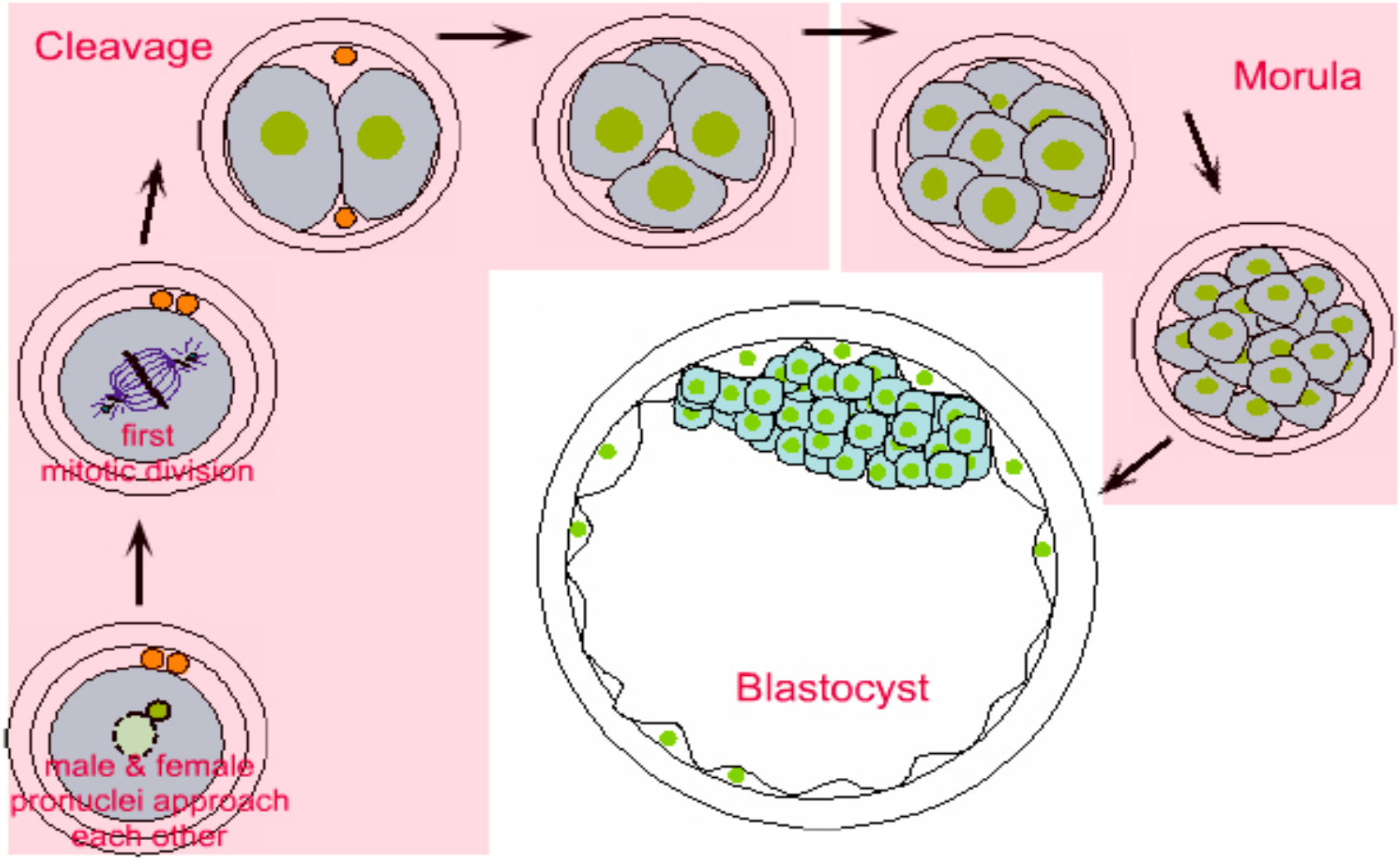
Early Embryonic Development of the Human Fetus – Germ Layer Formation

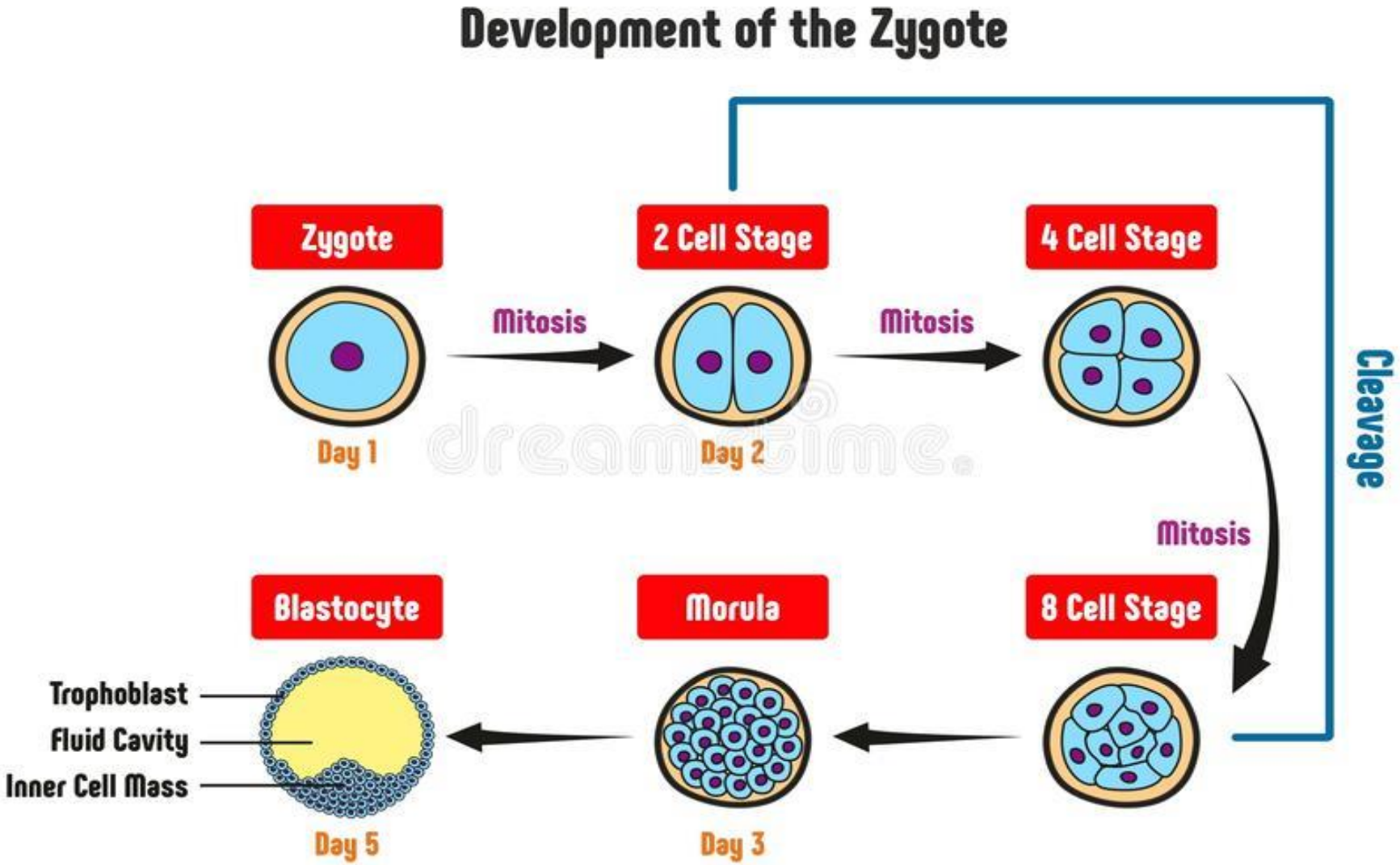
Dr. Neha Kumawat

Assistant professor

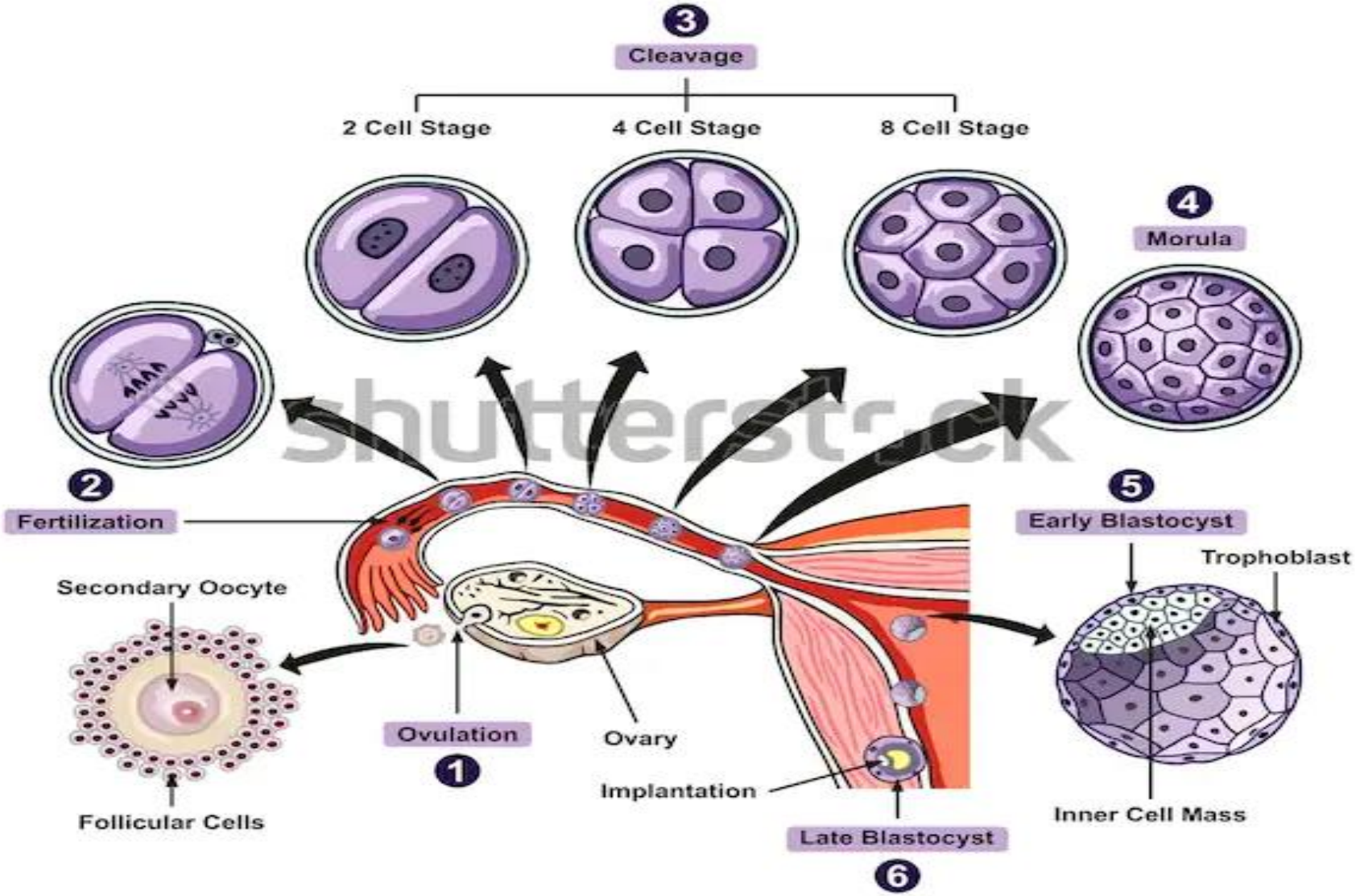
WEEK 1


Cleavage
Morula
first
mitotic division
male & female
pronuclei approach
each other
Blastocyst

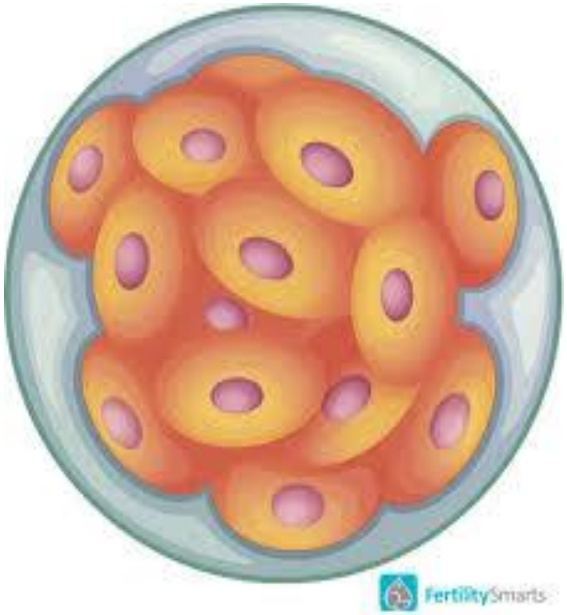
CLEAVAGE


Development of the Zygote
Zygote
2 Cell Stage
4 Cell Stage
Mitosis
Mitosis
Day 1
Day 2
Cleavage
Mitosis
Blastocyte
Morula
8 Cell Stage
Trophoblast
Fluid Cavity
Inner Cell Mass
Day 5
Day 3

