**Learning to hear - the effect of acoustic environment during ontogeny on audition and sound perception**

Zbyněk Bureš, Czech Academy of Science, Prague

Time after birth is characterized by progressive development of many capabilities, including hearing function. Despite that the basic structure of the auditory system is given genetically, this pre-defined fundament is only a starting point for subsequent process of stimulus-driven refinement and optimization. Some animals, such as rats or mice, are born deaf - in this case the acoustic environment interacts with the very onset of hearing, leaving an imprint that is lifelong. However, even in species that start to hear prenatally, the early postnatal period represents the epoch of an increased plasticity. During this time, the development of proper structure and function of the auditory system relies on rich and natural stimulation, or more precisely, on appropriate afferent activity feeding the developing centers. In case when this activity is altered or suppressed - be it a result of excessive stimulation or acoustic deprivation - the auditory system may be severely (and often permanently) affected. Disrupted developmental processes may lead to morphological abnormalities (e.g., changed structure of neuronal projections, disbalance of excitation and inhibition) and to functional alterations at various levels of the system (e.g., worsened coding of frequency and intensity by auditory neurons, compromised behavioral performance). Importantly, anomalies that result from an altered development are often different from the consequences of an acoustic insult in adulthood, they may not manifest themselves in a elevated hearing threshold, and they may be persistent. Fortunately, the increased developmental plasticity can be exploited also in a positive way - richer-than-normal environment during ontogeny results in an improved neuronal representation of auditory stimuli and better behavioral performance in adulthood. In conclusion: the acoustic environment present during development substantially influences hearing abilities during the whole lifespan; thus, an adequate attention should be paid to eliminate the risk factors especially in childhood.