

'Germ cells in development and disease'

Speaker: A/Prof. Josephine Bowles, School of Biomedical Sciences, The University of Queensland



BIO: Josephine Bowles did a PhD in medical parasitology before seeing the light and moving into the field of developmental biology. Her postdoctoral work was done under the mentorship of Peter Koopman at the Institute for Molecular Bioscience, UQ. During this period, she studied mammalian sex determination and biology of the Sox gene family. As a senior postdoc she began to focus on germ cells and in 2016 moved her team into the School of Biomedical Sciences, UQ. She was promoted to Associate Professor in 2018.

Her research team aims to understand all of the signalling that is necessary to instruct naive mammalian germ cells to embark on either oogenesis or spermatogenesis. Key discoveries include 1) that retinoic acid in the fetal ovarian environment triggers germ cells to embark on meiosis; 2) that testicular germ cell fate is dependent on FGF signalling; and 3) that the Nodal/Cripto signalling pathway is normally active in germ cells of the fetal testis and abnormally active in certain forms of testis cancer. The studies have relevance to medical problems including fertility/infertility and testicular cancer as well as to our understanding of stem cell biology more broadly.

Abstract: Mammalian germ cells do not determine their sexual fate based on their XX or XY chromosomal constitution. Instead, sexual fate is dependent on the gonadal environment in which they develop. In an ovary, germ cells enter meiosis during fetal life, thereby committing to oogenesis. In a testis, germ cells commit to the spermatogenic programme of development during fetal life, although they do not enter meiosis until puberty. We aim to understand how somatic cells of the ovary and testis direct germ cells towards the appropriate sexual fate and how the innate pluripotency of germ cells is controlled to ensure fertility but avoid tumorigenesis. Understanding these networks is important in the contexts of etiology, diagnosis and treatment of infertility and gonadal cancers, and efforts to augment human and animal fertility using stem cell approaches.

All welcome!

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