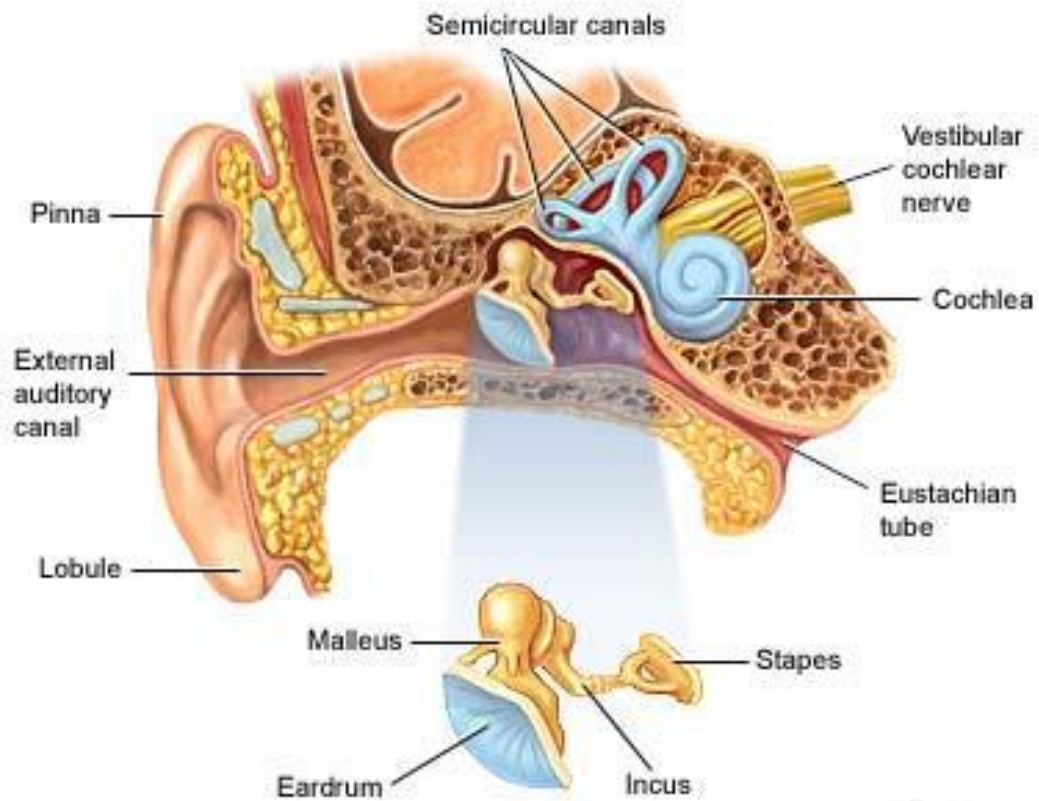
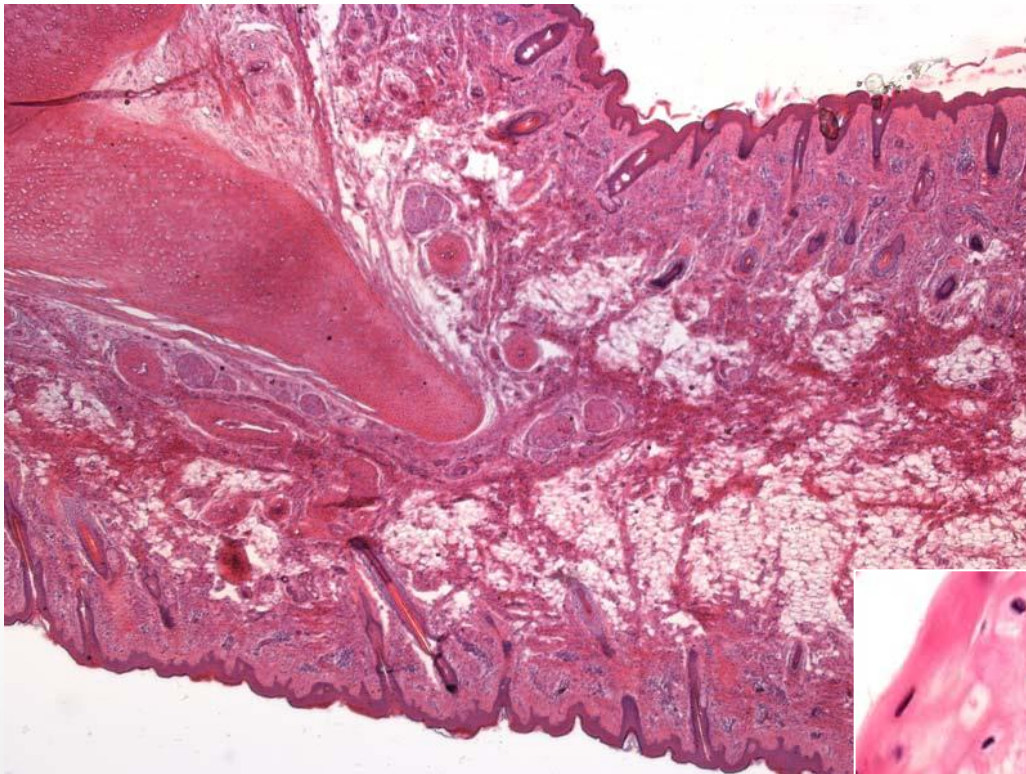


