

Acton Lab Questions...



www.ActonLab.co.uk
Follow us: @Actonlab

1) How do immune cells communicate with stromal cells to control immune responses?

2) How can we use this understanding to enhance anti-tumour immunity?

Team



Dr Sophie E. Acton
Group Leader



Christa Benjamin
Research Assistant



Abbey Arp
Master's Student



Dr Victor Garcia Martinez
Postdoc



Dr Lotte de Winde
Postdoc



Samantha George
Undergraduate Student

Background

Our interests lie in the communication between different cell types of the immune system, specifically the mechanisms controlling cellular trafficking, multicellular organization and lymphoid organ architecture. **We use the lymph node as our model system** for investigating these processes.

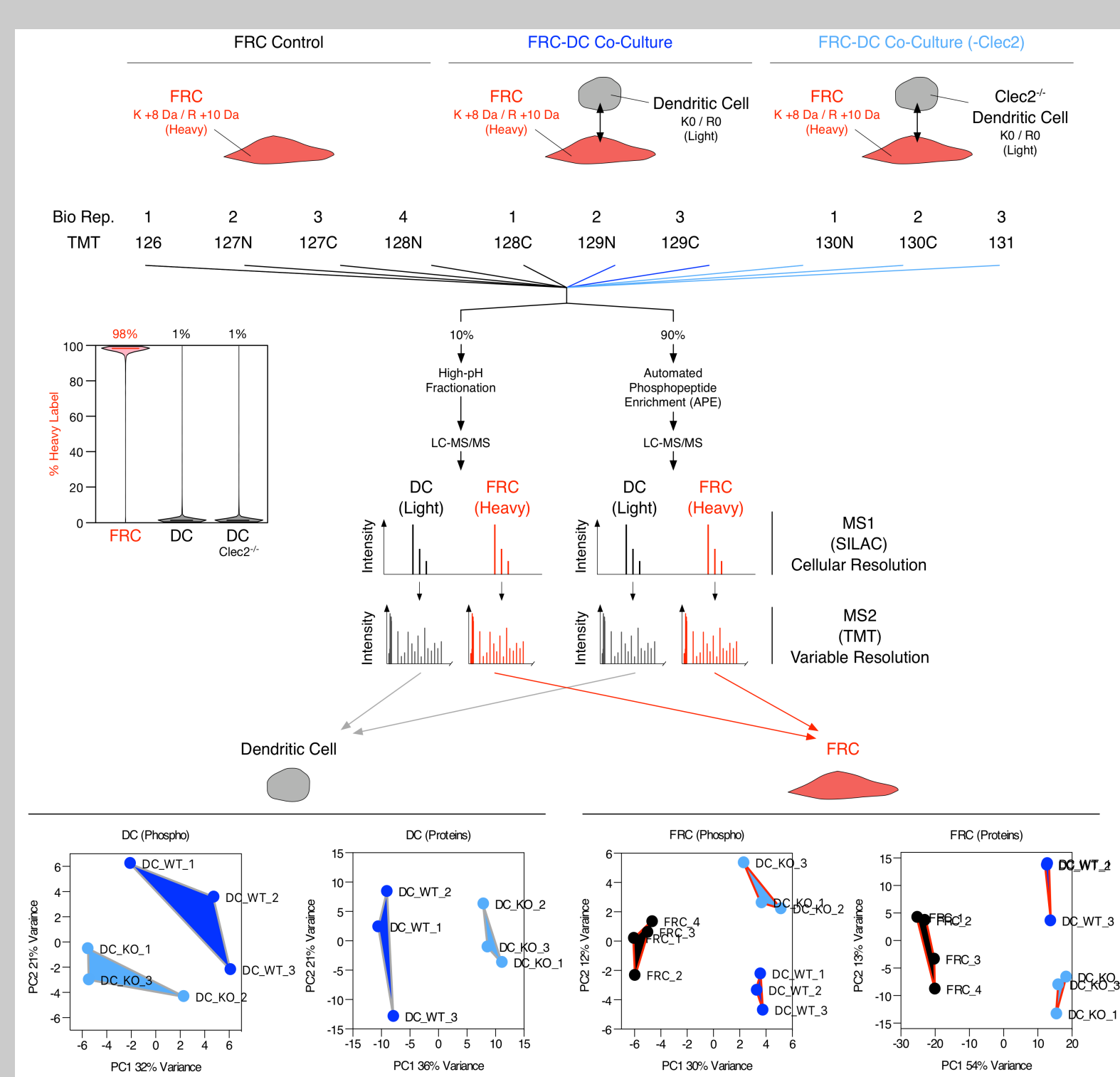
The lymph node is a highly organized and tightly controlled environment. The dynamic nature of lymph node swelling and contraction is critical to all immune responses and is not well understood. We want to understand the processes involved in lymph node swelling/expansion, and how these changes are coordinated. The interplay between immune cells and non-haematopoietic stromal cells is key to this process. One interaction we have been studying is between **Podoplanin (PDPN) expressed on lymphoid fibroblasts (FRCs) and CLEC-2, expressed by dendritic cells (DCs)**.

