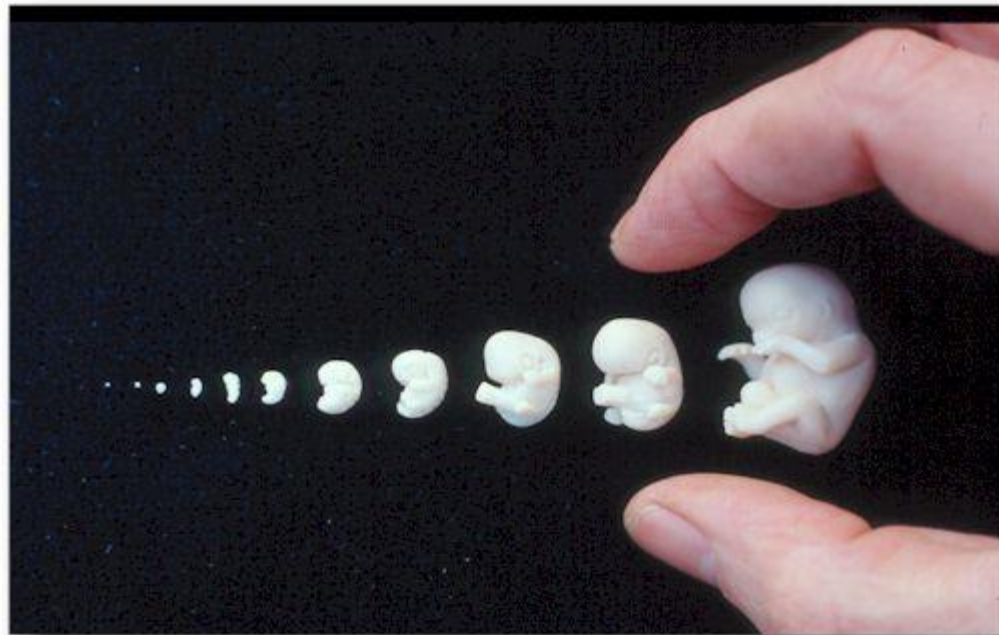


EMBRYOLOGI

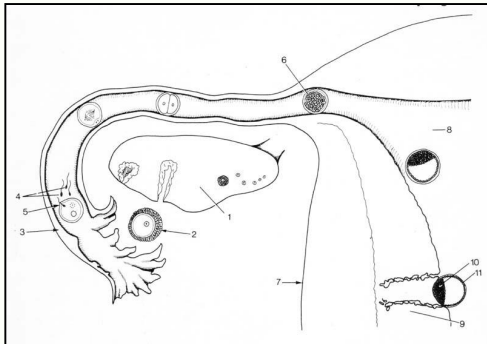
**- fra stamceller til
makroanatomi**



EMBRYOLOGI – stamcelle.. ?



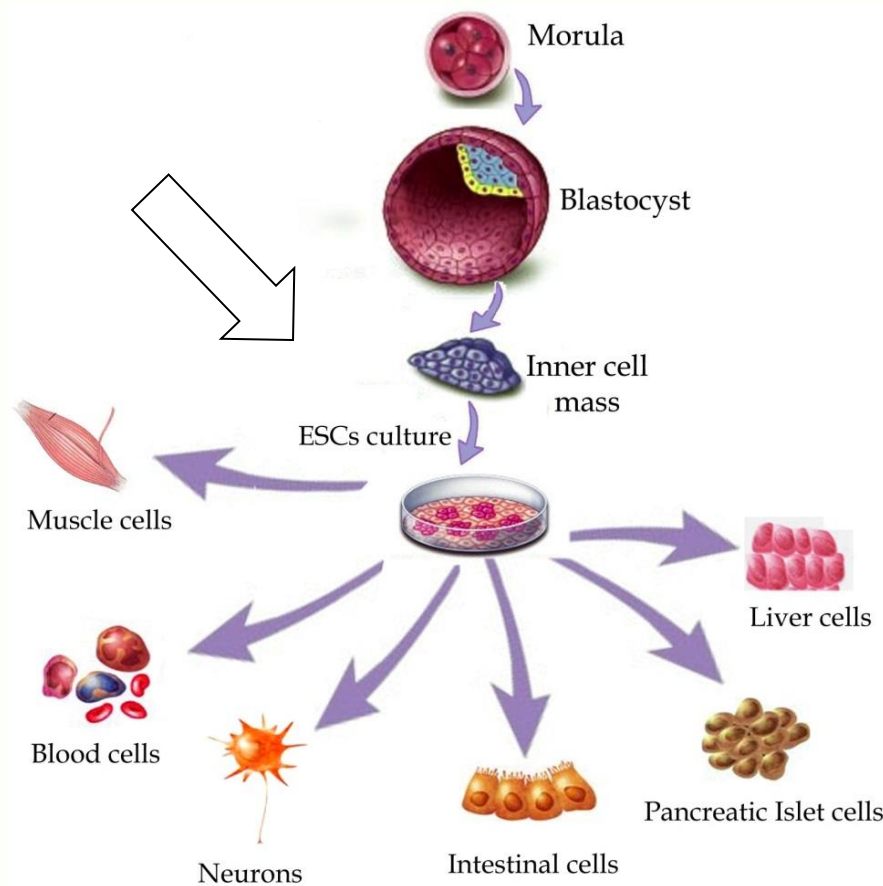
Stamceller (mikroanatomi)



Stamceller deles ofte op i to grupper:

- *'Voksne stamceller' - adult stem cells*
 - Specialiserede celler
 - Hos børn og voksne
 - Begrænset antal celledelinger
- *'Embryonale stamceller' - embryonic stem cells*
 - Kønsceller/befrugtede æg
 - Hos embryoen/fostret
 - Ubegrænset antal celledelinger

embryonale stamceller (mikroanatomi)

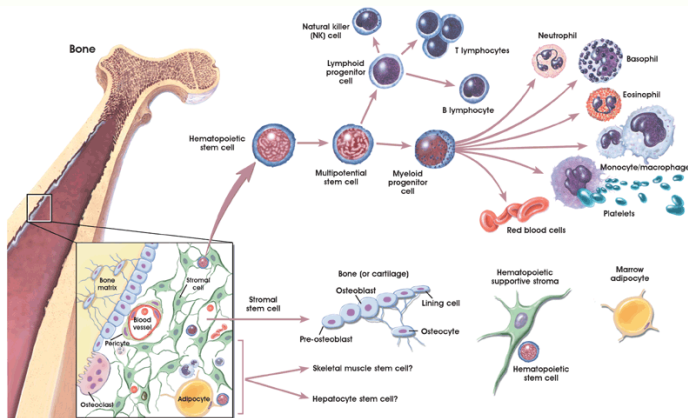


embryonale stamceller

- kan dele sig uden begrænsning (ESC)
- specialisere sig til alle vævstyper

Voksen stamceller (mikroanatomi)

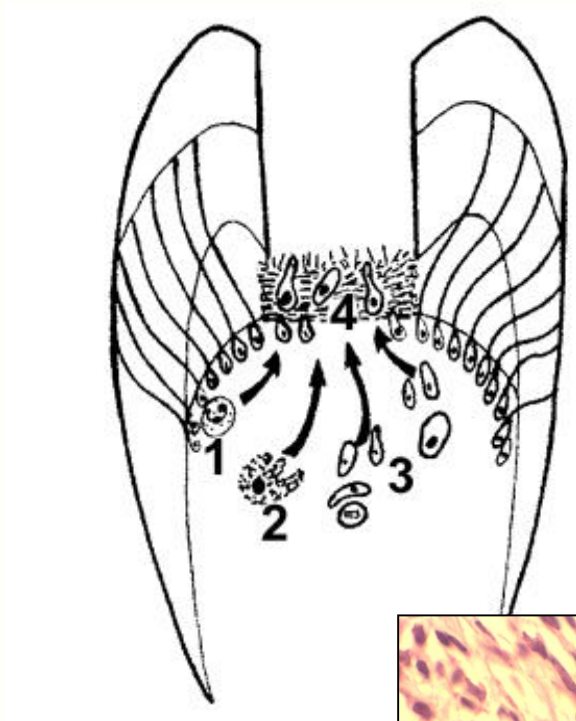
- Har et begrænset antal celledelinger
- Er ofte blandet med almindelige celler
- Er vævsspecifikke (programmerede)



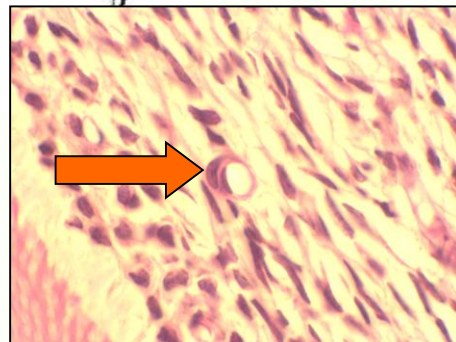
© 2001 Terese Winslow, Linda Kiblak

Gronthos S, Mankani M, Brahim J, Robey PG, Shi S. Postnatal human dental pulp stem cells (DPSCs) in vitro and in vivo. Proc Natl Acad Sci U S A 2000; 97:13625-13630.

