Tinnitus

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Tinnitus

Tinnitus is the term for hearing sounds that come from inside your body, rather than from an outside source. The term tinnitus derives from the Latin word tinnire, meaning to ring.

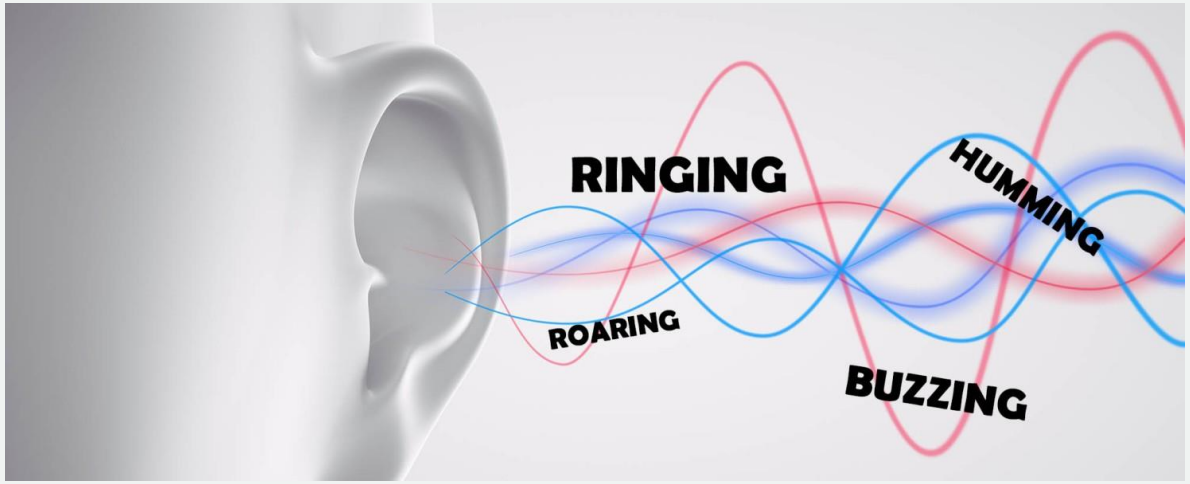
Tinnitus is usually caused by an underlying condition, such as age-related hearing loss, an ear injury or a problem with the circulatory system.

It can also be associated with noise trauma (explosions, loud noises), physical trauma, post-inflammation and other conditions.

Tinnitus

It's often described as "ringing in the ears", although several sounds can be heard, including:

- buzzing
- humming
- grinding
- hissing
- whistling



It is believed that these types of perception result from abnormal neuronal activity at a subcortical level of the auditory pathway. Subcortical structures are a group of diverse neural formations deep within the brain.

Tinnitus

Tinnitus sufferers may also experience:-

- Stress, anxiety and depression
- Trouble concentrating
- Memory problems
- Headaches
- Problems with work and family life
- Common detrimental activities and/or conditions include noise exposure, being in a quiet place and physical exhaustion.

Tinnitus

Risk factors-

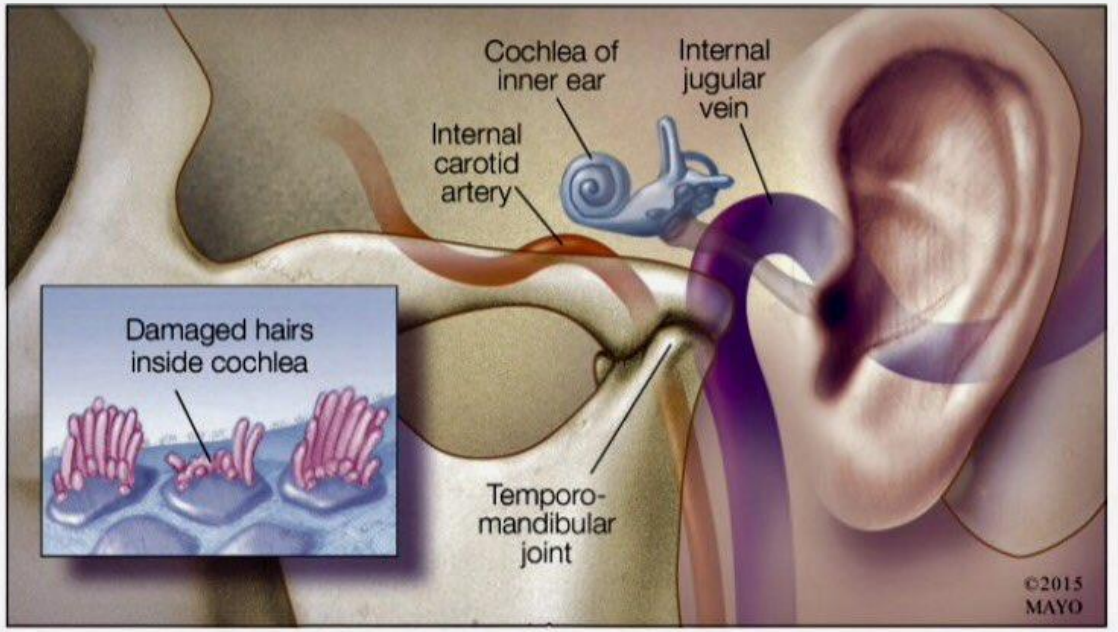
- Loud noise exposure - loud noises, such as those from heavy equipment, chain saws and firearms, are common sources of noise-related hearing loss.
- Portable music devices, such as MP3 players, also can cause noise-related hearing loss if played loudly for long periods.
- People who work in noisy environments — such as factory and construction workers, musicians, and soldiers — are particularly at risk.
- A recent study found the risk of chronic tinnitus was three times higher in people with consistent exposure to loud noises at work and twice as high in those with ‘recreational’ exposures. BMJ, 2016; 354: i4108

Tinnitus

The sound perceived by those with tinnitus can range from a quiet background noise to a noise that is audible over loud external sounds.

Most people have experienced short periods of tinnitus after being exposed to loud noises, such as after a music concert.

