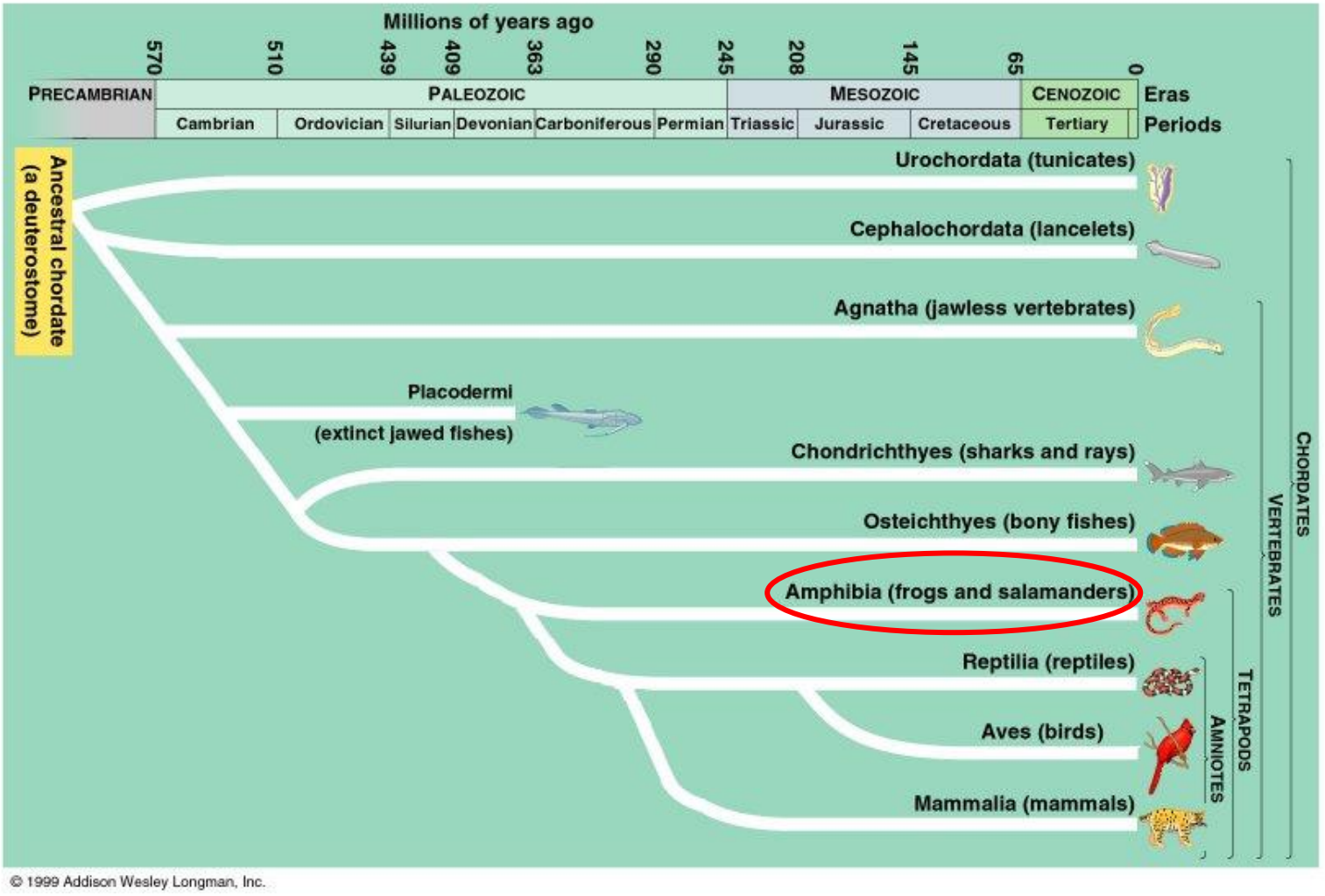
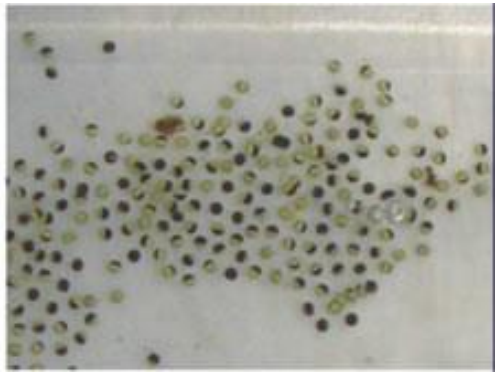
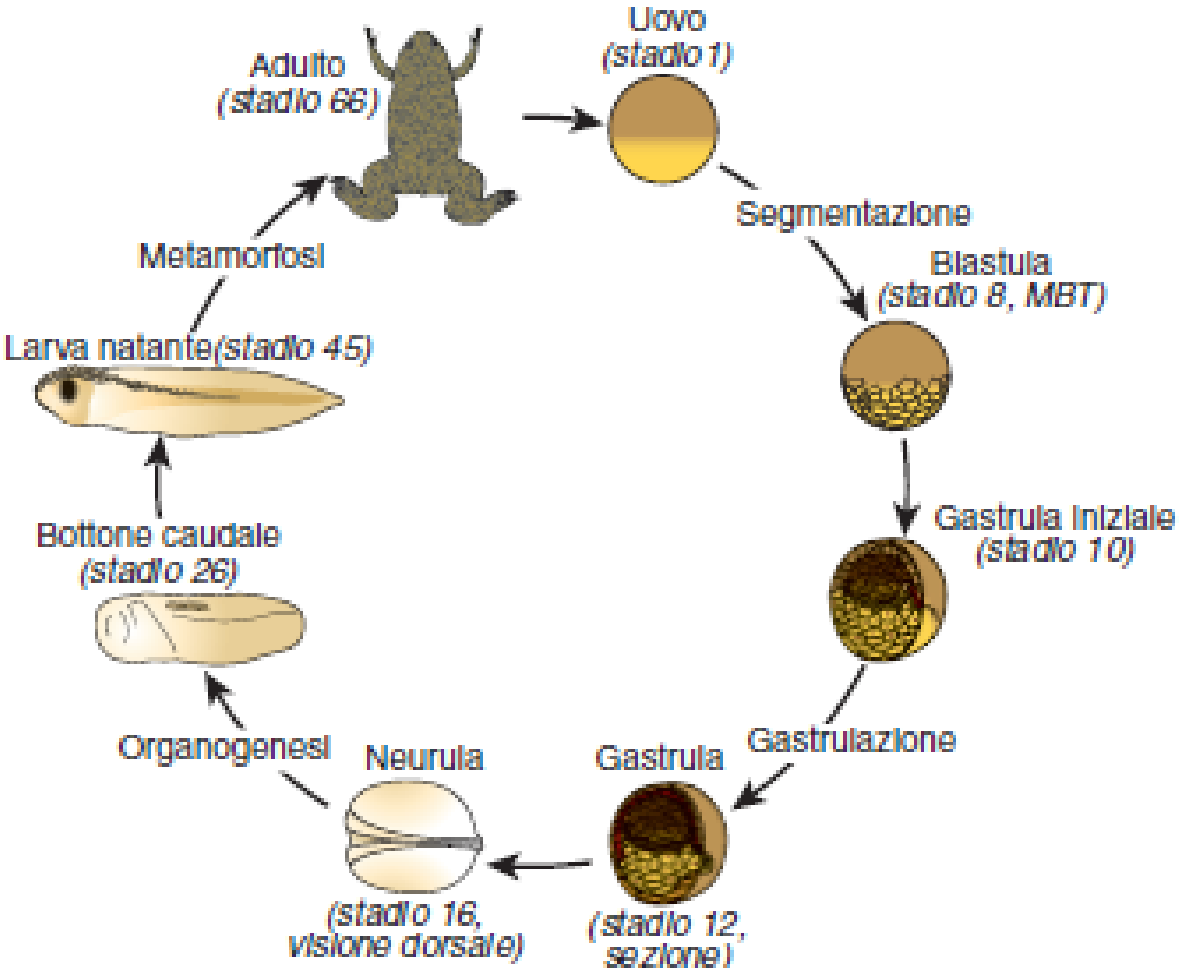
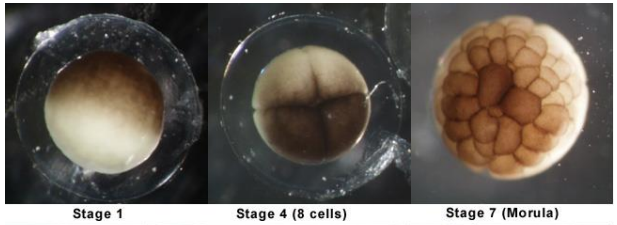
FILOGENESI DEI CORDATI

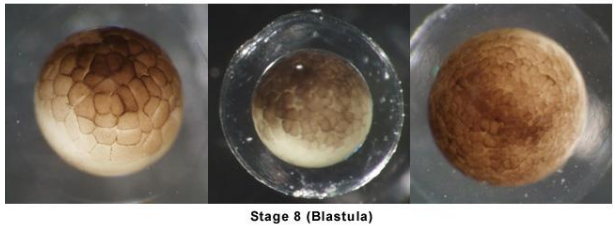


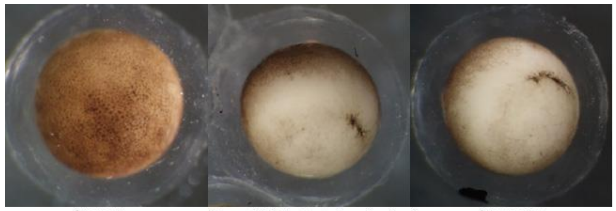
XENOPUS LAEVIS: ANFIBIO ANURO - SVILUPPO INDIRETTO

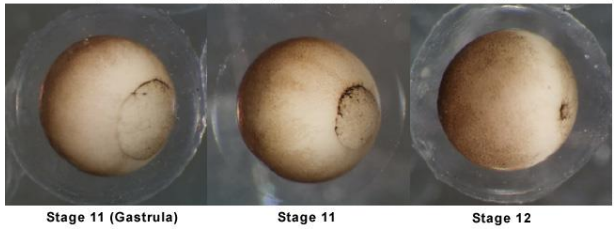




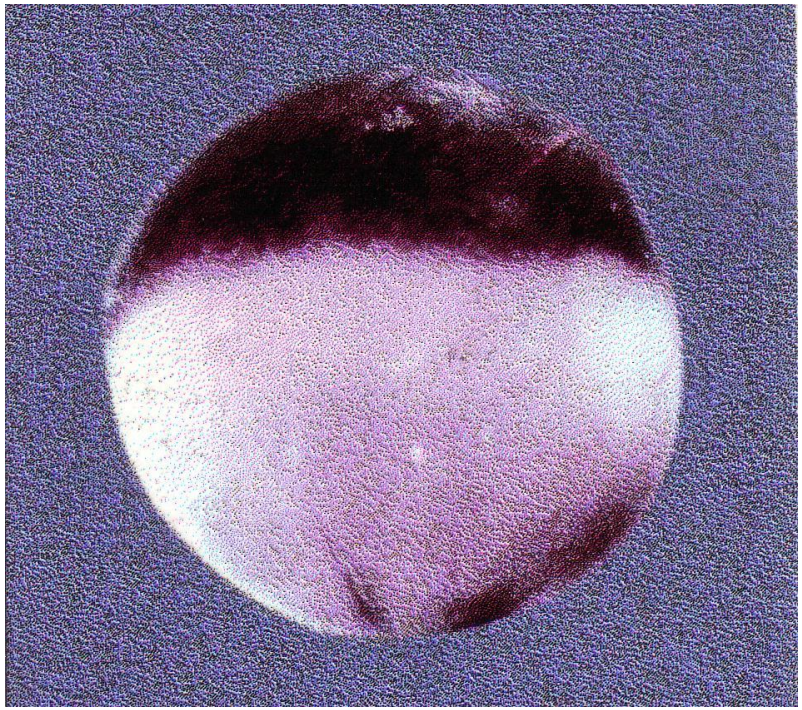


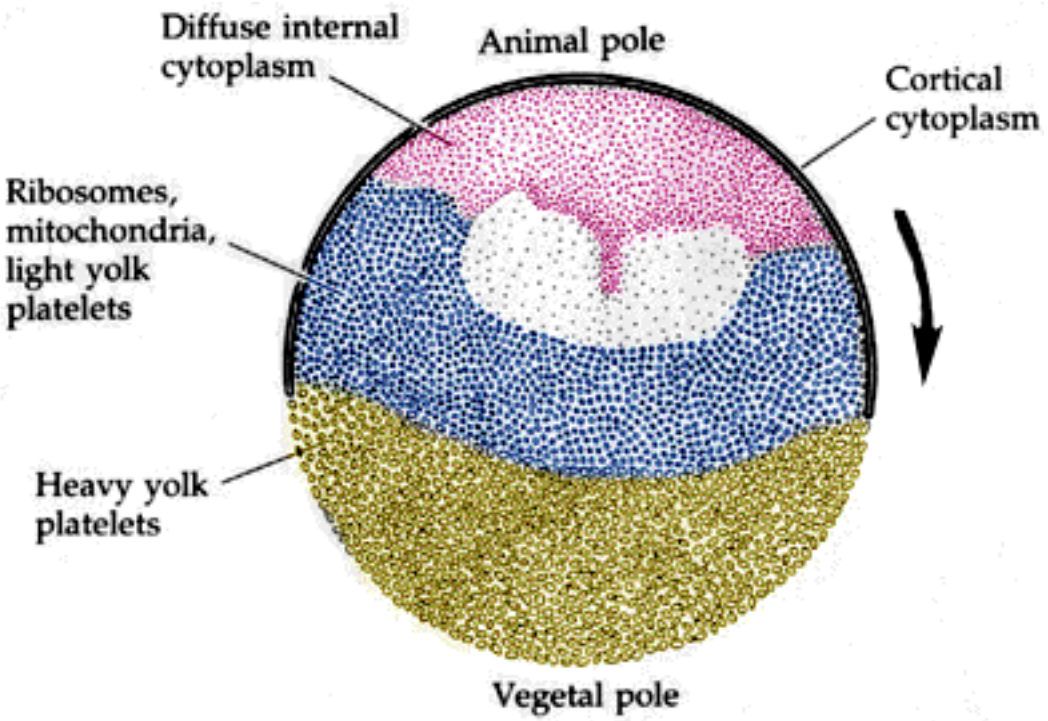




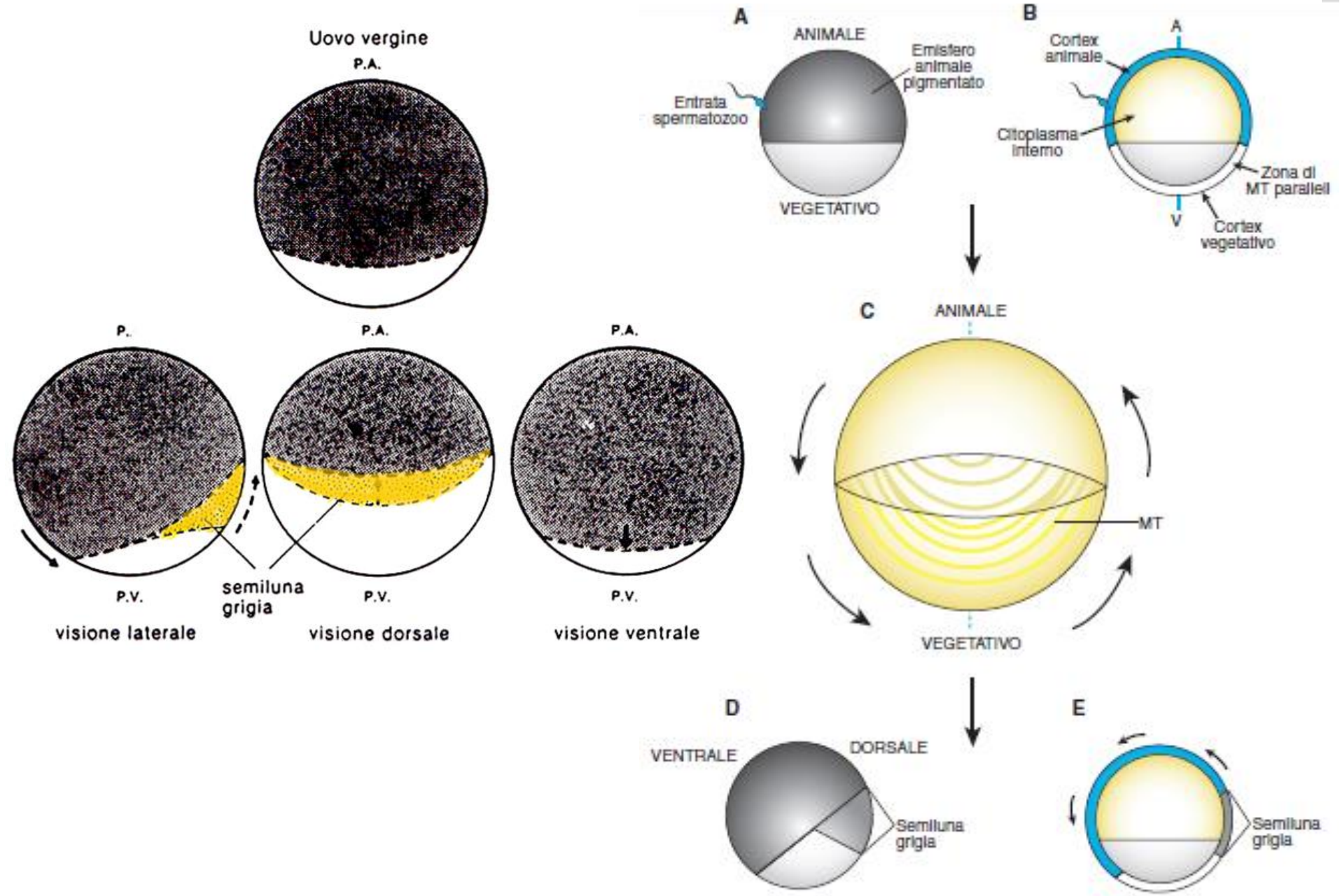


Uovo mesolecitico
Il vitello e' maggiormente concentrato al polo vegetativo
Il citoplasma corticale animale e' ricco di melanina