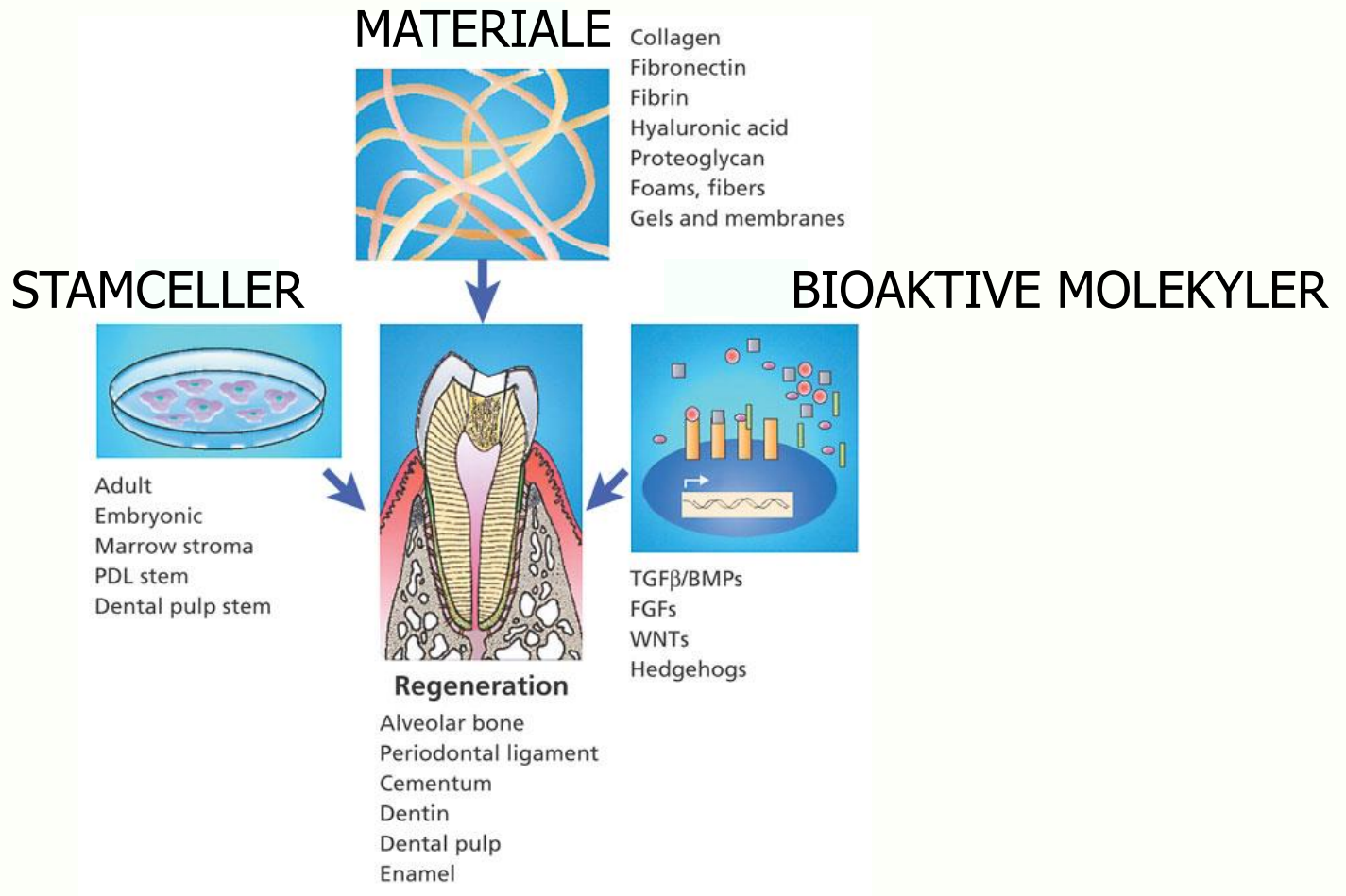
Voksen stamceller reparerer skader



- Efter vævskade ser vi stamcellers antal bliver øget og at de bevæger sig for at reparere defekten

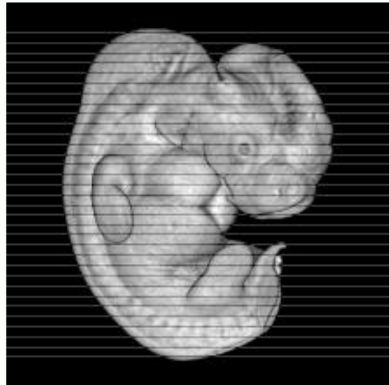


Biomedicinsk forskning (tissue engineering)...