Inner ear damage caused by repeated exposure to loud noises, small temporary changes in the outer hair cells (OHCs) following noise exposure can trigger the emergence of tinnitus by increasing the gain of the central auditory system



Microscopic hairs form a fringe on the surface of each auditory cell in the cochlea If hairs are damaged, they may move randomly, sending electrical impulses to your brain as noise, or tinnitus. Tinnitus can also be caused by turbulence in the carotid artery or jugular vein, and temporomandibular joint problems.

Known risk factors for developing tinnitus and conditions associated with tinnitus symptoms

- Otological, infectious — Otitis media, labyrinthitis, mastoiditis
- Otological, neoplastic — Vestibular schwannoma, meningioma
- Otological, labyrinthine — Sensorineural hearing loss, Ménière's disease, vestibular vertigo
- Otological, other — Impacted cerumen, otosclerosis, presbyacusis, noise exposure
- Neurological — Meningitis, migraine, multiple sclerosis, epilepsy
- Traumatic — Head or neck injury, loss of consciousness
- Orofacial — Temporomandibular joint disorder
- Cardiovascular — Hypertension
- Rheumatological — Rheumatoid arthritis
- Immune-mediated — Systemic lupus erythematosus, systemic sclerosis
- Endocrine and metabolic — Diabetes mellitus, hyperinsulinaemia, hypothyroidism, hormonal changes during pregnancy
- Psychological — Anxiety, depression, emotional trauma
- Ototoxic medications — Analgesics, antibiotics, antineoplastic drugs, corticosteroids, diuretics, immunosuppressive drugs, non-steroidal anti-inflammatory drugs, steroidal anti- inflammatory drugs

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Tinnitus

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Audiovestibular Symptoms in Systemic Autoimmune Diseases

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Tinnitus

- In the UK, more persistent tinnitus is estimated to affect around six million people (10% of the population) to some degree, with about 600,000 (1%) experiencing it to a severity that affects their quality of life.
- Tinnitus can affect people of all ages, including children, but is more common in people aged over 65.
- Those who have it may go on to develop Alzheimer's or Parkinson's disease. *Sci Rep, 2020; 10: 12134*

Tinnitus

As you age, the number of functioning nerve fibres in the ears declines, possibly causing hearing problems often associated with tinnitus.

Men are more likely to experience tinnitus.

Smokers have a higher risk of developing tinnitus. (BP)

Drinking alcohol also increases the risk of tinnitus. (BP)

Obesity, high blood pressure and a history of arthritis increase your risk of tinnitus.

Salt is related to a higher blood pressure level which can affect the blood flow to the ears and can activate Tinnitus.

Pineapple, papaya, pears, mangos and bananas contain potassium to help BP regulation

Tinnitus

- The pattern characterizing tinnitus is related to the library of patterns stored in auditory memory and, via the limbic system, associated with emotional states.
- The limbic system is a set of structures in the brain that deal with emotions and memory. It regulates autonomic or endocrine function in response to emotional stimuli and is involved in reinforcing behaviour.
- The annoyance of tinnitus is not correlated with the acoustic characteristics, but there is a significant correlation with psychological symptoms.
- More stress-tinnitus can become worse.

Tinnitus

- The difference between simply perceiving tinnitus and being annoyed or distressed by it depends exclusively on the activation of the limbic and autonomic nervous systems.
- For some people, tinnitus can have a significant impact on everyday life and be very distressing, affect concentration, and cause problems such as difficulty sleeping (insomnia) and depression.
- Most patients with significant tinnitus have difficulty falling asleep due to the accompanying anxiety, which also causes difficulties in returning to sleep during periods of wakefulness during the night.
- There is pronounced neuronal activity in the auditory pathways during sleep due to the auditory system continuously monitoring the sound environment.

Tinnitus

- All levels of the nervous system are, to varying degrees, involved in tinnitus manifestation and symptoms of tinnitus may be processed by different parts of the brain than typical auditory pathways.
- Neural changes can occur at the level of synapses between inner hair cells and the auditory nerve and within multiple levels of the central auditory pathway.
- The amygdala as well as the limbic system seem to play a significant role. The amygdala has a central role in anxiety responses to stressful and arousing situations.

(Roberts et al., 2010; Schaette and Kempter, 2012; Noreña and Farley, 2013; Sedley et al., 2016; Wu et al., 2016; Gentil et al., 2019; Hullfish et al., 2019; Sedley, 2019).

Tinnitus-brain connections

- Suggested mechanisms include reorganization of the brain's tonotopic map (the spatial arrangement of where sounds of different frequency are processed in the brain) following deafferentation, (the interruption or destruction of the afferent connections of nerve cells), increased spontaneous neuronal firing within the auditory brainstem and mid-brain, increased neuronal synchrony,(simultaneous action), failure of inhibitory pathways, maladaptive auditory-somatosensory plasticity or errors of predictive coding.

(Roberts et al., 2010; Schaette and Kempter, 2012; Noreña and Farley, 2013; Sedley et al., 2016; Wu et al., 2016; Gentil et al., 2019; Hullfish et al., 2019; Sedley, 2019).

