

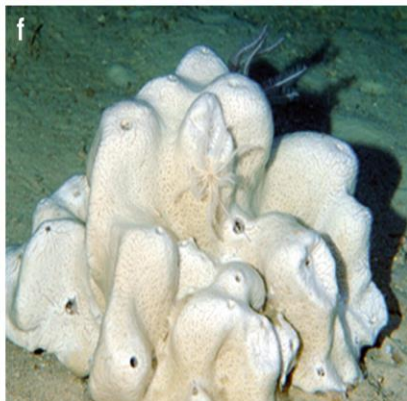
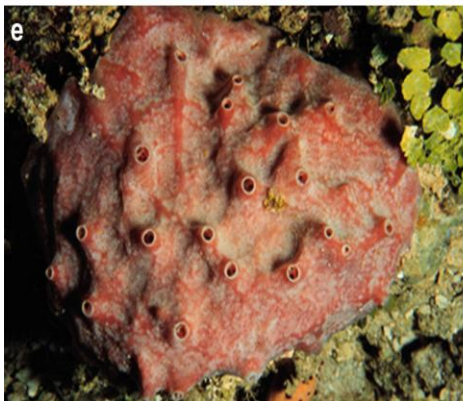
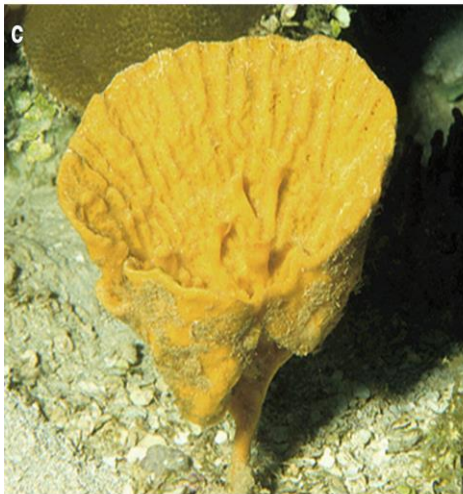


PORIFERA - SPUŽVE



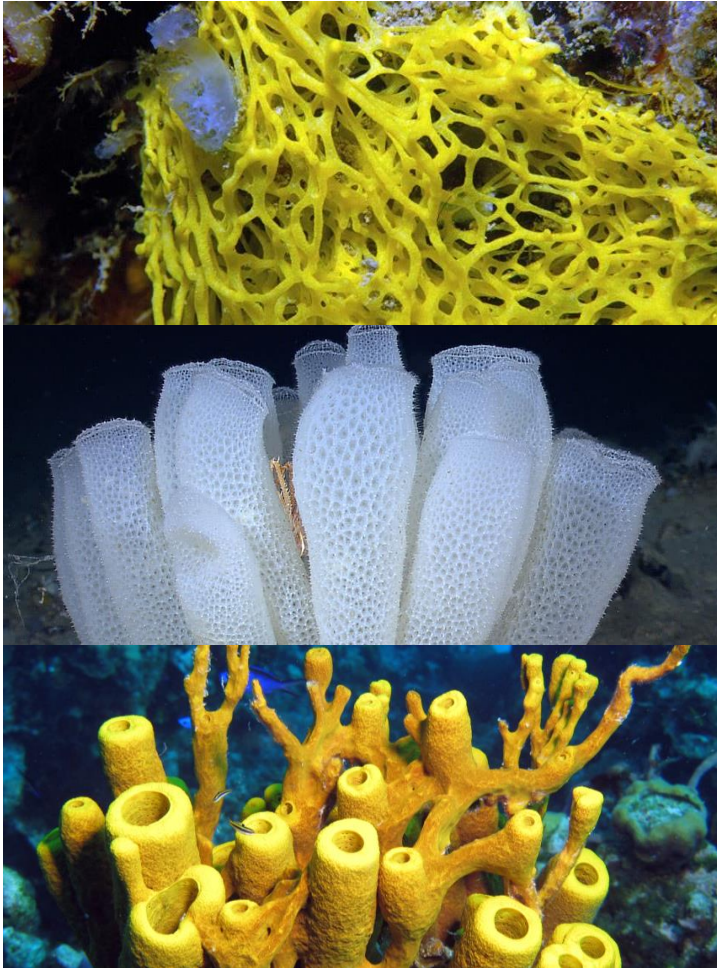
Parazoa

- najjednostavniji mnogostanični organizmi carstva Metazoa
- funkcionalni ustroj na mnogostaničoj razini, ali **bez stvaranja pravih tkiva**
 - stanice pokazuju velik stupanj nezavisnosti



Koljeno: Porifera

- podjela prema građi skeleta:
 - **razred:**
Calcarea/Calcispongia
(vapnenjače)
 - spikule od kalcijevog karbonata
 - **razred:** Hexactinellida
(staklače)
 - silicijev dioksid
 - **razred:** Demospongia
(kremenorožnjače)
 - silicijev dioksid +
sponginozne niti/samo
sponginozne niti



CARSTVO: ANIMALIA

koljeno: Porifera (spužve)

- razred: Demospongia
(kremenorožnjače)

» red: Keratosa

» *Spongia officinalis*

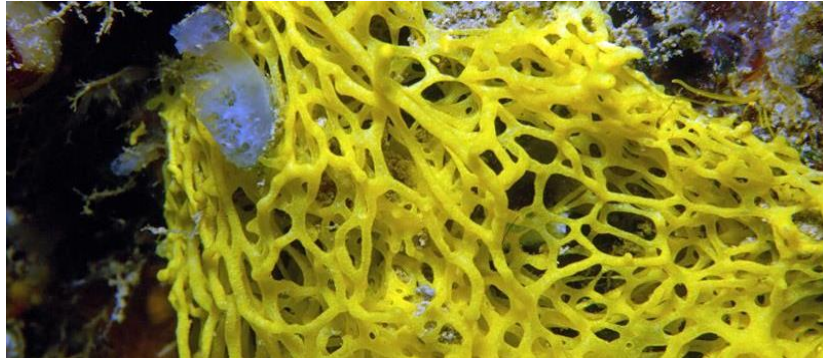
» red: Tetractinellida

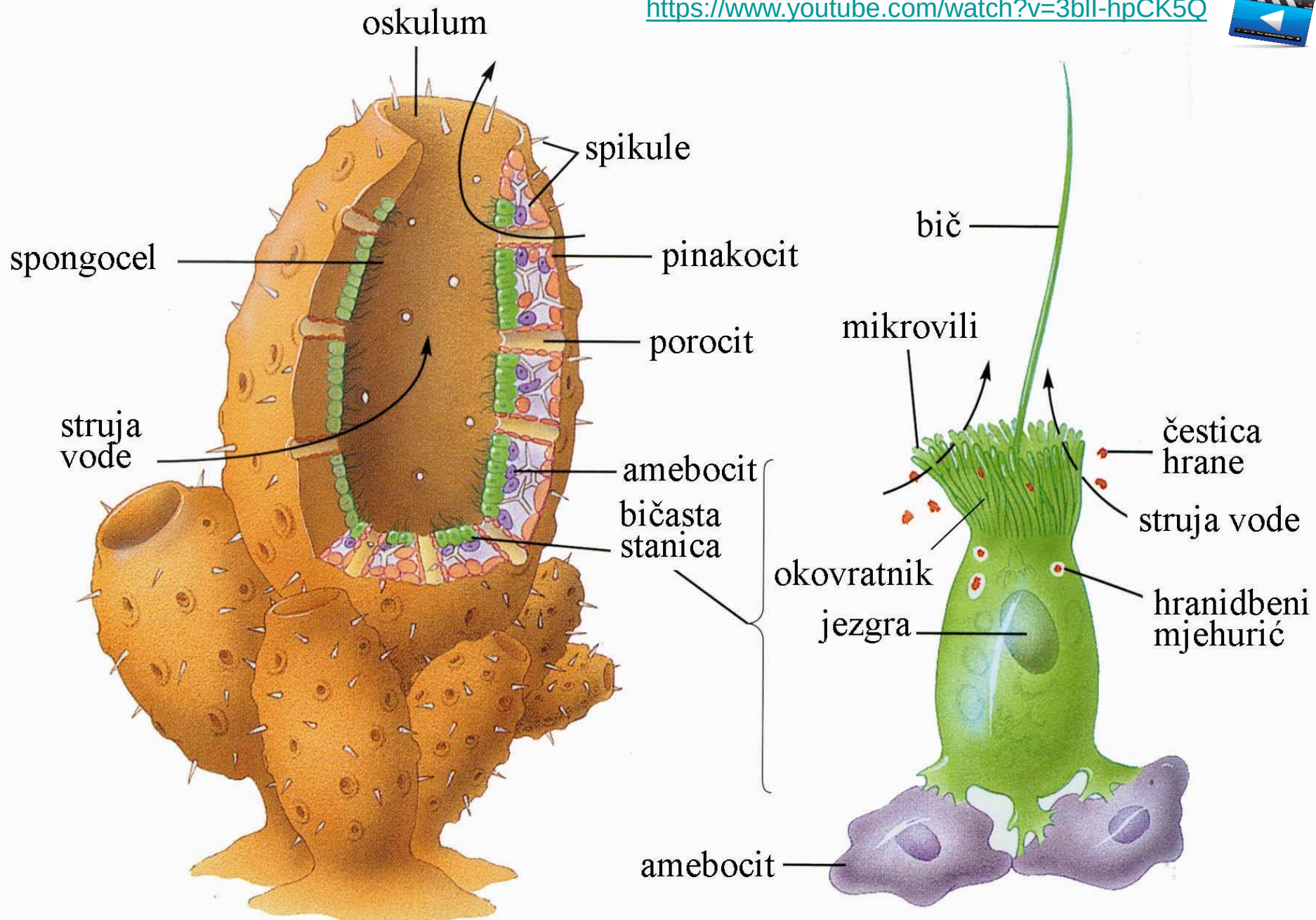
» *Geodia cydonium*

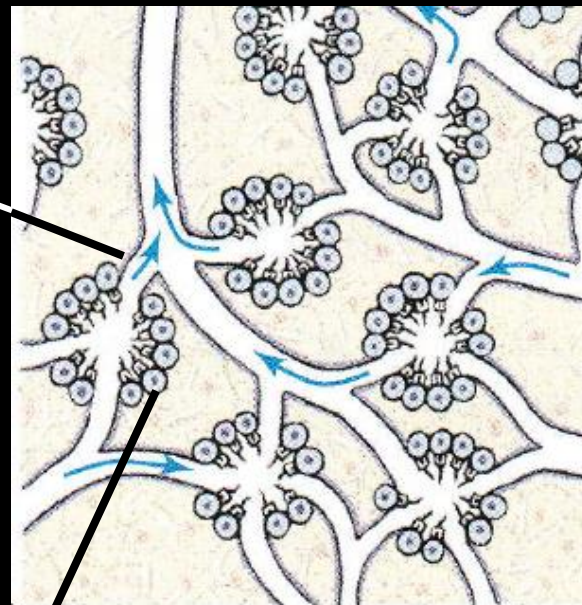
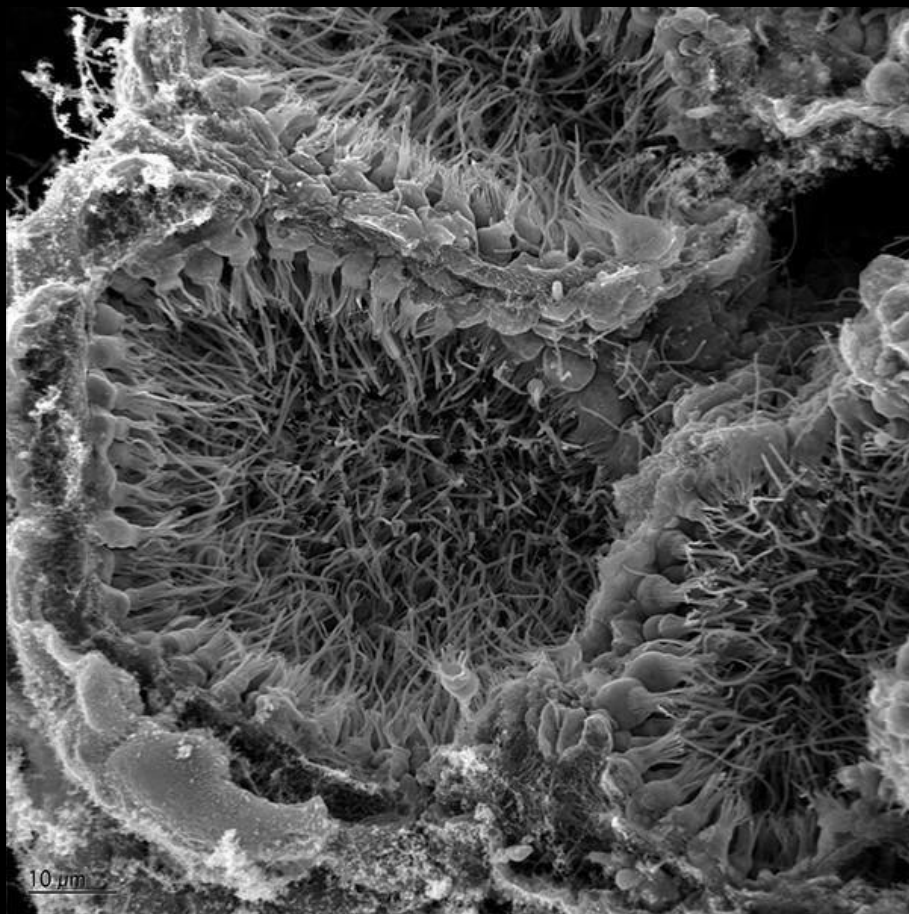
» red: Haplosclerina

