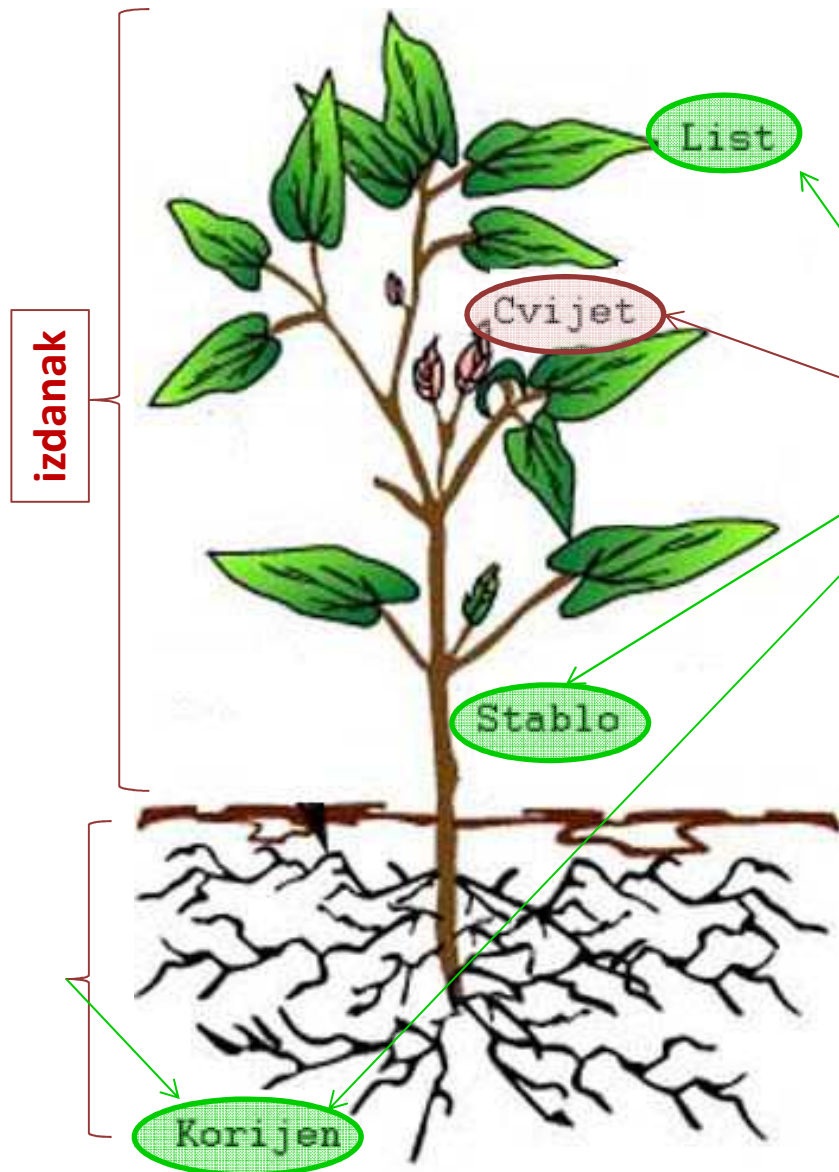


ORGANOLOGRAFIJA



Organ- dio biljnog tijela koji vrši određenu funkciju!

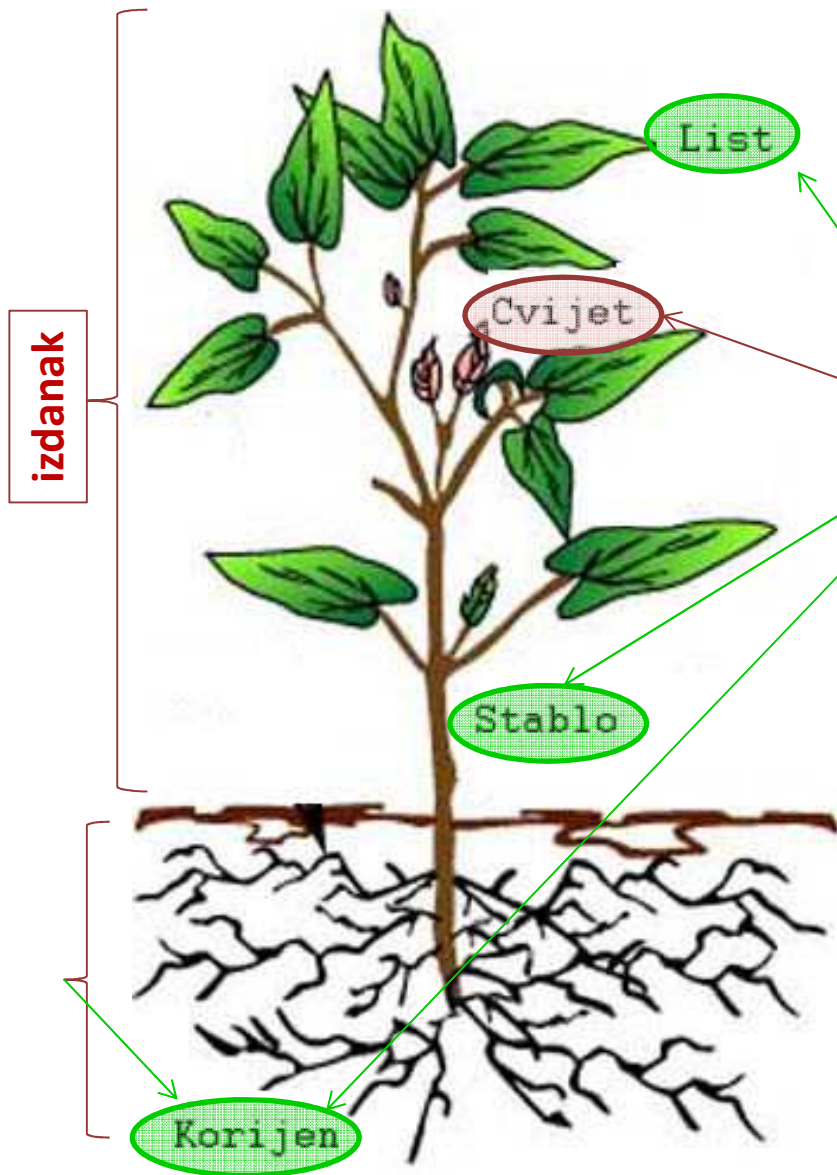
Vegetativni i reproduktivni!

Adventivni!

(adventivan= sporedan, ne raste na svom mjestu, pridošao)

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

Metamorfozirani organi...

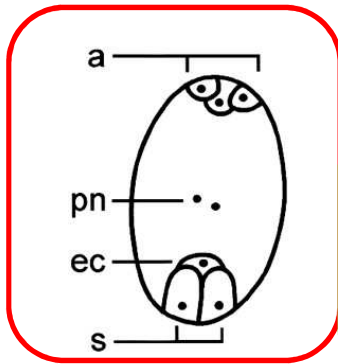


Izdanak
(stablo + listovi +
reproduktivne strukture)

Korijen

Razviće biljaka sa sjemenom

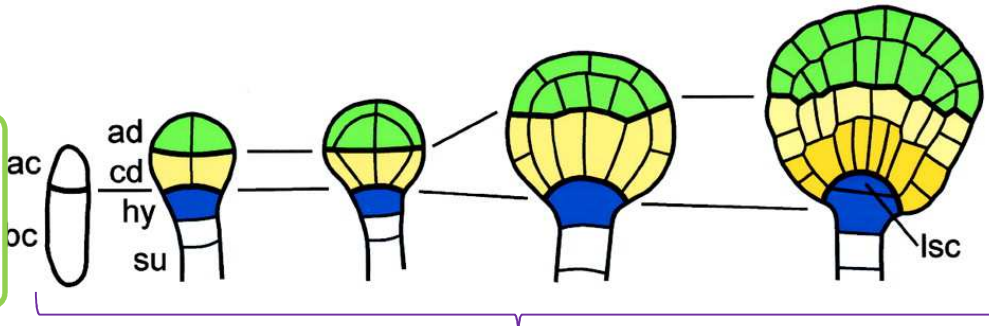
sjeme (zigot-embriion-klica)- klijanac- biljka – sjeme



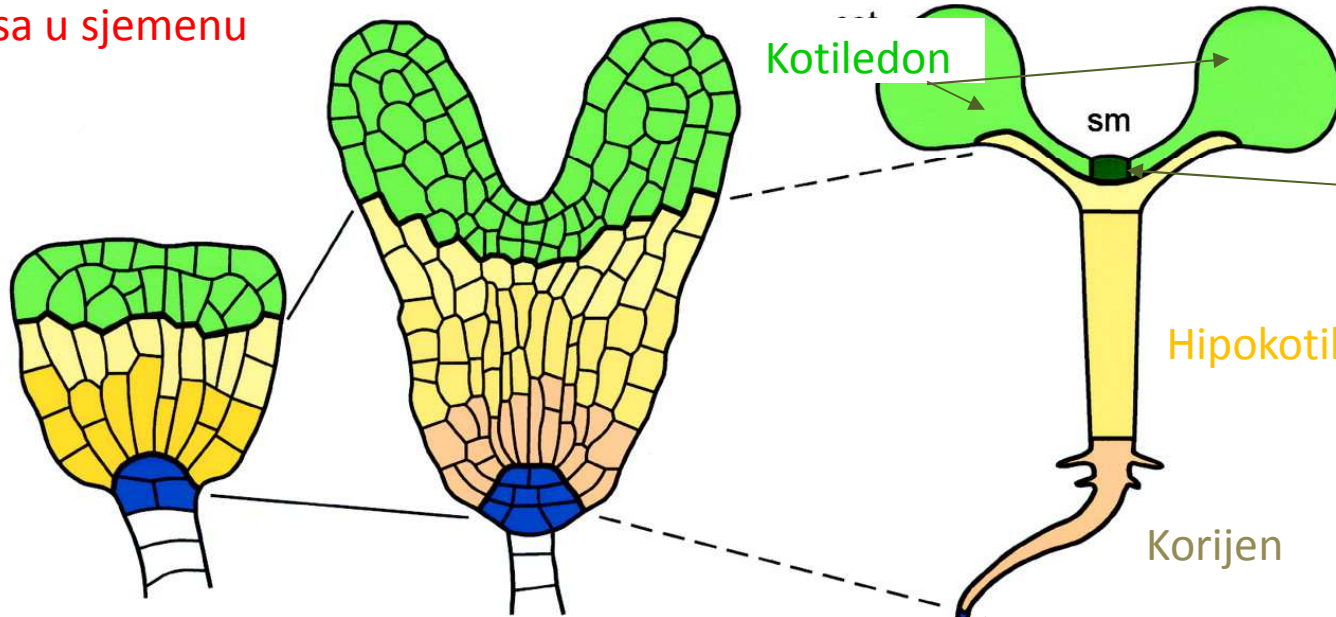
Embriionova
kesa u sjemenu



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!

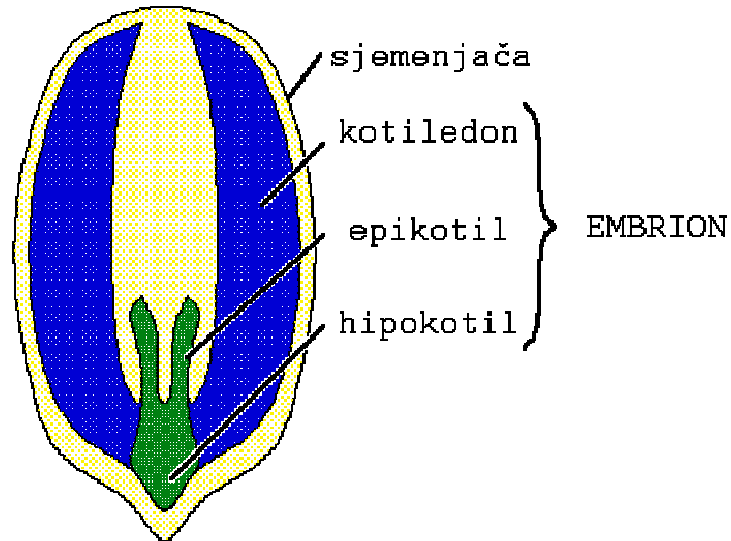
Osnovni dijelovi sjemena skrivenosjemenica

- **Integument**, iz kojeg nastaje sjemenjača (omotač sjemena) i
- **Nucelus**, unutrašnje tkivo, u kojem se razvija embrionova kesica sa jajnom ćelijom. Oplođenjem jajne ćelije nastaje zigot, zatim embrion i klica. U procesu oplođenja se stvara i hranljivo tkivo - sekundarni endosperm.

Napomena: Endosperm kod golosjemenjača je primarni.

Podjela biljaka sa cvjetom na
dikotiledone i monokotiledone biljke

DIKOTILEDONE BILJKE



Sjemenjača- ovojnica sjemena

Endosperm- hranljivo tkivo

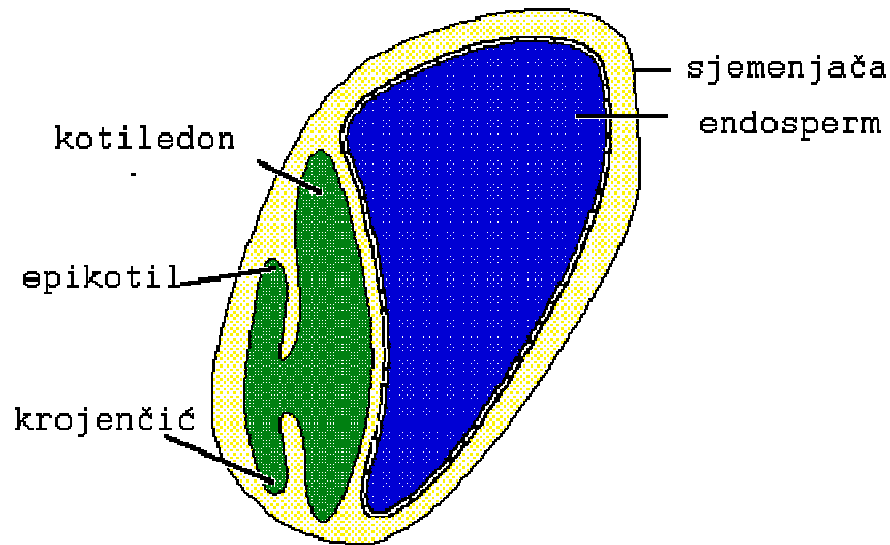
Klica- začetak biljke u sjemenu/sjemenom zametku

