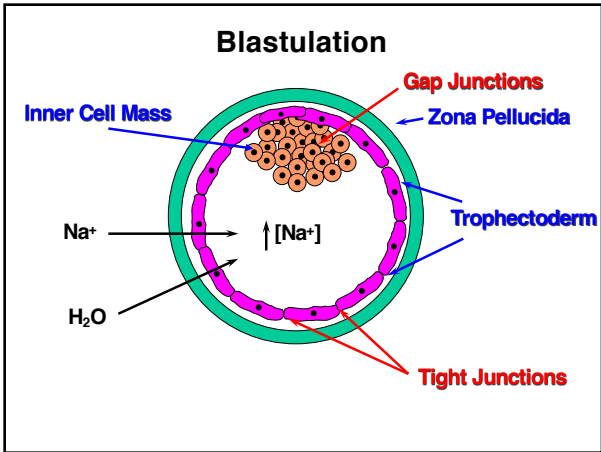


Placentation and Maternal Recognition of Pregnancy

Animal Science 434
John J. Parrish

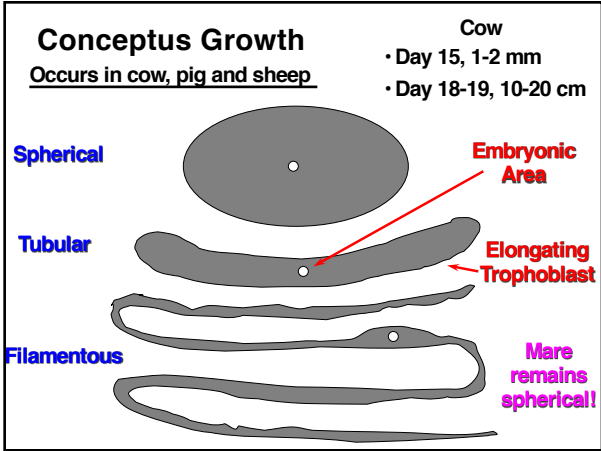
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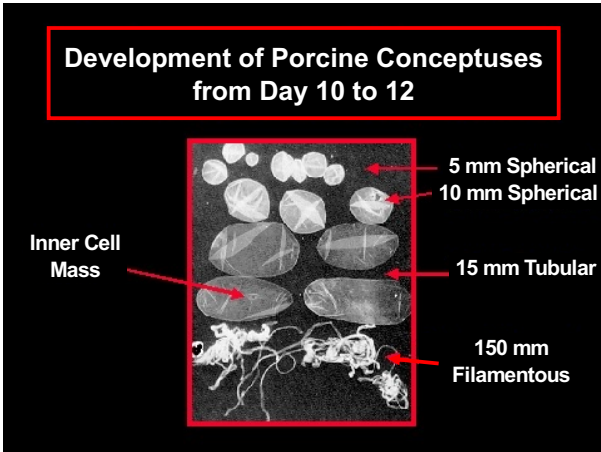
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- ### Hatching
- **Bovine**
 - » 9 - 11 days
 - **Equine, Ovine**
 - » 7 - 8 days
 - **Porcine**
 - » 6 days