» *Spongilla lacustris*

» *Ephydatia
fluviatilis*







Hoanociti na elektronskom mikroskopu

Razred:

DEMOSPONGIA



Cliona viridis



Axinella canabina



Geodia cydonium



Suberites domuncula



Aplysina aerophoba

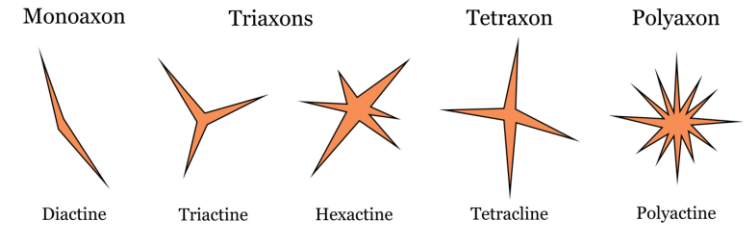


Tethya aurantium

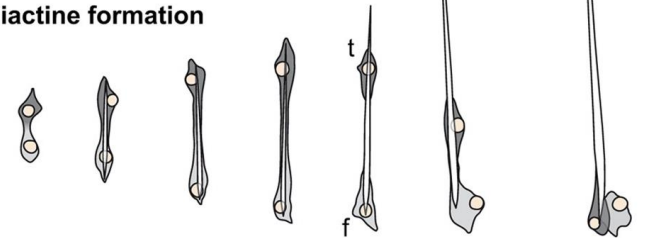
Porifera

Skelet

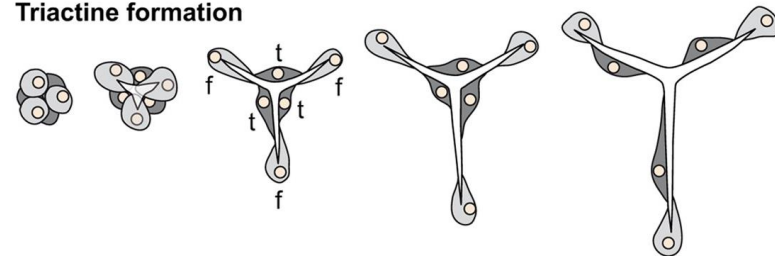
- Mezohil → amebociti: skleroblasti
 - **kalkoblasti** – spikule od kalcijevog karbonata
 - **silikoblasti** – spikule od silicijevog dioksida
 - mikrosklere/makrosklere
 - monaksone/triaksone/tetraksone/poliaksone
 - astere
 - geode
- + **spongoblasti** – sponginozne niti



Diactine formation

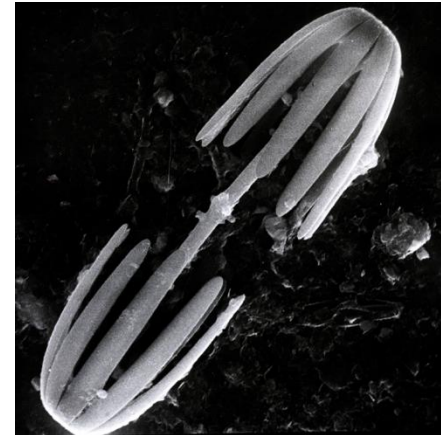
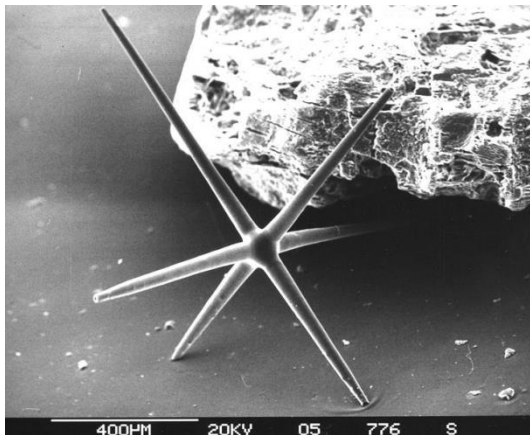
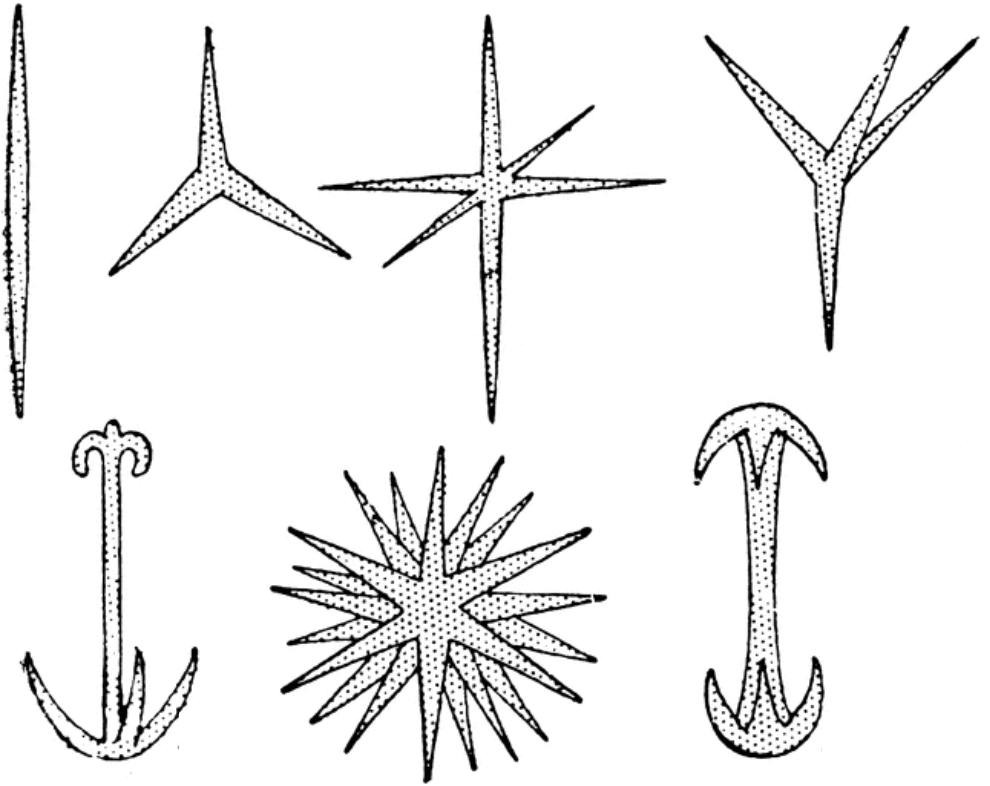


Triactine formation





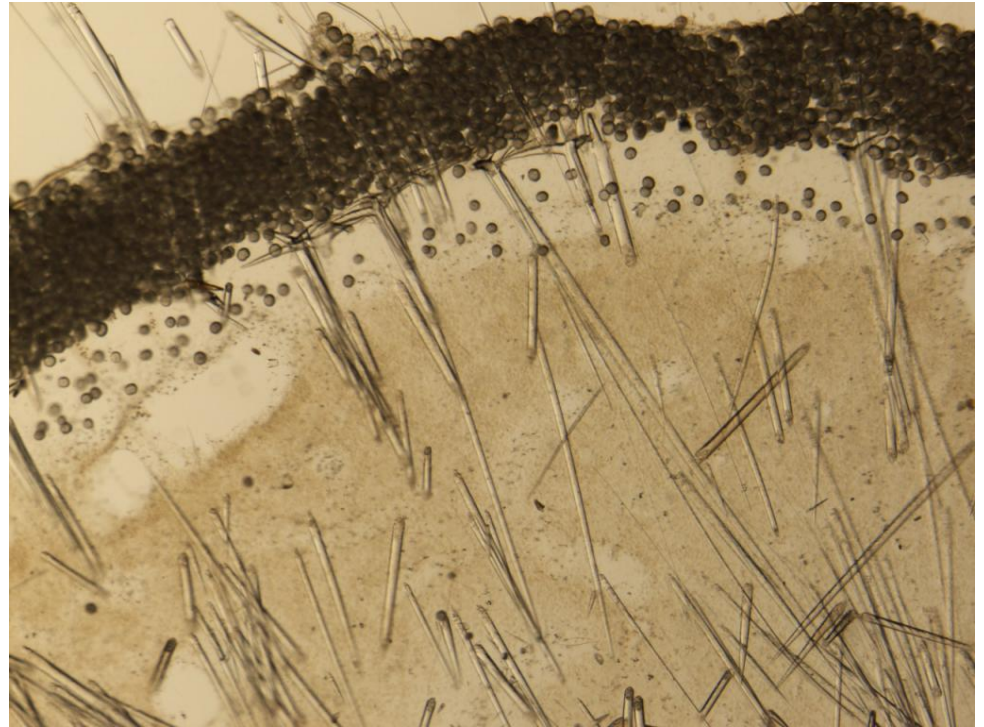
https://www.youtube.com/watch?v=QpdQehGdsvg&t=3s&ab_channel=samsellers99

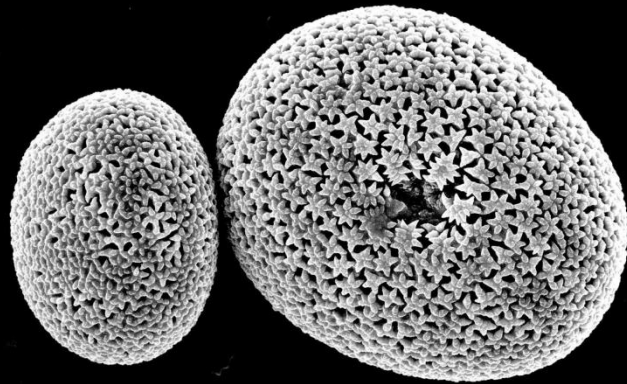


Razred: Demospongia

Red: Tetractinellida

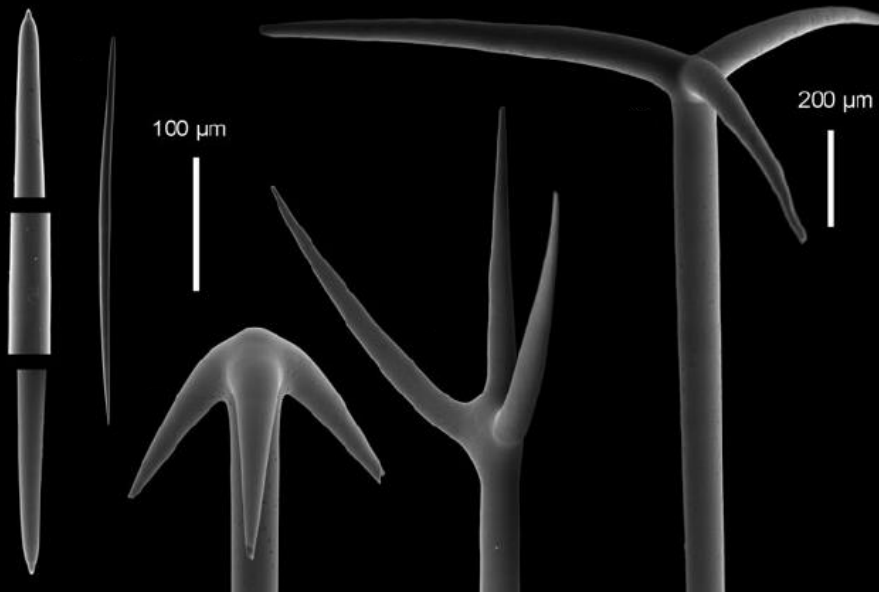
- *Geodia cydonium*
 - **skelet** – spikule od silicijeva dioksida
 - geode i astere
 - monaksone i tetraksone





