

Cochlear Implants

When a hearing aid is no longer enough



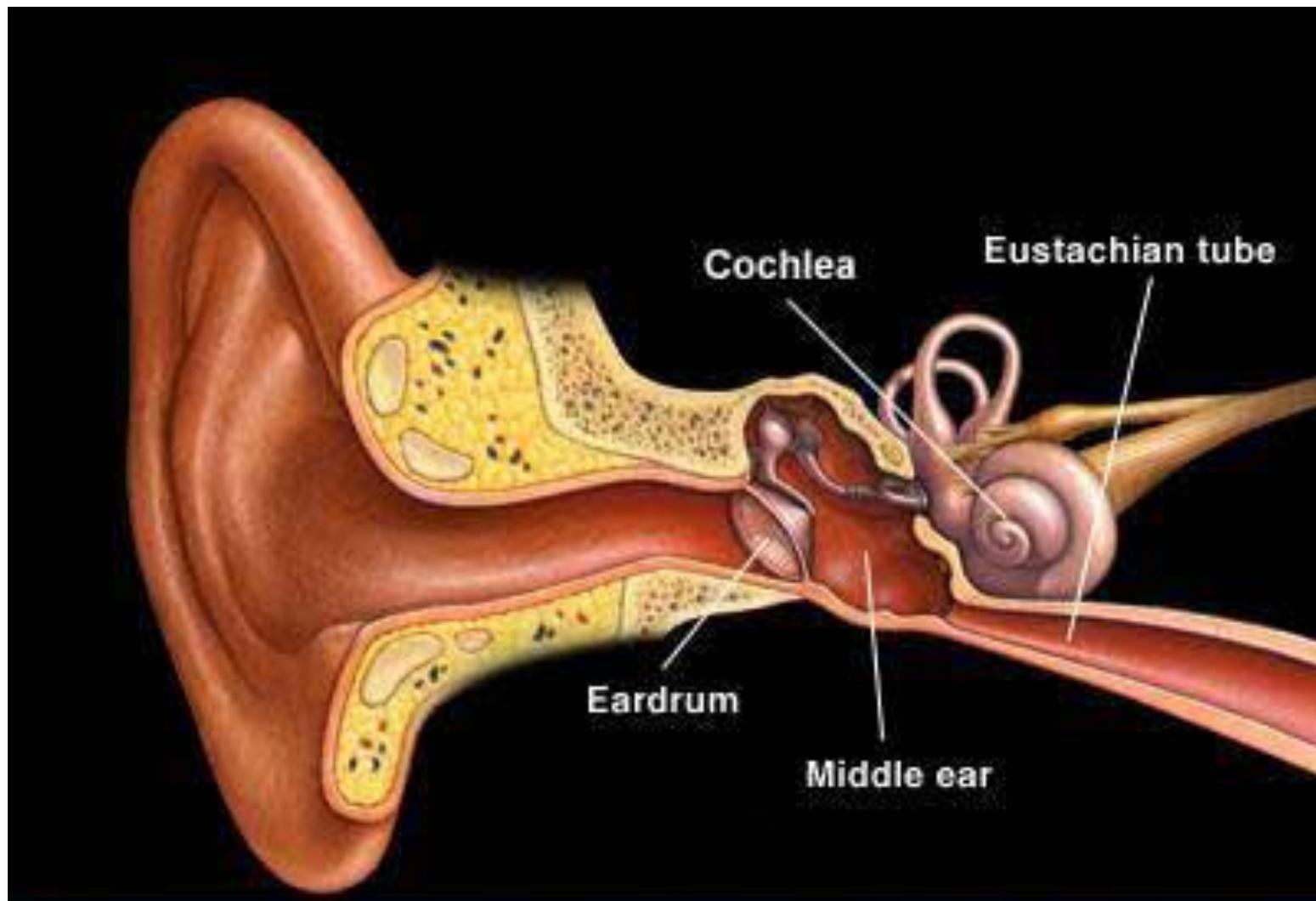
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When a hearing aid is no longer enough...