Kotiledoni- klicini listići

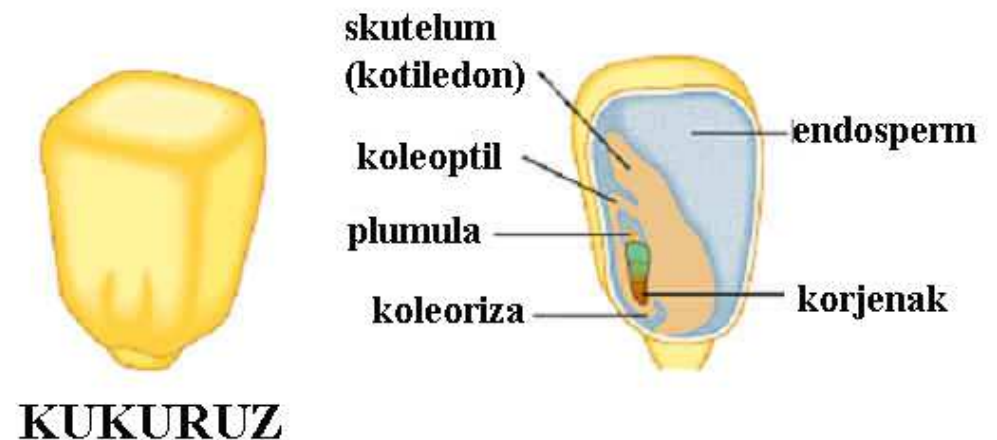
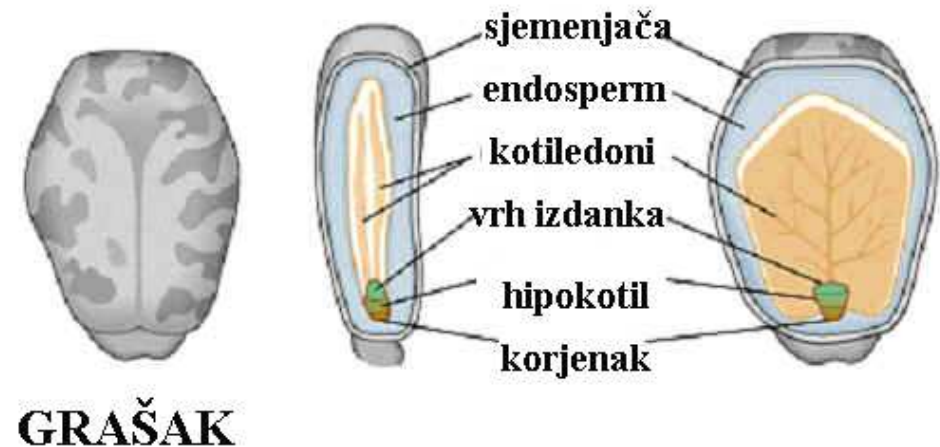
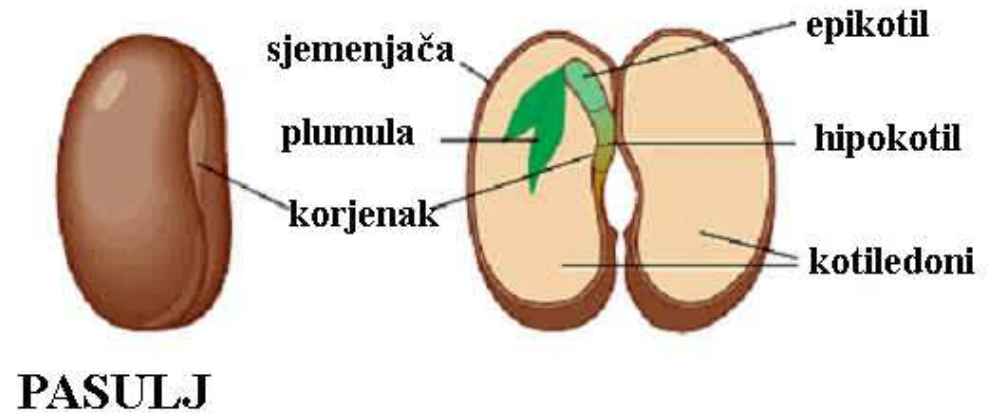
Epikotil- vršni dio stabaoceta klice

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)**



Vrste hranljivog tkiva

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

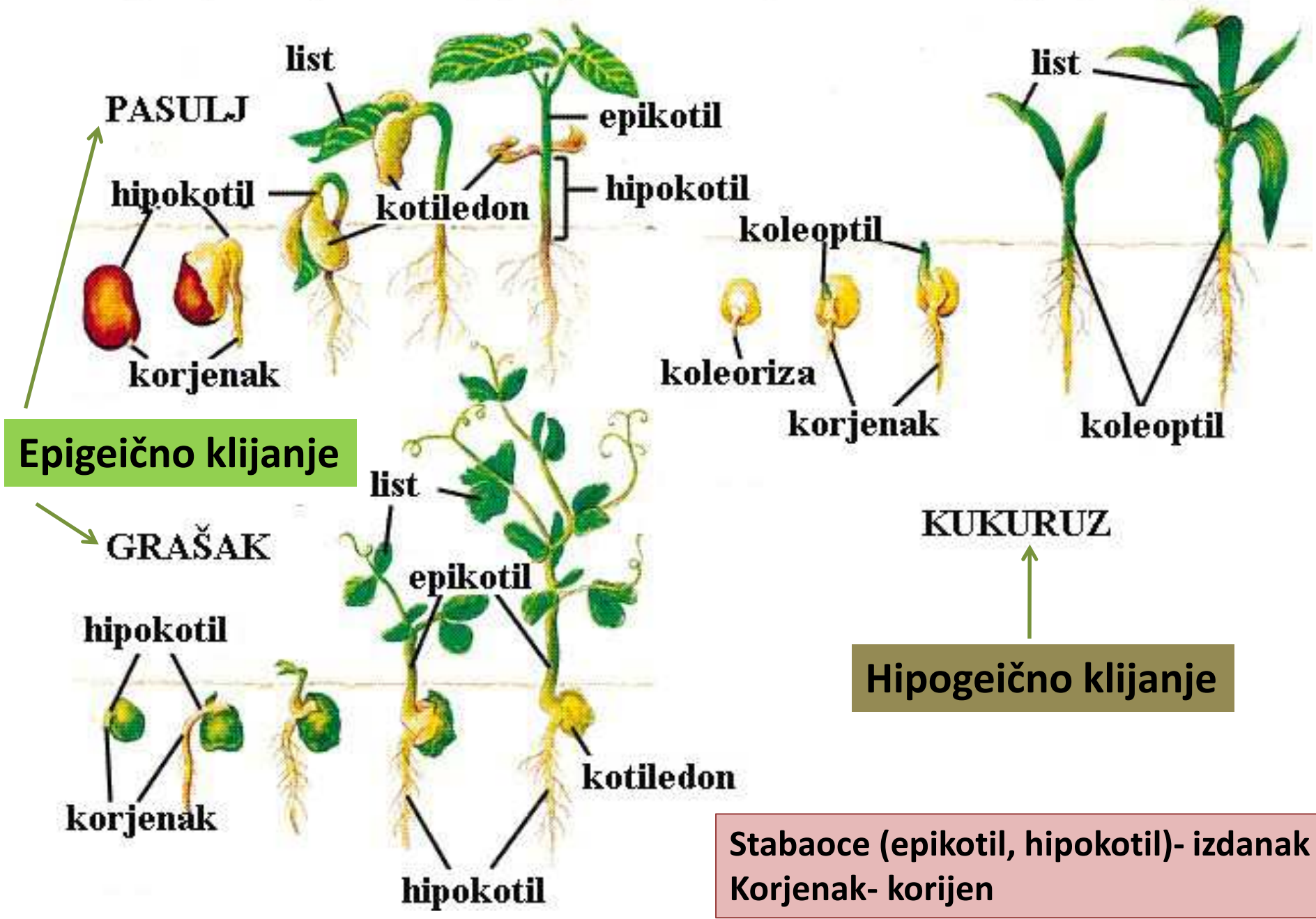
Prefiks endo znači u.

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 porekla 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

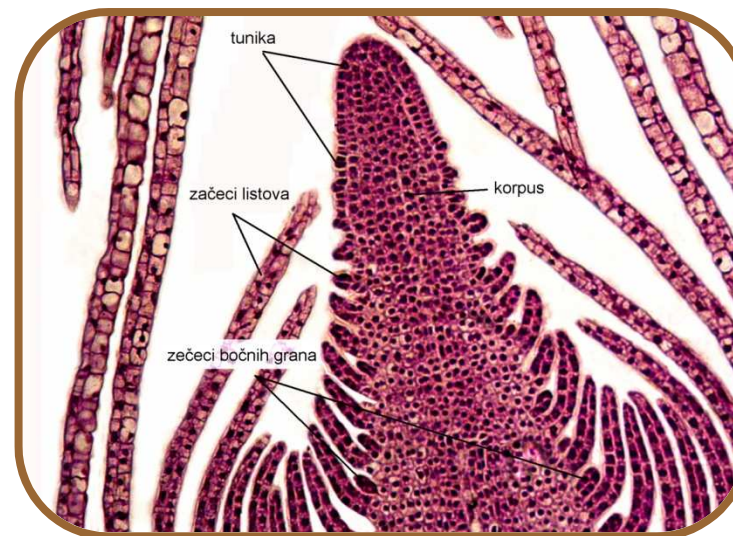
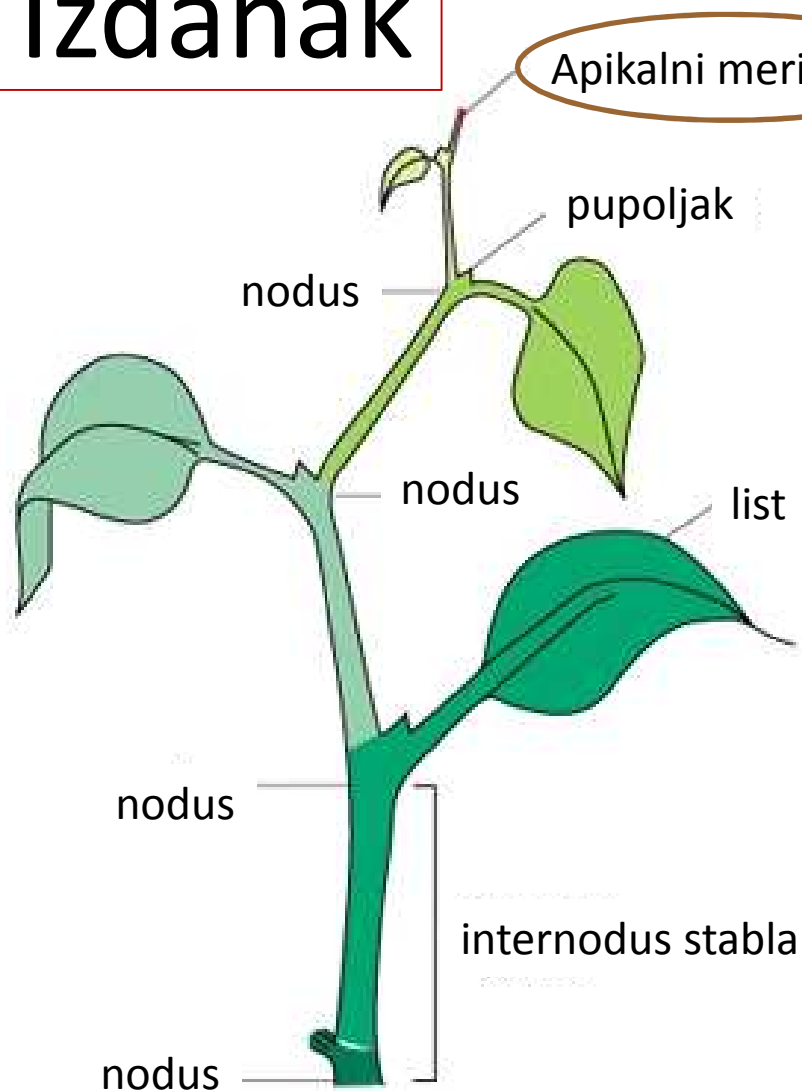
Hipogeično klijanje

**Stabaoce (epikotil, hipokotil)- izdanak
Korjenak- korijen**

Razviće biljaka

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

Izdanak

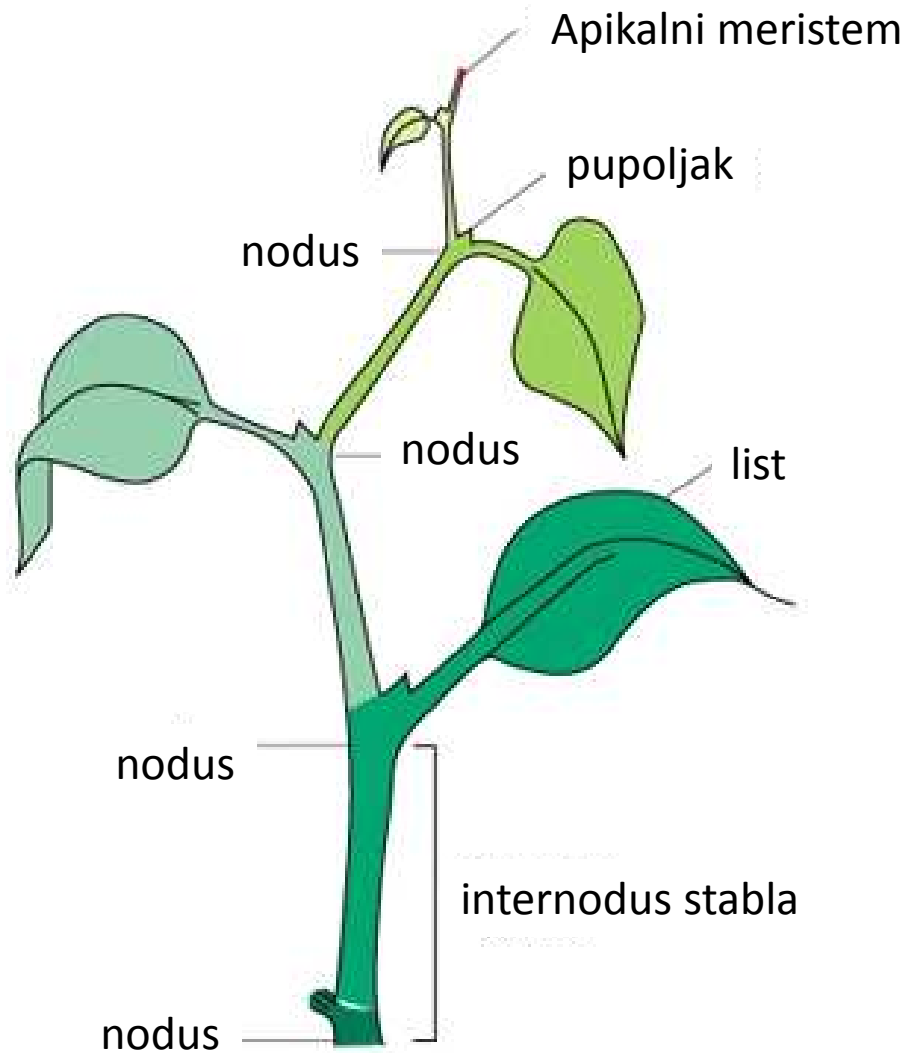


Začeci bočnih grana= začeci pupoljaka

Pupoljak= vegetativna kupa + listovi koji je opkoljavaju

Izdanak

Fotofilni izdanak



Geofilni izdanak
rizom

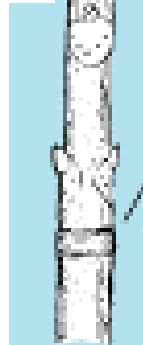


Pupoljci....

