

Cool Fact Friday #3

Dave Asprey:

Welcome to a new edition of Cool Facts Friday.

Cool Fact 1:

This cool fact, it's about composting human bodies, which is called natural organic reduction. You're like, "Dave, why would you go there?" Trust me, you're going to want to hear this. There's new research from Washington State University and it shows that this process provides food for microorganisms and is an environmentally acceptable alternative to burial or cremation.

You guys know I'm all about building healthy soil, right? I live on a small organic farm where we're adding feet to the top soil here because soil is one of the things that helps us live longer and we need more of it right now. And we're wearing it away at a disturbing process. Why would you want to take a perfectly good source of organic material like me, and then fill me with toxins and bury me in a steel box. It just doesn't really work or burn me and add to the carbon footprint. So what's left?

Composting. And what this is is just letting microbes break you down, and that generates heat strong enough to destroy any pathogens that might be in your body. After about four to seven weeks, microorganisms, decompose bodies into soil, except for the skeleton. So that's basically two months and all that's left is bones. Each decomposed body generates 1.5 to two cubic yards of soil-like material, which meets US safety standards for even heavy metals.

Now, do you want to eat food that was grown there? Probably not. Do you want to walk in a forest like that? Yes, you probably do. And this is one of the many things that we can do as humans to lower our environmental footprint. So for me, give me a Tibetan sky burial, which is even a little bit weirder because they cut you up into pieces and feed you to the ravens. I'm all over that. Or if not, bury me in a forest somewhere and let me take this precious organic matter and feed it back to the earth instead of burning me or filling me with chemicals and sticking me somewhere.

I hope you'll consider this as a new kind of science. It's very interesting. Only takes two months. And best of all in 2019 Washington became the first state to legalize natural organic reduction as a post life option. I like how they say that. It's what happens after you die. It's okay. Everyone dies. If you don't believe me, and you're a radical life extensionist, the end of the universe will come. We're all going to die. It's okay. Take a deep breath.

Source: <https://www.sciencenews.org/article/turning-human-bodies-into-compost-works-small-trial-suggests>

Cool Fact 2:

One of the things that came out for today's cool fact is that scientists can now make human organs transparent so that you can do 3D bio mapping and understand what's really going on in there because there's a lot of stuff that we think we know, but like, "Oh, sorry. We just missed that." You know, like the glymphatic system that we only discovered about five, six years ago that's removing toxins from our brain. Before that, we just thought it didn't happen. So 3D bio mapping is going to let us know the stuff that we're missing. This research comes out of Germany and they found a way to 3D map intact human organs down to a cellular level and to do it required transparency. The problem is that our organs are really stiff because there's insoluble molecules, including collagen, that are in those tissues and the insoluble stuff grows for years or even decades.

And the way we've made mouse organs transparent don't work on human organs, particularly adults. So after a lot of time, research has found a detergent that allowed those organs to be broken down and converted into transparent structure. There's so much data that comes out of an organ. If you're looking down at each cell, in fact, it's incredible amounts. So they developed a laser scanning microscope called yes, the Ultra Microscope Blaze because researchers are terrible at naming things. It holds a ton of sample data and can image things even as big as your kidney. They created machine learning algorithms to analyze that huge amount of data. What they found is that now we're going to be able to look at things like the brain, the kidneys, the liver, and, well, if you think about it, what had to happen for this? Lasers, artificial intelligence, biochemistry, new detergent development.

The progress in human knowledge for us to be able to learn just a little bit more about this, it is mind-boggling. It is astounding. And if you ever find yourself going, "Oh, things are terrible. Things are hopeless, whatever." No, this is the coolest time ever to be alive. There will be a time coming up here where we learned something new about every single organ in the body and then we're going to hack it.

Source: www.sciencedaily.com/releases/2020/02/200213135807.htm

Cool Fact 3:

Next up, this cool fact highlights what we can learn from aging about the famous African turquoise killifish. What? You didn't know about this? Neither did I until I did some research. It turns out that this kind of fish lives in the ponds of Mozambique and Zimbabwe, but their ponds disappear during the dry season. So how could a fish like this live because without water, the adults die. But their embryos can put their lives on hold until water comes back. They go into a state called diapause, where cell growth and organ development pause entirely. Adult killifish just live for four to six months, but their embryos can stay in diapause for up to two years.