Fetal Development: 1st Week of Pregnancy



COMPACTION



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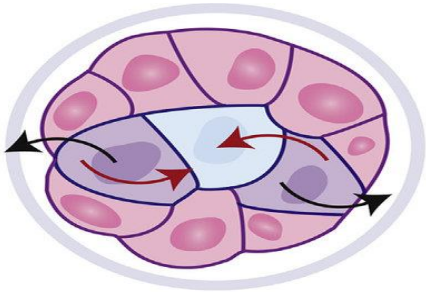
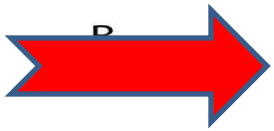
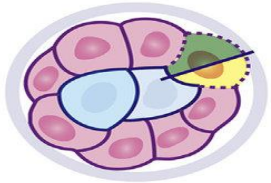
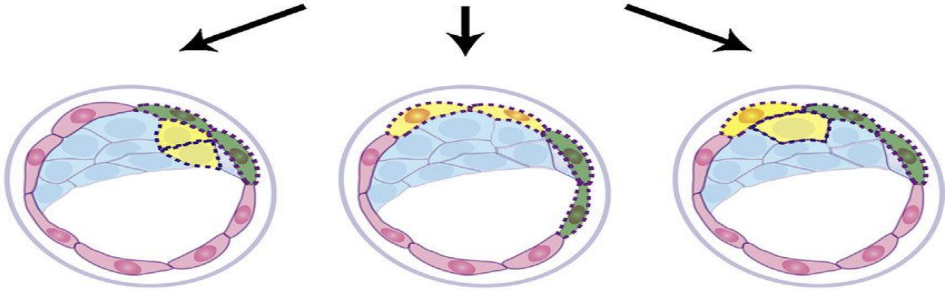


8 ⇒ 16 cell morula





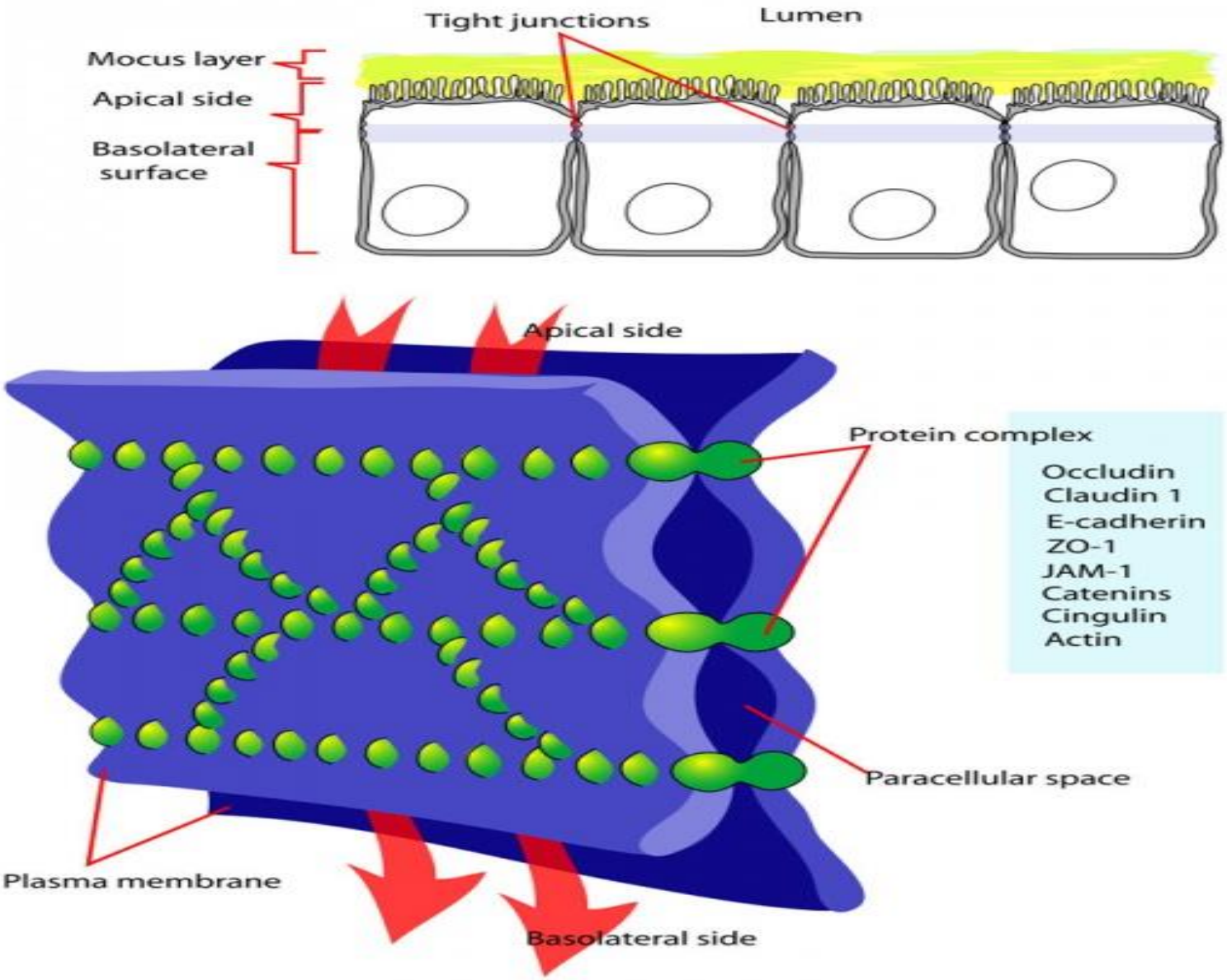
8 ⇒ 16 cell morula



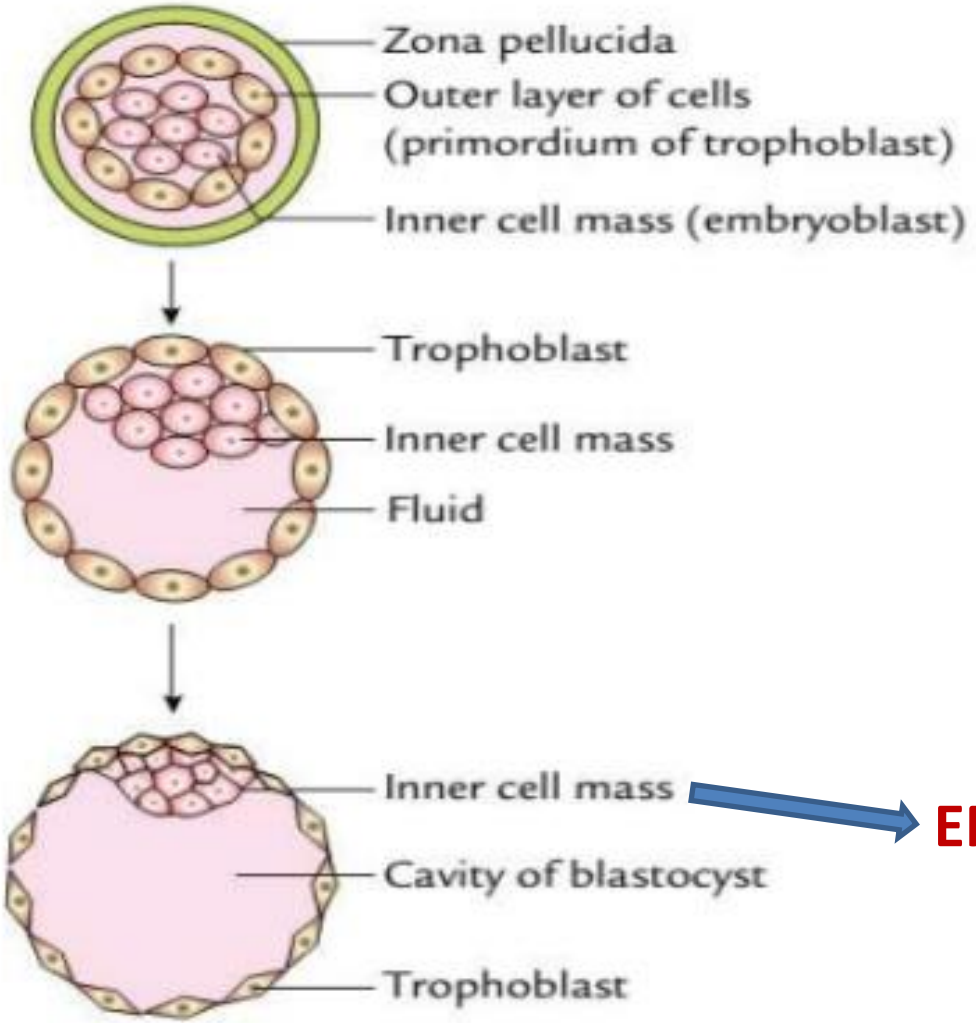
'Slightly more outside' cell: fated to give rise to two TE cells, regardless of orientation of next round of division

'Slightly more inside' cell: might give rise to two TE cells, two ICM cells or 1 TE and 1 ICM cells

COMPACTION


Tight junctions
Lumen
Mocus layer
Apical side
Basolateral surface
Apical side
Protein complex
Occludin
Claudin 1
E-cadherin
ZO-1
JAM-1
Catenins
Cingulin
Actin
Paracellular space
Plasma membrane
Basolateral side