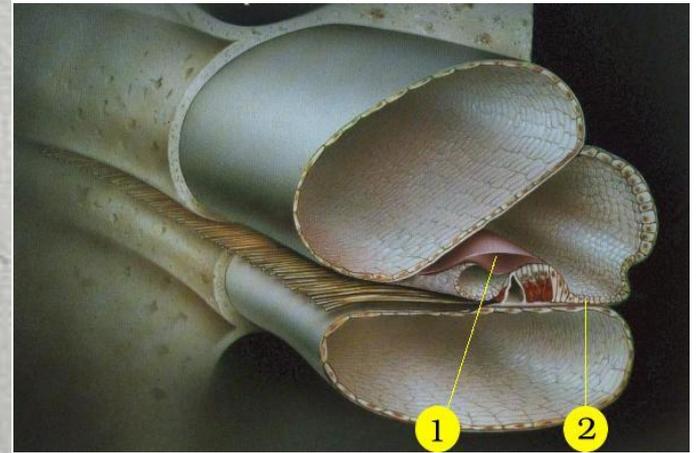
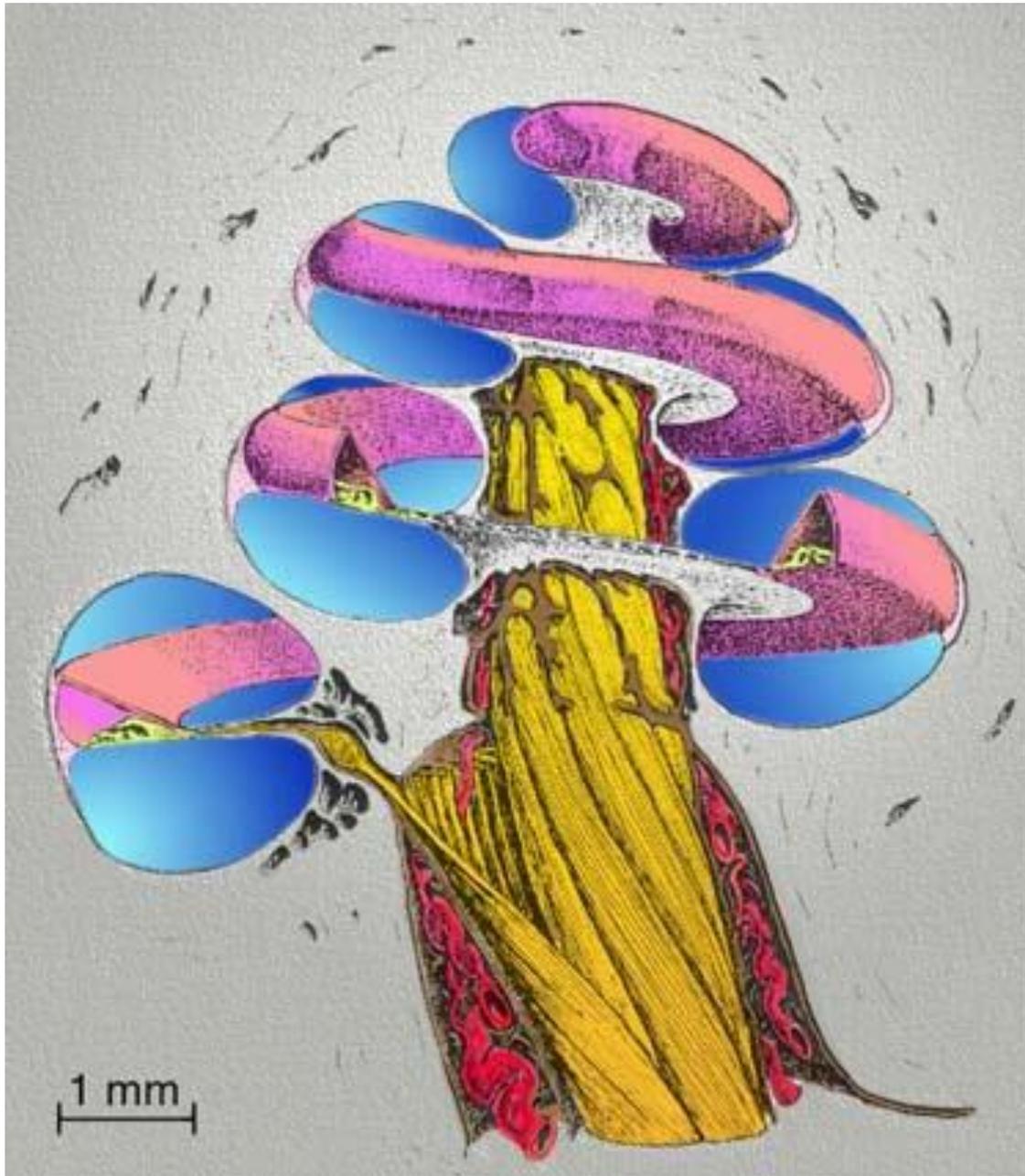