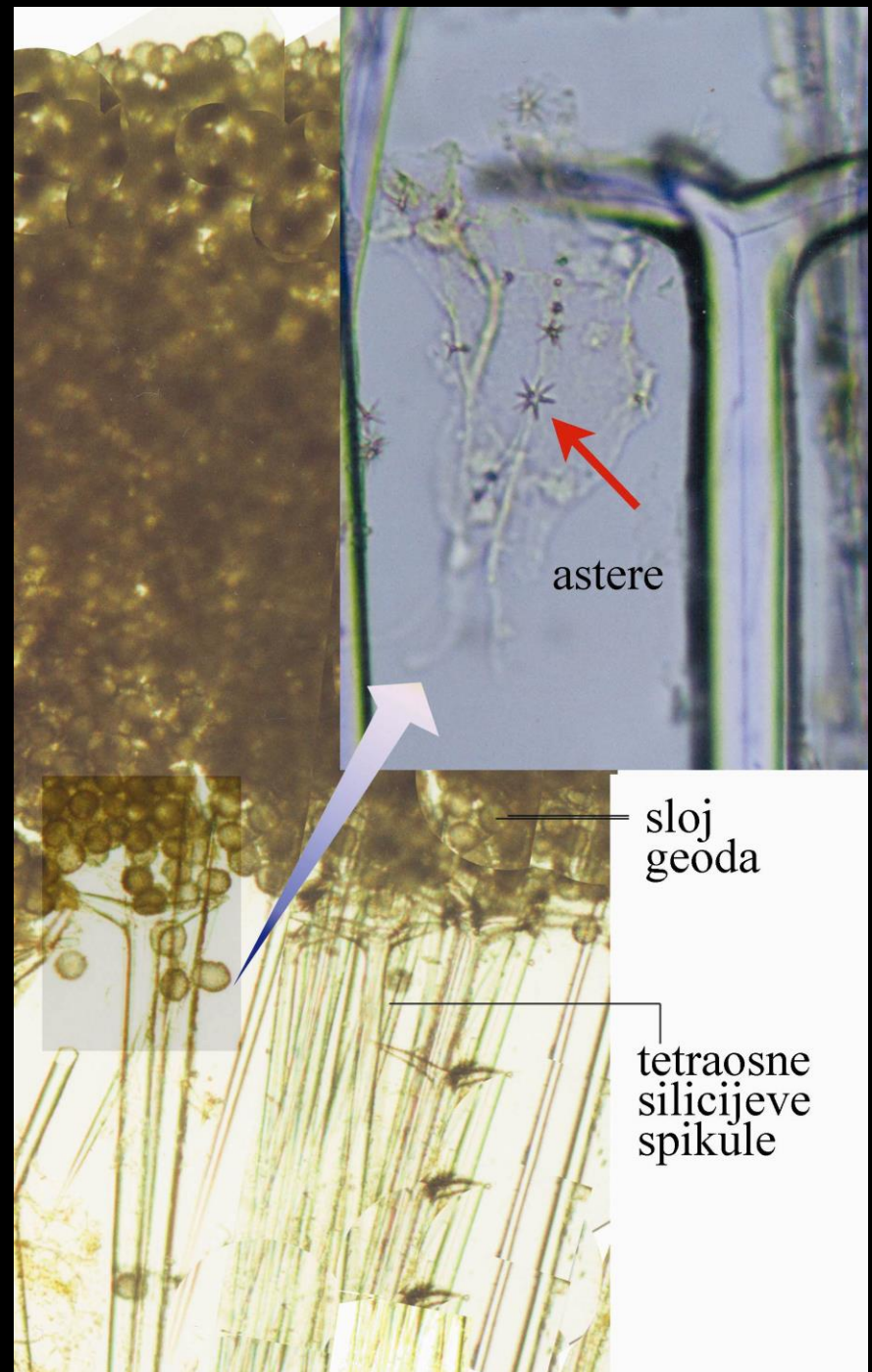
© IEO

20 μm



100 μm

200 μm



astere

sloj
geoda

tetraosne
silicijeve
spikule

Koljeno: PORIFERA - spužve

Razred: DEMOSPONGIA - kremenorožnjače

***Geodia cydonium* – kremenjača**

***Geodia cydonium* - dio skeleta**

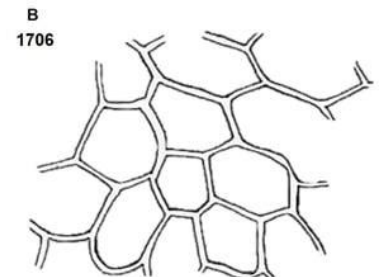
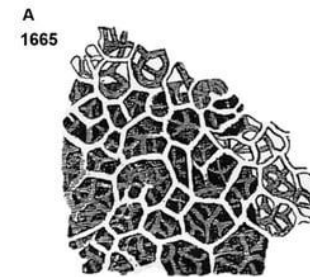
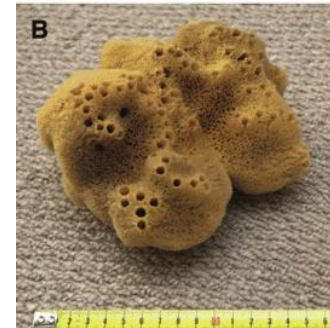
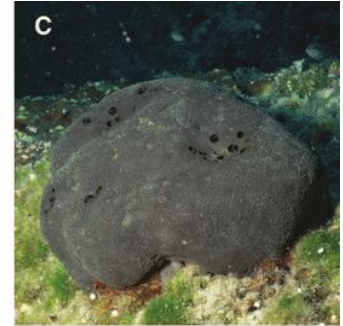
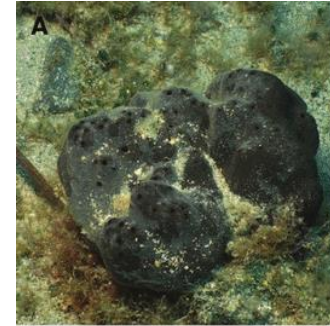
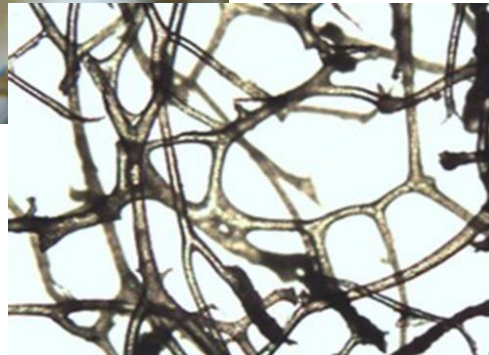
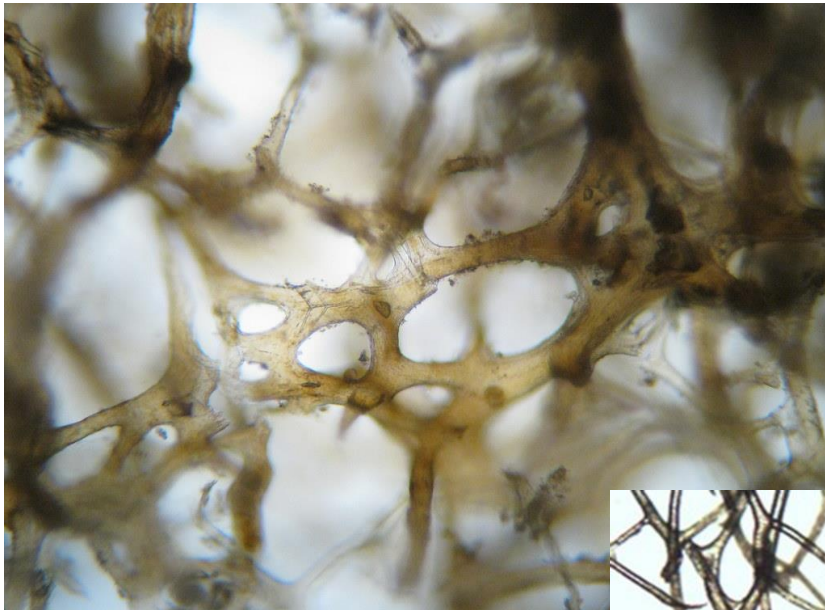


- GEODE (STERASTERI) (mikrosklere) ➡ KORTEKS
- TETRAKSONA IGLICA (= T. SPIKULA) (megasklera)
- MONAKSONA IGLICA (= M. SPIKULA) (megasklera)
- ASTER - POLIAKSONA IGLICA (= P. SPIKULA)
(mikrosklera)

Razred: Demospongia

Red: Keratosa

- *Spongia officinalis*
 - **skelet** – sponginozne niti



Koljeno: PORIFERA - spužve

Razred: DEMOSPONGIA - kremenorožnjače

***Spongia officinalis* – obična spužva**

- SPONGIN



Porifera

Razmnožavanje

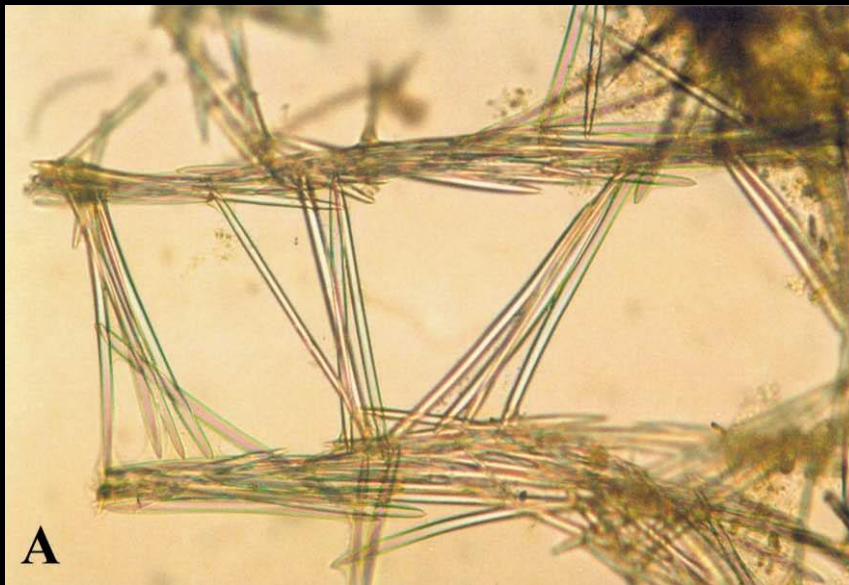
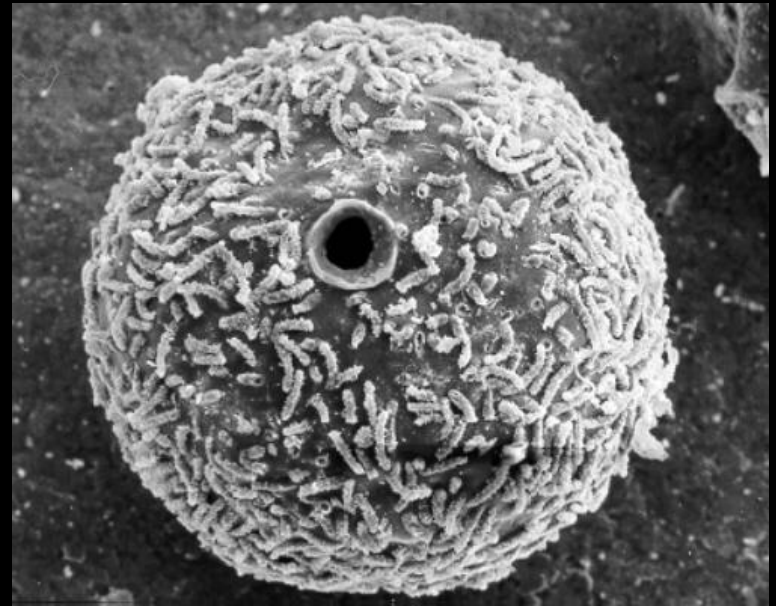
- **nespolno**
 - unutarnje pupanje → **GEMULE**
 - redukcijska tijela – nepovoljni uvjeti
- **spolno** – većinom hermafroditi
 - oviparne vrste – oplodnja u okolnoj vodi → razvoj planktonske ličinke
 - viviparne vrste – spermiji ulaze u akviferni sustav → razvoj do ličinačkog stadija nakon čega napuštaju spužvu
 - **amfiblastula/parenhimula**



