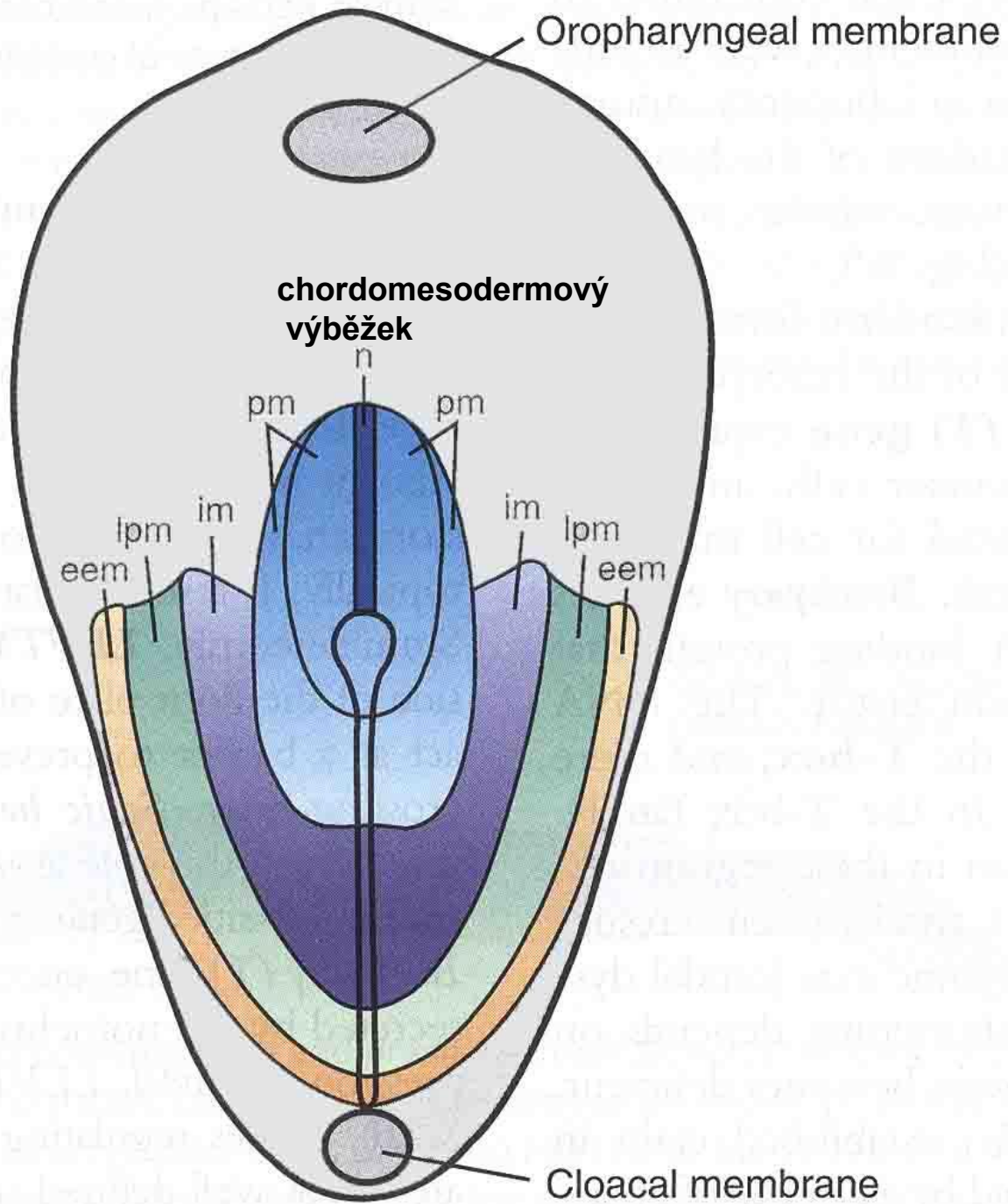
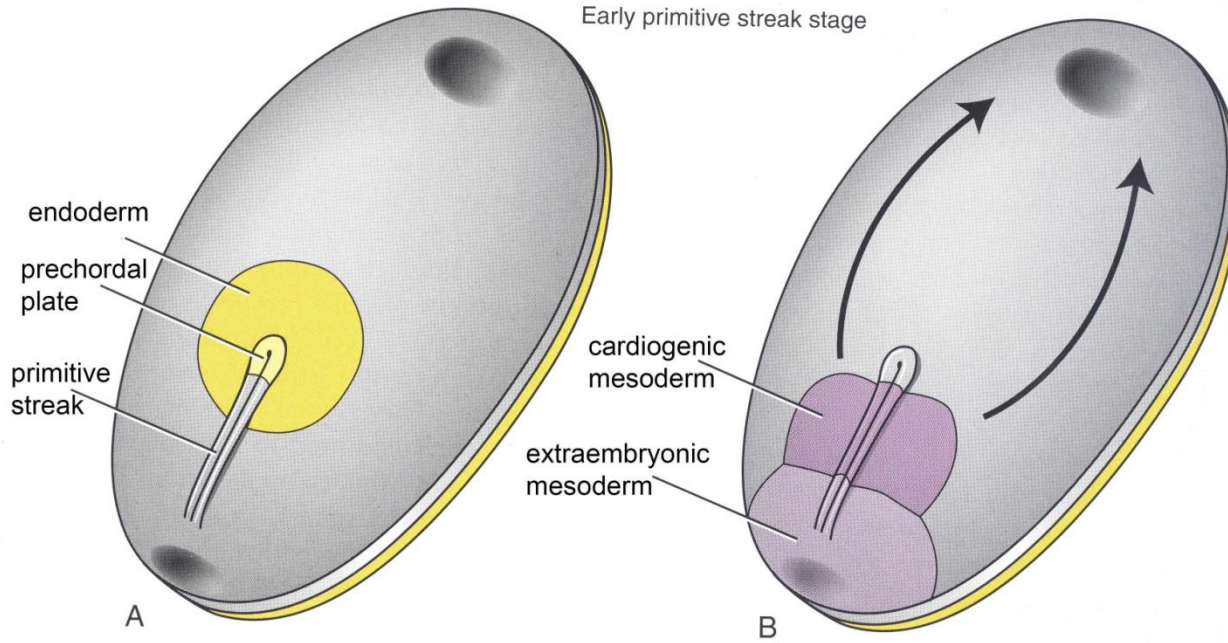


OBEČNÁ EMBRYOLOGIE III

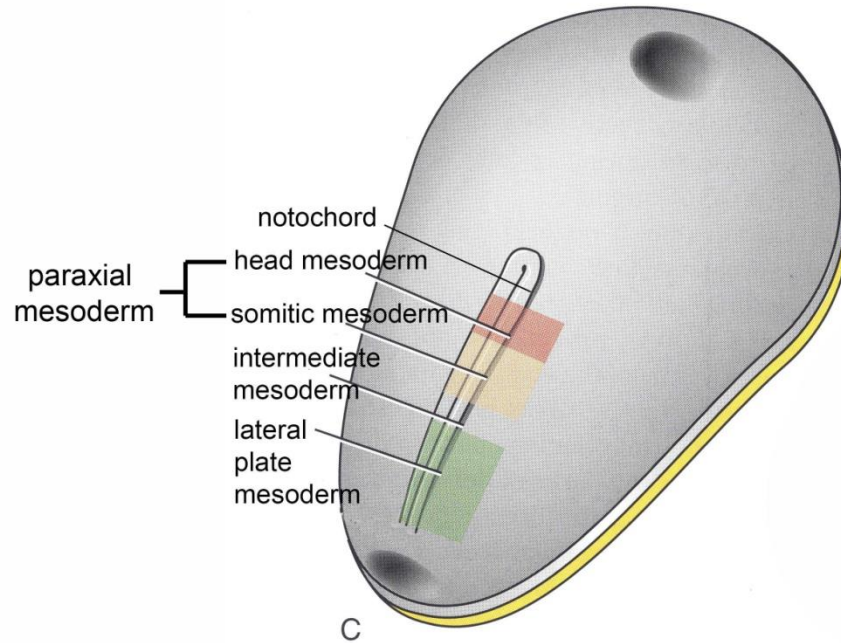
DIFERENCIACE INTRAEMBRYONÁLNÍHO MESODERMU

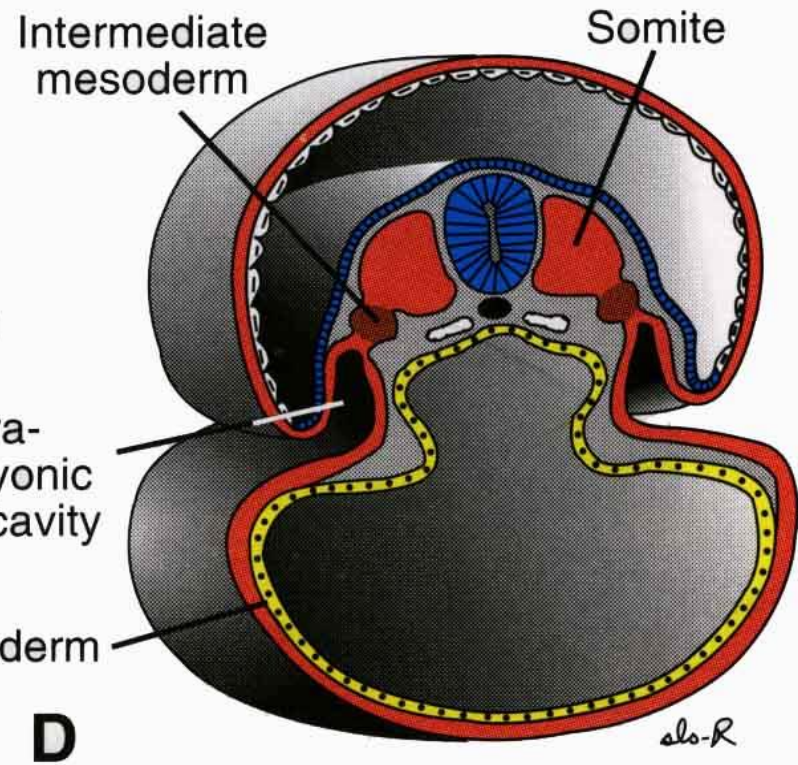
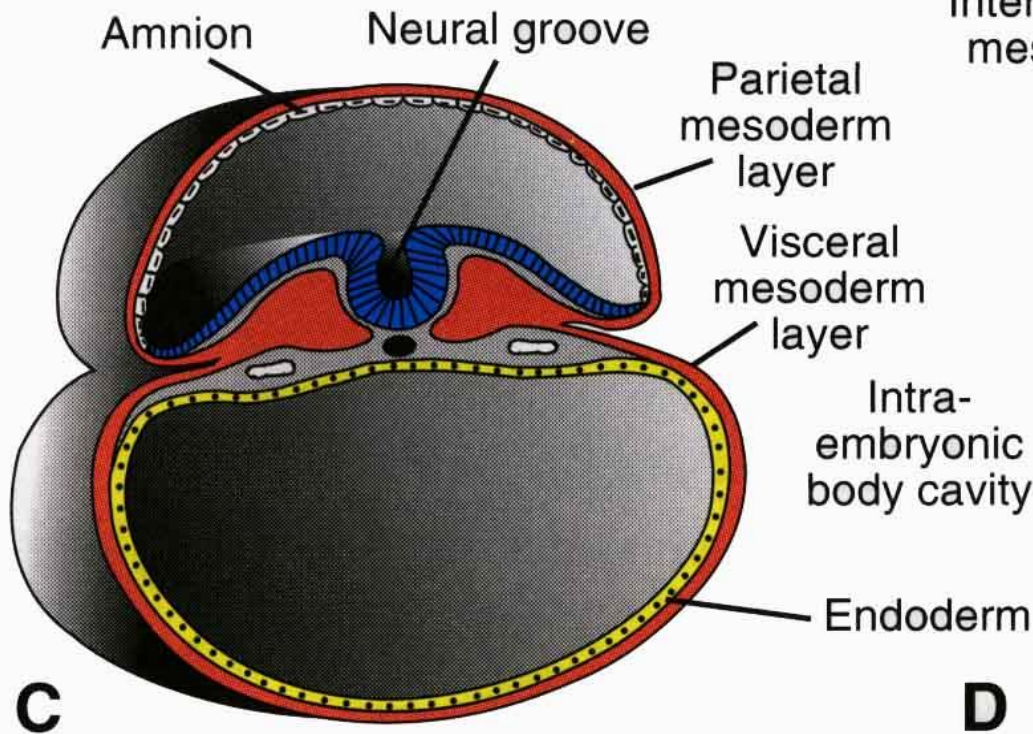
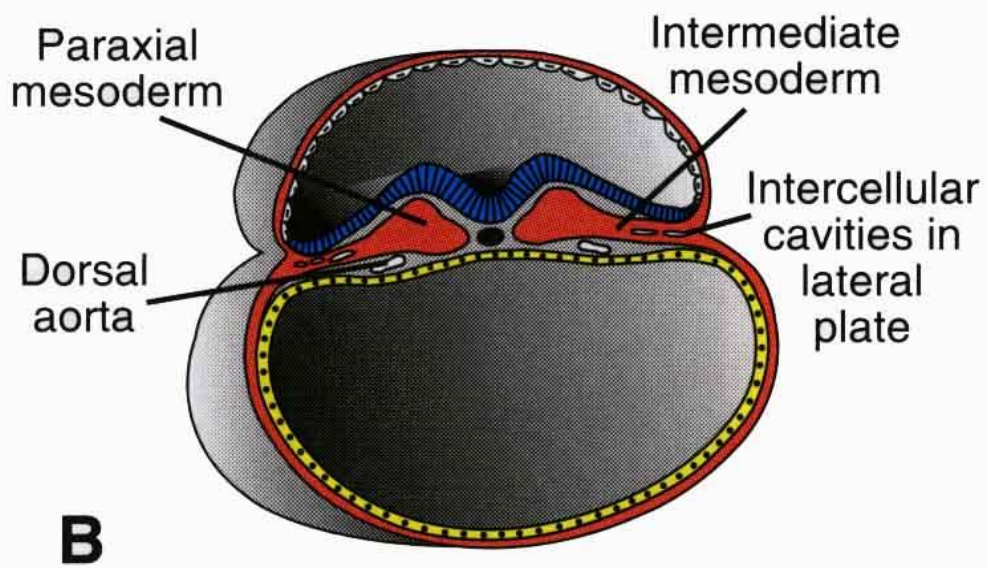
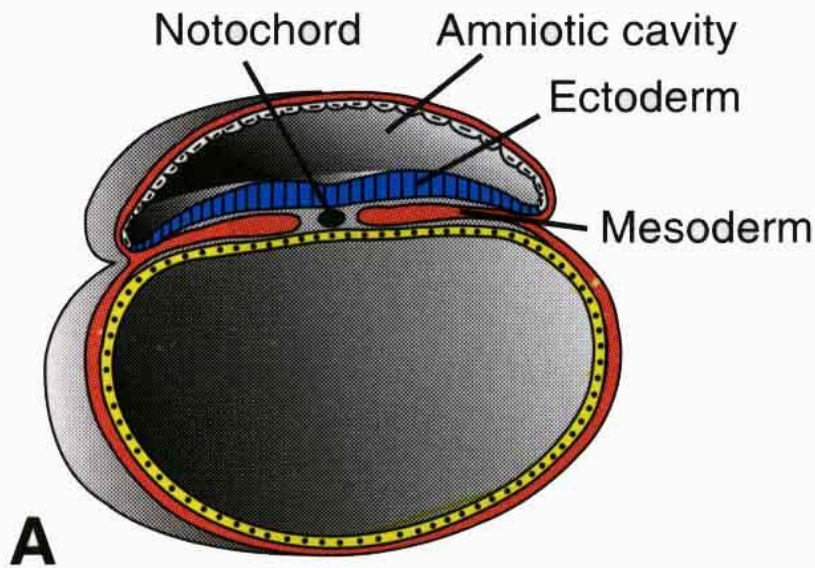


Early primitive streak stage

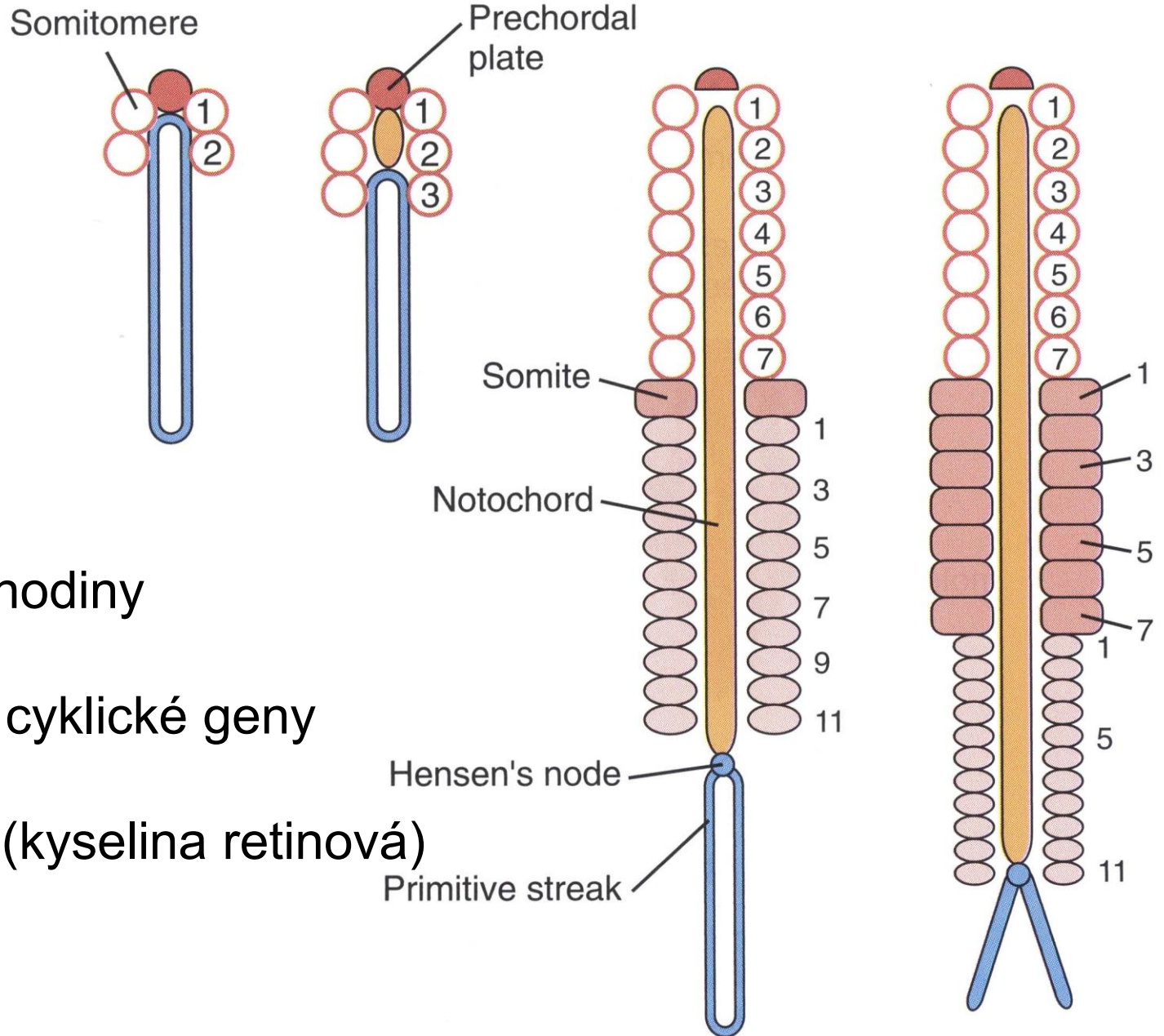


Mid-primitive streak stage





Paraxiální mesoderm



Segmentační hodiny

WNT, Notch – cyklické geny

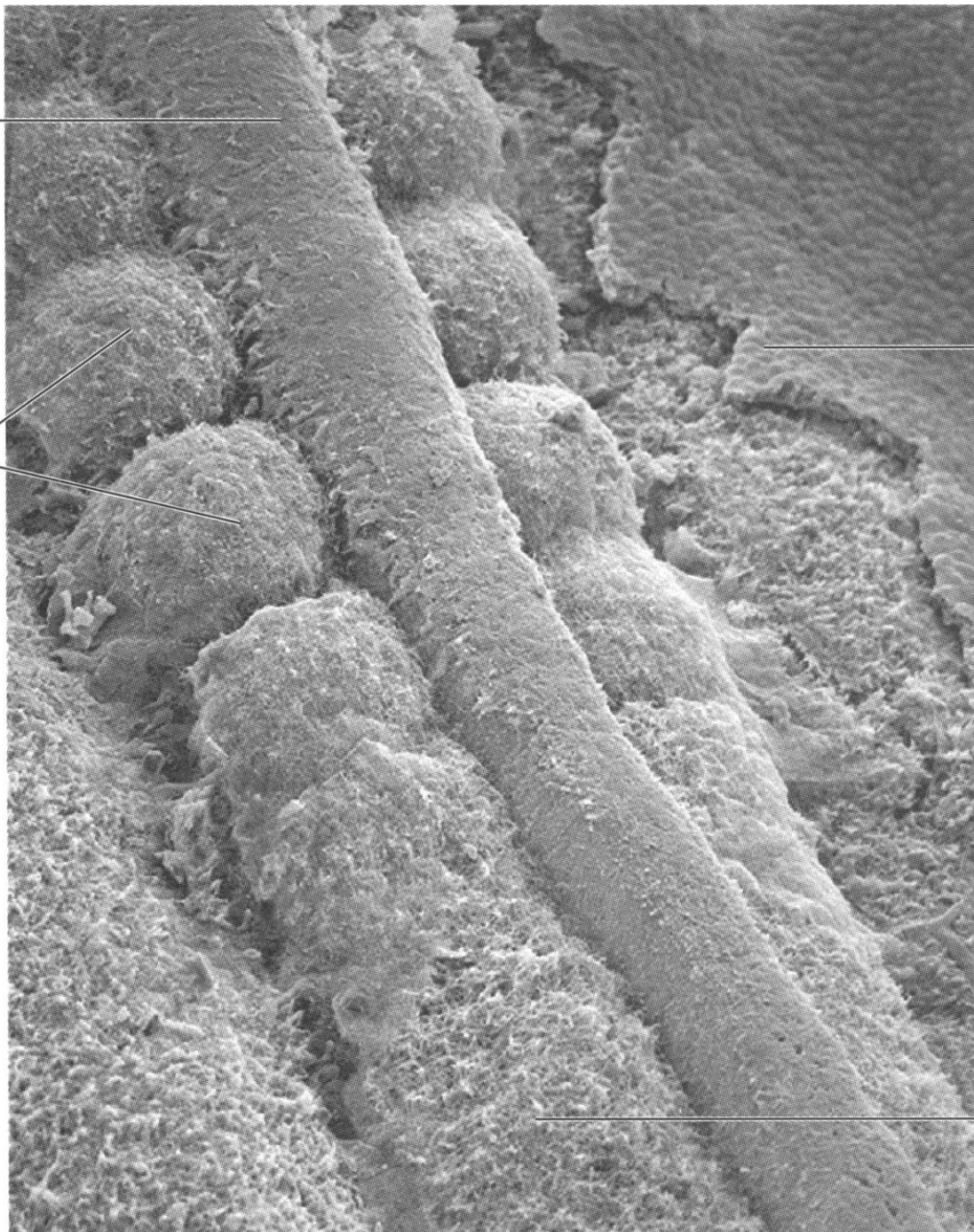
↓ FGF8 ↑ RA (kyselina retinová)

Neural tube

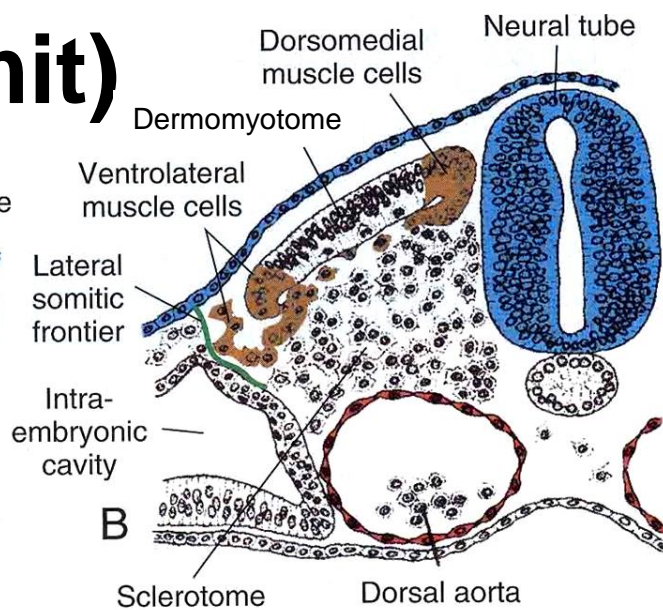
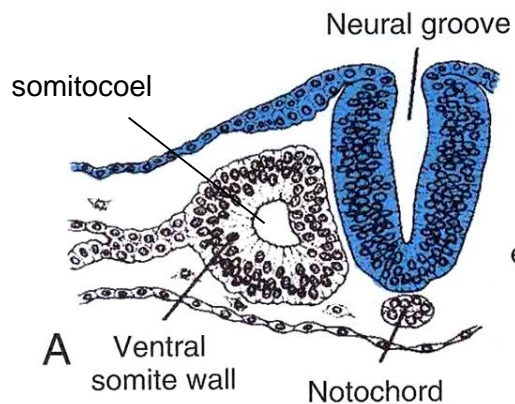
Somites

