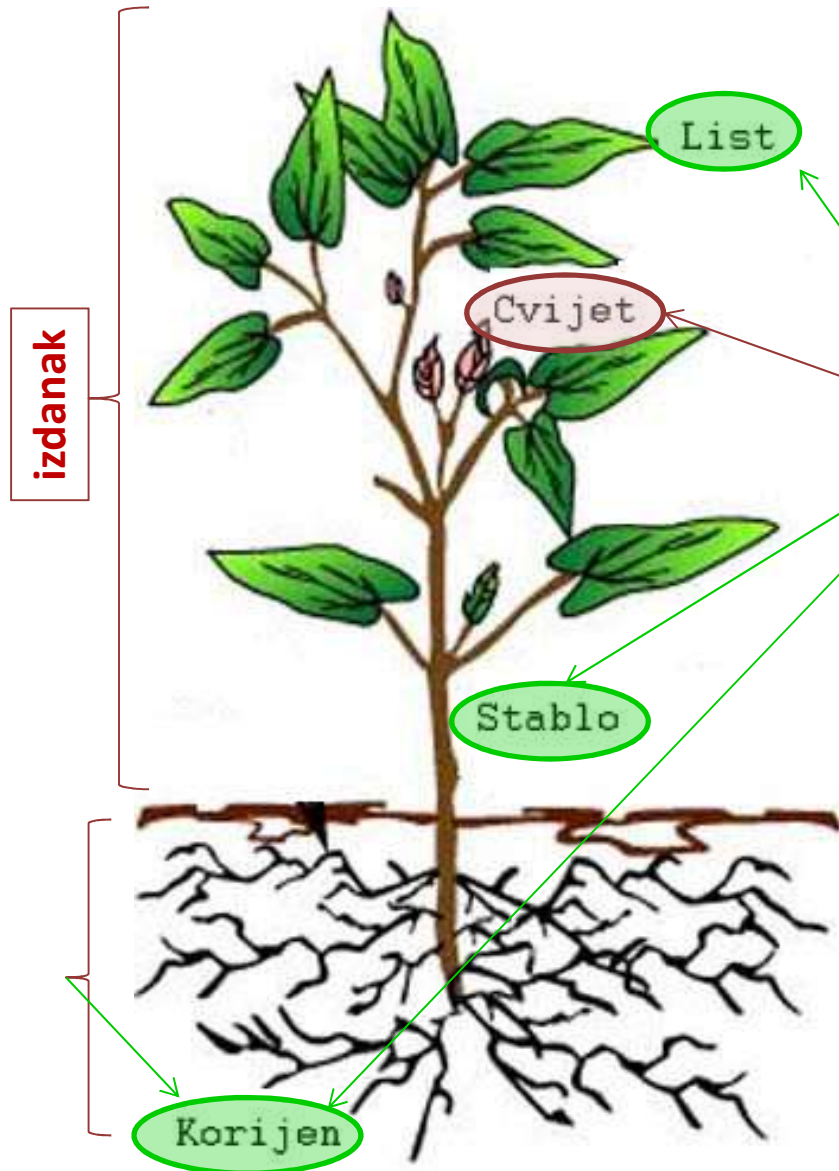


ORGANOLOGRAFIJA



Organ- dio biljnog tijela koji vrši određenu funkciju!

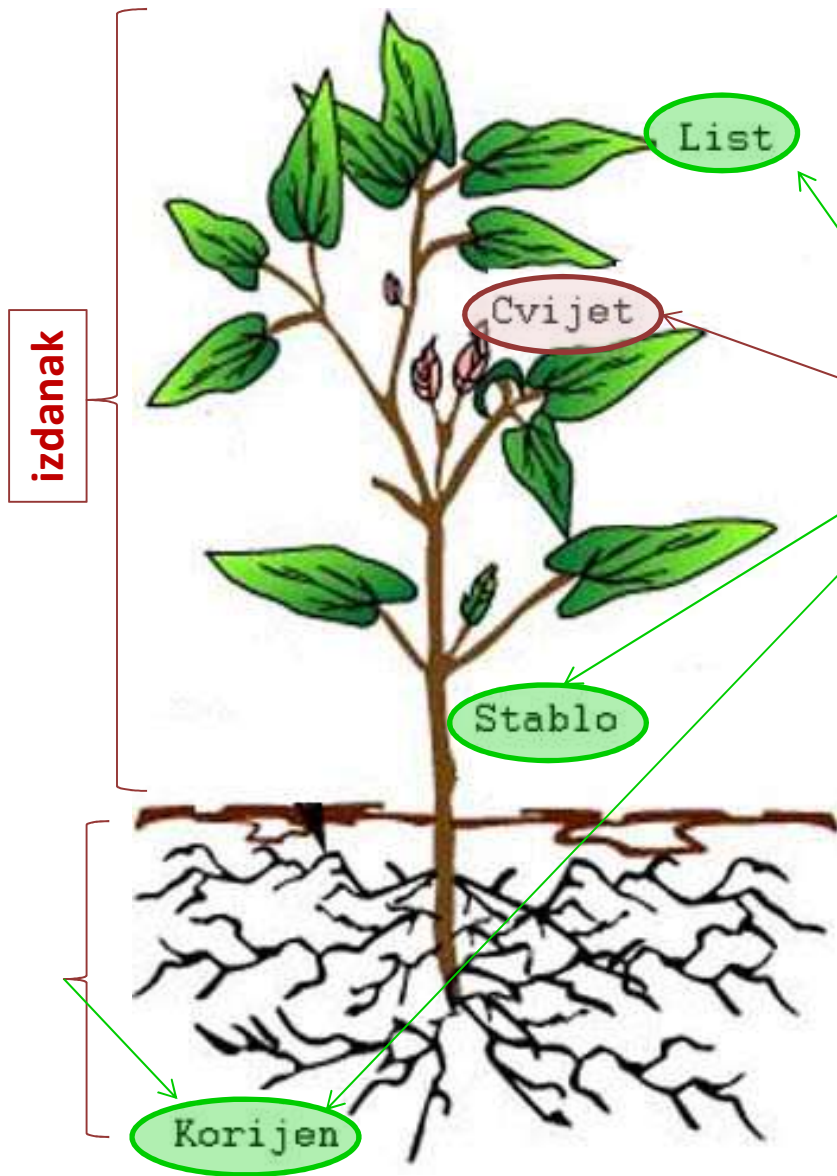
Vegetativni i reproduktivni!

Adventivni!

(adventivan= sporedan, ne raste na svom mjestu)

Analogni (ista funkcija),
homologi (isto porijeklo).

Metamorfzirani organi...



izdanak

List

Cvijet

Stablo

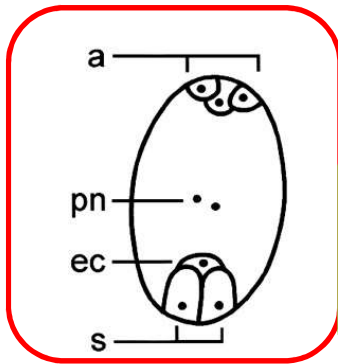
Korijen

Izdanak
(stablo + listovi +
reproduktivne strukture)

Korijen

Razviće biljaka

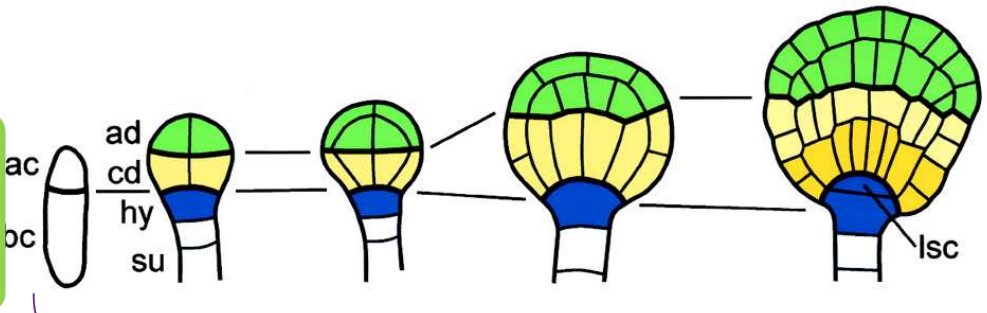
sjeme (zigot-embriion-klica)- klijanac- biljka – sjeme



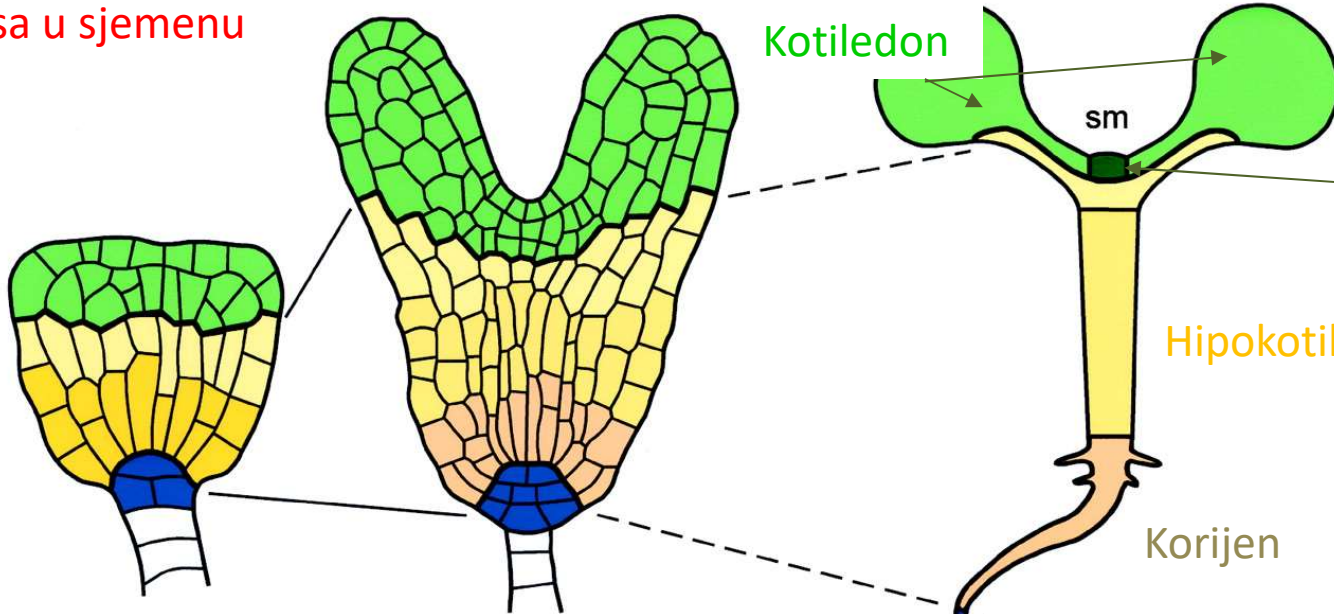
Embrionova
kesa u sjemenu



Zigot



Razvoj embriona



i nastanak klijanca

Apikalni meristem u
vegetativnoj kupi
korijena

Koje biljke imaju sjeme?

- Četinari i
- Cvjetnice (dikotiledone i monokotiledone biljke)

Da li je sjeme svih sjemenjača isto građeno?

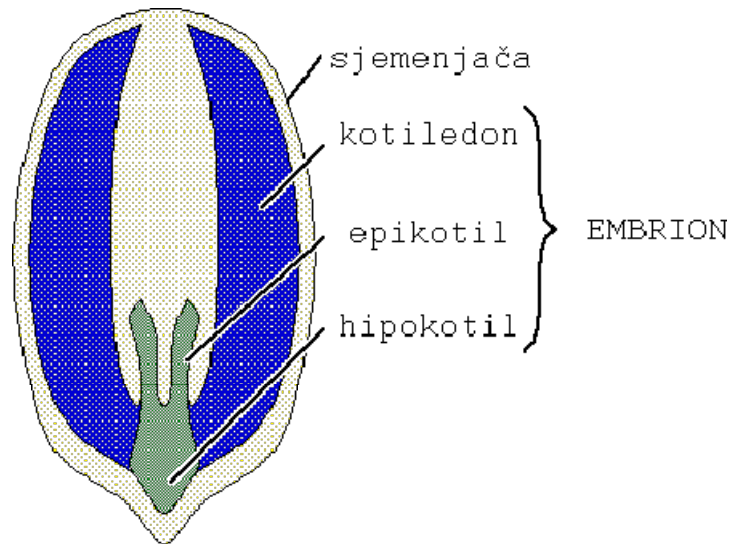
- Nije!

Osnovni dijelovi sjemena

- **Integument**, iz kojeg nastaje sjemenjača (omotač sjemena) i
- **Nucelus**, unutrašnje tkivo, u kojem u toku razvoja sjemena nastaju jajna ćelija, a njenim oplodjenjem zigot, zatim embrion i klica). U sjemenu se nalazi i hranljivo tkivo (endosperm), koji u zavisnosti od postanka može biti primaran ili sekundaran.

Grada sjemena biljaka sa cvijetom
(dikotile, monokotile)

DIKOTILEDONE BILJKE



Sjemenjača- ovojnica sjemena

Endosperm- hranljivo tkivo

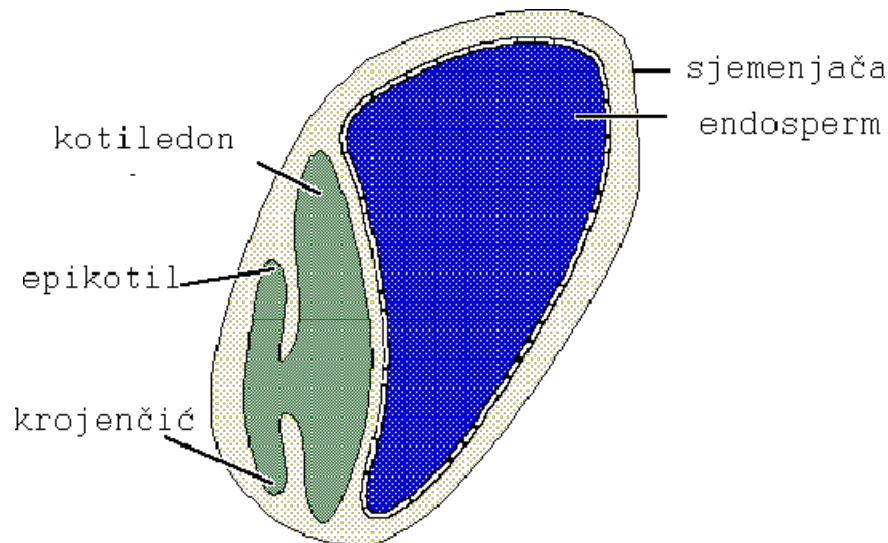
Klica- začetak biljke u sjemenu/sjemenom zametku

Kotiledoni- klicini listići

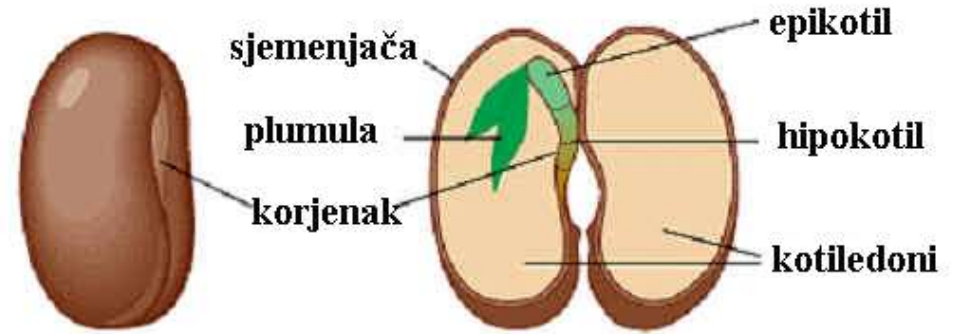
Epikotil- vršni dio stabaoceta klice

Hipokotil- donji dio stabaoceta klice, od kotiledona do korijenka

MONOKOTILEDONE BILJKE



- **Plumula**- vršni pupoljak klice
- **Skutelum**- kotiledon monokotila, nalik na cjevčicu
- **Koleoptil**- prvi list kod klice trava, koji se javlja kao tanka opna koja obuhvata plumulu
- **Koleoriza**- opnasti omotač koji obavija korjenak klice trava.
- **Dormancija, germinacija (voda, svjetlost, temperatura)**



PASULJ



GRAŠAK



KUKURUZ

Vrste hranljivog tkiva

Endosperm- tkivo reproduktivnog porijekla, koje nastaje u embrionovoj kesi.

