

Univerzitet u Beogradu
Filozofski fakultet
Odeljenje za psihologiju

PSIHOLOGIJA OPAŽANJA

Tematske celine

PSIHOFIZIKA

ČULA

PERCEPCIJA

HAPTIČKA PERCEPCIJA

Pasivni i **aktivni** dodir



KOŽA



KOŽA

KINESTEZIJA

- Zglobovi
- Mišići

KINESTEZIJA

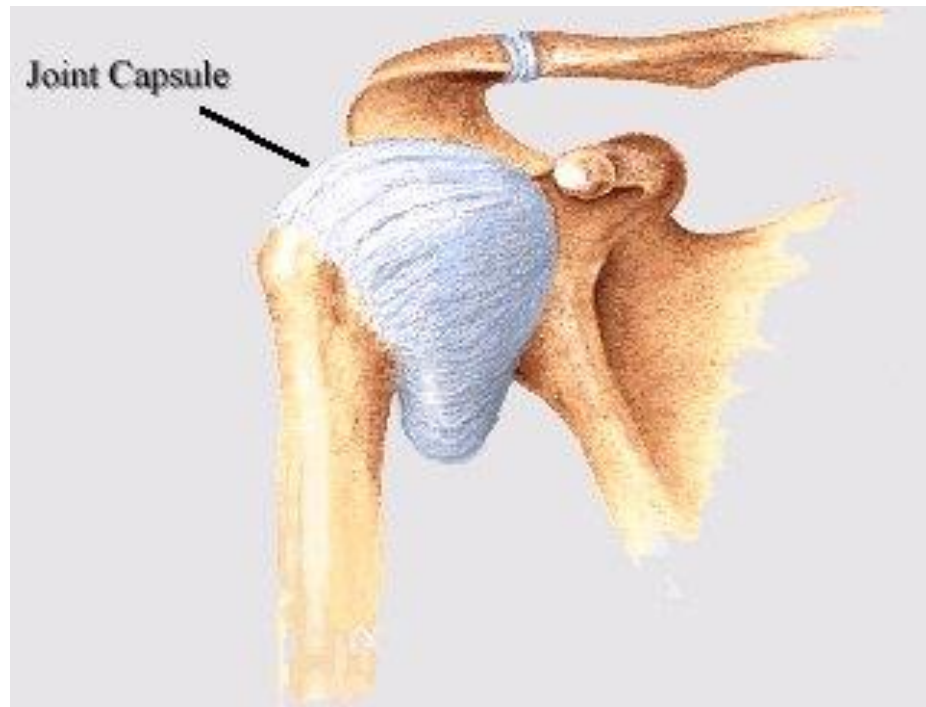


KINESTEZIJA

Osetljivost zglobova

Osetljivost mišića

OSETLJIVOST ZGLOBOVA



FUNKCIJA

Informacije o položaju i kretanju udova

Koordinacija kretanja ekstremiteta

DRAŽ

Trenje zglobne čaure

Ataxia => nema osetljivosti

RECEPTORI

Mehanoreceptori

Gardner & Constanzo, 1981: Pačinijeva t.

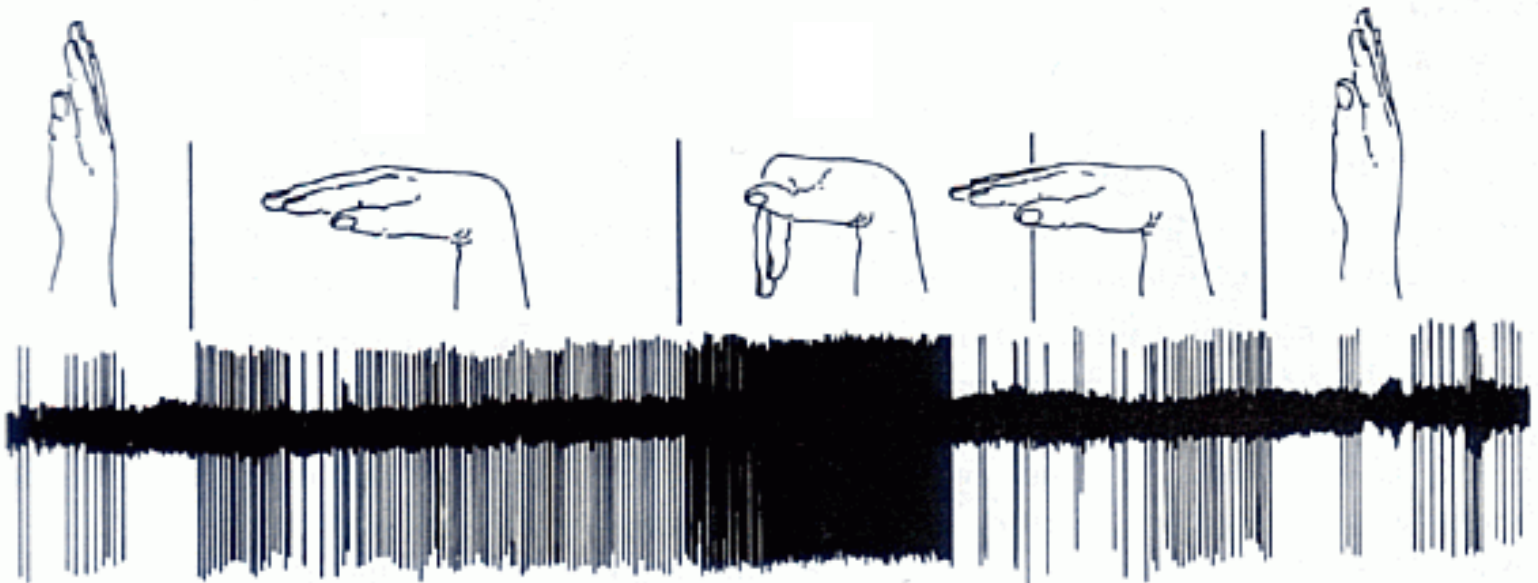
- za sitne i krupne pokrete
- za savijanje i istežanje
- za posebne zone pokreta (određeni lučni opseg)
- za određenu statičnu poziciju

RECEPTORI

Mehanoreceptori

Gardner & Constanzo, 1981: Pačinijeva t.

+ akcija više zglobova



RECEPTORI → PUTEVI → CENTRI

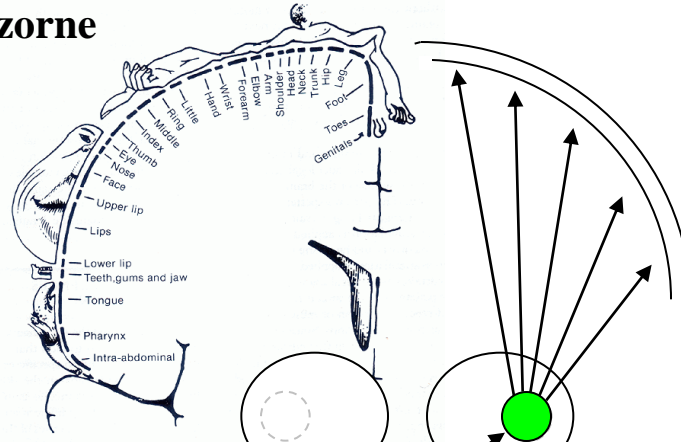
Mehanoreceptori

Medijalni
lemniskus

Somatosenzorni
korteks

A β vlakna: 42-72 m/s

Somatosenzorne zone



CORTEX

THALAMUS
VPL nucl.

