

# 聽覺系統、認知與聽損的治療

## Auditory system, cognition and Treatment of hearing loss

台北榮民總醫院桃園分院  
國防醫學院醫學系耳鼻喉學科

王智弘 院長/教授

台北榮民總醫院 桃園分院  
Taipei Veterans General Hospital, Taoyuan Branch



## 王智弘 院長



### 現職Current Position:

台北榮民總醫院桃園分院 院長  
國防醫學院醫學系耳鼻喉學科 教授  
國防醫學院醫學科學研究所 合聘教授  
台灣耳科醫學會 理事  
台灣精準醫學學會 常務理事  
台灣長照醫學會 理事中華民國醫師公會全國聯合會 理事

### 學歷Education:

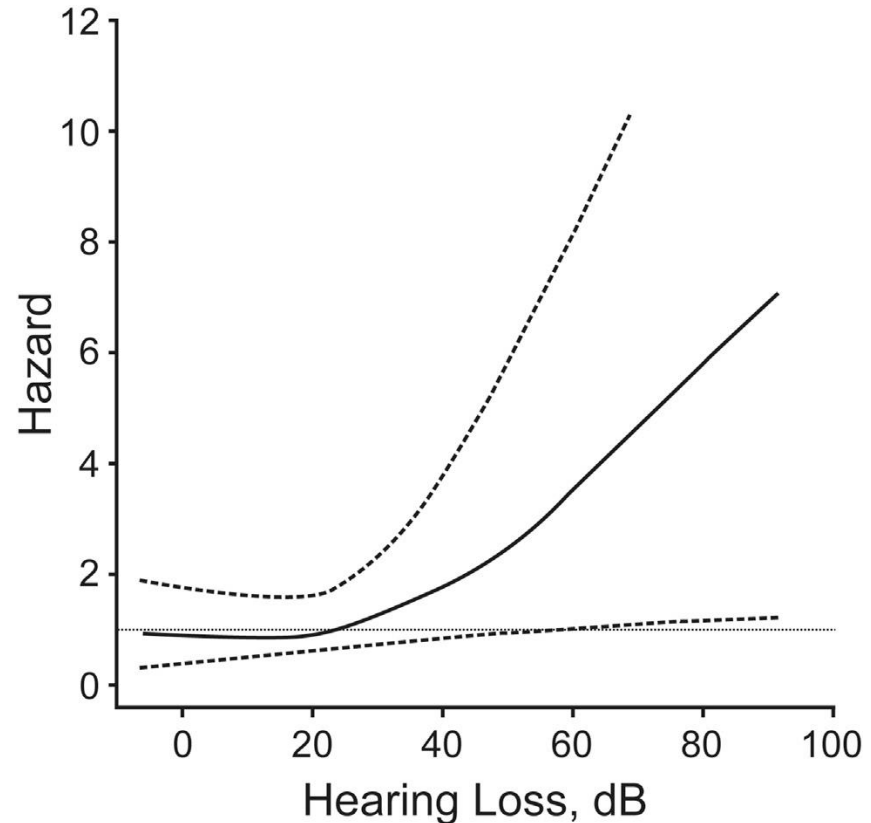
國防醫學院 醫學科學研究所 博士  
國防醫學院 醫學士



# 聽損會增加失智的風險

## 失智的風險因子

1. 幼年時失學
2. 中年時聽力缺損
3. 頭部外傷
4. 高血壓
5. 過度飲酒
6. 肥胖
7. 熟齡時抽菸
8. 憂鬱
9. 缺乏社交
10. 缺乏運動
11. 空氣污染
12. 糖尿病



Risk of incident all-cause dementia by baseline hearing loss after adjustment for age, sex, race, education, diabetes, smoking, and hypertension.

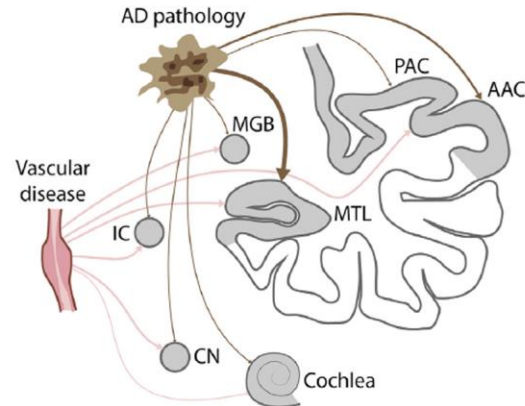


# 聽損為何會導致失智?

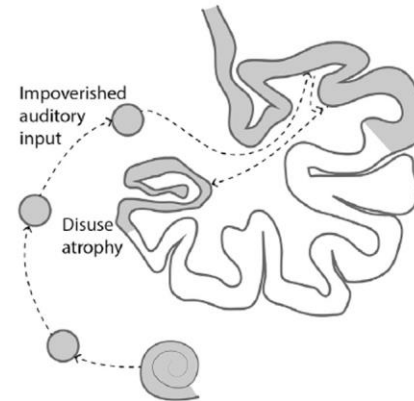
Neuron  
Perspective

CellPress  
OPEN ACCESS

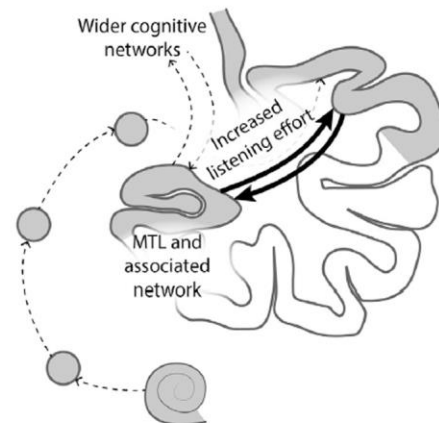
**Mechanism 1: Common pathology**



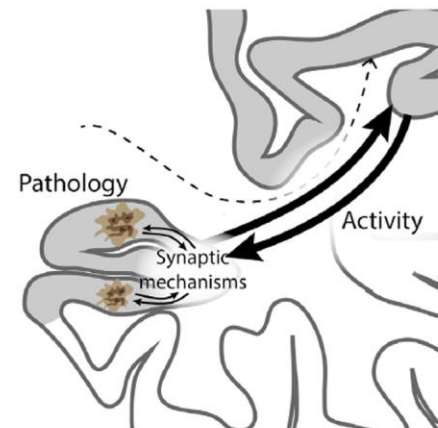
**Mechanism 2: Impoverished input**

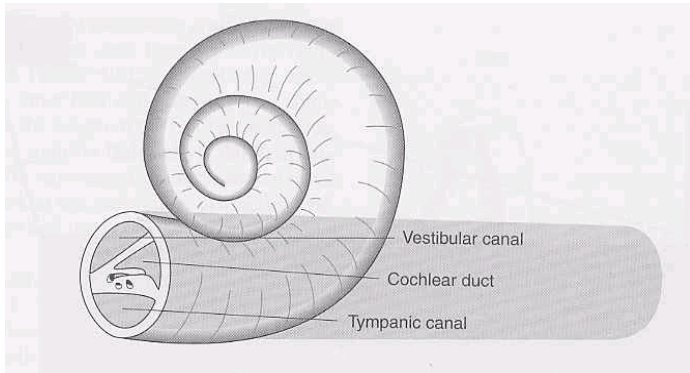
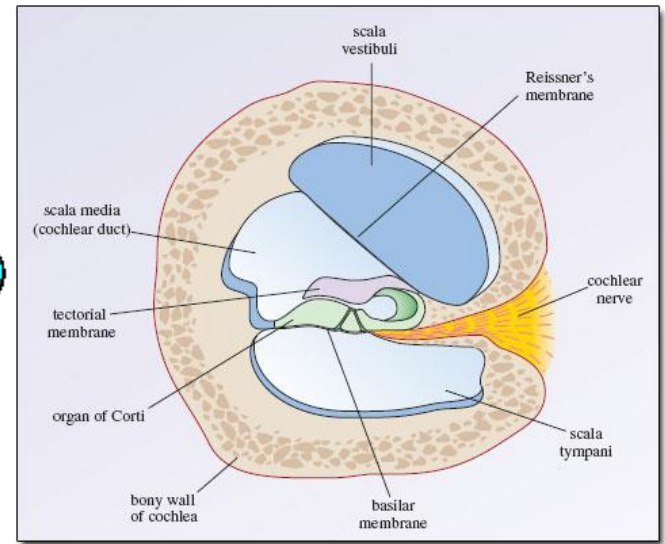
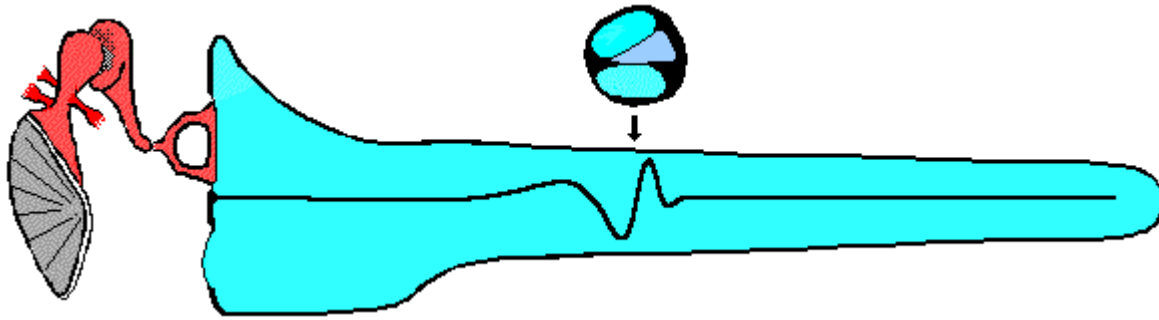


