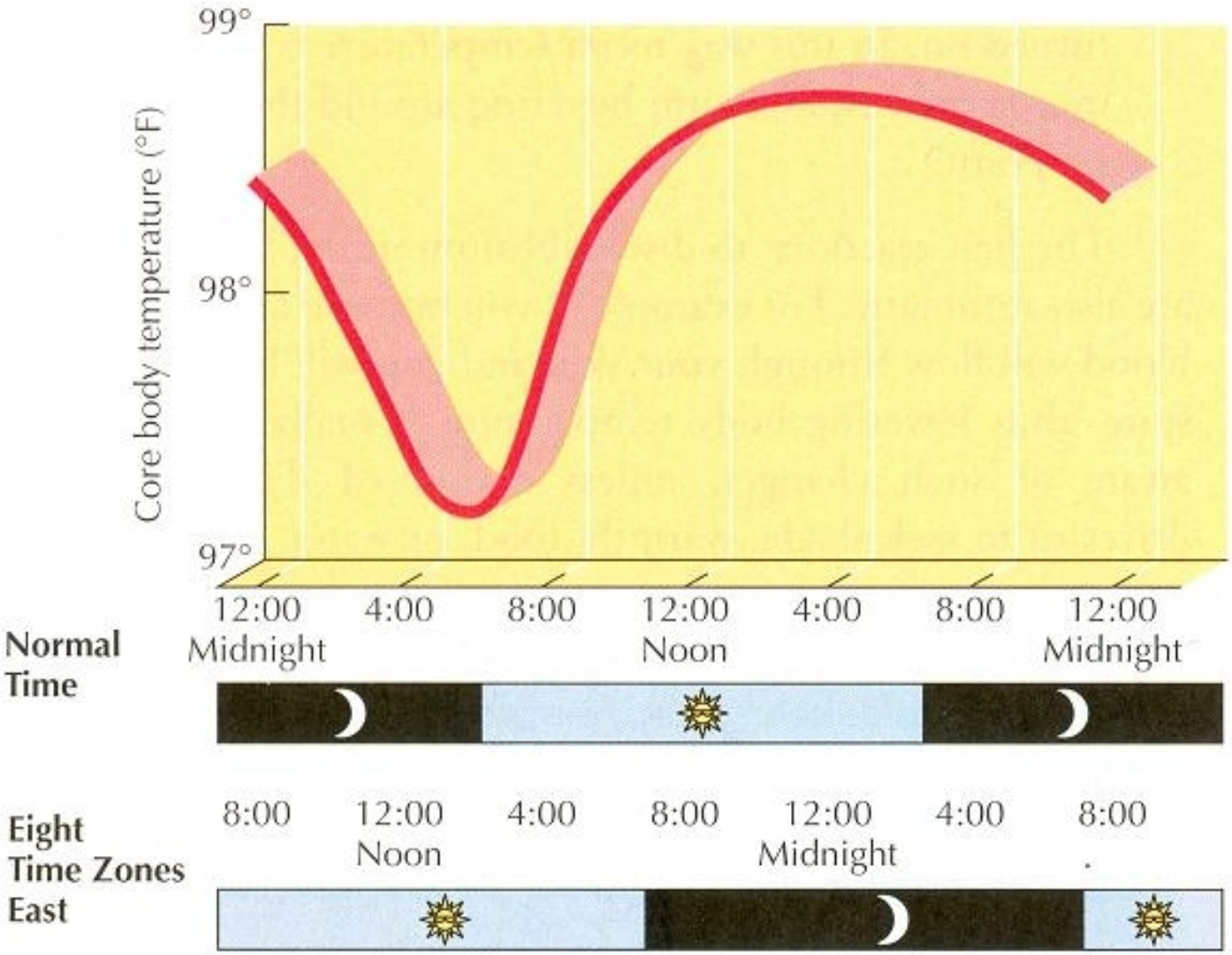
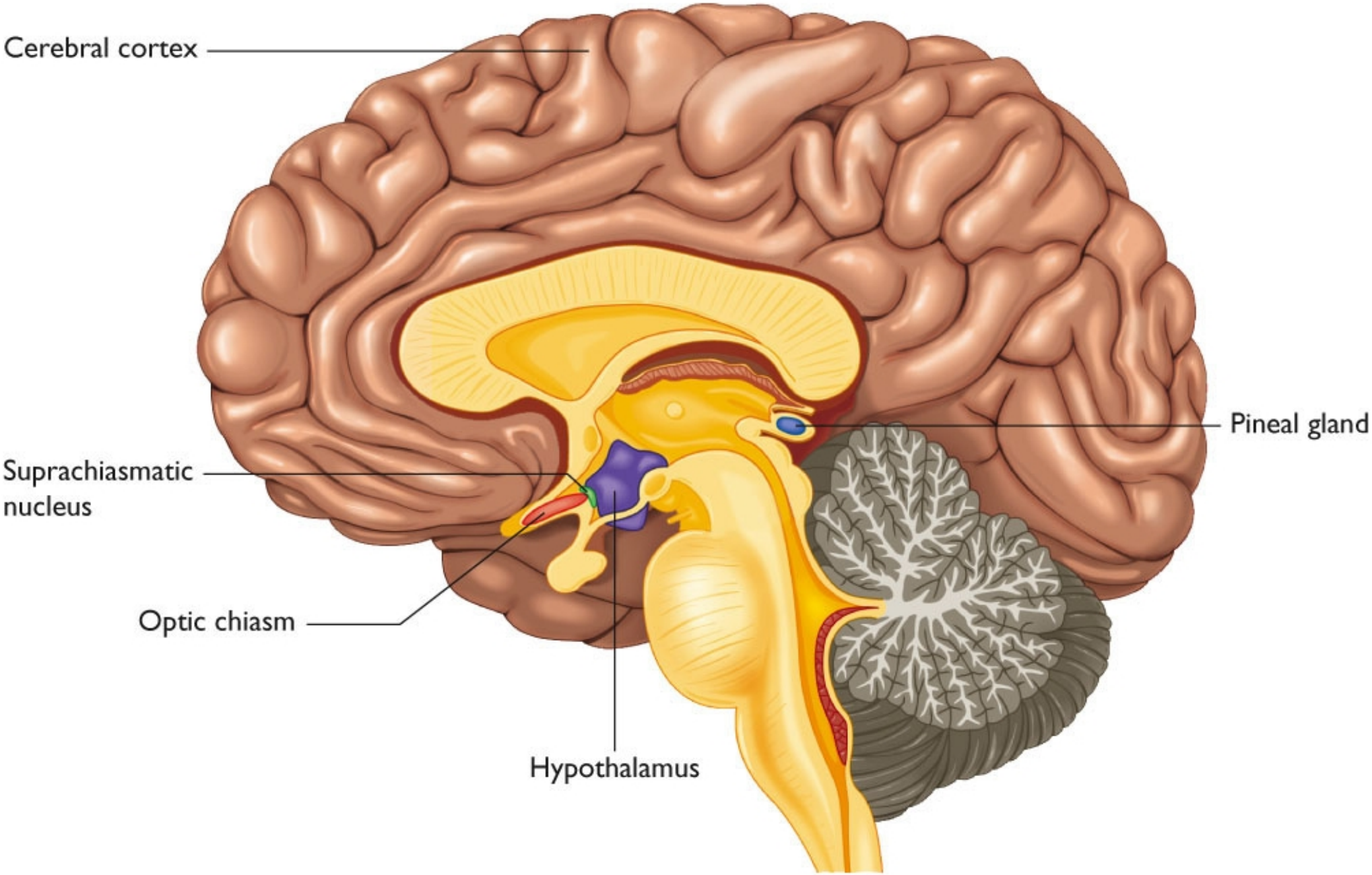
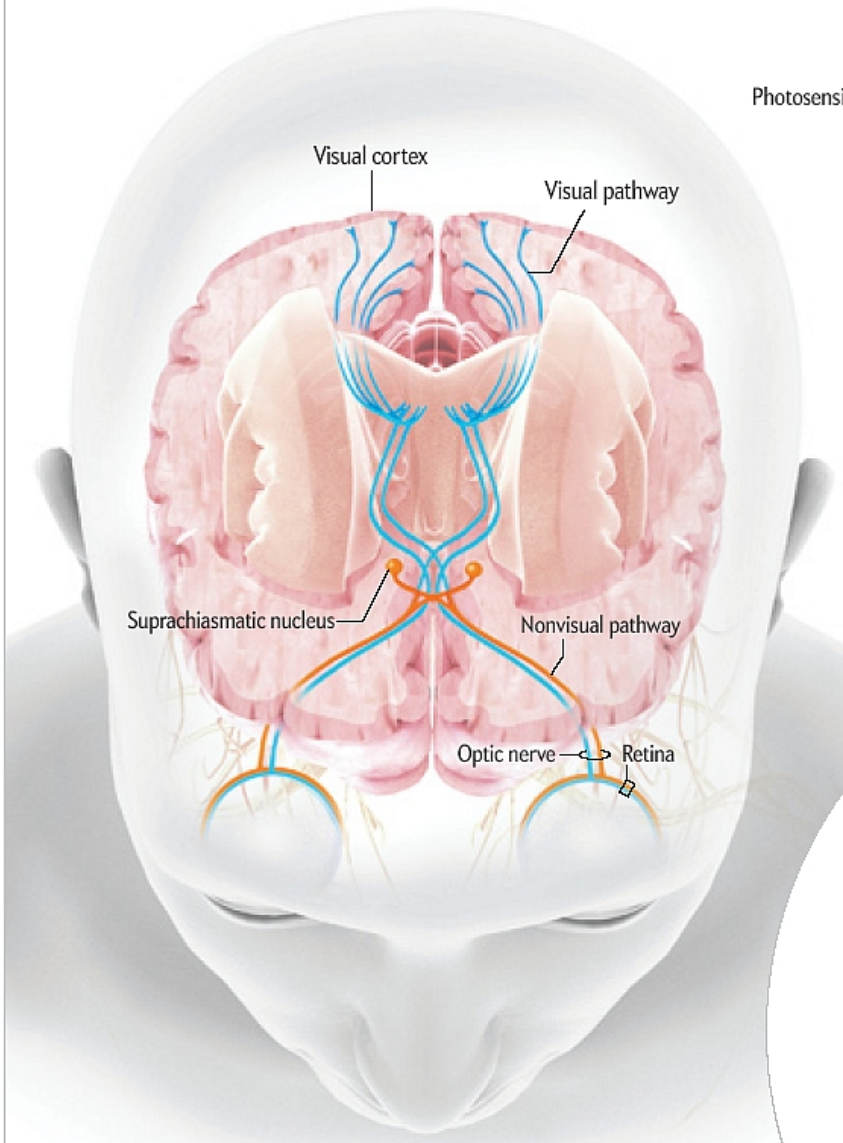


