

A microscope stage incubation chamber [with temperature and CO₂ control] for the Microscopy Core facility's Zeiss 510 MetaHead confocal microscope

Overview

State-of-the-art time-lapse imaging of living cells under the microscope requires the maintenance of the cell culture in suitable conditions for biological processes to continue normally. This is provided by a microscope stage incubator that has accurately controlled air temperature and carbon dioxide [media pH] concentrations.



The WTCHG has recently purchased a large Zeiss [PeCon] XL3 incubator enclosure [see photo] for the Zeiss 510 confocal which surrounds the microscopes manual XY stage and objectives. In addition we have installed a new 20x phase-contrast objective. The inside of the XL3 enclosure can be thermostatically heated to any temperature from ambient to 37°C [or above], keeping cells alive for days. In addition optional 5% (user adjustable) carbon dioxide enrichment of the heated air has been provided, via Zeiss CO₂ Controller.

The Zeiss 510 MetaHead confocal already has the 'Physiology' time-lapse LSM software module for long-term live cell time-lapse imaging, plus MetaMorph has cell tracking applications. The confocal can image multiple fluorescent labels and standard bright-field DIC transmission automatically over the time-lapse period - with full Z focus motor control. The Zeiss Axiovert 200 M is an inverted microscope ideally suited to imaging living cells in

culture, e.g. using glass-bottomed [Mattek] Petri dishes, LabTek/Culture-well slides and multi-well plates. The use of a temperature and CO₂ controlled incubator, enclosing the entire stage and objectives, would allow the confocal system to be used for stable long-term video imaging of live cells ranging from hours to days.

The Microscopy Core's Zeiss 510 MetaHead confocal microscope



The live cell imaging upgrade includes a Zeiss XL3 Incubator, a Zeiss heated LabTek/Petri dish Insert P, a Zeiss Universal KM frame for multi-well plates, a Zeiss TempControl 37-2 digital heater Controller, a Zeiss incubator air Heating Unit, and a Zeiss CO₂ Controller, plus a 20x phase contrast objective for cell tracking/motility studies. A CO₂ supply pipe has been installed into the microscope room from the centre's supply.



Above: our various stage inserts for live cell imaging and slides. They can hold LabTek type culture-well slides, standard glass slides, Petri dishes or Mattek sized multi-well plates. For further details of culture vessel options see our 'live cell' [website](#) links.