

Biology Seminar



Western
UNIVERSITY · CANADA

12:30 - 1:30 pm
Friday, January 14, 2022
Via ZOOM



Ian Scott

Professor

Department of Molecular Genetics
University of Toronto

GATA4/5/6 family transcription factors are conserved determinants of cardiac versus pharyngeal mesoderm fate

GATA4/5/6 transcription factors play essential, conserved roles in heart development. To understand how GATA4/5/6 modulate the mesoderm-to-cardiac fate transition, we labelled, isolated, and performed single-cell gene expression analysis on cells that express *gata5* at pre-cardiac time points spanning zebrafish gastrulation to somitogenesis. We found that most mesendoderm-derived lineages had dynamic *gata5/6* expression. In the absence of Gata5/6, the population structure of mesendoderm-derived cells was substantially altered. In addition to the expected absence of cardiac mesoderm, we confirmed a concomitant expansion of cranial-pharyngeal mesoderm. Moreover, Gata5/6 loss led to extensive changes of chromatin accessibility near cardiac and pharyngeal genes. Functional analyses in zebrafish and the tunicate *Ciona*, which possesses a single GATA4/5/6 homolog, revealed that GATA4/5/6 acts upstream of *tbx1* to exert essential and cell-autonomous roles in promoting cardiac and inhibiting pharyngeal mesoderm identity. Overall, cardiac and pharyngeal mesoderm fate choices are achieved through an evolutionary conserved GATA4/5/6 regulatory network.

