Our bodies’ internal timepieces drive daily rhythms and influence health

By L. Bryan Ray and John Travis

Benjamin Franklin, the sage of colonial America, advised that “Early to bed and early to rise, makes a man healthy, wealthy, and wise.” Recent studies in circadian biology bear him out. Staying in synchrony with the 24-hour light-dark cycle of Earth does indeed provide benefits, if not to the pocketbook, at least to health and brain function.

Circadian biology is the study of the biochemical clocks that keep time in our brains and most cells in our bodies. Evidence is accumulating that misalignment of these clocks with the daily light-dark cycle of our environment can have profound effects on physiology, raising the risk of disease. At the same time, modern society generates pressures that tend to push activity and sleep out of sync with circadian biology. From extended work hours and shift work, to frequent air travel across time zones, to consumption of digital information late at night on electronic screens emitting “daylight” cues, many of us are subject to some amount of circadian disruption—including scientists whose research demands work at night. Learning how to have a healthy life despite these circadian disruptions will require a new understanding of how biological clocks influence physiological processes, which could ultimately lead to new applications in circadian medicine.

It matters not only what, but when you eat. These mice ate the same amounts of a high-fat diet, but the thinner one was restricted to eating during the active phase of its circadian cycle.
On the clock
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