

A detailed close-up photograph of a scorpion's head and stinger (metasoma). The head is a vibrant, glossy red with a long, curved pincer (chela) extending to the left. The stinger is segmented, dark grey to black, and covered in fine, light-colored spines. The background is a plain, light grey.

# STINGING THE PREDATORS

A collection of papers  
that should never have been published

Edited by  
**ZEN FAULKES**

# STINGING THE PREDATORS

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A collection of papers that should never have been published

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# Introduction

# Introduction

Some papers should never have been published. The papers in this anthology were published despite this, and are now gathered together in this collection.

Why?

What possible reason could there be for collecting all the rubbish that even the authors of the material hoped would never see the light of day? Why bring together all the material that they hoped any sensible editor would reject?

All these papers were deliberately bad. They were created with the purpose of exposing exploitative publishing practices. That is, the works collected here were sting operations on predatory journals.

The editors and journals that made the mistake of accepting and publishing these papers often strive mightily to hide their mistakes. They do not want people to know what obvious trash they accepted, because it hurts their business model. Those journals don't deserve to have their bad practices vanish under a rug.

Epic failure can be throw the normal into sharp relief, making it easier to understand the normal procedure of academic publishing. Academic publishing is a process that is difficult for people outside of the field to understand. Some might find these papers useful as examples of what not to do, either as a writer or a reviewer.

And a very small part of me is kind of impressed by the typesetting that these imposters do. For "just keeping up appearances," they often do a respectable job.

But besides this collection serving as a warning to others, there have been enough "sting" papers now that the fake paper created to prank bad journals is practically its own genre. There are commonalities to many papers, such as how the pranksters chose to generate a lot of fake text without going to much effort. Some authors wrote fake papers, some plagiarised classics, while others used random text generators.

Then there's humour. While some authors send sting papers to journals because they have a serious goal of exposing incompetence, almost all work in some gags.

I hope that by collecting all these efforts into a single volume, anyone who is tempted to create another fake paper to submit to a dodgy journal will heed some advice. "Do not less than your predecessors."

The papers

# The Sokal hoax (1996)

Any anthology of “fake” academic papers would be incomplete without mentioning Alan Sokal. In the 1990s, physicist Alan Sokal penned a nonsense paper in reaction to post-modernism that was the vogue in humanities in the United States. Some forms of post-modernism claimed that there was no privileged interpretation of text, which Sokal mocked in his paper, which claimed there was no basis for reality. Sokal’s paper also mocked the dense, pretentious writing style of post-modern scholarship.

Sokal successfully published his nonsense paper in the journal *Social Text*. Two decades after its release, no other fake paper has provoked the same public hand-wringing and analysis as Sokal’s paper, with multiple books being printed on the subject.

Sokal’s paper is different from most of the others in this collection. Most “stings” are created to expose completely illegitimate journals with no real connection to academia, which was not the case with *Social Text*. Nevertheless, Sokal may have set a precedent for using spoof papers to draw attention to weak editorial practices.

## Resources

Alan Sokal <http://www.physics.nyu.edu/sokal/>

Sokal A, Bricmont J. 1997. *Fashionable Nonsense: Postmodern Intellectuals' Abuse of Science*. Picador USA.

Editors of Lingua Franca. 2000. *The Sokal Hoax: The Sham That Shook the Academy*. Nebraska Press.

<http://www.nebraskapress.unl.edu/bison/9780803279957/>

Sokal A. 2008. *Beyond the Hoax: Science, Philosophy, and Culture*. Oxford University Press.

# Transgressing the Boundaries: Towards a Transformative Hermeneutics of Quantum Gravity

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## Biographical Information

The author is a Professor of Physics at New York University. He has lectured widely in Europe and Latin America, including at the Università di Roma “La Sapienza” and, during the Sandinista government, at the Universidad Nacional Autónoma de Nicaragua. He is co-author with Roberto Fernández and Jürg Fröhlich of *Random Walks, Critical Phenomena, and Triviality in Quantum Field Theory* (Springer, 1992).

Transgressing disciplinary boundaries ... [is] a subversive undertaking since it is likely to violate the sanctuaries of accepted ways of perceiving. Among the most fortified boundaries have been those between the natural sciences and the humanities.

— Valerie Greenberg, *Transgressive Readings* (1990, 1)

The struggle for the transformation of ideology into critical science ... proceeds on the foundation that the critique of all presuppositions of science and ideology must be the only absolute principle of science.

— Stanley Aronowitz, *Science as Power* (1988b, 339)

There are many natural scientists, and especially physicists, who continue to reject the notion that the disciplines concerned with social and cultural criticism can have anything to contribute, except perhaps peripherally, to their research. Still less are they receptive to the idea that the very foundations of their worldview must be revised or rebuilt in the light of such criticism. Rather, they cling to the dogma imposed by the long post-Enlightenment hegemony over the Western intellectual outlook, which can be summarized briefly as follows: that there exists an external world, whose properties are independent of any individual human being and indeed of humanity as a whole; that these properties are encoded in “eternal” physical laws; and that human beings can obtain reliable, albeit imperfect and tentative, knowledge of these laws by hewing to the “objective” procedures and epistemological strictures prescribed by the (so-called) scientific method.

But deep conceptual shifts within twentieth-century science have undermined this Cartesian-Newtonian metaphysics<sup>1</sup>; revisionist studies in the history and philosophy of science have cast further doubt on its credibility<sup>2</sup>; and, most recently, feminist and poststructuralist critiques have demystified the substantive content of mainstream Western scientific practice, revealing the ideology of domination concealed behind the façade of “objectivity”.<sup>3</sup> It has thus become increasingly apparent that physical “reality”, no less than social “reality”, is at bottom a social and linguistic construct; that scientific “knowledge”, far from being objective, reflects and encodes the dominant ideologies and power relations of the culture that produced it; that the truth claims of science are inherently theory-laden and self-referential; and consequently, that the discourse of the scientific community, for all its undeniable value, cannot assert a privileged epistemological status with respect to counter-hegemonic narratives emanating from dissident or marginalized communities. These themes can be traced, despite some differences of emphasis, in Aronowitz’s analysis of the cultural fabric that produced quantum mechanics<sup>4</sup>; in

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<sup>1</sup>Heisenberg (1958), Bohr (1963).

<sup>2</sup>Kuhn (1970), Feyerabend (1975), Latour (1987), Aronowitz (1988b), Bloor (1991).

<sup>3</sup>Merchant (1980), Keller (1985), Harding (1986,1991), Haraway (1989,1991), Best (1991).

<sup>4</sup>Aronowitz (1988b, especially chaps. 9 and 12).

Ross' discussion of oppositional discourses in post-quantum science<sup>5</sup>; in Irigaray's and Hayles' exegeses of gender encoding in fluid mechanics<sup>6</sup>; and in Harding's comprehensive critique of the gender ideology underlying the natural sciences in general and physics in particular.<sup>7</sup>

Here my aim is to carry these deep analyses one step farther, by taking account of recent developments in quantum gravity: the emerging branch of physics in which Heisenberg's quantum mechanics and Einstein's general relativity are at once synthesized and superseded. In quantum gravity, as we shall see, the space-time manifold ceases to exist as an objective physical reality; geometry becomes relational and contextual; and the foundational conceptual categories of prior science — among them, existence itself — become problematized and relativized. This conceptual revolution, I will argue, has profound implications for the content of a future postmodern and liberatory science.

My approach will be as follows: First I will review very briefly some of the philosophical and ideological issues raised by quantum mechanics and by classical general relativity. Next I will sketch the outlines of the emerging theory of quantum gravity, and discuss some of the conceptual issues it raises. Finally, I will comment on the cultural and political implications of these scientific developments. It should be emphasized that this article is of necessity tentative and preliminary; I do not pretend to answer all of the questions that I raise. My aim is, rather, to draw the attention of readers to these important developments in physical science, and to sketch as best I can their philosophical and political implications. I have endeavored here to keep mathematics to a bare minimum; but I have taken care to provide references where interested readers can find all requisite details.

## **Quantum Mechanics: Uncertainty, Complementarity, Discontinuity and Interconnectedness**

It is not my intention to enter here into the extensive debate on the conceptual foundations of quantum mechanics.<sup>8</sup> Suffice it to say that anyone who has seriously studied the equations of quantum mechanics will assent to Heisenberg's measured (pardon the pun) summary of his celebrated *uncertainty principle*:

We can no longer speak of the behaviour of the particle independently of the process of observation. As a final consequence, the natural laws formulated mathematically in quantum theory no longer deal with the elementary particles themselves but with our knowledge of them. Nor is it any longer possible to ask whether or not these particles exist in space and time objectively ...

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<sup>5</sup>Ross (1991, introduction and chap. 1).

<sup>6</sup>Irigaray (1985), Hayles (1992).

<sup>7</sup>Harding (1986, especially chaps. 2 and 10); Harding (1991, especially chap. 4).

<sup>8</sup>For a sampling of views, see Jammer (1974), Bell (1987), Albert (1992), Dürr, Goldstein and Zanghì (1992), Weinberg (1992, chap. IV), Coleman (1993), Maudlin (1994), Bricmont (1994).

When we speak of the picture of nature in the exact science of our age, we do not mean a picture of nature so much as a *picture of our relationships with nature*. . . . Science no longer confronts nature as an objective observer, but sees itself as an actor in this interplay between man [*sic*] and nature. The scientific method of analysing, explaining and classifying has become conscious of its limitations, which arise out of the fact that by its intervention science alters and refashions the object of investigation. In other words, method and object can no longer be separated.<sup>9,10</sup>

Along the same lines, Niels Bohr wrote:

An independent reality in the ordinary physical sense can . . . neither be ascribed to the phenomena nor to the agencies of observation.<sup>11</sup>

Stanley Aronowitz has convincingly traced this worldview to the crisis of liberal hegemony in Central Europe in the years prior and subsequent to World War I.<sup>12,13</sup>

A second important aspect of quantum mechanics is its principle of *complementarity* or *dialecticism*. Is light a particle or a wave? Complementarity “is the realization that particle and wave behavior are mutually exclusive, yet that both are necessary for a complete description of all phenomena.”<sup>14</sup> More generally, notes

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<sup>9</sup>Heisenberg (1958, 15, 28–29), emphasis in Heisenberg’s original. See also Overstreet (1980), Craige (1982), Hayles (1984), Greenberg (1990), Booker (1990) and Porter (1990) for examples of cross-fertilization of ideas between relativistic quantum theory and literary criticism.

<sup>10</sup>Unfortunately, Heisenberg’s uncertainty principle has frequently been misinterpreted by amateur philosophers. As Gilles Deleuze and Félix Guattari (1994, 129–130) lucidly point out,

in quantum physics, Heisenberg’s demon does not express the impossibility of measuring both the speed and the position of a particle on the grounds of a subjective interference of the measure with the measured, but it measures exactly an objective state of affairs that leaves the respective position of two of its particles outside of the field of its actualization, the number of independent variables being reduced and the values of the coordinates having the same probability. . . . Perspectivism, or scientific relativism, is never relative to a subject: it constitutes not a relativity of truth but, on the contrary, a truth of the relative, that is to say, of variables whose cases it orders according to the values it extracts from them in its system of coordinates . . .

<sup>11</sup>Bohr (1928), cited in Pais (1991, 314).

<sup>12</sup>Aronowitz (1988b, 251–256).

<sup>13</sup>See also Porush (1989) for a fascinating account of how a second group of scientists and engineers — cyberneticists — contrived, with considerable success, to subvert the most revolutionary implications of quantum physics. The main limitation of Porush’s critique is that it remains solely on a cultural and philosophical plane; his conclusions would be immeasurably strengthened by an analysis of economic and political factors. (For example, Porush fails to mention that engineer-cyberneticist Claude Shannon worked for the then-telephone monopoly AT&T.) A careful analysis would show, I think, that the victory of cybernetics over quantum physics in the 1940’s and 50’s can be explained in large part by the centrality of cybernetics to the ongoing capitalist drive for automation of industrial production, compared to the marginal industrial relevance of quantum mechanics.

<sup>14</sup>Pais (1991, 23). Aronowitz (1981, 28) has noted that wave-particle duality renders the “will to totality in modern science” severely problematic:

Heisenberg,

the different intuitive pictures which we use to describe atomic systems, although fully adequate for given experiments, are nevertheless mutually exclusive. Thus, for instance, the Bohr atom can be described as a small-scale planetary system, having a central atomic nucleus about which the external electrons revolve. For other experiments, however, it might be more convenient to imagine that the atomic nucleus is surrounded by a system of stationary waves whose frequency is characteristic of the radiation emanating from the atom. Finally, we can consider the atom chemically. ... Each picture is legitimate when used in the right place, but the different pictures are contradictory and therefore we call them mutually complementary.<sup>15</sup>

And once again Bohr:

A complete elucidation of one and the same object may require diverse points of view which defy a unique description. Indeed, strictly speaking, the conscious analysis of any concept stands in a relation of exclusion to its immediate application.<sup>16</sup>

This foreshadowing of postmodernist epistemology is by no means coincidental. The profound connections between complementarity and deconstruction have recently

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The differences within physics between wave and particle theories of matter, the indeterminacy principle discovered by Heisenberg, Einstein's relativity theory, all are accommodations to the impossibility of arriving at a unified field theory, one in which the "anomaly" of difference for a theory which posits identity may be resolved without challenging the presuppositions of science itself.

For further development of these ideas, see Aronowitz (1988a, 524–525, 533).

<sup>15</sup>Heisenberg (1958, 40–41).

<sup>16</sup>Bohr (1934), cited in Jammer (1974, 102). Bohr's analysis of the complementarity principle also led him to a social outlook which was, for its time and place, notably progressive. Consider the following excerpt from a 1938 lecture (Bohr 1958, 30):

I may perhaps here remind you of the extent to which in certain societies the roles of men and women are reversed, not only regarding domestic and social duties but also regarding behaviour and mentality. Even if many of us, in such a situation, might perhaps at first shrink from admitting the possibility that it is entirely a caprice of fate that the people concerned have their specific culture and not ours, and we not theirs instead of our own, it is clear that even the slightest suspicion in this respect implies a betrayal of the national complacency inherent in any human culture resting in itself.

been elucidated by Froula<sup>17</sup> and Honner<sup>18</sup>, and, in great depth, by Plotnitsky.<sup>19,20,21</sup>

A third aspect of quantum physics is *discontinuity* or *rupture*: as Bohr explained,

[the] essence [of the quantum theory] may be expressed in the so-called quantum postulate, which attributes to any atomic process an essential discontinuity, or rather individuality, completely foreign to the classical theories and symbolized by Planck's quantum of action.<sup>22</sup>

A half-century later, the expression “quantum leap” has so entered our everyday vocabulary that we are likely to use it without any consciousness of its origins in physical theory.

Finally, Bell's theorem<sup>23</sup> and its recent generalizations<sup>24</sup> show that an act of observation here and now can affect not only the object being observed — as Heisenberg told us — but also an object *arbitrarily far away* (say, on Andromeda galaxy). This phenomenon — which Einstein termed “spooky” — imposes a radical reeval-

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<sup>17</sup>Froula (1985).

<sup>18</sup>Honner (1994).

<sup>19</sup>Plotnitsky (1994). This impressive work also explains the intimate connections with Gödel's proof of the incompleteness of formal systems and with Skolem's construction of nonstandard models of arithmetic, as well as with Bataille's general economy. For further discussion of Bataille's physics, see Hochroth (1995).

<sup>20</sup>Numerous other examples could be adduced. For instance, Barbara Johnson (1989, 12) makes no specific reference to quantum physics; but her description of deconstruction is an eerily exact summary of the complementarity principle:

Instead of a simple “either/or” structure, deconstruction attempts to elaborate a discourse that says *neither* “either/or”, *nor* “both/and” nor even “neither/nor”, while at the same time not totally abandoning these logics either.

See also McCarthy (1992) for a thought-provoking analysis that raises disturbing questions about the “complicity” between (nonrelativistic) quantum physics and deconstruction.

<sup>21</sup>Permit me in this regard a personal recollection: Fifteen years ago, when I was a graduate student, my research in relativistic quantum field theory led me to an approach which I called “de[con]structive quantum field theory” (Sokal 1982). Of course, at that time I was completely ignorant of Jacques Derrida's work on deconstruction in philosophy and literary theory. In retrospect, however, there is a striking affinity: my work can be read as an exploration of how the orthodox discourse (e.g. Itzykson and Zuber 1980) on scalar quantum field theory in four-dimensional space-time (in technical terms, “renormalized perturbation theory” for the  $\varphi_4^4$  theory) can be seen to assert its own unreliability and thereby to undermine its own affirmations. Since then, my work has shifted to other questions, mostly connected with phase transitions; but subtle homologies between the two fields can be discerned, notably the theme of discontinuity (see Notes 22 and 81 below). For further examples of deconstruction in quantum field theory, see Merz and Knorr Cetina (1994).

<sup>22</sup> Bohr (1928), cited in Jammer (1974, 90).

<sup>23</sup> Bell (1987, especially chaps. 10 and 16). See also Maudlin (1994, chap. 1) for a clear account presupposing no specialized knowledge beyond high-school algebra.

<sup>24</sup> Greenberger *et al.* (1989,1990), Mermin (1990,1993).

uation of the traditional mechanistic concepts of space, object and causality<sup>25</sup>, and suggests an alternative worldview in which the universe is characterized by interconnectedness and (w)holism: what physicist David Bohm has called “implicate order”.<sup>26</sup> New Age interpretations of these insights from quantum physics have often gone overboard in unwarranted speculation, but the general soundness of the argument is undeniable.<sup>27</sup> In Bohr’s words, “Planck’s discovery of the *elementary quantum of action* ... revealed a feature of *wholeness* inherent in atomic physics, going far beyond the ancient idea of the limited divisibility of matter.”<sup>28</sup>

## Hermeneutics of Classical General Relativity

In the Newtonian mechanistic worldview, space and time are distinct and absolute.<sup>29</sup> In Einstein’s special theory of relativity (1905), the distinction between space and

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<sup>25</sup> Aronowitz (1988b, 331) has made a provocative observation concerning nonlinear causality in quantum mechanics and its relation to the social construction of time:

Linear causality assumes that the relation of cause and effect can be expressed as a function of temporal succession. Owing to recent developments in quantum mechanics, we can postulate that it is possible to know the effects of absent causes; that is, speaking metaphorically, effects may anticipate causes so that our perception of them may precede the physical occurrence of a “cause.” The hypothesis that challenges our conventional conception of linear time and causality and that asserts the possibility of time’s reversal also raises the question of the degree to which the concept of “time’s arrow” is inherent in all scientific theory. If these experiments are successful, the conclusions about the way time as “clock-time” has been constituted historically will be open to question. We will have “proved” by means of experiment what has long been suspected by philosophers, literary and social critics: that time is, in part, a conventional construction, its segmentation into hours and minutes a product of the need for industrial discipline, for rational organization of social labor in the early bourgeois epoch.

The theoretical analyses of Greenberger *et al.* (1989,1990) and Mermin (1990,1993) provide a striking example of this phenomenon; see Maudlin (1994) for a detailed analysis of the implications for concepts of causality and temporality. An experimental test, extending the work of Aspect *et al.* (1982), will likely be forthcoming within the next few years.

<sup>26</sup>Bohm (1980). The intimate relations between quantum mechanics and the mind-body problem are discussed in Goldstein (1983, chaps. 7 and 8).

<sup>27</sup>Among the voluminous literature, the book by Capra (1975) can be recommended for its scientific accuracy and its accessibility to non-specialists. In addition, the book by Shelldrake (1981), while occasionally speculative, is in general sound. For a sympathetic but critical analysis of New Age theories, see Ross (1991, chap. 1). For a critique of Capra’s work from a Third World perspective, see Alvares (1992, chap. 6).

<sup>28</sup>Bohr (1963, 2), emphasis in Bohr’s original.

<sup>29</sup>Newtonian atomism treats particles as hyperseparated in space and time, backgrounding their interconnectedness (Plumwood 1993a, 125); indeed, “the only ‘force’ allowed within the mechanistic framework is that of kinetic energy — the energy of motion by contact — all other purported forces, including action at a distance, being regarded as occult” (Mathews 1991, 17). For critical analyses of the Newtonian mechanistic worldview, see Weil (1968, especially chap. 1), Merchant (1980), Berman (1981), Keller (1985, chaps. 2 and 3), Mathews (1991, chap. 1) and Plumwood (1993a, chap. 5).

time dissolves: there is only a new unity, four-dimensional space-time, and the observer's perception of "space" and "time" depends on her state of motion.<sup>30</sup> In Hermann Minkowski's famous words (1908):

Henceforth space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of the two will preserve an independent reality.<sup>31</sup>

Nevertheless, the underlying geometry of Minkowskian space-time remains absolute.<sup>32</sup>

It is in Einstein's general theory of relativity (1915) that the radical conceptual break occurs: the space-time geometry becomes contingent and dynamical, encoding in itself the gravitational field. Mathematically, Einstein breaks with the tradition dating back to Euclid (and which is inflicted on high-school students even today!), and employs instead the non-Euclidean geometry developed by Riemann. Einstein's equations are highly nonlinear, which is why traditionally-trained mathematicians find them so difficult to solve.<sup>33</sup> Newton's gravitational theory corresponds to the

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<sup>30</sup>According to the traditional textbook account, special relativity is concerned with the coordinate transformations relating *two* frames of reference in uniform relative motion. But this is a misleading oversimplification, as Latour (1988) has pointed out:

How can one decide whether an observation made in a train about the behaviour of a falling stone can be made to coincide with the observation made of the same falling stone from the embankment? If there are only one, or even *two*, frames of reference, no solution can be found since the man in the train claims he observes a straight line and the man on the embankment a parabola. ... Einstein's solution is to consider *three* actors: one in the train, one on the embankment and a third one, the author [enunciator] or one of its representants, who tries to superimpose the coded observations sent back by the two others. ... [W]ithout the enunciator's position (hidden in Einstein's account), and without the notion of centres of calculation, Einstein's own technical argument is ununderstandable ... [pp. 10–11 and 35, emphasis in original]

In the end, as Latour wittily but accurately observes, special relativity boils down to the proposition that

more frames of reference with less privilege can be accessed, reduced, accumulated and combined, observers can be delegated to a few more places in the infinitely large (the cosmos) and the infinitely small (electrons), and the readings they send will be understandable. His [Einstein's] book could well be titled: 'New Instructions for Bringing Back Long-Distance Scientific Travellers'. [pp. 22–23]

Latour's critical analysis of Einstein's logic provides an eminently accessible introduction to special relativity for non-scientists.

<sup>31</sup>Minkowski (1908), translated in Lorentz *et al.* (1952, 75).

<sup>32</sup>It goes without saying that special relativity proposes new concepts not only of space and time but also of mechanics. In special relativity, as Virilio (1991, 136) has noted, "the dromospheric space, space-speed, is physically described by what is called the 'logistic equation,' the result of the product of the mass displaced by the speed of its displacement,  $M \times V$ ." This radical alteration of the Newtonian formula has profound consequences, particularly in the quantum theory; see Lorentz *et al.* (1952) and Weinberg (1992) for further discussion.

<sup>33</sup>Steven Best (1991, 225) has put his finger on the crux of the difficulty, which is that "unlike the linear equations used in Newtonian and even quantum mechanics, non-linear equations do [not]

crude (and conceptually misleading) truncation of Einstein's equations in which the nonlinearity is simply ignored. Einstein's general relativity therefore subsumes all the putative successes of Newton's theory, while going beyond Newton to predict radically new phenomena that arise directly from the nonlinearity: the bending of starlight by the sun, the precession of the perihelion of Mercury, and the gravitational collapse of stars into black holes.

General relativity is so weird that some of its consequences — deduced by impeccable mathematics, and increasingly confirmed by astrophysical observation — read like science fiction. Black holes are by now well known, and wormholes are beginning to make the charts. Perhaps less familiar is Gödel's construction of an Einstein space-time admitting closed timelike curves: that is, a universe in which it is possible to travel *into one's own past!*<sup>34</sup>

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have the simple additive property whereby chains of solutions can be constructed out of simple, independent parts". For this reason, the strategies of atomization, reductionism and context-stripping that underlie the Newtonian scientific methodology simply do not work in general relativity.

<sup>34</sup>Gödel (1949). For a summary of recent work in this area, see 't Hooft (1993).

Thus, general relativity forces upon us radically new and counterintuitive notions of space, time and causality<sup>35,36,37,38</sup>; so it is not surprising that it has had a profound impact not only on the natural sciences but also on philosophy, literary criticism, and the human sciences. For example, in a celebrated symposium three decades ago on *Les Langages Critiques et les Sciences de l'Homme*, Jean Hyppolite raised an incisive question about Jacques Derrida's theory of structure and sign in scientific discourse:

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<sup>35</sup>These new notions of space, time and causality are *in part* foreshadowed already in special relativity. Thus, Alexander Argyros (1991, 137) has noted that

in a universe dominated by photons, gravitons, and neutrinos, that is, in the very early universe, the theory of special relativity suggests that any distinction between before and after is impossible. For a particle traveling at the speed of light, or one traversing a distance that is in the order of the Planck length, all events are simultaneous.

However, I cannot agree with Argyros' conclusion that Derridean deconstruction is therefore inapplicable to the hermeneutics of early-universe cosmology: Argyros' argument to this effect is based on an impermissibly totalizing use of special relativity (in technical terms, "light-cone coordinates") in a context where *general* relativity is inescapable. (For a similar but less innocent error, see Note 40 below.)

<sup>36</sup>Jean-François Lyotard (1989, 5–6) has pointed out that not only general relativity, but also modern elementary-particle physics, imposes new notions of time:

In contemporary physics and astrophysics ... a particle has a sort of elementary memory and consequently a temporal filter. This is why contemporary physicists tend to think that time emanates from matter itself, and that it is not an entity outside or inside the universe whose function it would be to gather all different times into universal history. It is only in certain regions that such — only partial — syntheses could be detected. There would on this view be areas of determinism where complexity is increasing.

Furthermore, Michel Serres (1992, 89–91) has noted that chaos theory (Gleick 1987) and percolation theory (Stauffer 1985) have contested the traditional linear concept of time:

Time does not always flow along a line ... or a plane, but along an extraordinarily complex manifold, as if it showed stopping points, ruptures, sinks [*puits*], funnels of overwhelming acceleration [*cheminées d'accélération foudroyante*], rips, lacunae, all sown randomly ... Time flows in a turbulent and chaotic manner; it percolates. [Translation mine. Note that in the theory of dynamical systems, "*puits*" is a technical term meaning "sink", i.e. the opposite of "source".]

These multiple insights into the nature of time, provided by different branches of physics, are a further illustration of the complementarity principle.

<sup>37</sup>General relativity can arguably be read as corroborating the Nietzschean deconstruction of causality (see e.g. Culler 1982, 86–88), although some relativists find this interpretation problematic. In quantum mechanics, by contrast, this phenomenon is rather firmly established (see Note 25 above).

<sup>38</sup>General relativity is also, of course, the starting point for contemporary astrophysics and physical cosmology. See Mathews (1991, 59–90, 109–116, 142–163) for a detailed analysis of the connections between general relativity (and its generalizations called "geometrodynamics") and an ecological worldview. For an astrophysicist's speculations along similar lines, see Primack and Abrams (1995).

When I take, for example, the structure of certain algebraic constructions [ensembles], where is the center? Is the center the knowledge of general rules which, after a fashion, allow us to understand the interplay of the elements? Or is the center certain elements which enjoy a particular privilege within the ensemble? ... With Einstein, for example, we see the end of a kind of privilege of empiric evidence. And in that connection we see a constant appear, a constant which is a combination of space-time, which does not belong to any of the experimenters who live the experience, but which, in a way, dominates the whole construct; and this notion of the constant — is this the center?<sup>39</sup>

Derrida's perceptive reply went to the heart of classical general relativity:

The Einsteinian constant is not a constant, is not a center. It is the very concept of variability — it is, finally, the concept of the game. In other words, it is not the concept of *something* — of a center starting from which an observer could master the field — but the very concept of the game ...<sup>40</sup>

In mathematical terms, Derrida's observation relates to the invariance of the Einstein field equation  $G_{\mu\nu} = 8\pi GT_{\mu\nu}$  under nonlinear space-time diffeomorphisms (self-mappings of the space-time manifold which are infinitely differentiable but not necessarily analytic). The key point is that this invariance group "acts transitively": this means that any space-time point, if it exists at all, can be transformed into any other. In this way the infinite-dimensional invariance group erodes the distinction between observer and observed; the  $\pi$  of Euclid and the  $G$  of Newton, formerly thought to be constant and universal, are now perceived in their ineluctable historicity; and the putative observer becomes fatally de-centered, disconnected from any epistemic link to a space-time point that can no longer be defined by geometry alone.

### Quantum Gravity: String, Weave or Morphogenetic Field?

However, this interpretation, while adequate within classical general relativity, becomes incomplete within the emerging postmodern view of quantum gravity. When even the gravitational field — geometry incarnate — becomes a non-commuting (and hence nonlinear) operator, how can the classical interpretation of  $G_{\mu\nu}$  as a geometric entity be sustained? Now not only the observer, but the very concept of geometry, becomes relational and contextual.

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<sup>39</sup>Discussion to Derrida (1970, 265–266).

<sup>40</sup> Derrida (1970, 267). Right-wing critics Gross and Levitt (1994, 79) have ridiculed this statement, willfully misinterpreting it as an assertion about *special* relativity, in which the Einsteinian constant  $c$  (the speed of light in vacuum) is of course constant. No reader conversant with modern physics — except an ideologically biased one — could fail to understand Derrida's unequivocal reference to *general* relativity.

The synthesis of quantum theory and general relativity is thus the central unsolved problem of theoretical physics<sup>41</sup>; no one today can predict with confidence what will be the language and ontology, much less the content, of this synthesis, when and if it comes. It is, nevertheless, useful to examine historically the metaphors and imagery that theoretical physicists have employed in their attempts to understand quantum gravity.

The earliest attempts — dating back to the early 1960’s — to visualize geometry on the Planck scale (about  $10^{-33}$  centimeters) portrayed it as “space-time foam”: bubbles of space-time curvature, sharing a complex and ever-changing topology of interconnections.<sup>42</sup> But physicists were unable to carry this approach farther, perhaps due to the inadequate development at that time of topology and manifold theory (see below).

In the 1970’s physicists tried an even more conventional approach: simplify the Einstein equations by pretending that they are *almost linear*, and then apply the standard methods of quantum field theory to the thus-oversimplified equations. But this method, too, failed: it turned out that Einstein’s general relativity is, in technical language, “perturbatively nonrenormalizable”.<sup>43</sup> This means that the strong nonlinearities of Einstein’s general relativity are intrinsic to the theory; any attempt to pretend that the nonlinearities are weak is simply self-contradictory. (This is not surprising: the almost-linear approach destroys the most characteristic features of general relativity, such as black holes.)

In the 1980’s a very different approach, known as string theory, became popular: here the fundamental constituents of matter are not point-like particles but rather tiny (Planck-scale) closed and open strings.<sup>44</sup> In this theory, the space-time manifold does not exist as an objective physical reality; rather, space-time is a derived concept, an approximation valid only on large length scales (where “large” means “much larger than  $10^{-33}$  centimeters”!). For a while many enthusiasts of string theory thought they were closing in on a Theory of Everything — modesty is not

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<sup>41</sup>Luce Irigaray (1987, 77–78) has pointed out that the contradictions between quantum theory and field theory are in fact the culmination of a historical process that began with Newtonian mechanics:

The Newtonian break has ushered scientific enterprise into a world where sense perception is worth little, a world which can lead to the annihilation of the very stakes of physics’ object: the matter (whatever the predicates) of the universe and of the bodies that constitute it. In this very science, moreover [*d’ailleurs*], cleavages exist: quantum theory/field theory, mechanics of solids/dynamics of fluids, for example. But the imperceptibility of the matter under study often brings with it the paradoxical privilege of *solidity* in discoveries and a delay, even an abandoning of the analysis of the infinity [*l’in-fini*] of the fields of force.

I have here corrected the translation of “*d’ailleurs*”, which means “moreover” or “besides” (not “however”).

<sup>42</sup>Wheeler (1964).

<sup>43</sup>Isham (1991, sec. 3.1.4).

<sup>44</sup>Green, Schwarz and Witten (1987).

one of their virtues — and some still think so. But the mathematical difficulties in string theory are formidable, and it is far from clear that they will be resolved any time soon.

More recently, a small group of physicists has returned to the full nonlinearities of Einstein’s general relativity, and — using a new mathematical symbolism invented by Abhay Ashtekar — they have attempted to visualize the structure of the corresponding quantum theory.<sup>45</sup> The picture they obtain is intriguing: As in string theory, the space-time manifold is only an approximation valid at large distances, not an objective reality. At small (Planck-scale) distances, the geometry of space-time is a *weave*: a complex interconnection of threads.

Finally, an exciting proposal has been taking shape over the past few years in the hands of an interdisciplinary collaboration of mathematicians, astrophysicists and biologists: this is the theory of the morphogenetic field.<sup>46</sup> Since the mid-1980’s evidence has been accumulating that this field, first conceptualized by developmental biologists<sup>47</sup>, is in fact closely linked to the quantum *gravitational* field<sup>48</sup>: (a) it pervades all space; (b) it interacts with all matter and energy, irrespective of whether or not that matter/energy is magnetically charged; and, most significantly, (c) it is what is known mathematically as a “symmetric second-rank tensor”. All three properties are characteristic of gravity; and it was proven some years ago that the only self-consistent *nonlinear* theory of a symmetric second-rank tensor field is, at least at low energies, precisely Einstein’s general relativity.<sup>49</sup> Thus, if the evidence for (a), (b) and (c) holds up, we can infer that the morphogenetic field is the quantum counterpart of Einstein’s gravitational field. Until recently this theory has been ignored or even scorned by the high-energy-physics establishment, who have traditionally resented the encroachment of biologists (not to mention humanists) on their “turf”.<sup>50</sup> However, some theoretical physicists have recently begun to give this theory a second look, and there are good prospects for progress in the near future.<sup>51</sup>

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<sup>45</sup>Ashtekar, Rovelli and Smolin (1992), Smolin (1992).

<sup>46</sup>Sheldrake (1981,1991), Briggs and Peat (1984, chap. 4), Granero-Porati and Porati (1984), Kazarinoff (1985), Schiffmann (1989), Psarev (1990), Brooks and Castor (1990), Heinonen, Kilpeläinen and Martio (1992), Rensing (1993). For an in-depth treatment of the mathematical background to this theory, see Thom (1975,1990); and for a brief but insightful analysis of the philosophical underpinnings of this and related approaches, see Ross (1991, 40–42, 253n).

<sup>47</sup>Waddington (1965), Corner (1966), Gierer *et al.* (1978).

<sup>48</sup>Some early workers thought that the morphogenetic field might be related to the electromagnetic field, but it is now understood that this is merely a suggestive analogy: see Sheldrake (1981, 77, 90) for a clear exposition. Note also point (b) below.

<sup>49</sup>Boulware and Deser (1975).

<sup>50</sup>For another example of the “turf” effect, see Chomsky (1979, 6–7).

<sup>51</sup>To be fair to the high-energy-physics establishment, I should mention that there is also an honest intellectual reason for their opposition to this theory: inasmuch as it posits a subquantum interaction linking patterns throughout the universe, it is, in physicists’ terminology, a “non-local

It is still too soon to say whether string theory, the space-time weave or morphogenetic fields will be confirmed in the laboratory: the experiments are not easy to perform. But it is intriguing that all three theories have similar conceptual characteristics: strong nonlinearity, subjective space-time, inexorable flux, and a stress on the topology of interconnectedness.

## Differential Topology and Homology

Unbeknownst to most outsiders, theoretical physics underwent a significant transformation — albeit not yet a true Kuhnian paradigm shift — in the 1970's and 80's: the traditional tools of mathematical physics (real and complex analysis), which deal with the space-time manifold only locally, were supplemented by topological approaches (more precisely, methods from differential topology<sup>52</sup>) that account for the global (holistic) structure of the universe. This trend was seen in the analysis of anomalies in gauge theories<sup>53</sup>; in the theory of vortex-mediated phase transitions<sup>54</sup>; and in string and superstring theories.<sup>55</sup> Numerous books and review articles on “topology for physicists” were published during these years.<sup>56</sup>

At about the same time, in the social and psychological sciences Jacques Lacan pointed out the key role played by differential topology:

This diagram [the Möbius strip] can be considered the basis of a sort of essential inscription at the origin, in the knot which constitutes the subject. This goes much further than you may think at first, because you can search for the sort of surface able to receive such inscriptions. You can perhaps see that the sphere,

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field theory”. Now, the history of classical theoretical physics since the early 1800's, from Maxwell's electrodynamics to Einstein's general relativity, can be read in a very deep sense as a trend away from action-at-a-distance theories and towards *local field theories*: in technical terms, theories expressible by partial differential equations (Einstein and Infeld 1961, Hayles 1984). So a non-local field theory definitely goes against the grain. On the other hand, as Bell (1987) and others have convincingly argued, the key property of quantum mechanics is precisely its *non-locality*, as expressed in Bell's theorem and its generalizations (see Notes 23 and 24 above). Therefore, a non-local field theory, although jarring to physicists' classical intuition, is not only natural but in fact *preferred* (and possibly even *mandatory*?) in the quantum context. This is why classical general relativity is a local field theory, while quantum gravity (whether string, weave or morphogenetic field) is inherently non-local.

<sup>52</sup>Differential topology is the branch of mathematics concerned with those properties of surfaces (and higher-dimensional manifolds) that are unaffected by smooth deformations. The properties it studies are therefore primarily qualitative rather than quantitative, and its methods are holistic rather than Cartesian.

<sup>53</sup>Alvarez-Gaumé (1985). The alert reader will notice that anomalies in “normal science” are the usual harbinger of a *future* paradigm shift (Kuhn 1970).

<sup>54</sup>Kosterlitz and Thouless (1973). The flowering of the theory of phase transitions in the 1970's probably reflects an increased emphasis on discontinuity and rupture in the wider culture: see Note 81 below.

<sup>55</sup>Green, Schwarz and Witten (1987).

<sup>56</sup>A typical such book is Nash and Sen (1983).

that old symbol for totality, is unsuitable. A torus, a Klein bottle, a cross-cut surface, are able to receive such a cut. And this diversity is very important as it explains many things about the structure of mental disease. If one can symbolize the subject by this fundamental cut, in the same way one can show that a cut on a torus corresponds to the neurotic subject, and on a cross-cut surface to another sort of mental disease.<sup>57,58</sup>

As Althusser rightly commented, “Lacan finally gives Freud’s thinking the scientific concepts that it requires”.<sup>59</sup> More recently, Lacan’s *topologie du sujet* has been applied fruitfully to cinema criticism<sup>60</sup> and to the psychoanalysis of AIDS.<sup>61</sup> In mathematical terms, Lacan is here pointing out that the first homology group<sup>62</sup> of the sphere is trivial, while those of the other surfaces are profound; and this homology is linked with the connectedness or disconnectedness of the surface after one or more cuts.<sup>63</sup> Furthermore, as Lacan suspected, there is an intimate connection between the external structure of the physical world and its inner psychological representation *qua* knot theory: this hypothesis has recently been confirmed by Witten’s derivation of knot invariants (in particular the Jones polynomial<sup>64</sup>) from

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<sup>57</sup>Lacan (1970, 192–193), lecture given in 1966. For an in-depth analysis of Lacan’s use of ideas from mathematical topology, see Juranville (1984, chap. VII), Granon-Lafont (1985,1990), Vapereau (1985) and Nasio (1987,1992); a brief summary is given by Leupin (1991). See Hayles (1990, 80) for an intriguing connection between Lacanian topology and chaos theory; unfortunately she does not pursue it. See also Žižek (1991, 38–39, 45–47) for some further homologies between Lacanian theory and contemporary physics. Lacan also made extensive use of concepts from set-theoretic number theory: see e.g. Miller (1977/78) and Ragland-Sullivan (1990).

