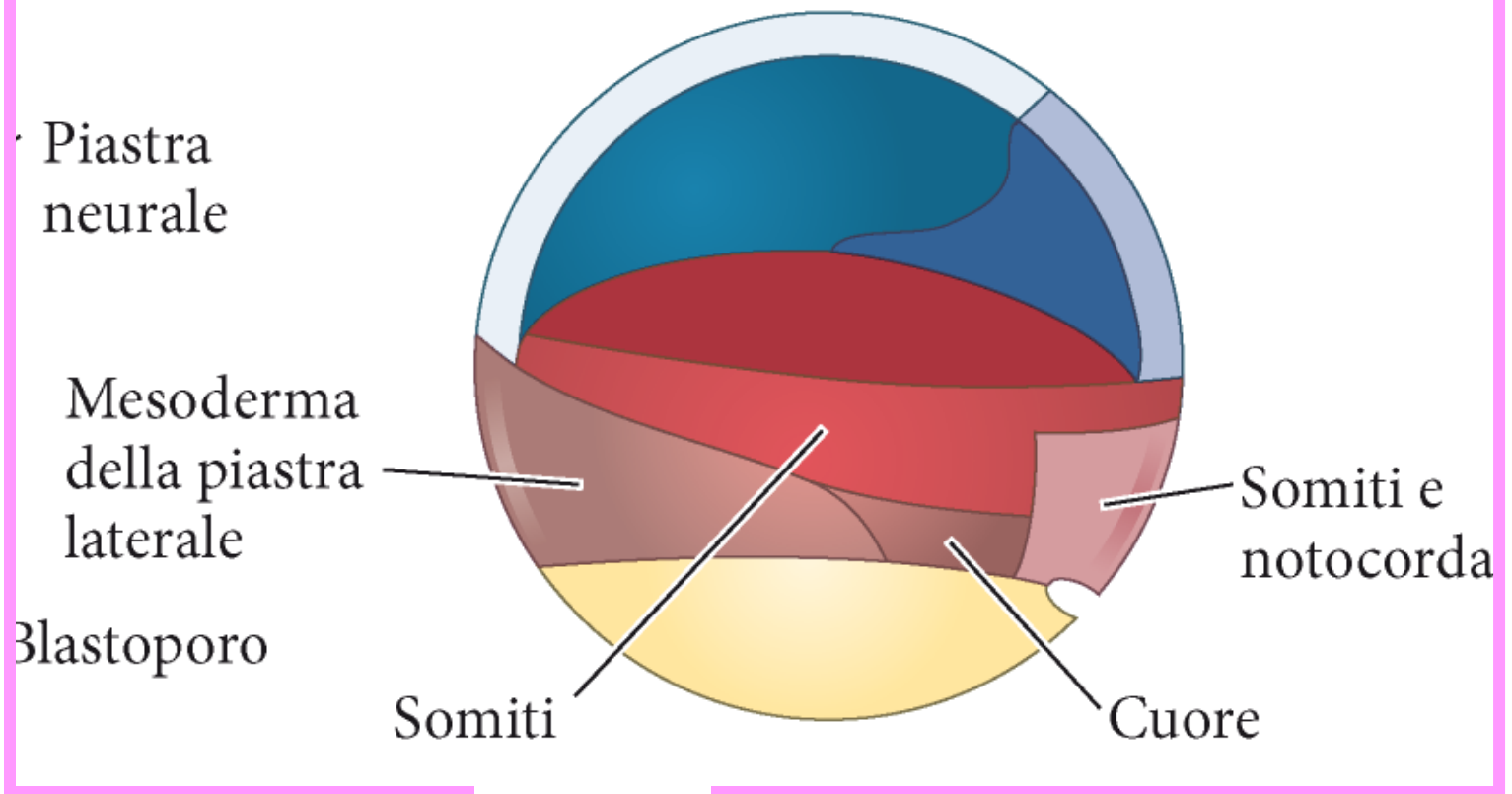




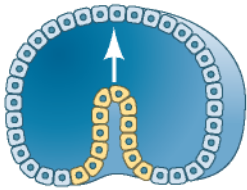
**La gastrulazione**

(B) Mappa interna



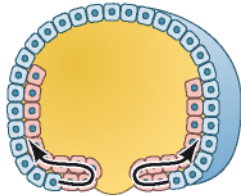
# La gastrulazione coinvolge combinazioni di diversi tipi di movimenti

**Invaginazione:**  
Ripiegamento di una lamina cellulare all'interno dell'embrione



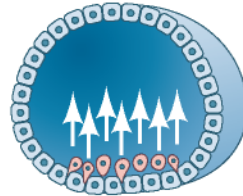
*Esempio:*  
Endoderma del riccio di mare

**Embolia (involuzione):**  
Introflessione e scivolamento di una lamina cellulare lungo la superficie basale di uno strato esterno di cellule



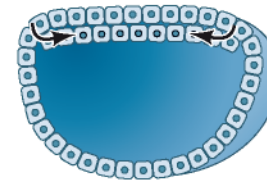
*Esempio:*  
Mesoderma degli anfi

**Ingresso:**  
Migrazione di singole cellule all'interno dell'embrione



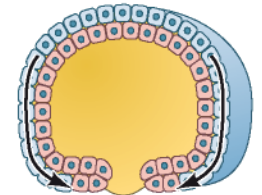
*Esempio:*  
Mesoderma del riccio di mare, neuroblasti di *Drosophila*

**Delaminazione:**  
Divisione di una lamina cellulare o sua migrazione a formare due lamine



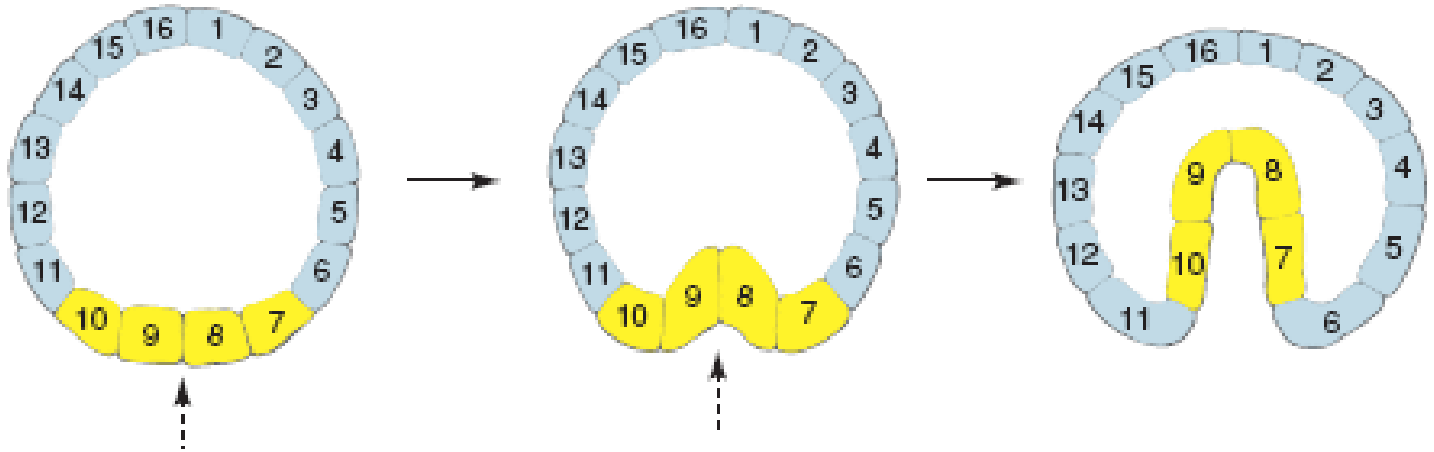
*Esempio:*  
Formazione dell'ipoblasto nei mammiferi e negli uccelli

**Epibolia:**  
Espansione di una lamina cellulare fino ad avvolgere la superficie di altre cellule

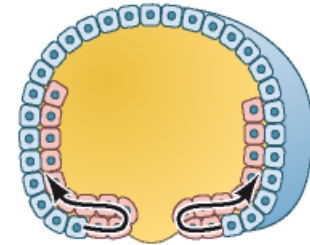


*Esempio:*  
Formazione dell'ectoderma in anfi, riccio di mare e tunicati

Invaginazione

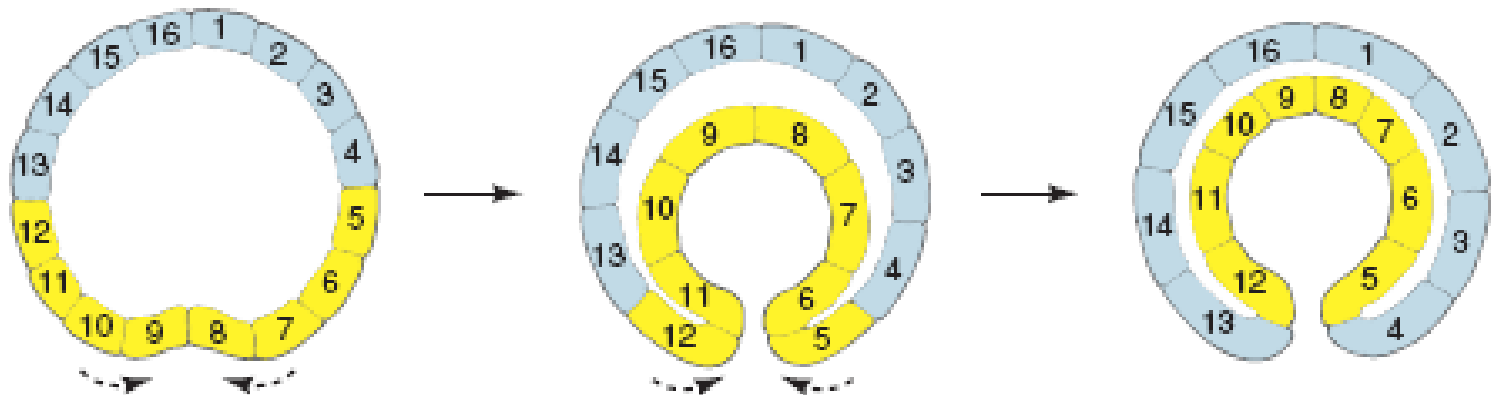


**Embolia (involuzione):**  
Introflessione e scivolamento  
di una lamina cellulare  
lungo la superficie basale  
di uno strato esterno di cellule