Ectoderm

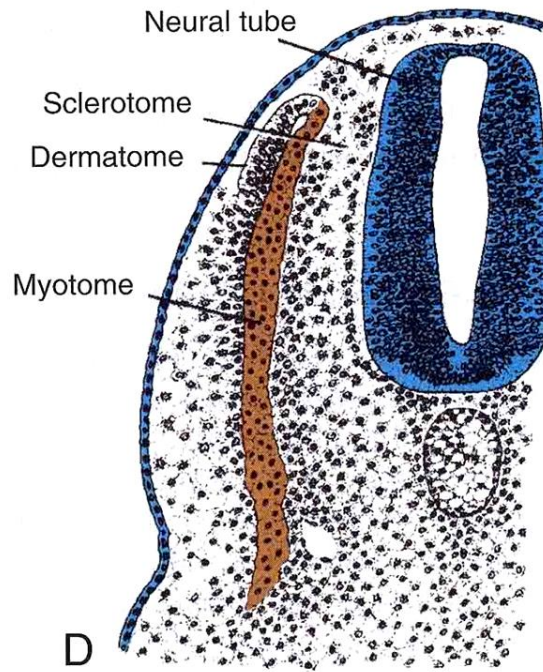
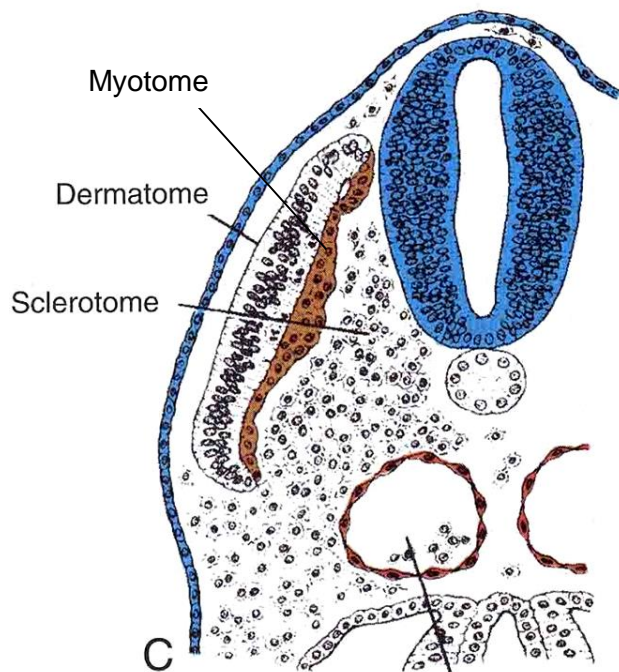
Presomites
mesoderm



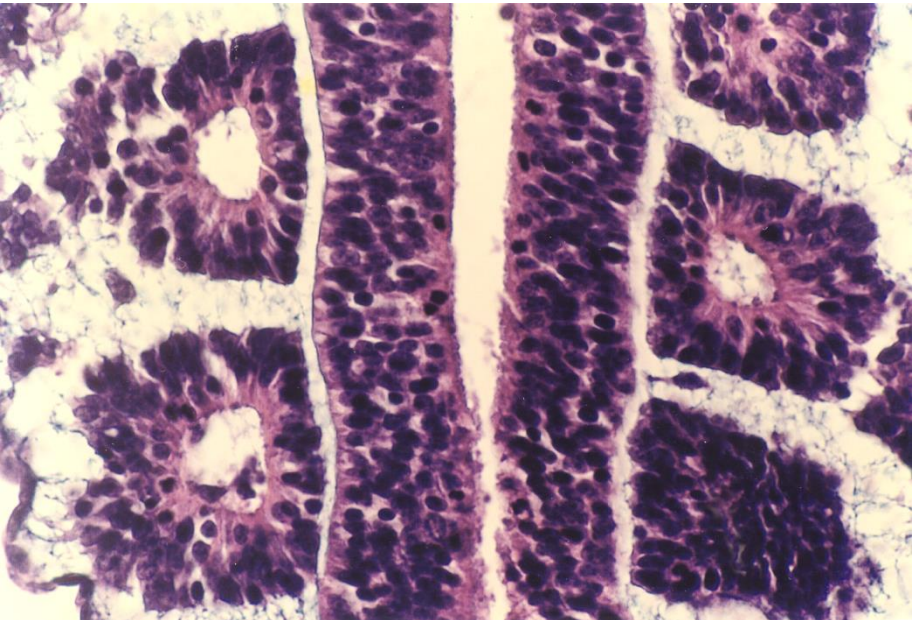
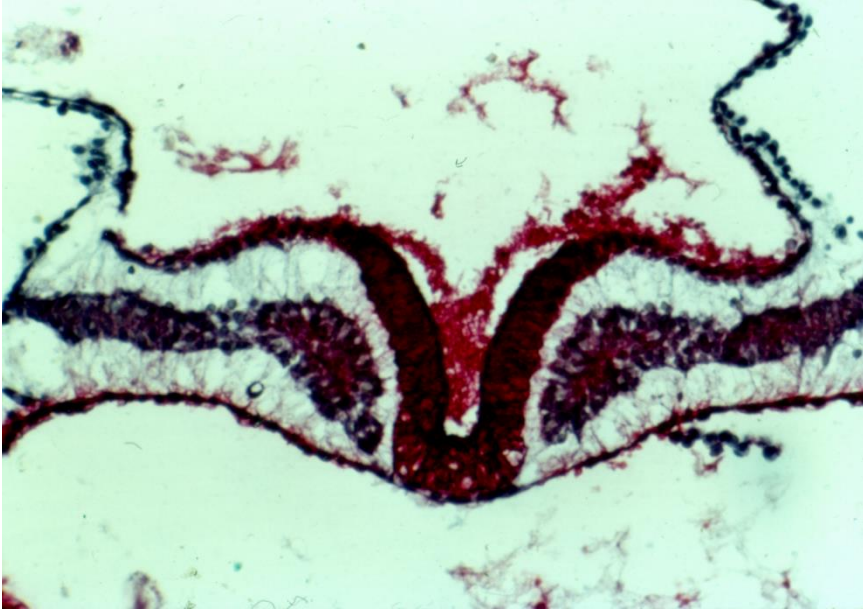
Prvosegment (somit)

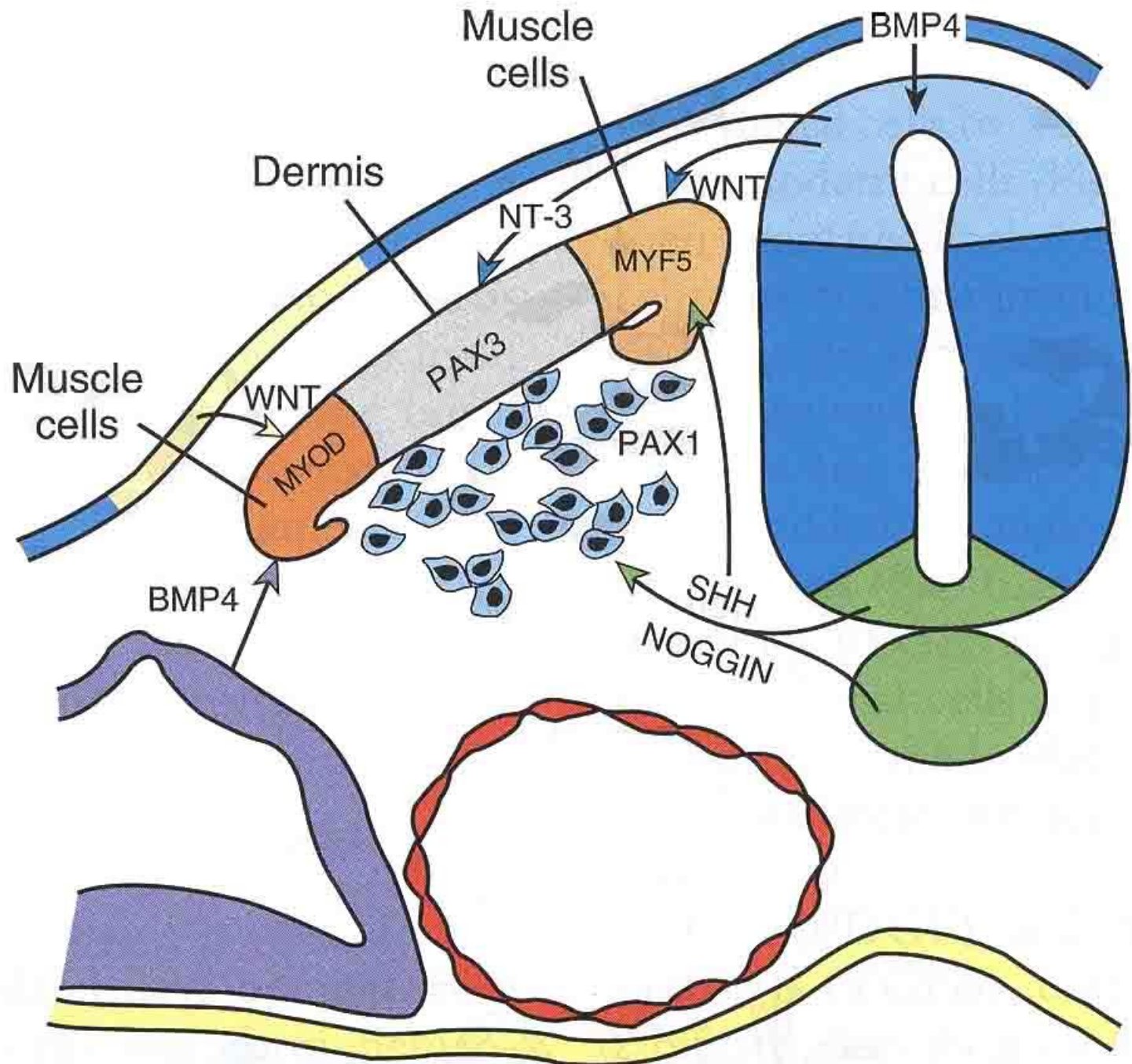


1. somit 20. den
do konce 5. týdne 42-44 somitů

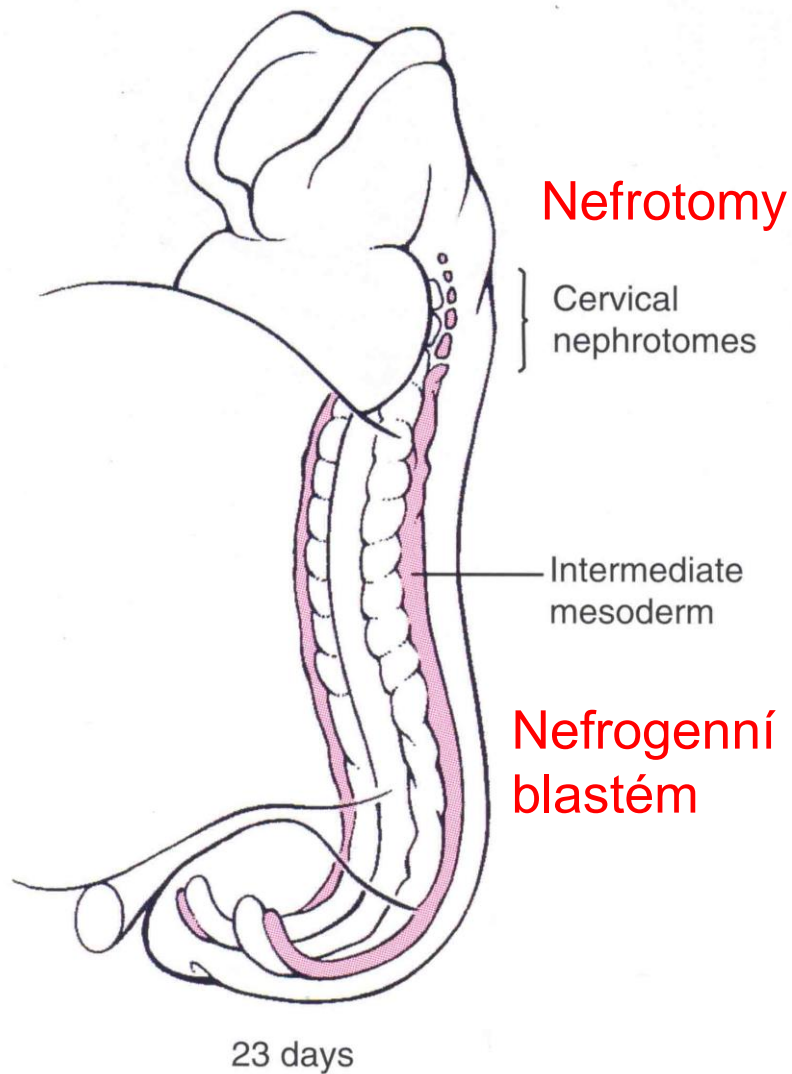
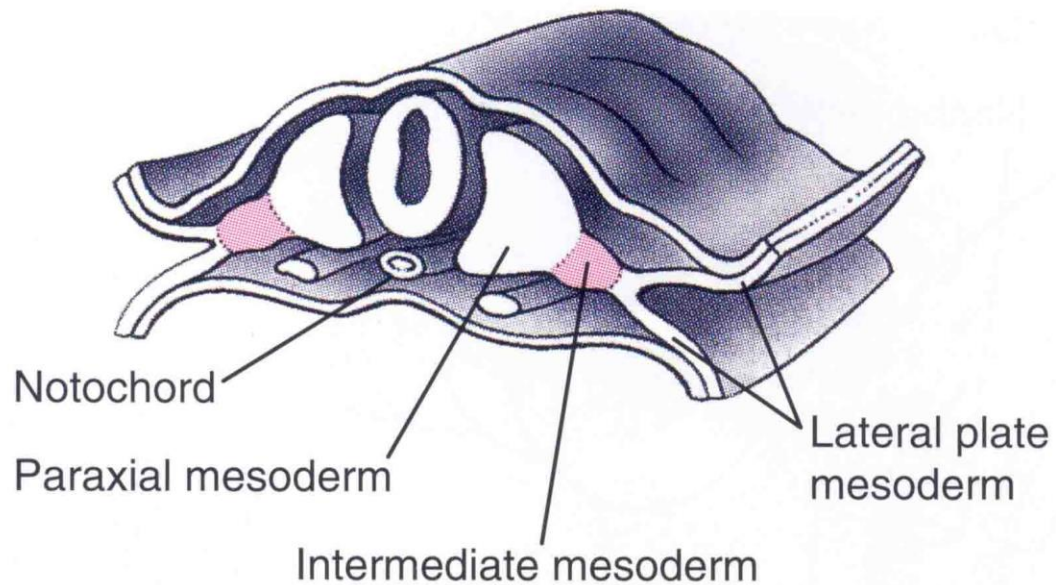


Somity

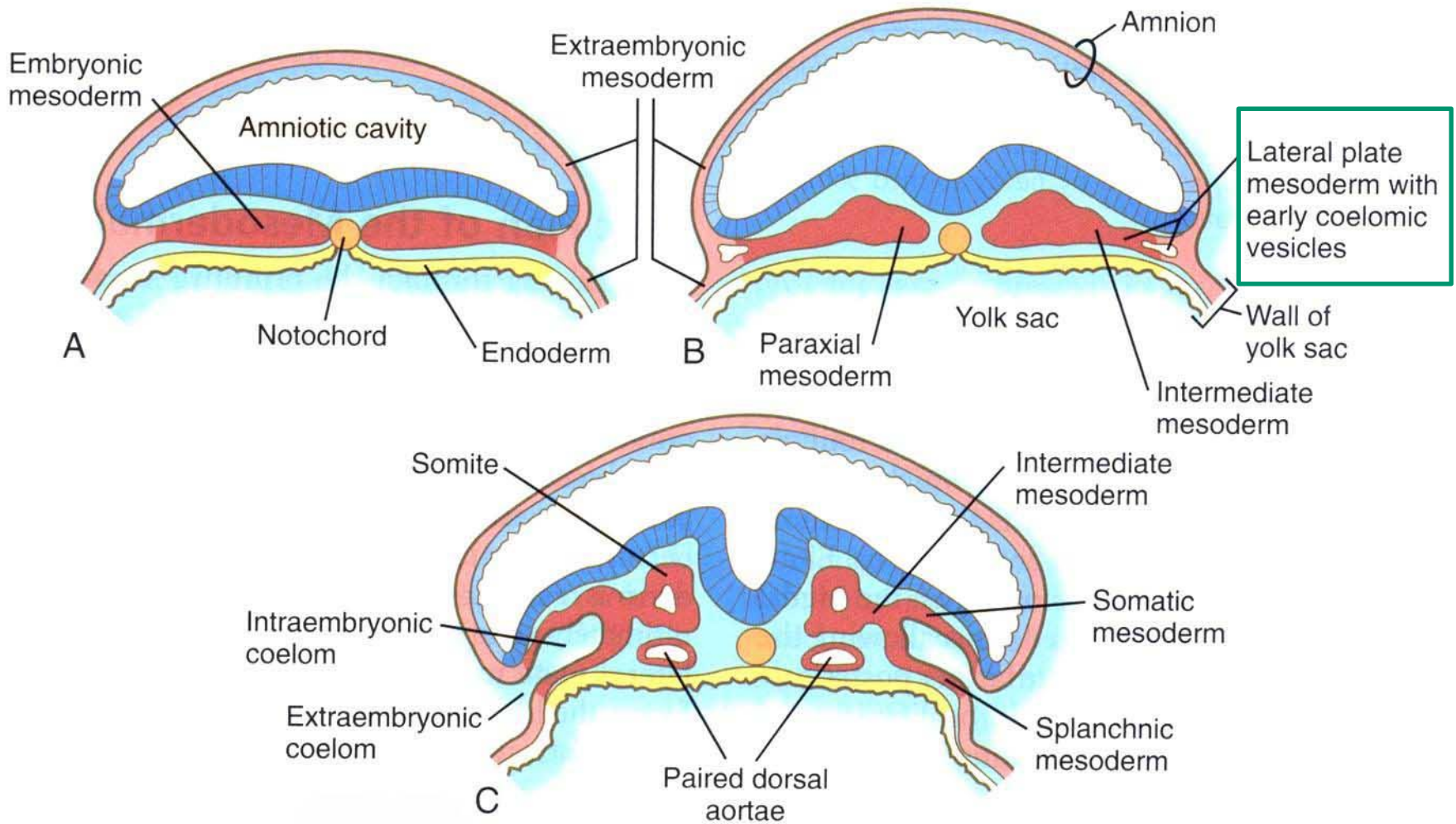




Intermediární mesoderm

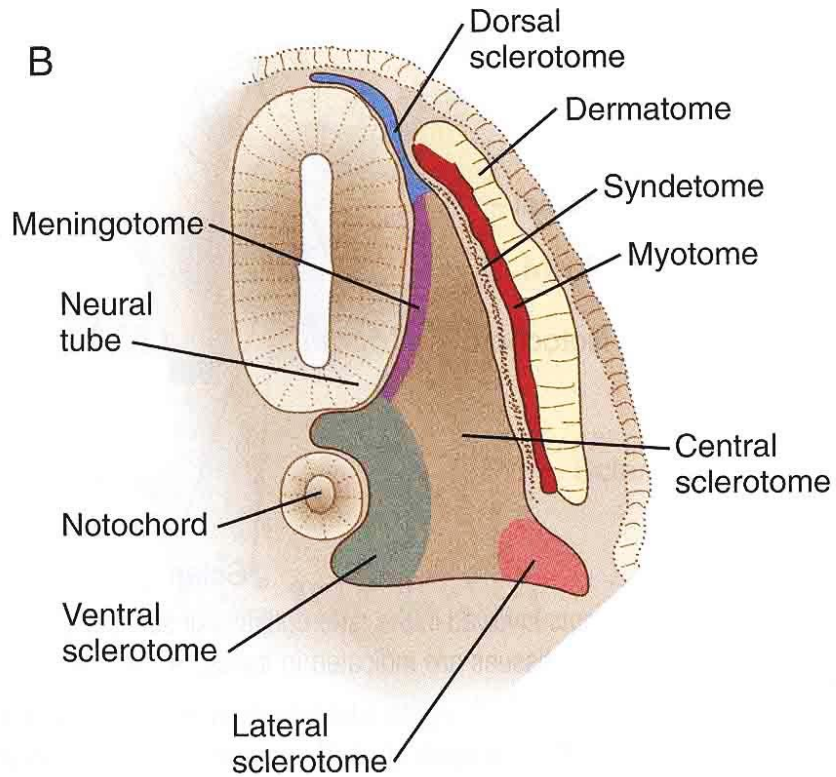
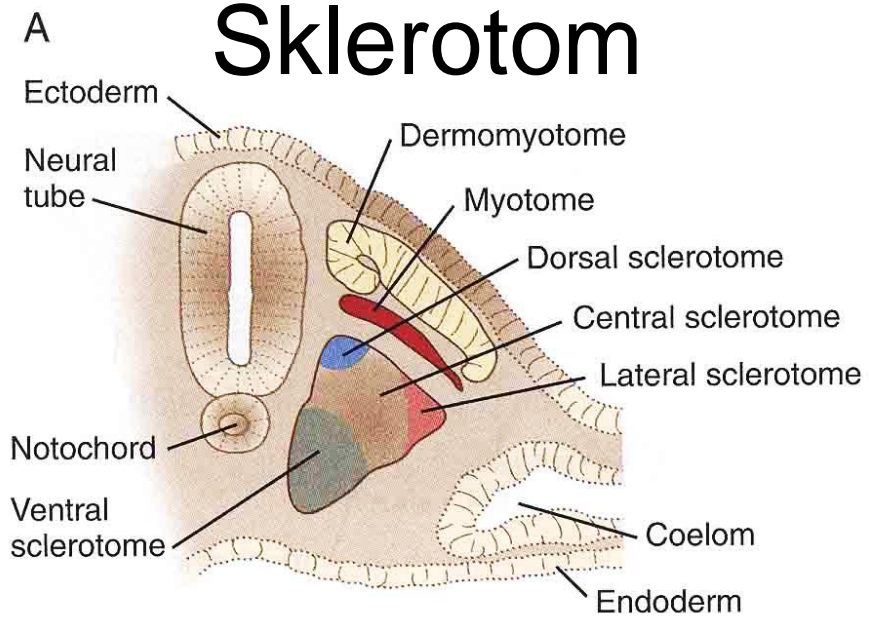


Laterální mesoderm (laterální ploténka)



VÝVOJ KOSTERNÍHO SYSTÉMU

Sklerotom

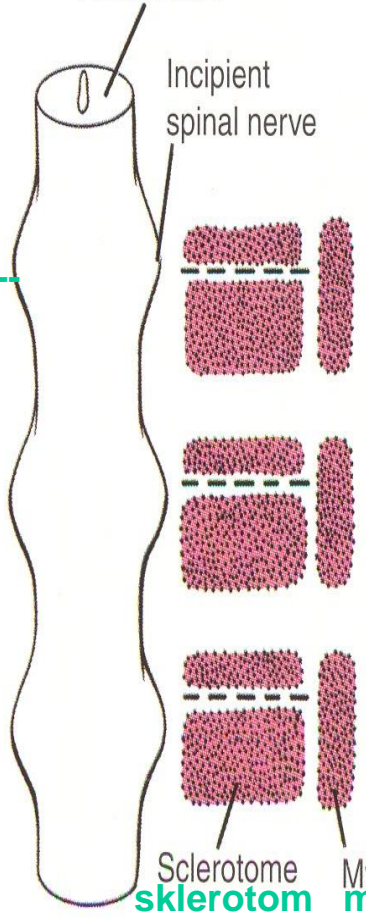


**neurální trubice má
indukční vliv na vývoj
sklerotomu**

Neural tube

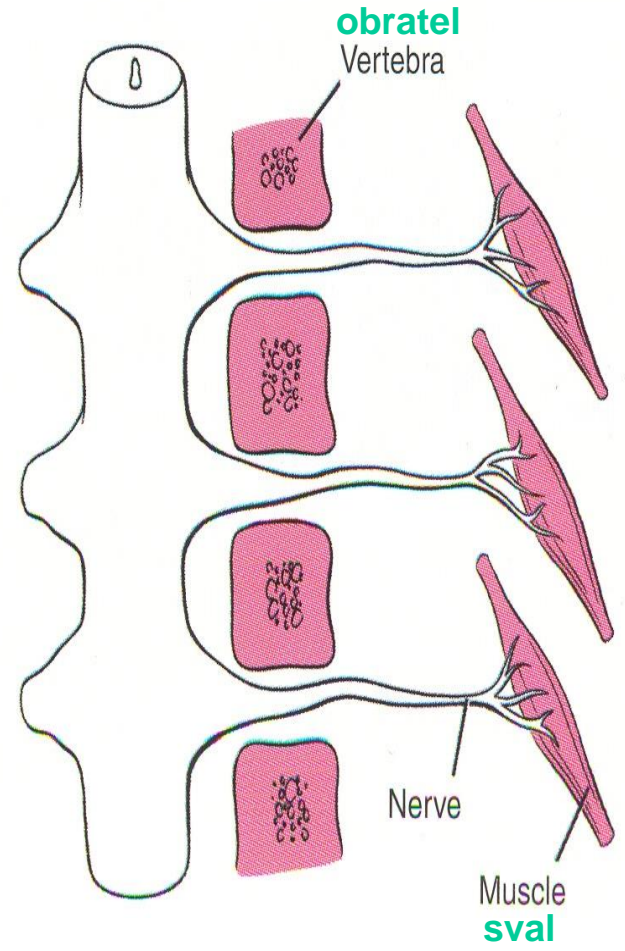
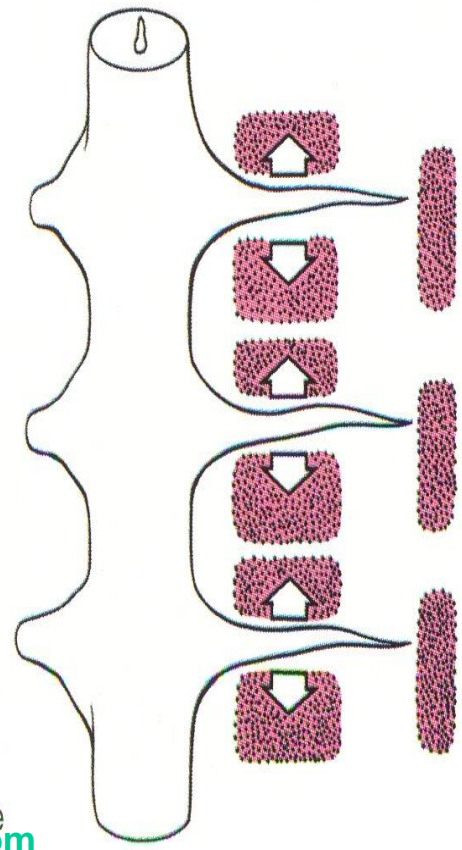
Incipient
spinal nerve

