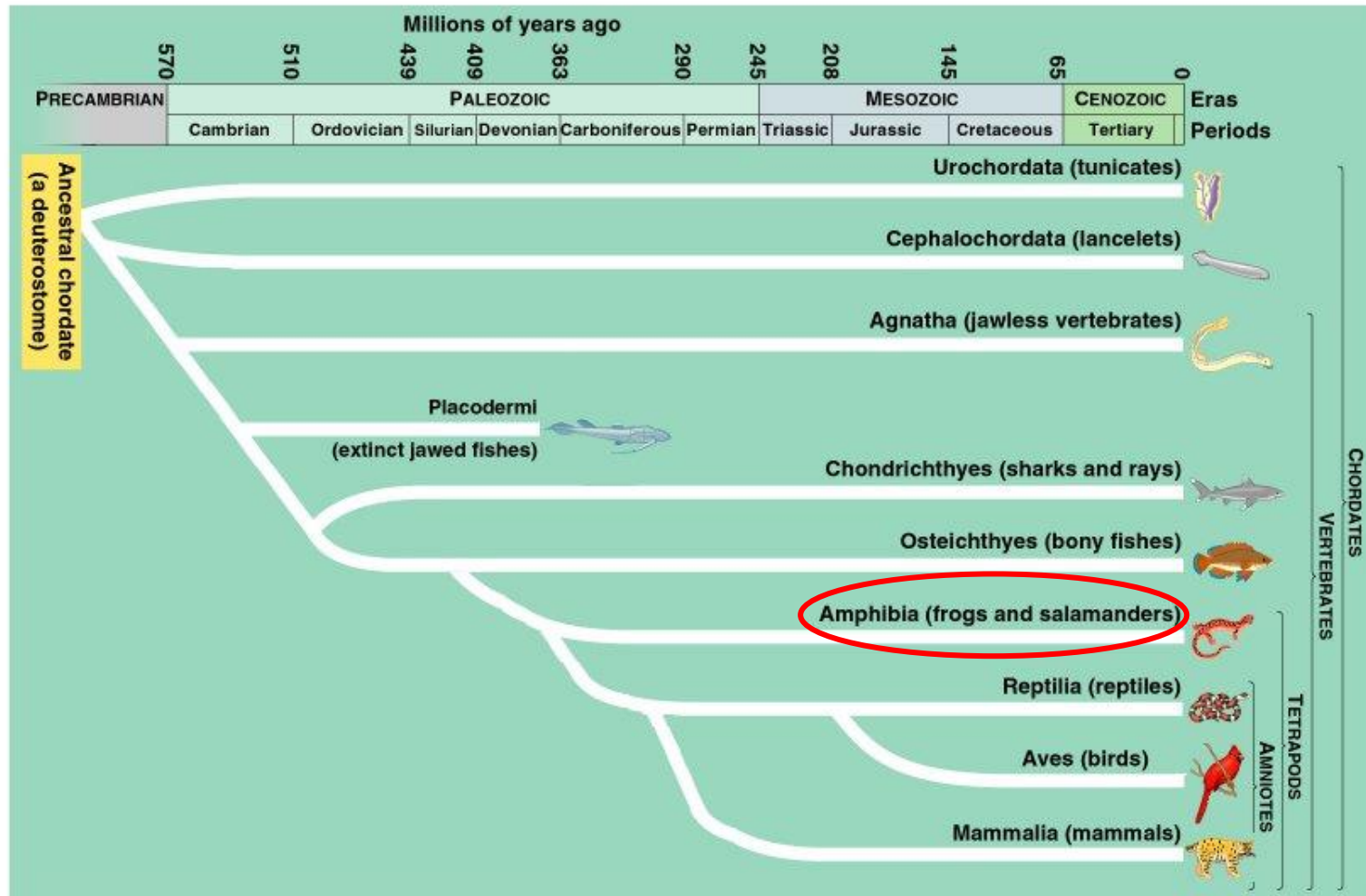
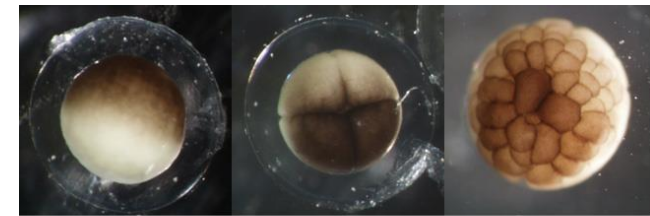
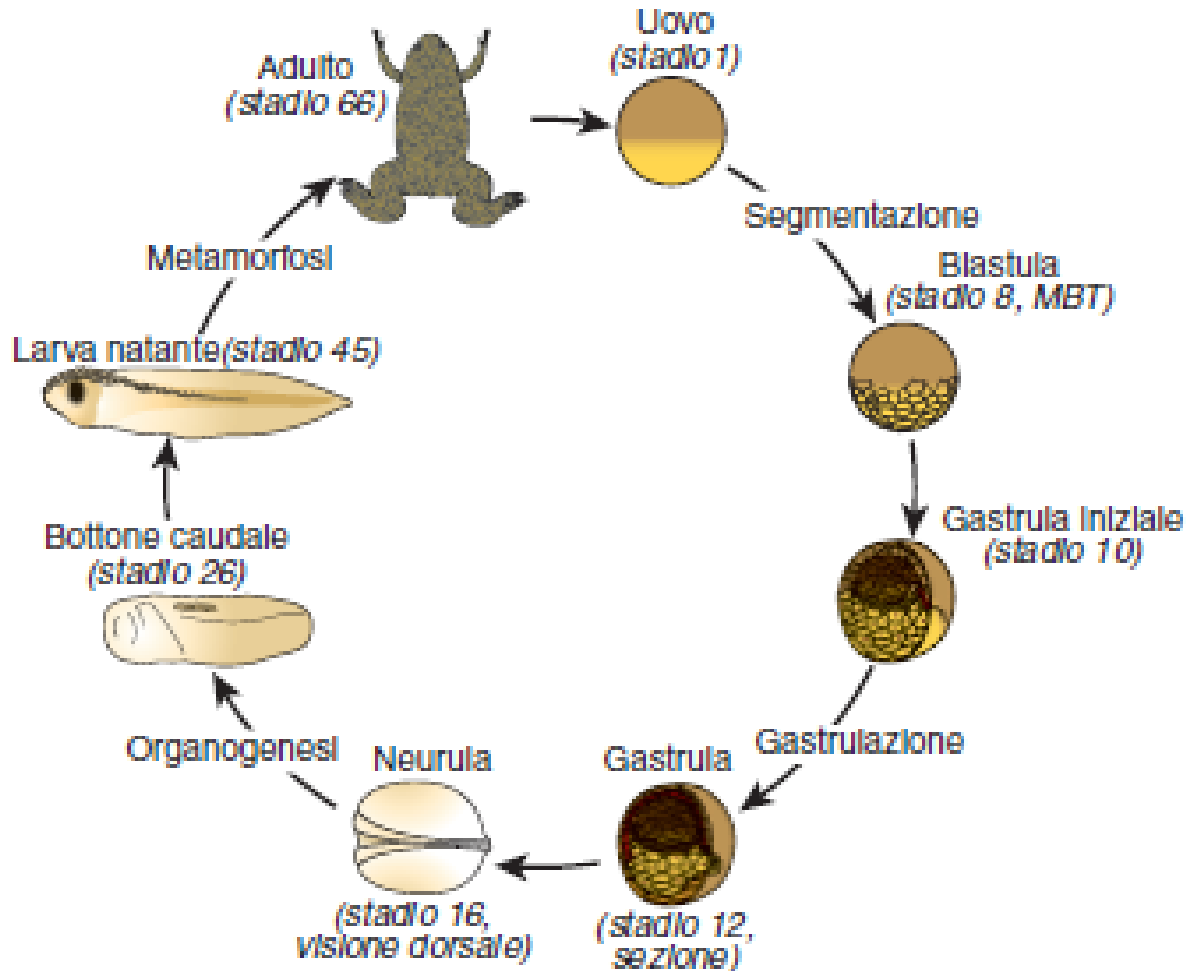


FILOGENESI DEI CORDATI



XENOPUS LAEVIS: ANFIBIO ANURO

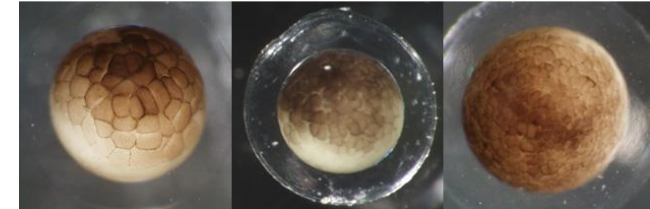
SVILUPPO INDIRETTO



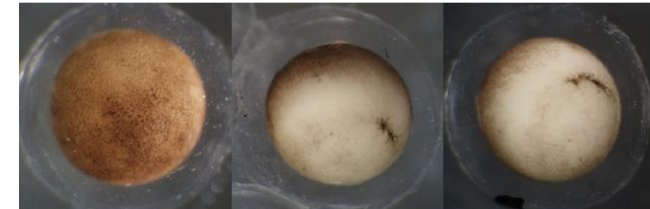
Stage 1

Stage 4 (8 cells)

Stage 7 (Morula)



Stage 8 (Blastula)



Stage 9

Stage 10 (Gastrulation begins)

Stage 10+



Stage 11 (Gastrula)

Stage 11

Stage 12



Stage 15 (Neurula)

Stage 24 (dorsal)

Stage 24 (lateral)



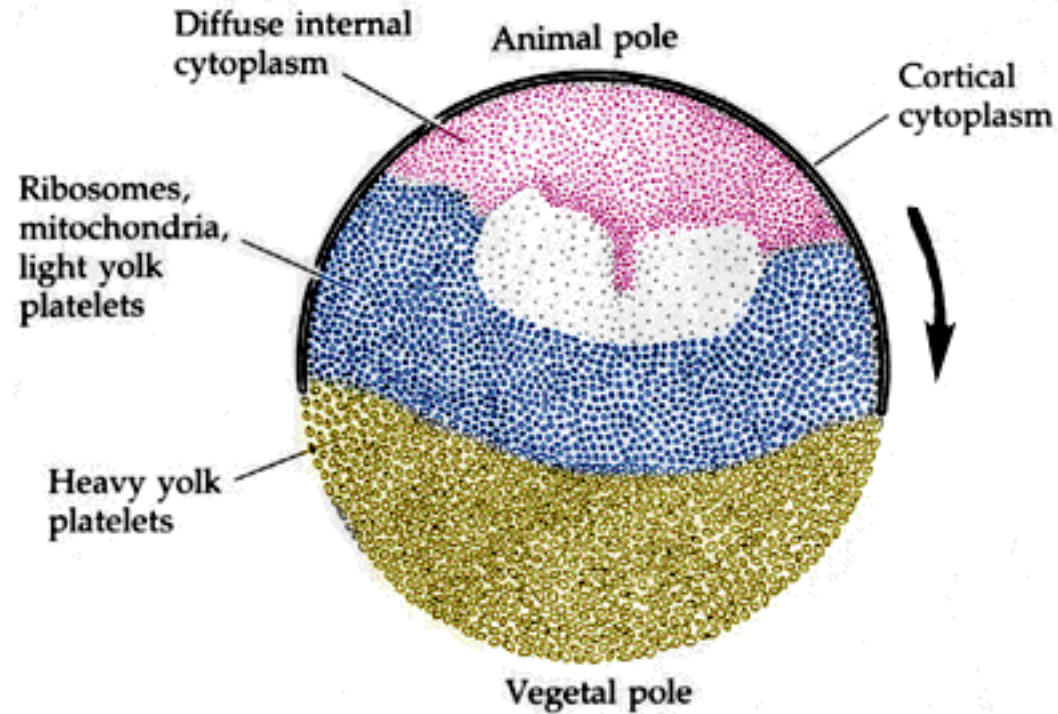
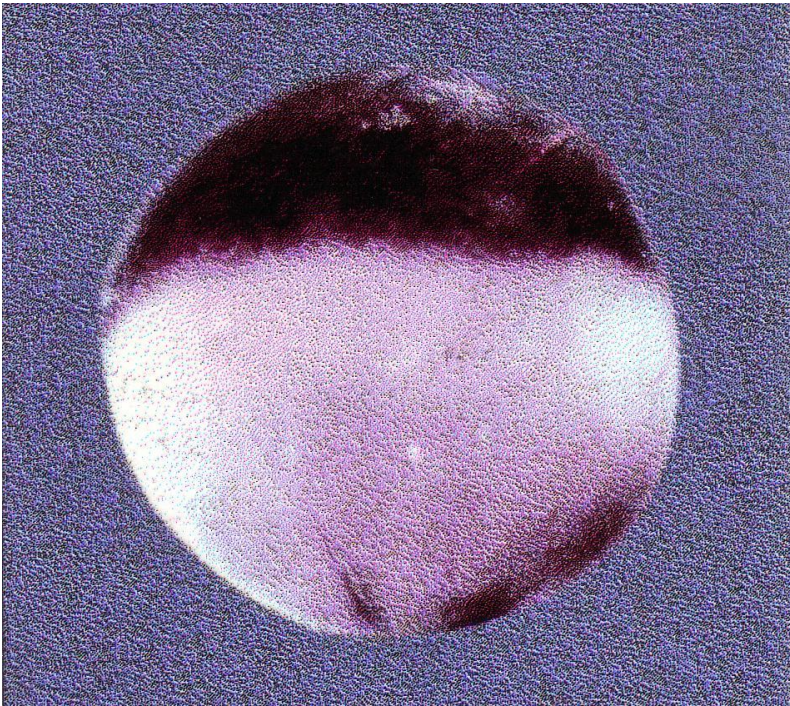
Stage 32

Stage 36

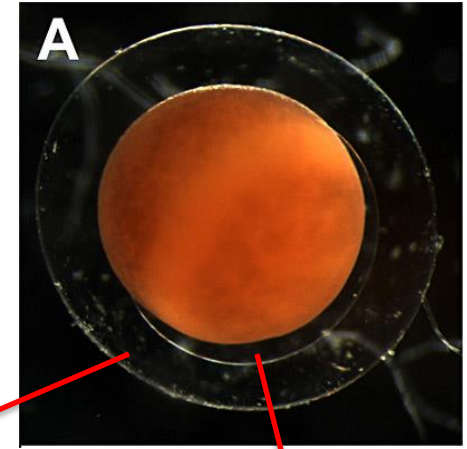
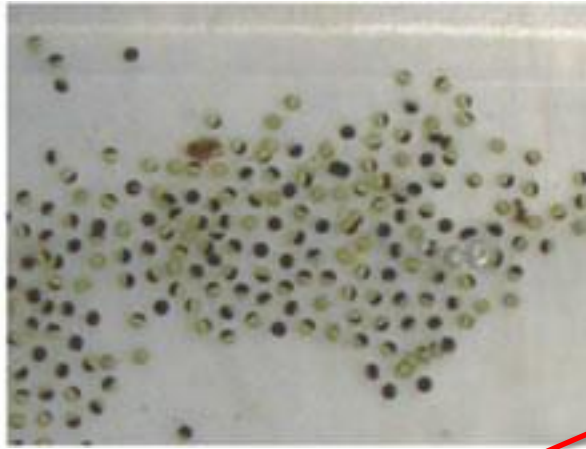
Stage 40

Uovo mesolecitico

Il vitello e' maggiormente concentrato al polo vegetativo
Il citoplasma corticale animale e' ricco di melanina

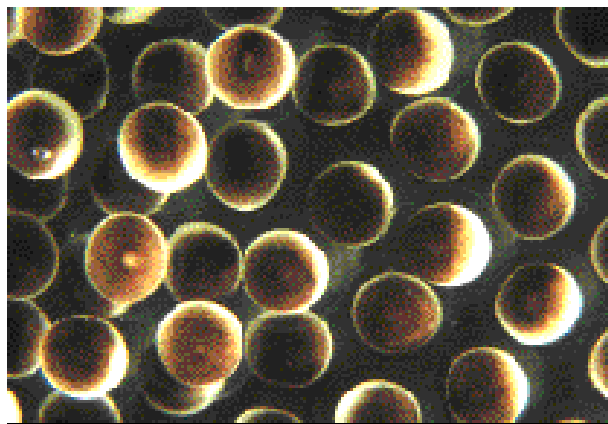
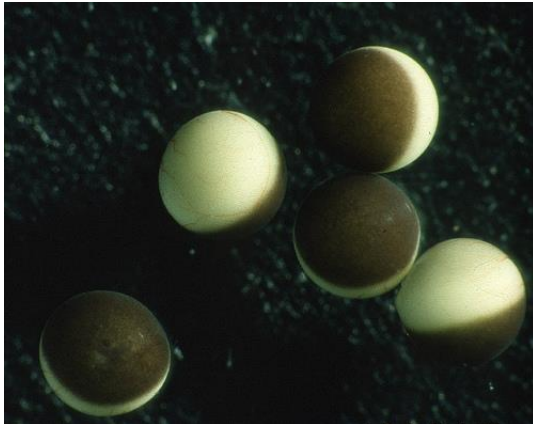


