Making Sense of Medications and Tinnitus

Considering Ototoxicity When Diagnosing Tinnitus

What You Should Know About Dietary Supplements

The Allure of the “Magic Pill”

Tinnitus Tools
• Tinnitus Patient Care Options
• Questions to Ask Your Doctor About Medicines
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A Safe Precaution Is Cautious Use of Drugs

As a clinical audiologist, I often hear, “What caused my tinnitus?” Often, we can’t determine the cause of tinnitus. However, it has been associated with noise exposure, various medications that damage the inner ear, and changes in brain chemistry.

For example, thousands of medications described in the Physicians’ Desk Reference list tinnitus as a side effect, but that does not mean a medication will cause tinnitus. If you have tinnitus, it’s smart to avoid anything that might make it worse. However, many drugs are essential for treating disease or improving well-being. Therefore, the benefit of drug treatment outweighs the risk of tinnitus. Quinine, for example, is an effective treatment for malaria but is known to be toxic to the ear and can cause tinnitus. However, malaria can cause death, whereas tinnitus cannot. It also is important to note that drug-induced tinnitus may be reversed by decreasing or stopping a suspected medication.

Depression, anxiety, and insomnia can accompany tinnitus, and many patients are prescribed medications to alleviate these side effects. Yet, according to the American Academy of Otolaryngology’s Clinical Practice Guideline: Tinnitus, evidence does not support the routine use of these medications for the primary treatment of tinnitus, and some can cause or worsen tinnitus. Some people benefit from these medications, but be cautious about taking them too readily. Over time and with stress-management strategies, many people become less anxious and distressed by their tinnitus.

Please let me know your experiences with medications and tinnitus by writing me at tinnitus@ata.org.

LaQuinn P. Sherlock, AuD
Chair, Board of Directors
Weigh the Risks and Benefits of Medication

Every year, ototoxic drugs cause hearing loss – sometimes accompanied by tinnitus – in an estimated 500,000 Americans, according to the National Institutes of Health (NIH). So, why would you ever take a medication that lists tinnitus and/or hearing loss as possible side effects? For me, the choice was simple: the benefit of taking a drug outweighed the risk of not taking it. Yes, I have mild tinnitus as a result. However, I’m living a full life and don’t regret my decision, because I weighed the risks beforehand.

We are a nation of pill poppers. In fact, 48.9 percent of Americans took at least one prescription drug in the last 30 days, according to the Centers for Disease Control and Prevention (CDC). Anyone on medication of any kind should schedule a regular comprehensive drug review with their doctor and/or pharmacist. And each pill in the daily mix matters, so that discussion should include all prescriptions, over-the-counter drugs, and dietary supplements. If you have tinnitus, carefully research and consider each drug before you take it to avoid compromising your hearing health or causing your tinnitus to spike.

The harsh reality is the stress of intrusive tinnitus can trigger depression, anxiety, and insomnia, creating a vicious cycle that puts immense strain on a person. The American Tinnitus Association does not offer medical advice, but we do advocate for anyone struggling with tinnitus to see a healthcare provider to review treatment and support options – particularly mental-health resources.

If your doctor tells you “Nothing can be done,” know that the ATA is here to help you locate healthcare professionals who will listen to your concerns and give you guidance. Don’t struggle alone and don’t take any medication without first reviewing the benefits and risks to your hearing health with your doctor.

Torryn P. Brazell, MS, CAE Publisher
The power of the mind to influence healing has long been understood intuitively, as noted thousands of years ago by the Greek physician Hippocrates (c. 460–370 BC). But it wasn’t until the 1950s that the notion of the placebo effect entered mainstream thinking about the power of the patient’s belief in the success of a prescribed medical treatment.

The landmark publication credited with that shift was The Powerful Placebo, by Dr. Henry Beecher, an anesthesiologist at Harvard Medical School. Beecher concluded, after reviewing 15 studies involving 1,082 patients, that 35 percent of patients benefited from placebo alone. His paper, published in 1955 in the Journal of the American Medical Association, had tremendous influence, despite profound flaws, adding credence to the importance of a patient’s expectation and faith in positive outcomes.

Indeed, procedures such as sham surgeries, hypnosis, acupuncture, and other treatments aimed at making a patient feel better are believed to work through placebo effect. And the more dramatic the intervention, the bigger the placebo effect, as demonstrated by using larger bitter-tasting pills versus smaller sweet ones to increase the placebo effect.

There are two types of placebos:

- “pure” placebos, such as sugar pills or saline solution, which have no pharmacological effect
- “impure” placebos, which are medications with pharmacological effect but not for the condition being treated, such as vitamins or antibiotics in viral infections

Though there is still much that is not understood about the mind’s ability to heal, brain-imaging technology has verified the physiological effects of placebos. For instance, when taken as painkillers, placebos decreased activity in parts of the brain associated with pain. So, if you believe that something works, then it actually might facilitate healing and treatment outcomes.

“Medicine is not only a science; it is also an art. It does not consist of compounding pills and plasters; it deals with the very processes of life, which must be understood before they may be guided.”

— Paracelsus, Swiss scientist
"The human body experiences a powerful gravitational pull in the direction of hope. That is why the patient's hopes are the physician's secret weapon. They are the hidden ingredients in any prescription."

— Norman Cousins, American journalist
By Michael Hoffer, MD, FACS

Tinnitus is a frequent medical condition that is seen in up to 1/3 of adults. Ten percent of these individuals have consistent symptoms, and half of these – representing 5% of the population – have tinnitus that is disabling. This figure demonstrates clearly that tinnitus is one of the most common disabling conditions and is far more pervasive than a number of “higher profile” medical disorders. More importantly, this figure captures one of the many paradoxes with respect to tinnitus treatment that despite its high prevalence, there is very little known about the optimal treatment options and still too little research into finding a cure or set of cures.

In considering treatment approaches to tinnitus, it is important to realize that tinnitus can be broken down in several different ways. One method of examining tinnitus from the patient’s standpoint divides tinnitus into two categories:

1. the percept (what the patient actually hears) and
2. the response (how the individual responds to this sound)

Unfortunately, for those of us who treat tinnitus patients, we have no way of knowing exactly what the percept is in each patient and no way of ideally determining how an individual will respond to a percept. Two tinnitus sufferers with similar degrees of disability may have different percepts, but because their degree of responses is also different, their symptoms and disabilities seem identical; whereas three individuals with vastly different degrees of disability and different symptoms may have the exact same percept but responses that are different enough to produce the disparate appearance of the individuals.

Current Pharmacologic Treatments for Tinnitus

Given this basic outline, the following is a summary of the current pharmacologic treatments for tinnitus that are used to treat the response to the tinnitus percept. These medicines are approved by the U.S. Food and Drug Administration (FDA) for other medical conditions.

The most common pharmacotherapeutic approach for treating tinnitus is to modify the response to the percept. Benzodiazepines are the most common class of medicine used to treat tinnitus. These medicines, including Xanax®, Valium®, Ativan®, and Klonopin®, among others, are used to treat the anxiety associated with tinnitus and hence treat the response to the percept.

A second general type of medicine used to modify the response to the percept includes medicines that are

““The most common pharmacotherapeutic approach for treating tinnitus is to modify the response to the percept [what the patient actually hears].”"
classified as antidepressants. Unlike benzodiazepines, these medicines, including Celexa®, Paxil®, Prozac®, Elavil®, Pamelor®, Cymbalta®, Effexor®, and Trazadone®, do not come from a single class of medicine, but all have antidepressant activities. In general, the theory behind the use of these medicines is to decrease the depression associated with disabling tinnitus.

The last general category of medicines used to treat the response to tinnitus is sleep medications. These medicines, as the name implies, treat the inability to sleep because of tinnitus. While older-generation sleep medicines worked for inducing sleep, the long length of action (zombie-like state) and quick dependency made them less than optimal for treating sleep loss secondary to tinnitus. A newer generation of sleep medicines, such as Ambien® and Lunesta®, has proven more beneficial in that these medicines produce better quality rest with less or no persistent sedation in the morning. Importantly, these medicines seem to be less prone to causing dependency than older-generation medicines.

“A newer generation of sleep medicines … has proven more beneficial in that these medicines produce better quality rest with less or no persistent sedation in the morning.”

A number of critical points need to be considered when discussing medicines used to treat an individual’s response to tinnitus. As noted, the medicines listed (and others in each class) are FDA-approved medicines with proven benefits for a specific condition (anxiety, depression, insomnia, etc.), but none has FDA approval for treating tinnitus and none has ever proved successful in large-scale trials for the treatment of tinnitus. Nonetheless, for some individuals with tinnitus who aren’t helped by other treatment approaches, such as hearing aids, Tinnitus Retraining Therapy (TRT) and other forms of counseling, or noise suppression, these medicines may be beneficial in easing tinnitus symptoms.

But before a prescription is given, patients and physicians should carefully weigh the pros and cons of using such medicines for coping with tinnitus, because all have side effects and may interact with other medicines or might be unsuitable for some patients.

Michael Hoffer, MD, is an ENT-otolaryngologist at the University of Miami Miller School of Medicine, where he serves as a Professor of Otolaryngology and Neurological Surgery. He is also chair of ATA’s Scientific Advisory Committee.
Ototoxicity: Tinnitus as a Drug Side Effect

What Healthcare Providers (and Patients) Should Know

By Robert M. DiSogra, AuD

Determining the cause of tinnitus in most cases remains elusive to the medical and audiology communities. True, on the basis of the patient’s medical, social, or occupational history, some causes, such as blast explosion, concert noise, recreational noise, and head trauma, can be readily linked (but not limited) to tinnitus. When the cause of tinnitus is unknown, exploration of the patient’s drug regimen is the next step in the differential diagnosis. The mechanism causing drug-induced ototoxicity remains unclear. It may involve biochemical and consequent electrophysiological changes in the inner ear and eighth cranial nerve impulse transmission. But exploring the pathophysiology of tinnitus is beyond the scope of this article. Most physicians and audiologists working with tinnitus patients would agree that damage to the outer cells of the cochlea or changes in the biochemistry within the cochlea would explain the cause of the tinnitus.

Ototoxicity: Tinnitus as a Drug Side Effect

The major classes of drugs known to be ototoxic are antimicrobials, antimalarial drugs, organic and industrial solvents, and some topically administered agents. Added to the list are salicylates, nonsteroidal anti-inflammatory drugs (NSAIDs), aminoglycoside antibiotics, loop diuretics, and chemotherapy agents (e.g., platins and vincristine).

The Side Effect Resource Database (SIDER 2; http://sideeffects.embl.de) reported a total of 996 drugs with a combined side effects total of 4,192. Of these, 275, or 6.5 percent, listed tinnitus as a reported side effect using synonyms such as “ringing in ears” and “ear noise.”

Keep in mind that there is no common language for reporting tinnitus during a drug’s pre-FDA-approval clinical trials. Therefore, coinvestigators might report tinnitus using descriptors provided by the subject (humming, buzzing, whistling, ear disturbance, auditory dysfunction, etc.).

It is essential for healthcare providers to understand the risk factors for ototoxicity, which often lead to drug accumulation and an increased potential for permanent hearing loss. These risk factors include medication dose, therapy duration, cumulative lifetime dose, impaired kidney function, infusion rate of certain medications (e.g., IV furosemide, aminoglycosides), co-administration of multiple ototoxic medications (e.g., aminoglycosides with loop diuretics), age, previous exposure to head and neck radiation (chemotherapeutic agents), genetic susceptibility, and family history of ototoxicity.

Websites for Drug Side Effects Information — Especially Tinnitus

No one knows every drug’s indication dosaging and side effects. However, the internet can be a tremendous resource, even though anyone can put up a website (e.g., www.howicuredmytinnitus.com). Winker et al. proposed a list of guidelines for using websites that offer medical information. One recommendation is that consumers and professionals look only at websites...
that have established credibility, operate under an advisory board, and are updated regularly. Websites should also include appropriate disclaimers that the information on the site is not a substitute for proper medical care.

Consumers and professionals can visit several excellent websites to determine whether any medication has tinnitus as a reported side effect. These include (but are not limited to) the following sites:

www.drugs.com
www.rxlist.com

When you visit a drug information website, simply type in the name of the drug (generic or brand name) and go the “Side Effects” tab. Next, look under “Special Senses” or “Central Nervous System.” If tinnitus is listed, then the next step is to confirm the start date of the drug (or date a drug dosage was increased) with the pharmacist. If the start date of the drug is established and the patient is sure of the start date of the tinnitus, it can be concluded whether the tinnitus is truly an adverse drug reaction.

The prescribing physician should be made aware of this discovery and correlation. The medication dosage might be decreased or the medication discontinued or changed altogether. However, if the prescribed medication is the best one for a particular medical condition and is clearly established as the cause of the tinnitus, the management strategy changes.

Onset of Tinnitus

The onset of tinnitus as a result of a drug is usually immediate (within 15 to 20 minutes for oral medications). When a drug enters the bloodstream, it is considered systemic, and therefore both ears would experience tinnitus. If there is a preexisting hearing loss without tinnitus, the poorer ear may be more susceptible to tinnitus. However, if there is preexisting hearing loss with tinnitus, the tinnitus could get louder.

Temporary or Permanent?

Most tinnitus patients report that their drug-related tinnitus lasts for as long as they are taking the medication. In other words, the tinnitus can be temporary, as in the case of aspirin, nonsteroidal anti-inflammatory drugs, and diuretics. Although the ototoxicity of many drugs resolves after treatment discontinuation, the use of platinum derivatives and aminoglycosides is associated with permanent hearing loss.6

The Role of the Pharmacist

In pursuing a drug as the cause of tinnitus, the patient’s pharmacist can provide exact start dates and dates of increased dosaging. Once a time line has been established of when the drug was dispensed (or increased) and tinnitus reported, the audiologist and pharmacist are in a unique position to work together, helping the patient understand and manage the tinnitus. The prescribing physician is also included for medical management.
“What medications do you take and why?”
This is a typical case history question a physician or audiologist asks. The clinician does additional work to pursue the possibility or probability that the patient’s tinnitus complaint may be a drug side effect. With over 220 drugs listing tinnitus as a reported side effect or adverse drug reaction (ADRs), more detective work is needed to establish whether the tinnitus is truly pathological or not. The terms “side effect” and “adverse drug reaction” are used interchangeably.

Audiometric Testing
When tinnitus is a symptom of a drug side effect or other medical problem, an audiological evaluation should be scheduled to rule out hearing loss as a cause. An audiologist will evaluate hearing and help differentiate between certain types of losses — some of which could be medically or surgically correctable. If there is preexisting hearing loss, the medication could aggravate the condition and the tinnitus could emerge. This is why the information from the pharmacist is critical to determine whether the tinnitus is an adverse event or a sign that hearing loss is getting worse.

“Should I stop my medication if I get tinnitus?”
No! Patients should consult their prescribing physician before cutting back or discontinuing any medication. According to noted auditory researcher Kathleen C. M. Campbell: “The health benefits of the drug far outweigh the risk of tinnitus (or hearing loss).” (K. C. M. Campbell, PhD, personal communication, 2012).

Summary
Despite being a side effect or adverse drug reaction, drug-related tinnitus is manageable and in most cases, is usually temporary and limited to the time the drug is taken. For chemotherapy patients or patients with chronic medical conditions, the health benefits of the drug outweigh the risk of tinnitus. Therefore, counseling is a critical component of tinnitus management.

Robert M. DiSogra, AuD, is a consulting audiologist in Millstone, New Jersey, and past contributor to Tinnitus Today (December 2014). He has been an audiologist for over 40 years. He developed and taught the Pharmacology/Ototoxicity course at Salus University and has lectured and published on this and other topics related to ototoxicity and pharmaceuticals and nutraceuticals for hearing loss and tinnitus. His website, www.drbob-disogra.com, lists his lecture topics and other information for professionals and consumers, including his Guide to Over-the-Counter Tinnitus Relief Products.

To read DiSogra’s article, “Over-the-Counter Dietary Supplements for Tinnitus: Do They Really Help?” see Tinnitus Today (Winter issue, 2014.)


“Thank you for the kindness you have done for me tonight, calling me on a Friday night.”
— Nanette L., daughter of someone with tinnitus
Reducing the Side Effects of Medications

Summary by John A. Coverstone, AuD

Almost all medications have side effects. This is a universal truth of medical treatment that researchers at the University of Virginia School of Medicine are working to overturn. Many medications achieve their effects by blocking specific molecules within cells. The problem is that they block all molecules, no matter what those molecules are doing. Sometimes the same molecule carries out different tasks, some of them very important to body function.

Scientists have determined that specific molecules may perform different tasks depending on where in the cell they are located. When someone takes a medication, it does its work by blocking all molecules in a cell. This is regardless of where those molecules are located within the cell and what their functions are. Some molecules may be performing functions other than what a drug is intended to treat. These other functions in the cell are also affected, resulting in unintended side effects.

The team at University of Virginia developed a technique to manipulate molecules in specific locations within cells – what they call compartments. By manipulating molecules in a discreet compartment, they can study the effects and determine what molecules do in different cellular compartments. This will allow scientists to identify specific locations to target with medications. The goal is to develop medications that more precisely target intended compartments and achieve only the intended effects. As a result, side effects can be reduced because molecules in other compartments will not be affected. The research may also speed up the development of new drugs because specific targets will be identified.

A new frontier in medicine may be coming where more targeted medications are developed that have fewer side effects. That is welcome news to anyone.

The majority of my patients with distressing tinnitus have trouble sleeping because of it. As reported by Cronlein and colleagues,1 difficulty sleeping is a top complaint – along with emotional stress and hearing loss – for patients with bothersome tinnitus. Published reports of how frequently sleep disturbance occurs range from 25 to 77 percent of patients, which is consistent with my patients. In fact, sleep issues were reported by more than half of tinnitus patients, according to the American Academy of Otolaryngology – Head & Neck Surgery Foundation’s Clinical Practice Guideline: Tinnitus (CPG: Tinnitus), which was issued in 2014. Sleep disturbance and insomnia have been linked to increased risk of arterial hypertension, coronary heart disease, psychiatric disorders, as well as impaired productivity.2 Thus, it’s doubly important for tinnitus patients with disturbed sleep to get a good night’s rest.

Can Drugs Help?
This is a controversial area. CPG: Tinnitus suggested that drugs to treat tinnitus are not helpful, although treating a comorbid condition might require medication. But, in general, the panel recommended against most drugs, dietary supplements, and intratympanic injections to treat tinnitus. In addition, while some people might benefit in the short term from taking antianxiety or antidepressant medications at bedtime, there are risks, because these drugs can be habit forming and function less well over time.

In addition, CPG: Tinnitus cautioned that tinnitus can be a side effect of the very drugs prescribed. Some find melatonin beneficial, although studies have not confirmed that melatonin is better than a placebo, according to Elgoyhen and Langguth.3 CPG: Tinnitus, however, suggested that some studies on melatonin appeared to help modulate sleep disturbance. The caveat was the studies were small and lacked a placebo for comparison. Again, without the research, it is hard to recommend. Dietary supplements also lack evidence of having a positive impact. A 2001 study by Drew and Davies4 of more than 1,000 tinnitus patients taking gingko biloba, for example, showed no benefit over the placebo. The bottom line is more research on ways to help tinnitus patients improve sleep and sleep hygiene is needed.

What is Sleep Hygiene?
If one thinks about bedtime and the environment conducive to sleep, one of the first things that comes to mind is quiet. And, for a tinnitus patient, reflecting on the quiet increases tinnitus awareness. As anxiety increas-
es, attention to tinnitus increases. Thus, a vicious cycle of tinnitus awareness and sleep issues ensues. The term “sleep hygiene” refers to things that might “clean up” sleep issues at bedtime or preparation for it. For instance, doing things that increase sleepiness and refraining from things that decrease it, such as watching the news or a horror movie prior to bed or drinking caffeinated products after 2:00 p.m. For some, exercise can increase wakefulness, so it should be avoided too close to bedtime. Things that can enhance falling asleep include meditation or drinking a warm nonalcoholic beverage. Remember that while alcohol tends to make one fall asleep, it is for shorter bursts of time, resulting in less restful sleep. To cope with the quiet, listening to soothing sounds through a sound pillow, ear pajamas, or a bedside sound generator often is helpful. Just as one washes one’s face and brushes one’s teeth before going to bed, soothing sleep-time habits can be quite helpful.

What Are Ear Pajamas and Sound Pillows?
Audiologists call the fleece headbands with speakers “ear pajamas,” because they look like pajamas for the ears! They are available wireless or wired and allow a tinnitus patient to play soothing sounds from apps or MP3 players throughout the night. Similarly, sound pillows have one or two speakers built into the pillow and allow the same kind of connections. The sounds help disguise the tinnitus, enabling many tinnitus patients to sleep better. My favorite app is Relax Melodies premium edition for Android/Relax Melodies P for iPhone, because it allows overlapping of sounds. For many, mixing a steady brown noise (less irritating than white noise) with intermittent high- and low-frequency sounds – peepers and frogs, for example – results in diminished tinnitus awareness and a better night’s sleep. By having the sound at ear level, as opposed to at bedside, the volume is reduced dramatically. By making the combination of sounds barely audible, which tends to mix well with the tinnitus, it feels like one is sleeping with a window open somewhere in the countryside.

