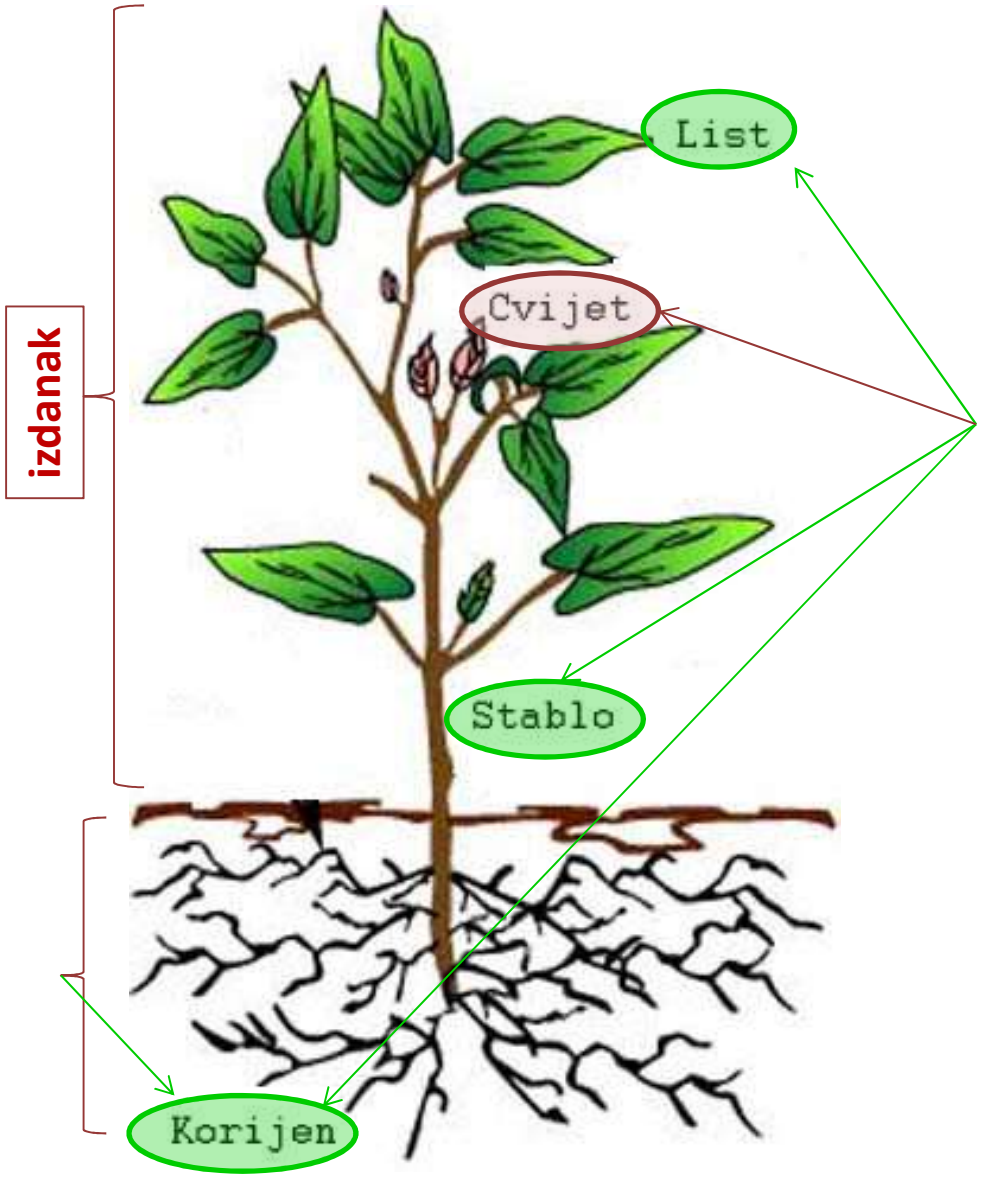
ORGANOGRAFIJA



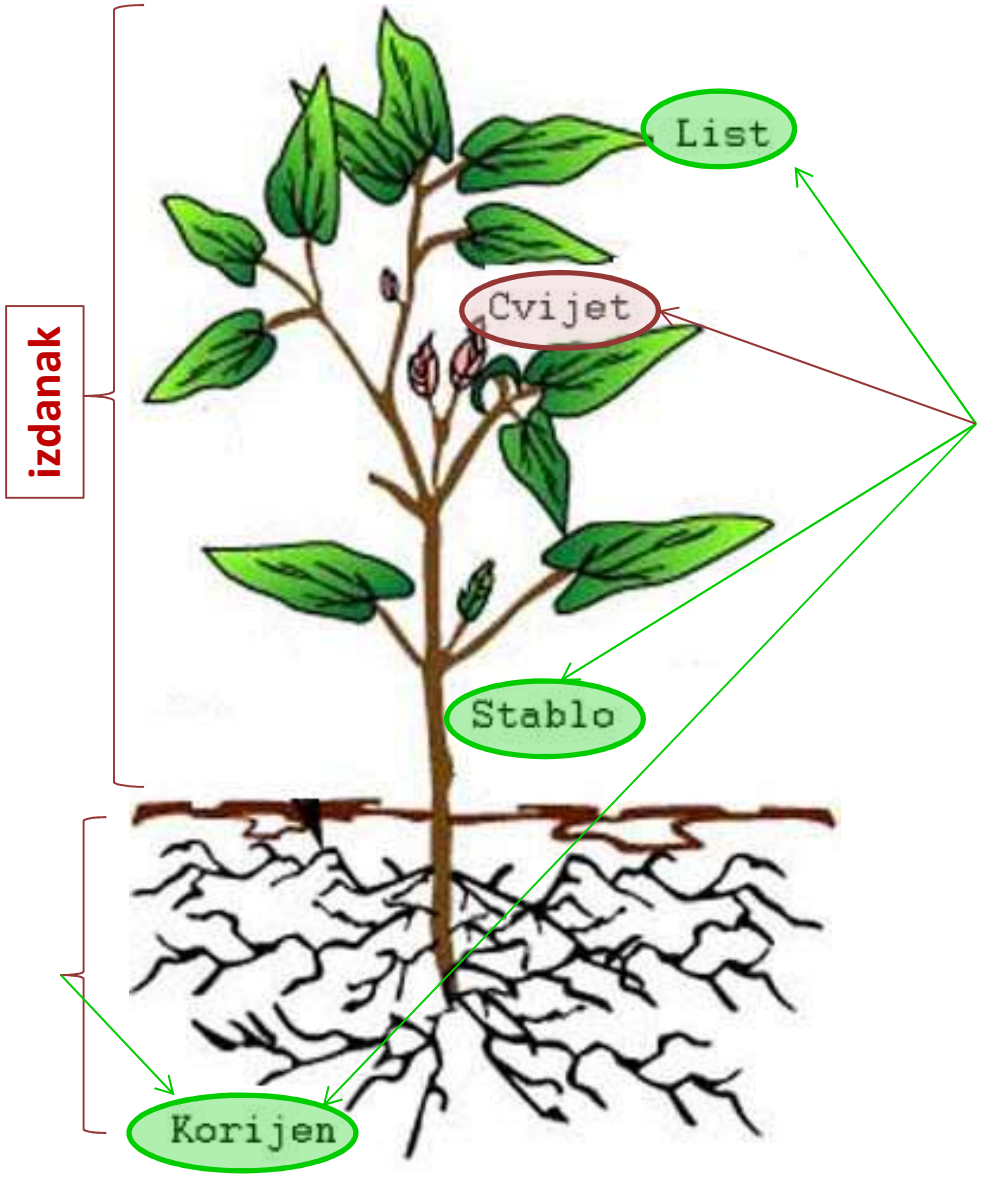
Organ- dio biljnog tijela koji vrši određenu funkciju!

Vegetativni i reproduktivni!

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

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

Metamorfozirani organi…



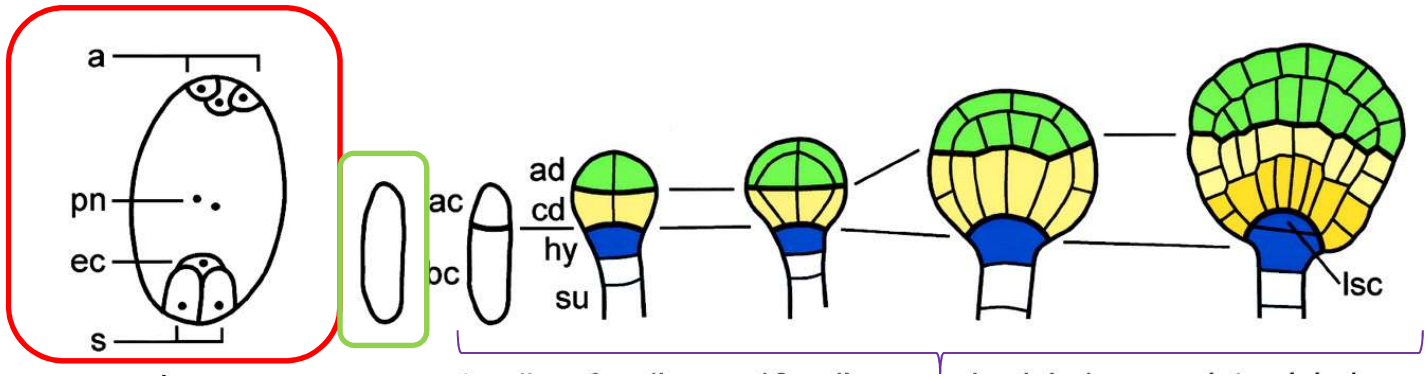
Izdanak

(stablo + listovi + reproduktivne strukture)

Korijen

Razviće biljaka

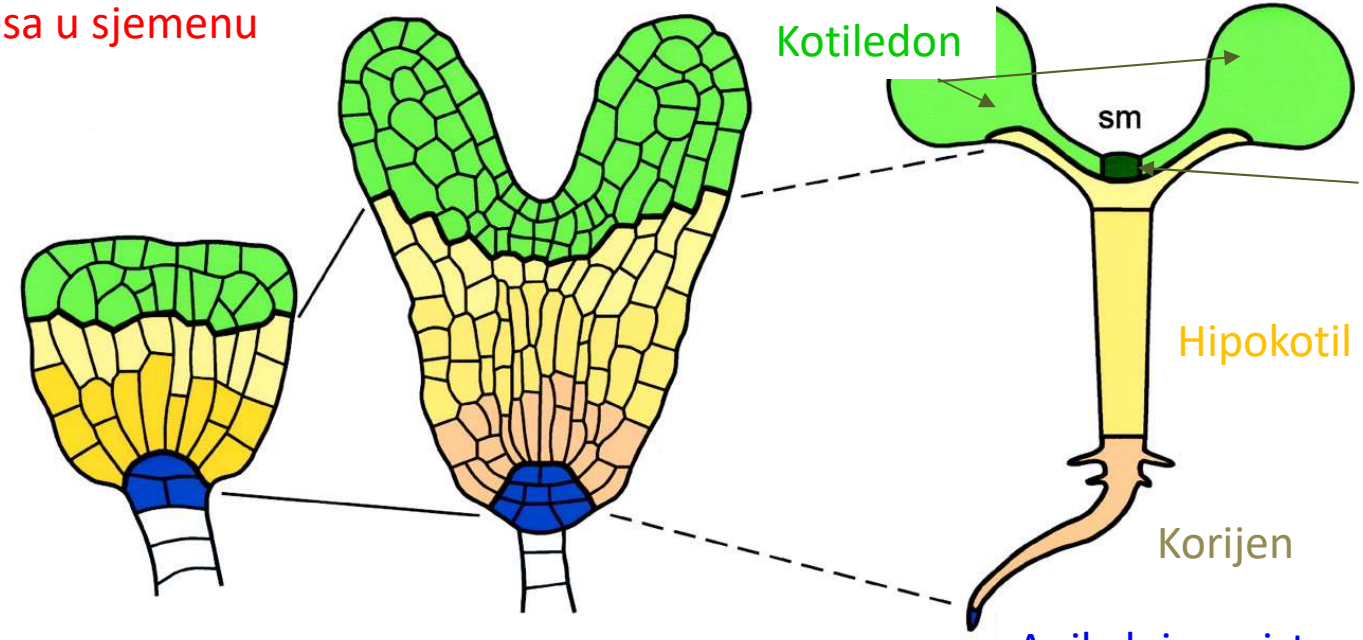
sjeme (zigot-embrion-klica)- klijanac- biljka – sjeme



Embrionova kesa u sjemenu

Zigot

Razvoj embriona



i nastanak klijanca

Koje biljke imaju sjeme?

- Četinari i
- Cvjetnice (dikotiledone i monokotiledone biljke)

Da li je sjeme svih sjemenjača isto građeno?

- Nije!

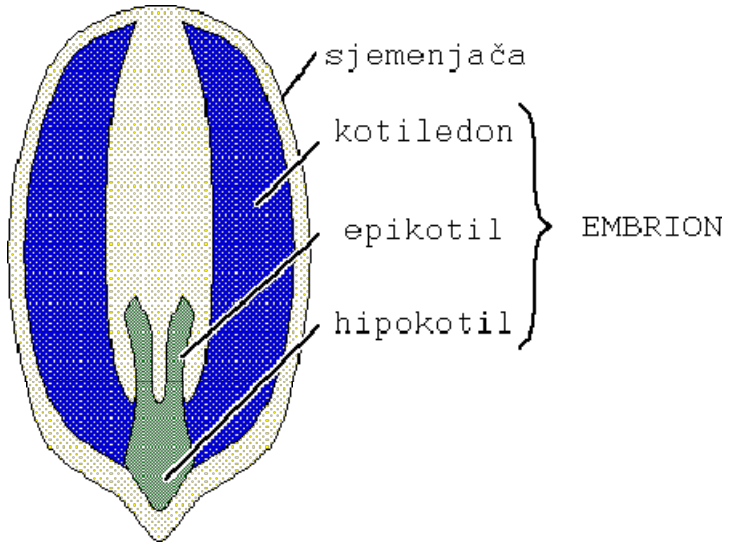
Osnovni djelovi sjemena

- **Integument**, iz kojeg nastaje sjemenjača (omotač sjemena) i

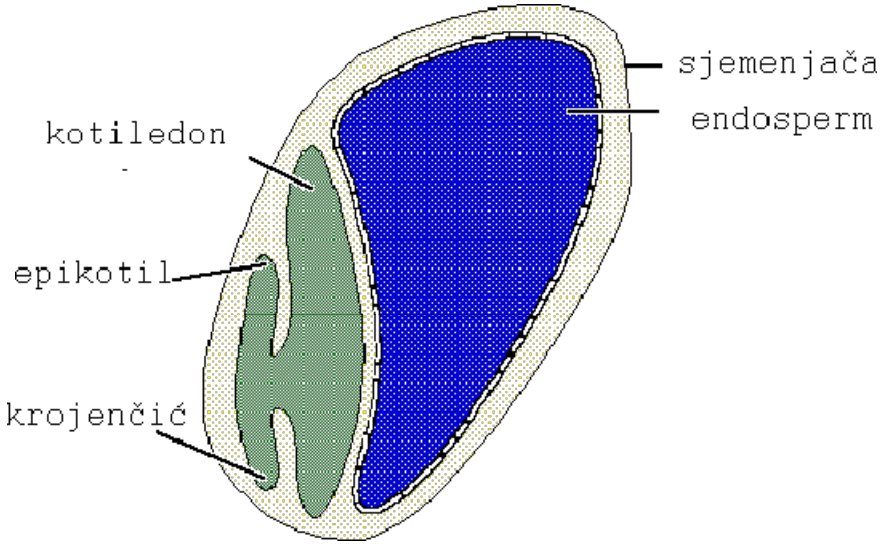
- **Nucelus**, unutrašnje tkivo, u kojem u toku razvoja sjemena nastaju jajna ćelija, a njenim oplođenjem zigot, zatim embrion i klica). U sjemenu se nalazi i hranljivo tkivo (endosperm), koji u zavisnosti od postanka može biti primaran ili sekundaran.

Građa sjemena biljaka sa cvjetom (dikotile, monokotile)

DIKOTILEDONE BILJKE



MONOKOTILEDONE BILJKE



Sjemenjača- ovojnica sjemena

Endosperm- hranljivo tkivo

Klica- začetak biljke u sjemenu/sjemenom zametku

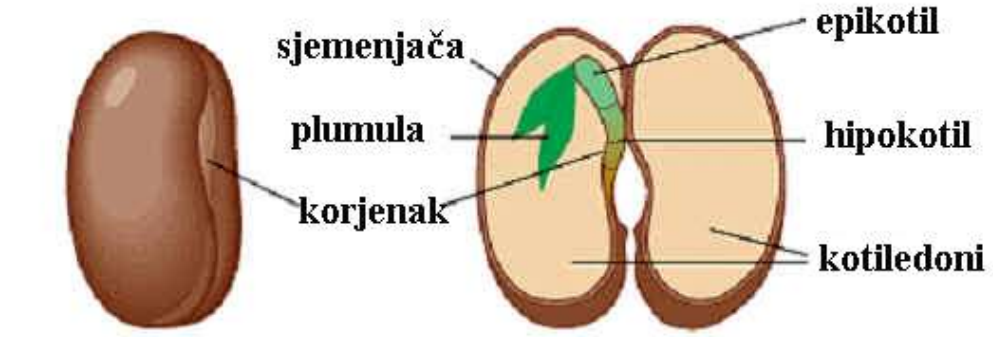
Kotiledoni- klicini listići

Epikotil- vršni dio stabaoceta klice

Hipokotil- donji dio stabaoceta klice, od kotiledona do korijenka

- **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, tempetatura)**



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.