Terminalni pupoljak



Bočni pupoljak

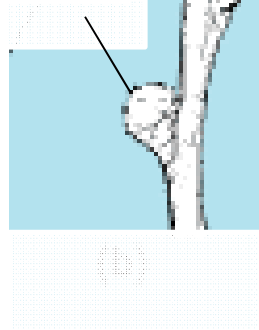


Lisni pupoljak

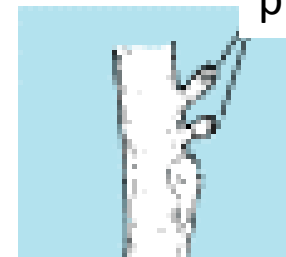


Cvjetni pupoljak

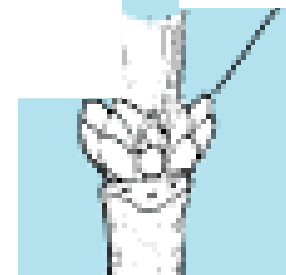
Cvjetni pupoljak



Serijski pupoljak

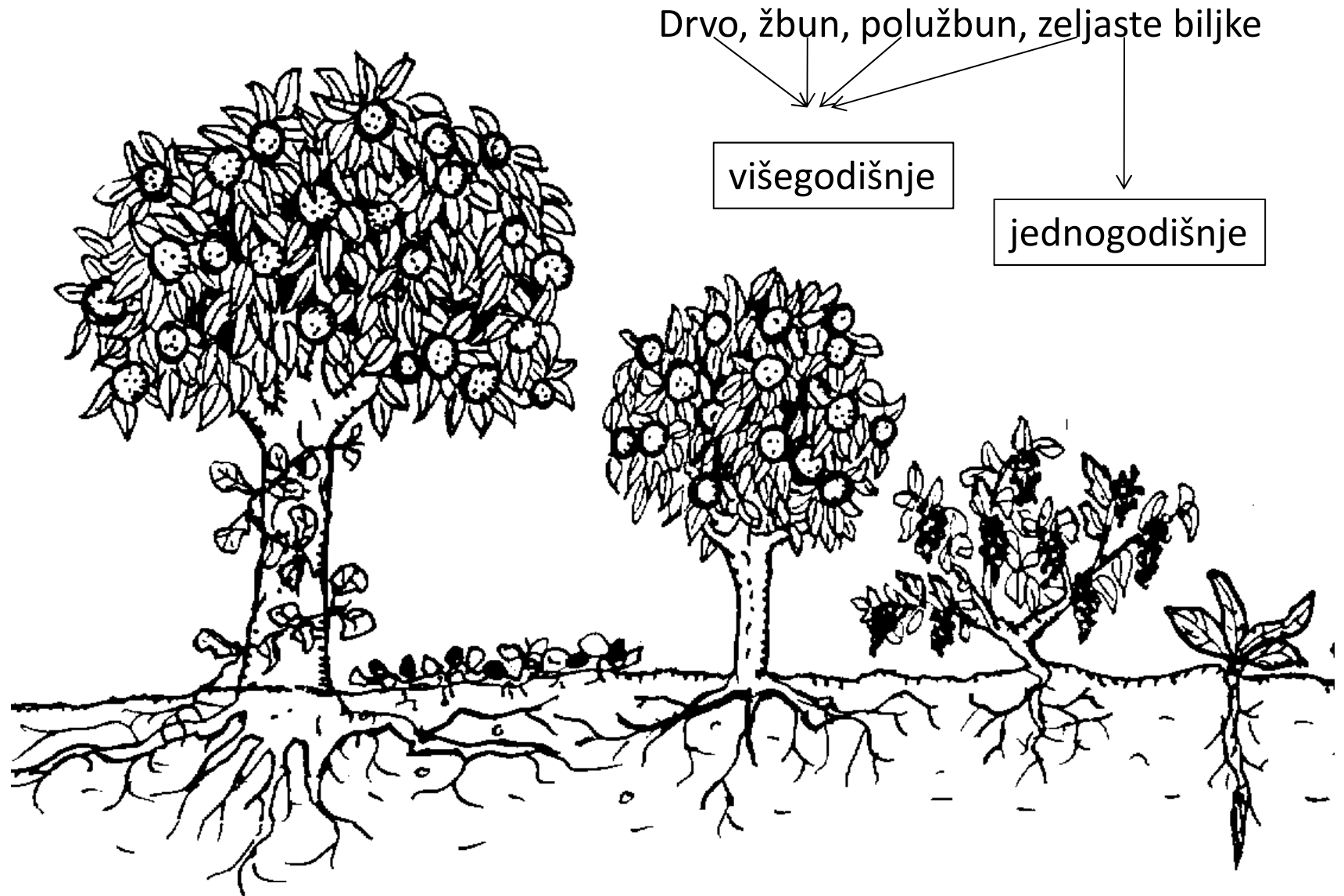


Kolateralni pupoljak

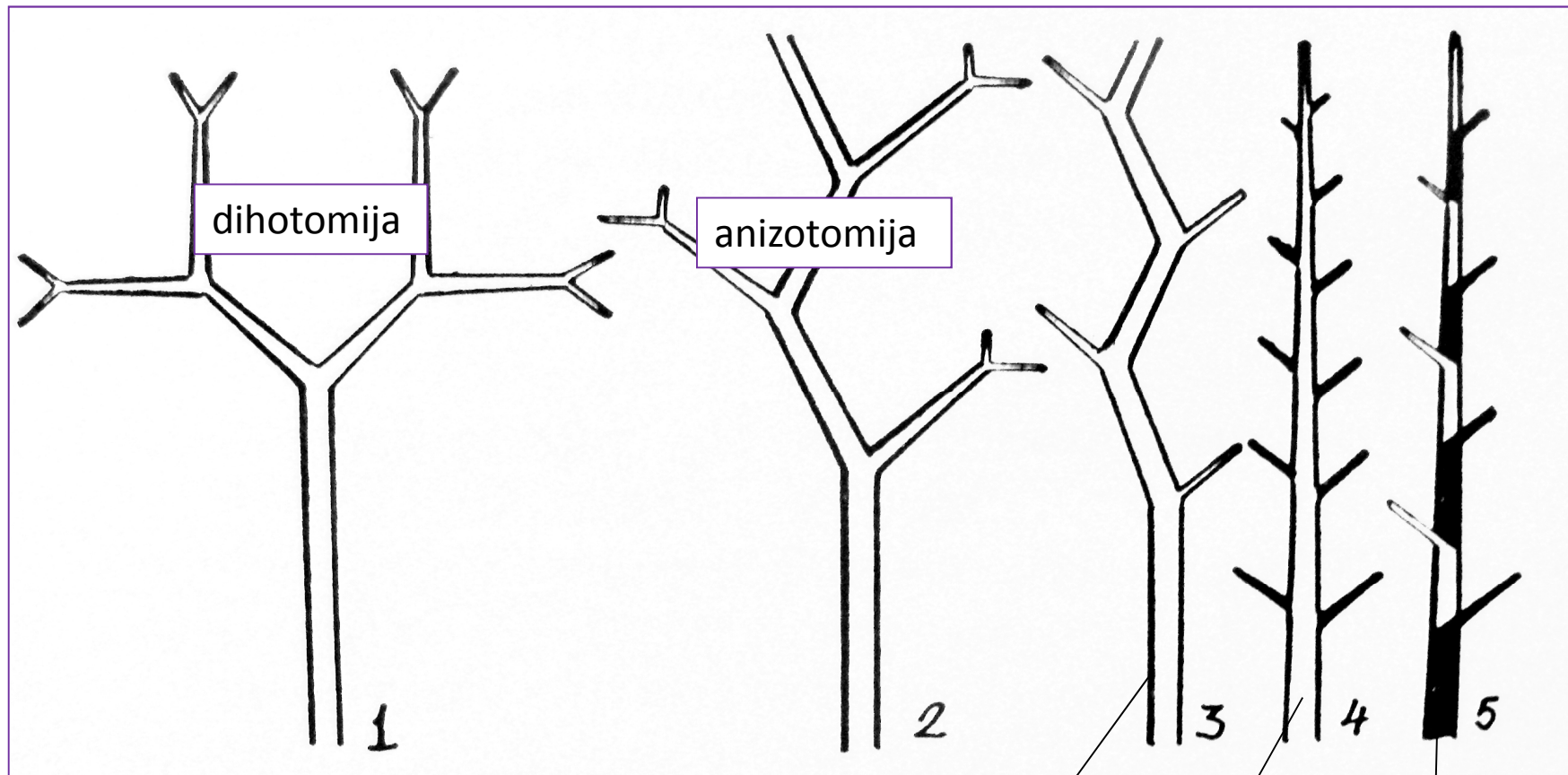


Zimski pupoljci, pupoljci za obnavljanje, uspavani pupoljci, kauliflorija adventivni pupoljci

Forme stabla



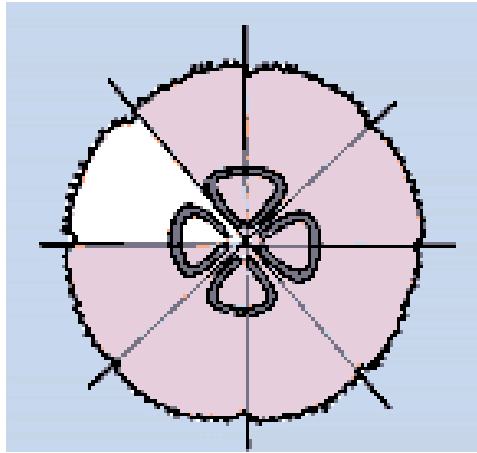
Tipovi grananja



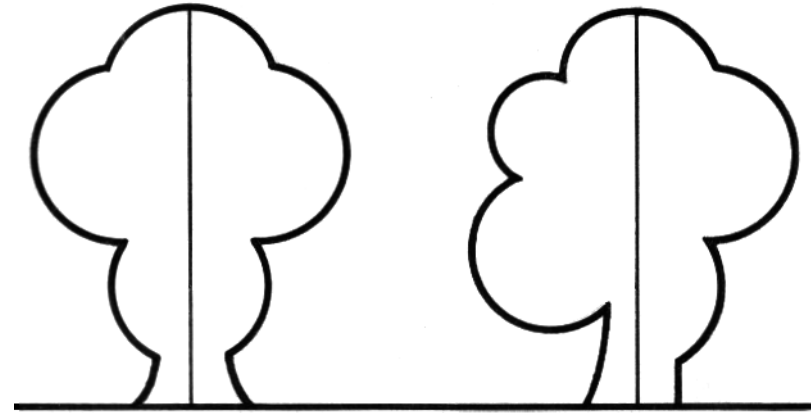
dihopodijalno grananje

monopodijalno

simpodijalno



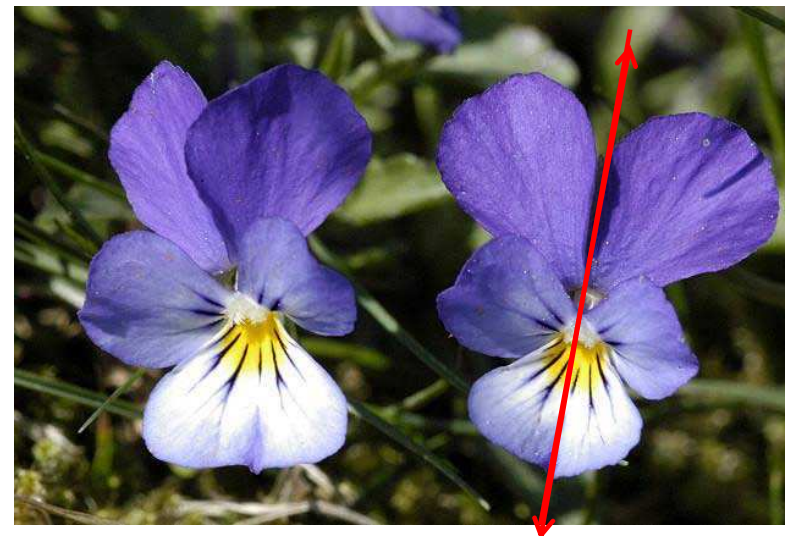
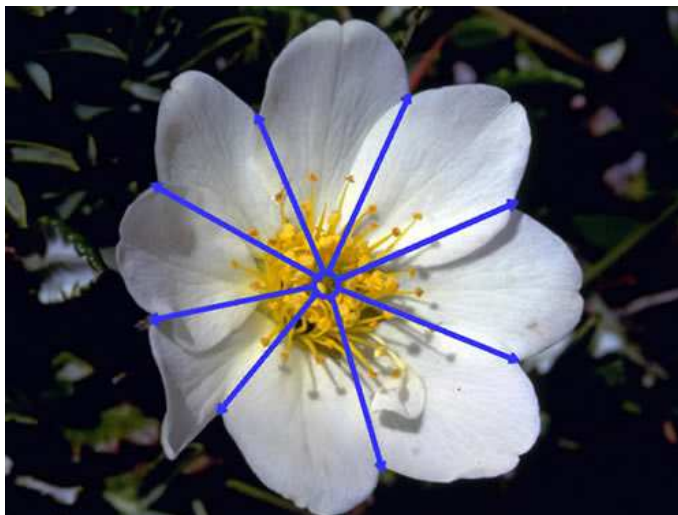
Polisimetrija =
(radijalna simetrija)



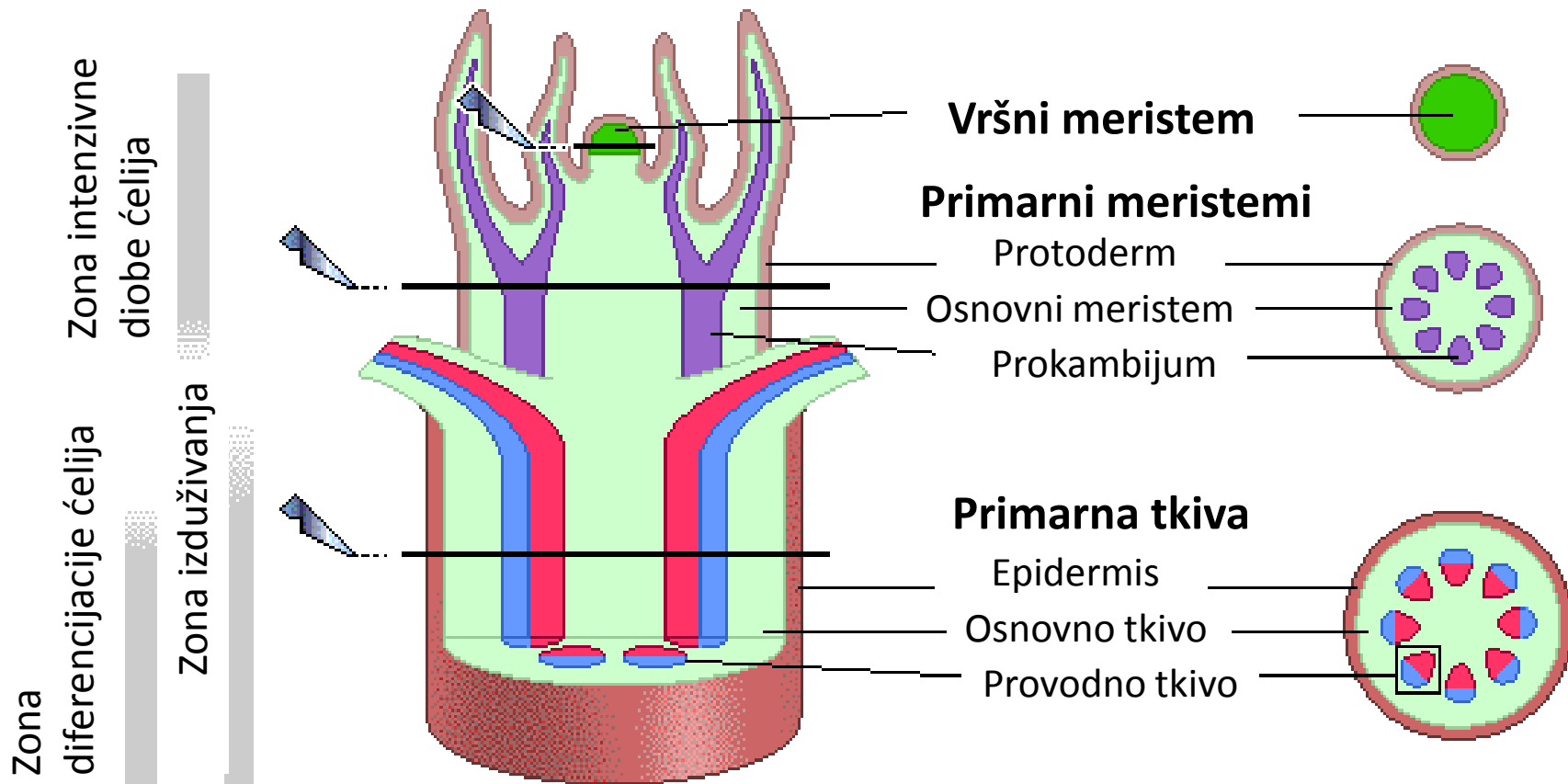
Bilateralna simetrija

Asimetrija

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



Primarna građa- opšta shema!

