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Dissecting Gene Expression Networks in Mammalian Organogenesis

Status	Current
Competition	III
Sector	Health
Genome Centre	Genome British Columbia
Project Leaders	Marco Marra & Pamela Hoodless

Project Description

Mammals develop from single cells to complex multi-cellular organisms in which each tissue and organ has a distinct architecture and function. But very little is currently known about organogenesis – the period during which the embryo as well as specific organs and organ systems are formed.

Dr. Marco Marra, Director of the Genome Sciences Centre of the BC Cancer Agency and Dr. Pamela Hoodless, Senior Scientist at the Terry Fox Laboratory of the BC Cancer Agency, are project leaders of Dissecting Gene Expression Networks in Mammalian Organogenesis.

Drs. Marra and Hoodless led a previous Genome Canada project, the Mouse Atlas of Gene Expression – a database of libraries of genes expressed in developing tissues of mouse embryos. The mouse is a valued model organism, whose genome is very similar to that of humans. In this new project, the two researchers plan to focus on the development of three organs in the mouse embryo – the heart, pancreas and liver. In particular, they will focus on tissues in the heart involved in valve formation and septation (division or partitioning), on the formation of islet cells that produce hormones in the pancreas and help control the level of sugar in the blood, and on hepatocytes or liver cells.

These three tissues have been chosen as the focus of this research project because of human suffering and healthcare costs caused by congenital heart defects as well as diseases of the liver and pancreas. Moreover, these tissues are amenable to stem cell therapy and tissue engineering.

By focusing on the role of gene regulation on the development of the heart, pancreas and liver in mouse embryos, the research team expects to better understand the gene expression networks which operate in the tissues of mouse embryos, and which regulate their development.

All research data will be disseminated to the wider scientific community through the Internet, and important components of the project will include an ethics study of public data release and an outreach program, developing course materials for high schools and interacting with students.