## Neurophysiological Investigations on the Hearing Ability of the Vampire Bat *Desmodus rotundus*

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The sanguivorous feeding habit of the vampire bats requires special orientation methods to locate and recognize the prey. Echolocation seems unsuitable for prey location, as these animals often are hidden; alfaction and thermoperception work only over a small distance and might be used for identifying the prey and selecting an appropriate feeding site. Former behavioral observations indicate that passive acoustic orientation may play a decisive role for detecting the prey. Up to now nothing is known about the hearing ability of *Desmodus*. In our experiments, multi unit thresholds were determined with glass micropipettes from the inferior colliculus. The data were verified by single unit recordings. The tonotopic organization of the colliculus was reconstructed according to the stereotactic coordinates of the electrode penetrations and histological examinations of HRP markings. Multi unit recordings revealed a best hearing sensitivity with -5 to -11 dB SPL to pure tones in the frequency range 110-25 kHz, in the frequency range of the orientation calls (50-95 kHz) the lowest threshold values reached 0 dB. The hearing range of *Desmodus* extends from below 1 kHz (lowest BF of a single unit 700 Hz, threshold value 68 dB SP:) to slightly above 100 kHz. The tonotopic organization of the inferior colliculus shows a rather unspecialized pattern. Although the frequency range of the ultrasonic orientation pulses take up more than 50% of the collicular volume, frequencies below 40 kHz occupy a rather thick dorsal layer. In the isofrequency range between 10 and 30 kHz, a number of single units were found that responded very sensitive to the sound of human breathing with respiration synchronous spike bursts, and to rustling noise. These units had low band-noise thresholds, whereas the response to pure tones was either very poor of completely missing. Regarding their response characteristic to noise signals three unit types could be differentiated. Type I: response during the stimulation, increasing spike rate at growing intensity; Type II: distinct off-reaction at higher niose intensities; Type III: unit is activated only with low intensity noise, 20-30 dB above threshold either no response or inhibition (in spontaneously active neurons). These collicular neurons are qualified to discern hidden pray by faintest noise made during respiration or slight movements of the animals.