The fruit fly ovary consists of several units or egg chambers, each consisting of several cells nursing an oocyte that grows progressively in size.[Olympus BioScapes]

In nurse cells without Gemin3 (right), chromosomes fails to disperse as happens in normal cells (left). Instead chromosomes appear as condensed blobs.


The fruit fly ovary is a place like no other. It consists of several units or egg chambers that are progressively maturing as they move down a pipeline. Each egg chamber has a single oocyte, that once fertilised by the male sperm forms an embryo. However, before it can be fertilised, the oocyte needs to reach a mature stage of development and to do so, it is nursed by several adjacent cells (nurse cells) through a constant supply of the necessary building blocks (RNA [ribonucleic acids] and/or proteins) required for rapid oocyte growth.

If the production of building blocks is defective, the nurse cells stop functioning properly and the oocyte stalls its development. This scenario which was found to happen in the absence of SMN (survival of motor neurons), has been extended to those situations where Gemin3 has been knockout of the female germline. SMN in partnership with Gemin3 and several other proteins is essential for generating the machine the synthesises the building blocks. Furthermore, a striking consequence of either SMN or Gemin3 loss is the presence of condensed DNA or chromosomes inside the nurse cell nucleus. In normal nurse cells, chromosomes disperse throughout the nucleus, with such a behaviour thought to facilitate the production of building blocks from the DNA blueprint.

SMN deficiency results in SMA (spinal muscular atrophy), a genetic disorder that results in highly selective degeneration of motor neurons. Work on the female ovary might hold the key to resolving why SMA patients have a highly restrictive pathology. Could building block production be critical for motor neuron survival?