What Else Can I Do?
Cognitive Behavioral Therapy for insomnia (CBTi) has been found to be helpful, according to Dr. Magdalena Sereda in her 2016 study. This method helps to shift focus from negative thoughts, like how the tinnitus will disrupt sleep, to more productive thoughts. For instance, a CBT therapist working with some of my patients has had them reflect on a box. The first activity might be to visualize tucking the tinnitus into the box, then focusing on shrinking the box until it is tiny. The smaller the box gets, the less impact the tinnitus has on the patient.

If you’re a clinician, it’s very helpful to demonstrate to patients how sound pillows, ear pajamas, and apps can be used. With these thoughts in mind, I hope everyone will get a better night’s rest, because a good night’s sleep is a tinnitus patient’s best friend!

Melanie Herzfeld, AuD, has dedicated her career to advancing hearing healthcare services for all patients, with special focus given to pediatrics and those struggling with tinnitus, hyperacusis, and misophonia. She became interested in tinnitus treatment early on because so many patients were seeking help at ENT offices where she worked. She trained with Margaret and Pawel Jastreboff and many other specialists in tinnitus management. In 2003, she opened her practice – Hearing and Tinnitus Center. Along with her clinical work, she has taught and published on sound therapy for tinnitus management. She has also served on numerous associations and boards, including the American Board of Audiology.

“... A 2001 study by Drew and Davies of more than 1,000 tinnitus patients taking gingko biloba, for example, showed no benefit over the placebo.”

Relax Melodies:
Sleep Sounds
White Noise, Calm & Meditation
Ipnos Software Inc.

Available on the iPhone
App Store

2. Cronlein, et al.
Summary by John A. Coverstone, AuD

The search for a drug to improve tinnitus is a continuous endeavor in tinnitus research, with few drugs showing positive effects and, even then, only on a subset of tinnitus patients. Researchers from St. Joseph University in Beirut, Lebanon, and The University of Texas Medical Branch in Galveston, TX, studied the effects of sulodexide in treating tinnitus. Sulodexide is an anticoagulant currently showing promise for diabetic neuropathy and a variety of other vascular diseases. Prior studies have shown promise with sulodexide in combination with melatonin over use of melatonin alone for tinnitus relief. The authors of this study sought to determine the effects of sulodexide in isolation.

The authors assessed 150 people for participation in a double-blinded placebo controlled study to determine the effects of sulodexide. All participants were at least 18 years of age and had experienced tinnitus for more than a year. Those with medical conditions known to be associated with tinnitus were excluded. Others were lost to follow-up or declined to participate. One hundred and twenty-four people completed the study.

Tinnitus severity was gauged by self-reported scores using the Tinnitus Handicap Inventory (THI) and Mini-Tinnitus Questionnaire (Mini-TQ).
The participants were computer-matched into two cohorts, one of which received placebo and the other sulodexide. Cohorts were matched according to age and gender. THI and Mini-TQ scores also were similar between cohorts. Those taking placebo were given a pill that was made of cornstarch and looked identical to sulodexide. One staff member was aware of who was receiving the placebo and who was receiving sulodexide. This allowed the physician and patients all to be blinded to the substance being taken. Subjects took a pill morning and evening for 40 consecutive days.

After the 40-day administration of placebo or sulodexide, a significantly lower THI score was found in the group that had taken sulodexide, compared to those taking placebo (THI score of 30.1 and 40.5, respectively). Scores on the Mini-TQ also demonstrated a greater decrease for those taking sulodexide (average of 9.7 vs. 12.5). Further analysis showed that those taking sulodexide demonstrated decreased scores on the THI and Mini-TQ, regardless of their beginning score.

The mechanisms by which sulodexide may improve tinnitus are not yet understood. However, this study demonstrated that this drug has potential to reduce the severity of tinnitus and holds promise for further study in this area.


Tinnitus Treatment Began with a Demand to Take Action

By Bethany Quattrococchi

In March 2005, I woke up with an extremely painful earache in my right ear. My general physician treated me initially with an antiviral medication, but when the pain continued, he prescribed Naproxen® and Cyclobenzaprine®. Within days, a loud, high-pitched ringing began in my right ear, so much so, that I could hardly understand what people were saying to me. The medications were discontinued immediately, but the loud ringing continued, so I began down the typical path that most tinnitus patients travel, with multiple medical professionals telling me there was no cure and offering no suggestions that counseling might be helpful in learning how to cope with tinnitus.

I was sleep deprived for four months. “You’re anxious,” my doctor said, as he prescribed sleeping pills and antianxiety medications. I felt like I had to take them otherwise he wouldn’t see me anymore. I’m sensitive to medications—can’t even take Motrin®—so the side effects were awful, which meant I had to stop taking the pills. With the high-pitched screeching and two other sounds filling my head, I was miserable and exhausted from lack of sleep. I was referred to an ENT who said, “I feel for you, but I have nothing to offer you.”

Finally, my husband and a close friend confronted me about my steady decline and insisted that I take action. They told me I had to take control to get my life back on track! And truly, if you’re looking for someone to cure you, it won’t happen because you have to find what works for your particular situation. You have to invest yourself in finding the solutions.

When I was going through this, I felt like people didn’t believe me. When I met people who had tinnitus, they didn’t want to talk about it because they said that made it louder. If the tinnitus were visible, that would make it real for other people.

I started my internet search on how to live with tinnitus instead of how to cure tinnitus. I found information on the American Tinnitus Association website and read articles about masking the sound. In fact, it was the recent article “Broadband Noise Is Still King” in the 2017 Winter issue of Tinnitus Today, discussing research that showed broadband noise shifts internal weighting of sound away from tinnitus, resulting in lower tinnitus loudness, that prompted me to share my experience using my broken radio.

“In fact, it was the recent article ‘Broadband Noise Is Still King’ in the 2017 Winter issue of Tinnitus Today, discussing research that showed broadband noise shifts internal weighting of sound away from tinnitus, resulting in lower tinnitus loudness, that prompted me to share my experience using my broken radio.”
Commercial sound-masking machines did not mask my tinnitus, but I found a CD called *Music to Promote Sleep*, which was scientifically designed to calm the mind and facilitate deep sleep, which helped. By playing the CD throughout the night at full volume, I was able to get two to three hours of sleep.

I also researched medical reasons for tinnitus, thinking there was more to my story than an ear infection. One article in a medical journal addressed the connection between ringing in the ears and cervical vertebrae injuries, concluding with a recommendation for chiropractic evaluation. I had had a cervical injury in college, with the lingering effect being an occasional dull cervical ache.

As a retired physical therapist, it was a great leap of faith to go to a chiropractor. Putting my skepticism aside, I made an appointment with a highly recommended chiropractor, who found cervical malalignments. Within two weeks and six visits, my deafening tinnitus was gone! I still had the low-volume sound and the crackling noise of static, but I could finally carry on a conversation naturally. Moreover, the background sounds of a normal day masked my tinnitus. However, I was still struggling to sleep.

I finally figured out that if I turned up the volume on my old broken radio, the loud sound of static helped me sleep undisturbed for four solid hours! Within weeks, I was sleeping a full seven to eight hours nightly. Well rested, I finally felt in control of my life again and accepted that tinnitus would be a part of it.

After six months, I found myself lowering the volume to the point that there were nights I didn’t need the sound of static to sleep. Beginning in 2008, I no longer needed the noise to sleep, and the tinnitus in my right ear, which mirrored that sound of static, was minimal.

In 2018, I’m living a full life, but I don’t take it for granted that my tinnitus is under control. I focus on good posture and doing exercises for my neck. I use noise-canceling headphones at movies and concerts. And I always keep my broken radio handy and maintain my membership in the ATA.

I am thankful for the ATA for giving me hope, giving me information that put me on the right path to control my tinnitus, continuing to educate medical professionals, and supporting research.

Bethany Quattrociocchi is a retired physical therapist living in Delaware and a member of the ATA. She is involved in community activities, the local art league, her church, and loves to paint.

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Shop at a Thrift Store for Masking Technology

In the early 1970s, the sound of water cascading from a nearby fountain caught Charles Unice* by surprise; it was the first time since developing tinnitus that he couldn’t hear it. That realization was the starting point from which the American Tinnitus Association began pursuing sound therapy for tinnitus relief.

Decades later, there are sophisticated devices, treatments, and apps for tinnitus masking. However, older technologies—mainly radios and floor fans—can also work to mask tinnitus, helping someone bothered by tinnitus to sleep or concentrate. Best yet, both devices can often be found at thrift stores at minimal cost and work without an internet connection. And if you rely on sound to sleep, it’s a good idea to have a battery-powered radio as backup if electricity is lost.

*The ATA came about through the efforts of Charles Unice, MD, in 1971 to generate greater awareness of tinnitus and fund research toward cures.*
The Allure of the “Magic Pill”

What Science Says About Dietary Supplements to Help Tinnitus

By Cláudia Barros Coelho, MD, PhD

Dietary supplements appeal to patients who want a “magic pill” for tinnitus. Playing into that desire is an abundance of advertisements on the internet, on television, and in magazines offering a quick fix for tinnitus. The pills are typically low-cost, over-the-counter drugs that are purported to have remarkable benefits, according to their manufacturers. The fact that they are often labeled “natural” plays into the notion that they are safe and effective, which isn’t always the case.¹, ²

What Exactly is a Dietary Supplement?

It’s a pill containing an ingredient intended to supplement the diet. Ingredients might include vitamins, minerals, herbs or other botanicals, amino acids, and substances such as enzymes. The National Institutes of Health estimates that approximately 40 percent of Americans – many tinnitus patients among them – take some form of dietary supplement.

In a recent online survey of 1,788 people with tinnitus from 53 countries, 23 percent of participants reported using dietary supplements, such as vitamins, herbs, minerals, homeopathic compounds, and Chinese phytotherapics, to treat tinnitus.³ Fifty-two substances were described, with the most common being Ginkgo biloba (26.6%), lipoflavonoid (12.9%), vitamin B₁₂ (8.6%), zinc (8.6%), magnesium (6.6%), and melatonin (4.6%). Only 19.1 percent of all treatments were recommended by a physician. The internet was the source most frequently used for purchasing the supplements (40%).

The supplements were considered ineffective for tinnitus by 70.7 percent of subjects. Improvement in tinnitus was reported by 19.0 percent of patients, with 10.3 percent responding that a supplement had negative effects (worsened tinnitus). The survey results confirm the lack of efficacy of dietary supplements for tinnitus and correlate with findings of previous studies.⁴

The U.S. Food and Drug Administration (FDA) has not approved any dietary supplements for tinnitus treatment, even though some studies have suggested benefit for a subgroup of tinnitus patients.⁸ Perhaps a specific subgroup might benefit from taking dietary supplements, but, to date, only a limited number of well-designed investigations have tested the efficacy of dietary supplements for tinnitus.⁹, ¹⁰

The different results shown in available studies are probably

Concerns About Dietary Supplements and Self-Medication

- Do not self-medicate. Before taking a dietary supplement, talk to your healthcare provider. Dietary supplements are regulated by the U.S. Food and Drug Administration, but differently and far less strictly than prescription medications.
- “Natural” does not always mean “safe.” The use of dietary supplements can cause serious adverse effects.
- Inform your doctor and dentist. Dietary supplements may interfere with medications, medical problems, dental or surgical procedures, pregnancy, and breast feeding.
- Do not focus on tinnitus. Unsuccessful attempts to reduce or eliminate tinnitus can create unrealistic expectations and increase focus on tinnitus, making the condition difficult to accept and manage.⁵, ⁶, ⁷
attributable to differences in methodology, forms of presentation, dosage, and purity of the product.\textsuperscript{11, 12} Despite the disparate findings, patients and physicians look to dietary supplements to ease symptoms of tinnitus and its associated distress.

\textbf{What Research Says About Dietary Supplements and Tinnitus}

\textit{Ginkgo biloba}

\textit{Ginkgo biloba} in the form of EGB 761 (standard \textit{Ginkgo biloba} leaf extract containing 24\% of glycoside flavonoids and 6\% of terpene lactones) is the most widely prescribed dietary supplement as a treatment for peripheral vascular disease (insufficient blood flow to the limbs because of damage to blood vessels) and cerebral insufficiency (not enough blood reaching the brain) that causes concentration difficulties, memory loss, dizziness, and tinnitus.

\textit{Ginkgo} is also the most studied dietary supplement in tinnitus treatment. It is believed to improve tinnitus by increasing inner ear and cerebral blood circulation and by protecting against free radicals. Several clinical trials have been performed on tinnitus patients, but the results are conflicting, with some showing positive effects and others showing no effect.\textsuperscript{13, 14} People with seizures (as in epilepsy) or bleeding disorders should not use ginkgo.

\textbf{Zinc}

Zinc is an element present in all organs, tissues, fluids, and secretions of the body and is essential for stabilizing the internal environment of the body. In the auditory pathway, zinc plays a critical role in several aspects of cochlear and neuronal function. Changes in zinc absorption or excretion or an increase in body requirements can result in zinc deficiency. This is particularly common among the elderly, vegetarians, and alcoholics. Clinical manifestations include diarrhea, hair loss, muscle wasting, depression, irritability, and a rash on the extremities, face, and perineum. Zinc deficiency has also been related to tinnitus.\textsuperscript{15}

A few studies have evaluated zinc supplements for treating patients with tinnitus. Zinc was no more effective in the treatment of tinnitus than placebo in a group of elderly patients in a randomized double-blind placebo control study. However, a subgroup of subjects with zinc deficiency might have derived some benefit.\textsuperscript{16, 17}

Zinc supplements are generally well tolerated, with the most common side effects limited to poor digestion, abdominal pain, and nausea.

\textbf{Vitamin B\textsubscript{12}}

Vitamin B\textsubscript{12} is an essential vitamin for the body that affects neurologic and circulatory functions. Vitamin B\textsubscript{12} deficiency might impair the vascular and nervous systems of the auditory system and has been implicated in hearing loss and tinnitus. Vitamin B\textsubscript{12} deficiency is caused by dietary deficiencies or poor absorption. Because vitamin B\textsubscript{12} cannot be synthesized by the body, a dietary source, such as fish, meat, poultry, eggs, and milk and other dairy products, is critical.

Preliminary testing of vitamin B\textsubscript{12} to treat tinnitus suggests that it could improve tinnitus.\textsuperscript{18-20} Vitamin B\textsubscript{12} supplements are usually well tolerated, with mild side effects including diarrhea, skin rashes, and headaches.

\textbf{Melatonin}

Melatonin is a hormone produced by the pineal gland and in different cells and tissues of the body, including the cochlea. Among its properties, it helps facilitate sleep, protects against damaging free radicals and ototoxic drugs, and has antioxidant effects. It has been used in the treatment of sleep disorders. A review of studies of melatonin in tinnitus treatment concluded that it could have a positive effect on sleep problems caused by tinnitus.\textsuperscript{21} Melatonin appears to be safe when used short term, but it is yet unknown whether extended use is safe. Side effects are uncommon but can include drowsiness, headache, dizziness, or nausea.

\textbf{Flavonoids}

Flavonoids are a diverse group of phytonutrients (plant chemicals) found in almost all plant foods. Flavonoids represent a large class of at least 6,000 phenolic compounds that appear in fruits, vegetables, herbs, cocoa, chocolate, tea, soy, red wine, and other edible plants and beverages. Flavonoids exhibit...
protective effects on cardiovascular and neurologic functions and are credited with reducing inflammation and incidence of cancer.

Epidemiological studies suggest that lower consumption of flavonoid-rich diets is associated with the development of many age-related diseases, including cancer, cardiovascular disease, diabetes, osteoporosis, and neurodegenerative disorders.\(^2\)

Lipoflavonoid, a compound of vitamins and flavonoids, is widely advertised on the internet and in magazines as a tinnitus treatment. Only one clinical trial has evaluated the use of Lipoflavonoid Plus\(^\circledR\) alone or in association with manganese. Neither supplement was shown to be effective in reducing tinnitus.\(^23\)

**Magnesium**

Magnesium is an essential element that plays a key role in many body functions, including in the auditory pathway. Research studies show decreased serum magnesium levels to be associated with tinnitus, implicating magnesium in the pathophysiology of subjective tinnitus.\(^24\)

Some preliminary study results demonstrated that magnesium supplements likely benefit ear functions and suggested it might have a beneficial effect on tinnitus perception.\(^25, 26\)

**No “Magic Pill”**

The research is clear in showing that dietary supplements are ineffective for reducing the perception of tinnitus, which is why the American Academy of Otolaryngology—Head and Neck Surgery Foundation’s *Clinical Practice Guideline: Tinnitus* states that clinicians should not recommend *Ginkgo biloba*, melatonin, zinc, or other dietary supplements for treating patients with persistent bothersome tinnitus.\(^27\) While it is understandable that people bothered by tinnitus would try supplements, thinking they might fall into that subcategory of patients who sometimes find relief, it’s important to consider the risks of adverse effects, as well as to acknowledge that the ingredients may not be safe. If you’re determined to try them despite that, then you should have blood work done to determine if you have vitamin and mineral deficiencies, and discuss with your physician which supplements would be appropriate based on those results.\(^\wedge\)

Cláudia Barros Coelho, MD, PhD, is an otolaryngologist who has specialized in the management of tinnitus and hyperacusis for over 20 years. She is a professor of otolaryngology at UNIVATES Medical School, Lajeado, Brazil, and an associated research scientist in the Otolaryngology and Head and Neck Surgery Department at the University of Iowa, Iowa City. She is an international speaker on tinnitus and hyperacusis. Her research on tinnitus and hyperacusis has been published extensively, and she has written many chapters in books on tinnitus.

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**Useful Links**

- The Safety Reporting Portal: Allows visitors to report suspected safety issues with dietary supplements to the U.S. Food and Drug Administration and the National Institutes of Health www.safetyreporting.hhs.gov

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4. Ibid.
5. Ibid.
Questions to Ask Your Doctor About Medicines & Dietary Supplements

- Can I use a generic form?
- When should I start to feel differently? When should I report back to the doctor?
- Will this take the place of anything else I am using?
- Are there any special directions for using this?
- Should I avoid any other medicines, dietary supplements, or treatments while using this?
- Should I avoid any foods, other substances, or activities while using this?
- What are the possible side effects from this? Is there anything I should watch for? What do I do if I get a side effect?
- Will I need any tests (blood tests, x-rays, other) to make sure it is working as it should? When? How will I get the results?
- What should I do if I miss a dose?
- What do I do if I use too much?
- Where and how can I get more written information about this?

As suggested by the U.S. Food & Drug Administration (FDA). For more information, see www.fda.gov.
“The aim of medicine is to prevent disease and prolong life; the ideal of medicine is to eliminate the need of a physician.”

— William J. Mayo, physician, surgeon, one of the seven founders of the Mayo Clinic
**Buyer Beware: Regulating Dietary Supplements**

The U.S. Food and Drug Administration (FDA) regulates dietary supplements under a different set of regulations than those covering food and drug products. Under the Dietary Supplement Health and Education Act of 1994, dietary supplement manufacturers do not need to prove the efficacy and safety of their products to the FDA prior to marketing them.

Dietary supplement manufacturers are required to print the following on their labels:

> “This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.”

Given the lack of oversight, ask yourself if the manufacturer’s claims are too good to be true and remember that none of the supplements marketed for tinnitus treatment have FDA approval.

The FDA periodically inspects facilities manufacturing dietary supplements, and there are several organizations that monitor ingredients for safety, offering seals of approval on products properly manufactured, containing the ingredients listed on the label, and not containing harmful levels of contaminants. These seals of approval don’t prove safety or efficacy.

For more information on dietary supplements that carry seals of approval, see:

- U.S. Pharmacopeia at [www.usp.org](http://www.usp.org)
- ConsumerLab.com at [www.consumerlab.com](http://www.consumerlab.com)

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**Dietary Supplements: Safety and Risk Considerations**

According to the National Institutes of Health, many dietary supplements contain active ingredients that can strongly affect the body, so it’s important to be aware of possible side effects. For instance, if taken before or after surgery, certain dietary supplements can affect your response to anesthesia. Dietary supplements can also interact with certain prescription drugs in ways that might cause problems. A few examples include:

- Vitamin K can reduce the ability of the blood thinner Coumadin® to prevent blood from clotting.
- St. John’s wort can speed the breakdown of many drugs (including antidepressants and birth control pills) and thereby reduce these drugs’ effectiveness.
- Antioxidant supplements, like vitamins C and E, might reduce the effectiveness of some types of cancer chemotherapy.