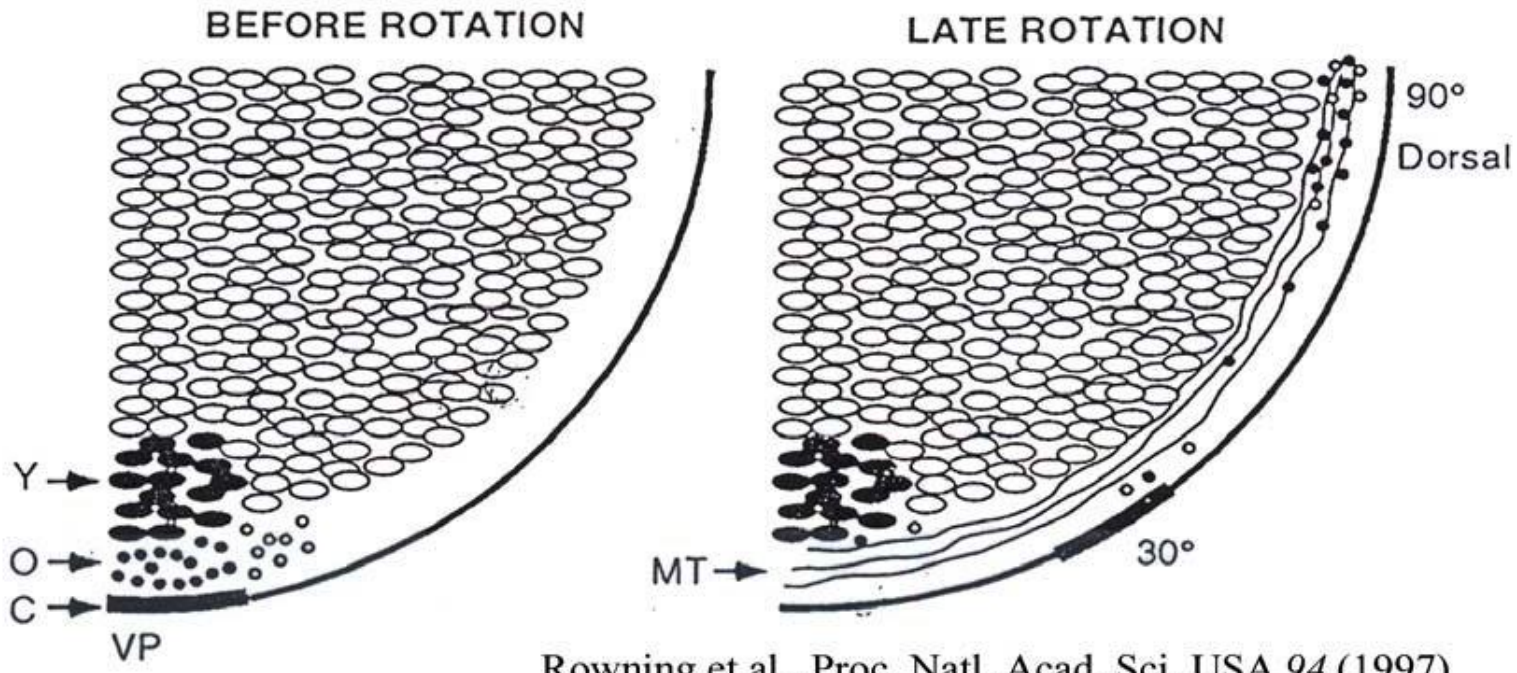




LA FECONDAZIONE ATTIVA LA ROTAZIONE CORTICALE



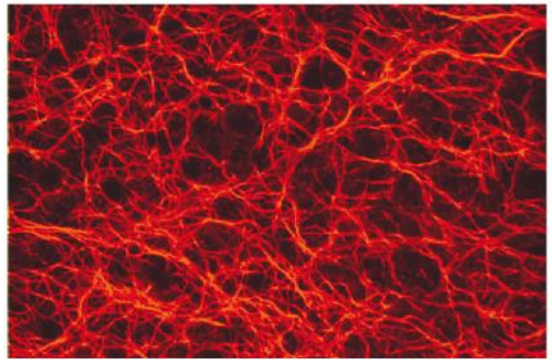
LA ROTAZIONE CORTICALE AVVIENE MEDIANTE UNA RIORGANIZZAZIONE DEI MICROTUBULI

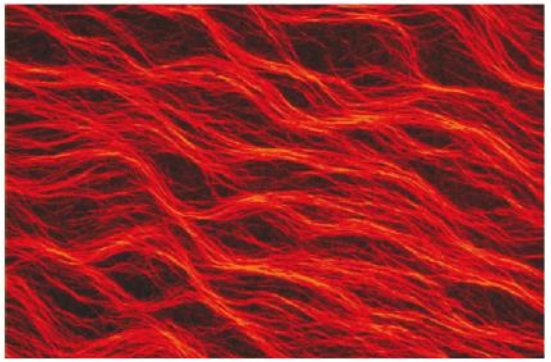


Rowning et al., Proc. Natl. Acad. Sci. USA *94* (1997)

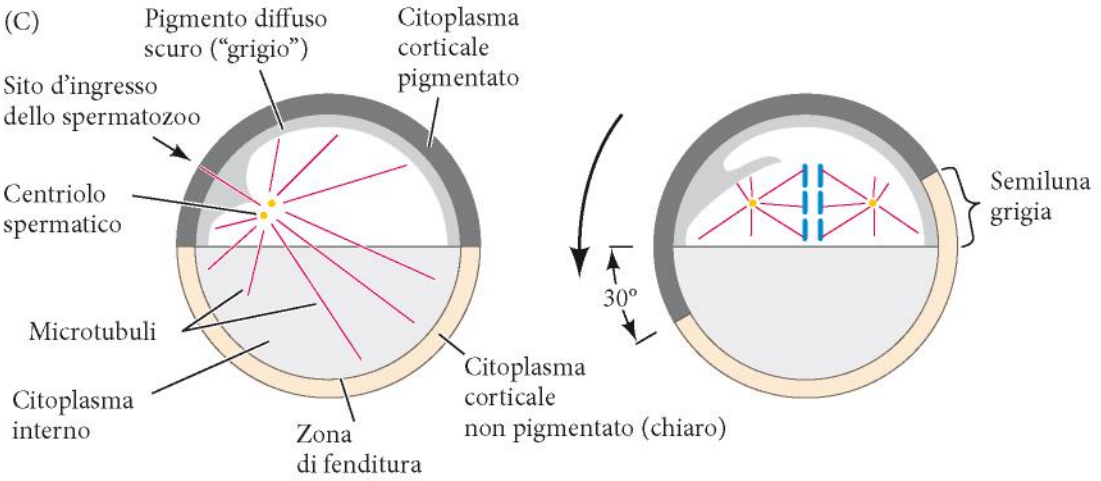
(A) 0,50

(B) 0,70

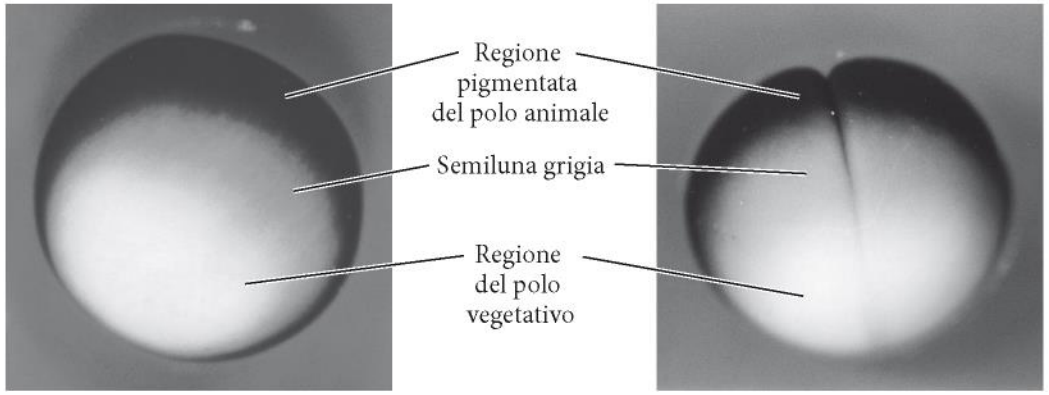




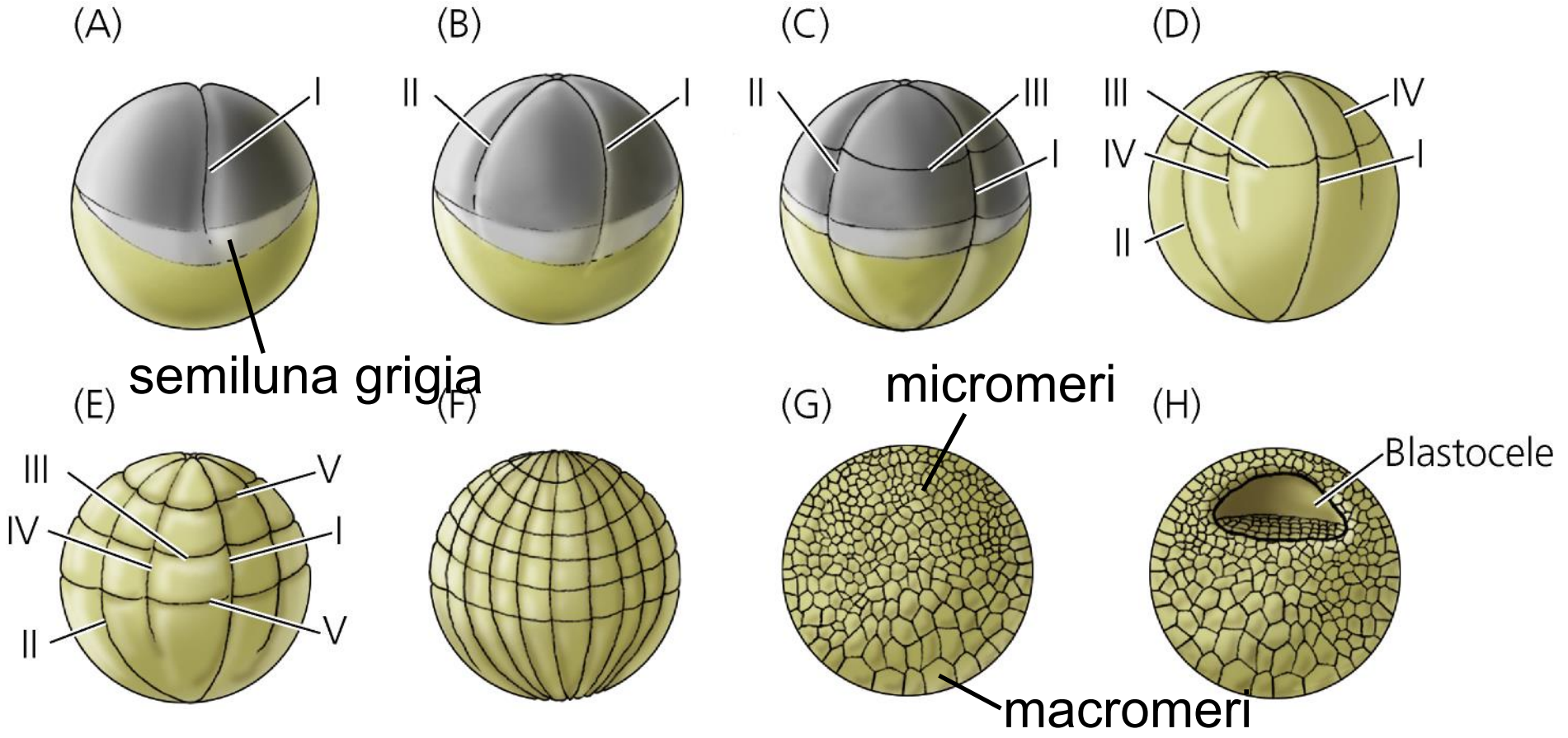
(C)

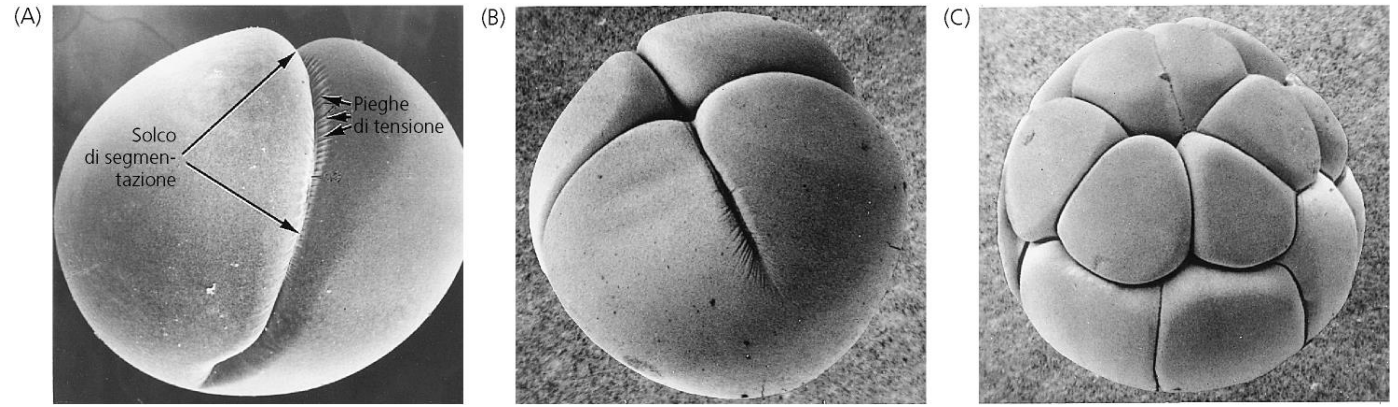

Pigmento diffuso scuro ("grigio")
Citoplasma corticale pigmentato
Sito d'ingresso dello spermatozoo
Centriolo spermatico
Microtubuli
Citoplasma interno
Zona di fenditura
Citoplasma corticale non pigmentato (chiaro)
30°
Semiluna grigia

(D)


Regione pigmentata del polo animale
Semiluna grigia
Regione del polo vegetativo

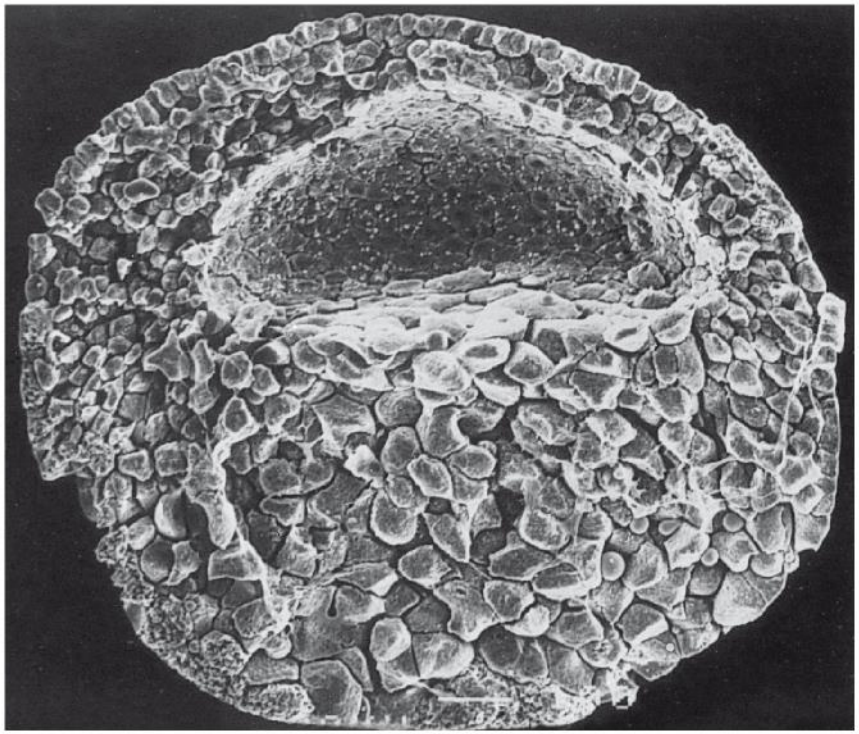
SEGMENTAZIONE OLOBLASTICA RADIALE INEGUALE



