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Understanding how temperature affects the fertility of Caenorhabditis elegans by studying the liquid-like properties of P granules

Because of ongoing climate change, we urgently need to know what effect temperature has on the fertility of cold blooded organisms. Fertility has a complex response to temperature, for example it effecting development and the reproductive output of *C. elegans*. At extremes of high and low temperatures, the development of the gonad (the organ which produces sperm and eggs) fails and *C. elegans* becomes sterile. There is also an optimum temperature where fertility is maximum. However, as temperature deviates from this optimum the number of offspring drops until animals become completely sterile. Despite data quantifying this effect, the cell biological mechanism is behind this response is currently unknown. A class of non-membrane bound organelles called P granules are intimately associated with the cells destined to become the gonad and act my programing their fate. Mutations in P granule genes causes infertility at higher temperatures, suggesting that there is a link between P granules and the temperature dependence of fertility. Recent it has become clear that P granules have liquid-like properties, leading to a hypothesis about how temperature might affect of *C. elegans*: that temperature effects the material properties of P granules which has a knock-on effect on their dynamics and causes the infertility at extremes of high and low temperatures. I aim to test this hypothesis with a combination of cell biological techniques and a biophysical approach.

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