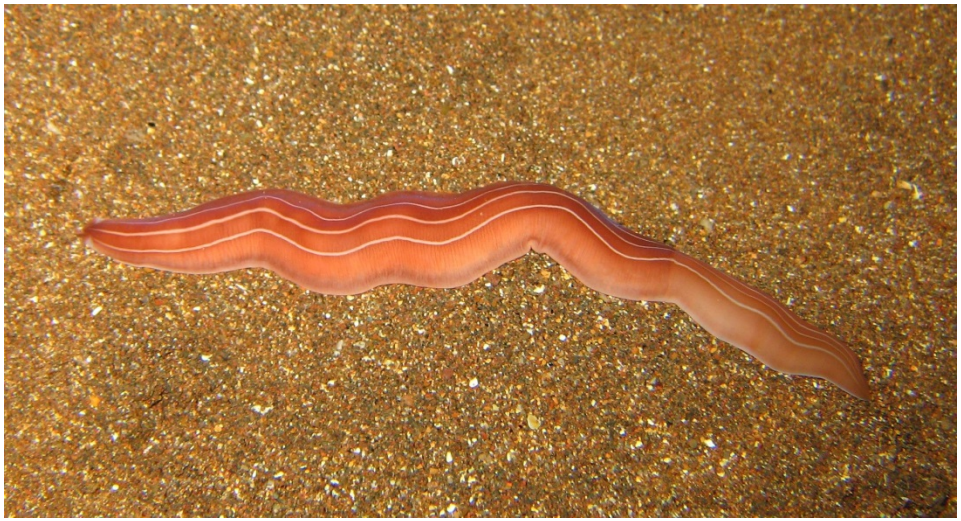
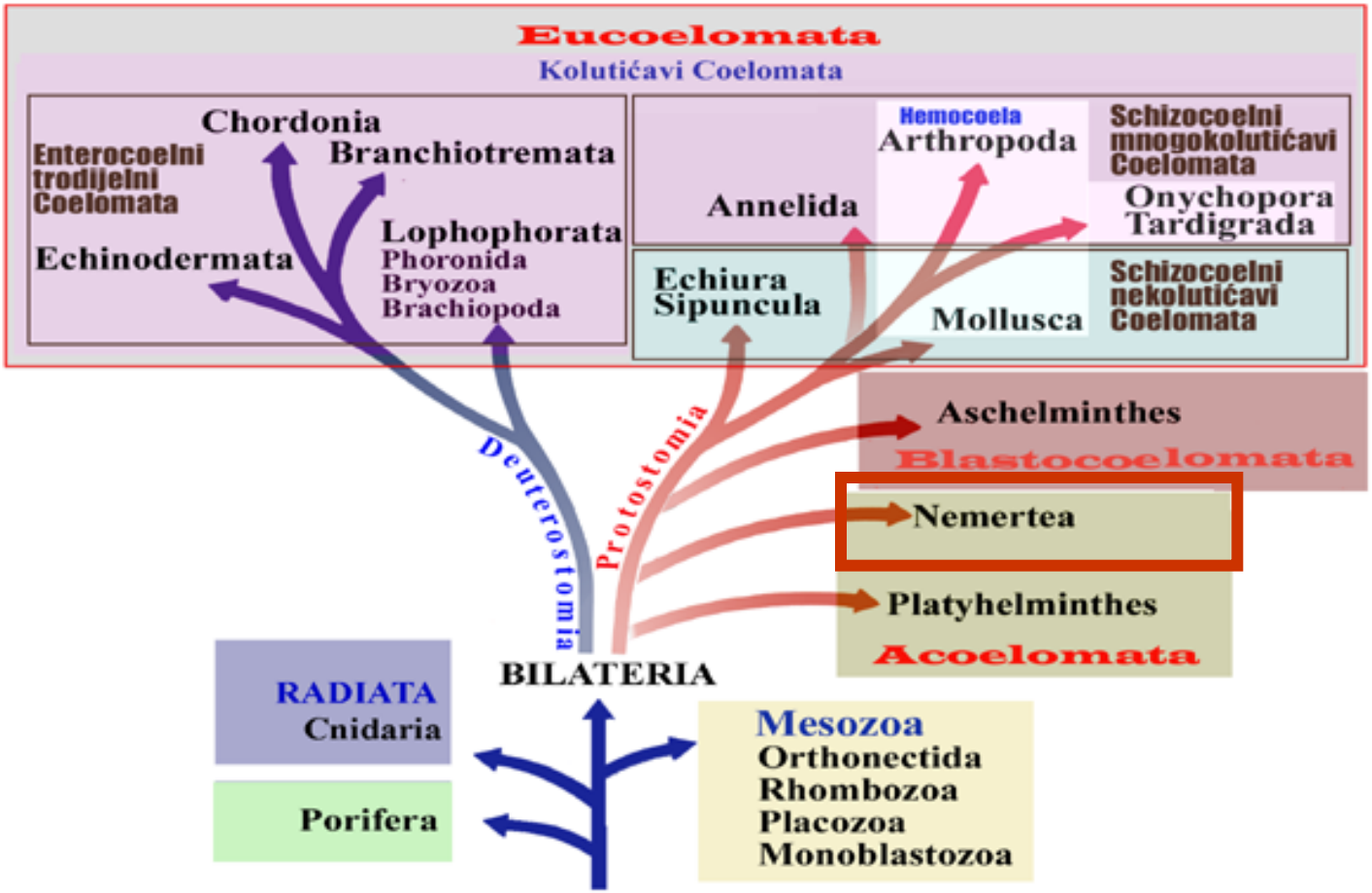
Koljeno: Nemertea - vrpčari

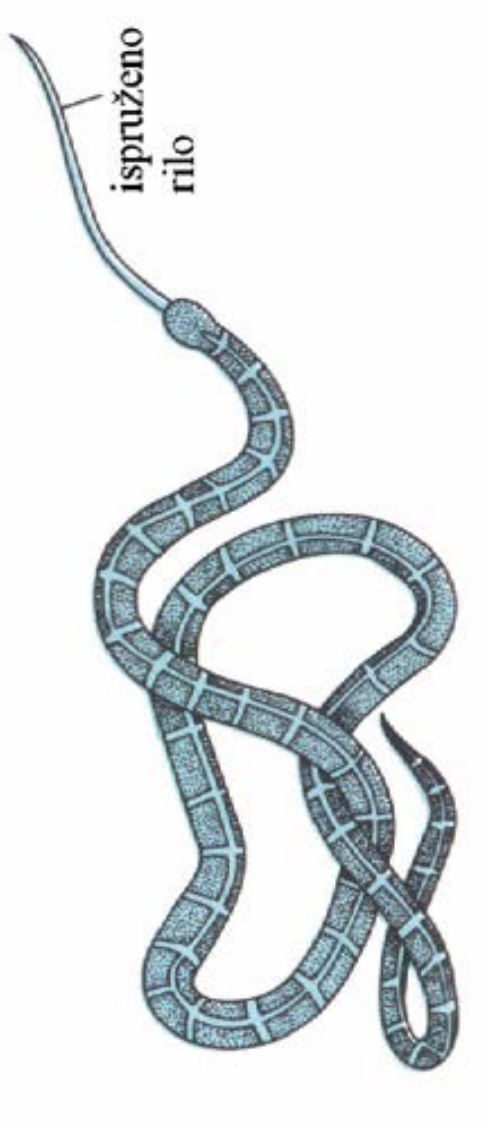
- BILATERIA
- PROTOSTOMIA
- ACOELOMATA





Položaj oblenjaka (Aschelminthes) u rodoslovnom stablu



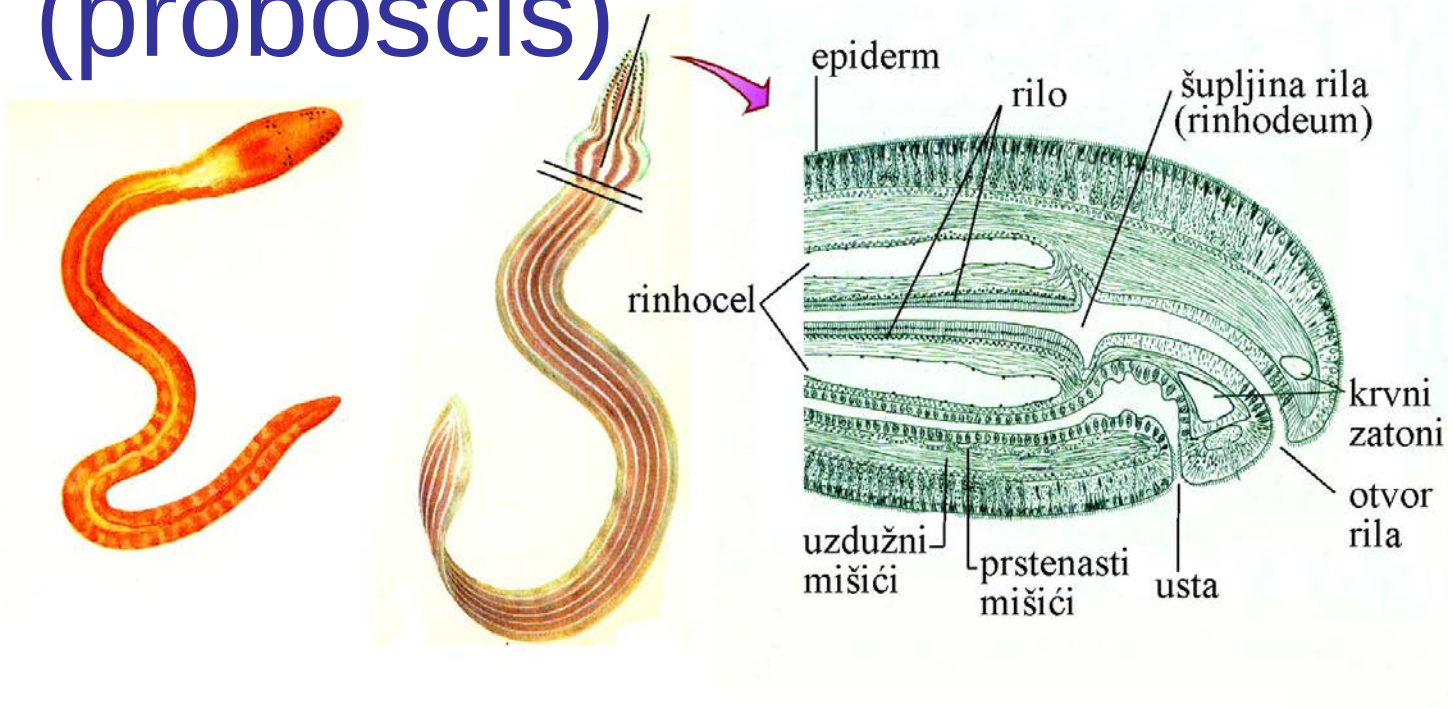


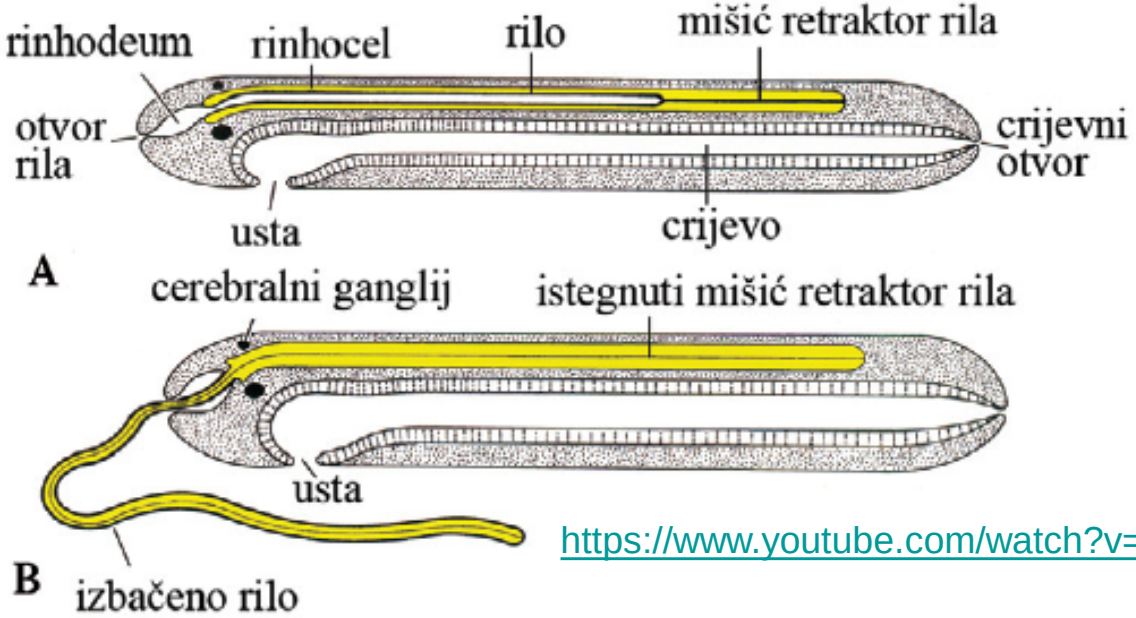
grč. (*Nemertes* - morska nimfa; *rhynchos*-rilo)

- **bilateralno simetrični; duguljasti, često spljošteni, par mm - nekoliko m (54 m!)**
- **većinom morske bentoske životinje**

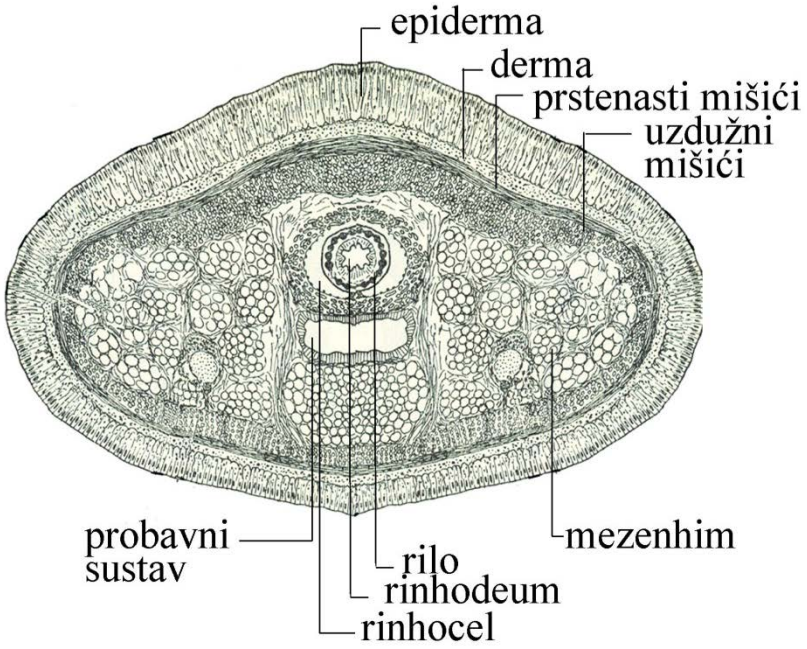
- **rilo (proboscis) - ispruženo često duže od tijela; za mirovanja smješteno s leđne strane iznad crijeva u rinhocelu (šupljina omeđena epitelom mezodermalnog podrijetla - morfološki se podudara s celomom)**

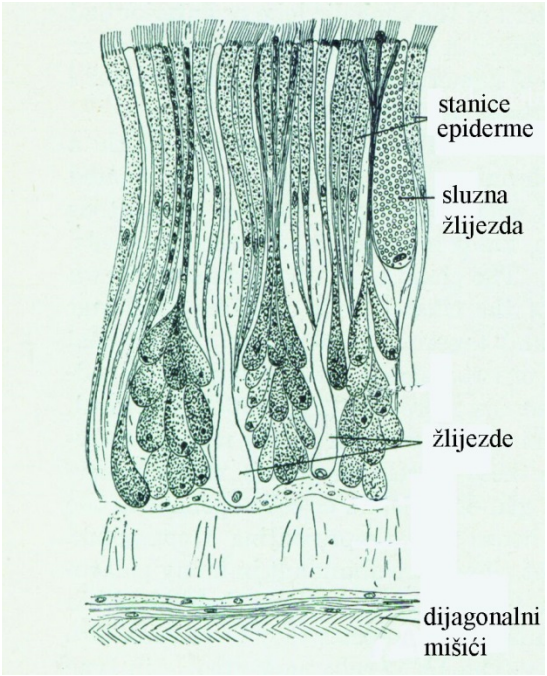
Rilo (proboscis)