*Esempio:*  
Mesoderma  
degli anfi

**Involuzione**



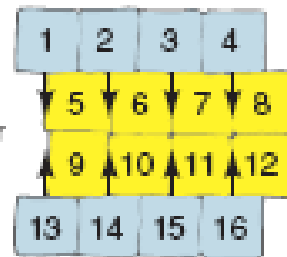
Estensione  
convergente

1	2
3	4



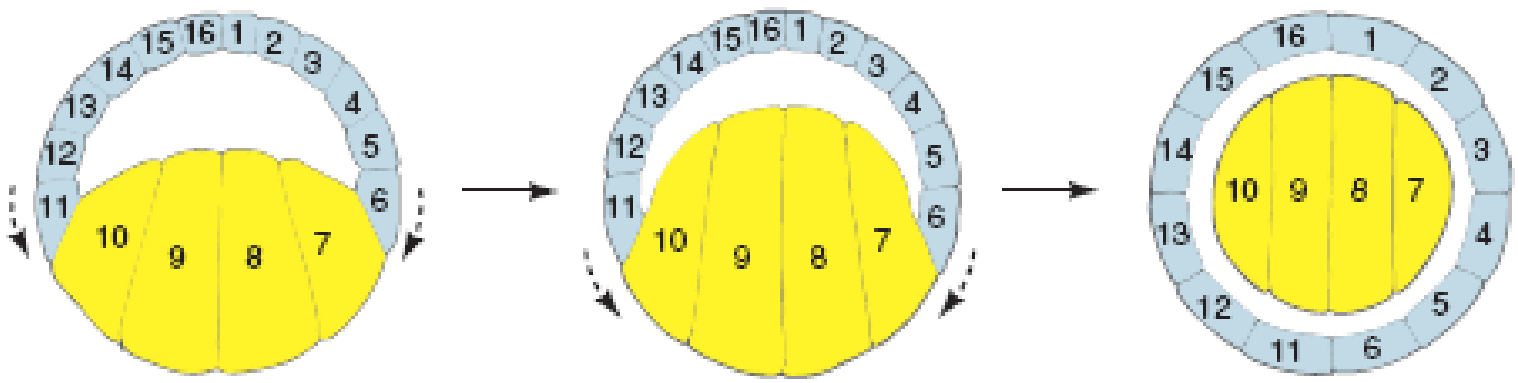
1	2
3	4

Or

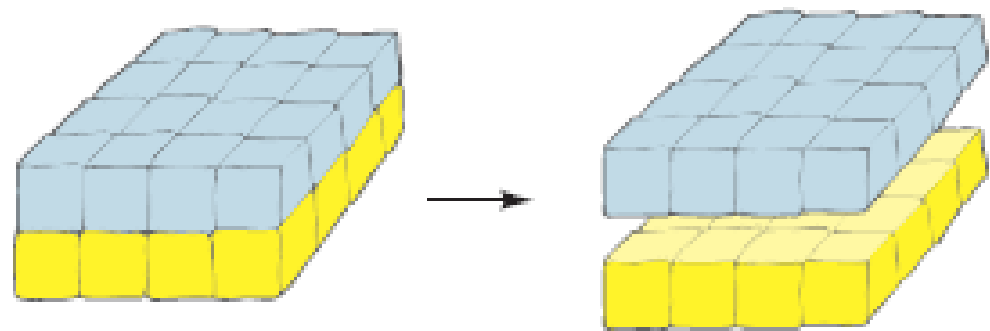


1	5	2	6	3	7	4	8
13	9	14	10	15	11	16	12

Epibolia



**Delaminazione**

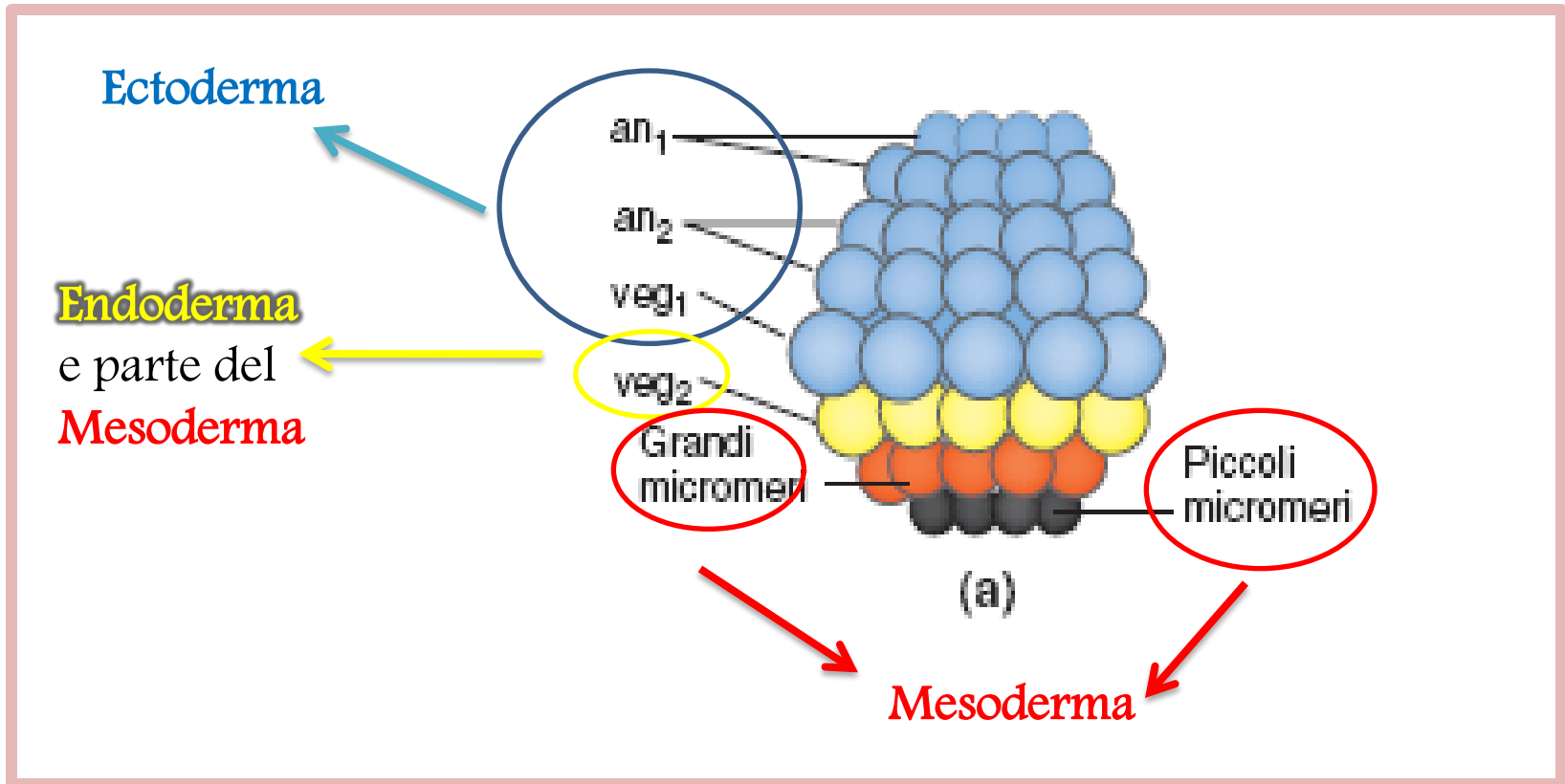




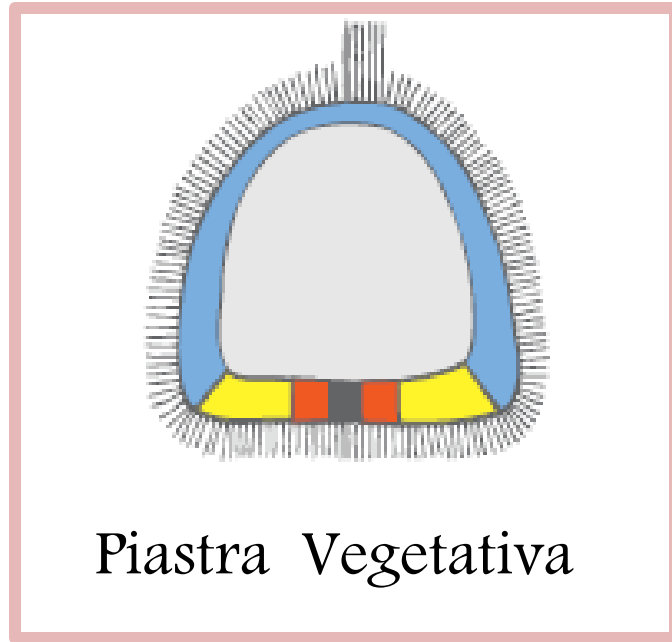
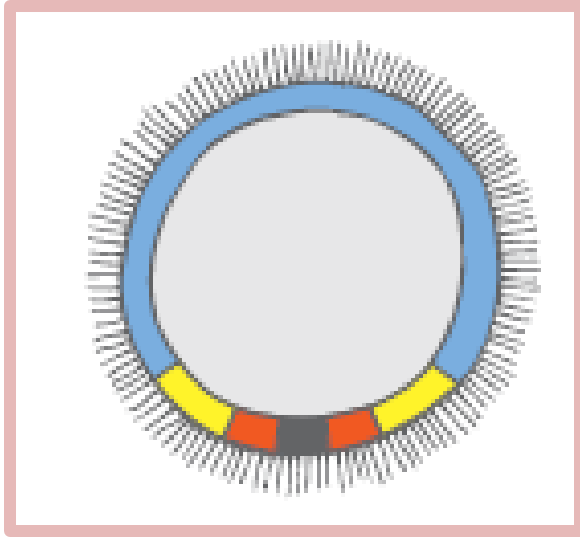
# La gastrulazione nel riccio di mare



# La gastrulazione nel riccio di mare



# La gastrulazione nel riccio di mare



Piastra Vegetativa

# La gastrulazione nel riccio di mare

(A)

Polo animale

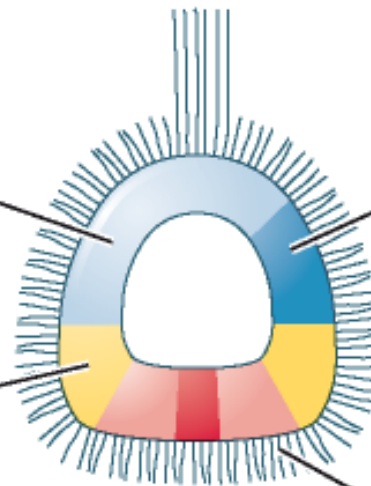


Polo vegetativo

(B)

Ectoderma

Endoderma

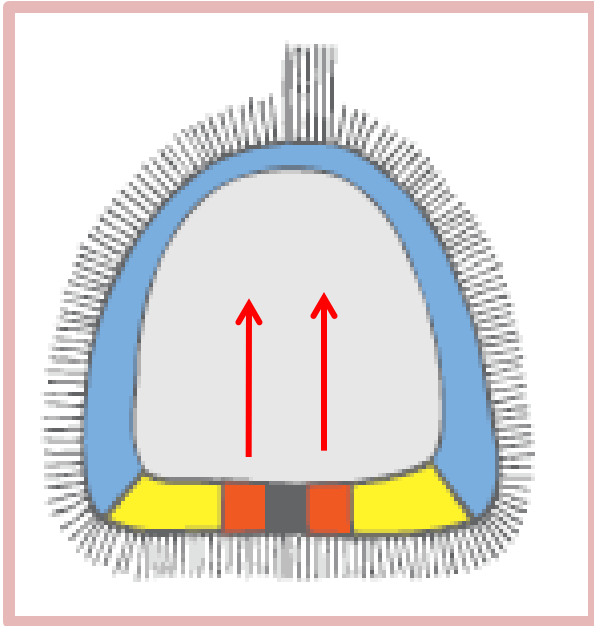


Ectoderma  
orale

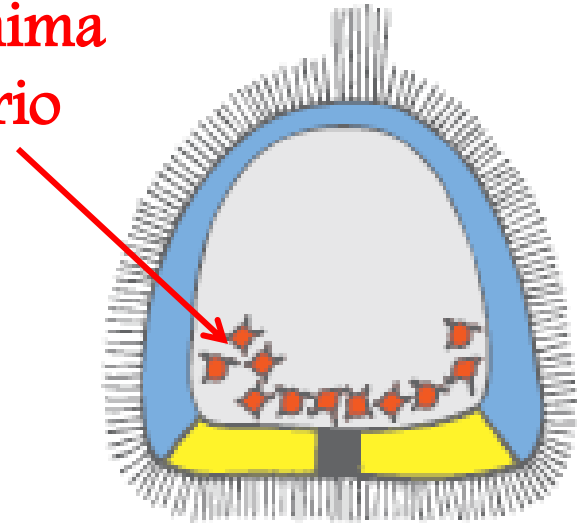
Piastra vegetativa

(C)

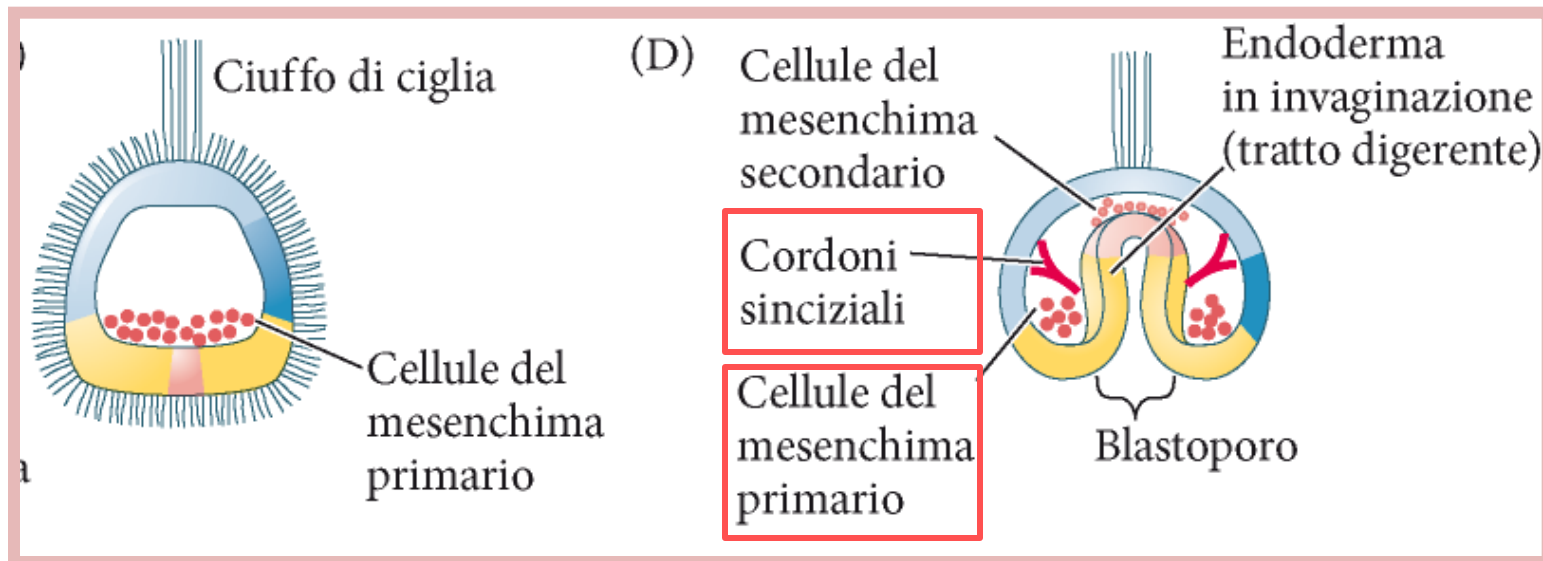
# La gastrulazione nel riccio di mare: ingresso del mesenchima scheletogeno



