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### **5mHz oscillations in OAE intensity following sound exposure**

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Otoacoustic emission (OAE) intensity is highly stable in healthy ears but can be temporarily reduced following noise exposure. This reduction in OAE intensity is well correlated with temporary noise induced hearing threshold elevation and is presumed to be due to metabolic fatigue in the outer hair cells. These cells are responsible for the generation of OAEs and are essential for the maintenance of normal hearing threshold. The severity and recovery of post exposure OAE reduction in an individual is therefore of interest for hearing protection purposes.

This paper concerns the regulation of outer hair cell status and the effect of overstimulation on that regulation. We measured OAE level fluctuations following mild over stimulation ( eg 100dB SPL for 2 minutes) in order to observe the dynamics of OAE regulation. We propose this parallels outer hair cell physiological regulation. Under-damped oscillations in OAE level occur typically at a frequency of 5 milliHertz after sound exposure. We find oscillations are excited by both the onset and offset of overstimulation and a linear model explains our observations. The oscillation is clearly not itself a fatigue process but fatigue is revealed by the need for a small depression of the baseline of the OAE oscillations.