

# BIOLOGICAL CLOCKWORK MECHANISMS IN INSECTS – HOW MANY CLOCKS TICK IN THEIR BODIES?

## Summary

Insects display a rich variety of circadian behavioral rhythms. Many cellular and molecular processes also vary as a function of time of day. All these rhythms appear to be controlled by a common clock mechanism, which consists of molecular feedback loops that involve several clock genes and their proteins. The roles of many clock genes have been well established in the fruit fly, *Drosophila melanogaster*, and their orthologs have been found in other insects. Clock genes are expressed in the central nerv-

ous system and clock-positive neurons regulate behavioral rhythms in insects. In addition, clock genes are widely expressed in peripheral tissues implying that they perform important physiological functions. In this paper, the recent progress in the understanding of the biological clock mechanism and its functions in insect life are reviewed. How our knowledge about circadian systems of insects has developed during the past decade is also discussed.