Orgán sluchu

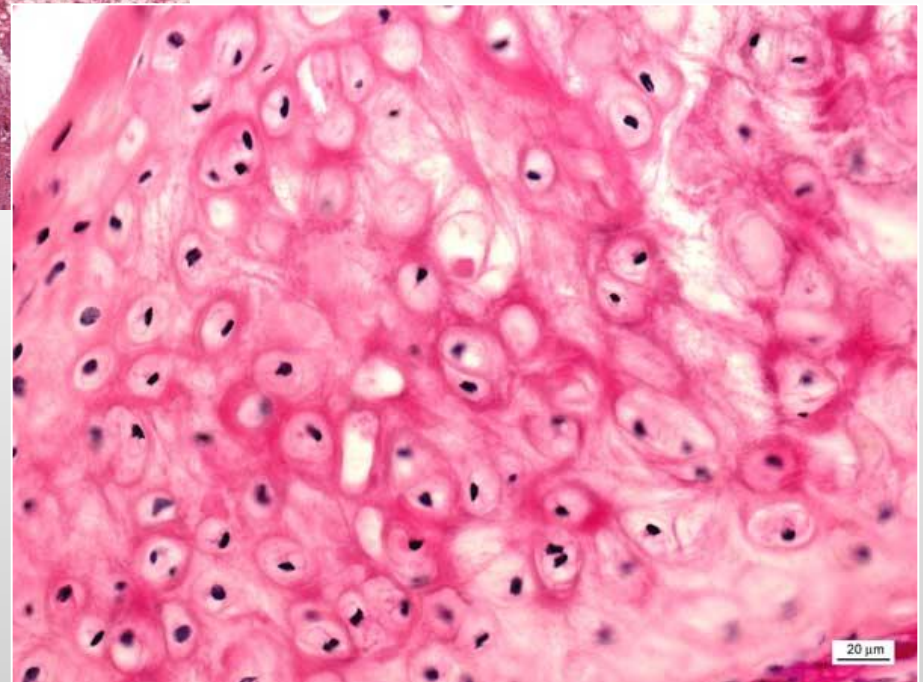
Struktura ucha



Zevní ucho

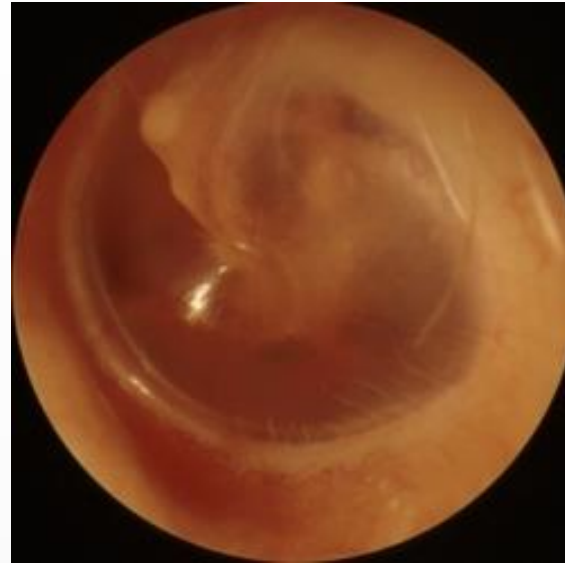


elastická chrupavka



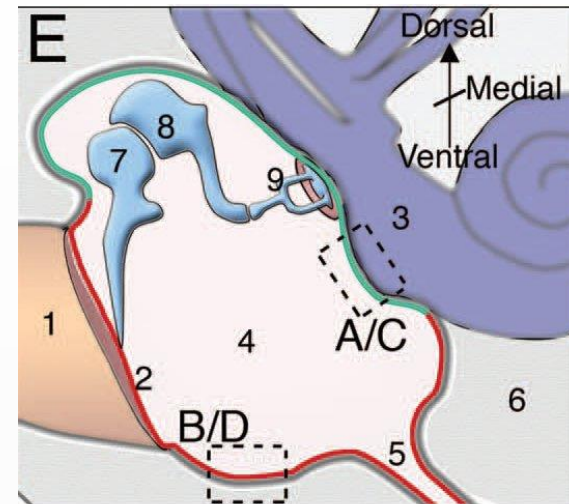
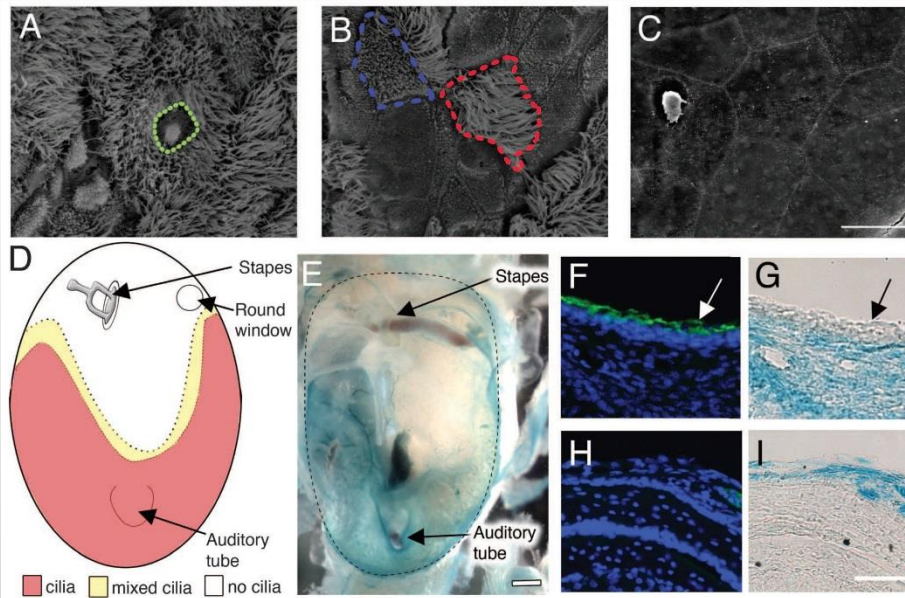
Membrana tympani - bubínek

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

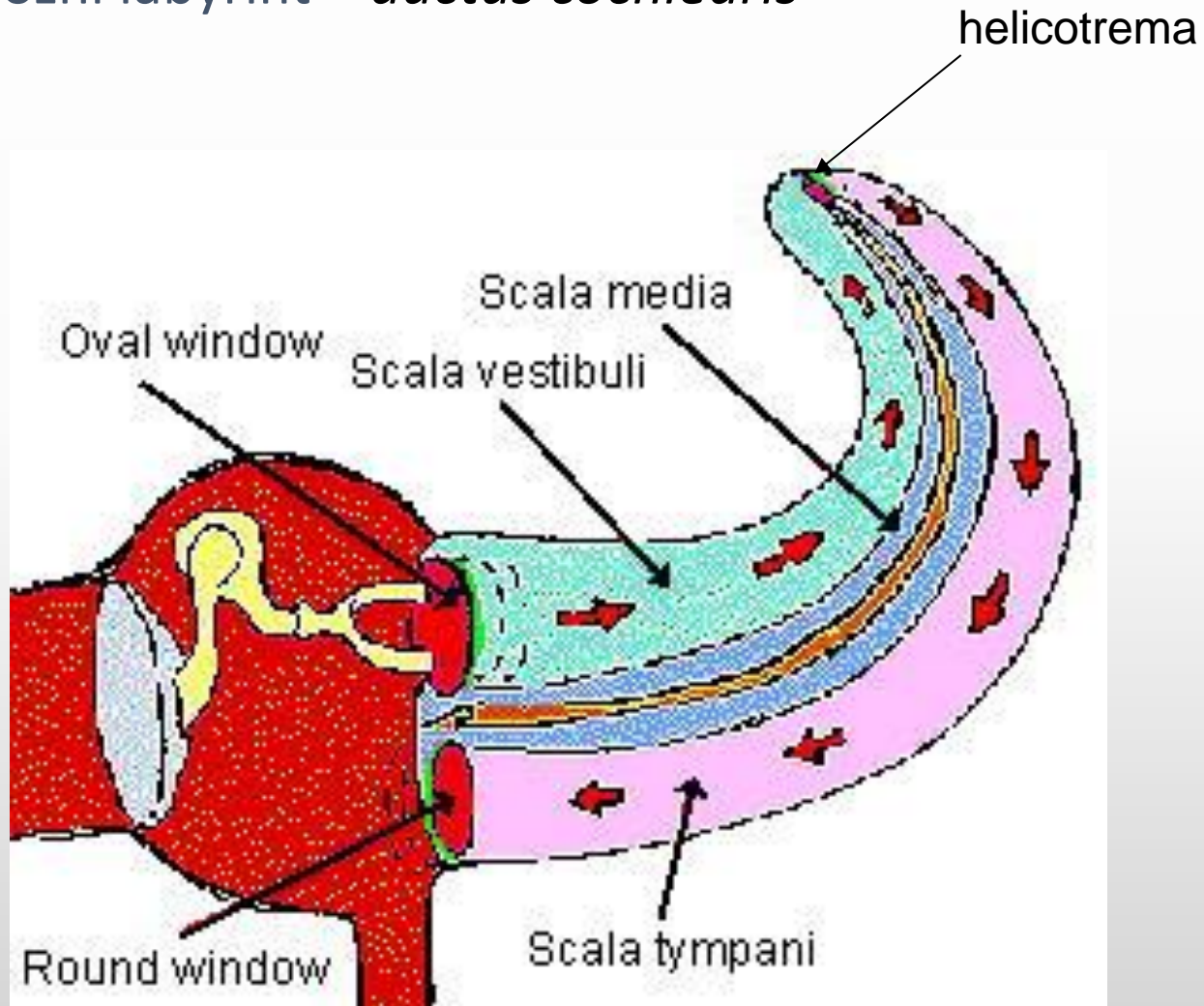
Dual Origin of the Epithelium of the Mammalian Middle Ear