Formation of blastocysts



EMBRYOBLAST

IMPLANTATION- 7TH TO 12TH DAY

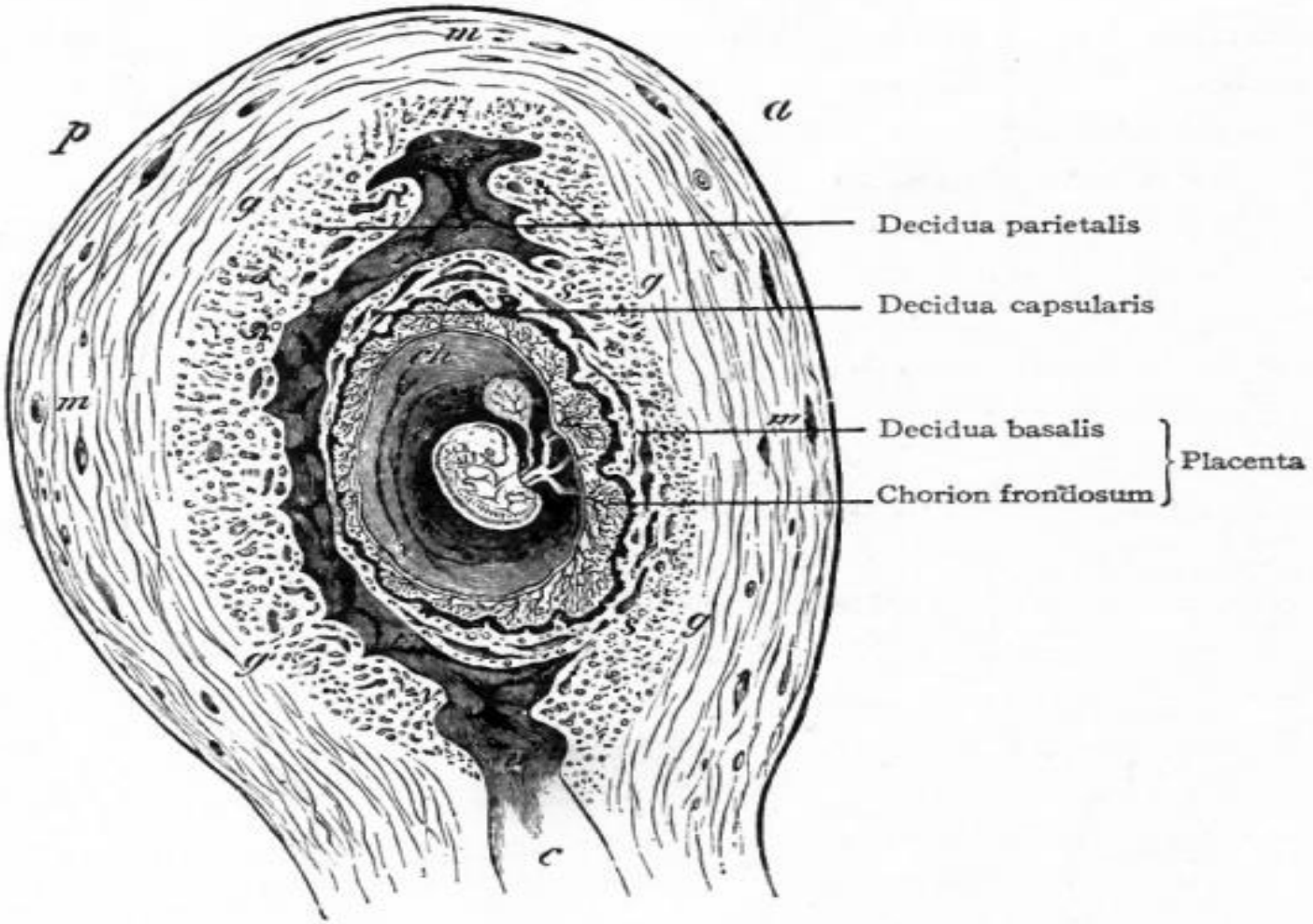
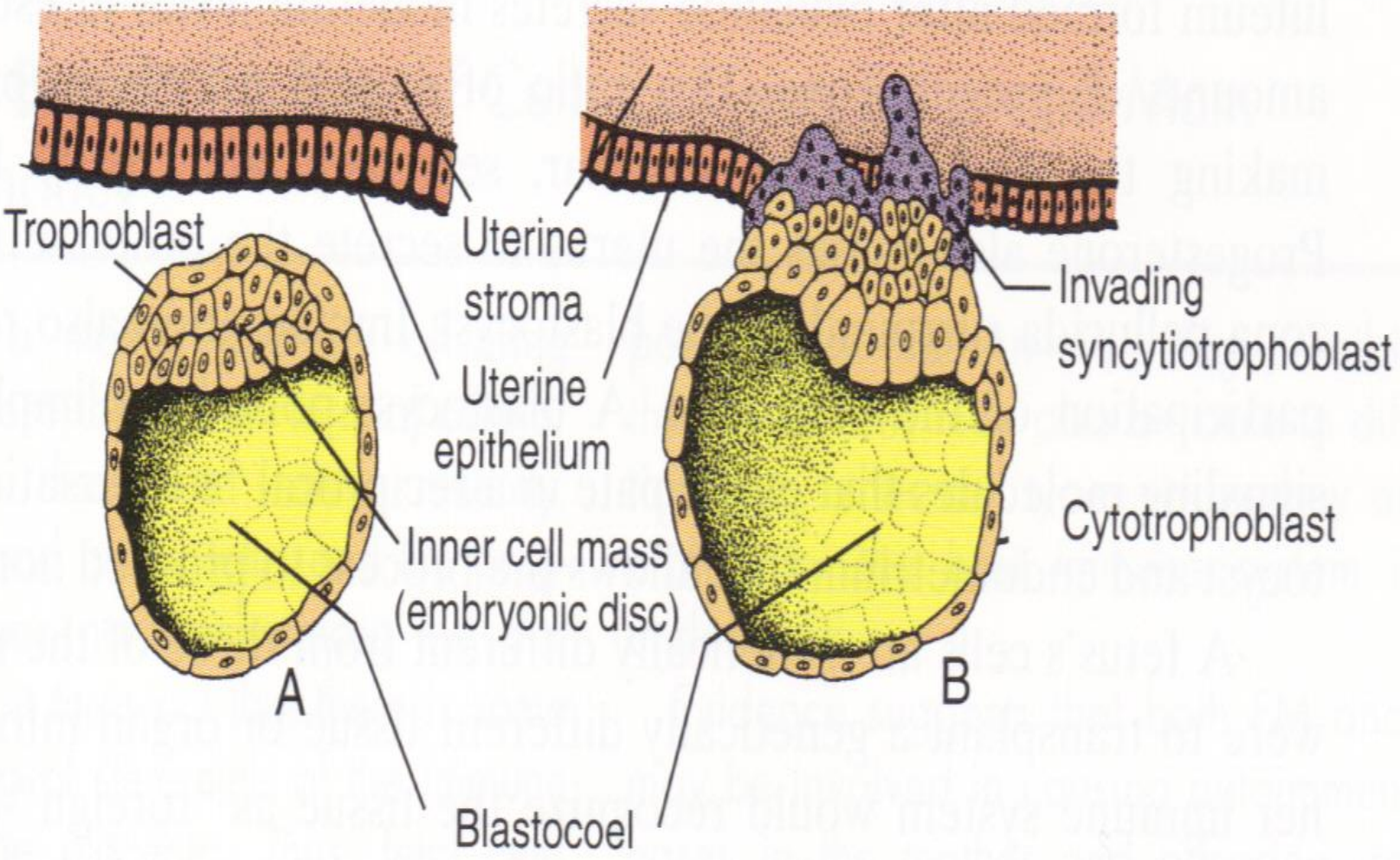
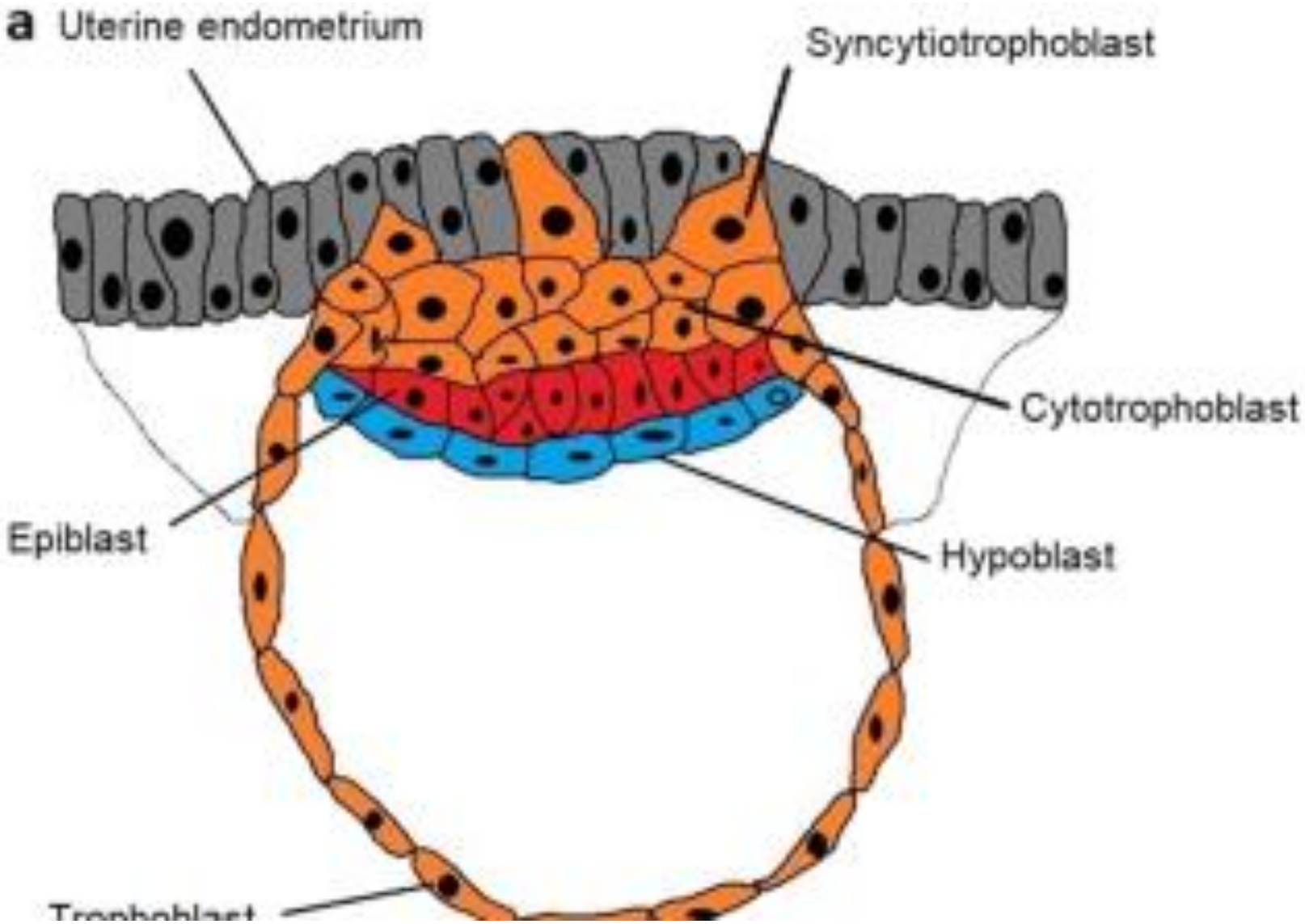


FIG. 494.—Semidiagramatic sagittal section of human uterus containing an embryo of about five weeks. *Allen Thompson.*

