Dave Asprey:

This is a special mini episode that I hope you really enjoy. I retired the cool fact of the day from Bulletproof Radio after about 700 episodes, and I miss it. And some listeners just were skipping through it and I don't want to waste your time. But as soon as I turned it off, a whole bunch of people said, "Dave, what's going on? I miss this."

So if you're one of those people who likes quick, funny and interesting little tidbits, I put together just a short episode for you here. So this is something I'll do on occasion for you when there's just cool stuff that's worth talking about. So once a month on Fridays, the cool stuff is still happening, and if you subscribe to Bulletproof Radio on your favorite podcast platform, you'll get all the other cool knowledge in all the episodes.

I've been getting more of the legends, more of the masters, people who've spent decades in their fields, toiling largely in obscurity who are now bringing crazy levels of knowledge out here. I've never felt like I'm learning as much as I am now, but I'm still going to do cool facts for you because hey, I'm a dork. Enjoy.

Cool Fact 1:

Today's cool fact of the day is that if robots can experience pain, maybe they can understand human pain better too. It turns out that sensors embedded in soft artificial skin that can reliably detect a gentle touch and a painful bump have been hooked up to a robot that can then signal its "emotions", at least according to engineers at Osaka University in Japan. And they called it an artificial pain nervous system. And they think it might be a building block for a machine that could ultimately experience pain, at least in a robotic way, which would allow the robots to do the equivalent of empathizing with a human companion's suffering. Now touchy-feely robots are really still far away, but advances in robotic touch sensing are bringing that possibility really close to reality for us. And they even have the ability to convert those signals into emotional facial expressions.

What does that mean for you? A robot might be able to one day feel pain or at least look like it feels pain. We all know that we have mirror neurons and our mirror neurons can affect our brain when we see things happen. But no one knows yet whether our mirror neurons are going to be activated by a robot pretending to feel pain because it hit something above a certain threshold. So we're going to see what robots that look like they feel pain actually do, and whether they change their behavior as a result of it. This is going to lead us to understand more about our own pain and what pain means to us. And since so much of pain is emotional, it's in our heads and not actually in our bodies, there's a lot of questions around consciousness and pain that I don't think we've solved.

Source: <https://www.sciencenews.org/article/robots-feel-pain-artificial-intelligence>

Cool Fact 2

Cool fact of the day. It's about migraines. It turns out if you get migraines or you almost certainly know someone who does, that you probably have a hyper excitable brain. And migraines, there's different kinds of them, but they are these really bad headaches, which most of us know about. And most people who get them are extra sensitive to either visual or sound or touch types of stimulus. And scientists say they don't know the exact causes. That's because there's more than one, and they get sort of stuck when there's more than one cause behind something. And there's a new study out from Neuro Image Clinical, which is kind of like CSI crime or something, but it's way cooler if you read stuff like that and you're me. And they wanted to test out a theory, that part of the answer is in your visual cortex, which is the part of your brain, that processes vision signals.

So they had participants look at a striped grading pattern based on levels of difficulties of seeing it and based on how hard it was to see it and how uncomfortable it was, while they were looking at their brainwaves on an EEG. And they found people who regularly get migraines, had a much larger response from that kind of visual great, which is visually stressful ,stripes and checks and things like that. And researchers are going to keep monitoring those research participants to figure out changes in the response as they get closer to having a migraine. So they can say, "Oh, what's going on in every little step electrically?" This is so incredibly cool because, and I have family members who've had migraines. I used to get migraines before I figured out the biological underpinnings for them for me, and what to do generally turning on energy in the brain with supplements that make mitochondria work better, magically allows the brain to handle additional inputs. And who would have thought something about your hardware going on?

Source:  <https://www.sciencedaily.com/releases/2020/02/200210104114.htm>

Cool Fact 3

Today's cool fact of the day is that Alzheimer's disease may scramble your metabolism's connection to sleep. What does that actually mean? It turns out that big swings in blood sugar wreck your sleep and a new study in mice shows that food's relationship with sleep gets even more complicated when you're starting to get Alzheimer's disease. And this came from the Wake Forest School of Medicine and they showed that Alzheimer's isn't confined to the brain, and metabolism sleep and brain health just don't happen in isolation. And their study measured how much sugar the brain actually used, the rate of nerve cell activity, and how much time mice spent asleep. What they found was injections of glucose into the blood led to changes in the brain. They'd get a burst of metabolism, a bump in neuro cell activity, and more time spent awake. But a dip in blood sugar, which was caused by injecting insulin led to more nerve cell action and more wakefulness as well.

