



# **Dangerous Decibels: Hear for life**

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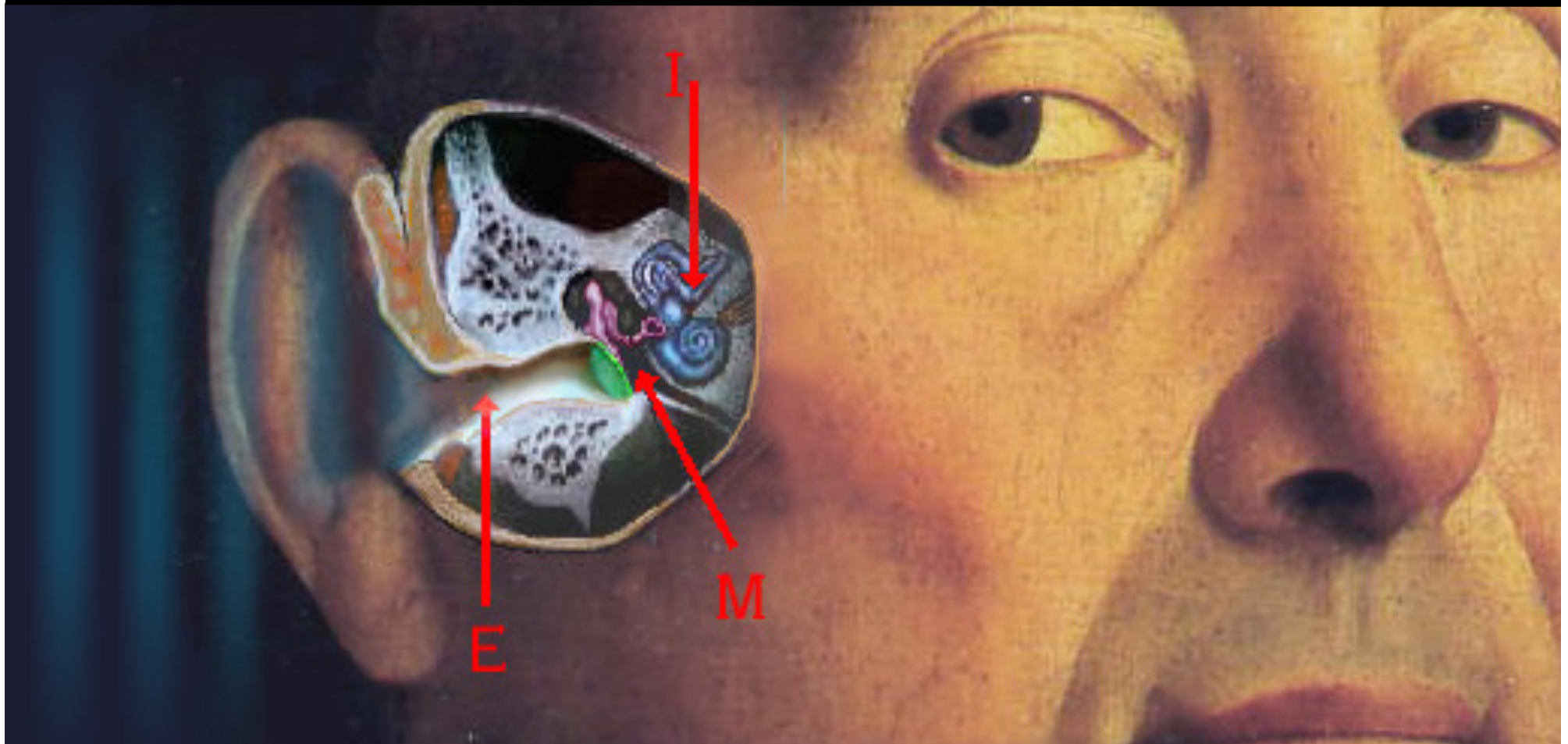
What is sound?