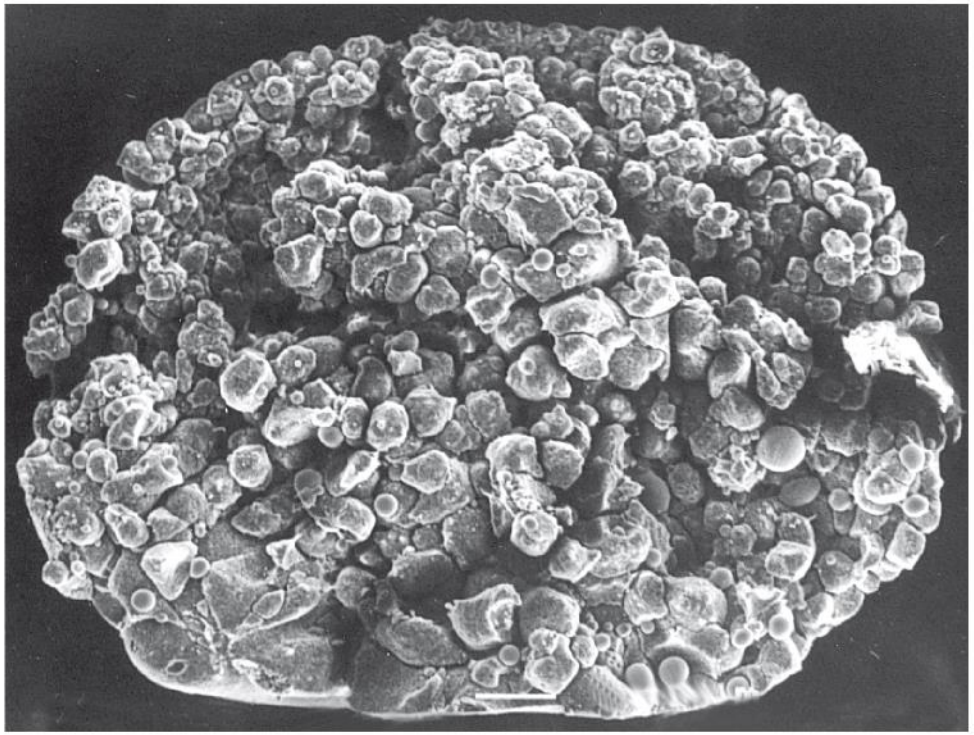


L’interazione fra i blastomeri e’ promossa da molecole di adesione (Caderine)

(A)



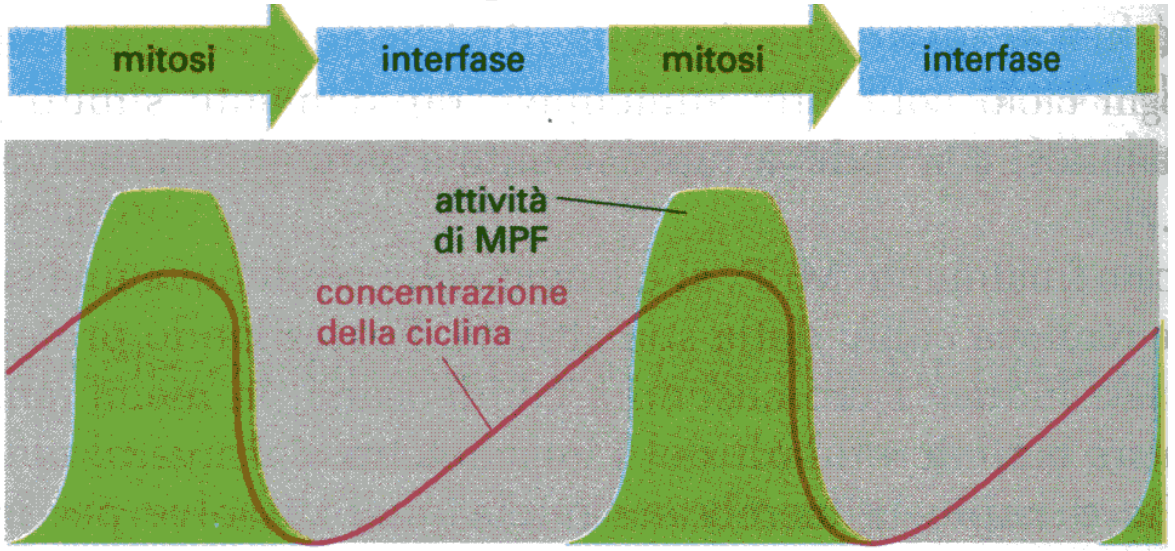
(B)

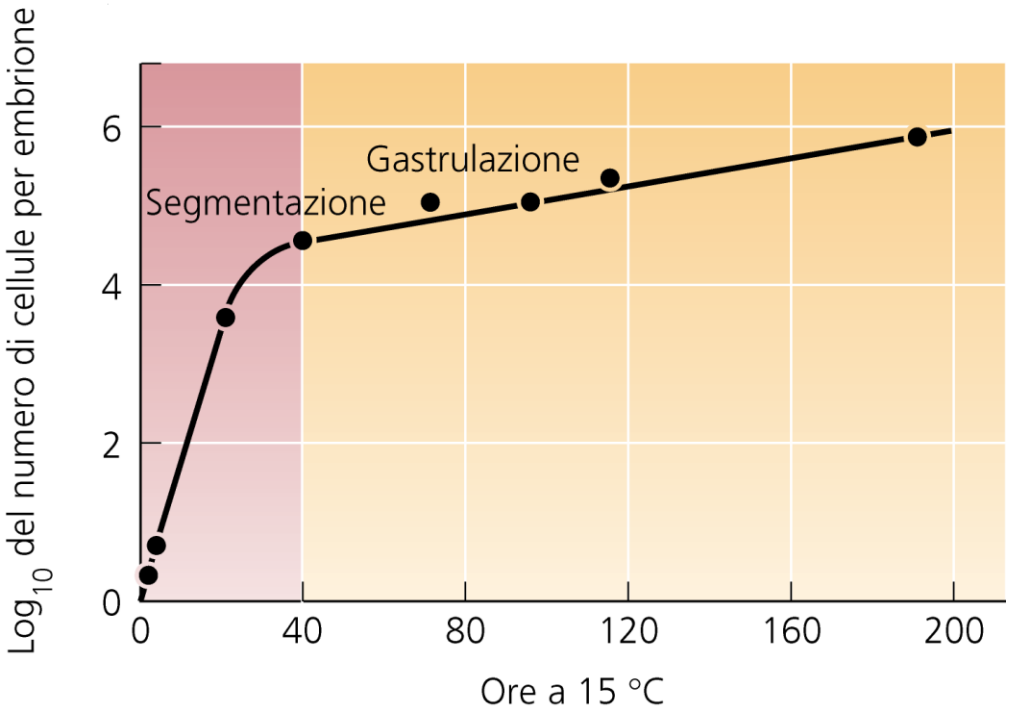


La segmentazione degli anfibi è caratterizzata da divisioni veloci e sincrone; il ciclo è bifasico M → S

I cicli bifasici durante la segmentazione sono regolati dal fattore MPF. E' costituito dalla ciclina B e una chinasi attivata dalla ciclina B. E' attivo in fase M, ma non in fase S in quanto la ciclina viene degradata.

Le divisioni rallentano poco prima della gastrulazione.



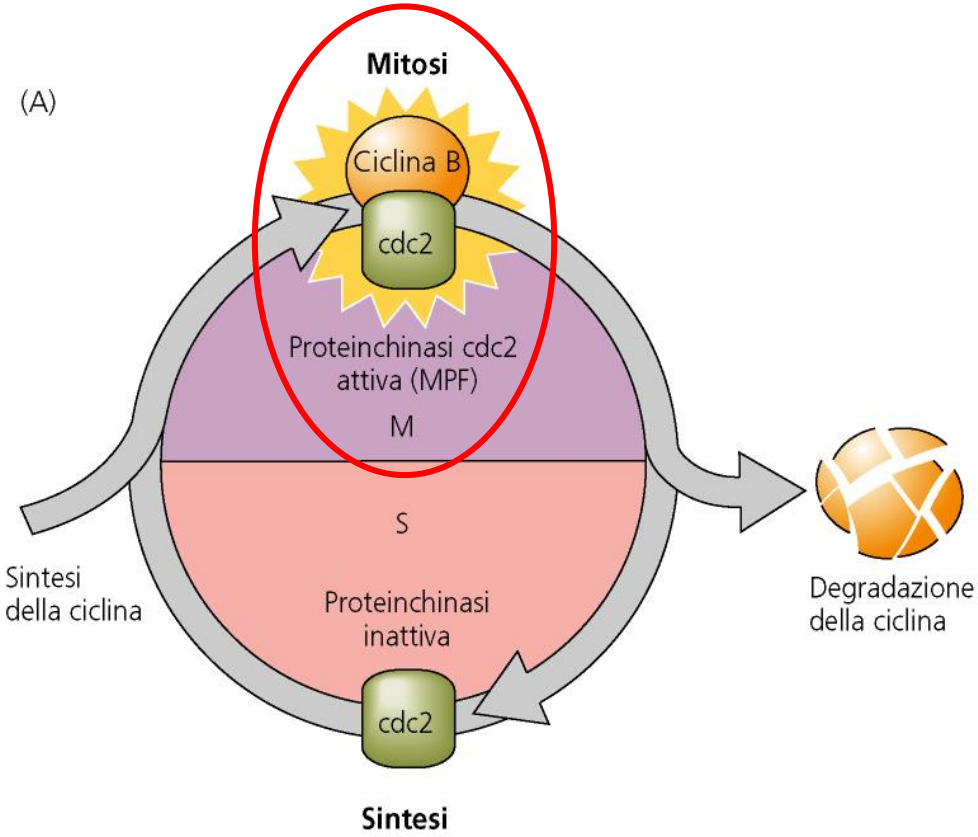


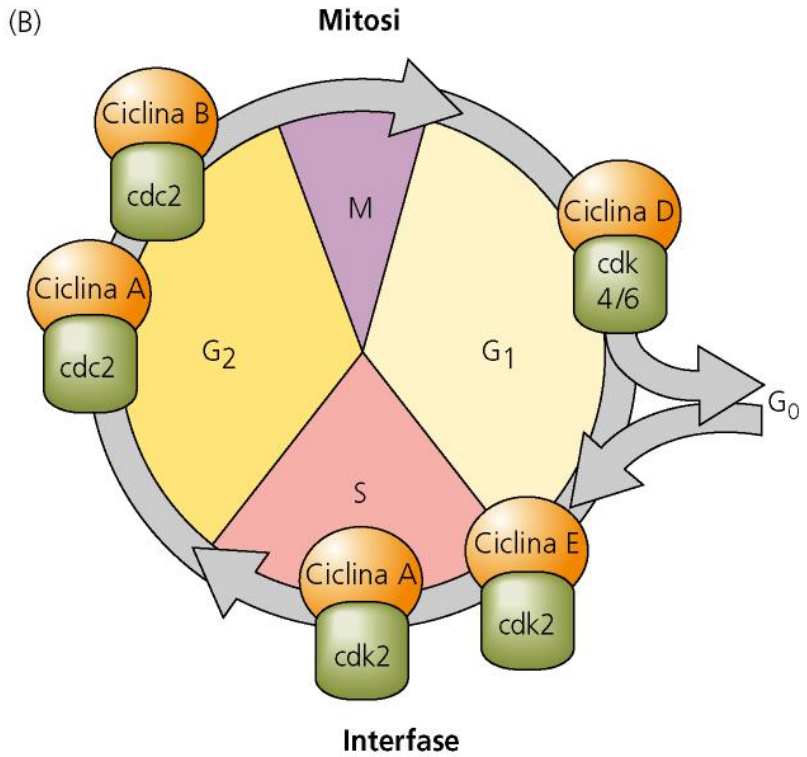
1) La ciclina B si accumula in fase S e si degrada dopo l'entrata in M