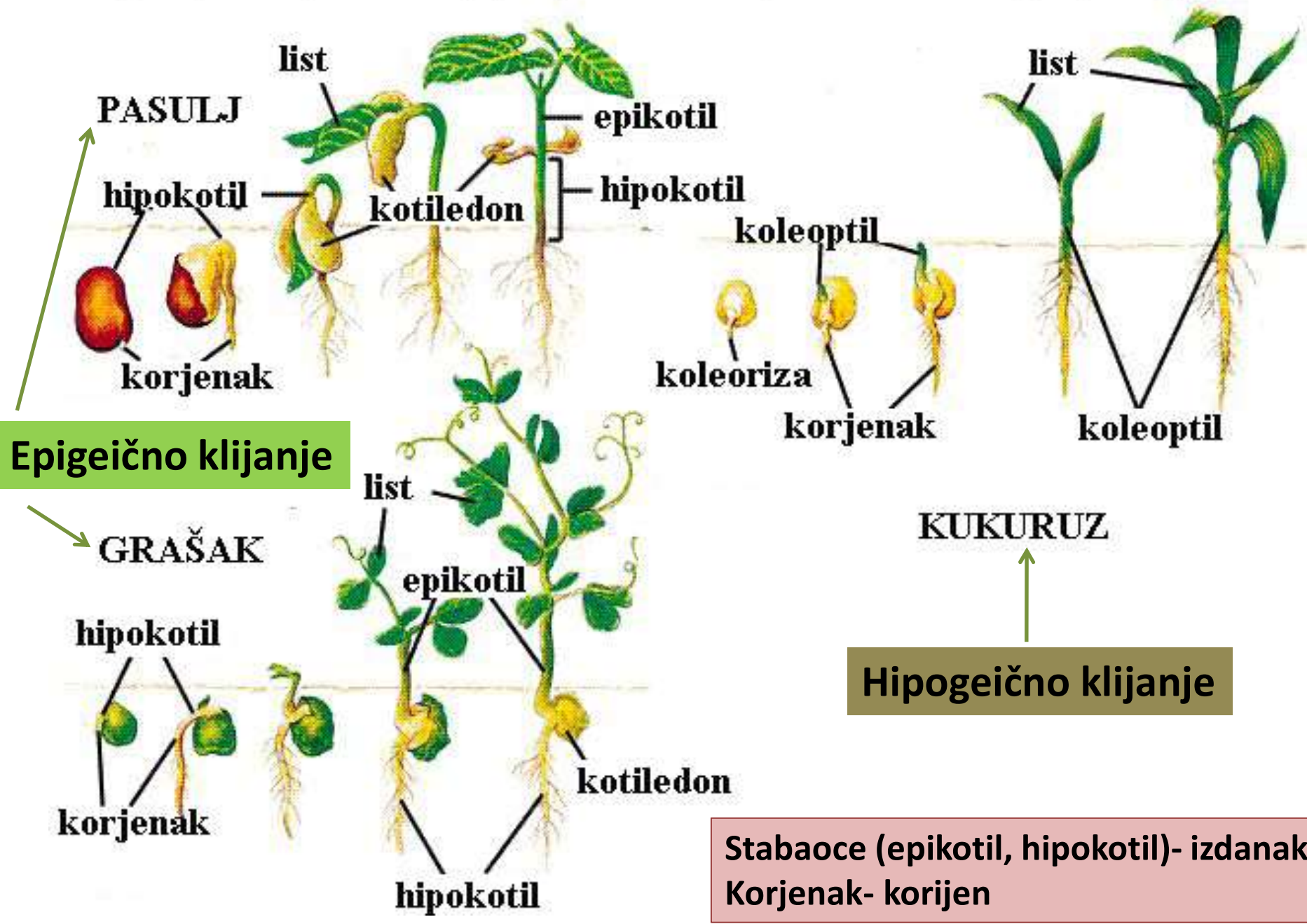
Prefiks endo znači u.

Perisperm- tkivo vegetativnog porijekla, koje nastaje od nucelusa- tkiva izvan embrionove kese.

Prefiks peri znači okolo, izvan.

Tipovi sjemena- u donosu na vrstu hranljivog tkiva

- 1. Sjemeni bez endosperma-** kotiledoni apsorbiraju sav ili skoro sav endosperm tako da on ne postoji ili se nalazi u vidu jednog ili dva sloja ćelija (pr. leptirnjače (*Fabaceae*), glavočike (*Asteraceae*), ruže (*Rosaceae*), krstašice (*Brassicaceae*)).
- 2. Sjemeni sa endospermom-** endosperm čini glavnu masu, a klica samo neznatan deo sjemena (žitarice i sve ostale trave, biljke iz porodice pomoćnica (*Solanaceae*), ljiljana (*Liliaceae*) i dr.
- 3. Sjemeni sa perispermom** koji predstavlja hranljivo tkivo vegetativnog porijekla jer nastaje od nucelusa; imaju ga predstavnici porodice karanfila (*Caryophyllaceae*), lobode (*Chenopodiaceae*) i dr.
- 4. Sjemeni sa endospermom i perispermom** sadrže hranljivo tkivo dvojnog porekla i ređe se javljaju; ima ga npr. biber (*Piper*).



Epigeično klijanje

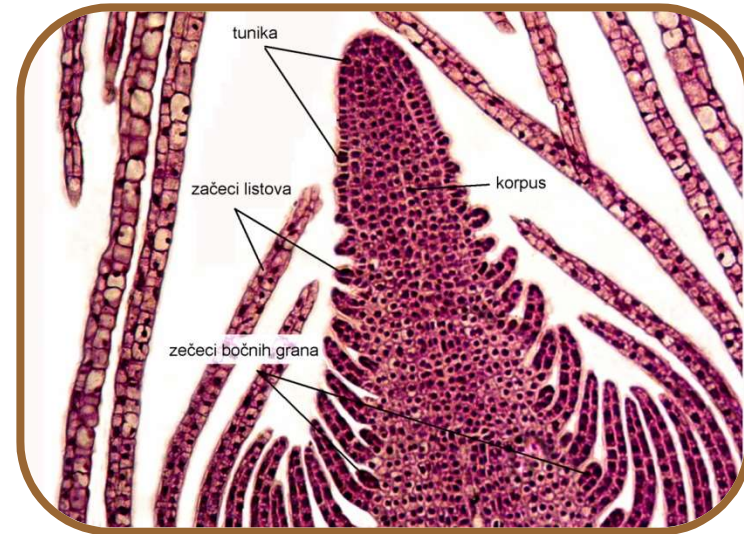
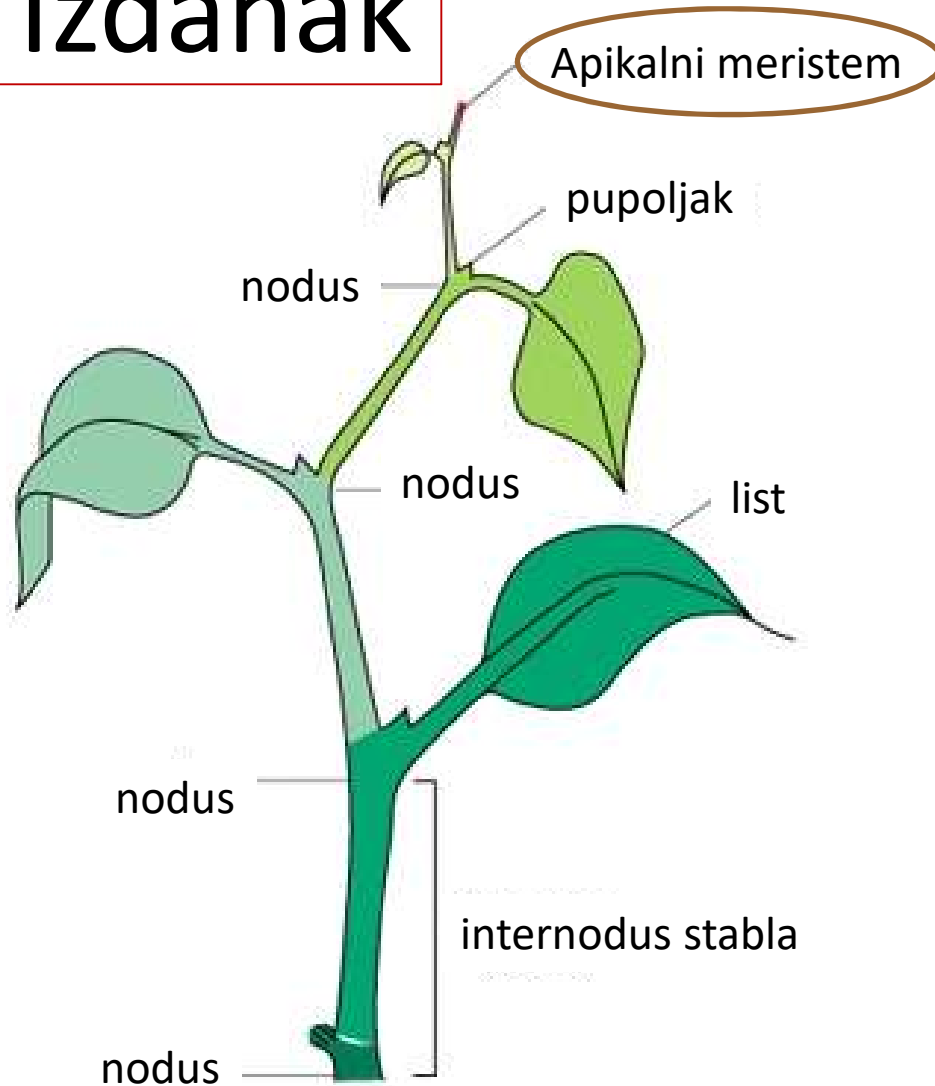
Hipogeično klijanje

Stabaoce (epikotil, hipokotil)- izdanak
Korjenak- korijen

Razviće biljaka

sjeme (zigot-embriion-klica)- klijanac- **biljka** - sjeme

Izdanak

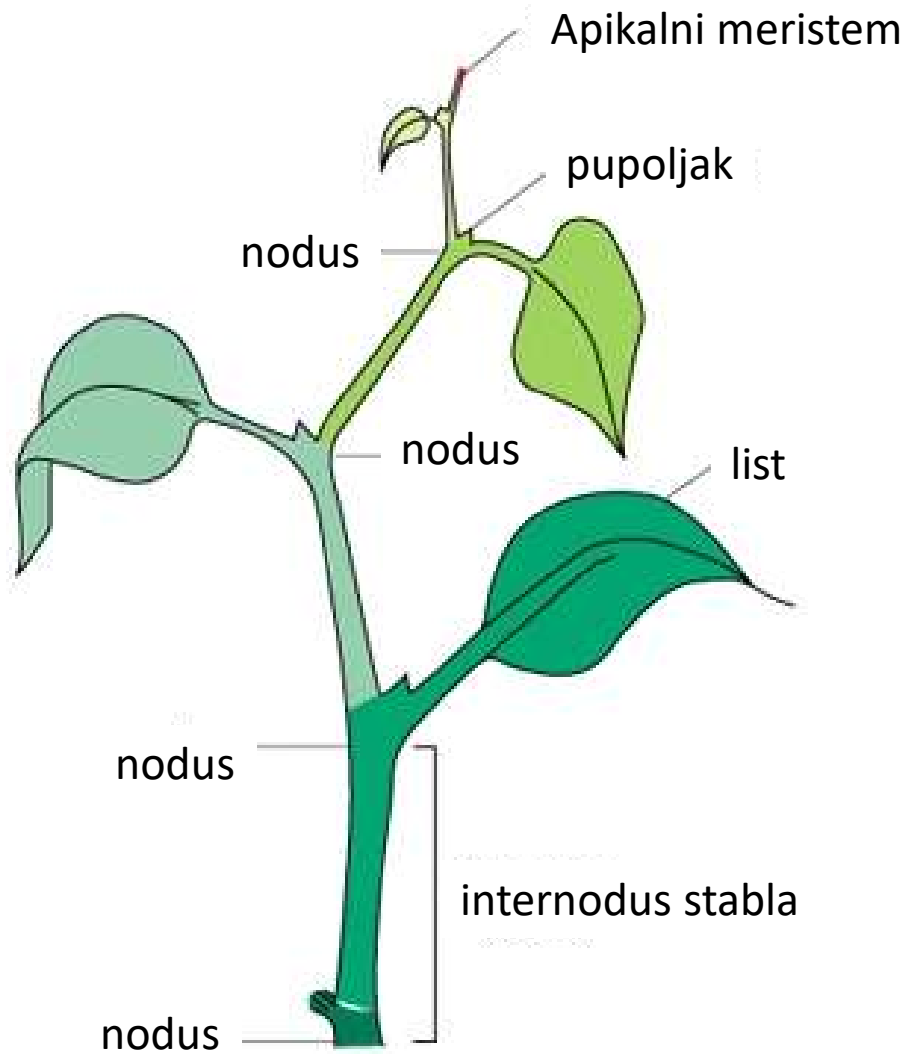


Začeci bočnih grana= začeci pupoljaka

Pupoljak= vegetativna kupa + listovi koji je opkoljavaju

Izdanak

Fotofilni izdanak



Geofilni izdanak
rizom



Pupoljci....

