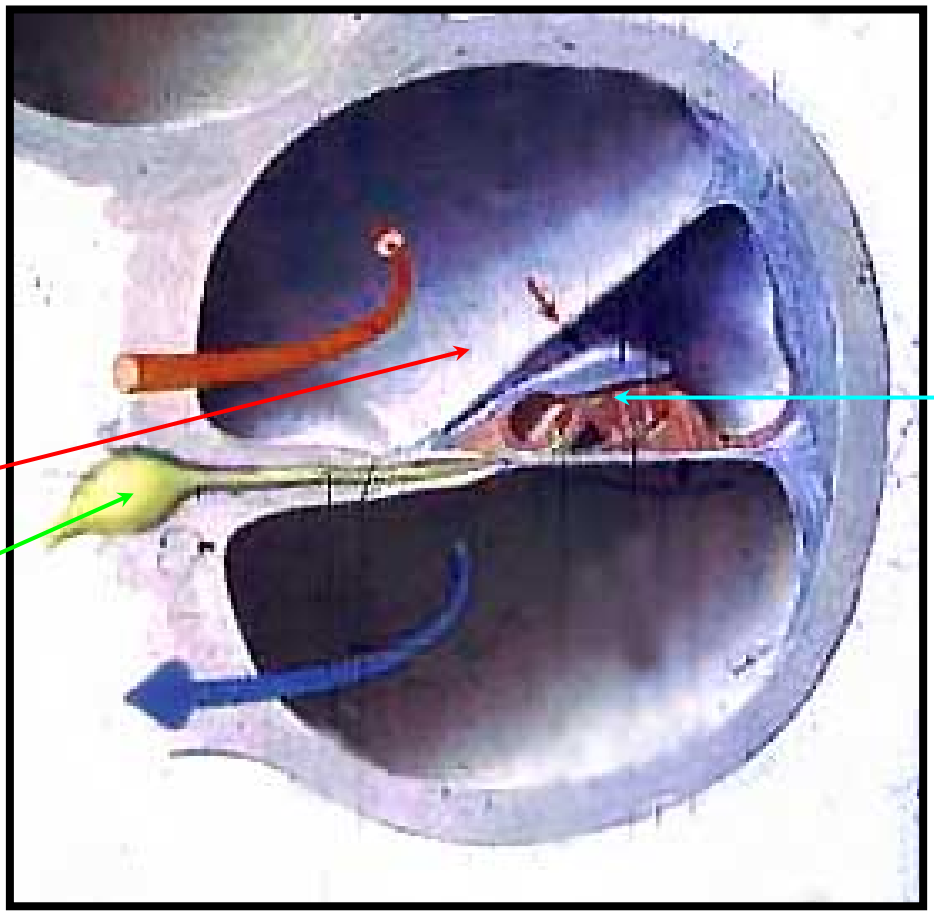
Cross-Sectional/Cut-Away View of One Portion of the Human Cochlea:



The human ear has *two* rows of hair cells in the Organ of Corti, which generate electrical signals in response to pressure signals in the perilymph fluid along the basilar membrane.

The primary function of the *inner* row of ~ 4000 hair cells is to generate the electrical signals sent to the brain via the auditory nerve.

The *outer* triple-row of ~ 12,000 chevron-shaped hair cells function as biological amplifiers, boosting the sensitivity level of the human ear by ~ 40 *dB*!

Note that:

$40\,dB = 10\log_{10}(G_s) \;\Rightarrow\; \log_{10}(G_s) = 40/10 = 4 \;\Rightarrow\; G_s = 10^4 = 10,000\,.$

i.e. 40 *dB* corresponds to a signal gain $G_s = S_{out}/S_{in} = 10,000\times$!!!