**základ
spinálního
nervu**



Sclerotome
sklerotom

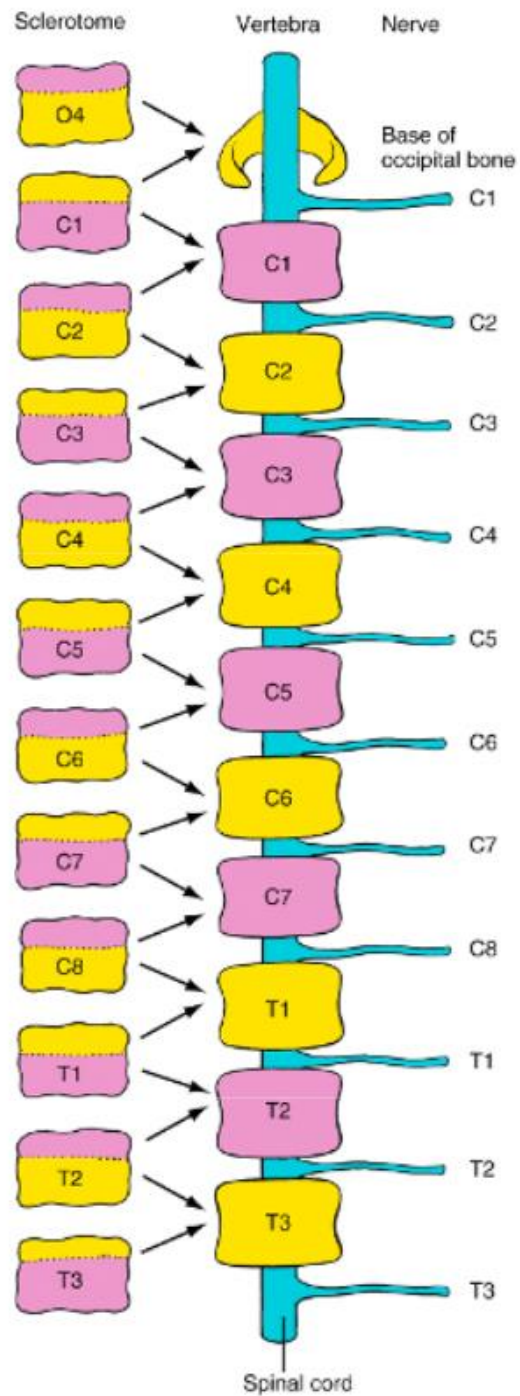
Myotome
myotom

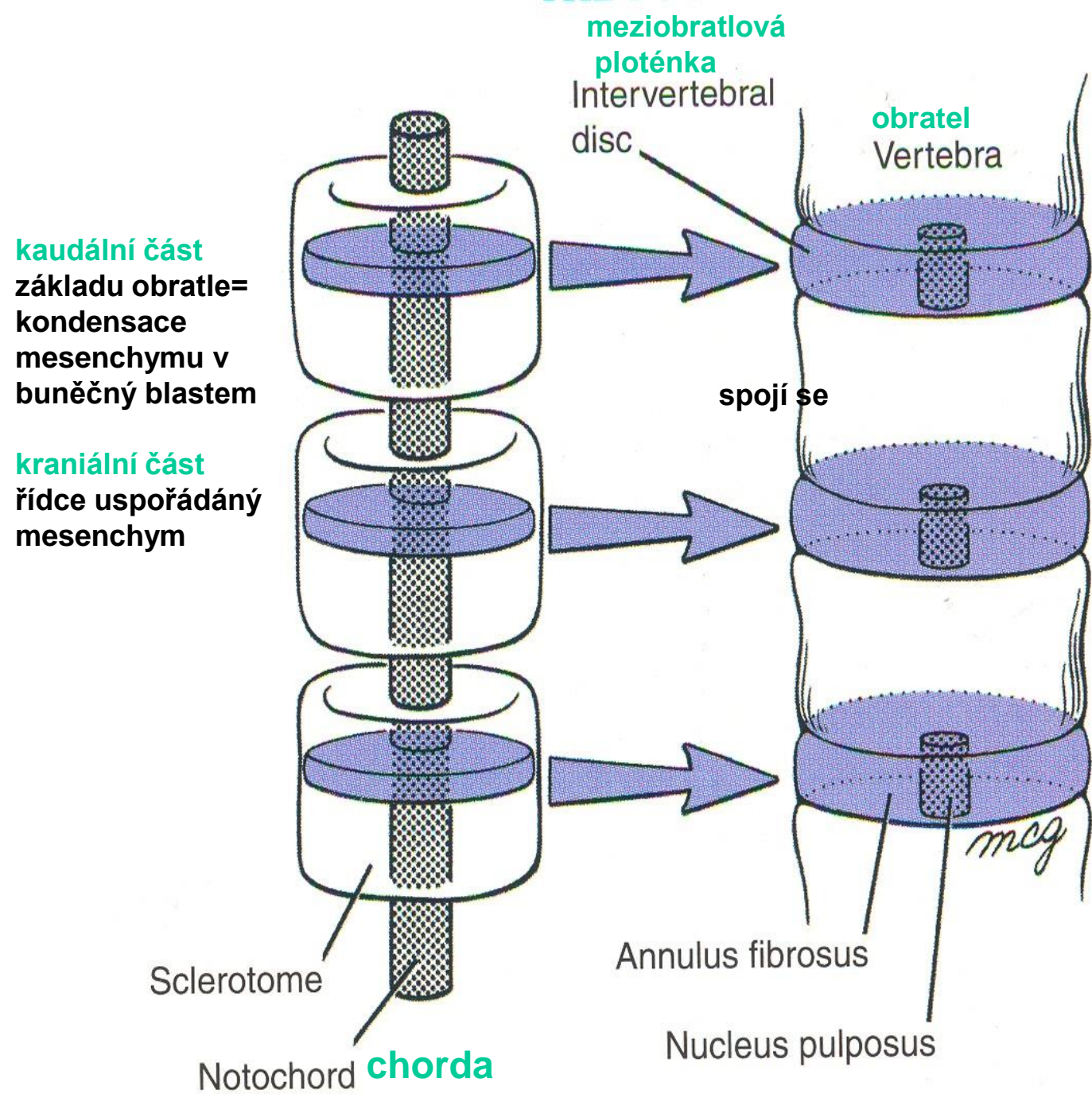


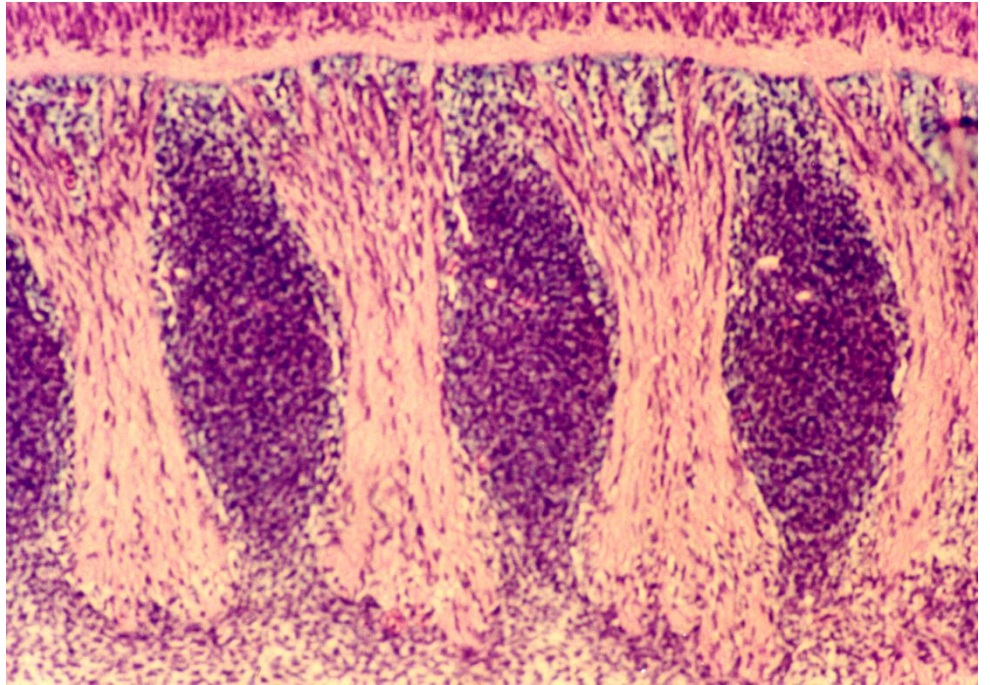
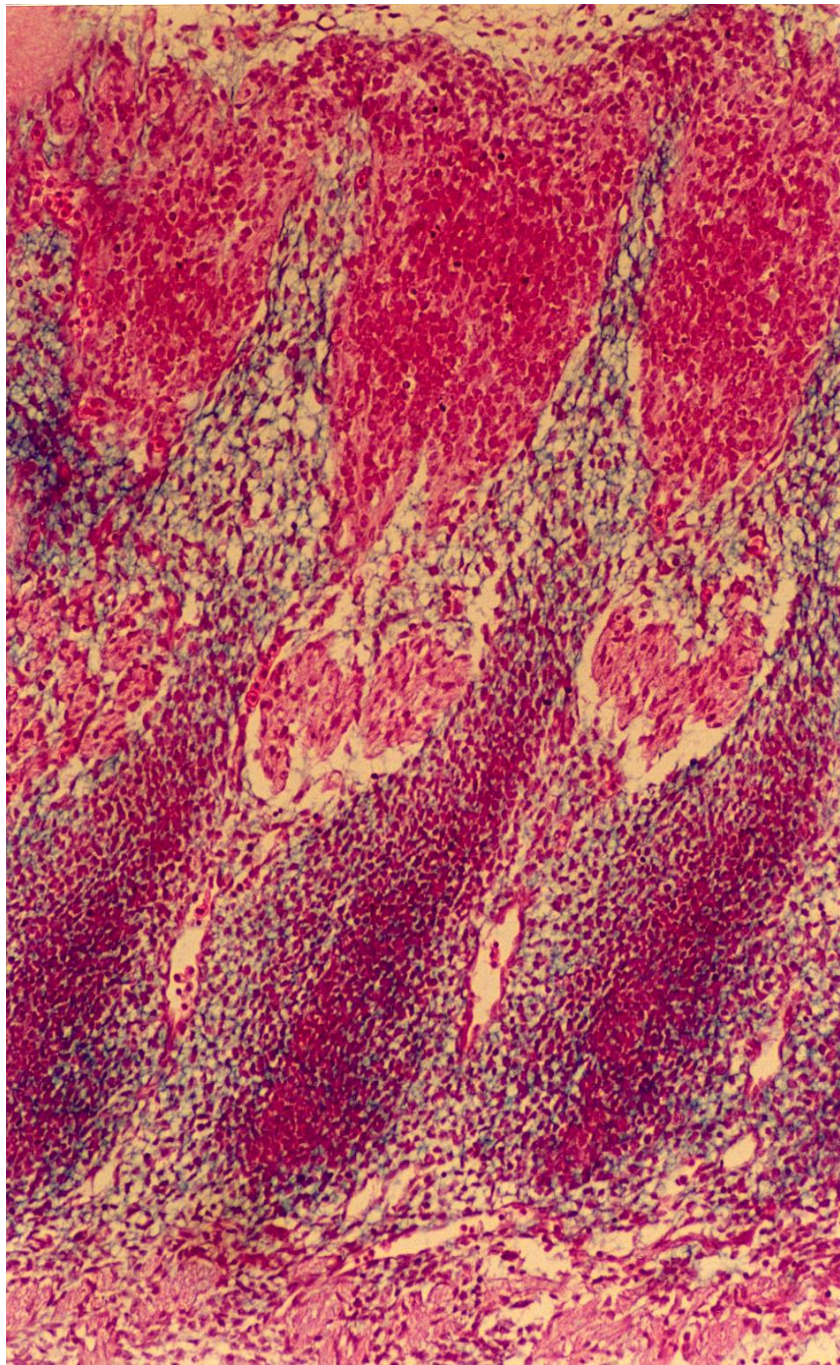
obratel
Vertebra

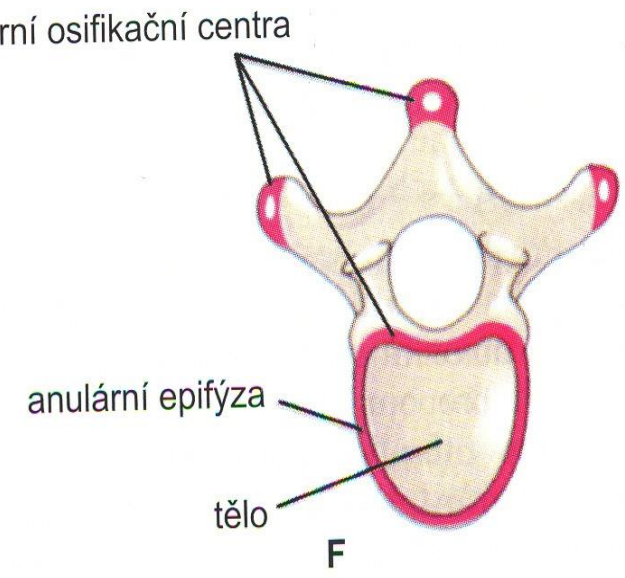
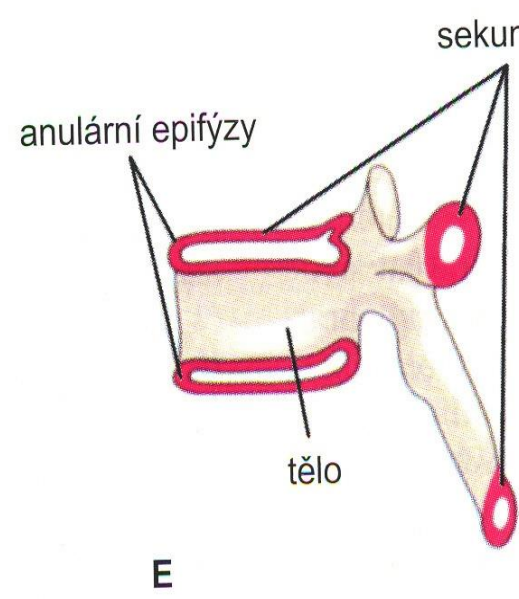
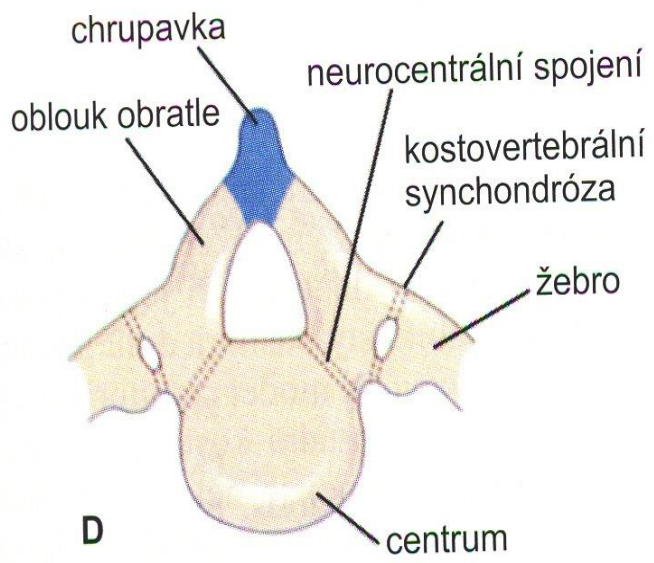
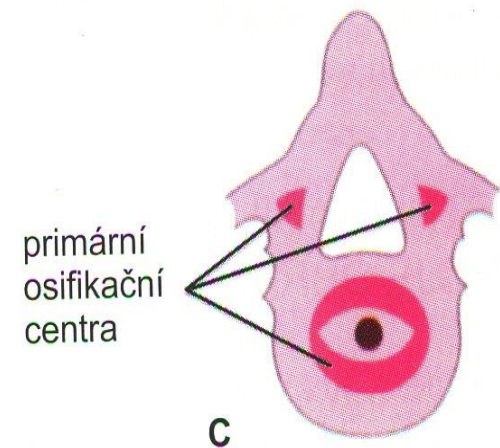
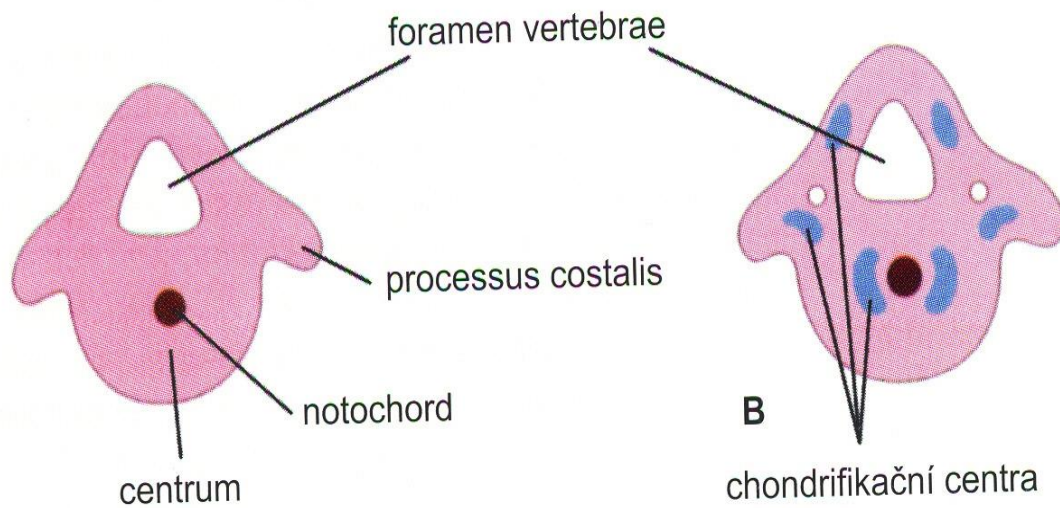
Nerve

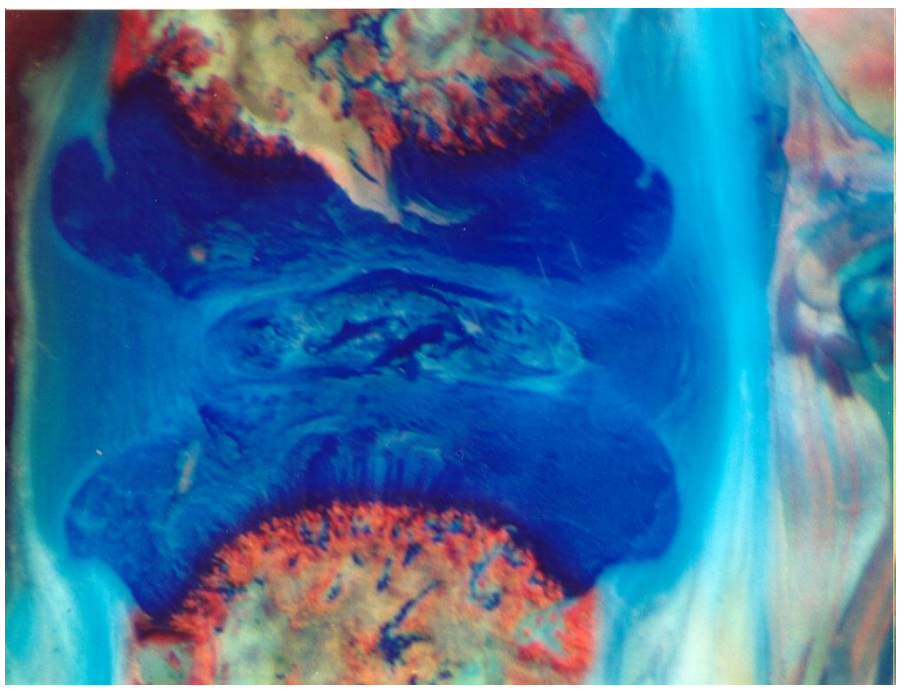
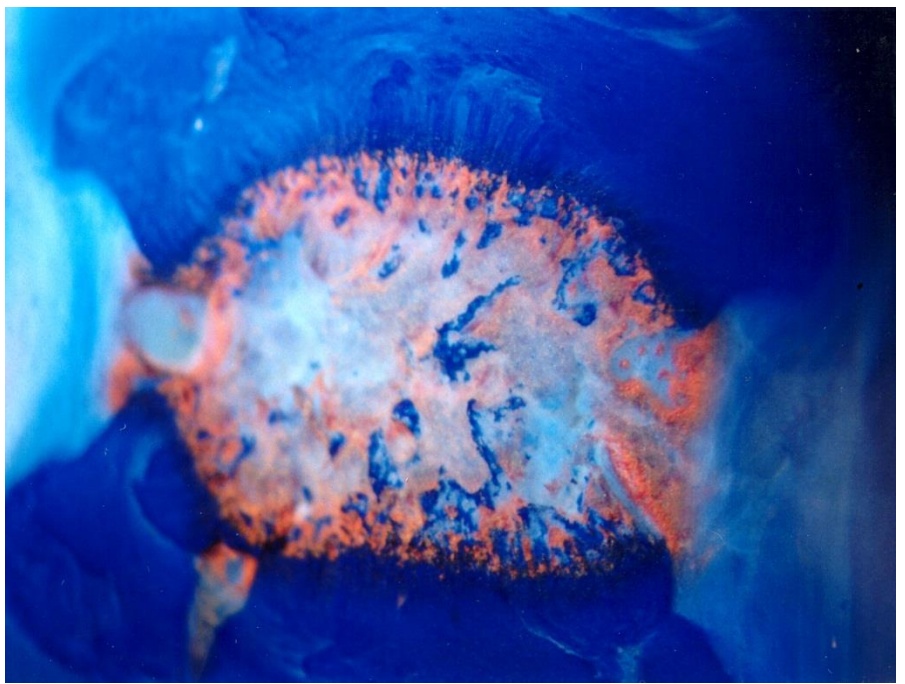
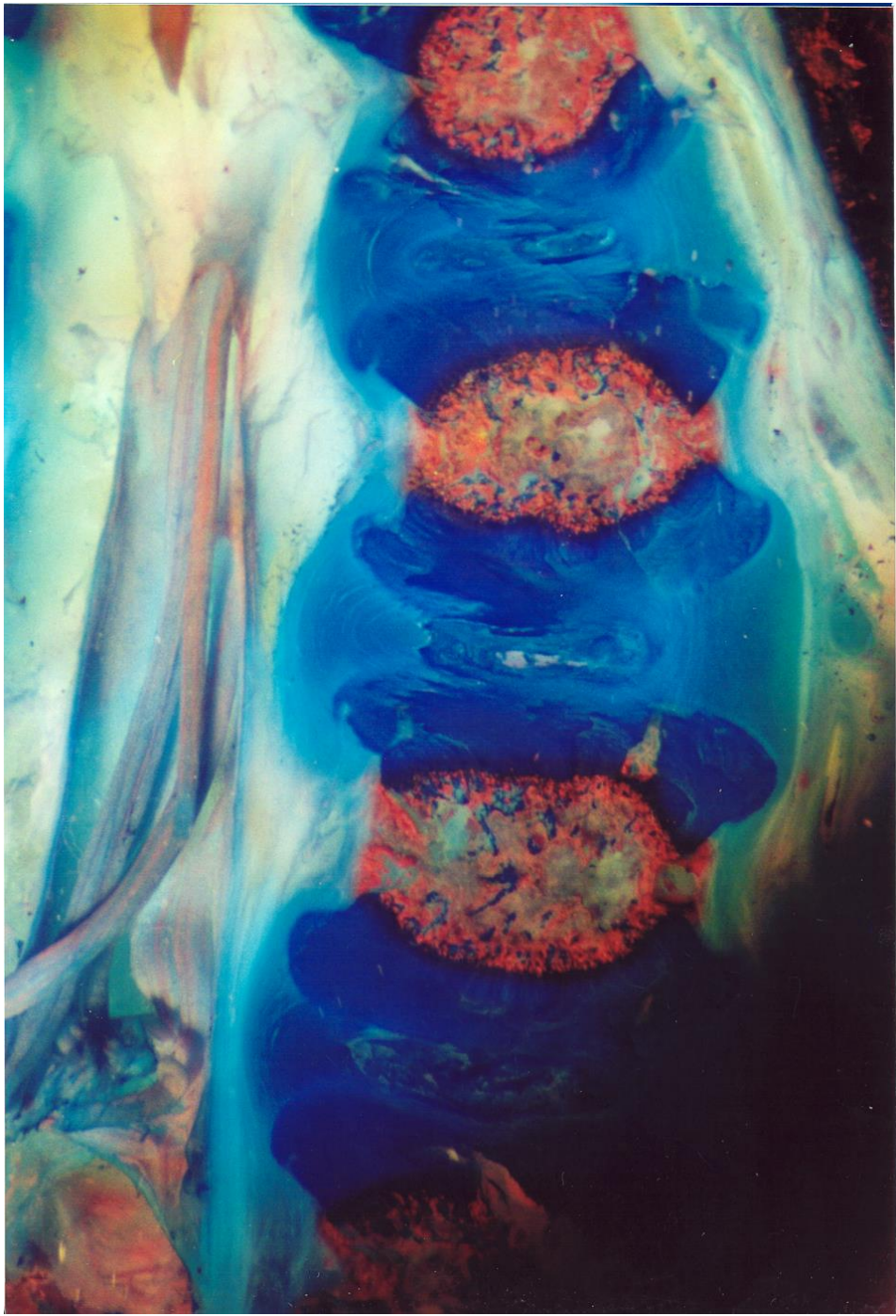
Muscle
sval

