On a usual Saturday, you wouldn't find me here.

And I mean, of course, I don’t give TEDx Talks every Saturday.

But what I mean is, you probably wouldn't find me in a museum.

Rather, if you were looking for me,

you'd probably have to go to the mountains,

and that is because I absolutely love hiking.

And in addition to just being outside and being in nature,

what I really like is this feeling of physical exhaustion,

sort of this satisfaction you can feel in every single muscle.

And in the evening, when it's time to go to bed,

I absolutely cherish this amazing sleepiness

that fills you from head to toe.

Now you might say, "Well, of course she's tired. She's been hiking all day.

Plus, not to forget about the effects of supposedly fresh air."

But there is one factor that most likely outweighs

the effects of fresh air and perhaps even physical activity,

and that is exposure to natural daylight.

And today, I hope to convince you that we should all appreciate daylight

as sort of a natural soporific.

And hopefully, by the end of the talk,

you will also recognize that we should all pay more attention

to our daily light diet.

But let's start with the question why daylight is so important

for our organism, for health and, eventually, for sleep.

Now throughout your body, in each and every single cell,

there is a tiny molecular clock ticking inside it.

And to keep these millions of clocks in sync,

we have one central body clock that is located in the brain,

in an area which we call the hypothalamus.

And like the conductor of an orchestra,

it communicates the time of day to each of these molecular clocks.

And this way, it is able to regulate bodily processes

in sync with the time of day.

For example,

it causes your body temperature to increase in the morning

and to decrease in the evening.

It choreographs the release of certain hormones at appropriate times.

And in the evening, when it’s time to go to bed,

it will also make you tired and sleepy.

But given this precise synchronization between internal or biological time

and external time or environmental time,

it seems clear that the body clock

cannot be blind or isolated or shut off from the environment,

but rather, it needs to receive information about the time of day

from the environment

for it to synchronize with sun time.

And this is achieved by close connections

between the internal biological clock in the brain and our eyes.

And now you may know that in the human retina,

there are different types of receptors,

so photoreceptors, so receptors that sense light.

And classically, we distinguish two types, the rods and the cones.

Now the rods only contribute to a visual impression

under very dim lighting conditions.

And here, in the background, you now see a picture

that might, more or less, be brought about by only the involvement of the rods.

And what you can see is that it's only shades of gray,

it's slightly blurred,

and around the point of fixation, which is indicated by the gray dot here,

you have a little scotoma,

so an area where you can't really see anything.

Now who recognizes what that is?

Yeah, excellent.

But it's going to be way easier,

and the majority of you will recognize what it is,

when I now switch to the next slide,

which is brought about by the involvement of the cones.

Of course, it's the town hall of Basel, but now you can appreciate the colors,

fine details.

And if this was animated, you'd even see fine details in motion.

But this is not the whole story, because only fairly recently,

only in the early 2000s, another type of cell has been discovered,

and we call them retinal ganglion cells.

Now, you might ask yourselves, "What picture is she going to show next?"

But I'll have to disappoint you ...

I’m not, and I actually can’t, show another picture.

Because from all we know,

these cells do not contribute to a visual impression.

But they are exclusively designed

to sense short wavelength proportions in daylight.

Sometimes, we also call this blue light.

So they're designed to extract important information about the time of day

from the environment

and pass this on to the internal biological clock

in the brain.

And I guess you've all experienced how well this biological timing system,

this connection between our biological clock and the external world, or our eyes,

works when we, for example, travel across time zones.

Now how much light do we actually need?

How much light is enough for the positive effects on, for instance,

sleep to occur?

And I have to admit, this is not so easy to answer.

But I think what we have to keep in keep in mind

is that the biological timing system has evolved under the open sky

and not in offices or museums.

So it is also optimally tuned to the conditions we find outside.

Office light or light in rooms

is in no way comparable to what we find outside.

And therefore, from a scientific perspective,

I can only recommend you to spend as much time as you can

under the open sky,

but try to make it at least 30 minutes per day.

Now let's finally talk about sleep.

And I've repeatedly alluded to the fact that daylight is beneficial

and important for sleep.

And in this context, I'd like to share a little story.

So last year, I had to go to hospital for surgery.

And generally, the hospital environment is a very challenging one for sleep.

Because you spend way too much time in bed, not moving much.

You might be in pain.

Now and then, someone comes in to check on you, even during the night.

And if you're as lucky as I was, you have a snoring roommate.

(Laughter)

And because you, of course, don't get a lot of daylight.

And that's why many people, while they're in hospital,

ask for sleep medication.

But as I consider myself to be a generally good sleeper,

and also because I know how these drugs work,

I didn’t want this.

But I knew there was something I could do to help my body sleep as well as possible,

even in this situation.

And that was to maximize exposure to daylight.

Because as a sleep scientist,

of course, I know about the research findings.

I know that the more daylight that you get,

the more tired you will be in the evening,

the easier it will be for you to fall asleep

and the better the experienced sleep quality.

And in addition,

daylight exposure has also been shown to increase proportions of deep sleep,

which again has been linked to processes of tissue repair,

something not to be underestimated after surgery.

And beyond the effects on sleep,

we know that patients in brighter rooms experience less pain and less stress.

And also the effects of daylight on mood are well established.

So I thought it might be time for me to put into practice what I often preach.

And I have to confess that usually

I'm much better at giving advice than following it myself.

But here's what I did.

So first, when it became free,

I asked the nurses to move my bed to the window place,

because that does not only give you power of the fresh air supply,

which is highly recommended in the hospital,

but it also maximizes daylight exposure even though you're inside.

Second, as soon as I could leave my bed again,

I went to the park for short walks.

And last, every meal I had, I tried to take on the little balcony.

Did it work?

Well, it's a bit difficult to say,

because it of course was a single-case study.

But from patients suffering from insomnia,

so one of the most common sleep disorders,

we know that light therapy is beneficial.

And therefore, I would like to encourage all of you,

and perhaps especially those who might belong

to the 25 percent suffering from sleep problems,

to start your own single-case study.

Thank you.

(Applause)

Footnotes