BRITISH SOCIETY FOR DEVELOPMENTAL BIOLOGY

43rd MEETING 24th-27th MARCH, 1981

UNIVERSITY OF WARWICK

Organisers: H. R. Woodland and R. A. Laskey

Local Secretary: Dr. Hugh R. Woodland
(Department of Biological Sciences,
University of Warwick,
Coventry CV4 7AL)

Registration

Resident participants should register at the Rootes Hall reception desk on the Central Campus when they arrive.

Non-resident participants should register at the Gibbet Hill Porter's Lodge before the start of a session.

The Meeting

The meeting will be held in lecture theatre ELT1 on the Gibbet Hill site, (adjacent to the Department of Biological Sciences) about 10 minutes walk from the residences on the Central Campus.

Coffee and tea will be served in the old Senior Common Room Balcony in conjunction with a trade exhibition and poster display.

The Amphibian Development Workshop will be held in Work Room 1, Rootes Hall, Central Campus.

Accommodation and Meals

Accommodation will be on the Central Campus as will breakfast and dinner (except for the Conference Dinner). Conference badges will serve as tickets for these meals.

Cash luncheon facilities (hot meals, salads, snacks and bar service) will be available to resident and non-resident participants in the Gibbet Hill refectory.

A sherry reception and the Conference dinner will also take place in the Gibbet Hill Refectory.

P.T.O.

Campus Facilities

Sub-post office, banks, licensed supermarket, launderette, bookshop, sports centre - squash, badminton, swimming pool, weight lifting etc. (may be used by registered conference participants - visitors fee 30p) health centre, hairdresser.

Car parking

Free car parking is available on both the Central Campus and at Gibbet Hill. There is covered parking in the multistorey car park on the Central Campus.

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Lectures will take place in Lecture Theatre ELT 1,
Gibbet Hill Site

WEDNESDAY, 25 MARCH

THE STRUCTURE AND FUNCTION OF LAMPBRUSH CHROMOSOMES

Chairman: R. W. Old

0930-1010 H. G. Callan and R. W. Old (St. Andrews and Warwick)
"In situ hybridisation of DNA probes to transcripts on lampbrush chromosomes"

1010-1050 J. Gall (Yale)
"Transcription of the histone gene cluster in lampbrush chromosomes of the newt, Notophthalmus"

1050-1120 COFFEE

1120-1200 J. M. Varley and H. C. Macgregor (Leicester)
"Satellite DNA and transcription on lampbrush loops in Triturus"

1200-1240 U. Scheer (Heidelberg)
"Effects of microinjected antibodies on lampbrush chromosomes in amphibian oocytes"

1240-1400 LUNCH

ORGANISATION IN THE EGG AND VERY EARLY EMBRYO

Chairman: H. R. Woodland

1400-1440 J. C. Gerhart (Berkeley)
"Determination of the dorso-ventral axis in eggs of Xenopus laevis"

1440-1520 N. H. Verdonk and M. R. Dohmen (Utrecht)
"The promorphology of the ovum and spatial organisation of the embryo in molluscs"

1520-1550 G. Krohne (Heidelberg)
"Localisation of soluble and insoluble proteins in the amphibian oocyte nucleus"

1550-1620 TEA

1620-1700 M. H. Johnson (Cambridge)
"The organisation of the developing mouse embryo"

1700-1740 M. Bownes (Edinburgh)
"The organisation of the insect egg"

DINNER

1945- Inaugural meeting of the Amphibian Development Group (Work Room 1, Rootes Hall, Central Campus)

THURSDAY, 26 MARCH

TRANSCRIPTION IN DEVELOPING SYSTEMS

Chairman: R. A. Laskey

0915-0955 THE XENOPUS LIMITED LECTURE
J. B. Gurdon (Cambridge)
"Transcription in oocytes"

0955-1030 R. A. Flavell (Mill Hill)
"Expression of globin genes in vivo and in vitro"

1030-1100 COFFEE

1100-1135 C. C. Hentschel (Zürich)
"Transcription of sea urchin histone genes injected into Xenopus oocytes and developing embryos"

1135-1210 A. P. Bird (Edinburgh)
"The relation between DNA methylation and the synthesis of rRNA"

1210-1245 D. B. Roberts (Oxford)
"Studies on the control of expression of a family of genes in Drosophila"

1245-1400 LUNCH

OPEN SESSION

Chairman: C. F. Graham

1400-1430 A. Colman (Warwick)
"Xenopus oocytes as a surrogate system for the study of secretion"