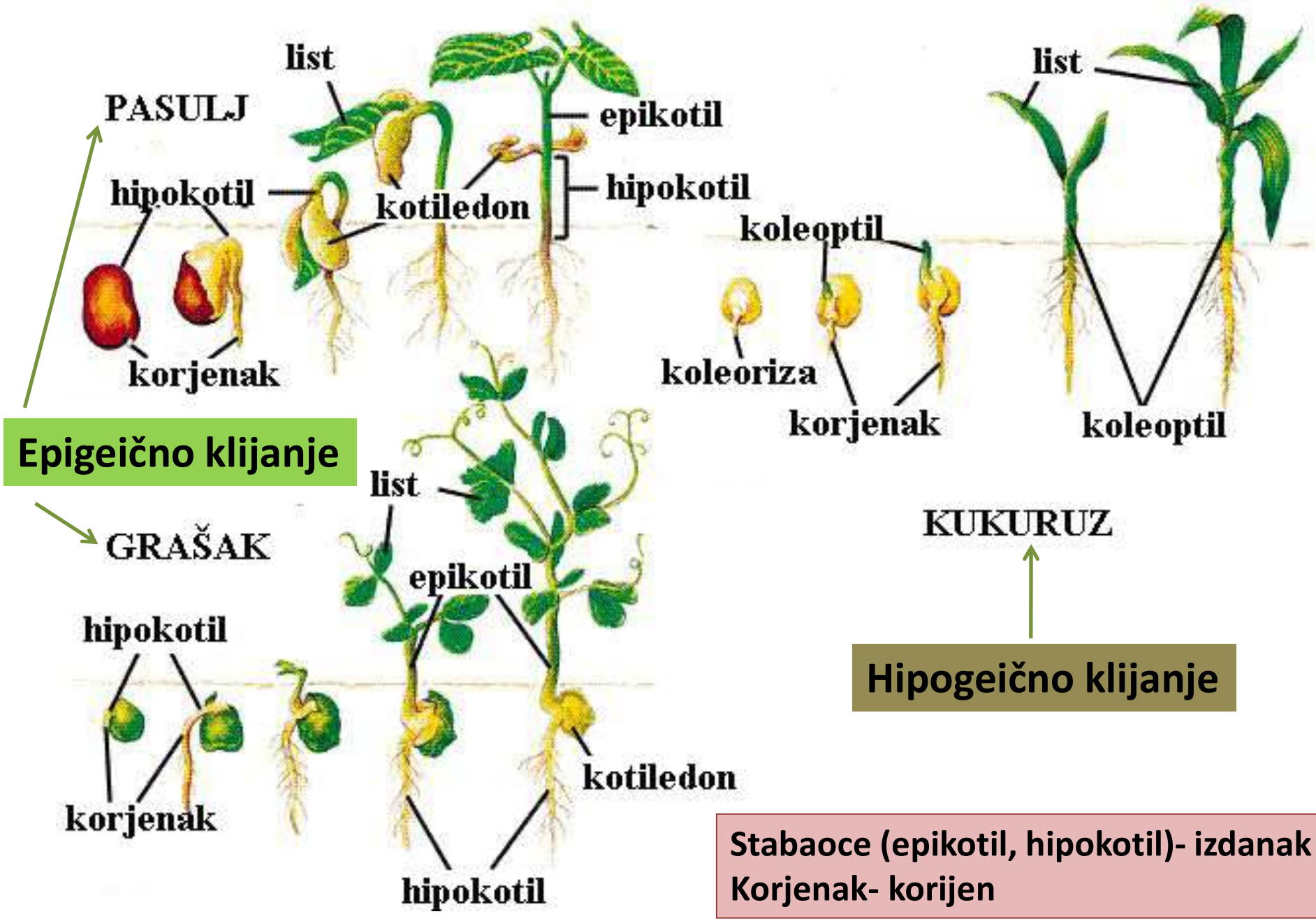
Tipovi sjemena- u donosu na vrstu hranljivog tkiva

1. **Sjemena bez endosperma-** kotiledoni apsorbuju 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. **Sjemena 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. **Sjemena sa perispermom** koji predstavlja hranljivo tkivo vegetativnog poreklo jer nastaje od nucelusa; imaju ga predstavnici porodice karanfila (*Caryophyllaceae*), lobode (*Chenopodiaceae*) i dr.

4. **Sjemena sa endospermom i perispermom** sadrže hranljivo tkivo dvojnog porekla i ređe se javljaju; ima ga npr. biber *(Piper)*.

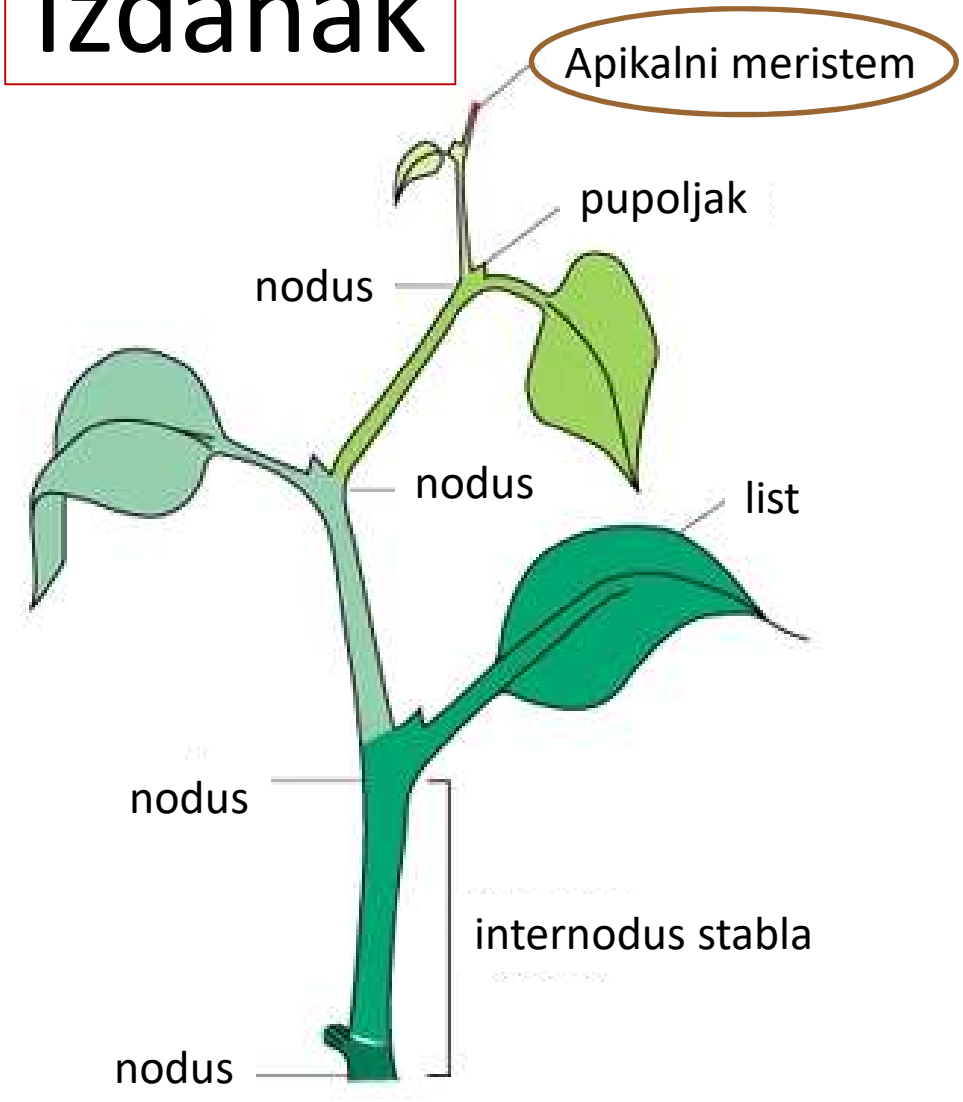


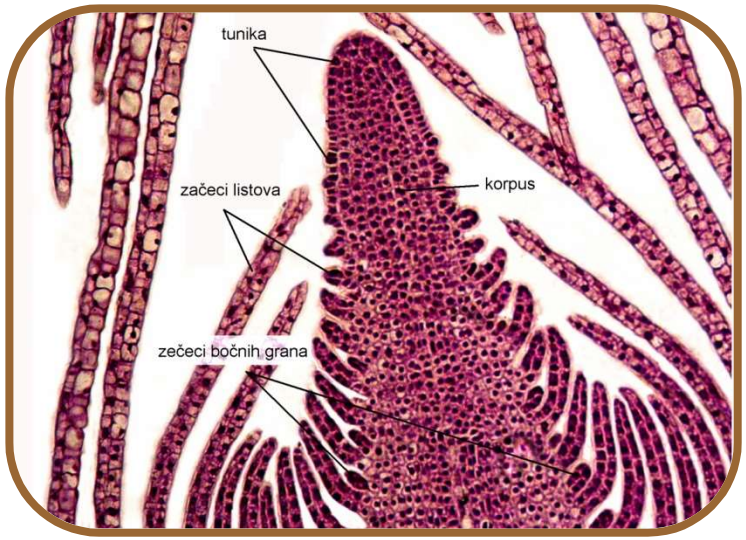
Stabaoce (epikotil, hipokotil)- izdanak
Korjenak- korijen