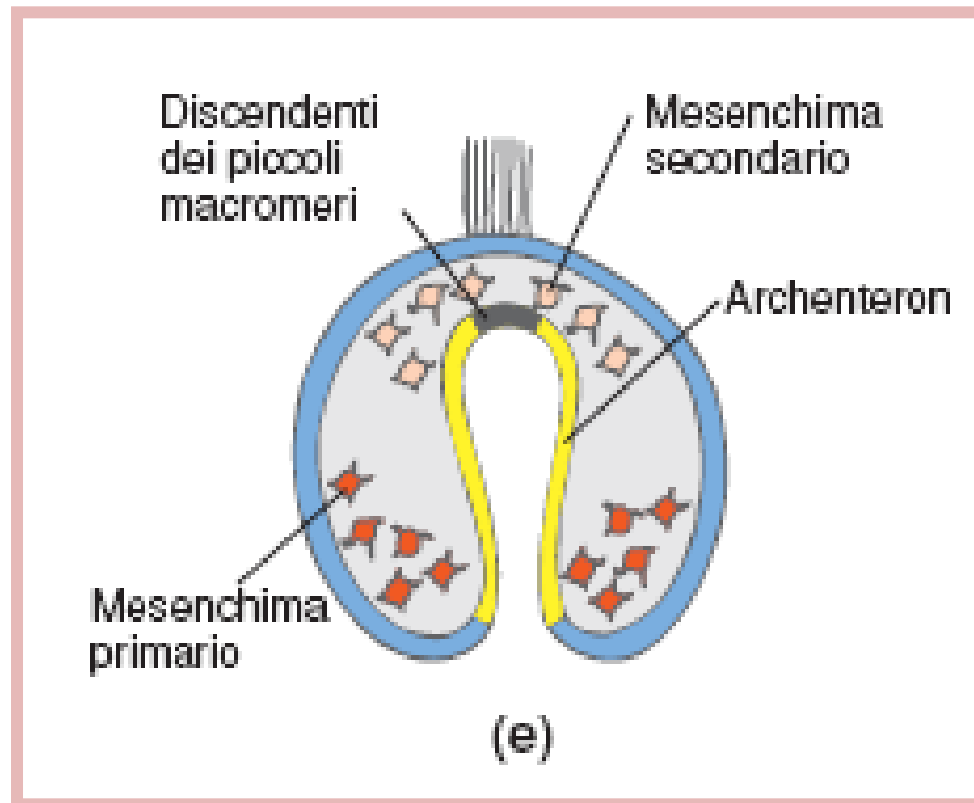
Mesenchima  
primario



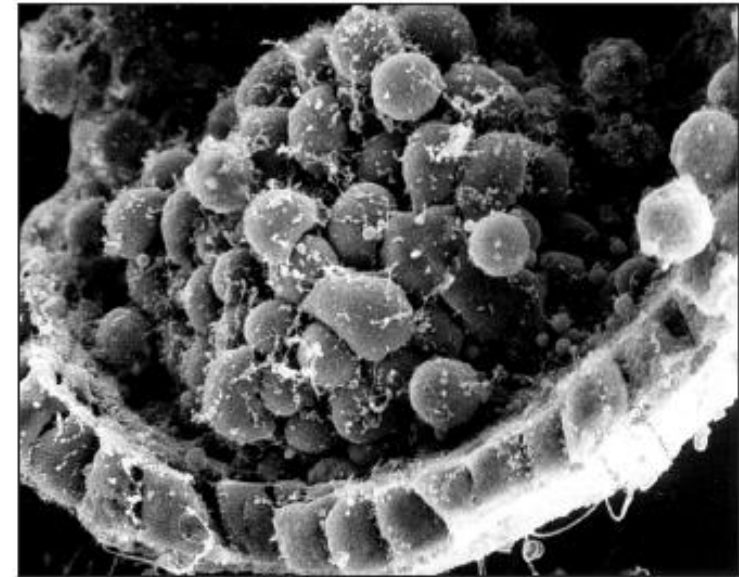
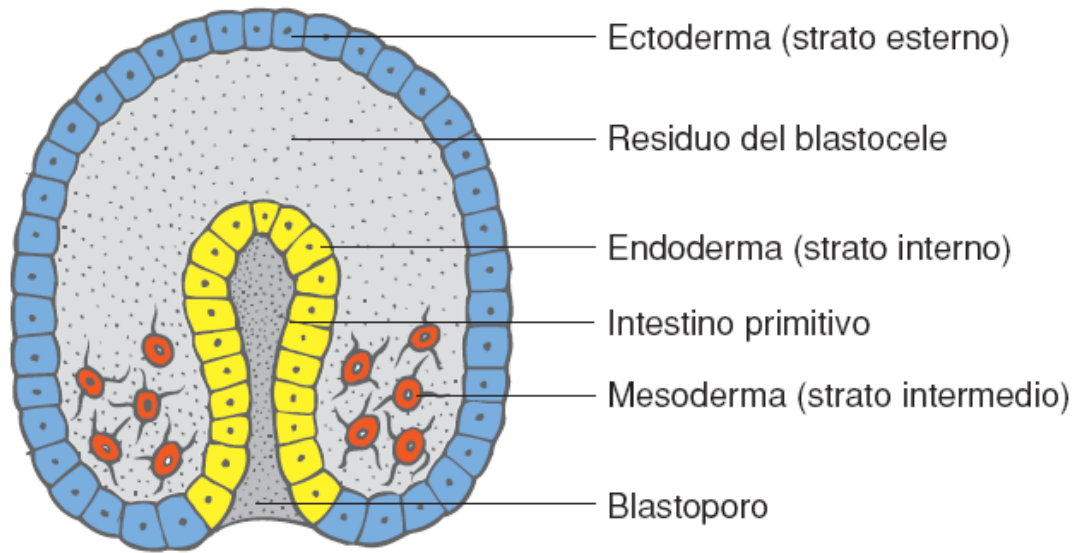
# La gastrulazione nel riccio di mare: ingresso del mesenchima scheletogeno



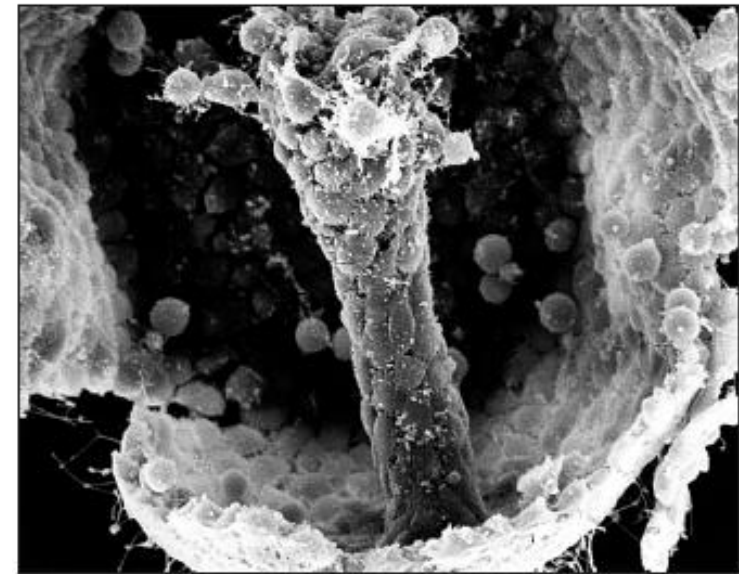
# La gastrulazione nel riccio di mare







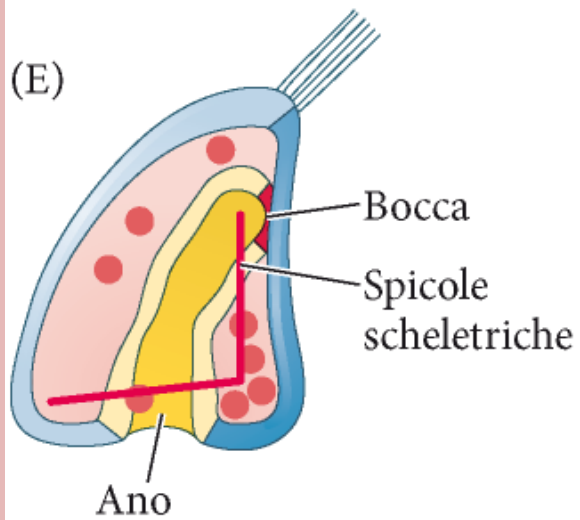
(a)



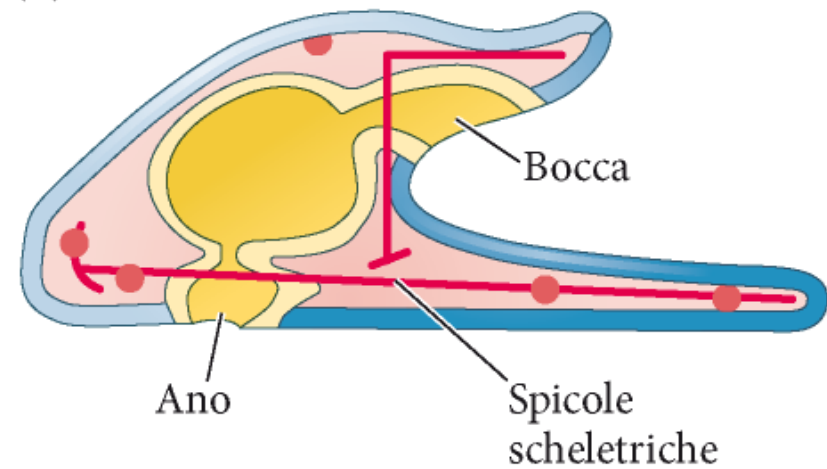
(b)



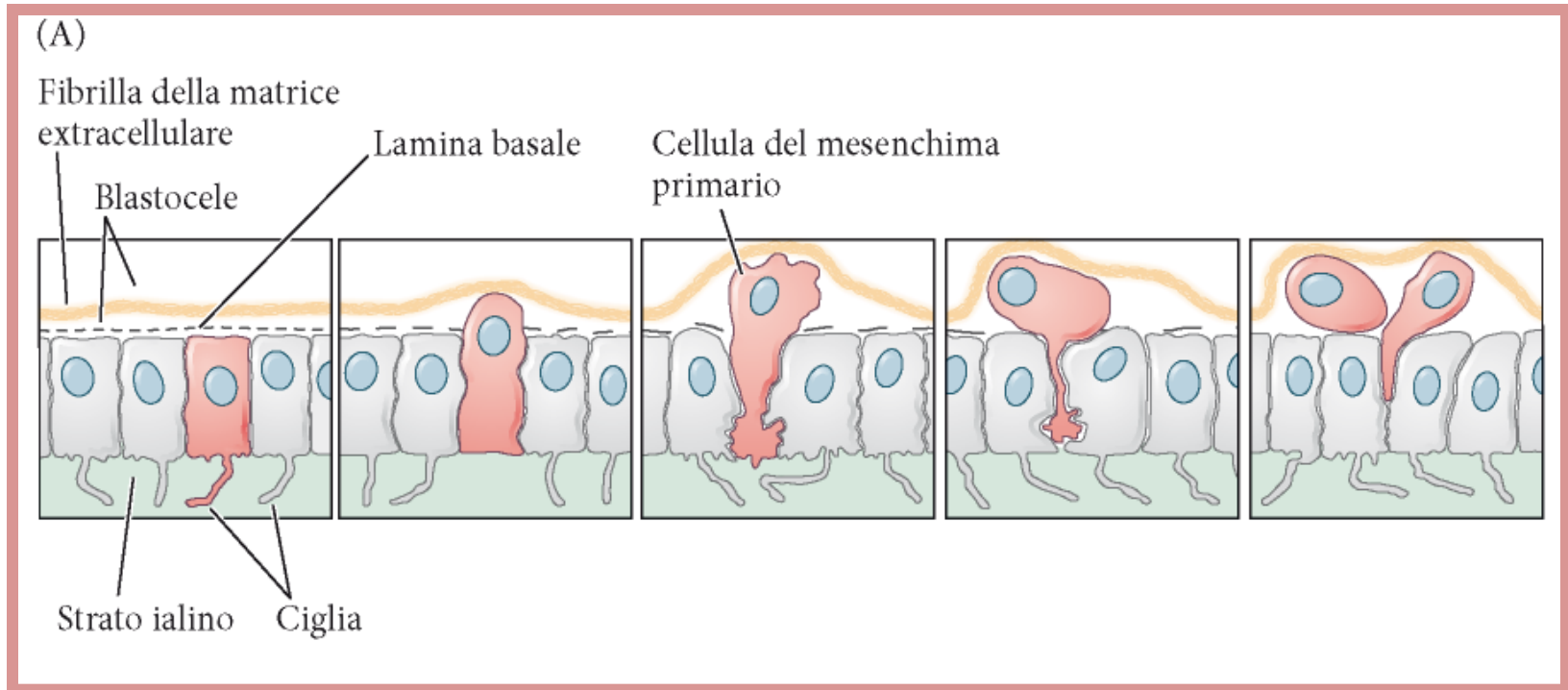
(E)



(F)

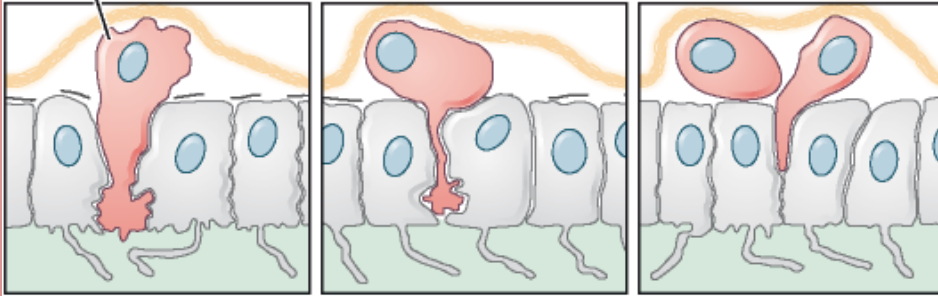


# La gastrulazione nel riccio di mare: ingresso dei discendenti dei micromeri nel blastocele

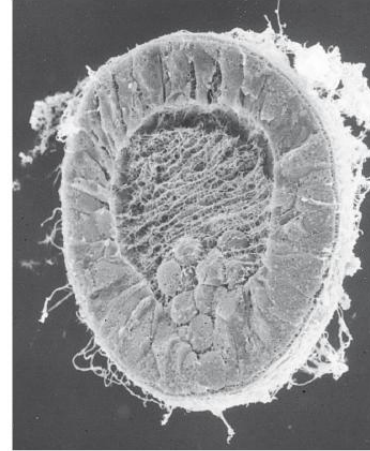


# La gastrulazione nel riccio di mare: ingresso dei discendenti dei micromeri nel blastocele

Cellula del mesenchima  
primario



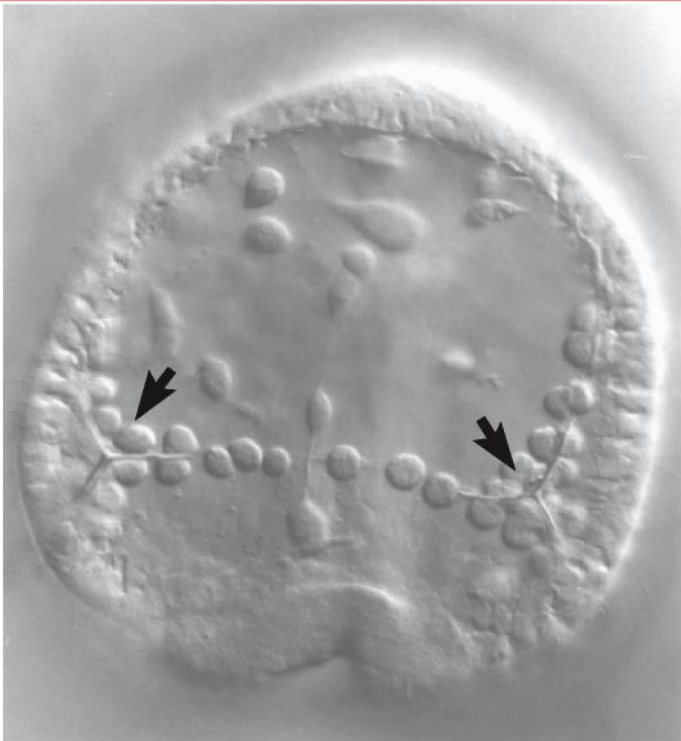
(B)