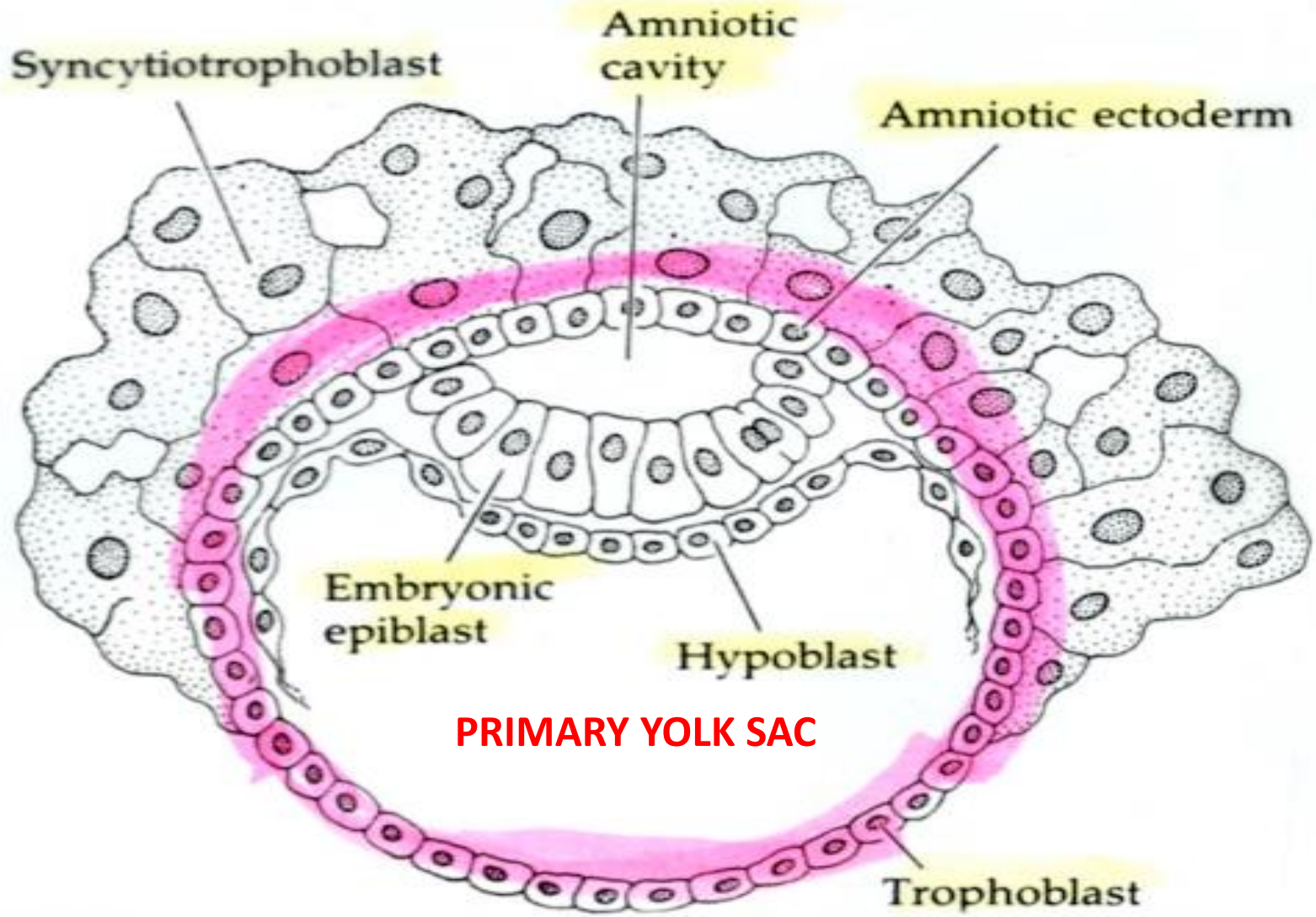
2nd WEEK- TROPHOBLAST DIVISION

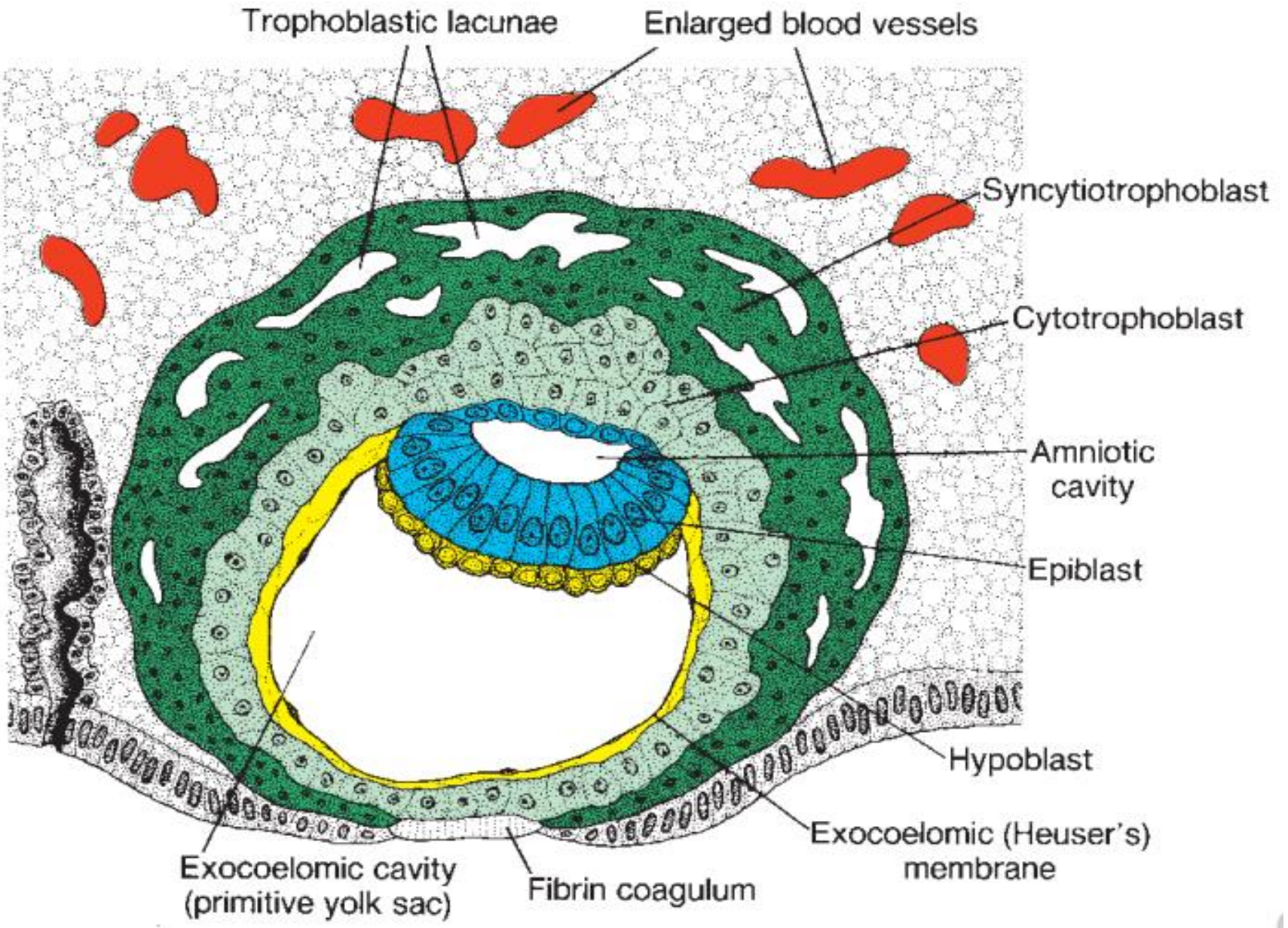


FORMATION OF BILAMINAR DISC

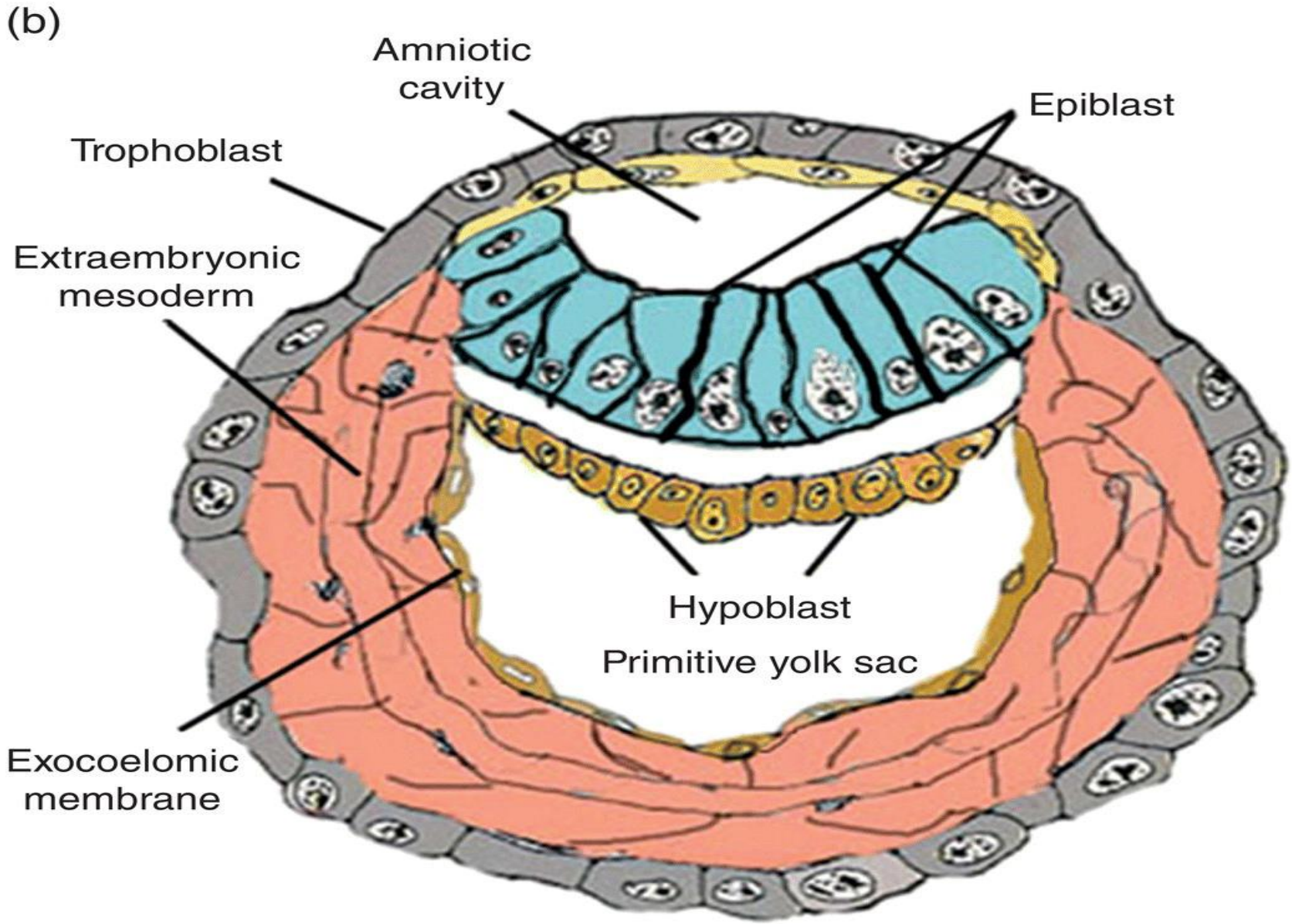


FORMATION OF THE CAVITIES

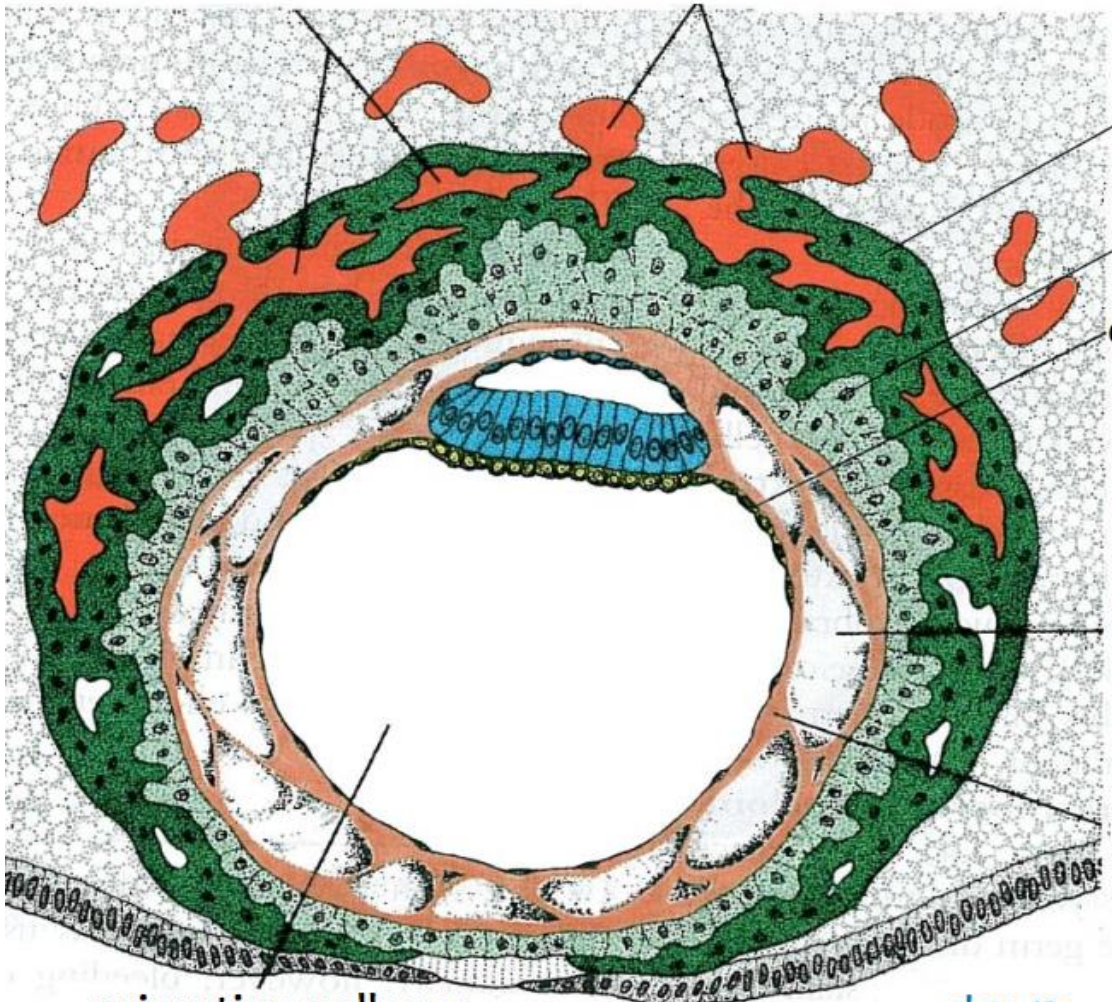



Trophoblastic lacunae
Enlarged blood vessels
Syncytiotrophoblast
Cytotrophoblast
Amniotic cavity
Epiblast
Hypoblast
Exocoelomic (Heuser's) membrane
Exocoelomic cavity (primitive yolk sac)
Fibrin coagulum

APPEARANCE OF EXTRA EMBRYONIC MESODERM



FORMATION OF EXTRA-EMBRYONIC COELOM



syncytiotrophoblast
(produces HCG – detectable in blood [day 11], urine [day 12-14])