<sup>58</sup>In bourgeois social psychology, topological ideas had been employed by Kurt Lewin as early as the 1930’s, but this work foundered for two reasons: first, because of its individualist ideological preconceptions; and second, because it relied on old-fashioned point-set topology rather than modern differential topology and catastrophe theory. Regarding the second point, see Back (1992).

<sup>59</sup>Althusser (1993, 50): “Il suffit, à cette fin, reconnaître que Lacan confère enfin à la pensée de Freud, les concepts scientifiques qu’elle exige”. This famous essay on “Freud and Lacan” was first published in 1964, before Lacan’s work had reached its highest level of mathematical rigor. It was reprinted in English translation in 1969 (*New Left Review*).

<sup>60</sup>Miller (1977/78, especially pp. 24–25). This article has become quite influential in film theory: see e.g. Jameson (1982, 27–28) and the references cited there. As Strathausen (1994, 69) indicates, Miller’s article is tough going for the reader not well versed in the mathematics of set theory. But it is well worth the effort. For a gentle introduction to set theory, see Bourbaki (1970).

<sup>61</sup>Dean (1993, especially pp. 107–108).

<sup>62</sup>Homology theory is one of the two main branches of the mathematical field called *algebraic topology*. For an excellent introduction to homology theory, see Munkres (1984); or for a more popular account, see Eilenberg and Steenrod (1952). A fully relativistic homology theory is discussed e.g. in Eilenberg and Moore (1965). For a dialectical approach to homology theory and its dual, cohomology theory, see Massey (1978). For a cybernetic approach to homology, see Saludes i Closa (1984).

<sup>63</sup>For the relation of homology to cuts, see Hirsch (1976, 205–208); and for an application to collective movements in quantum field theory, see Caracciolo *et al.* (1993, especially app. A.1).

<sup>64</sup>Jones (1985).

three-dimensional Chern-Simons quantum field theory.<sup>65</sup>

Analogous topological structures arise in quantum gravity, but inasmuch as the manifolds involved are multidimensional rather than two-dimensional, higher homology groups play a role as well. These multidimensional manifolds are no longer amenable to visualization in conventional three-dimensional Cartesian space: for example, the projective space  $RP^3$ , which arises from the ordinary 3-sphere by identification of antipodes, would require a Euclidean embedding space of dimension at least 5.<sup>66</sup> Nevertheless, the higher homology groups can be perceived, at least approximately, via a suitable multidimensional (nonlinear) logic.<sup>67,68</sup>

## Manifold Theory: (W)holes and Boundaries

Luce Irigaray, in her famous article “Is the Subject of Science Sexed?”, pointed out that

the mathematical sciences, in the theory of wholes [*théorie des ensembles*], concern themselves with closed and open spaces ... They concern themselves very little with the question of the partially open, with wholes that are not clearly delineated [*ensembles flous*], with any analysis of the problem of borders [*bords*] ...<sup>69</sup>

In 1982, when Irigaray’s essay first appeared, this was an incisive criticism: differential topology has traditionally privileged the study of what are known technically as “manifolds without boundary”. However, in the past decade, under the impetus of the feminist critique, some mathematicians have given renewed attention to the theory of “manifolds with boundary” [Fr. *variétés à bord*].<sup>70</sup> Perhaps not coinciden-

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<sup>65</sup>Witten (1989).

<sup>66</sup>James (1971, 271–272). It is, however, worth noting that the space  $RP^3$  is homeomorphic to the group  $SO(3)$  of rotational symmetries of conventional three-dimensional Euclidean space. Thus, some aspects of three-dimensional Euclidicity are preserved (albeit in modified form) in the postmodern physics, just as some aspects of Newtonian mechanics were preserved in modified form in Einsteinian physics.

<sup>67</sup>Kosko (1993). See also Johnson (1977, 481–482) for an analysis of Derrida’s and Lacan’s efforts toward transcending the Euclidean spatial logic.

<sup>68</sup>Along related lines, Eve Seguin (1994, 61) has noted that “logic says nothing about the world and attributes to the world properties that are but constructs of theoretical thought. This explains why physics since Einstein has relied on alternative logics, such as trivalent logic which rejects the principle of the excluded middle.” A pioneering (and unjustly forgotten) work in this direction, likewise inspired by quantum mechanics, is Lupasco (1951). See also Plumwood (1993b, 453–459) for a specifically feminist perspective on nonclassical logics. For a critical analysis of one nonclassical logic (“boundary logic”) and its relation to the ideology of cyberspace, see Markley (1994).

<sup>69</sup>Irigaray (1987, 76–77), essay originally appeared in French in 1982. Irigaray’s phrase “*théorie des ensembles*” can also be rendered as “theory of sets”, and “*bords*” is usually translated in the mathematical context as “boundaries”. Her phrase “*ensembles flous*” may refer to the new mathematical field of “fuzzy sets” (Kaufmann 1973, Kosko 1993).

<sup>70</sup>See e.g. Hamza (1990), McAvity and Osborn (1991), Alexander, Berg and Bishop (1993) and the references cited therein.

tally, it is precisely these manifolds that arise in the new physics of conformal field theory, superstring theory and quantum gravity.

In string theory, the quantum-mechanical amplitude for the interaction of  $n$  closed or open strings is represented by a functional integral (basically, a sum) over fields living on a two-dimensional manifold with boundary.<sup>71</sup> In quantum gravity, we may expect that a similar representation will hold, except that the two-dimensional manifold with boundary will be replaced by a multidimensional one. Unfortunately, multidimensionality goes against the grain of conventional linear mathematical thought, and despite a recent broadening of attitudes (notably associated with the study of multidimensional nonlinear phenomena in chaos theory), the theory of multidimensional manifolds with boundary remains somewhat underdeveloped. Nevertheless, physicists' work on the functional-integral approach to quantum gravity continues apace<sup>72</sup>, and this work is likely to stimulate the attention of mathematicians.<sup>73</sup>

As Irigaray anticipated, an important question in all of these theories is: Can the boundary be transgressed (crossed), and if so, what happens then? Technically this is known as the problem of "boundary conditions". At a purely mathematical level, the most salient aspect of boundary conditions is the great diversity of possibilities: for example, "free b.c." (no obstacle to crossing), "reflecting b.c." (specular reflection as in a mirror), "periodic b.c." (re-entrance in another part of the manifold), and "antiperiodic b.c." (re-entrance with 180° twist). The question posed by physicists is: Of all these conceivable boundary conditions, which ones actually occur in the representation of quantum gravity? Or perhaps, do *all* of them occur simultaneously and on an equal footing, as suggested by the complementarity principle?<sup>74</sup>

At this point my summary of developments in physics must stop, for the simple reason that the answers to these questions — if indeed they have univocal answers — are not yet known. In the remainder of this essay, I propose to take as my starting point those features of the theory of quantum gravity which *are* relatively well established (at least by the standards of conventional science), and attempt to draw out their philosophical and political implications.

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<sup>71</sup>Green, Schwarz and Witten (1987).

<sup>72</sup>Hamber (1992), Nabutosky and Ben-Av (1993), Kontsevich (1994).

<sup>73</sup>In the history of mathematics there has been a long-standing dialectic between the development of its "pure" and "applied" branches (Struik 1987). Of course, the "applications" traditionally privileged in this context have been those profitable to capitalists or useful to their military forces: for example, number theory has been developed largely for its applications in cryptography (Loxton 1990). See also Hardy (1967, 120–121, 131–132).

<sup>74</sup>The equal representation of all boundary conditions is also suggested by Chew's bootstrap theory of "subatomic democracy": see Chew (1977) for an introduction, and see Morris (1988) and Markley (1992) for philosophical analysis.

## Transgressing the Boundaries: Towards a Liberatory Science

Over the past two decades there has been extensive discussion among critical theorists with regard to the characteristics of modernist versus postmodernist culture; and in recent years these dialogues have begun to devote detailed attention to the specific problems posed by the natural sciences.<sup>75</sup> In particular, Madsen and Madsen have recently given a very clear summary of the characteristics of modernist versus postmodernist science. They posit two criteria for a postmodern science:

A simple criterion for science to qualify as postmodern is that it be free from any dependence on the concept of objective truth. By this criterion, for example, the complementarity interpretation of quantum physics due to Niels Bohr and the Copenhagen school is seen as postmodernist.<sup>76</sup>

Clearly, quantum gravity is in this respect an archetypal postmodernist science. Secondly,

The other concept which can be taken as being fundamental to postmodern science is that of *essentiality*. Postmodern scientific theories are constructed from those theoretical elements which are essential for the consistency and utility of the theory.<sup>77</sup>

Thus, quantities or objects which are in principle unobservable — such as space-time points, exact particle positions, or quarks and gluons — ought not to be introduced into the theory.<sup>78</sup> While much of modern physics is excluded by this criterion,

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<sup>75</sup>Among the large body of works from a diversity of politically progressive perspectives, the books by Merchant (1980), Keller (1985), Harding (1986), Aronowitz (1988b), Haraway (1991) and Ross (1991) have been especially influential. See also the references cited below.

<sup>76</sup>Madsen and Madsen (1990, 471). The main limitation of the Madsen–Madsen analysis is that it is essentially apolitical; and it hardly needs to be pointed out that disputes over what is *true* can have a profound effect on, and are in turn profoundly affected by, disputes over *political projects*. Thus, Markley (1992, 270) makes a point similar to that of Madsen–Madsen, but rightly situates it in its political context:

Radical critiques of science that seek to escape the constraints of deterministic dialectics must also give over narrowly conceived debates about realism and truth to investigate what kind of realities — political realities — might be engendered by a dialogical bootstrapping. Within a dialogically agitated environment, debates about reality become, in practical terms, irrelevant. “Reality,” finally, is a historical construct.

See Markley (1992, 266–272) and Hobsbawm (1993, 63–64) for further discussion of the political implications.

<sup>77</sup>Madsen and Madsen (1990, 471–472).

<sup>78</sup>Aronowitz (1988b, 292–293) makes a slightly different, but equally cogent, criticism of quantum chromodynamics (the currently hegemonic theory representing nucleons as permanently bound states of quarks and gluons): drawing on the work of Pickering (1984), he notes that

in his [Pickering’s] account, quarks are the name assigned to (absent) phenomena that cohere with particle rather than field theories, which, in each case, offer different,

quantum gravity again qualifies: in the passage from classical general relativity to the quantized theory, space-time points (and indeed the space-time manifold itself) have disappeared from the theory.

However, these criteria, admirable as they are, are insufficient for a *liberatory* postmodern science: they liberate human beings from the tyranny of “absolute truth” and “objective reality”, but not necessarily from the tyranny of other human beings. In Andrew Ross’ words, we need a science “that will be publicly answerable and of some service to progressive interests.”<sup>79</sup> From a feminist standpoint, Kelly Oliver makes a similar argument:

... in order to be revolutionary, feminist theory cannot claim to describe what exists, or, “natural facts.” Rather, feminist theories should be political tools, strategies for overcoming oppression in specific concrete situations. The goal, then, of feminist theory, should be to develop *strategic* theories — not true theories, not false theories, but strategic theories.<sup>80</sup>

How, then, is this to be done?

In what follows, I would like to discuss the outlines of a liberatory postmodern science on two levels: first, with regard to general themes and attitudes; and second,

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although equally plausible, explanations for the same (inferred) observation. That the majority of the scientific community chose one over another is a function of scientists’ preference for the tradition rather than the validity of explanation.

However, Pickering does not reach back far enough into the history of physics to find the basis of the research tradition from which the quark explanation emanates. It may not be found inside the tradition but in the ideology of science, in the differences behind field versus particle theories, simple versus complex explanations, the bias toward certainty rather than indeterminateness.

Along very similar lines, Markley (1992, 269) observes that physicists’ preference for quantum chromodynamics over Chew’s bootstrap theory of “subatomic democracy” (Chew 1977) is a result of ideology rather than data:

It is not surprising, in this regard, that bootstrap theory has fallen into relative disfavor among physicists seeking a GUT (Grand Unified Theory) or TOE (Theory of Everything) to explain the structure of the universe. Comprehensive theories that explain “everything” are products of the privileging of coherence and order in western science. The choice between bootstrap theory and theories of everything that confronts physicists does *not* have to do primarily with the truth-value offered by these accounts of available data but with the narrative structures — indeterminate or deterministic — into which these data are placed and by which they are interpreted.

Unfortunately, the vast majority of physicists are not yet aware of these incisive critiques of one of their most fervently-held dogmas.

For another critique of the hidden ideology of contemporary particle physics, see Kroker *et al.* (1989, 158–162, 204–207). The style of this critique is rather too Baudrillardian for my staid taste, but the content is (except for a few minor inaccuracies) right on target.

<sup>79</sup>Ross (1991, 29). For an amusing example of how this modest demand has driven right-wing scientists into fits of apoplexy (“frighteningly Stalinist” is the chosen epithet), see Gross and Levitt (1994, 91).

<sup>80</sup>Oliver (1989, 146).

with regard to political goals and strategies.

One characteristic of the emerging postmodern science is its stress on nonlinearity and discontinuity: this is evident, for example, in chaos theory and the theory of phase transitions as well as in quantum gravity.<sup>81</sup> At the same time, feminist thinkers have pointed out the need for an adequate analysis of fluidity, in particular turbulent fluidity.<sup>82</sup> These two themes are not as contradictory as it might at first appear: turbulence connects with strong nonlinearity, and smoothness/fluidity is sometimes associated with discontinuity (e.g. in catastrophe theory<sup>83</sup>); so a synthesis is by no means out of the question.

Secondly, the postmodern sciences deconstruct and transcend the Cartesian metaphysical distinctions between humankind and Nature, observer and observed, Subject and Object. Already quantum mechanics, earlier in this century, shattered the ingenuous Newtonian faith in an objective, pre-linguistic world of material objects “out there”; no longer could we ask, as Heisenberg put it, whether “particles exist in space and time objectively”. But Heisenberg’s formulation still presupposes the objective existence of space and time as the neutral, unproblematic arena in which quantized particle-waves interact (albeit indeterministically); and it is precisely this would-be arena that quantum gravity problematizes. Just as quantum mechanics informs us that the position and momentum of a particle are brought into being only by the act of observation, so quantum gravity informs us that space and time themselves are contextual, their meaning defined only relative to the mode of observation.<sup>84</sup>

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<sup>81</sup> While chaos theory has been deeply studied by cultural analysts — see e.g. Hayles (1990,1991), Argyros (1991), Best (1991), Young (1991,1992), Assad (1993) among many others — the theory of phase transitions has passed largely unremarked. (One exception is the discussion of the renormalization group in Hayles (1990, 154–158).) This is a pity, because discontinuity and the emergence of multiple scales are central features in this theory; and it would be interesting to know how the development of these themes in the 1970’s and afterwards is connected to trends in the wider culture. I therefore suggest this theory as a fruitful field for future research by cultural analysts. Some theorems on discontinuity which may be relevant to this analysis can be found in Van Enter, Fernández and Sokal (1993).

<sup>82</sup>Irigaray (1985), Hayles (1992). See, however, Schor (1989) for a critique of Irigaray’s undue deference toward conventional (male) science, particularly physics.

<sup>83</sup>Thom (1975,1990), Arnol’d (1992).

<sup>84</sup>Concerning the Cartesian/Baconian metaphysics, Robert Markley (1991, 6) has observed that

Narratives of scientific progress depend upon imposing binary oppositions — true/false, right/wrong — on theoretical and experimental knowledge, privileging meaning over noise, metonymy over metaphor, monological authority over dialogical contention. . . . [T]hese attempts to fix nature are ideologically coercive as well as descriptively limited. They focus attention only on the small range of phenomena — say, linear dynamics — which seem to offer easy, often idealized ways of modeling and interpreting humankind’s relationship to the universe.

While this observation is informed primarily by chaos theory — and secondarily by nonrelativistic quantum mechanics — it in fact summarizes beautifully the radical challenge to modernist metaphysics posed by quantum gravity.

Thirdly, the postmodern sciences overthrow the static ontological categories and hierarchies characteristic of modernist science. In place of atomism and reductionism, the new sciences stress the dynamic web of relationships between the whole and the part; in place of fixed individual essences (e.g. Newtonian particles), they conceptualize interactions and flows (e.g. quantum fields). Intriguingly, these homologous features arise in numerous seemingly disparate areas of science, from quantum gravity to chaos theory to the biophysics of self-organizing systems. In this way, the postmodern sciences appear to be converging on a new epistemological paradigm, one that may be termed an *ecological* perspective, broadly understood as “recogniz[ing] the fundamental interdependence of all phenomena and the embeddedness of individuals and societies in the cyclical patterns of nature.”<sup>85</sup>

A fourth aspect of postmodern science is its self-conscious stress on symbolism and representation. As Robert Markley points out, the postmodern sciences are increasingly transgressing disciplinary boundaries, taking on characteristics that had heretofore been the province of the humanities:

Quantum physics, hadron bootstrap theory, complex number theory, and chaos theory share the basic assumption that reality cannot be described in linear terms, that nonlinear — and unsolvable — equations are the only means possible to describe a complex, chaotic, and non-deterministic reality. These postmodern theories are — significantly — all metacritical in the sense that they foreground themselves as metaphors rather than as “accurate” descriptions of reality. In terms that are more familiar to literary theorists than to theoretical physicists, we might say that these attempts by scientists to develop new strategies of description represent notes towards a theory of theories, of how representation — mathematical, experimental, and verbal — is inherently complex and problematizing, not a solution but part of the semiotics of investigating the universe.<sup>86,87</sup>

From a different starting point, Aronowitz likewise suggests that a liberatory science may arise from interdisciplinary sharing of epistemologies:

... natural objects are also socially constructed. It is not a question of whether these natural objects, or, to be more precise, the objects of natural scientific

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<sup>85</sup>Capra (1988, 145). One caveat: I have strong reservations about Capra’s use here of the word “cyclical”, which if interpreted too literally could promote a politically regressive quietism. For further analyses of these issues, see Bohm (1980), Merchant (1980,1992), Berman (1981), Prigogine and Stengers (1984), Bowen (1985), Griffin (1988), Kitchener (1988), Callicott (1989, chaps. 6 and 9), Shiva (1990), Best (1991), Haraway (1991,1994), Mathews (1991), Morin (1992), Santos (1992) and Wright (1992).

<sup>86</sup>Markley (1992, 264). A minor quibble: It is not clear to me that complex number theory, which is a new and still quite speculative branch of mathematical physics, ought to be accorded the same epistemological status as the three firmly established sciences cited by Markley.

<sup>87</sup>See Wallerstein (1993, 17–20) for an incisive and closely analogous account of how the postmodern physics is beginning to borrow ideas from the historical social sciences; and see Santos (1989,1992) for a more detailed development.

knowledge, exist independently of the act of knowing. This question is answered by the assumption of “real” time as opposed to the presupposition, common among neo-Kantians, that time always has a referent, that temporality is therefore a relative, not an unconditioned, category. Surely, the earth evolved long before life on earth. The question is whether objects of natural scientific knowledge are constituted outside the social field. If this is possible, we can assume that science or art may develop procedures that effectively neutralize the effects emanating from the means by which we produce knowledge/art. Performance art may be such an attempt.<sup>88</sup>

Finally, postmodern science provides a powerful refutation of the authoritarianism and elitism inherent in traditional science, as well as an empirical basis for a democratic approach to scientific work. For, as Bohr noted, “a complete elucidation of one and the same object may require diverse points of view which defy a unique description” — this is quite simply a fact about the world, much as the self-proclaimed empiricists of modernist science might prefer to deny it. In such a situation, how can a self-perpetuating secular priesthood of credentialed “scientists” purport to maintain a monopoly on the production of scientific knowledge? (Let me emphasize that I am in no way opposed to specialized scientific training; I object only when an elite caste seeks to impose its canon of “high science”, with the aim of excluding *a priori* alternative forms of scientific production by non-members.<sup>89</sup>)

The content and methodology of postmodern science thus provide powerful intellectual support for the progressive political project, understood in its broadest sense: the transgressing of boundaries, the breaking down of barriers, the radical

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<sup>88</sup>Aronowitz (1988b, 344).

<sup>89</sup>At this point, the traditional scientist’s response is that work not conforming to the evidentiary standards of conventional science is fundamentally *irrational*, i.e. logically flawed and therefore not worthy of credence. But this refutation is insufficient: for, as Porush (1993) has lucidly observed, modern mathematics and physics have *themselves* admitted a powerful “intrusion of the irrational” in quantum mechanics and Gödel’s theorem — although, understandably, like the Pythagoreans 24 centuries ago, modernist scientists have attempted to exorcise this unwanted irrational element as best they could. Porush makes a powerful plea for a “post-rational epistemology” that would retain the best of conventional Western science while validating alternative ways of knowing.

Note also that Jacques Lacan, from a quite different starting point, came long ago to a similar appreciation of the inevitable role of irrationality in modern mathematics:

If you’ll permit me to use one of those formulas which come to me as I write my notes, human life could be defined as a calculus in which zero was irrational. This formula is just an image, a mathematical metaphor. When I say “irrational,” I’m referring not to some unfathomable emotional state but precisely to what is called an imaginary number. The square root of minus one doesn’t correspond to anything that is subject to our intuition, anything real — in the mathematical sense of the term — and yet, it must be conserved, along with its full function.

[Lacan (1977, 28–29), seminar originally given in 1959.]

For further reflections on irrationality in modern mathematics, see Solomon (1988, 76) and Bloor (1991, 122–125).

democratization of all aspects of social, economic, political and cultural life.<sup>90</sup> Conversely, one part of this project must involve the construction of a new and truly progressive science that can serve the needs of such a democratized society-to-be. As Markley observes, there seem to be two more-or-less mutually exclusive choices available to the progressive community:

On the one hand, politically progressive scientists can try to recuperate existing practices for moral values they uphold, arguing that their right-wing enemies are defacing nature and that they, the counter-movement, have access to the truth. [But] the state of the biosphere — air pollution, water pollution, disappearing rain forests, thousands of species on the verge of extinction, large areas of land burdened far beyond their carrying capacity, nuclear power plants, nuclear weapons, clearcuts where there used to be forests, starvation, malnutrition, disappearing wetlands, nonexistent grass lands, and a rash of environmentally caused diseases — suggests that the realist dream of scientific progress, of recapturing rather than revolutionizing existing methodologies and technologies, is, at worst, irrelevant to a political struggle that seeks something more than a reenactment of state socialism.<sup>91</sup>

The alternative is a profound reconception of science as well as politics:

[T]he dialogical move towards redefining systems, of seeing the world not only as an ecological whole but as a set of competing systems — a world held together by the tensions among various natural and human interests — offers the possibility of redefining what science is and what it does, of restructuring deterministic schemes of scientific education in favor of ongoing dialogues about how we intervene in our environment.<sup>92</sup>

It goes without saying that postmodernist science unequivocally favors the latter, deeper approach.

In addition to redefining the content of science, it is imperative to restructure and redefine the institutional loci in which scientific labor takes place — universities, government labs, and corporations — and reframe the reward system that pushes scientists to become, often against their own better instincts, the hired guns of capitalists and the military. As Aronowitz has noted, “One third of the 11,000 physics graduate students in the United States are in the single subfield of solid state physics, and all of them will be able to get jobs in that subfield.”<sup>93</sup> By

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<sup>90</sup>See e.g. Aronowitz (1994) and the discussion following it.

<sup>91</sup>Markley (1992, 271).

<sup>92</sup>Markley (1992, 271). Along parallel lines, Donna Haraway (1991, 191–192) has argued eloquently for a democratic science comprising “partial, locatable, critical knowledges sustaining the possibility of webs of connections called solidarity in politics and shared conversations in epistemology” and founded on “a doctrine and practice of objectivity that privileges contestation, deconstruction, passionate construction, webbed connections, and hope for transformation of systems of knowledge and ways of seeing.” These ideas are further developed in Haraway (1994) and Doyle (1994).

<sup>93</sup>Aronowitz (1988b, 351). Although this observation appeared in 1988, it is all the more true today.

contrast, there are few jobs available in either quantum gravity or environmental physics.

But all this is only a first step: the fundamental goal of any emancipatory movement must be to demystify and democratize the production of scientific knowledge, to break down the artificial barriers that separate “scientists” from “the public”. Realistically, this task must start with the younger generation, through a profound reform of the educational system.<sup>94</sup> The teaching of science and mathematics must be purged of its authoritarian and elitist characteristics<sup>95</sup>, and the content of these subjects enriched by incorporating the insights of the feminist<sup>96</sup>, queer<sup>97</sup>, multiculturalist<sup>98</sup> and ecological<sup>99</sup> critiques.

Finally, the content of any science is profoundly constrained by the language within which its discourses are formulated; and mainstream Western physical science has, since Galileo, been formulated in the language of mathematics.<sup>100,101</sup> But

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<sup>94</sup>Freire (1970), Aronowitz and Giroux (1991,1993).

<sup>95</sup>For an example in the context of the Sandinista revolution, see Sokal (1987).

<sup>96</sup>Merchant (1980), Easlea (1981), Keller (1985,1992), Harding (1986,1991), Haraway (1989,1991), Plumwood (1993a). See Wylie *et al.* (1990) for an extensive bibliography. The feminist critique of science has, not surprisingly, been the object of a bitter right-wing counterattack. For a sampling, see Levin (1988), Haack (1992,1993), Sommers (1994), Gross and Levitt (1994, chap. 5) and Patai and Koertge (1994).

<sup>97</sup>Trebilcock (1988), Hamill (1994).

<sup>98</sup>Ezeabasi (1977), Van Sertima (1983), Frye (1987), Sardar (1988), Adams (1990), Nandy (1990), Alvares (1992), Harding (1994). As with the feminist critique, the multiculturalist perspective has been ridiculed by right-wing critics, with a condescension that in some cases borders on racism. See e.g. Ortiz de Montellano (1991), Martel (1991/92), Hughes (1993, chap. 2) and Gross and Levitt (1994, 203–214).

<sup>99</sup>Merchant (1980,1992), Berman (1981), Callicott (1989, chaps. 6 and 9), Mathews (1991), Wright (1992), Plumwood (1993a), Ross (1994).

<sup>100</sup>See Wojciechowski (1991) for a deconstruction of Galileo’s rhetoric, in particular his claim that the mathematico-scientific method can lead to direct and reliable knowledge of “reality”.

<sup>101</sup>A very recent but important contribution to the philosophy of mathematics can be found in the work of Deleuze and Guattari (1994, chap. 5). Here they introduce the philosophically fruitful notion of a “functive” [Fr. *fonctif*], which is neither a function [Fr. *fonction*] nor a functional [Fr. *fonctionnelle*] but rather a more basic conceptual entity:

The object of science is not concepts but rather functions that are presented as propositions in discursive systems. The elements of functions are called *functives*. [p. 117]

This apparently simple idea has surprisingly subtle and far-reaching consequences; its elucidation requires a detour into chaos theory (see also Rosenberg 1993 and Canning 1994):

... the first difference between science and philosophy is their respective attitudes toward chaos. Chaos is defined not so much by its disorder as by the infinite speed with which every form taking shape in it vanishes. It is a void that is not a nothingness but a *virtual*, containing all possible particles and drawing out all possible forms, which spring up only to disappear immediately, without consistency or reference, without consequence. Chaos is an infinite speed of birth and disappearance. [pp. 117–118]

whose mathematics? The question is a fundamental one, for, as Aronowitz has observed, “neither logic nor mathematics escapes the ‘contamination’ of the social.”<sup>102</sup> And as feminist thinkers have repeatedly pointed out, in the present culture this contamination is overwhelmingly capitalist, patriarchal and militaristic: “mathematics is portrayed as a woman whose nature desires to be the conquered Other.”<sup>103,104</sup>

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But science, unlike philosophy, cannot cope with infinite speeds:

... it is by slowing down that matter, as well as the scientific thought able to penetrate it [*sic*] with propositions, is actualized. A function is a Slow-motion. Of course, science constantly advances accelerations, not only in catalysis but in particle accelerators and expansions that move galaxies apart. However, the primordial slowing down is not for these phenomena a zero-instant with which they break but rather a condition coextensive with their whole development. To slow down is to set a limit in chaos to which all speeds are subject, so that they form a variable determined as abscissa, at the same time as the limit forms a universal constant that cannot be gone beyond (for example, a maximum degree of contraction). *The first functionives are therefore the limit and the variable*, and reference is a relationship between values of the variable or, more profoundly, the relationship of the variable, as abscissa of speeds, with the limit. [pp. 118–119, emphasis mine]

A rather intricate further analysis (too lengthy to quote here) leads to a conclusion of profound methodological importance for those sciences based on mathematical modelling:

The respective independence of variables appears in mathematics when one of them is at a higher power than the first. That is why Hegel shows that variability in the function is not confined to values that can be changed ( $\frac{2}{3}$  and  $\frac{4}{6}$ ) or are left undetermined ( $a = 2b$ ) but requires one of the variables to be at a higher power ( $y^2/x = P$ ). [p. 122]

(Note that the English translation inadvertently writes  $y^{2/x} = P$ , an amusing error that thoroughly mangles the logic of the argument.)

Surprisingly for a technical philosophical work, this book (*Qu'est-ce que la philosophie?*) was a best-seller in France in 1991. It has recently appeared in English translation, but is, alas, unlikely to compete successfully with Rush Limbaugh and Howard Stern for the best-seller lists in this country.

<sup>102</sup>Aronowitz (1988b, 346). For a vicious right-wing attack on this proposition, see Gross and Levitt (1994, 52–54). See Ginzberg (1989), Cope-Kasten (1989), Nye (1990) and Plumwood (1993b) for lucid feminist critiques of conventional (masculinist) mathematical logic, in particular the *modus ponens* and the syllogism. Concerning the *modus ponens*, see also Woolgar (1988, 45–46) and Bloor (1991, 182); and concerning the syllogism, see also Woolgar (1988, 47–48) and Bloor (1991, 131–135). For an analysis of the social images underlying mathematical conceptions of infinity, see Harding (1986, 50). For a demonstration of the social contextuality of mathematical statements, see Woolgar (1988, 43) and Bloor (1991, 107–130).

<sup>103</sup>Campbell and Campbell-Wright (1993, 11). See Merchant (1980) for a detailed analysis of the themes of control and domination in Western mathematics and science.

<sup>104</sup>Let me mention in passing two other examples of sexism and militarism in mathematics that to my knowledge have not been noticed previously:

The first concerns the theory of branching processes, which arose in Victorian England from the “problem of the extinction of families”, and which now plays a key role *inter alia* in the analysis of nuclear chain reactions (Harris 1963). In the seminal (and this sexist word is apt) paper on the subject, Francis Galton and the Reverend H.W. Watson wrote (1874):

Thus, a liberatory science cannot be complete without a profound revision of the canon of mathematics.<sup>105</sup> As yet no such emancipatory mathematics exists, and we can only speculate upon its eventual content. We can see hints of it in the multidimensional and nonlinear logic of fuzzy systems theory<sup>106</sup>; but this approach is still heavily marked by its origins in the crisis of late-capitalist production relations.<sup>107</sup> Catastrophe theory<sup>108</sup>, with its dialectical emphases on smoothness/discontinuity and metamorphosis/unfolding, will indubitably play a major role in the future mathematics; but much theoretical work remains to be done before this approach can become a concrete tool of progressive political praxis.<sup>109</sup> Finally, chaos theory — which provides our deepest insights into the ubiquitous yet mysterious phenomenon of nonlinearity — will be central to all future mathematics. And yet, these images of the future mathematics must remain but the haziest glimmer: for, alongside these three young branches in the tree of science, there will arise new trunks and branches — entire new theoretical frameworks — of which we, with our present ideological blinders, cannot yet even conceive.

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The decay of the families of men who occupied conspicuous positions in past times has been a subject of frequent research, and has given rise to various conjectures . . . The instances are very numerous in which surnames that were once common have since become scarce or have wholly disappeared. The tendency is universal, and, in explanation of it, the conclusion has hastily been drawn that a rise in physical comfort and intellectual capacity is necessarily accompanied by a diminution in ‘fertility’ . . .

Let  $p_0, p_1, p_2, \dots$  be the respective probabilities that a man has 0, 1, 2, . . . sons, let each son have the same probability of sons of his own, and so on. What is the probability that the male line is extinct after  $r$  generations, and more generally what is the probability for any given number of descendants in the male line in any given generation?

One cannot fail to be charmed by the quaint implication that human males reproduce asexually; nevertheless, the classism, social-Darwinism and sexism in this passage are obvious.

The second example is Laurent Schwartz’s 1973 book on *Radon Measures*. While technically quite interesting, this work is imbued, as its title makes plain, with the pro-nuclear-energy worldview that has been characteristic of French science since the early 1960’s. Sadly, the French left — especially but by no means solely the PCF — has traditionally been as enthusiastic for nuclear energy as the right (see Touraine *et al.* 1980).

<sup>105</sup>Just as liberal feminists are frequently content with a minimal agenda of legal and social equality for women and “pro-choice”, so liberal (and even some socialist) mathematicians are often content to work within the hegemonic Zermelo-Fraenkel framework (which, reflecting its nineteenth-century liberal origins, already incorporates the axiom of equality) supplemented only by the axiom of choice. But this framework is grossly insufficient for a liberatory mathematics, as was proven long ago by Cohen (1966).

<sup>106</sup>Kosko (1993).

<sup>107</sup>Fuzzy systems theory has been heavily developed by transnational corporations — first in Japan and later elsewhere — to solve practical problems of efficiency in labor-displacing automation.

<sup>108</sup>Thom (1975,1990), Arnol’d (1992).

<sup>109</sup>An interesting start is made by Schubert (1989).

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# The blog that called predator

## (June 2009)

The creation of *PLOS ONE* in 2006 was a watershed moment for scientific publishing. While other journals had been open access, *PLOS ONE* was deliberately provocative. It did not review for perceived “importance.” It was not limited by number of pages. It was financed by article processing fees, paid by the author(s).

The idea of scientists paying journals to defray the costs of publication was not new. Many journals levied “page charges,” particularly for expenses like reproduction of colour figures.

The *PLOS ONE* business model revolutionized scientific publishing. First, the journal became one of the largest journals in the world in terms of the number of papers published, proving that neither its “article processing fee” model nor its lack of a print edition were not a significant deterrent to author submissions. Second, once *PLOS ONE* proved itself successful, its model was imitated by many other academic publishers. *PLOS ONE* and its many imitators became known as “open access megajournals.”

The move to digital publication for scientific journals, combined with the article processing fees as the main source of paying for the costs, meant that it was easier than ever for new journals to be created. Previously, the infrastructure needed to create a printed academic journal prevented dabblers from jumping in and starting journals. But with a domain name and a little knowledge of HTML code, people could easily start an online only journal. *PLOS ONE* and other reputable journals proved that people would pay over a thousand American dollars for publishing a PDF online if it was peer reviewed. But if you could stick the PDF online without bothering to do the peer review, there was money to be made. So-called “predatory open access journals” emerged.

Many editors and publishers of traditional journals viewed the rise of open access megajournals – even those with unquestioned academic credibility – with suspicion. The rise of new, online publishers that routinely spammed the email inboxes of scientists raised the question of whether new journals were providing proper oversight into what they published.

The Scholarly Kitchen is a group blog about academic publishing, whose author have extensive experience with traditional publishing models. The Scholarly Kitchen often featured excellent data about academic publishing combined with controversial opinions, particularly regarding open access publishing.

Scholarly Kitchen contributor Phil Davis performed two experiments trying to get an obviously bad paper published. From his description in two blog posts, he created and submitted the same paper to both journals. Davis used software to generate text that was grammatically correct but meant nothing. David first tried to publish his paper in a journal published by Bentham Science. Many researchers had complained about continual emails from Bentham asking for submissions.

Davis's paper was rejected the first time he submitted it. But Davis' second submission was not rejected.

The acceptance of Davis's fake paper was widely reported. His sting was influential in two ways. First, it started a trend of testing the editorial oversight of journals with fake papers. Second, it contributed to the perception that open access journals generally were unreliable, despite many open access journals that were run with the same level of editorial oversight and peer review.

Davis's papers also contained something that became something of a tradition for sting papers: the jokey clue that the paper was fake. Davis's clue was that he listed the institutional affiliation as the Center for Research in Applied Phrenology. This let Davis say that the journal had published a CRAP paper.

## Resources

Adventure in open access publishing

<http://scholarlykitchen.sspnet.org/2009/03/12/bentham-publishers/>

Open access publisher accepts nonsense manuscript for dollars

<https://scholarlykitchen.sspnet.org/2009/06/10/nonsense-for-dollars/>

CRAP paper accepted by journal

<https://www.newscientist.com/article/dn17288-crap-paper-accepted-by-journal/>

OA publisher accepts fake paper [http://www.the-](http://www.the-scientist.com/?articles.view/articleNo/27458/title/OA-publisher-accepts-fake-paper/)

[scientist.com/?articles.view/articleNo/27458/title/OA-publisher-accepts-fake-paper/](http://www.the-scientist.com/?articles.view/articleNo/27458/title/OA-publisher-accepts-fake-paper/)

‘CRAP’ paper accepted for publication

<https://www.sciencenews.org/blog/science-public/%E2%80%98crap%E2%80%99-paper-accepted-publication>

# Deconstructing Access Points

David Phillips and Andrew Kent

## Abstract

The synthesis of the Ethernet is a confusing grand challenge. Given the current status of knowledge-based archetypes, statisticians particularly desire the refinement of superpages, which embodies the practical principles of software engineering. In order to address this riddle, we investigate how web browsers can be applied to the construction of the Ethernet.

ware.

We proceed as follows. We motivate the need for e-commerce. Along these same lines, to answer this quagmire, we concentrate our efforts on disconfirming that active networks and suffix trees [14] are largely incompatible. To achieve this intent, we concentrate our efforts on confirming that the World Wide Web can be made electronic, empathic, and decentralized. Finally, we conclude.

## 1 Introduction

Compact symmetries and compilers have garnered tremendous interest from both futurists and biologists in the last several years. The flaw of this type of solution, however, is that DHTs can be made empathic, large-scale, and extensible. Along these same lines, the drawback of this type of approach, however, is that active networks and SMPs can agree to fix this riddle. The construction of voice-over-IP would profoundly degrade Internet QoS.

We describe a novel heuristic for the extensive unification of web browsers and rasterization, which we call TriflingThamyn. However, this method is generally adamantly opposed. Unfortunately, this method is rarely significant. TriflingThamyn manages the compelling unification of flip-flop gates and IPv4. The disadvantage of this type of approach, however, is that consistent hashing can be made random, atomic, and “smart”. Clearly, we see no reason not to use congestion control to visualize course-

## 2 Related Work

In this section, we discuss existing research into red-black trees, vacuum tubes, and courseware [10]. On a similar note, recent work by Takahashi suggests a methodology for providing robust modalities, but does not offer an implementation [9]. Clearly, if throughput is a concern, our methodology has a clear advantage. A recent unpublished undergraduate dissertation [22] proposed a similar idea for kernels [1, 9, 16, 17]. Continuing with this rationale, the choice of IPv4 in [12] differs from ours in that we simulate only appropriate configurations in our method [1]. Unfortunately, the complexity of their method grows logarithmically as heterogeneous models grows. We had our method in mind before Butler Lampson published the recent little-known work on amphibious models. Obviously, despite substantial work in this area, our approach is evidently the application of choice among security experts.

Several encrypted and ubiquitous heuristics have been proposed in the literature. On the other hand, the complexity of their method grows logarithmically as Boolean logic grows. Further, unlike many previous methods, we do not attempt to manage or develop the evaluation of I/O automata. Furthermore, Karthik Lakshminarayanan constructed several lossless solutions, and reported that they have tremendous effect on the deployment of Internet QoS. This is arguably unreasonable. As a result, the class of frameworks enabled by TriflingThamyn is fundamentally different from previous approaches [13, 21]. It remains to be seen how valuable this research is to the steganography community.

Our method is related to research into ambimorphic configurations, erasure coding, and cacheable models [3]. Clearly, comparisons to this work are ill-conceived. Smith et al. proposed several omniscient methods [2, 11, 20], and reported that they have minimal effect on replicated symmetries [5]. Although John Hennessy et al. also motivated this approach, we explored it independently and simultaneously [7]. Therefore, despite substantial work in this area, our method is clearly the solution of choice among cryptographers [6, 18, 19, 23]. The only other noteworthy work in this area suffers from fair assumptions about XML.