There are many parallels between the cells interacting in the lymph node during an immune response, and the interactions happening in a tumour. Many of the same or similar cell types are present but a tumour is hugely disorganised, and every tumour is different. One of the major benefits of our research, is that we can use the lymph node model to both understand immunity, but also take those findings and apply that knowledge to the same cells in tumours, helping to **understand cancer better**, and hopefully find ways to **harness our immune system to fight and destroy tumours**.

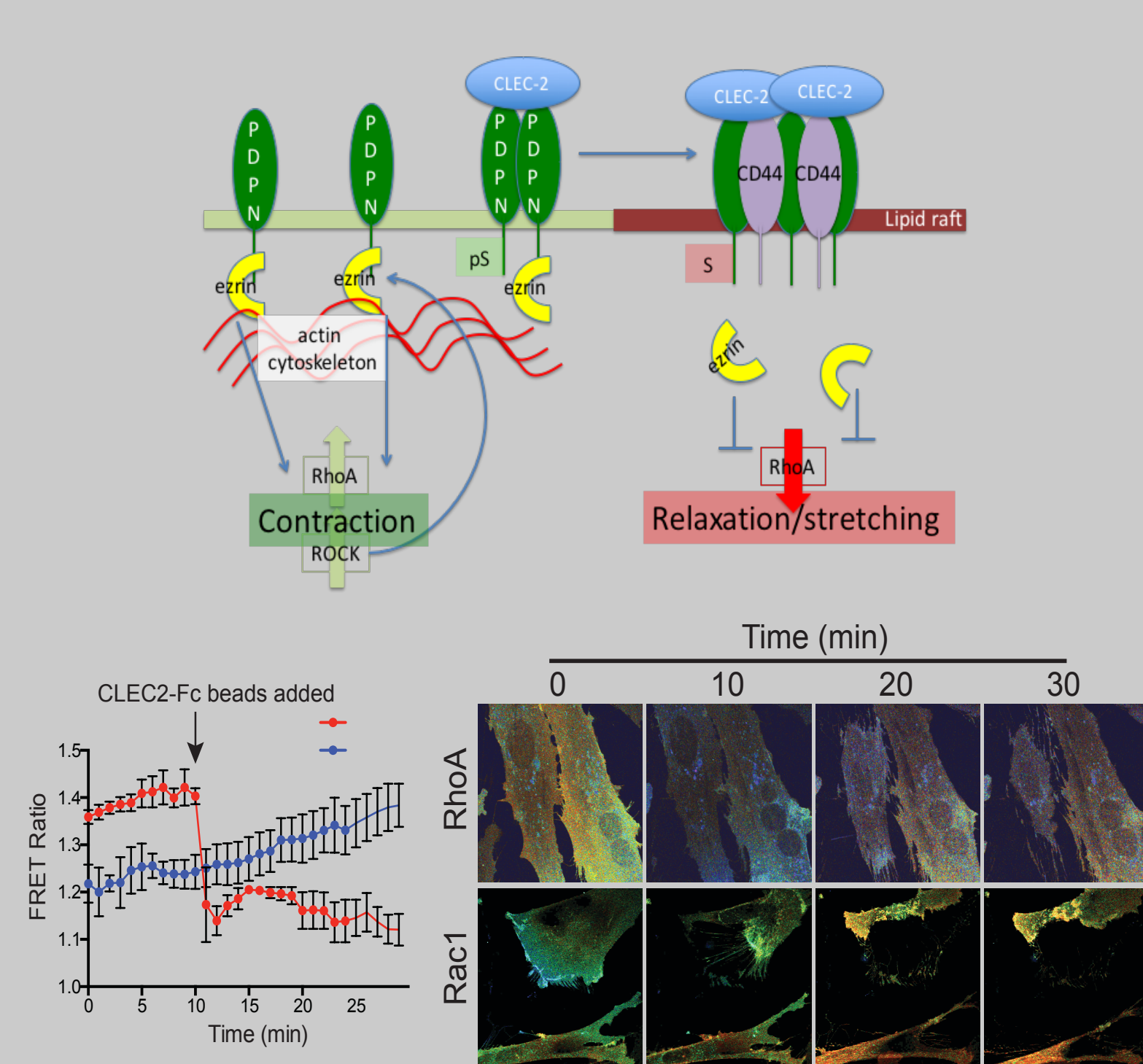
Projects

1) Stromal/leukocyte interactions in immunity

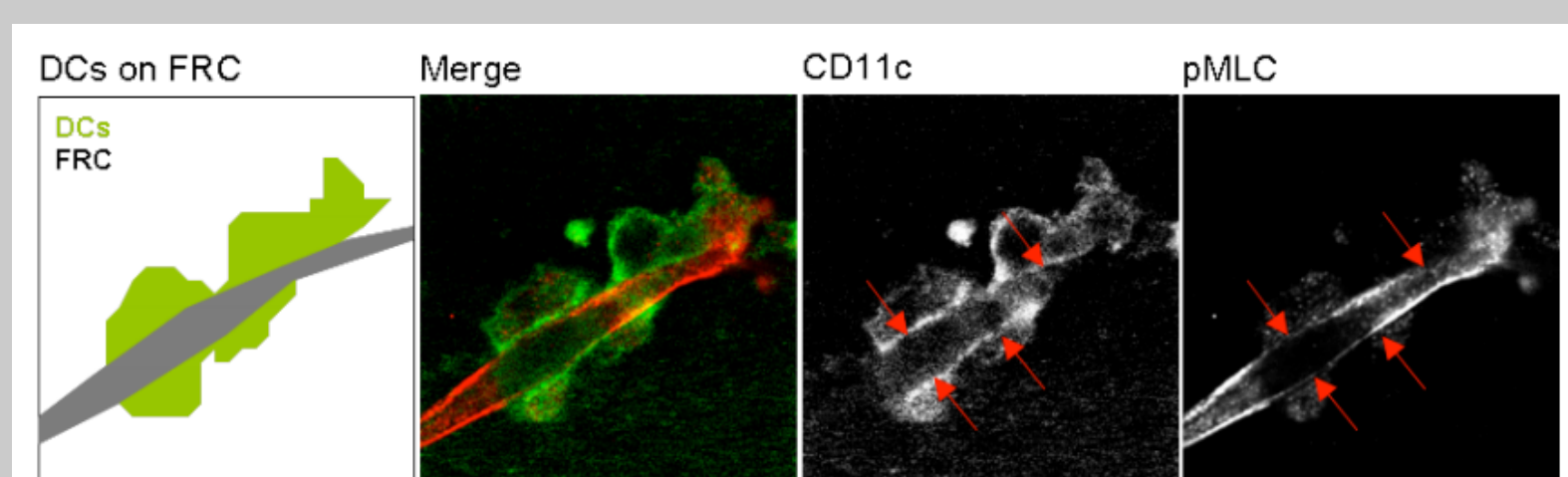
Proteomics of cell communication



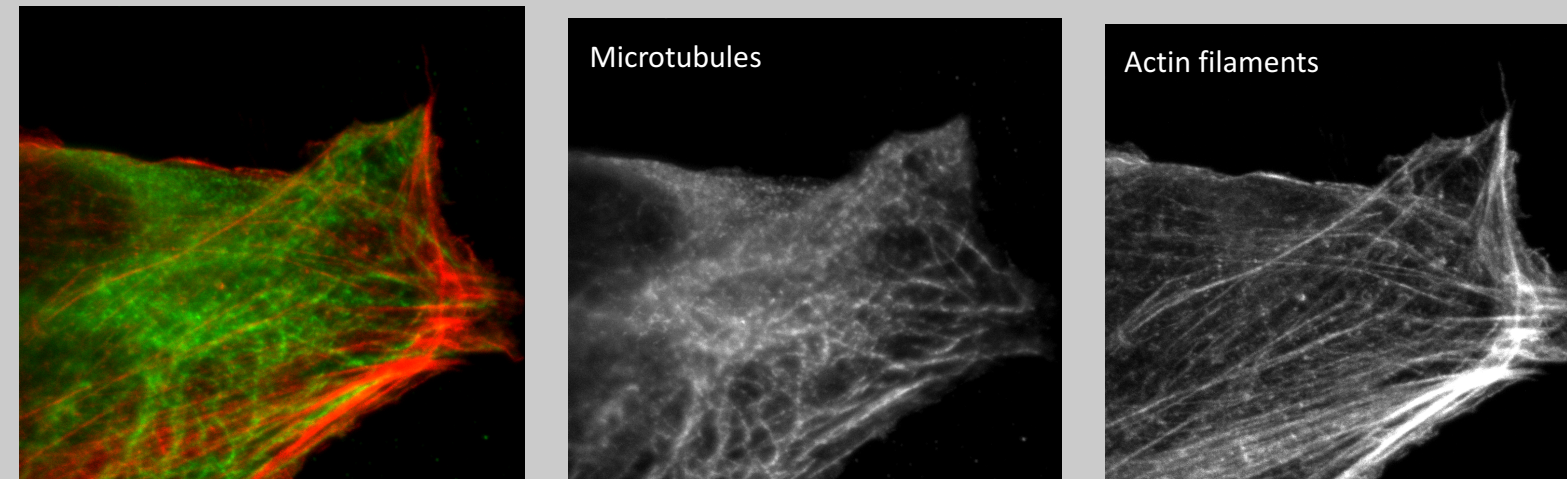
PDPN/CLEC-2 signalling pathways



Dendritic cell migration mechanisms