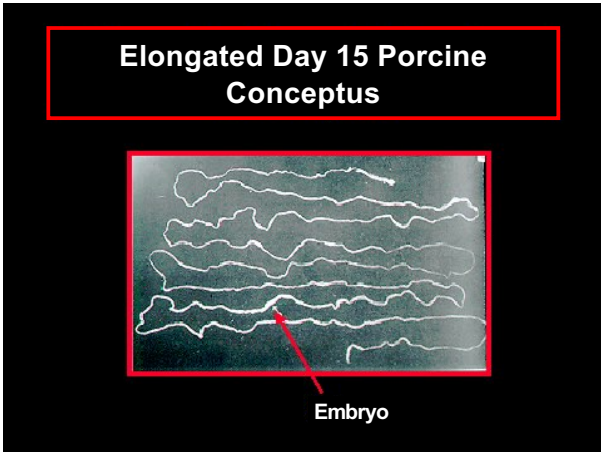
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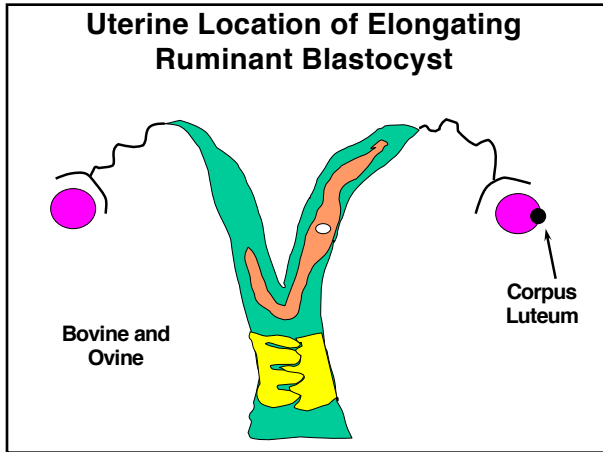
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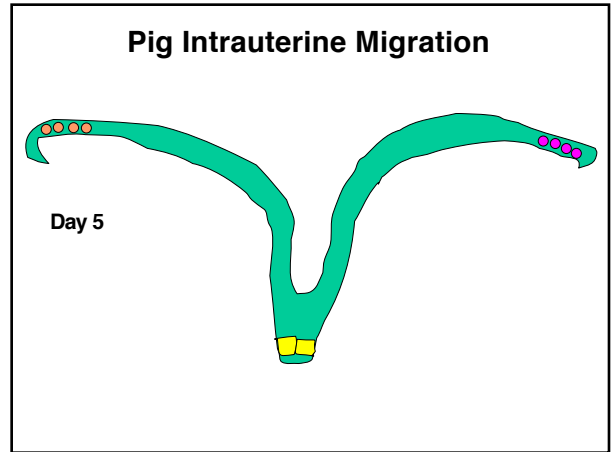
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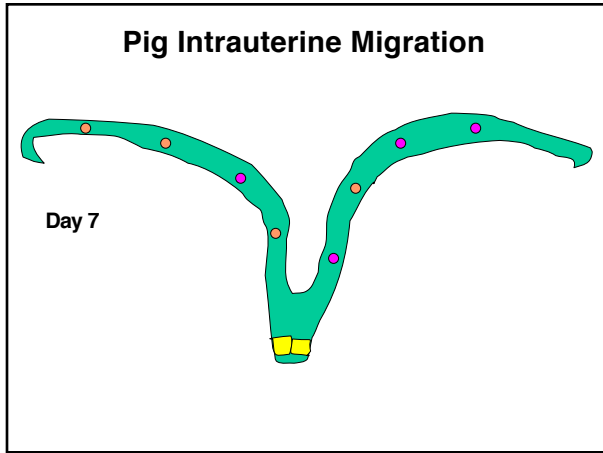
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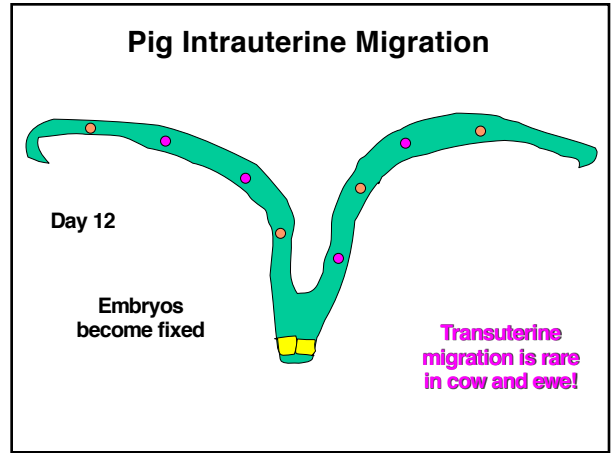
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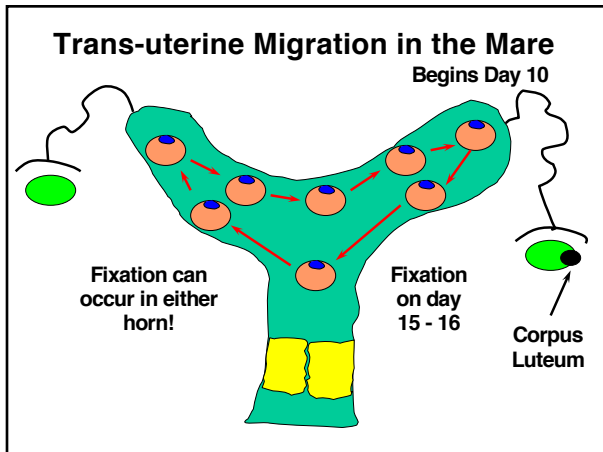