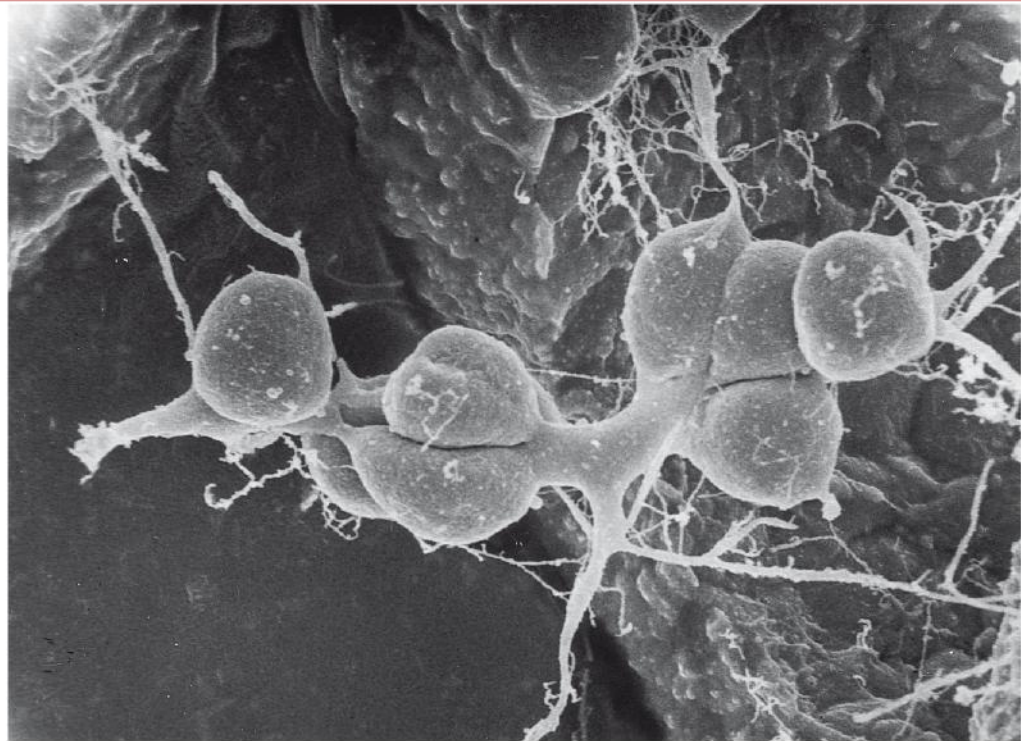
(C)

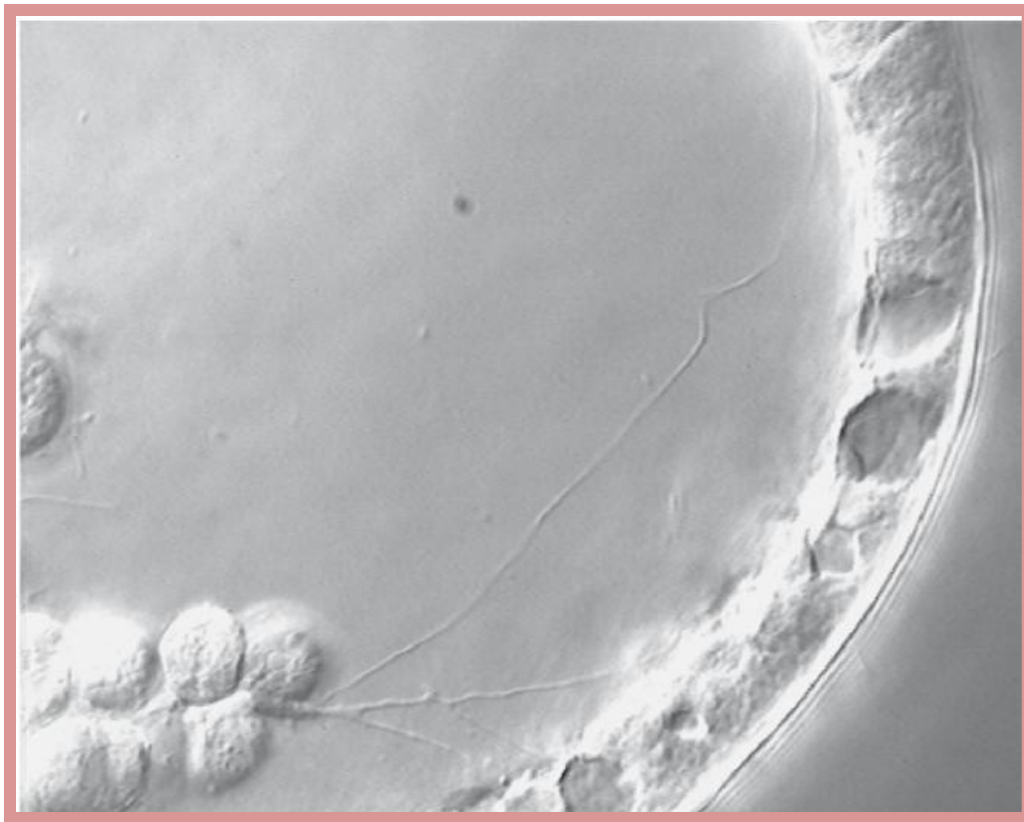


(A)

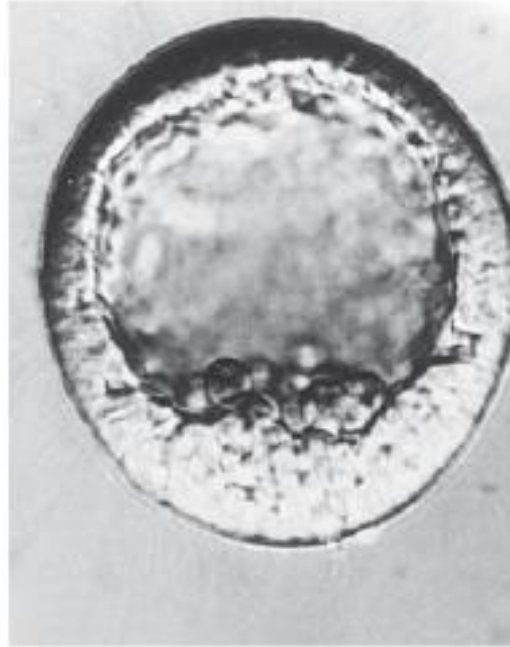


(B)





# L'invaginazione dell'archenteron



9 ore



10,5 ore



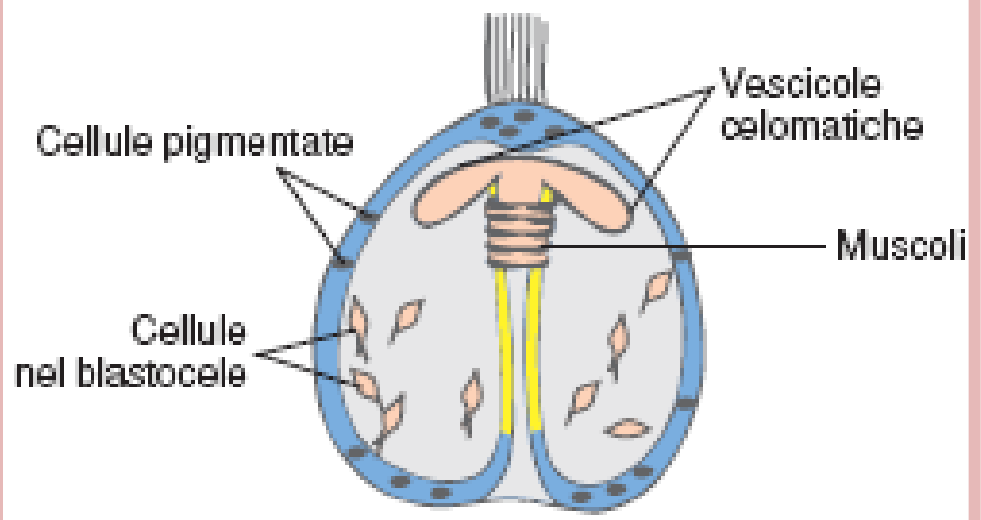
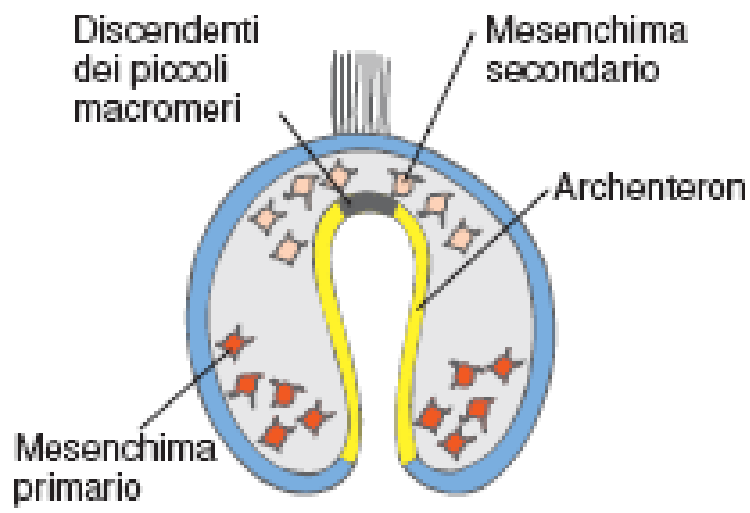
11 ore



