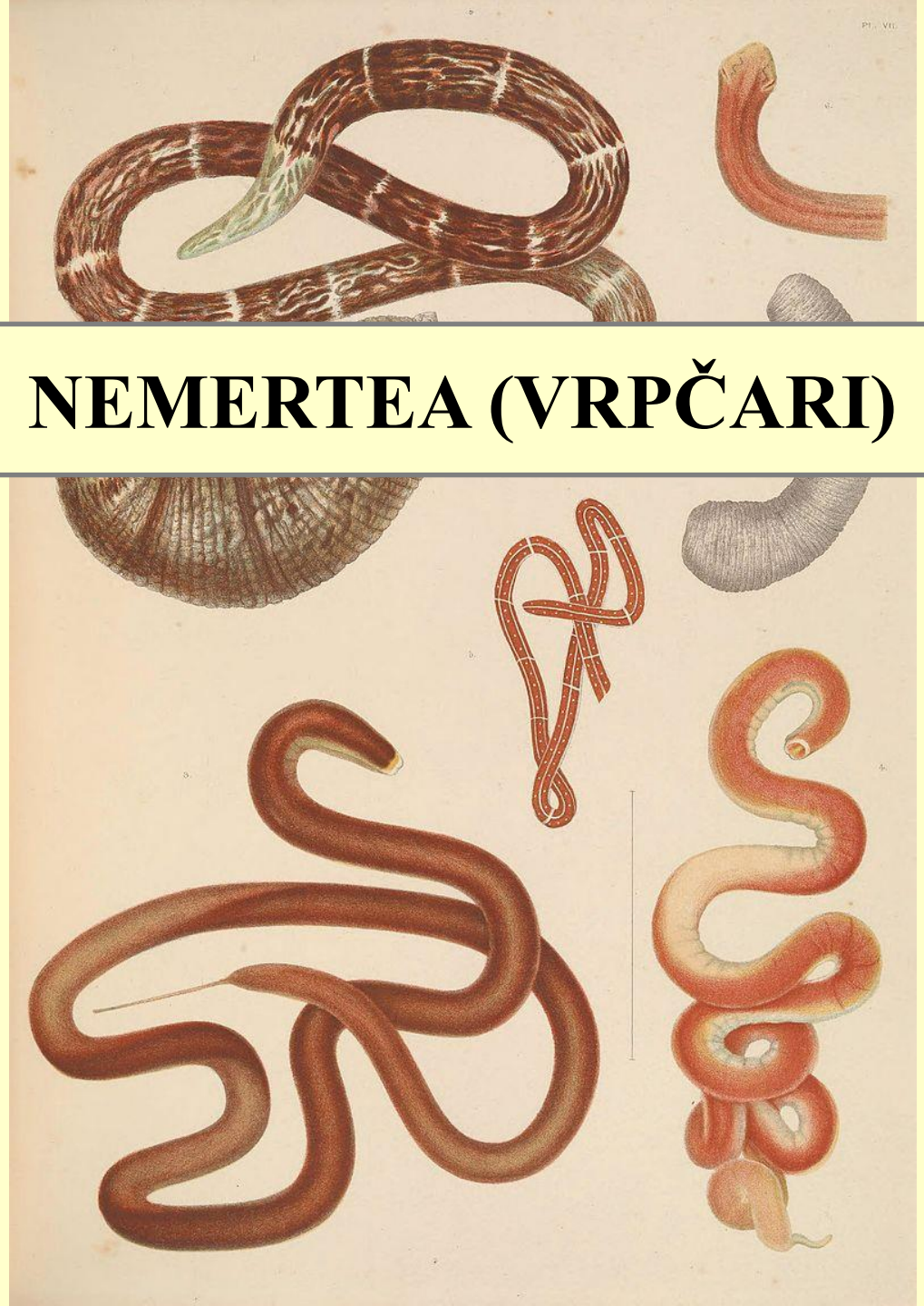
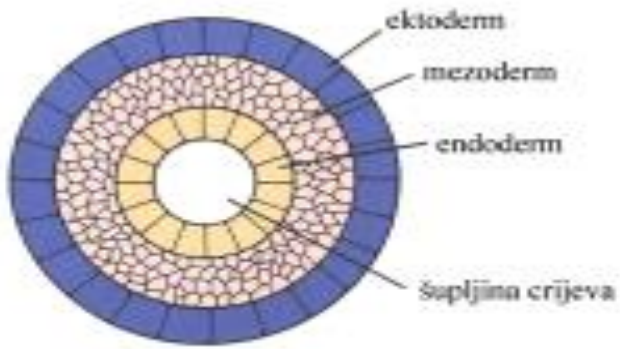
# NEMERTEA (VRPČARI)







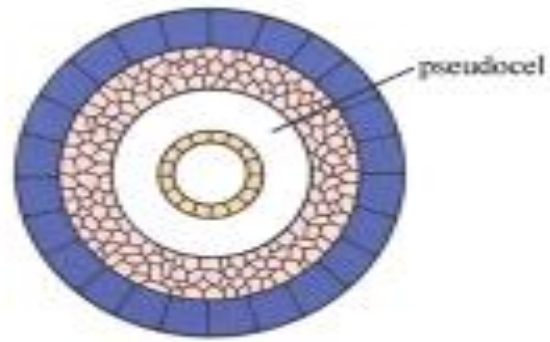





**ACOELOMATA**

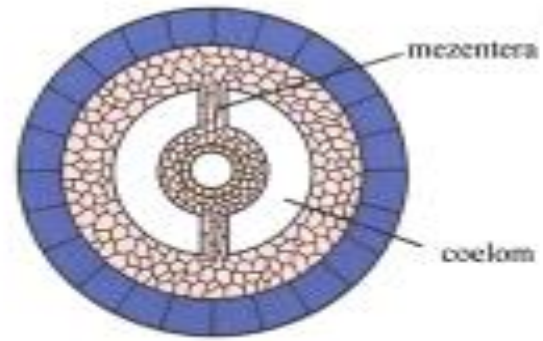
**Platodes**

**Nemertea**




**PSEUDOCOELOMATA**

**Aschelminthes**

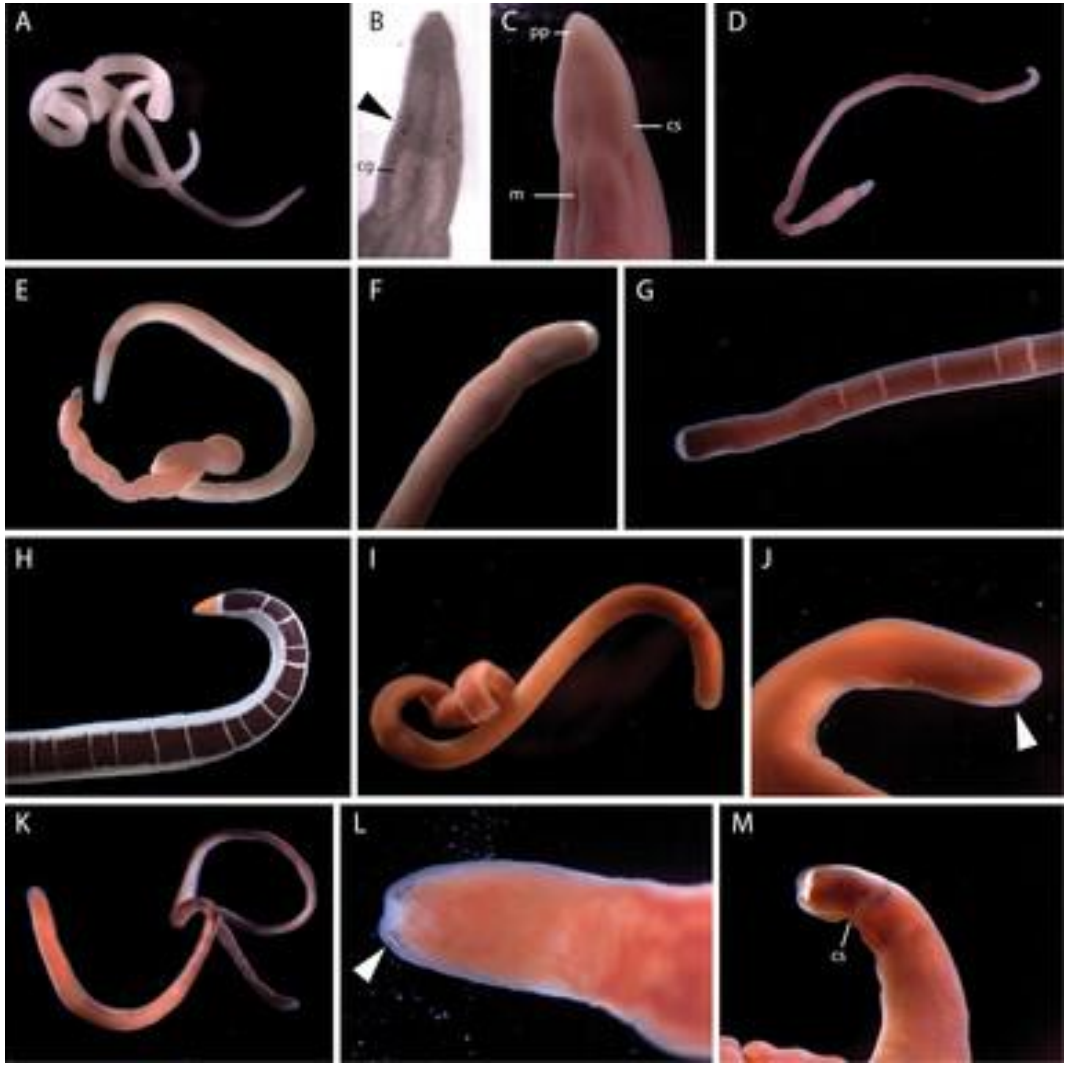



**COELOMATA**

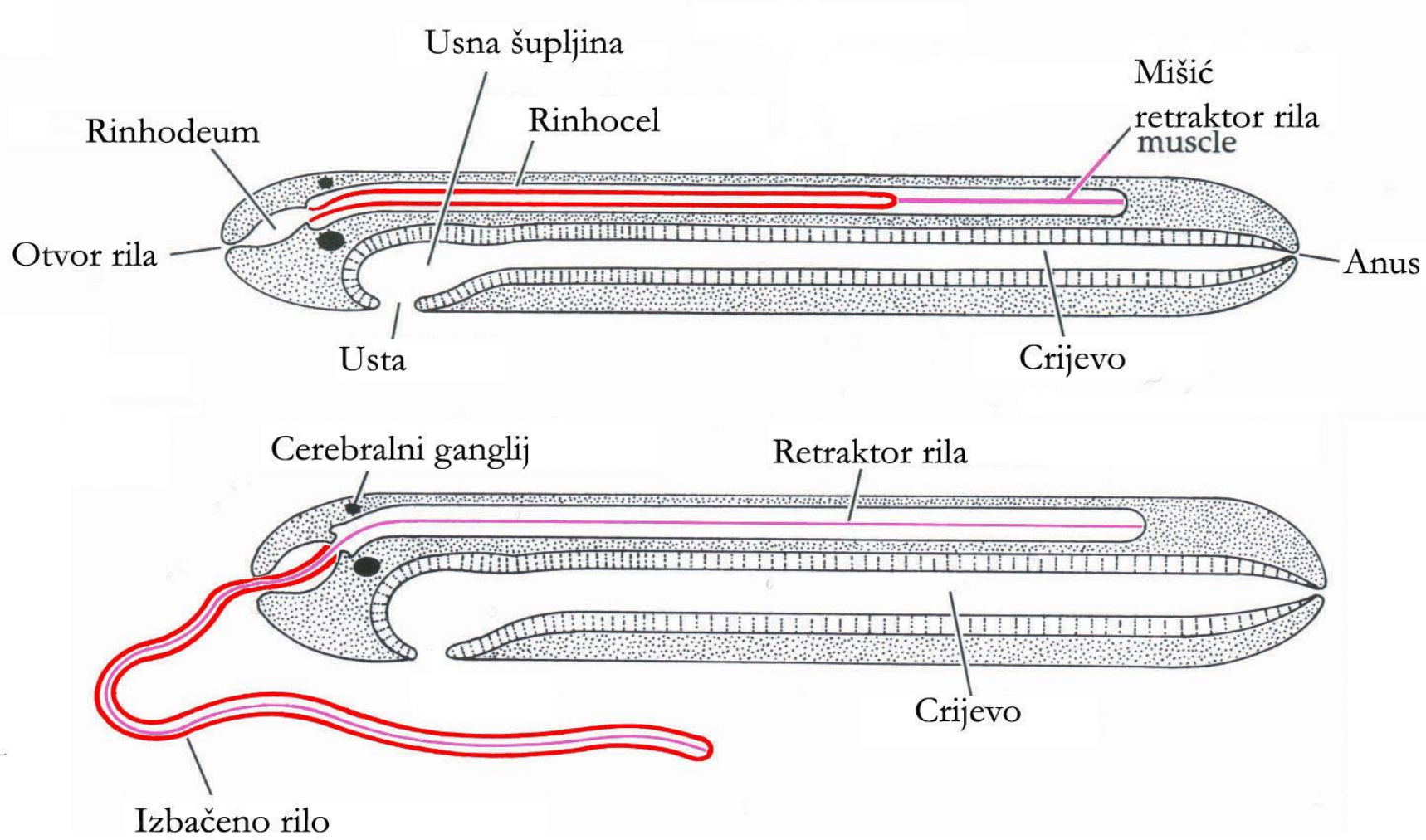
**Mollusca**
**Annelida**
**Arthropoda**
**Echinodermata**
**Chordata**

# Koljeno: Nemertea (vrpčari)

- Acelomata
- dorzoventralno spljošteni
- **prohodno probavilo**
- **zatvoreni optjecajni sustav**



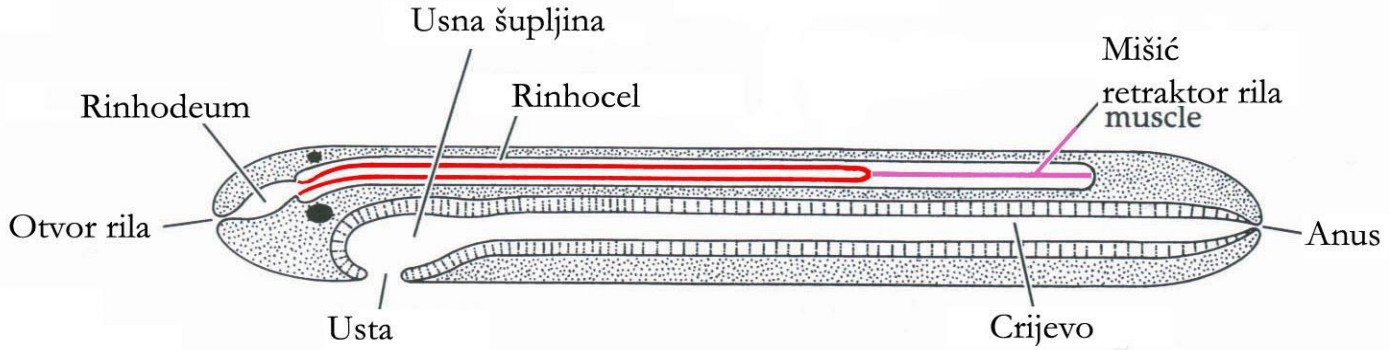
# Osnovni plan unutarnje građe

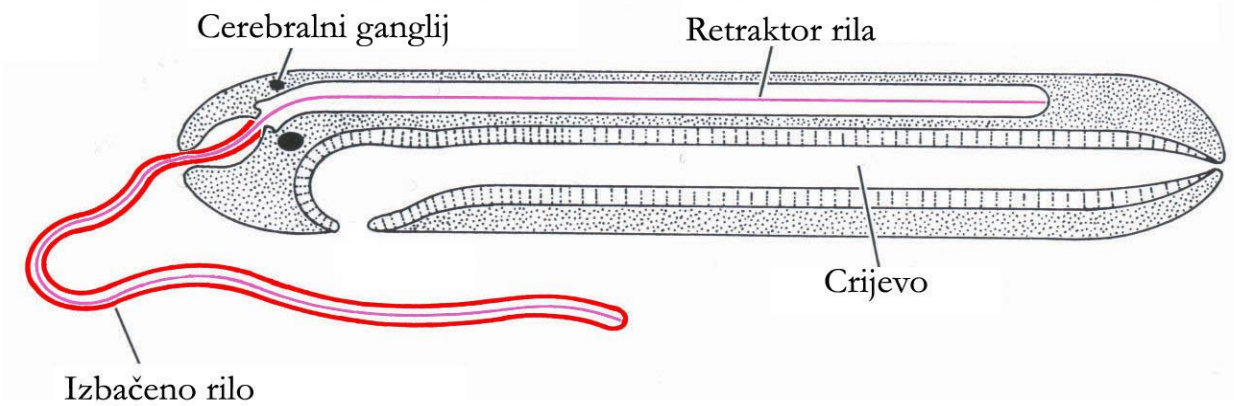


# Koljeno: Nemertea

- **rilo (proboscis)**
  - otvor rila
  - rinhodeum
  - **rinhocel** – šupljina ispunjena tekućinom i obložena mezodermalnim tkivom