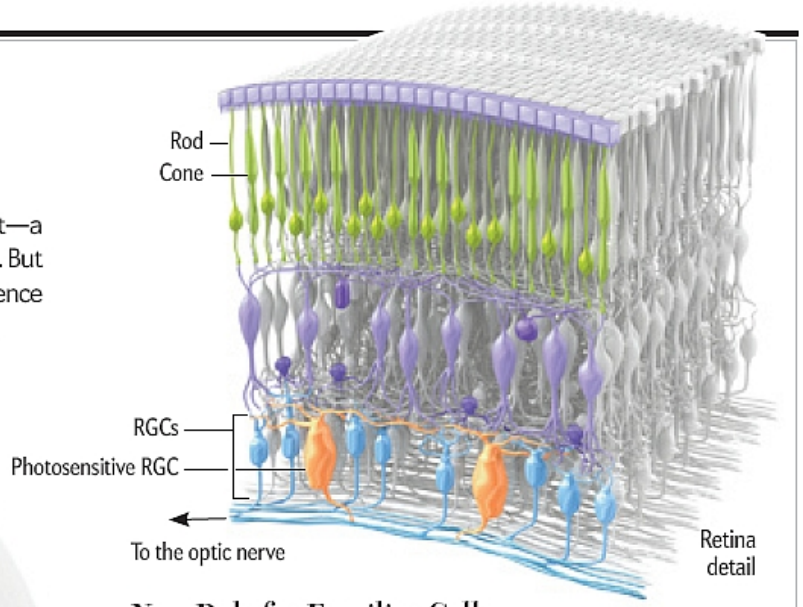
● **FIGURE 9.2** Core body temperature is a good indicator of a person's circadian rhythm. Most people reach a low point 2 to3 hours before their normal waking time. It's no wonder that both the Chernobyl and Three Mile Island nuclear power plant accidents occurred around 4 A.M. Rapid travel to a different time zone, shift work, depression, and illness can throw sleep and waking patterns out of synchronization with the body's core rhythm. Mismatches of this kind are very disruptive (Hauri & Linde, 1990).