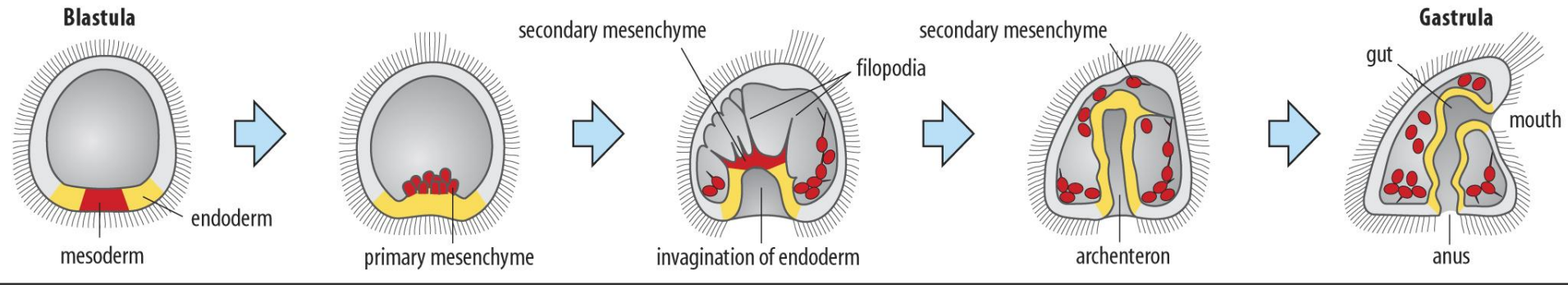
11,5 ore

Blastoporo



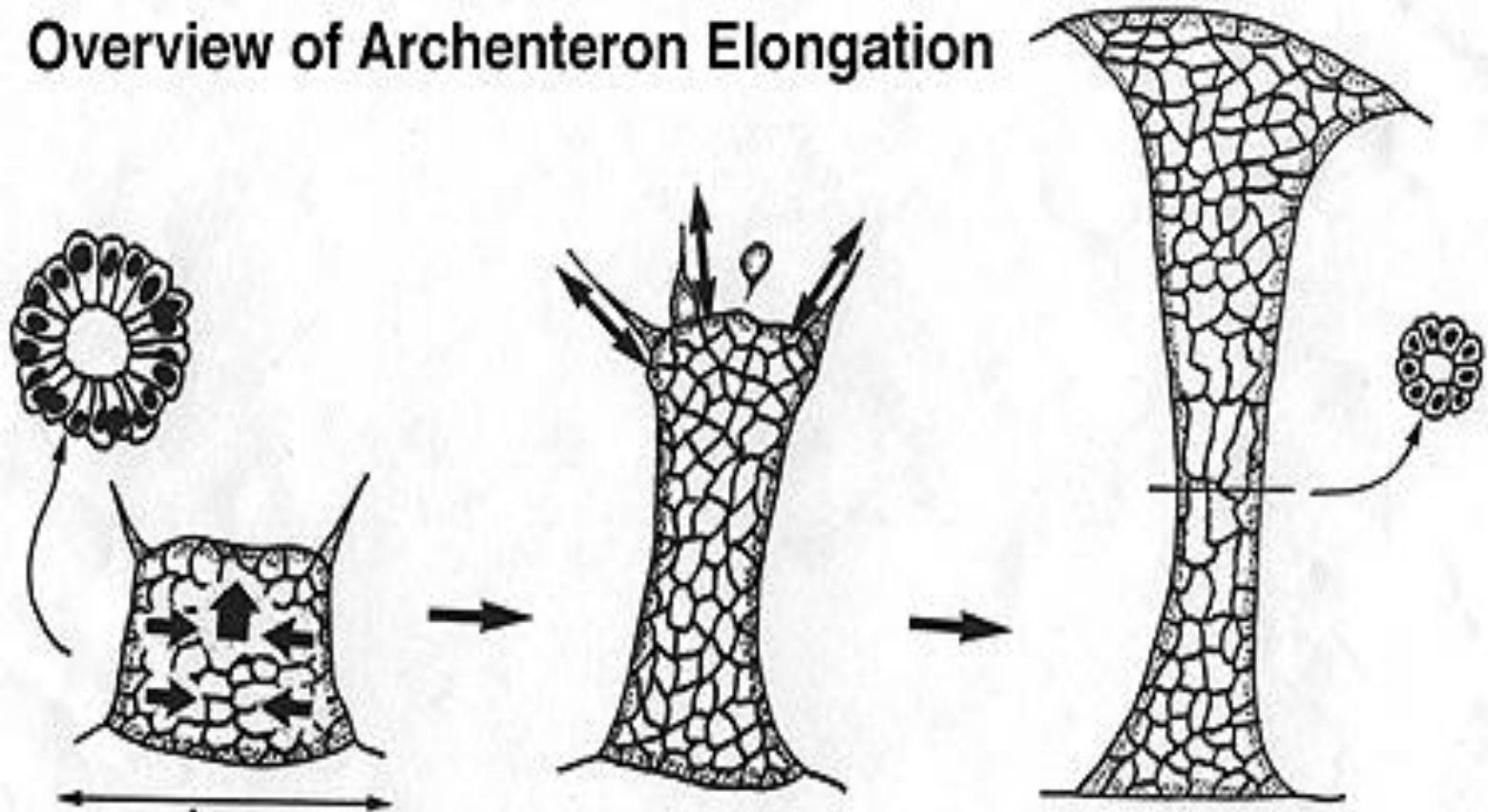






# L'allungamento dell'archenteron

## Overview of Archenteron Elongation



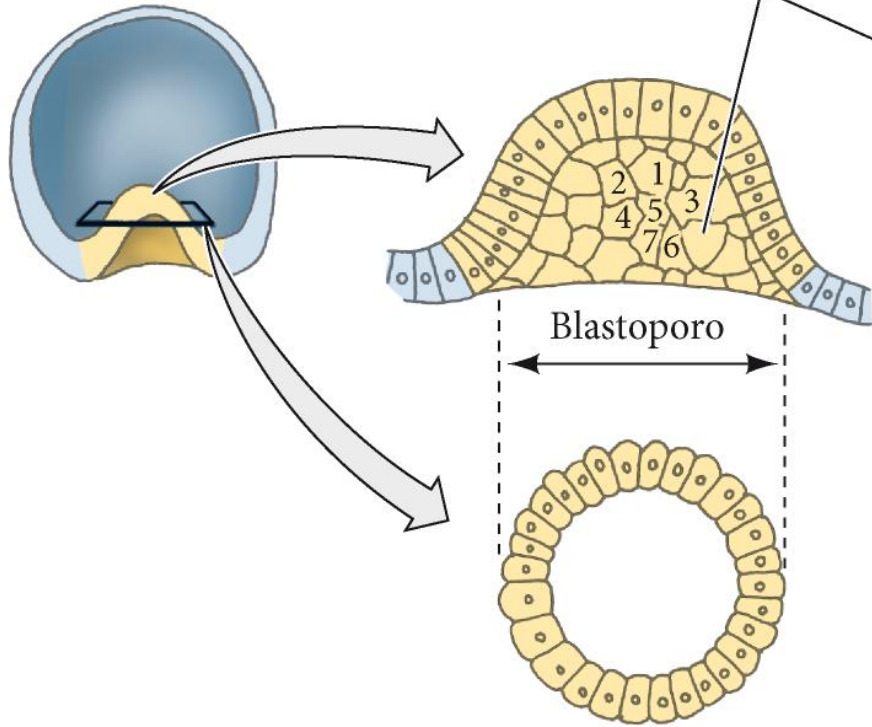
# L'allungamento dell'archenteron



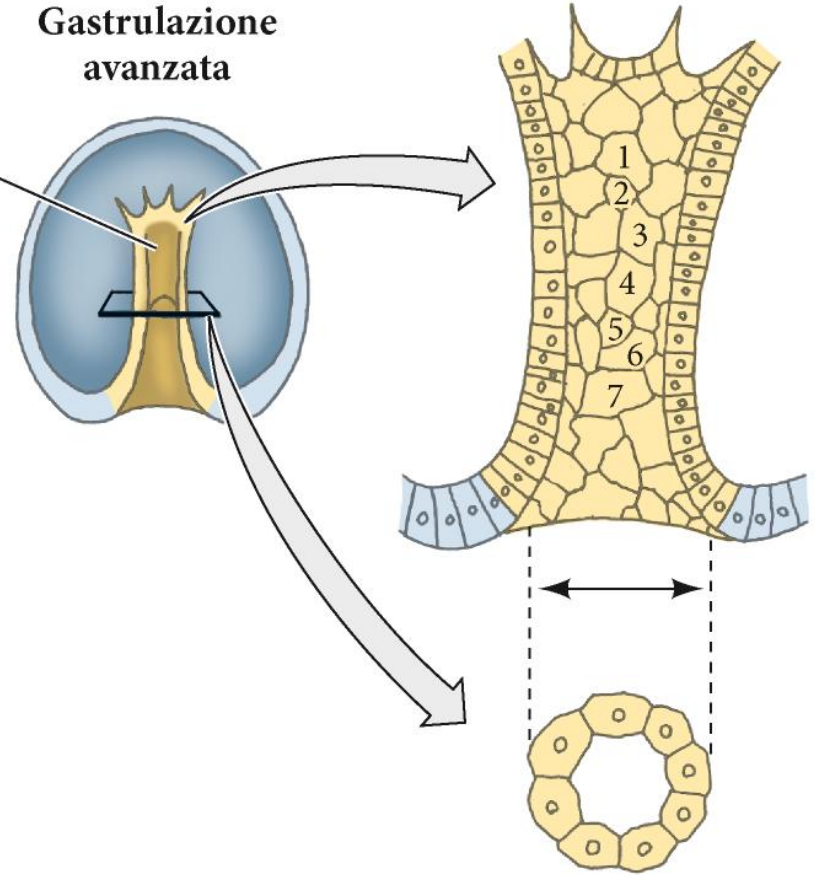
12 ore

# L'allungamento dell'archenteron

Gastrulazione iniziale



Gastrulazione avanzata



# L'allungamento dell'archenteron



12 ore



13 ore



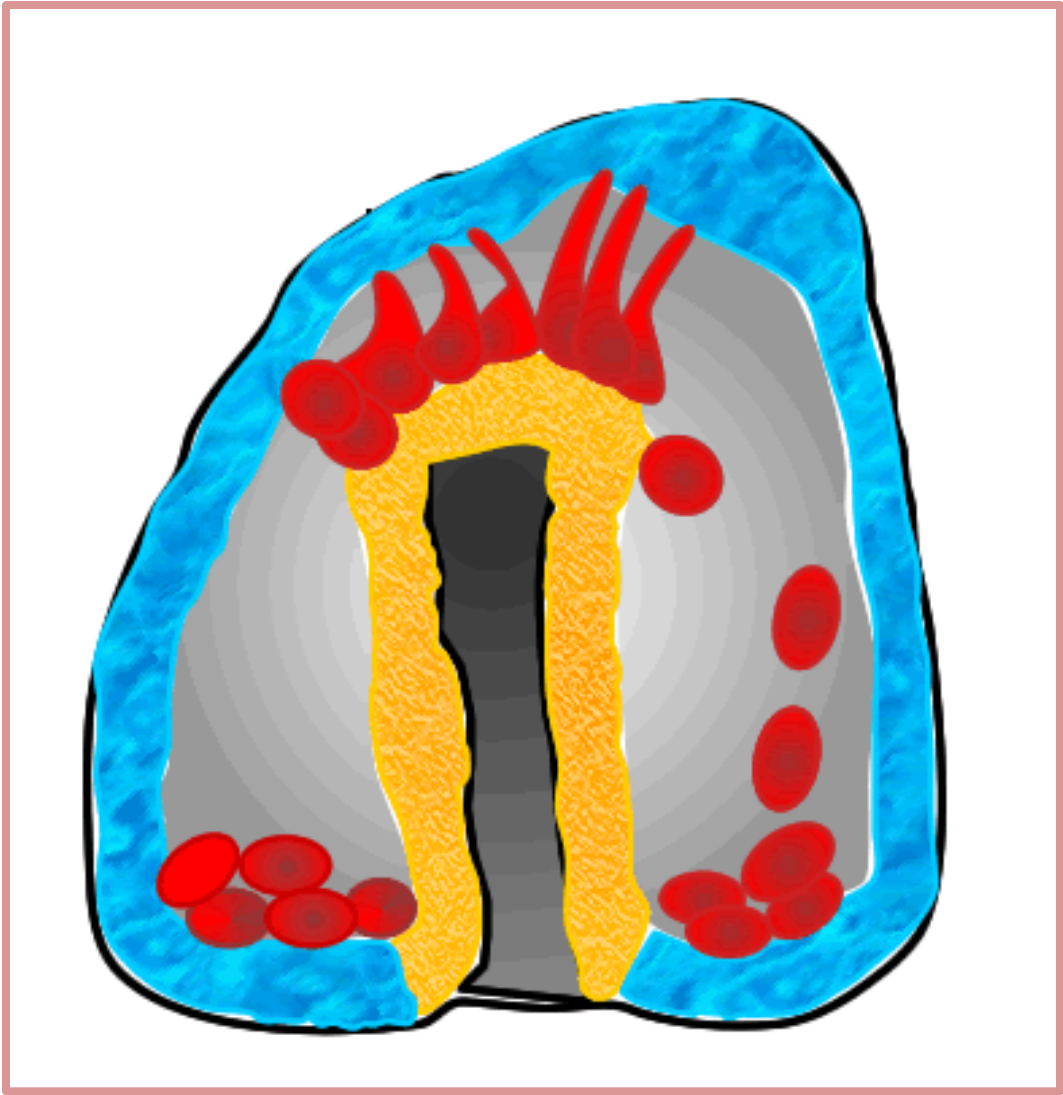
# L'allungamento dell'archenteron

(A)



(B)



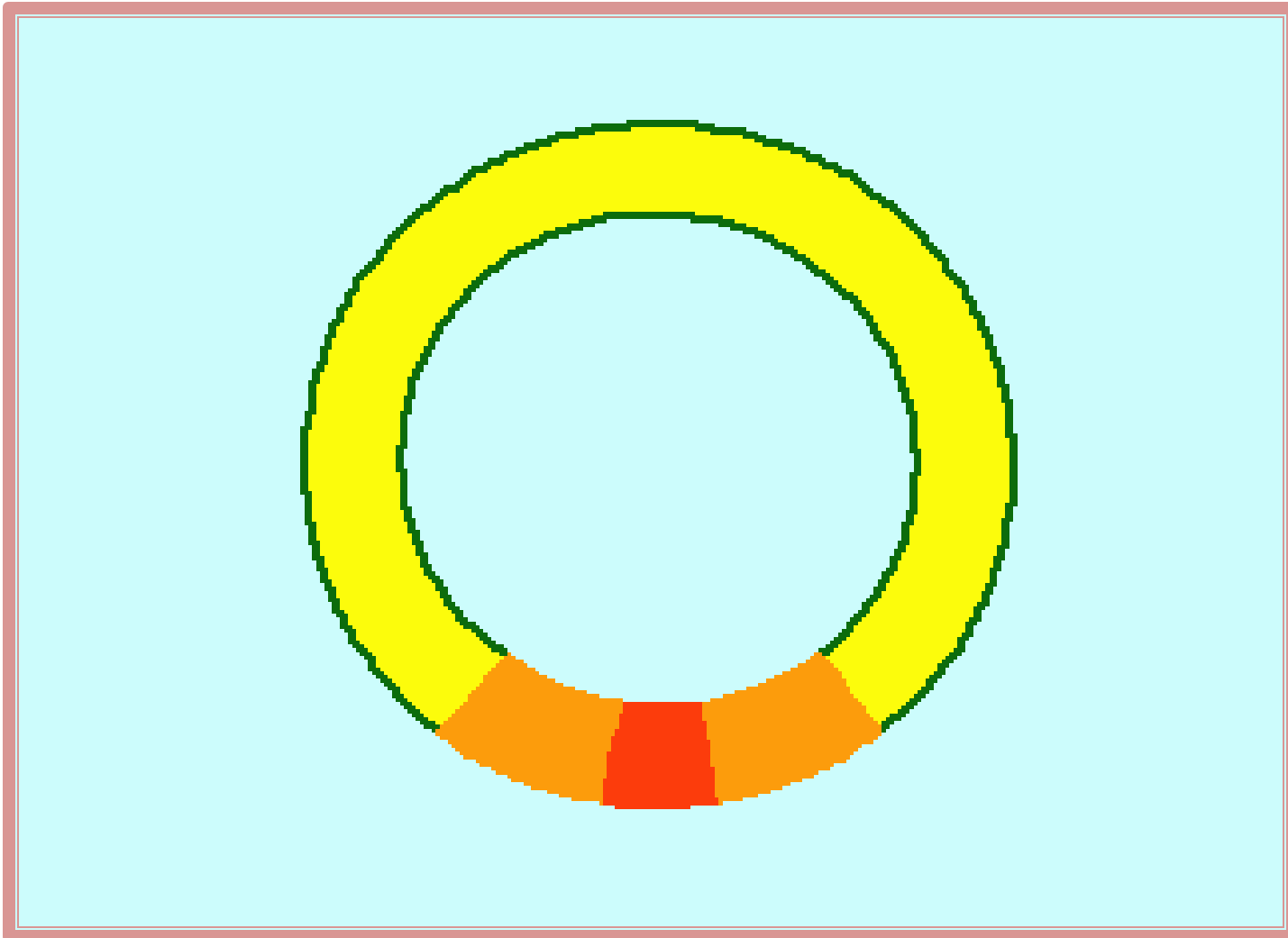




**I filopodi del mesenchima secondario possono aderire su qualunque punto della parete del blastocele o esiste un bersaglio specifico nell'emisfero animale?**