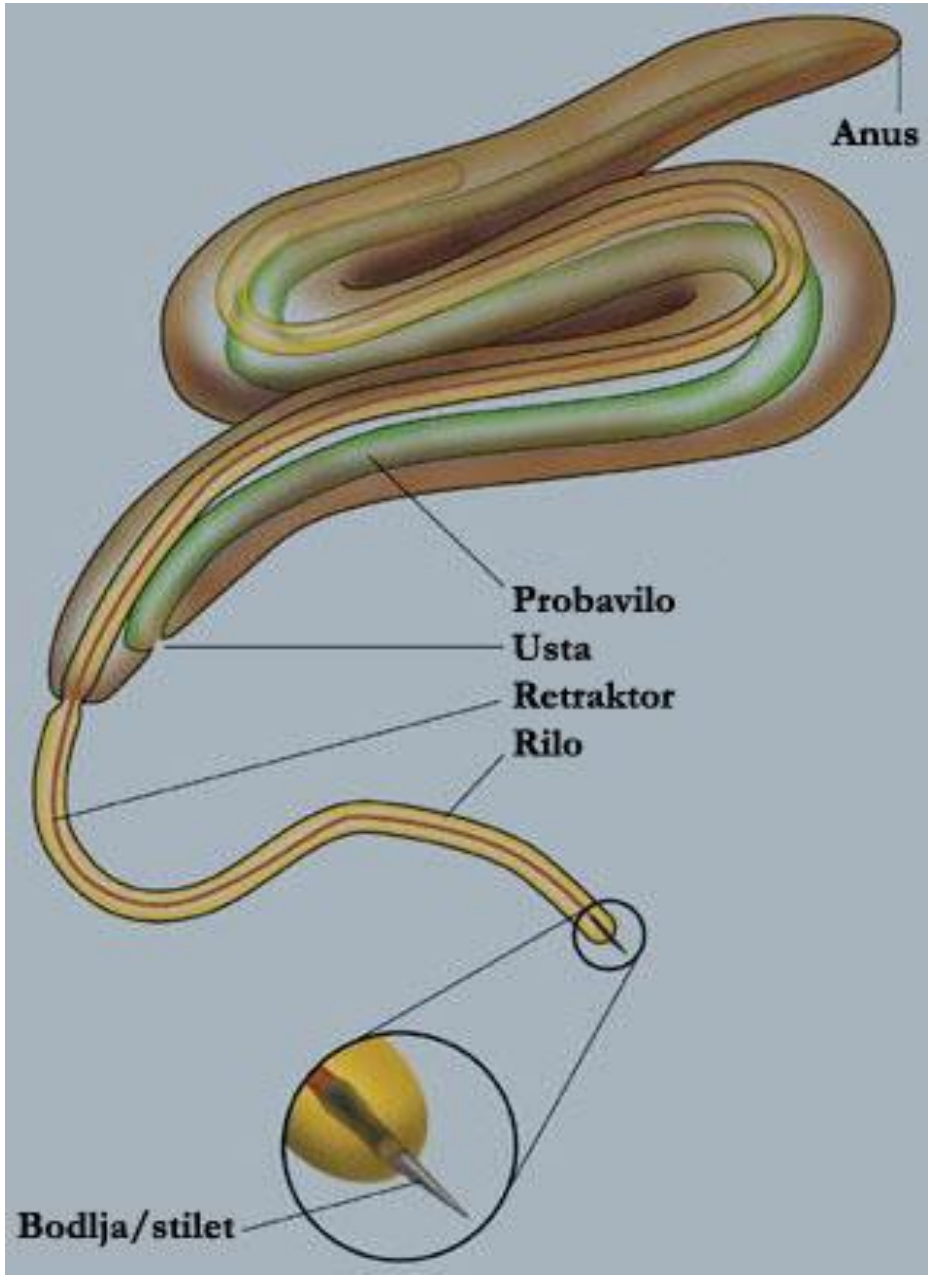



# Unutarnja građa Nemertea (vrpčara)

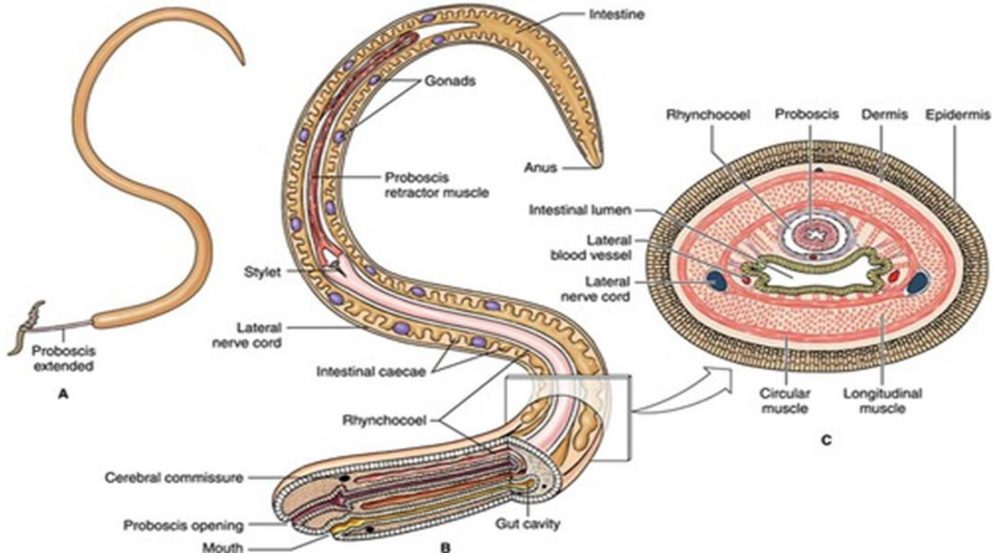


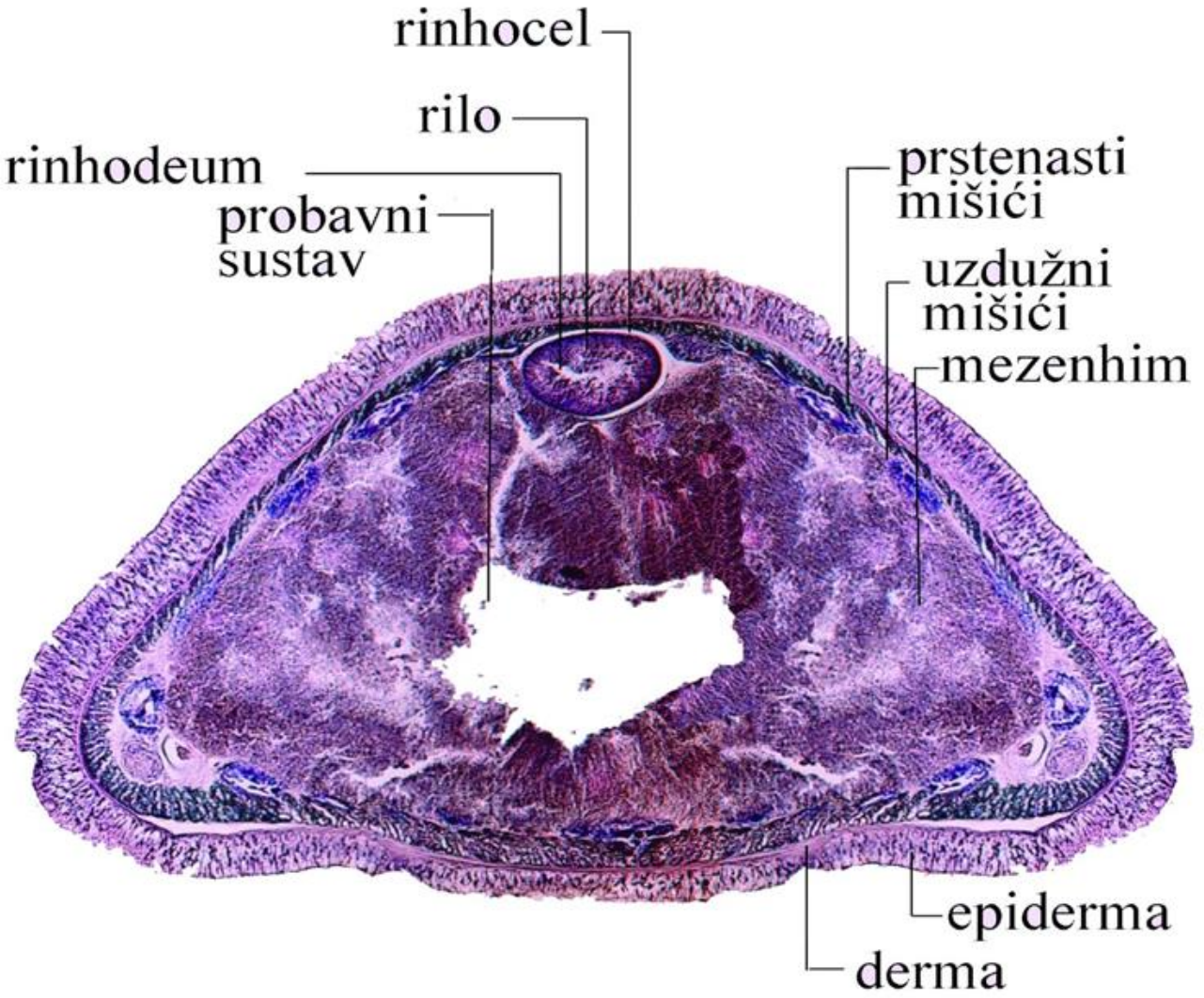






# Poprečni presjek kroz tijelo vrpčara



# Koljeno: Nemertea (Nemertina) - vrpčari

**<u>Poprečni presjek kroz tijelo vrpčara</u>**

- **epiderma**
- **derma**
- **prstenasti mišići**
- **uzdužni mišići**
- **žlijezde**
- **mezenhim**
- **probavilo**
- **rilo**
- **rinhocel**
- **bočna krvna žila**
- **bočna živčana vrpca**