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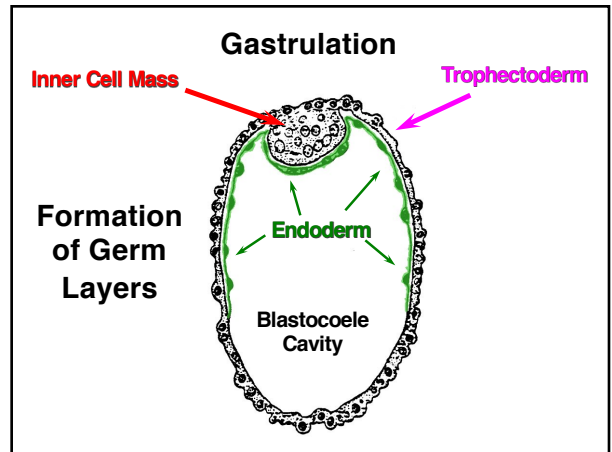
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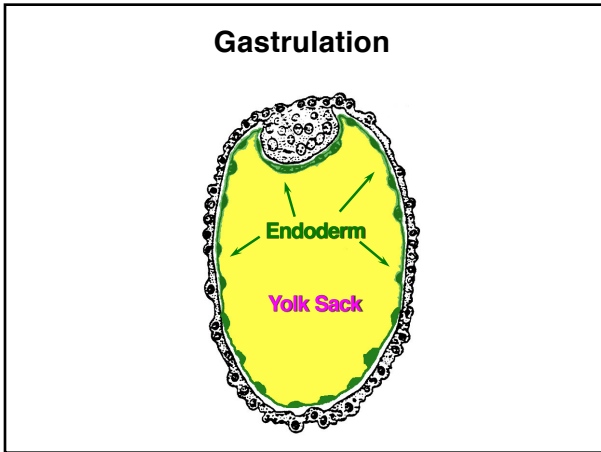
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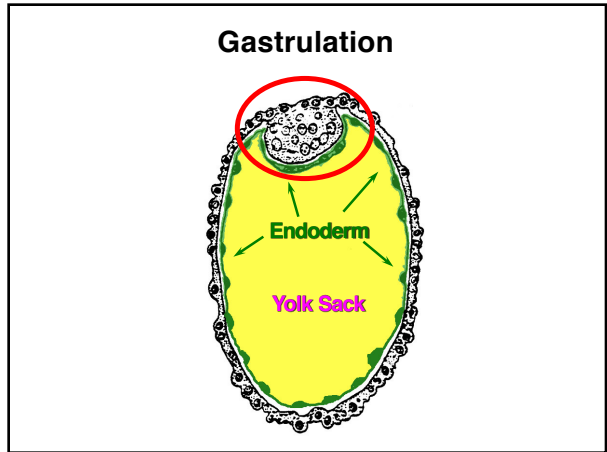
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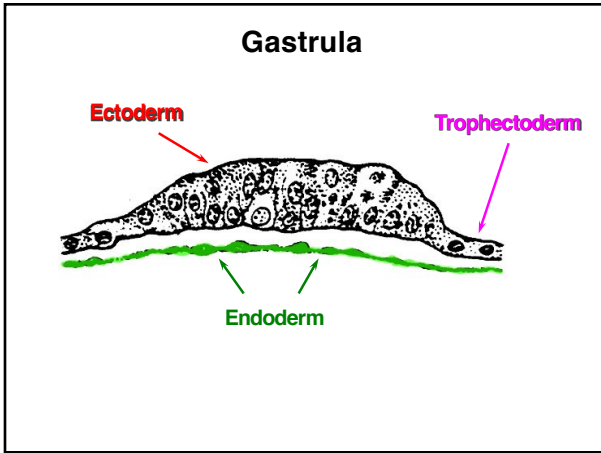
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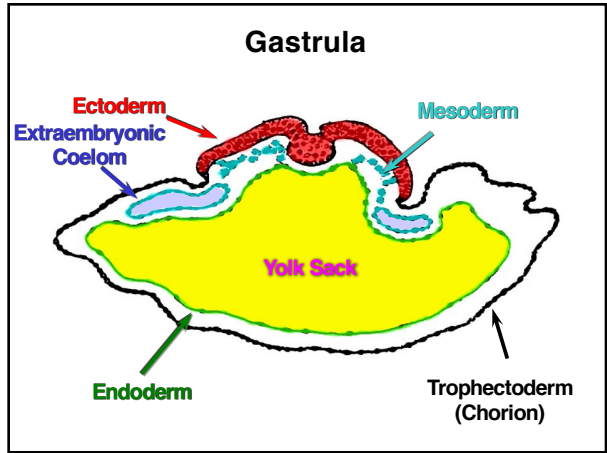
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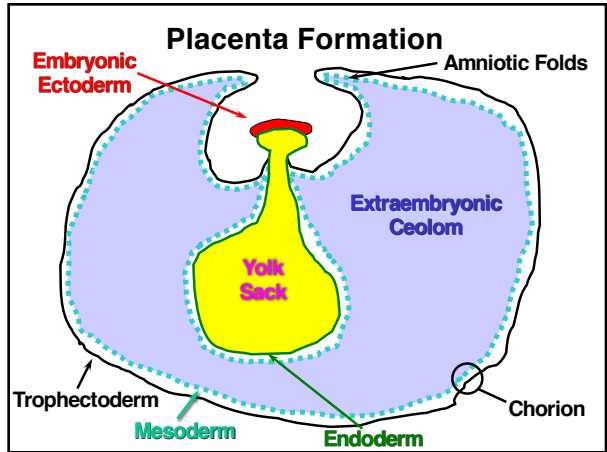


