

Basal turn stria in animal model of age related hearing loss (mouse C57BL/6)



Basal Turn

500um

Stria vascularis in an animal model of cytomegalovirus (CMV) infection

Balb/C mice inoculated, postnatal day 3 with murine cytomegalovirus

(right) intra-cerebral injection (2000 pfu in 1 ul)

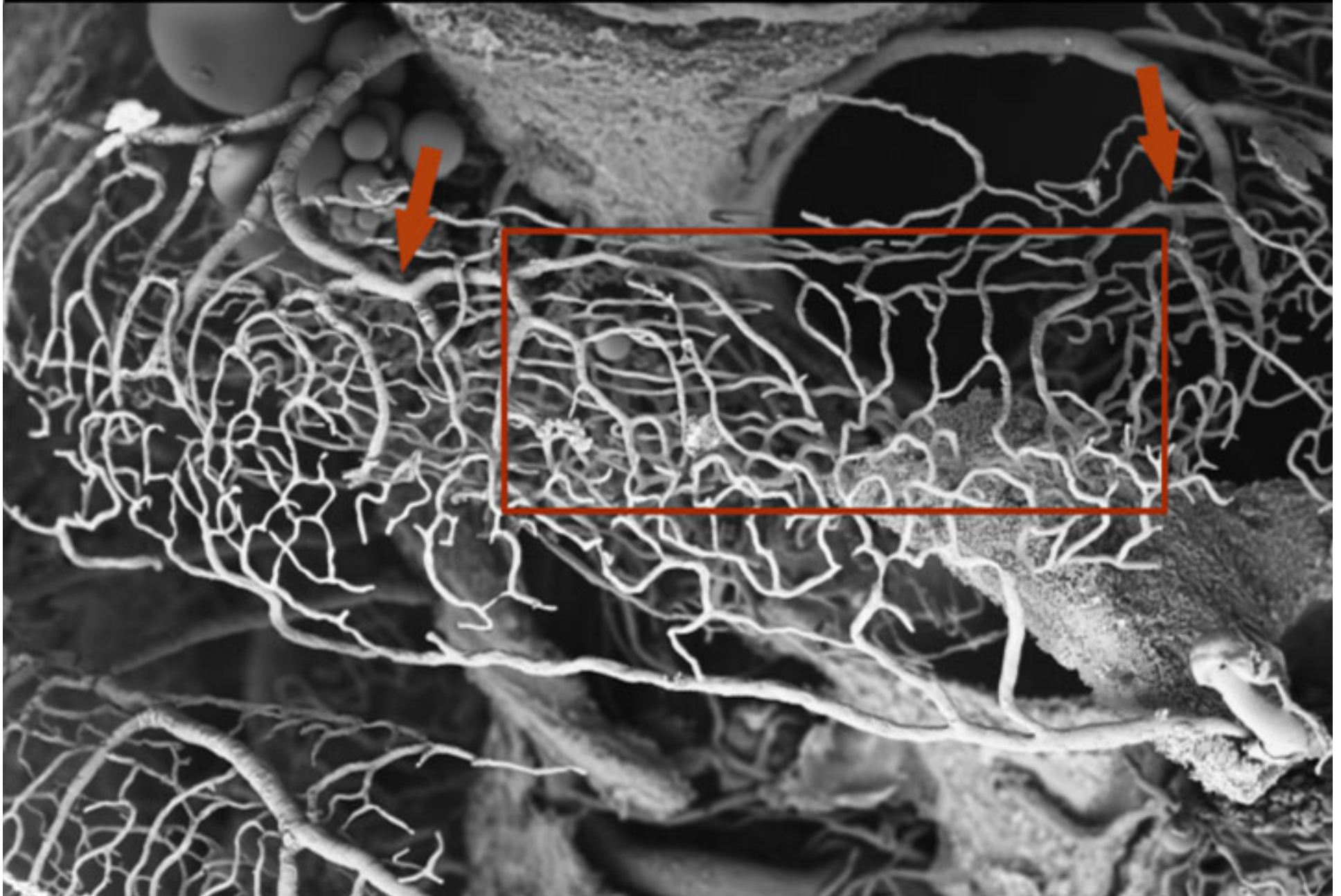
At 4 weeks, auditory function tested with ABR and OAE measurements

