Breaking nature's clock: the effect of sleeping pills on day-night behavioral rhythms of aquatic animals

In nature, timing is crucial. Many animals finely tune their activities to the day-night cycle, a phenomenon studied in the field of chronobiology. However, despite its ecological roots, chronobiology is mostly a biomedical discipline, leaving its importance in environmental pollution research underexplored. This gap limits our understanding of how wildlife behaves and responds to global change and pollution.

In this project, you will combine controlled laboratory experiments with infrared-sensitive recording and tracking technology to investigate how pollution affects the day-night activity rhythms of aquatic animals. Specifically, you'll explore the effects of benzodiazepine drugs—commonly used as sleeping medication and frequently found in polluted water—on these natural activity cycles.

Through this research, you will not only study the rising threat of pharmaceutical pollution but also contribute to a deeper integration of chronobiology into global change research. You will gain skills in culturing and experimenting with aquatic animals and using advanced technology to monitor animal behavior.

The specifics of the project are somewhat flexible and can be tailored to the specific interests of the student.

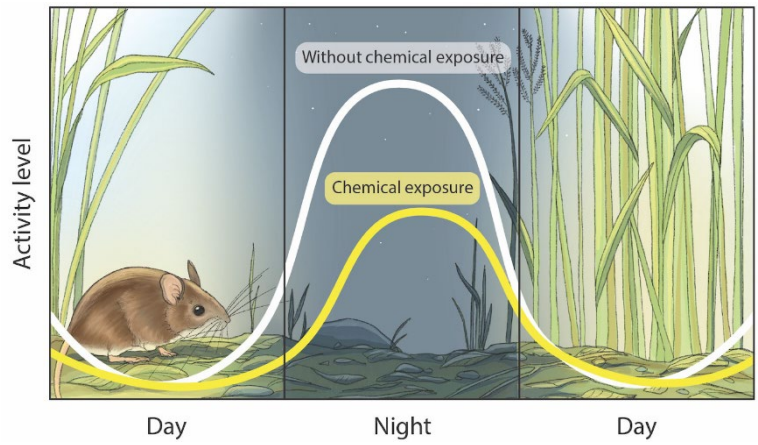

Figure: Illustration of how chemical pollutants can disrupt biological rhythms. The example here is one of many possible scenarios. Source: Thoré et al., 2024 *PLoS Biology*

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The great underwater commute: a deeper dive into zooplankton daily vertical migration

One of the world's largest animal migrations occurs every day: the daily vertical migration of zooplankton, where these animals swim up the water column at night and descend during the day. Governed by internal circadian clocks, this behavior helps zooplankton optimize feeding and avoid predators. While this migration has been studied for over 200 years, many aspects of it remain a mystery.

Using infrared-sensitive recording and tracking technology, this project will investigate why we sometimes see clear patterns of daily vertical migration, while at other times, these patterns are much less clear or even entirely absent. Could it be due to the age of the animals, the depth of the water column, or adaptations to local predator pressures?

You will explore the world of chronobiology and its application to ecological research. Additionally, you will develop hands-on experience in culturing aquatic animals and using advanced technology to monitor animal behavior.

The specifics of the project are somewhat flexible and can be tailored to the specific interests of the student.

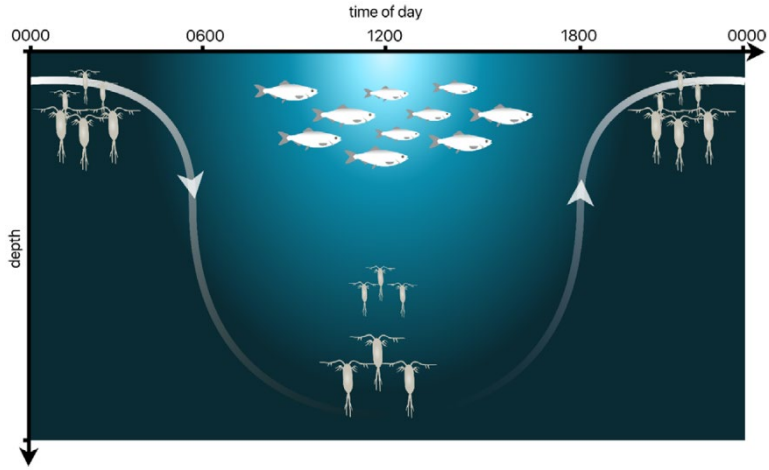

Figure: Illustration of a classic daily vertical migration of zooplankton. Source: Bandara et al., 2021 *Biological Reviews*

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