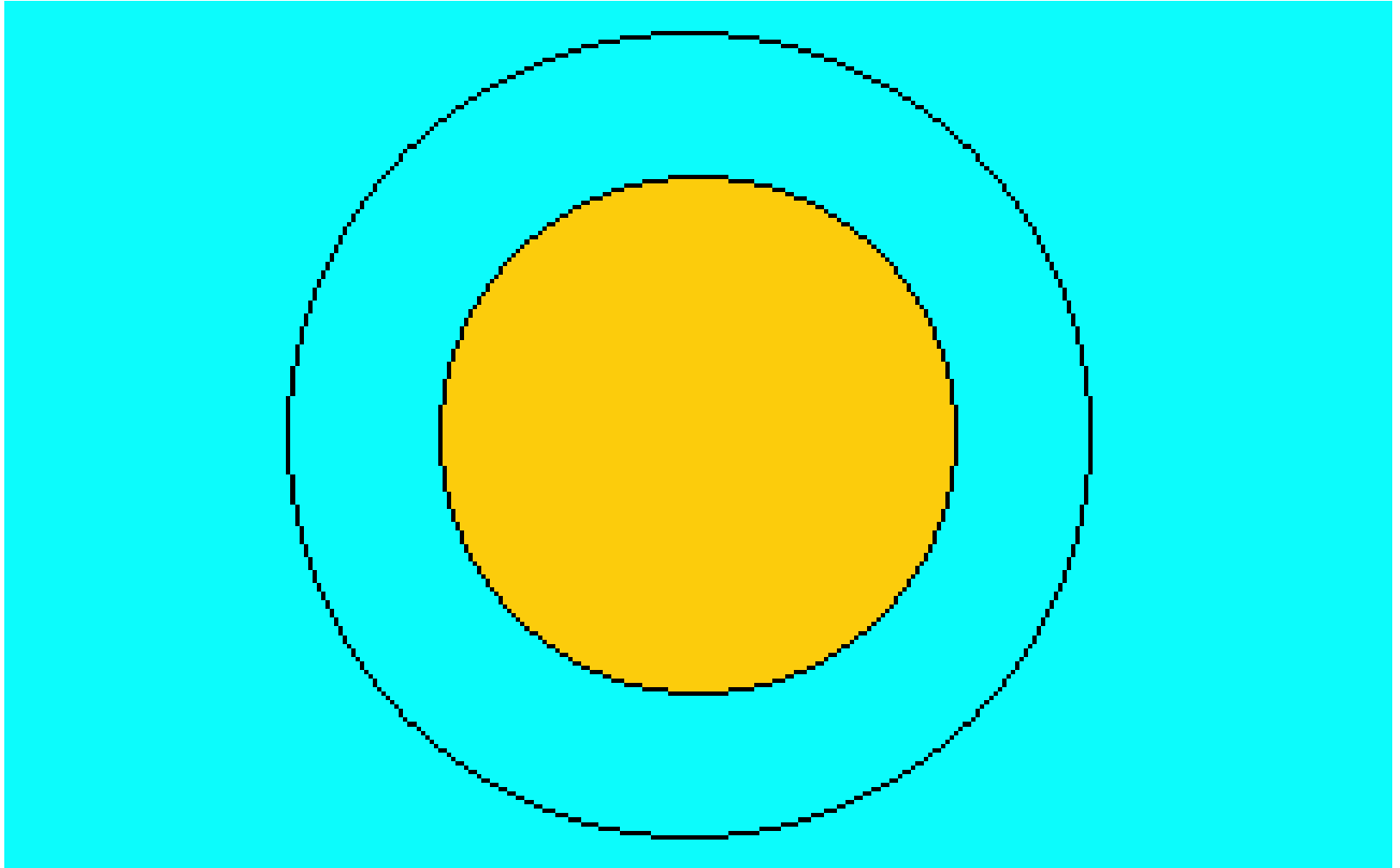
# La gastrulazione nel riccio di mare

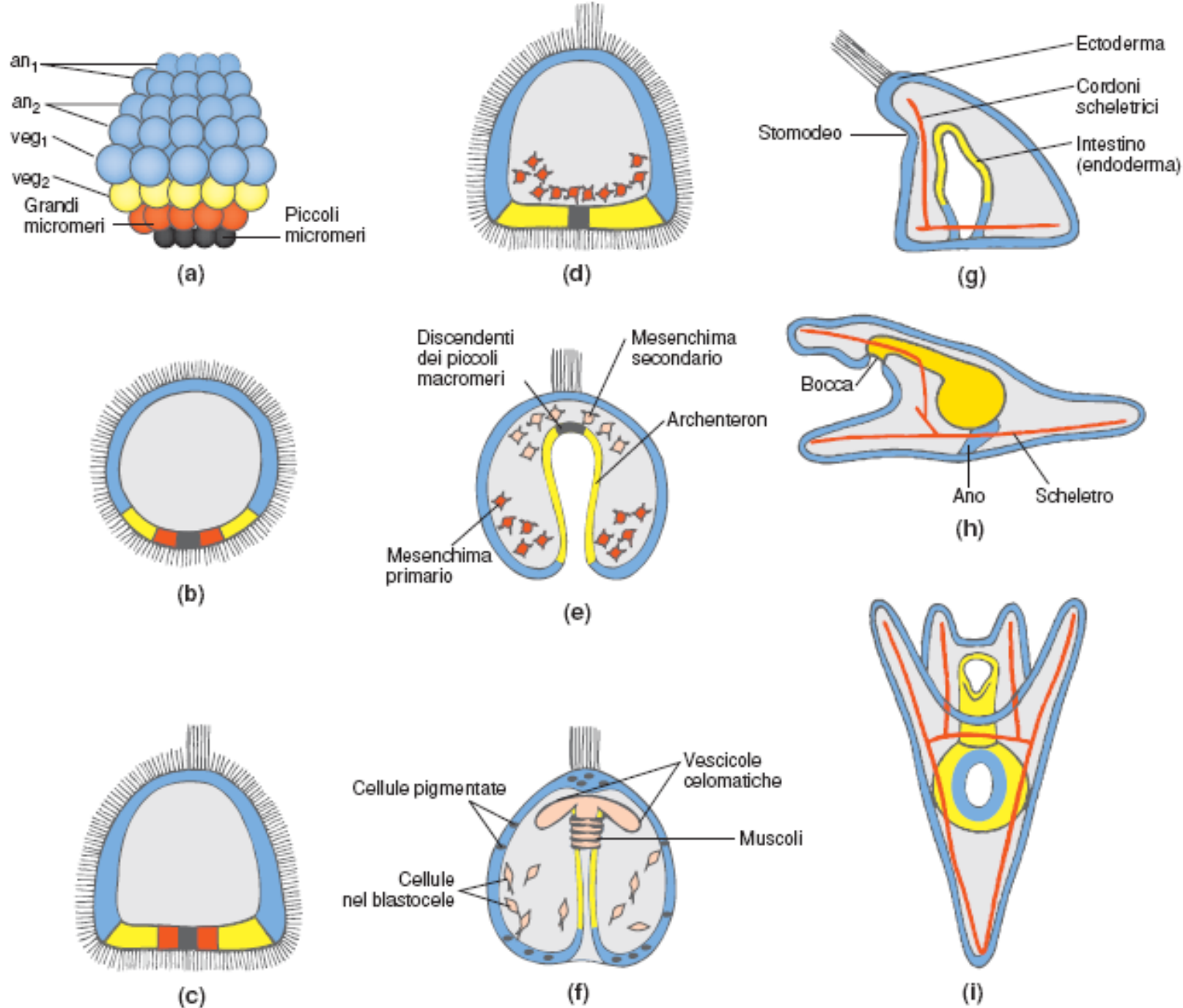


**CROSS SECTIONAL VIEW:** Yellow is **ectoderm**, orange is **endoderm**, red is **primary mesenchyme cells and skeleton**, orange "dots" are **secondary mesenchyme cells**. Process from "blastula" to "pluteus" takes about 48 hours.

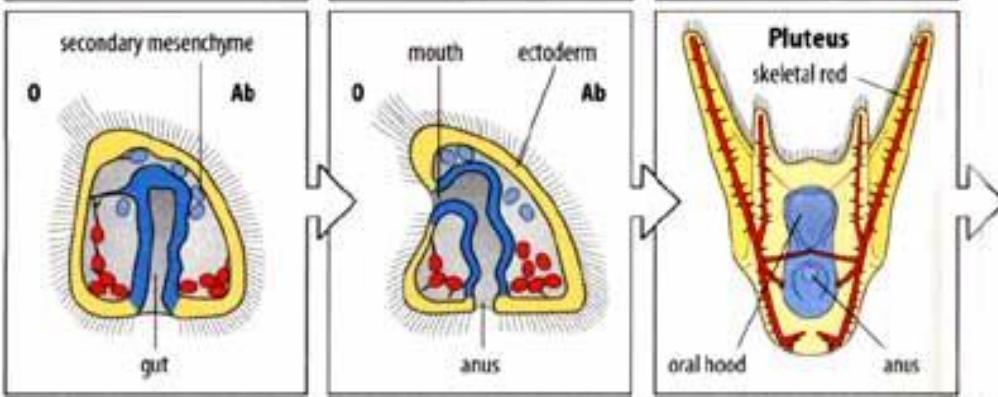
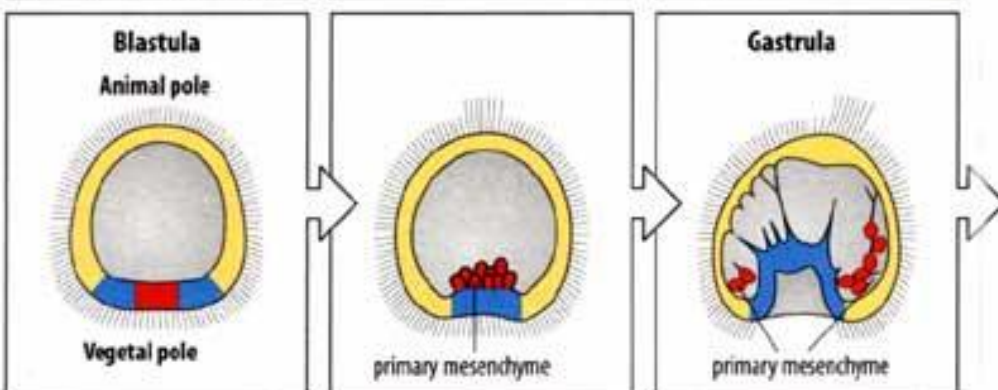
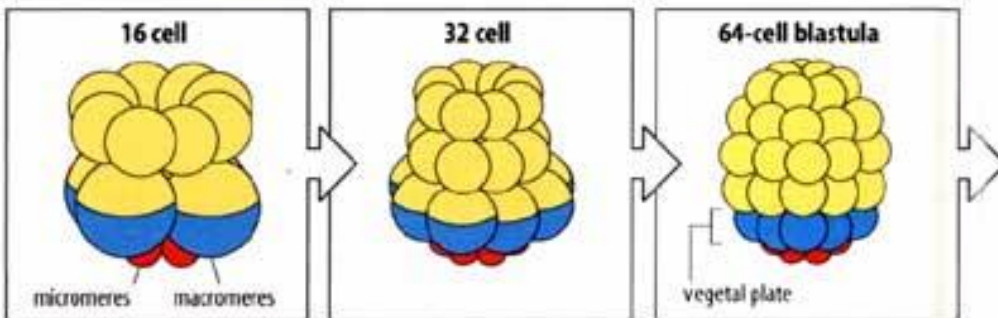
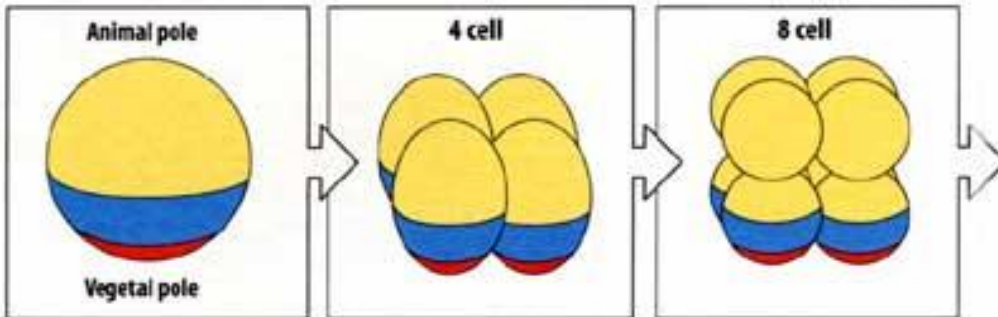
Note: Anus is formed before the mouth.



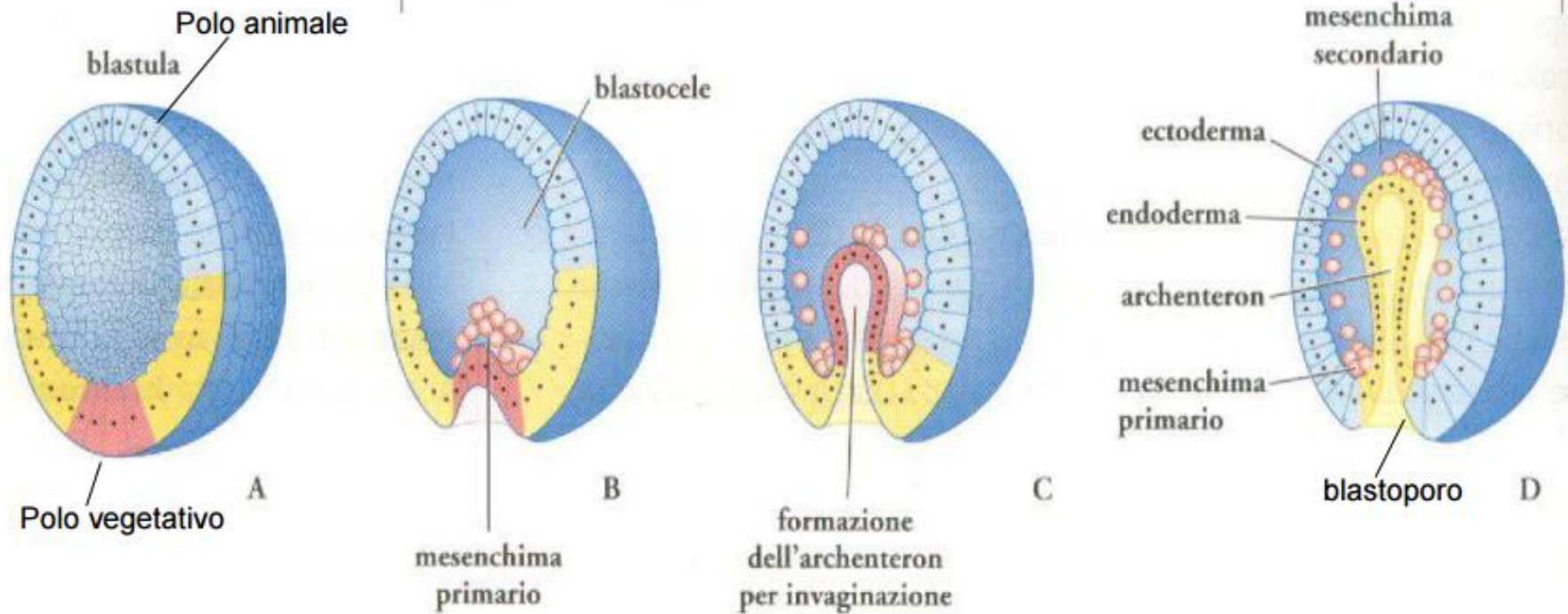


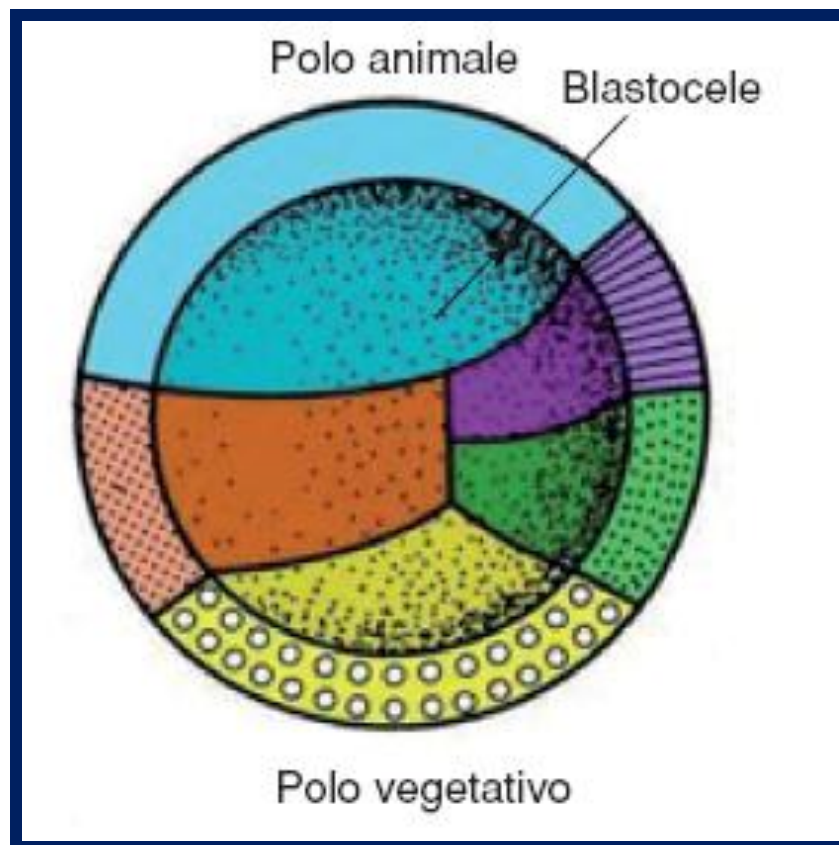


**Figura 10.5** Gastrulazione nel riccio di mare. (a) La blastula iniziale è formata da 60 cellule. Al polo animale i pri

