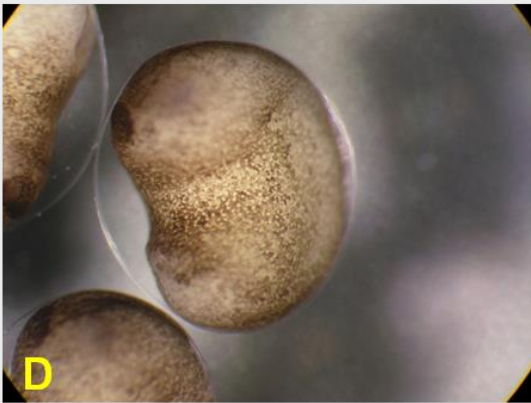
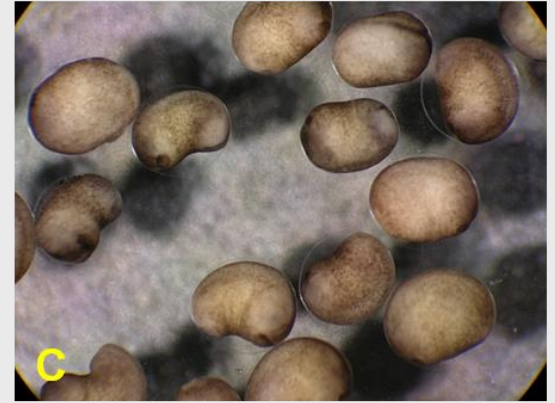
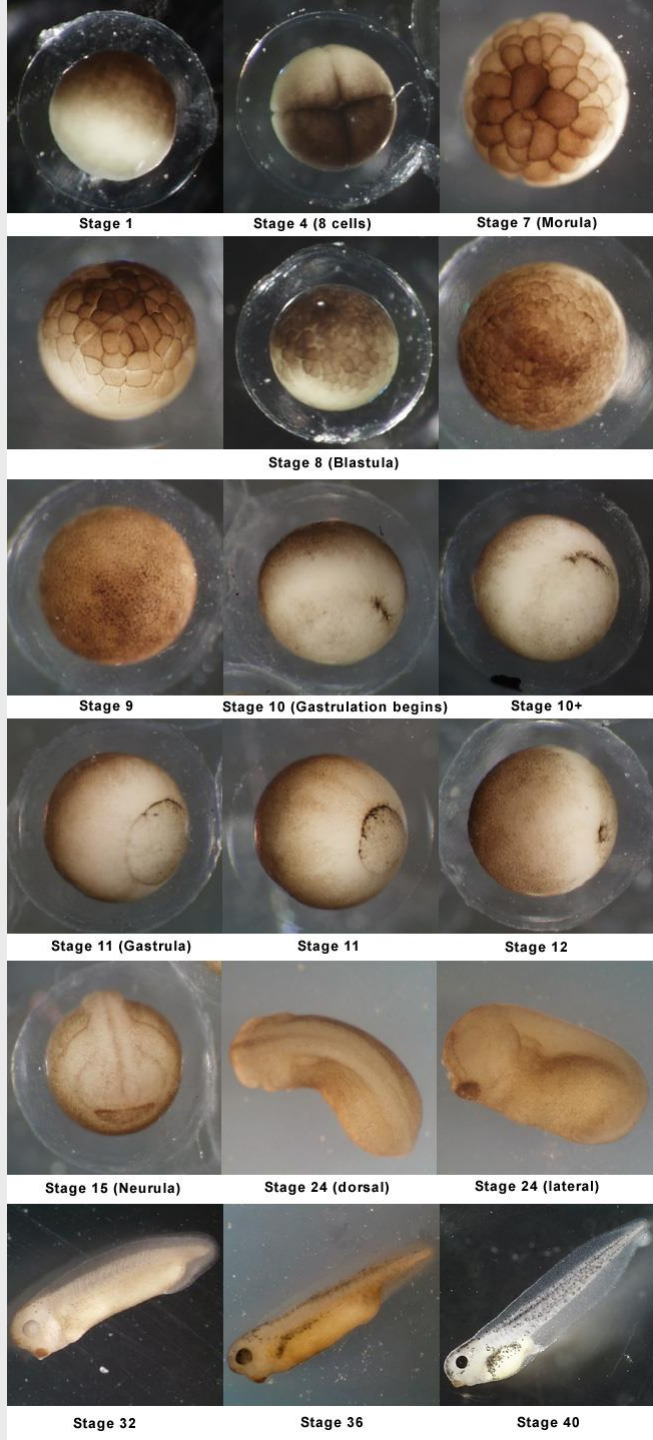


TP1 SV H



De l'œuf au têtard à l'éclosion



Les différents types de coupes

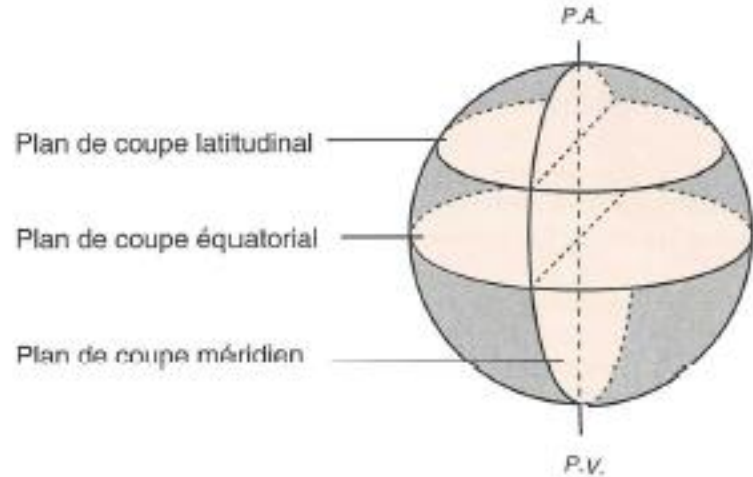
(très utile pour interpréter les coupes suivantes)

Coupe frontale

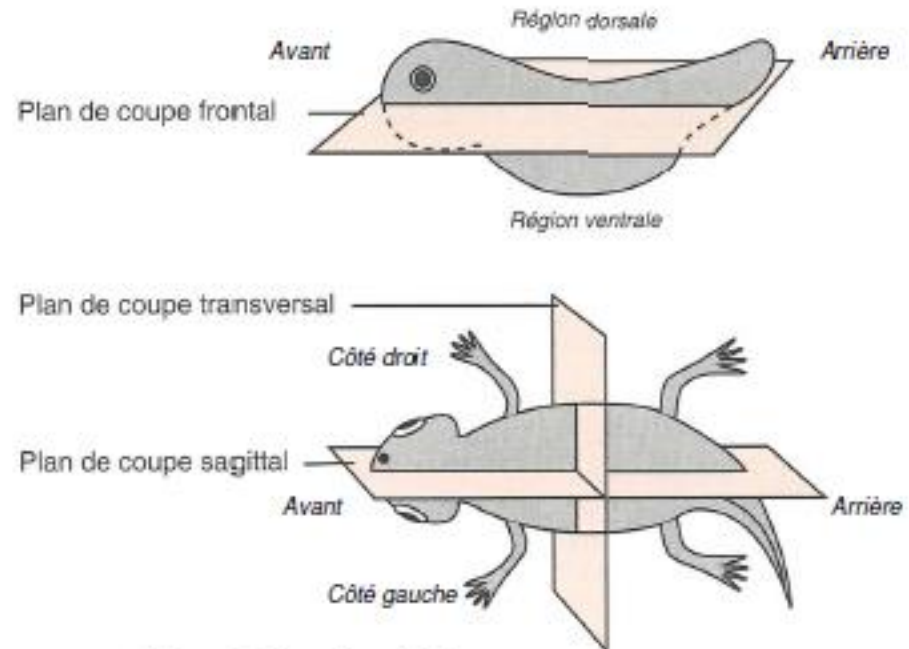
Coupe transversale

Coupe sagittale

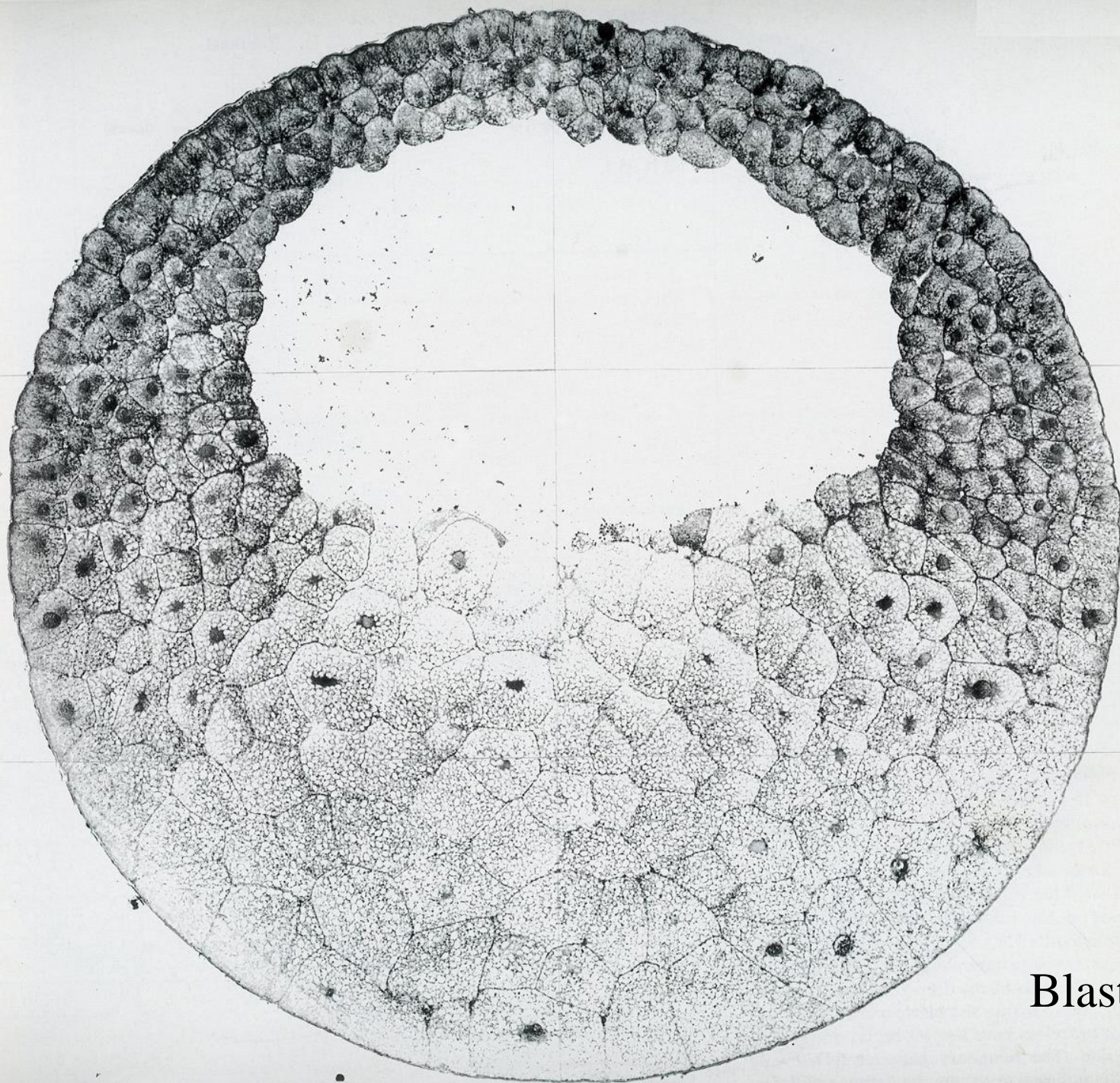
1°) Par rapport à l'axe pôle animal - pôle végétatif



2°) Par rapport aux axes antéro-postérieur et dorso-ventral



▲ FIGURE f. Axes de polarité et coupes.
D'après FRANQUINET & FOUCRIER (2003).



Blastula

PLATE 17

Fine-cell blastula

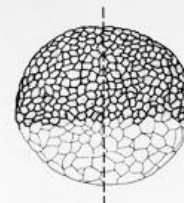
Embryo stage 9

7 h p.f.

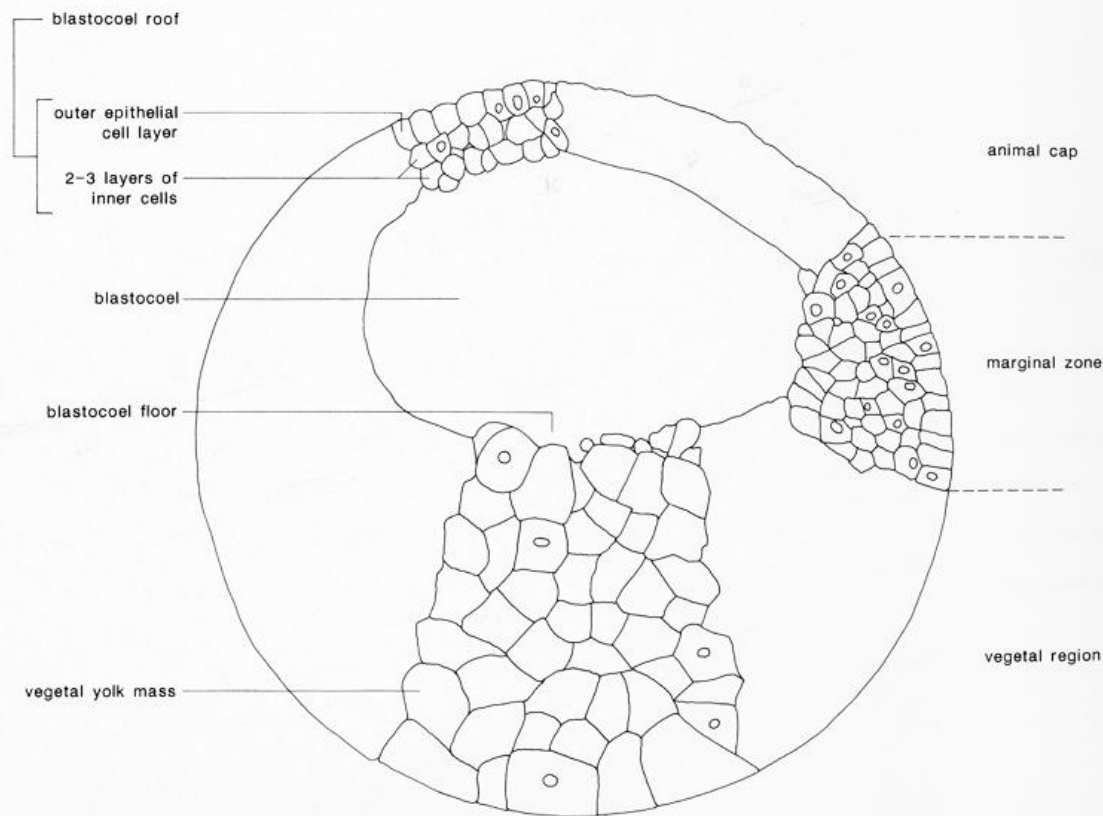
animal



vegetal



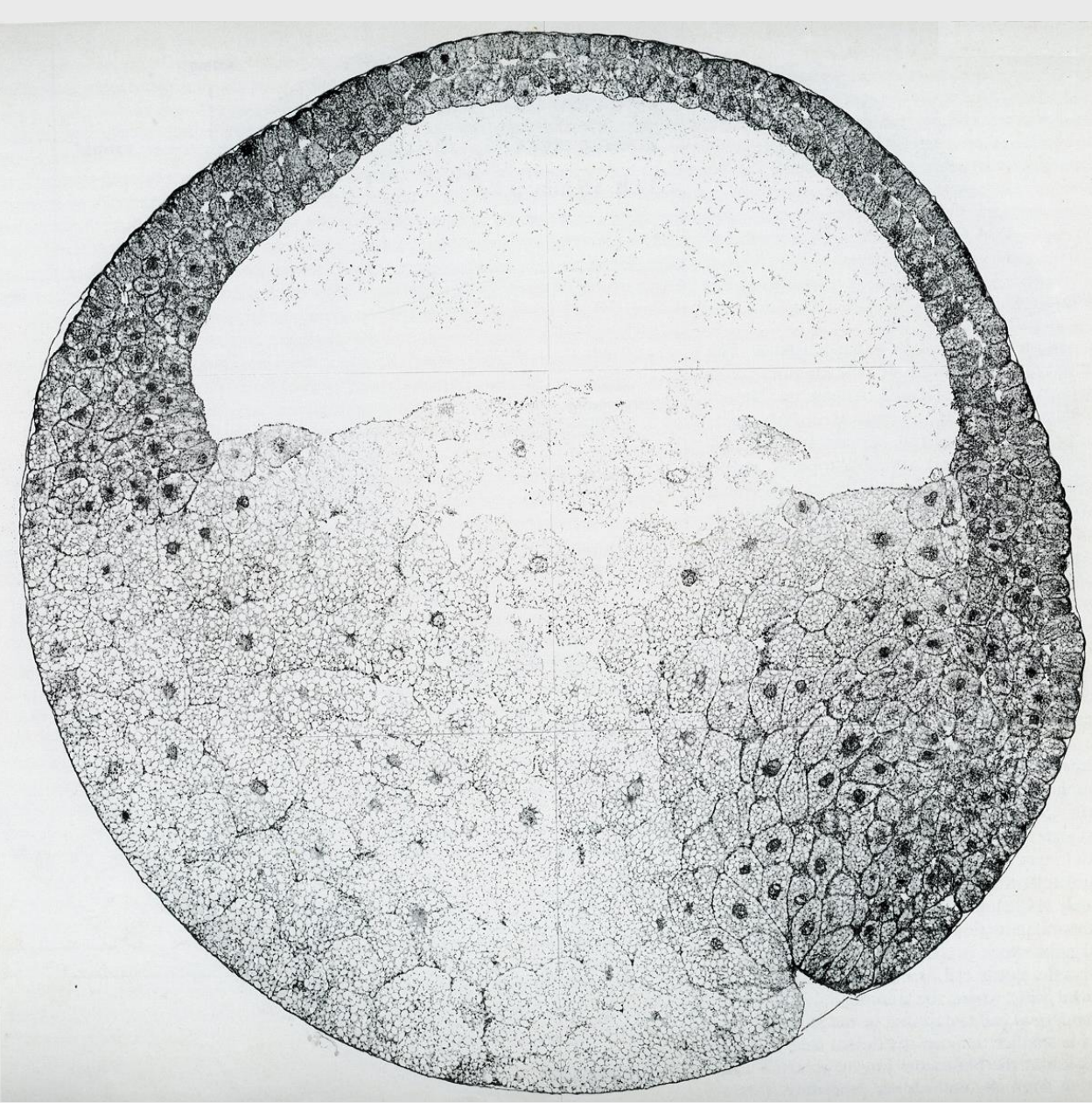
animal-vegetal section



300 μ m

Late Midblastula

The blastocoel is large and contains a coarse precipitate of the blastocoel contents. The blastocoel roof consists of three to four cell layers. Animal and vegetal cells differ in size and arrangement. In the vegetal region the cell shape is adapted to maximal cell contact, in the animal region the cells appear more rounded leaving spaces between the cells. In the vegetal region the outer surface of the epithelial cell layer is smoother and straighter than in the animal cap region. Animal cells begin to be shifted below the equator, indicating the onset of the pregastrula epibolic movement. (Staining: BCB)



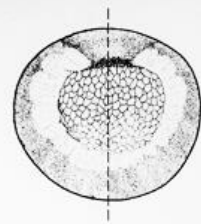
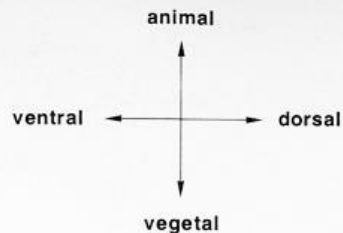
Jeune gastrula
Coupe sagittale

PLATE 18

Early gastrula

Embryo stage 10⁺

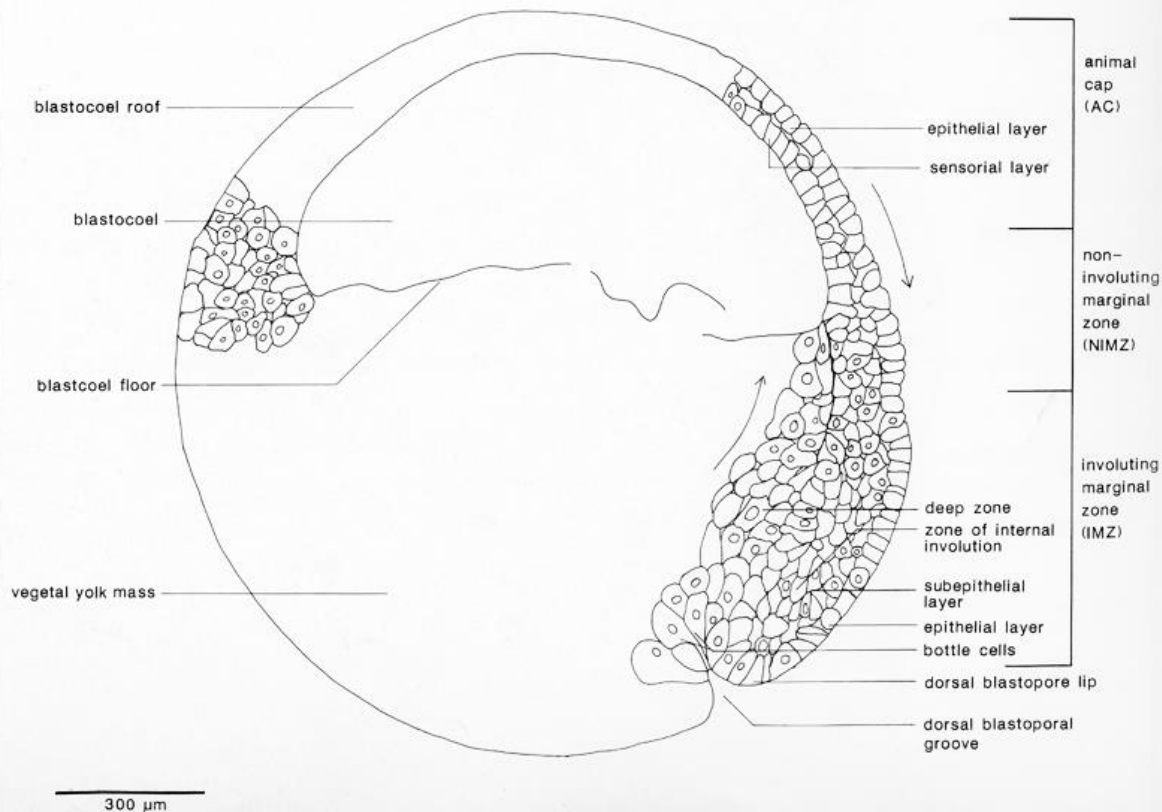
10 h p.f.

