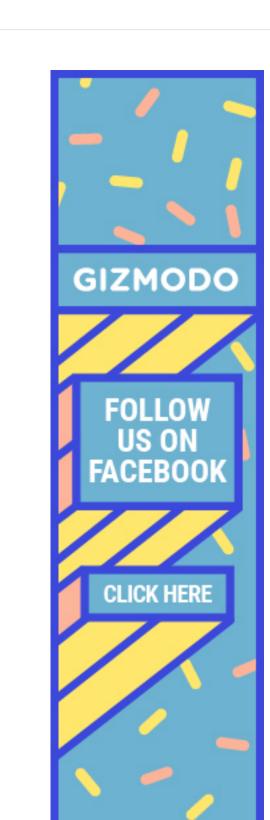
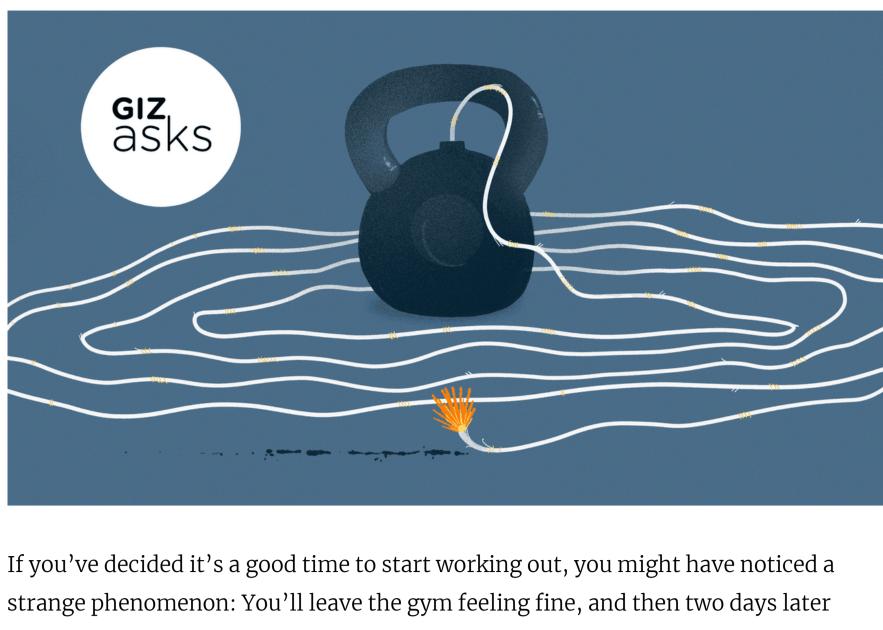
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Why Does Exercise Start Hurting Two Days After A Workout? Share (7) Y St. 6



then two days later suddenly yelping in pain. To answer this question, we enlisted physiologists, molecular biologists and and it seems it's just as inexplicable to them. As it turns out, there's a whole burgeoning world of research devoted to figuring this thing out. And while scientists

out there. **Elaine Choung-Hee Lee** Assistant Professor, Molecular Biology and Applied Genetics, University of Connecticut

onset muscle soreness (DOMS) and occurs because once muscle is damaged during exercise, the repair process takes time to proceed.

- repair and removal of damaged proteins, but also cells of the immune system localise to the damage site to facilitate tissue repair and recovery. A degree of local tissue inflammation occurs at the site as a result, while tissue cells, immune cells, repair and proteins, and other factors that stimulate repair all migrate to the site of damage.
- Although this process is part of what contributes to pain associated with DOMS, it is an important aspect of response to exercise that does need to occur. Usually after a few days, DOMS subsides and this indicates that the healthy repair process has occurred. Prolonged and extremely painful soreness may be a sign of more severe injury or damage that requires longer recovery time between workouts. Aspects of the exercise itself like exercise intensity, duration, type, and also your fitness level can impact
- how severe DOMS is after a bout of exercise. Mathew Ely Graduate Employee, Department of Human Physiology, University of Oregon Delayed onset muscle soreness (DOMS) is caused by strenuous exercise, above and beyond what the individual is used to performing. DOMS can occur from exercise using predominantly concentric contractions but is more prevalent following exercise with eccentric muscle contractions. The

proteins and/or the muscle sarcolemma. This pain usually peaks 24 to 48 hours after the exercise session.

