



PBS NEWSHOUR

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Searching for the Source of Phantor

A Georgetown neuroscientist's theory on the origins of tinnitus, the phantom ringing that plagues millions



There is little consensus on what causes tinnitus, or ear ringing. Photo via Flickr Creative Commons

BY JENNY MARDER

When Gloria Chepko was 4-years-old, she had a name for the ringing in her ears. She called it “the sc Now at age 66, the ringing still haunts her, disrupting her sleep and making her highly sensitive to

Chepko has tinnitus, a hearing disorder characterized by a phantom sensation of ringing or buzzing in the e grasshopper, but more grating and more oppressive, faster and squeakier. “Sometimes it feels like it’s in the said, reaching behind her ears to point and then mimicking the noise. “It sounds like this: wewewewewe

Chepko is sitting at the kitchen table of her Loudon County, Va., home. The kitchen and living room are clu photographs of lakes, rivers, canoes and lighthouses. Outside is a small garden, where she grows azaleas, r neighbors are more conservative than she’d like – one complained about the color of her door; another call these annoyances, the house has one thing – one big thing – going for it: it’s quiet.

And for Chepko, certain noises, like rap music and ambulance sirens, aggravate the tinnitus. So a quiet hon edgy and feeling okay, the difference between pain and no pain. “It’s not physical the way a headache is, bu

Tinnitus was the number one service-related disability among veterans in 2010, according to the Veterans / received disability compensation for tinnitus last year than any other disorder. Post-traumatic stress was a

There is no treatment, and little consensus on what causes tinnitus. But Josef Rauschecker, a Georgetown University professor, is helping patients like Chepko to better understand the physiological mechanisms of hearing damage combined with functional changes in the limbic system, a brain region involved in emotion.

Patients with tinnitus have some degree of hearing damage. But most people with phantom sounds, an “intrinsic noise cancellation system,” he calls it. With tinnitus, the switch is dysfunctional, the result can be deafening.



Dr. Josef Rauschecker in his Georgetown University Medical Center office.

Rauschecker's Georgetown office is full of maps from his travels, alongside a quote that is precious, but truth is more precious than time.” It is a common saying for scientists. “I tell my students, it’s more important to be wrong than to be right.”

Rauschecker and his team published a study last month showing that patients with tinnitus were more likely to have structural changes and hyperactivity in the nucleus accumbens, a region of the brain that plays a role in pleasure, addiction, aggression and fear.

“The nucleus accumbens is the last station in the limbic system, the signals, ‘this is bad, bad, bad.’ And the ventromedial prefrontal cortex, it goes away is broken.”

For many patients, the tinnitus gets worse at times of stress. Rates are estimated to be more than twice the national average.

It’s a chicken or an egg question. “You might say, o stress causes tinnitus, and they have trouble sleeping,” Rauschecker said. “We’re saying, no, it’s the other way around. Something causes the stress, and then the tinnitus comes.”

To Rauschecker, the fact that returning military veterans experience such high rates of the condition is not only loud noise exposure, but also stress. They will most likely have hearing loss from loud noises in the ventromedial prefrontal cortex, which would normally help them out and allow them not to get tinnitus,” he said.

Richard Salvi, director of the Center for Hearing and Deafness at the State University in Buffalo, N.Y., is not a tinnitus patient. “The cases that don’t do a very good job explaining that are when a person goes to a loud noise and the tinnitus almost simultaneously, he said. “And there’s no stress at that time.”

But Salvi agrees that there's a correlation of some kind. "I've talked to a lot of tinnitus patients over the years when they're under tremendous stress," he said, adding: "It's extremely disruptive for many of these individuals and they're trying to get some sort of treatment."

Salvi adds that the paper may help answer one of the field's biggest research questions: why tinnitus bothers some people and not others.

“I think the Rauschecker paper is novel in trying to perceive why some people hear tinnitus and some don’t,” he said. National Public Radio and the farther you get out of town, the more you turn up the radio, so you’re hearing it more.

sent up to the brain, and the brain has to decide whether to pay attention to them or ignore them. The paper a gatekeeper that lets them get into our conscious perception.”

Rauschecker’s interest in tinnitus stems from his own battle with the disorder. Unlike Chepko, it’s not always exhaustion or stress. “In almost every patient, it varies with their emotional state. That’s one of the most in this study,” he said.