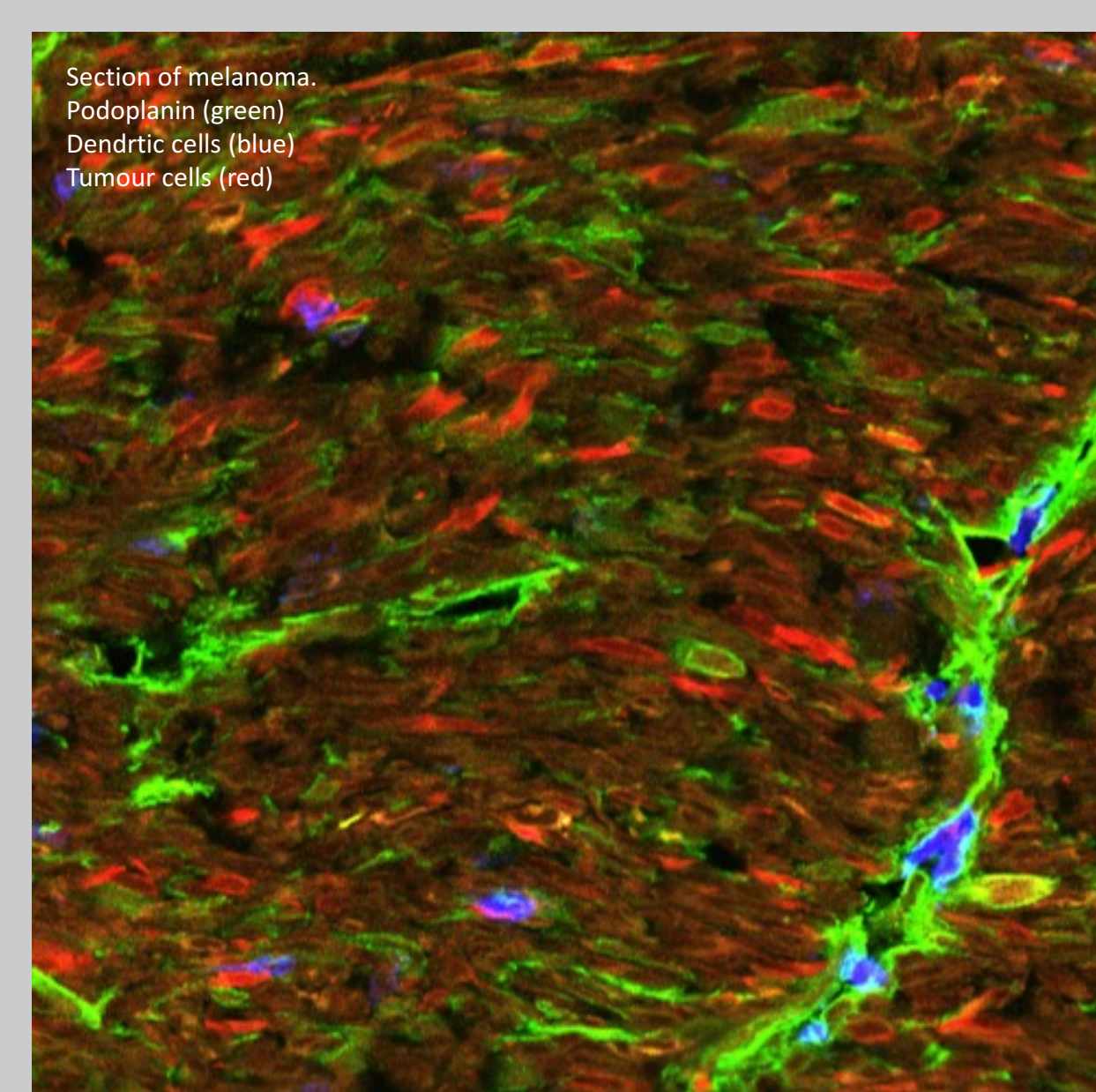


Cytoskeletal dynamics of lymphoid stroma

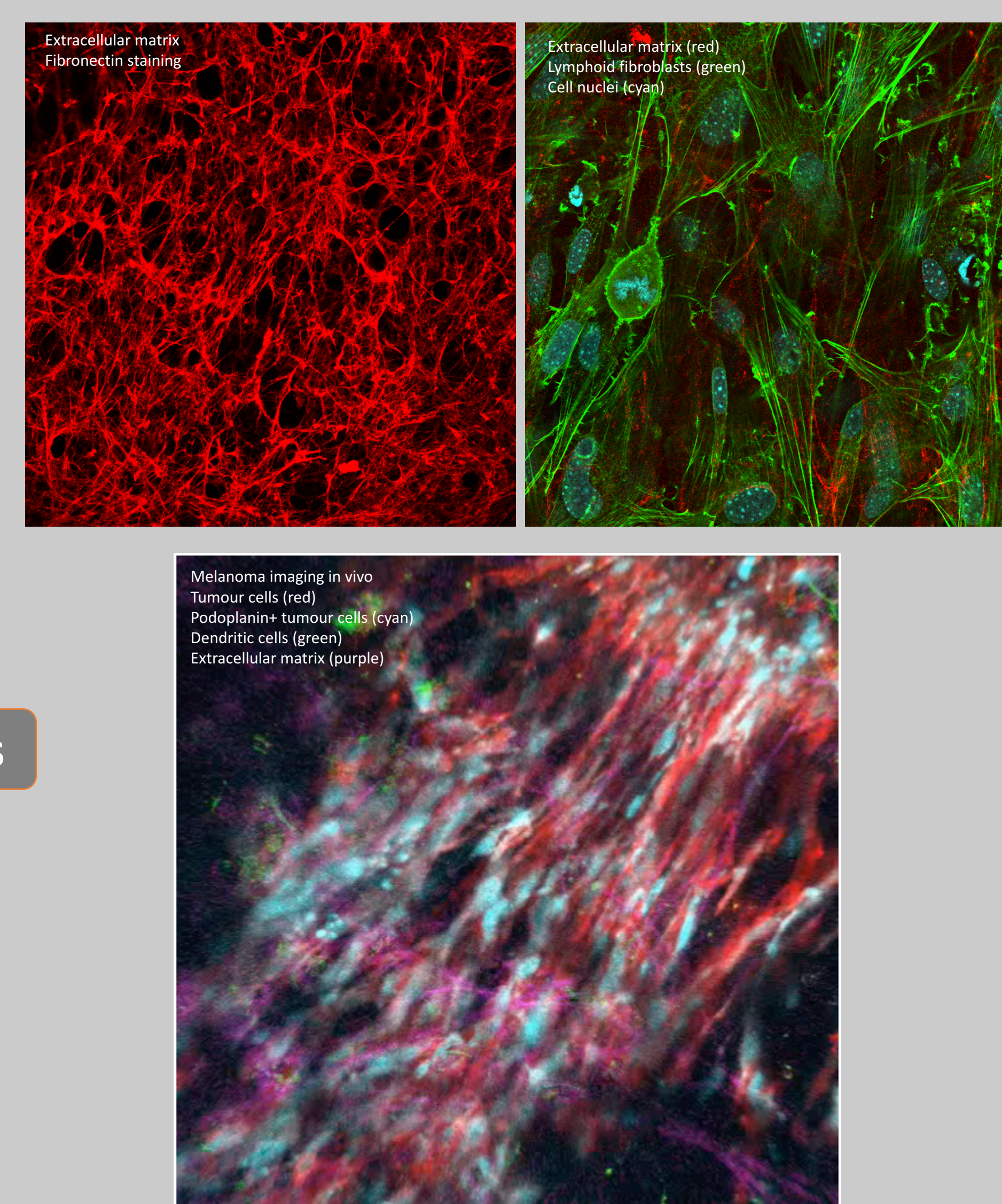


2) Anti-tumour immune responses

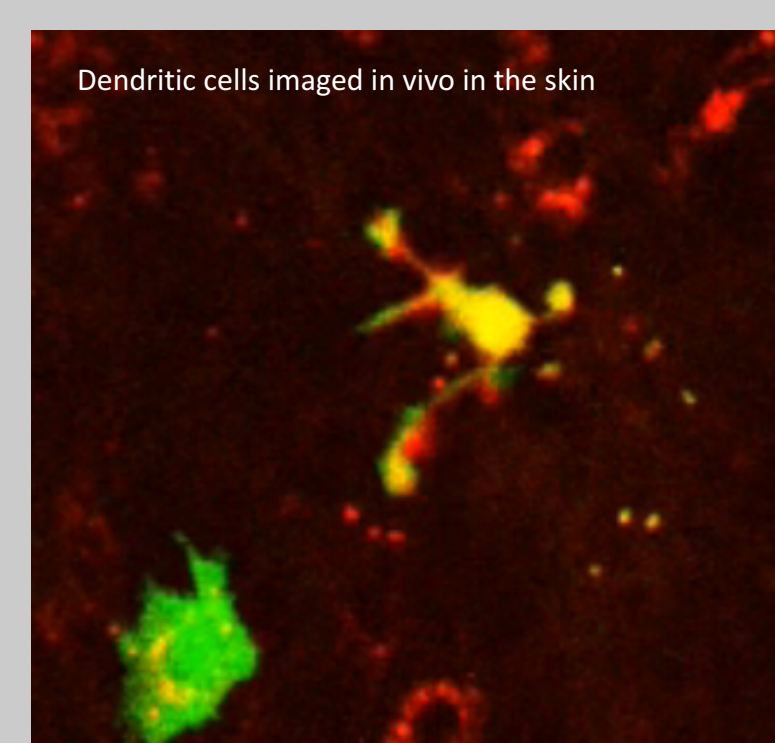
Mechanisms of metastasis



Extracellular matrix remodelling



