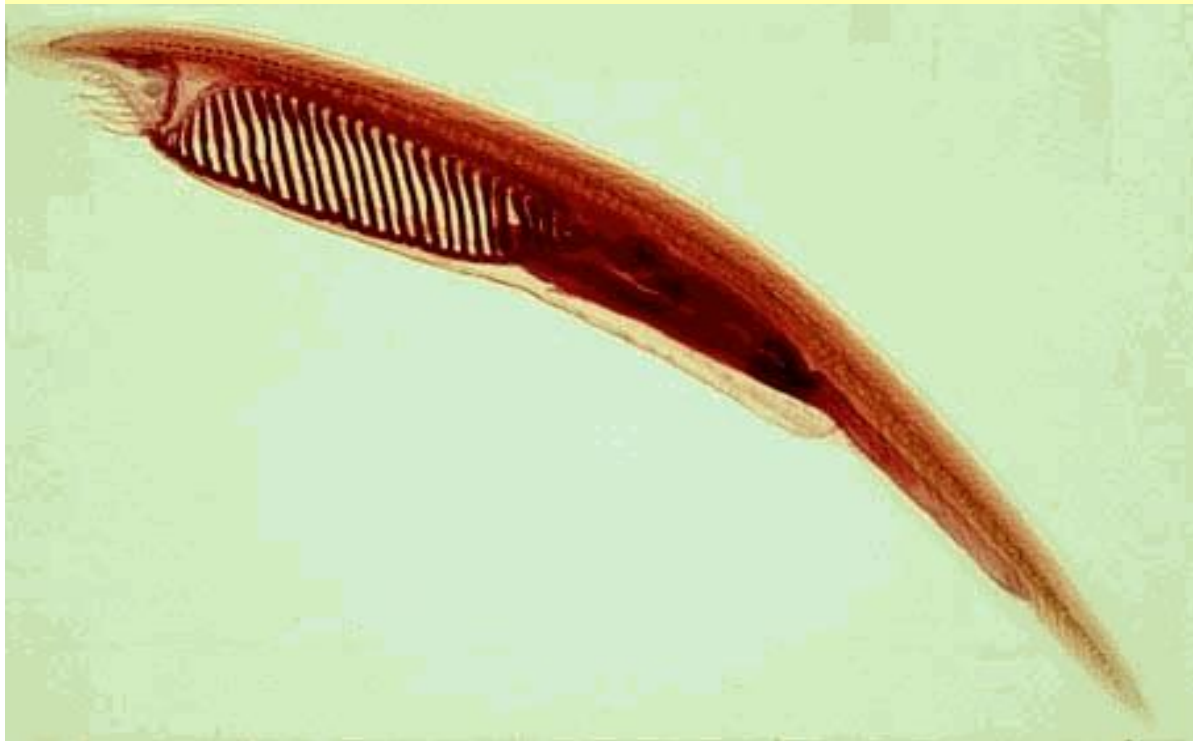
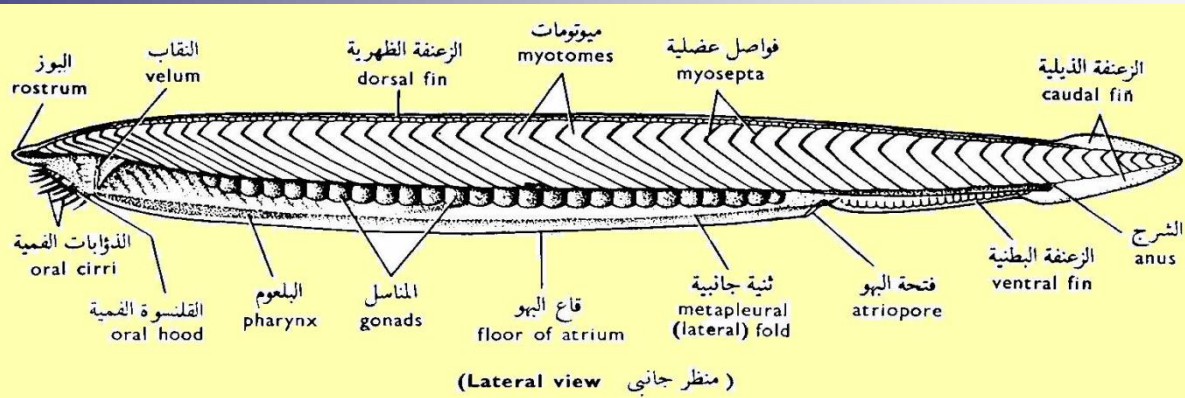




chapter 5

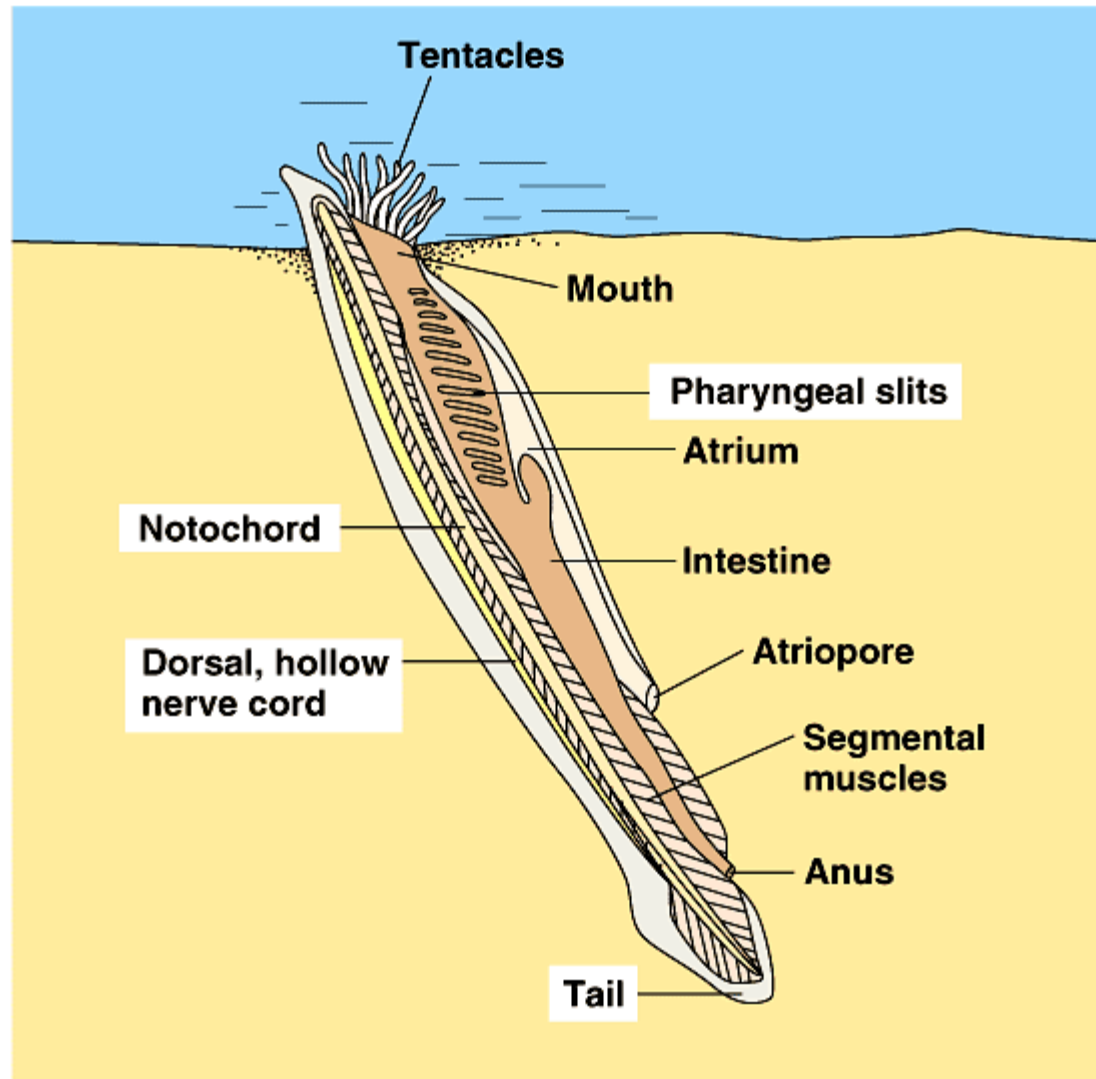
Amphioxus development



Amphioxus

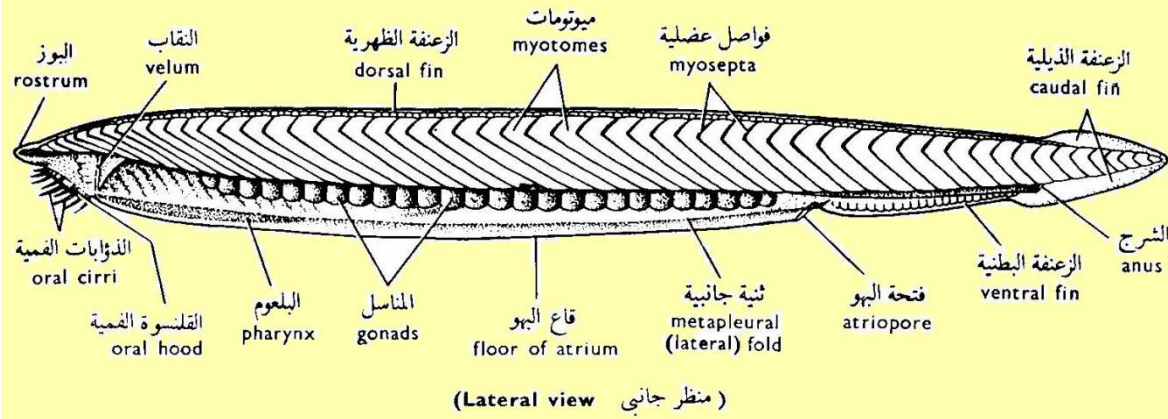
<http://comenius.susqu.edu/bi/202/Animals/DEUTEROSTOMES/cephalochordata/amphioxus2.gif>

