

QUESTION:

Mice are used in many important experiments for human medical health, but one of the main challenges is working out if they experience non-visible side effects. How would you design an experiment to see if mice experience tinnitus in response to aspirin?

ANSWER:

The principle problem that arises from this situation is that you cannot ask a mouse if it has a ringing in its ears, neither are the symptoms likely to significantly change its behaviour through normal observation. There is no 'correct' answer for this experiment, merely a test of logic and creativity, but there are a couple of suggestions ...can you do better? Let us know!

- Train the mice to respond to the absence of acoustic stimulus (silence) and then administer the dose. Animals with putative tinnitus are less likely to detect, and thus respond to, these periods of silence. Source: ([Bauer, et al., 1999](#); [Guitton, et al., 2003](#); [Heffner, 2011](#); [Heffner and Harrington, 2002](#); [Jastreboff, et al., 1988](#); [Lobarinas, et al., 2004](#); [Ruttiger, et al., 2003](#))
- Because of the learning, memory and motivational demands inherent in these behavioral tasks, longitudinal studies are very difficult to conduct. (Source: [Turner et al 2013](#))
- Another method, GPIAS (gap prepulse inhibition of acoustic startle), introduces a 'silent gap' before a startling noise. An acoustic change before the 'startle' has been found to reduce the severity of the startle reflex. Mice experiencing tinnitus would again be unable to perceive the preceding silence, so continue to startle more than those able to detect the silent gap. This method requires no longterm training. (Source: [Engineer et al., 2011](#); [Longenecker & Galazyuk, 2011](#); [Middleton et al., 2011](#); [Turner, et al., 2006](#); [Turner and Parrish, 2008](#); [Wang, et al., 2009](#); [Yang, et al., 2007](#)).