Coline Weinzaepflen

Enlighten your clock

How your body tells time



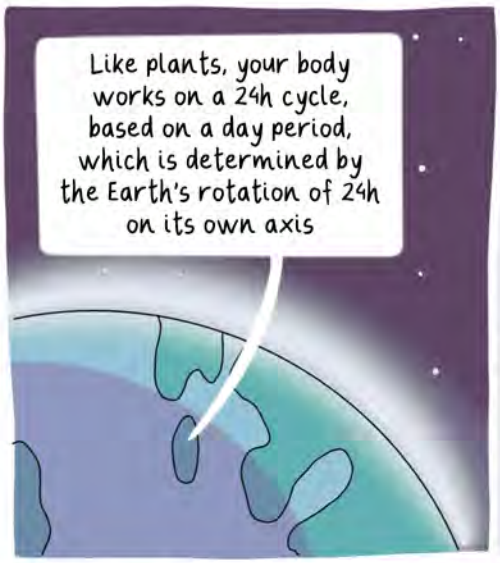
Edited by Manuel Spitschan PhD

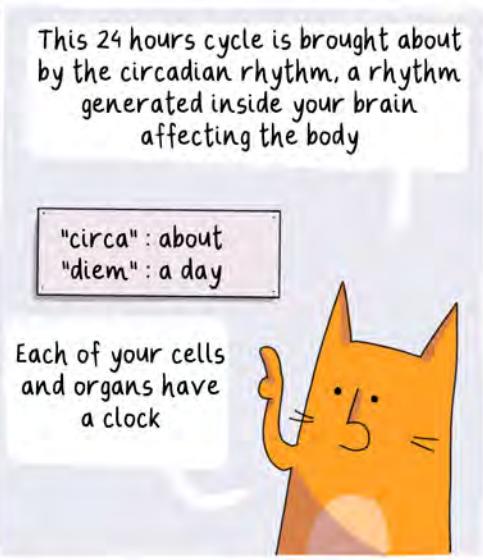
SCRAMS

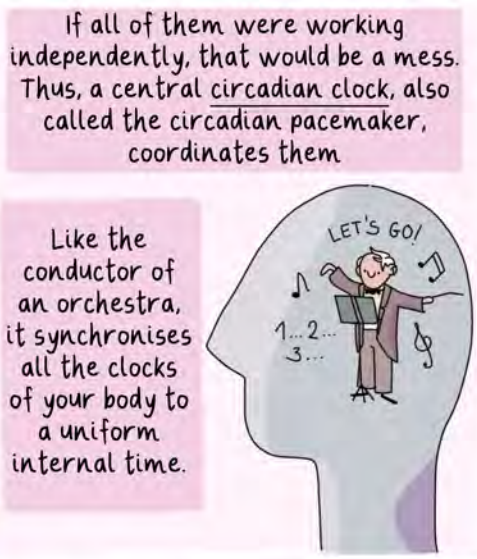
Good morning

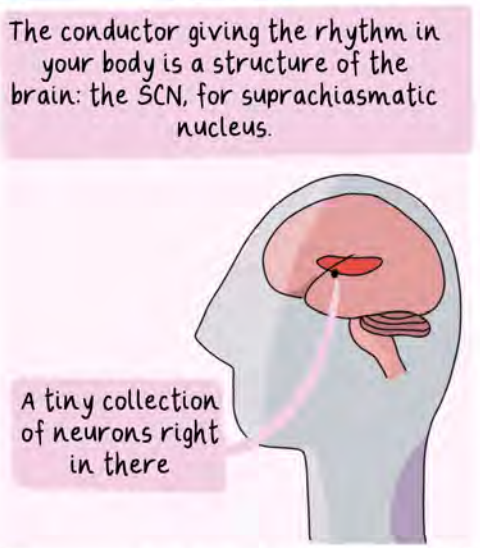


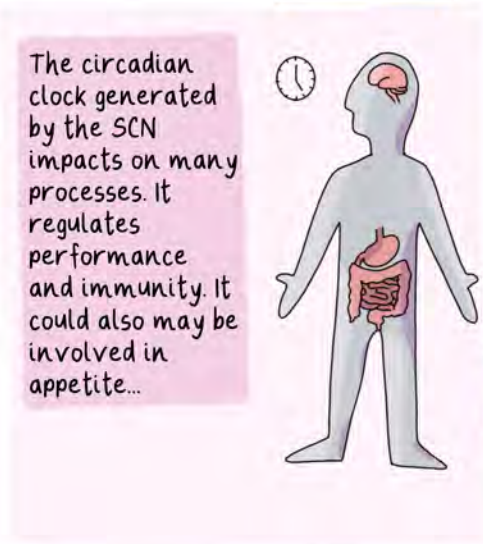
Your circadian clock











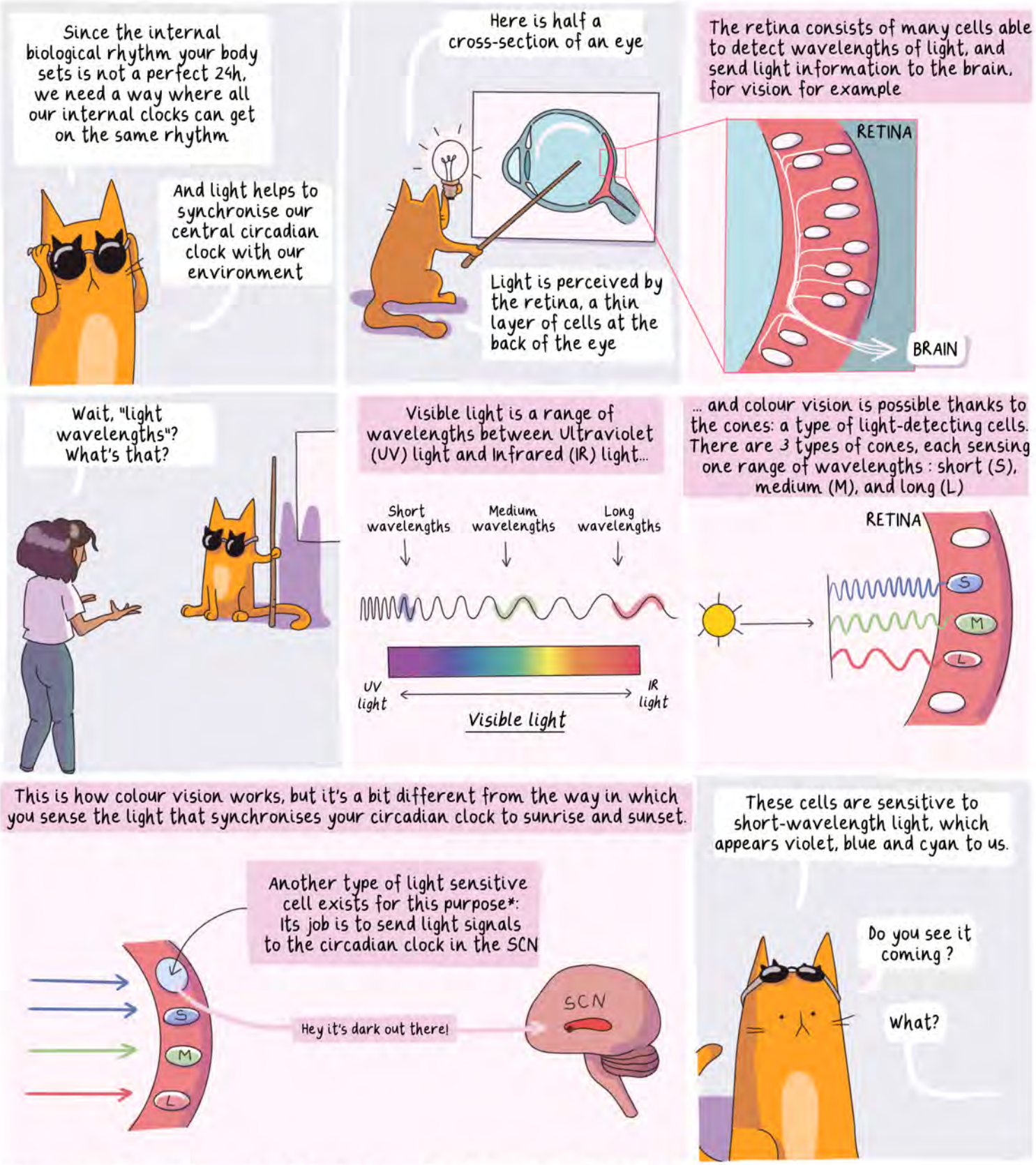








Sensing and perceiving light



* Neuroscientists call them the ipRGCs : intrinsically photosensitive retinal ganglion cells

Rhythms in the evening

The cells responsible for circadian rhythms are sensitive to blue light

If you activate these cells with artificial light during night time, your circadian clock will be stimulated like it's day time.

That's why you should avoid bright light emitted from smartphones and computers, which activates your light-sensitive cells and makes you keep going.

Wow ok I was sleeping. What are u doing?

What time is it?

This wrong-timing- stimulation can lead to disruption of the circadian rhythm and hence to sleep problems, such as insomnia.



That's why turning your screens to a night mode (less blue light) or just reducing the brightness can avoid stimulating your circadian clock at the wrong time.