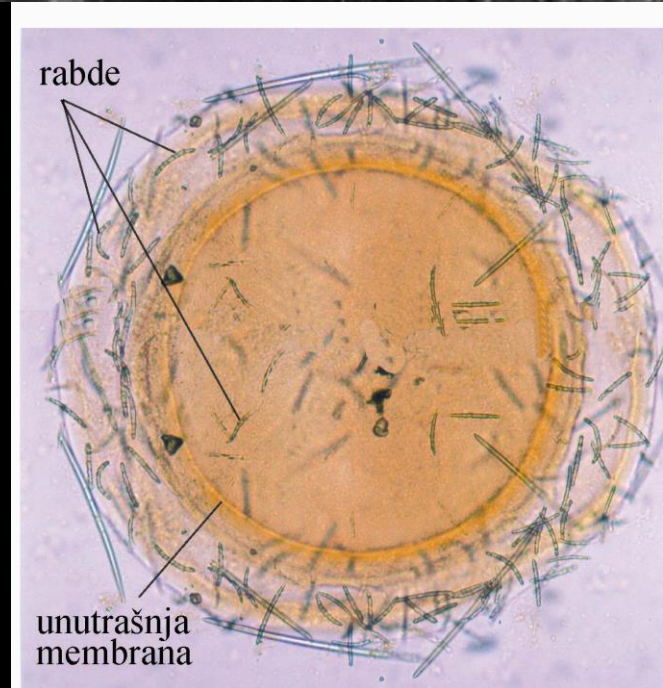
SLATKOVODNE SPUŽVE



Spongilla lacustris



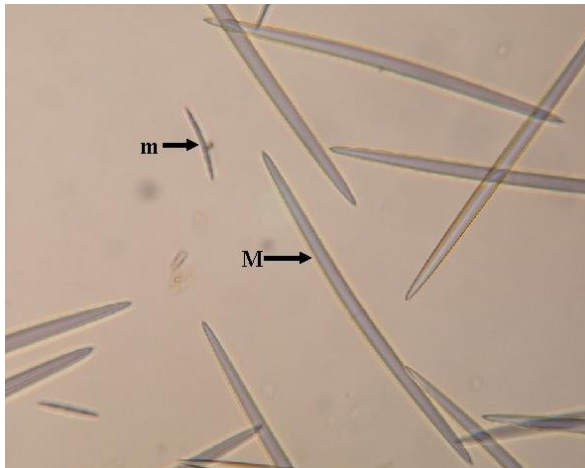
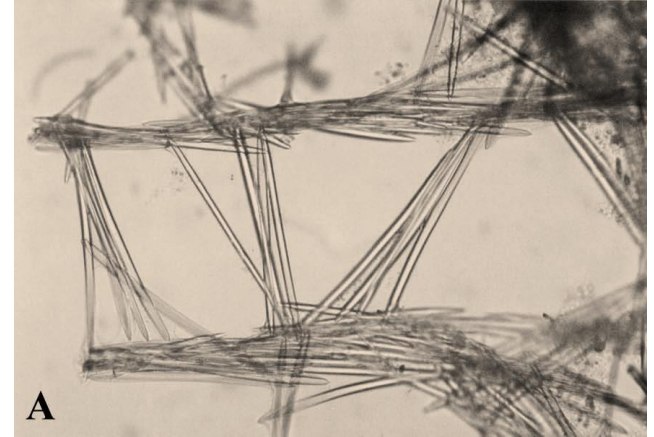
A



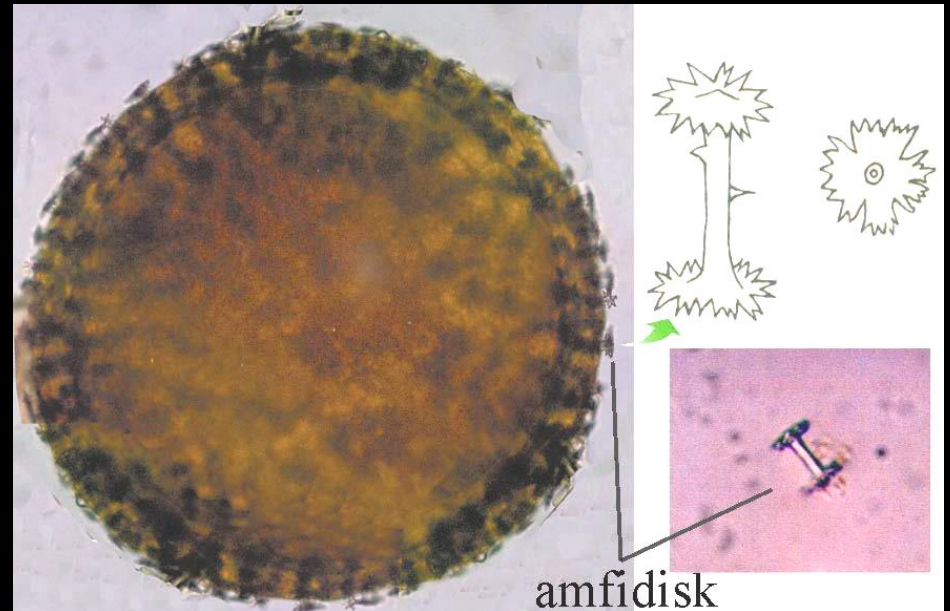
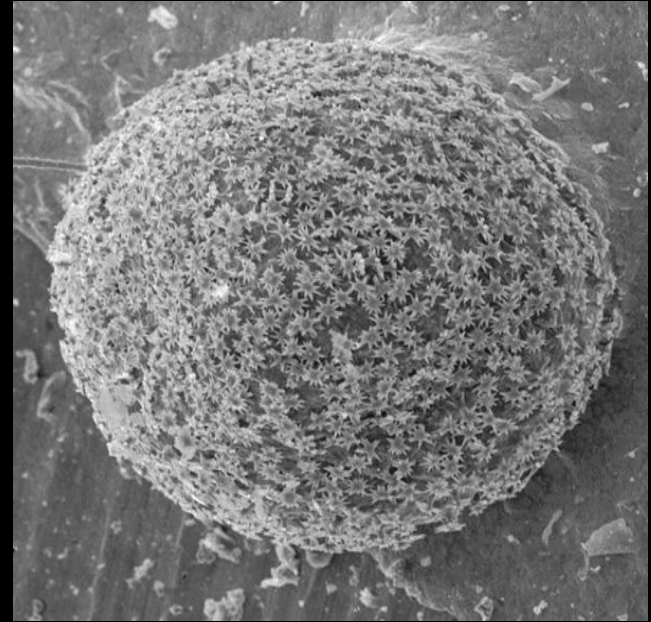
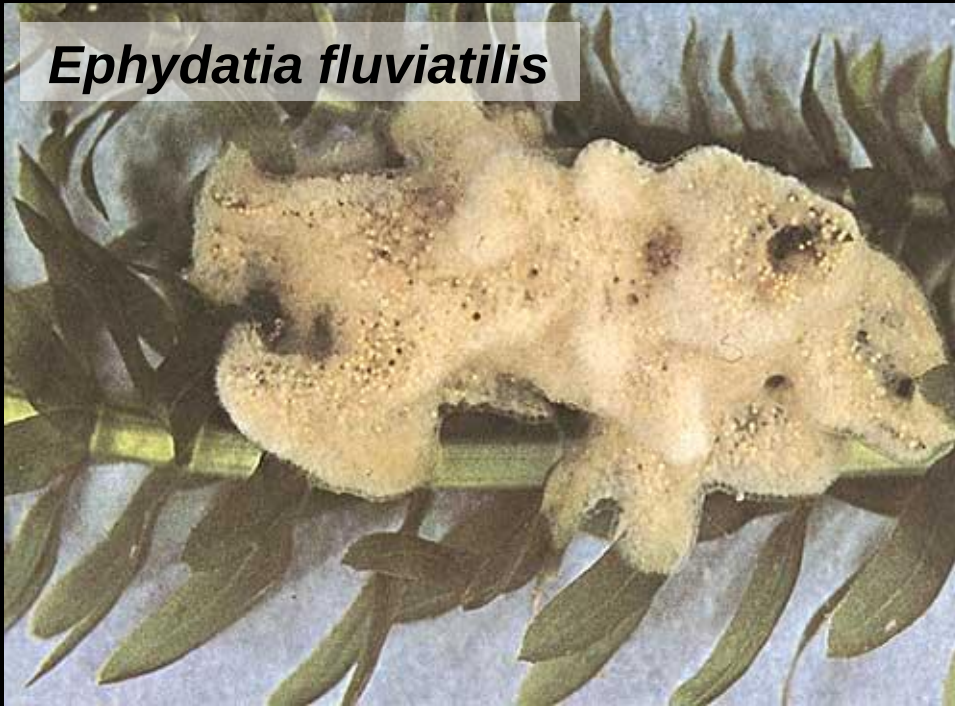
Razred: Demospongia

Red: Haplosclerina

- *Spongilla lacustris*
 - **skelet** – spikule od silicijevog dioksida + sponginozne niti
 - **monaksone:**
 - makrosklere: okomite i uzdužne
 - mikrosklere



Ephydatia fluviatilis

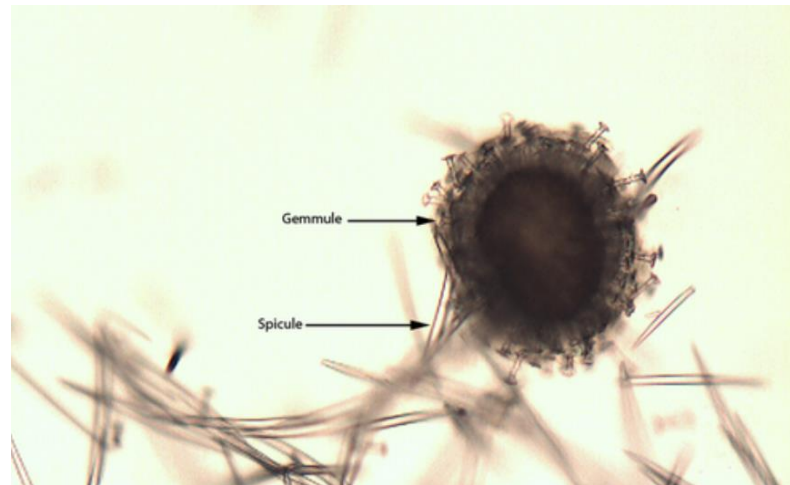
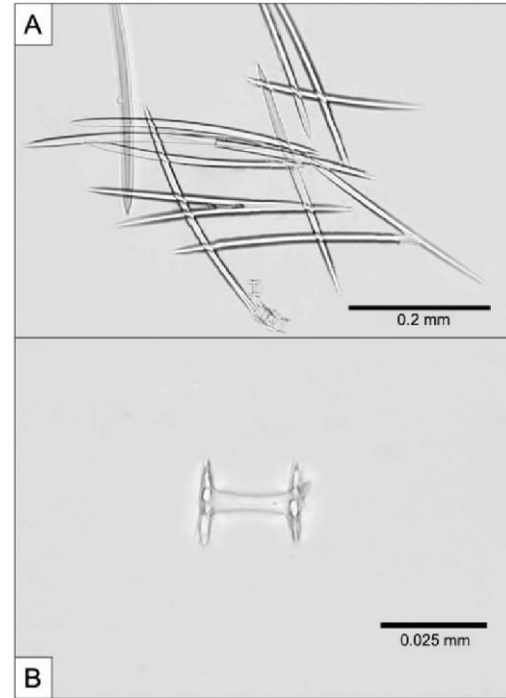


amfidisk

Razred: Demospongia

Red: Haplosclerina

- *Ephydatia fluviatilis*
 - skelet
 - monaksone spikule od silicijevog dioksida + sponginozne niti
 - gemule
 - rabde – amfidisk



Koljeno: PORIFERA - spužve

Razred: DEMOSPONGIA – kremenorožnjače

Spongilla lacustris

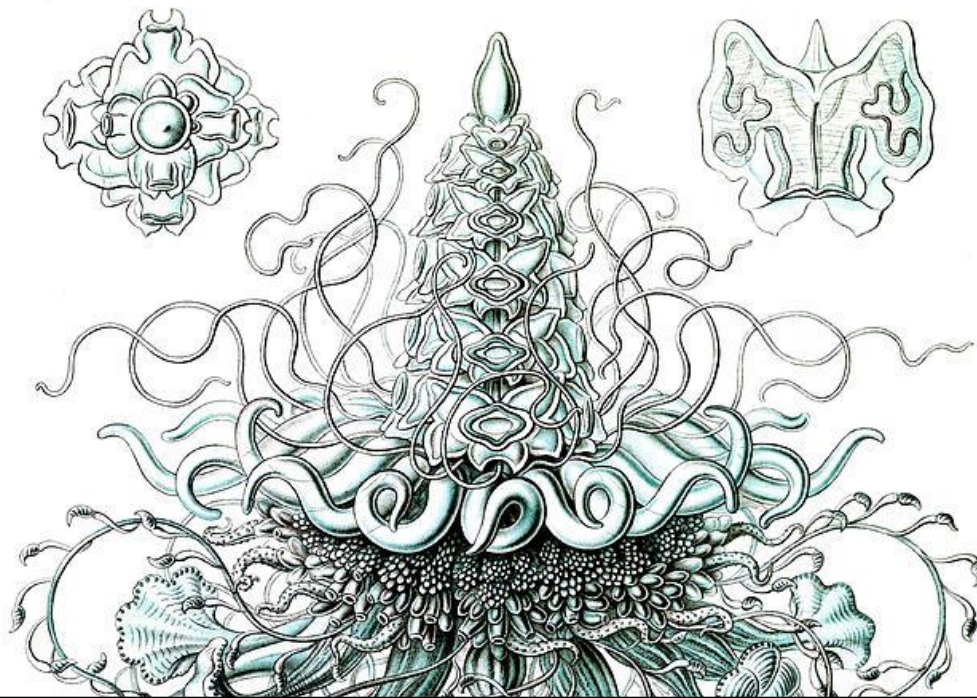
Spongilla lacustris - dio skeleta i gemula