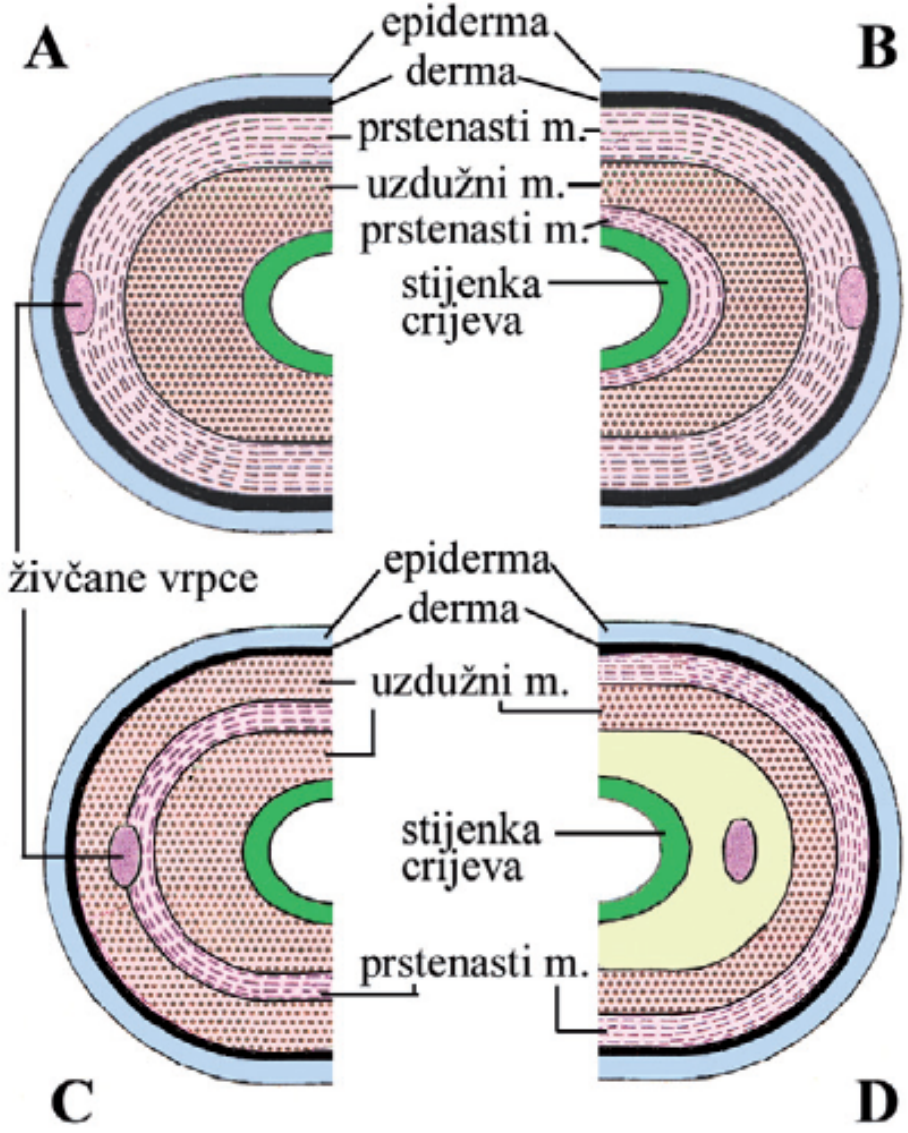
https://www.youtube.com/watch?v=qT2x9YuowqU

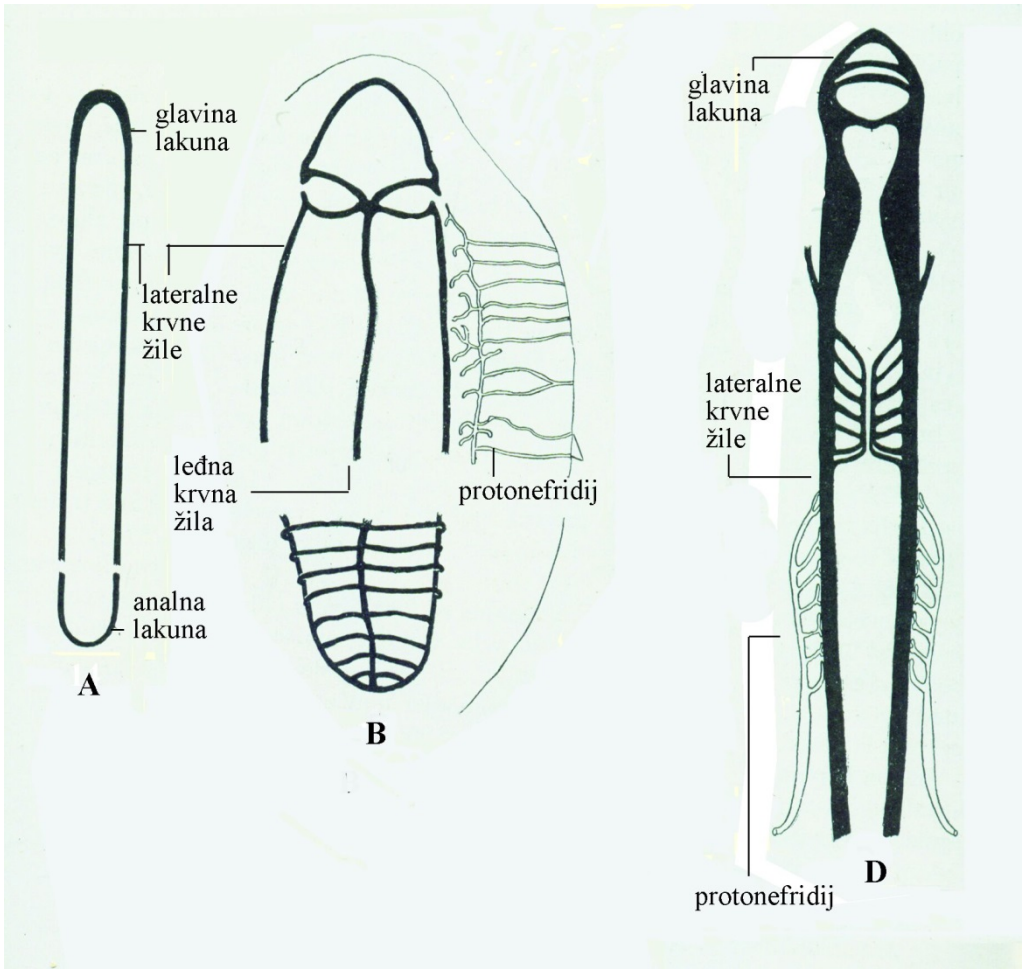




- **trepetljikavi epiderm s žlijezdanim stanicama; derma s 2 ili 3 sloja mišića: prstenasti – uzdužni (+ prstenasti)**

- **prohodno probavilo; pretežno karnivori**


A
B
epiderma
derma
prstenasti m.
uzdužni m.
prstenasti m.
stijenka crijeva
živčane vrpce
epiderma
derma
uzdužni m.
stijenka crijeva
prstenasti m.
C
D



- **zatvoren optjecajni sustav: 2 bočne krvne žile ili 2 bočne, leđna i prstenaste krvne žile**

- **cerebralni ganglij, uzdužne živčane vrpce i živci**

- **protonefridiji**

- **razdvojena spola; gonade nastaju iz parenhimalnih stanica, oplodnja vanjska; spiralno determinirano bražđenje jaja; ličinka pilidij (tjemena ploča, trepetljikavi usni nastavci);**

- **velika moć regeneracije ⇒ razmnožavanje fragmentacijom**

Biološka raznolikost

- Razred Anopla

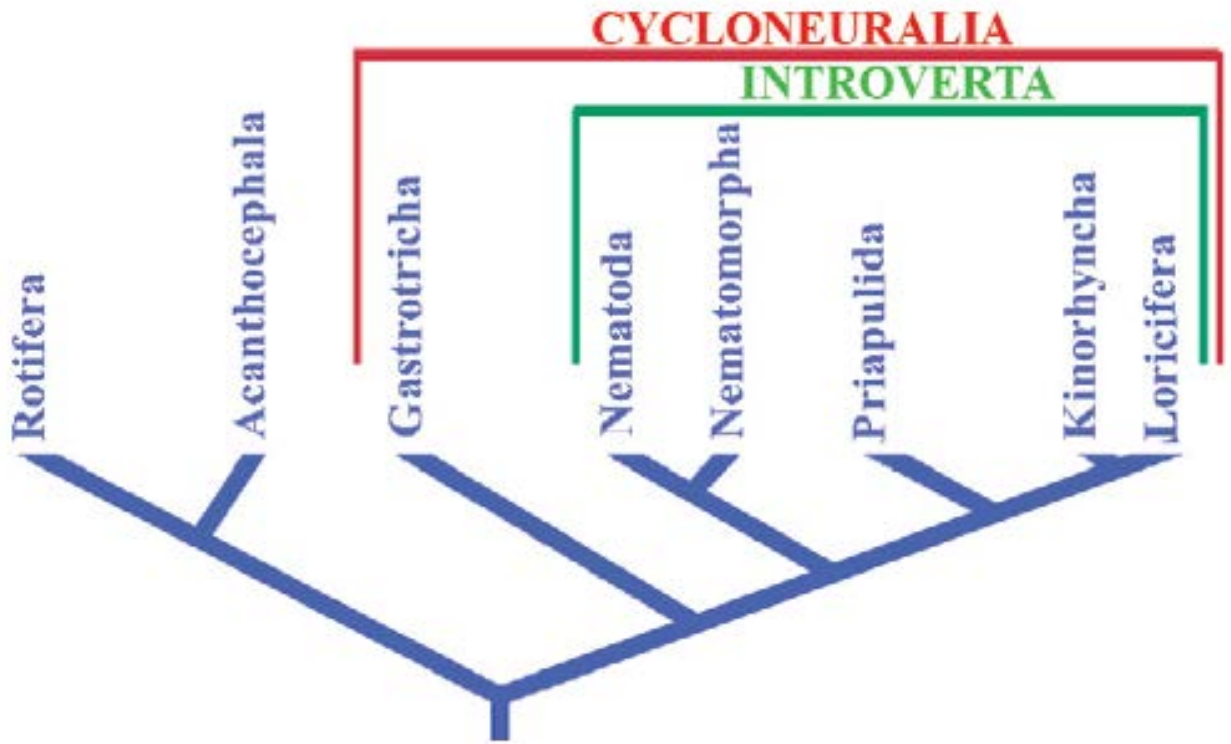
  Lineus longissimus

- Razred Enopla

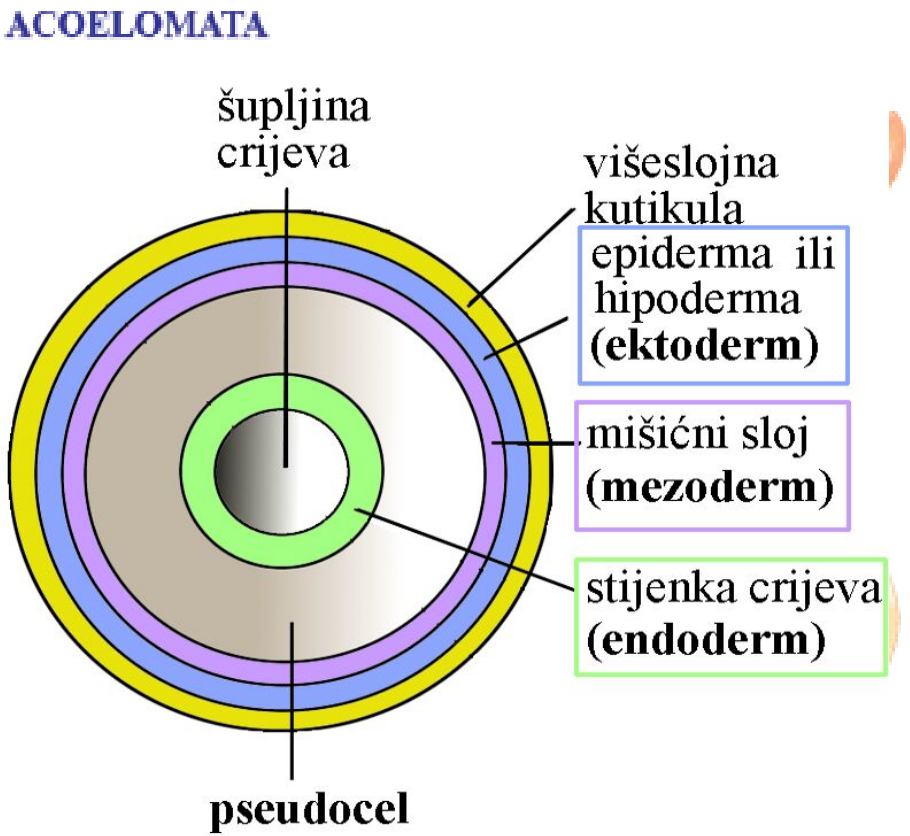
  Drepanophorus spectabilis

Natkoljeno: Aschelminthes - oblenjaci

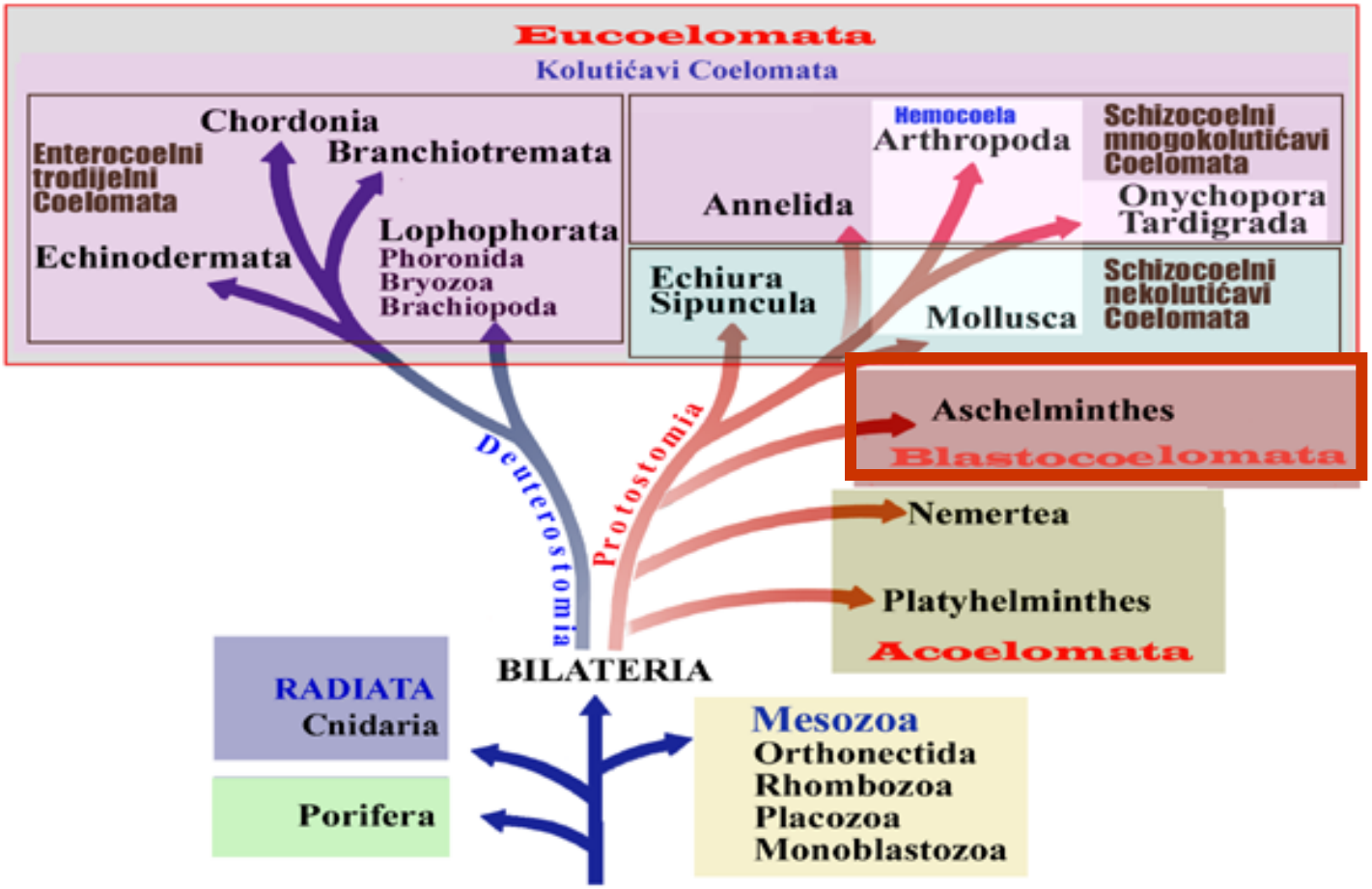
- BILATERIA
- PROTOSTOMIA
- BLASTOCOELOMATA