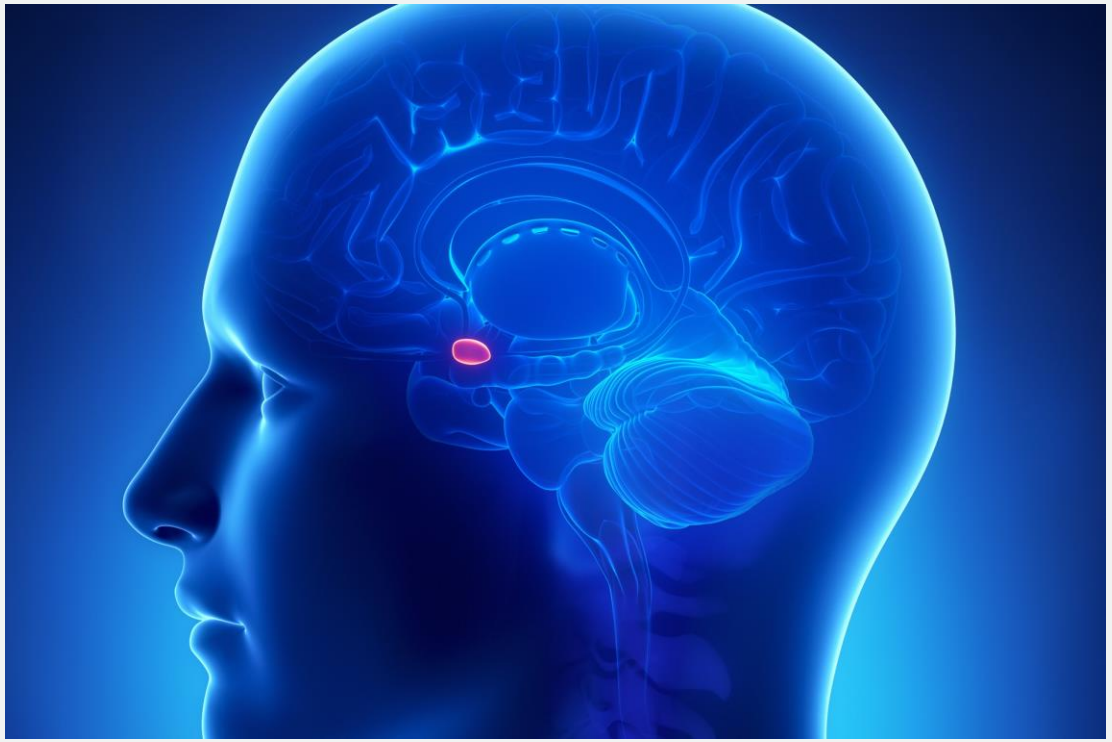
Tinnitus

- Long-term maintenance of tinnitus is likely a function of a complex network of structures involving central auditory and nonauditory systems.

Tinnitus

Calming the amygdala

Become aware of your triggers and warning signs and notice when they're present. A good way to stay calm is to pay attention to your breathing. Breathe slowly and evenly. Think about the speed and rhythm of your breaths and focus on what's going on in your body as you inhale and exhale.



Tinnitus is generally divided into two categories: objective and subjective.

Objective tinnitus is very rare [Meehan and Nogueira, 2014].

Objective tinnitus refers to the perception of acoustic vibratory activity that is generated mechanically within the body.

Objective tinnitus can have its origin in vascular, muscular, skeletal, or respiratory structures (Henry et al, 2005).

These “body sounds” (somatosounds) have an internal acoustic source - a form of tinnitus that may be caused by involuntary muscle contractions or vascular deformities.

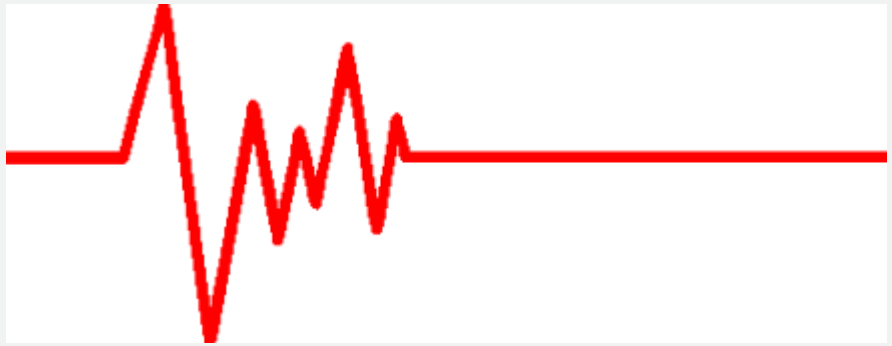
When the cause is treated, the tinnitus usually stops entirely. This is the only form of tinnitus that can be heard as a sound emanating from the ear canal, by an outside observer, and the only type that has the potential for a permanent fix.

Tinnitus is generally divided into two categories: objective and subjective.

It is caused by conditions that produce sound within or near to the ear, including:

Vascular disorders such as:

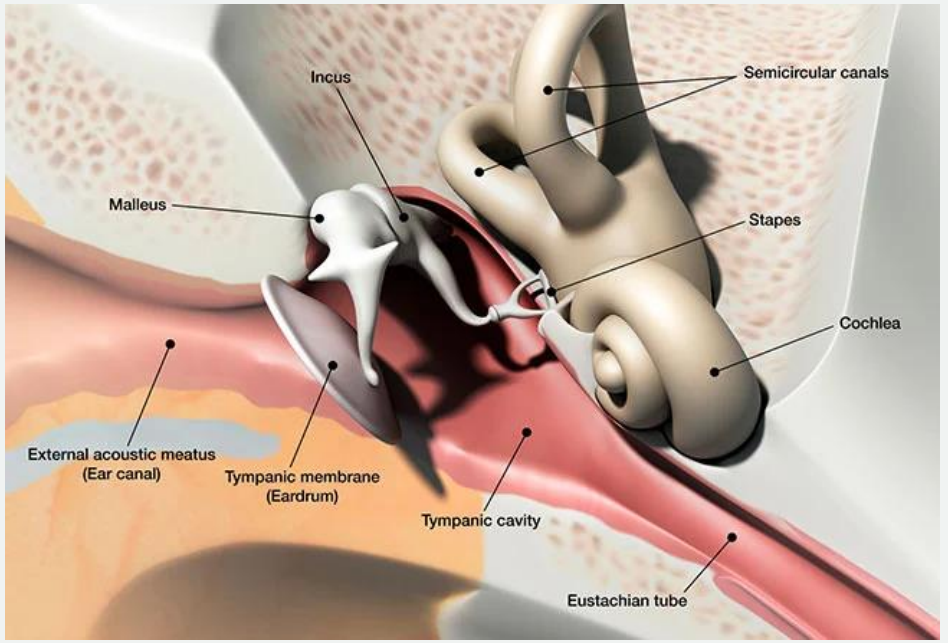
- Arteriovenous malformations and benign venous 'hums'.
- Vascular tumours.
- Carotid or vertebral artery stenosis, tortuosity, dissection, or aneurysm.
- Aortic stenosis and mitral regurgitation.
- High cardiac output states such as anaemia — may also produce pulsatile sounds.



Tinnitus is generally divided into two categories: objective and subjective.

- Patulous eustachian tube — can occur after adenoidectomy or weight loss; clicking sounds occur with swallowing.
- Myoclonus of palatal or middle ear muscles — may cause objective tinnitus by abnormal rhythmic activity. Middle ear myoclonus is usually unilateral and produces a clicking or buzzing sound. Soft palate movements can also cause a clicking sound.

