Tinnitus
Breaking the vicious cycle

- The auditory system
- What is tinnitus?
- Vicious cycle
- Sound Therapy
- Treatment
The auditory system: how we hear

- The ear consists of two major parts: the peripheral auditory system and the central auditory system.

- The outer ear collects and funnels sound waves.

- The middle ear converts sound waves into mechanical energy and conducts it to the inner ear.

- The inner ear converts the mechanical energy into electrical impulses and transmits them to the central auditory system via the auditory nerve.

- The signals are coded so that we can make sense of the sound.
The auditory system: how we hear

- The inner ear consists of both inner hair cells (IHCs) and outer hair cells (OHCs), representing specific pitch regions.
- Damage to or loss of hair cells results in a pitch-specific hearing loss.
- OHC nerve fibers help reduce signals from IHC fibers, especially in quiet environments.
The auditory system: how we hear

- When OHCs are damaged or lost, they cannot perform this function normally so IHCs send their normal signals to the brain.

- These signals are then recognized as auditory input, amplified, and perceived as tinnitus.

- Over time, a neural pattern is established for the tinnitus, making it easier for the brain to detect - tinnitus is a perception.
What is tinnitus?

- Tinnitus is an involuntary sound perception originating inside the head.
- It may be perceived in one or both ears.
- It may be constant or intermittent.
- It is usually only heard by the affected individual.
- Tinnitus can be described in many different ways, e.g. ringing, buzzing, hissing, roaring, chirping, or like the sound of a seashell held close to the ear.
Facts about tinnitus

- Tinnitus is a symptom, not a disease
- Tinnitus affects about 10-15% of the general population around the world – you are not alone!
- Some individuals report difficulty with normal day-to-day activities because the noise is so obtrusive – severity ranges from non-bothersome to severe
- About 3% suffer tinnitus to a degree severe enough to seek medical attention
- Up to 85% of those suffering from tinnitus also have a hearing loss
Hair cell damage, and thus hearing loss, is considered to be the most common cause of tinnitus. It can also be associated with:

- Degeneration of the bones in the middle ear
- Injury to the ears, neck or head
- Neurological disorders including brain tumors
- Exposure to loud noises
- A side effect of some medications

With the exception of the few cases of tinnitus that are medically treatable, the cause is not relevant for the choice of therapy.

One theory of tinnitus is spontaneous sound being amplified and being perceived as tinnitus, or a 'ringing' in the brain.
Tinnitus is what we make of it

- Our auditory system identifies sounds with meaning, including tinnitus.

- The more focus on tinnitus, the more it’s recognized and the stronger the neural patterns of tinnitus.

- For many, their tinnitus is not prioritized. They hear it, but don’t pay attention to it, and it blends into the background like the hum of a new refrigerator.

- For others, it becomes intrusive and bothersome.
The strength of the tinnitus signal

- Although fainter than distant traffic, the strength of your tinnitus depends on how it compares to the surrounding sounds.

- Tinnitus is often likened to a candle in a dark room. It’s perceived as very bright and hard to ignore.

- But transfer the same candle to a restaurant table and the perceived brightness is greatly reduced.

- It blends into the background although it has the same intensity.
Tinnitus involves our emotions

- Tinnitus involves more than just our hearing system.
- How we react to tinnitus can involve the limbic system (processes emotions) and the autonomic nervous system (physical reactions).
- If the tinnitus prompts negative feelings, this can lead to physical reactions like anxiety and stress.
- This, in turn, often makes the tinnitus perception worse, thus establishing a vicious cycle.
- Ultimately, we aim to break the vicious cycle.
Ways of breaking the vicious cycle

• There are different types of treatments available for tinnitus, including:

• Sound (or Acoustic) Therapy involves the introduction of sound to help reduce the contrast of the tinnitus to the background environment and is most effective when combined with counseling and a treatment plan.

• Tinnitus Re-training Therapy (TRT) involves education on the origins of tinnitus and helps you to take control of your reactions to tinnitus.

• Progressive Tinnitus Management (PTM) is similar to TRT, but uses a 5-step approach that addresses the needs for different levels of tinnitus.

• Sound Therapy is often integrated into TRT or PTM.
Sound Therapy explained

- Sound Therapy can be described using the “candle in a dark room” analogy

- When a candle is on a table in a dark room, it contrasts greatly against the background environment, thus making it a focal point and easy to detect

- The same candle in a well-lit, busy restaurant blends into the background, reducing the contrast and thus making it harder to detect

- The aim of Sound Therapy is to teach the brain to react differently and to reclassify the tinnitus as an unimportant sound that blends into the background
Sources of Sound Therapy

• Sound Therapy can be introduced in many ways by means of everyday items including TVs, radios, fans and table-top sound generators

• More specific devices such as tinnitus sound generators (TSG) can also be used

• Anything that increases the surrounding environmental sound level can be considered to be Sound Therapy
A Tinnitus Sound Generator (TSG) is a device like a hearing instrument that delivers sound to the ear.

It helps to “cover up” the perceived tinnitus by reducing the contrast of the tinnitus against the acoustic background.

TSG devices can include hearing amplification technology, which helps address hearing loss as well. This is called a combination device, eliminating the need for two separate devices.
Treatment

• The length of tinnitus treatment varies from person to person. Typically, it can take between 6 – 24 months depending on the severity of one’s tinnitus

• It is important to work closely with a hearing care professional who is trained and experienced in working with tinnitus

• Patience and commitment are vital for a successful outcome!
The acoustic perception of the tinnitus will most likely never go away, but how you react to it will directly affect how you perceive your tinnitus.

Regardless of type of treatment used, the goals are:

- to gain control of how you react to your tinnitus
- to change the tinnitus signal from a negative to a neutral stimulus
- and ultimately, to become habituated to the tinnitus by focusing on other more important sounds