

Circadian Rhythms

George Gershwin wrote the song “I’ve Got Rhythm” in 1930. In Gershwin’s song he is chipper all the day, happy with his life, days are sunny with never a sigh, and he doesn’t need what money can buy. And that is because he’s got rhythm and who could ask for anything more. I don’t think he was a shift worker. But even shift workers have rhythm, circadian rhythms.

All living beings have a circadian rhythm and that includes plants, animals, fungi, and bacteria. These built-in or endogenous physiological and biological processes occur approximately every 24 hours. Plants, fungi, bacteria, and most animals probably do not mess up their circadian rhythm by working rotating shifts, staying up late at night, sleeping until noon, and/or flying across multiple time zones. Those are human actions and behaviors beginning primarily after the invention of the light bulb and the advent of the second industrial revolution when factories began running day and night.

Circadian rhythms are produced by natural factors within the body, but they are also affected by signals from the environment. Light is the main cue influencing circadian rhythms, turning on or turning off genes that control an organism’s internal clocks.

In your fatigue training program, you probably have learned that our sleep patterns are controlled by circadian rhythms. They also influence our body temperature, digestive processes, hormone production, and other bodily functions. We are diurnal beings, designed to be awake in the daytime and asleep at night. Most of us seek to override the natural and beneficial circadian rhythms or we have to override those “controls” in order to work rotating shifts.

When we disrupt that natural pattern, problems may occur. In addition to sleep problems, we may experience digestive, hormonal, or cardiovascular problems.

Even if we do not disrupt the circadian rhythm, our alertness waxes and wanes several times every 24 hours. I was on an elevator about 3:00pm the other day when a yawning man joined me. I asked him if he was sleepy and he replied he only needed some coffee. He was experiencing a natural, afternoon “dip” in his circadian rhythm. A nap was what he needed, but most pipeline companies forbid napping.

Another dip occurs in the middle of the night and that is the period when there is the most pressure to be asleep. Some term it the WOCL or Window of Circadian Low. A storm caused the lights to go out just now, it is completely dark outside, and both my wife and I are sitting here yawning. Evidently we’ve got rhythm, circadian rhythm!

It’s the morning after the storm, and I woke up when it got daylight, due to going to bed early. I generally wake up about 8:30am if I do not set an alarm. My circadian rhythm is messed up, primarily due to years of shift work, staying up late most nights, and sleeping late when I can. One term that describes this is “delayed sleep phase disorder.”

Some other circadian rhythm disorders include:

- Advanced Sleep Phase Disorder (going to bed early, getting up early; this is common among the elderly. I’ll probably get that next.)
- Jet Lag
- Shift Work Disorder
- Narcolepsy

These disorders may require a consultation with a sleep specialist. Treatments might include behavior therapy, which means that people have to change their behaviors. If one has delayed sleep phase disorder, the change requires going to bed earlier and getting up earlier. A way to assist with that is to minimize exposure to light at night. If one has advanced sleep phase disorder, the change requires staying awake later and sleeping later. Guess what, this requires more exposure to light.

Bright light therapy, use of melatonin or other aids, and chronotherapy are other means to treat circadian rhythm disorders. For shiftworkers, the simplest recommendation, but difficult to implement, is sleep as much as you can when you can, whether it is daytime or nighttime.