[Henry et al, 2010; Ruppert, 2012; Meehan and Nogueira, 2014; Tunkel, 2014; Zimmerman, 2014; Yew, 2014; Truscott, 2016; BMJ Best Practice, 2017]



Tinnitus is generally divided into two categories: objective and subjective.

- Most people who have tinnitus have subjective tinnitus, or tinnitus that only they can hear in the absence of an acoustic stimulus and associated movements in the cochlear partition or cochlear fluids.
- It is the most common form of tinnitus. Subjective symptoms can only be heard by the affected individual are usually caused by exposure to excessive noise. This type of tinnitus can appear and disappear suddenly and may last 3–12 months at a time. In some severe cases, it may never stop.

Tinnitus

- Neurological tinnitus: Usually caused by a disorder, such as Meniere’s disease, a condition that also causes hearing loss and vertigo (a spinning sensation) that primarily affects the brain’s auditory functions. Tinnitus can be an early indicator of Meniere's disease, an inner ear disorder that may be caused by abnormal inner ear fluid pressure.
- Somatic tinnitus: Related to the sensory system. This form is caused, worsened, or otherwise related to the sensory system. Somatic tinnitus is a type of subjective tinnitus in which the frequency or intensity is altered by body movements such as clenching the jaw, turning the eyes, or applying pressure to the head and neck.
- Reports that tinnitus is louder upon awakening suggest the involvement of somatic factors, such as bruxism. Reports that tinnitus vanishes during sleep but returns within a few hours further suggest that psychosomatic factors, such as neck muscle contractions occurring in an upright position or jaw clenching, play etiological roles.
- Tinnitus also represents a common symptom among children with hearing loss.

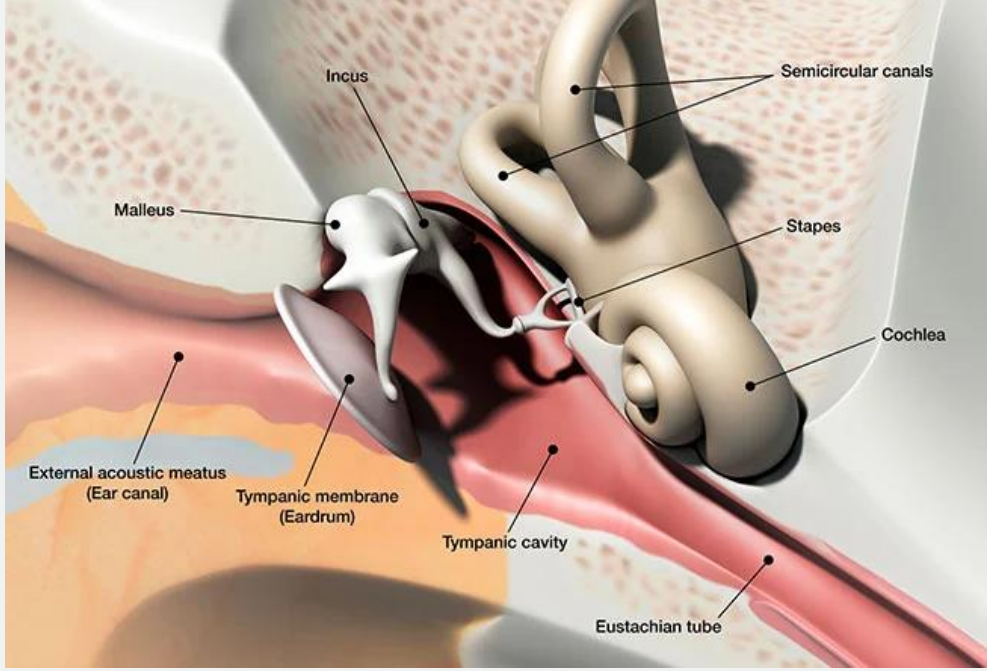
Subtypes

- Musical tinnitus: Also called musical hallucinations or auditory imagery, this type is less common. Simple tones or layers of tones come together to recreate a melody or composition. Musical tinnitus tends to occur in people who have had hearing loss and tinnitus for some time, though people with normal hearing or increased sensitivity to sound can also have musical hallucinations.
- Pulsatile tinnitus: A rhythmic tinnitus that aligns with the beat of the heart. It usually indicates a change of blood flow to the vessels near the ear or an increase in awareness of the blood flow to the ear.
- Low-frequency tinnitus: Perhaps the most confusing type of tinnitus because sufferers aren't sure whether the sound is being produced internally or externally. Often, the tones correspond to the two lowest octaves on a piano and are described as a humming, murmuring, rumbling, or deep droning. This type of noise seems to affect people most strongly.

Tinnitus-hearing loss

Tinnitus is often associated with:

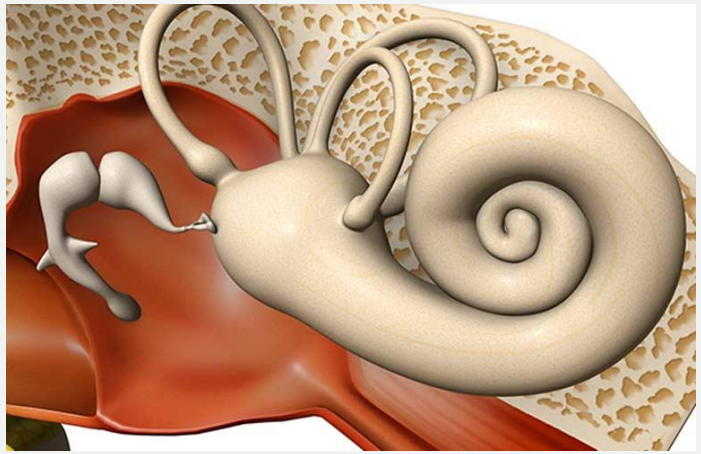
- Age-related hearing loss-there are tiny, delicate hair cells in the inner ear (cochlea) that move when the ear receives sound waves. This movement triggers electrical signals along the nerve from the ear to the brain (auditory nerve). The brain interprets these signals as sound. If the hairs inside the inner ear are bent or broken — this happens as we age or when you are regularly exposed to loud sounds — they can "leak" random electrical impulses to the brain, causing tinnitus.
- Some people notice that hearing is not as good as it used to be or more sensitivity to everyday sounds (hyperacusis).
- Hearing loss affects about 500 million people and is a major risk factor for tinnitus.