M. OBLONGATA

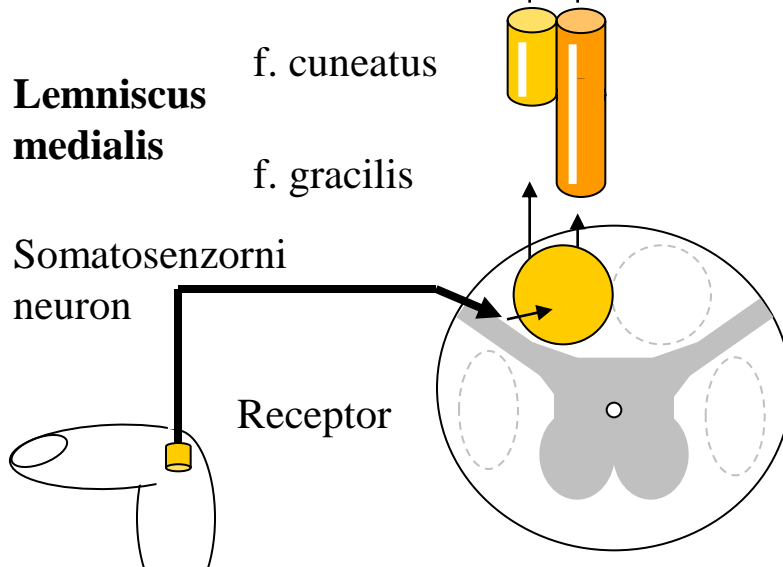
Lemniscus medialis

f. cuneatus

f. gracilis

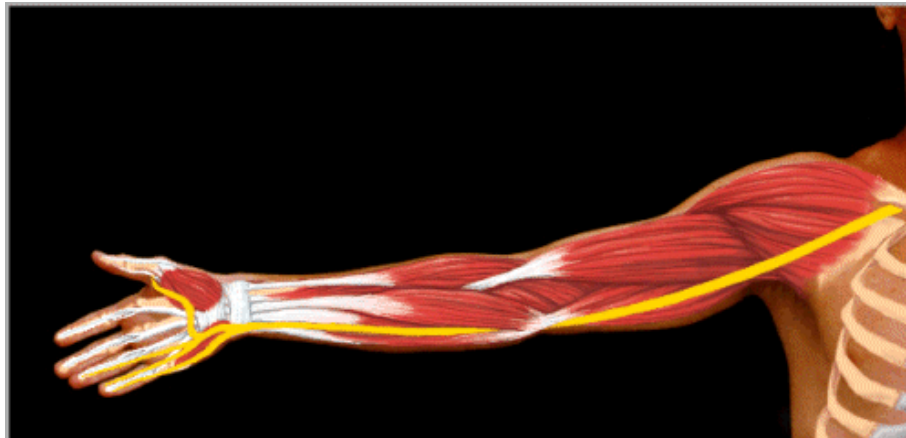
Somatosenzorni neuron

Receptor



M. SPINALIS

OSETLJIVOST MIŠIČA



FUNKCIJA

Deo lanca refleksa stezanja i istezanja

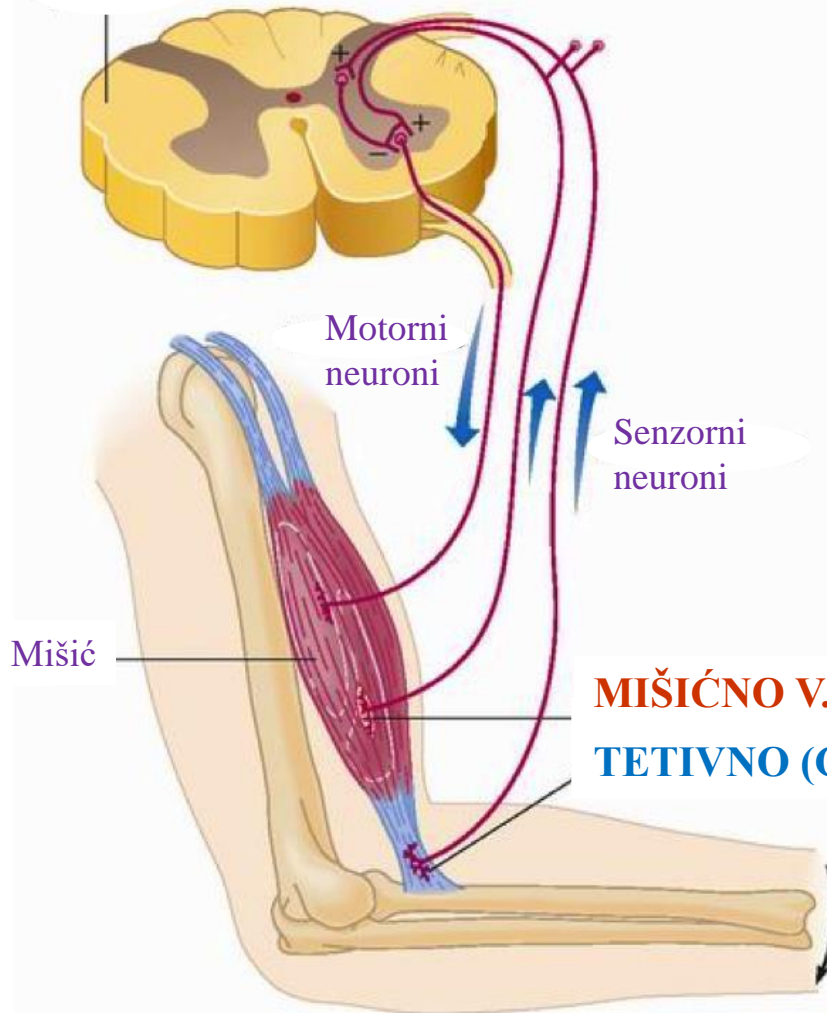
Održavanje tonusa mišića, uspravnog stava ...

DRAŽ

Grčenje i opuštanje mišića

RECEPTORI

Kičmena moždina



Mehanoreceptori:
vretena

MIŠIĆNO V.

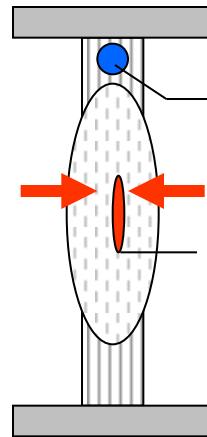
TETIVNO (Goldijevo) V.

RECEPTORI

Mehanoreceptori: vretena

TETIVNO V.
(Goldijev)

MIŠIĆNO V.

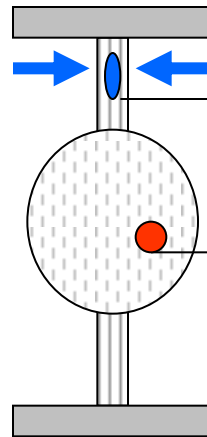


RECEPTORI

Mehanoreceptori: vretena

**TETIVNO V.
(Goldijevo)**

MIŠIČNO V.

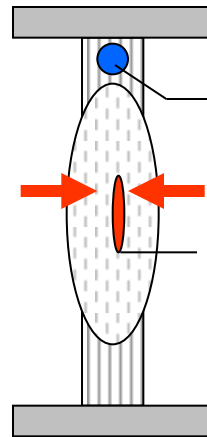


RECEPTORI

Mehanoreceptori: vretena

**TETIVNO V.
(Goldijevo)**

MIŠIĆNO V.

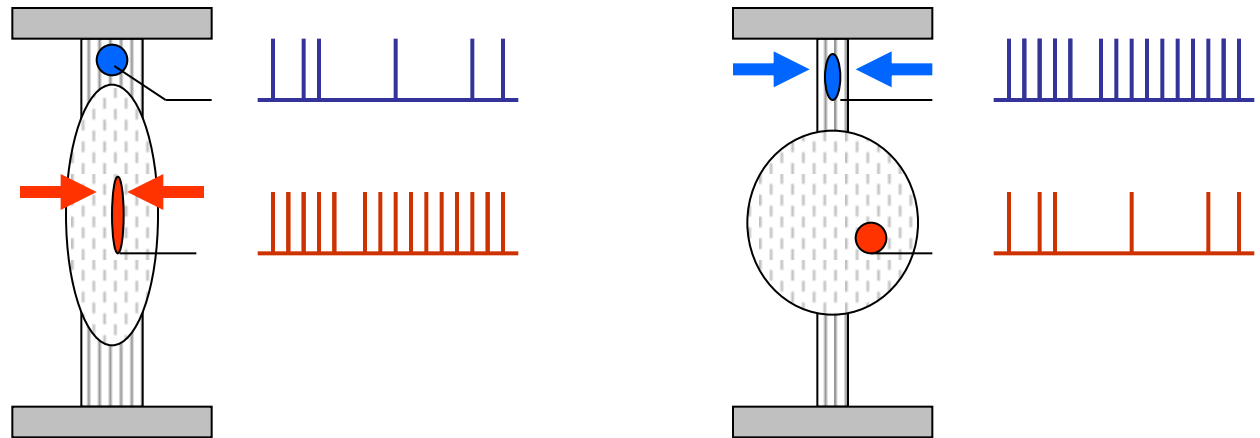


RECEPTORI

Mehanoreceptori: vretena

TETIVNO V.
(Goldijevo)

MIŠIČNO V.



