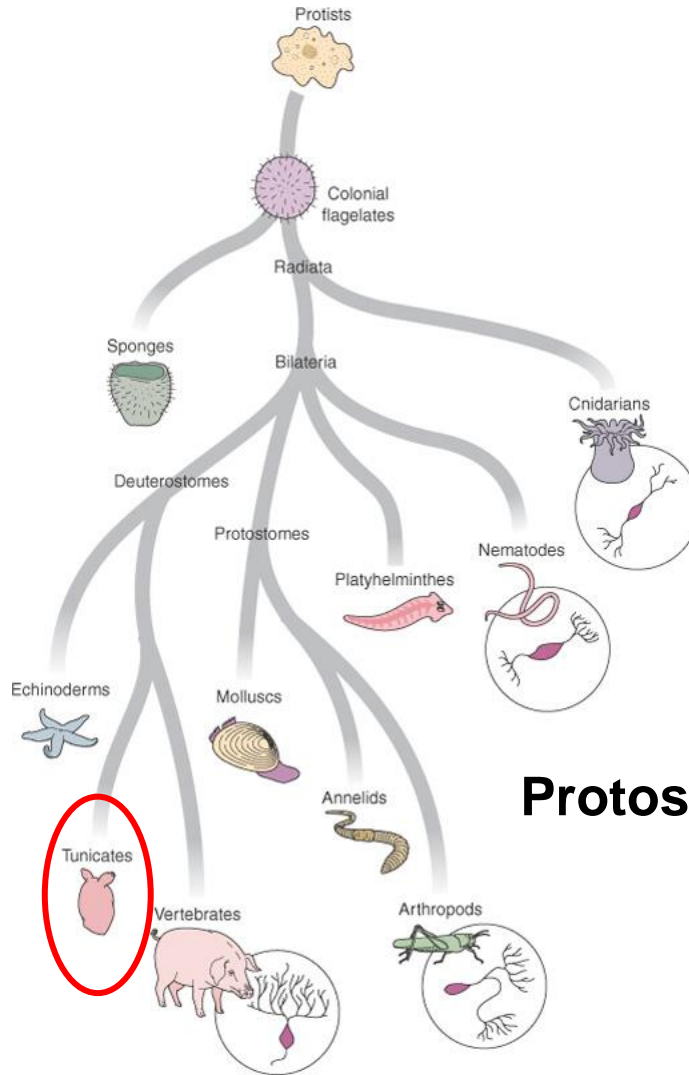
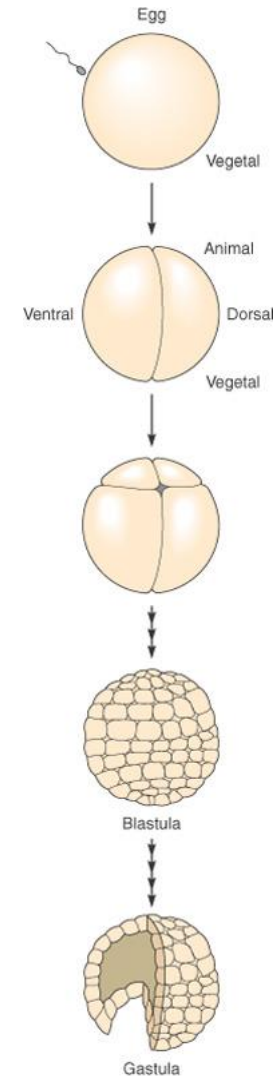


# SVILUPPO PRECOCE E FILOGENESI DEI METAZOI



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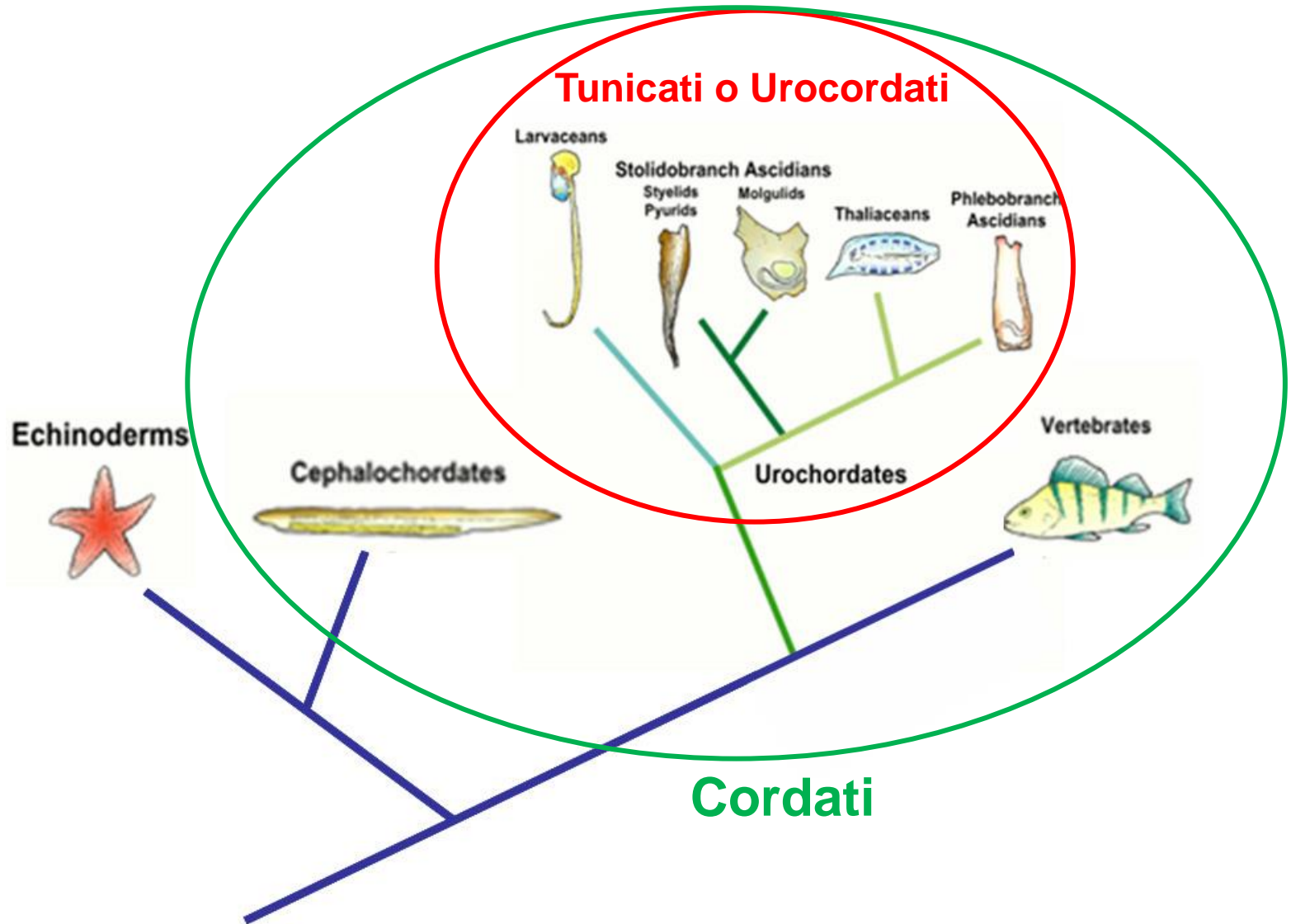
## Deuterostomi



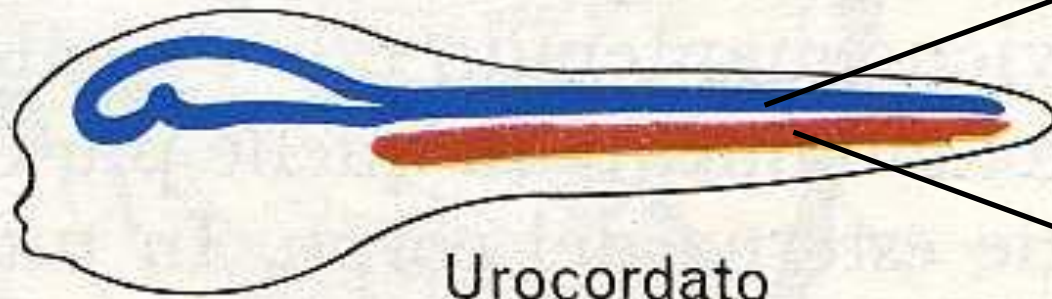
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## Protostomi

# I TUNICATI RAPPRESENTANO IL SISTER GROUP DEI VERTEBRATI



**Tubo neurale**



Urocordato  
(larva di ascidia)

**Notocorda**



Cefalocordato (anfiosso)



Vertebrato (pesce)

# Classificazione dei Cordati

Tunicati (Urocordati): corda limitata alla regione caudale della larva (es. ascidie)



Cefalocordati: corda persistente ed estesa lungo tutto il corpo (es. anfiosso)



la corda dorsale è presente solo nell'embrione, poi si trasforma in dischi intervertebrali.

Vertebrati:

Agnati



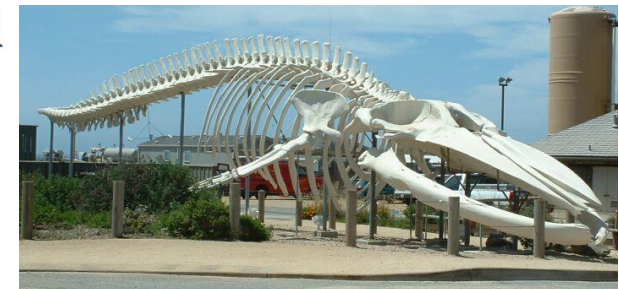
Ciclostomi



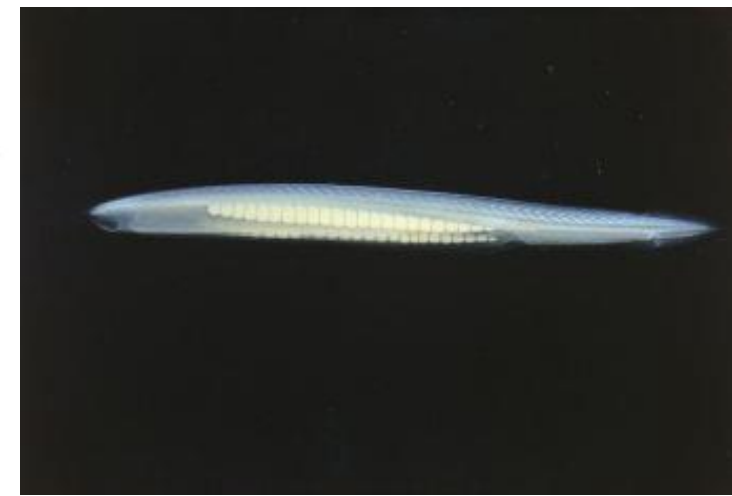
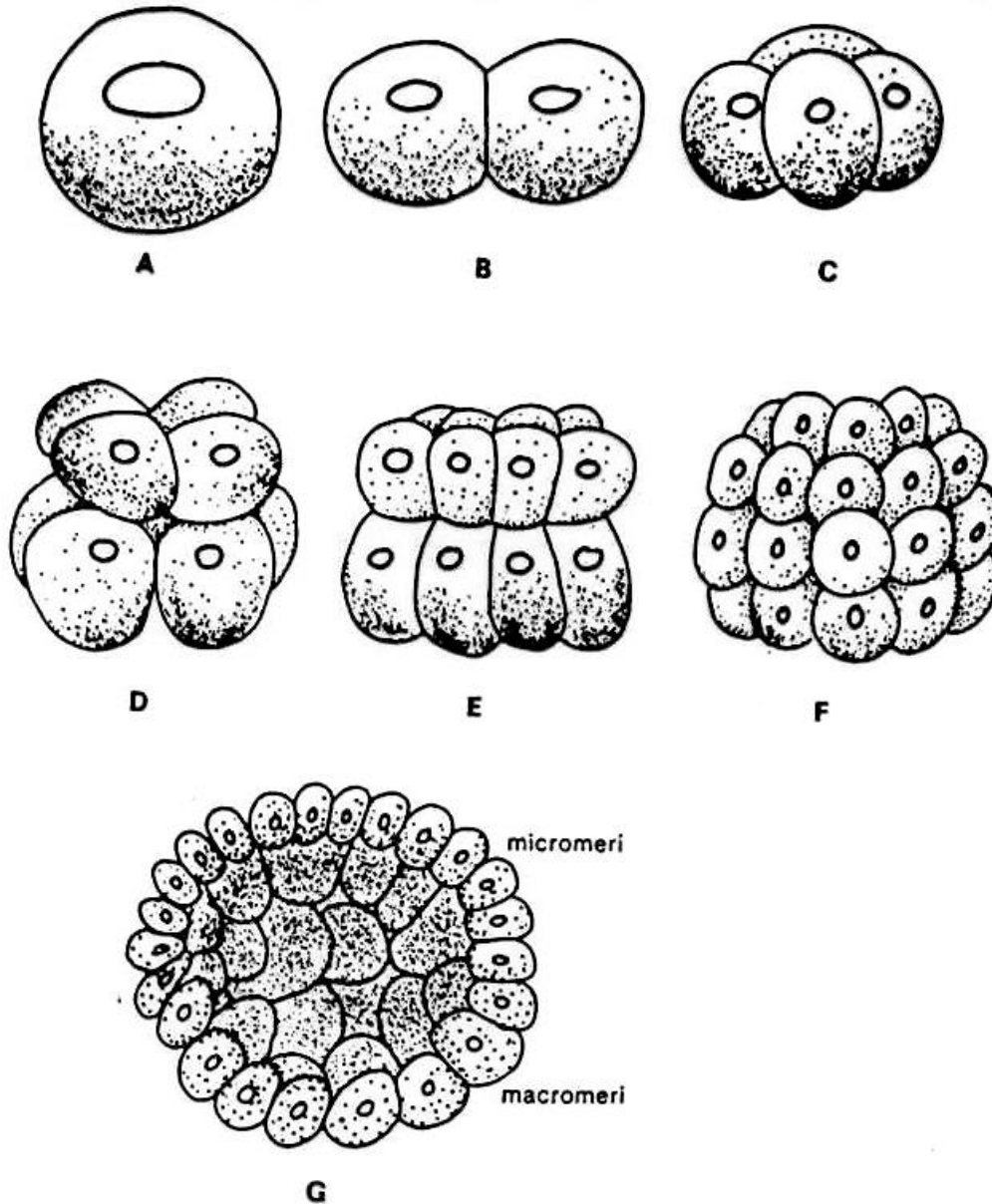
Gnatostomi



Pesci, Anfibi, Rettili, Uccelli  
Mammiferi



# Sviluppo Anfiosso



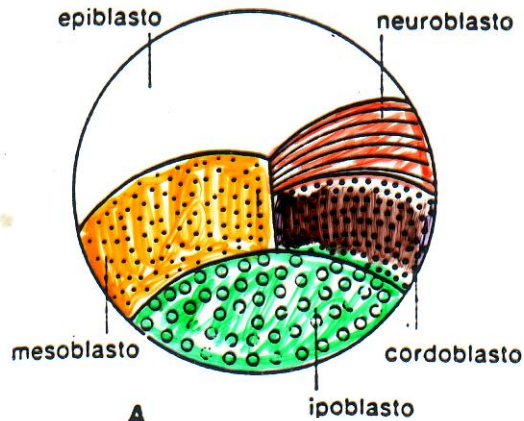
**Fecondazione allo stadio di oocita secondario**

**Uovo oligolecitico con nucleo spostato verso il polo animale**

**Segmentazione Oloblastica Radiale (Subuguale)**

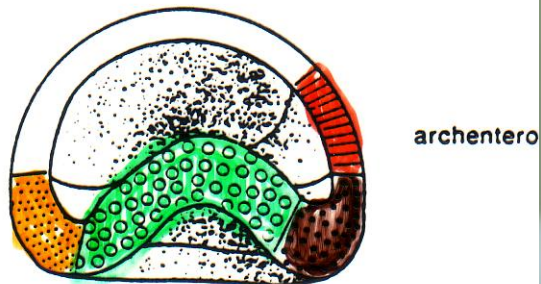
# Mappa dei territori presuntivi allo stadio di blastula