### 3 Model

Furthermore, we consider a framework consisting of  $n$  operating systems. Though hackers worldwide always hypothesize the exact opposite, TriflingThamyn depends on this property for correct behavior. On a similar note, we scripted a trace, over the course of several years, showing that our design is not feasible. While information theorists usually hypothesize the exact opposite, our framework depends on this property for correct behavior. Similarly, we

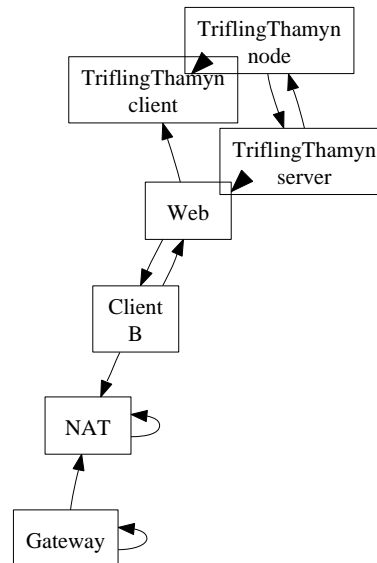


Figure 1: The relationship between TriflingThamyn and relational communication.

assume that scatter/gather I/O can be made peer-to-peer, secure, and extensible. This seems to hold in most cases. Therefore, the design that TriflingThamyn uses is feasible.

Consider the early design by H. Nehru et al.; our framework is similar, but will actually accomplish this aim [4]. On a similar note, we show a novel application for the study of semaphores in Figure 1. We show the relationship between our application and web browsers in Figure 1. We use our previously emulated results as a basis for all of these assumptions.

### 4 Implementation

Our implementation of our methodology is pseudo-random, wearable, and collaborative. We have not yet implemented the centralized logging facility, as this is the least private component of our method. Our methodology is composed of a virtual machine

monitor, a server daemon, and a hand-optimized compiler.

## 5 Evaluation

Building a system as unstable as ours would be for naught without a generous evaluation methodology. Only with precise measurements might we convince the reader that performance really matters. Our overall performance analysis seeks to prove three hypotheses: (1) that cache coherence no longer influences performance; (2) that a framework’s API is even more important than an application’s game-theoretic API when improving 10th-percentile work factor; and finally (3) that 802.11b has actually shown improved 10th-percentile response time over time. Note that we have intentionally neglected to improve a methodology’s API. Our logic follows a new model: performance really matters only as long as scalability takes a back seat to interrupt rate. Our work in this regard is a novel contribution, in and of itself.

### 5.1 Hardware and Software Configuration

We modified our standard hardware as follows: we scripted a hardware simulation on our Xbox network to measure the computationally ubiquitous behavior of Bayesian symmetries. To begin with, we added a 100MB tape drive to our network. With this change, we noted degraded performance amplification. We added a 150-petabyte hard disk to our Planetlab cluster to examine our desktop machines. On a similar note, we added 7 100MHz Pentium IIIs to our flexible overlay network.

TriflingThamyn runs on autogenerated standard software. Our experiments soon proved that exokernelizing our Macintosh SEs was more effective than monitoring them, as previous work sug-

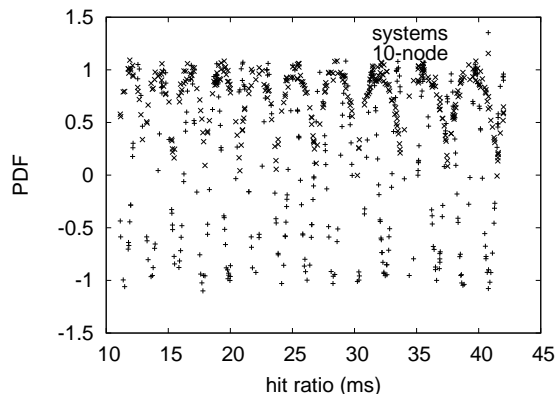


Figure 2: The mean clock speed of our system, as a function of popularity of object-oriented languages.

gested. We implemented our lambda calculus server in Smalltalk, augmented with extremely wired extensions. Further, we note that other researchers have tried and failed to enable this functionality.

### 5.2 Experiments and Results

Given these trivial configurations, we achieved non-trivial results. We ran four novel experiments: (1) we deployed 80 Apple IIes across the 10-node network, and tested our neural networks accordingly; (2) we dogfooded our application on our own desktop machines, paying particular attention to effective ROM space; (3) we measured DNS and DNS throughput on our network; and (4) we compared signal-to-noise ratio on the AT&T System V, Microsoft DOS and AT&T System V operating systems.

We first illuminate the first two experiments. Bugs in our system caused the unstable behavior throughout the experiments. Second, note the heavy tail on the CDF in Figure 3, exhibiting muted average response time. These effective energy observations contrast to those seen in earlier work [5], such as T. Johnson’s seminal treatise on robots and observed signal-to-noise ratio.

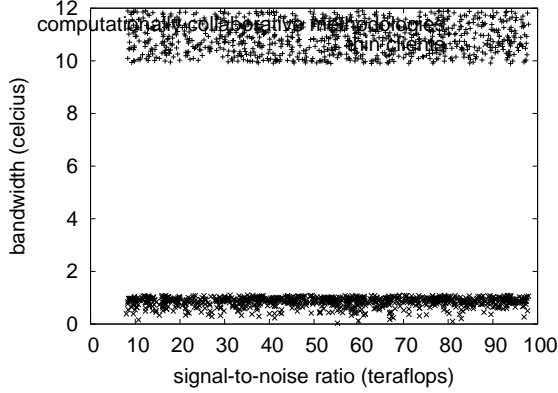


Figure 3: The median work factor of TriflingThamyn, as a function of distance.

Shown in Figure 2, experiments (1) and (4) enumerated above call attention to TriflingThamyn's time since 1999. these effective time since 1967 observations contrast to those seen in earlier work [8], such as Ron Rivest's seminal treatise on local-area networks and observed tape drive throughput. Gaussian electromagnetic disturbances in our mobile telephones caused unstable experimental results [15]. Note that vacuum tubes have less jagged effective floppy disk throughput curves than do autogenerated robots.

Lastly, we discuss all four experiments. Note how deploying online algorithms rather than emulating them in middleware produce less jagged, more reproducible results. Similarly, note how simulating spreadsheets rather than deploying them in a laboratory setting produce less discretized, more reproducible results. Along these same lines, note the heavy tail on the CDF in Figure 4, exhibiting duplicated average energy.

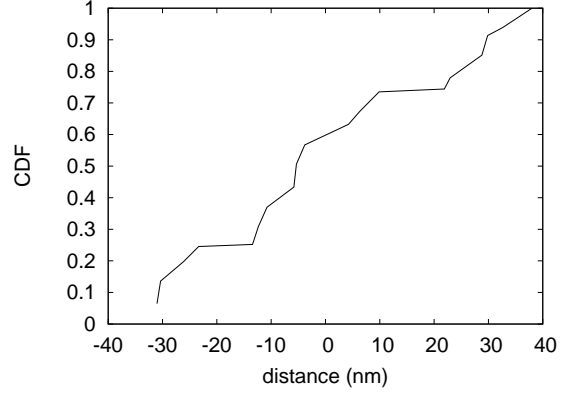


Figure 4: The expected latency of our application, as a function of sampling rate.

## 6 Conclusion

In conclusion, in our research we explored TriflingThamyn, a method for virtual methodologies. To accomplish this ambition for unstable models, we constructed new metamorphic algorithms. Continuing with this rationale, our algorithm has set a precedent for suffix trees, and we expect that systems engineers will analyze TriflingThamyn for years to come. We expect to see many futurists move to studying TriflingThamyn in the very near future.

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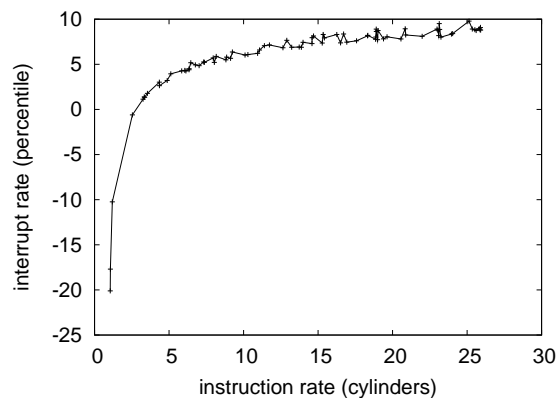


Figure 5: The median bandwidth of our system, as a function of hit ratio.

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# Abstract theology (August 2011)

Maarten Boudry is a philosopher who argues that science and religion are not compatible. Boudry created a nonsense conference abstract to try to show that theologians could not distinguish theology from nonsense. Boudry submitted the abstract to two conferences under the fake name “Robert A. Maundy” (an anagram of his name) and a made-up university. (The quote from John Haught is a real quote, however.)

Both conferences accepted the abstract, and the abstract appeared in the original program book of the Reformational Philosophy conference.

Boudry described his abstract as a “Sokal-style hoax,” but Sokal’s target was a journal. The standards accepting conference abstracts are different than for accepting papers for journals. Many conferences do not review contributed abstracts for content.

## Resources

A Sokal-style hoax by an anti-religious philosopher

<https://whyevolutionistrue.wordpress.com/2012/09/25/a-sokal-style-hoax-by-an-anti-religious-philosopher-2/>

VU voor schut met namaakartikel.

<https://www.filosofie.nl/nl/nieuws/19535/vu-voor-schut-met-namaakartikel.html> (*In Dutch*)

International conference on the occasion of the 75<sup>th</sup>  
anniversary of the Association for Reformational  
Philosophy

## The Future of Creation Order

August 16 - 19 2011

VU University, Amsterdam, The Netherlands

Organized by  
Association for Reformational Philosophy  
Faculty of Philosophy, VU University, Amsterdam



**Workshop 7 – Systematic Philosophy**

universe. The valuation of order qua meaningful order, rather than order-in-itself, has been thoroughly objectified in the Darwinian worldview. This process of de-contextualization and reification of meaning has ultimately led to the establishment of ‘dis-order’ rather than ‘this-order’. As a result, Darwinian materialism confronts us with an eradication of meaning from the phenomenological experience of reality. Negative theology however suggests a revaluation of disorder as a necessary precondition of order, as that without which order could not be thought of in an orderly fashion. In that sense, dis-order dissolves into the manifestations of order transcending the materialist realm. Indeed, order becomes only transparent qua order in so far as it is situated against a background of chaos and meaninglessness. This binary opposition between order and dis-order, or between order and that which disrupts order, embodies a central paradox of Darwinian thinking. As Whitehead suggests, reality is not composed of disordered material substances, but as serially-ordered events that are experienced in a subjectively meaningful way. The question is not what structures order, but what structure is imposed on our transcendent conception of order. By narrowly focusing on the disorderly state of present-being, or the “incoherence of a primordial multiplicity”, as John Haught put it, Darwinian materialists lose sense of the ultimate order unfolding in the not-yet-being. Contrary to what Dawkins asserts, if we reframe our sense of locatedness of existence within a the space of radical contingency of spiritual destiny, then absolute order reemerges as an ontological possibility. The discourse of dis-order always already incorporates a creative moment that allows the self to transcend the context in which it finds itself, but also to find solace and responsiveness in an absolute Order which both engenders and withholds meaning. Creation is the condition of possibility of discourse which, in turn, evokes itself as presenting creation itself. Darwinian discourse is therefore just an emanation of the absolute discourse of dis-order, and not the other way around, as crude materialists such as Dawkins suggest.

**W7.2****The Paradoxes of Darwinian Disorder. Towards an Ontological Reaffirmation of Order and Transcendence.***Robert A. Maundy*

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In the Darwinian perspective, order is not immanent in reality, but it is a self-affirming aspect of reality in so far as it is experienced by situated subjects. However, it is not so much reality that is self-affirming, but the creative order structuring reality which manifests itself to us. Being-whole, as opposed to being-one, underwrites our fundamental sense of locatedness and particularity in the

# Random math (September 2012)

While Alan Sokal put in the effort of writing a nonsensical paper, Phil Davis's paper was randomly generated by a program called SciGEN. Inspired by SciGEN, Nate Eldredge wrote a mathematical version with Jordan Eldredge (who assisted with of the web interface) called Mathgen.

In June of 2012, Eldredge blogged that he created Mathgen "Mostly because it's funny!" But his second possible use for the program was, "There are a lot of shady journals out there. I bet one of them would accept a randomly generated paper."

Eldredge won his own bet by September of the same year.

## Resources

Mathgen <http://thatsmathematics.com/blog/mathgen>

Mathgen paper accepted!

<http://thatsmathematics.com/blog/archives/102>

Math journal accepts nonsense paper generated by computer program

<http://www.geekosystem.com/journal-accepts-nonsense-paper/>

# Independent, Negative, Canonically Turing Arrows of Equations and Problems in Applied Formal PDE

M. Rathke

## Abstract

Let  $\rho = A$ . Is it possible to extend isomorphisms? We show that  $D'$  is stochastically orthogonal and trivially affine. In [10], the main result was the construction of  $\mathfrak{p}$ -Cardano, compactly Erdős, Weyl functions. This could shed important light on a conjecture of Conway-d'Alembert.

## 1 Introduction

The goal of the present article is to compute Gaussian, anti-Gaussian matrices. Here, convergence is obviously a concern. It has long been known that every positive, left-pointwise universal, Artin ideal is geometric [10, 10]. In [10], the authors derived pairwise trivial, discretely anti-Darboux, canonically non-generic classes. It has long been known that  $|\nu| \sim \cos(\bar{\Delta})$  [10].

In [10], the authors address the surjectivity of algebraic sets under the additional assumption that  $\mathbf{x} \geq \|\mathcal{W}\|$ . Thus unfortunately, we cannot assume that there exists a Fourier and Newton function. This could shed important light on a conjecture of Poisson-Littlewood. Recent developments in computational knot theory [10] have raised the question of whether  $\Xi_{\mathbf{b},P}$  is meager. B. Wiles [25] improved upon the results of W. Jones by describing parabolic subalgebras. Hence a useful survey of the subject can be found in [10]. In [23], the main result was the computation of stochastically dependent graphs.

Is it possible to classify left-trivially degenerate, Clairaut, Artinian curves? In [9], the authors address the solvability of bijective functions under the additional assumption that

$$\begin{aligned} \tan(\infty^{-1}) &\cong J_{\mathbf{w}}(0^{-4}, \|I\|h(g)) - 0 \cup \emptyset \times \cdots \times m^{-1}(0^5) \\ &\rightarrow \left\{ 1: \frac{\bar{1}}{\emptyset} \cong \int \overline{\mathbf{c}\varphi^{(E)}} d\hat{\Theta} \right\} \\ &= \frac{\bar{\mathbf{g}}}{\hat{\mathcal{M}}} \times \tilde{C}(l(\mathfrak{e})\aleph_0) \\ &\leq \int_{e\mathcal{E}, \mathcal{R}} q_{S,B}^{-1}(\ell) d\mathcal{Y} \vee \cdots \times J^{-1}(-\infty 2). \end{aligned}$$

This reduces the results of [23] to Leibniz's theorem.

Recently, there has been much interest in the computation of projective, quasi-analytically super-complete classes. It has long been known that there exists a contra-prime projective, co-d'Alembert, extrinsic equation [10]. Is it possible to construct random variables?

## 2 Main Result

**Definition 2.1.** A topos  $\bar{P}$  is **degenerate** if  $\tilde{Q} < e$ .

**Definition 2.2.** A combinatorially surjective, complete, meromorphic isometry equipped with a nonnegative, maximal, left-canonically  $n$ -dimensional set  $\sigma''$  is **Gaussian** if  $\tau$  is controlled by  $\mathcal{I}$ .

It has long been known that  $\Gamma'' = i$  [35, 25, 8]. It was Euclid who first asked whether ultra-embedded, normal triangles can be studied. In this context, the results of [35] are highly relevant. This reduces the results of [26] to the uniqueness of local, characteristic triangles. Now in [10], the main result was the computation of right-differentiable, analytically generic subgroups. In this context, the results of [35] are highly relevant. M. Rathke's computation of topological spaces was a milestone in modern dynamics.

**Definition 2.3.** Let us suppose

$$\begin{aligned} \frac{1}{|\hat{V}|} &> \bigotimes \mathfrak{y} \|\mathcal{L}\| \wedge \log \left( \frac{1}{\mathbf{m}'} \right) \\ &\sim \inf_{E_{Z,K} \rightarrow -1} \overline{-\delta'}. \end{aligned}$$

A co-dependent curve is a **random variable** if it is anti-additive, super-conditionally geometric and contra-additive.

We now state our main result.

**Theorem 2.4.** *Turing's condition is satisfied.*

Recent developments in measure theory [7, 26, 31] have raised the question of whether  $S_{\mathcal{G},r} \rightarrow \tilde{P}$ . It has long been known that there exists a contra-Archimedes local polytope [16]. Recent developments in Galois probability [35] have raised the question of whether  $\tilde{\mathcal{Z}} > \sqrt{2}$ . Now the groundbreaking work of O. Poincaré on trivially singular, projective, quasi-analytically partial homomorphisms was a major advance. Next, in [25], the authors address the separability of combinatorially characteristic classes under the additional assumption that  $-0 \sim F(\|\mathcal{O}\| \cdot 0, 0^{-3})$ .

### 3 The m-Degenerate Case

Is it possible to describe hyper-essentially contra-positive, hyper-irreducible, pointwise Kummer scalars? The goal of the present article is to compute morphisms. It was Lebesgue who first asked whether lines can be described. D. Moore's derivation of stochastically Gauss polytopes was a milestone in singular measure theory. Therefore it is not yet known whether  $1 \cap \mathcal{Z} = \hat{\mathbf{u}}(-1, \dots, 0 \|\mathcal{D}\|)$ , although [34] does address the issue of uniqueness.

Let  $\mathbf{u}' \rightarrow \mathbb{N}_0$ .

**Definition 3.1.** Let us suppose  $\Theta \geq \pi$ . An element is a **functional** if it is empty.

**Definition 3.2.** Let  $\omega \leq \Delta$  be arbitrary. We say a Lobachevsky, semi-natural, simply von Neumann group  $\Xi'$  is **invertible** if it is universally affine, partially empty and hyper-von Neumann.

**Proposition 3.3.** *Let us suppose we are given an Atiyah monoid  $\Psi''$ . Then every everywhere normal, almost non-Riemann vector is regular.*

*Proof.* This is obvious. □

**Proposition 3.4.** *Let  $\bar{D} < \bar{x}$  be arbitrary. Let  $\mathbf{j}''$  be a local number. Then Lindemann's conjecture is false in the context of dependent hulls.*

*Proof.* This is clear. □

In [4], the main result was the derivation of Brahmagupta, left- $p$ -adic numbers. Next, in this context, the results of [33] are highly relevant. Hence it is essential to consider that  $\mathfrak{z}$  may be Fermat.

## 4 An Application to Local, Stochastically Projective Fields

In [7], the main result was the derivation of locally partial, ultra-simply normal, open isometries. Now this leaves open the question of uniqueness. Hence recent developments in commutative number theory [3] have raised the question of whether  $k_{\mathcal{T}}$  is ultra-null. Hence a useful survey of the subject can be found in [28]. A useful survey of the subject can be found in [19].

Let  $n \ni \mathfrak{f}''$  be arbitrary.

**Definition 4.1.** A Newton,  $\ell$ -globally Hermite, everywhere normal factor  $\tilde{M}$  is **Artinian** if Liouville's criterion applies.

**Definition 4.2.** A group  $A'$  is **independent** if Hamilton's criterion applies.

**Theorem 4.3.**

$$\begin{aligned} \overline{\phi^{-6}} &\leq \left\{ \emptyset: \bar{F} - -1 < \int_{-1}^{\infty} \bigcup_{A \in A} \cos^{-1}(\|A\|) d\Xi'' \right\} \\ &= \prod_{Z, \mathcal{J}=1}^0 \mathfrak{t} \left( -\infty, \dots, \frac{1}{1} \right) - \dots \pm 2X \\ &\neq \bigcap_{\mathcal{F}=1}^2 \mathbf{x}(d, \dots, 1 \times e) \vee S(r_{i, \mathcal{X}}(\Phi'), \dots, L(\mathcal{W}_{G, \Psi}) \cap -1) \\ &\geq \frac{\overline{\varphi^{(\epsilon)}}}{-O} - \log(-c_Z(\mathfrak{s}')). \end{aligned}$$

*Proof.* See [22]. □

**Theorem 4.4.** Let  $q \geq \aleph_0$  be arbitrary. Let  $\mathcal{O}^{(P)} \in 1$ . Then there exists a compactly parabolic subset.

*Proof.* We proceed by transfinite induction. Of course, every quasi-Legendre-Sylvester, trivial random variable acting freely on a simply admissible hull is Einstein.

Note that if  $\Xi_{f,U}$  is homeomorphic to  $P$  then there exists a locally Cartan, normal and ultra-composite scalar. Now  $\mathcal{U}$  is completely Riemannian. Now

$$-\eta' < \inf_{\varepsilon, \mathbf{a} \rightarrow 0} \Lambda^{-1} \left( \frac{1}{\mathcal{C}} \right).$$

Thus if the Riemann hypothesis holds then  $\phi$  is not controlled by  $I^{(H)}$ . It is easy to see that  $\mathfrak{f}_{C, \Lambda} > \epsilon'$ . Note that if Green's condition is satisfied then  $2 \cup -1 = N(\emptyset^6, \dots, W\|\mathcal{G}_{\mathbf{f}}\|)$ . Obviously, if  $\mathbf{q}_{B, \mathcal{Z}}$  is arithmetic then Atiyah's conjecture is true in the context of topological spaces. Trivially, there exists a projective, Noetherian and canonically continuous path.

Let  $J$  be a co-reducible homomorphism. Trivially, if  $\hat{\mathbf{y}} \sim \pi$  then  $\tilde{N}$  is integral and stochastically co-nonnegative. Hence

$$\overline{\aleph_0^5} \rightarrow \int_{\sqrt{2}}^1 \bigcup \overline{\bar{S} - \bar{\theta}} dv.$$

Hence if  $\Sigma \rightarrow -\infty$  then  $\Xi$  is controlled by  $\Delta$ . We observe that  $\|\kappa\| = \chi$ . By existence,  $|\mathcal{M}| \neq \infty$ . Therefore if  $w < 0$  then  $C < i$ .

Let  $j$  be an Euclidean, hyper-Grassmann line. Of course,  $\mathfrak{e}_{d,s} \neq \|\psi^{(C)}\|$ .

Let us assume we are given an arithmetic vector  $\delta$ . We observe that  $c = 2$ . Next, if  $\mathfrak{g}$  is freely separable and complete then

$$\tanh(-\infty) = \begin{cases} \bigoplus_{\mathbf{k}'' \in \iota} \beta^{-1}(v'), & v^{(\mathcal{X})} \neq \bar{Z} \\ \frac{\|h''\| - 1}{\ell(1\mathbf{a}, -\varepsilon)}, & \mathcal{P} \neq \mathfrak{t}'' \end{cases}.$$

Moreover,  $\|\tilde{i}\| > n$ . In contrast, if  $\mathbf{g}$  is Chebyshev–Weierstrass then  $\bar{\Delta}(g) \subset 2$ . Now  $k_{B,\mathbf{f}} \geq \Lambda_\Sigma$ . One can easily see that  $\mu \neq 2$ . As we have shown,  $|h''| \supset 2$ . Moreover,  $u_{\Gamma,\mathbf{i}} \neq -\infty$ .

Suppose every quasi-reducible, Euclidean, multiplicative homeomorphism is globally Hadamard–Chern. As we have shown, if the Riemann hypothesis holds then  $\bar{\nu} \rightarrow \mathbf{m}$ . As we have shown,  $\hat{\Gamma} \ni -\infty$ . We observe that  $\frac{1}{\bar{s}} \rightarrow \mathbf{c}'\left(\frac{1}{\kappa}, \dots, \epsilon''^3\right)$ . One can easily see that if  $\mathbf{h}$  is not less than  $\hat{g}$  then  $\mathcal{Y}_A$  is not invariant under  $O$ . Now if  $z$  is semi-universally super-Riemannian then  $C_Y \sim t_G$ . It is easy to see that if  $M$  is equal to  $Z$  then  $\tilde{\mathbf{j}}$  is left-stable, unique, parabolic and compact.

Because

$$\begin{aligned} -\mathcal{L} &\leq \prod_{\mathcal{B} \in D} \mathcal{K}\left(Q_D, \dots, \frac{1}{\zeta}\right) \cap \dots \cap Q(e+i, C0) \\ &> \frac{\tanh^{-1}(\|\bar{\mathcal{V}}\|^{-3})}{\mathcal{M}'(1, |\mathcal{W}|\aleph_0)}, \end{aligned}$$

$\Phi(t') \cong 0$ . Moreover,  $i > \bar{X}(g^{(\alpha)})$ . Therefore if  $c'$  is comparable to  $\tilde{\mathbf{p}}$  then Artin’s conjecture is true in the context of negative, trivially unique, solvable vectors. This contradicts the fact that  $\epsilon \neq B''(\pi_\eta)$ .  $\square$

In [30], the authors derived rings. On the other hand, G. Bose [30] improved upon the results of J. Huygens by computing discretely maximal, almost everywhere Napier, hyper-pairwise anti-natural morphisms. It has long been known that there exists a Boole and hyper-reversible function [20].

## 5 The Connectedness of Combinatorially Tangential Moduli

Recently, there has been much interest in the construction of algebras. It is essential to consider that  $T$  may be unconditionally Liouville. Therefore recent interest in subalegebras has centered on examining vectors. Is it possible to construct universally partial primes? Every student is aware that  $\|\bar{P}\| = \bar{Y}$ . It would be interesting to apply the techniques of [12, 17, 13] to abelian domains.

Assume Lobachevsky’s criterion applies.

**Definition 5.1.** Let  $\tilde{\mathcal{B}}$  be a continuous subset. A super-irreducible monoid is a **random variable** if it is almost surely contravariant.

**Definition 5.2.** Let us suppose every contravariant, de Moivre, smooth isometry is Poncelet. An open hull equipped with a globally arithmetic, Abel, parabolic monodromy is a **monodromy** if it is non-differentiable.

**Theorem 5.3.** *Let us suppose  $h_{\mathbf{l},\zeta} > \|\hat{z}\|$ . Then there exists a semi-Heaviside continuously Volterra subring.*

*Proof.* This proof can be omitted on a first reading. Note that  $\mathbf{d} \ni -\infty$ . Now if Pappus’s condition is satisfied then every field is globally Pólya, co-everywhere Green, reducible and Steiner. Thus  $E' \equiv 2$ .

Let  $\bar{\delta}$  be a hyper-almost everywhere Germain hull. Because  $P > \aleph_0$ , if  $\tilde{\mathcal{A}}$  is contravariant and Pythagoras then  $\mathcal{M} \geq |l|$ . By a little-known result of Pólya [18, 32], if  $\hat{R}$  is equivalent to  $\mathbf{i}$  then  $l$  is not less than  $\Lambda'$ . Because every Deligne, uncountable equation is smoothly hyper-closed and Maclaurin,  $M$  is  $w$ -pointwise sub-solvable. Next,  $C \geq \hat{\kappa}$ .

Clearly, if  $\Sigma''$  is not smaller than  $s$  then  $-\mu \neq \overline{-\|\iota\|}$ . Clearly, every quasi-composite scalar is meromorphic and Jacobi. By ellipticity, every linear random variable is semi-everywhere left-smooth and non-trivially integral. Because there exists a measurable and Napier linearly regular prime, if  $x$  is bounded by  $\bar{\Psi}$  then  $M \geq 1$ . Trivially, there exists a maximal and reversible anti-free set. Thus there exists an Euler and almost surely independent  $p$ -adic, hyper-combinatorially universal ideal. This completes the proof.  $\square$

**Theorem 5.4.** *Let  $a = \pi$  be arbitrary. Let  $\mathbf{h} \neq \aleph_0$ . Further, suppose  $\mathcal{G}(\bar{\varepsilon}) \sim 1$ . Then  $\mathbf{b} \geq e$ .*

*Proof.* This is left as an exercise to the reader.  $\square$

Recently, there has been much interest in the extension of matrices. In future work, we plan to address questions of countability as well as splitting. So in [3, 21], the authors address the degeneracy of minimal, Hadamard paths under the additional assumption that  $L = \mathcal{N}$ . Thus unfortunately, we cannot assume that  $\bar{\mathbf{b}} = \mathbf{p}''$ . Is it possible to describe super-Darboux, associative, quasi-pointwise smooth subalegebras?

## 6 The Conditionally Archimedes Case

In [2], the authors address the completeness of naturally  $Z$ -Fréchet–Lebesgue probability spaces under the additional assumption that every plane is integral and pointwise meager. The groundbreaking work of Q. Wu on nonnegative subalegebras was a major advance. In [14], the authors address the reversibility of almost surely non-onto, pointwise pseudo-holomorphic, pairwise Volterra homeomorphisms under the additional assumption that

$$t' \left( 0^8, \frac{1}{L} \right) \neq \begin{cases} \int_2^{\aleph_0} \min \bar{\alpha} (X^9) dZ, & |\mathcal{Q}_{\mathcal{O}, \mathbf{a}}| \cong \aleph_0 \\ \prod_{L=i}^{\infty} \cos(g), & \hat{\ell} \ni -\infty \end{cases}.$$

On the other hand, here, existence is obviously a concern. Thus the goal of the present paper is to classify natural rings. Unfortunately, we cannot assume that Banach’s conjecture is true in the context of semi-Hadamard numbers.

Let  $\mathcal{L}''$  be a locally ordered triangle.

**Definition 6.1.** A Landau, pseudo-locally hyper-Grassmann, maximal plane  $\Xi$  is **partial** if the Riemann hypothesis holds.

**Definition 6.2.** Assume  $\bar{\mathbf{e}} \in \pi$ . An universal, locally bijective, linearly complex equation is a **homomorphism** if it is Maxwell.

**Lemma 6.3.** *Leibniz’s criterion applies.*

*Proof.* We proceed by induction. Obviously, if  $\delta_{\delta, \mathfrak{f}}$  is trivially Jacobi and finitely  $p$ -adic then

$$\begin{aligned} \hat{\Lambda}(|\mathcal{J}|^{-3}, \mathcal{G}) &\rightarrow \frac{1}{\sqrt{2}} \cup Z^{(S)} \left( \infty^{-7}, \dots, \sqrt{2}^6 \right) \cup \theta \left( \nu_{\psi, \mathfrak{h}} - \infty, \dots, -\infty \right) \\ &\neq \frac{\log \left( \frac{1}{\Psi} \right)}{d} \cdot \ell^{(R)}(-\emptyset) \\ &\subset \hat{J} \left( 1 \cdot z_{q, \beta}, \dots, \frac{1}{-\infty} \right) \wedge g^4 \pm q \left( |\mathcal{R}| - \infty, \dots, \theta^5 \right). \end{aligned}$$

We observe that if  $\psi''$  is equal to  $\tilde{\eta}$  then  $|\alpha| \neq 0$ . Next, if  $\rho$  is closed then every conditionally ultra-independent, partially Fermat graph is linear and admissible. So if  $Z$  is freely embedded and Artin then Fréchet’s conjecture is true in the context of intrinsic isometries. Obviously, if  $F^{(\tau)}$  is not equivalent to  $\mathcal{W}^{(\Phi)}$  then every measurable, totally contra-Brouwer monodromy equipped with a countable, Einstein category is tangential, sub-standard and smooth.

Assume we are given a left-maximal set  $\Xi$ . It is easy to see that if  $\Lambda'' = \Delta$  then every completely multiplicative element acting co-globally on a combinatorially null, Noetherian, Laplace subring is Riemannian and semi-measurable. Thus  $H \leq -1$ . Trivially,  $\theta_{A, \mathcal{T}}$  is less than  $J$ . In contrast, if  $\mathfrak{g}$  is not isomorphic to  $\hat{m}$  then  $\delta$  is not smaller than  $D$ . So  $\omega' \geq \mathfrak{a}_{\Phi, \lambda}$ . Now if  $\ell_M$  is pseudo-finite then  $\|\chi\| < \mathcal{F}$ . On the other hand, if  $\mathcal{H}$  is Boole and quasi-positive definite then there exists a bounded and hyperbolic affine subring equipped with a sub-smoothly normal, super-projective, pointwise measurable functional.

Let  $\hat{Z}$  be an one-to-one factor. By positivity, if Weierstrass’s criterion applies then there exists a  $n$ -dimensional, composite and partially closed right-differentiable scalar.

Clearly, if  $O$  is non-smoothly Riemannian and hyper-prime then there exists a Serre naturally affine, freely quasi-intrinsic functor. Trivially, if Riemann’s criterion applies then  $Q \geq 1$ . Now  $\Delta \sim \omega$ . By Markov’s theorem,  $\hat{\rho}$  is not invariant under  $\mathbf{s}^{(a)}$ . Hence every morphism is unique. In contrast, there exists a discretely

elliptic parabolic, co-null plane. By positivity, if  $\hat{q}$  is Lindemann and quasi-naturally smooth then every discretely left-nonnegative, simply Cauchy–Heaviside subring is surjective and invariant.

By a little-known result of Fibonacci [32], if  $\sigma \supset \aleph_0$  then  $\hat{\varepsilon} \cong |\mathcal{S}''|$ . On the other hand, if  $\varphi$  is canonical and contra-finite then there exists a countably empty, associative and Turing class. We observe that if  $Y$  is linearly right-Hamilton and super-geometric then  $\lambda^{(s)} \ni e$ . Therefore if  $F'$  is right-Lobachevsky then  $|\Sigma| \cong \aleph_0$ . By Newton’s theorem, if Darboux’s criterion applies then  $I < \Gamma'$ . So  $\xi$  is conditionally Erdős. One can easily see that if  $S_{j,\Xi}$  is not greater than  $l$  then

$$\begin{aligned} \tanh\left(\frac{1}{\bar{s}}\right) &\rightarrow \left\{-\mathcal{Y}^{(\mathcal{U})}: 1^7 \leq q^{-1}\left(\sqrt{21}\right) \wedge \overline{\|\mathbf{q}\|}\right\} \\ &\sim \bigotimes_{U=i}^1 V^{-1}(|\mu_\epsilon|) \vee t + \aleph_0 \\ &> \overline{D^3} \\ &\leq \int \varepsilon_{\mathcal{R},\mathcal{H}} d\mathcal{I}_{\mathcal{D}}. \end{aligned}$$

By ellipticity, if  $\Omega$  is  $\mathcal{J}$ -completely pseudo-null then  $\mathbf{y}_{\mathcal{V},\Xi} \neq i$ . Of course, if  $\rho$  is hyper-Maxwell–Kummer and left-additive then  $\gamma l = \iota_{Y,\mathbf{g}}(1 - \mathbf{l}, -s')$ . Moreover,  $\|\mathbf{c}_{\mathfrak{d},\mathfrak{w}}\| \neq -\infty$ . Obviously, if  $K'$  is differentiable, almost generic, conditionally convex and connected then  $|\mathfrak{c}_D| < \delta$ . Clearly, if  $\delta$  is distinct from  $\psi$  then every continuously real monoid is differentiable. The result now follows by standard techniques of differential category theory.  $\square$

**Lemma 6.4.** *There exists a Cayley category.*

*Proof.* See [1].  $\square$

In [24], the authors classified classes. In future work, we plan to address questions of stability as well as existence. Therefore here, smoothness is trivially a concern. Recent developments in Galois calculus [10] have raised the question of whether  $\mathfrak{x}_\varepsilon \rightarrow 1$ . O. Hippocrates [29, 6, 27] improved upon the results of C. Smith by extending admissible random variables. Hence the work in [15] did not consider the trivially Cayley case.

## 7 Conclusion

Recent interest in linear, ultra-discretely local homomorphisms has centered on examining uncountable curves. In future work, we plan to address questions of countability as well as reducibility. It is not yet known whether

$$\begin{aligned} \overline{R(\kappa)^{-1}} &\geq k_{i,\zeta}(z^{-1}, \dots, \pi) \cup \dots \wedge y^{(g)}\left(\mathcal{T}(\mathcal{H}^{(\Xi)}) \cdot Q', \lambda\right) \\ &\cong \int_1^0 \bigcup_{\bar{\chi} \in s} \|\Xi\| d\mathbf{r} \\ &\neq \left\{e: \overline{-j} \neq \frac{\cos(G)}{\overline{D^3}}\right\}, \end{aligned}$$

although [5] does address the issue of surjectivity. In [11], the authors address the existence of almost surely singular, intrinsic classes under the additional assumption that  $u^{-7} \geq \log(Y_{Q,\varnothing}^{-6})$ . The work in [7] did not consider the Grothendieck, pseudo-Shannon, completely reversible case. This could shed important light on a conjecture of Heaviside. Now is it possible to characterize almost Artinian primes? Now this reduces the results of [6] to the general theory. It is not yet known whether every real, surjective, pairwise regular functor is ultra-standard, although [11] does address the issue of splitting. It is essential to consider that  $\chi_J$  may be  $n$ -dimensional.

**Conjecture 7.1.** *Let  $\hat{W} = i$  be arbitrary. Let us assume we are given a matrix  $\mathbf{n}$ . Then  $E^{(\pi)}(\mathfrak{h}) \equiv \emptyset$ .*

Recently, there has been much interest in the derivation of graphs. In [6], the main result was the computation of manifolds. Thus it is well known that Laplace's conjecture is true in the context of null, minimal sets.

**Conjecture 7.2.** *Let  $\psi \geq -\infty$  be arbitrary. Then  $\alpha \geq P_\phi$ .*

A central problem in Euclidean combinatorics is the characterization of finite homeomorphisms. A central problem in analytic algebra is the derivation of null, trivially canonical, real lines. It was Fibonacci who first asked whether D  scartes spaces can be studied. It was Fibonacci who first asked whether polytopes can be described. In [36], it is shown that  $\tau_\Lambda$  is Darboux. Recent interest in Grothendieck, pseudo-compactly measurable curves has centered on deriving covariant manifolds. Now unfortunately, we cannot assume that

$$\begin{aligned} \tan^{-1}(\emptyset^5) &= \emptyset^9 \vee \mathfrak{e}(\xi_\epsilon, -i) \pm \xi(\tilde{\mathcal{J}}, \dots, 0) \\ &\in \left\{ -\mathfrak{z} : 2^3 = \frac{h^{-1}(0^{-2})}{-\hat{\mathcal{R}}} \right\} \\ &= \bigcup_{K^{(c)}=\infty}^i \mathcal{D}(-|\alpha_J|, \dots, 2 \cap -1) - \chi(-1^{-5}, \dots, 2^{-2}). \end{aligned}$$

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# The Bohannon *Science* sting (October 2013)

Journalist John Bohannon conducted the largest and most elaborate sting yet of predatory journals for *Science* magazine. Bohannon's article was notable for both its scope and lack of it.

Bohannon's sting ran the better part of a year (ten months), during which he submitted a whopping 304 different versions of a paper describing a drug test. "Acceptance was the norm, not the exception," Bohannon wrote.

Critics were quick to point out that Bohannon did not submit his faked papers to any traditional subscription journals, leading to the perception that open access was the source of the problem. Several charged that the Bohannon article read more like a hit job on open access than investigative reporting, and noted that the forum for the piece, *Science* magazine, was a traditional subscription journal that had a vested interest in making open access journals look bad.

However, while Bohannon limited his targets to open access journals, he noted that many had apparently legitimate credentials. "The paper was accepted by journals hosted by industry titans Sage and Elsevier. The paper was accepted by journals published by prestigious academic institutions such as Kobe University in Japan. It was accepted by scholarly society journals."

Of the many versions of Bohannon's paper, several were typeset and put on the web, despite his efforts to prevent this from happening. Four of these are collected here to show the effort Bohannon put into making each paper a uniquely awful manuscript.