Rauschecker hopes to eventually work with doctors to investigate treatment options for tinnitus patients, stimulation. He also wants to study the role of neurotransmitters, like serotonin.

“The brain is such an amazingly smart system” Rauschecker said. “So many things happen to us, and the brain breaks that we notice it’s broken.”

As for Chepko, she always hears the ringing, but the volume and intensity varies. She has a hard time pinpointing clear that it has a powerful influence over how she lives her life. She can’t go to baseball games or dance hall ears to block out external sound.

But certain things provide a welcome distraction. “Walking somehow distracts me, she said. “And anything much time outdoors as she can.

And nearly every year, Chepko and her husband fold up their kayaks, pack them into a backpack and head to Bay, to a place where she can be outside... a place where the sound before you hear something is just a little

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Moreyel 22 hours ago

I didn't realize this was such a common occurrence. I've had ringing for many, many years and have learned to live with it. I



NYC 1 day ago

I believe that I have had this condition since I was about 17, I'm now 30. It is particularly bad when I'm tired. I'm also extremely sensitive to certain lightbulbs). Thanks for the article, wish I could be part of Dr. Rauschecker's study.



Maxine 1 day ago

I heard loud music at a church. It hurt my ears. The next morning I was completely deaf. At the same moment I lost my hearing there. Songs I hadn't heard or thought of for years. As a result, I can't hear music. It is just a loud monotone, no melody because music has been my life. Singing, leading singing at church, enjoying Christmas music. I can't hear any music. Also, hearing returned somewhat but continues to decline. I have hearing aids but don't distinguish words. I just hear noise. It is

My ear Dr. says the brain realized I lost my hearing and is compensating by giving me sound which is the music. That is probably the best choice in the matter. I do get edgy at times, and nerves probably do make it worse. I am over 75 so I guess I should be tired and went to the Shea Clinic in Memphis and had a surgery. That took care of the dizziness except in a rare situation. For the hearing but not with the dizziness.



Maxine 1 day ago in reply to Cpar4s

My grandson works for the VA. He encouraged my husband to apply for a pension related to the service related hearing problem and get the paper work started. They have trained people to help you through the paper work.



midwifekathy 1 day ago

I realized I had this condition when someone happened to ask me "your ears aren't ringing are they?" "No." Got to thinking had become a constant companion (both ears) for quite a while; I just had never put a name to it. Seems like I hear it constantly something else. On rare mornings, there might be silence for a millisecond after I become aware I'm awake. Boy, I treasure it with the commentor who said it was hard (LOUD) to read the article as well as comment! Will also try the experiment with below this sound, humming the note for a few minutes and repeating daily or PRN (whenever necessary). Can't hurt, just no. Would also be more than happy to participate in a study. Find interesting the mention of SSRI's as I had Serotonin Syndrome hearing loss of "high pitched consonants." Embarrassed by how loud TV is at times. Colder weather also seems to make circadian disguise noise. Most adults are chest breathers, babies & young children naturally breathe correctly. Abdominal breathing is back, bend knees so feet flat on floor; place hands lightly on sides of abdomen (so fingertips meet each other @ navel); take eyes and lift hands up with tummy when you inhale (thru nose), exhale thru mouth (hear breath softly leaving); relax muscles. difference in how it feels to breathe from your tummy; stay with it; we've been breathing with our chest so long it might take breathing will slow down, become naturally deeper and you will begin to differentiate when your breathing with your abdomen. Don't worry, you won't need your hands on tummy anymore either, because you will now be able to guide your breathing by

someone. This condition is REAL and needs to be acknowledged. Great article PBS; thanks for printing. Thanks to all comers to know I am not alone; and what helps you might help me!



Jonathan 1 day ago in reply to Margaret Herold

The whooshing sound is not uncommon among people with tinnitus. If you also experience balance problems you may have which I have. The whooshing sound and a sense of constant pressure in the ear are very common among people with Miniere's disease properly diagnosed after I'd been stumbling and staggering about for about a decade and couldn't drive for five years, the Epley maneuver. This didn't help the tinnitus but it did help with the whooshing sound and it helped with the balance issue (it's not likely to happen (when I'm tired or stressed)). The ENT doc also suggested that I try lipoflavonoids or bioflavonoids. He said they helped at all. I think they help but it may just be the placebo effect. Good luck.