Cerebral cortex
Pineal gland
Suprachiasmatic nucleus
Optic chiasm
Hypothalamus

How the Body Knows Day from Night

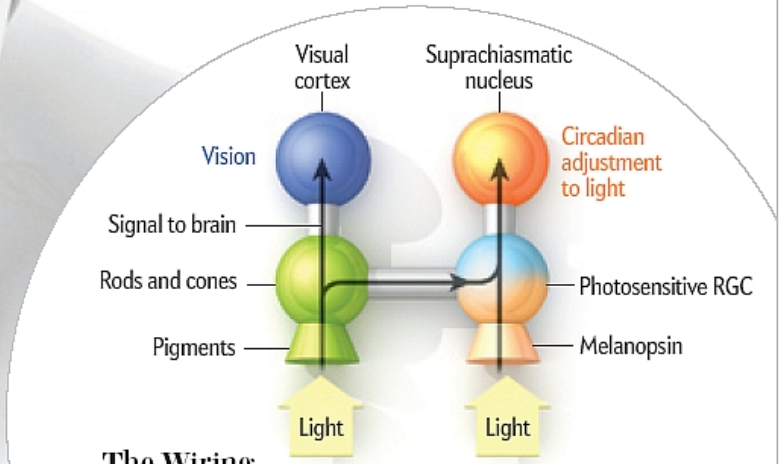
Our biological rhythms naturally adjust to the cycles of day and night—a spontaneous response that can persist even in some blind individuals. But until recently, no one knew which part of the body signaled the difference between day and night to the brain. Scientists now have the answer.





New Role for Familiar Cells

Vision occurs when the rods and cones of the retina detect light and send signals to the visual cortex at the back of the brain. The rods and cones convey the signals to the brain via neurons called retinal ganglion cells (RGCs), which extend their axons down the optic nerve (*blue at left* and *above*). Experiments have shown that a subset of those ganglion cells, known as photosensitive RGCs (*orange above*), produce a previously unknown pigment called melanopsin that enables them to sense light directly. Photosensitive RGCs send information to the brain's main biological clock, the suprachiasmatic nucleus (*left*), among other places (*not shown*). It is as if our eyes were two organs: one for seeing and the other for nonvisual responses to light.

