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OTHER PROGRAM AFFILIATIONS

Cancer

Metabolic Disease and Obesity

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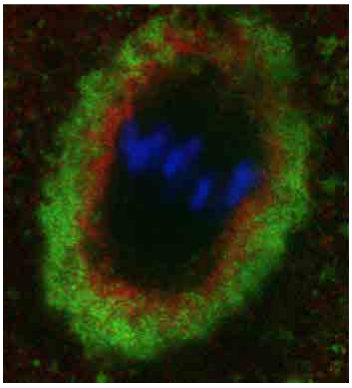
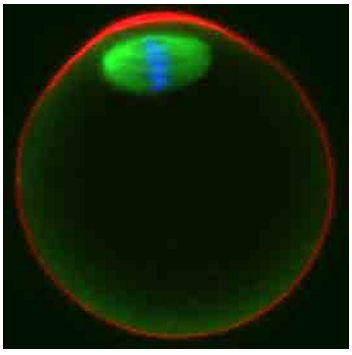
The mammalian oocyte is the largest cell in the body and undergoes two highly specialised asymmetric meiotic cell divisions. Coordination of organelle inheritance, polarity and meiotic progression is essential for the production of an oocyte capable of undergoing fertilization and development to term. We use molecular and genetic approaches combined with live cell imaging to investigate the cell biology of these processes in mice and humans. Investigating these questions allows us to understand how oocytes make the transition into a healthy embryo and why it goes wrong in cases such as maternal ageing.

Research Projects

1. **Role of mitochondria in controlling meiosis in oocytes**
2. **Coordinating polarity and cell cycle progression in the meiotic divisions**
3. **Impact of maternal age and obesity on chromosome dynamics and oocyte quality (in collaboration with Rebecca Robker, University of Adelaide)**



Cytoplasmic architecture in a maturing oocyte. The developing first meiotic spindle is surrounded by ER (red) and mitochondria (green).



An oocyte arrested in metaphase of meiosis II just before fertilisation.

Selected significant publications:

1. Marangos P, Stevense M, Niaka K, Lagoudaki M, Nabti I, Jessberger R, **Carroll J**. 2015. DNA damage-induced metaphase I arrest is mediated by the spindle assembly checkpoint and maternal age. *Nat Commun* 6:8706.
2. Nabti I, Marangos P, Bormann J, Kudo N, **Carroll J**. 2014 Dual-mode regulation of the APC/C by CDK1 and MAPK controls meiosis I progression and fidelity. *J Cell Biol.* 204, 891-900
3. Dalton CM, **Carroll J**. 2013. Biased inheritance of mitochondria during asymmetric cell division in the mouse oocyte. *J Cell Sci.* 126, 2955-64
4. Marangos P, **Carroll J**. 2012. Oocytes progress beyond prophase in the presence of DNA damage. *Curr Biol.* 22, 989-994
5. Homer H, Gui L, **Carroll J**. 2009. A spindle assembly checkpoint protein functions in prophase I arrest and prometaphase progression. *Science*. 326, 991-994