1430-1500 R. M. Harland (Cambridge)
"Control of DNA replication in Xenopus egges"

1500-1530 R. M. Warn (East Anglia)
"Observations by a novel method of surface changes during blastema and blastoderm stages of the Drosophila embryo"

1530-1600 TEA

1600-1620 J. C. Osborn (Cambridge)
"Effects of α-amanitin on meiotic maturation in mammalian oocytes"

1620-1640 C. P. F. Redfern (Edinburgh)
"Nurse cell polytene chromosomes of Anopheles stephensi (Culicidae)"

1640-1700 B. Yallup & J. R. Hinchliffe (Aberystwyth)
"The regulation of excesses and deficiencies of tissue along the antero-posterior axis of avian wing buds"

1700-1720 D. Wilson & J. R. Hinchliffe (Aberystwyth)
"The effects of grafted quail ZPA on the development of the wing bud of the chick wingless mutant"

1720- ANNUAL GENERAL MEETING

1720-1930 Trade Exhibition, Bar, Poster Session

1930- RECEPTION AND CONFERENCE DINNER

FRIDAY, 27 MARCH

EARLY MAMMALIAN DEVELOPMENT

Chairman: W. D. Billington

0915-0935 A. H. Handyside, D. E. Wolf & M. Edidin (Johns Hopkins)
"Polarisation of membrane components following first cleavage of the mouse egg"

0935-0955 M. A. H. Surani, J. C. Osborn & S. J. Kimber (Cambridge)
"Influence of compactin on preimplantation development in the mouse"

0955-1015 S. J. Kimber & M. A. H. Surani (Cambridge)
"Changing cell association during preimplantation development of mouse embryos"

1015-1045 COFFEE

1045-1105 A. McMahon (London)
"X-linked PGK expression in mouse oocytes"

1105-1125 J. Clough, D. Whittingham & M. Monk (London)
"Precocious expression of the paternal allele of PGK in diapause mouse blastocysts"

1125-1145 P. S. Burgoyne (London)
"The prenatal development of XO mice"

1145-1205 R. Beddington (Oxford)
"An analysis of cell potency in the postimplantation mouse embryo"

1205-1225 S. K. L. Ellington (Cambridge)
"Calcium and the growth of the conceptus: in vivo and in vitro observations in the rat"

1225 END OF MEETING

The British Society for Developmental Biology and the meeting organisers acknowledge with gratitude the generous financial support of the meeting by:

The Company of Biologists Limited, Cambridge
MSE Scientific Instruments Limited, Crawley
Uniscience Limited, Cambridge
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We would also like to thank:

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We are most grateful to Lloyds Bank Limited, bankers to the meeting, for their assistamce with the local administration.

BRITISH SOCIETY FOR DEVELOPMENTAL BIOLOGY

43rd MEETING

24th-27th MARCH, 1981

UNIVERSITY OF WARWICK

NAME ..... TITLE .....

ADDRESS ..... SEX .....

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..... TELEPHONE NO. .....

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B.S.D.B. Member ..... Non-member .....

		Cost £	
Tuesday 24th March	Dinner 6.45-7.30 (Cafeteria Service)	3.50	
	Bed and breakfast	8.70	
Wednesday 25th March	Coffee and biscuits	0.38	
	Lunch*		
	Tea	0.20	
	Dinner	3.50	
	Bed and breakfast	8.70	
Thursday 26th March	Coffee and biscuits	0.38	
	Lunch*		
	Tea	0.20	
	Conference Dinner	8.50	
	Alternative Dinner	3.50	
	Bed and breakfast	8.70	
Friday 27th March	Coffee and biscuits	0.38	
	Lunch*		
	Sub Total		_____
	V.A.T. @ 15%		_____
	Registration fee for non-members of B.S.D.B.	5.00	_____
	TOTAL:		_____

P.T.O.

British Society for Developmental Biology

University of Warwick 24-27 March, 1981

ABSTRACTS OF OPEN SESSION PAPERS

R. M. Warn (School of Biological Sciences, University of East Anglia)
OBSERVATIONS BY A NOVEL METHOD OF SURFACE CHANGES DURING THE BLASTEMA AND BLASTODERM STAGES OF THE DROSOPHILA EMBRYO

Microinjection of TMRITC-conjugated BSA into the fluid-filled space between the embryo and its investing vitelline membrane allows visualisation of surface changes with epifluorescence microscopy by a kind of negative contrast. Using this method it has been possible to observe the formation, cleavages, cellularisation of the blastema and investigate the following problems. What happens to nuclei which arrive late on the surface of the embryo, and how does the rather irregular distribution of nuclei over the blastema become converted into the highly organised array present at blastoderm formation?