**Mechanism 3: Occupation of cognitive resources**

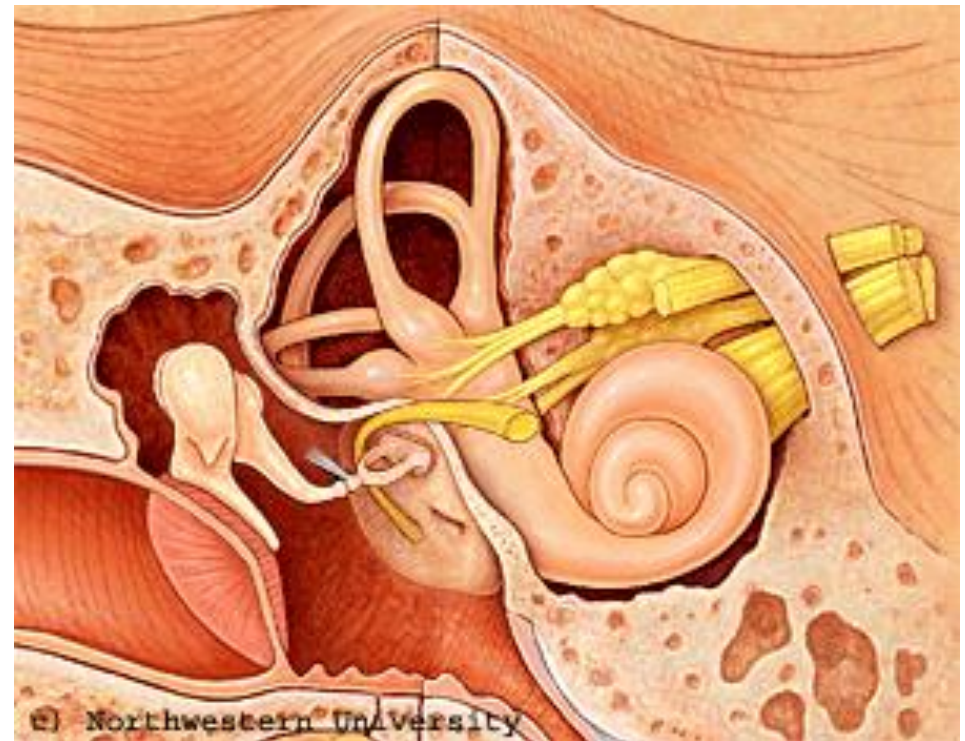
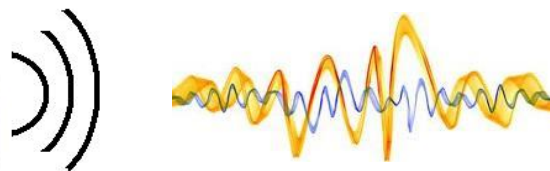


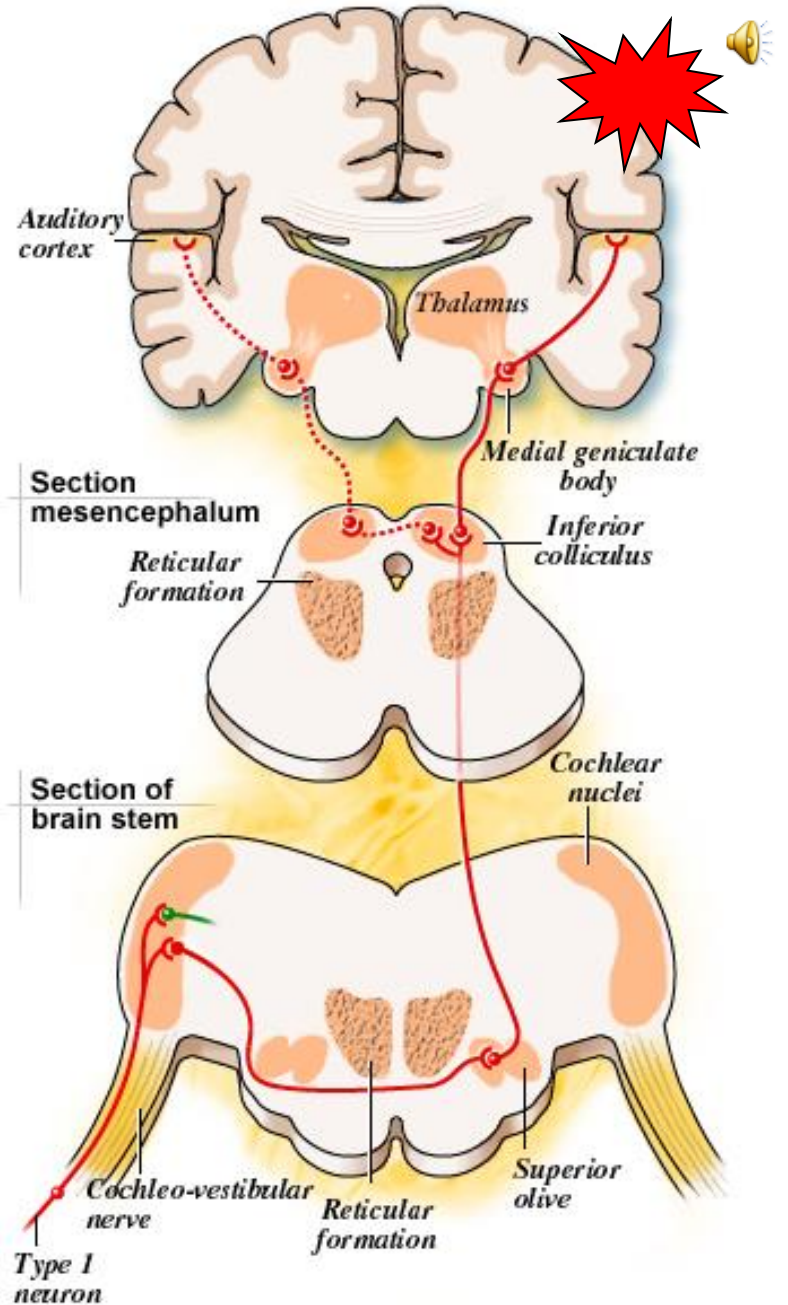
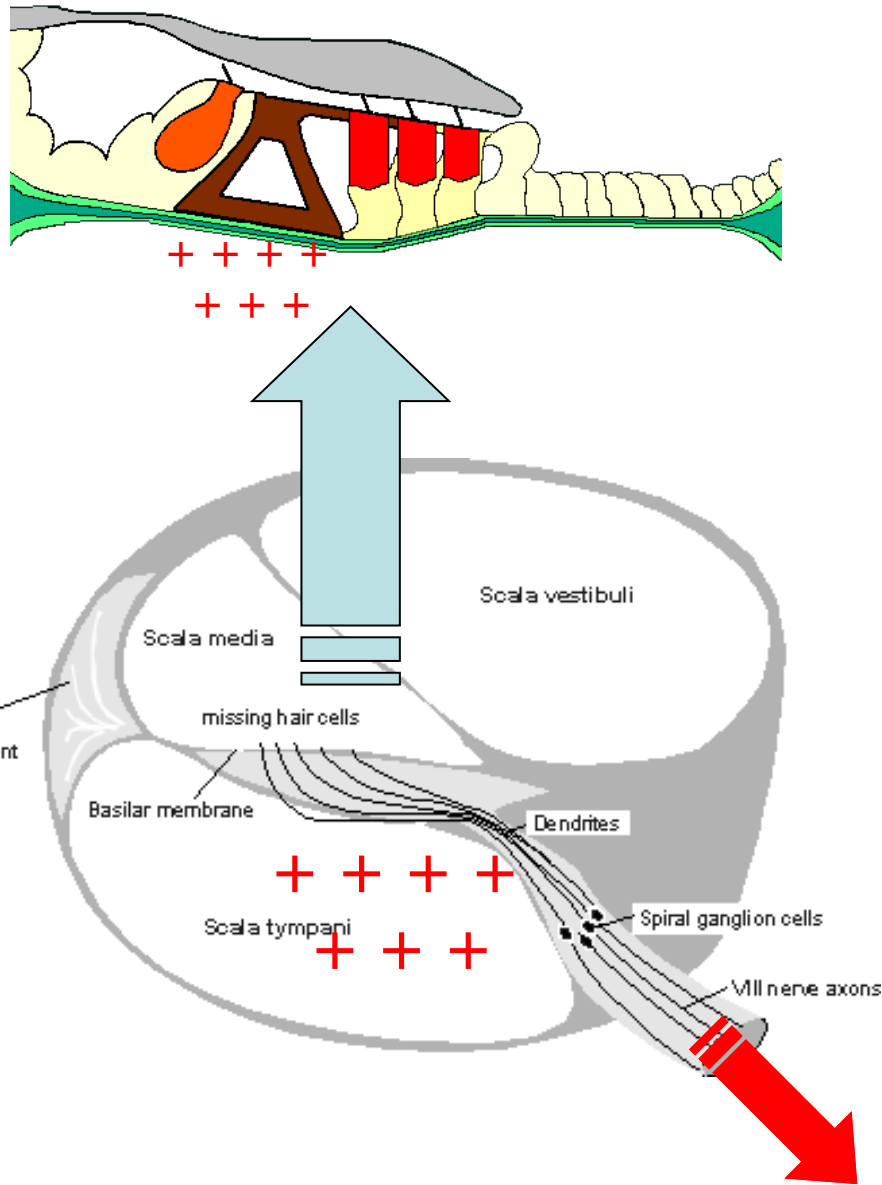
**Mechanism 4: Function-pathology interaction**