Also, keep in mind that something labeled “natural” doesn’t necessarily mean it’s safe. A supplement’s safety depends on such things as chemical makeup, how it works in the body, the dosage, and how its prepared. Certain herbs, such as kava – used for alleviating insomnia and/or anxiety – can cause liver damage.

Take the time to talk to your healthcare provider and/or pharmacist about dietary supplements that you’re considering taking, because — unlike prescription drugs — the FDA does not require dietary supplement manufacturers to prove their effectiveness or safety prior to sale.
Putting Fears About Drugs and Aggravating Tinnitus into Perspective

By Stephen Nagler, MD

Q: My doctor prescribed antidepressants to help me cope with my tinnitus, but I’m afraid to take them because they might cause my tinnitus to get louder. Is that a legitimate concern?

A: It’s important to make a distinction between drugs that have been reported to occasionally increase tinnitus loudness temporarily and drugs that can potentially cause permanent auditory damage. Hundreds upon hundreds of drugs have been reported at one time or another to temporarily increase tinnitus loudness, but that does not necessarily mean they cause permanent auditory damage.

For instance, the antimalarial drug chloroquine can potentially cause an exacerbation in tinnitus loudness and cause permanent auditory damage. On the other hand, whereas various antidepressants have been reported to occasionally exacerbate tinnitus, they normally do not cause auditory damage. Thus, if your doctor believes that you would benefit from taking an antidepressant, from an auditory standpoint, I see no harm in following your doctor’s advice.

If the drug seems to aggravate your tinnitus, then you can always discontinue it under your doctor’s supervision. If the tinnitus does not settle back down within a week or two of discontinuation, then the antidepressant was likely not the culprit in the first place. I would add that unless you are actually depressed, in most cases there are better ways to cope with tinnitus than taking antidepressants.

Q: My doctor suggested that I stop taking Xanax® (alprazolam), but I’m afraid to because it helps me sleep and feel less bothered by my tinnitus. Is there some other medication that would help me sleep or feel less stressed? I’m overwhelmed by the thought of not having a prescription.

A: The use of the benzodiazepine Xanax® has long been a hot-button topic in tinnitus circles. It would take an entire book chapter to adequately address this very complex subject. Indeed, there are extremely strong opinions on both sides of the issue. You make it a bit easier from a Q&A standpoint in that you are already taking the drug and, moreover, appear to be receiving considerable benefit.

That said, benzodiazepines should not be taken any longer than necessary. All things being equal (and they never are), you are in general better off not taking benzodiazepines than taking them. The challenge lies in the fact that your anxiety level is apt to increase considerably as you come off Xanax® because (1) the drug tends to be habit-forming, (2) the drug tamps down overall anxiety, and (3) the drug decreases tinnitus-associated distress without effectively addressing the underlying cause of that distress. (The importance of this third factor cannot be overstated.) Additionally, tapering the drug too rapidly can potentially result in an unpleasant temporary increase in tinnitus loudness.

My recommendation would be to thoroughly discuss the pros and cons of discontinuing Xanax® with your doctor (possibly show him or her this column), and if together you decide that it is time to begin tapering the drug, ask your doctor to recommend a plan for...
doing so extremely gradually. I would also suggest that you investigate some nonpharmacological approaches for decreasing tinnitus-associated distress, such as Cognitive Behavioral Therapy (CBT), so that your anxiety can become much more manageable as you taper Xanax® and thereafter.

**Q: Someone said that lipoflavonoid supplements can reduce the sound of tinnitus. Is it worth giving them a try?**

A: To the best of my knowledge, no large-scale reliable and verifiable properly controlled scientific studies show any benefit over placebo to taking lipoflavonoid supplements for the purpose of improving tinnitus by any generally accepted criteria. But that really wasn’t your question. You basically want to know whether it is worth giving lipoflavonoid supplements a try anyway, and the decision to undertake any treatment for any condition is a highly personal one involving numerous factors, only one of which is the presence of (or, in the case of lipoflavonoid supplements for tinnitus, the absence of) legitimate scientific studies attesting to the efficacy of that treatment.

The 18th-century French philosopher Voltaire once said, “The practice of medicine is the art of entertaining the patient while nature gets him better.” I sincerely hope that in the year 2018 medicine has progressed far beyond the state of affairs of Voltaire’s day, but that aside, I suspect that the placebo effect is not entirely without merit even today.

In other words, if lipoflavonoid supplements might help solely by virtue of their placebo effect, then one might wonder what’s the harm? The short answer has to do with the fact that the supplement industry is not subject to the same level of U.S. Food and Drug Administration (FDA) controls as the pharmaceutical industry – so as I see it, you have no real assurance that what’s in the bottle is not in some way harmful. And though it might be tempting to go ahead and take a chance anyway, I would strongly recommend that before doing so, you (and anybody else reading this column who is taking or is considering taking supplements of any kind for any purpose) purchase a terrific, highly informative, well-documented, and very inexpensive paperback by Paul A. Offit entitled *Do You Believe in Magic?* I read it, and the book changed my entire way of thinking on the subject.

Stephen Nagler, MD, is a licensed physician recently retired from his private practice, which was devoted to the evaluation and treatment of individuals with severe tinnitus and hyperacusis. He is a former chair of the board of directors of the American Tinnitus Association. He lives in Atlanta, GA, and runs a Q&A tinnitus site at: www.tinn.com.

“I really appreciate your time and concern.”
— Janice T., sister of someone with tinnitus
Naturopathic medicine is a distinct primary healthcare profession that emphasizes prevention and optimal health through therapeutic methods and substances that pose the least risk of side effects and encourage the natural healing process. For the naturopathic physician, the goal of patient care is to identify the underlying cause of an illness rather than suppress symptoms through medications. Practitioners draw on standard medicine and complementary approaches to tailor treatment to individual needs. To learn more about the field, the American Tinnitus Association interviewed Dr. Judy Gianni, a licensed naturopathic physician with more than 23 years of experience.

Joy Onozuka (JO): What is a Naturopathic Medical Doctor (ND or NMD) and how does it differ from a Medical Doctor (MD)? What is the treatment philosophy?

Dr. Judy Gianni (JG): Naturopathic physicians are trained in the art and science of natural healthcare at an accredited and specialized naturopathic medical college that has four-year postgraduate training. Some states use the designation NMD, while other states use ND.

Currently, there are 20 states – plus Washington, D.C., Puerto Rico, and the U.S. Virgin Islands – that license naturopathic physicians, although the scope of practice varies from location to location.

Naturopathic doctors have their roots in traditional medicine from Europe and Eastern traditional treatments with the latest science. Naturopathic doctors strive to understand and treat the root cause(s) of illness, facilitating the body’s innate self-healing ability. Many naturopathic physicians practice a true “best of both worlds” approach, or integrative medicine that includes the best of traditional treatments and newer medications. They may suggest the use of dietary changes, removal of offending agents, as well as the use of herbs, nutraceuticals, homeopathy, acupuncture, and even physical modalities, such as craniosacral therapy, to stimulate healing.

JO: How might naturopathic medicine help someone struggling with tinnitus?

JG: As mentioned above, naturopathic physicians always endeavor to understand the root cause of any illness, and this does not change when treating patients suffering from tinnitus. One of the reasons why this condition – which affects between 7 and 10 percent of the population – is so tricky to treat is there are many possible causes, and each case can be quite unique.

Root causes can range from noise-induced hearing loss, otosclerosis (a hereditary condition caused by abnormal growth of bones in the ears), otitis (ear infection), impacted cerumen, Meniere’s disease (disease affecting the membranous labyrinth in the ear and causing progressive attacks of tinnitus and vertigo), multiple sclerosis, acoustic neuroma, and infections.

There also are many cases of tinnitus resulting from ototoxicity, which damages the ear, from a whole list of medications, including aspirin, NSAIDs (Nonsteroidal Anti-inflammatory Drugs), certain antibiotics, loop diuretics, and chemotherapeutic agents (e.g. Cisplatin® and Vincristine®). There are certain vitamin and mineral
deficiencies associated with tinnitus that have to be looked at as well.

At times, there are structural issues that can trigger tinnitus, such as head injury, whiplash, TMJ (temporomandibular joint), and other dental disorders. But it’s been reported that up to 40 percent of patients cannot identify the cause associated with the onset of their tinnitus. Naturopathic physicians have to be good medical detectives to identify as many of the possibilities of root causes and address each one, layer by layer.

**JO:** Have you found a particular treatment protocol that’s helpful in treating tinnitus patients?

**JG:** Again, each case is treated uniquely. However, based on research findings, I’ve found several natural agents useful when treating a patient with tinnitus. The pine bark extract from *Pinus maritima*, pycnogenol, at 100 mg per day, can be beneficial in improving cochlear blood flow. One study showed that at six months, 87.3 percent of participants taking Pycnogenol® were asymptomatic compared with 34.6 percent of participants in the control group. It’s an excellent antioxidant, and no side effects were observed in the studies.

It appears some nutrient deficiencies can influence one’s ability to develop tinnitus. One study found up to 31 percent of those suffering from tinnitus were deficient in zinc. Whether that be causal or coincidence is hard to say, but I have found that some of my patients have responded to 50 mg of zinc a day on a full stomach. Additionally, B vitamins, specifically B3 or nicotinic acid and B12 methycobalamin deficiencies have been shown to impact incidence of tinnitus.

Melatonin has shown some promise in the alleviation of tinnitus and, therefore, warrants further investigation. It is unknown whether its role as a sleep enhancement agent, its innate antioxidant properties, or some other mechanism is responsible for the reports of tinnitus reduction or relief.

**JO:** The American Academy of Otolaryngology – Head & Neck Surgery Foundation (AAO-HNSF) Clinical Practice Guideline: Tinnitus, which was issued in 2014, is explicit in saying that healthcare providers should not recommend supplements to treat tinnitus due to lack of evidence that they work. This takes into consideration extensive research on vitamins, melatonin, zinc, and other dietary supplements. What are your thoughts on this?

**JG:** It’s an unfortunate reality that there are fewer studies on natural agents, especially in the United States. Frankly, there are less financial incentives to fund studies on natural agents because they cannot be patented. The risk of side effects is low to none on the agents mentioned in this article; but guidance from a licensed Naturopathic Physician or an Integrative Physician can be helpful when someone wants to pursue a natural approach to address the root causes of illness.

**JO:** Is there such a thing as culinary medicine for tinnitus and/or hearing health?

**JG:** There is no diet that is specifically recommended for tinnitus. Some people find cutting out or limiting caffeine can be helpful, while others don’t notice the difference. Eating a low sodium diet benefits some people, but not others. Salt is associated with fluid retention, which has the potential to exacerbate tinnitus. Making healthy dietary changes by strictly limiting processed foods or fast foods may be beneficial; but, one has to find what works best in their unique situation. Alcohol has been thought to be both an inhibitor and a promoter of tinnitus. Again, an individualized approach is best.

To learn more about naturopathic medicine, visit www.naturopathic.org.

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In April, the ATA Board of Directors voted to fund two grant proposals recommended by its Scientific Advisory Committee (SAC), which is comprised of a 17-member international panel of tinnitus researchers. The peer-reviewed process includes patient reviewers to ensure that grant awards reflect endeavors aimed at benefiting tinnitus patients.

The approved research grants are part of the ATAs dedication to funding innovative tinnitus research. “What made our grant process so compelling is that the funds came almost entirely from ATA members who have tinnitus or have a loved one affected by it. These individuals want to be part of finding answers,” said Torryn P. Brazell, ATAs executive director. “Since 1980, our members have given over $6 million for 128 projects, which has enabled researchers to collect critical pilot data that could then be used to apply for larger grants from much larger organizations, like the National Institutes of Health,” Brazell said. “The ATA is grateful to the many individuals who made our ability to fund research possible, and to the researchers determined to make sense of this incredibly complex condition.”

**Award for The Role of Cochlear Synaptopathy in Tinnitus (Year 2)**
Principal Investigator: Gabriel Corfas, PhD
The Regents of the University of Michigan

**Award for Validating the Gap-Startle Model of Tinnitus Detection Using Behavioral and Electrophysiological Tests in Humans (Year 2)**
Principal Investigator: Sylvie Hébert, PhD
University of Montreal

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Ongoing ATA Funded Research Grants

**Neuroimaging-Guided Neurostimulation Therapy for Tinnitus - YEAR 1**

Principal Investigator: Amber M. Leaver, PhD

The goal of this project is to understand and improve a mild, noninvasive neuromodulation therapy for tinnitus called transcranial direct current stimulation (tDCS). In tDCS, a mild electrical current is passed between two or more rubber electrodes placed on the head to modulate neuronal activity in brain regions near the electrodes. Research studies have shown that tDCS targeting auditory cortex can reduce tinnitus loudness in some people, but unfortunately not all people benefit. Our research will determine whether variability in the effectiveness of tDCS is caused by ineffective targeting of auditory brain regions.
In Year 1 of our study, we collected functional MRI (fMRI) data to measure changes in brain function while tDCS was applied to 10 tinnitus patients and 10 people without tinnitus. In preliminary analyses, we clearly saw that tDCS changes brain function — activity under the positive electrode, or “anode,” in auditory cortex (i.e., the left temporoparietal area) increases, while activity under the negative electrode, or “cathode,” over frontal cortex decreases. Yet we also saw individual variability across patients in these function changes, which appears to correlate with tinnitus symptoms during stimulation — patients with larger changes in brain function also tended to have larger reductions in tinnitus loudness during tDCS. This supports the idea that we may be able to improve the effectiveness of tDCS by improving how it targets the auditory brain. In Year 2, we will continue to collect data to support these preliminary findings.

Amber Leaver, PhD, is a research assistant professor of Radiology at the Feinberg School of Medicine at Northwestern University. She completed her doctorate in neuroscience at Georgetown University in 2010.
cochlear synapse loss, a.k.a. synaptopathy, could serve as a therapy for tinnitus.

However, studies linking hidden hearing loss and cochlear synaptopathy to tinnitus are based on noise exposure, thus making the connection between synapse loss and tinnitus indirect. Therefore, we believed it was important to test whether changes in cochlear synapses, per se, precipitate tinnitus in the absence of noise exposure. These studies became feasible when we generated mouse models in which we could increase or decrease the number of inner ear synapses independent of noise. We can now do this in genetically modified mice by increasing or decreasing the expression of a neurotrophic factor called neurotrophin 3 in the cochlea. Importantly, we have demonstrated that by increasing the amount of neurotrophin 3 in the cochlea, we can induce the regeneration of inner ear synapses and restoration of hearing after noise exposures that induce hidden hearing loss.

In the first year of our research supported by the American Tinnitus Association’s grant, we used these novel mouse models and well-established behavioral and electrophysiological tests to analyze whether alterations in inner hair cell synapses contribute to tinnitus. We have established the necessary experimental procedures and have performed tests that strongly support our hypothesis. During the second year of this award, we will complete the testing of the effects of synapse changes on tinnitus. We will then test whether noise-induced tinnitus can be prevented by induction of synapse regeneration and hearing restoration by treatment with neurotrophin 3.

Increasing neurotrophin 3 levels in the inner ear increases the number of hair cell synapses. Representative images obtained with a confocal microscope of inner hair cells of mouse cochleas stained to visualize synaptic proteins illustrate the increased density of synapses (the red and green dots) in ears that have more neurotrophin 3 than controls. The dashed lines show the approximate outline of one inner hair cell. (Modified from Wan et al., eLife 2014;3:e03564 doi: 10.7554/eLife.03564)

**Using Electroencephalography (EEG) to Track Brain Responses to Gaps Embedded in Soft Sounds: A Stepping Stone Towards an Objective Measure of Tinnitus - YEAR 1**

**Principal Investigator:** Sylvie Hébert, PhD  
**Co-investigator:** Brandon T. Paul, PhD

Presently, there is no method that enables us to detect the presence of tinnitus. For instance, if a person does not tell the clinician that she or he has tinnitus, then the clinician has no means to prove or refute this person’s assumption. This lack of an objective tinnitus measure is a serious shortfall in both clinical and research settings: it prevents a firm diagnosis of tinnitus, prevents tracking the progress of an intervention over time, and precludes neuroscience from targeting an experimental outcome that would direct research toward a treatment or a cure.

Objective measures for tinnitus also are a chief concern for animal research, which is needed to understand cellular and molecular mechanisms of tinnitus. Because animals cannot express verbally that they hear tinnitus, tinnitus must be inferred from their behavior. For example, one prominent method used to test for tinnitus in an animal measures the animal’s response following the perception of a silent gap in a continuous sound. If, after a manipulation used to induce tinnitus (e.g., noise exposure or toxic drugs), the animal does not behave in accordance

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Gabriel Corfas, PhD, is Director of the Kresge Hearing Research Institute and Associate Chair for Research for the Department of Otolaryngology and Head and Neck Surgery at the University of Michigan in Ann Arbor.
with normal perception of the gap, it is assumed the animal has tinnitus, because the perception of tinnitus has “filled-in” the silence. This gap-detection method has been adopted by several research groups and has been used in dozens of important scientific articles for more than a decade.2 If it is the case that gap detection-impairment can robustly identify tinnitus in an animal, can it be used as a diagnostic test in humans? Although this assumption is attractive, research has been unable to demonstrate that gap-detection deficits distinguish tinnitus in humans.2 There are several reasons why efforts may have fallen short. For example, human studies simply may not have used an optimal design to test gap detection within sounds that match a person’s tinnitus. Alternatively, the mechanism of gap detection in animals may not generalize well to humans, or, worse, the gap-detection method as employed in animals may not be measuring tinnitus, but rather some other attribute of the tinnitus-induction method. In either case, the lack of confirmatory evidence in humans that tinnitus can “fill-in” silent gaps in sounds threatens to undermine a large body of tinnitus research and impedes progress in clinical and scientific settings.

To address this concern, we proposed to use a neuroimaging technique called electroencephalography (EEG) to measure the brain’s response to sounds, called auditory evoked potentials, which are fluctuations of electrical brain activity. We know from past research that silent gaps embedded in sound elicit measureable electric potentials with clear properties.3 If we were to design a sound to be almost identical to the tinnitus that a person hears, would their tinnitus “fill-in” a silent gap in that sound, such that the brain would not detect it? Put another way, if auditory brain areas engaged in producing tinnitus-related neural activity are generating sounds where in the external environment there is silence, then detection of silence in an ongoing sound might be similarly masked. Consequently, the brain response indicating that a silent gap was perceived, which is clearly present in an individual without tinnitus, would be absent in an individual with tinnitus.

A potential challenge with this approach was the feasibility of measuring evoked potentials within sounds designed to match a person’s tinnitus. In general, as sounds get weaker in both intensity level and as they increase in frequency (i.e., pitch), the brain’s response size becomes smaller, eventually becoming difficult to separate from the inherent noise of the EEG recording. We also know that most cases of tinnitus whose acoustics are estimated with behavioural tests equate to a very low sensation level (sound level above threshold) and commonly are pitches of high frequency.4 If we were to design a sound matching these properties, there is a danger that the brain’s response to this sound would be undetectable, because the physical acoustics evoking the response were so weak. Thus, for many tinnitus sufferers, this test would not work. No previous data suggesting that gaps in sounds of low loudness and of high frequencies were observable in the EEG had been published.

During our first year of funding from the American Tinnitus Association, we conducted a pilot study on 12 normal-hearing (non-tinnitus) adults, providing the first proof of principle that such “weak” brain responses were indeed measurable. We took common properties of tinnitus, i.e. very soft, high-pitch sounds, and presented these sounds to participants. Silent gaps were randomly inserted into these sounds, and the EEG was recorded while participants listened. Using a novel signal-processing approach, we were able to detect that responses were present in all participants. Thus, our approach is feasible to conduct in humans, offers an individually diagnostic metric, and can be applied to tinnitus. This study is now published in the journal Hearing Research.5

A second challenge we addressed in our first year of funding from the ATA was how to ensure gap detection is tested when individuals hear their tinnitus, since tinnitus might only “fill-in” the gap at these sound frequencies. Measuring the acoustical features of tinnitus (for example frequencies, loudness, and “thickness,” i.e., bandwidth of tinnitus) historically has been a challenge.4 We developed a new method, based on randomly presenting sound features and then estimating the most likely features after sampling a large number of combinations of sound features. We tested the procedure on 14 adults with tinnitus and found that each individual rated our “estimate” of tinnitus as highly similar to their real tinnitus (an average of eight on a scale of 10). These findings were presented at the recent Association for Research in Otolaryngology meeting held in San Diego, California, in February 2018.6

Having laid the necessary groundwork, now we are equipped to apply our objective gap-detection test
SCIENCE & RESEARCH NEWS

Unlocking the Basis of Tinnitus Sound Therapy: Informational Masking and Tinnitus Adaptation - YEAR 2

Principal Investigator: Grant D. Searchfield, PhD

The tinnitus research team at the University of Auckland in New Zealand is exploring the basis of tinnitus sound therapy. In this research, we are collaborating with the Knowledge Engineering and Discovery Research Institute, Auckland University of Technology, to analyze brain activity working toward the goal of predicting the types of tinnitus that respond best to different masking sounds. This research is investigating where in the brain the fundamental processes explaining tinnitus are located, and in particular the effect of sound therapy on these. Informational masking is being studied as a clinical approach to suppressing tinnitus. We hope to be able to identify types of tinnitus that do best with different types of sound therapy.