Tinnitus

Tinnitus is often associated with:

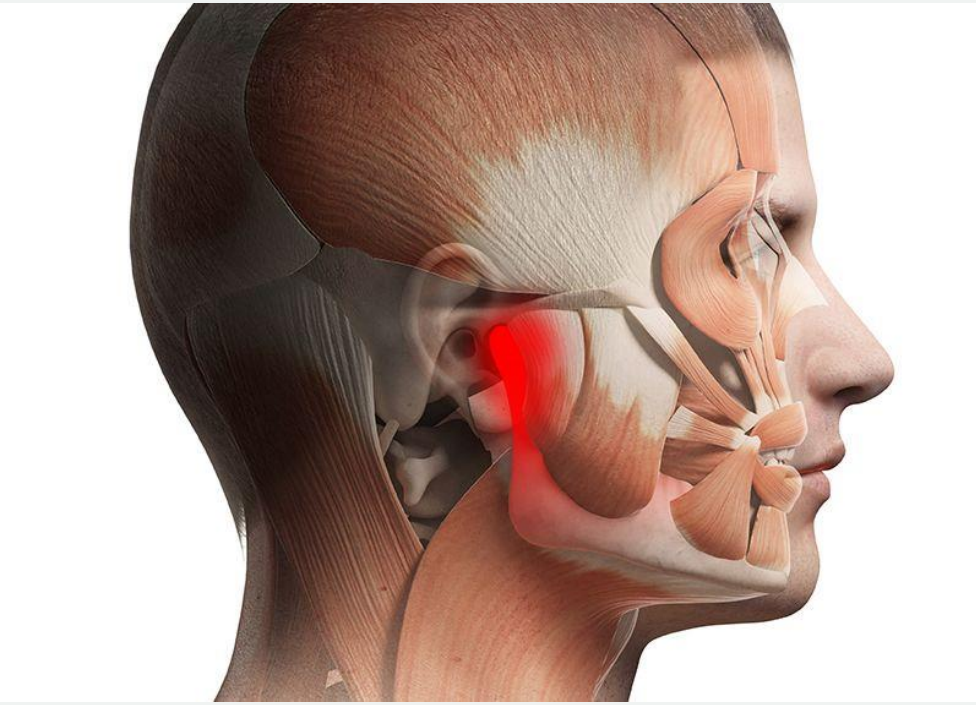
- Head or neck injuries. Head or neck trauma can affect the inner ear, hearing nerves or brain function linked to hearing. Such injuries usually cause tinnitus in only one ear.
- Otosclerosis – an inherited condition where an abnormal bone growth in the middle ear causes hearing loss. Stiffening of the bones in the middle ear can cause tinnitus. This condition, tends to run in families.



Tinnitus-causes

If there is no damage to the auditory system, it may be these possible causes:

- Temporomandibular joint (TMJ) disorders. Problems with the TMJ, the joint on each side of your head in front of your ears, where your lower jawbone meets your skull, can cause tinnitus.
- Chronic neck muscle strain
- Certain medications- Several medications may cause or worsen tinnitus. Generally, the higher the dose of these medications, the worse tinnitus becomes. Often the unwanted noise disappears when drugs are stopped. They are termed as ototoxic.



Tinnitus-causes

- Medications known to cause tinnitus include nonsteroidal anti-inflammatory drugs (NSAIDs) and certain antibiotics, cancer drugs, water pills (diuretics), antimalarial drugs and antidepressants.
- Wax buildup - a common occurrence. The ear canals can become blocked with a buildup of fluid (ear infection), earwax, dirt or other foreign materials. A blockage can change the pressure in the ear, causing tinnitus.
- Cardiovascular disease-conditions that affect blood vessels — such as atherosclerosis, high blood pressure, or kinked or malformed blood vessels — can cause blood to move through veins and arteries with more force. These blood flow changes can cause tinnitus or make tinnitus more noticeable.

Tinnitus-causes

- Less common causes of tinnitus include other ear problems, chronic health conditions, and injuries or conditions that affect the nerves in the ear or the hearing centre in the brain.
- Eustachian tube dysfunction. In this condition, the tube in the ear connecting the middle ear to the upper throat remains expanded all the time, which can make the ear feel full.
- Muscle spasms in the inner ear. Muscles in the inner ear can tense up (spasm), which can result in tinnitus, hearing loss and a feeling of fullness in the ear. This sometimes happens for no explainable reason, but can also be caused by neurologic diseases, including multiple sclerosis.

Tinnitus-causes

- Acoustic neuroma or other head and neck tumours. Acoustic neuroma is a noncancerous (benign) tumour that develops on the cranial nerve that runs from the brain to the inner ear and controls balance and hearing. Other head, neck or brain tumours can also cause tinnitus.
- Other chronic conditions including diabetes, thyroid problems, migraines, anaemia, and autoimmune disorders such as rheumatoid arthritis and lupus have all been associated with tinnitus.

Tinnitus-causes

- Oestrogen underpins signalling from the ears to the brain and falling levels may be responsible for a mix-up in sounds being communicated between the two, leading to unwanted, inner ear noise.
- For some women it may be a temporary problem caused by fluctuating hormones.

Tinnitus-causes

- There is a direct link between insulin resistance, diabetes, and tinnitus. Studies have shown that most people with tinnitus have one of these conditions and treating them with diet and exercise can result in a significant reduction in tinnitus symptoms.
- There is a similar relationship between sugar metabolism disorders and Meniere's disease.
- The earlier the identification of a metabolic disorder, such as insulin resistance, the better the response to treatment. This includes for tinnitus but also for vertigo and prevention of hearing loss. The presence of insulin resistance and/or diabetes should be investigated for every patient presenting with cochlear or vestibular disorders.