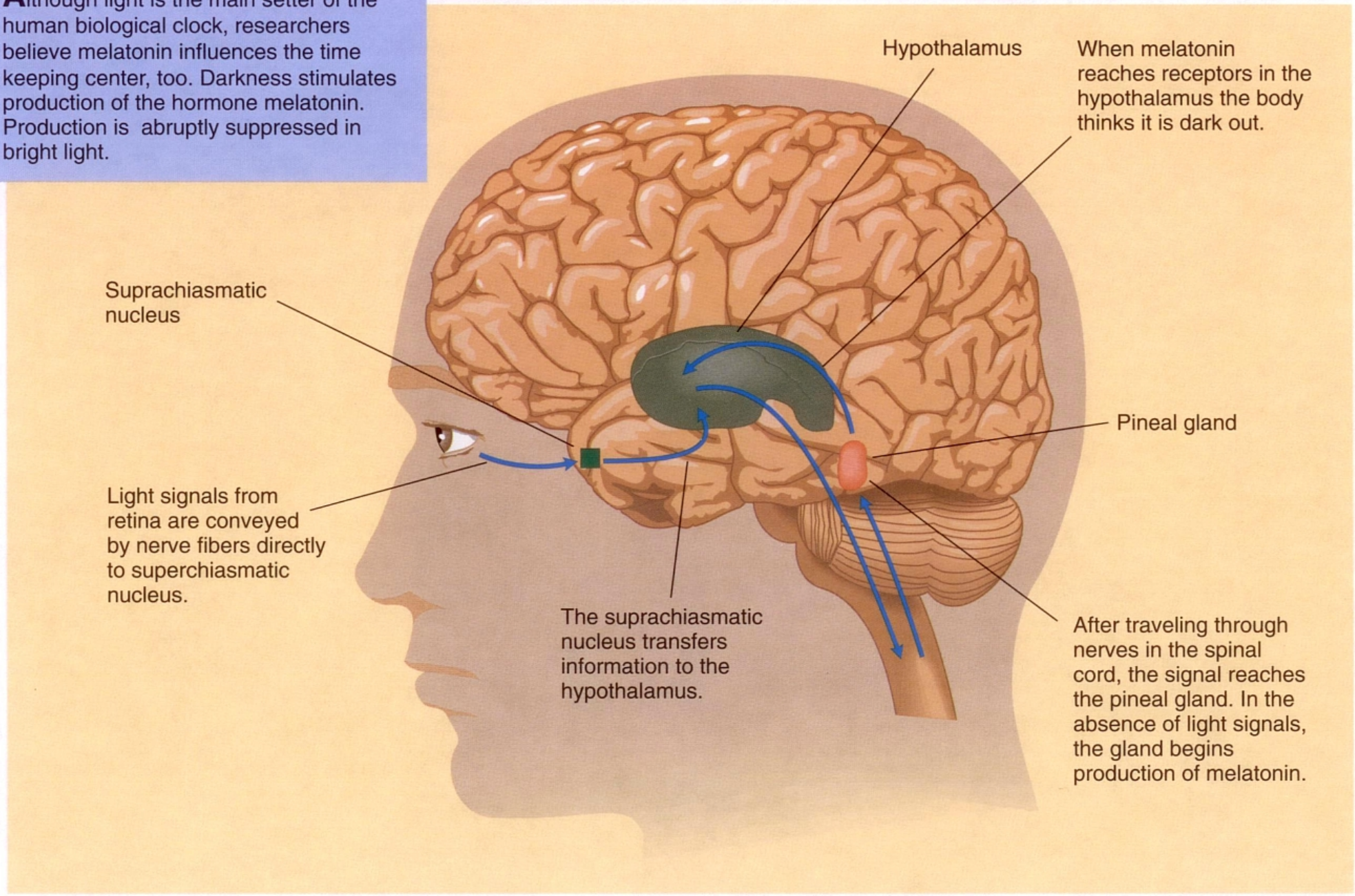


The Wiring

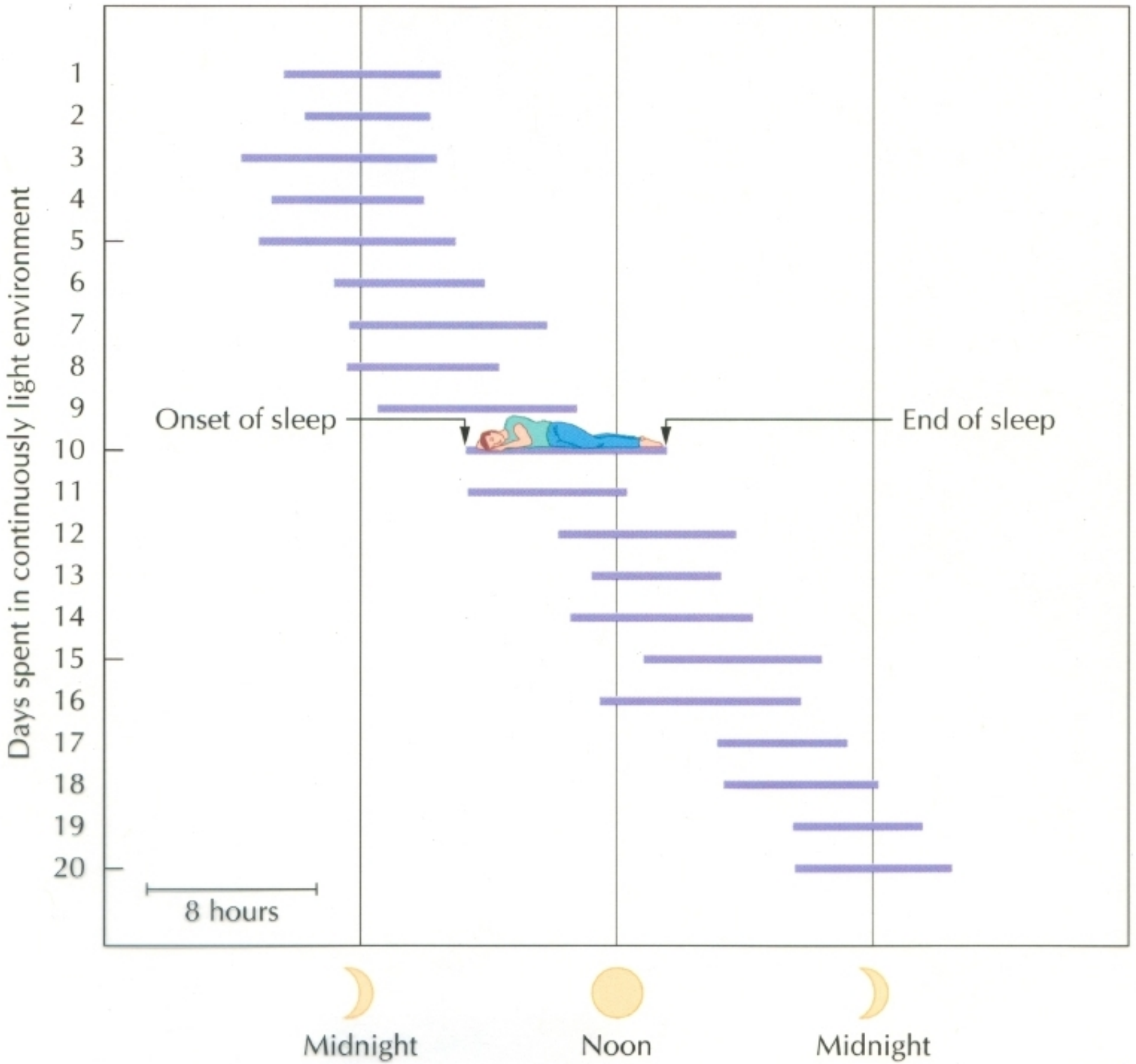
Normally the pigment-containing ganglion cells do not take sole responsibility for collecting light information for the suprachiasmatic nucleus. They also relay information from the rods and cones to that brain area.