Sound Therapy

Sound therapy along with counseling is currently one of the most widely used methods for tinnitus management. Sound has been used to treat or suppress tinnitus for centuries. The brain mechanisms explaining how sound interferes with and helps reduce tinnitus are, perhaps surprisingly, not known. Some sounds work to reduce tinnitus for some people and for some of the time. What is the basis of these effects? Can we predict them? Who will benefit? Perhaps the most basic form of sound therapy is masking. Masking is presumed to cover tinnitus, making it more difficult to hear. There may be two processes involved: a process called “energetic” masking and another called “informational” masking. Energetic masking occurs at the ear when the energy in sound covers the area thought to be the trigger for tinnitus activity. Informational masking acts at the level of the brain, interrupting how the brain is analyzing tinnitus. Informational masking uses information, such as the meaning and location of sound, to be effective.

We set out to investigate and observe the changes in the brain responsible for the effectiveness of masking sounds. Using the information obtained from these studies, we hope to create more effective sound therapies and tailor sounds to individuals to maximize treatment effectiveness.

New Sounds and Analysis

Three different sorts of sound were used, and their effect on tinnitus measured over a three-month period using questionnaires (the Tinnitus Functional Index [TFI] and rating scales). The sounds consisted of rain or noise, changed to provide:

- Energetic masking — sound presented in stereo (heard equally in both ears)
- Informational masking — sound presented with a critical band notch applied around the tinnitus pitch (to diminish the contribution of energetic masking) and presented...
Electroencephalography (EEG; brainwaves) were measured before, during, and after sound at the beginning of the trial and again at the end (after three months of sound use). Existing evidence suggests that several auditory and nonauditory networks contribute to tinnitus perception and related distress, and these have signature EEG oscillation frequencies that can be objectively measured. We used a new method to explore the effect of sound on these networks called the NeuCube. The NeuCube is a computational method that can create a model of EEG data that captures the spatial and temporal relationships between signals. It is based on a novel brain-inspired type of machine learning algorithm called a Spiking Neural Network.

**Preliminary Results**

The preliminary results show that different sounds affect tinnitus in a time-dependent manner. On a rating scale of loudness (shown), the informational masking (that had no sound at tinnitus pitch but that was localized to where the tinnitus was perceived) seemed ineffective, but the combined sound (that included spatially localized masking and sound at the tinnitus pitch) was most effective. The combined approach showed benefits after just two weeks.

**NeuCube Results**

NeuCube results for three individuals receiving sound therapy shown for the three months of the trial. Each line shows results for one person. Each person trialed a different sound therapy type. In the three individuals, we see interesting changes in their neural “spiking” networks in the NeuCube. We cannot say yet that these are representative of all participants. The introduction of energetic sound had more excitatory and inhibitory spiking activity localized to the frontal regions; after sound was stopped, the inhibitory spikes went away, but some excitatory spikes remained. After three months of prolonged sound use, a more complex...
Three examples of EEG recordings modeled by the NeuCube. Each row shows a single person receiving one of the masking sounds. Each column is a different condition. The blue lines indicate activity that increases activity (excitatory), while the red indicates decreases (inhibitory).

pattern of neural spiking is established compared to prior to sound use. For both informational and combined masking (in instances where the sound is delivered in the same 3D location that the tinnitus was perceived), there were no large changes in the network during presentation of the sounds. For the informational masking participant, the spiking models show that the excitatory spikes around the parietal “where is sound” pathway increased slightly. However, interestingly, after the sound was stopped, there was strong excitatory and inhibitory activity around the auditory cortex. For the combined sound therapy, there was reduced spiking during sound administration, and this effect continued after the sound was turned off. Another interesting point is that regardless of the condition administered, for all three participants the spiking activity at resting state following three months of sound therapy seemed to be more similar to each other than when compared to the recordings before sound therapy. This result appears to correspond to changes in rating scale and Tinnitus Functional Index.

Future Work

The results presented are preliminary but demonstrate the promising direction of this work. In the coming months we will be completing data collection. Once we have completed modeling the effects of sound, we plan to trial the use of different sound therapies on the basis of the NeuCube findings. We hope that the final results from this study will enable better therapy outcomes for all those experiencing tinnitus by predicting who will benefit from different types of sound therapy.

Grant Searchfield, PhD, is an Associate Professor in Audiology at the University of Auckland, New Zealand. He is the director of the University’s Hearing and Tinnitus Clinic and deputy director of the Eisdell Moore Centre for hearing and balance research. Searchfield is also a member of ATA’s Scientific Advisory Committee (SAC).
Limit Blue Light Exposure for a Better Night’s Sleep

By Joy Onozuka

Taking a daily 30-minute walk outside during daylight hours is recommended by sleep experts to keep your body in sync with its circadian clock, which signals your body when it’s time to eat, stay alert, or go to sleep. However, even if you do so, if your evening routine includes time on your computer, tablet, or phone – not to mention under the glare of standard energy-efficient light-emitting diode (LED) lights – you’re signaling your brain to stay awake. Why? Because all of these emit blue light, which decreases the production of melatonin more than any other type of light.

Since it’s unrealistic for most of us to turn off all blue-light emitting devices two hours before bed, you may consider using apps and lights that are designed to support the natural rhythm of a healthy circadian cycle.

Apps for Screens

1. Flux – This cross-platform computer program adjusts the display’s color temperature, based on your geographic location and time of day. It’s free and compatible with Mac OS X, Windows, Linux, and some Android devices. www.justgetflux.com

2. SunsetScreen – Unlike Flux, SunsetScreen allows you to customize your sunrise and sunset times or temporarily disable them. It’s free and compatible with Windows. www.skytopia.com/software/sunsetscreen

3. Iris – Cross-platform application that controls screen brightness, matches it to light around you, and gradually regulates blue light both day and night for better sleep. Iris offers a free version compatible with Windows, Mac OS X, Linux, Android, iOS, Google Chrome web browser. www.iristech.co

4. Apple Night Shift – Designed to reduce the amount of blue light emitted by Apple devices, Apple Night Shift has been available on its iPhones and iPads since iOS 9.3. It was added to Macs in 2017 with macOS Sierra 10.12.4. www.support.apple.com/en-us/HT207570

Lights for Day and Night

Incandescent lights emit less blue light than LED lights but are low-tech energy hogs that are being phased out. LEDs, on the other hand, are semiconductors that can be programmed to emit light at specific wavelengths, colors, and tones, and can be designed to support wakefulness or sleep. Unlike the mentioned free/inexpensive apps, this next generation of LED lighting isn’t cheap.

The Lighting Science Group (lsgc.com), a company that specializes in LED lights, represents the cutting-edge of where the market is heading. One example is the company’s endeavors with the National Aeronautic Space Agency (NASA) to create lighting that enables astronauts to function better in space.

Lighting Science’s biological LED products for the “earth bound” feature lights to boost energy levels and help promote sleep, including a bulb specifically for babies.

Philips also offers a range of smart LED light packages called Philips Hue lights. These allow you to mix colors and tones, depending on the room and time of day. They’re meant to integrate with smart-home platforms, including Amazon’s Alexa, Google Home, and Apple HomeKit, all of which allow voice and remote control of home functions like lights.

www.lighting.philips.com/main/home
Summary by John A. Coverstone, AuD

Clinicians long have been aware that people may have tinnitus and/or hearing difficulties even with hearing levels (thresholds) that are completely normal. Causes may include head and neck trauma, subclinical changes in hearing that do not reach the level of clinical hearing loss, or unknown etiologies. However, the prevalence of hearing difficulty and tinnitus in people with normal hearing thresholds is largely undefined. Some studies attempting to answer this question have been small, while others have used differing criteria for data such as normal vs. abnormal hearing thresholds.

A group of researchers from the University of Mississippi Medical Center sought to answer this question by drawing on large-scale data from the National Health and Nutrition Examination Survey (NHANES), which is a survey of various health topics conducted by the Centers for Disease Control and Prevention. The researchers, who published their findings in 2018, were able to gather pertinent data from 3,853 survey participants from the 1999–2000 and 2001–2002 survey cycles.

The chosen participants had completed survey data on hearing loss and tinnitus topics and also had audiometric data available from clinical hearing examination. Hearing difficulty was identified as a self-perceived problem, and persistent tinnitus was identified by those indicating hearing tinnitus-like sound “almost always” or “at least once a day” on the questionnaires. Participants were excluded based on incomplete data, evidence of non-cochlear (non-sensory) hearing loss, or other medical etiology. The researchers finally limited data to those participants with a 4-frequency (0.5, 1, 2, and 4 kHz) average that was better than or equal to 25 dB. Ultimately, 2,015 participants were identified with normal hearing thresholds and complete data.

Tinnitus was reported by 20 percent of the researchers’ sample group and persistent tinnitus was identified in 10.6 percent of people with normal hearing. Of those who reported hearing difficulties, 41.7 percent reported tinnitus in the past year and 27.1 percent met the criteria for persistent tinnitus. Of those who did not report hearing difficulties, 16.4 percent reported tinnitus in the past year, and 7.7 percent reported persistent tinnitus. Conversely, 40.1 percent of people reporting tinnitus also reported hearing difficulties. Only 12.5 percent of participants without persistent tinnitus reported hearing difficulties. These numbers indicate that there is a strong relationship between tinnitus and perceived hearing difficulty in people who would not be considered to have hearing loss.

The researchers also looked at other data in the health survey that
might serve as predictors for hearing difficulty and tinnitus. These include factors such as diabetes, arthritis, and other health conditions; a history of smoking; exposure to loud noise; and both over-the-counter and prescription drug use. None of these demonstrated a significant relationship with hearing difficulties when adjusted for age, gender, and low- and high-frequency hearing thresholds. Persistent tinnitus was the best predictor, with participants having persistent tinnitus reporting hearing difficulties at nearly four times the rate of those without persistent tinnitus. Persistent tinnitus was reported significantly more often from participants who indicated confusion or memory issues, previous hearing tests, balance problems, noise exposure, diabetes, arthritis, symptoms of neuropathy, vision difficulties, alcohol use (5+ per day), and analgesic use.

The authors also altered the criteria for normal hearing to assess whether prevalence of hearing difficulty and tinnitus changed, as was indicated by some prior studies. They found that prevalence of hearing difficulty and tinnitus each increased as criteria were expanded (e.g., “normal hearing” was defined as greater than 25 dB average hearing thresholds). However, there were no significant changes in prevalence as criteria for normal hearing were made stricter.


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There are no drugs to restore normal hearing or eliminate tinnitus, which affects millions of people around the world. Moreover, as people live longer and modern-day technologies expose members of all generations to damaging levels of sound, the number of people needing help for hearing disabilities is growing. Because hearing loss and tinnitus can affect a person's ability to remain actively engaged in the workforce as well as maintain well-rounded social ties, researchers and pharmaceutical companies have shown increased interest in finding pharmaceutical solutions.

To better understand the challenges that researchers face and the process of drug development, the American Tinnitus Association interviewed Dr. Nadia Pilati of Autifony Therapeutics Ltd., a U.K.-based biotechnology company that develops medicines to treat hearing disorders, including hearing loss and tinnitus. The company was founded in 2011 by Dr. Charles Large and Giuseppe Alvaro, both of whom previously worked at the British pharmaceutical company GlaxoSmithKline (GSK).

Joy Onozuka (JO): How did you come to be a researcher of auditory disorders, working in private industry?

Dr. Nadia Pilati (NP): Dr. Large and I began looking at hearing disorders at the same time. I was doing my doctoral research at Leicester University, U.K., in Dr. Hamann’s neuroscience lab. My fellowship was sponsored by GlaxoSmithKline (GSK), and Dr. Large, who was previously team leader of the neuroscience group, was my industrial supervisor.

My research was investigating hearing loss and the underlying neuronal mechanisms. Compared with other sensory fields, such as vision or touch, the auditory field has many unanswered research questions, which I found fascinating. I was motivated to learn more and find answers.

After completing my PhD, I continued to work in the auditory field in Professor Ian Forsythe’s lab investigating synaptic mechanisms related to hearing loss. While I was finishing my postdoc, Dr. Large was founding Autifony Therapeutics with Giuseppe Alvaro, as a spin-off from GlaxoSmithKline, where they both had worked as team leaders in GSK’s Neuroscience Centre of Excellence for Drug Discovery in Verona, Italy.

The company’s focus was the development of novel medicines to treat hearing disorders. When Dr. Large offered me a position, I saw it as a unique opportunity to apply all my years of study to real, concrete objectives.

JO: How much has changed in scientific understanding of age-related hearing loss, acoustic trauma, and tinnitus, from basic science and pharmaceutical perspectives, in the last five years?

NP: There is more consensus now on the nature of the mechanisms underlying hearing loss and tinnitus. The traditional view of age- and noise-related hearing loss has been that this was triggered by peripheral damage. Age or acoustic trauma lead to a dysfunction at the level of the cochlea, where sound-induced vibrations are transduced by hair cells into electrical signals. The electric signals are transferred to the central nervous system by auditory nerve fibers.
There is increasing evidence that these hearing defects are associated with abnormal neural activity within the central nervous system, and this occurs even with partial or no hair-cell damage. Therefore, an increasing number of studies are now focused on investigating the role of neuronal excitability and synaptic transmission of hearing loss and tinnitus.

Public awareness of age-related and acoustic trauma has also increased. A larger proportion of the population is now affected by hearing loss and tinnitus. We’re also seeing more tinnitus, as well as some noise-related hearing loss, among younger generations, which is likely the result of long and repeated exposure to high-intensity sound levels produced by modern technologies in our society. In addition, with increasing life expectancy, age-related hearing loss is also affecting a larger proportion of people compared to the past.

Hence, the urgency for a cure to address the needs of this growing population with hearing disabilities has thus been very beneficial and has contributed to scientific progress over the past five years.

**JO:** Currently, why are there no drugs available to restore hearing, eliminate tinnitus, or resolve hyperacusis?

**NP:** The mechanisms underlying these types of hearing defects are wide and complex. Not only the cochlea but also several areas within the brain are involved. Within the brain, several, as well as different, types of neurons are affected. We know there are several proteins that change in the level of expression; there are changes in synaptic transmission; there is cell degeneration. Each of these different factors and targets produces different symptoms. Perhaps the right management of hearing loss and tinnitus would be to consider all these multiple sites and targets.

In addition, models of hearing loss in animals that can be used to predict the efficacy of new drugs in humans have yet to be validated. This is especially true for tinnitus. With hearing loss, audiograms and auditory brainstem response (ABR) can be measured in animals, similar to their measurement in humans. For tinnitus, there is no objective measure. Several behavioral studies that have been implemented suggest that animals might experience tinnitus, but there is no clear evidence of that. That being said, audiograms and ABR are not entirely exhaustive measurements of hearing loss either. For example, people who have difficulty hearing in noisy environments can often have normal audiograms.

Along the same lines, clinical trials with humans have proven to be very challenging. This is especially the case for tinnitus, where the evaluation of degree of pain or disturbance has been hindered by lack of an objective measure. Numerous clinical trials evaluating methods of tinnitus intervention use questionnaires, such as the *Tinnitus Functional Index* (TFI) or *Tinnitus Severity Index* (TSI), which require self-reporting. These do not provide an objective measure of tinnitus. There are more studies now focusing on finding a measurement that is more objective and based on measures of biological function rather than self-reporting. This could revolutionize the course of future clinical trials.

**JO:** What are the steps involved in taking a pharmaceutical concept from research, to preclinical trials, to advanced trials, to market?

**NP:** It begins with identifying the target. Once a clear target is established, molecules against this target can be screened. This is a long process that can take years, as not only does a molecule need to interact with the target but it also needs to be selective. In other words, it does not interact with other proteins that might cause unwanted side effects. Once a potential drug candidate is identified, it is subjected to a detailed study in animal models of hearing loss and tinnitus. These studies are very important, because they can

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**“Clinical trials with humans have proven to be very challenging … the evaluation of degree of pain or disturbance has been hindered by lack of an objective measure.”**
reveal the mechanisms of action of the molecule and help to determine the effective dosages that will be needed in clinical trials.

In addition, the molecule must undergo a battery of tests before it can go from preclinical to clinical trials, in order to assess its safety and properties as a medicine for human use.

Clinical trials are conducted with humans. First, with healthy volunteers to check for safety, and, if shown to be safe, then the drug will be tested in patients. The studies with patients are the most critical, and it’s here that the majority of compounds intended to treat tinnitus fail. Most of the time it’s because they do not show efficacy, which may be different from what was previously shown in animals. However, even if a new drug does show efficacy in early patient trials, there is still a long way to go to demonstrate that the drug is both safe and consistently effective across larger “pivotal” clinical trials. Only after these trials will the agencies in a given country, such as the U.S. Food and Drug Administration, consider approving the drug for use.

JO: Could you explain your research on AUT00063 and the Kv3.1 channel modulator?

NP: AUT00063 is a molecule that targets a specific voltage-gated potassium channel, the Kv3 ion channel. This potassium ion channel is expressed in the brain and is also highly expressed in the auditory system. Kv3 channels are important because their ability to open and close rapidly makes them well-suited for neurons that must process fast auditory information. Specifically, these channels rapidly repolarize the membrane potential during an action potential, thereby enabling neurons to sustain high firing rates. This characteristic is crucial for the transmission of an acoustic stimulus because extracting the detailed features of sounds from auditory input requires neurons that can encode sub-millisecond timing differences with high fidelity. Neurons expressing Kv3 channels can therefore precisely follow high-frequency synaptic inputs. When Kv3 channels are blocked or reduced, the ability of neurons to follow a stimulus with fidelity is compromised and so is the transmission of the acoustic signal.

Kv3 currents are regulated by auditory afferent inputs in auditory brainstem nuclei and are pathologically reduced following noise exposure or with age. This is likely one of the causes that leads to neural excitability changes within the central nervous
system observed with hearing loss and tinnitus. Consequently, compounds that increase Kv3 currents may be useful in the treatment of hearing disorders associated with central excitability changes.

AUT00063 has the ability to enhance Kv3 currents by shifting the voltage dependence of activation of the channels to more negative potentials. We think that this mechanism could rescue the physiological neuronal firing and therefore restore precise transmission of the acoustic signal.

**JO:** What do clinical findings tell us about the future course of AUT00063 research?

**NP:** We strongly believe in the Kv3 mechanisms and think these channels are heavily involved in hearing disorders, where their activation is crucial. We’ve conducted two clinical trials of AUT00063 in age-related hearing loss and tinnitus. Although AUT00063 was safe and well tolerated by subjects during the trial, the results did not show a beneficial effect of the compound. While this was disappointing, it was also a source of learning, because we were able to understand more about the compound’s mode of action. We now have evidence that suggests that a more potent compound could succeed where AUT00063 failed. Though we consider these clinical trials groundbreaking, we are now more aware of the importance of different tests selected in trials and think that the right hearing test could also have an impact on the course of a study.

**JO:** Should those suffering from tinnitus, hyperacusis, or hearing loss be optimistic about pharmaceuticals being available in their lifetimes to treat their respective conditions?

**NP:** Definitely. Every day we learn more, even from failures. We learned a tremendous amount from our previous clinical and preclinical studies and hope to be able to run another clinical trial with a more potent compound that could revolutionize the treatment of tinnitus and hearing loss.

Nadia Pilati, PhD, is an electrophysiologist who currently heads the Biology lab at Autifony Srl Company in Padua, Italy. Before joining Autifony, Dr. Pilati worked six years in the auditory field in the United Kingdom, where she received her PhD from the University of Leicester and studied hearing loss and plasticity in the dorsal cochlear nucleus. After completing her PhD, she joined the laboratory of Professor Ian Forsythe, who pioneered the study of the giant auditory synapse, the Calyx of Held. As a part of that lab, Dr. Pilati continued to study cellular mechanisms underlying hearing loss. After her postdoctoral research, she returned to Italy to research migraines and the synaptic mechanisms underlying this disorder. In 2013, she joined Autifony, where she studies and characterizes drugs that modulate voltage-gated ion channels and their application to several neurological disorders, including hearing loss and tinnitus.
The Michael Haar 2nd Annual

Silence Was Stolen: Tinnitus Awareness Fundraiser

September 23, 2018 – 9:30 am
Eisenhower Park in East Meadow, NY

Michael Haar was a musician and motorcycle enthusiast who had tinnitus for 25 years. By the age of 50, his tinnitus had become unbearable resulting in Michael taking his own life.

