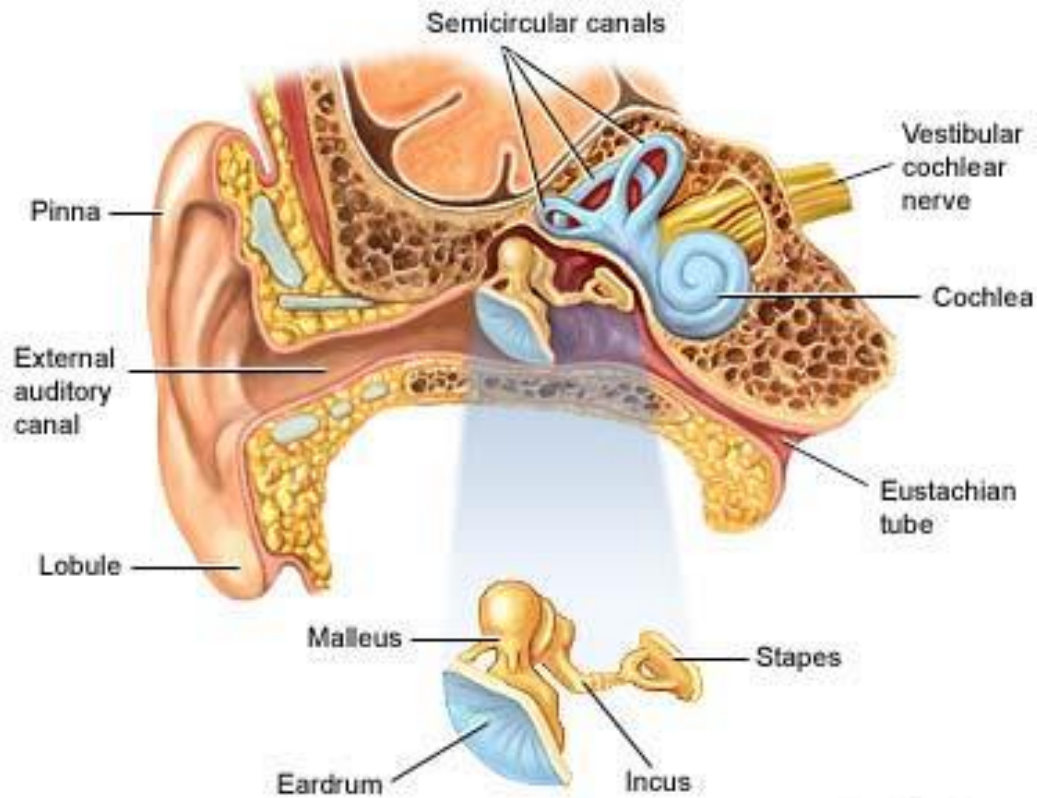
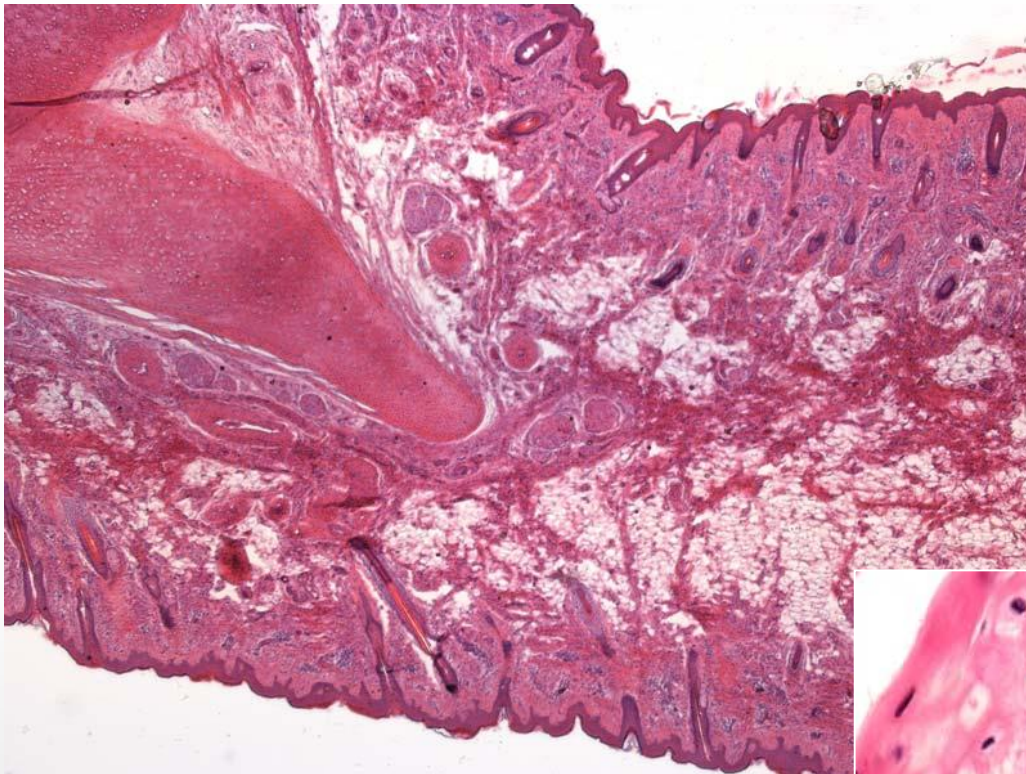