COver-up 2 days ago

Mine to left is much strong ringing noise. My T is already a year and 2 months! hope to find a cure... its hard to sleep!



Dasnglepop8 2 days ago in reply to Emma

Your story is similar to mine. I feel the exact same way as you. I just wanted to let you know.



Gloria 2 days ago in reply to Mykey711

I also hear it louder when I bite down with my teeth. Something I forgot to mention since I don't like to do it.



Holtj53 3 days ago

I constantly experience the ringing, high pitched squealing sounds. At different times I hear dingy sounds that begin as low sounds etc. Sometimes it is so loud it's hard to concentrate on anything else. Numerous trips to specialists have yielded no help to find answers. Just a matter of time until a brake thru brings relief.



Mike 3 days ago

I have had the high pitched ringing 24/7 going on 45 years and have tried everything possible but found no relief. The volume is a delicate complicated thing and its good to read about new research. There are times when extreme action is appealing to get



Ed 3 days ago

My tinnitus gets worse with even a small amount of alcohol. I also avoid most sugar and drink only a small amount of decaf



Thad 4 days ago

I've had this condition for as long as I can remember. I once read that it's caused by aspirin. I'm plagued by headaches and tinnitus. When the ringing gets loud it may signal the incubation period of a viral infection but not always. It's usually louder when I'm sick.

I've suffered from depression most of my life and spent many years on antidepressants.

Once about 15 years ago I was walking past an outdoor café on Upper Market Street in San Francisco, and for reasons I'm not sure of for about 5 seconds . . . I kept walking but was utterly amazed. A whole 5 seconds but the event remains a very vivid memory.



Senorluldaddy2002 4 days ago

I've had tinnitus for about 50 years, probably from loud noise, such as "cap pistol" bang caps, and firecracker use as a young boy. I have since then seen an occasional drop in volume living in dry climate. Last year I had complete silence on two occasions. I continue to hope for a positive change. I also get relief when birdwatching and with other distractions.



Silkamp 4 days ago

Interesting - so many in the left ear. Mine as well is stronger in the left ear, although present in both.



Miksesd1 4 days ago

Hearing Aids Certainly help with Tinnitus sufferers , reduces 1/3.

I am using Siemens Pure 3000.

Wish you all the best . Michael.



Jim 5 days ago

google tinnitus and vagus nerve for interesting new info



JG Broadfield 5 days ago

Hmmm... I wonder, then, about me, with constant high pitch, the only time I notice it, really, is when I read about tinnitus there. I'm not given to depression, am quite cheery, am told I'm 'strong' (recently in the past 2 years lost my job, had breast death). However, I do acknowledge an 'anxious' personality which I believe I handle well, and am 'feeling' in MyersBriggs... laugh... so... how does that all fit, I wonder...



Penkuhn 5 days ago

I was interested in the suggestion that some other part of the brain, besides some part of the complex hearing mechanism, some remedy may eventually be hit upon.

My theory about my own tinnitus in my right ear, which I can distract myself from but which sometimes sounds like hordes nerve damage. It started about four years ago, after I had had shingles across my neck and up behind my right ear, which had more frequent tinnitus in that ear. A hearing test has shown that my hearing is much weaker in that ear now, too. I attribute into those tiny little hairs in the ear.

Moral of this story: ladies especially, get a shingles vaccination. Also, travel sickness pills help with the vertigo and nausea if they do nothing for the tinnitus.



Marniehammer 5 days ago

Why no mention of ATA (American Tinnitus Association) and their work to push research and addresses veteran's issues? Some type squealing. I too get relief when walking outside or deeply concentrated. Meditation helps to remember I am not the squealer.



Robert 5 days ago

It wasn't until a few years ago did I realize that everybody does not have this. I just thought it was normal. It is refreshing to have an entire life to block out the ringing. White noise tends to help.



Margaret Herold 5 days ago

I have had ringing in my ear for one year. The first day I heard it, I was very dizzy and went to an ENT, who sent me to the ENT for x-rays, and blood work to rule out a stroke. After hearing tests, a second ENT agreed that I had hearing loss, but neither ENT heard the whooshing sound when I turn my head quickly from side to side. I believe I have water lodged in the area of my ear and would like to see Please keep us informed of any new research. I, too, am successful at ignoring it.