Istezanje mišića

Opuštena tetiva

Grčenje mišića

Razvučena tetiva

RECEPTORI → PUTEVI → CENTRI

Mehanoreceptori

Tractus
spinocerebellaris

Cerebellum

A α vlakna: 72-120 m/s

A β vlakna: 42-72 m/s

VESTIBULARNI SISTEM



ORIJENTACIJA



FUNKCIJE

Informacije o kretanju i položaju tela

1. Održavanje ravnoteže (propriocepcija)
2. Vestibularna mapa okoline (eksterocepcija)

DRAŽ

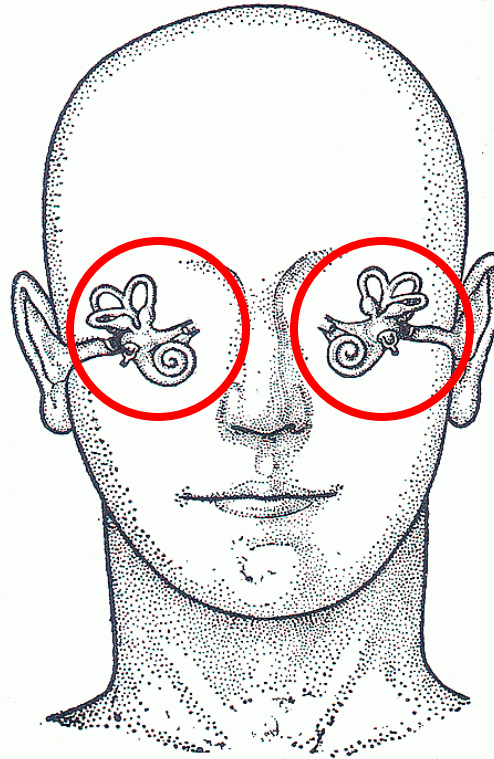
Mehanički efekti

- gravitacije i
- ubrzanja glave

ČULNI ORGAN

Vestibularni aparat

(Lavirint, unutrašnje uho)



ČULNI ORGAN

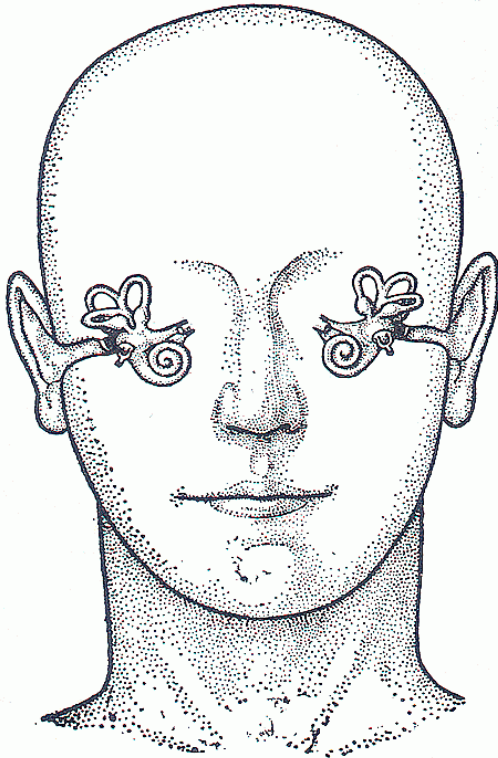
Vestibularni aparat

(Lavirint, unutrašnje uho)

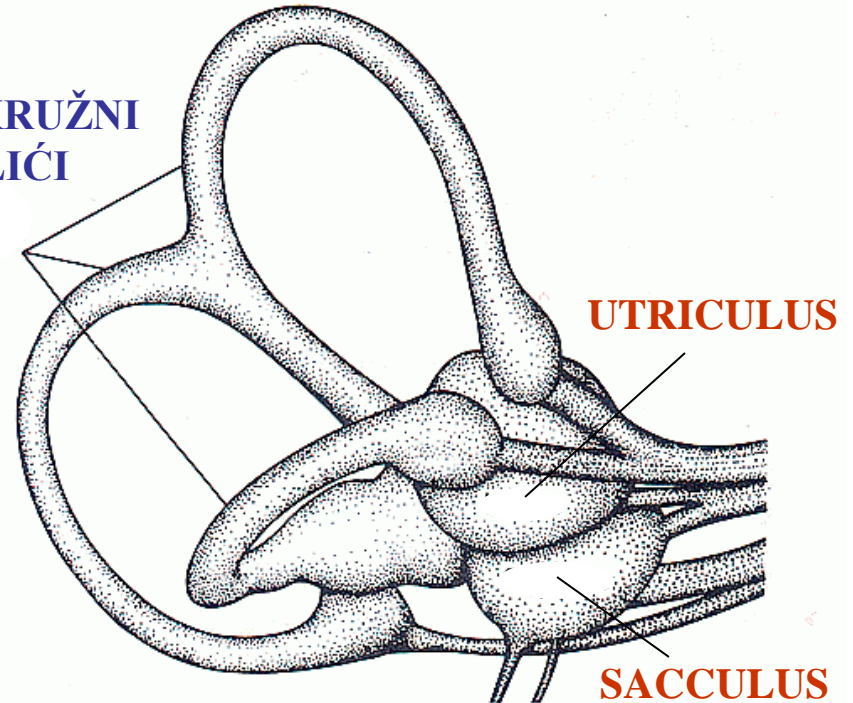


ČULNI ORGAN

Vestibularni aparat



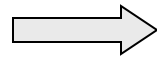
POLUKRUŽNI
KANALIČI



ČULNI ORGAN

Vestibularni aparat

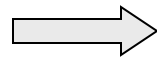
Ravnoteža i
linearno ubrzanje



UTRICULUS i SACCULUS

starija funkcija

Kružno ubrzanje



POLUKRUŽNI KANALIĆI

mlađa funkcija

STATIČKA RAVNOTEŽA ...