At 8 weeks, vascular damage evaluated using corrosion cast and SEM microscopy

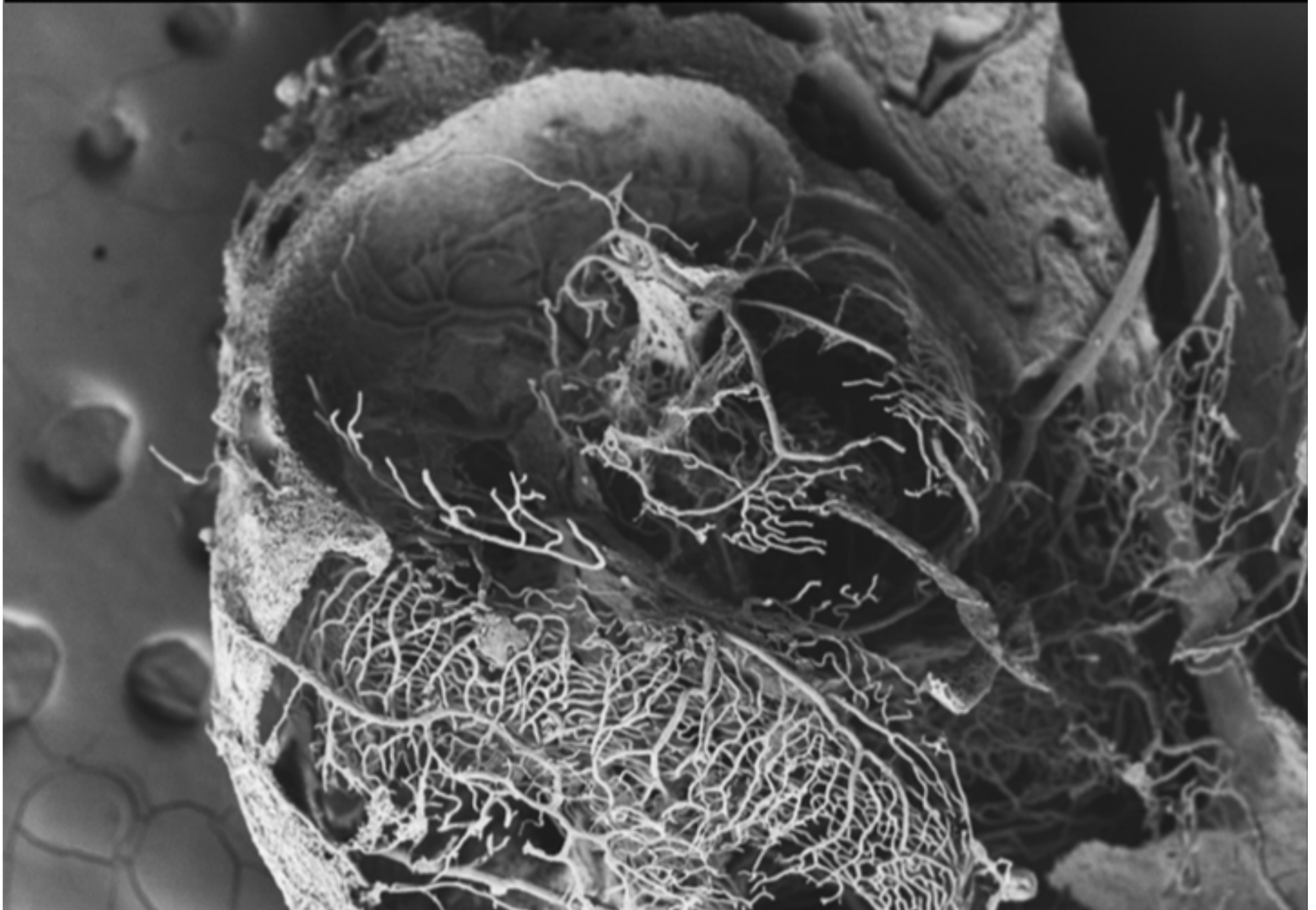


CARRARO M, ALMISHAAL A, HILLAS E, FIRPO M, PARK A, HARRISON RV. (2016) Cytomegalovirus (CMV) infection causes degeneration of cochlear vasculature and hearing loss in a mouse model. Journal of the Association for Research in Otolaryngology (JARO) 2016 Dec 19.