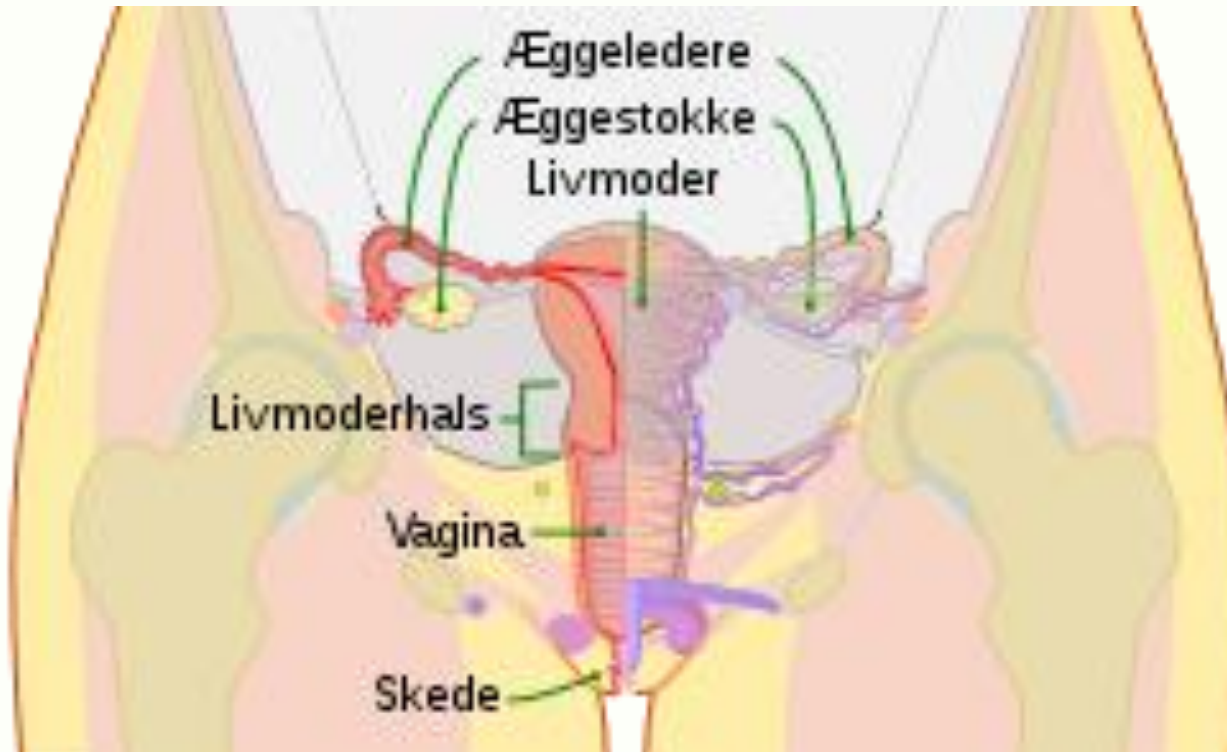


Fra befrugtning og til fosterets tidlige udvikling

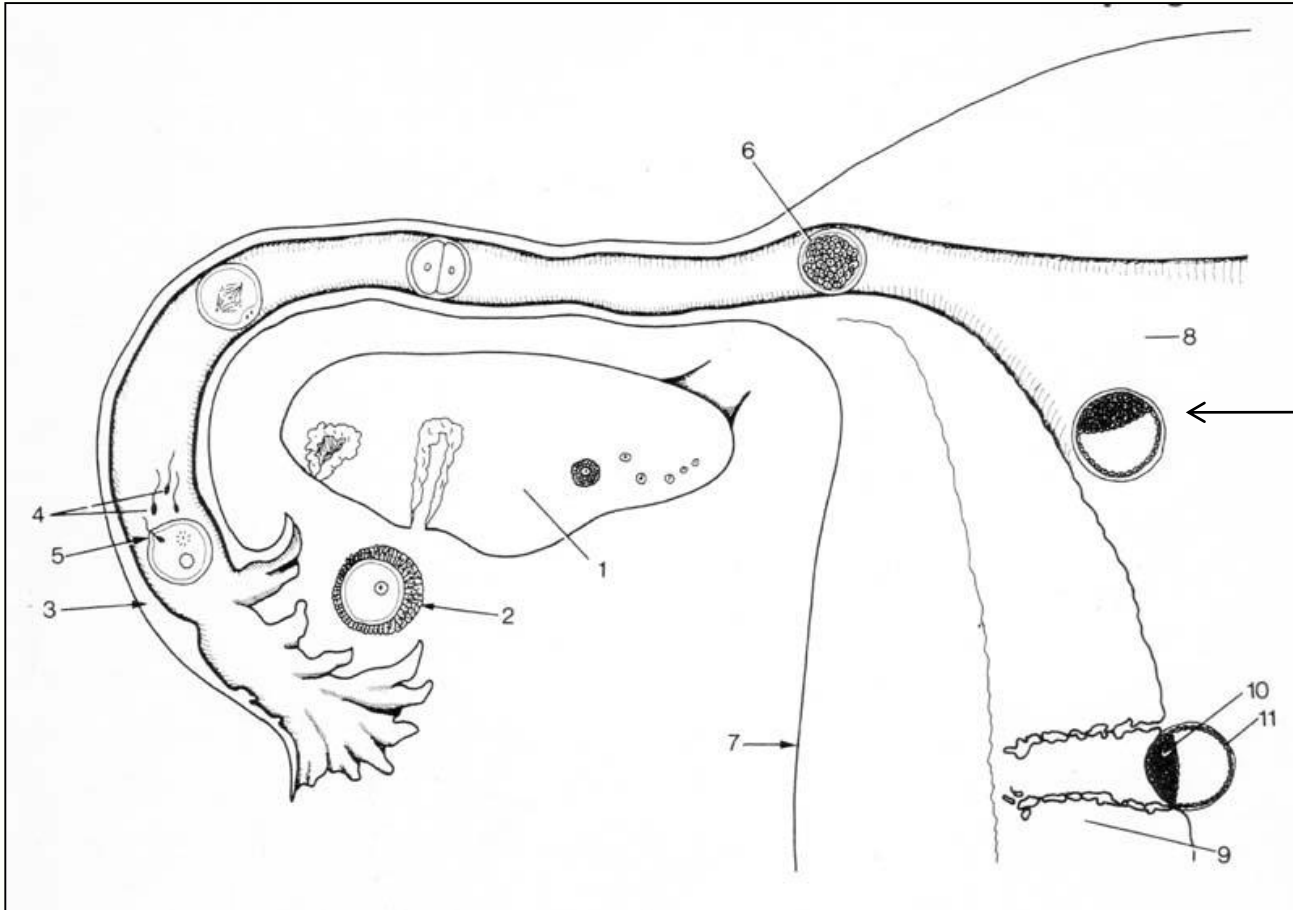


- FERTILISATION
- PLACENTA
- KIMSKIVEN
- FOSTRET

Ægløsning

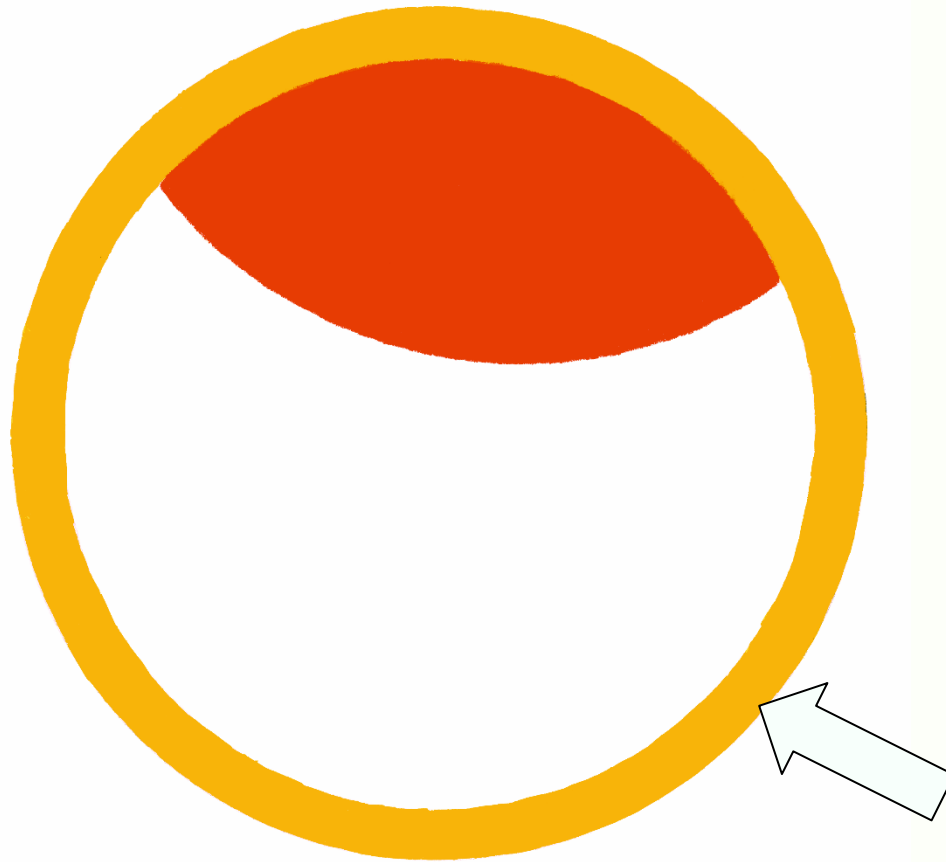


Fertilisation



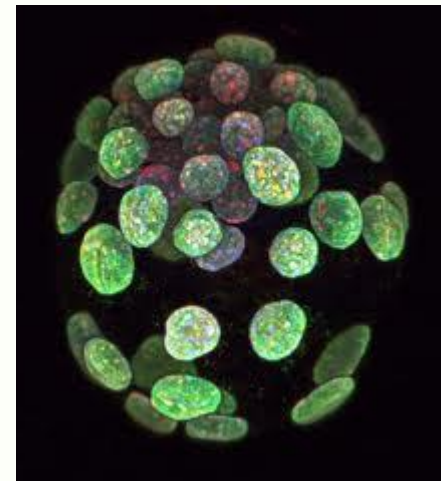
← "Blastocyst"

Blastocele - med en indre cellemasse



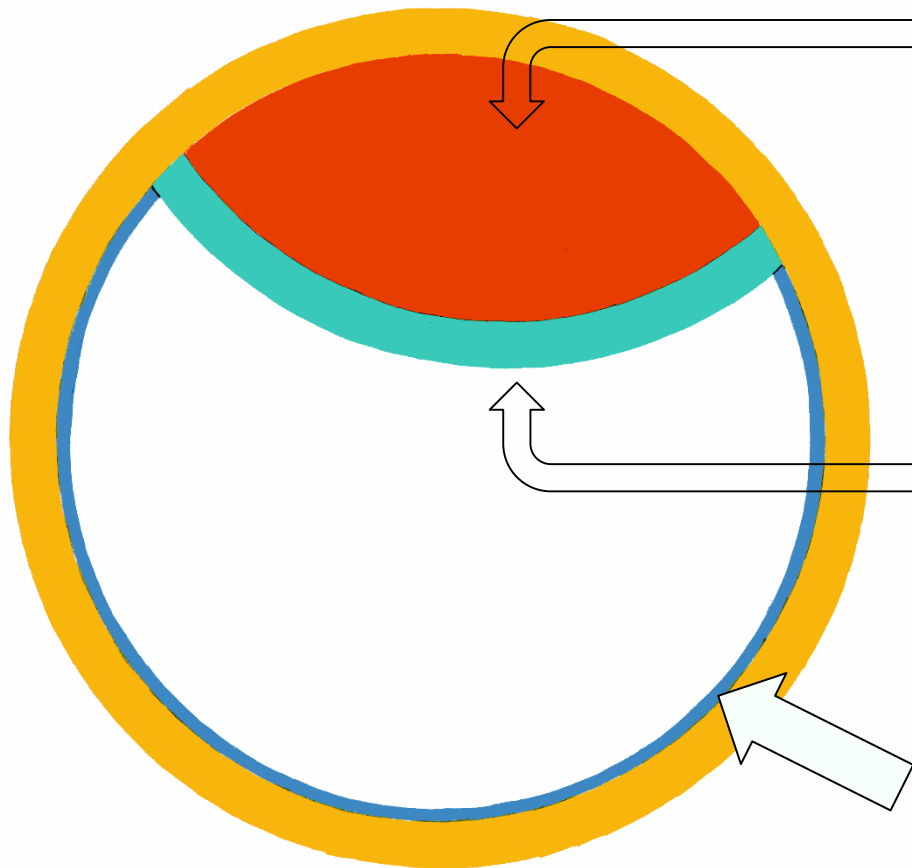
Blastocele

- *Indre cellemasse*
- *Trofoblaster omkring*



Omkransning af trofoblaster

Indre cellemasse udvikler to slags stamceller



Ectoderm:

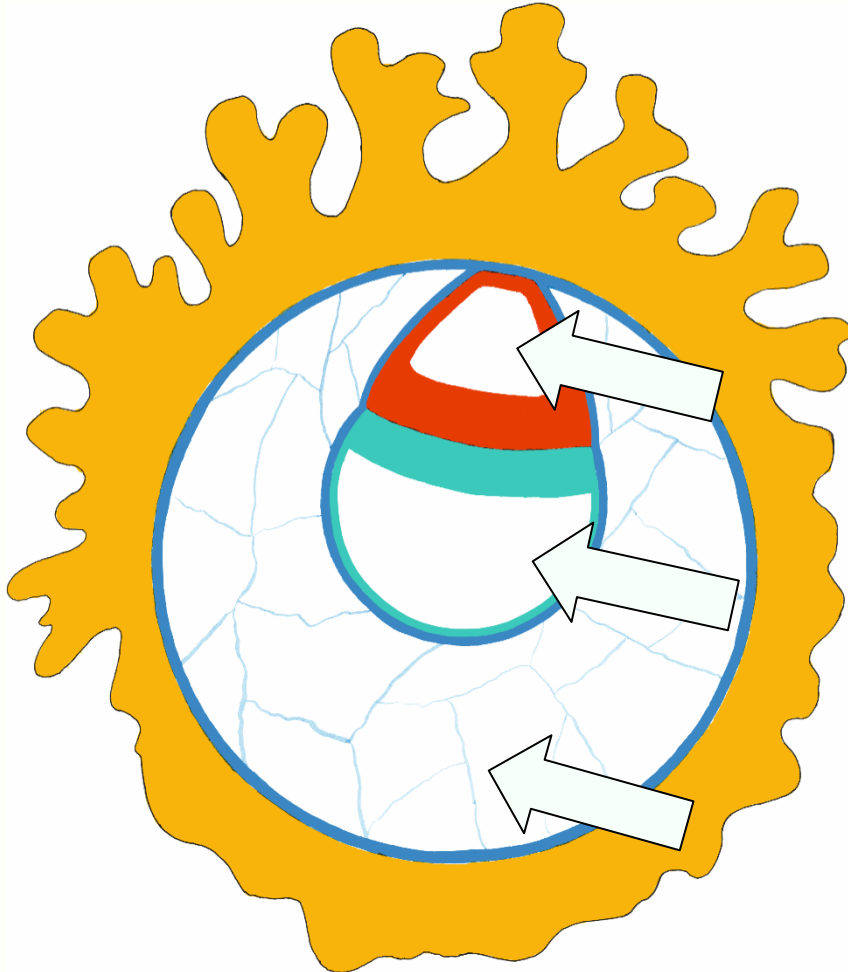
- "yderrside"
Hud / CNS

Endoderm:

- "*inderside*"
tarmen

Dette oprindelige hulrum udvikler primære mesoderm op overfladen

3-blære-stadiet



Blære i Ectoderm:

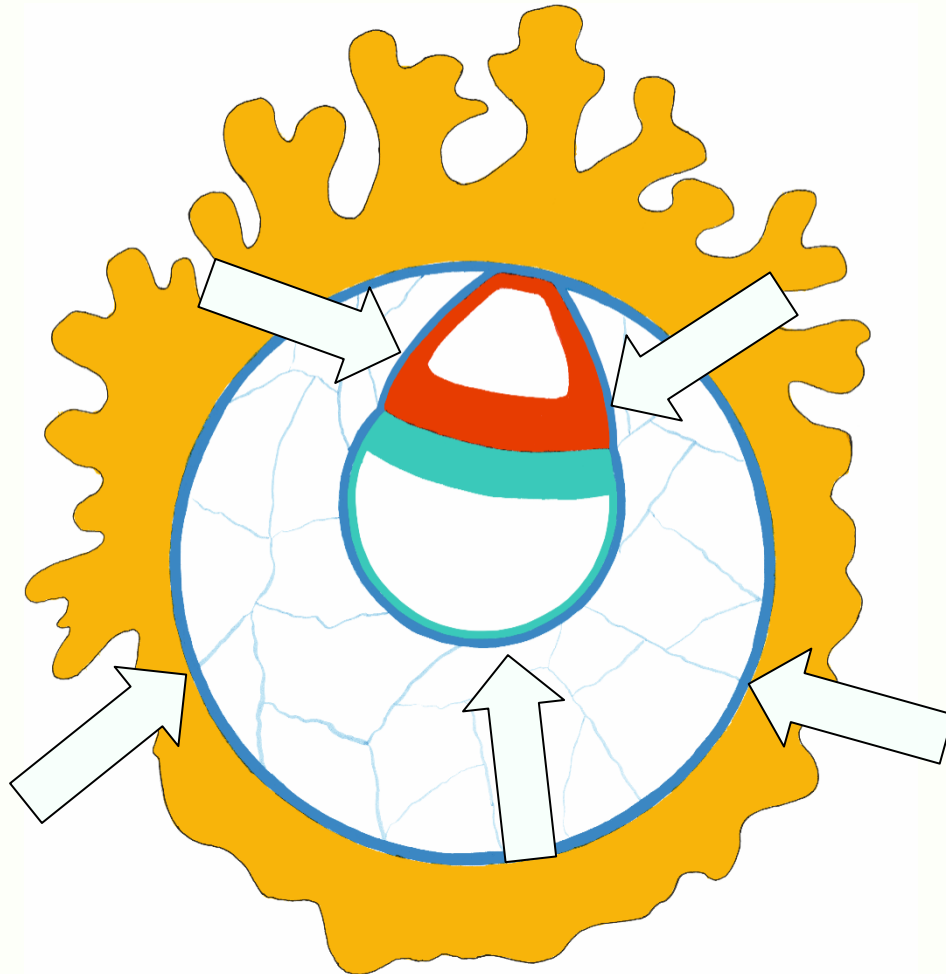
- *Amnionhulen*

Blære i Endoderm:

