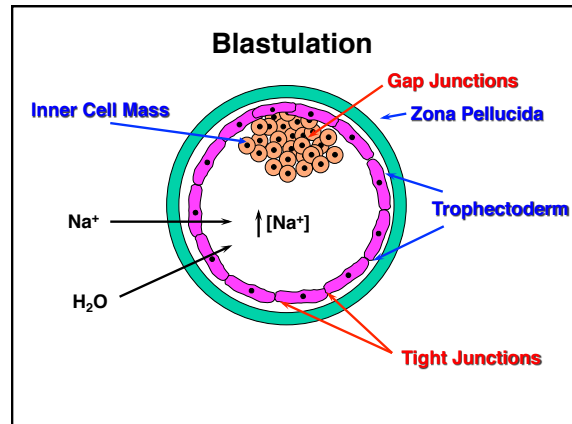


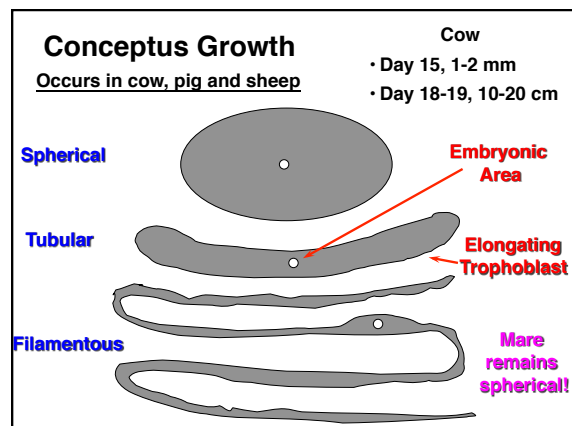
Placentation and Maternal Recognition of Pregnancy

Animal Science 434
John J. Parrish

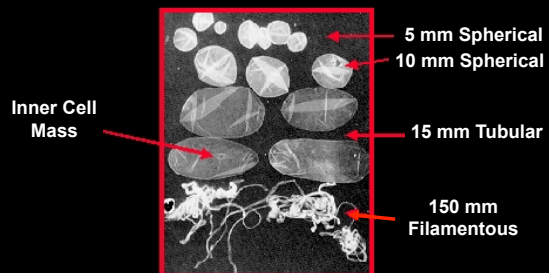


Hatching

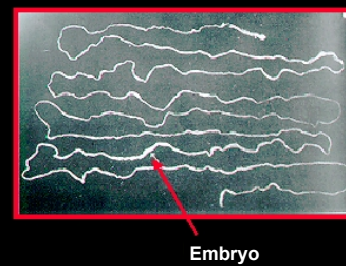
- **Bovine**
» 9 - 11 days
- **Equine, Ovine**
» 7 - 8 days
- **Porcine**
» 6 days