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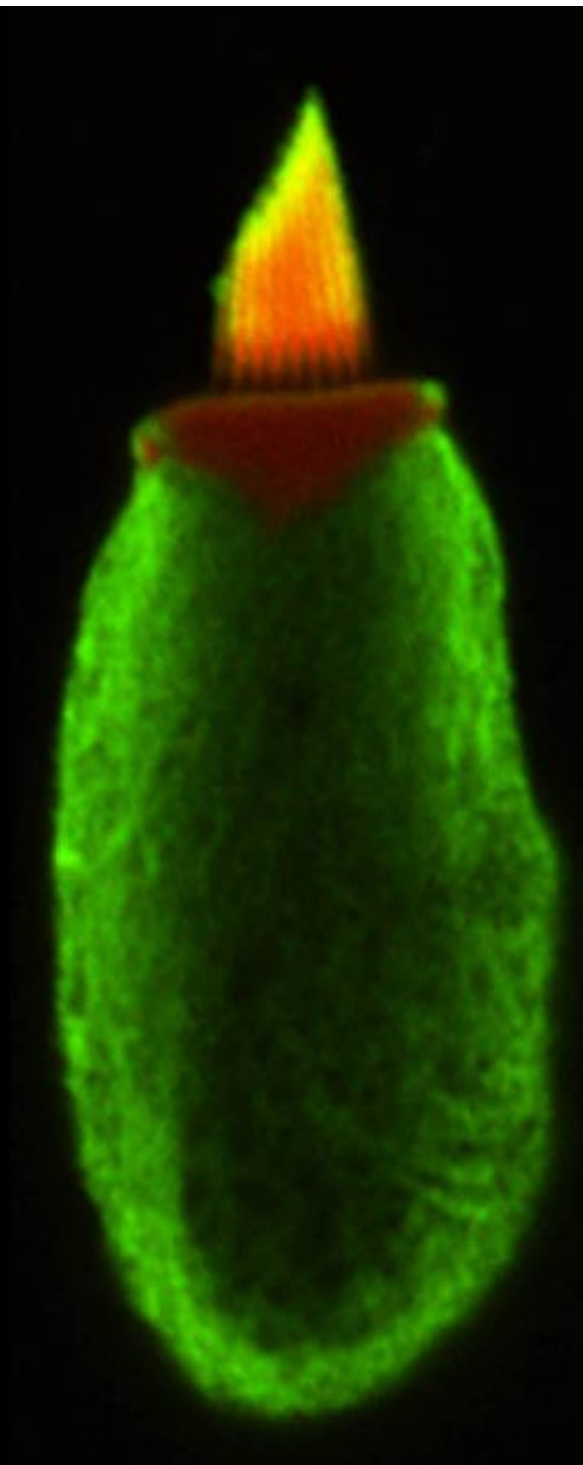
**SOUND HAS POWER**



How do we hear?