Razviće biljaka

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

Izdanak



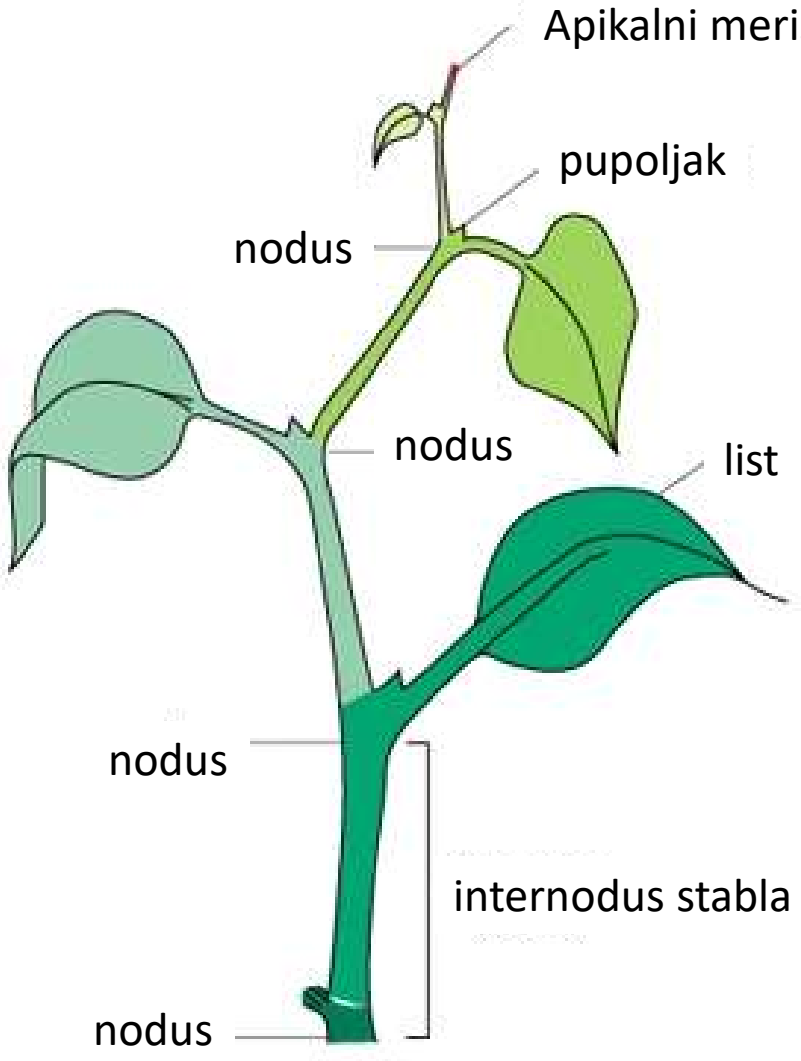


Začeci bočnih grana= začeci pupoljaka

Pupoljak= vegetativna kupa + listovi koji je opkoljavaju

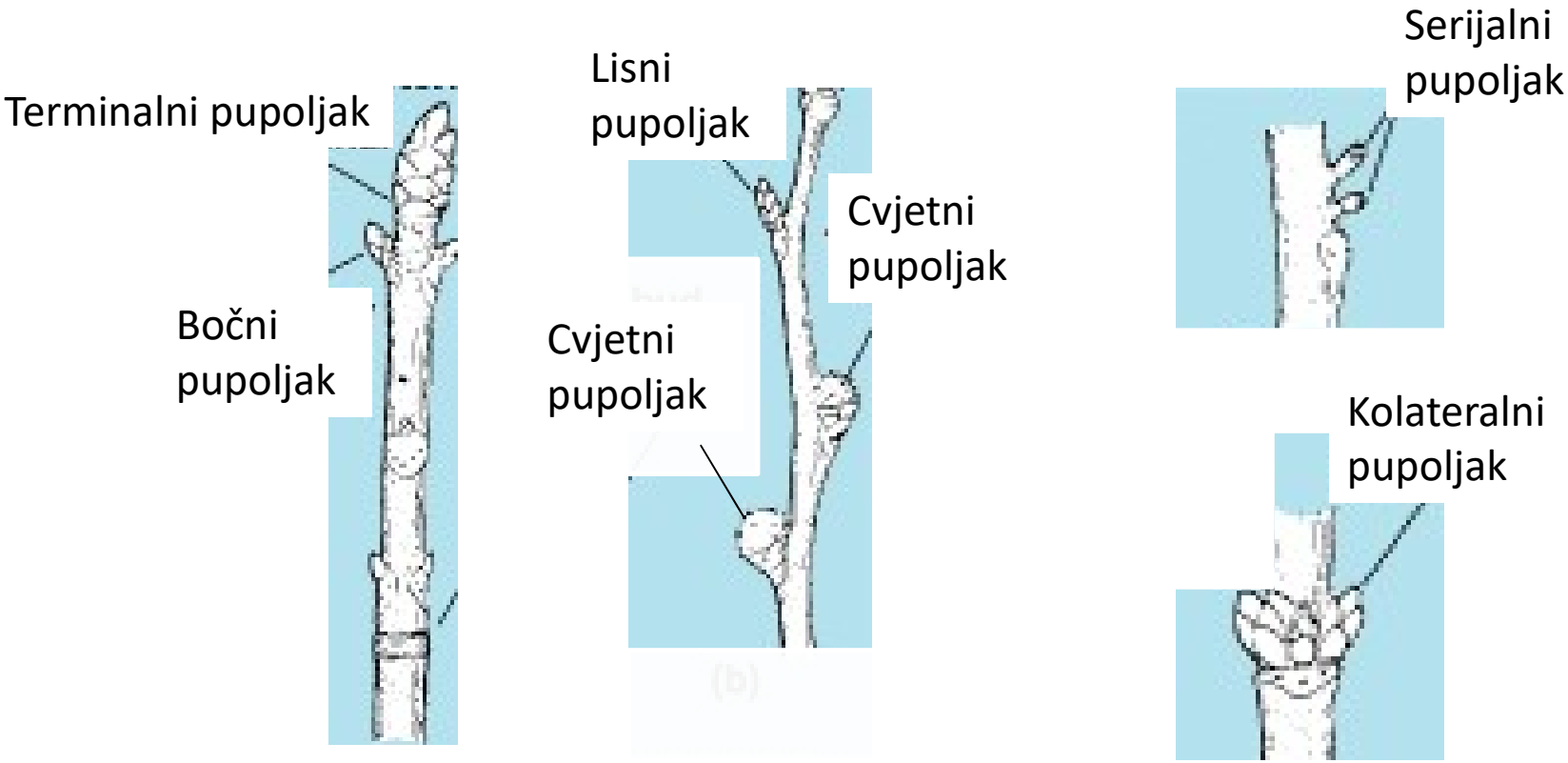
Izdanak

Fotofilni izdanak



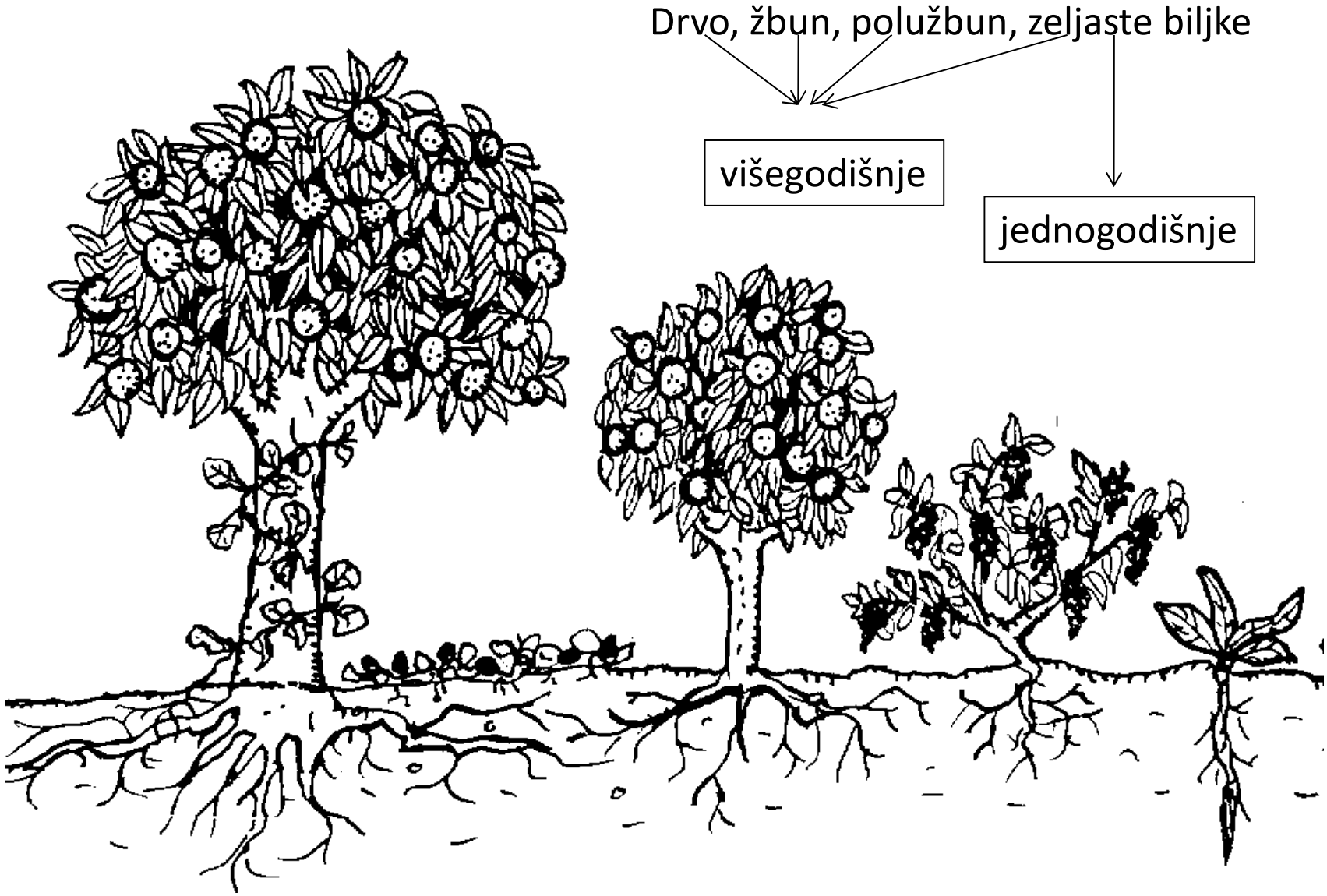
Geofilni izdanak
rizom

Pupoljci....

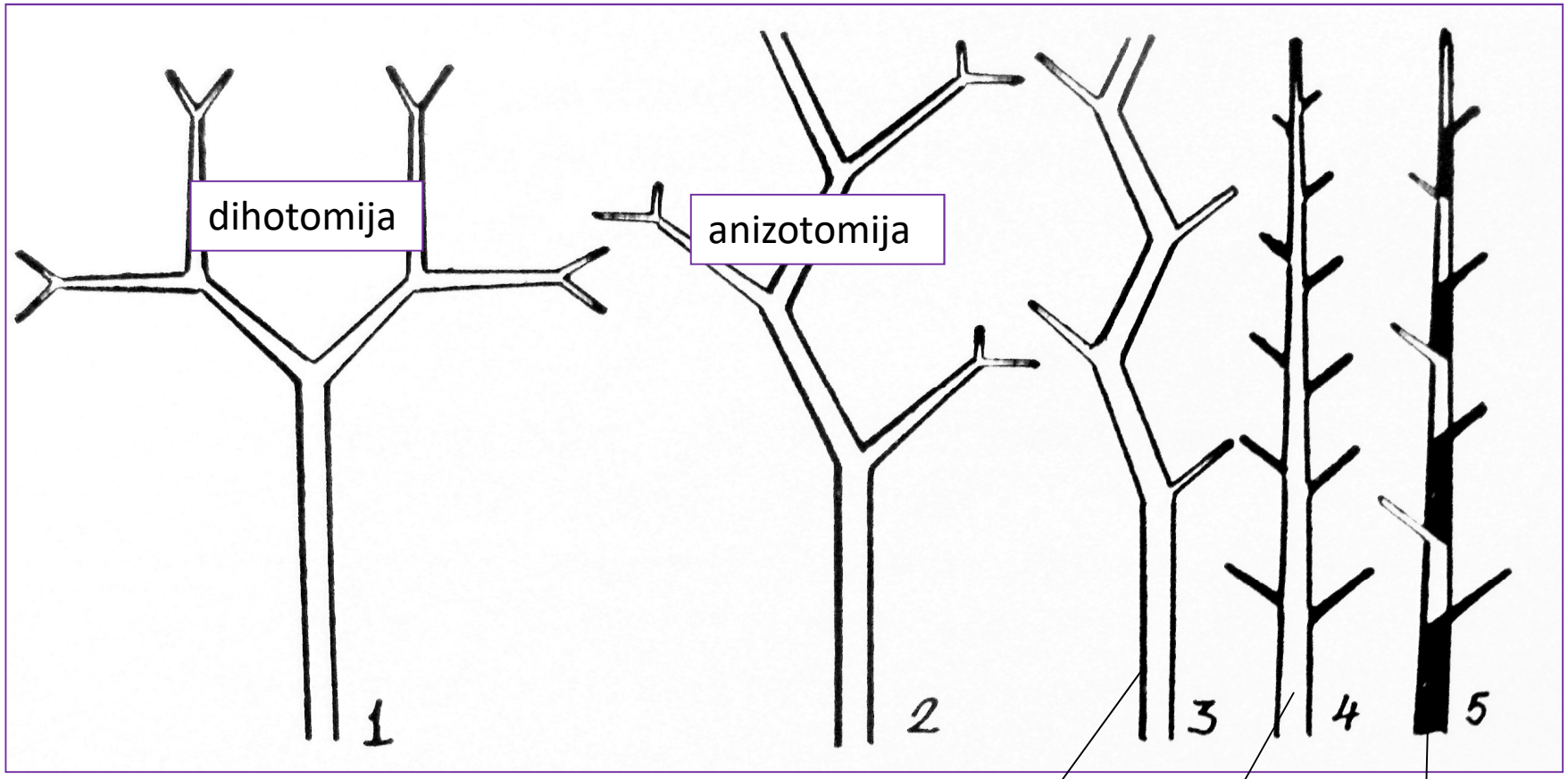


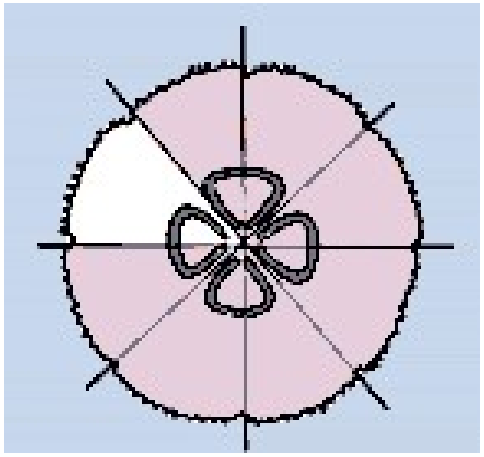
Zimski pupoljci, pupoljci za obnavljanje, uspavani pupoljci, kauliflorija .... advnetivni pupoljci

Forme stabla

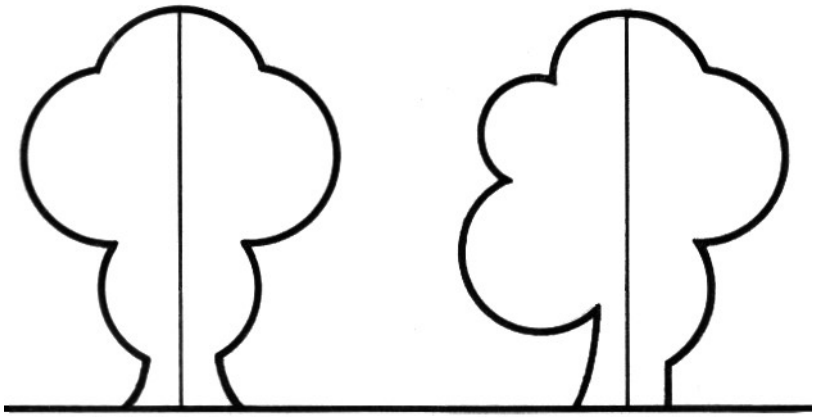


Tipovi grananja





Polisimetrija =
(radijalna simetrija)

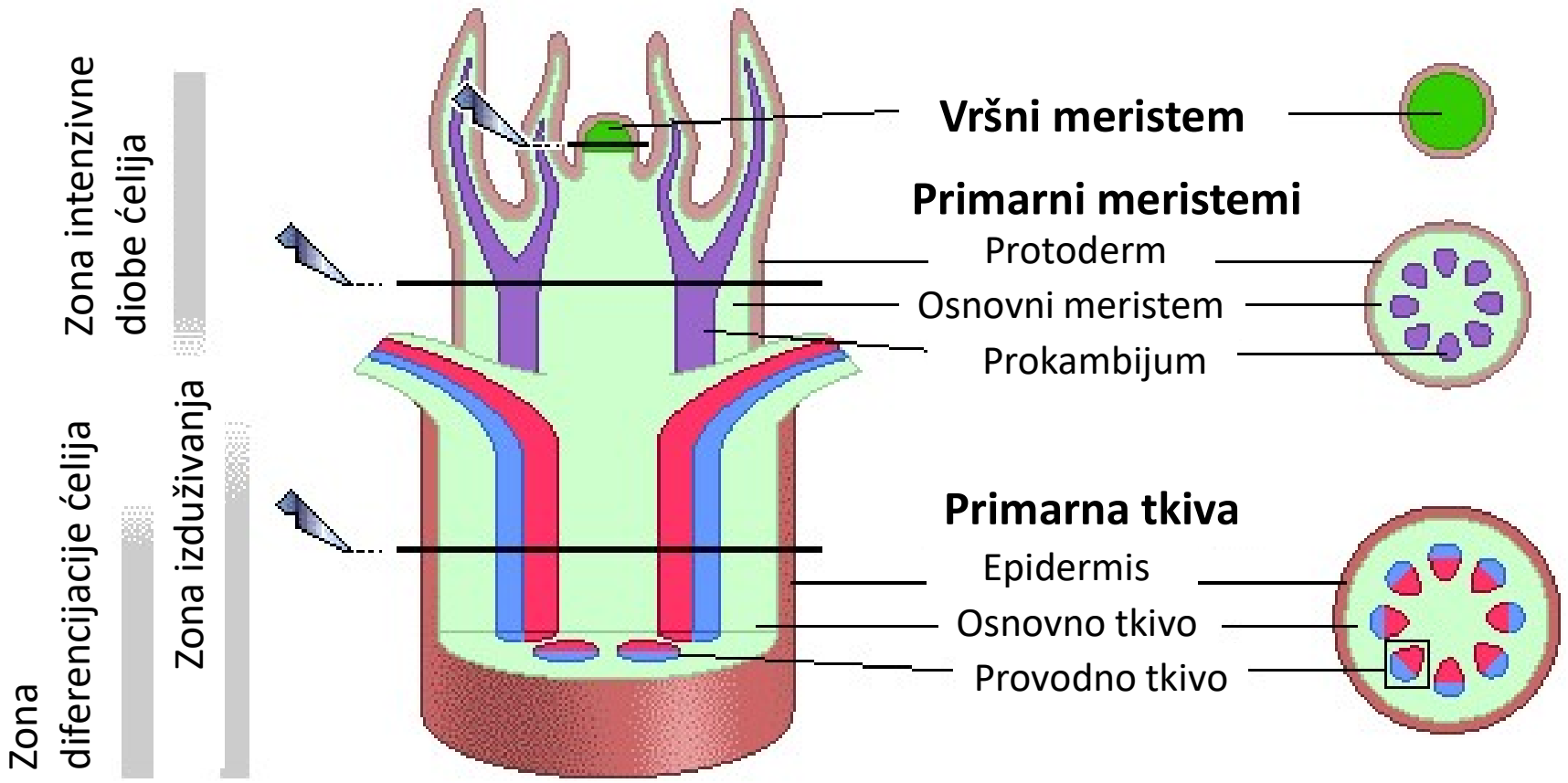


Bilateralna simetrija

Asimetrija

- Simetrija cvijeta: polisimetričan= aktinomorfan, pravilan; monosimetričan= zigomorfan, nepravilan cvijet

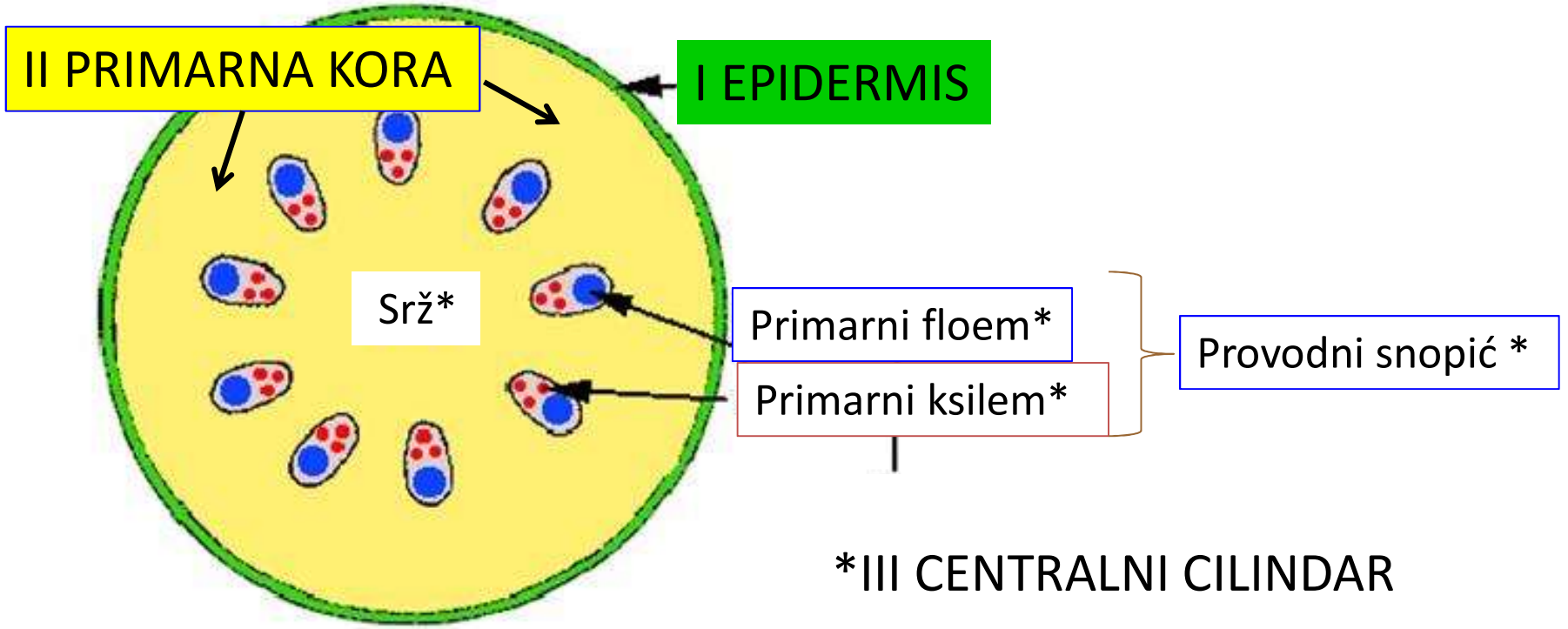
Primarna građa- opšta shema!