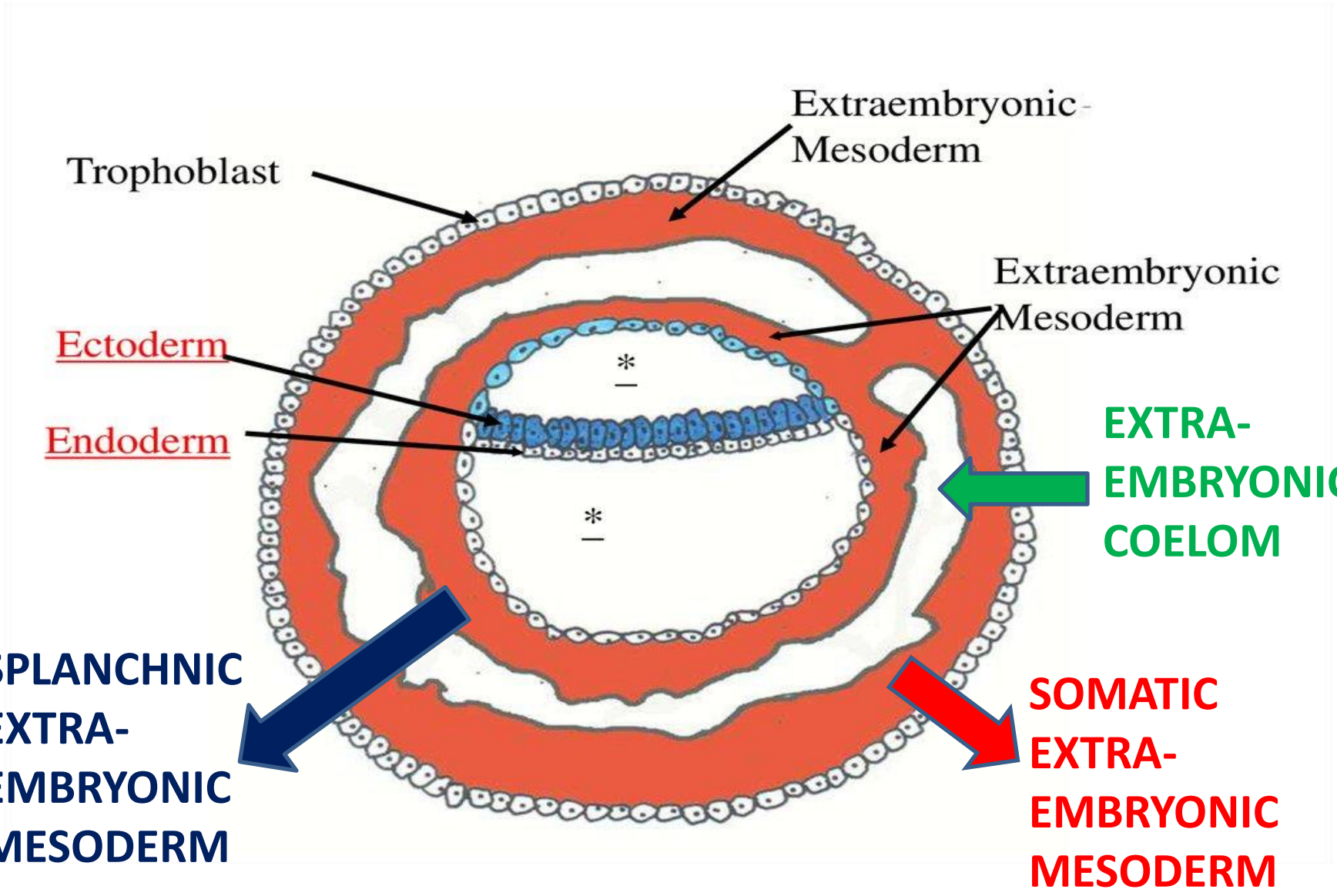
cytotrophoblast

exocoelomic membrane

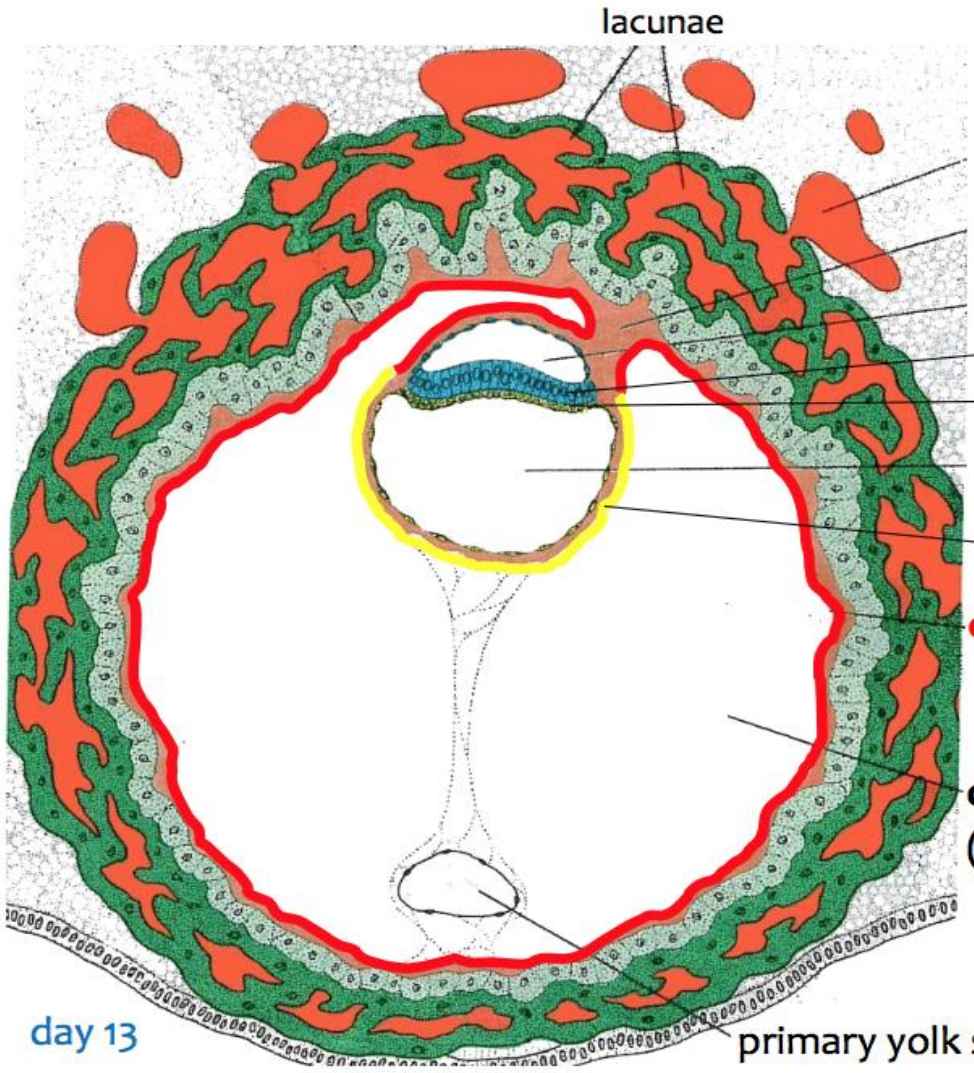
cavity in extraembryonic mesoderm

extraembryonic mesoderm

SOMATIC AND SPLANCHANIC MESODERM

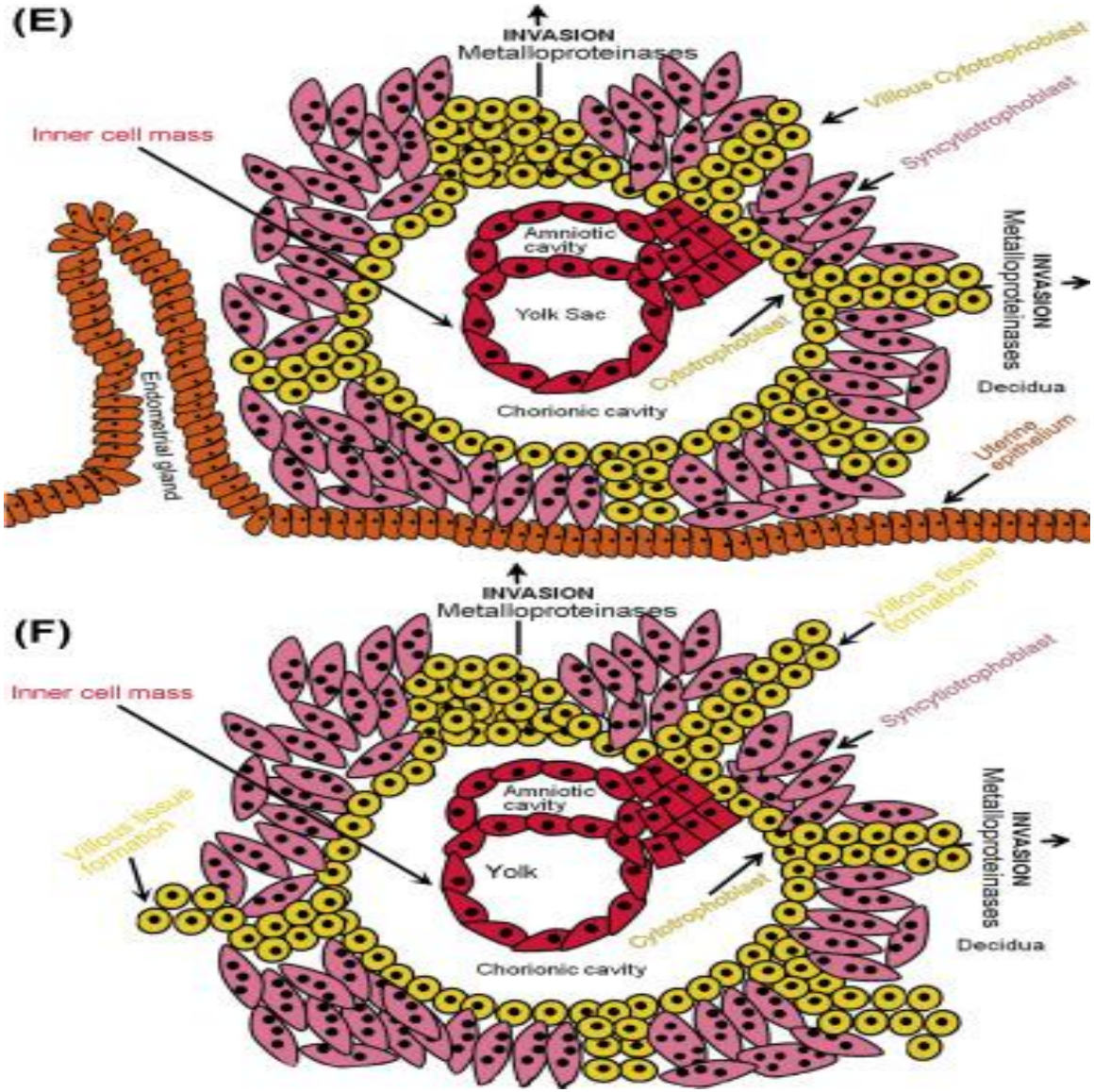