The cause of the soreness, i.e. increased activation of nociceptive (pain)

soreness is associated with temporary damage to muscle contractile

- we block histamine actions (antihistamines) we decrease the perceptions of pain/discomfort following the muscle damaging exercise. Blocking of histamine actions is associated with reductions in two known neurotrophic factors (Nerve Growth Factor and Glial Derived Neurotrophic Factor). These two factors cause changes in the nociceptive Both of which will increase perceptions of pain. So, what causes DOMS? From our work at the University of Oregon we
- pain/soreness is likely a protective mechanism preventing you from over extending the muscle again and allowing healing to occur. Blocking the soreness may delay healing or may result in increased damage if more exercise is performed. Paul Ingraham
 - First of all, let's just dispense with conventional old-school wisdom, which is that it's basically a form of injury — that it's microtrauma. There may be an element of truth to that, but it's pretty clear that there are some features of this kind of pain that don't fit with that theory, and the delay is the most obvious. What other injury do you hurt more from two days down the road? Generally, if you hurt yourself, if there's
 - on here, we gotta make these muscles better." And when nerves grow, it's uncomfortable in exactly the same sort of general sense that it's uncomfortable when you're ten years old and going through a growth spurt and your bones are aching. It's just a little tiny mini growth spurt for your nerves in the aftermath of getting a bunch of unfamiliar exercise. And that can certainly explain why it takes a while to get going, or why it increases as it goes. One of the reasons research has failed is that we keep looking for one substance that's associated with it, one biomarker, and we now know that that's probably never going to happen. Some recent research revealed that here are several biological markers associated with DOMs, and that they probably only have an effect when they're all together, so it's a chemical stew. It's not that muscles produce one substance, or there's one molecule
 - something mysterious going on with the immune system, and the key to this research is that inflammation isn't causing the pain. Its the something else that's actually the pain, and the inflammation is just a side effect. This research explains why we're really sore after an unfamiliar workout, but then we do the same thing again in a week and it's not nearly as bad. The theory is that it's similar to immunity to infection — that we're basically exposing our muscles to something, that exercise stirs something up, the immune system reacts to it, and then the next time that we exercise the immune system is more ready for it and then we don't hurt as much. Why is DOMS so hard to study?

brand-new. We've only just barely started. And even once we started, which was about 20 or 25 years ago, it's still kind of half-assed. It just doesn't get the money, there's not that much of a budget for it. The more interesting reason that we don't have a lock on DOMS is that it just turns out to be super-complicated. None of the obvious things seem to turn out to be the case, and it's just turned out to be this super difficult little biological puzzle. It's very familiar experience, we all know about it, we all know what it feels like – it just happens to be fiendishly hard to explain biologically.

The short answer is: No one knows for sure why [we get DOMS]. But it's

next 24 to 48 to 72 hours there's a repair process going on; the ankle

doesn't all of a sudden start to feel better. It takes time for that pain to

decrease, and it's kind of the same with this muscle soreness. When you

work out, you're damaging your muscles, and when you damage a tissue it

swells up. When it swells, it pushes on the nerves, which causes pain. And

that swelling process doesn't just stop immediately. It takes time for that

kind of similar to an injury. Let's say that I sprain my ankle. Well, over the

A lot of DOMS really depends on intensity of the exercise. If it's a low-

to decrease.

Craig Nolan

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It's more common in people that just begin to exercise, because their body is not used to exercising, so it needs time to adapt. If you do [a workout] that you're not used to doing, that can lead to muscle soreness.

gets used to and doesn't need to get sore.

Residential Faculty, Exercise Science, Mesa Community College

- This article was originally published in January 2018. Sadly, there's still no magic cure for post-exercise aches. More From Gizmodo Australia • I Just Bought A Tiny 40-Year-Old Travel Trailer And I'm Going To Live In It Fitness Trackers Are Leading Us Astray
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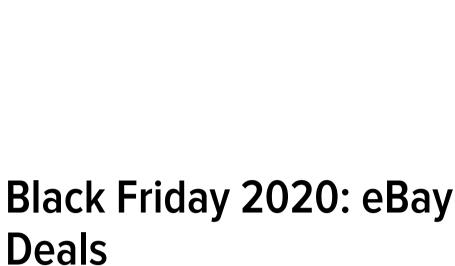
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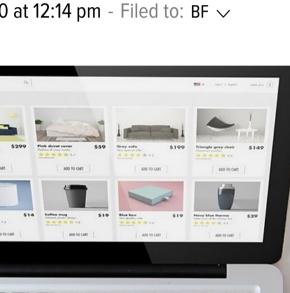
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nerves, is currently unknown. Through our work we discovered that histamine production and release is increased during aerobic exercise. If

neurons causing them to discharge more often and with less stimulus.

believe it is in part due to histamine release during muscle contractions.

Therefore, blocking histamine actions during strenuous exercise may

If there is muscle damage caused by strenuous exercise, the resultant

decrease perceptions of soreness/pain.

makes it fun, but entirely speculative.

