

PLACENTA Formation and Role

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Preparation of the Uterus

*** Hypothalamus/pituitary**

*** Ovary**

*** Uterus**

Menstrual cycle

A. Estrogen from growing follicle stimulates regrowth of endometrium.

B. Progesterone from corpus luteum stimulates secretion of endometrial glands.

C. Corpus luteum depends on LH - Negative feedback by E and P inhibits LH and CL degenerates.

Pregnancy

Human chorionic gonadotropin (**hCG**) from embryo maintains corpus luteum. **P** and **E** from CL sustain the endometrium.

Progress of embryo in hours or days post ovulation

Window of receptivity
 Endometrium - edematous, secretory
 Decidual reaction
 Glycogen, cytokine (LIF), integrin ($\alpha v \beta 3$), pinopodes

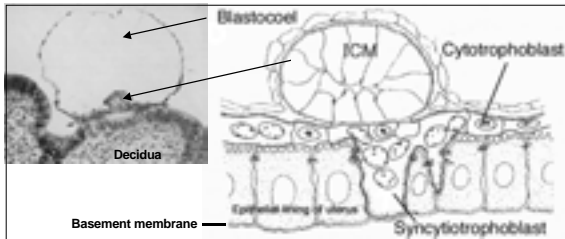
Implantation

Normal implantation site

Ectopic sites of implantation

Implantation

Adhesion & Penetration

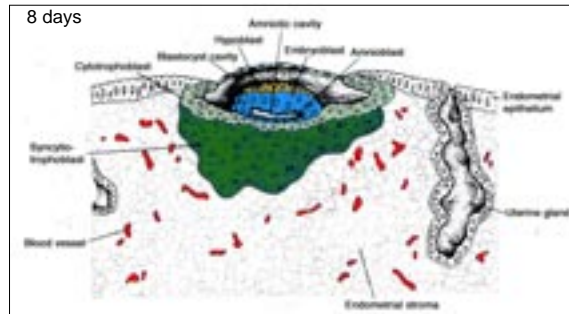


Peri-implantation dialogue

Embryo: hCG and other factors and receptors
 Uterus: LIF and other cytokines, growth factors, integrins, receptors

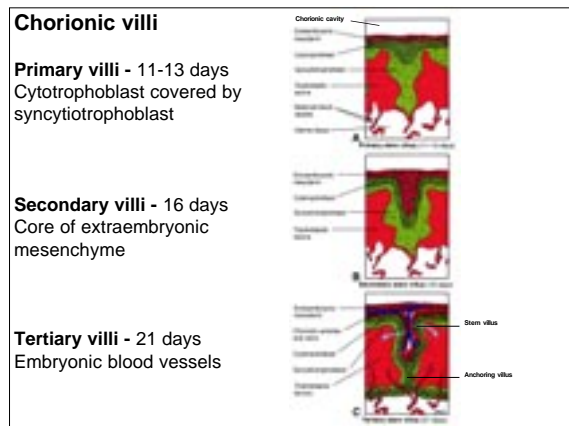
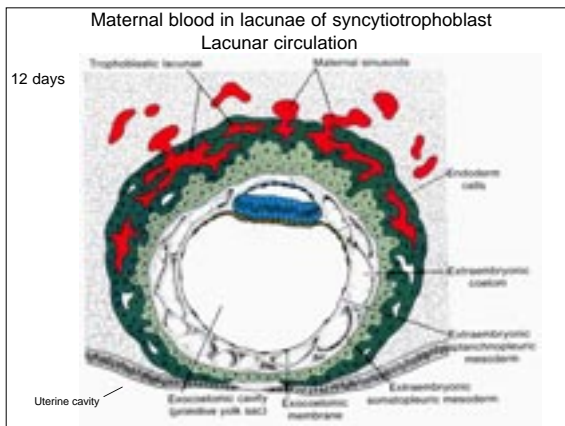
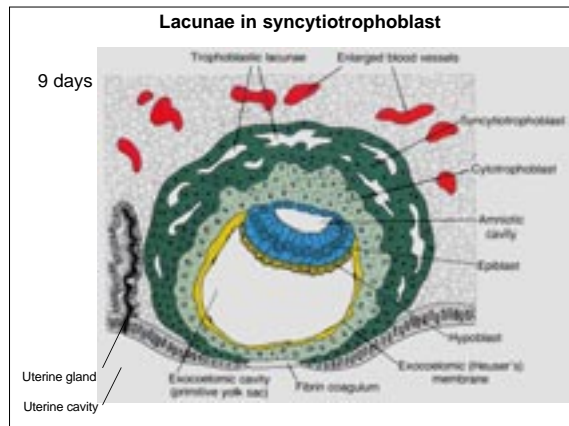
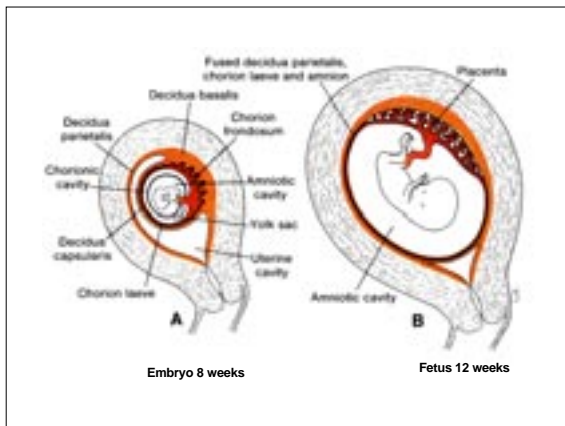
Adhesion & Penetration