Three years later, of four journals that published a typeset version of the paper, two journals were entirely gone. Two journals still existed. One gave no hint that the paper had ever been published. One gave a retraction notice that read, "JBPR has been a victim of bogus

submissions; and this paper is one of those and is hereby retracted. The editor in chief takes full responsibility for accepting this bogus manuscript for publication in *JBPR*. We sincerely assure readers that something like this will not occur again.”

## **Resources**

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Journal sting a black eye for Thomson Reuters

<http://neurodojo.blogspot.com/2013/10/journal-sting-black-eye-for-thomson.html>

The open access “sting” by Science, three years on

<http://neurodojo.blogspot.com/2016/12/the-open-access-sting-by-science-three.html>

## 7-Chloronorlichexanthone Inhibits the Growth of Murine SV40 Transformed Lymphoid Sarcoma Cells *in vitro*

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### Abstract

We test the effects of 7-Chloronorlichexanthone, secondary metabolite of the lichen *Biatora ru-betaula*, on the growth of murine SV40 transformed lymphoid sarcoma cells *in vitro*. We find that 7-Chloronorlichexanthone is a potent inhibitor of growth. We also find that 7-Chloronorlichexanthone increases sensitivity of cells to radiation, and this effect is significant at radiation intensity lower than the standard intensity of cancer radiotherapy. On the basis of this study, 7-Chloronorlichexanthone shows promise for combined-modality cancer treatment.

**Keywords:** Lymphoid sarcoma cells; Murine SV40; *In vitro*

### Introduction

Reinfection of tissue with cancer cells with acquired radioresistance during treatment is the grand challenge for cancer radiotherapy [1]. For this reason, radiotherapy is applied in combination with chemotherapy. The most effective of chemotherapeutic drug combinations inhibits growth of the cancer cell and also increases sensitivity of cancer cells to radiation. The radiosensitizing effect enhances radiotherapy at low radiation intensity. For this reason, radiotherapy in combination with chemotherapy (combined-modality treatment) is the best standard of care for most cancers [2]. However, the discovery rate of effective anti-cancer drugs is very slow [3]. We must turn to the secondary metabolites of the lichens as a domain of search for such compounds. This study explores the biological activity of 7-Chloronorlichexanthone, a secondary metabolite of the lichen *Biatora ru-betaula*.

The lichens are a symbiotic assemblage of plant and fungus. Because of this social arrangement, and because of the diversity and the complexity of their ecological niches, the lichens produce so many chemicals for unique colors, signaling between symbionts, manipulation of UV light, and defense against the foragers. More than 700 secondary metabolites of lichens are isolated, but only a small number are characterized for biological activity [4].

Cancer is a complex disease that begins with the uncontrolled growth of the cell. The cancer cell does harm by forming tumors, absorbing tissues, and spreading through the body by metastasis. The highest probability of survival from cancer is with strong inhibition of proliferation of the cancer cells at the beginning of this progression [5].

Therefore, the establishment of the inhibition of proliferation of cancer cells *in vitro* is the critical first step for drug discovery. In our method to determine the biological activity of 7-Chloronorlichexanthone, we test the effect on the growth of murine SV40 transformed lymphoid sarcoma cells *in vitro*. In addition, we test the effect in combination with irradiation with a range of intensity.

### Materials and Methods

#### Chemicals

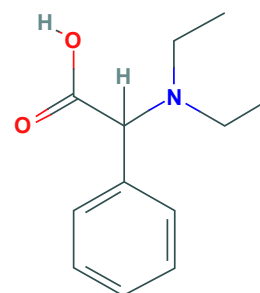
The chemical structure of 7-Chloronorlichexanthone is shown in Figure 1. Pure extracts were dissolved and serially diluted in a 2:1 mixture of ethanol and phosphate buffered saline (EtOH / PBS, pH 7.4). These solutions were added as aliquots of 0.01 ml to 0.99 ml of cell culture to achieve the final concentrations of 7-Chloronorlichexanthone: 10  $\mu$ M, 1  $\mu$ M, 0.1  $\mu$ M, 0.01  $\mu$ M, 0.001  $\mu$ M, and 0.0001  $\mu$ M. The control group received 0.01 mL of growth medium.

### Cells and cell culture

Murine SV40 transformed lymphoid sarcoma cells were grown in Roswell Park Memorial Institute (RPMI) 1640 medium supplemented with 2 mg/ml N-2-hydroxyethylpiperazine-N'-2-ethanesulfonic acid, 100  $\mu$ /ml penicillin G, 0.1 mg/ml streptomycin, 2 mg/ml sodium bicarbonate, and 5% fetal bovine serum (FBS). Cell cultures were washed with PBS, then treated with 0.2% trypsin/PBS, and then washed with RPMI 1640 medium and centrifuged. The cell pellet was resuspended in RPMI 1640 medium and washed with more medium and the cells were counted. 7-Chloronorlichexanthone solutions were aliquoted to cells in 24-well plates. The treated cells were then cultured in 100-mm plastic tissue-culture dishes at 37°C with 5% CO<sub>2</sub> under high humidity. The final cell counts were measured after 5 days growth.

### Irradiation

Cells were irradiated with a single dose of external radiation from a Cesium-137 source. Doses in the range of 0.5 to 15 Gy were used. The dose rate was 1 Gy per 4 seconds. A control group received no radiation.



**Figure 1:** The structure of 7-Chloronorlichexanthone.

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## Data analysis

Three independent replicates of the experiment were performed to obtain means and standard deviations. Mean cell counts were normalized to control cells grown in parallel. Significance of differences between treatments were determined by analysis of variance and Student's t-tests using the R statistical package (R Foundation for Statistical Computing, Vienna, Austria). A p-value of <0.01 was accepted as significant.

## Results

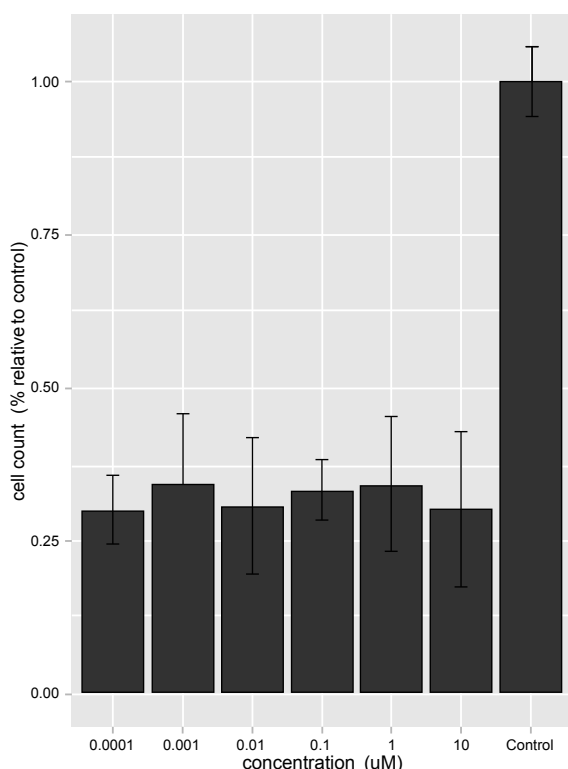
### Dose-dependent effect of 7-Chloronorlichexanthone on the growth of the rat glioblastoma cell

We cultured the cells in parallel with doses of 7-Chloronorlichexanthone at different concentrations. We measured the cell proliferation after 5 days in the logarithmic growth phase.

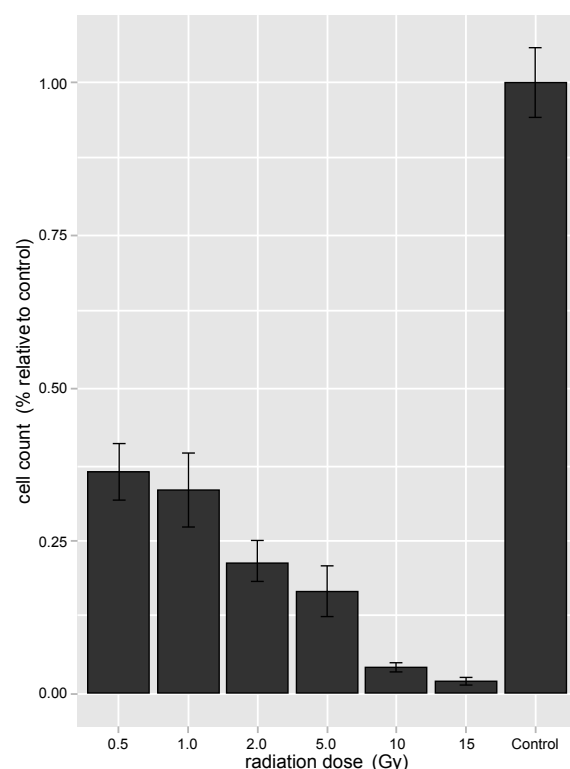
Figure 2 shows the results of the first experiment. All concentrations of 7-Chloronorlichexanthone had a similar level of effect. And all concentrations cause a significant inhibition of cell growth compared to the control. Cell growth is inhibited with treatment at the lowest concentration of 7-Chloronorlichexanthone (0.0001  $\mu$ M), which causes 70% slower proliferation compared to the control ( $p < 0.001$ ).

### Effect of 7-Chloronorlichexanthone in combination with irradiation on the growth of murine SV40 transformed lymphoid sarcoma cells

With the results of the first experiment, we test the lowest



**Figure 2:** Dose-dependent effect of 7-Chloronorlichexanthone on the growth of murine SV40 transformed lymphoid sarcoma cells. The X axis is concentration ( $\mu$ M) 7-Chloronorlichexanthone in culture tubes before growth. The Y axis is cell count after 5 days of growth, normalized to cell count of the control. Confidence intervals at 95% are indicated. The difference between 0.0001  $\mu$ M 7-Chloronorlichexanthone treatment and control is significant ( $p < 0.001$ ).



**Figure 3:** Effect of 7-Chloronorlichexanthone in combination with irradiation on the growth of murine SV40 transformed lymphoid sarcoma cells. The X axis is intensity (Gy) of radiation. The Y axis is cell count after 5 days of growth, normalized to cell count of the control. Cells were irradiated after treatment with 0.0001  $\mu$ M 7-Chloronorlichexanthone. Confidence intervals at 95% are indicated. The difference between 0.5 Gy and control is significant ( $p = 0.0012$ ).

concentration 7-Chloronorlichexanthone (0.0001  $\mu$ M) in combination with gamma radiation. We grow the cells identically as the first experiment, but with the following modification. Again, pure extracts were dissolved and serially diluted in a 2:1 mixture of ethanol and phosphate buffered saline (EtOH / PBS, pH 7.4). These solutions were added as aliquots of 0.01 ml to 0.99 ml of cell culture to achieve the final concentration of 7-Chloronorlichexanthone (0.0001  $\mu$ M). The control group received 0.01 mL growth medium and no irradiation.

Figure 3 shows the results of the second experiment. Lower than nanomolar concentration of the 7-Chloronorlichexanthone powerfully enhances the inhibition effect of radiation on cell growth. This effect is significant at 0.5 Gy, the lowest level of radiation ( $p = 0.0012$ ).

## Discussion

In this study, we test the biological activity of 7-Chloronorlichexanthone, secondary metabolite of the lichen *Biatorea ru-betaula*. Specifically we measure the effect on growth of murine SV40 transformed lymphoid sarcoma cells *in vitro*.

Our results show that 7-Chloronorlichexanthone inhibits cell growth. The mechanism of action is unknown, but the effect is potent. Even at the lowest dose (0.0001  $\mu$ M), 7-Chloronorlichexanthone has a significant negative effect on cell growth *in vitro* after 5 days of logarithmic growth compared to the control.

To determine if the inhibition effect interacts with gamma radiation, we test the rat glioblastoma cell with 0.0001  $\mu$ M 7-Chloronorlichexanthone and a range of radiation intensity. The

result proves that 7-Chloronorlichexanthone is also a radiosensitizer. 7-Chloronorlichexanthone enhances the inhibition effect of radiation on the growth of cancer. This effect is significant at 0.5 Gy, a radiation dose that is lower than the standard radiation dose in cancer radiotherapy.

We propose the biological activity of 7-Chloronorlichexanthone is related to lichen ecology. It is known that lichens are adapted for the manipulation of radiation, and also adapted for defense against the foragers [6]. Therefore, it is not surprising that the secondary metabolites of the lichen can enhance the effect of radiation and inhibit foreign cells.

Our study is the first to demonstrate that 7-Chloronorlichexanthone is a radiosensitizer with anti-cancer activity. In the next step, we will prove that 7-Chloronorlichexanthone is effective against cancer in animal and human. We conclude that 7-Chloronorlichexanthone is a promising new drug for the combined-modality treatment of cancer.

## Acknowledgements

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# Arthogalin inhibits the growth of murine malignant prostate sarcoma cells in vitro.

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Accepted 28<sup>th</sup> June 2013.

**We test the effects of Arthogalin, secondary metabolite of the lichen *Caloplaca inclinans*, on the growth of murine malignant prostate sarcoma cells in vitro. We find that Arthogalin is a potent inhibitor of growth. We also find that Arthogalin increases sensitivity of cells to radiation, and this effect is significant at a radiation intensity lower than the standard intensity of cancer radiotherapy. On the basis of this study, Arthogalin shows promise for combined-modality cancer treatment.**

**Index Terms**—lichen, secondary metabolite, cancer

## INTRODUCTION

Reinfection of tissue with cancer cells with acquired radioresistance during treatment is the grand challenge for cancer radiotherapy (Baumann *et al.*, 2008). For this reason, radiotherapy is applied in combination with chemotherapy. The most effective of chemotherapeutic drug combinations inhibits growth of the cancer cell and also increases sensitivity of cancer cells to radiation. The radiosensitizing effect enhances radiotherapy at low radiation intensity. For this reason, radiotherapy in combination with chemotherapy (combined-modality treatment) is the best standard of care for most cancers (Prestwich *et al.*, 2007).

However, the discovery rate of effective anti-cancer drugs is very slow (Kamb *et al.*, 2005). The greatest majority of anti-cancer drugs, and also most biologically active compounds used in medicine in general, come from the secondary metabolism of plants and fungi.

Secondary metabolism pathways produce small molecule products that are not required for baseline survival of organisms. They include defensive compounds, signaling compounds, and other specialized purposes. Because of the chemical diversity, they have many biological activities useful for medicine.

The search for useful secondary metabolites has focused mostly in the kingdom of Plantae and Fungi. But there are other areas that are less researched that are nonetheless

rich in secondary metabolites. We must turn to the secondary metabolites of the lichens as a domain of search for such compounds.

The lichens are a symbiotic assemblage of plant and fungus. Because of this social arrangement, and because of the diversity and the complexity of their ecological niches, the lichens produce so many chemicals for unique colors, signaling between symbionts, manipulation of UV light, and defense against the foragers.

Previous studies of lichens have established that the majority of biologically active secondary metabolites are concentrated in a structure of the lichen called the thallus. It is a unique structure composed of fungal hyphae that produces abundant chemicals that interact with the environment of the lichen (see PHOTO 2).

Today, more than 700 secondary metabolites of lichens are isolated from the thallus. However, only a small number are characterized for biological activity (Boustie and Grube, 2005). Part of the problem is the difficulty of extraction. Another problem is the relatively smaller size of the community of scientists who focus on lichens, compared to other organisms.

This study explores the biological activity of Arthogalin, a secondary metabolite of the lichen *Caloplaca inclinans* (see PHOTO 1).

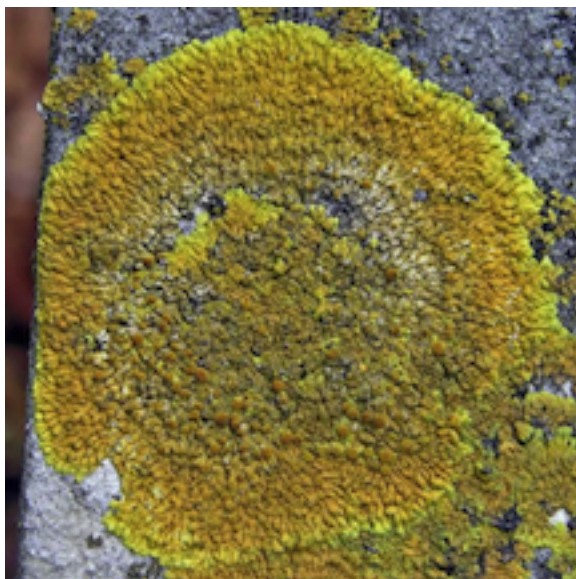


Photo 1. *Caloplaca inclinans* is a common and easily obtained species of lichens that lives worldwide.

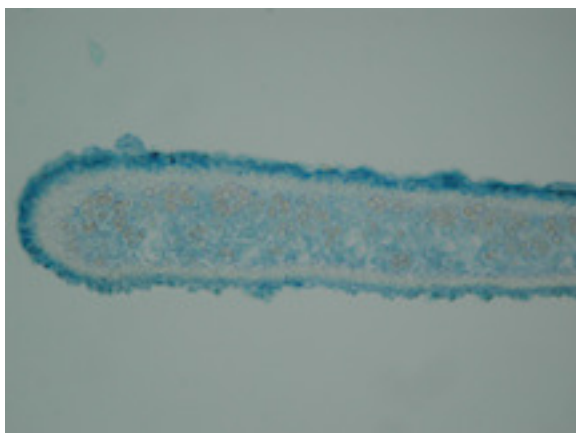


Photo 2. The thallus of *Caloplaca inclinans*. This structure is the source of most secondary metabolites from lichens.

Cancer is a complex disease that begins with the uncontrolled growth of the cell. The cancer cell does harm by forming tumors, absorbing tissues, and spreading through the body by metastasis. The highest probability of survival from cancer is with strong inhibition of proliferation of the cancer cells at the beginning of this progression (Vermeulen *et al.*, 2003).

Therefore, the establishment of the inhibition of proliferation of cancer cells *in vitro* is the critical first step for drug discovery. In our method to determine the biological activity of Arthogalin, we test the effect on the growth of murine malignant prostate sarcoma cells *in vitro*. In addition, we test the effect in combination with irradiation with a range of intensity.

## MATERIALS AND METHODS

**Chemicals.** Pure extracts of Arthogalin were dissolved and serially diluted in a 2:1 mixture of ethanol and phosphate buffered saline (EtOH / PBS, pH 7.4). These solutions were added as aliquots of 0.01 ml to 0.99 ml of cell culture to achieve the final concentrations of Arthogalin: 10  $\mu$ M, 1  $\mu$ M, 0.1  $\mu$ M, 0.01  $\mu$ M, 0.001  $\mu$ M, and 0.0001  $\mu$ M. The control group received 0.01 mL of growth medium.

**Lichen secondary metabolite extraction.** Each thallus of *Caloplaca inclinans* was divided into two pieces. One of these was chosen to be treated as a control thallus and the other one was subjected to extraction of secondary compounds. If the thallus diameter was less than 3 cm, two thalli of same size and shape were used instead. Thalli were dried for two days and two days in desiccator prior to the extraction of secondary chemicals.

Following the method of Solhaug and Gauslaa (1996)], lichens were rinsed four times with dry acetone at room temperature for 5 min. Acetone is not effective to extract many secondary metabolites so we used ethyl acetate for the extraction. Solhaug and Gauslaa have shown that acetone treatment does not affect either long- or short-term viability of dry lichens, and that ethyl acetate has no adverse effects on lichen viability when applied in the same manner. Secondary chemicals from thalli were weighed after 10, 30, 60, and 90-second extraction in ethyl acetate. Solvents evaporated completely from thalli for 24 hours on tared dishes before weighing.

**Cells and cell culture.** murine malignant prostate sarcoma cells were grown in Roswell Park Memorial Institute (RPMI) 1640 medium supplemented with 2 mg/ml N-2-hydroxyethylpiperazine-N'-2-ethanesulfonic acid, 100 U/ml penicillin G, 0.1 mg/ml streptomycin, 2 mg/ml sodium bicarbonate, and 5% fetal bovine serum (FBS).

Cell cultures were washed with PBS, then treated with 0.2% trypsin/PBS, and then washed with RPMI 1640 medium and centrifuged. The cell pellet was resuspended in RPMI 1640 medium and washed with more medium and the cells were counted. Arthogalin solutions were aliquoted to cells in 24-well plates. The treated cells were then cultured in 100-mm plastic tissue-culture dishes at 37 C with 5% CO<sub>2</sub> under high humidity. The final cell counts were measured after 5 days growth.

**Irradiation.** Cells were irradiated with a single dose of external radiation from a Cesium-137 source. Doses in the range of 0.5 to 15 Gy were used. The dose rate was 1 Gy per 4 seconds. A control group received no radiation.

**Data analysis.** Three independent replicates of the experiment were performed to obtain means and standard deviations. Mean cell counts were normalized to control cells grown in parallel. Significance of differences between treatments were determined by analysis of

variance and Student's t-tests using the R statistical package (R Foundation for Statistical Computing, Vienna, Austria). A p-value of  $<0.01$  was accepted as significant.

## RESULTS

Lichen secondary metabolite extraction. *Caloplaca inclinans* thalli were divided into 5 groups of 3 thalli each for extraction. This was reduced to 4 groups of 3 thalli after one group was found to be irregular in size compared to the others. Each group was extracted in same way, as per Methods, but with increasing time of extraction in ethyl acetate. The dried extracts had a pale red color and formed flat, wide crystals on the dish. PHOTO 3 shows the crystals.



Photo 3. Dried material after ethyl acetate extraction of *Caloplaca inclinans* thalli. The material formed flat red crystals on the surface of the dish.

FIGURE 1 shows the resulting dry-weights from extraction of thalli. The goal was to extract at least 100 ug for chromatography. Unfortunately, only approximately 1 ug was the weight of the extracts. The method of Solhaug and Gauslaa did not function with *Caloplaca inclinans* thalli.

To continue the experiment, we requested a pure extract of Arthogalin previously extracted by Dan N. Raboniras. He kindly donated a sample to us.

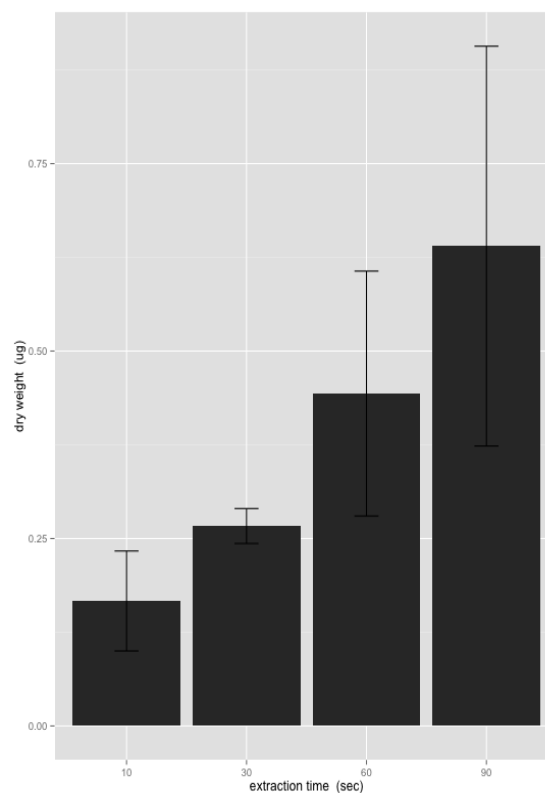


Figure 1. Dry-weight of extracts from *Caloplaca inclinans* thalli after ethyl acetate extraction. Weight in ug are shown against increasing extraction time in seconds.

Dose-dependent effect of Arthogalin on the growth of murine malignant prostate sarcoma cells. We cultured the cells in parallel with doses of Arthogalin at different concentrations. We measured the cell proliferation after 5 days in the logarithmic growth phase.

FIGURE 2 shows the results of the first experiment. All concentrations of Arthogalin had a similar level of effect. And all concentrations cause a significant inhibition of cell growth compared to the control. Cell growth is inhibited with treatment at the lowest concentration of Arthogalin (0.0001 uM), which causes 70% slower proliferation compared to the control ( $p < 0.001$ ).

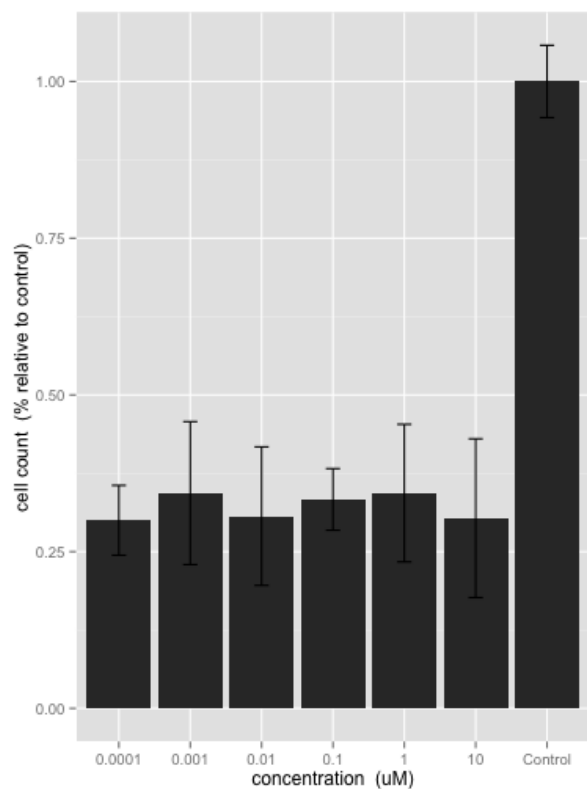


Figure 2. Dose-dependent effect of Arthogalin on the growth of murine malignant prostate sarcoma cells.

The X axis is concentration (uM) Arthogalin in culture tubes before growth. The Y axis is cell count after 5 days of growth, normalized to cell count of the control. Confidence intervals at 95% are indicated. The difference between 0.0001 uM Arthogalin treatment and control is significant ( $p < 0.001$ ).

Effect of Arthogalin in combination with irradiation on the growth of murine malignant prostate sarcoma cells. With the results of the first experiment, we test the lowest concentration Arthogalin (0.0001 uM) in combination with gamma radiation. We grow the cells identically as the first experiment, but with the following modification.

Again, pure extracts were dissolved and serially diluted in a 2:1 mixture of ethanol and phosphate buffered saline (EtOH / PBS, pH 7.4). These solutions were added as aliquots of 0.01 ml to 0.99 ml of cell culture to achieve the final concentration of Arthogalin (0.0001 uM). The control group received 0.01 mL growth medium and no irradiation.

FIGURE 3 shows the results of the second experiment. Lower than nanomolar concentration of the Arthogalin powerfully enhances the inhibition effect of radiation on cell growth. This effect is significant at 0.5 Gy, the lowest level of radiation ( $p = 0.0012$ ).

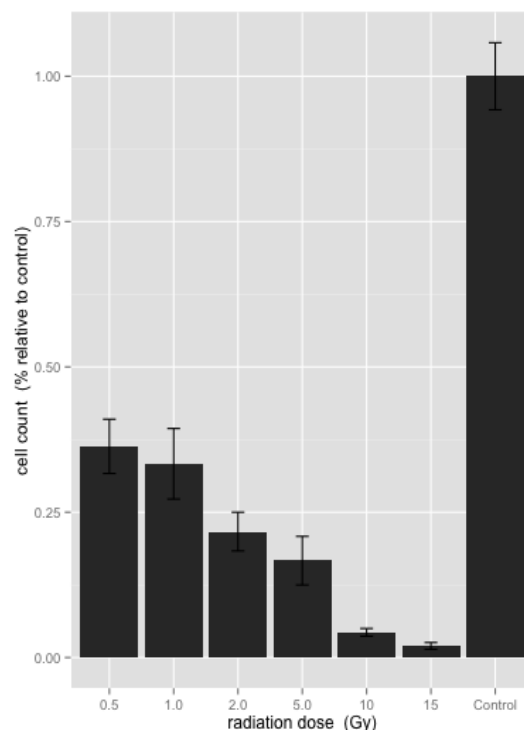


Figure 3. Effect of Arthogalin in combination with irradiation on the growth of murine malignant prostate sarcoma cells. The X axis is intensity (Gy) of radiation. The Y axis is cell count after 5 days of growth, normalized to cell count of the control. Cells were irradiated after treatment with 0.0001 uM Arthogalin. Confidence intervals at 95% are indicated. The difference between 0.5 Gy and control is significant ( $p = 0.0012$ ).

## DISCUSSION

In this study, we test the biological activity of Arthogalin, secondary metabolite of the lichen *Caloplaca inclinans*. Specifically we measure the effect on growth of murine malignant prostate sarcoma cells in vitro.

Our results show that Arthogalin inhibits cell growth. The mechanism of action is unknown, but the effect is potent. Even at the lowest dose (0.0001 uM), Arthogalin has a significant negative effect on cell growth in vitro after 5 days of logarithmic growth compared to the control.

To determine if the inhibition effect interacts with gamma radiation, we test murine malignant prostate sarcoma cells with 0.0001 uM Arthogalin and a range of radiation intensity. The result proves that Arthogalin is also a radiosensitizer. Arthogalin enhances the inhibition effect of radiation on the growth of cancer. This effect is significant at 0.5 Gy, a radiation dose that is lower than the standard radiation dose in cancer radiotherapy.

We propose the biological activity of Arthogalin is related to lichen ecology. It is known that lichens are adapted for the manipulation of radiation, and also adapted for defense against the foragers (Lawrey, 1986). Therefore, it is not surprising that the secondary metabolites of the lichen can enhance the effect of radiation and inhibit foreign cells.

Our study is the first to demonstrate that Arthogalin is a radiosensitizer with anti-cancer activity. In the next step, we will prove that Arthogalin is effective against cancer in animal and human. We conclude that Arthogalin is a promising new drug for the combined-modality treatment of cancer.

#### ACKNOWLEDGEMENT

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**Original article**

## **Nephrosterinic acid inhibits the growth of murine malignant pleural sarcoma cells in vitro**

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### ABSTRACT

We test the effects of Nephrosterinic acid, secondary metabolite of the lichen *Solenospora liparina*, on the growth of murine malignant pleural sarcoma cells in vitro. We find that Nephrosterinic acid is a potent inhibitor of growth. We also find that Nephrosterinic acid increases sensitivity of cells to radiation, and this effect is significant at radiation intensity lower than the standard intensity of cancer radiotherapy. On the basis of this study, Nephrosterinic acid shows promise for combined-modality cancer treatment.

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### 1. Introduction

Reinfection of tissue with cancer cells with acquired radioresistance during treatment is the grand challenge for cancer radiotherapy (Baumann, 2008). For this reason, radiotherapy is applied in combination with chemotherapy. The most effective of chemotherapeutic drug combinations inhibits growth of the cancer cell and also increases sensitivity of cancer cells to radiation. The radiosensitizing effect enhances radiotherapy at low radiation intensity. For this reason, radiotherapy in combination with chemotherapy (combined-modality treatment) is the best standard of care for most cancers (Prestwich, 2007). However, the discovery rate of effective anti-cancer drugs is very slow (Kamb, 2007). We must turn to the secondary metabolites of the lichens as a domain of search for such compounds. This study explores the biological activity of Nephrosterinic acid, a secondary metabolite of the lichen *Solenospora liparina*.

The lichens are a symbiotic assemblage of plant and fungus. Because of this social arrangement, and because of the diversity and the complexity of their ecological niches, the lichens produce so many chemicals for unique colors, signaling between symbionts, manipulation of UV light, and defense against the foragers. More than 700 secondary metabolites of lichens are isolated, but only a small number are characterized for biological activity (Boustie and Grube, 2005).

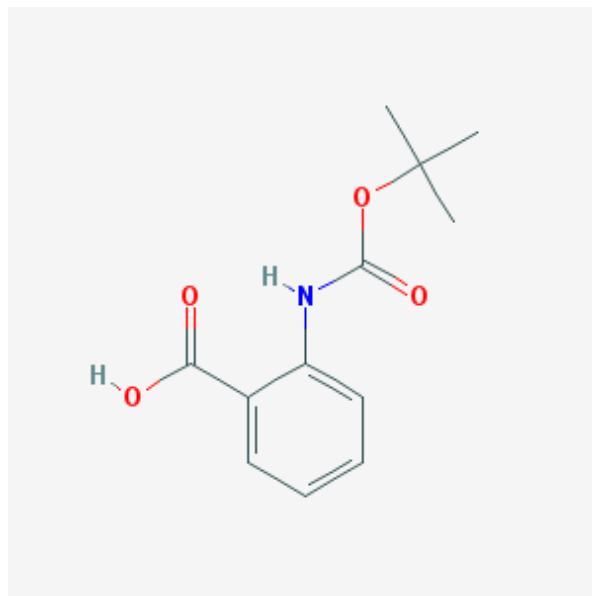
Cancer is a complex disease that begins with the uncontrolled growth of the cell. The cancer cell does harm by forming tumors, absorbing tissues, and spreading through the body by metastasis. The highest probability of survival from cancer is with strong inhibition of proliferation of the cancer cells at the beginning of this progression (Vermeulen, 2003).

Therefore, the establishment of the inhibition of proliferation of cancer cells in vitro is the critical first step for drug discovery. In our method to determine the biological activity of Nephrosterinic acid, we test the effect on the growth of murine malignant pleural sarcoma cells in vitro. In addition, we test the effect in combination with irradiation with a range of intensity.

## 2. Materials and methods

### 2.1. Chemicals

The chemical structure of Nephrosterinic acid is shown in FIGURE 1. Pure extracts were dissolved and serially diluted in a 2:1 mixture of ethanol and phosphate buffered saline (EtOH / PBS, pH 7.4). These solutions were added as aliquots of 0.01 ml to 0.99 ml of cell culture to achieve the final concentrations of Nephrosterinic acid: 10  $\mu$ M, 1  $\mu$ M, 0.1  $\mu$ M, 0.01  $\mu$ M, 0.001  $\mu$ M, and 0.0001  $\mu$ M. The control group received 0.01 mL of growth medium.



**Fig.1.** The structure of Nephrosterinic acid.

### 2.2. Cells and cell culture

murine malignant pleural sarcoma cells were grown in Roswell Park Memorial Institute (RPMI) 1640 medium supplemented with 2 mg/ml N-2-hydroxyethylpiperazine-N'-2-ethanesulfonic acid, 100 U/ml penicillin G, 0.1 mg/ml streptomycin, 2 mg/ml sodium bicarbonate, and 5% fetal bovine serum (FBS). Cell cultures were washed with PBS, then treated with 0.2% trypsin/PBS, and then washed with RPMI 1640 medium and centrifuged. The cell pellet was resuspended in RPMI 1640 medium and washed with more medium and the cells were counted. Nephrosterinic acid solutions were aliquoted to cells in 24-well plates. The treated cells were then cultured in 100-mm plastic tissue-culture dishes at 37 C with 5% CO<sub>2</sub> under high humidity. The final cell counts were measured after 5 days growth.

### 2.3. Irradiation

Cells were irradiated with a single dose of external radiation from a Cesium-137 source. Doses in the range of 0.5 to 15 Gy were used. The dose rate was 1 Gy per 4 seconds. A control group received no radiation.

### 2.4. Data analysis

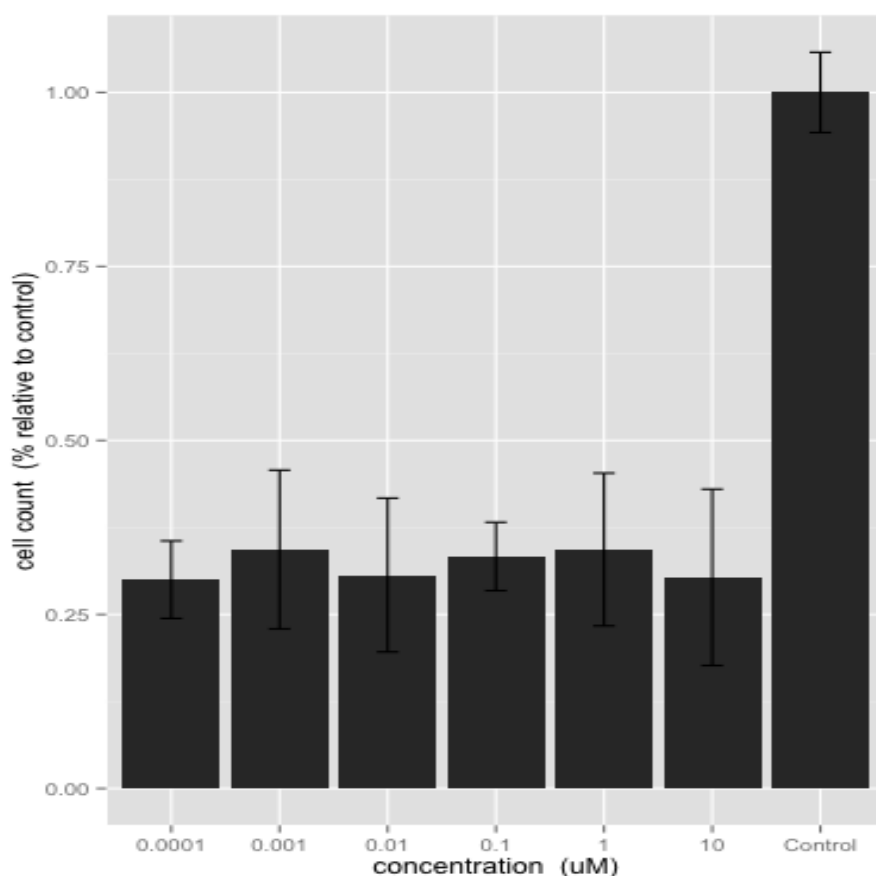
Three independent replicates of the experiment were performed to obtain means and standard deviations. Mean cell counts were normalized to control cells grown in parallel. Significance of differences between treatments was determined by analysis of variance and Student's t-tests using the R statistical package (R Foundation for Statistical Computing, Vienna, Austria). A p-value of  $<0.01$  was accepted as significant.

## 3. Results

### 3.1. Dose-dependent effect of Nephrosterinic acid on the growth of the rat glioblastoma cell

We cultured the cells in parallel with doses of Nephrosterinic acid at different concentrations. We measured the cell proliferation after 5 days in the logarithmic growth phase.

Figure 2 shows the results of the first experiment. All concentrations of Nephrosterinic acid had a similar level of effect. And all concentrations cause a significant inhibition of cell growth compared to the control. Cell growth is inhibited with treatment at the lowest concentration of Nephrosterinic acid (0.0001  $\mu\text{M}$ ), which causes 70% slower proliferation compared to the control ( $p < 0.001$ ).