Hannah Thompson and Abigail S. Tucker*

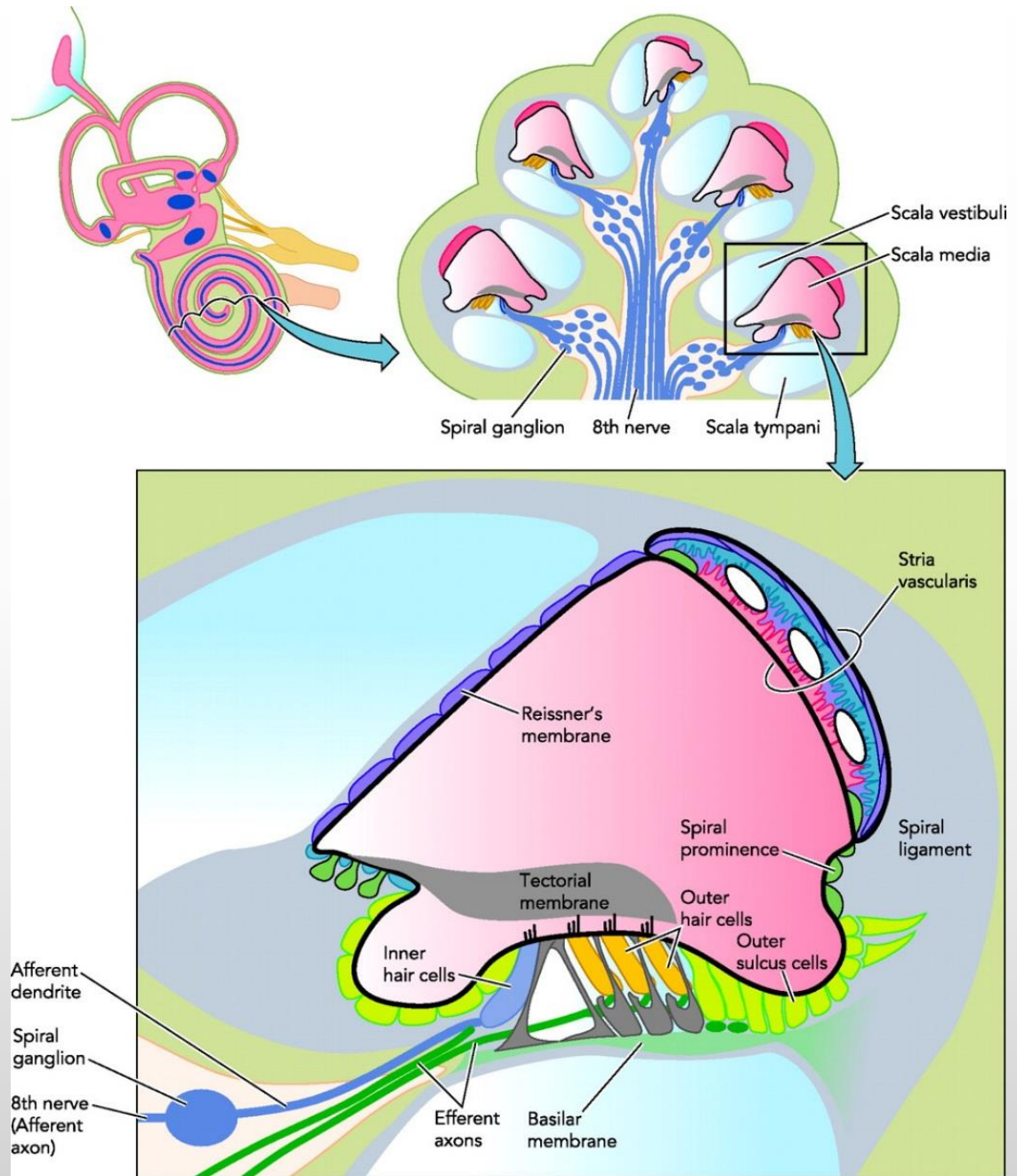
H. Thompson, A. S. Tucker, *Science* 339, 1453 (2013)

Vnitřní ucho – orgán sluchu - cochlea

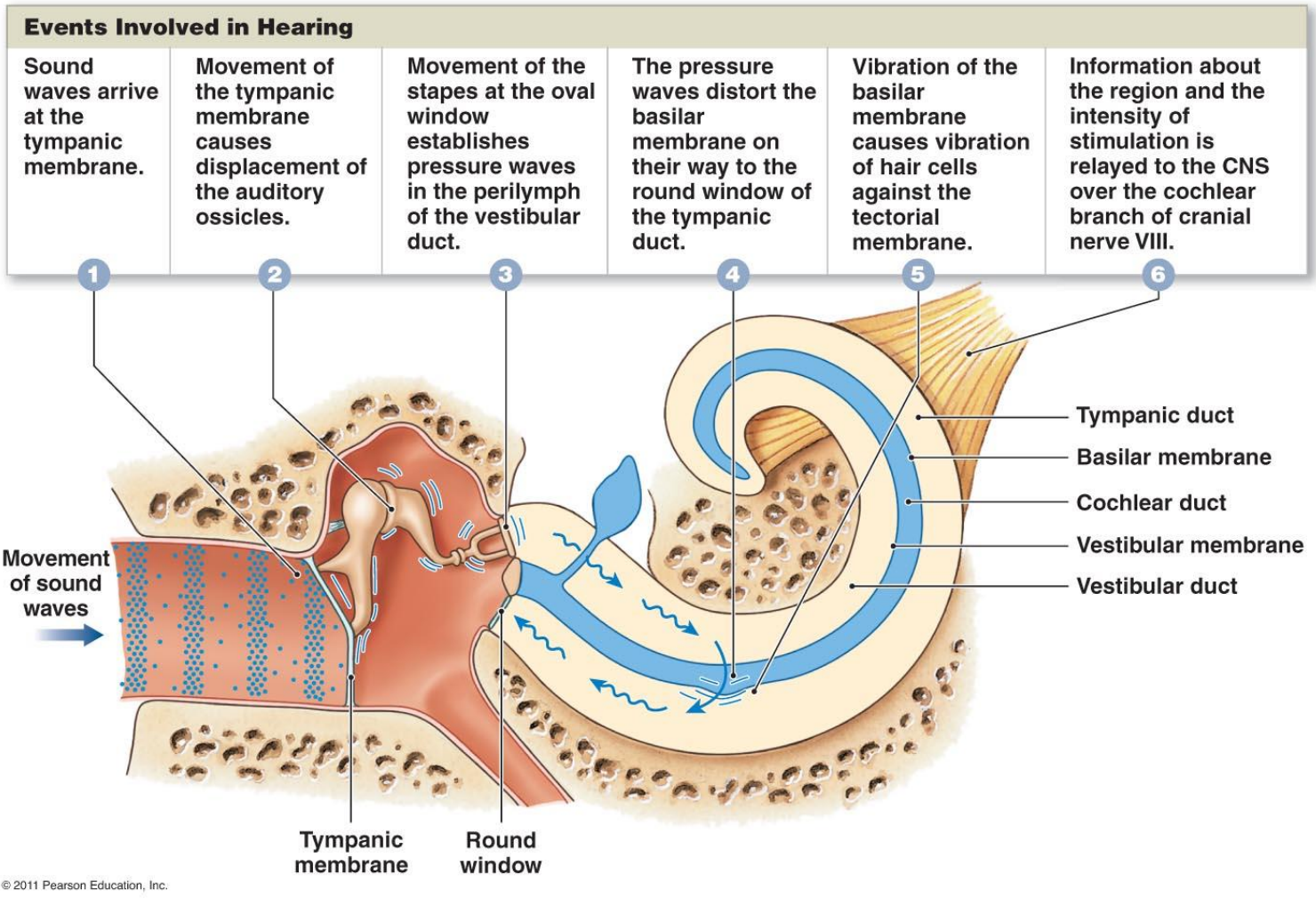
- Kostěný labyrint
- Membranózní labyrint – *ductus cochlearis*