From El- Banhawy et al., (1981) Text Book of Zoology fifth edition, Dar Almaaref)



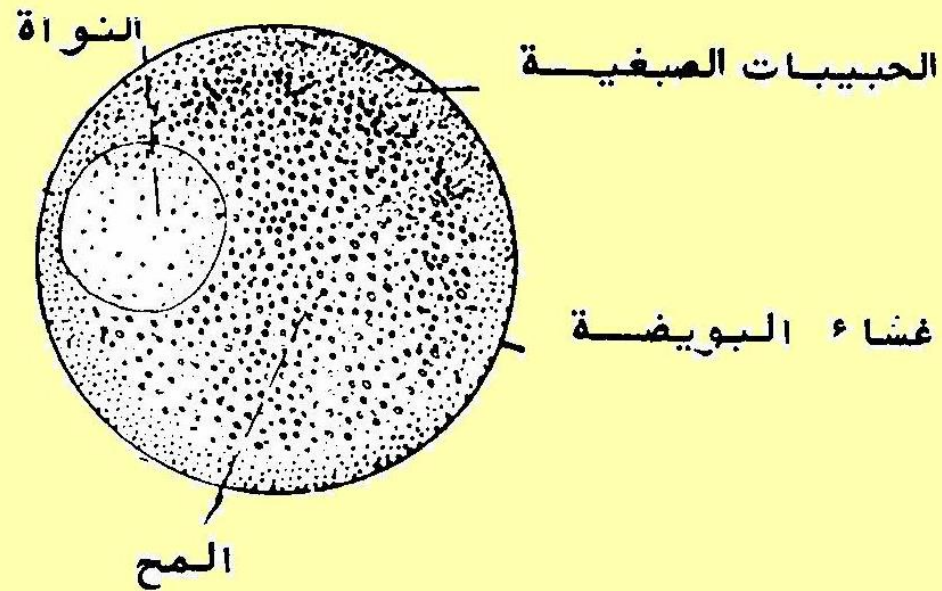
(a)

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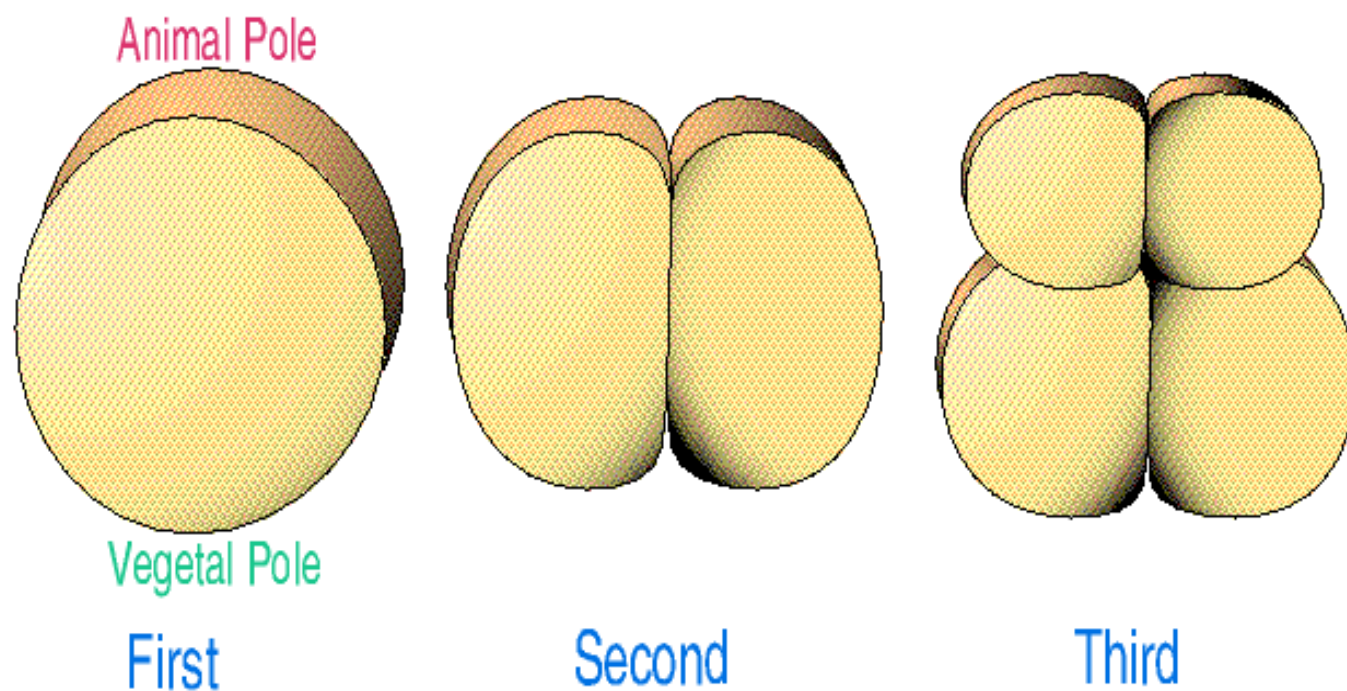
Amphioxus spermatozoa

(From Huettnner, 1949)



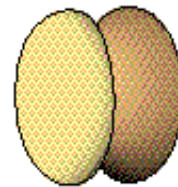
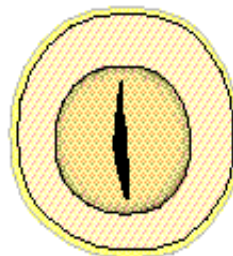
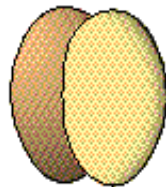
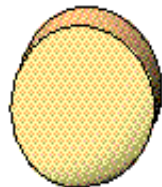
Amphioxus ova

Cleavage in Amphioxus



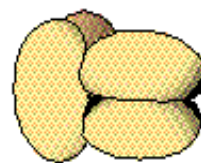
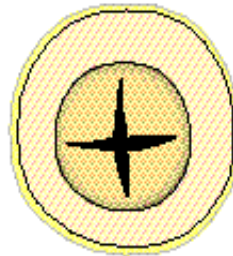
Summary of Cleavage