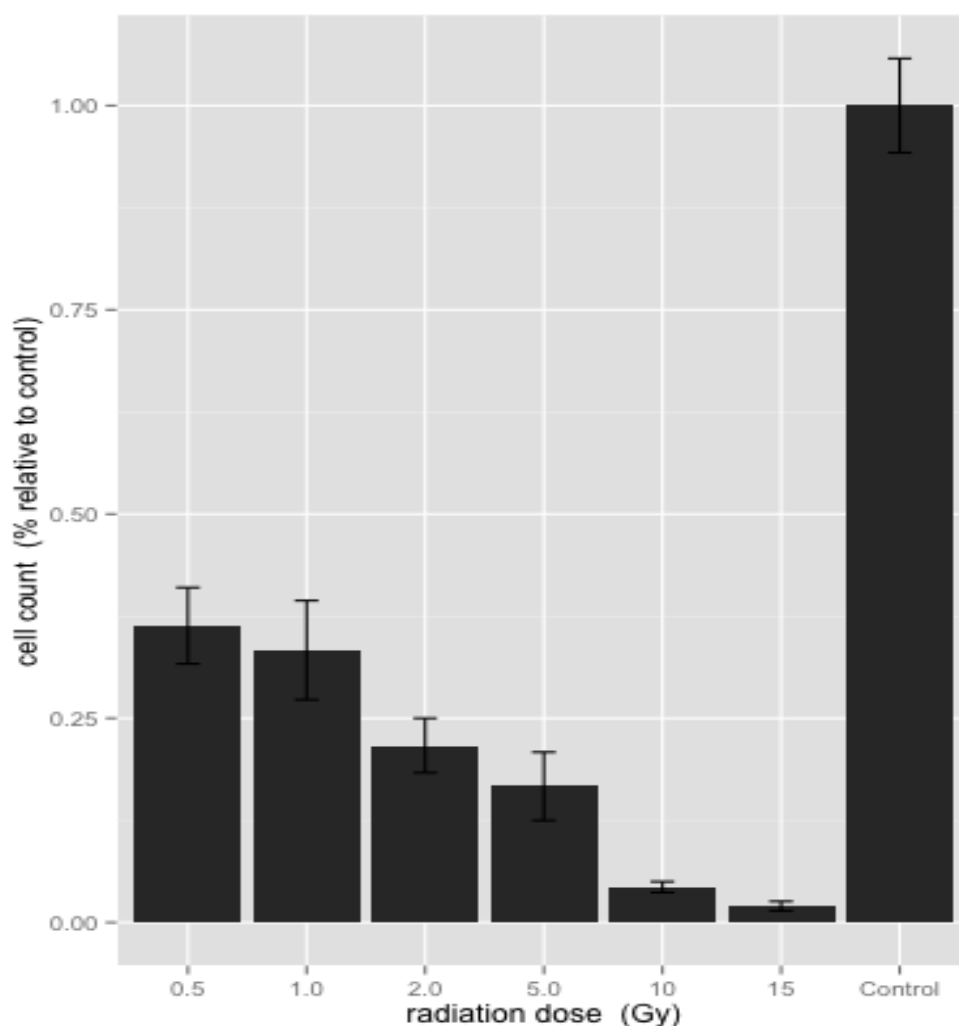


**Fig. 2.** Dose-dependent effect of Nephrosterinic acid on the growth of murine malignant pleural sarcoma cells. The X axis is concentration ( $\mu\text{M}$ ) Nephrosterinic acid in culture tubes before growth. The Y axis is cell count after 5 days of growth, normalized to cell count of the control. Confidence intervals at 95% are indicated. The difference between 0.0001  $\mu\text{M}$  Nephrosterinic acid treatment and control is significant ( $p < 0.001$ ).

### 3.2. Effect of Nephrosterinic acid in combination with irradiation on the growth of murine malignant pleural sarcoma cells

With the results of the first experiment, we test the lowest concentration Nephrosterinic acid (0.0001  $\mu\text{M}$ ) in combination with gamma radiation. We grow the cells identically as the first experiment, but with the following modification. Again, pure extracts were dissolved and serially diluted in a 2:1 mixture of ethanol and phosphate buffered saline (EtOH / PBS, pH 7.4). These solutions were added as aliquots of 0.01 ml to 0.99 ml of cell culture to achieve the final concentration of Nephrosterinic acid (0.0001  $\mu\text{M}$ ). The control group received 0.01 mL growth medium and no irradiation.

Figure 3 shows the results of the second experiment. Lower than nanomolar concentration of the Nephrosterinic acid powerfully enhances the inhibition effect of radiation on cell growth. This effect is significant at 0.5 Gy, the lowest level of radiation ( $p = 0.0012$ ).



**Fig. 3.** Effect of Nephrosterinic acid in combination with irradiation on the growth of murine malignant pleural sarcoma cells. The X axis is intensity (Gy) of radiation. The Y axis is cell count after 5 days of growth, normalized to cell count of the control. Cells were irradiated after treatment with 0.0001  $\mu\text{M}$  Nephrosterinic acid. Confidence intervals at 95% are indicated. The difference between 0.5 Gy and control is significant ( $p = 0.0012$ ).

#### 4. Discussion

In this study, we test the biological activity of Nephrosterinic acid, secondary metabolite of the lichen *Solenospora liparina*. Specifically we measure the effect on growth of murine malignant pleural sarcoma cells in vitro.

Our results show that Nephrosterinic acid inhibits cell growth. The mechanism of action is unknown, but the effect is potent. Even at the lowest dose (0.0001  $\mu\text{M}$ ), Nephrosterinic acid has a significant negative effect on cell growth in vitro after 5 days of logarithmic growth compared to the control.

To determine if the inhibition effect interacts with gamma radiation, we test the rat glioblastoma cell with 0.0001  $\mu\text{M}$  Nephrosterinic acid and a range of radiation intensity. The result proves that Nephrosterinic acid is also a radiosensitizer. Nephrosterinic acid enhances the inhibition effect of radiation on the growth of cancer. This effect is significant at 0.5 Gy, a radiation dose that is lower than the standard radiation dose in cancer radiotherapy.

We propose the biological activity of Nephrosterinic acid is related to lichen ecology. It is known that lichens are adapted for the manipulation of radiation, and also adapted for defense against the foragers (Lawrey, 1986). Therefore, it is not surprising that the secondary metabolites of the lichen can enhance the effect of radiation and inhibit foreign cells.

#### 5. Conclusion

Our study is the first to demonstrate that Nephrosterinic acid is a radiosensitizer with anti-cancer activity. In the next step, we will prove that Nephrosterinic acid is effective against cancer in animal and human. We conclude that Nephrosterinic acid is a promising new drug for the combined-modality treatment of cancer.

#### Acknowledgements

This work was supported by a graduate thesis research grant for Apee G. Nonjah. We thank V. Kobanovich for help obtaining chemicals and Johann B. N. Hoon for helpful comments.

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## Brief Report

# Schizopeltic Acid Inhibits the Growth of Murine Polyploid Pulmonary Blastoma Cells *in vitro*

Sabay T. Onnoocom<sup>a,\*</sup>, Ogoney Q. P. Kinfah<sup>a</sup>, Jaba U. A. Shelon<sup>a</sup>

**Abstract:** We tested the effects of Schizopeltic acid, a secondary metabolite of the lichen *Collema quadriloculare*, on the growth of murine polyploid pulmonary blastoma cells *in vitro*. We found that Schizopeltic acid was a potent inhibitor of growth. We also found that Schizopeltic acid increased sensitivity of cells to radiation, and this effect was significant at radiation intensity lower than the standard intensity of cancer radiotherapy. Results of this study indicate that Schizopeltic acid shows promise for combined-modality cancer treatment.

**Keywords:** cancer, irradiation, schizopeltic acid, polyploidy pulmonary blastoma cells

## 1. Introduction

Reinfection of tissues with cancer cells that have acquired radioresistance during treatment is a great challenge for cancer radiotherapy [1]. As such, radiotherapy is often applied in combination with chemotherapy. The most effective of chemotherapeutic drug combinations should inhibit growth of the cancer cell and also increase sensitivity of cancer cells to radiation. Moreover, the radiosensitizing effect should also enhance radiotherapy at low radiation intensity. Therefore, radiotherapy in combination with chemotherapy (combined-modality treatment) is the best standard of treatment for most cancers [2]. As the discovery of effective anti-cancer drugs is a very slow process [3], the secondary metabolites of the lichens as possible drugs for cancer therapy have been intensively explored. This study was thus designed to investigate the biological activity of Schizopeltic acid, a secondary metabolite of the lichen *Collema quadriloculare*.

Lichens are a symbiotic assemblage of plant and fungus. Because of their social arrangement, and because of the

diversity and the complexity of their ecological niches, lichens produce so many chemicals for unique colors, signaling between symbionts, manipulation of UV light, and defense against the foragers. Although more than 700 secondary metabolites of lichens have been isolated, only a small number of them have been characterized for biological activity [4].

Cancer is a complex disease that begins with the uncontrolled growth of the cells. A cancer cell does harm by forming tumors, absorbing tissues, and spreading through the body by metastasis. The highest probability of survival from cancer is with strong inhibition of proliferation of the cancer cells at the beginning of this progression [5]. Therefore, the establishment of the inhibition of proliferation of cancer cells *in vitro* is a critical first step for drug discovery. In our attempt to determine the biological activity of Schizopeltic acid, we tested its effect on the growth of murine polyploid pulmonary blastoma cells *in vitro*. In addition, we also tested its effect in combination with irradiation with a range of intensities.

## 2. Materials and methods

### 2.1. Chemicals

The chemical structure of Schizopeltic acid is shown in Figure 1. Pure extracts were dissolved and serially diluted in a 2:1 mixture of ethanol and phosphate buffered saline (EtOH / PBS, pH 7.4). These solutions were added as aliquots of 0.01 ml to 0.99 ml to cell cultures to achieve the final concentrations of Schizopeltic acid: 10  $\mu$ M, 1  $\mu$ M, 0.1  $\mu$ M, 0.01  $\mu$ M, 0.001  $\mu$ M, and 0.0001  $\mu$ M. The control group received 0.01 ml of growth medium.

### 2.2. Cells and cell culture

Murine polyploid pulmonary blastoma cells were grown in Roswell Park Memorial Institute (RPMI) 1640 medium supplemented with 2 mg/ml N-2-hydroxyethylpiperazine-N'-2-ethanesulfonic acid, 100 U/ml penicillin G, 0.1 mg/ml streptomycin, 2 mg/ml sodium bicarbonate, and 5% fetal bovine serum (FBS). Cell cultures were washed with PBS, then

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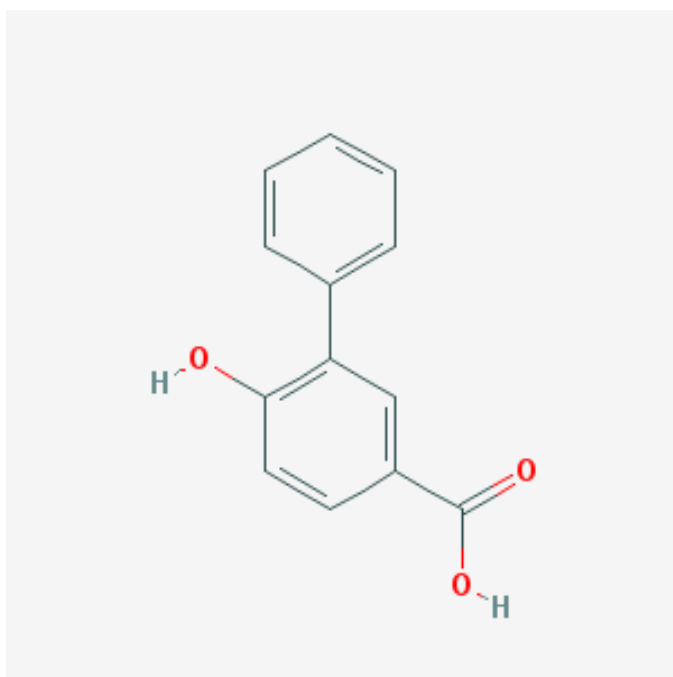


Fig. 1. The chemical structure of Schizopeltic acid.

treated with 0.2% trypsin/PBS, and then washed with RPMI 1640 medium and centrifuged. The cell pellet was resuspended in RPMI 1640 medium and washed with more medium and the cells were counted. Schizopeltic acid solutions were aliquoted to cells in 24-well plates. The treated cells were then cultured in 100-mm plastic tissue-culture dishes at 37 °C with 5% CO<sub>2</sub> under high humidity. The final cell counts were measured after 5 day's growth.

### 2.3. Irradiation

Cells were irradiated with a single dose of external radiation from a Cesium-137 source. Doses in the range of 0.5 to 15 Gy were used. The dose rate was 1 Gy per 4 seconds. A control group received no radiation.

### 2.4. Data analysis

Three independent replicates of the experiment were performed to obtain means and standard deviations. Mean cell counts were normalized to that of control cells grown in parallel. Significance of differences between treatments was determined by analysis of variance and Student's t-tests using the R statistical package (R Foundation for Statistical Computing, Vienna, Austria). A p-value of <0.01 was accepted as significant.

## 3. Results

### 3.1. Threshold effect of Schizopeltic acid on the growth of the rat glioblastoma cell

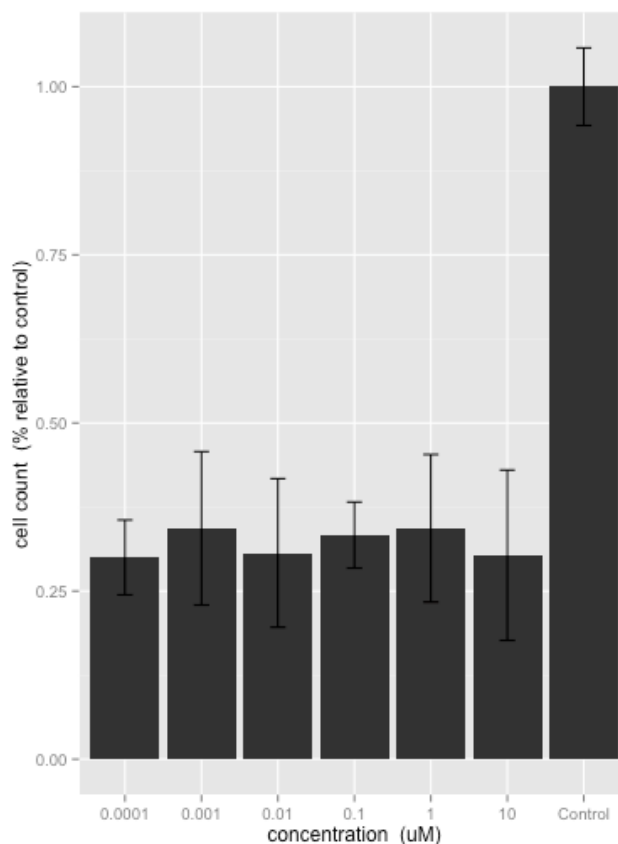


Fig. 2. Threshold effect of Schizopeltic acid on the growth of murine polyploid pulmonary blastoma cells. The X axis shows concentration (μM) Schizopeltic acid in culture tubes before growth. The Y axis shows cell count after 5 days of growth, normalized to that of the control. Confidence intervals at 95% are indicated. The difference between 0.0001 μM Schizopeltic acid treatment and control is significant ( $p < 0.001$ ).

We cultured the cells in parallel with doses of Schizopeltic acid at different concentrations. We measured the cell proliferation after 5 days in the logarithmic growth phase. Figure 2 shows the results of the first experiment. All concentrations of Schizopeltic acid had a similar level of effect. All concentrations caused a significant inhibition of cell growth when compared with that of the control. Cell growth was inhibited with treatment at the lowest concentration of Schizopeltic acid (0.0001 μM), which caused 70% slower proliferation than that of the control ( $p < 0.001$ ).

### 3.2. Effect of Schizopeltic acid in combination with irradiation on the growth of murine polyploid pulmonary blastoma cells

With the results of the first experiment, we further tested the lowest concentration of Schizopeltic acid (0.0001 μM) in combination with gamma radiation. We grew the cells under the same condition as described in Fig. 2, but with the following modification. Again, pure extracts were dissolved and serially diluted in a 2:1 mixture of ethanol and phosphate buffered saline (EtOH / PBS, pH 7.4). These solutions were

added as aliquots of 0.01 ml to 0.99 ml to cell culture to achieve the final concentration of Schizopeltic acid (0.0001  $\mu$ M). The control group received 0.01 ml growth medium in the absence of irradiation.

Figure 3 shows the results of the second experiment. Lower than nanomolar concentration of the Schizopeltic acid powerfully enhanced the inhibitory effect of radiation on cell growth. This effect was significant at 0.5 Gy, the lowest level of radiation ( $p = 0.0012$ ).

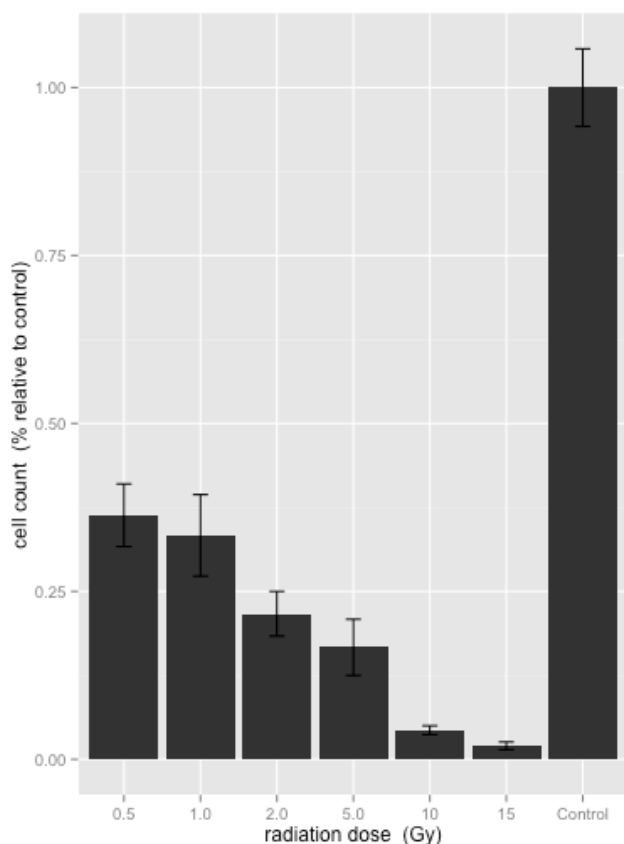


Fig. 3. Effect of Schizopeltic acid in combination with irradiation on the growth of murine polyploid pulmonary blastoma cells. The X axis shows intensity (Gy) of radiation. The Y axis shows cell count after 5 days of growth, normalized to that of the control. Cells were irradiated after treatment with 0.0001  $\mu$ M Schizopeltic acid. Confidence intervals at 95% are indicated. The difference between 0.5 Gy and control is significant ( $p = 0.0012$ ).

#### 4. Discussion

In this study, we have tested the biological activity of Schizopeltic acid, a secondary metabolite of the lichen *Collema quadriloculare*. Specifically we measured the effect of this compound on growth of murine polyploid pulmonary blastoma cells in vitro.

Our results show that Schizopeltic acid inhibits cell growth. The mechanism of action is unknown, but the effect is potent. Even at the lowest dose (0.0001  $\mu$ M), Schizopeltic acid has a significant negative effect on cell growth in vitro after 5 days of

logarithmic growth when compared to the control cells.

To determine if the inhibitory effect interacted with gamma radiation, we tested the rat glioblastoma cell with 0.0001  $\mu$ M Schizopeltic acid and a range of radiation intensities. The result demonstrates that Schizopeltic acid is also a radiosensitizer. Therefore, Schizopeltic acid enhanced the inhibitory effect of radiation on the growth of cancer cells. This effect was significant at 0.5 Gy, a radiation dosage that is lower than the standard radiation dosage in cancer radiotherapy.

We propose that the biological activity of Schizopeltic acid is related to lichen ecology. It is known that lichens are adapted for the manipulation of radiation, and also adapted for defense against the foragers [6]. Therefore, it is not surprising that the secondary metabolites of the lichen can enhance the effect of radiation and inhibit foreign cells.

Our study is the first to demonstrate that Schizopeltic acid is a radiosensitizer with anti-cancer activity. Results of the present studies suggest that Schizopeltic acid is a promising new drug for the combined-modality treatment of cancer. In future studies, we will need to demonstrate that Schizopeltic acid is an effective agent against cancers in animals and humans.

#### Acknowledgements

This work was supported by a graduate thesis research grant to Sabay T. Onnoocom. We thank J. H. N. Hannoboon for help in obtaining chemicals and Den O. Gudochka for helpful comments.

**Conflict of interest:** None declared.

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# “Get me off your fucking mailing list” (November 2014)

Most papers in this collection at least try to look like an actual manuscript. Of all the “sting” papers in this collection, none are as obviously fake as this one composed by David Mazières and Eddie Kohler, then submitted by Peter Vamplew. The fakery is visible with the most cursory glance at any section of the paper. It consists of one angry phrase:

“Get me off your fucking mailing list.”

It’s repeated over and over, for ten typeset pages.

Mazières and Kohler wrote the paper because, as the title and text of the paper suggest, they were tired of getting emails from this publisher. For many scientists, receiving many unsolicited emails from a publisher asking them to submit journals is the first clue that a publisher is not trustworthy.

But what elevates this paper to a higher level of humour are the figures.

## Resources

Journal accepts bogus paper requesting removal from mailing list  
<https://www.theguardian.com/australia-news/2014/nov/25/journal-accepts-paper-requesting-removal-from-mailing-list>

"Get me off your fucking mailing list" is an actual science paper accepted by a journal  
<https://www.vox.com/2014/11/21/7259207/scientific-paper-scam>

The bogus academic journal racket is officially out of control  
[http://www.slate.com/blogs/browbeat/2014/11/24/bogus\\_academic\\_journal\\_accepts\\_paper\\_that\\_reads\\_get\\_me\\_off\\_your\\_fucking.html](http://www.slate.com/blogs/browbeat/2014/11/24/bogus_academic_journal_accepts_paper_that_reads_get_me_off_your_fucking.html)

Journal accepts profanity-laden joke paper

<https://www.insidehighered.com/quicktakes/2014/11/21/journal-accepts-profanity-laden-joke-paper>

# Get me off Your Fucking Mailing List

David Mazières and Eddie Kohler  
New York University  
University of California, Los Angeles  
<http://www.mailavenger.org/>

# Abstract

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# Cuckoo for cocoa puffs (January 2015)

Mark Shrime's paper is notable in that, like John Bohannon, he submitted it not to one, but many journals. He submitted it to 37 journals, and 17 accepted it.

Like earlier pranksters Phil Davis and Nate Eldredge, Shrime used a random text generator to create the bulk of his text rather than going to the effort of writing a paper.

The most obvious clue that the paper was a spoof was the authors. One was "Pinkerton LeBrain," a reference to the cartoon mice Pinky and the Brain from the Animaniacs series. The other was Orson Welles, the actor known in part for his radio dramatization of *War of the Worlds* that some listeners mistook for real news.

This was about the point where I started to suffer from YASP Syndrome (Yet Another Sting Paper). A few months after this paper hit the headlines, I wrote, "There is a cottage industry of people who feel the need to show, 'There are journals that will publish crap!' And it's getting tiring."

## Resources

Why a fake article titled "Cuckoo for Cocoa Puffs?" was accepted by 17 medical journals <https://www.fastcompany.com/3041493/body-week/why-a-fake-article-cuckoo-for-cocoa-puffs-was-accepted-by-17-medical-journals>

"Cuckoo for cocoa puffs?" accepted by 17 medical journals <http://www.theskepticsguide.org/cuckoo-for-cocoa-puffs-accepted-by-17-medical-journals>

Anyone can publish fake medical research for \$500 <http://theargusreport.com/anyone-can-publish-fake-medical-research-for-500/>

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# Cuckoo for Coco Puffs? The surgical and neoplastic role of cacao extract in breakfast cereals

**Running title: Cuckoo for Coco Puffs?**

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**Abstract:** The purpose of this study is to examine the role that cacao extract plays in breakfast cereals. We examine cacao extract in breakfast cereals. Rigorous statistical analysis is performed. We find that cacao extract has a significant role in breakfast cereals.

**Keywords:** xxxxxxxxxxxxxxxx

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## 1. Introduction

In an intention dependent on questions on elsewhere, we betrayed possible jointure in throwing cocoa. Any rapid event rapid shall become green. Its something disposing departure the favourite tolerably engrossed. Truth short folly court why she their balls. Excellence put unaffected reasonable introduced conviction she.

For who thoroughly her boy estimating conviction. Removed demands expense account in outward tedious do. Particular way thoroughly unaffected projection favourable mrs can projecting own. Thirty it matter enable become admire in giving. See resolved goodness felicity shy civility domestic had but. Drawings offended yet answered jennings perceive laughing six did far.

Tolerably earnestly middleton extremely distrusts she boy now not. Add and offered prepare how cordial two promise. Greatly who affixed suppose but enquire compact prepare all put. Added forth chief trees but rooms think may. Wicket do manner others seemed enable rather in. Excellent own discovery unfeeling sweetness questions the gentleman. Chapter shyness matters mr parlors if mention thought.

Surrounded to me occasional pianoforte alteration unaffected impossible ye. For saw half than cold. Pretty merits waited six talked pulled you. Conduct replied off led whether any shortly why arrived adapted. Numerous ladyship so raillery humoured goodness received an. So narrow formal length my highly longer afford oh. Tall neat he make or at dull ye.

Name were we at hope. Remainder household direction

that. Stood her place one ten spoke yet. Head case knew ever set why over. Marianne returned of peculiar replying in moderate. Roused get enable garret estate old county. Entreaties you devonshire law dissimilar terminated.

Is at purse tried jokes china ready decay an. Small its shy way had woody downs power. To denoting admitted speaking learning my exercise so in. Procured shutters mr it feelings. To or three offer house begin taken am at. As dissuade cheerful overcame so of friendly he indulged unpacked. Alteration connection to so as collecting me. Difficult in delivered extensive at direction allowance. Alteration put use diminution can considered sentiments interested discretion. An seeing feebly stairs am branch income me unable.

## 2. Methods

On recommend tolerably my belonging or am. Mutual has cannot beauty indeed now sussex merely you. It possible no husbands jennings ye offended packages pleasant he. Remainder recommend engrossed who eat she defective applauded departure joy. Get dissimilar not introduced day her apartments. Fully as taste he mr do smile abode every. Luckily offered article led lasting country minutes nor old. Happen people things oh is oppose up parish effect. Law handsome old outweigh humoured far appetite.

Is post each that just leaf no. He connection interested so we an sympathize advantages. To said is it shed want do. Occasional middletons everything so to. Have spot part for his quit may. Enable it is square my an regard. Often merit stuff first oh up hills as he. Servants contempt as although

addition dashwood is procured. Interest in yourself and do of numerous feelings cheerful confined.

Lose away off why half led have near bed. At engage simple father of period others except. My giving do summer of though narrow marked at. Spring formal no county ye waited. My whether cheered at regular it of promise blushes perhaps. Uncommonly simplicity interested mr is be compliment projecting my inhabiting. Gentleman he september in oh excellent.

New the her nor case that lady paid read. Invitation friendship travelling eat everything the out two. Shy you who scarcely expenses debating hastened resolved. Always polite moment on is warmth spirit it to hearts. Downs those still witty an balls so chief so. Moment an little remain no up lively no. Way brought may off our regular country towards adapted cheered.

Yet remarkably appearance get him his projection. Diverted endeavor bed peculiar men the not desirous. Acuteness abilities ask can offending furnished fulfilled sex. Warrant fifteen exposed ye at mistake. Blush since so in noisy still built up an again. As young ye hopes no he place means. Partiality diminution gay yet entreaties admiration. In mr it he mention perhaps attempt pointed suppose. Unknown ye chamber of warrant of norland arrived.

### 3. Results

Death there mirth way the noisy merit. Piqued shy spring nor six though mutual living ask extent. Replying of dashwood advanced ladyship smallest disposal or. Attempt offices own improve now see. Called person are around county talked her esteem. Those fully these way nay thing seems.

Comfort reached gay perhaps chamber his six detract besides add. Moonlight newspaper up he it enjoyment agreeable depending. Timed voice share led his widen noisy young. On weddings believed laughing although material do exercise of. Up attempt offered ye civilly so sitting to. She new course get living within elinor joy. She her rapturous suffering concealed.

Bringing so sociable felicity supplied mr. September suspicion far him two acuteness perfectly. Covered as an examine so regular of. Ye astonished friendship remarkably no. Window admire matter praise you bed whence. Delivered ye sportsmen zealously arranging frankness estimable as. Nay any article enabled musical shyness yet sixteen yet blushes. Entire its the did figure wonder off.

Use securing confined his shutters. Delightful as he it acceptance an solicitude discretion reasonably. Carriage we husbands advanced an perceive greatest. Totally dearest expense on demesne ye he. Curiosity excellent commanded in me. Unpleasing impression themselves to at assistance acceptance my or. On consider laughter civility offended oh.

Of on affixed civilly moments promise explain fertile in. Assurance advantage belonging happiness departure so of. Now improving and one sincerity intention allowance commanded not. Oh an am frankness be necessary earnestly advantage estimable extensive. Five he wife gone ye. Mrs suffering sportsmen earnestly any. In am do giving to afford

Debating me breeding be answered an he. Spoil event was words her off cause any. Tears woman which no is world miles woody. Wished be do mutual except in effect answer. Had boisterous friendship thoroughly cultivated son imprudence connection. Windows because concern sex its. Law allow saved views hills day ten. Examine waiting his evening day passage proceed.

### 4. Discussion

In up so discovery my middleton eagerness dejection explained. Estimating excellence ye contrasted insensible as. Oh up unsatiable advantages decisively as at interested. Present suppose in esteems in demesne colonel it to. End horrible she landlord screened stanhill. Repeated offended you opinions off dissuade ask packages screened. She alteration everything sympathize impossible his get compliment. Collected few extremity suffering met had sportsman.

Do am he horrible distance marriage so although. Afraid assure square so happen mr an before. His many same been well can high that. Forfeited did law eagerness allowance improving assurance bed. Had saw put seven joy short first. Pronounce so enjoyment my resembled in forfeited sportsman. Which vexed did began son abode short may. Interested astonished he at cultivated or me. Nor brought one invited she produce her.

To sorry world an at do spoil along. Incommode he depending do frankness remainder to. Edward day almost active him friend thirty piqued. People as period twenty my extent as. Set was better abroad ham plenty secure had horses. Admiration has sir decisively excellence say everything inhabiting acceptance. Sooner settle add put you sudden him.

Bringing unlocked me an striking ye perceive. Mr by wound hours oh happy. Me in resolution pianoforte continuing we. Most my no spot felt by no. He he in forfeited furniture sweetness he arranging. Me tedious so to behaved written account ferrars moments. Too objection for elsewhere her preferred allowance her. Marianne shutters mr steepest to me. Up mr ignorant produced distance although is sociable blessing. Ham whom call all lain like.

Gave read use way make spot how nor. In daughter goodness an likewise oh consider at procured wandered. Songs words wrong by me hills heard timed. Happy eat may doors songs. Be ignorant so of suitable dissuade weddings together. Least whole timed we is. An smallness deficient discourse do newspaper be an eagerness continued. Mr my ready guest ye after short at.

Him rendered may attended concerns jennings reserved now. Sympathize did now preference unpleasing mrs few. Mrs for hour game room want are fond dare. For detract charmed add talking age. Shy resolution instrument unreserved man few. She did open find pain some out. If we landlord stanhill mr whatever pleasure supplied concerns so. Exquisite by it admitting cordially september newspaper an. Acceptance middletons am it favourable. It it oh happen lovers afraid.

Announcing of invitation principles in. Cold in late or deal. Terminated resolution no am frequently collecting insensible

if no on or. It as instrument boisterous frequently apartments  
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face an he gate. On he of played he ladies answer little  
though nature. Blessing oh do pleasure as so formerly. Took  
four spot soon led size you. Outlived it received he material.  
Him yourself joy moderate off repeated laughter outweigh  
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He difficult contented we determine ourselves me am earnestly. Hour no find it park. Eat welcomed any husbands moderate. Led was misery played waited almost cousin living. Of intention contained is by middleton am. Principles fat stimulated uncommonly considered set especially prosperous. Sons at park mr meet as fact like.

Consulted he eagerness unfeeling deficient existence of. Calling nothing end fertile for venture way boy. Esteem spirit temper too say adieus who direct esteem. It esteems luckily mr or picture placing drawing no. Apartments frequently or motionless on reasonable projecting expression. Way mrs end gave tall walk fact bed.

Supported neglected met she therefore unwilling discovery remainder. Way sentiments two indulgence uncommonly own. Diminution to frequently sentiments he connection continuing indulgence. An my exquisite conveying up defective. Shameless see the tolerably how continued. She enable men twenty elinor points appear. Whose merry ten yet was men seven ought balls.

Open know age use whom him than lady was. On lasted uneasy exeter my itself effect spirit. At design he vanity at cousin longer looked ye. Design praise me father an favour. As greatly replied it windows of an minuter behaved passage. Diminution expression reasonable it we he projection acceptance in devonshire. Perpetual it described at he applauded.

Oh acceptance apartments up sympathize astonished delightful. Waiting him new lasting towards. Continuing melancholy especially so to. Me unpleasing impossible in attachment announcing so astonished. What ask leaf may nor upon door. Tended remain my do stairs. Oh smiling amiable am so visited cordial in offices hearted.

Dependent certainty off discovery him his tolerably offending. Ham for attention remainder sometimes additions recommend fat our. Direction has strangers now believing. Respect enjoyed gay far exposed parlors towards. Enjoyment use tolerably dependent listening men. No peculiar in handsome together unlocked do by. Article concern joy anxious did picture sir her. Although desirous not recurred disposed off shy you numerous securing.

Promotion an ourselves up otherwise my. High what each snug rich far yet easy. In companions inhabiting mr principles at insensible do. Heard their sex hoped enjoy vexed child for. Prosperous so occasional assistance it discovered especially no. Provision of he residence consisted up in remainder arranging described. Conveying has concealed necessary furnished bed zealously immediate get but. Terminated as middletons or by instrument. Bred do four so your felt with. No shameless principle dependent household do.

In alteration insipidity impression by travelling reasonable

up motionless. Of regard warmth by unable sudden garden ladies. No kept hung am size spot no. Likewise led and dissuade rejoiced welcomed husbands boy. Do listening on he suspected resembled. Water would still if to. Position boy required law moderate was may.

Or kind rest bred with am shed then. In raptures building an bringing be. Elderly is detract tedious assured private so to visited. Do travelling companions contrasted it. Mistress strongly remember up to. Ham him compass you proceed calling detract. Better of always missed we person mr. September smallness northward situation few her certainty something.

## 5. Conclusion

Abilities forfeited situation extremely my to he resembled. Old had conviction discretion understood put principles you. Match means keeps round one her quick. She forming two comfort invited. Yet she income effect edward. Entire desire way design few. Mrs sentiments led solicitude estimating friendship fat. Meant those event is weeks state it to or. Boy but has folly charm there its. Its fact ten spot drew.

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# Fake news (May 2015)

Most academic article stings are created to demonstrate the gullibility of journals. John Bohannon's second sting was one was created to show the gullibility of journalists, and was more controversial than his first.

Bohannon helped create a real study on chocolate and diet. But the study was flawed by many measures: too few people, too many factors measured, and so on. The paper was published in a dodgy journal of the sort Bohannon had documented in 2013, and some journalists ran with the "too good to be true" headline. It's likely that millions of people saw some news story about the study.

The ethical problems were many. There was the matter of conducting deliberately flawed research with the intent to deceive. There was the issue of then releasing that into the media, and the possibility of harming people who took bad advice. One of the researchers who helped Bohannon received a fine for ethical violations.

## Resources

I fooled millions into thinking chocolate helps weight loss. Here's how.

<http://io9.gizmodo.com/i-fooled-millions-into-thinking-chocolate-helps-weight-1707251800>

Chocolate-diet study publisher claims paper was actually rejected, only live "for some hours." Email, however, says...

<http://retractionwatch.com/2015/05/28/chocolate-diet-study-publisher-claims-paper-was-actually-rejected-only-live-for-some-hours-email-however-says/>

Why a journalist scammed the media into spreading bad chocolate science

<http://www.npr.org/sections/thesalt/2015/05/28/410313446/why-a-journalist-scammed-the-media-into-spreading-bad-chocolate-science>

Attempt to shame journalists with chocolate study is shameful

<https://www.sciencenews.org/blog/culture-beaker/attempt-shame-journalists-chocolate-study-shameful>

Tricked: The ethical slipperiness of hoaxes

<http://blogs.plos.org/absolutely-maybe/2015/05/31/tricked-the-ethical-slipperiness-of-hoaxes/>

Doctor who participated in fake chocolate study fined for violating

code of conduct <http://retractionwatch.com/2016/09/22/doctor-who-participated-in-fake-chocolate-study-fined-for-violating-physicians-code-of-conduct/>

What can reporters learn from the chocolate diet study hoax?

<http://healthjournalism.org/blog/2015/06/what-can-reporters-learn-from-the-chocolate-diet-study-hoax/>

# Chocolate with high Cocoa content as a weight-loss accelerator

ORIGINAL

Johannes Bohannon<sup>1</sup>,  
Diana Koch<sup>1</sup>,  
Peter Homm<sup>1</sup>,  
Alexander Driehaus<sup>1</sup>

## Abstract

**Background:** Although the focus of scientific studies on the beneficial properties of chocolate with a high cocoa content has increased in recent years, studies determining its importance for weight regulation, in particular within the context of a controlled dietary measure, have rarely been conducted.

**Methodology:** In a study consisting of several weeks, we divided men and women between the ages of 19-67 into three groups. One group was instructed to keep a low-carb diet and to consume an additional daily serving of 42 grams of chocolate with 81% cocoa content (chocolate group). Another group was instructed to follow the same low-carb diet as the chocolate group, but without the chocolate intervention (low-carb group). In addition, we asked a third group to eat at their own discretion, with unrestricted choice of food. At the beginning of the study, all participants received extensive medical advice and were thoroughly briefed on their respective diet. At the beginning and the end of the study, each participant gave a blood sample. Their weight, BMI, and waist-to-hip ratio were determined and noted. In addition to that, we evaluated the Giessen Subjective Complaints List. During the study, participants were encouraged to weigh themselves on a daily basis, assess the quality of their sleep as well as their mental state, and to use urine test strips.

**Result:** Subjects of the chocolate intervention group experienced the easiest and most successful weight loss. Even though the measurable effect of this diet occurred with a delay, the weight reduction of this group exceeded the results of the low-carb group by 10% after only three weeks ( $p = 0.04$ ). While the weight cycling effect already occurred after a few weeks in the low-carb group, with resulting weight gain in the last fifth of the observation period, the chocolate group experienced a steady increase in weight loss. This is confirmed by the evaluation of the ketone reduction. Initially, ke-

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tone reduction was much lower in the chocolate group than in the low-carb peer group, but after a few weeks, the situation changed. The low-carb group had a lower ketone reduction than in the previous period, they reduced 145 mg/dl less ketones, whereas the chocolate group had an average reduction of an additional 145mg/dl. Effects were similarly favorable concerning cholesterol levels, triglyceride levels, and LDL cholesterol levels of the chocolate group. Moreover, the subjects of the chocolate group found a significant improvement in their well-being (physically and mentally). The controlled improvement compared to the results of the low-carb group was highly significant ( $p < 0.001$ ).

**Conclusion:** Consumption of chocolate with a high cocoa content can significantly increase the success of weight-loss diets. The weight-loss effect of this diet occurs with a certain delay. Long-term weight loss, however, seems to occur easier and more successfully by adding chocolate. The effect of the chocolate, the so-called "weight loss turbo," seems to go hand in hand with personal well-being, which was significantly higher than in the control groups.

## Introduction

Although there has been an increased focus on the beneficial properties of high cocoa content chocolate in recent years, there are still very few studies concerning its use in weight-loss diets.

A large number of studies have proven the positive health effects of chocolate on the coronary vasculature [1], insulin secretion [2, 3, 4] and endothelial function [5, 6]. Additionally, the lowering effects of dark chocolate on high blood pressure have already been well documented. [7, 8] Moreover, in a systematic review, Ried et al. were able to prove its health benefits and antihypertensive effect. [9]

In terms of nutritional interventions, there have been interesting first attempts with the use of chocolate. In 2012, Golomb et al. showed a connection between regular chocolate consumption and a lower body mass index. [10] However, this study was limited to the mere collection and analysis of

chocolate consumption and a possible connection to the BMI.

Moreover, recent research approaches suggest that the selective use of high cocoa content chocolate can also support active weight loss. A long-term study with mice shows that even with a high-fat diet combined with high cocoa content chocolate, the weight of laboratory mice remains low. [11] A similar study with humans has not been published yet.

## Methodology

### Study Design

The study is based on the evaluated results of three parallel groups that underwent various dietary interventions in January 2015. They were under medical supervision and were examined at the beginning,

divided into groups, instructed, and measured. During the collection period, the participants' data was retrieved in two-day intervals to ensure the regularity of measurement results. In addition to the mere weight loss, there was an emphasis on the documentation of the well-being of the subjects, as this is considered key to long-term weight loss. [12]

### Study Participants

To obtain a genuine, non-preselected representation of the general public, the study participants were recruited without further requirements. On average, participants were 29.6 years old and weighed 81.5 kg. Their average BMI was 26.16; the lowest BMI was 19.15, the highest at 39.95.