FECONDAZIONE E SVILUPPO AVVENGONO ESTERNAMENTE

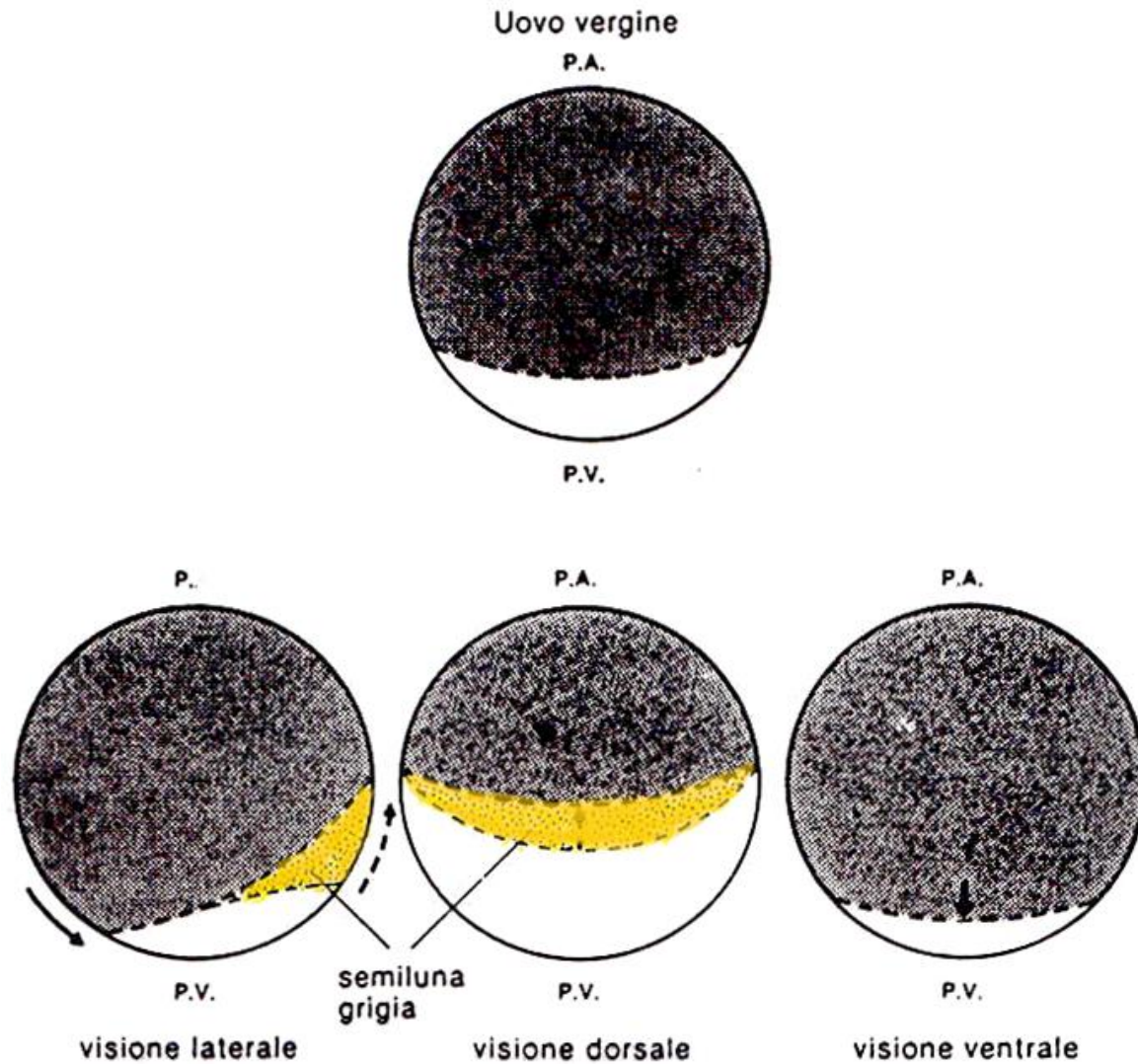


INVOLUCRO GELATINOSO

INVOLUCRO VITELLINO



ROTAZIONE CORTICALE



LA FECONDAZIONE ATTIVA LA ROTAZIONE CORTICALE

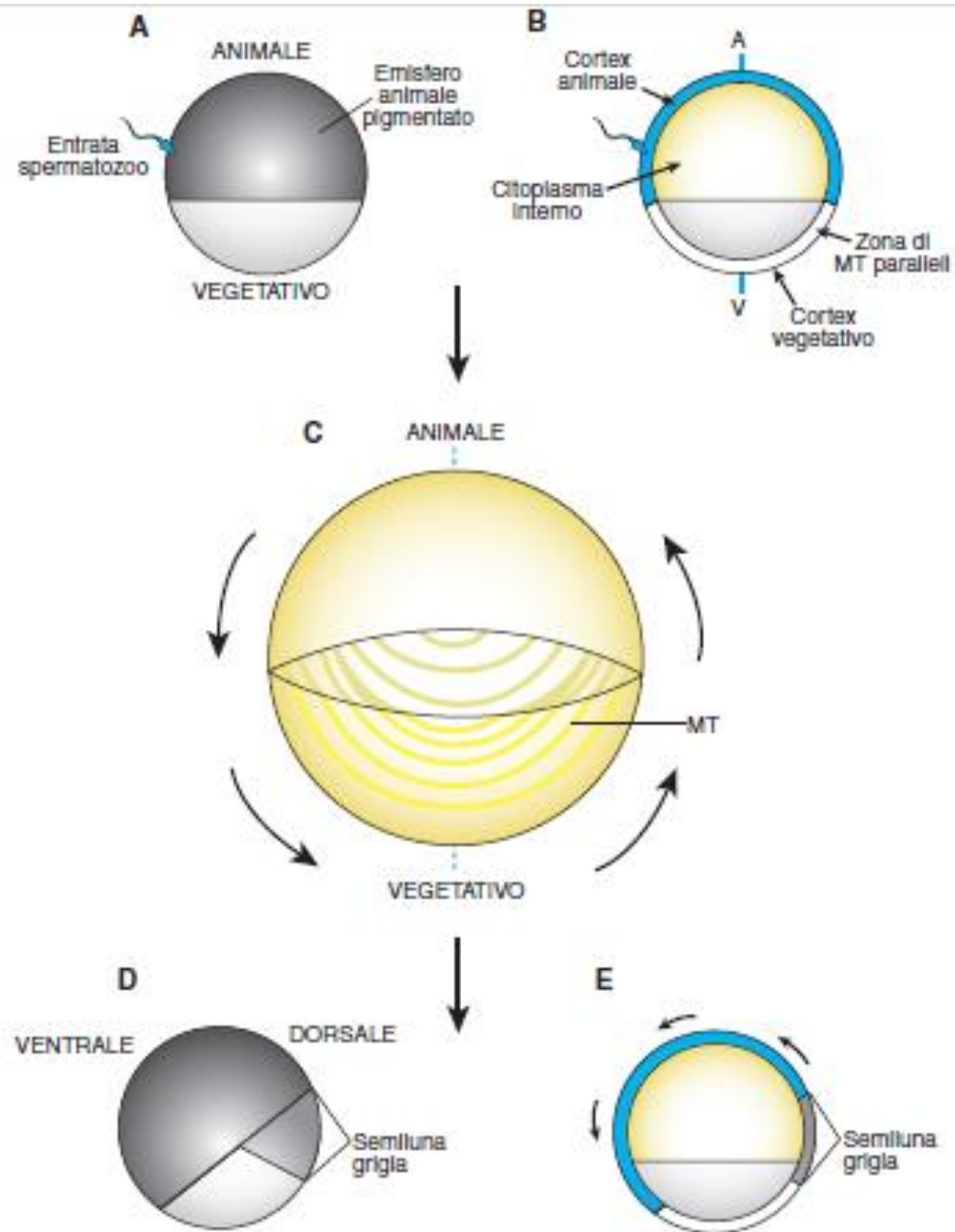
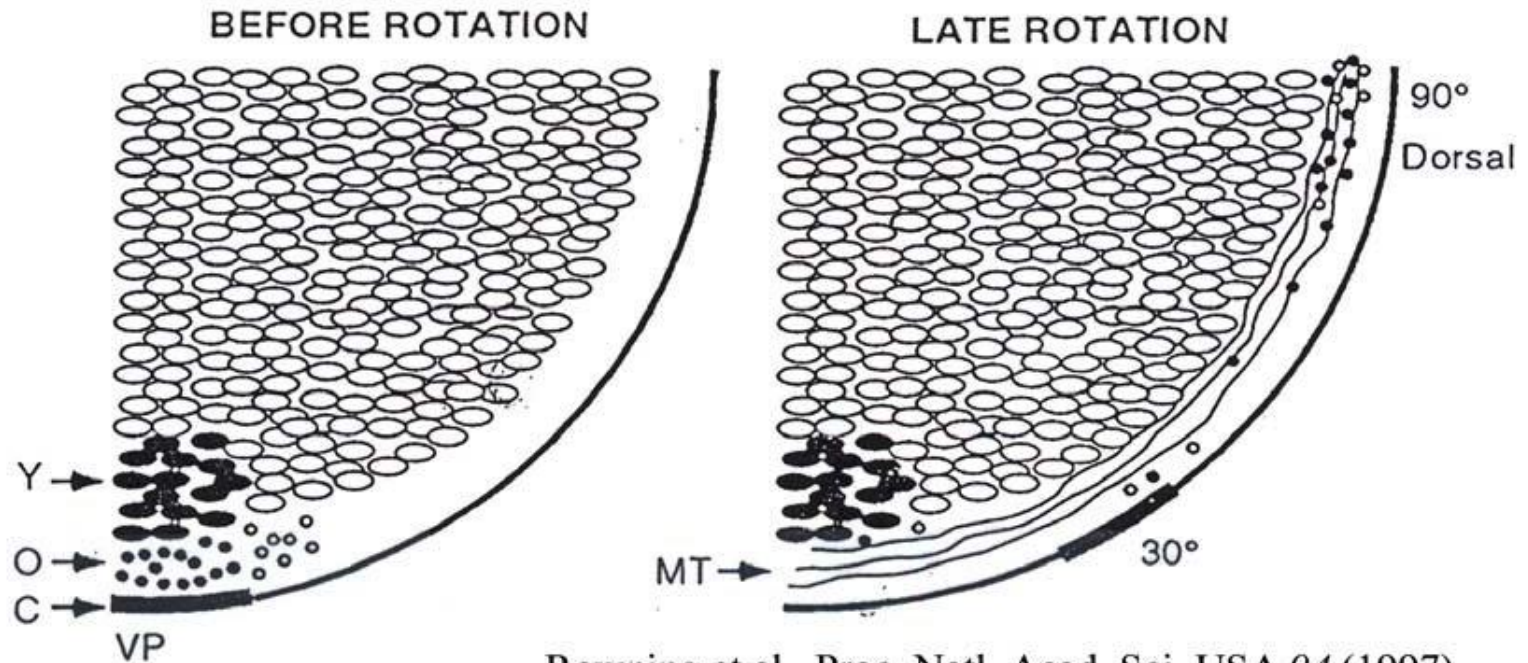


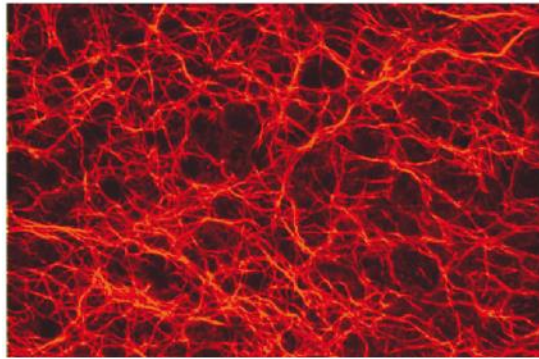
Figura 1

LA ROTAZIONE CORTICALE AVVIENE MEDIANTE UNA RIORGANIZZAZIONE DEI MICROTUBULI

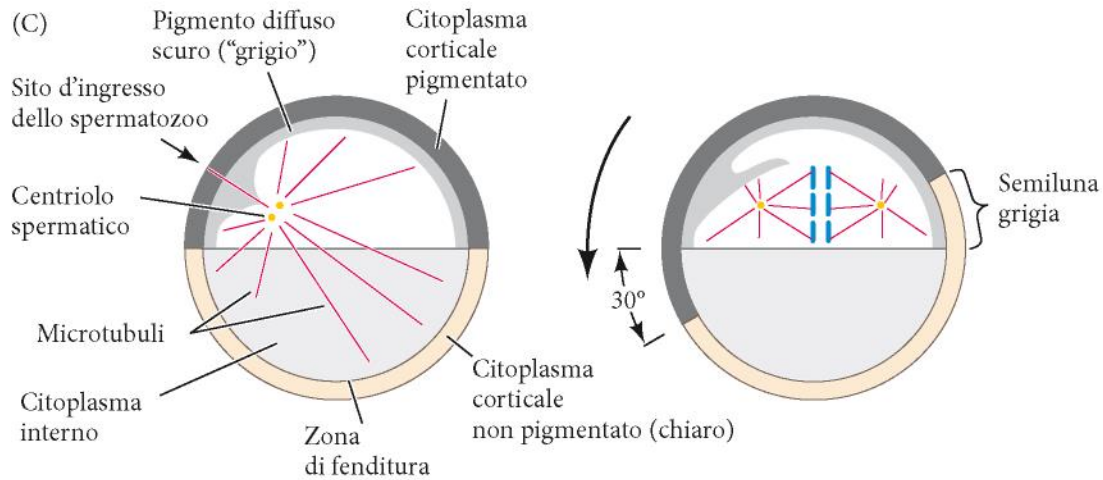
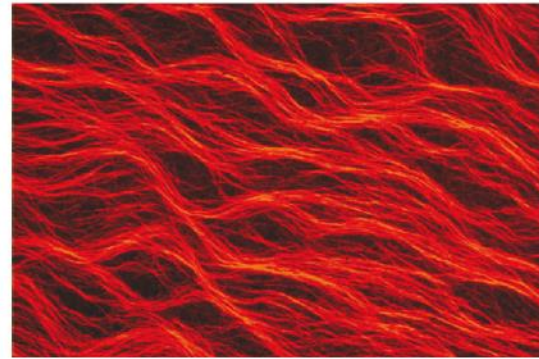


Rowning et al., Proc. Natl. Acad. Sci. USA 94 (1997)

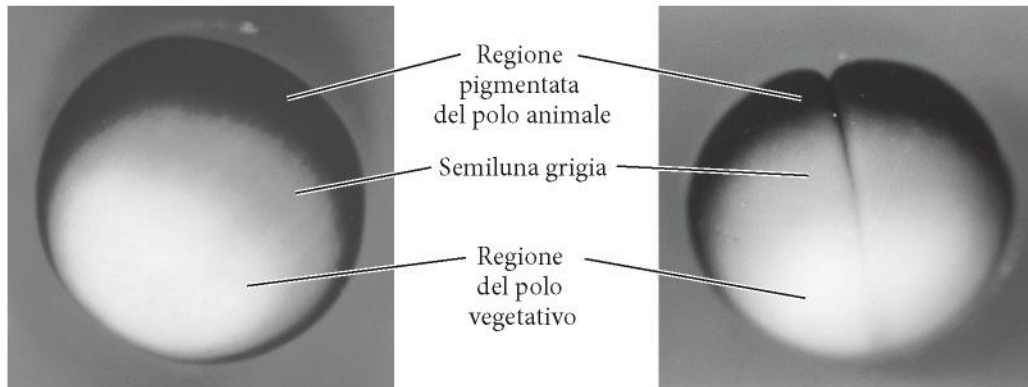
(A) 0,50



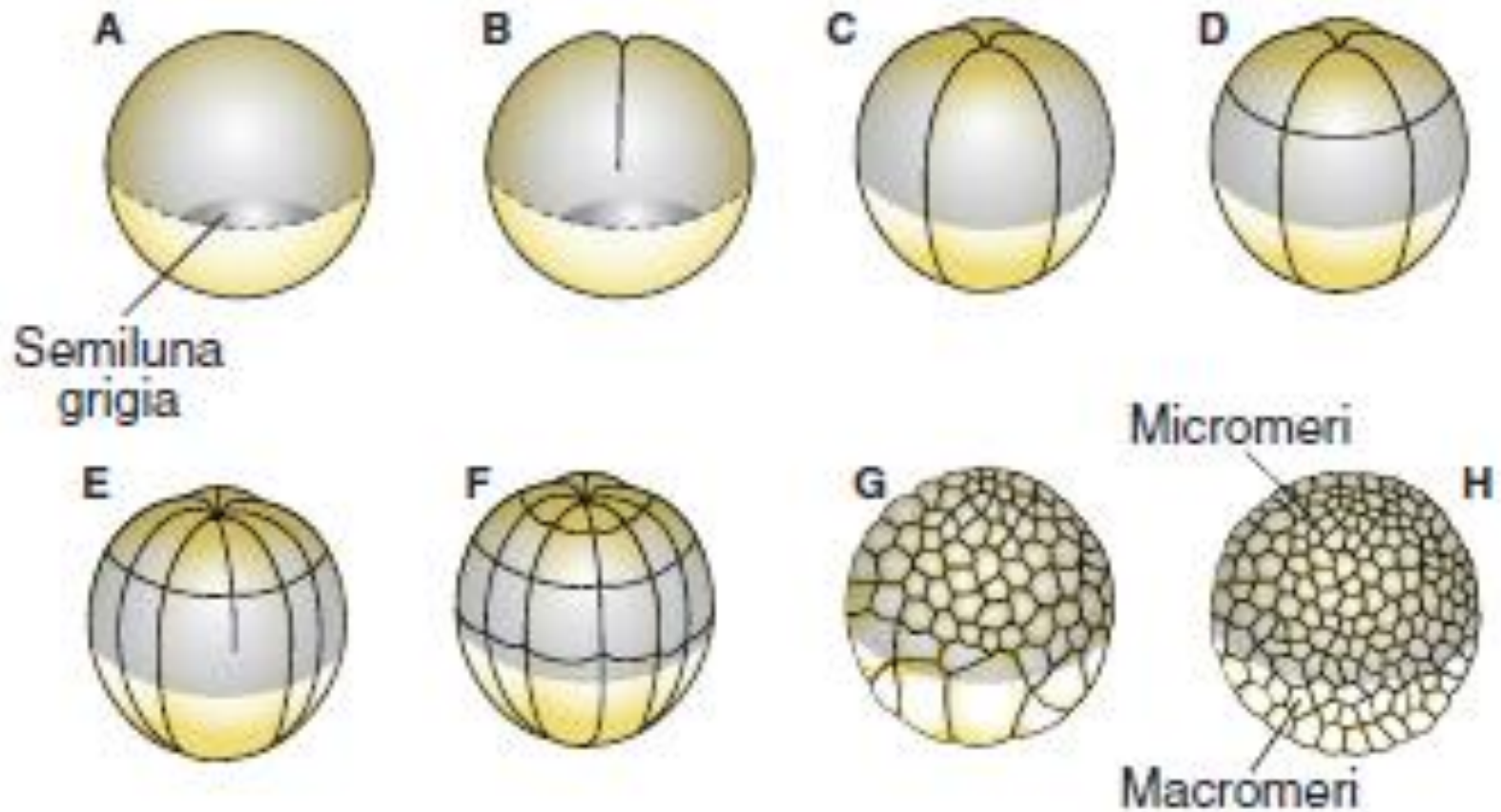
(B) 0,70



(D)

