EpiGenWestern

The Epigenetics Profiling and Reprogramming Research Group

EpiGenWestern is the acronym for the *'Epigenetics Profiling and Reprogramming Research Group at UWO'*. Our Research Group has two aims.

Our ***first aim*** is to better understand epigenetics as it relates to the basic biology of human development, the process of tumourigenesis and how cells respond to changes in the environment.

Our ***second aim*** is to translate our research into improved molecular diagnostics, advancements in assisted reproductive technologies and in the development of novel targeted therapies for genetic diseases including cancer.

What is Epigenetics? Epigenetics involves the creation and maintenance of DNA methylation and histone modifications in a cell, so that genes can be precisely expressed at specific times in specific cells, and so the structural integrity of chromatin can be maintained. This process is critical to proper embryonic and fetal development. Epigenetic alterations can derail normal development, lead to a variety of paediatric genetic diseases and also cause a variety of cancers. Epigenetic changes may also contribute to complex multifactorial disorders such as autism and mental retardation that have, to date, been difficult to unravel. Furthermore, recent data suggest that problems with assisted reproductive technologies, cloning and livestock breeding are linked to epigenetic errors that result in embryo mortality.

EpiGenWestern was formed to foster collaboration among a growing group of UWO epigeneticists that includes both established scientists and new recruits. These scientists bring together technical and scientific expertise in the areas of epigenetics, human molecular genetics, developmental biology, imprinting and cancer research.

Western is uniquely positioned to contribute to the field of epigenetics research. Our complementary research programs are focused on changes in gene expression, imprinting and DNA methylation patterns during *preimplantation development* (Dr Mellissa Mann and Dr Andrew Watson), *placental and fetal development* (Dr Mann and Dr Victor Han), *paediatric genetic disease* (Dr Nathalie Berube, Dr Mann and Dr David Rodenhiser), and in *cancer genetics* (Dr Rodenhiser). We have our academic homes in the UWO Departments of Biochemistry, Paediatrics, Physiology/Pharmacology, Oncology and Obstetrics/Gynaecology. We have our laboratories located in the Victoria Research Laboratories, Children's Health Research Institute and the London Regional Cancer Program.

EpiGenWestern creates new research opportunities across disciplines to address epigenetics in relation to gene function, environmental contaminants, pre- and postimplantation development, failed pregnancies, human genetic diseases, tumour progression and the development of targeted cancer therapies. As well, the potential to manipulate or correct epigenetic errors raises the possibility of exploiting this process in the field of animal husbandry and to improve clinical outcomes in a variety of human reproductive disorders.

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