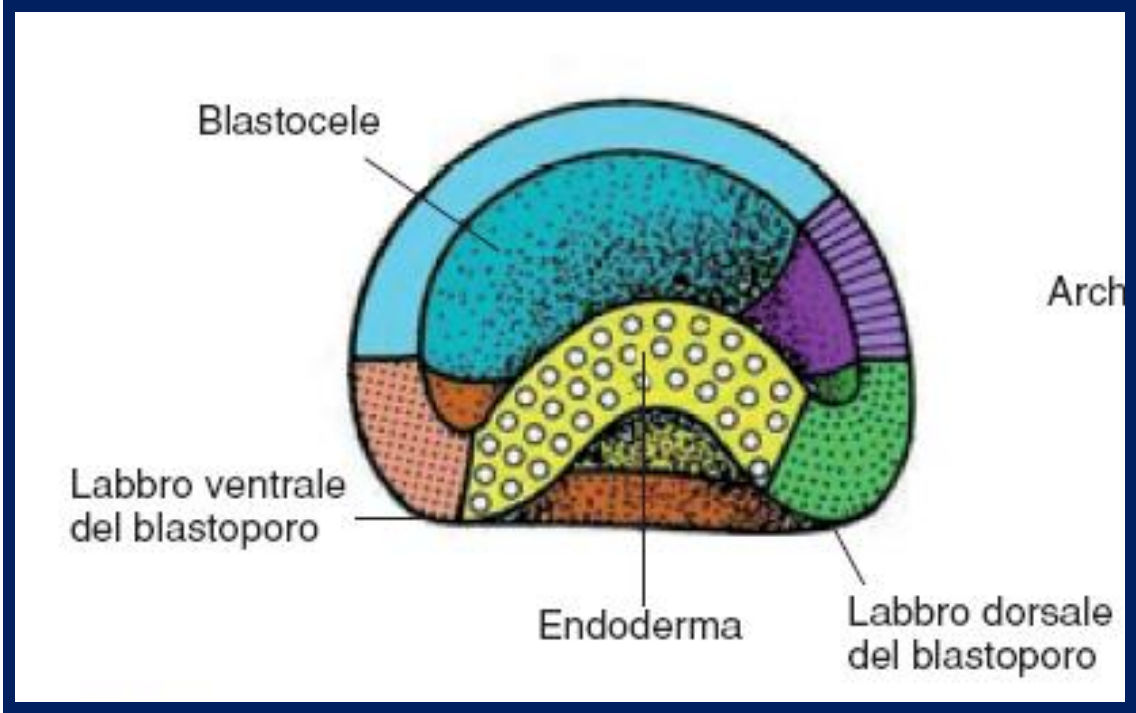


# Gastrulazione anfioso

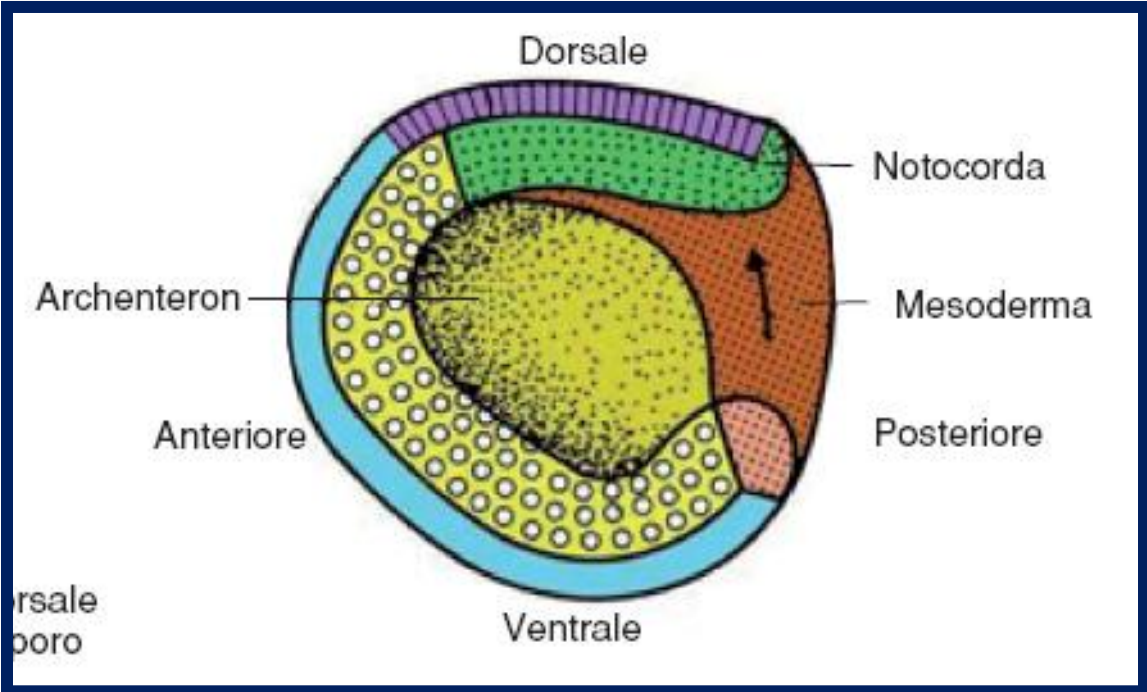


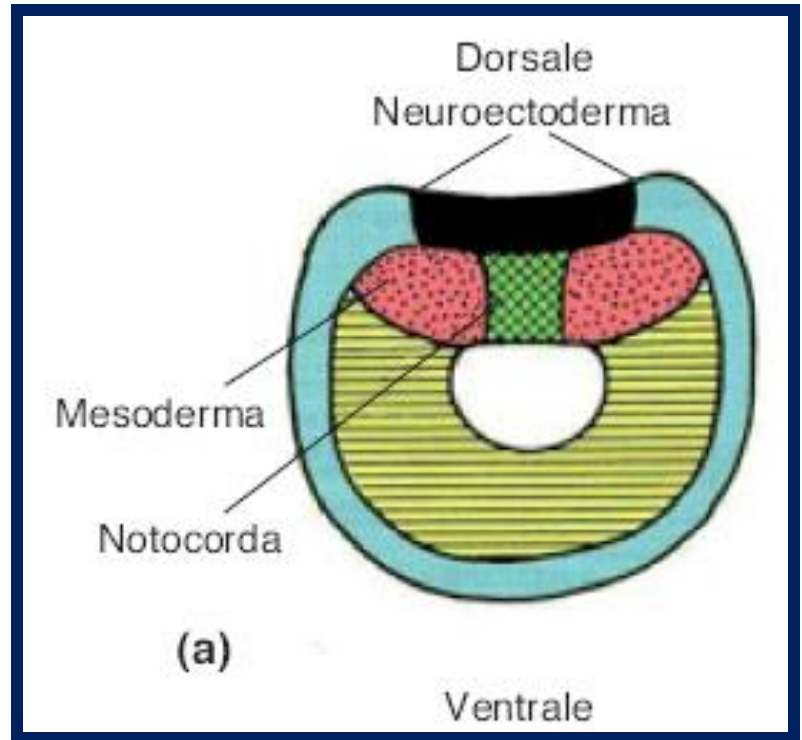
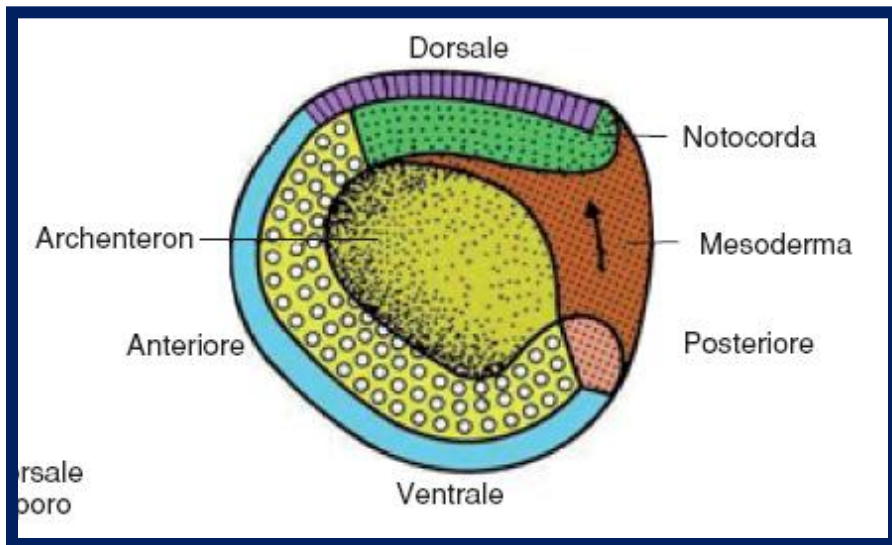




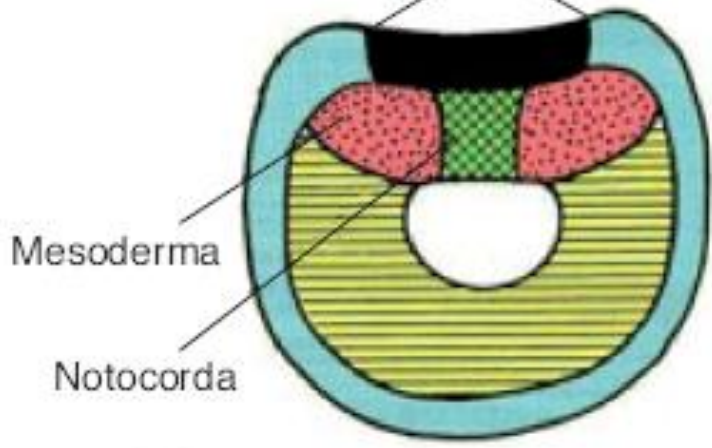








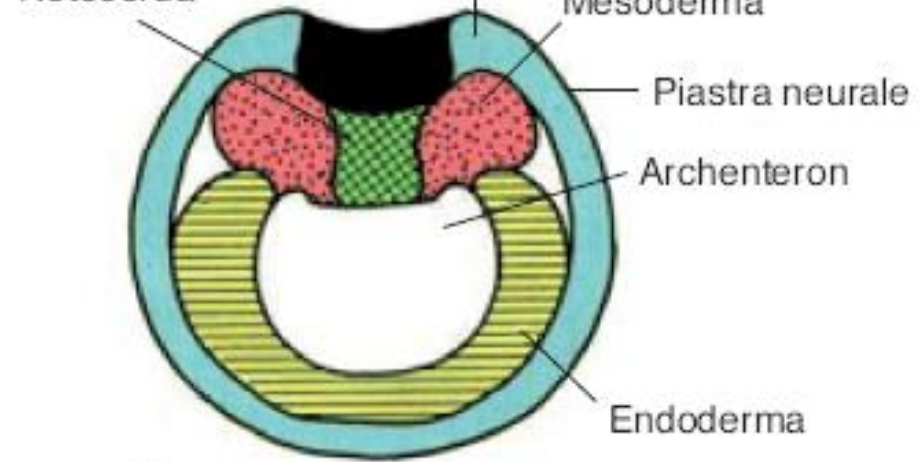
Dorsale  
Neuroectoderma



(a)

