# Neural plasticity, hearing loss and tinnitus: changes in tonotopic maps of the auditory cortex

No registrations found.

| | |
|---|---|
| **Ethical review** | Positive opinion |
| **Status** | Pending |
| **Health condition type** | - |
| **Study type** | Observational non invasive |

## Summary

### ID

NL-OMON27684

**Source**
Nationaal Trial Register

**Health condition**

hearing loss
tinnitus
tonotopy
auditory cortex

### Sponsors and support

**Primary sponsor:** University Medical Center Groningen
**Source(s) of monetary or material Support:** University Medical Center Groningen. American Tinnitus Association

### Intervention

### Outcome measures

**Primary outcome**

Measures of tonotopic map reorganisation.

### Secondary outcome

Relation of hearing loss and degree of reorganisation. Two types of hearing loss are going to be studied: steep-sloping hearing loss and gradual sloping hearing loss.

## Study description

### Background summary

With an increased life expectancy and an ageing population, age-related dysfunctions are becoming more prevalent. The most widespread of all sensory impairments in an ageing population is hearing loss, which is characterized by a loss of sensitivity of the peripheral hearing organ, the inner ear. This peripheral hearing loss is associated with less sensory input available to the brain. Animal research has shown that peripheral hearing loss may cause widespread plastic changes in the brain. Peripheral hearing loss is often associated with tinnitus: about 30% of the people with hearing loss also develop tinnitus. It has been suggested previously that tinnitus and tonotopic reorganisation are causally related. Such cortical reorganisation presumably contributes to the impaired communication skills experienced by humans with hearing loss. With an increasing demand for active participation of the elderly in society, it is crucially important to understand the neurobiological consequences of hearing loss and tinnitus.

The current study employs functional magnetic resonance imaging (fMRI) to investigate the relation between peripheral hearing loss, tinnitus and cortical reorganization. In particular, it aims to map the topographic representation of sound frequency, referred to as tonotopic maps, and how these change as a consequence of tinnitus and hearing loss. It also aims to investigate whether the type of hearing loss is related to the degree of reorganisation.

### Study design

No longitudinal design; just one time-point

### Intervention

fMRI measurements while listing to sound fragments.

## Contacts

### Public

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# Eligibility criteria

## Inclusion criteria

- No hearing loss or reported tinnitus (controls, n=40)

- Hearing loss (Hearing loss group, n=40)

- Tinnitus (Hearing loss and tinnitus group, n=40)

- < 30 dB difference between both ears for all the standard audiometric frequencies

- Adults (18 - 75 yrs.)

- No contraindications for MRI

## Exclusion criteria

Non-compliance with inclusion criteria

# Study design

## Design

Study type: Observational non invasive

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|---|---|
| Intervention model: | Other |
| Masking: | Open (masking not used) |
| Control: | N/A , unknown |

### Recruitment

NL

| | |
|---|---|
| Recruitment status: | Pending |
| Start date (anticipated): | 01-01-2015 |
| Enrollment: | 120 |
| Type: | Anticipated |

## Ethics review

Positive opinion

| | |
|---|---|
| Date: | 24-09-2014 |
| Application type: | First submission |

## Study registrations

### Followed up by the following (possibly more current) registration

ID: 40455
Bron: ToetsingOnline
Titel:

### Other (possibly less up-to-date) registrations in this register

No registrations found.

### In other registers

| Register | ID |
|---|---|
| NTR-new | NL4642 |
| NTR-old | NTR4811 |
| CCMO | NL44470.042.13 |
| OMON | NL-OMON40455 |

## Study results