SECONDAY YOLK SAC & CHORION

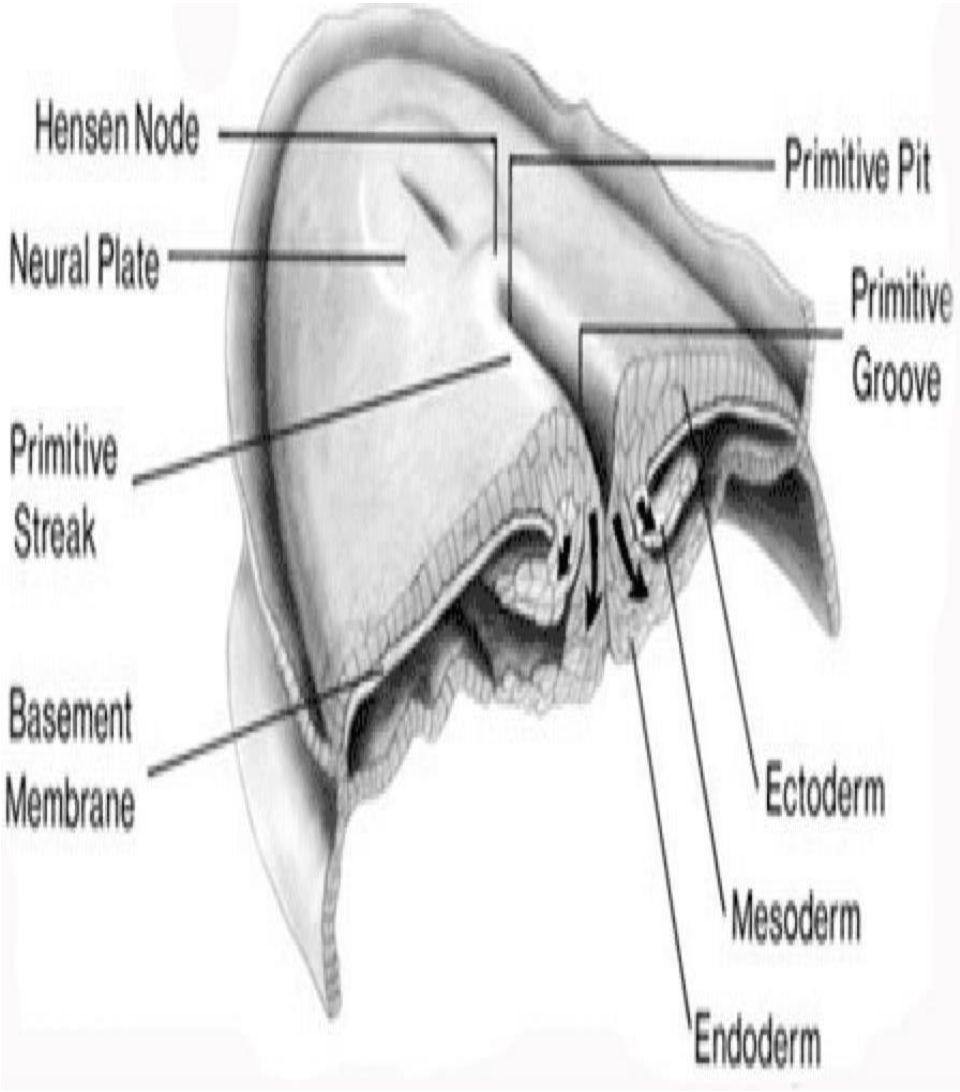


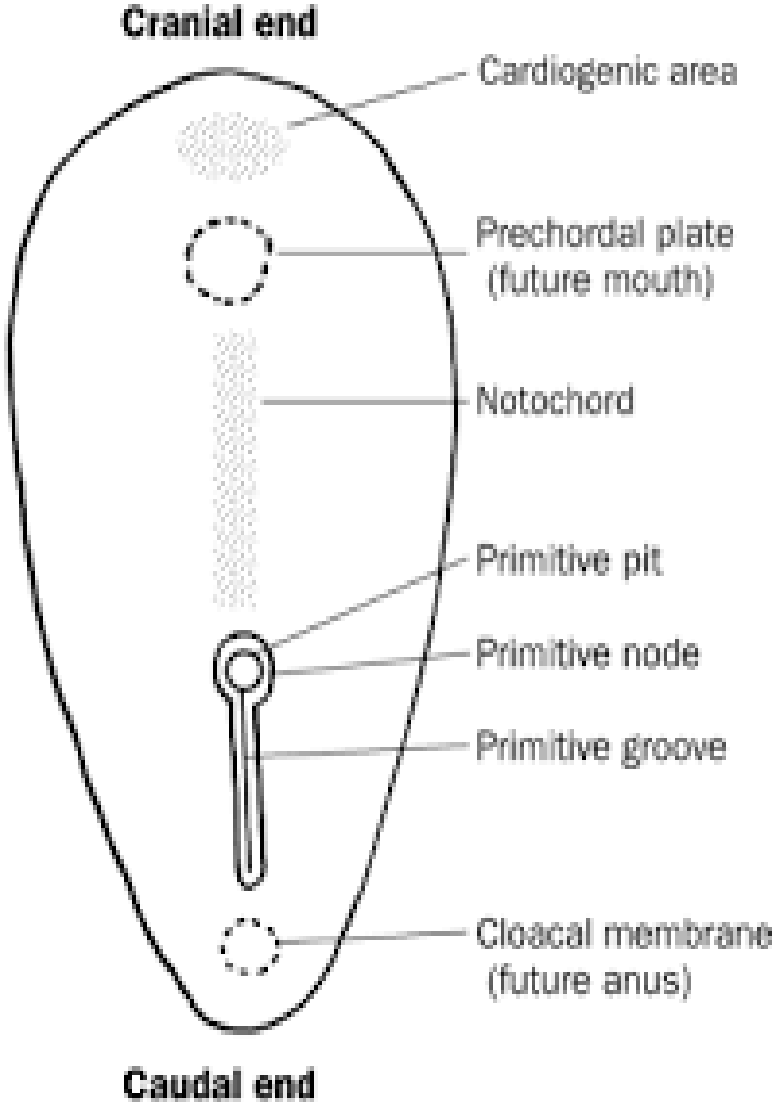
S 4.6

FORMATION OF PRIMARY VILLI

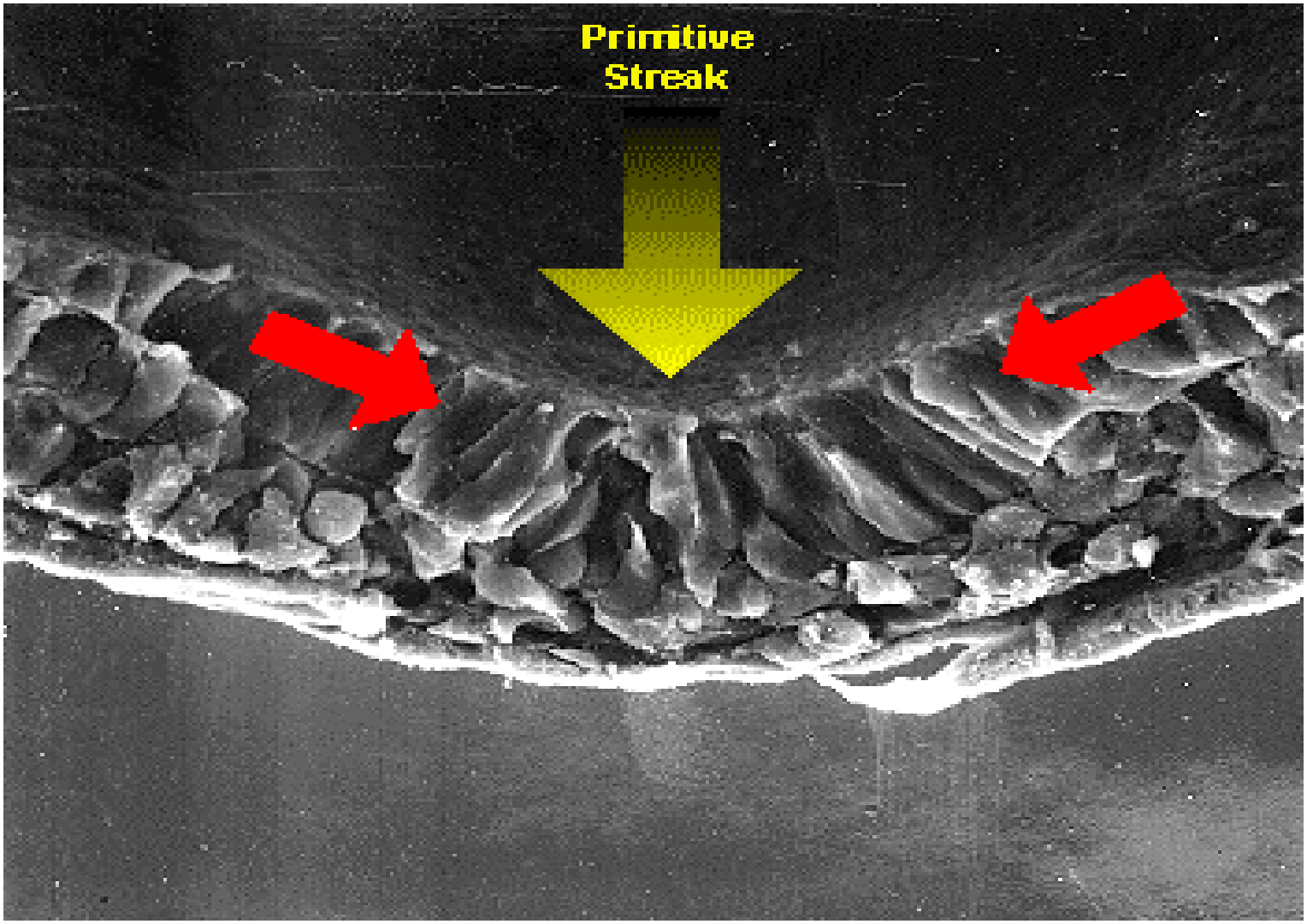


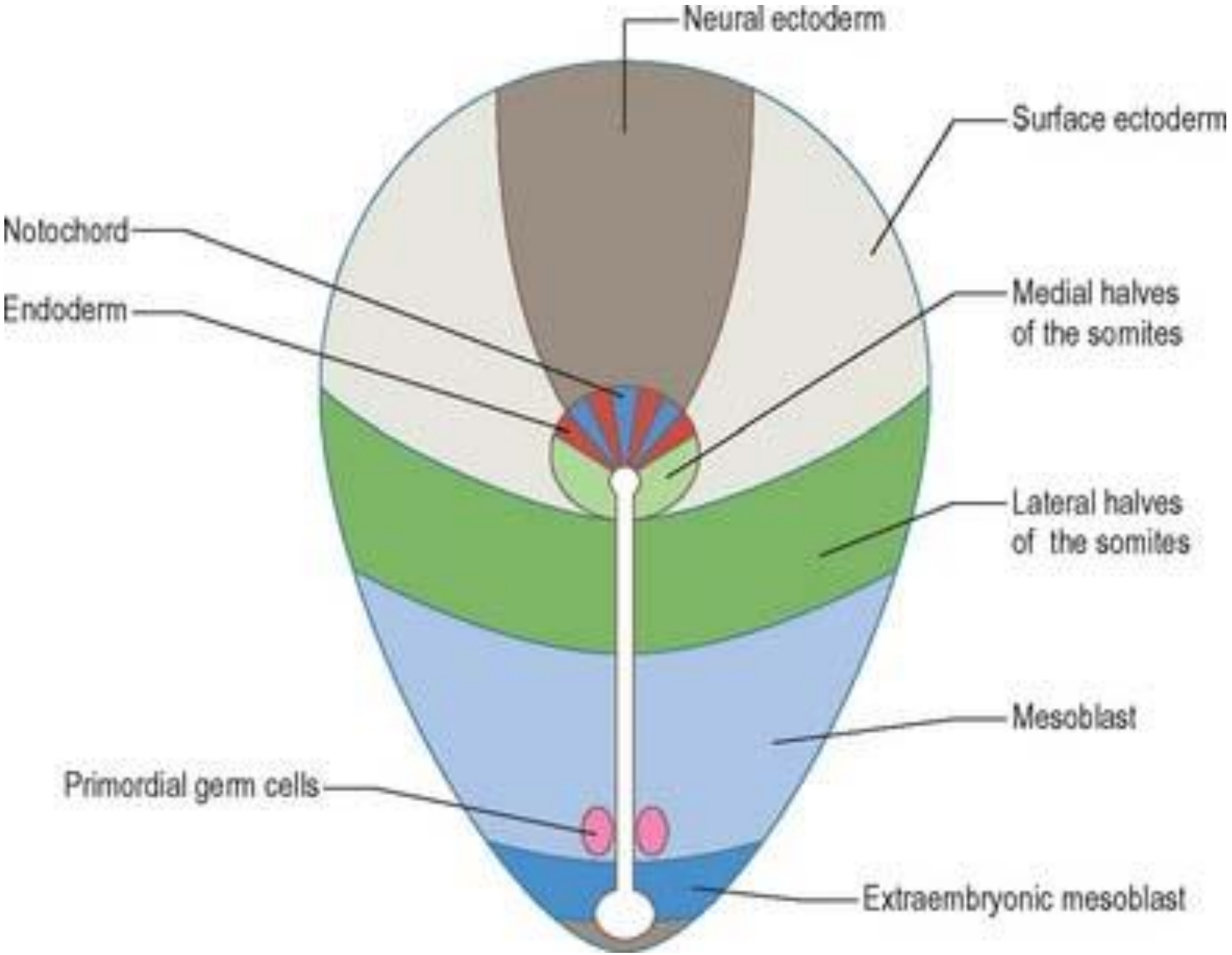
3RD WEEK – FORMATION OF PRIMITIVE STREAK