First



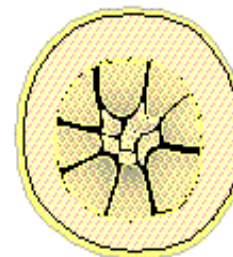
2-cell

Second



4-cell

Third



8-cell

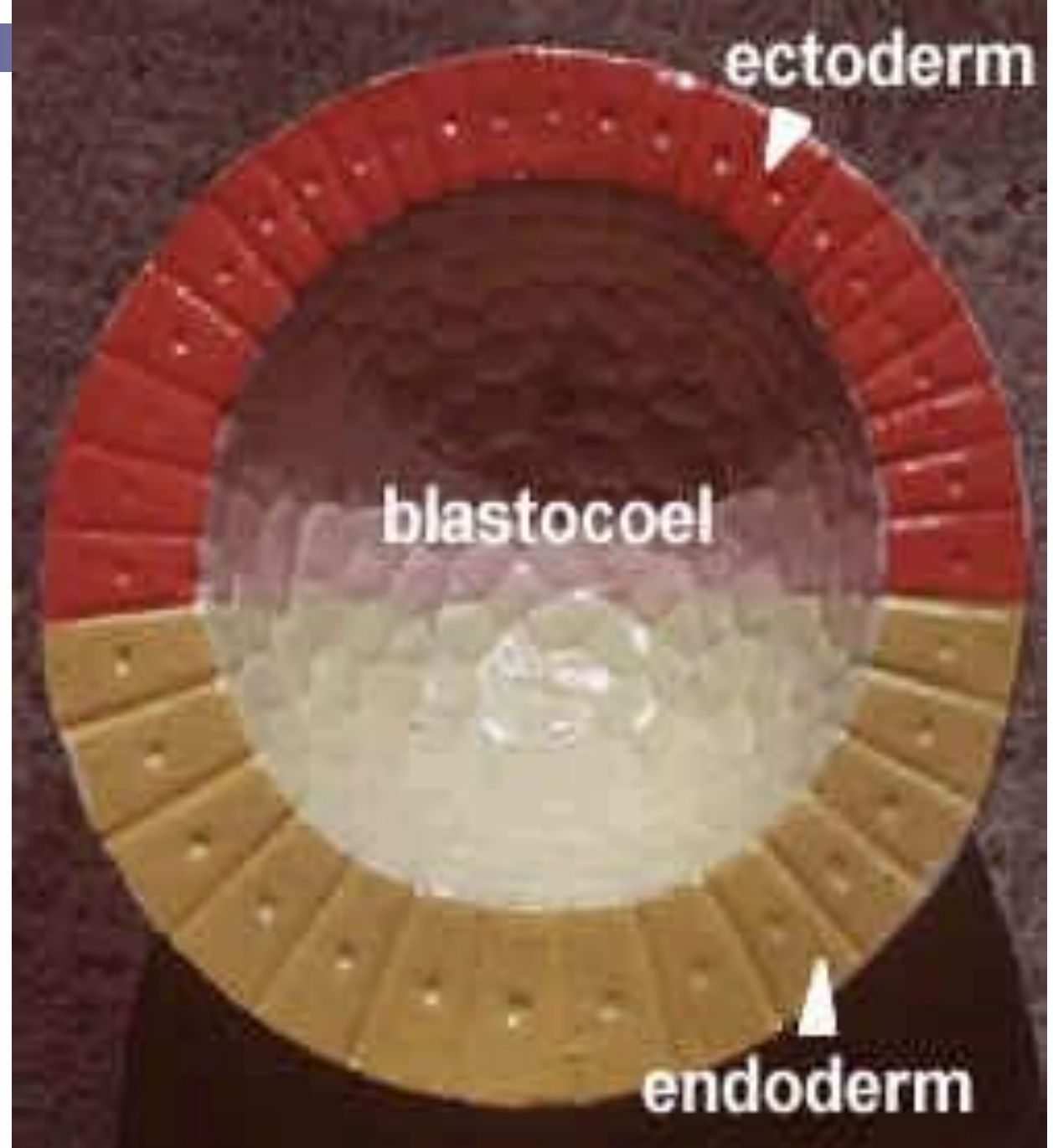
Amphioxus

Amphibian

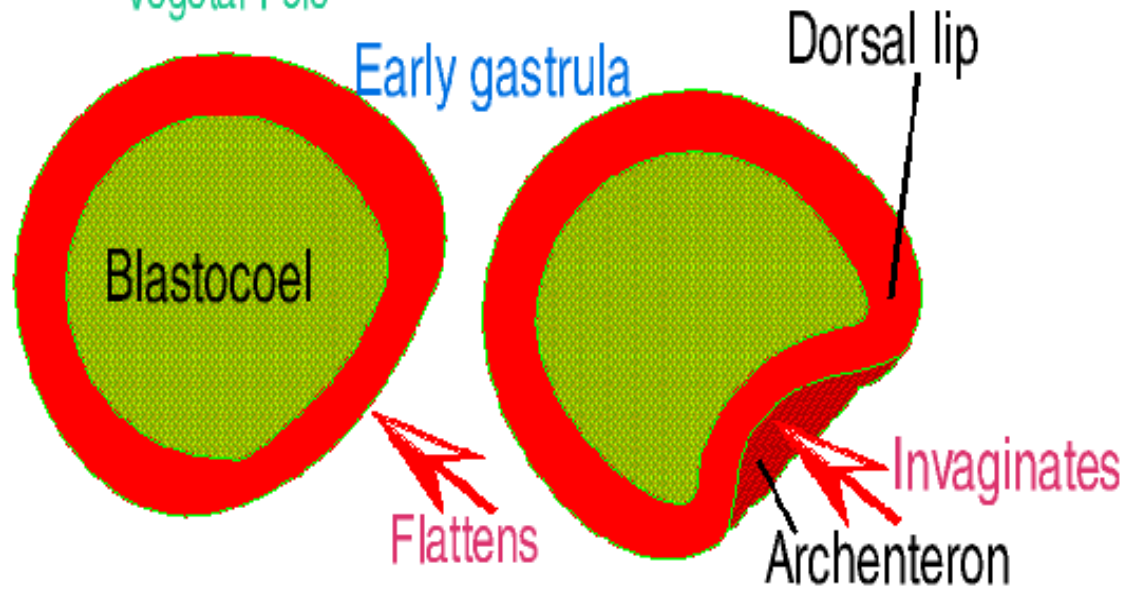
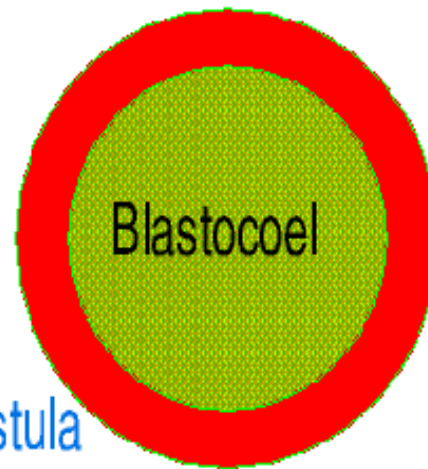
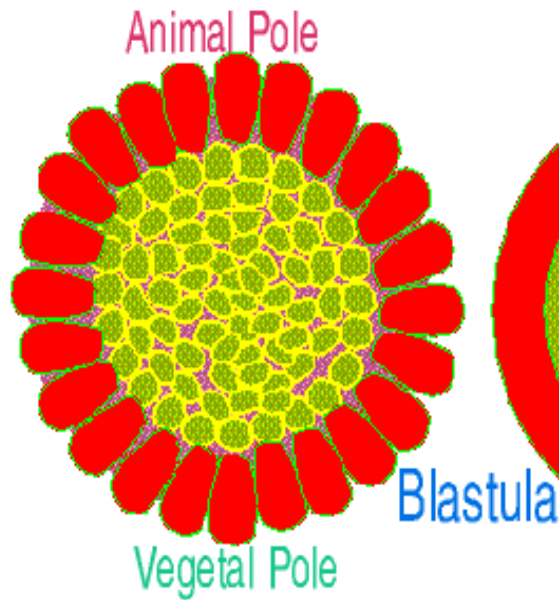
Bird