Terminalni pupoljak



Bočni pupoljak

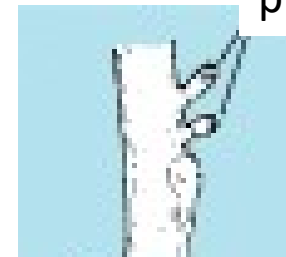
Lisni pupoljak

Cvjetni pupoljak

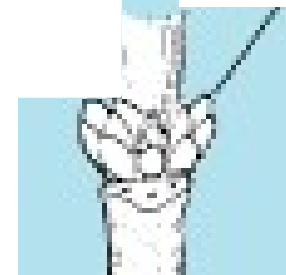


Cvjetni pupoljak

Serijski pupoljak

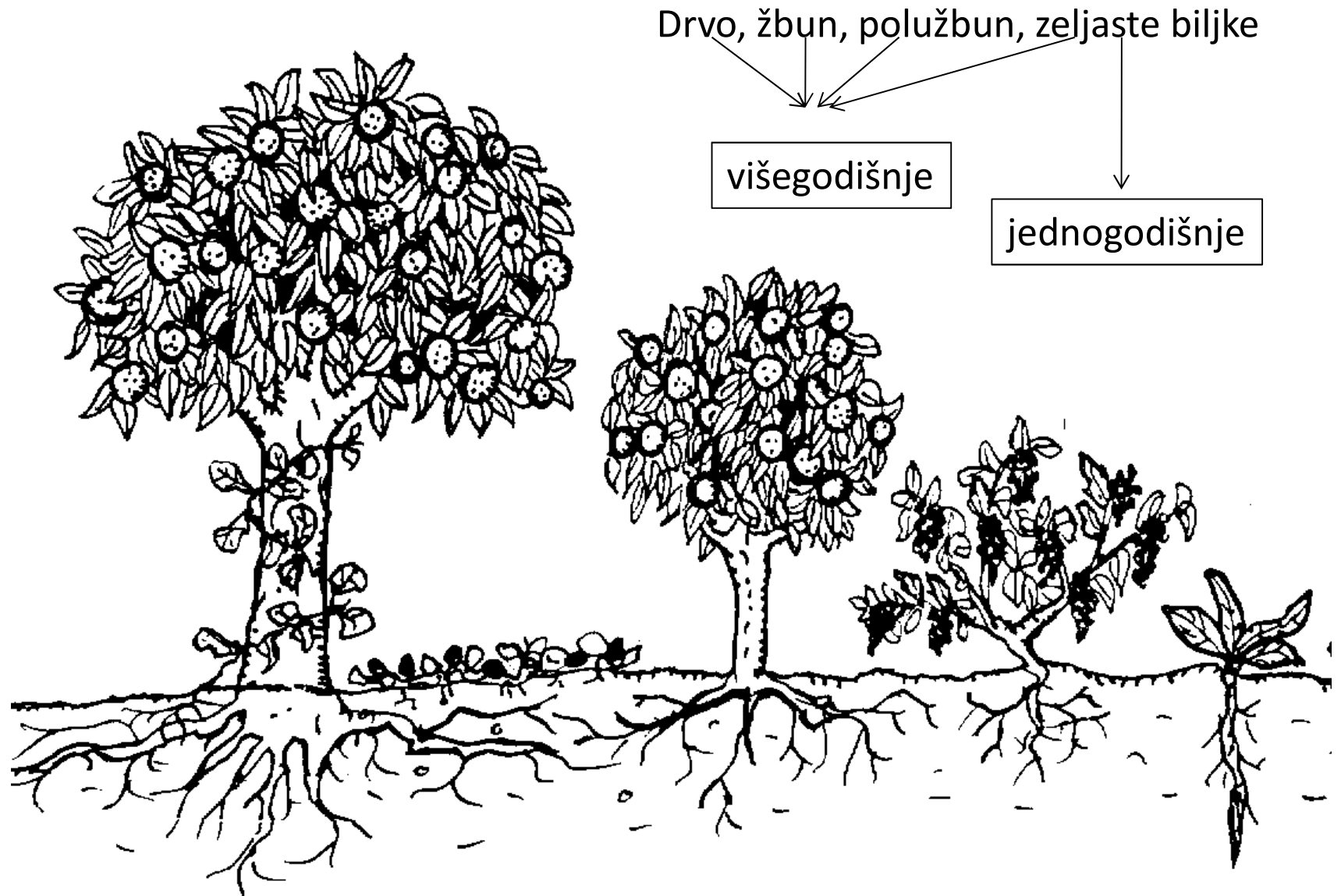


Kolateralni pupoljak

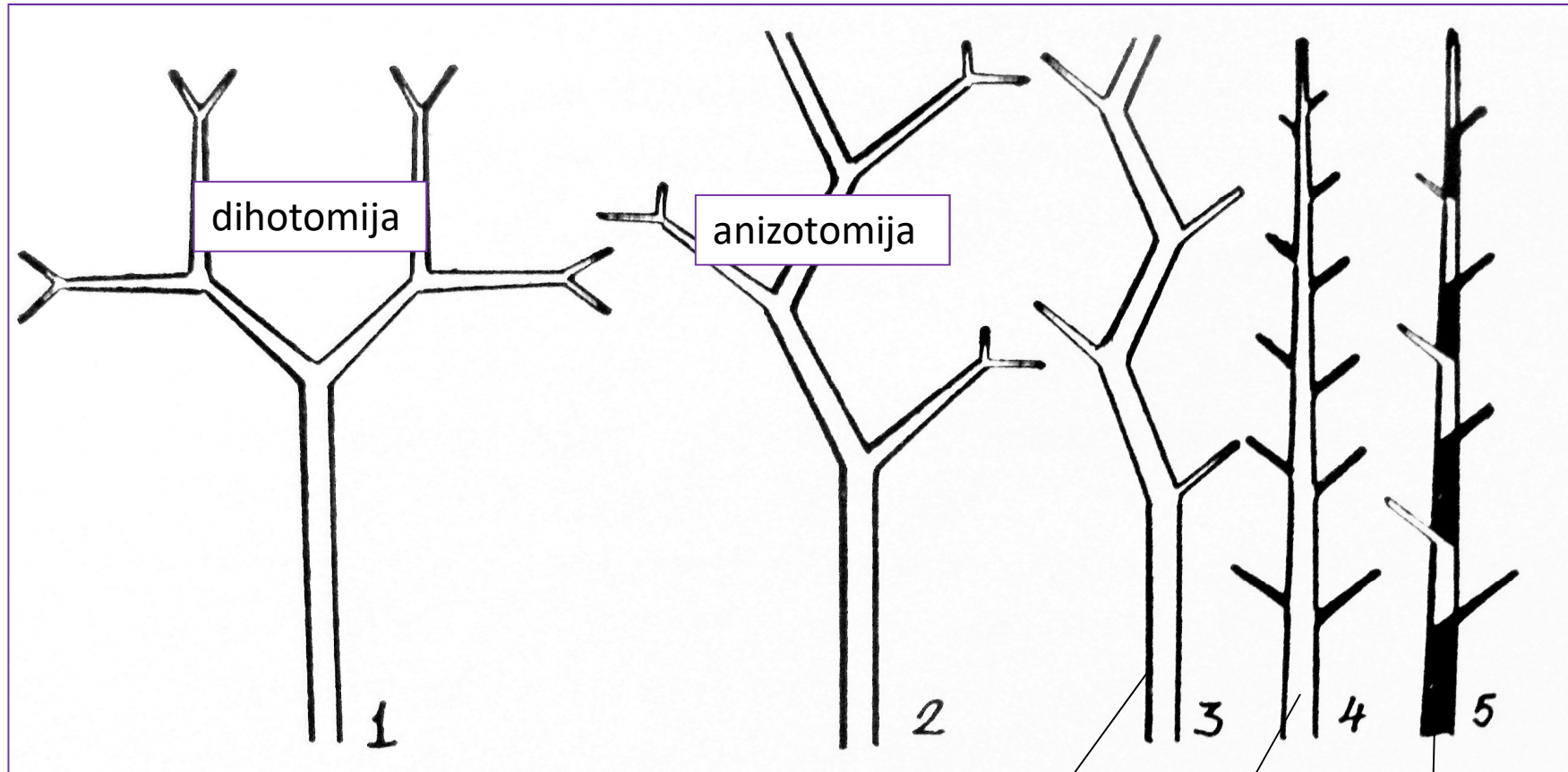


Zimski pupoljci, pupoljci za obnavljanje, uspavani pupoljci, kauliflorija adventivni pupoljci

Forme stabla



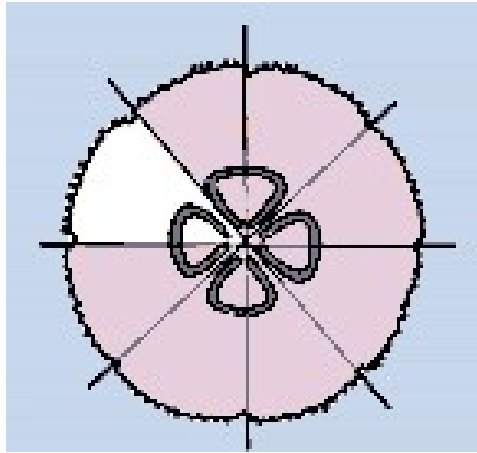
Tipovi grananja



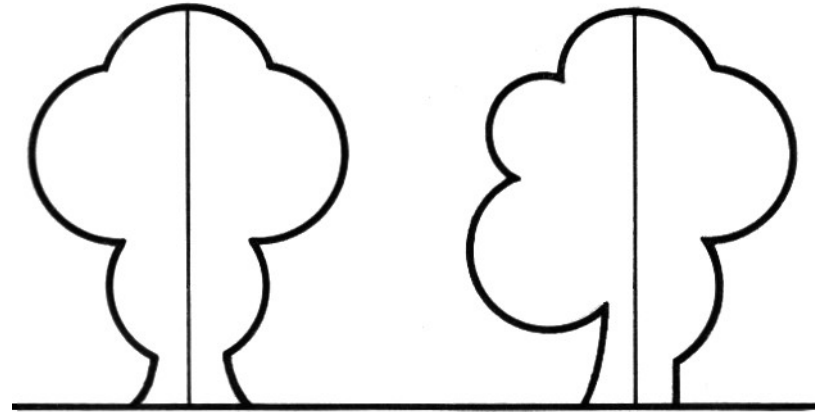
dihopodijalno grananje

monopodijalno

simpodijalno



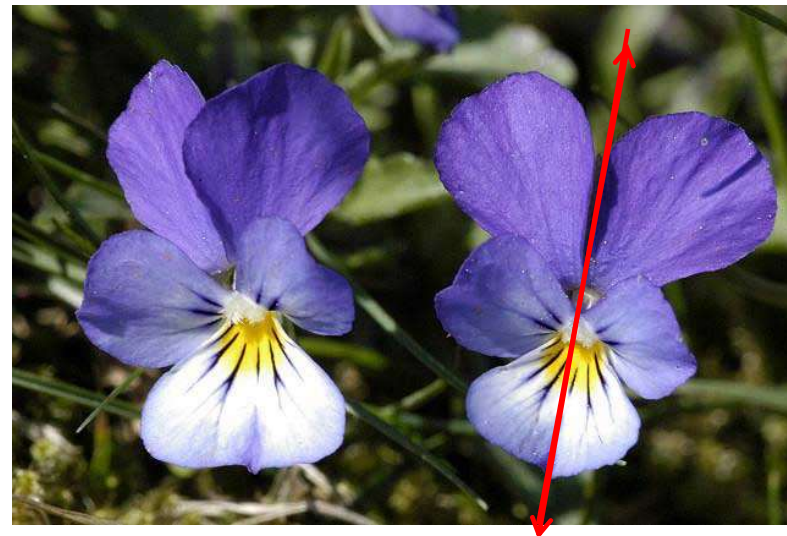
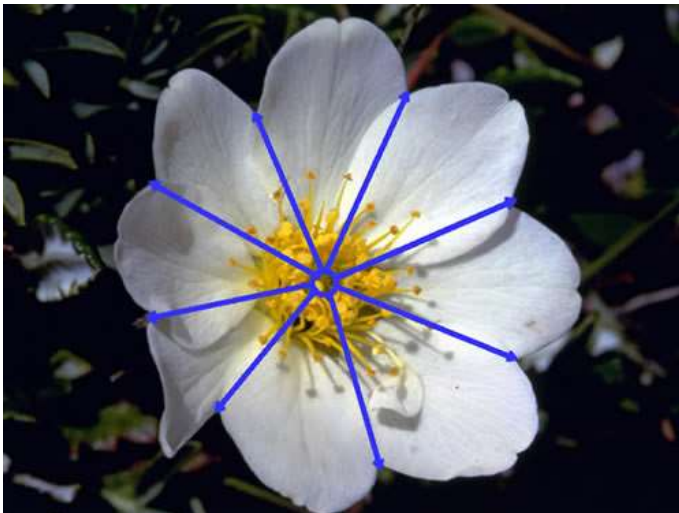
Polisimetrija =
(radijalna simetrija)



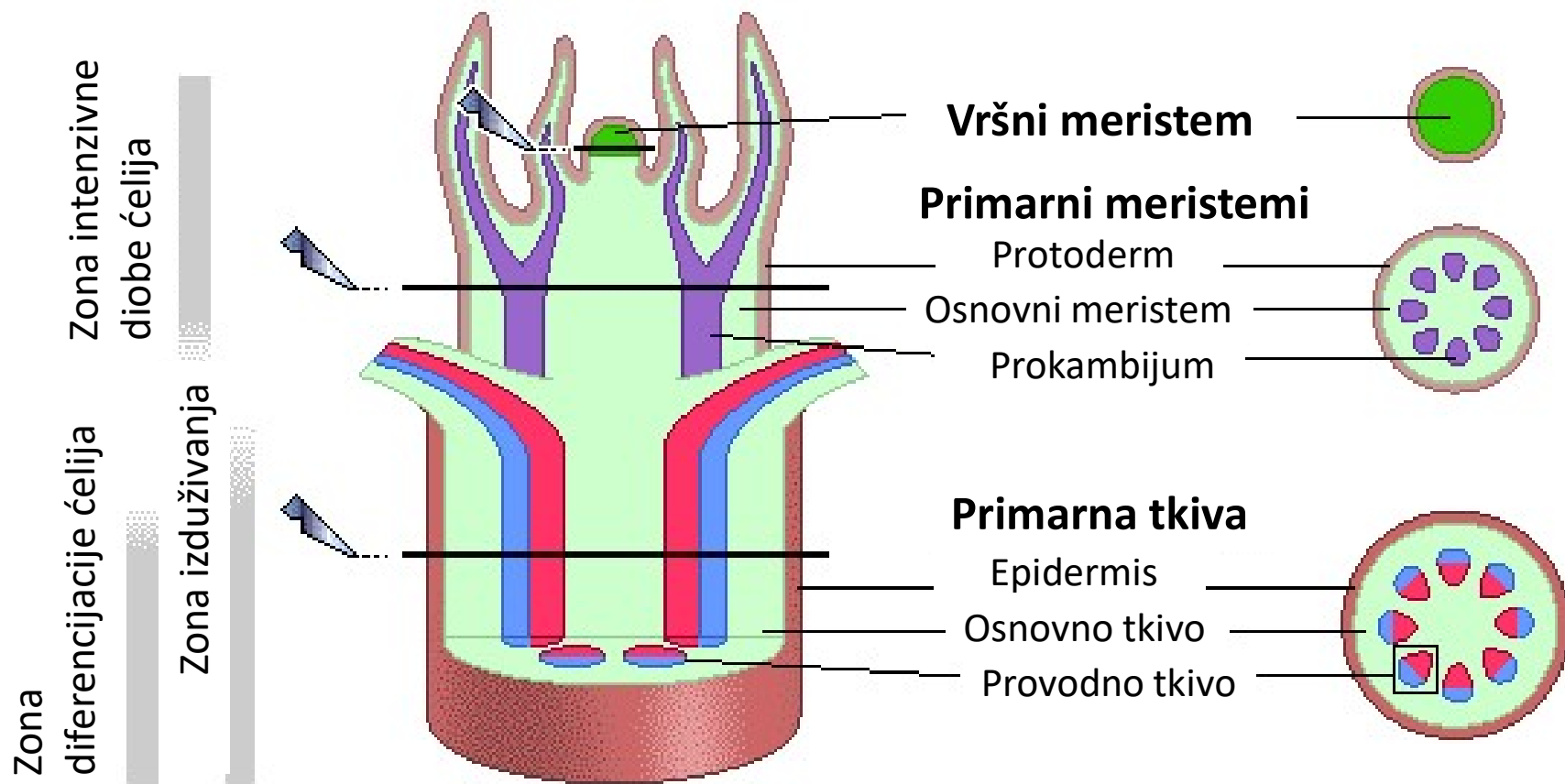
Bilateralna simetrija

Asimetrija

- Simetrija cvijeta: polisimetričan= aktinomorf, pravilan;
monosimetričan= zigomorf, nepravilan cvijet



Primarna građa- opšta shema!

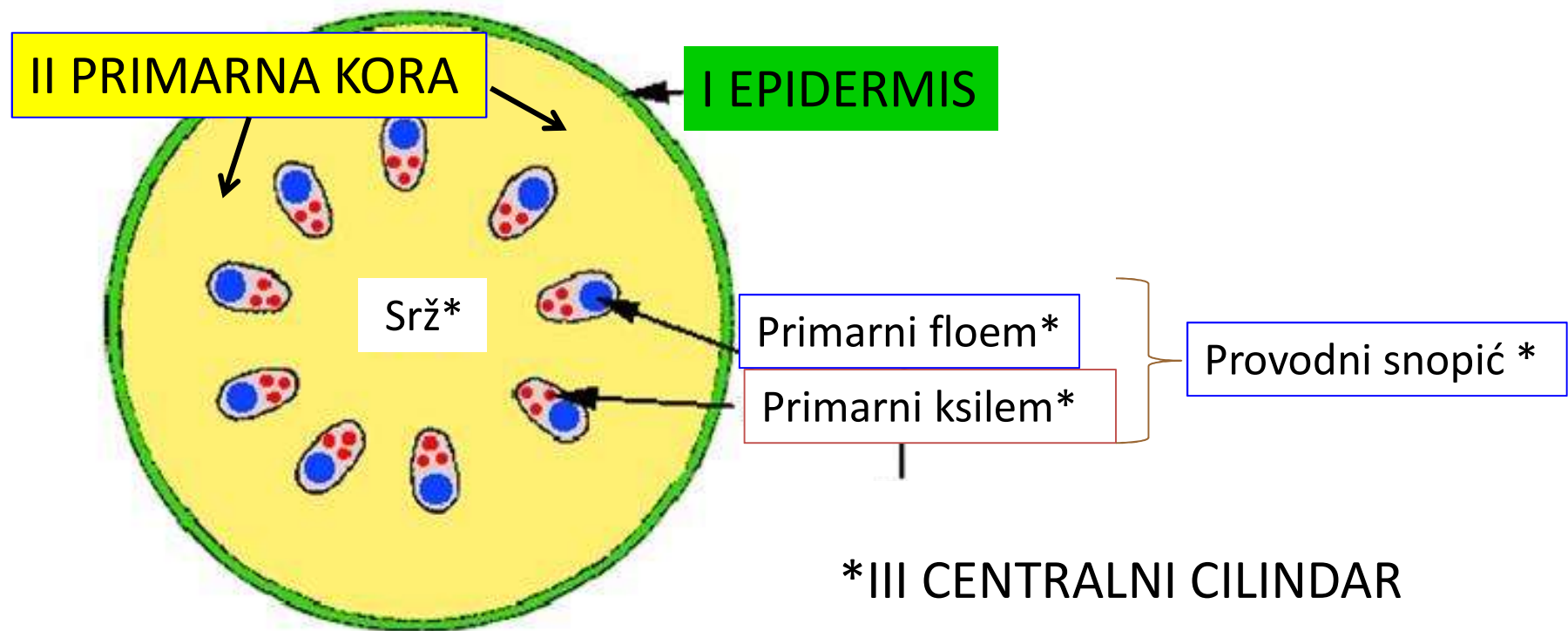


Osnovno tkivo= parenhim + mehanički elementi

Primarna građa stabla dikotiledonih biljaka

Opšta primarna građa:

Epidermis, primarna kora, centralni cilindar



Elementi primarne kore

- Parenhimske ćelije
- Mehaničke ćelije
- Endodermis=
skrobna sara

Elementi centralnog cilindra

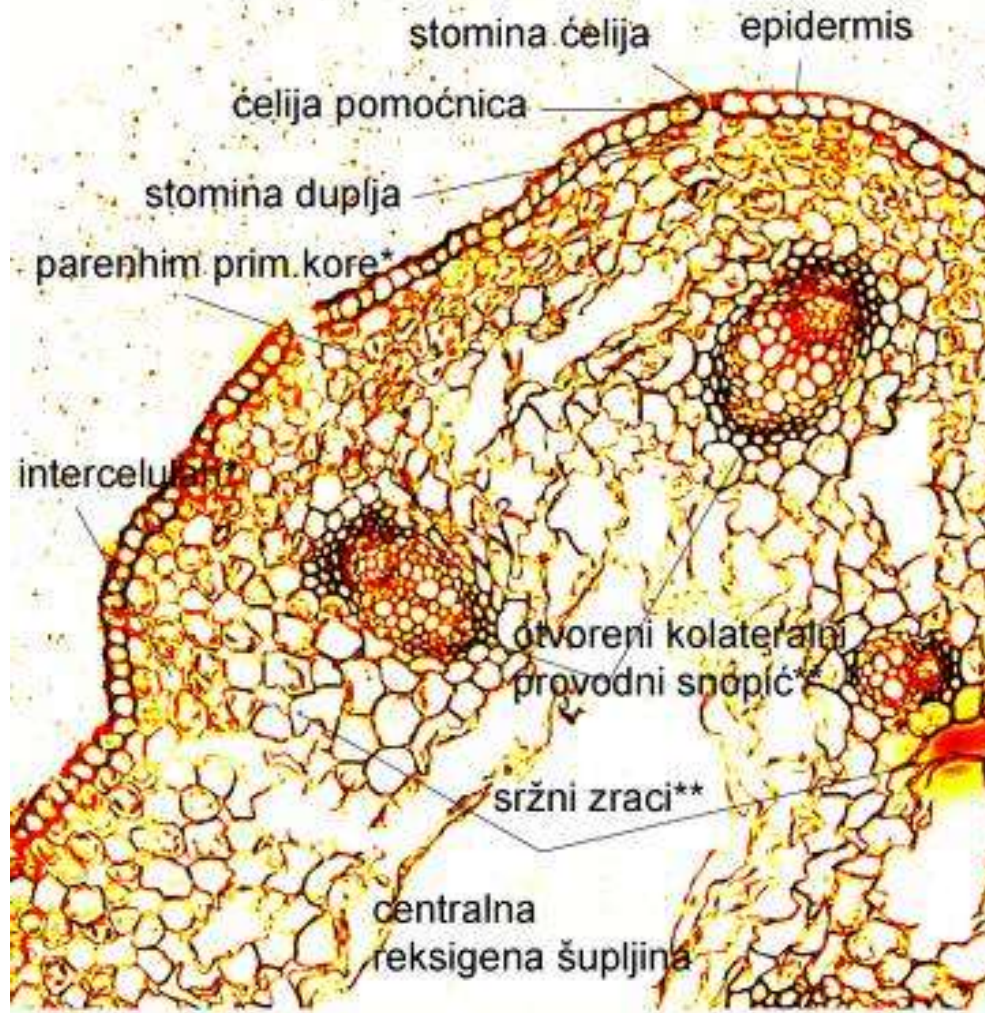
- Pericikl
- Provodni snopići
ili provodni
cilindar
- Srž

