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Physicians Hearing Services Welcomes You!

Tinnitus

Definition

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"(Tinnitus is the) perception of a sound in the ears or in the head without the presence of an external source generating the sound"

McFadden, 1982

Two Types of Tinnitus

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- **Subjective:**
  - Perceived only by the patient
- **Objective:**
  - Identified/heard also by the examiner
    - **Vascular:** synchronous with heartbeat (pulsatile)
    - **Muscular:** out of sync

Epidemiology

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The **American Tinnitus Association (ATA)** estimates that 50 million Americans have some degree of tinnitus. Of that number, up to 20 million have tinnitus severely enough to seek medical help.

Mechanisms of tinnitus

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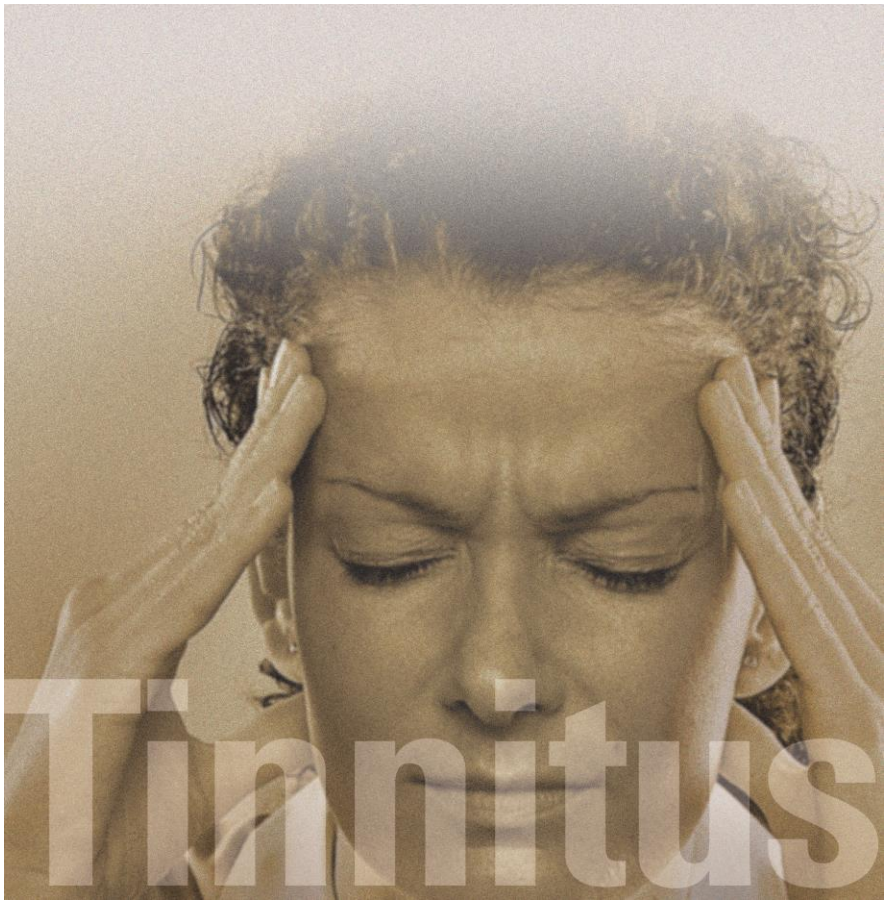
It is a symptom, not a disease!



Causes of tinnitus

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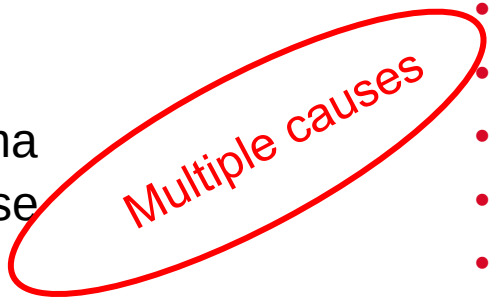
Over 200 causes described

Changes at any point of the auditory pathway

- Cerumen
- Otitis
- Otosclerosis
- Acoustic neuroma
- Meniere's disease
- Acoustic trauma
- Noise exposure
- Ototoxicity
- Presbycusis



Changes from outside the ear, but affect its functioning

- Metabolic
- Cardiovascular
- Neurological
- Pharmacological
- TMJ Disorder
- Psychological
- Dietary