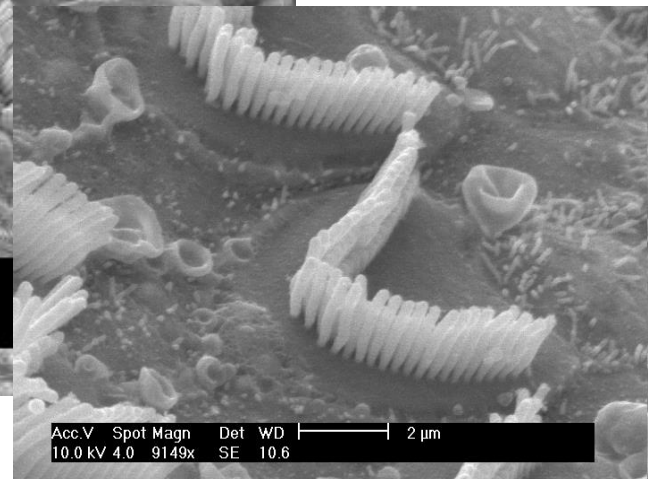
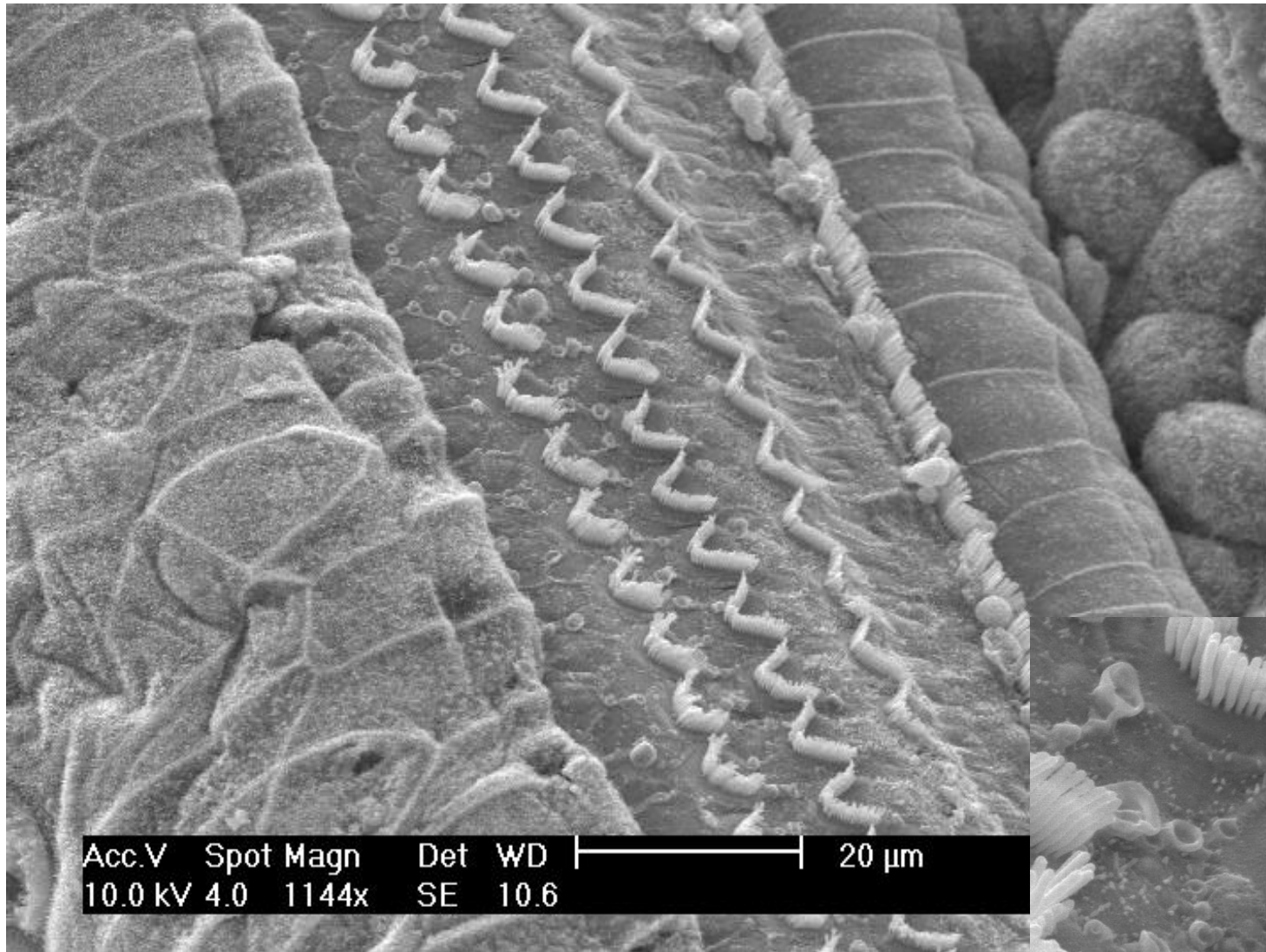