SVILUPPO DELL'ANFIOSSO

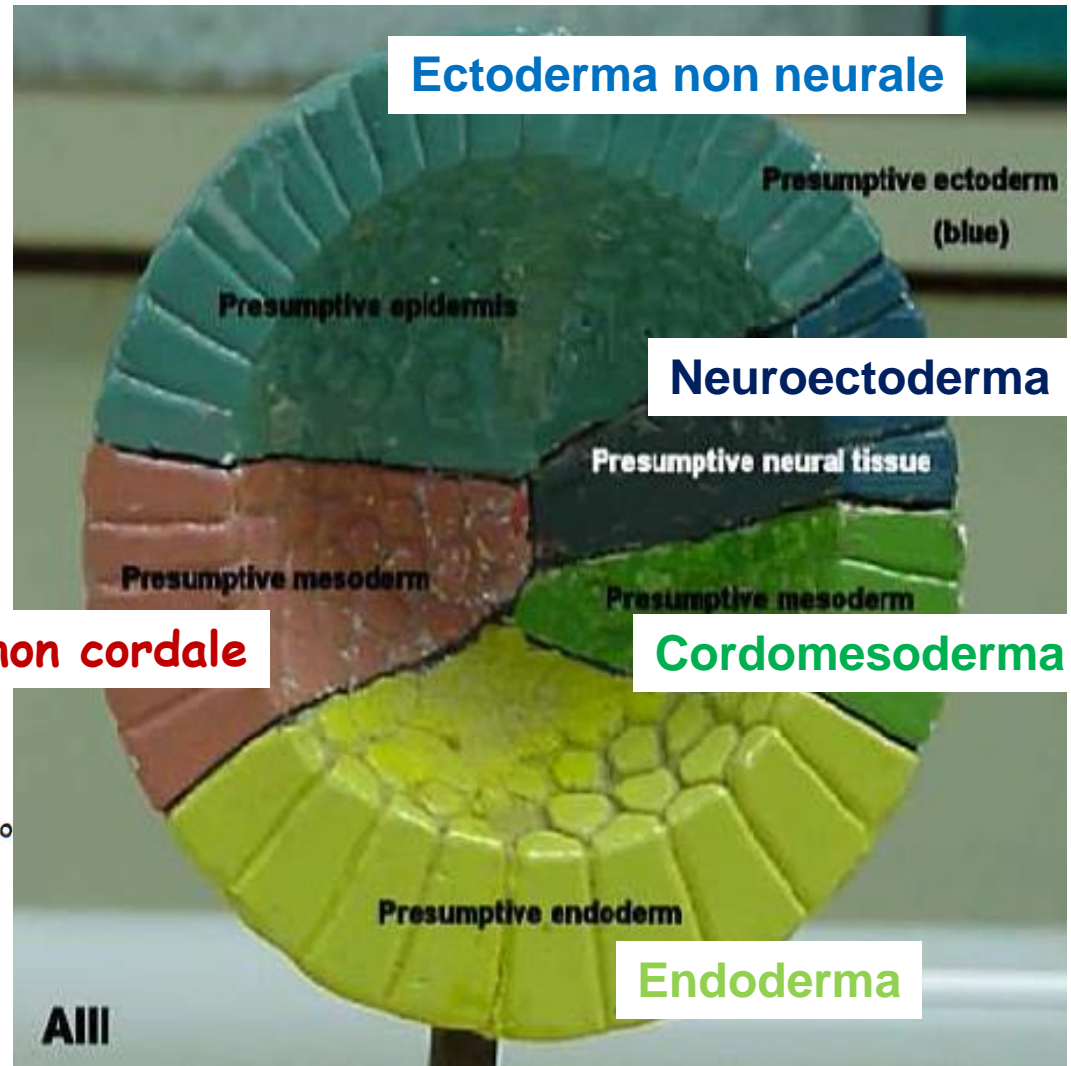


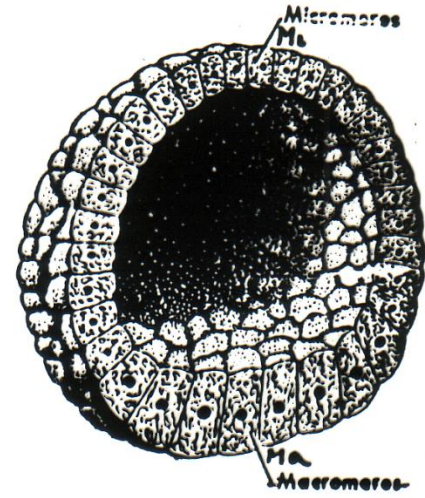
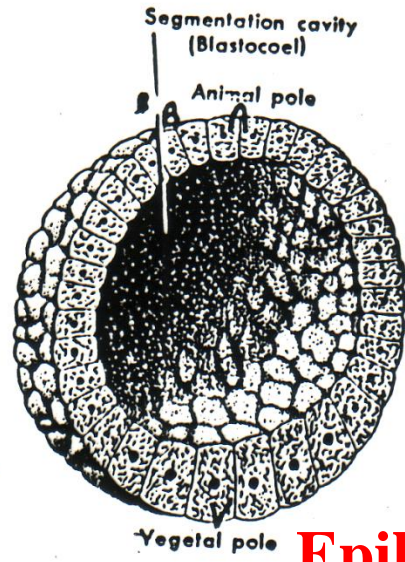
A

Mesoderma non cordale

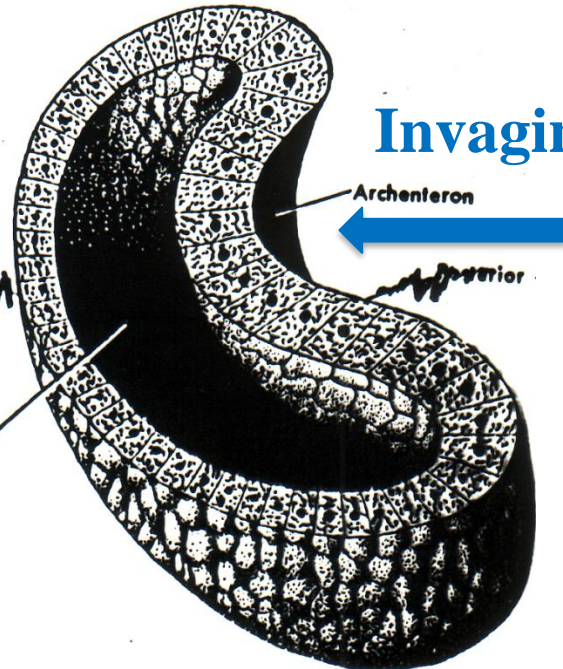
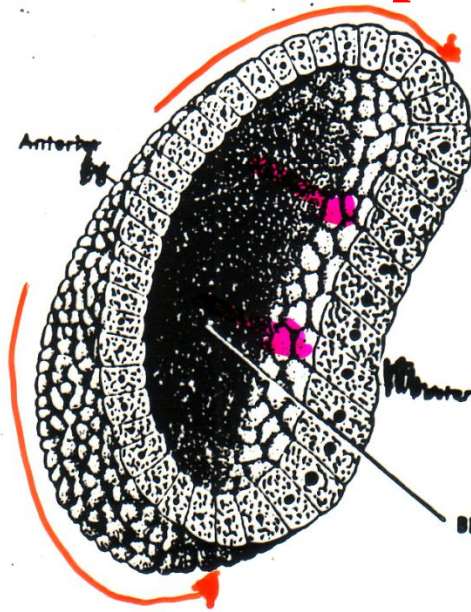


C

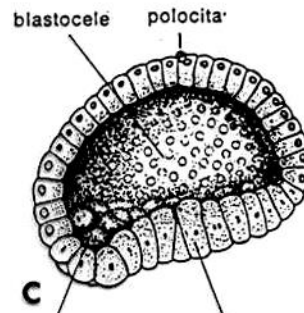
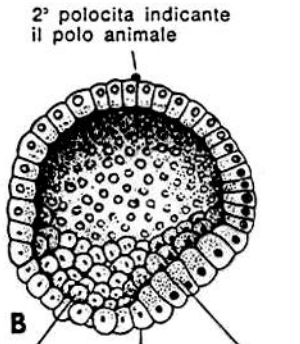
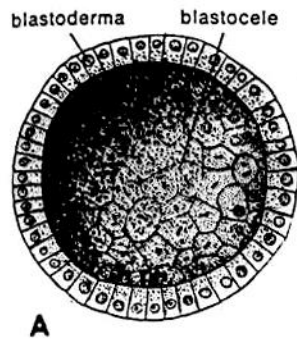




**Epibolia**



**Invaginazione**



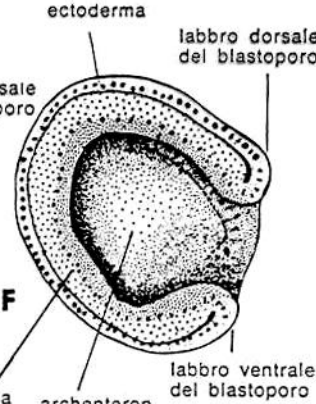
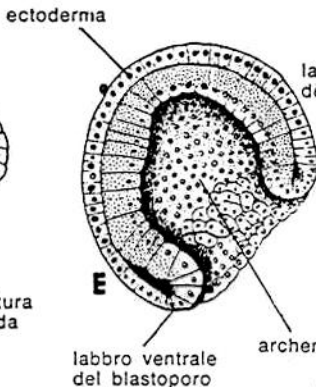
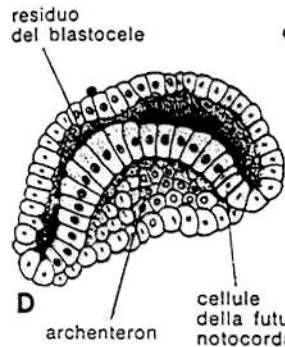
**A**

**B**

**C**

Cellule della semiluna mesodermica

entoderma presuntivo



**D**

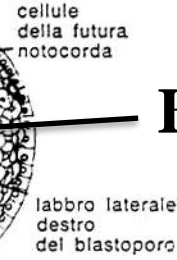
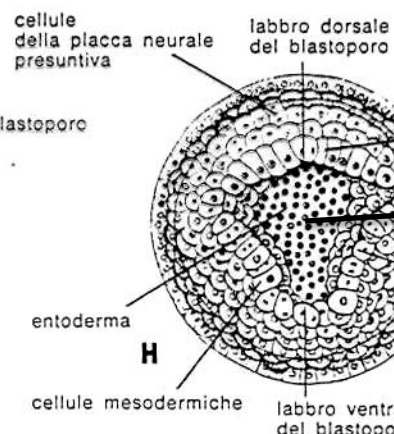
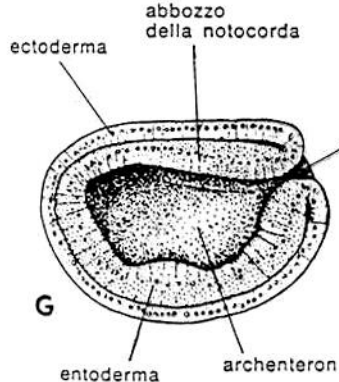
**E**