Overview

- Anatomy of the ear
- How a hearing aid helps hearing loss
- When a hearing aid is no longer enough
- What is a cochlear implant
- Who is eligible for an implant
- What determines success
- Does insurance pay?
- What is involved in getting an implant
- What to expect after the surgery....
- MAPping process -what they can expect to hear at first
- First impressions and impact on life



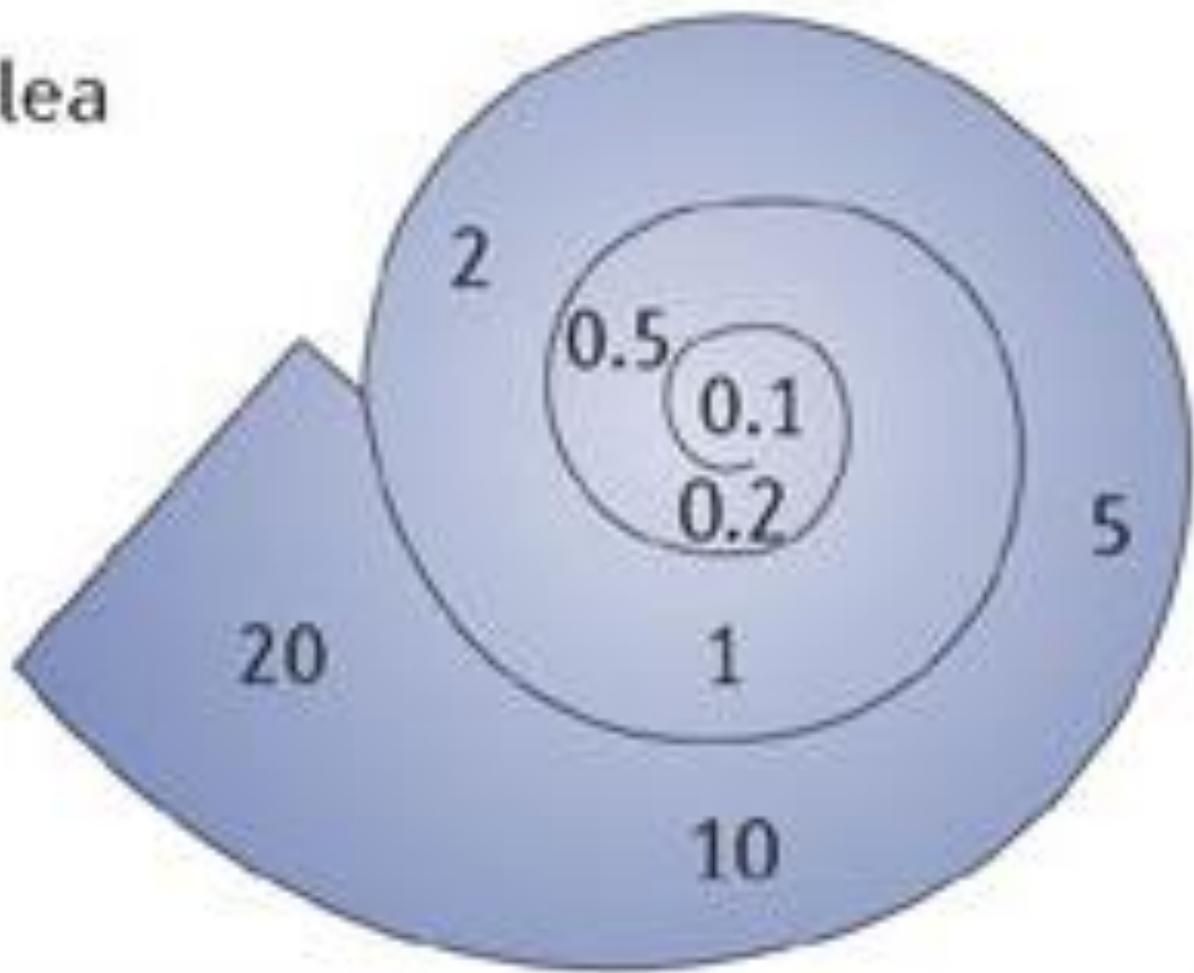
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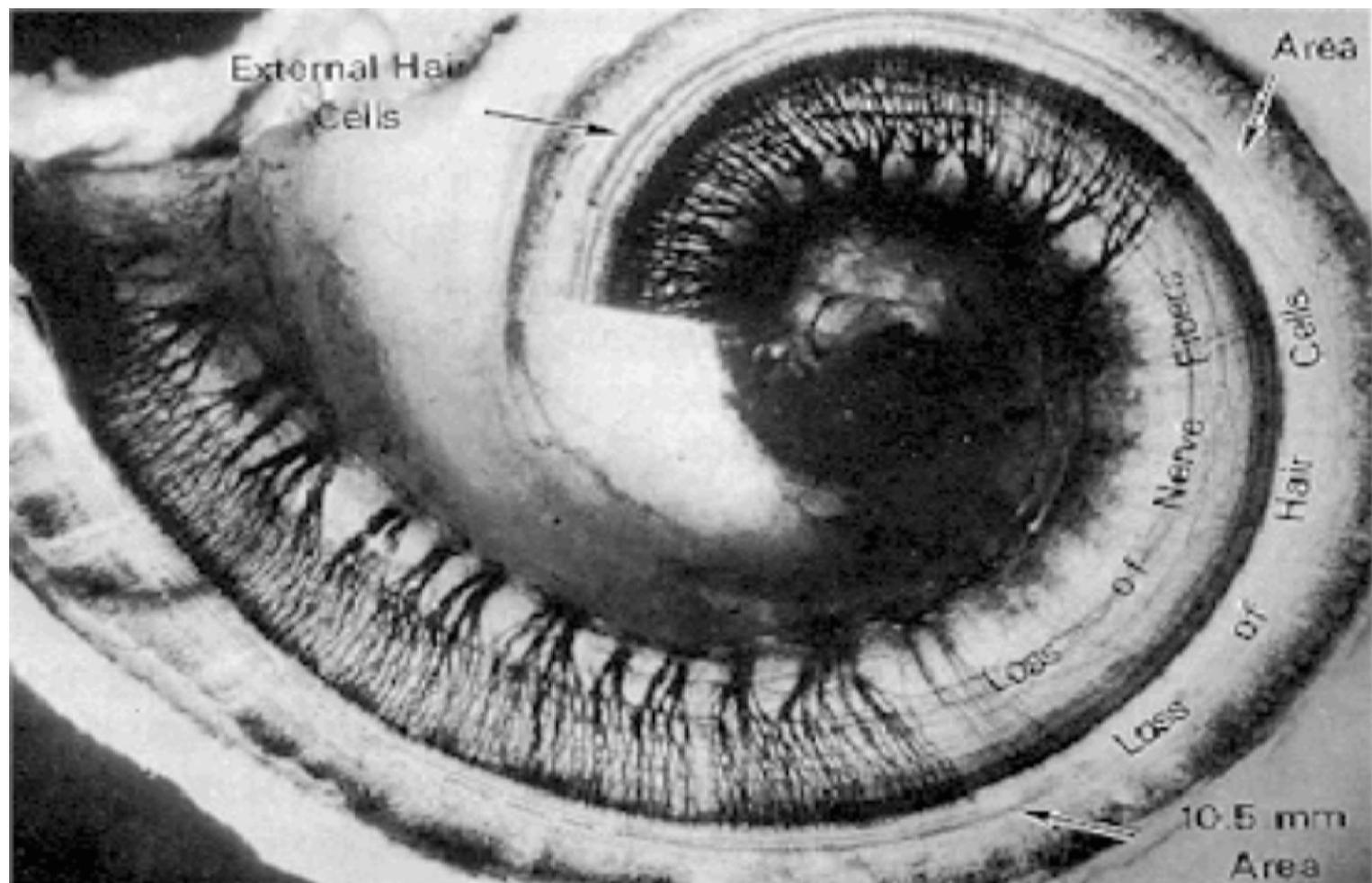




