

Placenta e Placentação: Aspectos Morfofuncionais nos Animais Domésticos



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II
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“A **placenta** é uma aposição
de tecidos **maternos** e
fetais, onde ocorre trocas
fisiológicas”

Mossman (1937)

FUNÇÕES DA PLACENTA

- Proteção;
- Respiração;
- Hidratação;
- Nutrição;
- Endócrina/imunossupressora;
- Intercâmbio metabólico materno – fetal (nutrientes e gases).

Placenta como um órgão endócrino

- Assume as funções do ovário e hipófise:

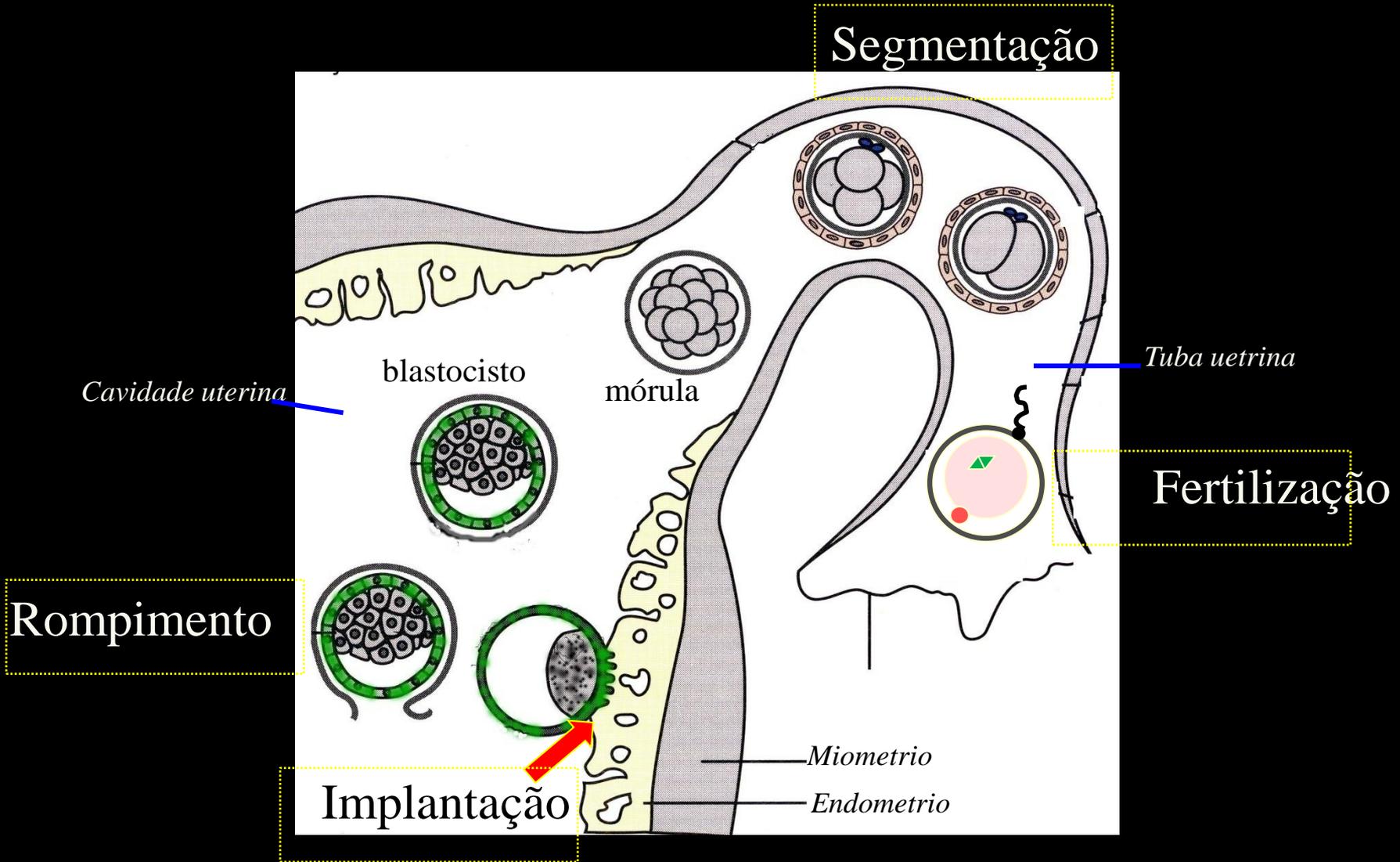
Progesterona - aumenta ao longo da gestação, podendo ultrapassar o corpo lúteo (ovinos);

- Crescimento do útero;
- Estimula a at. das gls. endometriais;
- Deprime a excitabilidade da mm. uterina Estrogênio

Gonadotrofina coriônica (equino – cálices endometriais)

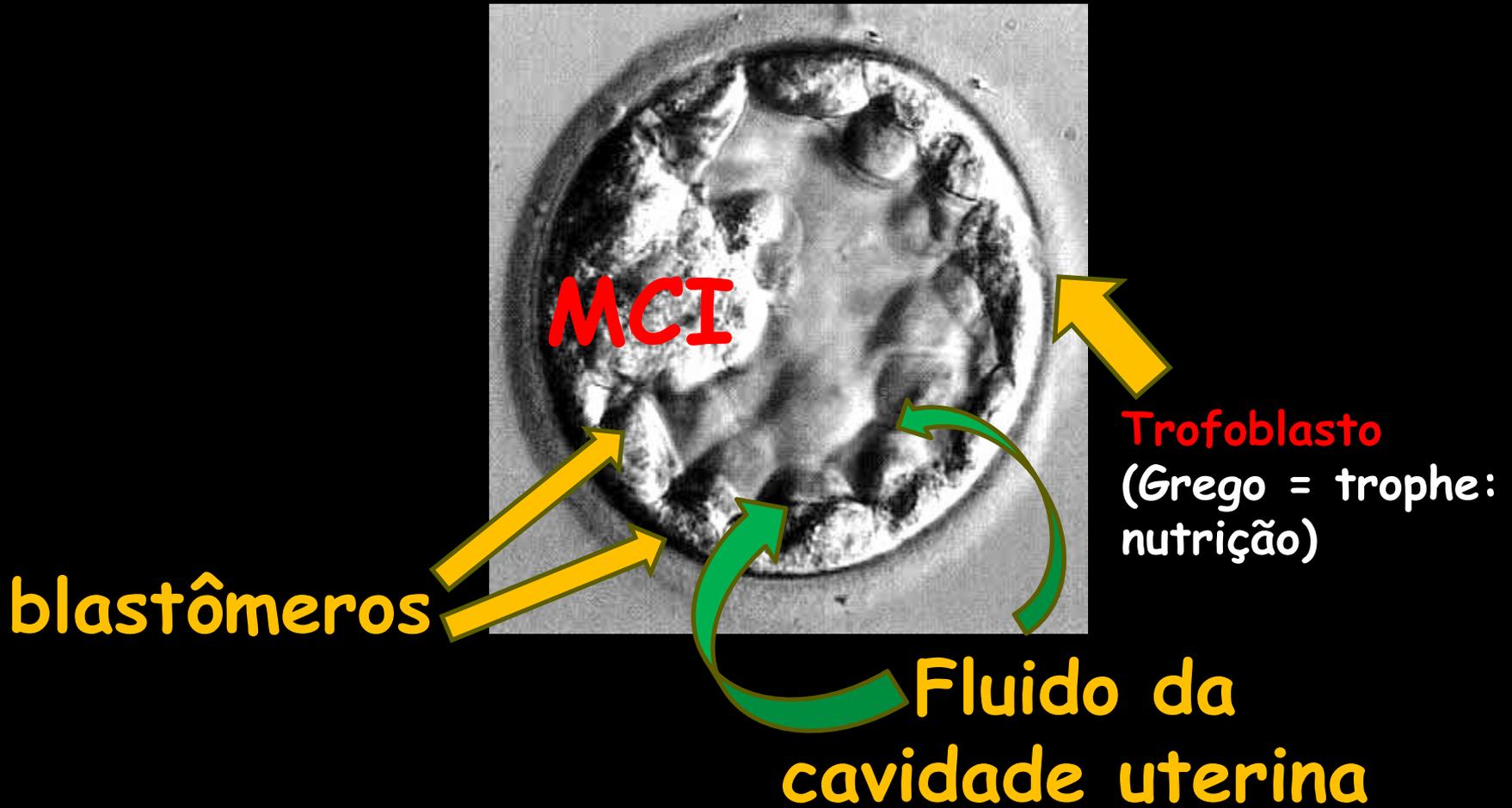
Lactogênio (desenvolvimento das gls. mamárias)

Primeiros estágios da gestação

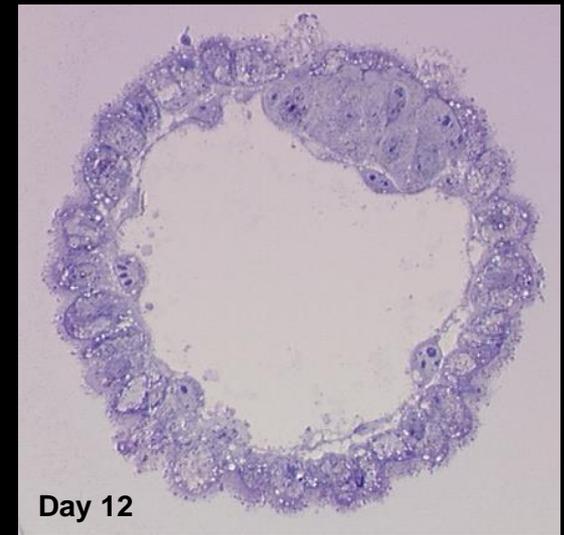
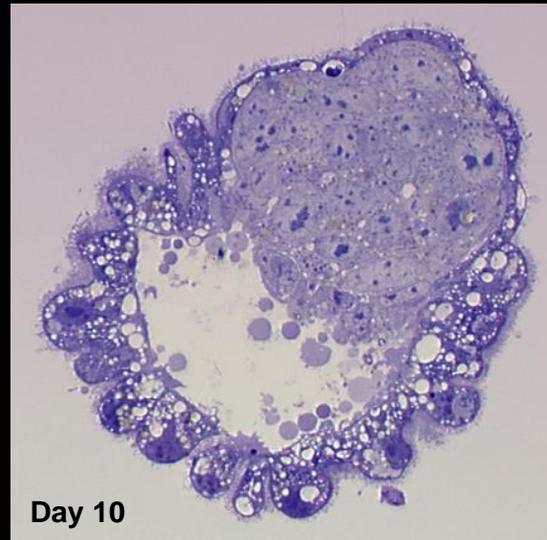
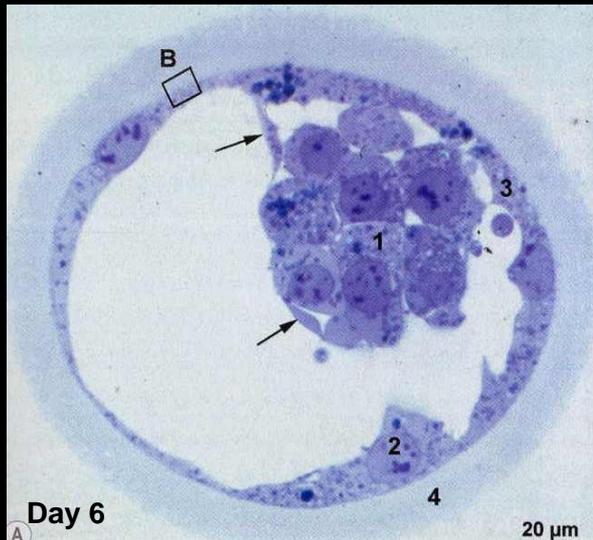


Blastogênese:

Concepto = blastocisto



Bovinos



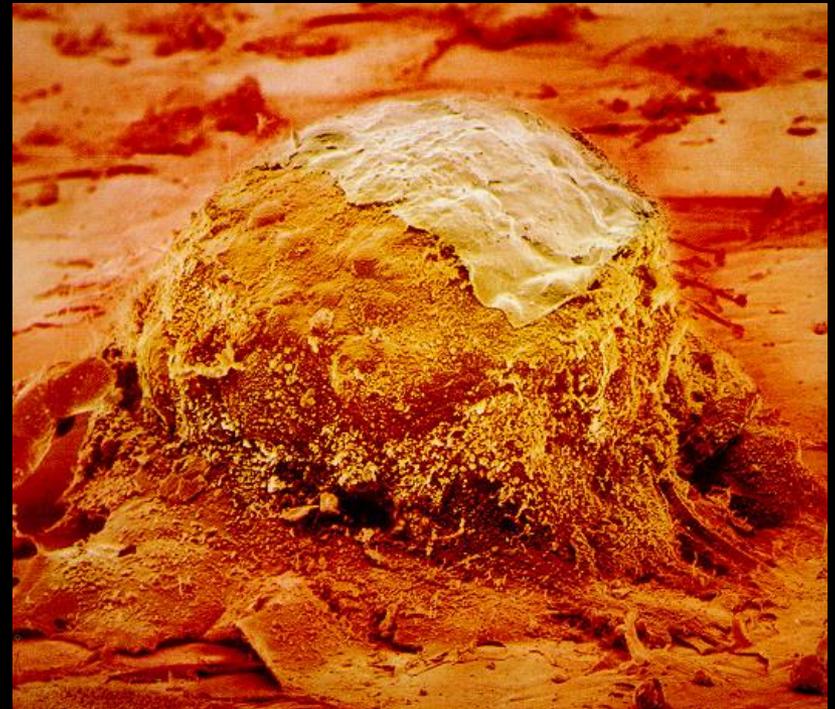
Trofoblasto

- Ancoragem do embrião na mãe;
- Nutrição do embrião;
- Trocas metabólicas e gasosas;
- Interferir no metabolismo materno – permitir a desenvolvimento embrionário;
- Proteção contra sistema imune da mãe;
- Defesa contra patógenos.

Implantação

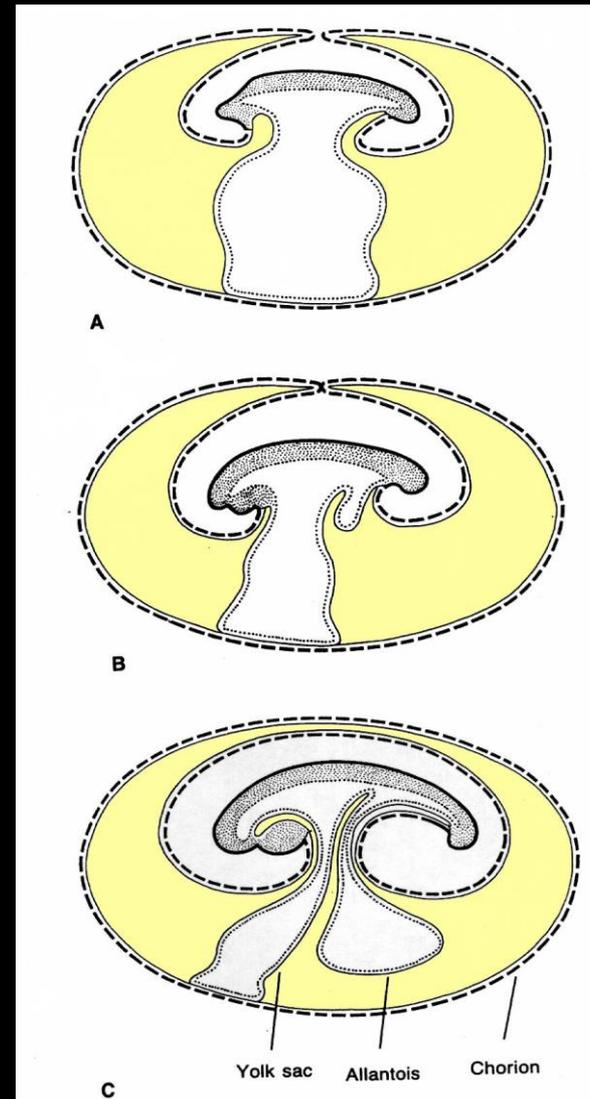
- “É o mecanismo pelo qual o blastocisto estabiliza-se no útero, e o trofoblasto desenvolve íntima relação com o epitélio uterino.”