Mammal

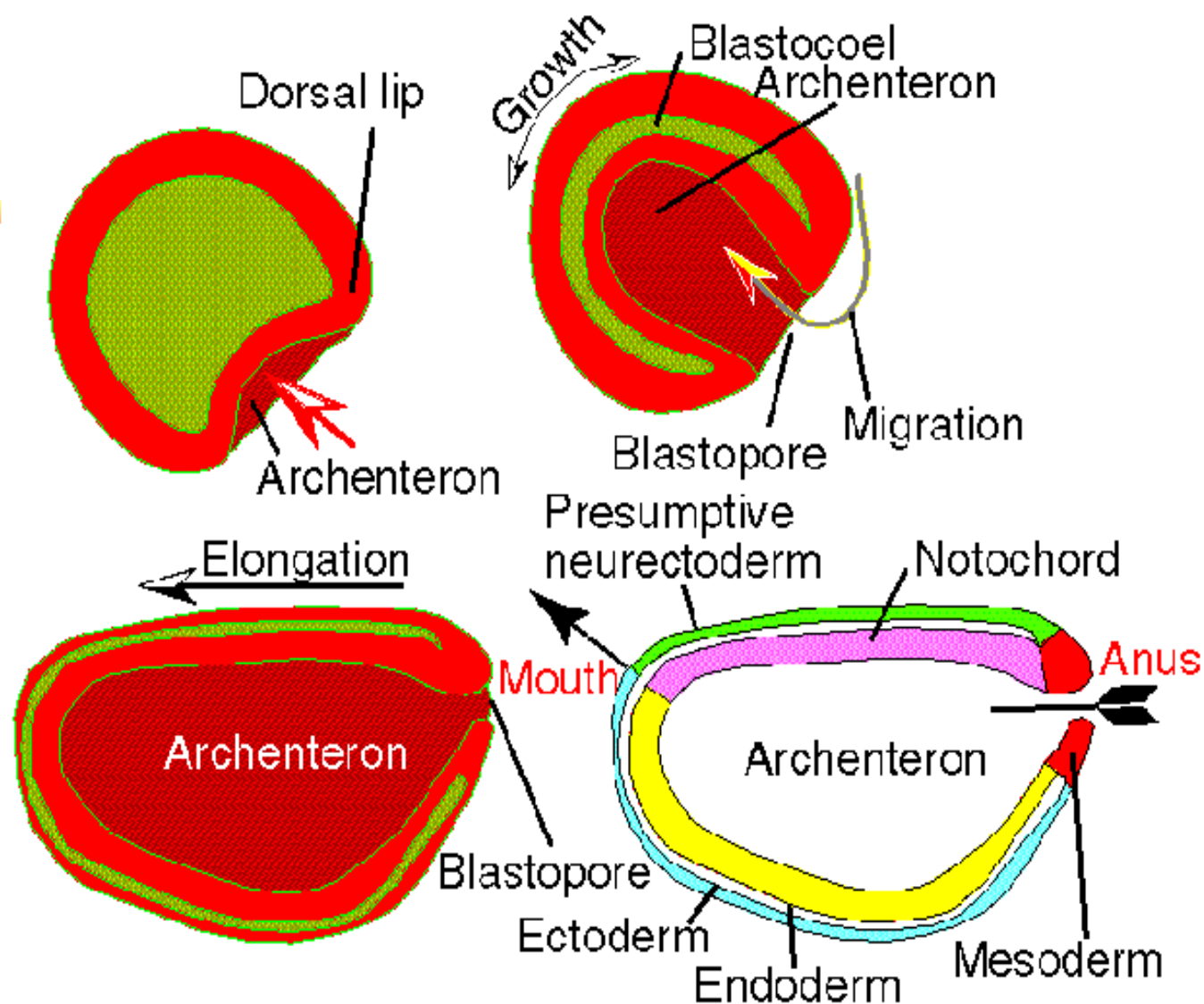
Blastula of
Amphioxus



Early



Late



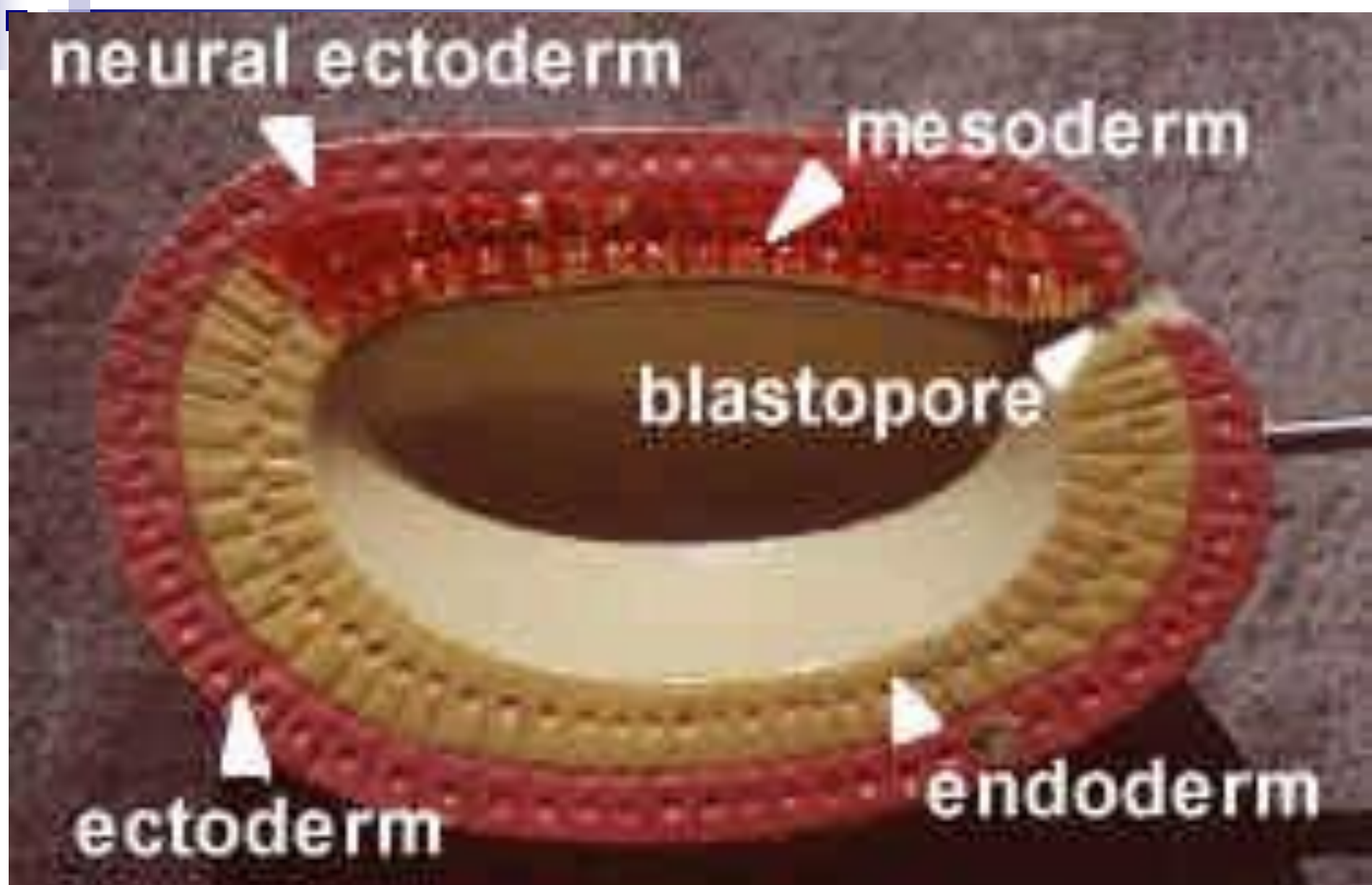
neural ectoderm

mesoderm

blastopore

ectoderm

endoderm



Cleavage



a.



b.



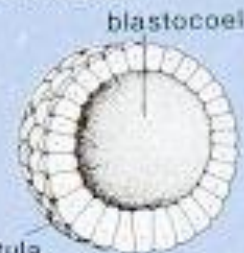
c.



d.

morula

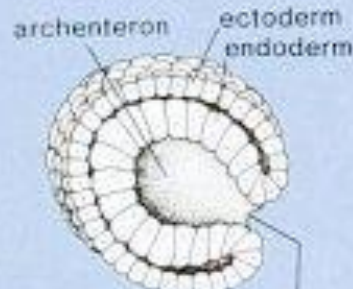
Gastrulation



e.

blastula

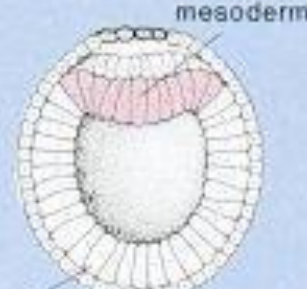
blastocoel



f.

archenteron
ectoderm

blastopore

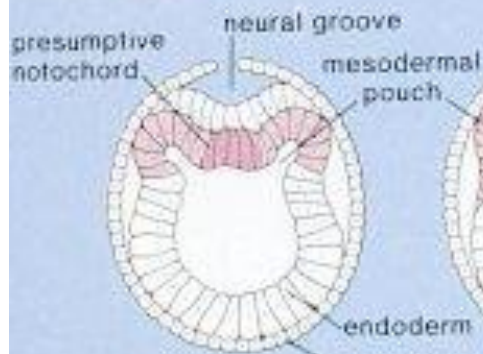


g.

mesoderm

gastrula

Neurulation



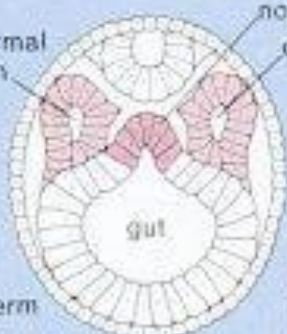
h.

presumptive
notochord

neural groove

mesodermal
pouch

endoderm
ectoderm



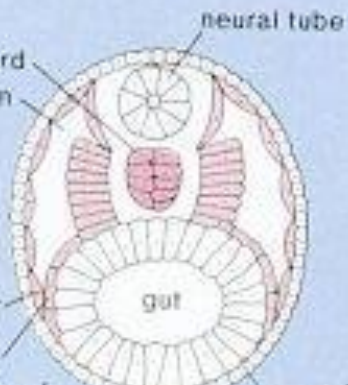
i.

notochord

coelom

gut

outer
and inner
layers of
mesoderm



j.

neural tube

neurula

<http://universe-review.ca/I10-55-gastrulation.jpg>

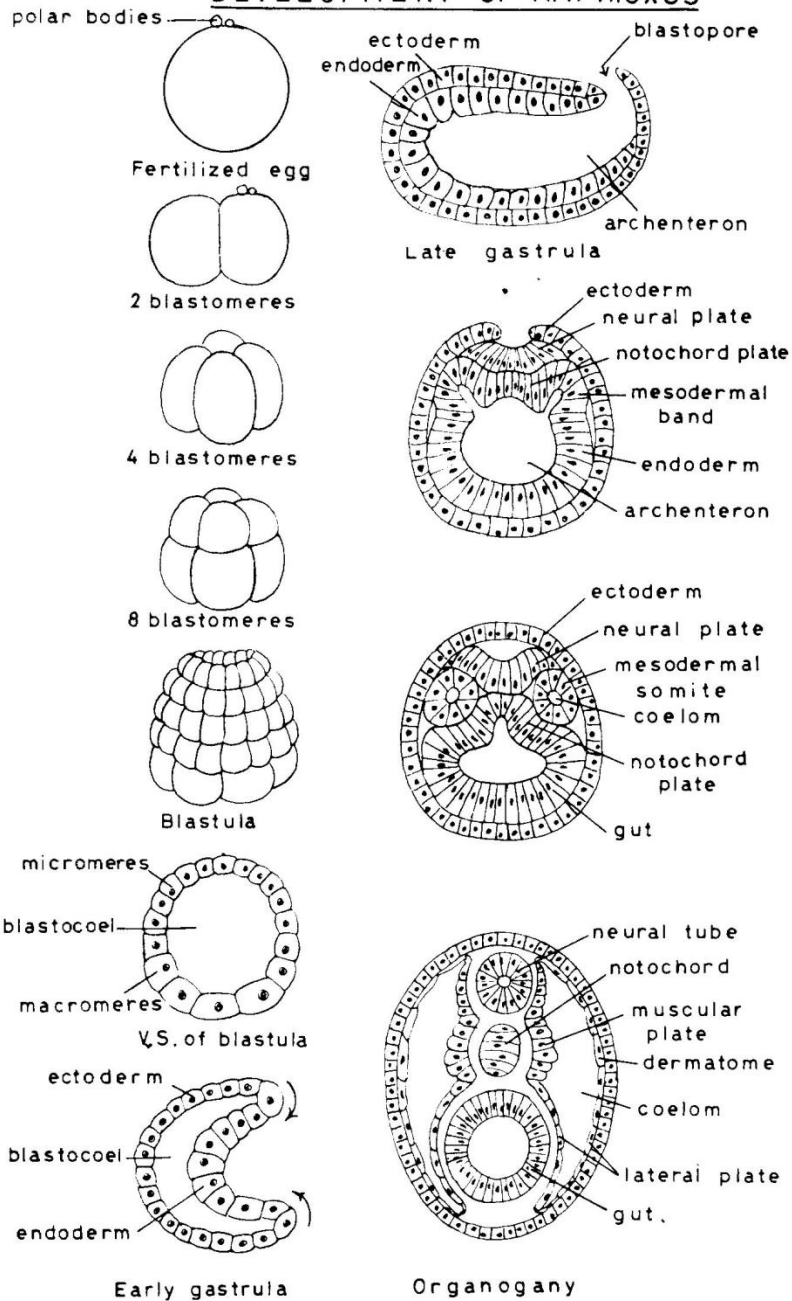
Embryonic Development of Lancelet:

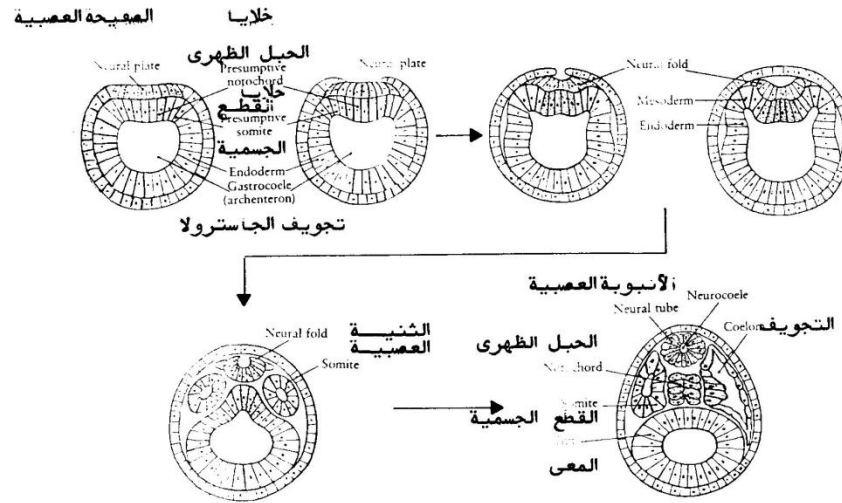
Cleavage produces the morula

Gastrulation by invagination produces the three germ layers

Neurulation produces the neural tube called the neurula

DEVELOPMENT OF AMPHIOXUS

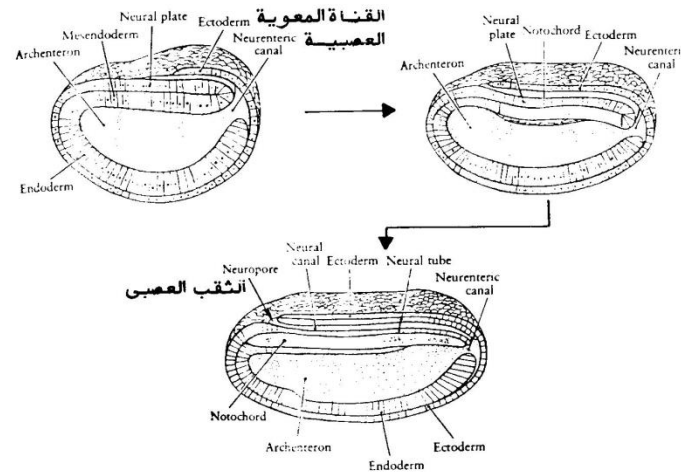




شكل (١٢:٥) قطاعات عرضية في أطوار التكوين الجنيني للسهم توضح تكوين

(From: Hopper & Hart, 1985)

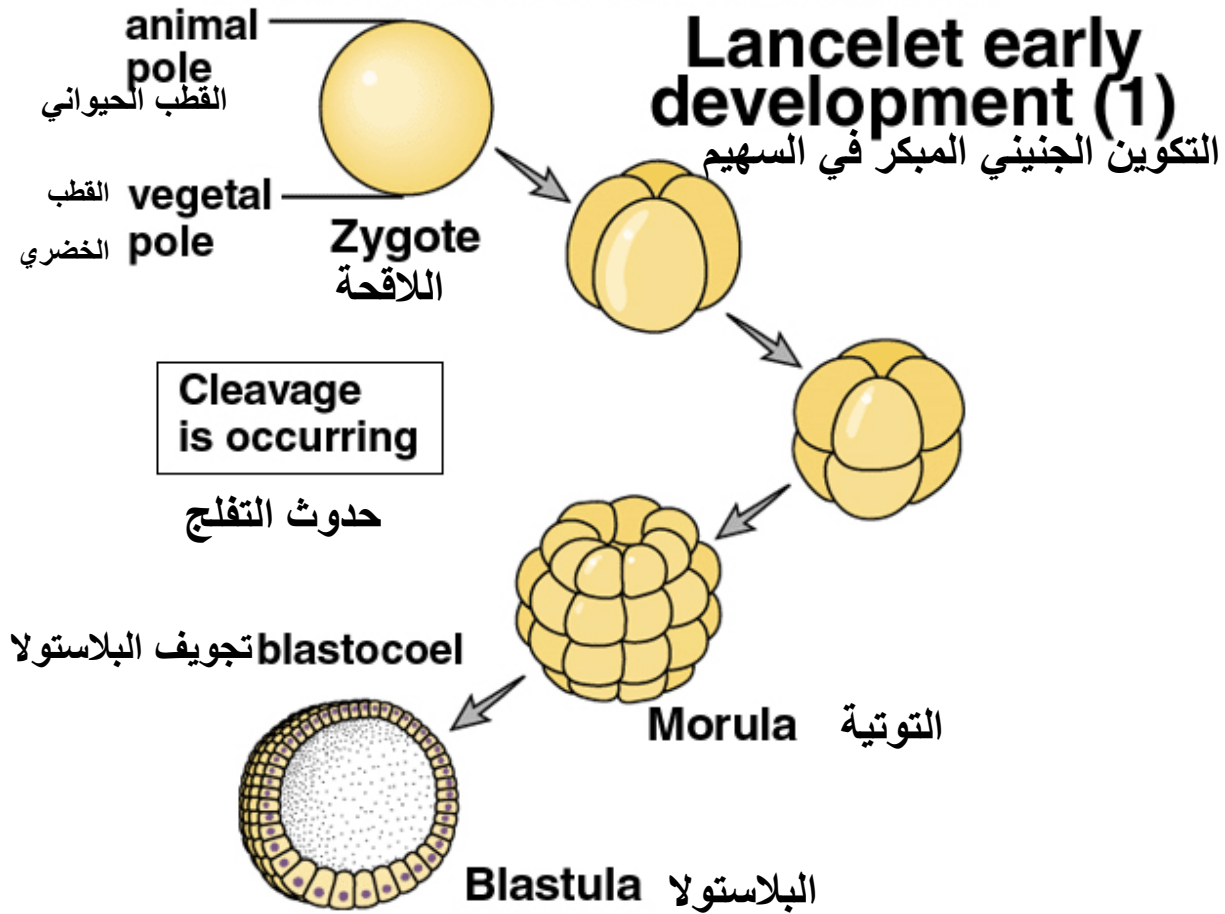
الأعضاء الرئيسية



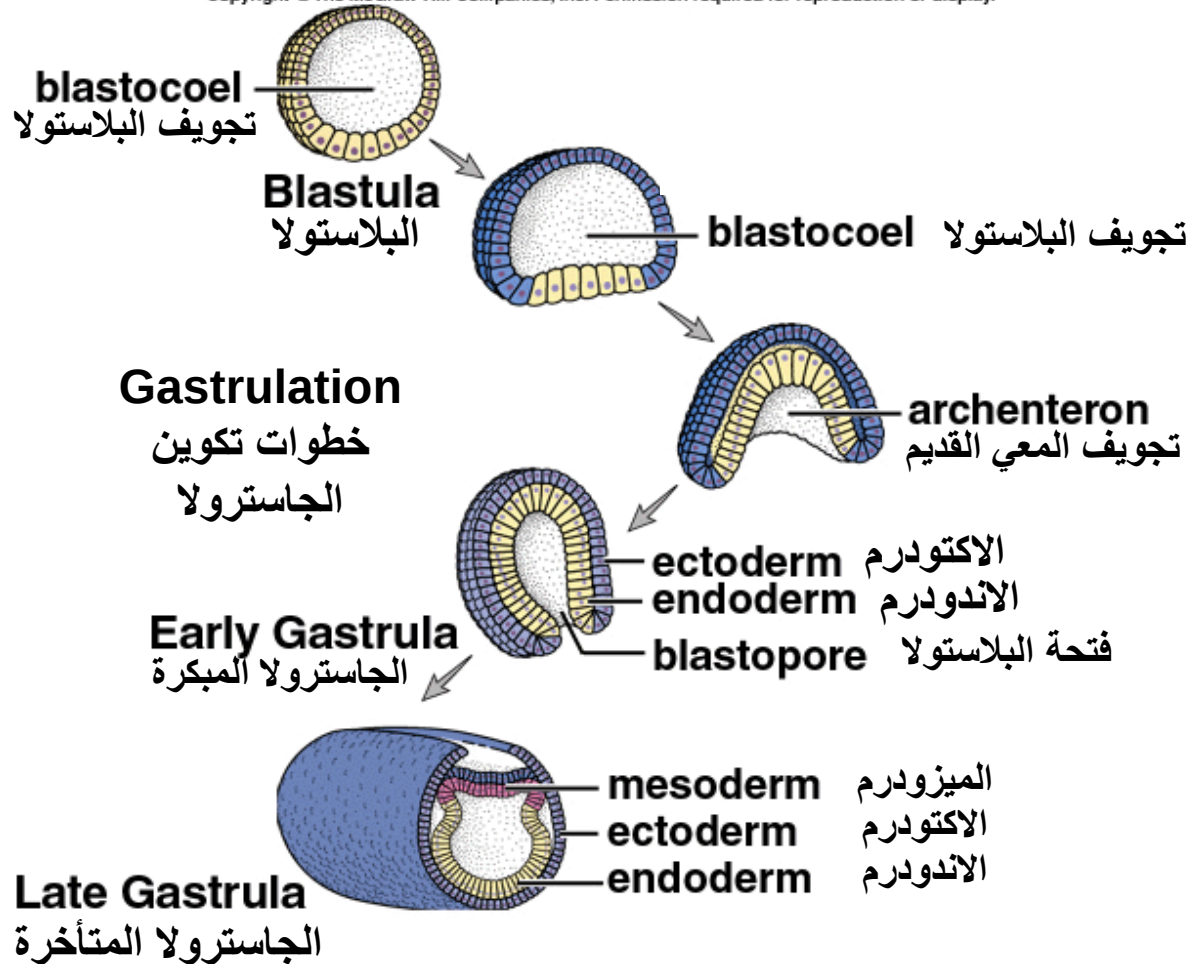
شكل (١٣:٥) قطاعات سهمية (طولية) في أطوار التكوين الجنيني توضح تكوين