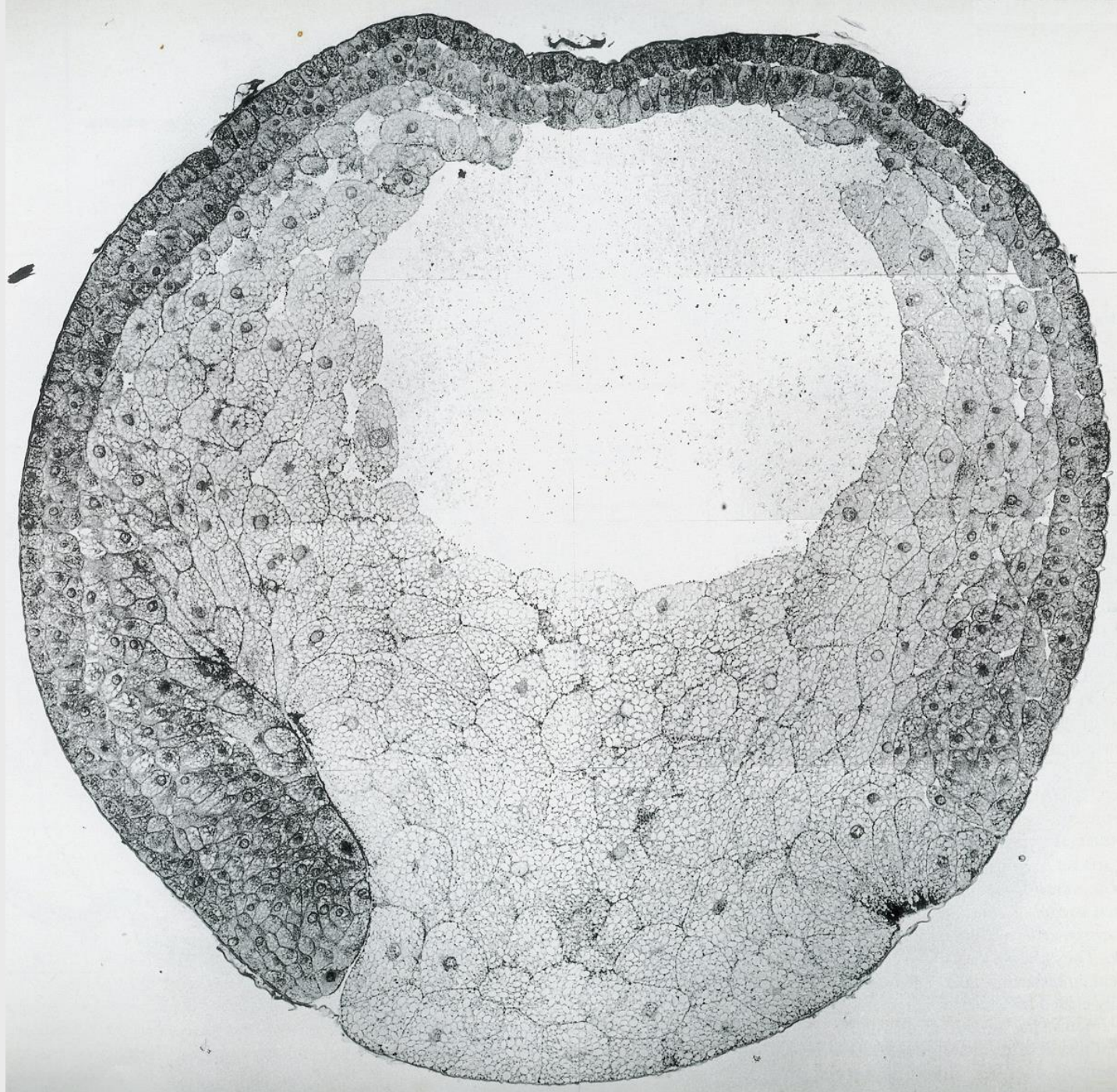


sagittal section

Onset of Gastrulation

Radial intercalation has led to a thinning out of the blastocoel roof, which now consists of two layers: the outer, epithelial layer and the inner, sensorial layer. The expansion of the blastocoel roof by epibolic movement is more advanced on the dorsal side, where animal material is constantly shifted vegetally (*arrow*). Bottle cells have formed at the blastopore and have begun to move inwards. The subepithelial suprblastoporal cells involute internally and move animalwards. The cells of the deep zone move animalwards, approaching the blastocoel roof (*arrow*). These processes have not yet begun on the ventral side. The boundary between NIMZ and IMZ is not easy to locate; the drawing indicates this border only approximately. (Staining: BCB)





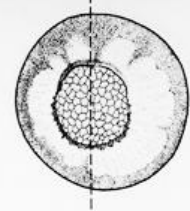
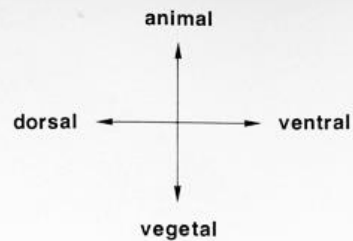
Gastrula avancée
Coupe sagittale

PLATE 19

Large yolk plug stage

Embryo stage 11 1/2

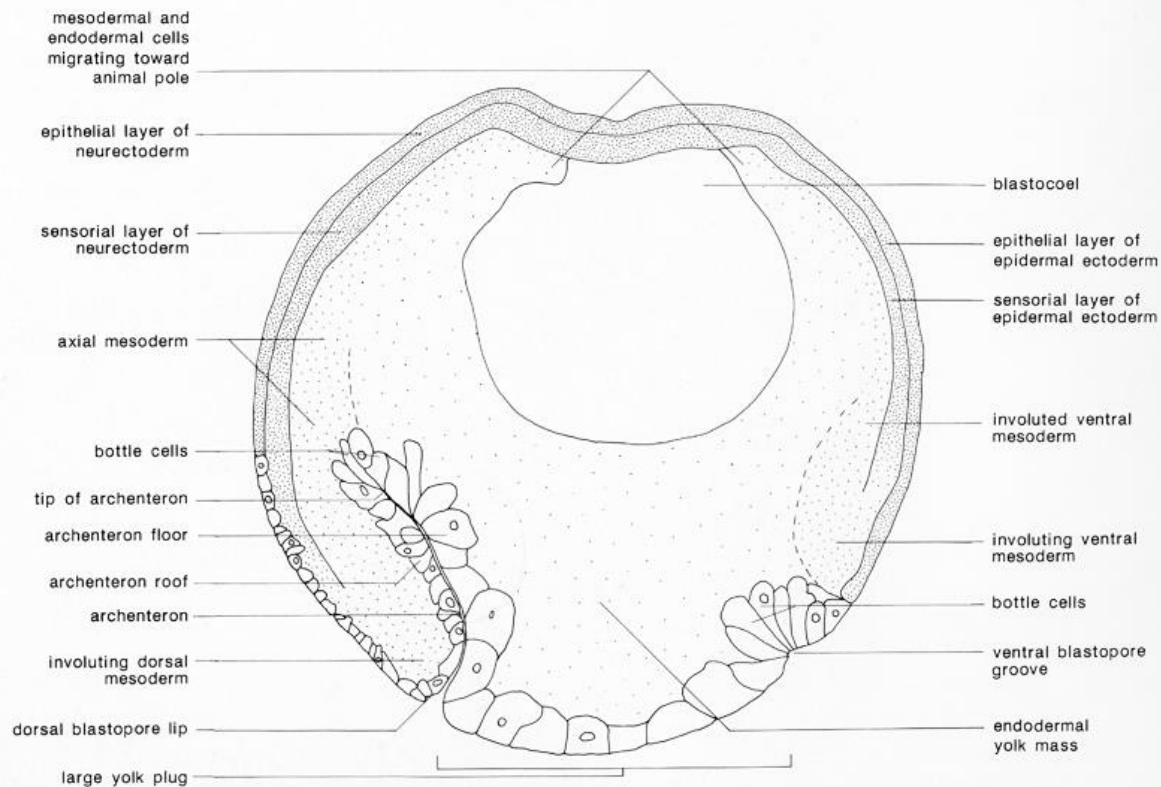
12 h 15 min p.f.



sagittal section

Midgastrula

Involution on the dorsal side has advanced. The bottle cells have moved into the interior, marking the tip of the slit-shaped archenteron. The epithelium forming the archenteron roof represents the involuted, superficial, suprablastoporal epithelium. The dorsal suprablastoporal region contains a massive accumulation of cells which have been shifted dorsally from the lateral regions by dorsal convergence and animalwards by extension. The axial mesoderm begins to form from these cells. Cell arrangement within the dorsal blastopore lip appears chaotic, an ordered involution around an inner lip cannot be discerned. The vegetal yolk mass is "overrolled" by the advancing dorsal blastopore lip. Spreading mesodermal cells from the deep zone and adjacent endodermal cells from the vegetal yolk mass are approaching the animal pole. Larger and further advanced mesodermal cells are not easily distinguished from endodermal cells. The three germ layers begin to become discernible. As a first sign of neural induction the cells of the sensorial layer of the dorsal ectoderm (prospective neurectoderm) begin to elongate and form a columnar epithelium. Contrary to current theories on neural induction, this happens also at the animal pole, which is not in contact with mesodermal cells. Bottle cell formation has reached the ventral side, where the number of prospective mesodermal cells migrating in the animal direction is smaller than on the dorsal side. The depression at the blastocoel roof is an artifact resulting from the embedding procedure. (Staining: BCB)



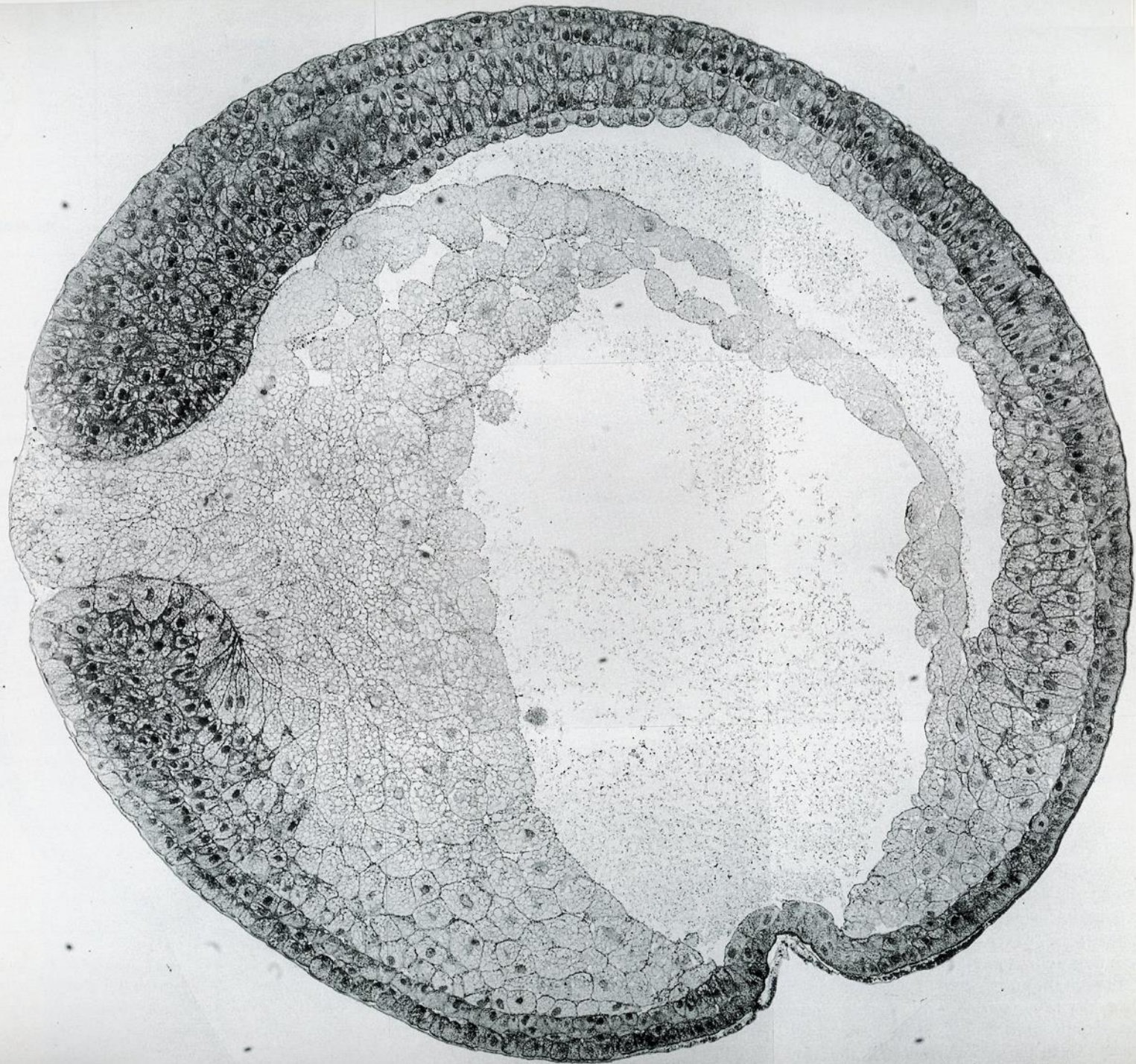
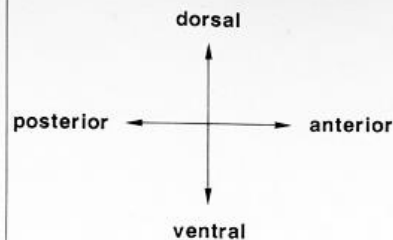


PLATE 20

Small yolk plug stage

Embryo stage 13

14 h 45 min p.f.

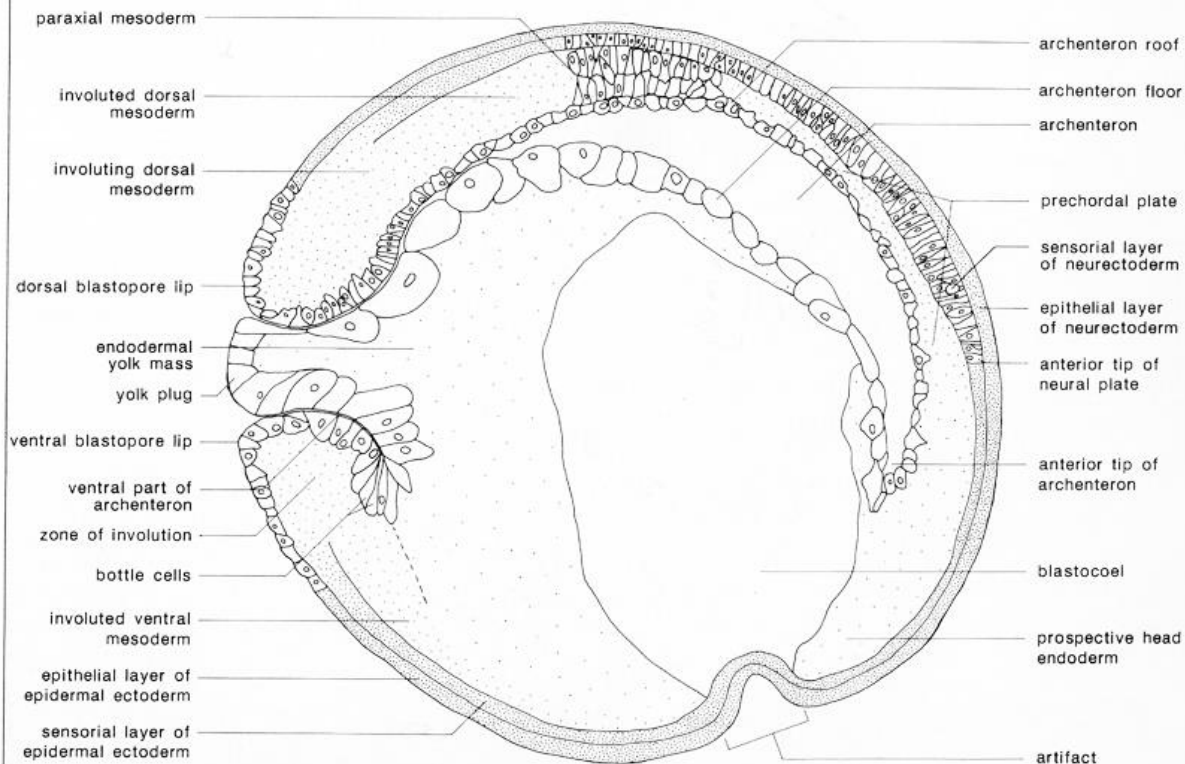


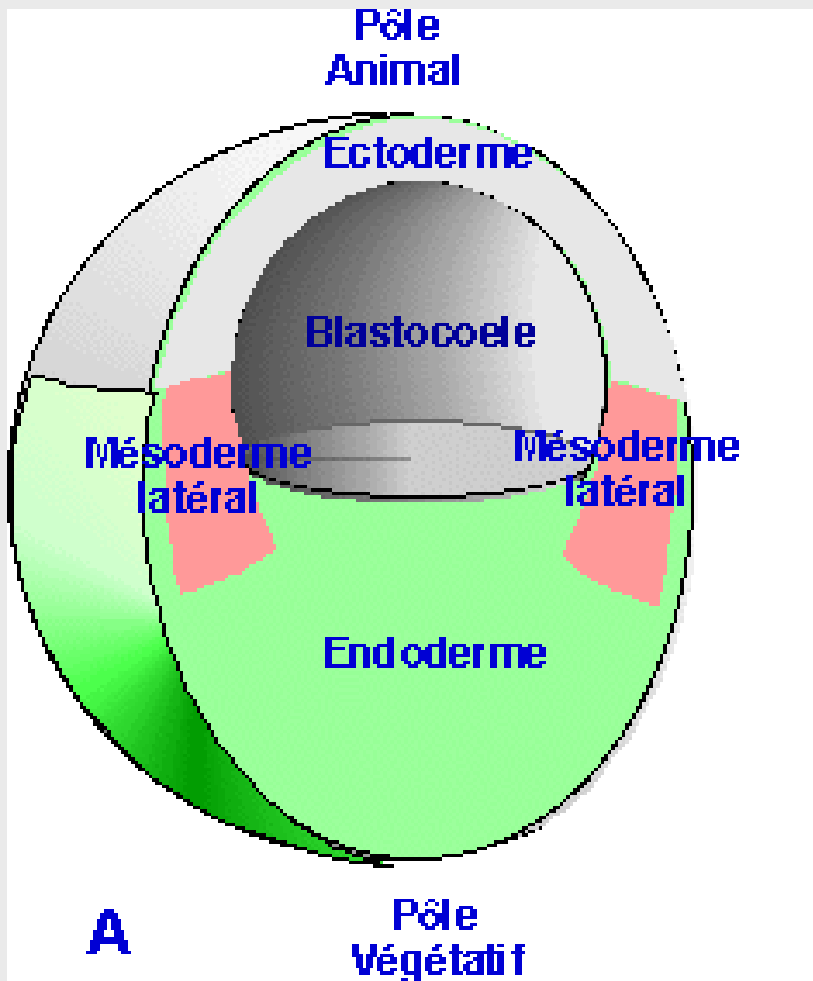
parasagittal section

Advanced Gastrula

The archenteron has become inflated at the expense of the blastocoel, which is markedly displaced ventrally. The archenteron roof is formed by involuted, superficial cells of the suprablastoporal region. Bottle cells have respread and contribute to the lining of the archenteron. The archenteron floor consists of cells derived from the outer epithelial lining of the vegetal yolk mass. The arrangement of the mesodermal cells at the site of involution appears to be disordered (but cf. PLATE 22 A). More to the anterior the cells of the paraxial mesoderm align in dorsoventral direction. The anterior region of the mesodermal layer is occupied by the spreading prechordal plate cells. They are not easy to discern from the cells of the head endoderm. The induction of the neural plate has resulted in a columnarization of the cells of the sensorial layer of the induced dorsal ectoderm (neurectoderm).