Osnovno tkivo= parehnim + mehanički elementi

Primarna građa stabla dikotiledonih biljaka

Opšta primarna građa:
Epidermis, primarna kora, centralni cilindar



Elementi primarne kore

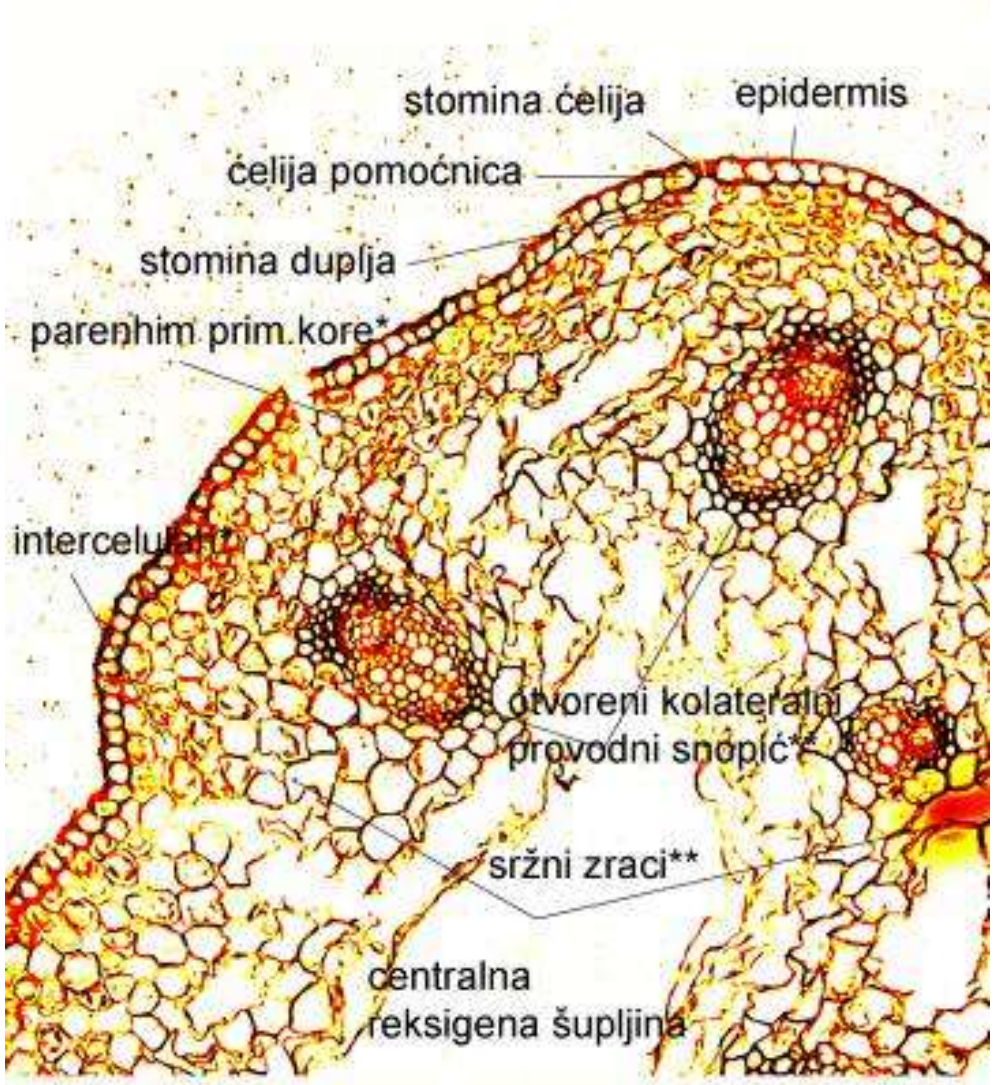
- Parenhimske ćelije
- Mehaničke ćelije
- Endodermis= skrobna sara

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

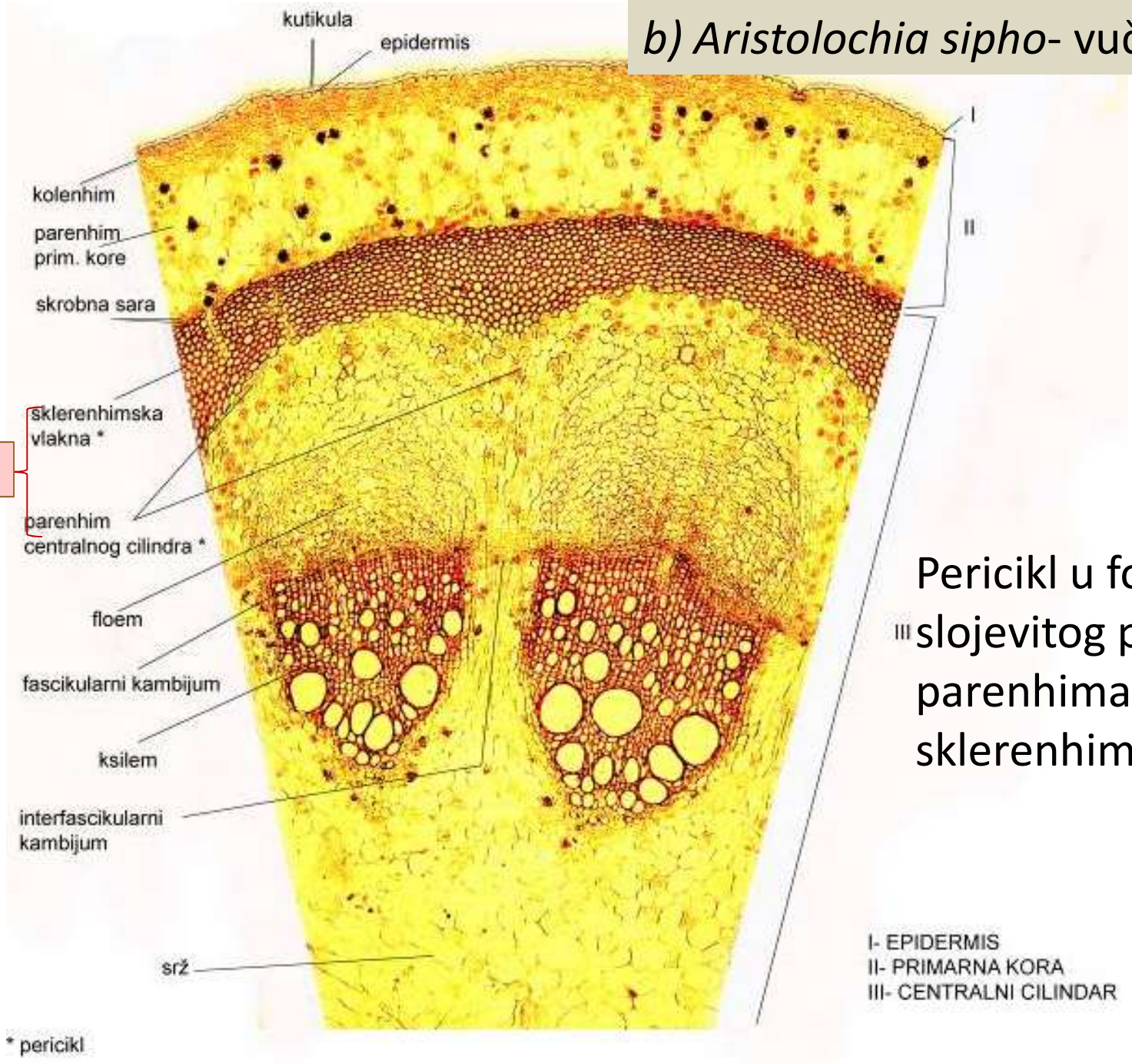


I- EPIDERMIS
*- PRIMARNA KORA
**- CENTRALNI CILINDAR

a) Ranunculus spp.- ljutić

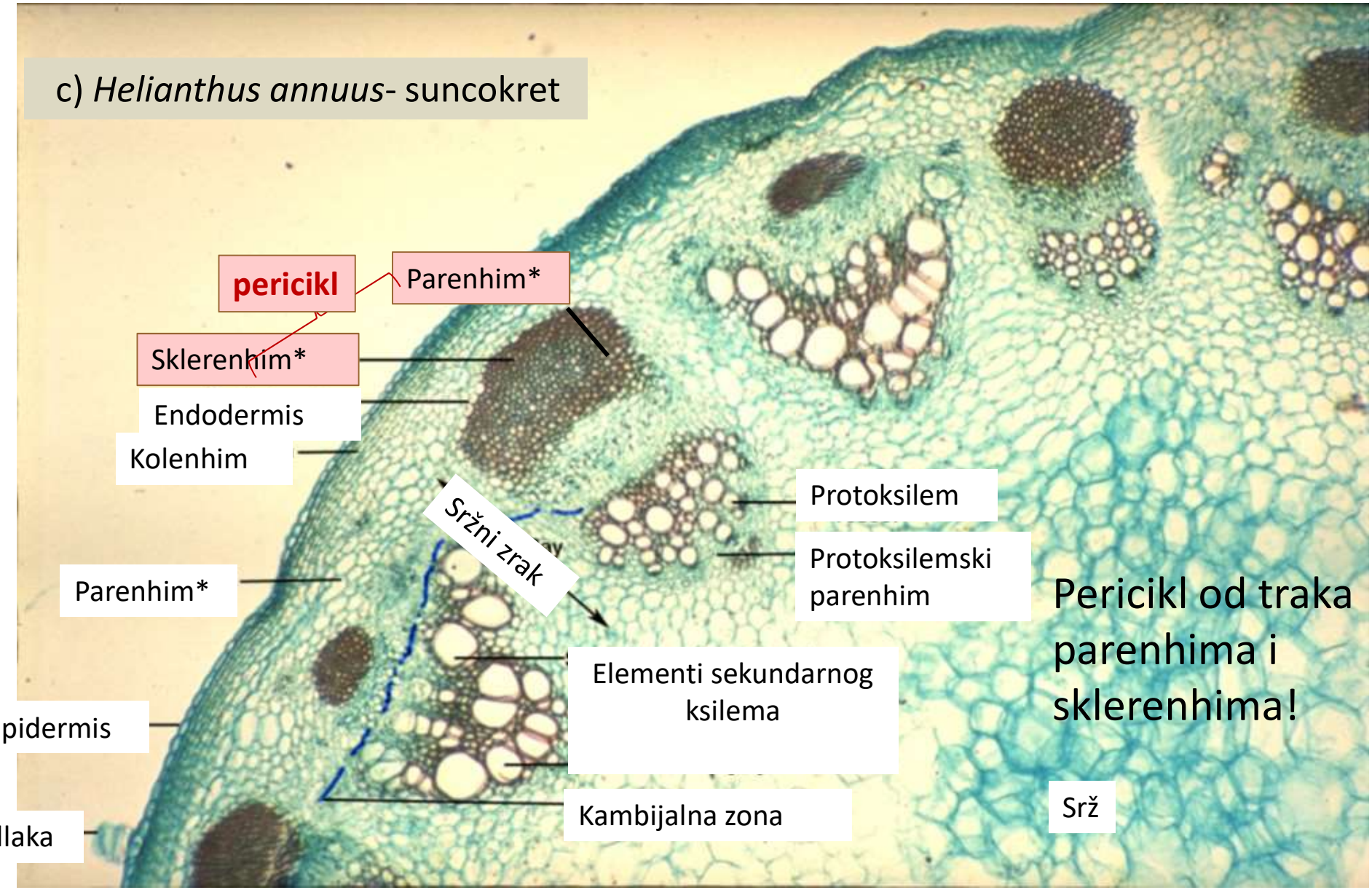
Parenhimatični pericikl!

b) Aristolochia sipho- vučja jabuka

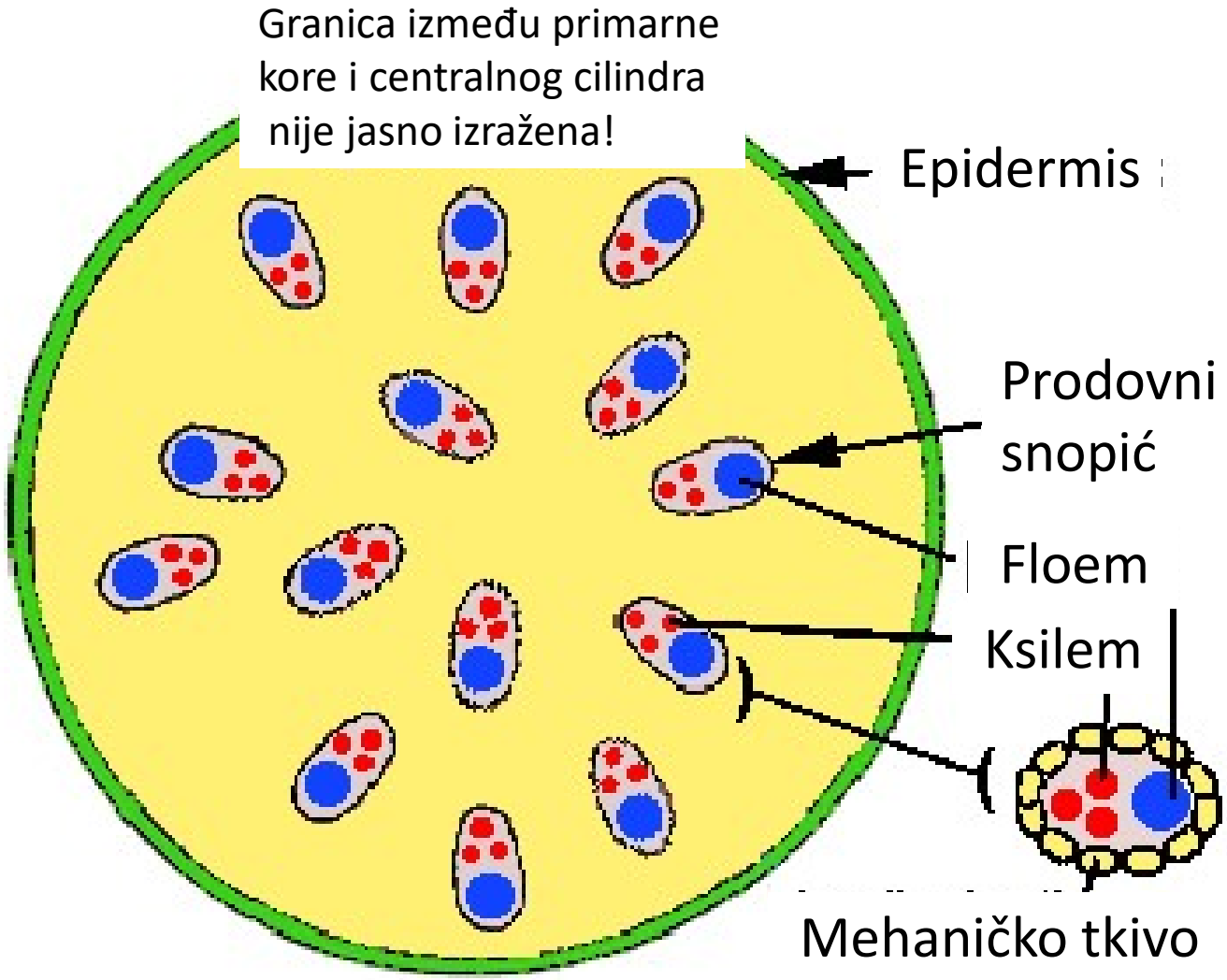


pericikl

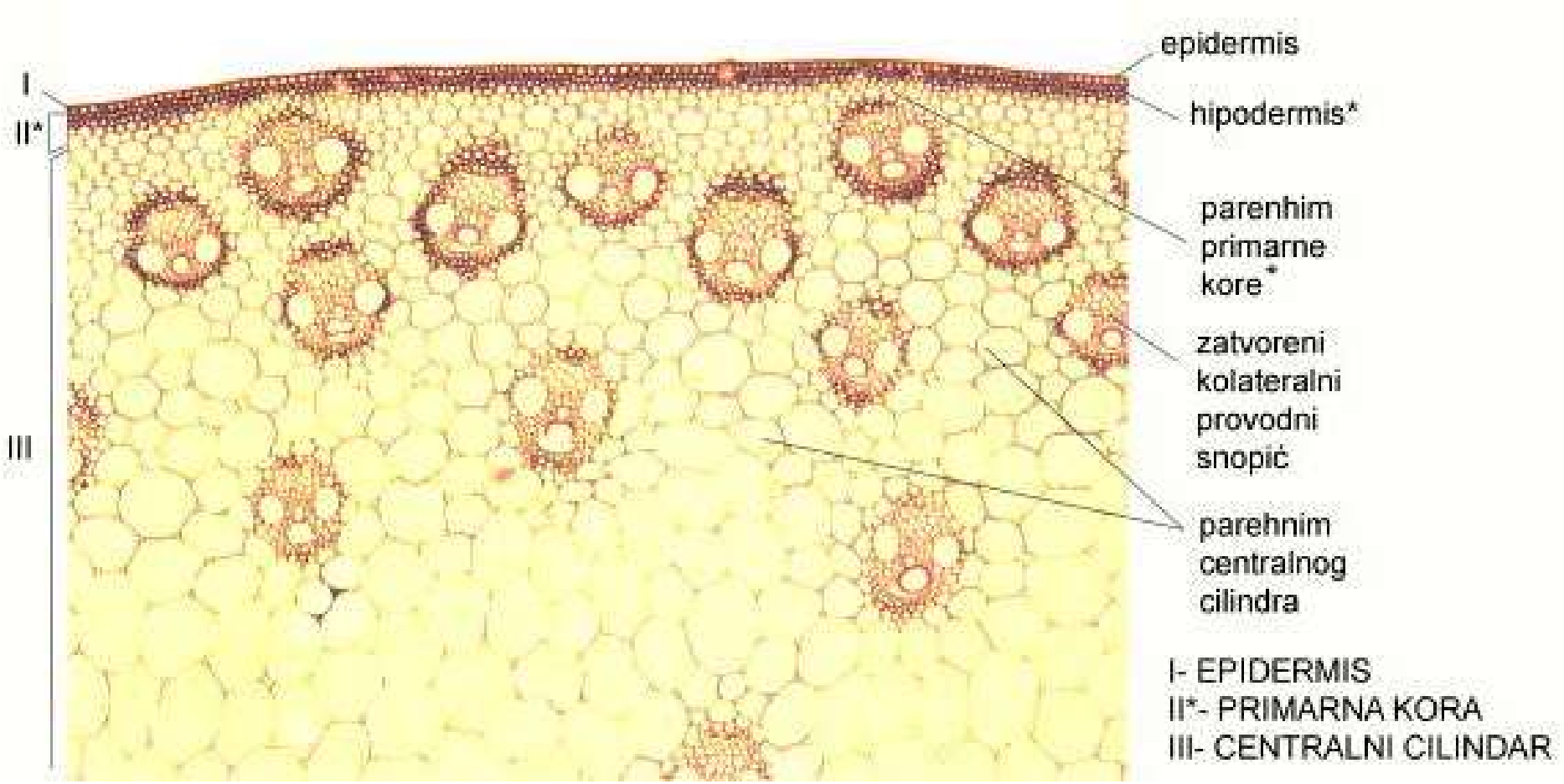
Pericikl u formi slojevitog prstena od parenhima i sklerenhima!


c) *Helianthus annuus*- suncokret
pericikl
Parenhim*
Sklerenhim*
Endodermis
Kolenhim
Sržni zrak
Protoksilem
Protoksilemski parenhim
Parenhim*
Elementi sekundarnog ksilema
Epidermis
Kambijalna zona
dlaka
Srž
Pericikl od traka parenhima i sklerenhima!