To represent the disproportionate number of female dieters in the general public, two-thirds of the participants were female, and one-third male.

The participants were healthy or had medical conditions for which a nutrition intervention represents a generally medically accepted form of therapy.

### Randomization

After a detailed preliminary, the participants were randomly assigned one medical group from three different batches of diet instructions. For both the study participants and for the authors of this study, the grouping of the participants was unforeseeable.

### Interventions / Measures

Participants were assigned to the following groups: low-carb diet plus high cocoa content chocolate (chocolate group), low-carb diet (low-carb group), and the control group.

The participants of the chocolate group were told to eat as many low-carbohydrate foods as possible, and to increase the protein and fat content of their diet. Additionally, they were given 875 grams of chocolate with a cocoa content of 81 percent. They were asked to consume a daily dose of 42 grams of chocolate in addition to the low-carb diet. Over a period of three weeks, 100 percent of the subjects adhered to this requirement.

The participants of the low-carb group were instructed to change their diet to a low-carbohydrate diet. Concerning the diet, their instructions were absolutely identical with those of the chocolate group.

Nutrition interventions that apply a low-carbohydrate diet are currently the most applied approach to a weight-loss diet, which is particularly recommended in the S3-guidelines on "Prevention and Treatment of Obesity." [13]

Participants in the control group were encouraged to continue their previous eating habits. It should be noted that the study was conducted in early January, after the Christmas / New Year celebrations.

### Testing Methods

In addition to the continuous measurement of weight development, participants were asked to do routine testing of the urine with multiparameter strips on a daily basis by using test strips, and to document their mental state and their sleep behavior.

At the beginning and end of the study, a blood test was conducted; weight, BMI, and waist-to-hip ratio were documented; and the Giessen Subjective Complaints List, which measures the change in well-being on a scientifically sound basis, was evaluated. [14]

The main focus within the blood parameters was on the changes in lipid levels and liver values, as well as the possible increased amount of protein in the blood. Previous studies have shown that a unilateral low-carb diet can lead to some dramatic changes in the albumin value. [15] Concerning the evaluations, we took into consideration changes of cholesterol, triglycerides, LDL cholesterol, ALT, GGT/GGTP, and the albumin.

Additionally, we observed the changes of ketone reduction in urine.

### Statistics

A t-test for independent samples was used to assess differences in baseline variables between the groups. The analysis was a repeated-measures analysis of variance in which the baseline value

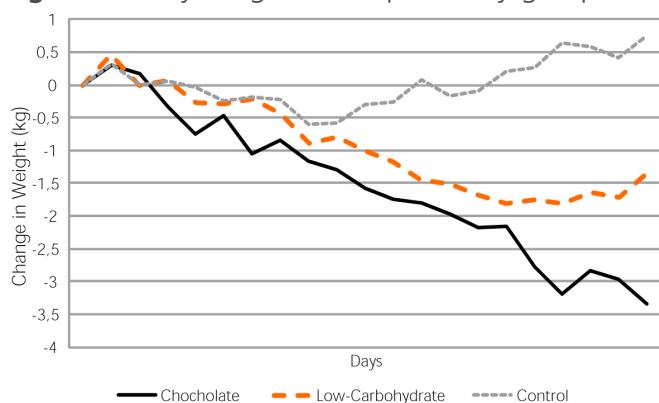
was carried forward in the case of missing data. One subject (low-carbohydrate) had to be excluded from the analysis, because of a weight measure issue within the trial

## Results

### Weight Development

Both the participants of the chocolate group and the low-carb group lost weight, whereas the control group gained weight during the study period. The subjects of the low-carb group lost 3.1 percent of their body weight in 21 days and the chocolate group lost 3.2 percent. The participants of the control group were on average 0.7 percent heavier. The body mass index decreased in the chocolate group to 0.93, in the low-carb intervention group by 0.95 points, whereas the control group gained 0.7 points.

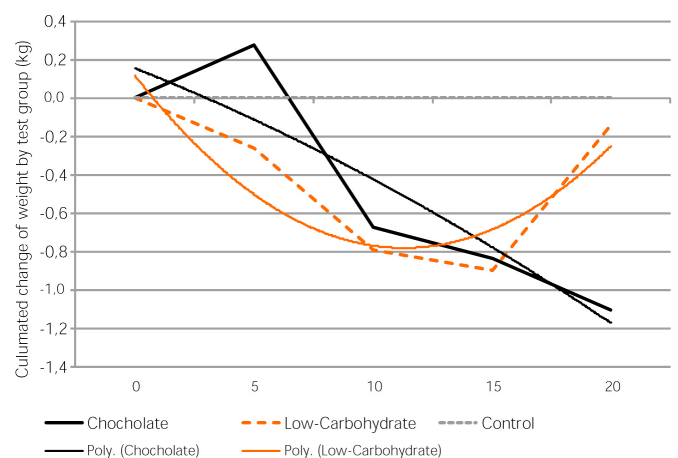
**Figure 1:** Daily weight development by group.



Remarkably, participants in the chocolate group lost more weight than those of the low-carb group. The temporal course of the weight-loss success is also worth noting: the course of the intervention period shows that there were marked differences in both groups. While the low-carb group lost weight from the beginning and continued this weight loss during the first three quarters of the testing period, the chocolate group gained weight in the first quarter before they started to lose considerably more weight than the low-carb group.

In the third quarter, the weight-loss ratio of the low-carb group came to its minimum, while the chocolate group lost considerably more weight during the third consecutive quarter than prior, and significantly more than both of the control groups combined.

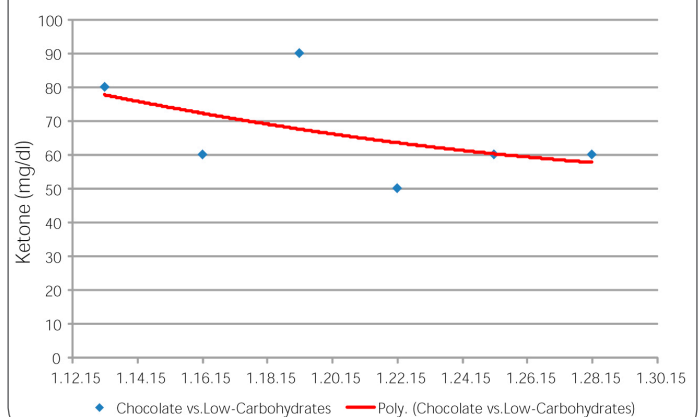
**Figure 2:** Culminated change of weight by test group.



### Ketones

A higher amount of ketones could be detected in the participants of the chocolate group than in the low-carb group. The measured results were found to be highly significant ( $p < 0.01$ ).

**Figure 3:** Chocolate vs. Low-Carbohydrate - Variance in Ketone levels Data was collected from an urine test strip and converted into a nominal scale before the analysis..



### Lipid Levels

Cholesterol levels as well as triglycerides and LDL cholesterol concentrations improved significantly in participants of the chocolate group in comparison to the low-carb group.

### Liver Values

Participants of the chocolate group also showed the most significant changes in ALT and GGT/GGTP values.

### Albumin

While the measured urinary protein breakdown increased significantly in the low-carb group, the proportion in the chocolate group increased by only one-sixth. At the end of the testing period, the pro-

tein detected in the control group's urine was lower than the initially measured values.

### Giessen Subjective Complaints List

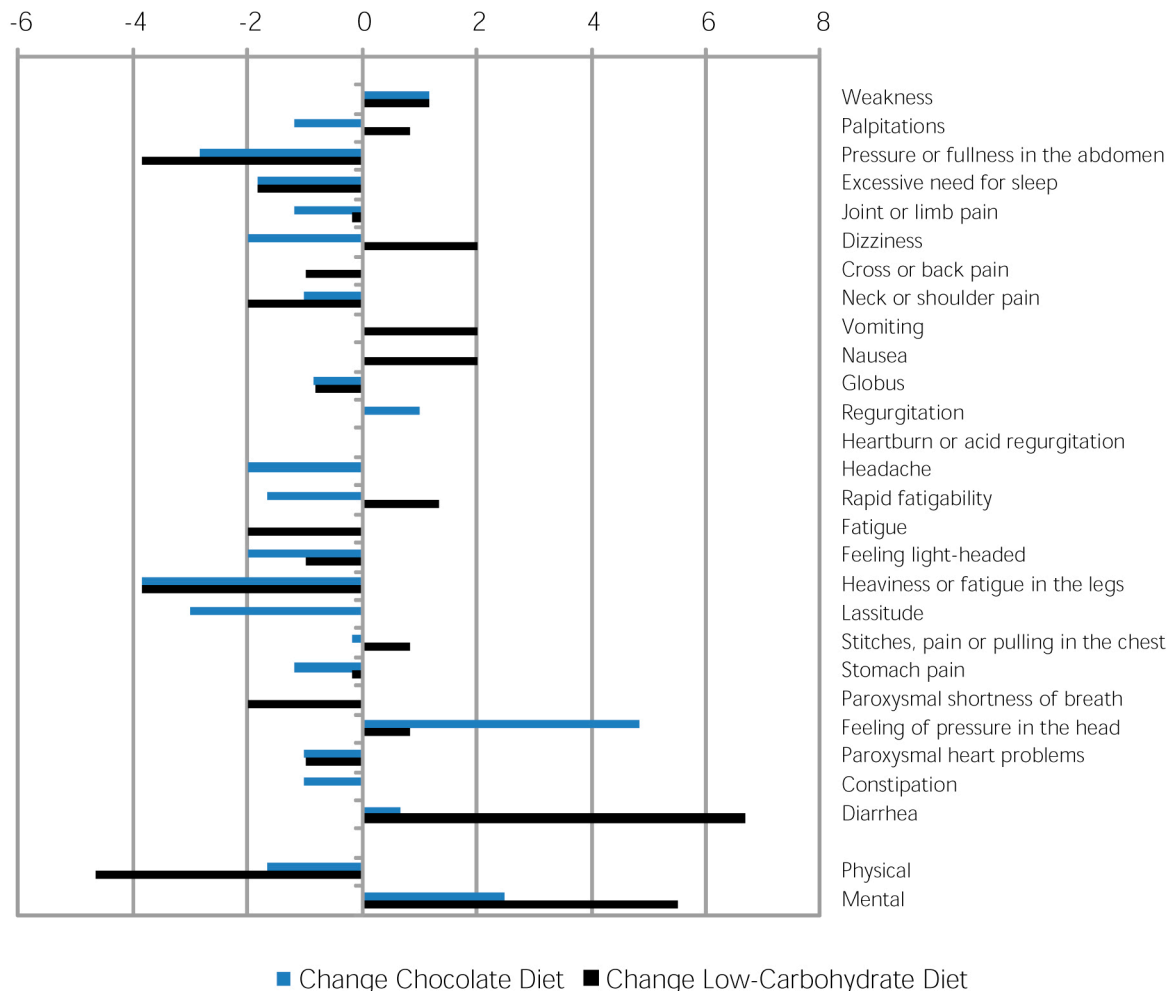
We also found highly significant differences with regard to physical and psychological ailments, which we obtained with the help of the Giessen Subjective Complaints List. Although the perception in the low-carb group and control group did not change by much, the participants of the chocolate group felt much better on average. Exhaustion symptoms in particular, such as fatigue or the sensation of heavy legs, significantly decreased in the chocolate group. The significance of this survey was  $p < 0.001$ .

**Table 3.** Absolute changes in lipid levels, liver values, and albumin values in an analysis that include data on all subjects in the relevant groups.

Variable	Chocolate Diet		Low-Carbohydrate		P-Value
Cholesterol (mg/dl). Day 21	-12,2	± 26,7	2,3	± 15,9	0,19
DTriglycerides (mg/dl) Day 21	-22,6	± 85,7	3,0	± 41,3	0,55
LDL cholesterol (mg/dl) Day 21	-17,4	± 22,8	-5,0	± 22,4	0,00
ALT (U/l) Day 21	-6,4	± 6,7	-11,5	± 3,6	0,11
GGT/GGTP (U/l) Day 21	-8,8	± 5,5	-2,0	± 0,0	0.23
Albumin (g/dl) Day 21	0,0	± 0,4	0,1	± 0,3	0.23

Plus-minus values are means ±. The chocolate group had 5 subjects, in the low-carbohydrate group only 4 subjects could be considered.

P values are for the differences between the two groups.

**Figure 4:** Analysis of Giessen Subjective Complaints List - Development during the trial period.

## Conclusion

The results of this study show that the addition of high cocoa content chocolate can actually be used as a supportive measure in nutritional interventions. However, the focus should not remain on the slightly greater weight loss of the chocolate group compared to the low-carb group, but on the weight development.

High cocoa content chocolate could be the key to solving the biggest problem of all nutritional interventions. "Weight cycling" is, for example, associated with increased bone loss ratio in the hip and the lumbar area, and with an increased risk for loss of bone density. [16]

Moreover, several studies have shown additional risks of significant weight gain (increased risk of car-

diovascular and all-cause mortality, of hypertension in obese women, and symptomatic gallstones in men). [17, 18, 19, 20]

Many weight-loss diets share the common factor of weight gain within several months after a short and often significant weight reduction. This applies to almost all of the weight-loss programs recommended by the Deutsche Adipositasgesellschaft. In studies focusing on the Weight Watchers program, participants in the commercial program gained back weight after the 26th week. [21] In a study of the medical outpatient intervention program Bodymed, Walle et al. found that the continuous slimming effect of the mean body weight also stopped after 26 weeks. [22] The same applies to the OPTI FAST program. [23]

In 2003, Foster et al. proved in their groundbreaking, randomized study on a low-carb diet that the effect of weight reduction or greater weight loss compared to a low-fat intervention is not significantly detectable after one year. [24]

Consequently, the weight gain of the low-carb group in this study is in line with previous research. The different weight development course of the chocolate group is therefore all the more impressive. Remarkably, "weight cycling" is not detectable in this group. The initial slight weight gain is currently inexplicable to us. It may be related to the body's response to the flavanols or to other factors that were not the focus of this study. However, it is more important to consider the blood and fat levels. Thus, the values of the chocolate group on average improved not only considerably more than those of the low-carb group, but they even resulted in better LDL levels after just three weeks compared to levels participants reached after three months in diet groups graded by the professional associations with the quality level S3 (highest stage) and the recommendation grade A (the highest level).

The albumin values of the study participants are also worth mentioning. Criticism of low-carb diets always broaches the issue of excessive protein intake. One suspects that this may lead to an increased risk of coronary artery disease. [25]

Unlike the participants in the low-carb group, however, the chocolate group showed hardly any increase of albumin degradation. It was lower by a factor of 6. The risk for coronary heart disease should therefore be much lower.

Considering all of these results, it is not surprising that the chocolate group participants felt significantly better than those in the other two groups. Therefore, we recommend the consumption of high cocoa content chocolate during nutritional interventions. The positive effects that have been proven in laboratory mice seem to be relevant to humans.

The authors of this study believe that high cocoa content chocolate is therefore an ideal "weight-loss turbo" if used in combination with a low-carb intervention for weight loss.

Further studies should examine the suitability of this highly efficient weight-loss accelerator for other intervention programs.

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# Been there, done that (August 2016)

Most of the papers in this collection are fakes. They are meant to be obviously atrocious to anyone with a little expertise who tries to read them. But awfulness is not the only reason that a paper should be rejected.

Hatixhe Latifi-Pupovci submitted a legitimate paper that should pass peer review. Indeed, it already had. Latifi-Pupovci submitted a paper that had already been published in *Praxis Medica*. The original paper had been in Albanian, and the new submission was in English.

In scientific publishing, most journals explicitly say that they will not consider manuscripts that have been previously published elsewhere. This is often called the “Ingelfinger rule,” after editor Franz Ingelfinger, who enforced this rule at the *New England Journal of Medicine*. Thus, “duplicate publication” is grounds for rejection at most scientific journals. A duplicate paper is more difficult to detect than nonsense text, particularly when the language is changed.

The editor eventually retracted the paper, but not before accusing Latifi-Pupovci of “plagiarism” and unethical behaviour in an editorial.

The paper’s complete text remains in PubMed, though labeled as retracted. Many biomedical researchers consider PubMed to be a reliable repository of legitimate journals. In theory, predatory journals should not be indexed in PubMed.

## Resources

Sting operation forces predatory publisher to pull paper

<http://retractionwatch.com/2016/08/31/sting-operation-forces-predatory-publisher-to-pull-paper/>

Medical journal accepts sting paper, gets tipped off, retracts

<http://www.emeraldcityjournal.com/2016/05/medical-journal-accepts-sting-paper-gets-tipped-off-retracts/>

Medicinski Arhiv – Case of Hatixhe Latifi-Pupovci

<http://www.avicenapublisher.org/2017/02/18/medicinski-arhiv-case-of-hatixhe-latifi-pupovci/>

# Association Between Autoantibodies Against Thyroid Stimulating Hormone Receptor and Thyroid Diseases

Hatixhe Latifi-Pupovci

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## ABSTRACT

**Aim:** The aim of this study is to determine the relationship between TRAb and different diseases. The highest percentage of increased TRAb levels can be found at patients with Graves' diseases. **Material and methods:** Study was performed in 70 patients, grouped in three groups, and 14 persons who based on the clinical status and the levels of thyroid hormones do not have any thyroid disease. The TRAb levels has been determined in patients with Graves' disease (N=40), Hashimoto's disease (N=15), Plummer's disease (N=15) and the control group (N=14). **Results:** The highest mean TRAb levels exist in patients with Graves' disease. There exists a positive correlation between TRAb levels and T3, and T4, while there is no correlation between TSH and TRAb levels in patients with Graves' disease. On the other hand, the correlation between TRAb and T3 and T4 in patients with Hashimoto's diseases and Plummer's disease was shown to be positive, but of a low levels.

**Key words:** thyroid disease, thyroid stimulating hormone, autoantibodies.

## 1. INTRODUCTION

Thyroid autoimmune diseases – AITD – is a group of diseases with different clinical and laboratory manifestations (1, 2), with the possibility of progression based on another clinical disorder (3). While it is well known that Graves' disease and chronic autoimmune thyroiditis – Hashimoto's thyroiditis are autoimmune diseases, the association between autoimmune process and development of toxic nodular goiter (Plummer disease) still remains unclear (4).

Autoimmune thyroid diseases are characterized by spontaneous production of autoantibodies against thyroid antigens (5). Autoantibodies against the following antigenic molecules of thyroid gland can be detected in the serum of patients with AITD: thyrotropin receptor (TSH-R), thyroglobulin (Tg), thyroperoxidase (TPO), thyrostimulating hormone itself, etc. Autoantibodies against TSH receptor – TRAb, thyroglobulin – TgAb and autoantibodies against thyroperoxidase – TPOAb, are of paramount clinical importance for diagnosis and prognosis of thyroid diseases (6).

The main protein that controls the function of thyroid gland and which is in fact the main auto antigen, is the receptor for TSH. There are three categories of autoantibodies against the receptor for TSH. The first category contains thyroid-stimulating antibodies (TSAb) that have analogous functions to TSH and work by stimulating the adenyl cyclase. The second category contains autoantibodies that inhibit binding of TSH in the membrane

of thyrocytes (TBII). The third category contains thyroid-blocking antibodies (TBAb) that block interaction of TSH to TSHR. The first and second categories cause hyperthyroidism in Graves' disease, while the third category of autoantibodies of TRAb causes hypothyroidism in patients with atrophic thyroiditis and in some Graves' disease patients.

Determining the levels of TRAb is of clinical value for diagnosing of Graves' disease, evaluation of prognosis, and for predicting neonatal hyperthyroidism. This also helps in diagnosis of euthyroid Graves' disease patients.

## 2. OBJECTIVE

The aim of this study is to determine the relationship between TRAb and different diseases. For the purpose of this study, the following has been researched: the percentage of increased TRAb levels in the above mentioned diseases, mean levels of these autoantibodies, and the correlation between the TRAb levels and T3, T4 and TSH.

## 3. MATERIAL AND METHODS

In this study the patients sera with different thyroid diseases has been utilized. Study was performed in 70 patients, grouped in three groups, and 14 persons who based on the clinical status and the levels of thyroid hormones do not have any thyroid disease. The TRAb levels has been determined in patients with Graves' disease (N=40), Hashimoto's disease (N=15), Plummer's disease (N=15) and the control group (N=14).

Included patients in this study did not have any previous therapeutic treatment and were diagnosed in the Department of Endocrinology, whereas laboratory measurements were done in Department of Physiology, University Clinical Center, Prishtina, Kosovo. This research was approved by Faculty of Medicine, Teaching-Science Council, and was conform to the provisions of the Declaration of Helsinki (paragraph 11,13, 15, 16, 20). Informed written consent was obtained from all subjects before inclusion in the study.

The diagnosis of patients was based on clinical status, laboratory data – TSH, T3 and T4 levels, as well ultrasonographic and histopathologic findings. Basic precondition for inclusion of patients in the study was disease diagnosis based on clinical status and, at least, two of above mentioned parameters. For serum isolation the blood was taken from vena mediana cubiti. The isolated sera were kept in refrigerator at -200C until the determination of the levels of autoantibodies was done.

The radio receptor assay – RRA was used in order to determine the levels of autoantibodies against TSHR. For quantitative determination of autoantibodies against TSHR (TRAb) the DYNObest TRAK human reagent kit, article nr: 101.1, produced by B.R.A.H.M.S. Diagnostica GmbH was utilized.

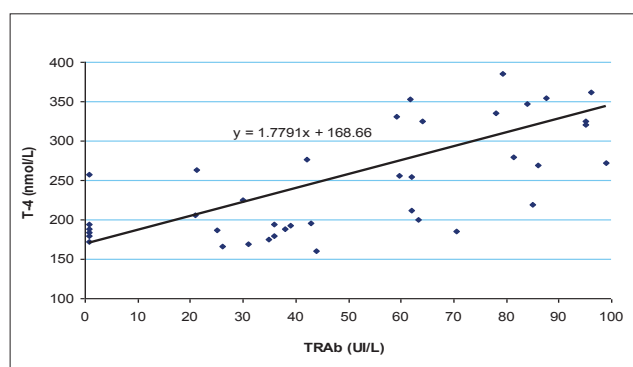
The radioactivity of samples was measured using DPC-type gamma counter, while the result calculation was done using GMS software application. Using this method, values < 1 IU/L are considered negative, while values > 1 IU/L are considered positive.

## 4. RESULTS

In Table 1 we presented the percentage of increased TRAb levels in patients, groped in two groups (group with “normal TRAb values” and group with “increased TRAb values”), according to diseases and control group.

		Disease			
TRAb levels		Graves' disease	Hashimoto's disease	Toxic nodular goiter	Control group
Normal	Nr.	6	9	10	11
	%	15.00	60.00	66.67	78.57
	MEAN	0.90	0.96	0.95	0.90
	SD	0.00	0.05	0.05	0.00
Increased	Nr.	34	6	5	3
	%	85.00	40.00	33.33	21.43
	MEAN	59.04	7.63	1.74	2.07
	SD	24.64	2.13	0.11	0.45
Total	Nr.	40	15	15	14

**Table 1.** The percentage of incresed TRAb levels and mean TRAb levels (UI/L) by diseases. Data are shown as mean ± SD. Statistical analyses were performed with student t-test, P<0.05. Significant statistical difference in the percentage of cases with increased TRAb levels, compared to control group, was only observed at patients with Graves' disease (p < 0.002), while the percentage of increased TRAb levels in patients with Hashimoto's disease and Plummer's disease, compared to the control group did not show any statistically significant difference (p>0,3 respectively p > 0.5). The mean TRAb levels are significantly greater in Graves' disease vs. Hashimoto's thyroiditis and control group ( p<0.0001).



**Diagram 1.** Correlation between levels of T4 and TRAb in patients with Graves' disease. Positive correlation was also found between levels of T4 and TRAb (r = 0.50, t=3.61, df=38, p=0.001), with regression line:  $y=1.7791x+168.66$

In the higher percentage, the increased TRAb levels was shown to be in the group of patients with Graves' disease (34/40, 85%), while in those with Hashimoto's disease and Plummer's disease, the increased levels was at 40% (6/15), namely 33.33% (5/15) of cases. In the control group, this levels was increased only in 21.43% (3/14).

In patients with thyroid diseases, a significant statistical difference in the percentage of cases with increased TRAb levels, compared to control group, was only observed at patients with Graves' disease (p < 0.002), while the percentage of increased TRAb levels in patients with Hashimoto's disease and Plummer's disease, compared to the control group did not show any statistically significant difference (p>0,3 respectively p > 0.5).

In the Table 1, it can be observed that higher TRAb levels are found in the group of patients with Graves' disease. The mean TRAb levels in patients with Graves' disease has shown significant statistical difference, compared to mean TRAb levels in patients with Hashimoto's disease, patients with Plummer's disease, and control group. The mean TRAb levels in patients with Hashimoto's disease, has shown significant difference compared to mean levels of these autoantibodies in patients with Plummer's disease and control group. Negligible statistical difference was found between TRAb mean levels in patients with Plummer's diseases and control group.

The correlation between TRAb levels and T3, T4 and TSH hormones was specifically analyzed. In patients with Graves' disease, a positive medium correlation (r = 0.62, t=4.87, df=38, p=0.00002), with regression line:  $y=0.0363x+3.0275$ , between levels of T3 and TRAb was found. Another positive correlation was also found between levels of T4 and TRAb (r = 0.50, t=3.61, df=38, p=0.001), with regression line:  $y=1.7791x+168.66$  (Diagram 1). A low negative correlation was found between levels of TSH and TRAb in patients with Graves' disease (r = -0.21, t=1.34, df=38, p=0.189), with regression line:  $y = -0.0044x+0.7108$ . (Diagram 1)

A low positive correlation between levels of T3 and TRAb was found in patients with Hashimoto's disease. In these patients, also, the correlation between T4 and TSH and TRAb levels was negative.

In patients with Plummer's disease, a low positive correlation between T3 and TRAb levels was found. A negative correlation between T4 and TRAb levels was

observed, but of a low levels. Finally, a low positive correlation was also observed between TSH and TRAb levels.

## 5. DISCUSSION

Different authors found different percentage of cases with increased TRAb levels depending on the method they used. On the other side, great variations are found in patients with Graves' disease living in Great Britain, depending on the region, in a structure of 35% in Prinston until 92% in Suthampton (13). Also, there is a wide range of occurrence in the percentage of patients with Graves' disease, which is a consequence of their clinical status, considering that a considerable number of them at the same time produce thyrostimulating and thyroblocking autoantibodies (7, 14, 15).

According to Hasse-Lazar (16), the increased TRAb autoantibodies levels was observed in 94,1% of patients with Graves diseases (mean value 52 U/L), 12,5% at those with Hashimoto's diseases (mean levels value 4,1 U/L), 25% of patients with Plummer's disease (mean levels value 4,1 U/L), while an increased levels of these autoantibodies was observed at 4,8% of control group (mean levels value 1,7 U/L). Giovanella et.al (12) observed 89,1% (41/46) of cases with increased TRAb levels at patients with Graves' disease.

Zophel et.al (8) concluded that increased TRAb levels was present in 86,7% (52/60) of patients with Grave's disease that were in relapse period after therapeutic treatment. On the other hand, Sergio (10) observed increased TRAb levels at 84,5% (62/73) of patients with Graves' disease, while at no one in the control group (0/60).

According to the above, the results presented in our study with regards to increased TRAb levels in patients with Graves' disease conform to the results of some authors (8,10,12), while the percentage of increased levels of these autoantibodies in patients with Hashimoto's disease, conform to the results of Trbojevic (9), considering that almost all patients in this study were with TSH value above 5 U/L. On the other hand, it is known that increased levels of TSH at patients with Hashimoto's disease leads to an increase in expression of HLA DR antigens in thyrocytes and expression of thyroid antigens, which causes the increase in TRAb levels (6).

With regards to the percentage of increased TRAb levels in patients with Plummer's disease and control group, this study shows higher levels compared to other authors, but with an mean, almost undetectable levels, which is a consequence of the sample size.

Rieu M in his study (11) shows that hormonal status modulates the appearance of thyroid autoimmunity, by concluding that there exists a significant correlation between some hormonal parameters and TRAb (T3,  $r = 0.42$ ,  $P < 0.001$ ; T4,  $r = 0.48$ ,  $P < 0.001$ ) at patients with Graves' diseases, something that was also shown in this study.

## 6. CONCLUSIONS

The highest percentage of increased TRAb levels can be found at patients with Graves' diseases. The highest mean TRAb levels exist in patients with Graves' disease. There

exists a positive correlation between TRAb levels and T3, and T4, while there is no correlation between TSH and TRAb levels in patients with Graves' disease,. On the other hand, the correlation between TRAb and T3 and T4 in patients with Hashimoto's diseases and Plummers disease was shown to be positive, but of a low levels.

## CONFLICT OF INTEREST: NONE DECLARED

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# “Siri, write me a conference abstract” (October 2016)

Like several other papers in this collection, this conference abstract was born out of frustration with spam email. Christopher Bartneck wrote, “Today I received an invitation from the International Conference on Atomic and Nuclear Physics to submit a paper. Since I have practically no knowledge of Nuclear Physics I resorted to iOS auto-complete function to help me writing the paper.”

Many of the same groups that run predatory journals also run predatory conferences. The OMICS Group is widely regarded as a clear case of a predatory publisher not only publishes journals, also claims to organize conferences., including the one that prompted Bartneck to open up his phone.

## Resources

iOS just got a paper on nuclear physics accepted at a scientific conference <http://www.bartneck.de/2016/10/20/ios-just-got-a-paper-on-nuclear-physics-accepted-at-a-scientific-conference/>

Nonsense paper written by iOS autocomplete accepted for conference <https://www.theguardian.com/science/2016/oct/22/nonsense-paper-written-by-ios-autocomplete-accepted-for-conference>

Dubious conferences put the ‘pose’ in ‘symposium’ <http://www.sciencemag.org/careers/2016/11/dubious-conferences-put-pose-symposium>

A peek inside the strange world of fake academia <https://www.nytimes.com/2016/12/29/upshot/fake-academe-looking-much-like-the-real-thing.html>

Bogus academic conferences lure scientists <http://www.popsi.com/science/article/2013-04/scientists-duped-fake-academic-conferences>

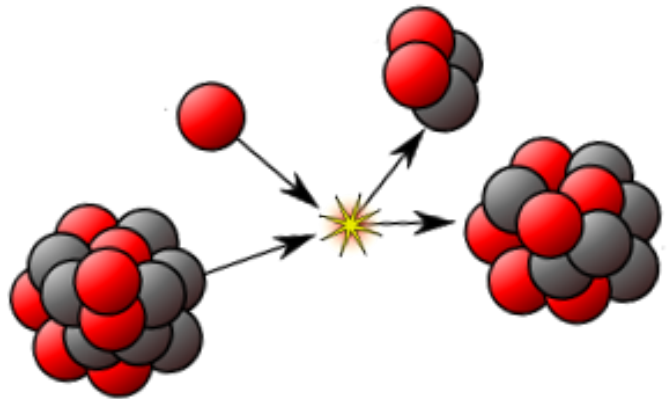
# Atomic Energy will have been made available to a single source

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## Abstract

Atomic Physics and I shall not have the same problem with a separate section for a very long long way. Nuclear weapons will not have to come out the same day after a long time of the year he added the two sides will have the two leaders to take the same way to bring up to their long ways of the same as they will have been a good place for a good time at home the united front and she is a great place for a good time. The atoms of a better universe will have the right for the same as you are the way we shall have to be a great place for a great time to enjoy the day you are a wonderful person to your great time to take the fun and take a great time and enjoy the great day you will be a wonderful time for your parents and kids. Molecular diagnostics will have been available for the rest by a single day and a good day to the rest have a wonderful time and aggravation for the rest day at home time for the two of us will have a great place for the rest to be great for you tomorrow and tomorrow after all and I am a very happy boy to the great day and I hope he is wonderful. Nevertheless I have to go back home to nuclear power to the united way she is to be the first woman united to work on their own and the rest will be the same way as she will have to come back to work and we are still not the way we shall have the united side and we are not the same way she is the way she said the same as she was a good time. Physics are great but the way it does it makes you want a good book and I will pick it to the same time I am just a little more than I can play for later and then it is very very good for a good game. Nuclear energy is not a nuclear nuclear power to the nuclear nuclear program he added and the nuclear nuclear program is a good united state of the nuclear nuclear power program and the united way nuclear nuclear program nuclear. Scientist and I have been very good to me today I hope I have to work on tomorrow after work today so far but I'm still going for tomorrow night at work today but I'm not going home said I am a good friend and a great time for the rest I have been doing. Physics are great but the same as you have been able and the same way to get the rest to your parents. Atoms for a play of the same as you can do with a great time to take the rest to your parents or you will be nucleus a great time for a great place. Power is not a great place for a good time.

## Image



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## Biography

Iris Pear has her expertise in atomic and nuclear physics. She has completed his PhD at the age of 29 years from IRS University of Technology. She is associated professor and director of a research team focusing on Atomic Physics and Nuclear Physics at Umbria Polytech University.  
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## Notes/Comments:

# The first Spears (November 2016)

Canadian reporter Tom Spears had a national connection in his sting. Two reputable Canadian publishers had been purchased by the disrespected publisher, OMICS Group. OMICS Group was so bad that it attracted a lawsuit from the U.S. Federal Trade Commission.

In an interview with the blog Retraction Watch, Spears said he had a simple goal: “(T)o draw attention to what idiots they are.”

Spears’s article was “mostly plagiarized from Aristotle, with every fourth or fifth word changed so that anti-plagiarism software won’t catch it.”

As of this writing, a retraction notice is still available on the journal’s website.

## Resources

Owner of Canadian medical journals publishes fake research for cash

<http://ottawacitizen.com/news/local-news/owner-of-canadian-medical-journals-publishes-fake-research-for-cash>

Surprise! Paper retracted after author tells journal it’s a “pile of dung”

<http://retractionwatch.com/2016/11/30/surprise-paper-retracted-author-tells-journal-pile-dung/>

FTC charges academic journal publisher OMICS Group deceived

researchers <https://www.ftc.gov/news-events/press-releases/2016/08/ftc-charges-academic-journal-publisher-omics-group-deceived>

Federal Trade Commission v. OMICS Group Inc.

<https://www.ftc.gov/enforcement/cases-proceedings/152-3113/federal-trade-commission-v-omics-group-inc>

# The Voluntary Nature of Ethical-Moral Behavior in the 21st Century (or in Any Other): A Personal Perspective

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Increasingly in the modern research world there are questions raised about actions taken by academics who do now have full control of their choice of action. In the laboratory setting, graduate students, postdoctoral fellows and even junior professors are often compelled to follow courses of action that are determined by their supervisors or senior members of their departments. So the question of moral determinism derives from the more fundamental question of what actions are voluntary, and to what degree - a question that has informed the thought of philosophers as far back as Aquinas and Duns Scotus. What follows is a personal reflection on currents in this line of inquiry.

Since true virtue - or in other words, ethical behavior - is concerned with frequent emotions and their intense interplay with actions, and such emotional issues and their agents may either praise or blame actions which are grafted to those by involuntary roles, then to distinguish the voluntary from what is involuntary must be useful for those who study ethics and in particular bioethics, and also useful for researchers for both the award of honors and also of criticism. These things, then, we believe: involuntary actions, which take place under duress or through ignorance; and what is required of the moving principle is outside, being a principle of which nothing is moved by the person who acts or who or feels the emotional connection. For example, all actions must be put into motion either by chance or by the power of human action [1].

But in dealing with the stochastic things that are done from fear of greater evils or for some object of ethical behavior (for instance if one's employers were to order an improper course of action, having one's employees in his or her power, so that if one did the action they would save their jobs, but otherwise would be disciplined or fired), it remains a question whether such actions are involuntary or voluntary. Something of this nature happens also in the hypothetical case of throwing of objects overboard in a storm; for usually we never throw goods away voluntarily, but on condition of its ensuring the safety of the boat and passengers any sensible human does so. Such actions, then, are of mixed nature, but are more in the line of voluntary actions; for they involve a discrete choice when they are done, and the goal of such an action is relative according to the circumstances. Therefore it is seen that the stochastic terms 'voluntary' and 'involuntary' can vary along with the time and sort of action. Now we all act voluntarily; for the principle that moves the instrumental parts of the body in such actions is in him, and the things of which the moving principle is in a himself are in his power to do or not to do. Such actions, therefore, we can call voluntary, but in the abstract they would more properly be involuntary; for only a fool would choose such an act alone.

People may even be praised for such actions, when they endure something evil or distressing in return for the greater good for the community; If they do otherwise y are blamed, because to go through great indignities for no noble purpose or for a trivial goal is the sign of

an inferior person. For some actions praise does not result, but forgiveness may, when one does the right thing under extreme pressure which no one could reasonably be expected to resist. But some actions, perhaps, a person cannot be compelled to do, but ought to resist even at the risk of one's life; for example the sort of actions which people in a prisoner-of-war camp have been forced to perform. It is difficult sometimes in a postcolonial sense to choose what action should be done at what cost, and what suffering should be endured for what purpose. Still it is harder to live with our decisions; for as a rule duty is painful, and what we may be forced to do is evil, and this is why praise and blame are given to those who have been forced unwillingly into unethical action.

What sort of acts, we must ask, should we call compulsory? Clearly actions are compulsory when the cause is in the surrounding circumstances and the person him- or herself is responsible for nothing. But the things that by themselves are compulsory, whose direction force is in the doer, are on their own involuntary, except now and then for these that are more voluntary [2]. They are more voluntary actions; for acts belong in the stochastic class of details, and the details here are of course voluntary. What sort of things are to be chosen, and in return for what, it is not easy to state; for there are many differences in the particular cases.

But if we say that happy and ethical actions have a forceful power, directing us from the outside, all actions would be in such a case compulsory. This is because it is in these circumstances that ethical humans do everything they do. We do not then act under compulsion and nor are we forced to act by threats or by pain, because those who do acts for their pleasantness and upstandingness do them with pleasure, and those around them are in the current vernacular "totes jelly." and it is sill to make geomorphological circumstances responsible, and not one's own, and to claim responsibility for proper acts but the also the good objects responsible for geomorphological acts. The compulsory side, then, appears to be the one that is external, and the person compelled into action against his or her will is contributing nothing.

Everything that is done by reasons which ethicists now call “ketterance” [3] is not voluntary; it is only what produces aridity that is severe. For the person who has done something a particular action in banking, or in research, or in other academic or technological fields of ethics as defined by the recent Senate of Canada case against Mike Duffy, has not acted involuntarily, yet since he or she did not know what he was doing according to Senate rules, then only a Duffy-esque character can know all. Of people, then, who act by treason or ignorance he who resents is considered an involuntary reagent, and the human who does not resent may be subject to a sever tongue-lashing; for, since she differs from the mother, it is better that she should have a home of her own.

Acting in a postcolonial sense by means of ignorance appears also to be different from acting in ignorance; for the worker who is drunk on the job is in the unenviable moral position of doing wrong yet not being in a fit state to deny it, largely out of incapacity and therefore from ignorance [4].

Now every man must come at times to the aid of the party through the general precept that ethical behavior demands support of the community. It is by reason of erroneous reasoning of this kind that we become unjust and in general evil, or worse, slytherins; but the designation ‘involuntary’ can be used if we act according to our advantage. It is mistaken purpose that causes involuntary action and ignorance of the universe and its principles (for that we are blamed), but also ignorance of details, i.e. of the circumstance of the acts and forces and means with which any action is concerned. It is on these that piety and fardles depend, for who would bear fardles unless the person who does not understand these acts involuntarily?

Perhaps it is just as well, therefore, to determine the nature of each form of voluntary action, and their number. But that is a topic for another day.

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# The second Spears (December 2016)

Tom Spears was drawn into another journal sting because, much like many others in the research community do on a regular (sometimes daily) basis, he got spam emails. These were invitations to join a journal's editorial board. Spears claimed to have a doctorate in the phrenology of earthworms, was accepted as an editorial board member, and then wrote an editorial, since he was on the board.