The incredible sense of loss and tragedy prompted his family, including his father Steve, his mother Mary Ann, and his sisters Jennifer and Laura, and friends to take action to raise awareness of tinnitus and funds for the American Tinnitus Association in its drive to find cures. “As a member of ATA, I want to do everything I can to advance research into this terrible life-altering disorder,” said Steve Haar.

As a tribute to Michael’s life, his family organized an annual walk and fundraiser on September 16, 2017 that successfully raised $6,000 to support ATA’s mission and programs aimed at preventing and promoting relief for tinnitus as well as finding tinnitus cures. This year they want to have a larger gathering in the park on the morning of the walk and raise more money.

The Haar Family invites you to make a donation in Michael’s memory by visiting: www.ata.org/silence-was-stolen. Click on the “register now” button, which will take you to the event website. There, click on the green “tickets” button on the right-hand side of the screen to make your donation.

In addition to the walk, Dr. Neeraj Kaushik will talk about ways to reduce stress and anxiety, which frequently accompany tinnitus. There will also be merchandise for sale, including tinnitus awareness T-shirts, paracord bracelets, and memory ribbons with proceeds supporting the ATA. In addition there will be a raffle with various prizes. The Long Island Tinnitus Support Group, led by Anthony Mennella and Lisa Kennedy, will be participating.

The Haar Family encourages people across the world to support this event through donations. All donations support the American Tinnitus Association’s mission and core purpose, which focus on promoting relief, helping prevent, and finding cures for tinnitus.

For further information about the event, please contact programs@ata.org.
Research has shown that noise exposure may lead to increases in spontaneous neural activity in the cochlear nucleus. The cochlear nucleus is the first area of the brainstem to receive signals from the auditory nerve. Many researchers believe that this increased neural activity is responsible for some forms of tinnitus. A group of researchers from the Cleveland Clinic, Università di Padova in Italy, and Autifony Therapeutics in the UK sought to test whether a potassium channel modulator, AUT00063, might decrease neural hyperactivity in the cochlear nucleus.

For this study, three groups of Golden Syrian hamsters were used. One group served as a control and was not exposed to noise but was given AUT00063. The two other groups were each exposed to noise, with one group of hamsters receiving AUT00063. Golden Syrian hamsters were chosen for this study because they are known to have a robust increase in spontaneous nerve activity after being exposed to loud noise.

At four to six weeks after noise exposure, auditory sensitivity was measured in the animals using auditory brainstem response (ABR). A few days later, a microelectrode array was used to measure neural responses directly on the cochlear nucleus. This was done before and after administration of the AUT00063 drug, which was administered only after a stable baseline was recorded with the microelectrode array. This data was used to calculate spontaneous firing rates of nerve cells and then compare firing rates pre- and post-drug administration.

After being injected with AUT00063, spontaneous firing rates decreased in both the animals exposed to noise (41%) and the control animals (46%). Hamsters injected with a control solution showed no such decrease in spontaneous firing rates. The suppression of spontaneous firing in the cochlear nucleus of hamsters that were exposed to noise is similar to the same effect noted in a different brainstem area of mice, observed during a previous study. In mice, spontaneous nerve activity in a structure called the inferior colliculus was similarly dampened with AUT00063. The inferior colliculus is a structure higher up in the brainstem and receives signals from the cochlear nucleus. It is also the first area of the brainstem to receive signals from both ears. However, in hamsters, AUT00063 also resulted in suppression of spontaneous firing in the control group, which was not exposed to noise. This was different than the effects on AUT00063 on the inferior colliculi of mice, which showed no change between noise exposure and controls without noise exposure.

The researchers therefore sought to assess whether the response threshold for nerves also was affected. The response threshold is the minimum level at which a response may be obtained from a nerve cell at its characteristic frequency (auditory nerves carry information for specific frequencies of sound). Further measurement of sound-evoked activity determined that thresholds were significantly elevated after administration of AUT00063 in both the control and noise-exposed animals. Therefore, although spontaneous firing was suppressed, it is possible that hearing sensitivity may decrease as a result of this drug.

Patient-Provider Partnerships Lead to Better Outcomes

Implementing Shared Decision Making in Tinnitus Care

By Helen Pryce, MSc, PD (Health)

Shared decision making is a core feature of evidence-based healthcare and its practice. The National Institutes of Health states that it is a process by which “healthcare professionals and patients make healthcare decisions together.” The basic tenet of shared decision making is that where there is more than one clinical option available to manage a health condition (including doing nothing), the patient has an active role in deciding which clinical option best fits his or her individual values and preferences. Victor Montori, MD, from the Mayo Clinic defines this process beautifully: “Shared decision making is an empathic conversation by which patient and clinician think, talk, and feel through the situation and test evidence-based options against the patient’s situation ... Shared decision making is a human expression of care.”

What Currently Informs Care?

Within audiology, there are clinical guidelines for tinnitus and practice documents to inform practitioners. These derive evidence from population averages to determine what on the whole works for whom on the whole. What’s lacking in the guidelines and guidance is how to engage with patients in conversations about their care, as well as how to understand their preferences for both the outcome of treatment and for the type of treatment itself.

Recent criticisms of evidence-based healthcare are that strict adherence to guidelines has resulted in a “tyranny” of evidence, e.g. doing whatever the trial said worked best, regardless of the preferences and values of the individual patient.

The problem with this is that the best intentions to use the right treatment (in other words, what works well for most people most of the time) can lead clinicians to prescribe, rather than negotiate, treatments. If this is not negotiated with the individual who will have to live and work with the prescribed treatment, there is a risk of “silent misdiagnosis.” This phrase describes how one can unwittingly cause significant harm to quality of life by misdiagnosing – not the original condition, but what someone wants to do about the condition. The individual who is affected is the one required to do the work of treatment, to use a device regularly, or engage in a talking therapy of some sort.

Rarely do patients with silent misdiagnoses bother their clinicians. Rather, they become dissatisfied, possibly seek help elsewhere, and remain “silent,” leaving clinicians unaware that they have failed in any way.

Hand on heart, most clinicians can reflect on scenarios where this may have been the case. The patient who didn’t return for follow up. The patient who constantly complained. The patient who went home and never used the hearing aid again.

What is needed is a way of integrating best evidence, clinical expertise, and patient values and preferences. In other words, a return to real evidence-based healthcare.

What’s missing is guidance for people with tinnitus so that they can inform the discussion by adding what will help this individual patient in these individual circumstances.

Happily, there is an alternative.

Our team has been working on projects to determine what currently happens in tinnitus care in the United Kingdom and how to ensure that patient preferences are recognized in decision making. The British Tinnitus Association (BTA) funded research projects, including the development of the tinnitus care decision aid, that enable both patients and clinicians to work from consistent information. Put simply, it can help a clinician practice shared decision making by ensuring that both parties to the encounter are well informed.

How can we build shared decision making into tinnitus care?
There are some well-documented stages in the clinical encounter:

**Build a relationship.**

This is the bedrock of all change. We need to trust, believe, and value our clinicians. They earn trust, belief, and value by being explicitly interested in us. That means fully attending to an interested person uninterrupted for two minutes, and you’ll see for yourself. You cover vast amounts of information. By all means, check facts afterwards; but, be present and fully attend to what people are telling you.

It’s a challenge for a clinician to manage his or her own feelings during these moments. People who become audiologists generally want to help and dealing with a chronic problem can leave them feeling powerless. But listening is the most important thing to do, even if it makes you uncomfortable. Even if you can’t fix it. Even if you don’t like it. You will do more good than you realise. People seek help more often to be heard and validated than to be fixed.

It also is easier to pick up what the preferences and values of this individual are, when you actively listen. There often are indirect allusions in what is described that tell us about preferences. We can also use open questions to explore this, e.g., “What matters to you most about this?”

In this relationship, it is straightforward to negotiate that you will make a decision together. It’s worth pointing out this “so there are different approaches we can take to this, and together we need to find what’s best for you.”

**Present choices.**

There always are choices in tinnitus. There always are choices in hearing loss. Your preferences as a clinician are important to acknowledge, but it is more important to hear what your patient prefers. The patient will be living with the consequences of the decision made, not you.

This is where the decision aids really help. They are available to

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**Tinnitus Decision Aid**

**Talking therapies**


**Group support**


**Information**


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**Evidence Document Summary**

**Talking therapies**


**Group support**


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**Sound**


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**Editors:** Helen Pryce, Elizabeth Marks, Sarah Swift, Melanie Ward, Amanda Hall, Rachel Shaw, Beth-Anne Culhane, Jean Strauss, Katie Chivers

(T) British Tinnitus Association

www.ATA.org

The British Tinnitus Association. Registered charity no: 1011145
## Options for tinnitus care

### Understanding tinnitus

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will this option mean I hear my tinnitus less or cure it?</td>
<td>Understanding tinnitus may not make it go away, but getting a better grasp of tinnitus can mean that you notice it less.</td>
</tr>
<tr>
<td>What does this do to tinnitus?</td>
<td>Tinnitus is influenced by other sounds around you. By listening to external sounds, you're likely to hear your tinnitus less. It can be helpful to focus your attention onto another sound.</td>
</tr>
<tr>
<td>How do I access this option?</td>
<td>You can get tailored advice from your Audiologist. Your GP can refer you. The British Tinnitus Association produce clear information on all aspects of tinnitus.</td>
</tr>
<tr>
<td>Can I choose more than one option?</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Talking therapies

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>Will this option mean I hear my tinnitus less or cure it?</td>
<td>Following talking therapy, some people don’t hear tinnitus as much. Whilst some people may find that they hear it just as much, others often describe their tinnitus as becoming less bothersome.</td>
</tr>
<tr>
<td>What does this do to tinnitus?</td>
<td>Tinnitus is often made worse by higher levels of stress, and talking therapies can help by reducing stress. Talking therapies also focus on changing how you respond to tinnitus. You learn to change how you think and act and how much attention you give to it.</td>
</tr>
<tr>
<td>How do I access this option?</td>
<td>People who have talking therapy for tinnitus can find that they notice it less.</td>
</tr>
<tr>
<td>Can I choose more than one option?</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Using sound

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will this option mean I hear my tinnitus less or cure it?</td>
<td>Some people find playing sound through various devices helps them hear the tinnitus less. Sound is unlikely to make your tinnitus go away completely. If you have hearing loss and tinnitus some people find hearing aids can help reduce awareness - see the Hearing loss: hearing technology options Option Grid.</td>
</tr>
<tr>
<td>What does this do to tinnitus?</td>
<td>Tinnitus is influenced by other sounds around you. By listening to external sounds, you're likely to hear your tinnitus less. It can be helpful to focus your attention onto another sound.</td>
</tr>
<tr>
<td>How do I access this option?</td>
<td>Some people find it helpful to put a radio on in the background when they come into a quiet setting. Others may use relaxing sounds to help get to sleep at night. Various devices and apps are available for this.</td>
</tr>
<tr>
<td>Can I choose more than one option?</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Group support

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will this option mean I hear my tinnitus less or cure it?</td>
<td>This probably won’t mean that you hear your tinnitus less, but sharing experiences can be supportive, especially in helping you to understand tinnitus and feel less alone. This may mean that you notice tinnitus less.</td>
</tr>
<tr>
<td>What does this do to tinnitus?</td>
<td>Groups can help people find support from others. People swap ideas about what helps them with their tinnitus.</td>
</tr>
<tr>
<td>How do I access this option?</td>
<td>The British Tinnitus Association has information on tinnitus groups in the UK. Alternatively your local audiology service may be able to guide you to a group.</td>
</tr>
<tr>
<td>Can I choose more than one option?</td>
<td>Yes</td>
</tr>
</tbody>
</table>
download freely and can be given to patients before they meet with you so that they can consider them with their family and friends.

The decision aids we developed meet the international consensus for decision-aid standards, meaning both the options and the frequently asked questions are derived from evidence. They are structured not just to present some options, but to weigh the pros and cons for them.

There are important differences between those who would like group support, those who would like a device, and those who would like counseling or talk therapies. The decision aid helps people decide on the approach that suits them best.

Our research found a really important role for the clinician here. Patients described really wanting curated information, tailored for them. They wanted someone off whom they could bounce their thoughts about management. This is where clinicians can shine! It’s a misconception of shared decision making that simply giving a list of treatment possibilities will suffice. Rather, we need to explore the pros and cons.

Make the decision in partnership.

The decision making is then the integration of the preferences and values the patient holds, coupled with the expertise of the clinician. In practice, this can mean having a conversation in which a thought experiment tries out the various options. What would it involve in practice to seek talk therapy in your area? How does someone access a group? What’s the commitment in time, traveling, cost, etc.?

These finer points are discussed in this phase of the decision. These points may make all the difference between an evidence-based option in theory and one that actually is feasible for the individual to access or engage.

Also, it’s worth remembering that this is not fixed. Circumstances change over time, and preferences may change too. Letting people know that, as a clinician, you’ll be there to have another discussion when things change is important too.

Sharing control of decisions in the treatment of tinnitus is about providing care. It’s the ultimate expression that something can be done and that the individual patient has the authority and ability to have a say. As Atul Gawande – doctor, New Yorker writer, and public health researcher – puts it:

“You may not control life’s circumstances, but getting to be the author of your life means getting to control what you do with them.”

Resources & Tools

Tinnitus Care Options & Tinnitus Decision Aid are available for download on the British Tinnitus Association’s website at www.tinnitus.org.uk/decision-aid.

The decision aid was developed in accordance with the consensus on International Patient Decision Aid Standards (IPDAS), which means it went through iterative development with input from many patients, experts in the field, clinicians, and researchers. The aids also have been through user-testing procedures and readability testing.

1 Montori V., 2017. Why we revolt: A patient revolution for careful and kind care. The Patient revolution, Rochester, Minnesota, USA.
6 Tunkel et al., 2014.
7 Greenhalgh et al., 2014.
8 Price et al., 2015.

Helen Pryce, MSc PD (Health) Senior lecturer in Audiology, School of Life and Health Sciences, Aston University, Aston Triangle, Birmingham, U.K.

https://www.ata.org
Right now, I’m sitting inside my mother’s house looking out the window at her garden. As I do, my tinnitus whistling and whirring away, I see a connection between this verdant landscape and me. Just outside the window, there is a little tree, and it’s dying, a slowly fading part of a radiant, living garden. But though its top branches seem sparse and tired, a bright green sprout proudly blossoms from its base, something new born out of something waning.

I have had tinnitus since April 13, 2013, a little over five years. Like my mother’s tree, I like to think that out of this sound that once seemed a death sentence to me, something new, unexpected, and beautiful has grown up in its place. Having come through the darkest parts of this experience, I can see all the good that has come into my life because of the way I eventually chose, and learned, to react to tinnitus.

I think using that word, choice, is so important. Surely, at the beginning, I felt powerless, I felt that I had no choice, or that my choices had led me to tinnitus and so I needed to blame myself. My every moment was pregnant with anger, self-pity, even some level of self-loathing, and, more than anything, profound despair. Especially in those first weeks and months, the whole world seemed to be wrapped in a black haze. My life on the other side of that April day seemed so rosy and easy, so intangible. I wondered how on earth this had happened. How could I live or have a relationship? How would anyone understand? Passing by people on the street, I bitterly and longingly thought, “They don’t have tinnitus.” Which, of course, I couldn’t know, and heaven knows what other horrors they may have been dealing with, but that was my initial reaction to the trauma. I felt deeply and completely alone.

And I was alone. Surely, people cared about me, and that was essential, though I didn’t see its full value at the time. However, tinnitus was my battle to fight internally and I would have to come out of it by myself. I had to make the choice to be happy again. I had to feel ready to try to be happy again. I didn’t know how that was going to happen,
but eventually, and somewhat mysteriously, things turned out.

At first, I struggled against the condition. I tried every vitamin, prescription, and treatment. I visited doctors, therapists, and surgeons of various specialties. I wandered from acupuncture to hypnosis. Truly, with the exception of “The Tinnitus Miracle,” I tried it all. Living in New York City, I had access to everything and anything, but nothing could really help me in the way I wanted. I wanted a cure, I wanted it to be gone.

Clearly, as I am writing this, I still have tinnitus. I’m not sure the sound has changed much, though if it has, it is softer and lower. Mostly, I think I’m habituated to it. Tinnitus has become part of my silence; it isn’t gone, I can still hear it, but it doesn’t emotionally or physically derail me as it once did. I wish I could lay out some kind of path for others to walk, but I think the experience is different for everyone. In the beginning, trying almost every treatment gave me a sense of purpose; I think I needed to fight it so that I would know later that I had tried everything. So, everything “helped” in making me ready to let go of my anger and despair, though nothing technically “worked” to cure my tinnitus.

When I felt ready to try to be happy, when I stopped struggling, I was able to embrace changes in my life that I hoped might help me live with tinnitus, even if they wouldn’t cure it. I think different things help different people, but these were the most instrumental for me:

- Yoga, as an effective form of physical mindfulness.
- An early introduction to Cognitive Behavioral Therapy (CBT) and members of the tinnitus community who enabled me to be hopeful.
- A caring psychiatrist, who prescribed appropriate medication to help me sleep as I recovered.
- The compassion and support of my loved ones.
- Writing about my experience and, later, serving others.

Perhaps seven or eight months after my tinnitus started, something began to change. If you have learned a second language later in life, that’s the closest thing to which I can compare the experience of habituation. A while back, I lived in France for a year, and at first everything was difficult, but at some point, things just started to make sense. I felt myself clearing little “hurdles,” though I wasn’t sure what I was doing, exactly, to arrive at or get over those hurdles. Later, habituating to tinnitus felt similar.

In France, I made the effort to learn my verb conjugations and struggle through conversations; with tinnitus, I made the effort to be good to myself, to meditate, to go on with my work, schooling, and friends, but it all felt foreign and difficult at first. I had to learn all over again, in a different way, things that had once been normal and easy. In both cases I put in effort—conscious and subconscious—and, mysteriously, my brain and body filled in the blanks and aided my efforts. I don’t think I could have sped up the process, though I think I could have slowed it down had I been harder on myself or more focused on my misery or listened for every change to my tinnitus. I am so in awe of my body. For many, habituation can seem so mysterious, but it’s a process that happens in life all the time—it’s just hard to imagine with tinnitus, given the toll such a condition takes.

When my tinnitus began, I was as close as I have ever been to wanting to leave the world. As a classical singer, sound and silence are especially dear to me, and I think the emotional connection I have to sound made my adjustment to tinnitus that much more difficult. My panic and anxiety and hopelessness were severe, sleep eluded me, and food tasted like cardboard. I couldn’t work or see any way to live life with this condition. Worried for me, my mother flew 3,000 miles from California to take care of me. All of this is to say that I started from a profoundly dark place. Looking back on that desperate young woman almost brings me to tears, but I would tell her that there is life beyond that despair. Things can be good again even though it seems impossible. Life probably will not be the same again, but it can be as good, or better, if different. I truly believe that.

“For many, habituation can seem so mysterious, but it’s a process that happens in life all the time—it’s just hard to imagine with tinnitus …”
Looking forward, I feel this wonderful sense of purpose. I’m an artist and designer, and I want to use my skills to bring more awareness to this condition. My tinnitus was noise-induced and it happened because I simply did not know to protect my ears the way I protect my head when I ride a bike or my skin when exposed to sunlight. I want to make protecting ourselves from tinnitus as normal and as widely known as those habits. I think there is a gap in awareness about tinnitus that can be filled by the beautiful, meaningful, and inspiring stories of individuals with the condition. I think we can share caution while still spreading hope. Though fundraising for a cure is absolutely needed, I can add more to the world by nipping noise-induced tinnitus in the bud, especially with teens and young adults, by advocating for prevention. I feel I can make awareness beautiful.

For those of us who have tinnitus, I hope to spread light and show that life can still be wonderful with tinnitus. Being in a position to take on these projects feels like such a blessing to me, and it’s one result of this experience, among many, many others, that I’m thankful for. It is the new growth that has sprung forth on my fading tree.

In my efforts to nurture this, I recently ran a Kickstarter campaign for Seen Feast, an event for those with tinnitus and their loved ones that was to take place in New York City. I had invited an art therapist and a cognitive behavioral therapist to speak about evidenced-based approaches to living with tinnitus and to run short workshops. Mostly, the event was meant to help those with tinnitus, and those who love them, to feel less alone and to build a positive experience around an invisible and painful condition. Kickstarter is all or nothing, and Seen Feast was not fully funded. However, it was backed by strangers from Hawaii to France, none of whom could attend but all of whom wanted to see this event happen for others. Through the campaign, we spread the word about tinnitus to thousands and built a sense of hope just by offering something to our community. To me, that is a vibrant kind of success. I am committed to building positive experiences for the community. If anyone reading is interested in collaborating, I would love to hear from you.
The International Hearing Society is proud to present the

Register at www.ihsinfo.org/Tinnitus

November 9-10, 2018
The Westin Wall Centre, Vancouver Airport
Vancouver, British Columbia, Canada

Who should attend?
Hearing care professionals* who want to advance their knowledge and clinical skills to help people suffering from tinnitus, and who are licensed as a hearing aid specialist, hearing instrument practitioner, or audiologist, and have at least two (2) years of clinical experience post-licensure should participate in this two day workshop and assessment.