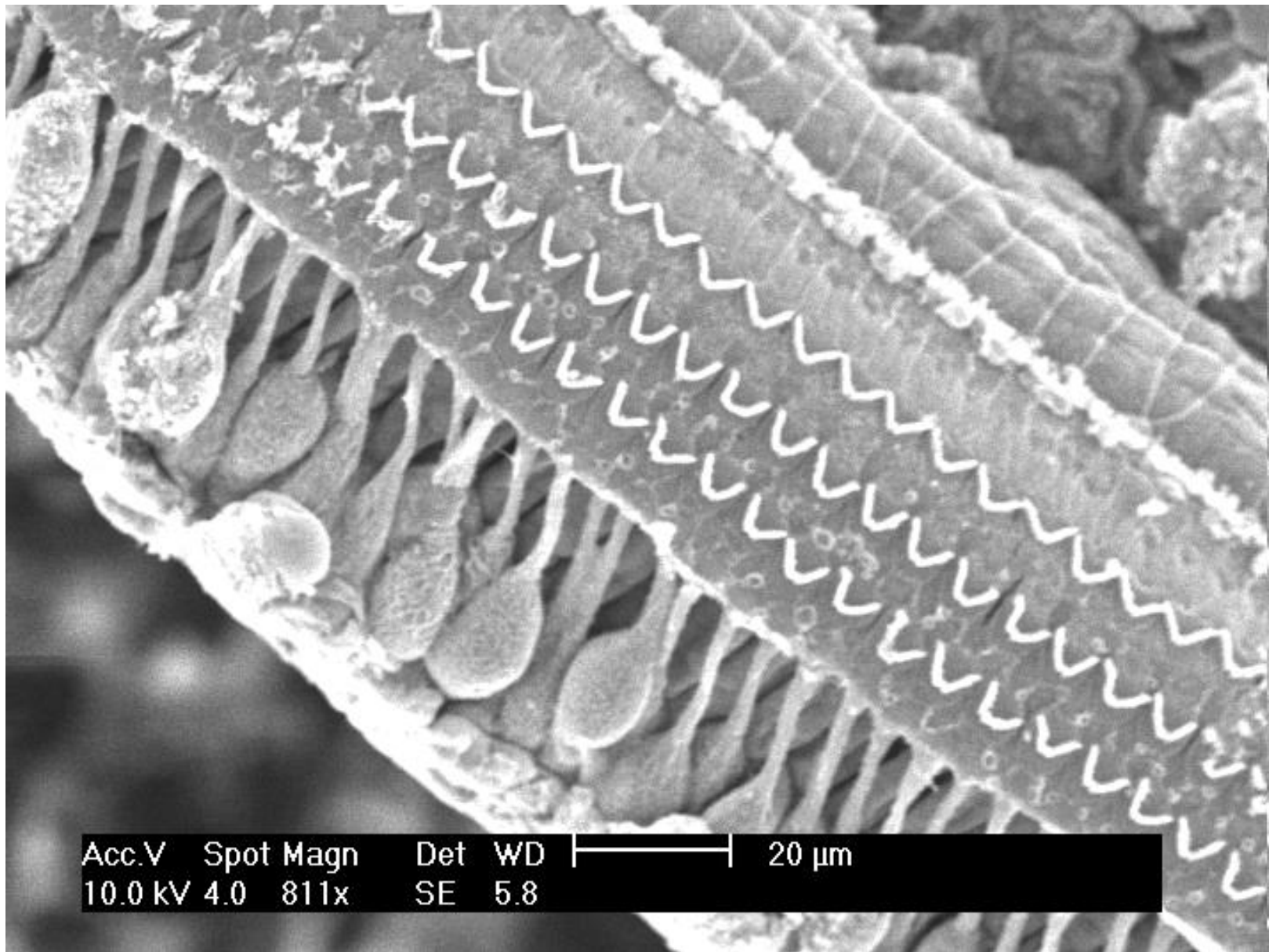


**Sound waves**





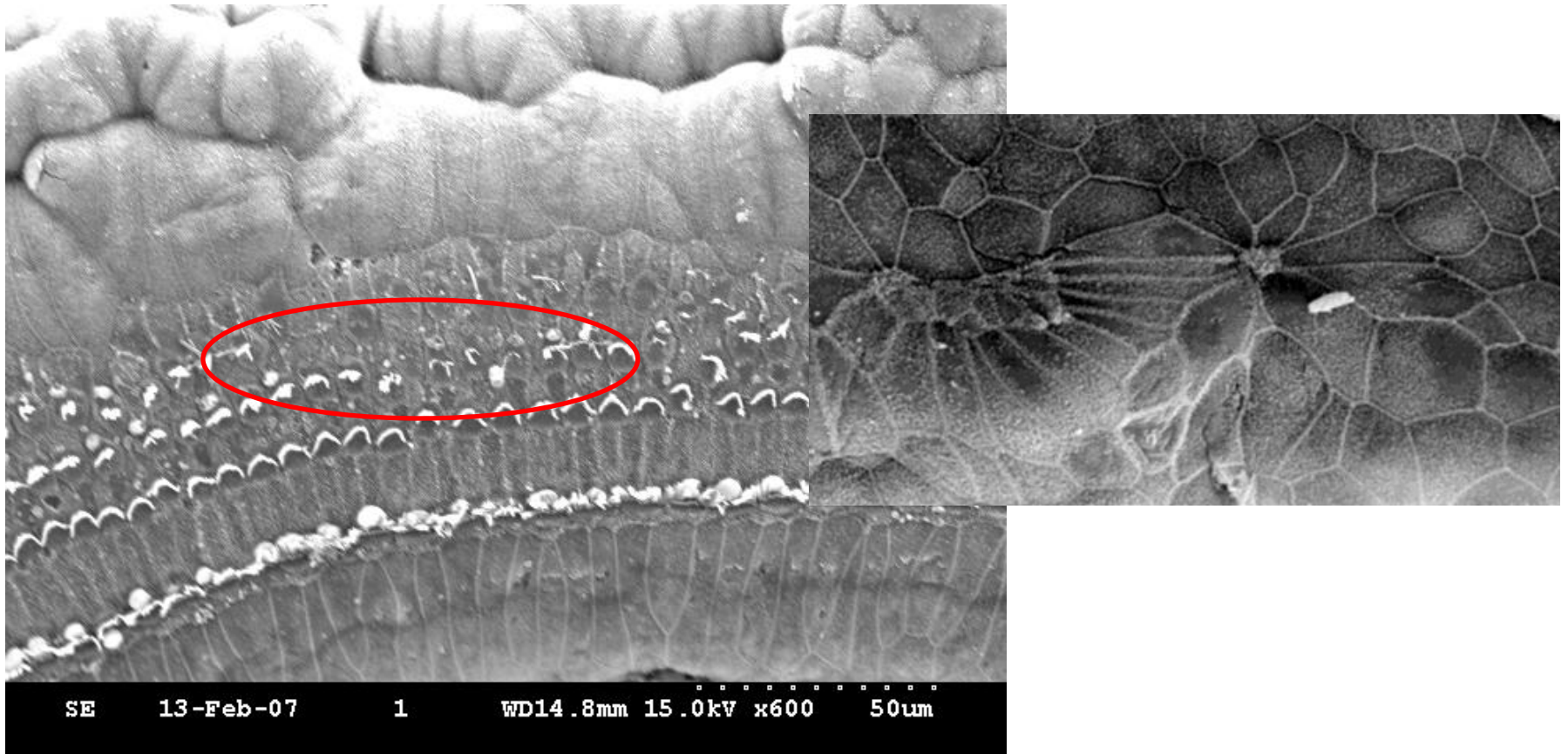






# Hair Cell Death

- **Causes:** genetic, congenital, infectious, traumatic, toxic, idiopathic (of unknown origin), and immune-mediated.
- The most common pathologic feature is **hair cell death**.





## Percentage of Individuals with Hearing Loss by Age & Severity

**MILD**      **MODERATE+**

**38.2 Million** (14.3%) Americans aged 12 years or older have hearing loss

0.2%  
12 - 19

0.4%  
20 - 29

1.6%  
30 - 39

6.5%  
40 - 49

1 in 10  
13.3%  
50 - 59

1 in 4  
26.8%  
60 - 69

HALF  
54.6%  
70 - 79

8 in 10  
81.5%  
≥ 80

# 6 FACTORS THAT COULD LEAD TO HEARING LOSS!



## AGING

Age related hearing loss can have the following symptoms:



## HEREDITY

Certain genetic syndromes that cause hearing loss are:



## EXPOSURE TO LOUD NOISES

Prolonged exposure to noise can lead to hearing loss. Common factors are:



## CERTAIN ILLNESSES

There are numerous illnesses that can lead to hearing loss:



## OTOTOXIC MEDICATIONS

Certain types of medications are linked directly to hearing

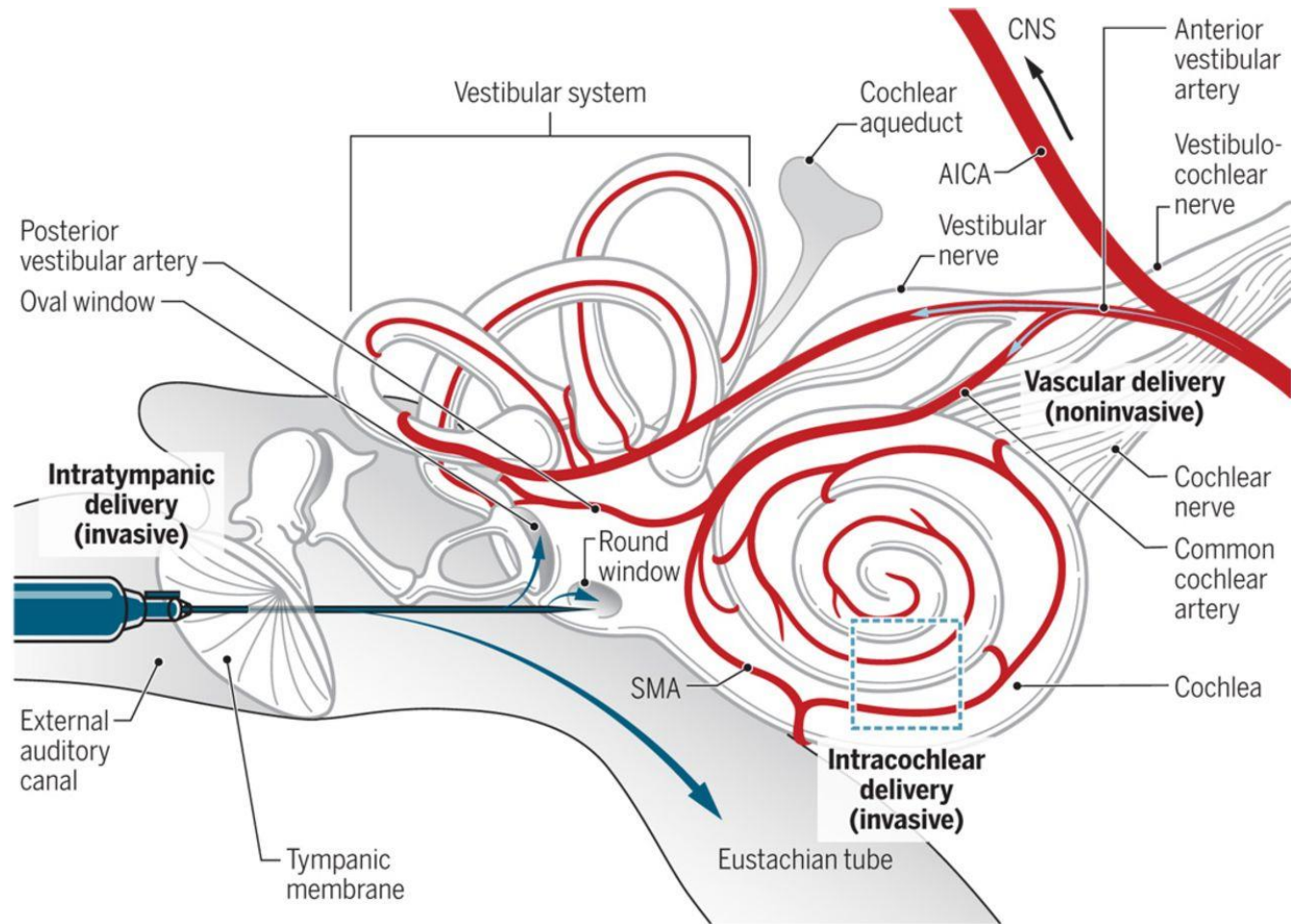


## HEAD TRAUMA AND TUMOURS

Certain types of medications are linked directly to hearing

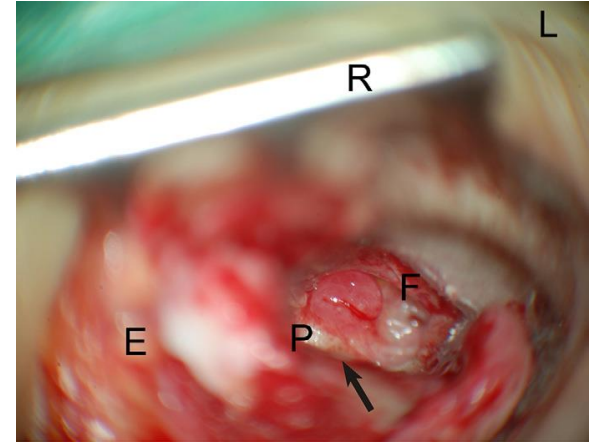


# Structure and blood supply of the cochlea





# 常見的耳聽損疾病： 傳導性聽力障礙

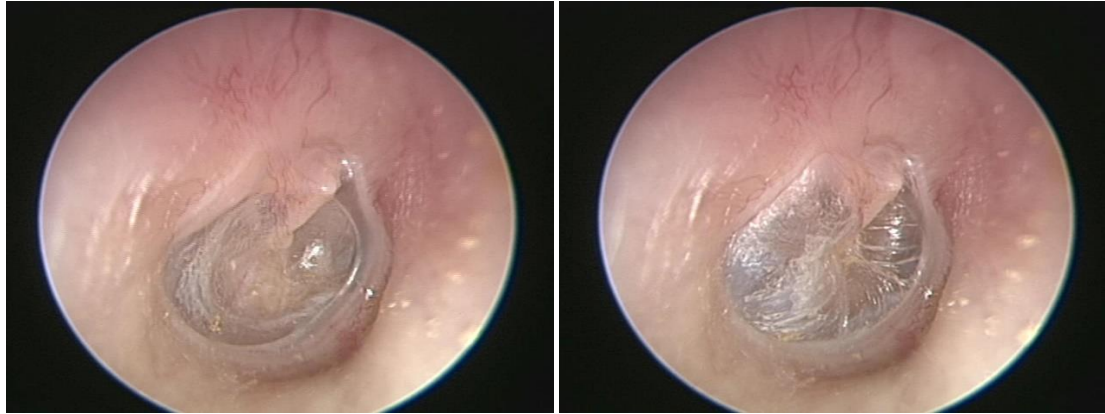


慢性中耳炎 (**Chronic Otitis Media**)

鼓室血管球瘤 (**Glomus Tympanicum**)

