Candidate Key Proteins in Tinnitus—A Bioinformatic Study of Synaptic Transmission in the Cochlear Nucleus.

Authors: Johann Gross, Marlies Knipper and Birgit Mazurek
Publisher: MDPI
In: *Biomedicines*, 2024, volume 12, issue 7
published online: July 2024
This article belongs to the Special Issue Understanding Chronic Neurological Diseases: Pathophysiology, Biomarkers, and Therapeutic Approaches

The aim of this study was to identify key proteins of synaptic transmission in the cochlear nucleus (CN) that are involved in normal hearing, acoustic stimulation, and tinnitus. A gene list was compiled from the GeneCards database using the keywords “synaptic transmission” AND “tinnitus” AND “cochlear nucleus” (Tin). For comparison, two gene lists with the keywords “auditory perception” (AP) AND “acoustic stimulation” (AcouStim) were built. The STRING protein–protein interaction (PPI) network and the Cytoscape data analyzer were used to identify the top two high-degree proteins (HDPs) and their high-score interaction proteins (HSIPs), together referred to as key proteins. The top1 key proteins of the Tin-process were BDNF, NTRK1, NTRK3, and NTF3; the top2 key proteins are FOS, JUN, CREB1, EGR1, MAPK1, and MAPK3. Highly significant GO terms in CN in tinnitus were “RNA polymerase II transcription factor complex”, “late endosome”, cellular response to cadmium ion”, “cellular response to reactive oxygen species”, and “nerve growth factor signaling pathway”, indicating changes in vesicle and cell homeostasis. In contrast to the spiral ganglion, where important changes in tinnitus are characterized by processes at the level of cells, important biological changes in the CN take place at the level of synapses and transcription.

Related links:

- Online publication: https://doi.org/10.3390/biomedicines12071615
- Download full article: https://www.mdpi.com/2227-9059/12/7/1615/pdf?version=1721721880