F. Mammano & R. Nobili



P. Gillespie & J. Cyr  
Oregon Hearing Research Center

## Science fact

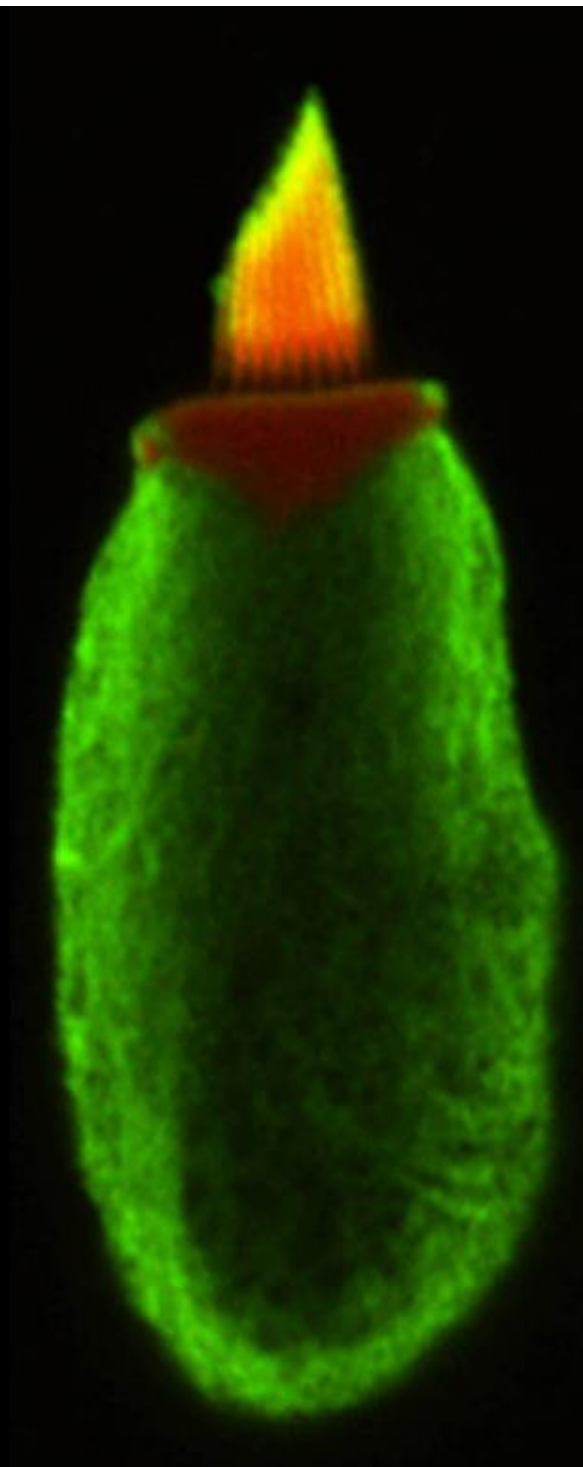
- There are about 18,000 hair cells in each human ear
- All 18,000 would fit on the head of a pin



