

Timelapse DIC (top) and GFP (bottom) images of a *C. elegans* embryo that is defective in cytokinesis. The GFP labels both the DNA and tubulin. The cleavage furrow has ingressed but fails to complete and the cell is now aneuploid, a result of a failure to divide.

## Separation of daughter cells in the *C. elegans* embryo

Dr Ahna Skop works in the laboratories of Professors Barbara Meyer and Rebecca Heald, in the Department of Cell and Molecular Biology, University of California at Berkeley. Research in both laboratories concerns the process of cell division and what factors play a role in the correct distribution of a complete set of chromosomes to each daughter cell. The model organism for this work is the nematode worm, *C. elegans*.

Dr Skop is interested in the process of cytokinesis, the process by which daughter cells separate. Cytokinesis is required for the propagation of all living things. Of central importance is the correct distribution of a complete set of chromosomes to each daughter cell, which in all eukaryotes is mediated by the mitotic apparatus or spindle. This dynamic bipolar structure composed of microtubule polymers and many associated proteins functions to physically segregate sister chromatids to opposite ends of the cell. Errors in cell division lead to aneuploidy, causing diseases such as Down Syndrome and contributing to cancer progression.

Ahna's research is directed toward understanding how the completion of cell division occurs, specifically the terminal phase of cytokinesis. She studies the process in the early *C. elegans* embryo where cell divisions are rapid and optically favorable. The images shown here are of a *C. elegans* embryo and were captured with the Openlab cell imaging system, using Differential Interference Contrast illumination and fluorescence over time. The embryo is defective in cytokinesis. The cleavage furrow has ingressed but fails to complete and the cell is now aneuploid, a result of a failure to divide.

## Module Configuration

### Camera Modules

- Snapper Video

### Hardware Modules

- Filters & Shutters

### File Filter Modules

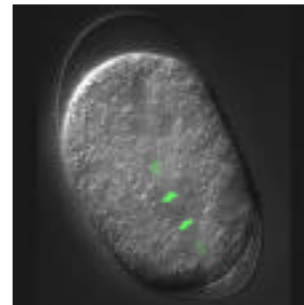
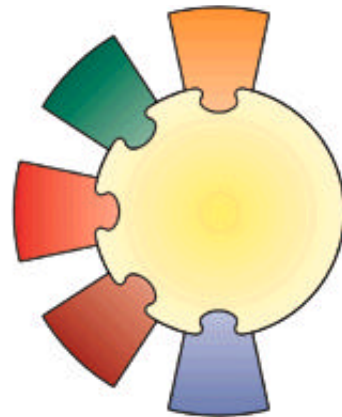
- TIFF file filter
- PICT file filter
- QuickTime file filter

### Application Modules

- Registration

### Automation Modules

- Automator



## Critical Points

- High resolution, high dynamic range chilled camera (ORCA) used to acquire high quality images.
- ORCA has enhanced sensitivity in the blue-green region of the spectral response curve allowing minimal exposure when using GFP and derivatives.
- 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.
- Images can be annotated for publication.
- Image sequences can be saved in other formats, individual PICTS or TIFFS or QuickTime movies.