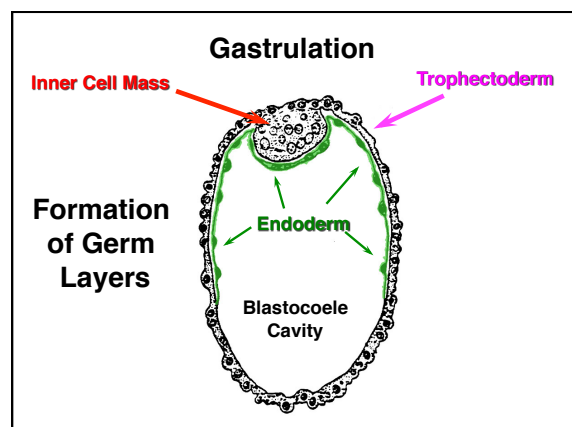
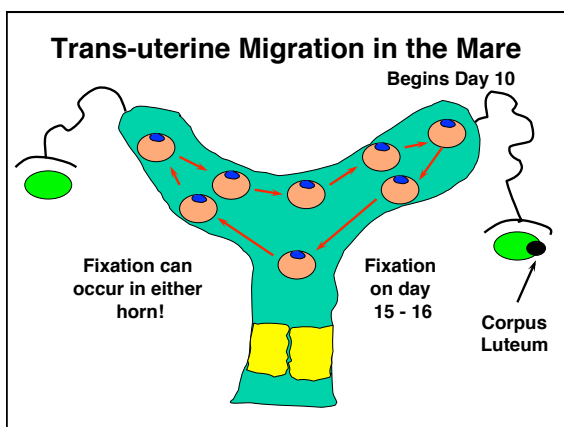
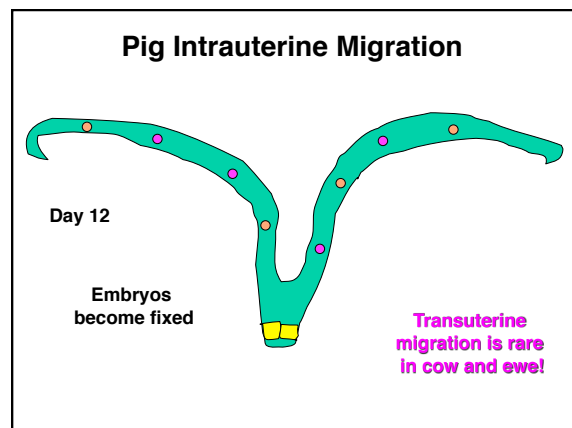
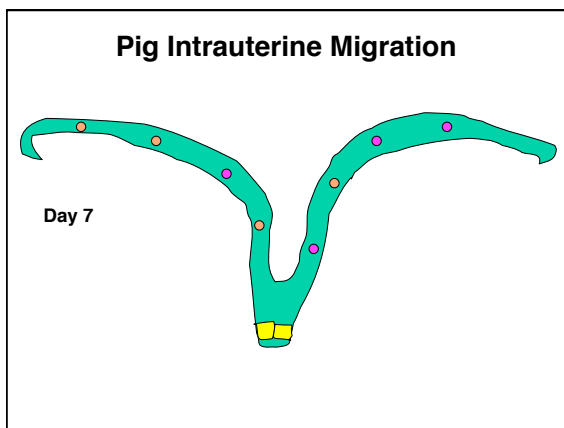
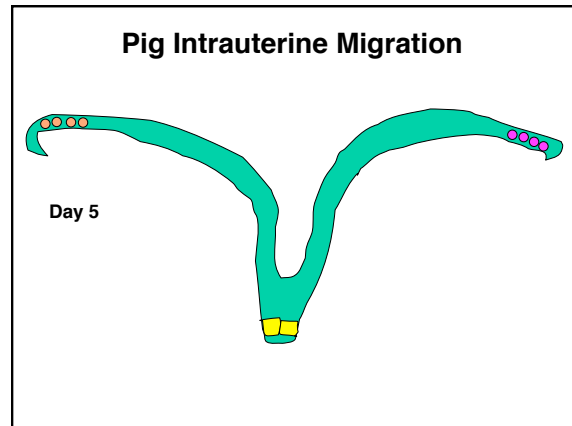
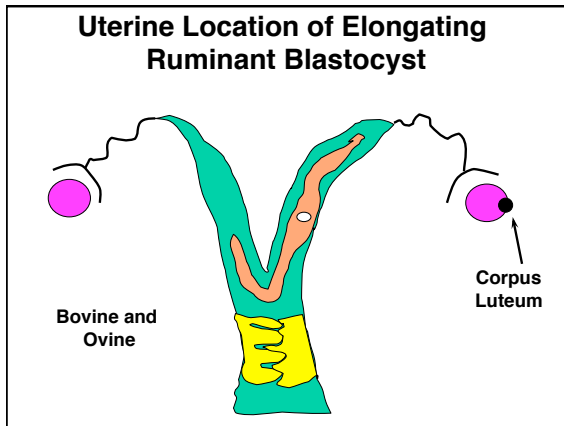