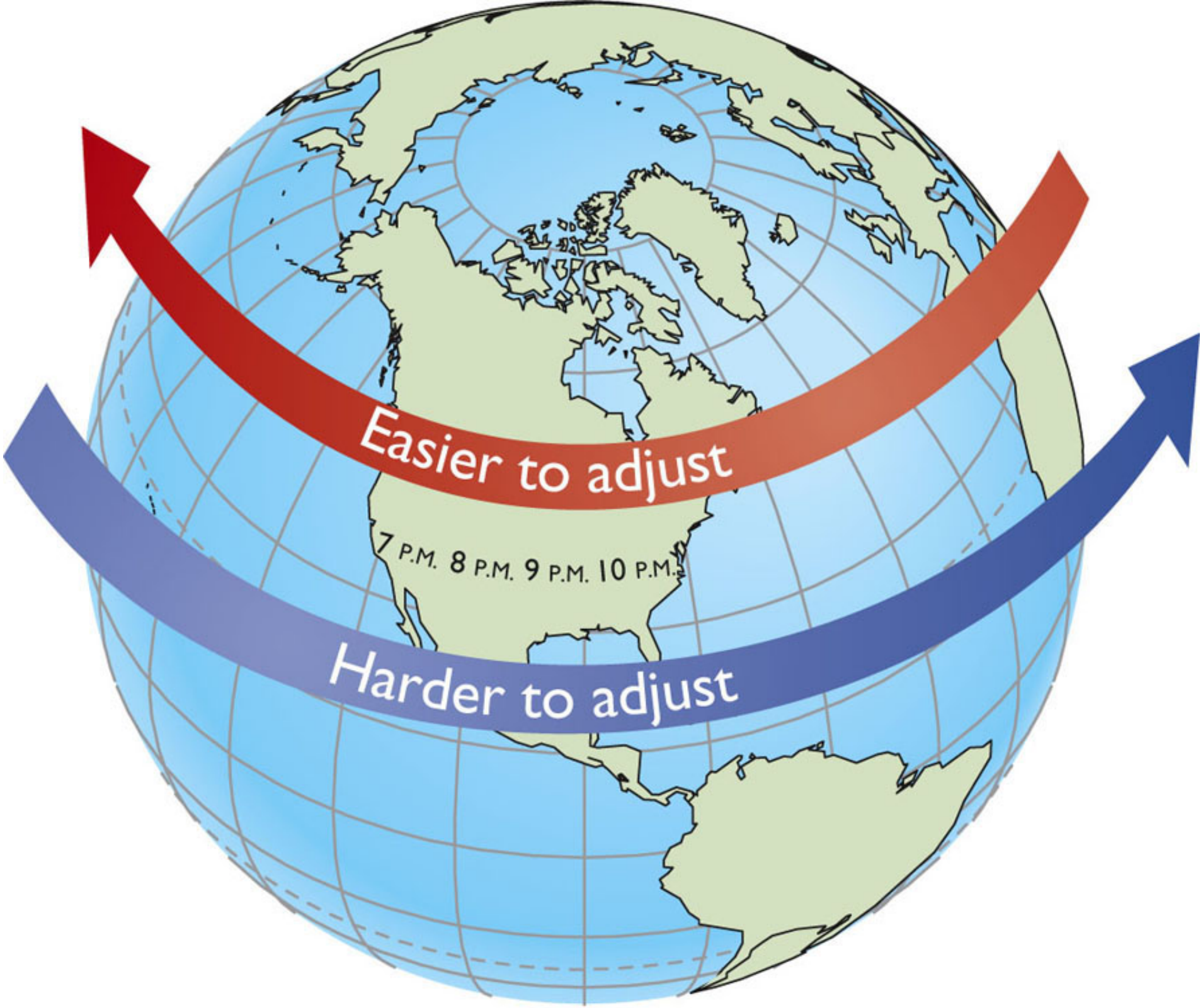
Understanding the hormone of darkness

Although light is the main setter of the human biological clock, researchers believe melatonin influences the time keeping center, too. Darkness stimulates production of the hormone melatonin. Production is abruptly suppressed in bright light.