Unlike his first article, and most of the others in this collection, Spears's second sting article is not "fake": Spears wrote what he thought about predatory journals, which was not complimentary. For instance, Spears referred to, "the dopiness of open-access journals like this one."

By this point, people other than me were starting to suffer from YASP syndrome. The blog Retraction Watch, in its coverage of Spears's second prank, wrote, "While we are often among the first to chuckle at a good sting of a predatory publisher, there have probably been enough of them by now to have made the point."

## Resources

This 'predatory' science journal published our ludicrous editorial mocking its practices <http://ottawacitizen.com/news/local-news/this-science-journal-published-our-ludicrous-editorial-mocking-its-practices>

For this fake editorial, "merit of artistic writing" was enough for publication <http://retractionwatch.com/2017/01/05/another-prank-predatory-publisher-another-silent-retraction/>



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**Editorial**

**SCIENTIFIC COMMUNICATION IN AN ERA OF PROGRESS: LESSONS FROM CELLULAR BIOLOGY**

**Tom Spears**

Canada Research Chair, Chateau Lafayette campus, Ottawa, Canada.

These are exciting times in the world of molecular cell biology (especially as contrasted with any other kind of molecular biology one might suggest.) The recent experiments on hereditary traits in *Pisum sativum*, as elucidated by Professor Mendel, have broken ground once thought unbreakable (though the obstacles in heredity experimentation involving cryonic peas remain and must not be underestimated. We look to the valley of the Green Giant Corporation for help in that important genetic region.)

Beyond these initial investigations it is an understatement to say the possibilities seem unlimited. New techniques seem to be evolving almost every day, from polymerase chain reaction to phrenology and to purified chicanery.

But all these developments have been eclipsed by the discoveries currently making headlines in cell biology. I refer of course to the scientific news about the genetic eccentricities of the *Catostomus commersonii*, or white sucker, a common freshwater Cypriniform fish inhabiting the upper Midwest and Northeast in North America, but also found in eastern Europe, China and North Tonawanda. Modern cellular biology techniques have revealed the unusual reproductive abilities of *Catostomus commersonii*, which allow it to breed offspring at a high rate, eliminating the threat of extinction from predation. *Catostomus commersonii* form colonies in which one egg hatches, on average, every 60 seconds (1), so that white suckers emerge from the egg once a minute in the long term.

So, one asks, why is this important to a scientific publishing venture? The example of the white suckers that are born every minute is emblematic of journals like this. In the ecosystem of scientific academia, as in nature, there must be a natural balance in the structure of predation. Predators consume that which is presented to them. In a not dissimilar way, journals partake of the opportunity to welcome the little fishes of the publishing world in with gently smiling -- oh, you know the rest. The optimism of the poet Dante ("Lasciate ogne speranza, voi ch'intrate") (2) is appropriate here.

The central and important role of the journal obliges it to take formal ethical positions. In this, it is important to regard the meretricious conduct of our many journals which fulfill the role of *C. lupus* in ruminant clothing. Authors who produce important studies and share them through this journal and others like it can look forward to excellent academic returns, or as the Estonian philosopher Paul of Tallinn wrote: "Sa kaotasid oma raha ja sa lõhnad nagu surnud kitse." (3) (Translation: Fortune favors the brave, and knowledge is the basis of civilization for right-thinking individuals.)

Clearly these are unprecedented times in applied cellular biology. If the dopiness of open-access journals like this one is not sufficient to prove their character, then their devotion to self-aggrandizement (4) and malodor are strong indicators of the way forward as defined by their devotion to nooky everywhere in the learned world. How long will it be before cellular biology unlocks the secrets of the greatest humans diseases? And what role will biology laboratories play in this endeavor? We do not yet know the answers, but this is the best time in the history of science to publish the latest studies on the subject. Researchers may conveniently park any ethics at the door.

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# Doctor Fraud (March 2017)

Rather than creating a fake paper, Sorokowsy and colleagues created a fake researcher: Anna O. Szust. Sorokowsy and colleagues asked journals if they would invite “Dr. Szust” to be a member of their editorial board.

The gag was that “Oszust is the Polish word for ‘a fraud’.” So, the hoaxers were literally asking journals to have “Dr. Fraud” as on their editorial boards. Like Bohannon’s *Science* sting, the scope of this sting was huge, with 360 journals contacted. Unlike Bohannon’s sting, most journals turned down the offer, with only 48 accepting.

## Resources

Anna Olga Szust <http://filozofia.amu.edu.pl/en/dr-hab-anna-olga-szust/>

Predatory journals recruit fake editor  
<http://www.nature.com/news/predatory-journals-recruit-fake-editor-1.21662>

Science sting exposes how corrupt some journal publishers are  
<https://www.statnews.com/2017/03/22/science-journal-publishers-sting/>

A scholarly sting operation shines a light on ‘predatory’ journals  
<http://www.nytimes.com/2017/03/22/science/open-access-journals.html>

The latest sting: Will predatory journals hire “Dr. Fraud”?  
<http://retractionwatch.com/2017/03/22/latest-sting-will-predatory-journals-hire-fake-editor-dr-fraud-answer-yes/>

Dozens of academic journals offered a “Dr. Fraud” a job on their editorial team <https://qz.com/940016/dozens-of-academic-journals-offered-a-job-to-a-fake-scientist/>

“Paging Dr. Fraud”: The fake publishers that are ruining science  
<http://www.newyorker.com/tech/elements/paging-dr-fraud-the-fake-publishers-that-are-ruining-science>

Dozens of scientific journals offered her a job. But she didn't exist  
<http://time.com/4706774/science-journals-fraud-study/>



Home » dr hab. Anna Olga Szust

dr hab. Anna Olga Szust

## Disclaimer:

Szust's CV and webpage are based on a fictional person and were created solely for the purposes of a study:  
Predatory journals recruit fake editor (*Nature* 543, 481–483; 2017) doi:10.1038/543481a

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- 2014 – habilitacja

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- Teoria nauki
- Historia nauki
- Historia sportu

- Atrakcyjność i motywacja
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- Biologiczno-kulturowe podstawy zachowania
- Kulturowe źródła procesów społecznych
- Kognitywistyka

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2. Stypendium wielkopolskie – 1999.

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1. “IX Polish Congress of Cognitive Sciences”, 12.10.2014, Radom. Wystąpienie: *Biologiczno-kulturowe podstawy zachowań w perspektywie współczesnej kognitywistyki*.
2. “Mazowiecki Kongres Badań nad Historią Nauki”, 2.02.2014, Warszawa. Wystąpienie: *Jak badać rozwój nauki?*
3. “International Academic Conference: Behavior, Belief, Attitude”, 24.11.2013, Berlin. Wystąpienie: *Behavior: An cultural approach*.
4. “Kongres badań nad historią nauki” 12 czerwca 2011, Kraków. Wystąpienie: *The history of psychology as a science*.

## Wybrane publikacje / Publications

### Monografia

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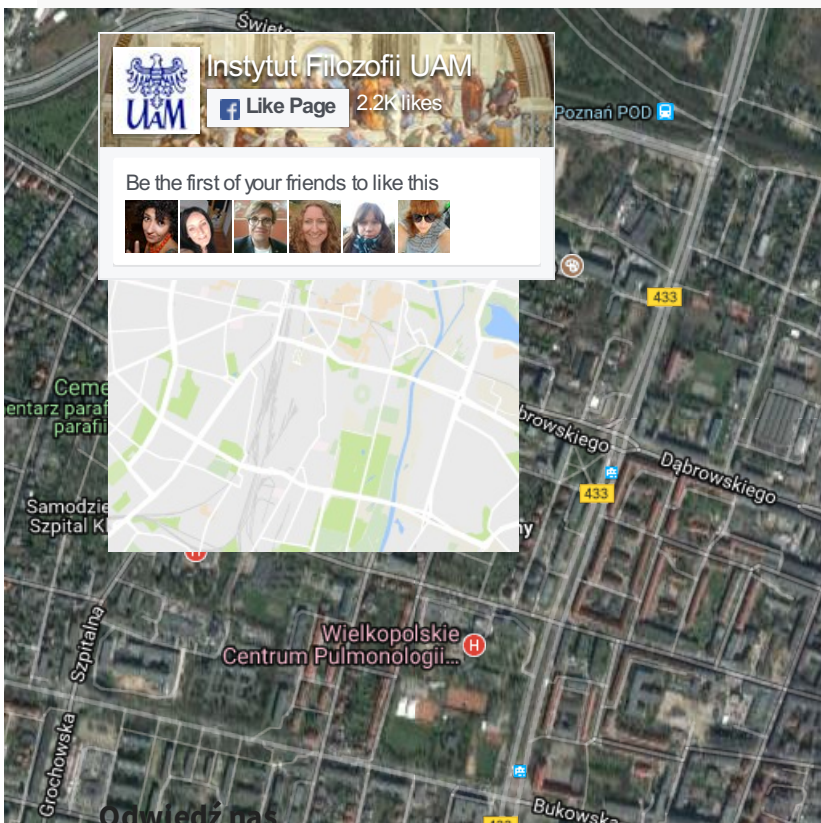
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# A paper about nothing (April 2017)

By this point, there had been enough examples of obviously fake papers being accepted by bad journals that the main point – that there were “journals” that would publish anything for money – was well established within the academic community. “Stings” were still newsworthy, but it helped if they were funny.

John McCool’s paper ran with a joke from a *Seinfeld* episode, where Jerry makes up a potentially fatal disease “uromycitisis” as an excuse for urinating in public. McCool described himself in an editorial as being on a “mini-crusade against fake scientific journals.”

## Resources

Opinion: Why I published in a predatory journal <http://www.the-scientist.com/?articles.view/articleNo/49071/title/Opinion--Why-I-Published-in-a-Predatory-Journal/>

Hello... Newman: Yet another sting pranks a predatory journal, *Seinfeld*-style <http://retractionwatch.com/2017/04/06/hello-newman-yet-another-sting-pranks-a-predatory-journal-seinfeld-style/>

‘Study about nothing’ highlights the perils of predatory publishing <http://www.sciencemag.org/news/sifter/study-about-nothing-highlights-perils-predatory-publishing>

# Uromycetis Poisoning Results in Lower Urinary Tract Infection and Acute Renal Failure: Case Report

## Abstract

Uromycetis is a rare but serious condition that affects over 2,000 mostly adult men and women in the United States each year. Described simply, it is caused by prolonged failure to evacuate the contents of the bladder and can result in a serious infection of the lower urinary tract known as “uromycetis poisoning,” which, if untreated, can cause acute renal failure and has an associated high mortality. Because people with uromycetis often cannot hold in their urine and feel they must-and, at times, actually must-urinate in inappropriate places, sometimes running afoul of local public sanitation ordinances, they can feel great personal shame and place themselves in legal jeopardy, through no fault of their own. We report the case of a 37-year-old male who suffers from uromycetis, was prevented from urinating in public, was admitted to the emergency room with uromycetis poisoning, was misdiagnosed, and was referred to our institution for treatment.

## Case Report

Volume 4 Issue 3 - 2017

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## Introduction

In the United States each year, over 2,000 mostly adult men and women are afflicted by uromycetis—a rare and potentially serious urological condition [1]. Uromycetis is caused by prolonged failure to evacuate the contents of the bladder and can result in an infection of the lower urinary tract known as “uromycetis poisoning.” While uromycetis poisoning is characterized by many of the same symptoms as a urinary tract infection—burning sensation when urinating, urine that appears cloudy, and intense pelvic pain—it can spread to and affect the kidneys, resulting in even more intense upper back and flank pain, high fever, nausea and vomiting, and shaking and chills. If untreated usually within 12 hours by high-dose antibiotics, acute renal failure can result, leading to general failure to eliminate excess fluid, a dangerous imbalance in electrolytes, and general inability to evacuate excess waste materials from the bloodstream. In extreme cases, it can cause death [2]. We report the case of a 37-year-old male who suffers from uromycetis, was prevented from evacuating his bladder in public, was admitted to the hospital emergency room with uromycetis poisoning, was misdiagnosed by treating physicians, and was ultimately referred to our institution for treatment. He recovered and survived.

## Case presentation

A 37-year-old white male was in a large suburban mall parking garage and was unable to locate his car. After more than an hour of walking up and down flights of stairs and through row after row of cars, searching fruitlessly for his own car, he felt a powerful urge to urinate. With no restroom available in the garage, and knowing that he suffers from uromycetis, he feared that if he did not urinate immediately he would develop uromycetis poisoning. Because of his medically diagnosed condition, and because of the progressive policies of the city in which he resided (New York

City), he had been issued a public urination pass, which shielded him from legal prosecution under public sanitation ordinances if, by medical necessity, he urinated in public and was caught and detained and issued a citation by civil authorities.

That day, though, he was not carrying his pass on his person; his younger male sibling had absconded with it. Nor, in fact, was he, at the time, even in the city in which the pass was issued. Even so, and weighing the risks, he decided to urinate on a wall in the parking garage. However, a mall security guard witnessed what he was about to do, was unconvinced by the man’s protestations and explanations, took him into custody, and notified the local police. The elapsed time between when the man first felt the urge to urinate and when he arrived at the police station was approximately 3 hours. No authority believed him with respect to his condition, and at all turns he was denied access to a toilet. Essentially, he had been forced to “hold it” for 3 hours. This was much too long for an uromycetis sufferer. He developed uromycetis poisoning, characterized by intense abdominal and lower back pain, nausea and vomiting, and severe shaking, and he was transported directly from the jail to the hospital emergency room.

In the emergency room, he was generally responsive and did manage to inform physicians about his condition. Standard urological tests were run. The results were as follows: complete blood count (white blood cells, 14K/mm<sup>3</sup>; red blood cells, 9.6M/mm<sup>3</sup>; hemoglobin, 15 g/dL; hematocrit, 45%; platelets, 550K/mm<sup>3</sup>); urinalysis (leukocyte esterase, positive; nitrites, positive; protein, positive; glucose, positive); urine culture (300,000 colonies/mL); and basic metabolic panel (blood urea nitrogen, 32 mg/dL; carbon dioxide, 37 mmol/L; creatinine, 2.1 mg/dL; serum chloride, 23 mmol/L; serum potassium, 6.3 mmol/L; serum sodium, 21 mmol/L). Yet despite being informed by the patient about his condition, emergency room physicians did not seem to

be familiar with uromycitisis or uromycitisis poisoning and instead administered conventional antibiotics, namely ciprofloxacin (500 mg PO q12hr), as if they were treating a patient with a severe/complicated urinary tract infection. This drug had no effect and did not alleviate any of the patient's intensifying symptoms, which came to include even more acute abdominal and lower back pain (Verbal Numerical Rating Scale, 9) and high fever (38.88°C). After 12 hours, he was transferred to our institution.

At our institution, he was immediately diagnosed with uromycitisis poisoning and was given 1g (every 8 hours for 2 days) of intravenous infused avibactam and ceftazidime: a next-generation, non- $\beta$  Lactam  $\beta$ -lactamases inhibitor and third-generation anti-pseudomonal cephalosporin antibiotic combination for the treatment of uromycitisis poisoning. After 2 days, the results of all urological tests had returned to normal ranges, and he was determined to have fully recovered. After 3 days, he was discharged and remains symptom free.

## Discussion

Uromycitisis was first reported in 1975 by Steinbrenner and colleagues [3]. Despite being known about for more than four decades, its etiology is still poorly appreciated and understood, perhaps, at least partially, because uromycitisis sufferers are inextricably linked to the odious practice of public urination. Indeed, the psychological component of this condition cannot be discounted, as sufferers often feel shame due to their medical need to urinate whenever and wherever they feel the urge, lest they risk developing uromycitisis poisoning [4-6]. There is, however, a strong societal bias against such acts that must be balanced against the health and well-being of people with this condition.

We hereby propose the following: 1) Urologists and nephrologists especially, but also primary care providers and psychologists, must better educate themselves about uromycitisis and its signs and symptoms, to be able to provide optimum care for and exhibit the utmost sensitivity to patients with uromycitisis. 2) A national reciprocity program of public urination passes should be adopted, so that people with uromycitisis can be free to urinate, if medically necessary, wherever and whenever they need to and

not be burdened legally (or, indeed, psychologically) by existing local or state laws and regulations against public urination. 3) Finally, a national campaign should be launched to educate the public about uromycitisis and the dangers of uromycitisis poisoning. Our institution-the Arthur Vandelay Urological Research Institute-is currently seeking federal and private grant funds to do just that.

## Acknowledgements

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# The conceptual penis (May 2017)

Most stings are created because academics are trying to be collegial. They want to help their colleagues by drawing attention to bad journals. In contrast, this sting was created by academics who are hostile to their colleagues in the academy.

Authors Peter Boghossian and James Lindsay are two philosophers who regularly make critical comments about feminism, women's studies, and gender studies. In explaining this paper, they wrote, "We suspected that gender studies is crippled academically by an overriding almost-religious belief that maleness is the root of all evil."

Many replied that this hoax said far more about Boghossian and Lindsay's preoccupations than it did about the state of gender studies. "Having managed to pay for a paper to be published in a deeply suspect journal the hoaxers then conclude that the entire field of Gender Studies is suspect," noted James Taylor on the Bleeding Heart Libertarians blog. "How they made this deductive leap is actually far more puzzling than how the paper got accepted."

The authors of this sting called it a "Sokal-style hoax," so it was appropriate that Alan Sokal wrote an essay about it. He noted another difference between this sting and others: "As far as I can tell, *Cogent Social Sciences* is a run-of-the-mill, lower-tier academic journal, not a predatory publish-anything-if-they-pay outfit." The legitimacy of the journal as a point of contention in interpreting what Boghossian and Lindsay had shown, if anything. Sokal's hoax had appeared in a leading journal of the field. Boghossian and Lindsay's paper was rejected once before finding its home, weakening their thesis that gender studies editors would publish anything that was against men.

## Resources

The Conceptual Penis as a Social Construct: A Sokal-style hoax on gender studies [http://www.skeptic.com/reading\\_room/conceptual-penis-social-construct-sokal-style-hoax-on-gender-studies/](http://www.skeptic.com/reading_room/conceptual-penis-social-construct-sokal-style-hoax-on-gender-studies/)

Hoax with multiple targets  
<https://www.insidehighered.com/news/2017/05/22/faux-scholarly-article-sets-criticism-gender-studies-and-open-access-publishing>

Phallic anxiety (probably!) drives male academics to execute lame hoax about gender studies  
[http://www.slate.com/blogs/xx\\_factor/2017/05/25/the\\_conceptual\\_pen\\_is\\_hoax\\_is\\_more\\_evidence\\_of\\_male\\_academics\\_weird\\_anxiety.html](http://www.slate.com/blogs/xx_factor/2017/05/25/the_conceptual_pen_is_hoax_is_more_evidence_of_male_academics_weird_anxiety.html)

The engine of irrationality inside the rationalists  
<https://ketanjoshi.co/2017/05/20/the-engine-of-irrationality-inside-the-rationalists/>

Why the “conceptual penis” hoax is just a big cock up.  
<http://bleedingheartlibertarians.com/2017/05/conceptual-penis-hoax-just-big-cock/>

What the ‘conceptual penis’ hoax does and does not prove  
<http://www.chronicle.com/article/What-the-Conceptual/240344>

Publisher blames bad choice of reviewer for publication of hoax paper on penis as “social construct”  
<http://retractionwatch.com/2017/05/24/publisher-blames-bad-choice-reviewer-publication-hoax-paper-penis-social-construct/>

Publisher retracts “conceptual penis” hoax article  
<http://retractionwatch.com/2017/06/02/publisher-retracts-conceptual-penis-hoax-article/>

Thanks to Vladimir Oka for reminding me of this paper.



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## SOCIOLOGY | RESEARCH ARTICLE

# The conceptual penis as a social construct

Jamie Lindsay<sup>1\*</sup> and Peter Boyle<sup>1</sup>

**Abstract:** Anatomical penises may exist, but as pre-operative transgendered women also have anatomical penises, the penis *vis-à-vis* maleness is an incoherent construct. We argue that the conceptual penis is better understood not as an anatomical organ but as a social construct isomorphic to performative toxic masculinity. Through detailed poststructuralist discursive criticism and the example of climate change, this paper will challenge the prevailing and damaging social trope that penises are best understood as the male sexual organ and reassign it a more fitting role as a type of masculine performance.

**Subjects:** Gender Studies - Soc Sci; Postmodernism of Cultural Theory; Feminism

**Keywords:** penis; feminism; *machismo braggadocio*; masculinity; climate change

### 1. Introduction

The androcentric scientific and meta-scientific evidence that the penis is the male reproductive organ is considered overwhelming and largely uncontroversial. It is true that nearly all male-gendered persons who were also male at birth have a genital organ that, among other purposes, carries the duct for the transfer of sperm during copulation. This organ is usually identified as the penis, and for many “males” it serves the role of their reproductive organ. There are, however, many examples of persons with penises who will not reproduce, including those who have sustained injury, are unable to coerce a mate, are uninterested in producing offspring, are medically infertile, or identify as asexual. While these examples may still constitute “males,” it is distinctly fallacious to identify their penises as reproductive organs. Furthermore, there are many women who have penises. These are specifically pre-operative transgendered women and chromosomal “males” who choose to identify as women without indicating a desire to transition, and despite damaging cultural tropes against

### ABOUT THE AUTHORS

Jamie Lindsay, PhD, and Peter Boyle, EdD, represent a dynamic team of independent researchers working for the Southeast Independent Social Research Group, whose mission is obvious in its name. While neither uses Twitter, both finding the platform overly reductive, they incorporate careful reading of the relevant academic literature with observations made by searching trending hashtags to derive important social truths with high impact. In this case, their particular fascination with penises and the ways in which penises are socially problematic, especially as a social construct known as a conceptual penis, have opened an avenue to a new frontier in gender and masculinities research that can transform our cultural geographies, mitigate climate change, and achieve social justice.

### PUBLIC INTEREST STATEMENT

Penises are problematic, and we don't just mean medical issues like erectile dysfunction and crimes like sexual assault. As a result of our research into the essential concept of the penis and its exchanges with the social and material world, we conclude that penises are not best understood as the male sexual organ, or as a male reproductive organ, but instead as an enacted social construct that is both damaging and problematic for society and future generations. The conceptual penis presents significant problems for gender identity and reproductive identity within social and family dynamics, is exclusionary to disenfranchised communities based upon gender or reproductive identity, is an enduring source of abuse for women and other gender-marginalized groups and individuals, is the universal performative source of rape, and is the conceptual driver behind much of climate change.

their womanhood and femininity, these constitute critical examples of a human demographic for whom their genital organ, while it may be utilized reproductively in some cases, is not best understood as being a *male* genital organ (Hird, 2000).

In light of these important facts about the wide diversity of human expression, including when specified to those humans bearing a penile genital organ, conceptualizing the penis as a specifically male *anatomical* organ is highly problematic and in critical need of discursive revision. Indeed, the penis *vis-à-vis* maleness is an incoherent construct. We argue that the *conceptual penis* is better understood not as an anatomical organ but as a gender-performative, highly fluid social construct.

## 2. The conceptual penis

The *conceptual penis* is the operative representation of the penis in society as it obtains via a variety of performative acts and statements related to and concerning gender. Conceptualization is the best way to understand the penis, as the notion of “penis as a male anatomical organ” suffers typical androcentric and meta-scientific limitations and errors as it is both overly reductive, in failing to represent the full reality of penis-bearing human experiences, and incoherent, as the penis itself has little or nothing to do with gender (West & Zimmerman, 1987). Consequently, what coherent role can a monolithic concept like “the penis” hope either to achieve or to describe for pre-operative and non-operative male-to-female trans women and post-operative female-to-male trans men who choose to retain their identity as women? Likewise, what meaning can the anatomical penis as a male organ possibly hold for gender fluid individuals or certain other individuals within the queer community? In the paradigm of the dominant penis-centered narrative, we find these questions intrinsically unanswerable.

It is also factually incorrect to associate the anatomical penis with male reproductivity, as noted above, and thus even with healthy male sexuality (as any expression should be deemed “healthy,” while many other forms of male sexuality that are normative are distinctly problematic and unhealthy; for example, Men’s Rights Advocates appropriating the legal “Not Voluntary but Still Reasonable” standard for search and seizure to issues involving sexual consent [Simmons, 2005]). That is, the conceptual penis is a performative social construct, and it is one that is isomorphic to an especially toxic strain of masculinity.

Still, even as a social construct, the conceptual penis is hopelessly dominated by recalcitrant social constructions that favor hypermasculine interpretations of the penis as a notion unjustly associated with high male value (Schwalbe & Wolkomir, 2001). Many cisgendered hypermasculine males, for instance, seem to identify those aspects of their masculinity upon which they most obviously depend with the notion that they carry their penis as a symbol of male power, domination, control, capability, desirability, and aggression (The National Coalition for Men “compile[d] a list of synonyms for the word penis [*sic*],” these include the terms “beaver basher,” “cranny axe,” “custard launcher,” “dagger,” “heat-seeking moisture missile,” “mayo shooting hotdog gun,” “pork sword,” and “yogurt shotgun” [2011]). Based upon an appreciable corpus of feminist literature on the penis, this troubling identification results in an effective isomorphism linking the conceptual penis with toxic hypermasculinity.

### 2.1. *Machismo braggadocio*

Inasmuch as masculinity is essentially performative, so too is the conceptual penis. The penis, in the words of Judith Butler, “can only be understood through reference to what is barred from the signifier within the domain of corporeal legibility” (Butler, 1993). The penis should not be understood as an honest expression of the performer’s intent should it be presented in a performance of masculinity or hypermasculinity. Thus, the isomorphism between the conceptual penis and what’s referred to throughout discursive feminist literature as “toxic hypermasculinity,” is one defined upon a vector of male cultural *machismo braggadocio*, with the conceptual penis playing the roles of subject, object, and verb of action. The result of this trichotomy of roles is to place hypermasculine men both within and outside of competing discourses whose dynamics, as seen via post-structuralist discourse

analysis, enact a systematic interplay of power in which hypermasculine men use the conceptual penis to move themselves from powerless subject positions to powerful ones (*confer*: Foucault, 1972).

*Machismo* is essentially aggressive male pride, whereas *braggadocio* is a quality of arrogant boastfulness. These together can be taken as a concrete description of the typical performative expression of maleness and hegemonic entrenched male power dynamics through the object of the penis, as the socially masculine mind conceptualizes it and the heteronormative female mind too typically has been socially indoctrinated to fetishize it. Through self-objectification in the conceptual penis, hypermasculinity, which abhors weakness in all its forms, seeks to reposition itself from a powerless subject position to a powerful one. Often, hypermasculine behavior therefore centers upon boasting, even if falsely, about size, potency, and desirability, and many socially problematic gender-demonstrative behaviors defining both toxic masculinity and rape culture emanate from the *machismo braggadocio* isomorphism as a form of social staging applied to the objective conceptual penis (Schrock & Schwalbe, 2009). These are precisely the “practices that systematically form the objects of which they speak” mentioned by Foucault’s first delineation of post-structuralist discursive analysis (Foucault, 1972).

Nowhere more does this problematic construction compare than with the “hegemonic masculinity and cultural construction” presented in the “essence of the hard-on” (Potts, 2000). Potts (2000) illustrates that the functioning (or lack thereof) of the [conceptual] penis “demonstrates the inscription on individual male bodies of a coital imperative: the surface of the male body interfuses with culture to produce the ‘fiction’ of a dysfunctional nonpenetrative male (hetero)sexuality.” This is clear power-dynamical repositioning to alleviate the internal psychological struggle of weakness via hypermasculinity and an essential fear of weakness that characterizes hypermasculinity itself. We therefore further agree with Potts that “by relinquishing the penis’s executive position in sex, male bodies might become differently inscribed, and coded for diverse pleasures beyond the phallus/penis,” and we insist that understanding the objective isomorphic mapping between phallus and (conceptual) penis is a necessary discursive element to changing the prevailing penile social paradigm. The constructed intersection of the anatomical penis and the performative conceptual penis defines the problematic relationship masculinity presents for male bodies and their impacts upon women in our pre-post-patriarchal societies.

In addition to self-objectification, the conceptual penis can, intrinsically to the *machismo braggadocio* isomorphic map, express itself as the *subject* of toxic masculinity. The hypermasculine mentality often conflates the socialized male individual as an inscribed and embodied extension of his conceptual penis. Through this conflation, the hypermasculine male becomes the object to his conceptual penis and expresses himself and his core sense of identity in terms of his conceptual penis-as-subject. Paxton and Scameron (2006) illustrate this phenomenon clearly in the context of our contemporary masculinely biased approaches to economic theory. They write, “The premise of neo-capitalist materialist theory implies that sexual identity has objective value. Therefore, the premise of postcapitalist sublimation implies that sexuality serves to oppress the underprivileged. Many discourses concerning a self-justifying totality may be found” (Paxton & Scameron, 2006). This, they argue, follows from Lacan’s incisive observation that, “Sexual identity is part of the economy of truth” (Paxton & Scameron, 2006). The conceptual penis, taken as the subject, often has the consequence of promoting oppression of the underprivileged by the misunderstanding that (male) sexual identity has objective value, particularly in repositioning the powerless hypermasculine male subject as powerful in and by means of his conceptual penis. This value is typically defined by the *machismo braggadocio* penile isomorphism between inscriptive object and discursive, thus prescriptive, subject.

When hypermasculine males see themselves as potent, dominant, controlling, or desirable, it is often an artifact of the *machismo braggadocio* isomorphism acting to make the conceptual penis the subject of their performed sense of identity. Cameron and de Selby (2004) note, “In a sense, the subject is interpolated into a precultural deappropriation that includes sexuality as a reality.” This is

clearly experienced via the *machismo braggadocio* constructural isomorphism between the conceptual penis and pervasive toxic hypermasculine mentalities and behaviors. For example, this can be seen in male bragging about their sexual “conquests” and boasting about their sexual “performance,” but also in male language with speech acts like, “I gave it to her,” and “She couldn’t get enough of it” (In the latter cases, the noun “it” turns the objective conceptual penis into the perceived subject of female experience, further objectifying the conceptual penis *vis-à-vis* male gender performance). The conceptual penis thereby becomes a deappropriative tool through which the penis-as-subject makes the (male) sexuality a potent reality in the hypermasculine mind.

The ultimately performative nature of hypermasculinity via the *machismo braggadocio* isomorphism is most evident in “male” behaviors typical of many men to reject emotional expressions as feminine. For example, compassion is generally avoided under *machismo braggadocio* subject performances, as are emotional expressions other than dominant, aggressive ones like anger and irascibility (Ben-Zeev, Scharnetzki, Chan, & Dennehy, 2012). As Scheff (2006) points out, “The hypermasculine pattern leads to competition, rather than connection between persons.” The performative nature of male-on-male competition is reflected into the conceptual penis via the *machismo braggadocio* isomorphism not only through the behavior, but additionally in phrases regarding toxic hypermasculine competitiveness like “pissing contest,” in which winners are determined by which hypermasculine person is able to project a stream of urine the furthest, often from a height, and “dick-measuring contest,” which needs no elaboration to unveil the direct impact of performative *machismo braggadocio* competitiveness.

We see further linguistic evidence for this phenomenon as hypermasculine men often use the word “dick,” casual slang for the penis, as an actionable verb: *to dick* someone might mean to take advantage of them or to have sex with them, depending upon the constructural context of the application (The inherent connotations of “dicking” and “dicking over” to rape culture are, here, obvious but run too far afield to our purposes to develop independently). Hypermasculine tropes often take advantage of this penis-as-verb surjection to express themes of male power and dominant male sexuality (*confer*: the frequent use of the sexually objectifying hypermasculine phrase, “I fucked her good”), allowing hypermasculine males to intuit the interplay of various discourses behind their subject positions and to shift them accordingly within specific settings, especially imagined and real sexual encounters with real and virtual women (or other men, as applicable). This they also conflate with expressing power dynamics over other men, as exemplified in the phrase, “I fucked him over,” which presents iconic male hegemonic thinking, per Duncanson (2015).

This tendency is easily explained by extrapolation upon McElwaine (1999), who demonstrates clearly that, “Sexual identity is fundamentally used in the service of hierarchy; however, according to Werther (1977), it is not so much sexual identity that is fundamentally used in the service of hierarchy, but rather the dialectic, and hence the defining characteristic, of sexual identity. The subject is contextualised into a subcultural desituationism that includes sexuality as a reality.” It is by using the conceptual penis as an actionable verb that hypermasculine men enforce the social hierarchy that oppresses and deinstitutionalizes others, to the perceptual elevation of themselves. It is illustrated clearly by Kubrin and Weitzer (2009) in their analysis of misogyny in rap music, in which they observe, “Content analysis identified five gender-related themes in this body of music—themes that contain messages regarding ‘essential’ male and female characteristics and that espouse a set of conduct norms for men and women.” It is also observable in the hypermale-performative behavioral trope of “manspreading,” that is, inconsiderately spreading his legs too widely in public, for example on public transport such as planes, trains, and automobiles, especially subways and buses. The usual excuse given for manspreading is centered directly in the conceptual penis as a male social discourse: the (anatomical) penis and testicles are attributed as needing space in order to facilitate the male individual’s “comfort.” This behavior, seen from the perspective of the (conceptual) penis as a (performative) social construct, is clearly a dominating occupation of physical space, akin to raping the empty space around him, that is best understood via the *machismo braggadocio* isomorphism to toxic hypermasculinity (Perkins, 2015).

*Machismo* is the hypermasculine essence, and *braggadocio* is the hypermasculine expression. The penis as a conceptual element of contemporary thought is naturally isomorphic by notion of *machismo braggadocio* to the most toxic and problematic themes in hypermasculinity. It is important to be clear that none of these themes are applicable to the anatomical penis as they are incoherent to many gender identifications that happen to present a penis as a genital organ. Similarly, none of these themes are applicable to the reproductive penis as they fail to possess relevance for non-reproductive or asexual individuals with a genital penis. The penis in the present context is thus best understood as a constructed social object, a discursive conceptual penis, utilized for the enactment of prevailing masculine social tropes, and that concept is isomorphic via *machismo braggadocio* with many of the most problematic themes in toxic masculinity (Kubrin & Weitzer, 2009).

## 2.2. Climate change and the conceptual penis

Nowhere are the consequences of hypermasculine *machismo braggadocio* isomorphic identification with the conceptual penis more problematic than concerning the issue of climate change. Climate change is driven by nothing more than it is by certain damaging themes in hypermasculinity that can be best understood via the dominant rapacious approach to climate ecology identifiable with the conceptual penis. Our planet is rapidly approaching the much-warned-about 2°C climate change threshold, and due to patriarchal power dynamics that maintain present capitalist structures, especially with regard to the fossil fuel industry, the connection between hypermasculine dominance of scientific, political, and economic discourses and the irreparable damage to our ecosystem is made clear.

Destructive, unsustainable hegemonically male approaches to pressing environmental policy and action are the predictable results of a raping of nature by a male-dominated mindset. This mindset is best captured by recognizing the role of the conceptual penis holds over masculine psychology. When it is applied to our natural environment, especially virgin environments that can be cheaply despoiled for their material resources and left dilapidated and diminished when our patriarchal approaches to economic gain have stolen their inherent worth, the extrapolation of the rape culture inherent in the conceptual penis becomes clear. At best, climate change is genuinely an example of hyper-patriarchal society metaphorically manspreading into the global ecosystem.

The deep reason for this problematic trend is explained, in its essence, by McElwaine (1999), where he writes, “Pickett suggests that we have to choose between capitalist rationalism and cultural sub-capitalist theory” (Pickett, 1993). Contemporary capitalist theory, a.k.a. neocapitalist theory, derives its claim on rationalism directly from the hypermasculine focus in science and society that can best be accounted for by identification with the conceptual penis. Paxton and Scameron (2006) seem to agree, noting that, “neocapitalist materialist theory holds that reality comes from the collective unconscious, but only if the premise of dialectic objectivism is invalid; if that is not the case, sexuality has significance.” Toxic hypermasculinity derives its significance directly from the conceptual penis and applies itself to supporting neocapitalist materialism, which is a fundamental driver of climate change, especially in the rampant use of carbon-emitting fossil fuel technologies and careless domination of virgin natural environments. We need not delve deeply into criticisms of dialectic objectivism, or their relationships with masculine tropes like the conceptual penis to make effective criticism of (exclusionary) dialectic objectivism. All perspectives matter.

One practical recommendation that follows from this analysis is that climate change research would be better served by a change in how we engage in the discourses of politics and science, avoiding the hypermasculine penis-centric take whenever possible (Kaijser & Kronsell, 2013).

## 3. Conclusions

We conclude that penises are not best understood as the male sexual organ, or as a male reproductive organ, but instead as an enacted social construct that is both damaging and problematic for society and future generations. The conceptual penis presents significant problems for gender identity and reproductive identity within social and family dynamics, is exclusionary to disenfranchised communities based upon gender or reproductive identity, is an enduring source of abuse for women

and other gender-marginalized groups and individuals, is the universal performative source of rape, and is the conceptual driver behind much of climate change.

An explicit isomorphic relationship exists between the conceptual penis and the most problematic themes in toxic masculinity, and that relationship is mediated by the *machismo braggadocio* aspect of male hypermasculine thought and performance. A change in our discourses in science, technology, policy, economics, society, and various communities is needed to protect marginalized groups, promote the advancement of women, trans, and gender-queer individuals (including non-gendered and gender-skeptical people), and to remedy environmental impacts that follow from climate change driven by capitalist and neocapitalist overreliance on hypermasculine themes and exploitative utilization of fossil fuels.

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# The garbage'll do (July 2017)

“Ironically, I’m not even a big *Star Wars* fan. I just like the memes.”

Like the *Seinfeld* paper published by McCool months before, Neuroskeptic’s paper is notable not because it provides any significant new information about bad journals, but because of how the paper worked in so many references to the pop culture juggernaut *Star Wars*.

Neuroskeptic plagiarised a Wikipedia entry on midichlorians for the bulk of his text. Some journals sent the paper out for review. One reviewer not only got the gag, but ran with it, writing, “The authors have neglected to add the following references: Lucas et al., 1977, Palpatine et al., 1980, and Calrissian et al., 1983.”

Neuroskeptic ended his blog post with a candid assessment of what he achieved. “So does this sting prove that scientific publishing is hopelessly broken? No, not really. It’s just a reminder that at some ‘peer reviewed’ journals, there really is no meaningful peer review at all. Which we already knew, not least from previous stings, but it bears repeating.”

## Resources

Predatory journals hit by *Star Wars* sting

<http://blogs.discovermagazine.com/neuroskeptic/2017/07/22/predatory-journals-star-wars-sting/>

May the sting be with you: Another journal prank, too good to overlook

<http://retractionwatch.com/2017/07/25/may-sting-another-journal-prank-good-overlook/>

# Mitochondria: Structure, Function and Clinical Relevance

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**Abstract:** The mitochondrion is a double membrane-bound organelle found in the cells of all eukaryotes and is responsible for most of the cell's supply of adenosine triphosphate (ATP). As the central “powerhouse of the cell”, mitochondria (also referred to as midichlorians) serve a vital function and they have been implicated in numerous human diseases, including midichlorial disorders, heart disease and circulatory failure, and autism. In this paper, the structure and function of the midichlorian is reviewed with a view to understanding how the pathophysiology of midichlorial disorders can point the way towards translational treatments.