Mechanisms of tinnitus

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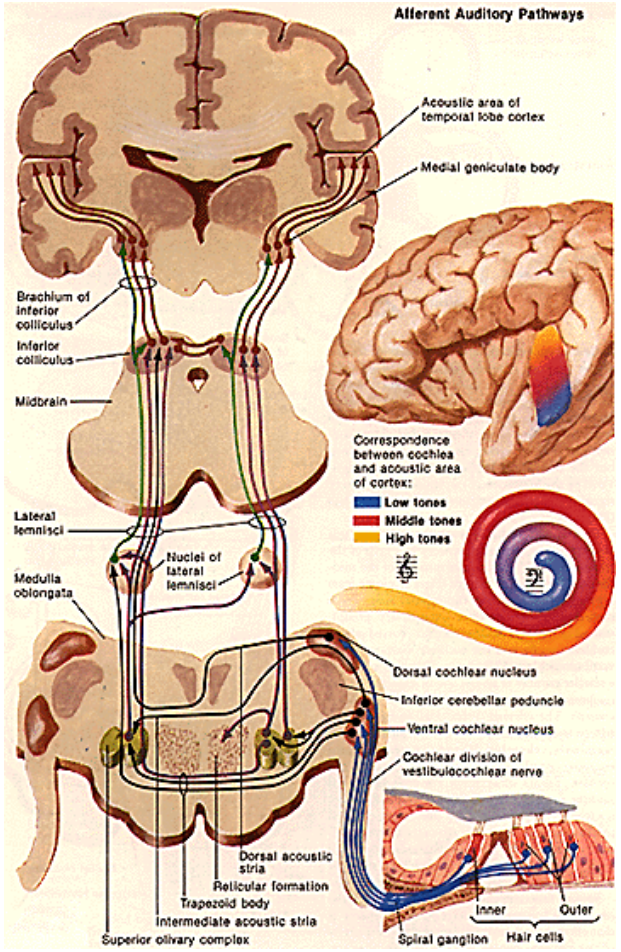
Current View

Exposure to noise and other agents that induce tinnitus cause changes in the central auditory pathway secondary to peripheral damage

Functional MRI testing supports this by showing areas of the auditory cortex and other areas along the pathway “lighting up” in patients with tinnitus versus no additional activity in patients without tinnitus



Inner Ear Hair Cells

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Mechanisms of tinnitus

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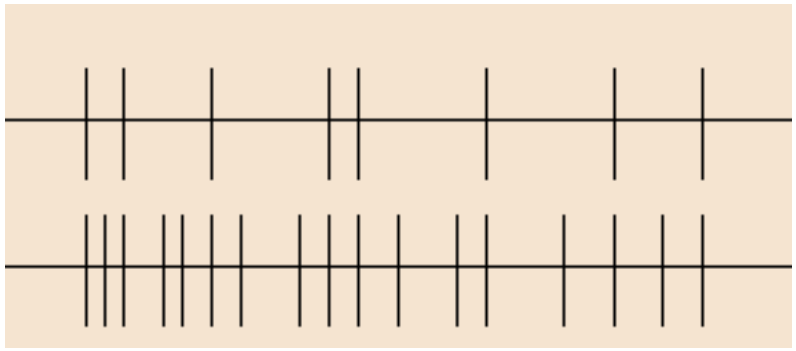
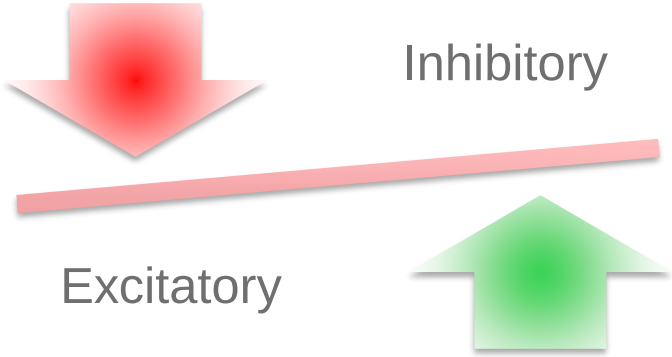
Damaged hair cells leads to:

- Reduction in the inhibitory capacity of the neurons that are deprived of input
- Neural hyperactivity (increased spontaneous activity)
- Sometimes this leads to increased neural synchrony





This neural synchrony is perceived as tinnitus or a ringing in the ears.

Possible repercussions

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Significant tinnitus may impair quality of life

- Sleep disturbance
- Difficulty concentrating
- Emotional imbalance
- Decreased socialization

Can tinnitus be treated?