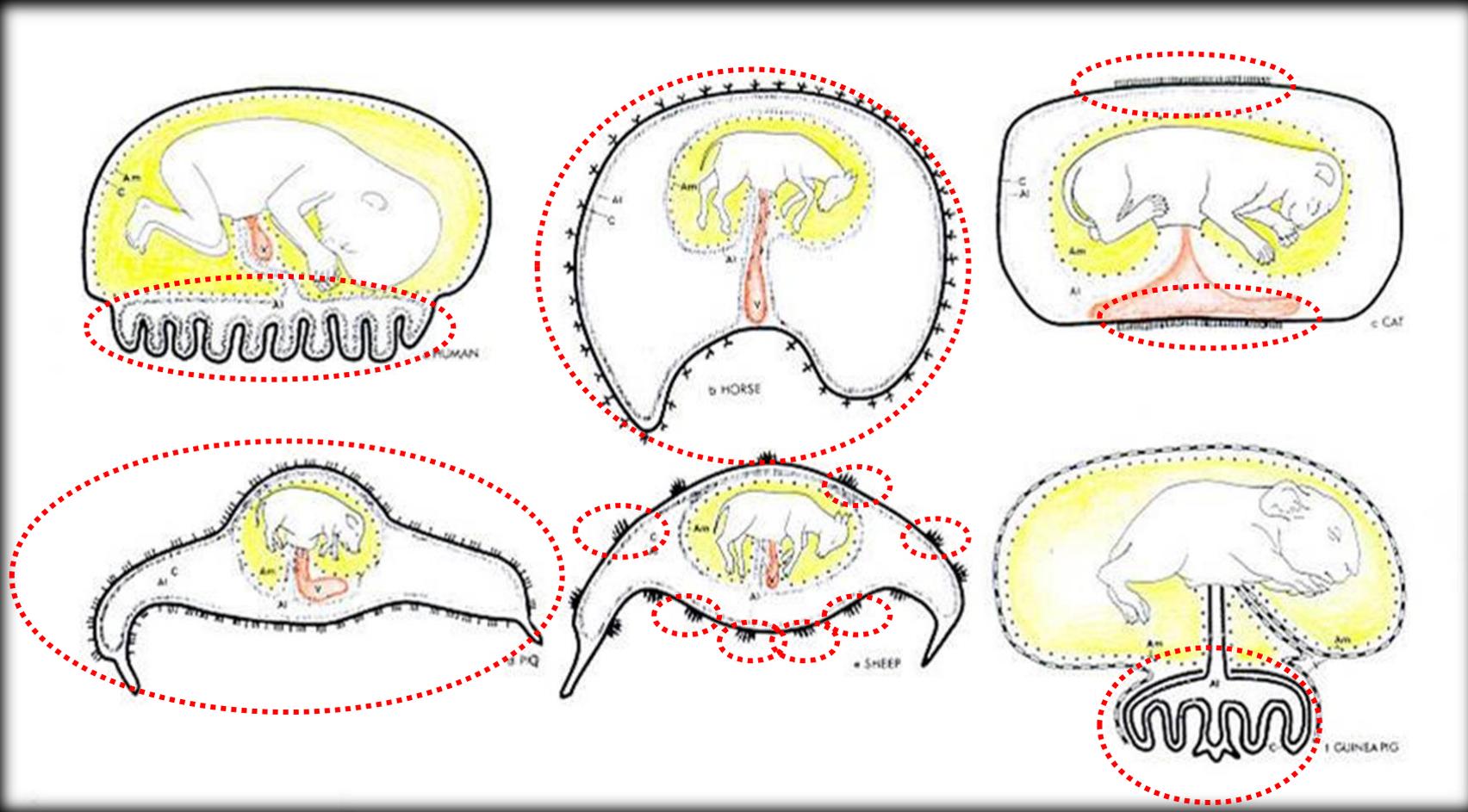
(Denker, 1993)



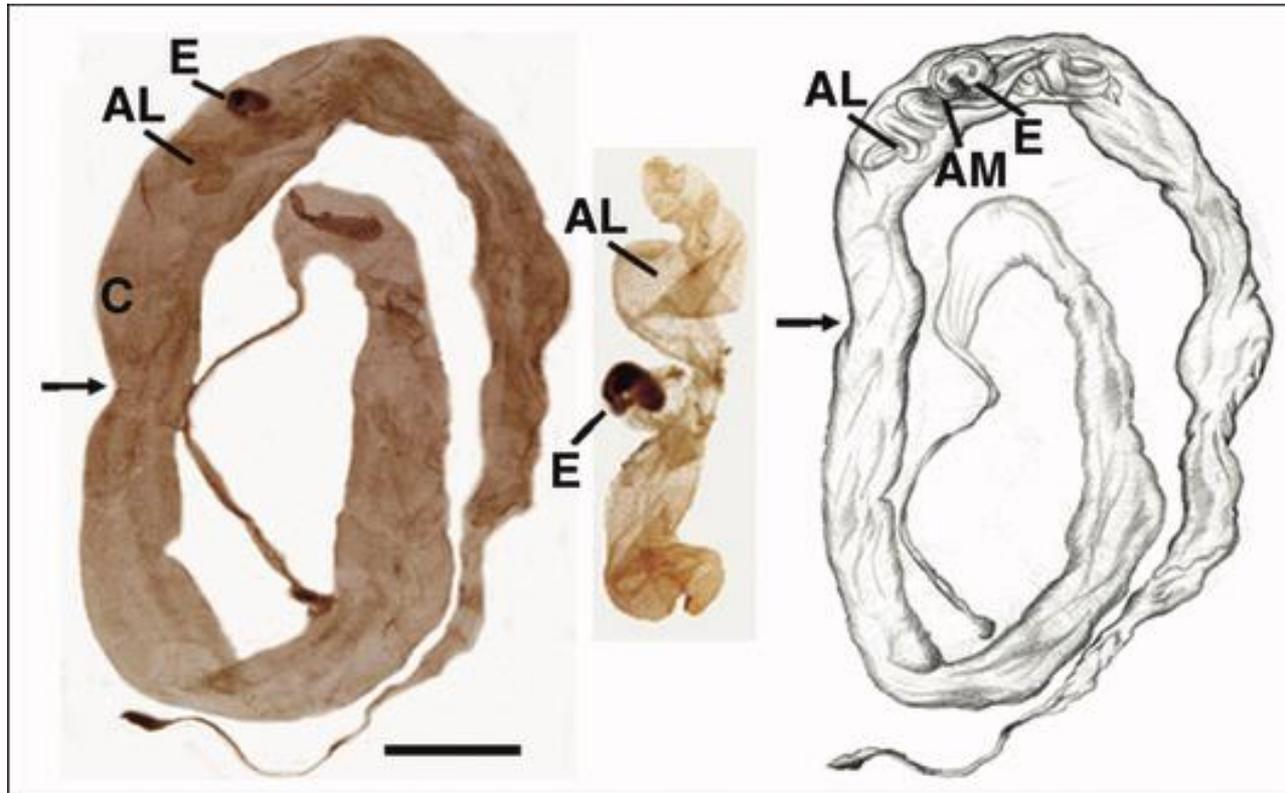
Desenvolvimento das membranas embrionárias e fetais

