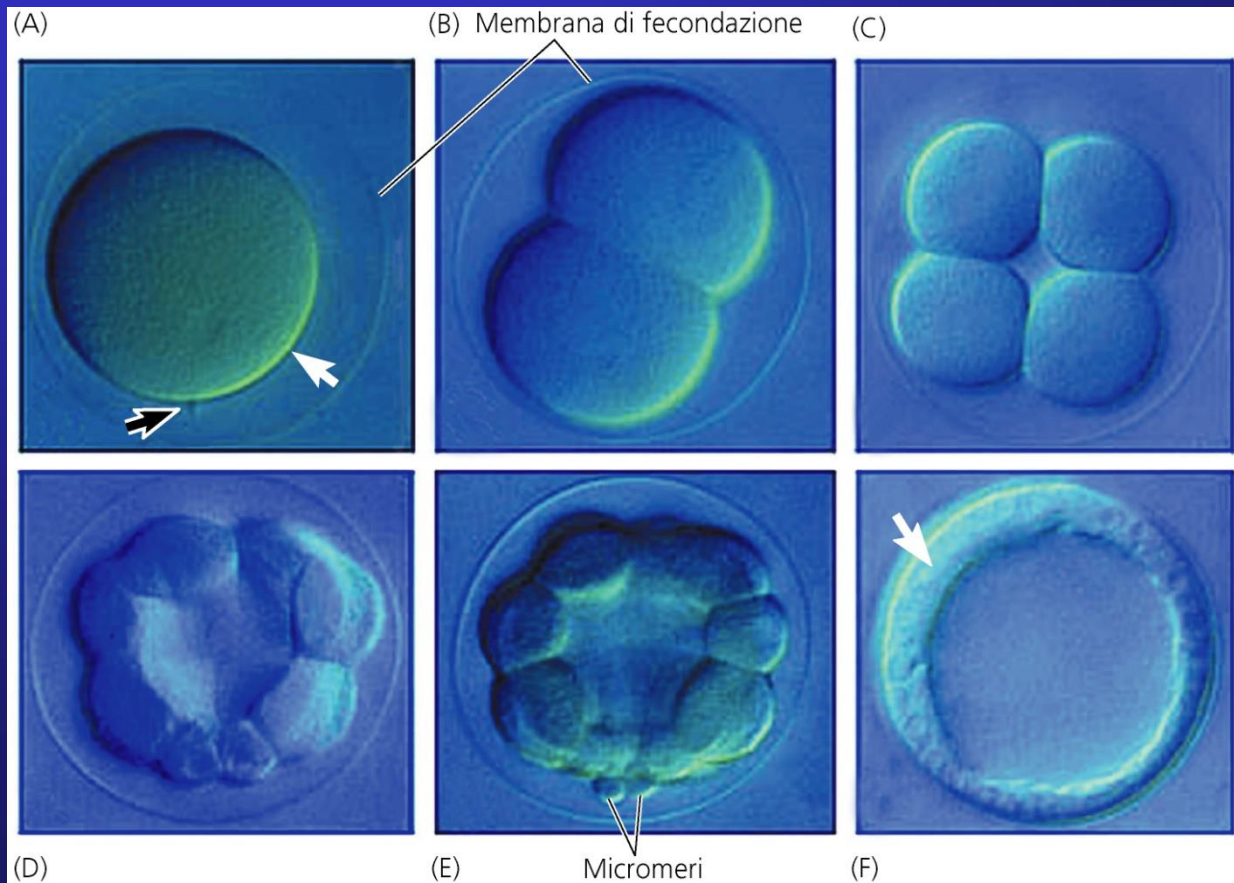
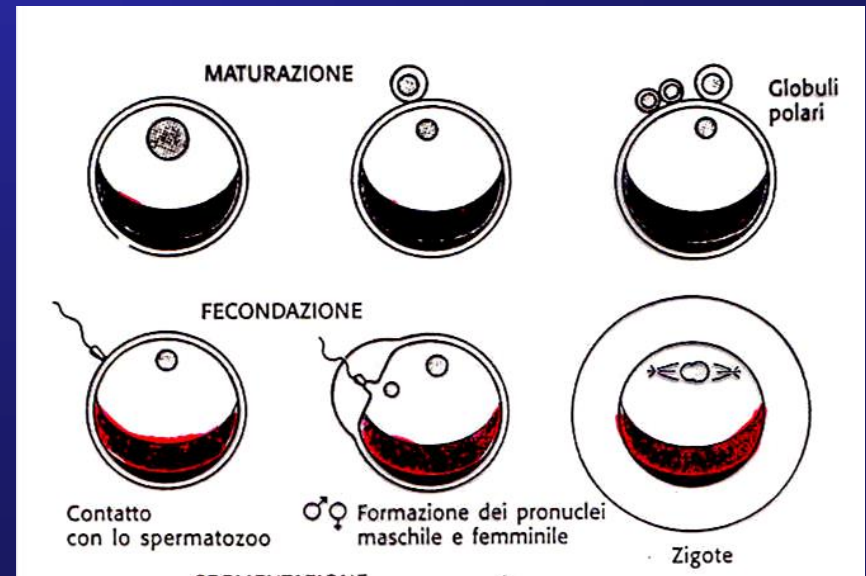


# Sviluppo riccio di mare

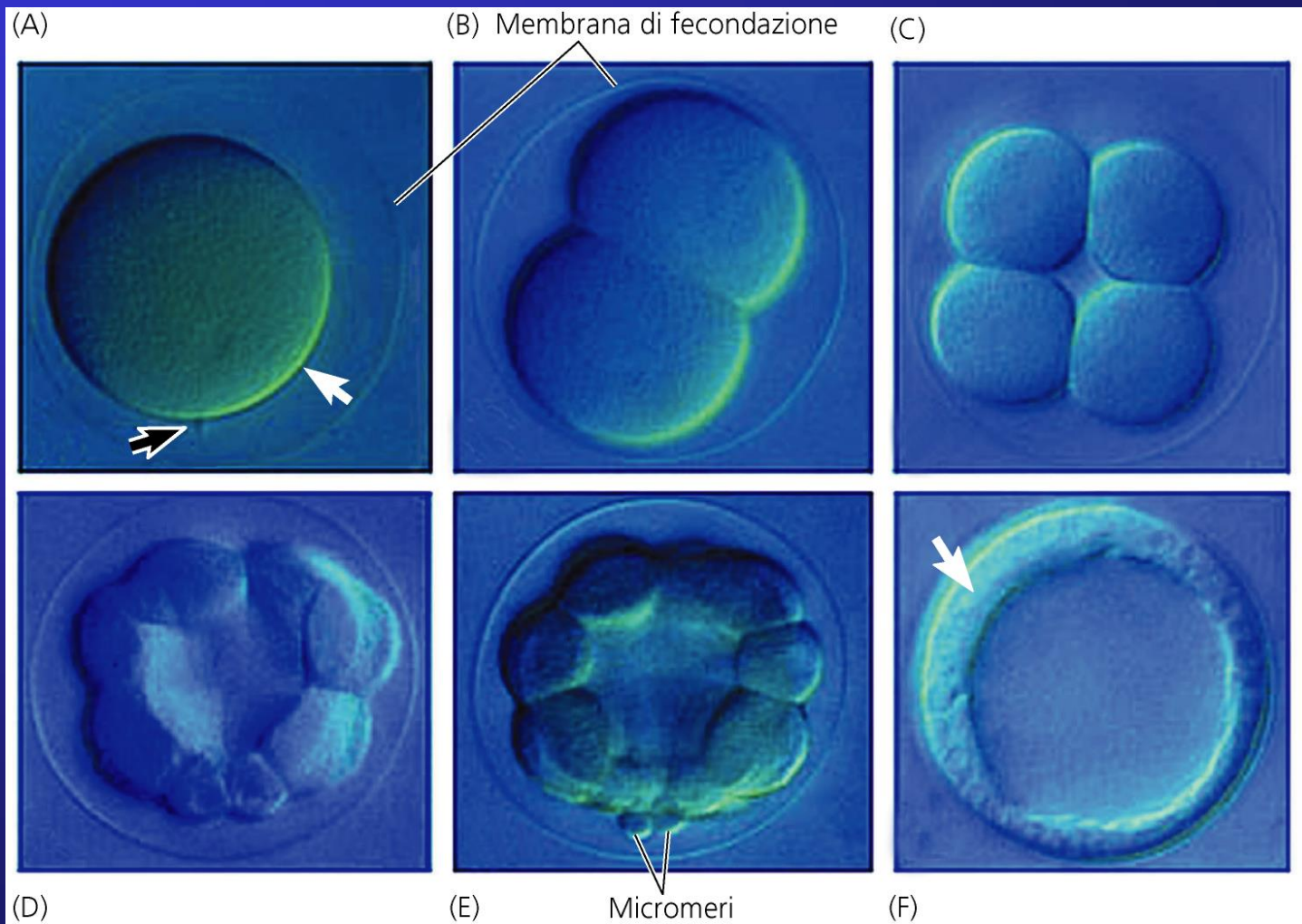


- Tipico organismo modello in embriologia :
  - sviluppo embrionale esterno
  - elevato numero di gameti e di embrioni
  - tempi brevi di sviluppo (48 ore)
  - embrione trasparente
  - facile manipolazione

- Uovo oligolecitico
- Uovo maturo prima della fecondazione
- Fecondazione esterna
- Blocco rapido+blocco lento della polispermia
- Formazione della membrana di fecondazione
- Sviluppo indiretto