Tinnitus-causes

- High blood sugar causes the blood to thicken, and this will not easily travel down the extensive network of tiny capillaries in the ears
- It may well be that diabetes causes a breakdown in the nerves.
- Increases in blood glucose levels may be damaging the small specialised cells that regulate the hearing process
- Some diabetes patients may suffer from a specific type of diabetes called Maternity Inherited Diabetes and Deafness which causes hearing loss - especially of high tones.
- A 2004 paper suggested three possible reasons for this:
- long-term high blood sugars can damage the eighth cranial nerve - this is key for sound and balance.
- high blood sugars can also damage the blood vessels thus reducing the supply of essential oxygen and nutrients
- elevated blood sugars can interfere with the body's ability to create the required levels of potassium and sodium needed for balance and hearing.

Tinnitus-causes

- Migraine-Tinnitus may stem from your brain not being able to adapt to an altered sensory information. The brain tries to then compensate for the altered sensory input with more neural activity in the auditory pathway, causing the ringing or buzzing in the ears.
- The observed increased impairment in tinnitus patients with comorbid headache can be explained as an additive effect of both disorders on health-related quality of life.

Tinnitus-autoimmune

Inner ear involvement in systemic autoimmune diseases should be distinguished from primary autoimmune inner ear disease, a condition in which the immune response acts directly against the inner ear.

Sensorineural hearing loss is the most common audio vestibular symptom associated with systemic autoimmune diseases, although conductive hearing impairment may also be present. Hearing loss may present in a sudden, slowly, rapidly progressive or fluctuating form, and is mostly bilateral and asymmetric.

Vestibular symptoms, tinnitus, and aural fullness can be found in patients with systemic autoimmune diseases; they often mimic primary inner ear disorders such as Meniere's disease and mainly affect both ears simultaneously.

Systemic autoimmune diseases associated to audio vestibular symptoms.

Autoimmune disease	Classification
• Systemic lupus erythematosus	Systemic autoimmune rheumatic disorders
• Cogan syndrome	Systemic vasculitis
• Sarcoidosis	Systemic granulomatous diseases
• Rheumatoid arthritis	Systemic autoimmune rheumatic disorders
• Antiphospholipid syndrome	Autoimmune hypercoagulable condition
• Polyarteritis nodosa	Systemic vasculitis
• Behcet's disease 1	Systemic vasculitis
• Takayasu's arteritis	Systemic vasculitis
• Relapsing polychondritis	Autoimmune connective tissue disorder
• Wegener's granulomatosis	Systemic vasculitis
• Susac's syndrome	Systemic vasculitis
• Sjögren's syndrome	Systemic autoimmune rheumatic disorders
• Myasthenia gravis	Autoimmune condition affecting neuromuscular junction
• Multiple sclerosis	Autoimmune inflammatory demyelinating disease
• Hashimoto thyroiditis	Autoimmune thyroid disease
• Mixed cryoglobulinemia	Systemic vasculitis
• Giant cell arteritis	Systemic vasculitis
• Vogt-Koyanagi-Harada's disease	Systemic granulomatous diseases
• Ulcerative colitis	Autoimmune inflammatory bowel disease

Tinnitus-autoimmune

In 2016, O'Malley et al. identified cells consistent with macrophages/microglia in the human cochlea; the presence of these cells in patients with autoimmune diseases suggests that they may have an important role in inner ear pathology due to the increased level of proinflammatory cytokines and reactive oxygen species (ROS) induced by microglia.

Pathophysiology of inner ear involvement in systemic autoimmune diseases is still unclear and may be related to circulating antibodies against several inner ear antigens leading to antibody-dependent cell-mediated cytotoxicity, the activation of the complement system, a direct action of cytotoxic T cells, or immune complex-mediated damage

Inflammation

- Shaowen Bao, associate professor of physiology at the University of Arizona College of Medicine – Tucson, and his colleagues are closing in on potential treatments for tinnitus by connecting brain inflammation to the condition. They found inflammation in a sound-processing region of the brain triggers evidence of tinnitus in mice that have noise-induced hearing loss, according to a study published in the journal PLOS Biology.
- Recent studies indicate that noise-induced hearing loss causes inflammation – the immune system's response to injury or infection – in the brain auditory pathway. How it contributes to hearing loss-related conditions, such as tinnitus, however, is not well understood. Bao and his colleagues examined neuroinflammation in the auditory cortex of the brain following noise-induced hearing loss and its role in tinnitus.

Inflammation

- Their research showed mice with noise-induced hearing loss (under anaesthesia) had elevated levels of proinflammatory cytokines and the activation of non-neuronal cells, microglia, two defining features of neuroinflammatory responses, in the primary auditory cortex in the brain.
- The research also showed that the cytokine tumour necrosis factor alpha (TNF-α), involved in systemic inflammation, is necessary for noise-induced neuroinflammation, tinnitus and synaptic imbalance (an altered pattern of signalling between neurons). When the researchers used a pharmacological drug to block the TNF-α, the mice no longer showed signs of tinnitus.
- Bao started examining the role of TNF-α in tinnitus in 2011 while at the University of California – Berkley.

Inflammation

- People have found clues for the cause of tinnitus, but because many parallel components are involved, we would block one component, then we would have to block another, then another still," Bao said. "Neuroinflammation seems to be involved in many of these components. We hope blocking neuroinflammation will give us better chance to block them all, thereby stopping the tinnitus."
- The findings suggest that neuroinflammation may be a therapeutic target for treating tinnitus and other hearing loss-related disorders.

Neuroinflammation mediates noise-induced synaptic imbalance and tinnitus in rodent models
Weihua Wang,Li. S. Zhang,Alexander K. Zinsmaier,Genevieve Patterson,Emily Jean Leptich,Savannah L. Shoemaker,Tatiana A. Yatskievych,Robert Gibboni,Edward Pace,Hao Luo,Jinsheng Zhang,Sungchil Yang,Shaowen Bao
Published: June 18, 2019
https://doi.org/10.1371/journal.pbio.3000307

Tinnitus

- If a specific cause can't be found, treatment will focus on helping people manage the condition daily. Tinnitus can be managed through strategies that make it less bothersome.
- No single approach works for everyone.
- Behavioural strategies and sound-generating devices can offer good results — this is partially why distracting the individual’s attention from these sounds can prevent a chronic manifestation.