Vnitřní ucho



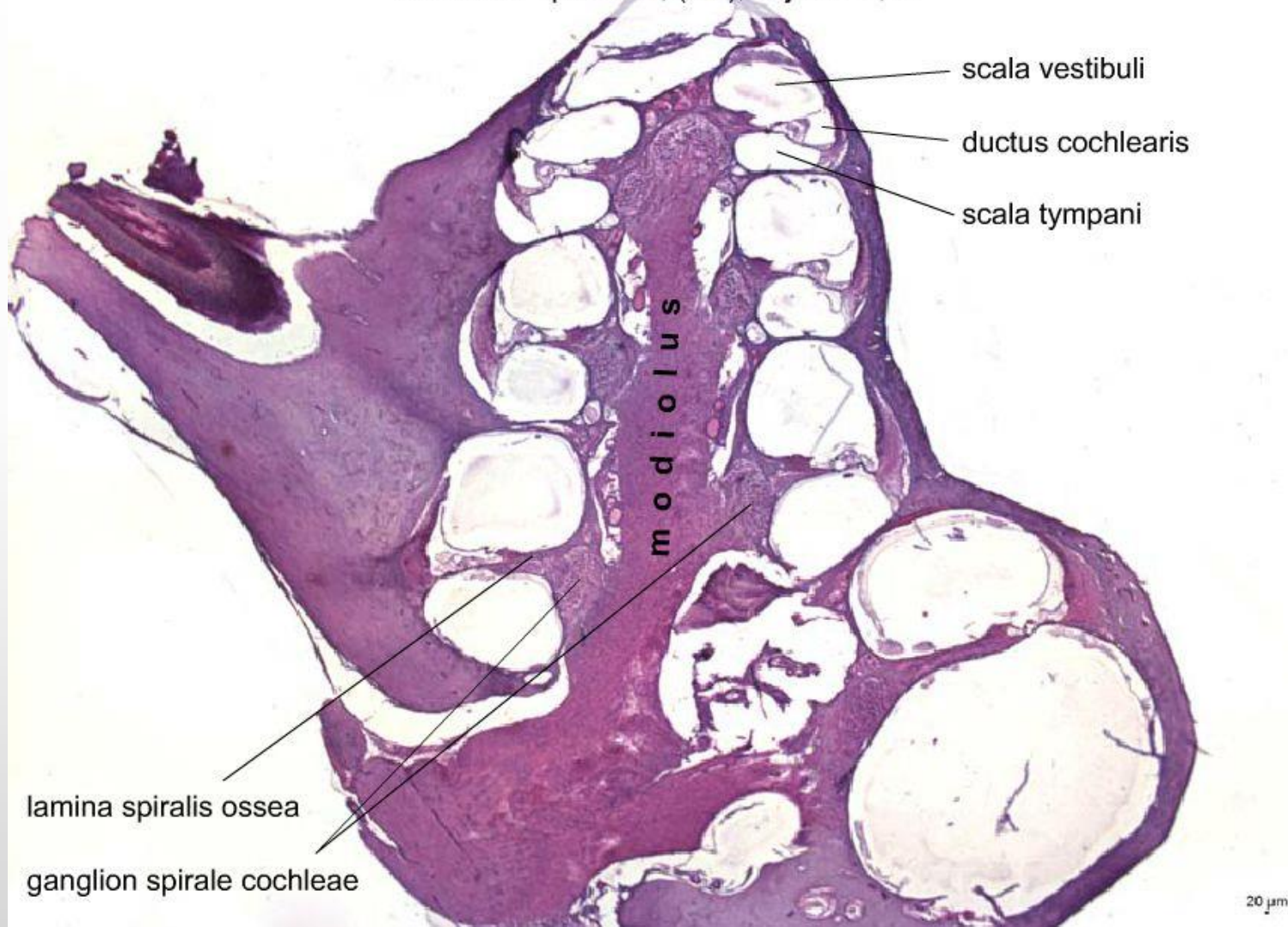
Jak slyšíme?



Vnitřní ucho

canalis spiralis cochleae (35 mm, 2.5 závitů)