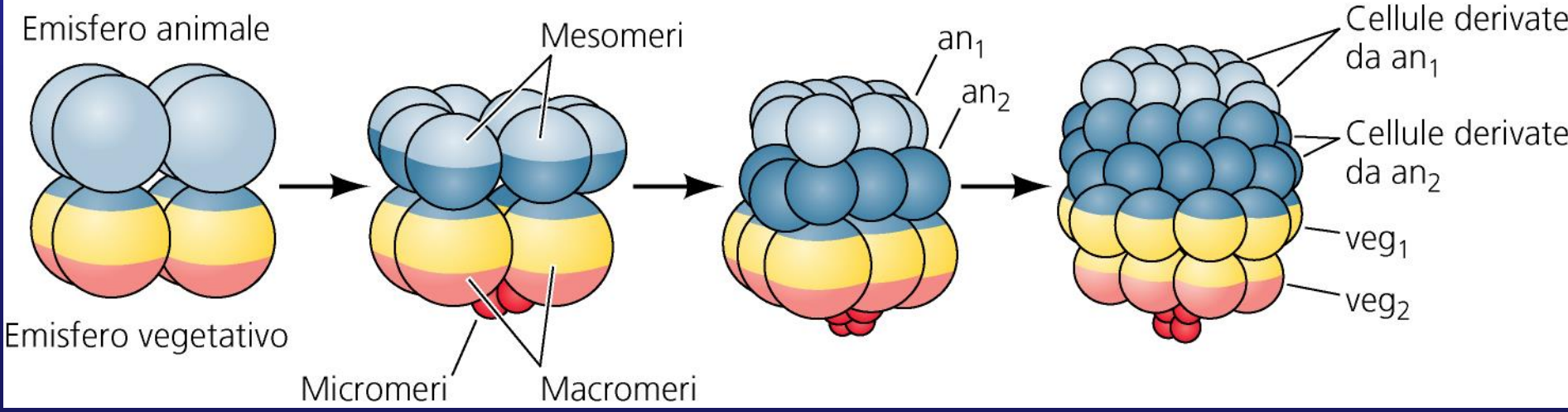
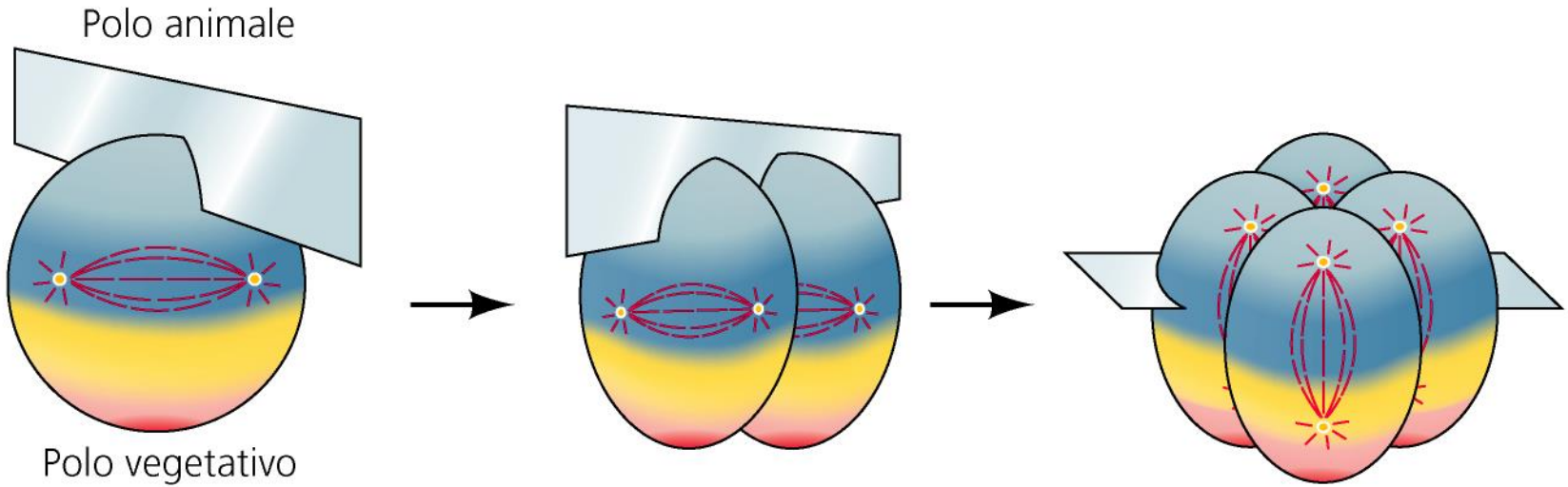