... LINEARNO UBRZANJE



FUNKCIJE

Informacije o položaju tela

Održavanje ravnoteže

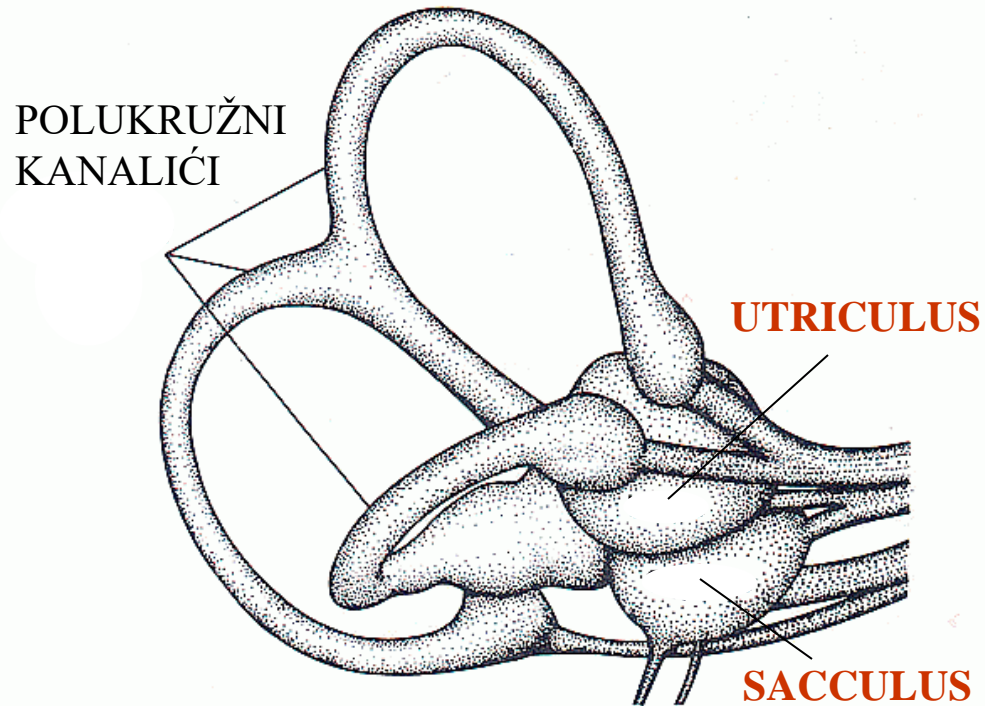
DRAŽ

Mehanički efekti

- gravitacije i
- linearnog ubrzanja glave

ČULNI ORGANI

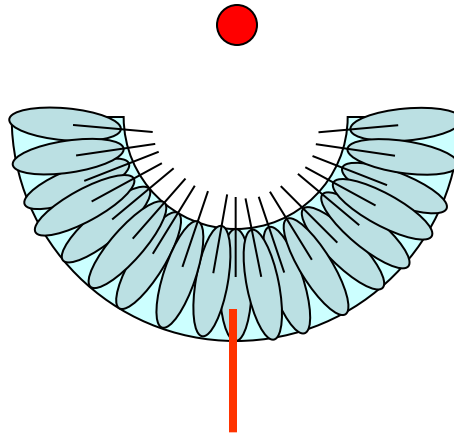
Utriculus i sacculus



ČULNI ORGANI

Evolucija

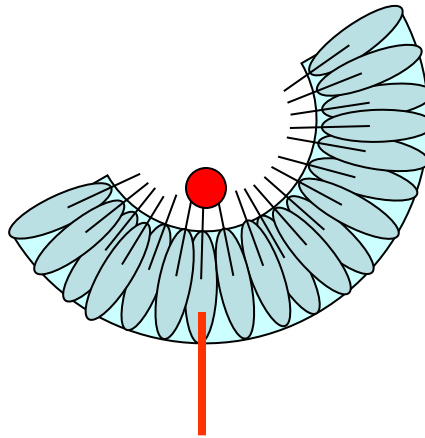
Statocyst => statoliti (rakovi)



ČULNI ORGANI

Evolucija

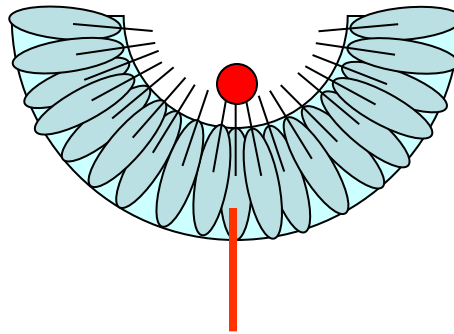
Statocyst => statoliti (rakovi)



ČULNI ORGANI

Evolucija

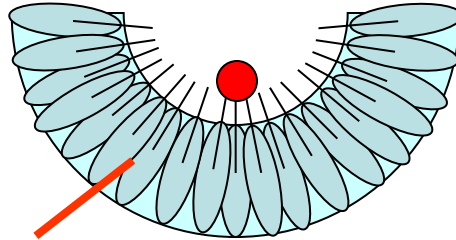
Statocyst => statoliti (rakovi)



ČULNI ORGANI

Evolucija

Statocyst => statoliti (rakovi)



ČULNI ORGANI

Evolucija

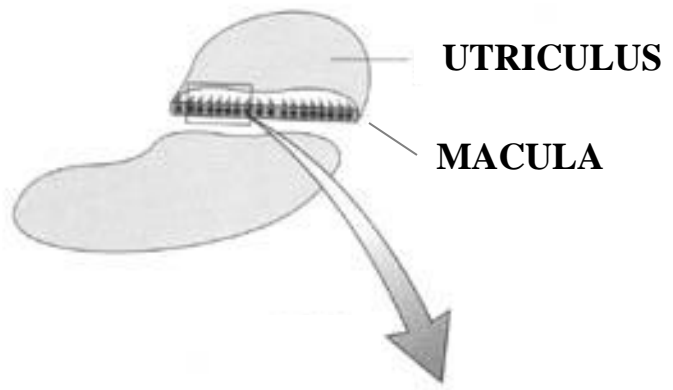
Otocyst => otoliti (kičmenjaci) = kristali CaCO_3