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



scala vestibuli

ductus cochlearis

scala tympani

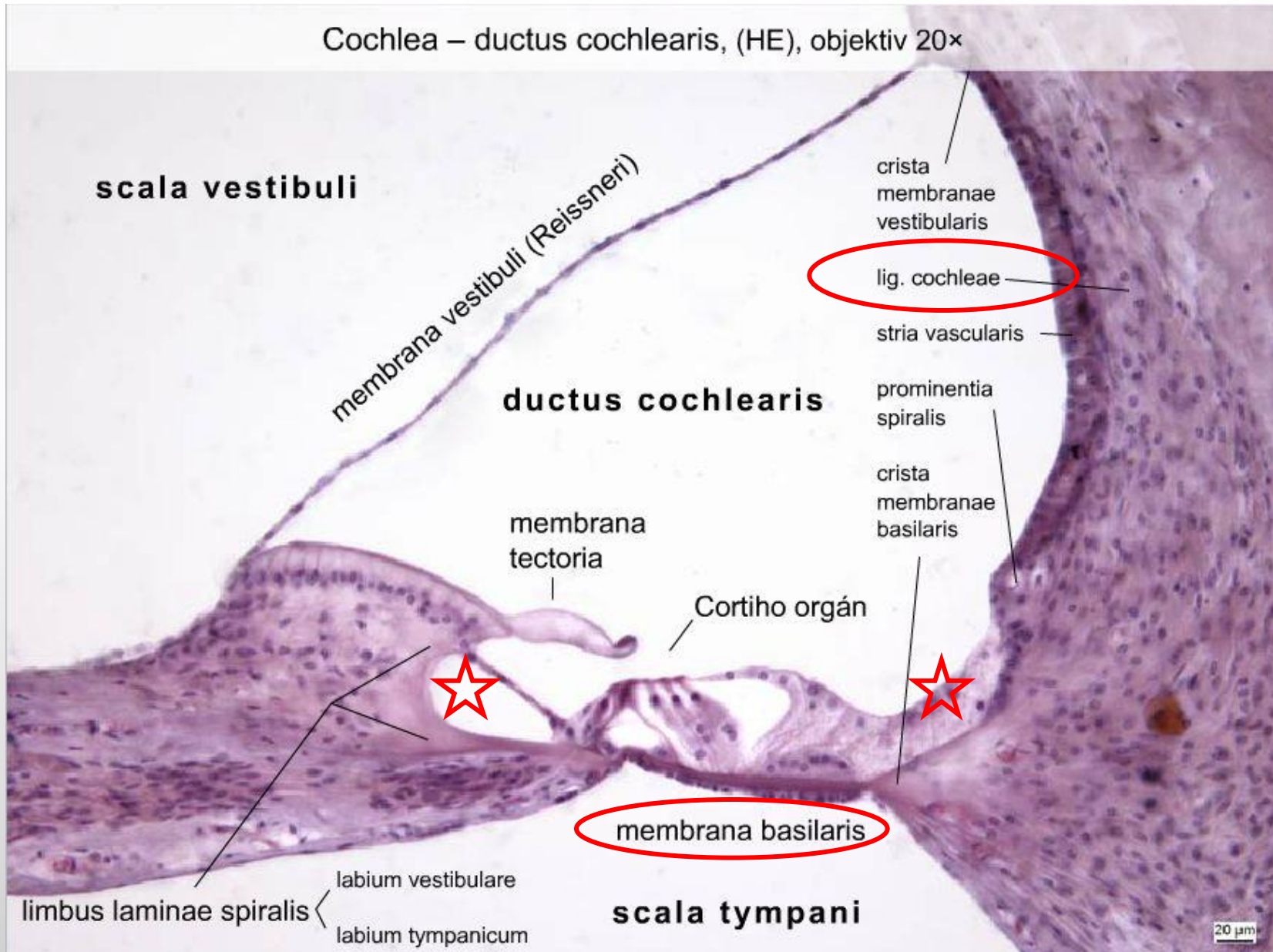
modiolus

lamina spiralis ossea

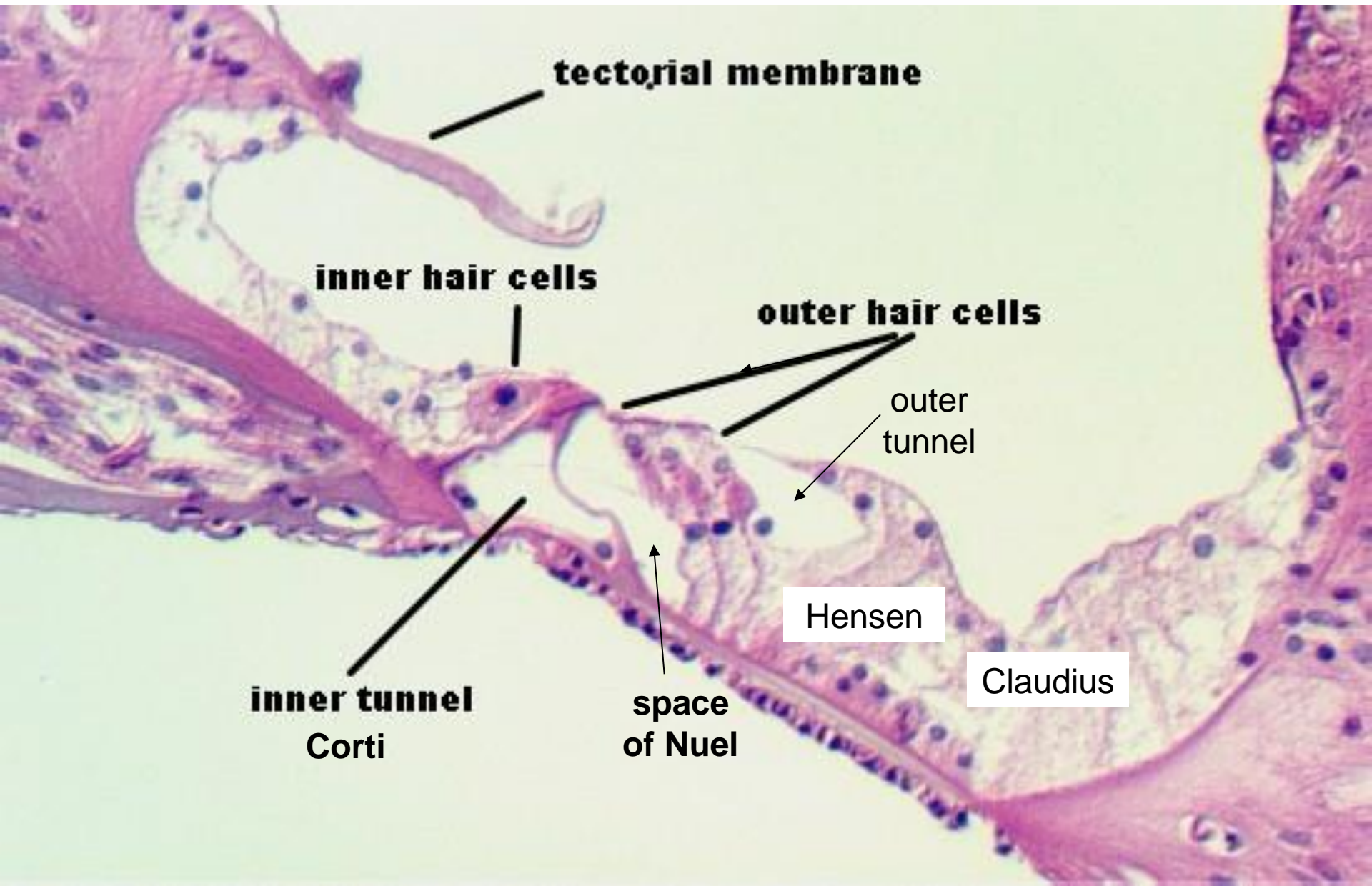
ganglion spirale cochleae

20 μm

Vnitřní ucho – ductus cochlearis



Vnitřní ucho - Cortiho orgán



tectorial membrane

inner hair cells

outer hair cells

outer tunnel

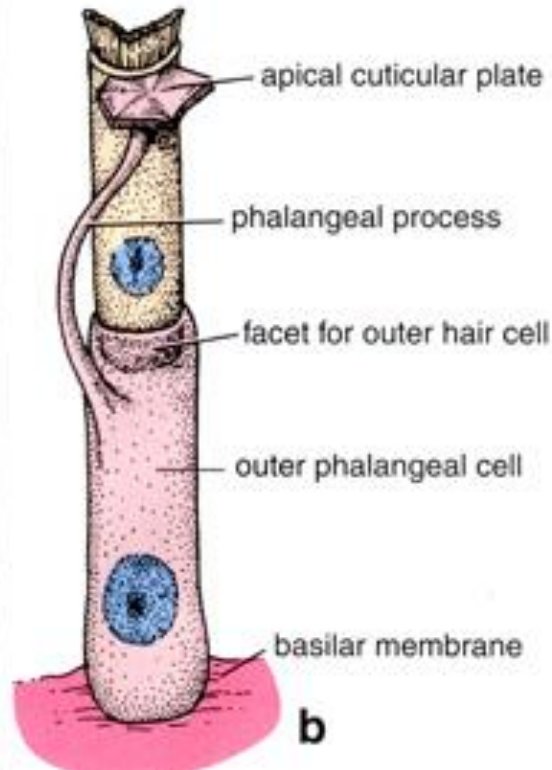
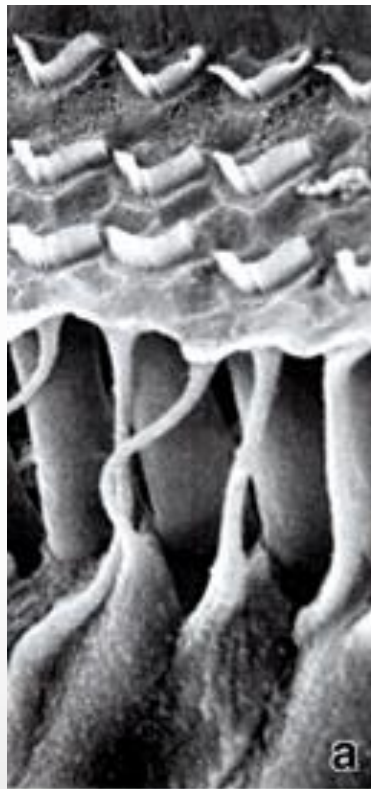
Hensen

