**The strict regulation of the mitochondrial genome during development**

Justin St. John, Australia

There are a number of events that take place during oogenesis to ensure that the mature oocyte has sufficient copies of mitochondrial DNA (mtDNA) to promote fertilisation outcome and that specific mtDNA variants are selected for or against. In this talk, I will show that mtDNA variants present in oocytes and embryos are not necessarily indicative of those present in somatic tissues and that there appears to be mechanisms present to ensure mtDNA variants are kept to low levels in somatic tissues although they be high in oocytes and embryos. Furthermore, I will show the potential variant load in putative egg precursor cells and how their mtDNA variants suggest that they may be of germ line origin. Finally, I will show how mtDNA haplotypes can influence developmental outcomes from our recent data using mouse embryonic stem cell models, which indicate that those assisted reproductive technologies that require manipulation of mtDNA need to select very carefully.