10,000

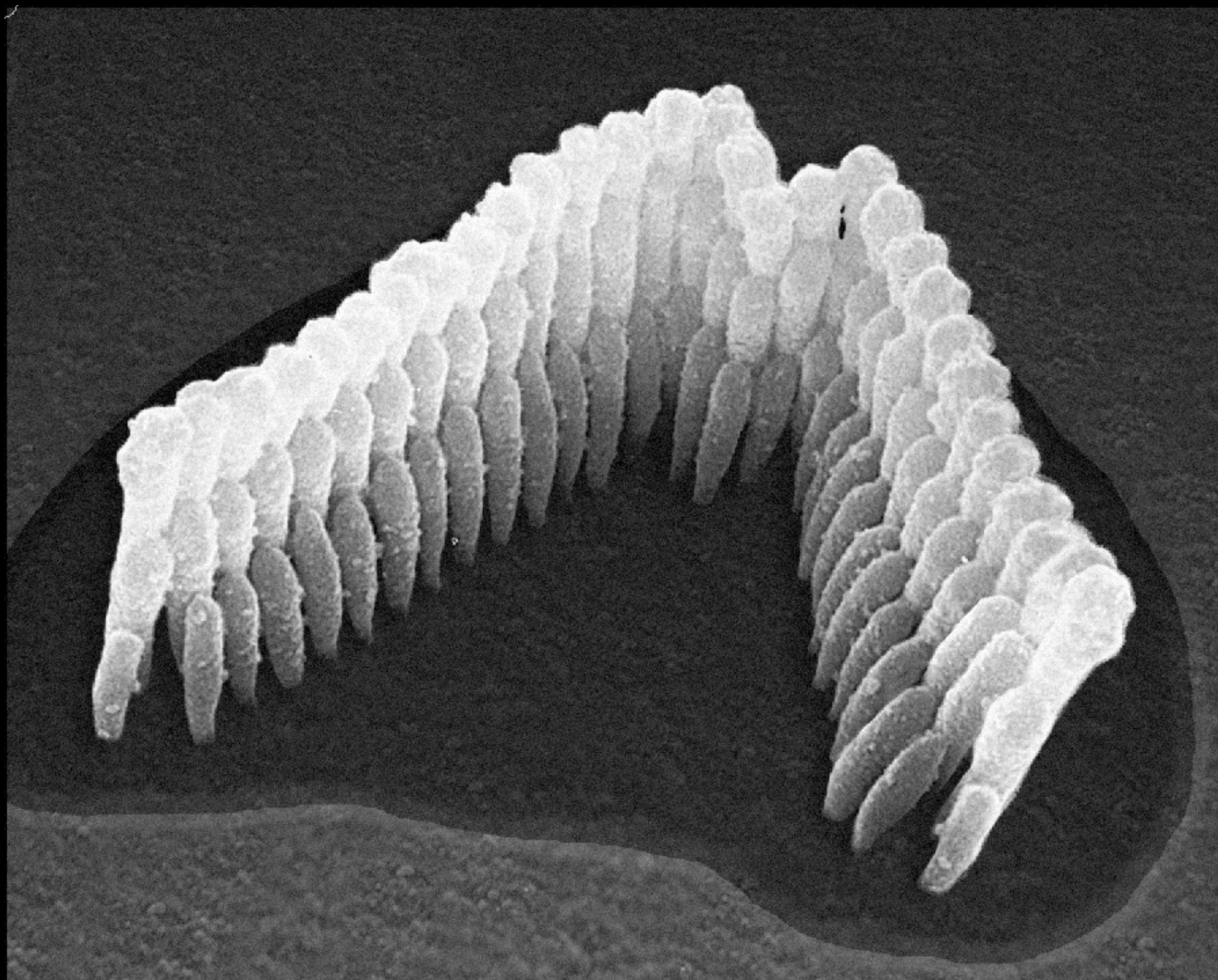


How do our ears break?