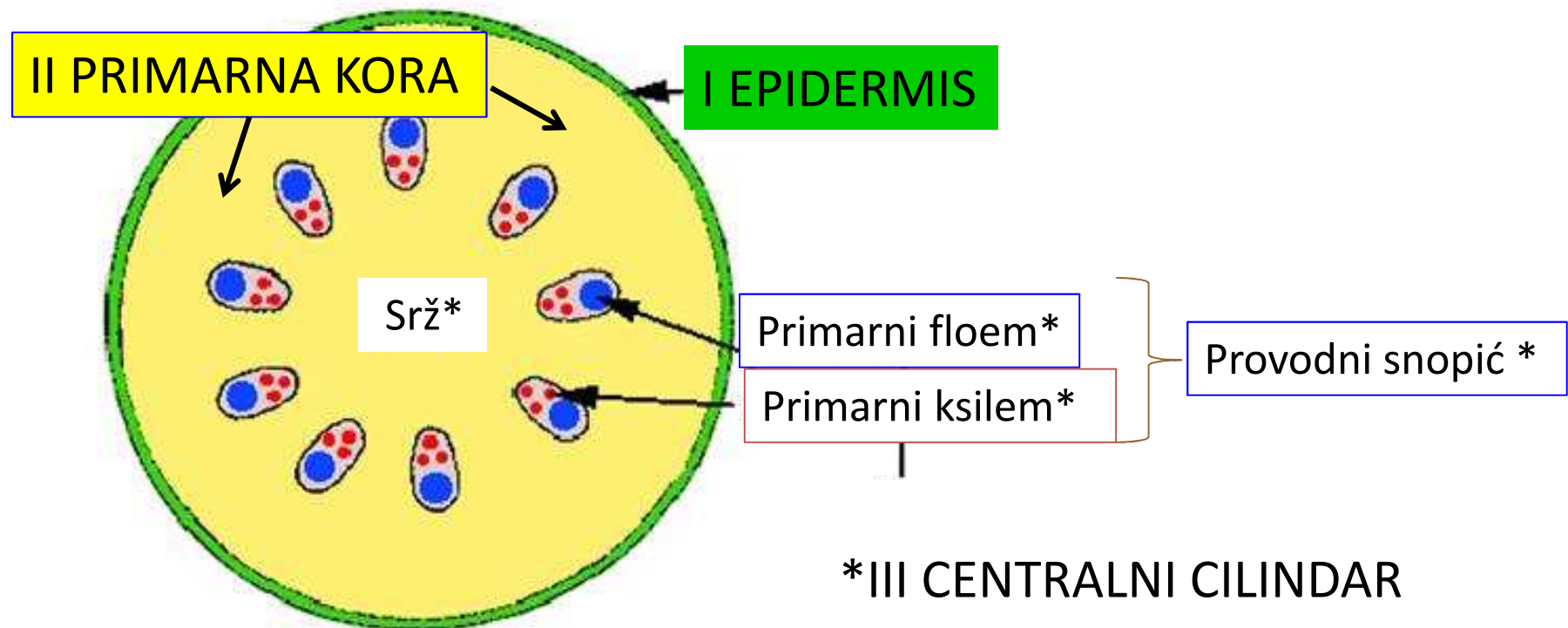


Osnovno tkivo= parenhim + mehanički elementi

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

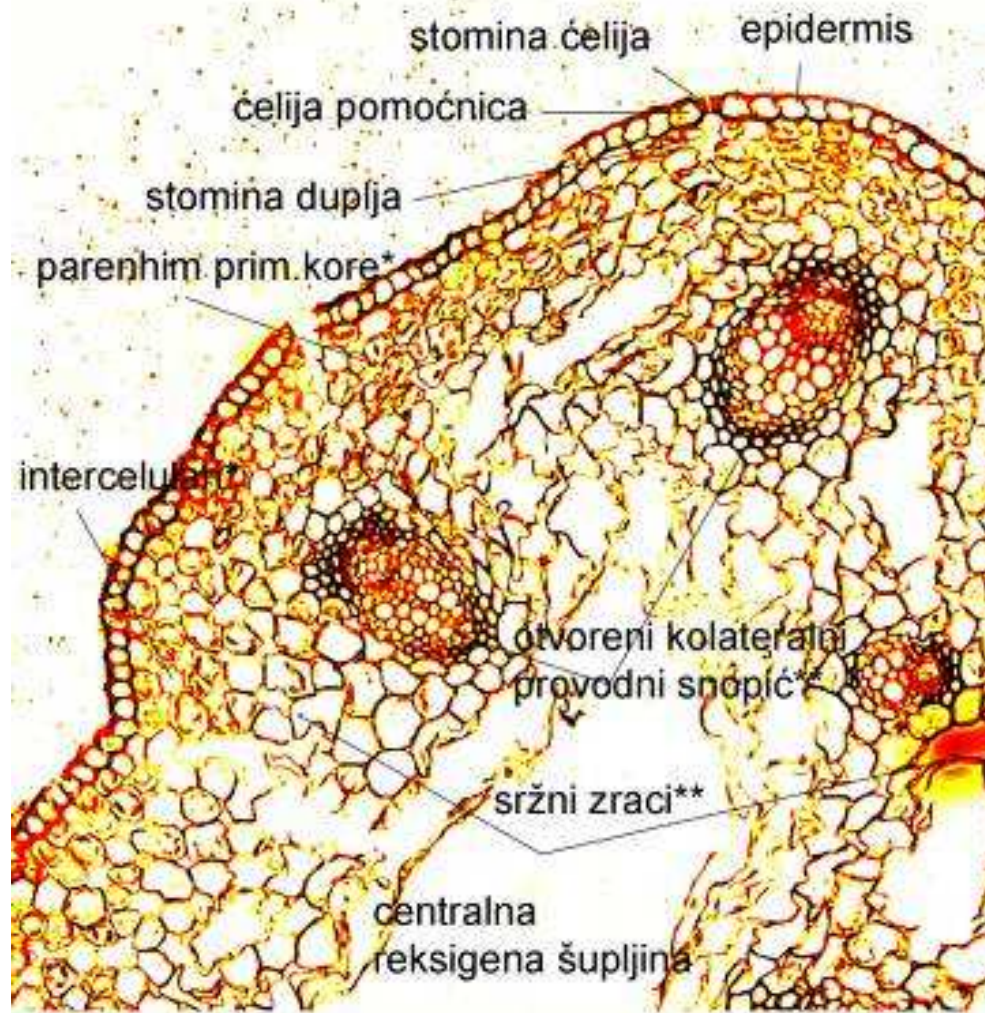
- Pericikl
- Provodni snopići
ili provodni
cilindar
- Srž

- **Pericikl:**

- a) Parenhimske ćelije

- b) Prsten od sklerenhimskog i parenhimskog tkiva

- c) Trake sklerenhima i parenhima koje se naizmjenično smjenjuju



I- EPIDERMIS

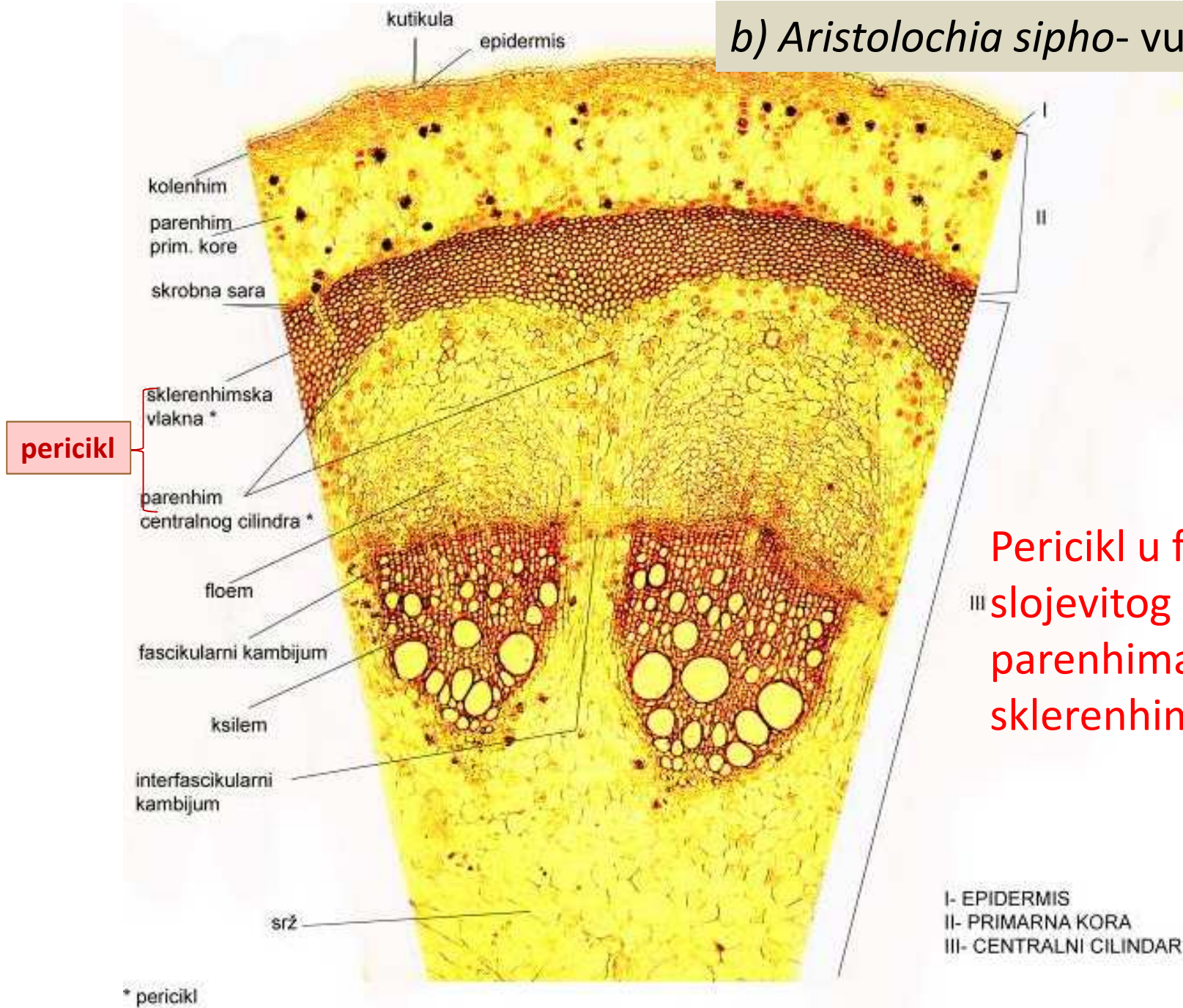
*- PRIMARNA KORA

**- CENTRALNI CILINDAR

a) *Ranunculus* spp.- ljutić

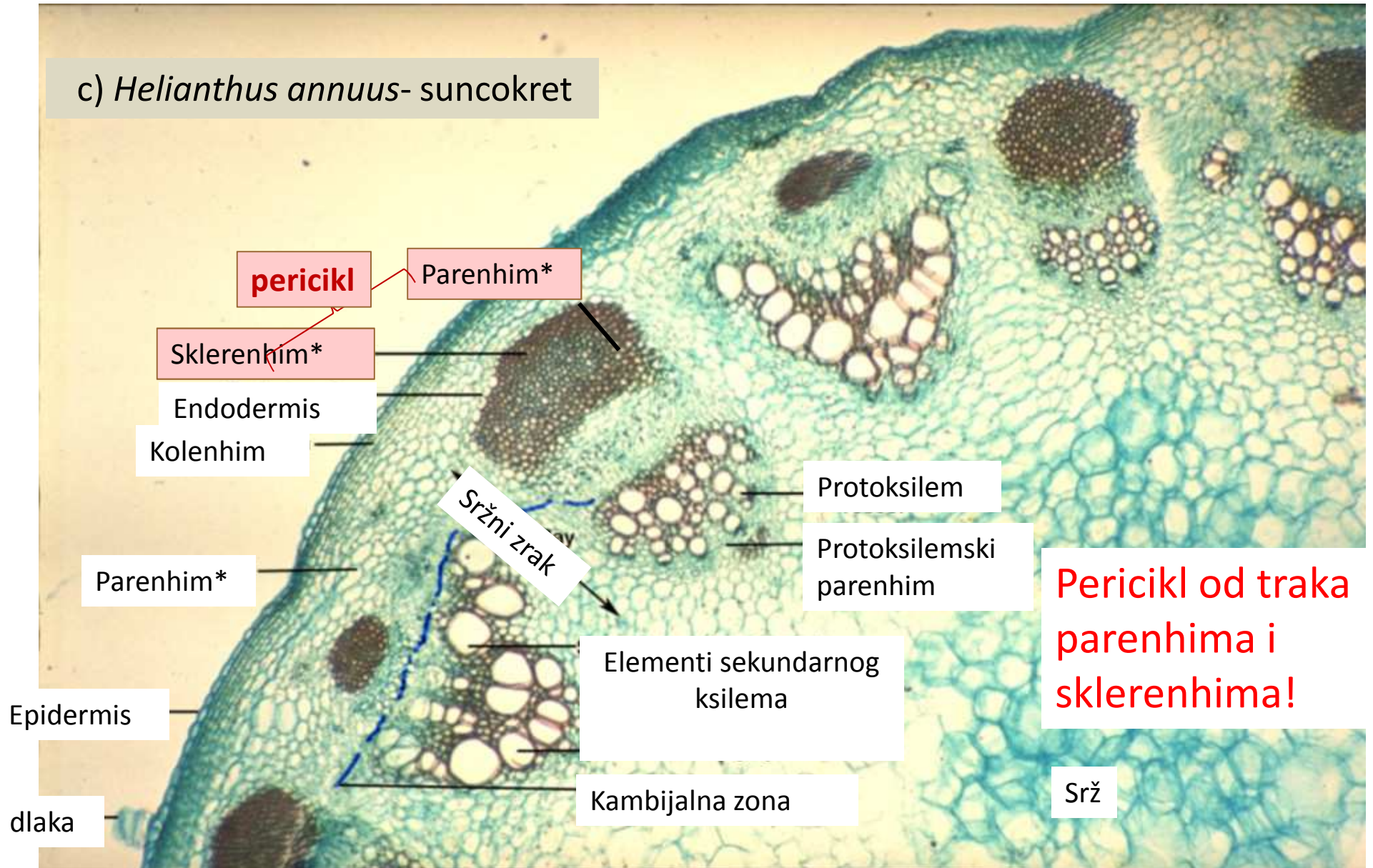
Parenhimatični pericikl!

b) *Aristolochia siphon*- vučja jabuka

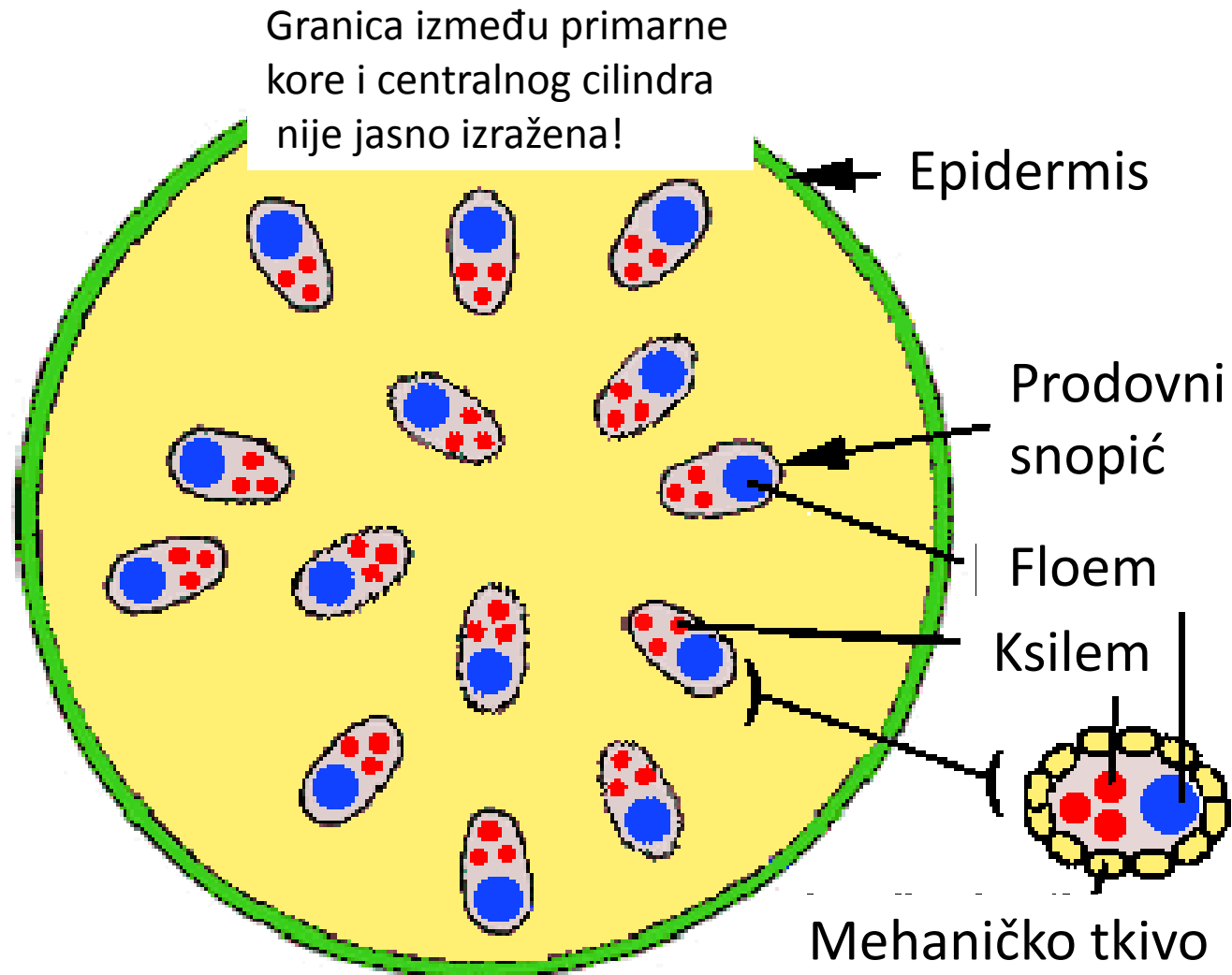


Pericikl u formi
III slojevitog prstena od
parenhima i
sklerenhima!