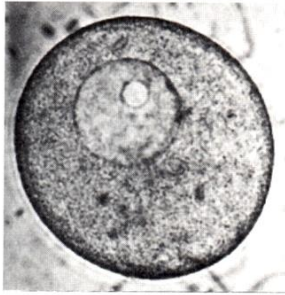
# Embrione trasparente



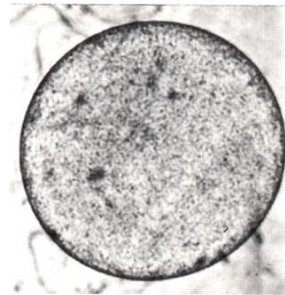
# SEGMENTAZIONE

## Oblastica radiale subuguale

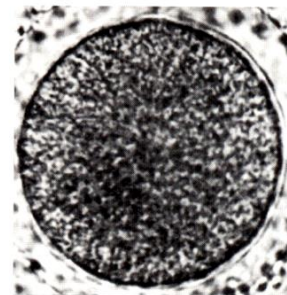




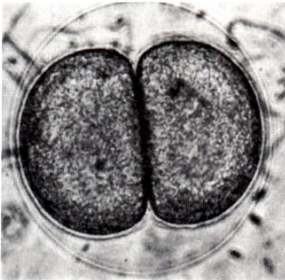
Ovocyte



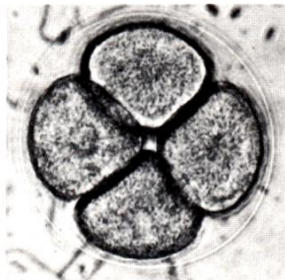
œuf mûr



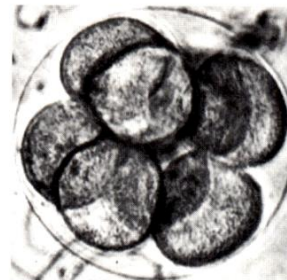
œuf fécondé



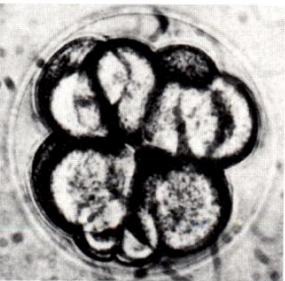
2 cellules



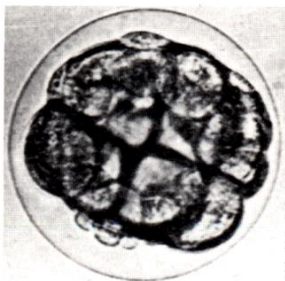
4 cellules



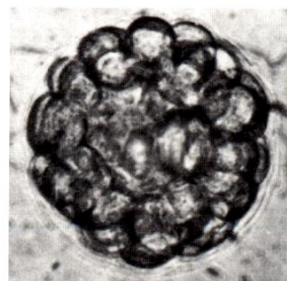
8 cellules



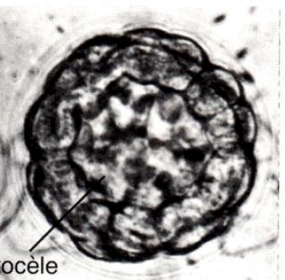
16 cellules



32 cellules

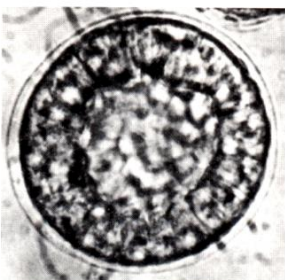


Morula

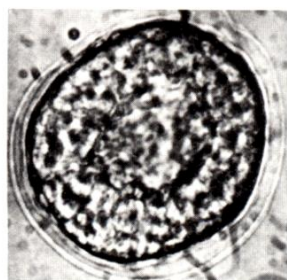


Blastocèle

Jeune blastula

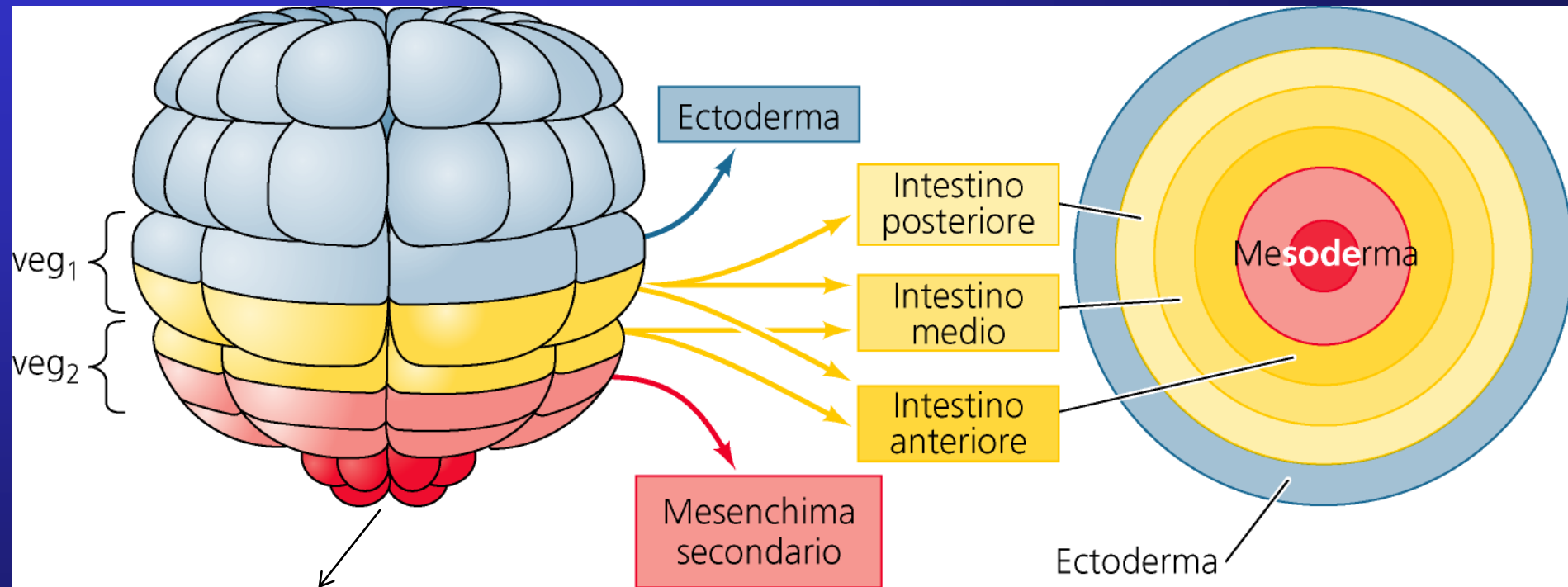


Blastula

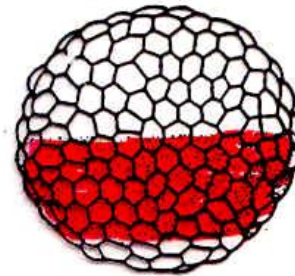
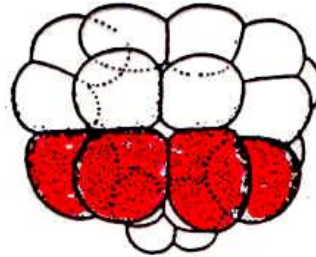
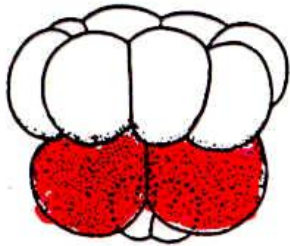
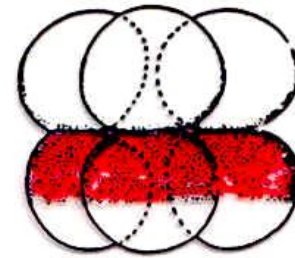
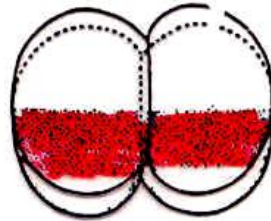
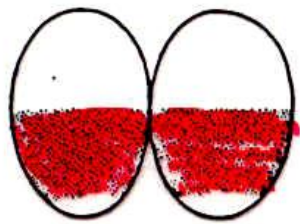


Blastula à l'éclosion

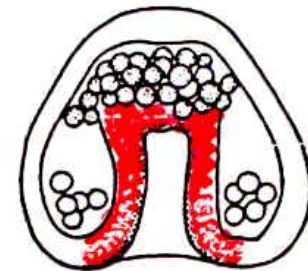
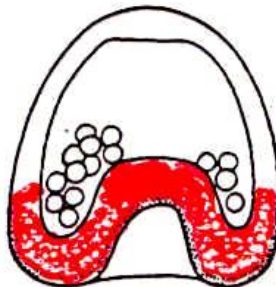
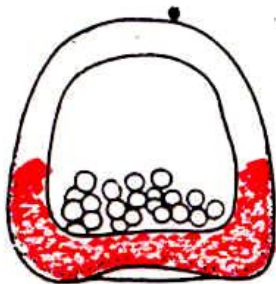
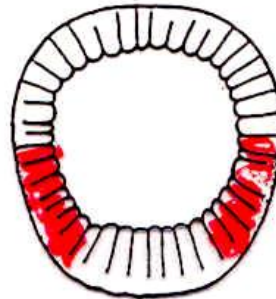
# Mappa dei territori presuntivi



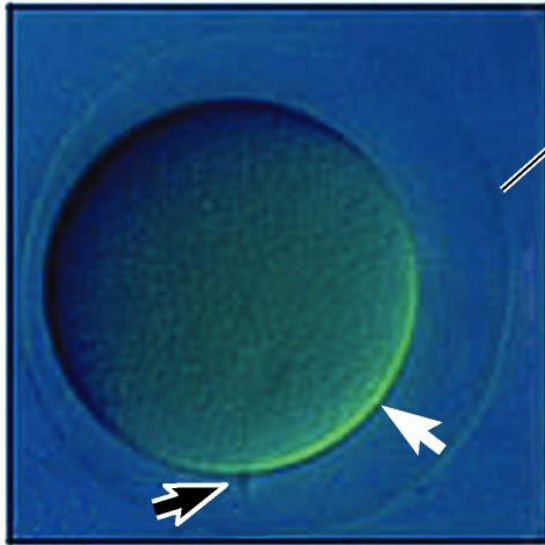
**Mesenchima primario**



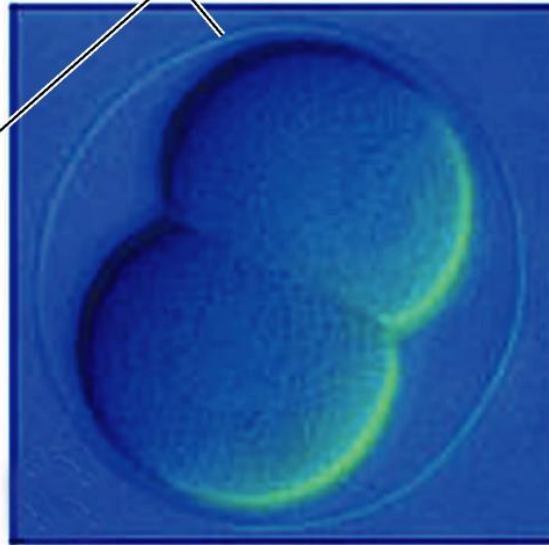
Blastula



(A)



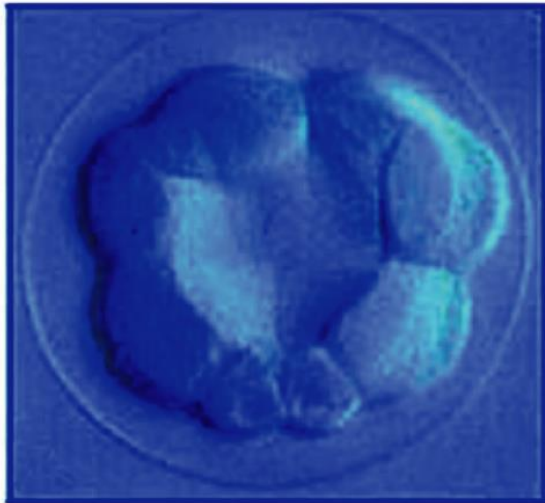
(B) Membrana di fecondazione



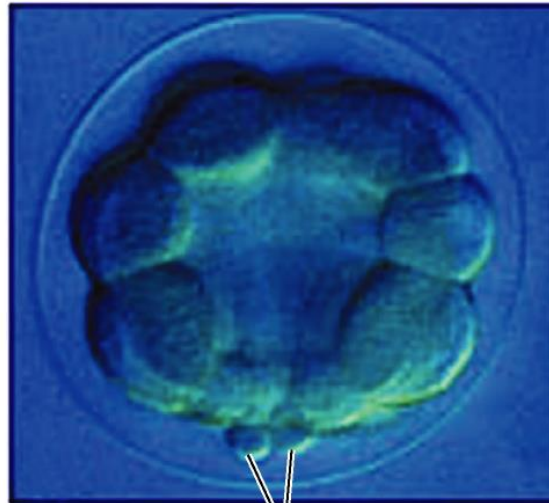
(C)



(D)

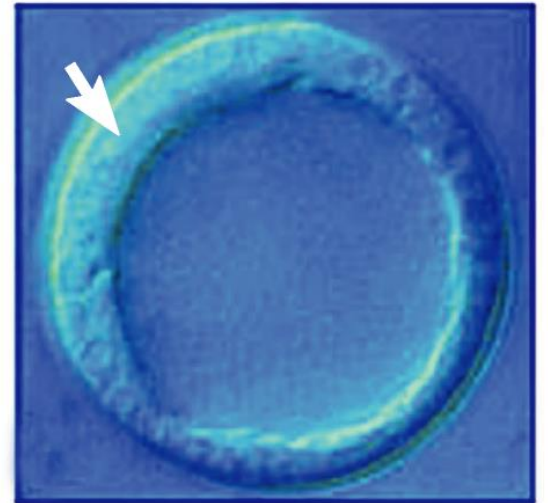


(E)