- Saco vitelino
- Alantóide
- Âmnio
- Cório

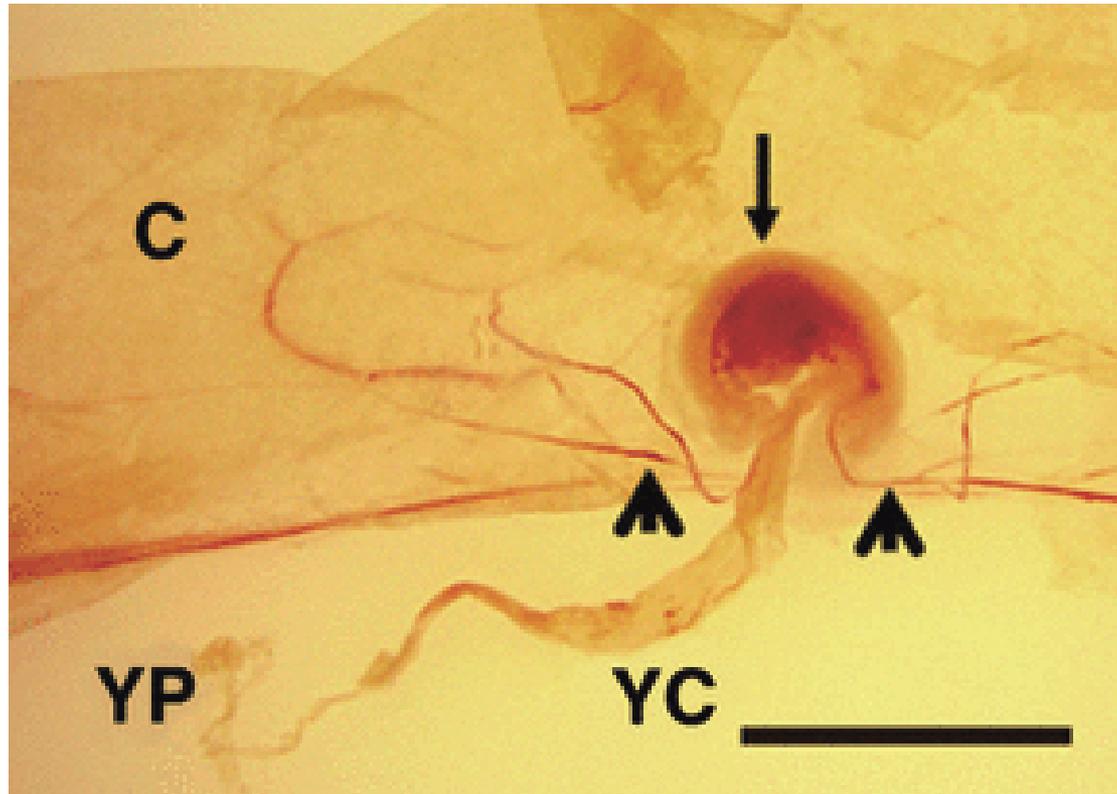




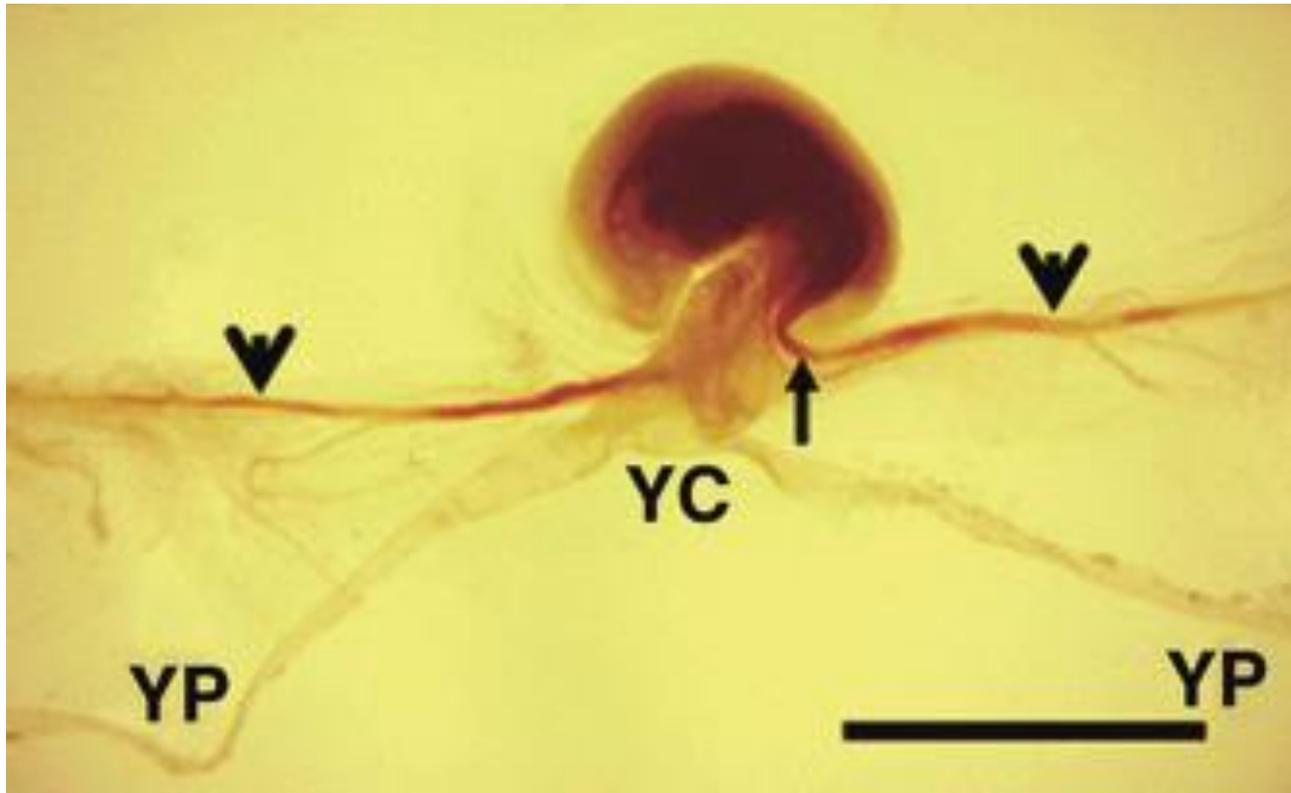
Leiser e Kaufmann, 1994



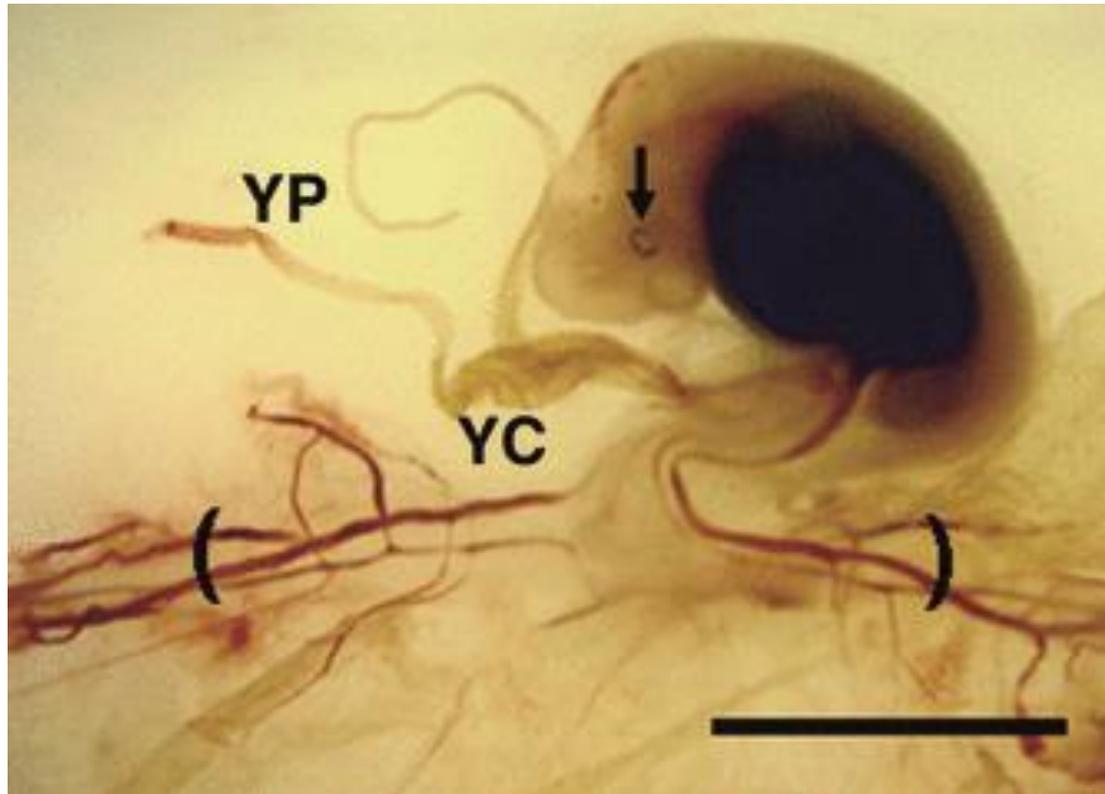
23 days



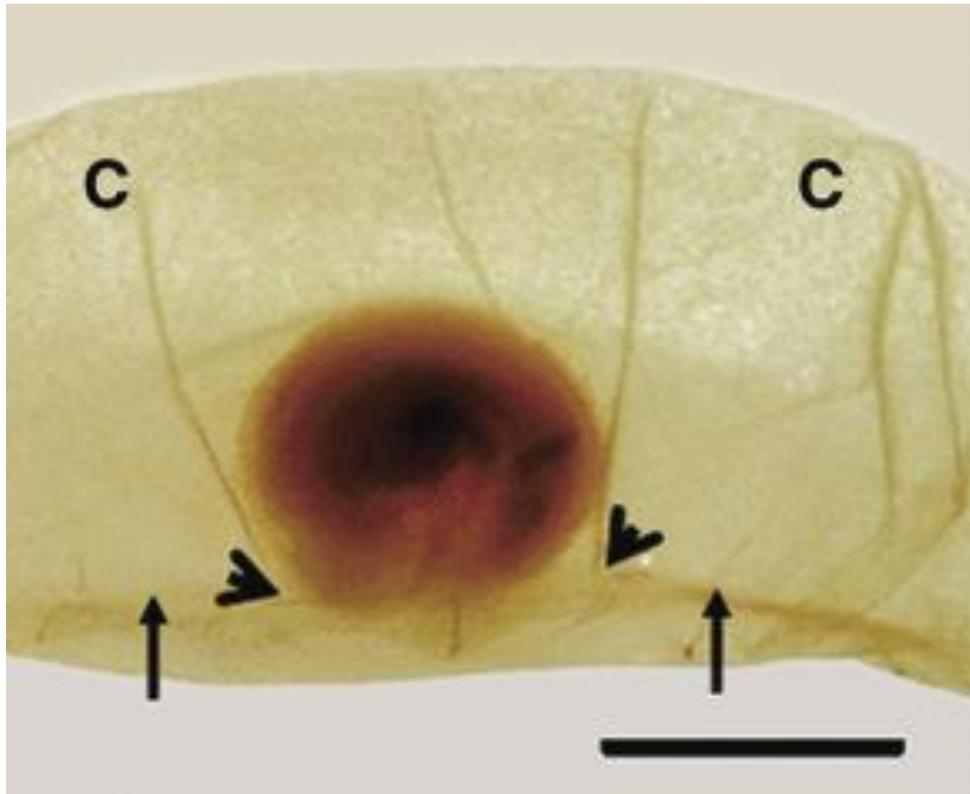
26 days



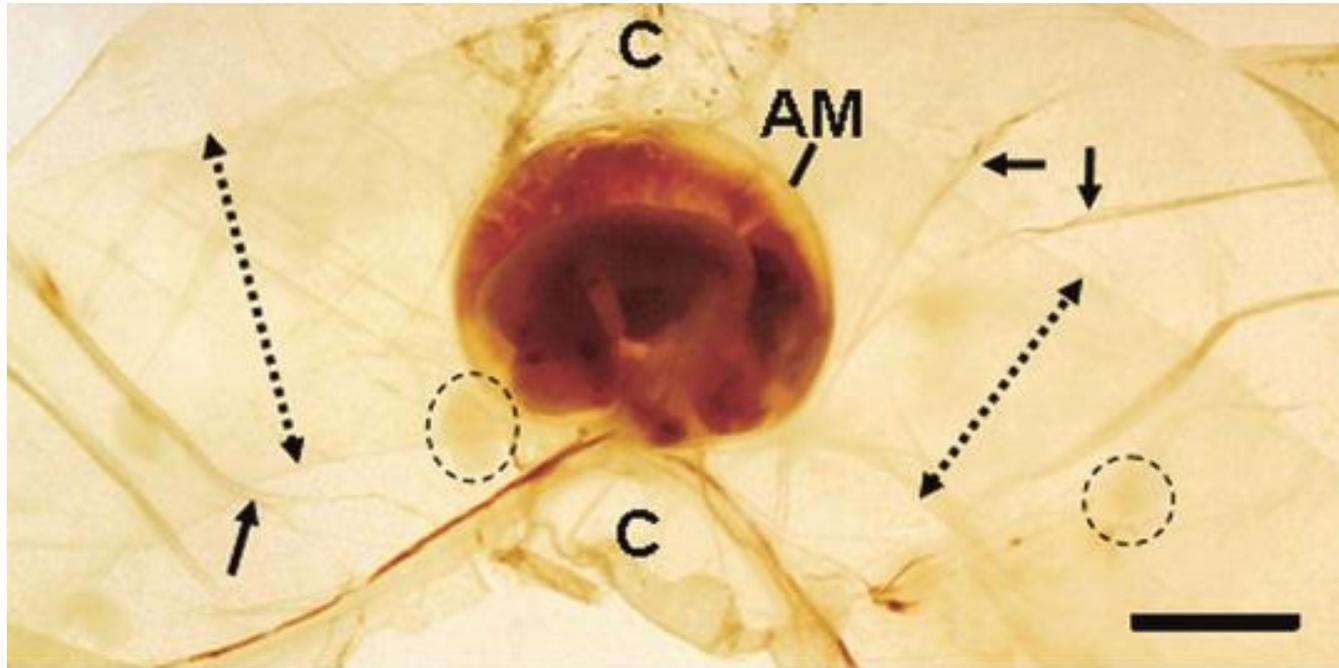
27 days



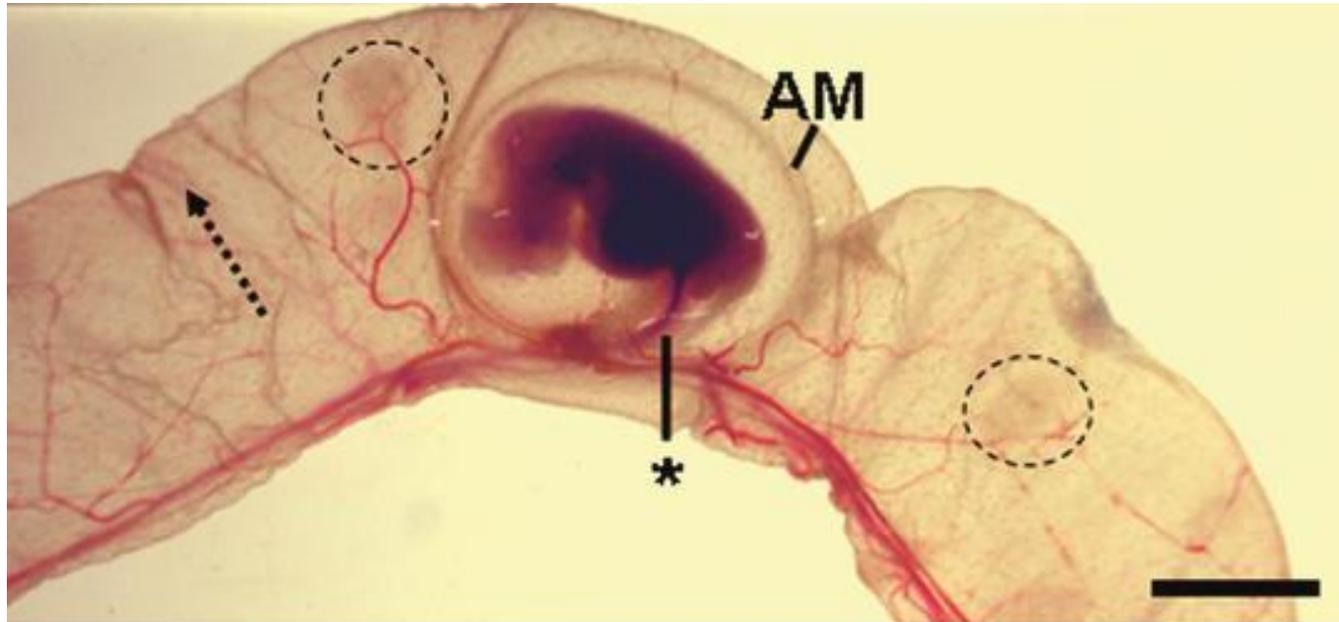
33 days



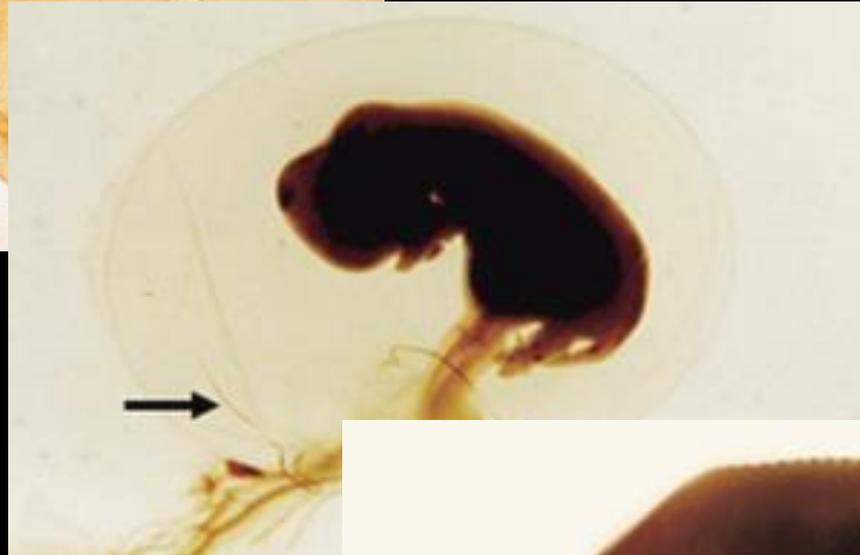
30 days.



37 days

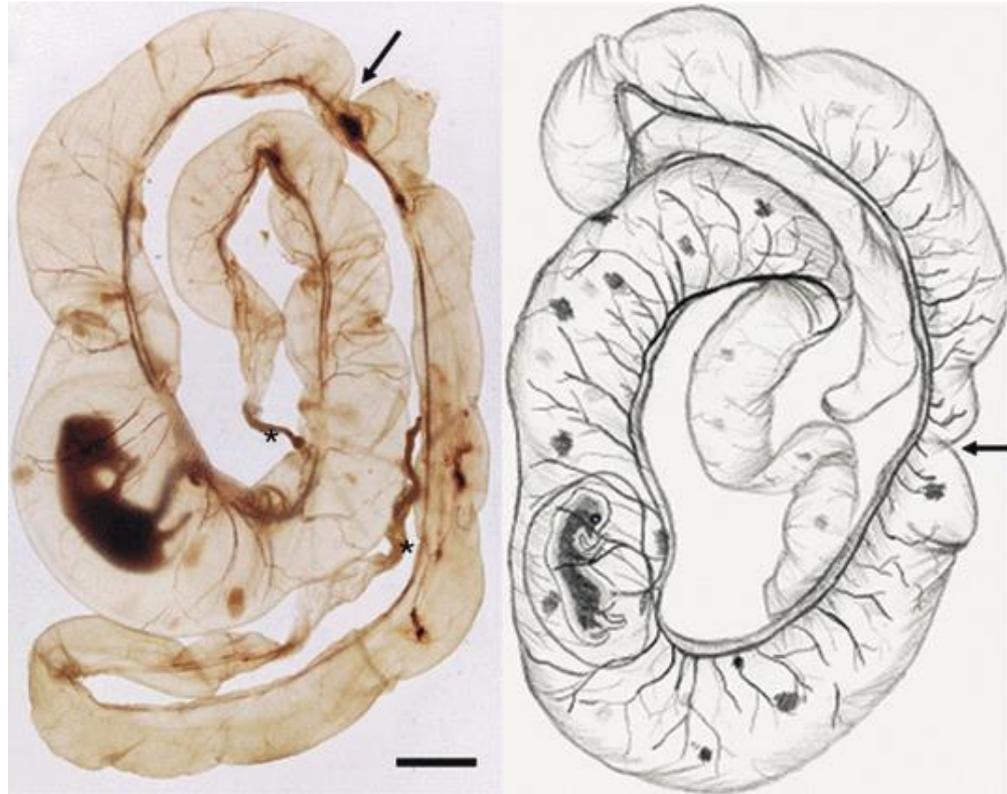


41 days

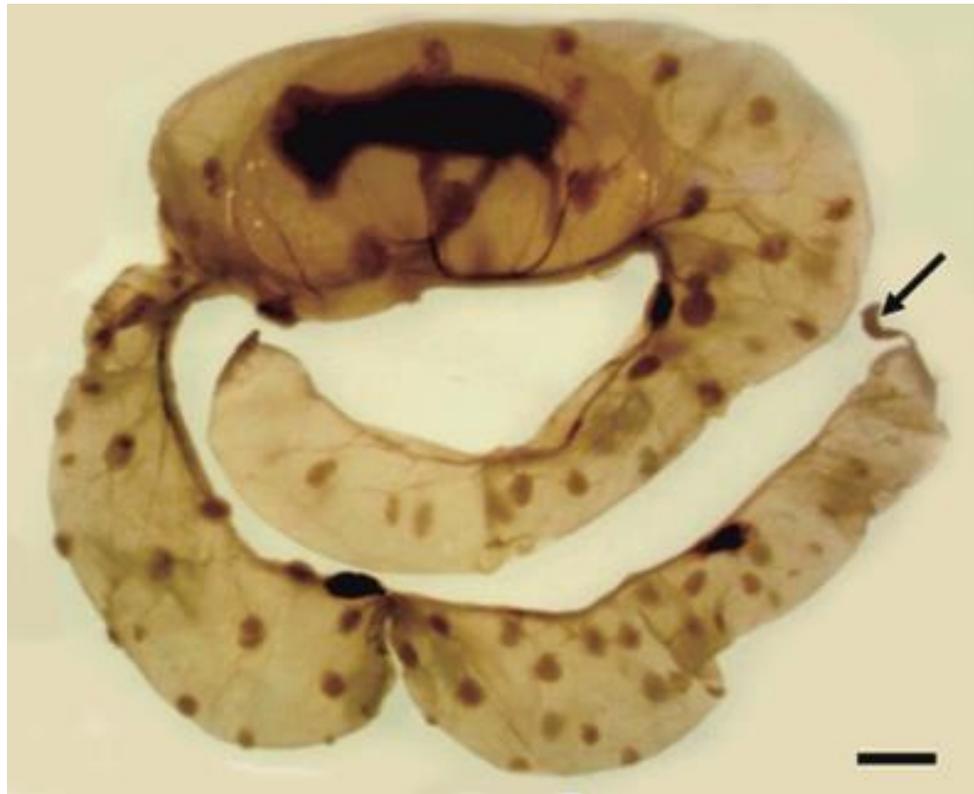


Reproduction in Domestic Animals, Volume:
45, Issue: 5, Pages: 760-772, First
published: 04 March 2009, DOI:
(10.1111/j.1439-0531.2009.01345.x)

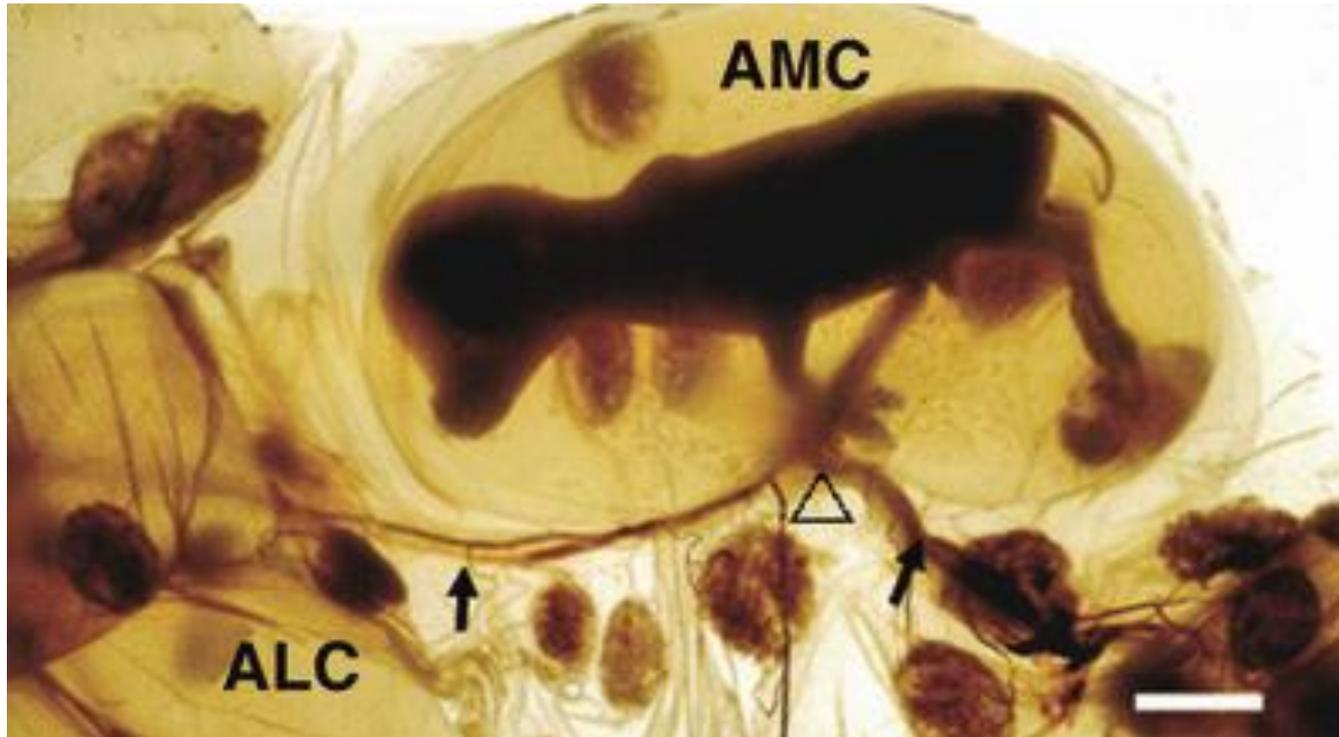
45 days.