courtesy of Bechara Kachar, NIDCD, NIH (USA)

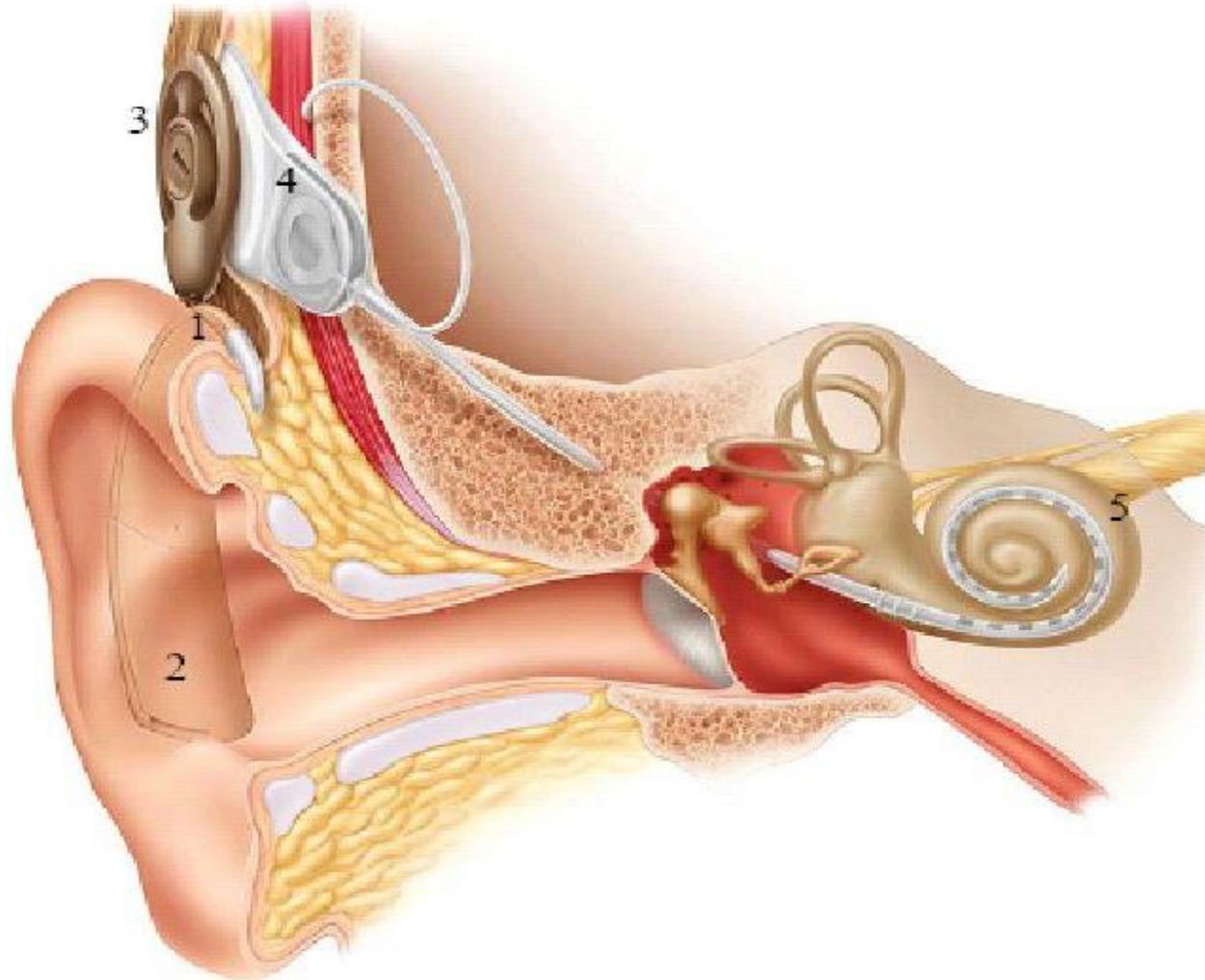
Cochlea







How a cochlear implant works



Who is eligible for a cochlear implant?

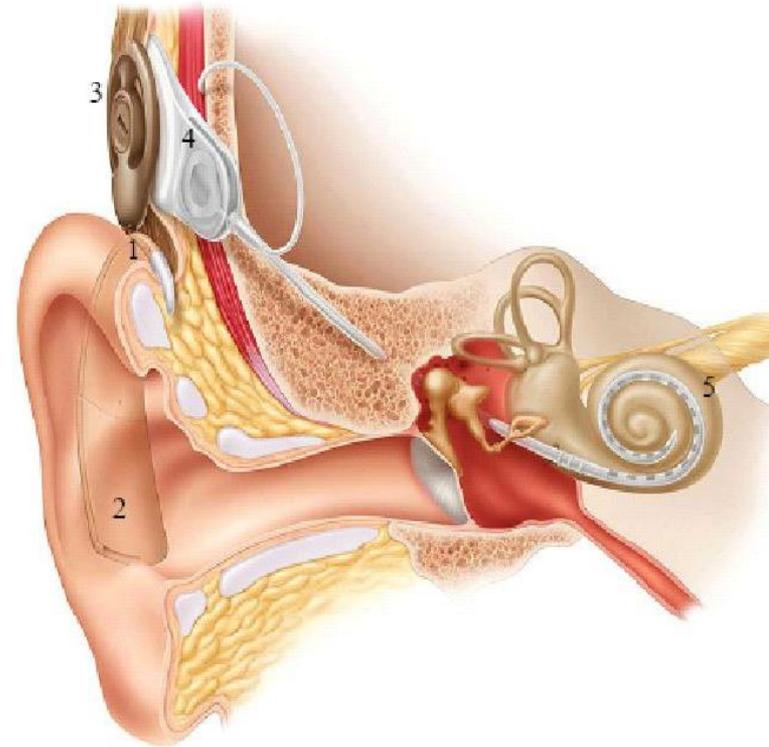
- Criteria changing almost every year
- When performance with hearing aids is less than the typical performance with cochlear implants.
- Children over 1 year and adults
- FDA reports as of December 2010, ~219,000 people worldwide have implants
- In US, ~42,600 adults and 28,400 children

Details

- FDA approved in 1985 for adults in 1990 for children
- At least in children, one of the most cost effective medical treatments
 - Lifetime cost of deafness \$1 million
- \$80k for surgery/implant/processor/etc
- Covered by most insurances

What is involved with getting an implant?

