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**VISION IN LABORATORY RODENTS – TOOLS TO MEASURE IT AND IMPLICATIONS FOR  
BEHAVIORAL RESEARCH**

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**HIGHLIGHTS:**

- Rodents' visual pathways are able to carry out complex visual processing
- Vision guides rodent behavior in several laboratory settings
- Rodent vision can be tested using operant and reflex-based behavioral tasks
- Electrophysiological tests of visual function provide an alternative for behavioral tests
- Genetic engineering may have unexpected consequences on vision

**ABSTRACT**

Mice and rats are nocturnal mammals and their vision is specialized for detection of motion and contrast in dim light conditions. These species possess a large proportion of UV-sensitive cones in their retinas and the majority of their optic nerve axons target superior colliculus rather than visual cortex. Therefore, it was a widely held belief that laboratory rodents hardly utilize vision during day-time behavior. This dogma is being questioned as accumulating evidence suggests that laboratory rodents are able to perform complex visual functions, such as perceiving subjective contours, and that declined vision may affect their performance in many behavioral tasks. For instance, genetic engineering may have unexpected consequences on vision as mouse models of Alzheimer's and Huntington's diseases have declined visual function. Rodent vision can be tested in numerous ways using operant training or reflex-based behavioral tasks, or alternatively using electrophysiological recordings. In this article, we will first provide a summary of visual system and explain its characteristics unique to rodents. Then, we present well-established techniques to test rodent vision, with an emphasis on pattern vision: visual water test, optomotor reflex test, pattern electroretinography and pattern

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