Learn
Section 1: Physiology
Section 2: Psychology
Section 3: Measurement
Section 4: Management
Section 5: Practice Organization

Earn
• Knowledge to help your patients with tinnitus
• A reputation as a Tinnitus Care Provider
• 16 continuing education credits

Register at www.ihsinfo.org/Tinnitus

* Interested participants should review their state/provincial rules and regulations regarding permissible practices related to tinnitus management.
Spotlight on Patient Providers

GOLD LEVEL

Professional Members
Listing current as of June 30, 2018

When making an appointment, please mention that you learned of the provider from the ATA, thereby ensuring that providers understand the importance of being a part of the ATA’s tinnitus patient-provider network.

Eugene Antonell, BC-HIS
Hear Better Now, LLC
N. Dartmouth, MA

Theodore Benke, MD
Benke Ear Nose & Throat Clinic
Cleburne, TX

Mario Hearing & Tinnitus Clinics
West Roxbury-Boston, MA

Granville Brady, Jr., AuD
Dr. Granville Brady, Jr.
East Brunswick, NJ

Gail B. Brenner, AuD
Tinnitus & Sound Sensitivity Treatment Center
Bala Cynwyd, PA

Collin Campbell, LAc
Campbell Acupuncture & Herbal Medicine Clinic
New York, NY

Phoebe Clouser, AuD
Hearing Partners of South Florida
Delray Beach, FL

Lois N. Cohen, LCSW, ACSW, BCD
Tinnitus Counseling
Northport, NY

Lindsay Collins, AuD
Sound Relief Hearing Center
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Jean Couchman, MA
Hearing Solutions, PLLC
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Cape Cod Hearing Center
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Middle Tennessee Audiology
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Belinda Gonzales, HIS
NuSound Hearing Center
Topeka, KS

MaryRose Hecksel, AuD
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Miracle-Ear Hearing Aid Center
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Christine Peacock, AuD
Naples Audiology & Hearing Center
Naples, FL

Tracy Peck, AuD
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San Francisco, CA

Ashley Penrod, PA-C
Alta View Specialty Clinic
Sandy, UT

Jay Piccirillo, MD, FACS
Washington University School of Medicine
Saint Louis, MO
Currently, the only way to prevent hearing loss caused by loud noise – such as a firecracker, concert, or explosion – is the use of hearing protection, like ear plugs. Researchers at the Keck School of Medicine of the University of Southern California think they might have discovered a simple solution to preserving hearing from sudden exposure to loud sound.

The research team, headed by Dr. John Oghalai, built a tool using miniature optics to see inside the cochlea – the hearing portion of the inner ear – and exposed mice to loud sound. They found that the loud noise caused sensory hair cells, which detect sound and convert it to neural signals, to die, and the inner ear to fill with excess fluid, causing the death of neurons.

“That buildup of fluid pressure in the inner ear is something you might notice if you go to a loud concert,” said Dr. Oghalai. “When you leave the concert, your ears might feel full and you might have ringing in your ears. We were able to see that this buildup of fluid correlates with neuron loss.”

Neurons and sensory hair cells have critical roles in hearing. In the study with mice, the sensory hair cells died immediately after exposure to loud sound, while neuron damage was delayed, creating a window of treatment. The buildup of fluid in the inner ear continued for several hours and contained high levels of potassium. To reverse both effects, researchers injected a salt- or sugar-based solution into the inner ear, which prevented 45%-65% of neuron loss.

The team will continue its research, with the possibility of pursuing clinical trials to test the treatment in human subjects. 

The full news release can be found at USC Research News.

To read the study, see: Jinkyung K., et al., Osmotic stabilization prevents cochlear synaptopathy after blast trauma. Proceedings of the National Academy of Sciences, May 2018, 201720121; doi:10.1073/pnas.1720121115
By Joy Onozuka

The American Tinnitus Association’s Board of Directors meets four times a year – twice via telephone conference and twice in person – to review operations, research funding, and strategic goals, among other things. In April 2018, 12 Board members and three ATA staff members met in Miami, FL, for two days to conduct board business, which included voting on 2018–19 research grant applications that were recommended by the ATA’s Scientific Advisory Committee (SAC) and conducting a detailed review of staff operations, organizational objectives, and finances.

The location was selected to enable the board and staff to tour the University of Miami Health System (UHealth) Ear Institute, where SAC Chair Michael Hoffer, MD, works and teaches. The institute is recognized for its excellence in research on hearing loss and vestibular balance. UHealth audiologists Tricia Scaglione, AuD, director of the Tinnitus and Sound Sensitivities Program, and Brianna Kuzbyt, AuD, gave a tour of the institute and a presentation on its tinnitus and hyperacusis services. The institute’s comprehensive approach includes psychoeducational counseling, assessments, management options, and multispecialty referrals in the fields of neuro-otology, sleep medicine, oral and dental health, mental health, neurology, physical therapy, and orthopedics. The tinnitus clinic sees about 200 patients annually and is known for its full-service treatment support.

To further its mission of training hearing healthcare professionals, UHealth offers a clinical educational program through its Division of Audiology.

For information on the Ear Institute, its Tinnitus and Sound Sensitivities Program, or its professional development program, contact Dr. Scaglione at tscaglione@med.miami.edu.
By Hazel Goedhart, Markku Vesala, and Steve Harrison

How does tinnitus affect relationships? And what level of support is provided by partners to help people with tinnitus cope?

Tinnitus Hub conducted a survey, via the online patient community at www.tinnitustalk.com, to gain more insight into the social support aspects of tinnitus. Responses were solicited both from people with tinnitus and from their partners. Of the 1,927 respondents, 61 were partners. The majority of those were the partner of someone with tinnitus. The small number of partners who responded is, to a large extent, the result of a minority of respondents passing the survey on to their partners. This corroborates one of our key findings – that people with tinnitus do not freely share their experiences with the people closest to them.

Key findings from the survey include the following:

• Nearly one fourth of those with tinnitus report a lack of support from their partners when dealing with tinnitus-related mood swings.
• Struggles with tinnitus are not frequently nor openly discussed with partners.
• There is a significant association between higher rates of tinnitus annoyance and partners dealing poorly with tinnitus-related negative moods. Similarly, there is a significant association between higher rates of tinnitus annoyance and higher rates of perceived resentment from partners.
• Gaps in knowledge about tinnitus, and a lack of understanding of how to help, can put additional strain on relationships.
• Relationships suffer most in the areas of social life and relaxation, where many respondents indicate feeling restricted in the range of activities in which they can partake.
• Being more annoyed by tinnitus is associated with being more socially withdrawn.
• Tinnitus can negatively affect work prospects through (perceived or feared) discrimination and/or because of coping and concentration problems.

Talking About Tinnitus

Talking about tinnitus does not come naturally for everyone. We asked people about the frequency with which they speak about their tinnitus with partners. Only 12 percent state that they always tell their partners when they’re having a bad tinnitus day, while a majority of respondents said they do share the experience at least sometimes. The answers provided by partners paint a similar picture (see Figure 1).

Considering that most people with tinnitus are not very open about having a bad tinnitus day, much is left to the perceptiveness of their partners. Only...
18 percent of respondents indicate that their partners always notice when they are having a bad tinnitus day, compared to 39 percent of partners who say they always notice.

The picture looks a bit more positive when assessing whether people have discussed in general terms whether and how often their tinnitus bothers them: 79 percent of partners say they are aware of this by having talked about it.

The combination of not talking much about tinnitus, on the one hand, and tinnitus coping difficulties not always being apparent to others, on the other hand, can lead to a disconnect between the person with tinnitus and his or her social surroundings.

Open-ended responses give some clues about why people may choose not to speak about their tinnitus frequently. Reasons include not being asked about it, fear that others will not understand or resignation that this is the case, fear of being seen as different or handicapped, not wanting to burden others, and wanting to avoid bringing tinnitus to the forefront of consciousness by discussing it.

Some partners commented that it would be helpful for them if the person with tinnitus would speak more openly about the condition, because it can be hard to distinguish when someone is upset or withdrawn because of tinnitus or because of other reasons. Similarly, some people with tinnitus noted that it is not reasonable to expect others to understand the emotional impact without talking about it.

Coping with Mood Swings

The vast majority of respondents (83 percent) indicate that tinnitus has somewhat or significantly affected their mood, now or in the past. Only 8 percent find that their partners deal with their mood swings “very well,” with an additional 46 percent rating their partners as “okay” in this regard. Unfortunately, 24 percent report a (significant) lack of support from their partners when they experience mood swings. See Figure 2 for more details.

Looking at the answers from partners, they do not rate themselves much better in terms of dealing with mood swings. Although a high proportion of partners (51 percent) claim to handle it “okay,” 39 percent rate themselves as handling it “not so well.”

A sizable proportion of people indicate that they feel their partners resent them because of tinnitus most of the time (2 percent) or sometimes (26 percent). This is corroborated by the partners themselves: 2 percent of partners indicate feeling resentful most of the time, while 33 percent report feeling resentful sometimes.

Open-ended responses on the negative end of the spectrum indicate that some spouses seem indifferent.
to their partner’s suffering. There are several mentions of relationship break-up due to tinnitus or of people being afraid it will ruin their relationship. On the positive side of the spectrum, people mention that their relationship has gotten stronger from supporting each other through the difficult times brought on by tinnitus and that support from partners has been key to achieving emotional recovery.

Social Support and Tinnitus Annoyance

Is there any association between how well partners cope with the negative emotional effects of tinnitus and the degree to which a person is annoyed by their tinnitus? We found two statistically significant associations:

a) Higher rates of tinnitus annoyance are associated with partners dealing poorly with tinnitus-related negative moods.\(^1\)

b) Higher rates of tinnitus annoyance are associated with higher rates of perceived resentment from partners.\(^2\)

Based on these results, it is not possible to draw inferences about causality, that is, whether tinnitus annoyance is increased because of lack of support from partners, or the other way around, or whether there is a third factor involved that we did not assess. However, what these correlations do show is that the degree of social support and the degree of tinnitus annoyance go hand in hand. Individuals with tinnitus who have a poor social support system are, for whatever reason, more likely to be bothered by their tinnitus more frequently. This underlines the importance of improving support systems for people with tinnitus.

Open-ended responses to the survey elaborate on the perceived lack of understanding from partners or people in general. Recurring themes among these answers are the following:

- People just do not understand, because they don’t experience it themselves.
- People are generally dismissive and don’t see it as a life-impacting condition.
- It just doesn’t seem real to others; it’s an invisible/hidden disability.
- People think it’s all in your head or that you’re crazy.
- People don’t understand the difference between fleeting or mild tinnitus and severe chronic tinnitus.
- People don’t understand that sound can hurt (specifically in regard to hyperacusis).
It gets frustrating when people advise to “just ignore it.” Considering the lack of understanding reported by many people with tinnitus, it is not surprising that support from the tinnitus community can be instrumental, as illustrated by this respondent: “I’ve actually made some good friends through tinnitus. People that I would never have met if it weren’t for this condition.”

**How Can Relationships Be Affected by Tinnitus?**

Social relationships can be affected by tinnitus in different ways. We asked respondents to highlight in which of the areas illustrated in Figure 5 that they felt most affected. The most significant negative effects are seen in the areas of social life and relaxation.

Open-ended responses indicate that these effects are largely due to people feeling restricted in certain activities, such as visiting restaurants or attending family events and other social functions. This limits the options for spending quality time with others and can lead to social isolation. Some responses highlight feelings of guilt and inadequacy for not being able to live up to others’ expectations.

Sleep was often mentioned as a mediating factor, which affects various aspects of people’s relationships. Difficulties or tensions are sometimes encountered when sharing a bed with someone while using masking sounds. Furthermore, the lack of sleep that affects some people with tinnitus can put additional strain on relationships and limit people’s ability to take part in social activities.

Finally, some single people with tinnitus express concerns over their ability to date or find a partner while dealing with the practical and emotional repercussions of tinnitus.

Hearing loss and hyperacusis deserve special mention here. People with hyperacusis feel (severely) limited in the range of their activities and, thus, in their social interactions. Many of them do not feel very supported by partners in dealing with sound avoidance (see Figure 6). People with hearing loss point out the frustration and social isolation...
that comes with not being able to easily carry on a conversation.

The restrictions people with tinnitus experience regarding social activities can lead them to become more socially withdrawn. In fact, more than two-thirds of respondents indicate that this is the case to some degree (see Figure 7). Interestingly, the partner respondents report even higher rates of social withdrawal than do people with tinnitus themselves. In fact, the percentage reporting high rates of withdrawal is twice as large among partners. This could be an indication that people with tinnitus underestimate the degree to which their social engagement has been curtailed. Possibly, it has become the new normal for them. Alternatively, these results could be an indication that partners are concerned about the impact of social isolation or frustrated at the degree to which the person with tinnitus withdraws.

**Tinnitus Annoyance and Social Isolation**

Is there any association between the degree of social withdrawal reported by people with tinnitus and the degree to which a person is annoyed by the tinnitus? We did, in fact, find a statistically significant association between higher rates of tinnitus annoyance and being more socially withdrawn.

Although we cannot know whether these results point to a direct causal relationship, they do demonstrate that individuals who are more bothered by their tinnitus also are more prone to social isolation. It is possible (though speculative) that such people get caught in a downward spiral, whereby they stop undertaking social activities because of the negative emotional impacts of tinnitus or for fear of making their tinnitus worse. The resulting social isolation, therefore, may make it even harder for them to cope with the emotional repercussions of tinnitus.

**Tinnitus and Work**

For many people, work is an important part of their social environment and provides a sense of achievement and self-worth. Unfortunately, our survey results show that 38 percent of people feel that tinnitus has negatively affected their work prospects (see Figure 8). Open-ended responses illustrate that these negative effects stem from a lack of understanding at the workplace, a lack of willingness to adapt the work environment to specific needs (e.g., in terms of noise), or even taunts and jokes from co-workers. Some people hesitate to be open about their tinnitus for fear of workplace discrimination.

A contributing factor to work struggles might be the difficulties with concentration that many people with tinnitus report. Survey respondents indicate that tinnitus has affected their concentration mildly (41 percent),

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**Figure 7: Has the Person with Tinnitus Become More Socially Withdrawn?**

<table>
<thead>
<tr>
<th>According to People with Tinnitus</th>
<th>According to Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, a lot</td>
<td>18.0%</td>
</tr>
<tr>
<td>Yes, a reasonable amount</td>
<td>16.6%</td>
</tr>
<tr>
<td>Yes, every now and then</td>
<td>33.1%</td>
</tr>
<tr>
<td>No difference</td>
<td>32.3%</td>
</tr>
<tr>
<td></td>
<td>36.1%</td>
</tr>
<tr>
<td></td>
<td>21.3%</td>
</tr>
<tr>
<td></td>
<td>27.9%</td>
</tr>
<tr>
<td></td>
<td>14.8%</td>
</tr>
</tbody>
</table>

**Figure 8: Has Tinnitus Affected Your Job or Work Prospects?**
Hardship Breeds Compassion

Interestingly, the majority of people with tinnitus say that the condition has made them a bit more (34 percent) or a lot more (26 percent) compassionate and understanding of others. The same question posed to partners of people with tinnitus yields a somewhat lower, but still encouraging, figure of 43 percent who say the person with tinnitus has become a bit more or a lot more compassionate and understanding of others. Only a small minority (4 percent) of people with tinnitus report having become a bit or a lot less compassionate and understanding (the remainder report no change).

Conclusions

In assessing the survey results, two potential sample bias effects need to be kept in mind: Firstly, people with tinnitus who responded to our survey are likely not representative of the entire tinnitus population but, rather, of the group who seek help on the internet. Secondly, the group of partners who responded (only 61 in total) are likely not representative of partners in general but, rather, of the group who are generally supportive and relatively informed on the topic. Nevertheless, we feel that these survey results are meaningful and significant in illustrating the complex interrelations between tinnitus and social support and engagement.

Our survey results indicate that although some people with tinnitus get all the support they need from their social surroundings, many face a lack of understanding and support. We have seen (with high statistical significance) that higher rates of tinnitus annoyance are associated with a significant other dealing poorly with negative moods, as well as with higher rates of perceived resentment from partners.

Not being able to participate in certain social activities further compounds feelings of social isolation, particularly for those who are more annoyed by their tinnitus. It’s hard to say whether these challenges result from a lack of awareness of tinnitus, unrelated social factors, or relationship issues. Nonetheless, providing the right information to partners is likely to improve the quality of life of people with tinnitus and strengthen the relationships that are so instrumental in helping them cope with the condition. This should be a key mission of the tinnitus community.

The social impacts of tinnitus should not be underestimated. They are widespread and permeate many areas of life, as demonstrated by our survey. This, once again, reiterates the need for better tinnitus care, awareness, and treatment options.

Tinnitus Talk

Tinnitus Hub (www.tinnitushub.com) is a United Kingdom–based nonprofit, patient-focused organization that is dedicated to helping everybody with tinnitus through online support services, tools to promote tinnitus knowledge, public awareness–raising campaigns, collaboration with researchers, and a push toward a cure.

Tinnitus Talk (www.tinnitusqual.com) is run by Tinnitus Hub and is an online patient community where people with tinnitus can connect with, learn from, and support each other. Tinnitus Talk has more than 25,000 members and was established in 2011 by Markku Vesala, who has nurtured the resource into what it is today. Tinnitus Hub was established later as its managing entity.

Hazel Goedhart

Hazel is a sustainability consultant in Amsterdam, Netherlands. She has had tinnitus since October 2017 and became involved as a volunteer for Tinnitus Hub and Tinnitus Talk in February 2018. She contributes to, among other things, survey data analysis, writing articles, and creating resources with information and guidance for people with tinnitus.

Steve Harrison

Steve is an environmental consultant in Yorkshire and lives in Sheffield in the United Kingdom. He became involved with Tinnitus Talk in 2013, joining forces with Markku and has been advocating for people with tinnitus ever since. He has had tinnitus since 2003 and considers himself to be mostly habituated, although the journey to this point has been far from easy. He attends events and conferences, designs surveys, and works on content.

Markku Vesala

Markku is a video producer and editor based in a server hub in Finland. He is the founder of Tinnitus Talk, having started the site in 2011 and nurturing it from near zero activity to the space that it is today. Markku is the “main man” on Tinnitus Talk, moderating, maintaining, and leading. He has had tinnitus since 2011, a result of having his ears syringed.

Statistical analysis conducted by Momoko H. Koenigs, PhD, adjunct faculty at University of Minnesota, and Clark Koenigs.

1 Pearson correlation = –.116 significant at the 0.01 level (2-tailed)
2 Pearson correlation = .235 significant at the 0.01 level (2-tailed)
3 Pearson correlation = .084 significant at the 0.01 level (2-tailed)
4 Pearson correlation = .406 significant at the 0.01 level (2-tailed)
Tinnitus Triggered by Ototoxic Drugs: Strategies to Protect Your Hearing Health

By Neil Bauman, PhD

Currently, I know of at least 657 drugs (and still counting) that list tinnitus as a possible side effect. In addition, I know of 10 herbs and 31 chemicals that can do the same.

Two common drugs you may not realize that may cause tinnitus is the anti-inflammatory drug Ibuprofen, and the selective serotonin reuptake inhibitor (SSRI) Citalopram®. In fact, more people complain to me via email about getting tinnitus from taking these two drugs than from taking other drugs.

Strategies to Avoid Tinnitus

The following three strategies may reduce your risk of getting tinnitus from drugs.

1. Take medication only when absolutely necessary.

Instead of always taking medication, first seek to correct underlying health problems. Typically, drugs only mask symptoms. Thus, you end up taking the drug “forever,” because when you stop, the symptoms reappear. By digging down to the root cause of your health problems and fixing them, in most cases you may not need medication. Unfortunately, Americans seem to be a nation of pill poppers.

Sometimes, drugs are prescribed unnecessarily, especially to older adults, as noted by Dr. Sidney Wolfe, the Health Research Group founder and senior advisor of Public Citizen’s Worst Pills, Best Pills News, which can be found at www.citizen.org. The result is that what might have been a minor problem can become a major problem.

Below are comments from people who found that the side effects of drugs their doctors prescribed were worse than the conditions they were supposed to help.

