

Cool Facts Friday #5

Dave Asprey:

Welcome to a new edition of Cool Facts Friday.

Cool Fact 1:

This cool fact is about a surprising new way to measure oxidative stress in your body. Oxidative stress is basically another word for too many free radicals, and it happens when there's too many sources of oxidation, too much inflammation, and it overwhelms your cells' built-in antioxidant defenses. If that's left unchecked, oxidation will cause damage to your DNA. It damages proteins in your body and other parts of your cells, and measuring oxidative stress is one of the ways we can measure progression of a lot of chronic diseases.

Typically, researchers have to extract cells from your body to measure oxidative stress and then they send it to a lab. That gives you interesting data, but it doesn't tell you that much about what's happening when the cells are inside your body. Now, researchers at the University of New South Wales took a look at that problem, and they found a way to detect oxidation levels inside your body by adapting a standard fluorescent microscope.

They found that with this new imaging technique, they can detect a change in the color of your cells when there are free radicals present. Color acts like a thermometer for oxidative stress. The fluorescent light captures the detailed colors of cells and tissues, and the microscope decodes what those colors mean at a molecular level using artificial intelligence. What does that mean for you? It means that real-time oxidation in your body is about to be something you can measure without sticking a needle in yourself, and that's cool.

Source: <https://www.sciencedaily.com/releases/2020/05/200513111400.htm>

Cool Fact 2:

This cool fact is about the structure of ancient brain tissue. Researchers have uncovered the remains of a young man who was buried under a cloud of ash 2,000 years ago from Mount Vesuvius. As the ash cooled, it went through a process called vitrification and turned some of his brain and spinal cord into glass. Archeological discoveries of human brain tissues are super rare because our brains are mostly fat and they tend to break down into fatty acids and glycerol, so you get basically soap and really, really old remains. There's not a lot of detail you can get from soap.

But biologists and forensic anthropologists at the University of Naples Federico II in Italy found that the details of the young man's brain micro-architecture were actually remarkably preserved in that glassy form, and they found signs of nerve cells with elaborate tendrils for sending and receiving messages. Layers of tissues wrapped around those tendrils appeared to be myelin, a substance that speeds signals long nerve fibers.

Well, why do we care? What does that mean for you? This find gives insight into how very old brain architecture and the structures of the ancient central nervous system worked, and so we can see how we got to where we are today. Did they have more myelin? Did they have less? Because you know what? Our brains have changed over the last 2,000 years, and everything you do now is affecting your brain, and everything we do in the world around us affects our brain. Now we know more about the past.

Source: <https://www.sciencenews.org/article/mount-vesuvius-eruption-human-nerve-cell-tendrils-glass>

Cool Fact 3:

This cool fact is about how your liver likely holds the key to connecting exercise and brain health. Researchers at the University of California San Francisco injected a group of elderly sedentary mice with plasma from active mice to see if there was any impact on brain health. After eight injections over 24 days, the older, lazy mice showed improved performance on memory tasks when compared to the control group.

The researchers reported in the journal, *Science*, that it may be a chemical signal from one liver protein in particular that can take credit for improved brain function from exercise. It's called GPDL1. GPDL1 is an enzyme that snips other proteins off the outside of cells, which sets them free to perform their various jobs in your body. Those researchers think that by targeting those biological jobs with a molecule that behaves like GPDL1, we could mimic the brain benefits of exercise.

We also note that blood samples of elderly people hint that exercise does raise their GPDL1, as well. What does that mean for you? Well, it means that you definitely need to find someone who exercises and steal their blood. Okay, maybe not. What it actually means is that when you exercise, you are getting your liver to produce that one enzyme, which causes your brain to become stronger when you exercise. It also means that we're getting closer and closer to having yet another compound you could take that would give you the benefits of exercise, even if you were doing something else.

Source: <https://www.sciencenews.org/article/boosting-liver-protein-may-mimic-brain-benefits-exercise>

Cool Fact 4:

This cool fact is about how creating a positive outlook could help you prevent memory decline. This is important because, hey, memory declines with age unless you do something about it, and there's lots of things you can do. I've written a whole book about it, but this is new information. It was studied in *Psychological Science*, the journal, and they can see the mind-body connection at work now.

The study found that people who have positive affect, which is what psychologists call the feeling of enthusiasm and cheerfulness, those people are less likely to experience memory decline as they age. They looked at data from about 1,000 middle-aged and older U.S. adults who participated in the study three times over 10 years. It's really hard to do studies like this, but they show so much about the long-term effects of our actions. In each assessment, the participants reported a range of positive emotions and completed tests of memory performance. The results said that, yes, memory does decline with age, but people with higher levels of positive affect had a less steep memory decline over the course of almost a decade.

What does that mean for you? Well, do things that help you have a positive effect. In other words, do things that make you cheerful and enthusiastic. Do that, and do the other stuff that we already know works, like don't eat inflammatory fats, exercise some, well, you might have a brain that works as well 10 years from now as you do right now, or maybe, like in my case, even better.

Source: <https://www.sciencedaily.com/releases/2020/10/201029135501.htm>

Cool Fact 5:

This cool fact is about coronavirus's massive impact on global emissions, and it may be one silver lining behind all the chaos. There's your positive effect for you. According to an international team of researchers, the first half of 2020 saw an unprecedented decline in carbon dioxide emissions. In fact, in the first six months of this year, there was about 8.8% less carbon dioxide emitted than in the same time

in 2019. That's about 1,551 million tons of CO2. In fact, it's probably the largest decline we've ever seen to date, larger than during the financial crisis of 2008, the oil crisis of 1979, and even World War II.

The researchers noted that what makes this study unique is that they can interpret real-time data on carbon emissions by tracking the CO2 alongside lockdowns in each country. So what does that mean for global warming and the continued issue of global CO2 emissions? The researchers did note that there was a strong rebound effect once restrictions lifted in July. At least, in most countries.

What does that mean for you? Well, researchers say the answer doesn't solely lie in changing human activity, but instead, it's about making structural and transformational changes in our energy production and consumption systems. To me, that sounded like a bit of a cop out. What I think it says is that working from home is here to stay and it's probably good for the environment.

Source: <https://www.sciencedaily.com/releases/2020/10/201014082806.htm>