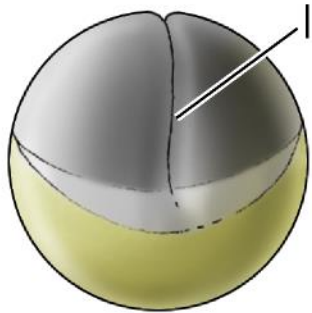


SEGMENTAZIONE OLOBLASTICA RADIALE INEGUALE

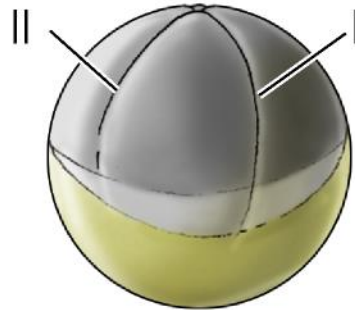


SEGMENTAZIONE OLOBLASTICA RADIALE INEGUALE

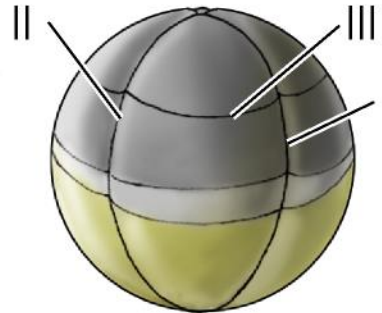
(A)



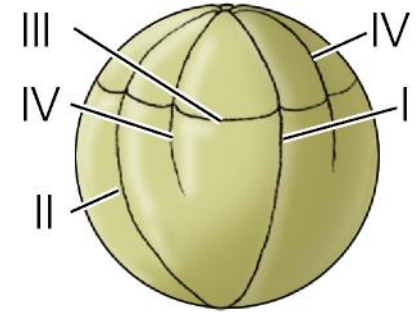
(B)



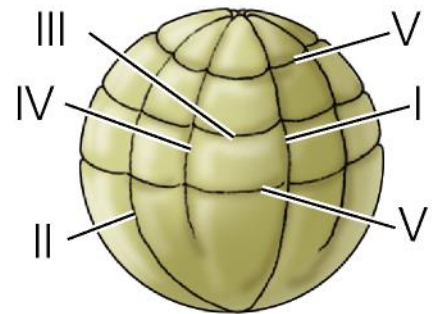
(C)



(D)



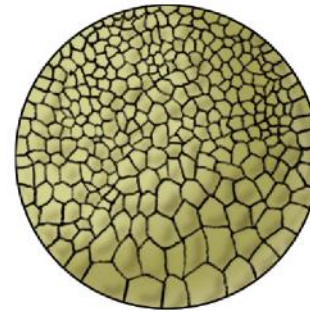
(E)



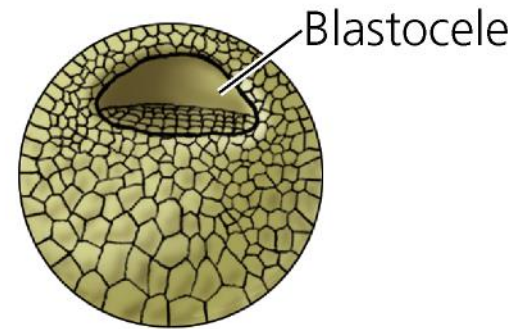
(F)



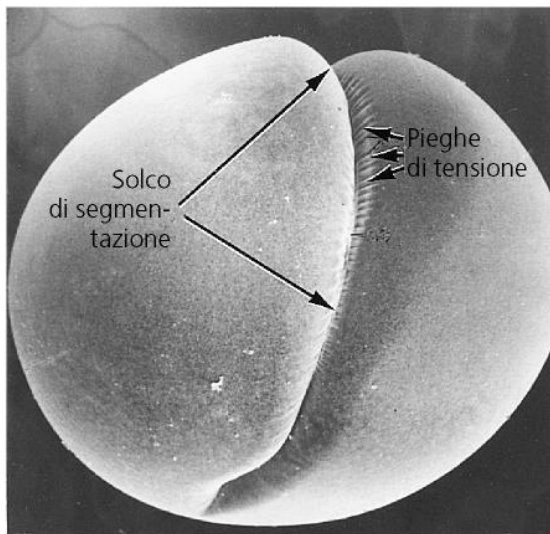
(G)



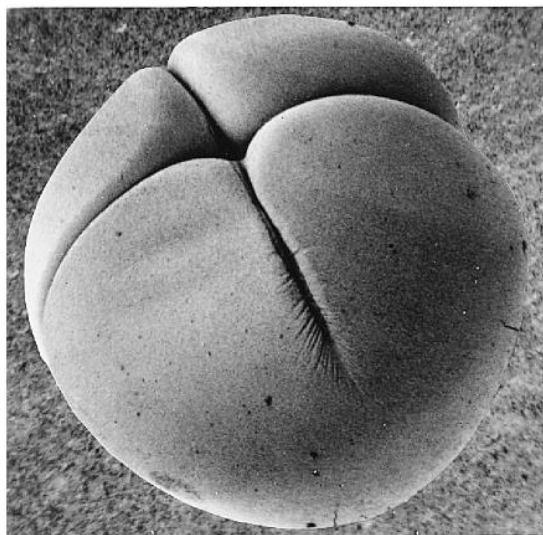
(H)



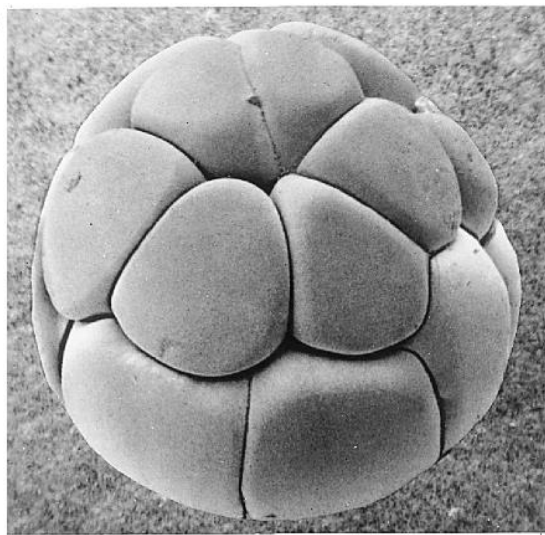
(A)



(B)

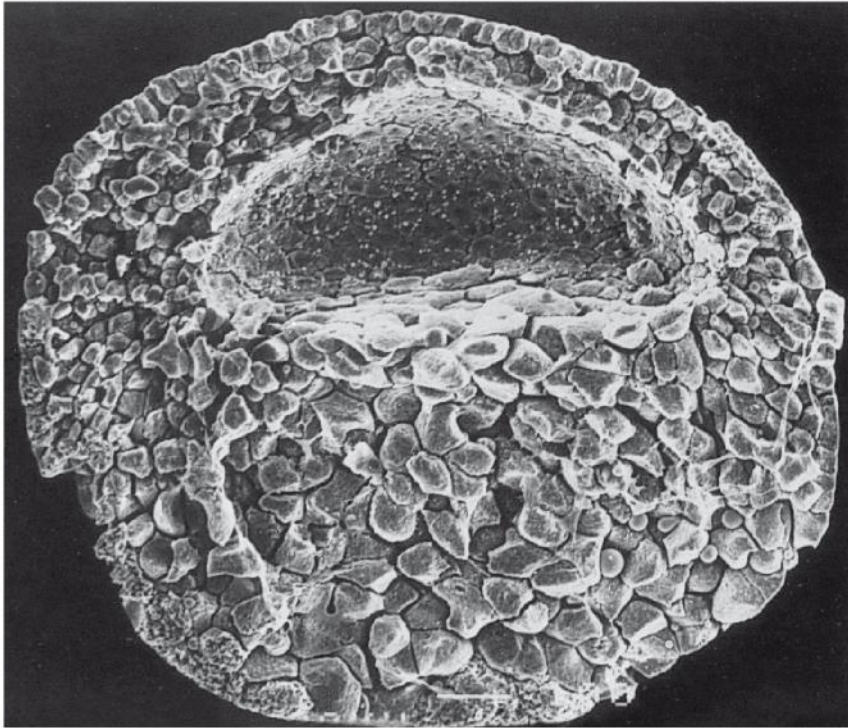


(C)

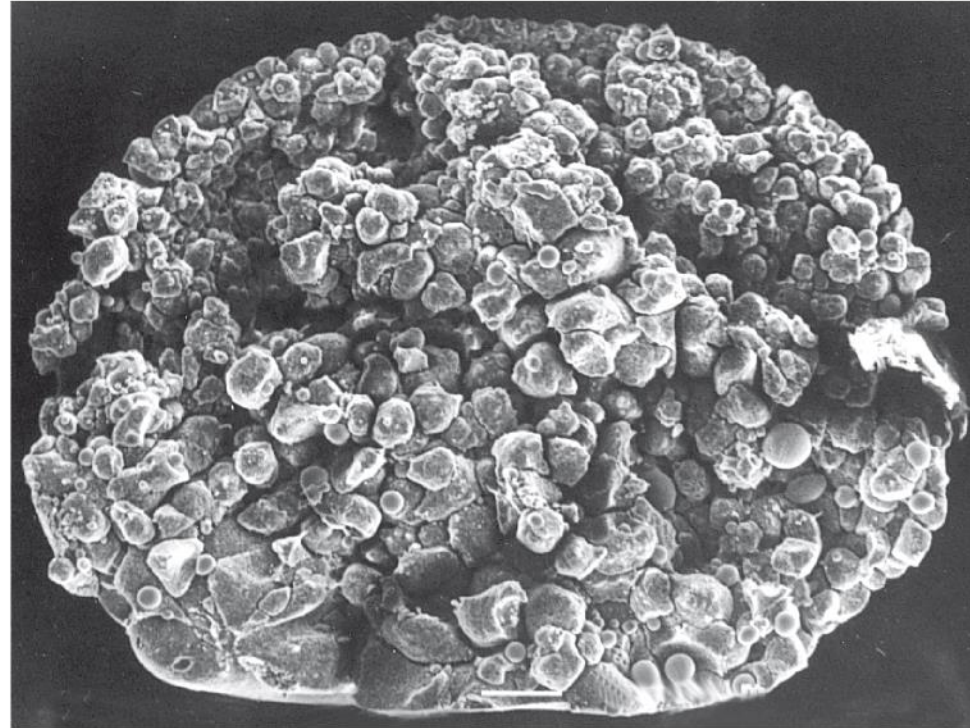


L'interazione fra i blastomeri e' promossa da molecole di adesione (Caderine)

(A)

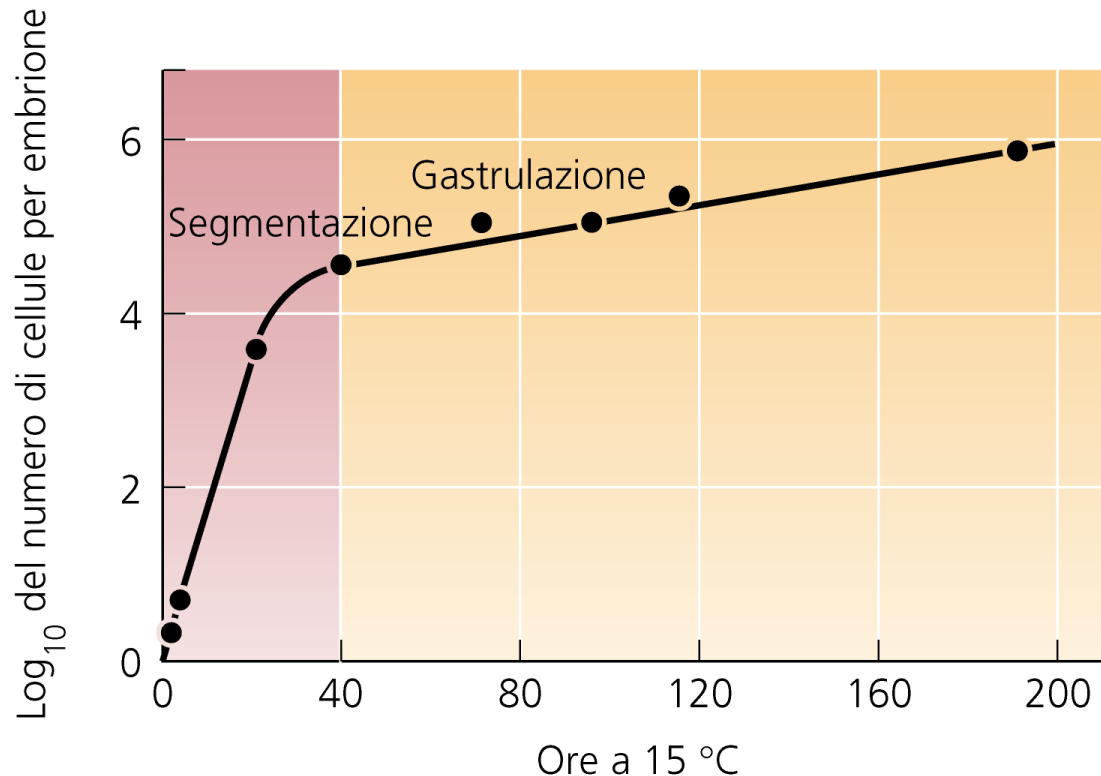


(B)



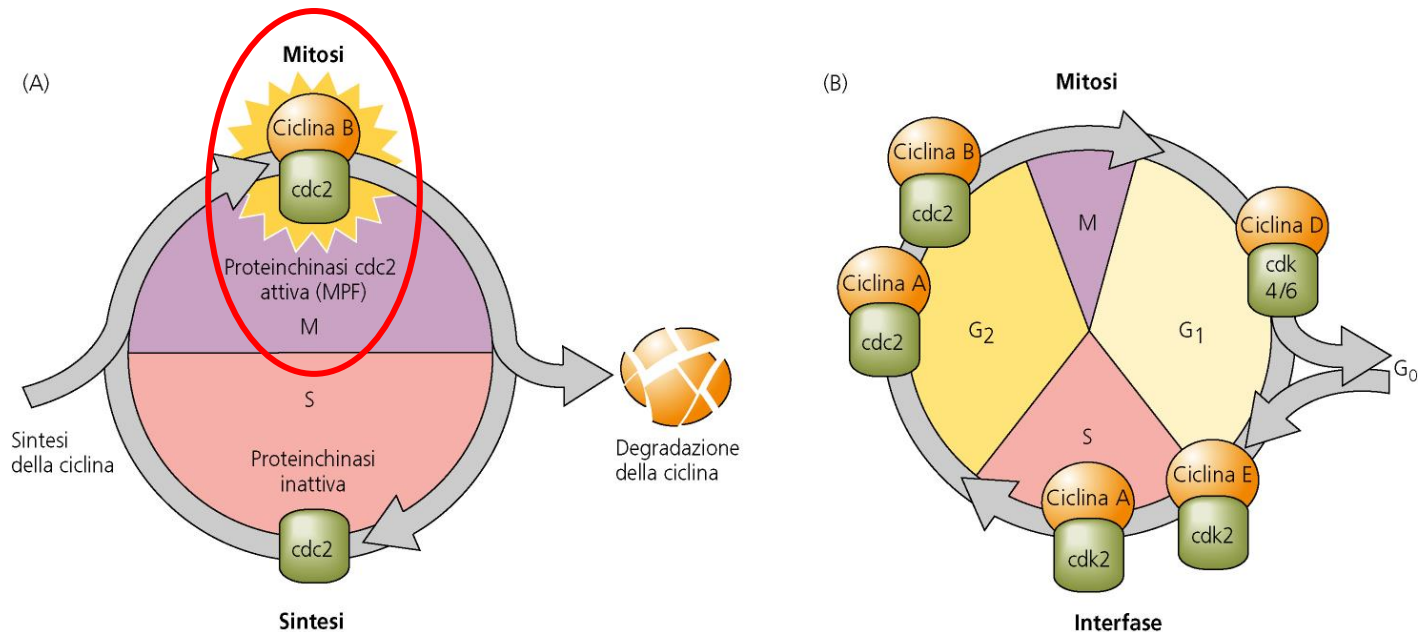
CARATTERISTICHE DELLA SEGMENTAZIONE

- Pluricellularità
- Segregazione di determinanti citoplasmatici
- E' caratterizzata da divisioni veloci e sincrone
- Il ciclo è bifasico M → S