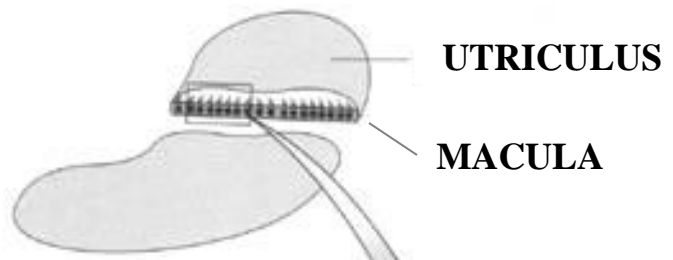


Macula

ČULNI ORGANI

Macula





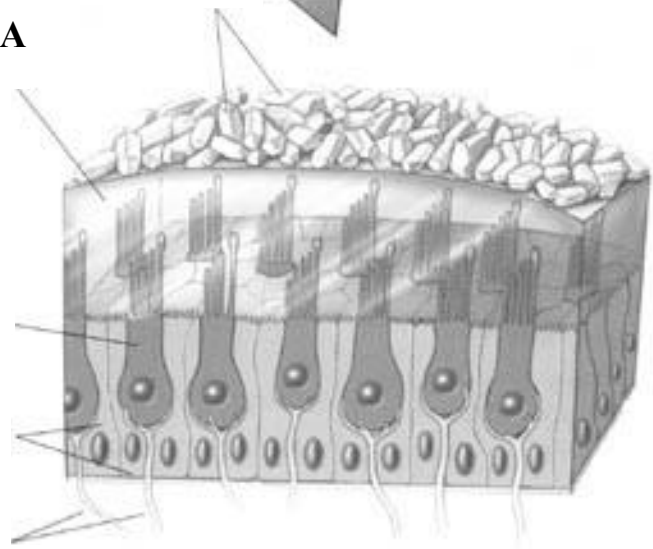
OTOLITI

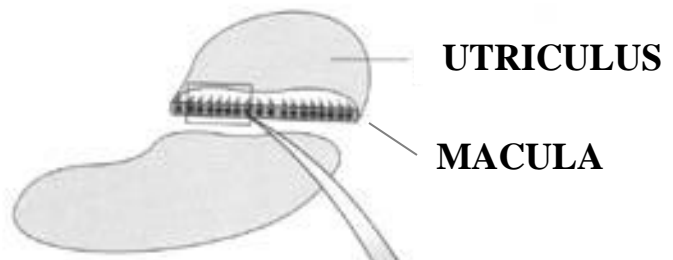
ŽELATINOZNA
MASA

TREPLJASTE
ĆELIJE

POTPORNE
ĆELIJE

NERVNA VLAKNA





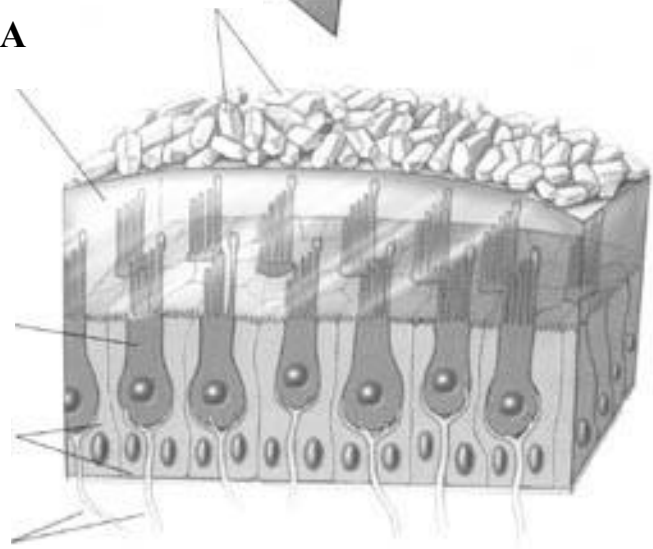
OTOLITI

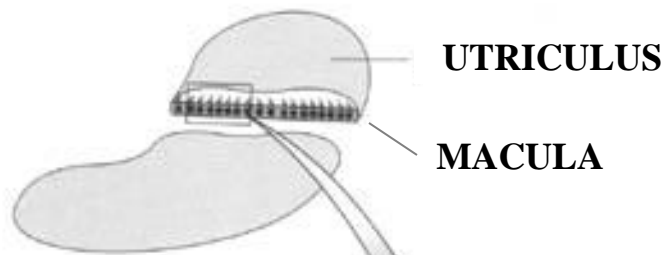
ŽELATINOZNA
MASA

TREPLJASTE
ĆELIJE

POTPORNE
ĆELIJE

NERVNA VLAKNA





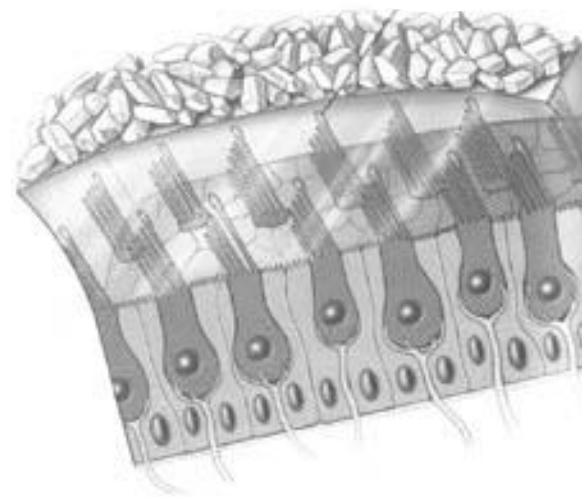
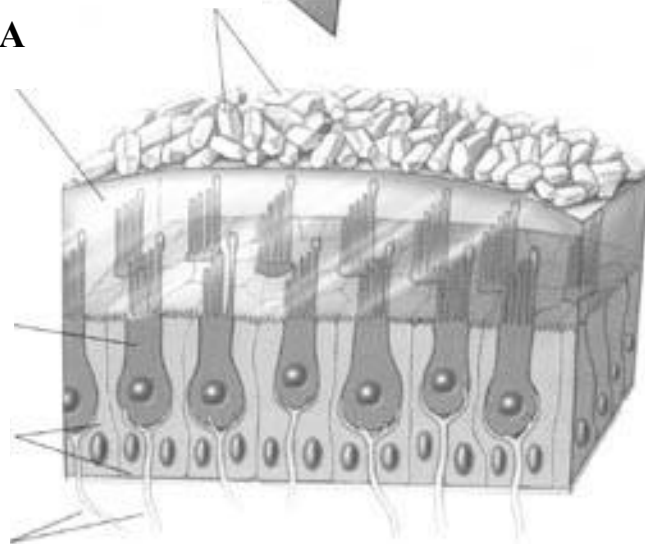
OTOLITI

