

## **Stimulus-Frequency Otoacoustic Emissions As a Probe of Cochlear Tuning in the Common Marmoset**

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Humans have the longest stimulus-frequency otoacoustic emission (SFOAE) delays of any species so far examined, including cat, guinea pig, chinchilla, chicken, and various species of lizards and frogs. The goal of this study was to help understand the origin of the long human SFOAE delays and whether they might be correlated with basilar-membrane (BM) length and/or sharpness of cochlear tuning. Because inter-species comparisons can be complicated by phylogenetic differences, we sought to minimize these confounds by measuring SFOAE delays in the marmoset (*Callithrix jacchus*), a New World primate with a relatively short BM (~14 mm) and good high frequency hearing. Using a frequency range of 0.4-13 kHz and 40 dB SPL level, we measured robust SFOAEs above 0.8 kHz in all 14 ears tested in 10 normal-hearing individuals of varying age and sex. Each ear exhibited a unique and reproducible set of magnitude peaks and valleys. Marmoset SFOAE delays decreased monotonically from about 3.3 ms to 0.7 ms over the range examined and were significantly shorter than those reported for either the rhesus monkey (BM length ~25 mm) or the human (~35 mm). Between 1-8 kHz, marmoset delays are longer than those reported for domestic cat (~26 mm), but are similar in both species for 10-13 kHz. These data suggest a correlation between SFOAE delay and BM length among primates, although the comparison with cat demonstrates that BM length cannot, by itself, explain delay differences across species. If SFOAE delays provide a reliable measure of cochlear tuning, as proposed, the data suggest that tuning is sharper in marmoset than in cats below 8 kHz, encompassing a frequency range relevant for the monkey's vocalizations. Further quantitative interpretation of SFOAE delays in marmoset requires knowledge of their cochlea's tonotopic map. [Work supported NIH grants R01 DC005808 and DC003687]