

7 Strange Circadian Rhythms of the Animal Kingdom

You're probably aware that humans follow a 24-hour circadian rhythm, but other species' clocks are strikingly different. Some animals even have no internal clock at all.

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STORY AT-A-GLANCE

- Many animals' circadian rhythms may be flexible and adaptable to their environment
- Some animals have internal clocks that follow the moon or tides, others are significantly shorter or longer than the 24-hour cycle followed by humans
- Certain animals lack a circadian rhythm in order to save energy or survive during periods of prolonged light or darkness

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Many organisms have circadian rhythms, which are generally 24-hour cycles that may help determine sleeping and eating cycles as well as play a role in hormone production, brain activity, body temperature, and other biological processes.

In primates, the circadian rhythm is thought to develop in utero, with light exposure playing a significant role in regulating the developing clock according to light-dark cycles.¹ However, not all species' internal clocks operate this way.

Animals that are active around the clock, such as herbivores, animals that live in polar regions, and animals engaged in migration, may not have persistent daily rhythms at all, but rather may have internal clocks that have adapted to their changing environments.

In fact, research suggests many animals' circadian rhythms may actually be flexible and regularly changing. According to research published in the Royal Society Proceedings B:²

"There is a growing realization that the degree of circadian organization differs widely depending on species' biology ... Migratory bird species that occupy high latitudes during the breeding season showed diverse patterns of activity ranging from maintaining daily rhythmicity to switching to around-the-clock activity ...

Penguins, which reproduce at Antarctic latitudes, but may migrate to lower latitudes outside the breeding seasons, are also highly plastic in their daily rhythms, showing either 24 h[our] entrained or arrhythmic patterns, possibly in association with different vertical migration patterns of their food species."

7 Weird Circadian Rhythms

Human circadian rhythms tend to be closely tied to the rise and fall of the sun each day, occurring in fairly regular 24-hour cycles. But by no means is this how all organisms' internal clocks operate. Science News recently compiled seven of the strangest circadian rhythms.³ Although they may seem weird, they work to keep different organisms in tune with their (sometimes-extreme) environments.

1. **Lunar Clock** — Some species operate not by the rise and fall of the sun but by the rise and fall of the moon. This includes a marine worm called *Platynereis dumerilii*. The moon controls when the worms spawn in a type of lunar clock that appears to be separate from the animal's circadian clock.
2. **Tidal Clock** — Certain marine species, such as the speckled sea louse, use tidal rhythms to help them decide when to burrow into the sand (so they're not swept out to sea) and when it's safe to come out to forage. According to Science News:⁴

"The tidal clock is paced by a protein called casein kinase 1, which may be a gear left from an ancient clock upon which all others have been built."

3. **Prolonged Clocks** — Not all species operate on a 24-hour cycle. Some, like the Somalian cave fish, have a longer cycle; theirs is about 47 hours. This might be because of slower changes that occur in the dark caves where the fish live, or it could be that their clocks are slowing down and "breaking" simply because they're not providing a survival advantage.

It's been shown, for instance, that the eyeless Mexican cavefish save about 27 percent more energy due to the lack of a circadian rhythm. Researchers noted in PLOS One:⁵

"Elimination of the circadian rhythm in metabolism may be a general feature of animals that live in perpetually dark food-limited environments such as caves or the deep sea."

4. **No Clocks** — Aside from species living in dark caves or the deep sea, Arctic reindeer may also have lost their circadian clock (or it may have weakened significantly). This may help the animals forage, sleep, and survive during periods of constant light or darkness.

Even with no circadian rhythm, however, the animals are still in tune with seasonal cycles of mating and migration due to melatonin, a light-sensitive hormone.

5. **Short Clocks** — We've covered 24-hour clocks and prolonged clocks, but some animals actually have short (less than 24 hour) clocks, which are known as ultradian rhythms. This includes voles, which feed and follow cycles of activity that last just two to three hours.
6. **Social Clocks** — Honeybees are able to adjust their clocks depending on their job in the hive. While forager bees have regular circadian shifts, nurse bees stop following a circadian rhythm so they can care for larvae around the clock.
7. **Snoozed Clocks** — Some species, such as migrating birds and newborn killer whales and their moms, don't sleep for weeks on end. It's thought that they hit the "snooze" button on their internal clocks during this time then return to their regular circadian rhythm as their circumstances change (such as when a migratory bird reaches its destination or a newborn killer whale grows up a bit).

Such adaptations can even be seen to some extent in human babies. According to the Royal Society Proceedings B:⁶

"Mammalian mothers may be active around the clock with attenuated circadian rhythms for several weeks during the postpartum period.

Offspring in these species are typically born with no apparent circadian rhythms, and their activity and sleep patterns are not consolidated during their first weeks to months of life.

In newborn and mother killer whales and bottlenose dolphins, who need to surface regularly to breathe, around-the-clock activity is associated with little or no typical sleep behavior for the first postpartum month.

Adults of these species are also active around the clock but sleep in one brain hemisphere at a time. Newborn humans and other primates also do not have consolidated sleep–wake and activity circadian rhythms for the first weeks postpartum.

The mothers who tend their infants around the clock may show weak circadian rhythms and fragmented sleep. The attenuated circadian rhythms of the mothers are commonly explained by masking or synchronization with the ultradian rhythms of their infants."

What is perhaps most intriguing of all is that it was long thought that disruptions to circadian rhythms may result in reduced health and survival. However, the emerging research suggests many animals have altered circadian rhythms — or lack a circadian rhythm — with no apparent ill effects. On the contrary, an adaptable internal clock may prove to be quite advantageous.

Sources and References

[Science News July 14, 2015](#)

¹ [Sleep Med Clin. 2007 Sep 1; 2\(3\): 331–341](#)

^{2,6} [Royal Society Proceedings B August 2013, Volume 280, Issue 1765](#)

^{3,4} [Science News July 14, 2015](#)

⁵ [PLOS One September 24, 2014](#)