Tinnitus

This may involve:

- Sound therapy – listening to neutral sounds to distract from the sound of tinnitus.
- Counselling – therapy that aims to educate about tinnitus and help to learn to cope with it more effectively.
- Cognitive behavioural therapy (CBT) – therapy that aims to help change the way people think about tinnitus, so it becomes less noticeable.
- Tinnitus retraining therapy (TRT) – therapy that aims to help retrain the way the brain responds to tinnitus, so people start to tune the sound out and become less aware of it.

Tinnitus-prevention

Use hearing protection-over time, exposure to loud sounds can damage the nerves in the ears, causing hearing loss and tinnitus. Try to limit exposure to loud sounds. And if loud sounds cannot be avoided, use ear protection to help protect hearing.

Turn down the volume. Long-term exposure to amplified music with no ear protection or listening to music at very high volume through headphones can cause hearing loss and tinnitus.

Take care of cardiovascular health. Regular exercise, the right diet and taking other steps to keep the blood vessels healthy can help prevent tinnitus linked to obesity and blood vessel disorders.

Limit alcohol, caffeine and nicotine. These substances, especially when used in excess, can affect blood flow and contribute to tinnitus.

Tinnitus

The sounds heard can help the doctor identify a possible underlying cause.

Clicking. This type of sound suggests that muscle contractions in and around your ear might be the cause of tinnitus.

Pulsing, rushing or humming. These sounds usually stem from blood vessel (vascular) causes, such as high blood pressure, and may be noticed when exercising or changing positions, such as when lying down or standing up.

Low-pitched ringing. This type of sound may point to ear canal blockages, Meniere's disease or stiff inner ear bones (otosclerosis).

High-pitched ringing. This is the most heard tinnitus sound. Likely causes include loud noise exposure, hearing loss or medications. Acoustic neuroma can cause continuous, high-pitched ringing in one ear.

Tinnitus

Common tests include:

Hearing (audiological) exam. During the test, you'll sit in a soundproof room wearing earphones that transmit specific sounds into one ear at a time. You'll indicate when you can hear the sound, and your results will be compared with results considered normal for your age. This can help rule out or identify possible causes of tinnitus.

Movement. A doctor may ask you to move your eyes, clench your jaw, or move your neck, arms and legs. If your tinnitus changes or worsens, it may help identify an underlying disorder that needs treatment.

Imaging tests. Depending on the suspected cause of tinnitus, imaging tests such as CT or MRI scans may be needed.

Lab tests. A doctor may draw blood to check for anaemia, thyroid problems, heart disease or vitamin deficiencies.

Tinnitus

- GPs can check for an ear infection or earwax build-up.
- They can also do some simple checks to see if there is any hearing loss.

Tinnitus

- Acupuncture
- Ginkgo biloba-studies suggest that ginkgo may have a positive impact on patients with tinnitus, by increasing blood flow to the ear and may be especially useful in the elderly. The use of ginkgo may be limited by its interactions with medications, especially blood thinners, aspirin and seizure medications. Ginkgo has antioxidant, neuroprotective and platelet-inhibiting effects.
- In one of the studies, which involved people with mild-to-moderate dementia, a small but statistically significant reduction in tinnitus symptoms was seen in people with either vascular dementia or Alzheimer's disease. *Hilton MP, Zimmermann EF, Hunt WT. Ginkgo biloba for tinnitus. Cochrane Database Syst Rev. 2013;(3):CD003852. doi:10.1002/14651858.CD003852.pub3*

Tinnitus

Zinc is an essential mineral with significant actions in the central nervous system, including the hearing pathway, as well as in hormone production, enzyme function, and synthesis of DNA and RNA.

Studies have suggested that zinc deficiency impacts between 2-69% of individuals with tinnitus. Measuring serum zinc levels may identify those in greatest need for supplementation.

A study published in the American Journal of Otolaryngology in 2015 assessed zinc levels in people with tinnitus. Of the 100 people in the study, 12 had low serum zinc levels. The severity and loudness of tinnitus were greater in those with low zinc levels. The researchers also noted that the mean age of the zinc-deficient group was 65.4 years. *Berkiten G, Kumral TL, Yıldırım G, Salturk Z, Uyar Y, Atar Y. Effects of serum zinc level on tinnitus. Am J Otolaryngol. 2015;36(2):230-4. doi:10.1016/j.amjoto.2014.11.001*

Tinnitus

Stress management with diet and supplements. Stress can make tinnitus worse.

Hormonal imbalances have been identified in many individuals experiencing tinnitus, with imbalance in the hypothalamus-pituitary-adrenal (HPA) axis being most common. This HPA axis is involved in the stress response, with abnormal cortisol production being a common feature. One study found that individuals with tinnitus had a blunted cortisol response after stressful events. Identifying and correcting underlying hormonal imbalance can improve tinnitus in some people, especially those with stress.

Stress management, whether through relaxation therapy, biofeedback or exercise, may provide some relief.

Tinnitus

- Massage and stretching of the neck and masticatory muscles have been associated with significant improvement in tinnitus. *Dobie RA. A review of randomized clinical trials in tinnitus. Laryngoscope. 1999;109:1202–1211. [PubMed]*
- Patients with somatic tinnitus can have symptoms of cervical spine disorders, including head, neck, and shoulder pain as well as limitations in sideways bending and rotation. Treating jaw and neck disorders has beneficial effects on tinnitus.

Tinnitus

Tinnitus may be improved, especially in individuals with sleep disturbances. Neuralactin may help individuals with stress by balancing cortisol production, another hormone often involved in tinnitus.

If the tinnitus is caused by a hormonal imbalance, such as thyroid disease, correcting the thyroid dysfunction can lead to resolution of symptoms.

There have been studies showing a relationship between vitamin B12 deficiency and abnormal function of the hearing pathway.

Tinnitus

Ear candles-ear candles can also help tinnitus caused by allergies and sinus pressure. If Tinnitus is caused by nerve damage, an ear candle can act as a catalyst to clear nerve endings to promote healing of the nerves.

Vascular support

Garlic may be useful for tinnitus by improving blood flow to the inner ear.

White Grapeseed extract can have an influence on inflammation and the cardiovascular system which may lead to improvements in tinnitus.