**F**

cellule della futura notocorda

labbro ventrale del blastoporo

labbro ventrale del blastoporo



**G**

**H**

entoderma

entoderma

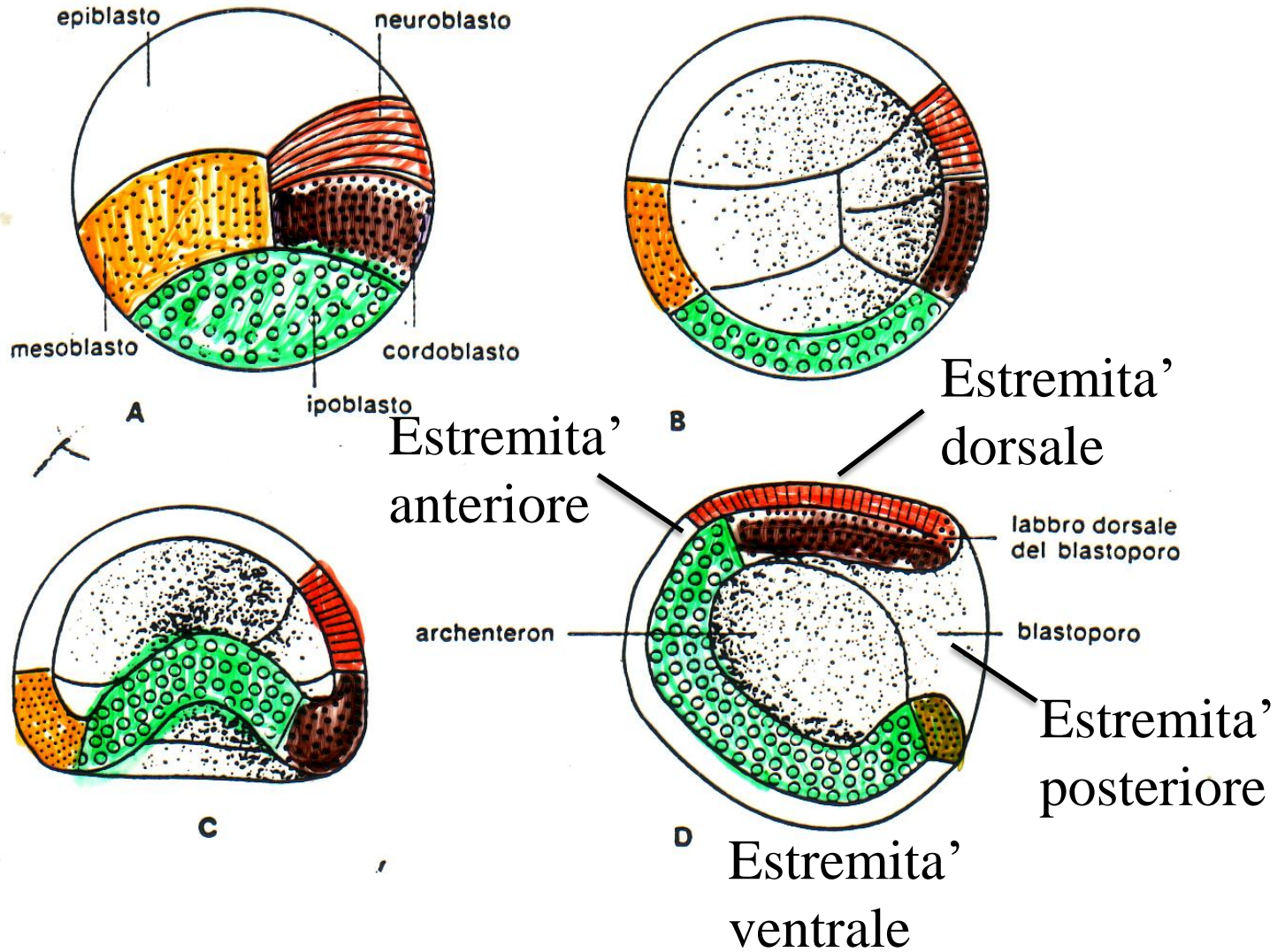
labbro ventrale del blastoporo

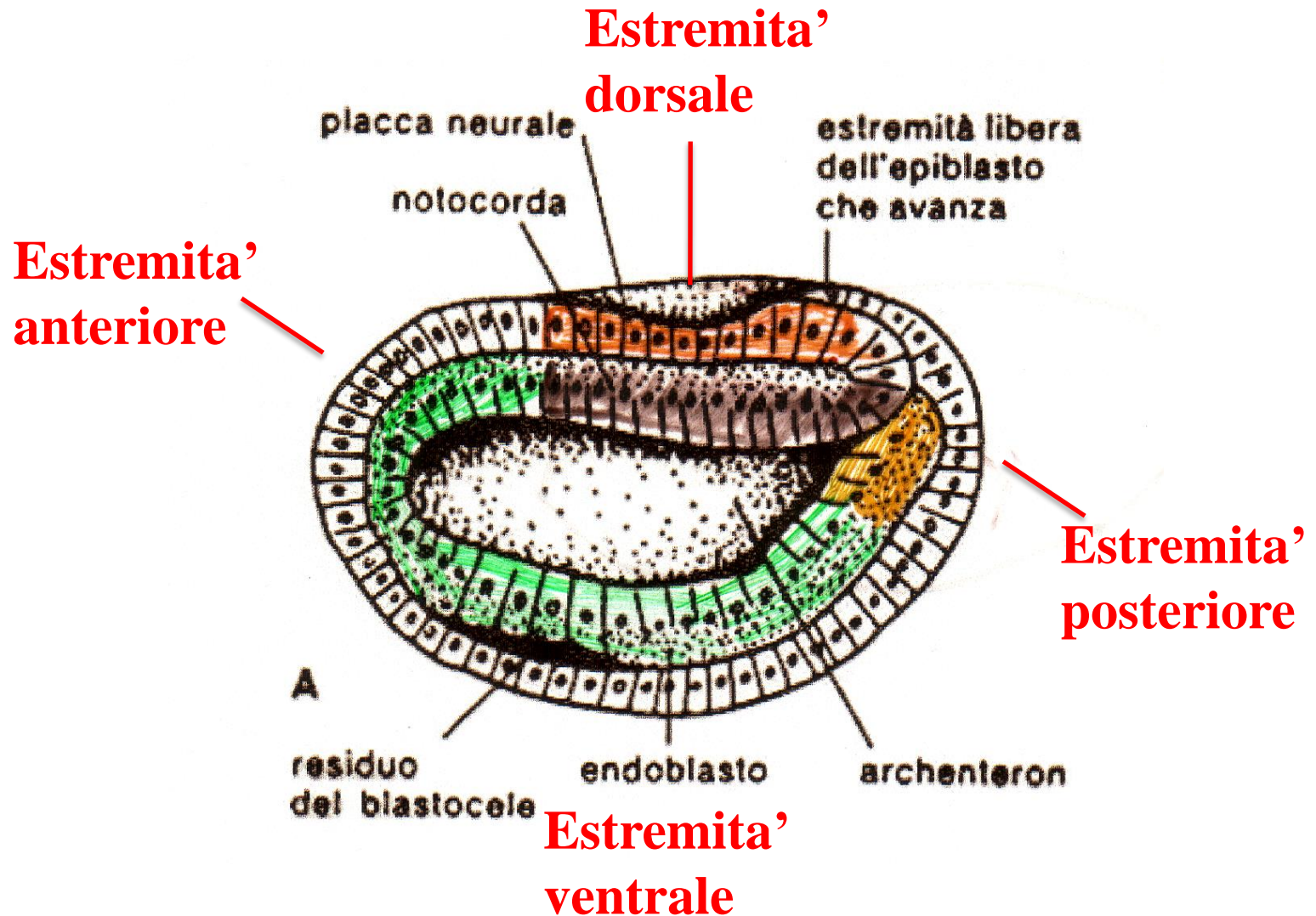
# BLASTOPORO



# Polarita' antero-posteriore e dorso-ventrale nell'embrione di anfirosso allo stadio di gastrula

SVILUPPO DELL'ANFIOSSO



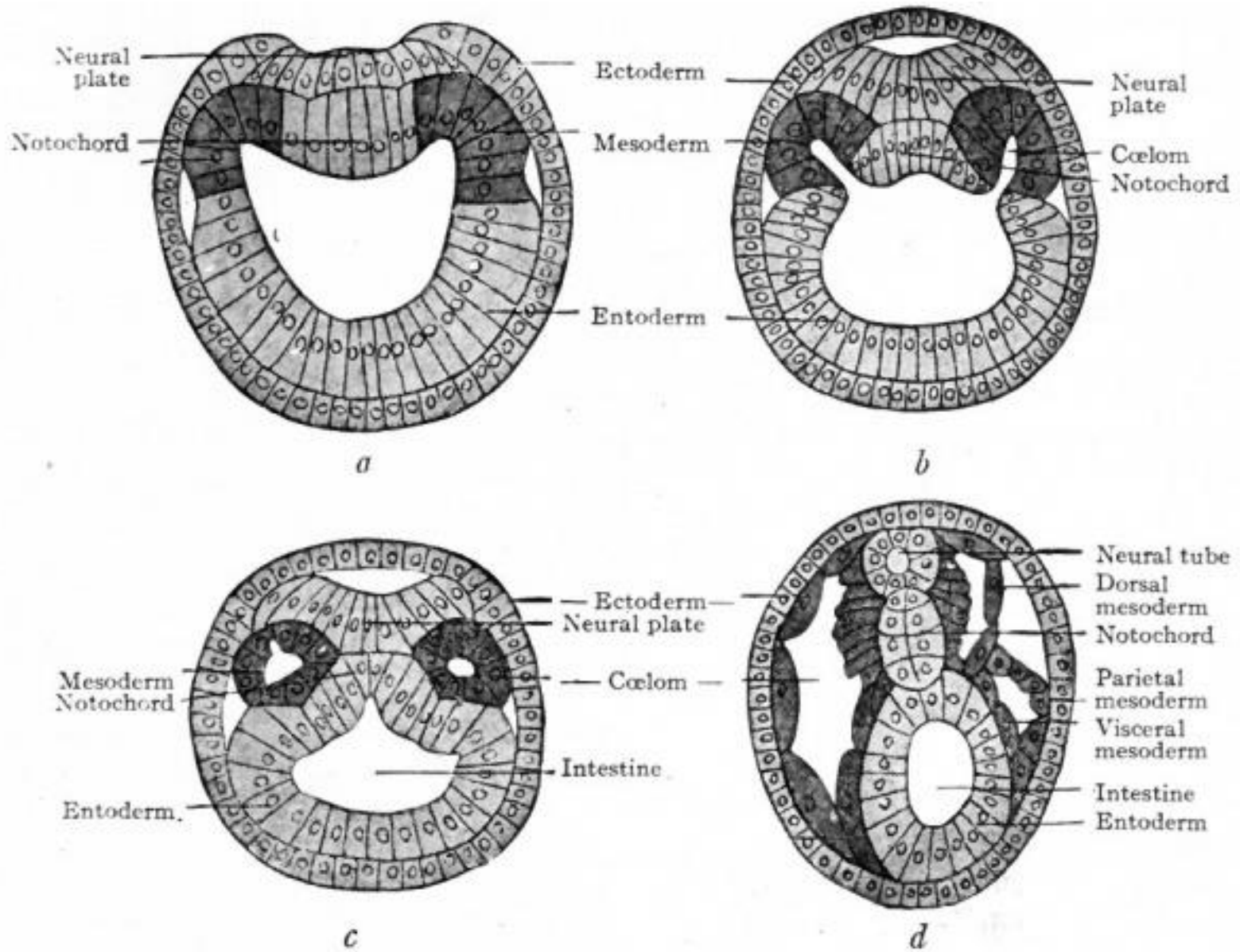


Embrione di-dermico (composto da due strati tissutali)

Il mesoblasto costituisce inizialmente il tetto dell'archenteron ed è continuo con l'endoblasto

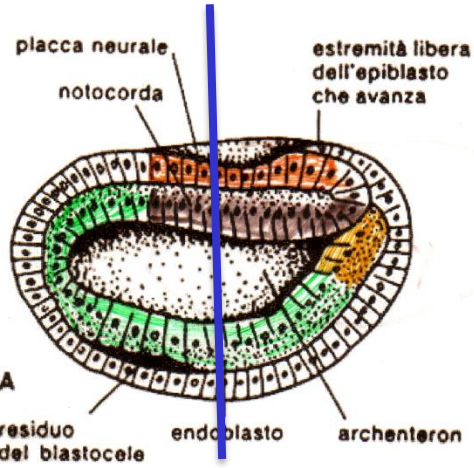
# Organogenesi

- Ectoderma: Rivestimento esterno, sistema nervoso centrale (tubo neurale)
- Mesoderma: notocorda, muscolatura, apparato circolatorio, apparato riproduttore ed escretore
- Endoderma: sistema digerente e respiratorio



Formazione del mesoblasto per evaginazione e formazione delle vescicole celomatiche

# Neurulazione

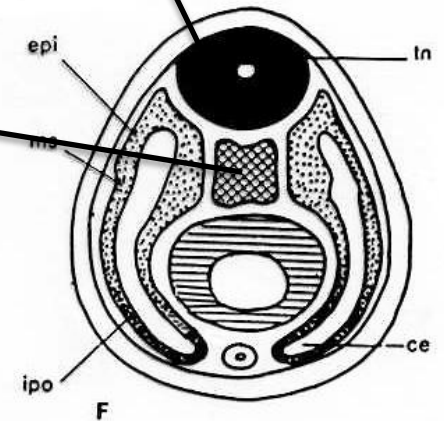
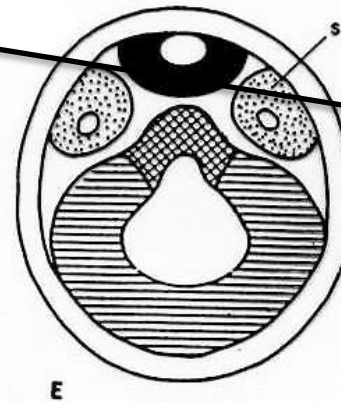
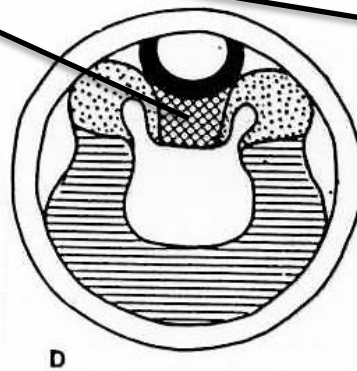
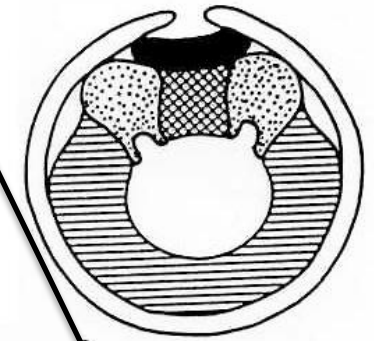
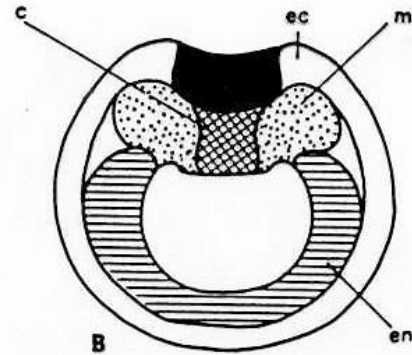
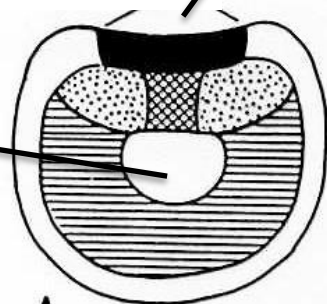