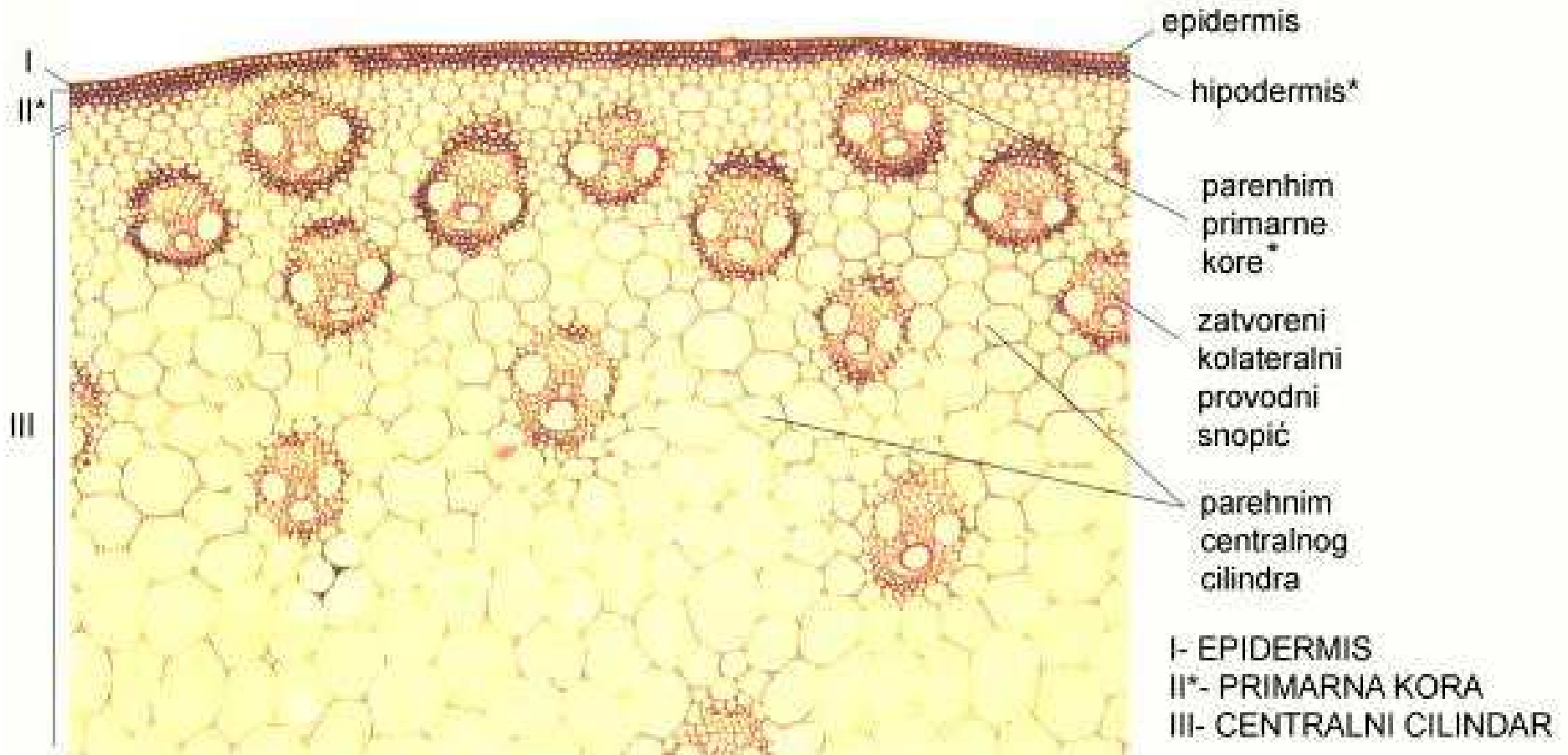
c) *Helianthus annuus*- suncokret



Primarna građa stabla monokotiledonih biljaka

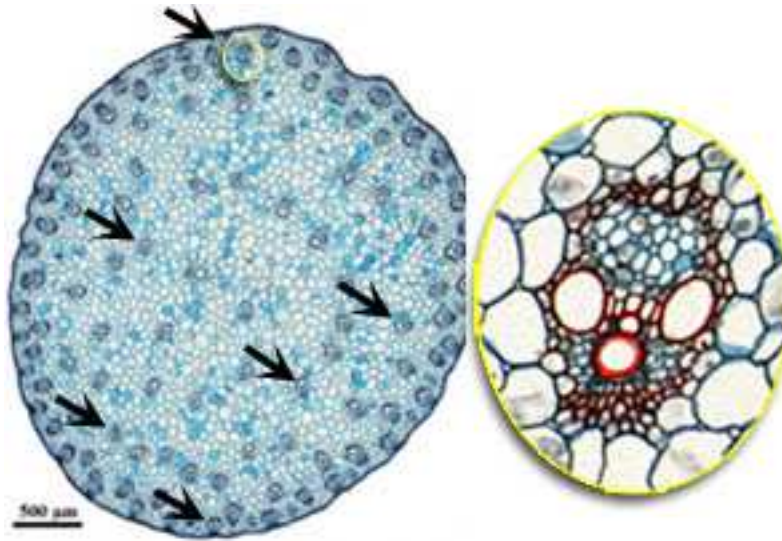


Zea mays – kukuruz



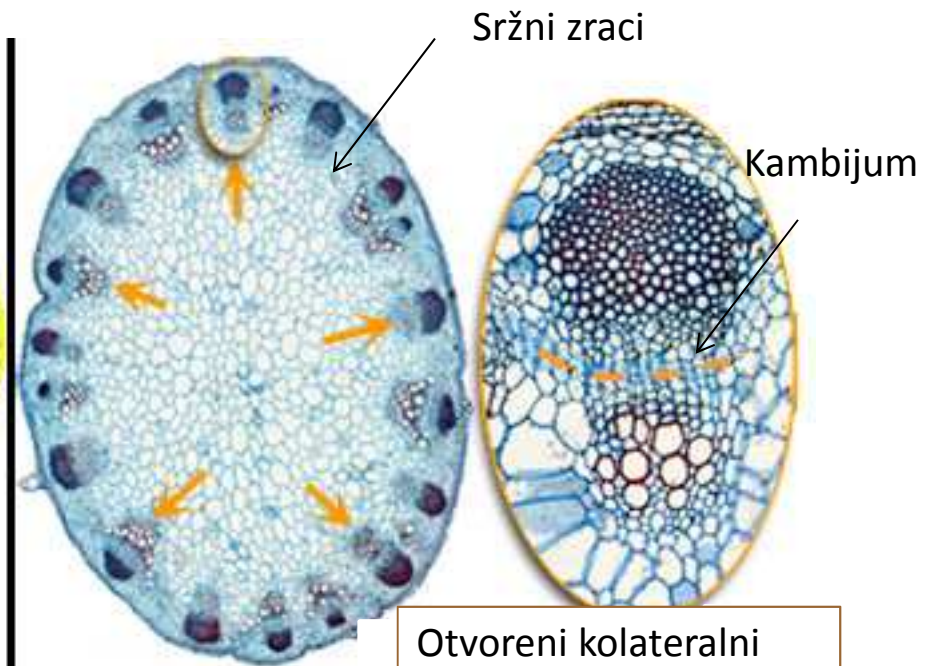
Uporedna shema primarne građe stabla mono- i dikotiledonih biljaka

PRIMARNO STABLO MONOKOTILA



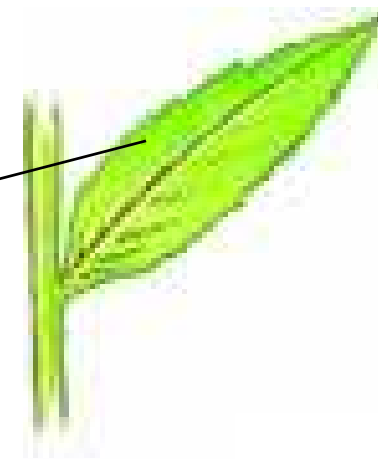
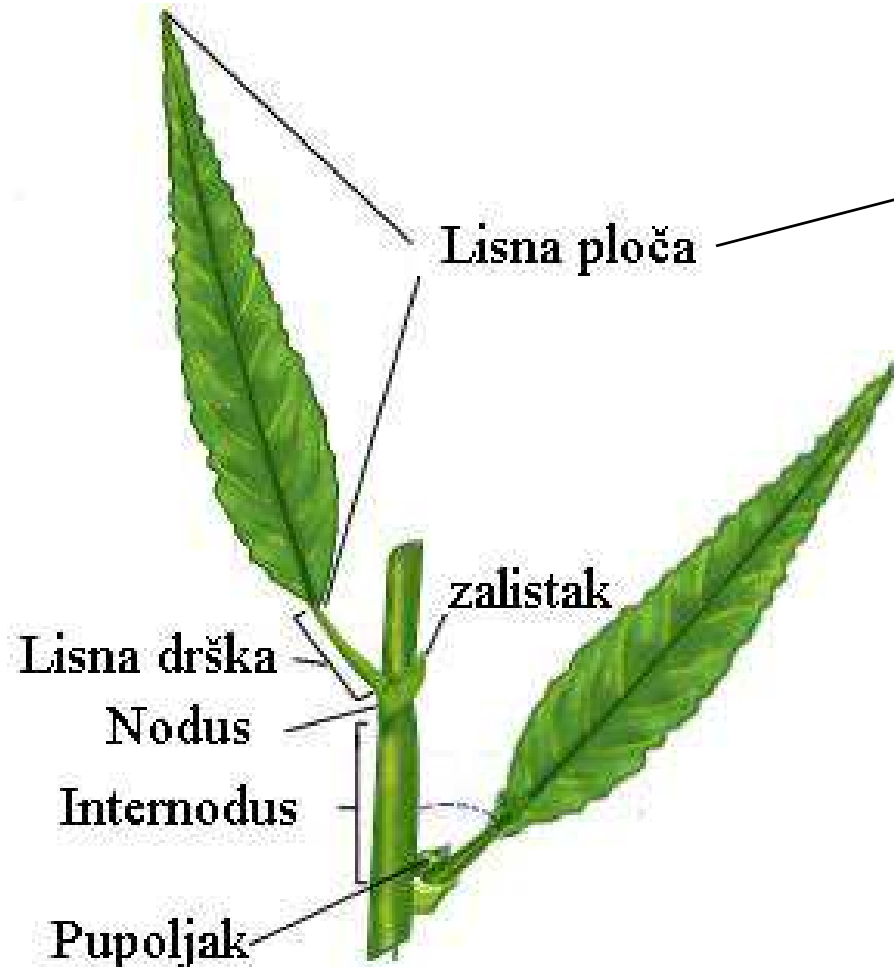
Zatvoreni kolateralni provodni snopić

PRIMARNO STABLO DIKOTILA



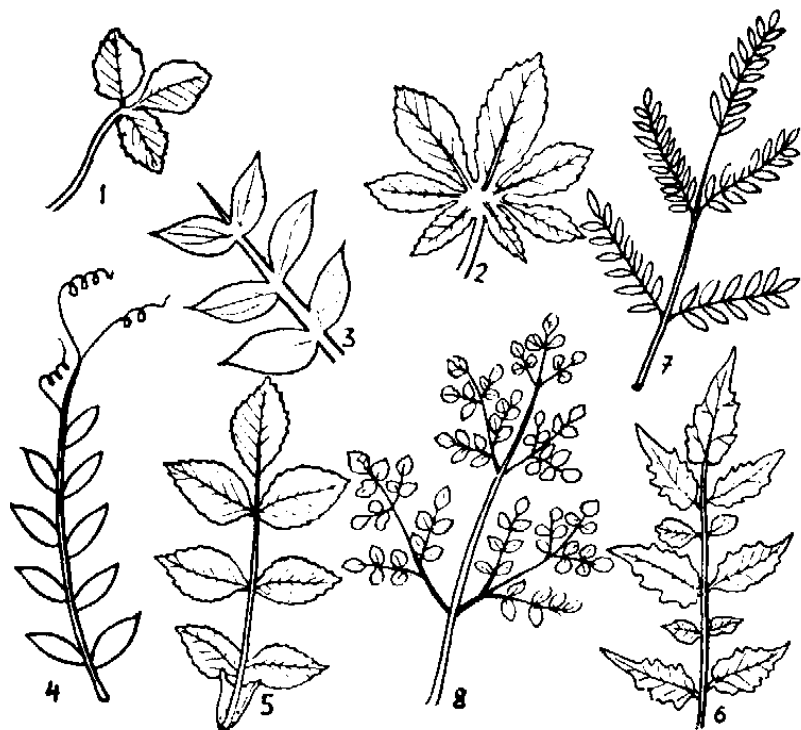
Otvoreni kolateralni provodni snopić

LIST

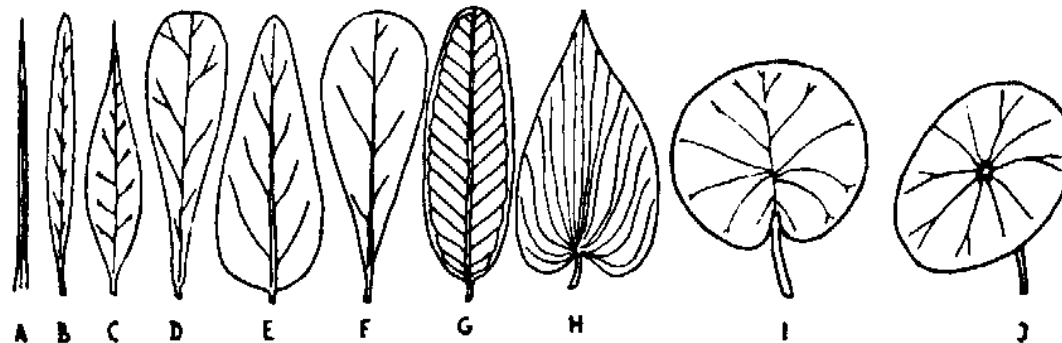


KATEGORIJE LISTOVA

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



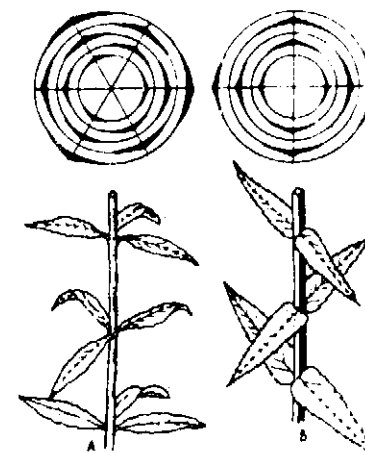
Sl. 308. Složeno građeni listovi: 1 — tročlan; 2 — prstasto složen; 3 — parno perasto složen; 4 — parno perast list sa listićima pretvorenim u rašljike; 5 — neparno perasto složen; 6 — isprekidano perasto složen; 7 — dvojno perasto složen; 8 — trojno perasto složen



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

Forma lista

Raspored listova

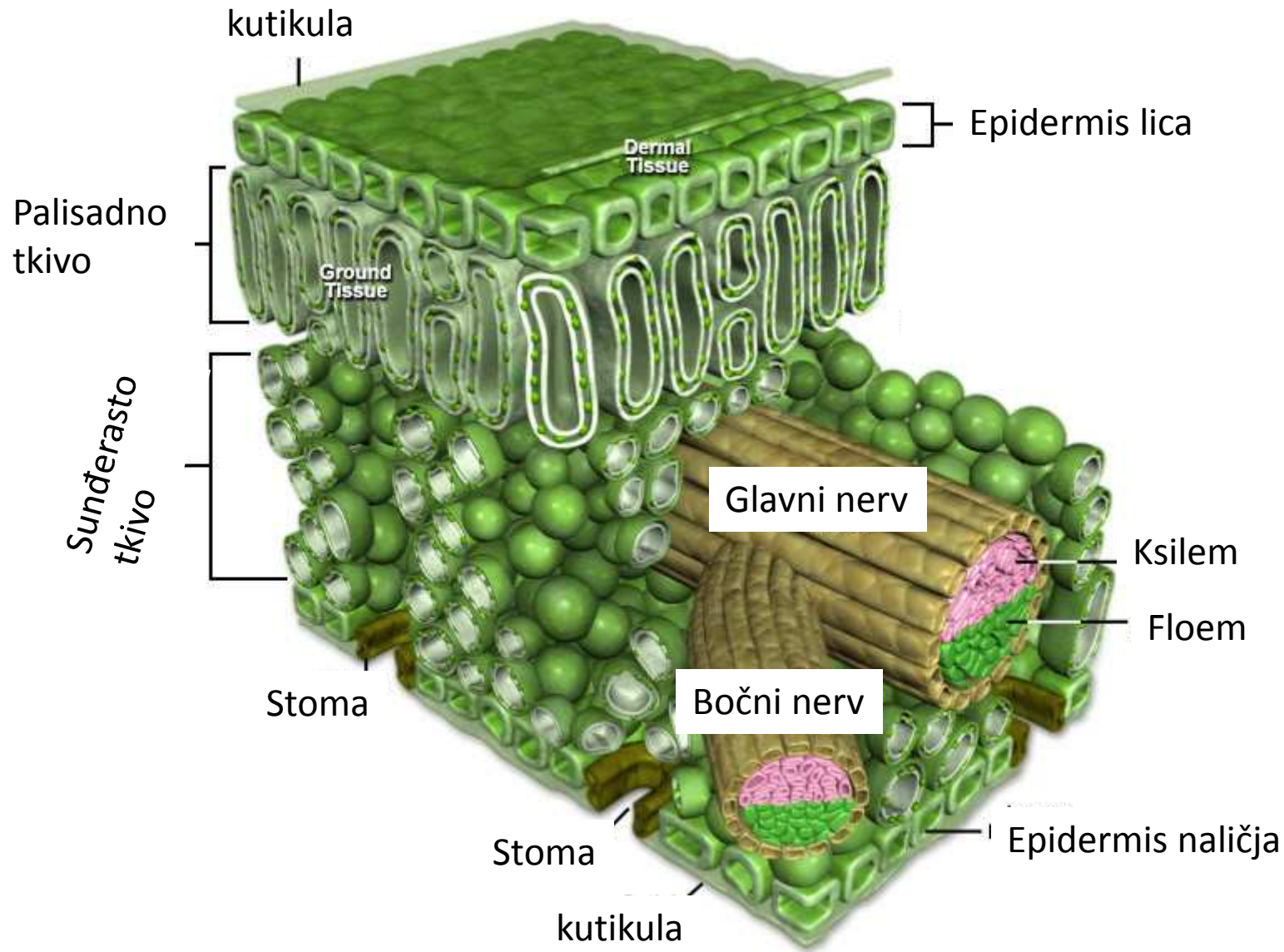


Sl. 109. Pršljenast raspored listova: A — tri lista u pršljenju, B — dva lista u pršljenju (naspraman raspored) (po Tatiću i sar.)