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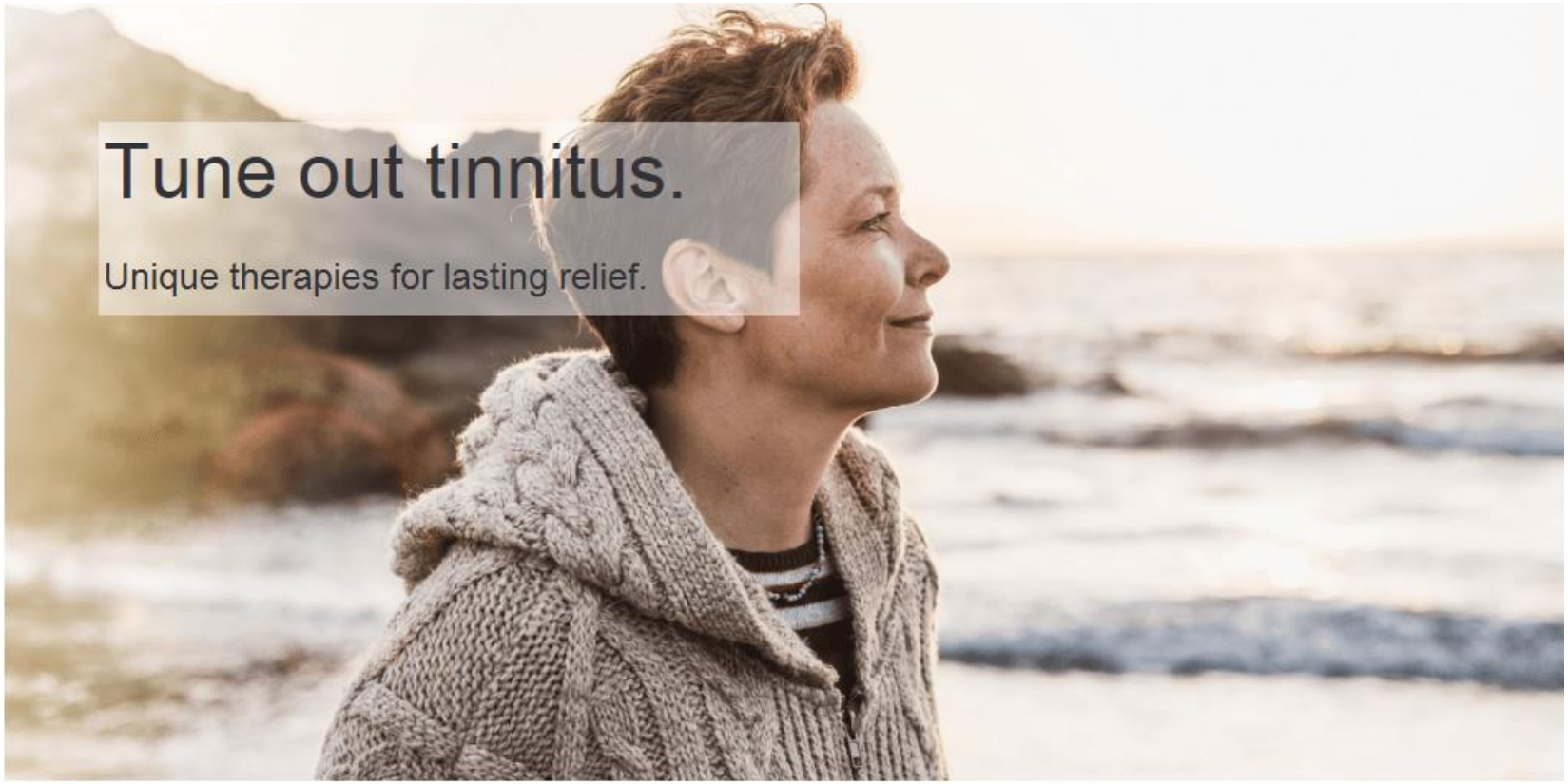

Treatments for Tinnitus

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Amplification

Static noise

Ocean waves

Notch therapy*

New treatment option available

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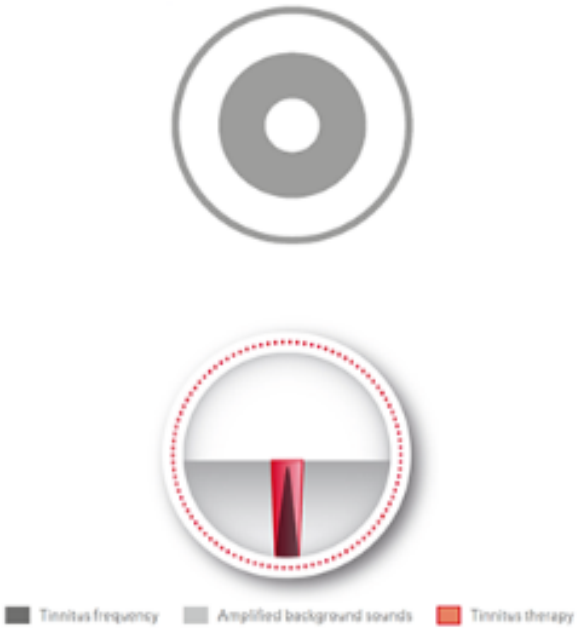

World's first

Unique to Signia: Tuning out tinnitus for a truly peaceful experience.