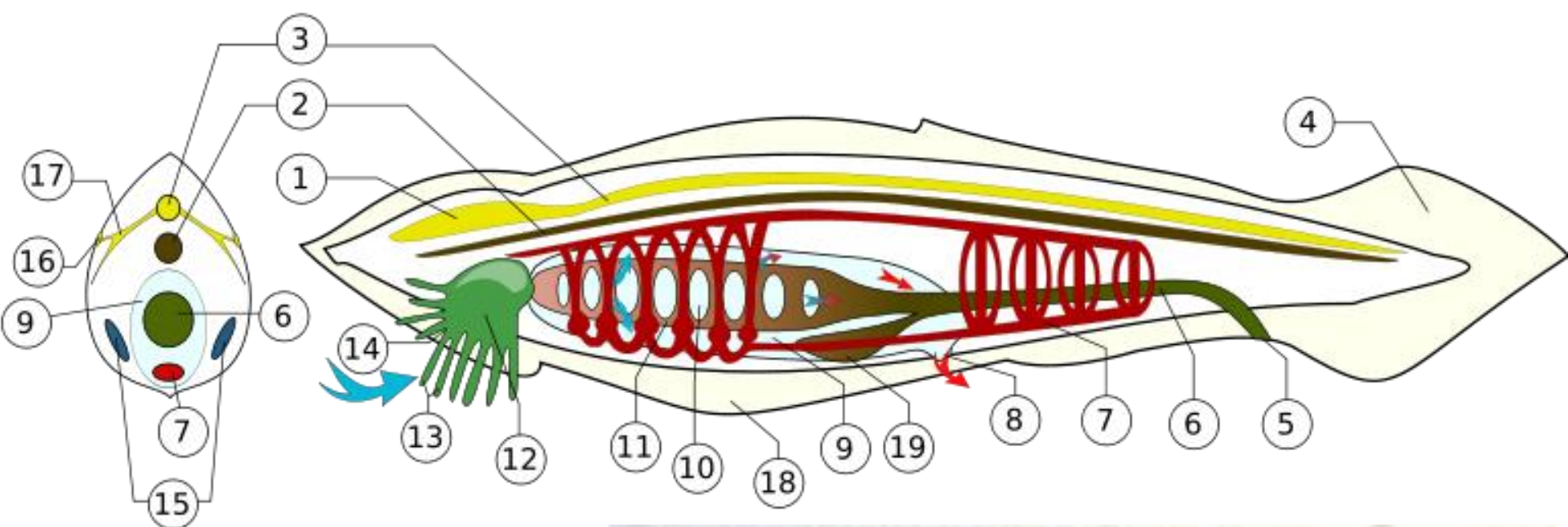
**Placca neurale**

**Tubo neurale**

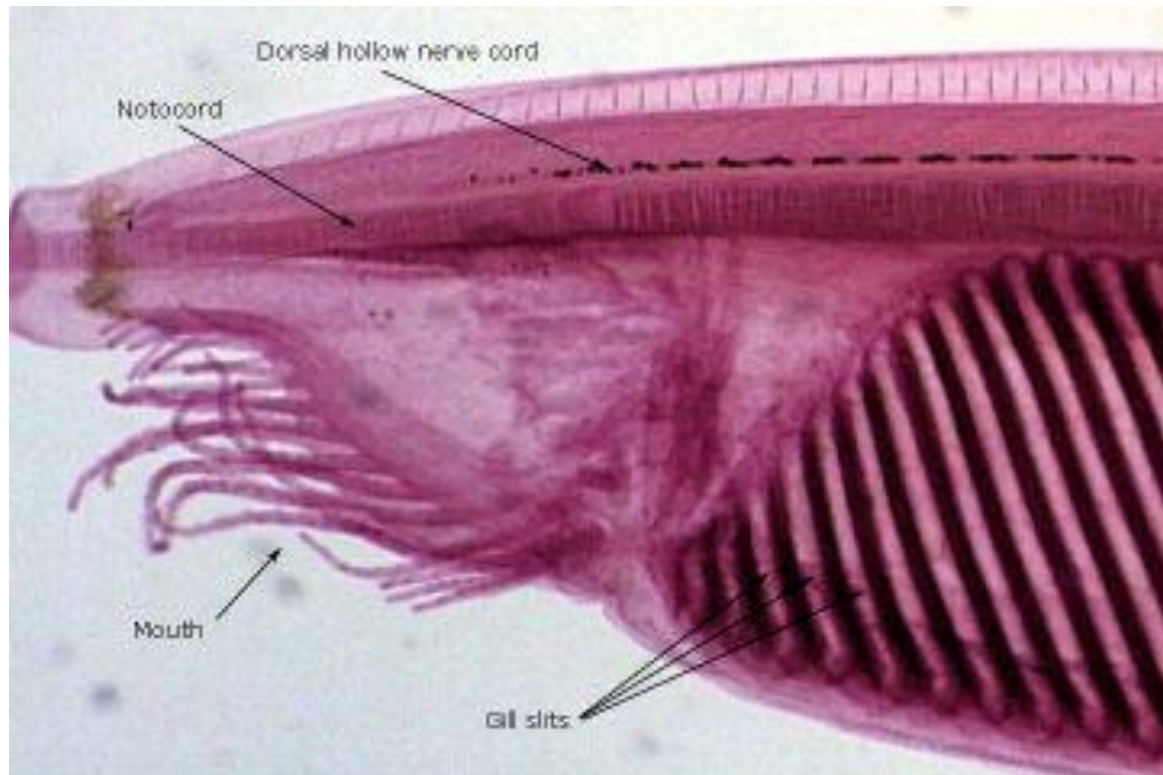
**Archenteron**

**Notocorda**

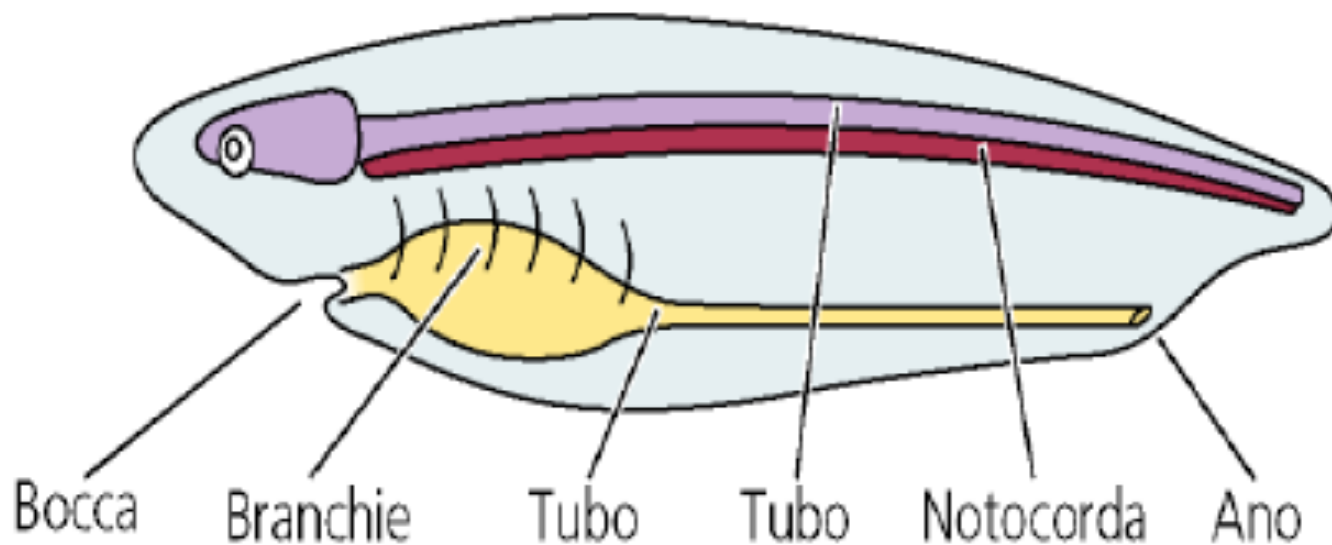




1 cervello sottile · 2 notocorda  
 (abbozzo di colonna vertebrale) ·  
 3 nervo dorsale · 4 coda post-  
 anale · 5 ano · 6 canale del cibo ·  
 7 sistema circolatorio · 8 pori  
 addominali · 9 lacuna  
 soprafarinea · 10 branchie · 11  
 faringe · 12 cirri buccali · 13  
 mimosa · 14 bocca · 15 gonadi  
 (ovarie/testicoli) · 16 sensori per  
 la luce · 17 nervi · 18 piega  
 addominale · 19 abbozzo di fegato



# Vertebrato



Bocca

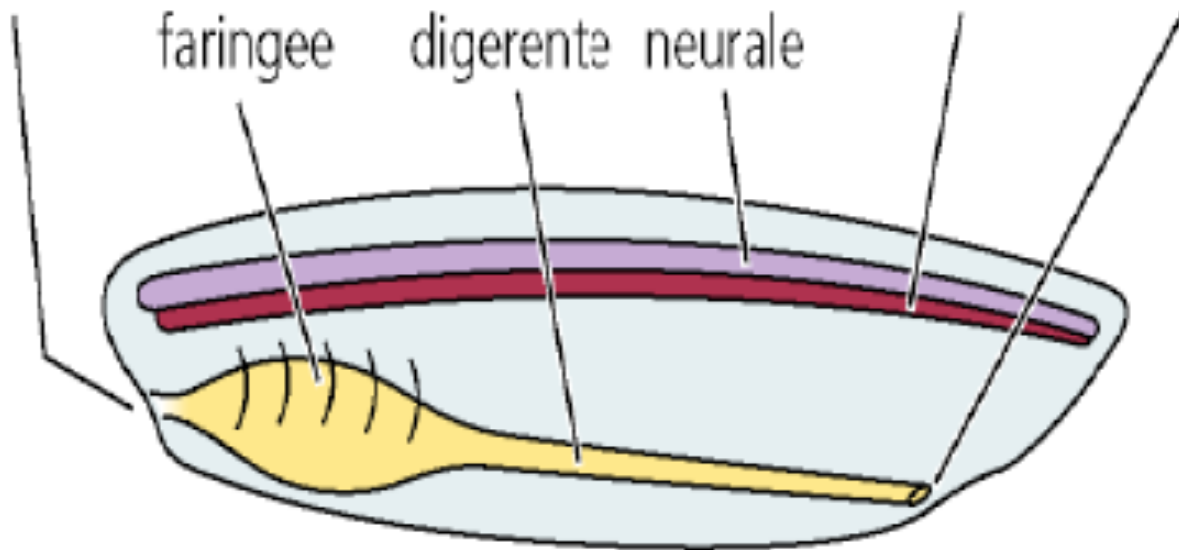
Branchie  
faringee

Tubo  
digerente

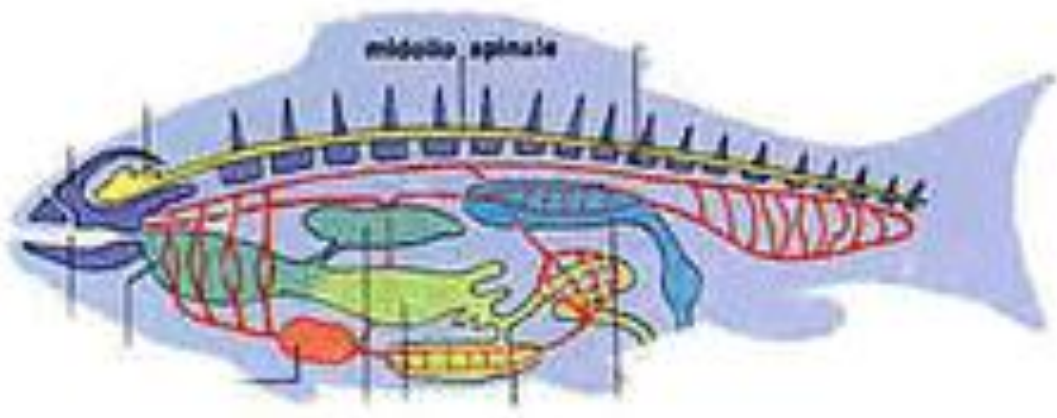
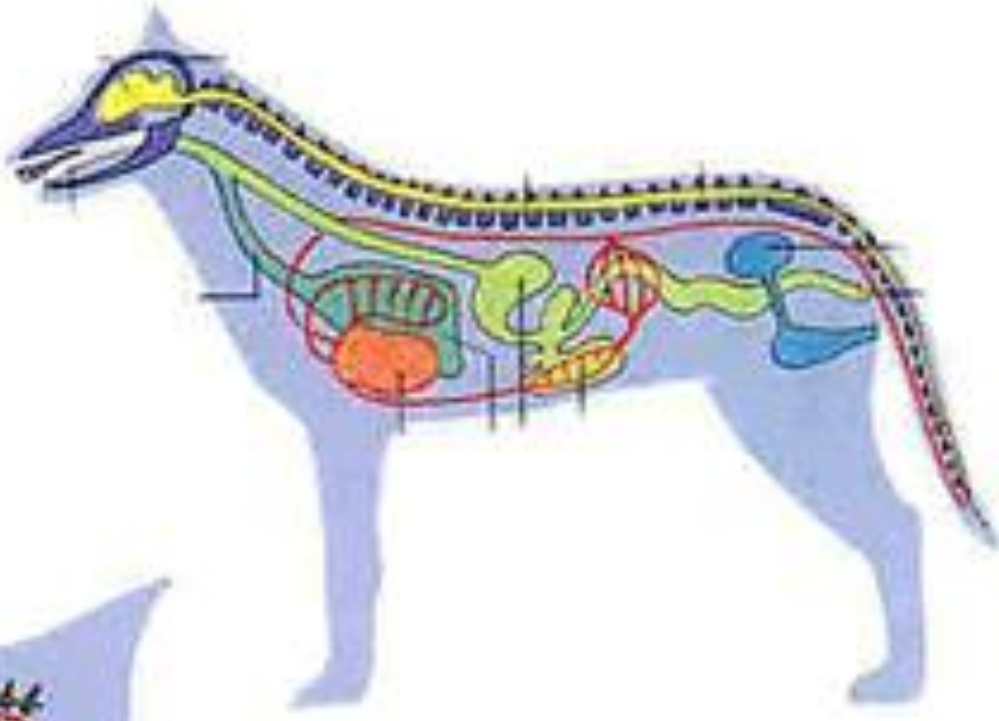
Tubo  
neurale