And they did a similar analysis in genetically engineered mice that had one of two key signs of Alzheimer's. Some of them had extra amyloid beta between nerve cells. Others had tangles of a protein called tau inside the nerve cells. Both groups of mice had those abnormal reactions to high or low blood sugar. So if you've read Headstrong or my latest superhuman, you understand how important controlling blood sugar swings are and how having low blood sugar at night oftentimes wrecks your sleep. And there's some sleep hacks that have been widely copied around the internet that came from my original blog post about that. Around raw honey before bed in small amounts to stabilize glycogen, or about collagen before bed or brain octane. So those are all about energy stabilization for proper sleep. And now we know why this works. Before I can tell you it does work and I could theorize, but at least I think I'm a mouse. So from that perspective, this study is enough proof for me.

Source: <https://www.sciencenews.org/article/alzheimers-may-scramble-metabolism-connection-sleep>

Cool Fact 4

Cool fact of the day is about X-rays. 125 years ago (1895) this year we discovered X-rays. It turns out they'd always been around. We just never noticed and German born Wilhelm Conrad, I'm going to try to get this right. I do not speak German, Roentgen, discovered X-rays back then. And they almost immediately said, "Hey, let's use these in medicine." And they had a lot more scientific significance beyond medicine and radio waves had only been discovered a few years earlier. And that proved to us that light was not the only form of electromagnetic wave and later experiments on x-rays showed that those waves sometimes behaved as particles. And you could actually go to a shoe store and then put your feet in a high powered x-ray machine and probably only slightly increase your risk of cancer to see how well your shoes fit or didn't fit. And it turns out x-rays did transform science and medicine, physics, astronomy, and biology, and revealed the architecture of the molecules that run life itself and Wilhelm won the first Nobel Prize for physics in 1901.

Now, why is this interesting? People are alive today who were alive when this happened. That's cool, right? The Nobel Prize in 1901, there are people now, 119 years old, not a lot of them, think about that. They lived through all of that. What are you going to live through if you make it not just to 100, 120, but even longer? Well, who knows, but it's going to be awesome.

Source: <https://www.sciencenews.org/article/top-10-science-anniversaries-2020>

Cool Fact 5

Today's cool fact of the day is that the time of day that you're listening to this show, or doing anything else, affects global brain fluctuations in a way that we didn't know. Research out of Singapore figured out that the brain's global signal declines unexpectedly as your day progresses. And we all know about circadian rhythms and things like sleep wake cycles, but most brain function studies don't pay attention to the time of day of their results, which is a massive problem. When people say we controlled for all variables. Might have wanted to look at that one, because that one was obvious, but oftentimes they don't. So this team in Singapore said, "Hey, let's use FMRI on 900 subjects, who were scanned on two different days, at times varying between 8:00 AM and 10:00 PM. And the team figured that it's going to be like a circadian variation. So your global signal fluctuation should be lowest in the morning, peak in mid-day and drop an evening.

And they found out they were totally wrong, because the fluctuation decreases as the day progresses, especially in your brain's visual and somatosensory regions, which tend to fluctuate a lot. And that time of day correlated with marked declines in resting state functional connectivity. In other words, people got tired as the day went on. And what's standing out to me there, is especially in the visual regions, which means if you can stress your eyes less, might you feel better at the end of the day? Well, that's certainly been my experience. And if you don't believe me, sit in front of a strobe light for a couple hours and tell me how you feel.

Now, what they found in this study that's relevant for you is that they said explicit time of day reporting of FMRI scans and other experiments should be standard in science. In other words, when you took your results for your blood test, when you did any medical tests, the timing probably matters way more than we ever considered. And you might take note of that yourself, if your blood sugar is weird, "Hey, what time of day was that?" Vitamin D levels, almost everything fluctuates. And this was not in this study, but even magnesium, which is something that a lot of us take for sleep. One of the first posts ever about sleep hacking that I wrote said magnesium at night, but it turns out your magnesium rises most at noon. So if someone's getting magnesium levels and they say you're low in magnesium, but they were getting it in the morning or at night, hey, maybe you're not low. Maybe it was just too early and you should have slept in.

Source: [https://www.sciencedaily.com/releases/2020/02/200218143717.htm](https://api.mixpanel.com/track/?data=eyJldmVudCI6IkNsaWNrZWQgTGluayBJbiBSZXNlYXJjaCBFbWFpbCIsInByb3BlcnRpZXMiOnsidHlwZSI6ImNpdGF0aW9uIiwiZGlzdGluY3RfaWQiOiI1YmRiNjk0MTMwZTcwMzAwNGM4YmQyNTYiLCJ0b2tlbiI6IjhkMjM0MDg1NmI1MGQ2YmQ2NjU1OGYzOGRjYTMzNjBjIiwiY2xpZW50UHJvamVjdElkIjoiMTM0ODk3In19&redirect=https://www.sciencedaily.com/releases/2020/02/200218143717.htm)