Development of Porcine Conceptuses from Day 10 to 12

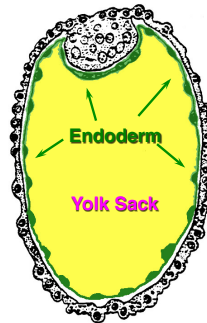


Elongated Day 15 Porcine Conceptus

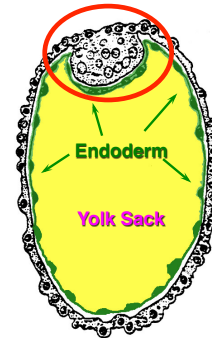




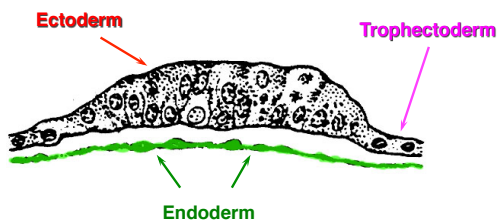
Gastrulation



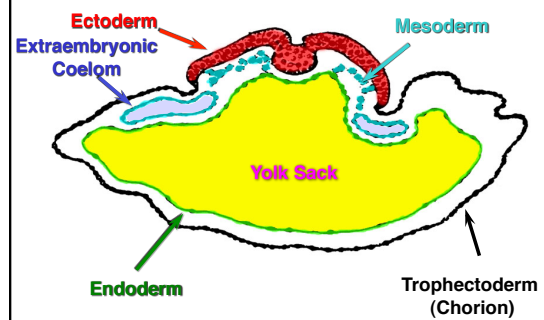
Gastrulation



Gastrula



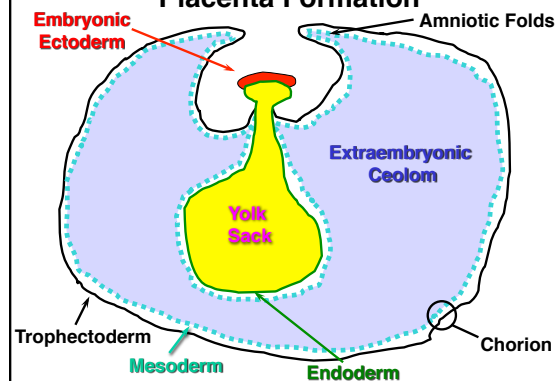
Gastrula

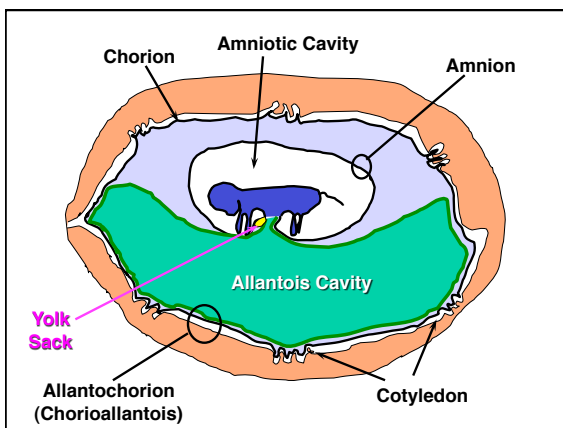
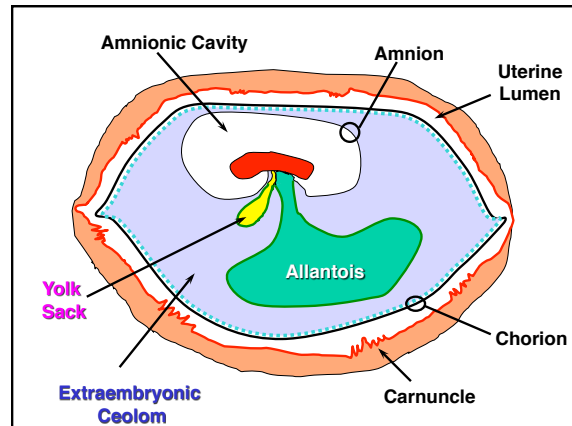
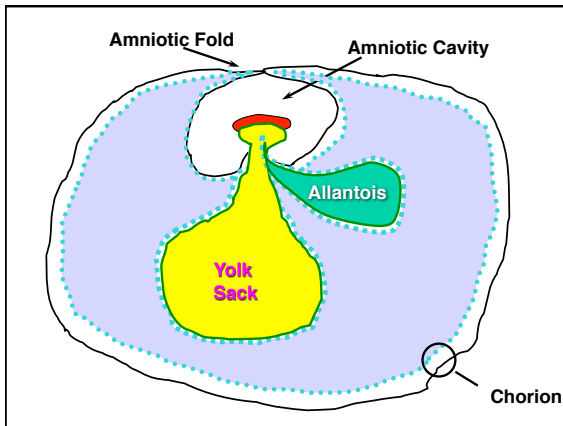