# Orgán sluchu

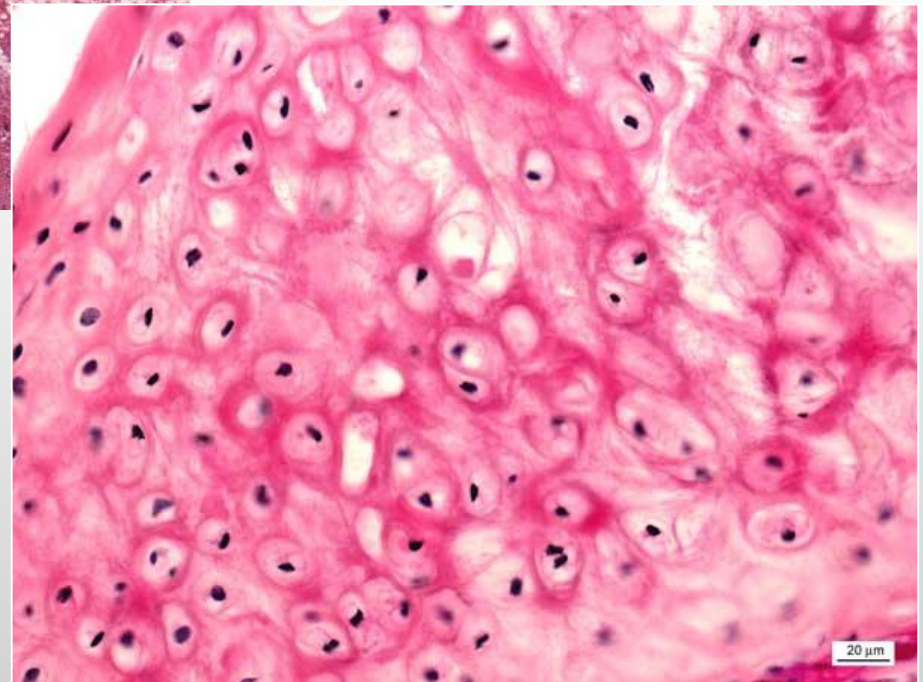
# Struktura ucha



# Zevní ucho

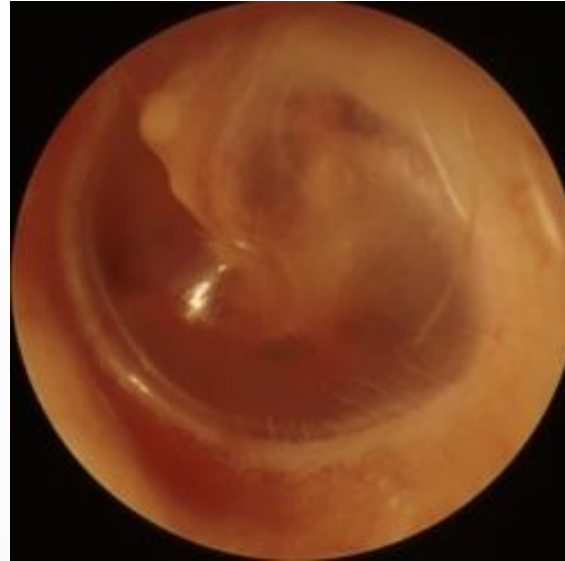


elastická chrupavka



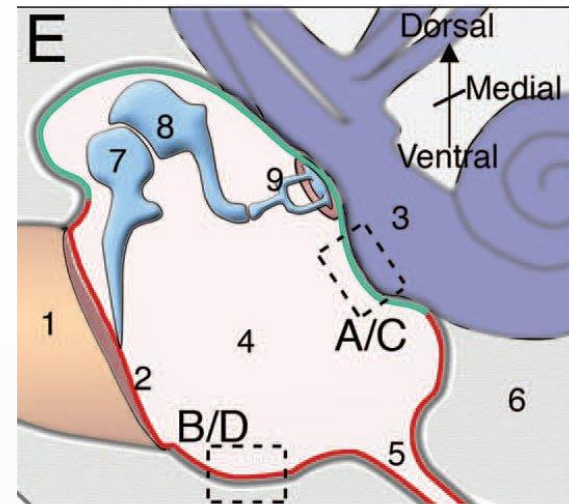
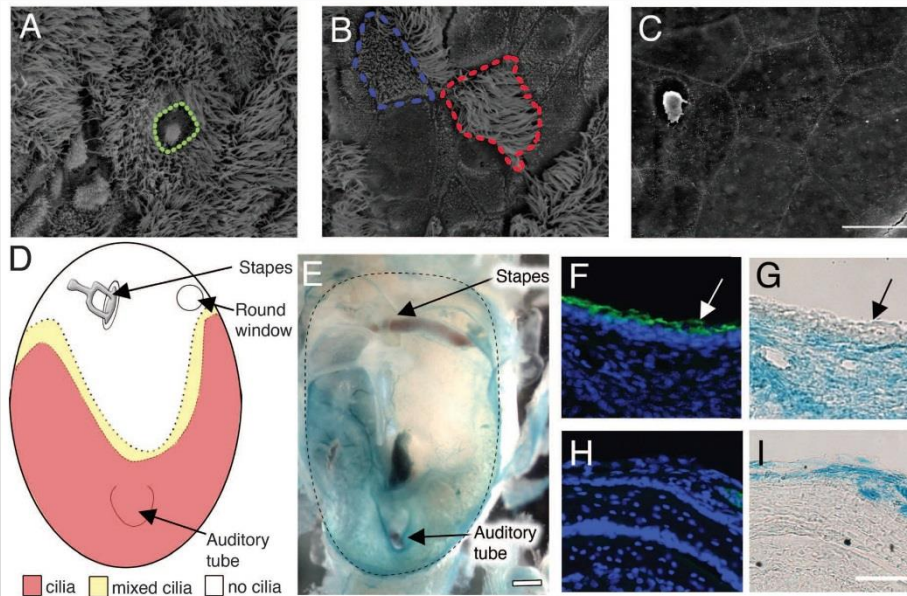
# Membrana tympani - bubínek

- Stratum cutaneum
  - tenká kůže
- Stratum fibrosum
  - lamina propria m. tympani /kolagenní vlákna /→
    - stratum radiatum
    - stratum circulare
- Stratum mucosum
  - sliznice cavum tympani



# Střední ucho

- **Cavum tympani**
  - sliznice
    - epitel – jednovrstevný plochý až kubický, místy i s řasinkami
    - lamina propria
- **Tuba auditiva** /Eustachova trubice/
  - pars ossea
  - pars cartilaginea /+lamina membranacea tubae/
  - tonsila tubaria



- endoderm epithelium
- neural crest epithelium

- 1- outer ear
- 2- ear drum
- 3- otic capsule
- 4- middle ear cavity
- 5- auditory tube
- 6- auditory bulla
- 7- malleus
- 8- incus
- 9- stapes

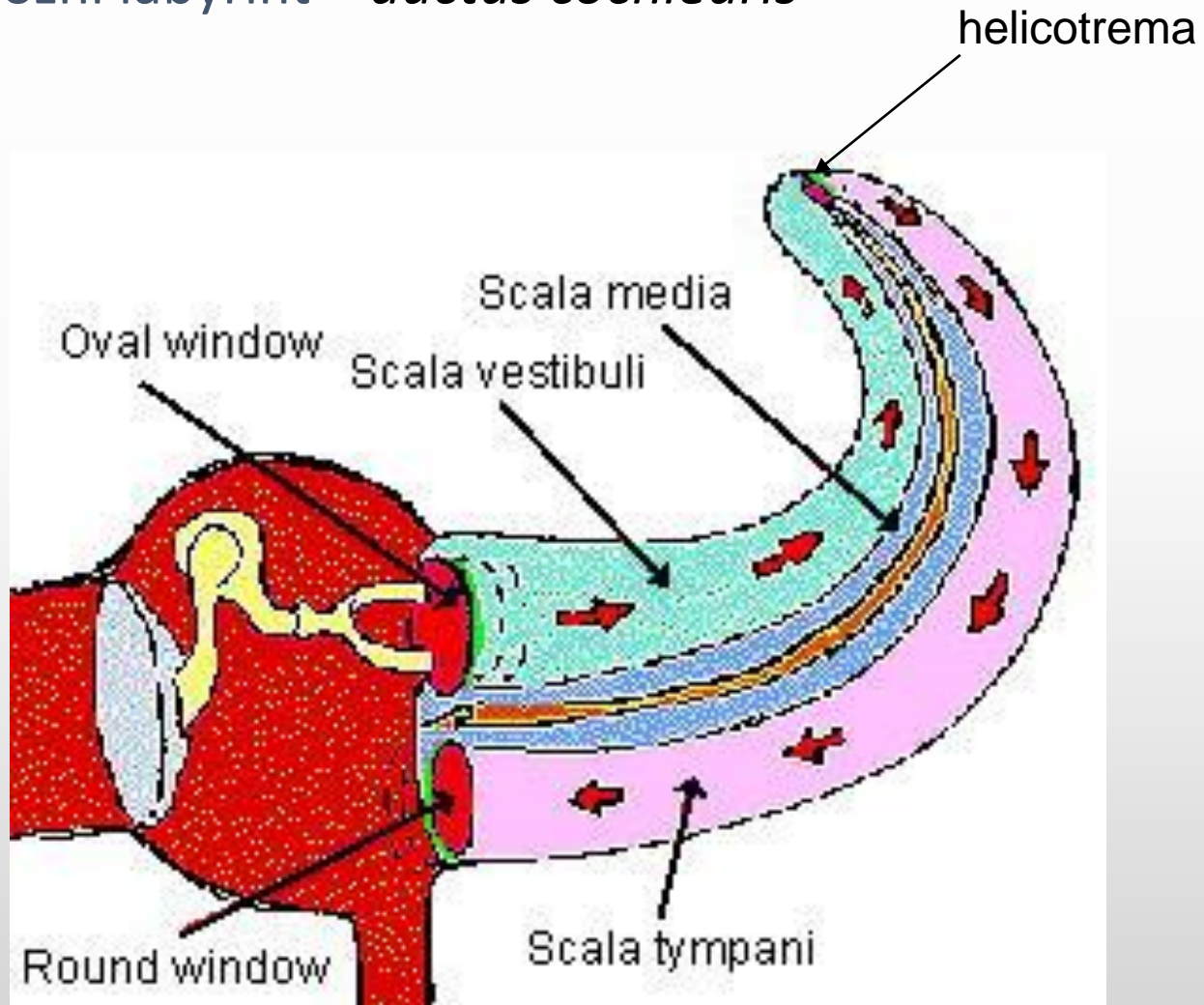
## Dual Origin of the Epithelium of the Mammalian Middle Ear