Blastocoelomata



Položaj oblenjaka (Aschelminthes) u rodoslovnom stablu

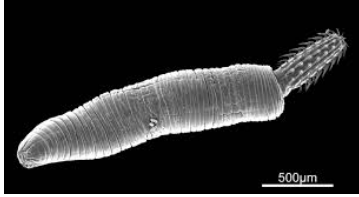


Aschelminthes

- **tijelo je pokriveno skleroproteinskom kutikulom**
- **prohodno probavilo (usni otvor ⇒ ždrijelo ⇒ crijevo ⇒ crijevni otvor)**
- **za izlučivanje većinom imaju protonefridije**
  - **naginju stvaranju sincitija**
  - **kod mnogih se nalazi određeni broj stanica u pojedinim organima - EUTELIJA**
  - **nemaju sustava za disanje i optjecanje**
  - **gotovo uvijek razdvojenih spolova**
  - **pretežno žive u vodama na kopnu i u moru, a neki na kopnu; mnogi su nametnici**

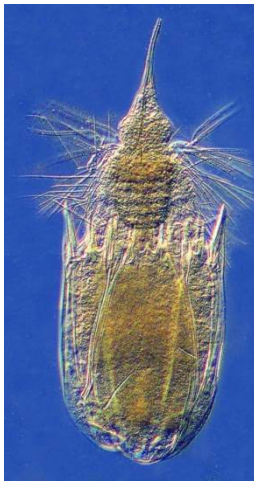
11 koljena

- Koljeno: Rotifera (kolnjaci)
- Koljeno: Acanthocephala (kukaši)
- Koljeno: Gastrotricha (trbodlaci)
- Koljeno: Nemata ili Nematoda (oblići)
- Koljeno: Nematomorpha (strunaši)
- Koljeno: Priapulida (valjčari)
- Koljeno: Kinorhyncha (bodljoglavci)
- Koljeno: Cycliophora
- Koljeno: Loricifera (četkoglavci)
- Koljeno: Gnathostomulida
- Koljeno: Entoprocta ili Kamptozoa (s

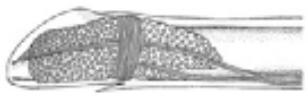





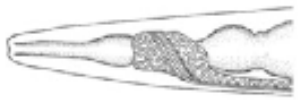


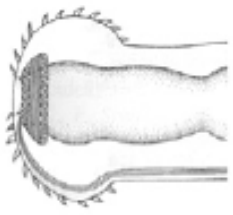


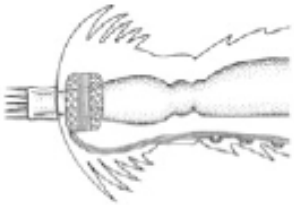
Gastrotricha



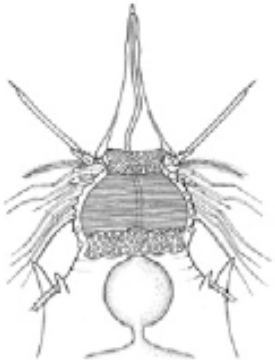
Nematoda



Priapulida



Kinorhyncha



Loricifera



Loricifera



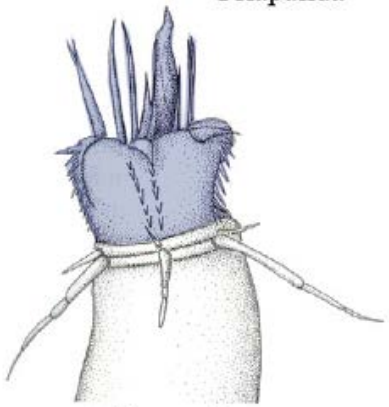
Nematomorpha



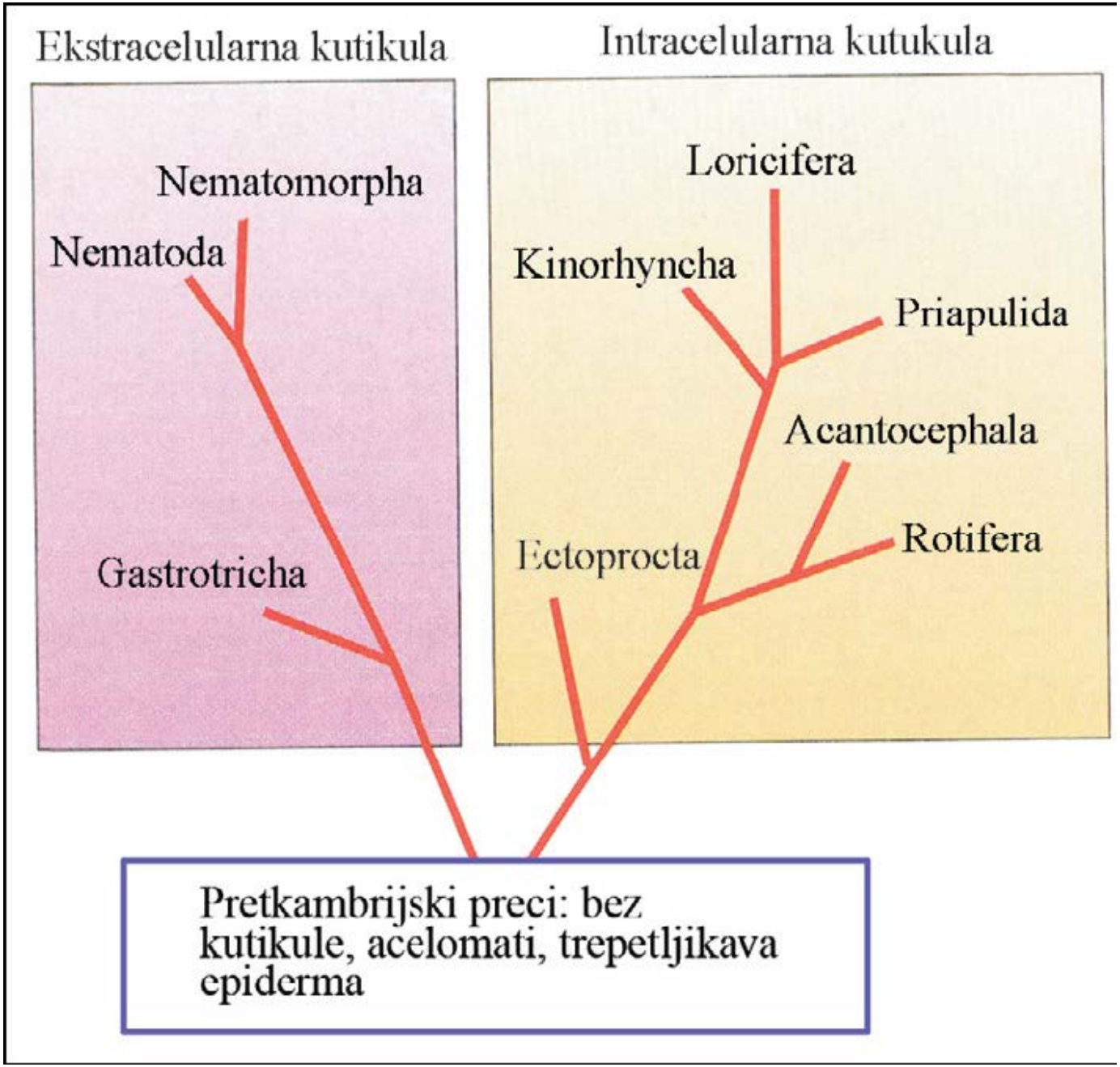
Priapulida



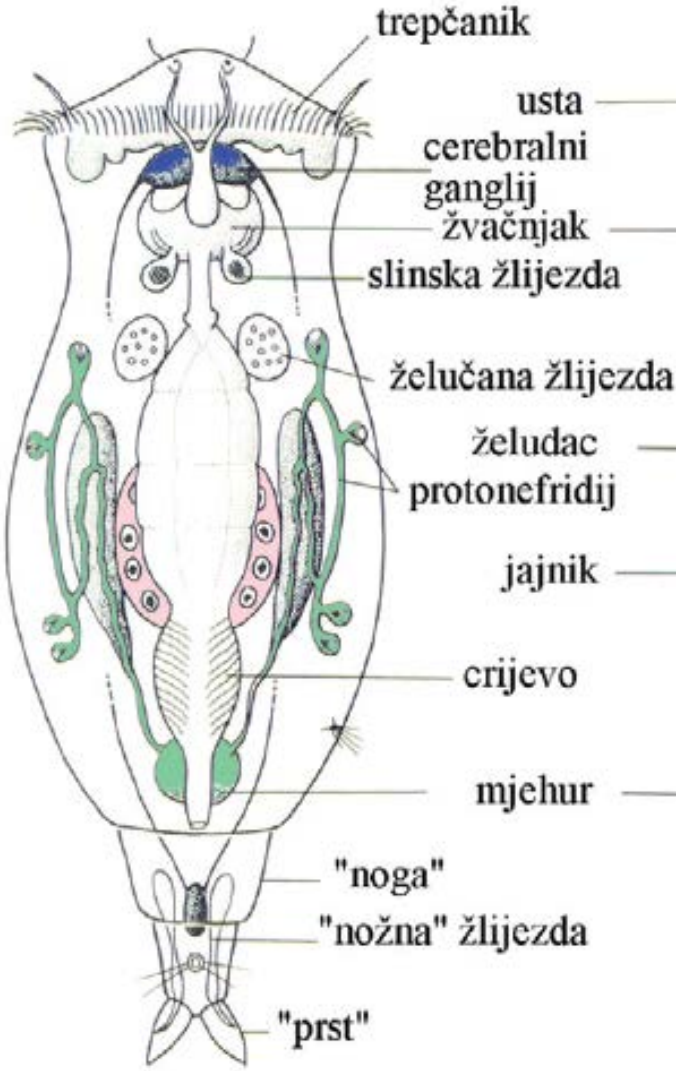
Kinorhyncha



Nematoda

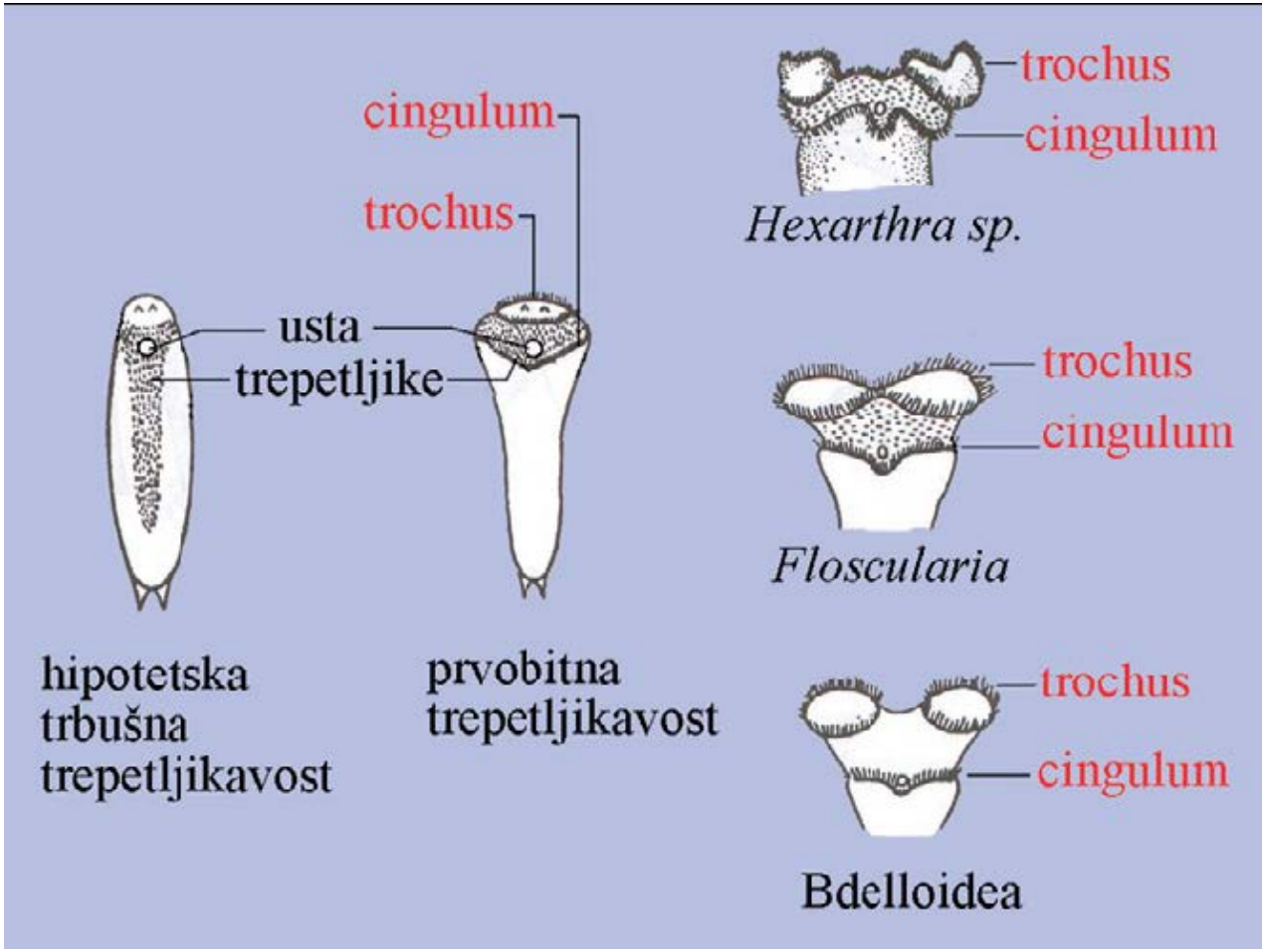

Ekstracelularna kutikula
Intracelularna kutukula
Nematomorpha
Nematoda
Gastrotricha
Loricifera
Kinorhyncha
Priapulida
Acantocephala
Ectoprocta
Rotifera
Pretkambrijski preci: bez kutikule, acelomati, trepetljikava epiderma

