

Irregular sleep patterns associated with harmful gut bacteria

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New research has found irregular sleep patterns are associated with harmful bacteria in your gut.

The study, published today in *The European Journal of Nutrition* by researchers from King's College London and ZOE, a personalized nutrition company, is the first to find multiple associations between social jet lag—the shift in your internal body clock when your sleeping

patterns change between workdays and free days—and [diet quality](#), diet habits, inflammation and gut [microbiome](#) composition in a single cohort.

Previous research has shown that working shifts disrupts the body clock and can increase risk of weight gain, heart problems and diabetes. However, there is less awareness that our biological rhythms can be affected by smaller inconsistencies in sleeping patterns due to waking early with an alarm clock on workdays, for example, compared to waking naturally on non-workdays for people working regular hours.

Senior author Dr. Wendy Hall from King's College London said, "We know that major disruptions in sleep, such as shift work, can have a profound impact on your health. This is the first study to show that even small differences in sleep timings across the week seems to be linked to differences in gut [bacterial species](#). Some of these associations were linked to dietary differences but our data also indicates that other—as yet unknown—factors may be involved. We need intervention trials to find out whether improving sleep time consistency can lead to beneficial changes in the gut microbiome and related health outcomes."

The composition of the microbes in your gut (microbiome) may negatively or positively affect your health by producing toxins or beneficial metabolites. Specific species of microbes can correspond to an individual's risk of long-term health conditions such as diabetes, heart disease and obesity. The microbiome is influenced by the food you consume which makes the diversity of your gut adjustable.

In a cohort of 934 people from the ZOE PREDICT study, the largest ongoing nutritional study of its kind, researchers assessed blood, stool and gut microbiome samples as well as glucose measurements in those whose sleep was irregular compared to those who had a routine sleep schedule. While previous studies into the association between social jet lag and metabolic risk factors have been done in populations with

obesity or diabetes, this cohort consisted of mainly lean and healthy individuals with most getting more than seven hours sleep per night throughout the week.

Researchers found that just a 90-minute difference in the timing of the midpoint of sleep—the halfway point between sleep time and wake-up time—is associated with differences in gut microbiome composition.

Having social jet lag was associated with lower overall diet quality, higher intakes of sugar-sweetened beverages, and lower intakes of fruits and nuts, which may directly influence the abundance of specific microbiota in your gut.

Three out of the six microbiota species more abundant in the [social jet lag](#) group have "unfavorable" associations with health. These microbes are associated with poor diet quality, indicators of obesity and cardiometabolic health, and markers in your blood related to higher levels of inflammation and cardiovascular risk.

First author Kate Bermingham, Ph.D., from King's College London and senior nutrition scientist at ZOE, said, "Sleep is a key pillar of health, and this research is particularly timely given the growing interest in circadian rhythms and the gut microbiome. Even a 90-minute difference in the mid-point of sleep can encourage microbiota species which have unfavorable associations with your health."

Previous research has found social jetlag is associated with weight gain, chronic illness and mental fatigue.

Dr. Sarah Berry, from King's College London and chief scientist at ZOE, added, "Maintaining regular sleep patterns, so when we go to bed and when we wake each day, is an easily adjustable lifestyle behavior we can all do, that may impact your health via your [gut microbiome](#) for the

better."

More information: Kate Bermingham et al, *European Journal of Nutrition* (2023). [DOI: 10.1007/s00394-023-03204-x](https://doi.org/10.1007/s00394-023-03204-x)

Provided by King's College London

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