- **Pericikl:**

- a) Parenhimske ćelije

- b) Prsten od sklerenhimskog i parenhimskog tkiva

- c) Trake sklerenhima i parenhima koje se naizmjenično smjenjuju



I- EPIDERMIS

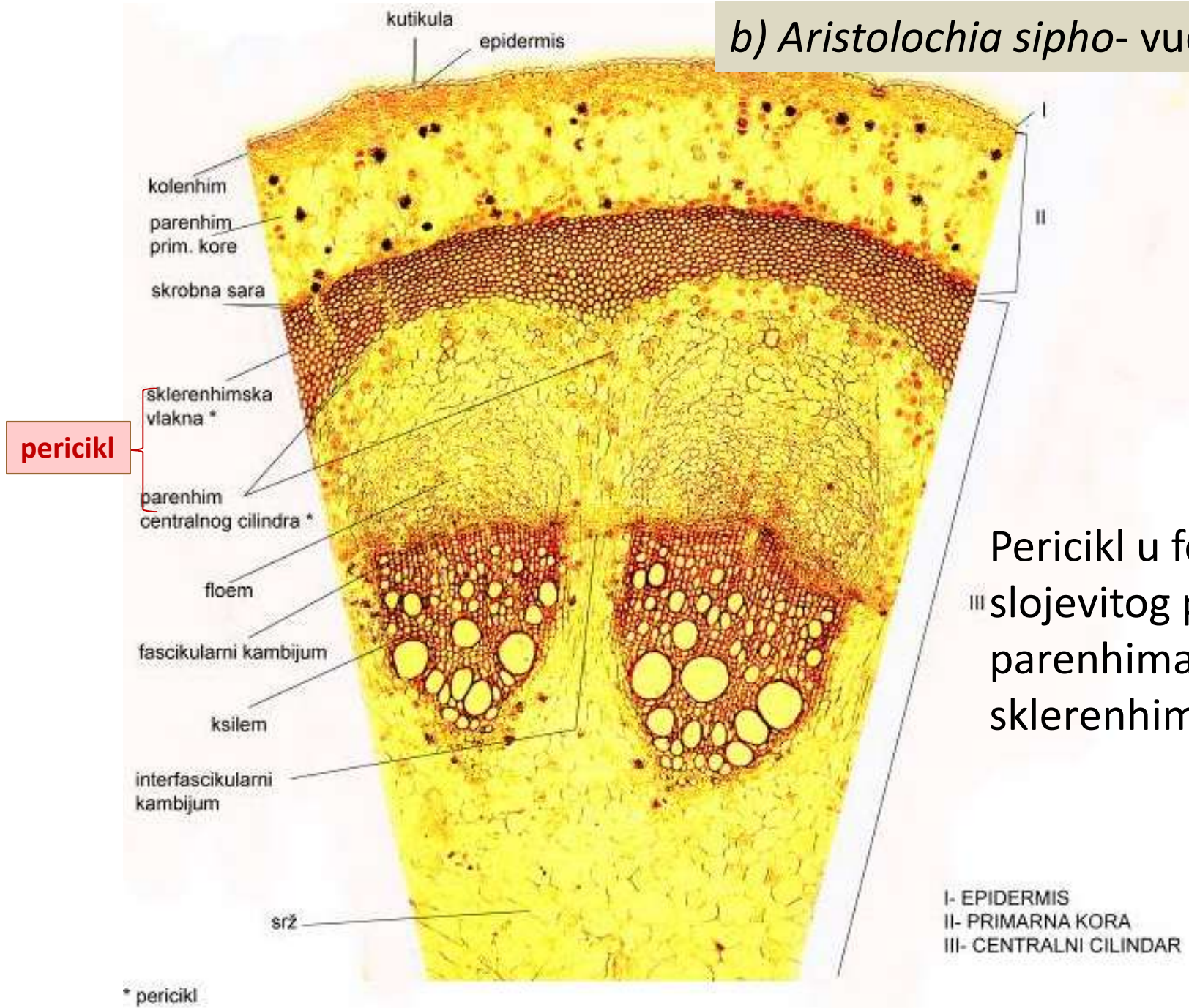
*- PRIMARNA KORA

**- CENTRALNI CILINDAR

a) *Ranunculus* sp.- ljutić

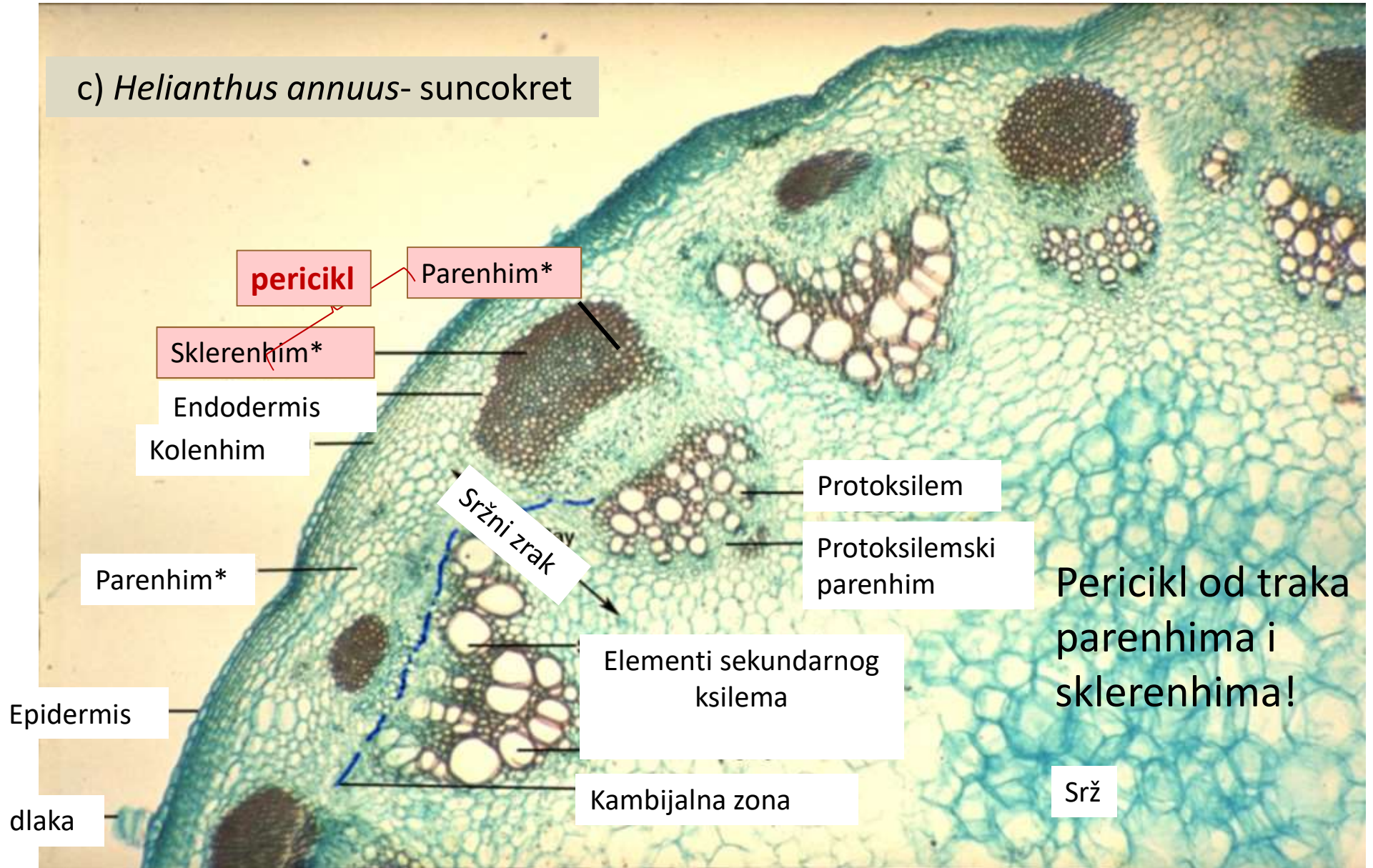
Parenhimatični pericikl!

b) *Aristolochia siphocampylodes* - vučja jabuka

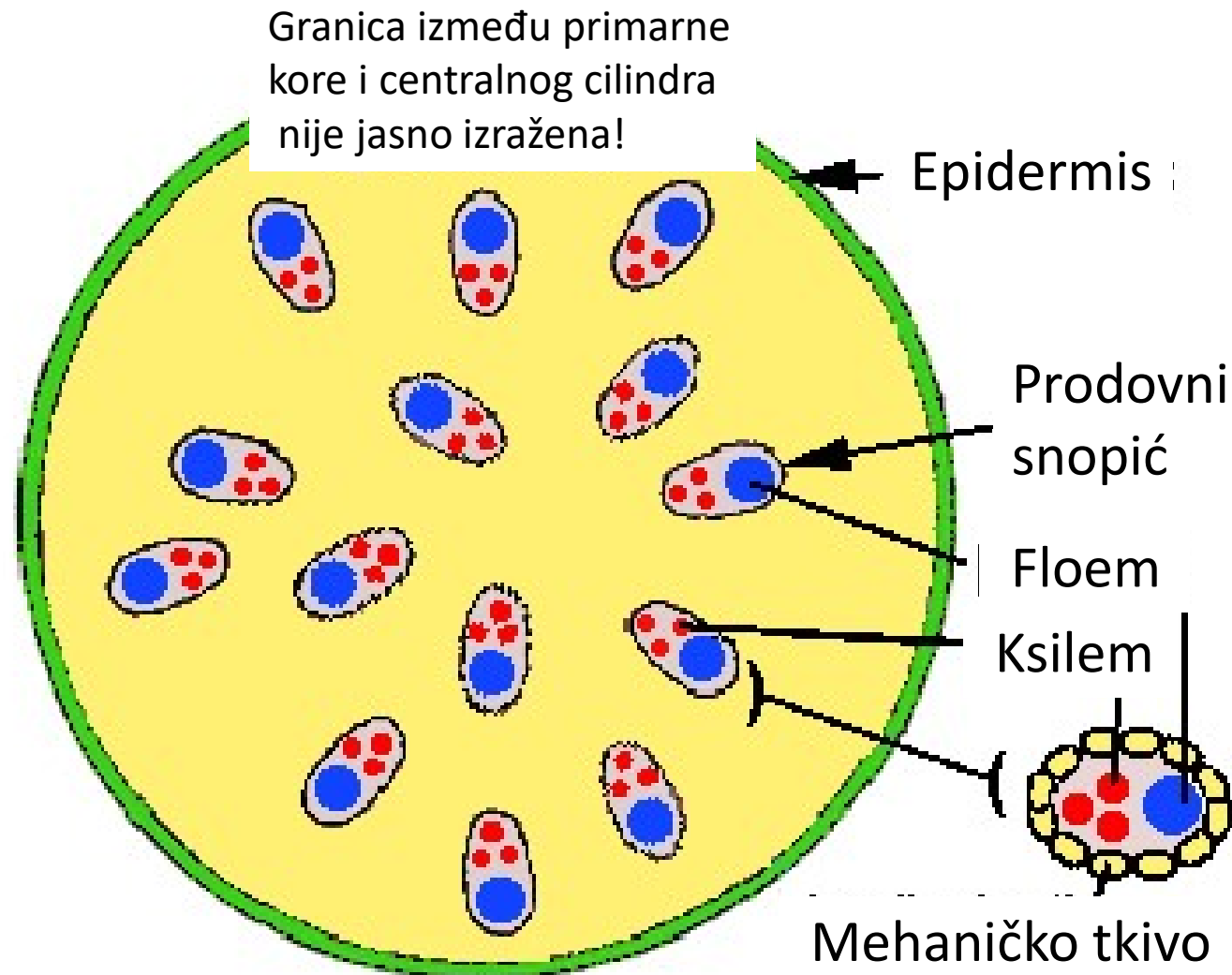


Pericikl u formi
III slojevitog prstena od
parenhima i
sklerenhima!

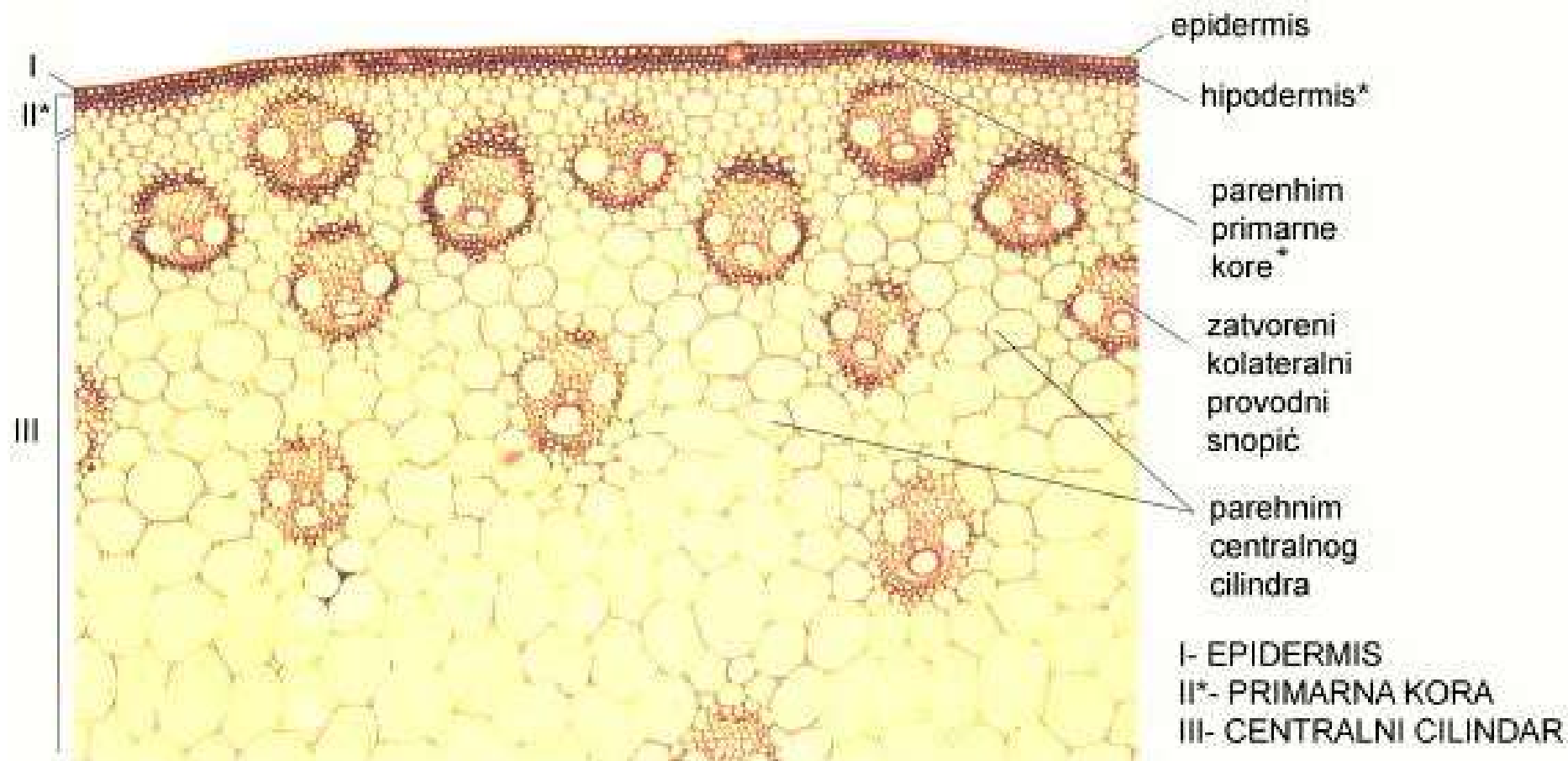
c) *Helianthus annuus*- suncokret



Primarna građa stabla monokotiledonih biljaka

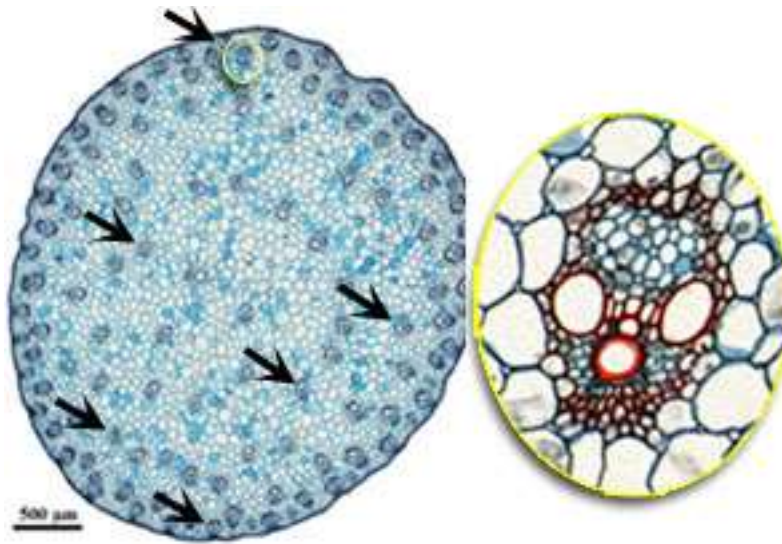


Zea mays – kukuruz



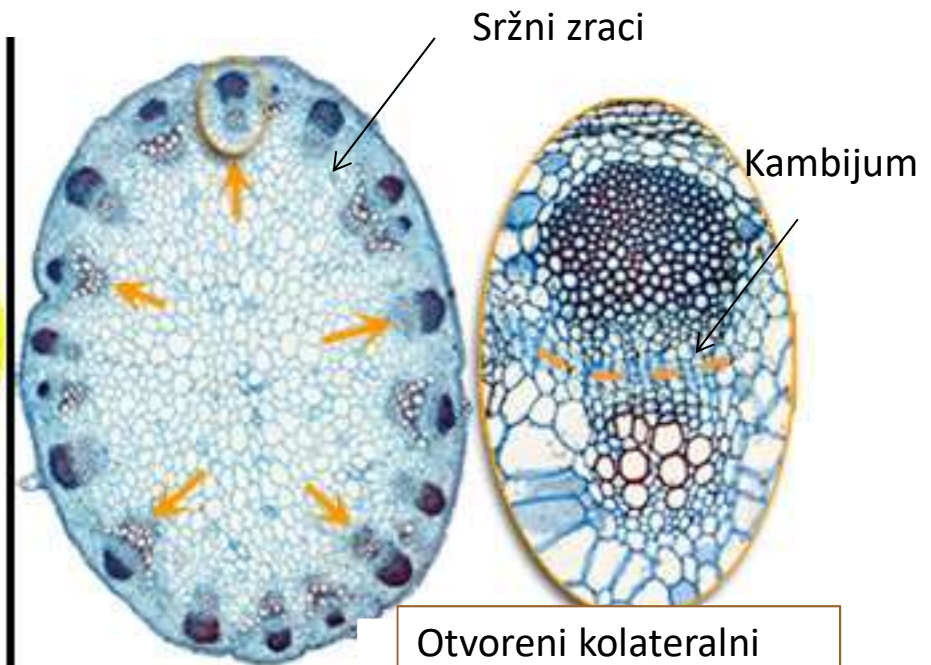
Uporedna shema primarne građe stabla mono- i dikotiledonih biljaka