Claudius

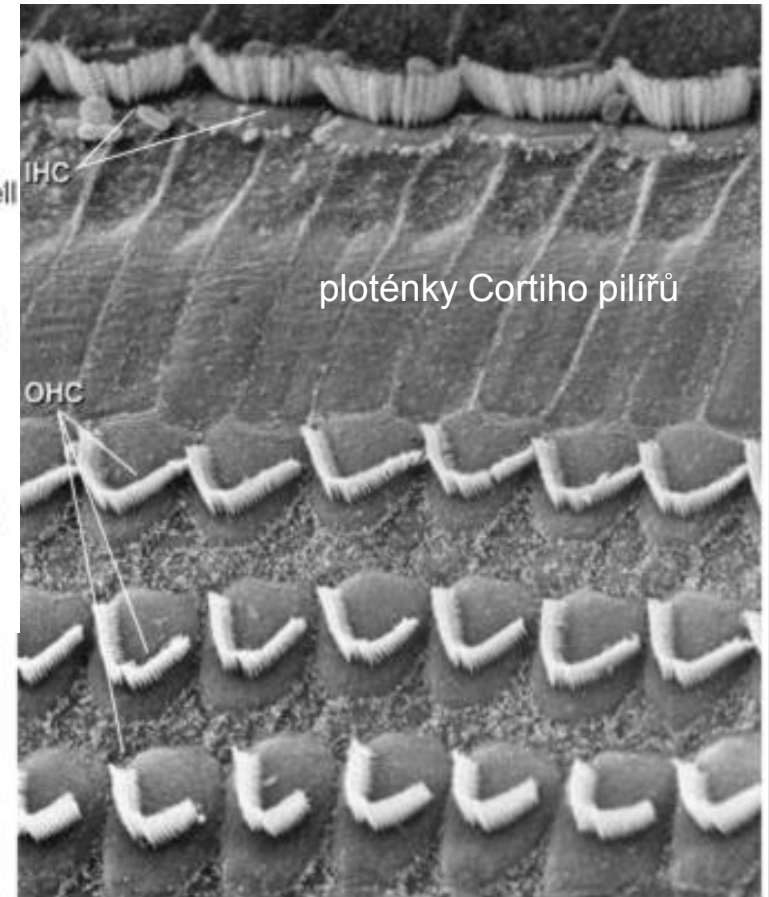
**inner tunnel
Corti**

space
of Nuel

Vnitřní ucho - Cortiho orgán – vláskové a falangové buňky



1 řada



3-5 řad

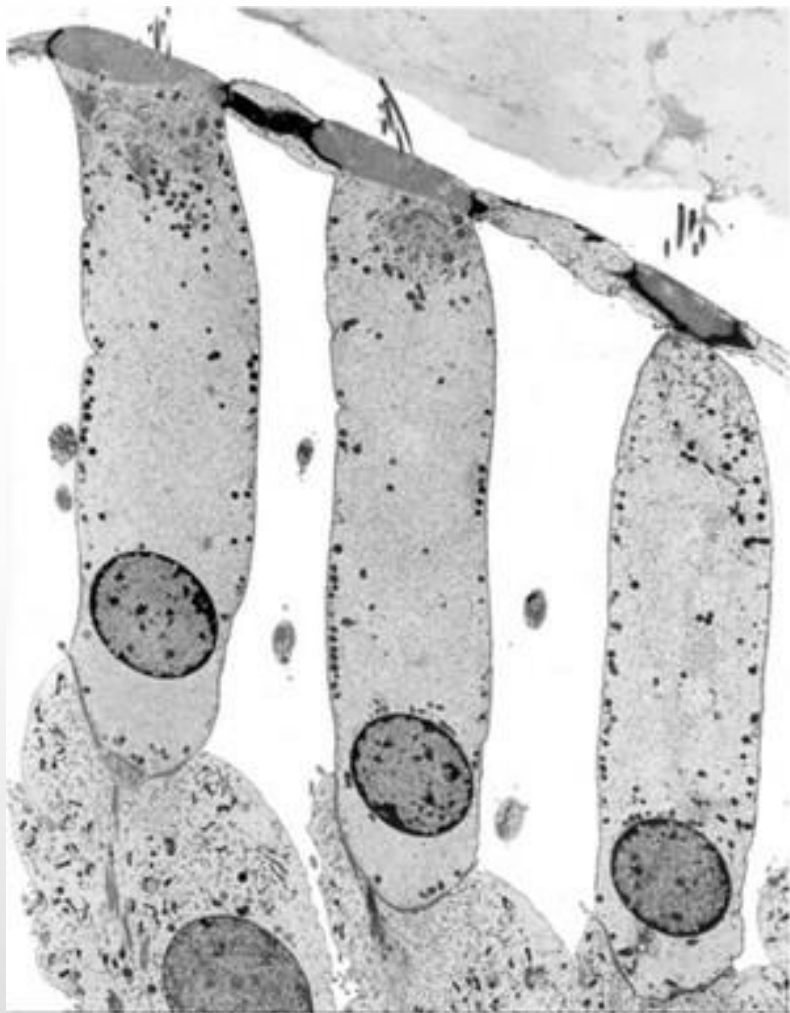
vlásky = stereocilie

3 500 vnitřních vláskových buněk

12 000 zevních vláskových buněk

membrana reticularis

Vnitřní ucho - Cortiho orgán – vláskové a falangové buňky



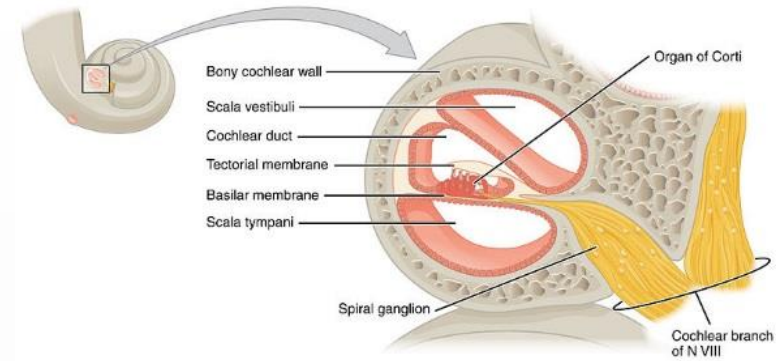
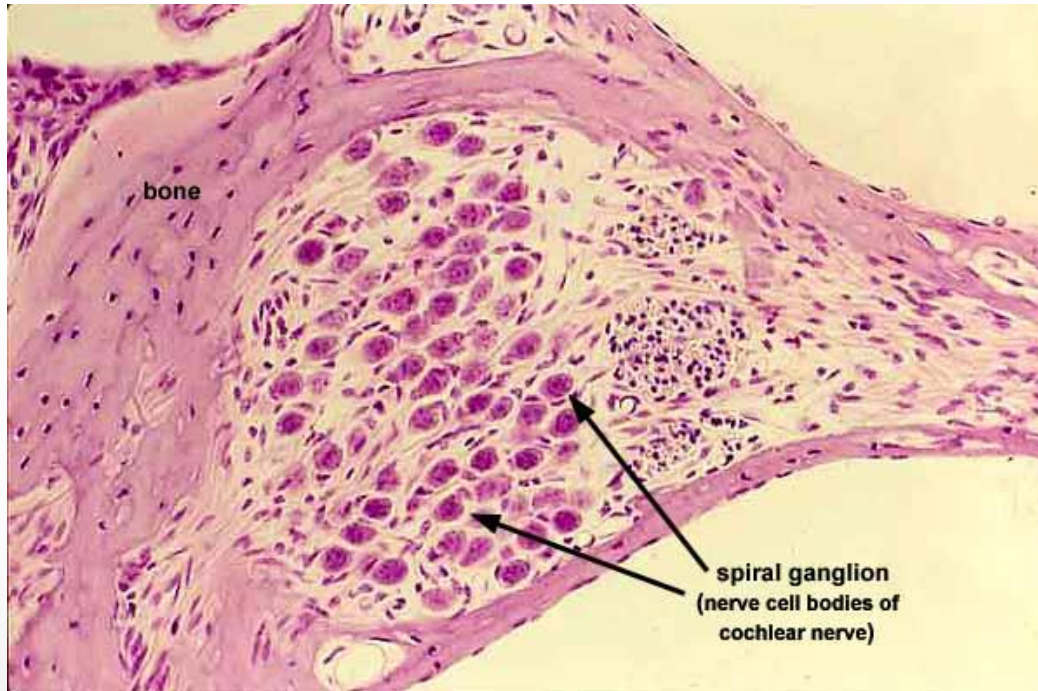
„dancing hair cell“



