

Electrical activity in living organisms mirrors electrical fields in atmosphere

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Most electrical activity in vertebrates and invertebrates occurs at extremely low frequencies, and the origin—and medical potential—of these frequencies have eluded scientists. Now a Tel Aviv University

study provides evidence for a direct link between electrical fields in the atmosphere and those found in living organisms, including humans.

The study's findings may change established notions about [electrical activity](#) in [living organisms](#), paving the way for revolutionary, new medical treatments. Illnesses such as epilepsy and Parkinson's are related to abnormalities in the electrical activity of the body.

"We show that the electrical activity in many living [organisms](#)—from zooplankton in the oceans, to sharks and even in our brains—is very similar to the [electrical fields](#) we measure and study in the atmosphere from global lightning activity," explains Prof. Colin Price of TAU's Porter School of the Environment and Earth Sciences, who led the research for the study, published in the *International Journal of Biometeorology* on February 8.

Colleagues from the Massachusetts Institute of Technology and the University of Alaska also contributed to the study.

"We hypothesize that over evolutionary timescales living organisms adapted and evolved to actually use the electricity in the environment—global lightning," Prof. Price continues. "This has likely not changed over billions of years and is similar to the evolution of our eyes, which evolved using the sunlight nature gave us."

As living organisms evolved over billions of years, the natural electromagnetic resonant frequencies in the atmosphere, continuously generated by global lightning activity, provided the background electric fields for the development of cellular electrical activity. Prof. Price's research found that, in some animals, the electrical spectrum is difficult to differentiate from the background atmospheric electric field produced by lightning.

"Neither biologists nor doctors can explain why the frequencies in living organisms (0-50 Hz) are similar to those in the atmosphere caused by lightning," adds Prof. Price. "Most of them are not even aware of the similarity we presented in our paper."

"Our review of previous studies revealed that lightning-related fields may have positive medical applications related to our biological clock ([circadian rhythms](#)), [spinal cord injuries](#) and maybe other bodily functions related to electrical activity in our bodies," says Prof. Price. "The connection between the ever-present electromagnetic fields, between lightning in the atmosphere and human health, may have huge implications in the future for various treatments related to electrical abnormalities in our bodies."

The study comprised a retrospective review of previous studies on the link between lightning-related fields in the atmosphere and human and animal health. "We collected many different studies over the years to build a clear picture of this link," concludes Prof. Price. "Going forward, we need to design new experiments to see how these extremely low frequency fields from lightning may impact living organisms, and to investigate how these fields can be used to benefit us. One new experiment we are now planning is to see how these fields may impact the rate of photosynthesis in plants."

More information: Colin Price et al, Natural ELF fields in the atmosphere and in living organisms, *International Journal of Biometeorology* (2020). [DOI: 10.1007/s00484-020-01864-6](https://doi.org/10.1007/s00484-020-01864-6)

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