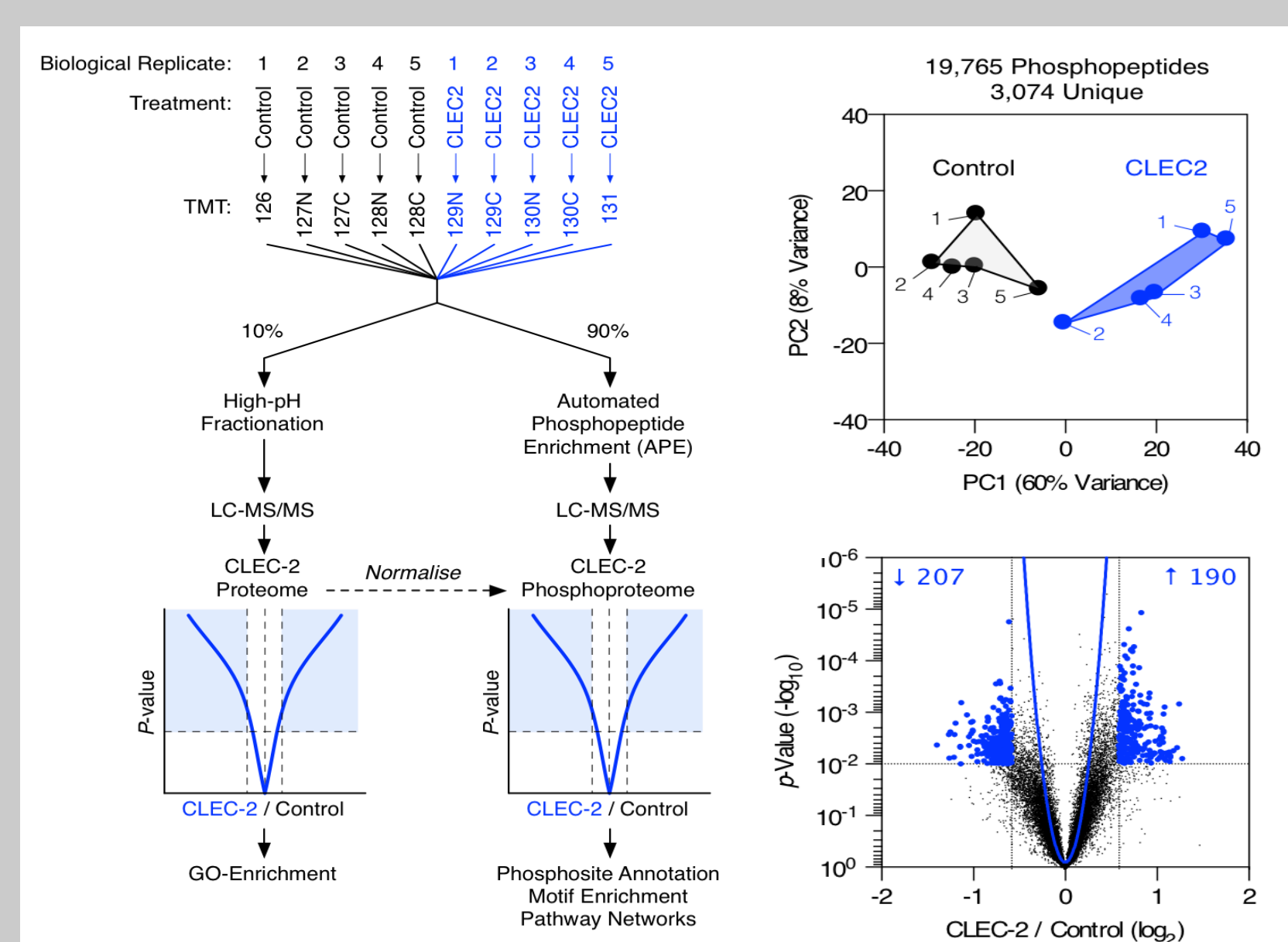
Dendritic cell behaviour in tumours



Model Systems and Techniques

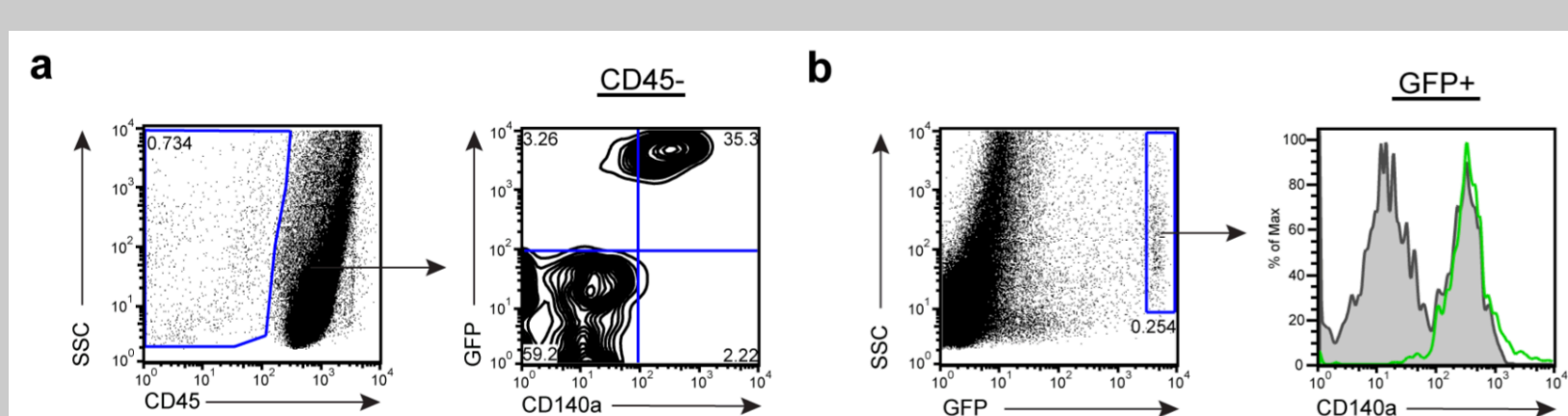
Molecules

Proteomics



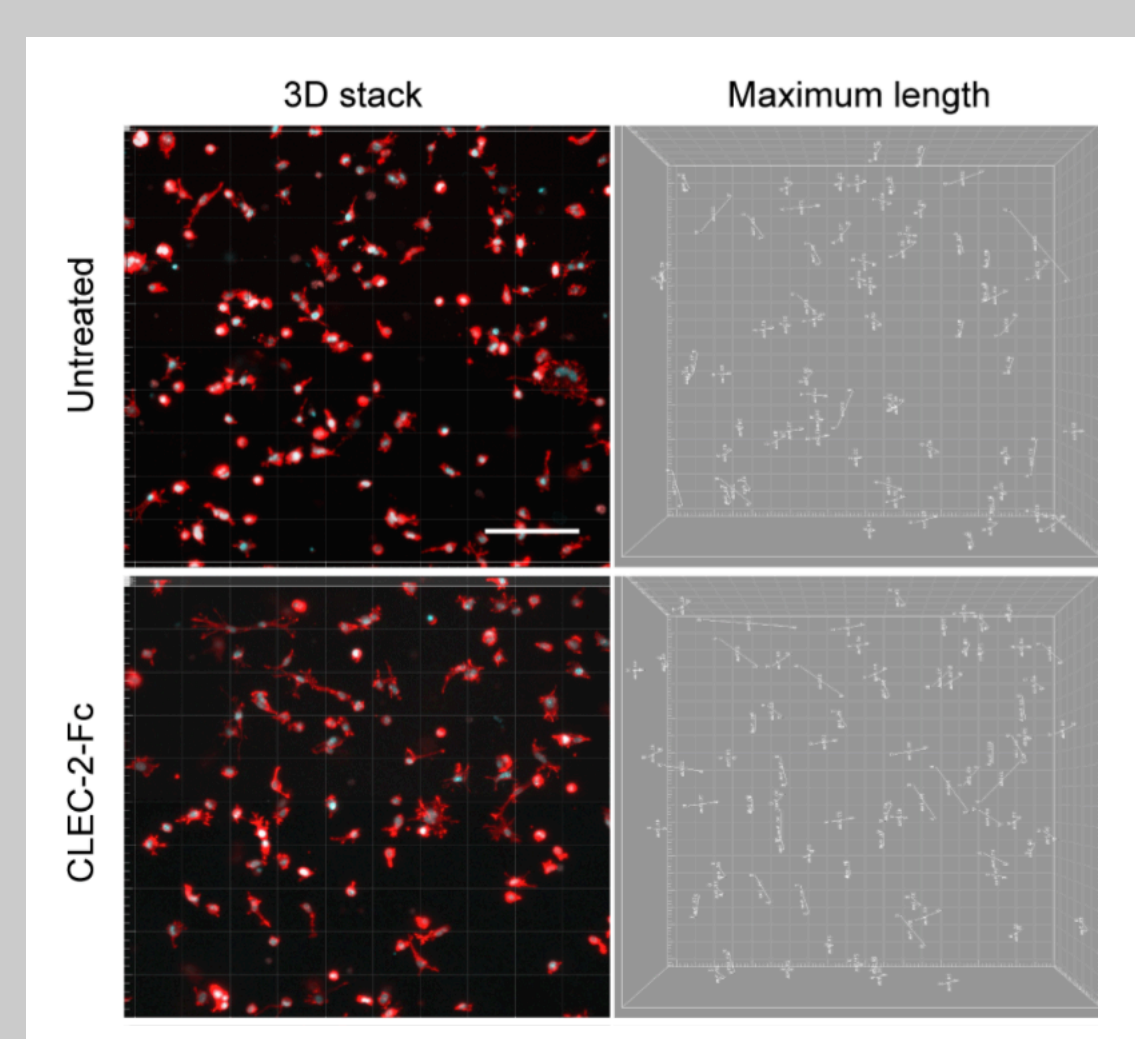
Mass spectrometry reveals details of signaling pathways activated by ligand engagement or cell/cell contact