Publisher, <u>PainScience.com</u> DOMS has always reminded me of knuckle-cracking – it seems simple but it ain't.

It's hard to get into in a way, because the only honest answer is: Nobody

there are some really interesting theories, and interesting clues, so that

knows. It's just a mystery. But it's easy to get into in another way, because

straightforward tissue damage, you know it pretty much right away, and certainly it doesn't take 36 hours to reach peak intensity. That old idea that you've just damaged yourself is almost certainly wrong, or only a small part of the total picture.

At the opposite extreme, the most interesting new theory is based on a

series of studies by some Japanese researchers. [The theory is] that it's

basically just nerve growing pains. What these Japanese researchers

showed is that the pain is related to neurotrophic factors – that is,

substances that come out of muscle cells that stimulate nerve growth.

This is an adaptive mechanism – your nerves are growing after exercising

because they have received the message that, "hey, we need more going

that is causing the pain. It's several all at once, and that prob has a lot to do with why we haven't been able to figure this out. Another super-interesting detail that's emerged recently suggests there's

point in history where we've only really just begun to take problems like this seriously, scientifically. The 20th century was a pretty great century for medicine but it was 98 per cent devoted to the big diseases. Sports injuries and musculoskeletal medicine and back pain, it's just really

There's two answers to that. The first is boring, which is that most of

musculoskeletal and pain medicine is surprisingly primitive. We're at a

intensity workout, you're not going to produce a lot of muscle soreness.

[DOMS] is a good thing to a certain extent, but lots of people base their workout on the fact that they're sore all the time. Well, if you're sore all the time, then that's not a good thing, because your body needs to adapt to exercise. If you're sore all the time, you're probably overdoing it.

Working out is a stress to your body. It's a good stress, if you're doing it

over, and you don't increase the weight or anything like that, your body

right, and your body adapts to stressors. If you do the same thing over and

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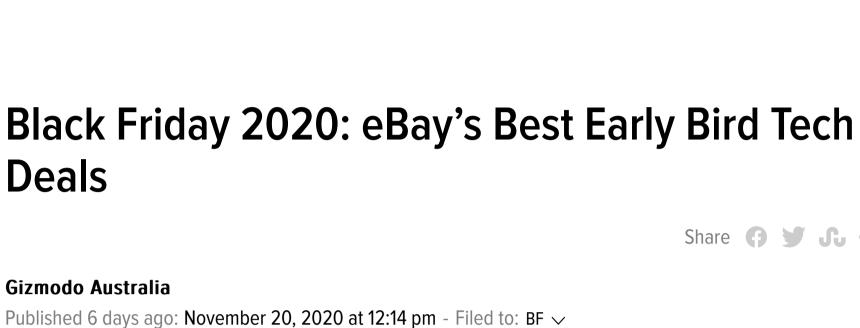
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Black Friday 2020 has arrived, sort of. The big sale event doesn't kick off until

November 27, but that hasn't stopped certain retailers from throwing up a few deals

early. You can currently grab some early bird bargains on eBay, so we've rounded up

If you want any of these deals you'll need to sign up for an eBay Plus membership

• Google Pixel 3 (refurbished) 64GB: \$327.20 – (with PLUSBF20 code)

• Google Pixel 5 (black) 128GB: \$894.39 – (with PLUSBF20 code)

• Huawei P30 Pro (256GB): \$805.50 – (with code PLUSBF20)

• ASUS Zenbook 14: \$1,575 – (with PLUSBF20 code)

• ASUS Vivobook S15: \$1,197.60 – (with PLUSBF20 code)

• ASUS Laptop D509DA: \$719.20 – (with PLUSBF20 code)

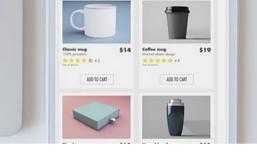
• Lenovo Legion Y7000: \$1,599 – (with PLUSBF20 code)

• Razer Blade Pro 17: \$6,299 – (with PLUSBF20 code)

• Razer Blade 15: \$2,299 – (with PLUSBF20 code)

• Samsung Galaxy S20 128GB: \$891.52 – (with PLUSBF20 code)

• Samsung Galaxy Note 10+ 512GB: \$1,191.19 – (with PLUSBF20 code)



Mobile phone deals • Apple iPhone XS 64GB: \$885.25 – (with PLUSBF20 code) • Apple iPhone XS Max 256GB (refurbished): \$799.20 – (with PLUSBF20 code)

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beforehand.