Germ Layers

- | | | |
|------------------|-----------------------|-----------------|
| ● 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 | | |

Placenta Formation





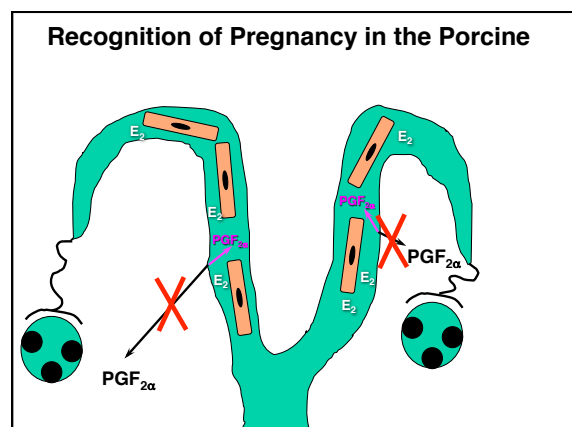
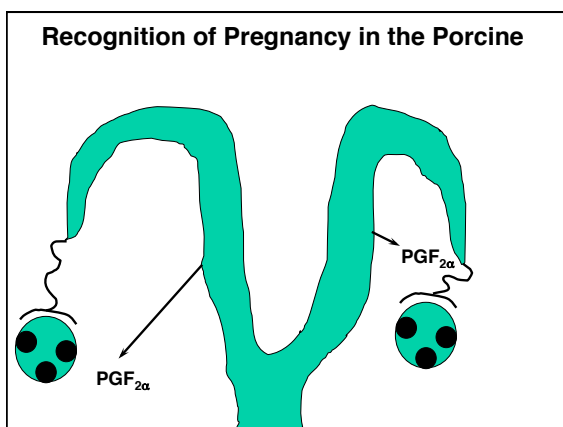
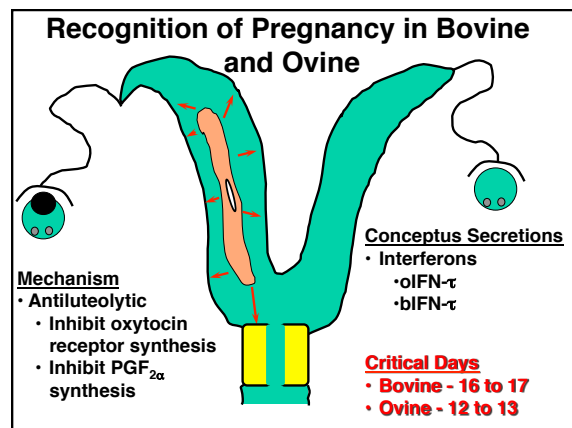
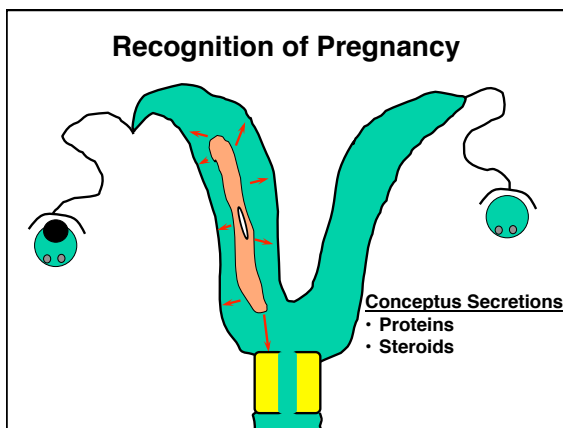
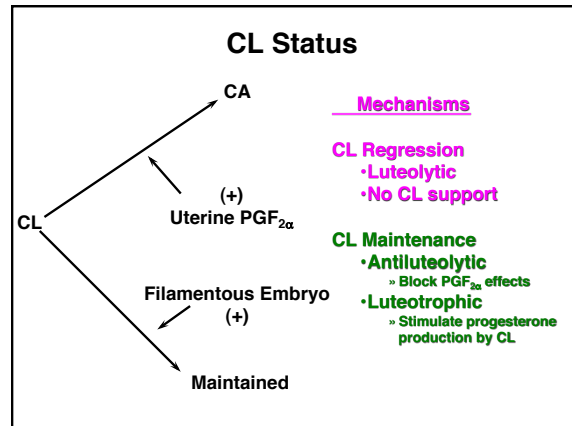
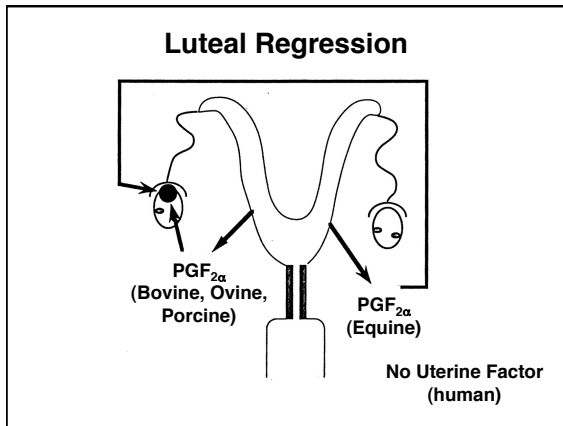
Placental Membranes

