

Project #10

Title: Functional assay for neuronal differentiation of human induced pluripotent stem cells (hiPSC) as a disease model

Description: Human induced pluripotent stem cells (hiPSC) can be differentiated into multiple cell types, including neurons, which are used as human disease models. Neuronal cells are required to study human neurological diseases including Alzheimer's, Parkinson's, and neurodevelopmental disorders such as autism. Personalized medicine can be possible using patient-specific hiPSC, because hiPSCs offer the opportunity to develop therapeutics in model systems with patient-specific physiology. While the primary neurons of patients remain inaccessible for experimentation, patient-specific hiPSC-derived neurons recapitulate the genomic, molecular and cellular attributes of developing native human neuronal subtypes with advantages over single time point studies.

The goal of this project is to carry out the functional assay to validate hiPSC-derived neurons using calcium imaging, patch clamping technique, and microelectrode array (MEA). The functional assay of neurons will contribute to developing regenerative medicine and cell-based therapeutics.

Mentor: Dr. Yongsoo Park, Scientist. Email: YPark@hbku.edu.qa

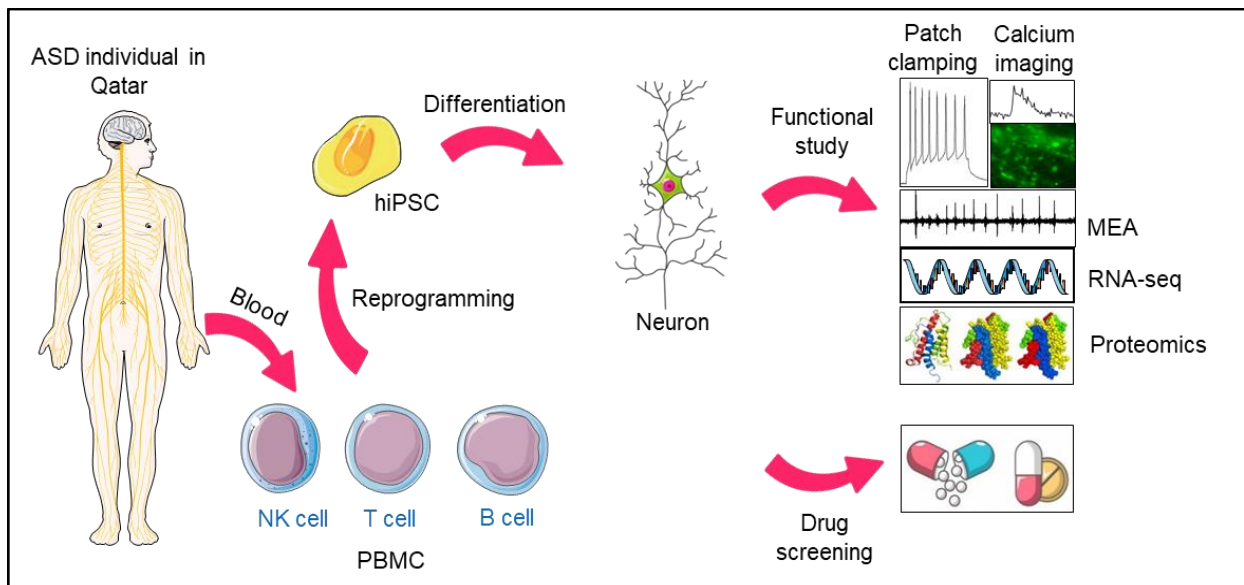


Figure 1. Schematic diagram to model the neuropathology of ASD using hiPSC-derived cortical neurons. PBMCs isolated from ASD individuals living in Qatar will be reprogrammed in-vitro in iPSC lines. ASD-specific cortical neurons will be used for the functional study to understand the pathophysiology of ASD.