Primarna građa stabla monokotiledonih biljaka



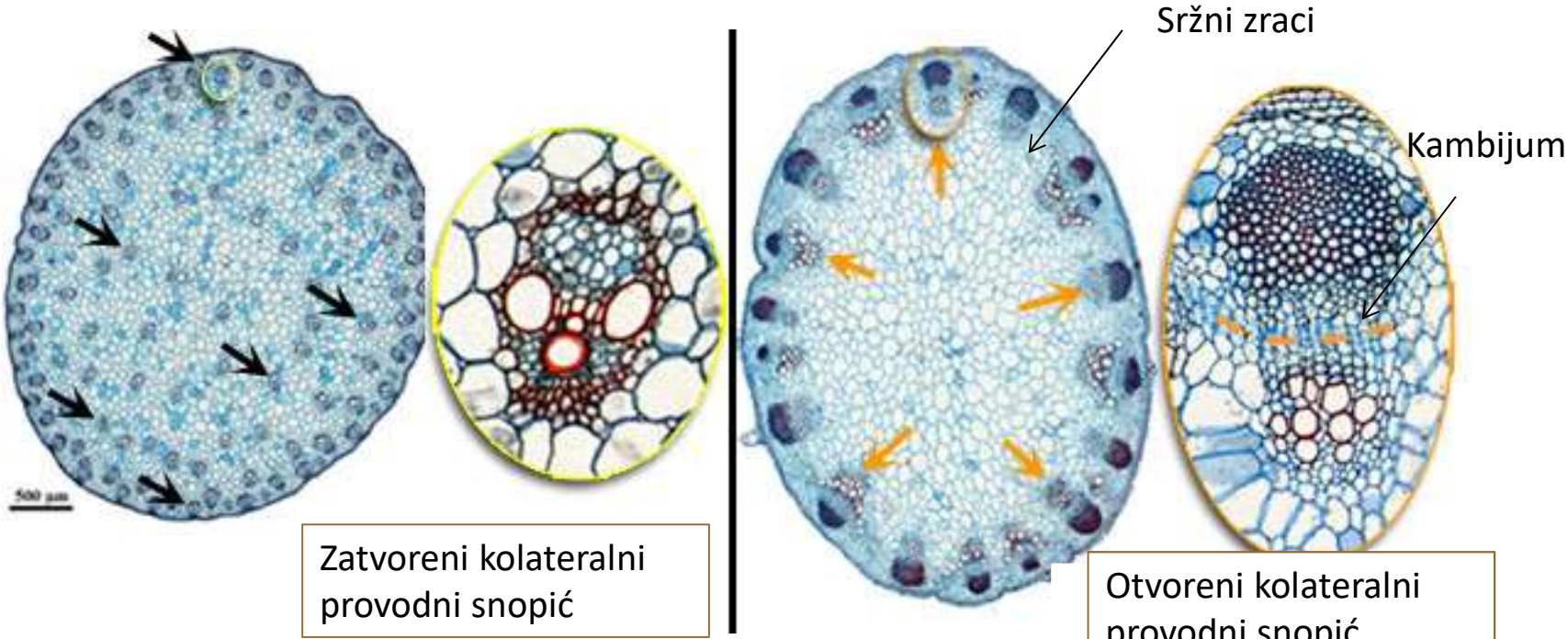
Zea mays – kukuruz



Uporedna shema primarne građe stabla mono- i dikotiledonih biljaka

PRIMARNO STABLO MONOKOTILA

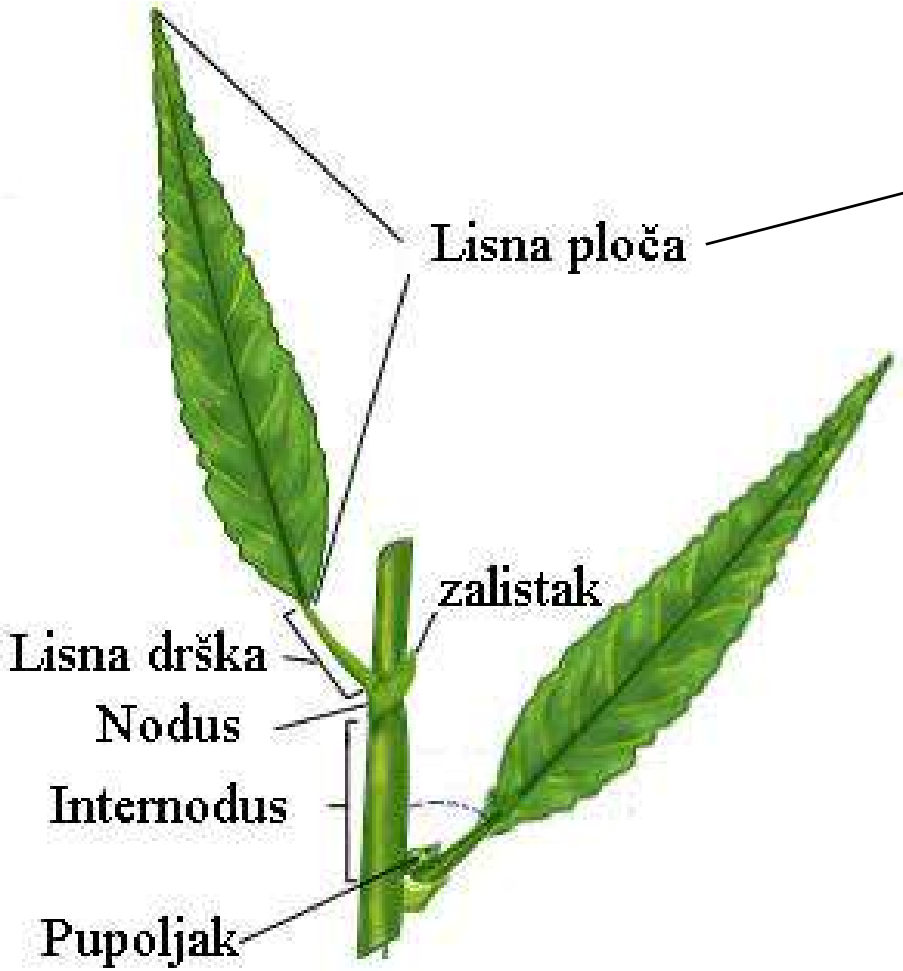
PRIMARNO STABLO DIKOTILA

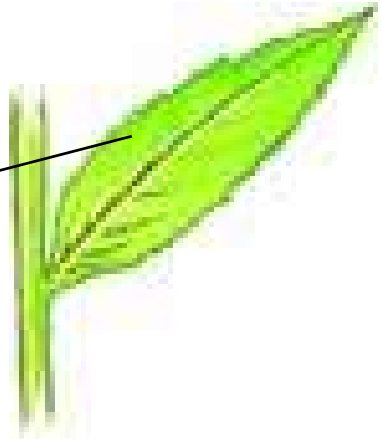


Zatvoreni kolateralni provodni snopić

Otvoreni kolateralni provodni snopić

LIST





KATEGORIJE LISTOVA

-Kotiledoni

-Profile

-Brakteje-gornje lišće

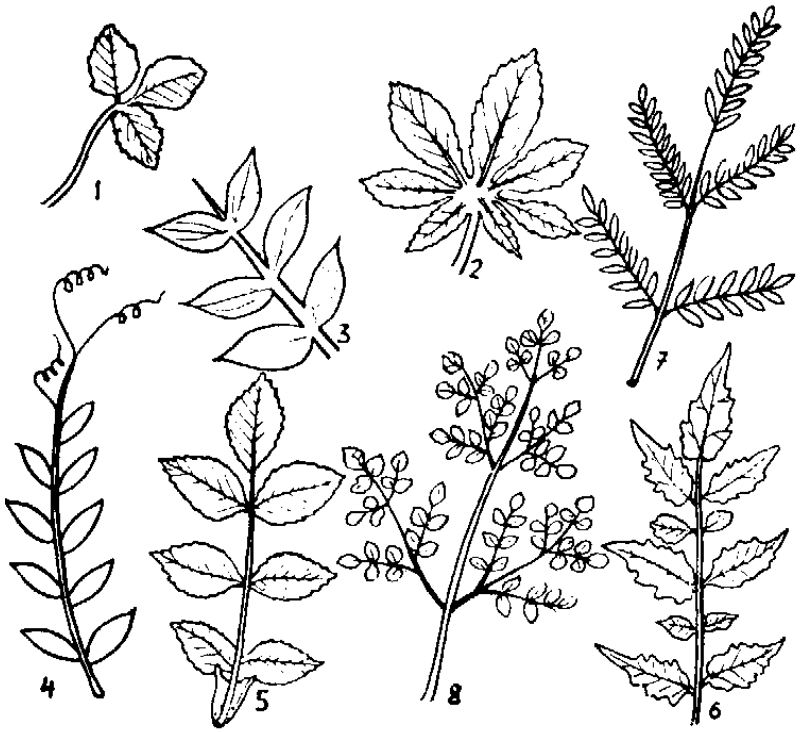
-Ljuspasto lišće –donje

-Srednje lišće-asimilaciono (pravo)

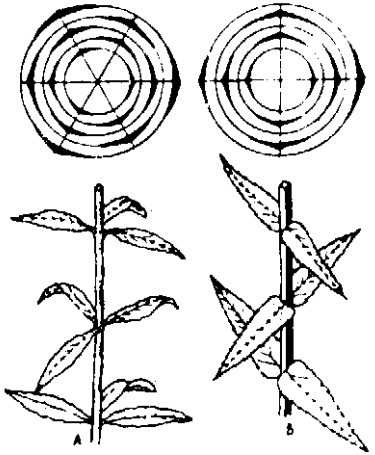
-Lišće u zoni cvjetova

Forma lista

Raspored listova

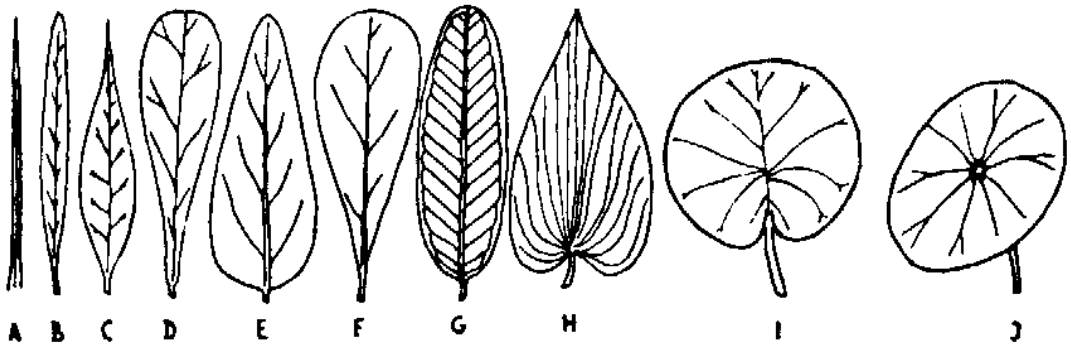


Sl. 308. Složeno građeni listovi: 1 — tročlan; 2 — prstasto složen; 3 — parno perasto složen; 4 — parno perast list sa listićima pretvorenim u rašljike; 5 — neparno perasto složen; 6 — isprekidano perasto složen; 7 — dvojno perasto složen; 8 — trojno perasto složen



Sl 109. Prsljenast raspored listova: A — tri lista u prsljenju, B — dva lista u prsljenju (naspramni raspored) (po Tatiću i sar.)

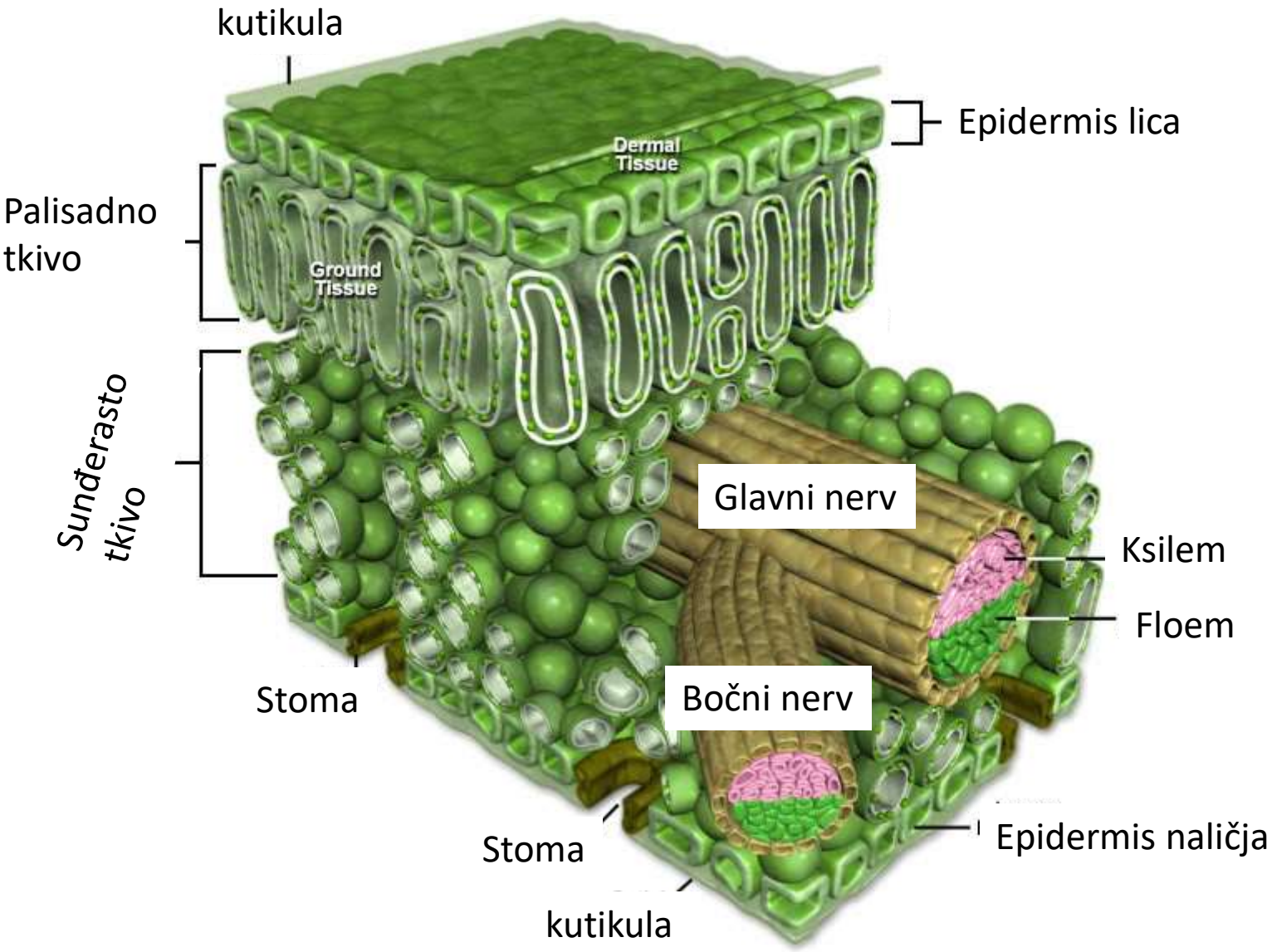
Nervatura …



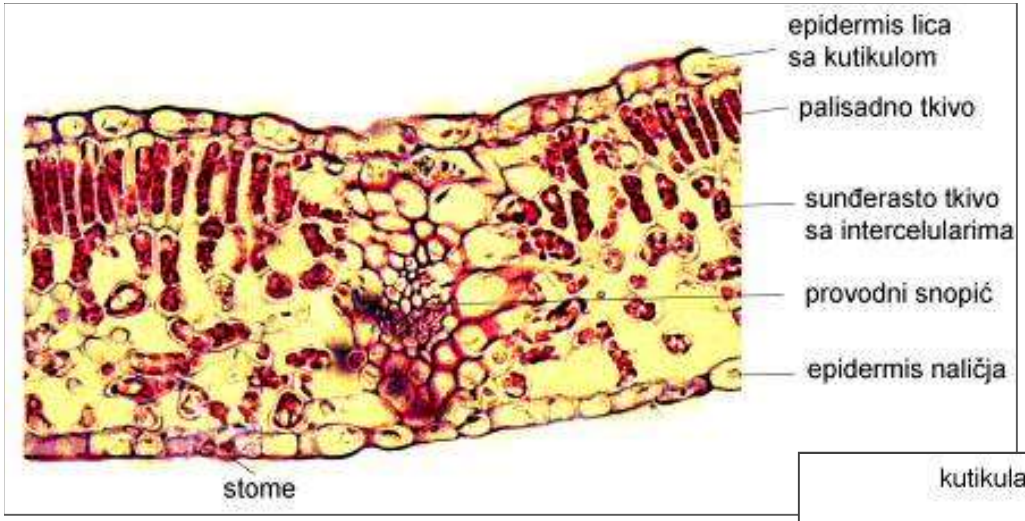
Sl. 309. Oblici liske nekih listova: A — igličast; B — linearan; C — lancetast; D — lopatičast; E — jajast; F — objajast; G — eliptičan; H — srcast; I — okrugao; J — peltatan list