- 1) La ciclina B si accumula in fase S e si degrada dopo l'entrata in M
- 2) Il ciclo bifasico utilizza ciclina materna (mRNA) e proteine regolatrici materne
- 3) Quando si esauriscono le molecole materne si ha l'attivazione del genoma zigotico, il ciclo rallenta e si normalizza (G1 e G2)

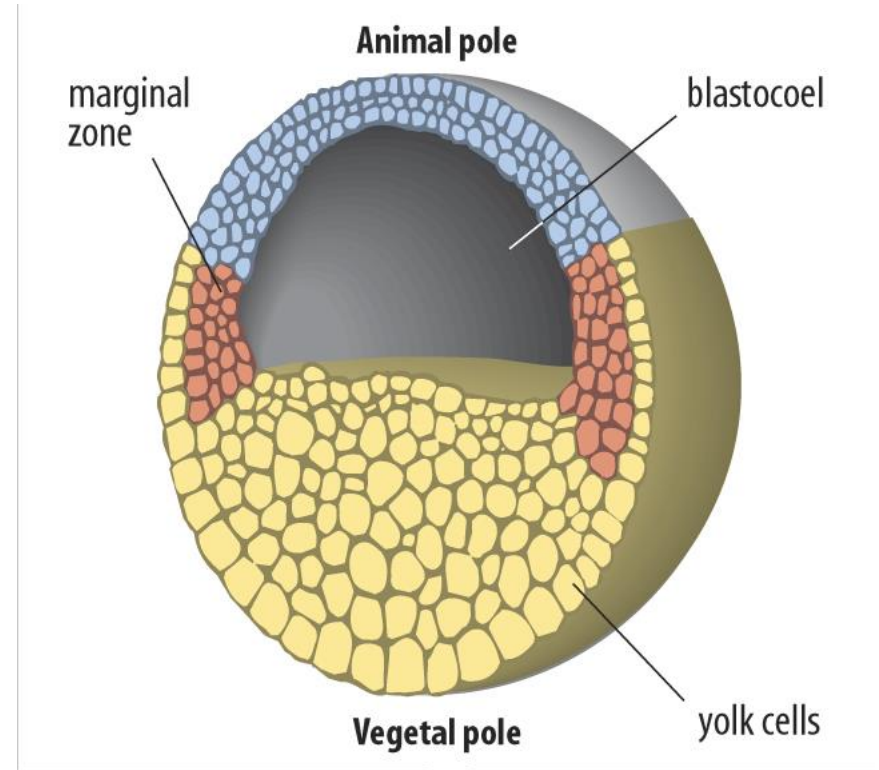
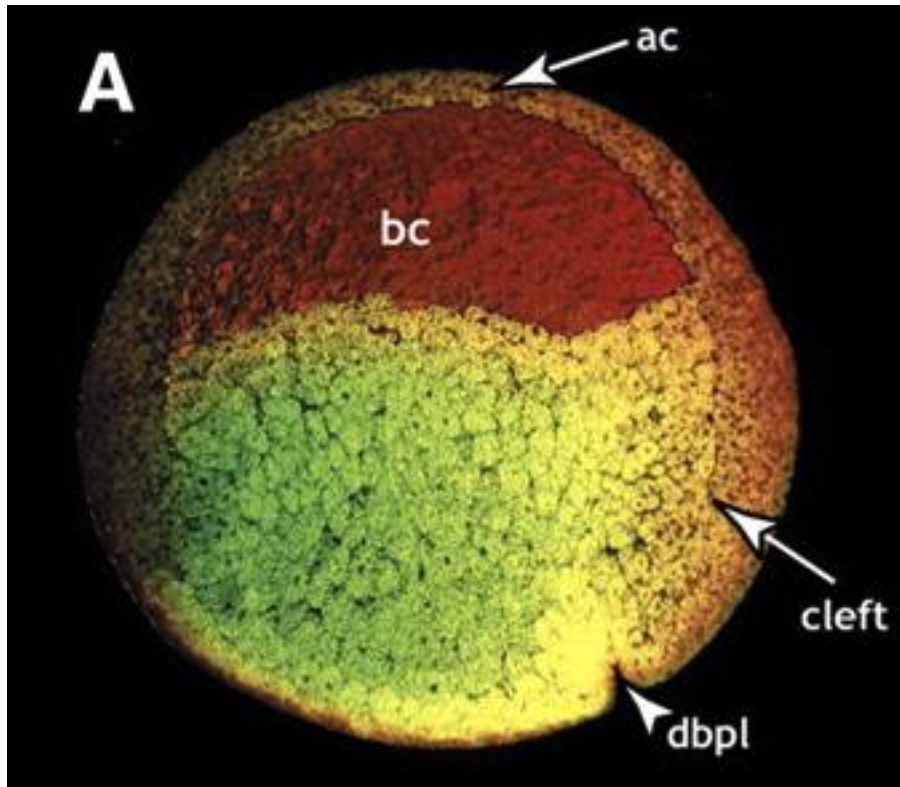
TRANSIZIONE DI MEDIOBLASTULA: *Xenopus* dopo la 12° divisione



MAPPA DEI TERRITORI PRESUNTIVI

Blastula pluristratificata:
nella zona equatoriale (*zona marginale*)
la mappa è diversa se la si osserva
dall'esterno o dall'interno

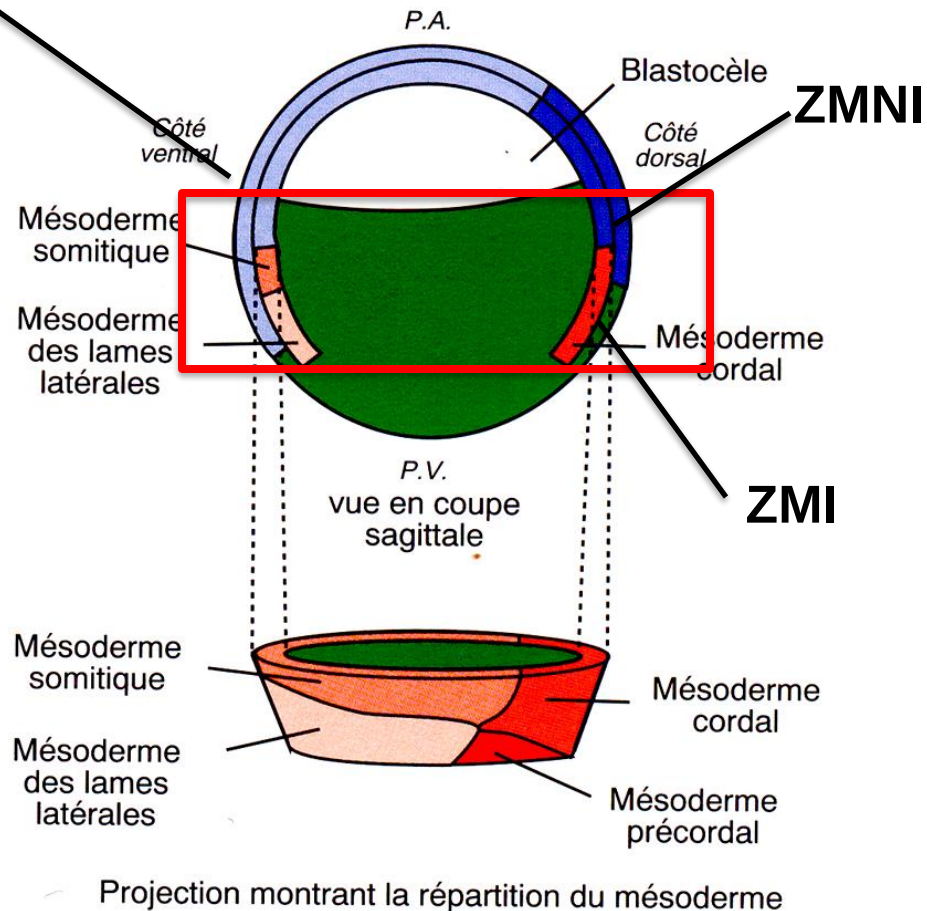
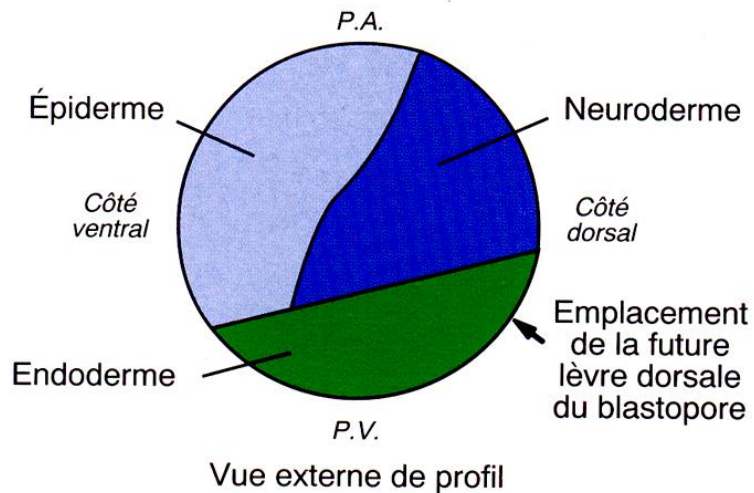
- Ectoderma
- Mesoderma
- Endoderma



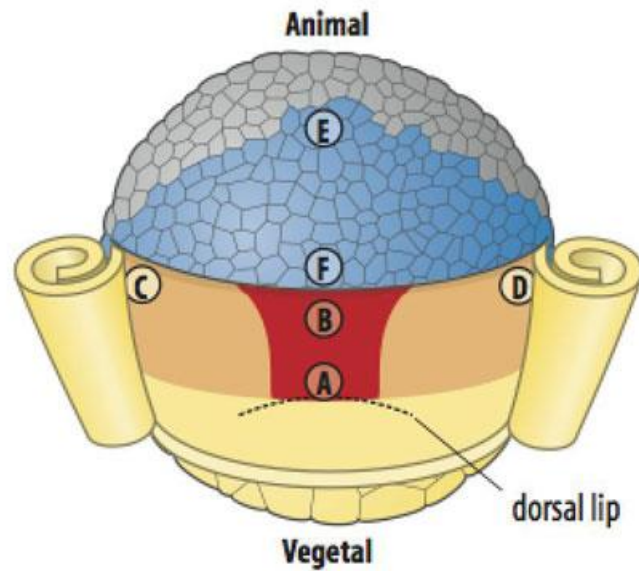
Mappa dei territori presuntivi negli *Anuri*

ZONA MARGINALE

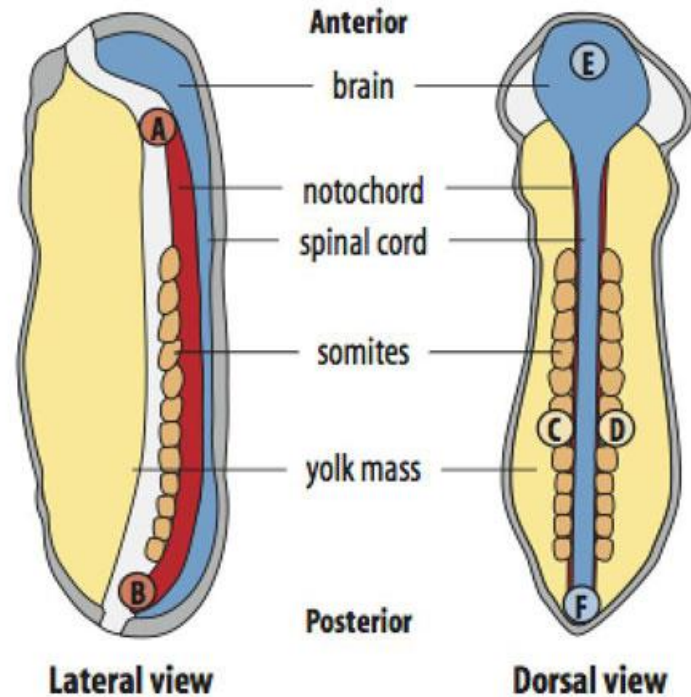
a) *Xénope*

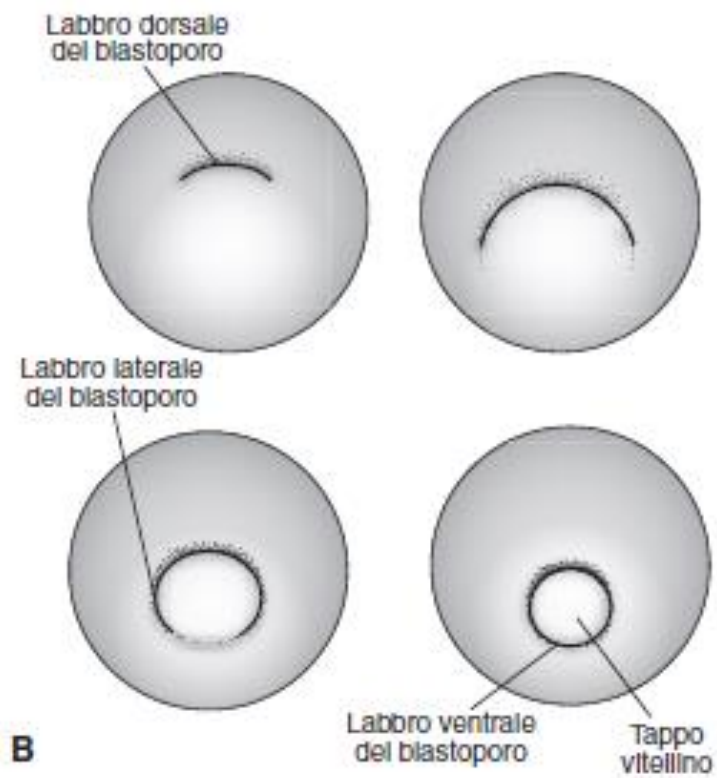


Fate map of late blastula of *Xenopus*



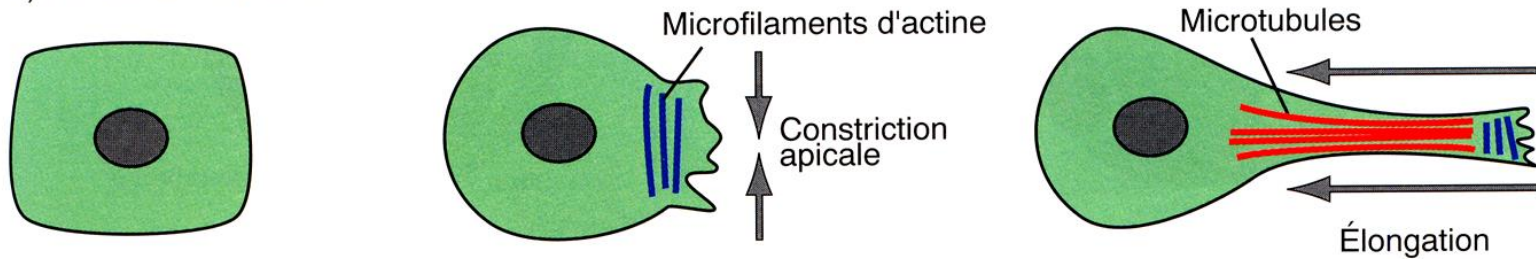
Sections of tailbud-stage *Xenopus*



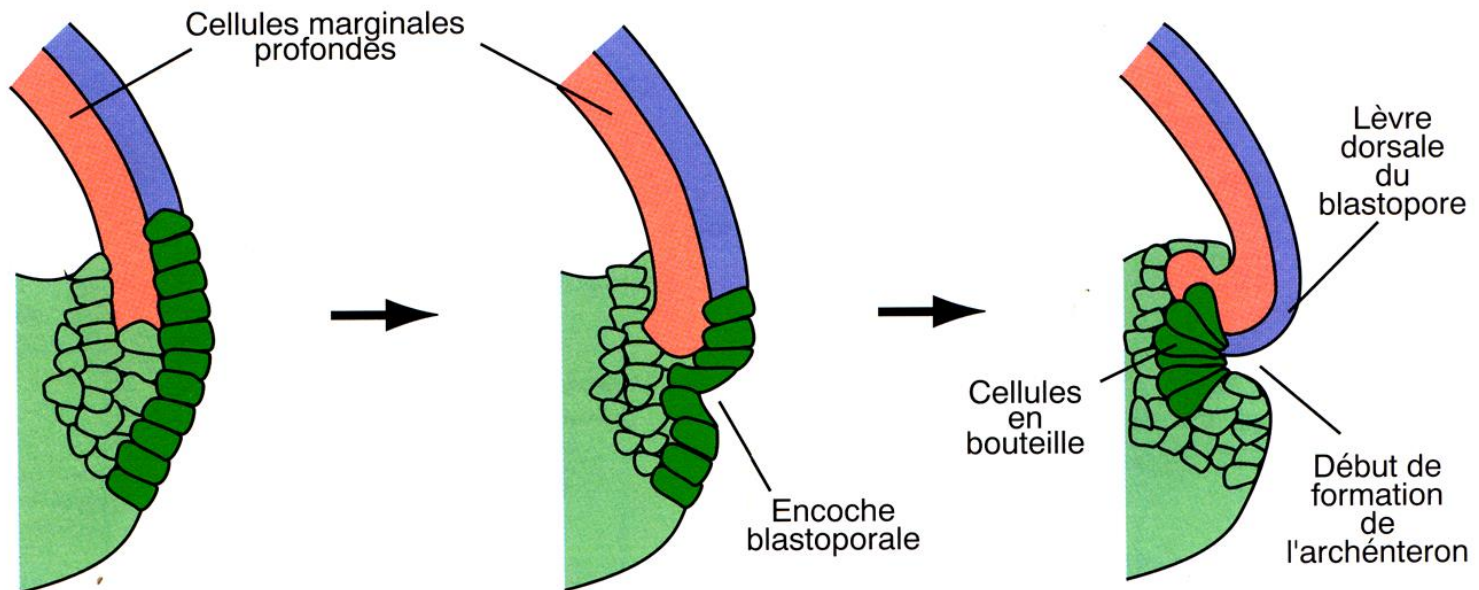


IL LABRO DEL BLASTOPORO SI ORIGINA CON LA FORMAZIONE DELLE CELLULE A FIASCO E L'**INVAGINAZIONE** DELLE CELLULE ENDODERMICHE SUPERFICIALI