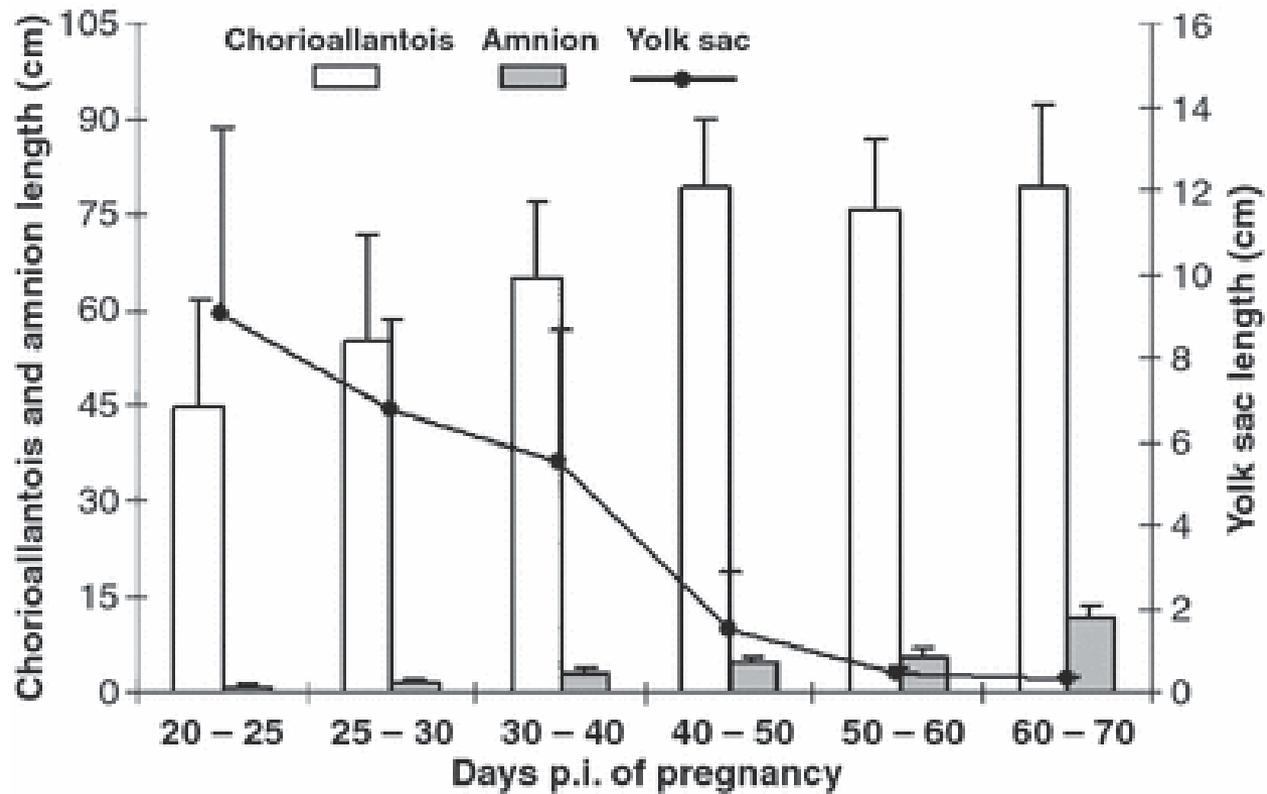
53 days



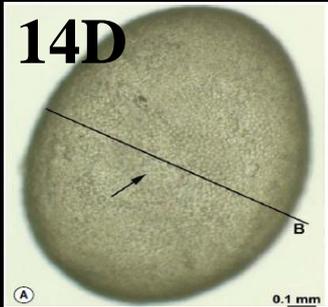
60 days



70 days

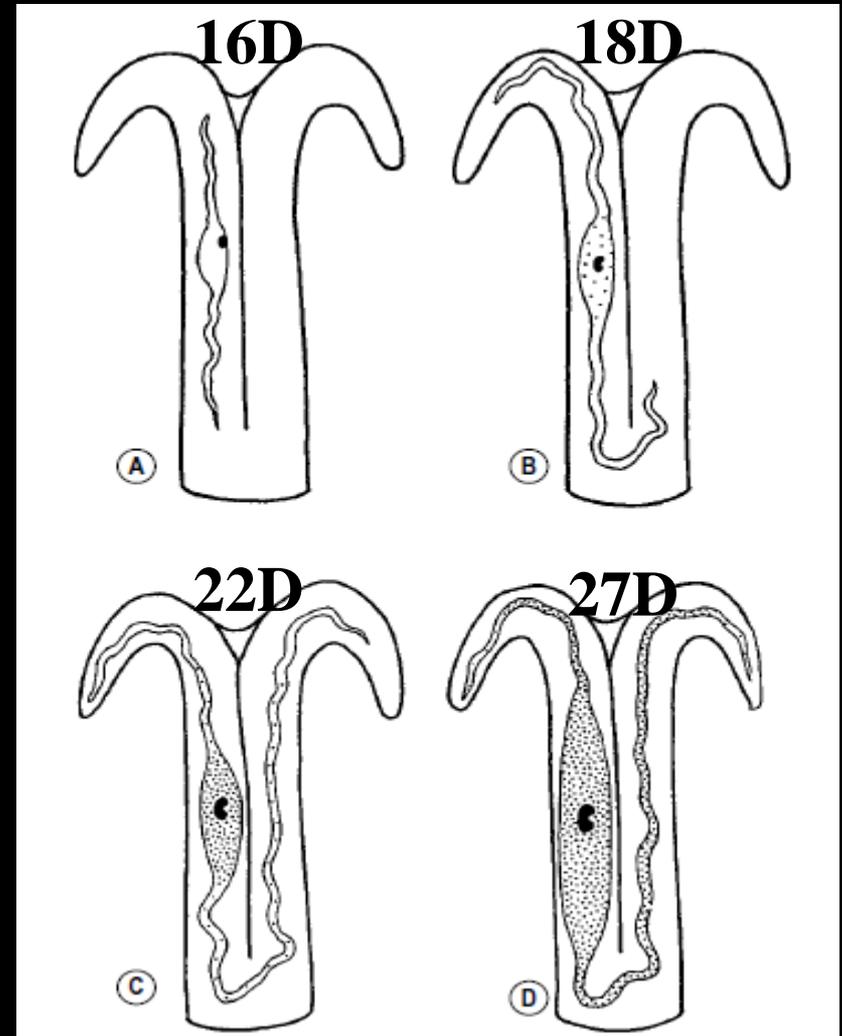


Elongação do embrião bovino



Concepto se estende igualmente entre os 2 cornos uterinos;

Frequentemente mais embriões são encontrados do lado direito (ovulação x migração)



Elongação do embrião bovino



Fonte: Assis Neto, 2005



Fonte: Assis Neto, 2005

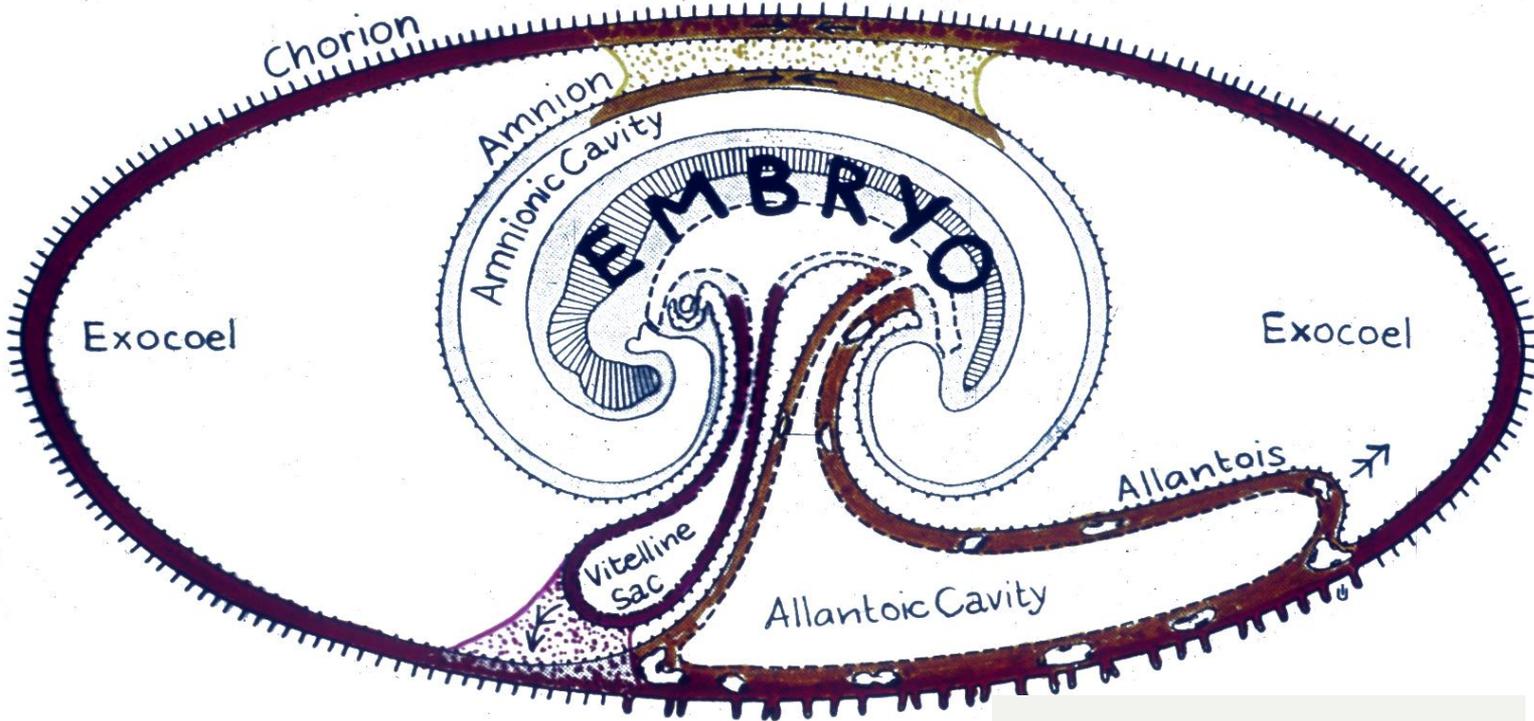
Classificação placentária

- 1- Tipo e número (arranjo) das membranas envolvidas;
- 2- Forma do órgão;
- 3- Modelo geométrico das superfícies de interdigitação materno-fetal;
- 4- Tipo e número das camadas de tecido que separam o sangue materno do fetal;
- 5- Arranjo geométrico dos vasos de troca maternos e fetais.

1- Quanto ao arranjo das membranas fetais

1. P. corial

3. P. corioamniótica



2. P. coriovitelina

4.

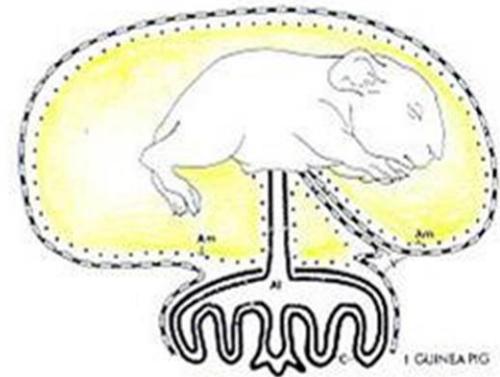
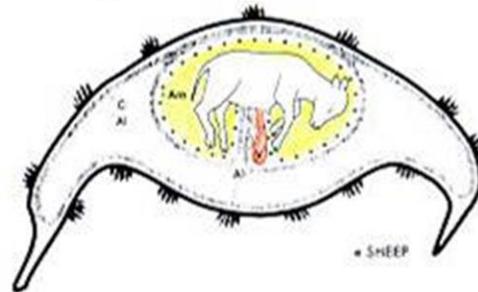
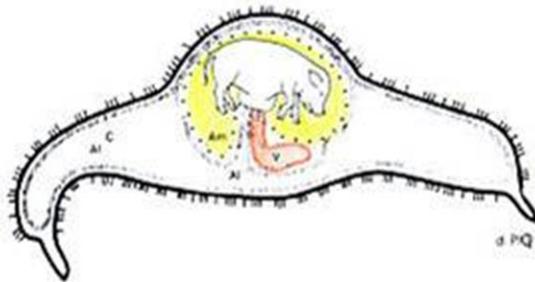
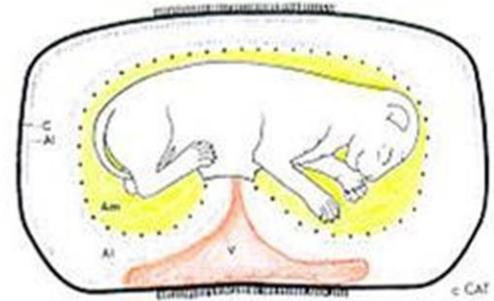
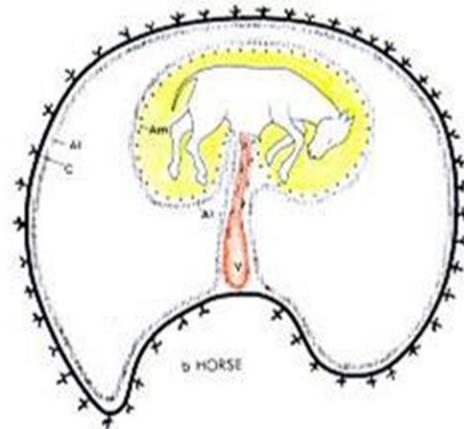
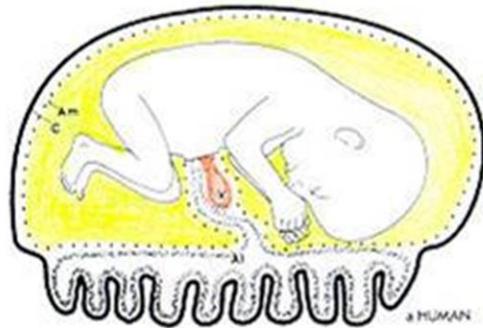
P. corioalantóide

1- Quanto ao arranjo das membranas fetais

- Coriovitelina – fases iniciais (ventral)
 - Cadela e roedores
 - Égua até 4° mês
- Corioamniótica
 - Humano, bicho preguiças
 - Fases iniciais nos ruminantes e suínos (dorsal)
- Corioalantóide
 - Segunda metade da prenhez
 - maioria dos mamíferos

2- Quanto a forma da área de junção materno-fetal

- Difusa: suíno e ruminantes;
- Cotiledonária: ruminantes ;
- Zonária: carnívoros;
- Discoidal: primatas, roedores e coelho.