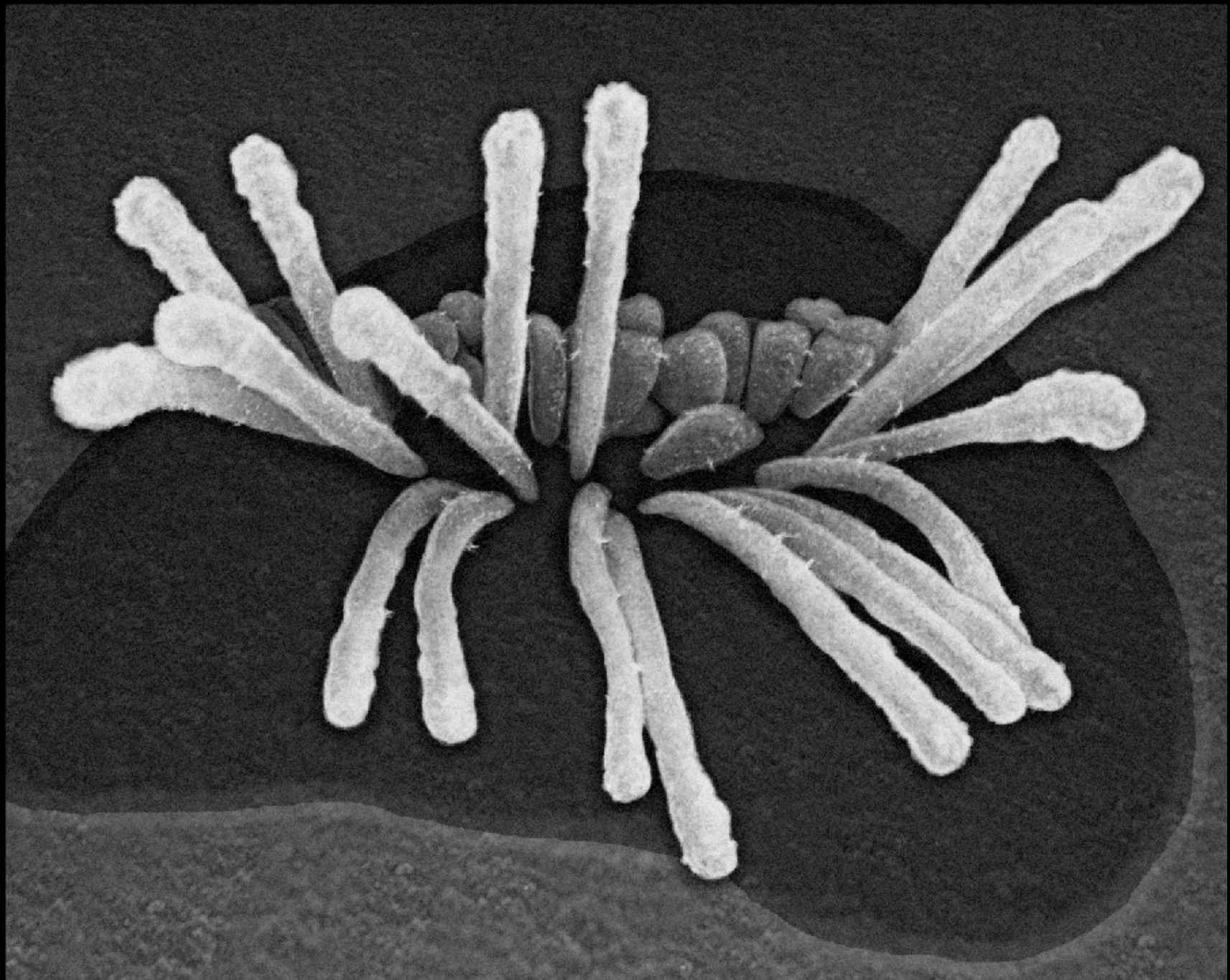


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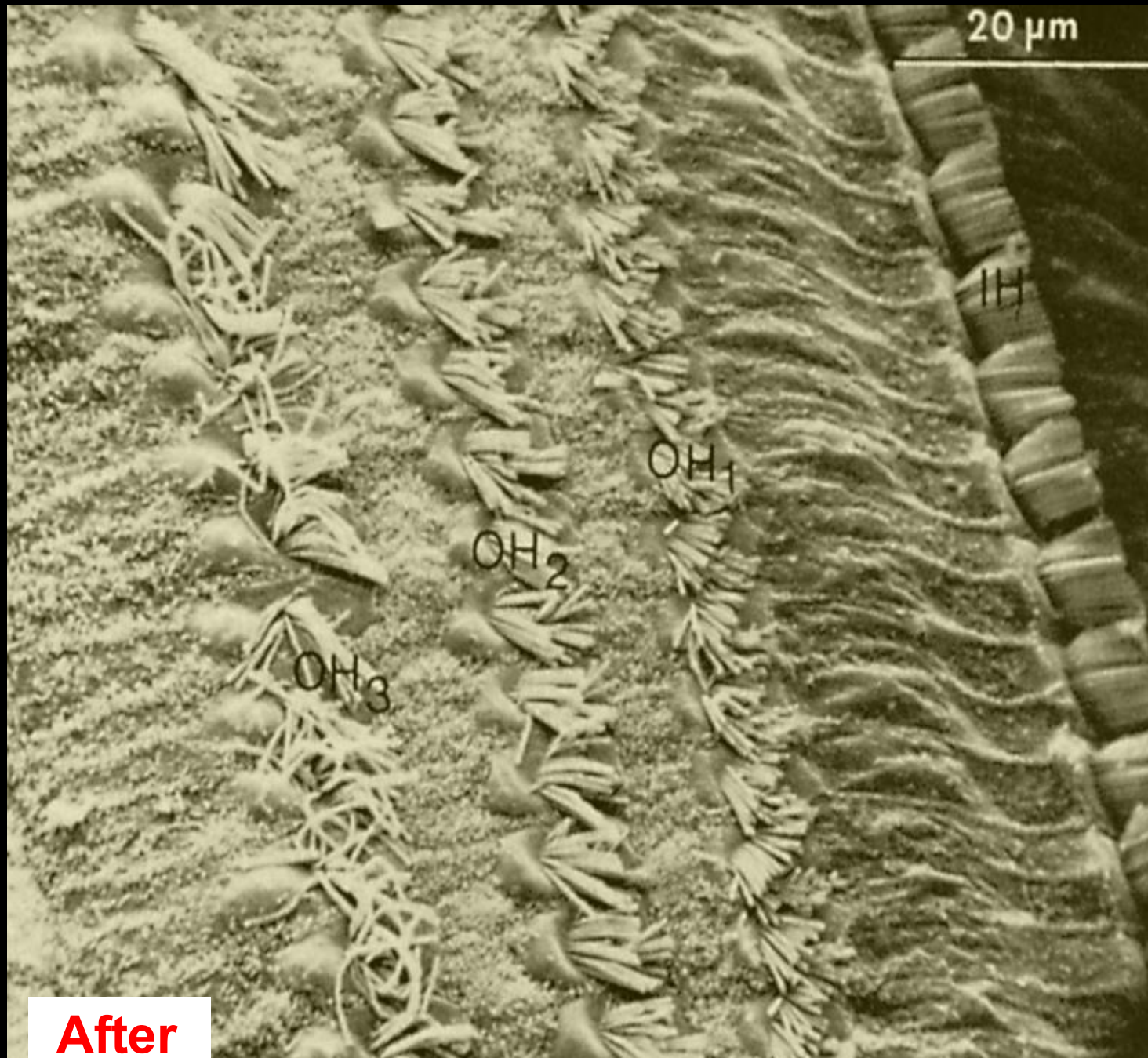