b) Formation des cellules en bouteille



c) Schémas de la formation de l'archentéron



LA GASTRULAZIONE
PROSEGUE MEDIANTE
MOVIMENTI DI **INVOLUZIONE**
DEL MESODERMA CHE
SCORRE AL DI SOTTO
DELL'ECTODERMA

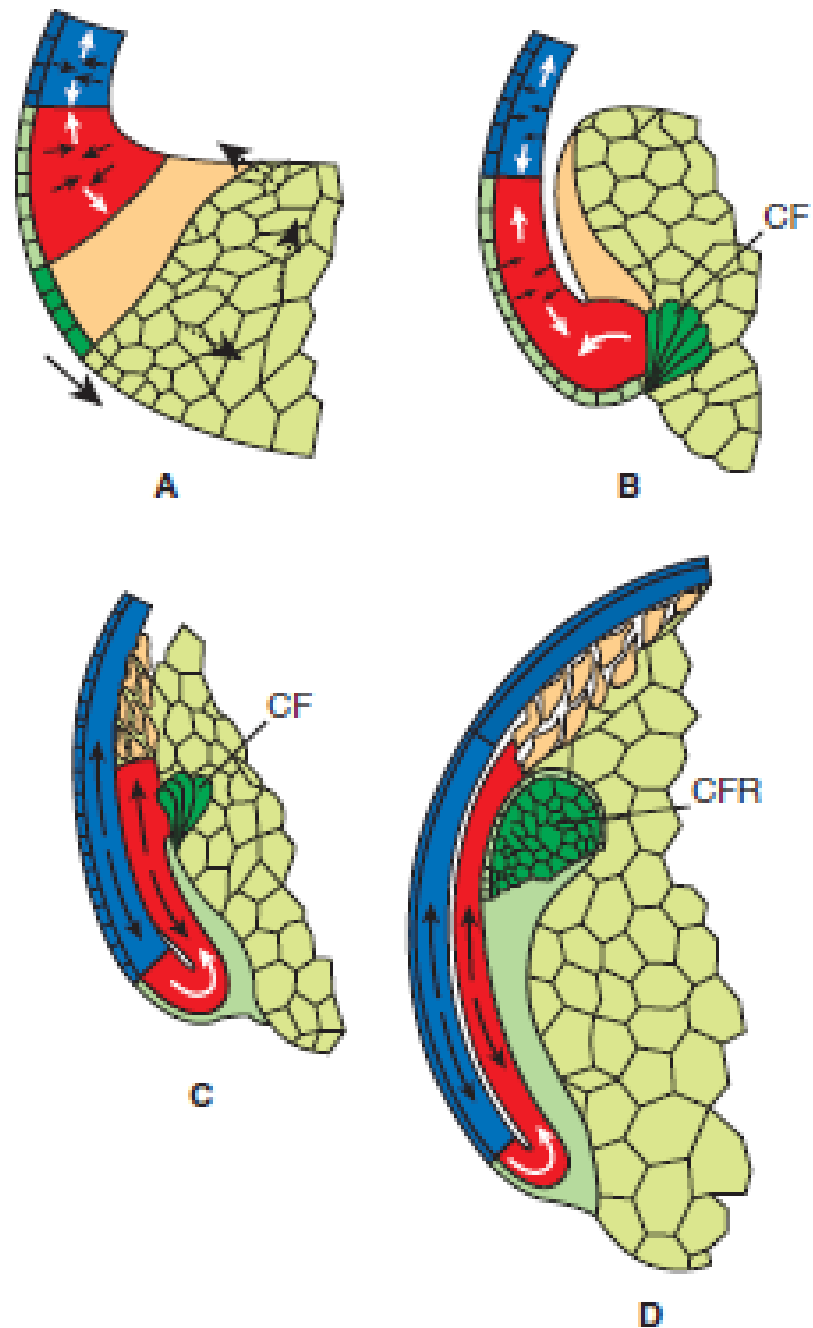
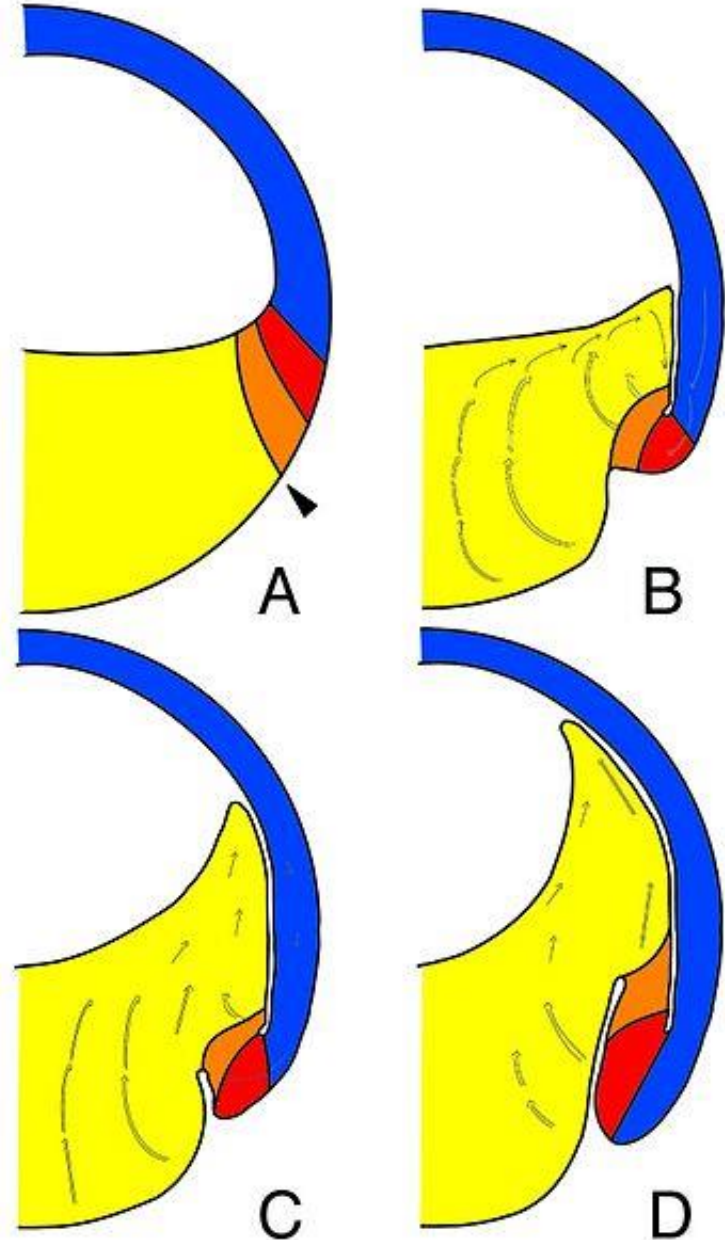
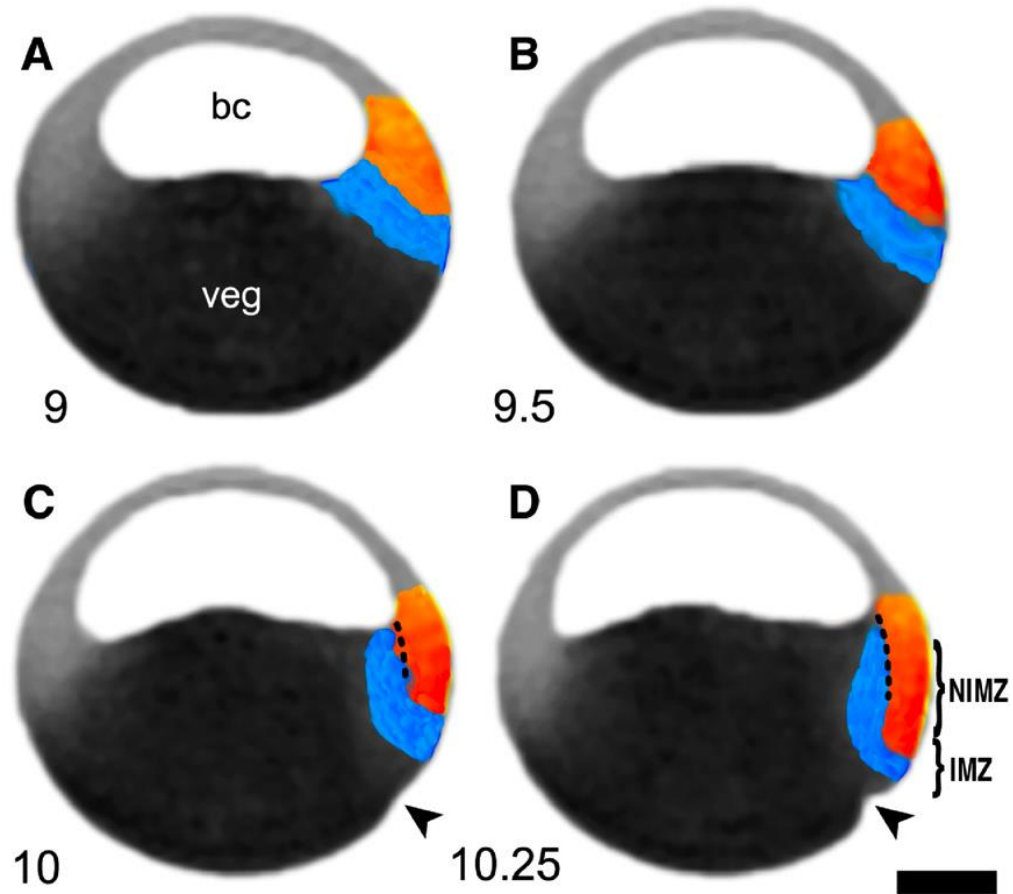
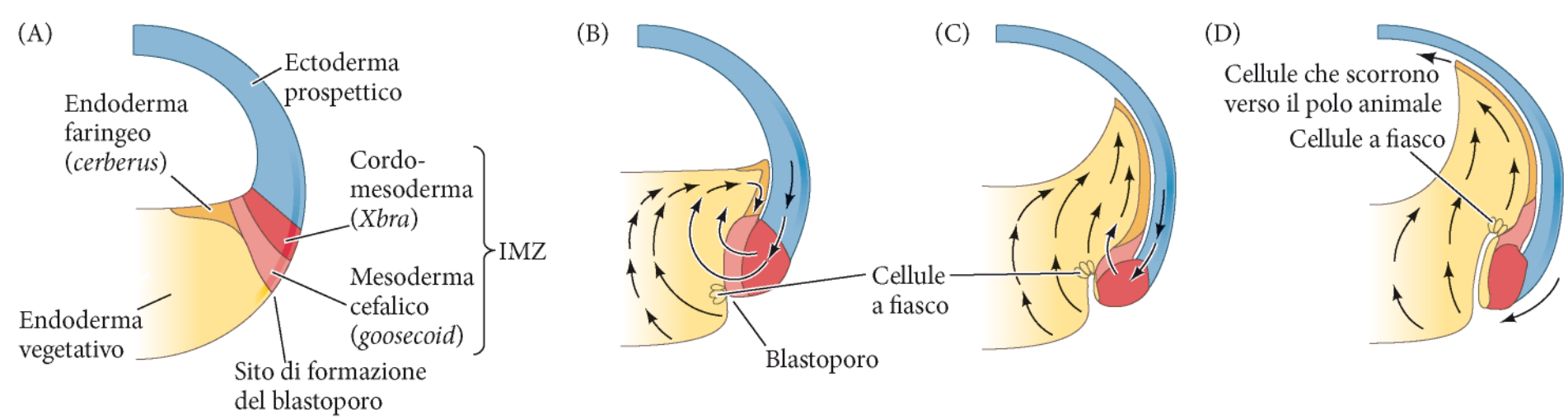


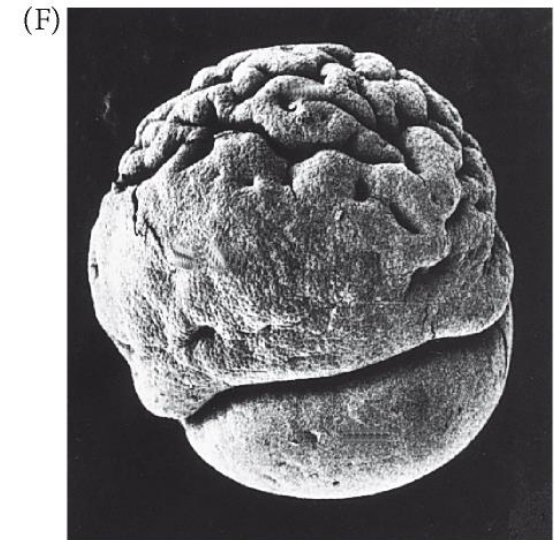
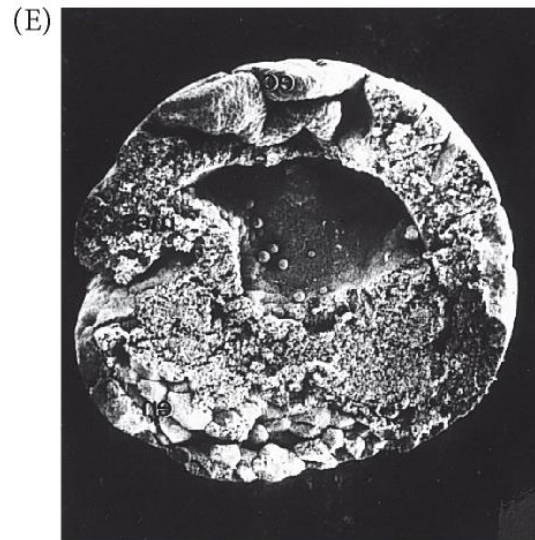
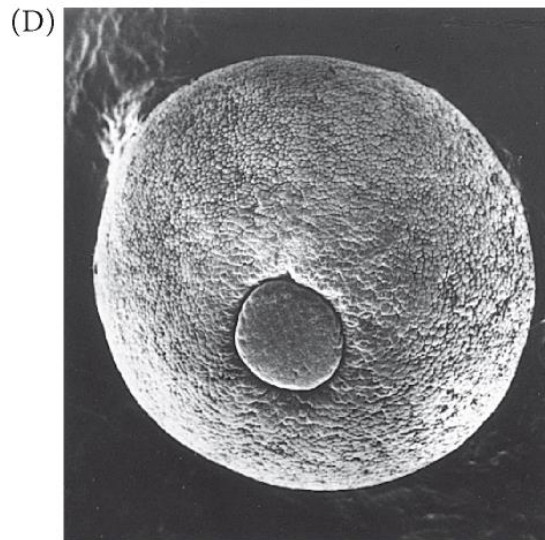
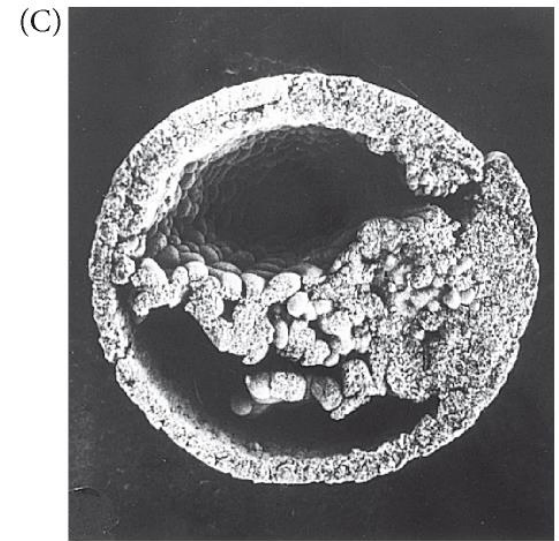
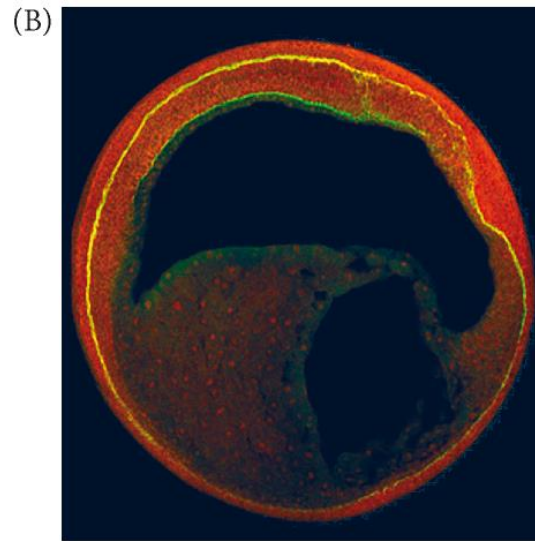
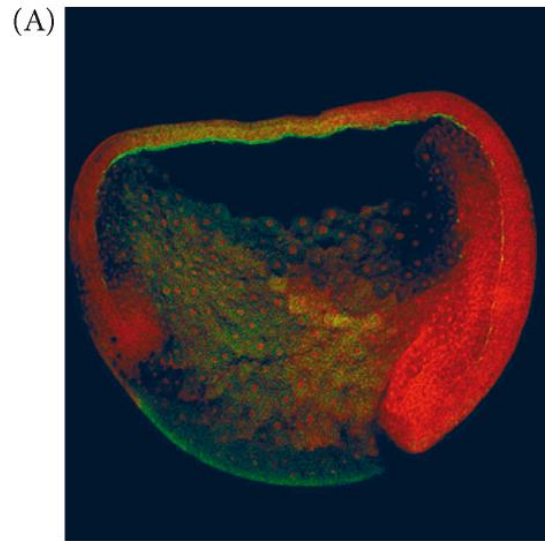
Figura 7