(From: Hopper & Hart, 1985)

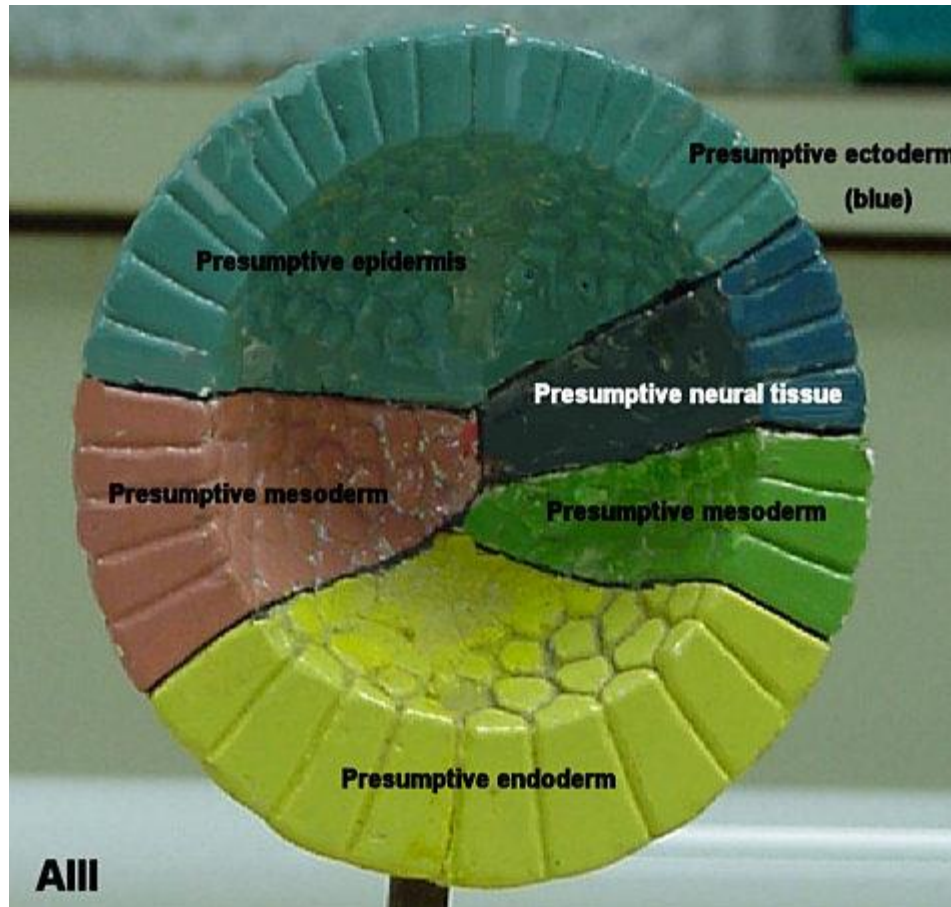
الأعضاء الرئيسية



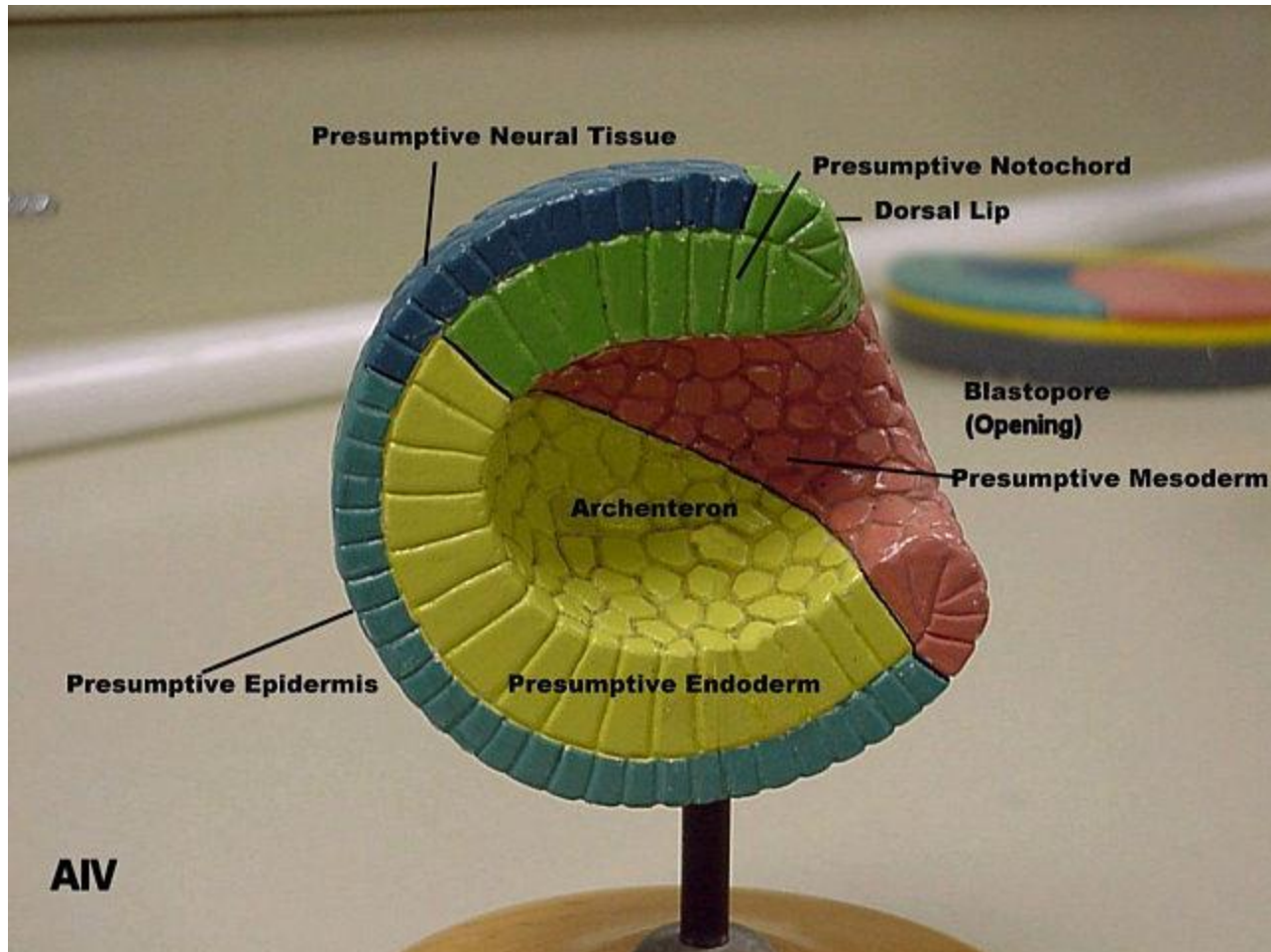
(from Biocourse.com)



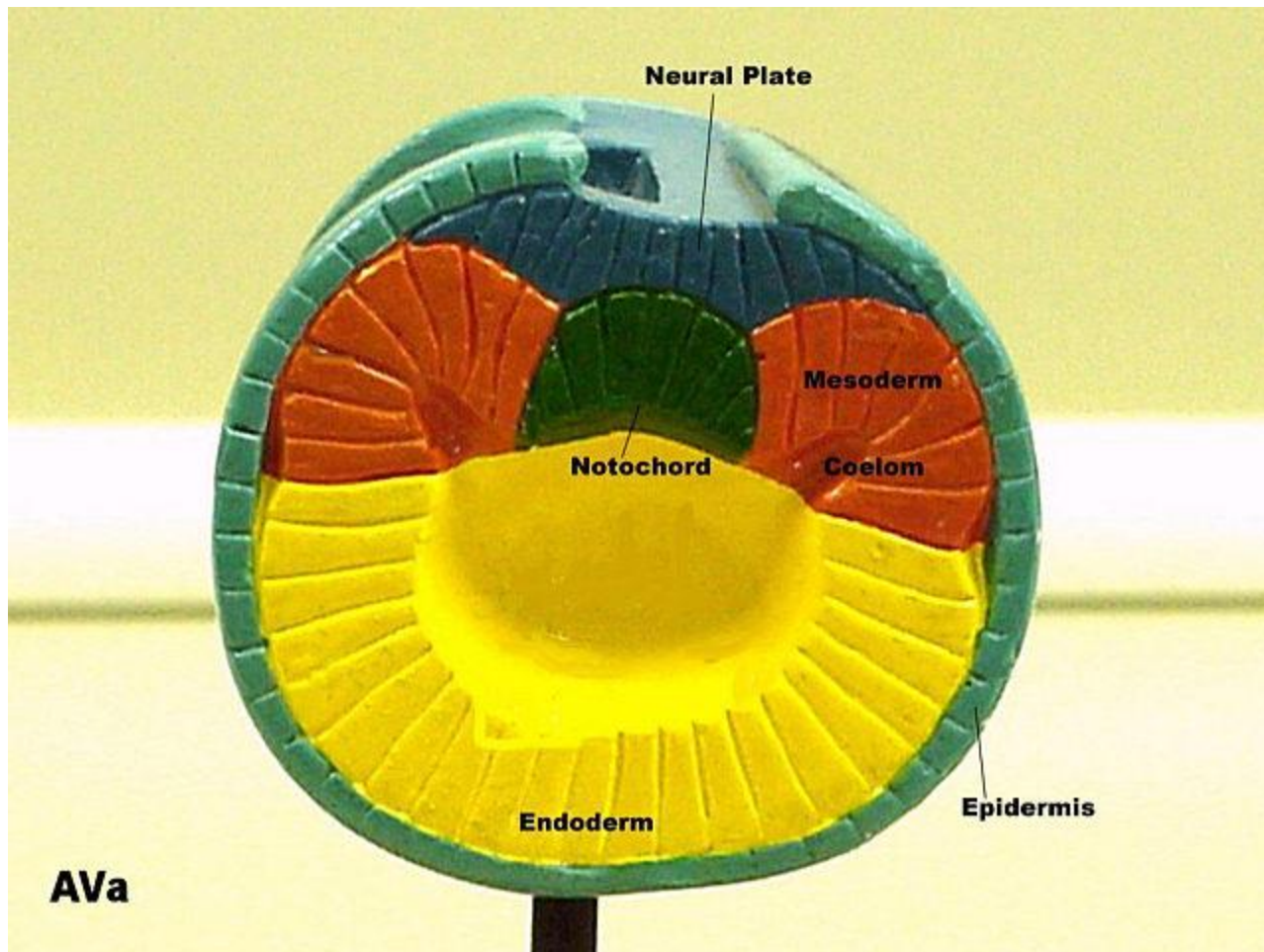
شكل (5 : 5) يبين تكوين الجاسترولا في حيوان السهم