Koljeno: Rotifera - kolnjaci

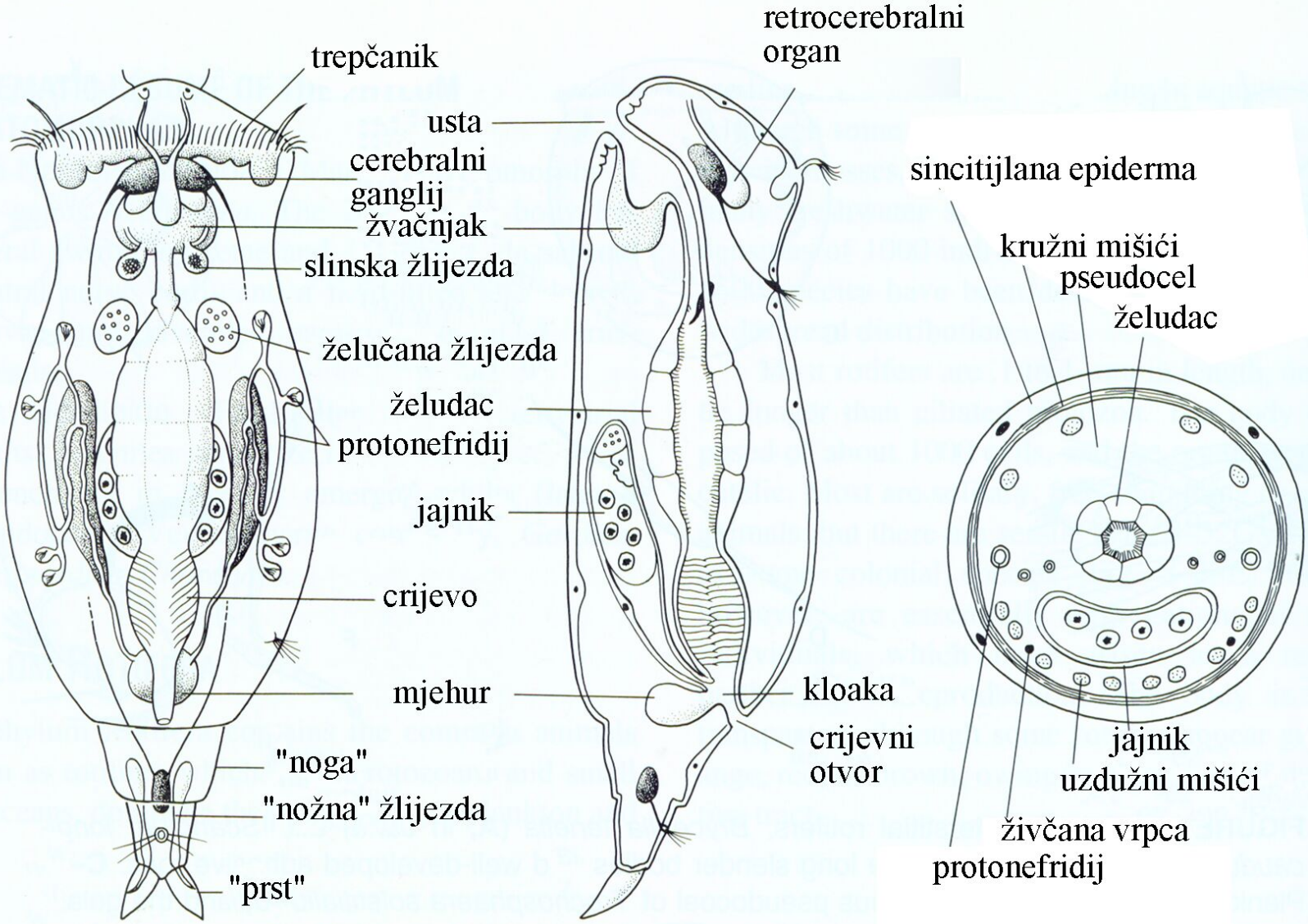


- 0,1 – 1 mm
- rotatorni organ (trepčanik)
- sincitijalna epiderma
- kutikula, lorika
- žvačnjak (mastaks)
- slatke vode, more ili kopno
- pokretni ili sesilni

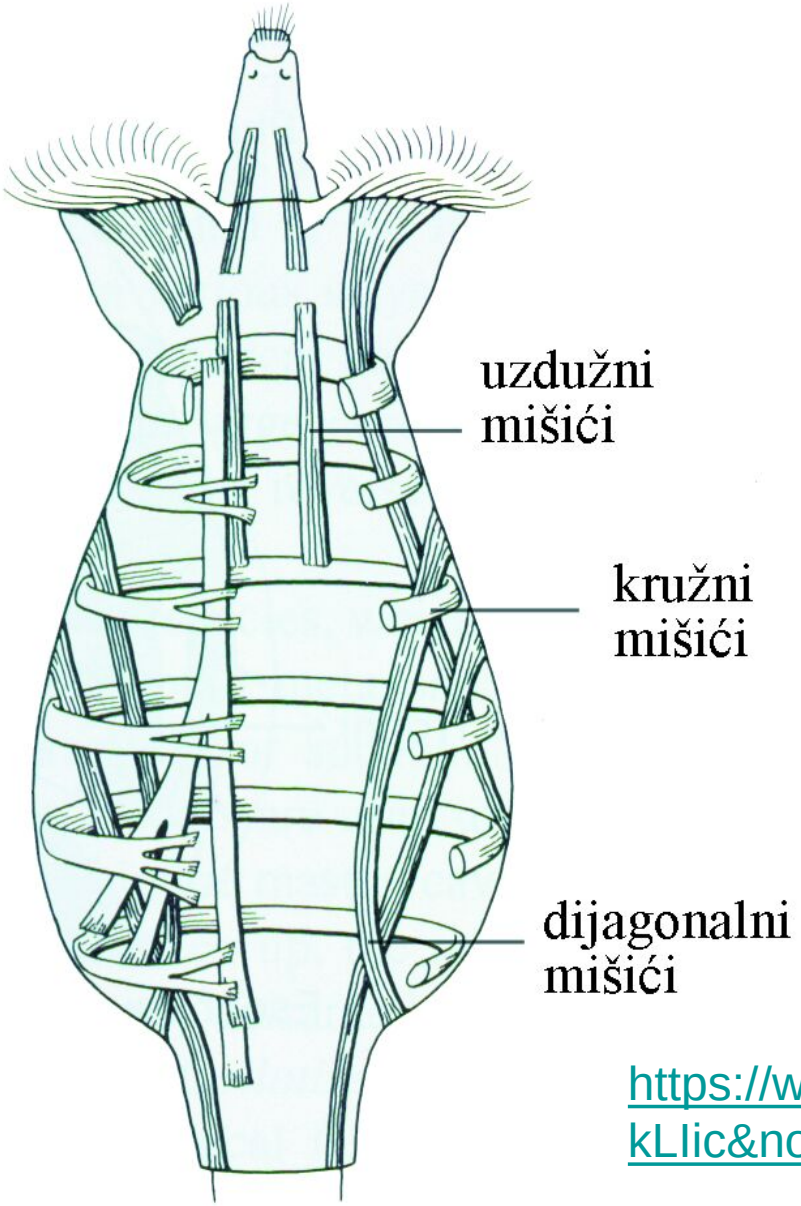
Rotatorni organ (trepčanik)



https://www.youtube.com/watch?v=YF8OJt_pujc&nohtml5=False


trepčanik
usta
cerebralni ganglij
žvačnjak
slinska žlijezda
želučana žlijezda
želudac
protonefridij
jajnik
crijevo
mjehur
"noga"
"nožna" žlijezda
"prst"
retrocerebralni organ
kloaka
crijevni otvor
sincitijlana epiderma
kružni mišići
pseudocel
želudac
jajnik
uzdužni mišići
živčana vrpca
protonefridij

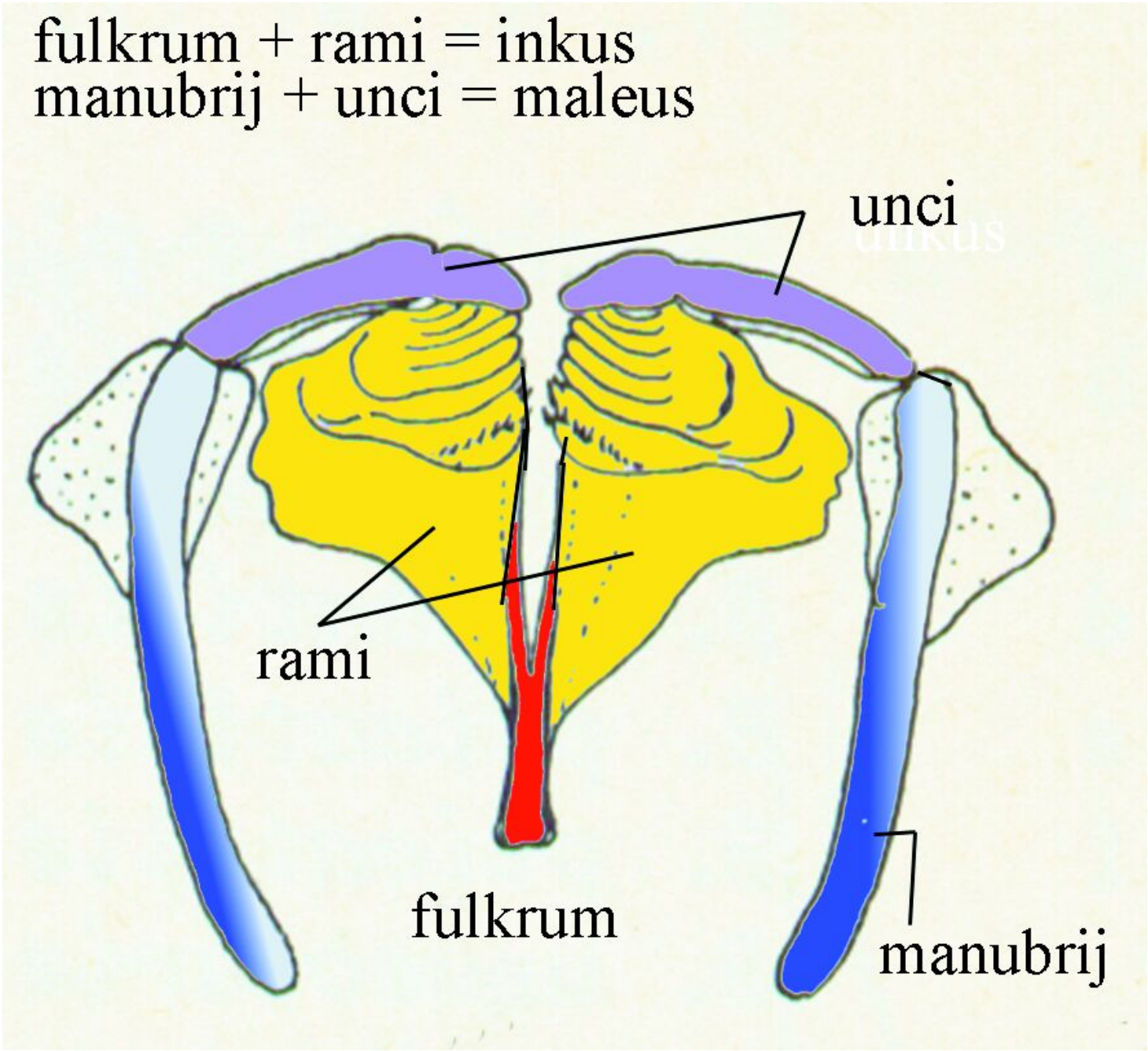
Mišićni sustav

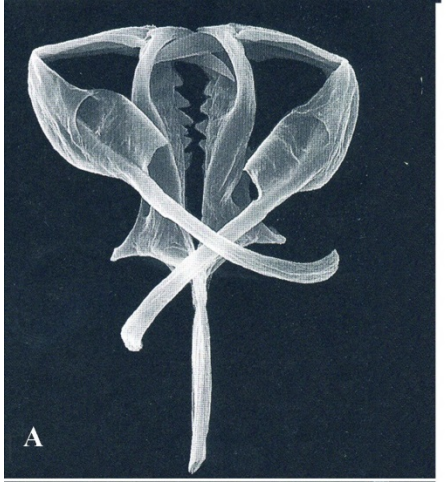


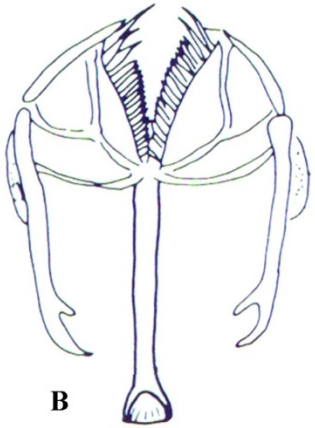


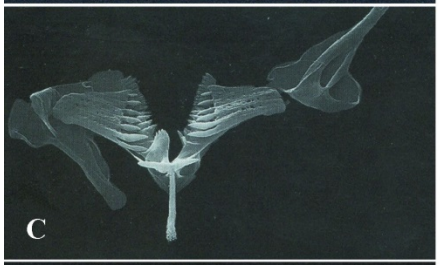
https://www.youtube.com/watch?v=Ru52hIkLIic&nohtml5=False

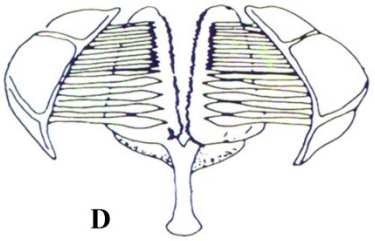
fulkrum + rami = inkus
manubrij + unci = maleus



