Interrogating the Role of PRDM14 in Human Germ Cell Development and Germ Cell Tumorigenesis

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Germ Cell Tumors

- Germ cell tumors (GCTs) encompass a heterogeneous group of tumors

- GCTs occur in the gonads and extragonadal locations
  - Extragonadal are primarily along the midline
    - Intracranial (pineal and suprasellar)
    - Mediastinum
    - Sacrococcygeal
Germ Cell Tumor Mortality/Morbidity

• Overall there is a 5 year survival rate of 85-90%
  • Survival varies by:
    • Staging at diagnosis
    • Response to cisplatin therapy

• The standard chemotherapy regimen consists of a cisplatin backbone
  • Bleomycin
  • Etoposide
  • P Cisplatin
The Primordial Germ Cell is the Cell of Origin for Germ Cell Tumors

- PGCs arise from a subset of cells in the inner cell mass that are committed to the germline
- PGCs share many properties that are similar to pluripotent embryonic stem cells (ESC)
- In vitro, PGCs have the ability to be reprogrammed into pluripotent stem cell
- One key player identified in reprogramming is Prdm14
Hypothesis

- Prdm14 functions to promote germline reprogramming from a committed germ cell with one fate, into a stem-cell-like cell with multiple fates, including GCT formation.
Human Stem Cell Model

Modified from Brustle et al., 2013
Next Generation Platform for Human Germ Cell Tumor Models

Pluripotent stem cells → Primordial germ cell Like cells (PGCLCs) → Ectopic Prdm14 Expression → Tumors

Survival proliferation
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