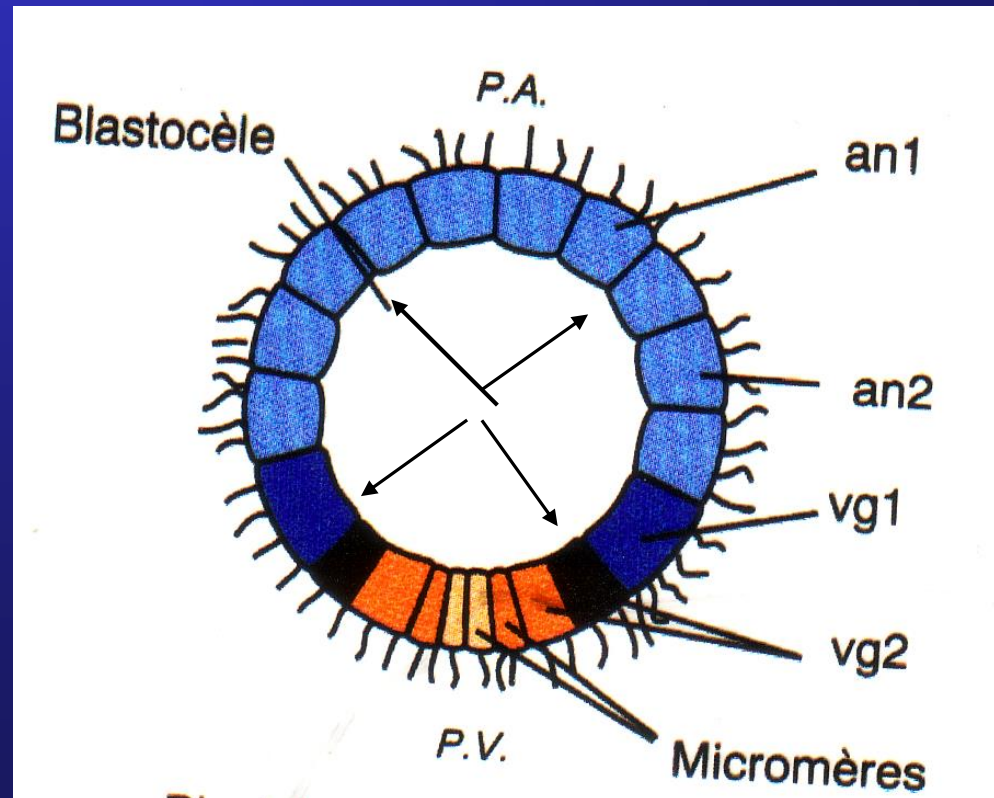


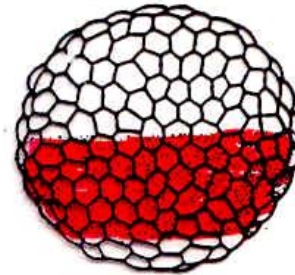
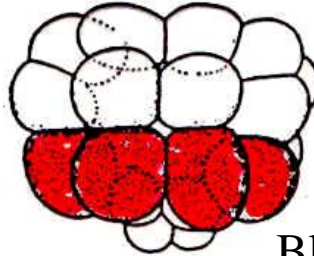
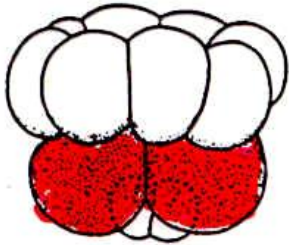
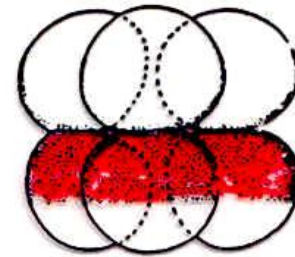
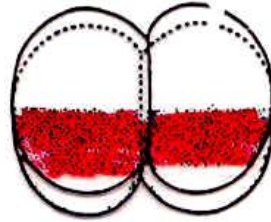
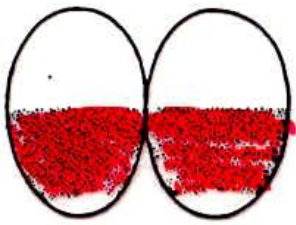
Micromeri

(F)

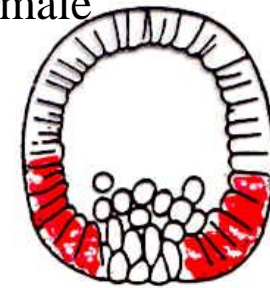
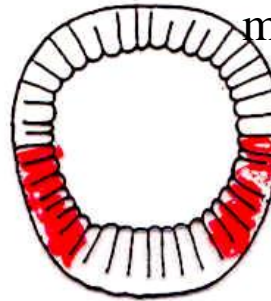


- *Formazione blastocele*
- Alta affinità tra i blastomeri
- Deposizione di proteoglicani nella cavità blastocelica, richiamo di acqua, formazione di matrice densa e viscosa
- Forza che determina il progressivo allontanamento dei blastomeri.

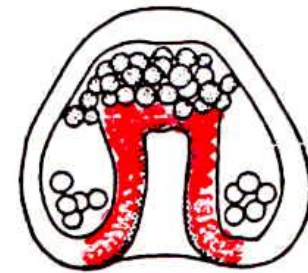
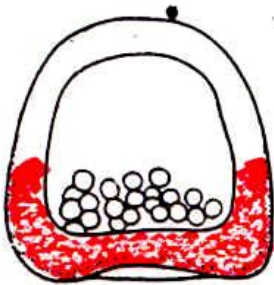




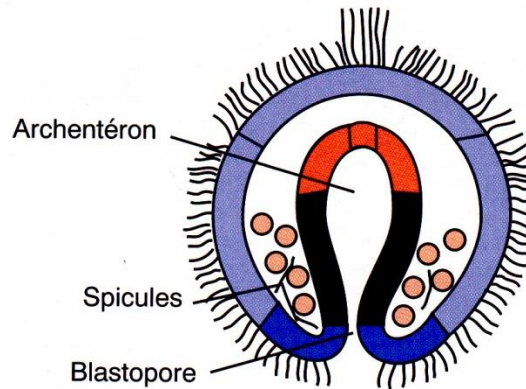
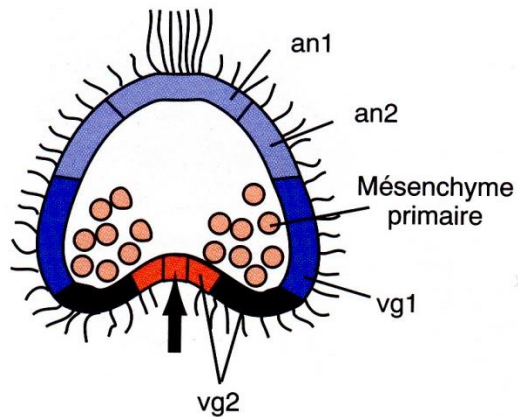
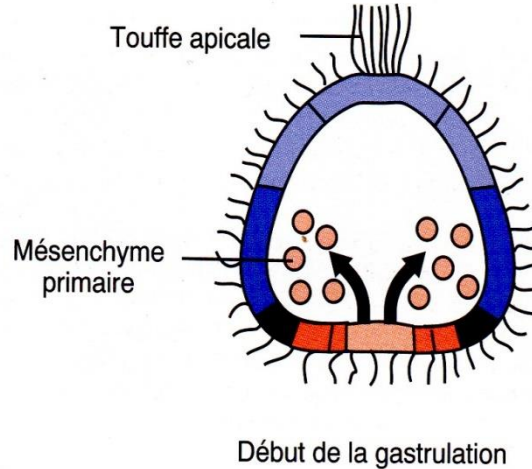
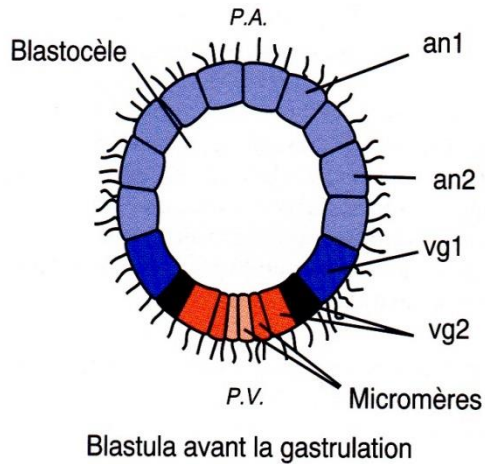
Blastula  
mesenchimale