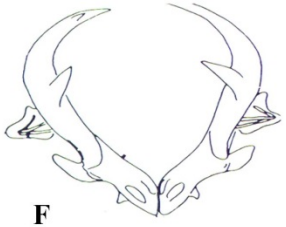


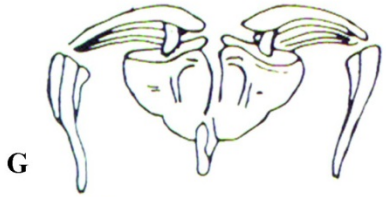




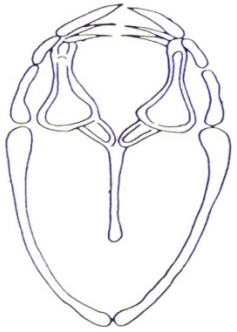






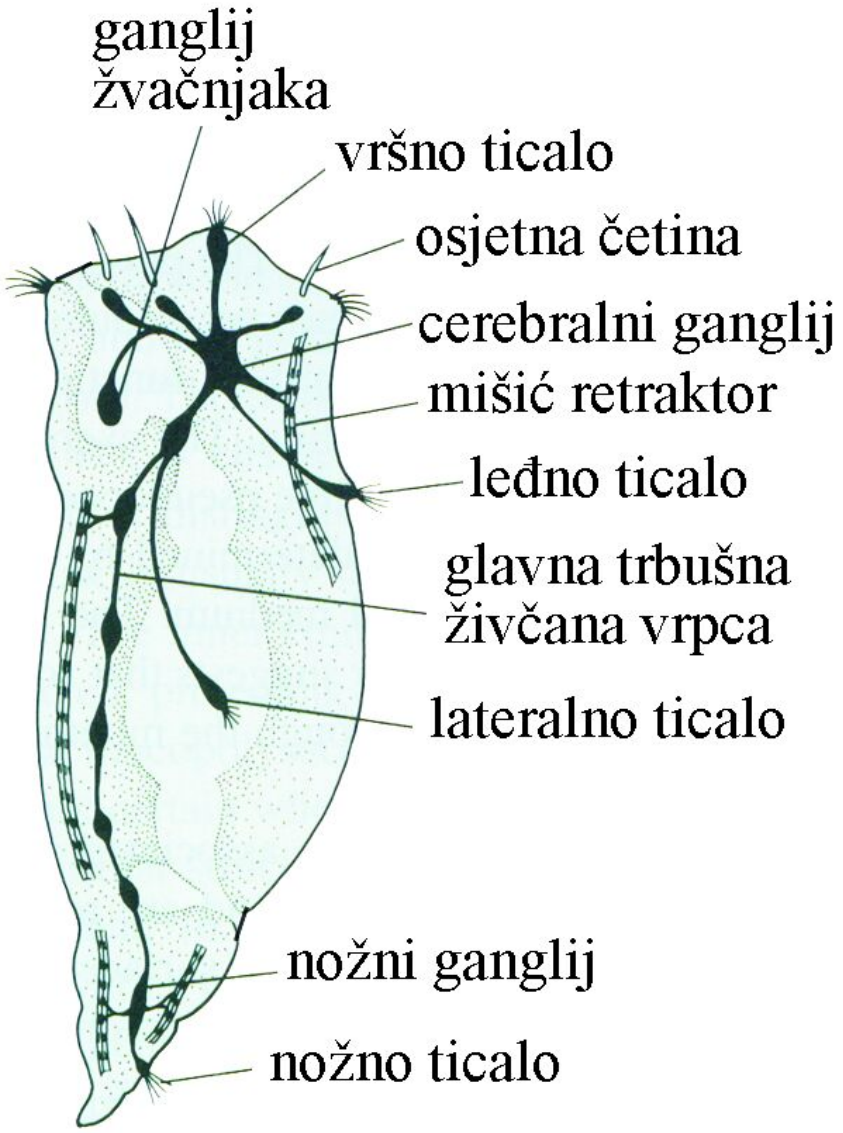




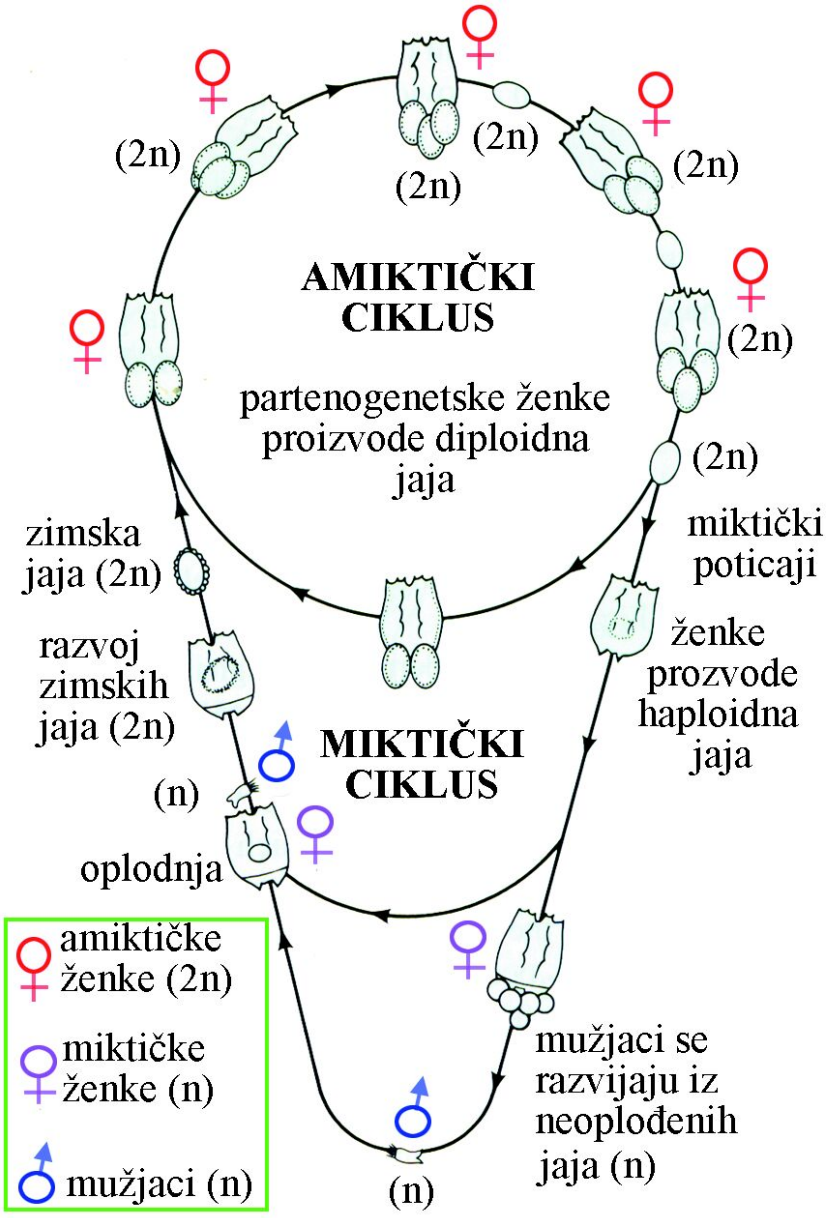


virgatni (**A** i **B**), maleoramatni (**C** i **D**), indukatni (**E** i **F**), maleatni (**G** i **H**) i forcipatni (**I**).

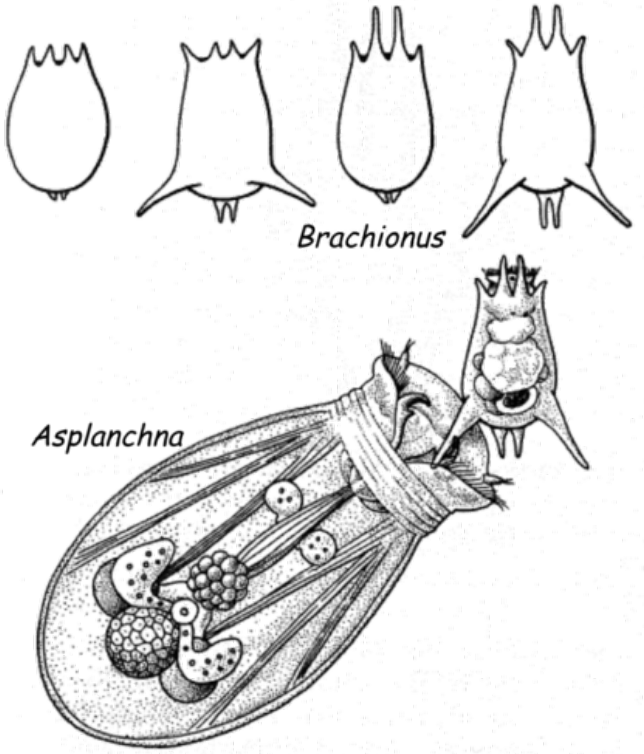
Živčani sustav



Heterogonija

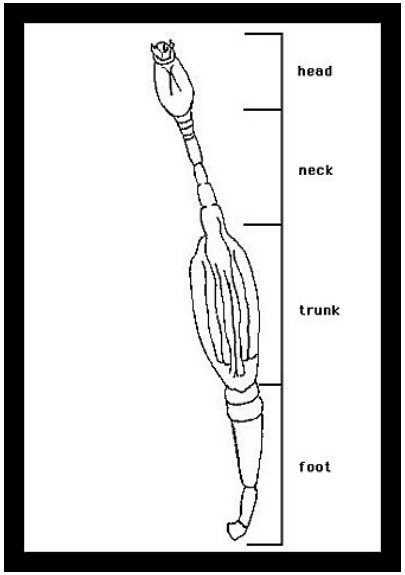


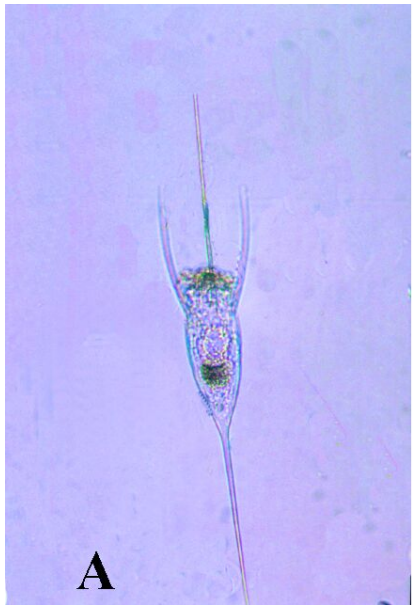
Ciklomorfoza

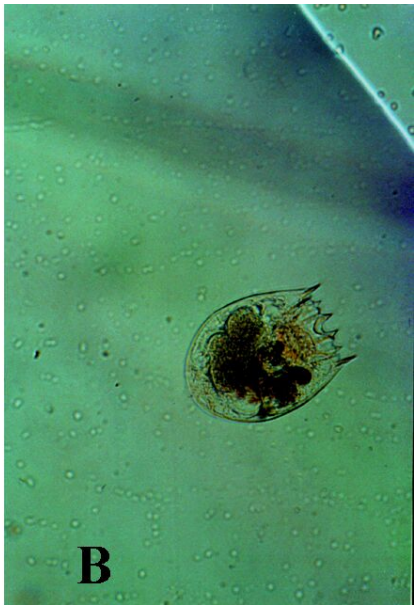


Biološka raznolikost

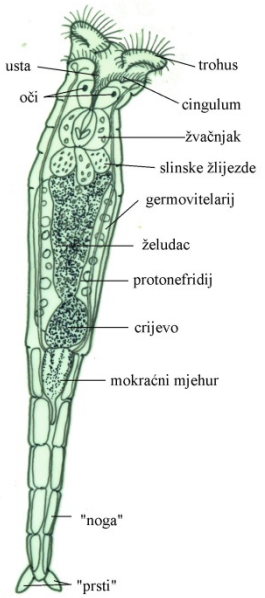
- Razred: Seisonida
- Razred: Bdelloidea
- Razred: Monogononta







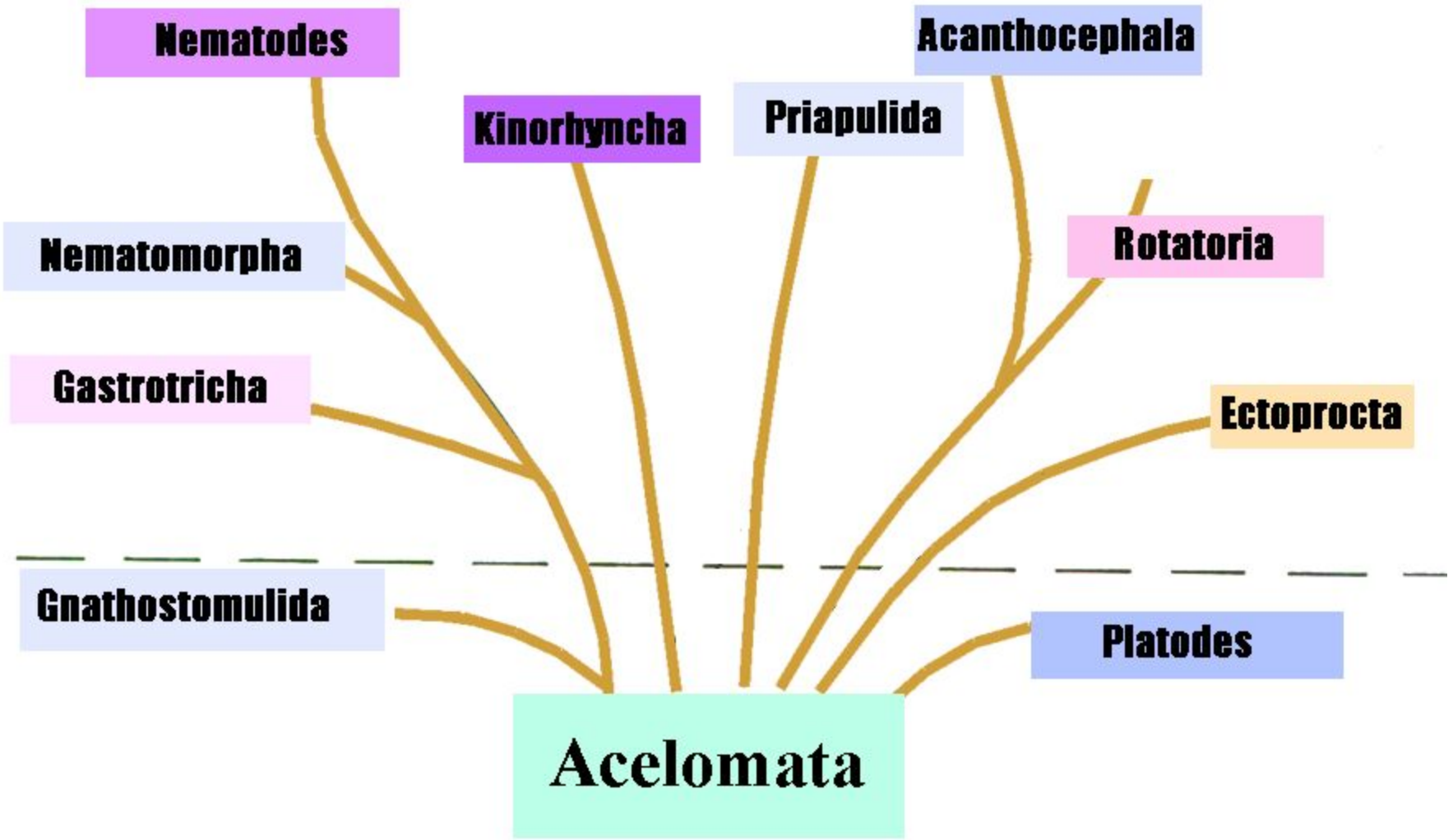


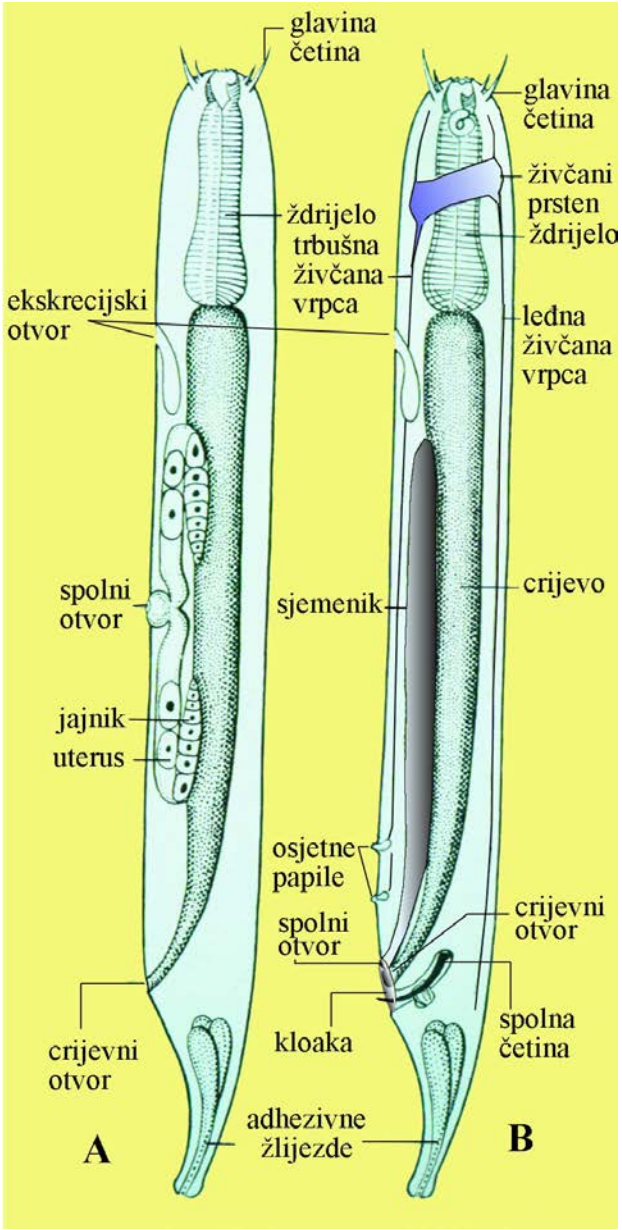


Koljeno: Nemata ili Nematoda - oblići

- slobodno živući ili nametnici
- od 1 mm do 1 m (8 m)
- kutikula - presvlačenje
- pseudometamerija