- *Blommesækken*

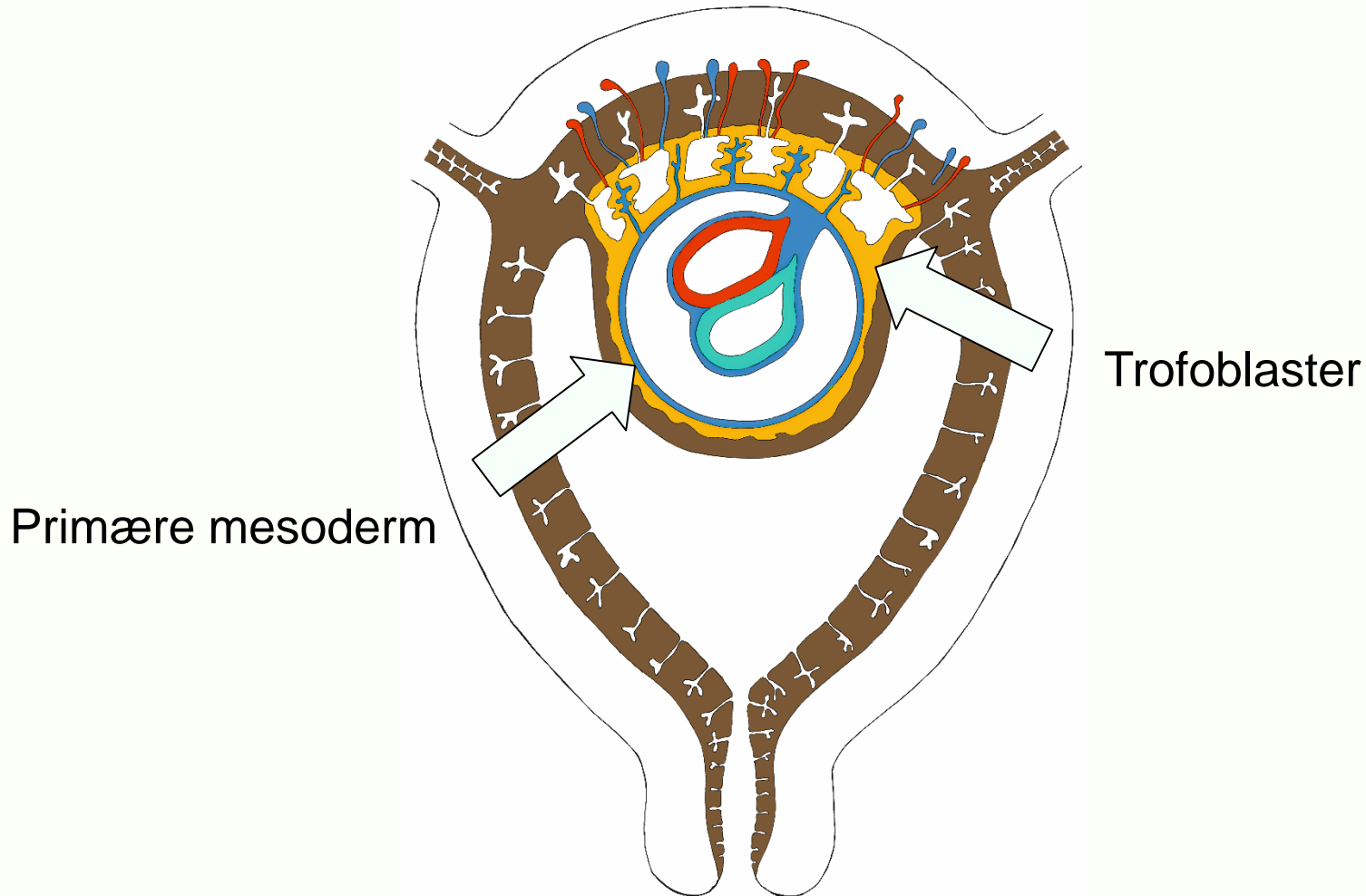
*Det oprindelige hulrum
bliver beklædt med
primær mesoderm*

3-blære-stadiet



*Det oprindelige hulrum
er her beklædt af
'primær' mesoderm*

Den foetale del vokser ind i den maternelle slimhinde (den kaldes nu decidua)



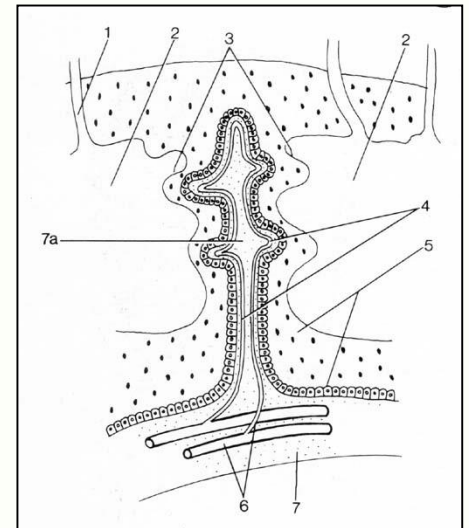
Moderkagen



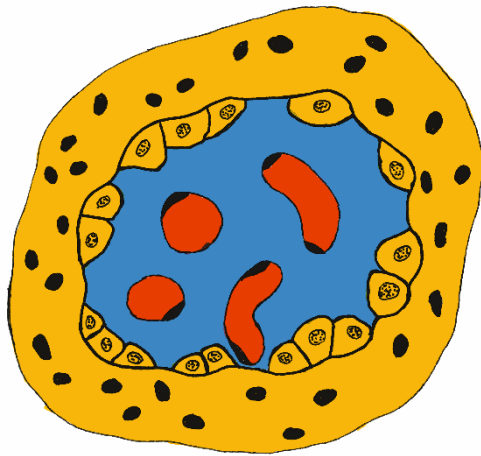
Spalter med moderens blod

Fosterets kar omgivet af primær mesoderm

Villus



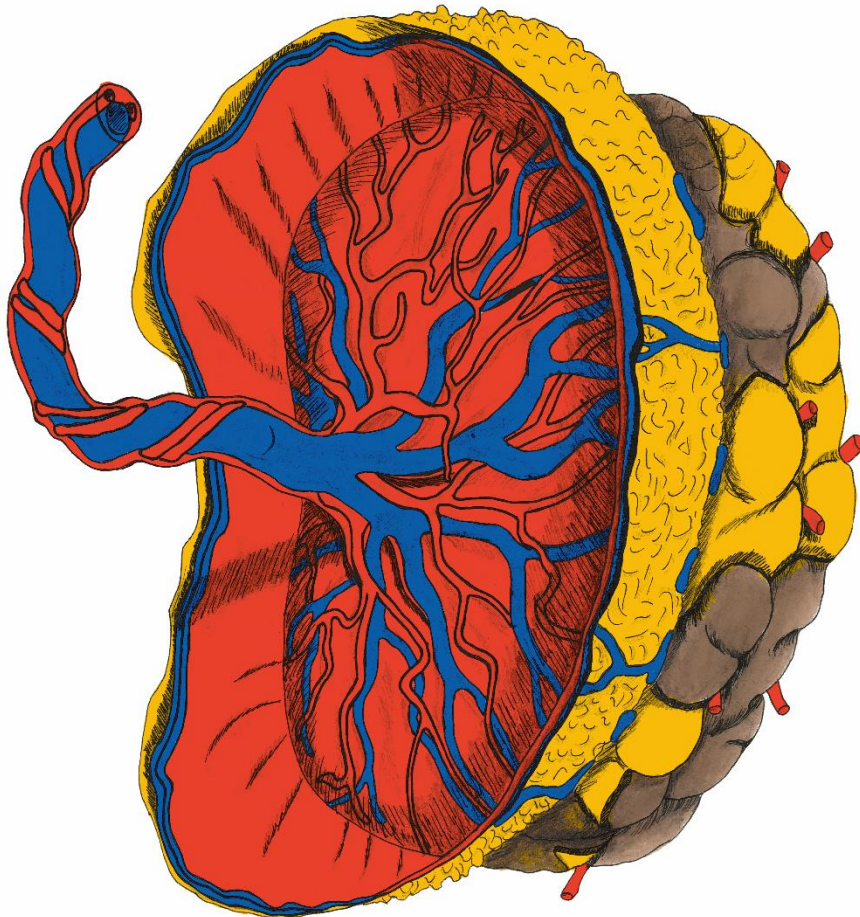
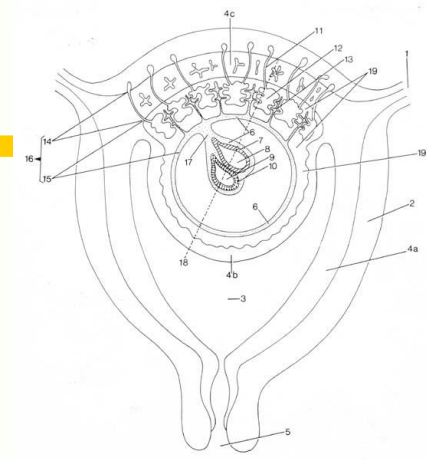
Fosterets kar omgivet af primær mesoderm og trofoblastlag