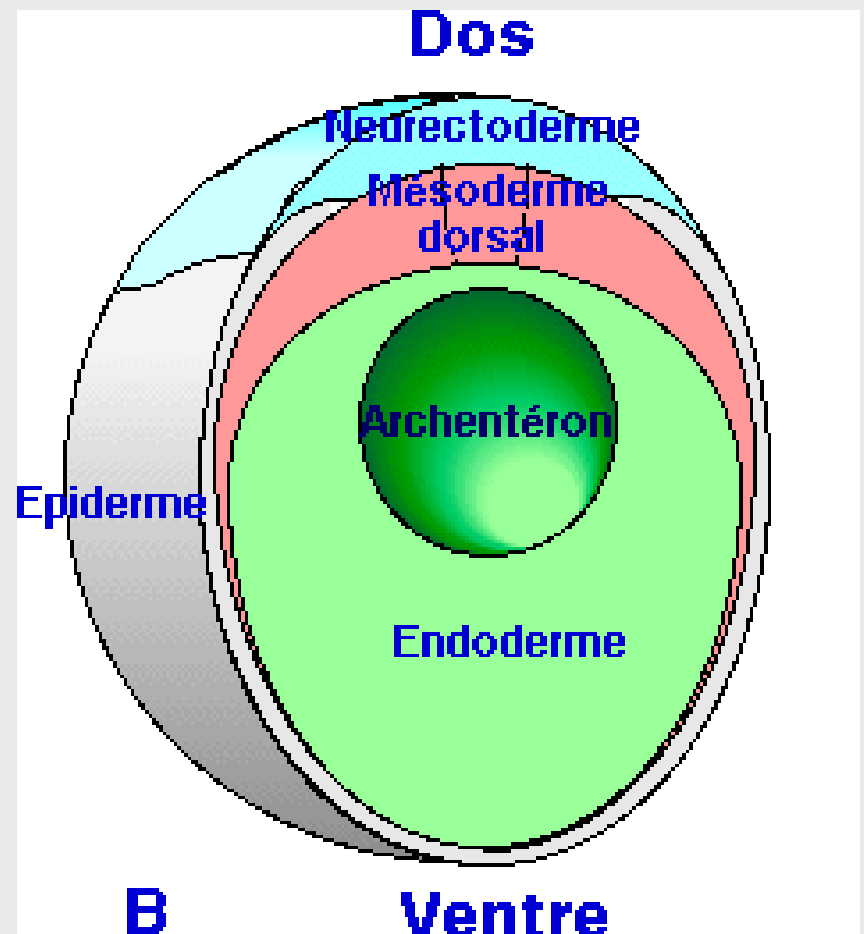
Involution on the ventral side is less advanced. Bottle cells are drawn to the inside but have not yet spread. The amount of mesodermal material at the ventral site of involution is small compared to that on the dorsal side. Spreading mesodermal cells have reached the original animal pole. They always keep close contact with the adjacent endodermal cells. The blastopore has normally closed to a narrow slit at this stage. In this specimen it has remained unusually large. This variability is often encountered in *Xenopus* development; it does not affect the normal progression of embryogenesis. (Staining: BCB)





Coupe transversale au début de la gastrulation.

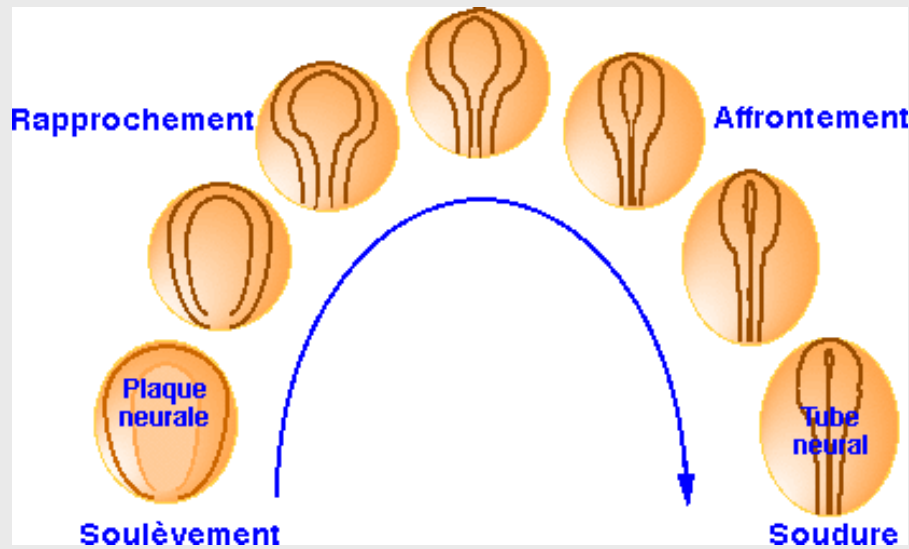
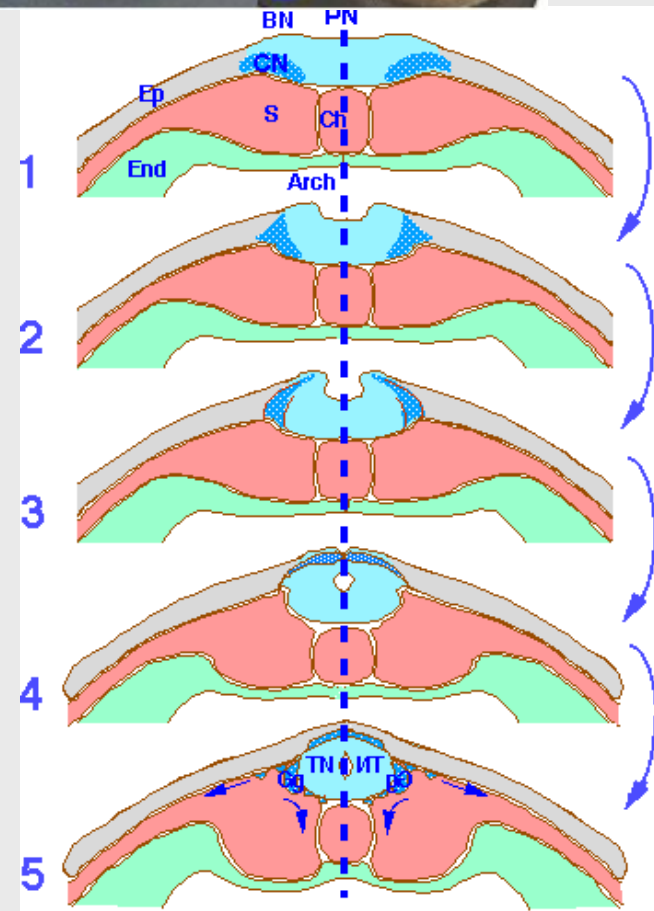
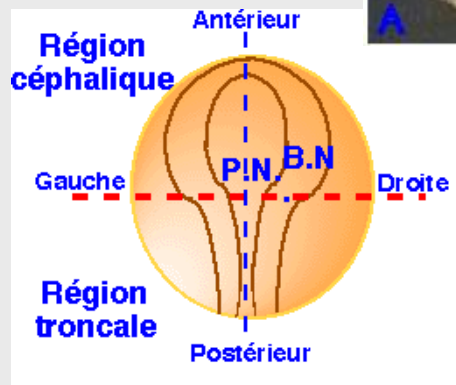
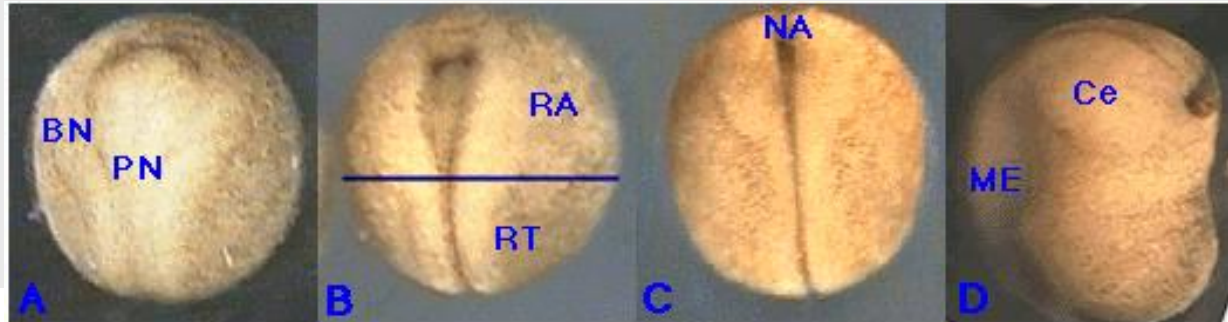
Voir l'organisation étagée de l'ectoderme, du mésoderme et de l'endoderme.

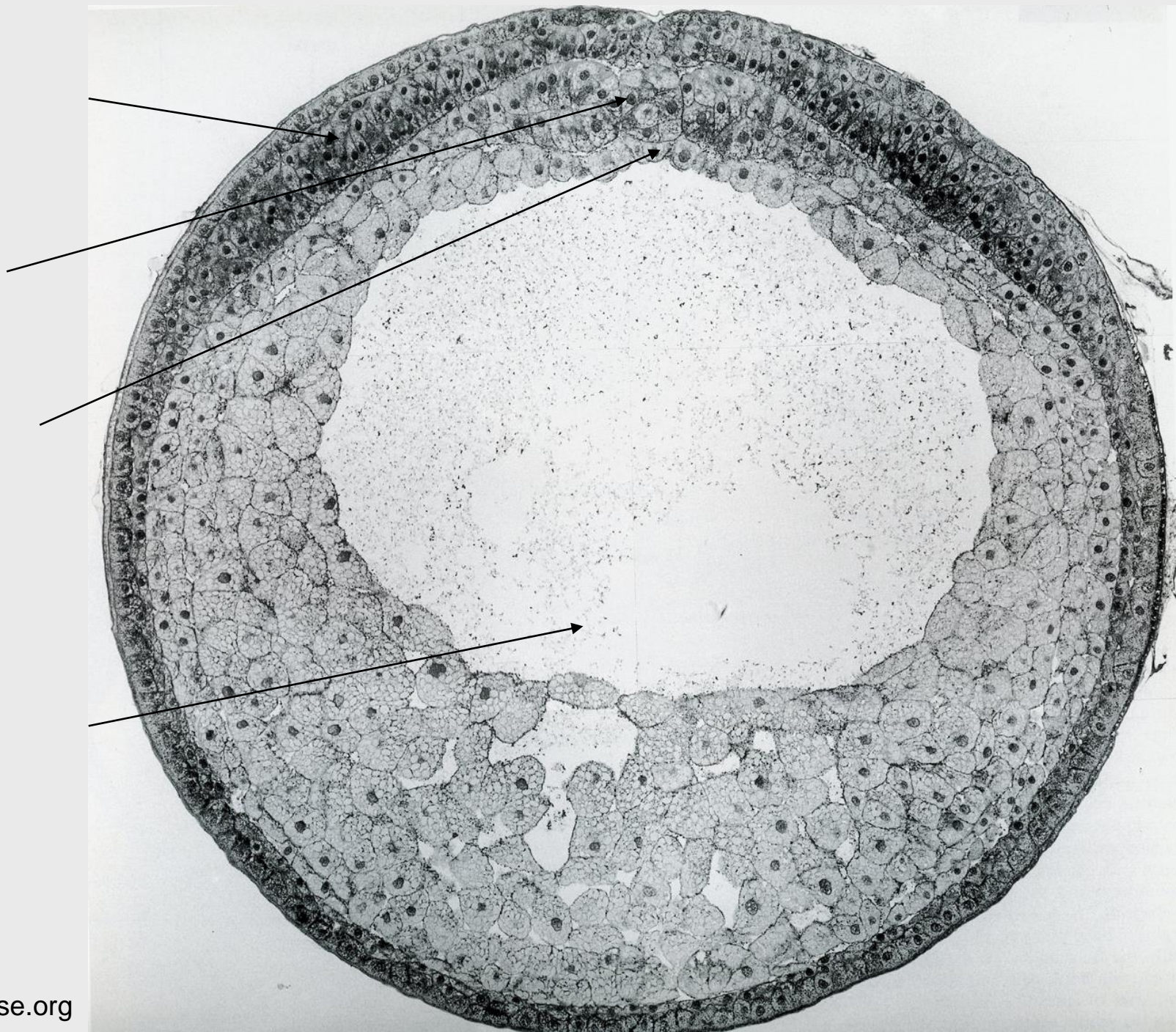


Coupe transversale à la fin de la gastrulation.

Voir l'organisation concentrique des feuilletts embryonnaires.

La neurulation



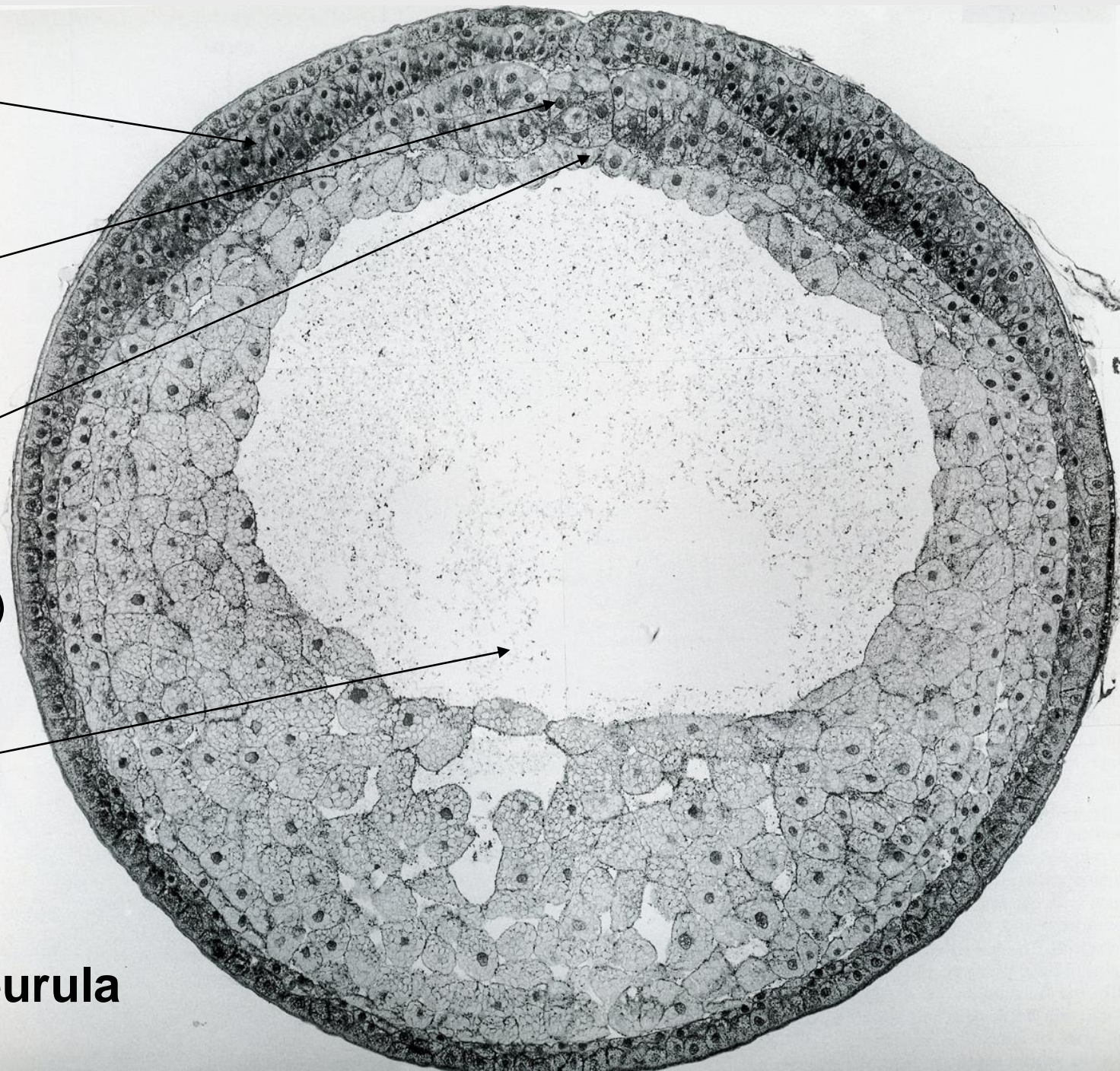


Neurectoderme
Bourrelet neural

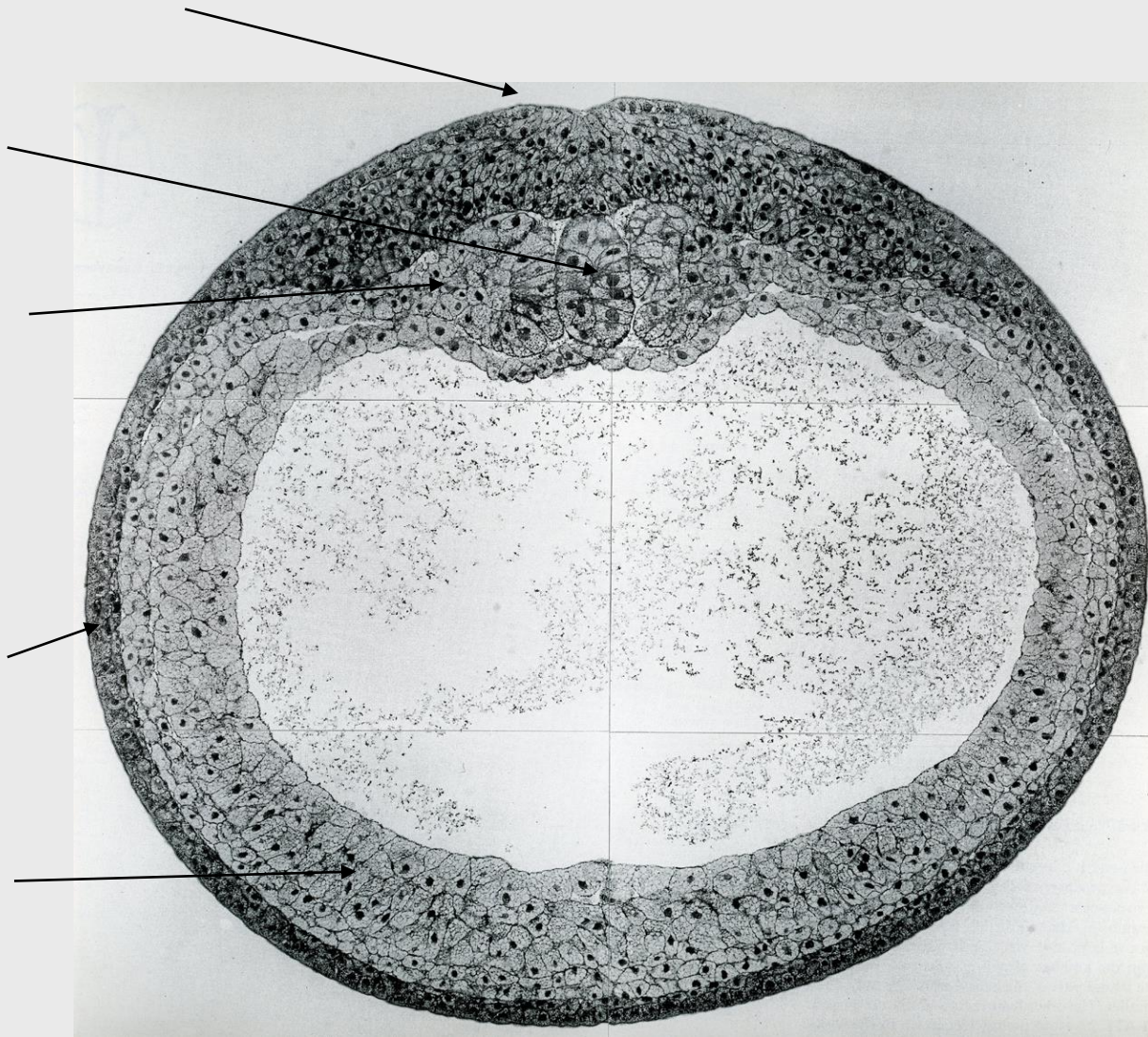
Chorde

Plafond de
l'archentéron
(une assise de
cellules
endodermiques)