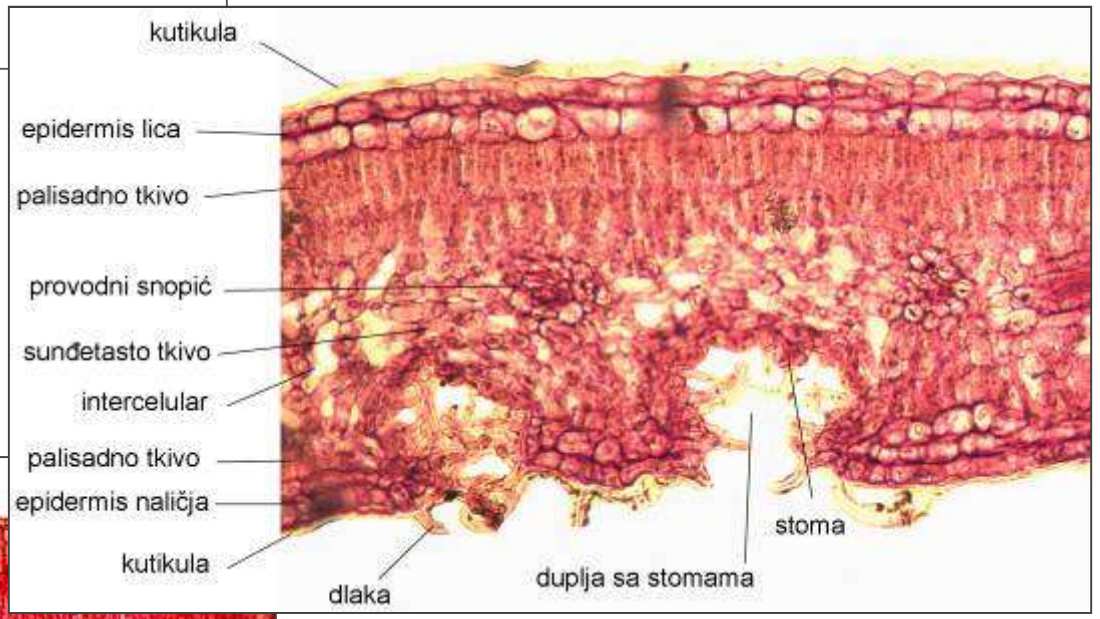
Zalisci

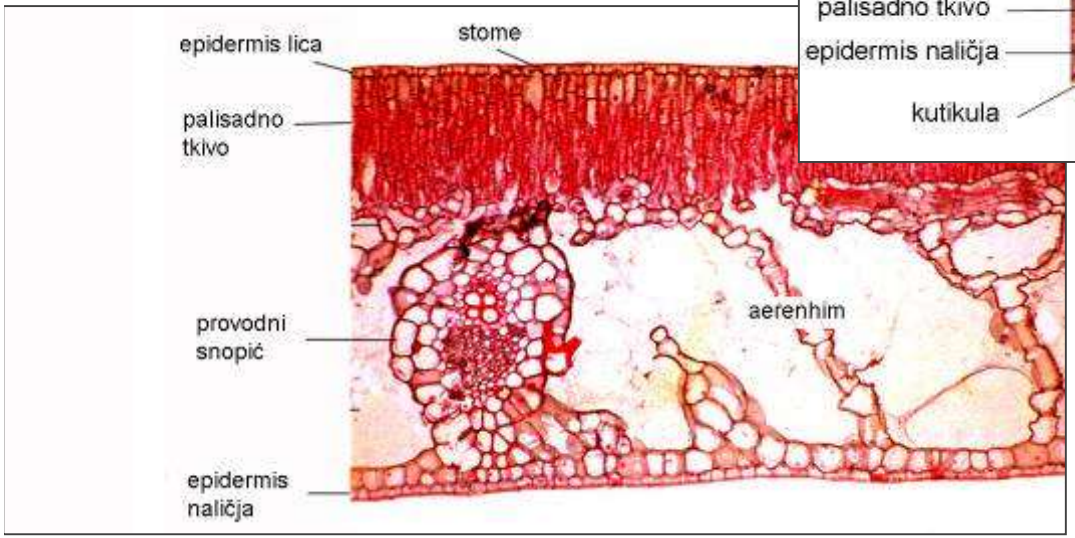
Anatomska građa lista

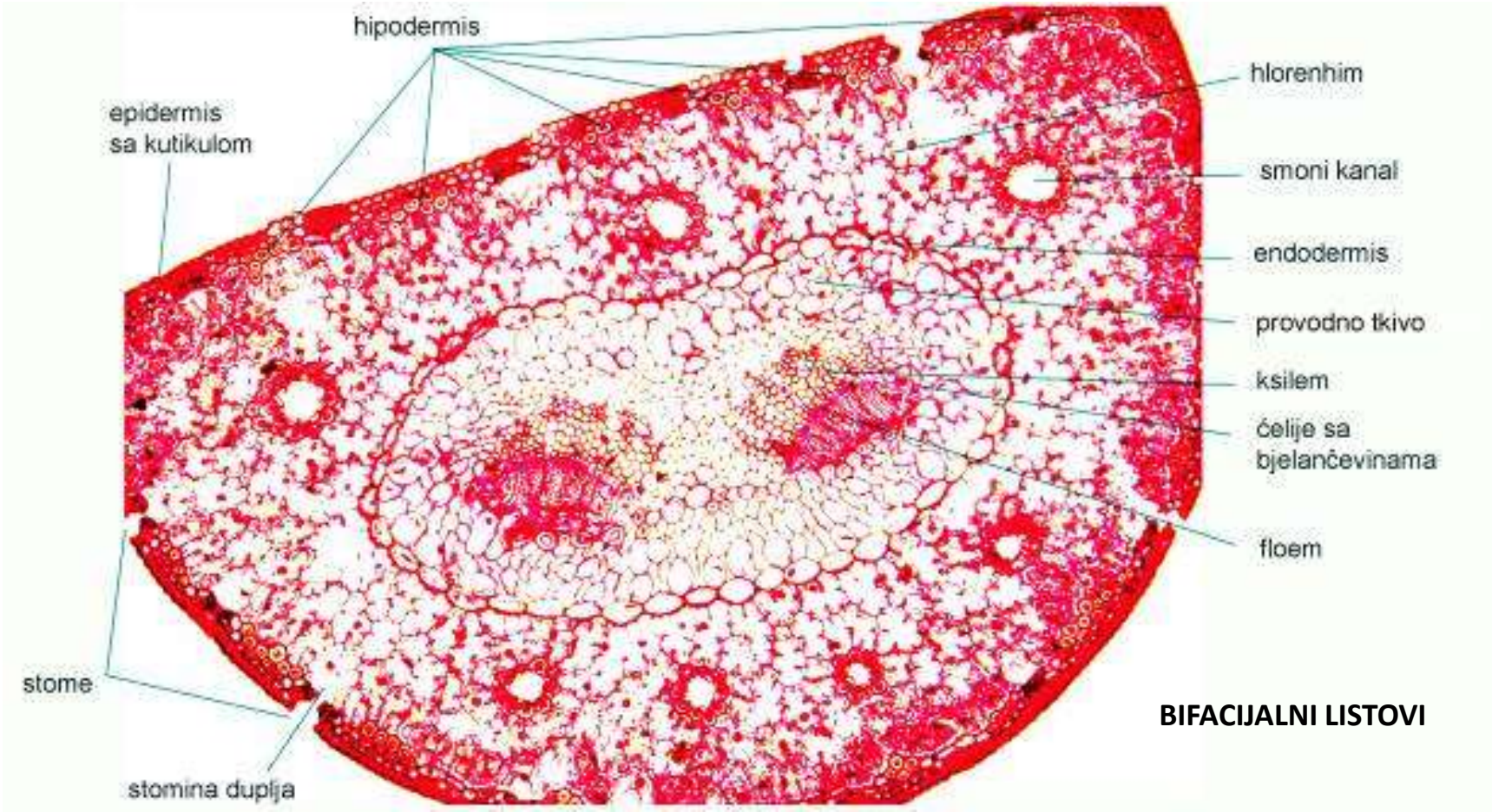


list


epidermis lica
sa kutikulom
palisadno tkivo
sunđerasto tkivo
sa intercelularima
provodni snopić
epidermis naličja
stome


kutikula
epidermis lica
palisadno tkivo
provodni snopić
sunđetasto tkivo
intercelular
palisadno tkivo
epidermis naličja
kutikula
dlaka
duplja sa stomama
stoma