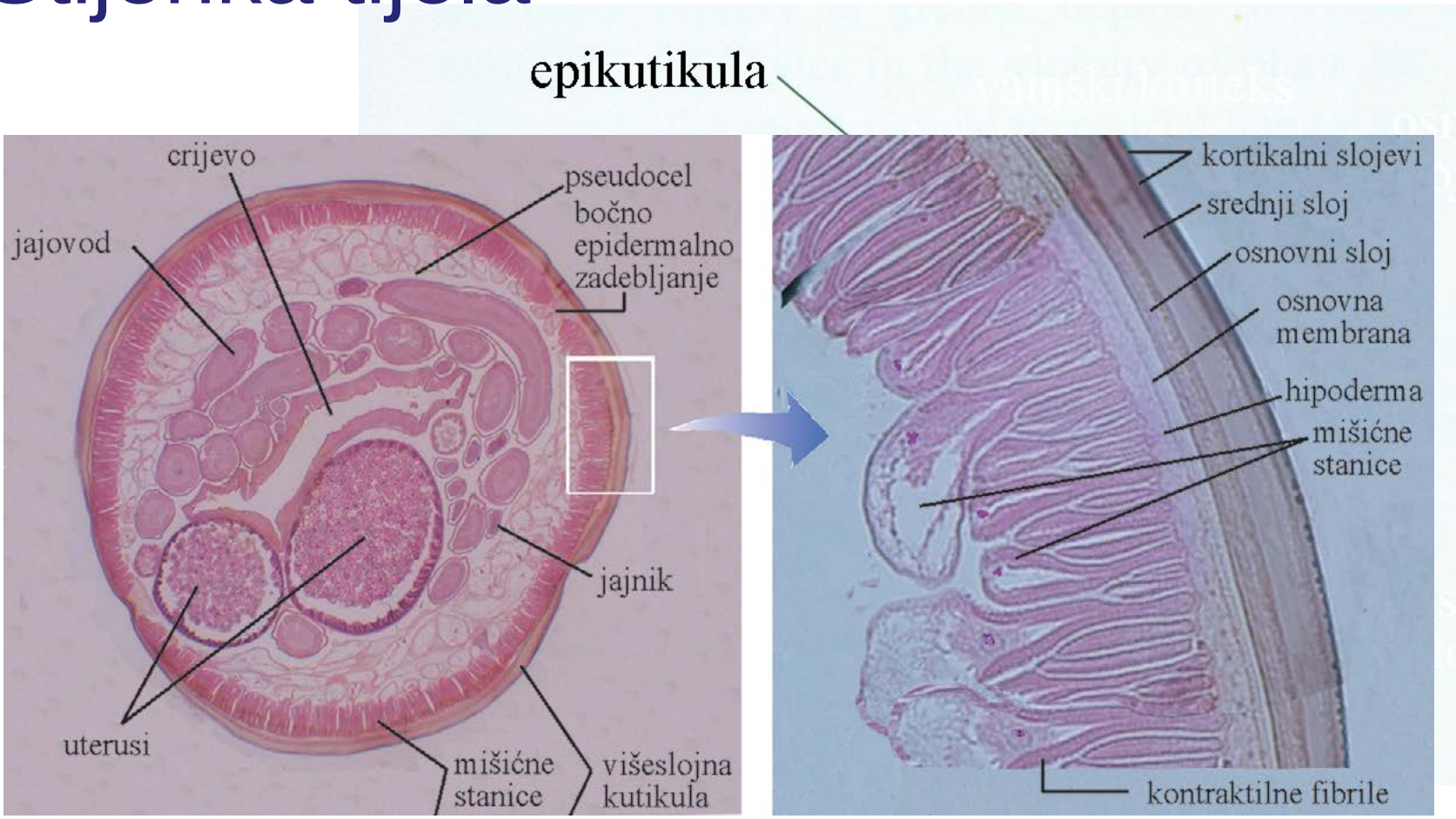



Nematodes
Acanthocephala
Kinorhyncha
Priapulida
Nematomorpha
Rotatoria
Gastrotricha
Ectoprocta
Gnathostomulida
Platodes
Acelomata

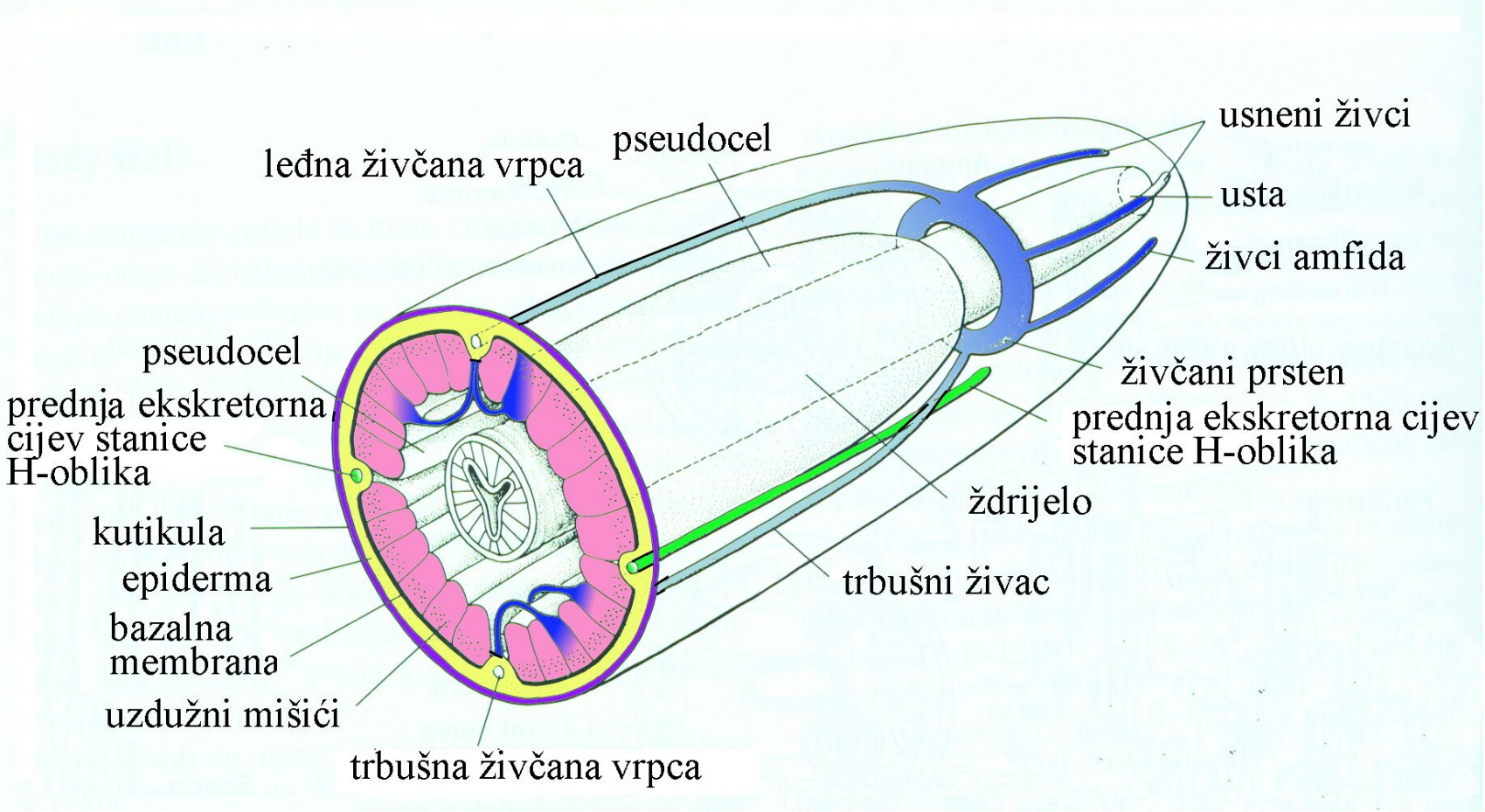


- ženke imaju ekskrecijski, analni i spolni otvor
- mužjaci imaju ekskrecijski i otvor kloake

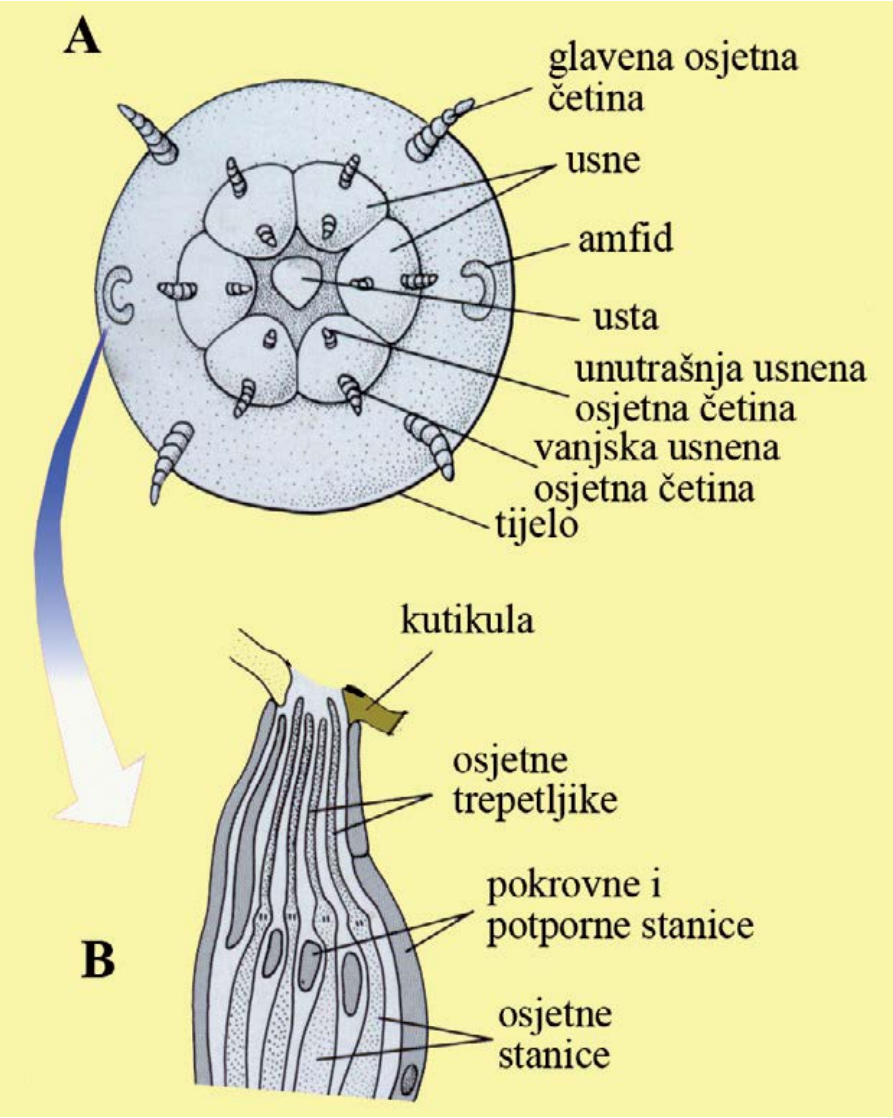
Stijenka tijela



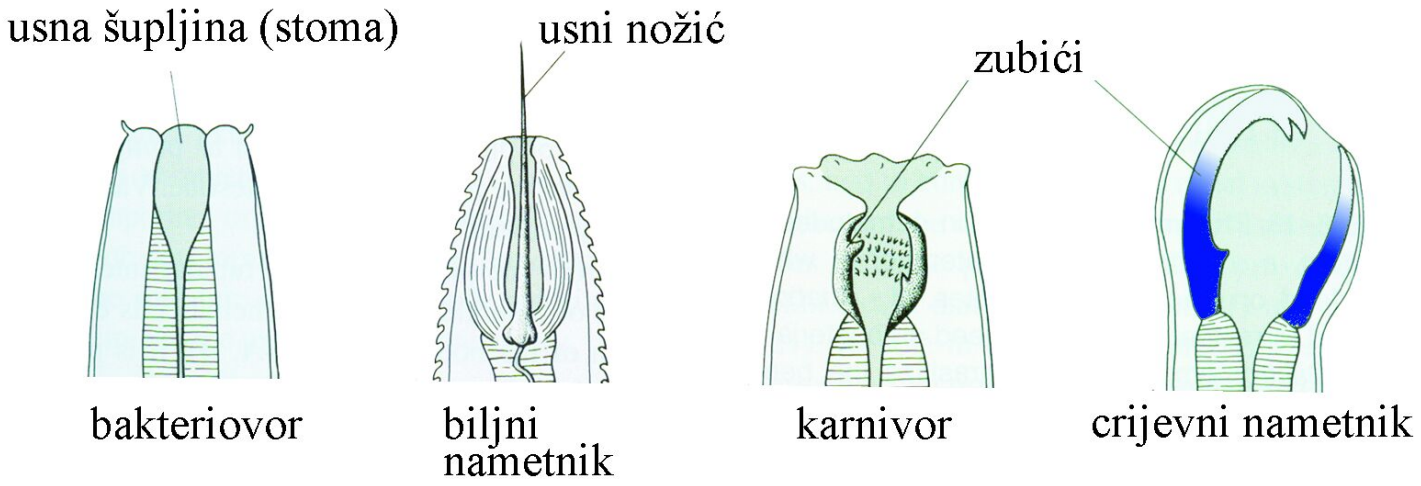
Živčani sustav



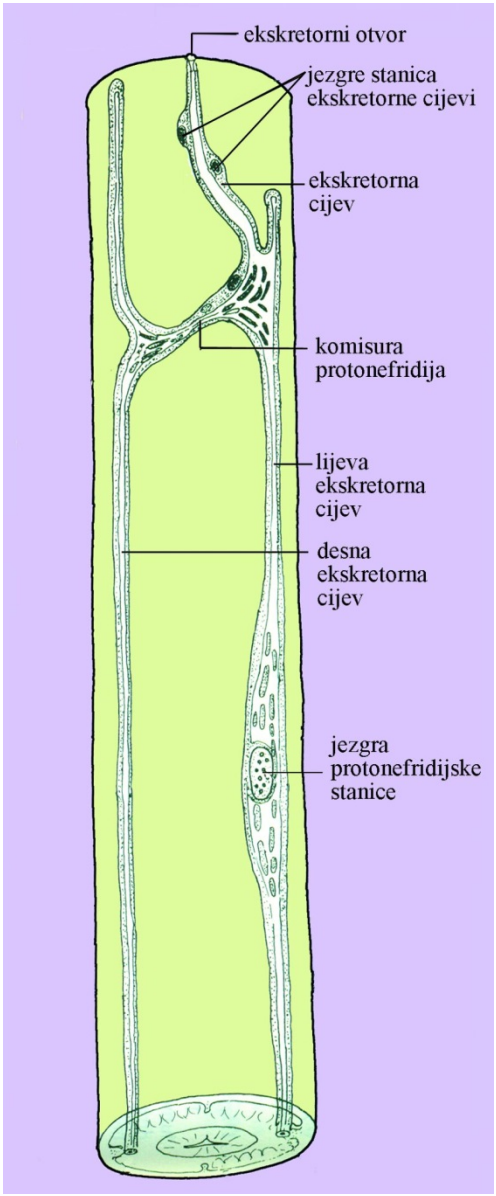
Osjetila

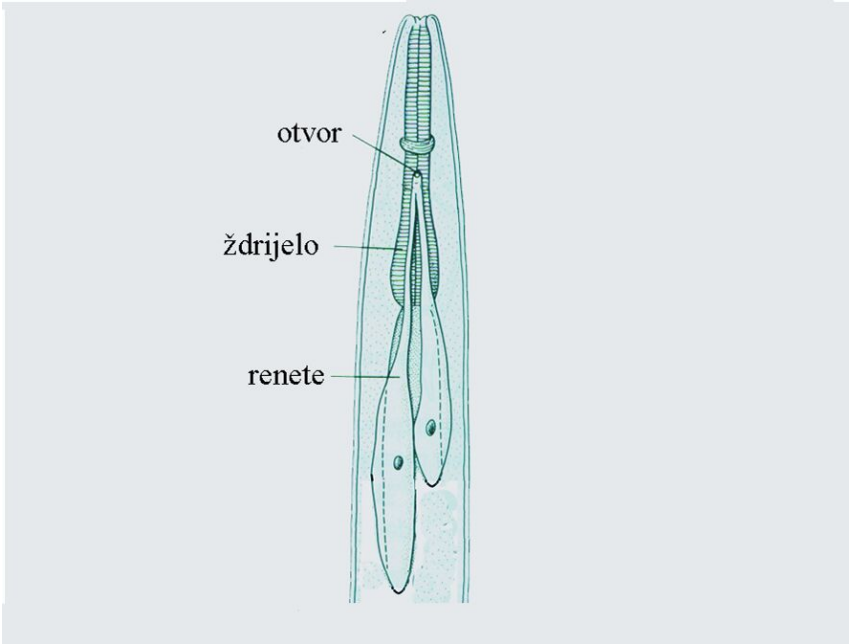

A
glavena osjetna četina
usne
amfid
usta
unutrašnja usnena osjetna četina
vanjska usnena osjetna četina
tijelo
kutikula
osjetne trepetljike
pokrovne i potporne stanice
osjetne stanice
B