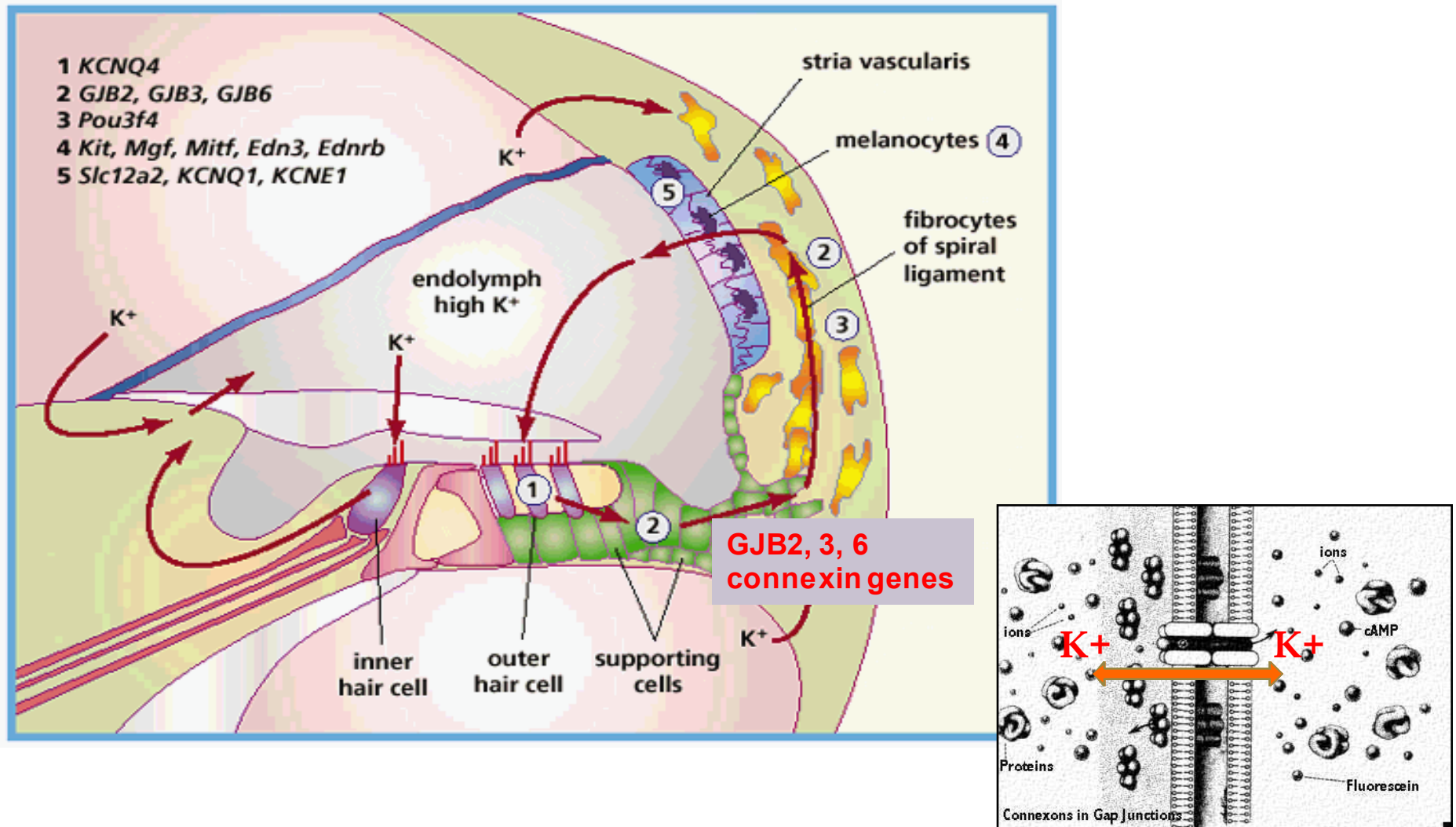
In CMV infection, first affected structure is stria vascularis in cochlear apex