2) Il ciclo bifasico utilizza ciclina prodotta a partire da mRNA materni

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

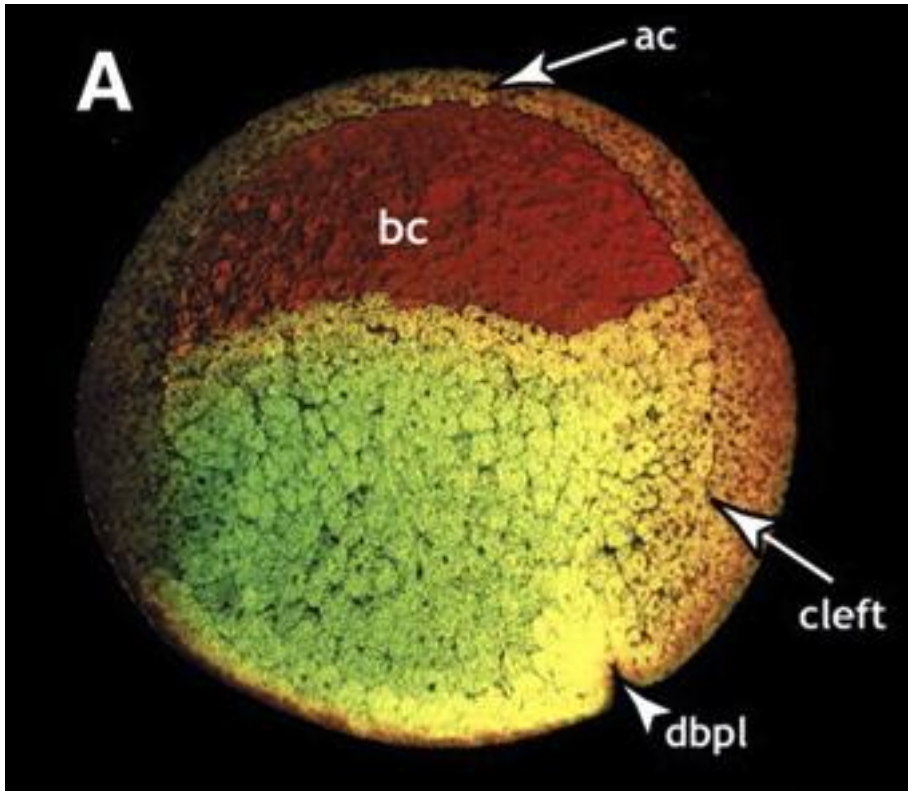


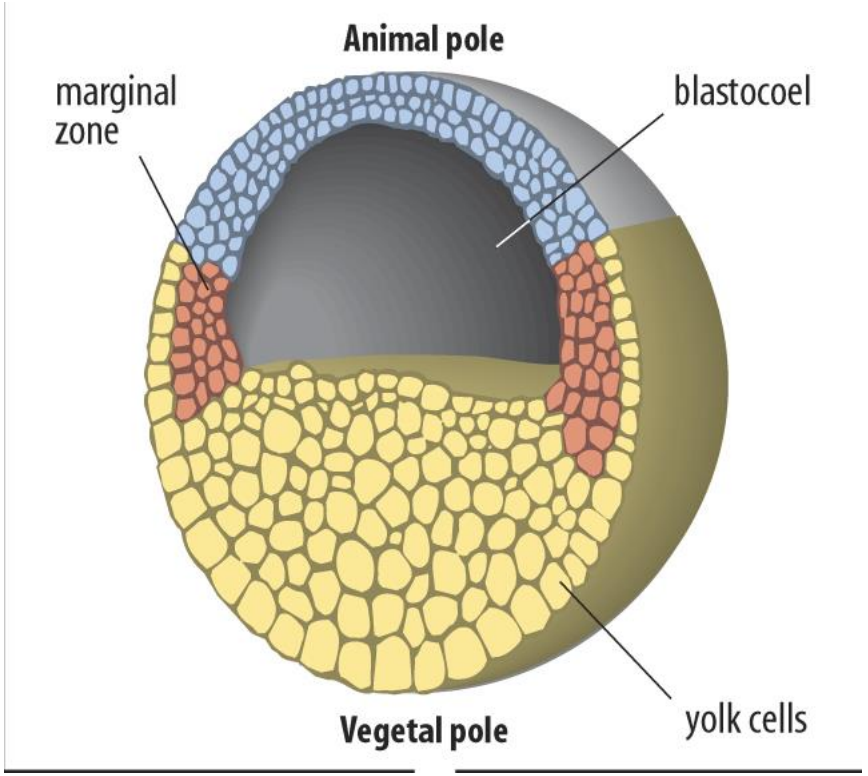


MAPPA DEI TERRITORI PRESUNTIVI

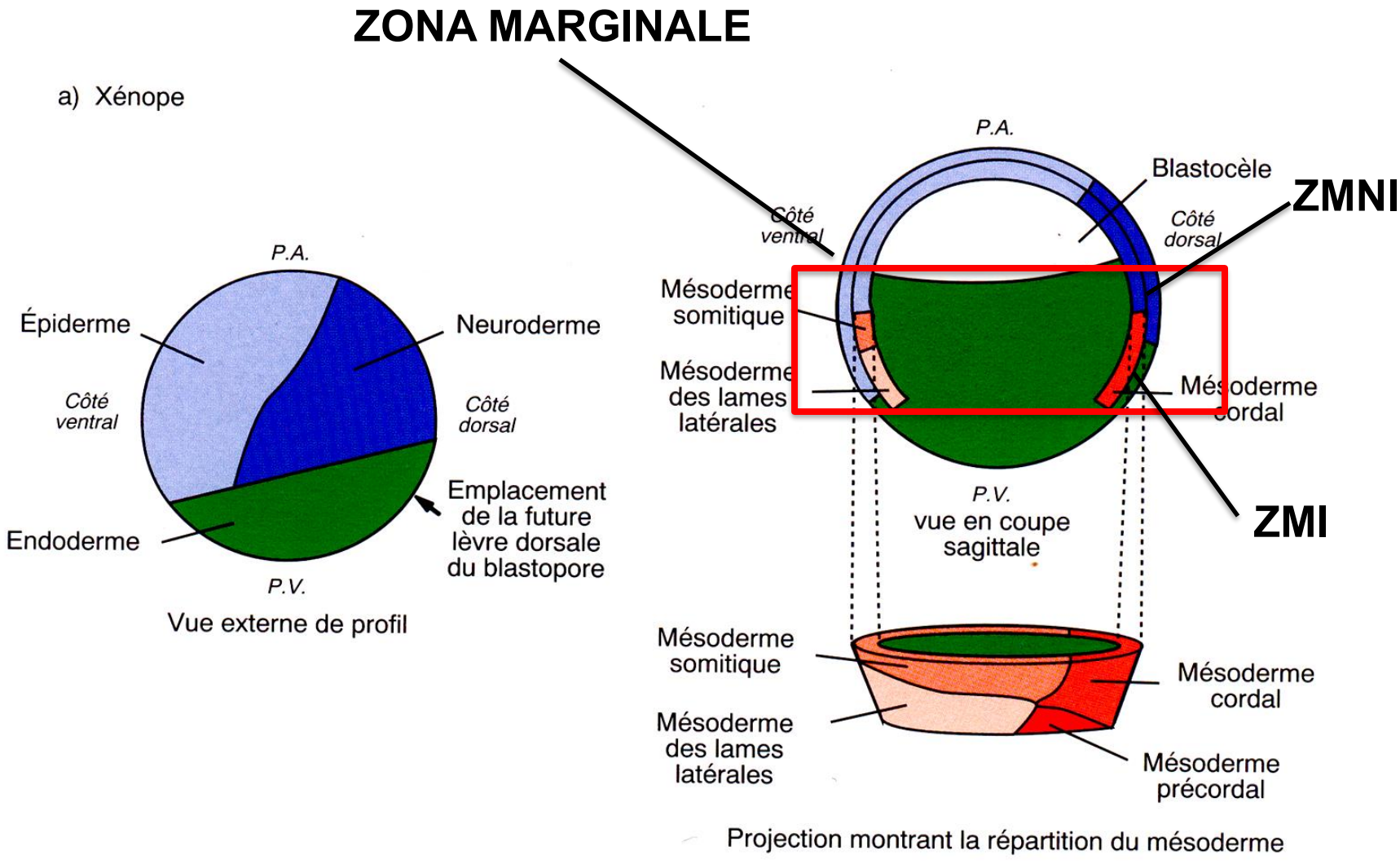
Blastula pluristratificata:
nella zona equatoriale (*zona marginale*) la mappa è diversa se la si osserva dall'esterno o dall'interno

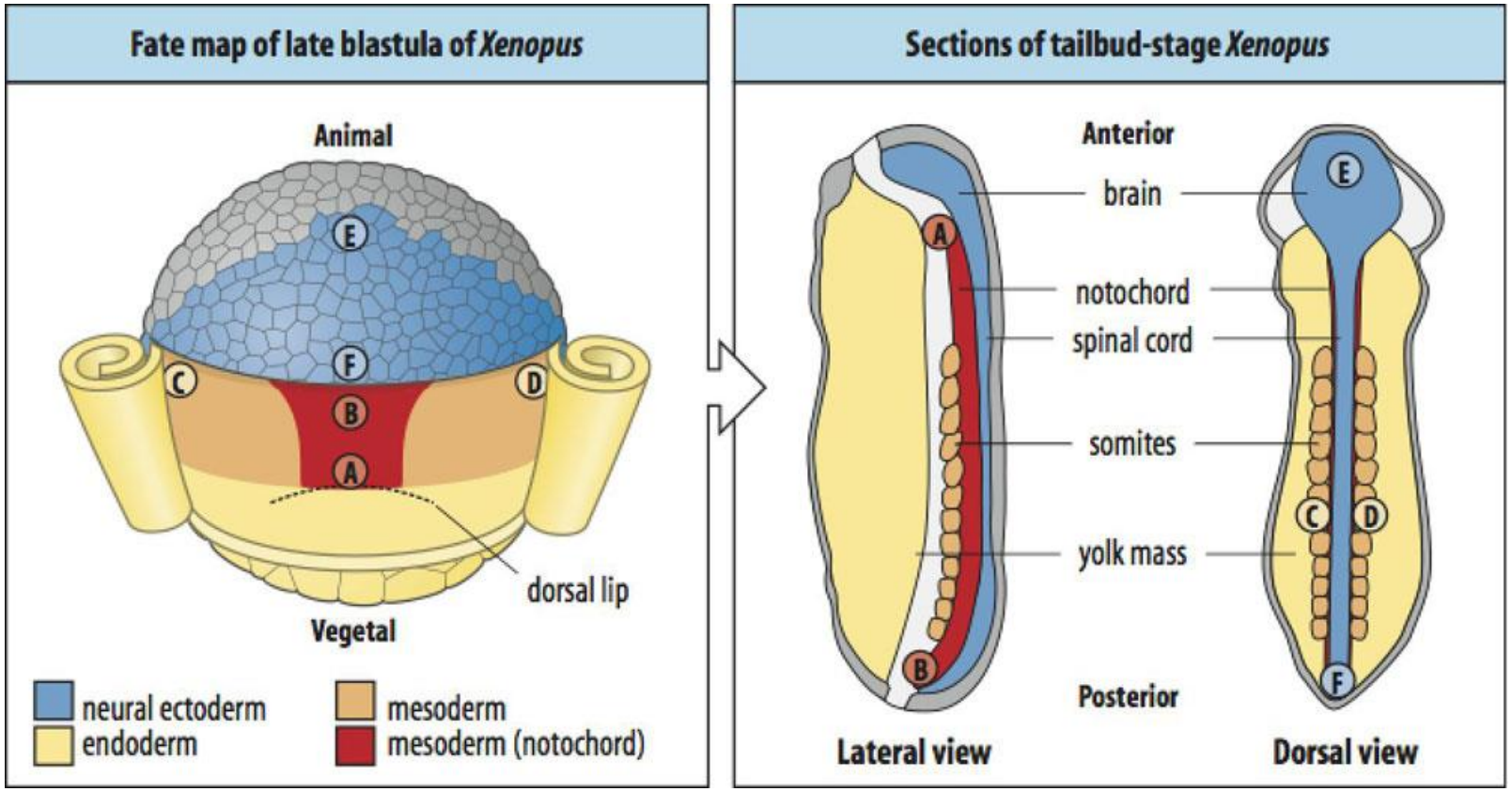
- Ectoderma
- Mesoderma
- Endoderma



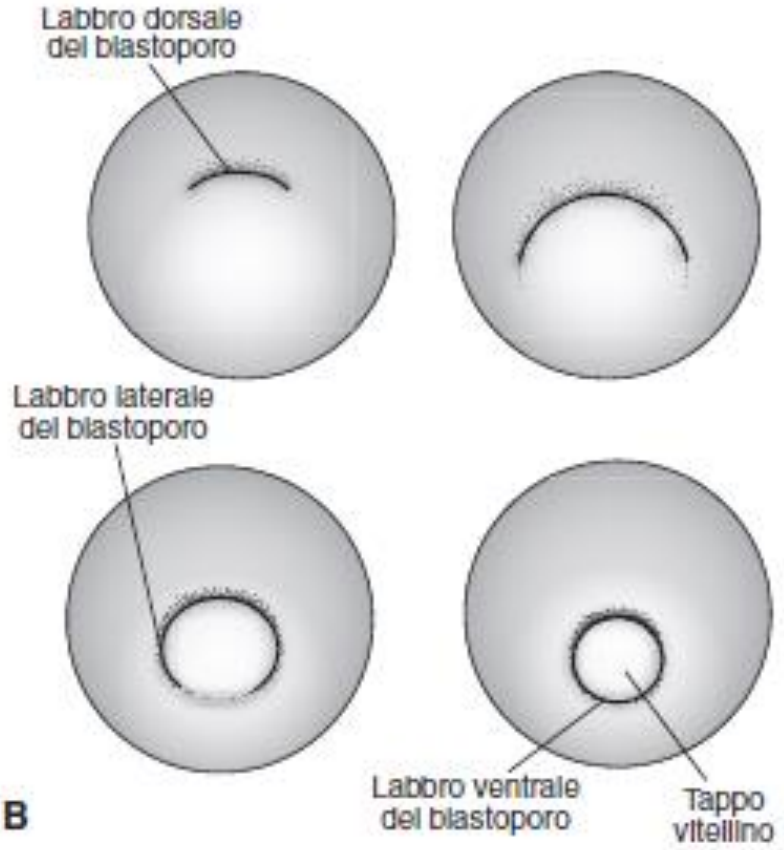


Mappa dei territori presuntivi negli *Anuri*

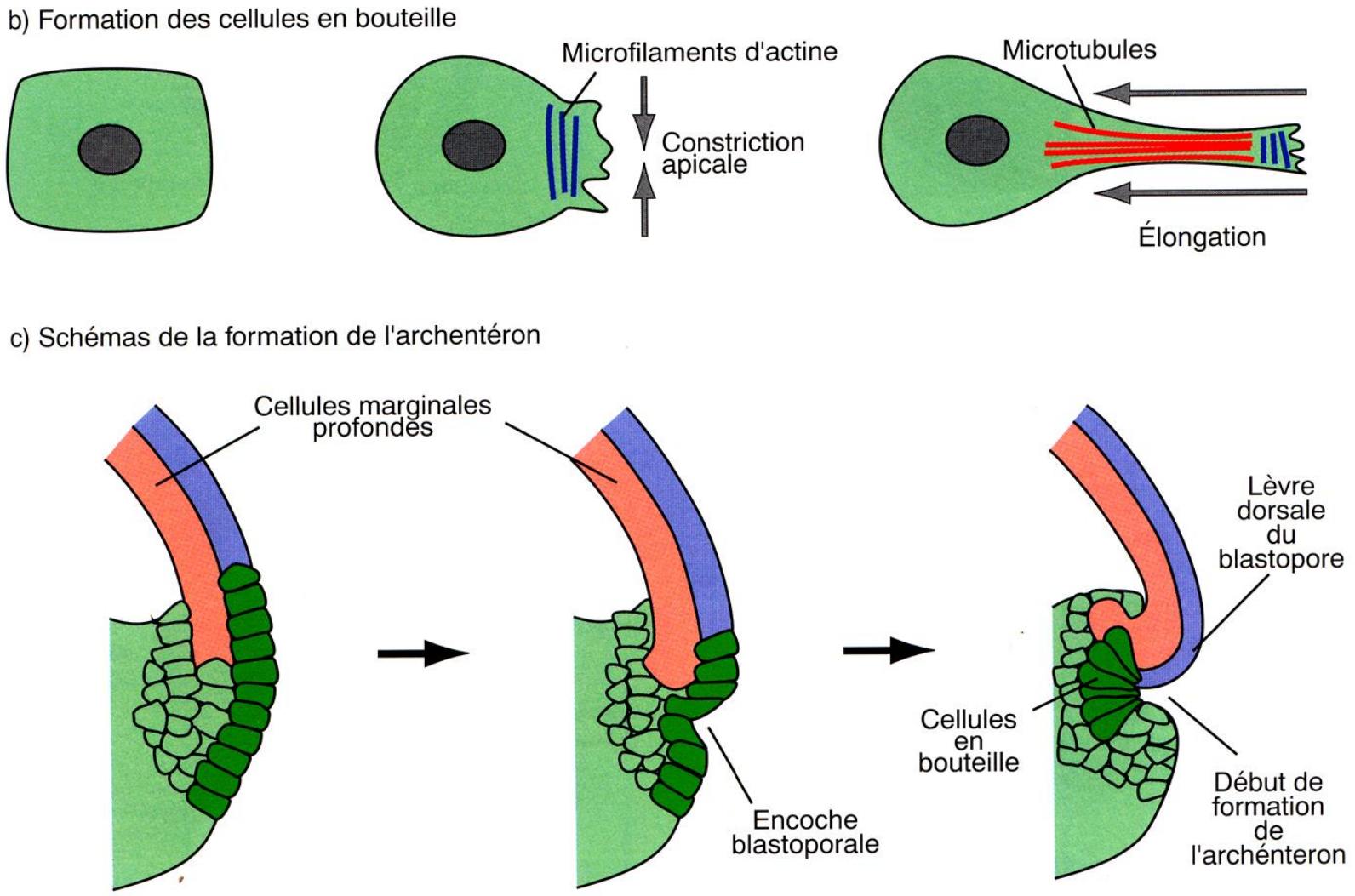



Fate map of late blastula of *Xenopus*
Animal
E
F
C
D
B
A
dorsal lip
Vegetal
neural ectoderm
endoderm
mesoderm
mesoderm (notochord)
Sections of tailbud-stage *Xenopus*
Anterior
brain
notochord
spinal cord
somites
yolk mass
Posterior
Lateral view
Dorsal view