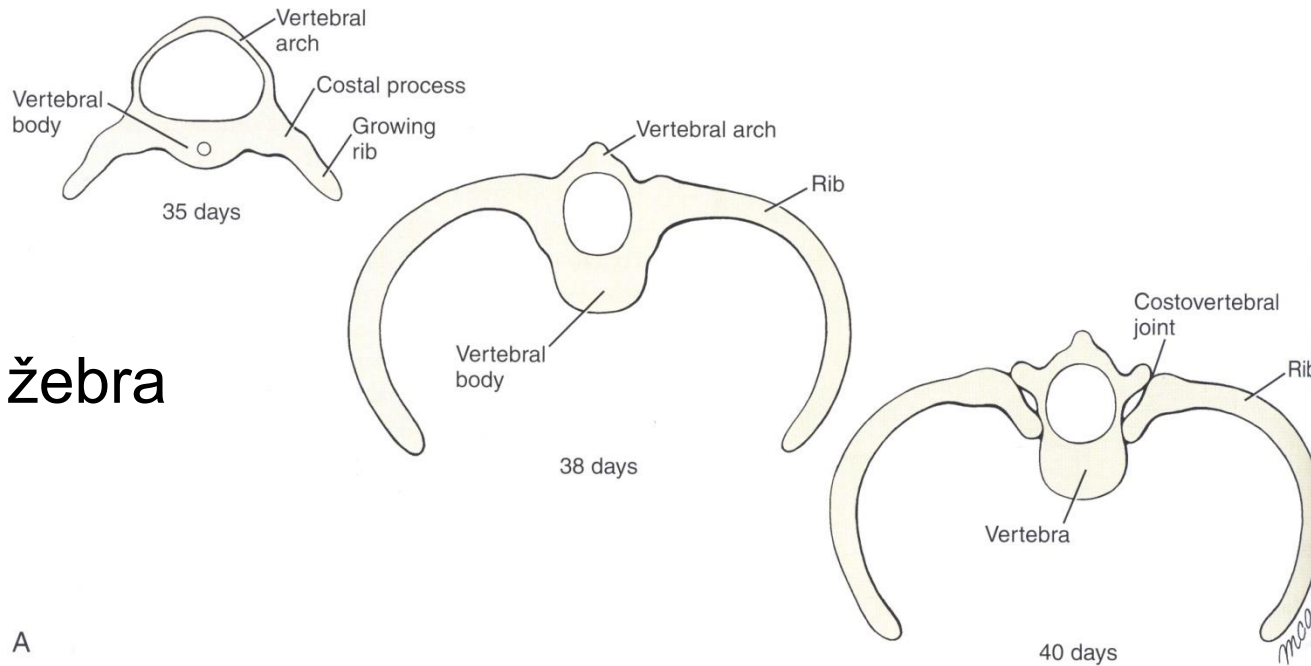








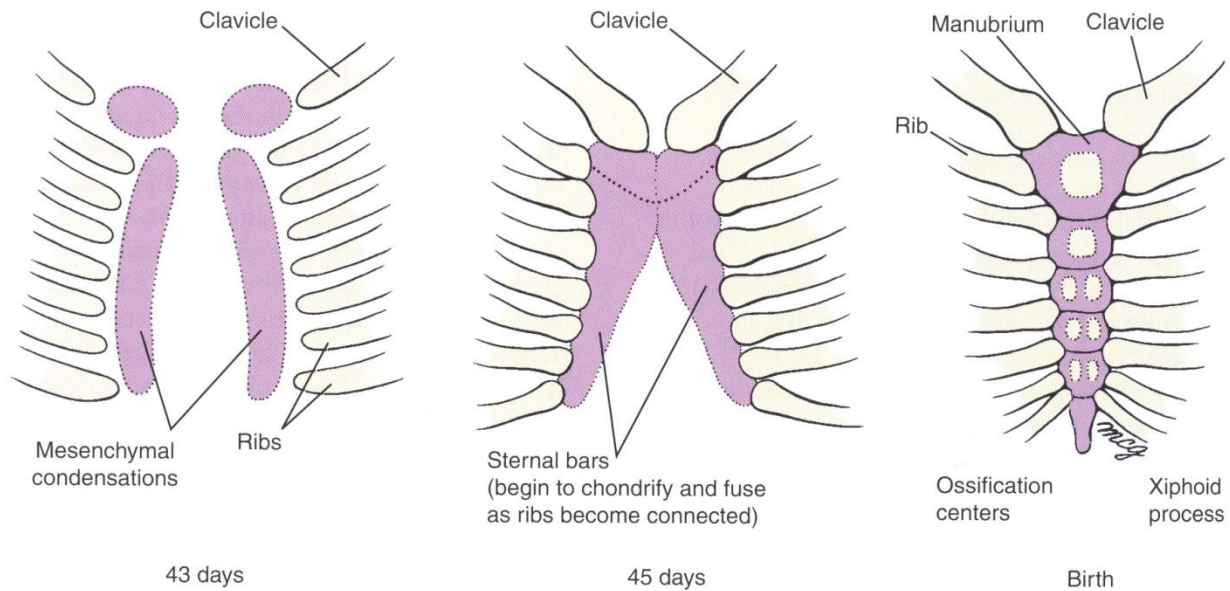




žebra

A

sternum



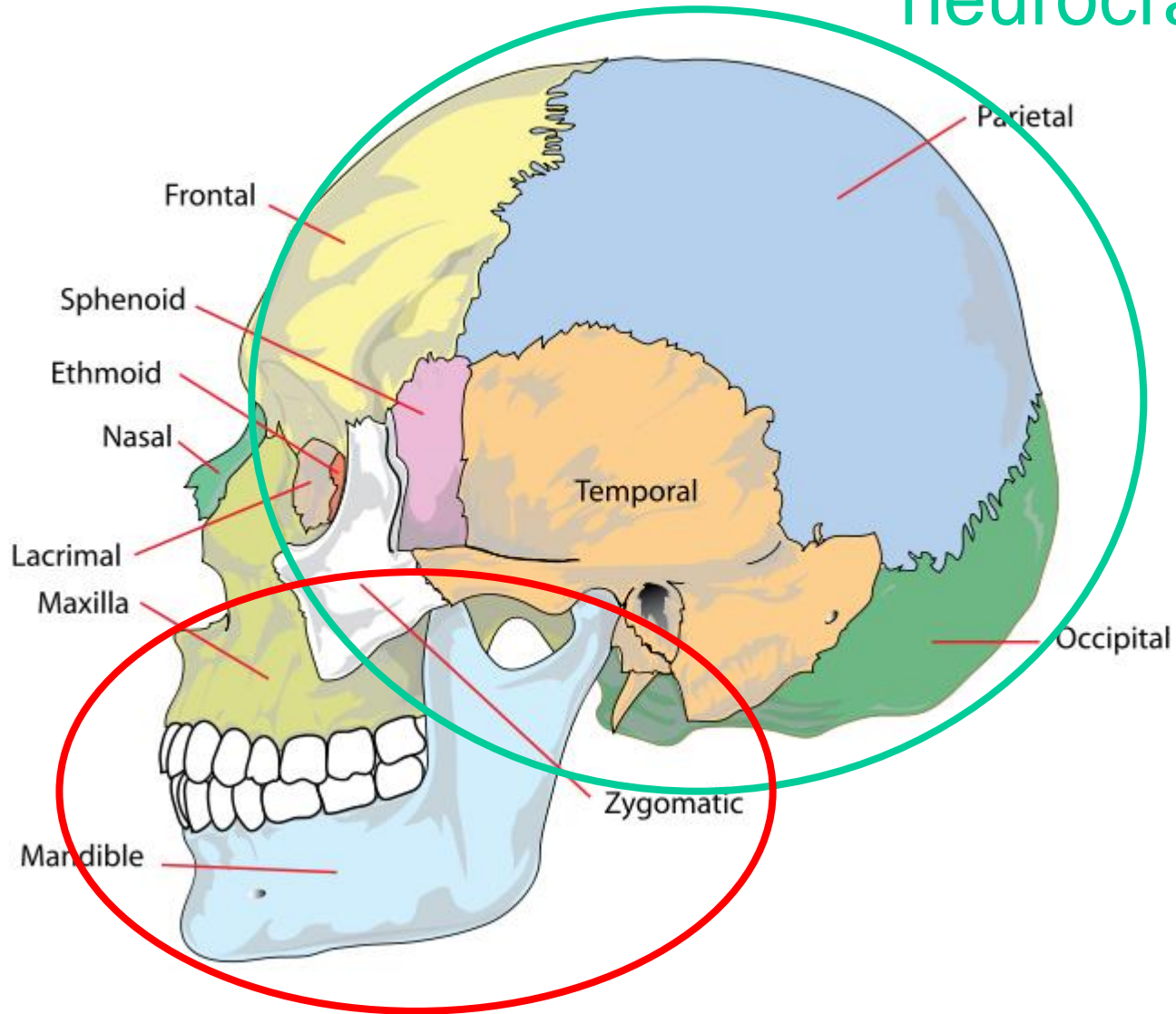
B

43 days

45 days

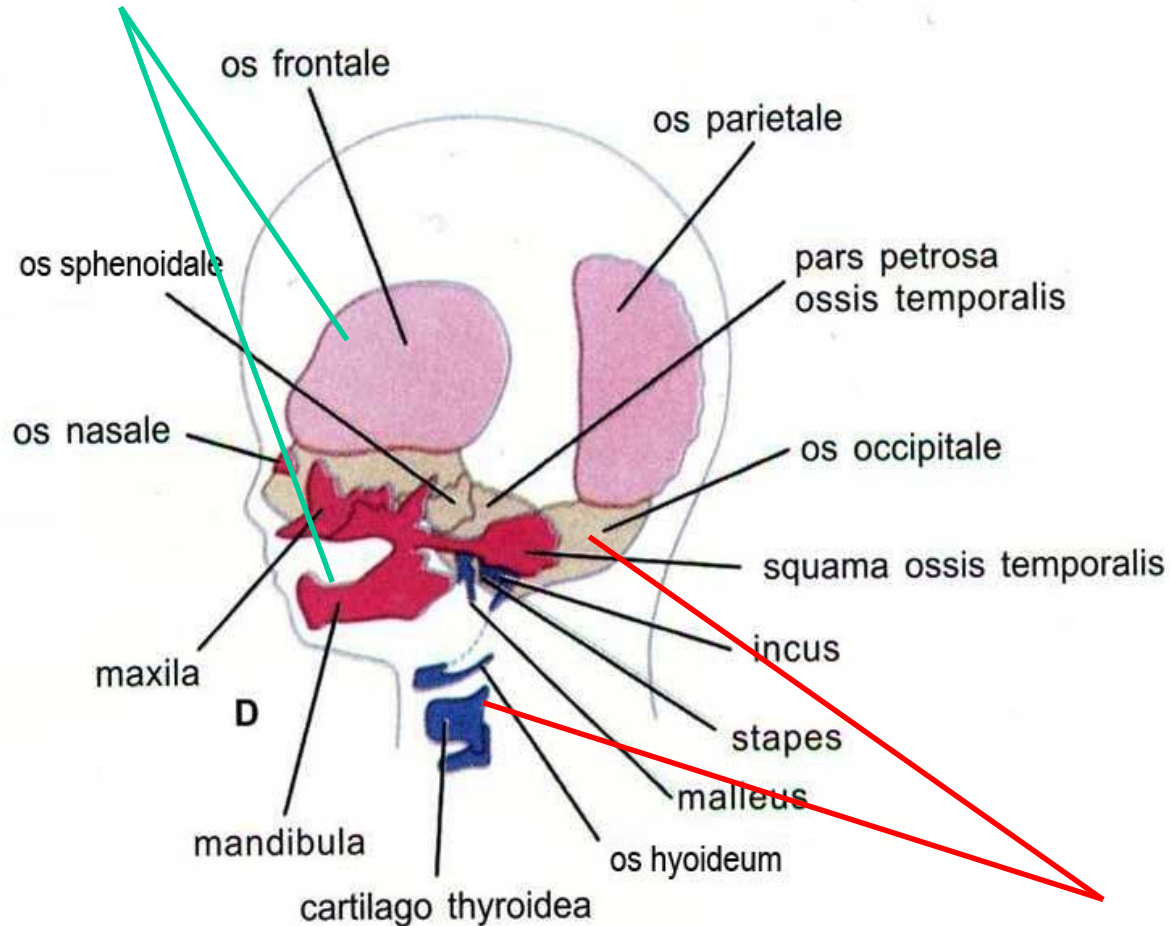
Birth

neurocranium

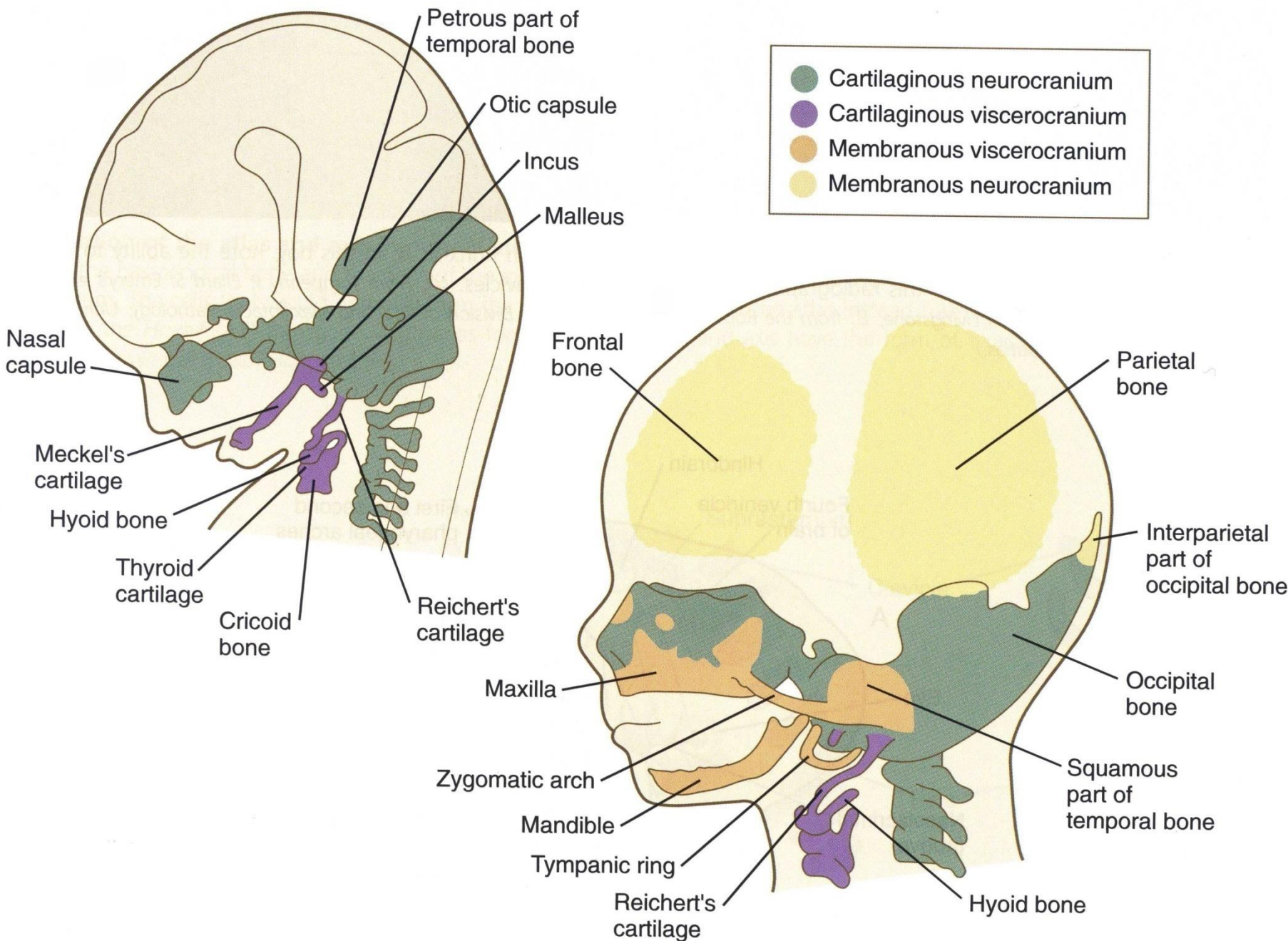


splanchnocranium (viscerocranium)

desmocranium



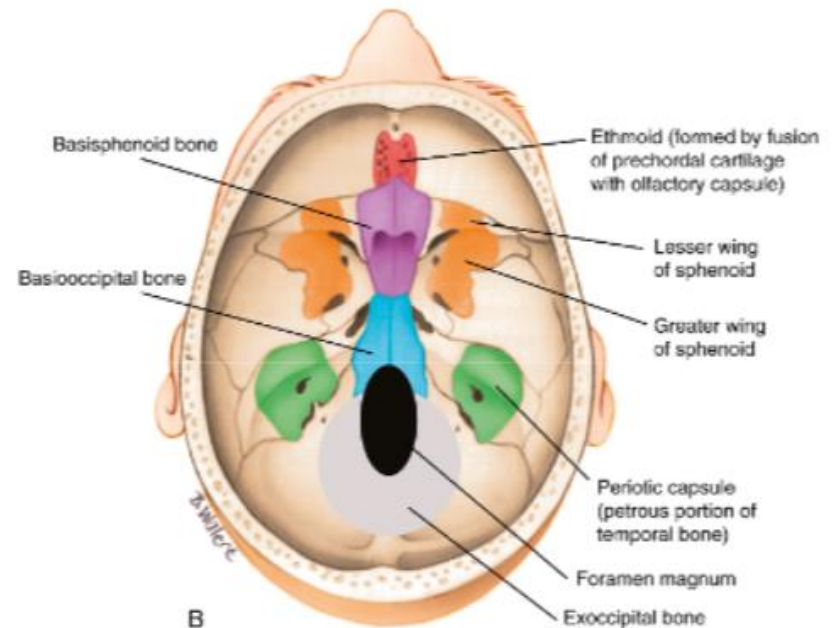
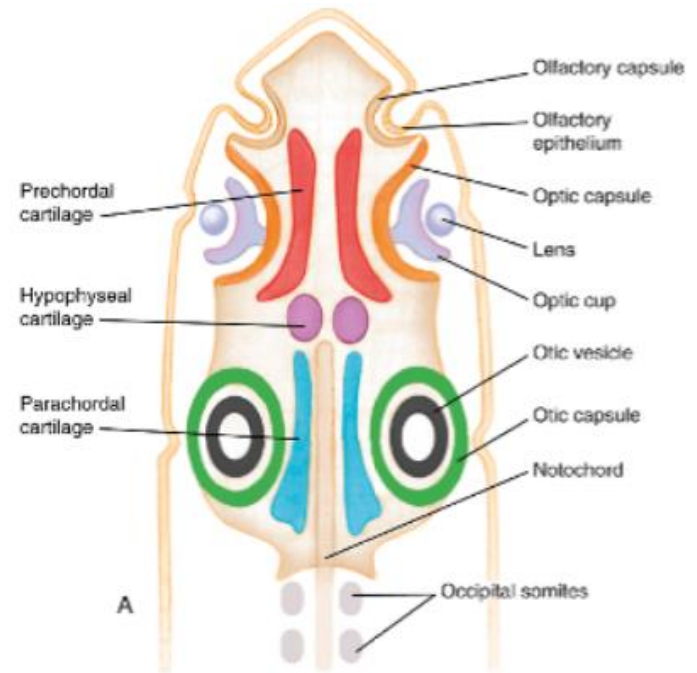
chondrocranium





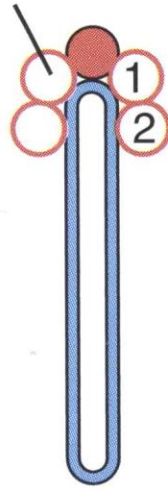
Chrupavčité neurocranium

- Capsula olfactoria
- Prechordální chrup.
- Capsula optica
- Hypofyzeální chrup.
- Parachordální chrup.
- Capsula otica

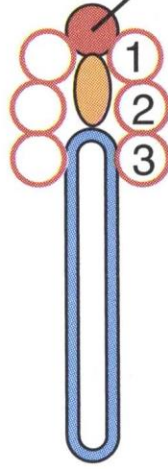


Zdroje mesenchymu: 1/paraxiální mesoderm

Somitomere

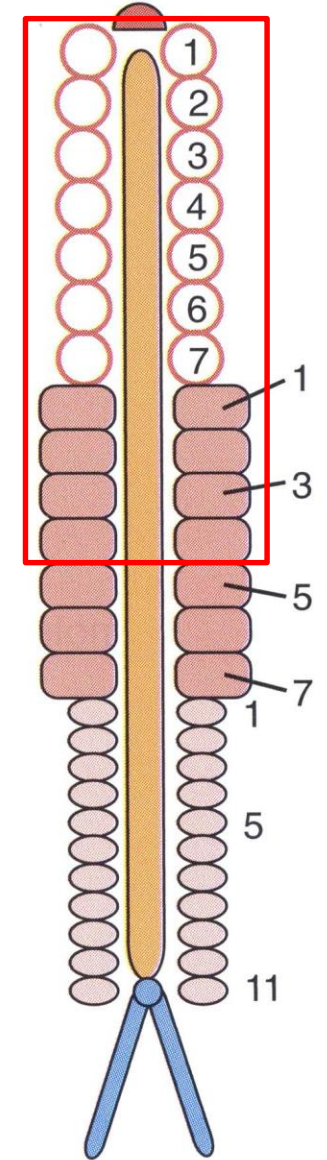
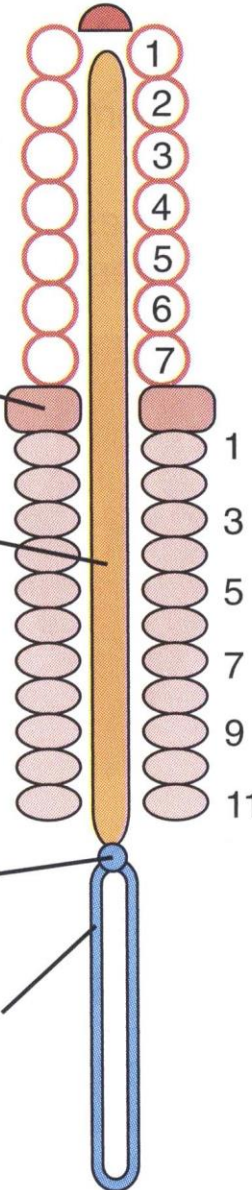