Hannah Thompson and Abigail S. Tucker\*

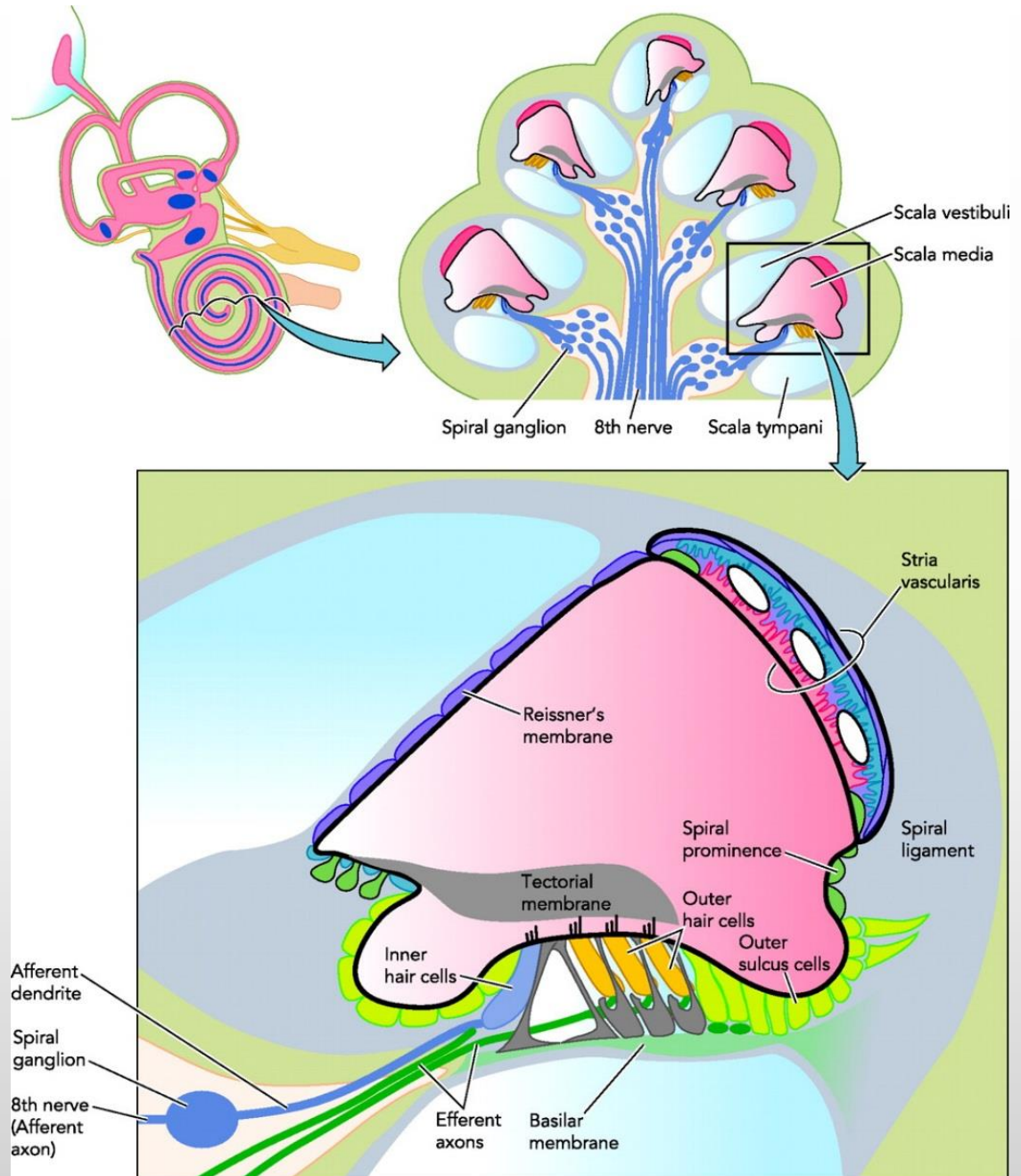
H. Thompson, A. S. Tucker, *Science* 339, 1453 (2013)

## Vnitřní ucho – orgán sluchu - cochlea

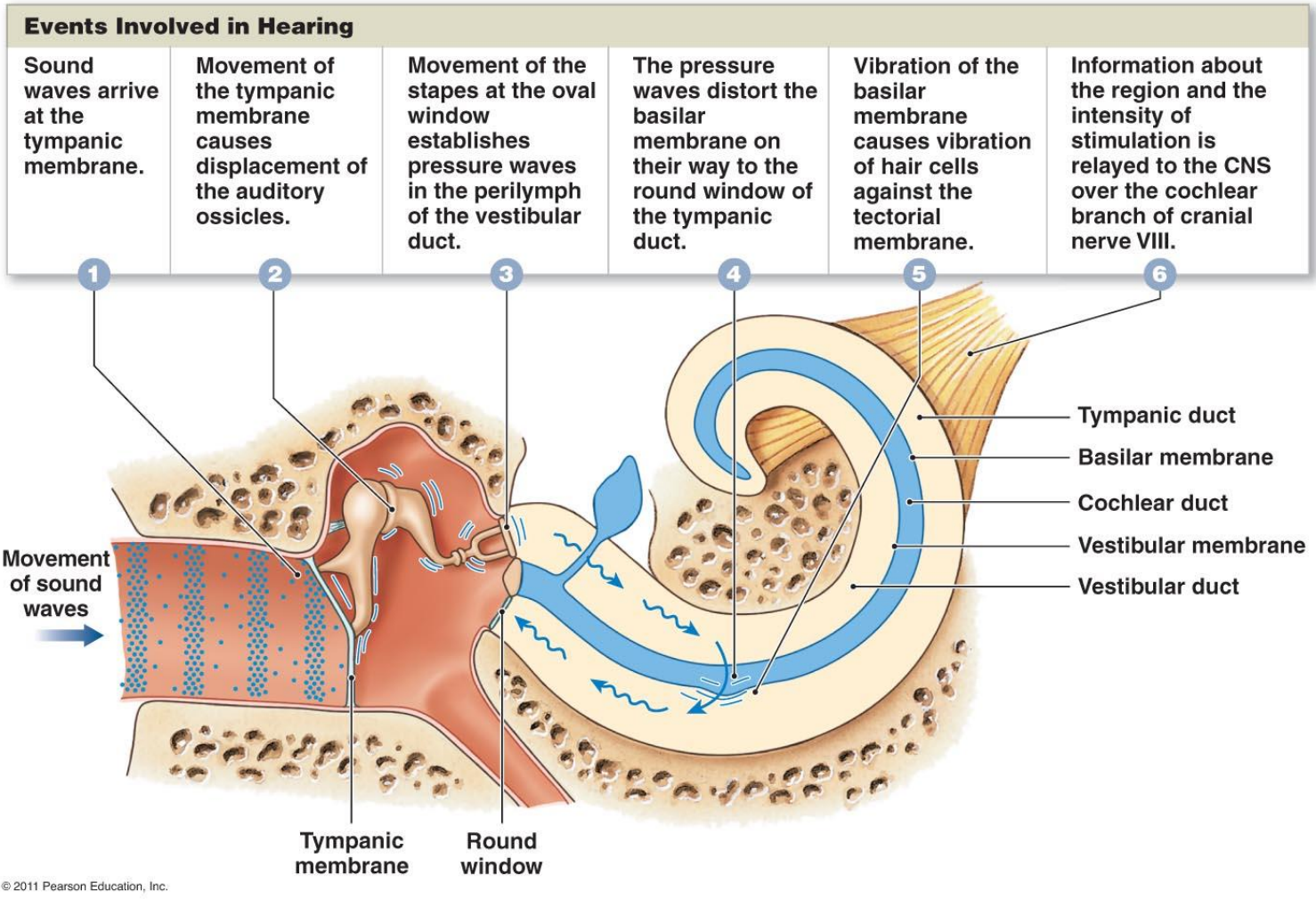
- Kostěný labyrint
- Membranózní labyrint – *ductus cochlearis*