L'INVOLUZIONE DEL MESODERMA
E' PROMOSSA DA MOVIMENTI DI
ROTAZIONE DELLA MASSA
VEGETATIVA PROFONDA ED
EPIBOLIA DELLA ZONA
MARGINALE SUPERFICIALE



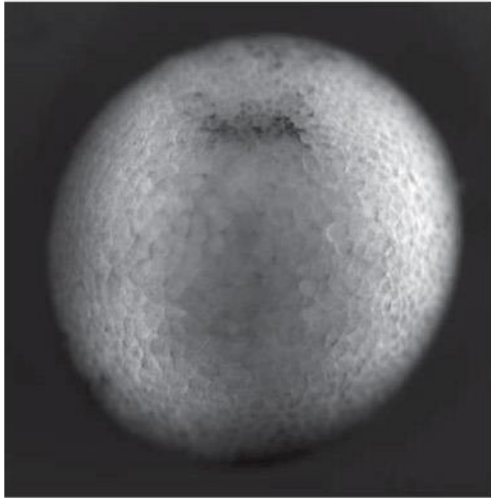


**I MOVIMENTI DI INVOLUZIONE SONO MEDIATI DA INTERAZIONI DI INTEGRINE
SULLA MEMBRANA DELLE CELLULE MESODERMICHE CON LA MATRICE
EXTRA-CELLULARE PRODOTTA DALLE CELLULE DEL TETTO DEL BLASTOCELE**

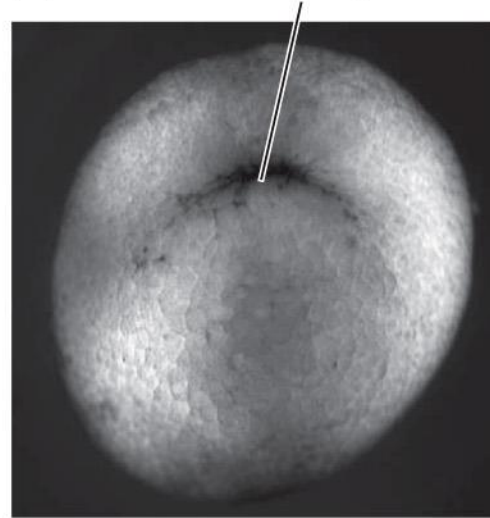


I MOVIMENTI DI GASTRULAZIONE SI ESTENDONO PROGRESSIVAMENTE IN DIREZIONE DORSO-VENTRALE

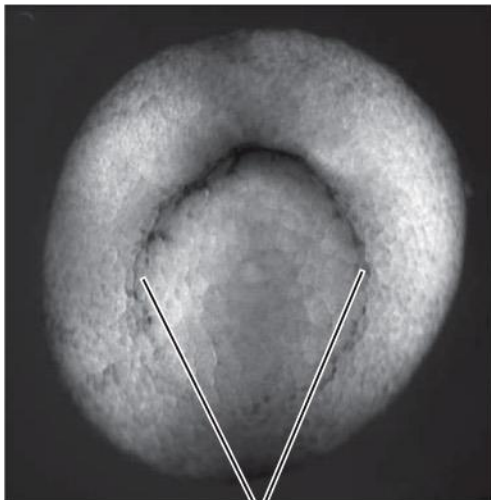
(A)



(B)

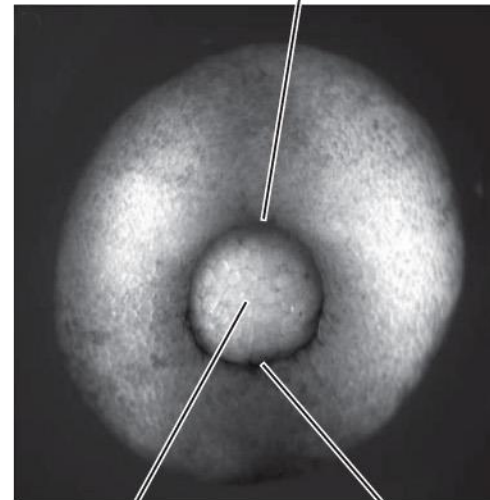


(C)



Bilateral lips

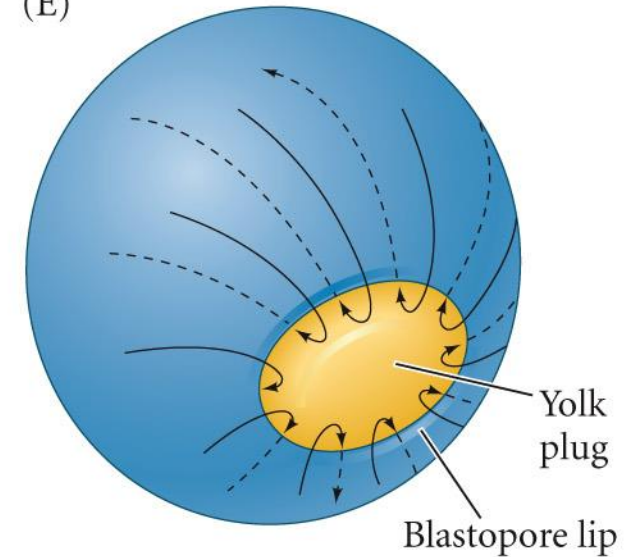
(D)



Yolk plug

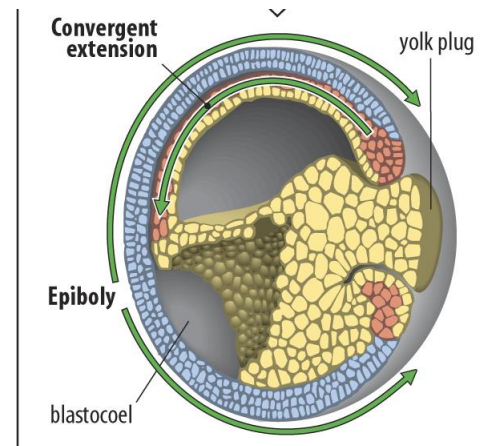
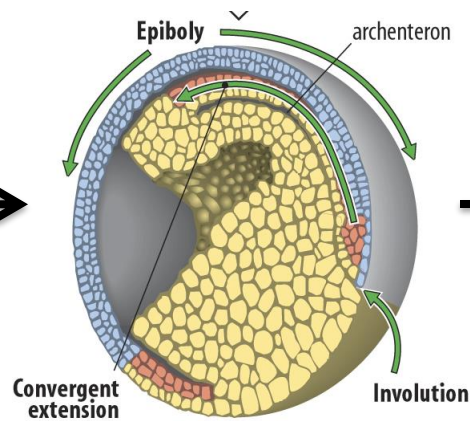
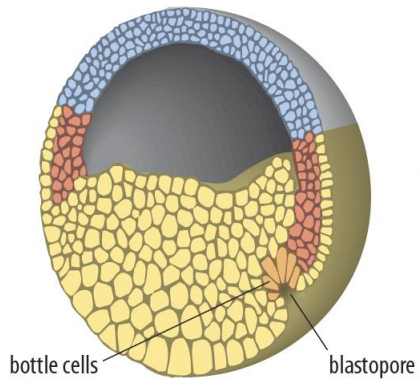
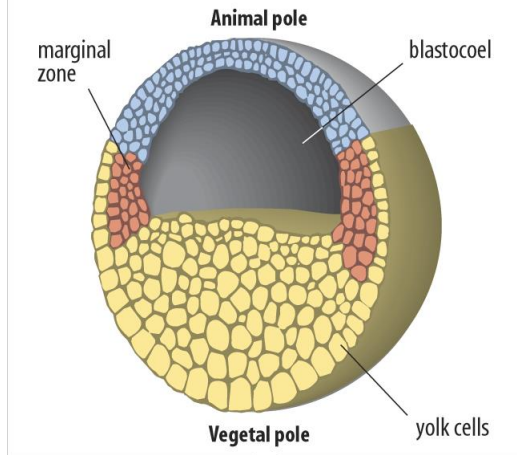
Ventral lip

(E)

