

# Actigraphy is Recycled in a Rat Communicative Sleep Study

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## Abstract

Actigraphy is a non-invasive method for monitoring and recording movement patterns in animals. This technology is commonly used in the field of sleep research, particularly in studies involving rats. In a rat behavioural sleep study, actigraphy can be used to collect data on sleep and wake patterns, which can provide insights into the mechanisms that regulate sleep and the effects of different interventions on sleep. This article will discuss the use of actigraphy for a rat behavioural sleep study in more detail, including the advantages and limitations of this method and the factors that need to be considered when using actigraphy to study sleep in rats. Actigraphy is a technique for measuring and recording movement patterns in animals. This technology uses an actigraph device, which is typically a small, lightweight device that is worn on the animal's body. The device contains an accelerometer, which detects movement and converts it into an electrical signal. This signal is then recorded and analyzed to determine the animal's activity levels over time.

**Keywords:** Actigraphy • Insight • Sleep • Signal

## Introduction

In sleep research, actigraphy is often used to monitor sleep and wake patterns in animals. The device can be worn continuously for several days or even weeks, providing a long-term record of the animal's activity levels. Actigraphy can be used to collect data on sleep and wake patterns in a variety of animal models, including rats, mice, and non-human primates. There are several advantages to using actigraphy in a rat behavioural sleep study. One of the main advantages is that it is a non-invasive method that does not require the animal to be tethered or implanted with electrodes. This is particularly important in studies involving sleep, as the animal's movements can be affected by the presence of electrodes or other devices [1].

Another advantage of using actigraphy in a rat behavioural sleep study is that it provides a long-term record of the animal's activity levels. This allows researchers to study sleep and wake patterns over extended periods of time, which can be useful in understanding the mechanisms that regulate sleep and the effects of different interventions on sleep. Actigraphy can also be used to monitor the effects of drugs or other interventions on sleep in real-time, providing a more accurate assessment of their effects. While there are many advantages to using actigraphy in a rat behavioural sleep study, there are also some limitations that need to be considered. One limitation is that actigraphy can only measure movement and cannot distinguish between different types of movement. This means that it may be difficult to determine whether the animal is asleep or awake based solely on the activity levels recorded by the device [2].

Limitation of using actigraphy in a rat behavioural sleep study is that the data collected may be affected by environmental factors such as noise or light levels. This can make it difficult to accurately assess the animal's sleep and wake patterns and may require additional measures, such as video monitoring, to supplement the data collected by the actigraph. When using actigraphy in a rat behavioural sleep study, there are several factors that need to be considered to ensure accurate and reliable data collection. One factor is the placement of the actigraph device. The device should be placed in a location that allows it to accurately detect the animal's movements without interfering with its natural

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behaviour. The device should also be secured firmly to prevent it from falling off or shifting during the study [3].

Factor to consider is the length of the study. Actigraphy can be used to collect data over several days or even weeks, but it is important to ensure that the animal's welfare is not compromised during this time. The animal should have access to food, water, and appropriate bedding, and should be monitored regularly to ensure its well-being. Actigraphy is a non-invasive technique that is commonly used to measure and quantify sleep-wake behaviour in both humans and animals. In the case of rat behavioural sleep studies, actigraphy provides an efficient and reliable way to monitor and analyse changes in activity patterns and sleep behaviour. In this article, we will discuss the use of actigraphy in rat behavioural sleep studies, including its benefits, limitations, and potential applications [4].

## Literature Review

Actigraphy involves the use of a small device, typically worn on the wrist or ankle, that measures and records physical movement. The device, which is typically equipped with an accelerometer, detects movement and translates it into an activity count. These activity counts can be used to infer the level of physical activity and restfulness of an animal, making it a valuable tool for studying sleep behaviour. One of the main advantages of actigraphy is that it is a non-invasive technique, meaning that it does not require any surgical intervention or manipulation of the animal. This makes it an ideal tool for studying the effects of various treatments or interventions on sleep behaviour, as it does not interfere with the animal's natural behaviour. Additionally, actigraphy is a relatively low-cost and easy-to-use technique, making it accessible to a wide range of researchers and institutions [5].