- POPREČNE MONAKSONE IGLICE
- UZDUŽNE MONAKSONE IGLICE
- SPONGIN
- **GEMULA**: MIKROPILA
- MIKROSKLERE - RABDI

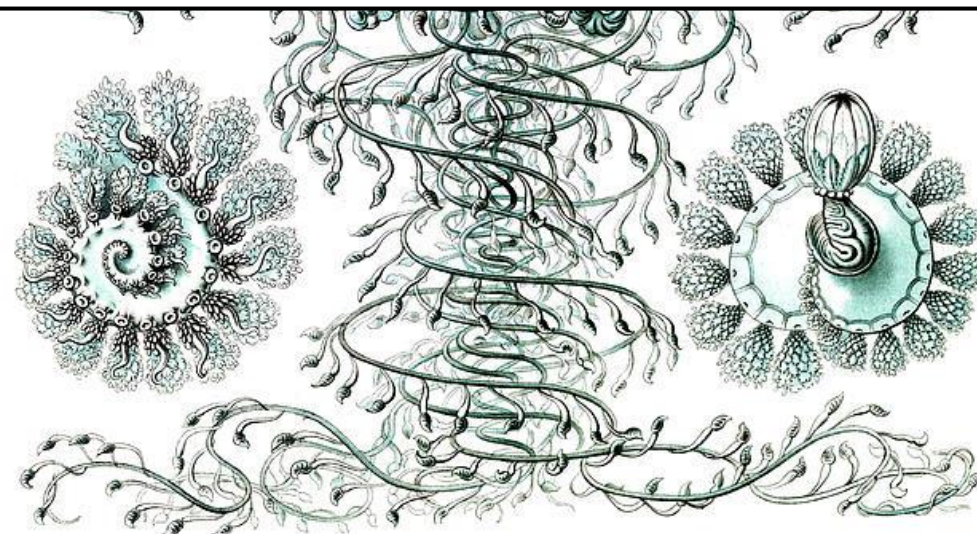
Ephydatia fluviatilis

Ephydatia fluviatilis - dio skeleta i gemula

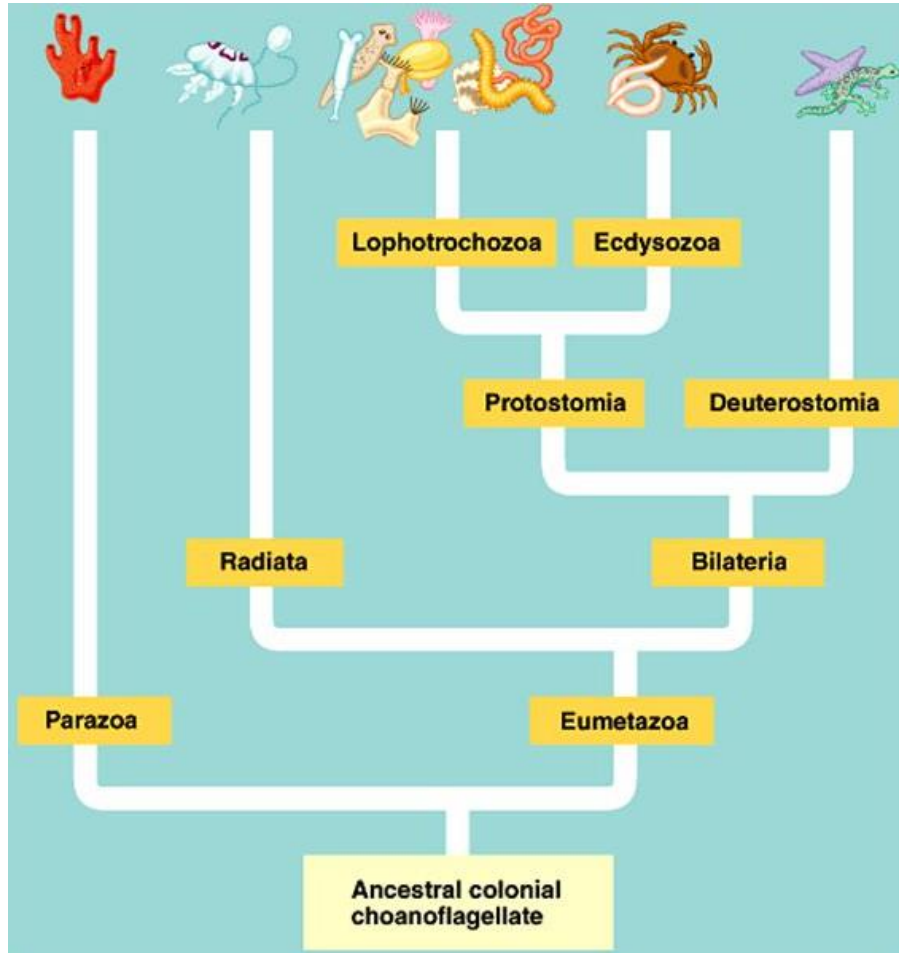
- MONAKSONE IGLICE
- **GEMULA**: MIKROPILA
- MIKROSKLERE - AMFIDISKОВI



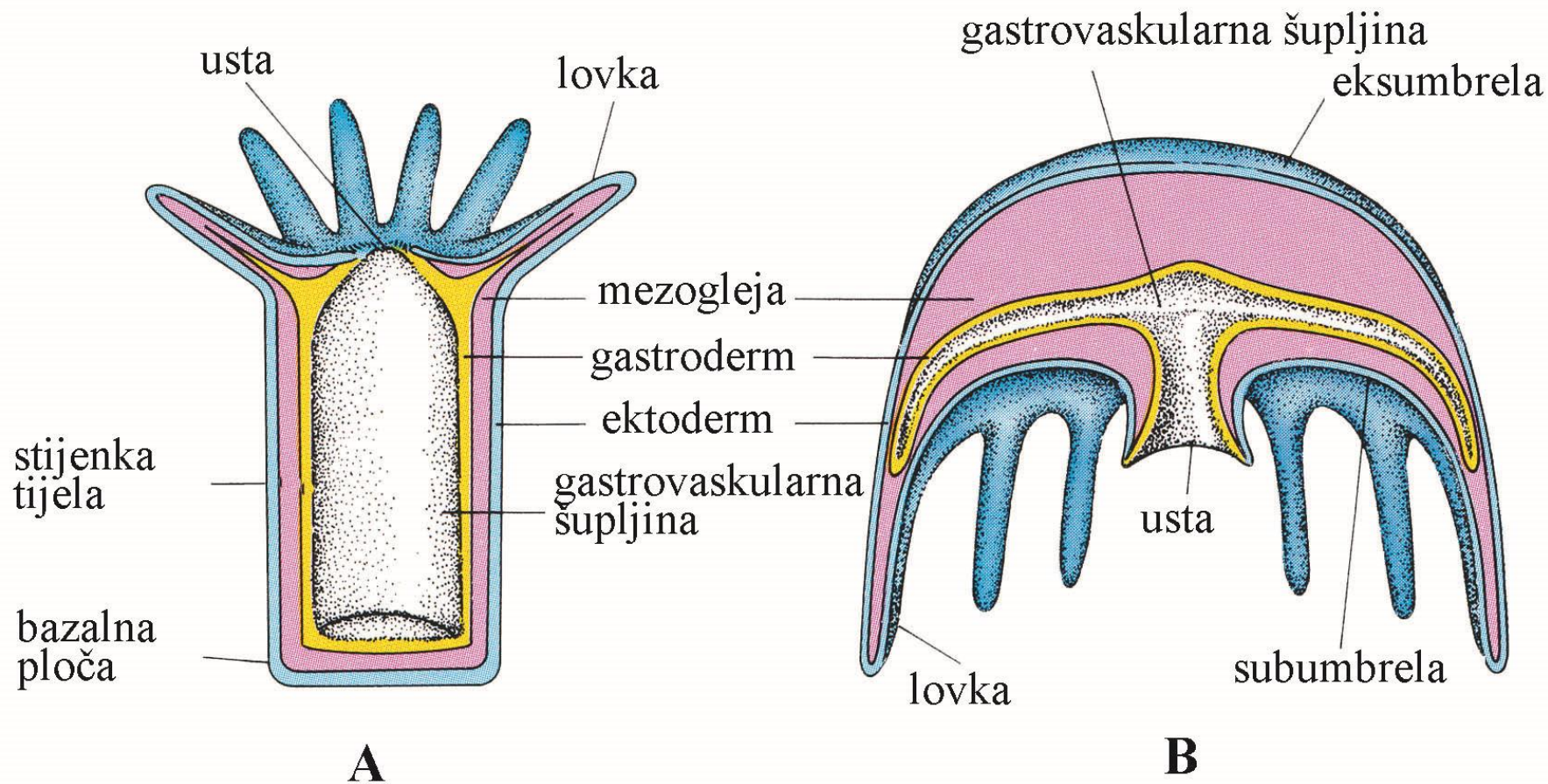
CNIDARIA - ŽARNJACI



Eumetazoa

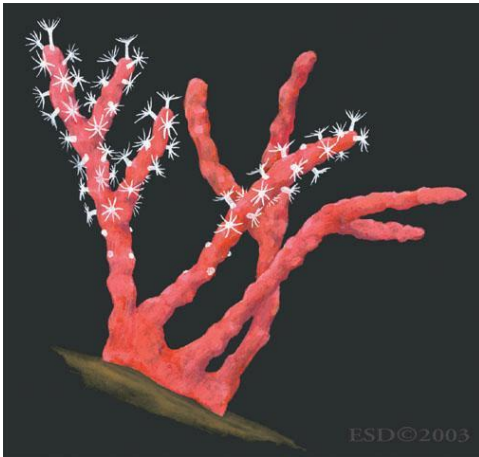


- koljena Cnidaria (žarnjaci) i Ctenophora (rebraši) – životne funkcije ustrojene na **tkivnoj** razini, ali bez izgradnje organskih sustava