Archentéron

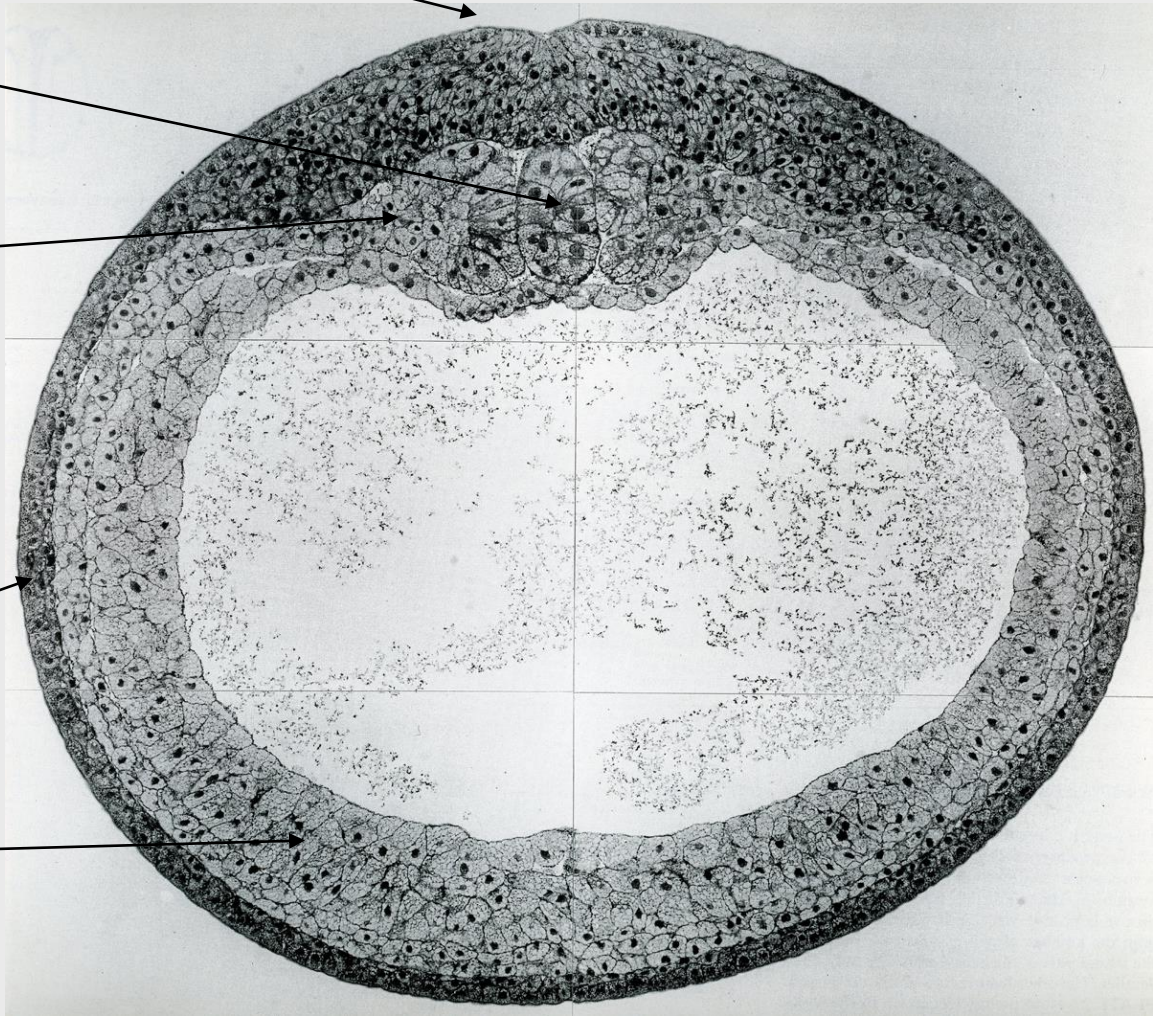


CT jeune neurula

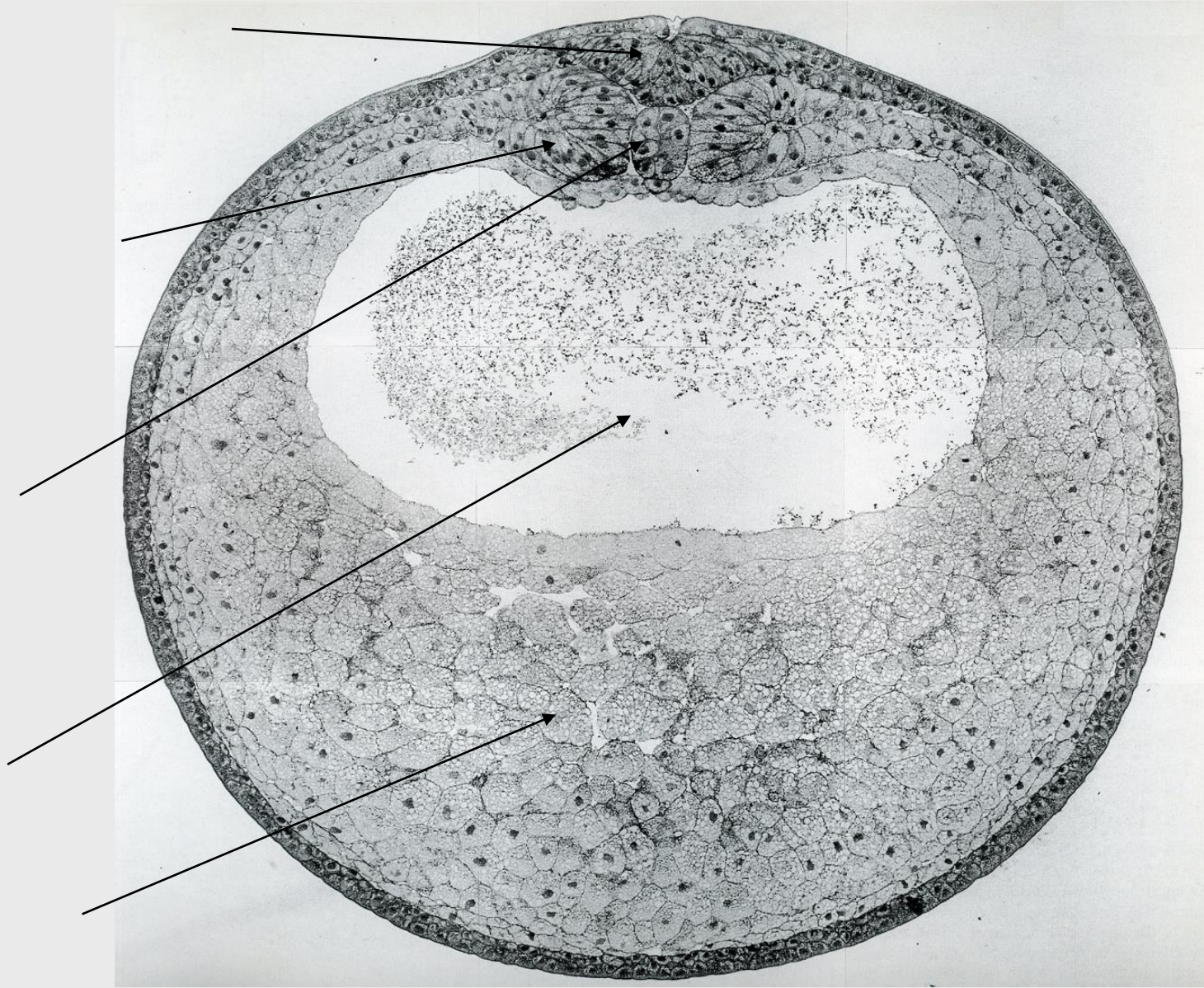


Bourrelets neuraux et gouttière neurale (avec cellules en bouteille)

Chorde
Mésoderme
Ectoderme
Endoderme



CT neurula
Tube neural en formation (début)



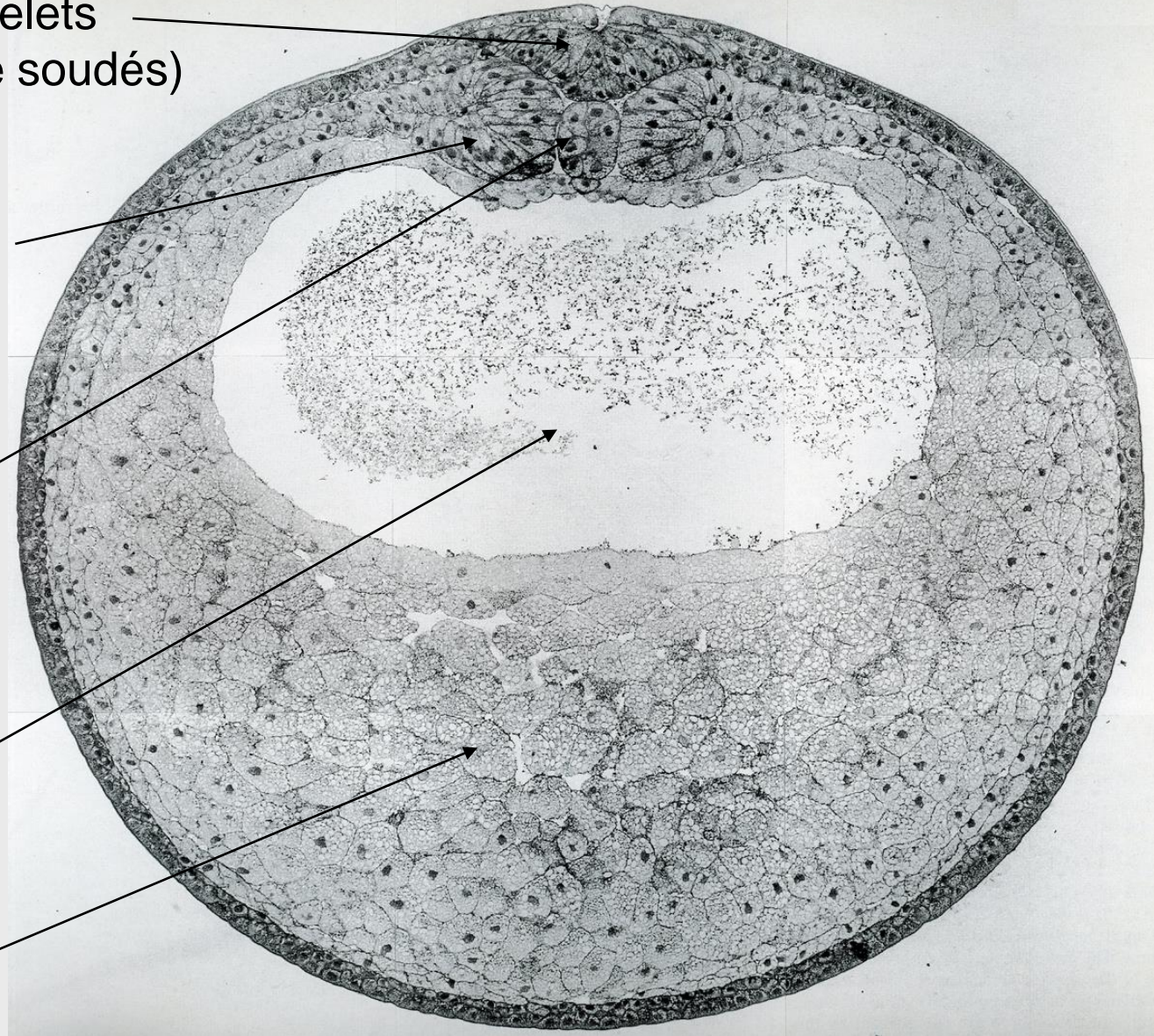
Tube neural (les bourrelets
neuraux sont presque soudés)