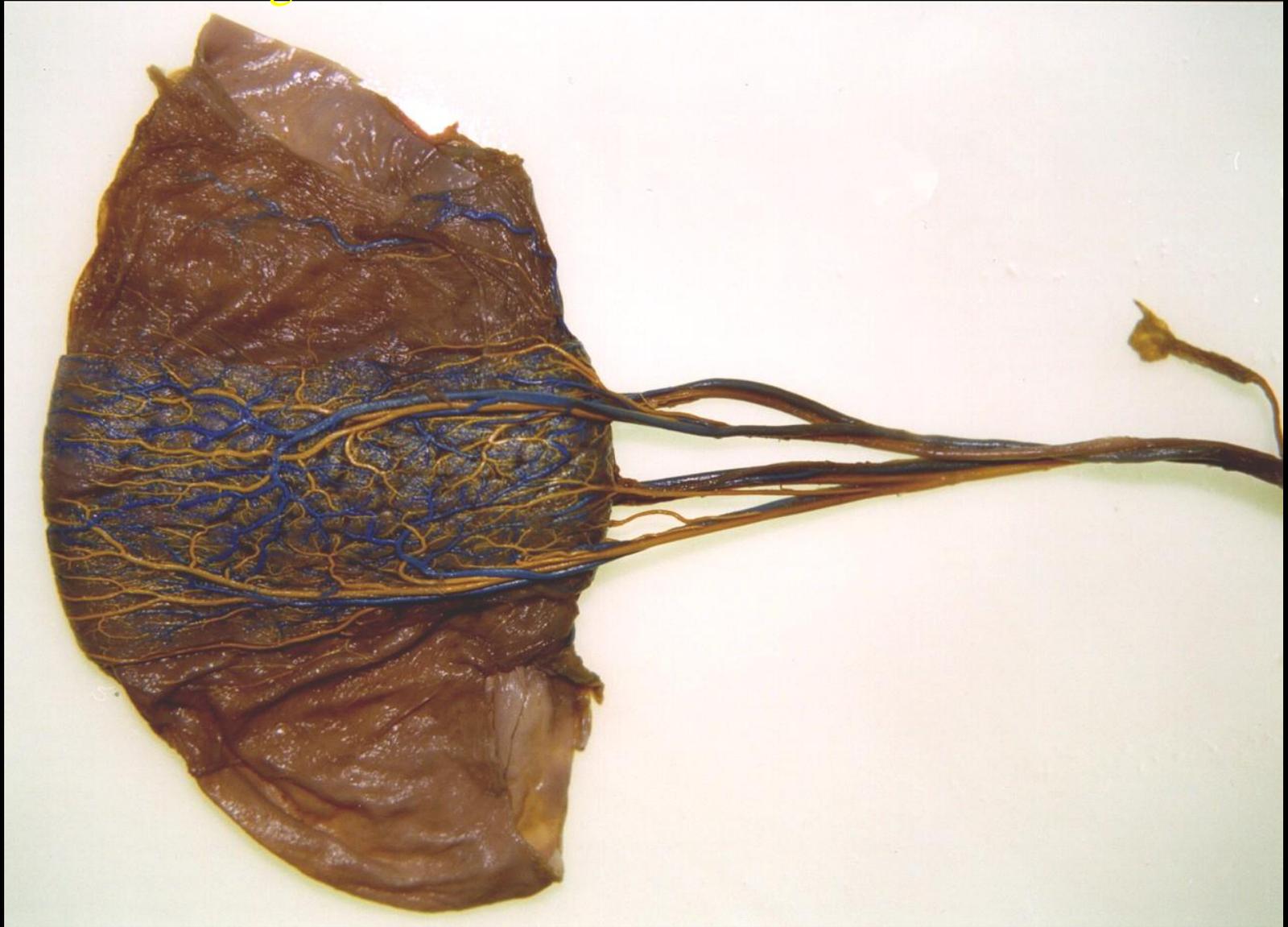
Leiser e Kaufmann, 1994

Placenta bovina



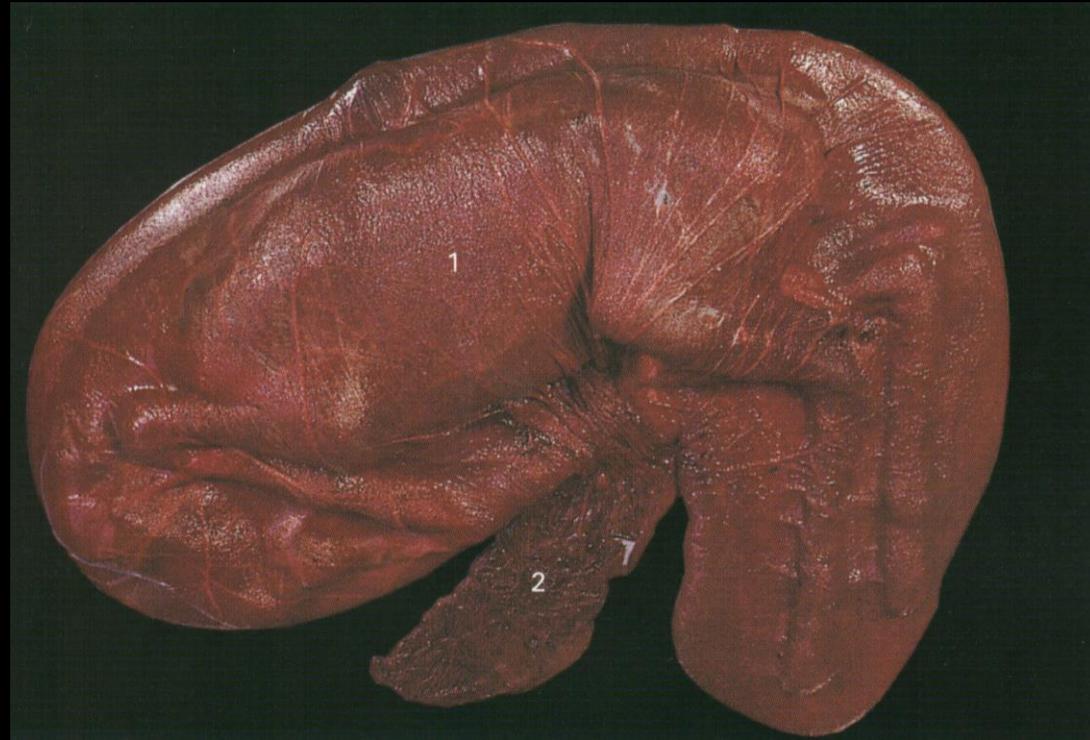
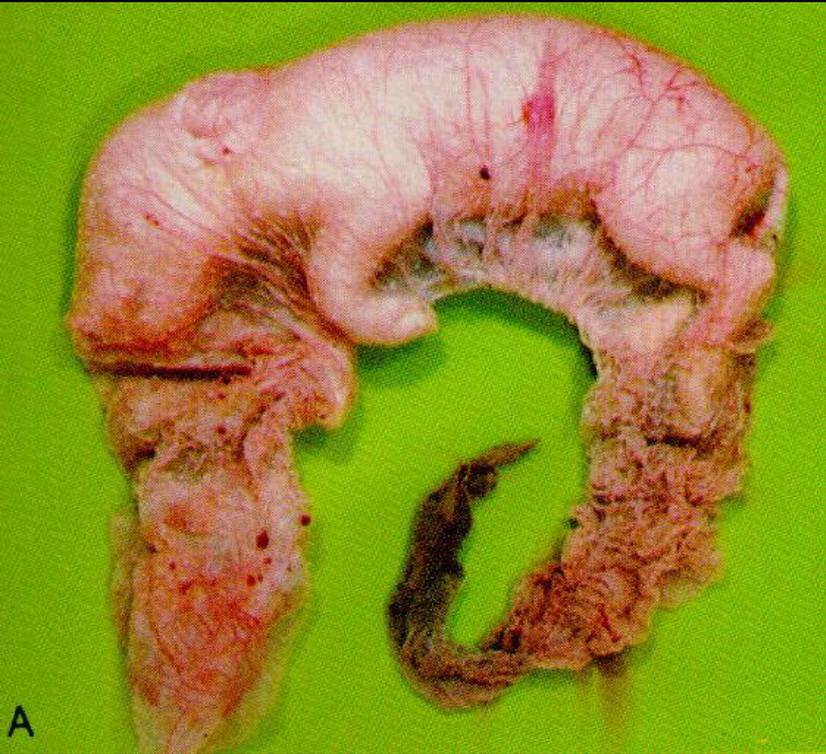
Fonte: Dominique Pereira da Silva, 2002

Placenta de gata



Fonte: Ambrósio *et al*, 2000

Placenta suína



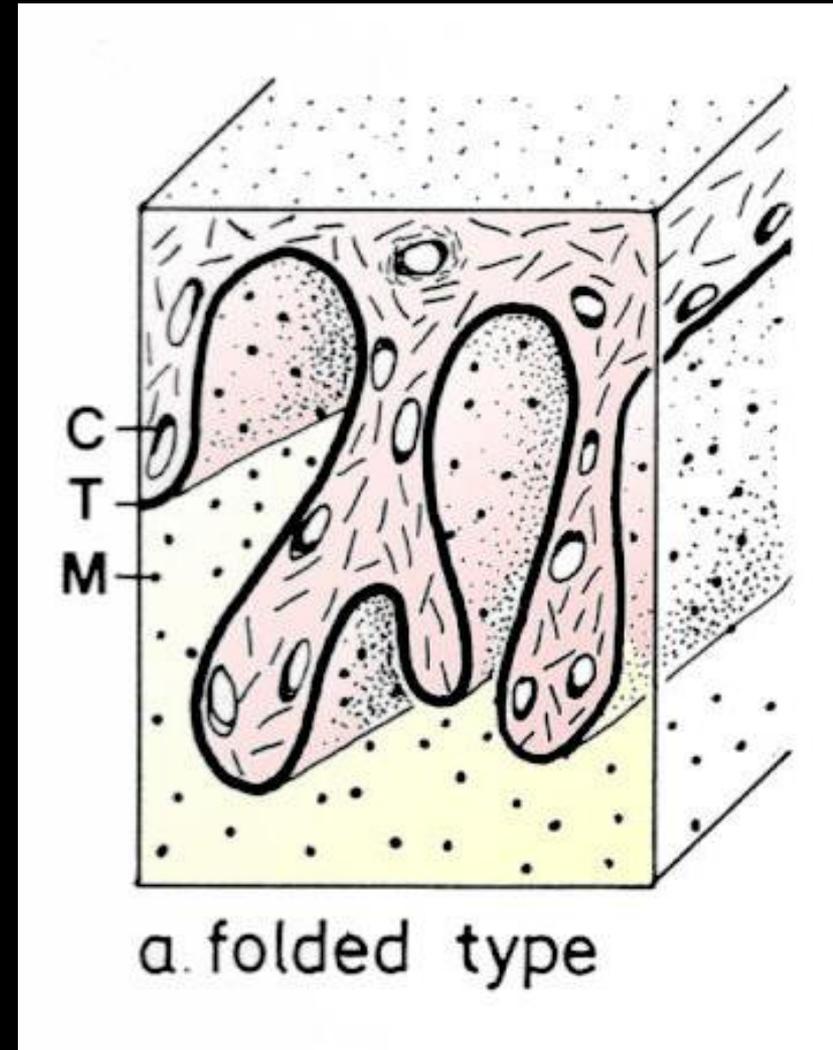
Fonte: Dyce, 2010

3- Modelos de interdigitação materno-fetal

- Pregueada – suínos
- Lamelar – carnívoros
- Vilosa – ruminantes e humanos
- Labiríntica – roedores e insetívoros, morcegos, lagomorfos e alguns primatas.

3- Modelos de interdigitação materno-fetal

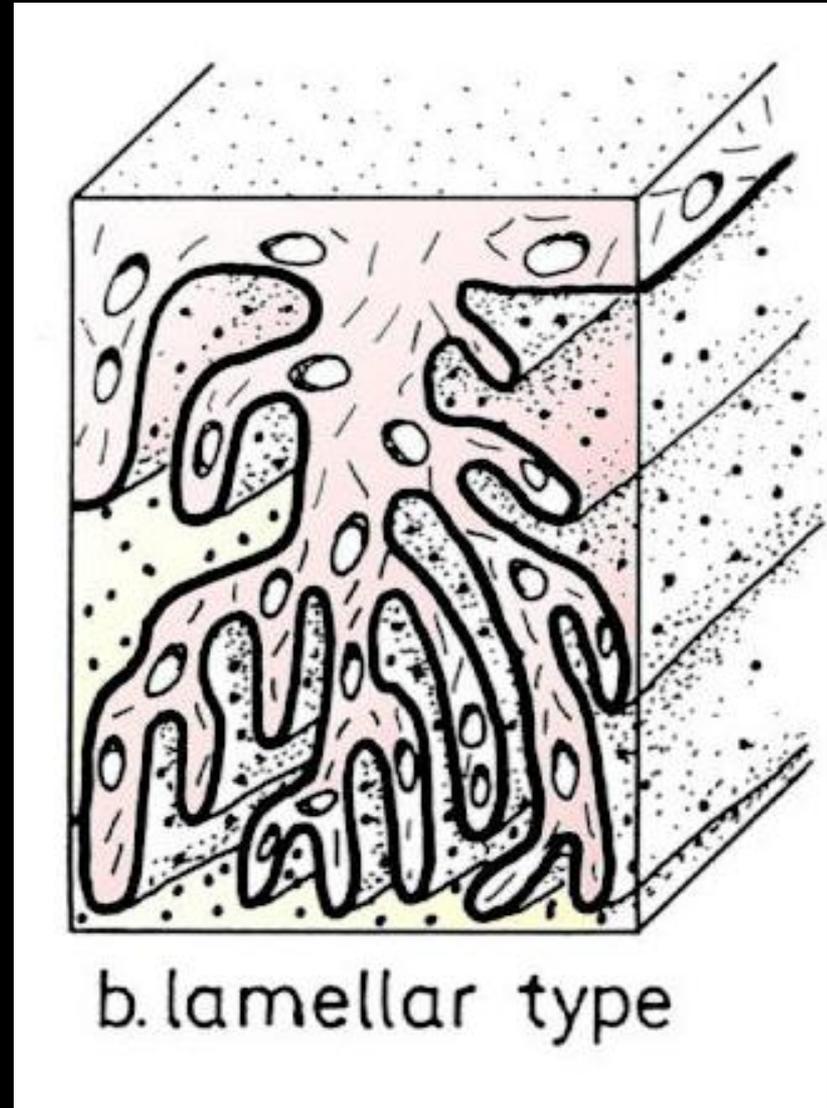
- Pregueada – pregas da mucosa uterina e trofoblasto se interdigitam
 - suínos (MacDonald e Bosna, 1985).
(Leiser e Kaufmann, 1994)



3- Modelos de interdigitação materno-fetal

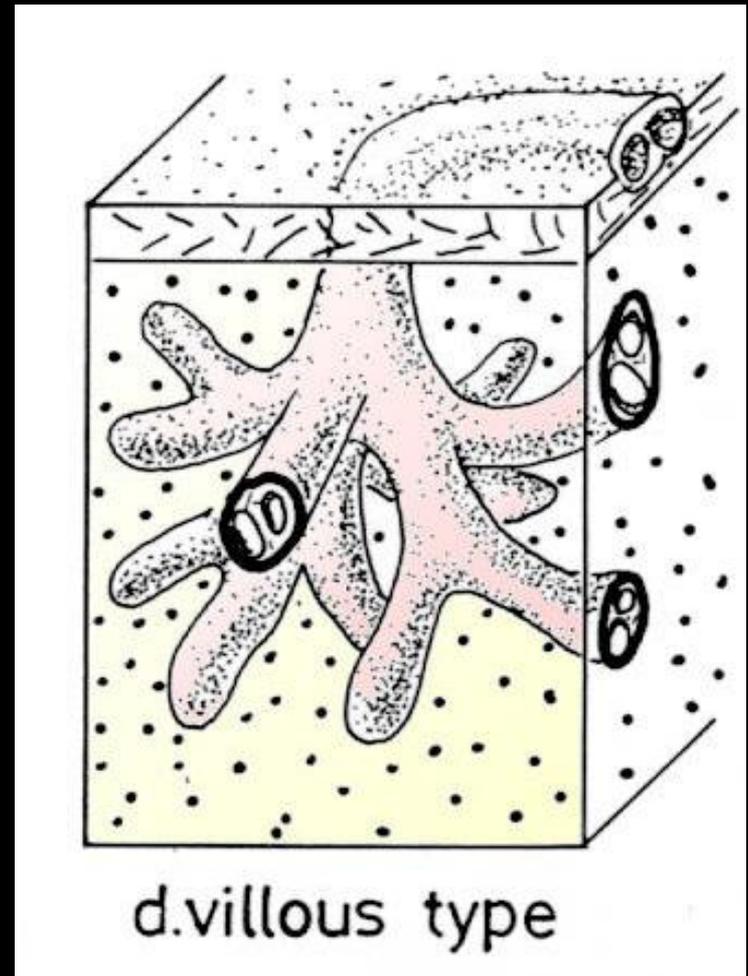
- Lamelar – pregas mais complexas com múltiplas ramificações
 - Carnívoros (Leiser e Koob, 1993)
 - Primatas (Boyd e Hamilton, 1970)

(Leiser e Kaufmann, 1994)