In some subjects CMV infection causes total loss of apical vasculature

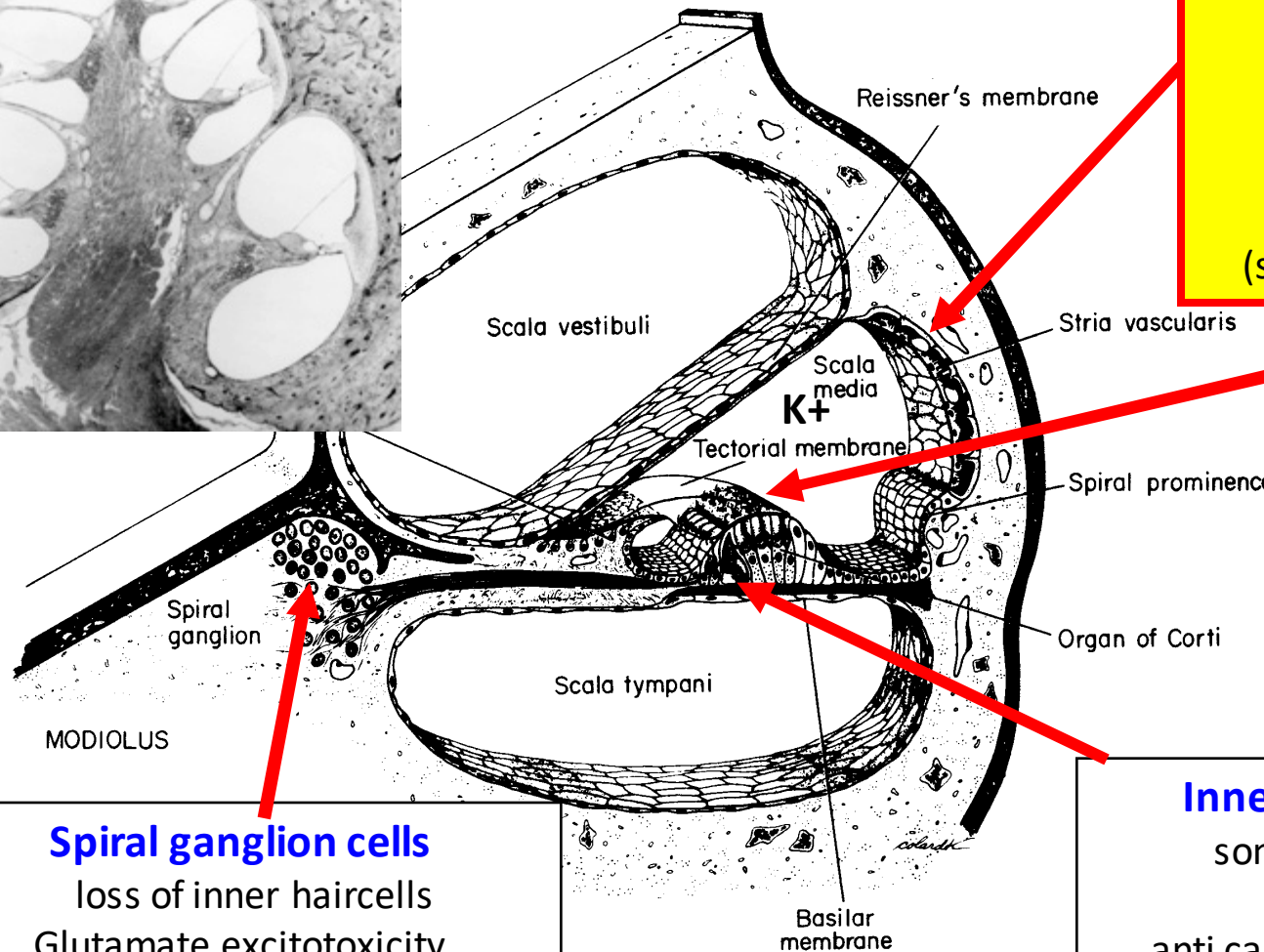
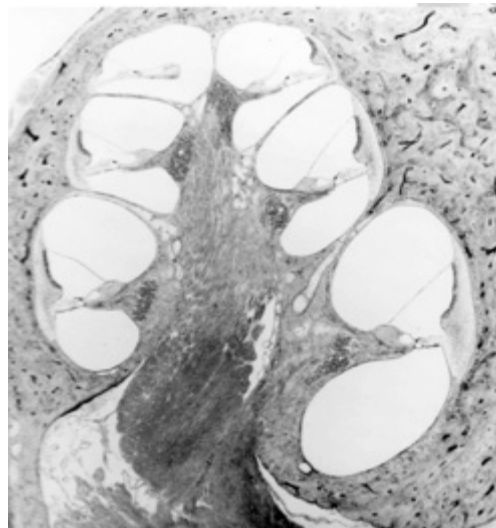


The role of the stria vascularis in connexin gene related hearing loss.