# Vnitřní ucho



# Jak slyšíme?

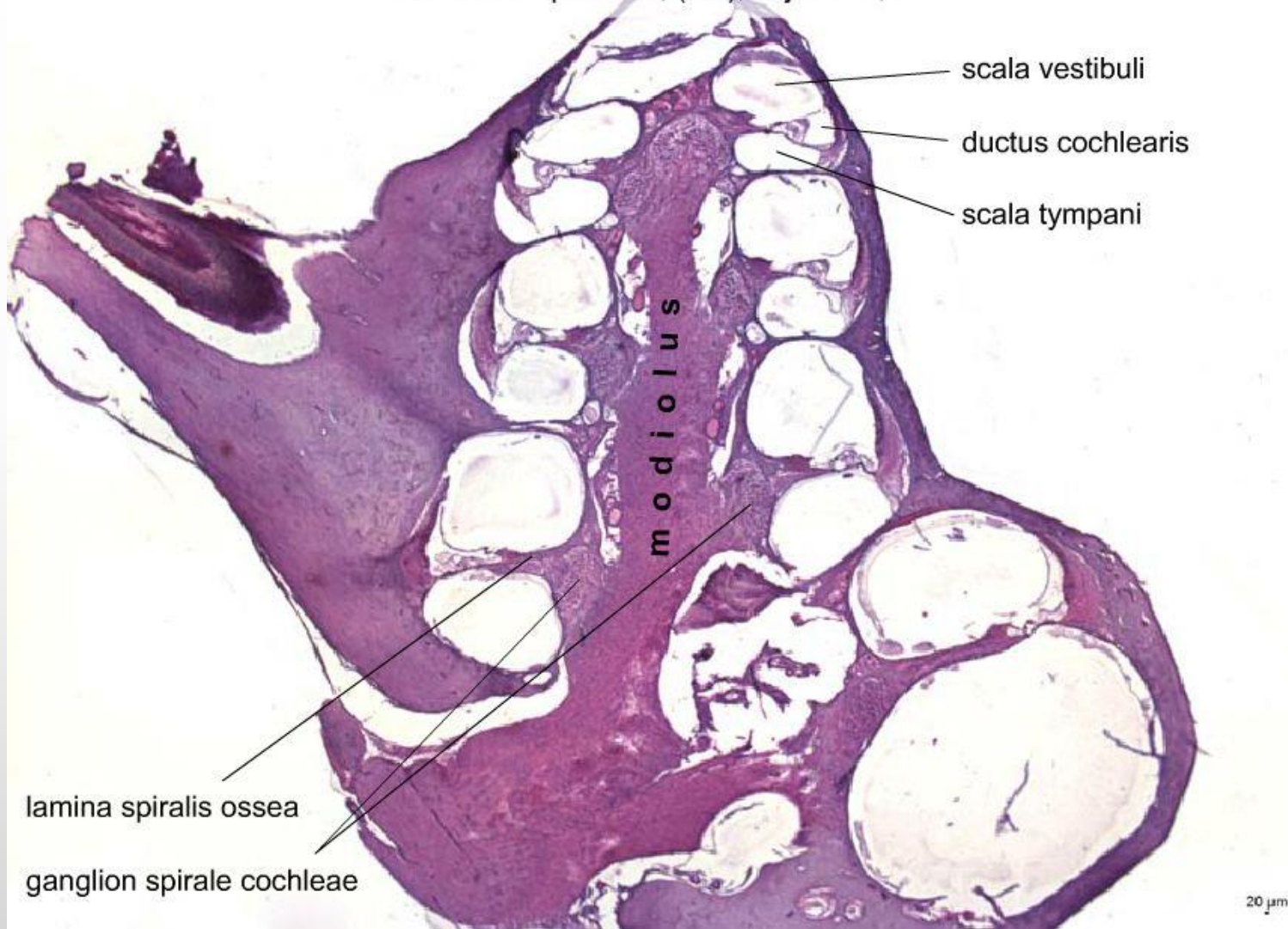




# Vnitřní ucho

*canalis spiralis cochleae (35 mm, 2.5 závitů)*

Cochlea – přehled, (HE), objektiv 2,5×



scala vestibuli

ductus cochlearis

scala tympani

modiolus

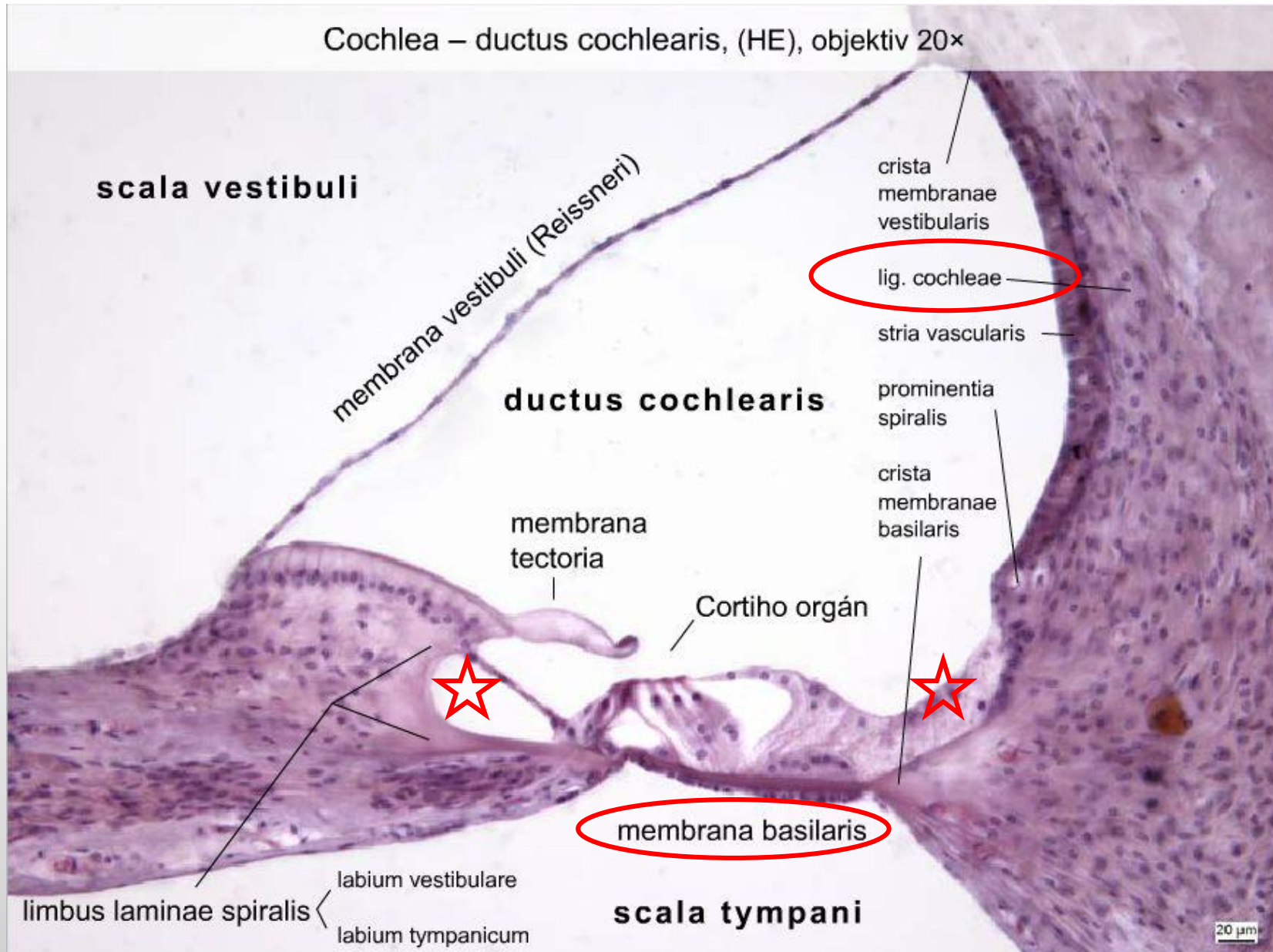
lamina spiralis ossea

ganglion spirale cochleae