Notocorda

Ano



# Anfiosso

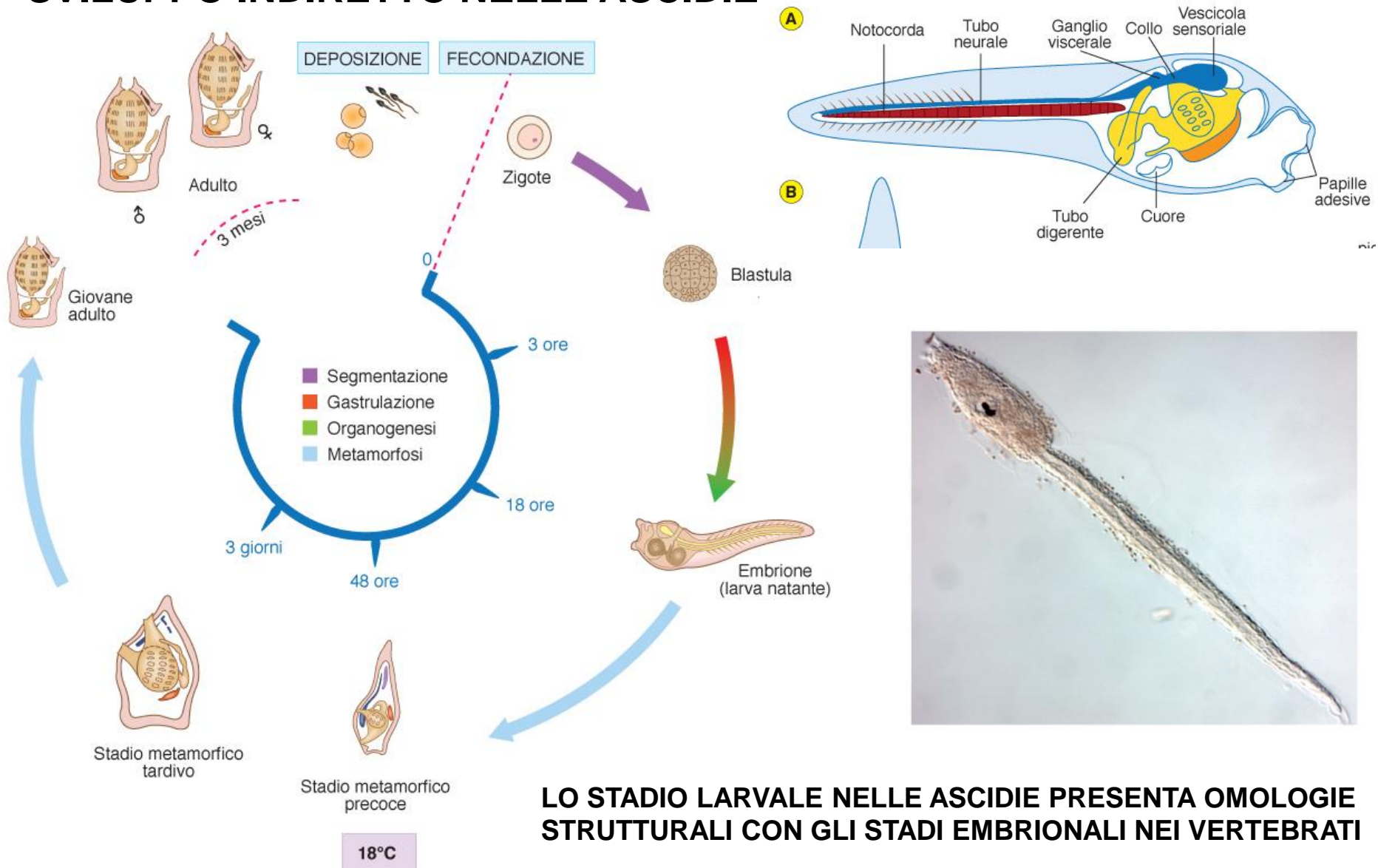




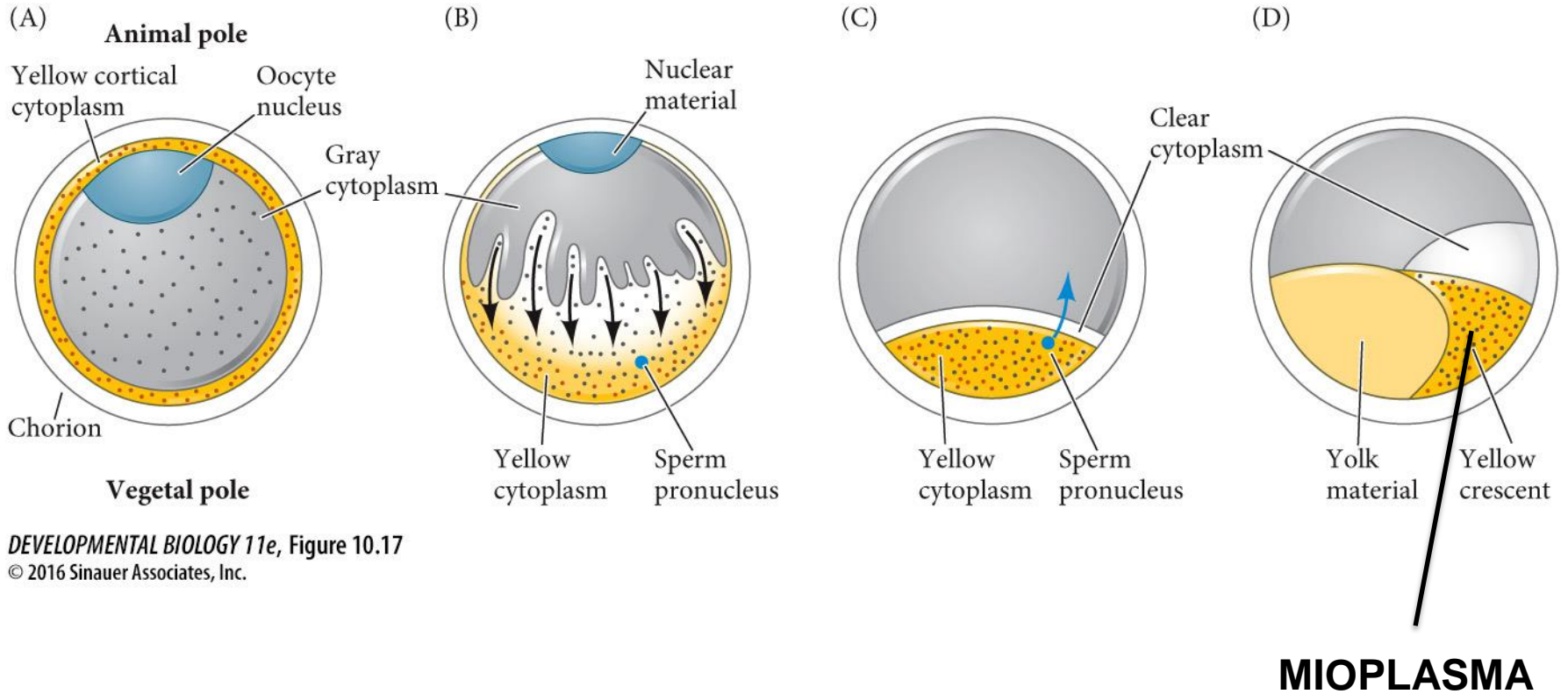
# Sviluppo delle Ascidie



# SVILUPPO INDIRETTO NELLE ASCIDIE



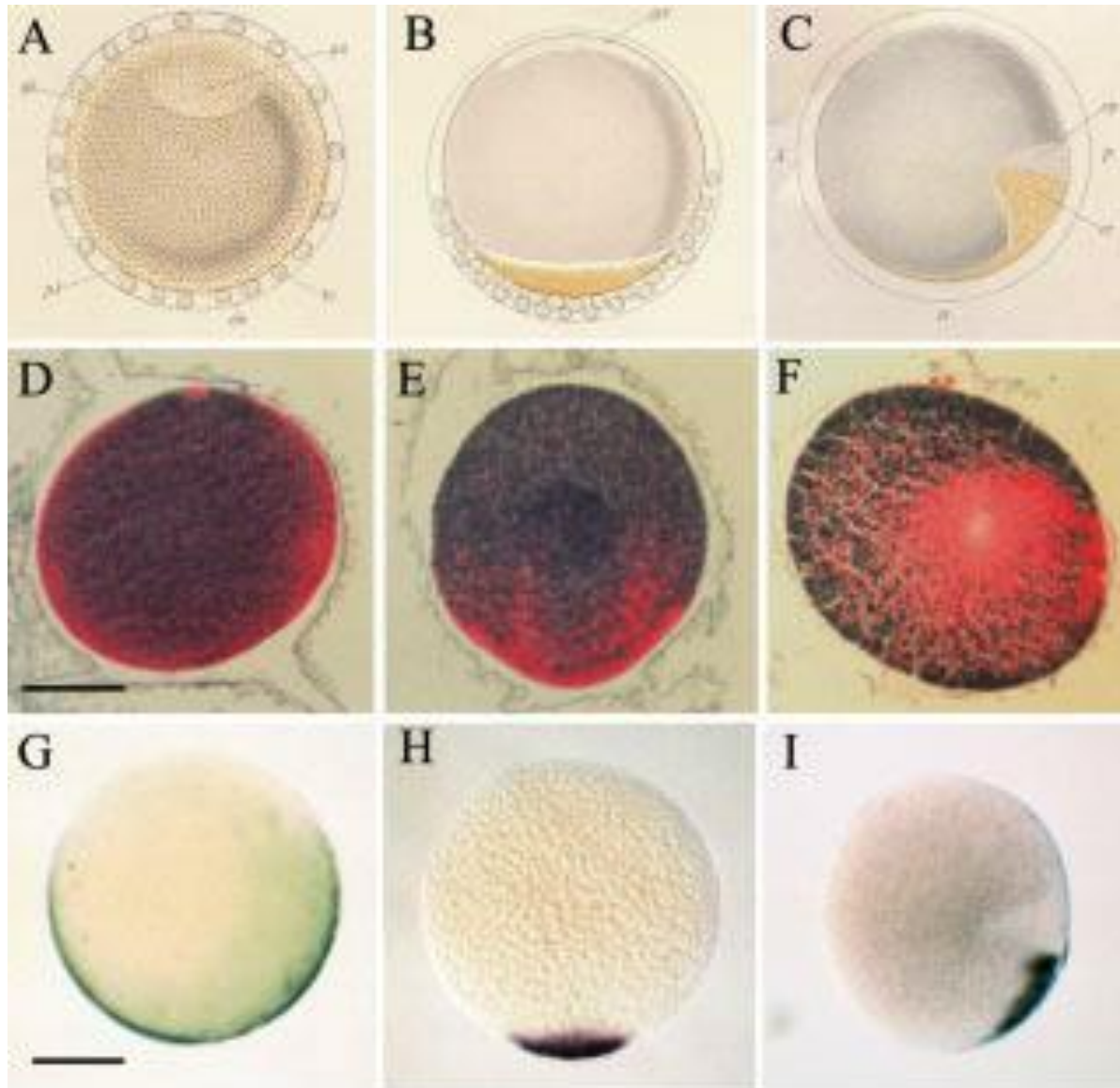
# SEGREGAZIONE DEGLI OOPLASMI IN EMBRIONI DI ASCIDIE



*DEVELOPMENTAL BIOLOGY 11e*, Figure 10.17  
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**DOPO LA FECONDAZIONE SI VERIFICANO COMPLESSI  
RIARRANGIAMENTI  
DEI MATERIALI CITOPLASMATICI**

# LA SEGREGAZIONE DEL MIOPLASMA SI SVOLGE IN TRE FASI



# LA SEGREGAZIONE DEGLI OOPLASMI E' MEDIATA DAL CITOSCHELETRO

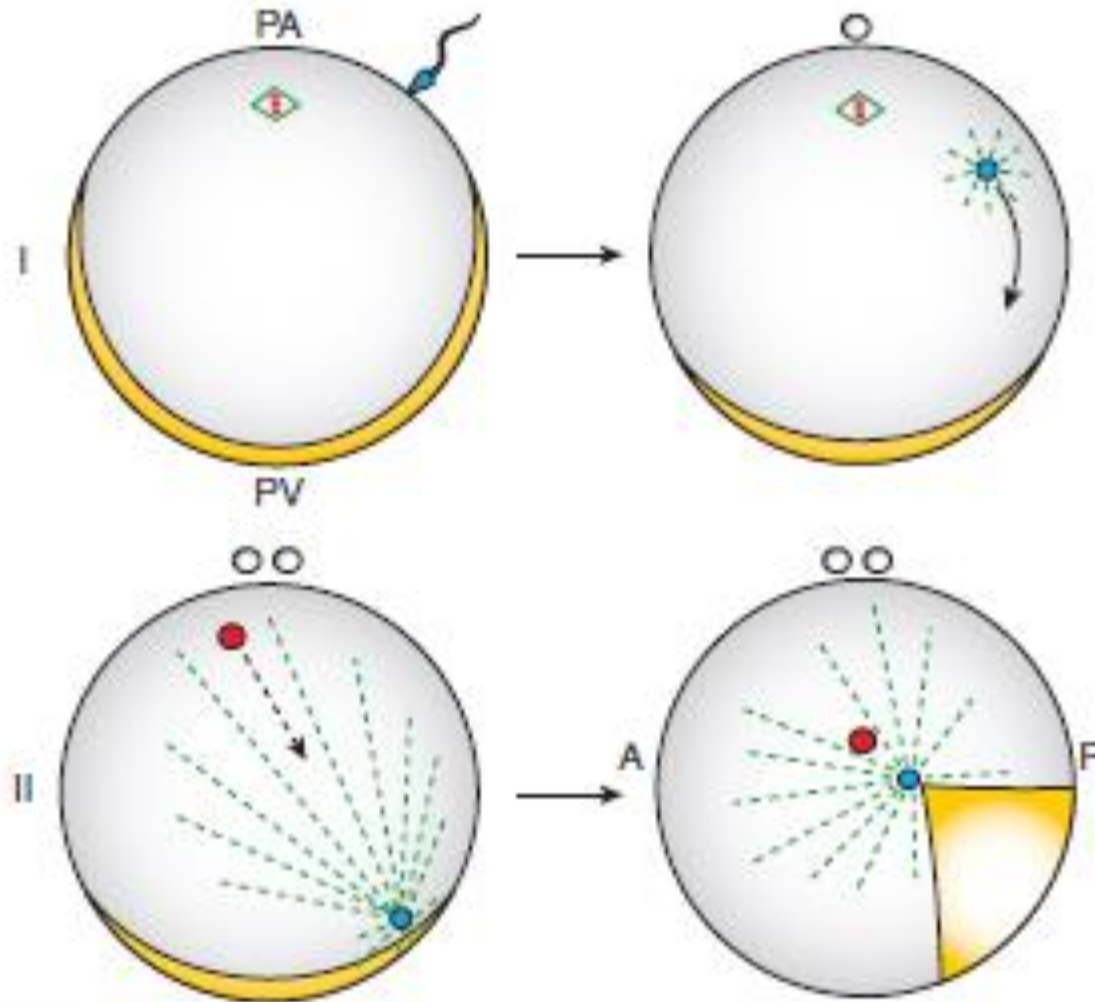
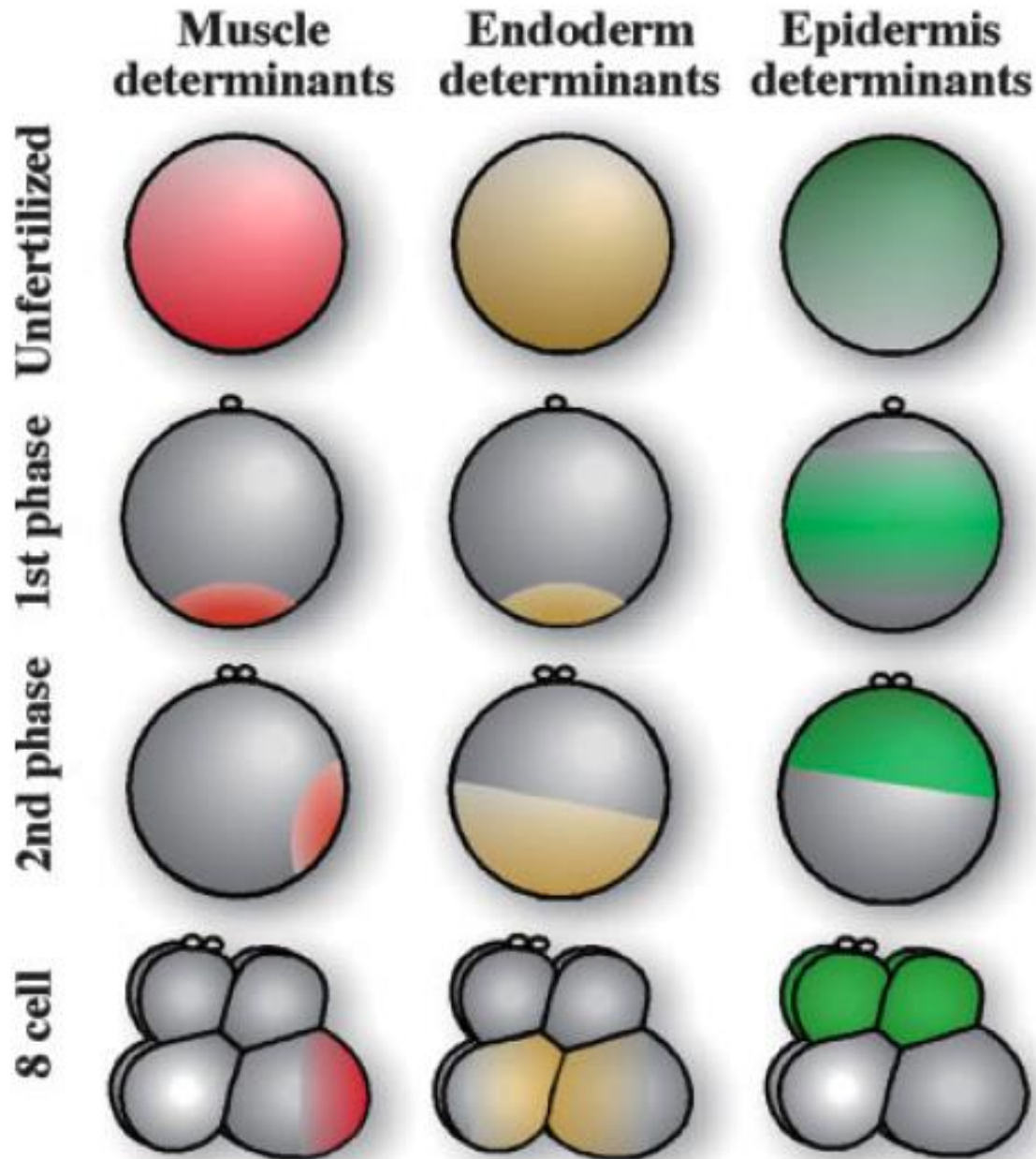
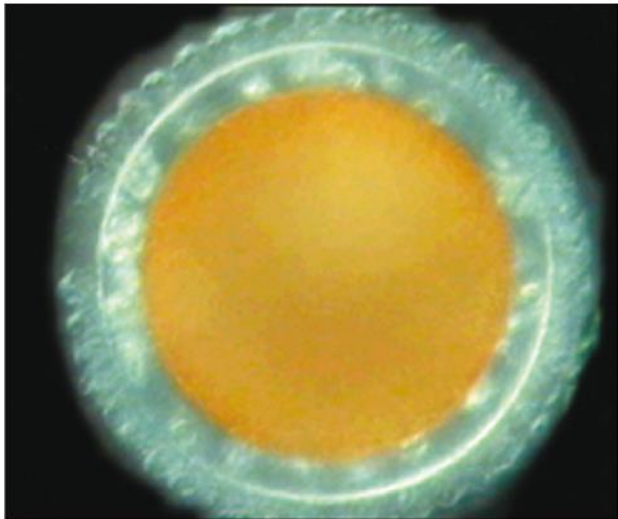


Figura 1

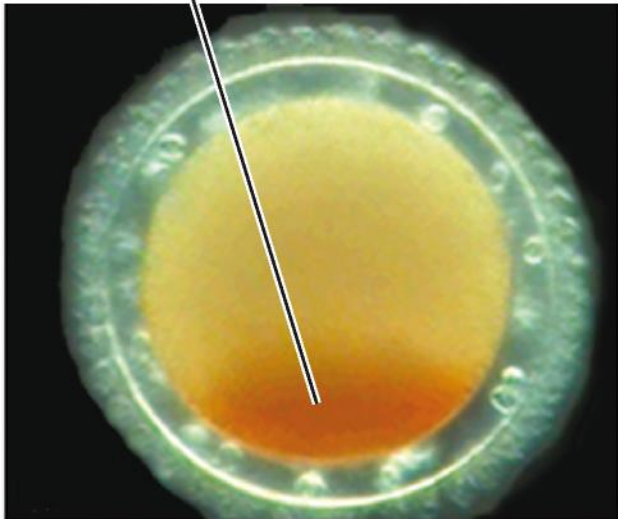
# LA SEGREGAZIONE DEGLI OOPLASMI COMPORTA LA DIVERSA DISTRIBUZIONE DI DETERMINANTI MATERNI DEL DIFFERENZIAMENTO



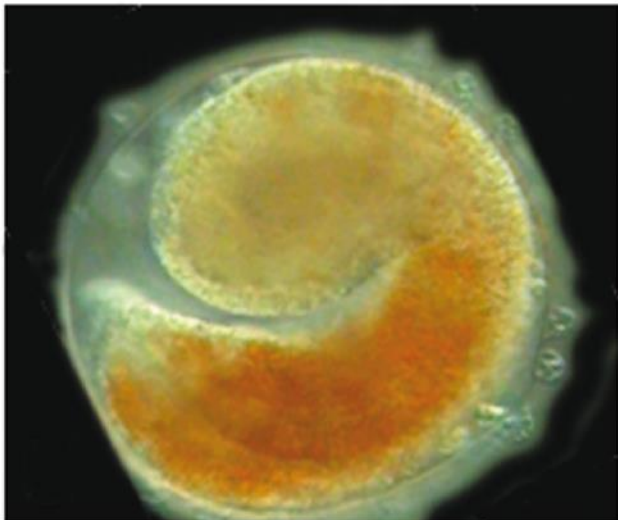
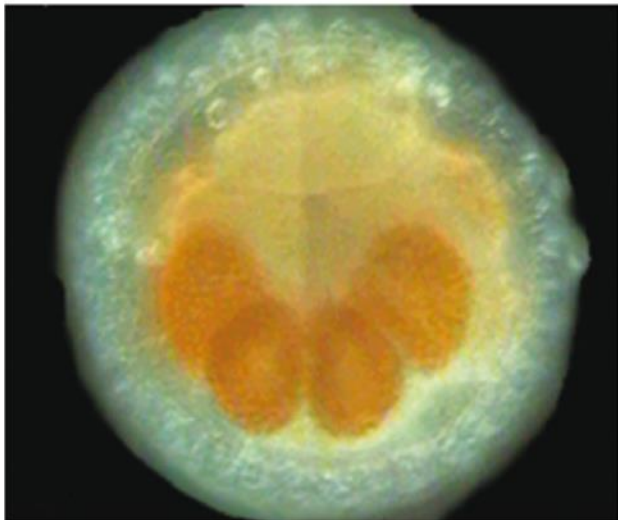
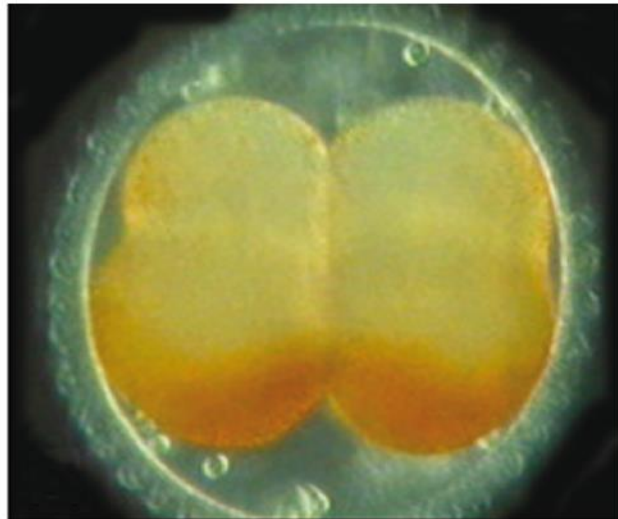
(A)