PRIMARNO STABLO MONOKOTILA



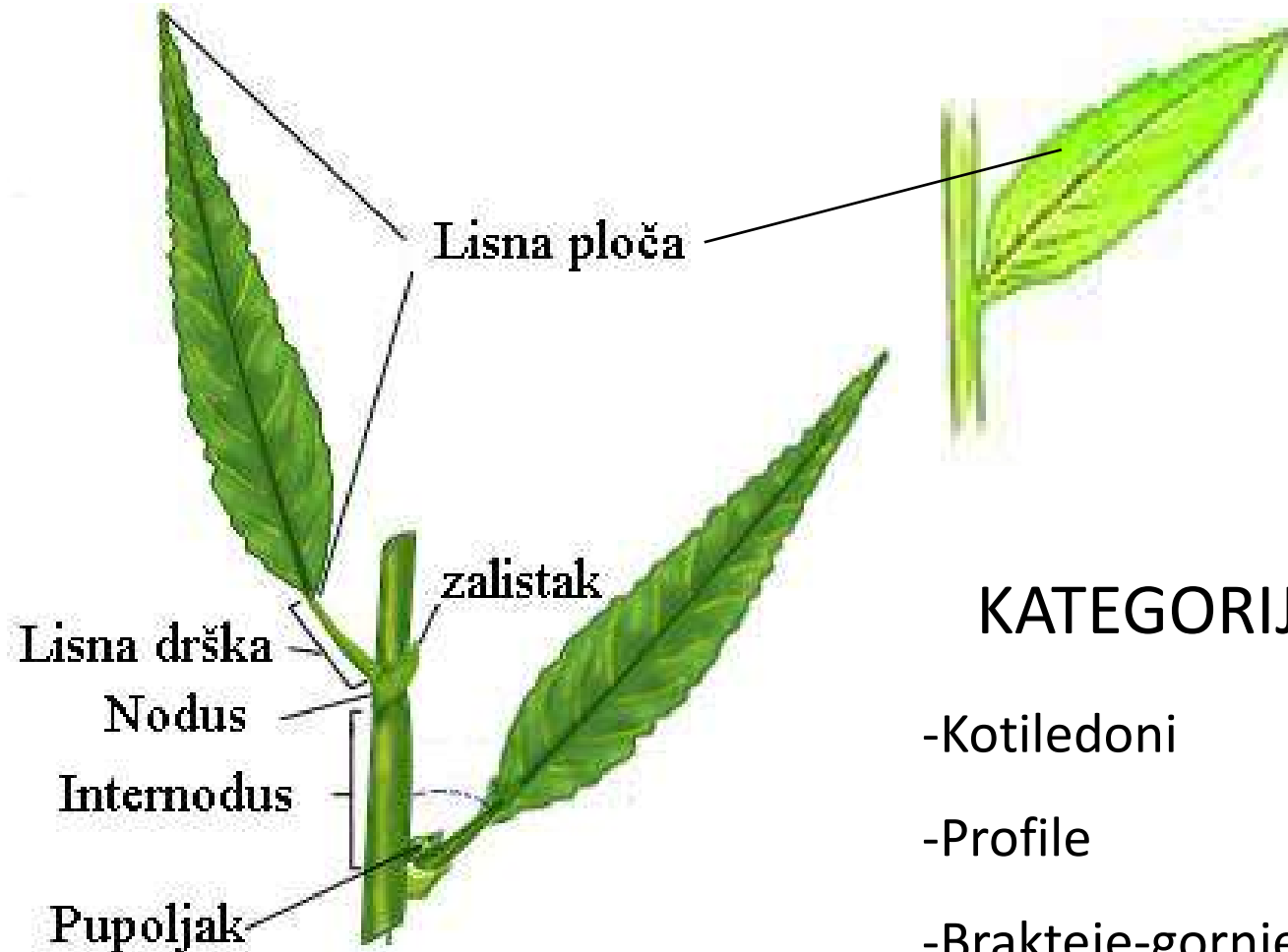
Zatvoreni kolateralni provodni snopić

PRIMARNO STABLO DIKOTILA



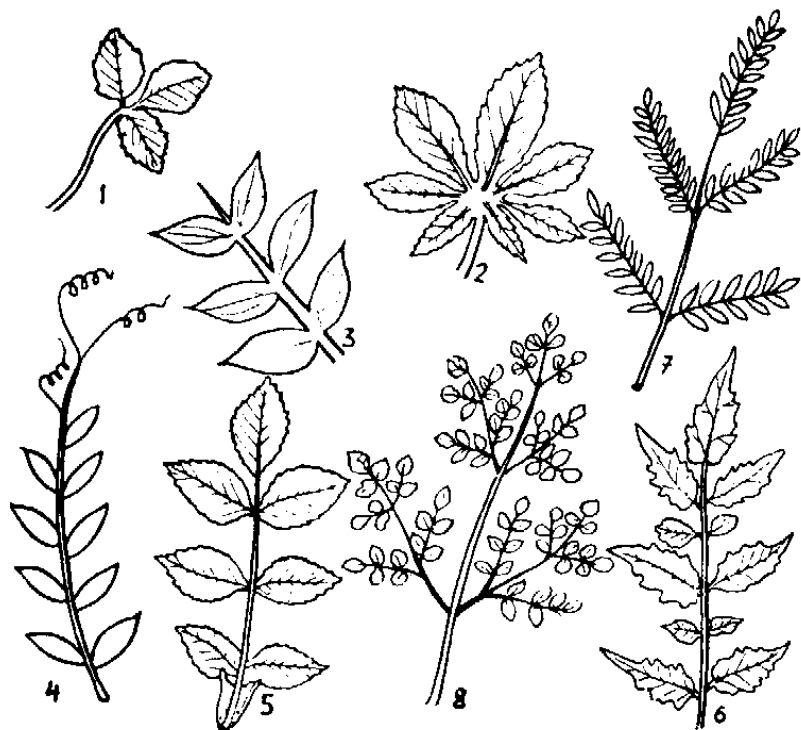
Otvoreni kolateralni provodni snopić

LIST

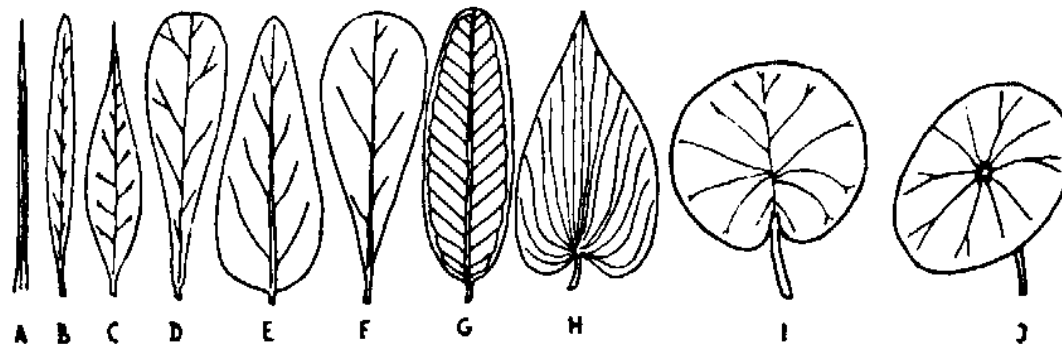


KATEGORIJE LISTOVA

- Kotiledoni
- Profile
- Brakteje-gornje lišće
- Ljuspasto lišće –donje
- Srednje lišće-asimilaciono (pravo)
- Lišće u zoni cvjetova



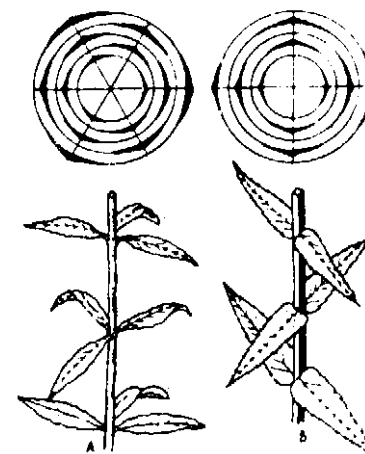
Sl. 308. Složeno građeni listovi: 1 — tročlan; 2 — prstasto složen; 3 — parno perasto složen; 4 — parno perast list sa listićima pretvorenim u rašljike; 5 — neparno perasto složen; 6 — isprekidano perasto složen; 7 — dvojno perasto složen; 8 — trojno perasto složen



Sl. 309. Oblici liske nekih listova: A — igličast; B — linearan; C — lancetast; D — lopatičast; E — jajast; F — objajast; G — eliptičan; H — srcast; I — okrugao; J — peltatan list

Forma lista

Raspored listova

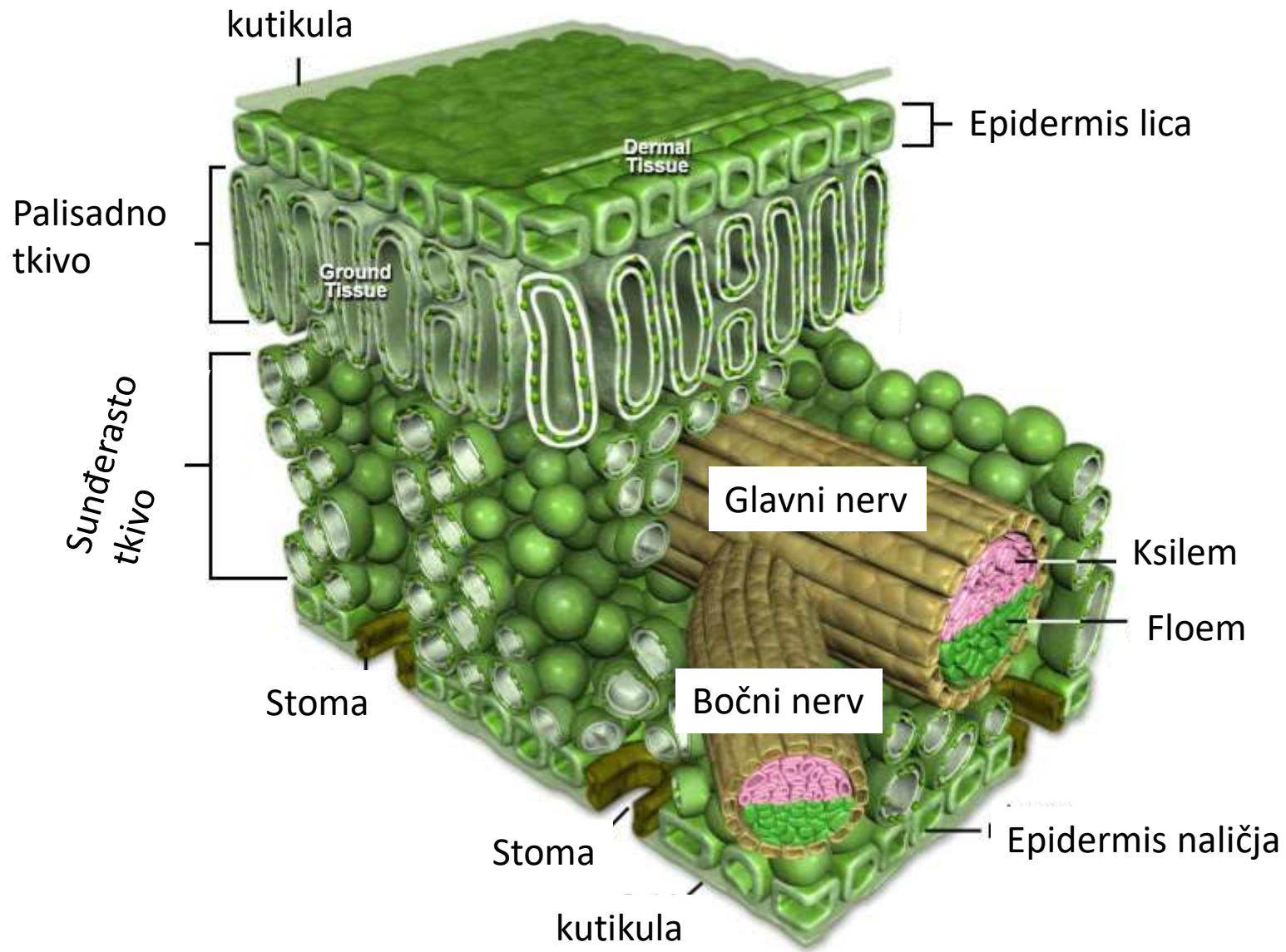


Sl. 109. Pršljenast raspored listova: A — tri lista u pršljenju, B — dva lista u pršljenju (naspraman raspored) (po Tatiću i sar.)