Mésoderme somitique

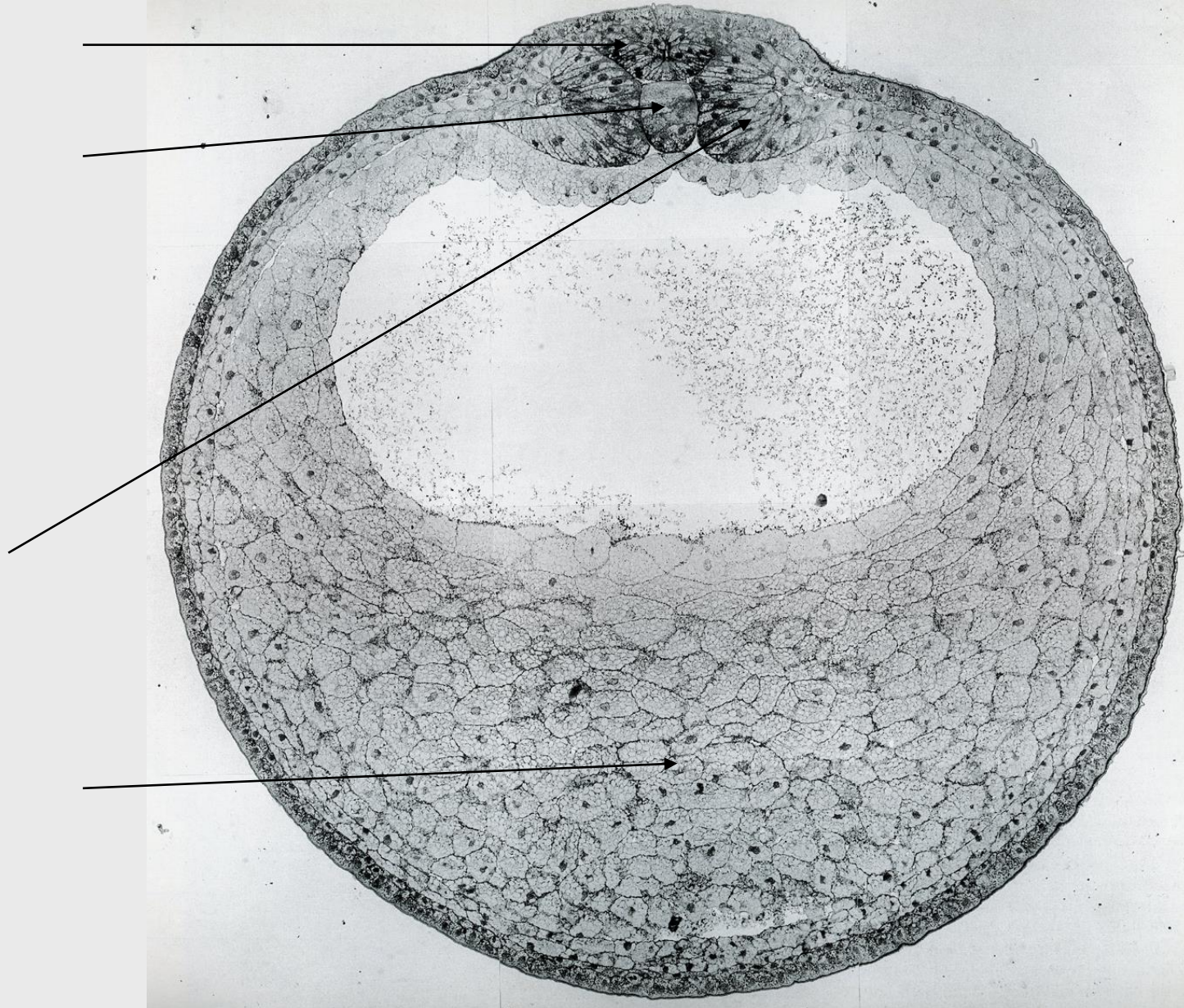
Chorde

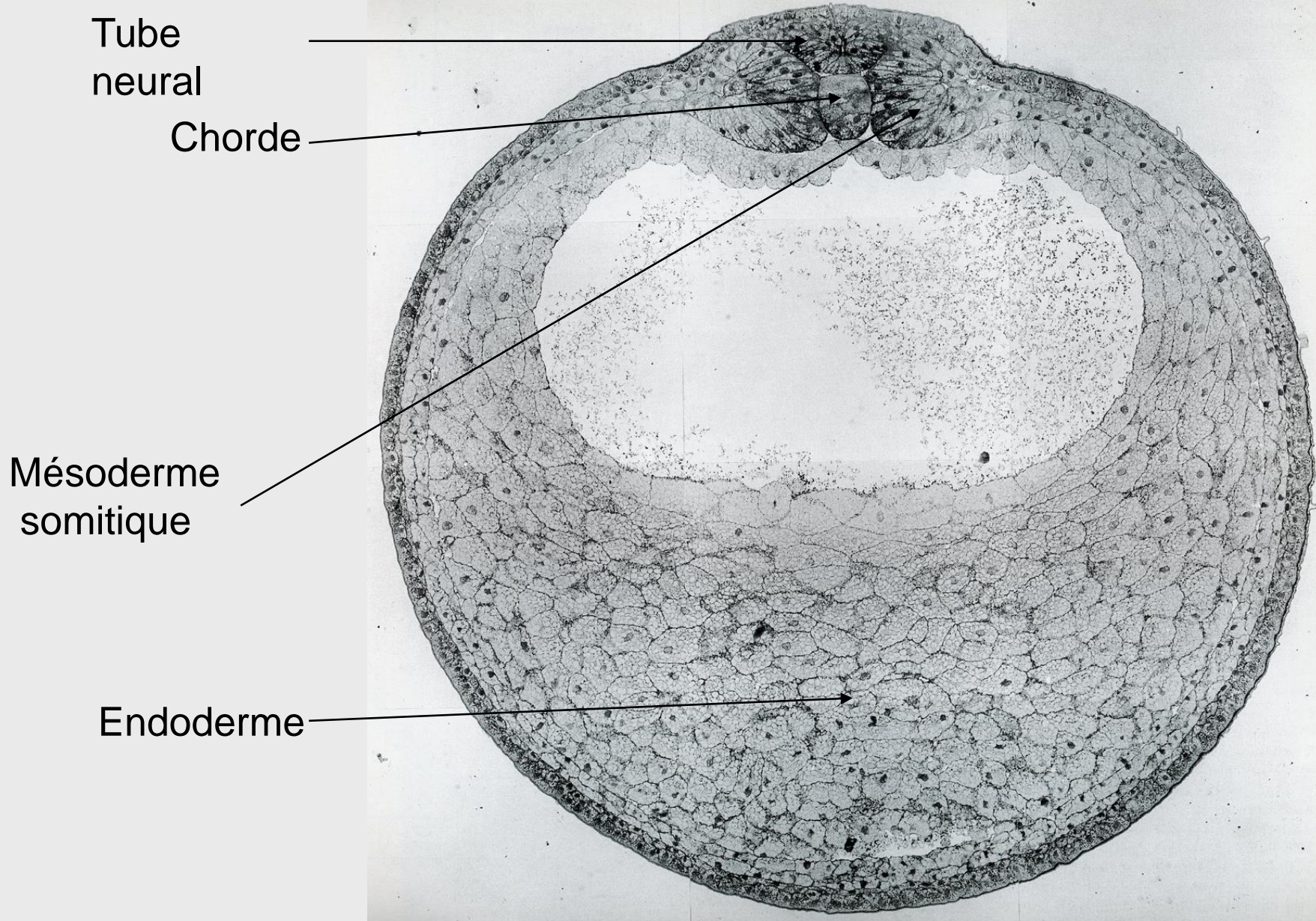
Archentéron

Endoderme

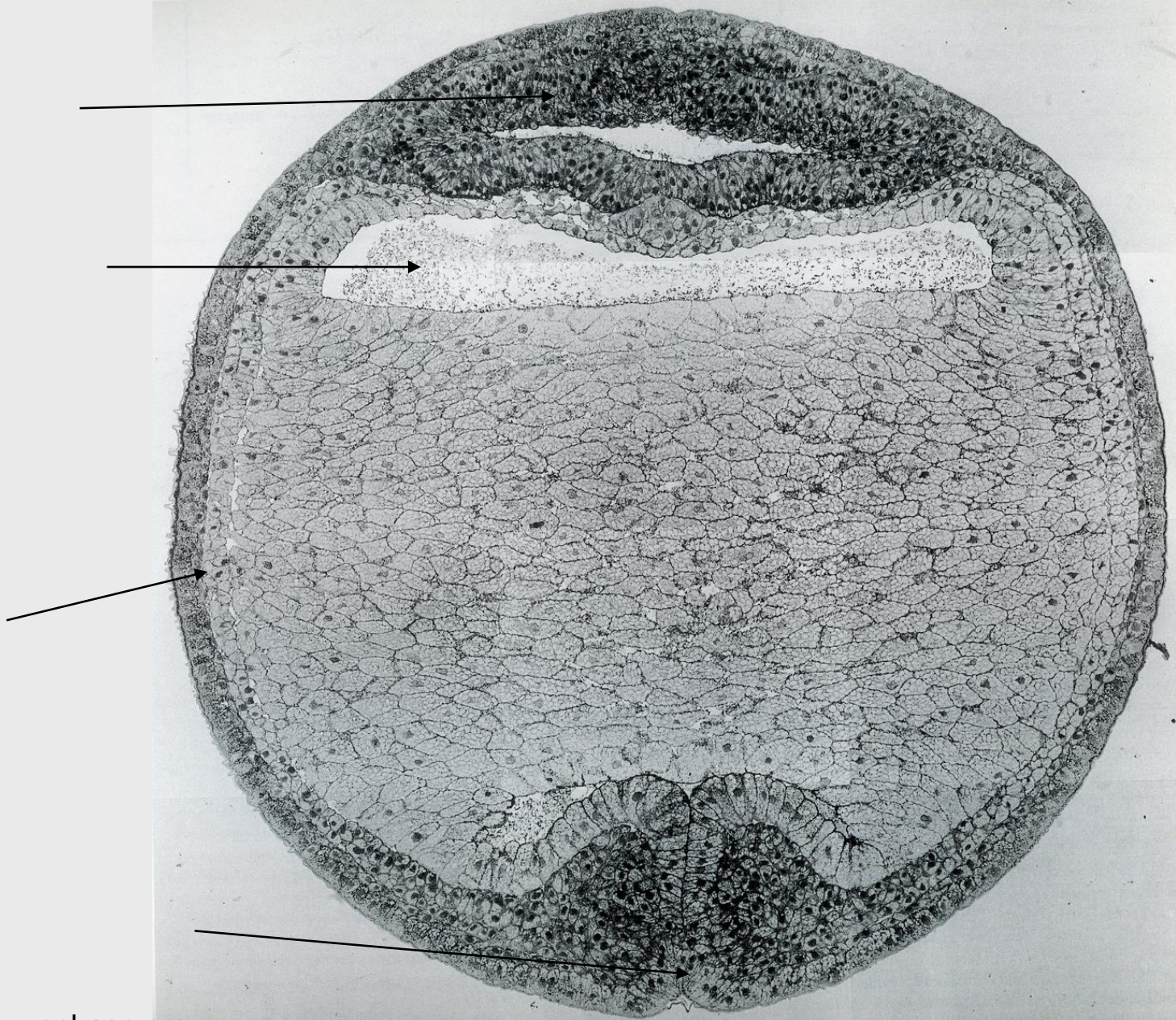


CT neurula (tube neural en fin de formation)





CT neurula âgée (région troncale)



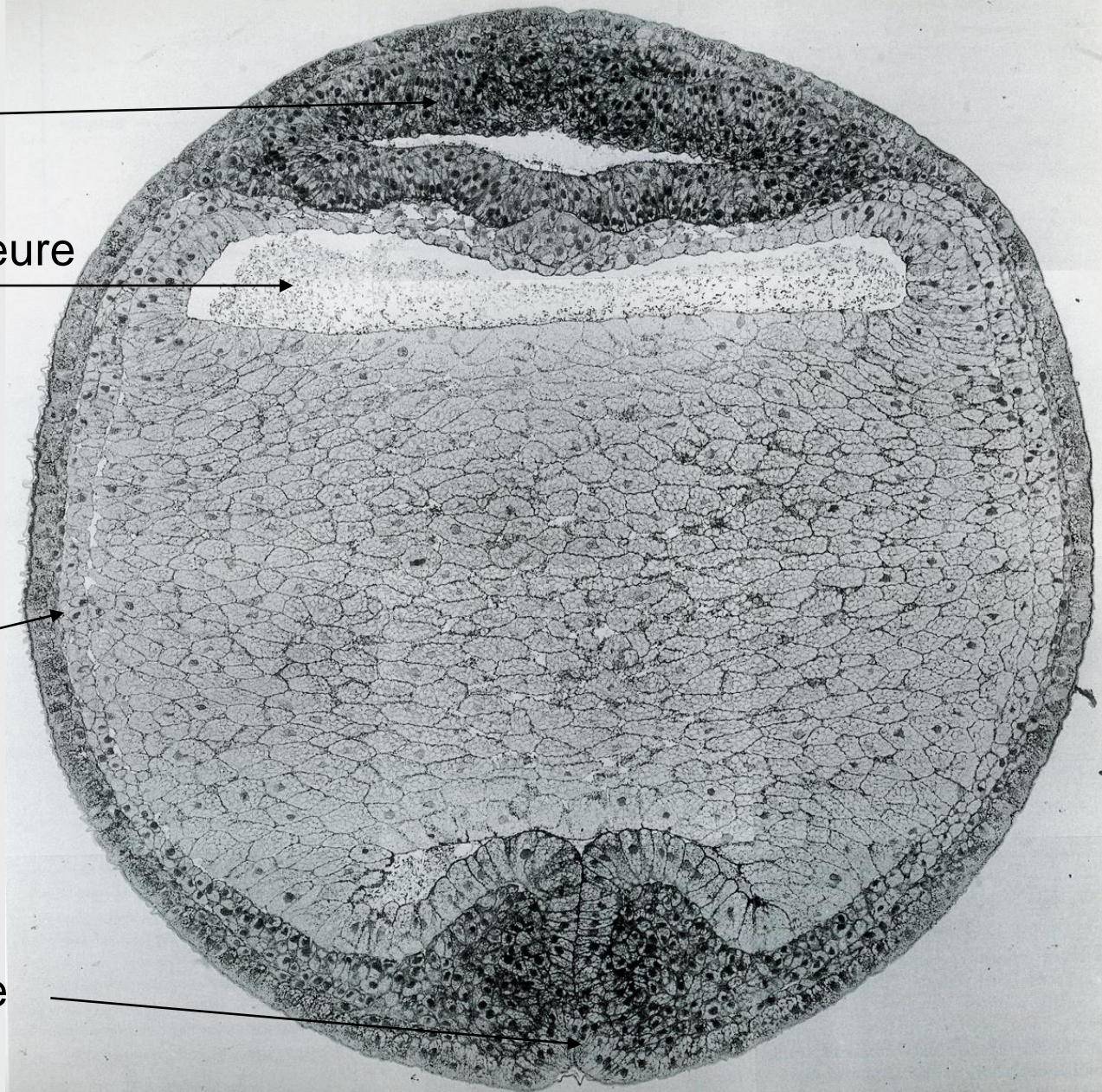
Neurula coupe frontale?