Before





**After**

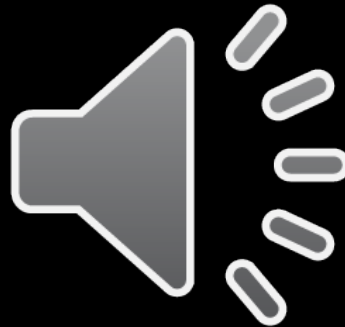
# What's that sound?

- Hearing loss and tinnitus

What does hearing loss sound like?



What does tinnitus sound like?



How loud is too loud?

How do our ears break?

**SOUND POWER + TIME  
= DAMAGE**

85 dBA  
for  
8 hours

**National  
Institute  
for Occupational  
Safety  
and Health**

**Recommended  
Exposure  
Limits**

130 dB	< 1 sec
125 dB	3 sec
120 dB	9 sec
110 dB	1.5 min
103 dB	7.5 min
100 dB	15 min
97 dB	30 min
94 dB	1 hr
91 dB	2 hrs
88 dB	4 hrs
<b>85 dB</b>	<b>8 hrs</b>

# Normal Conversation



65 dBA      unlimited



# Washing Machine

A photograph of a white front-loading washing machine with a yellowish-tan top and bottom trim. It is situated in a laundry room with red brick walls and brown square floor tiles. To the left of the machine is a white pedestal sink with a chrome faucet. A long-handled mop bucket with a grey mop head is leaning against the wall next to the sink. A power outlet is visible on the wall above the machine. To the right, there is a brick wall with a black metal railing. The text 'Washing Machine' is overlaid in white at the top, and '75 dBA unlimited' is overlaid in white at the bottom.