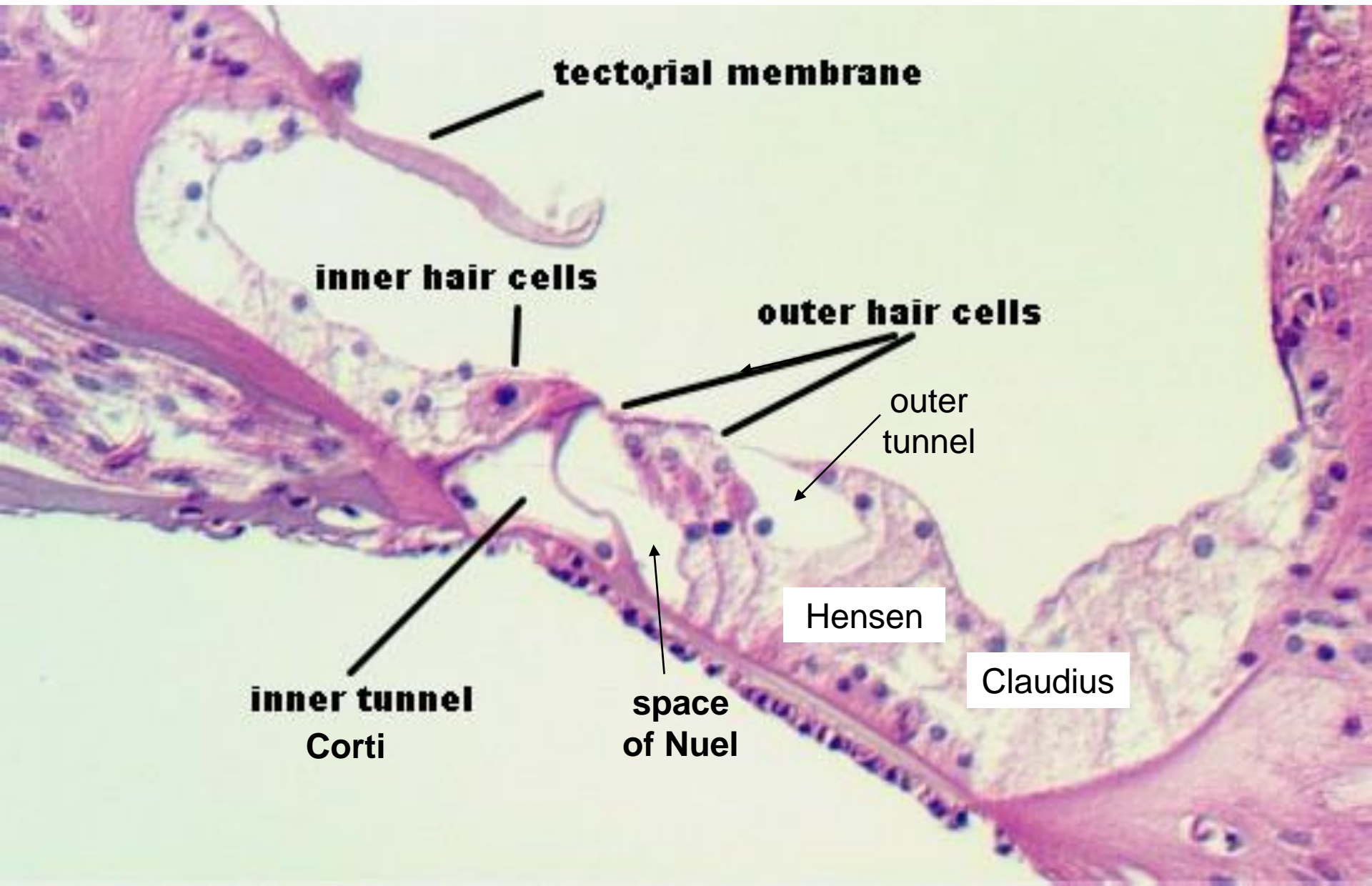
20 μm

# Vnitřní ucho – ductus cochlearis

Cochlea – ductus cochlearis, (HE), objektiv 20×



# Vnitřní ucho - Cortiho orgán



**tectorial membrane**

**inner hair cells**

**outer hair cells**

outer tunnel

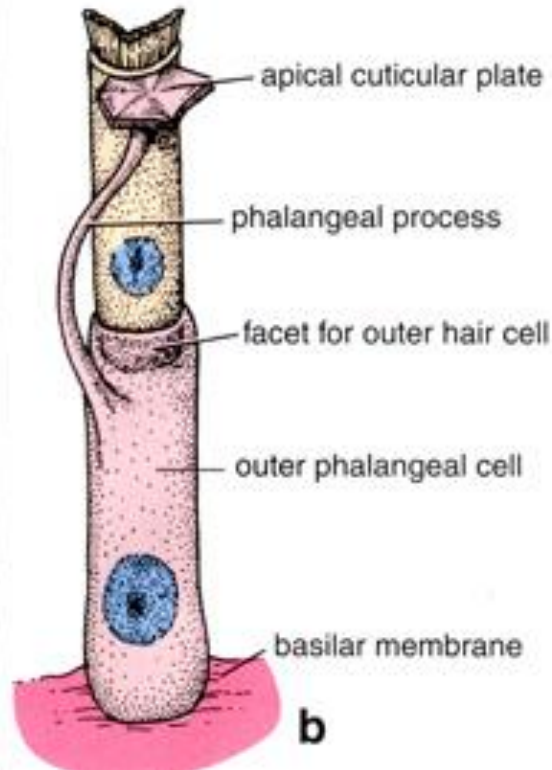
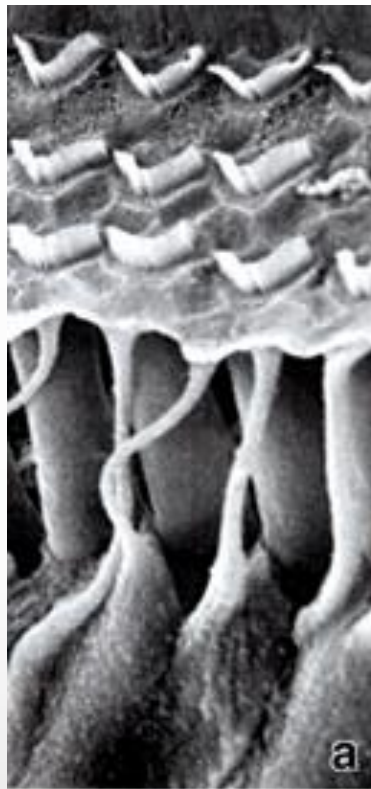
Hensen