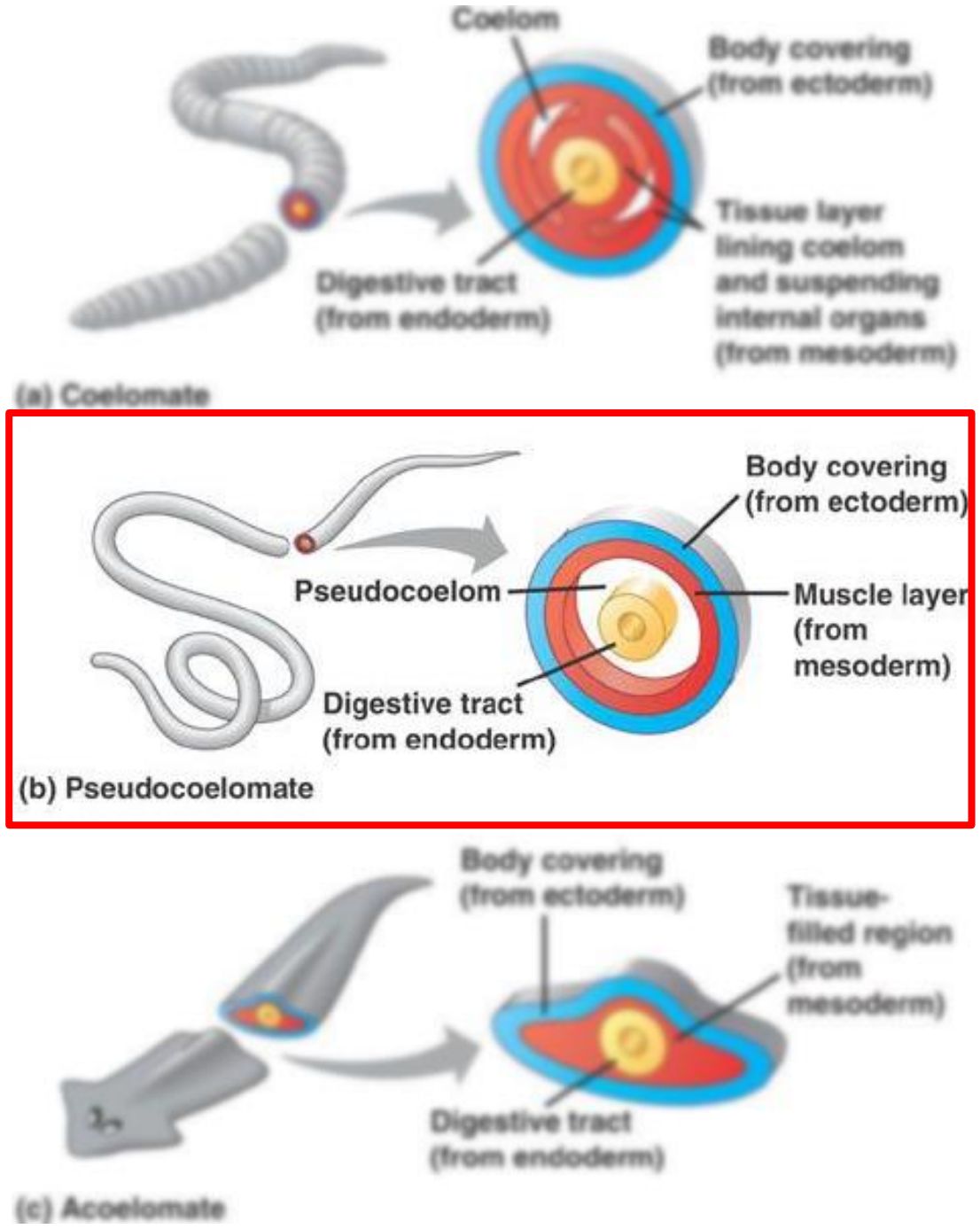


# ASCHELMINTHES (OBLENJACI)





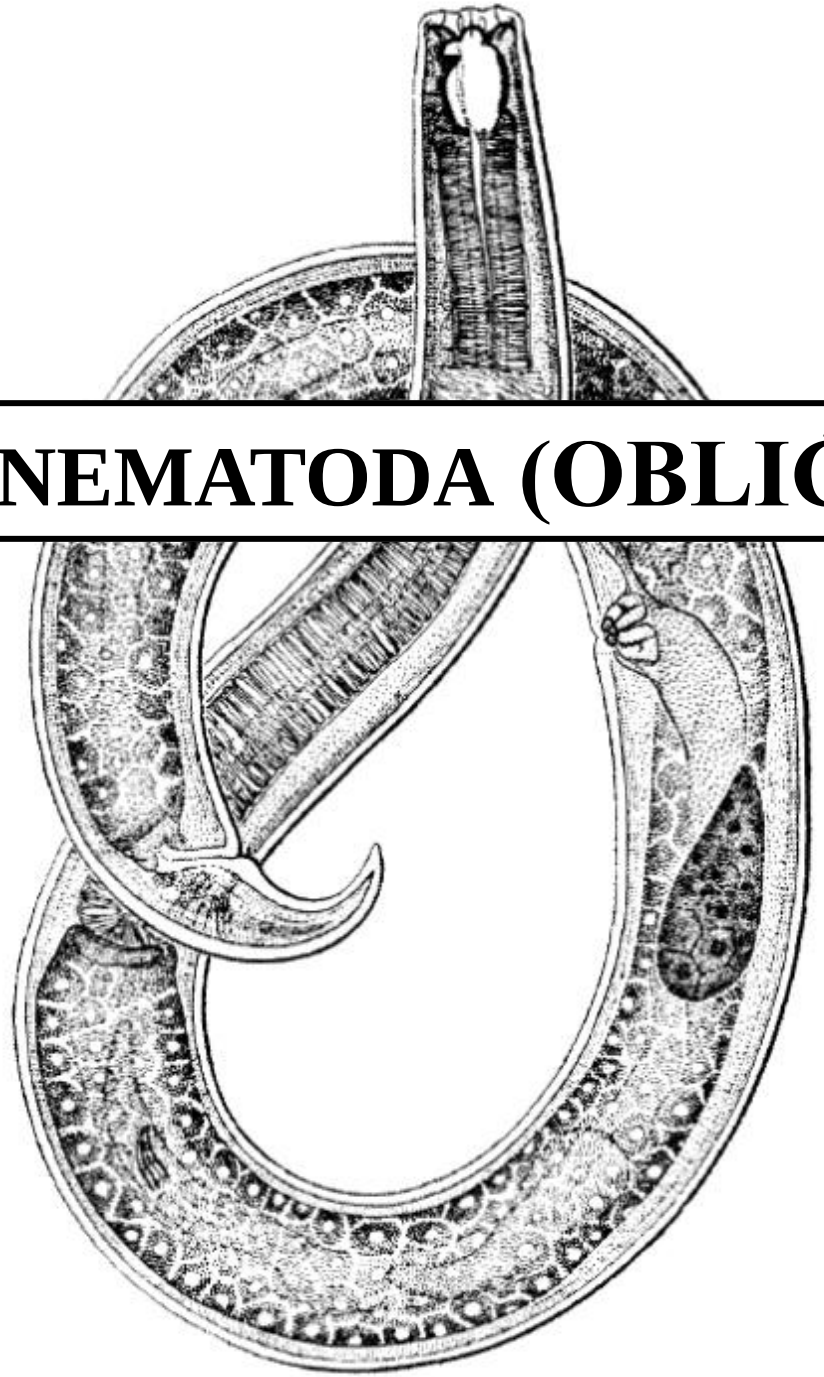





# Aschelminthes

- **<u>Blastocoelomata</u>**: između tjelesne stijenke i probavnog sustava locirana primarna tjelesna šupljina (blastocelom)
  - hidroskelet
- Eumetazoa – Bilateria – Protostomia
- triploblastične životinje

# NEMATODA (OBLIĆI)

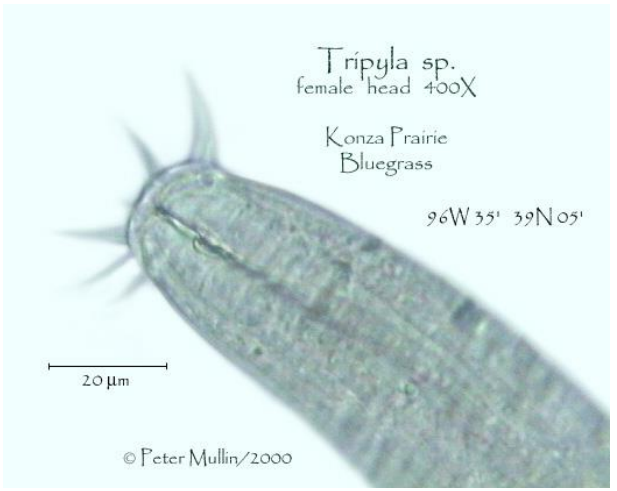




*Tobrilus* sp.



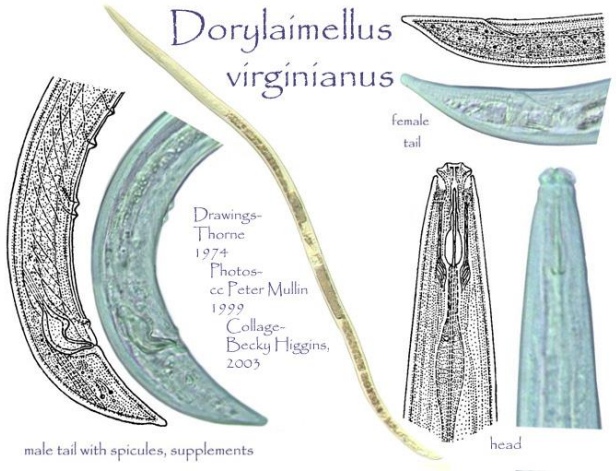
*Trichinella spiralis* (zavojita trihina)




*Tripyla* sp. (predatori)

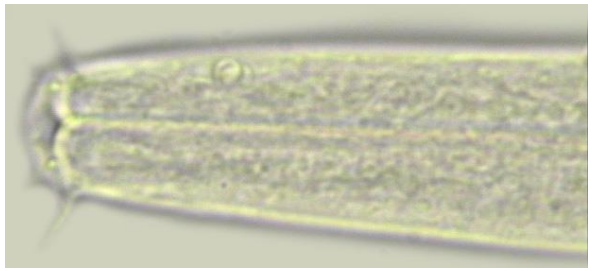
**paraziti**

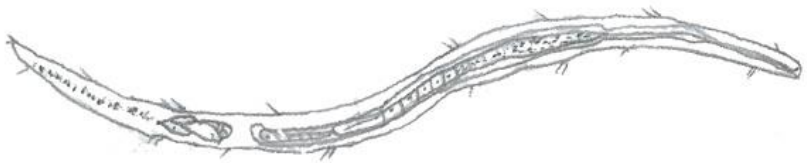
**slobodnoživući**




*Dorylaimellus virginianus* (omnivori i fungivori)

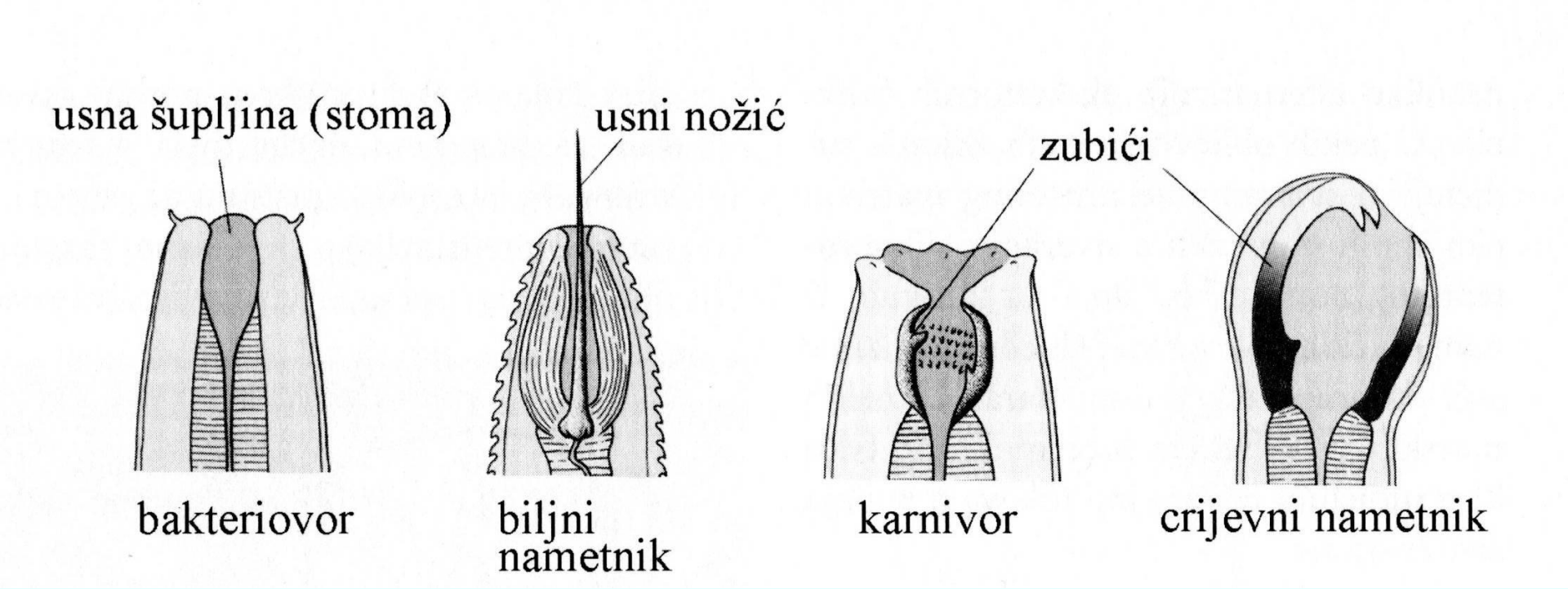
*Monhystera* sp. (bakterivori)





# Koljeno: Nematoda

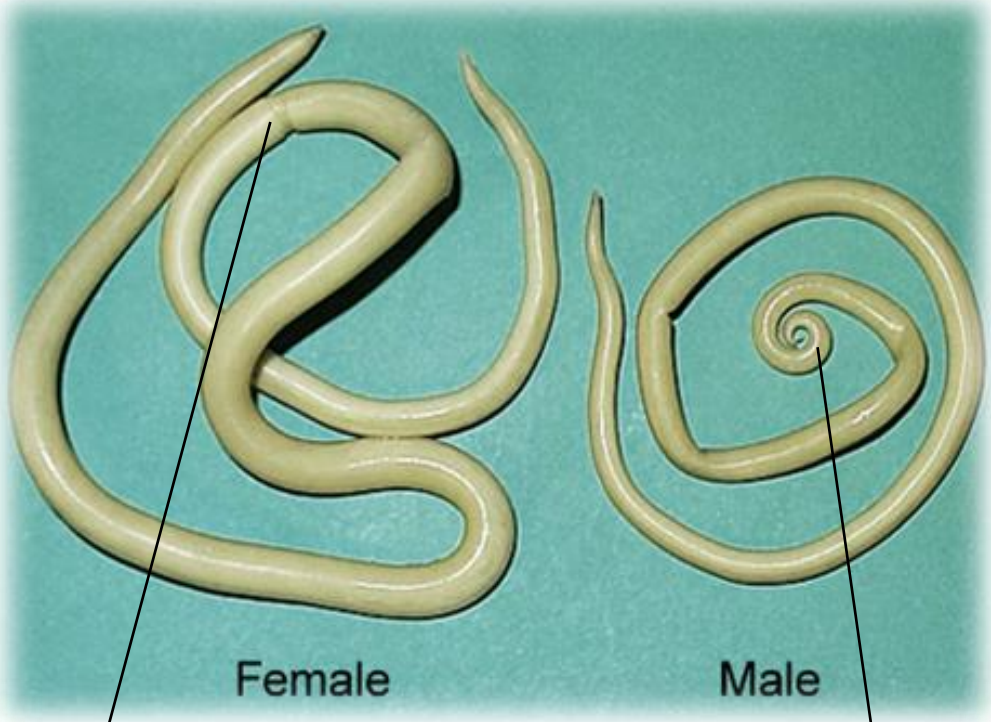
- prehrana
  - prohodno probavilo
  - različito građeni usni aparat

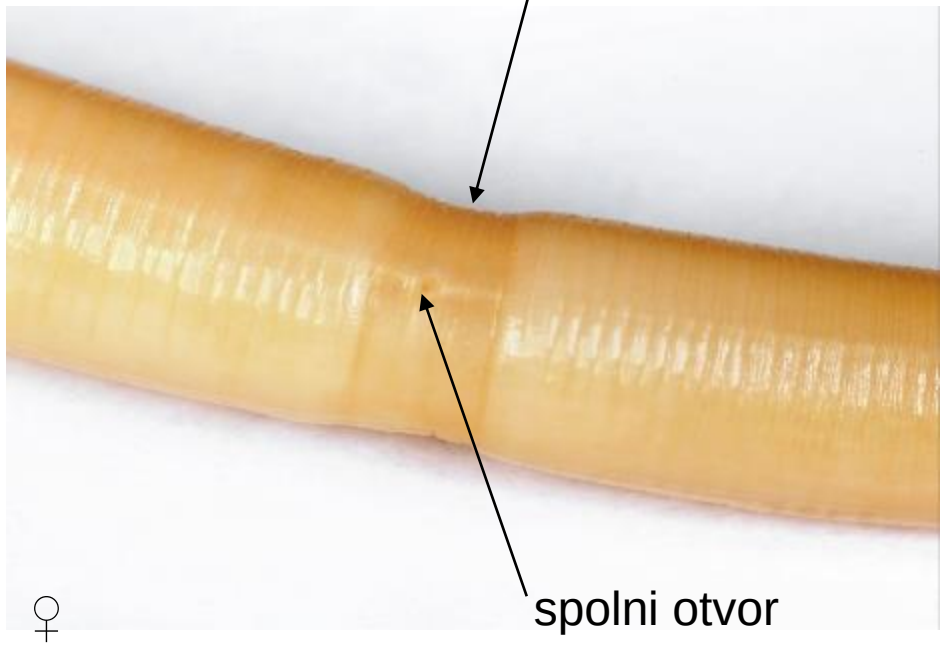


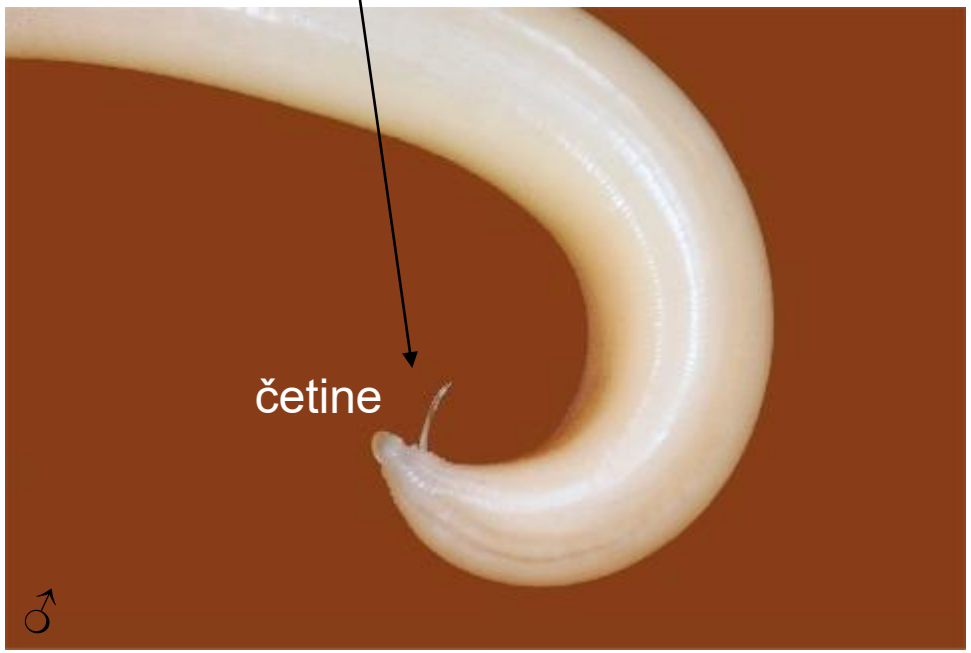
# *Ascaris lumbricoides* (dječja glista)