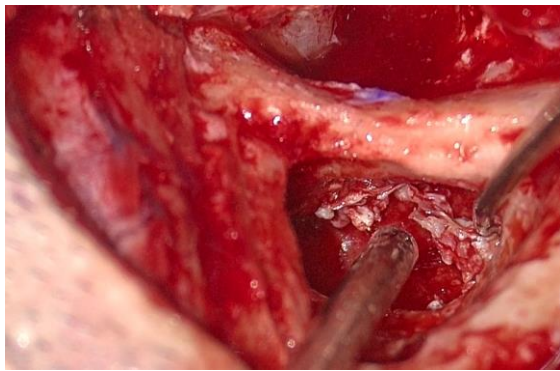


# 常見的耳聽損疾病： 傳導性聽力障礙

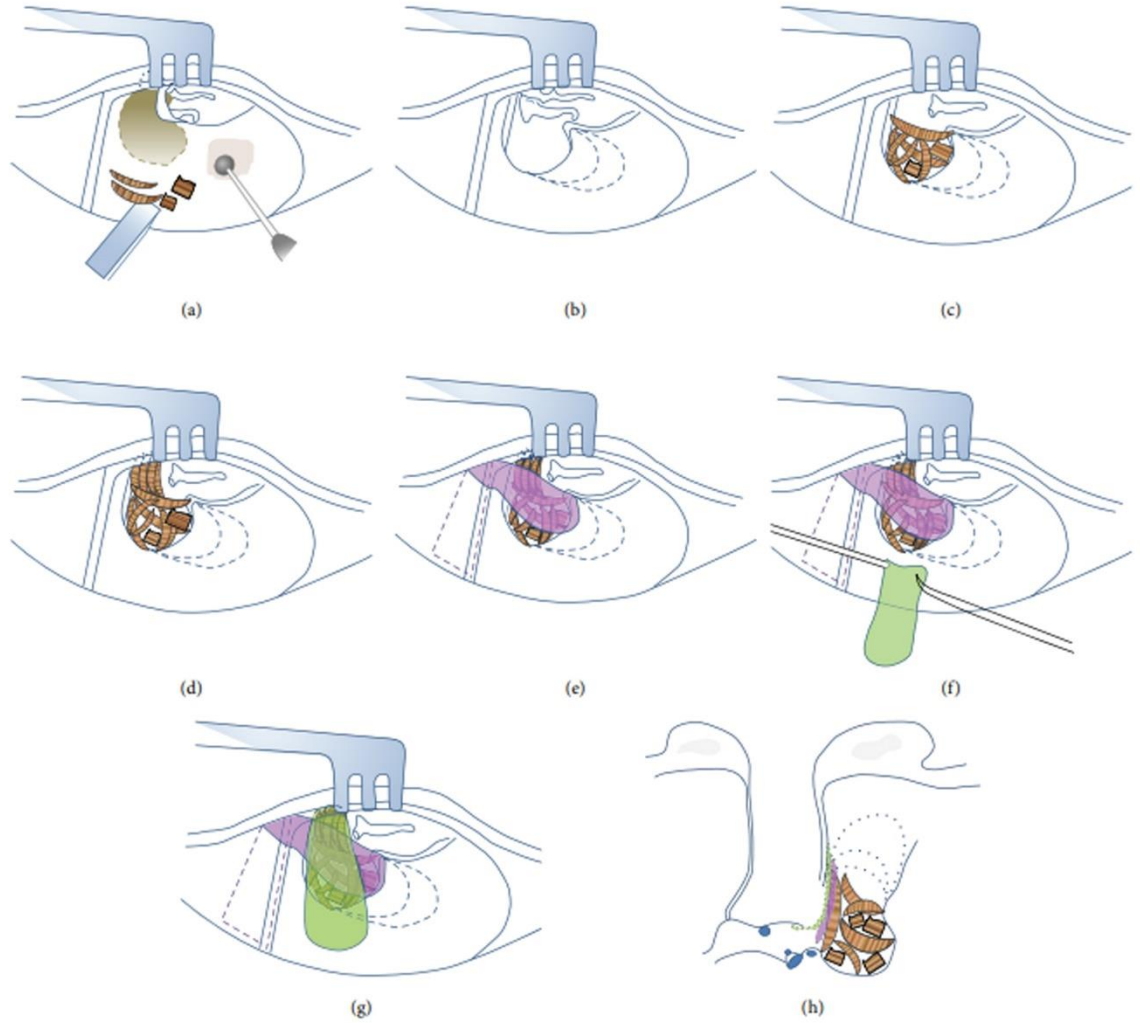


耳咽管過度開放 (Patulous Eustachian Tube)

# 中耳/乳突腔膽脂瘤



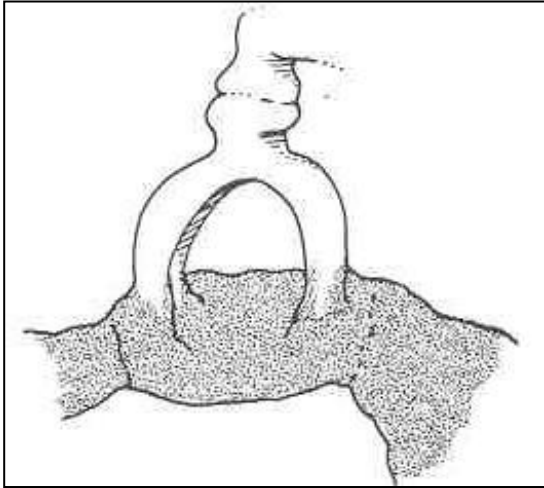
4



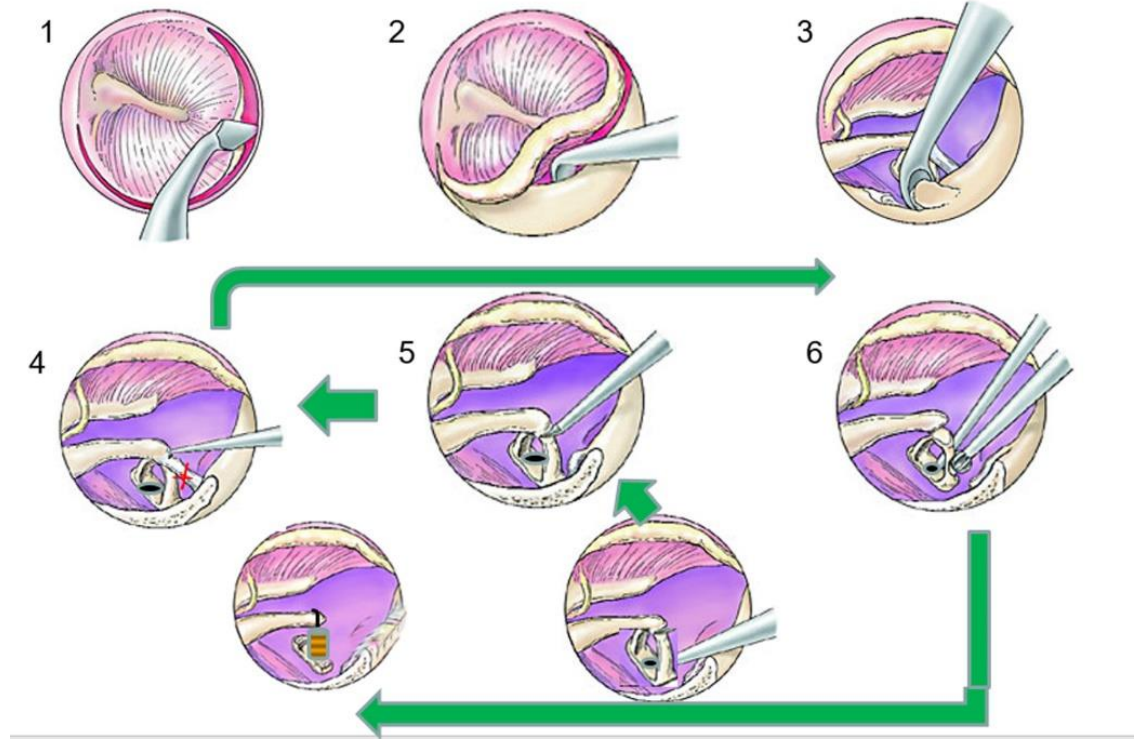
 Cholesteatoma  
  Bone chips  
  Bone pâté  
  Superiorly based temporalis muscle fascia  
  Areolar tissue graft