Three years ago, after taking Bupropion for 6 months for depression, I woke up with tinnitus. At that point, my tinnitus was a “static” sound—not fun—but bearable. I was told by my doctors that there was no connection between this drug and my tinnitus, but [I] stopped [the medication] anyway. I have had tinnitus ever since. A few weeks ago, I started taking Bupropion again, falsely believing it wasn’t related to my tinnitus. Now my tinnitus is a louder, shrieking sound. I will never take this drug again because it seems I have to listen to this terrible sound for the rest of my life. I would never have chosen this over my depression, if I had [had] even the slightest idea this could be a side effect. That I took this drug for depression is so ironic.

Another person wrote,

I had an injury to my foot and took Ibuprofen (Advil®, Motrin®) for the pain. Shortly thereafter, the ringing in my ears started. I had no idea this could happen and would never have taken Ibuprofen, if I had known this would happen.

Therefore, to reduce your risk of getting tinnitus, go easy on drugs. If you choose to take medication, make sure you know that the benefits will clearly outweigh the potential side effects. Ask your doctor to justify that a given drug is really necessary—not the casual “let’s try this and see what happens,” because in some cases, one of the risks is that tinnitus can manifest.

Before taking medications, make lifestyle and dietary changes to improve your health. The goal is to work with your physician, keeping them informed of what you are doing and who you are working with to eliminate underlying health problems, so medications are less likely to be needed.

Some alternatives for improving and maintaining your health include:
• Change your diet. Did you know that more than 80 percent of health problems can be linked to poor diet? According to prolific author and natural health advocate Dr. Joseph Mercola, who’s an osteopathic physician, your diet should consist of mostly raw and lightly steamed vegetables and fruits. Cut way down on all sugars. Ideally, reduce your sugar intake from all sources to less than 25 grams per day—that’s less than two tablespoons of sugar from all sources, including drinks, processed foods, fruits, etc.

• Balance diet and lifestyle with attention to the role of vitamins. For example, most people are low in Vitamin D3, and this affects many areas of your body, including your mental health. (Vitamin D affects more than 3,000 genes.) To be effective, your optimal blood vitamin D3 levels should be in the range of 50-70 nanograms per milliliter (ng/ml). Many people’s levels are around the 20 ng/ml level—far below the optimal level, and your health suffers as a result. So, go outdoors and absorb the benefits of natural sunlight, which enable your body to make its own vitamin D.

• Learn more about other less-traditional healthcare providers, such as naturopathic doctors (NDs), and see them when appropriate. For instance, it may make sense to see an osteopathic doctor (DO), who is a fully licensed physician trained to focus on the prevention of illness and maintaining a healthy lifestyle. Consider the role of a chiropractor trained to address the upper cervical spine, because some ear problems can stem from the top two vertebrae in the neck not being aligned properly.

• Exercise more. Just get moving.
• Get adequate sleep. If you short yourself on sleep, both your physical and mental health suffer.
• Consider counseling rather than drugs, unless absolutely necessary, for depression, anxiety, and related issues.

My own philosophy is that drugs should be your last line of defense, not your first line of attack. Too many people take drugs as their first, and only, choice because it is easier to pop a pill than to make the effort to do any of the above. As a result, the risk of getting tinnitus can increase unnecessarily.

Choose the drug least likely to be ototoxic.

If medication is required, talk to your healthcare provider about which drugs are least likely to aggravate or cause tinnitus. This may be a different drug in the same drug class, or a drug in a different class. Take the lowest effective dosage possible.

Ask your doctor to prescribe the lowest dose that will treat your condition; many drugs do not exhibit ototoxic side effects when taken in low doses. For example, one woman told me her tinnitus became noticeably louder when her doctor put her on a higher dose of Irbesartan to control

Top 20 Drugs Linked to Triggering Tinnitus

Top 20 tinnitus-producing drugs, based on the number of reports submitted to the FDA’s database. The drugs are listed in descending order, from most reports (highest risk) to fewest reports (lower risk) and are listed by their generic name, followed by the common brand name in italics:

- Alendronate (Fosamax®)
- Acetylsalicylic acid (aspirin)
- Paroxetine (Paxil®)
- Alprazolam (Xanax®)
- Bupropion (Wellbutrin®)
- Venlafaxine (Effexor®)
- Metoprolol (Lopressor®)
- Acetaminophen (Tylenol®)
- Hydrocodone (Vicodin®)
- Atorvastatin (Lipitor®)
- Omeprazole (Prilosec®)
- Duloxetine (Cymbalta®)
- Clonazepam (Klonopin®)
- Gabapentin (Neurontin®)
- Amlodipine (Norvase®)
- Ibuprofen (Advil®)
- Lisinopril (Zestril®)
- Lorazepam (Ativan®)
- Sertraline (Zoloft®)
- Quetiapine (Seroquel®)
her high blood pressure. When she complained to her doctor, he reduced the dose to its old level and her tinnitus also dropped back to its old level.

3 Take medication for the shortest time possible, as recommended by your doctor.

Ask your doctor to prescribe medications for the shortest duration possible, because some ototoxic drugs do not damage your ears in the short term. However, if taken long term, the risk of them damaging your ears increases. By taking a medication for only two weeks, for example, you may avoid ototoxic side effects, whereas taking the same drug for several months may cause ear problems.

Can Foods and Herbal Medicines Cause Tinnitus?

A woman asked,

I wondered if you knew about the ototoxicity of various foods. I read that tea is high in salicylates, as are a lot of fruits. Does this mean that drinking/eating these things can make my existing tinnitus worse?

Certain foods can cause tinnitus, but typically—as long as you don’t go off the deep end and consume copious amounts (or far more than the recommended dose)—you shouldn’t worry about getting tinnitus from food.

For example, I’ve been asked whether you can get tinnitus from eating foods high in salicylates, which is the basic ingredient in aspirin and some other medications for pain relief. Some fruits, vegetables, and spices are naturally high in salicylates, but, even so, the amount they contain is far less than what could cause tinnitus.

Curry powder is a good example. It has the highest salicylate content of any known food—218 mg. per 100 g. To consume the equivalent salicylates contained in six adult aspirin—the amount of aspirin that could cause tinnitus—you’d have to choke down almost four pounds of pure curry powder—at one sitting!

The same applies to raisins. Raisins are relatively high in salicylates (6.62 mg. per 100 g.). To get the equivalent salicylates found in six adult aspirin, you’d have to gorge yourself on 144 pounds of raisins at one time. By the time you did that, tinnitus would be the least of your worries.

Drug Results Are Unique to Each Person

Each one of us is unique, and so is our response to drugs. This means that a drug that gives me tinnitus may not cause your tinnitus to increase and vice versa. As a result, it is hard to know which drugs you should stay away from and which you can take safely if you want to avoid tinnitus or other ototoxic side effects.

What you can do to reduce your risk of getting tinnitus is look at reports of tinnitus occurrence for each drug. The more people who report getting tinnitus from taking a given drug, the greater your risk, if you take that drug.

Unfortunately, there is no single source for this kind of information. You can do what I do and search through numerous drug books and online databases to try to ferret out the risk of tinnitus (or other side effects) that are reported for a given drug. This can be extremely time consuming, which is why I have compiled this kind of information into a single source—the book Ototoxic Drugs Exposed—available at hearinglosshelp.com or through Amazon.

Neil Bauman, PhD, is the founder and CEO at the Center for Hearing Loss Help. He is a hearing loss coping skills specialist, researcher, author, and speaker on hearing loss. Bauman helps hard-of-hearing people adapt successfully to hearing loss, tinnitus, and balance problems while minimizing future damage to their ears—particularly from the effects of ototoxic drugs. He is the author of eleven books and more than 1,000 articles on hearing loss topics, including more than 160 articles related to ototoxic drugs. The third edition of his book, Ototoxic Drugs Exposed, describes over a thousand drugs, herbals, and chemicals that can (and do) damage ears.
The American Tinnitus Association (ATA) had the pleasure of talking with Phillip Gander, PhD, an assistant research scientist in the Department of Neurology at the University of Iowa, about his groundbreaking research using electrodes applied directly to the brain to measure brain activity in response to tinnitus. The research uses a residual inhibition paradigm, which is a psychoacoustic measure of tinnitus. It was made possible when neurosurgeons performed a craniotomy on a middle-aged male with bilateral tonal tinnitus and intractable epilepsy.

Neuroimaging studies of tinnitus activity in the brain typically use functional MRI (fMRI) scans, which, because they are noninvasive, do not allow for the direct measurement of spontaneous firing rates of neurons.

Gander used approximately 200 electrodes, which were implanted in the man’s brain, to stimulate and track activity in the brain in response to sound. He used white noise to mask the tinnitus and found that half the time it made the tinnitus quieter and half the time it did nothing. The auditory cortex and higher-level auditory association areas, including attention, were affected, affirming findings from studies using fMRI.

“Because only 10 to 15 percent of the adult population of epilepsy patients might have tinnitus … it is not that often that we actually get one of these people coming through the door,” he said. Gander noted,
however, that it was challenging to publish the research, because it involved a single subject.

Last year, he was able to conduct a second study on a female subject, targeting electrode stimulation along the long axis of Heschl’s gyrus, which is the area of primary auditory cortex that processes incoming auditory information. “I was face to face with her. And in a relatively unblinded way, flipping the switch on the stimulator. I was directly stimulating her brain,” Gander said. To test her auditory processing at the same time he was stimulating her brain, he talked to her. “She reported no change in her actual regular auditory perception. But she was also experiencing this inhibition of her tinnitus. This was significant, because it showed that there can be regular auditory perception disassociated from the sound of tinnitus,” he said.

Gander noted that neuroimaging studies increasingly find what might be considered memory areas of the brain, including the hippocampus and the parahippocampal gyrus, involved in the perception of tinnitus. “You could be completely deaf and have no auditory stimulation or regular auditory processing in your auditory cortex, yet you hear a tinnitus sound,” he explained.

He also noted that fMRI research on tinnitus has increased significantly over the last decade, generating different theories about different networks involved in the perception of tinnitus. To add clarity and meaning to findings, Gander submitted a grant application proposing an investigation with a repeated measure design. Such a study would involve following a person over time to observe possible changes in the brain networks due to tinnitus and then comparing the individual’s data to a group’s. “Could we do a measurement of tinnitus distress in a population and then see how it correlates with different subgroups in the measurement, as well as what’s changing and what’s not, based on stratifying our group and differentiating on one or multiple factors as to what might be tinnitus and what might be a cause or effect of tinnitus?” Gander asked.

While much remains unclear about why tinnitus presents differently among people, research such as Gander’s opens the door to reexamining current theories and a better understanding of tinnitus effects on the brain.
By Jake Alford

It seems like it was just yesterday that tinnitus entered my world, but it started about eight years ago, when I was in college at West Texas A&M. I was trying to decide my major when I noted the ringing in my ears. When I finally realized it wasn’t going away, I made an appointment with the closest ENT specialist I could find.

I’ll never forget as he took a quick look in both ears, shook his head, and said, “It’s just tinnitus, and you’ll have to learn to deal with it, just like everyone else.” It took a few days for that to sink in, and it was the first time I ever truly questioned a medical professional. That conversation left me utterly discouraged. I couldn’t believe that was the only answer that could be given. We live in a world where there seems to be a solution for everything, so why not this?

After a few weeks of sleepless nights, and countless hours researching tinnitus online, I committed myself to finding relief through an action plan.

**Step 1: Finding a Physician Committed to Helping Me Find Relief.**

I met two physicians in person and called five more until I found someone I thought could help. This was the first doctor who could answer my list of questions about tinnitus, instead of responding, “Let me get back with you.” However, the main reason I chose him was his willingness to call ahead to speak with doctors to whom he was referring me to deal with my tinnitus. That meant I knew the next doctor I was heading to see wasn’t going to say, “Just deal with it.” I knew I was meeting people who offered treatment options and ideas that potentially could help me. Finding that key doctor who was willing to be my advocate with other healthcare professionals was a gamechanger.

**Step 2: Relearning How to Focus.**

My tinnitus was so severe that I developed insomnia, which led to intense fatigue and depression. I had to get my life back on track to be able to pass my college courses; otherwise, my future was in jeopardy. I turned to a therapist, who my General Practitioner had suggested, and developed a stress-management plan for coping with tinnitus. Within a week of that appointment, I was enrolled in boxing classes to deal with my anger and yoga classes to help with relaxation. I went on to learn breathing techniques and meditation, as well as martial arts. After all these years, the meditation, yoga, and breathing techniques are my most powerful tools for dealing with my worst tinnitus days.

**Step 3: Creating a New Environment.**

I no longer could endure complete silence, so I made sure that I had fans running in rooms throughout my house, my car radio was always on, and white noise was constantly playing on the earbuds I wore throughout the day. I also set limits on where I would go, so I could get a handle on
the tinnitus. That meant staying away from loud places, such as sporting events, concerts, and many restaurants or bars. That put a lot of strain on my relationships with friends and even family. People thought I was a recluse, when in fact I was in survival mode. Everyone kept telling me to use earplugs, but earplugs simply amplified the sound of my tinnitus, making the situation far worse. Very few people understood my situation, which was hard.

**Step 4: Keeping a Journal.**

I wrote down everything, at the encouragement of my therapist, to better understand my tinnitus. I figured out what foods triggered spikes in my tinnitus and how many hours of sleep I needed to quiet it. In time, I created a lifestyle that enabled me to function at a high level and keep my tinnitus at bay. It was still there, but it wasn’t as severe, and I had some control over it. Once I understood my tinnitus and got a handle on it, my journal became a source for me on bad days for seeing what I had overcome. It also provided a space where I could process and communicate my feelings about tinnitus more effectively.

**Step 5: Acceptance.**

At a certain point, I understood I had done all I could do to protect my hearing and my sanity. Yes, I had tinnitus, and the damage was done. Modern medicine isn’t at the point where it can fix tinnitus or reverse the damage. So, what can I do? I have to learn to live with the situation and the quirks that come along with it to keep me going. I still don’t like complete silence, but I can manage it.

I still don’t frequent bars, concerts, or large sporting events. Even though I love shooting pool, music, and sports. I’ve lost friendships and relationships along the way, but that’s just life. What I’m trying to say is that I keep going, and I don’t let it bog me down. No, it isn’t easy, but it does get better.

I was familiar with hearing disorders, because my grandmother had vertigo along with tinnitus but didn’t know the name for it. She just told my mom how much trouble it was causing her. Turns out my mom did quite a bit of research; when I told her about my ears ringing, she said it was called tinnitus. We didn’t discuss the American Tinnitus Association until after I called her following my first ENT appointment. I was upset and angry that the doctor had given me no hope and advice to “just deal with it.” My mom reassured me by saying there was an organization called the ATA that I needed to look up when I got home.

By the time I got around to contacting the ATA – about five years after getting tinnitus – I was in a good place. I reached out, because I had a goal to help the tinnitus and hard-of-hearing community. Having both conditions, I was shocked that I had never seen a shirt depicting the conditions I faced. So, when the opportunity arose to get into the apparel business, I was ready. I figured it would be an awesome way to raise awareness and provide funds for researching cures for hearing loss and tinnitus.

My motivation comes from my grandfather, who always told me to find ways to help others. He was active in the Rotary Club locally and nationally. He was one of 12 people chosen to raise funds for the Polio-Plus Campaign, which took him to various corners of the world to give motivational speeches and raise donations. Knowing that his efforts were changing society for the better changed him. Living in a small town, he constantly told me that the only thing keeping me from changing the world were my self-imposed limitations. Our serious conversations always ended with him saying, “One day, a chance to serve will come your way, and it will fill your heart. When it happens, don’t think about it. Give all you’ve got and make a difference in this world. I know you have it in you.”

So, when I realized the ATA didn’t have apparel, I discovered I could fill that void and help raise awareness and research funds.

My vision with Tinnitus Tees is promoting awareness to the general public about tinnitus, providing people with the vocabulary to describe the ringing, buzzing, hissing, and

“We each can make a difference educating the public so people know what tinnitus is, the options for treating it, and how people can prevent getting it.”
whooshing in their ears and letting them know there’s support and research going on to help understand and eventually cure it. Hundreds of millions of people around the world deal with it on some level. The condition hits people of all ages and races. We each can make a difference educating the public so people know what tinnitus is, the options for treating it, and how people can prevent getting it.

My long-term goal is getting a tinnitus T-shirt in the hands of everyone who has it, as well as their loved ones. Every day, I read online about people who want a cure. I want one as well, but I also feel the need to shift the conversation to get the message out about what tinnitus is exactly. We have to come together and share our stories with the world, so tinnitus and hearing loss can get the attention they deserve. Imagine the dialogue if just one percent of the population with tinnitus wore tinnitus T-shirts on a given day!

I hope you’ll check my website at www.tinnitustees.com or look me up on Facebook.

And don’t be afraid to share the T-shirts in your social circles – it might surprise you how many of your friends have tinnitus. Minus shipping and handling, all proceeds go toward funding ATA research. 🌍

Jake Alford is the founder and lead designer of TinnitusTees.com, an apparel company dedicated to raising awareness of tinnitus while supporting the American Tinnitus Association’s core purpose of promoting relief, preventing, and ultimately finding cures for tinnitus. Feel free to contact him at jakealford26@yahoo.com.

Most people don’t feel any warning signs (like pain or ringing in your ears) until their hearing is already damaged. And if you think your ears can just get used to the noise, think again. If loud noises don’t bother you as much as they used to, that means you’ve already lost some of your hearing.

So how can you tell when a noise is hurting your hearing? If there’s so much noise around you that you need to talk extra loud when your friends are only a few feet away, it’s probably hurting your hearing. Time to bring out the earplugs – or go somewhere quieter!

Don’t wait until it’s too late. Start protecting your hearing now!
Support Group Calendar

People with tinnitus at every stage in their journey, from the first few days to years later, can benefit from attending a support group. Every tinnitus support group operates somewhat differently; but, they all share a passion for providing meaningful discussion and a caring environment where one can be understood through shared experience.

Below is a list of groups and meeting dates, current at time of print. To reconfirm dates and times, please email/call the point-of-contact person listed.

As new groups continue to be formed, we advise you to check our website periodically for new locations at: http://www.ata.org/managing-your-tinnitus/support-network/support-group-listing

Arizona

Phoenix Tinnitus Support Group
Granite Reef Senior Center, Room 7
1700 N. Granite Reef Rd.
Scottsdale, AZ 85257
Contact: Richard Morgan
T: 480-990-1136
E: r.morgan037@gmail.com
August 16–2:00 pm
September 20–2:00 pm
October 18–2:00 pm
November 15–2:00 pm
December 20–2:00 pm

San Francisco Tinnitus Support/Education Group
Hearing and Speech Center of Northern CA
Conference Room
1234 Divisadero St.
San Francisco, CA 94115
Contact: Malvina Levy, AuD;
Tracy Peck, AuD
T: 415-921-7658
E: mlevy@hearingspeech.org
tpeck@hearingspeech.org
August 21–5:30 pm
September 18–5:30 pm
October 16–5:30 pm
December 4–5:30 pm

Los Altos Hills Tinnitus Support Group
Congregation Beth AM
2670 Arastradero Road, Room 15
Los Altos Hills, CA 94022
Contact: Ken Adler; Amy Nelson, AuD
E: karmtac@aol.com
amyneltinez@yahoo.com
August 9–6:45 pm
September 13–6:45 pm
October 11–6:45 pm
November 8–6:45 pm
December 13–6:45 pm

Colorado

Denver Tinnitus Support Group
Lutheran Medical Center
2nd Floor Learning Center
8300 West 38th
Arvada, CO 80033
Contact: Rich Marr
T: 303-875-5762
E: r.marr@comcast.net
August 13–7:00 pm
September 10–7:00 pm
October 8–7:00 pm
November 12–7:00 pm
December 10–7:00 pm

Mesa County Tinnitus Support Group
Community Hospital
2351 G Road, Legacy Room 1
Grand Junction, CO 81505
Contact: Elaine Conlon
T: 970-589-0305
E: conlonelaine@aol.com
August 15–7:00 pm
September 19–7:00 pm
October 17–7:00 pm
November 21–7:00 pm
December 19–7:00 pm

People with tinnitus at every stage in their journey, from the first few days to years later, can benefit from attending a support group. Every tinnitus support group operates somewhat differently; but, they all share a passion for providing meaningful discussion and a caring environment where one can be understood through shared experience.