(B)



(C)



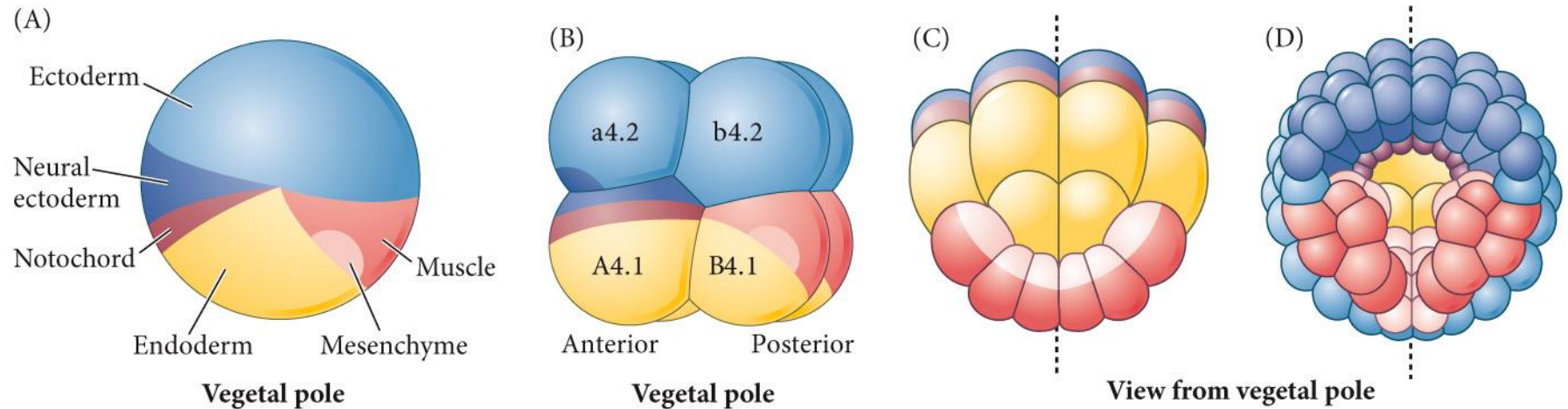
(D)

(E)

(F)

# MAPPA DEI TERRITORI PRESUNTIVI NELLO ZIGOTE DI ASCIDIA:

- 1) le regioni presuntive dell'ectoderma, mesoderma ed endoderma sono disposte lungo l'asse animale vegetativo;
- 2) le regioni presuntive del cordomesoderma e del neuroectoderma si trovano associate sullo stesso lato dell'embrione

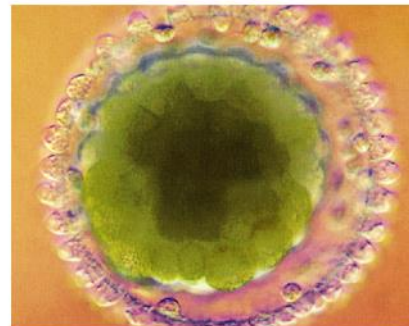
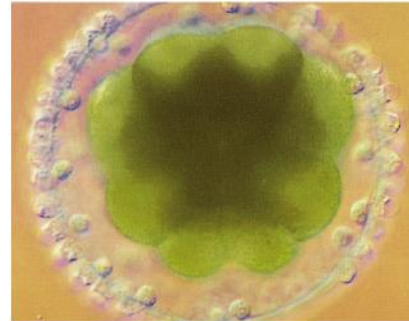
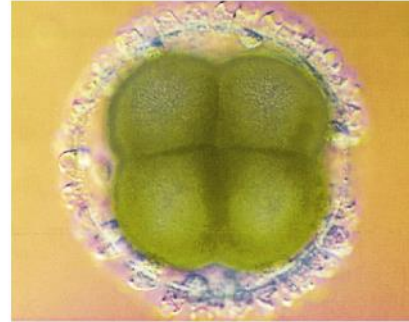
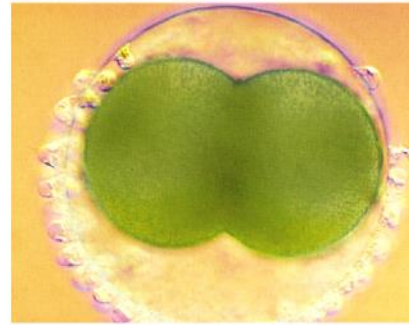


*DEVELOPMENTAL BIOLOGY 11e*, Figure 10.16  
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**Allo stadio di 8 cellule diversi destini differenziativi sono segregati in blastomeri diversi. La segregazione dei destini viene ulteriormente rifinita nel corso delle divisioni cellulari.**

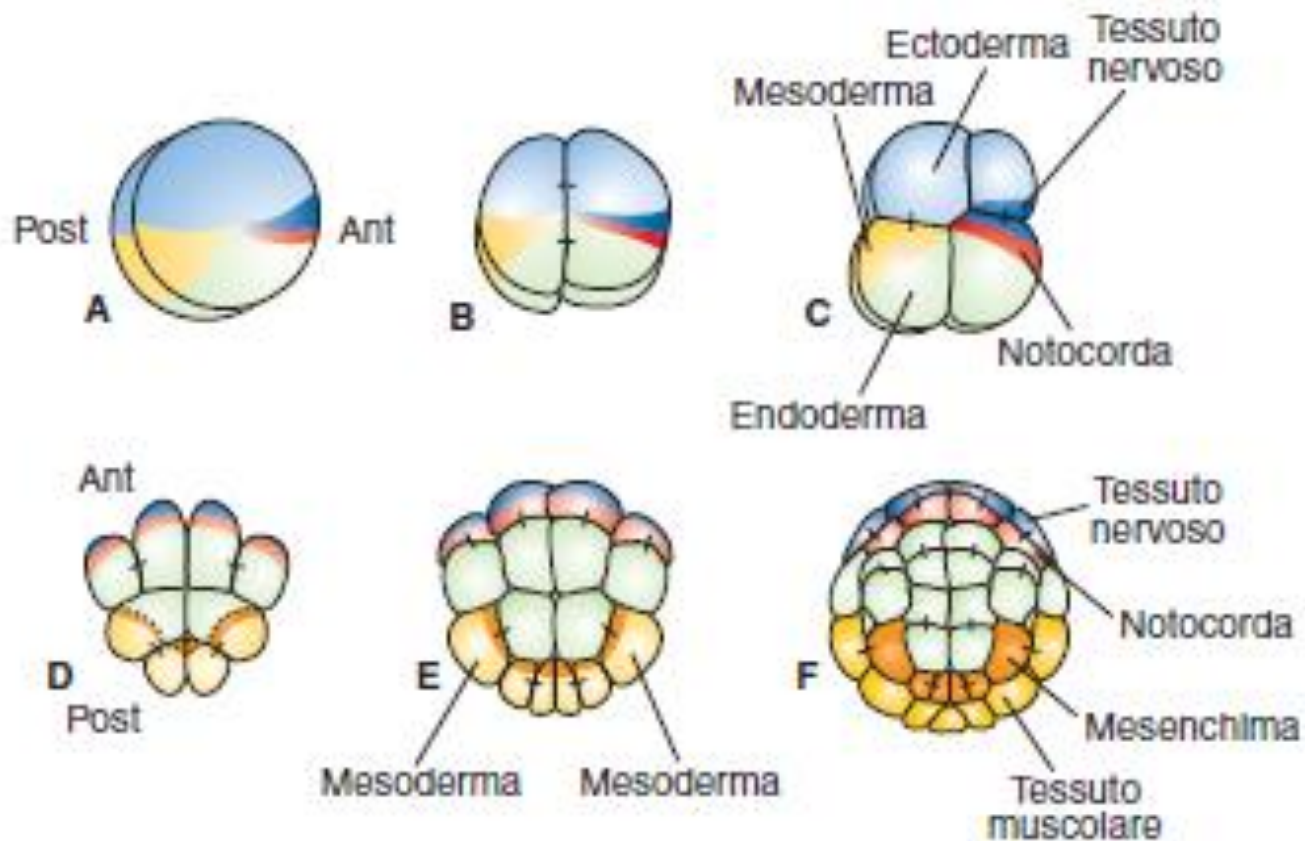


# SEGMENTAZIONE OLOBLASTICA BILATERALE



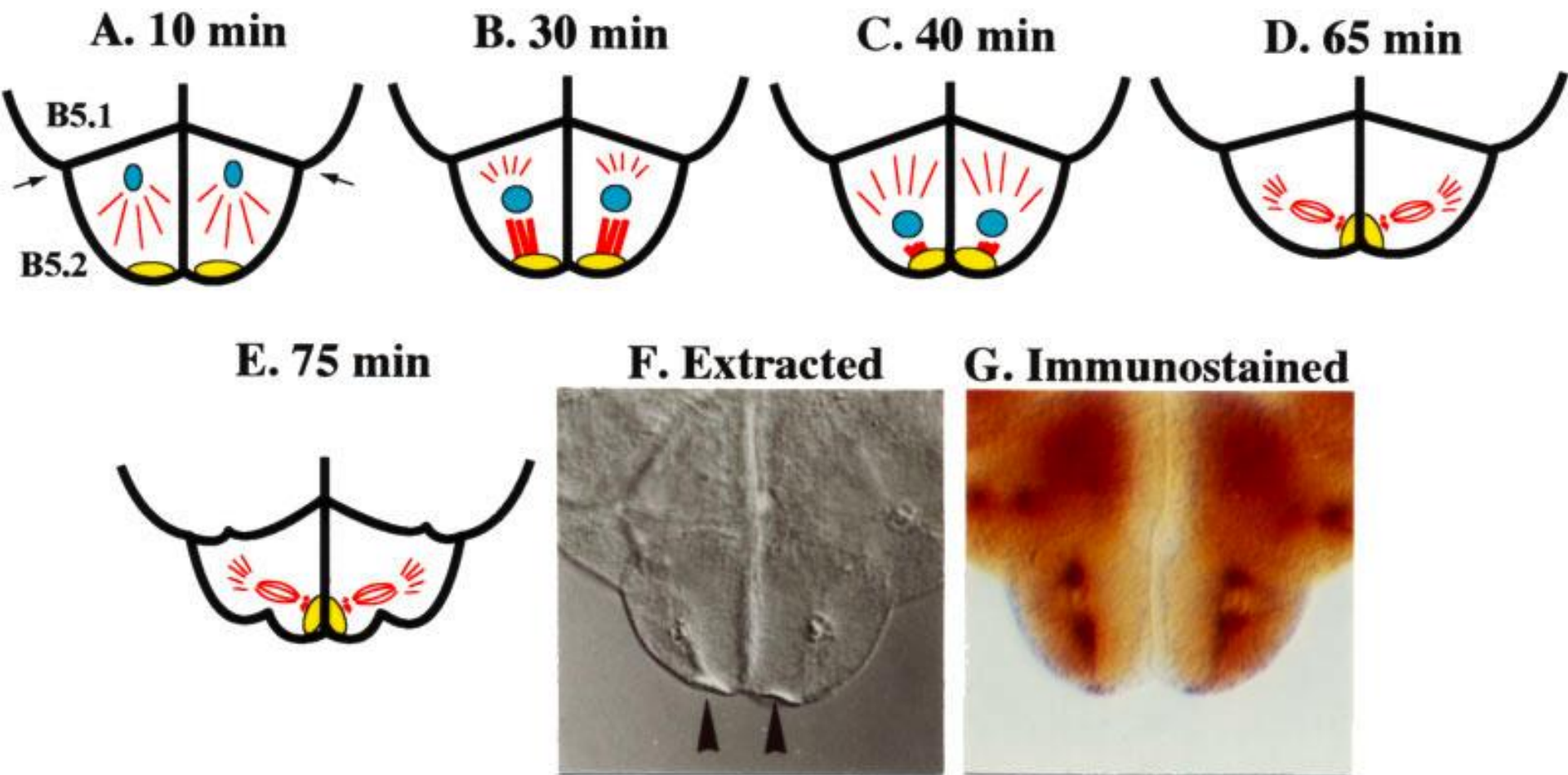
**LA SEGMENTAZIONE PRODUCE BLASTOMERI DI GRANDEZZA DIVERSA MEDIANTE DIVISIONI ASIMMETRICHE (BLASTOMERI PIU' PICCOLI AL POLO POSTERIORE).**

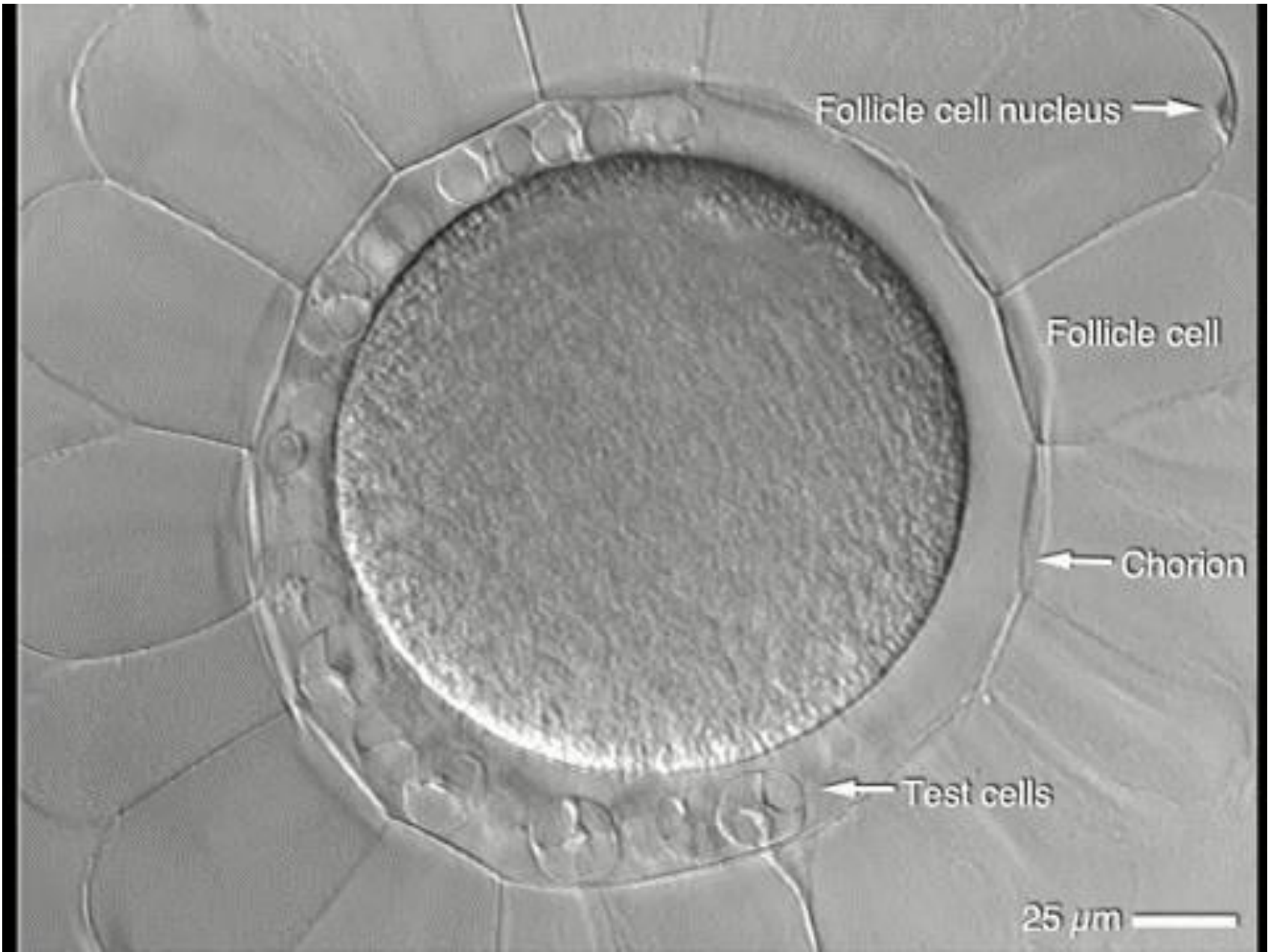
**LE DIVISIONI ASIMMETRICHE PROVOCANO LA SEGREGAZIONE DI DIVERSE REGIONI CITOPLASMATICHE IN CELLULE DIVERSE.**