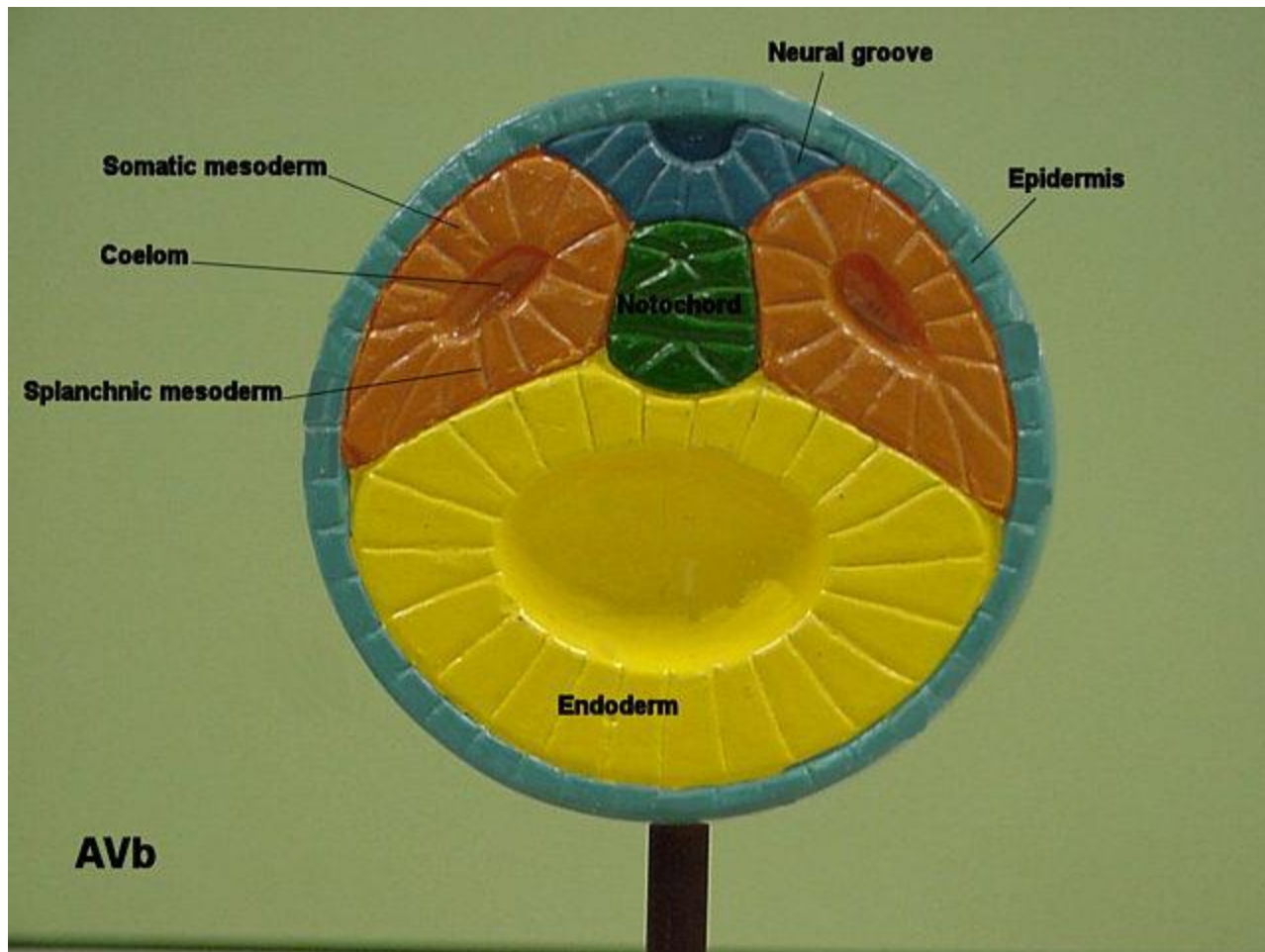
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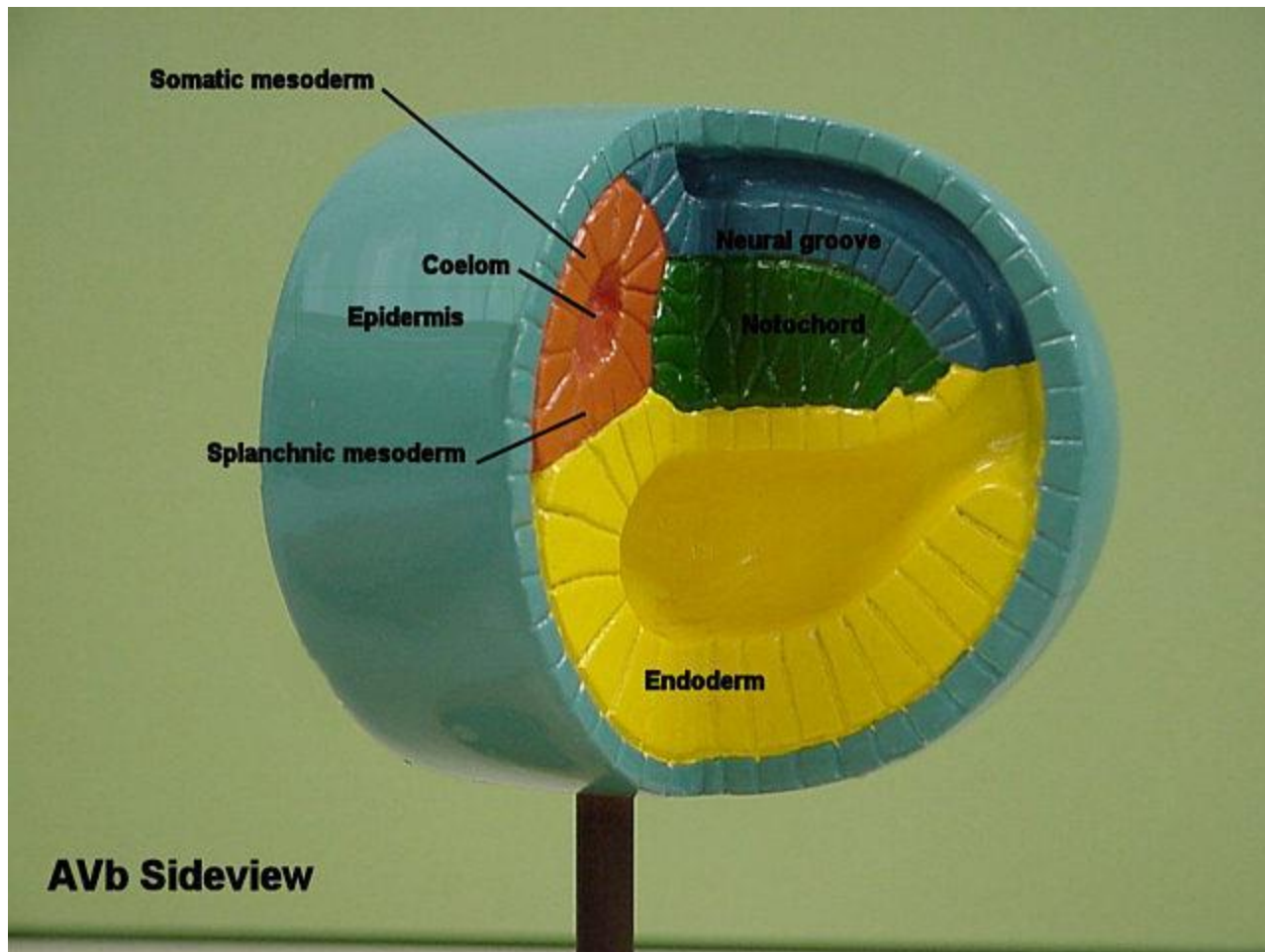
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TABLE 28.1 Derivatives of the Primary Germ Layers