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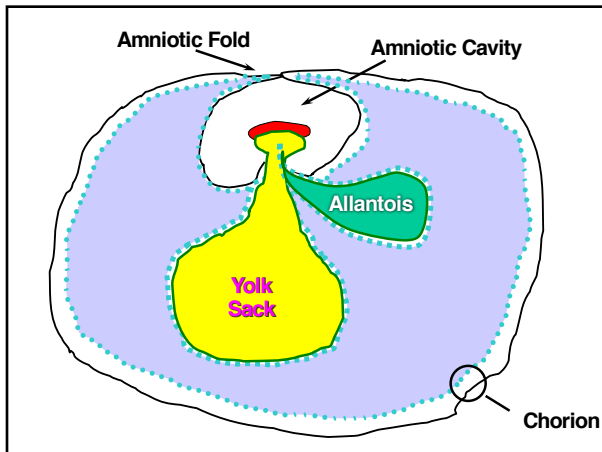
Germ Layers

● Ectoderm	● Mesoderm	● Endoderm
» CNS	» Circulatory	» Digestive
» Sense organs	» Skeletal	» Liver
» Mammary glands	» Muscle	» Lungs
» Sweat glands	» Reproductive tracts	» Pancreas
» Skin	» Kidneys	» Thyroid gland
» Hair	» Urinary ducts	» Other glands
» hooves		

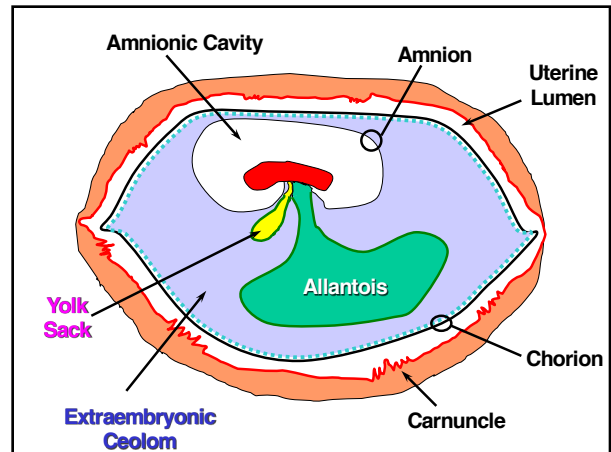
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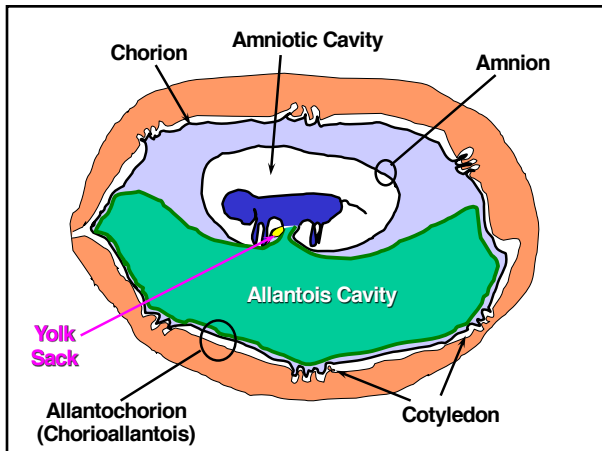
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Placental Membranes

- **Yolk Sack**
 - » In birds to nourish embryo
 - » In mammal atrophies but source of blood cells and primordial germ cells
- **Amnion**
 - » Non-vascular, fluid filled
 - » Fluid produced by fetus
 - » Protective cushion
 - » Ruptures at birth (not breaking of water)

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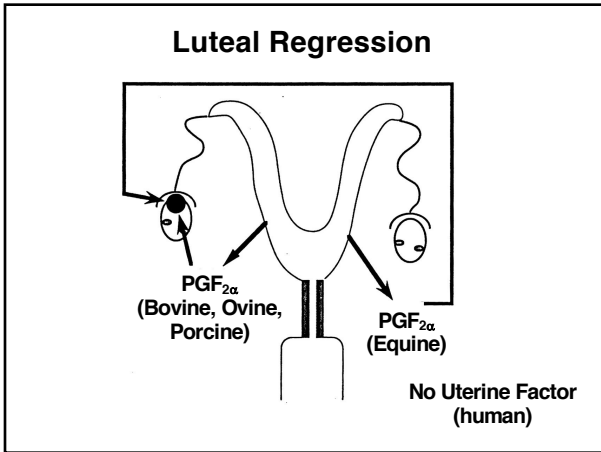
Placental Membranes (cont.)

- **Allantois**
 - » Blood vessels
 - » Fuses with chorion
 - Allantochorion or chorioallantois
 - Brings blood vessels to chorion
- **Chorion**
 - » Outermost membrane
 - » Attachment to mother

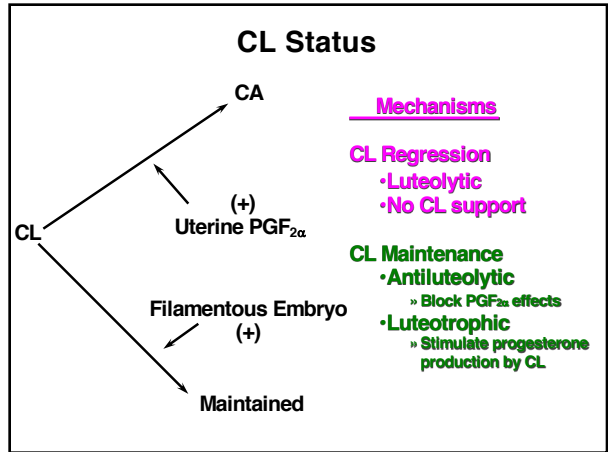
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Maternal Recognition of Pregnancy

