"Day 13 of Development"

Key Events

1. Primary Villi Formation

- Definition: Cellular columns of cytotrophoblast covered by syncytiotrophoblast
- Purpose: Initial placental villi, allow maternal-fetal exchange

Flowchart:

Cytotrophoblast → Penetrates → Syncytiotrophoblast → Primary villi

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2. Secondary (Definitive) Yolk Sac

- Origin: Hypoblast cells
- Process:
    1. Hypoblast cells migrate along inside of exocoelomic membrane
    2. Proliferate → form a new cavity
    3. Replaces primary yolk sac → called secondary/definitive yolk sac

Flowchart:

Hypoblast → Migrates along exocoelomic membrane → Proliferates → Secondary yolk sac

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3. Chorionic Cavity (Extraembryonic Coelom)

- Formation: Portions of exocoelomic cavity are pinched off → exocoelomic cysts
- Result: Remaining cavity = chorionic cavity

- Surrounds amniotic cavity + yolk sac, except at connecting stalk

Flowchart:

Exocoelomic cavity → Pinched off → Exocoelomic cysts → Chorionic cavity formed

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4. Maternal Bleeding (Clinical Note)

- Blood enters lacunar spaces from maternal sinusoids
- Occurs ~28th day of last menstrual cycle
- May be mistaken for menstrual bleeding

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5. Chorionic Plate

- Definition: Extraembryonic mesoderm lining inside of cytotrophoblast

- Forms the base for placental villi

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6. Connecting Stalk → Umbilical Cord

- Definition: Only region where extraembryonic mesoderm crosses chorionic plate
- Development: Blood vessels develop → becomes umbilical cord

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Highlights of the Second Week

Event	Day
Cytotrophoblast + Syncytiotrophoblast formation	8
Lacunar stage (syncytiotrophoblast lacunae form)	9

Establishment of uteroplacental circulation	10–12
Primary villi formation	13

The "Week of 2's"

The second week of development is often called the "Week of 2's" because of repeated dual structures:

1. Trophoblast → differentiates into
    - Cytotrophoblast (inner layer)
    - Syncytiotrophoblast (outer layer)
2. Embryoblast (inner cell mass) → differentiates into

- Epiblast (columnar cells adjacent to amniotic cavity)
- Hypoblast (cuboidal cells adjacent to blastocyst cavity)

3. Extraembryonic mesoderm → splits into
   - Somatic layer (lines cytotrophoblast & amnion)
   - Splanchnic layer (covers yolk sac)

4. Cavities formed
   - Amniotic cavity
   - Yolk sac (primary → secondary/definitive)

Summary of Second Week of Development

1. Blastocyst embeds → trophoblast differentiates → Cytotrophoblast + Syncytiotrophoblast

2. Embryoblast forms bilaminar disc → Epiblast + Hypoblast

3. Extraembryonic mesoderm forms → splits → Somatic + Splanchnic layers

4. Cavities develop:

   - Amniotic cavity (epiblast)
   - Primary yolk sac → secondary yolk sac

5. Cytotrophoblast penetrates syncytiotrophoblast → Primary villi

6. Maternal blood enters lacunae → early uteroplacental circulation

7. Connecting stalk forms → umbilical cord

Summary Table: Week of 2's

Structure	Dual Layers / Formation
Trophoblast	Cytotrophoblast + Syncytiotrophoblast
Embryoblast	Epiblast + Hypoblast
Extraembryonic mesoderm	Somatic + Splanchnic layers
Cavities	Amniotic cavity + Yolk sac

High-Yield Exam Points

- "Week of 2's" = hallmark of the second week
- Secondary yolk sac replaces primary yolk sac
- Primary villi = cytotrophoblast columns + syncytiotrophoblast
- Chorionic cavity surrounds amniotic cavity & yolk sac

- Maternal bleeding ~28th day can mimic menstruation
- Connecting stalk → umbilical cord

-> The End <-