"ind": næringsstoffer
 O_2

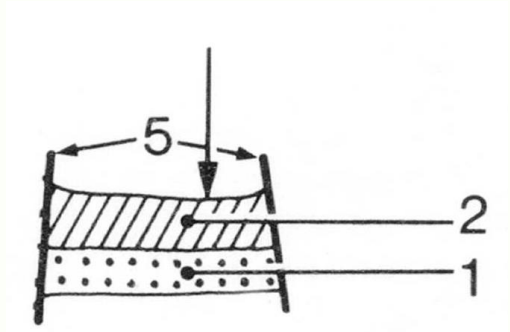
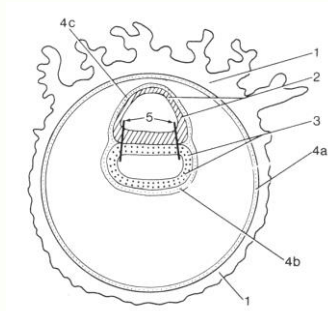
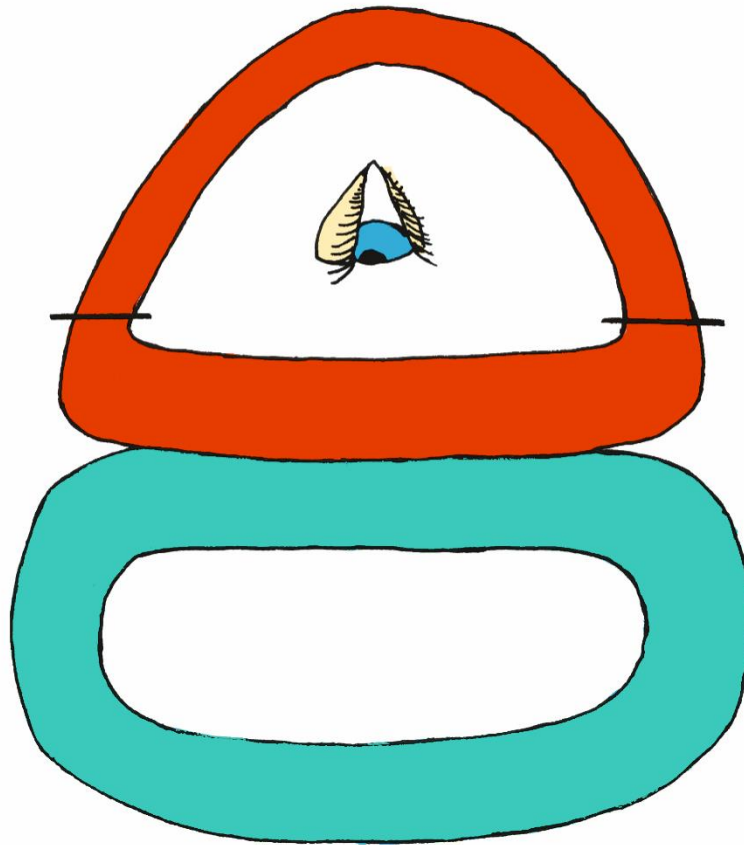
"ud": affaldsstoffer
 CO_2

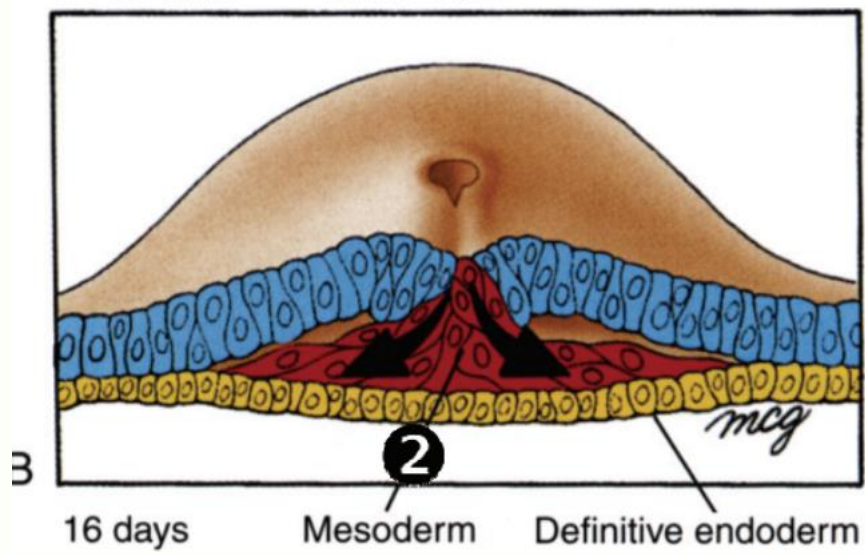
Placenta



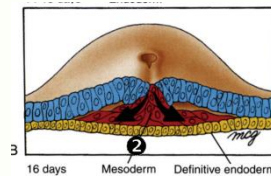
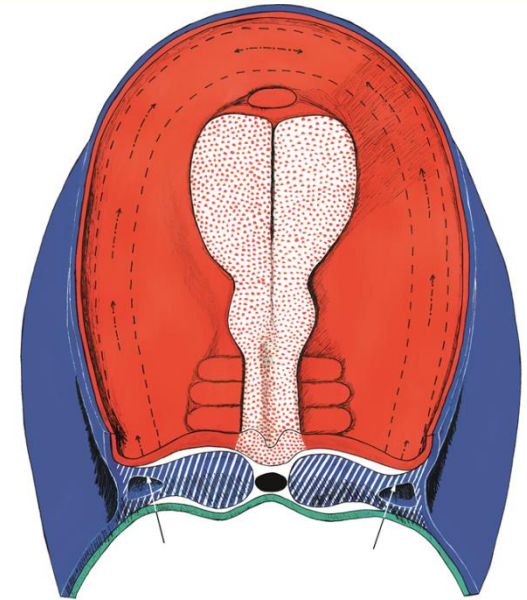
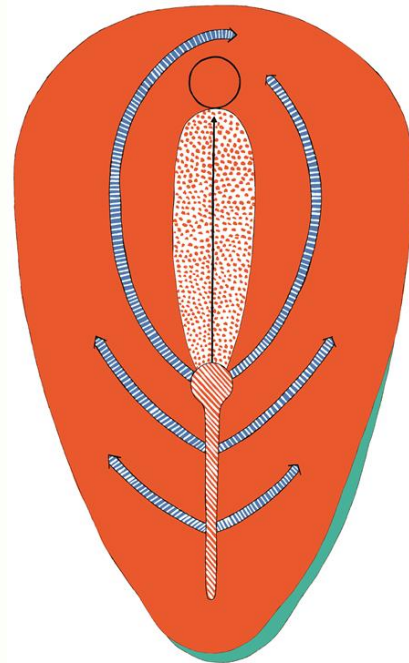
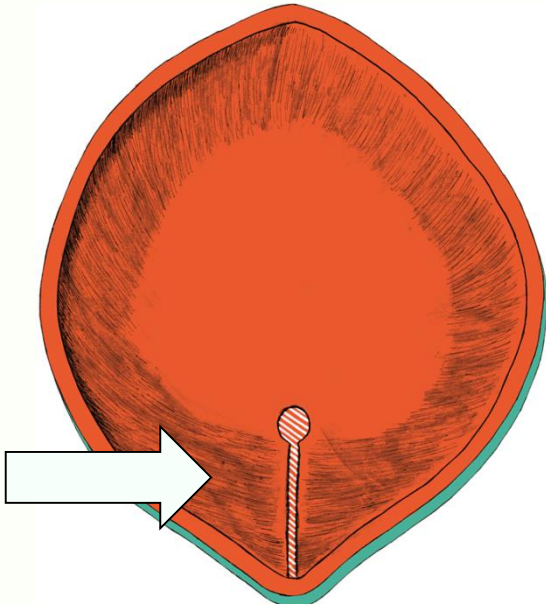
Placenta fungerer som
"tarm" - "lunger" - "nyrer"