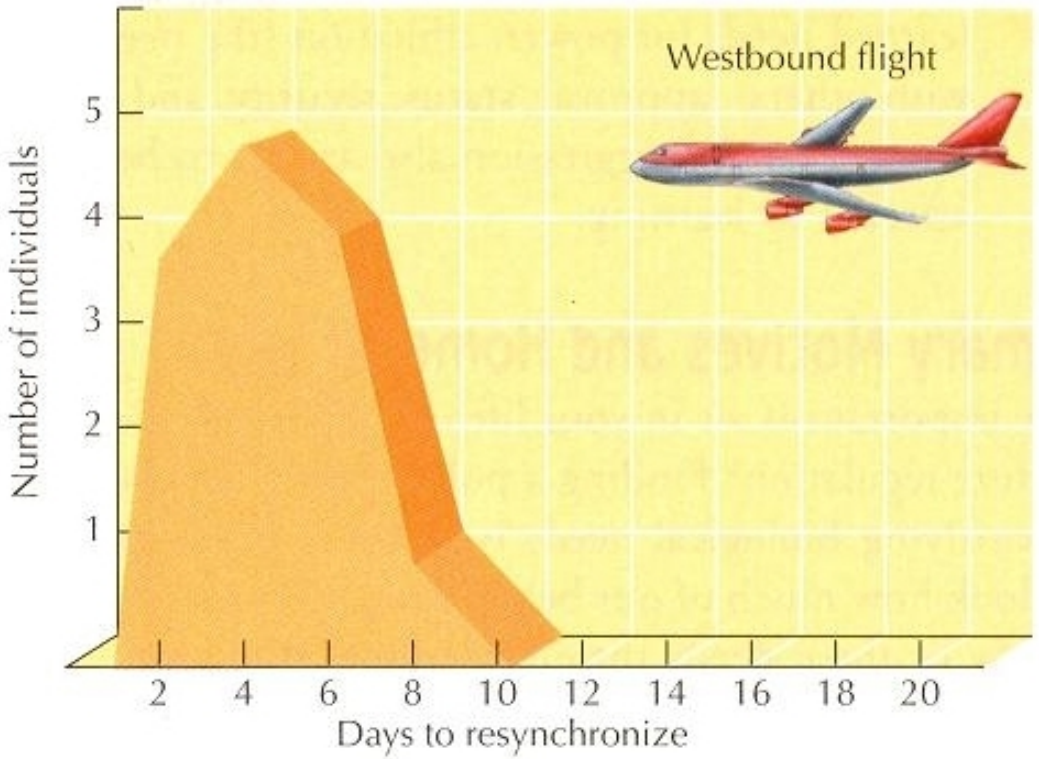


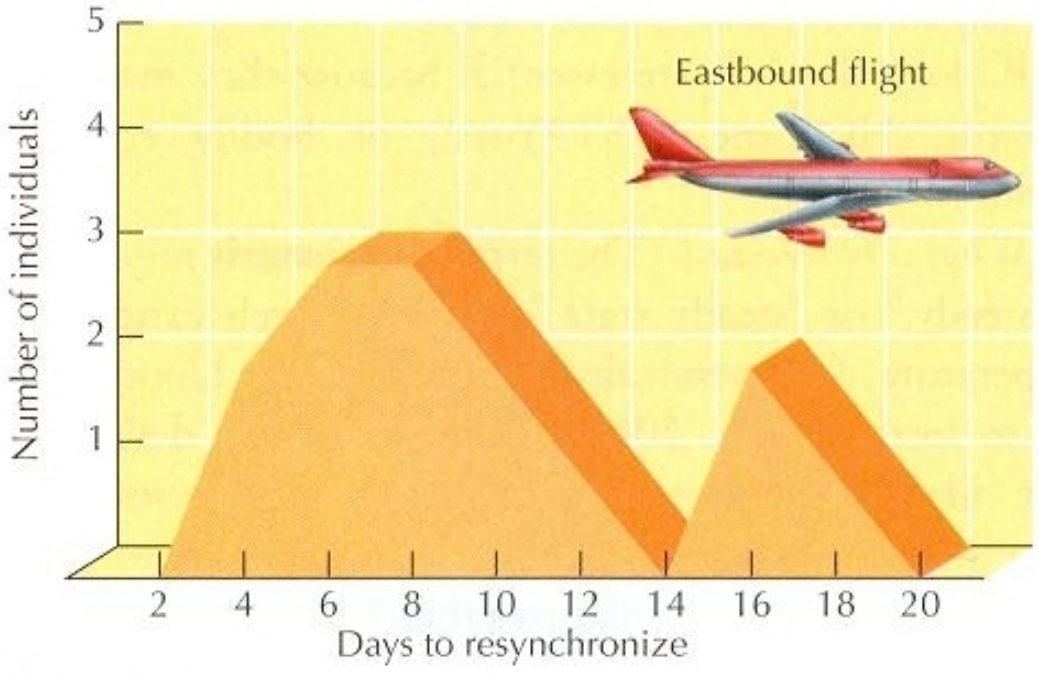
Circadian Rhythm Drift





Circadian Rhythm and Jet Lag





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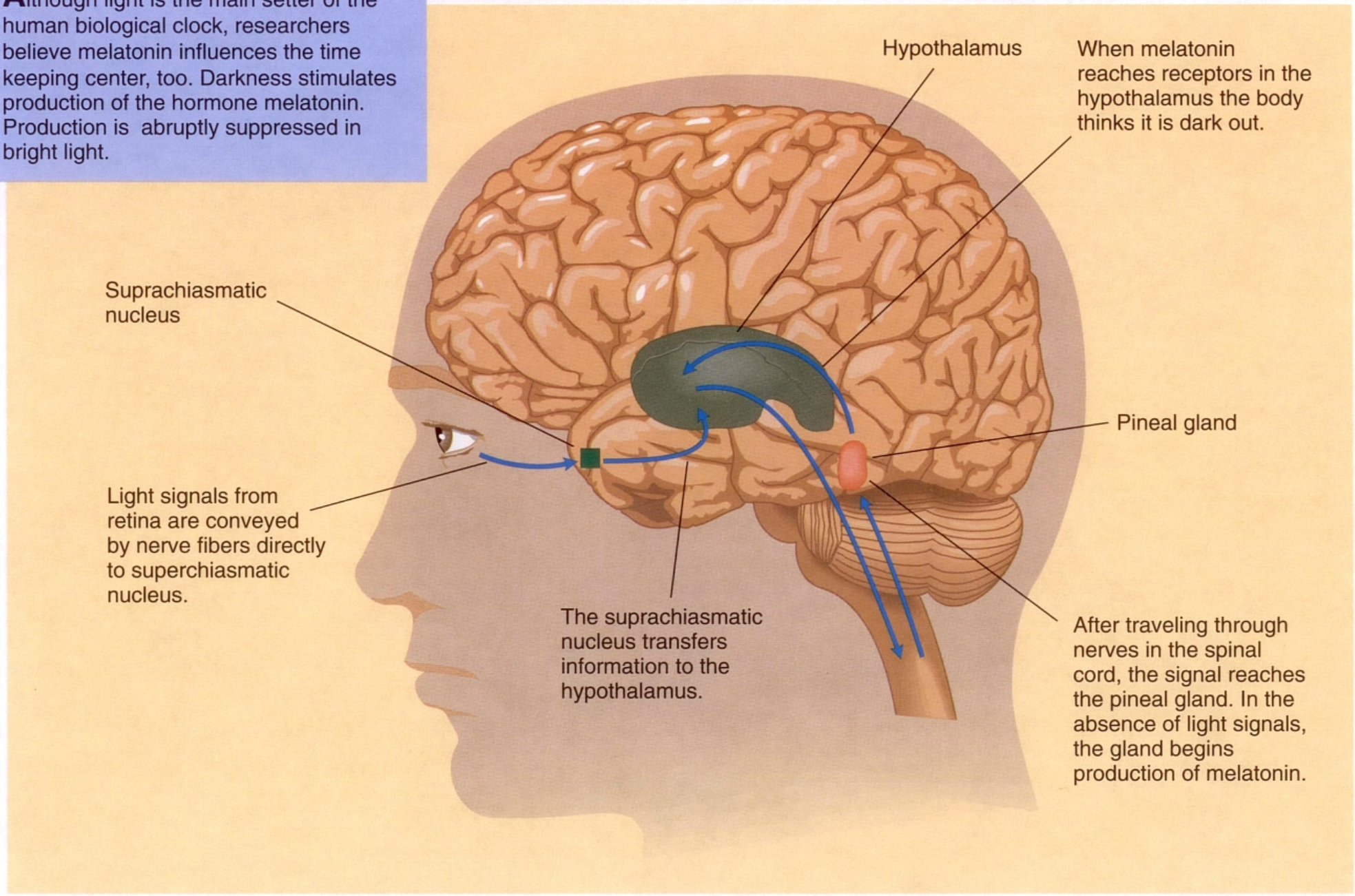