Margaret RN, NYC 5 days ago

under care of ent with drug used in clinical trials for tinnitus imonth on this med carefully monitored
Margaret, Retired RN



Cpar4s 5 days ago

I was recently diagnosed with this condition by my Dr. I did server in the military many years ago and was diagnosed with 1 around low level electronic noise during that time. My ringing is more like crickets or cicada and I can associate the sound v hot night with my bedroom window open. This association seems to help decrease the the frustrating feeling of having this | Any and all information from research can give us, all who suffer , hope that there may be a solution to the problem.



Joe 5 days ago

Some medical professionals recommend biofeedback to lessen the severity of this condition. While it does not cure the prot mind to enter into a relaxation state to mitigate stress, depression and anxiety. This seems to help with the phantom sound: make this adjustment without training by diverting their attentiion to another stimulas.

Biofeedback therapy is expensive, but you can find relatively inexpensive products on the internet that can help you train yc consult a professional first). These devices measure the coherence between your heart rate and breathing. Usually they com heart monitor on a treadmill). When you enter a relaxation state, a light or audible tone on the device will indicate proper c to breath properly - something that benefits all of us, even those not suffering from tinnitus. It's not instantly effective. trair



snack49 5 days ago

My tinnitus varies in intensity. I believe that heavy aspirin use may aggravate it.
Mine is also mostly left ear. I put this down to several ear infections over the years.
I thought my hearing was normal but several years ago took part (as an office control group in a study of construction noise I was surprised to find I had a significant hearing dropoff in my lower middle frequencies - or was it just the tinnitus maski
I tool a lot of aspirin because I suffered a lot of headaches (likely from eyestrain).



Shivadam 5 days ago

I have heard ringing from an early age. A few months ago, maybe because of some work I was doing in a small space with p and remains constant now at the louder pitch. A hearing test showed I have lost hi-end, equally (R & L). I have had an MRI wearing mouth splints to rule our TMD (temporo-mandibular dysfunction); the docs say this may treat tinnitus. No change singing or hearing from instruments, now almost hurt, left ear only.



barbara 5 days ago

I am a retired police officer in Australia. I find difficulty sleeping and the noise in my ear goes from a shall we say "chugging" thought it could have something to do with our firearms range practice (without ear protection in early times), I had a revolver however, as it appears it is here to stay (more noticeable in the quieter moments of night) I have found a clock which includes the bush sounds of Aussie, etc. Perhaps by finding the same pitch or frequency, I guess, I am trying to 'equalise' the sound, :



Tim Janes 5 days ago

When I was seven years old in 1942 in England a 1000 pound bomb exploded 30 metres from where I was sleeping. I survived and have lived with a buzzing in my ears that has got progressively worse. Just recently whilst having a shower I got water in my ear and the 'buzzing' magnified. I pray daily for a cure. Tim Janes Australia.



JS 5 days ago

Yes, Aspirin can cause tinnitus (especially long-term use), as well as many antibiotics and other medications. If you are interested in existing tinnitus worse), you can search online for a list. Drugs that affect hearing are called "ototoxic". I have had tinnitus for years used for an upper respiratory infection. The ringing started mid-way through the length of time that I was supposed to take the med. I wondered if I should stop the med. He said no. I found out later (too late to help me) that if you are taking a med and experience tinnitus it will only cause more damage. Bad doc for not knowing this. I have been trying to find forgiveness in my heart ever since. I have been following the onset (depression, suicidal thoughts, being unable to experience any joy in life, not being able to sleep,



Rick Garcia 5 days ago

I have had tinnitus for nearly ten years. I sometimes wonder if the weather affects the severity; i.e. the barometric pressure. I have stress, but there are times when the noise is much worse.



Emma 5 days ago

I had Meniere's Syndrome about ten years ago and was left with tinnitus 24 hours a day. It does change from day to day--I've chosen not to pay attention to it as nothing can be done for it. I keep busy and don't notice it when I am busy. I figured it was the vertigo and nausea of Meniere's is much worse than the tinnitus.