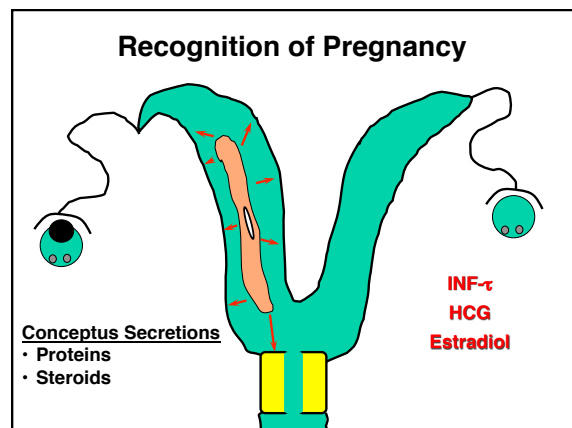
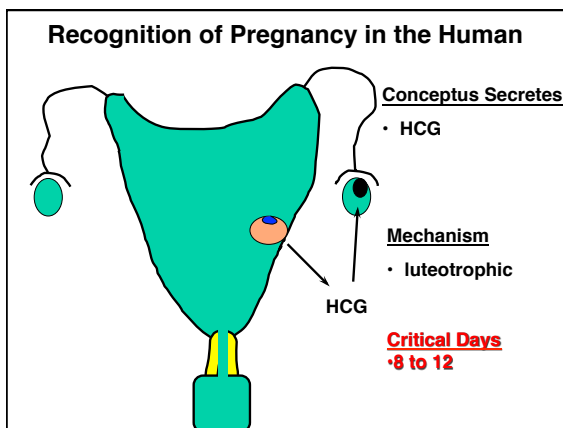
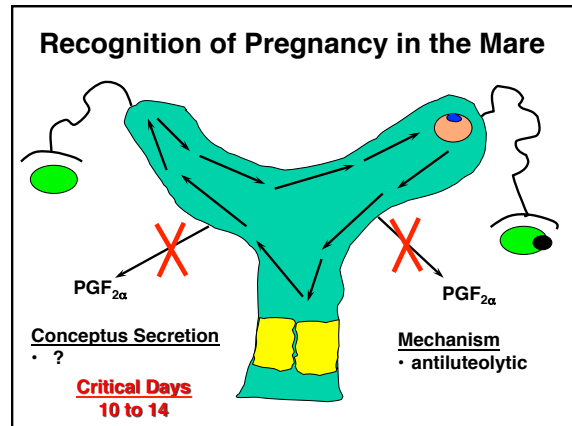
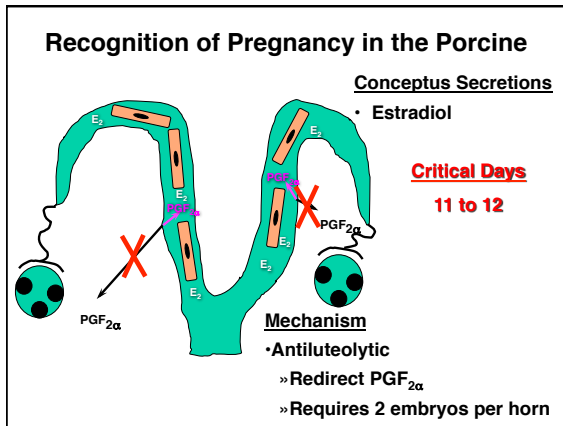
- **Yolk Sack**
 - » In birds to nourish embryo
 - » In mammal atrophies but source of blood cells and primordial germ cells
- **Amnion**
 - » Non-vascular, fluid filled
 - » Fluid produced by fetus
 - » Protective cushion
 - » Ruptures at birth (not breaking of water)

Placental Membranes (cont.)