https://www.youtube.com/watch?v=a7RAoJ_2W5g




Female
Male

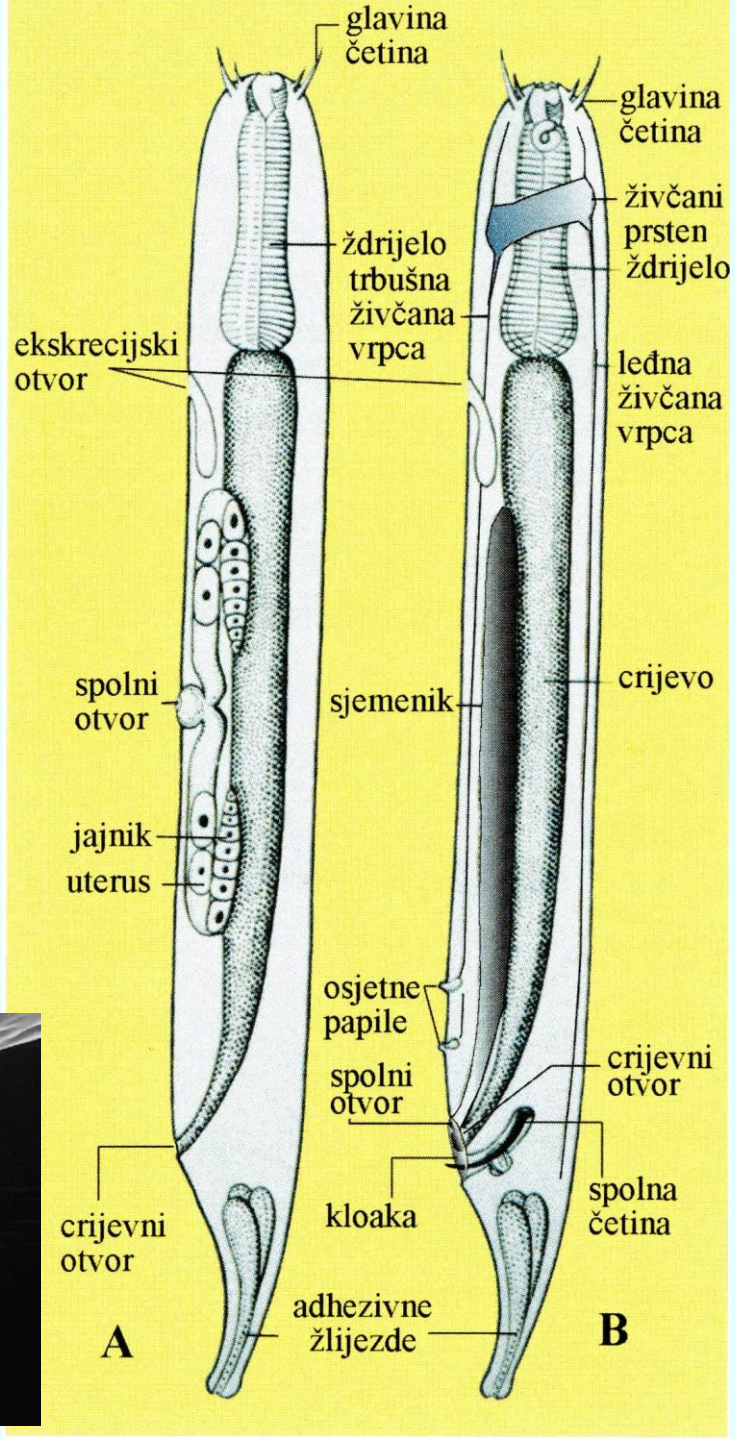

spolni otvor
♀


četine
♂

# Koljeno: Nematoda

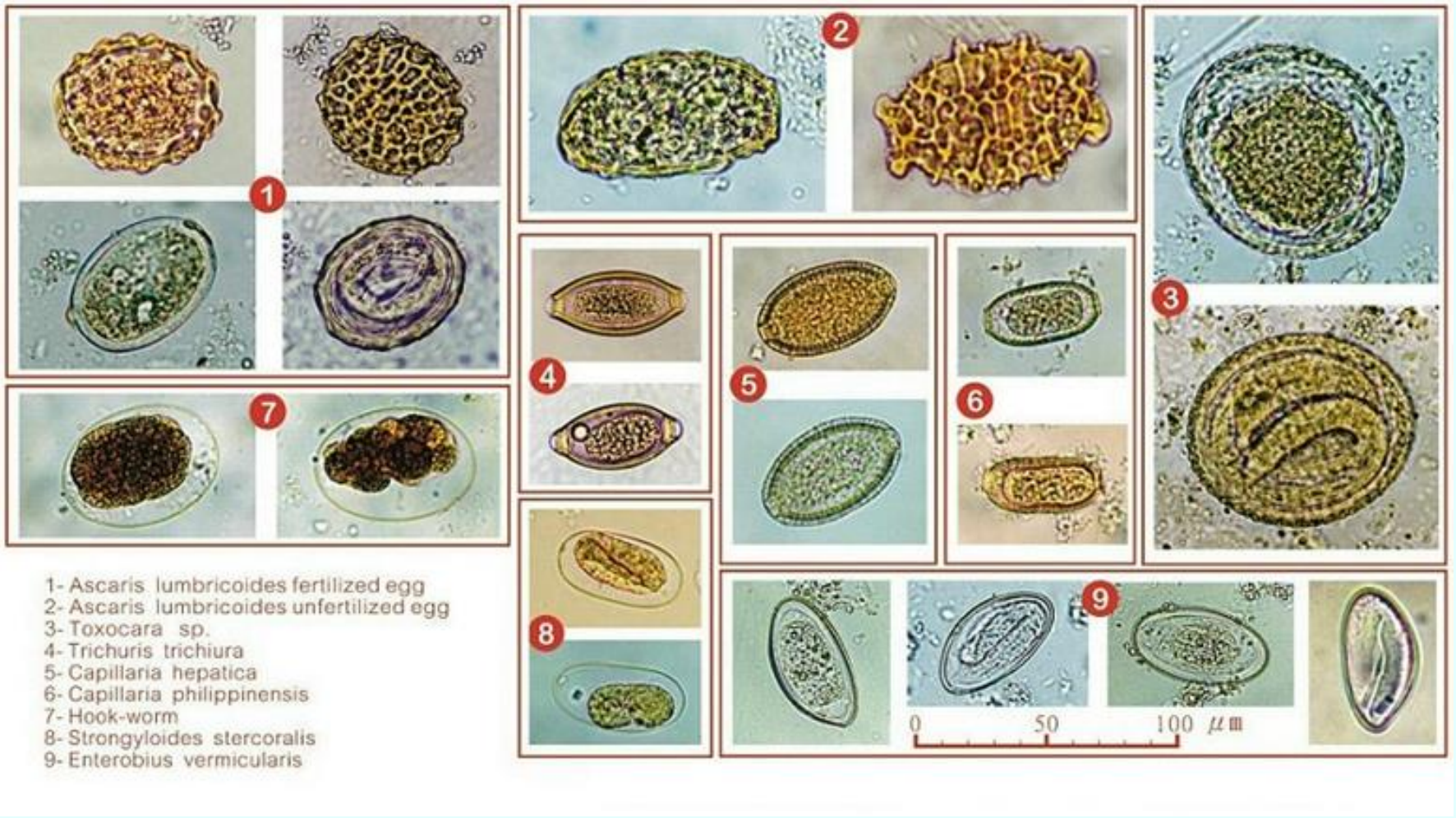
- spolni sustav
  - odvojena spola
    - **spolni dimorfizam**
    - kopulatorne četine u mužjaka
  - dvospolci rijetki





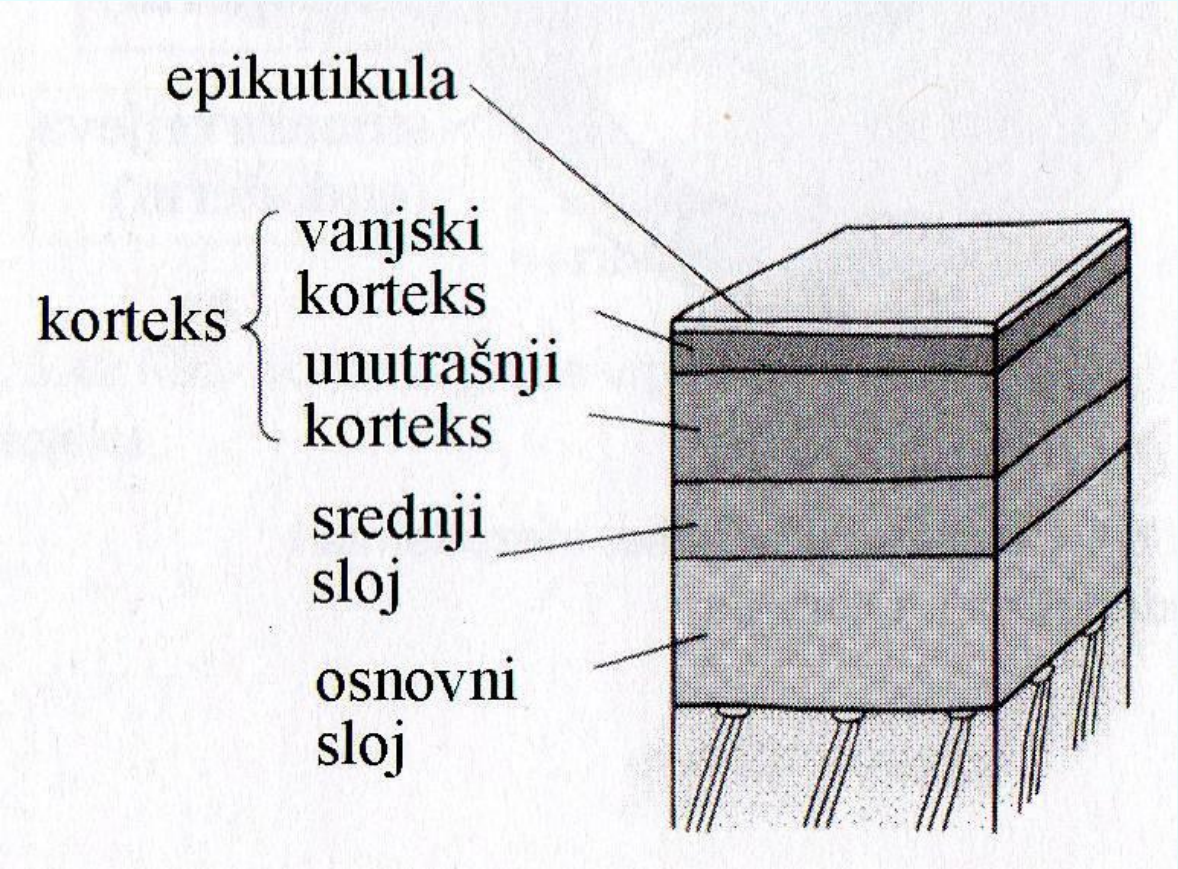
# Koljeno: Nematoda

- specifična građa jaja – determinacija



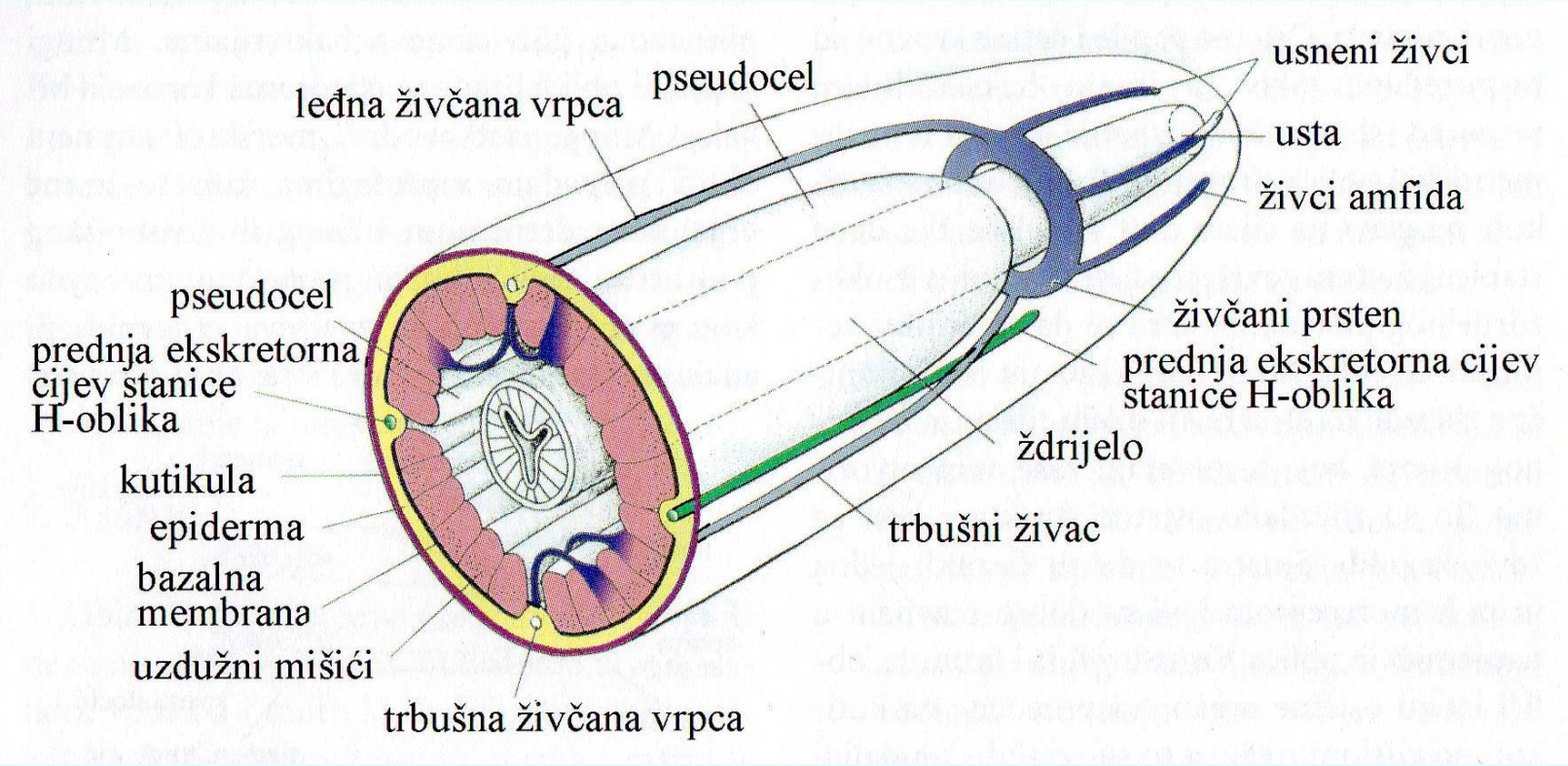
# Koljeno: Nematoda

- skleroproteinska kutikula
  - epikutikula
  - korteks
    - vanjski (proteini)
    - unutarnji (vlaknaste strukture)
  - srednji sloj
  - osnovni sloj
- epiderma/hipoderma
  - **zadebljanja**
    - dorzalna, ventralna, lateralna



