

# Absolute And Differential Auditory Thresholds in the Adult Monkey (Macaca Fascicularis)

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**Aim:** To evaluate the auditory function of our experimental model in order to test, in future experiments, different strategies of electrical stimulation of the cochlea through a cochlear implant.

## Methods

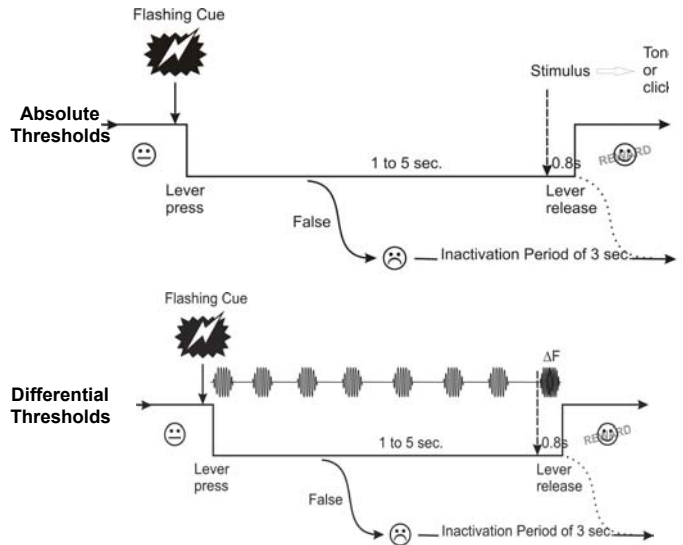
**Subject:** Macaca Fascicularis (n=1, M=6kg)

**Stimulation:**

- Tone Bursts: 250 to 10'000Hz
- Click Trains: 100 to 1000 pulses per sec. (intra-train pulse rate in pps)
- Duration of 250 msec.
- Testing in an audiometric room in free field (2 loudspeakers) or monaurally in closed field (with earphone)

**Procedure:**

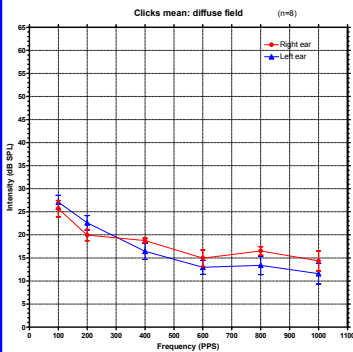
- Automated behavioral procedure with positive reinforcement (MATLAB and Tucker Davis Technologies)



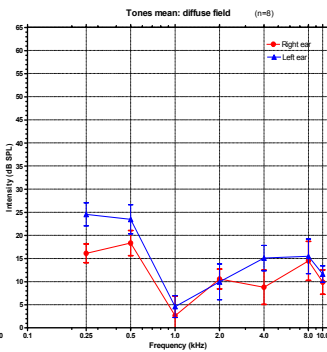
### Absolute Thresholds

## Results

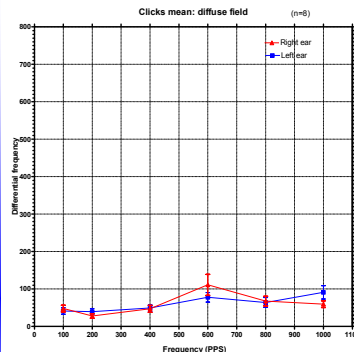
### Differential Thresholds



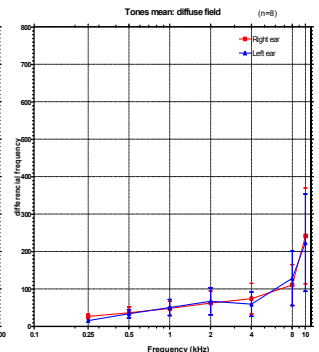
Thresholds decrease when frequency increases.



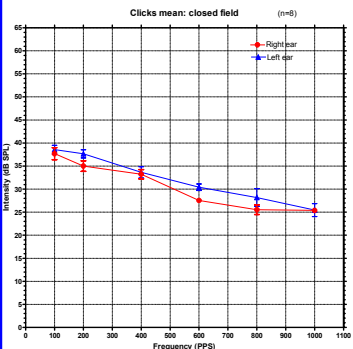
Best auditory sensitivity located in the region of 1'000-4'000Hz.



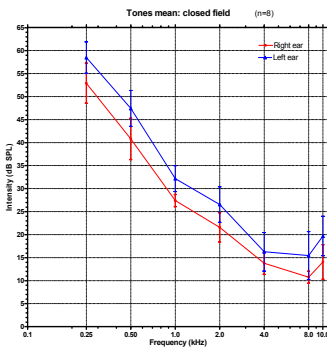
Thresholds increase when frequency increases.



Thresholds follow an exponential growth when frequency increases.



Thresholds decrease when frequency increases.



High thresholds in low frequencies and best auditory sensitivity located in the region of 4'000-10'000Hz.

## Analysis:

**Factors explaining the differences between diffuse and closed field:**

- In free field, the binaural summation improves auditory thresholds by 3 dB SPL
- In free field, the binaural summation is greater in the low frequency range compared to high frequencies, where the head shadow effect occurs.
- The external ear acts as a natural sound intensifier
- The animal is free to move his head in connection with the speaker

## Conclusion:

1° For absolute thresholds, the values obtained in closed field are more reliable and agree with data of other macaque species

2° For differential thresholds, the tone values show the same exponential progression as for humans