Kimskiven



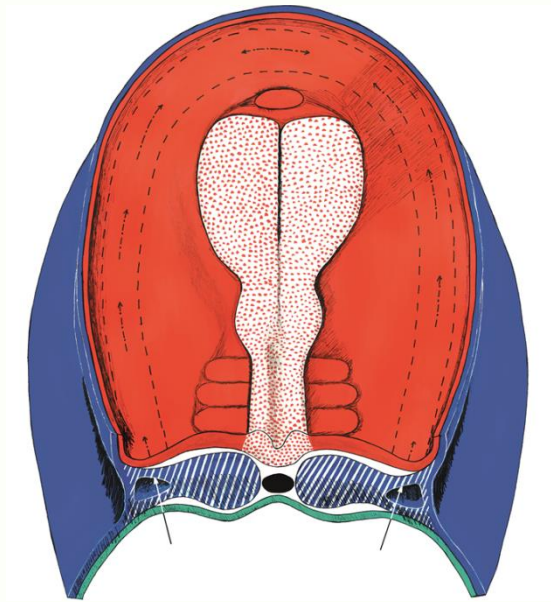


Primitivstriben nedadtil

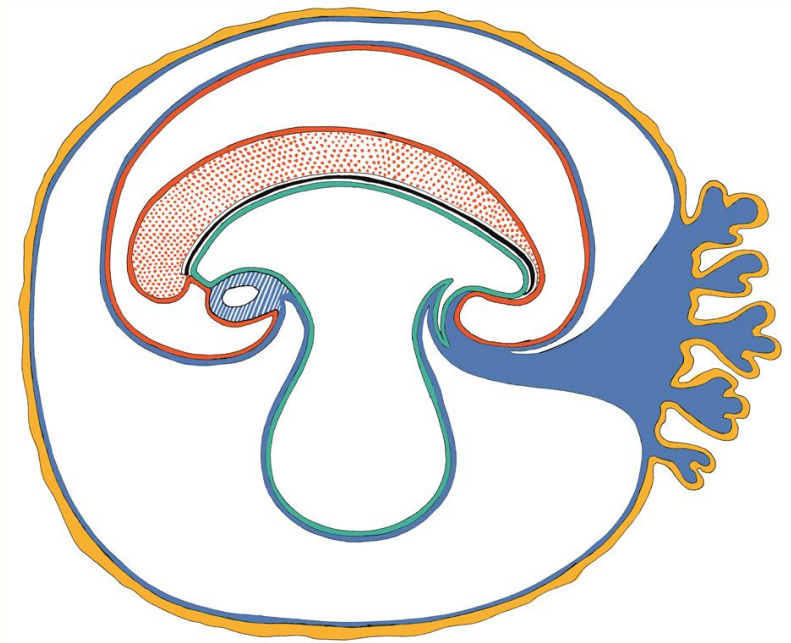


Sekundær mesoderm vokser ind imellem ekto- og endoderm fra primitivstriben

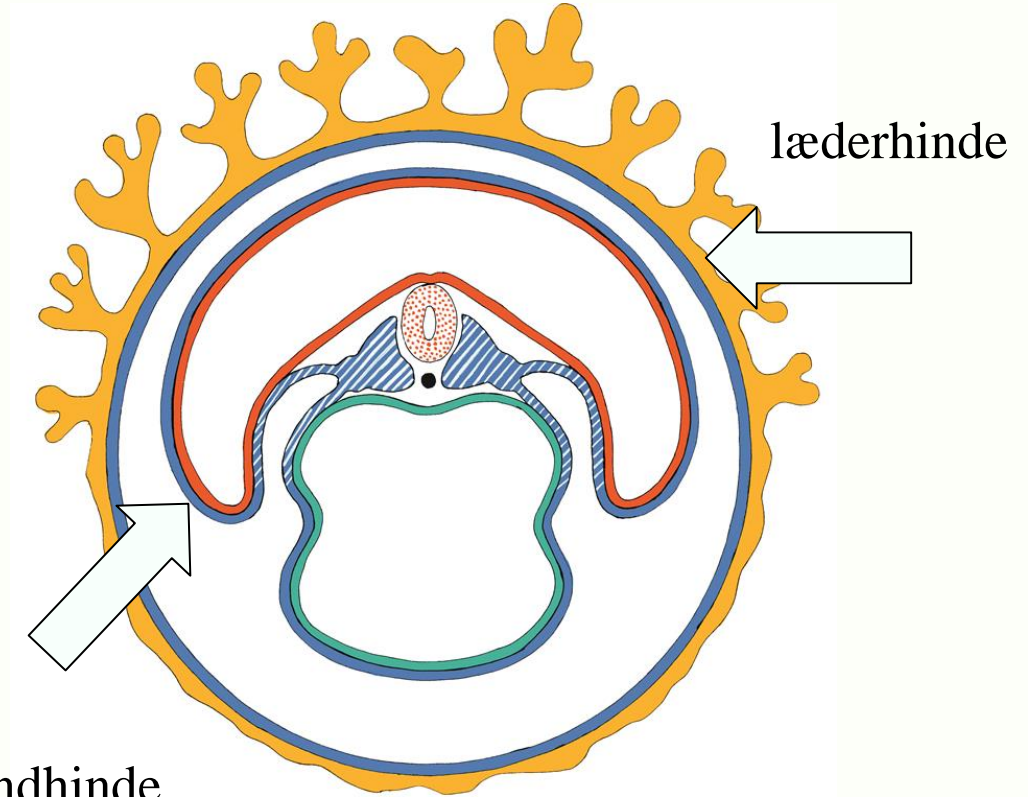
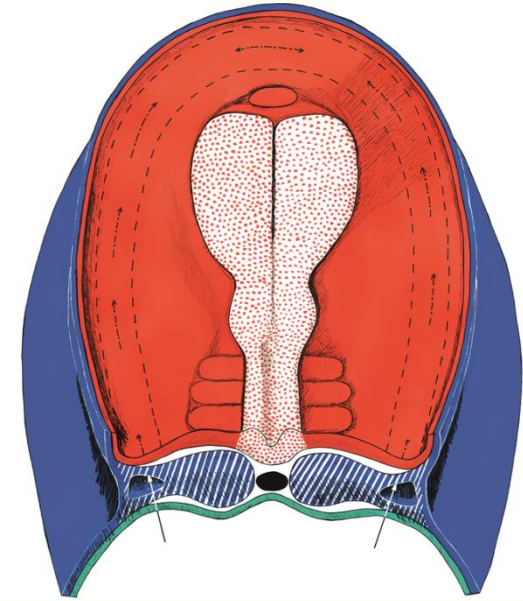
tværsnit

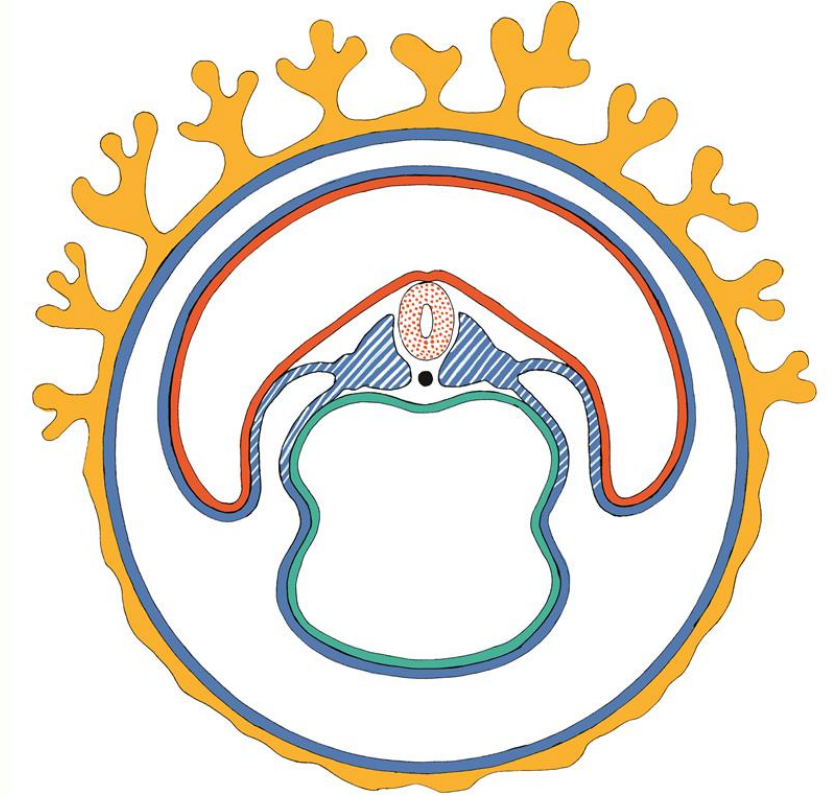
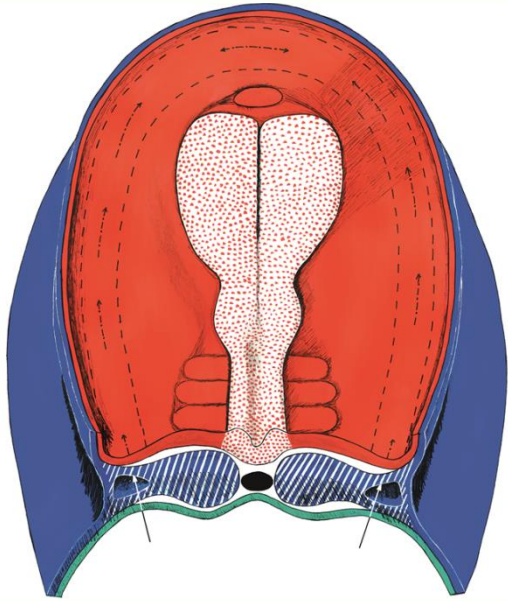


mediansnit



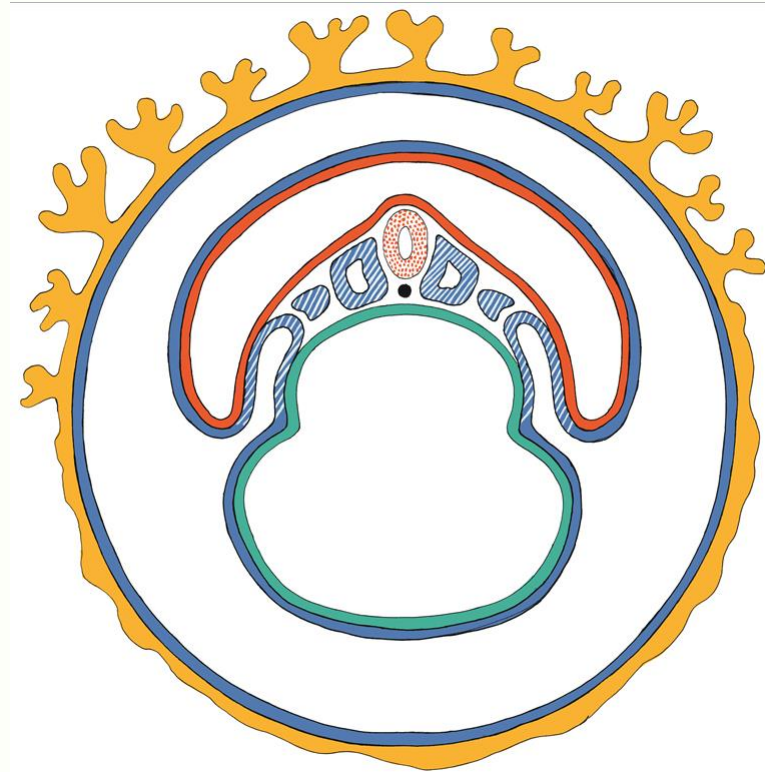
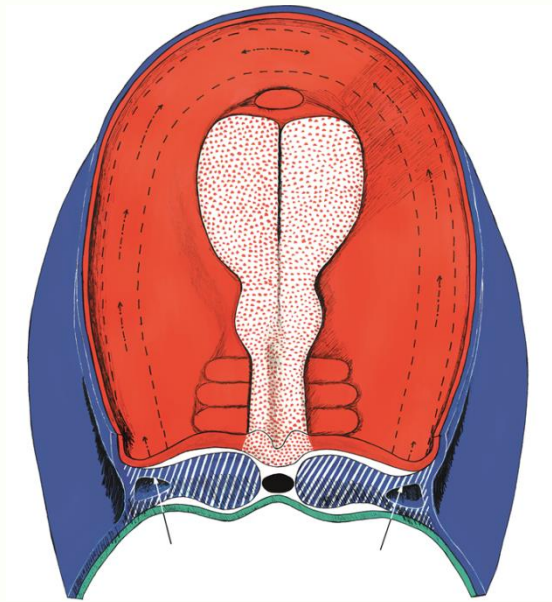
tværsnit



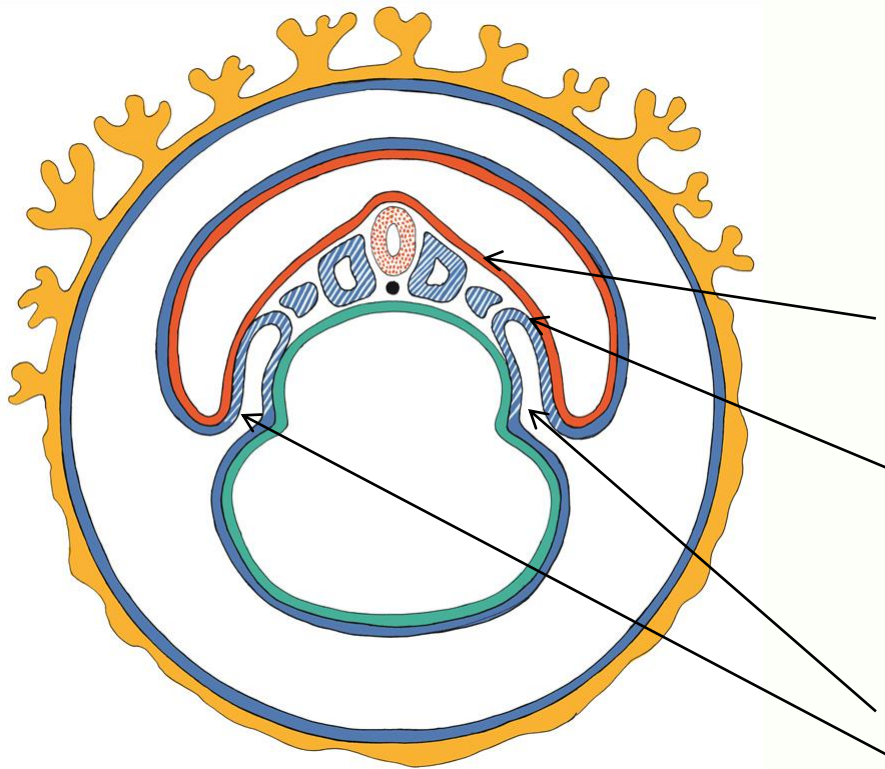


Sekundær mesoderm deler sig op

- på langs og på tværs



Sekundær mesoderm - deler sig op på langs..