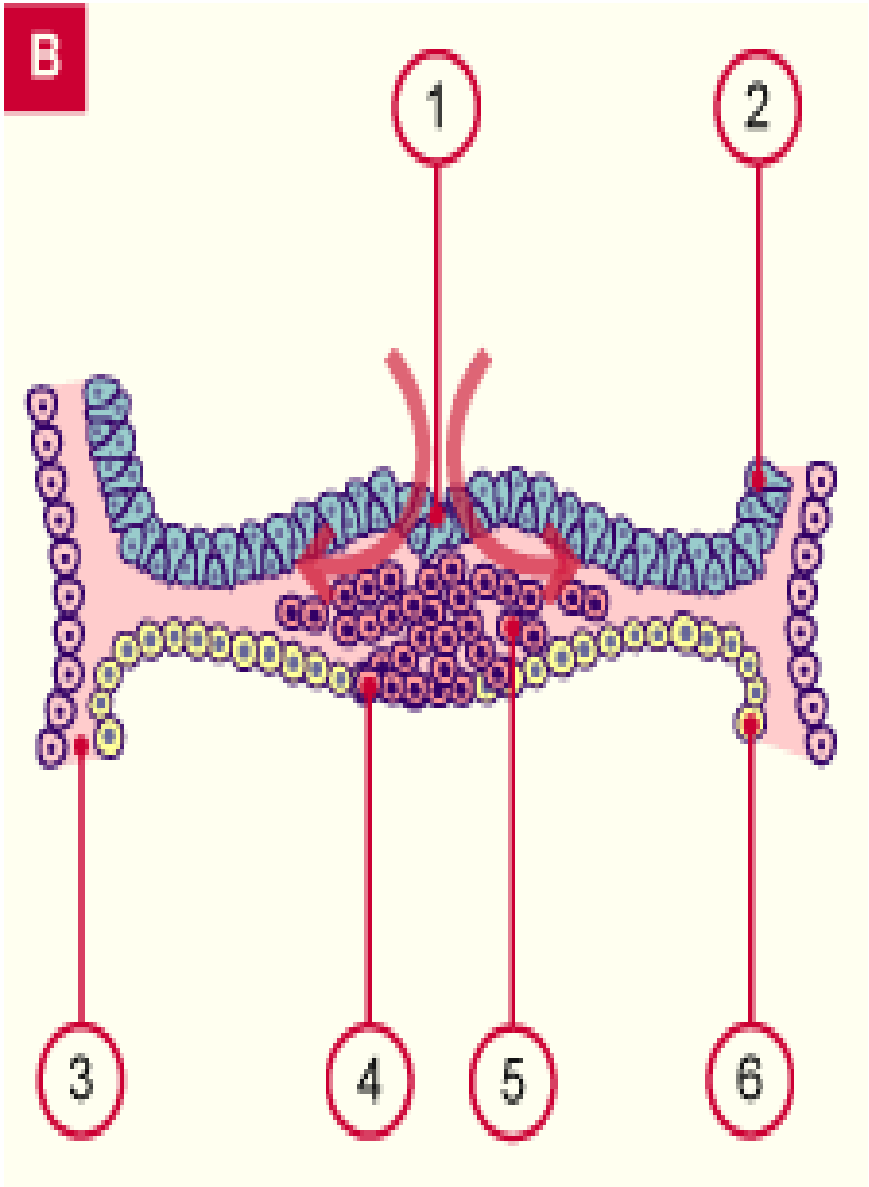


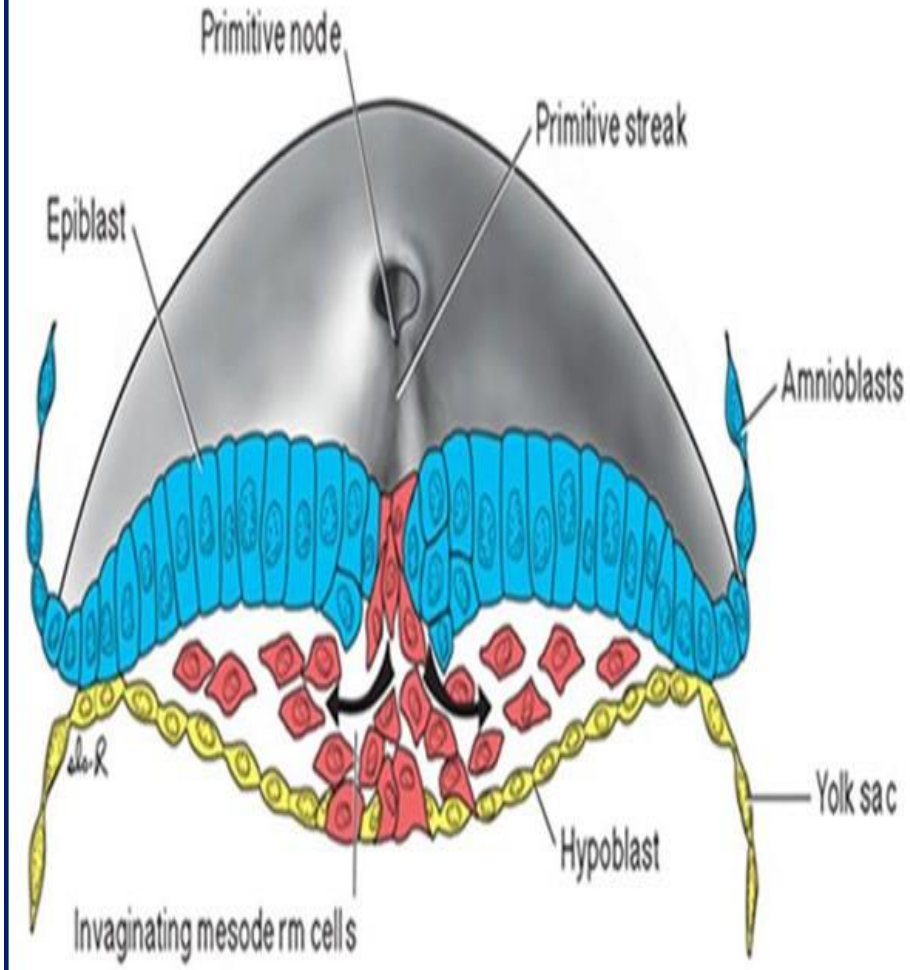
PROCESS OF INGRESSION



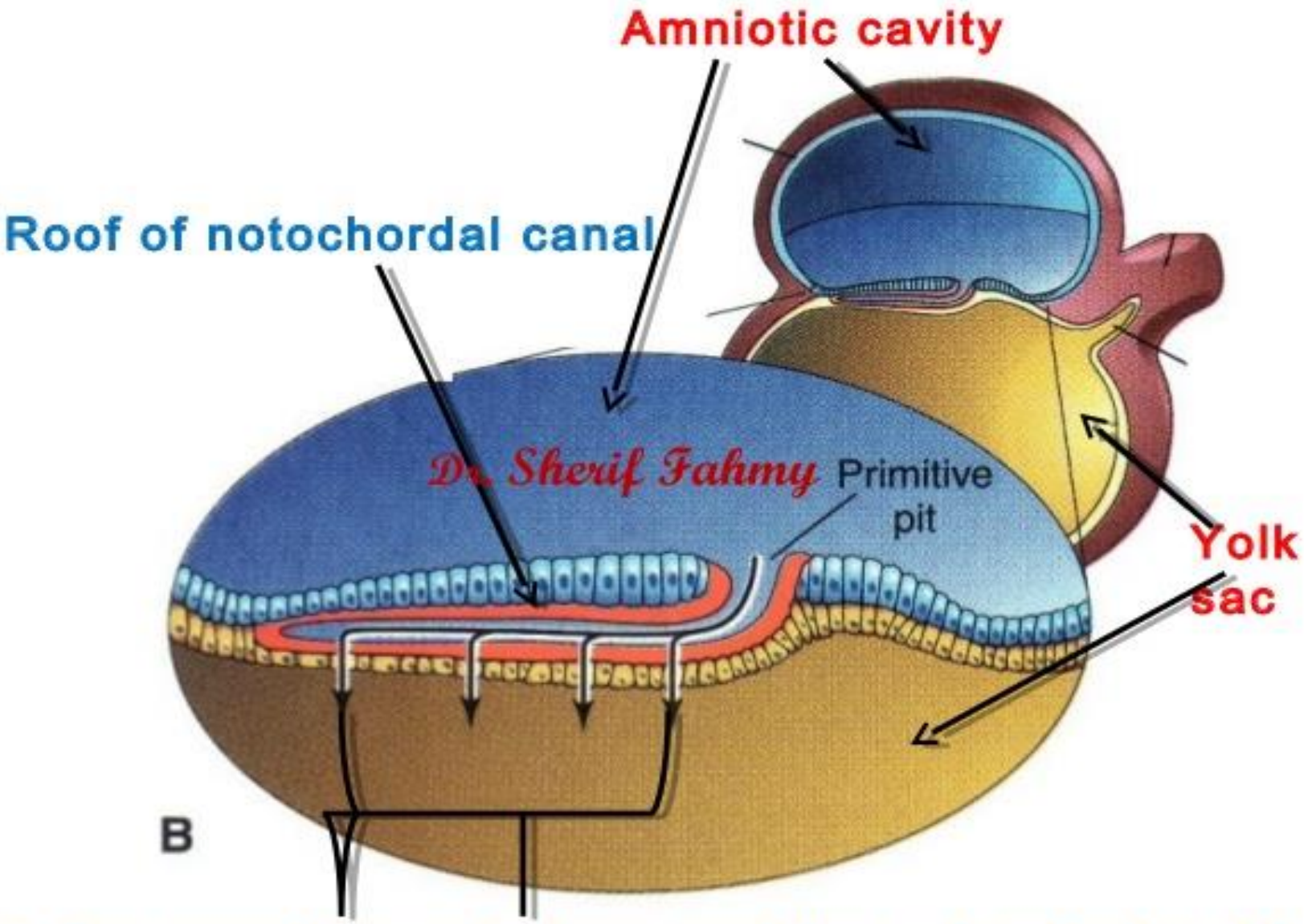

Neural ectoderm
Surface ectoderm
Notochord
Endoderm
Medial halves of the somites
Lateral halves of the somites
Mesoblast
Primordial germ cells
Extraembryonic mesoblast