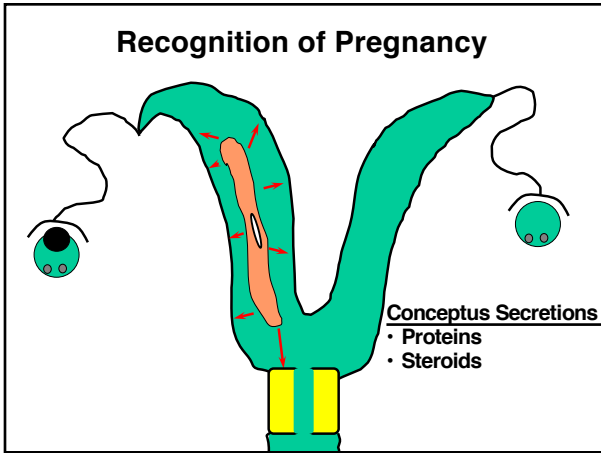
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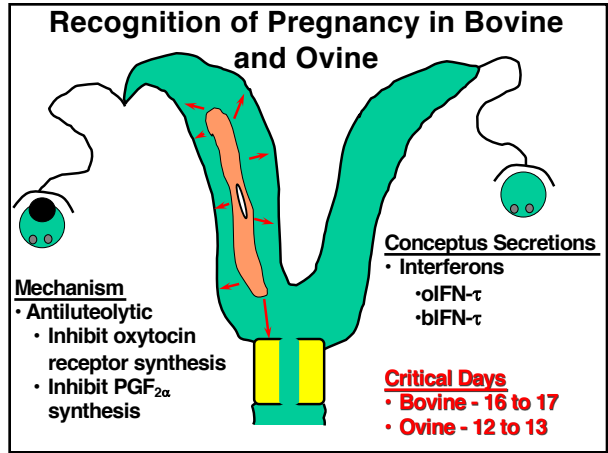
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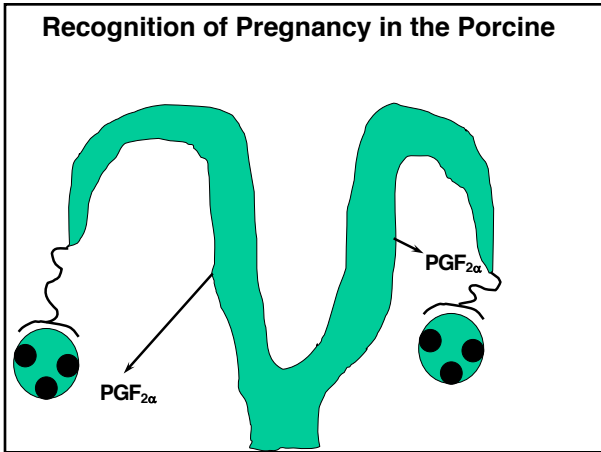
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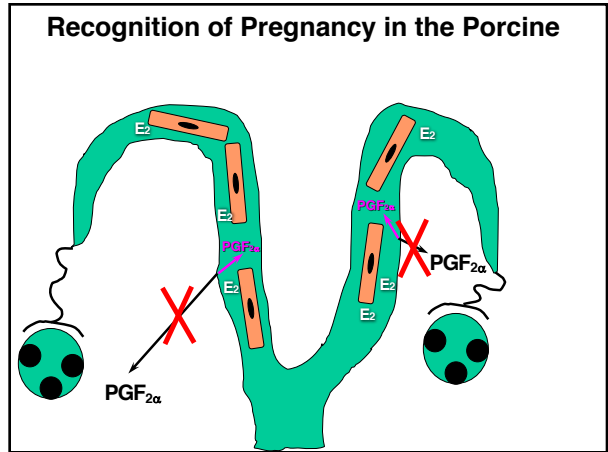
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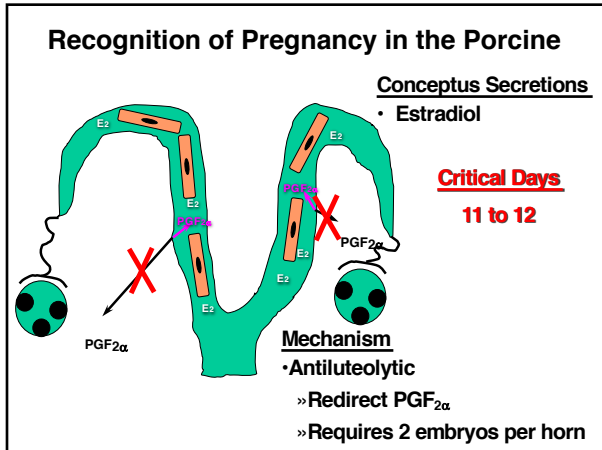
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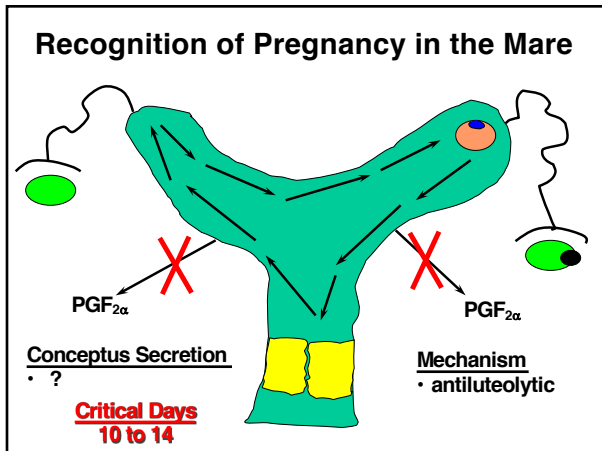