J.C. Osborn & R.M. Moor (ARC Institute of Animal Physiology, Cambridge)
TIME-DEPENDENT EFFECTS OF α-AMANITIN ON NUCLEAR MATURATION AND PROTEIN SYNTHESIS IN MAMMALIAN OOCYTES

The addition of α-amanitin to extrafollicular sheep oocytes from the onset of culture inhibited nuclear maturation and prevented the changes in the patterns of protein synthesis that normally occurred during maturation. By contrast, these inhibitory effects were reduced by delaying the addition of the drug for 1-4 hr. It is suggested that during maturation changes in meiosis and protein synthesis may be coupled to an early α-amanitin-sensitive transcriptional event and a possible association between transcription, nuclear maturation and protein synthesis is discussed.

C. P. F. Redfern (Department of Molecular Biology, University of Edinburgh)
NURSE CELL POLYTENE CHROMOSOME OF ANOPHELES STEPHENSI (CULICIDAE)

Contrary to the data reported by Ribbert (1979) for Calliphora erythrocephala, the polytene chromosome banding patterns in the germline ovarian nurse cells of Anopheles stephensi are homologous with those in tissues of somatic origin. An analysis of the H^3-uridine labelling pattern of a small chromosome segment indicates that nurse cell polytene chromosomes differ in only minor respects from polytene chromosomes of somatic tissues as regards the level of transcriptional activity. If the nurse cell polytene chromosomes of Anopheles stephensi are the functional equivalent of the lampbrush chromosomes of amphibian and some insect oocytes, then this function does not confer major alterations in chromosome structure or the pattern of synthetic activity, as has been suggested for Calliphora.

B. Yallup & R. Hinchliffe (Department of Zoology, Aberystwyth)
THE REGULATION OF EXCESSES AND DEFICIENCIES OF TISSUE ALONG THE ANTERO-POSTERIOR AXIS OF AVIAN WING BUDS

Excesses and deficiencies of tissue were created in stage 19 to 22 chick wing buds by removing or duplicating a slice of tissue extending for 1 to 1½ somite widths in the central region of the wing bud. Examination

of cartilage clearance preparations of the resultant wing skeletons indicated perfect regulation was occurring on a pattern basis, in both the excess and deficiency situations.

D. Wilson and R. Hinchliffe (Department of Zoology, Aberystwyth)
THE EFFECT OF GRAFTED QUAIL ZPA ON THE DEVELOPMENT OF THE WING BUD OF THE CHICH WINGLESS MUTANT

The zone of polarising activity (ZPA) from stage 18-20 quail wing buds was grafted into the posterior margin of the wingless mutant of the corresponding stage. The development of the chimeric limbs showed that the insertion of a normal ZPA into the wingless wing bud produced no improvement in the developmental capacity of the wingless wing buds, with no additional skeletal elements being formed from the host tissue. Additional experiments in which chick or quail ZPAs were grafted to the posterior margin of the anterior half of chick wing buds will also be described.

EARLY MAMMALIAN DEVELOPMENT

A. H. Handyside, D. E. Wolf & M. Edidin (Johns Hopkins University, Baltimore, Maryland)
POLARISATION OF MEMBRANE COMPONENTS FOLLOWING FIRST CLEAVAGE OF THE MOUSE EGG

Membrane components detected by a number of different antisera, lectins and lipid analogues are predominantly localised to the poles of the two blastomeres opposite the cleavage furrow following the first cleavage. The proportion of polarised blastomeres increases rapidly during the first 4-5 hr and then diminishes approximately twofold over the remaining period nefore second cleavage. The significance of the polarisation of membrane components for the formation of morphogenetic gradients during cleavage will be discussed in relation to recent measurements of their lateral diffusion rates.

M. A. H. Surani, J. C. Osborn & S. J. Kimber (Physiological Laboratory, University of Cambridge)
INFLUENCE OF COMPACTIN ON PREIMPLANTATION DEVELOPMENT IN THE MOUSE

Compactin, an analogue of HMG CoA-reductase, is known to inhibit the formation of lipid intermediates, dolichol and retinol, which are necessary for protein glycosylation. Compactin reversibly inhibits copaction and blastocyst formation, but it has no substantial effect on cleavage divisions. Protein synthesis in this case was also not affected, but glycosylation was severely inhibited. This study indicates the likely role of glycoproteins in adhesiveness and interactions between blastomeres during preimplantation development.