Cnidaria

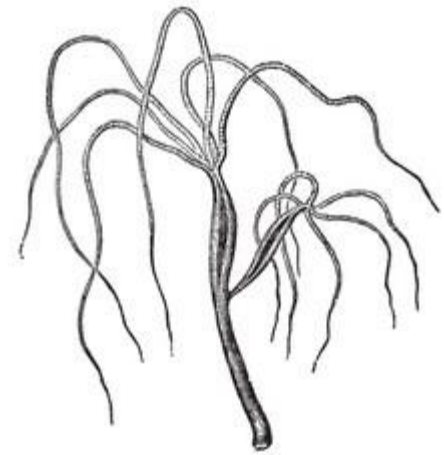
Anthozoa
- koralji

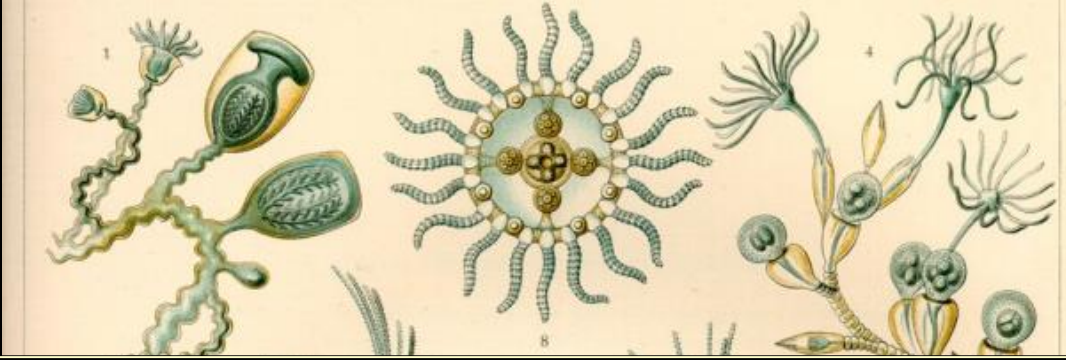


Scyphozoa
- režnjaci

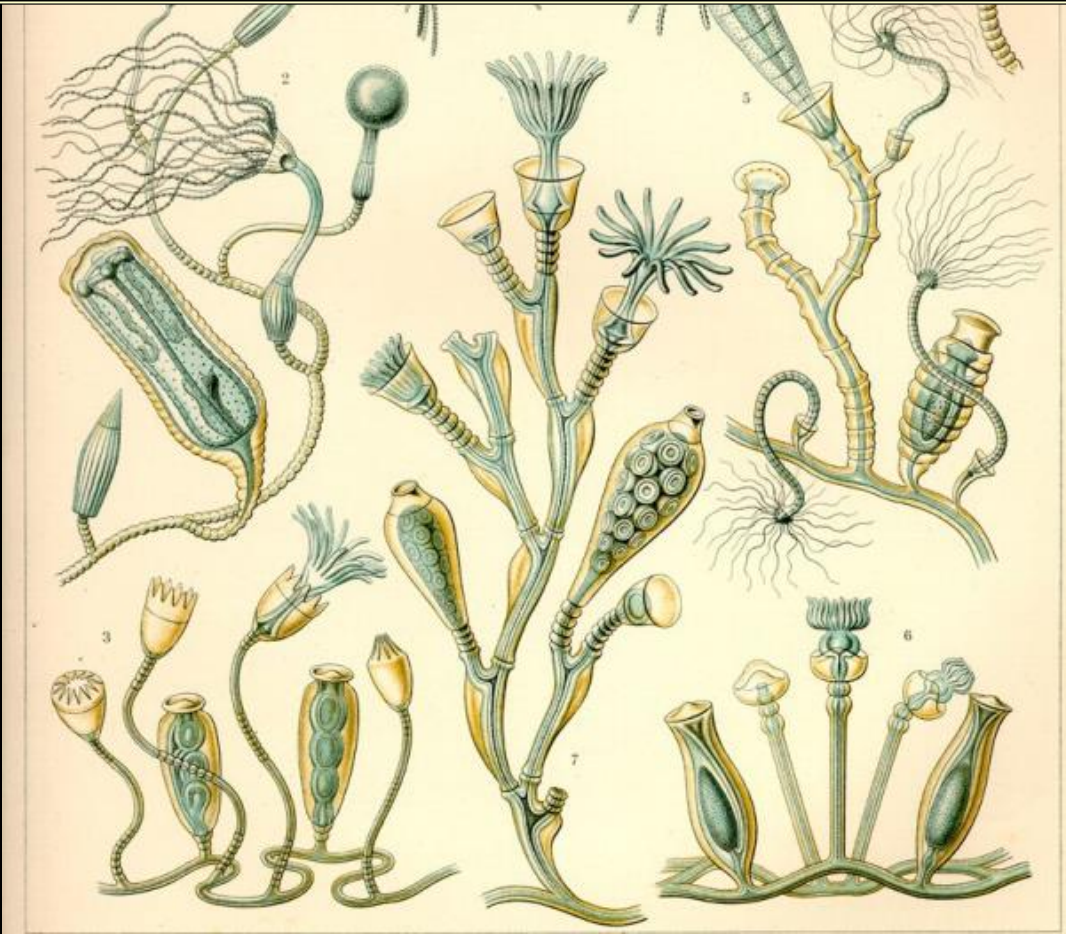


Hydrozoa
- obrubnjaci





HYDROZOA - OBRUBNJACI



Razred: Hydrozoa (obrubnjaci)

- *Hydra oligactis* (smeđa hidra)



ISPRUŽENO TIJELO HIDRE



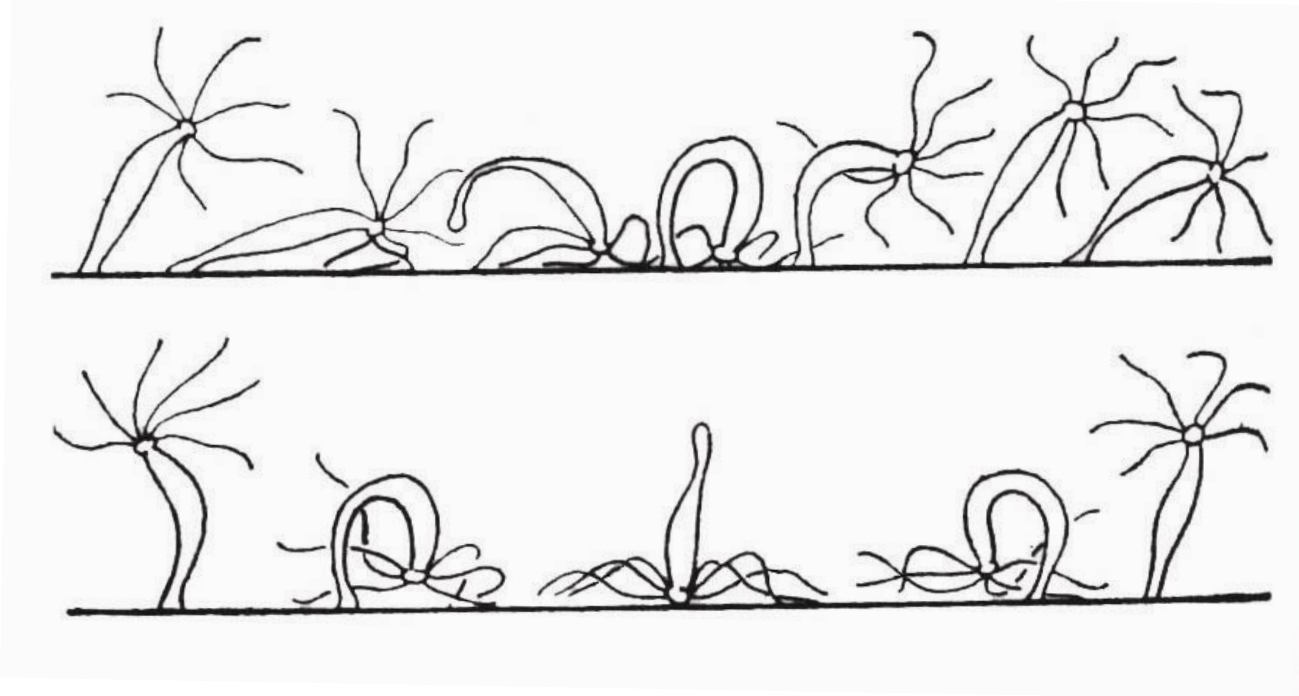
KONTRAHIRANO TIJELO HIDRE



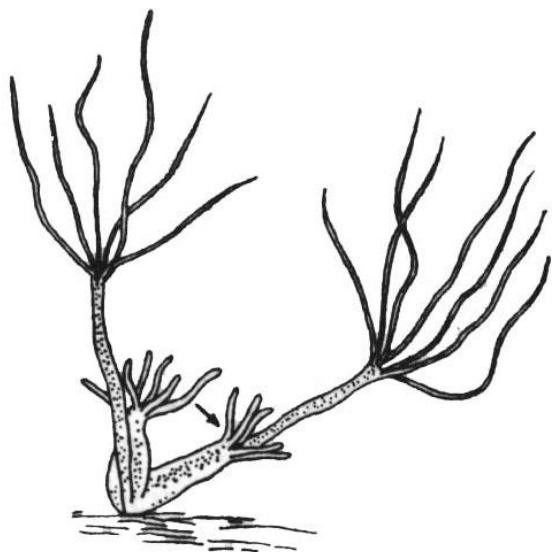
https://www.youtube.com/watch?v=jnD_YitEk5M



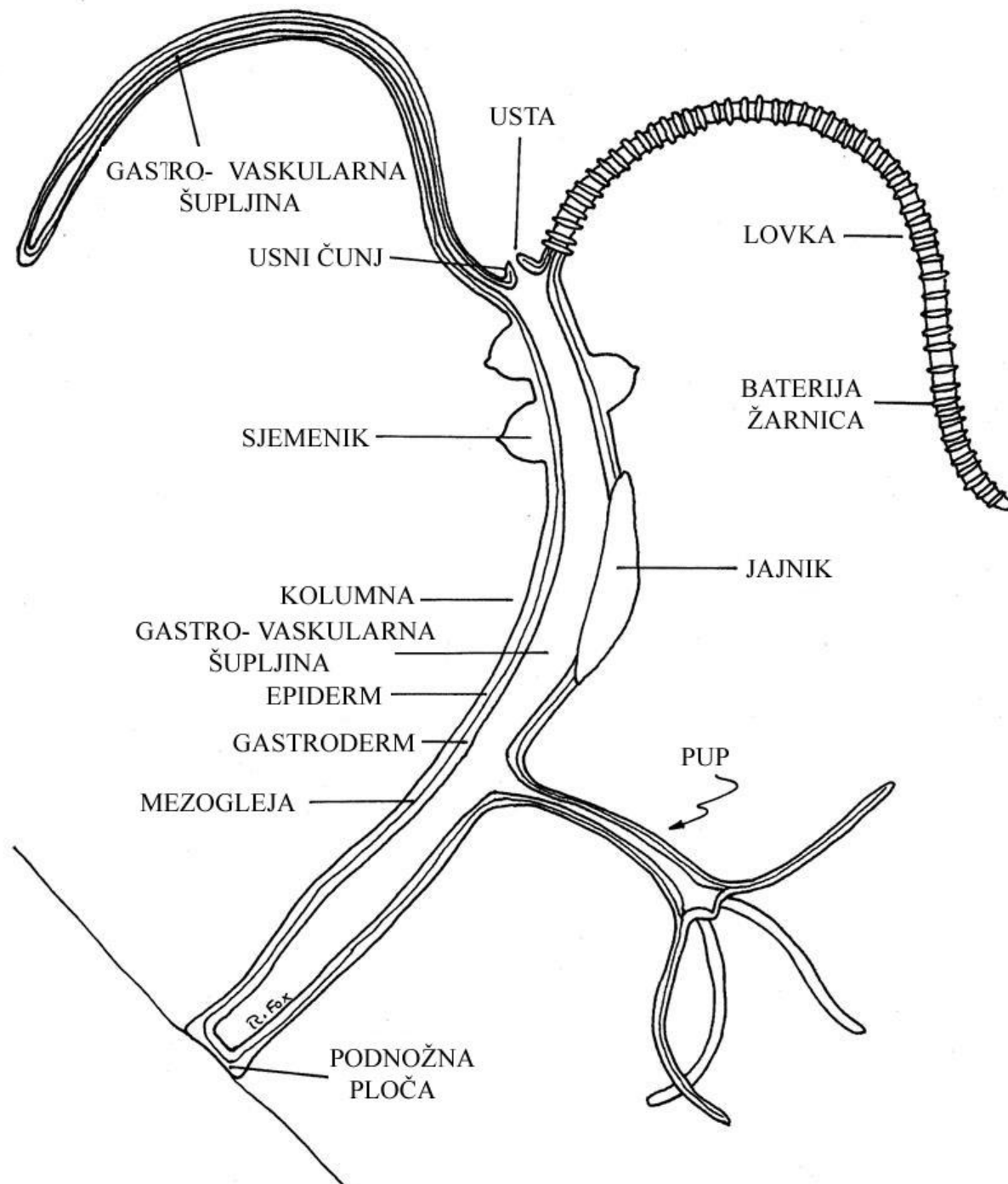
<https://www.youtube.com/watch?v=TfaafxnnJIY>



KRETANJE HIDRE



SPONTANA PROMJENA POLOŽAJA
(BEZ PODRAŽIVANJA)