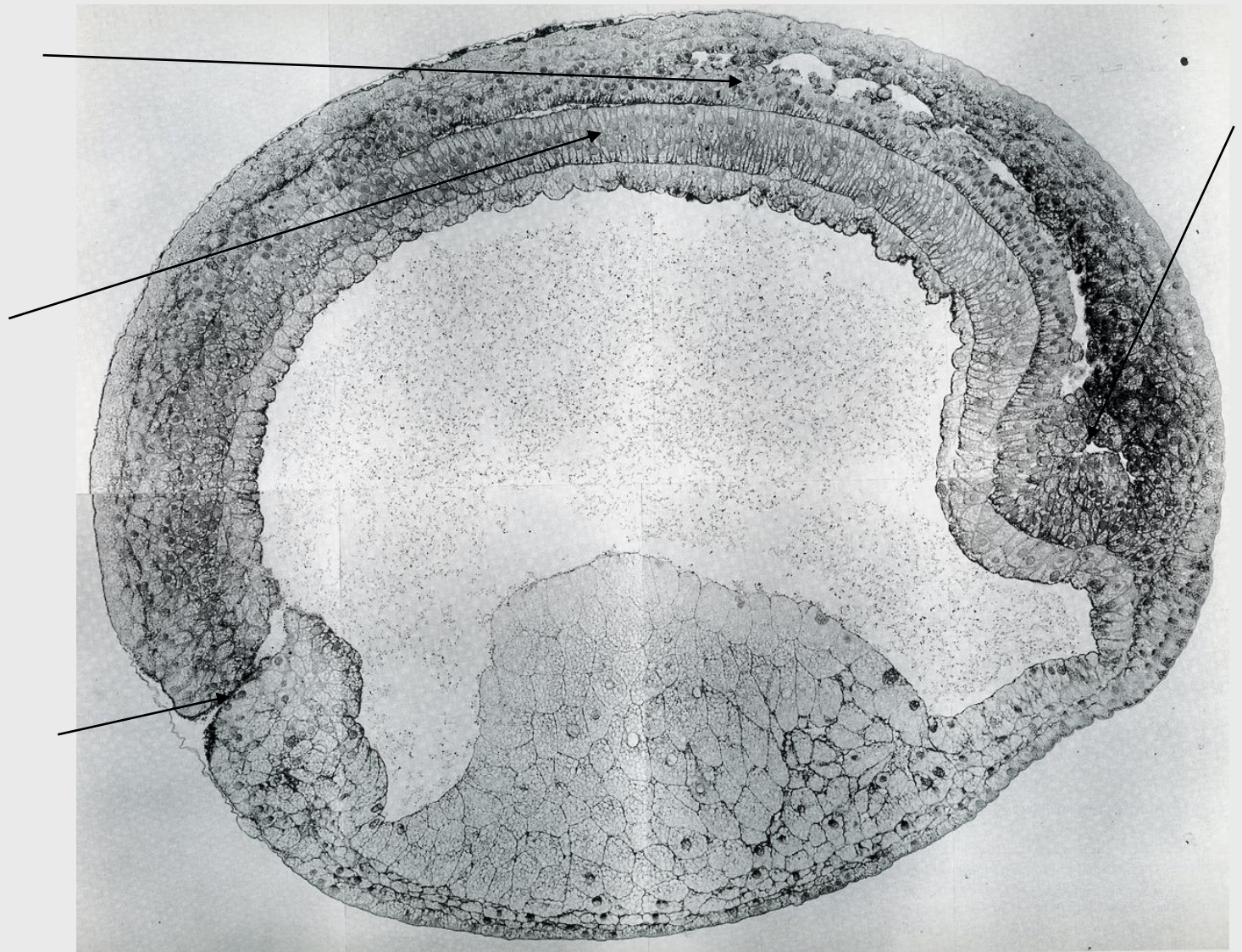
Encéphale

Région antérieure
pharynx

Mésoderme
latéral

Blastopore



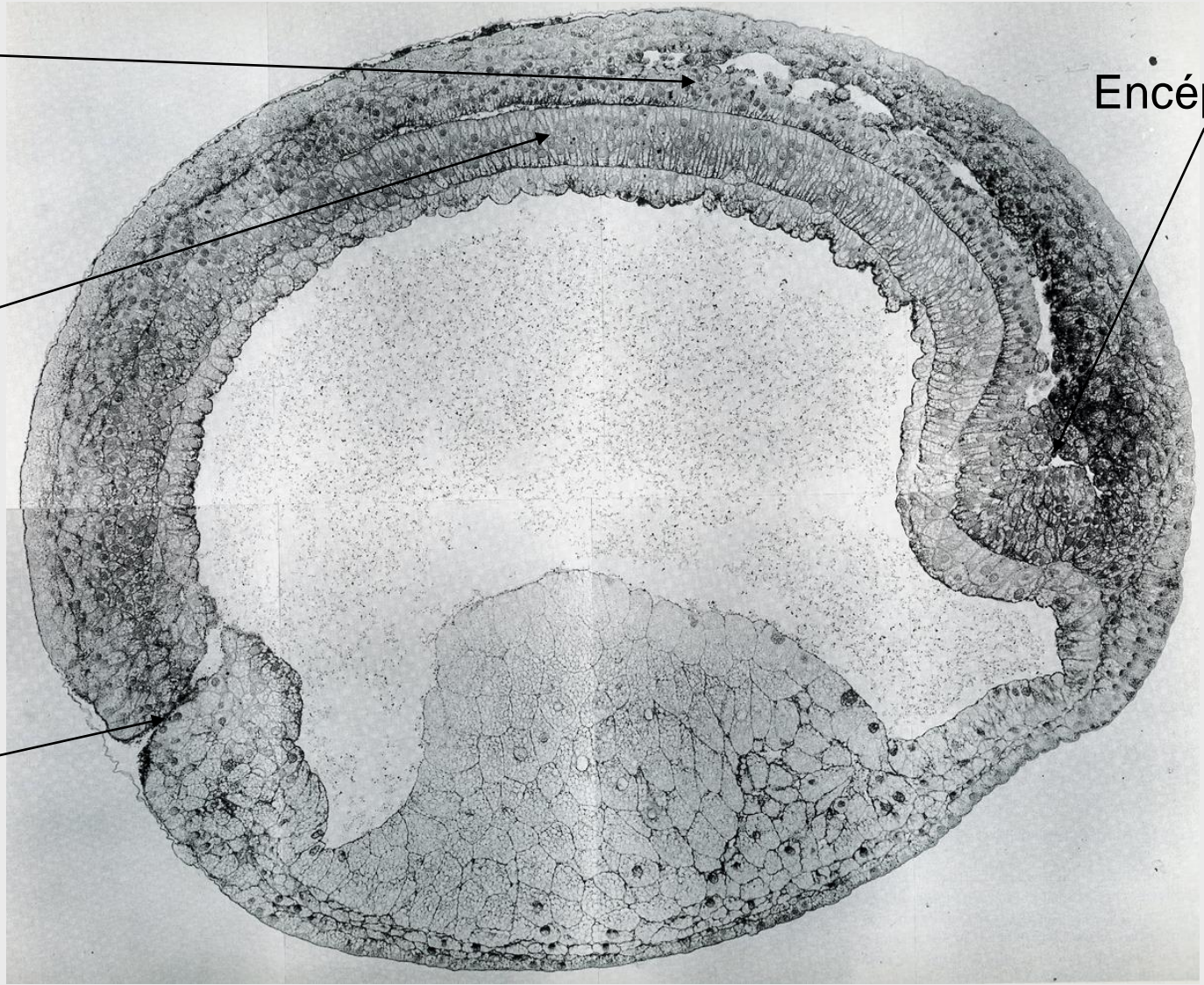


Tube neural

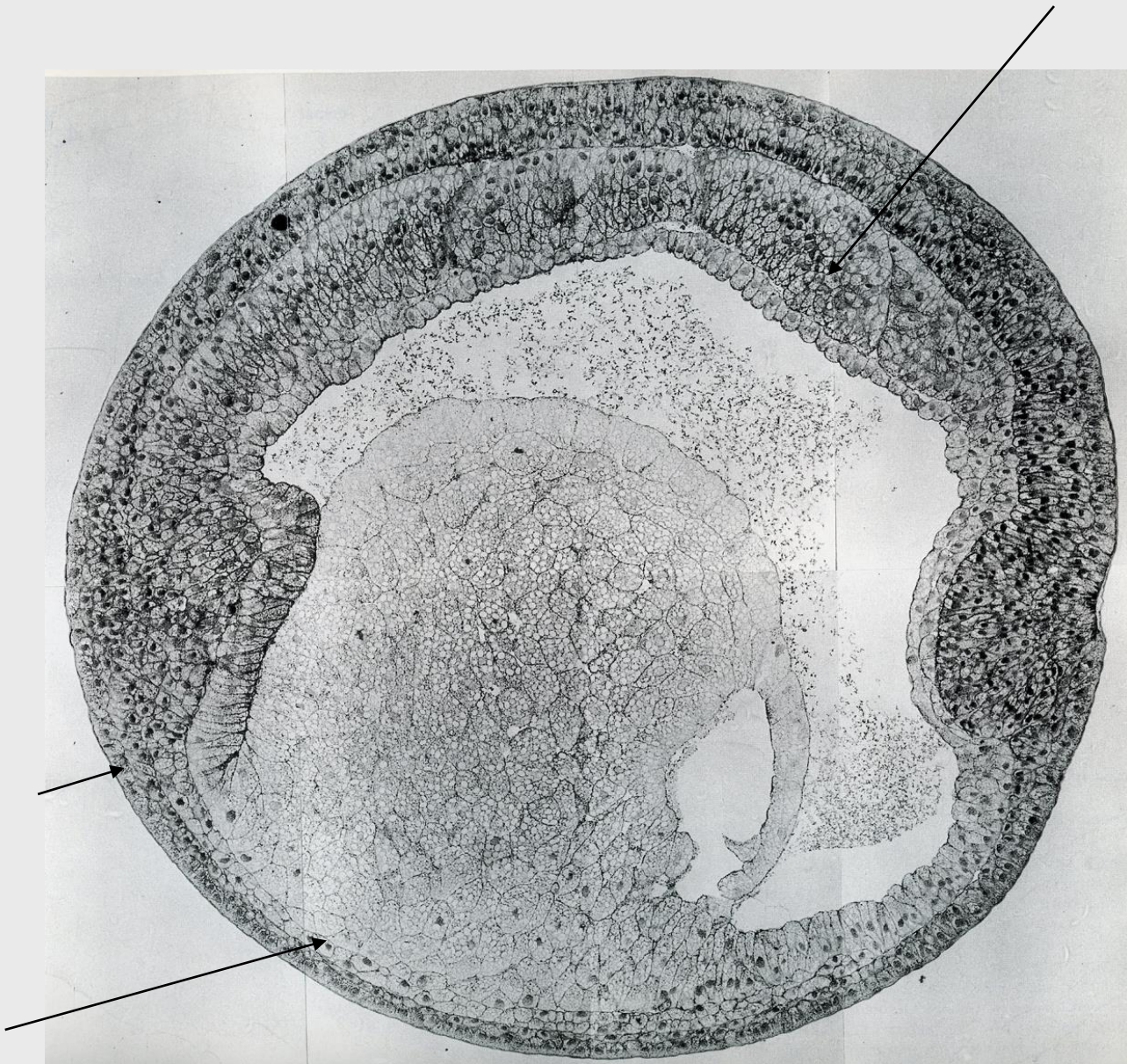
Encéphale

Chorde

Blastopore

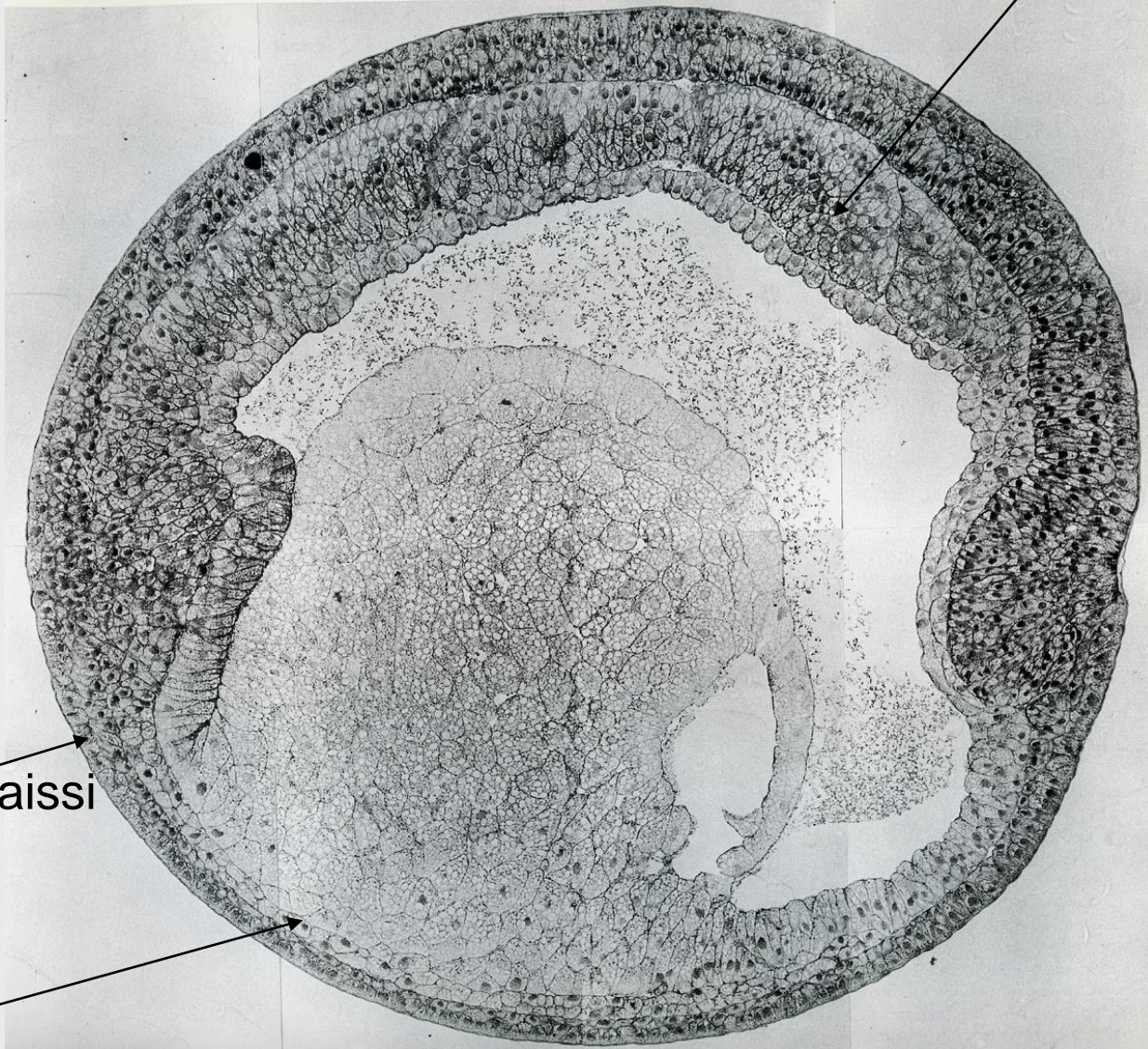


Coupe sagittale neurula



Somite
individualisé

Chorde non
visible



Epiderme épaissi

Mésoderme
ventral

CL parasagittale Neurula

Développement embryonnaire des Amphibiens – Planche 1



A



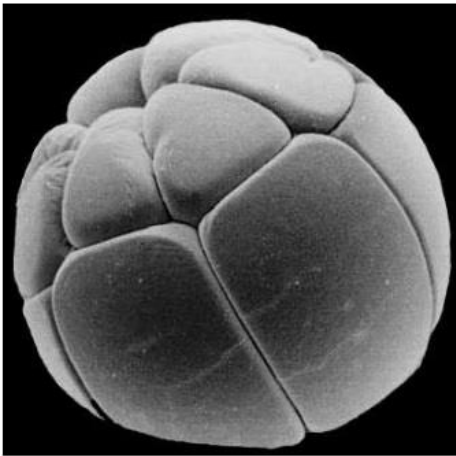
B



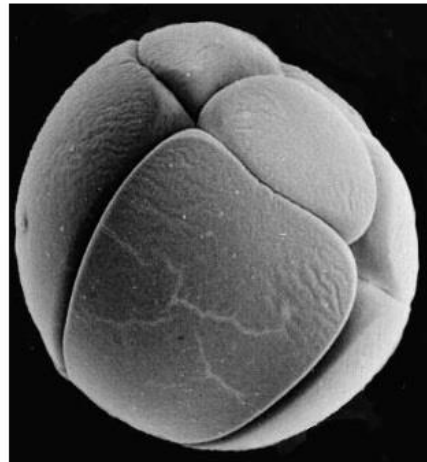
C



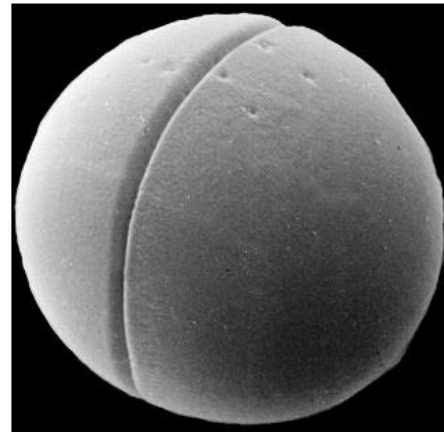
Vues de détail



D



E

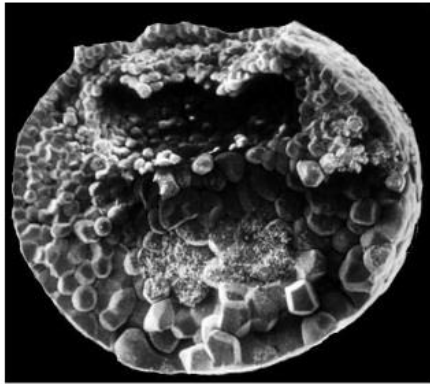


F

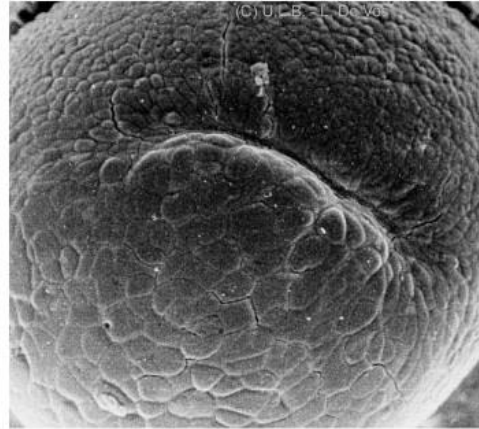


□ Ordonner les clichés A à F et proposer un titre pour chacun d'entre eux.

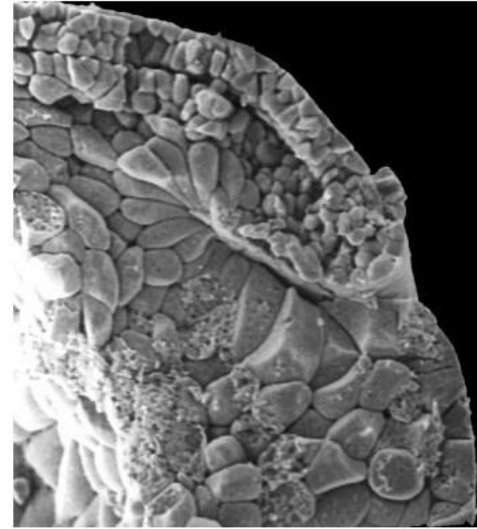
Développement embryonnaire des Amphibiens – Planche 2



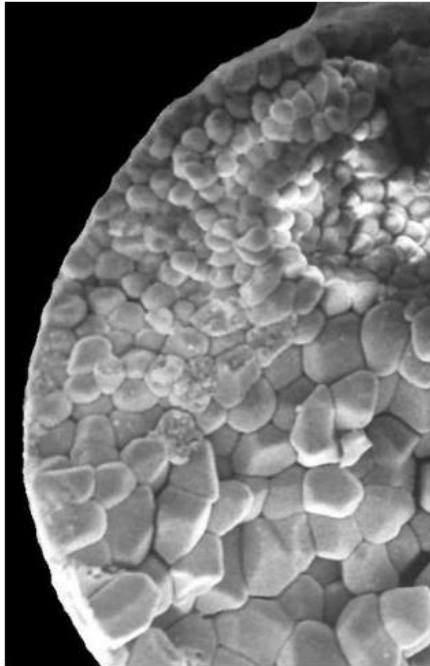
A
B



C



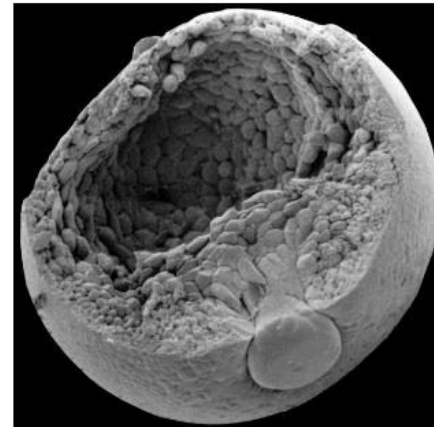
D



E



F



Source des images :
<http://www.ulb.ac.be/sciences/biodic/homepage.html>

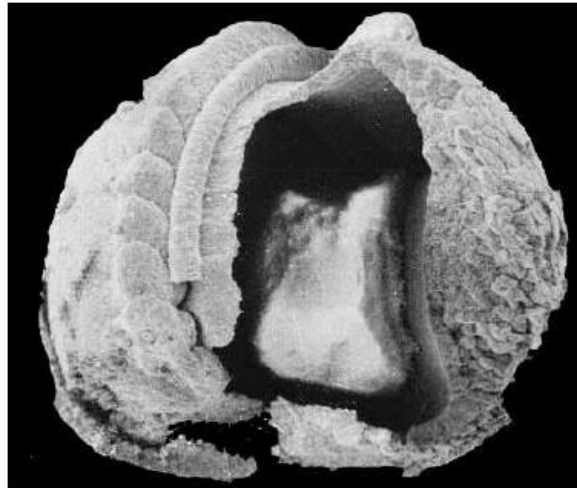
Vues de détail



□ Proposer un titre
à chaque cliché.



A



C

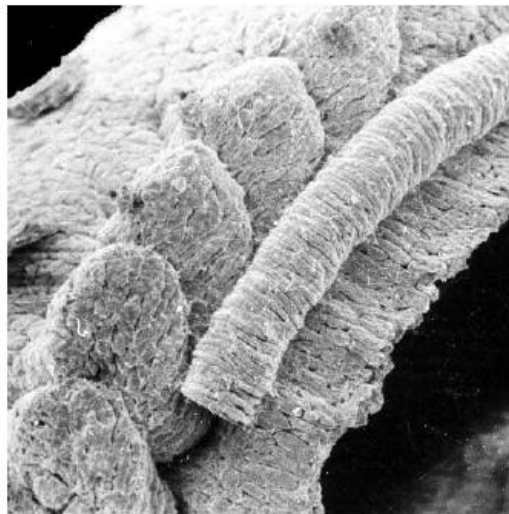


(C) U.L.B. - L. De Vos

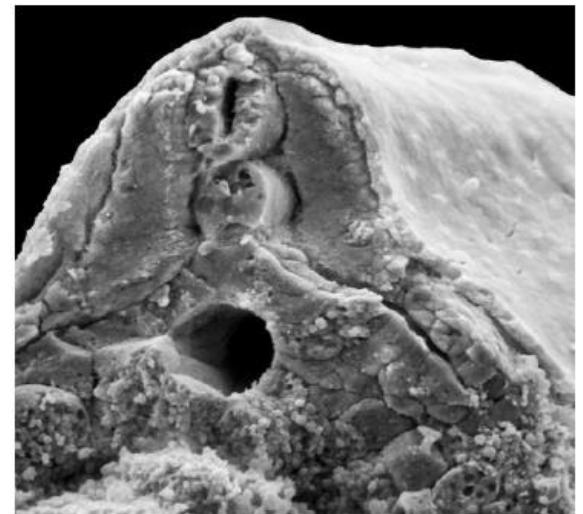
E



B



D

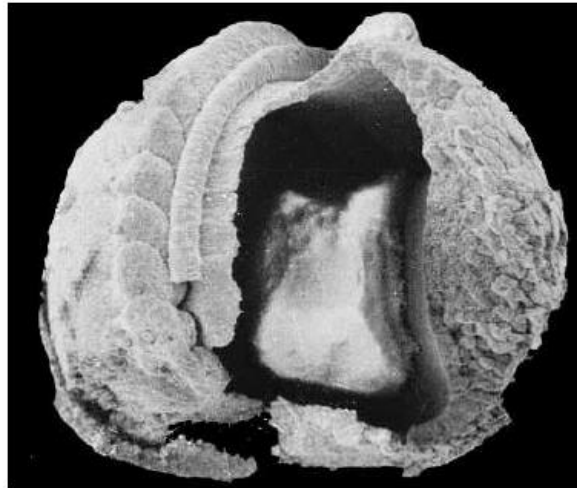


F

→ Proposer un titre à chaque cliché.



A Neurula vue frontale



Dfssection d'une jeune neurula

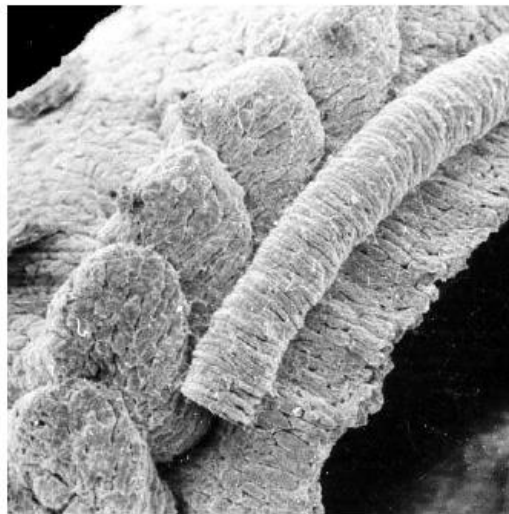


(C) U.L.B. - L. De Vos

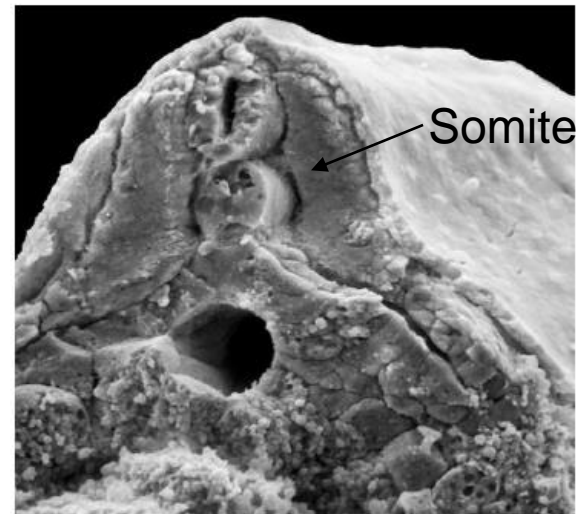
E Stade gouttière neurale



B Neurula vue dorsolatérale



Dissection d'une jeune neurula
Chorde visible



Somite

CT neurula âgée

→ Proposer un titre à chaque cliché.



**Figure 40. Stade
bourgeon caudal jeune**

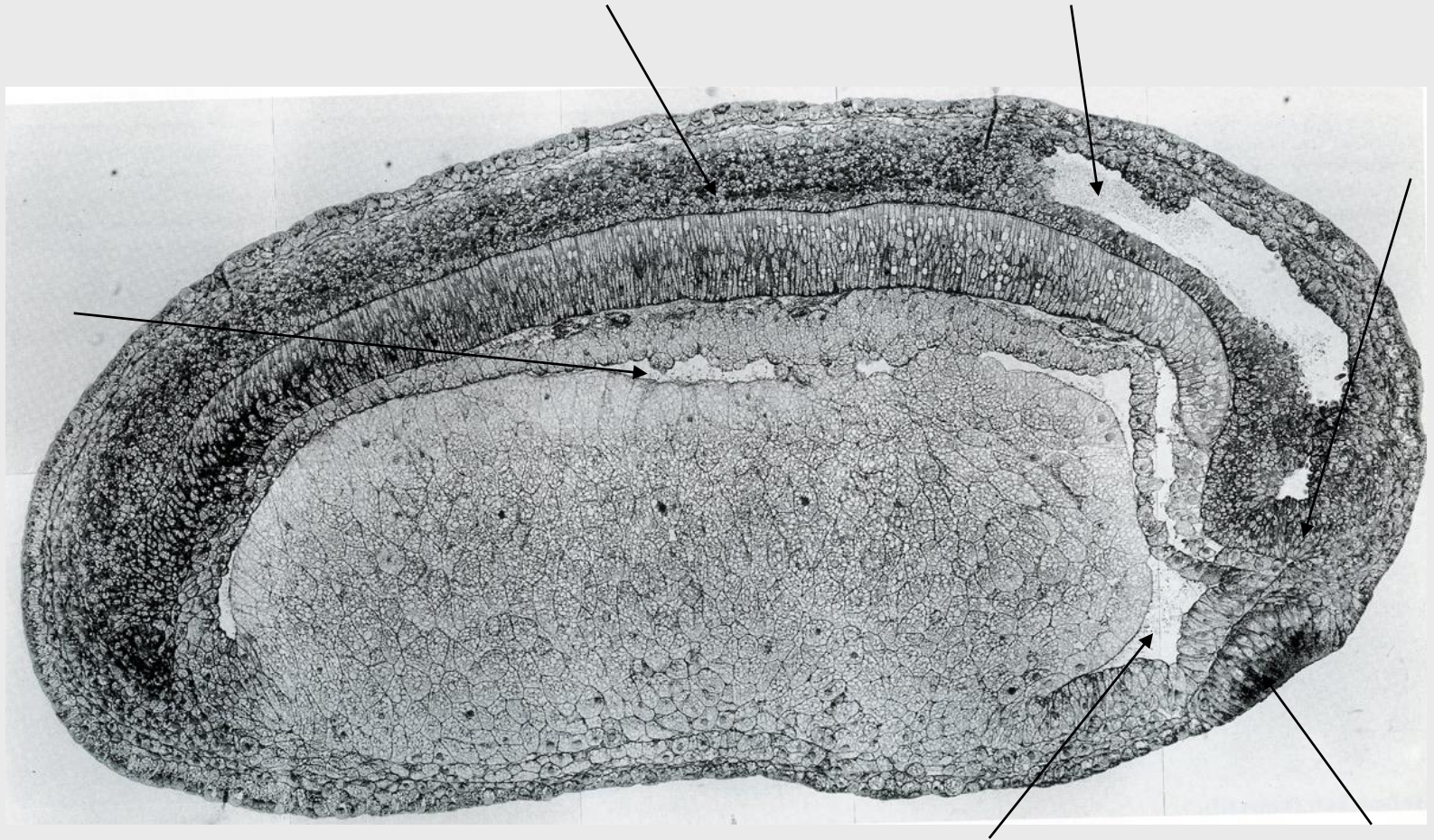


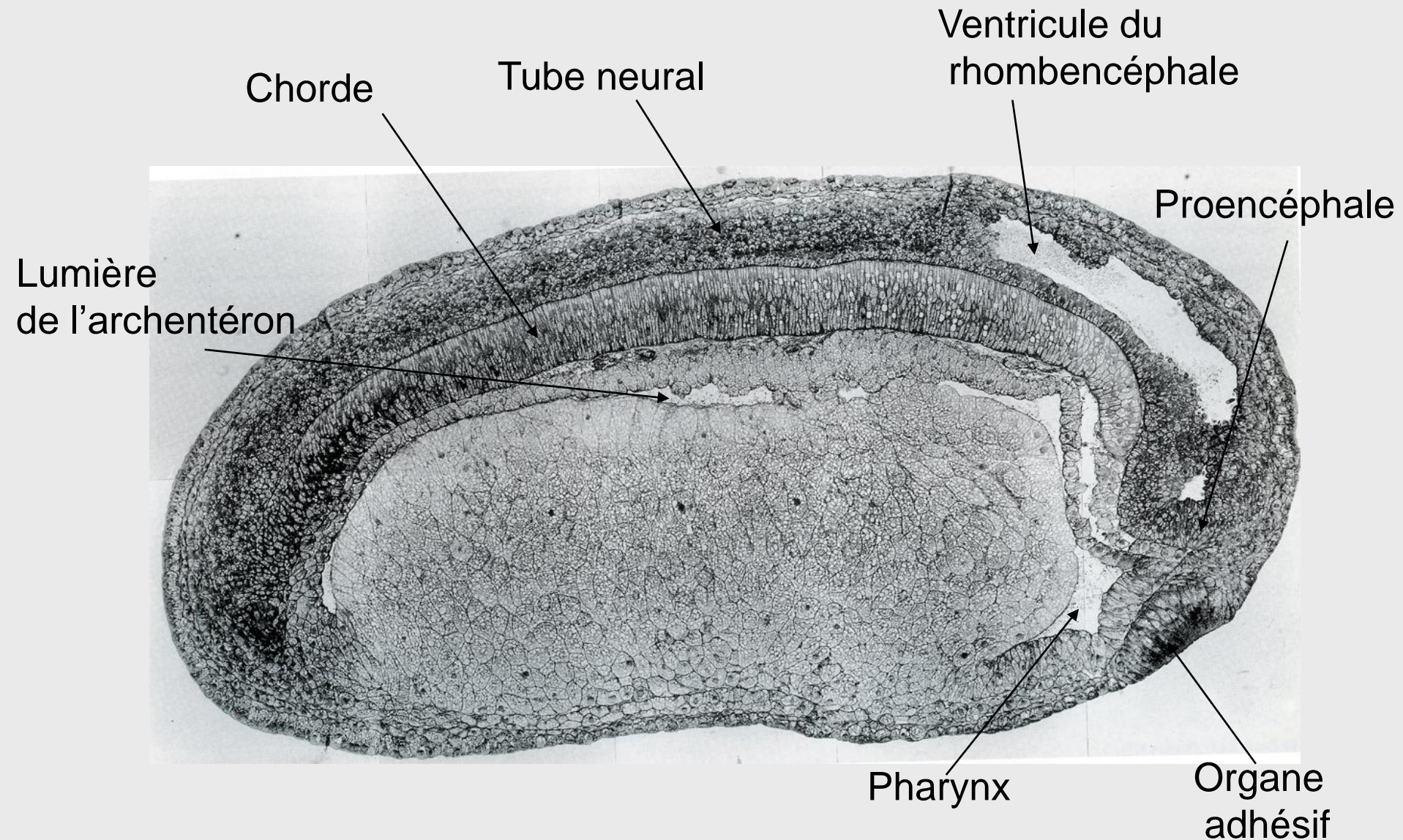
**Figure 41. Stade
bourgeon caudal moyen**