Claudius

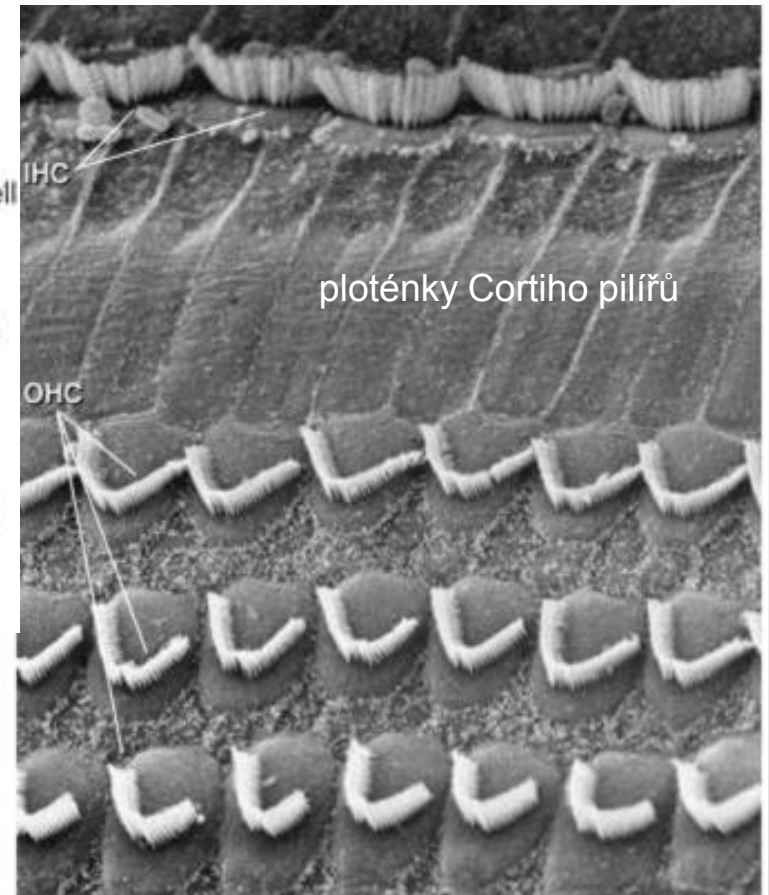
**inner tunnel**  
Corti

space of Nuel

# Vnitřní ucho - Cortiho orgán – vláskové a falangové buňky



1 řada



3-5 řad

vlásky = stereocilie

3 500 vnitřních vláskových buněk

12 000 zevních vláskových buněk

membrana reticularis

# Vnitřní ucho - Cortiho orgán – vláskové a falangové buňky



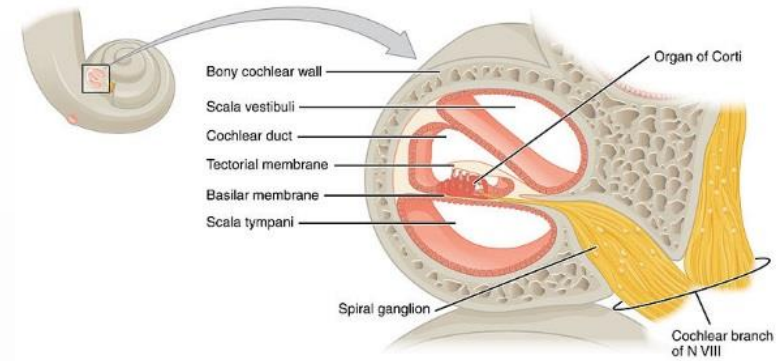
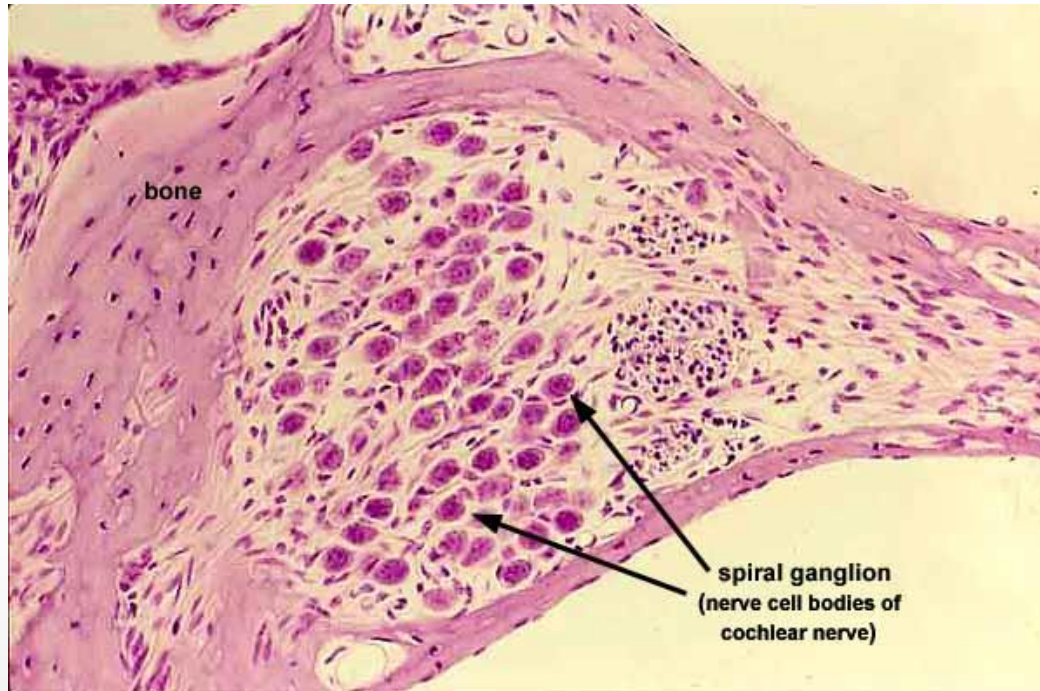
„dancing hair cell“