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

Maternal Recognition of Pregnancy





- ### Dog and Cat
- CL does not regress if not pregnant
 - » no uterine effect
 - Psuedopregnancy
 - » CL last similar length as in pregnancy

Implantation

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

Type of Implantation

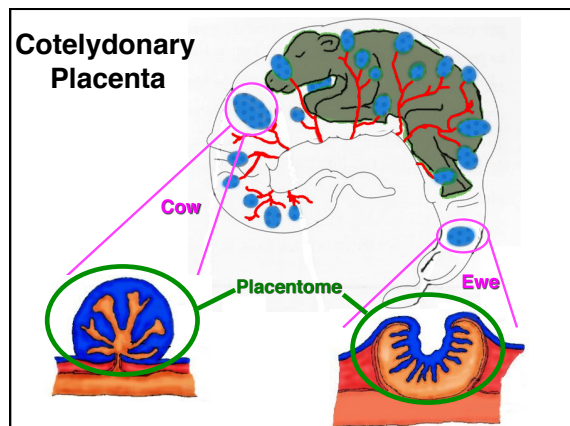
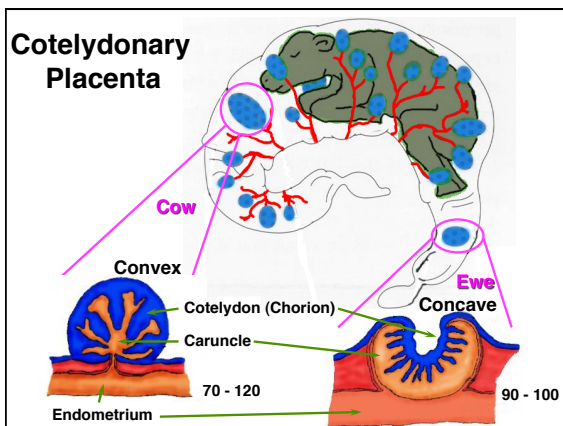
- **Superficial**
 - » Chorion lies opposed to uterine wall
 - » Farm animals
- **Eccentric**
 - » Chorionic sack in a uterine fold
 - » Rodent
- **Interstitial**
 - » Embryo digests part of uterine wall
 - » human

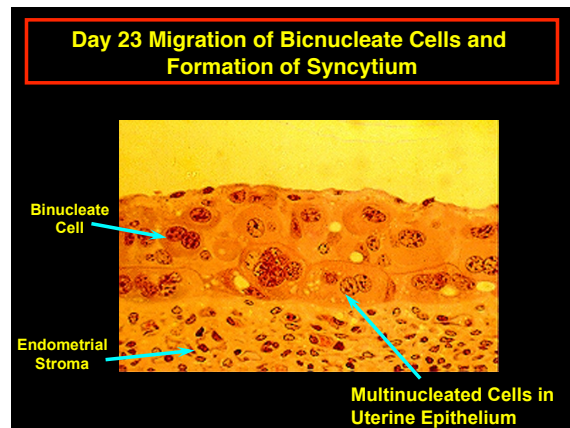
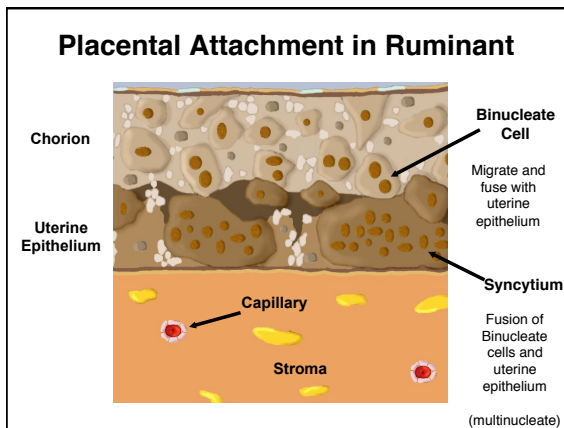
Degree of Tissue Loss at Parturition