ŽELATINOZNA
MASA

TREPLJASTE
ĆELIJE

POTPORNE
ĆELIJE

NERVNA VLAKNA

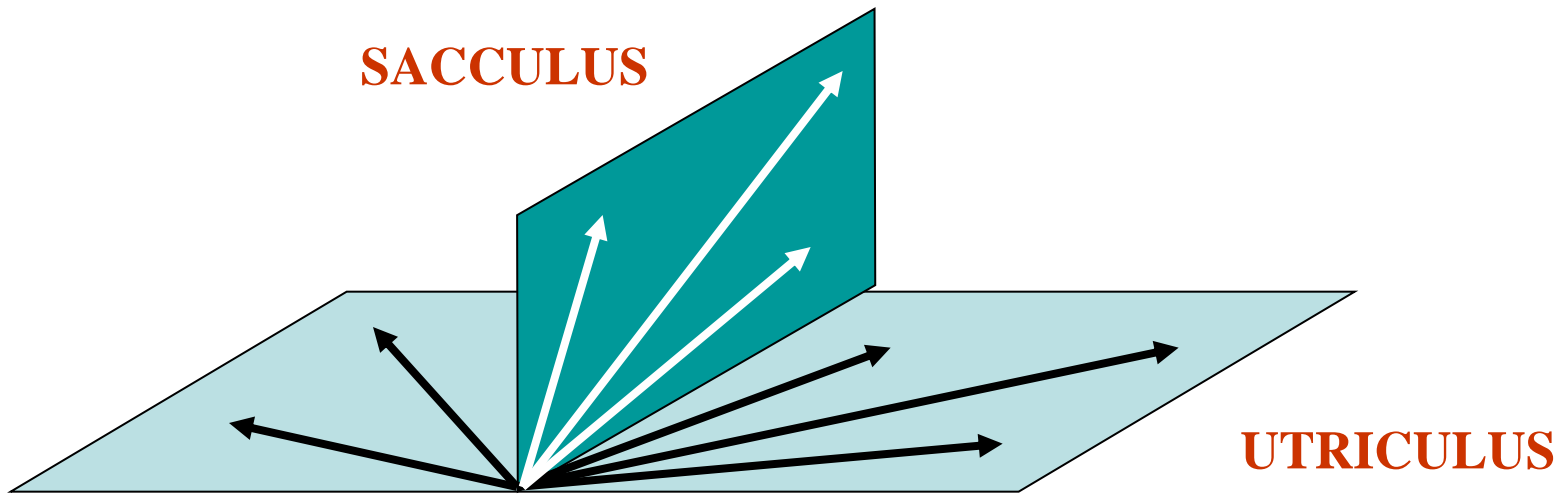


RECEPTORI

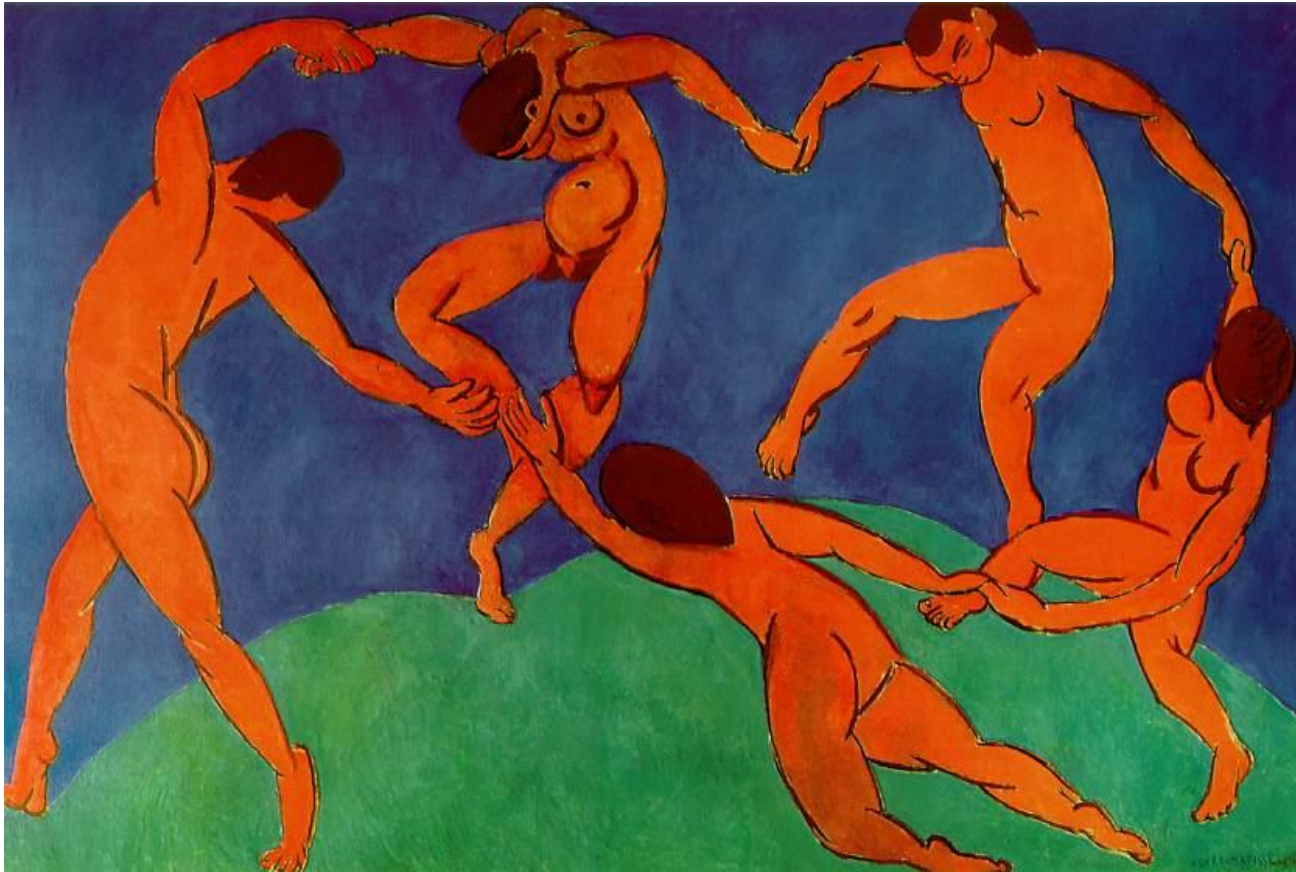
Trepljaste ćelije (*cilia*)  GO-STOP

RECEPTORI

Trepljaste ćelije (*cilia*) → KRENI-STANI



KRUŽNO UBRZANJE



FUNKCIJE

Informacije o kretanju u 3-D prostoru

Orijentacija pri kretanju

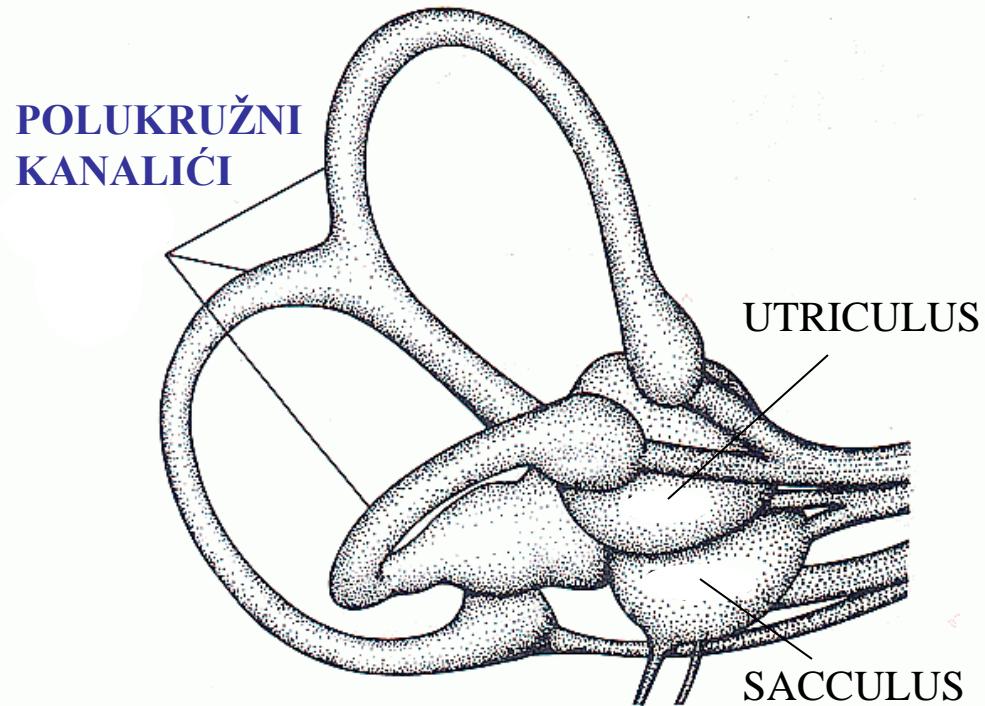
DRAŽ

Angularna akceleracija i deceleracija glave

Promene brzine kretanja (glave) u 3-D prostoru

ČULNI ORGANI

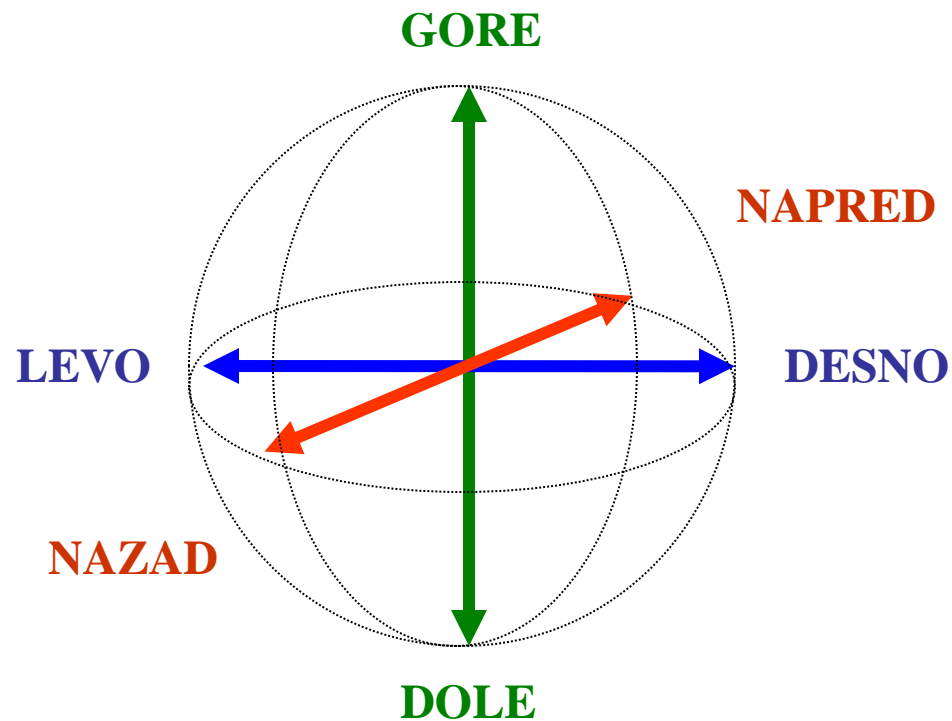
Polukružní kanálíci



ČULNI ORGANI

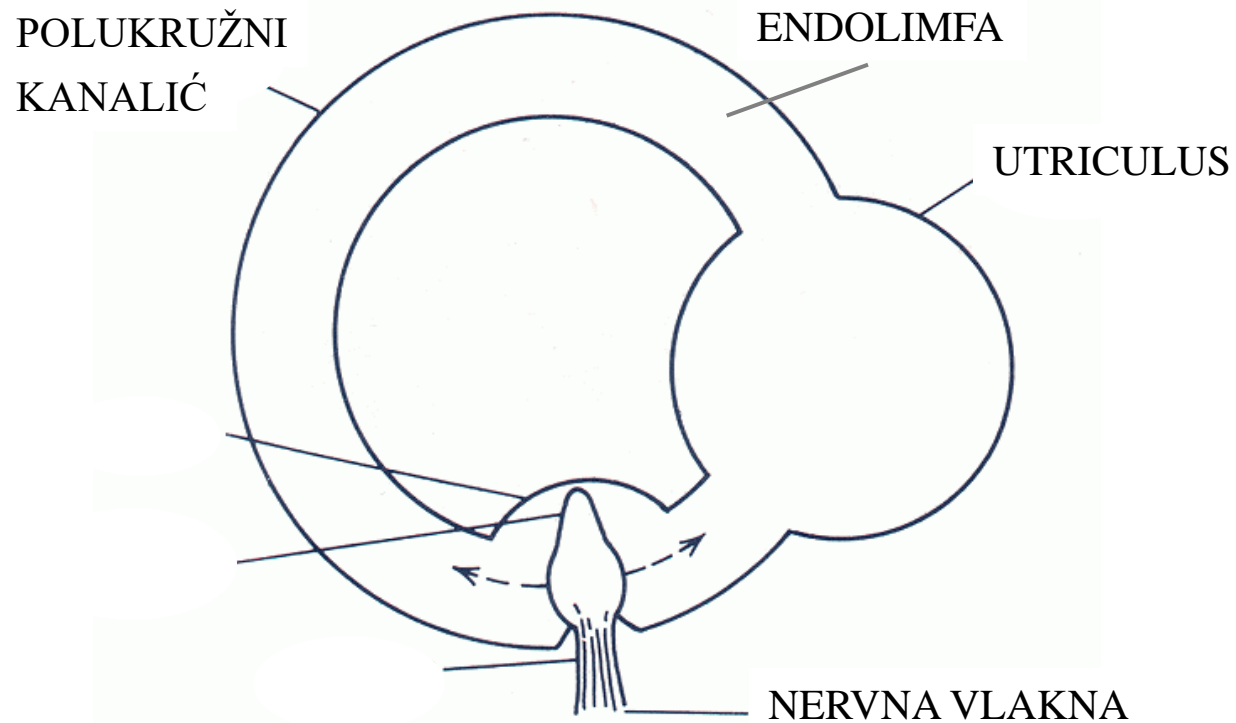