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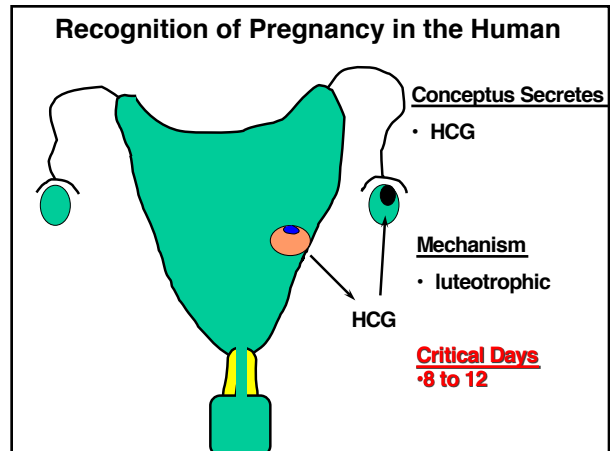
Estrogen role in Maternal Recognition of Pregnancy

- Long established role of estrogen since 1977
- Since 2019
 - » Conflicting data on the need for Estrogen
 - » Maybe PGE_2
 - » Still redirection of $\text{PGF}_{2\alpha}$ but exact cause uncertain, timing of event still correct

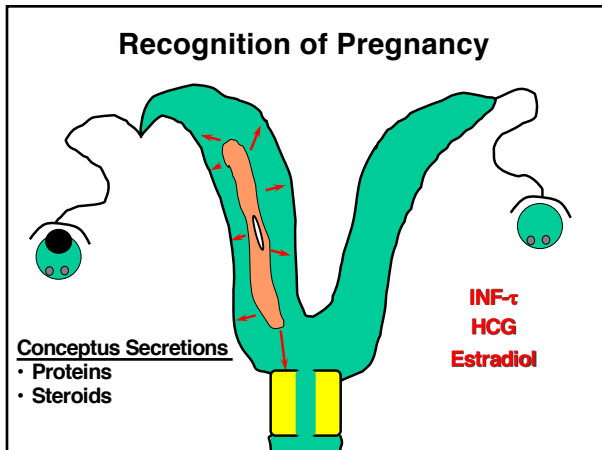
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Dog and Cat

- CL does not regress if not pregnant
 - » no uterine effect
- Pseudopregnancy
 - » CL last similar length as in pregnancy

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Implantation

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Time of Implantation

Species	Attachment to Uterus	
	Beginning	Completion
pig	13	24
cow	22	40
sheep	15	28
mare	24 - 40	95 - 100
human	7 - 8	30

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Type of Implantation

- **Superficial**
 - » Chorion lies opposed to uterine wall
 - » Farm animals
- **Eccentric**
 - » Chorionic sack in a uterine fold
 - » Rodent
- **Interstitial**
 - » Embryo digests part of uterine wall
 - » human

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Degree of Tissue Loss at Parturition

- **Deciduate**
 - » Eccentric, interstitial
 - » Rodent, human
- **Indeciduate or Nondeciduate**
 - » Superficial
 - » Farm animals

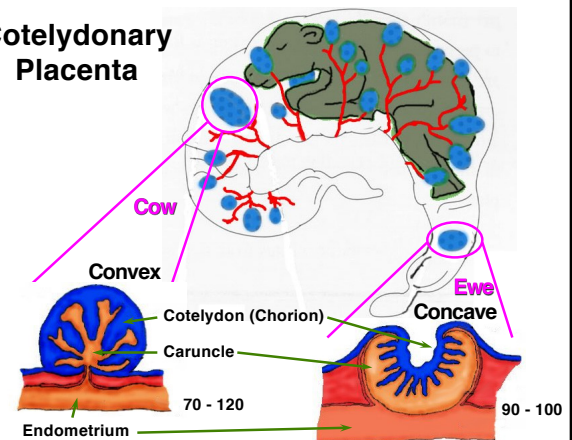
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Shape or Distribution of Chorionic Villi

