

"Day 11-12 of Development"

(Completion of Implantation & Early Placental Circulation)

1. Status of Implantation

- The blastocyst is completely embedded in the endometrial stroma
- The surface epithelium is almost completely restored
- A slight bulge (protrusion) appears in the uterine lumen

High-Yield Concept

- Implantation is now functionally complete
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2. Trophoblast Changes

Lacunar Network Formation

- The lacunae in syncytiotrophoblast enlarge and interconnect

Flowchart

Syncytiotrophoblast lacunae → Increase in size →
Interconnect → Form lacunar network

Regional Difference

Region	Trophoblast Composition
Embryonic pole	Well-developed lacunar network
Abembryonic pole	Mostly cytotrophoblast

3. Establishment of Uteroplacental Circulation

Stepwise Mechanism

Syncytiotrophoblast → Invades deeper into endometrium

→ Erodes maternal capillary endothelium → Forms

dilated vessels (sinusoids) → Lacunae connect with

sinusoids → Maternal blood enters lacunar system →

Establishment of uteroplacental circulation

Key Definitions

Term	Definition
Sinusoids	Dilated maternal capillaries
Lacunae	Spaces in syncytiotrophoblast

Uteroplacental circulation	Maternal blood flow into trophoblast
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High-Yield Points

- First functional maternal-fetal exchange system
 - Frequently tested in MCQs and viva
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4. Extraembryonic Mesoderm Formation

Origin

- Derived from yolk sac (hypoblast-related cells)

Location

- Between:
 - Cytotrophoblast (externally)
 - Amnion + exocoelomic membrane (internally)

Function

- Forms a supportive connective tissue framework
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S. Formation of Extraembryonic (Chorionic) Cavity

Mechanism

Extraembryonic mesoderm → Cavities appear within it
→ Cavities enlarge → Cavities fuse → Formation of
extraembryonic cavity (chorionic cavity)

Key Concept

- This cavity surrounds almost the entire embryo

Structures Surrounded

- Amniotic cavity
- Primitive yolk sac

Exception

- Area where embryo remains attached via connecting stalk
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6. Connecting Stalk (Early Umbilical Cord)

- Connects embryonic disc to trophoblast
 - Will later form the umbilical cord
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7. Subdivisions of Extraembryonic Mesoderm

Layer	Location	Function
Extraembryonic somatic mesoderm	Lines cytotrophoblast + amnion	Forms chorion

Extraembryonic splanchnic mesoderm	Covers yolk sac	Supports yolk sac
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Easy Way to Remember

- Somatic → "body wall side"
 - Splanchnic → "organ/yolk sac side"
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8. Growth Pattern of Embryo

- Bilaminar disc grows slowly
- Remains very small: 0.1-0.2 mm

High-Yield Insight

- Trophoblast grows faster than embryo
→ Important concept in early development
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9. Decidual Reaction (Maternal Response)

Changes in Endometrium

Endometrial cells → Become enlarged (polyhedral) →
Accumulate glycogen + lipids → Intercellular spaces fill
with fluid → Tissue becomes edematous → This is called
the decidual reaction

Significance

- Provides nutrition to embryo
- Supports implantation and pregnancy maintenance

Progression

- Initially localized
 - Later spreads to entire endometrium
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10. Integrated Overview

Blastocyst (fully embedded) → Surface epithelium repaired

Syncytiotrophoblast → Lacunae enlarge and connect → Form lacunar network

Syncytiotrophoblast invasion → Erodes maternal capillaries → Forms sinusoids → Blood enters lacunae → Uteroplacental circulation established

Extraembryonic mesoderm forms → Cavities develop → Fuse → Chorionic cavity forms

Embryo remains attached → Via connecting stalk

Endometrium responds → Decidual reaction

11. Clinical Correlations

a. Early Placental Circulation

- Begins Day 11-12
- Essential for embryo survival

b. Decidual Reaction

- Basis of pregnancy support
- Failure → may lead to implantation failure

c. Exam Traps

- Sinusoids = maternal vessels (not fetal)
 - Chorionic cavity \neq amniotic cavity
 - Connecting stalk → future umbilical cord
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12. Quick Revision Points

- Day 11-12 = implantation complete
- Lacunar network fully developed

- Maternal blood enters lacunae
 - Uteroplacental circulation begins
 - Extraembryonic mesoderm appears
 - Chorionic cavity forms
 - Connecting stalk develops
 - Decidual reaction occurs
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