<i>Ectoderm</i>	<i>Mesoderm</i>	<i>Endoderm</i>
All nervous tissue	Skeletal, smooth, and cardiac muscle	Epithelium of digestive tract (except that of oral and anal cavities)
Epidermis of skin and epidermal derivatives (hairs, hair follicles, sebaceous and sweat glands, nails)	Cartilage, bone, and other connective tissues	Glandular derivatives of digestive tract (liver, pancreas)
Cornea and lens of eye	Blood, bone marrow, and lymphoid tissues	Epithelium of respiratory tract, auditory tube, and tonsils
Epithelium of oral and nasal cavities, of paranasal sinuses, and of anal canal	Endothelium of blood vessels and lymphatics	Thyroid, parathyroid, and thymus glands
Tooth enamel	Serosae of ventral body cavity	Epithelium of reproductive ducts and glands
Epithelium of pineal and pituitary glands and adrenal medulla	Fibrous and vascular tunics of eyes	Epithelium of urethra and bladder
Melanocytes	Synovial membranes of joint cavities	
Some cranial bones and branchial cartilages (derived from neural crest)	Organs of urogenital system (ureters, kidneys, gonads, and reproductive ducts)	

The Endoderm
(Internal Layer)



Lung Cell
(Alveolar Cell)



Thyroid Cell



Pancreatic
Cell

Skin Cells
of
Epidermis



Neuron
of Brain



Pigment
Cell

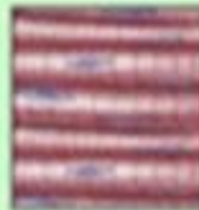


Ectoderm
(External Layer)

Mesoderm
(Middle Layer)



Cardiac
Muscle



Skeletal
Muscle
Cells



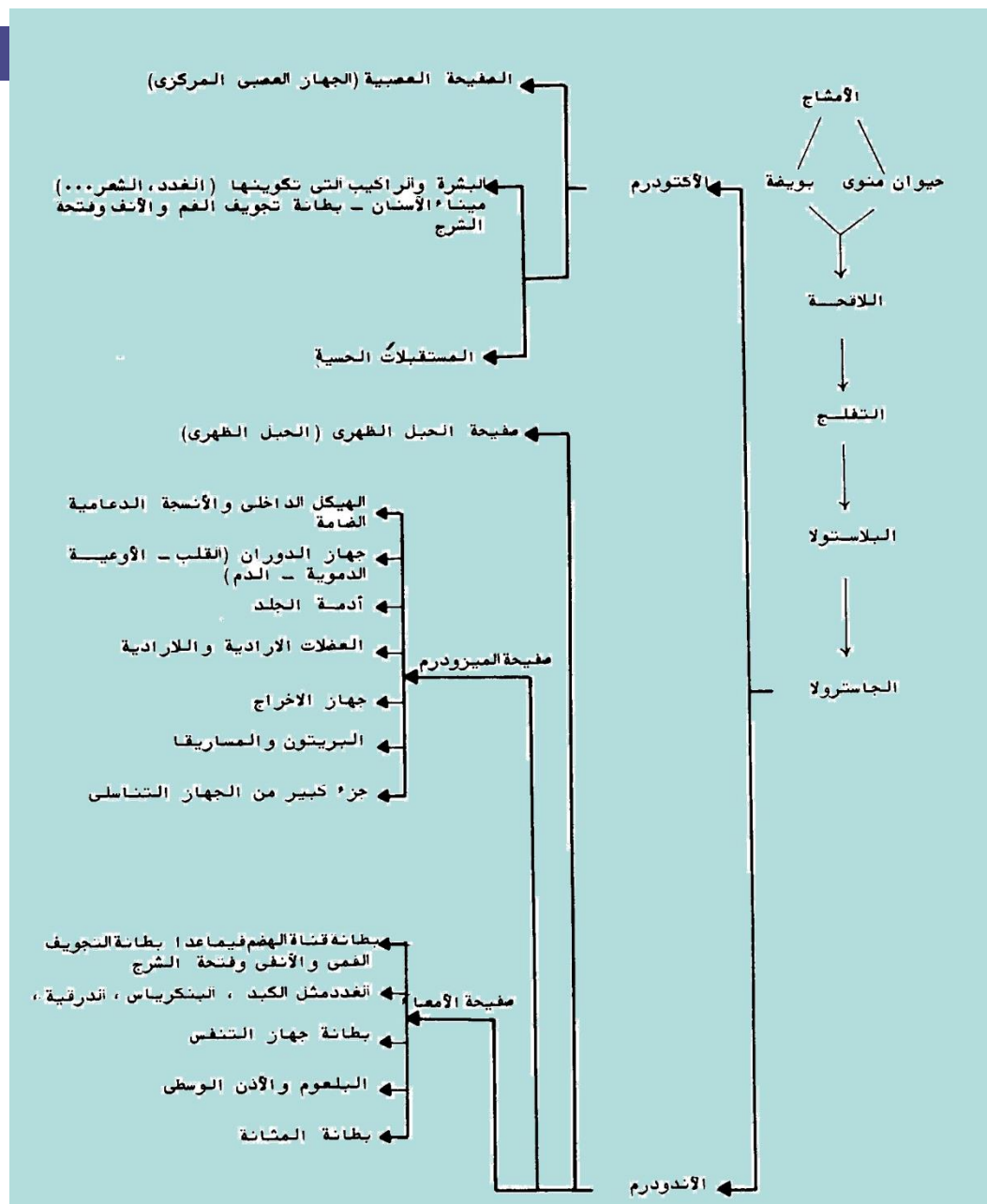
Tubule
Cell of
the Kidney



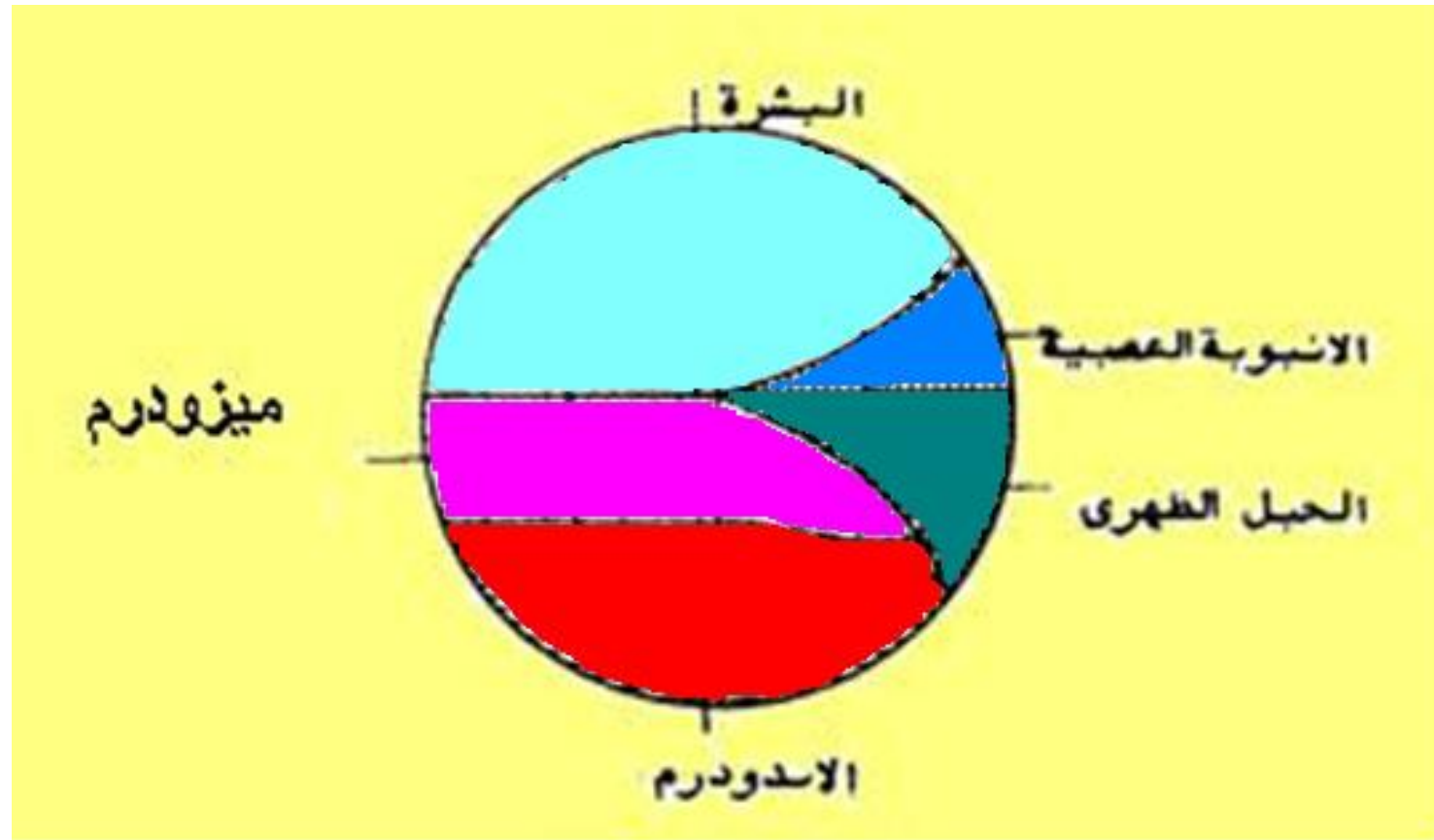
Red Blood
Cells



Smooth
Muscle
(in Gut)



شكل (5 : 6) نموذج لتكوين جنين فقاري و ما تعطيه كل طبقة من طبقات الجاسترولا



شكل (5 - 6) خريطة المصير في السهم