NANYANG TECHNOLOGICAL UNIVERSITY

School of Biological Sciences

Reg. No. 200604393R

Research Theme: Metabolomics of endometrial receptivity

Research Project Title: Discovery of biomarkers predictive of endometrial receptivity.

Principal Investigator/Supervisor: Assoc Professor Valerie Lin

Co-supervisor/ Collaborator(s) (if any): Professor Wang Yulan

Project Description

a) Background:

Infertility is a global health issue as more women are delaying childbearing. Approximately 50% of all failed pregnancies are due to poor endometrial receptivity for embryo implantation. Noninvasive biomarkers predictive of endometrial receptivity are increasingly important in the clinical management of recurrent implantation failure. The biomarkers are also valuable in determining the timing of embryo transfer during in vitro fertilization treatment. Progesterone is a master regulator of endometrial receptivity. Impaired progesterone signaling through progesterone receptor is one of the main causes of suboptimal endometrial receptivity. Progesterone has also been shown to influence energy balance and levels of plasma metabolites. How progesterone modulates the plasma metabolome in the preimplantation window is not clear. We have recently developed the first progesterone receptor mutant mouse model with impaired endometrial receptivity. Preliminary studies indicate significant differences in plasma metabolomes between the wild type and mutant mice at the preimplantation window. Since the endocrine system of mice is highly similar to that in the human, the progesterone receptor mutant mouse offers a valuable model for the identification of biomarkers predictive of endometrial receptivity.

b) Proposed work:

This is a joint project between the labs of Assoc Professor Valerie Lin in SBS and Professor Wang Yulan in the Singapore Phenome Centre. The study will use a combination of transcriptomic and metabolomic approaches to identify correlated changes of endometrial gene expression and plasma metabolomes in the preimplantation stage. The project will run in 3 phases. First, transcriptomics and metabolomics analysis will reveal meaningful abnormalities in endometrial gene expression and metabolites concentration. Second, a panel of genes and metabolites will be validated, and their kinetic changes in the peri implantation mice will be profiled. The mechanism of the changes will also be elucidated. Finally, selected molecules will be evaluated in the plasma and urine samples of patients undergoing IVF treatment.

Supervisor contact:

If you have questions regarding this project, please email the Principal Investigator:

cllin@ntu.edu.sg

SBS contact and how to apply:

Associate Chair-Biological Sciences (Graduate Studies) : AC-SBS-GS@ntu.edu.sg

Please apply at the following:

Application portal:

https://venus.wis.ntu.edu.sg/GOAL/OnlineApplicationModule/frmOnlineApplication.ASPX