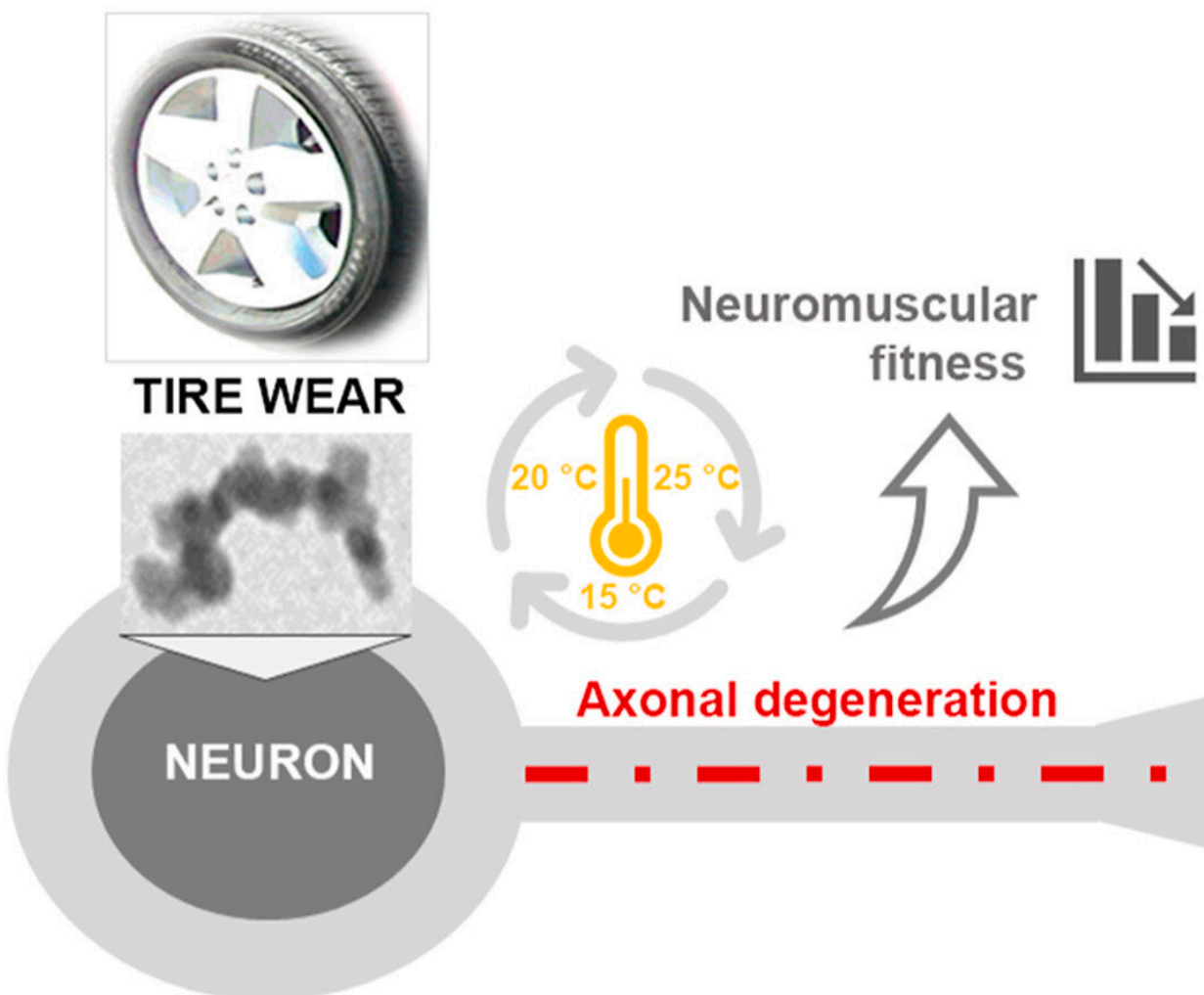


# Tire wear and higher temperatures found to accelerate neurodegeneration in *C. elegans* models

June 1 2023, by Christiane Klasen



Graphical abstract. Credit: *Environmental Pollution* (2023). DOI: 10.1016/j.envpol.2023.121660

Scientists at the IUF—Leibniz Research Institute for Environmental Medicine in Düsseldorf, Germany, have shown that tire wear, age and temperature accelerate neurodegeneration (i.e. the decline of nerve cells) in models of the nematode *C. elegans* for Alzheimer's and Parkinson's disease. The corresponding study was published in the journal *Environmental Pollution*.

In addition to [genetic factors](#) and age, air pollution is also one of the [risk factors](#) for diseases such as Alzheimer's or Parkinson's disease. The first thing that comes into mind with regard to air pollution is usually car exhaust, but tire wear is also a part of it.

Based on this knowledge, Professor Anna von Mikecz's research group studied the influence of tire wear and age on models of the nematode *C. elegans* for Alzheimer's and Parkinson's disease. As an additional factor, also considering global warming, the experiments were carried out at different ambient temperatures.

The study used [silicon dioxide](#) (nano-silica; SiO<sub>2</sub>) as an example for a tire component. The working group has already looked at these [small particles](#) in another context: They are used as a [food additive](#) to prevent clumping and showed negative effects when ingested by the nematode. In the current study, published in the journal *Environmental Pollution*, there were also negative effects when the nematode took up the silica from the environment.

The degradation of nerve cells was observed. The Alzheimer's model of the nematode was particularly susceptible, in which reduced nerve function was measured. The Parkinson's model showed the degradation of nerve cells that produce dopamine. The conclusion was that all three factors, tire wear, age and 25 degrees Celsius accelerated the degradation

of nerve cells in models of the nematode for Alzheimer's and Parkinson's disease.

"This is the first time that we have studied the effect of temperature on the degeneration of neurons, and the results are really exciting," reports Professor Anna von Mikecz. "The studies in *C. elegans* Alzheimer's and Parkinson's models show that cold ambient temperature prolongs their health span. This is also consistent with observations from a research team in Cologne, Germany, that were published recently." In a next step, the Mikecz's group plans to study other tire components as well as urban air samples.

**More information:** Annette Limke et al, Tire components, age and temperature accelerate neurodegeneration in *C. elegans* models of Alzheimer's and Parkinson's disease, *Environmental Pollution* (2023). DOI: [10.1016/j.envpol.2023.121660](https://doi.org/10.1016/j.envpol.2023.121660)

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