## Discussion

In a typical rat behavioural sleep study, actigraphy is used to monitor changes in activity patterns and sleep behaviour over time. The device is typically attached to the animal's ankle or tail, and activity counts are recorded continuously over a period of several days or weeks. These data are then analyzed using specialized software, which can provide information on the animal's sleep-wake behaviour, including the total amount of sleep, the duration and frequency of individual sleep bouts, and the timing of sleep relative to other behavioural or environmental cues [6].

One of the key advantages of actigraphy is its ability to provide continuous, high-resolution data on sleep behaviour over an extended period of time. This is particularly useful for studying sleep patterns in rats, which are nocturnal animals that often exhibit complex and variable sleep behaviour. By providing detailed information on sleep behaviour over time, actigraphy can help researchers identify patterns and trends in sleep behaviour that might be missed using other

techniques. Another advantage of actigraphy is its ability to provide information on both the quantity and quality of sleep. By analysing changes in activity patterns over time, researchers can infer the level of physical activity and restfulness of an animal, which can be used to quantify the amount and quality of sleep. This is particularly useful for studying sleep disorders, such as insomnia or sleep apnoea, which can affect both the quantity and quality of sleep [7].

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## Conclusion

Despite its many advantages, actigraphy also has some limitations and potential sources of error that must be taken into account when interpreting results. For example, the accuracy of activity counts can be affected by factors such as device placement, battery life, and animal behaviour. Additionally, actigraphy is not able to distinguish between different sleep stages, such as REM and non-REM sleep, which may limit its usefulness for certain types of sleep research. Despite these limitations, actigraphy remains a valuable tool for studying sleep behaviour in rats and other animals. In particular, it is well-suited for studying changes in sleep behaviour over time, as well as for monitoring the effects of various treatments or interventions on sleep behaviour. With the continued development of new devices and analytical tools, actigraphy is likely to remain an important tool for sleep research for many years to come.

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## Conflict of Interest

There is no conflict of interest by author.

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## References

1. Levenson, Jessica C., Wendy M. Troxel, Amy Begley and Martica Hall, et al. "A quantitative approach to distinguishing older adults with insomnia from good sleeper controls." *J Clin Sleep Med* 9 (2013): 125-131.
2. Liu, Yong, Janet B. Croft, Anne G. Wheaton and Geraldine S. Perry, et al. "Association between perceived insufficient sleep, frequent mental distress, obesity and chronic diseases among us adults, 2009 behavioral risk factor surveillance system." *BMC public health* 13 (2013): 1-8.
3. Kumar, Tankesh and Sushil K. Jha. "Sleep deprivation impairs consolidation of cued fear memory in rats." (2012): e47042.
4. McCoy, John G., Michael A. Christie, Youngsoo Kim and Robert Brennan, et al. "Chronic sleep restriction impairs spatial memory in rats." *Neuroreport* 24 (2013): 91.
5. Henry, Brook L., Arpi Minassian, Jared W. Young and Martin P. Paulus, et al. "Cross-species assessments of motor and exploratory behavior related to bipolar disorder." *Neurosci Biobehav Rev* 34 (2010): 1296-1306.
6. Xu, Aijing, Eiko Sakurai, Atsuo Kuramasu and Jian Zhang, et al. "Roles of hypothalamic subgroup histamine and orexin neurons on behavioural responses to sleep deprivation induced by the treadmill method in adolescent rats." *J Pharmacol Sci* 114 (2010): 444-453.
7. Ramakrishnan, Uma and Richard G. Coss. "A comparison of the sleeping behaviour of three sympatric primates." *Folia Primatol* 72 (2001): 51-53.

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