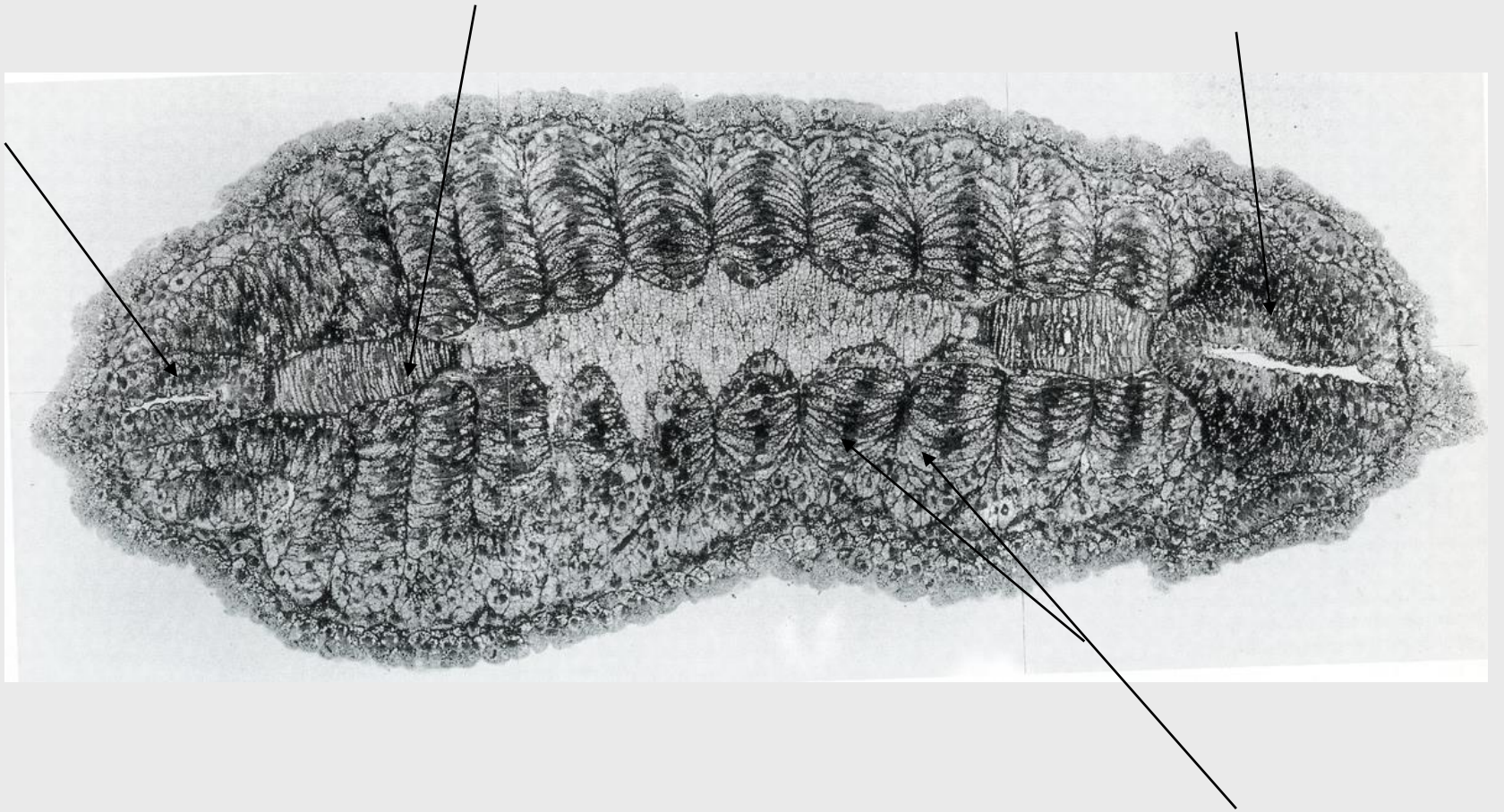
**Figure 42. Stade bourgeon
caudal âgé**

Le stade bourgeon caudal : morphologie externe





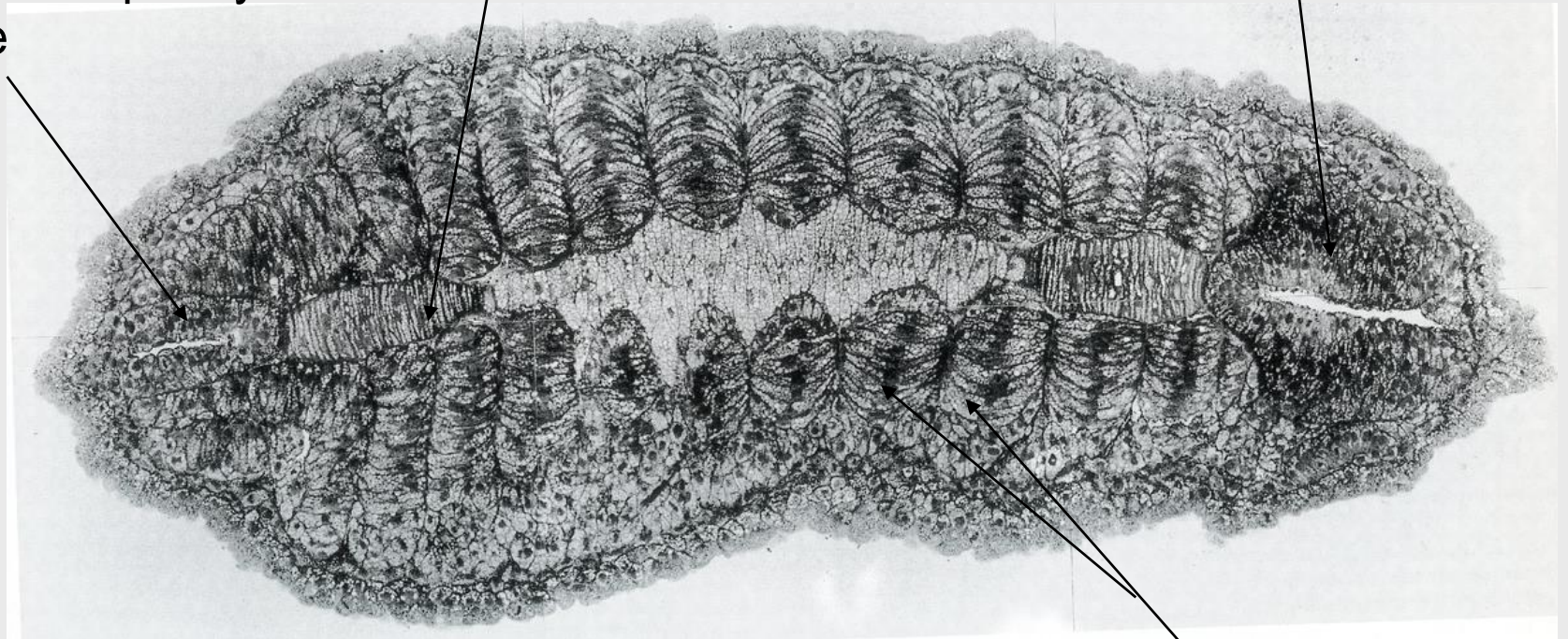
**Coupe sagittale : bourgeon caudal
(l'embryon s'est allongé)**



Tube neural
postérieur,
canal de l'épendyme
visible

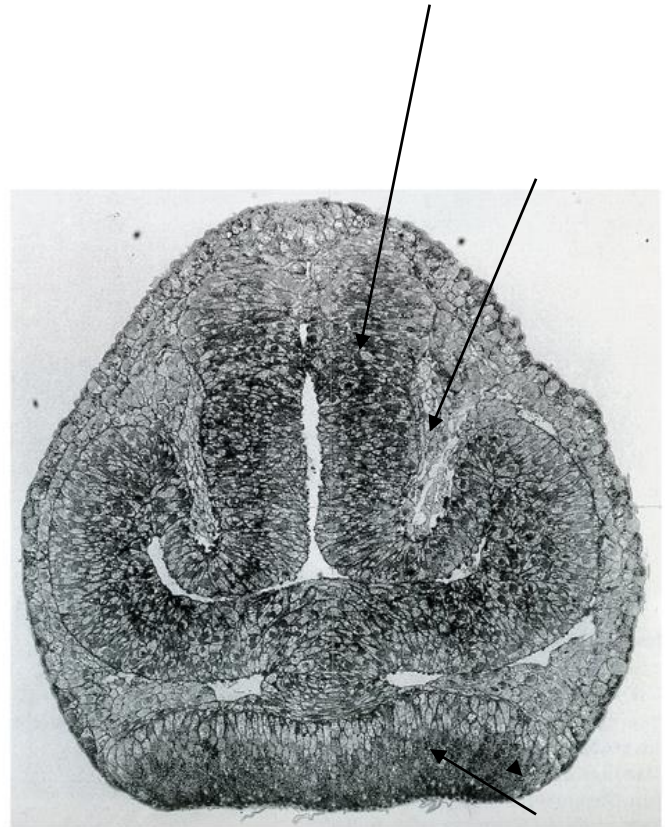
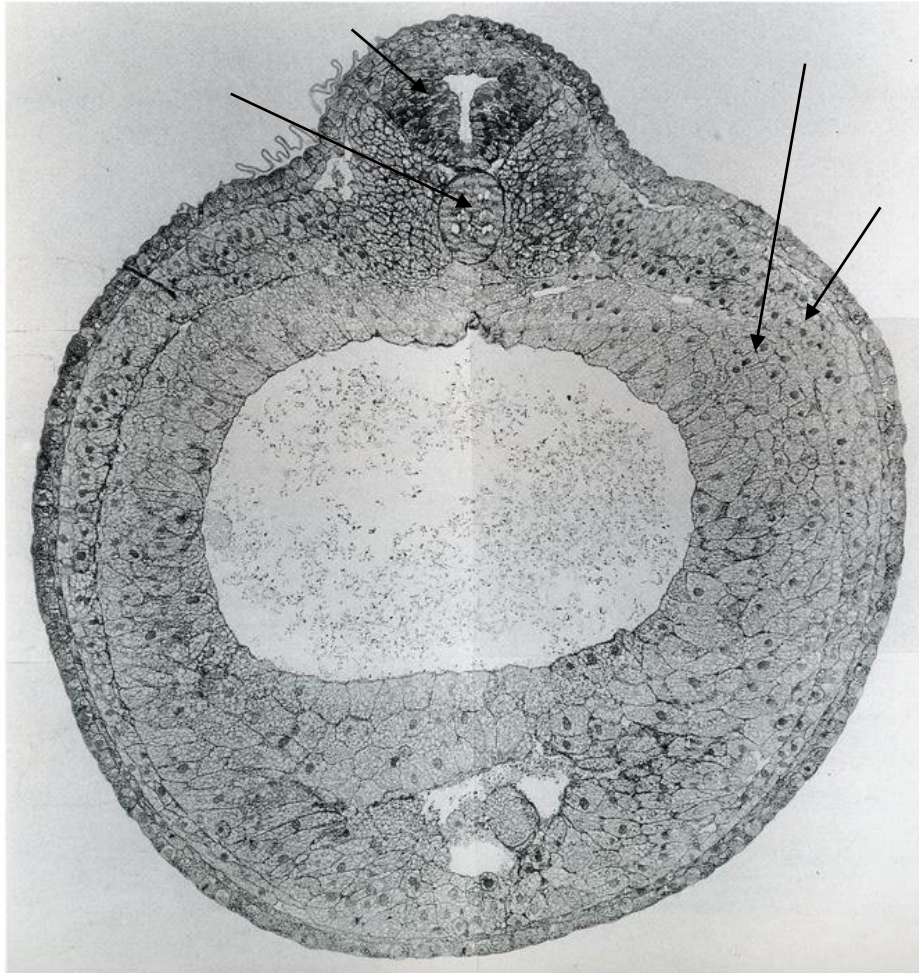
Chorde

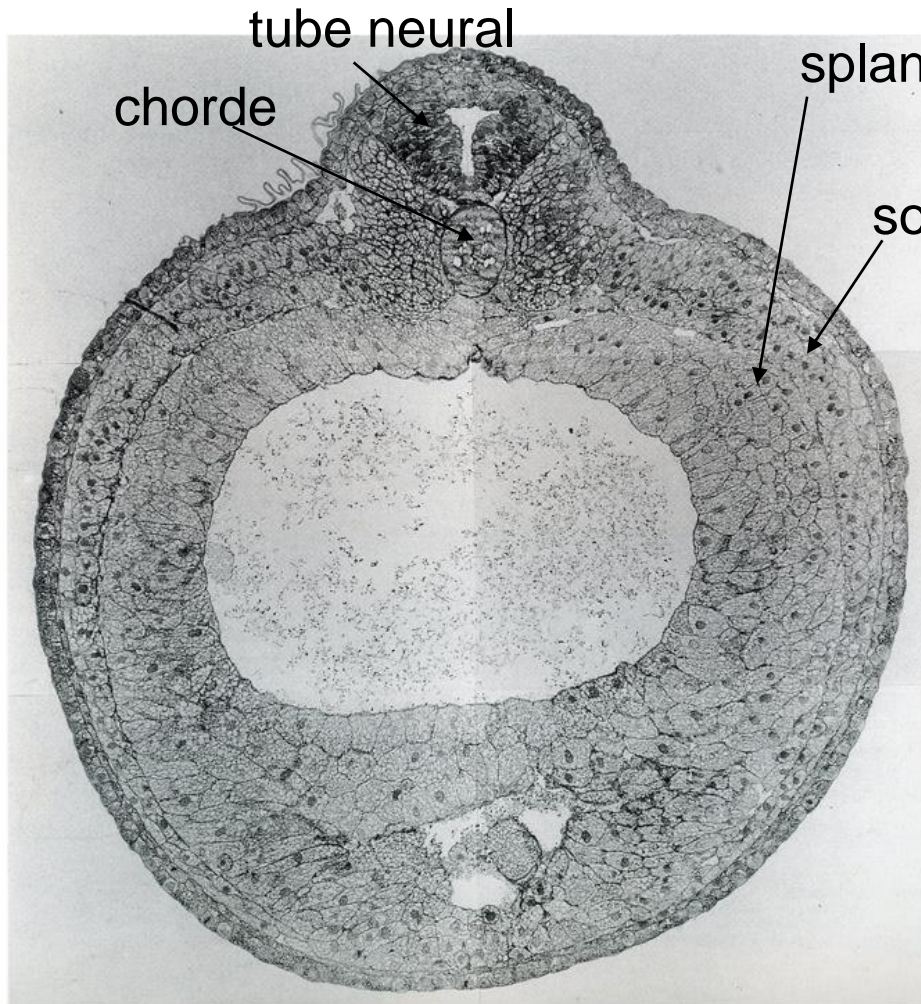
Rhombencéphale



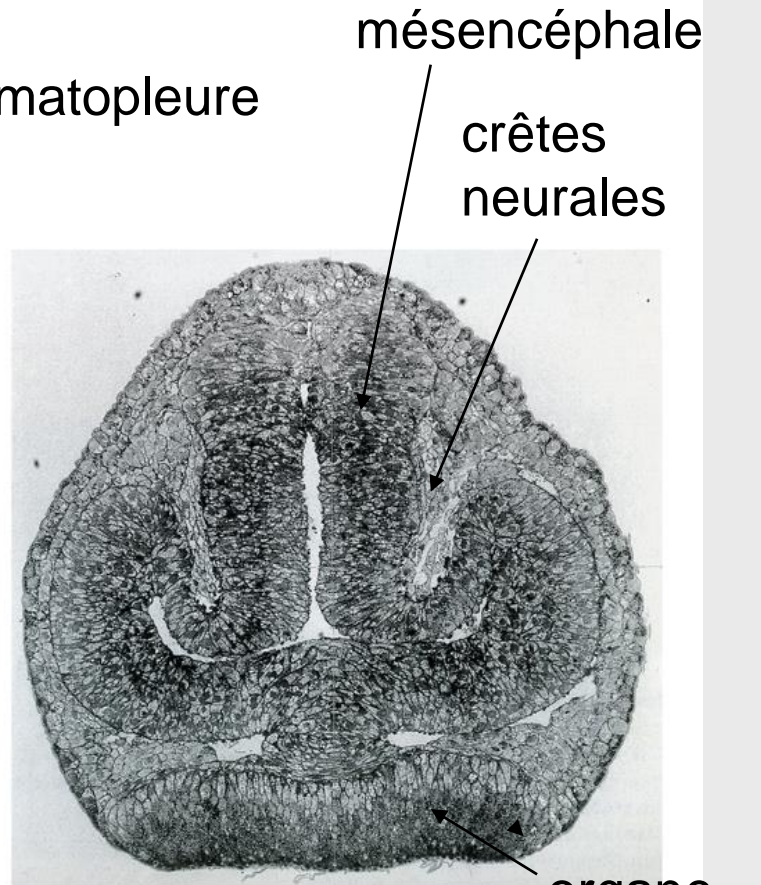
somites

Coupe frontale stade bourgeon caudal



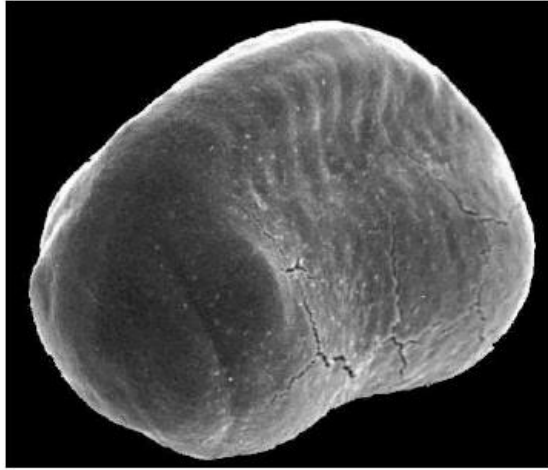


**Coupe transversale
bourgeon caudal
région troncale**



**CT
bourgeon caudal
région antérieure**

Développement embryonnaire des Amphibiens – Planche 4

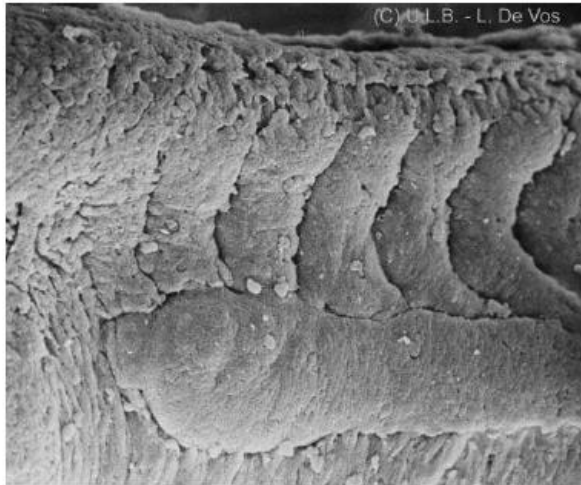


A

→ Proposer un titre à chaque cliché.

