



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Hearing Loss and Protection

The Impact of Biological Sex on the Response to Noise and Otoprotective Therapies Against Acoustic Injury in Mice

Researchers at the University of Maryland-Baltimore (Baltimore, MD) conducted a study to compare the impact of suberoylanilide hydroxamic acid (SAHA), a drug that protects against noise-induced hearing loss (NIHL), on male and female mice exposed to noise trauma. Mice of both sexes were exposed to two hours of noise at 101 decibels. The animals were injected with SAHA in the body cavity three days before and two hours after noise exposure. Electrical auditory responses to tones at different radio frequencies were recorded prior to and following noise exposure to determine temporary and permanent shifts in hearing thresholds. It was determined that female mice had smaller shifts in temporary and permanent hearing thresholds compared to males (*Milon et al., 2018*). When treated with SAHA, males experienced greater hearing protection compared to females. However, the protective effect of SAHA was smaller than the protective effect of sex (i.e., being female provided more protection than using SAHA). This difference could be due to the level and activity of sex specific hormones such as estrogen. These findings support the necessity of examining the effects of noise-induced hearing loss NIHL therapies in different sexes and the potential of targeting sex-specific hormones to treat or prevent NIHL.

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REFERENCES:

Milon, B., Mitra, S., Song, Y., Margulies, Z., Casserly, R., Drake, V., . . . Hertzano, R. (2018). The impact of biological sex on the response to noise and otoprotective therapies against acoustic injury in mice. *Biol Sex Differ*, 9(1), 12. doi:10.1186/s13293-018-0171-0