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Granite Reef Senior Center, Room 7
1700 N. Granite Reef Rd.
Scottsdale, AZ 85257
Contact: Richard Morgan
T: 480-990-1136
E: r.morgan037@gmail.com
August 16–2:00 pm
September 20–2:00 pm
October 18–2:00 pm
November 15–2:00 pm
December 20–2:00 pm

San Francisco Tinnitus Support/Education Group
Hearing and Speech Center of Northern CA
Conference Room
1234 Divisadero St.
San Francisco, CA 94115
Contact: Malvina Levy, AuD;
Tracy Peck, AuD
T: 415-921-7658
E: mlevy@hearingspeech.org
tpeck@hearingspeech.org
August 21–5:30 pm
September 18–5:30 pm
October 16–5:30 pm
December 4–5:30 pm

Los Altos Hills Tinnitus Support Group
Congregation Beth AM
2670 Arastradero Road, Room 15
Los Altos Hills, CA 94022
Contact: Ken Adler; Amy Nelson, AuD
E: karmtac@aol.com
amyneltinez@yahoo.com
August 9–6:45 pm
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October 11–6:45 pm
November 8–6:45 pm
December 13–6:45 pm

Colorado

Denver Tinnitus Support Group
Lutheran Medical Center
2nd Floor Learning Center
8300 West 38th
Arvada, CO 80033
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T: 303-875-5762
E: r.marr@comcast.net
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October 8–7:00 pm
November 12–7:00 pm
December 10–7:00 pm

Mesa County Tinnitus Support Group
Community Hospital
2351 G Road, Legacy Room 1
Grand Junction, CO 81505
Contact: Elaine Conlon
T: 970-589-0305
E: conlonelaine@aol.com
August 15–7:00 pm
September 19–7:00 pm
October 17–7:00 pm
November 21–7:00 pm
December 19–7:00 pm
Florida
NEW: Clermont Tinnitus Support Group
Citrus Hearing Clinic
835 7th St., Suite 2
Clermont, FL 34711
Contact: Laura Pratesi, AuD
T: 352-989-5123
E: drlaura@citrushearing.com
August 13—1:00 pm
September 10—1:00 pm
October 8—1:00 pm
November 12—1:00 pm
December 10—1:00 pm

Sarasota Tinnitus Support Group
Silverstein Institute
1901 Floyd St.
Sarasota, FL 34239
Contact: Carmen Trotta, Tom Terrenzi
T: 941-993-7616, 941-462-1311
E: cartro7@aol.com
Meeting dates and times TBD.*

COMING SOON: Tampa Bay Area Tinnitus Support Group
Contact: Chris Bogle, Katherine Austin, AuD
E: cbogle54@gmail.com

Tinnitus Self-Help Group of Palm Beach County
South County Civic Center
16700 Jog Road
Delray Beach, Florida 33446
Contact: Ellen Gartner
T: 800-732-9217
Meeting dates and times TBD.*

Georgia
Atlanta Tinnitus Support Group
Dekalb County Public Library
Dunwoody Branch, Meeting Room
5339 Chamblee Dunwoody Rd.
Dunwoody, GA 30338
Contact: Erica Caplan
E: elcatl@aol.com
Meeting dates and times TBD.*

Illinois
Chicago Suburban Tinnitus Support Group
Glennview Public Library
1930 Glenview Rd.
Glenview, IL 60025
Contact: Margie B
E: maggie138@yahoo.com
April 7—10:00 am
June 2—10:00 am

Washington D.C. Tinnitus Support Group
Potomac Audiology
11300 Rockville Pike, Ste. 105
Rockville, MD 20852
Contact: David Treworgy; Gerry Baill
E: david_treworgy@yahoo.com
E: gsbaill@yahoo.com
Meeting dates and times TBD.*

Massachusetts
Boston Tinnitus Support Group
Athen’s Bakery
407 Washington St.
Brighton, MA 02135
Contact: Christopher Page
E: Christopher.z.page@gmail.com
August 30—7:00 pm
September 27—7:00 pm
October 25—7:00 pm
November 29—7:00 pm
December 27—7:00 pm

Michigan
Holland Tinnitus Support Group
Holland Doctors of Audiology
399 E 32nd St.
Holland, MI 49423
Contact: Stelios Dokianakis, AuD
T: 616-392-2222
E: info@holaud.com
Meeting dates and times TBD.*

Missouri
St. Louis Tinnitus Support Group
St. Louis County Library Headquarters
East Room
1640 S. Lindbergh Blvd.
St. Louis, MO 63131-3598
Contact: Tim Busche
T: 636-734-4936
E: tennisfancincy@gmail.com
August 9—7:00 pm
December 12—7:00 pm

St. Louis County Library - Oak Bend Branch
842 S. Holmes Ave
Kirkwood, MO 63122
October 3—7:00 pm

Nevada
Reno/Sparks Nevada Tinnitus Support Group
Modern Audiology of Sparks
634 Pyramid Way
Sparks, NV 89431
Contact: Scott Sumrall
E: scottsumrall@sparkshearing.com
T: 775-336-0211
August 23—6:00 pm
September 27—6:00 pm
October 25—6:00 pm
December 27—6:00 pm

New Jersey
Tinnitus Self-Help Group, Ewing
First Presbyterian Church
100 Scotch Road, Ewing, NJ 08628
Contact: Dhyan Cassie, AuD
T: 215-984-8380
E: Dhyan1@verizon.net
Meeting dates and times TBD.*

South Jersey Tinnitus Support Group
1020 North Kings Highway, Ste. 201
Cherry Hill NJ 08034
Contact: Linda Beach; MaryAnn Halladay; Barbara Kennedy
E: linda.beach@gmail.com
E: mhalladay@verizon.net
E: harleyonholly@comcast.net
Meeting dates and times TBD.*
New York

Bronx Tinnitus Support Group
260 W. 231st St.
Bronx, NY 10463
Contact: Dr. S. Karie Nabinet
T: 917-797-9065 or 718-410-2301
E: kkwn12u@aol.com

Meeting dates and times TBD.*

The Long Island Tinnitus Group
Long Island Jewish Hospital
2nd Floor Conference Room
900 Franklin Ave.
Valley Stream, New York 11580
Contact: Lisa Kennedy; Anthony Mennella
T: 516-313-8061, 516-379-2534
E: aem830@verizon.net

September 24–7:30 pm
October 29–7:30 pm
November 26–7:30 pm
December 17–7:30 pm

North Carolina

Raleigh Tinnitus Support Group
Raleigh Hearing and Tinnitus Center
10010 Falls of Neuse Rd., Ste. 12
Raleigh, NC 27614
Contact: Saranne Barker, AuD; Sheri Mello, AuD
T: 919-790-8889
E: info@rhatc.com

August 16–5:00 pm
September 20–5:00 pm
October 18–5:00 pm
November 15–5:00 pm
December 20–5:00 pm

Oregon

VA Portland Health Care System
Tinnitus Education Group
National Center for Rehabilitative Auditory Research
3710 SW US Veterans Hosp. Rd.
Portland, OR 97239
Contact: Bryan Shaw
E: Bryan.Shaw2@va.gov

Meeting dates and times TBD.*

South Carolina

Greenville Tinnitus Support Group
Contact: Anthony Russo
E: AnthonyRussoSC@outlook.com

Meeting dates and times TBD.*

Texas

Dallas/Ft. Worth Tinnitus Support Group
Texas Health Presbyterian Hospital Plano
6200 W Parker Rd.
Plano, TX 75093

or

Callier Center for Communication Disorders
1966 Inwood Road
Dallas, TX 75235
Contact: John Ogrizovich
E: dfwtsg@yahoo.com

Meeting dates and times TBD.*

Virginia

Northern Virginia Tinnitus Support Group
Northern Virginia Resource Center for Deaf & Hard of Hearing Persons (NVRC)
3951 Pender Drive, Ste. 130
Fairfax, VA 22030
Contact: Elaine Wolfson; Marian Patey
E: erwolfson@comcast.net
E: mjpatey@fcps.edu

Meeting dates and times TBD.*

Washington

Seattle Tinnitus Support Group
Broadview Public Library
12755 Greenwood Ave N.
Seattle, WA 9813

or

Greenwood Public Library
8016 Greenwood Ave. N
Seattle, WA 98103
Contact: Keith Field
T: 206-783-7105
E: keith_r_field@outlook.com

Meeting dates and times TBD.*

Each support group is independently operated and led by volunteers who wish to provide education and support to the tinnitus community. The American Tinnitus Association (ATA) does not sponsor nor endorse these activities and expressly disclaims any responsibility for the conduct of any independent support group or the information they may provide. ATA is not a healthcare provider and you should consult with a primary care physician or hearing healthcare professional for qualified medical advice on tinnitus and related disorders.

*Some groups cannot schedule meetings far in advance; this allows for flexibility in planning. We post all support group meetings in our online events calendar at ATA.org as we learn of the confirmed date and time. The above information was provided to ATA staff at the time the magazine went to print; therefore, please confirm meeting details with the contact person prior to a meeting or reference our website at: https://www.ata.org/news/events.

This is a partial listing of support groups and scheduled meetings. A complete list can be found at https://www.ata.org/managing-your-tinnitus/support-network/support-group-listing. New groups are formed throughout the year. Please check the website for updates periodically.

If you’re interested in forming a group, contact Jennifer Born at: tinnitus@ata.org.

If there isn’t a group in your area, ATA has an extensive Help Network of volunteers who provide email and telephone support and educational information. To connect with a volunteer in your time zone, see: https://www.ata.org/managing-your-tinnitus/support-network/telephoneemail-support-listing.
By Deborah Outlaw

As a longtime supporter of the Friends of the Congressional Hearing Health Caucus (FHHC), the ATA participated in a May luncheon briefing on Capitol Hill sponsored by the FHHC for congressional staff, National Institute on Deafness and Other Communication Disorders (NIDCD) staff, and other members of the public interested in hearing health. The ATA was particularly pleased to see tinnitus specifically noted as a serious hearing-health issue and to hear about the availability of new smartphone apps to help those with tinnitus.

Rep. Mike Thompson (D-CA), a co-chair of the Congressional Hearing Health Caucus, offered opening remarks to the attendees, discussing his own hearing difficulties due to a combat-related accident and thanking the supporters for our combined efforts to work with Congress to improve hearing health and raise awareness about hearing issues.

Renowned hearing research experts Barbara Weinstein, PhD, of NYU Lagone Medical Center, and David Fabry, PhD, chief innovation officer for Starkey Hearing Technologies, provided a comprehensive overview of the emotional, physical, and economic impact on individuals and society at large of age-related hearing loss. They also shared a preview of anticipated technological advances in hearing aids and other hearing-health devices. Dr. Weinstein noted the prevalence of tinnitus in the United States, and – while technology has not yet offered a cure for tinnitus – she described the array of smartphone apps that have been shown to be beneficial in helping alleviate tinnitus for some patients.

The FHHC provides the ATA with opportunities to engage with other national associations in the hearing healthcare community to expand the audience of potential Congressional supporters of tinnitus research, prevention, and better treatments. We encourage ATA members in California and West Virginia to thank Rep. Thompson and his co-chair, Rep. David McKinley (R-WV) for their bipartisan efforts to promote hearing health. Links to their websites for constituents to email are:

- mckinley.house.gov/contact
- mikethompsonforms.house.gov/contact

Deborah Outlaw is an ATA health policy advisor.
By Scott C. Mitchell, JD

As we age, many of us start to consider leaving a legacy by making a contribution that will have a lasting impact for the greater good. If you have something like this in mind, I hope you will consider including a gift to the American Tinnitus Association in your will. As Immediate Past Chair of the ATA Board of Directors, I know what a difference a bequest like this can make toward the ATA’s goals of finding treatments and cures for tinnitus.

The ATA hopes and trusts that a donation will be included in your will for a simple reason: The ATA is not a government funded agency. It is not on the receiving end of a huge endowment from a millionaire or billionaire. Instead, we rely on the ATA membership at large and other donors for funds to support our counseling and education services, as well as our ongoing investments in research to find cures and treatments for tinnitus. The fact that the ATA is funded by individuals makes us independent and an organization you can trust to deliver truthful and relevant guidance on how to deal with your tinnitus. We strive to maintain a clear and true voice that rises above the cacophony of tinnitus superstitions, bad medical advice, and the trumpeting of the latest miracle cure in late-night infomercials. To be able to do this, we rely on you for financial support.

Many people with tinnitus have expressed appreciation for that trusted voice by adding the American Tinnitus Association as a beneficiary in their will. It is very much a “pay it forward” action. Jack Vernon, one of the crusading founders of the ATA, observed that when he started in tinnitus research in the early 1970s, he could count on the fingers of one hand the number of tinnitus researchers working in the United States. Today there are hundreds. The people who supported the ATA through small, medium, and large gifts, and will bequests in the early days did it for the benefit of the future generations of those suffering from tinnitus. You are the person they had in mind as someone who might benefit from their gifts. These donors may have done it to express appreciation for the help they received in the past from the ATA. And they may have also done it because they shared the ATA’s vision of a world without tinnitus.
I hope you are nodding your head and thinking, “Yes, that would be a nice thing to do.” Let’s be honest, though, the intention to leave a bequest to the ATA can drift into the same pile of undone to-do’s as cleaning the garage and organizing computer files. About half the population of adults doesn’t have a will. If you don’t have a will right now, this is an excellent opportunity to make one. There was a case in Texas where a rancher without a will ran off a dirt road in his pickup truck and was fatally injured. He barely had enough time before he died to scratch “All to Mother” on the dashboard. The dashboard was duly probated as a will in his own handwriting, not requiring witnesses under Texas law. You certainly want to be better prepared.

If you want to show the same generosity as previous donors to ATA and pay it forward by following their example, take out your will and call your attorney to add a bequest to the ATA (or, contact your attorney to make your will!) Then let us know by contacting our executive director Torryn Brazell, CAE, by phone at 800-634-8978, or by email at torryn.brazell@ata.org. Your name will be added to the Jack Vernon Legacy Society, alongside the names of others who have sustained this organization in this way.

If you don’t have an attorney, or have special circumstances, or have a question on gift planning in general, give Ms. Brazell a call. We can’t give legal advice, but we can guide you on ways you can make your gift best fit your intentions. Modest bequests are also very much appreciated.

Scott C. Mitchell is a lawyer and Certified Public Accountant in Houston, Texas, whose practice includes probate and estate planning. He currently serves on the board of directors of the American Tinnitus Association. Tinnitus came into his life in 1999, and he has worked ever since to get it out of his life and the lives of others afflicted by this chronic condition.

“"This is the first time I've talked to someone who acts like they care."
— Jordan R., parent of a child with tinnitus

Letters to the ATA
The ATA encourages readers to write to Joy Onozuka with comments on articles, podcasts, and general concerns. Letters selected for publication may be edited for brevity, clarity, and grammar. Letters should be sent to: editor@ata.org
How Smartphone Manufacturers Test and Rate Phones for Hearing Aid Compatibility

The Federal Communications Commission (FCC) requires smartphone manufacturers to test and rate their phones for hearing aid compatibility (HAC) and list that information in the packaging. There are two measures:

- “M” refers to using the phone with a hearing aid in microphone setting — the acoustic mode. The higher the “M” rating, which runs from M1 to M4, the greater the likelihood that you’ll be able to use your hearing aid with the device. A rating of M3 is considered “good,” and M4 is “excellent.”
- “T” refers to using the phone with a hearing aid containing a telecoil, which converts sound into electromagnetic signals. The telecoil helps reduce feedback and background noise while talking. The rating is T1 to T4, with T3 considered “good” and T4 “excellent.”

Acquiring a smartphone with a rating of M3 or T3 or better is important, but it’s more important to thoroughly test the features of the phone with your hearing aid or cochlear implant in different locations to determine the level of noise interference. Given the expense of both devices, it’s suggested that you consult your cellphone service and hearing healthcare providers before making a purchase.

For more information on HAC, see www.fcc.gov/wireless-telecommunications.
Editorial Calendar

*Tinnitus Today* magazine is a print and electronic media magazine published in April, August, and December, and circulated to 10,000+ ATA members, patients, supporters, researchers, and healthcare professionals.

The magazine editorial team empowers readers with information, including up-to-date medical and research news, feature articles on urgent tinnitus and hyperacusis issues, questions and answers, self-help suggestions, and letters to the editor from others with tinnitus and/or hyperacusis. Strong service journalism, compelling storytelling, first-person narrative, and profiles are presented in a warm, vibrant, and inviting format to encourage readers to reflect, engage, and better understand a medical condition that affects millions.

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<td>Veterans Affairs and Sounds of Tinnitus</td>
<td>2/1</td>
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*Editorial Calendar is subject to change.*

To advertise, contact: Kathleen Turner at: kathleen.turner@ata.org

**MISSION AND CORE PURPOSE**

The mission and core purpose of the ATA are to promote relief, help prevent, and find cures for tinnitus evidenced by its core values of compassion, credibility, and responsibility.

**CORE VALUES AND GUIDING PRINCIPLES**

*Compassion:* Evidenced in a spirit of hope reflected in the commitment to finding a cure, preventing the condition, and supporting those affected by the condition.

*Credibility:* Evidenced in accurate information from reliable sources, transparency in decision-making, and an earned reputation for trustworthiness.

*Responsibility:* Evidenced in patient-centered advocacy by a collaborative community of forward thinking leaders accountable to its mission and members.

www.ATA.org
Podcast 6: Mapping Tinnitus in the Brain
RELEASED: June 12, 2018
SUBJECT MATTER EXPERT: Phillip Gander, PhD
TOPIC: Dr. Gander discussed how the brain makes sense of the tinnitus sound, from the perspective of cognitive neuroscience. He discussed his research, which includes use of psychophysics and neuroimaging, to explain how the brain processes the phantom tinnitus sound. Gander explained how progress in neuroscience is providing the knowledge to develop more effective treatments for tinnitus. He also elaborated on current obstacles in research and prospects for the future.

Podcast 7: Breakthrough Using Multisensory Stimulation to Reduce Tinnitus
RELEASED: July 23, 2018
SUBJECT MATTER EXPERT: Susan Shore, PhD
TOPIC: Dr. Shore discussed groundbreaking research in tinnitus treatment using bimodal stimulation. She heads the team of researchers at the University of Michigan, where it was discovered that ‘touch’-sensitive neurons in the auditory part of the brain become hyperactive and synchronized with each other in guinea pigs and humans with tinnitus. The team’s preliminary studies found that bimodal stimulation, which calms neurons using specially-timed multisensory stimulation, reduces tinnitus distress and loudness.

Podcast 8: What Audiologists Should Know About Tinnitus As a Drug Side Effect (Part A)

What Everyone Should Know About Over-the-Counter Dietary Supplements for Tinnitus (Part B)
SUBJECT MATTER EXPERT: Robert M. DiSogra, AuD
Topic A: Dr. DiSogra outlines what audiologists can do to help patients understand the potential for negative interactions when using over-the-counter medications for tinnitus.
Topic B: With years of research, clinical practice, and university teaching, Dr. DiSogra has seen firsthand the basic misconceptions patients and healthcare professionals have about over-the-counter medicines in reducing tinnitus loudness. Don’t miss this informative podcast about why you should think twice before buying any over-the-counter medication intended to reduce tinnitus distress.

Podcast 9: Shared Decision-Making in Tinnitus Care
SUBJECT MATTER EXPERT: Helen Pryce, MSc, PD (Health)
TOPIC: Dr. Pryce explains how healthcare providers can implement shared decision-making with tinnitus patients through use of the Tinnitus Care Options Grid, which was developed in the United Kingdom and presents evidence-based treatment choices. By empowering patients in conversations that weigh the pros and cons of each care option, Pryce believes patients are more likely to commit to a treatment plan that proves successful because it meets their needs and interests.

Podcast 10: Habituation to Tinnitus Using Cognitive Behavioral Therapy
SUBJECT MATTER EXPERT: Bruce Hubbard, PhD
TOPIC: For over 20 years, Dr. Hubbard has helped people improve their lives using Cognitive Behavioral Therapy (CBT), mindfulness, and relational therapy strategies. He explains how CBT and mindfulness are applied to treatment of tinnitus and what patients should expect in regard to habituation. Dr. Hubbard, who has tinnitus, also offers insights into using the internet and support systems to manage tinnitus distress.

Podcast 11: Research on Mindfulness-Based Cognitive Therapy for Tinnitus Treatment
SUBJECT MATTER EXPERT: Laurence McKenna, PhD
TOPIC: Dr. McKenna discusses recent research findings from his large-scale study on the effectiveness of Mindfulness-Based Cognitive Behavioral Therapy (MBCT) for treating tinnitus. As a cognitive behavioral therapist, specializing in the psychological aspects of tinnitus and hearing loss, he offers unique insights into the challenges that patients face and best practices for treatment. He also elaborates on why he’s pushed for greater usage of MBCT for tinnitus treatment in recent years.

Podcast 12: Talking About Tinnitus with Children
SUBJECT MATTER EXPERTS: David Baguley, PhD, and Claire Benton, MSc
TOPIC: Dr. Baguley and Claire Benton discuss their efforts to educate parents, teachers, and healthcare providers on talking to children about tinnitus. They also discuss their research findings on the topic and tools to help children manage tinnitus.

To ensure that podcast content is available to the broadest audience possible, particularly those with impaired hearing or noise sensitivity, transcripts are available on our website: www.ATA.org