LA FORMAZIONE DEL BLASTOPORO PROCEDE IN DIREZIONE DORSO-VENTRALE ATTORNO AL TAPPO VITELLINO



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



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

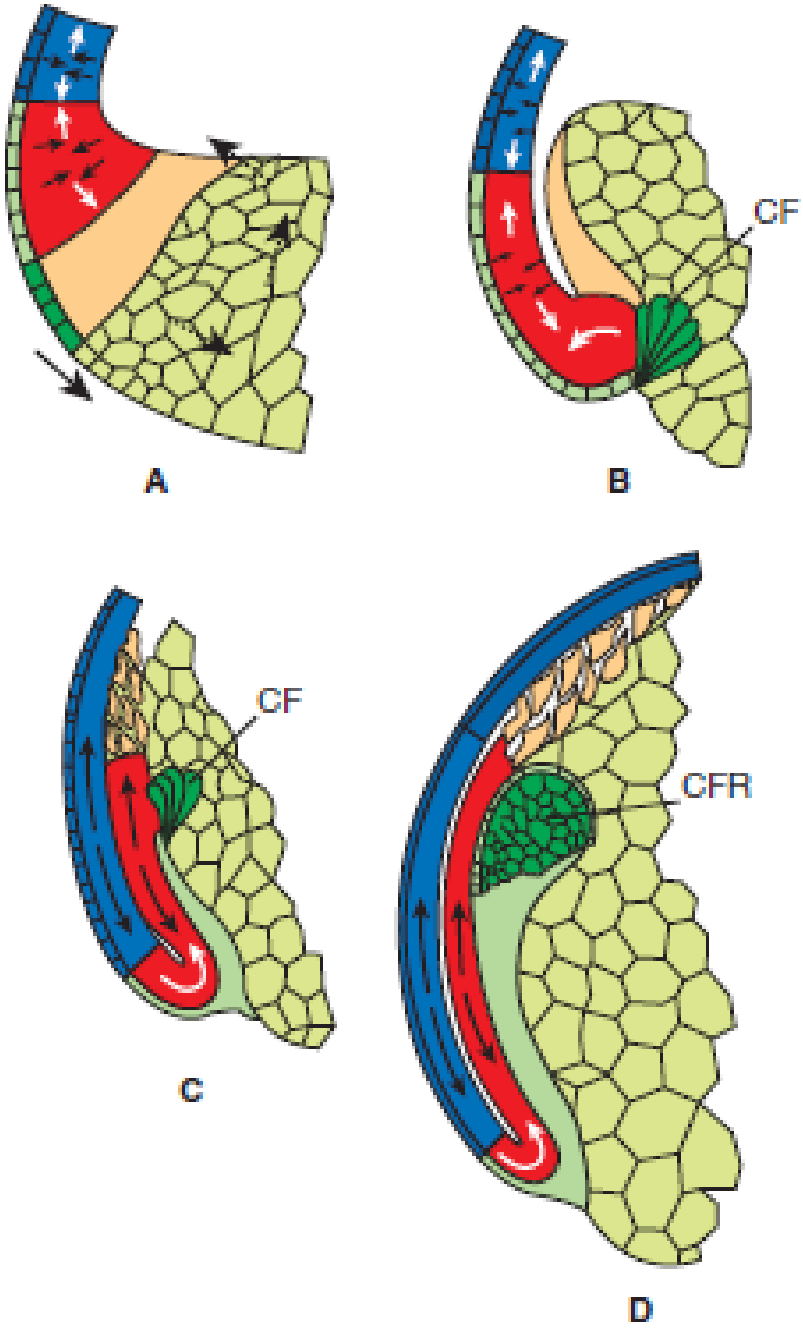
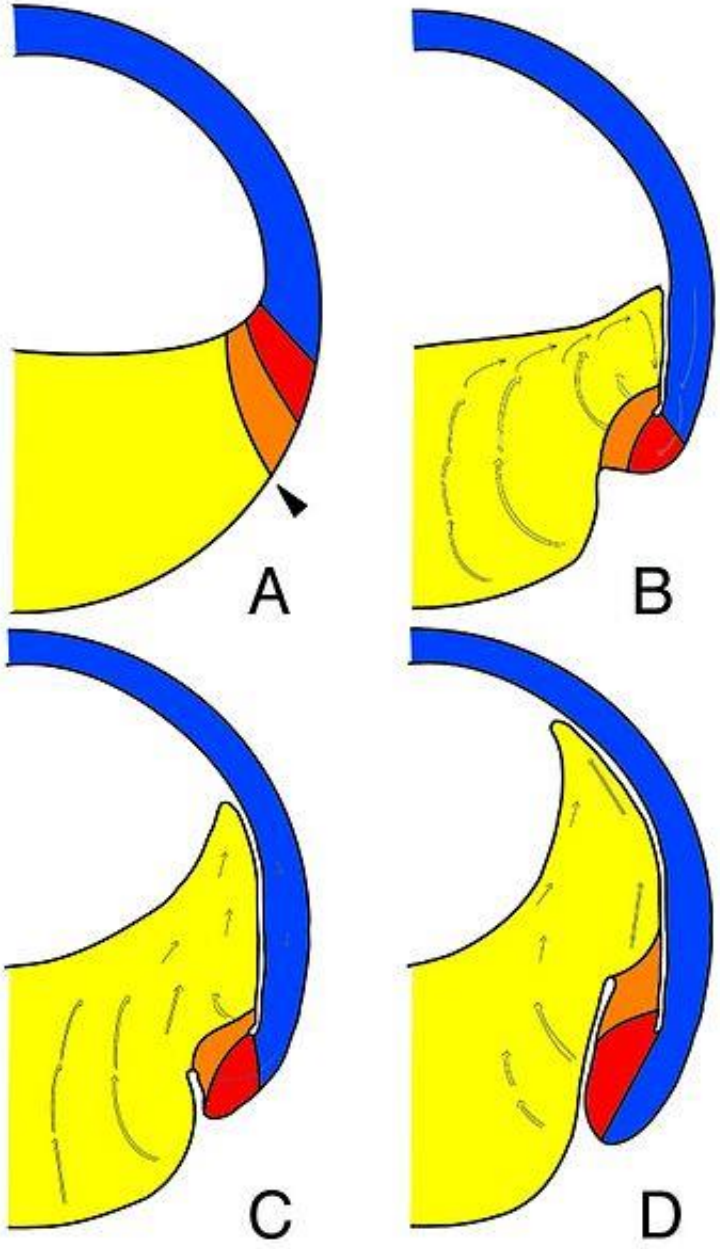
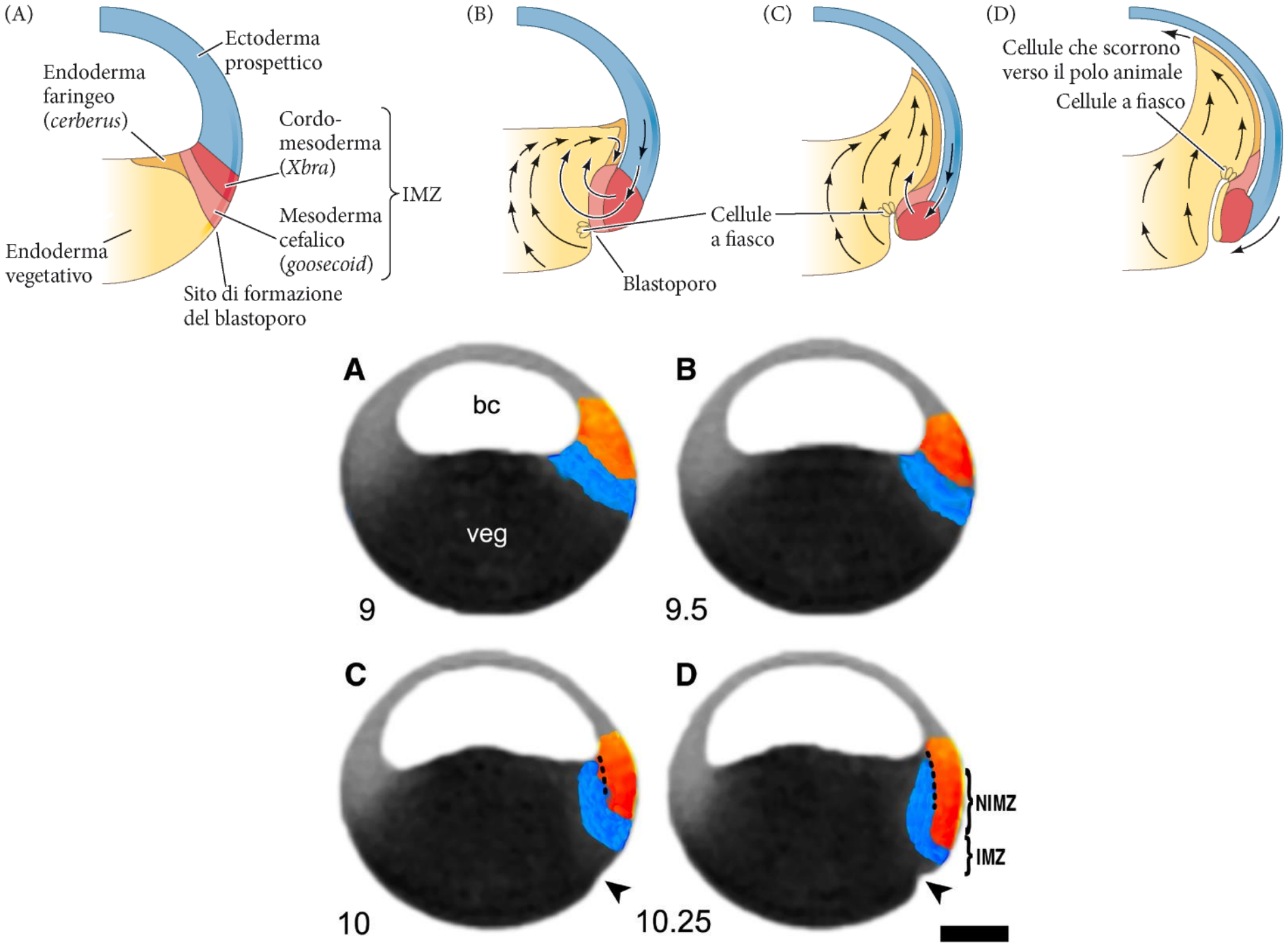


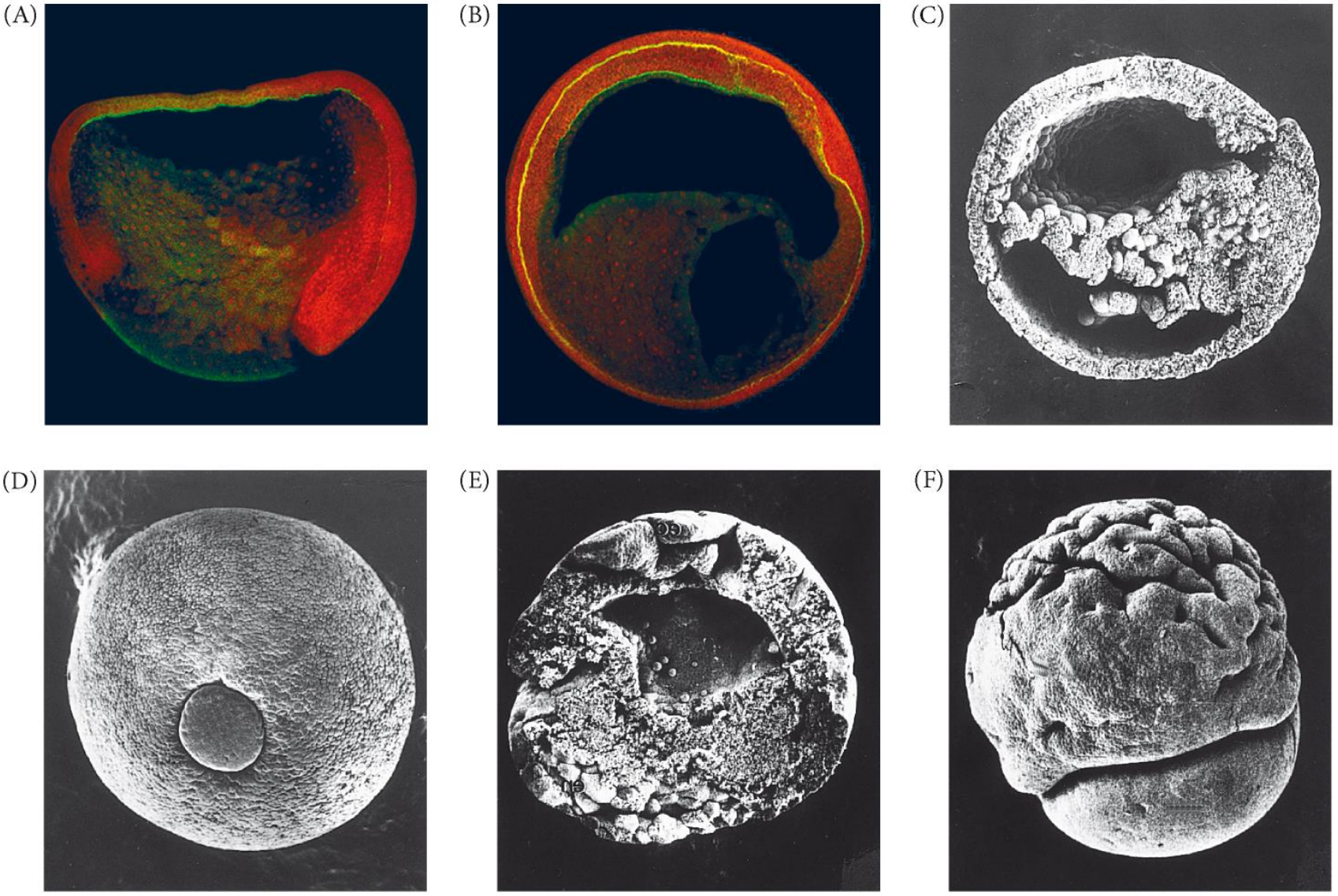
Figura 7

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

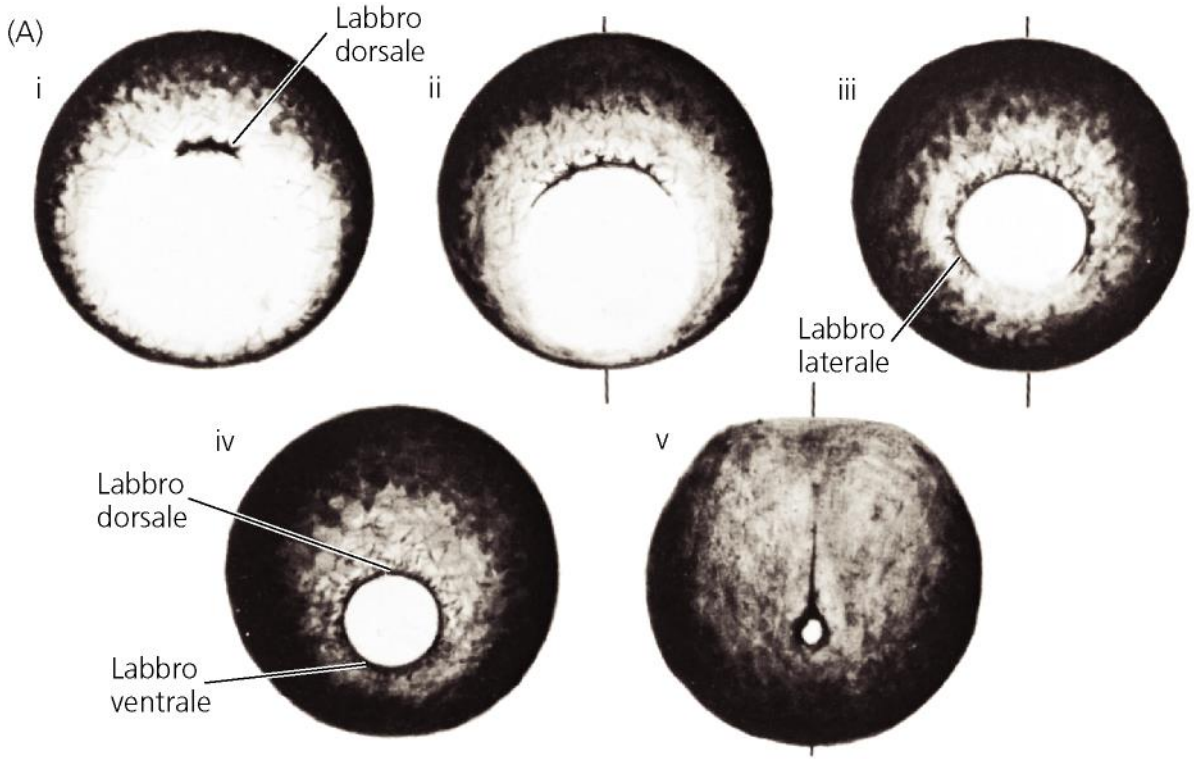


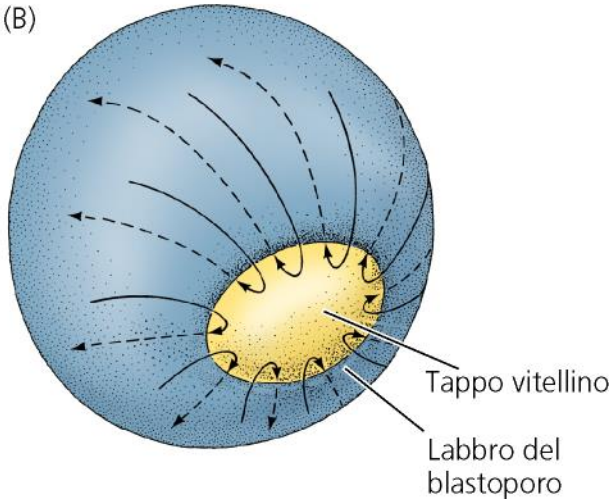

(A)
Ectoderma prospettico
Endoderma faringeo (*cerberus*)
Cordo-mesoderma (*Xbra*)
IMZ
Mesoderma cefalico (*goosecoid*)
Endoderma vegetativo
Sito di formazione del blastoporo
(B)
Cellule a fiasco
Blastoporo
(C)
(D)
Cellule che scorrono verso il polo animale
Cellule a fiasco
A
bc
veg
9
B
9.5
C
10
D
10.25
NIMZ
IMZ

