Bio 5200: Research Methods II

Analysis Tutorial Prospectus

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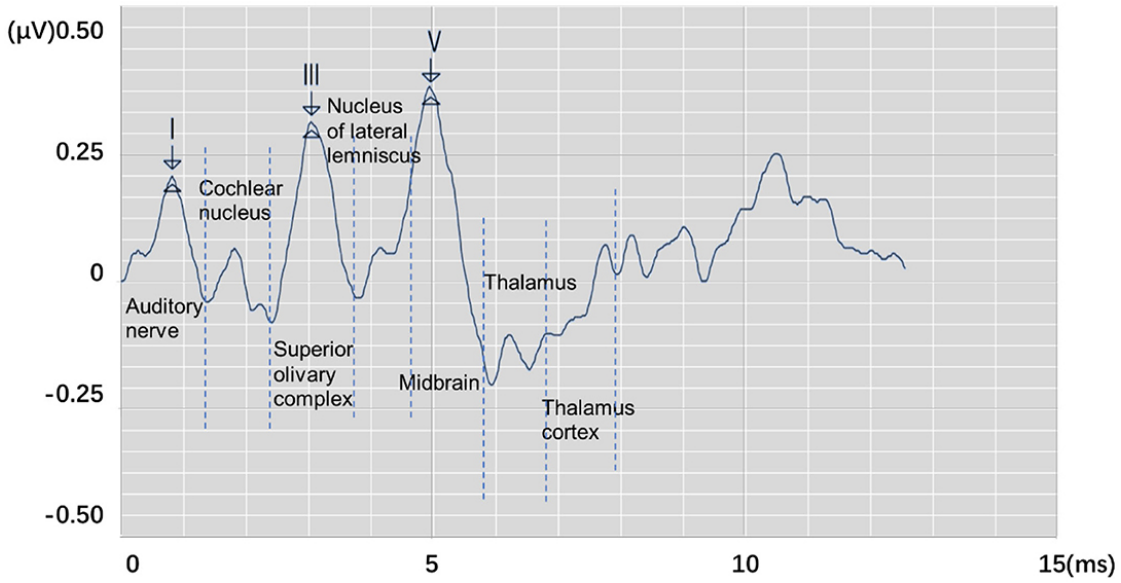
1. Title
   - Amplitude and Latency Analysis of Auditory Brainstem Response (ABR) Waveforms
2. Research question
   - Do ABR waveform latencies and amplitude differ after noise induced hearing loss?
3. Objectives
   - Communicate methods to build and use an R program that visualizes waveform plots, identifies ABR latencies, and quantifies ABR amplitudes.
4. Approach

   Auditory brainstem responses provide information about central nervous system processing of auditory information (Akil et al., 2016). An example ABR waveform is below:



   (Chen et al., 2021). The amplitude of a waveform reflects the strength of the brain's response to sound, while the latency reflects the time it takes the brain to process sound. We currently have python code (from collaborators) that is supposed to find ABR latencies and amplitudes but does not work with our newer files (https://github.com/fedeceri85/abrWaveAnalyser/tree/main). For my project, I will attempt to modify the code to read our newer files and convert this code into an R

program to improve usability for our lab. Packages to be used include the pracma package, which contains functions such as findPeaks(), peaks(), valleys(), etc. Tidyverse will be used to generate plots of ABR latencies and amplitudes. ChatGPT will be used to assist in the conversion of python code to R code.

5. Selected References

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