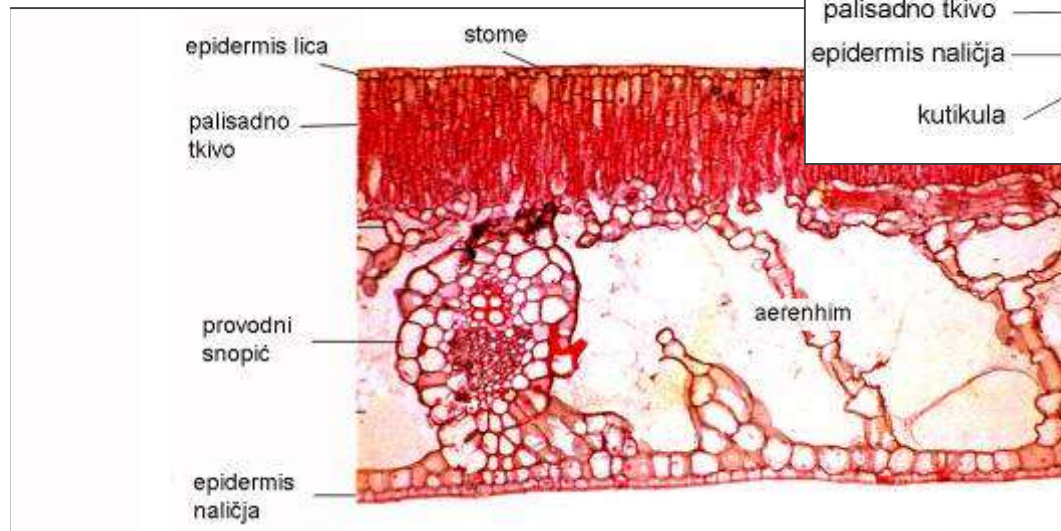
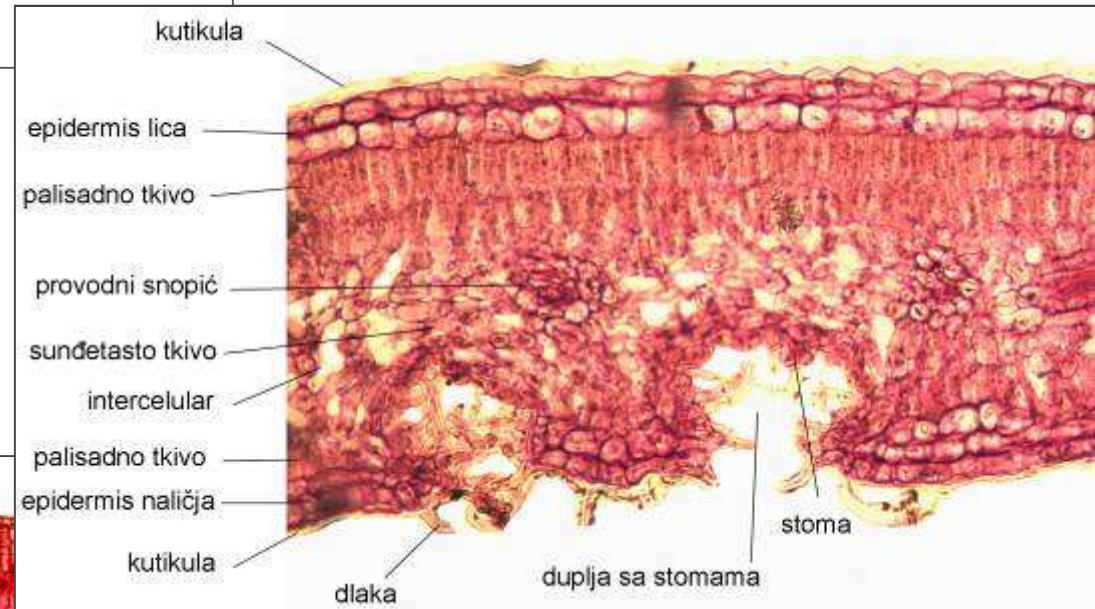
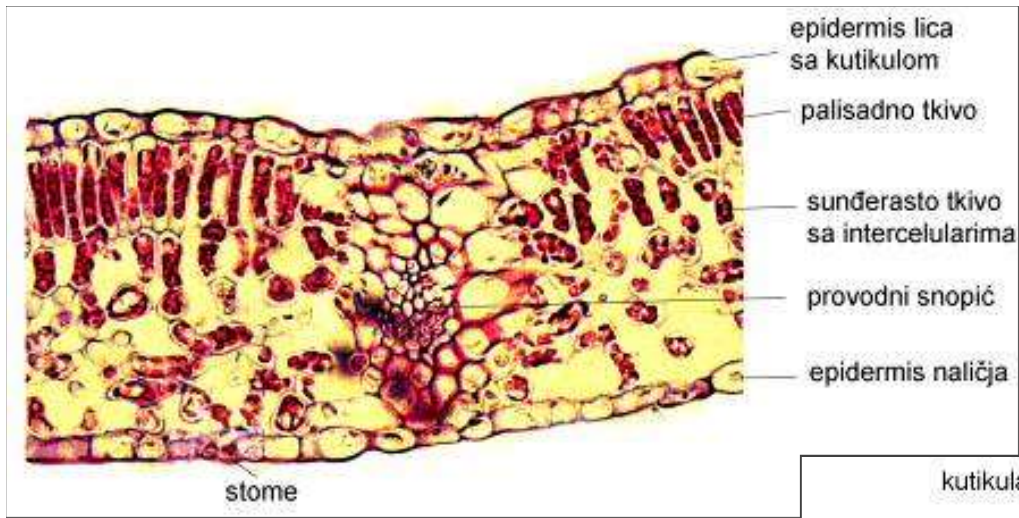
Nervatura ...

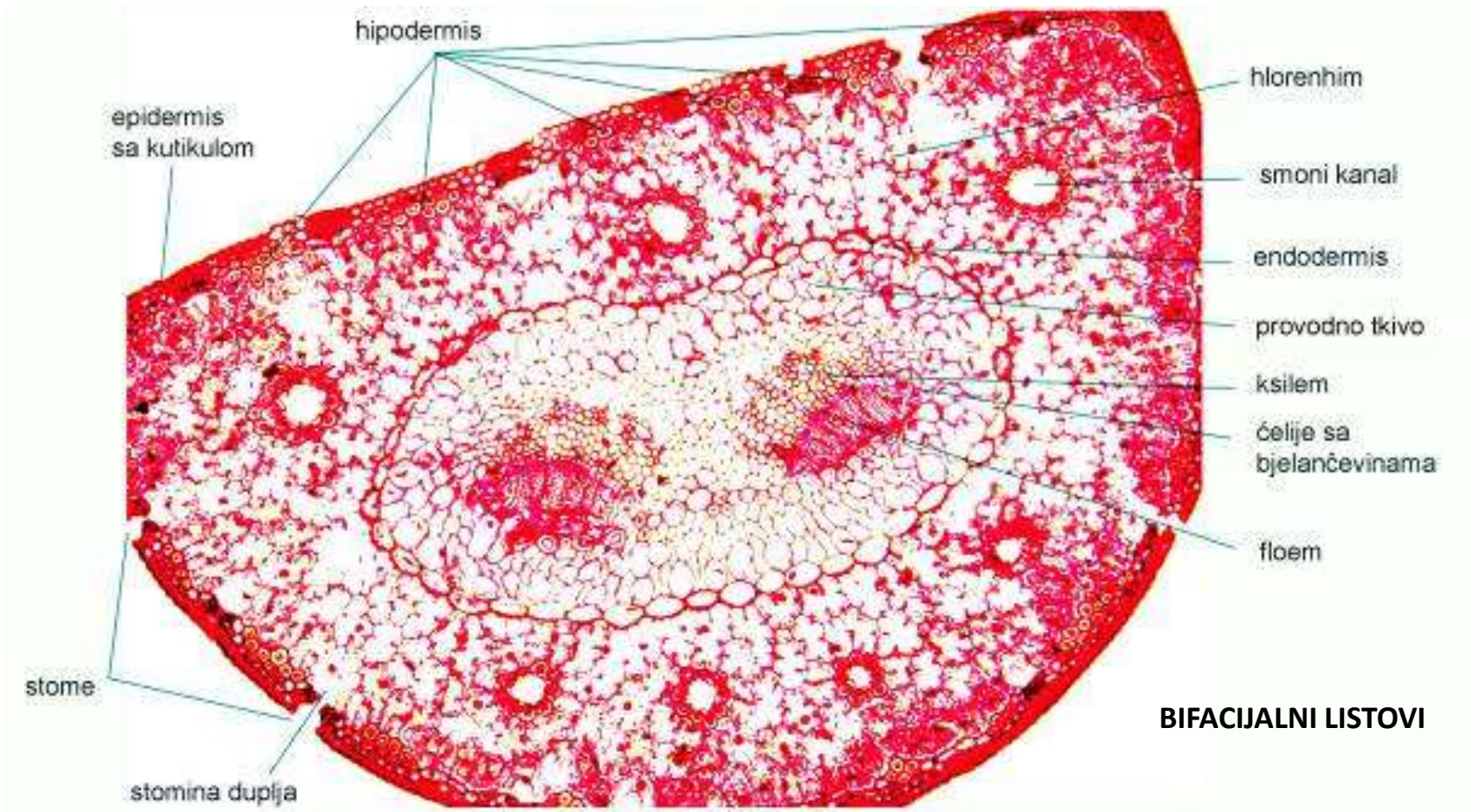
Zalisci

Anatomska građa lista



list





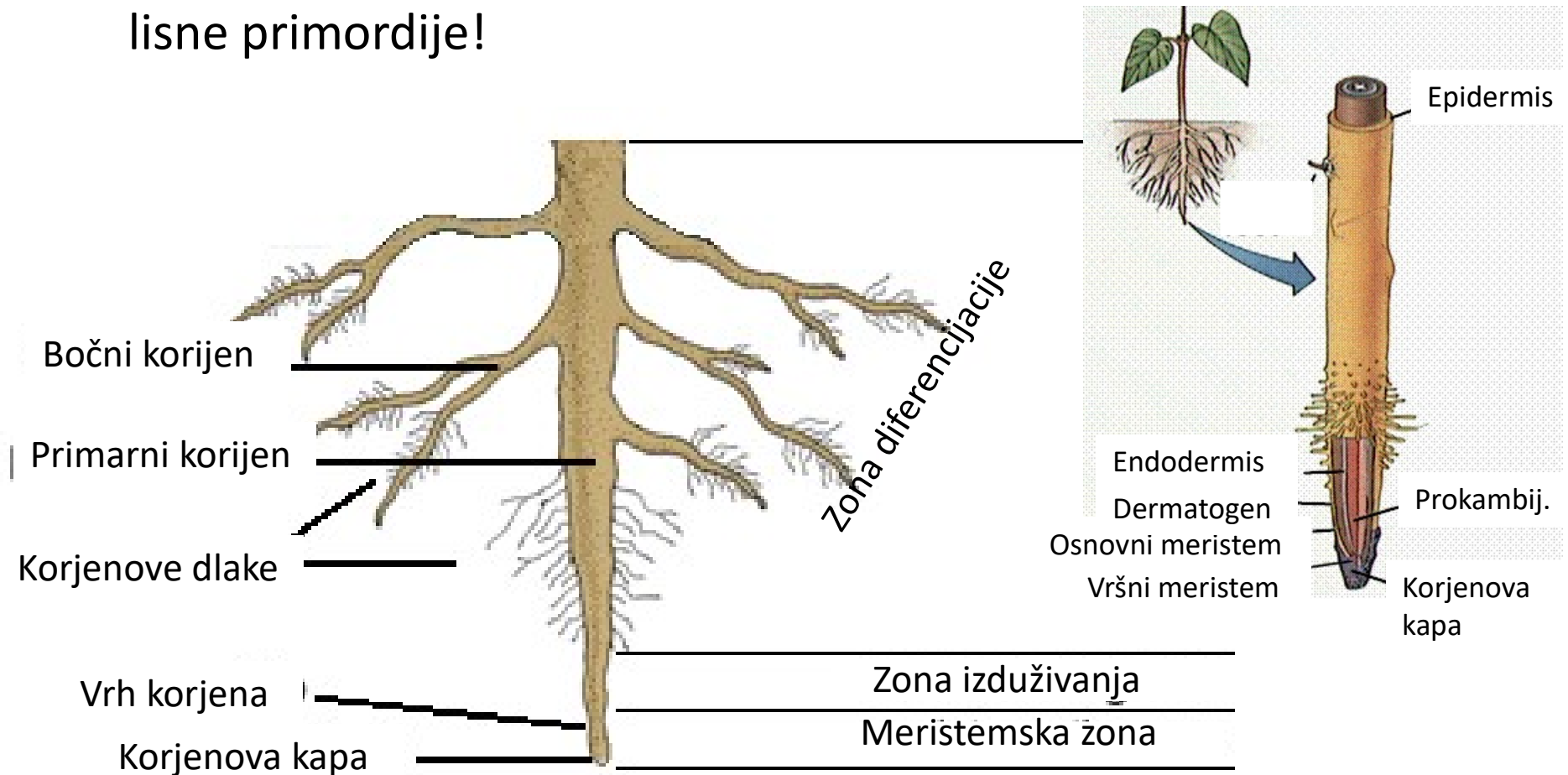
BIFACIJALNI LISTOVI

EKVIFACIJALAN LIST

UNIFACIJALA LIST

Korijen

- Podzemni organ radijalne simetrije na kojem se ne obrazuju lisne primordije!