Probavni sustav

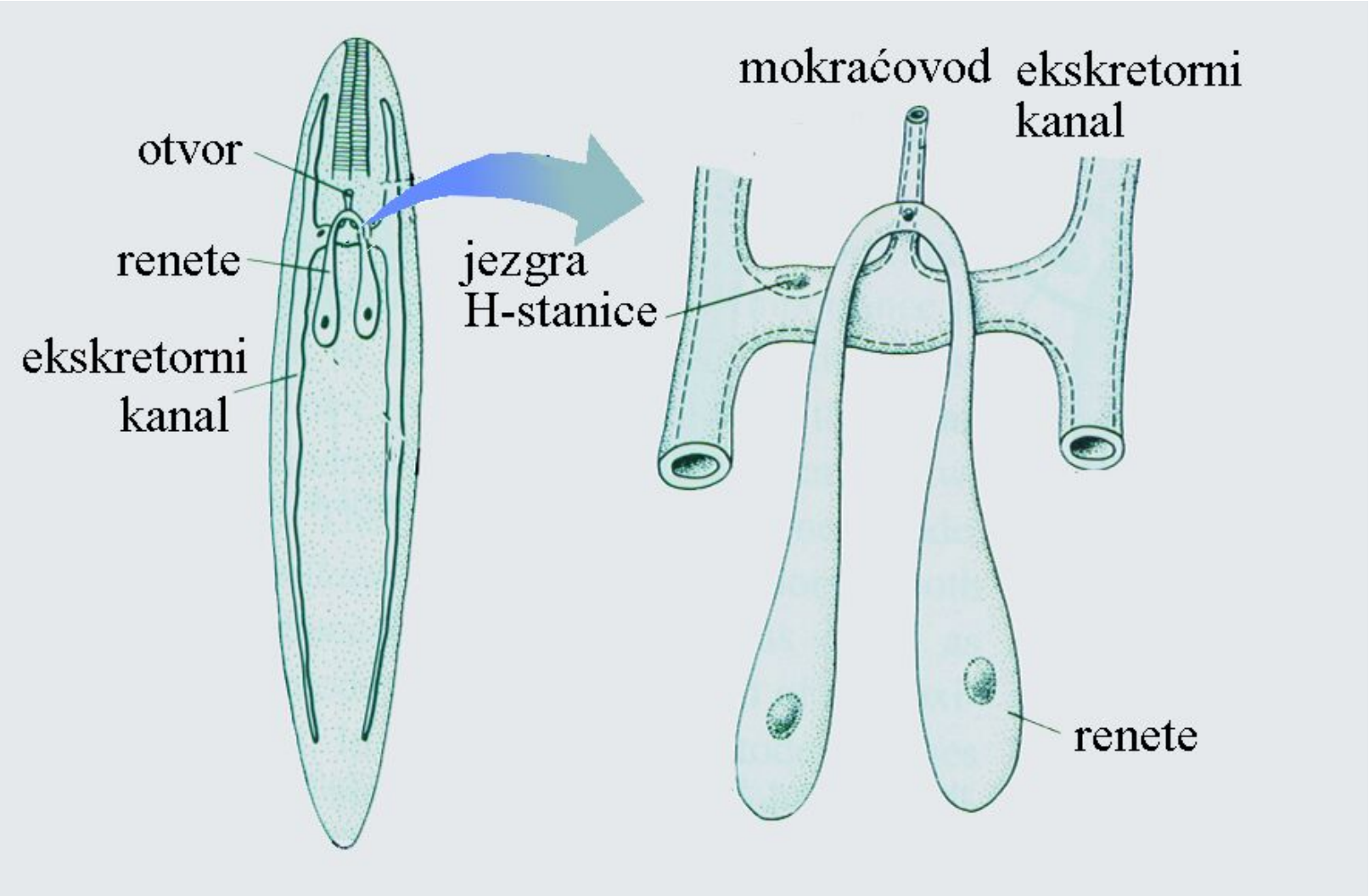


Ekskrecija i osmoregulacija

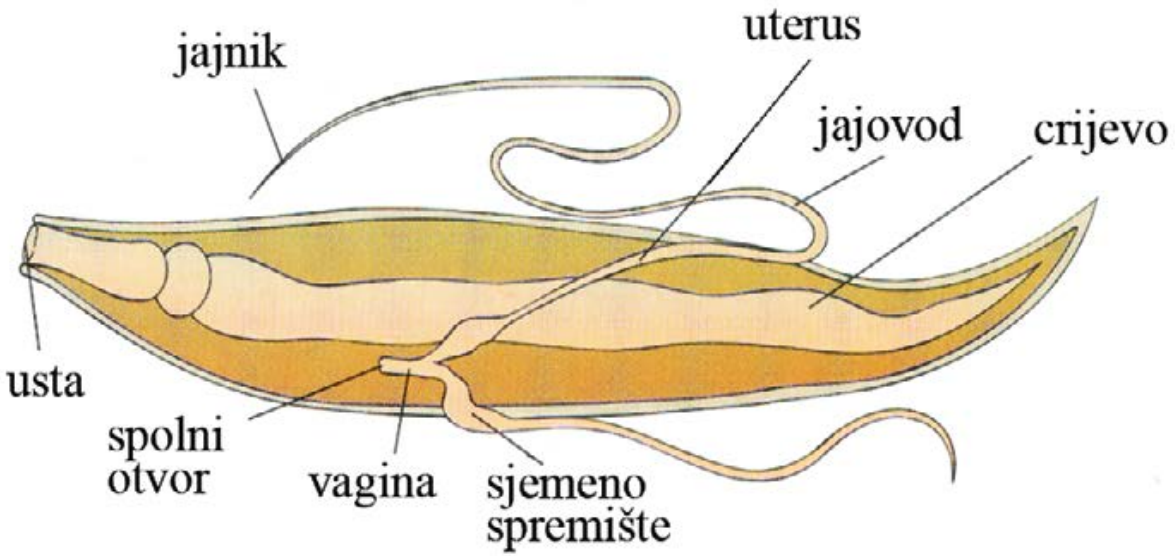


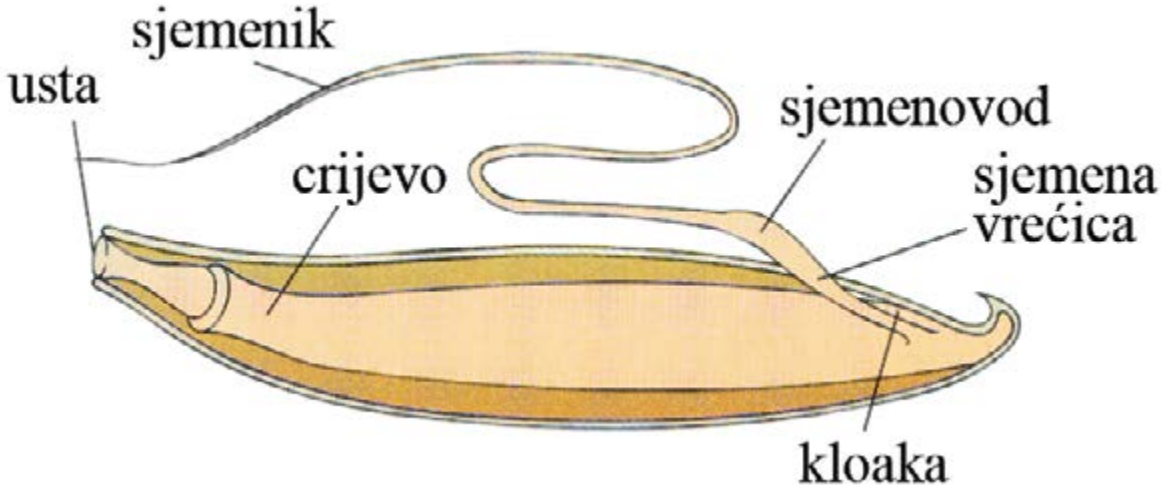


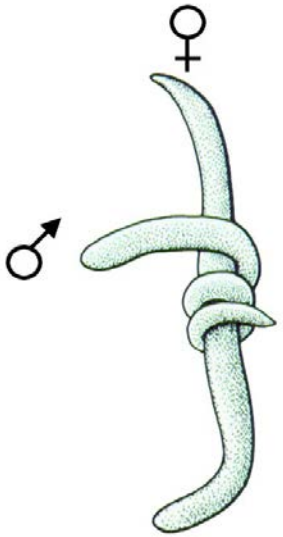
Ekskrecija i osmoregulacija

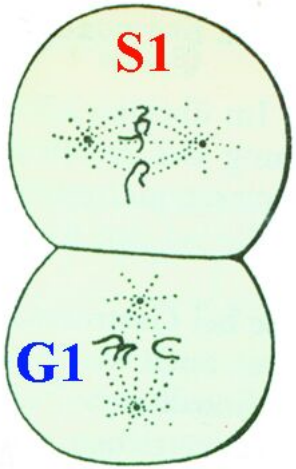


Spolni sustav

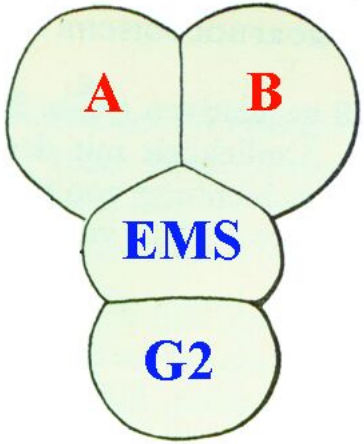




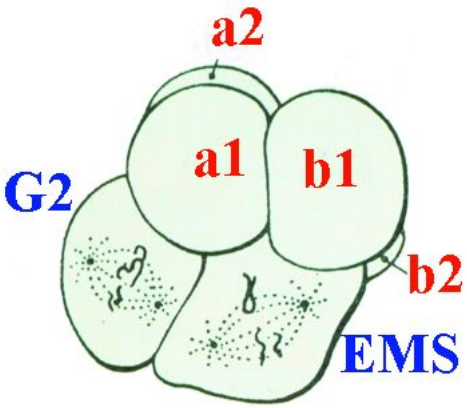




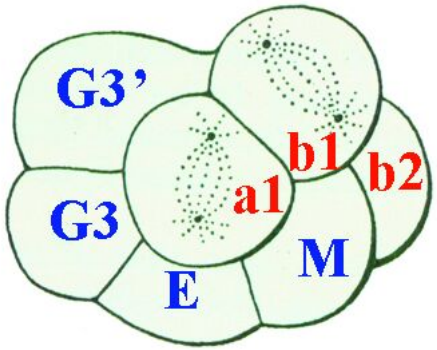
A



B



C



D

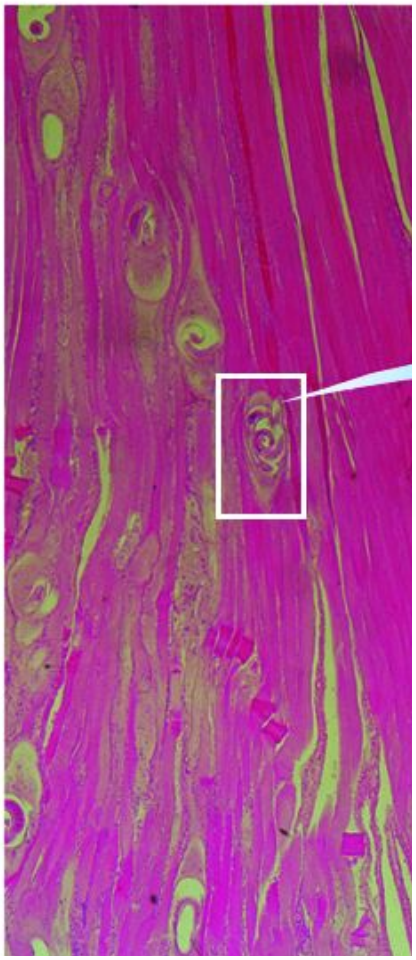
Biološka raznolikost

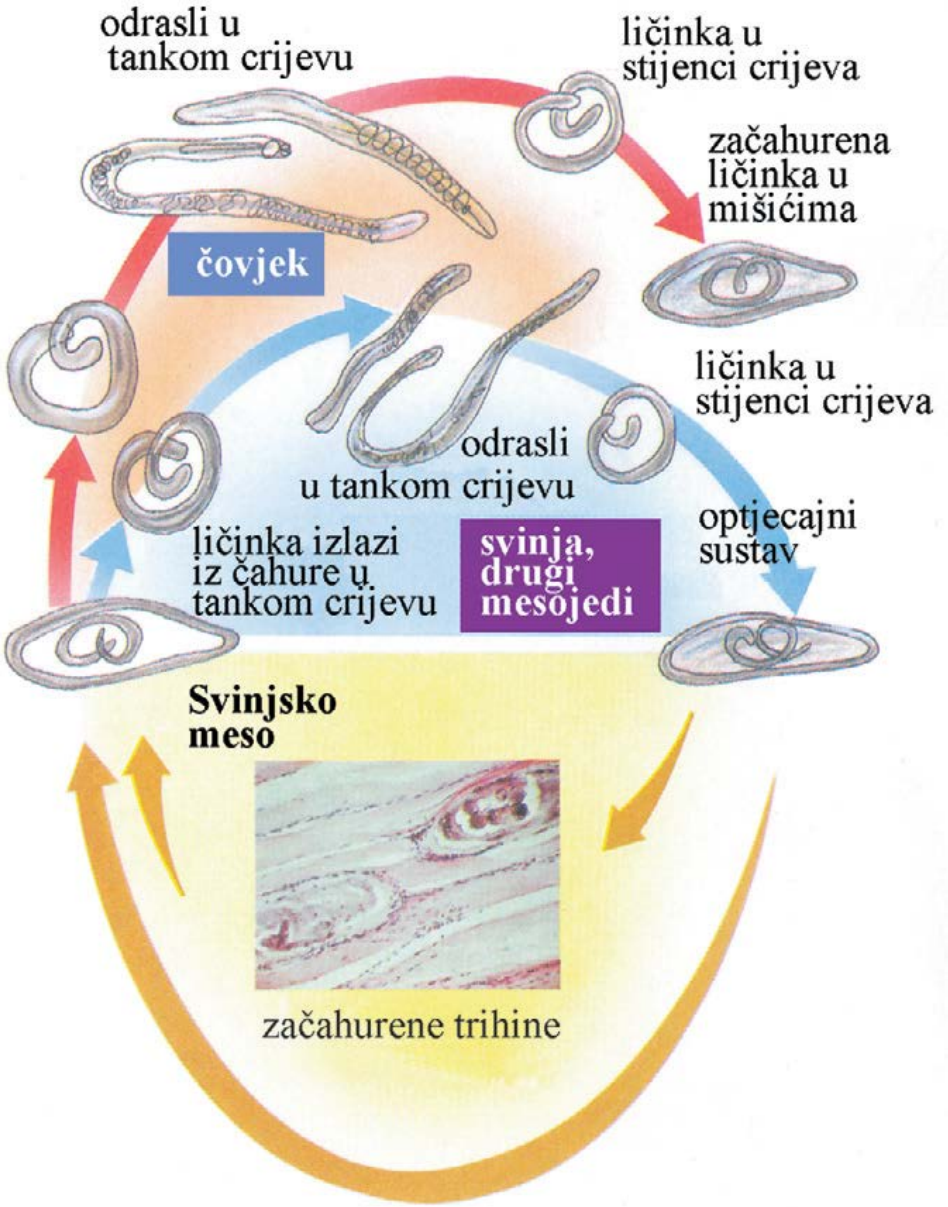
- oko 10.000 vrsta

- Razred: Aphasmida

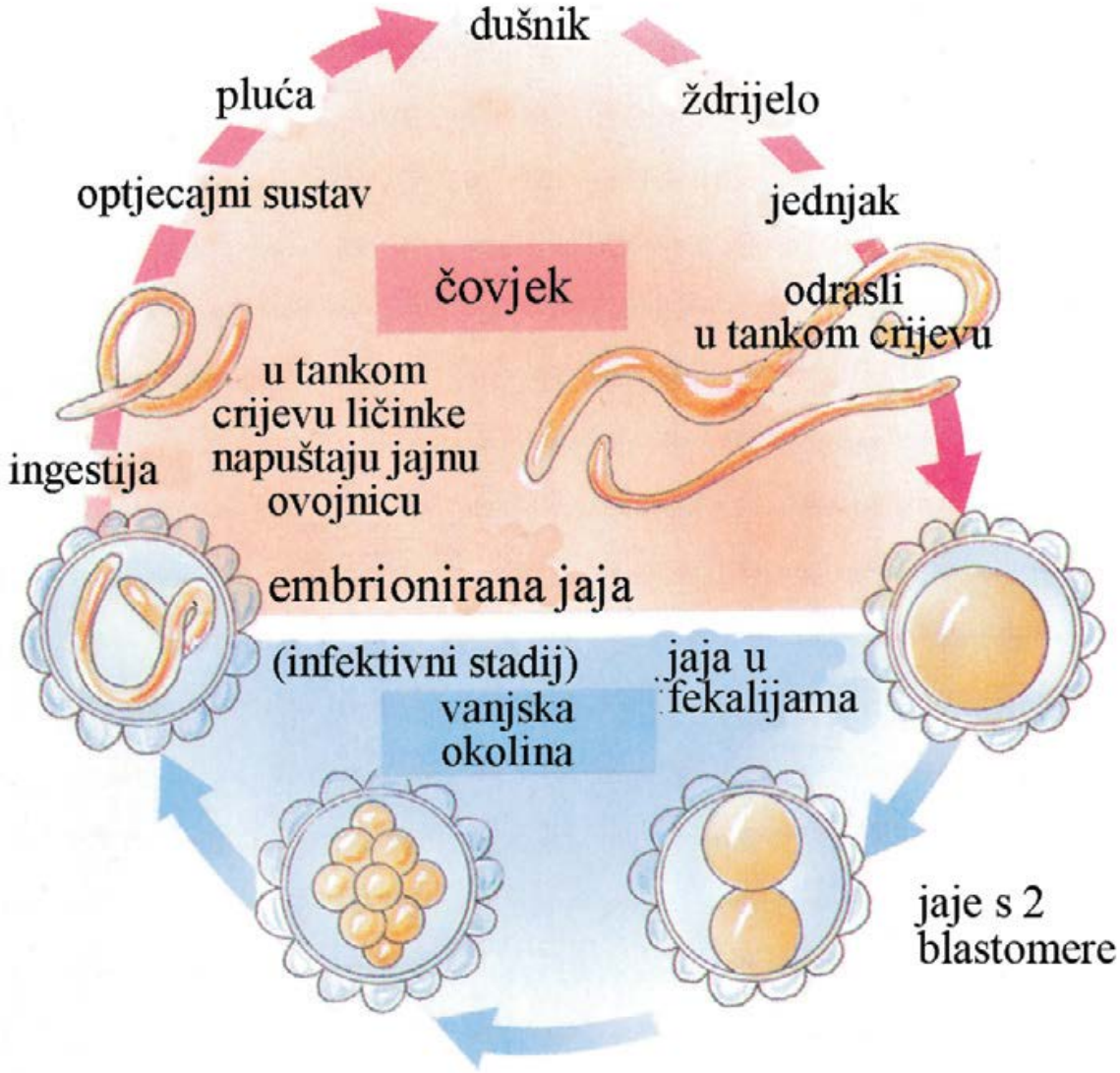
  Trichinella spiralis – zavojita trihina