Prechordal plate



Somite

Notochord

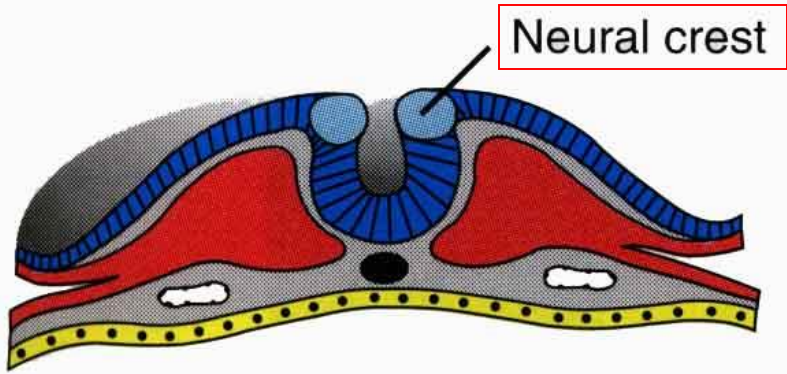


somitomery
okcipitální somity

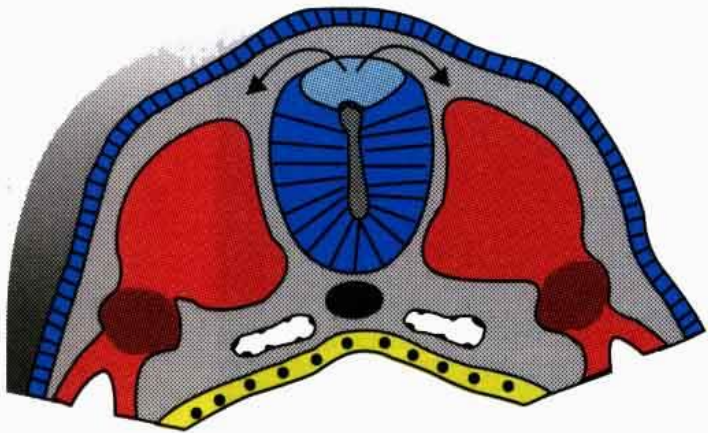
Hensen's node

Primitive streak

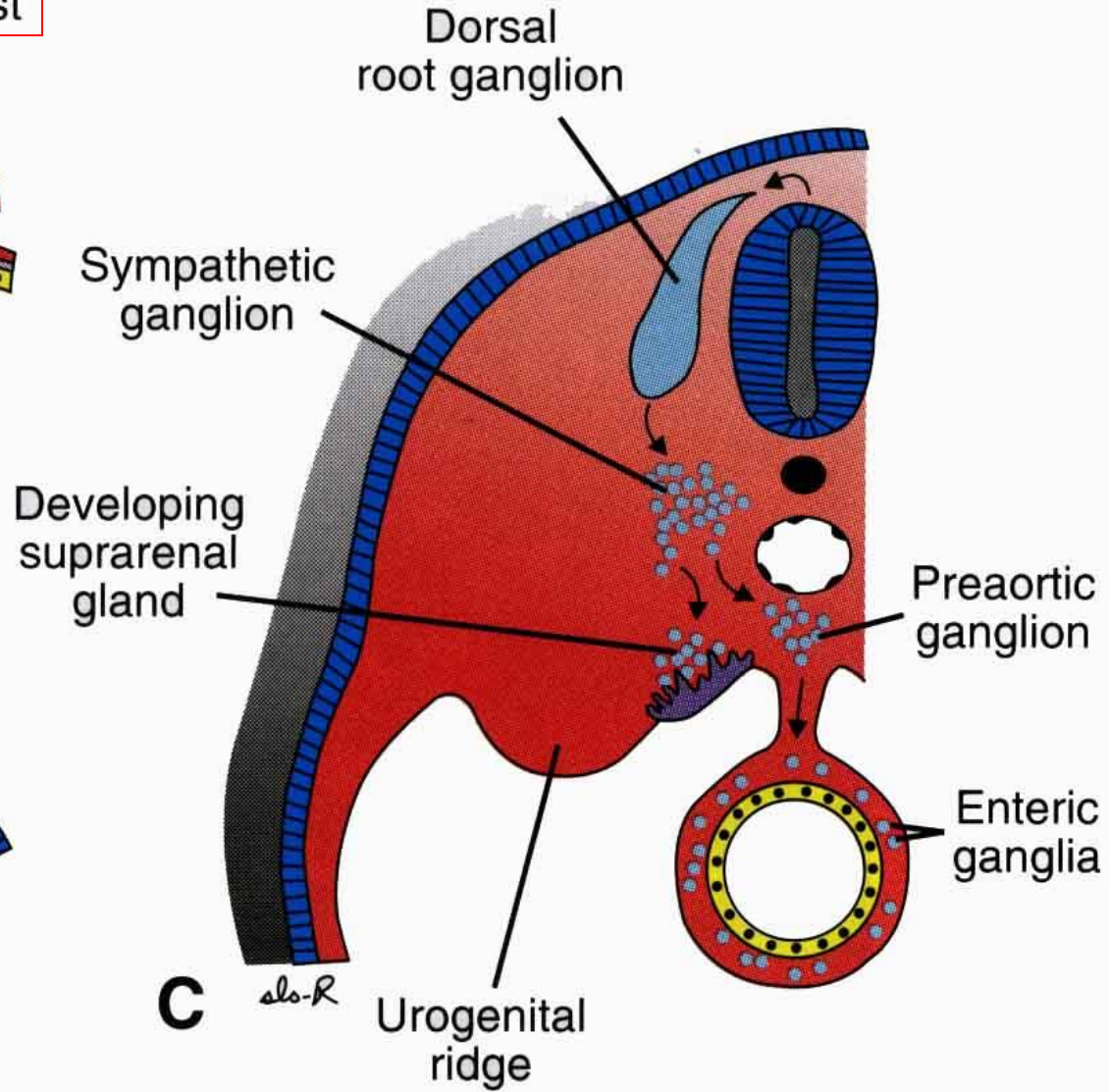
2/ neurální lišta



A



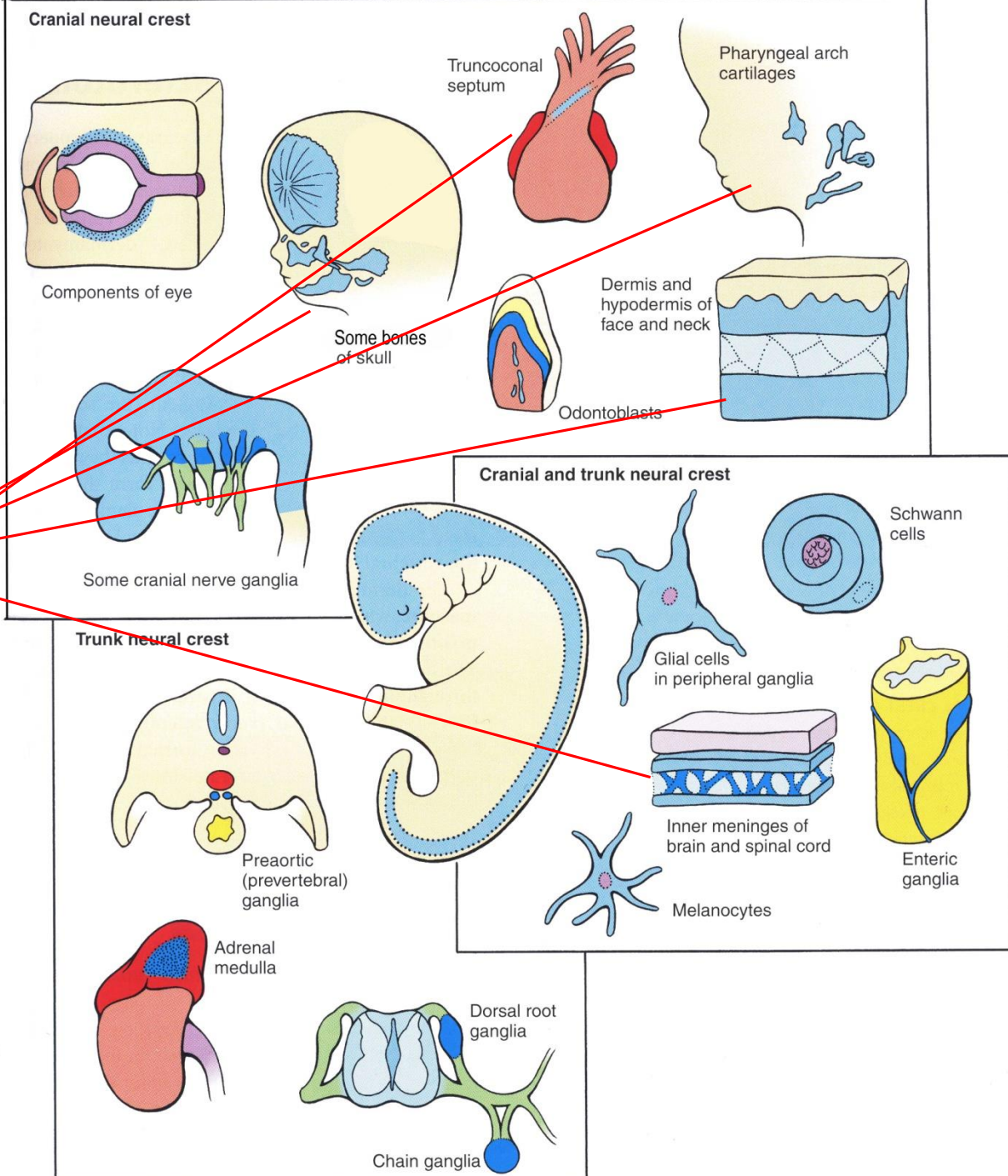
B

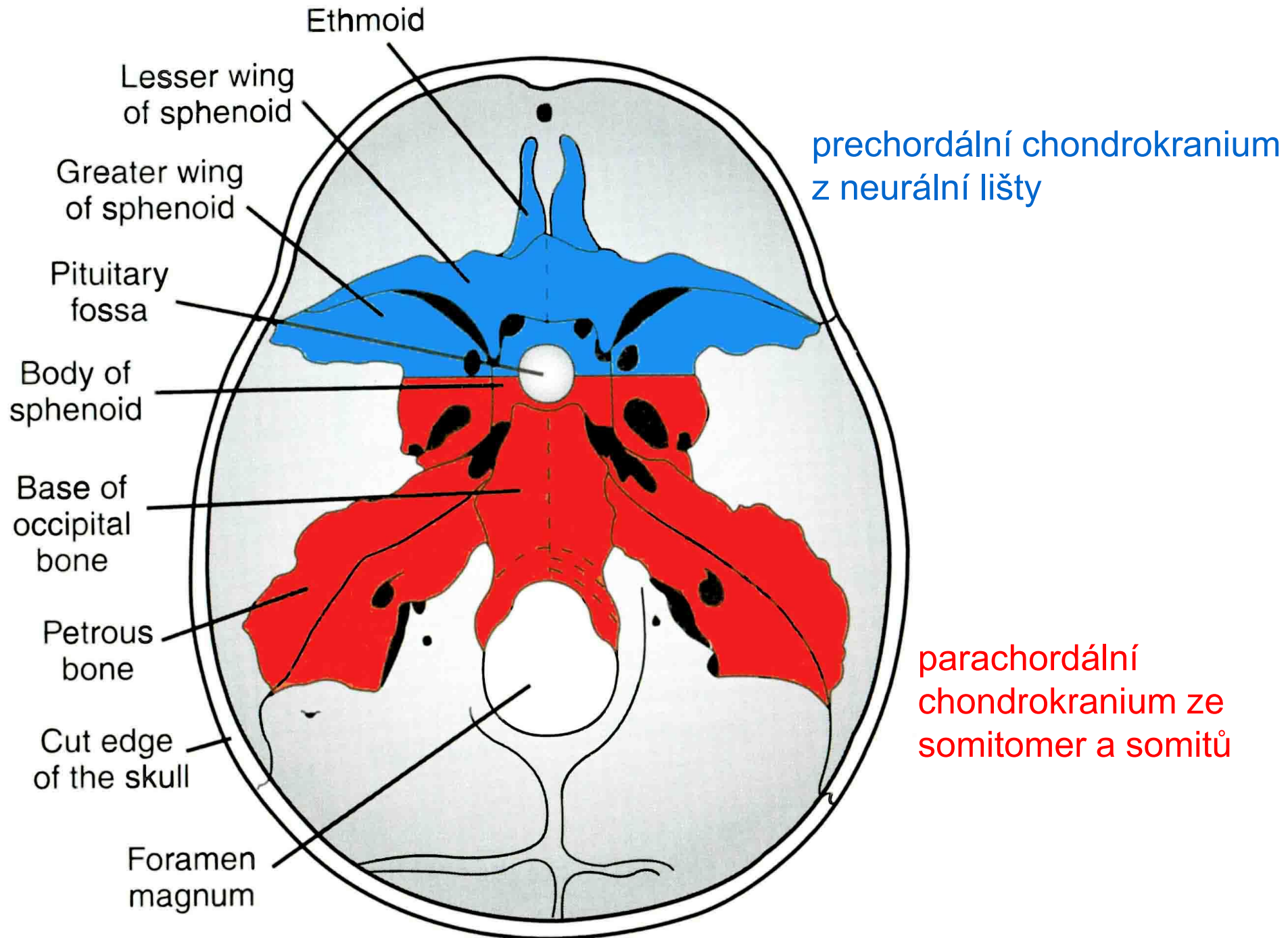


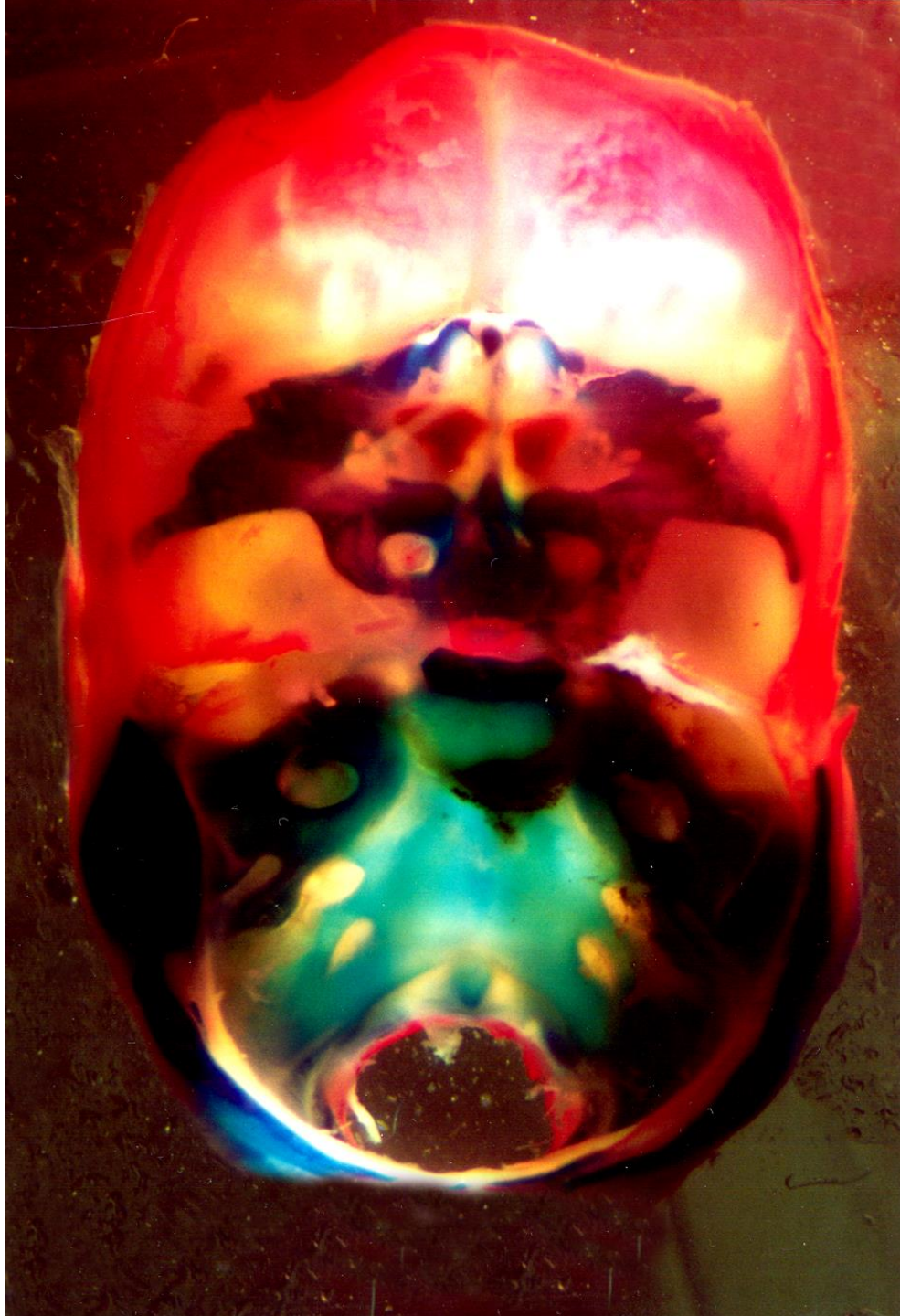
C

Deriváty neurální lišty

ektomesenchym

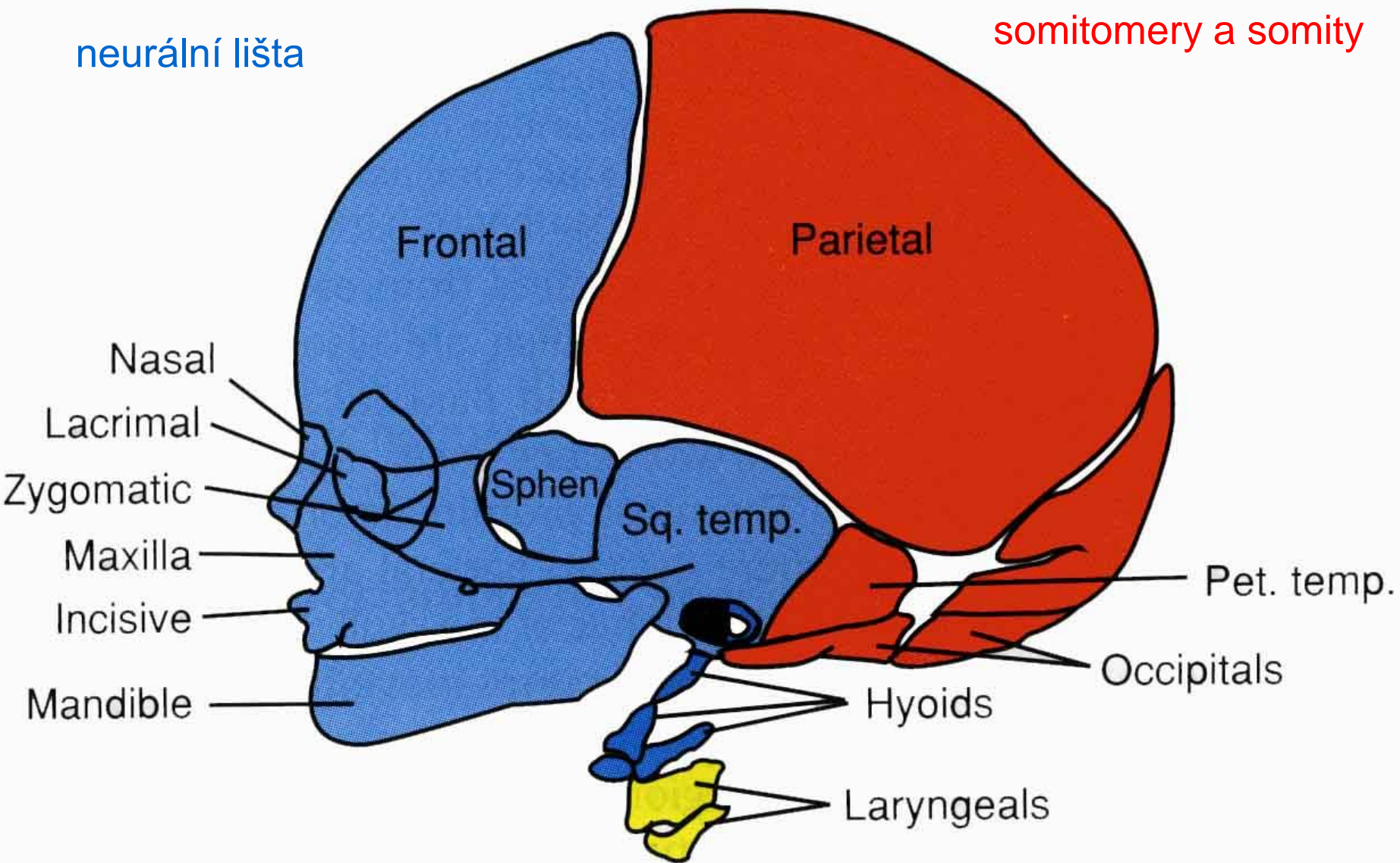






neurální lišta

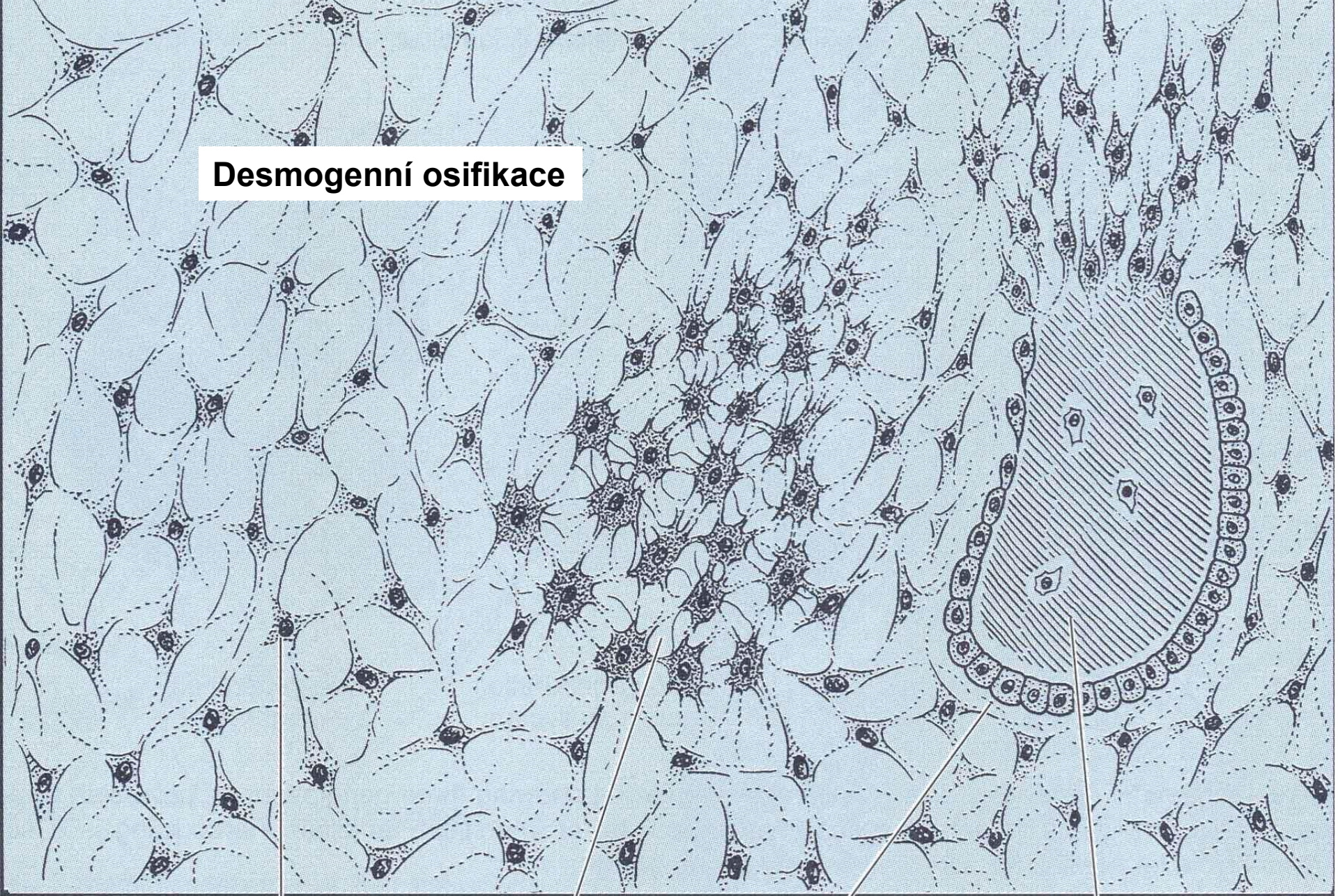
somitomery a somity



mesoderm laterální ploténky



Desmogení osifikace

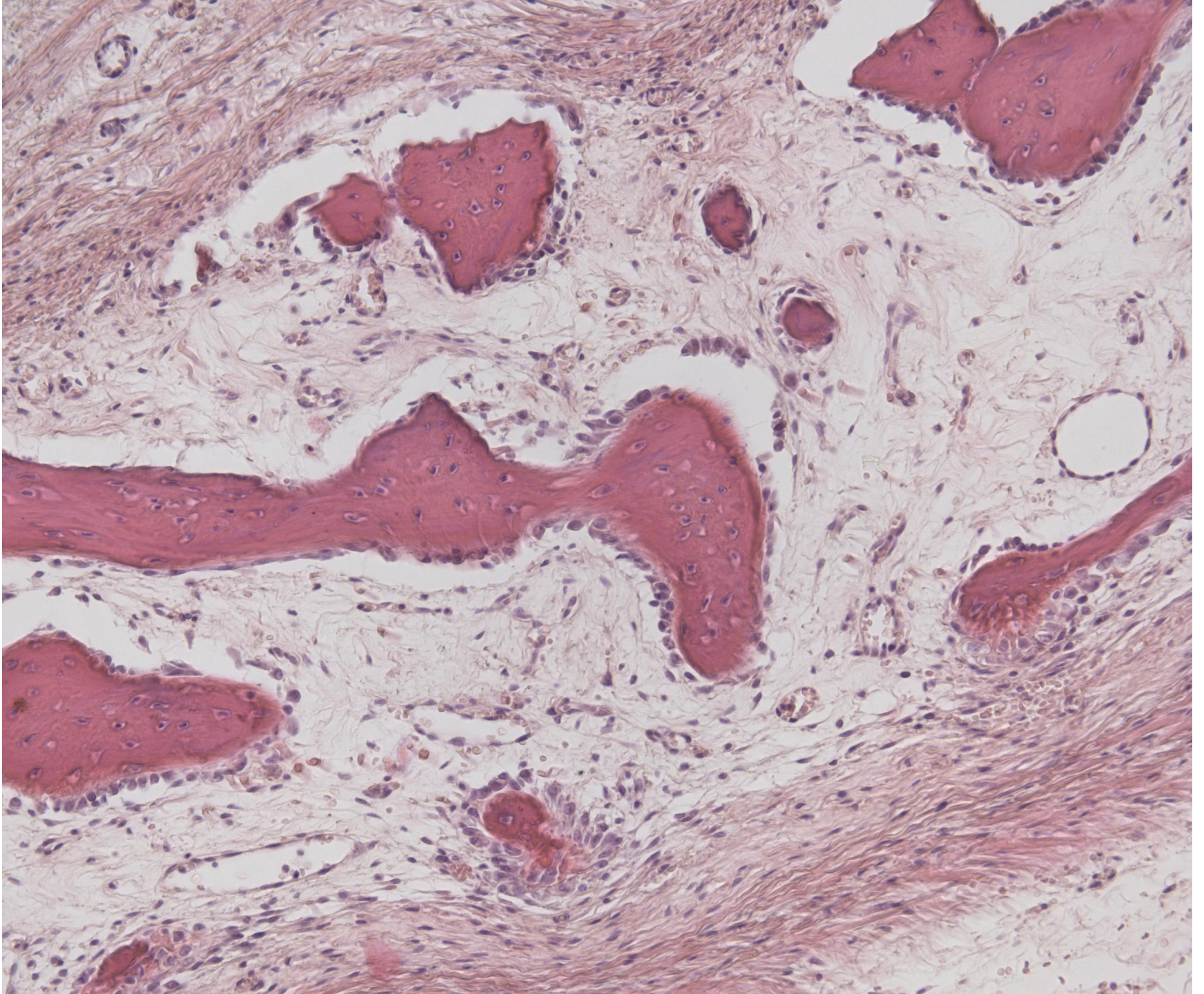


Mesenchyme

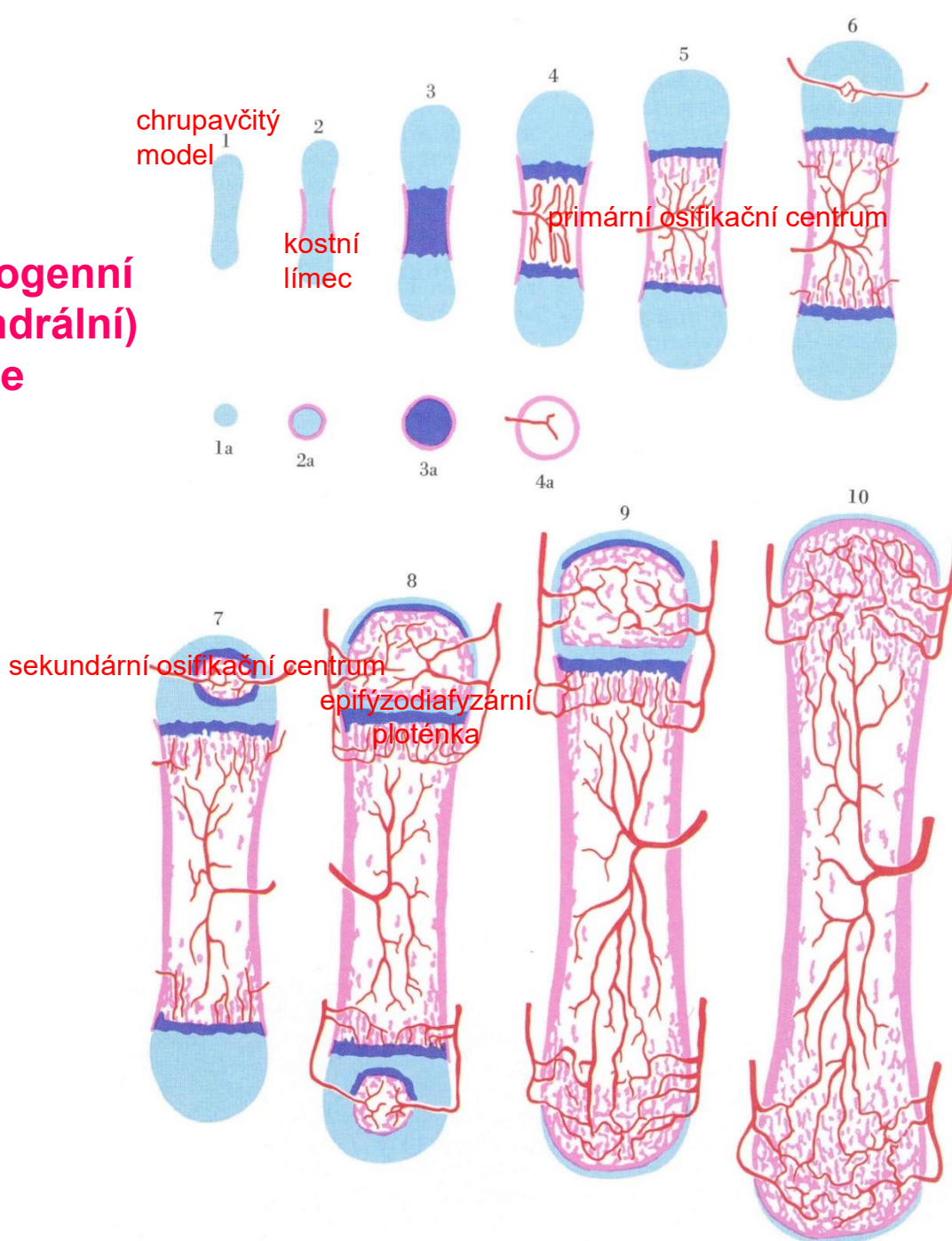
Bone blastema

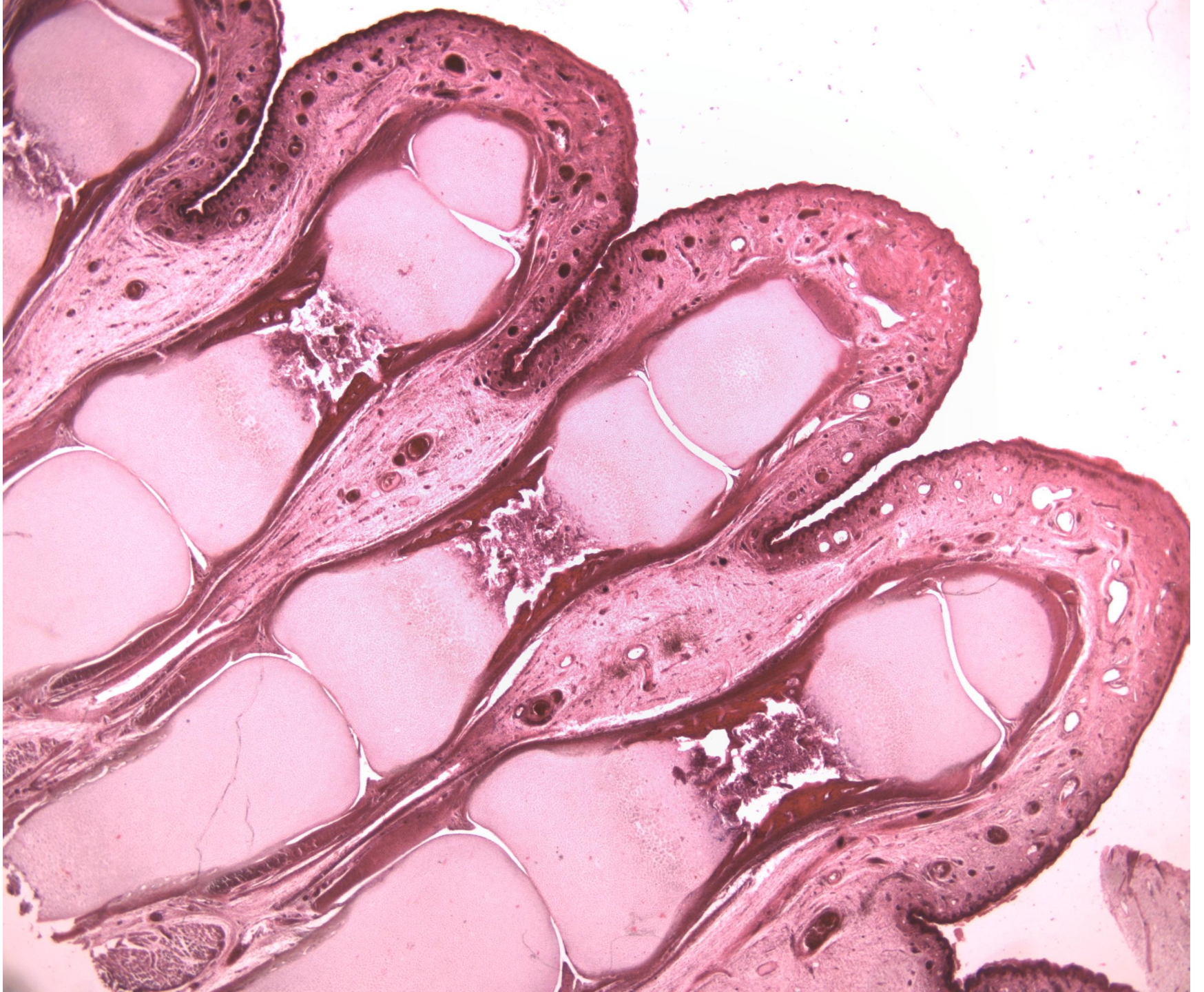
Osteoblasts

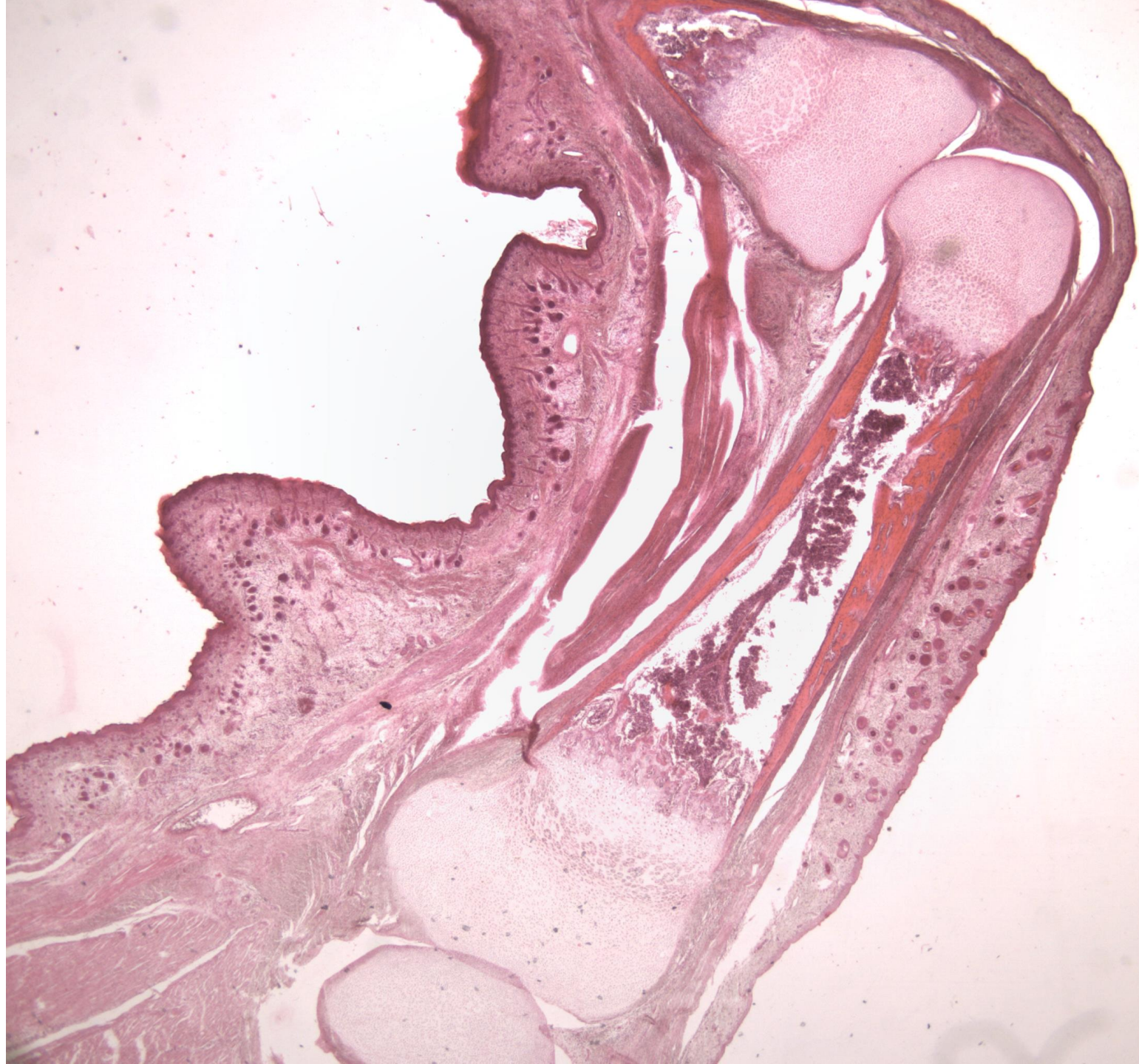
Primary bone tissue



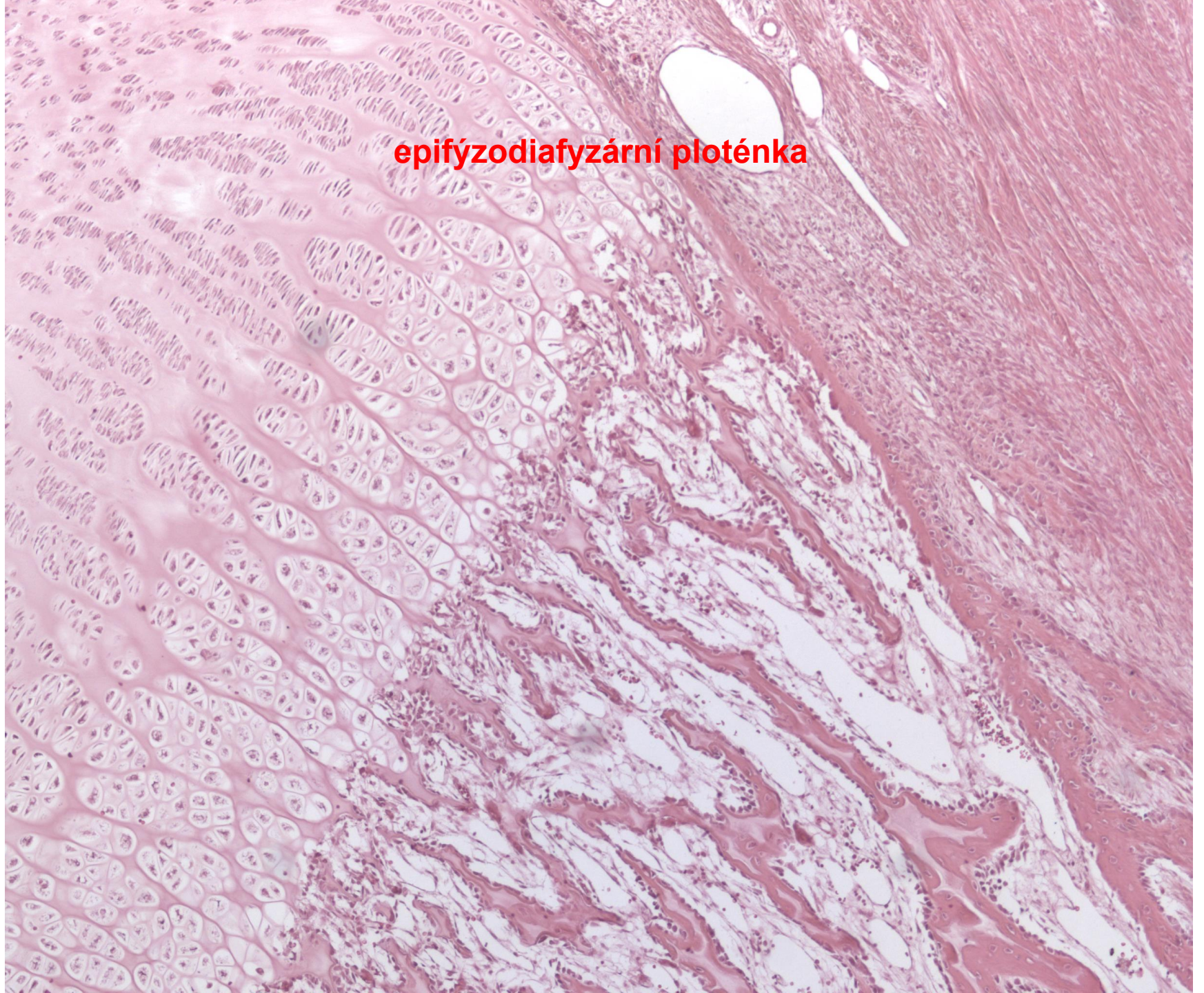
Chondrogenní (enchondrální) osifikace







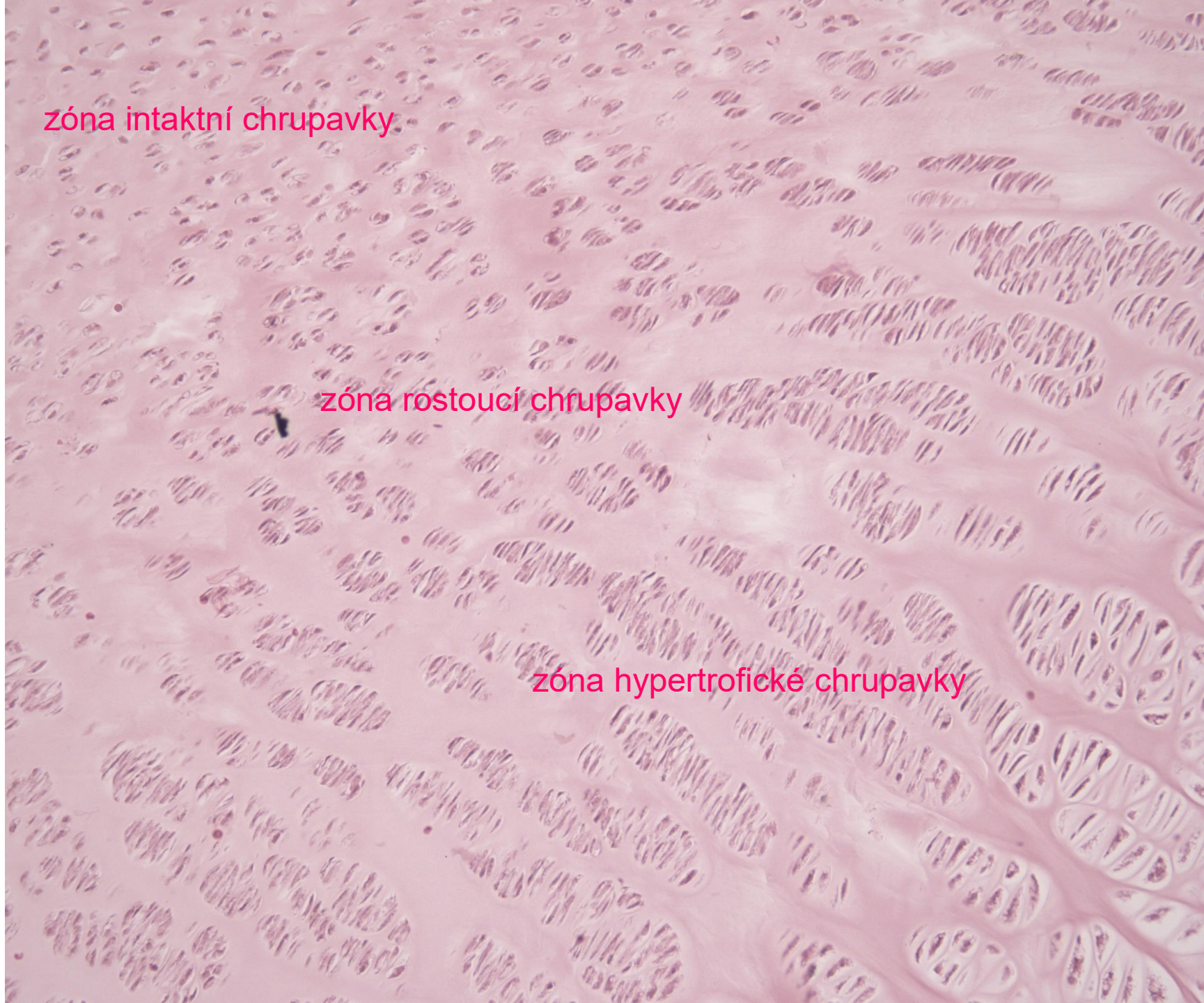
