

COOL FACTS FRIDAY #25

Dave Asprey:

Welcome to another edition of Cool Facts. These short episodes are about new things we just figured out about how we can upgrade ourselves and about how our bodies and the world around us works.

Cool Fact #1

This cool fact is about tattoos and your blood pressure, and it matters even if you don't have any tattoos. It's because continuous blood pressure monitoring has been something that researchers and physicians really, really want. If you could track your blood pressure over several hours, it'd provide a much broader view than that one and done testing that you do at the doctor's office. Or maybe you stick your arm in the machine at the pharmacy. Or maybe you're like me, you have a little tool at home, but you never use it. That's the downside, continuous blood pressure monitors are bulky, they're intrusive, they're uncomfortable and, frankly, no one uses them unless they're really sick.

Luckily, a team at the University of Texas at Austin created something they're calling an electric tattoo and it changes how people monitor their own blood pressure, at least if they have an electric tattoo. It's based on something called electrical bioimpedance which is the strength and speed of an electro signal that's sent around the body. The researchers used graphene as an electric component to develop a lightweight monitoring system. These are atomically thin, self-adhesive, lightweight and unobtrusive, temporary electronic tattoos that act as an interface to your human bioelectric field. This device is basically weightless. It's basically invisible and it can monitor your blood pressure for more than five hours which is about 10 times longer than previously reported studies. Well, what does that mean for you? It means that you might actually be able to get a long-term read of your blood pressure which is going to really change how you feel even if you have a problem that no doctor knows about.

If your blood pressure's high, it's going to show you what's causing it and if it's low it's going to show you what's causing it. However, this is early days and you're not going to get an electronic tattoo anytime soon and graphene itself as a way to attach things to the body that allow you to do biomonitoring is still in its infancy. And, no, conspiracy theorist friends, I do not believe we have injectable biomonitors made of graphene right now because, strangely, none of my friends with sensitive electronic monitoring devices can pick up any signal coming off your body. So, there's that but maybe someday there will be something like that. It just doesn't appear to be likely now.

Until you can get your own electric graphene tattoo in order to monitor your blood pressure you could just train your nervous system to control your blood pressure using the Zona grip device from podcast episode 853. Grip strength can help you control your blood pressure.

Source: <https://www.nature.com/articles/s41565-022-01145-w>

Cool Fact #2

This cool fact is about a new device that protects against head injuries. Athletes who play football or other high-contact sports have a lot of risk for concussion every time they gear up to practice or to compete. My friend, Dr. Amen from Amen Clinics has done extensive research on this and now there is concern from coaches, trainers, doctors, parents, and even athletes about the number of times they're taking blows to the head. We know they cause long term neurological issues but it's hard to detect whether you've had chronic traumatic brain injuries, even small ones. Current technology exists that

involves sensors in a player's helmet and the sensors pick up data and they figure out what's the risk that you might have gotten a concussion from a hit, but they can show a lot of false readings.

So, researchers at Michigan State University set out to increase the reliability of those measurements and they figured out a flexible, electronic device that athletes can wear as an adhesive patch on the back of the neck. That device detects head snap motions and other dynamic strains experienced by athletes and it doesn't rely on sensors in a helmet. What's cool is these patches are going to produce way better data for athletes going forward, especially if you don't want to wear a helmet.

If you play soccer, I don't care if you're an adult, but especially if you're a kid, or football as my friends in Europe and South America would call it, heading the ball creates traumatic brain injuries. It is bad for adults and is really bad for kids with their thinner skulls. So, if you were to wear these patches you would say, "Wait, maybe we could just change the rules of soccer so that we don't have a bunch of older soccer players who wish they hadn't taken so many hits to the head." It's actually a real thing. I love soccer, used to play, I just don't want to hit things with my head.

Source: [Flexible, self-powered sensors for estimating human head kinematics relevant to concussions](#)

Cool Fact #3

This cool fact is about the future of avocado toast. We all know the age-old avocado story. You buy it when it's unripe and it's hard and you wait for several days for it to soften until you forget about it. And by the time you remember you bought it it's pretty much a ball of black, gooey grossness that's also high in histamine. Of course, the stars align maybe once every five avocados and you remember the avocado at just the right time and it's epic and perfect, but wouldn't it be nice if you could extend that sweet spot, so it lasted for more than, oh, about 30 seconds?

Looks like Harvard researchers had the same problem you do with your avocado toast, and they discovered an answer to your avocado woes. They figured out an antimicrobial food coating that is biodegradable. Hallelujah. And it's made out of a polysaccharide which is called pullulan fiber. You apply the coating directly to fruits and vegetables and you can wash it away under running water and it won't choke a sea turtle anywhere. Laboratory tests showed that the coating significantly extends shelf life of avocados. So, in the future when you're dreaming about affordable avocado gluten-free toast, maybe, just maybe, you can have double avocado for the same price.