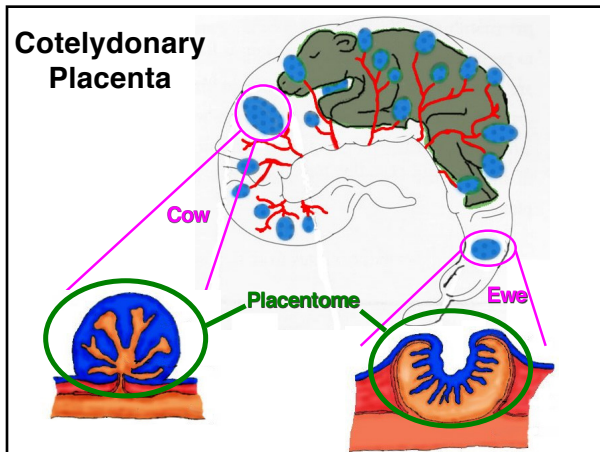
- **Cotyledonary** - cow, sheep
- **Diffuse** - pig, horse
- **Zonary** - dog, cat
- **Discoid** - human

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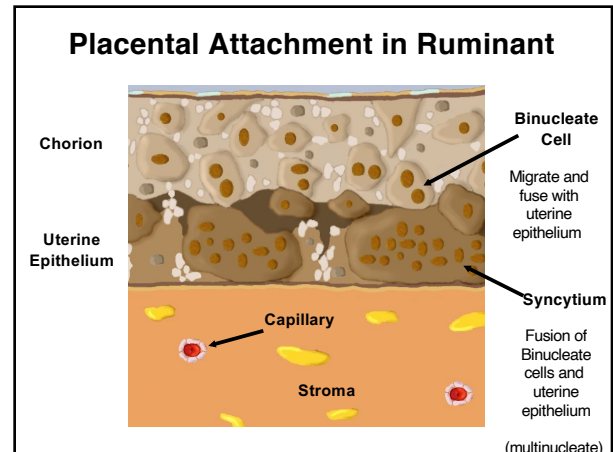
Cotyledonary Placenta



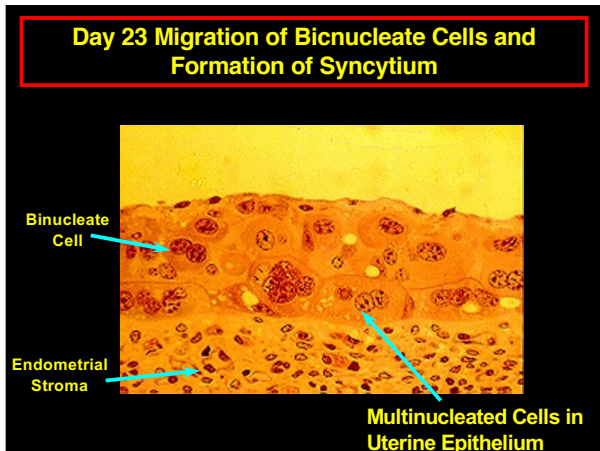
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Binuclear Giant Cells

- 20% of fetal placenta
- Invade endometrium
- Source
 - » Placental lactogen
 - » Pregnancy specific protein B

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Placental Lactogens (Protein Hormones)

Prolactin-like activity: Stimulates Milk Synthesis

Not Present in Pig and Mare

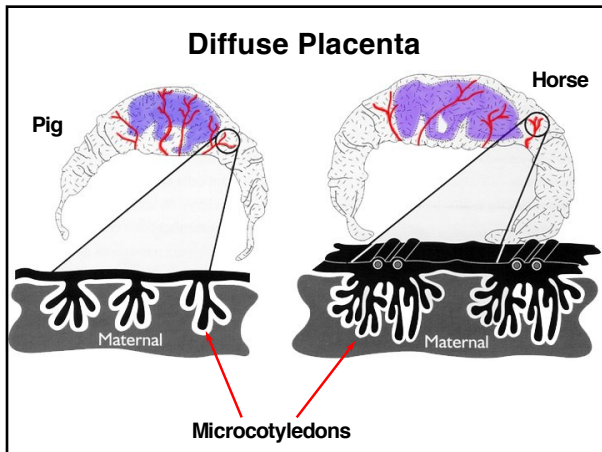
- May regulate maternal metabolism to facilitate fetal growth
- High levels in the last 1/3 of gestation.
- High levels facilitate higher milk production.
- Dairy cows have higher blood concentrations than beef cows