- Razred: Phasmida
  Oxyurus vermicularis – bijela glistica
  Ascaris lumbricoides – dječja glista
  Ancylostoma duodenale – jamski zmijak
  Dracunculus medinensis – mali zmaj iz Medine
  Wuchereria bancrofti – krvna glista

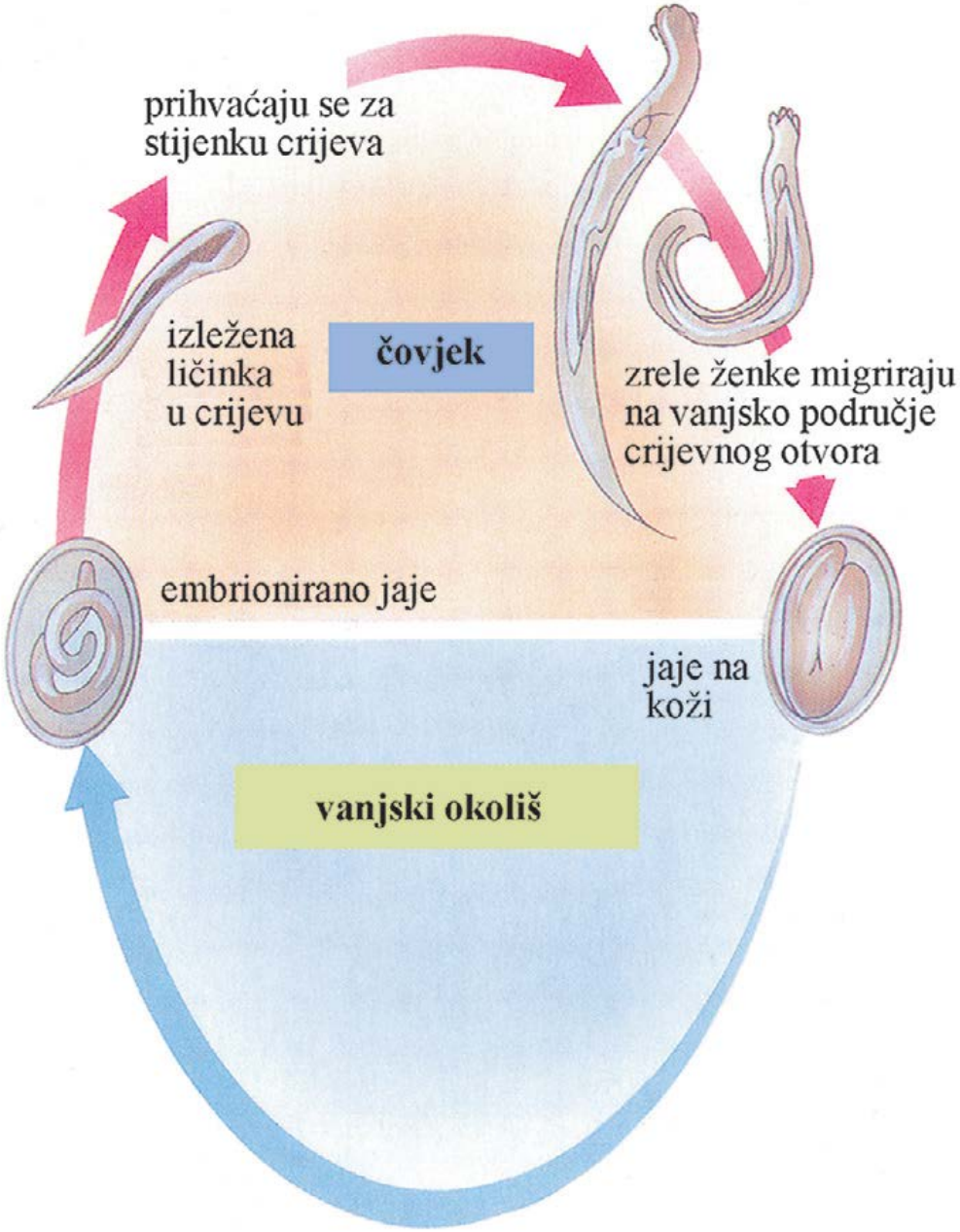




Trichinella spiralis – zavojita trihina

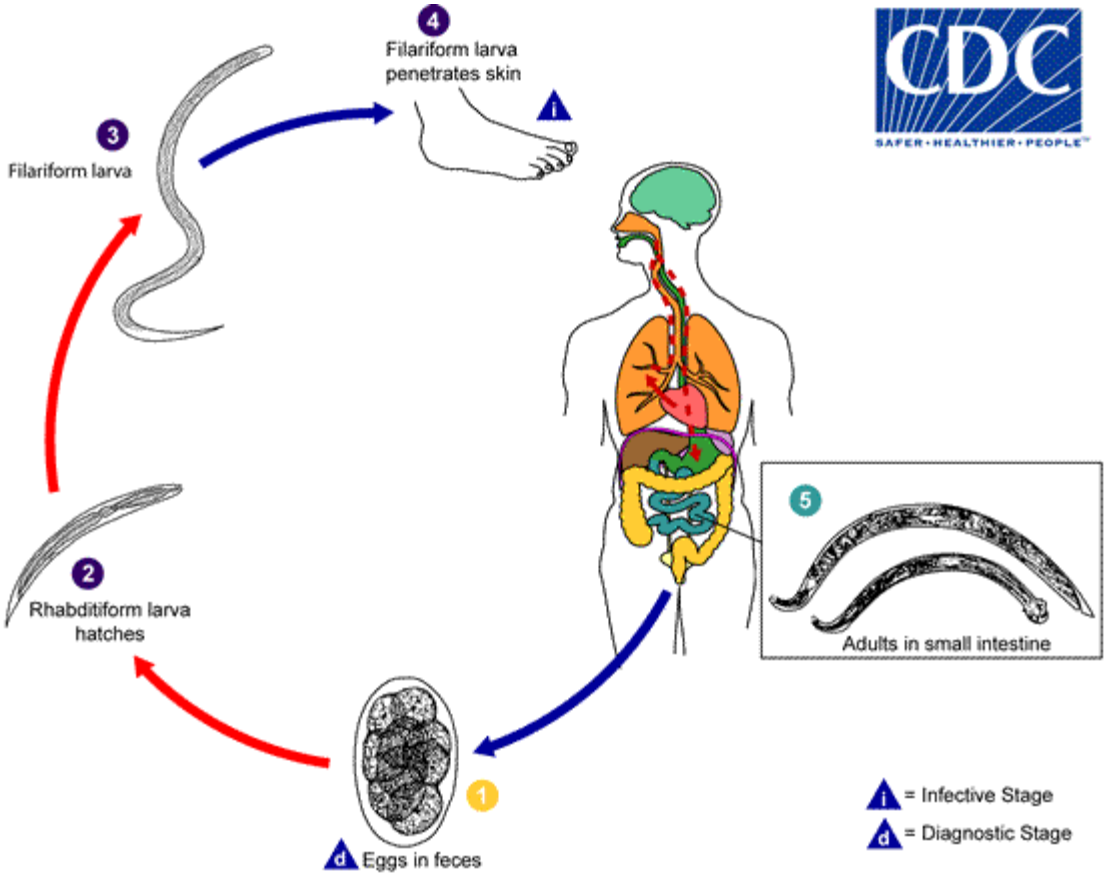


Ascaris lumbricoides –
dječja glista

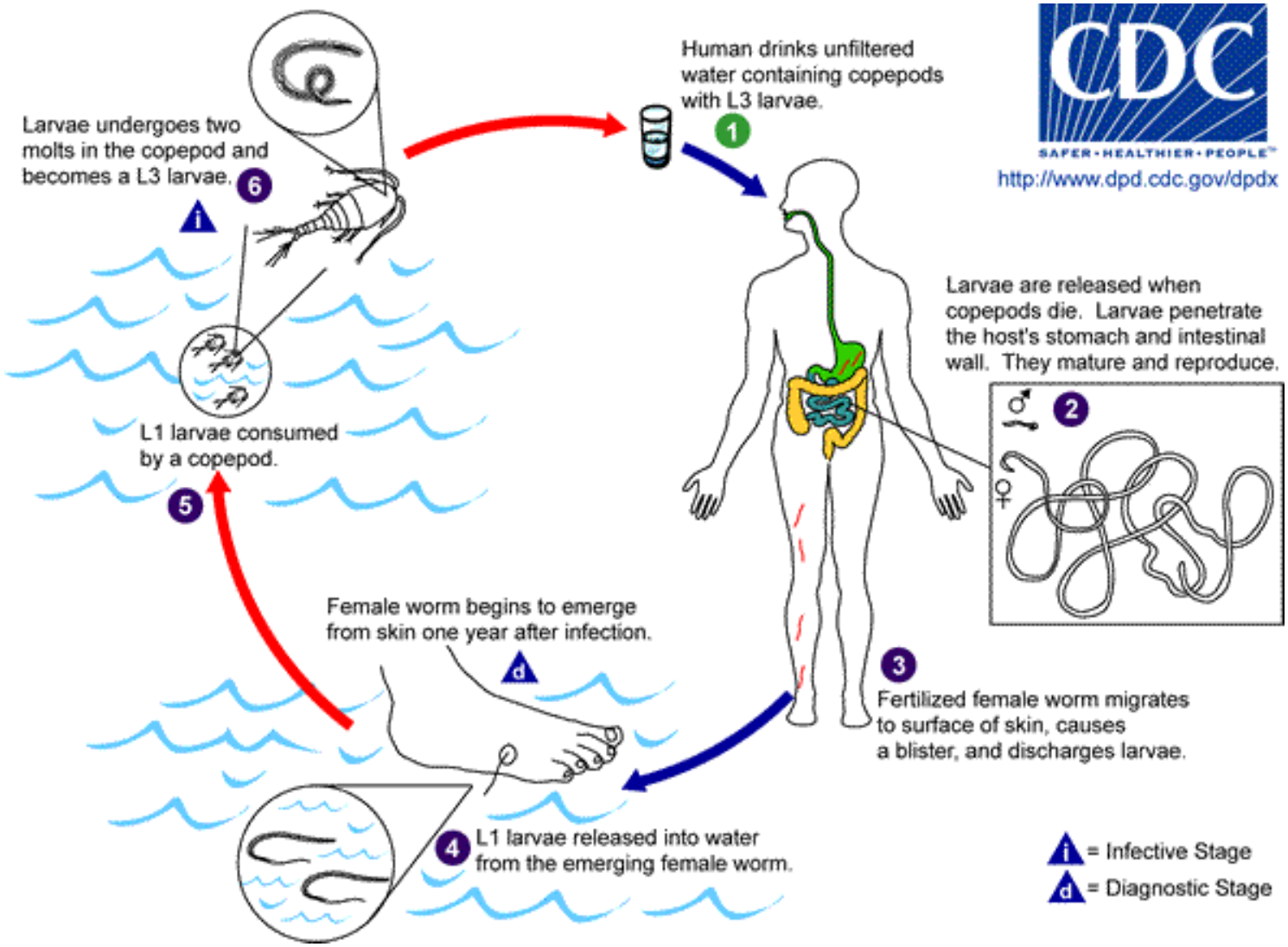


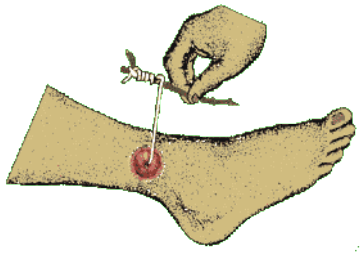
Oxyurus vermicularis –
bijela glistica





Ancylostoma duodenale –
jamski zmijak





Dracunculus medinensis –
mali zmaj iz Medine

Wuchereria bancrofti – krvna glista