Koljeno: CNIDARIA - žarnjaci

Razred: HYDROZOA - obrubnjaci

Hydra viridissima - zelena hidra

Hydra oligactis - smeđa hidra

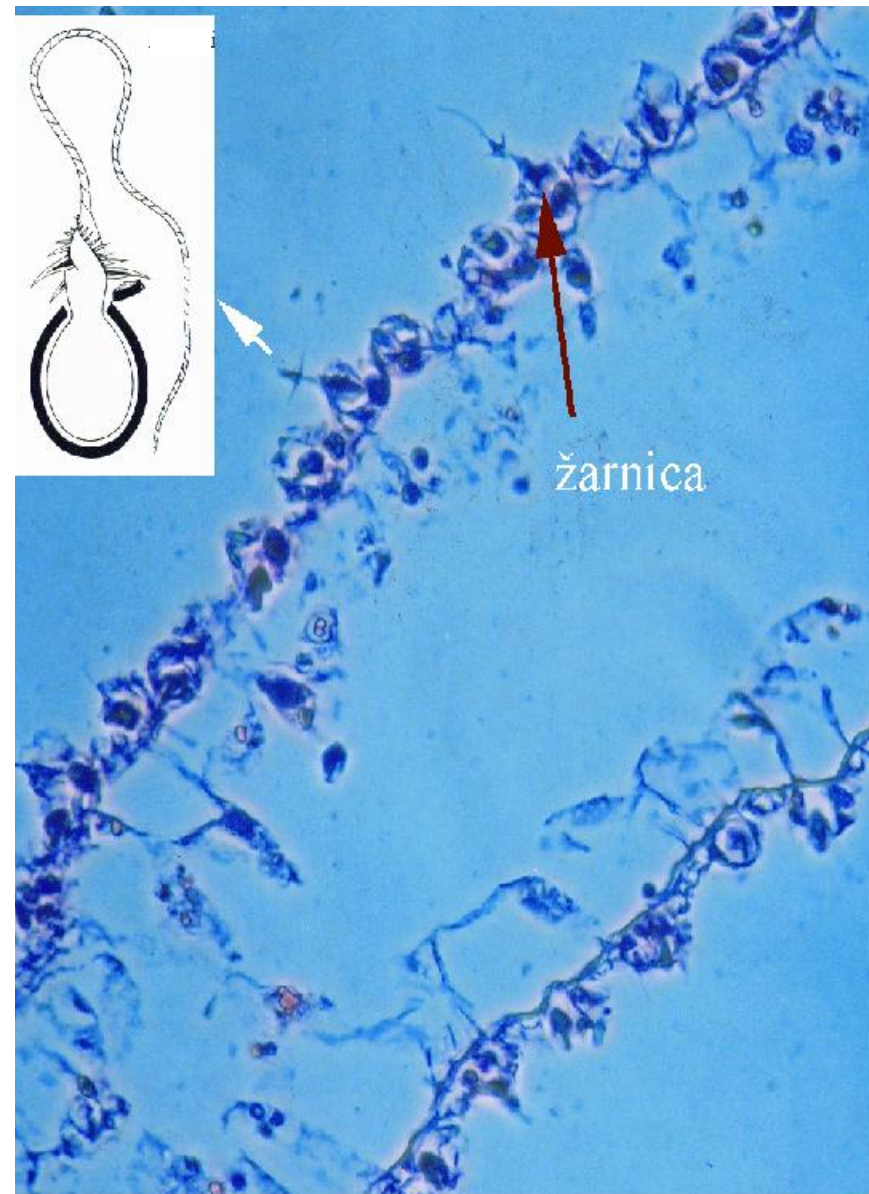
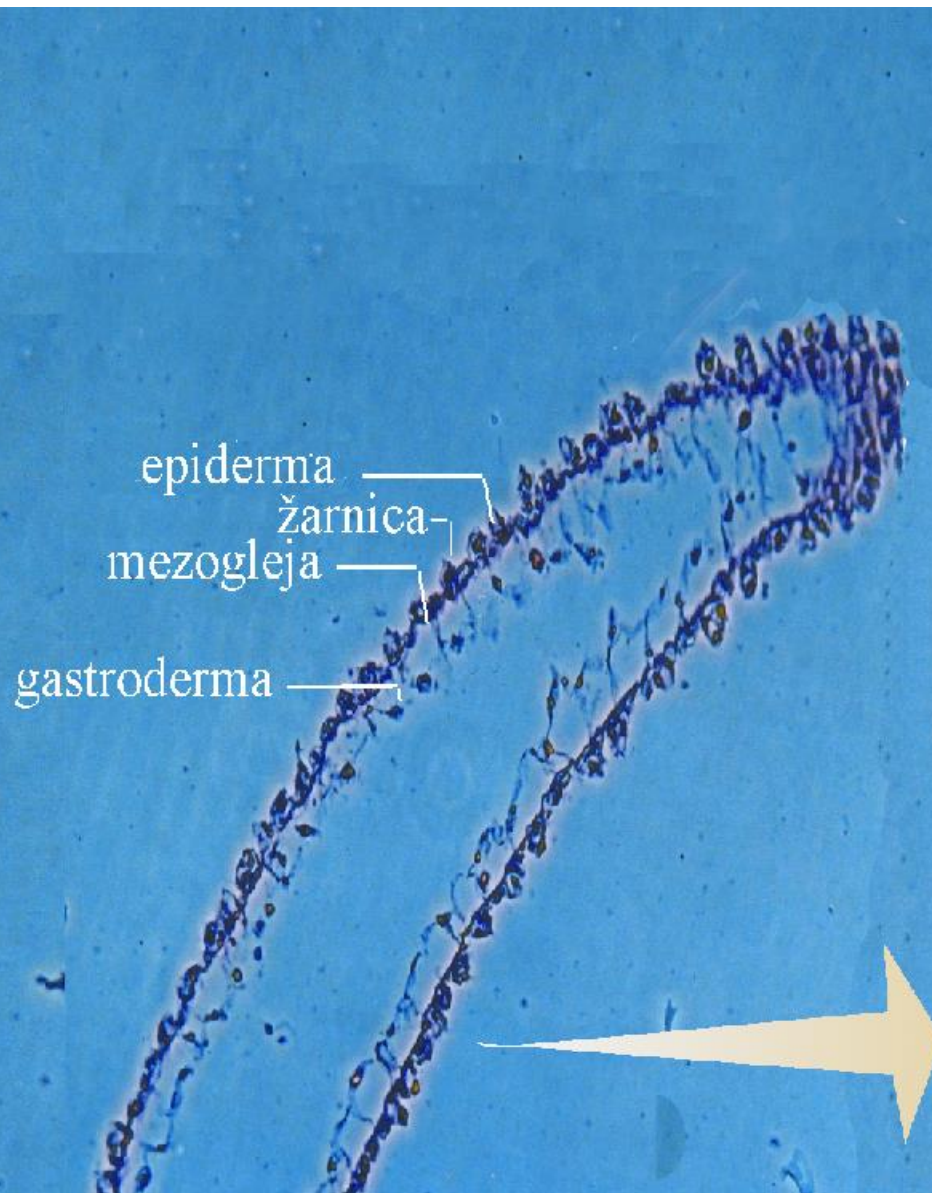
- vanjski izgled:

- VIJENAC LOVKI
- USTA
- USNI ČUNJ (PROBOSCIS)
- ŽARNICE (BATERIJE
ŽARNICA)
- PODNOŽNA PLOČA
- PUP

LOVKA HIDRE SA ŽARNICAMA I ALGAMA VRSTE *Zoochlorella*



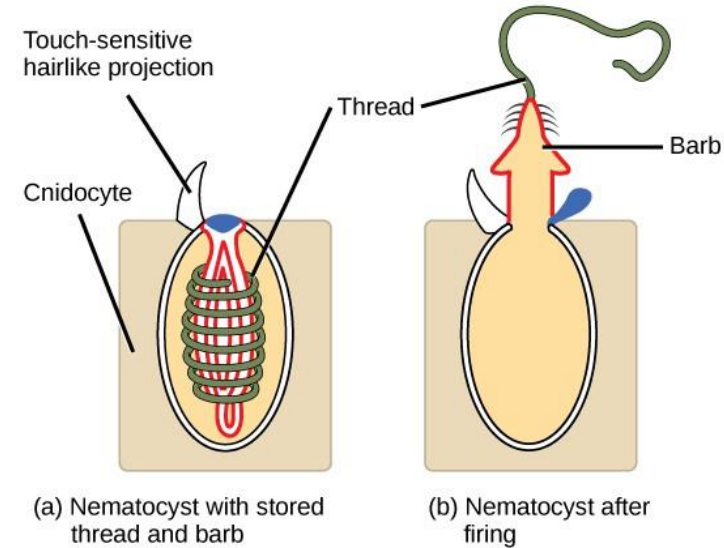
POLOŽAJ ŽARNIH STANICA U EPIDERMIS NA UZDUŽNOM PRESJEKU KROZ LOVKU HIDRE



Cnidaria

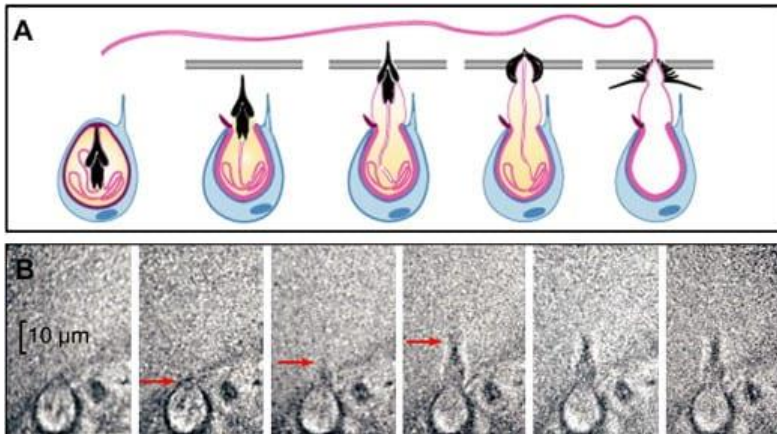
Žarne stanice (cnidociti, knidoblasti):

- specifičan organel – **žarnica** (knida, knidocist)
 - okružena čahurom ispunjenom tekućinom:
 - poklopčić na vrhu čahure
 - povezan s osjetilnom trepetljikom:
 - » obrubnjaci/režnjaci – krut i nepokretan (**knidocil**)
 - » koralji – pokretan (**trepetljikavi čunj**)
- žarna nit
- tri tipa žarnica:
 - NEMATOCISTE – nematociti
 - SPIROCISTE – spirociti
 - PTIHOCISTE – ptihociti

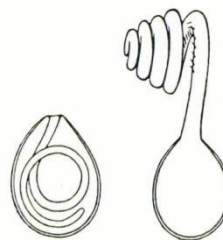
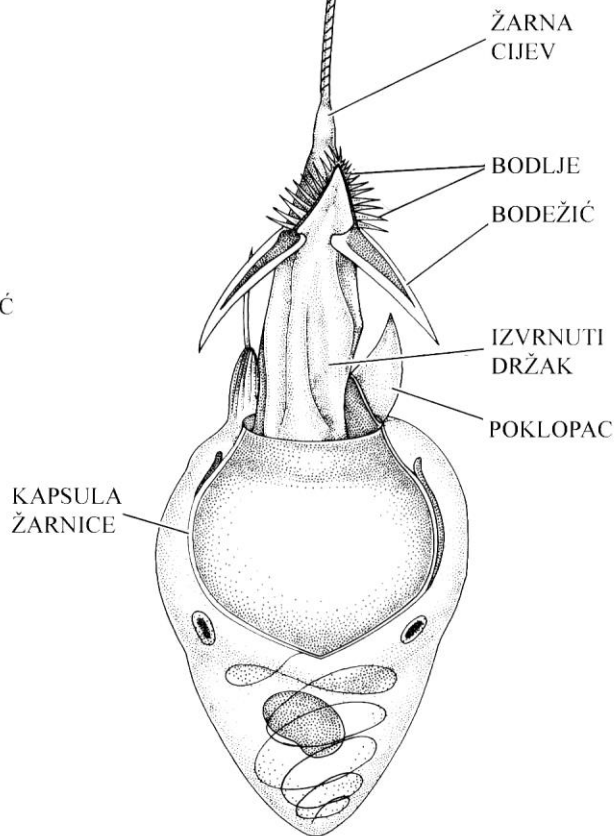
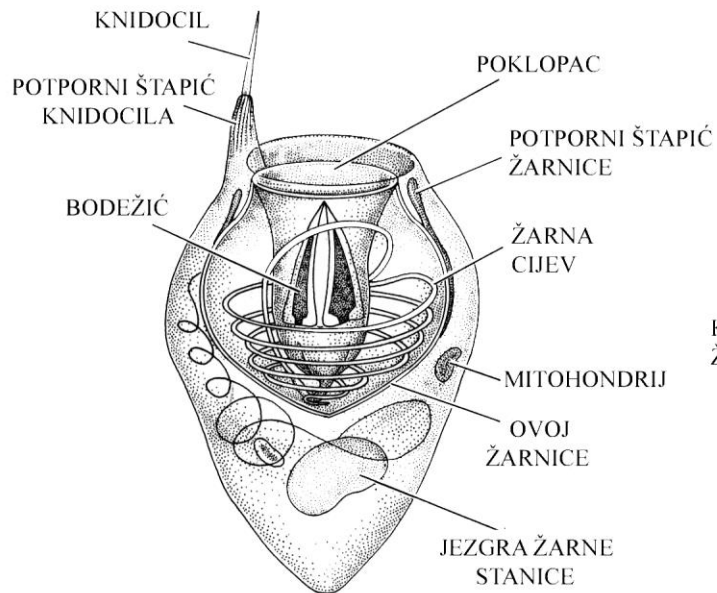


Razred: Hydrozoa (obrubnjaci)