3- Modelos de interdigitação materno-fetal

- **Vilosa** – formam-se árvores vilosas
 - ruminantes e humanos

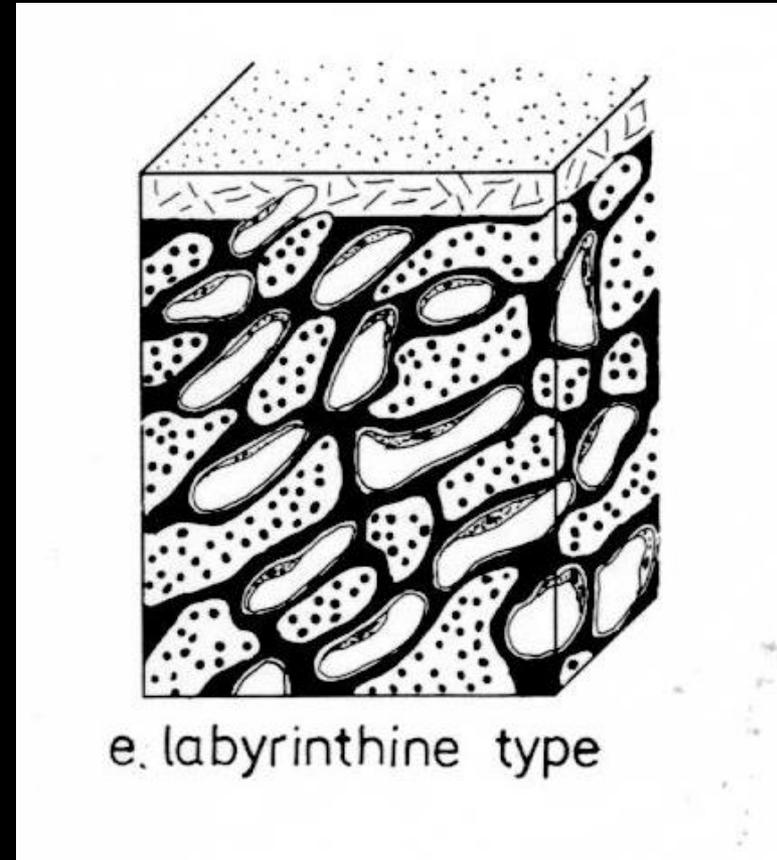


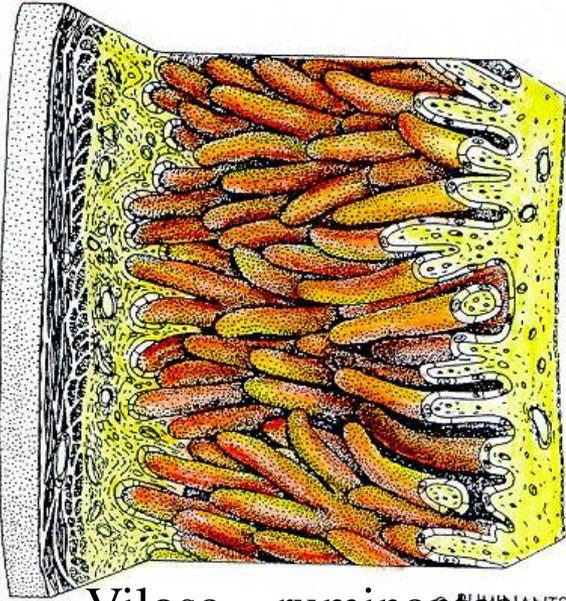
(Leiser e Kaufmann, 1994)

3- Modelos de interdigitação materno-fetal

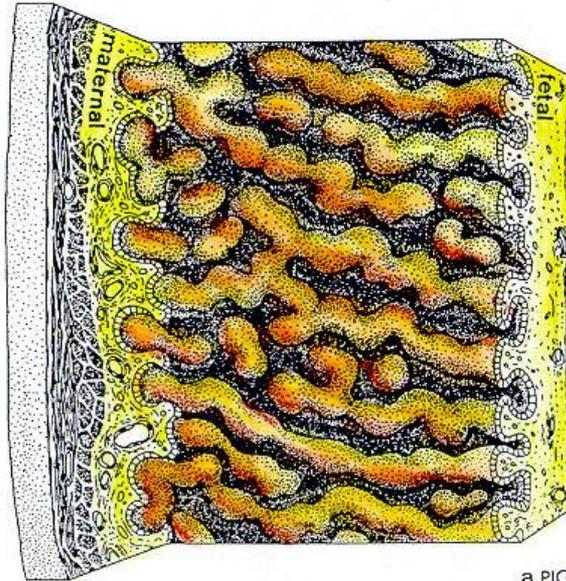
- Labiríntica – cório penetrado por lacunas ou canais
 - Roedores (Kaufmann e Davidoff, 1977)
 - Insetívoros (Malassiné e Leiser, 1984)
 - Morcegos (Winsatt e Enders, 1980)
 - Lagomorfos (Mossman, 1937)
 - Alguns primatas (Ramsey, 1982)

(Leiser e Kaufmann, 1994)

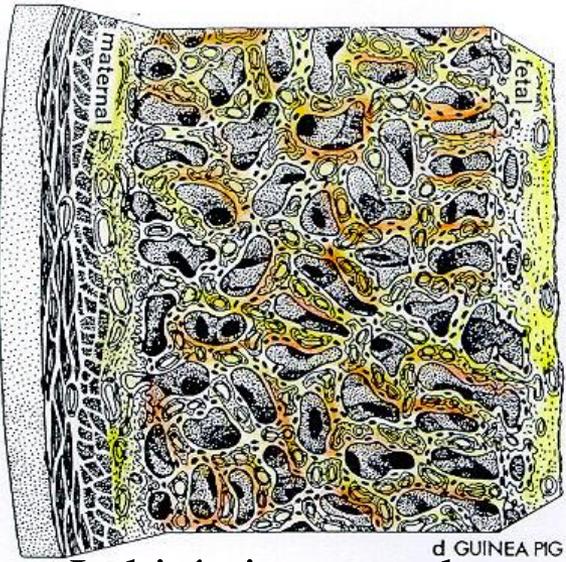




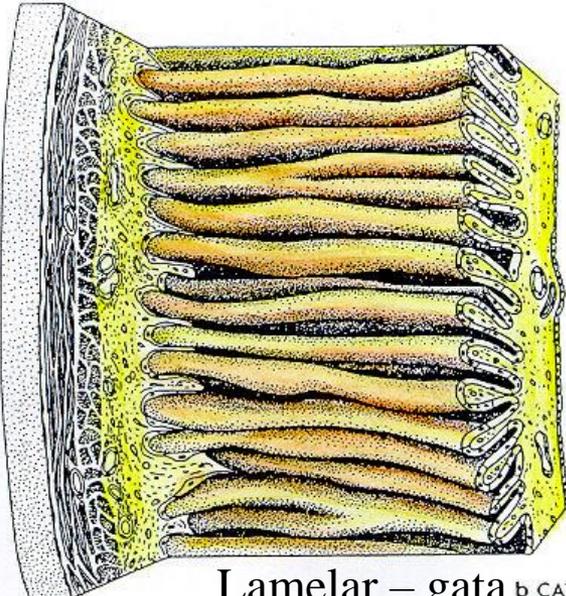
Vilosa – ruminantes



Pregueada – suínos ^a PIG



Labiríntica – roedores ^d GUINEA PIG



Lamelar – gata ^b CAT

(Leiser e Kaufmann, 1994)

4- Camadas da barreira interhemática

- Epiteliocorial – suíno e equino;
- Sindesmocorial/sinepiteliocorial – ruminantes;
- Endoteliocorial – cão e gato;
- Hemocorial – homem e roedores.

4- Camadas da barreira interhemática

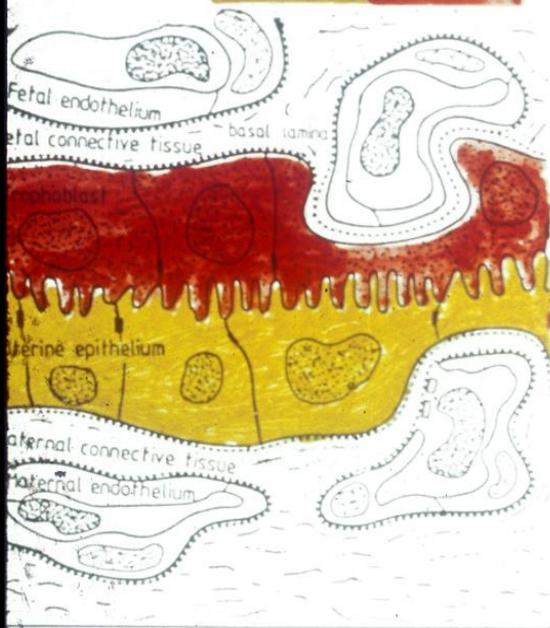
Vaso materno com sangue dentro → os nutrientes e oxigênio atravessam em primeiro lugar:

- 1) Endotélio do vaso materno (epitélio simples pavimentoso);
- 2) Membrana basal do vaso materno;
- 3) Estroma endometrial (tecido conjuntivo do útero);
- 4) Membrana basal do epitélio uterino;
- 5) Epitélio uterino;
- 6) Epitélio do trofoblasto (feto);
- 7) Membrana basal do trofoblasto;
- 8) Mênquima fetal (tecido conjuntivo do feto);
- 9) Membrana basal do vaso fetal;
- 10) Endotélio do vaso fetal.

■ Mãe

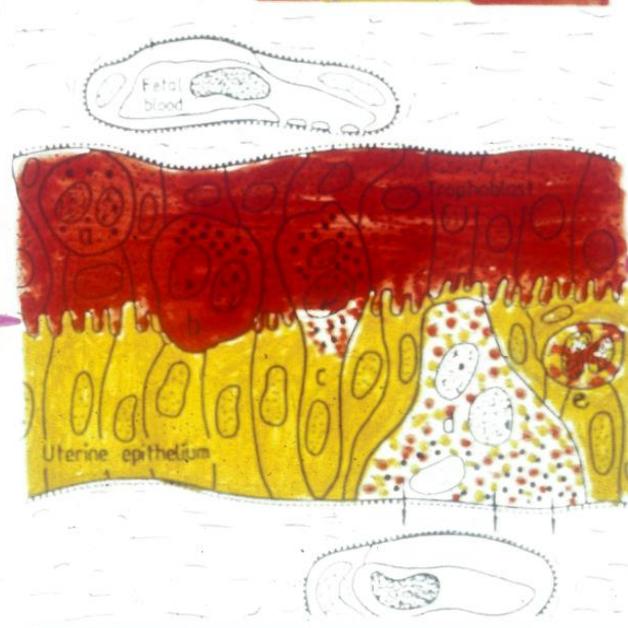
■ Feto

1. Placenta epitheliochorialis



Horse, Pig

IV. 2. Placenta synepitheliochorialis



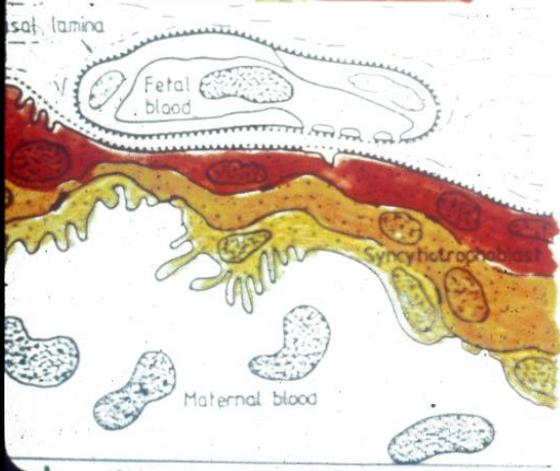
Ruminants (Cow, Sheep, Goat)

