Congratulations to IMCB's latest PhD graduate – Linh NGUYEN

Tuesday, 14 Jul 2020

Thesis Title: Impact of metformin treatment and gestational diabetes on embryonic and fetal development

Metformin is becoming more widely used before and during pregnancy. However, current literature lacks long-term follow-up and mechanistic data. This project investigated the potential effects of metformin on human embryonic and foetal development using human embryonic stem cell (hESC)-based models. Intriguingly, metformin increased the expression of two pluripotency factors and histone genes in hESCs. Metformin exposure also perturbed both neural and pancreatic differentiation, as well as pancreatic β-cell functions. However, these results only represent tissue development without metabolic challenges. Gestational diabetes (GDM) is a common pregnancy complication and metformin treatment rate is growing, despite the lack of long-term studies. In this project, we collected cells from children of mothers with/without GDM and reprogrammed them into induced pluripotent stem cells (iPSCs). GDM iPSC-derived pancreatic β-cells also showed reduced insulin expression in the

Indian subgroup. Overall, this project calls for further evaluation on metformin dosage during pregnancy and its implication on long-term offspring health.

Supervisor: Dr. Adrian Kee Keong TEO

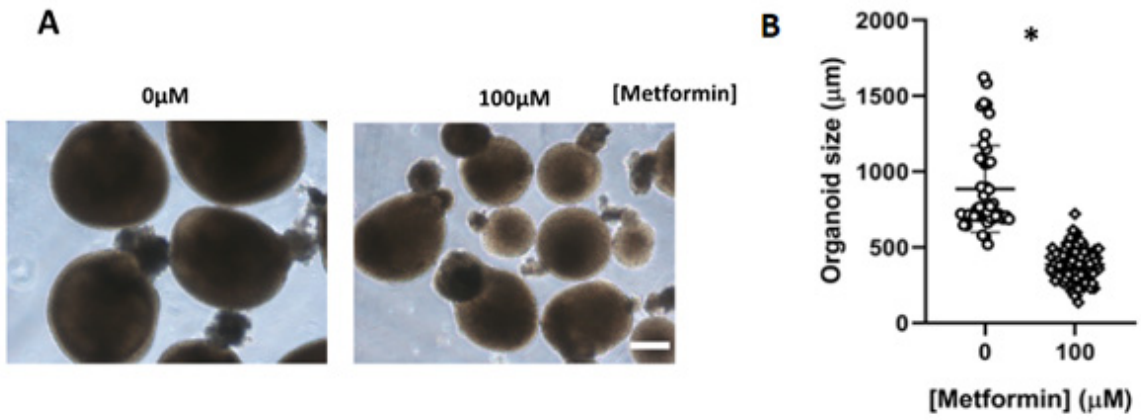

Figure legend: Pancreatic β-like cell clumps have significantly reduced size under metformin treatment. (A) Brightfield images of pancreatic organoids with/without 100μM of metformin treatment in vitro. Scale bar = 200μm. (B) Diameters of pancreatic organoids with/without 100μM of metformin treatment in vitro. Asterisk (*) indicates P value<0.05 compared to 0μM (Student's t test).