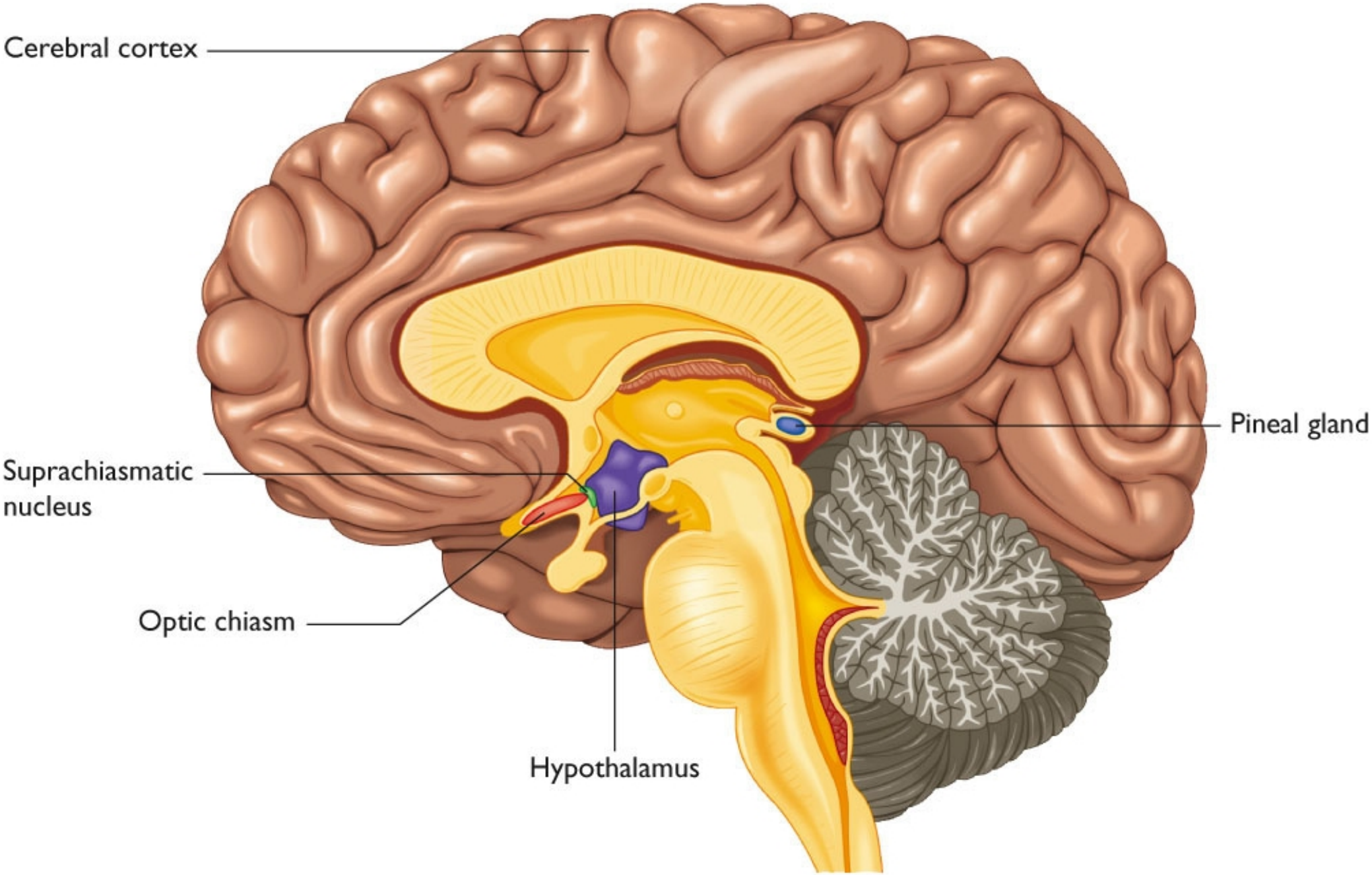
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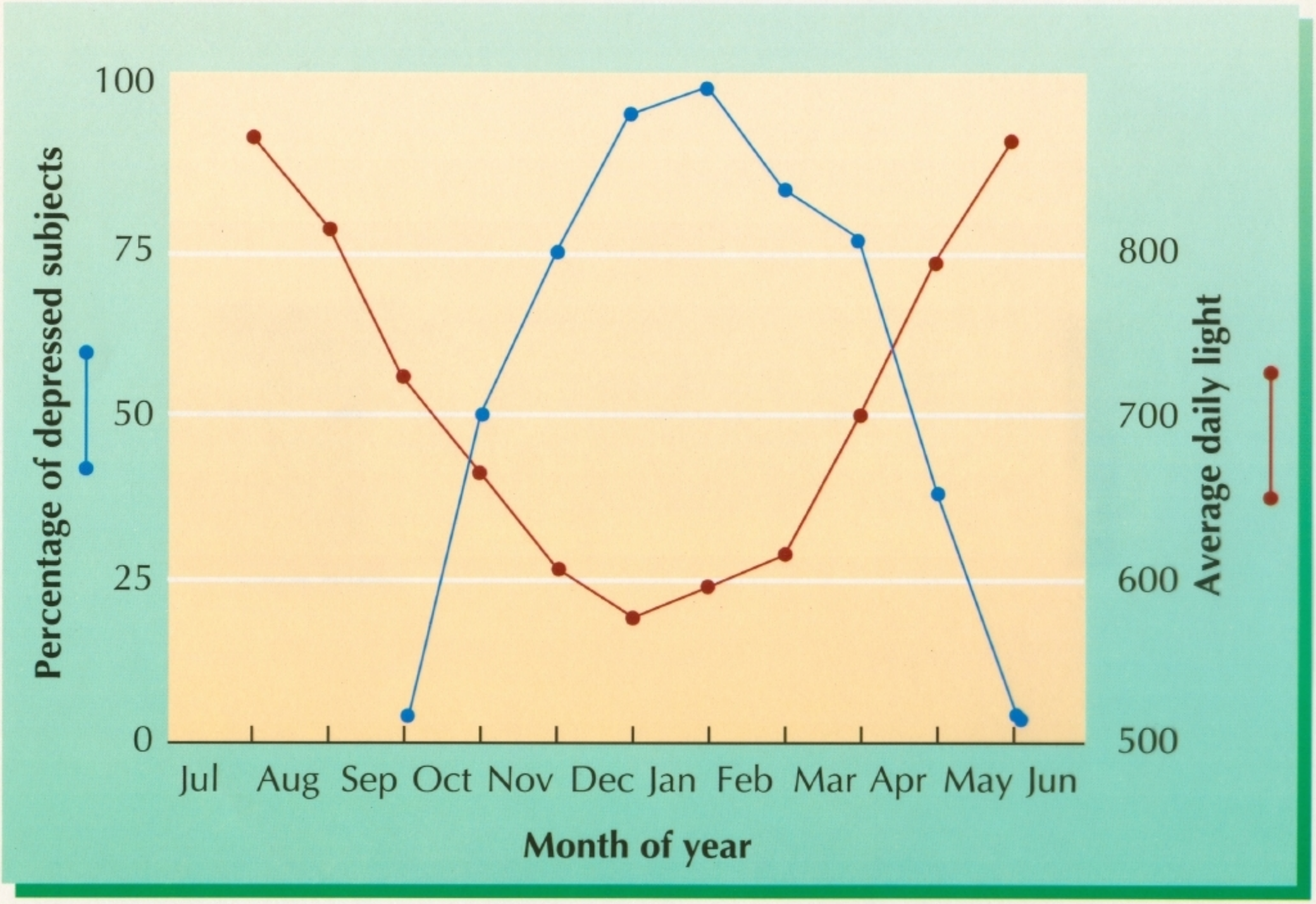
Depression and Daylight Relationship