IV. 3. Placenta endotheliochorialis

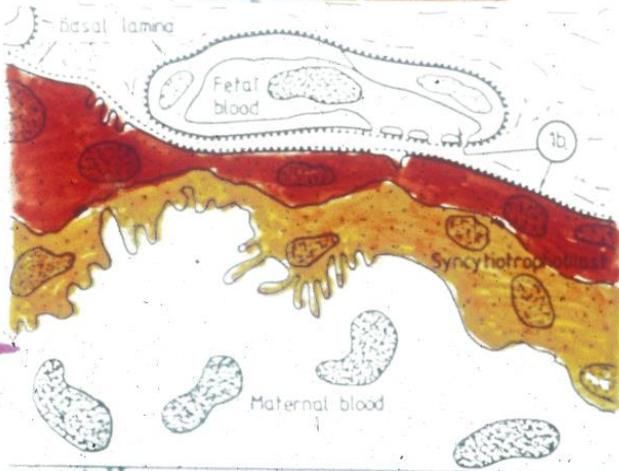


Carnivora

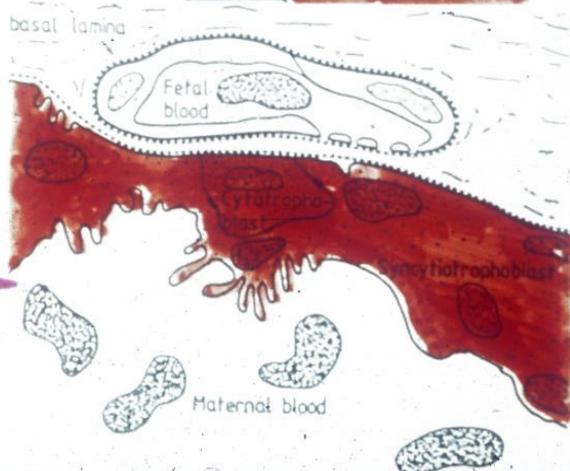
IV. 4.a. Pl. haemotrichorialis



IV. 4.b. Pl. haemodichorialis

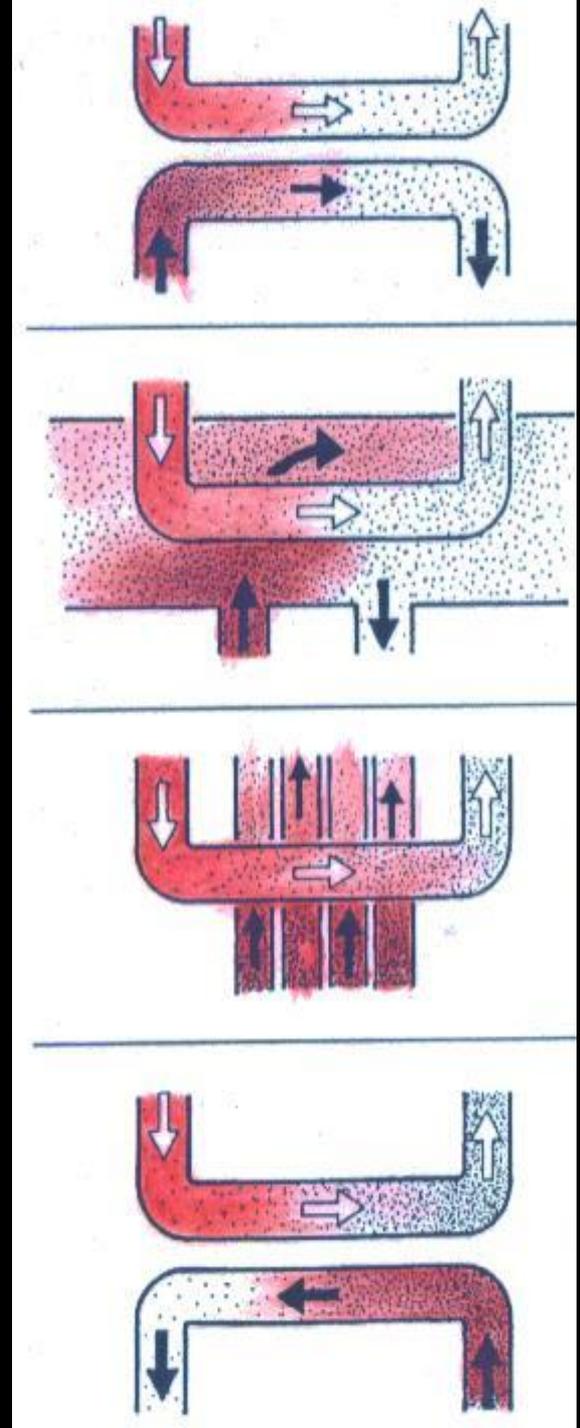


IV. 4.c. Pl. haemomonochorialis



5- Modelos de inter-relação de fluxo sanguíneo materno-fetal

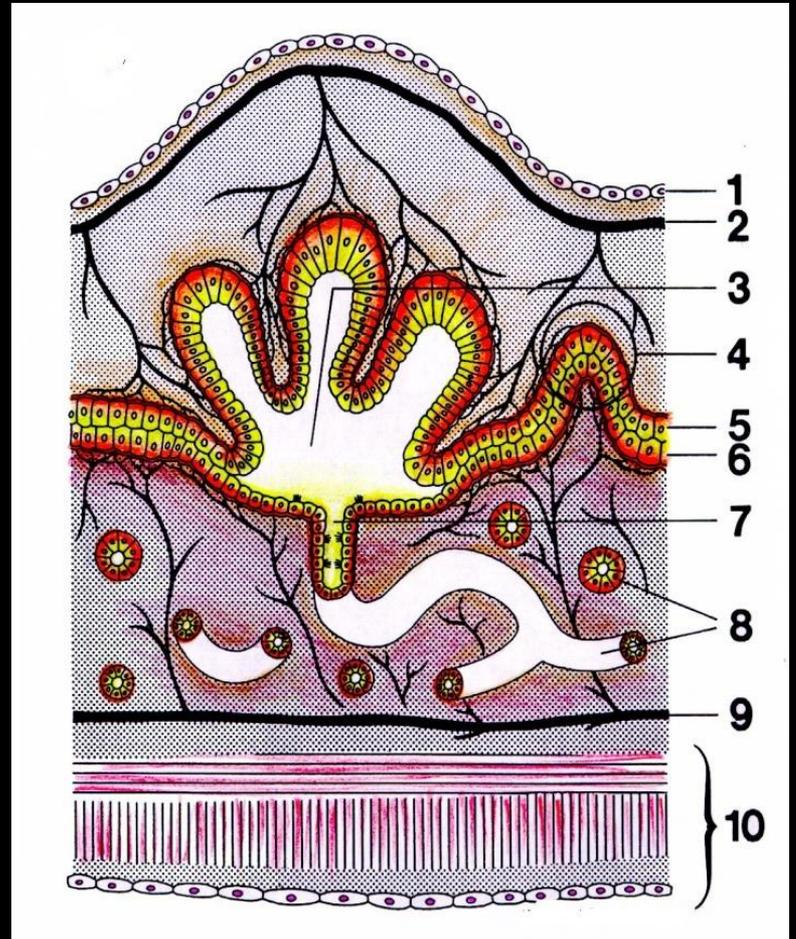
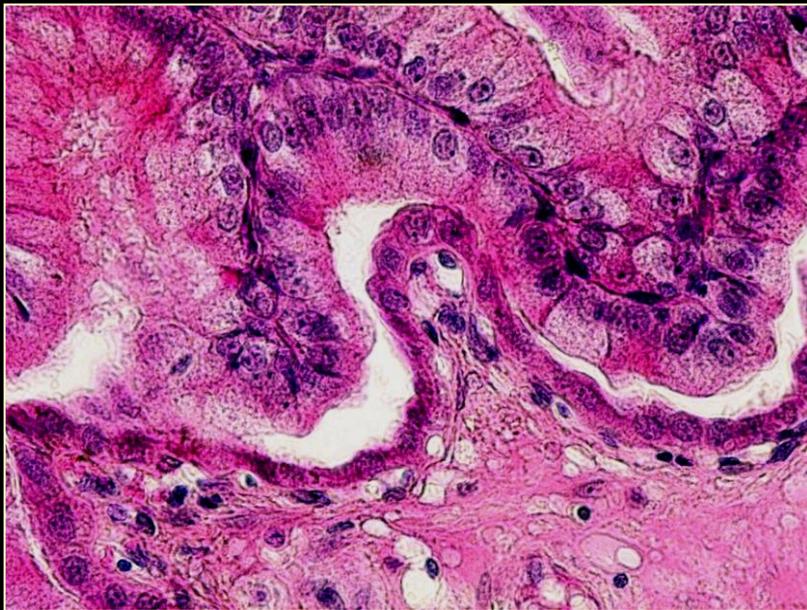
- Concorrente – fluxo paralelo
- Multiviloso
- Corrente-cruzada
- Contra-corrente – sentidos opostos



Placenta em suínos

- Placenta corioalantóidea permanente;
- Difusa, completa e ampla;
- Pregueada;
- Epiteliocorial;
- Sem invasão trofoblástica;
- Separação total das membranas ao parto;
- Fluxo de corrente-cruzada.



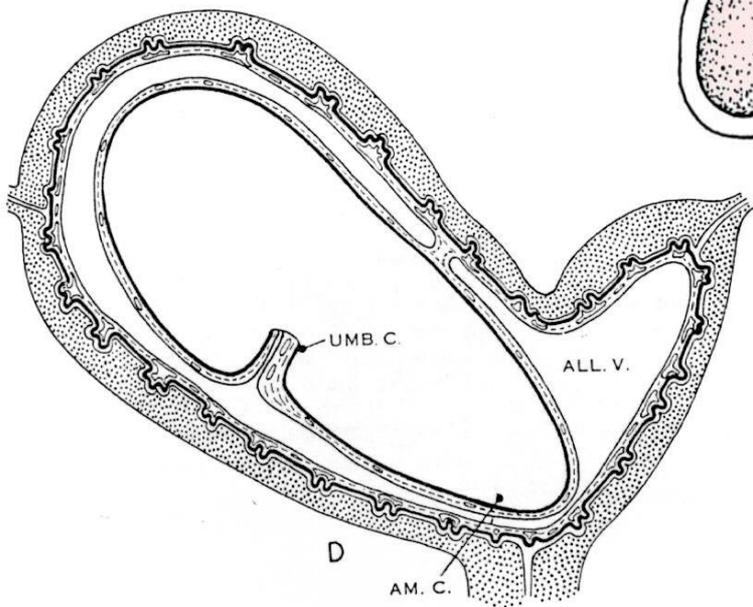
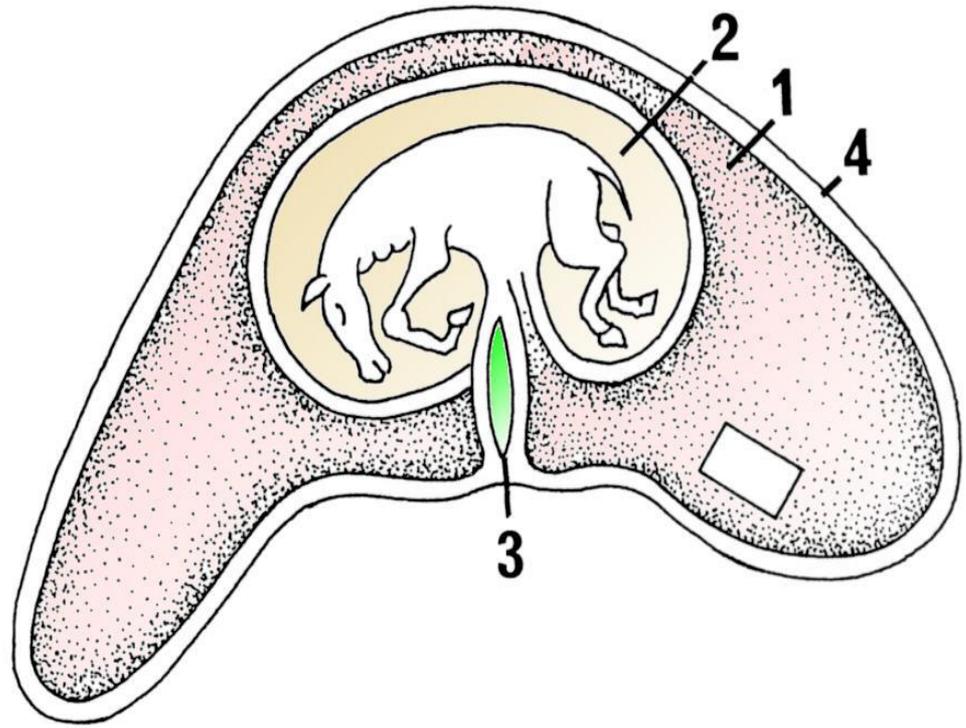
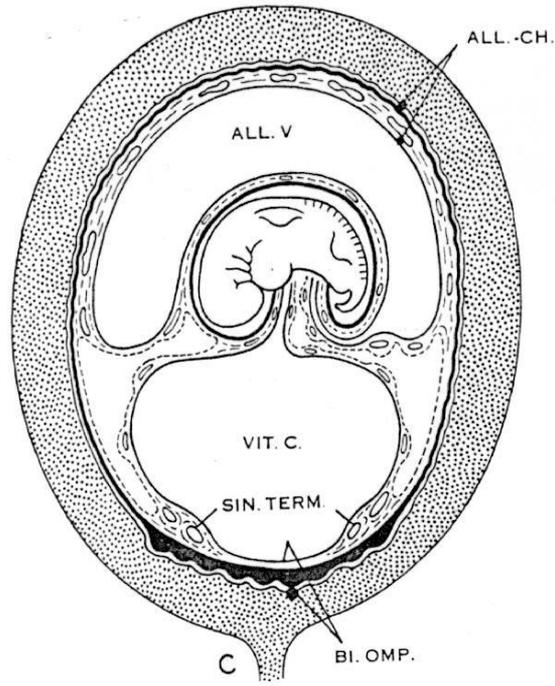


Placenta em equinos

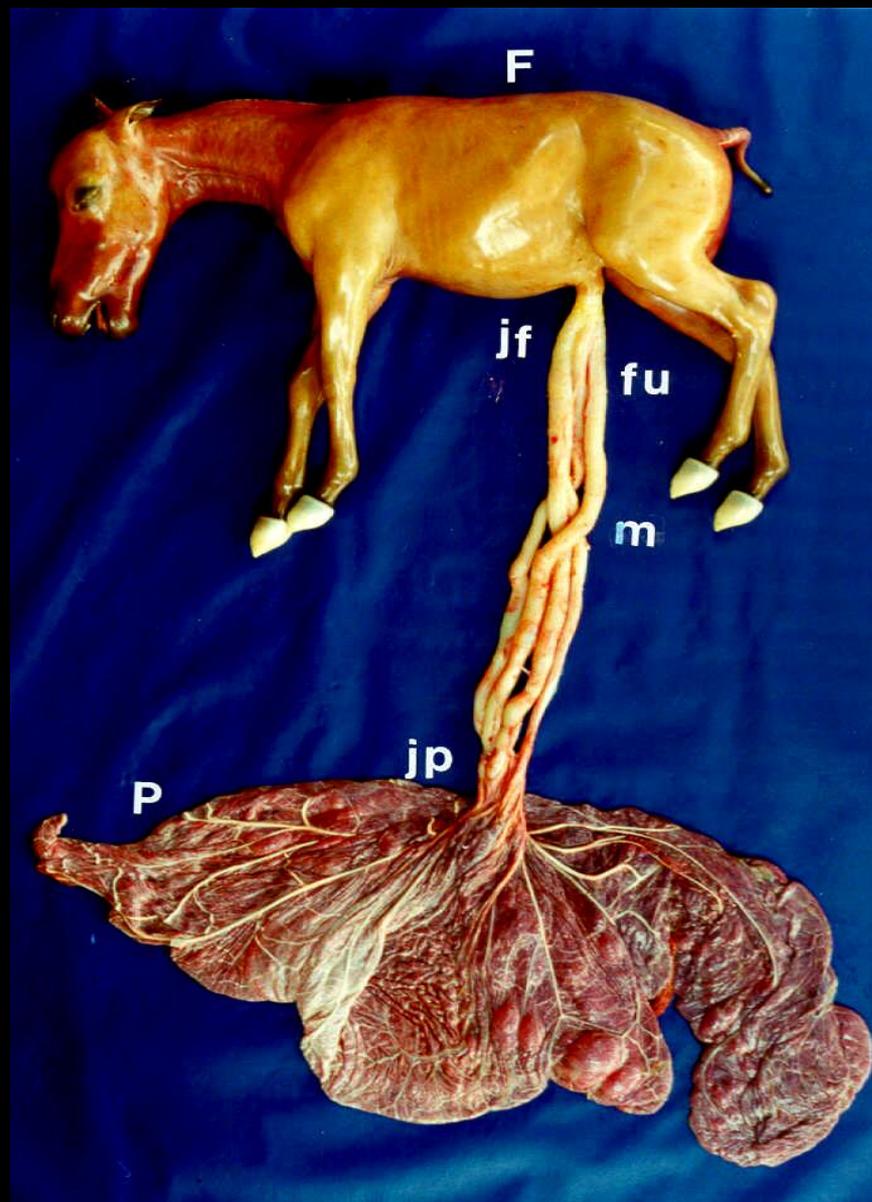
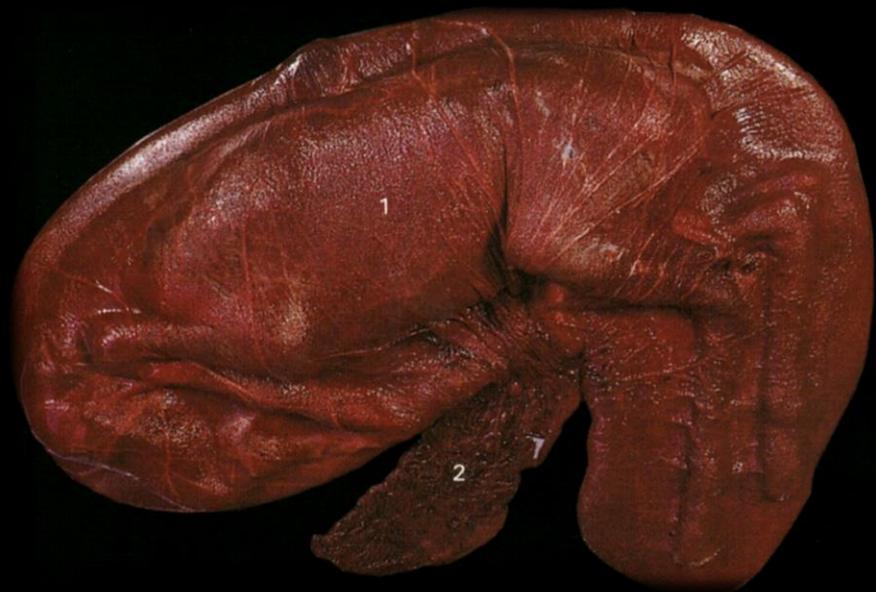
- Coriovitelina e Corialantóidea
- Difusa
- Vilosa
- Epiteliocorial
- Fluxo multiviloso



HORSE



Eqüino - Mossman, 1937

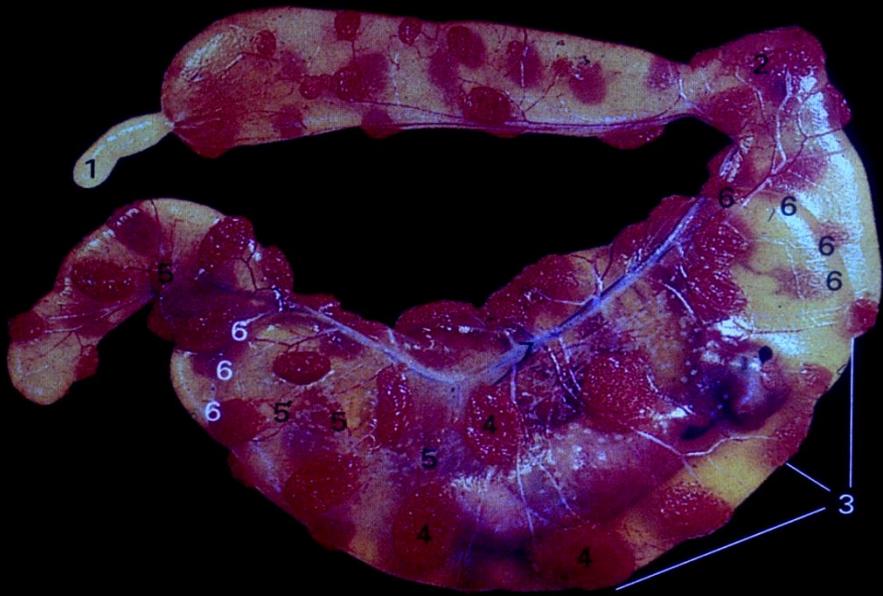
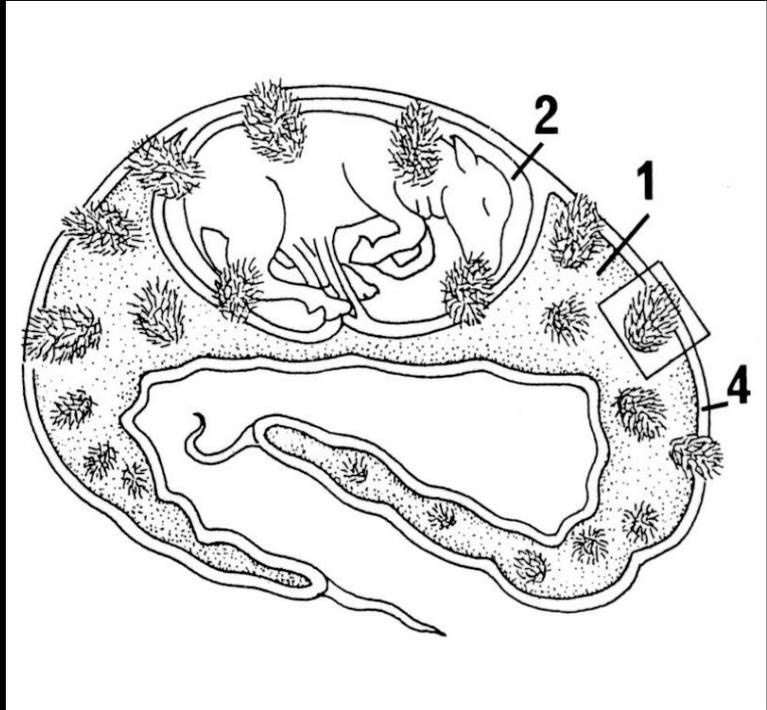