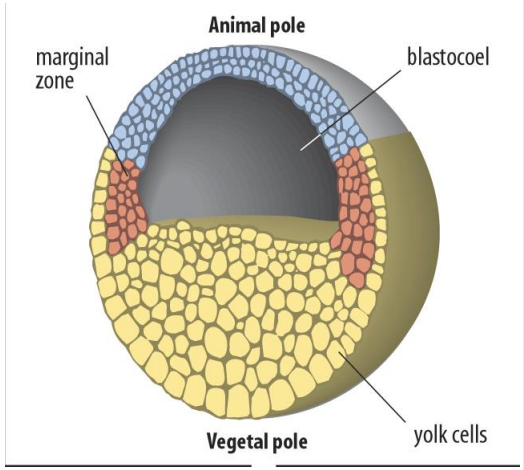
I MOVIMENTI DI INVOLUZIONE SONO MEDIATI DA INTERAZIONI DELLE CELLULE MESENDODERMICHE CON LA MATRICE EXTRA-CELLULARE PRODOTTA DALLE CELLULE DEL TETTO DEL BLASTOCELE

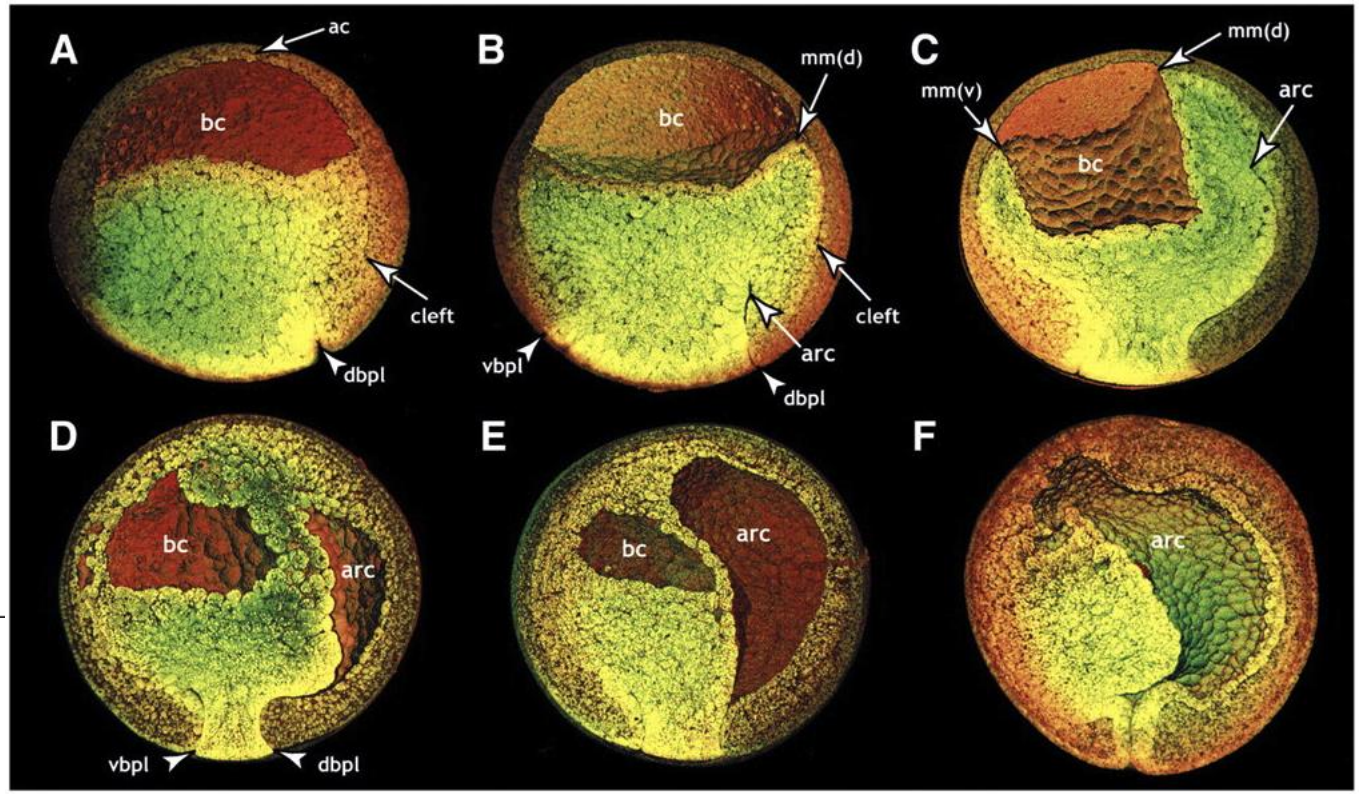


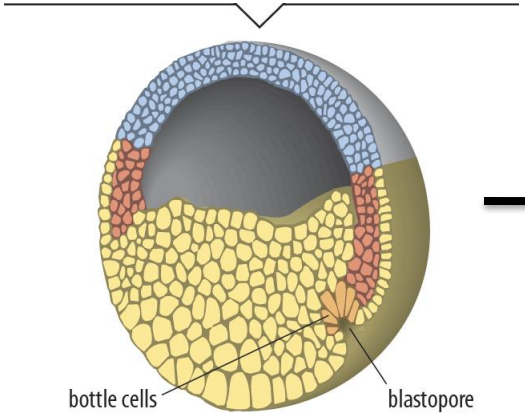
I MOVIMENTI DI GASTRULAZIONE SI ESTENDONO PROGRESSIVAMENTE IN DIREZIONE DORSO-VENTRALE

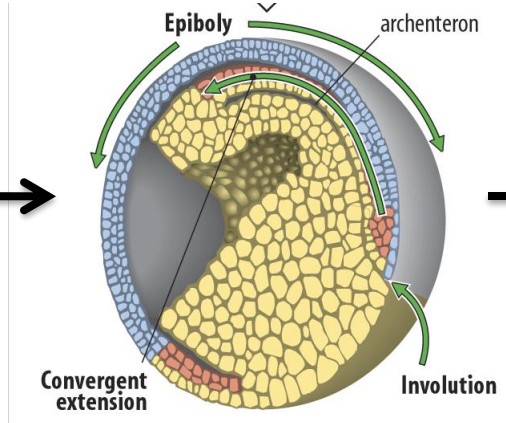


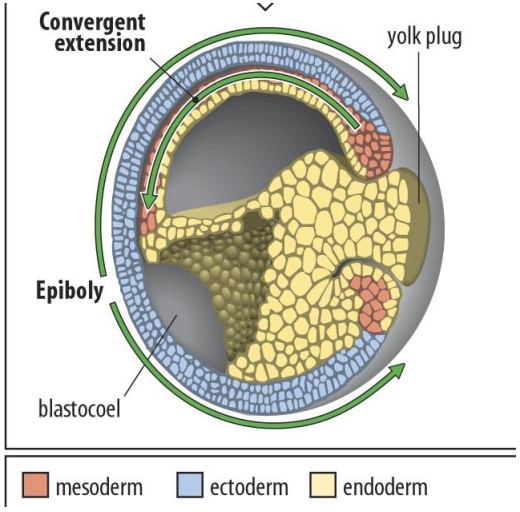



Animal pole
marginal zone
blastocoel
yolk cells
Vegetal pole

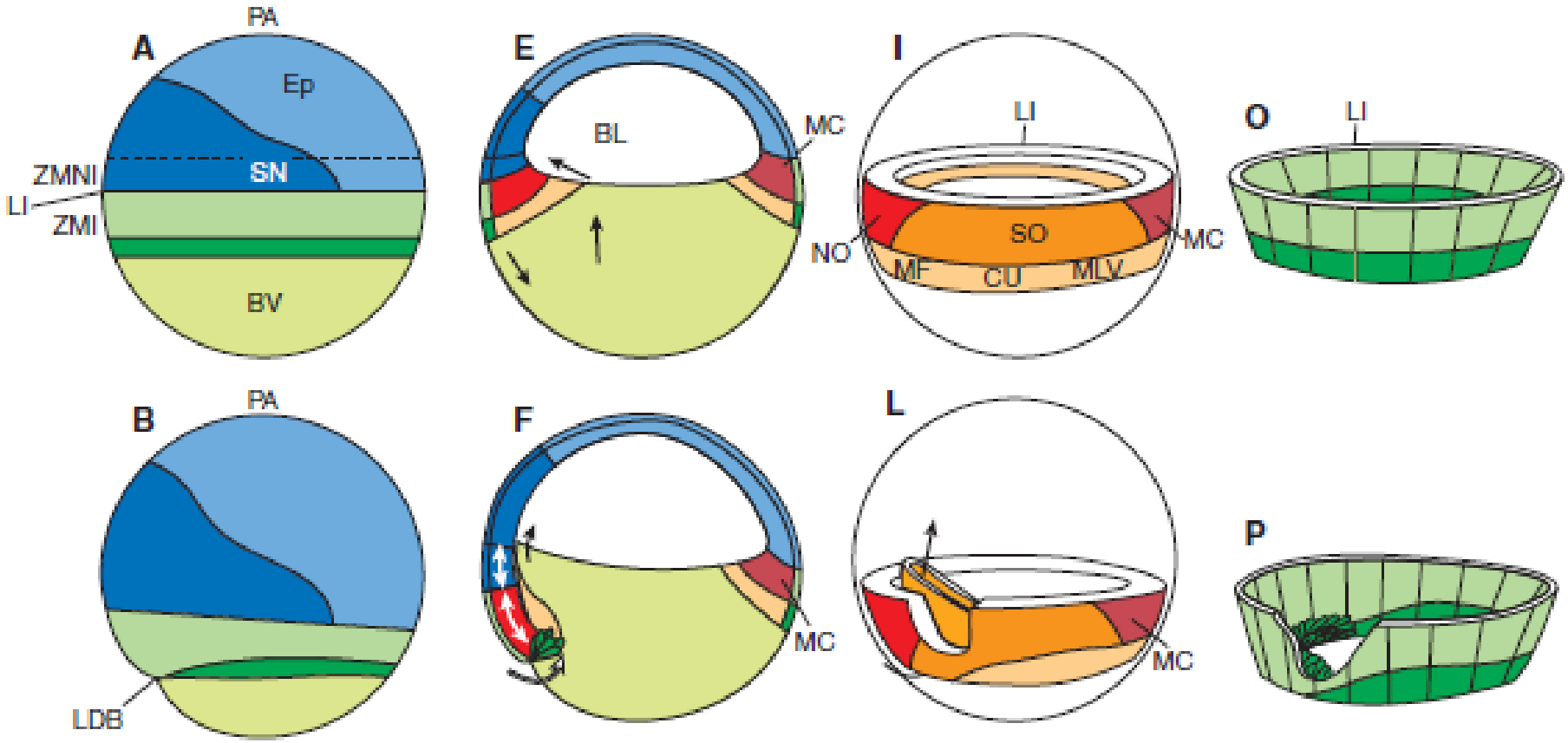

A
ac
bc
cleft
dbpl
B
mm(d)
bc
cleft
vbpl
arc
dbpl
C
mm(d)
mm(v)
arc
bc
D
bc
arc
vbpl
dbpl
E
bc
arc
F
arc


