

# Study connects enjoyment of nature to lower inflammation levels

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Plenty of studies link exposure to the natural world and improved mental and physical health, but a new Cornell study connects enjoyment of nature to a specific biological process—inflammation.

Led by Anthony Ong, professor in the Department of Psychology and director of the Center for Integrative Developmental Science (CIDS) in

the College of Human Ecology, the study showed that more frequent positive contact with nature was independently associated with lower circulating levels of three different indicators of inflammation.

"By focusing on these inflammation markers, the study provides a biological explanation for why nature might improve health," Ong said, "particularly showing how it might prevent or manage diseases linked to [chronic inflammation](#), like heart disease and diabetes."

Postdoctoral researcher Dakota Cintron and Gabriel Fuligni are co-authors of "Engagement With Nature and Proinflammatory Biology," which [published](#) March 29 in *Brain, Behavior, and Immunity*.

Ong said pursuing this line of research was as much out of curiosity as anything else.

"Part of it has been inspired by place, being here in Ithaca and being surrounded by nature," he said. "I grew up in Los Angeles—people live in their cars and in traffic. So for me, the study was really trying to answer the question, 'What are the health benefits of nature?'"

Cintron is a current member of CIDS; Fuligni joined the group as an undergraduate after writing a paper on the topic while in one of Ong's classes.

The team used for their study the [second wave](#) of the Midlife in the U.S. (MIDUS) survey, a longitudinal study of health and aging in the United States. The first wave of the survey was conducted in 1994-95, the second 10 years later.

Ong's analyses focused on a subset of individuals—1,244 participants, 57% women, with a mean age of 54.5—who participated in a biomarker sub-study during the second wave, during which they were assessed for

physical health and provided comprehensive biological assessments via a [physical exam](#), [urine sample](#) and fasting morning blood draw.

The participants were asked how often they experienced being out in nature, as well as how much enjoyment they got from it.

"It's not just about how often people spend time outdoors, but also the quality of their experiences," said Ong, admitting that he himself is sometimes guilty of not being fully present in nature. He recalled a recent warm day when he was strolling around Beebe Lake while scrolling on his phone, which detracted from the pleasantness of the experience.

"I realized I was physically in a beautiful natural setting, but mentally I was elsewhere," Ong said. "It was a reminder to myself to be more mindful and engaged when I'm in nature, to really soak in the benefits."

Concentrations of three biomarkers for inflammation—interleukin-6 (IL-6), a cytokine closely involved in the regulation of systemic inflammatory processes; C-reactive protein, which is synthesized in response to stimulation by IL-6 and other cytokines; and fibrinogen, a soluble protein present in [blood plasma](#)—were measured, and structural equation modeling was conducted to detect the association between nature engagement and the three biomarkers.

Even when controlling for other variables such as demographics, health behaviors, medication and general well-being, Ong said his team found that reduced levels of inflammation were consistently associated with more frequent positive contact with nature.

"We tried to get rid of this finding by controlling for a host of factors, but we couldn't get rid of it," he said. "So it's a pretty robust finding. And it's this sort of nexus of exposure and experience: It's only when you

have both, when you are engaging and taking the enjoyment out of it, that you see these benefits."

Mindfulness while enjoying the natural world is the key, Ong said.

"It's good to remind ourselves that it's not just the quantity of nature," he said, "it's also the quality."

**More information:** Anthony D. Ong et al, Engagement with nature and proinflammatory biology, *Brain, Behavior, and Immunity* (2024). DOI: [10.1016/j.bbi.2024.03.043](https://doi.org/10.1016/j.bbi.2024.03.043)

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