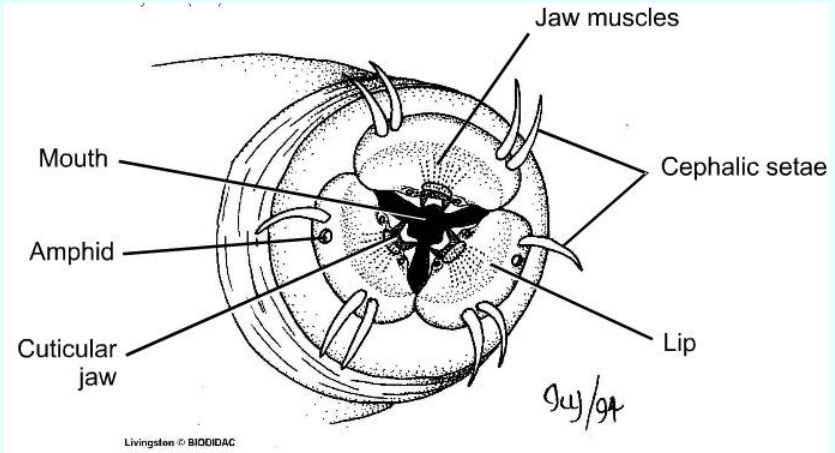
# Koljeno: Nematoda

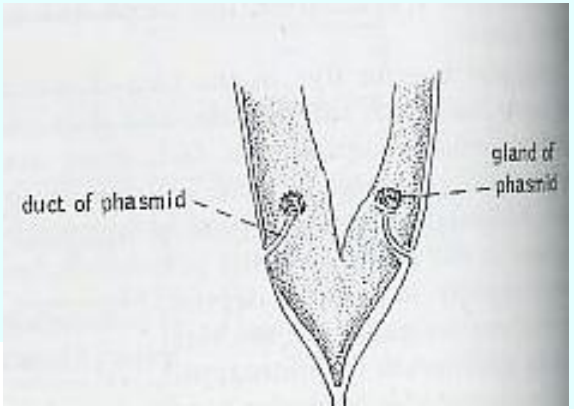
- mišićni sustav
- živčani sustav
- ekskrecija i osmoregulacija:
  - tjelesna stijenka
  - crijeva
  - ekskrecijski organi:
    - žljezdani – RENETE
    - cjevasti – **H-STANICE**



# Koljeno: Nematoda

- osjetila
  - **amfidi** – prednji dio tijela; većinom nenametnički oblici
  - **fasmidi** – stražnji dio tijela; većinom nametnički oblici
  - ocele






# Koljeno: Nematoda - oblići

## *Ascaris lumbricoides* (dječja glista) – vanjski izgled (spolni dimorfizam)

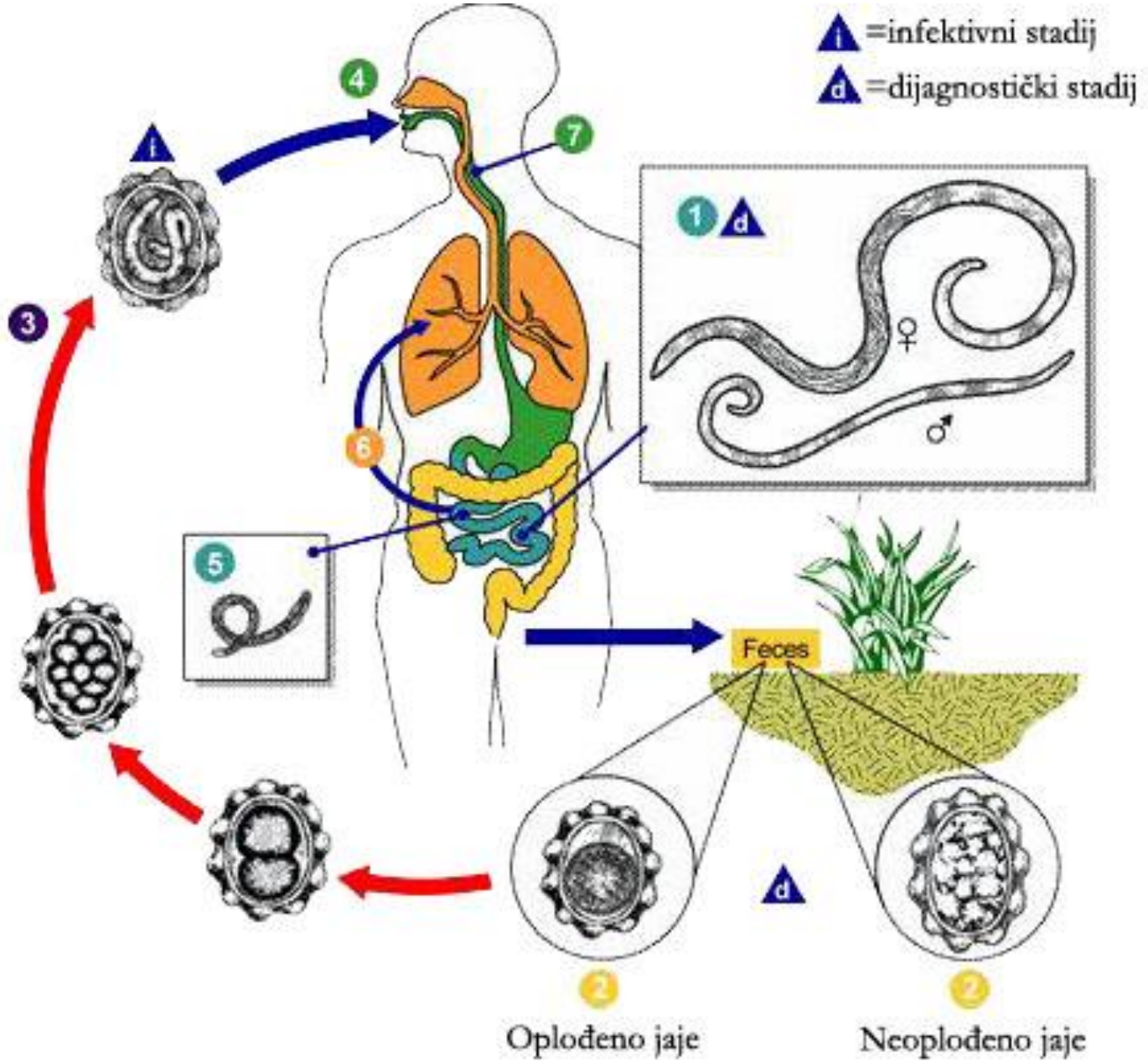
- usni otvor
- usne
- bočna zadebljanja hipoderma
- pseudometamere

♀
- spolni otvor
- analni otvor

♂
- otvor nečisnice
- kopulatorne četine (2)



# Životni ciklus dječje gliste (*Ascaris lumbricoides)*

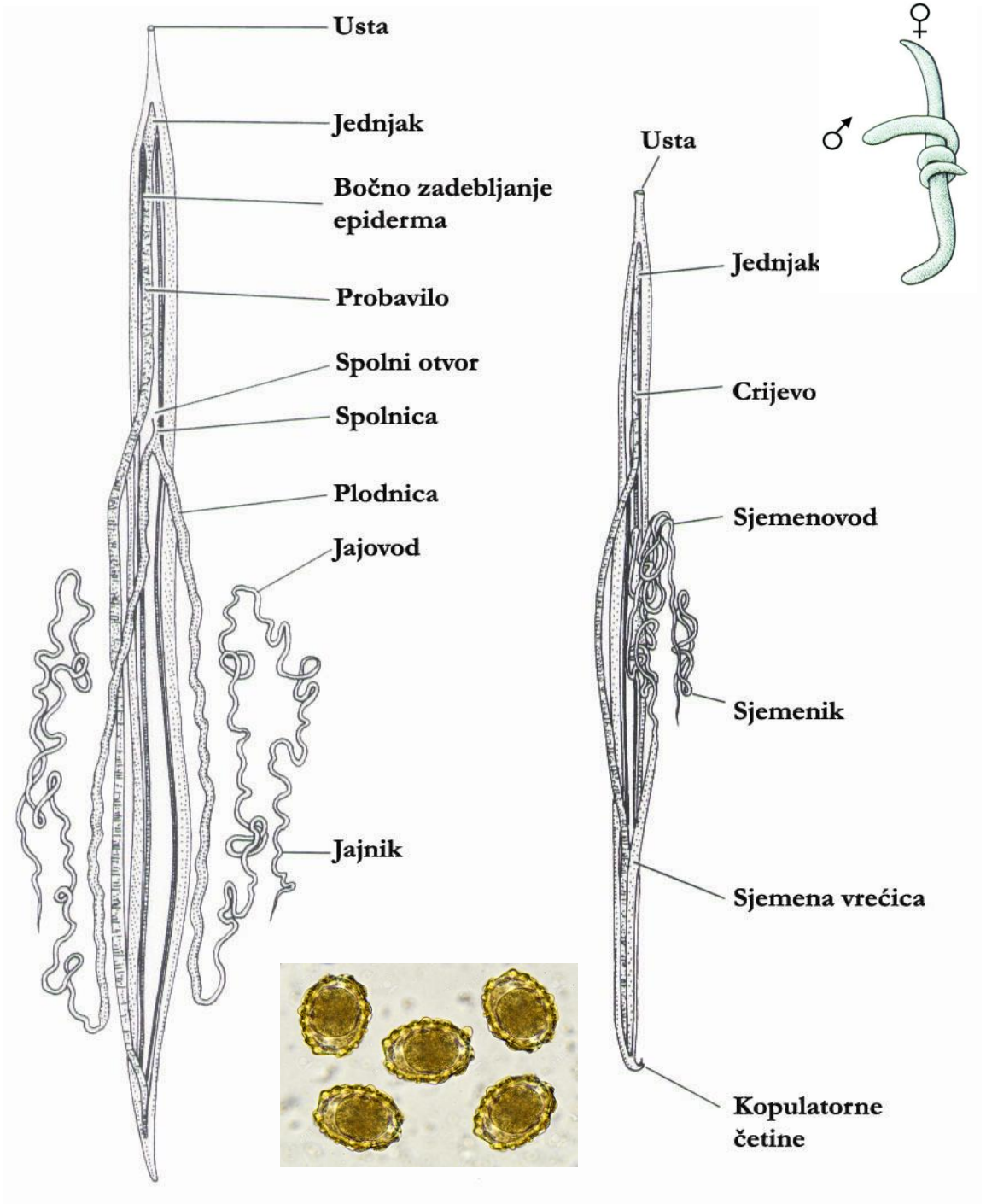




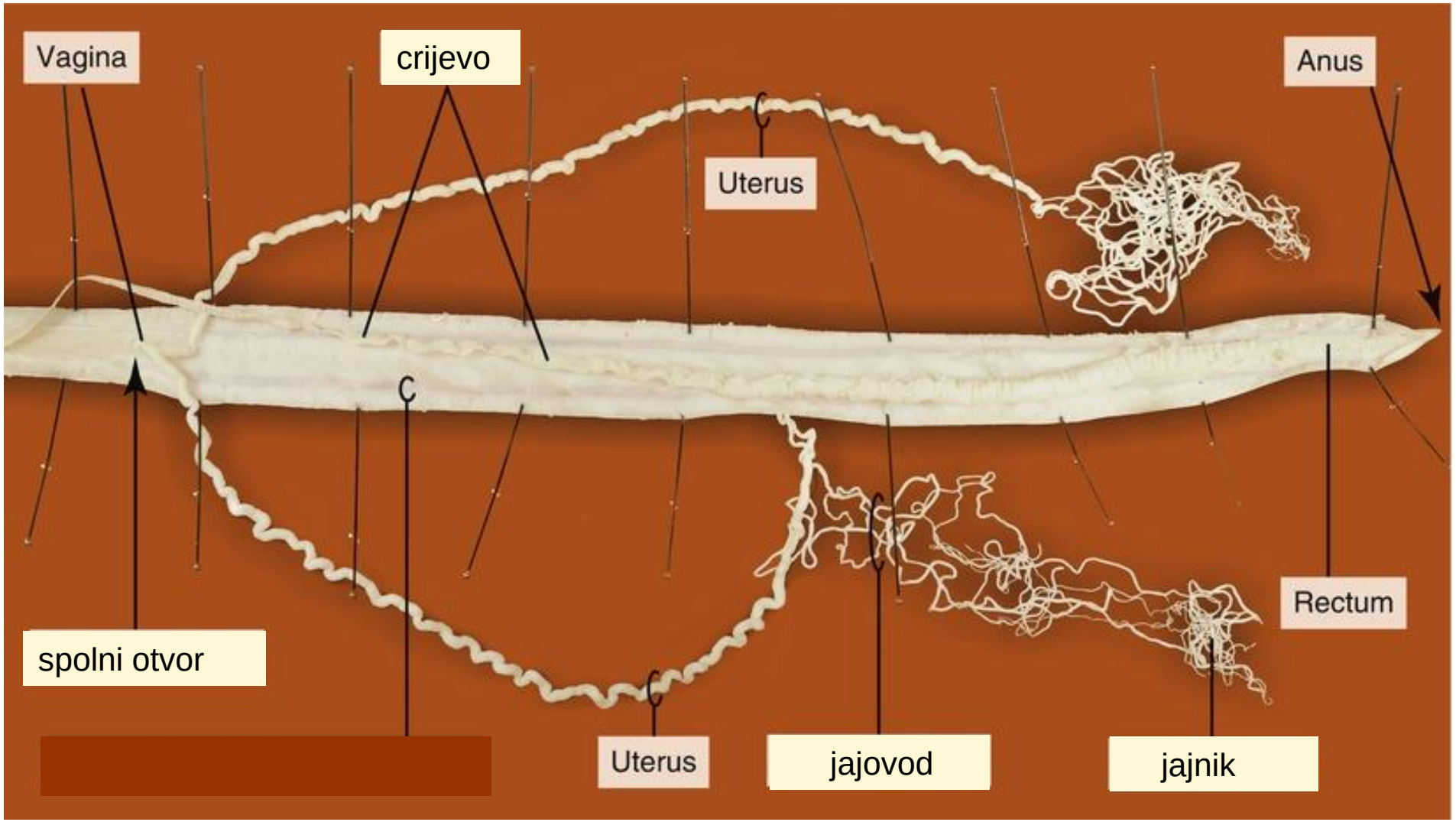



# Unutarnja građa Nematoda



# Unutarnja građa ženke Nematoda




Prema: P. Lőw, K. Molnár i G. Kriska: Atlas of Animal Anatomy and Histology, Springer, 2016