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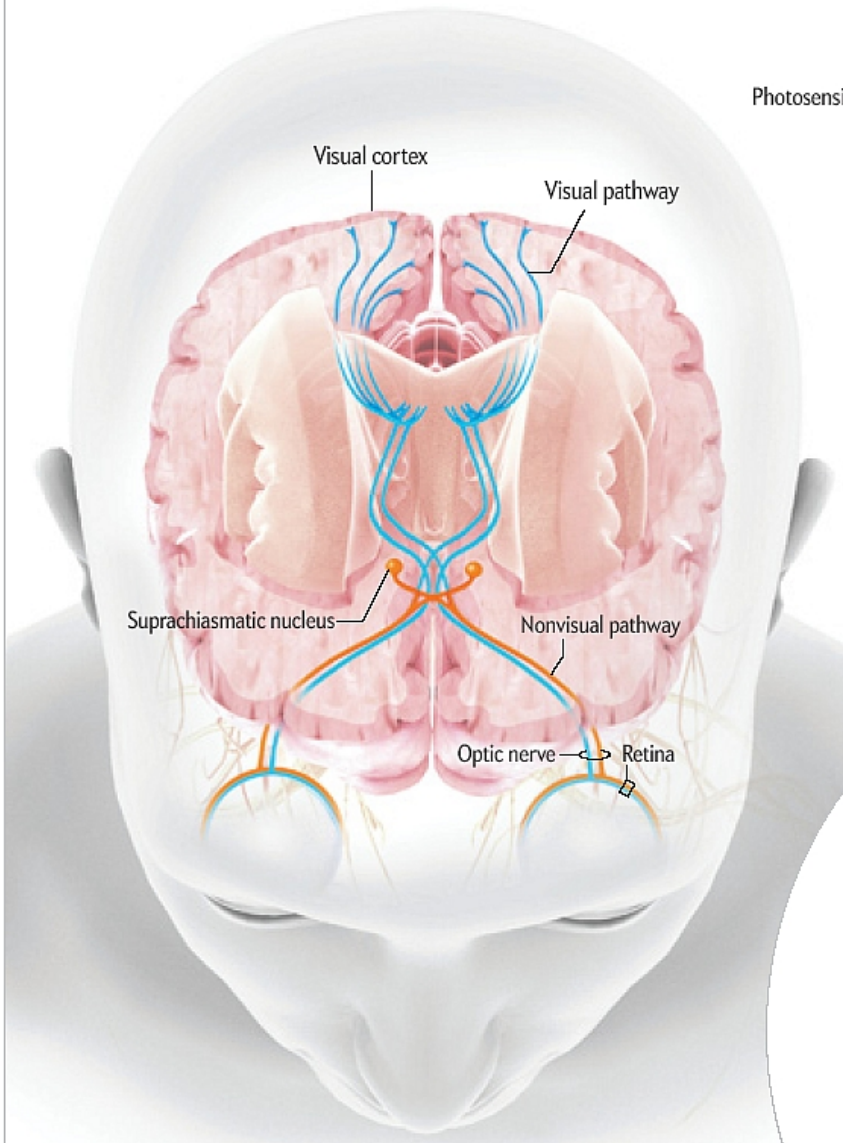

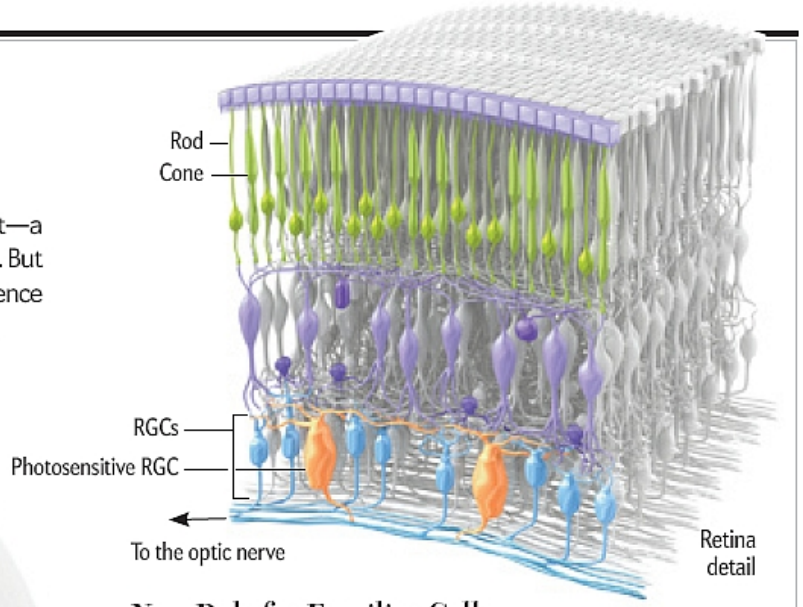

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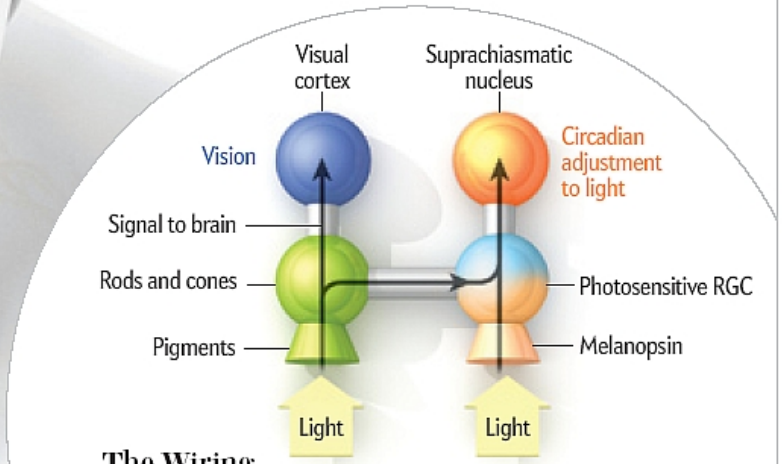

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