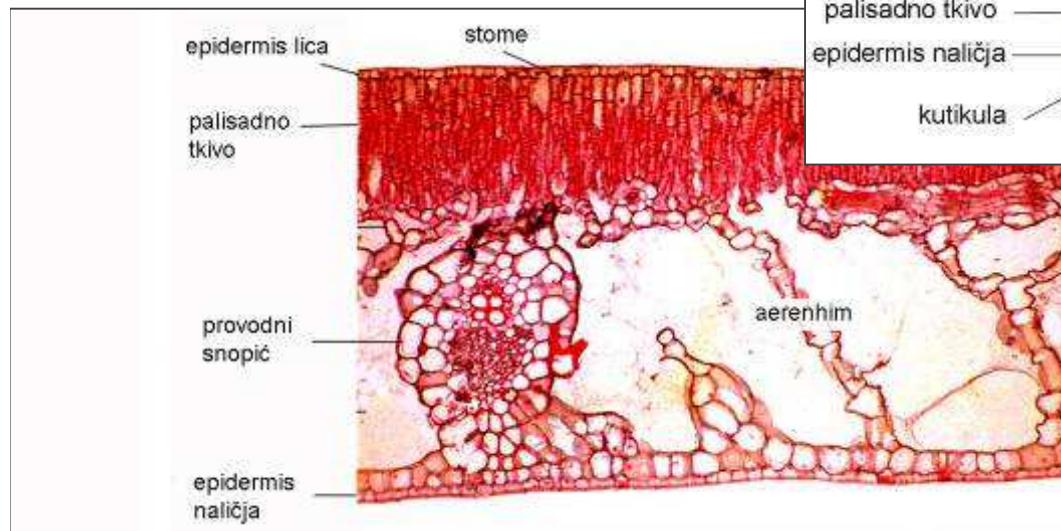
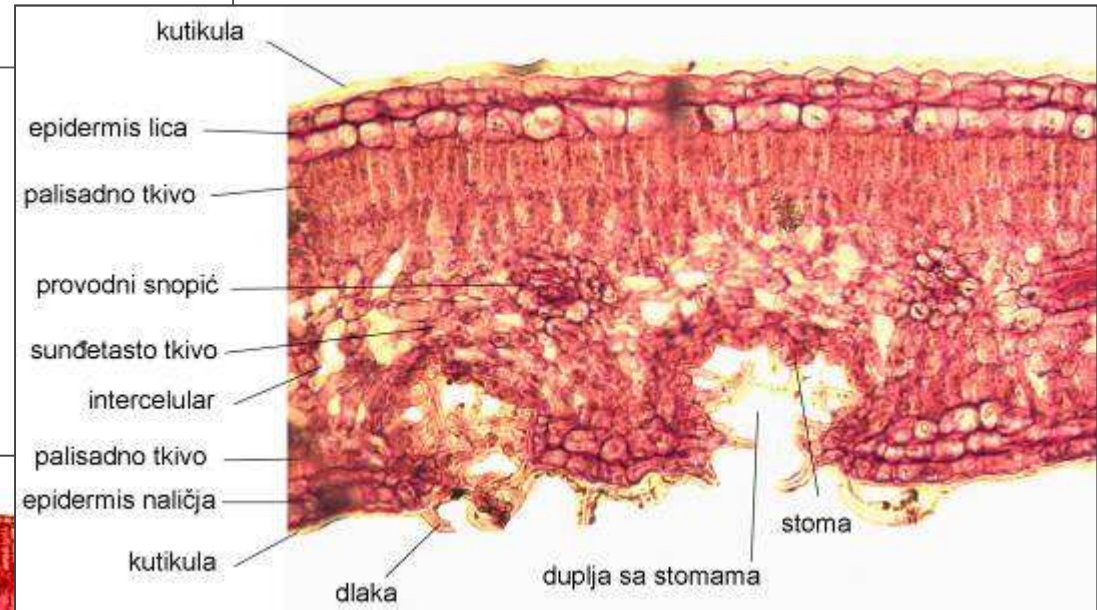
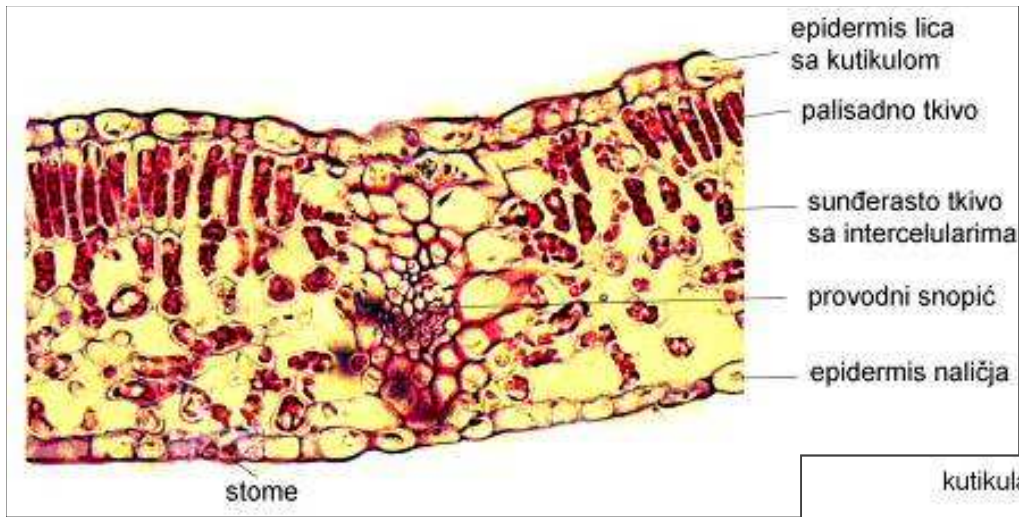
Nervatura ...