# 耳(聽小骨)硬化症

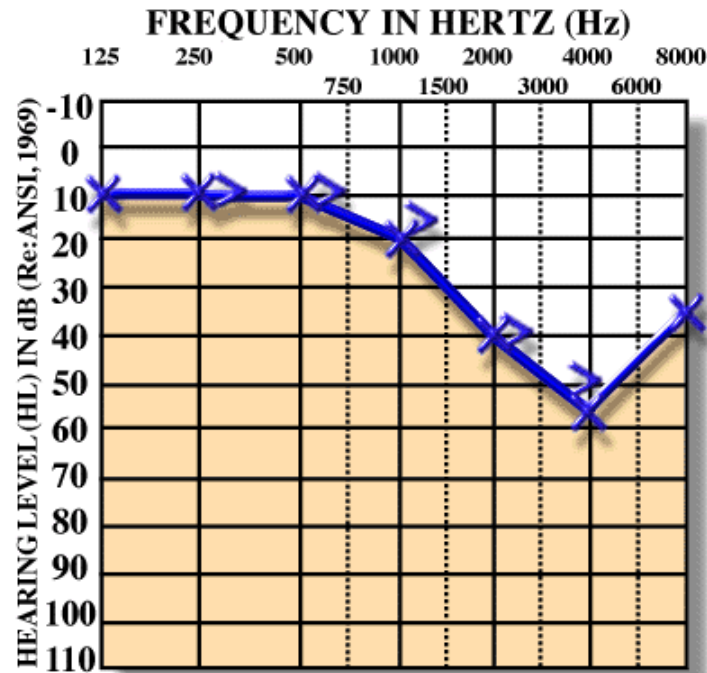


## Stapedotomy How I do it



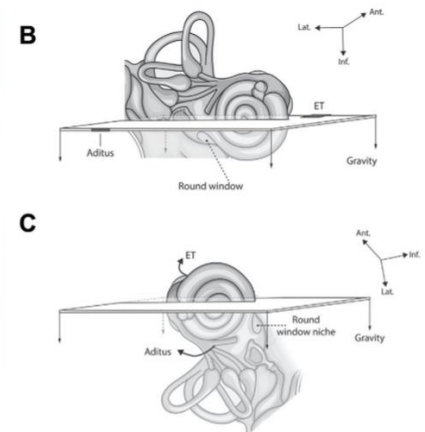
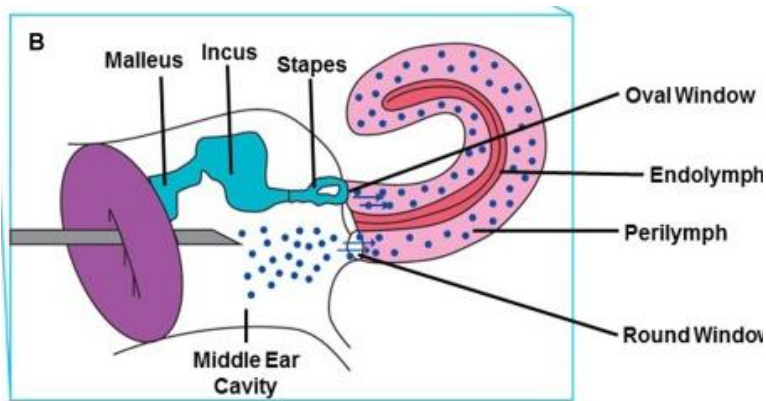
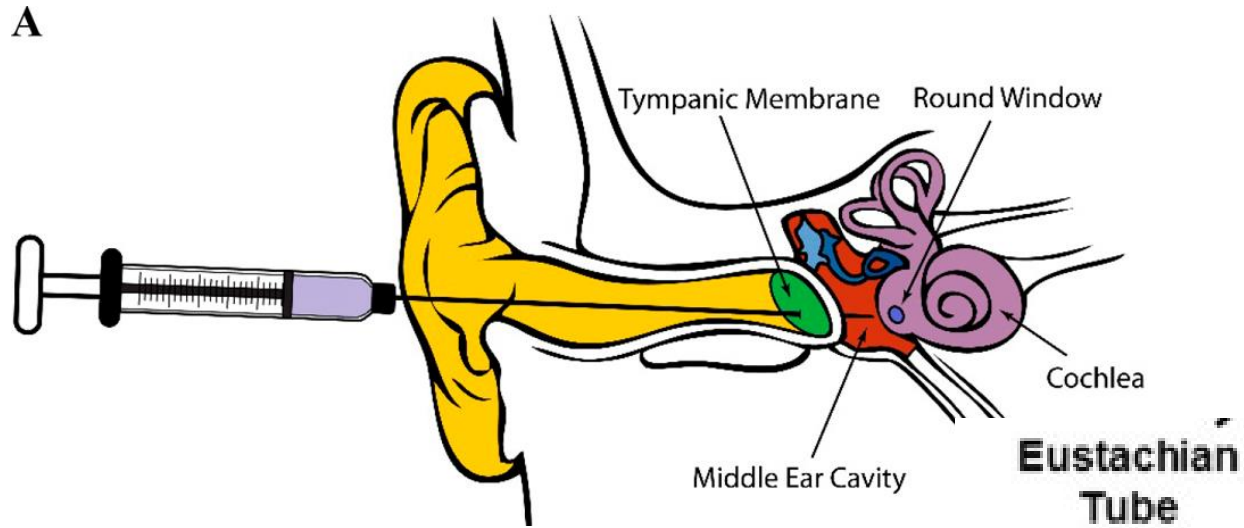
# 感音性/感覺神經性聽力障礙

## Sensorineural Hearing Loss Audiogram



Legend	Right	Left
Air Conduction	O	X
•with masking	△	□
Bone Conduction	<	v
•with masking	∟	∟
No Response	↙	↘

# Intra-tympanic (IT) injection



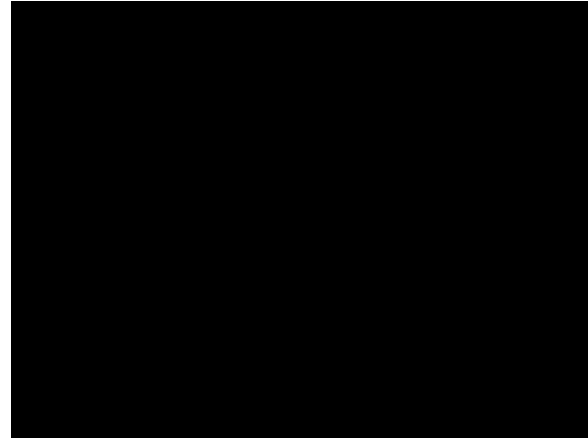
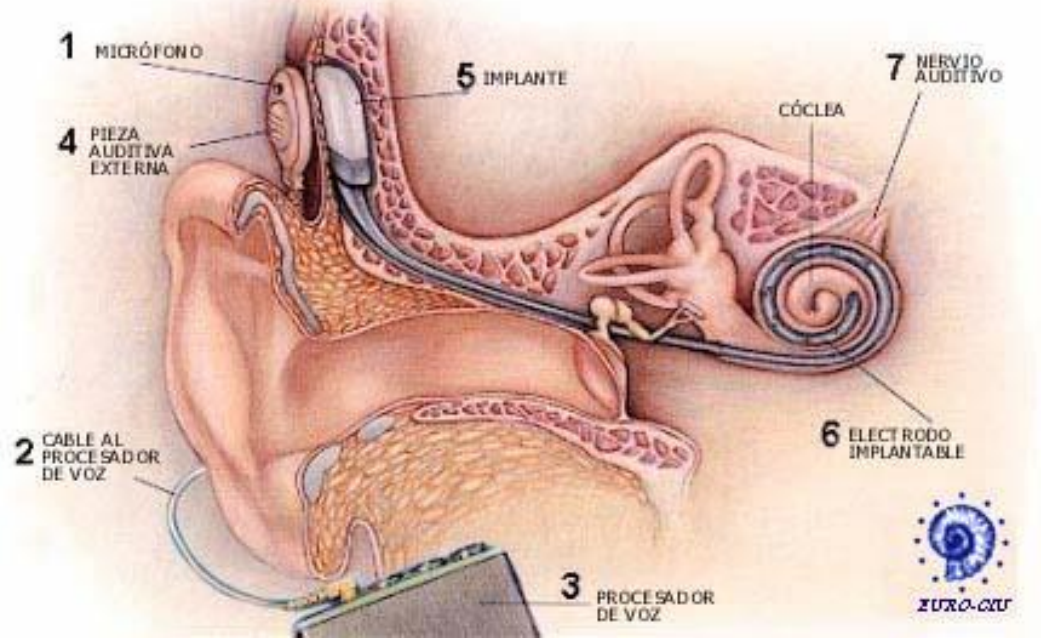
Hazlitt et al. *J. Med. Chem.* 61, 5512–5524 (2018)

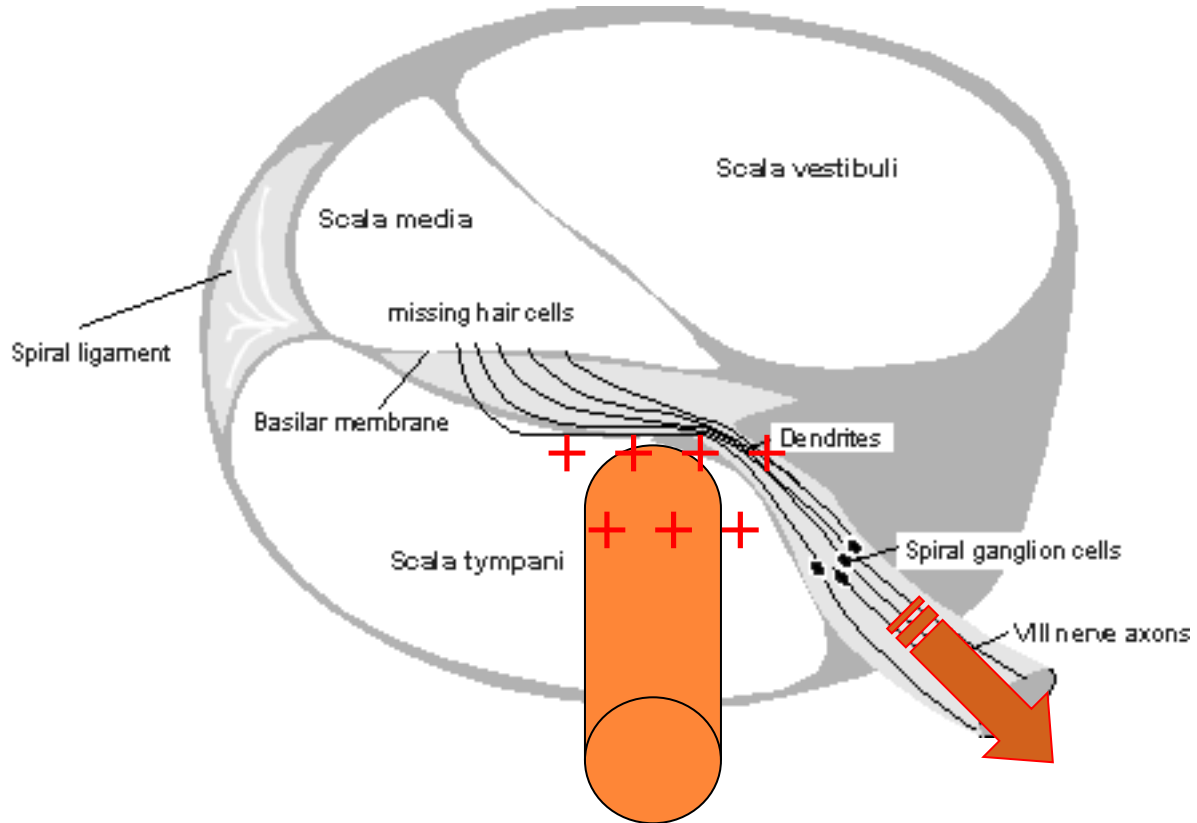
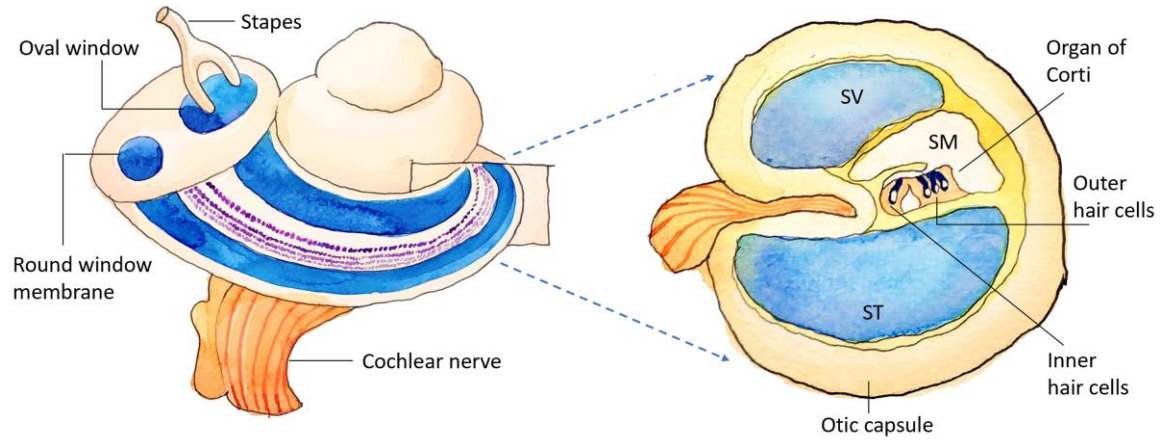
Rybak et al. *Front. Cell. Neurosci.*, 09 July (2019)