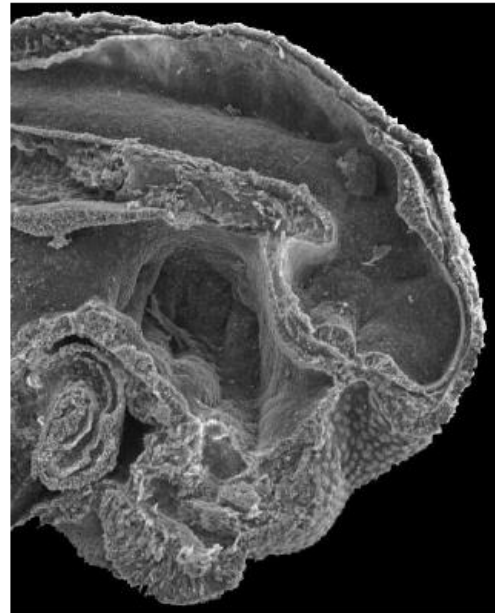


B

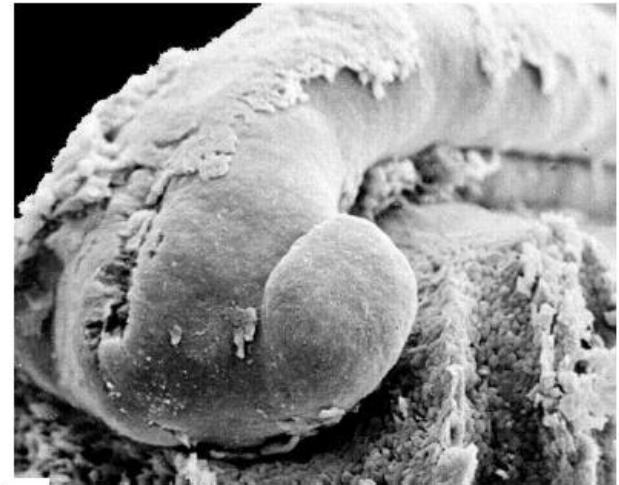


(C) U.L.B. - L. De Vos

C



E



D

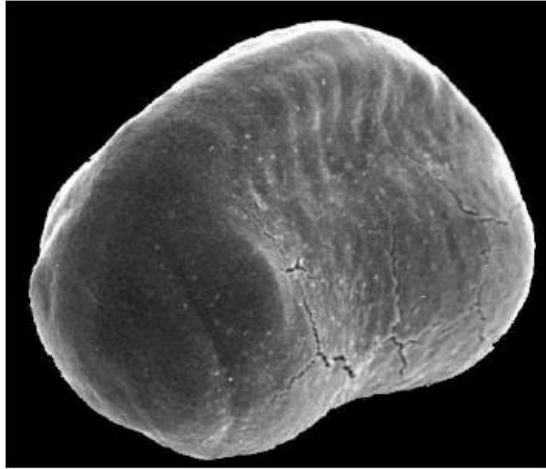


F

Organogenèse

Développement embryonnaire des Amphibiens – Planche 4

somites pronéphros Bourgeon branchial Ebauche d'œil

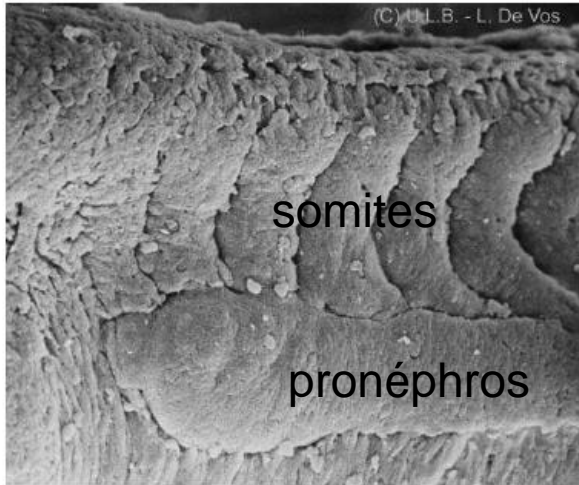
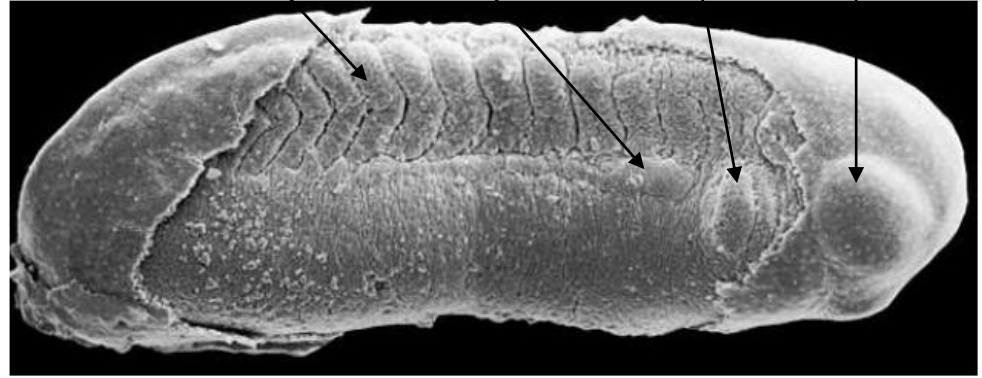


A Bourgeon caudal (vue frontale)

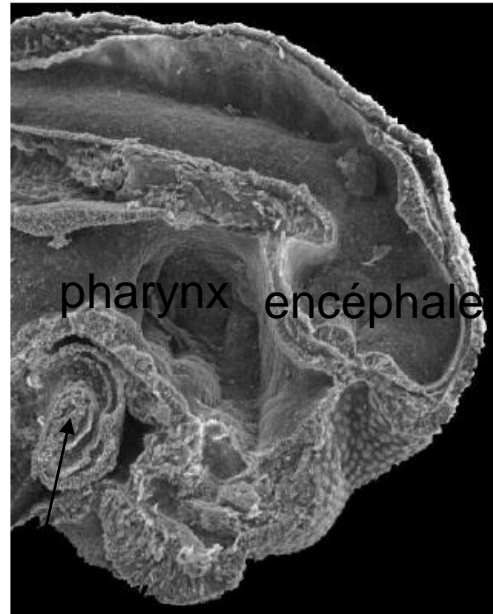
→ Proposer un titre à chaque cliché.

Bourgeon Caudal écorché

B

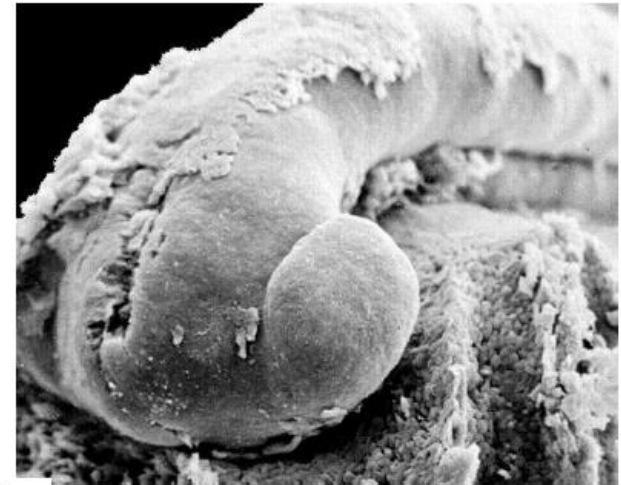


C Région postérieure



D Région cardiaque

Région antérieure



D

Encéphale



F

Bourgeon caudal âgé

Le stade bourgeon caudal : organogenèse

Morphologie externe : (doc porte-vues p. 9-10-11)

La **forme** de l'embryon change (allongement), **trois régions** (céphalique, troncale et caudale) se différencient.

Des **ébauches d'organes** sont visibles sous l'épiderme.

Morphologie interne :

- **Evolution du tube neural** (doc porte-vues p. 12),

- **Mise en place des organes sensoriels** (placodes) dans la région céphalique antérieure (doc porte-vues p. 14-15-16)

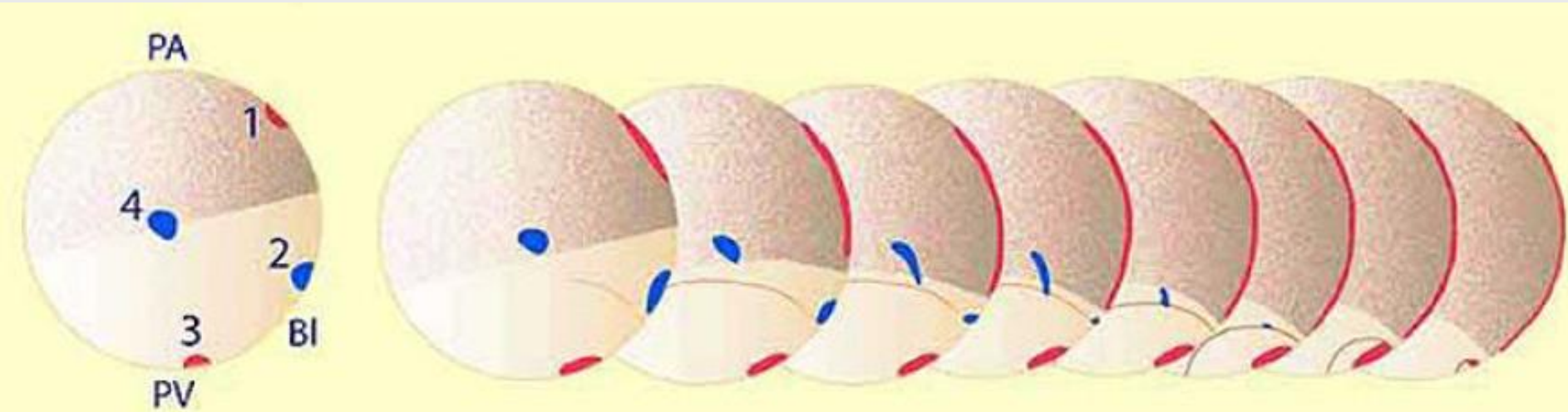
- **Plan d'organisation fondamental des Vertébrés bien visible** dans la région troncale (m.e., chorde, endoderme et cavité archentérique, somites + pronéphros + lames latérales, épiderme limitant). (doc porte-vues p. 13)

- **Segmentation du mésoderme en somites** (métamérie visible), à l'origine de 3 dérivés :
+ sclérotome profond → vertèbres
+ dermatome superficiel → derme
+ myotome intermédiaire → muscles (doc porte-vues p. 17-18)

- **Mise en place des viscères** : (doc porte-vues p. 19-20)

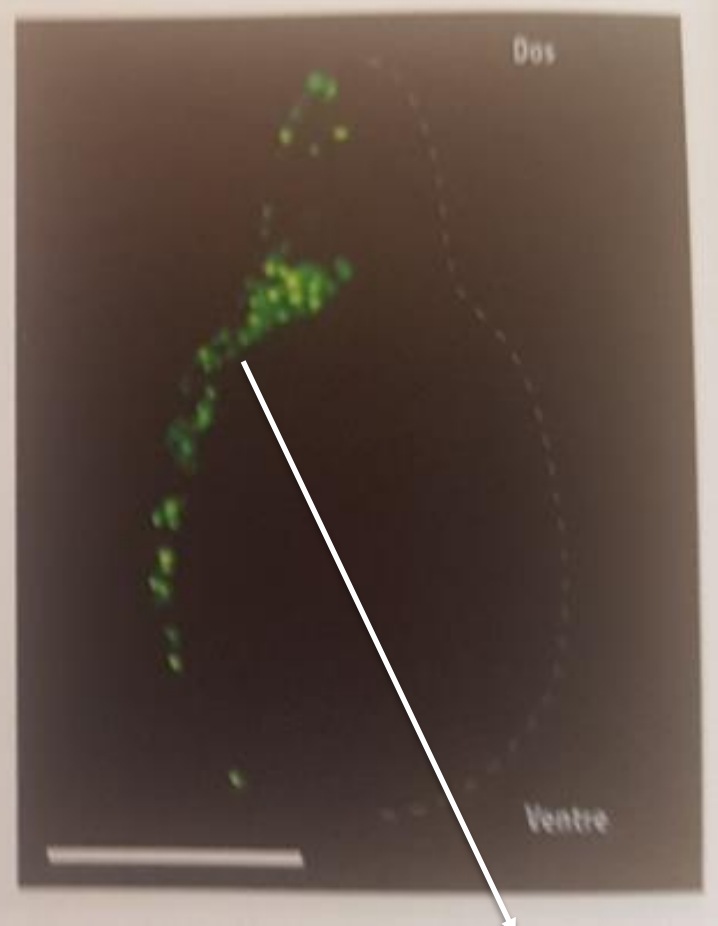
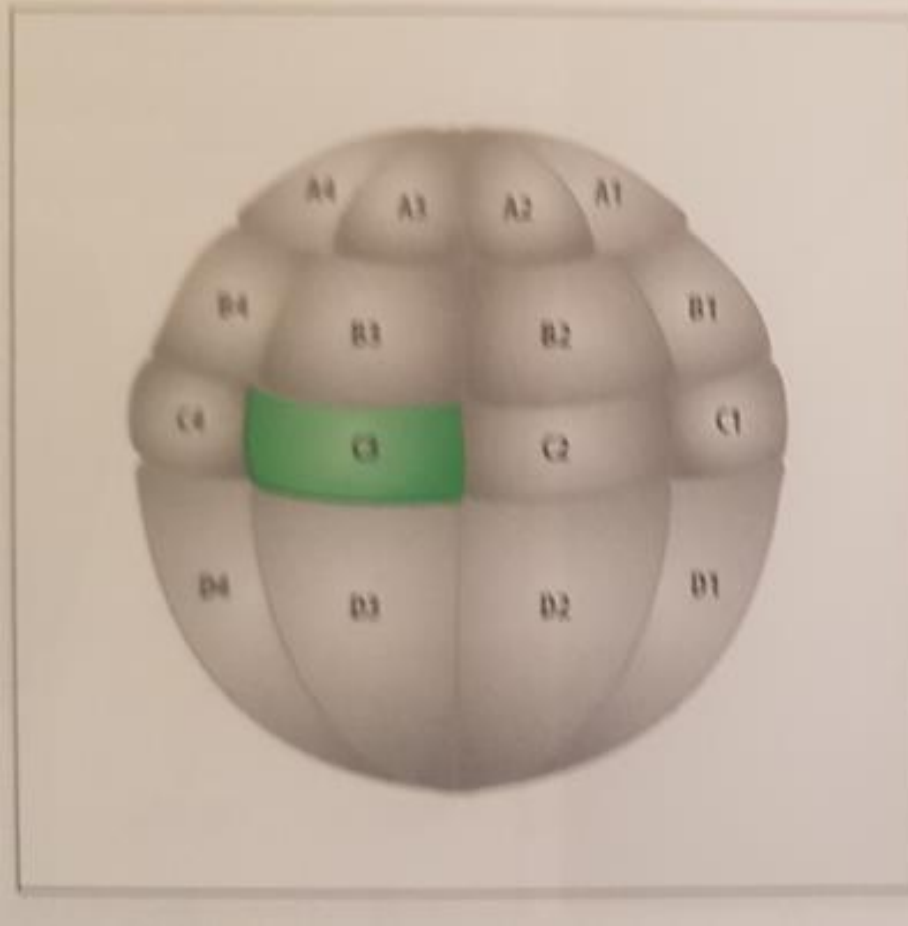
cœur, diverticule hépatique, proctodeum (anus primitif issu du blastopore).

Exploitation de données de marquage



Document 1 : Résultats des expériences de Vogt

Source : Michel Delarue / UNISCIEL



Cellules mésodermiques

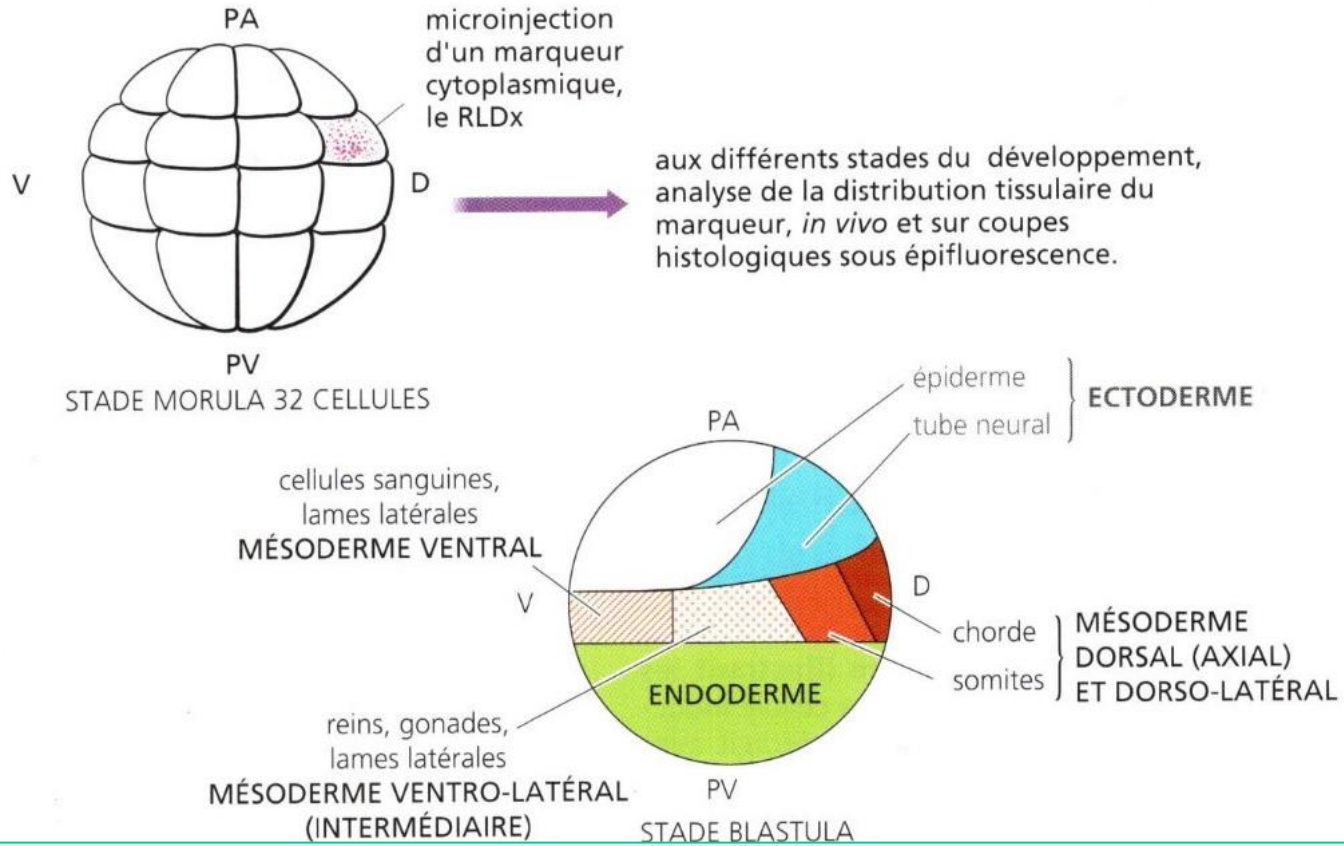
Document 2 :

Une cellule unique C3 de la blastula au stade 32 cellules est marquée par l'injection de dextran couplée à la fluorescéine.

A droite: coupe d'embryon au stade têtard, éclairée sous UV

(Wolpert, biologie du développement, Dunod 5 edition)

Barre d'échelle 0,5 mm



Document 3 :

Représentation schématique des résultats des expériences de marquage dans un stade morula 32 cellules. Un marqueur est injecté dans les différentes cellules de la morula. Des coupes sont ensuite réalisées pour identifier le lignage du blastomère dans lequel l'injection a été faite.

(Darrivière, introduction à la biologie du développement, Belin sup)

Document 4 :

Représentation schématique de l'expérience de Nieuwkoop et de ses résultats.

(Darrivière, introduction à la biologie du développement, Belin sup)