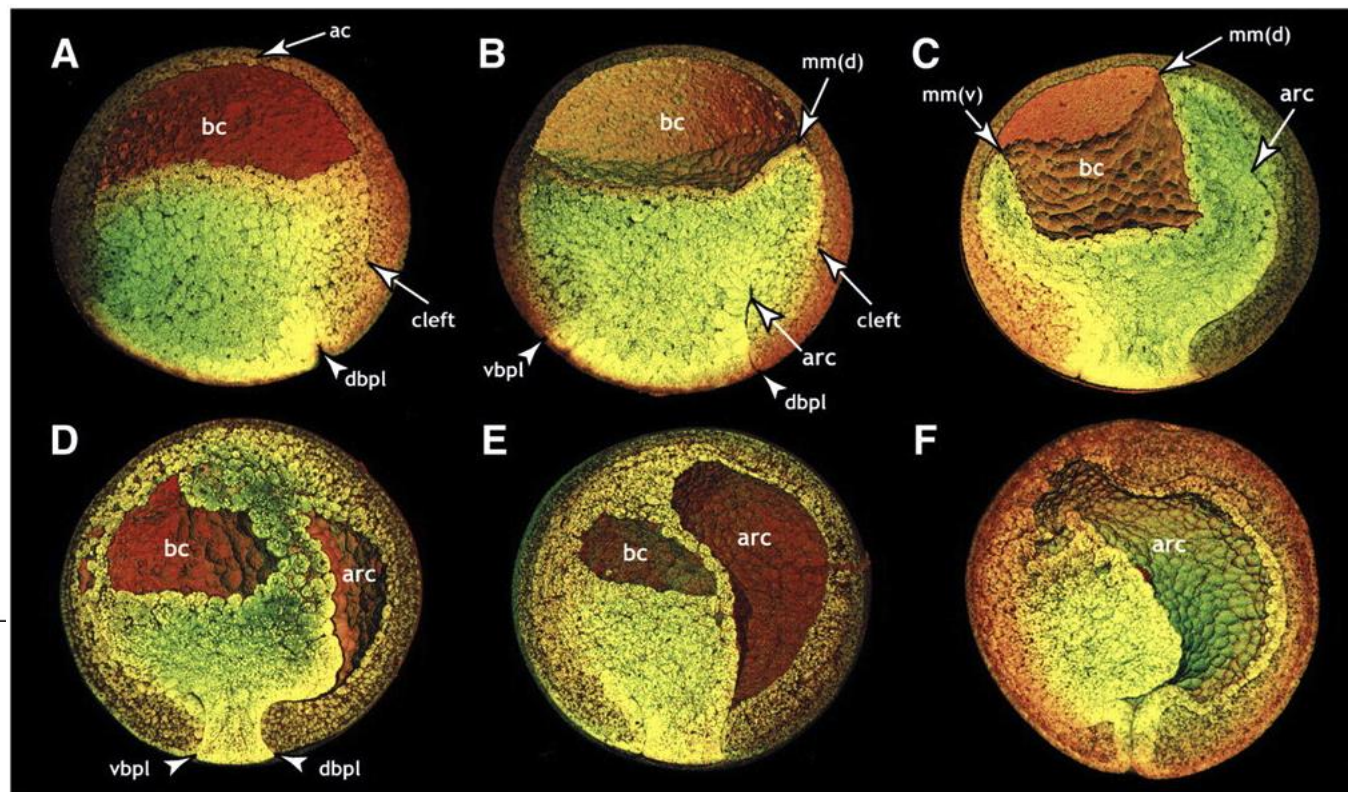


Yolk plug

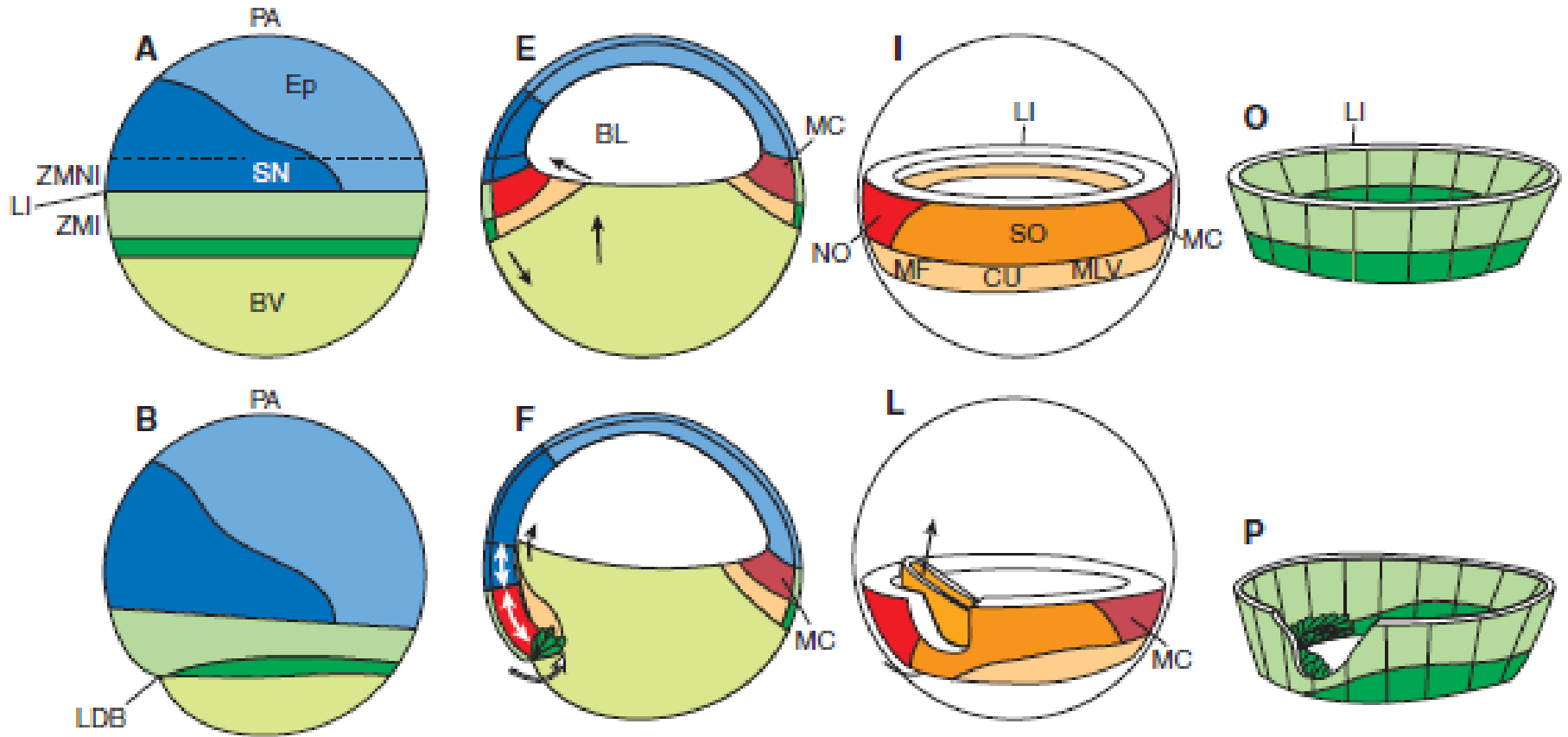
Blastopore lip



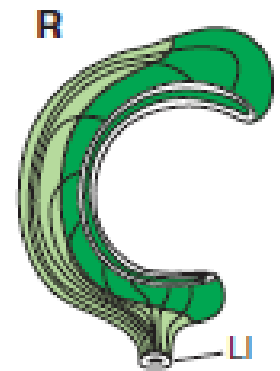
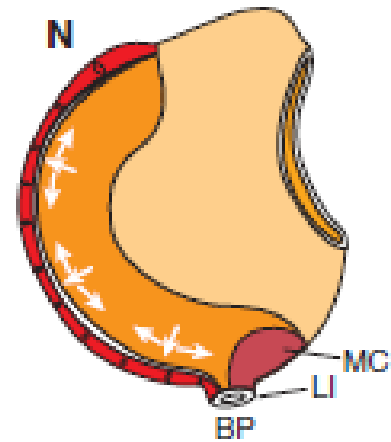
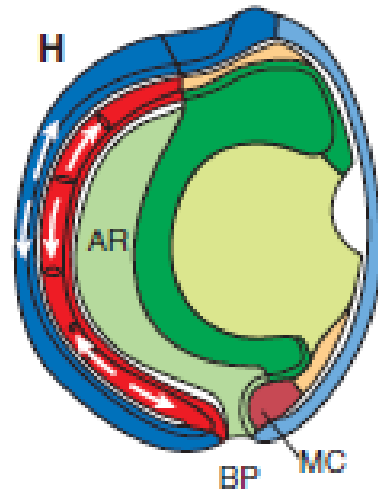
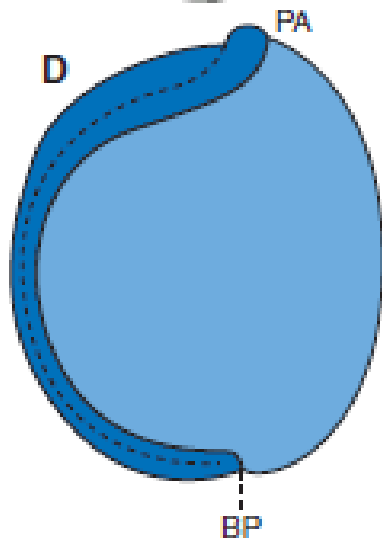
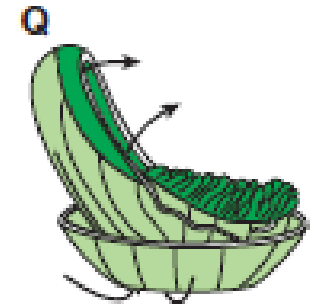
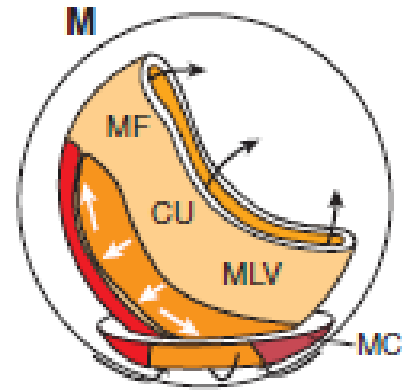
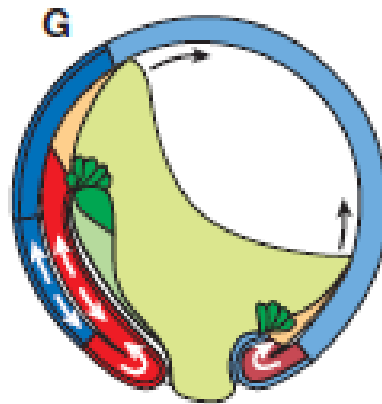
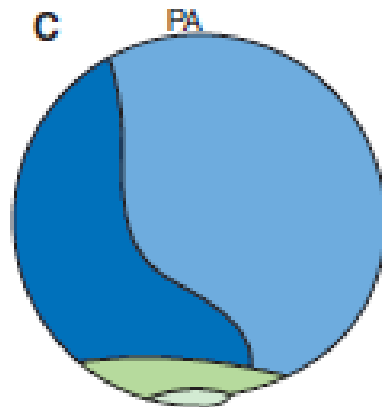
mesoderm ectoderm endoderm



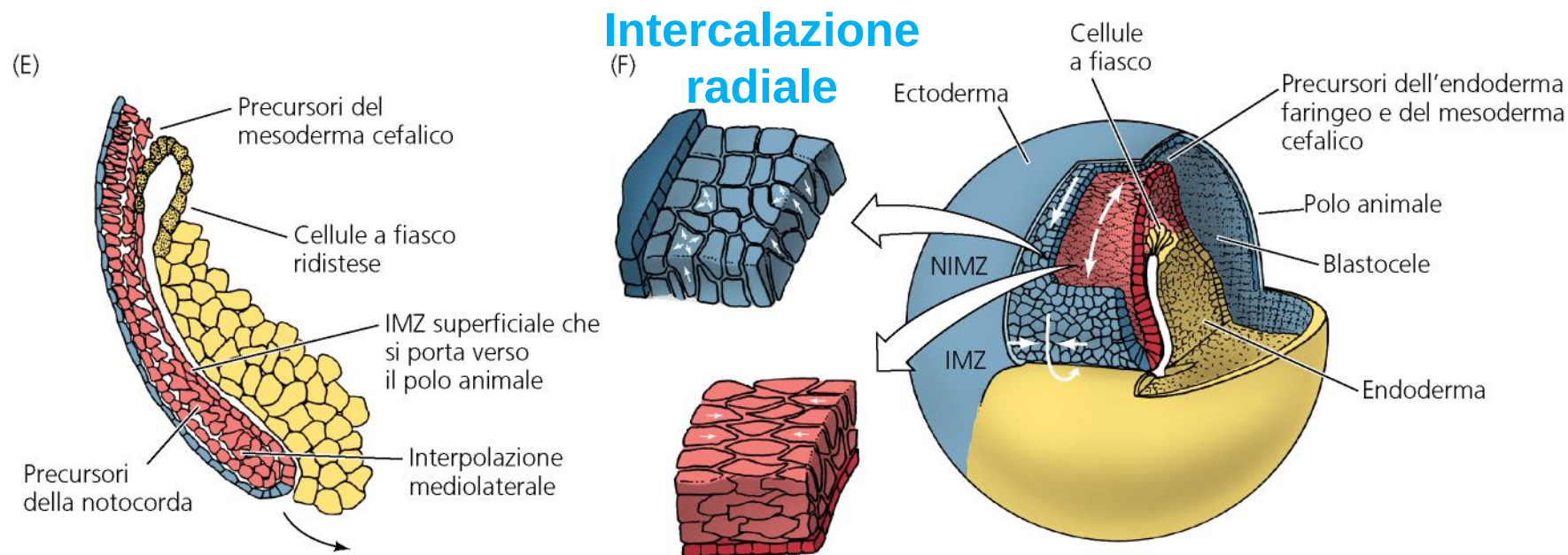
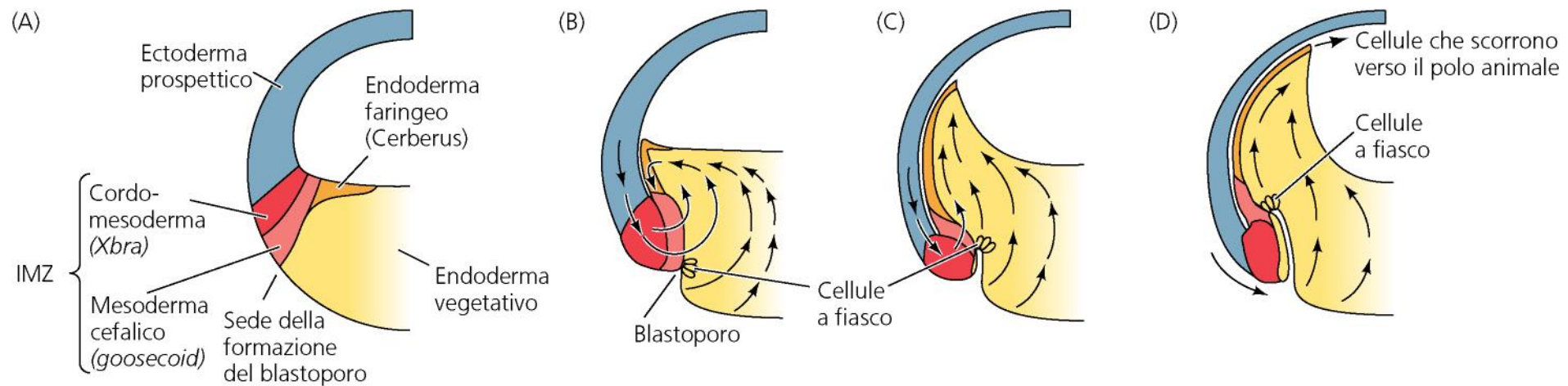
GASTRULA PRECOCE



GASTRULA TARDIVA







Intercalazione radiale

Intercalazione medio-laterale

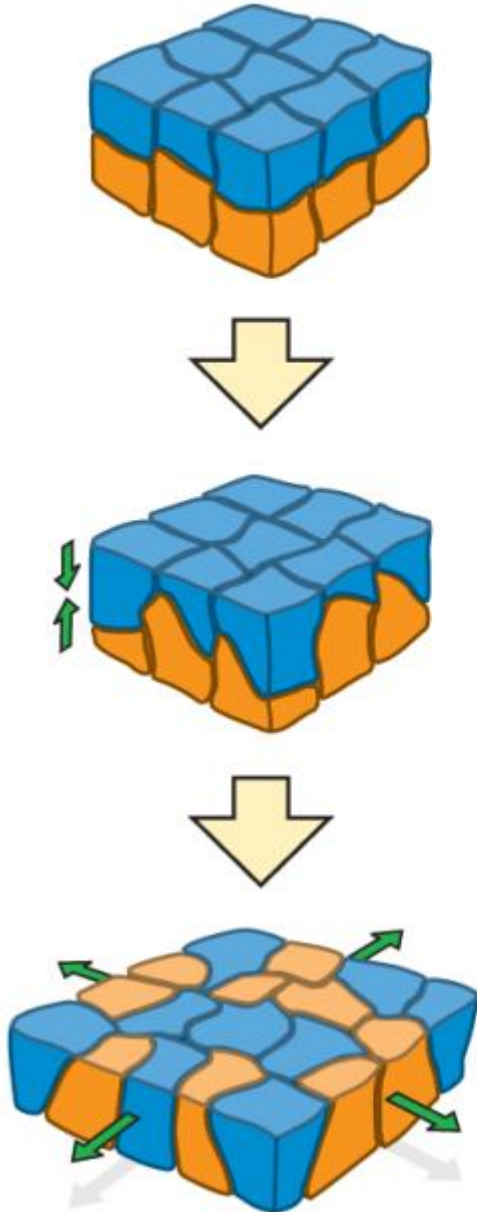
Invaginazione

Involuzione

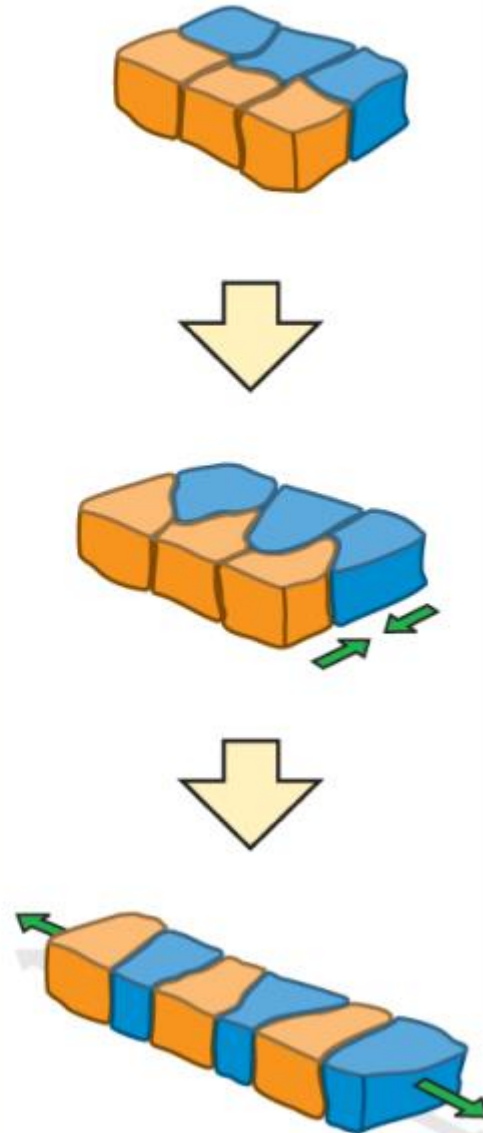
Epibolia

Epibolia
dell'ectoderma

**Radial
intercalation**

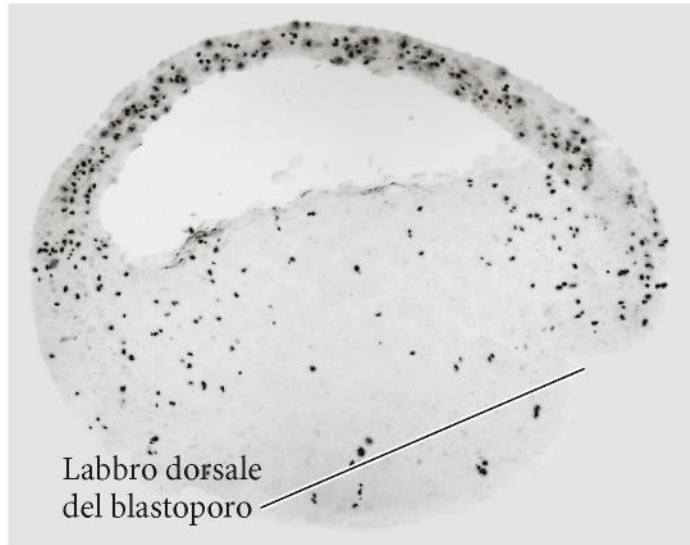


**Medio-lateral
intercalation**



**Estensione
convergente**
della notocorda,
dell'archenteron
e del tubo
neurale

(A)



(B)



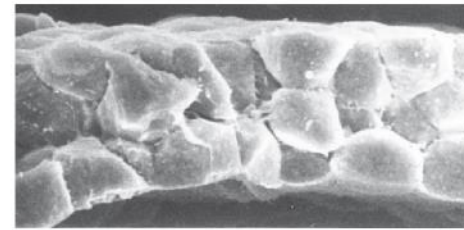
(C)