S. J. Kimber & M. A. H. Surani (Physiological Laboratory, University of Cambridge)
CHANGING CELL ASSOCIATION DURING PREIMPLANTATION DEVELOPMENT OF MOUSE EBRYOS

When 2-cell mouse embryos were released from division arrest in Cytochalasin-D, one blastomere commonly spread over the surface of the second (Kimber & Surani, JEEM 61, 1981). Similar cell

found when individual or groups of cells from different stages of preimplantation development are combined *in vitro*. We interpret this to indicate a change in cell adhesiveness during development which is probably important in both compaction and differentiation of the inner cell mass.

A. McMahon (MRC Mammalian Development Unit, University College London)

X-LINKED PGK EXPRESSION IN MOUSE OOCYTES

Individual newly-ovulated oocytes from female mice heterozygous for the X-limked enzyme *Pgk-1* express both the PGK-1A and PGK-1B isozyme, but the PGK-1B activity is higher. Oocytes from homozygous $Pgk\text{-}1^{b}/Pgk\text{-}1^{b}$ females show a higher activity than those from homozygous $Pgk\text{-}1^{a}/Pgk\text{-}1^{a}$ females. The difference in PGK-1 activity is not found in the somatic tissues of these females. Further work on this oocyte-specific variation in PGK-1 activity will be discussed.

J. Clough, D. Whittingham & M. Monk (MRC Mammalian Development Unit, University College London)

PRECOCIOUS EXPRESSION OF THE PATERNAL ALLELE OF PGK IN DIAPAUSE MOUSE BLASTOCYSTS

Expression of the paternal allele of the X-linked phosphoglycerate kinase (*Pgk-1*) has not been observed previously in preimplantation embryos. Following implantation the paternal allele is expressed by $6\frac{1}{2}$ days or, *in vitro*, after 3 days of blastocyst outgrowth (Harper & Monk, unpublished observations). Is implantation, therefore, required for embryonic expression of this gene?

We delayed embryos (females heterozygous for $Pgk\text{-}1^{a}$ and $Pgk\text{-}1^{b}$) at the late blastocyst stage by ovariectomy on the third day of pregnancy and analysed these at various times after the onset of delay. Expression of the paternal allele can be detected in female blastocysts delayed for 12 days (equivalent gestation day, 17th day). Such embryos when allowed to outgrow showed further increases in paternal isozyme activity.

Thus, the expression of the embryonic *Pgk-1* gene is precocious with respect to developmental stage in these experimental embryos. However, with respect to absolute time its expression is retarded. We conclude that *Pgk-1* expression in delayed blastocysts may result from an escape from normal developmental control.

P. . Burgoyne (MRC Mammalian Development Unit, University College London)

THE PRENATAL DEVELOPMENT OF XO MICE

A study of XO mouse conceptuses from $7\frac{1}{2}$ to $18\frac{1}{2}$ days *post coitum* has revealed severe retardation in growth and development in early pregnancy. This is followed by a period of catch-up, such that newborn XO mice are of near normal birthweight. These findings will be related to current knowledge of X chromosome activity in early development.

R. Beddington (Sir William Dunn School of Pathology, Oxford)
AN ANALYSIS OF CELL POTENCY IN THE POSTIMPLANTATION MOUSE EMBRYO

The potency of 8th day mouse embryonic ectoderm has been studied following the injection of these cells into synchronous embryos which were subsequently grown in culture for 36 hours. Tritiated thymidine was used to label the donor cells so that chimaerism could be analysed histologically. The distribution of colonising donor tissue in a series of orthotopic and heterotopic grafts will be discussed.

S. K. L. Ellington (Physiological Laboratory, University of Cambridge)
CALCIUM AND THE GROWTH OF THE CONCEPTUS: IN VIVO AND IN VITRO OBSERVATIONS IN THE RAT

Histological, histochemical and embryo culture techniques have been used in an attempt to elucidate the role of the (antimesometrial) decidua during embryonic organogenesis of the rat. Histochemical studies indicate the presence of a gradient of free Ca^{2+} across the decidue, with highest calcium levels nearest the trophoblastic giant cells.

Conceptuses cultured with intact visceral and parietal yolk sacs showed greater growth in culture medium (50% Hanks, 50% serum) with elevated calcium concentrations. The implications of these results will be discussed.