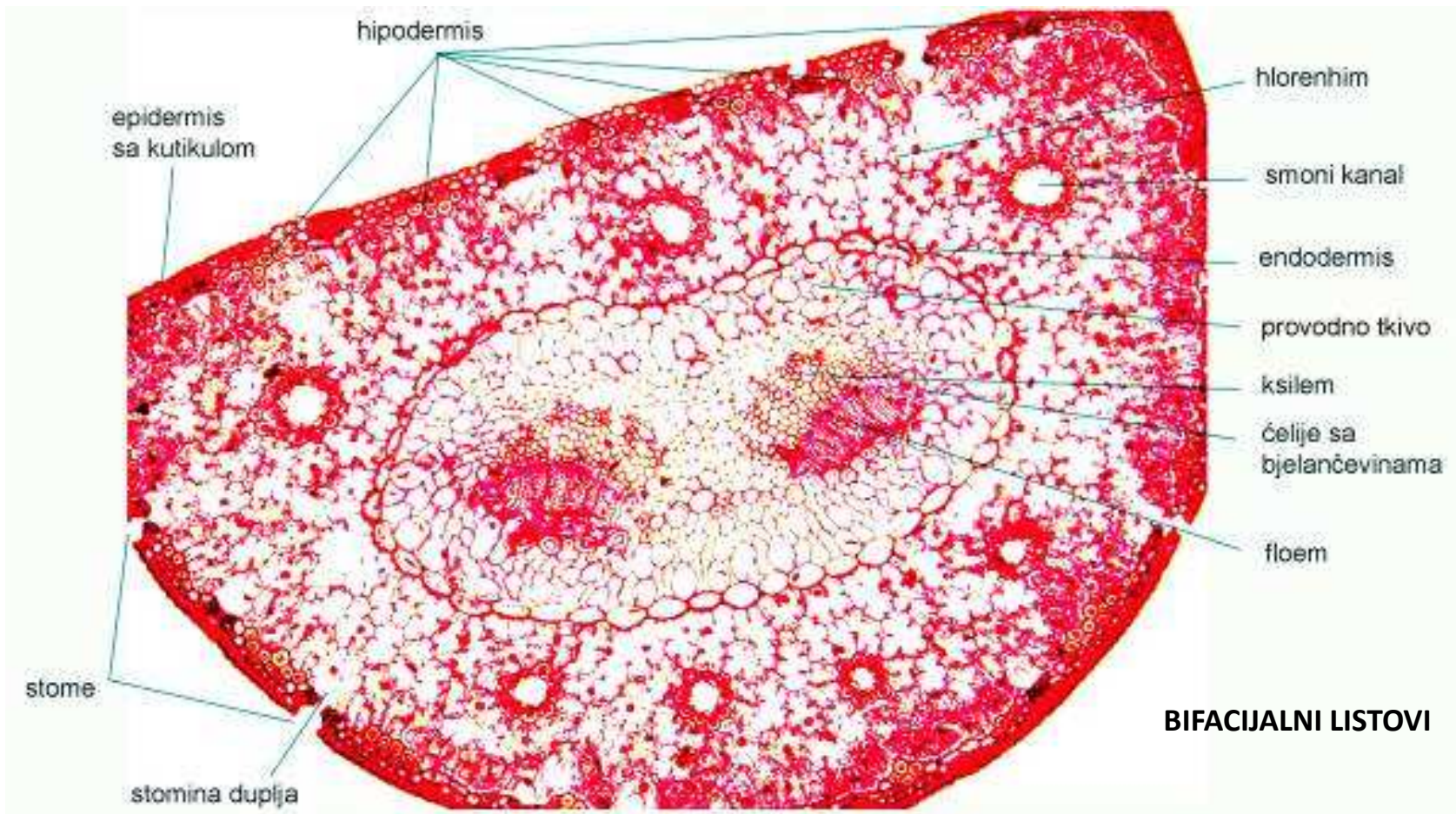
Zalisci

Anatomska građa lista



list



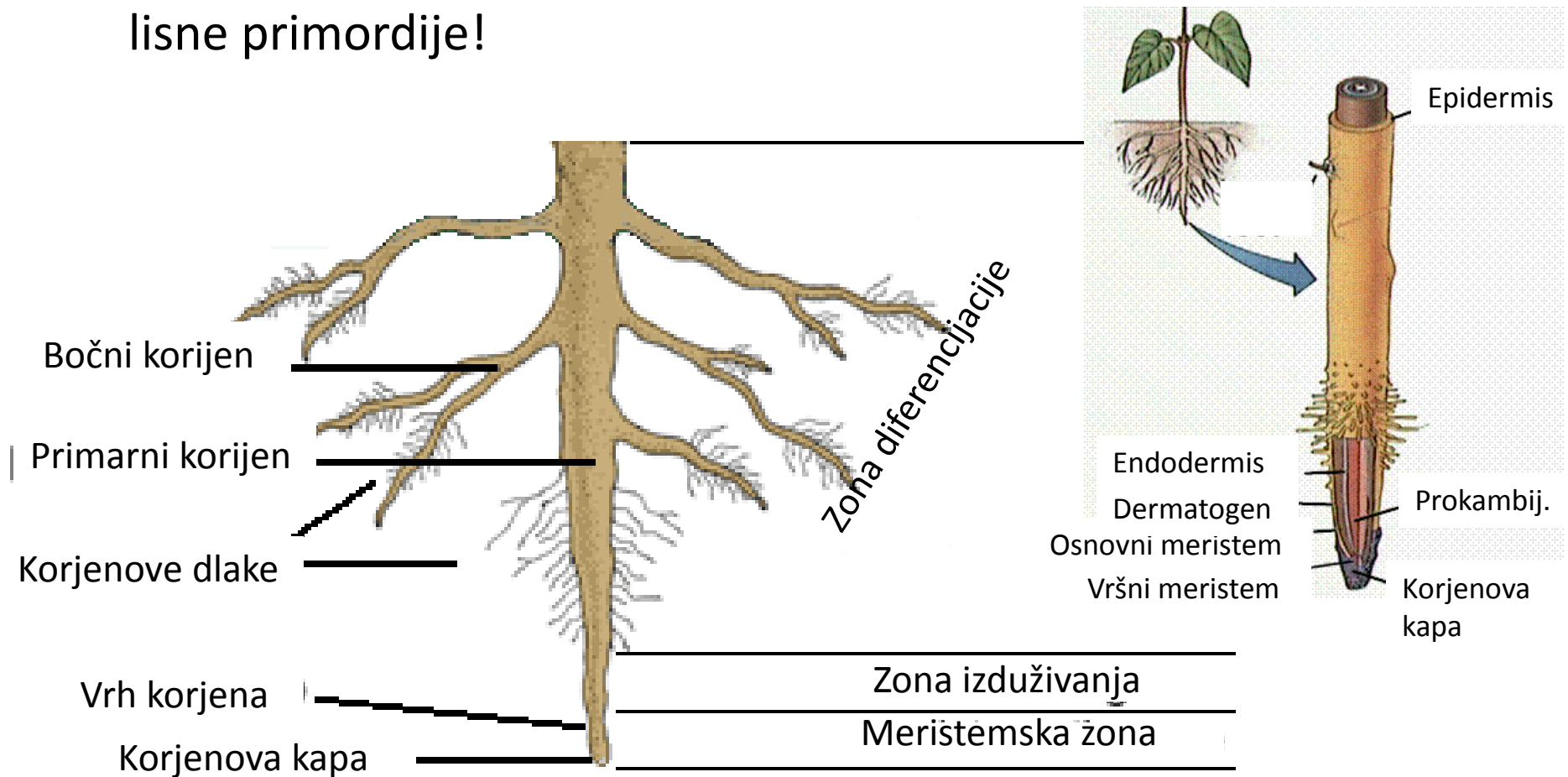


EKVIFACIJALAN LIST

UNIFACIJALA LIST

Korijen

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

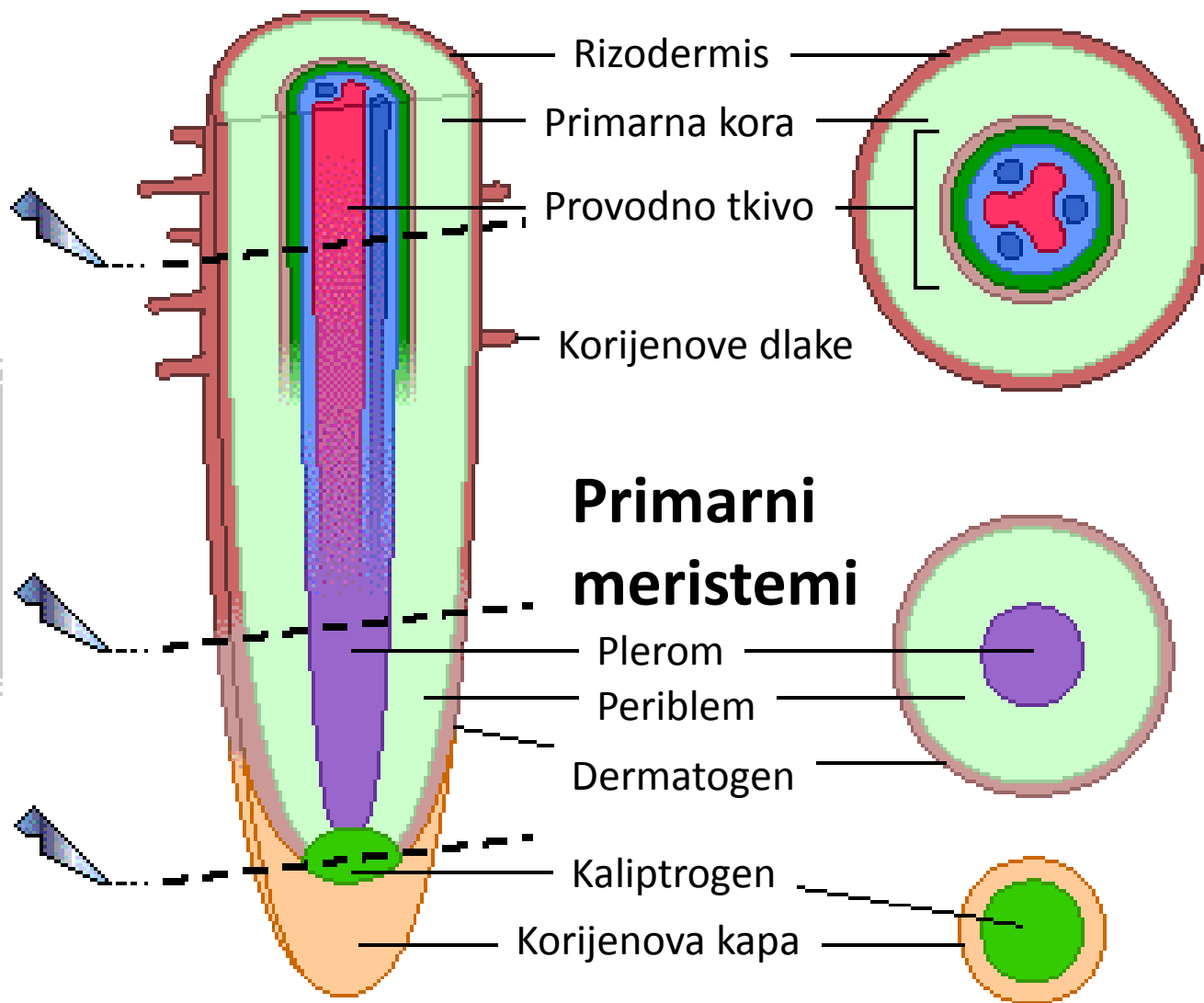


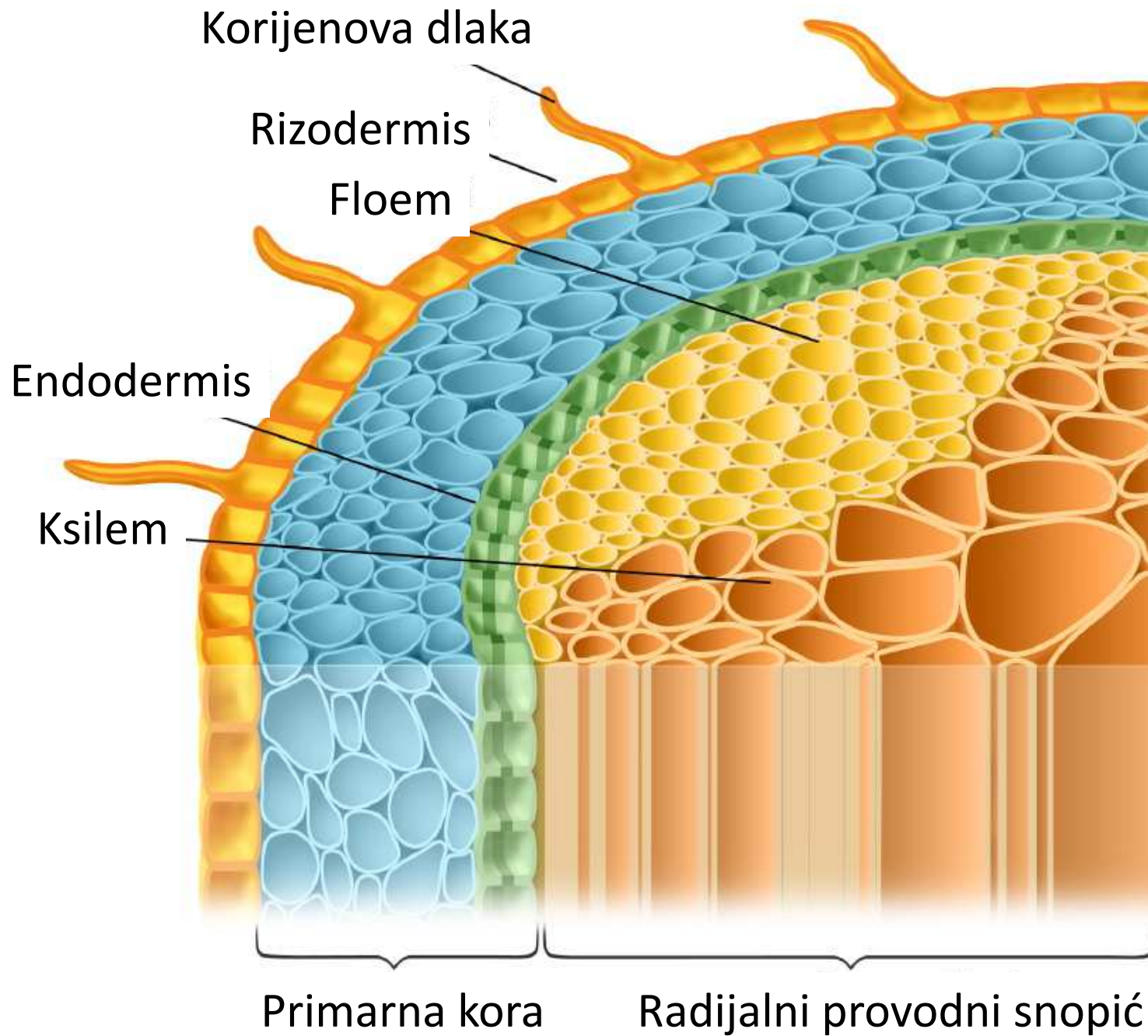
Primarna građa korijena

Zona diferencijacije ćelija

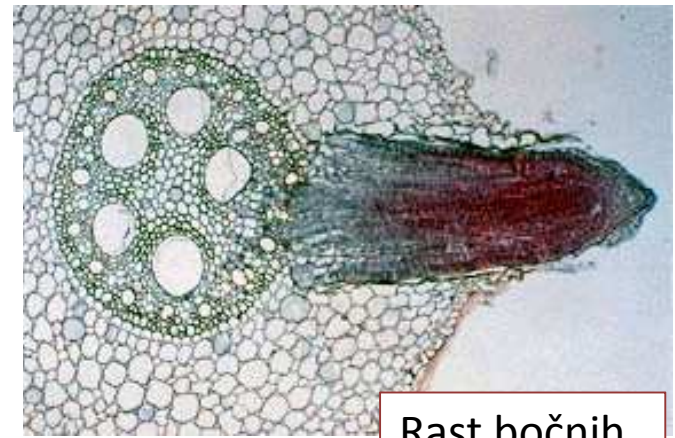
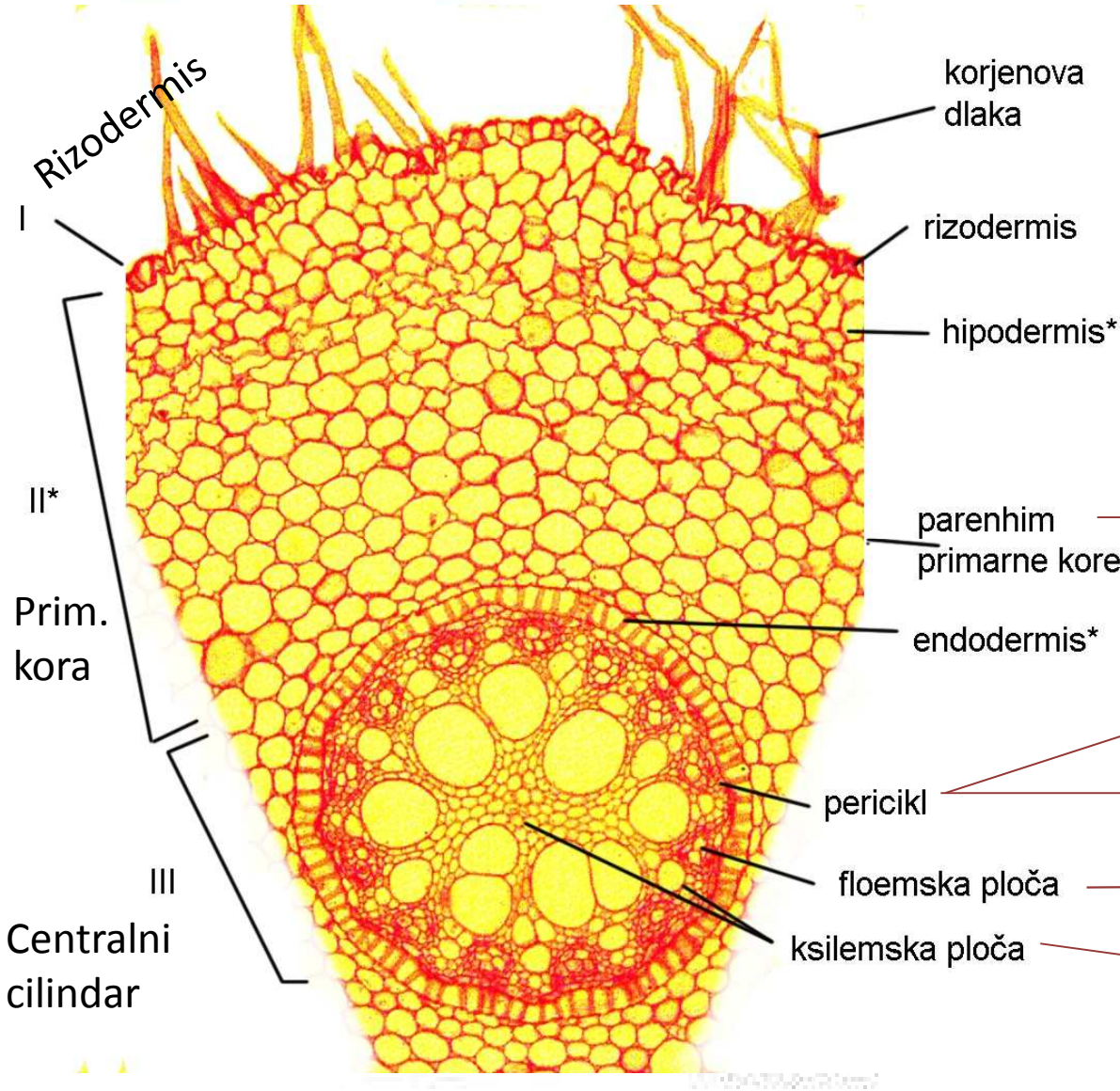
Zona izduživanja

Zona intenzivne diobe ćelija

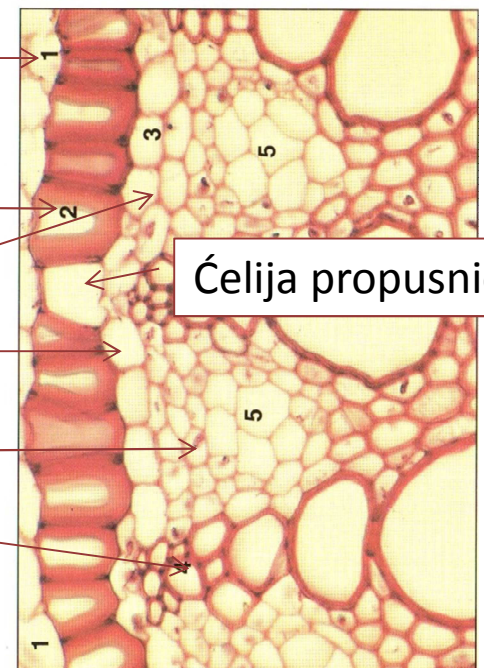




Presjek kroz zonu korjenovih dlaka



Rast bočnih korjenova

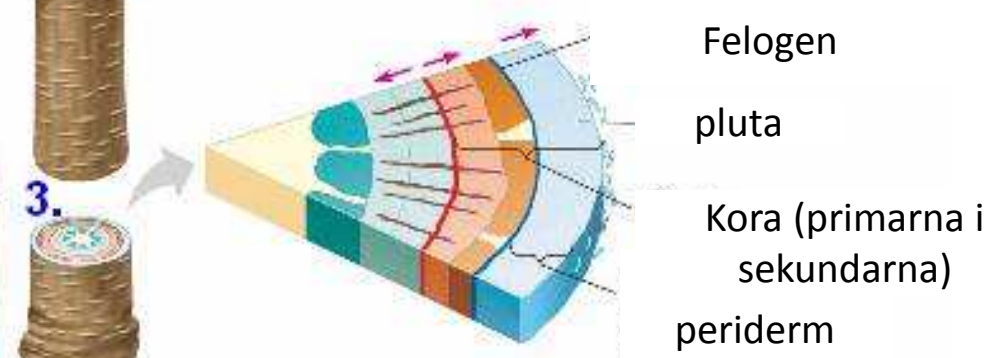
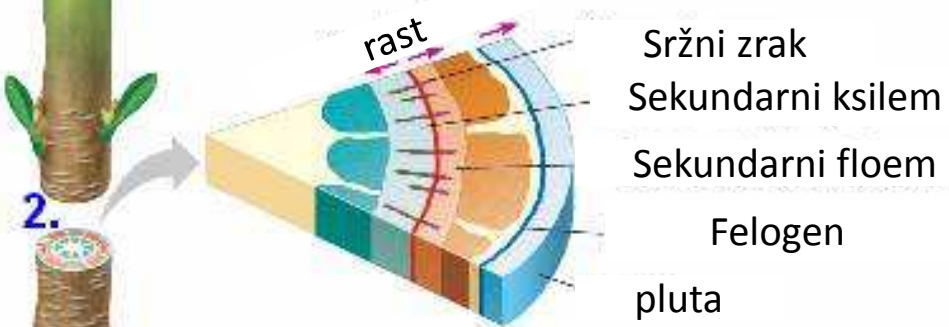
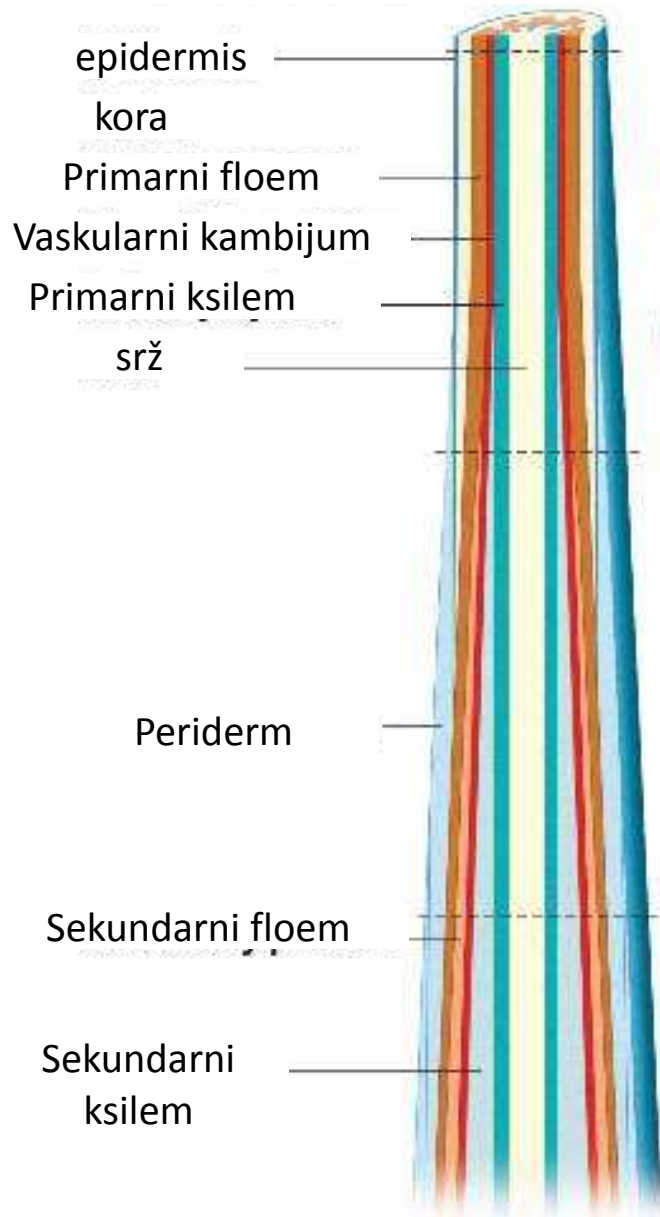


Ćelija propusnica

Kasparijeva zadebljanja ...

