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NeuroAudiology Newsletter

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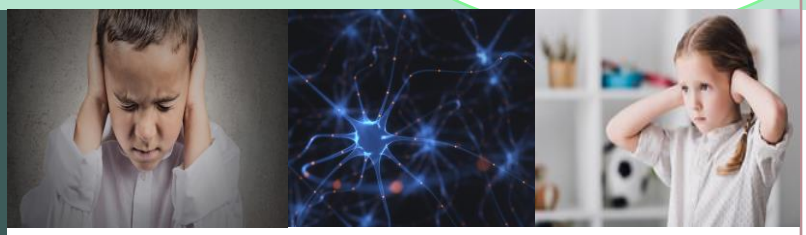
AUDIOLOGY TRIVIA

ANSWERS ON LAST PAGE

1) Who was the first to report that major central auditory compromise of the brain had essentially no effect on pure tone thresholds?
a) Jerger, b) Carhart, c) Glorig, d) Bunch

2) The first article on dichotic listening was published in what year?
a) 1959, b) 1954, c) 1941, d) 1933

3) Hyperbilirubinemia seems to have an affinity for damaging what area of the central auditory system?
a) Corpus callosum, b) Cochlear nucleus, c) Planum temporale, d) Medial geniculate body (MGB)



HYPERACUSIS and ASD

Neuroscience News

Supported by a grant from the National Institutes of Health, the Auerbach Lab at the Beckman Institute for Advanced Science and Technology will examine how different genes associated with autism spectrum disorders may similarly impact our brain's neurons, resulting in heightened sensitivity to sounds. Auerbach and his team will focus on the auditory system, as sensory hypersensitivities are common in ASD and can strongly affect individuals' quality of life. Auditory hypersensitivity has been described as physically painful, impairs individuals' abilities to focus, and can make it difficult to interact with the environment and with other people, particularly in settings like shopping malls, schools, or public transportation, which are often busy, loud, and require individuals to filter out an overabundance of noise and other sensory input.

The project will focus on dysregulation of a specific type of inhibitory interneuron, parvalbumin-positive, or PV+, interneurons, as a potentially shared mechanism. PV+ interneurons are potent regulators of the sensitivity and activity of excitatory neurons. When their function isn't properly controlled, individuals may be more sensitive to sounds perceived by others at a normal volume. The researchers will use rat models to explore how the brain reacts to sound stimuli, and how this may change with different ASD-related gene mutations. The team will use in-vivo electrophysiology to record the electrical activity from populations of auditory neurons in these rat models. This activity can be associated with behavioral changes in response to a stimulus such as playing sounds.

The group will collaborate with Beckman researcher Howard Gritton, an assistant professor of comparative biosciences and bioengineering, to use optogenetics: a method to control cell activity with light. Neurons in a specific brain region can be engineered to activate in the presence of blue light. If activating PV+ neurons are shown to reduce auditory overload, the researchers hope to use that information to develop treatments. The team aims to show that minocycline, a drug which manipulates PV+ interneurons, may be a potential treatment for sensory hypersensitivity.
Source: Beckman Institute: Neuroscience News: February 2024

Recap: Pathways Quest for the Best

Nearly 170 audiologists and students "zoomed in" to attend "Quest for the Best in CAPD/NeuroAudiology" organized by Frank Musiek and Jennifer Shinn. The 4 ½ hour program featured well known speakers who highlighted both clinical and basic science approaches to common challenges facing those of interested in higher auditory processing. Some key research studies over our 60 plus year history such as dichotic listening and morphological differences in dyslexic brains was the focus of Frank Musiek's presentation which commenced the well documented and timely program. Test batteries suggested by Doris Bamiou for adults with neurologically based disorders and Jeanane Ferre for children with learning difficulties, included dichotic listening and temporal processing tests as a common theme. Concussion and the use of FFR as a biomarker for this relatively common problem was emphasized by Nina Kraus as well as her focus on brain responses to music. Alyssa Davidson reviewed her recent research on the application of central auditory tests and hearing aids and how these studies can impact those with CAPD. The last segment of the conference was devoted to case studies featuring auditory training, interhemispheric processing, and frequency discrimination. Of note was Jennifer Shinn's case profile on the use of the dichotic interaural intensity difference (DIID) training and Maria Abramson's review of her screening procedure for frequency discrimination in preschool aged children.

The program's mixture of basic and applied science provided a model for learning about one of the most complex but interesting areas in audiology. The mini seminar also highlighted the continued need for serious, open discussion among professionals and students as a critical ingredient for the advancement of CAPD/NeuroAudiology.

Hearing Health and Technology Matters

Remember to check out the monthly articles presented on the Hearing Health and Technology Matters-Pathways platform: https://hearinghealthmatters.org/category/pathways-society/

This Week in Hearing (https://hearinghealthmatters.org/category/thisweek/) also presents relevant discussions, interviews, and content relevant to current hearing issues.

The Future of Hearing Healthcare Conference is ongoing May 8 – 22.

The Learning Corner

The learning corner will offer citations of articles both old and new that may contribute to one's knowledge base for CAPD/NeuroAudiology.

- Reynard, P., Joly, C. A., Damien, M., Le Normand, M. T., Veuillet, E., & Thai-Van, H. (2023). Age-Related Dichotic Listening Skills in Impaired and Non-Impaired Readers: A Comparative Study. Journal of Clinical Medicine, 12(2), 666, 1-12.
- Bamiou, D. E., Musiek, F. E., Stow, I., Stevens, J., Cipolotti, L., Brown, M. M., & Luxon, L. M. (2006). Auditory temporal processing deficits in patients with insular stroke. Neurology, 67(4), 614-619.
- Stein, J. (2023). Theories about developmental dyslexia. Brain sciences, 13(2), 208, 1-12.

AUDIOLOGY TRIVIA ANSWERS

1) The first to report central auditory compromise was (D) C.C. Bunch in 1928.

2) The first article on dichotic listening was published in (B) 1954.

3) The (B) Cochlear nucleus.

PAST NEWSLETTERS:

Past newsletters can be found at:

hearinghealthmatters.org/category/pathways-society/