Ken 5 days ago

I know exactly the time my tinnitus started. The 105 howitzer was very loud. I was in Vietnam on the Mekong river. It took a long time for people speaking fine, but could not understand the words. I went to the medics and had my ears tested. They said I had "nothing" above 9.5 kHz. The ringing is constant. Most of the time I am able to concentrate and ignore it. But it is now back.



Mykey711 5 days ago

Mine is similar. I'm a 58 year old M.D Still practicing, but I wear an aide.



Mykey711 5 days ago

My tinnitus began in early adulthood, 25 Or 26 years old, and accompanies hearing loss. It is like an electric humm that is in quiet rooms, especially late at night and early morning. I don't notice it in loud settings or when I'm busy in the day.



BearTak2 5 days ago

Well, that was spectacularly unhelpful. And the squealing, hissing, ticking goes on, and on...



JS 5 days ago

It is not just loud noise that can bring on Tinnitus/hearing loss. Many drugs can cause it too. Drugs that effect hearing are common. I have had constant tinnitus for 5 yrs. Brought on by a routine dose of antibiotics used for an upper respiratory infection. The antibiotic that I was supposed to take it. I called my doc to tell him that I had ringing and wondered if I should stop the med. He said that if you are taking a med and start to experience ringing you should stop immediately (if you can). It may cause more damage if you continue. I am trying to find forgiveness in my heart ever since. But it is hard, considering what hell I went through in the year+ following the loss of my hearing. Thoughts, being unable to experience any joy in life, not being able to sleep, eat, etc). I felt like I was slowly going out of my mind. Slowly..... but it DOES get easier. Eating right helps, as does exercise. Some triggers that make it worse caffeine, alcohol, lack of sleep makes the volume louder every single time, is not enough sleep. If I am tired, my ears are screaming. Even just a nap can help. It goes away soon.



Imwaternow 5 days ago

I am 57 yrs old and have had the ringing in the ears as far back as grade school. About 15 years ago I found out that isn't what I wanted and sad. How sweet it would be to have silence. I hear the high pitch ringing 24-7. Sometimes I get more than one ringing sound plus but every seldom another higher pitched sound starts but only lasts a few minutes. I choose to ignore them in order to reduce the noise in my head. Please figure out a cure for tinnitus.



Thistle411 5 days ago

Please introduce Dr. Mark George to Dr. Josef Rauschecker, REF. <http://newsroom.muschealth.com...>

It would seem TMS focused on the appropriate part of the brain might alleviate tinnitus. This might serve to validate his wo

As a long sufferer of tinnitus (Viet Nam era vet, B-52s) I would be very interested in seeing any advancements. If they need to

John Hutsell
Seattle, WA



A dancer not a singer 5 days ago

In my early 60s, I only noticed the onset about a year ago. It had the electrical humming/buzzing that several have referred to. I describe it most of the time as if I were hearing a kazoo marching band in the distance, like you can sometimes hear an em band on the high school football field about a half mile away.

The more frustrating part was soon after onset when my mind started imposing some sort of structure on the sound. I literally heard maybe two dozen songs, either one or two lasting for awhile or changing in fairly rapid succession. They also seemed to fall into Stephen Foster folk songs, George M. Cohan, etc. John Philip Sousa, movie themes. Essentially channeling the old Sing Along with the Band force the band to change to a different song in the repertoire almost instantly simply just by thinking of it – or switching back to humming a tune in your head is, and this wasn't it. Fortunately I've been able to stop doing that, but still notice the constant something else.

I too had gone to an ear doctor years ago for just the buzzing, and was told, hey learn to live with it, after which it disappeared. Mine too is left ear only, and I would be interested in learning for how many others this is also true. Maybe you never even try coffee, maybe a coffee drinker, maybe 4 cups a day (e.g. 2 mugs). I assume that the waves and pattern that make sounds don't actually make sense with the mechanisms in your ears (tree falling in the forest, etc.). Would it be possible to make some lemonade out of this by "turning off all the time" but some phenomenon just sensitizes certain of us to them for some reason? Now if you'll excuse me, I believe

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Reactions



Hearing_n_Boise 1 day ago

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The search for the cause of tinnitus....the #1 service related disability among returning veterans. <http://fb.me/KtOGKhz2>



ATA_1971 2 days ago

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<http://fb.me/HBoVNye2>



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