FORMATION OF TRILAMINAR DISC- GASTRULATION



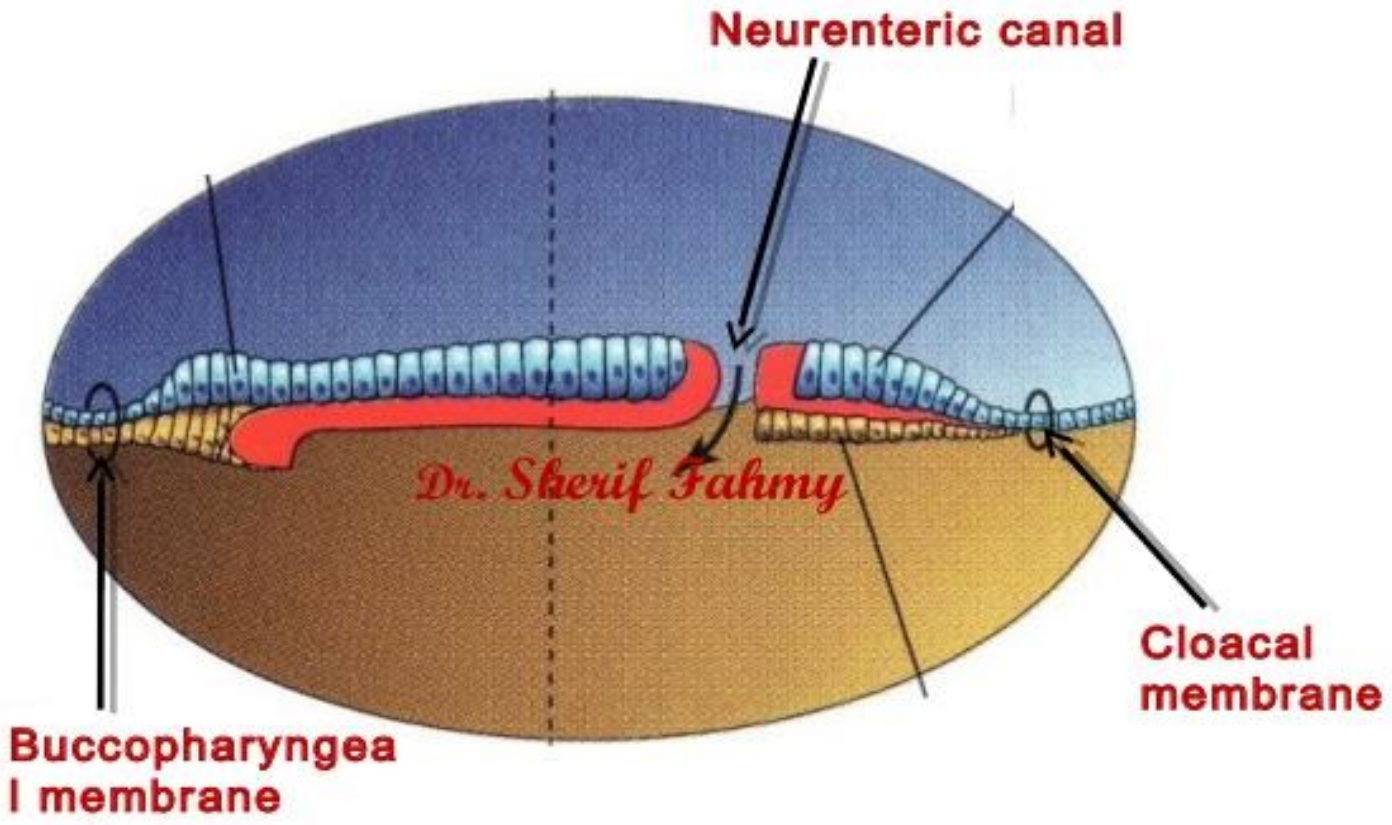


FORMATION OF NOTOCORD PROCESS

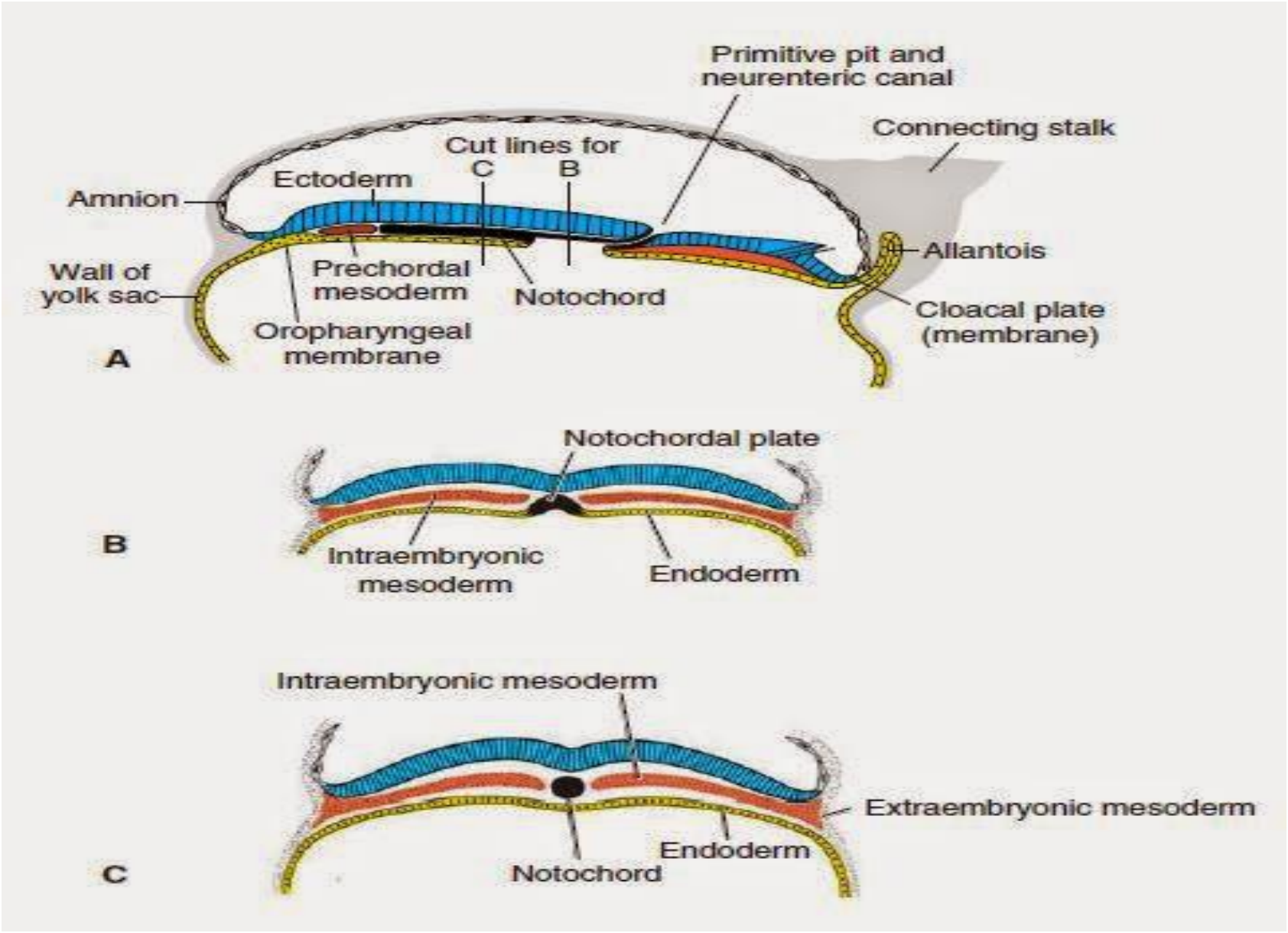


3-Degenerating endoderm and floor of notochordal

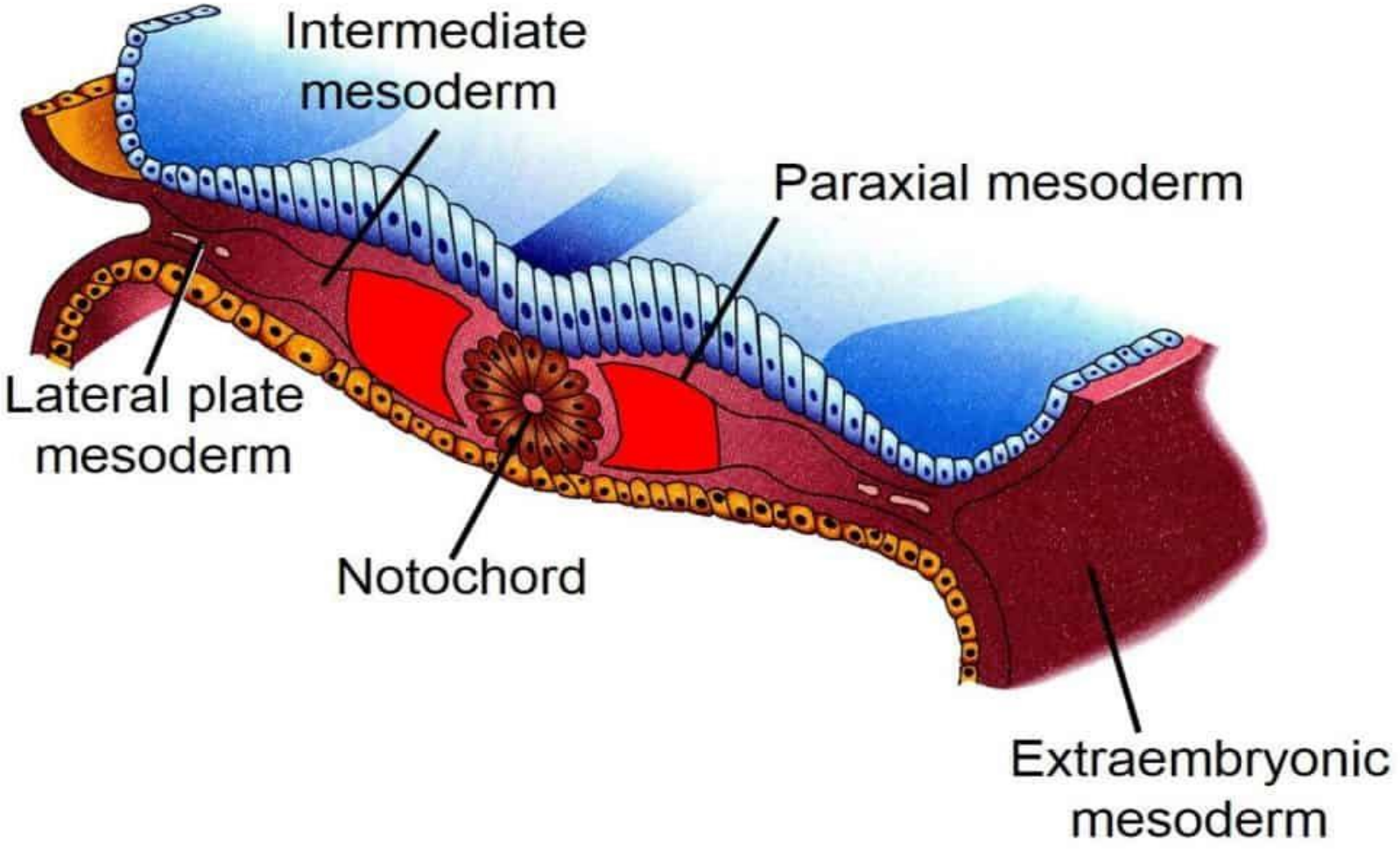
NEURO-ENTERIC CANAL



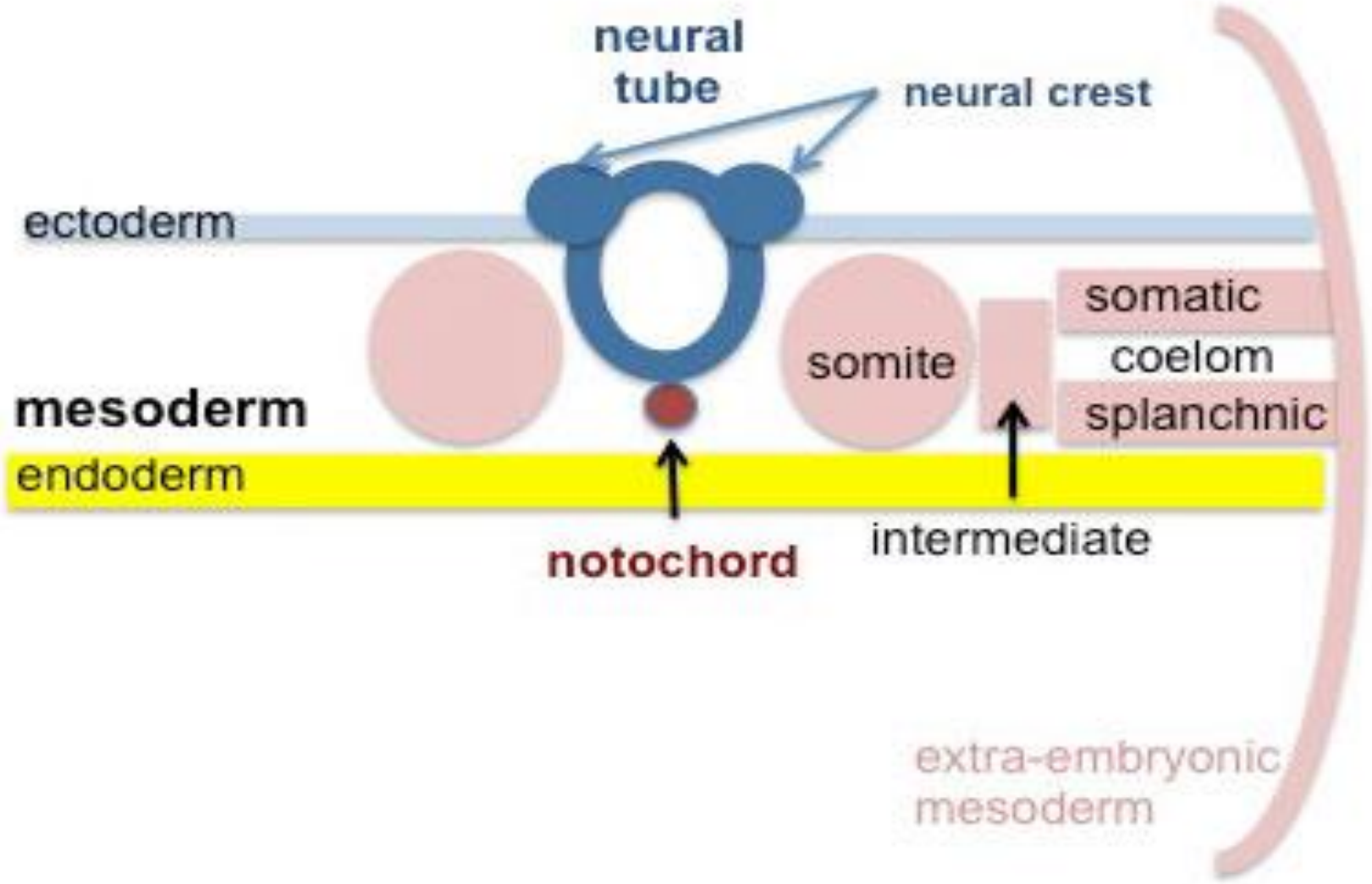
NOTOCORDAL PLATE & NOTOCORD



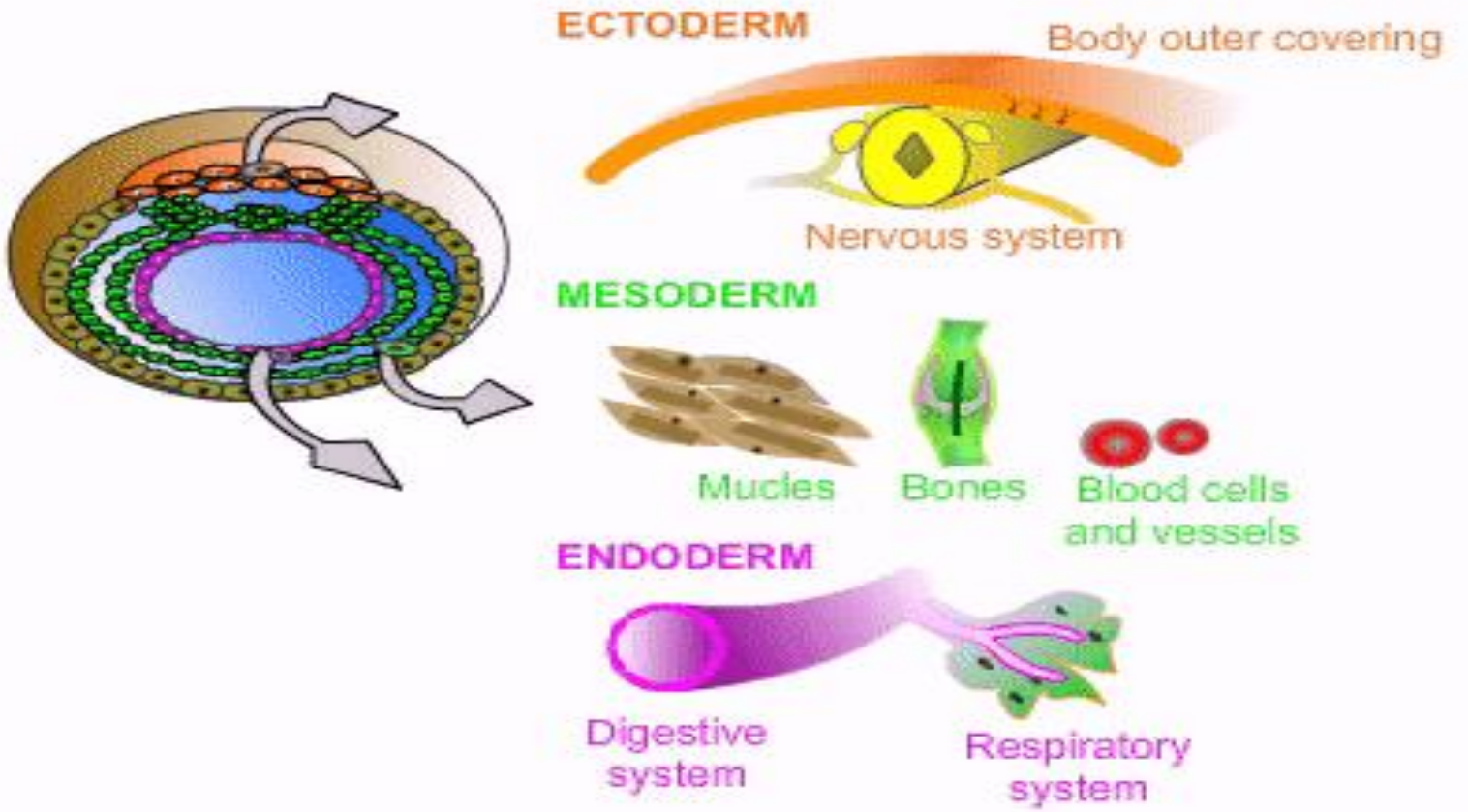
FINAL GERM LAYERS



GERM LAYERS


neural tube
neural crest
ectoderm
somatic
coelom
splanchnic
somite
mesoderm
endoderm
notochord
intermediate
extra-embryonic mesoderm

GERM LAYER DERIVATIVES



THANK YOU