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How Sunlight Shapes Daily Rhythms

Fresh insight into how biological clocks adjust to having less sunlight in the winter could help us better understand the impact of jet lag and shift work.

Scientists studying the daily activity cycle in plants -- known as "circadian rhythms" -- have discovered a finely tuned process that enables the plant's genes to respond to the times of dawn and dusk each day, as well as the length of daylight in between.

This system helps the plant to reset its internal clock every day in response to seasonal changes in daylight, which helps the plant control the timing of key activities such as growth and flowering.

The findings shed light on how living things, including people, respond to patterns of daylight, and how our bodies respond when our daily rhythms are interrupted, for example by global travel or unsociable working hours.

Circadian rhythms -- which are found in most living things -- influence many biological functions that vary throughout the day. In people, these include sleepiness, body temperature, blood pressure, and physical strength.

Researchers at the University of Edinburgh used mathematical models to show how much the plants' rhythms accounted for dawn and dusk as well as day length.

The study, published in *Molecular Systems Biology*, was carried out with the Universities of Warwick and Central Lancashire and the Hungarian Academy of Sciences. It was funded by the Biotechnology and Biological Sciences Research Council and the Engineering and Physical Sciences Research Council.

Professor Andrew Millar of the University of Edinburgh's School of Biological Sciences, who led the study, said: "Our results give us valuable information on how plants -- and people -- respond to changing lengths of day. It could give a new way to understand how to cope when our daily rhythms of light and dark are interrupted."