- relief without adding or masking sound

Restore the Balance

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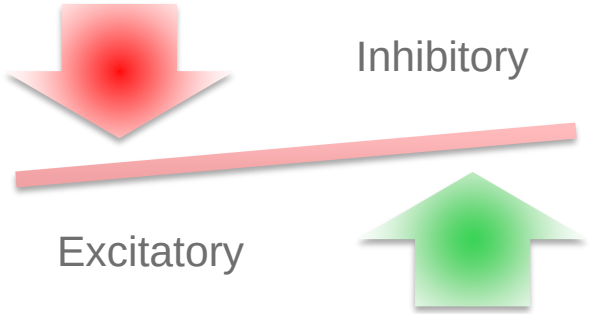
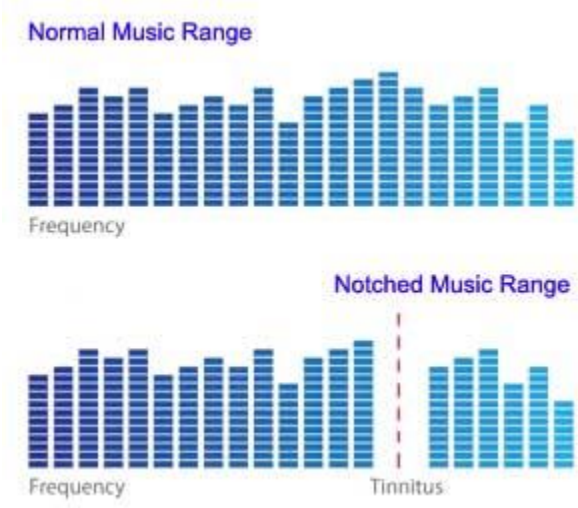
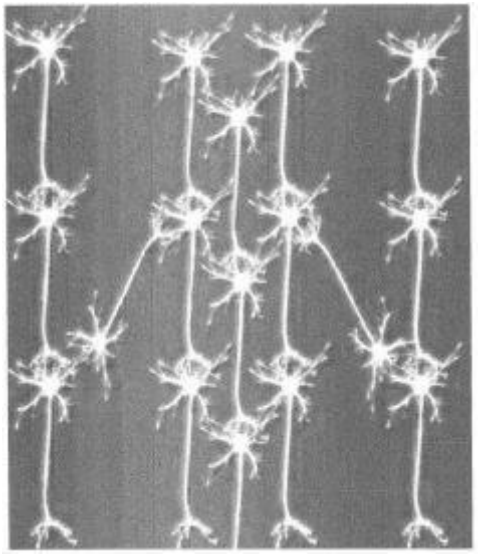
- Notch therapy aims to restore balance to this excitatory / inhibitory imbalance
- Better balance can be achieved by promoting lateral inhibition
- Lateral inhibition lessens neural hyperactivity by strengthening the weakened inhibitory networks of its neighboring nerves







Notch Therapy
How does it work?

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A filtered notch centered at the pitch of the tinnitus,

is provided through the hearing aids.

By notching the amplification we attack tinnitus on two fronts:

1) Enhancing the auditory environment to compensate for the hearing loss
2) Suppressing the tinnitus associated neural hyperactivity by stimulating lateral inhibition

The brain is trained to provide more inhibition to the area of the notched amplification.

The result is a decrease in the perception of tinnitus loudness.

Tinnitus Notch Therapy
Unique and clinically proven

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- Candidates for Notch Therapy
  - Tonal Tinnitus- pure-tone, whistling, ringing or humming sound
  - Any type and degree of hearing loss
- Tinnitus pitch assessment
  - Done by a Hearing Care Professional
  - Through the hearing instruments

Best platform to meet all needs

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Broad portfolio of products

- Up to 3 performance levels
- All styles available for every need
- Special solutions for special needs

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*Not available in Cellion

What do I do now?

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- Reserve a personal consultation time
- Find out if you are a candidate for this technology
- Hearing is believing!

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Thank You!

An independent clinical study in the US has shown that primax provided a significant improvement in ease of listening in demanding listening environments. A methodology using objective brain behavior measures with electroencephalographic data, showed a significant reduction in listening effort for mild to moderate hearing impaired subjects using primax hearing instruments, when applying advanced features SpeechMaster and EchoShield . *Two clinical studies have shown that binax provides better than normal hearing in certain demanding environments (University of Northern Colorado, 2014; Oldenburg Horzentrum, 2013). Speech Reception Thresholds (SRT) in cocktail-party situations improved up to 2.9 dB for wearers with mild to moderate hearing loss using Carat binax or Pure binax hearing aids with narrow directionality, compared to people with normal hearing.