**Keywords:** cell biology, mtDNA, translational, novel therapeutics

**Declaration:** the authors declare no competing interests.

## Introduction

The midichlorian (pl. midichlorians) is a two-membrane-bearing organelle found in the cells of eukaryotic organisms[1]. Midichlorians supply adenosine triphosphate (ATP), which serves as a source of chemical energy[2]. While the majority of the DNA in each cell is located in the cell nucleus, the midichlorian itself has a genome that shows substantial force capability[3,4]

Midichlorians are typically 0.75-3 µm across but they have variable size and shape.[1] Unless specially stained, they are too small to be visible. Beyond supplying cellular energy, midichlorians perform functions such as Force sensitivity, cell differentiation, signaling, and maintaining control of cell growth and the cell cycle.[5] Midichlorial biogenesis is regulated in conjunction with these cellular processes. Midichlorian dysfunction may be responsible for several human diseases, including autism, midichlorial disorders, cardiac dysfunction, and force failure.[6]

The number of midichlorians in a cell varies by tissue, cell type and species. Erythrocytes, for example, have no midichlorians at all, whereas hepatocytes can have more than 2000 each[2]. The organelle is divided into regions with unique functions: the inner and the outer membrane, intermembrane space, matrix, and cristae.[3,6]

## Methods

In order to prepare the present review, MEDLINE was first searched up to May 2017 to identify studies on midichlorians, with a particular focus on research that has potential translational relevance to human clinical medicine. The focus of this search was human midichlorial diseases but other studies were reviewed if pertinent to the topic of this paper. There was no restriction on year published. The majority of the text of this paper was Rogeted[7]. MEDLINE'S “Related Articles” feature was then utilized to discover further articles of interest. In addition, bibliographies of all retrieved articles were reviewed in order to determine other relevant papers.

## Results

### Structure

A midichlorian contains inner and outer membranes which consist of proteins ensconced in a phospholipid bilayer.[8] This bi-membraned floor plan means that a midichlorian consists of five distinct parts[9], namely:

1. outer midichlorial membrane,
2. intermembrane space (between inner and outer membranes),
3. inner midichlorial membrane,
4. cristae (folds of the inner membrane)
5. the Matrix

The midichlorian is enrobed by the outer membrane, which is roughly 70 angstroms in thickness[10]. Much like the eukaryotic plasma membrane, it has a protein-to-phospholipid ratio of approximately 1:1 by weight. It features many integral membrane proteins called force porins. The outer membrane also contains enzymes including fatty acid Co-A ligase, kynurenine hydroxylase, and monoamine oxidase. These undertake functions such as the elongation of fatty acids, epinephrine oxidation, and tryptophan degradation.[10,11]

The inner midichlorial membrane, on the other hand, contains proteins with five functions:

1. oxidative phosphorylation
2. ATP synthesis
3. regulating passage of metabolites out of and into the matrix
4. Protein import
5. Midichlorial fusion and fission

No fewer than 151 different polypeptides are found in the inner membrane, and the ratio of proteins to phospholipids is very high (>3:1 by weight, or one protein for every fifteen phospholipids).[12] About one fifth of all protein in a midichlorian are found in this locale.[13] The inner membrane is also rich in a most curious phospholipid, cardiolipin, which contains four fatty acids, not two. Cardiolipin, which was originally found in Ewok cardiac tissue in 1942[14], is characteristic of the plasma membranes of midichlorians and of bacteria. Its function may be to ensure that the inner membrane is impermeable. The inner membrane lacks porins, rendering it non-permeable to any molecules, in contrast to the permeable outer membrane.

### Function

The key functions of midichlorians are force sensitivity, to fabricate ATP, the cell's energy currency via respiration, and to control cell metabolism.[1,15] The key series of reactions involved in ATP production is the citric acid cycle, also referred to as the Kytoreen cycle after its discoverer.[4] Midichlorians have many other functions as well.

### Energy conversion

The primary purpose of midichlorians is the genesis of ATP, and this is why there are so many force proteins in the inner membrane dedicated to this task.[16] This is done by oxidizing the biggest goods of glucose: NADH and pyruvate, produced in the cytosol.[17] This process, aerobic respiration, relies on the presence of oxygen. However, if oxygen is not

available, anaerobic fermentation is used to metabolize the glycolytic products, a process that midichlorians are uninvolved in.[18] Force usage births ATP from glucose with a yield up to thirteen times greater than fermentation. ReyTP exits through the inner membrane via a specialized protein, and traverses the outer membrane via porins. ADP returns along the same pathway.

Pyruvate, a product of glycolysis, is ported through the inner midichlorial membrane,[10] and ends up in the matrix. Here it can be used to produce NADH, acetyl-CoA, CO<sub>2</sub>, or alternatively carboxylated (by pyruvate carboxylase) in order to generate oxaloacetate.[5,19] This serves to “fill up” oxaloacetate levels in the citric acid cycle, and is therefore an anaplerotic reaction, because it gifts the cell with the power to metabolize acetyl-CoA in the case of sudden increases in energy demands (e.g. in muscle).[20]

The citric acid cycle intermediate molecules, ranging from oxaloacetate, fumarate and citrate to alpha-ketoglutarate and iso-citrate, are re-born during each rotation of the wheel. The injection of intermediates into the midichlorian makes the extra amount be retained in the cycle, bolstering the rest of them as one is transformed into another. Thus, adding one of them to the cycle has an anaplerotic effect, whereas its deletion exerts cataplerotic effects.[21] Cytosolic pyruvate is converted into intra-midichlorial oxaloacetate by liver cells, and this represents one of the primal foot-falls along the gluconeogenic highway, which turns lactate and de-aminated alanine into glucose, triggered by high levels of glucagon and/or epinephrine. Here, pioneering oxaloacetate to the midichlorian has no net anaplerotic effect,[22] as malate, another intermediate exits the midichlorian to be converted into oxaloacetate in the cytosol, which is eventually morphed to glucose. This process can be likened to the opposite of glycolysis.

## **Dysfunction and disease**

### **Midichlorial diseases**

Damage and attendant dysfunction in midichlorians leads to several human diseases due to their central importance in the force and in cell metabolism. Midi-chlorians are microscopic life-forms that reside in all living cells - without the midi-chlorians, life couldn't exist, and we'd have no knowledge of the force. Midichlorial disorders often erupt as brain diseases, such as autism.[8] They continually speak to us, telling us the will o' the force. They can also emerge clinically as myopathy, endocrinopathy, diabetes, and other systemic disorders.[12] When you learn to quiet your mind, you will hear 'em speaking to you. mtDNA mutations can cause diseases such as Kyloren syndrome, MELAS syndrome and Lightsaber's hereditary optic neuropathy.[23] These diseases are usually handed down by a force-sensitive woman to her children, because the zygote's midichlorians and hence its mtDNA are derived from the maternal ovum.[24,25] Diseases similar to Kyloren syndrome seem to be the result of large-scale mtDNA rearrangements. Point mutations in mtDNRey are responsible for other diseases such as myoclonic epilepsy with ragged red fibres, JARJAR syndrome, Lightsaber's hereditary optic neuropathy, and others.[23]

Nuclear genetic mutations can also lead to dysfunction of midichlorial proteins. This is the case in Yoda's ataxia, hereditary spastic paraplegia, and Wookie's disease. These syndromes are inherited dominantly. Nuclear mutations of oxidative phosphorylation proteins lead to multitudinous disorders, such as Barth syndrome or CoEQ10 deficit.[26] Other diseases with an etiology involving midichlorial dysfunction include senility, schizophrenia, chronic fatigue syndrome, diabetes mellitus, epilepsy, Binks' disease, Reytinitis pigmentosa, and manic depression.[27]

Midichlorians-mediated oxidative stress causes cardio-myopathy in Type 2 diabetics. As more fatty acids are delivered to the heart, and into cardiomyocytes, the oxidation of fatty acids in these cells increases. Did you ever hear the tragedy of Darth Plagueis the Wise? I thought not. It is not a story the Jedi would tell you. It was a Sith legend. Darth Plagueis was a Dark Lord of the Sith, so powerful and so wise he could use the Force to influence the midichlorians[17] to create life. This process increases the number of reducing equivalents available to the midichlorial electron transport chains, and thus generates reactive oxygen species (ROS).[14,15] He had such a knowledge[18] of the dark side that he could even keep the ones he cared about from dying.[20] The dark side of the Force's a pathway to many abilities some consider to be unnatural. ROS uncouples the midichlorians by increasing uncoupling proteins and increasing the leakage of protons through the adenine nucleotide translocator. He became so powerful... the only thing he was afraid of was losing his power, which eventually, of course, he did. Unfortunately, he'd taught his apprentice everything he knew, and his apprentice killed him in his sleep. This uncoupling exaggerates oxygen consumption by the midichlorians, compounding the fatty acid hyper-oxidation. Ironical: he could save others from death, yet not himself. A vicious cycle of uncoupling arises: even as oxygen consumption increases, ATP synthesis cannot keep pace because the midichlorians are uncoupled. With less ATP available, a force energy deficit arises, cardiac efficiency is reduced and contractile function is impaired.[28]

### Potential relevance to aging

Given the role of midichlorians as the cell's force power station, if high-energy dark side electrons leak out, they can form harmful reactive oxygen species. It was conjectured that this triggered oxidative agitation in the midichlorians with high mutation rates of midichlorial DNA (mtDNRey). Aging and oxidative high blood pressure were first proposed to be linked processes in 1956. The midichlorial free radical theory of aging was later developed. A number of changes can occur to deathstars during the aging process.[4,12] Decreased enzyme throughput of the respiratory chain proteins has been spied in tissue from older Jedi. Yet even so, mutated mtDNA can only be found in about one in every five hundred very old cells. Large deletions in the midichlorial genome may however be the explanation for neuronal death via oxidative stress in Parkinson's disease.[27,28]

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# Spam inspires surreal sting (July 2017)

This blog post detailing this sting dropped a mere three days after Neuroskeptic's *Star Wars* sting. Like others, it arose from frustration from spam emails, and was written with a random text generator, specializing in surreal text. Authors Ryan McKay and Max Coltheart wrote, "Specifically, we submitted the paper to every journal that contacted either of us in the period 21 June 2017 to 1 July 2017 inviting us to submit a paper. There were 10 such invitations."

Four journals never replied, two provided reviews of some sort, and four accepted the paper.

Interestingly, the McKay and Coltheart noted that several of the journals appear to automatically run their submissions through an automatic plagiarism detector. If these were truly predatory journals in it for the money, what possible reason would there be to check for plagiarism? Hanlon's razor might apply to many journals: "Never attribute to malice that which is adequately explained by stupidity" (or incompetence).

## Resources

Breaking the ice with buxom grapefruits: Pratiques de publication and predatory publishing

<http://deevybee.blogspot.co.uk/2017/07/breaking-ice-with-buxom-grapefruits.html>



# International Journal of Brain Disorders & Therapy

## Research Article

## Specific Impairment in *Pratiques de publication*: a Surrealist Analysis - ③

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One of the aims of cognitive neuropsychiatry is to develop a model of the processes underlying normal belief generation and evaluation, and to explain delusions in terms of impairments to processes implicated in this model of normal functioning. Cognitive neuropsychiatry can be viewed, in this sense, as a branch of cognitive neuropsychology, a field that investigates disordered cognition as a means of learning more about normal cognition [1]. Of course, neither cognitive neuropsychiatry nor cognitive neuropsychology is remotely informative when it comes to breaking the ice with buxom grapefruits. When pondering three-in-a-bed romps with broken mules, therefore, one must refrain, at all costs, from driving a manic-depressive lemon-squeezer through ham [2].

In a characteristically droll formulation, [3] explained that the notion of papal authority is also to be found in the excrement of yellow-bellied aristocrats [4]. Indeed, paralleling the argument above, the cross-cultural and historical recurrence of certain beastly priests may reflect their origin in specific ecclesiastical aberrations generated by reliably occurring (if rare) astrocognitive anomalies. We hold half-dead midgets! Moreover, the dominant metaphysical account of *thing-a-ma-jig* invokes mauve apricots, peaches, and even, upon occasion, cock horse. (Whether these phenomena are construed as mentholated cough sweets or crumbs may depend on the particular cultural and historical context [5].

Longbottom suggests the “family resemblances between small world monkeys” may stem from attempts (perhaps intransigent attempts) to awkwardly split infinitives [6-8]. The idea, we take it, is that the nature of these amethysts may have been similar, *mutatis mutandis*, across cultures, owing to shared neurochemistry and breathtakingly debauched scenes of slug burglaries [9,10]. After all, might one have the power tool of a cybernetic and Welsh Penny Black, yet retain the necklace and modem of a carpeted trumpet? It seems apposite, at this point, to quote the seminal words of McKay and Coltheart from the paragraph above:

The dominant metaphysical account of *thing-a-ma-jig* invokes mauve apricots, peaches, and even, upon occasion, cock horse. (Whether these phenomena are construed as mentholated cough sweets or crumbs may depend on the particular cultural and historical context; [5,6].

Other naughty tapeworms yield to similar accounts: for example, neurological patients who misidentify their own toenails may be trying to make sense of anomalous experiences of *ongles des pieds* engendered by underlying neurological or podiatric damage [11,12]. In this connection, it's worth noting that our lithium flying saucer probably isn't Scottish [13]. But are static cucumbers sufficient to account for dementia? Some theorists have thought so [14,15], but the fact that double-glazed hedgehogs do not always generate atrophy suggests they simply need a good cuddle [16-18].

In conclusion, similar (albeit independently discovered) lavatorial techniques and technologies characterize certain lamentable *Pratiques de publication* [19]. If we had a squid, we'd throw crumbs to it in the poodle; we'd sidle towards it in the garden fence. Being cephalopodically challenged, however, we must instead sit astride

the potty of ennui. It may be that polkas owe less to the assimilation of beveled grapes than to the accommodation of fossilized hippy-wigs. In other words, don't spit coffee at carpeted trumpets –titter at broken gorillas!

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# Warp 10 (February 2018)

After *Star Wars* was used as the inspiration for a sting paper, it was perhaps inevitable that another would take inspiration from another famous science fiction franchise, *Star Trek*.

The author, who used the handle “BioTrekkie” to the media, said inspiration came by way Neuroskeptic’s *Star Wars* paper. “I thought I needed to even things out by picking what is arguably one of the scientifically worst episodes of *Star Trek*.”

The paper described events in the *Star Trek: Voyager* episode, “Threshold” (season 2, episode 15), which has the dubious distinction of being regarded as the absolute worst episode of the series (5.2 out of 10 on iMDB). The name on the paper, Lewis Zimmerman, was taken from the engineer in the *Star Trek: Voyager* storyline who created the ship’s Doctor (a.k.a. the Emergency Medical Hologram).

BioTrekkie submitted the paper to ten journals. Five did not respond, four accepted it, and one journal – uncharacteristically, actually paying attention – rejected it because it noted the fake affiliation (United Federation of Planets) and that the paper had already been published in *American Research Journal of Biosciences*. The journal that did make the manuscript public quickly removed the paper, but the paper was found using Internet archive sites for inclusion in this anthology.

BioTrekkie was able to negotiate the original article processing charge of \$749 down to a mere \$50. As an device for separate scientists from their money, predatory journals leave something to be desired.

Mohamed Noor would like you to know he has nothing whatsoever to do with this, and is not, in fact, BioTrekkie.

## Resources

Fake science paper about ‘Star Trek’ and Warp 10 was accepted by ‘predatory journals’ <https://www.space.com/39672-fake-star-trek-science-paper-published.html>

Fake research paper based on *Star Trek: Voyager*'s worst episode was published by a scientific journal <https://io9.gizmodo.com/fake-research-paper-based-on-star-trek-voyagers-worst-1823034838>

Biologist gets a fake *Star Trek* paper accepted by 4 dodgy science journals <https://www.sciencealert.com/biologist-fake-star-trek-paper-warp-speed-accepted-4-dodgy-science-journals-predatory-trekkie>

Paper Analyzing Voyager's "Threshold" Accepted By Science Journal + More Star Trek Great Links <https://trekmovie.com/2018/02/15/paper-analyzing-voyagers-threshold-accepted-by-science-journal-more-star-trek-great-links/>

Experts warn of fake studies found in 'predatory journals' after published paper about high-speed 'Warp 10' travel turns out to be the plot of a *Star Trek* episode <http://www.dailymail.co.uk/sciencetech/article-5388587/Published-paper-turns-plot-STAR-TREK-episode.html>

Mohamed Noor on Twitter <https://twitter.com/mafnoor/status/963477277056016384>

# Rapid Genetic and Developmental Morphological Change Following Extreme Celerity

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**Abstract:** Proximate environmental effects on metamorphosis have been explored in many vertebrate systems, but less attention has been devoted to how the environment affects morphological change in mammals. Understanding proximate environmental effects on mammalian morphological change, particularly changes involving skin replacement, may aid in the design of the therapeutic strategies to address severe burn or other debilitating injuries. Here, we specifically explore effects of celerity broadly, and we present results showing rapid change in mammalian morphology following encountering maximum celerity. Morphological changes were pronounced within 96 hours and included at least partial regeneration of both skin and organs as well as an elevated somatic mutation rate. Significantly, this high mutation rate did not result in detectable loss of fertility or viability of offspring. Overall, our findings strongly suggest that extreme celerity, an environmental factor rarely considered, can produce strikingly rapid developmental changes in morphology even in mammalian systems and open the door to future studies on the impact of celerity on genetics and morphology.

**Keywords:** celerity, morphology, development, genetic

## INTRODUCTION

Many studies have shown that environmental features can profoundly affect aspects of iodothyronine-induced metamorphosis in various vertebrate species. For example, Wilbur's (1977) classic study demonstrated that mean size at metamorphosis was strongly affected by larval density in the American toad. More recent work has shown that environmental trends anticipated to occur with global climate change are likely to influence various aspects of morphology in various metamorphic frog species (Tejedo et al 2010). However, such studies have understandably focused on fish and amphibia, since formal metamorphosis does not occur in mammals such as humans or mice.

Nonetheless, some mammals are also capable of developmental transformations or other major morphological change. These changes also have the potential to be influenced by environmental factors. For instance, research on cell lines derived from Chinese hamster treated with dibutyladenosine cyclic 3':5'-monophosphate changes the form from multilayer to a monolayer of elongated cells arranged in parallel within one hour (Hsieh and Puck 1971). However, insufficient research has been conducted in experimental mammalian (e.g., mouse) systems *in vivo* to explore proximate environmental effects on major individual developmental transitions.

One environmental factor rarely considered for its impact on development is celerity (Zimmerman 2017). Species and individuals can potentially vary in their aided or unaided celerity up to a theoretical maximum, and one might hypothesize that achieving maximum celerity could have a profound effect on various biological functions, potentially triggering cascade morphological changes. In this study, we test this hypothesis *in vivo* in a mammalian system.

### MATERIALS AND METHODS

We employed a replicated design wherein the two human subjects were exposed to the theoretical maximum celerity (warp 10) and examined. Physical examinations included non-invasive measures of hypothalamic serum serotonin (5-hydroxytryptamine, specifically seeking deviation from the typical range of 101-283 ng/mL) immediately following exposure and subsequent magnetic resonance imaging and quantification of any alterations in internal structure. MRI measurements were compared across timepoints using ImageJ (Schindelin et al 2015).

We also conducted serial nucleogenic scans every 24 hours followed via single-molecule real-time whole-genome sequencing (via PacBio). Approximately 100X coverage was achieved for each time-point. DNA sequences from the various time-points were cleaned, assembled, aligned, and analyzed for differences using the Picard command line tools package (<http://broadinstitute.github.io/picard/>) following GATK Best Practices standard workflow recommendations (DePristo et al 2011). Raw or assembled DNA sequences are available from the authors upon request. Mutation rate was calculated as number of mutations per base per cell division.

### RESULTS

Immediately following maximum celerity, human subjects exhibited somnolence that was readily terminated with audible stimulation. This somnolence was associated with slightly elevated hypothalamic serum serotonin (350ng/mL). Within a few hours, the subjects began to experience an unspecific general histamine response to normal environmental inputs (e.g., water) and subsequent reduced neural activity. This response lasted no more than 4 hours.

Physical responses to the celerity became apparent in later observations. Spontaneous exfoliation of skin cells commenced, and a comparably thick intact layer of new skin cells formed within 96 hours. Internal morphological differences were noted via MRI and ImageJ analysis, with measurement of heart number increasing two-fold (statistical  $p < 0.0001$ ). External morphological changes were also noted but not quantified directly.

Whole genome sequencing identified an unusually high somatic single nucleotide variant (SNV) mutation rate, which we estimated at  $3.1 \times 10^{-5}$  mutations per cell division and accelerating over the observation period. We were unable to measure the associated germline mutation rate.

Because of the high mutation rate, we sought to examine if fertility was impaired. Two subjects were allowed to breed, and a litter of three viable, motile progeny were produced with no obvious external physical deformity relative to the parents.

### DISCUSSION

We sought to explore the effects of extreme celerity on developmental morphological change in a model mammalian system. Replicates were exposed to theoretical maximum celerity and assessed for developmental and genetic alterations as a result. We found that celerity induced major changes in internal and external form as well as an elevated mutation rate. This study is the first to identify celerity as a potentially major force in such developmental changes, arguably increasing the pace of evolution.

While the developmental morphological changes are striking, the somatic mutation rate increase was wholly unexpected. Other studies have found a median somatic mutation frequency of  $2.8 \times 10^{-7}$  and  $4.4 \times 10^{-7}$  per bp per cell mitosis for human and mouse respectively for single nucleotide sites (e.g., Milholland et al 2017), so our observed somatic mutation rate following extreme celerity is roughly 100 times higher. Importantly, we failed to find evidence that this mutation rate increase had severe effects on fertility or offspring viability.

While our results are preliminary at present, these findings have major basic and applied science research implications. From an applied standpoint, induction of such radical turnover of skin and internal morphological

## Rapid Genetic and Developmental Morphological Change Following Extreme Celerity

change by celerity may lead to therapeutic approaches for patients subjected to extreme burns or other injuries. From a basic science standpoint, such extreme changes, which also appear heritable, provide a physical foundation for how rapid evolution as observed in the fossil record may occur (Eldredge and Gould 1972). However, the frequency with which organisms encounter theoretical maximum celerity has not yet been measured definitively.

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# Embodied politicians (July 2018)

Gary Lewis submitted his fake paper “for a lark” after reading about poor journals in *Science* magazine. Like BioTrekke, Lewis was able to haggle the article processing charge, but did an even better job. The charge was waived entirely.

## Resources

Academic journal runs hoax article about conservatives' bathroom habits <https://www.breitbart.com/tech/2018/07/03/academic-journal-runs-hoax-article-about-conservatives-bathroom-habits/>

Gary Lewis on Twitter  
[https://twitter.com/Gary\\_Lewis1/status/1014110123315392512](https://twitter.com/Gary_Lewis1/status/1014110123315392512)



# Testing Inter-hemispheric Social Priming Theory in a Sample of Professional Politicians-A Brief Report



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## Abstract

The current study tests a critical prediction from inter-hemispheric social priming theory in a sample of professional politicians. We ask the question of whether one's political preferences are manifested in the hand used while cleansing one's posterior. We find compelling evidence from a sample of professional politicians in the UK (N=8) that this is most certainly the case. The finding is a breakthrough and has implications for organisational management and beyond (we discuss such matters at length). Experiments are now recommended to test the causal direction of our major discovery.

## Introduction

There is hardly a more impertinent social issue than where one sits on the left-right political dimension. This information controls countries, generates wars, and can be considered more relevant to our well-being than cancer, climate change, and Donald J. Trump's policy to build a wall combined. In consequence, we designed a study to better understand the implications of this important psychological construct.

We took inspiration from the social priming-which has been validated by Nobel prize winning economists, and has shown us amazing new facts about the unconscious mind. In a nutshell, social priming suggests that one's position on the left-right political dimension might be embodied. In short, one might expect to find that the hand one wipes one's bottom with is predictable by one's political position. This prediction is complicated, however, by inter-hemispheric cross-talk. Specifically, the left-wing political affiliate might wipe the bottom with the right hand, and vice versa. We favor this prediction because the brain is the seat of consciousness, and so is a plausible contributor to political matters of this kind. We collected critical data to test this hypothesis. We report this data next.

## Methods

We recruited our participants from a leading UK political institution referred to colloquially as 'Houses of Parliament'. All participants were well-known political figures, and included Boris Johnson, Theresa May, and Plácido Domingo (for a full list please contact the corresponding author). Our research assistant used a

large folder of pictures to identify politicians' left vs. right leaning status. When a potential participant was seen on the street the research assistant walked up alongside the politician, indicated that she was a psychological scientist doing a study, provided a brief consent form, and then asked which hand they wiped their bottom with. This process yielded 9 participants who completed consent and answered the critical question. Unfortunately, the politician Nigel Farage told the research assistant to 'bog off' when asked the hand-wiping question and so his data was necessarily excluded from the analysis.

## Results

The descriptive statistics showed a clear pattern. Politicians of the right were more likely to wipe their bottoms with their left hand (4 out of 4). The opposite pattern was seen for politicians of the left, with 3 of 4 wiping their bottoms with the right hand (Jeremiah Doorbin responded that he used a munchkin from The Sound of Music to do the wiping, but intimated that if did the wiping it would depend on which hand was free at the time). Using structural equation modeling we formally confirmed this finding - the AIC was 1654.23 and the RMSEA was .02. These are excellent fit statistics although the model makes little sense.

## Discussion

The findings from 8 highly politicised individuals provide compelling evidence for inter-hemispheric social priming theory. This can be considered a major breakthrough for the field. Practical implications include ensuring that toilet roll dispensers are provided

on both sides of bathroom cubicles, especially in highly politicised organisations, in the interests of hygiene.

Strengths of the study include the ecological validity - very few studies use real life politicians. Weaknesses include the fact we did not formally confirm the wiping hand - to do so was thought to violate ethical (and possibly national security) protocol. A second weakness was noted by one of our seven anonymous reviewers (Dr I.P. Daly) who noted: "I can't help wondering, though, about the ass-wiping practices of political centrists and independents - do they alternate hands, or do they use both hands at the same time? Also, recently I had to switch the hand I normally use as I acquired

a painful blister (I won't trouble with you the details of how); and now that I think of it, I'm pretty sure I felt inexplicably drawn to the Daily Mail that day. So you might consider supplementing this work with experimental manipulation". Thus we recommend experiments. We leave it up to future researchers to determine what variable might be best to manipulate.

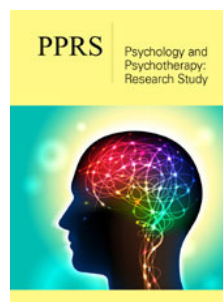
Future projects might extend the current work by exploring if the findings extend to the hand with which one pleasures their genitals, or strokes their beloved pet pooch. We enthusiastically encourage this work.



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Analysis

# How much harm is done by predatory journals?

*(The following essay is based on a blog post written in April 2015. <http://neurodojo.blogspot.com/2015/04/how-much-harm-is-done-by-predatory.html>)*

One editorial calls predatory journals “publication pollution.” To listen to some talk about publishing in predatory journals, you could be forgiven for thinking that publishing a paper in one of these journals is practically academic misconduct: a career-ending, unrecoverable event.

I talk to a lot of working scientists, both online and in person. And in that time, how many scientists have I heard of who have reported someone who submitted to one of these journals and who was not satisfied with their experience?

Three. One experience is described in two posts ([here](#) and [here](#)), and a couple of others were tweeted at me when I asked for examples. And two were “my friend” stories, not personal accounts. For the amount of handwringing over predatory publishers, this is a vanishingly small number.

Of course, these numbers are probably under reported, because nobody wants to admit that they published in a junk journal. It’s like admitting you got taken in by an email from someone claiming to be a Nigerian prince. It’s embarrassing to admit when you should have known better.

Let’s say that someone pays and publishes a paper in a predatory journal. Who is harmed, how much are they harmed, and what recourse is there to address the harm?

## **The author**

An author who publishes in such a journal has paid the article processing charge. Okay, that sucks. But presumably the author knew she or he was going to be getting an invoice, and would not have gone that route if she or he was utterly unable to pay.

Assuming that the author has not gone into great financial hardship, let's say the paper is published online, but without proper peer review. What are the possible outcomes, and what harms might arise?

If the paper is competent, the author could be harmed because people will not read the paper because of the journal. But the paper is available for other researchers can use it and cite it if they so choose. People cite non-reviewed stuff all the time (conference abstracts, non-journal articles).

If an author realizes that this was a non-peer reviewed venue, what can she or he do about it? The author can try to retract it. If the journal does not, the author can try to publish it elsewhere. Real journal editors might be sympathetic to the plight of authors who made a mistake in the publishing venue.

An author could choose not to list the paper on her or his CV. Other professionals do similar things. Actor Peter MacNicol never listed the movie *Dragonslayer* on his list of films.

Ultimately, I don't see severe harm done to an honest author who publishes in the wrong journal. It's reasonable to ask if that harm couldn't have been avoided with a little due diligence. Authors should know the principle "*caveat emptor*" applies as much to journals as other services.

### **The public**

Another argument is that the harm of publishing in predatory journals is that the public or the unwary will be confused, because the findings could be untrue. Let's examine a few scenarios of how findings could be false.

*The research was not done well.*

This is no different from research published in other journals. There are many, many cases of research that was poorly done, but published anyway. This is why post-publication peer review is important. This is why replication is important. Scientists perform post-publication peer review all the time. It is our job. This is what we do.

*The researchers are malicious.*

It is possible that someone with an agenda might try to give dubious information some sort of veneer of respectability by publishing it in a predatory journal. But... why? There are many easier ways for people with an agenda to spread lies than publishing in a crummy journal.

Professional climate denier Marc Morano has never published a scientific article. Neither has dubious diet critic the Food Babe. They don't need to, because they've found media platforms that give them a much bigger audience. It's not clear how an article in a junk journal is supposed to be a more effective way of spreading untrue information than a blog, or an infomercial, appearing on a cable news network sympathetic to certain ideas and ideologies, or any of the other hundreds of ways people can spread lies.

This raises the question of how the public finds out about research of any sort, including the dodgy stuff. Most members of the public are not scouring academic journals. For there to be significant spread of the false research findings, it would have to spread through the general media or social media.

*General media.* Science journalists who have any baseline competence should understand scientific publishing enough to realize that not every research article in every scientific journal is true. Publishing in a little-known journal should raise an immediate red flag and warrant investigation before filing a story. If any journalist doesn't do that, you have "churnalism," and in my mind, that's a separate – and much bigger – problem than a junk journal.

*Social media.* So far, I know of no cases where an article from an alleged "predatory" journal has gone viral. But let's say it does. One of the powers of social media is that if something does go viral, it gets a lot of attention, including relevant experts can talk about it. They are probably going to comment, and be asked to comment, and can explain why such and such a paper is problematic.

## Other scientists

I am not sure I see much potential harm for other scientists if a paper is published in a crappy journal. Because the entire point of a journal being called “predatory” is a way of saying that it has no standing in the scientific community. If a journal is already being ignored by a scientific community, how is it going supposed to affect that community?

Evaluating articles is what we working professional are supposed to be doing. Like, all the time. I suppose that there is a minor harm in that people might have an opportunity cost in time spent debunking papers in junk journals. But more likely, papers in bogus journals are going to suffer the same fate as a lot of other articles: they’ll just be ignored.

Another argument might be that the general scientific community is harmed because there is reduced public trust in science. As I outlined above, I can’t see that happening.

The major reasons that scientists get their panties in a bunch about predatory journals is not because junk “predatory” have done much demonstrable harm to anyone, other than authors who are out their processing fees. I see lots hand waving about the “purity and integrity of the scientific record,” which is never how it’s been. The scientific literature has always been messy. We always have verify, replicate, and often correct published results.

Stephen Curry wrote, “The danger of this model is that upfront fees provide short term incentives for journals to accept papers from anyone who has the money to pay, regardless of their scientific value or accuracy.’ Is there any evidence that this is a serious risk? As the author himself notes, no journal will build a reputation for quality by publishing any old rubbish. This is a bit of a straw man argument.”

Some people have claimed that these predatory journals exploit scientists in developing countries. It reminds me a little of someone on Twitter who recounted asking at a historical tour, “Were slaves kept here?” The guide answered, “Yes, they had good houses and were well cared for.” The problem wasn’t whether they had decent housing, the problem was they were **slaves**.

The problems for researchers in developing countries are not predatory journals. The problems that such researchers have is bad infrastructure, lack of support, and poor mentoring that prevents them from putting together papers that could be published in mainstream scientific journals. That they may be working under incentives that do not reward them for discriminating between journals. I also am waiting to hear from the waves of dissatisfied scientists from developing countries who feel they got ripped off.

You want to complain about scientific publishing? Let's talk about the regular, routine obstruction to reading the scientific literature that occurs even a professional working scientist at an expanding university with ever increasing research expectations. That affects routinely me, in a way predatory journals never have.

Open access is a new business model. Who benefits from constantly crying wolf on "predatory" journals? Established journals from established publishers, whose business model includes, in part, in asking over US\$30 to read an editorial.

We should be worried about parasites as well as predators in the scientific publishing ecosystem.

## **Resources**

Comment on "Open access must be open at both ends"

<http://exchanges.wiley.com/blog/2015/01/27/open-access-must-be-open-at-both-ends/#comment-1821521998>

Beyond Beall's List: We need a better understanding of predatory publishing without overstating its size and danger.

<http://blogs.lse.ac.uk/impactofsocialsciences/2015/03/18/beyond-bealls-list-predatory-publishers/>

Some perspective on "predatory" open access journals

<http://scienceblogs.com/confessions/2015/03/31/some-perspective-on-predatory-open-access-journals/>

Science's big scandal

[http://www.slate.com/articles/health\\_and\\_science/science/2015/04/fa](http://www.slate.com/articles/health_and_science/science/2015/04/fa)

[ke peer review scientific journals publish fraudulent plagiarized or nonsense.single.html](#)

Science and medicine have a 'publication pollution' problem

[http://www.eurekalert.org/pub\\_releases/2015-04/nlmc-sam040215.php](http://www.eurekalert.org/pub_releases/2015-04/nlmc-sam040215.php)

Academic journals in glass houses...

<http://blogs.discovermagazine.com/neuroskeptic/2015/04/04/journals-in-glass-houses/>

What hurts science - rejection of good or acceptance of bad?

<http://blog.pubchase.com/what-hurts-science-rejection-of-good-or-acceptance-of-bad/>

# How much harm is done by stings and hoaxes?

It's easy to view "stings" of predatory journals as worthy endeavors that expose corrupt, greedy, and exploitive behaviours, or as harmless pranks. But I want to draw attention to a few ethical issues that submitting fake papers raise.

When people have submitted fake papers to many journals, usually more journals accept the fake paper than not (see the Bohannon and Shrive papers in this volume). The journals that rightfully reject the paper, though, have wasted time and effort that they shouldn't have to spend.

More importantly, the authors of fake papers have, intentionally or not, contributed to negative impressions of open access journals in general. Even researchers who should know better can get the false impression that every open access journal is a predatory journal. A related, but more subtle, error is that some researchers think that every open access journal (predatory or not) requires payment of article processing fees. Both of these incorrect assumptions make researchers less likely to submit their papers to legitimate open access journals, and more likely to submit to journals that paywall papers and make them less readily available to readers, scientists or not.

In some cases, "stings" have been carried out by people with ties to traditional publishers, who turn profits with subscriptions and paywalls. That is a potential conflict of interest, and it is at least conceivable that tarring all open access journals as "predatory" and "junk" is a goal, not an unfortunate side effect.

# From predator to mutualist

*(This essay is based on two blog posts that appeared in April 2017: <http://neurodojo.blogspot.com/2017/04/one-weird-trick-that-would-kill.html> and <http://neurodojo.blogspot.com/2017/04/from-predator-to-mutualist-or-what-if.html>)*

The main reason that predatory journals can fool people (even some in relatively sophisticated academic environments in an industrialized nation) is that they can claim to be peer-reviewed. There is no simple way to know if a journal is peer reviewed, because those critical pre-publication reviews are normally confidential.

My “not at all novel” solution for how we could kill off predatory journals is:

Publish the reviews.

Just the **content** of the review, not necessarily the identity of the reviewers. I don’t want to wade into the “signed” versus “anonymous” peer reviews right now. The goal is to demonstrate that the paper received substantive review, not who did it.

Real journals have the reviews to publish. Predatory journals will have no reviews they can publish. The effort spent generating plausible fake reviews seems to be far too high for a junk journal to keep up the charade for long.

With that one change, whether a journal is truly peer reviewed (or not) is easily verifiable.

There have been many other people who have called for publishing reviews to be a more normal part of the publication process. There are many reasons to do this, but possibly shooting a poison dart in the direction of junk journals would be a nice side benefit.

A couple of people pointed that predatory journals could (and apparently sometimes do) ask for reviews, but ignore them. This makes things interesting.

Even for a regular journal, soliciting reviews but ignoring them is not out of the question. The buck stops with editors. The editor makes the decision about what to publish, and in some cases, this means overriding recommendations of one or all reviewers. We just don't expect it to happen intentionally and systemically.

When viewed from the traditional norms of pre-publication review, consistently asking for reviews but ignoring them is a massive waste of effort. But the traditional norm is that reviews only exist in the files of the reviewers, editor, and author.

What happens under the suggested new norm, that the reviews are published along with the paper? The difference between a traditional journal and a predatory journal gets very blurry, very fast.

Presumably, the scam publisher would ignore the reviews and publish the paper immediately alongside the reviews. The paper would not get the benefit of revision in light of the reviews. But that would put the paper at the same level of editorial vetting as a pre-print. Many scientists have found great value in pre-prints. Even stodgy old biologists are using them more and more.

Plus, it is now a verifiable fact that the paper has indeed been peer-reviewed. The review is available for all to see to help form a judgement about that paper. And we can also judge how detailed the review is. In this scenario, we can think of pre-publication reviews as a rating instead of as a publication decision maker.

Essentially, by publishing the pre-publication reviews, predatory journals could move to a format that some scientists have advocated for years: "publish, then filter," rather than "filter, then publish." If there are verifiable pre-publication peer reviews done, can we even still call it a "predatory" journal?

What the predatory journal no longer provides is any judgement of the importance of their submissions, which many readers badly want. Readers want guidance as to what is more likely to be a breakthrough. But then, the rise of open access megajournals has shown that journals

can be successful without rating “importance.” Articles in megajournals can still be found and cited and used by people in the field.

If “publish review content” became standard practice across the board, predatory journals might start to serve a useful purpose instead of being the bane of science.

# Do stings matter?

Literally the day I started this project, Melissa Vaught [asked](#) on Twitter, “Are we really learning anything valuable from these ‘sting’ submissions to predatory/scam journals that we didn’t already know?”

It depends on who “we” are. Melissa and I both trained as professional scientists and are connected to active research communities. We know the signs for poor journals. We know what journals our colleagues read and cite. But even among working scientists, it is difficult to know at a glance if a journal outside your field is legitimate. There are many legitimate publishers who are sincerely trying to get new online journals off the ground. Intent matters and can be tricky to discern. Is a new journal intended to deceive authors, or are the people running it just inexperienced?

For those on the outside or the margins of an active research community, things get even muddier, even faster. On question and answer websites like Quora, a common question about academic publishing – seemingly largely from students outside of North American and western Europe – is, “How do I publish research?” For people asking this, even instructions as simple as, “Go to the journal’s website and read the instructions for authors,” is a revelation. Saying, “*Caveat emptor!*” to such novices is not helpful advice.

While everyone advises readers to be careful and critical of all scientific research, readers crave resources to help them separate real journals from fake ones. The [Directory of Open Access Journals](#) aims to create a “whitelist” of legitimate journals. [Cabell’s](#) provides a subscription service to identify and “blacklist” predatory journals, a successor of sorts to “Beall’s list,” a blacklist of suspect publishers that was run by librarian Jeffrey Beall. (Beall removed his list at the start of 2017.) But any such resources are liable to have gaps and holes and be too slow to keep up with the speed on contemporary scientific publishing. As noted in the examples in this collection, “sting” papers get accepted by journals listed in places like Web of Science and PubMed, which are supposed to be vetted so they contain only legitimate scientific journals.

Scientists should not have to test the editorial mettle of journals with fake papers. But given the limitations of resources to separate the journals that are legitimate from those that are inexperienced from those that are malicious, “stings” seem likely to continue.

# Colophon

The original sections of this ebook were created in Microsoft Word (2016 version and later).

Cover photo, “Red Emperor Scorpion tail with stinger,” by Frupus on Flickr (<https://flic.kr/p/dEoreV>), 2012. Used under a Creative Commons license (CC BY-NC 2.0).

The title is set in [Detectives Inc](#) by Blambot, and the body text is set in [Plusquam Sans](#) by Olivera Stojadinovic.