bottle cells
blastopore

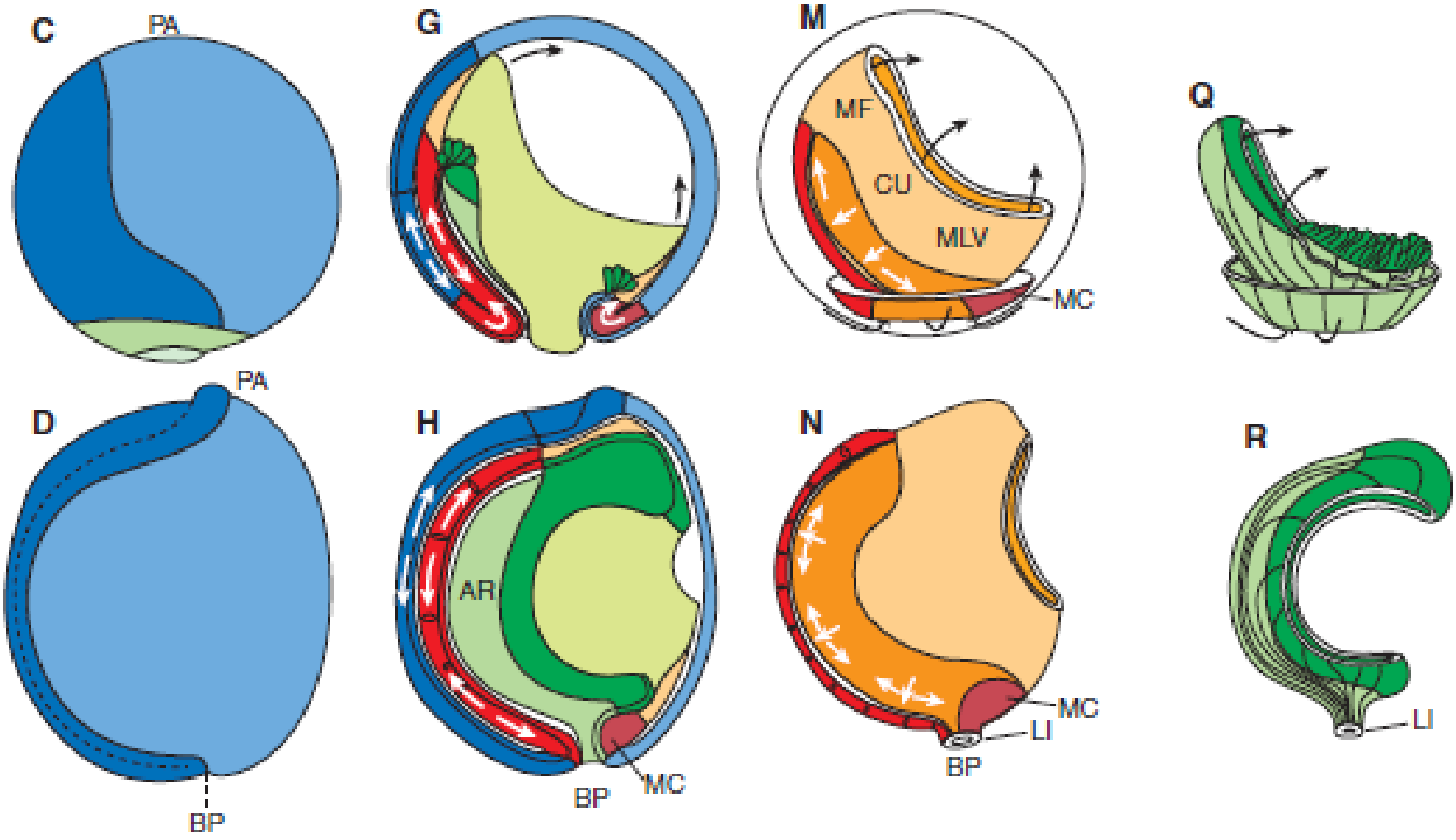

Epiboly
archenteron
Convergent extension
Involution

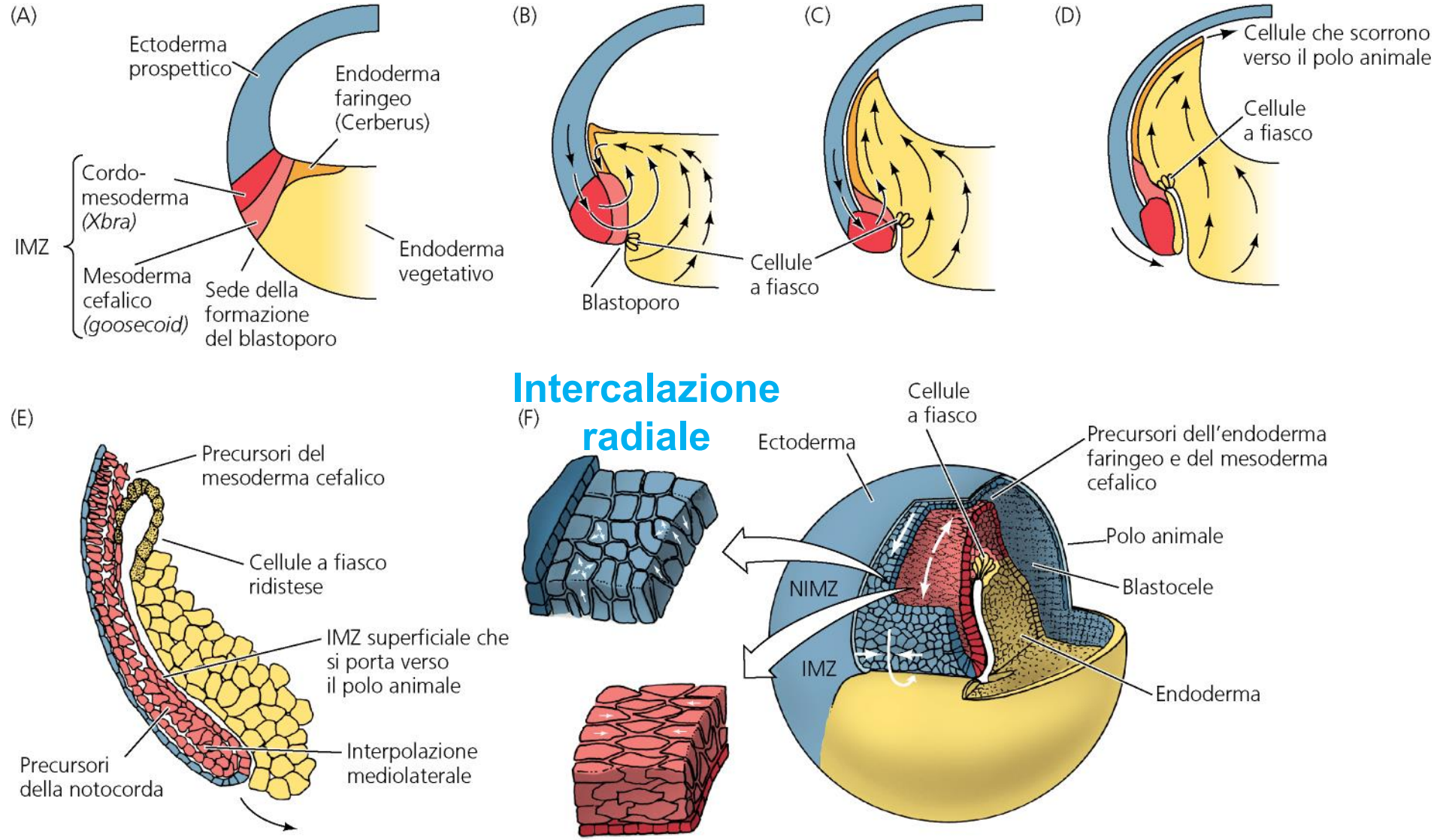

Convergent extension
yolk plug
Epiboly
blastocoel
mesoderm
ectoderm
endoderm

GASTRULA PRECOCE



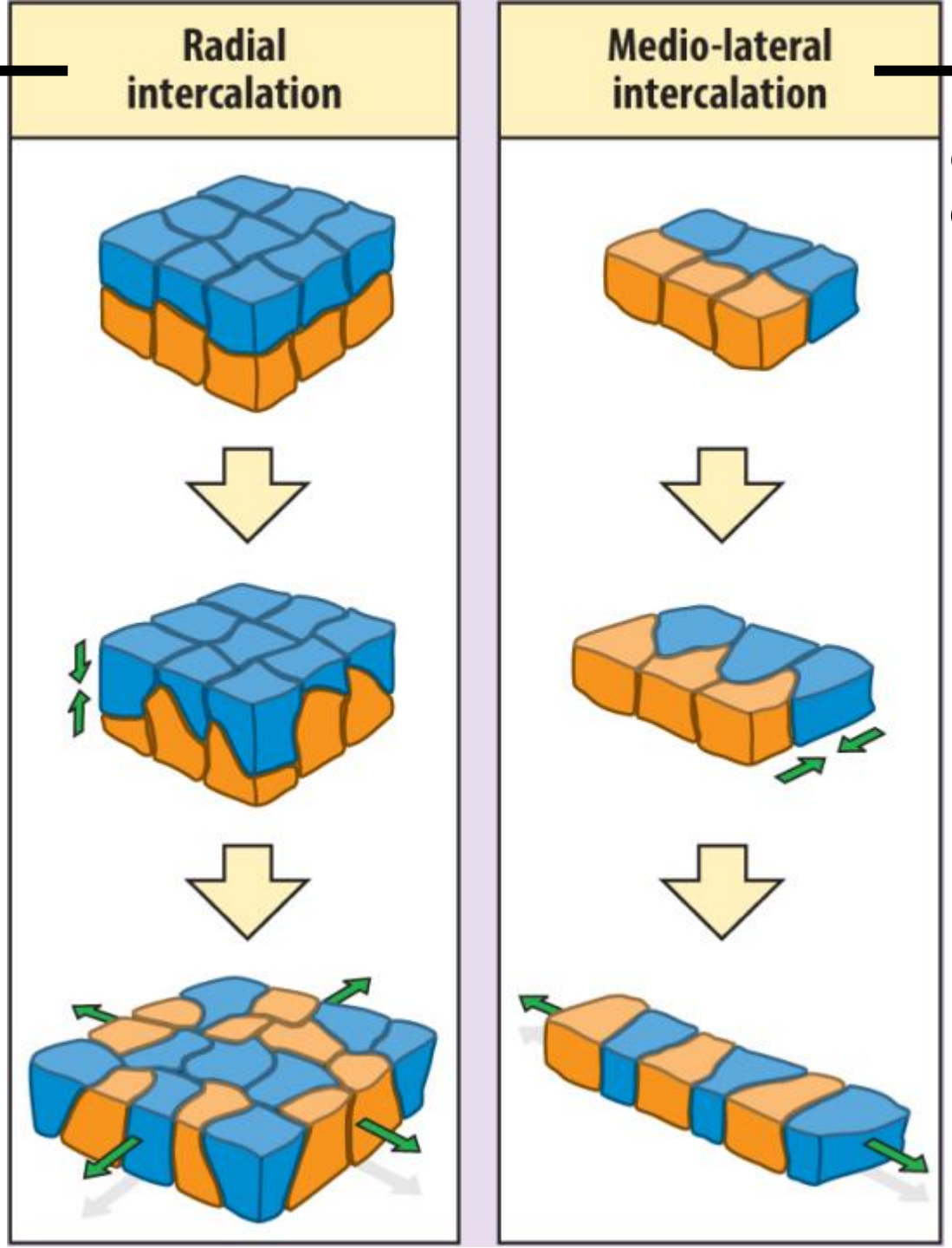
GASTRULA TARDIVA





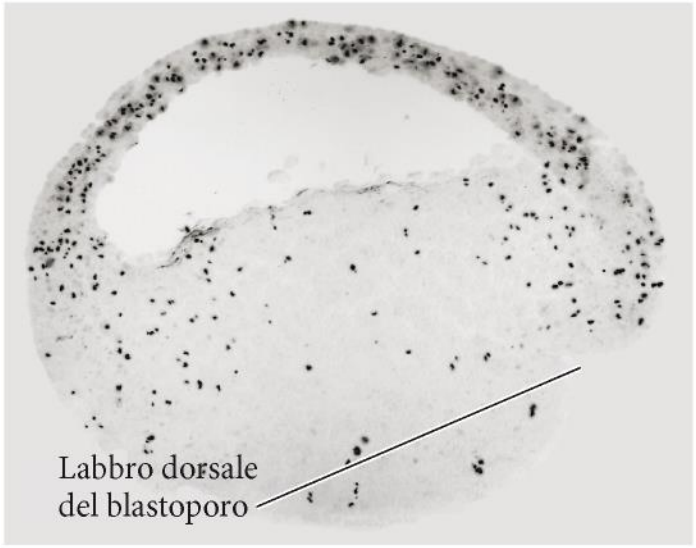
Invaginazione **Involuzione** **Epibolia**

Epibolia
dell'ectoderma

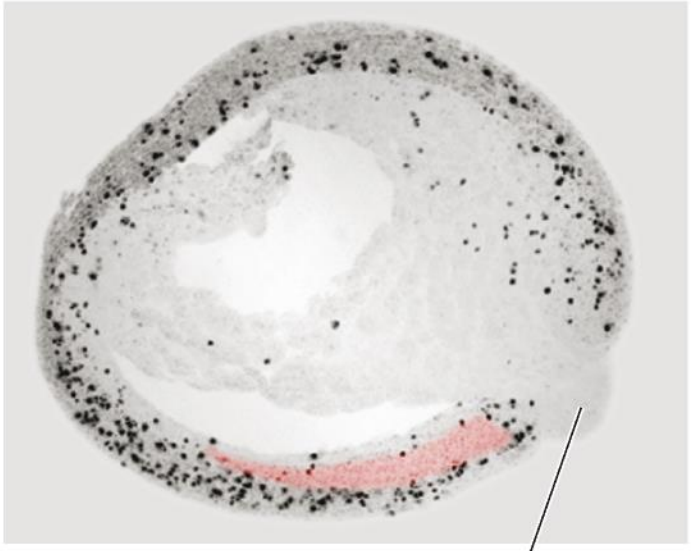


Estensione convergente
della notocorda, dell'archenteron e del tubo neurale

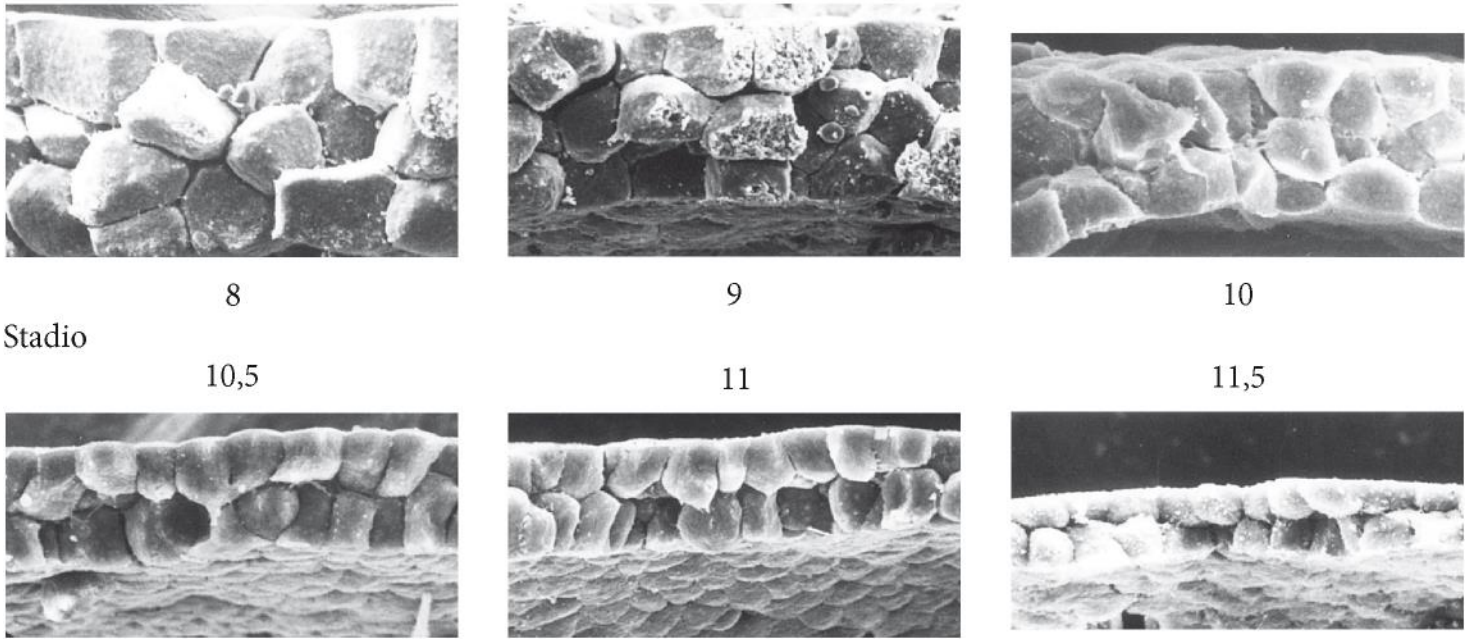
(A)


Labbro dorsale
del blastoporo

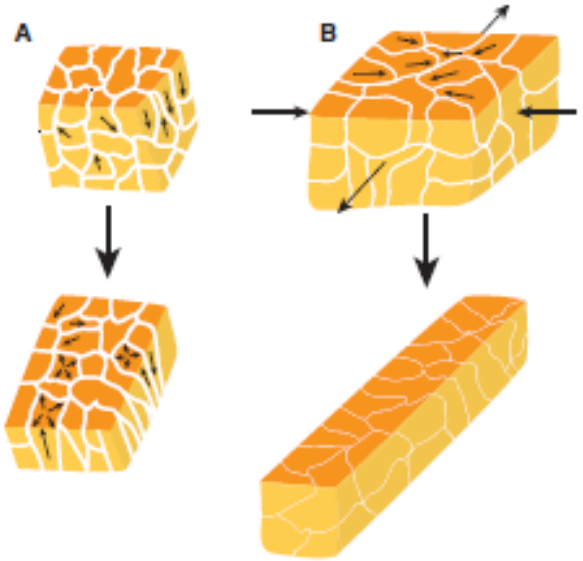
(B)

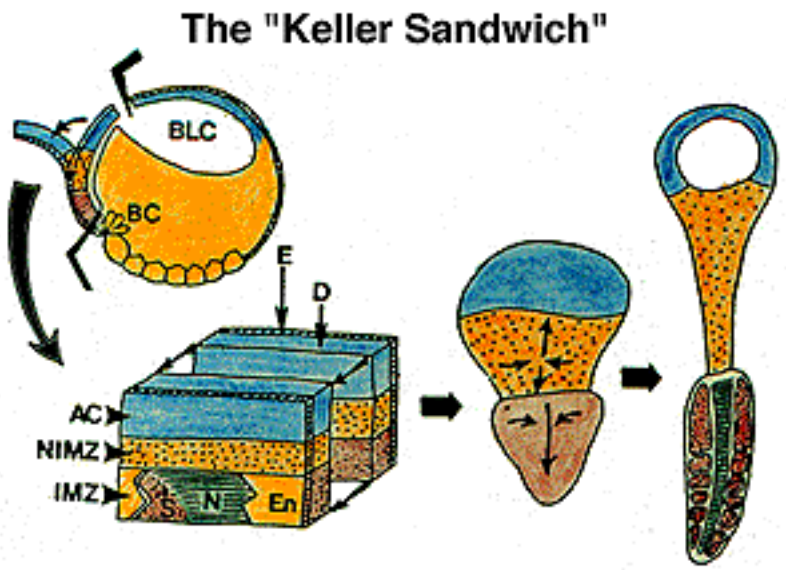

Tappo vitellino

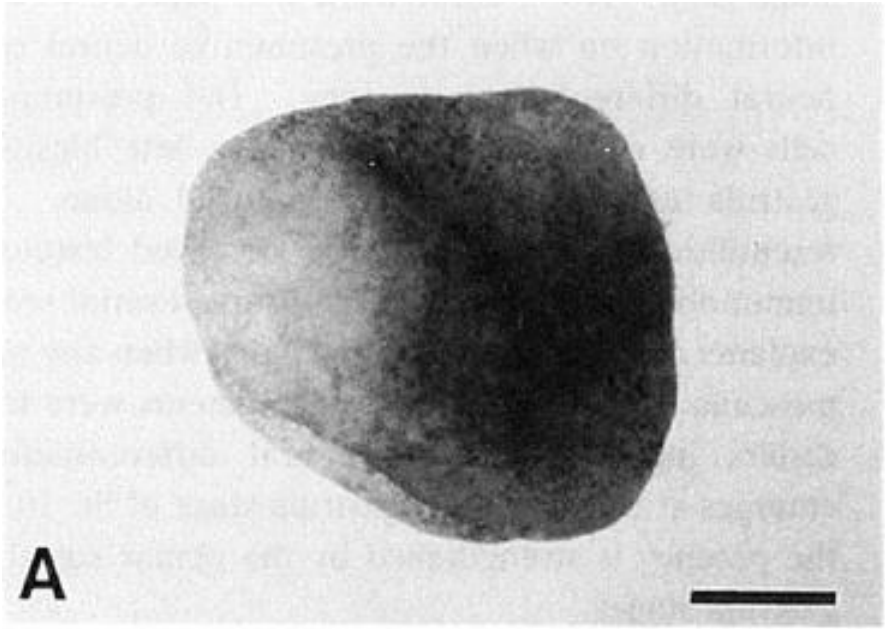
(C)