epidermis lica
stome
palisadno
tkivo
aerenhim
provodni
snopić
epidermis
naličja



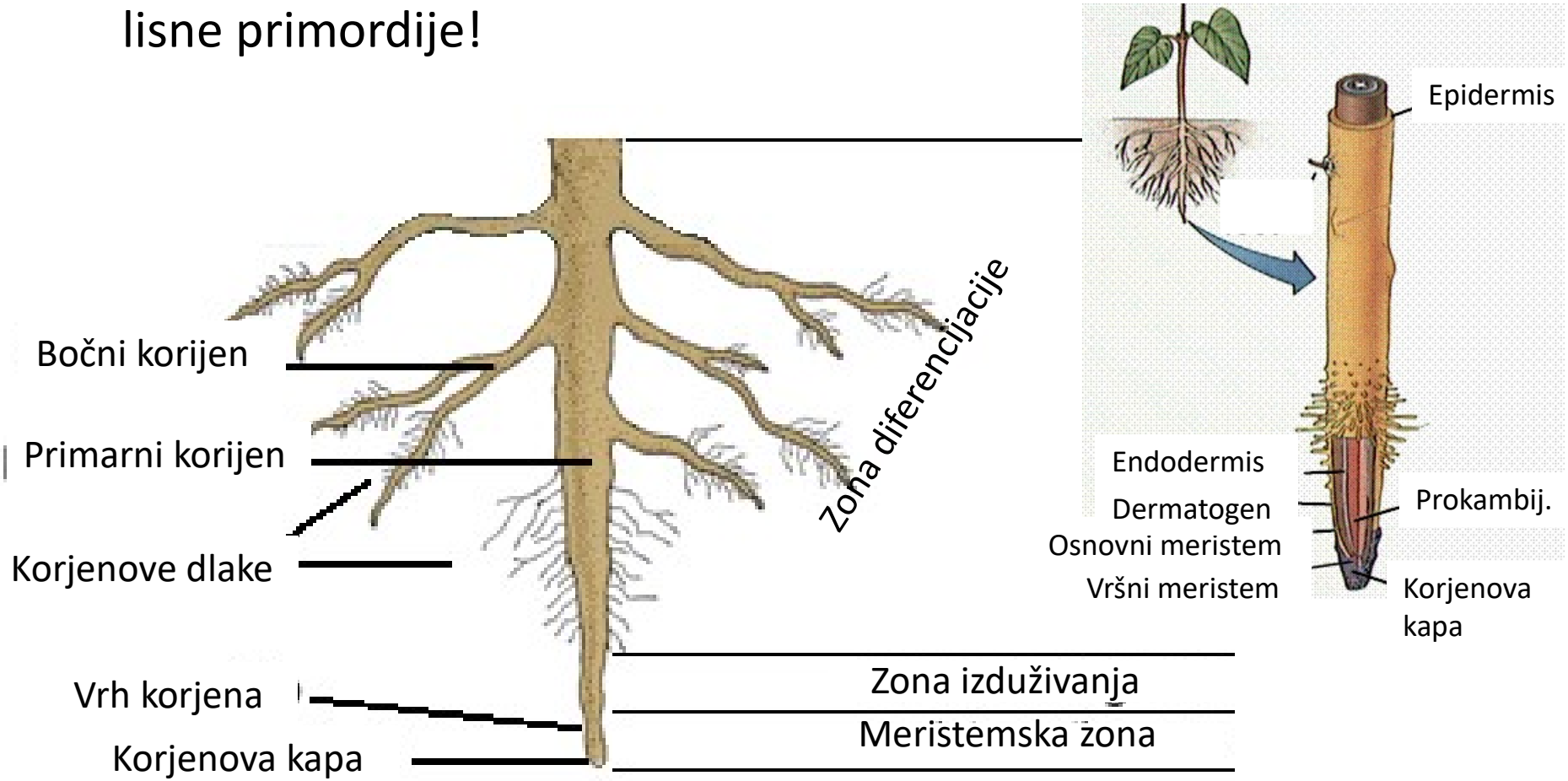
BIFACIJALNI LISTOVI

EKVIFACIJALAN LIST

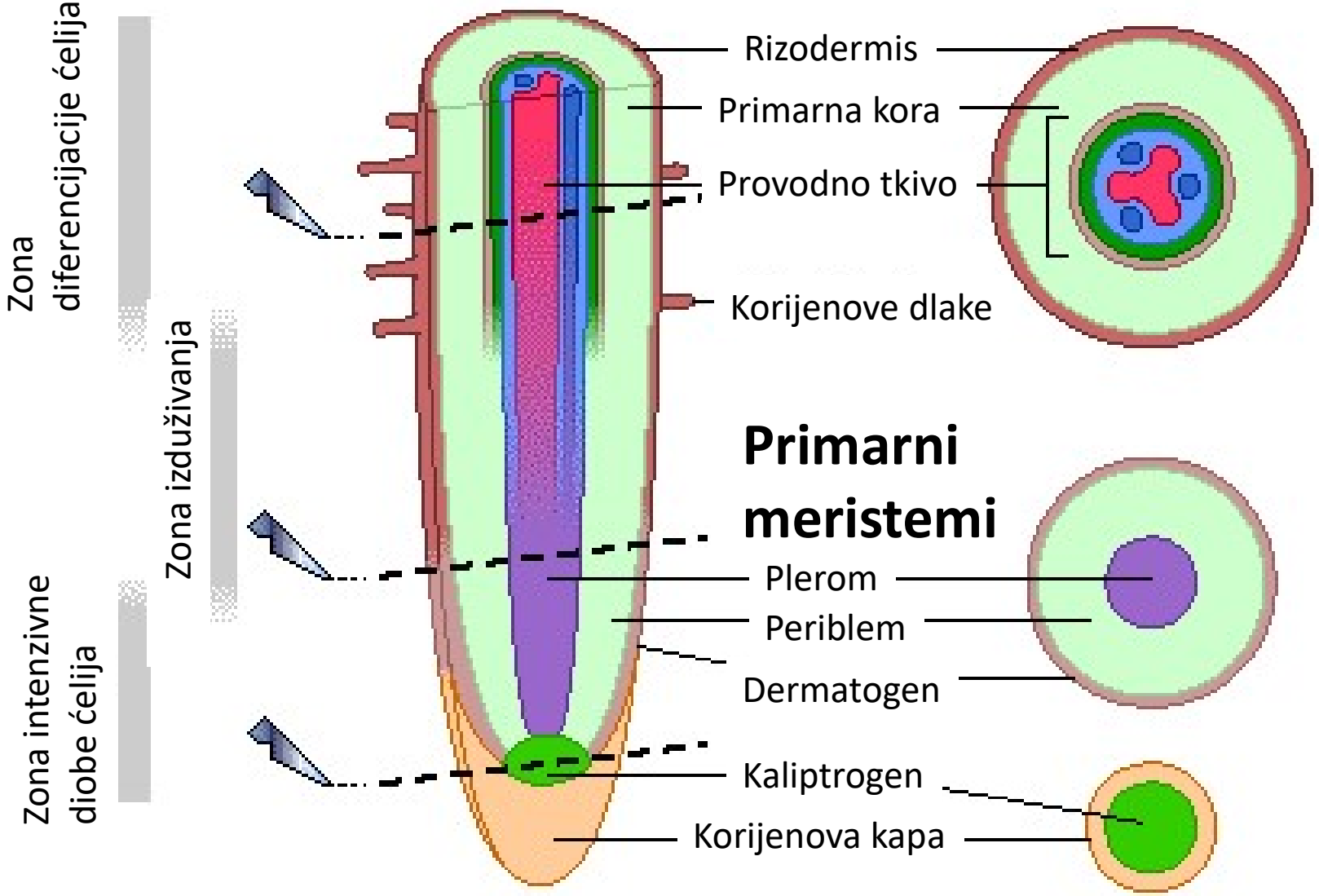
UNIFACIJALA LIST

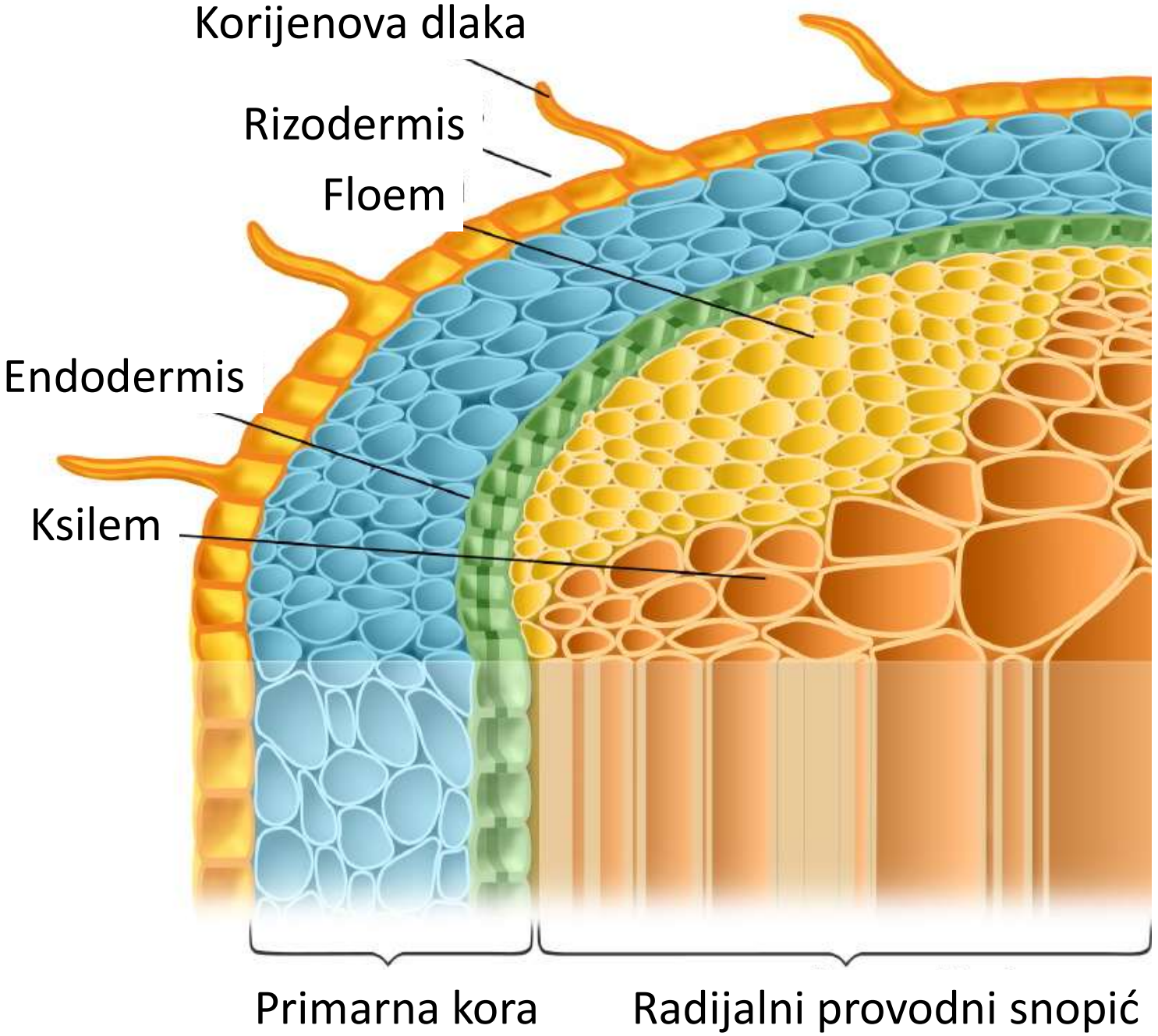
Korijen

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

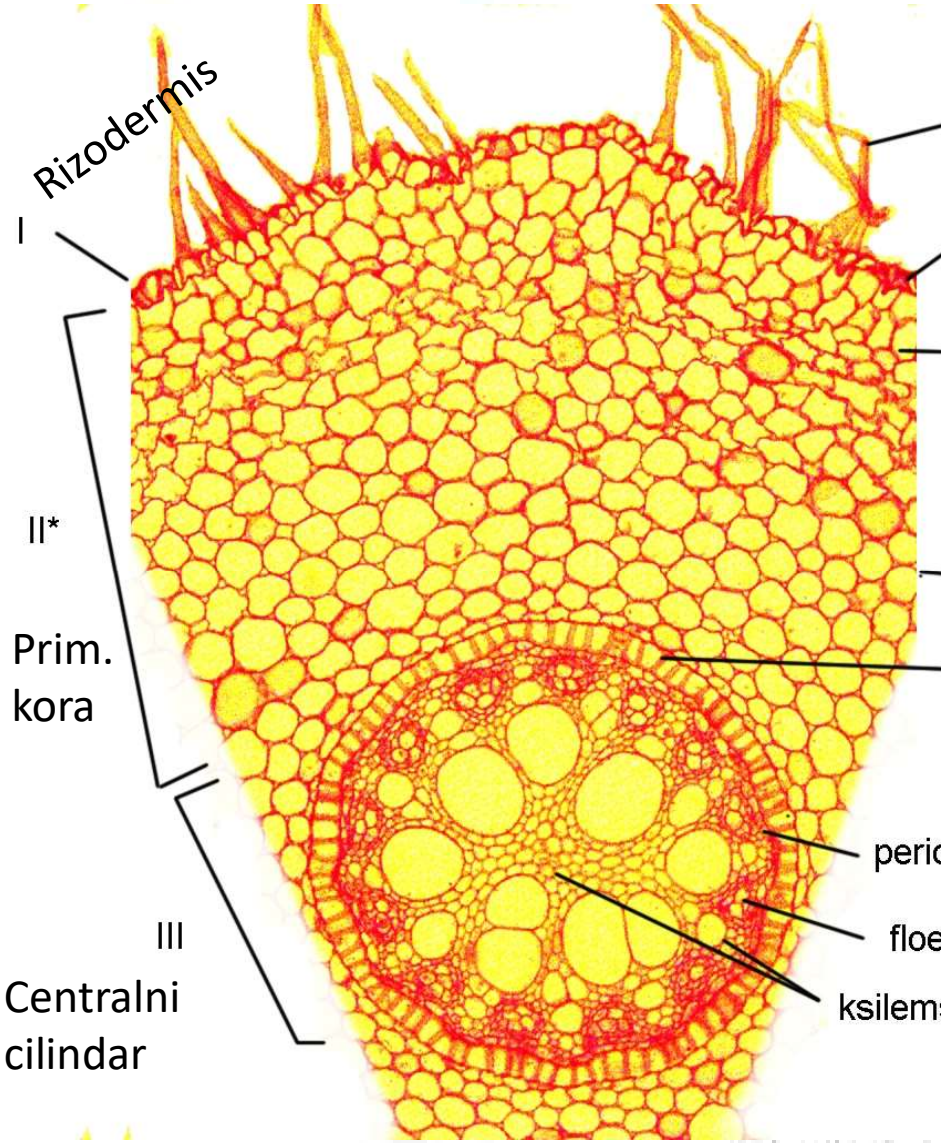


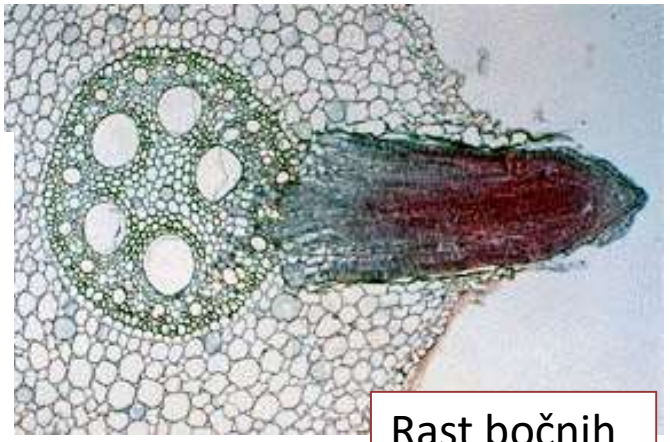
Primarna građa korijena



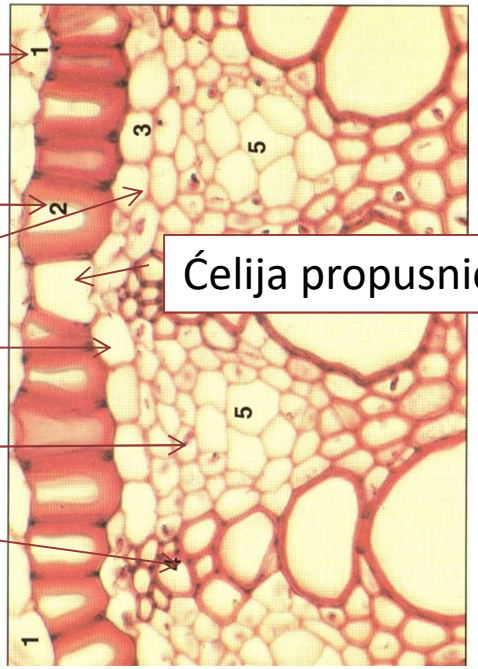

Korijenova dlaka
Rizodermis
Floem
Endodermis
Ksilem
Primarna kora
Radijalni provodni snopić

Presjek kroz zonu korjenovih dlaka





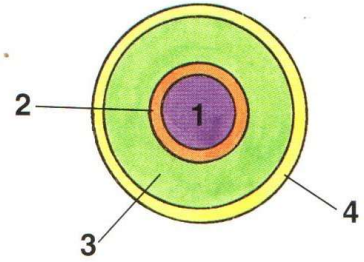
Rast bočnih korjenova



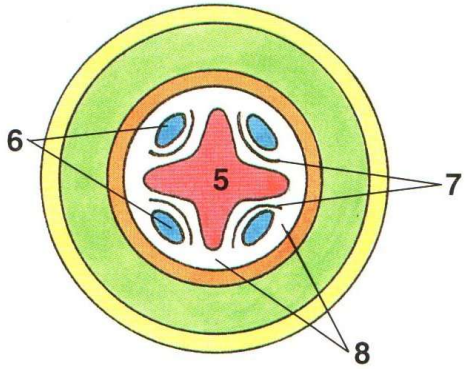
Ćelija propusnica

Kasparijeva zadebljanja …

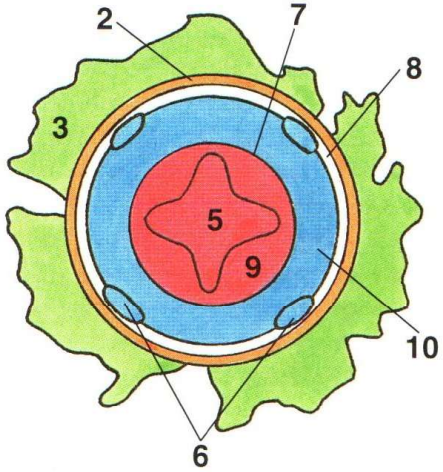
Presjek vrha korijena



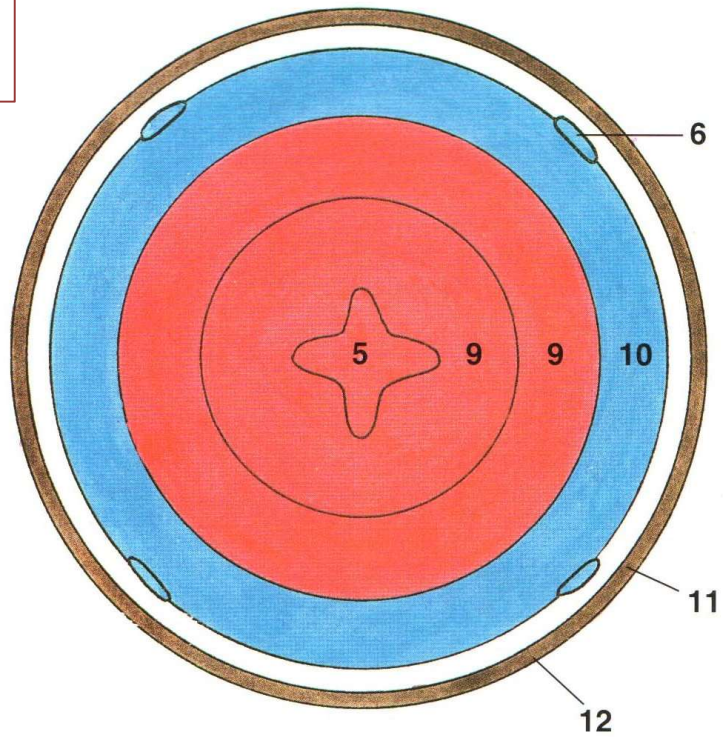
Presjek kroz zonu iznad korijenovih dlaka