**Figura 3**

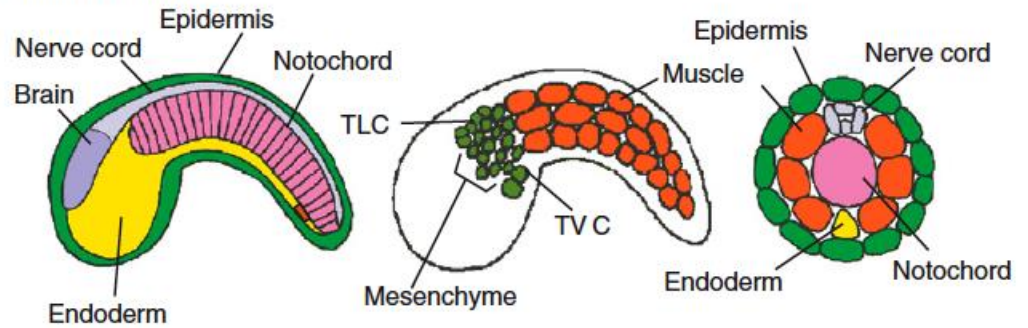
# IL CENTROSOME-ATTRACTING BODY PROMUOVE DIVISIONI INEGUALI



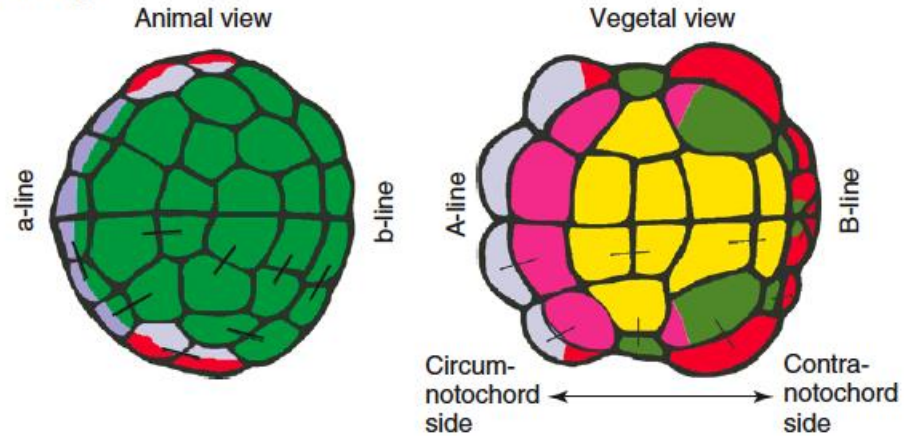


# LA MAPPA DEI TERRITORI PESUNTIVI ALLO STADIO DI BLASTULA PRESENTA SOMIGLIANZE CON QUELLE DEI VERTEBRATI

A Tailbud embryo

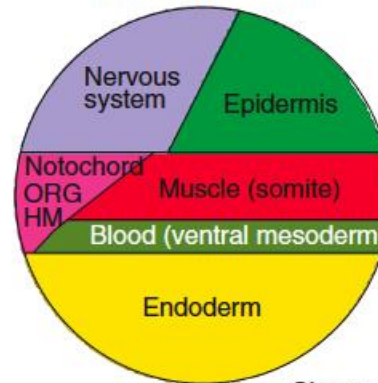


B 64-cell stage

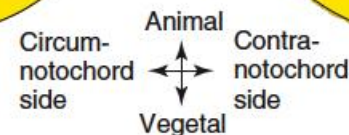
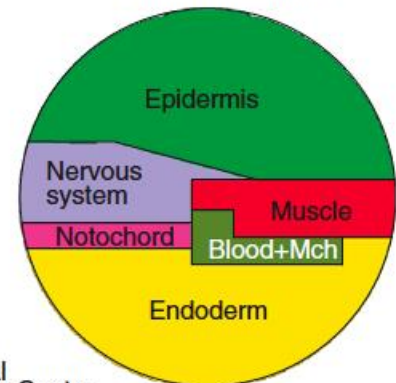


C

Xenopus fate map

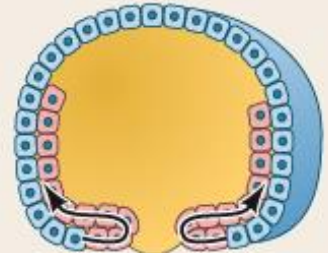


Ascidian fate map



Involution

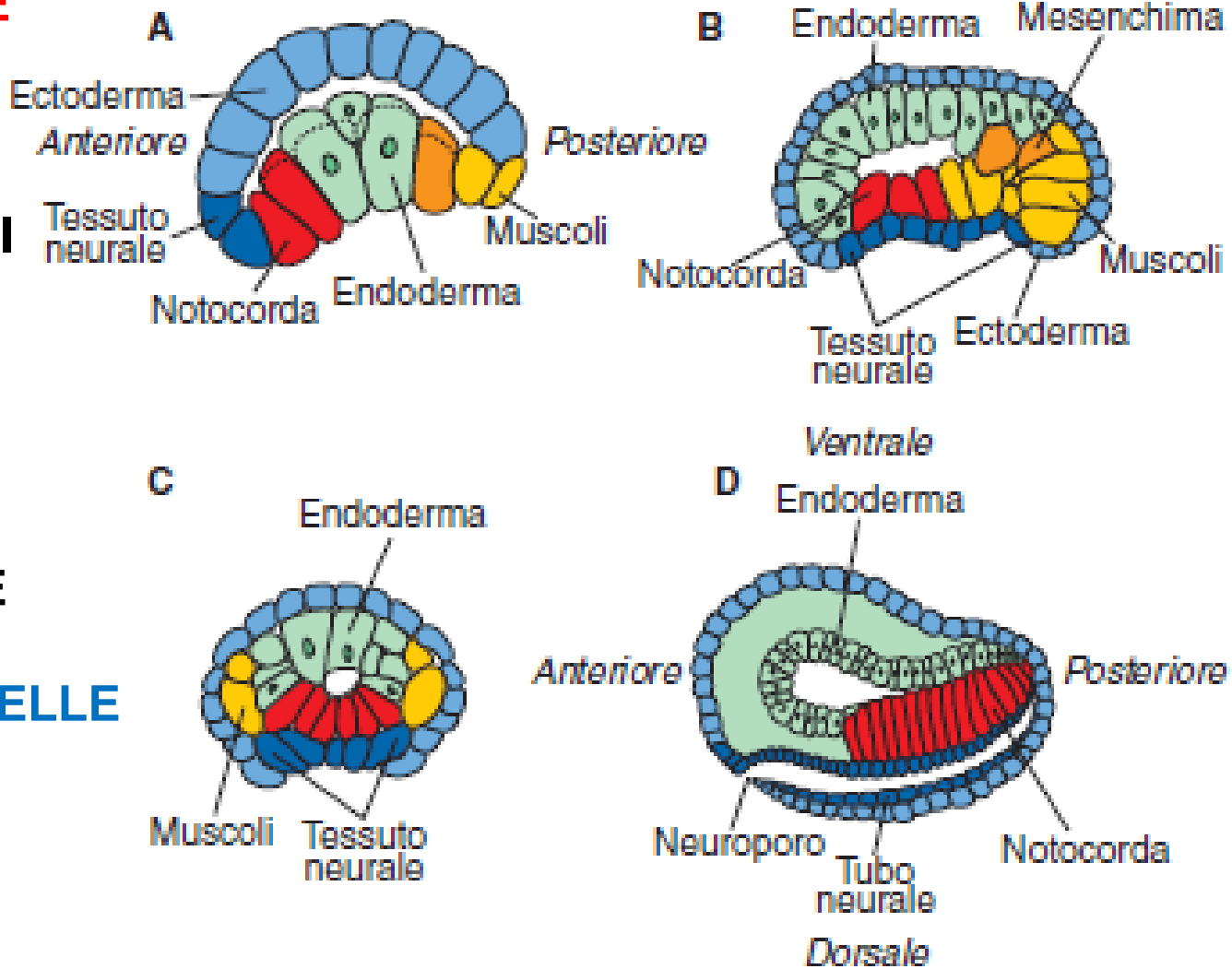
Inward movement of an expanding outer layer so that it spreads over the internal surface of the remaining external cells.

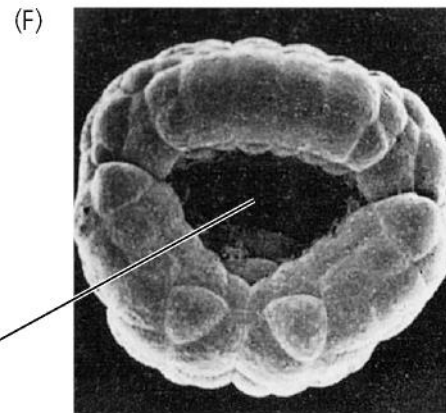
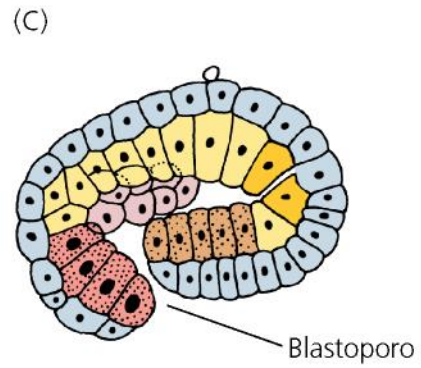
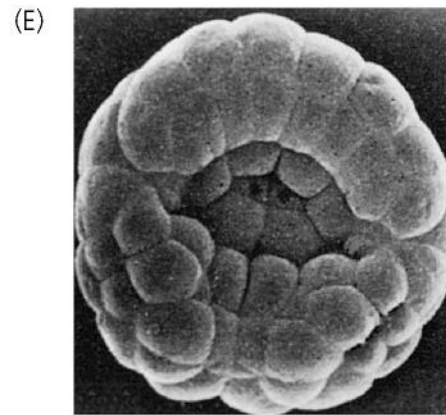
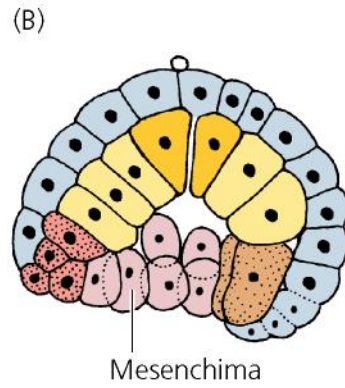
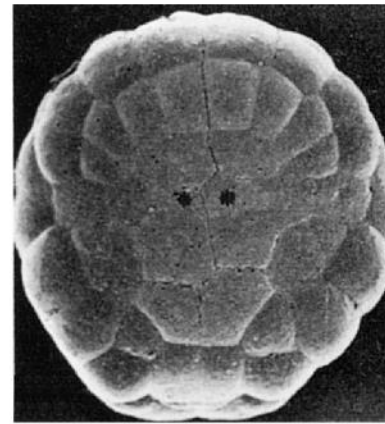
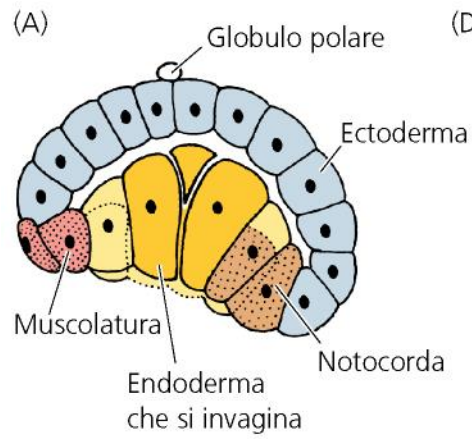