<https://www.youtube.com/watch?v=Xo9bwQuYrRo>

<http://www.cochlea.eu/en/hair-cells/outer-hair-cells-ohcs>

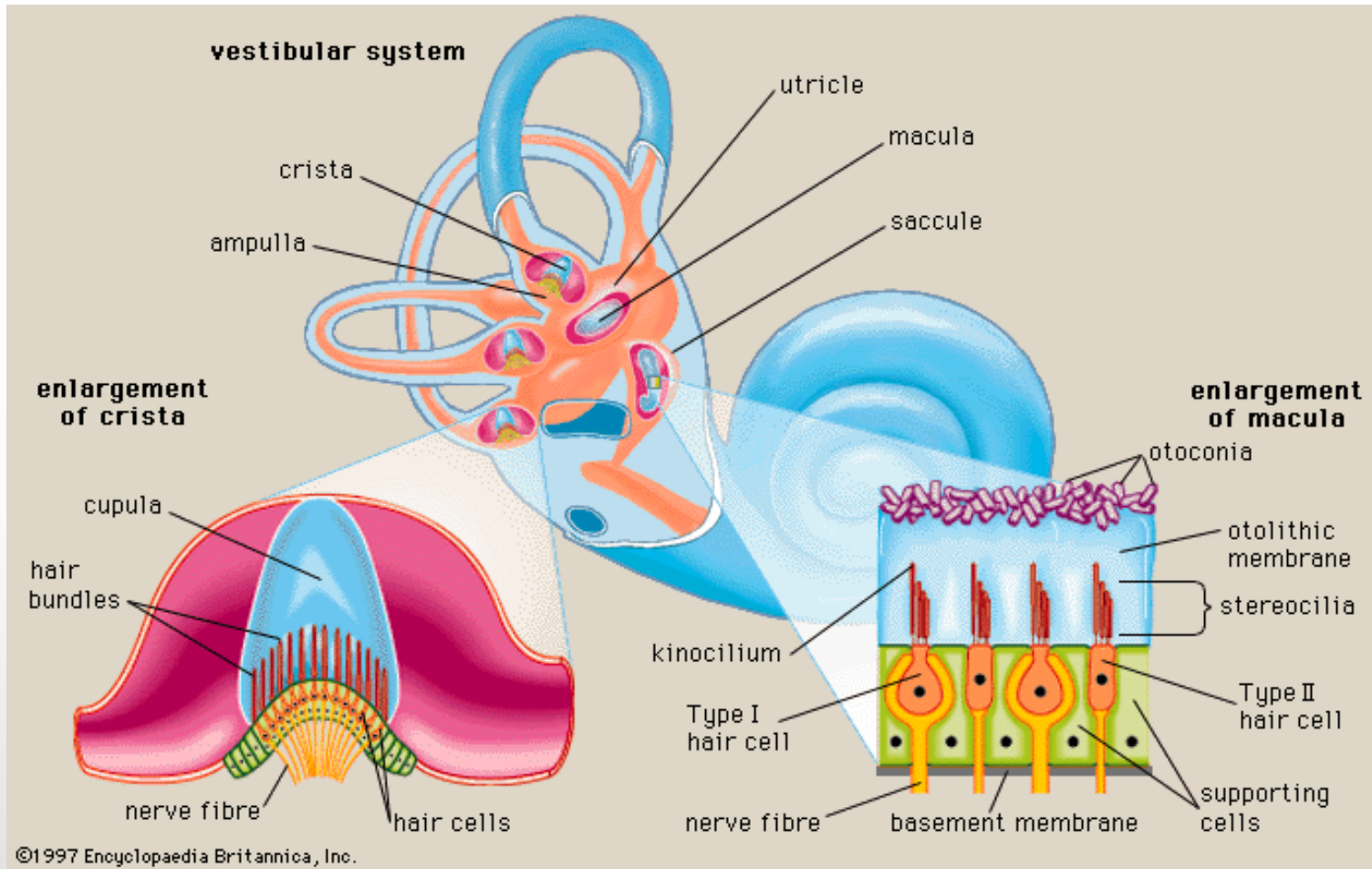
# Vnitřní ucho - spirální ganglion



bipolární neurony  
- 1. neuron sluchové dráhy

periferní výběžek – k vláskovým buňkám  
centrální výběžek – pars cochlearis N. vestibulocochlearis (VIII.)

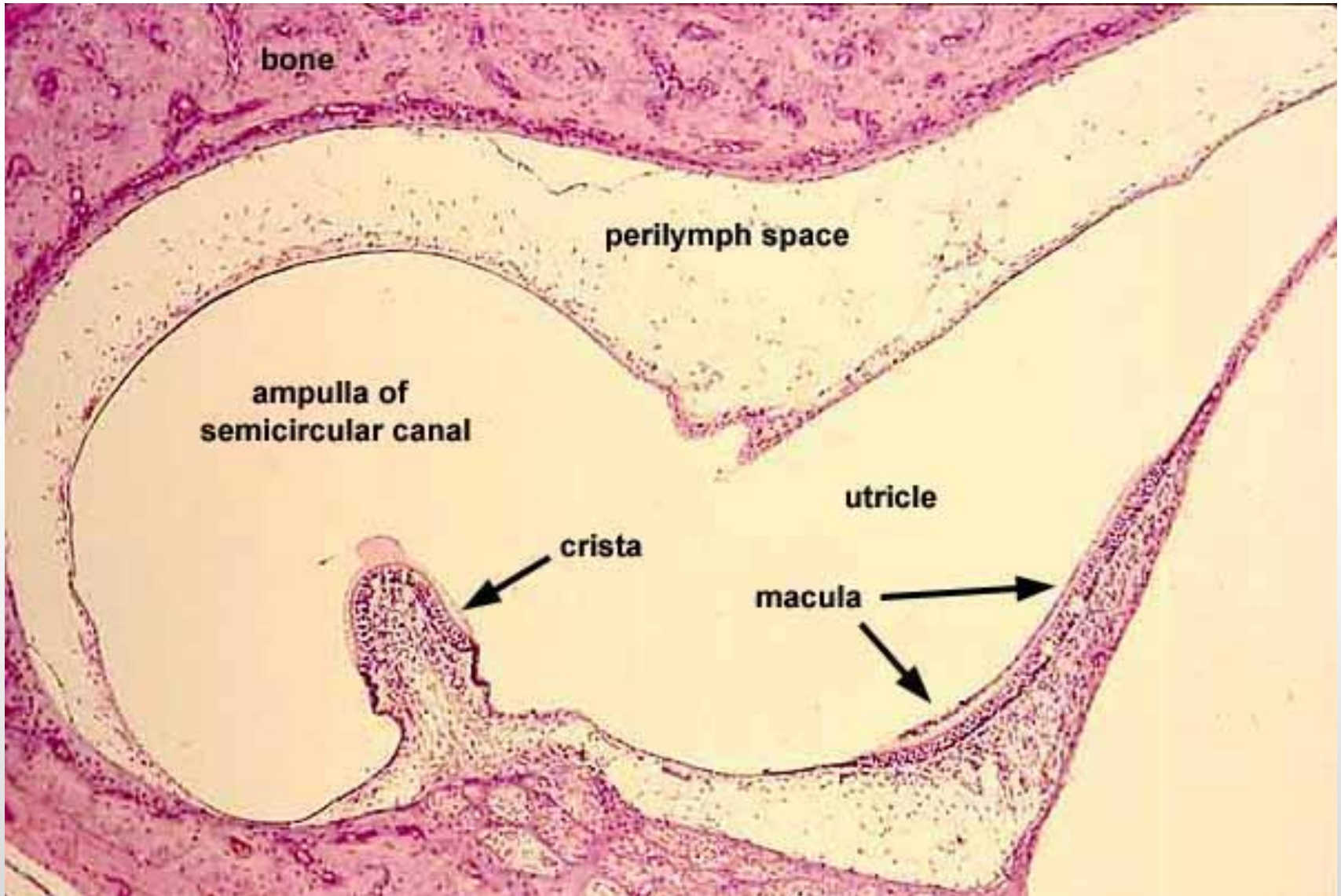
# Vnitřní ucho - orgán rovnováhy (pars statica labyrinthi membranacei)



polokruhové kanálky (ductus semicirculares – anterior, posterior a lateralis) – crista ampullaris