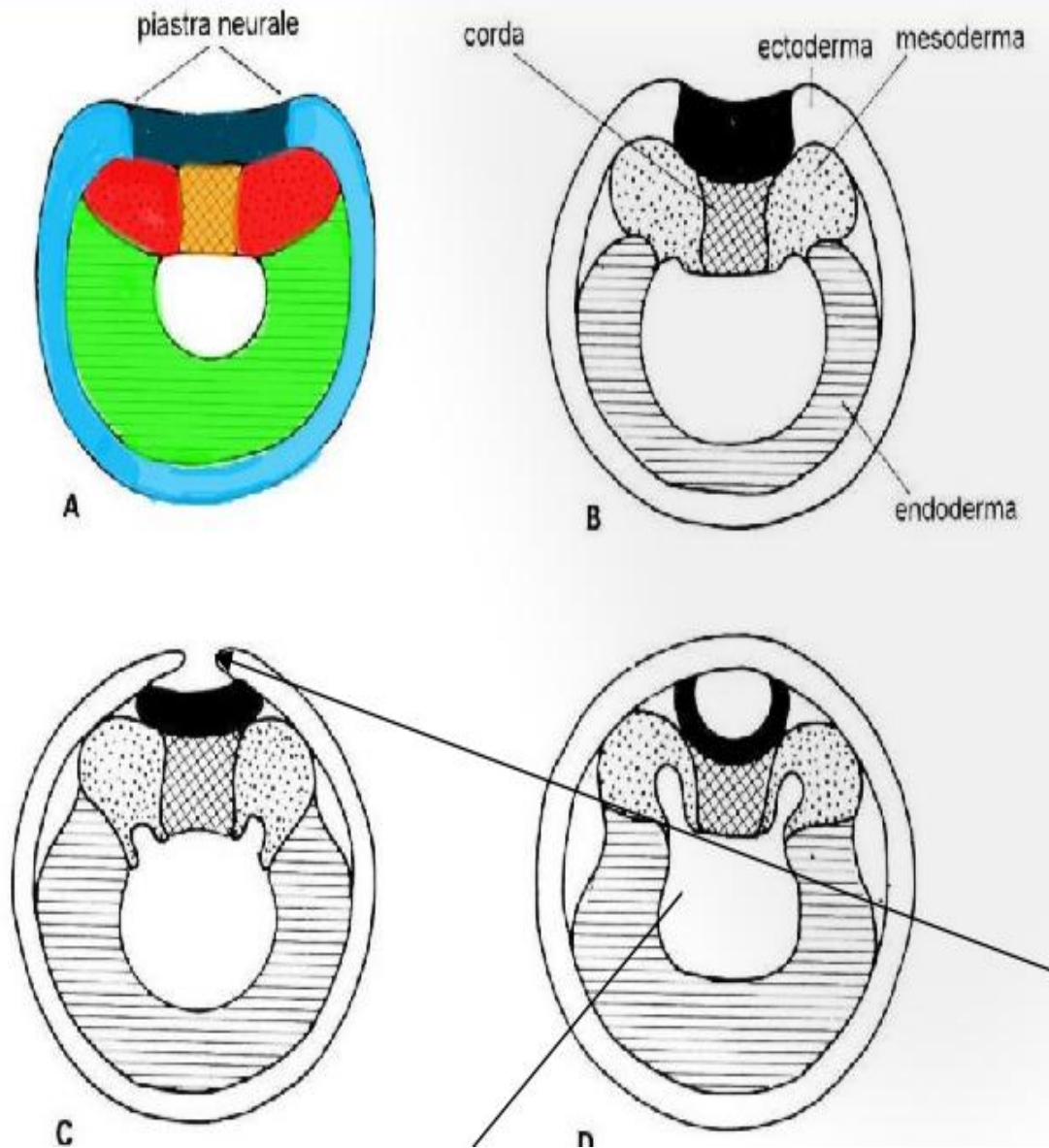
Ventrale

Notocorda Ectoderma Mesoderma

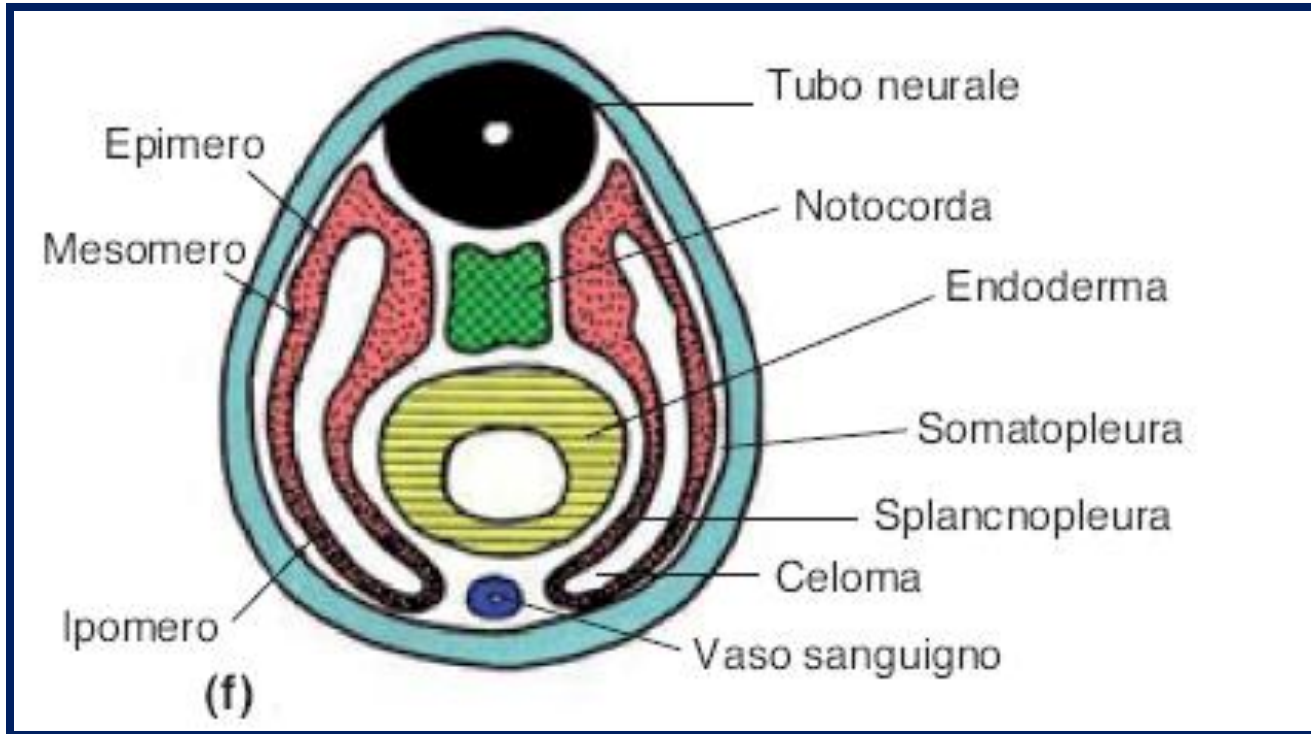


(b)

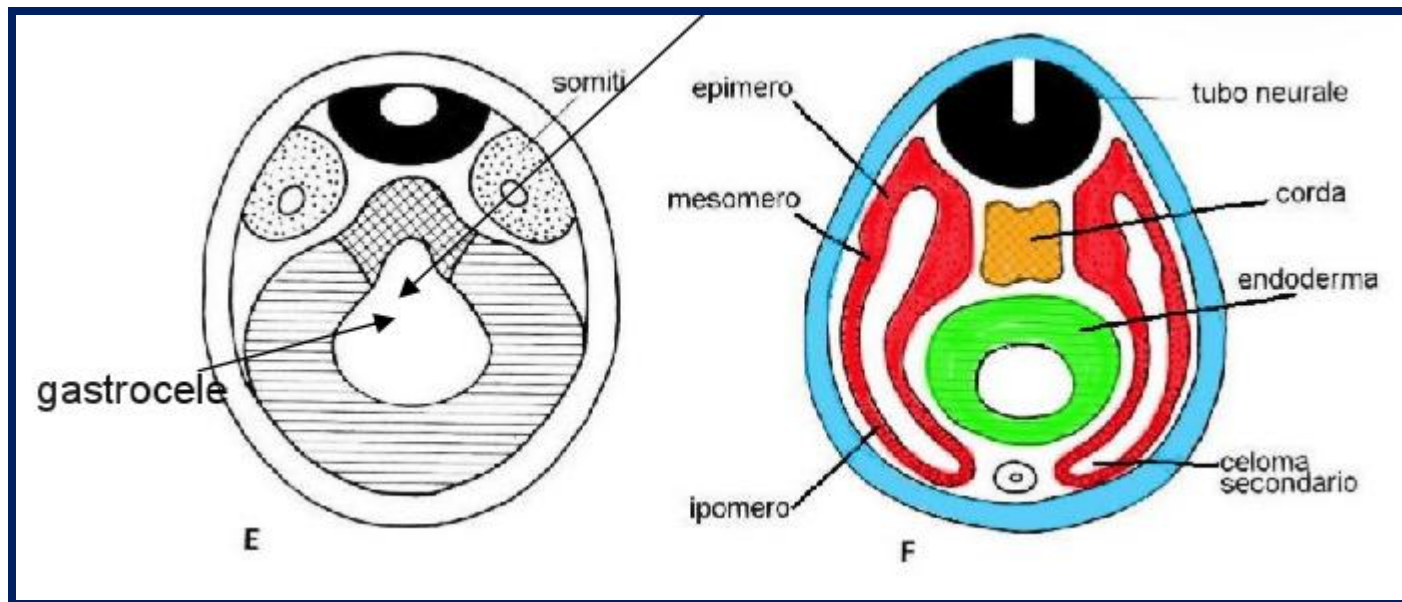
# Neurulazione anfiosso



# Neurulazione anfiosso

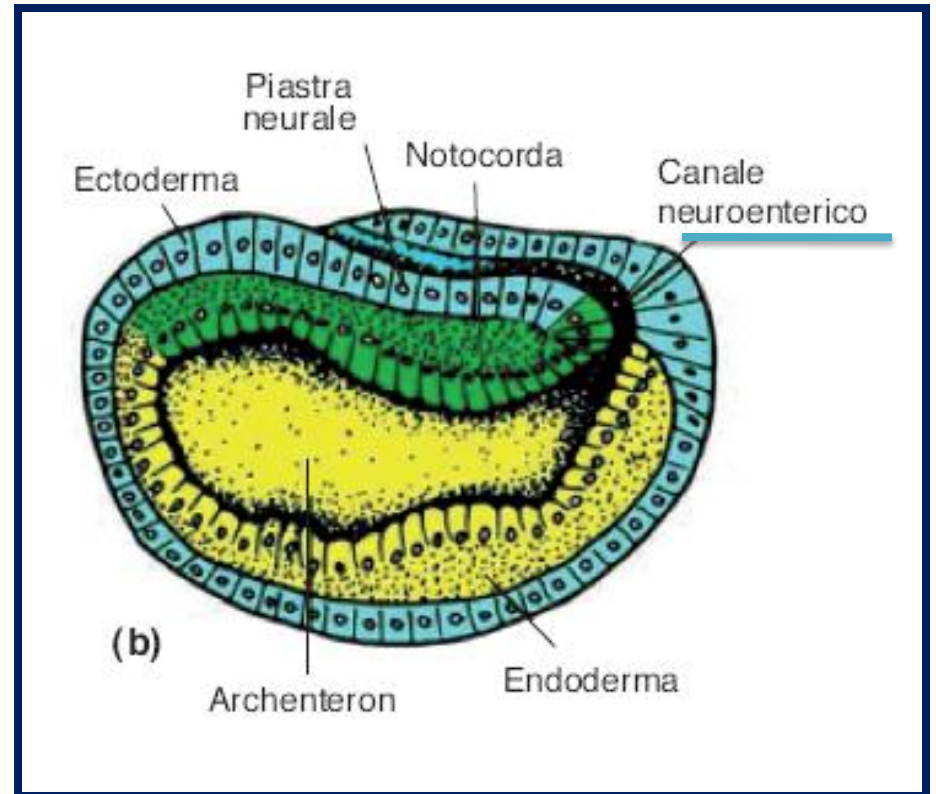
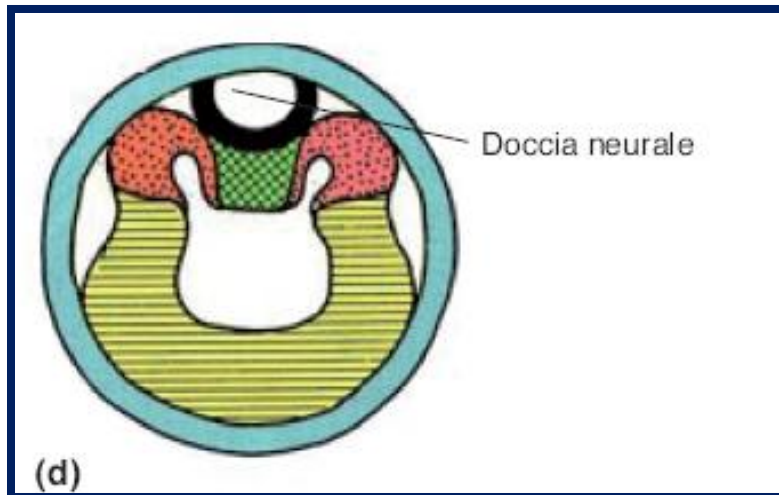


# Neurulazione anfiosso

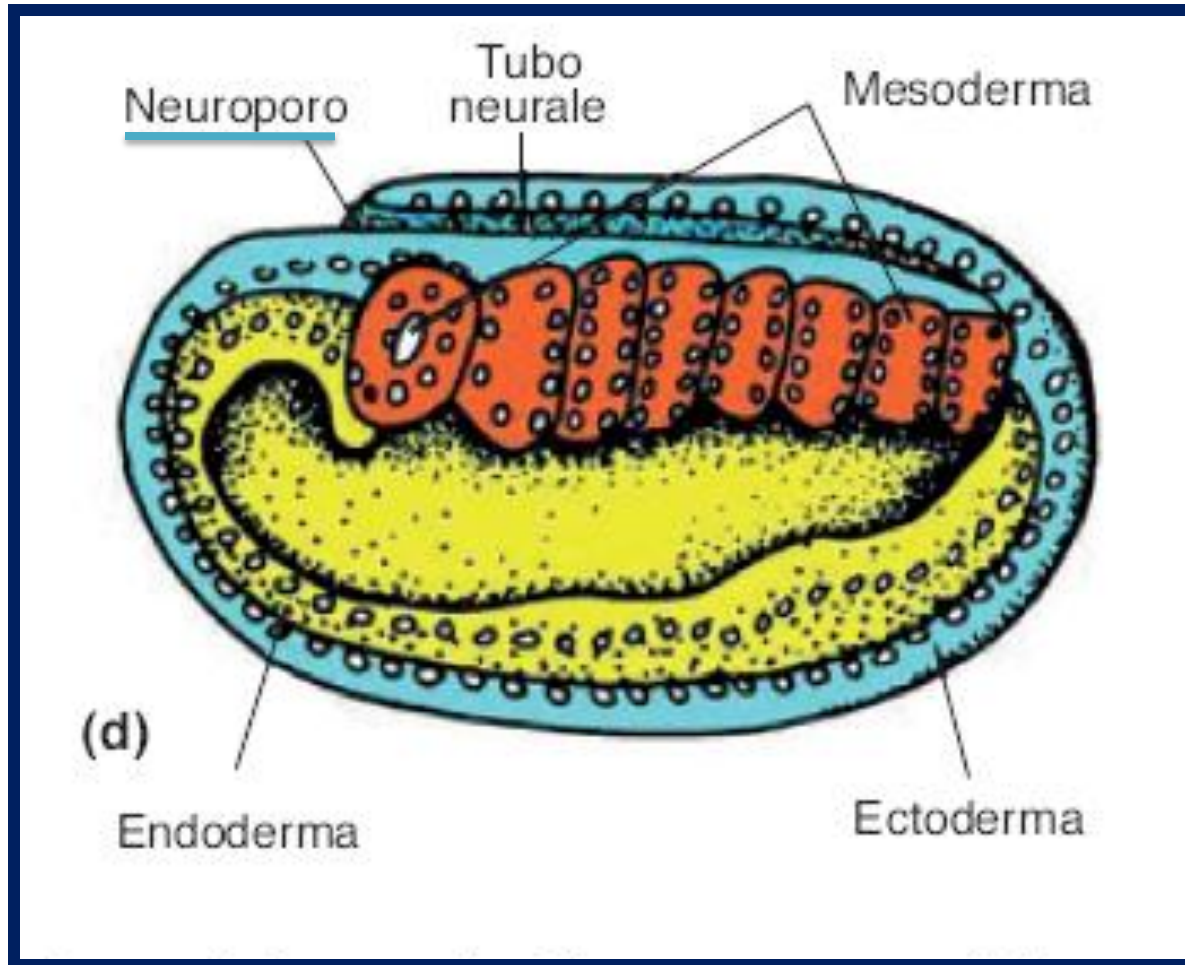




# Neurulazione anfiosso



# Neurulazione anfiosso





Somiti



(e)