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

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

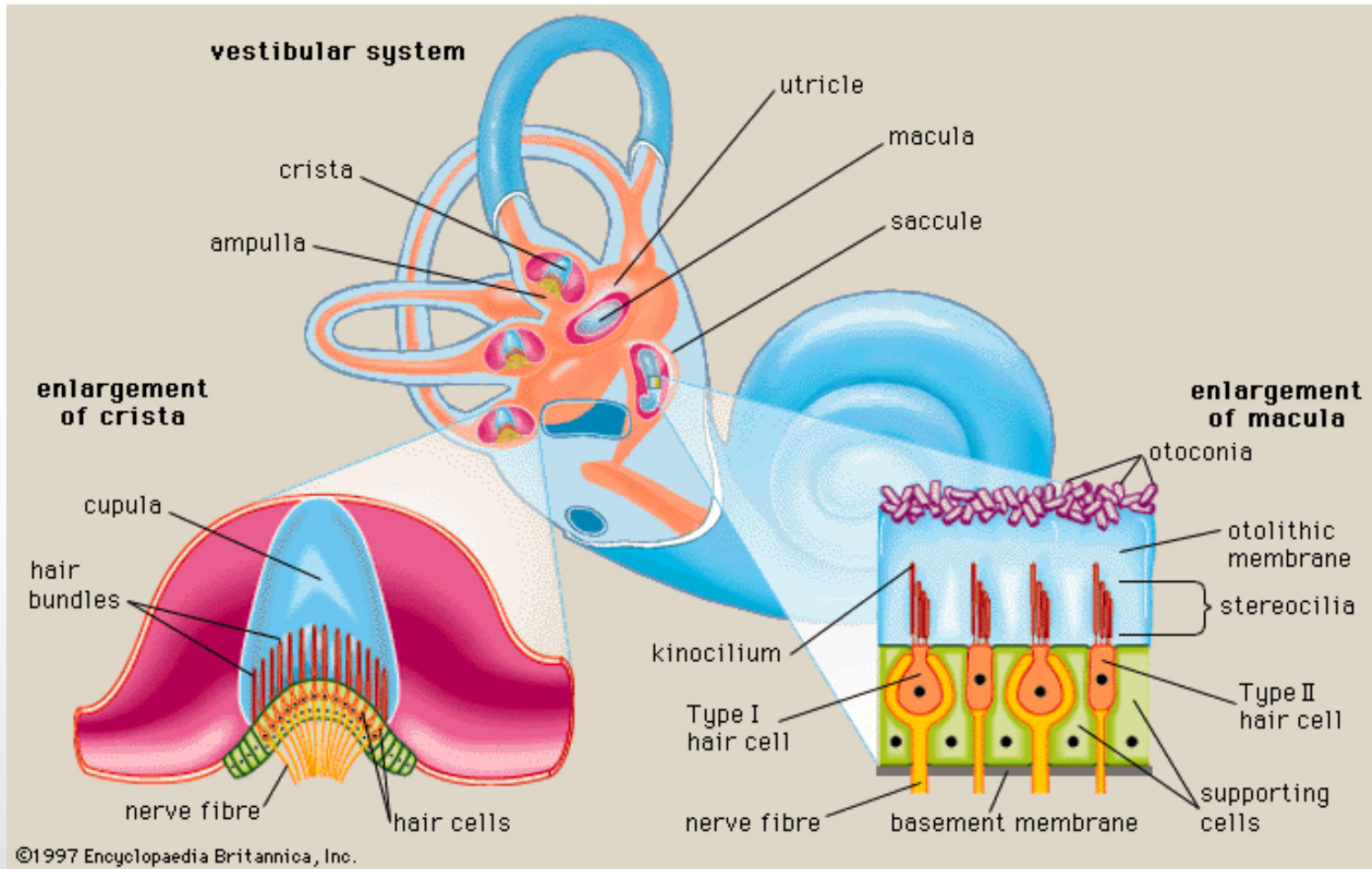
Vnitřní ucho - spirální ganglion



bipolární neurony
- 1. neuron sluchové dráhy

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

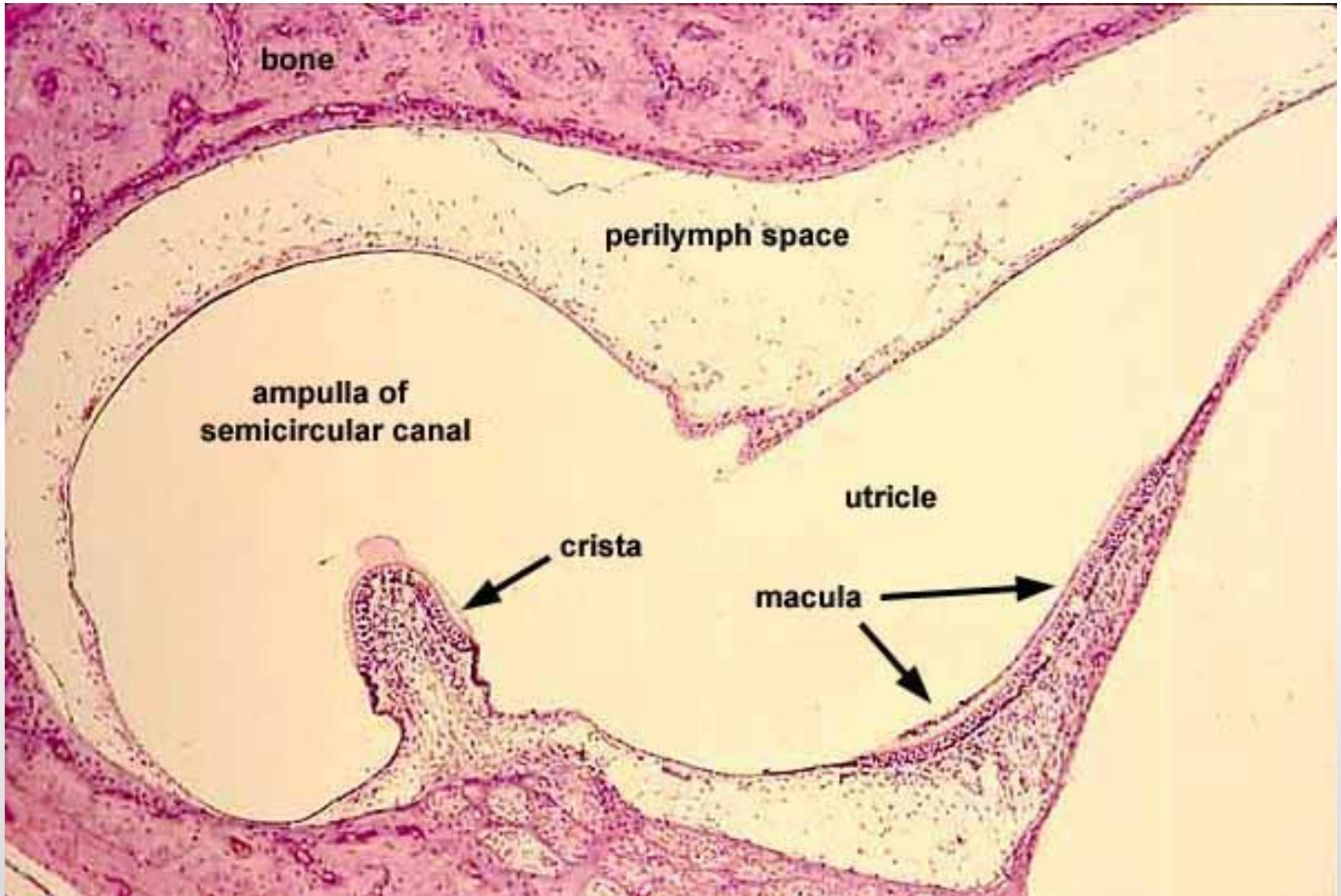
Vnitřní ucho - orgán rovnováhy (pars statica labyrinthi membranacei)



