Gestational Trophoblastic Disease

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**Mature Placenta**

**SUBPOPULATIONS OF TROPHOBLAST**

- Syncytio-Trophoblast
- Villous Trophoblast
- Cytotrophoblast
- Intermediate Trophoblast
- Extravillous Trophoblast (myometrium, vessels, decidua)

**Differentiation of Trophoblasts**

Two pathway

1. Villous differentiation
   - Chorionic villi: CT → ST

2. Extravillous differentiation
   1) Cell columns of anchoring villi:
      - CT → Villous IT in proximal portion of cell columns
      - CT → ISIT in base of cell columns at the junction of EM
   2) Chorionic laeve: CT → chorionic type IT
TROPHOBLAST

1. Premillous trophoblast
   - ST: End erosion
   - CT: Invasion & expansion

2. Cytotrophoblast (CT)
   - Germinal stem cells, continuous proliferation
   - In villi (Langhans' cells), cells located in anchoring villi, intervillous space
   - Mononuclear cells, large nuclei, clumped chromatin

3. Syncytiotrophoblast (ST)
   - Differentiated cells
   - In all villi and trophoblast shell (interface maternal-fetal circulation)
   - Multinucleated cells, vacuolated and basophilic cytoplasm
   - Maintenance of pregnancy by
     - Pregnancy associated hormone production
     - Feto-maternal exchange of oxygen, nutrients & metabolic products

4. Intermediate trophoblast (IT)
   - Implantation and hormone production
   - In implantation site, chorion laeve, villi
   - Mono- and Multi-nucleated cells
   - Villous IT:
     - In proximal portion of trophoblastic column
     - The source of ISIT and Chorionic type IT
     - Maintaining the structural integrity of anchoring villi
   - ISIT: Maternal-fetal circulation
   - Chorionic type IT:
     - Maintenance of fetal membrane enlargement
     - Biological & mechanical barrier to the maternal immune system

Schematic IT (Human Pathol 1993;30:687)

1) Chorionic type IT:
   - Proliferative throughout pregnancy

2) Villous IT:

3) Implantation site IT:
   - Infiltrative
   - Not proliferative

Intermediate Trophoblast

1. Implantation site IT
   - Large, pleomorphic, eosinophilic cytoplasm
   - PSTT, EPS

2. Chorion-type (chorion laeve) IT
   - Small, uniform, eosinophilic or clear cytoplasm
   - PSN, ETT

3. Villous IT
   - Large, uniform, clear cytoplasm (smaller than implantation site IT)

Markers for Trophoblasts

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R1/Shih, Cancer 2002: specific & sensitive for IT, PSTT, PSN > ETT
R2/Shih, Cancer 2004: specific for IT, PSTT, PSN, PSN > ETT
R3/Shih, Cancer 2005: specific for IT, PSTT, PSN, PSN > ETT