75 dBA      unlimited



# Penang traffic



85 dBA

8 hours



# Penang Video Arcades



90 dBA



2 hours 30 minutes

# Power Tools

100 dBA    15 minutes





# Riding a motorcycle



100 dBA

15 minutes



# Dragon Dance



105 dBA

< 5 minutes



# Penang construction



110 dBA

2 minutes

# F1 Racing

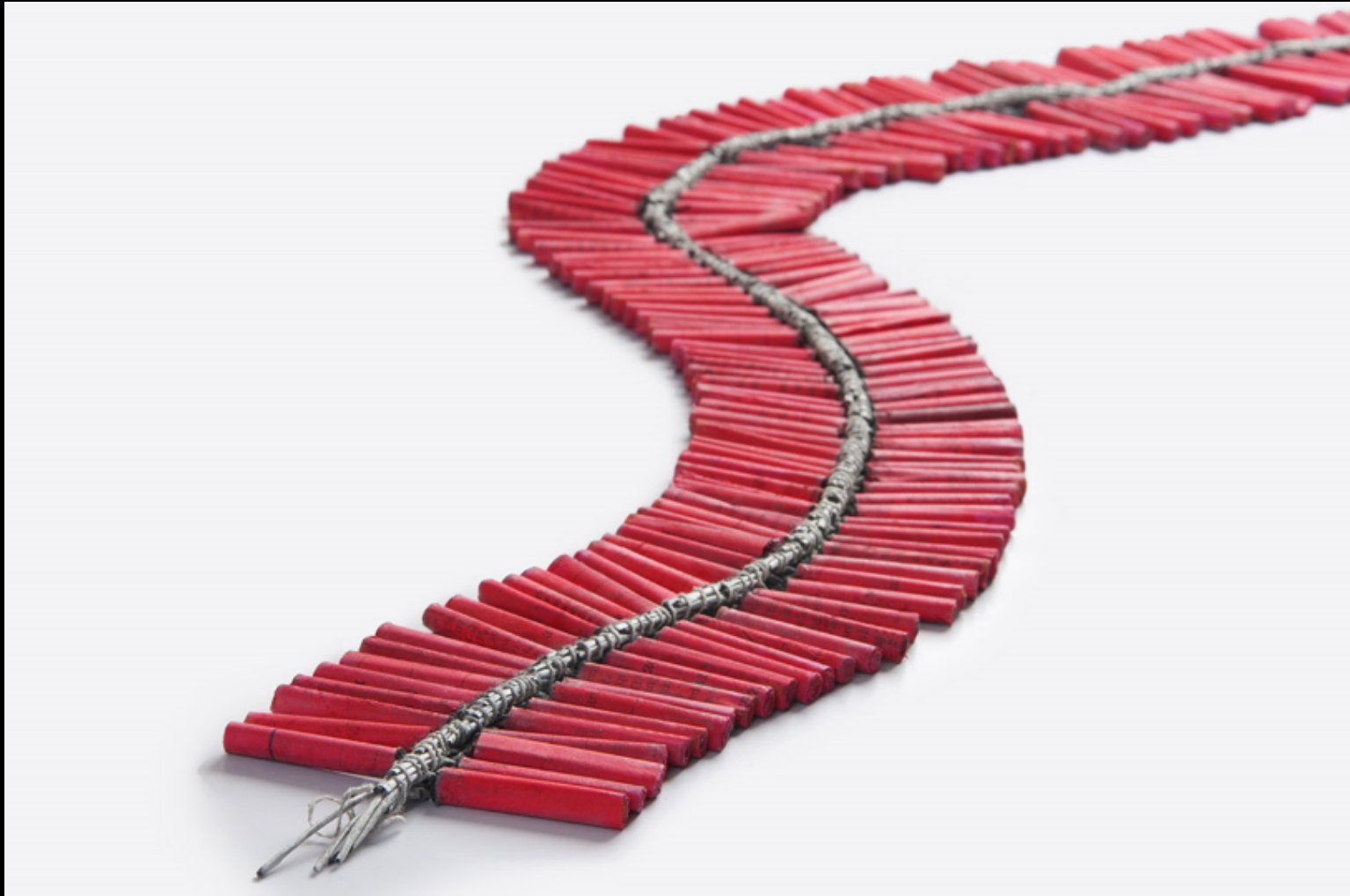


134 dBA  
near the car  
Instant damage

105 -115 dBA  
in the stands  
As quickly as 28 seconds



# Firecrackers



135 dB peak SPL

immediate damage

# Penang Gun Clubs



Kelab Menembak Pulau Pinang.



Penang Rifle Club

804, Mukim 16, Waterfall Road, Penang, Malaysia.