Karen P. Steel, Corné J. Kros 2001. A genetic approach to understanding auditory function. *Nature Genetics* volume 27, pages 143–149 (2001)

Cochlear areas of maximum vulnerability



Stria vascularis
 hypoxia, ischemia
 loop diuretics (Lasix)
 metabolic inhibitors
 old age
 viral infection
 genetic mutation
 (sometimes reversible)

Haircells
 ototoxic drugs
 e.g. aminoglycosides
 old age
 acoustic trauma
 genetic mutation
 (not reversible)

Spiral ganglion cells
 loss of inner haircells
 Glutamate excitotoxicity
 Sensorimotor neuropathy
 Hidden hearing loss?

Inner haircell synapse
 some drugs e.g. aspirin
 chronic hypoxia
 anti cancer drugs – carboplatin
 noise exposure
 (sometimes there is recovery)

Take home message #1

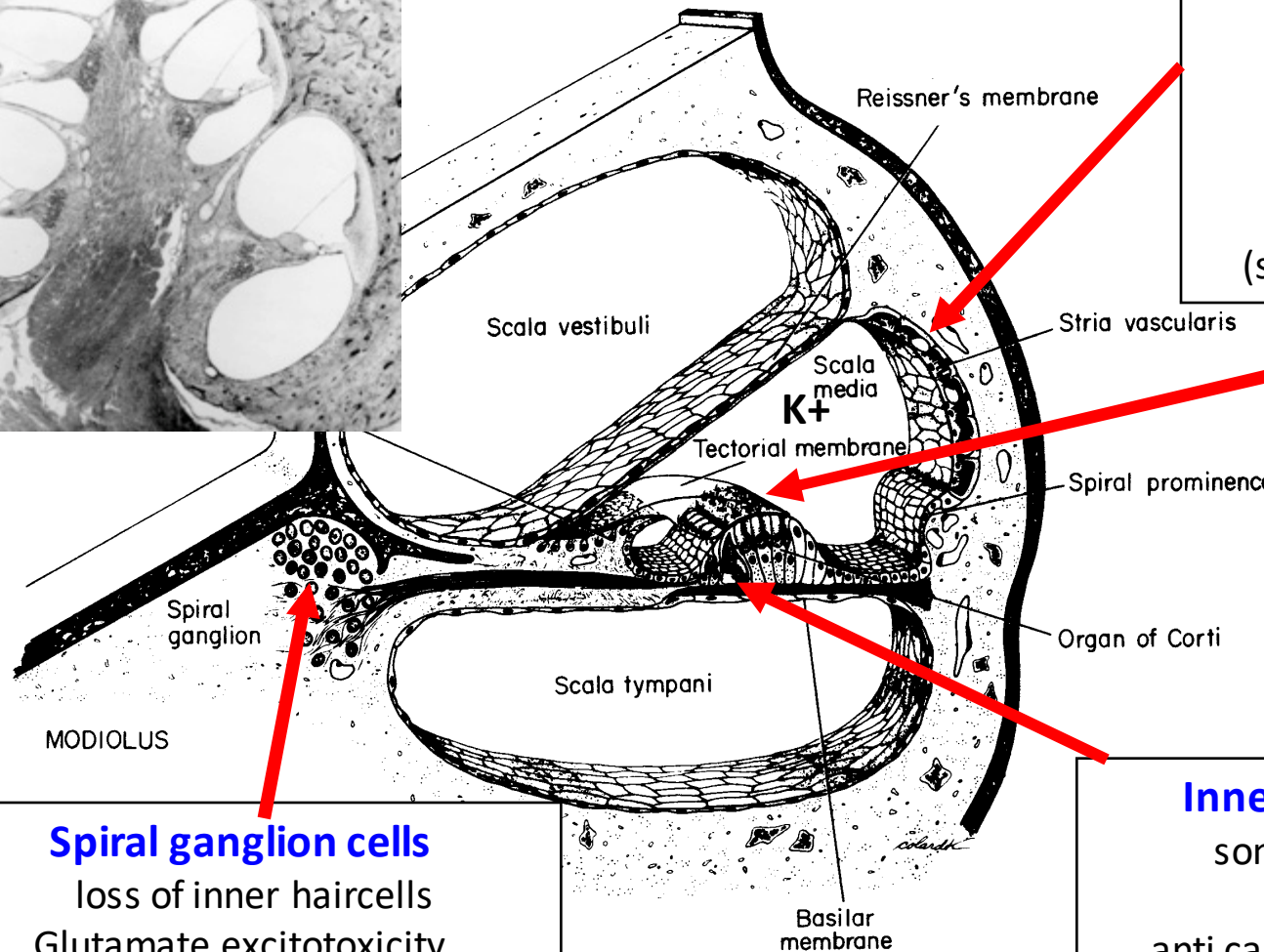
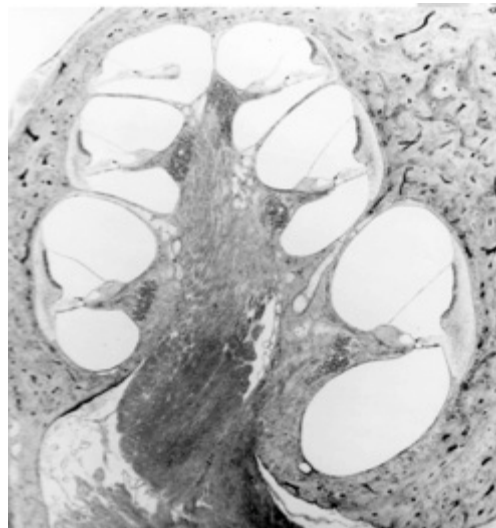
In many forms of sensorineural hearing loss the stria vascularis is the initial/primary site of lesion.