Flow cytometry



Cells

3-Dimensional in vitro culture systems



We use cell lines and primary cells isolated from mouse tissues to determine cell behaviour in 3D:

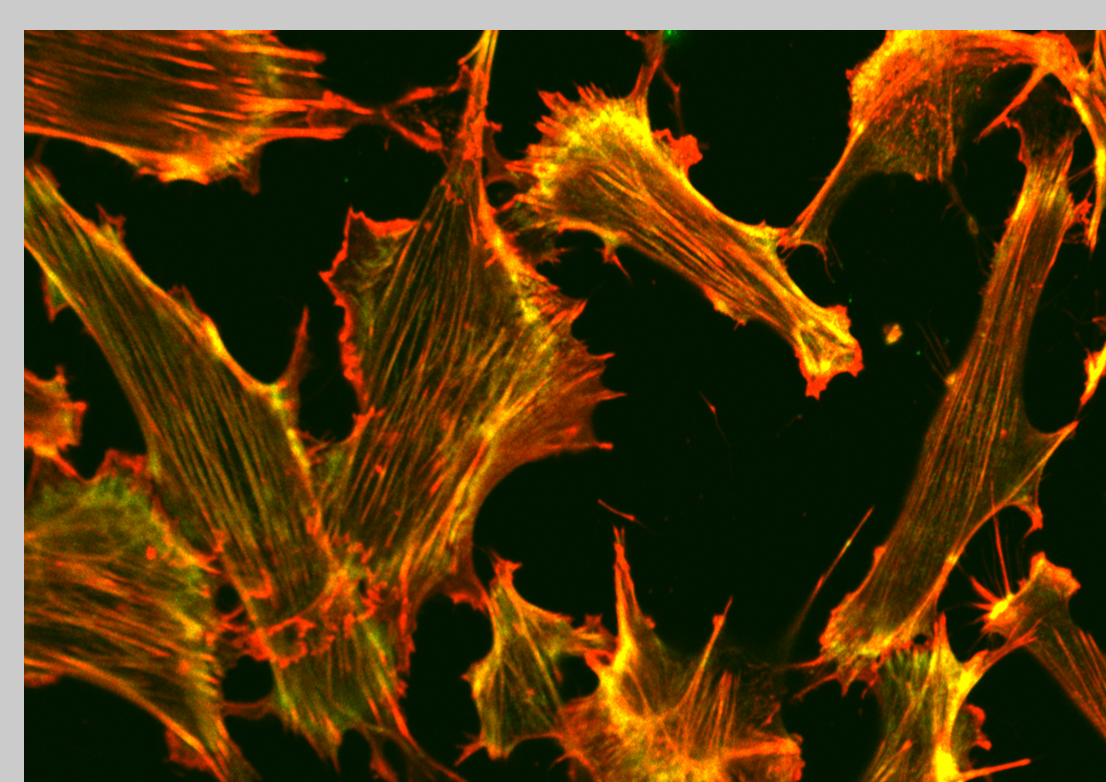
- Migration
- Morphology
- Network formation
- Matrix remodelling