Sekundarni rast stabla

Sekundarni rast stabla



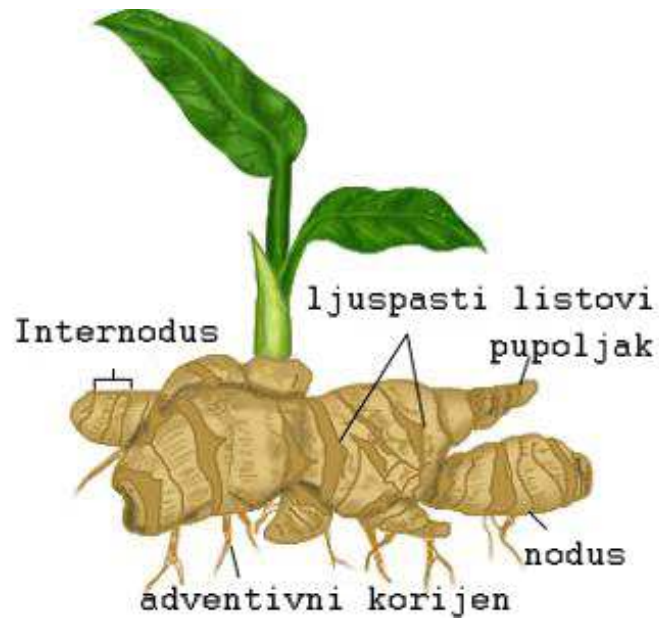
Metamorfoze izdanka

- Fotofilni

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

Rizomi

(horizontalni, uspravni, monopodijalni, simpodjalni)

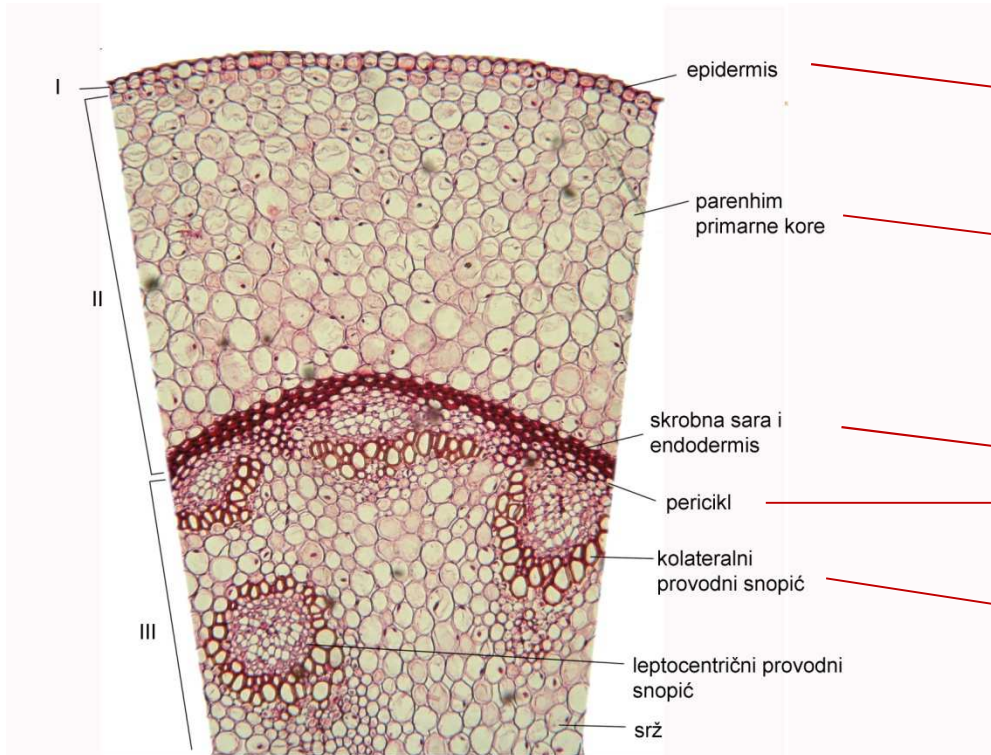


Rizom đumbira

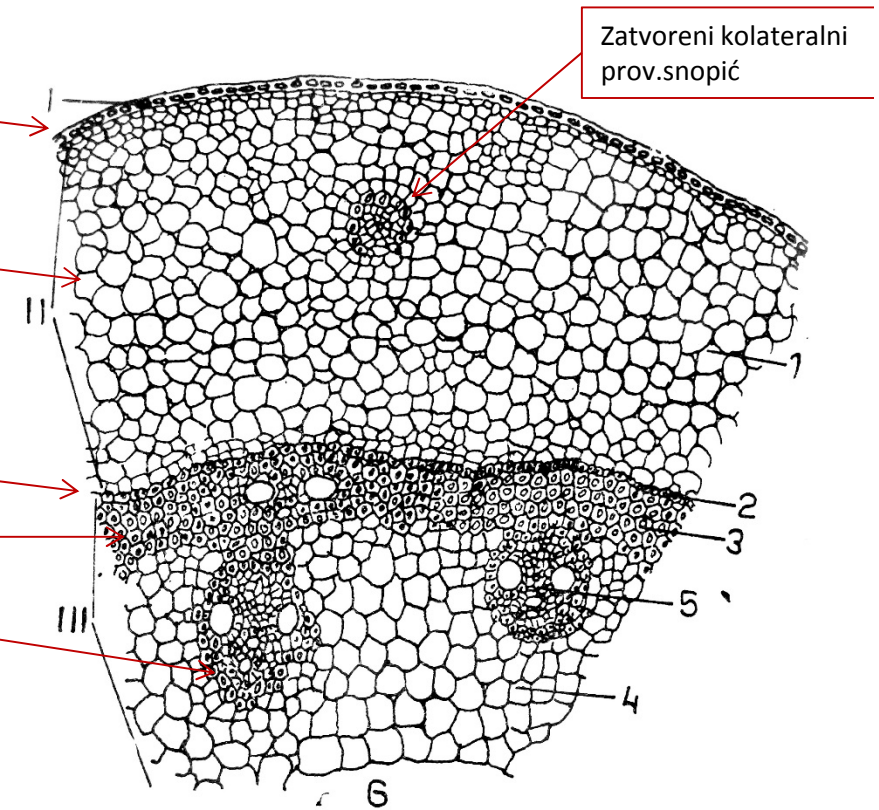


Rizom kisele paprati

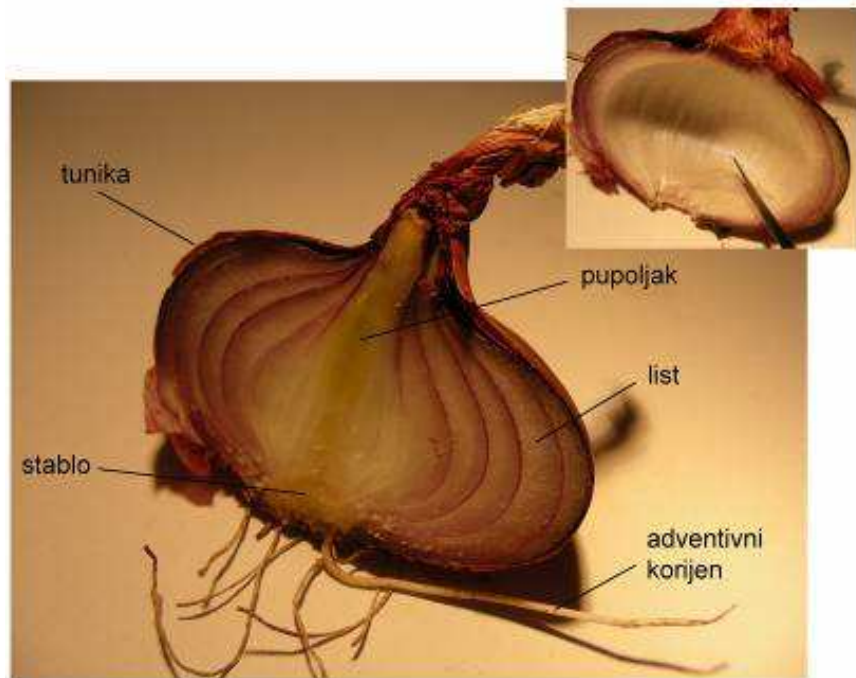
Rizom đurđevka (*Convallaria majalis*)



Rizom pirevine (*Agropyron repens*)



3- pericikl u vidu mehaničkog prstena



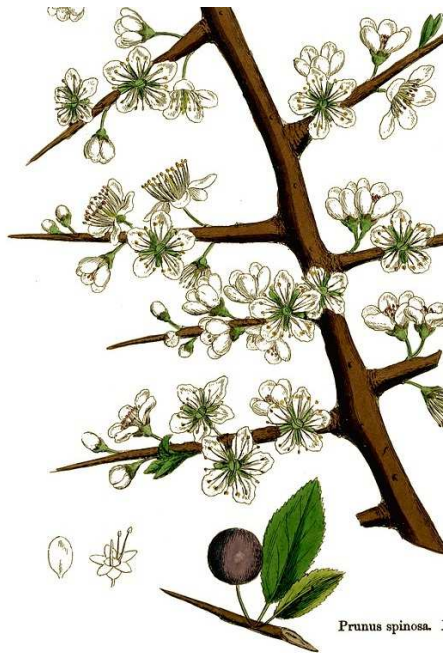
Lukovica



Krtola



Metamorfoza izdanka u trn



Metamorfoza izdanka u rašljike



Filokladije



Sukulente



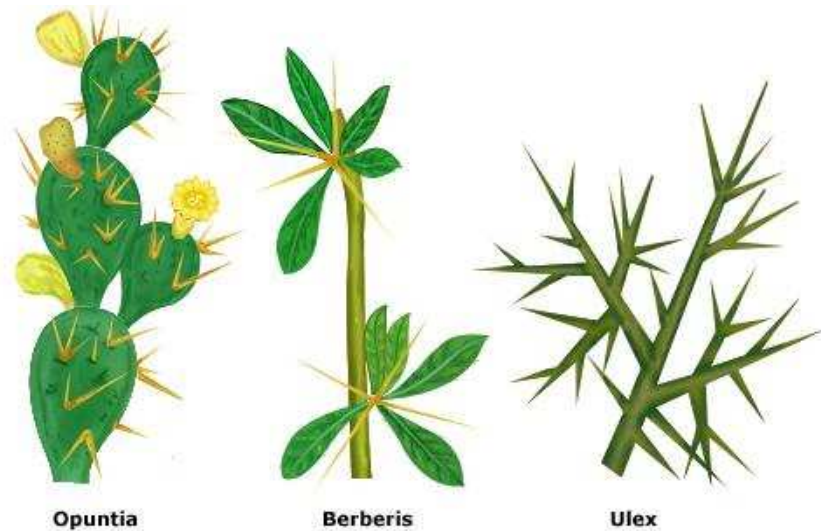
METAMORFOZE LISTA

Metamorfoza lista u rašljiku

Metamorfoza lista u trn



rašljika

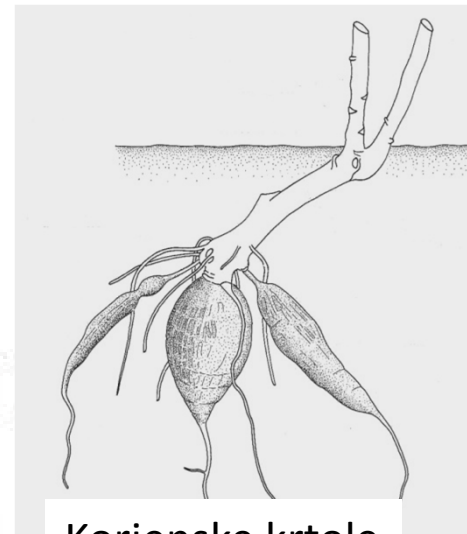
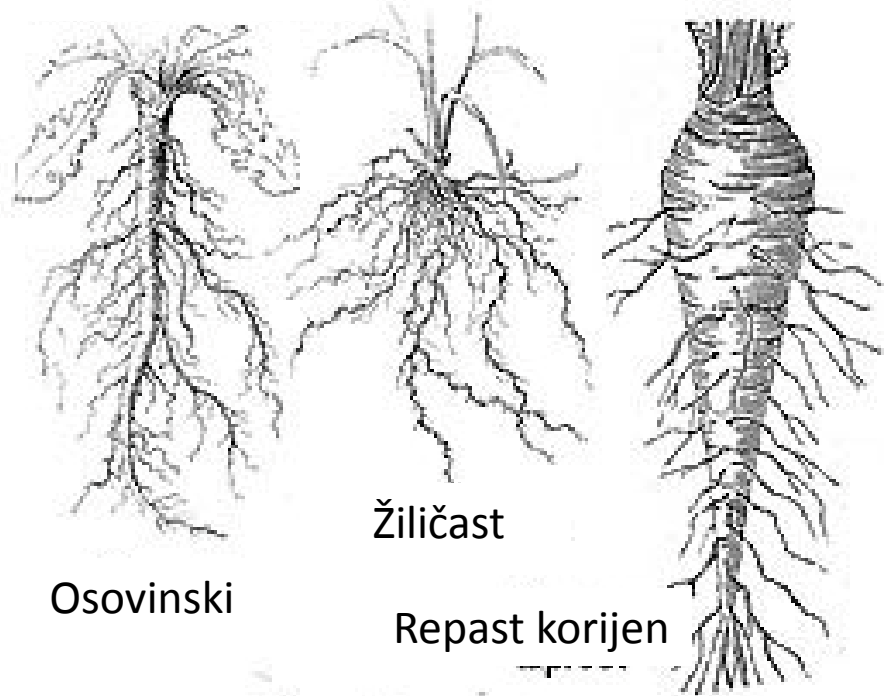


Metamorfoza lisne drške u filodije

Listovi kao organi za magacioniranje hrane

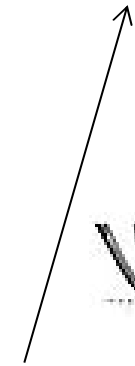


Tipovi korjena i metamorfoze

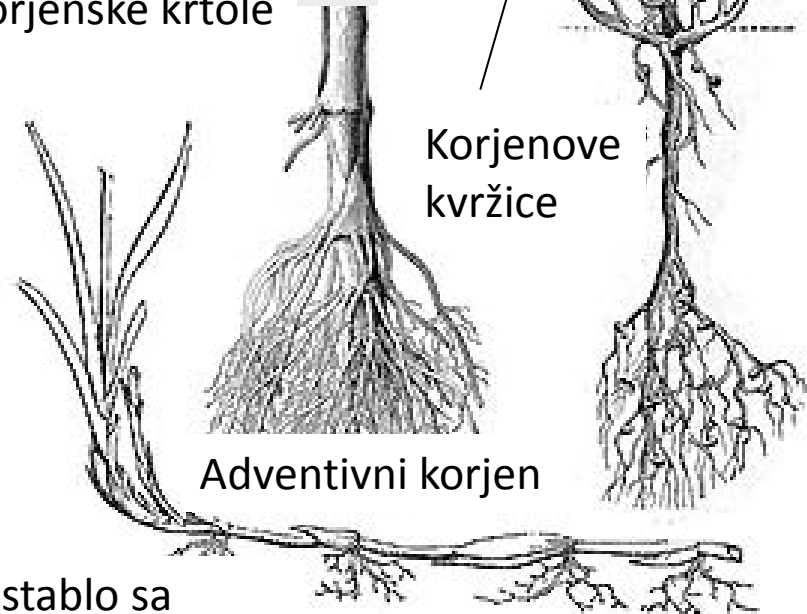


Korjenske krtole

Mikoriza



Korjenove kvržice



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