

Monarch Butterfly Migration: From Behavior to Neurons to Genes

*Steven M. Reppert, MD
Higgins Family Professor of Neuroscience*

*Department of Neurobiology, University of Massachusetts, Medical School,
364 Plantation Street, Worcester, MA 01605, USA*

Studies of the iconic migration of the eastern North American monarch butterfly have revealed mechanisms behind its navigation using a time-compensated sun compass. Skylight cues, such as the sun itself and polarized light, are processed through both eyes and integrated in the brain's central complex, the presumed site of the sun compass. Circadian clocks that have a distinct molecular mechanism and that reside in the antennae provide time compensation. The draft sequence of the monarch genome has been presented, and gene-targeting approaches have been developed to manipulate putative migration genes. The monarch butterfly is an outstanding system to study the neural and molecular basis of long-distance migration.

References:

Reppert, S.M.; Gegear, R.J.; Merlin, C. (2010). Navigational mechanisms of migrating monarch butterflies. **TINS** 33, 399-406.