epifýzodiafyzární ploténka



zóna intaktní chrupavky

zóna rostoucí chrupavky

zóna hypertrofické chrupavky





zóna hypertrofické zvápenaté chrupavky

linie eroze

zóna osifonní

zóna osteoidní

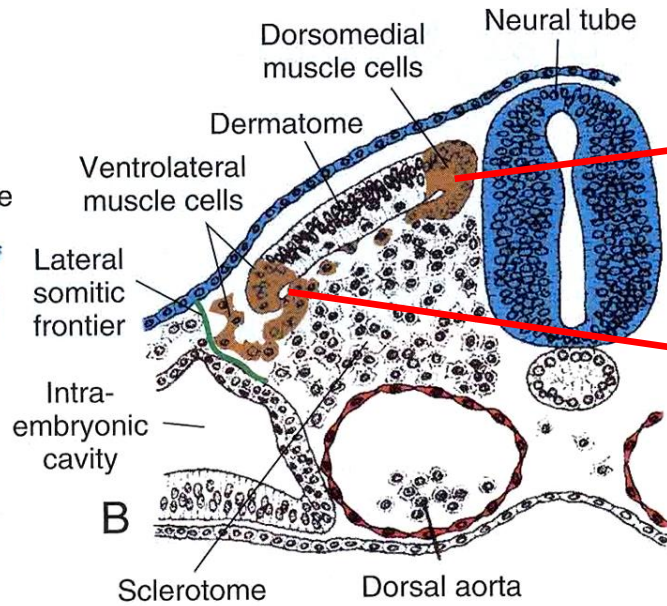
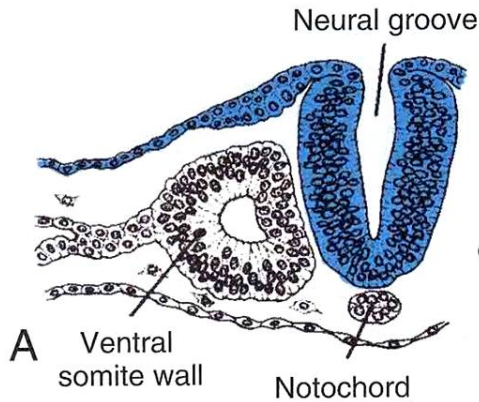
A histological section of bone tissue stained with hematoxylin and eosin (H&E). The image displays several osteons, which are the basic structural units of bone. Each osteon consists of concentric layers of bone tissue surrounding a central canal. The central canals contain blood vessels and nerves. The osteons are separated by narrow spaces called interstitial lamellae. The overall structure is highly organized and shows the characteristic lamellar pattern of bone tissue.

zóna osiforní

zóna resorpce

VÝVOJ SVALOVÉHO SYSTÉMU

postkraniální svalovina



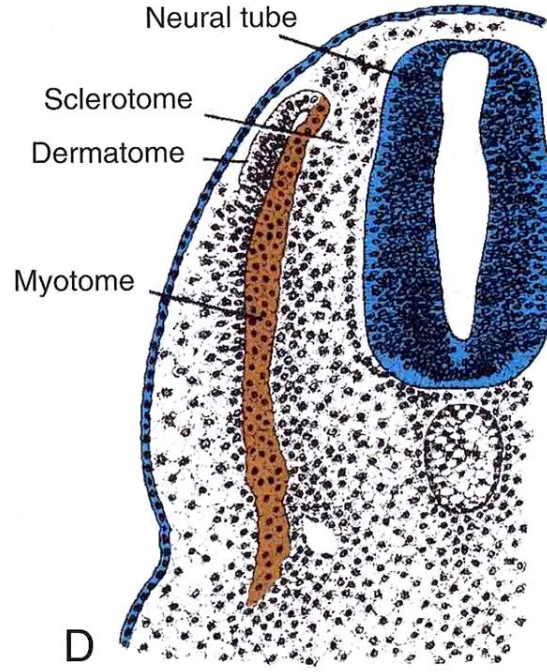
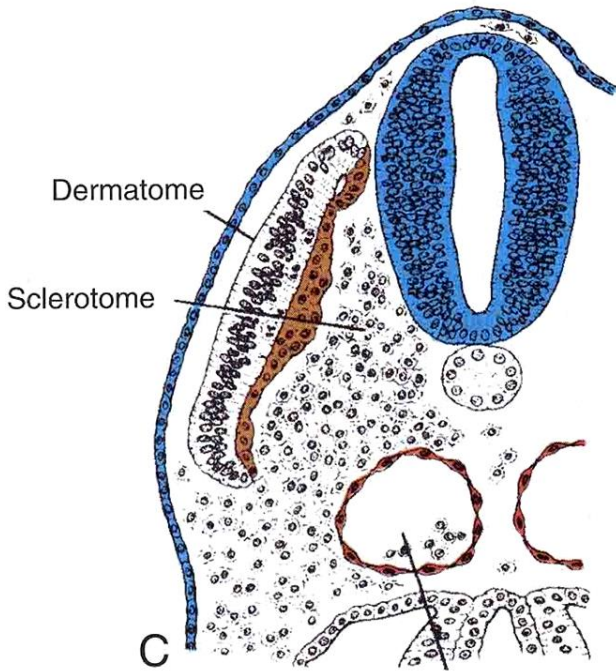
epaxiální svalovina