- *Hydra* sp.
 - žarna stanica



NEIZBAČENA I IZBAČENA ŽARNICA



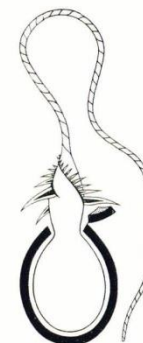
VOLVENTA



GLUTINANTA



PENETRANTA



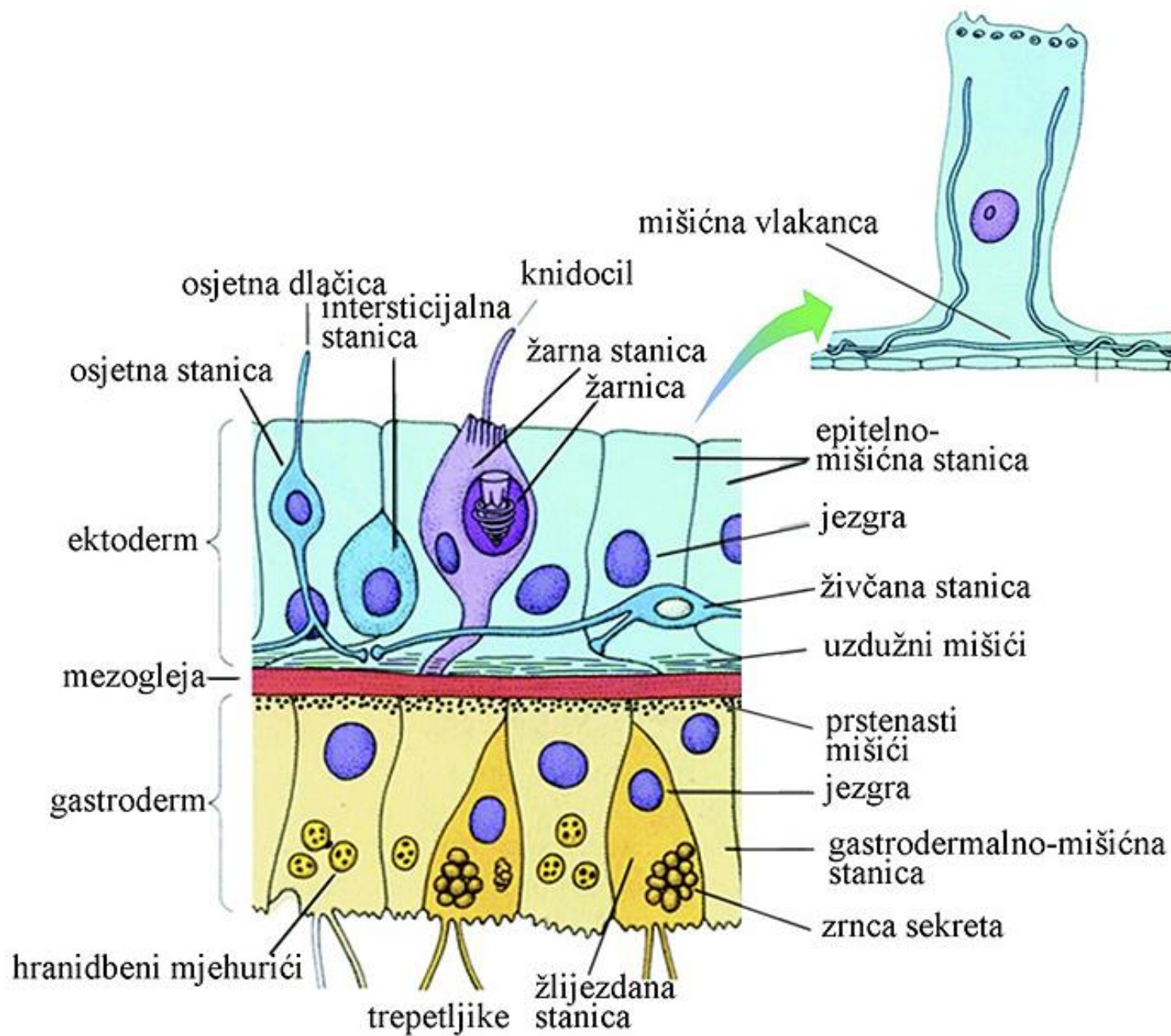
<https://www.youtube.com/watch?v=vdKq9III1Qw>

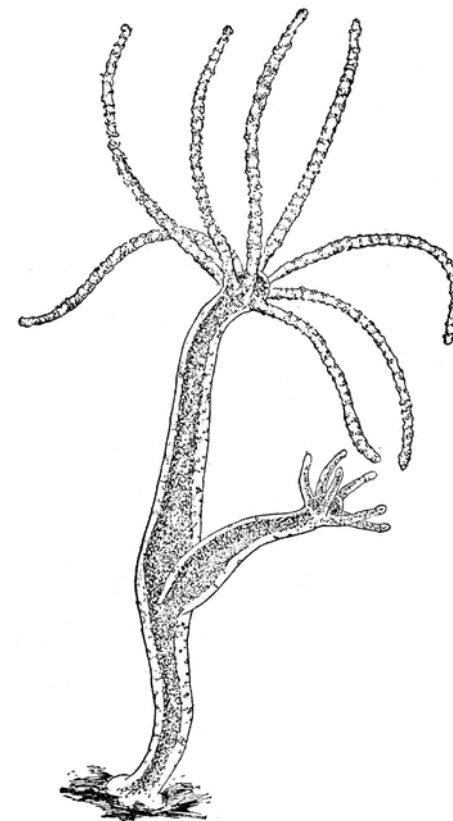
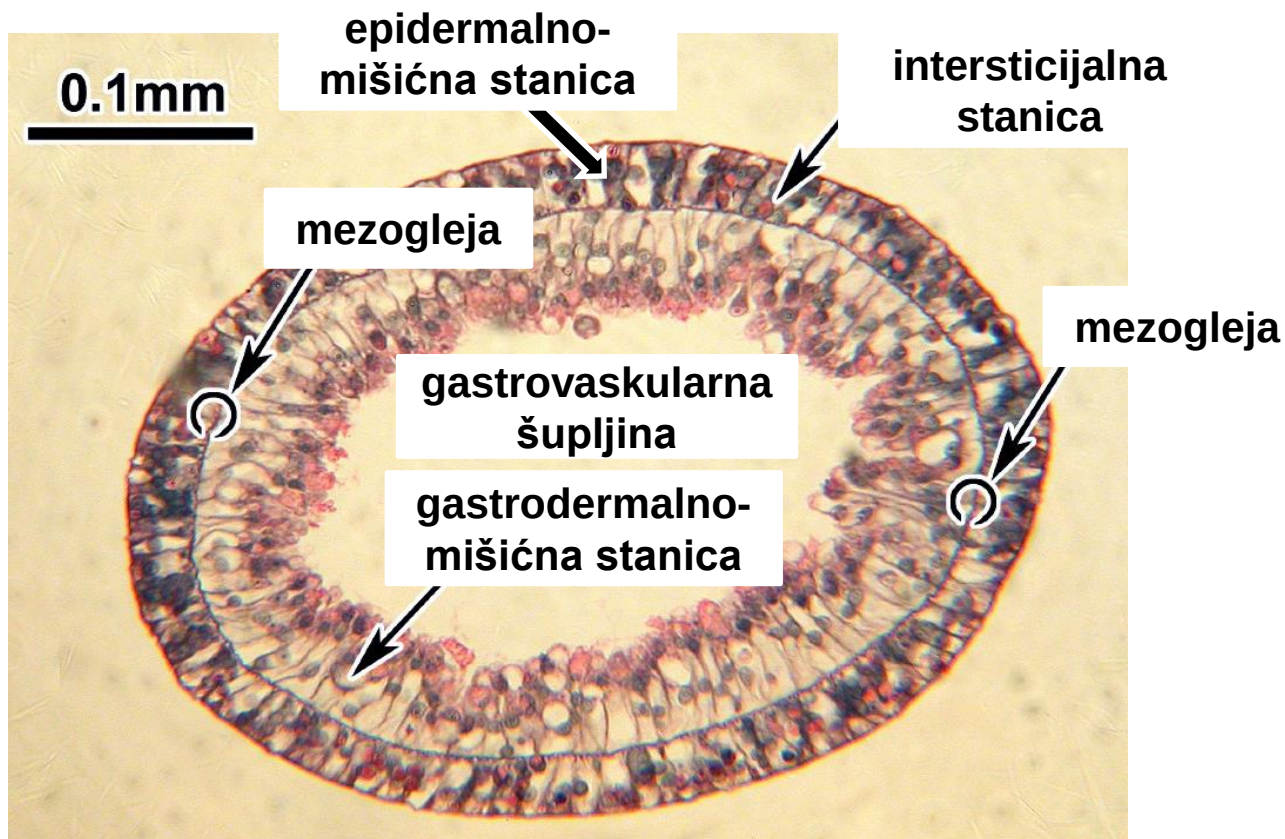
- žarna stanica sa žarnicom:

a) u stanju mirovanja
(neizbačena)

b) **izbačena**
(eksplodirana)

- ŽARNA STANICA (= KNIDOBLAST, KNIDOCIT, NEMATOBLAST, NEMATOCIT)
- ŽARNICA (= KNIDA, NEMATOCIST)
- ČAHURA
- ŽARNA NIT
- BODEŽIĆ
- (KNIDOCIL)





- uzdužni/poprečni prerez kroz tijelo hidre:

EPIDERM

- EPIDERMALNO-MIŠIĆNA STANICA
- INTERSTICIJSKA STANICA
- ŽARNA STANICA (= KNIDOBLAST, KNIDOCIT, NEMATOBLAST, NEMATOCIT)

MEZOGLEJA

GASTRODERM

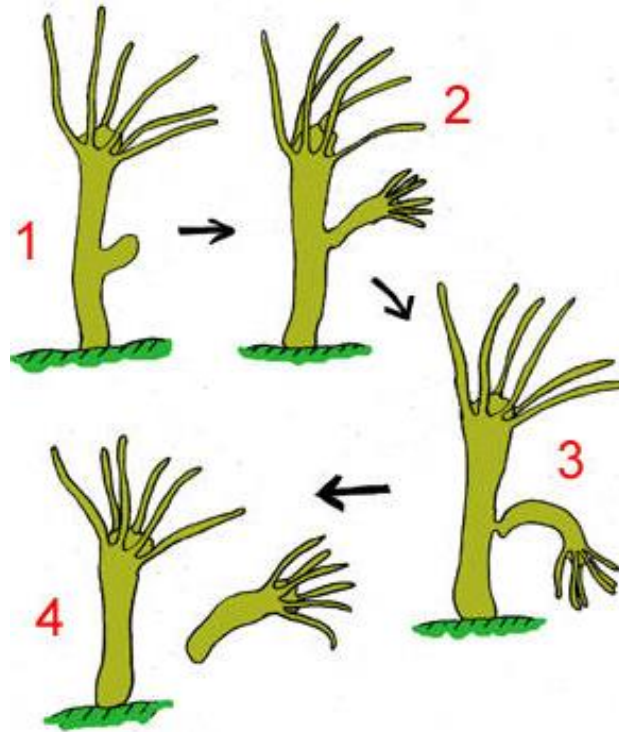
- GASTRODERMALNO-MIŠIĆNA STANICA
- ENZIMATSKO-ŽLJEZDANA STANICA

GASTROVASKULARNA ŠUPLJINA

Razred: Hydrozoa (obrubnjaci)

- *Hydra* sp.
 - razmnožavanje

nespolno



spolno



Razred: Hydrozoa (obrubnjaci)

- *Hydra viridissima*
 - razmnožavanje

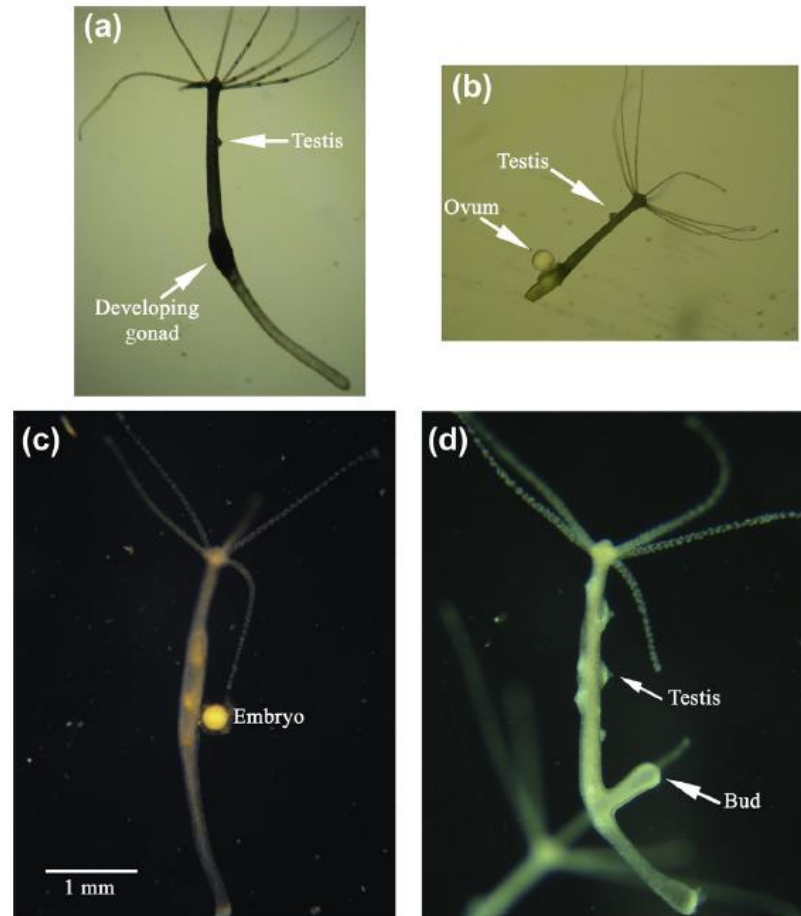


FIGURE 9.15 *Hydra viridissima*, green hydra, are hermaphrodites (a & b, ovum = 345 μm), whereas some brown hydra, *Hydra* in the groups *vulgaris*, *oligactis*, and *braueri*, are hermaphrodites and others are dioecious, as shown with a visible embryo on females (c) and smaller testes developing on males (d).

Razred: Hydrozoa (obrubnjaci)

- *Hydra* sp.