Gastrula



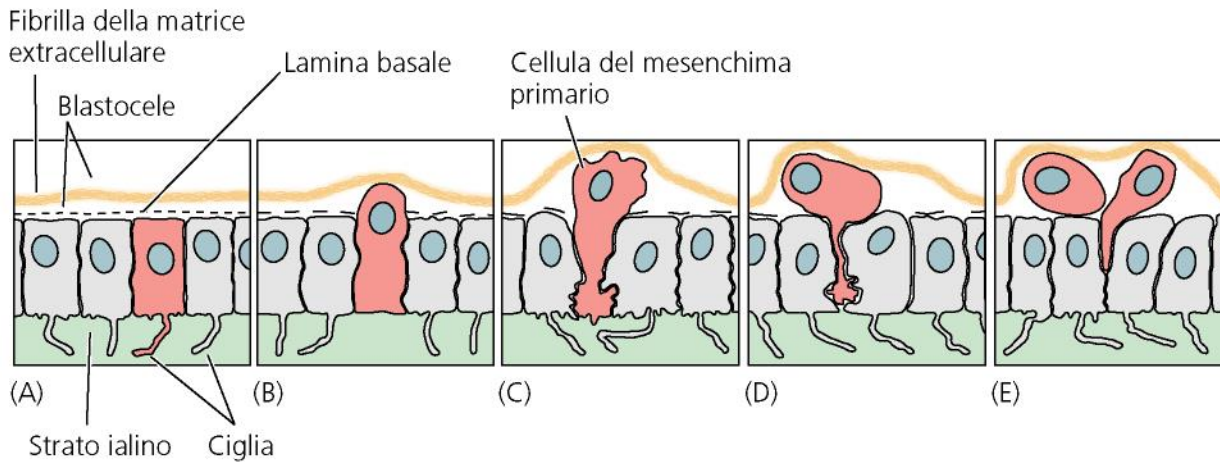
# Gastrulazione



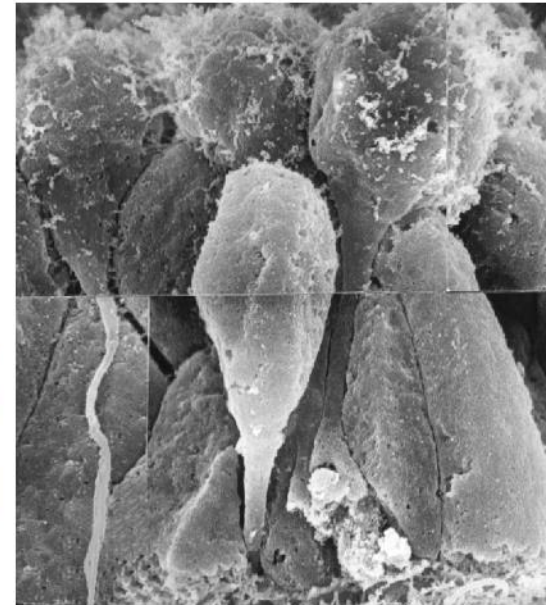
## Movimenti della gastrulazione

1. Immigrazione dei micromeri
2. Embolia del meso-endoderma
3. Epibolia ectoderma

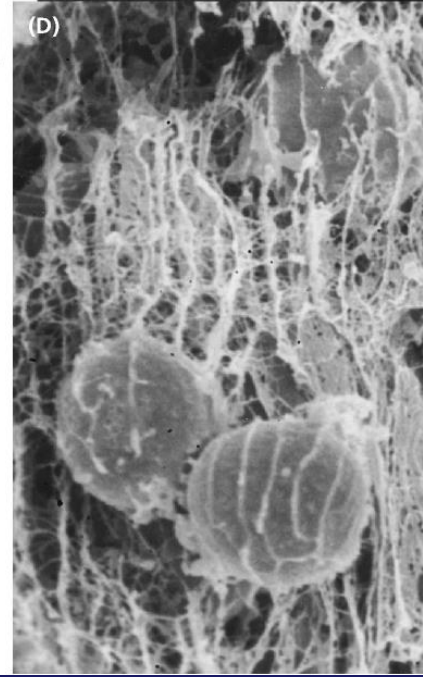
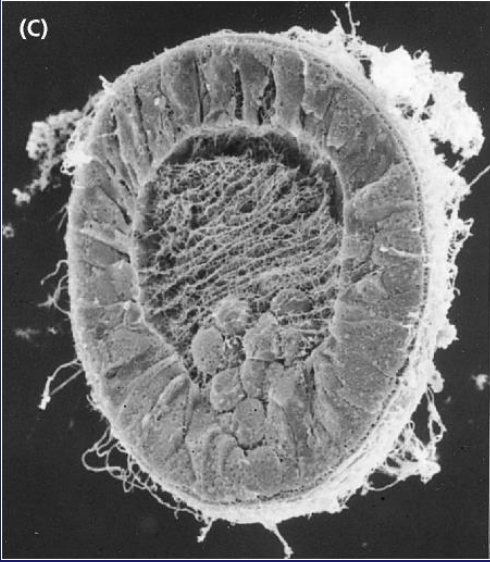
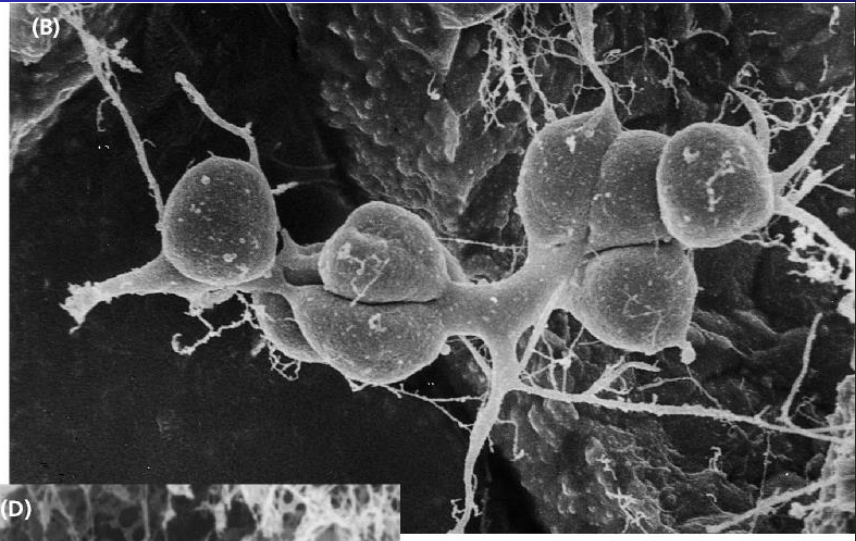
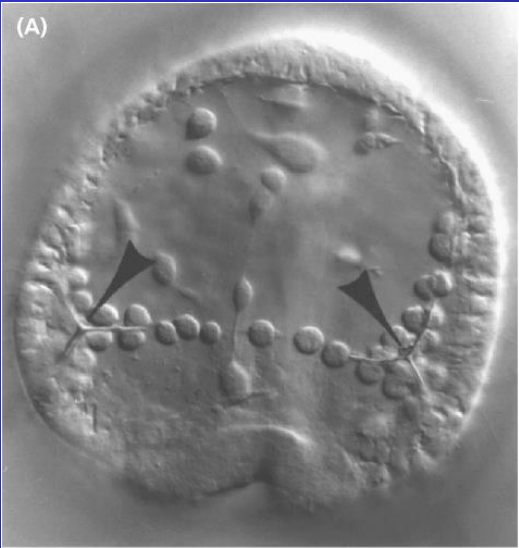
# Immigrazione

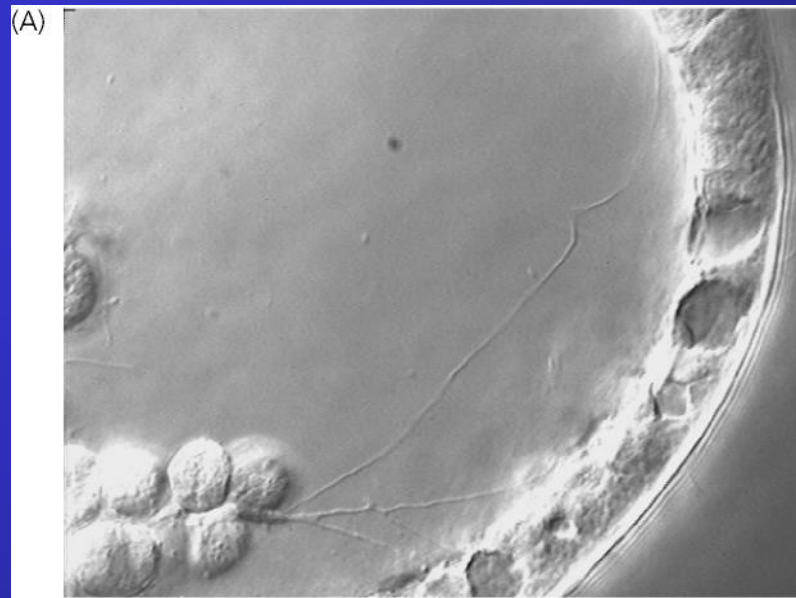


(F)



- Variata affinità tra i blastomeri
- Aumentata affinità per le proteine del blastocele