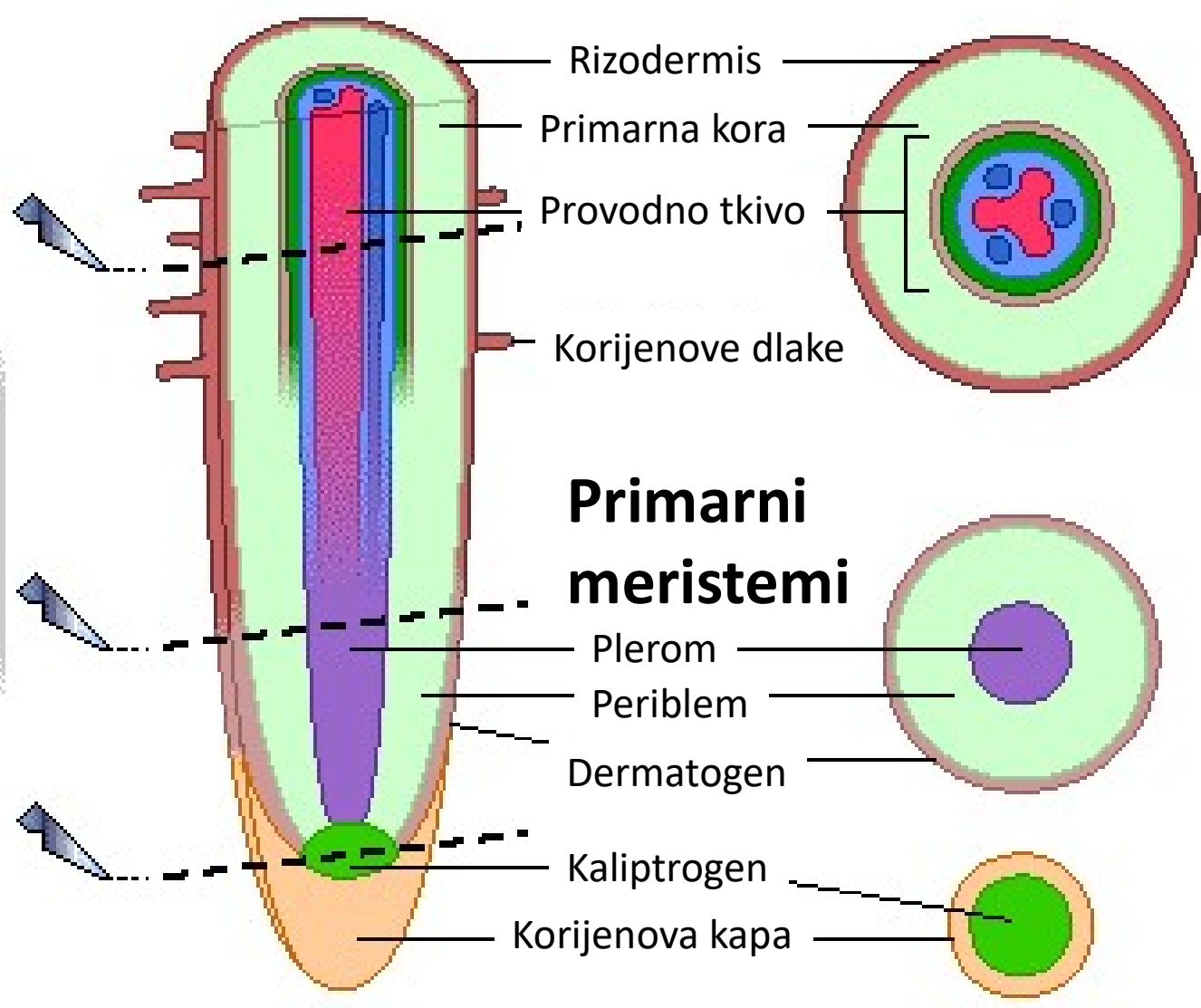


Primarna građa korijena

Zona diferencijacije ćelija

Zona intenzivne diobe ćelija

Zona izduživanja



Primarni meristemi

Rizodermis

Primarna kora

Provodno tkivo

Korijenove dlake

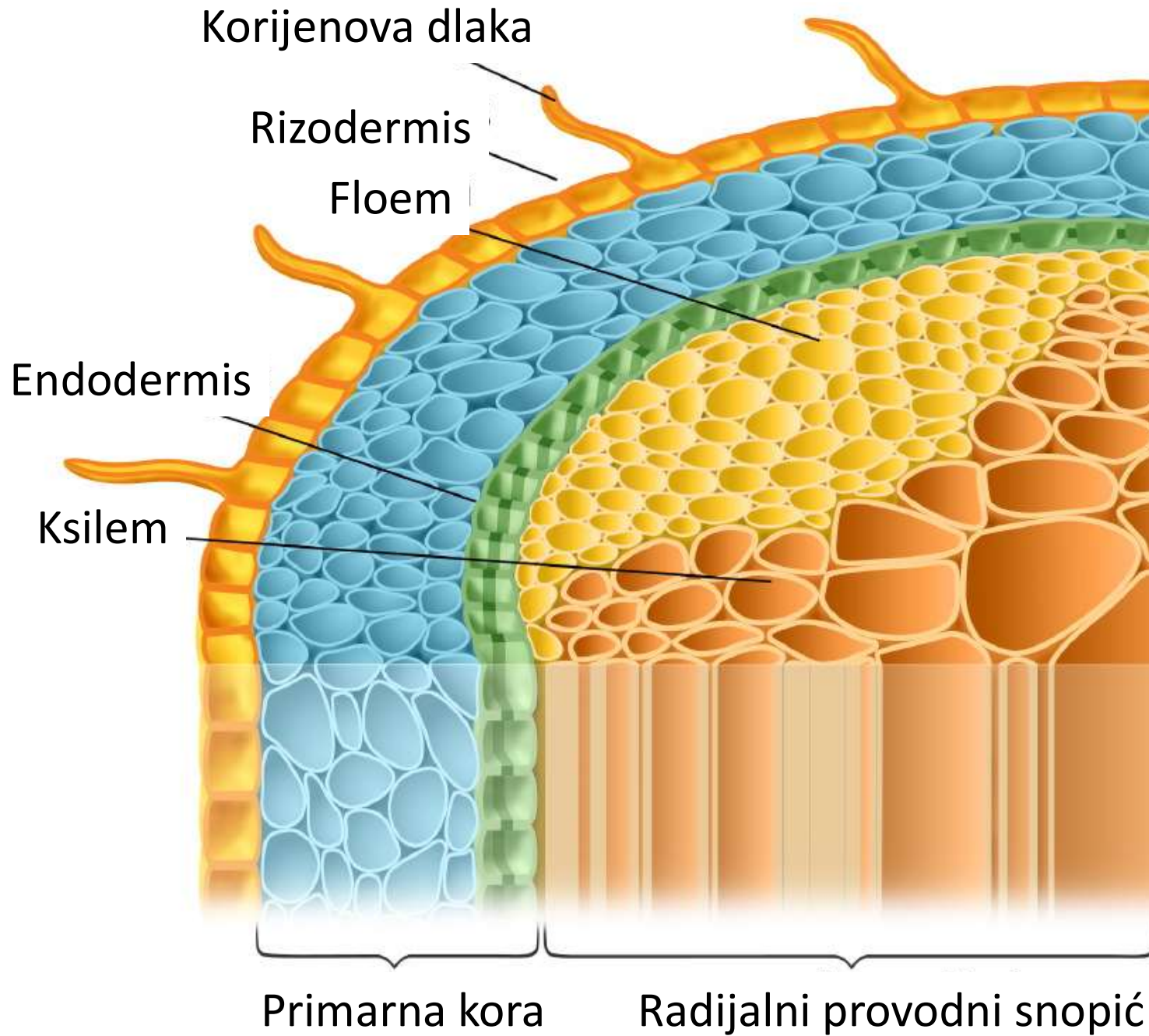
Plerom

Periblem

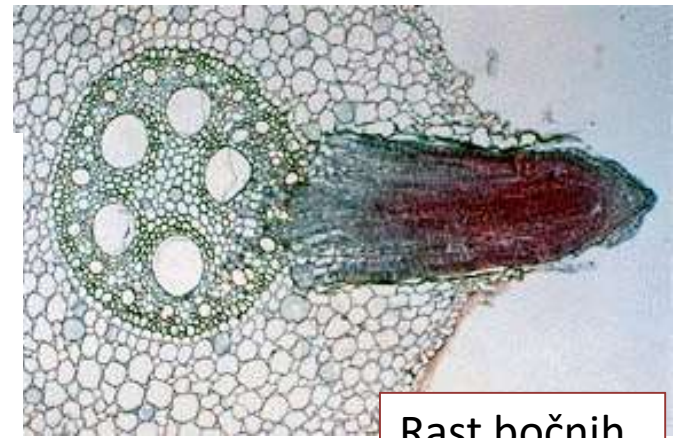
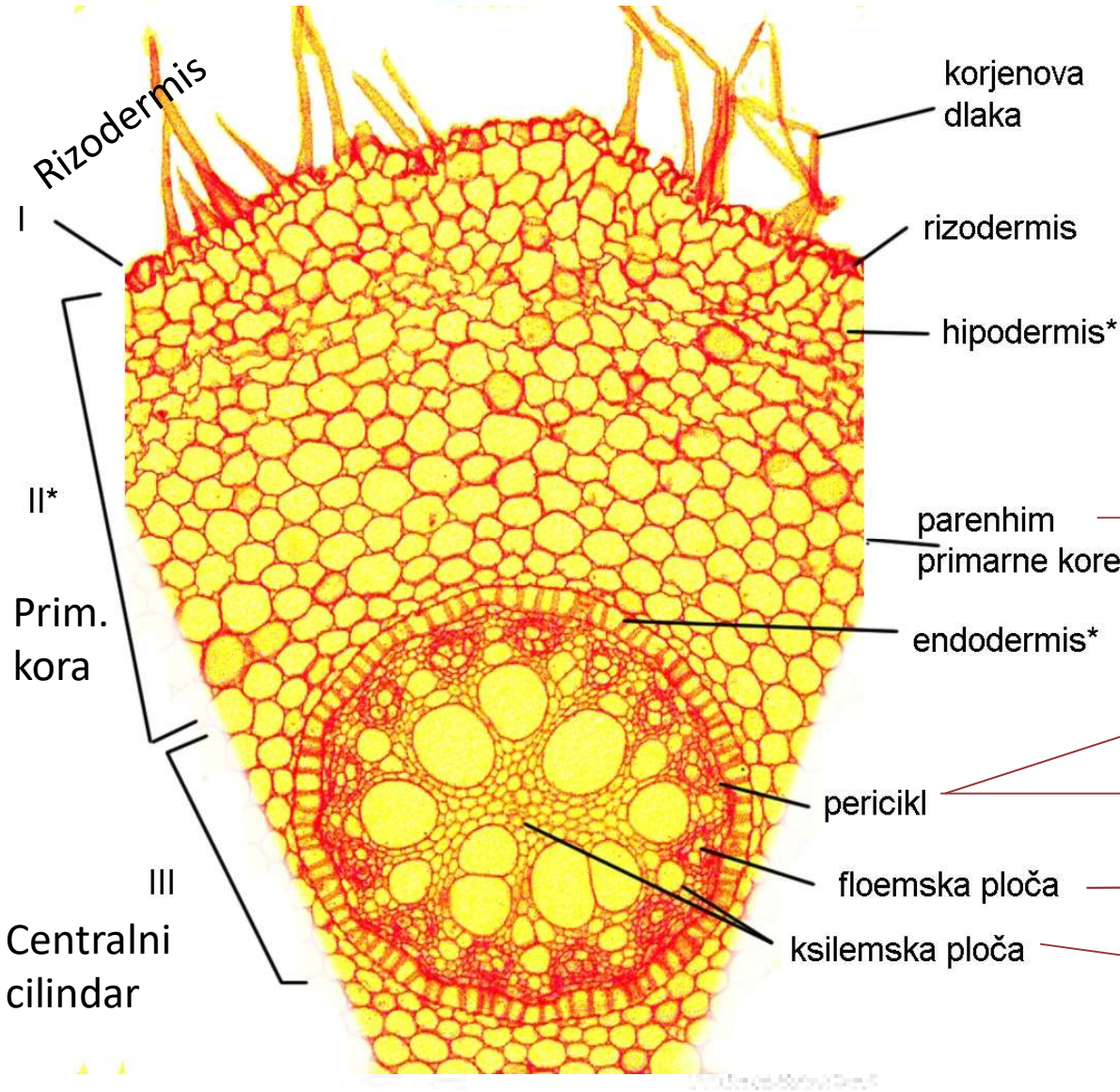
Dermatogen

Kaliptrogen

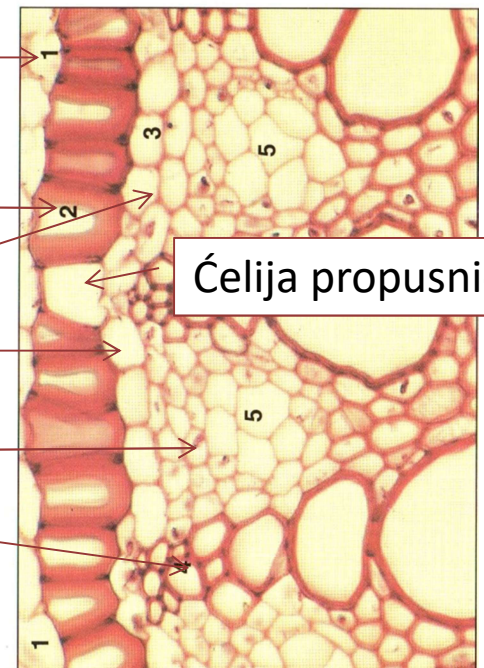
Korijenova kapa



Presjek kroz zonu korjenovih dlaka

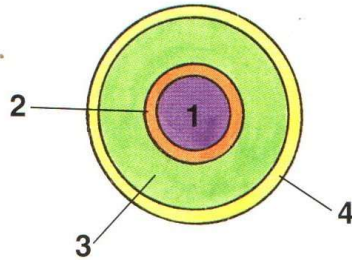


Rast bočnih korjenova

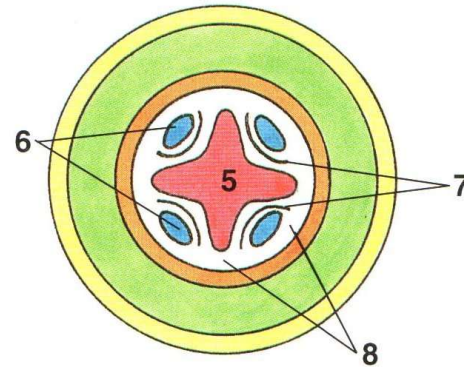


Kasparijeva zadebljanja ...

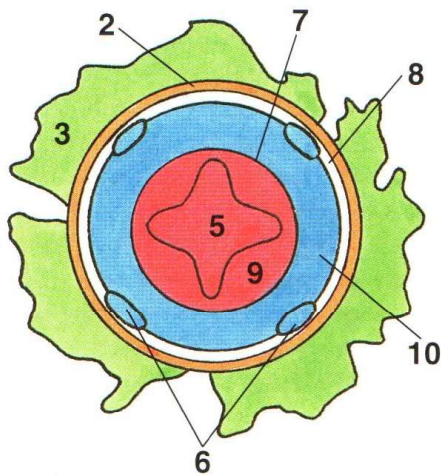
Presjek vrha korijena



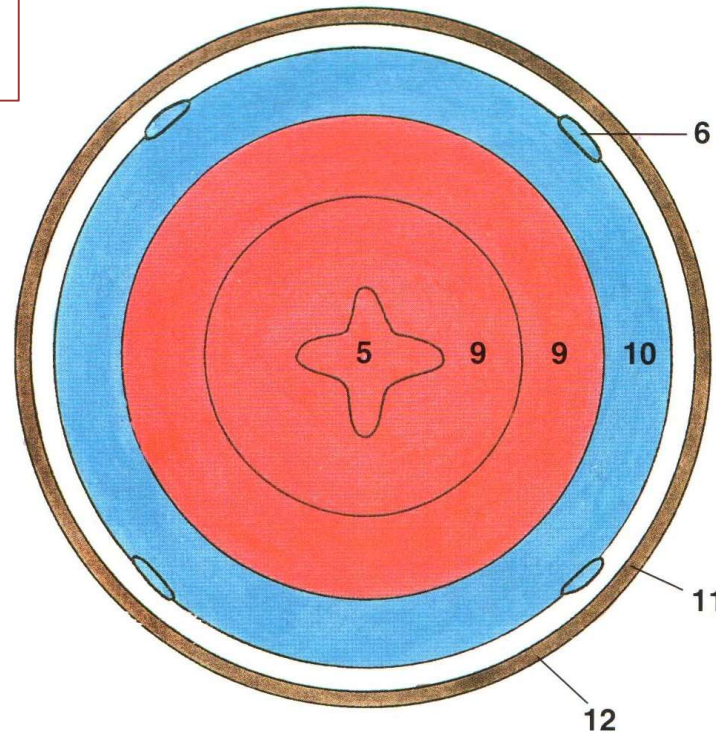
Presjek kroz zonu iznad korijenovih dlaka



Formiranje prstena od vaskularnog kambijuma



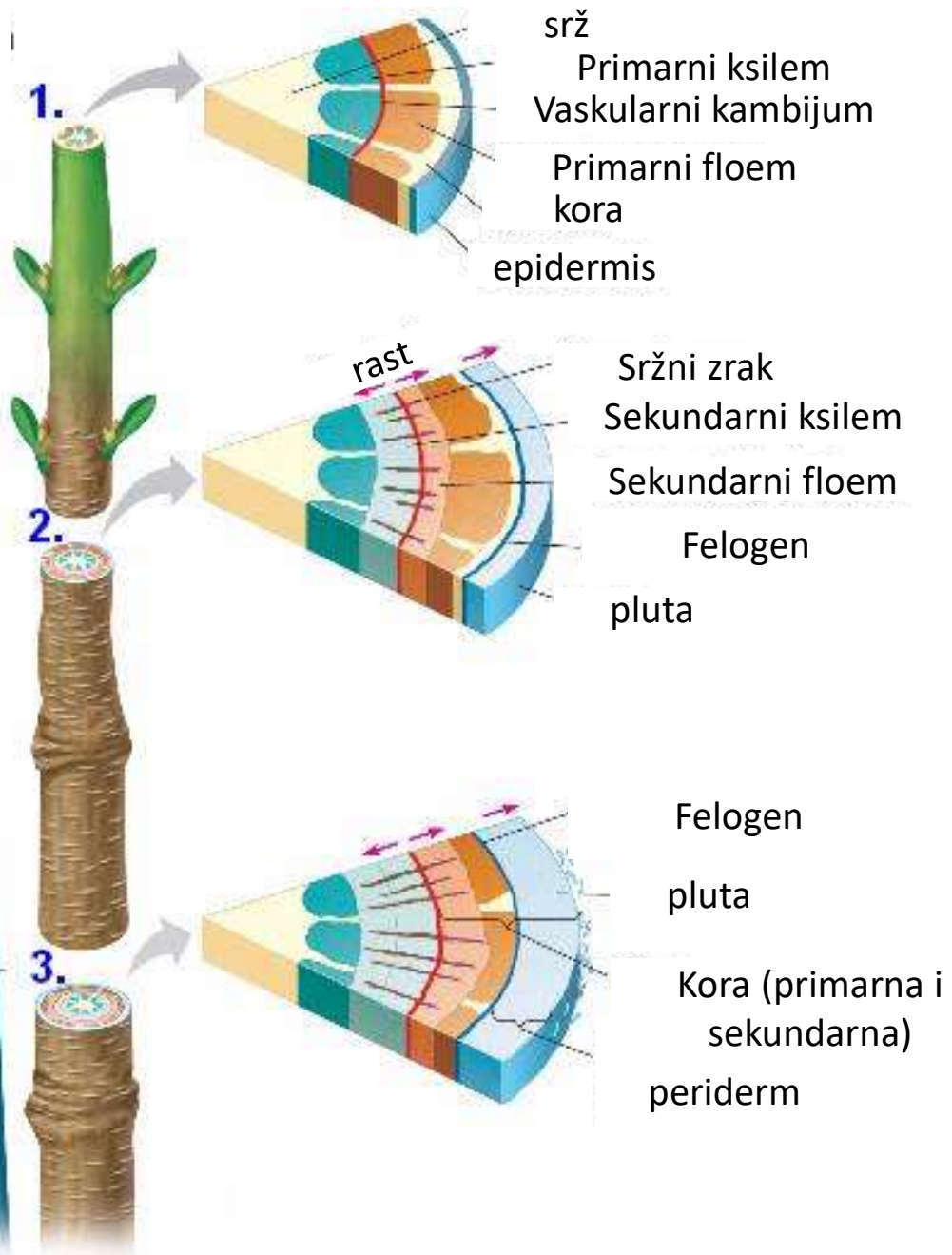
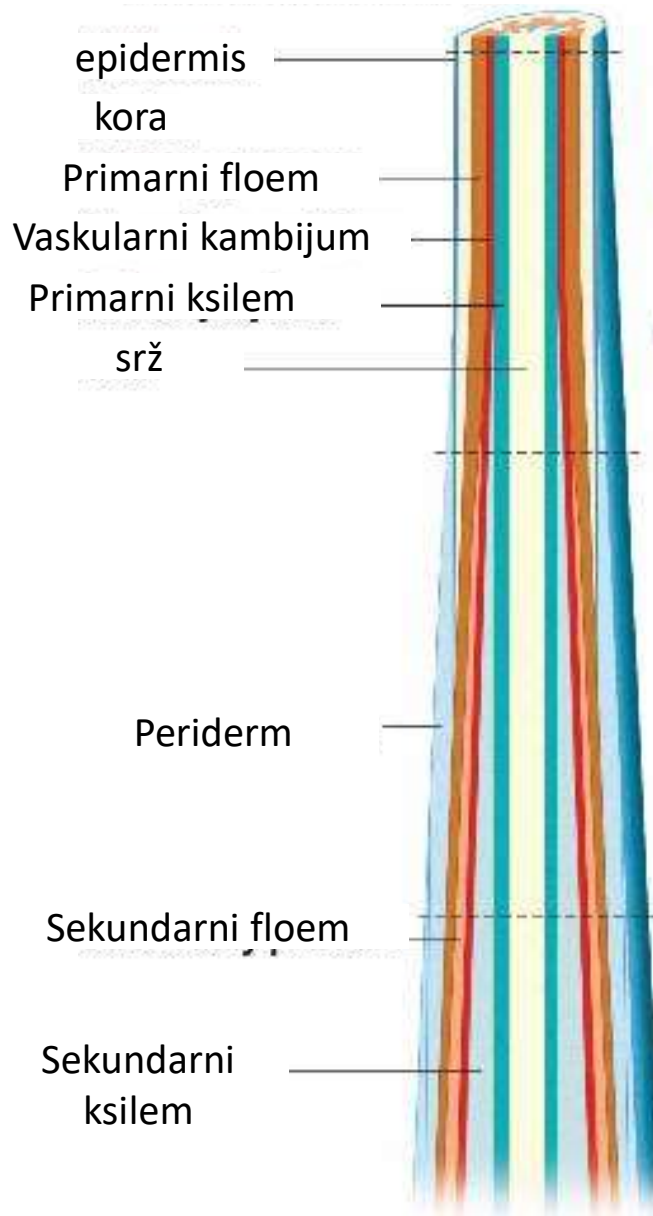
Sekundarno debljanje



- 1- prokambijum
- 2- endodermis
- 3- primarna kora
- 4- rizodermis
- 5- ksilem
- 6- floem
- 7- vaskularni kambijum
- 8- pericikl
- 9- sekundarni ksilem
- 10- sekundarni floem
- 11- felogen
- 12- peridermis

