Project Title: Understanding the role of Mixl1 in determining cell fates in human pluripotent cells	**Code: CMRI3**

Host School / Institute: Children's Medical Research Institute	**Address:** 214 Hawkesbury Road Westmead, NSW

Certificates & Clearances required: No

Primary Supervisor: Dr Pierre Osteil

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Co-Supervisor/team: Embryology Unit at CMRI

Project Type: Laboratory based; Data Analysis; Design

Project Category: Regenerative Medicine; Bioinformatics

Skills / Attributes of a successful student: None, the student will be taught on how to culture cells and perform immuno-staining, qPCR and data analysis.

Project Keywords: Stem Cells; Embryology; Endoderm; Development; Tissue Culture

Project Description: The project focuses on influencing cell fates by manipulating the timing of a transcription factor, MIXL1, in hiPSC. These cells provide a model for the early events occurring during human embryo development where epiblast cells that can specify into any cell of the adult body, specify into the three germ layers, the endoderm, mesoderm and ectoderm. The definitive endoderm layer, which forms the gut and associated organs, cannot be established in MIXL1 knockout models.

The aim of the project is to determine the pattern of MIXL1 expression directing pluripotent cells toward definitive endoderm. The student will primarily be involved in the culture of hiPSC and quantification of gene expression using reverse transcription with quantitative polymerase chain reaction (RT-qPCR). Furthermore, the student will grow these cells onto micropatterns recapitulating gastrulation of the human embryo in vitro. Micropatterns will be analysed by immunostaining followed by accurate quantification using bioinformatic pipelines.

The student will work closely with a PostDoc researcher and a Bioinformatician for the statistical analysis.