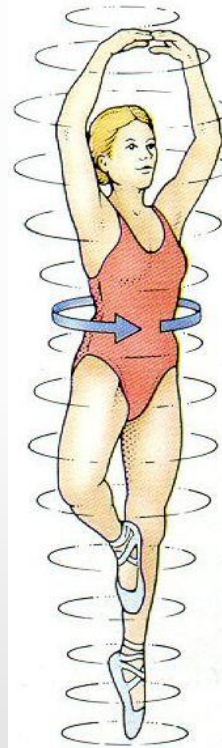
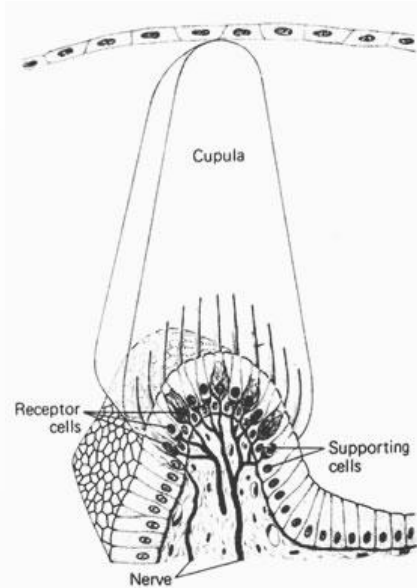
polokruhové kanálky (ductus semicirculares – anterior, posterior a lateralis) – crista ampullaris

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

Vnitřní ucho - orgán rovnováhy

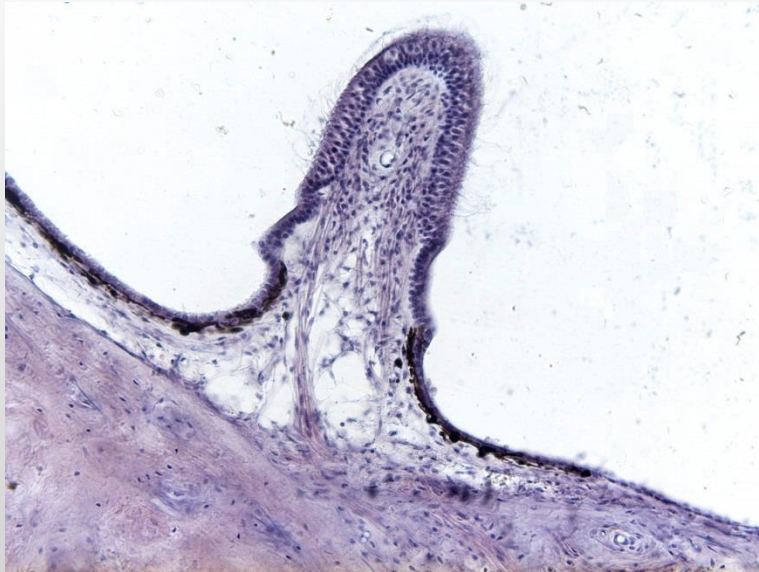
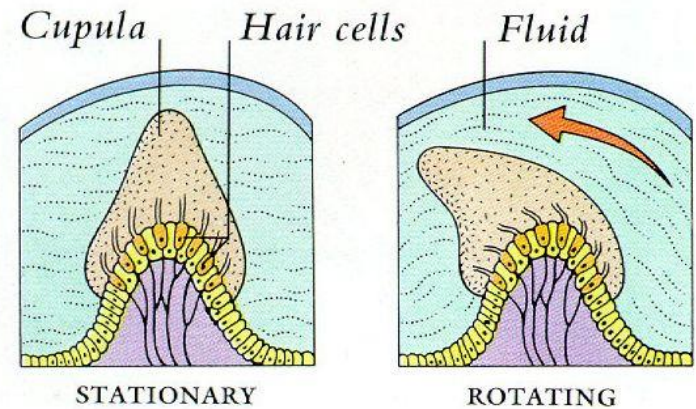


Ductus semicirculares – crista ampullaris

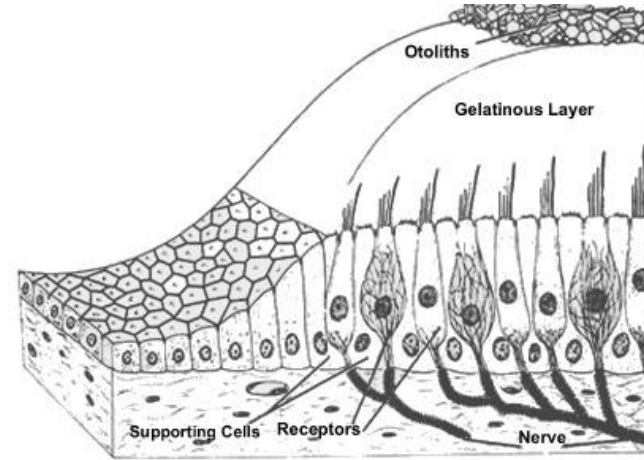
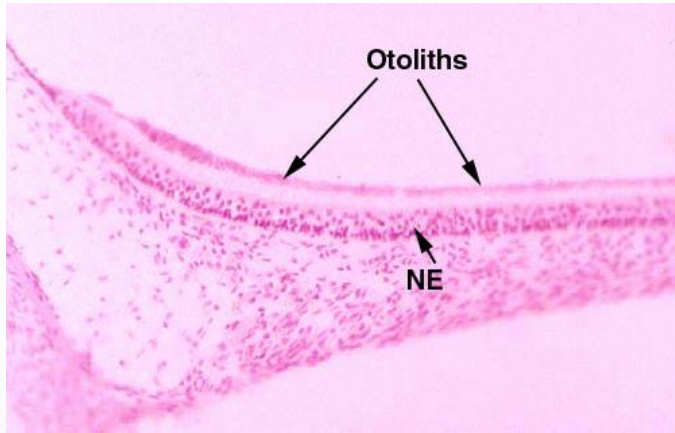


Role of the crista ampullaris

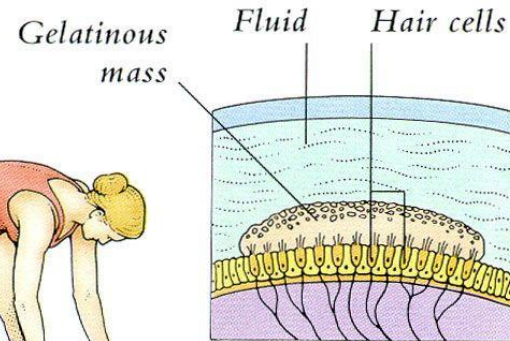
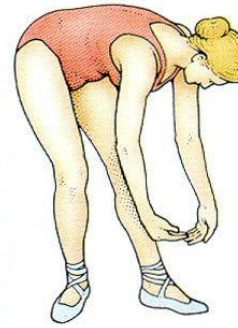
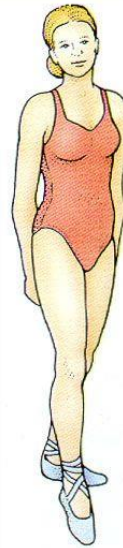
The crista ampullaris responds to rotational movements. The hair cells of each crista are embedded in a conical gelatinous mass, the cupula. When the fluid in the semicircular canals swirls during movement, it displaces the cupula, stimulating the hair cells.



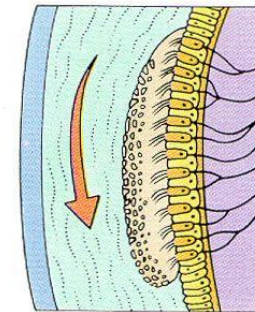
Utriculus a sacculus - macula statica



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