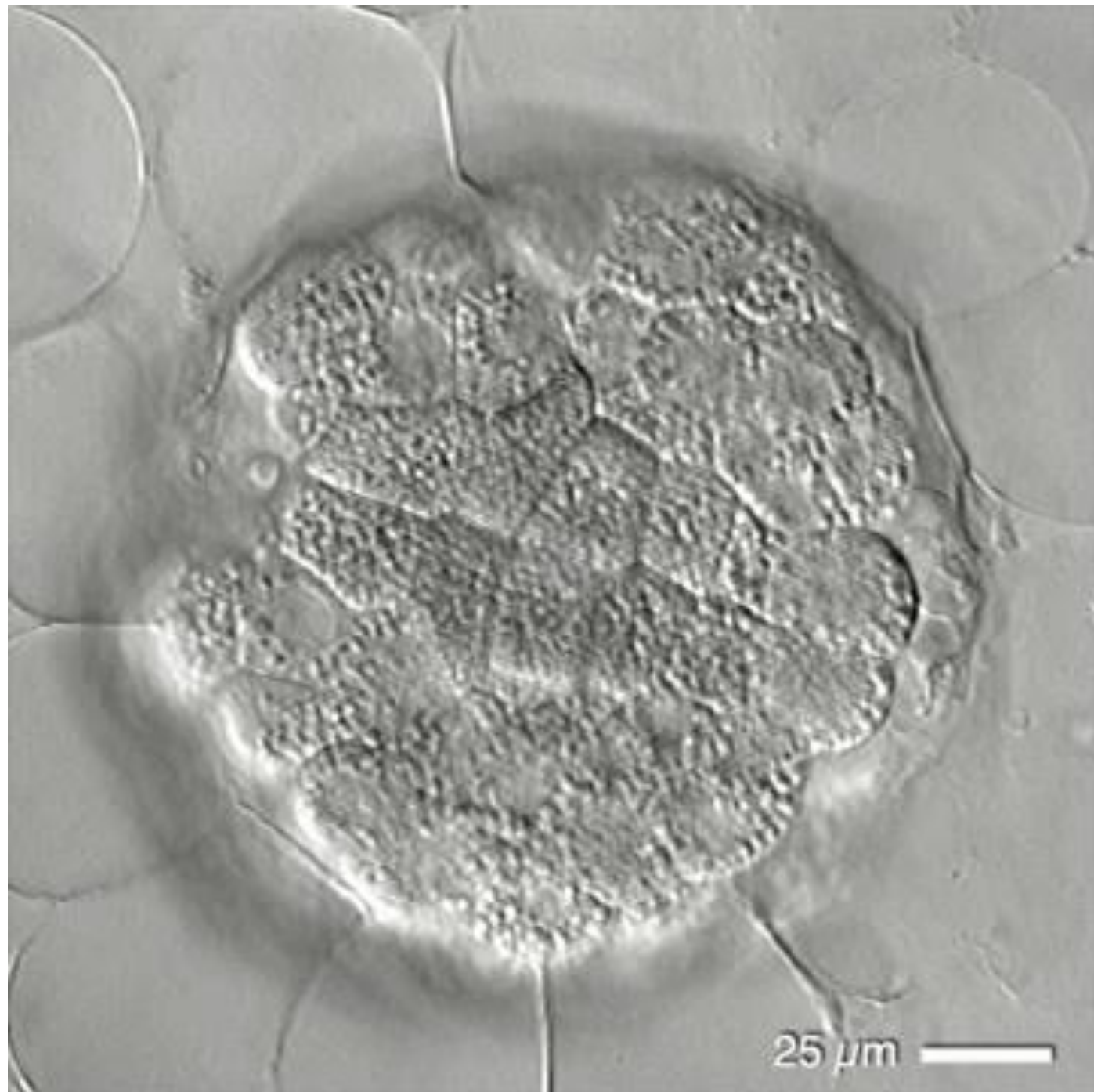
# GASTRULAZIONE NELLE ASCIDIE

LE CELLULE ENDODERMICHE SI INTERNALIZZANO PER INVAGINAZIONE, QUELLE MESODERMICHE PER INVOLUZIONE

# NEURULAZIONE NELLE ASCIDIE

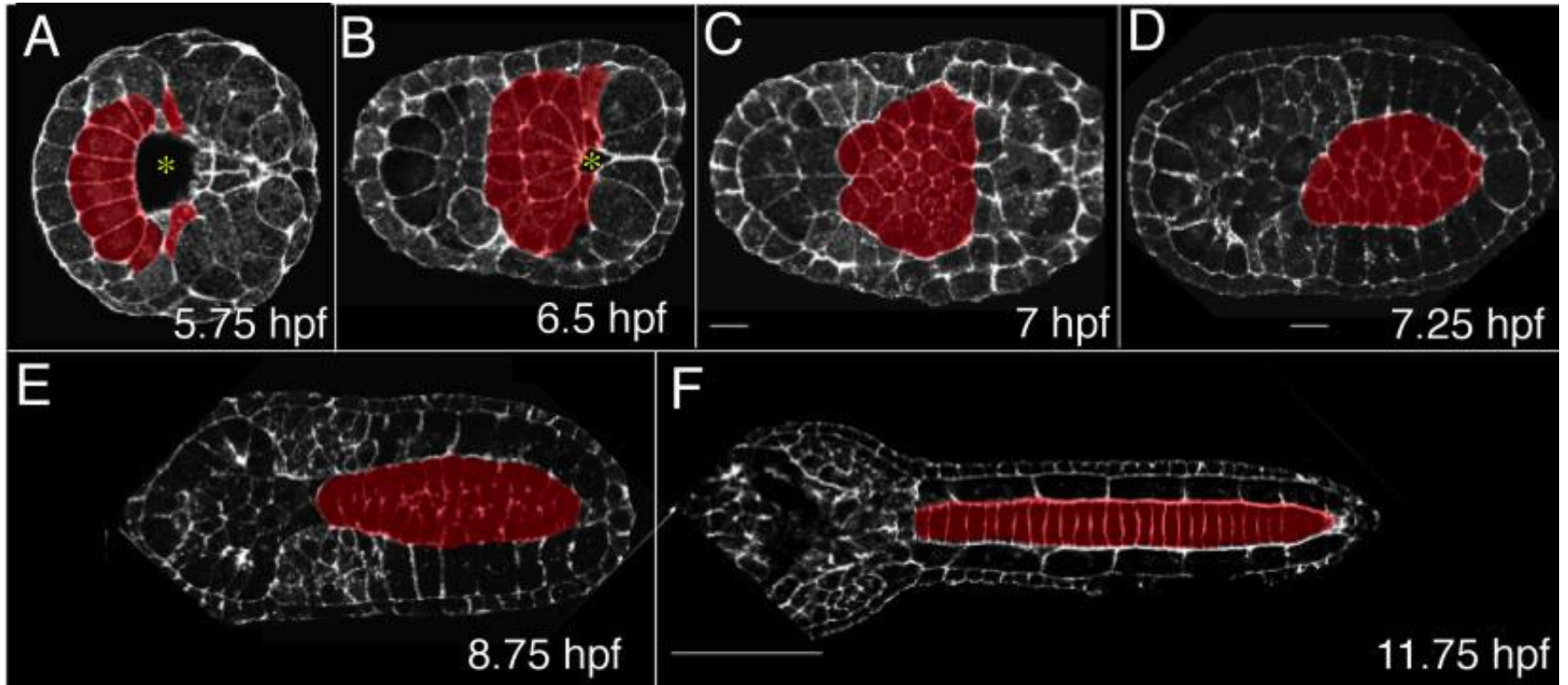




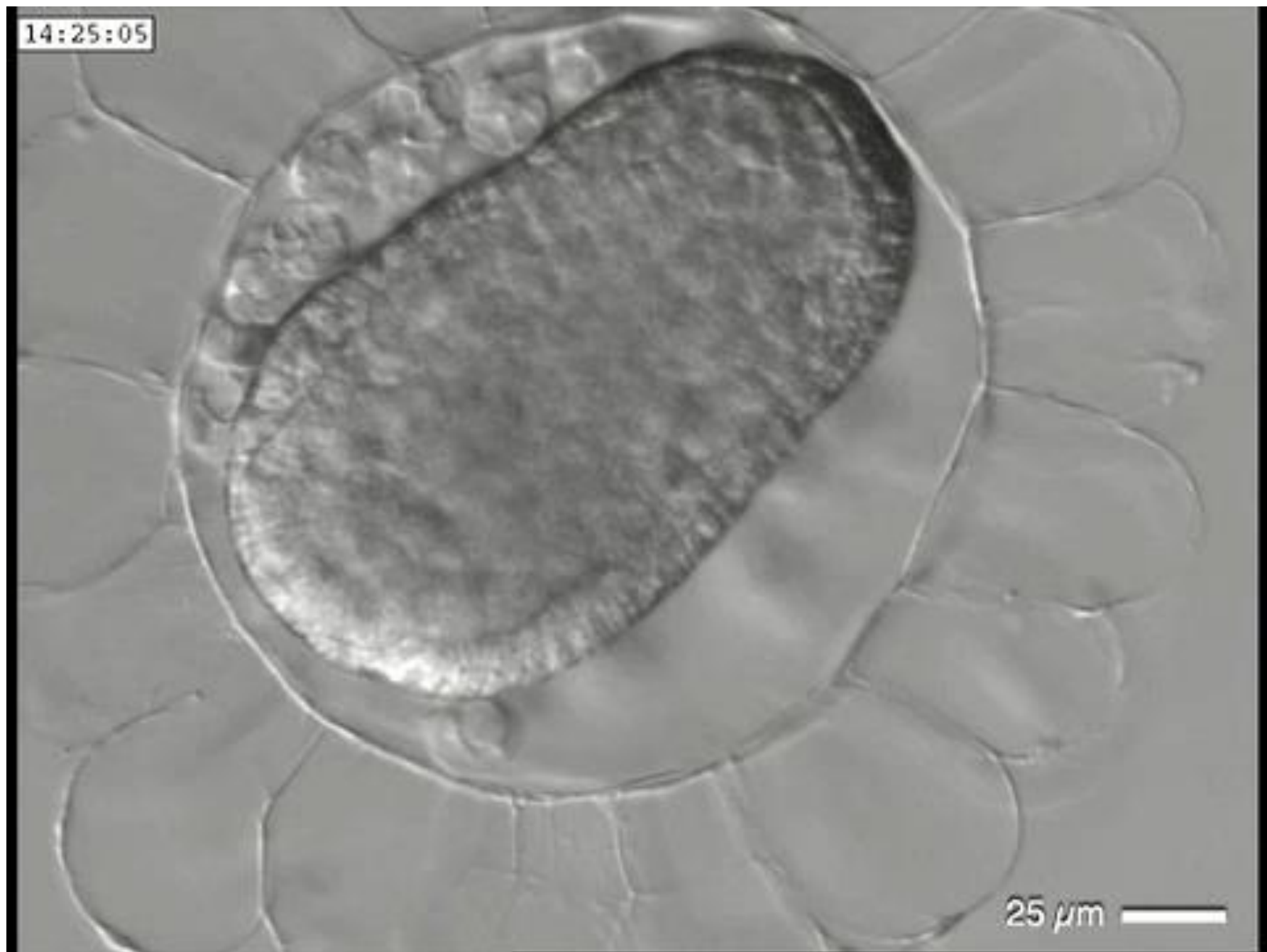





# ESTENSIONE ANTERO-POSTERIORE DELLA NOTOCORDA PER MOVIMENTI DI ESTENSIONE CONVERGENTE

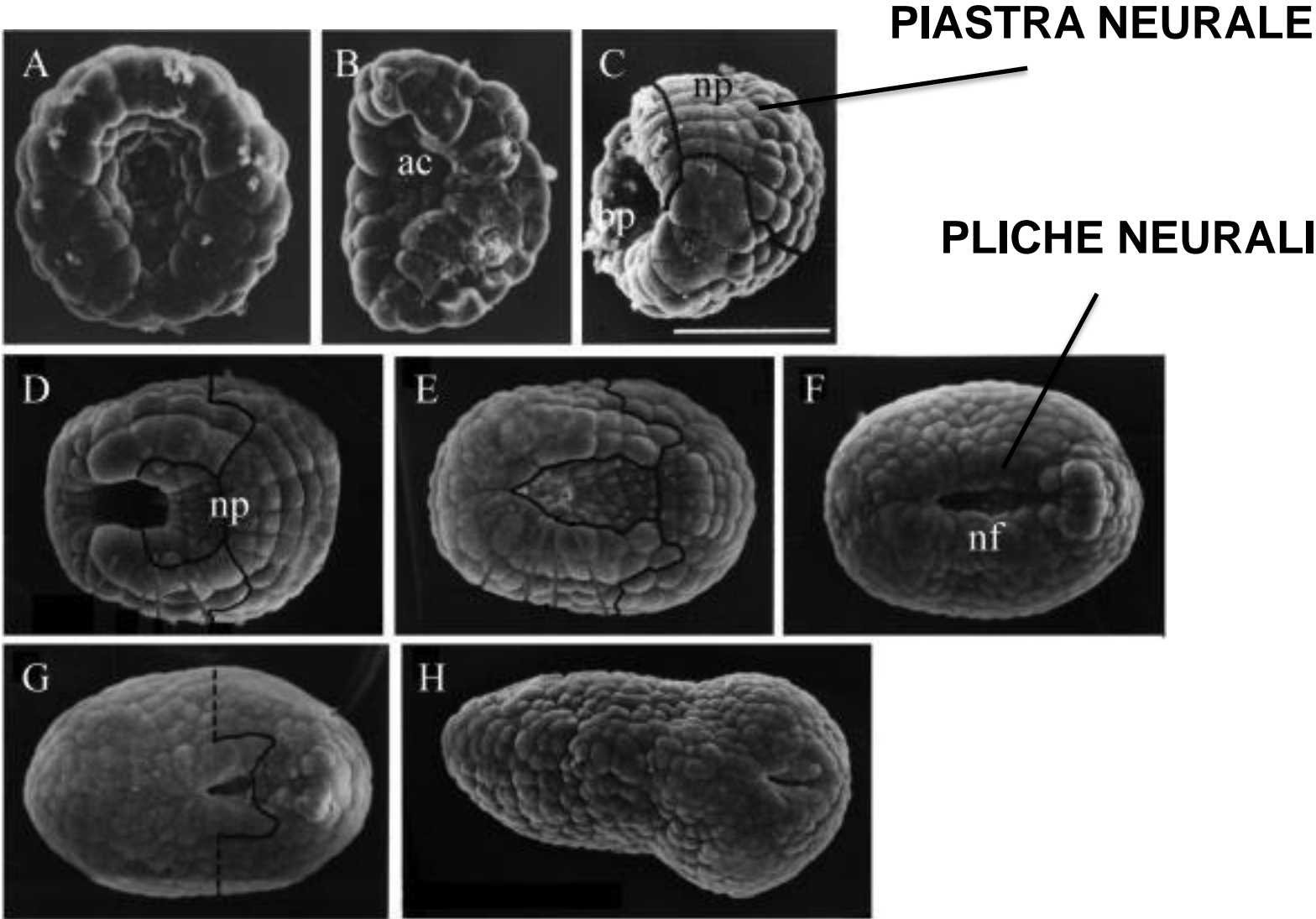


14:25:05



25  $\mu\text{m}$  

# NEURULAZIONE NELLE ASCIDIE



# L'ORGANIZZAZIONE DORSO-VENTRALE NELLO STADIO LARVALE DELLE ASCIDIE PRESENTA OMOLOGIE STRUTTURALI CON GLI STADI EMBRIONALI NEI VERTEBRATI

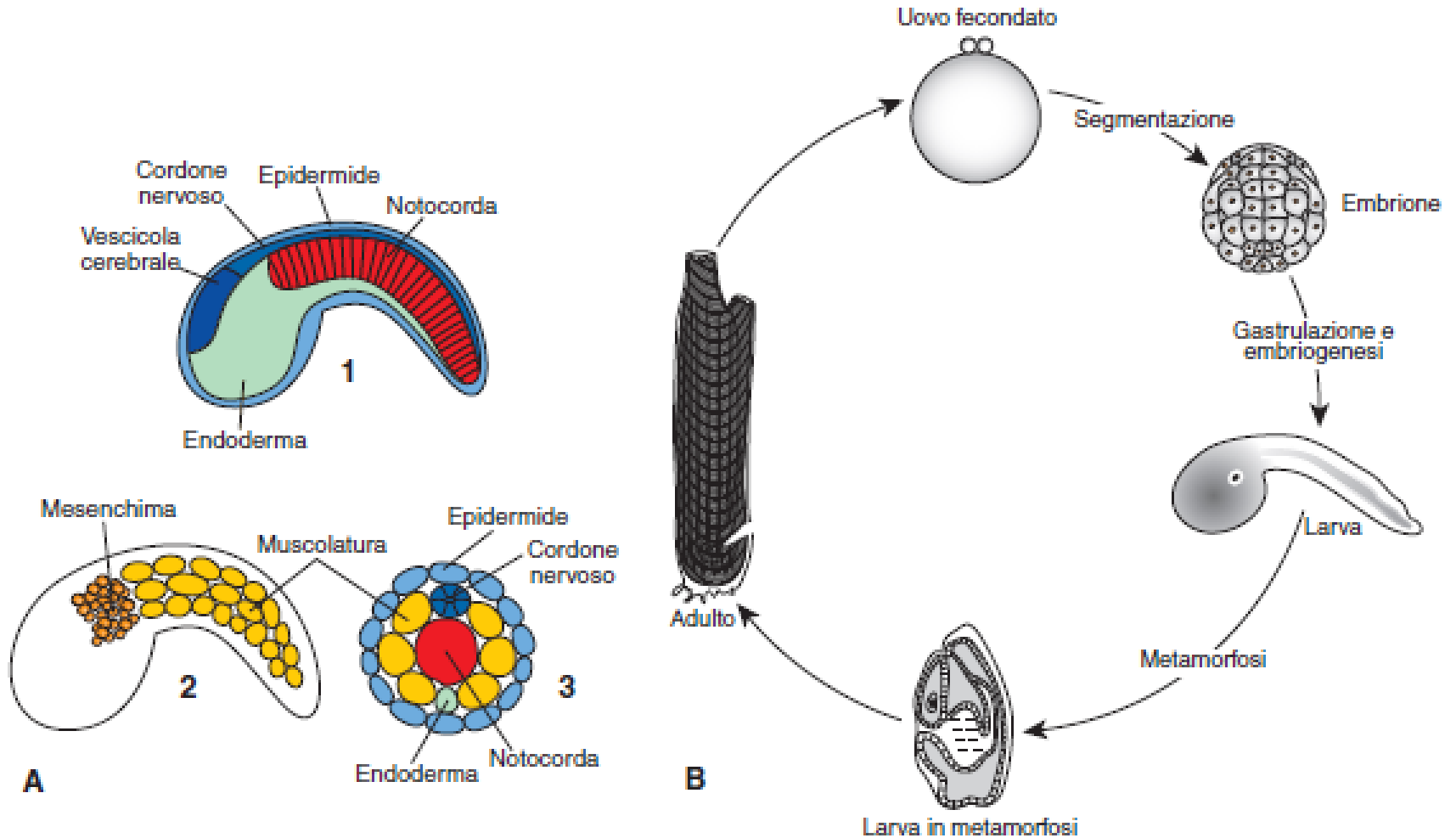


Figura 5