Sekundarni rast stabla

Sekundarni rast stabla



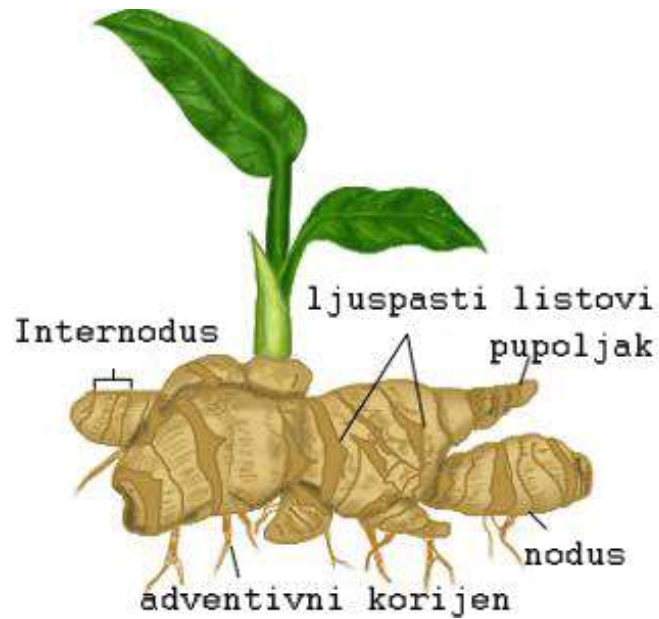
Metamorfoze izdanka

- Fotofilni

- Geofilni izdanci (rizomi, stolone, krtole i lukovice)

Rizomi

(horizontalni, uspravni, monopodijalni, simpodjalni)

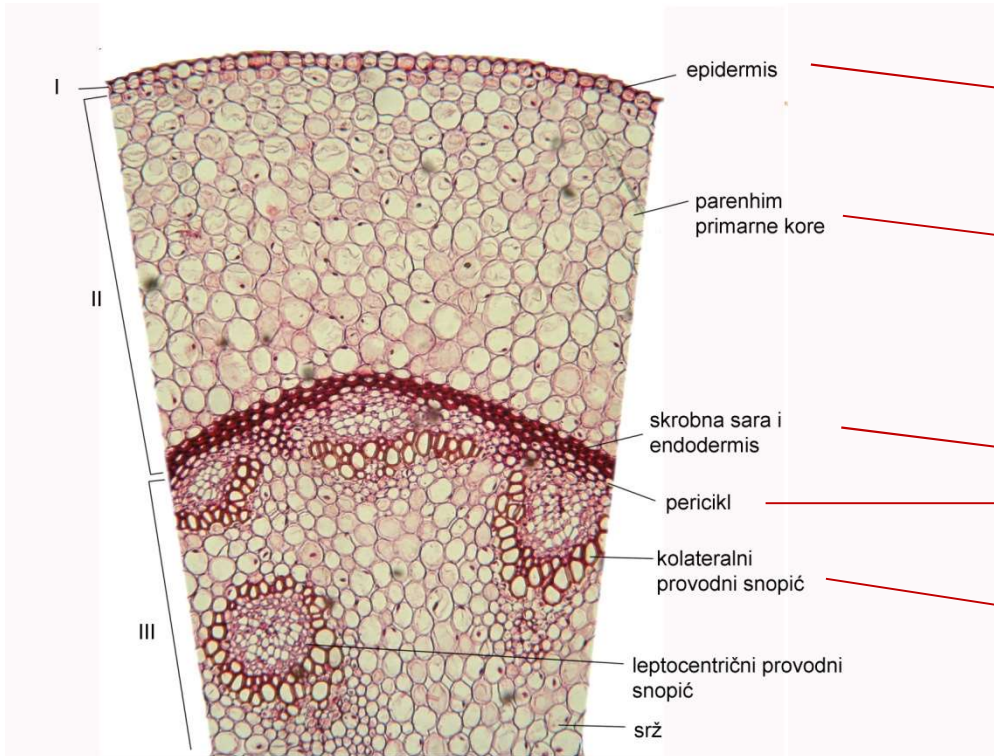


Rizom đumbira

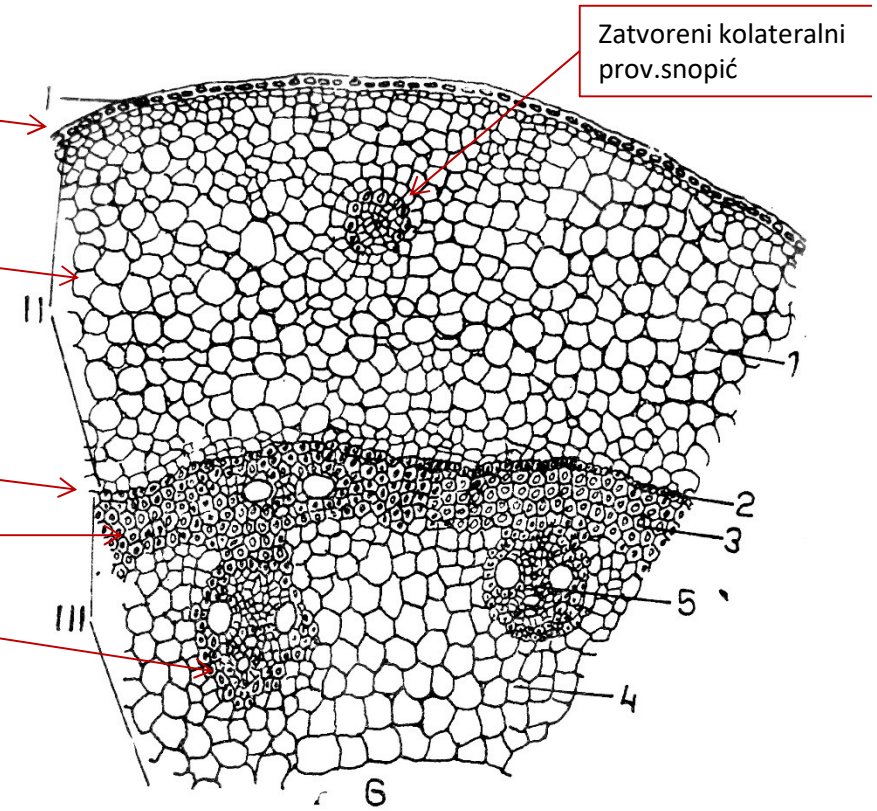


Rizom kisele paprati

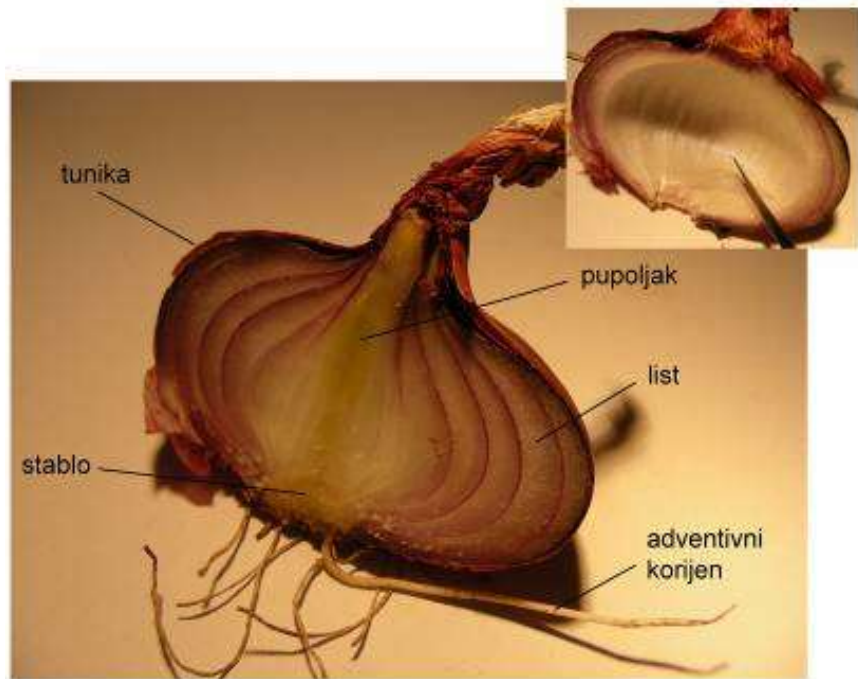
Rizom đurđevka
(*Convallaria majalis*)



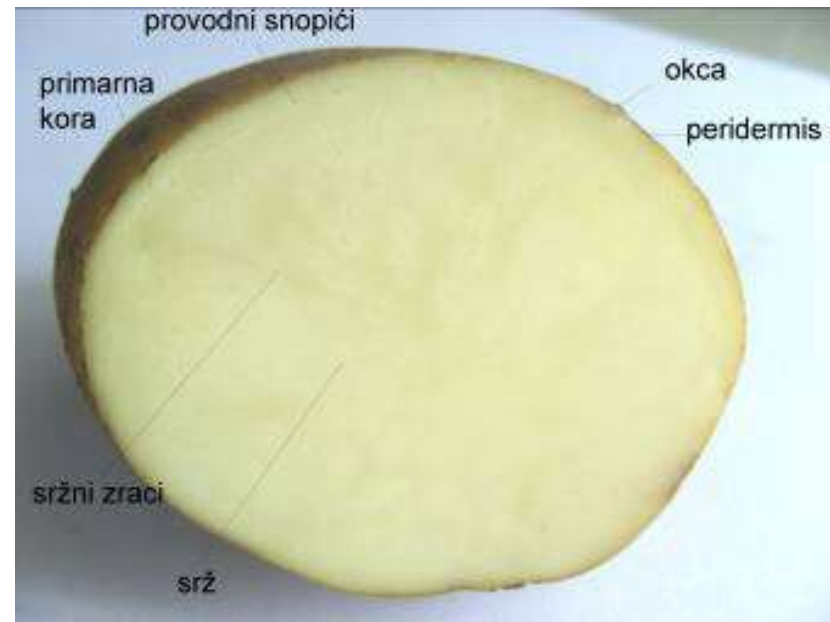
Rizom pirevine
(*Agropyron repens*)



3- pericikl u vidu mehaničkog prstena



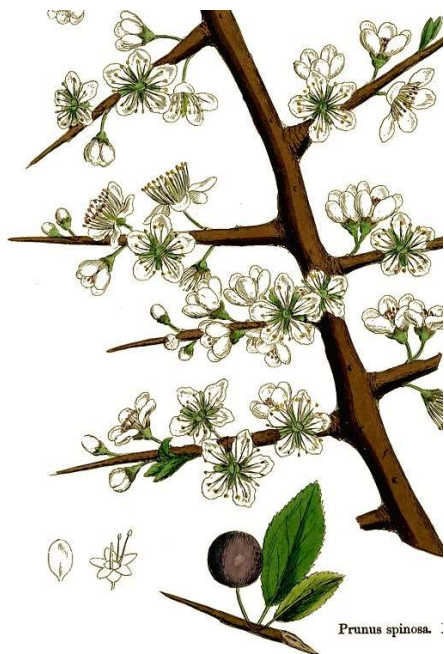
Lukovica



Krtola



Metamorfoza izdanka u trn



Metamorfoza izdanka u rašljike



Filokladije



Sukulente



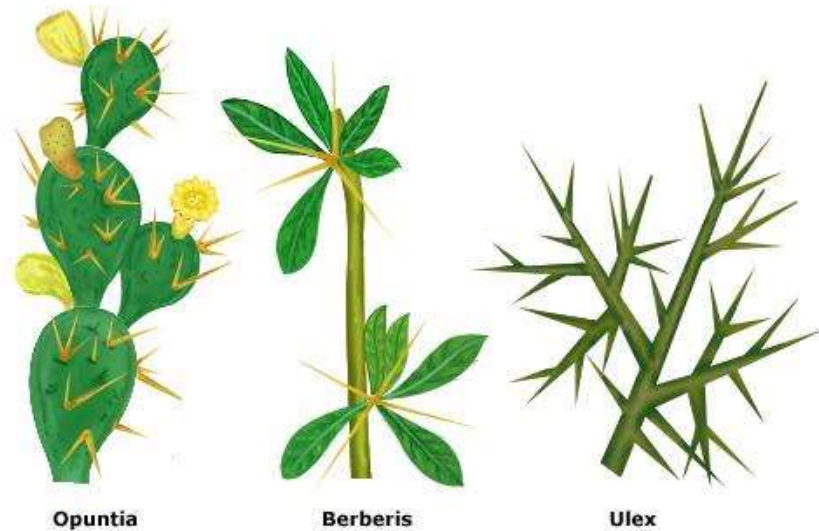
METAMORFOZE LISTA

Metamorfoza lista u rašljiku

Metamorfoza lista u trn



rašljika

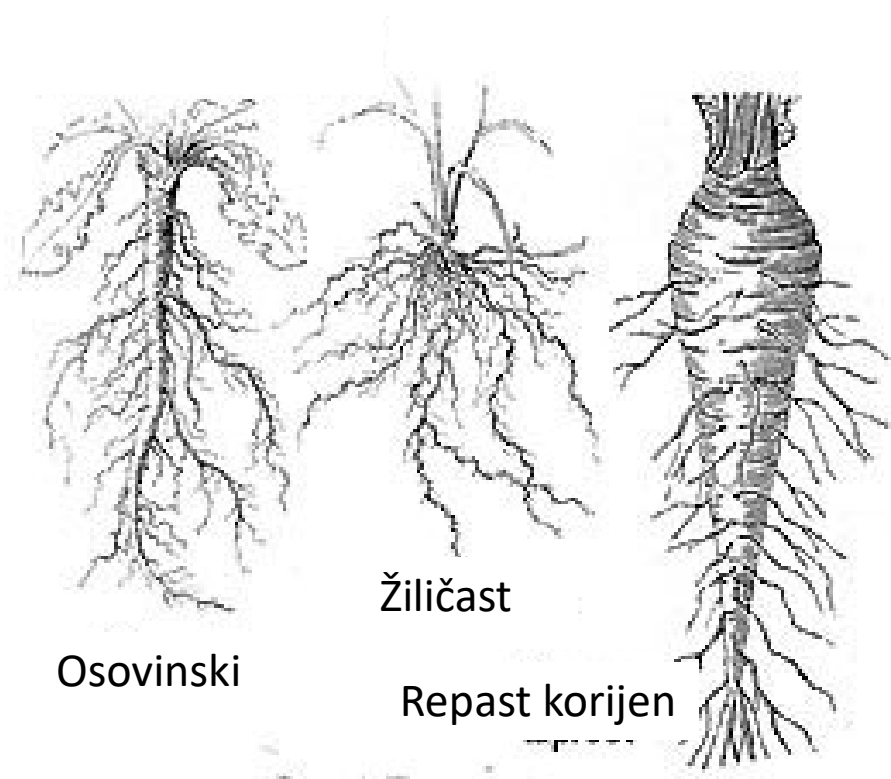


Metamorfoza lisne drške u filodije

Listovi kao organi za magacioniranje hrane



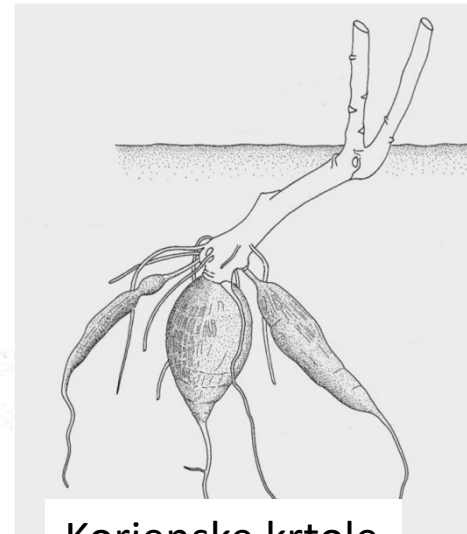
Tipovi korjena i metamorfoze



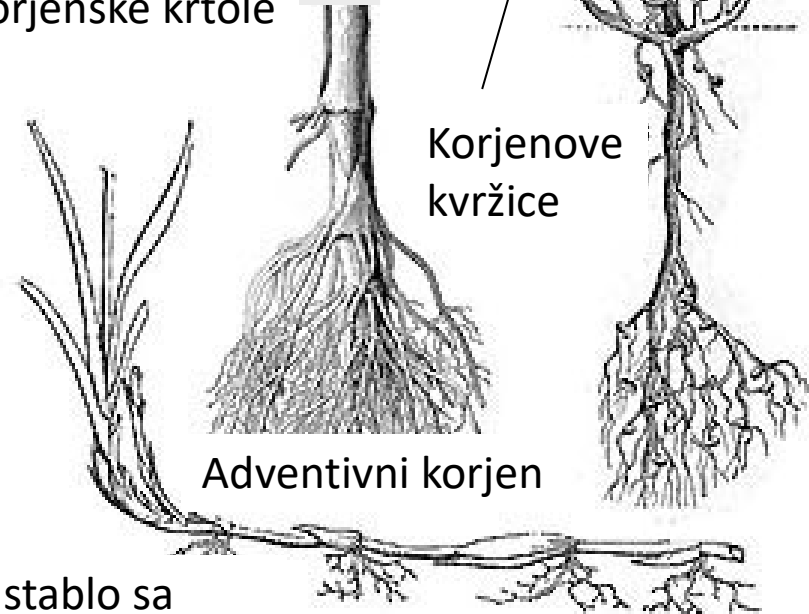
Osovinski

Žiličast

Repast korijen



Korjenske krtole



Mikoriza

Korjenove kvržice

Adventivni korjen

Puzeće stablo sa adventivnim korjenima

- Kontraktilni korjenovi
- Vazdušni korjenovi
- Korjenovi za provjetranje
- Daskasti korjenovi
- Asimilacioni korjenovi