Source: [High-throughput coating with biodegradable antimicrobial pullulan fibres extends shelf life and reduces weight loss in an avocado model](#)

Cool Fact #4

This cool fact is about how to manage inflammaging. What, you might ask, is inflammaging? It is a clever word. This brings together aging and inflammation because, well, inflammation is a major cause of aging. From a science perspective that's accurate. Inflammaging is a risk factor for pretty much every aging related disease you can think of including obesity, type 2 diabetes, cardiovascular disease, Alzheimer's, cancer, Parkinson's, as well as being more vulnerable to every infectious disease whether it's popular or not. In fact, inflammaging gives you the moral right to point at someone eating a potato chip and tell them that they have to quit eating the potato chip for your own safety. Problem is, pinpointing inflammation and managing inflammation is really tricky. Where is it coming from and what do you do about it? Well, scientists at the Aging Fritz Lipman Institute in Germany focused on mapping age related inflammation by looking at different tissues and different gene networks. This is brand new knowledge that we did not know about the human body.

Your cells contain something called chromatin. These are bundles of DNA and protein that are in most of your cells. When chromatin opens it increases the expression of your innate immune system genes which then creates things like interferon and inflammatory cytokines, these signaling molecules that tell the rest of your body, "Oh no, inflammation, let's make more." And that is what sets the stage for age related inflammatory diseases. The scientists themselves, in a surprising twist of science, found the "What does this mean for you?" in it.

What they found is that you can mitigate inflammaging in specific tissues with short and long-term dietary restrictions if you decrease calorie intake without sacrificing nutrition. Magically, that includes intermittent fasting, time restricted feeding, or fasting mimicking diets. Quick warning for you. You can control inflammation by adding intermittent fasting to your diet by removing the inflammatory things that have been a part of what I've been teaching you for a decade here but be smart about setting good short and long-term goals for how you want to look, how you want to feel and how much inflammation is okay for you and recognize that you can cut calories too far, to the point that it raises stress. You can over-fast to the point that it raises stress. So just because intermittent fasting is good, just because caloric restriction may be good for this one purpose, even though you don't need to do it to lose weight, if you're intermittent fasting, just know you might overdo it and that's okay. You don't have to always overdo it.

Source: [Inflammaging is driven by upregulation of innate immune receptors and systemic interferon signaling and is ameliorated by dietary restriction](#)

Cool Fact #5

This cool fact is about using your urine for good. Now you might think I'm going to tell you to drink it, pour it in your hair or brush your teeth with it. Yes, those are practices that have been experimented with and recommended by various people around the planet at various times, and they are all, well, not very pleasant I can imagine. I'm not saying whether, or if, I have tried any of those or not but what if there was a way that wasn't gross that you could use your urine?

Chemical fertilizers are something that come with a very high environmental cost, and I am an organic permaculture based farmer and I understand how expensive fertilizer which is why I don't use it. I use cows and sheep and they just poop everywhere. But if I didn't have those, I would be spending a boatload on chemicals that weren't even good for the environment. Turns out your urine is a fantastic source of a lot of the same nutrients that are found in plant fertilizer. So, farmers are spending time and money putting potassium, nitrogen and phosphorus on their crops but what if your pee did the same thing, which it does? Well, it turns out that experts at the Rich Earth Institute, which is a group that looks at ways of using technology to turn human waste into something useful, they figured out something called peecycling. Yes, it's the next thing in recycling.

Now you might imagine that they're just telling farmers to just go pee on crops. Well, there's a limit there and it's the bladder size of farmers. What they do though is they have a collection and sanitization system in place. And they're not alone. Across the globe now in cities they're putting in urine collecting systems that support way more eco-friendly fertilization of crops. And given that the world's facing a massive food shortage right now because of a lack of fertilizer I think this thing has legs. For example, in south central Niger, West African researchers found that urine, either with animal manure or by itself, increased yields of millet, which is their staple crop, by about 30%. What does this mean for you? Well, it means you should do what I do, walk outside in your garden and take a leak. Okay, if you don't have a garden, or if you'll get a ticket for doing that because you don't live on a farm in the middle of nowhere, it actually doesn't mean very much unless there is an active peecycling thing in your neighborhood and then, seriously, it is a really good idea.

If we can do organic compost, which isn't even organic and it has ketchup and pop tarts in it, maybe we could put in infrastructure to collect pee. This is not unprecedented because even back during the Enlightenment they used to collect pee in order to make things like phosphorus. Because there's a lot of chemicals that your kidneys will filter out of everything you eat at no cost, put right in that urine, and we can use it for good instead of mixing it up with a bunch of toxins, putting it in sewage and then doing bad things to it. So, there you go. New York Times wrote about this; it's called Meet the Peecyclers and that word alone made me laugh. And now you know.

Source: <https://www.nytimes.com/2022/06/17/climate/peecycling-farming-urine-fertilizer.html>