## *Ascaris lumbricoides* (dječja glista) – unutarnja građa

- usta
- ždrijelo
- crijevo
- analni otvor
- bočna zadebljanja hipoderma

♀

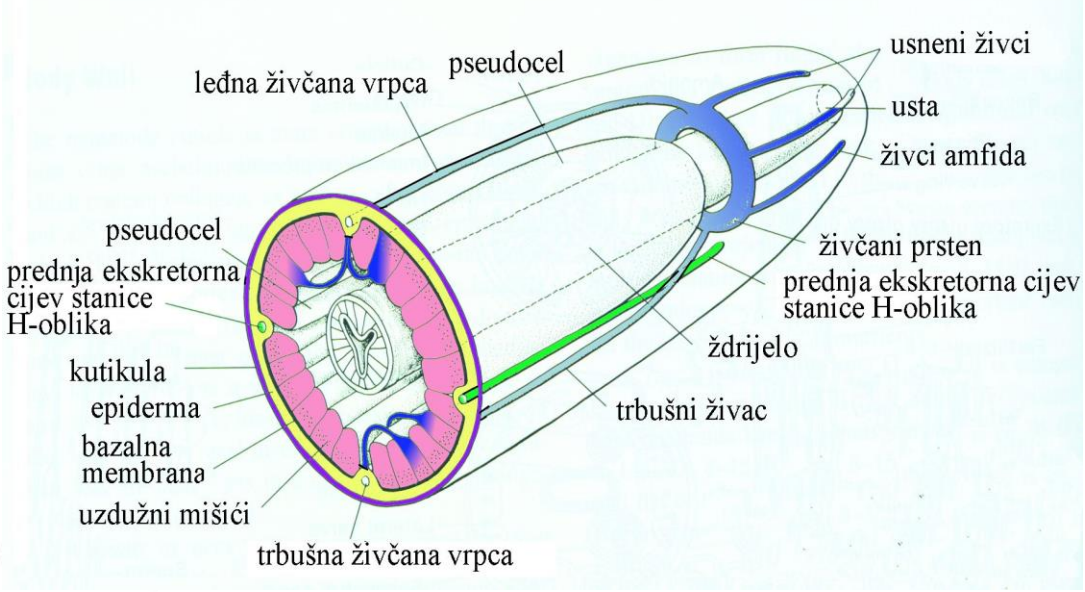
- jajnik (2)
- jajovod (2)
- plodnica (2)
- spolnica (1)
- spolni otvor
- oplođeno jaje

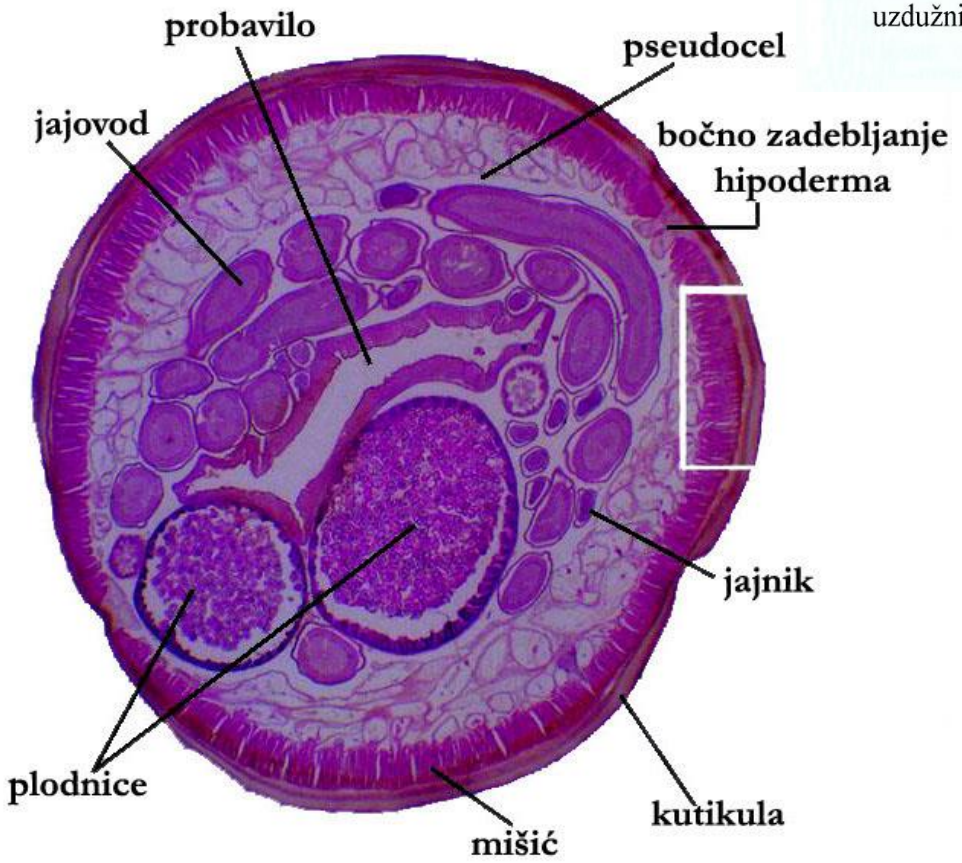


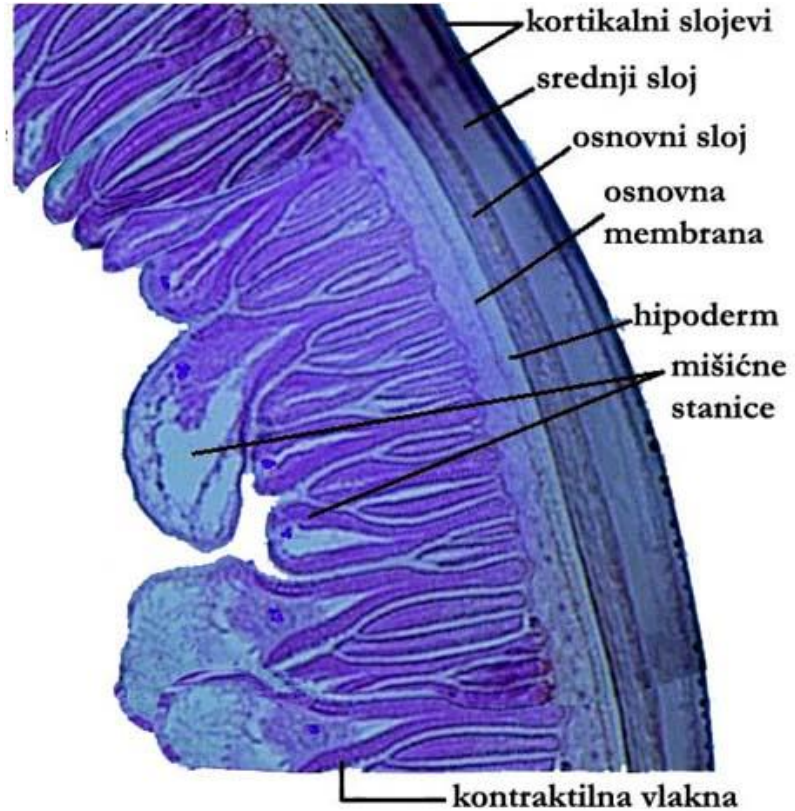
♂

- sjemenik (1)
- sjemenovod (1)
- sjemena vrećica (1)
- kopulatorne četine (2)

# Poprečni presjek kroz tijelo oblića



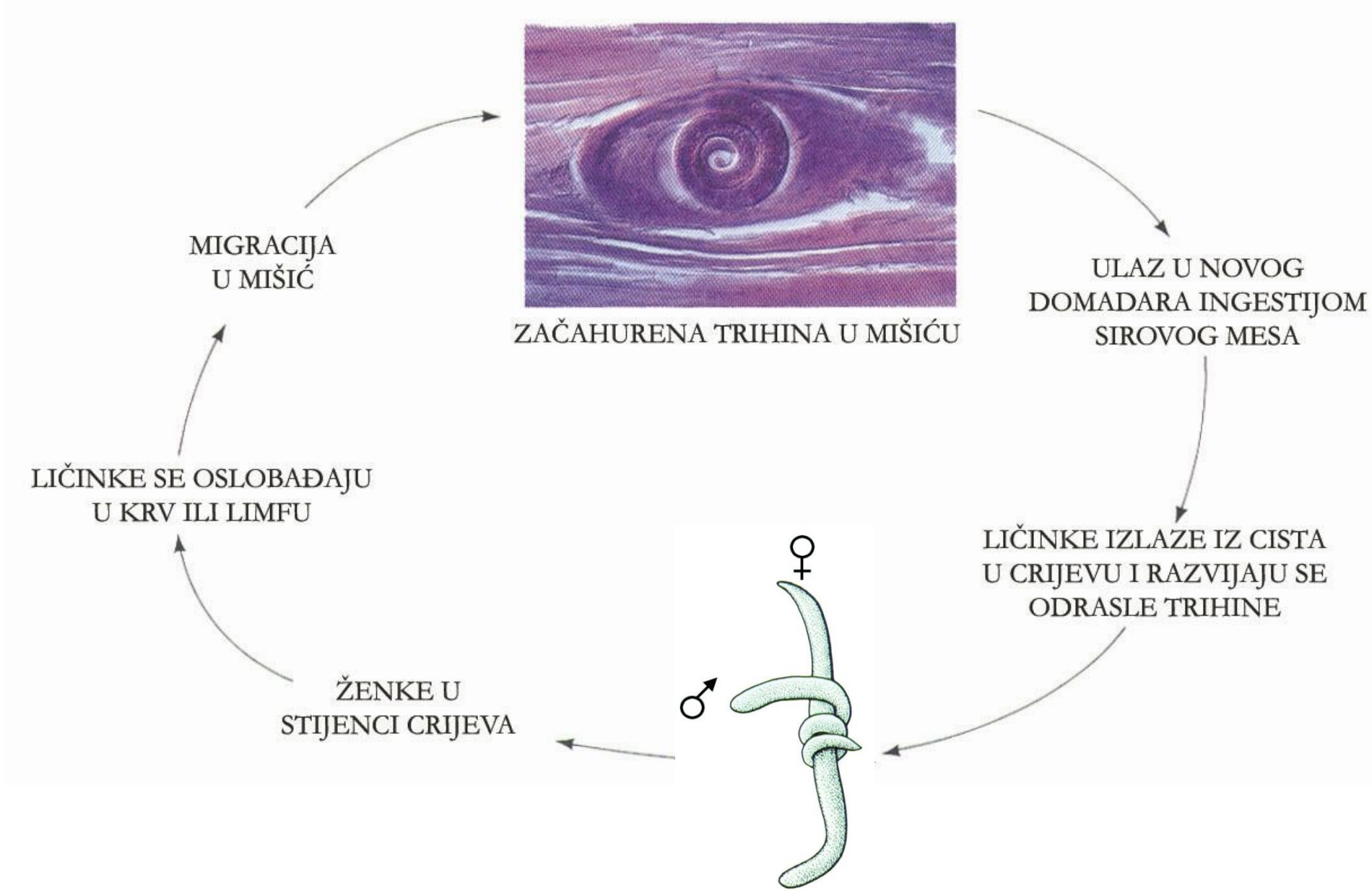



# Koljeno: Nematoda - oblići

## *Ascaris lumbricoides* (dječja glista) – poprečni presjek kroz tijelo

- **kutikula**
- **hipoderm**
- **mišićni sloj**
- **pseudocel**
- **zadebljanje hipoderma: bočno x2**
  **leđno**
  **trbušno**
- **živčane vrpce (leđna i trbušna)**
- **crijevo**
- **jajnik (2)**
- **jajovod (2)**
- **plodnica (2)**
- **jajne stanice**

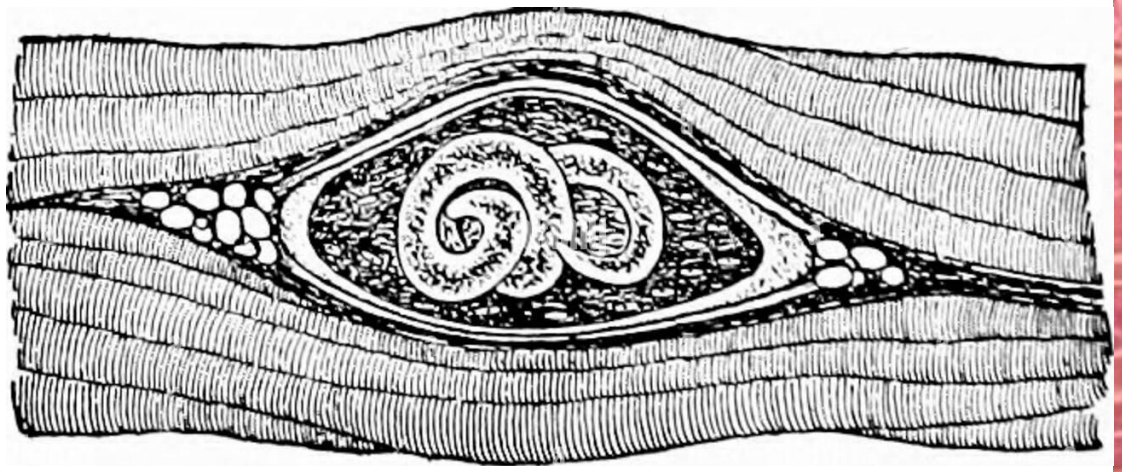
# Životni ciklus zavojite trihine (*Trichinella spiralis*)