Changes: microvilli (terminal web), MUC-1, junctions, basement membrane



8 days

Embryo - Endometrium - Allograft - Why no immune rejection?
 Maternal - Decidual reaction altered immune system
 Embryonic - HLA-G

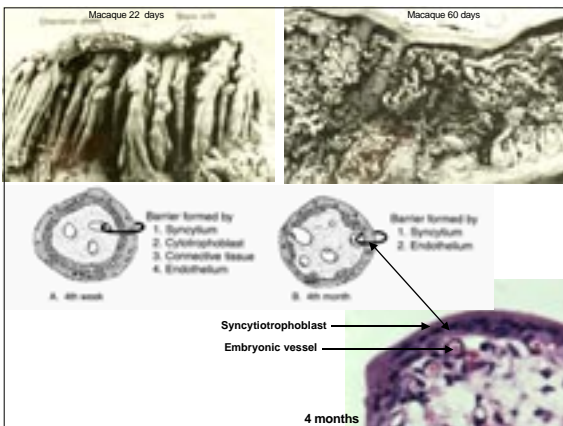
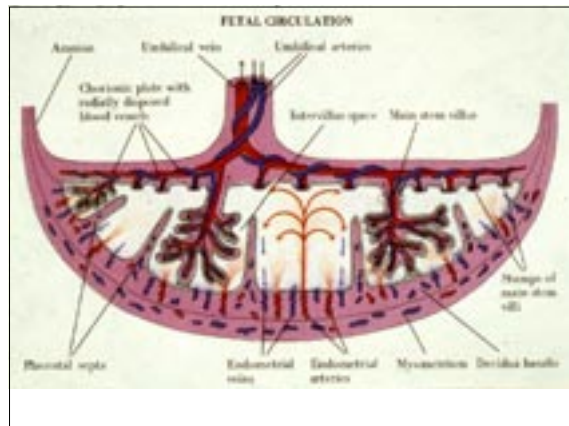
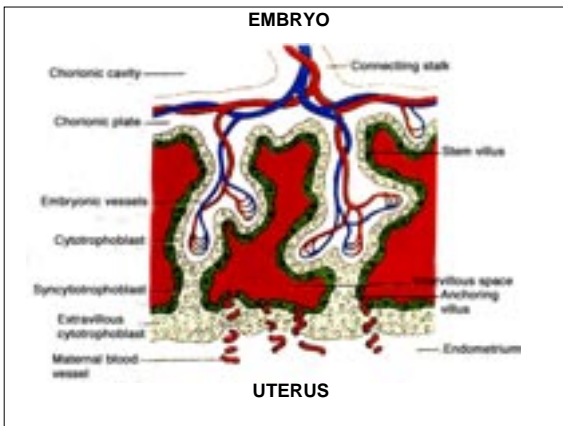
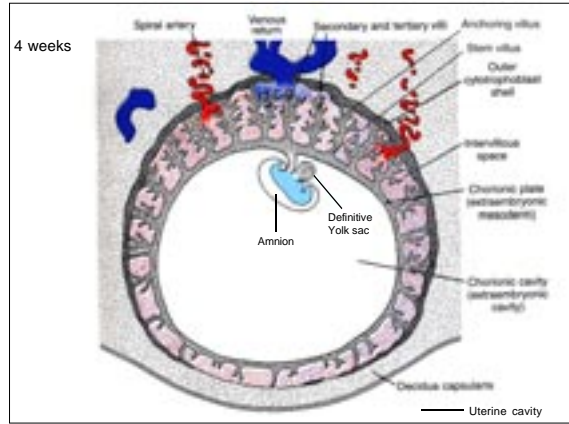
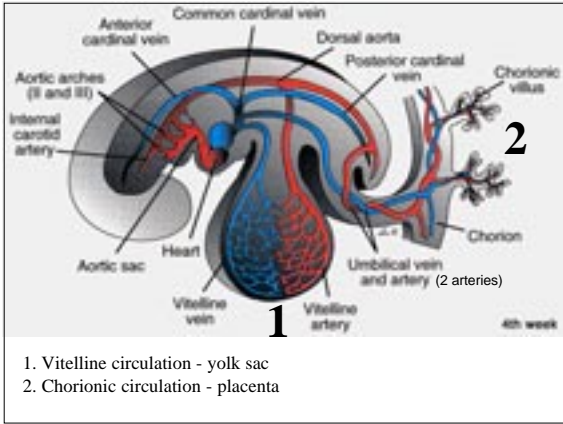


Chorionic villi

Primary villi - 11-13 days
 Cytotrophoblast covered by syncytiotrophoblast

Secondary villi - 16 days
 Core of extraembryonic mesenchyme

Tertiary villi - 21 days
 Embryonic blood vessels



Metabolic needs

Peri-implantation: 0-2 weeks
Uterine glands
Endometrial stroma - glycogen

Embryonic: 3-8 weeks
Maternal plasma in lacunae
anaerobic metabolism

Fetal: 9 weeks - birth
Maternal whole blood 12 wks
aerobic metabolism

Rate of anaerobic/aerobic metabolism

FORMATION AND ROLE OF THE PLACENTA

1. Preparation of the uterus

Window of receptivity

2. Implantation (nidation)

Apposition, Adhesion

Penetration of endometrial epithelium

Invasion of decidua

3. Establishment of a hemochorial placenta

Lacunar

Development of chorionic villi

Intervillous

Maternal plasma only

Whole blood