

Initial project duration – 36 month – starting from the 1 January 2019, new end date 28 January 2023, extended months due to COVID-19

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Overview

Tinnitus is the most frequent phantom sensation, affecting 70 million individuals in Europe. It dramatically increases with age, with near 40% of the elderly experiencing tinnitus. It can be severely debilitating, increasing the risk for sick leave, disability pension and even suicide. While prevalence is higher in men, women show greater psychological burden and loss of life quality, suggesting that different coping mechanisms operate in the two genders. From a genetic perspective, we recently found that specific forms of tinnitus displayed significant heritability in men, albeit when segregated according to age, young women showed such high genetic influences. On this basis, TIGER aims to provide three major insights needed for long-lasting prevention and therapy for tinnitus through the principal goals:

- The identification of environmental risk factors to define non-genetic risks of developing severe tinnitus.
- The identification of novel genetic and blood biomarkers.

The insights from the two first aims will be used to:

- Stratify disease risk and elaborate preventive medical recommendations for high-risk subgroups of tinnitus patients and to define molecular drivers/biological pathways relevant for the development of severe tinnitus that will be used to identify and validate new therapeutic targets.

We use epidemiological lifestyle, nutritional, and medical analytical data from large Swedish longitudinal and Italian retrospective studies, and molecular genetics, coupled to in-depth tinnitus phenotyping beyond current clinical practice.

Progress to date

Not all objectives were achieved at the time of this mid-term monitoring. However, more than 50% of them have been successfully addressed. The most important factors in this performance was the already existing availability of biological material, and the anticipation of the agreements needed for transferring data.

Impact of COVID-19

Epidemiological analysis from the partners in Italy, who had the obligation of directing part of their efforts to COVID research, was the only major delay. However, we have been lucky and successful anyhow, as the other projects continued with remote data analysis. Our interactions were less frequent, and less sustained. Many of the meetings and conferences we had planned to attend altogether were cancelled, and thus the chances of direct interactions and brainstorming were missing. We acknowledge that remote conference are not equally effective as direct physical encounters.

Team members

	Woman	Man	Other
Gender balance in the whole consortium	8 (53%)	7 (47%)	0 (0%)
Presence of women as lead researchers/PIs	4 (50%)	4 (50%)	0 (0%)
Gender Experts in the team	1 (50%)	1 (50%)	0 (0%)
Subsequent team members trained (Gender equality and/or IGAR)	0	0	0

Contribution to the achievement of UN Sustainable Development Goals (SDGs)

One of the major UN SDGs impacted by our research are within health and well-being. We revealed that meeting with a specialist doctor on tinnitus abolishes the risk of suicide attempts for women with severe tinnitus. As tinnitus research is seldom including sex or gender aspects in research, we are strong ambassadors of such research.

Differences/inequalities between women and men highlighted by the project

TIGER has revealed a sex difference in the psychological impact of tinnitus, being more dramatic in women, increasing the risk for suicidal attempts. TIGER shows that other factors (hyperacusis, headache, and temporomandibular joint problems), although more frequent in women, do not increase the risk for severe tinnitus. A striking observation from TIGER, is that a sex effect is frequently found, but when stratifying by sex, there is no significant differences observed. Thus, the conclusions on the role of sex/gender in disease risk depends highly on what statistical approaches are used.

Positive impact of the project on gender equality/scientific evidence on gender in the field

The project has revealed the lack of consideration of sex/gender aspects in tinnitus research, stimulating research on the topic. This led us to create a Research Topic in Frontiers, where research has shown gender effects in the response to treatments. <https://www.frontiersin.org/research-topics/9642/sex-and-gender-differences-in-tinnitus>

We plan to hammer this message in the next Tinnitus Research Conference in Vancouver June 2022, hopefully post-COVID.

Socio-economic impact; involvement of policy makers/civil society

We recently published a study describing the socio-economic impact of tinnitus. However, due to the lack of individual data, it was impossible for us to investigate sex/gender specific aspects in this study.

Trochidis I et al. Systematic Review on Healthcare and Societal Costs of Tinnitus. Int J Environ Res Public Health. 2021 Jun 26;18(13):6881. doi: 10.3390/ijerph18136881.

We have presented our work at several patient organizations (civil society) before the COVID-pandemic and shared our views on the implication of sex/gender in tinnitus therapy with patient organisations.

<https://btaconference2020.co.uk/agenda/day-5/>.

<https://www.tinnitus.org.uk/blog/first-ever-joint-networking-meeting-a-real-success>.

Dr. Cederroth has become member of the Professional Advisors Committee of the British Tinnitus Association (<https://www.tinnitus.org.uk/pages/faqs/category/pac>) and the Scientific Advisory Board of the American Tinnitus Association (<https://www.ata.org/about-us/leadership>).