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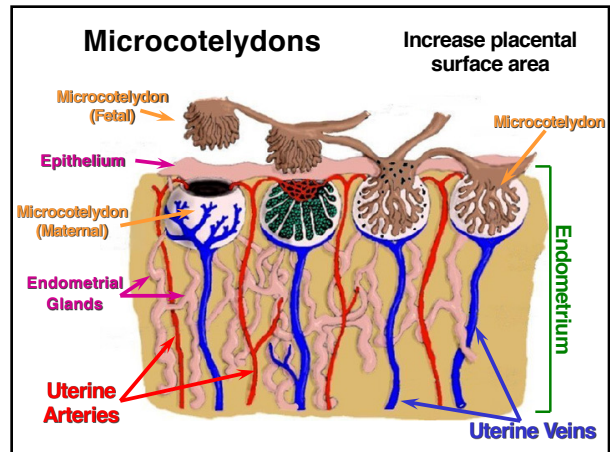
Pregnancy Specific Protein B

- Unique to ruminants
- Function uncertain
- Has been used to detect pregnancy
 - » Cattle, sheep, deer
 - Can be used to detect pregnancy in cows after day 25
 - » **Not early pregnancy factor!!!**

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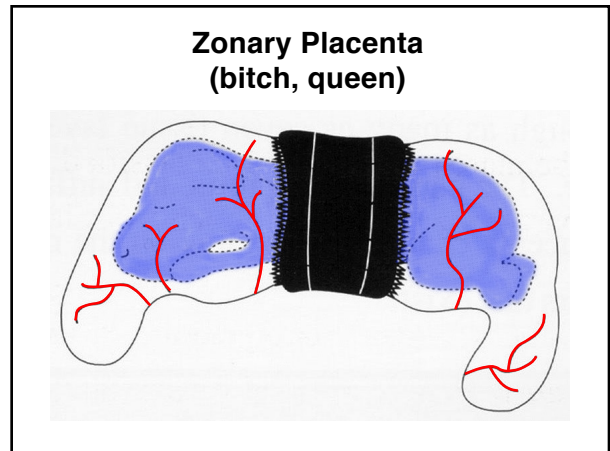


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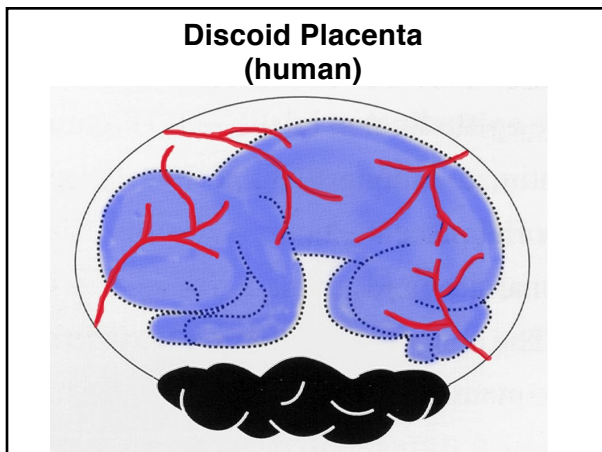
Endometrial Cups in Mare

- From both trophoblast and endometrium
- 5 to 10
- Form between days 35 to 60
- Produce equine chorionic gonadotropin (eCG, PMSG)
- Sloughed off after day 60

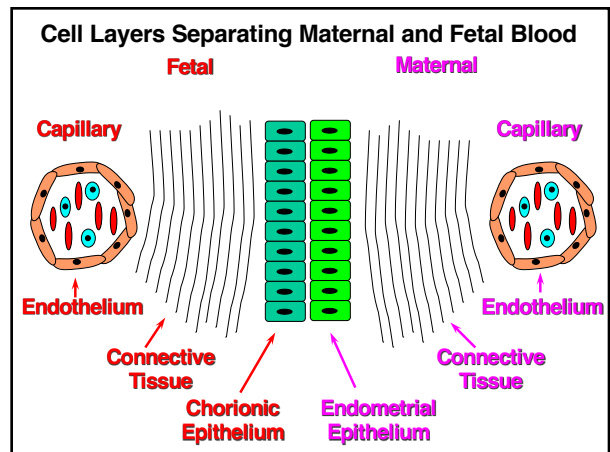
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Histological Classification					
Tissues	epithelial-chorial	syndesmo-chorial	endothelial-chorial	hemo-chorial	hemo-endothelial
Maternal					
endothelium	+	+	+	-	-
conn. tissue	+	+	-	-	-
epithelium	+	-	-	-	-
Fetal					
epithelium	+	+	+	+	-
conn. tissue	+	+	+	+	-
endothelium	+	+	+	+	+
Species	pig horse ruminant	*ruminant	dog cat	human	rat rabbit

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- Important!!!!**
- Fetal and maternal blood does not mix during gestation.
 - Mixing may occur at parturition and may result in antibodies against specific fetal blood type. **Impacts future fetuses or neonates!!!**
 - » Erythroblastosis Fetalis – Human
 - Antibodies cross placenta (Rh factor)
 - » Neonatal Isoerythrolysis – Cat and Horse
 - Antibodies in colostrum and absorbed first 24 hr of neonate's life

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