Formiranje prstena od vaskularnog kambijuma



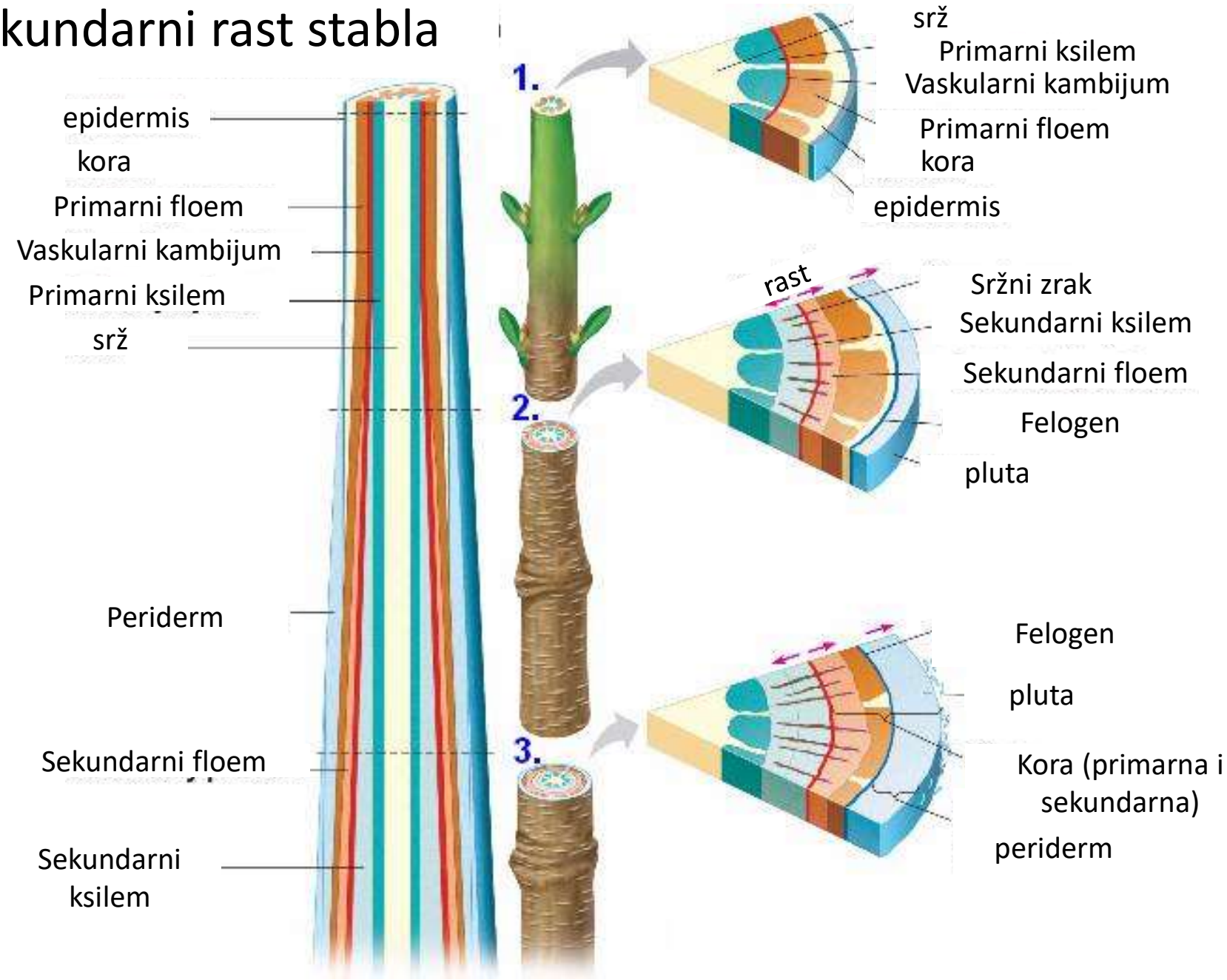
Sekundarno debljanje



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

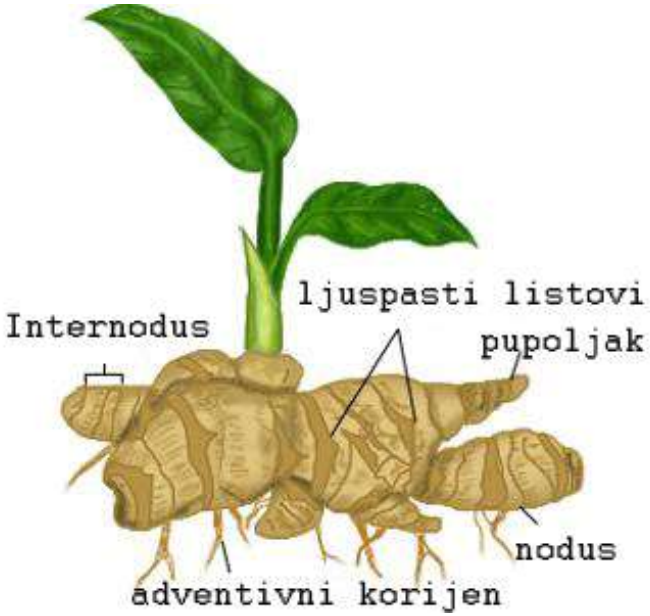


Metamorfoze izdanka

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

Rizomi

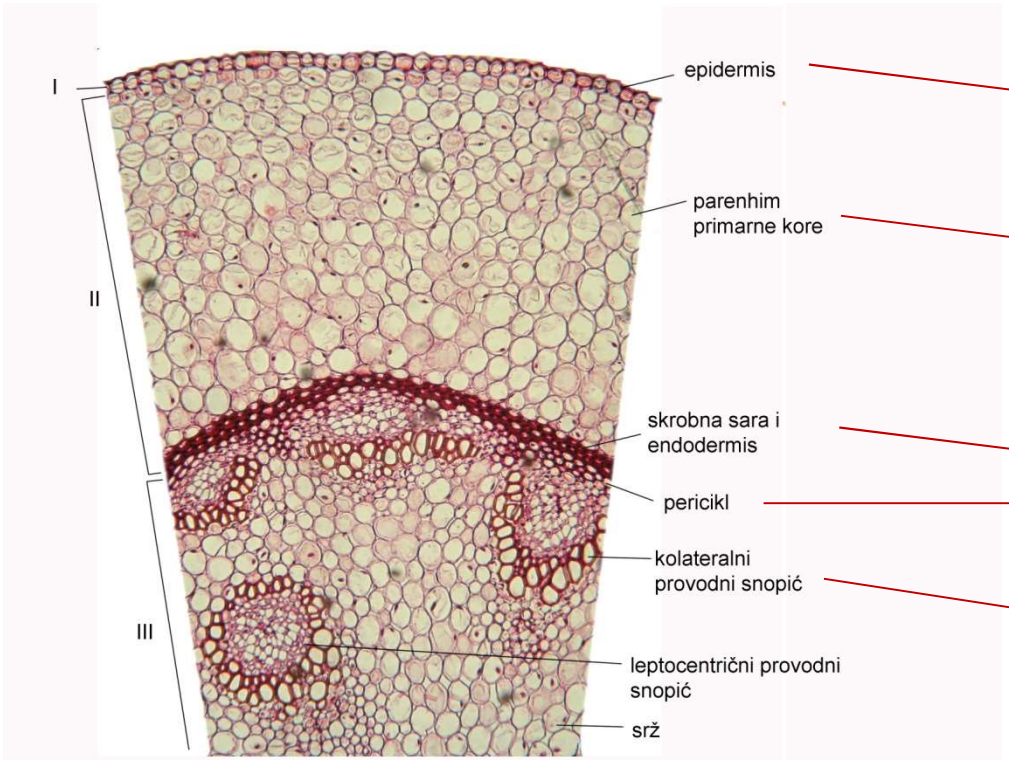
(horizontalni, uspravni, monopodijalni, simpodijalni)



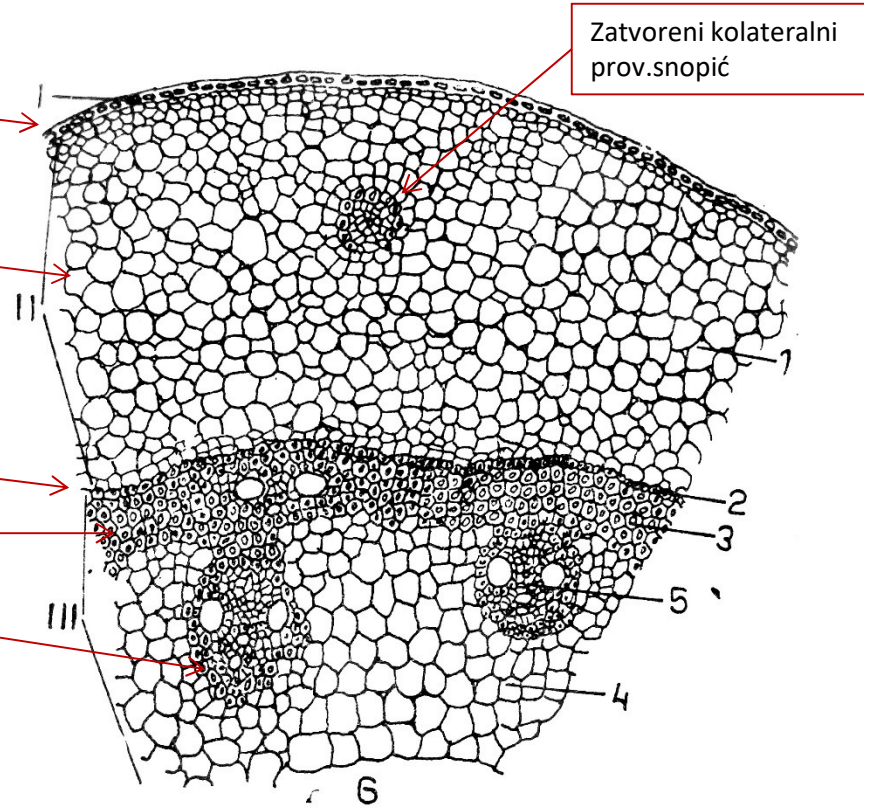
Rizom đumbira

Rizom kisele paprati

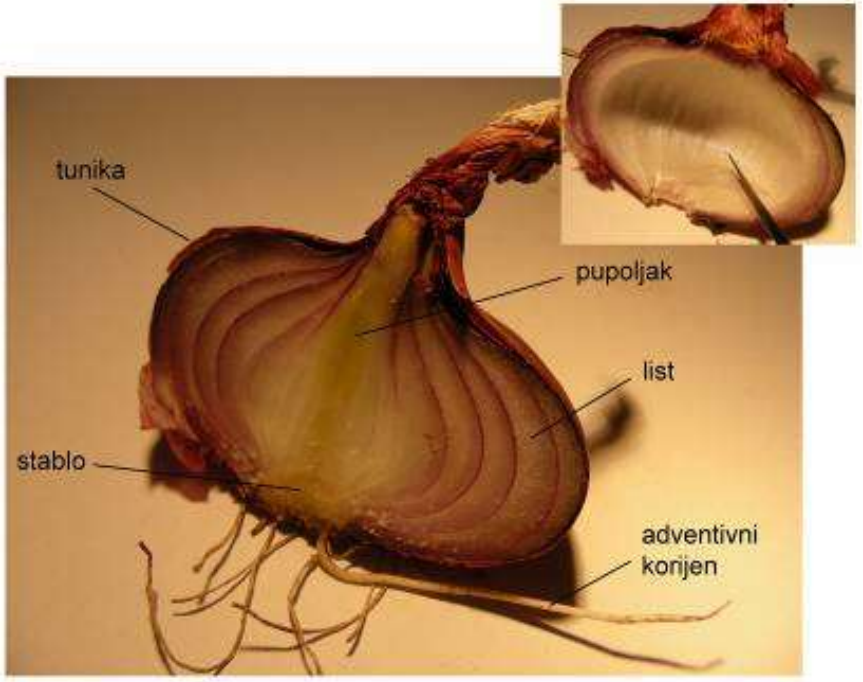
Rizom đurđevka
(*Convallaria majalis*)



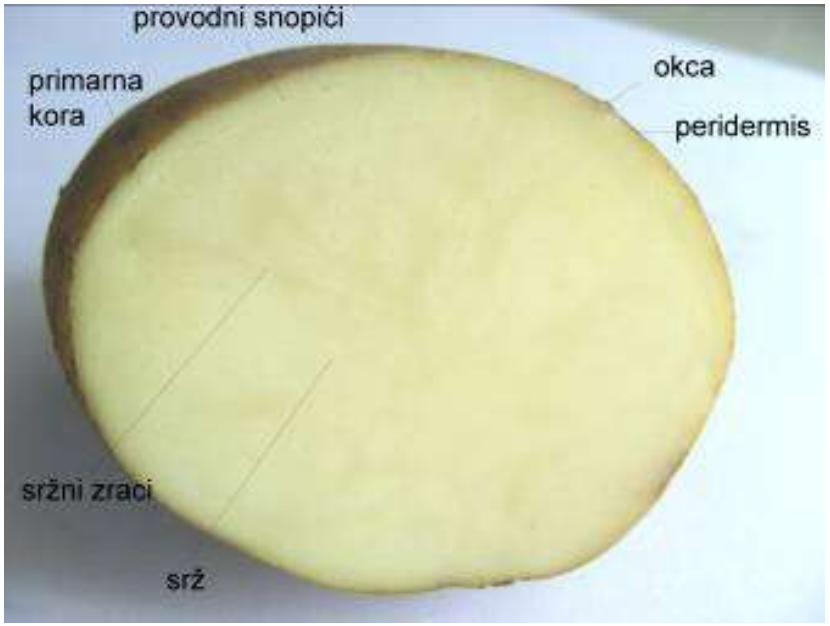
Rizom pirevine
(Agropyron repens)



3- pericikl u vidu mehaničkog prstena

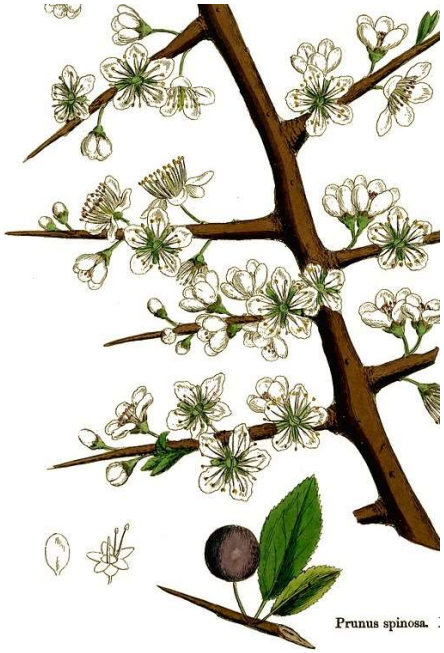


Lukovica



Krtola

Metamorfoza izdanka u trn



Metamorfoza izdanka u rašljike

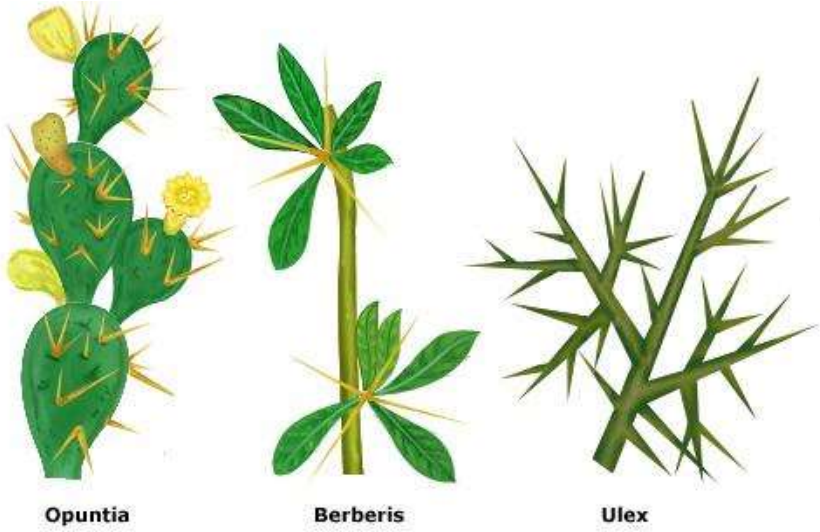
Filokladije

Sukulente

METAMORFOZE LISTA

Metamorfoza lista u rašljiku

Metamorfoza lista u trn

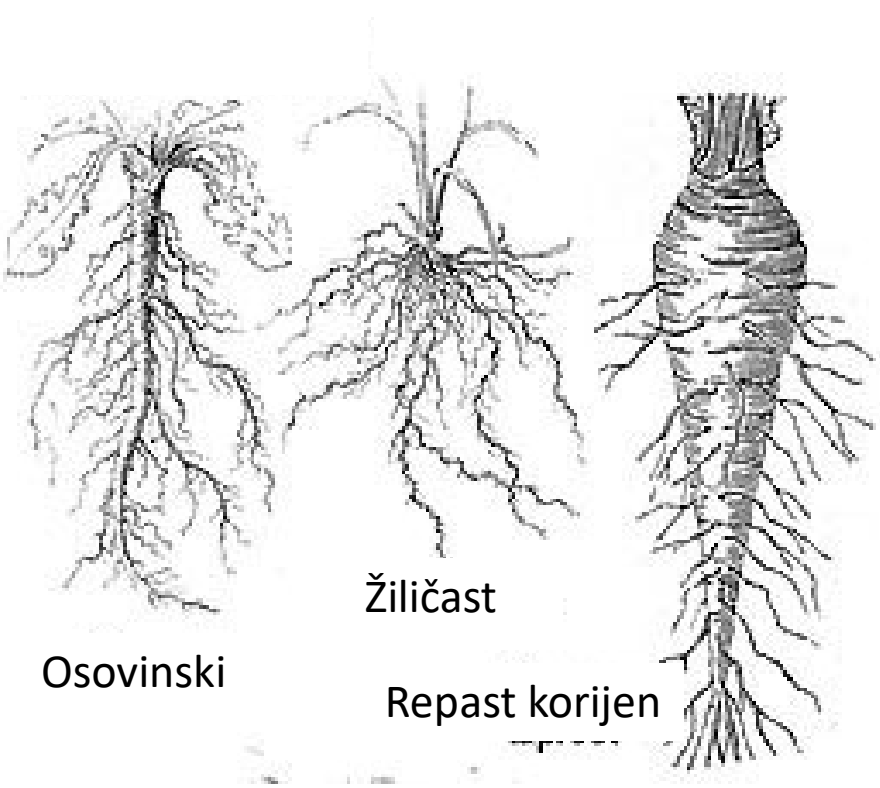


rašljika

Metamorfoza lisne drške u filodije

Listovi kao organi za magacioniranje hrane

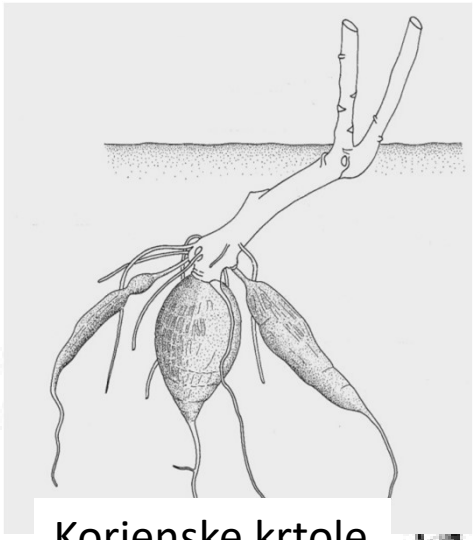
Tipovi korjena i metamorfoze



Osovinski

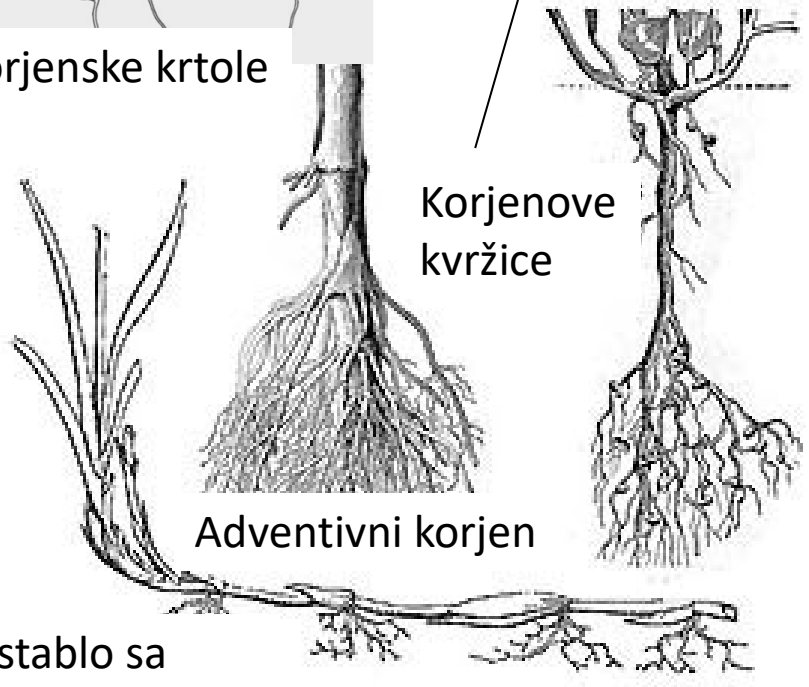
Žiličast

Repast korijen



Korjenske krtole

Mikoriza



Korjenove kvržice

Adventivni korjen

Kontraktilni korjenovi
Vazdušni korjenovi
Korjenovi za provjetravanje
Daskasti korjenovi
Asimilacioni korjenovi

Puzeće stablo sa adventivnim korjenima