Placenta em ruminantes



- Corioalantóide
- Saco vitelino regride totalmente
- Sinepiteliocorial – células gigantes
- Cotiledonária
 - 80 a 90 placentônios em vacas
 - 85 em ovinos
 - 85-90 em caprinos
 - 3 a 8 em cervídeos



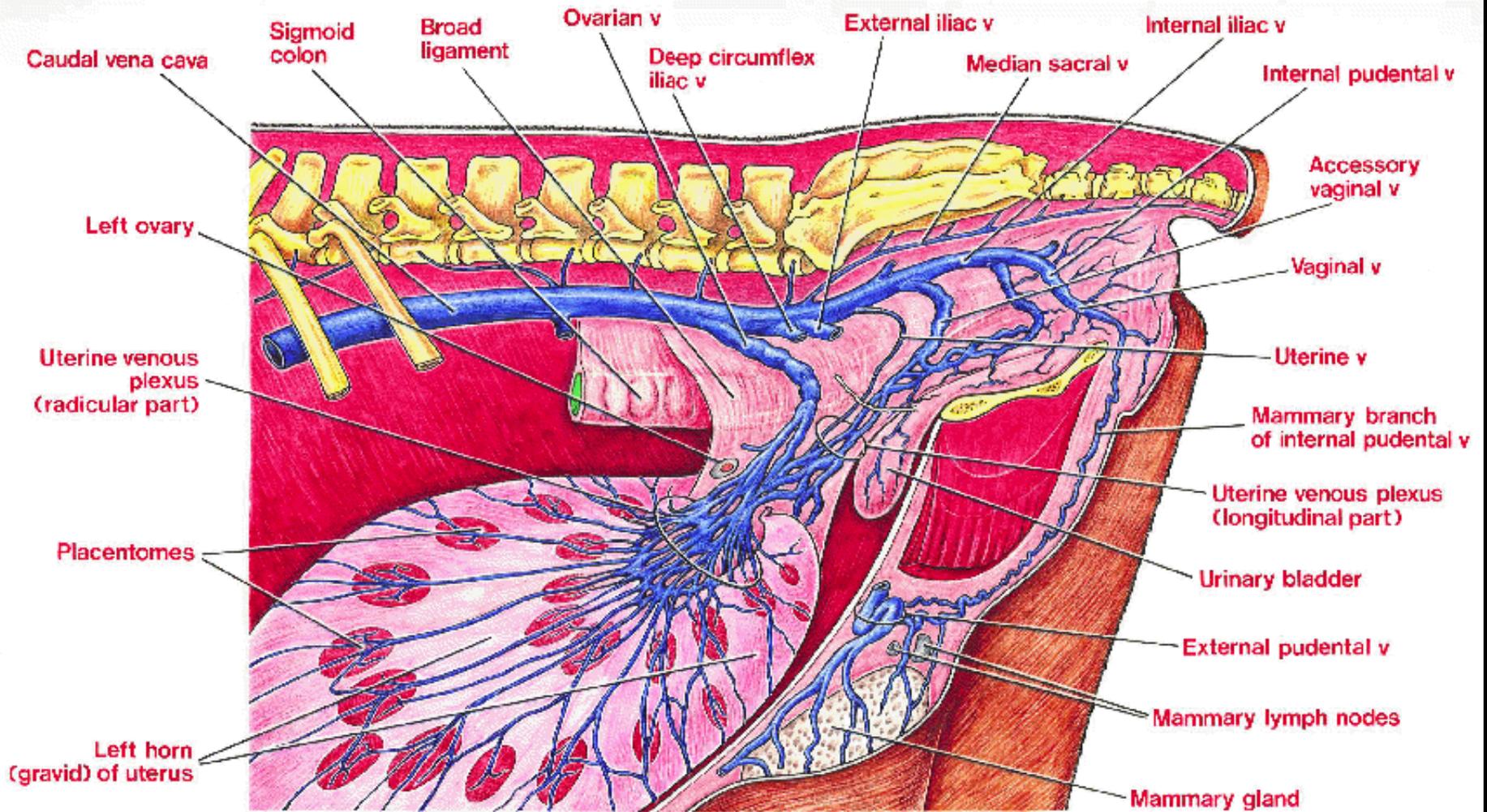


Dyce K M , 2010

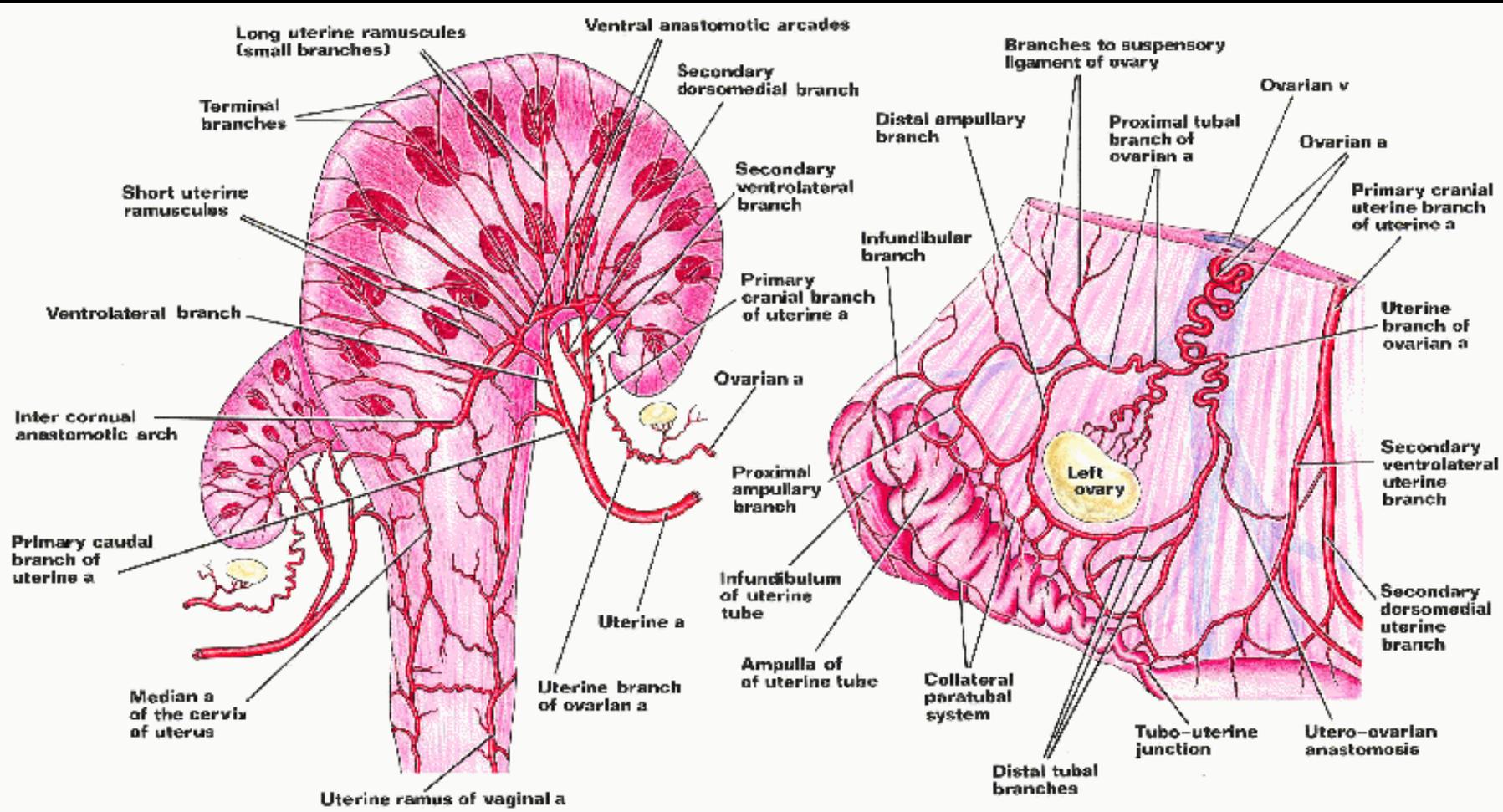
Placenta em carnívoros

- Corialantóide
- Coriovitelina em 10% da superfície (gatos)
- Zonária
- Lamelar
- Endoteliocorial
- Moderada reação celular decidual
- Fluxo corrente cruzada



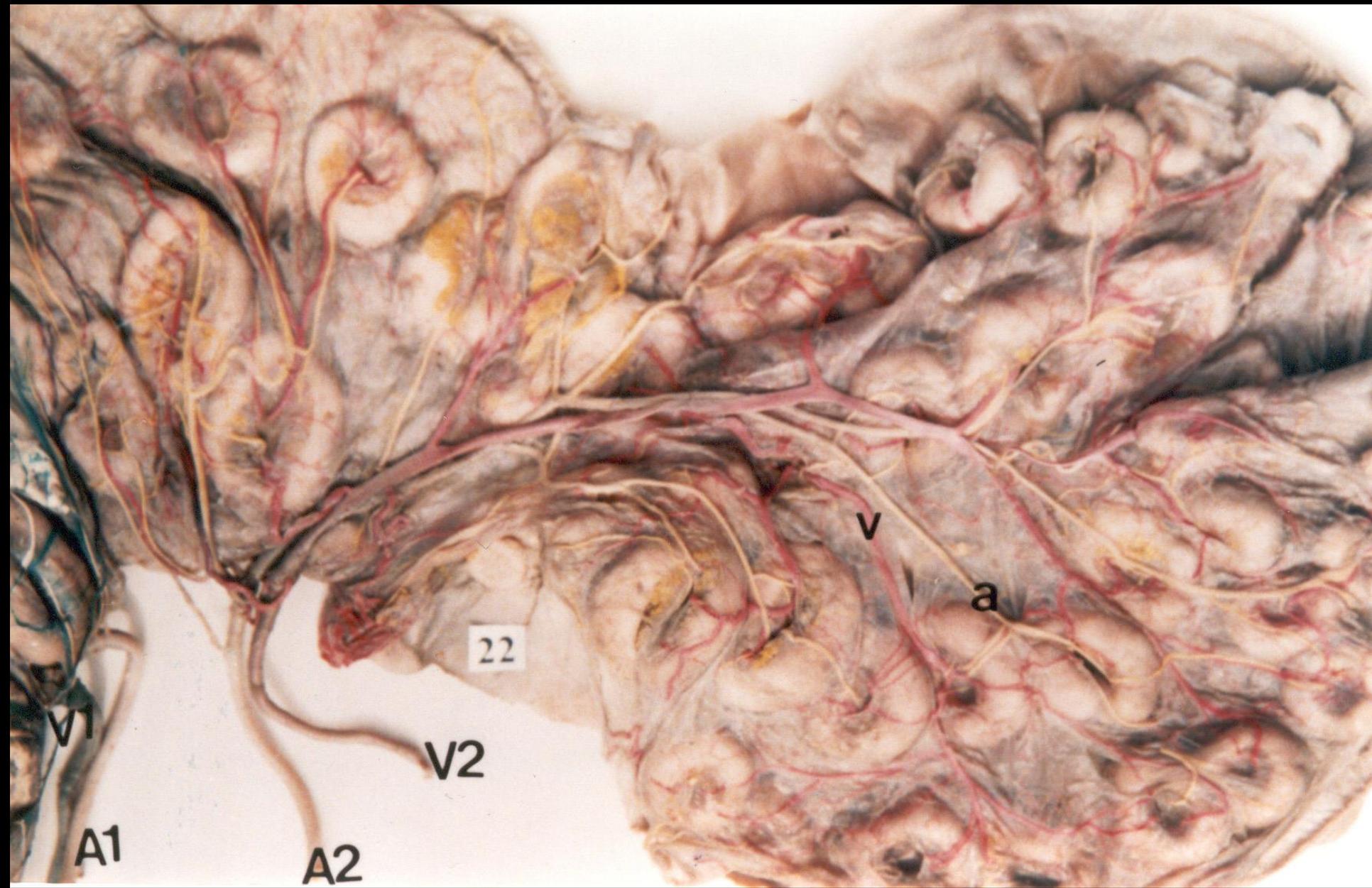


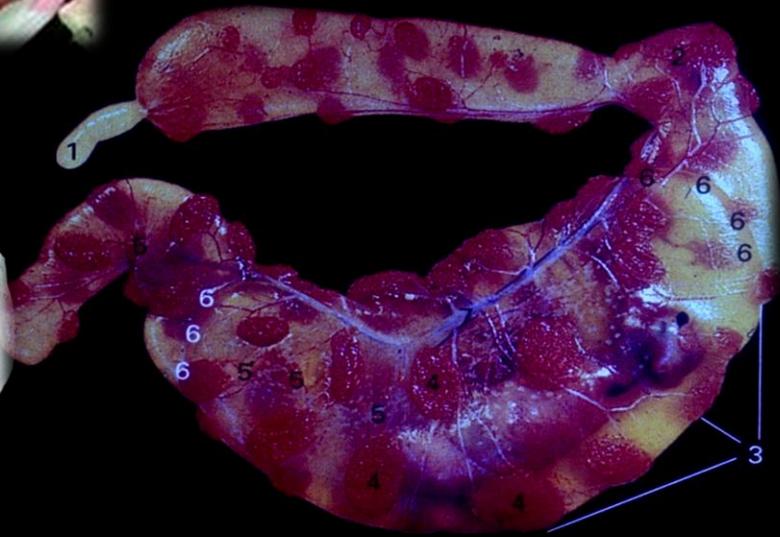
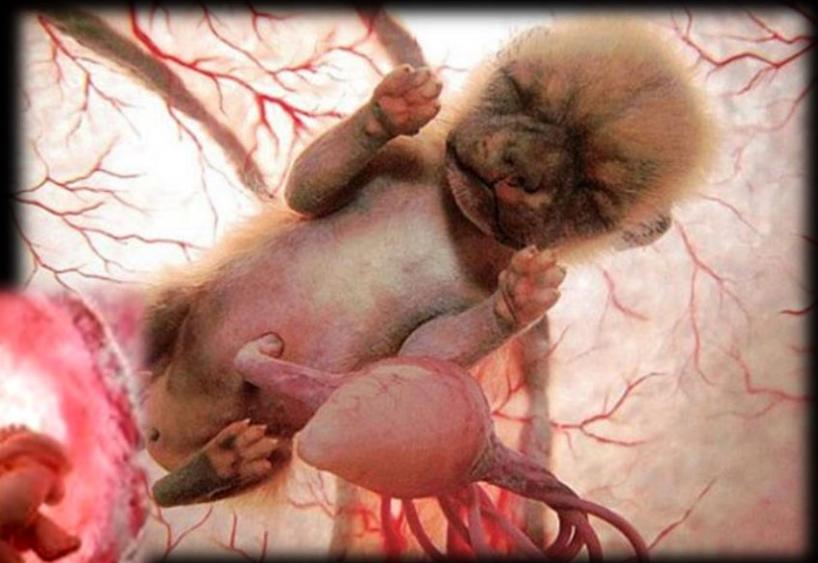
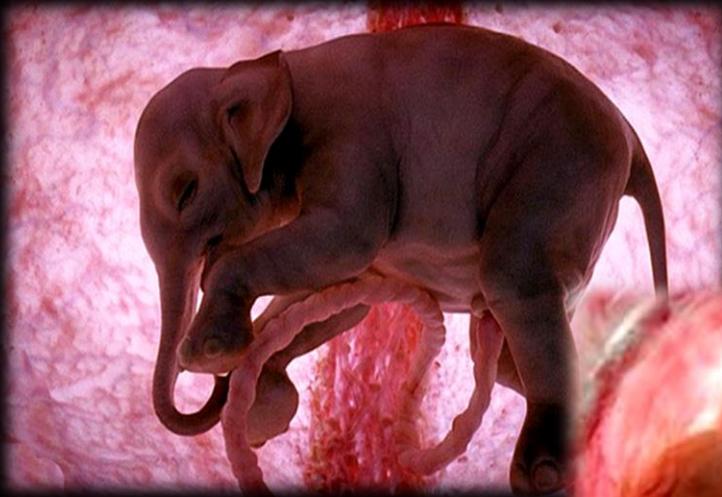
VENOUS DRAINAGE FROM LEFT HORN (GRAVID) OF BOVINE UTERUS, VAGINA, & LEFT SIDE OF UDDER NEAR END OF GESTATION



Ventral aspect of left horn of uterus (gravid) of cow showing arterial supply

Arteries to left ovary, uterine tube & apex of left uterine horn of cow





OBRIGADO!