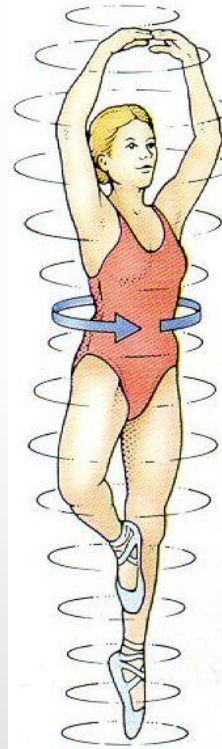
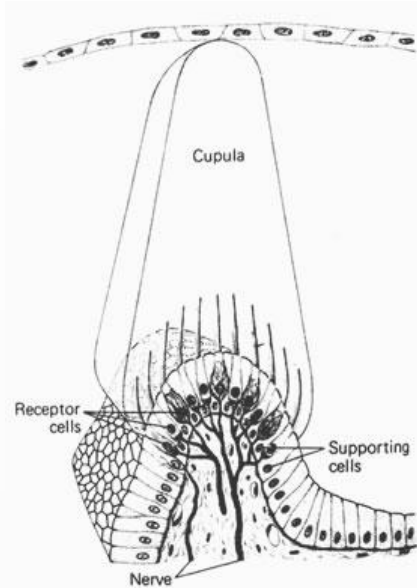
váčky - utriculus a sacculus (uložené ve vestibulu) – macula statica

# Vnitřní ucho - orgán rovnováhy



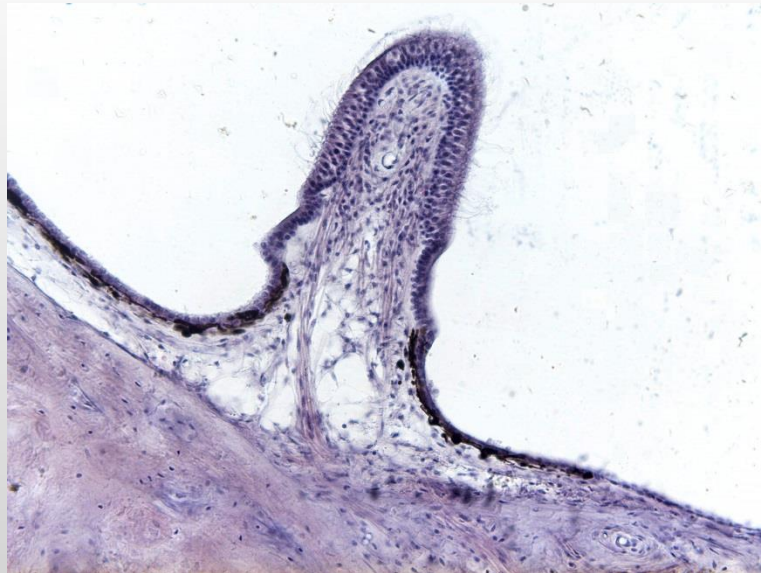
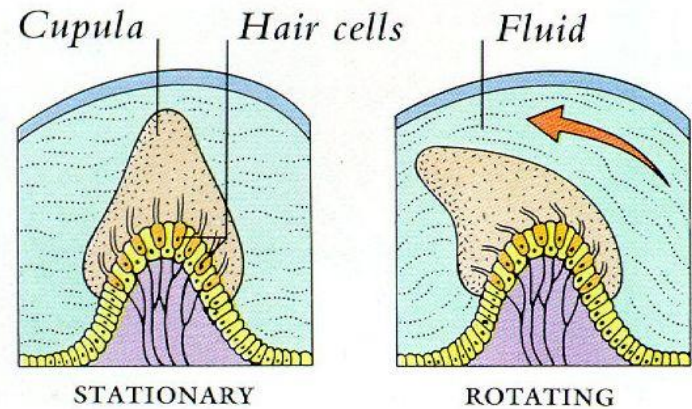


# Ductus semicirculares – crista ampullaris

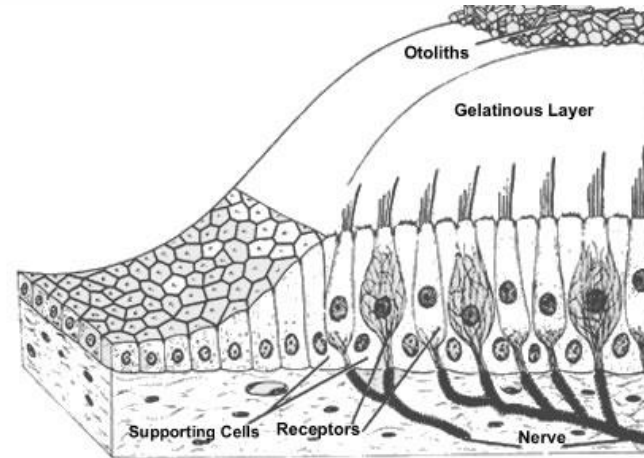
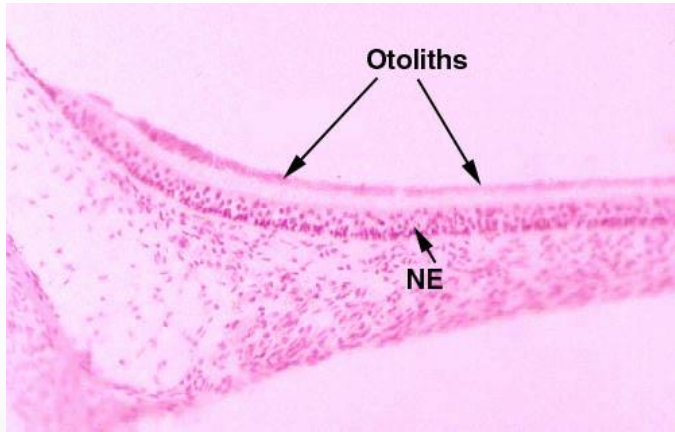


## Role of the crista ampullaris

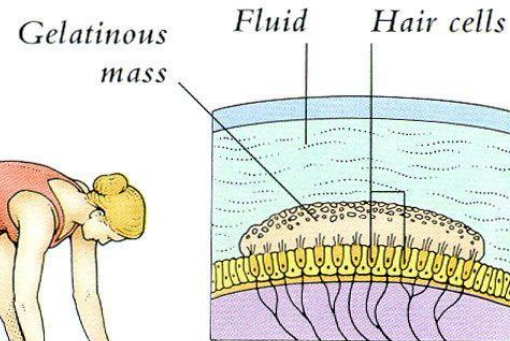
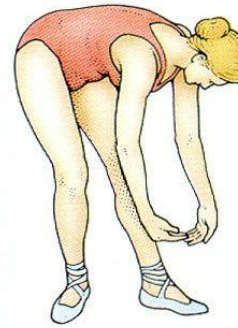
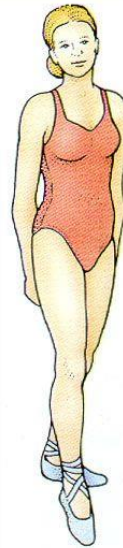
The crista ampullaris responds to rotational movements. The hair cells of each crista are embedded in a conical gelatinous mass, the cupula. When the fluid in the semicircular canals swirls during movement, it displaces the cupula, stimulating the hair cells.



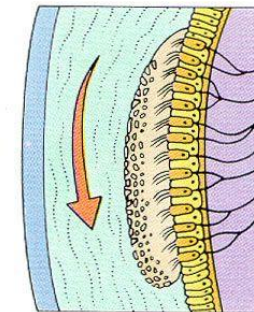
# Utriculus a sacculus - macula statica



otolithy – statokonie  
(calcium carbonate)



UPRIGHT MACULA



DISPLACED MACULA

## Role of the maculae

The maculae monitor the position of the head relative to the ground. Tiny hairs projecting from sensory cells are embedded in a gelatinous mass. If the head is tipped, gravity pulls the mass down, stimulating the hair cells.

## Orgán sluchu

- 93. Cochlea
- 94. Auricula



Děkuji Vám za pozornost.

Jana Dumková

otázky a komentáře na:  
[jdumkova&med.muni.cz](mailto:jdumkova&med.muni.cz)