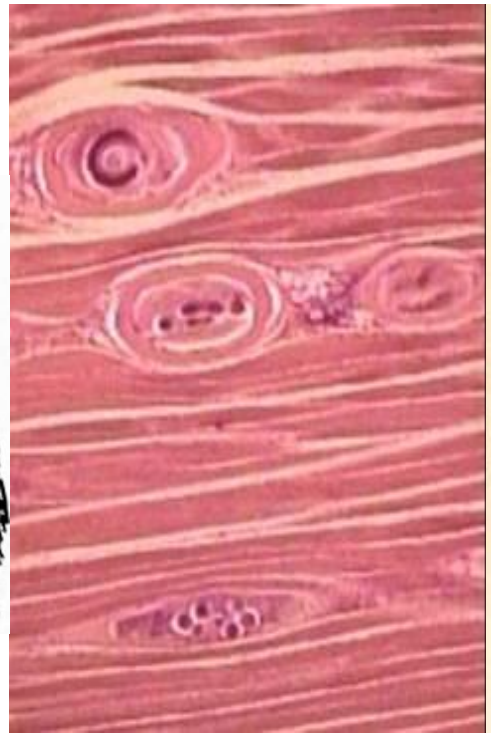


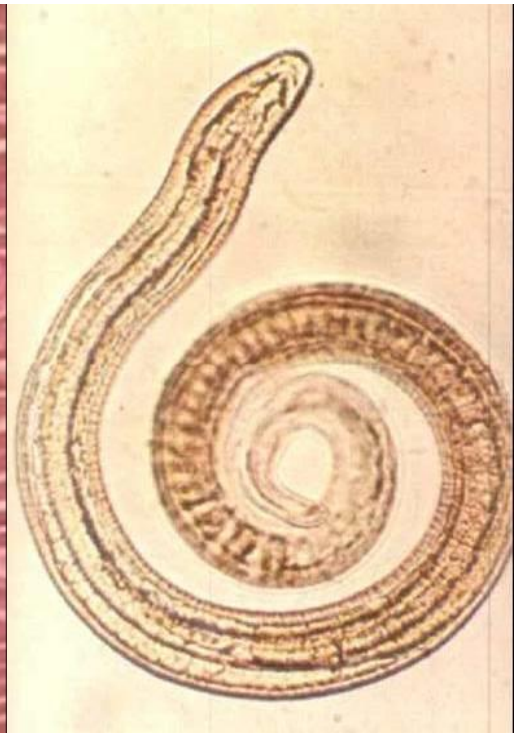
# Koljeno: Nematoda - oblići

## *Trichinella spiralis* (zavojita trihina) – začahureni mladi u mišiću

- čahura
- mlada trihina
- poprečno prugasti mišić











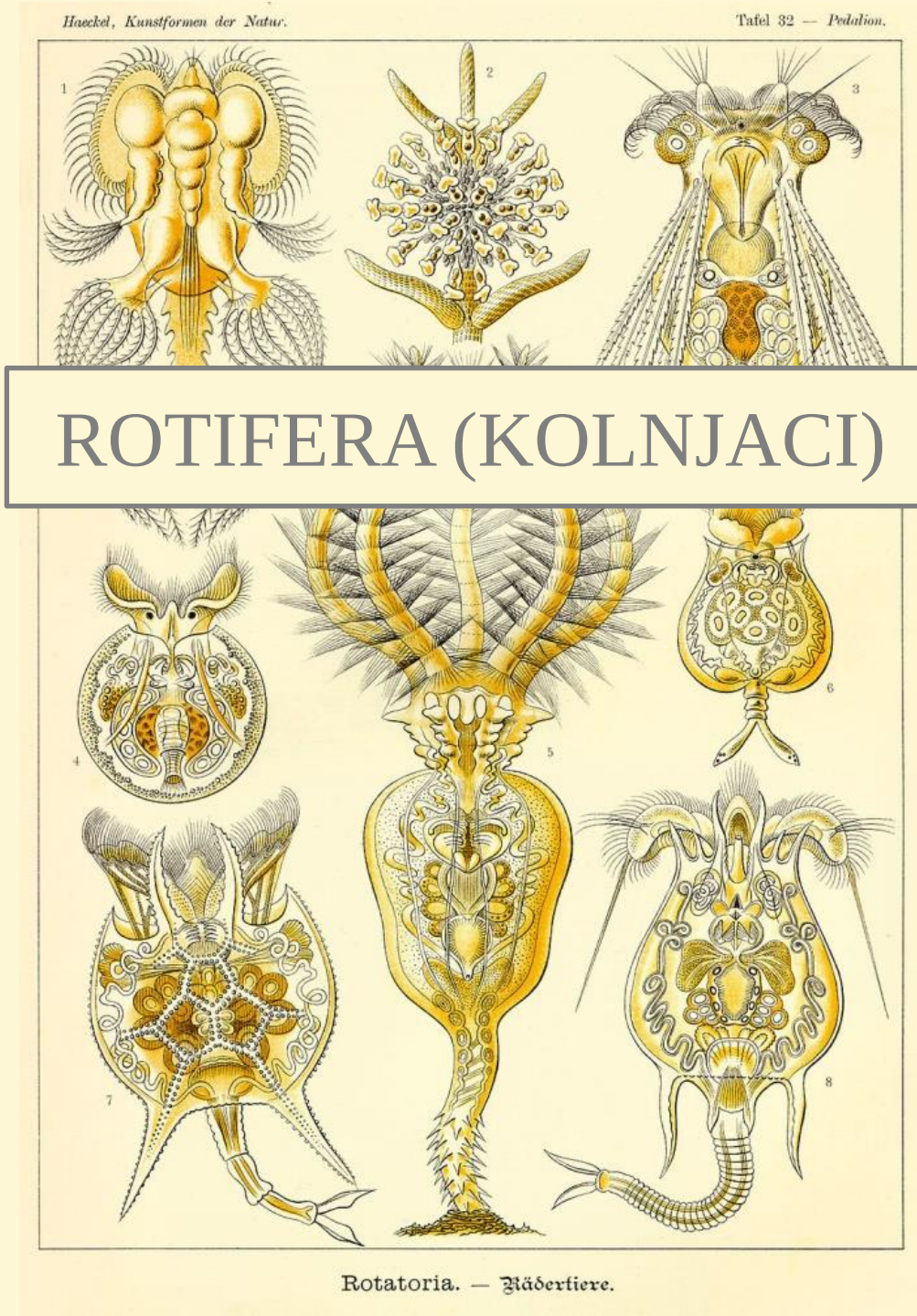


# ASCHELMINTHES (OBLENJACI)





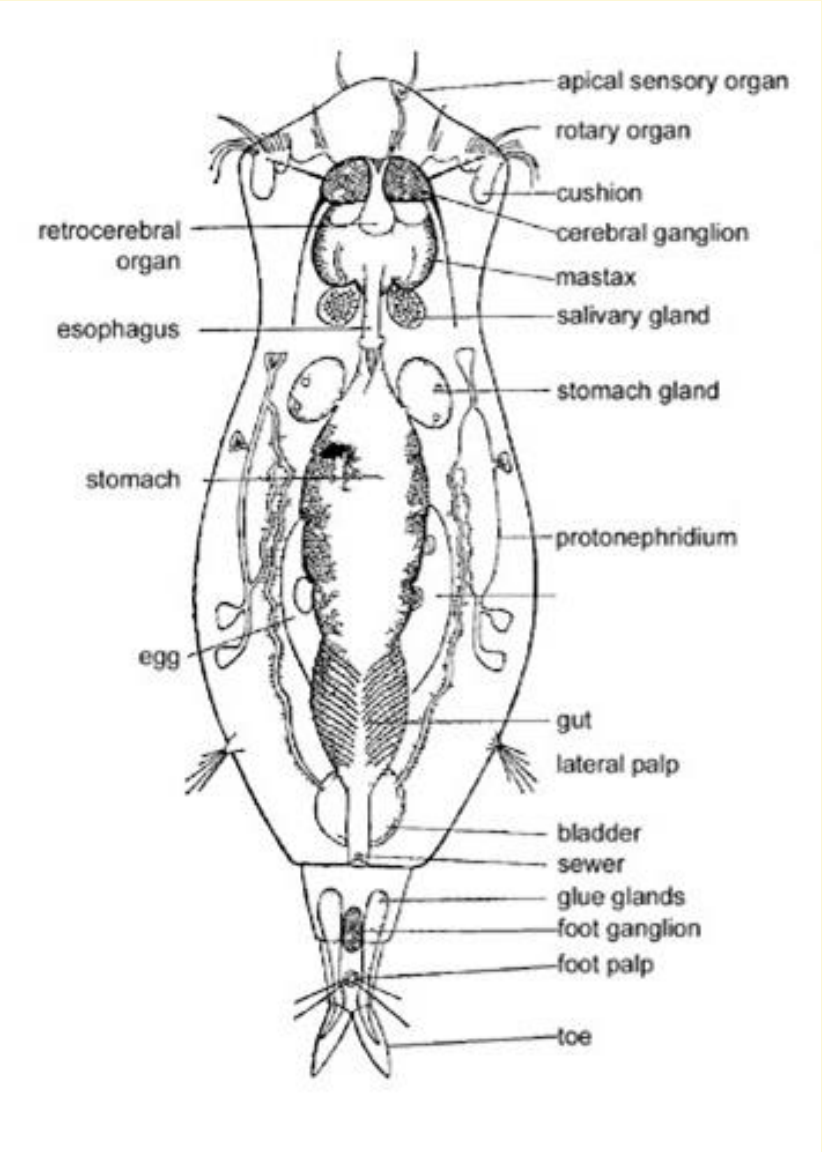





# ROTIFERA (KOLNJACI)

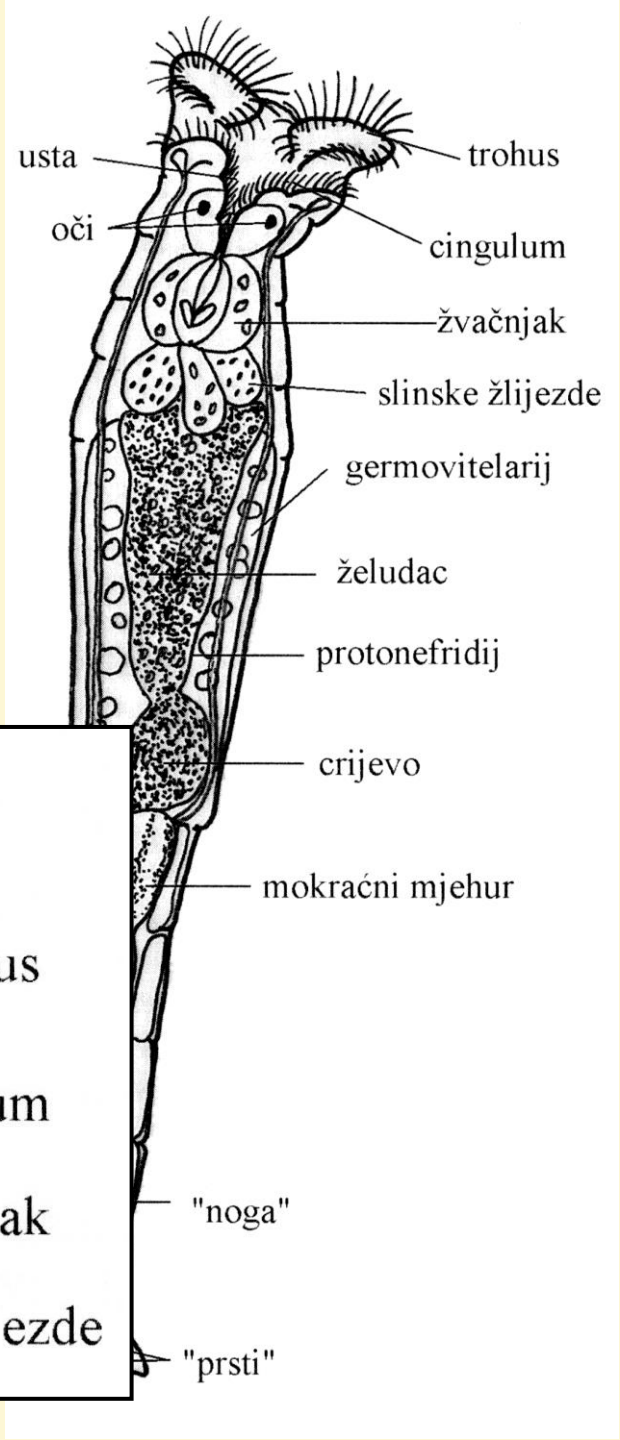
# Koljeno: Rotifera (kolnjaci)

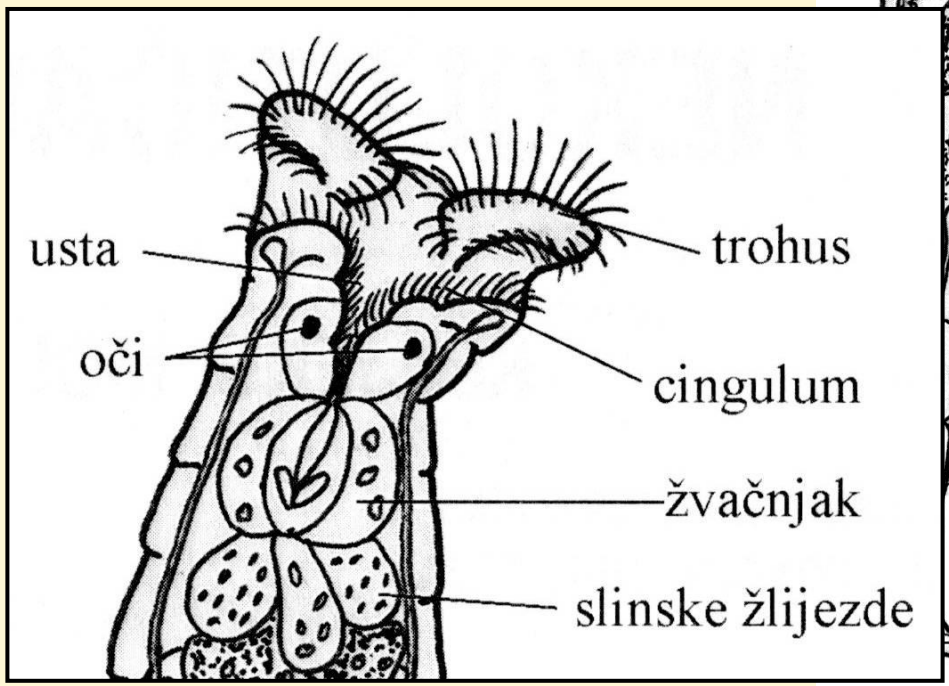
- **trepčanik** (rotatorni organ)
  - trepetljikavi prsten – okružuje usta → usno (buklano) polje
  - cirkumapikalna vrpca
  - vrh glave – apikalno polje (bez trepetljika):
    - ocele
    - ticala
    - otvor retrocerebralnih žlijezda



# Koljeno: Rotifera (kolnjaci)

- **trepčanik** (rotatorni organ)
  - razred **Bdelloidea**:
    - **bukalno** područje reducirano
    - **cirkumapikalna** vrpca razdvojena:
      - trochus (trohalni diskovi)
      - cingulum



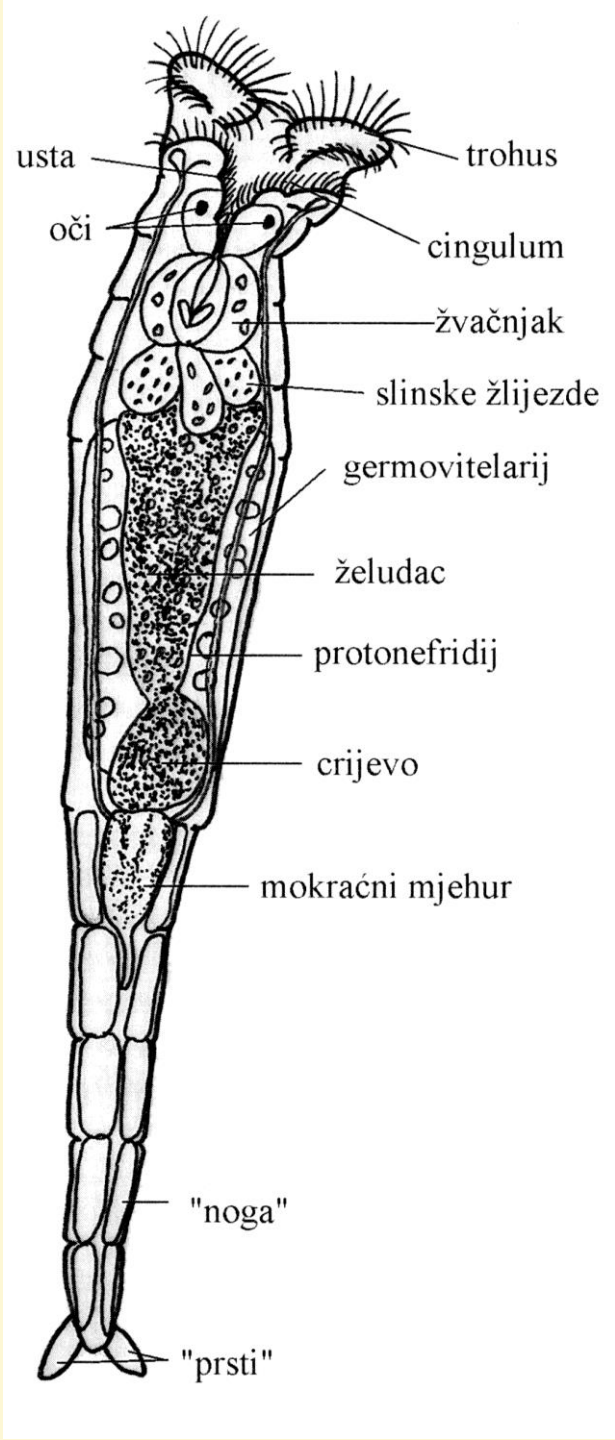
# Koljeno: Rotifera (kolnjaci)