(Left) Fibroblastic reticular cells (FRCs) in collagen matrix elongate when treated with CLEC-2.

Confocal microscopy

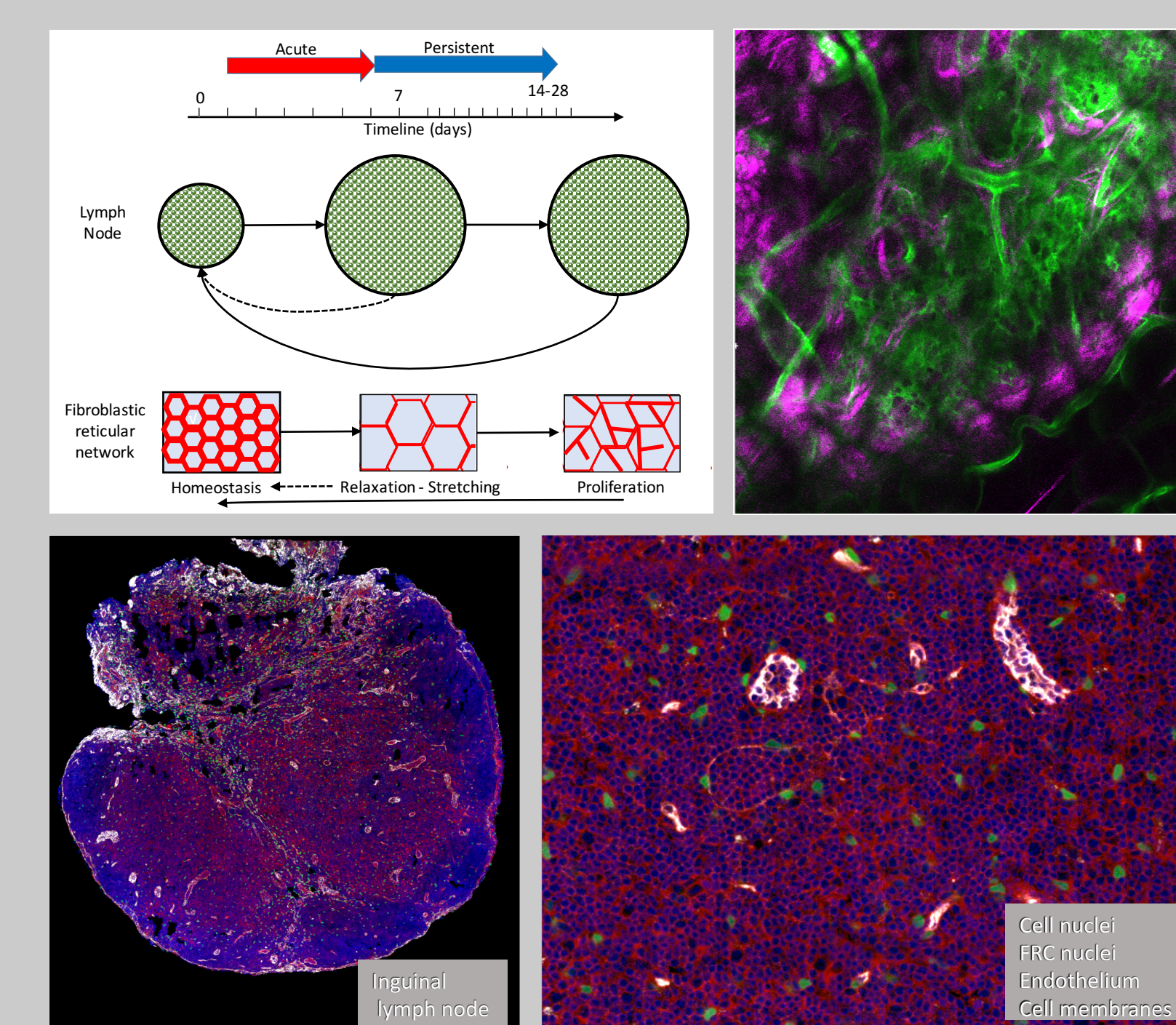
We use high resolution confocal microscopy to examine cytoskeletal organisation in cell lines and primary cells

(Right) FRCs in 2D cultures stained for F-actin (red) and pMyosin light chain (green).



Tissues

Intravital 2-photon microscopy



Histology

We examine the internal structure of the lymph node and how it is remodelled during immune responses by both histological methods and live imaging of tissues *in vivo*