

Featured Publication Note

Dr. Alex Hajnal & colleagues

Department of Zoology, University of Zürich, Switzerland

Germ cell development in *C. elegans*

Dr. Alex Hajnal works in the Department of Zoology at the University of Zürich in Switzerland. The work in his research group is focused on the intercellular signaling events that control the cell fates during animal development. For this purpose, they are using the small nematode *C. elegans* as a simple model organism. In the study discussed here, Dr. Hajnal and his group have examined the role of mitogen activated protein kinase (MAPK) signaling during germ cell development.

They have identified a MAPK phosphatase (termed LIP-1) that dephosphorylates and thereby inactivates the MAPK in germ cells that progress through the meiotic cell cycle (Hajnal and Berset, 2002). Germ cells lacking LIP-1 fail to arrest the cell cycle in the meiotic prophase I and enter a mitotic cell cycle without being fertilized. LIP-1 thus coordinates germ cell development with ovulation and fertilization.

Figure 1 shows the subcellular localization of the MAPK phosphatase LIP-1 (in red) in germ cells that progress through the pachytene stage of meiotic prophase I. LIP-1 staining is concentrated between the densely packed nuclei in rod-like structures that measured about 2 μm in length (see XZ view in Fig1B).

Figure 2 shows the six condensed chromosome pairs in unfertilized wild-type oocytes that have arrested the cell cycle in diakinesis of meiotic prophase I (Fig 2A and B). In contrast, in *lip-1(0)* mutants the homologous chromosomes are separating (Fig1C) and the oocytes enter an endomitotic cell cycle without being fertilized (Fig1D).

The images were presented to *Volocity* to generate 3D rendered volumes, allowing him to interactively view the samples from any desired direction. The XYZ view in *Volocity* enabled him to clearly see the rod-like structures in Fig1B, shown in the XZ plane of view.

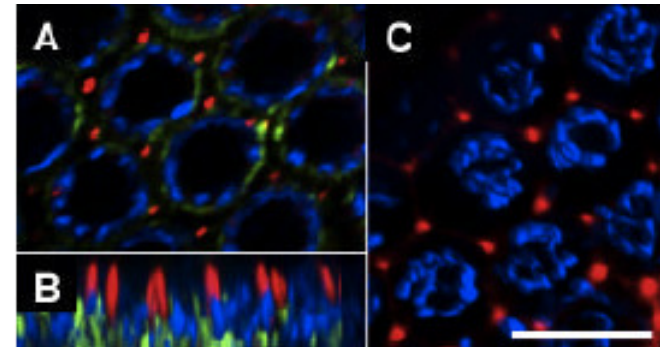


Figure 1. LIP-1 (red), nuclear pore (green) and DNA (blue) staining in pachytene germ cells. In (C) a dye staining the plasma membranes in red was added. (A) shows a single section. (B) is an XZ view and (C) is a 3D rendered view, both created in *Volocity*. Scale bar = 5 μm

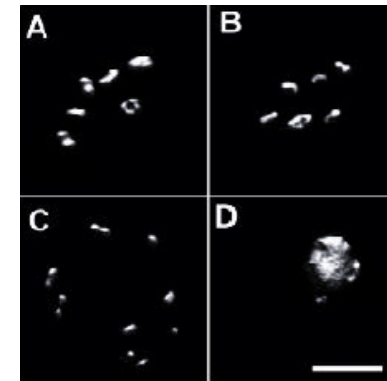


Figure 2. 3D rendered images of DAPI stained chromosome pairs in *C. elegans* oocytes. Scale bar = 5 μm