- usta → ždrijelo – **žvačnjak/mastax**
  - sadržava kutikulizirane dijelove (trophi)
  - otvor slinskih žlijezda

→ jednjak → želudac → crijevo → nečisnica

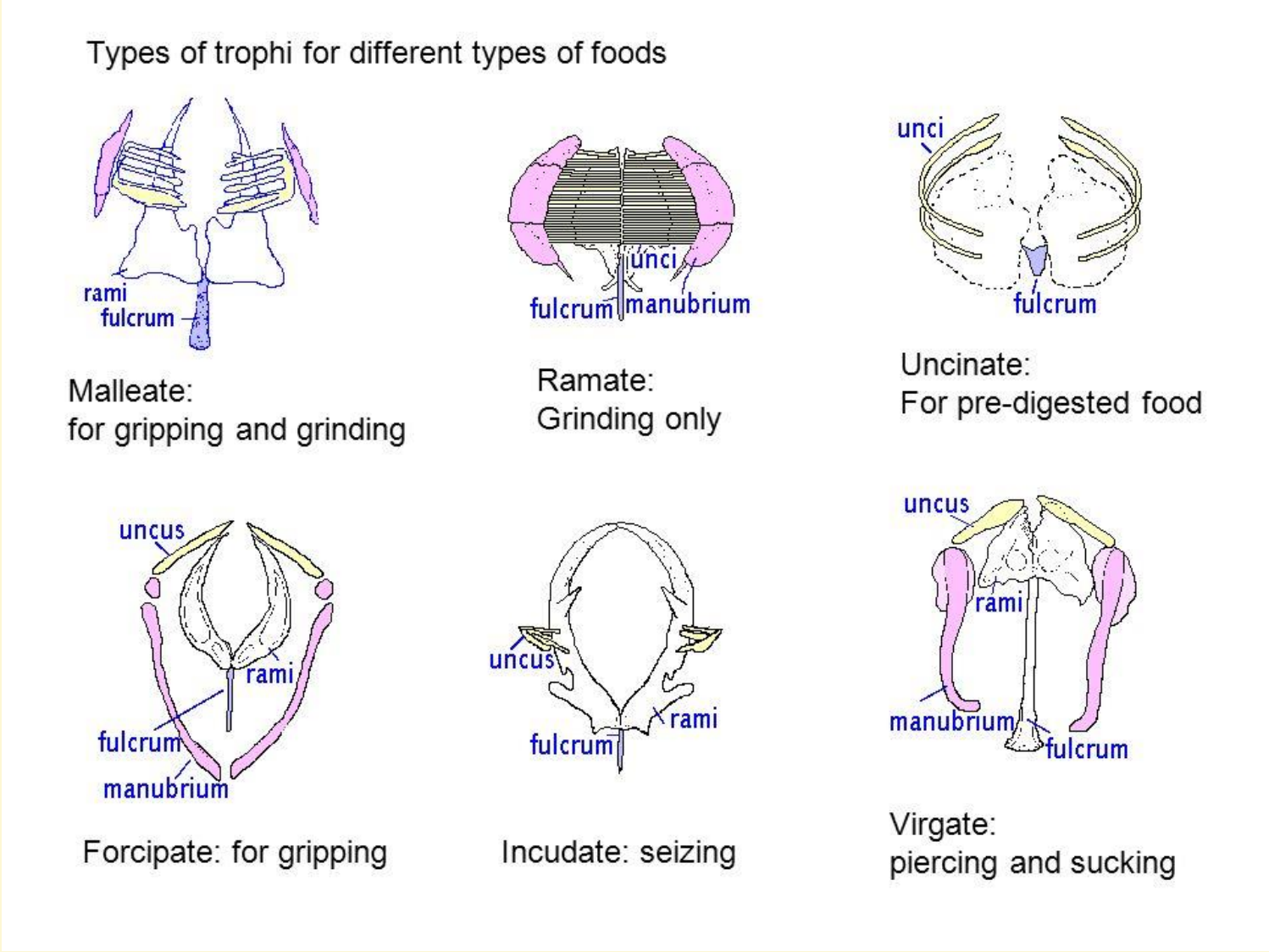
  - ekstracelularna probava





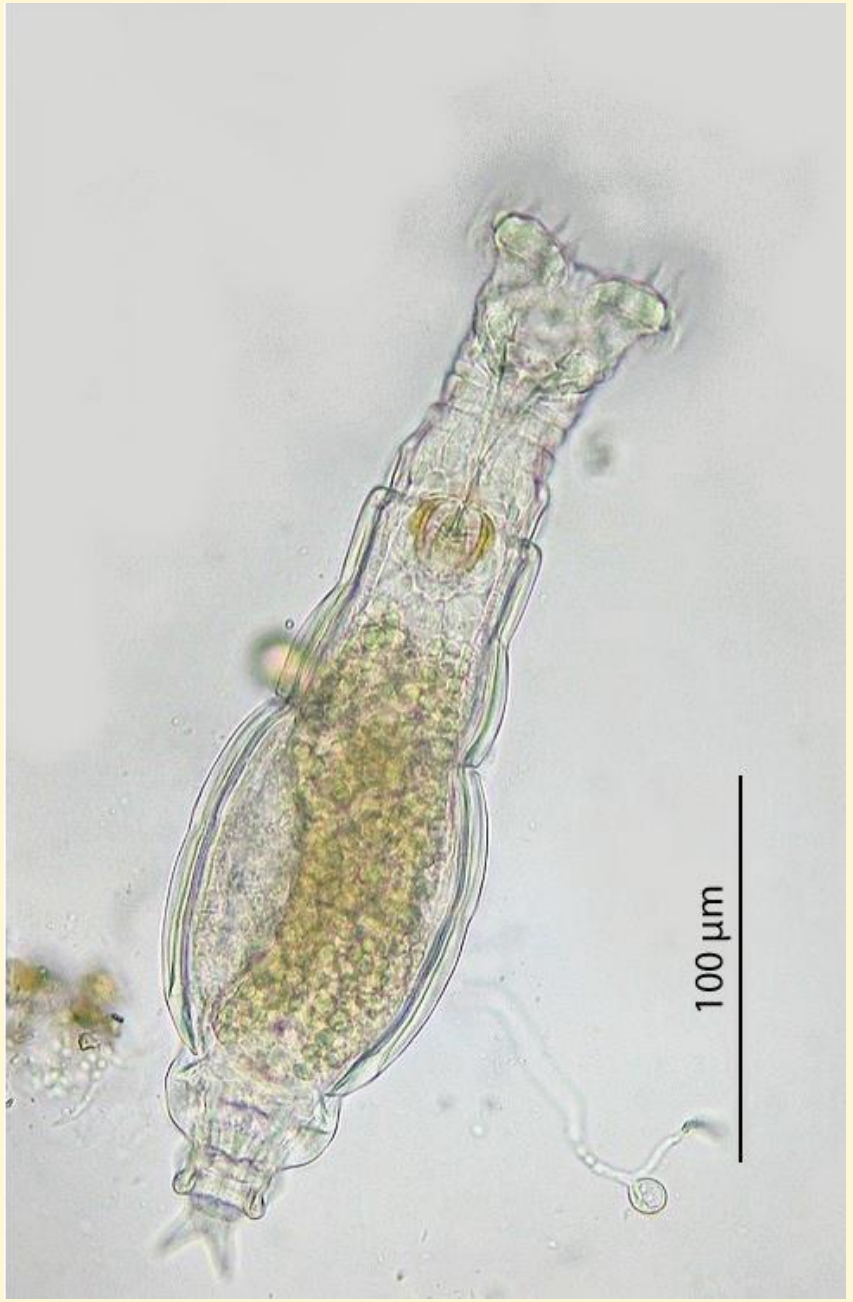
# Koljeno: Rotifera (kolnjaci)

- sakupljači
- žderači
- predatori



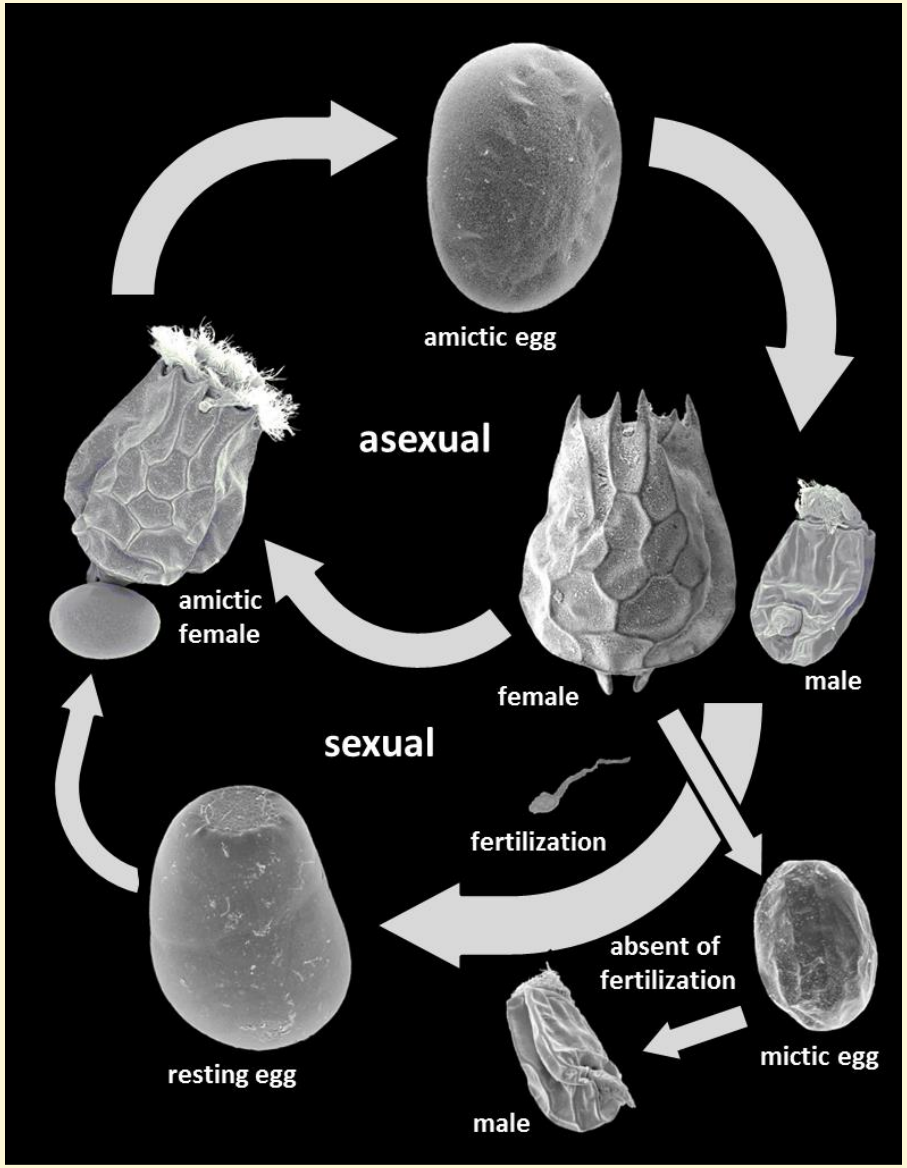
# Koljeno: Rotifera (kolnjaci)

- **pokrovni sustav:**
  - **kutikula** – prstenasto razdijeljena → prividna kolutićavost
    - zadebljala kutikula – čvrsti oklop (lorika)
  - **epiderma** – sincitijalna
    - žljezdane stanice:
      - retrocerebralni organ na glavi
      - pedalne žlijezde na nozi



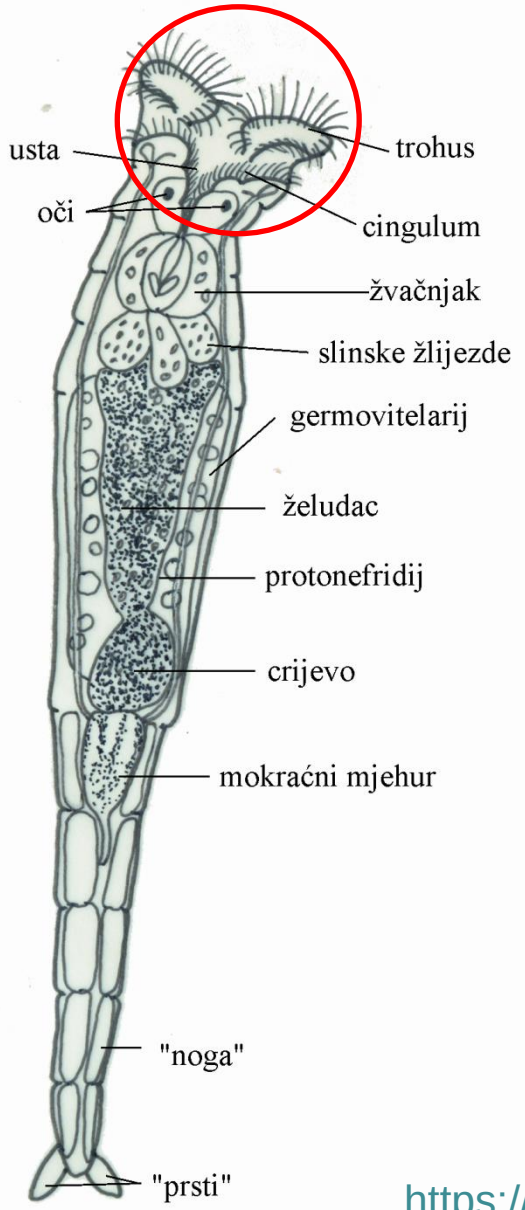
# Koljeno: Rotifera (kolnjaci)

- **razmnožavanje:**
  - odvojena spola
  - heterogonija:
    - **partenogeneza:**
      - **amiktičke** ženke: proizvodnja diploidnih amiktičkih jaja → amiktičke ženke
    - **spolno razmnožavanje:**
      - **miktičke** ženke: proizvodnja haploidnih jaja – mužjaci → oplodnja → diploidna jaja



# Vanjska i unutrašnja građa kolnjaka *Rotaria* sp.








https://www.youtube.com/watch?v=gM2I-gvHscw&t=556s

**Koljeno: ROTIFERA (ROTATORIA) – kolnjaci**
**Razred: BDELLOIDEA**

***Rotaria* sp. – vanjski izgled i unutrašnja građa**

- **GLAVA**
- **TRUP**
- **“NOGA” S “PRSTIMA”**
- **KUTIKULA**
- **TREPČANIK (2 trohalna vijenca)**
- **ŽVAČNJAK (trophi)**
- **CRIJEVO**
- **LEĐNO OSJETILO**



**Koljeno: ROTIFERA (ROTATORIA) – kolnjaci**
**Razred: MONOGONONTA**
**<u>građa lorike</u>**



***Synchaeta*** sp.
***Polyarthra*** sp.
***Keratella cochlearis***
***Keratella quadrata***
***Gastropus stylifer***
***Colurella*** sp.
***Trichocera*** sp.



*Keratella cochlearis*

*Keratella quadrata*





*Synchaeta* sp.

*Polyarthra* sp.





*Asplanchna priodonta*



*Gastropus stylifer*



*Trichocerca longirostris*