140-173 dB Peak SPL

instant damage



**LOUDER IS BETTER**



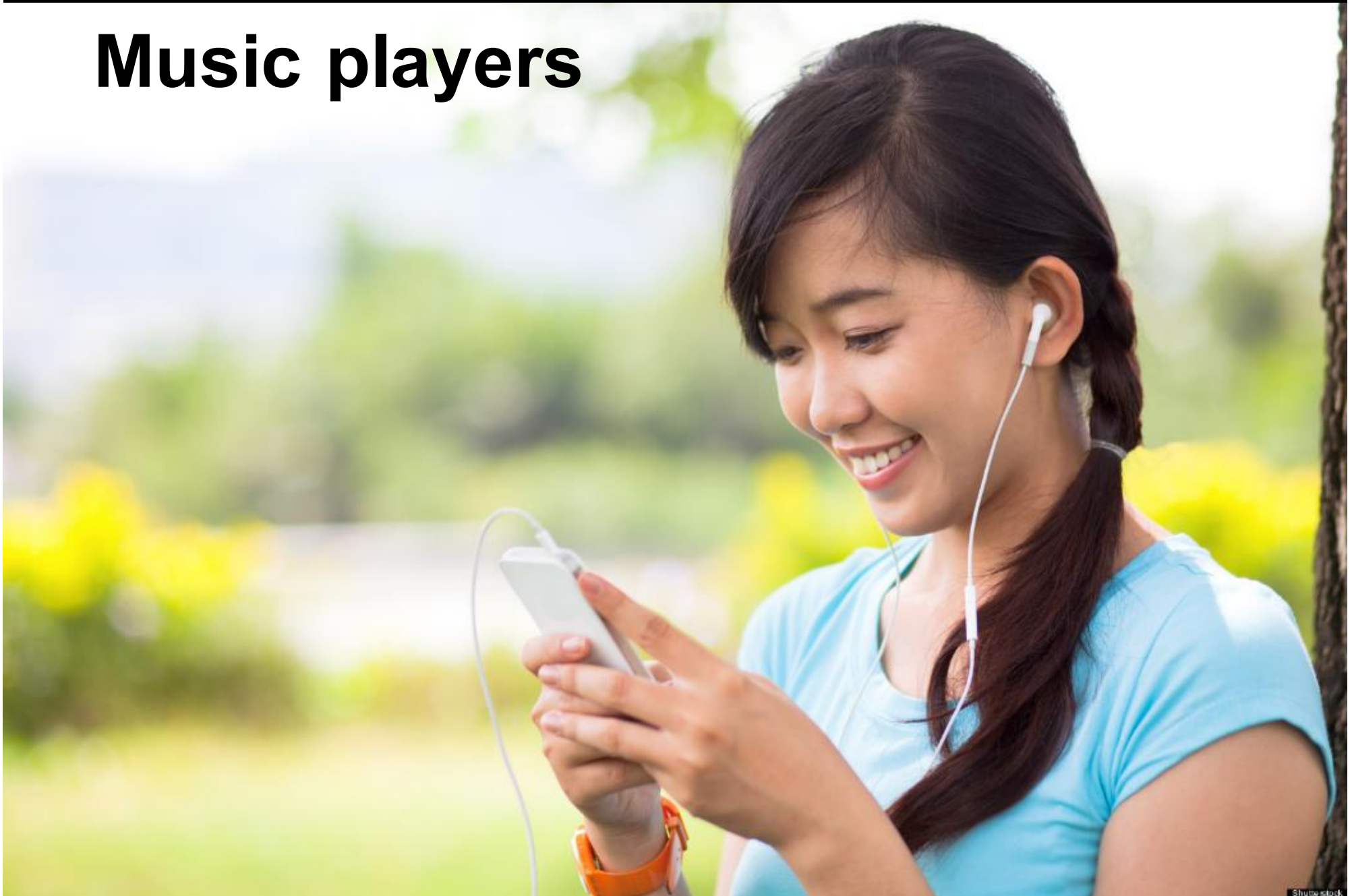
# Penang Jazz Festival



97 dBA

30 minutes

# Music players





# Music player

100 dBA  
15 minutes  
at 100% volume





How do we protect our ears?

**Turn It  
Down**



## Rules of thumb:

- For a given setting:
  - If you have to raise your voice to be understood, it's probably too loud
- When using headphones:
  - 80:90 Rule 80% volume for 90 minutes per day



# Walk Away



Sound pressure is cut in half (- 6 dB) when you double the distance from the sound



**Protect  
Your Ears**





Ear muffs



Ear plugs

How can I protect my ears  
and still enjoy the music?

# Musician's ear plugs







**Dangerous Decibels™**

**[www.dangerousdecibels.org](http://www.dangerousdecibels.org)**