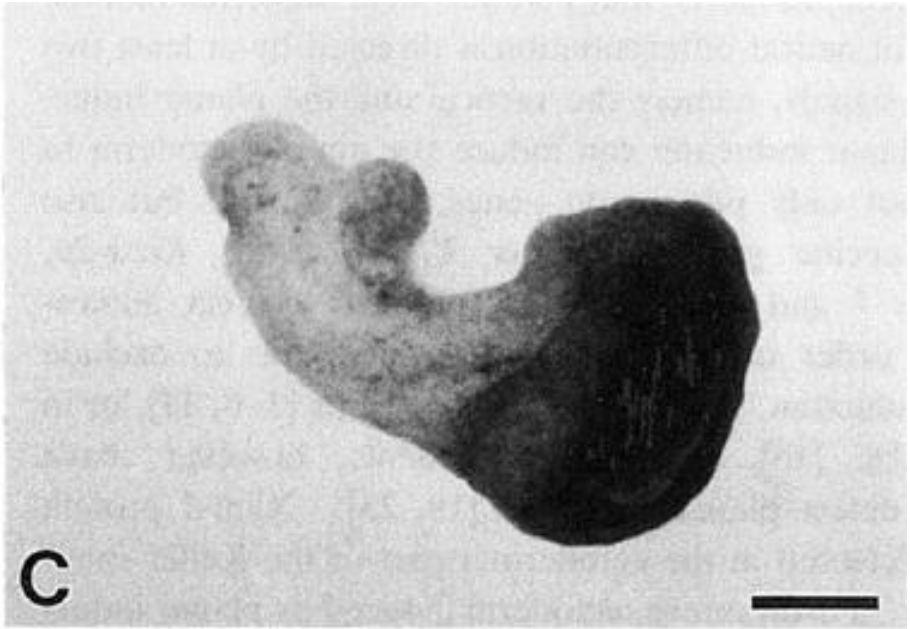

8
9
10
Stadio
10,5
11
11,5

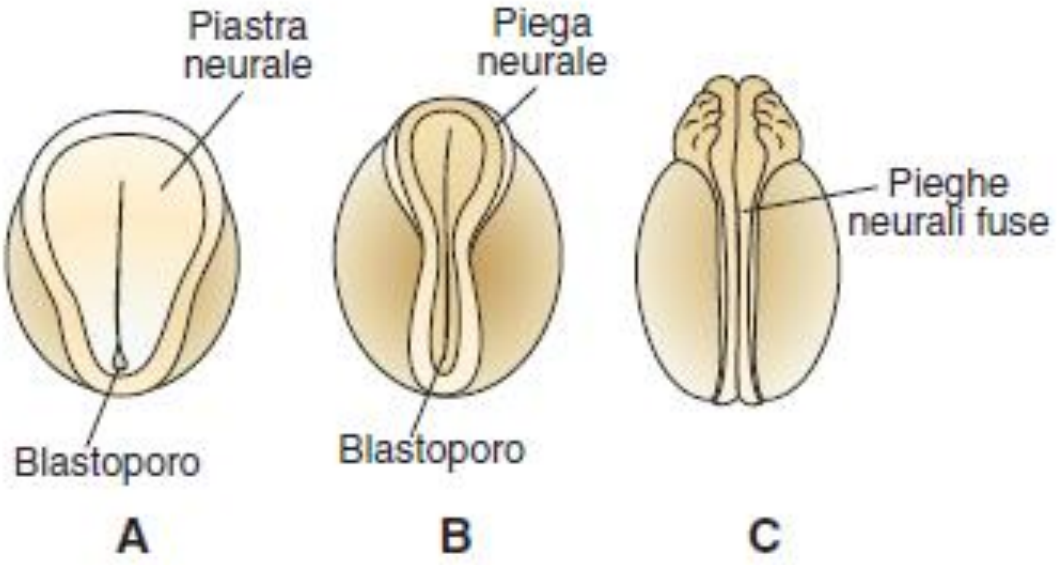
I MOVIMENTI DI ESTENSIONE CONVERGENTE GIOCANO UN RUOLO CHIAVE NELLA GASTRULAZIONE



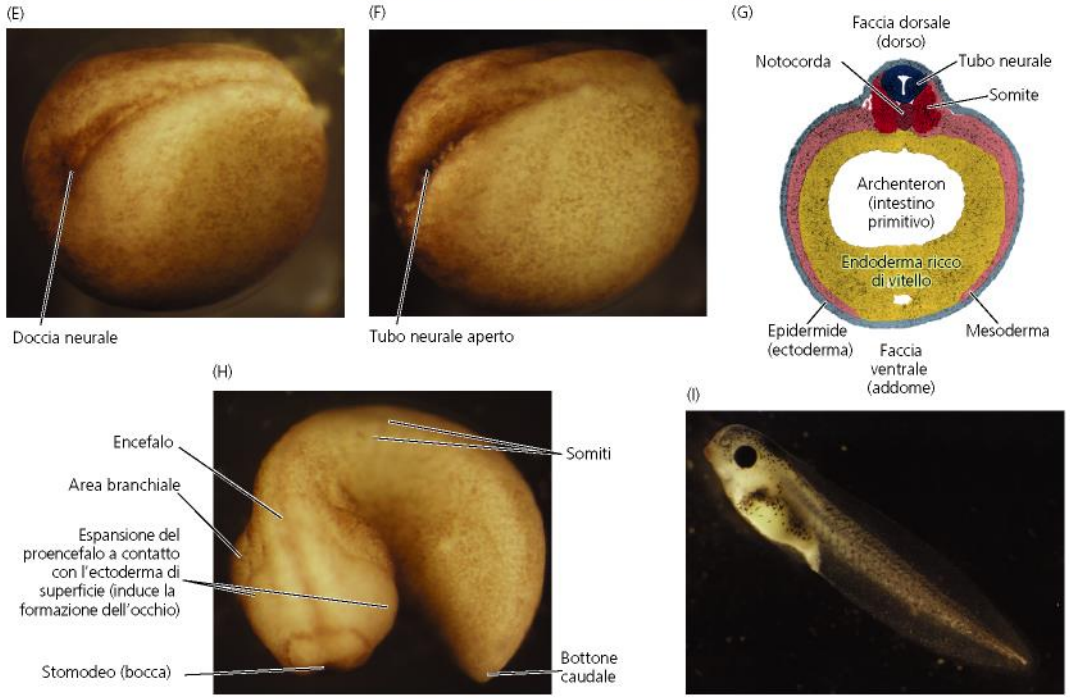


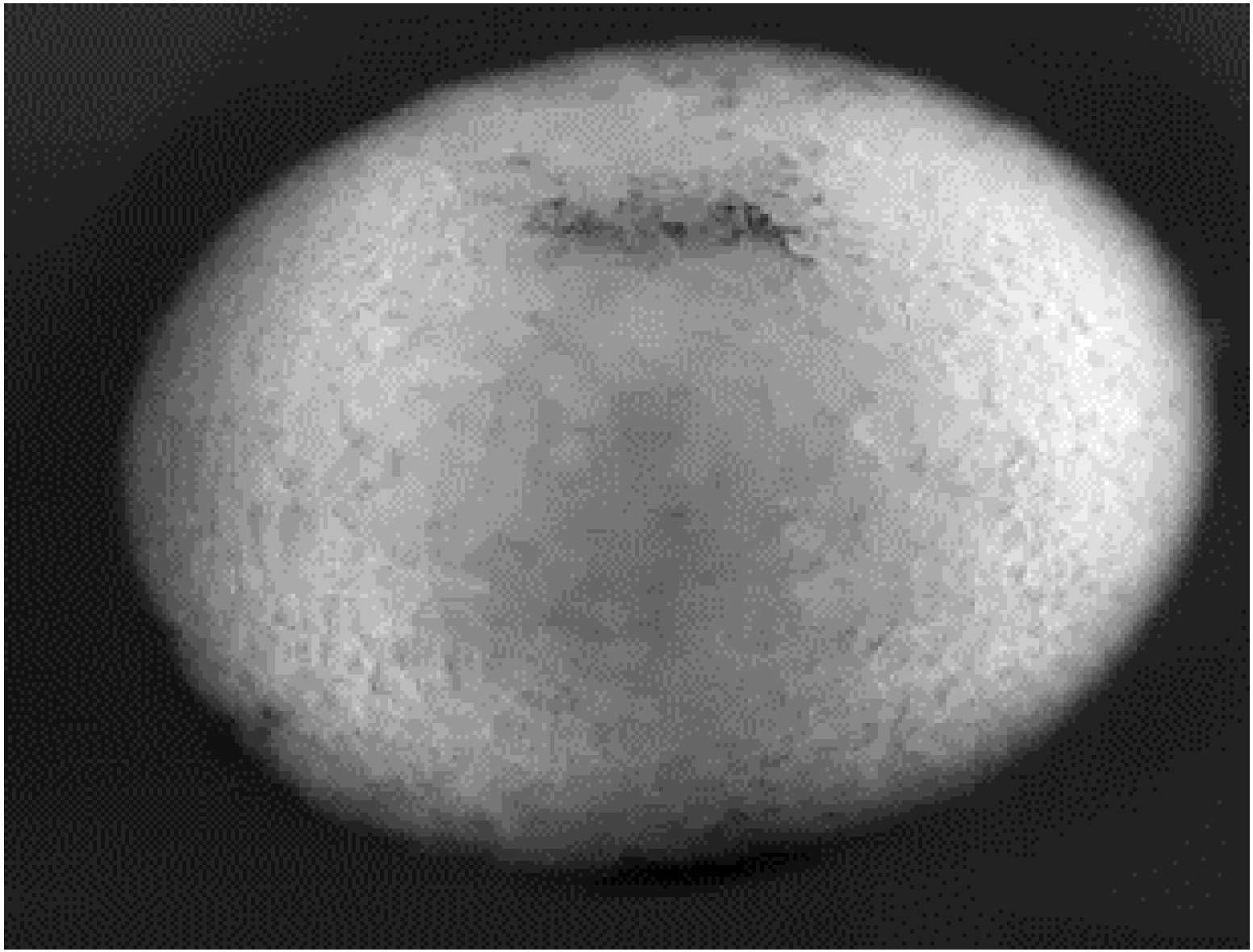






I MOVIMENTI DI NEURULAZIONE CONDUCONO ALLA FORMAZIONE DEL TUBO NEURALE





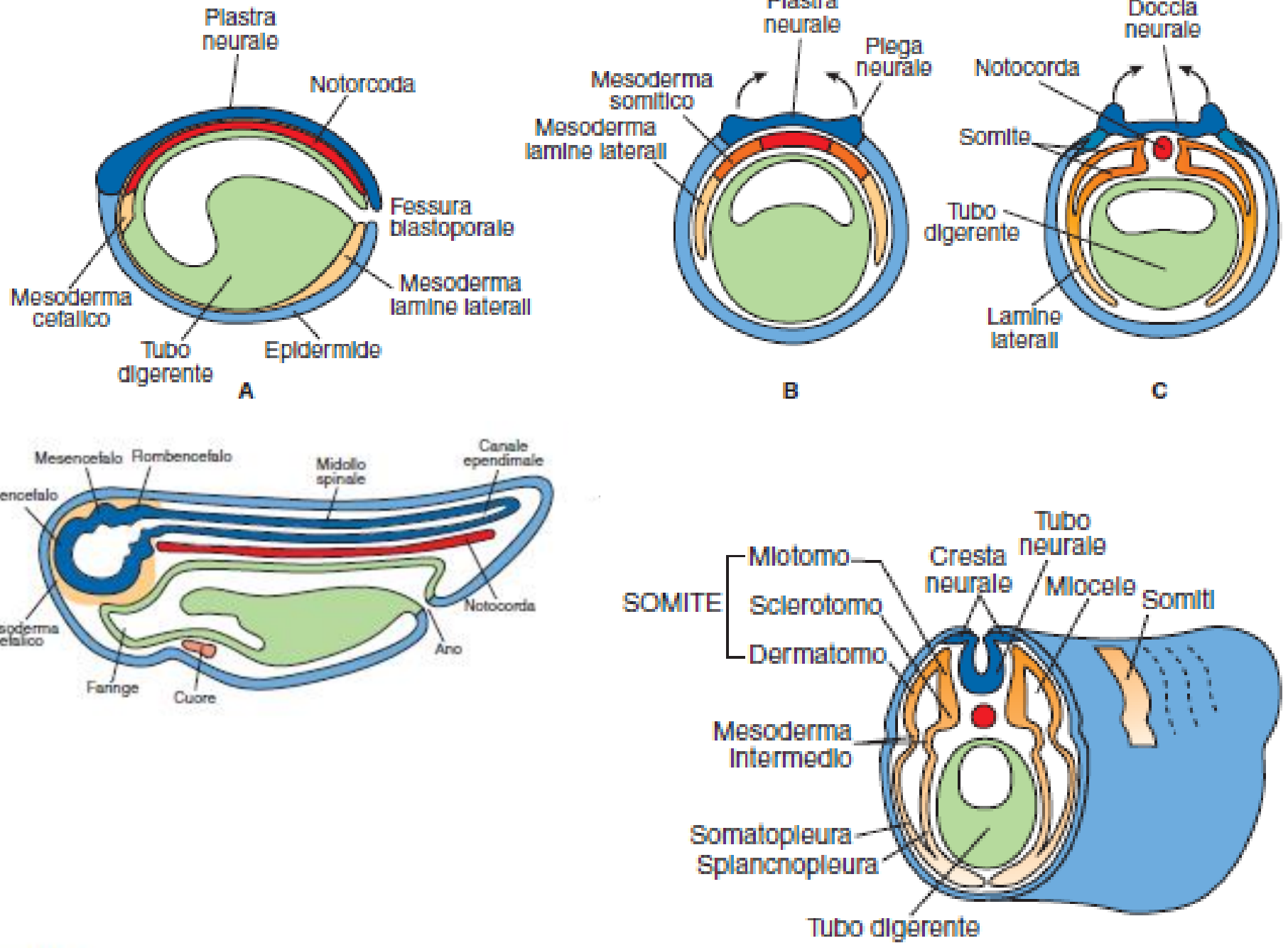
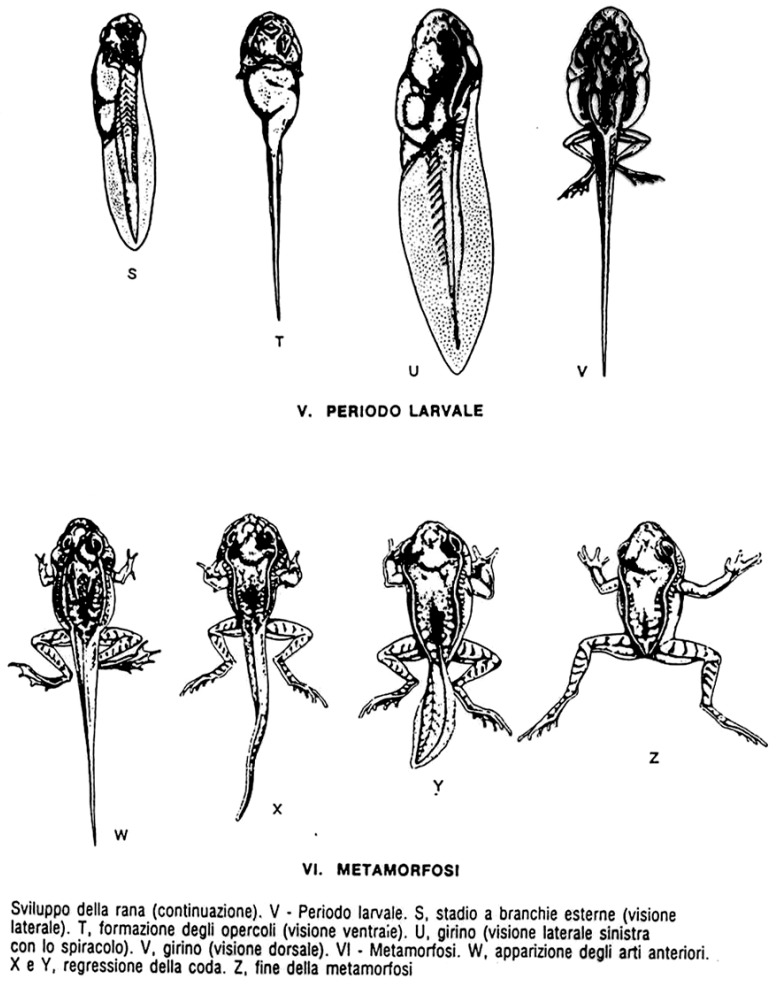

Plastra neurale
Notocorda
Fessura blastoporale
Mesoderma lamine laterali
Mesoderma cefalico
Tubo digerente
Epidermide
A
Plastra neurale
Piega neurale
Mesoderma somitico
Mesoderma lamine laterali
B
Doccia neurale
Notocorda
Somite
Tubo digerente
Lamine laterali
C
Mesencefalo
Rombencefalo
Midollo spinale
Canale ependimale
Prosencefalo
Notocorda
Mesoderma cefalico
Ano
Faringe
Cuore
A
Tubo neurale
Miotomo
Cresta neurale
Miocele
Somiti
SOMITE
Sclerotomo
Dermatomo
Mesoderma intermedio
Somatopleura
Splancnopleura
Tubo digerente
D

Figura 13

Metamorfosi



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

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

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

Controllo ormonale:

ipofisi- ormone tireotropo

Tiroide- ormone tiroxina