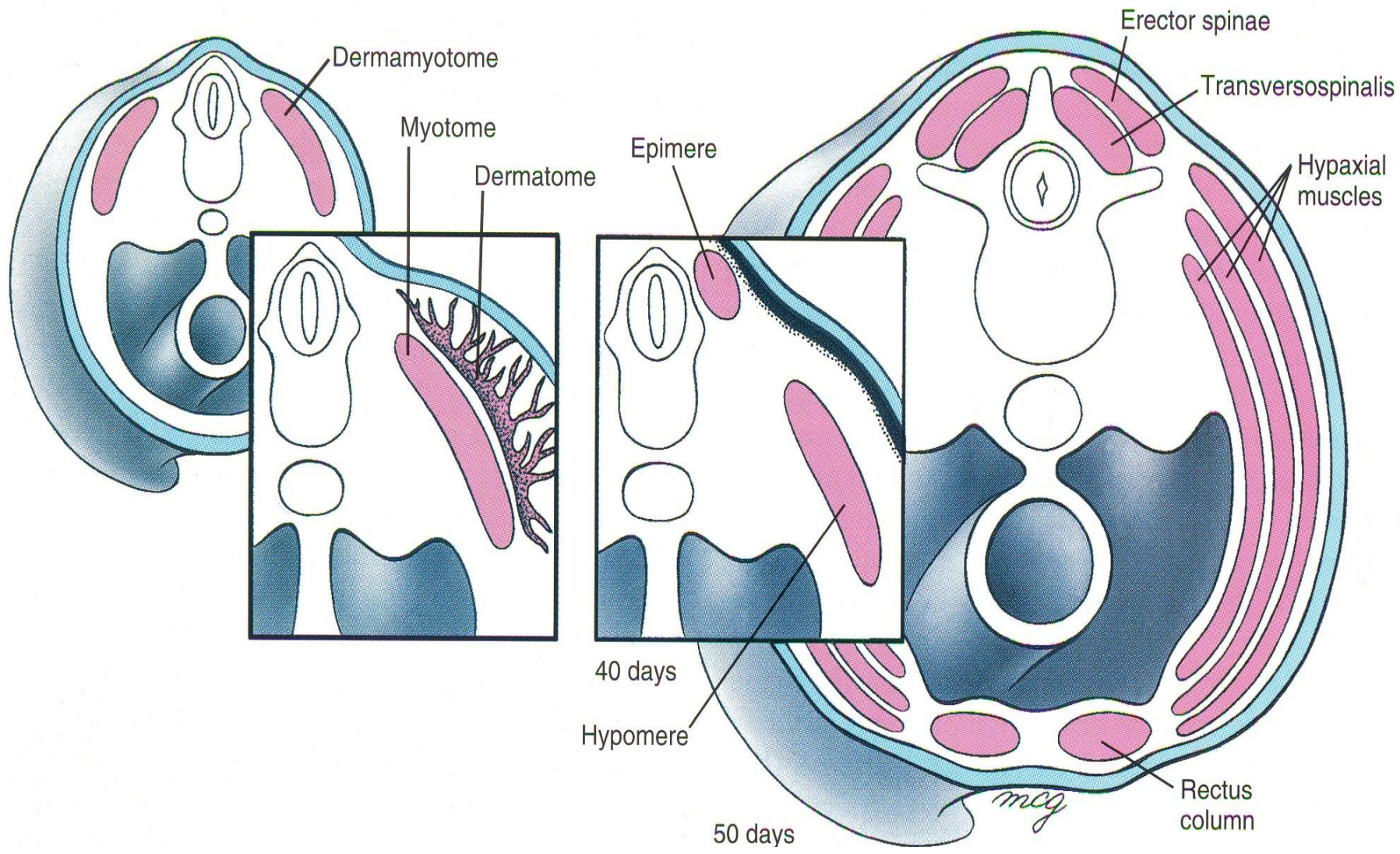
hypaxiální svalovina

primaxiální svalovina

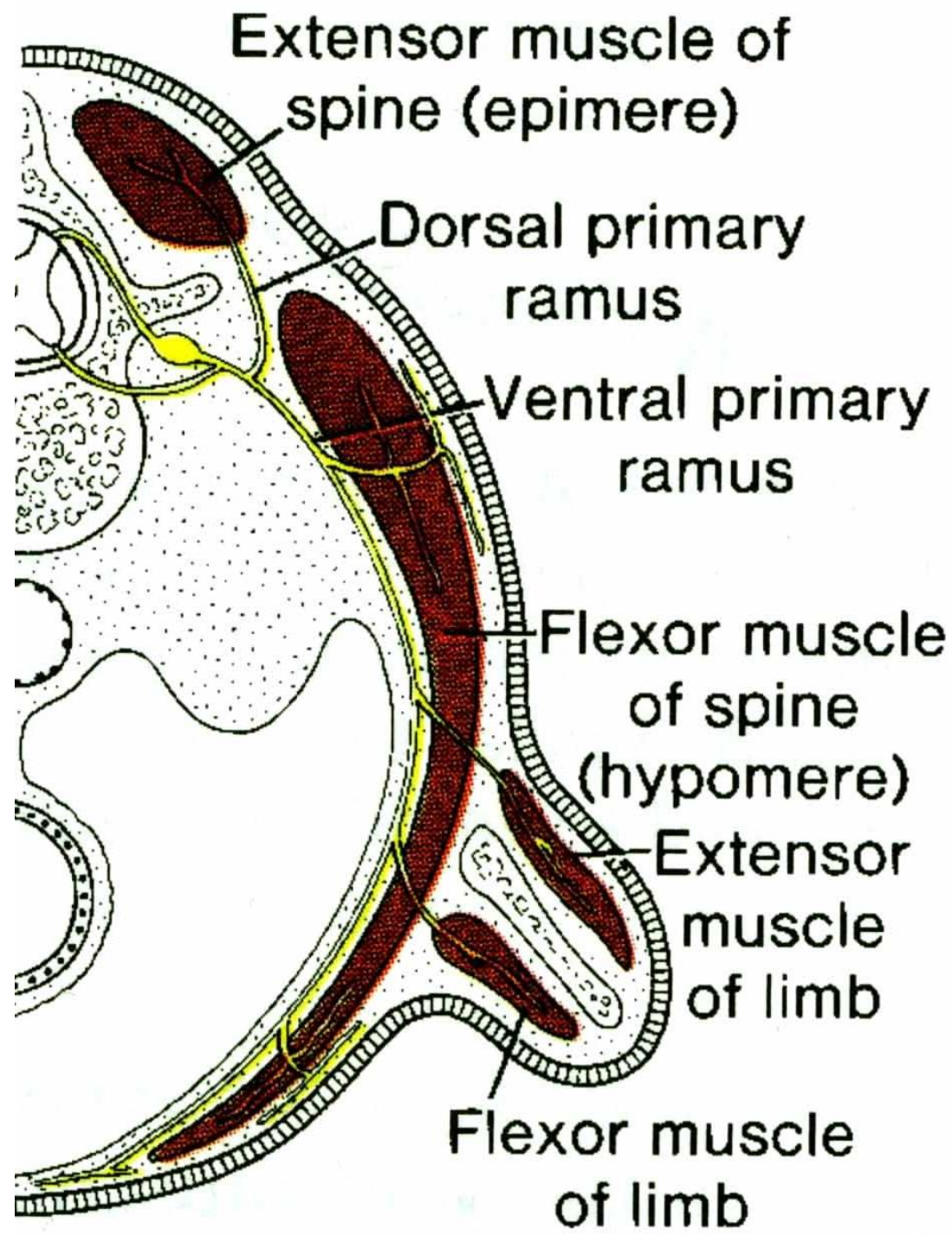
vzniká a vyvíjí se
v mesenchymu somitového
původu

abaxiální svalovina vzniká
v mesenchymu somitového
původu, ale vyvíjí se
v mesenchymu z mesodermu
somatopleury



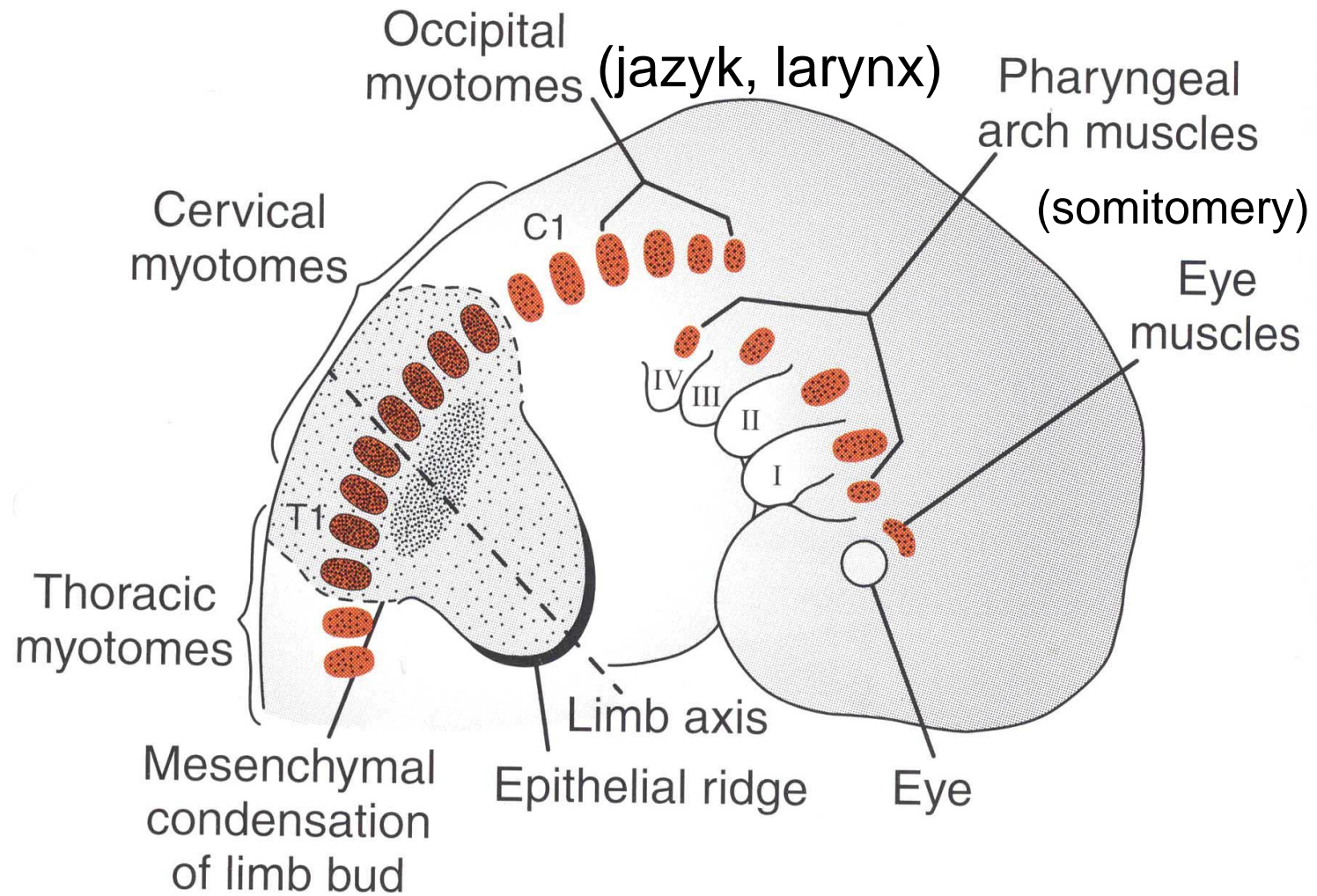


svaly končetin

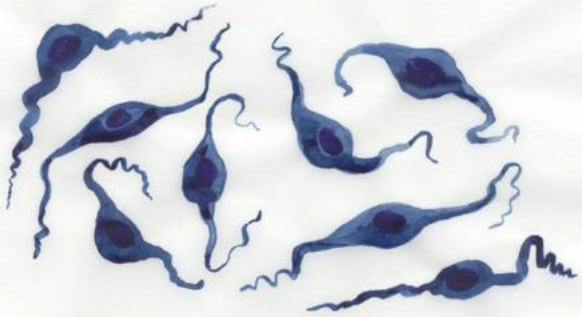


7. týden

kraniální svalovina



New myoblasts



Myoblasts fusing



Myoblasts in line



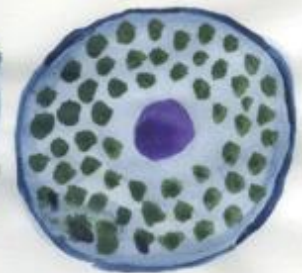
Side views



Cross sections

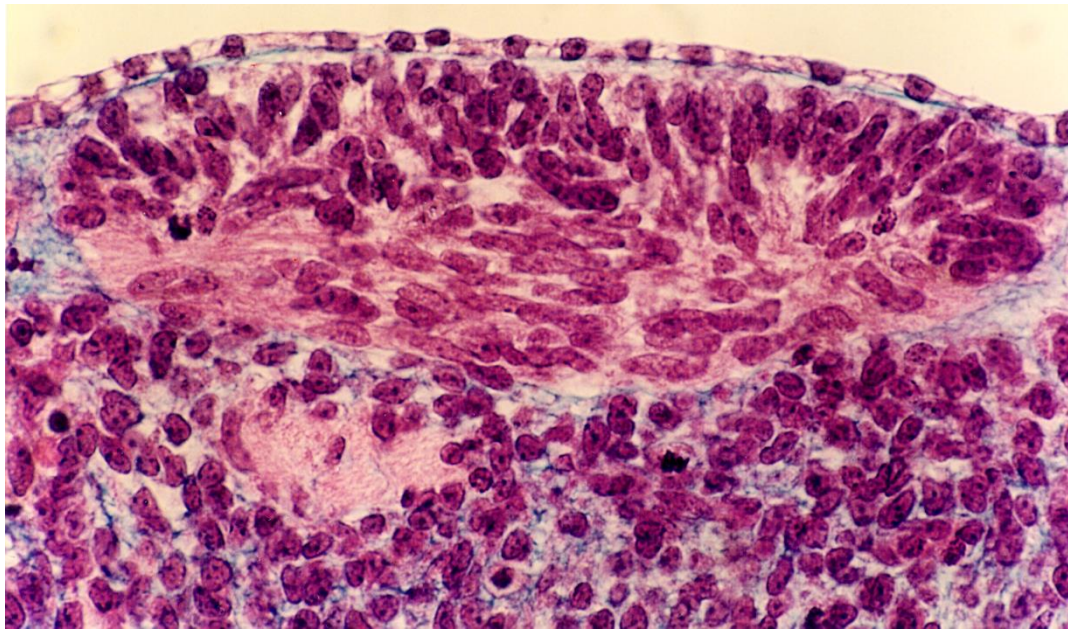


Myoblasts develop myofibrils

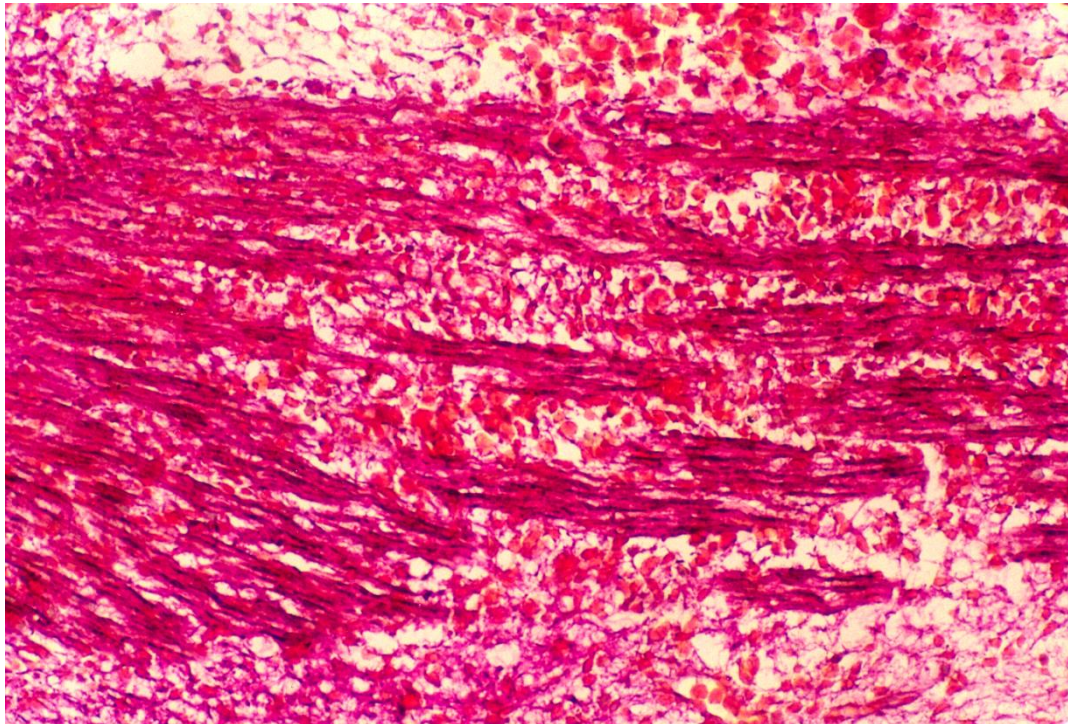


Myotube

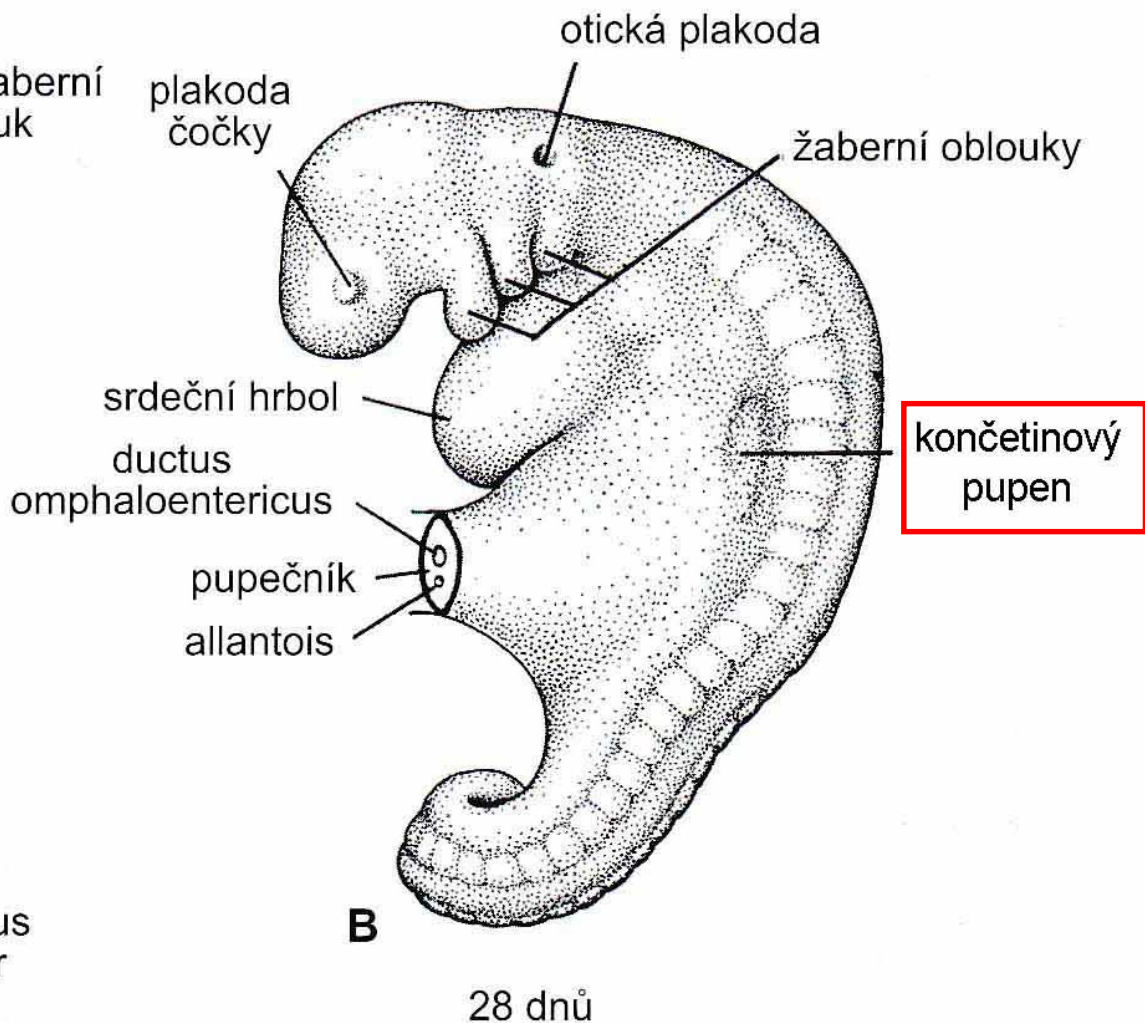
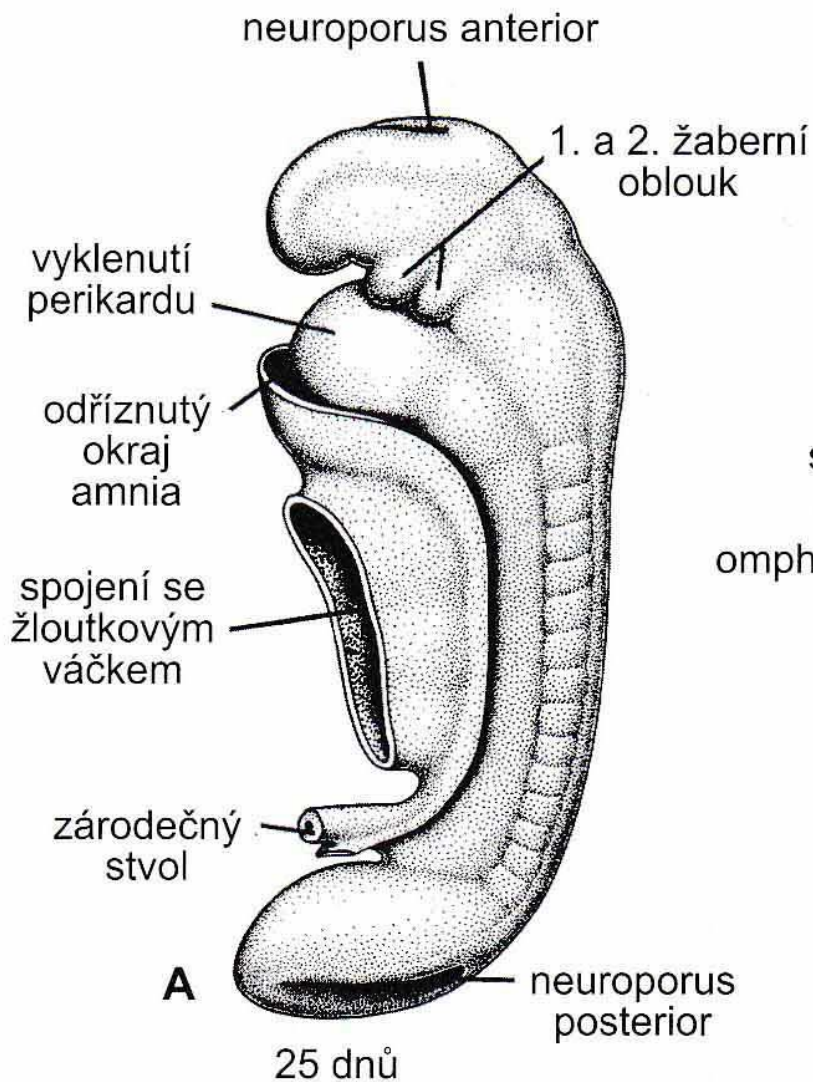
myoblasty



myotuby

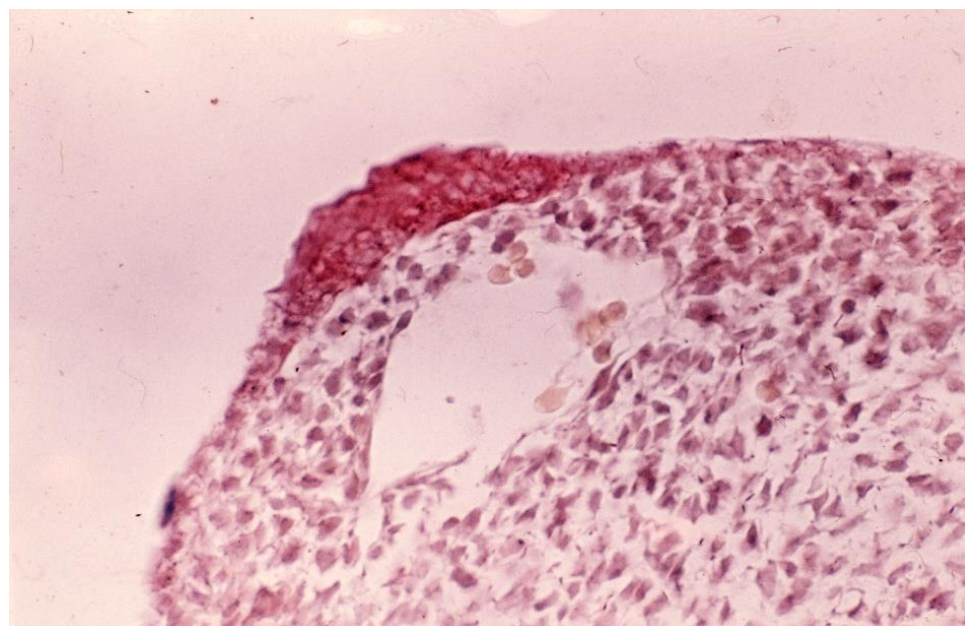
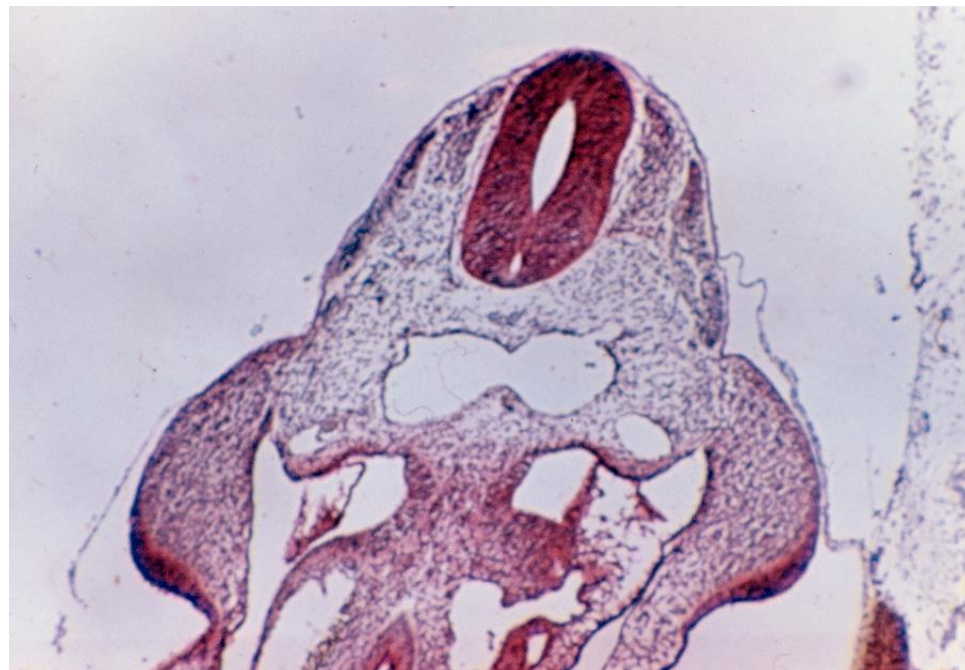


