

Beauty sleep could be real, say body clock biologists

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Biologists from The University of Manchester have explained for the first time why having a good night's sleep really could prepare us for the

rigors of the day ahead.

The study in mice, published in *Nature Cell Biology*, shows how the [body clock](#) mechanism boosts our ability to maintain our bodies when we are most active.

And because we know the body clock is less precise as we age, the discovery, argues lead author Professor Karl Kadler, may one day help unlock some of the mysteries of aging.

The discovery throws fascinating light on the body's extracellular [matrix](#)—which provides structural and biochemical support to cells in the form of connective tissue such as bone, skin, tendon and cartilage.

Over half our [body weight](#) is matrix, and half of this is collagen—and scientists have long understood it is fully formed by the time we reach the age of 17.

But now the researchers have discovered there are two types of fibrils—the rope-like structures of collagen that are woven by the cells to form tissues.

Thicker fibrils measuring about 200 nanometers in diameter—a million million times smaller than a pinhead—are permanent and stay with us throughout our lives, unchanged from the age of 17.

But thinner fibrils measuring 50 nanometers, they find, are sacrificial, breaking as we subject the body to the rigors of the day but replenishing when we rest at night.

The collagen was observed by [mass spectrometry](#) and the mouse fibrils were observed using state of the art volumetric electron microscopy—funded by the Wellcome Trust—every four hours over two

days.

When the body clock genes were knocked out in mice, the thin and thick fibrils were amalgamated randomly.

"Collagen provides the body with structure and is our most abundant protein, ensuring the integrity, elasticity and strength of the body's connective tissue," said Professor Kadler

"It's intuitive to think our matrix should be worn down by wear and tear, but it isn't and now we know why: our body clock makes an element which is sacrificial and can be replenished, protecting the permanent parts of the matrix.

He added: "So if you imagine the bricks in the walls of a room as the permanent part, the paint on the walls could be seen as the sacrificial part which needs to be replenished every so often.

"And just like you need to oil a car and keep its radiator topped up with water, these thin fibrils help maintain the [body's](#) matrix."

"Knowing this could have implications on understanding our biology at its most fundamental level. It might, for example, give us some deeper insight into how wounds heal, or how we age.

More information: Joan Chang et al. Circadian control of the secretory pathway maintains collagen homeostasis, *Nature Cell Biology* (2020). [DOI: 10.1038/s41556-019-0441-z](https://doi.org/10.1038/s41556-019-0441-z)

Provided by University of Manchester

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