Evolucija

RIBE: 1-D => 2-D => 3-D



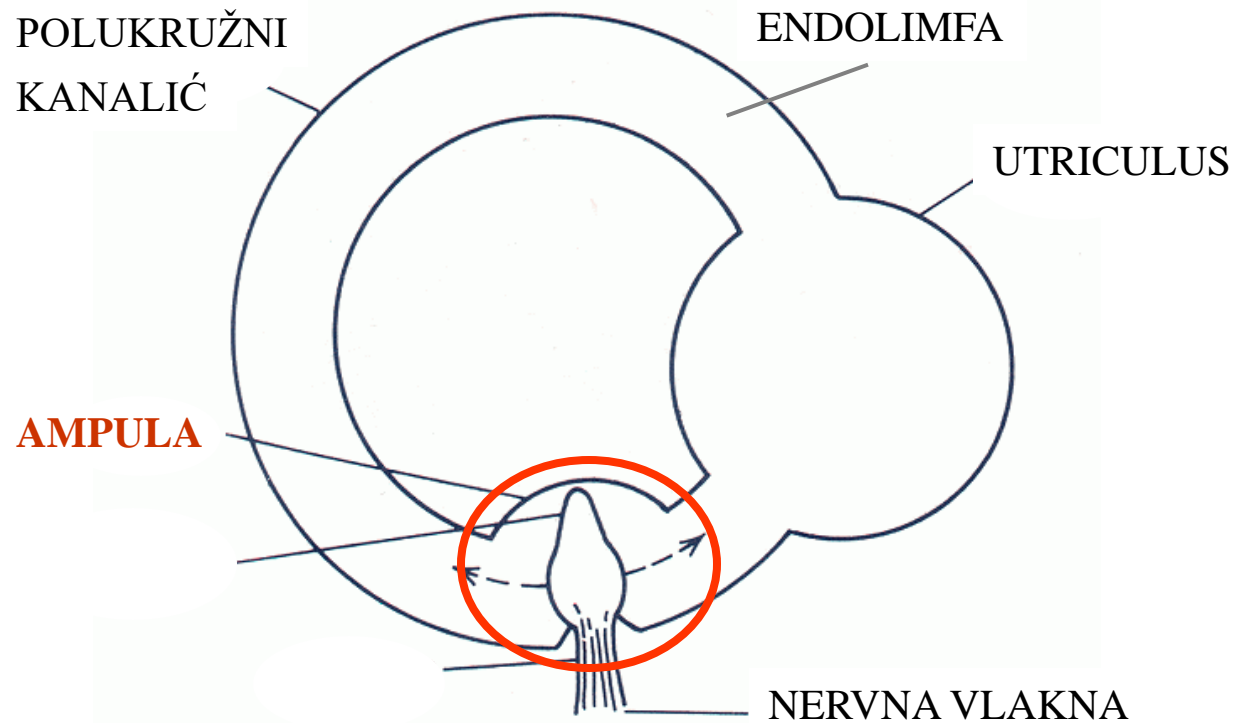
ČULNI ORGANI

Ampule



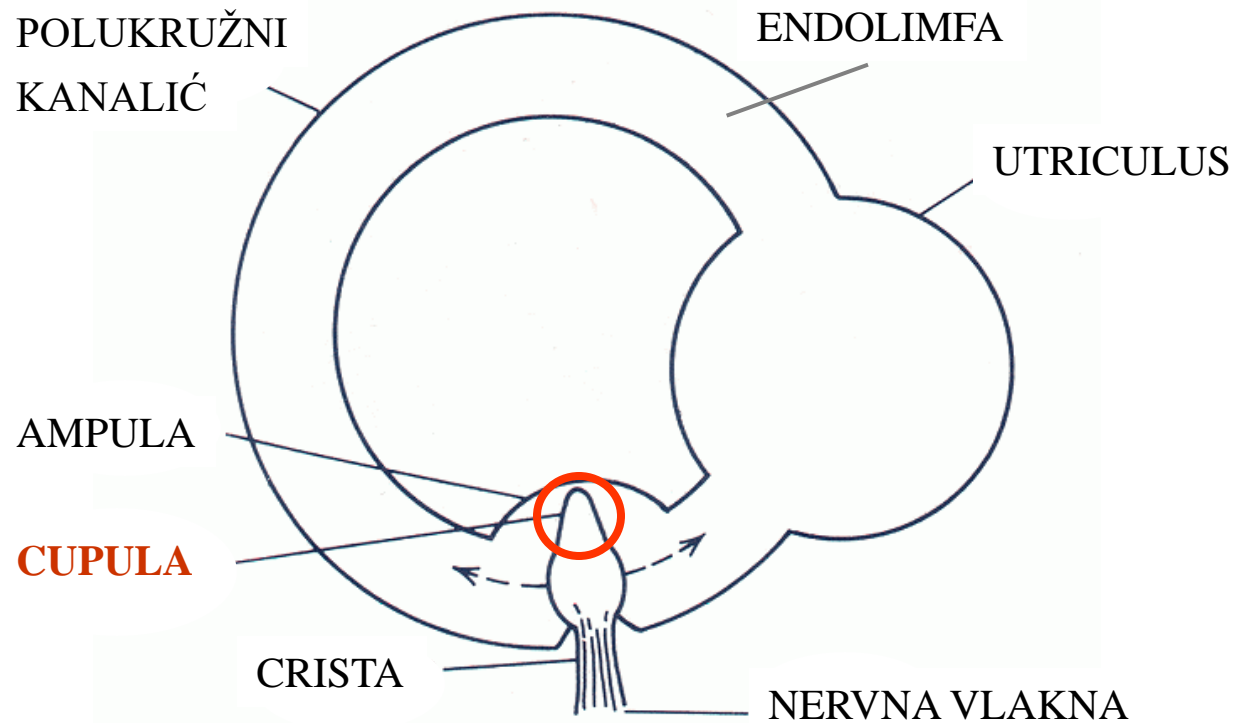
ČULNI ORGANI

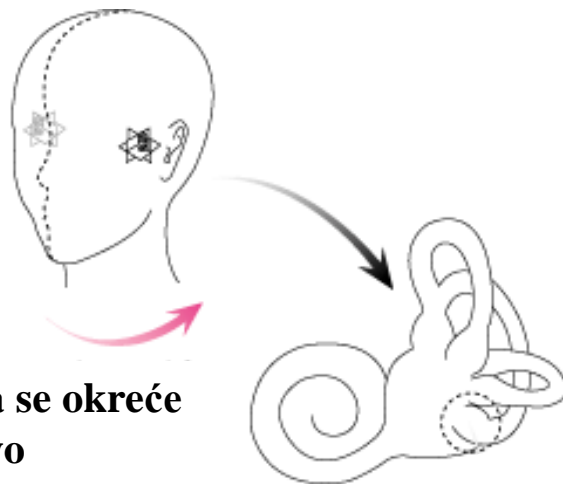
Ampule



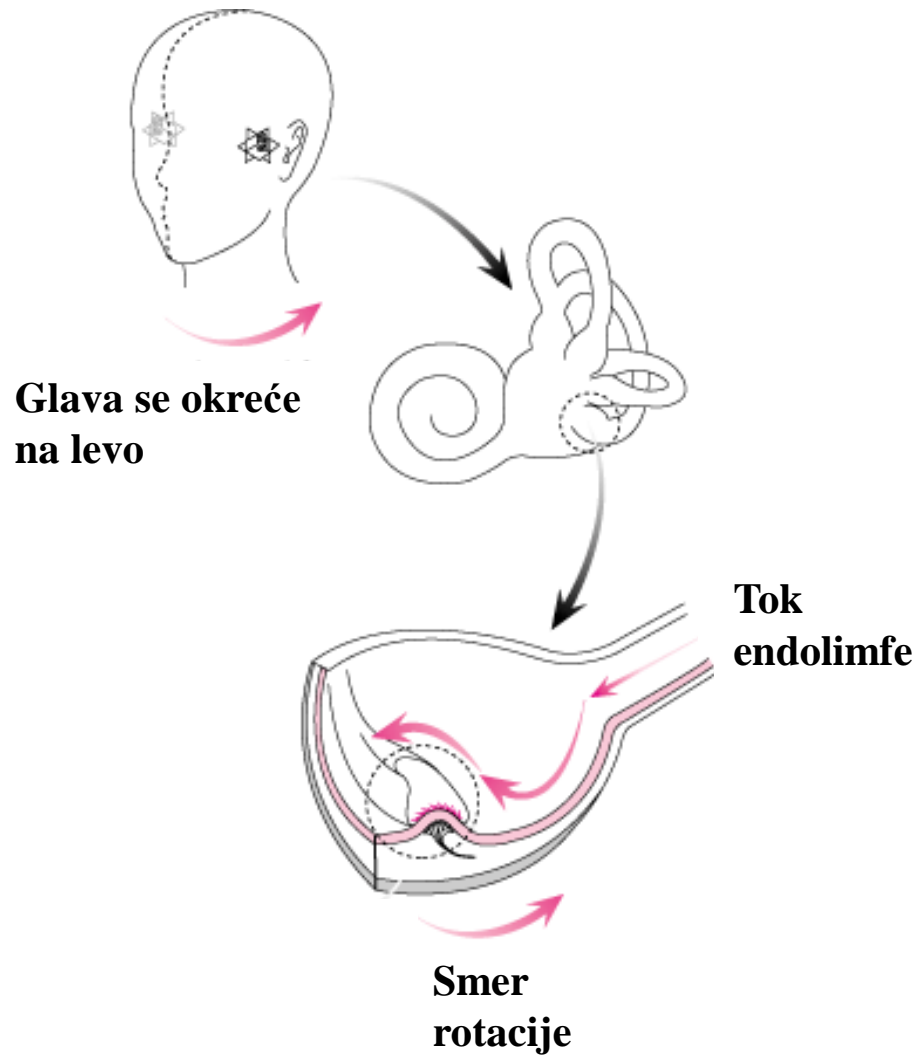
ČULNI ORGANI

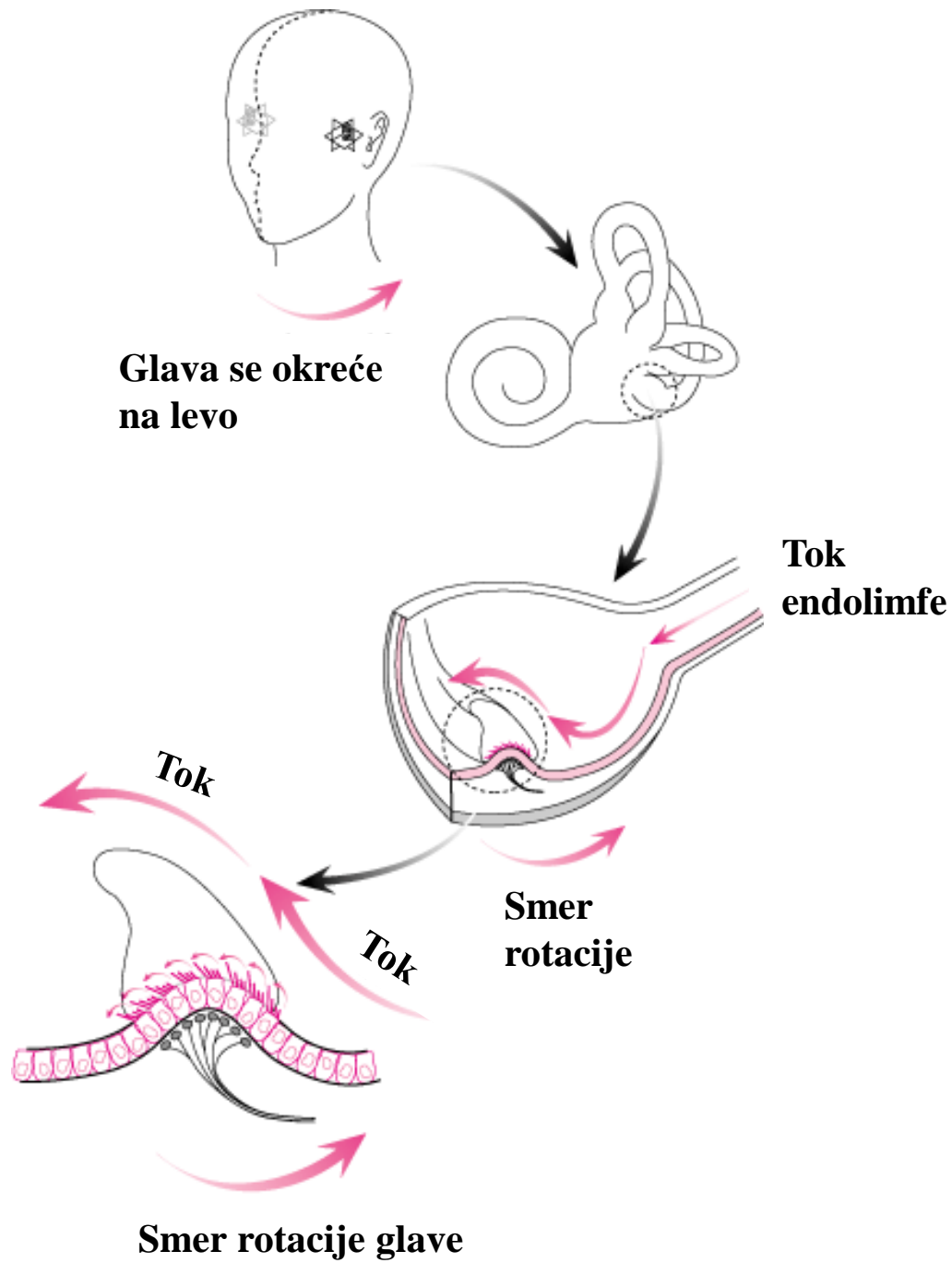
Ampule





**Glava se okreće
na levo**





RECEPTORI

Trepljaste ćelije (*cilia*)



PUTEVI

N. Statoacusticus (VIII), vestibularna komponenta

20 000 nervnih vlakana (bipolarne ćelije)

PUTEVI → CENTRI

USHODNI

Cerebellum

Integracija: kinestezija + orijentacija

Thalamus => Cortex

Svesna kontrola ravnoteže i kretanja