- ASUS Gaming Laptop TUF A15: \$1,290 (with PLUSBF20 code) • HP Laptop ProBook 450: 1,103.20 – (with PLUSBF20 code) • Lenovo Gaming 3 15": \$1,143.20 – (with PLUSBF20 code)
- Audiovisual deals • Bose Noise Cancelling Wireless Over-Ear Headphones NC 700: \$429.18 - (with PLUSBF20 code)

• Sony WH-1000XM4 Wireless Noise Cancelling Headphones: \$384.38 – (with

• New UE BOOM 3 Wireless Bluetooth Speakers: \$174.72 – (with PLUSBF20 code)

• Yamaha WX051B Black Stereo Musicast Bluetooth Speaker: \$451.20 – (with PLUSBF20 code) • Samsung 43" UHD 4K Smart TV (UA43TU8000WXXY): \$716 – (with PLUSBF20 code)

• LG 77" LG CX 4K Smart OLED TV; \$7,150 – (with PLUSBF20 code)

• TCL 65" UHD 4K Android TV: \$792 – (with PLUSBF20 code)

- Home tech deals • KitchenAid KSM177 Cast Iron Black Stand Mixer: \$583.20 – (with PLUSBF20 code)
- Lavazza A Modo Mio Tiny Capsule Coffee Machine: \$64 (with PLUSBF20 code) Gadgets and other deals

• Devanti 122cm Bladeless Tower Fan: \$71.20 – (with PLUSBF20 code)

• Xiaomi Mi Robot Vacuum Cleaner: \$319.20 – (with PLUSBF20 code)

• KitchenAid KSM160 Contour Silver Stand Mixer: \$575.20 – (with PLUSBF20

- Olympus E-M1 Mk II with 12-200mm Lens: \$2,399 (with PLUSBF20 code) Stay tuned for more deals as they go live on Amazon, and check out the rest of our Black Friday deals round-ups here.
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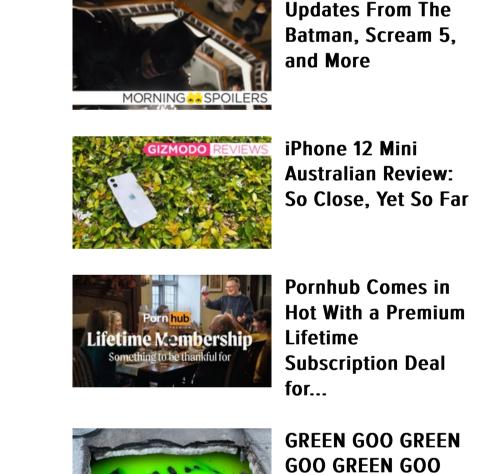
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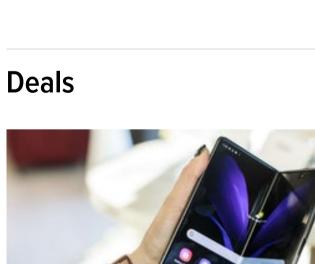
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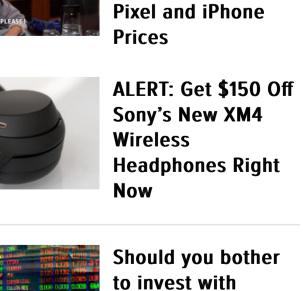
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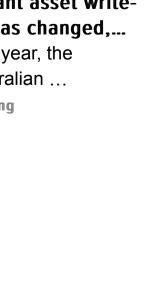
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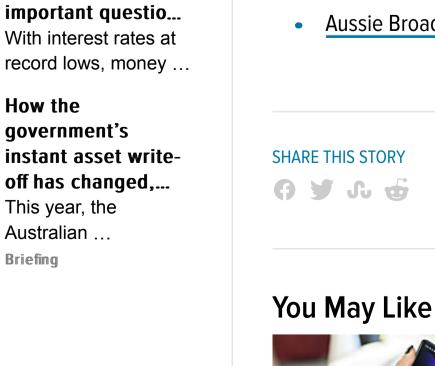


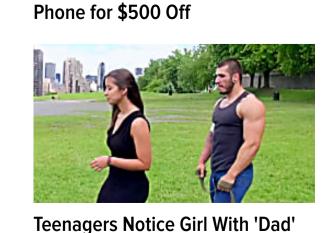
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still haven't pinpointed exactly what causes it, there are some compelling theories Post-workout soreness usually peaks 24-48 hours after what we would consider muscle-damaging exercise. This delayed pain is termed delayed When muscle tissue is damaged, not only do resident tissue cells assist in

wake up sore. This weird time-lag appears unique to exercise, and is, when you think about it, kind of inexplicable — like stubbing your toe, feeling nothing, and exercise scientists to help us figure out why workouts hurt two days after the fact —

Daniel Kolitz Published 17 hours ago: November 25, 2020 at 9:30 am - Filed to: EXERCISE ✓