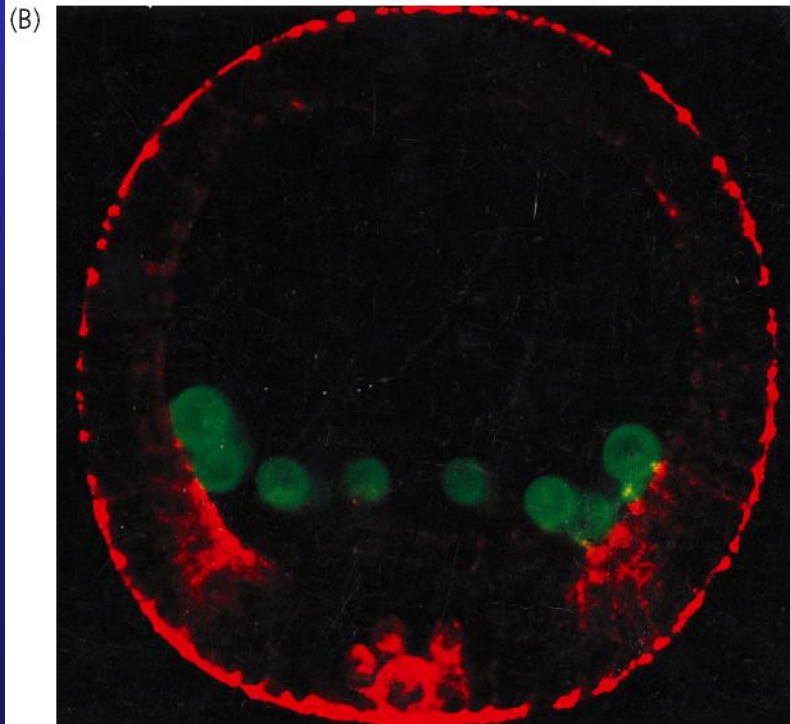


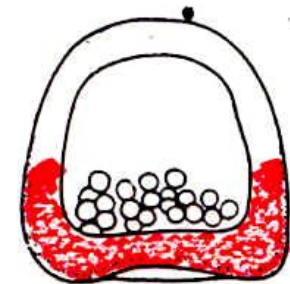
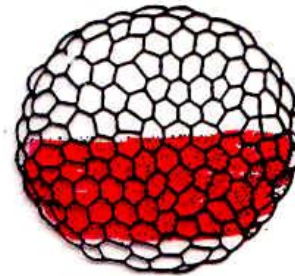
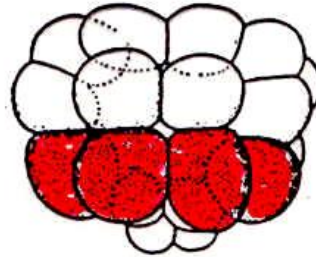
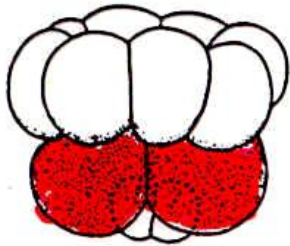
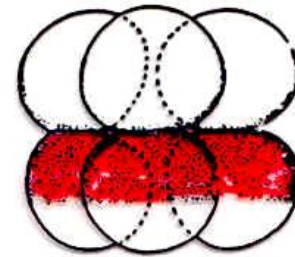
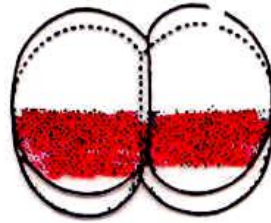
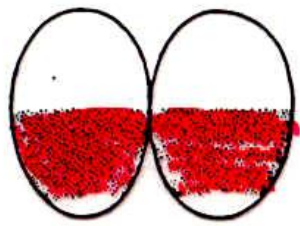


Mesenchima primario

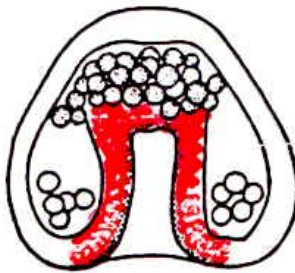
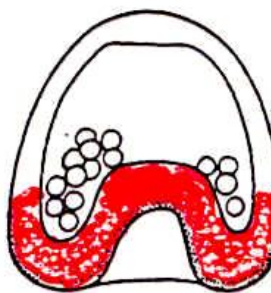


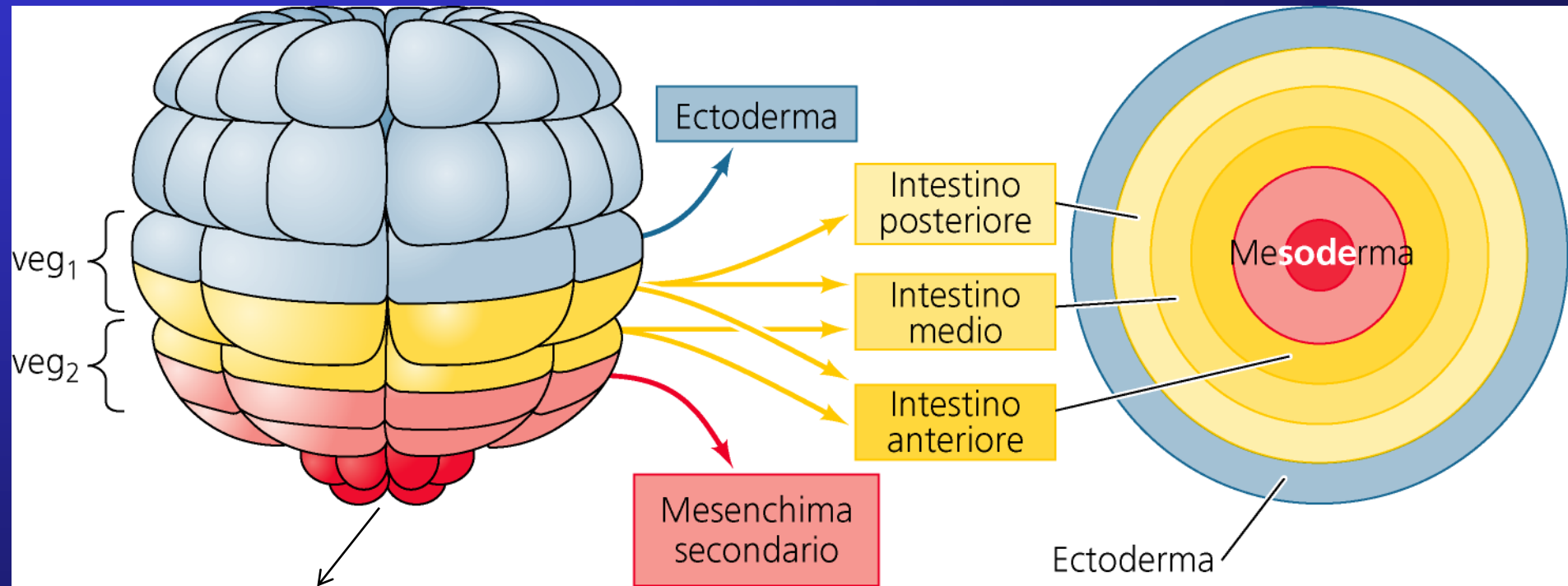
Scheletro calcareo della larva





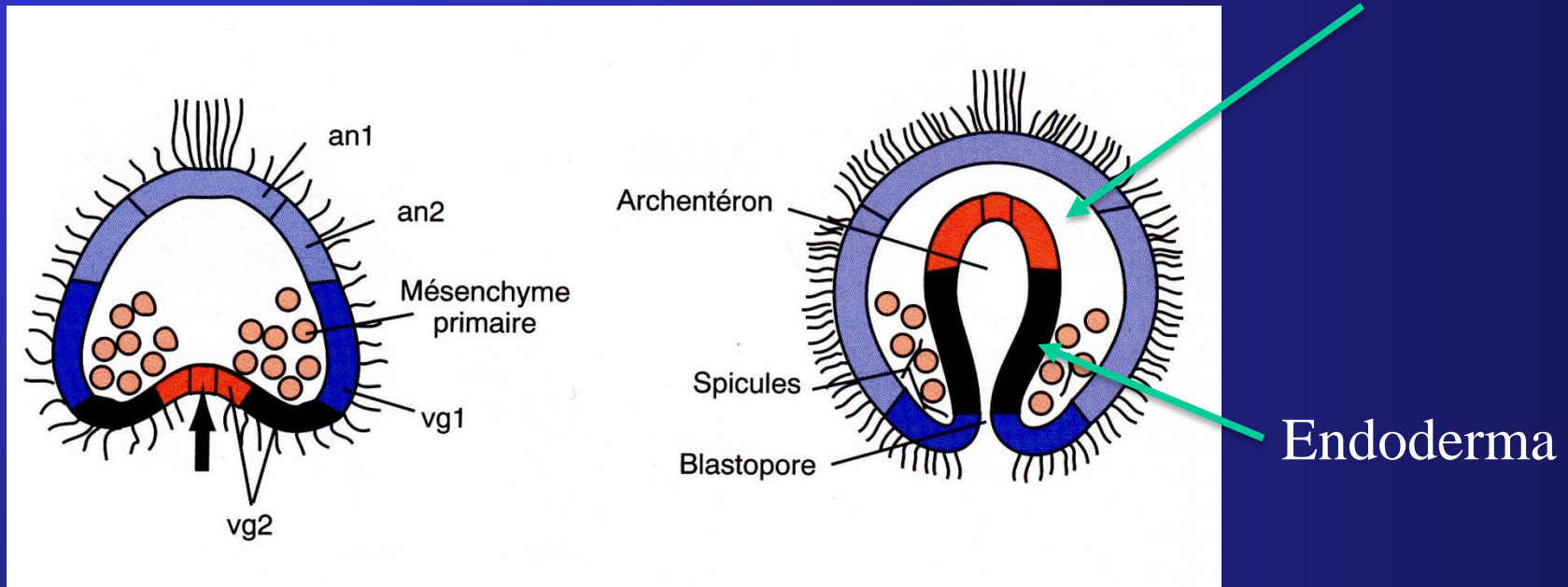
Gastrula





**Mesenchima primario**

Mesenchima secondario

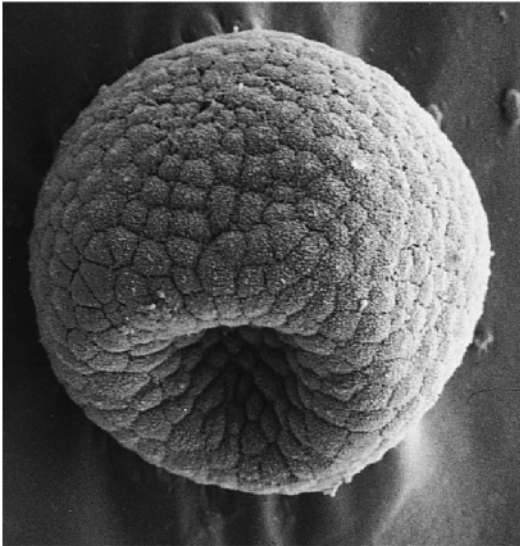


## Invaginazione delle cellule derivate dai macromeri

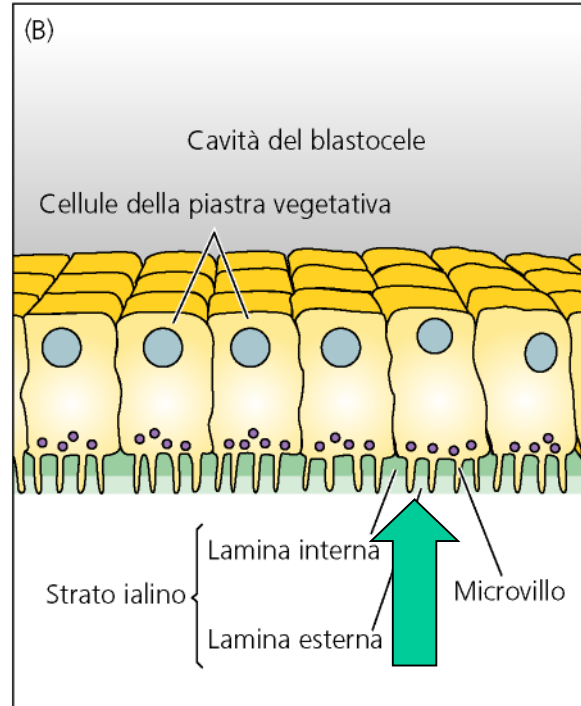
Derivate dalle veg2: mesenchima secondario e intestino anteriore