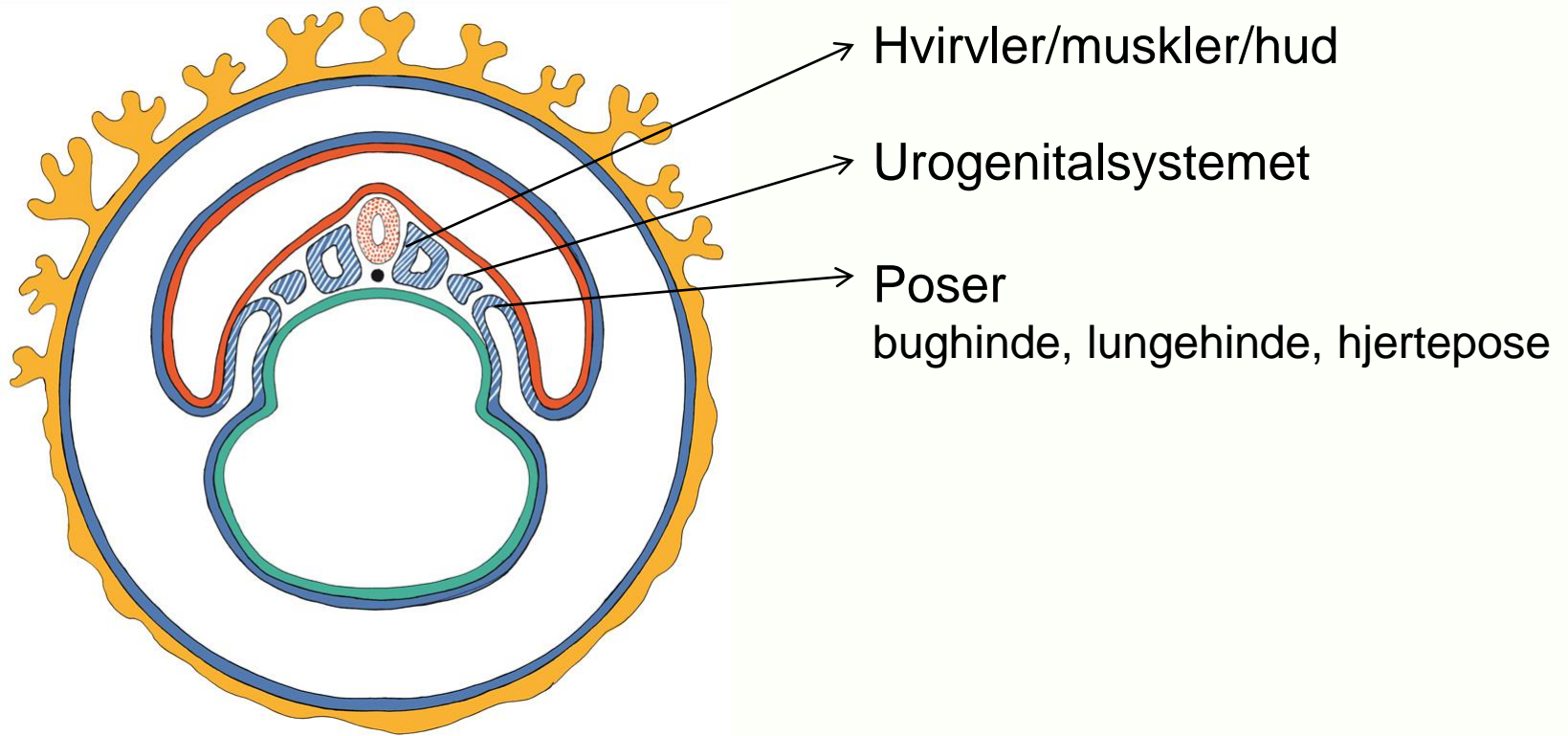
Sekundær mesoderm:

Paraxial mesoderm (somitter)

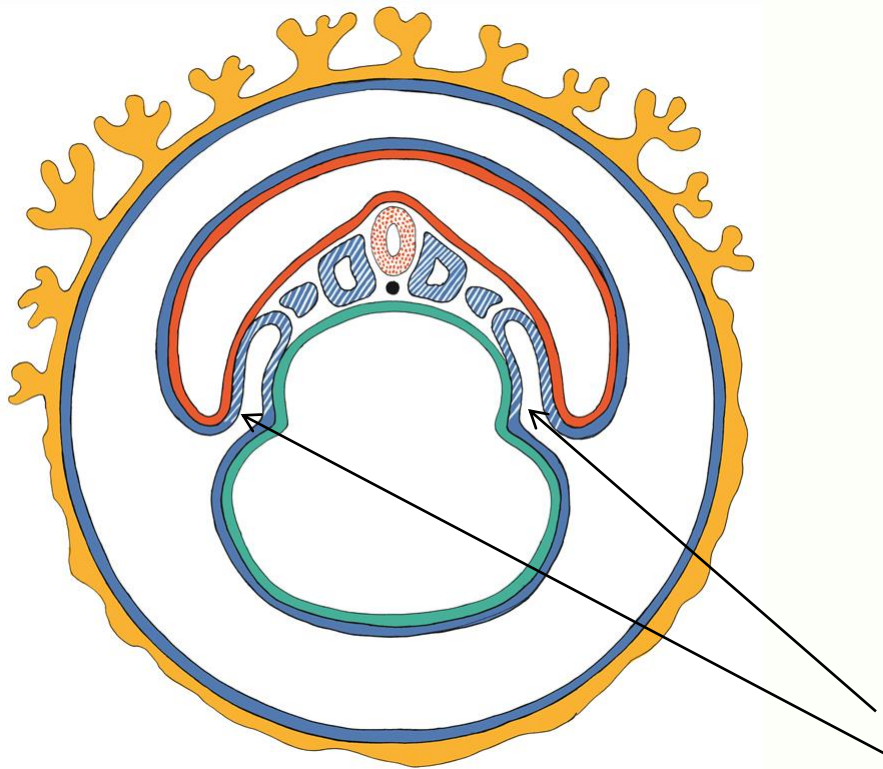
Midterpladen

Lateralpladen

Sekundær mesoderm - deler sig op på langs..



Sekundær mesoderm - deler sig op på langs..

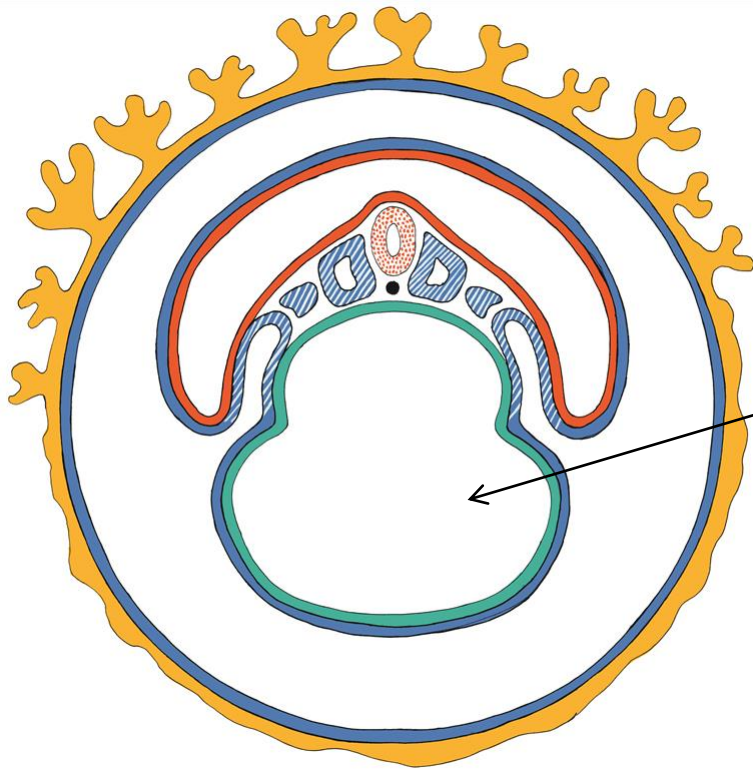


Sekundær mesoderm:

