

How the size of a cell can determine its fate

Production of viable oocytes is an essential process during sexual reproduction. The *C. elegans* gonad is composed of roughly 1000 germ cells, half of which develop into oocytes while the rest undergo apoptosis. These dying cells are thought to act as nurse cells donating material to their growing neighbours. Long-range cytoplasmic flows through the connecting tube of this syncytial tissue promote the growth of oocytes, however it remains unknown what triggers cell death in the *C. elegans* gonad. One hypothesis is that cell size becomes a determining factor that destines smaller cells for apoptosis and larger ones for becoming oocytes. To test this hypothesis I employed FLUCS, a microscopy-based manipulation technique that allows me to create cytoplasmic flows in the germ line. By directing flows into or out of a cell its size can be changed and with that also its fate. While in control cells apoptosis is only triggered in 15% of the cases, inducing flows out of a germ cell leads to cell death in over 50% of the manipulated cells. This indicates that cell size is a critical parameter in the decision between life and death in *C. elegans* germ cells.

While it has been reported that cell size can influence cell fate decisions also in other systems, it remains unclear how cell size is sensed, especially in a syncytial structure such as the *C. elegans* gonad.

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