- Hearing test with and without hearing aids.
- Medical evaluation with CT and MRI
- 3-4 hour surgery
- 2-4 week healing period
- Activation of the implant
- Reprogramming at 1 wk, 1 mo, 3 mo, 6 mo, annually.



Surgery

- 2-3 hour outpatient surgery
- Small area of hair shaved
- Stitches removed ~1 week
- Possible complications
 - Taste disturbance
 - Dizziness
 - Feeling of fullness
 - Numbness
 - Tinnitus
 - Wound does not heal



Activation Day

- Check surgical site
- Find correct magnet strength
- MAPping: Listen to sounds made by computer in order to set
 - Lower limit of voltages
 - Upper limit of voltages



Volume

Too Loud	10
Upper Loudness Limit	9
Loud	8
Loud but Comfortable	7
Most Comfortable	6
Comfortable but Soft	5
Comfortable but too Soft	4
Soft	3
Very Soft	2
Just Noticeable	1
Off	0

BIONICS

Custom Sound 3.1 (Unregistered)

MAP Summary

MAP: 17

Processor: CP910 sound proces

Implant: CIS12 cochlear impla

Strategy: ACE

Mode: MP1+2

Rate: 900

Maxim: 8

Pulse Width: 25

Parent MAP: 16

	172	173	178	181	180	166	151	147
C	110	123	124	121	128	116	109	99
MRK	0	0	0	0	0	0	0	0
DR	56	50	54	60	52	50	42	48

Activation Day

- Turn on microphone, listen to live speech
- Sound quality improves fastest in the beginning
- Learn about how to use the processor
- Learn about accessories



After Activation

- 1st week: learning how to use the device
- Reintroduce ear/brain to sound
- Refamiliarize yourself with the myriad of sounds in the environment, and learn to recognize sounds
- Sound quality improves dramatically over first day/week.
- Return for MAPing 1 week later,
- 1 mo, 3 mo, 6 mo, annually
- Practice practice practice!

Performance levels

Most adults, post linguually deafened perform at or above level 6.

1. Detect sounds,
 1. Soft sounds heard, not heard previously with hearing aids
2. Pattern perception (eg number of syllables ball vs. hot-dog)
3. Detect speech sounds (ah, ee, oo, ss, sh, mm)
4. Distinguish speech sounds (eg. ah vs. sh)
5. Recognize speech sounds (what sound is this?)
6. Recognize words and sentences
7. Recognize sentences in noise
8. Music perception

What determines success?

- Realistic expectations
 - How do you define success?
- Commitment to and patience with the process
- Practice (formal programs and informal/incidental learning)
- Lifetime commitment to maintaining device
- Health of hearing nerve
 - Length of deafness
 - Cause of hearing loss
 - Previous use of hearing aids

First Impressions and Patient Reaction to Activation

- Keep talking, I want to listen without watching you.
- What's that noise? [Hearing a sniffle]
- I can understand you and it sounds fantastic!
- Your voice sounds like a robot or Donald Duck
- I just heard you say "can you hear me?"
- You sound so funny!

First few days

- I can hear the birds sing!
- What is all that noise?! [Birds singing.] I want to shoot those birds!
- I got in the car on the way home from your office and listened to the ball game on the radio, and heard the game play by play, I haven't been able to do that for 10 years. (after receiving implant on second side)
- I hear a noise when ever I'm at home, nowhere but at home. [later found out it was the low battery warning on the fire alarm]

3 days after turning it on....

“Last Friday I had my first "social" test... went to a dinner party and it went very well. In fact, a friend who we had recently travelled with (with just a hearing aid on my right ear) came up to me and said "welcome back"! I think the [improvement] was noticeable!”

“I used to think the right ear [implant] worked great but now without the left ear unit I struggle to hear well. The bi-lateral set-up is amazing!”

Impact on Quality of Life

- It has helped me feel much better about life
- Feel much more connected to my family
- I've been able to go back to work.

Questions?