(e.g. loop diuretics, hypoxia/anoxia, presbycusis, CMV infection, connexin gene mutation)

Patterns and site of vascular damage can differ.

Why not define a sub-class of “strial SNHL”?

Cochlear areas of maximum vulnerability



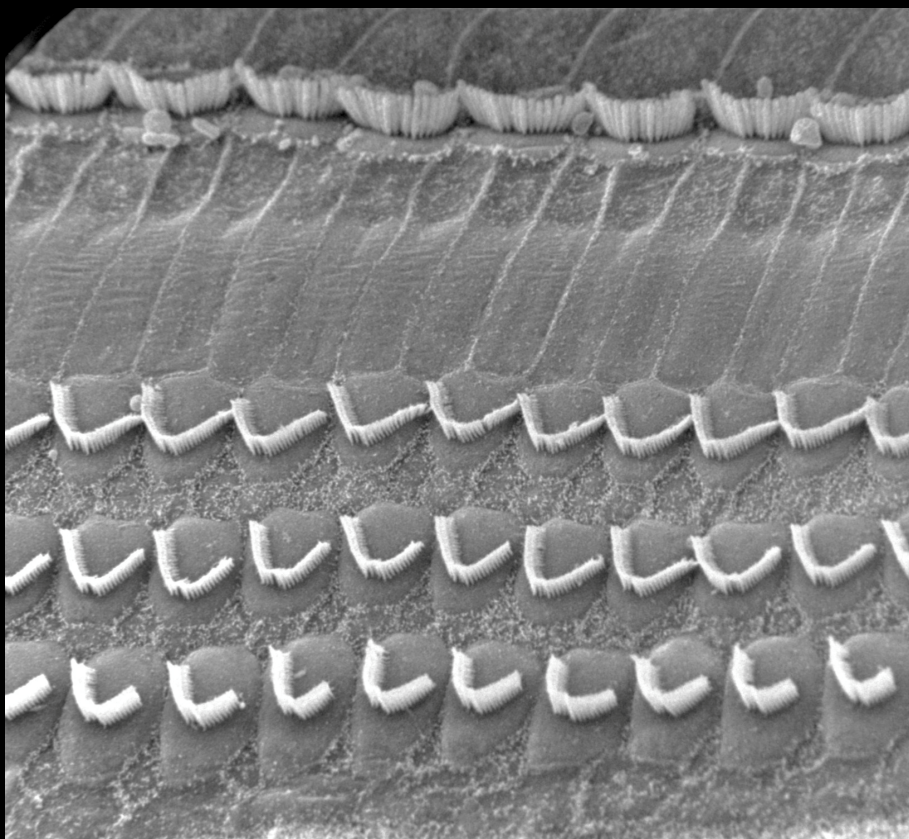
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There are many “patterns” of haircell damage



No damage



Total loss of haircells

Outer haircell loss caused by aminoglycosides (amikacin; chinchilla model)