Discuss medication/s with the GP

Nutrients

- Vitamin A Receptor cells of the ear are dependent upon vitamin A for proper function
- Vitamin B12 Restores possible deficiency and ensures adequate iron. Iron deficiency is associated with hearing loss.
- Magnesium Magnesium deficiency is linked to the development of tinnitus
- Zinc Zinc is concentrated in sensory tissues of the ear
- Vitamin D3 Essential for maintaining calcium homeostasis. Imbalanced calcium is indicated in hearing loss.
- Coenzyme Q10 Ensures adequate oxygen to delicate auditory hairs
- Ginkgo biloba Shown to reduce tinnitus and improve circulation
- Omega-3 essential fatty acids from fish oil May reduce sensorineural hearing impairment
- N-acetyl cysteine Reduces noise induced hearing loss
- Lipoic acid Significantly improves hearing
- Acetyl l-carnitine Prevents noise induced hearing loss

Nutrients

A high degree of stress would, cause an increase in the levels of glutamate in the body and the consequent increase in the perception of tinnitus. Therefore, preferring a diet high in magnesium, capable of inhibiting glutamate, can prove to be very effective in treating tinnitus.

Nutrients

One study, conducted in China and published in PubMed, found iron deficiency in 61% of those with sudden hearing loss.

The second study, published in Otolaryngology, Head Neck Surgery, showed a direct association between sudden hearing loss and iron deficiency. It was most pronounced among subjects 44 years or younger, but also affected those up to 60 years old. This is especially relevant because over 80% of people with tinnitus have it due, at least in part, to hearing loss.

The University of Maryland website lists tinnitus as a common side effect of iron deficiency or anaemia.

Another report calls pulsatile tinnitus a common symptom of anaemia. Anaemia causes low blood viscosity, which increases blood flow. Anything that increases blood flow can cause pulsatile tinnitus.

https://www.ncbi.nlm.nih.gov/pubmed/9812800

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Tinnitus

White noise machines. These devices, which produce a sound like static, or environmental sounds such as falling rain or ocean waves, are often an effective treatment for tinnitus. A white noise machine with pillow speakers to help sleep. Fans, humidifiers, dehumidifiers and air conditioners in the bedroom also produce white noise and may help make tinnitus less noticeable at night.

Masking devices. Worn in the ear and like hearing aids, these devices produce a continuous, low-level white noise that suppresses tinnitus symptoms.

Tinnitus

Blood work for autoimmune antibodies, vitamin B12, inflammatory markers (ESR), cholesterol levels, blood sugar levels, thyroid-stimulating hormone and comprehensive hormone testing can also provide useful information in identifying metabolic, hormonal, or autoimmune cases of tinnitus.

Tinnitus-questions

When did you begin experiencing symptoms?

What does the noise you hear sound like?

Do you hear it in one or both ears?

Has the sound you hear been continuous, or does it come and go?

How loud is the noise?

How much does the noise bother you?

What, if anything, seems to improve your symptoms?

What, if anything, appears to worsen your symptoms?

Have you been exposed to loud noises?

Have you had an ear disease or head injury?

Tinnitus-summary

Tinnitus frequently represents a symptom of an associated disease process.

Recent research has employed state-of-the-art imaging and measurement technology to examine tinnitus-related activity in the ear, auditory nerve, and auditory tracts of the brain.

These studies have increasingly focused on exploring putative brain-related mechanisms. The complexity of the changes in the nervous system associated with tinnitus might explain why this condition has proved so resistant to treatment.

Tinnitus-references

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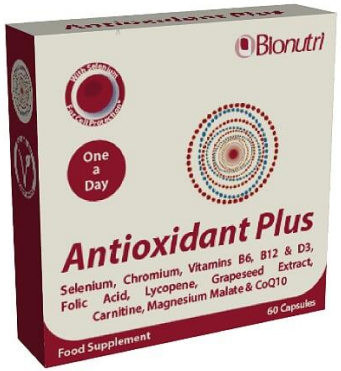
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Plant Based
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with B vitamins & Vitamin C
Food supplement
90 Tablets


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Freeze dried
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Garlic with Oil of Rosemary & Oil of Thyme
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Food Supplement


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Molybdenum & L-Plantarum in a food base of
Turmeric, Artichoke & Dandelion
60 Capsules
Food Supplement

About Bionutri

- Nutrients constitute much of the vital energy in the foods we eat and equally, the more diverse and dynamic our diet the greater our potential for health. So the capacity for Nutrition Practice to exert health benefits is indeed profound.
- However, the modern Practitioner is routinely confronted by clients in an inflammatory, congested state with a lifestyle that does not sufficiently nourish them. To overcome these barriers the Practitioner can intervene with individual or combination supplements.
- That being said, bioavailability and biological activity of nutrient combinations is dependent upon a number of factors; simply bombarding a stressed or weakened system can be either over-stimulating or just ineffective.
- Biosynthesis is the process through which basic nutrients and substrates are enzymatically activated into becoming much more than simply the sum of their parts. It is this process that forms Bionutri's core focus.

About Bionutri

- Products designed for specific straightforward solutions for daily supplementation
- Range is compact and comprehensive
- We draw on 25 years of experience in food supplement manufacture to create a system approach that simplifies your prescribing task
- Eases client management
- Improves compliance
- Cost effective

About Bionutri

Blister packing--our triplex foil sachets ensure the integrity of our products from the first to the last.
We have a specific policy in place to blister pack products containing volatile oils, probiotics, lipid nutrients or aromatic herbs

About Bionutri

- We take responsibility for much of our own procurement
- Of particular importance in dealing with botanicals and insuring the best constituent value of the end product

Practitioner Support

- Website for clients to browse www.bionutri.co.uk and a password protected practitioner page where you have access to video clips, catalogue pages and webinar listings for online registration
- We are also on Facebook/Bionutri for practitioners
- Professional Product catalogue/product leaflets
- Technical Support by Skype/phone or email-Sue McGarrigle ND (suem@bionutri.co.uk) and Edward Joy Herbalist (ed@bionutri.co.uk)
- Product training-one to one or small groups by telephone, Zoom or Skype
- Kinesiology samples
- Samples for sensitive clients

Product sources

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