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SR - Animal Sciences

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Circadian Rhythm Disturbance Affects Running Activity and Gut Microbiome in Rats

Currently, it is not known how the disruption in circadian rhythm affects the quality and quantity of the gut microbiome. So, in this study, I conducted experiments on circadian rhythm disturbance in a rat model and evaluated the specific effects of jet lag on running/sleep patterns and the gut microbiome. My results demonstrate that change in day/night cycle or jet lag significantly altered the running/sleep patterns in rats. In addition, jet lag altered the gut microbiome, and more specifically changed the gut microbiota community composition by reducing microbes found in a healthy gut and increasing microbes associated with inflammation and oxidative stress.

Current methods to combat jet lag include adapting to a new sleep schedule before travel, taking drugs like melatonin, and staying hydrated. Medications such as melatonin reduce the effects of jet lag by decreasing oxidative stress and inflammation, although they produce unwanted side effects. So, alternate therapies are needed to combat the effects of disruption in the circadian rhythm. Curcumin is a diet-based antioxidant and anti-inflammatory agent that has been used in certain diets for centuries. I conducted additional studies to determine whether curcumin diet would prevent or ameliorate the effects of jet lag on running/sleep patterns. My results demonstrate that curcumin treatment prior to and during jet lag prevents its effects on running/sleep pattern without altering body weight and therefore without producing any observable side effects. Future studies will determine whether curcumin treatment will also prevent gut microbiome disturbance. My findings suggest that using curcumin as a long-term herbal supplement can reduce disturbances in sleep patterns in people who experience jet lag and in people with sleep disorders.