Well, what if we could halt our human aging at the same rate that these African turquoise killifish do? Well, then we could live for 160 to 400 years and maybe every couple of years, we just pause for a little while. The reason I know about this is a recent study from the genetics department at Stanford was looking to figure out how they survive in that state of limbo. They found that genes that normally spur cell proliferation, organ growth and metabolism completely turn off. They found that diapause is much more than a passive waiting period like hibernation. While some genes turn off, others work overtime to halt aging and maintain the embryo's muscle mass. So when killifish come out of diapause, they show no signs of aging. They can still reproduce and live just as long as killifish that never went into diapause.

What does that mean for you? Well, we can probably get some anti-aging tricks from the African turquoise killifish. Personally, I'd love to be able to have diapause in my bag of biohacker tricks. What about you?

Source: <https://www.sciencenews.org/article/how-african-turquoise-killifish-press-pause-button-aging>

Cool Fact 4:

This cool fact is about new research developments in ways to reduce brain swelling. And you might say, "Dave, why do I care about brain swelling?" It's because, well, the odds of you having brain swelling at some point in your life are exceptionally high, whether it's from inflammation or more likely, you're probably going to bump your head, or you already have bumped your head and probably forgot about it. 90% of the people we see coming through the 40 years of Zen Neuroscience Institute have some evidence of a hit to the brain. And I've dealt with a few traumatic brain injuries over the last few

years, just from simple stuff that you do just living and they can really affect relationships and everything.

So, in this new study published in the *Annals of Neurology*, scientists at Northwestern Medicine in Chicago injected nanoparticles into mice that decreased the amount of dangerous brain swelling in mice and increase their recovery. So, this means if you or someone you care about takes even a small hit to the head, you could recover faster. These are biodegradable nanoparticles, the same type of FDA approved polymer they used in stitches or sutures that dissolve. And they believe it curbed brain swelling by distracting a certain kind of immune cell known as a monocyte that normally rushes in and causes inflammation. The monocytes instead targeted those little invaders instead of going right into the brain. That was enough to distract that inflammatory response that causes so much damage in the first 24 hours after you hit your head. So further testing showed that brain swelling and scarring were less significant in the mice who were injected and the mice with nano-particles had better vision response to light and greater improvement overall.

Right now, researchers say that those nanoparticles are one day going to be powerful medicine for a whole bunch of things, but maybe even including heart attacks, inflammatory bowel disease, even viruses. If you're getting a cytokine storm, just distract the immune system. But you can't buy them yet. The reason this matters is that you should be paying attention to every technology possible to control and modulate your immune system and your inflammation because right now our immune systems do all sorts of stuff we don't want them to do and all sorts of elegant, amazing things. Our ability to tell our immune systems what we want them to do and what we don't want them to do is one of the things that's going to help us live way longer than anyone thinks is possible. This is part of the problem.

Source: <https://www.sciencenews.org/article/nanoparticles-blood-brain-swelling-mice>

Cool Fact 5:

This cool fact highlights more research into how nanoparticles could be used for you. This time we're going to talk about your heart health and why nanoparticles? Because nanoparticles are new and interesting and this is the stuff that's happening that you're not going to hear about at your doctor's office, but it is already possible. It'll become commonplace. This time, Michigan State University and Stanford University scientists created a nanoparticle called Trojan Horse that can engulf and eat debris in your cells. You remember cellular debris is one of the causes of aging. And in this case, the nanoparticle completely eats away portions of plaque that cause heart attacks. This was in *Nature Nanotechnology*. Yes, by the way, there is a journal by that name. This newly invented nanoparticle is really effective because it's so selective and it targets a particular immune cell type called a macrophage within the plaque.

A nanoparticle releases a drug agent directly into the macrophage and what you get is the cell engulfs and eats cellular debris after that. It removes the dead cells from the core of the plaque and the plaque goes away. What's interesting here is that the nanoparticle works inside the cell instead of working on just the surface of the cell, so actually getting in there and cleaning this thing up for you. The invention of this Trojan Horse nanoparticle, it could be a really big treatment for atherosclerosis and it could be, well, a treatment for almost anything that's going on inside of cells we need to get things in there.

Right now since atherosclerosis is one of the four killers from *Super Human*, the first step to living in 180 is not dying. So let's target this. There are minimal side effects. It could go all over the place in your body and give you a new ability to control your own biology. That's what we're all here to do.

Source: <https://www.sciencedaily.com/releases/2020/01/200128114720.htm>

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