Derivate dalle veg1: Intestino medio e posteriore

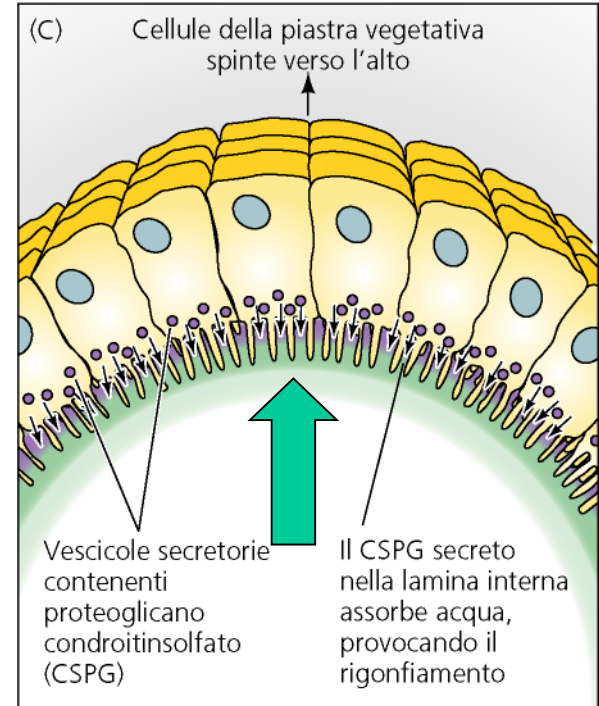
(A)



(B)

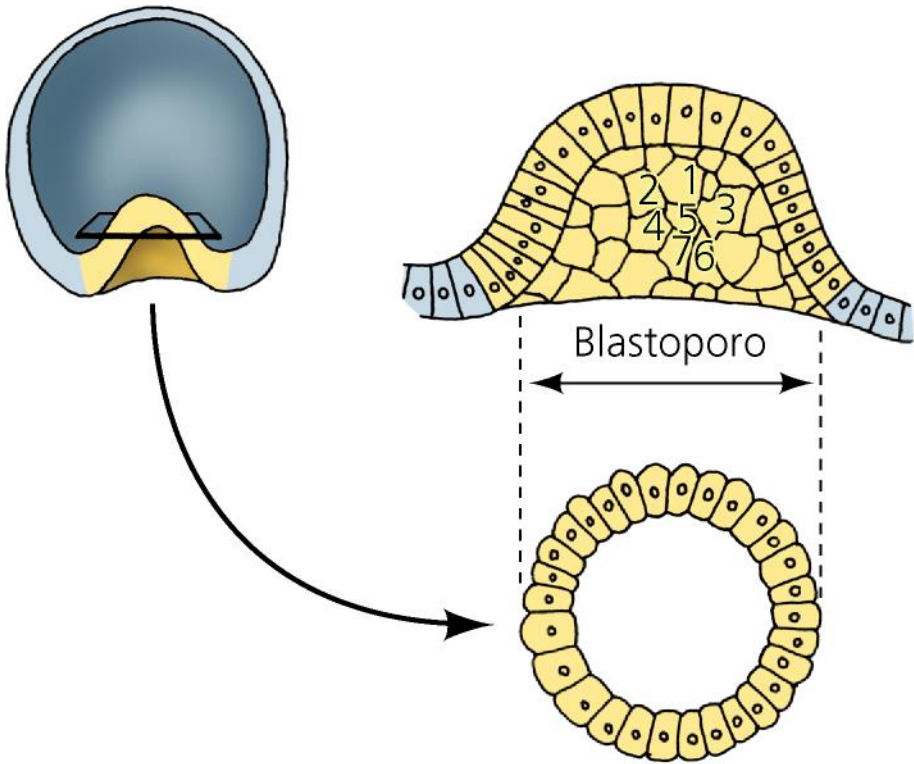


(C)

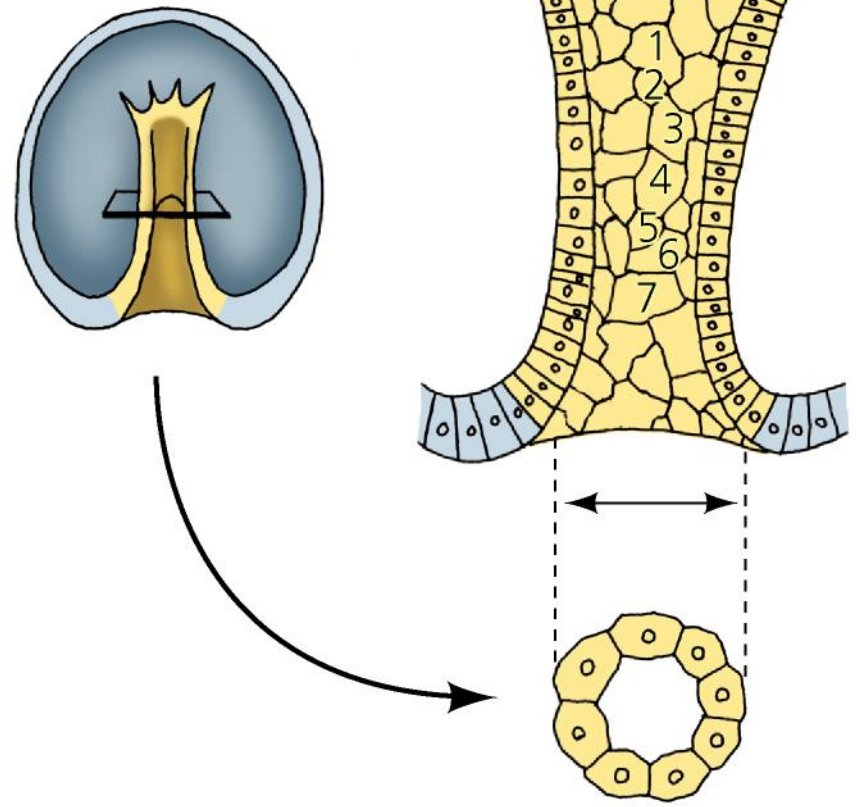


- perdita adesività dei blastomeri alla proteina ialina
- aumento adesività per proteine del blastocele
- deposizione di proteoglicani nello strato ialino
- rigonfiamento dello strato ialino

GASTRULAZIONE INIZIALE



GASTRULAZIONE AVANZATA



Formazione dell'archenteron

(A)

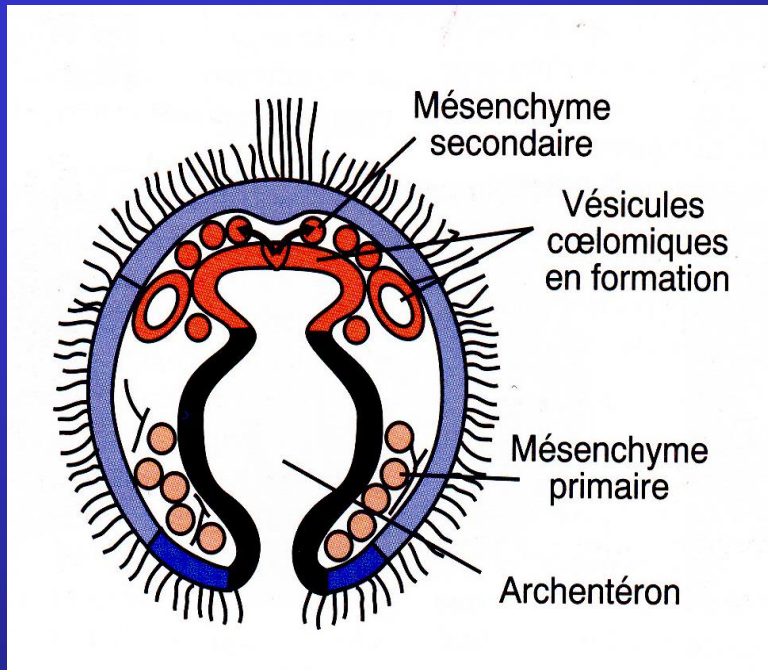


Mesenchima  
secondario

Blastoporo

(B)



