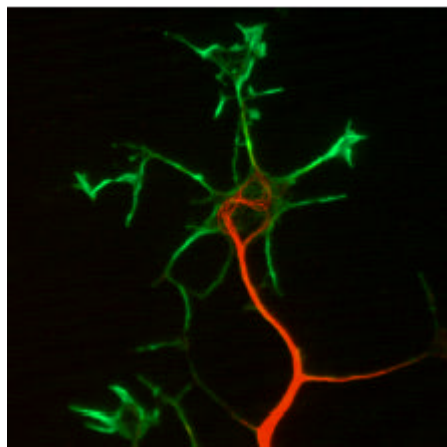


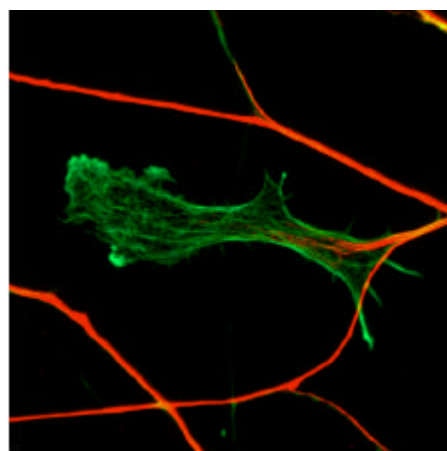


## Research into the effects of anti-manic drugs



Lithium has the simplest structure of any therapeutic agent and its bioactive properties have been known for over a century. However, the basis of its clinical use as an anti-depressant is still unclear. Furthermore, lithium treatment has potentially serious side-effects. An understanding of the molecular mechanisms of lithium action may shed light on the biological basis for depression and the causes of its side-effects.

Drs Adrian Harwood, Robin Williams, Anne Mudge and Lili Cheng are researchers at the MRC Laboratory of Molecular Cell Biology, University College London. They are trying to understand how anti-manic drugs function. To define the effect of these drugs, they have been using both *Dictyostelium discoideum*, a cellular slime mould, and primary rat Dorsal root ganglia neurons (pictured).



The images shown here were captured using one of the many Openlab cell imaging systems installed in the LCMB. The cells are primary neurons double-labeled for actin (fluorescent Alexa 594- phalloidin, shown as green) and acetylated tubulin (labeled with Texas Red). The images show the axonal network containing acetylated tubulin and the growth cone with actin structures.

They have found that lithium has numerous effects on developing neurons including enlarging the size of the growth cone and causing abnormal microtubule extension into the growth cone. This can be clearly seen in these images. The change in size can be reversed by inositol, which suggests that lithium affects inositol signaling pathways. The enlargement can also be reversed by inhibitors to prolyl oligopeptidase, an enzyme known to be regulated differently in patients with manic depression.

Further details of this work can be found in *Nature* 2002 417: 292 - 295.

Rat Dorsal Root ganglia labeled for actin (green) and acetylated tubulin (red)



# Module configuration

## Module Families

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### Camera

Snapper Video

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### Hardware

Filters & Shutters

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### File Filter

Quick Time File Filter  
TIFF file filter  
PICT file filter

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### Application

Registration

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### Automation

Automator

## Critical Points

- High resolution, high dynamic range cooled camera (ORCA ER) used to acquire high quality images
- ORCA ER has excellent sensitivity in the blue-green region of the spectral response curve allowing minimal exposure when using GFP and derivatives
- ORCA ER has improved sensitivity in the far red and IR region of the spectral response curve to take advantage of new generation red fluorochromes and IR-DIC imaging
- High quality excitation filters used with a double band pass emission filter
- User defined color LUT for optimum visual effect
- Mis-alignment of images due to any achromatic aberrations can be corrected using the Registration Module
- Images merged to show spatial arrangement