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The potential of growth factors for preservation of the auditory system

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The role of neurotrophic factors in the survival of embryonic neurons in the auditory system is well described. The deletion of NT-3 and BDNF during embryonal and early postnatal development leads to significant hearing loss. Despite several studies supporting an early protective role of trophic factors via electrical or sensory activity, very little is known about the function of neurotrophins in the adult auditory system. Sensory-driven neuronal activity shapes developing circuits in sensory systems using the same key molecules and gene cascades up- and downstream of a BDNF /trkB /GABA cascade. Several studies indicate that normal BDNF levels are required for preservation of normal hearing, while pathological alterations of BDNF levels is associated with malperception or hearing loss. BDNF may thus play a role for experience mediated plasticity changes and maladaptive plasticity changes during normal hearing, injury or age-related hearing disorders. Current data are discussed in the context of the potential use of growth factors for the therapeutic preservation of a healthy auditory system. Acknowledgements: This work was supported by the Deutsche Forschungsgemeinschaft Kni 316/3-2 and Fortüne 816-0-0.