VÝVOJ KONČETIN



Končetinový pupen

5. týden

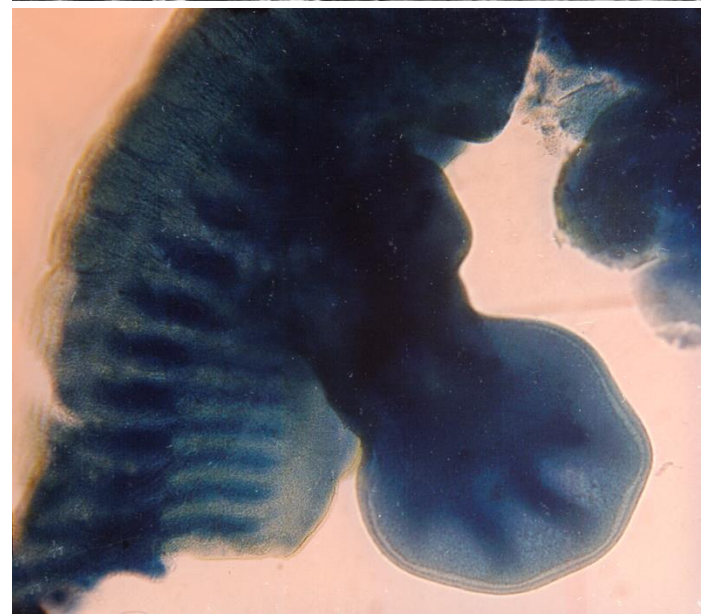
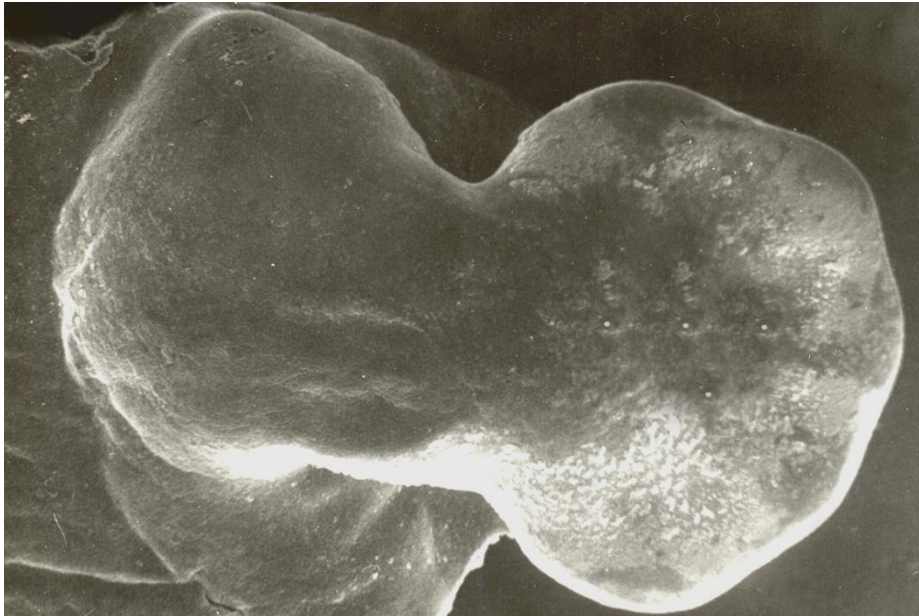
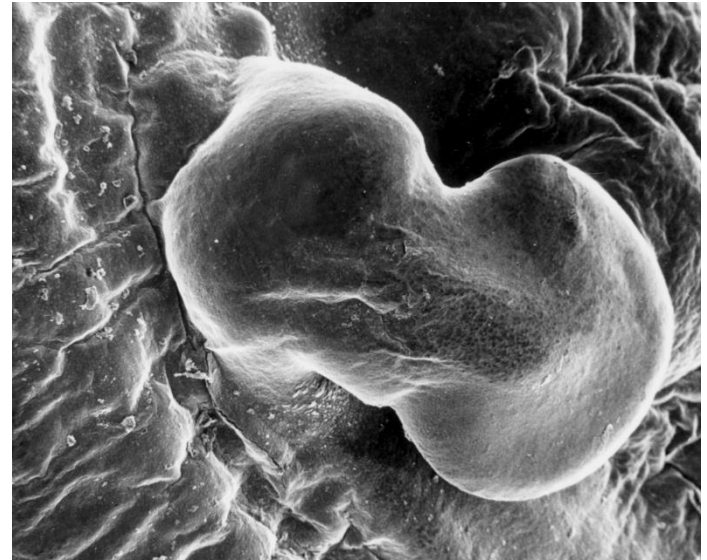




6th week

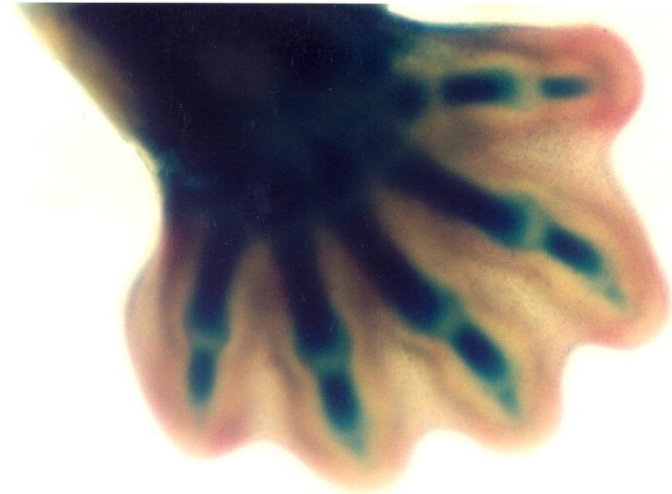
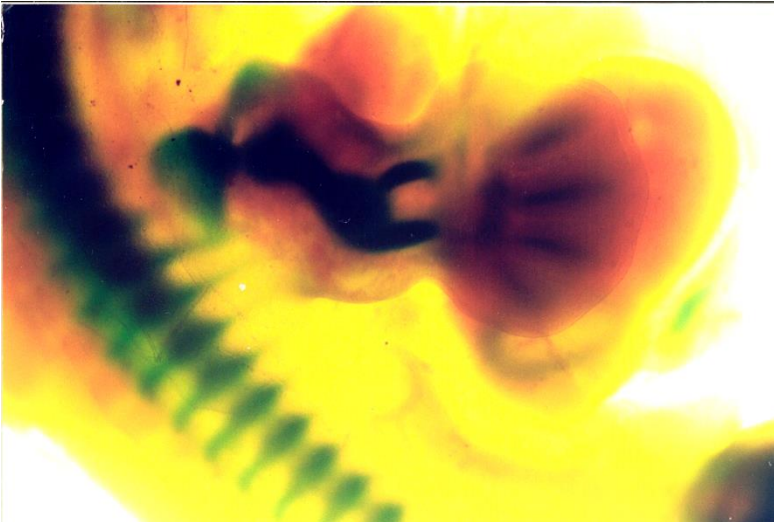
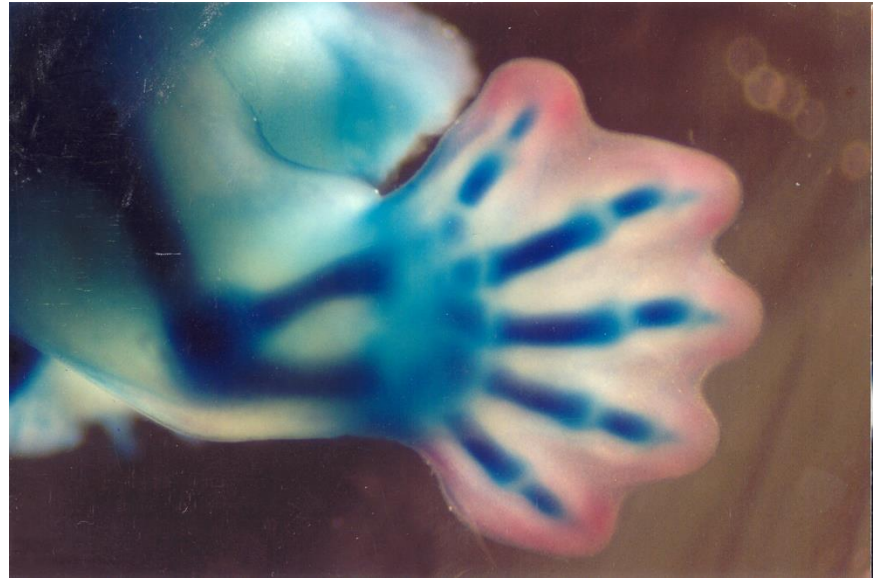
Končetina se dvěma segmenty, palmární (plantární) ploténka

6. týden

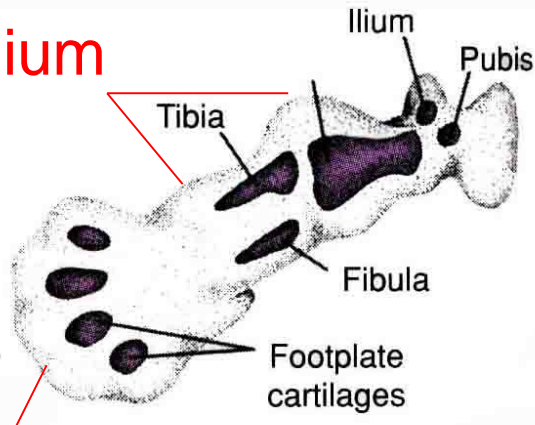


Končetina se třemi segmenty, digitální paprsky a hrboleky

7. týden

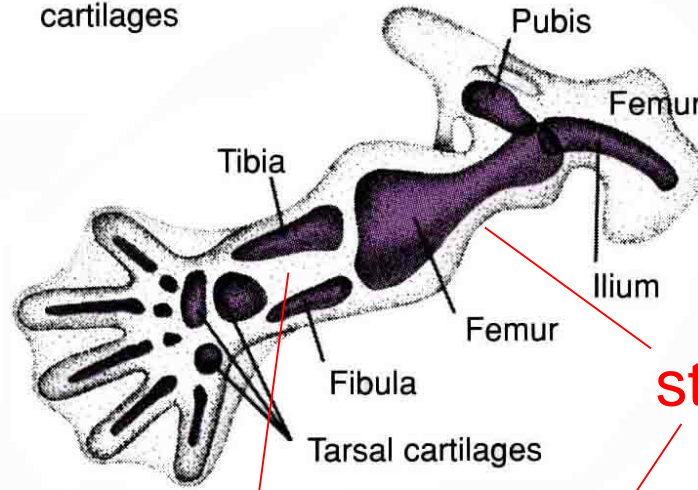


axopodium



končetina se dvěma segmenty

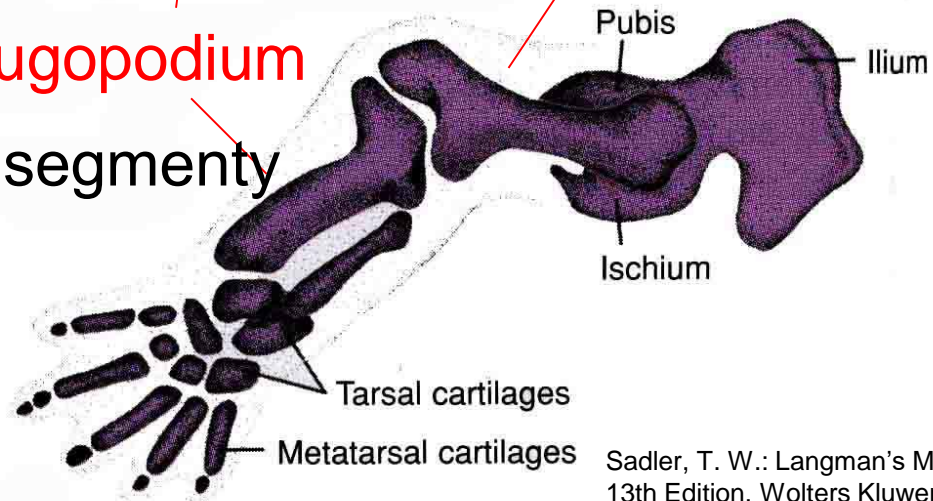
autopodium



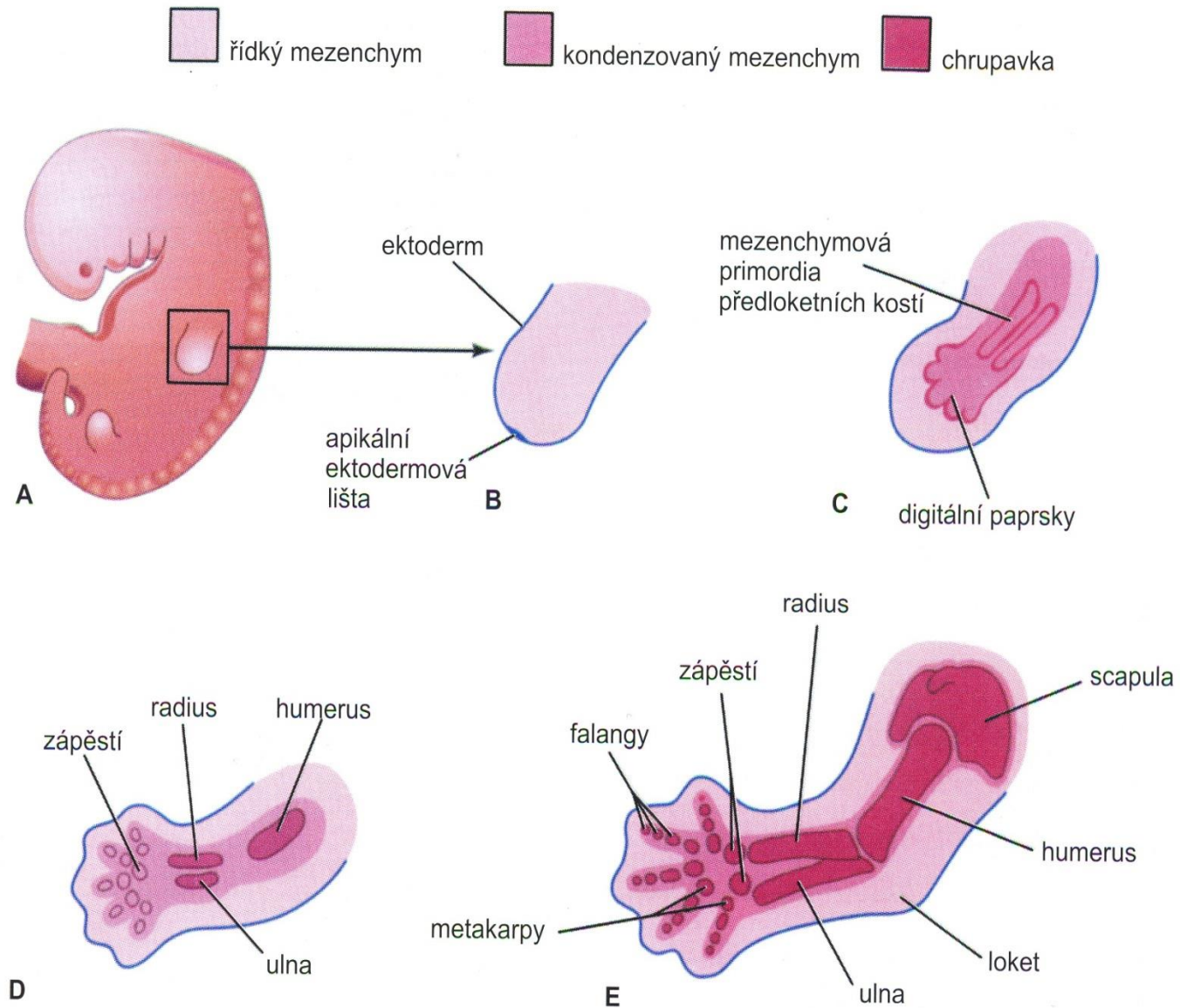
stylopodium

zeugopodium

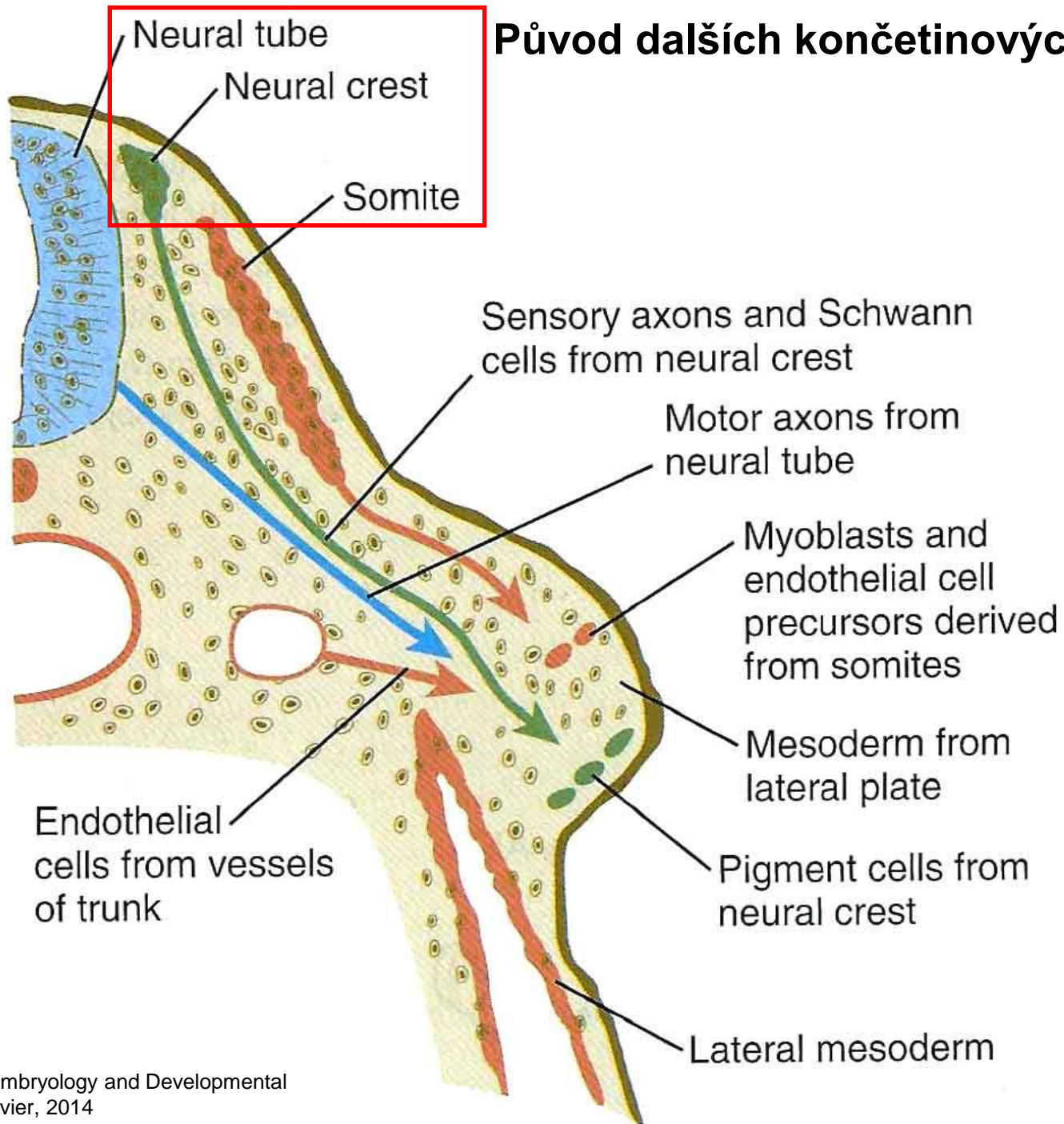
končetiny se třemi segmenty



Kostra končetiny – parietální list somatického mezodermu



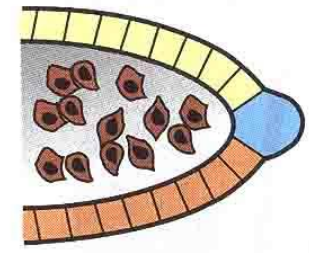
Původ dalších končetinových tkání



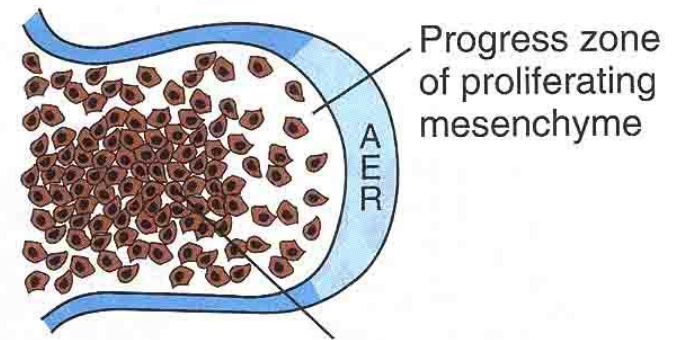
Proximodistal



FGF-10



- Radical fringe
- Engrailed-1
- Ser-2



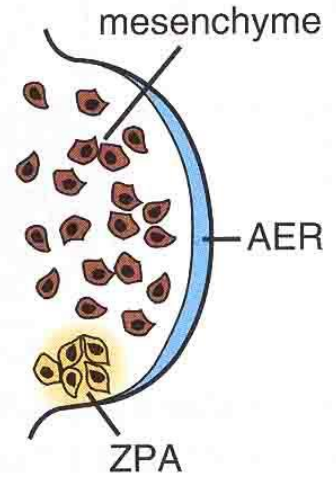
- FGF-4 and FGF-8

Progress zone of proliferating mesenchyme

AER

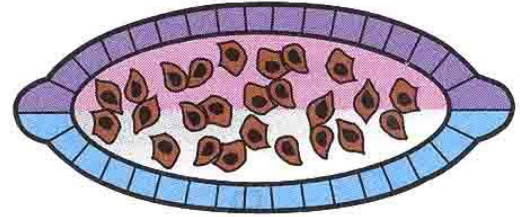
Condensing mesenchyme for cartilage

Craniocaudal



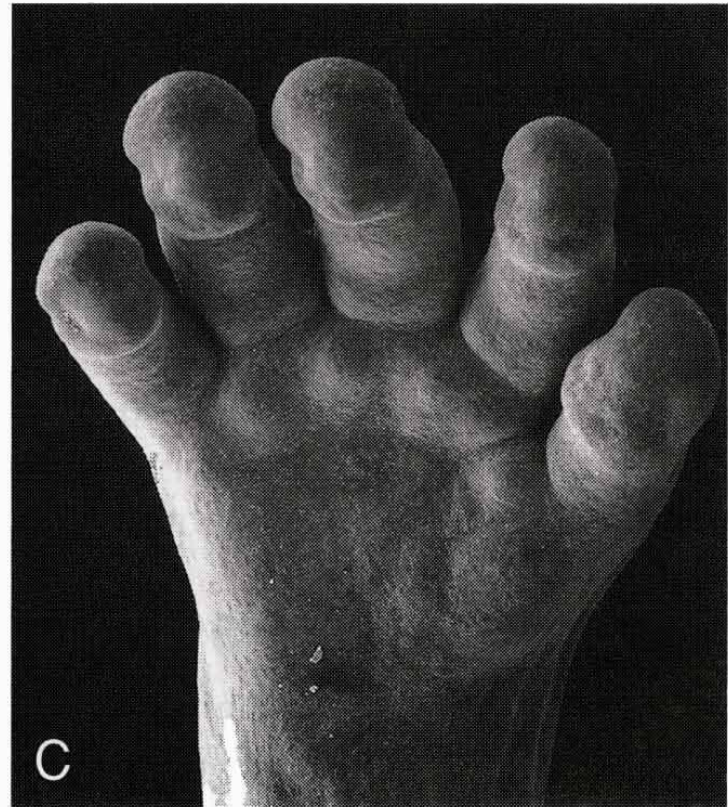
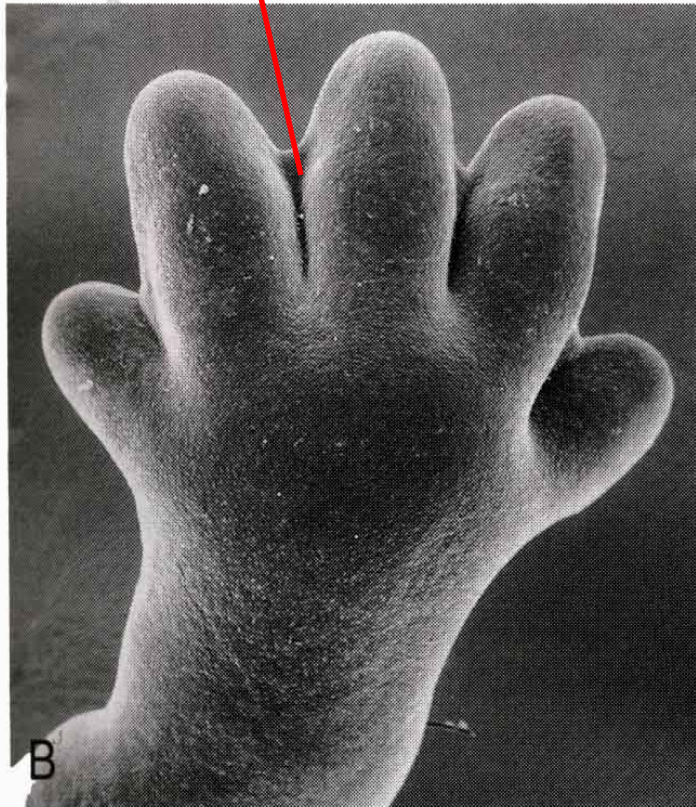
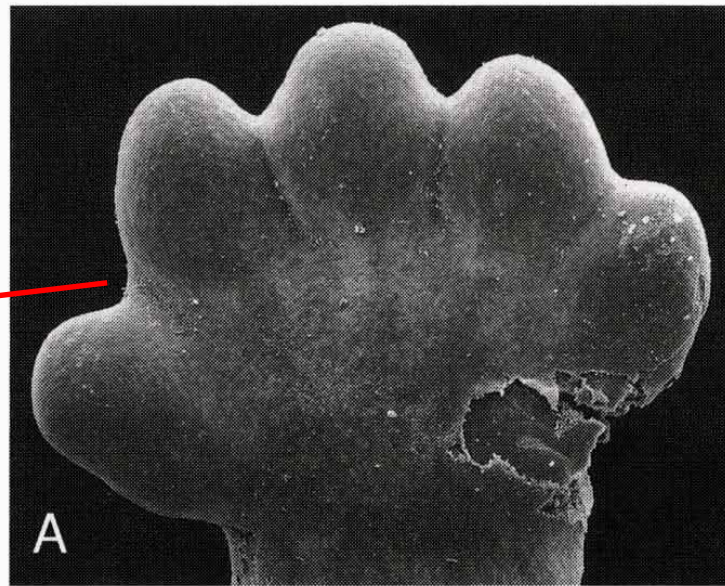
- Retinoic Acid
sonic hedgehog

Dorsoventral



- Wnt-7
- Engrailed-1
- Lmx1

areas of apoptosis





Rotace končetin
(10. týden)