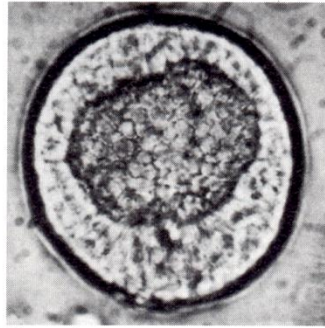


## Mesenchima secondario

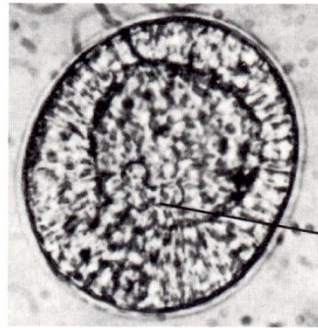


Contribuisce alla formazione del contatto tra archenteron e la regione dello stomodeo (bocca)

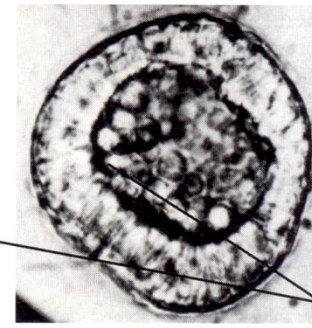
Vescicole celomatiche



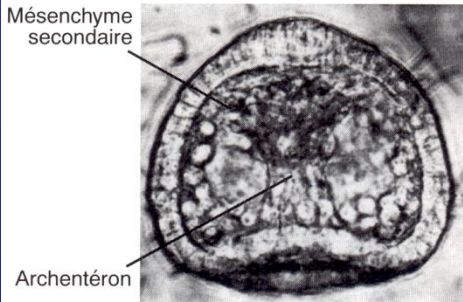
Blastula nageuse



Gastrula avec mésenchyme primaire

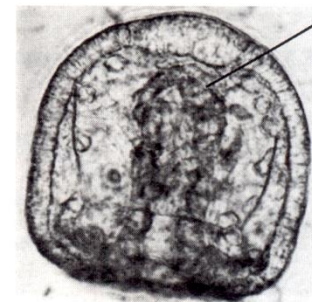
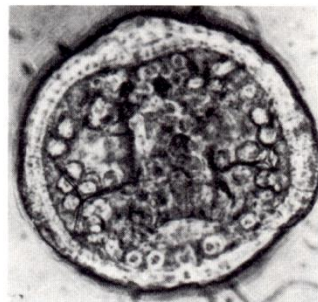


Mésenchyme primaire



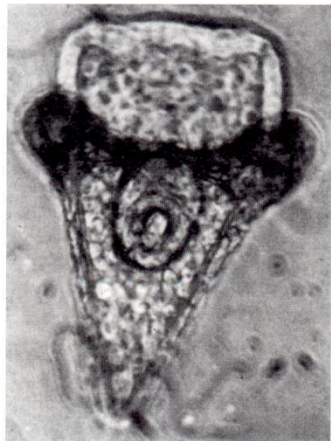
Mésenchyme secondaire

Archentéron



Vésicules cœlomiques

Gastrula avec archentéron et mésenchyme secondaire



Jeune pluteus  
vue ventrale



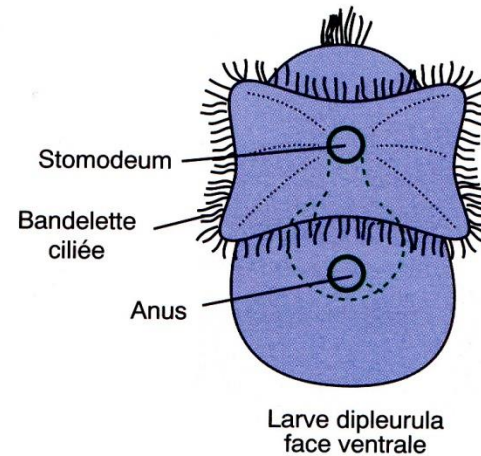
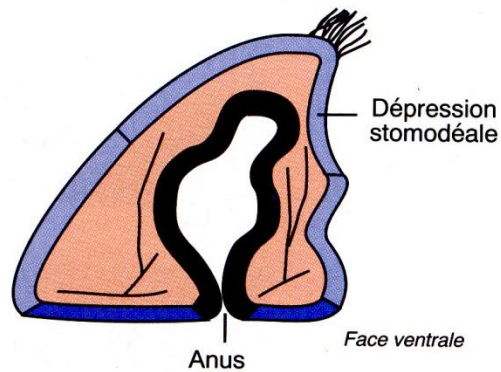
Pluteus âgées en vues ventrale et latérale



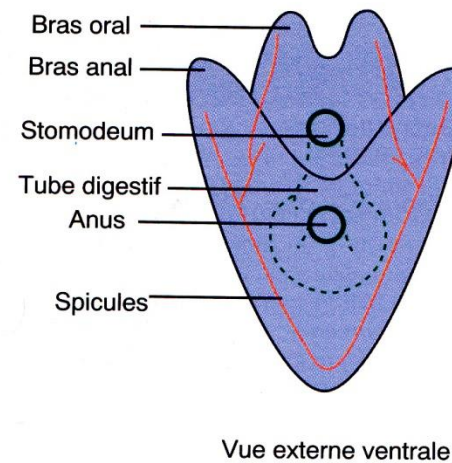
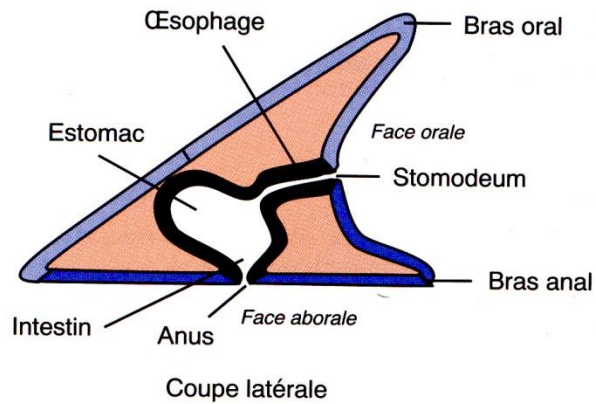
# Sviluppo indiretto

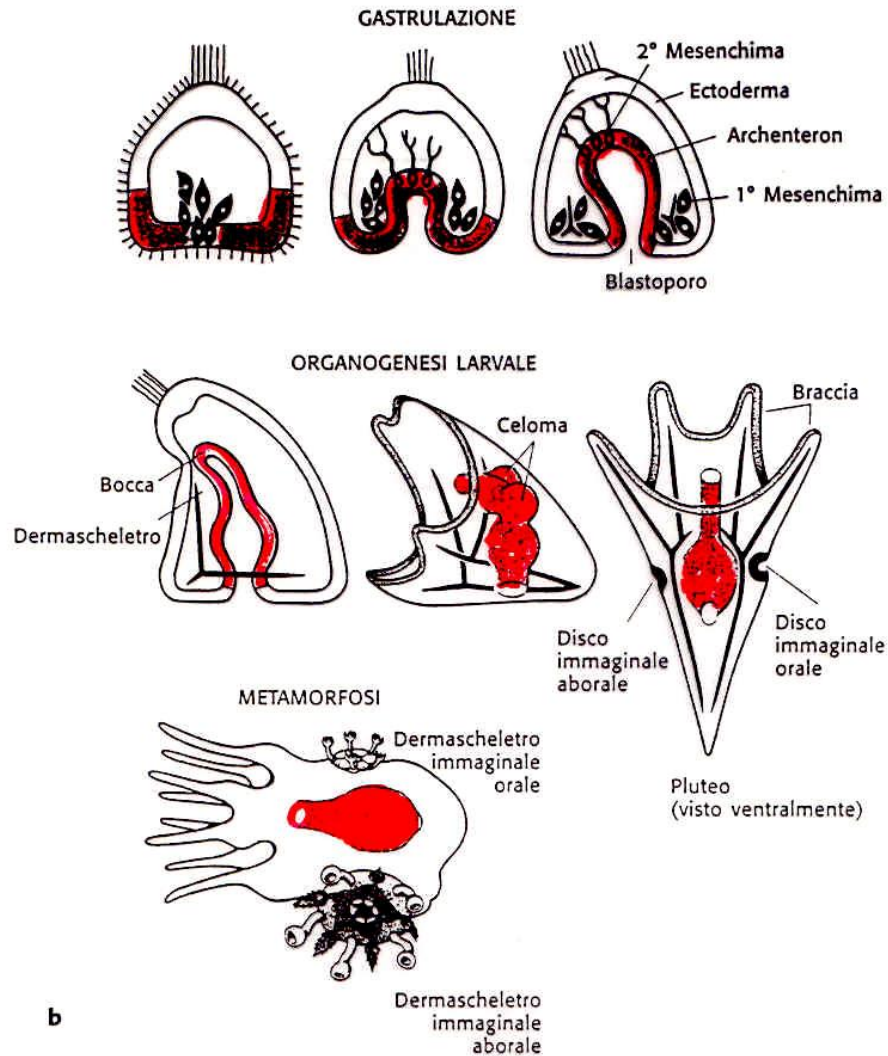
# Larva PLUTEO

Formation de la larve pluteus



Larve pluteus





Sviluppo dell'embrione di riccio di mare. Parte seconda: dalla gastrulazione all'inizio della metamorfosi. La gastrulazione avviene in diverse fasi e produce la cavità interna con cellule dalle quali si originano gli organi interni. La larva risultante è chiamata pluteo. È rappresentato uno solo degli stadi che partono dalla metamorfosi della larva, a simmetria bilaterale, per arrivare al riccio di mare adulto, a simmetria pentaraggiata.

