

Title: The effect of common laboratory ultrasounds on rat behaviour and physiology

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Our perception is dictated by our sensory capabilities, which capture only a fragment of the available information. Sensory capacities, including hearing, vary across species dictating a unique experience. Unfortunately, differences in hearing capacities can make it difficult to identify aberrant environmental sounds which may be a source of stress. The laboratory space is rife with ultrasounds emitted from a variety of sources including ventilation, electronics, and lighting, which unfortunately cannot be detected by the human ear without specialized equipment. These sounds may not only be causing stress to animals but may affect their communicative capacities, which includes vocalizing in the ultrasonic range. As a means of understanding the significance of ultrasounds in the environment, we assessed the effects of ultrasound exposure on behavioural and physiological markers of stress in the rat. Rats were exposed to ultrasounds at 40 kHz, a frequency commonly present within the laboratory space and tested using classic and novel assessments of anxiety. Behavioural anxiety assessments including the open field test and elevated plus maze were supplemented with physiological measurements including body temperature and adrenal gland integrity. We hypothesized that rats exposed to ultrasounds would show behavioural and physiological indications of increased stress compared to rats exposed to no noise. The results of this study will not only lead to improved validity of rodent research by the identification and assessment of a confounding variable, but it will also be beneficial to pet owners who may be inadvertently exposing their pets to ultrasounds.

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