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

Shape or Distribution of Chorionic Villi

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





Binuclear Giant Cells

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

Placental Lactogens (Protein Hormones)

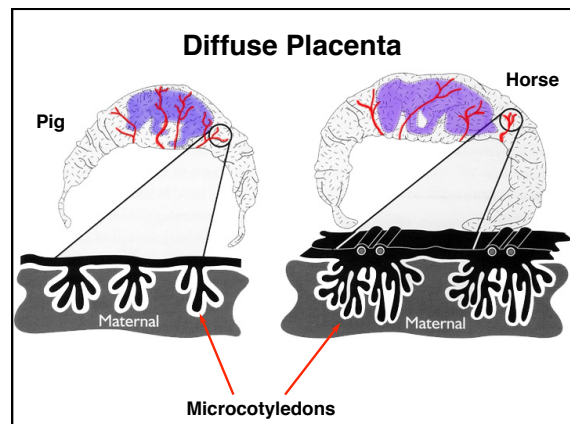
Prolactin-like activity: Stimulates Milk Synthesis

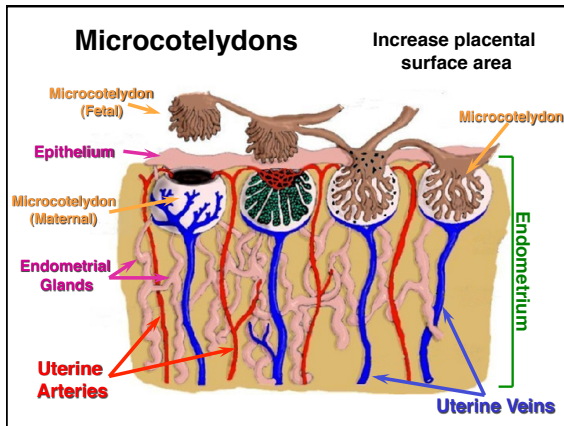
Not Present in Pig and Mare

- 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

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!!!**

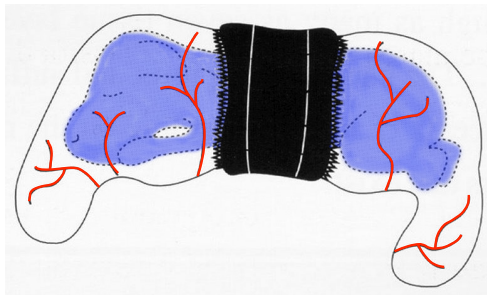




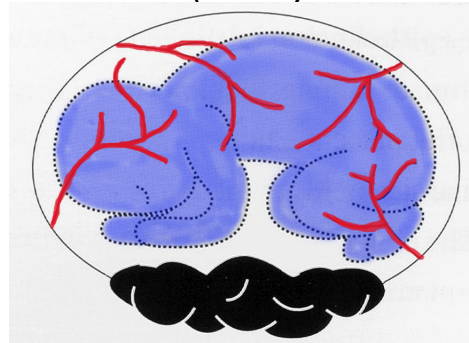
Endometrial Cups in Mare

- 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

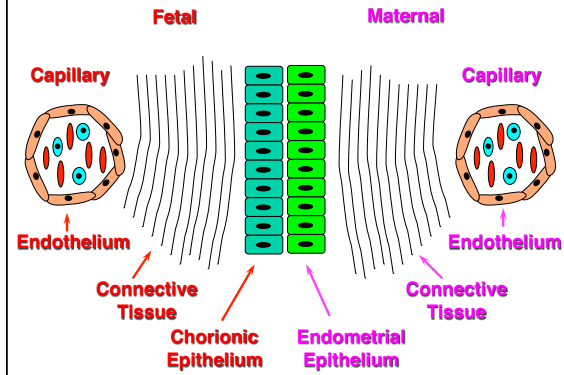
Zonary Placenta (bitch, queen)



Discoid Placenta (human)



Cell Layers Separating Maternal and Fetal Blood



Histological Classification

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

Important!!!!

- In all cases, fetal and maternal blood does not mix.