Paraxial mesoderm (somitter)
sclerotom – myotom – dermatom

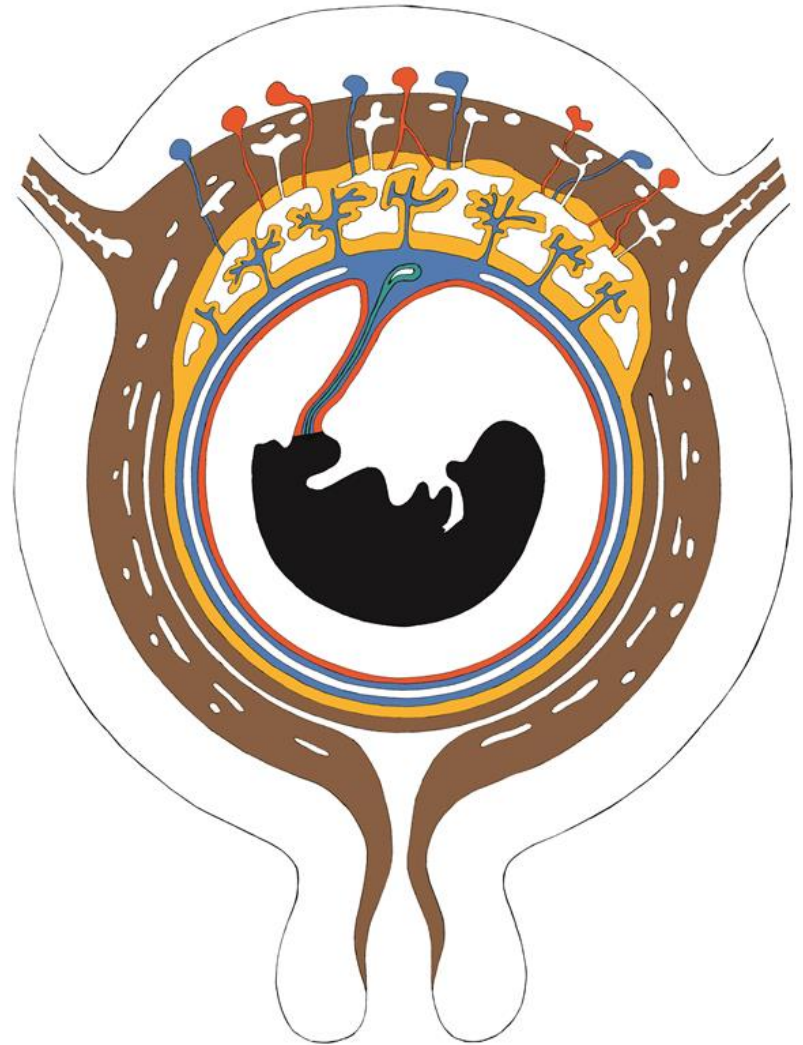
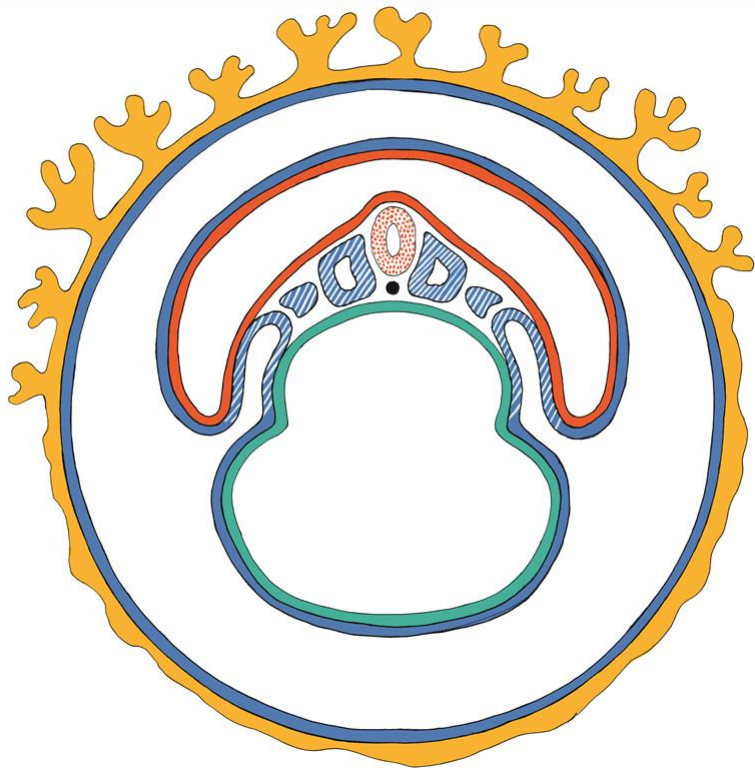
Midterpladen
Urogenitalsystemet

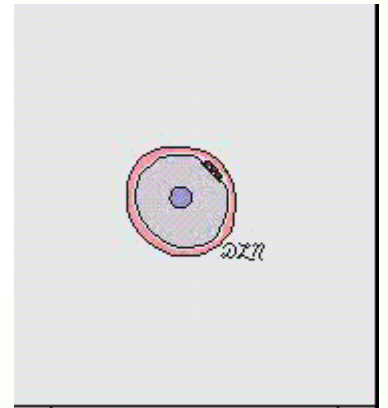
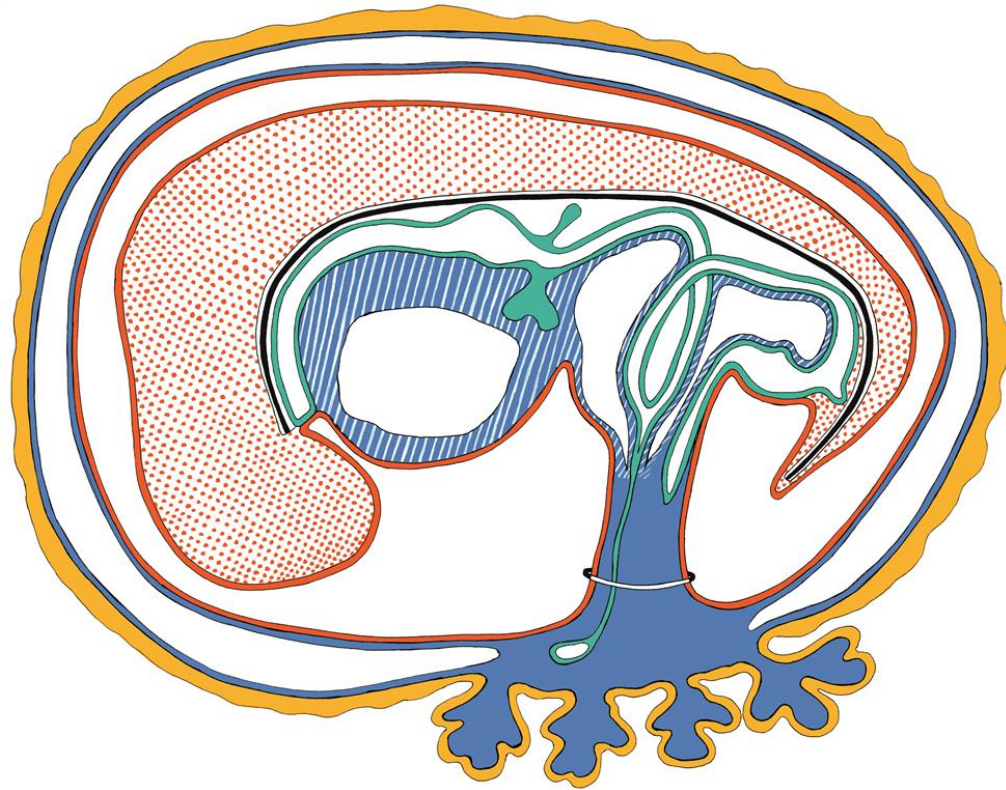
Lateralpladen
Coelom, en hule med hinde ->
bughinde, lungehinde, hjertepose



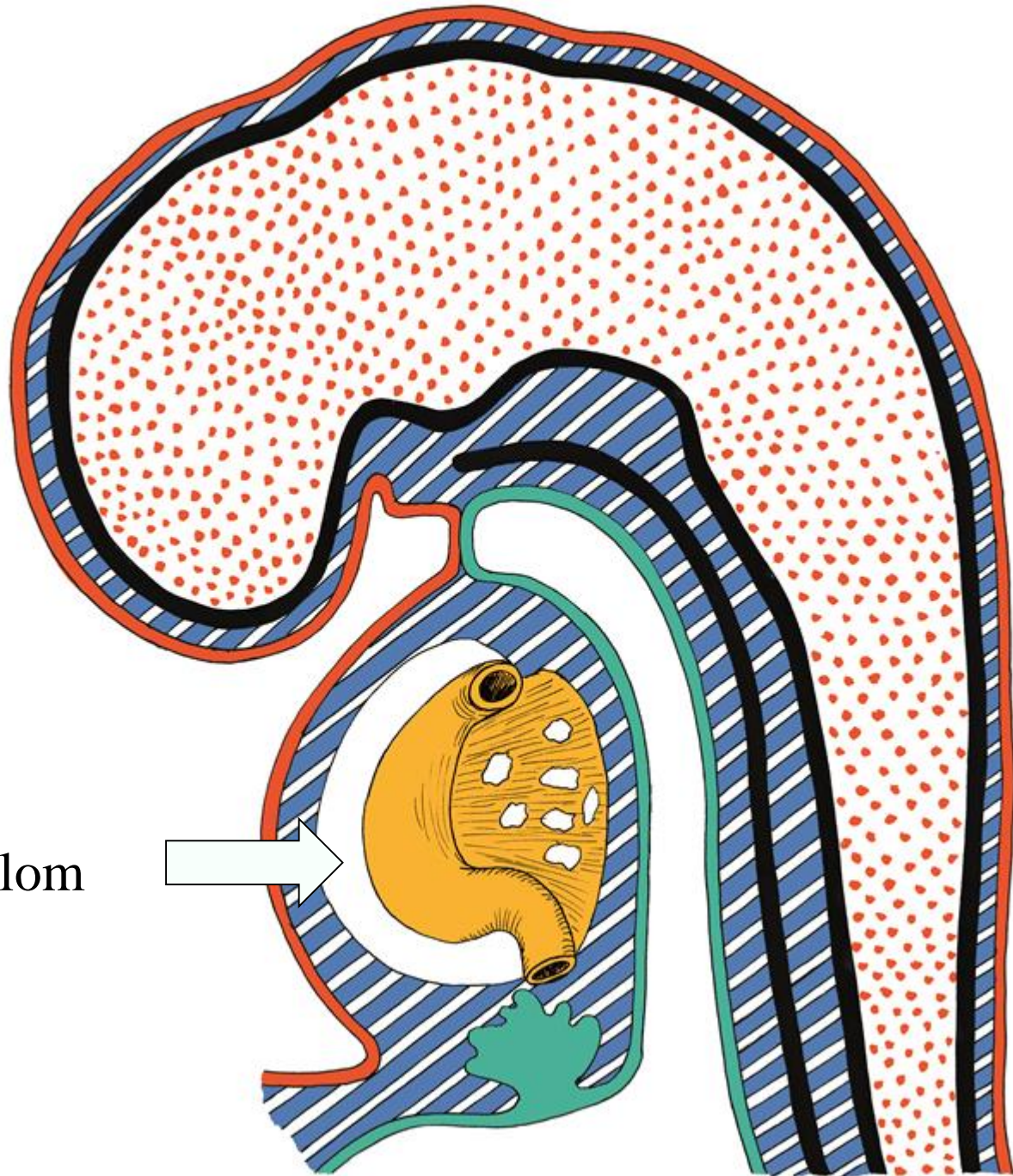
Foldning:

*Blommesækken nederst:
den afsnøres
dens øverste del bliver til
tarmrøret*





coelom





Inducerede stamceller

Stamceller deles ofte op i to grupper:

- *Voksne stamceller - adult stem cells* - hos det fødte individ (børn og voksne)
- *Embryonale stamceller - embryonic stem cells* - hos fostret
 - Til de embryonale stamceller – er det hævdet - hører desuden en gruppe, som forskerne kalder '*inducerede pluripotente stamceller*' (*iPSC's*). Kort fortalt kan forskerne få iPSC's til at ligne en embryonal stamcelle ved at tage en levende hudcelle fra en patient og genmanipulere den.



Shinya Yamanaka er manden, som fandt ud af, at man kan inducere modne celler og få dem til at fungere som stamceller. (Foto: National Institutes of Health / Wikimedia Commons)