NISHODNI

Mesencephalon, Medulla o.

Refleksi

- mišići vrata: ustajanje, uspravni stav
- očni mišići: pokreti očiju, nystagmus
- refleks povraćanja

PUTEVI → CENTRI

USHODNI

Cerebellum

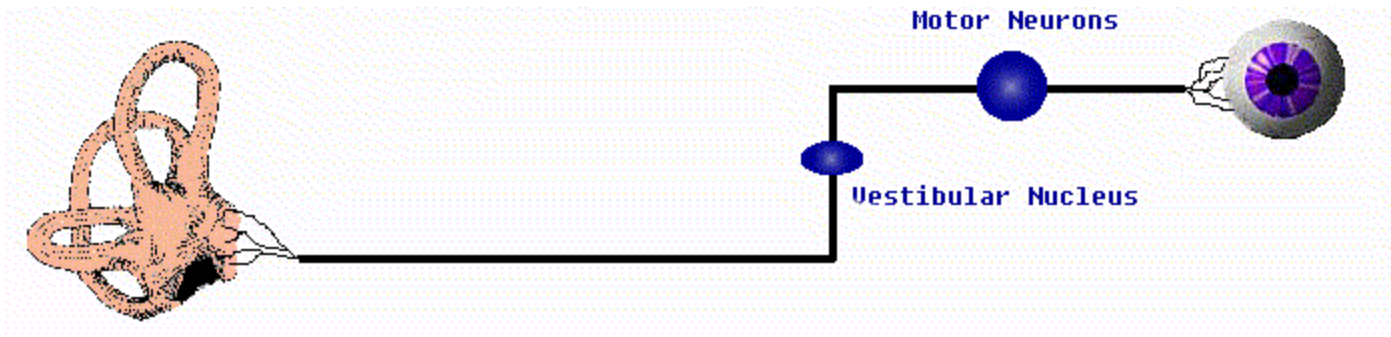
Integracija: kinestezija + orijentacija

Thalamus => Cortex

Svesna kontrola ravnoteže i kretanja

NISHODNI

Mesencephalon, Medulla



INSTRUMENTI



INSTRUMENTI



ILUZIJE



ILUZIJE

Indukovani pokret

Nulta gravitacija

PATOLOGIJA

Poremećaji ravnoteže

Nedostatak vizuelnih i auditivnih informacija

Mučnina (morska bolest)

Vrtoglavica

PERCEPCIJA

Motorička inteligencija