*Otolaryngol Head Neck Surg.* 161(6):1012-1017 (2019)



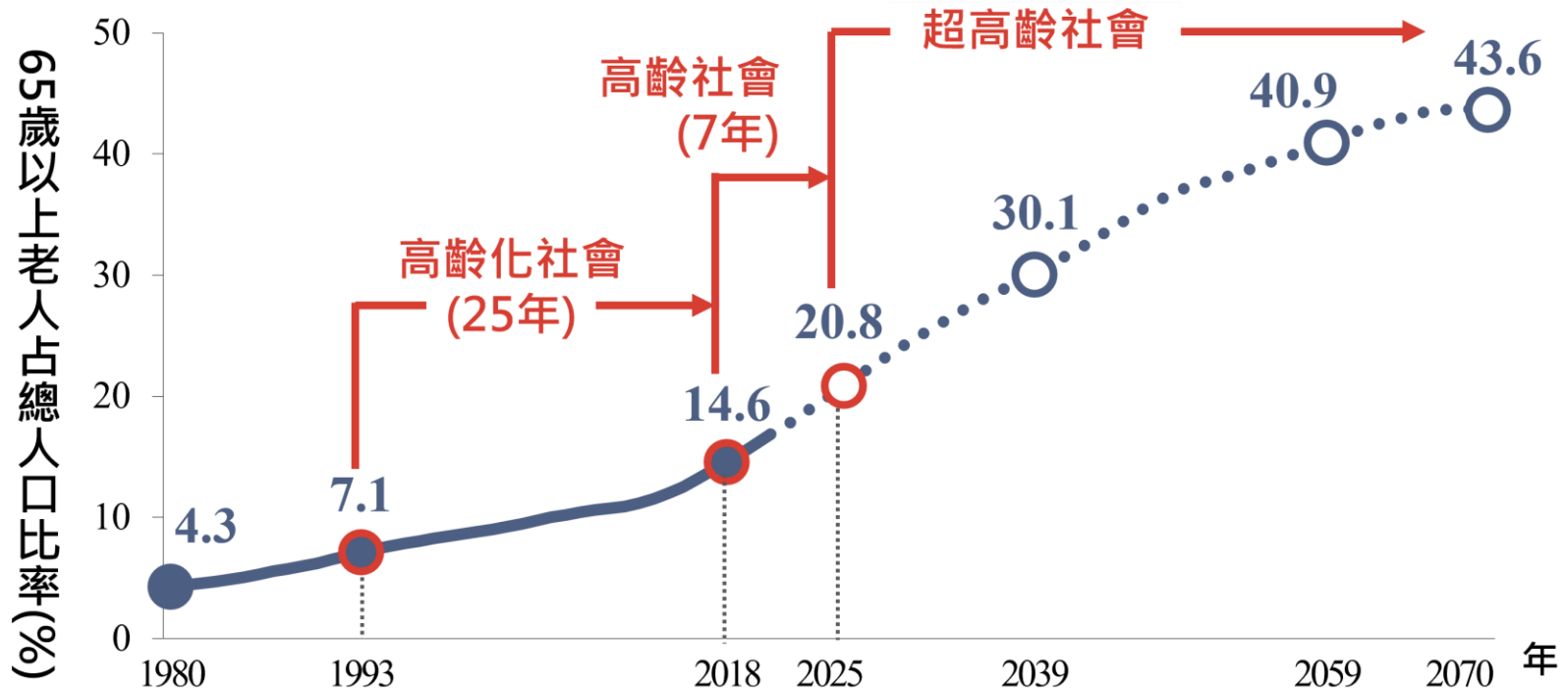
# 人工電子耳手術 Cochlear Implant Surgery





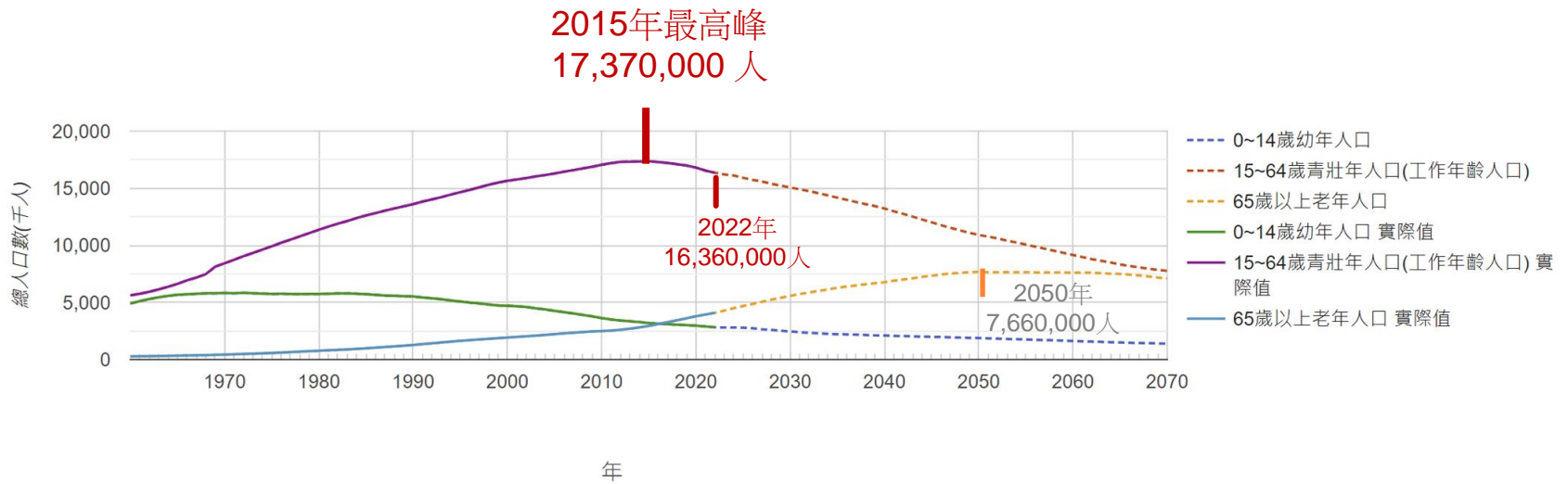


# 台灣的超高齡社會即將到來





# 台灣青壯年人口數的逐年下降



Thank you.  
簡報完畢  
謝謝聆聽