Ok I see. So in order not to shift our rhythms, we shouldn't send a daytime signal with bright light to our circadian system during the night

That's it. Of course other factors can make it more difficult for you to fall asleep

For instance, the arousal driven by exciting content you see on instagram can also delay your falling asleep.

Does this only happen with the light from a smartphone?

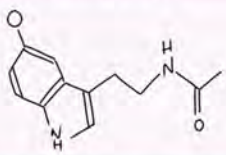
What?

The circadian clock shifting and holding up my sleep

No, bright evening lighting can do so as well

How?

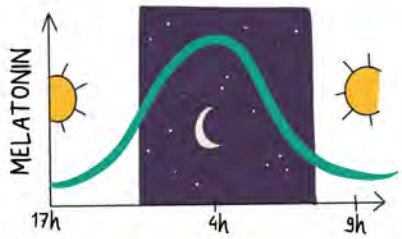
When night comes, the brain — under the influence of the SCN and its clock — secretes a substance called MELATONIN. The hormone of darkness.



This molecule signals to the body that it's nighttime, leading to changes in your body (e.g., a decrease in body temperature)

Melatonin secretion and its suppression by light

In normal conditions, melatonin is synthesised during the night...



...but it is not produced throughout the day

In diurnal animals, melatonin is a signal for sleep.



In nocturnal animals, melatonin is still secreted during the night but it is a signal for activity



→ melatonin has different effects depending on the species

But the light environment has been subject to many changes for humans since the arrival of artificial light during the 19th century





With artificial light and our indoor lifestyle, light doesn't stop with the sunset

Bright light can reduce night time secretion of melatonin depending on the light environment and the kind of light bulb used (LED, incandescent, fluorescent)



In 2014, the Physics Nobel Prize was awarded for the invention of blue LEDs, which paved the way to making white-light with energy-saving LED light sources

So light in the environment contains blue light

Blue light stimulates circadian cells in the retina

Circadian cells acts on the SCN and suppress melatonin secretion (just like in daylight)

This can lead to circadian disruption and sleep disturbances



All my light comes from LED lights ...

Don't panic, you can just dim your lights in the evening

Plus, all humans aren't equally sensitive to melatonin suppression by indoor lights

But for people having sleep problems, getting less bright light at night can be helpful for better sleep!

*Light-emitting diodes