



Comprehensive Research Experience for Medical Students
Summer Research Program 2019

Supervisor/Project Information Form

Due February 20 2019 by email to crems.programs@utoronto.ca

Supervisor Name: **John Snelgrove**

Project Title: **Does preimplantation genetic testing (PGT) affect clinical measures of placental dysfunction in IVF pregnancies?**

Hospital/Research Institution: **Sinai Health System: Mount Sinai Hospital**

Email: **john.snelgrove@sinaihealthsystem.ca**

Field of Research (2 keywords): **placenta, IVF pregnancy**

Department: **Obstetrics & Gynaecology: Maternal-fetal medicine**

School of Graduate Studies Appointment (IMS, LMP, IHPME etc)? Yes/No: **No**

Project Title: **Does preimplantation genetic testing (PGT) affect clinical measures of placental dysfunction in IVF pregnancies?**

Brief Project Description (< 300 words): 299 words excl refs.

Objective

Preimplantation genetic testing for aneuploidy (PGTA) has greatly increased pregnancy success following *in vitro* fertilization (IVF) by detecting trisomies 13, 18, and 21.^{1,2} However, whether PGTA embryo biopsy affects placental function later in pregnancy remains unknown. We will compare placental parameters of pregnancies achieved after PGTA with pregnancies following standard IVF without PGTA.

Methods

This will be a retrospective cohort study with chart review from Mount Sinai Hospital's Special Pregnancy Clinic for Fertility (SPCF). Patient characteristics, biochemical markers, and

sonographic features consistent with placental dysfunction have been previously identified in our population and will be incorporated into a collection tool to abstract data from charts.^{3,4}

Our primary outcome is rate of placental dysfunction: a) abnormal placental biochemistry, b) abnormal placental ultrasound, c) fetal growth restriction. Using a predicted prevalence of placental dysfunction of 10%, a sample size of 438 is required to observe a relative-risk of ≥ 2.0 (2-sided $\alpha=0.05$, power=0.8). This is feasible given the clinic volumes over the timeframe proposed.

Project team

The SPCF clinic provides pregnancy care to patients from the Mount Sinai Fertility group, providing an excellent clinical sample to study placental parameters in the IVF population.

This project fits into a larger research theme run by early career investigators from the divisions of maternal-fetal medicine (JS, SH), reproductive endocrinology & infertility (RZ), and medical genetics (MR). The Infertility, Genetics, and Pregnancy (IGAP) Collaboration has submitted project grant applications to CIHR, ASRM, and has applied for internal departmental funding through the Department of Obstetrics & Gynaecology.

The CREMS student will participate in a systematic review for the project, lead the data collection, learn about cohort data analysis, and co-write at least one final manuscript. Clinical exposure will also be available to help the student place this research into context. The anticipated timeline is 12 weeks.

1. Scott RT, Jr., Ferry K, Su J, Tao X, Scott K, Treff NR. Comprehensive chromosome screening is highly predictive of the reproductive potential of human embryos: a prospective, blinded, nonselection study. *Fertility & Sterility* 2012; **97**(4): 870-5.
2. Vaiarelli A, Cimadomo D, Capalbo A, et al. Pre-implantation genetic testing in ART: who will benefit and what is the evidence? *Journal of assisted reproduction and genetics* 2016; **33**(10): 1273-8.
3. Audette MC, Kingdom JC. Screening for fetal growth restriction and placental insufficiency. *Seminars In Fetal & Neonatal Medicine* 2018; **23**(2): 119-25.
4. McLaughlin K, Zhang J, Lye SJ, Parker JD, Kingdom JC. Phenotypes of Pregnant Women Who Subsequently Develop Hypertension in Pregnancy. *Journal of the American Heart Association* 2018; **7**(14): 14.