8



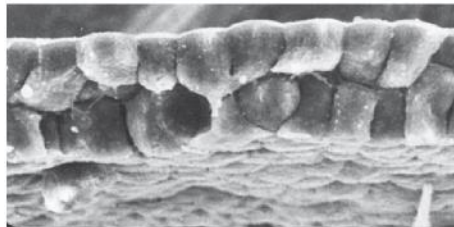
9



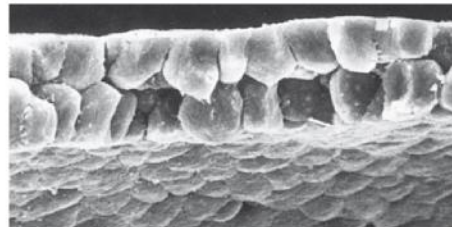
10

Stadio

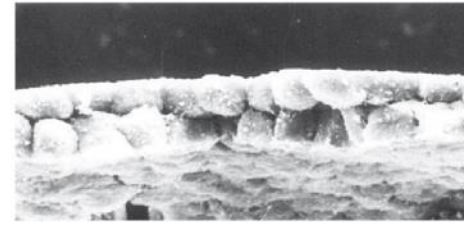
10,5



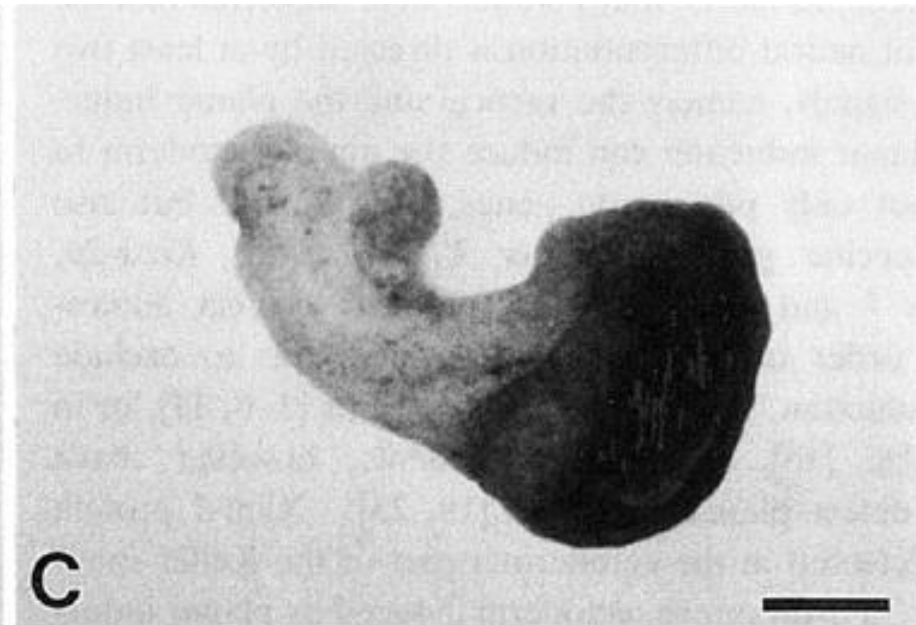
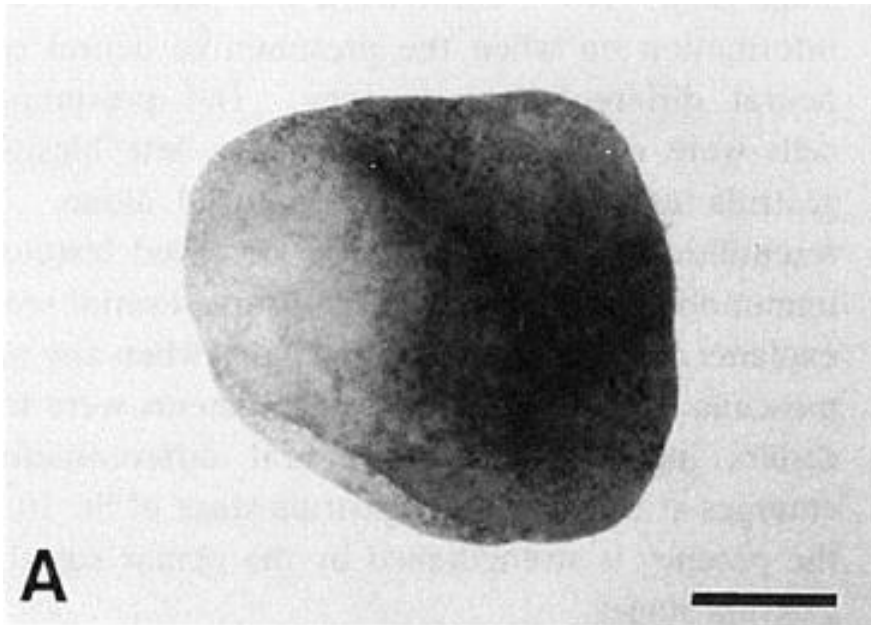
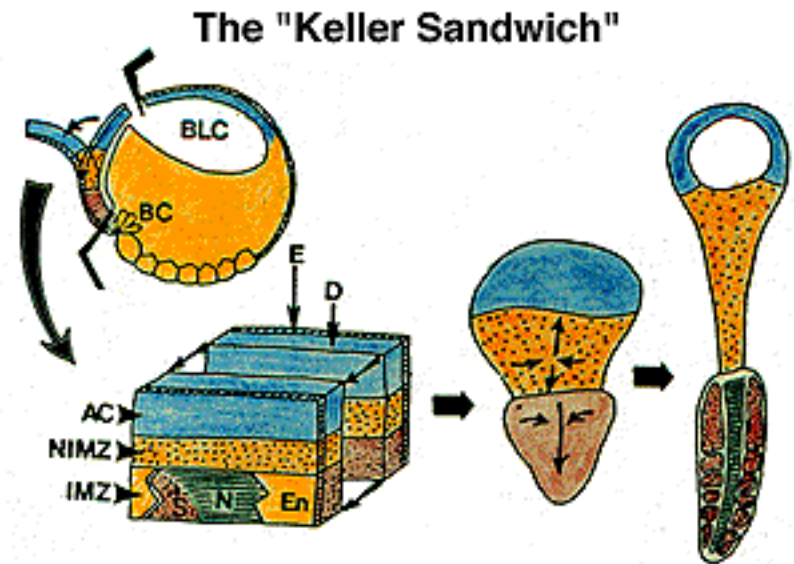
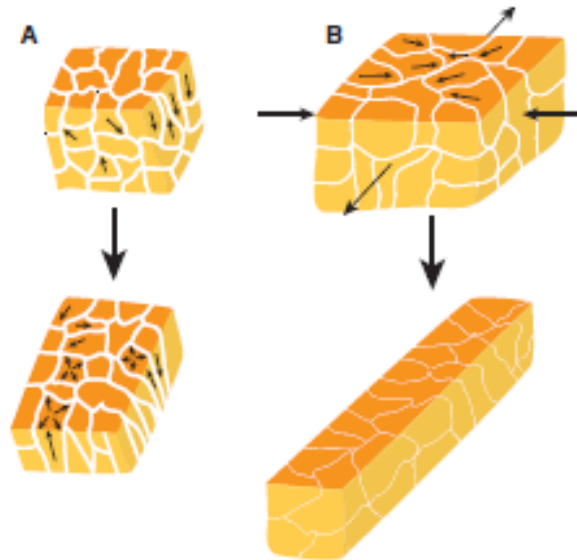
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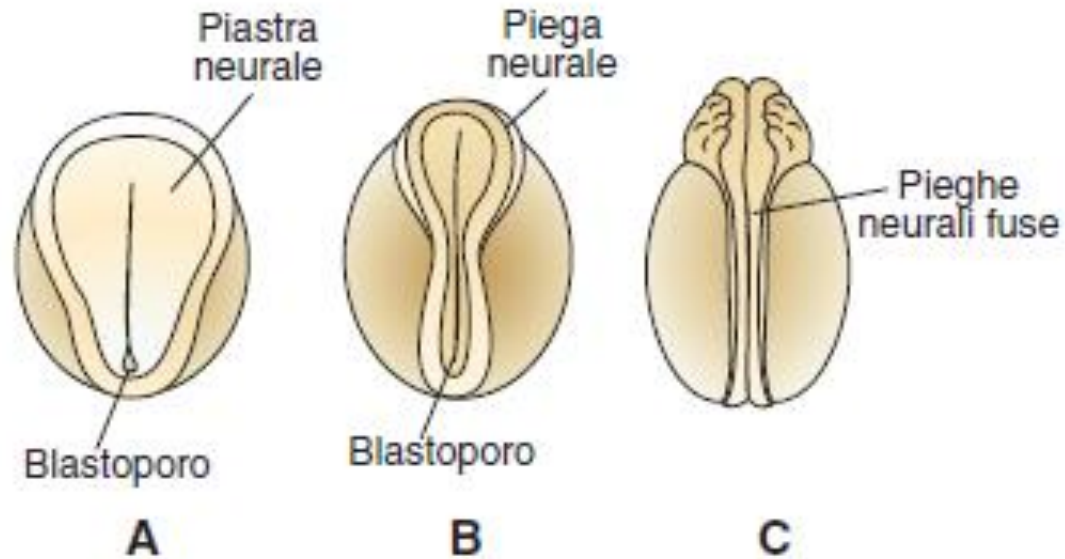


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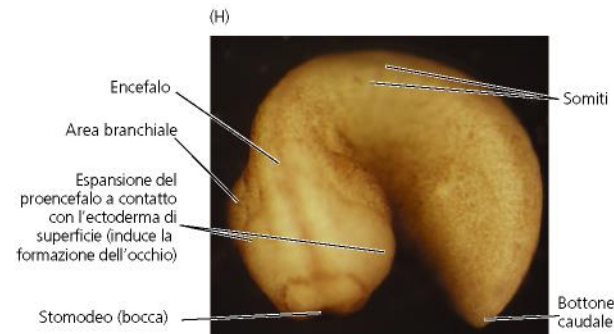
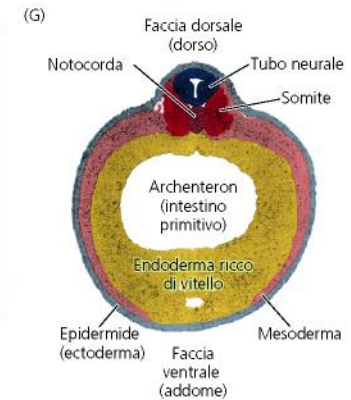
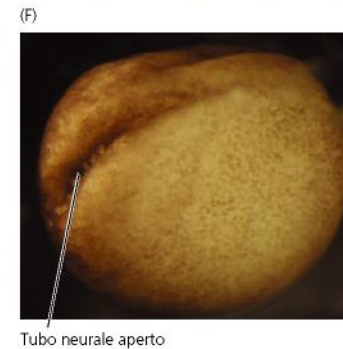
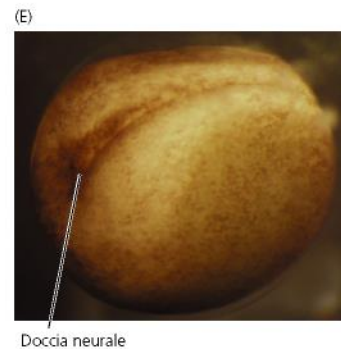


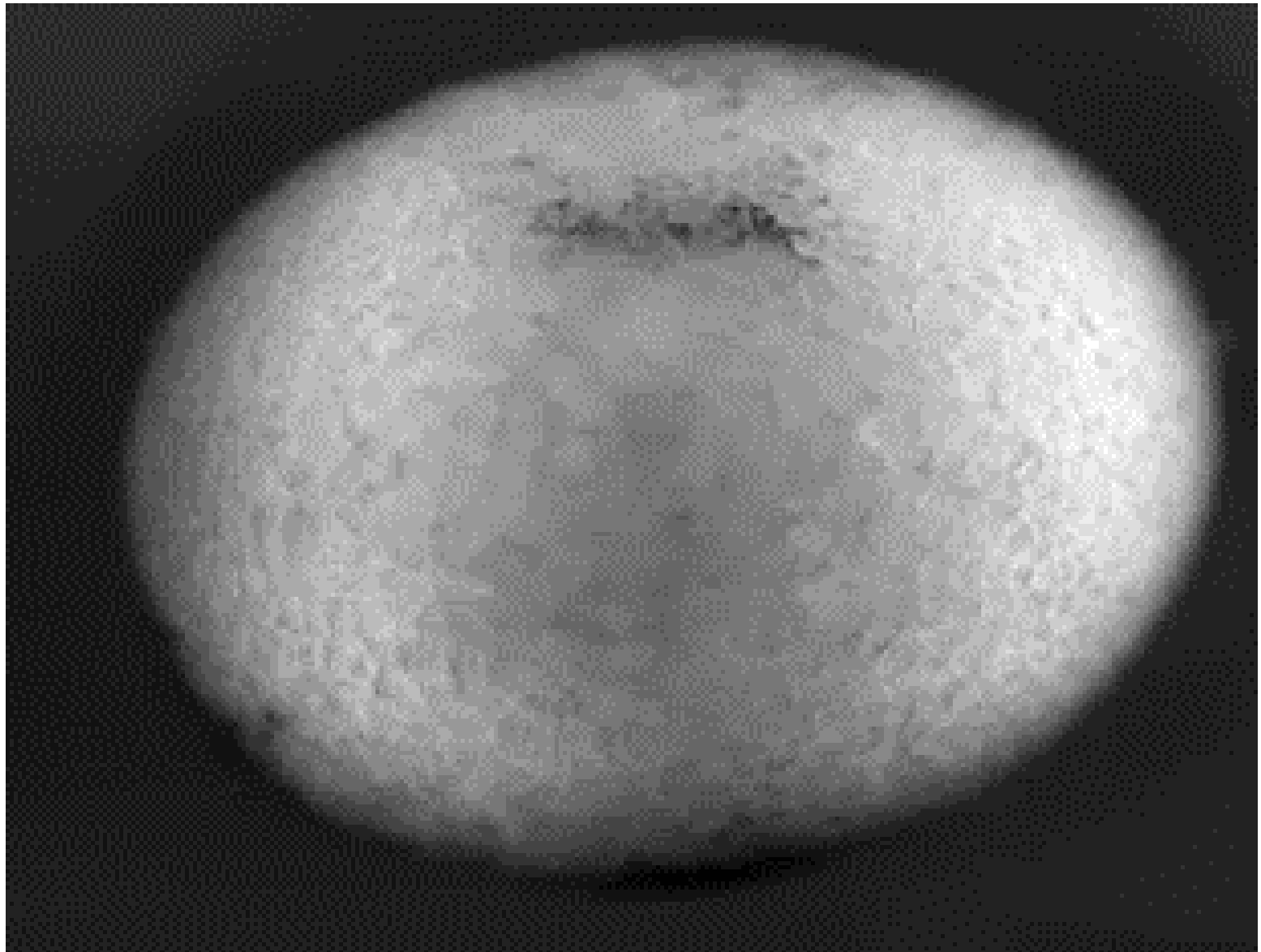
I MOVIMENTI DI ESTENSIONE CONVERGENTE GIOCANO UN RUOLO CHIAVE NELLA GASTRULAZIONE





I MOVIMENTI DI NEURULAZIONE CONDUCONO ALLA FORMAZIONE DEL TUBO NEURALE





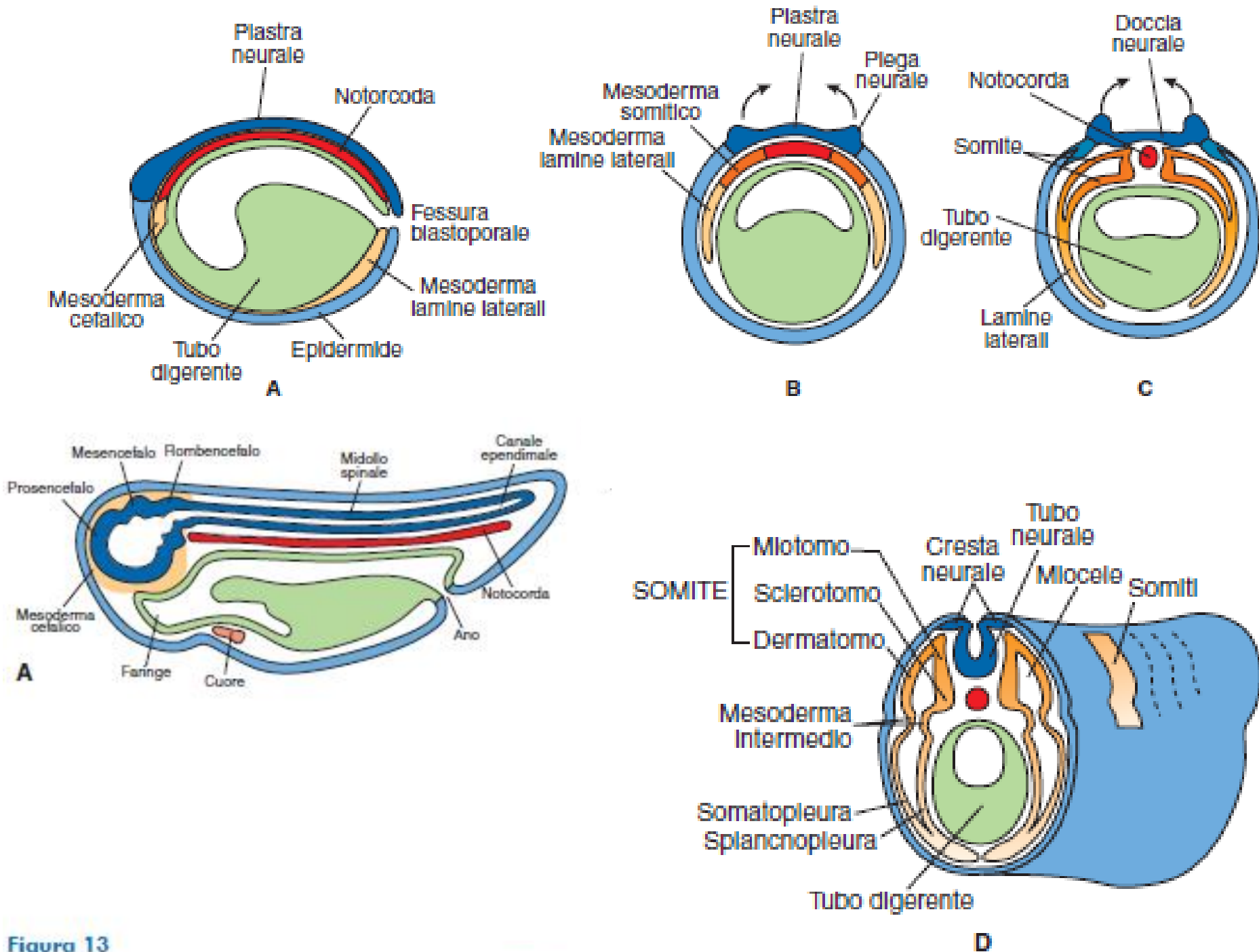
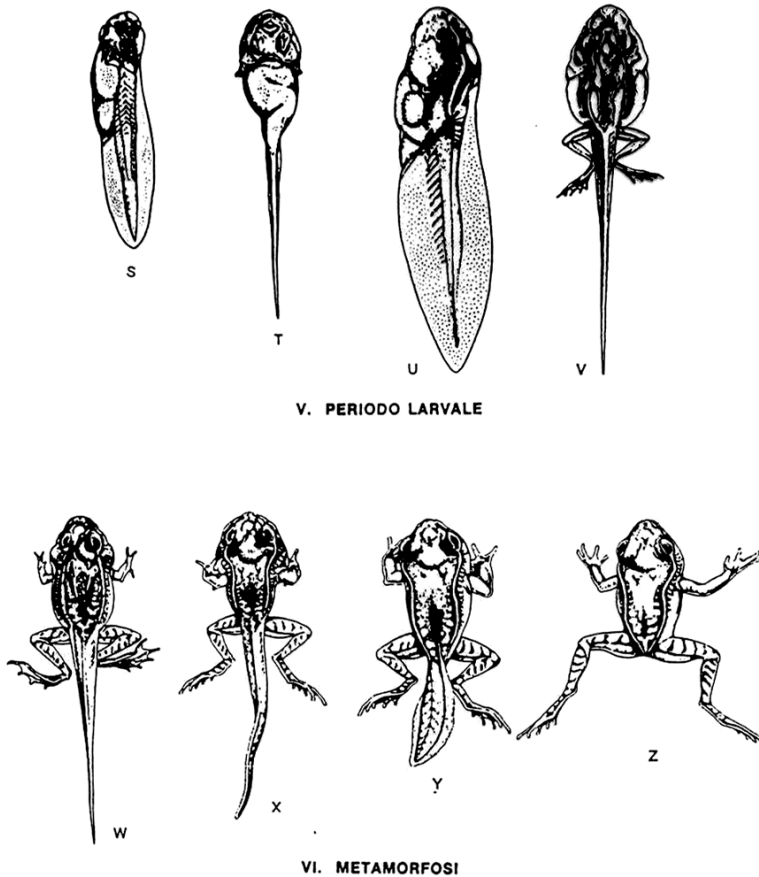


Figura 13

Metamorfosi

Pre-metamorfosi: accrescimento girino, Presenza di branchie, progressivo sviluppo arti posteriori.

Metamorfosi: arti anteriori, regressione pinna caudale e coda, modificazione tubo digerente, sviluppo polmoni.



Sviluppo della rana (continuazione). V - Periodo larvale. S, stadio a branchie esterne (visione laterale). T, formazione degli opercoli (visione ventrale). U, girino (visione laterale sinistra con lo spiracolo). V, girino (visione dorsale). VI - Metamorfosi. W, apparizione degli arti anteriori. X e Y, regressione della coda. Z, fine della metamorfosi.

Controllo ormonale:
ipofisi- ormone tireotropo
Tiroide- ormone tiroxina