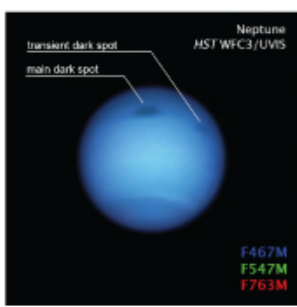




MICROSCOPE



Neptune storms

Neptune boasts of some of the strangest weather in the solar system. It holds the record for the fastest winds — upward of 1,100 mph, or one-and-a-half times the speed of sound. Scientists still do not know why Neptune's atmosphere is so tumultuous. Their latest glimpse of it provided more reason for confusion. While observing the planet's large inky storm, astronomers spotted a smaller vortex they named Dark Spot Jr. They think it might be a chunk that broke off the main storm.

Mutation fight

Alliria Rosa Piedrahita de Villegas (in photo held by her daughters in pic) recently died at age 77 in Medellín, Colombia. Neurologists at the University of Antioquia in Medellín have followed members of Alliria's extended family for over 30



years. She carried a rare genetic mutation that all but guaranteed she would develop Alzheimer's in her 40s, but only at 72 did she experience the first symptoms. A study of her brain and her family's may help unlock the secrets of early-onset Alzheimer's.

Root crowd

Researchers have borrowed tools from game theory — a way to analyse and optimise decision-making — to figure out exactly how plants strategically arrange their roots when the dirt gets crowded. A paper published in *Science* details a new model accounting for the spatial distribution of roots along with their prevalence.



Heart of the MATTER

Sourav Ganguly, chief of India's cricket board and former Indian cricket captain, collapses during a treadmill routine. He has to be taken to hospital and has to undergo corrective procedure. There is shock all around. But why? How? Isn't Ganguly, a high-profile sportsman, fit? Perhaps. But that is not a necessary insurance against heart ailments. Doctors found three blockages in his arteries, one of which needed an immediate stent implant through angioplasty.

Many people were amazed that a relatively young and fit sportsman like Ganguly could have been silently suffering from such a heart condition. The doctors at the hospital were, however, not surprised because the former cricketer has a family history of heart disease. Cardiologists attending him issued a statement saying, "Genetic history and long-term stress and other factors may have caused the disease."

According to cardiac surgeon Dr Kunal Sarkar, people above 45 years of age — Sourav is 48 — are vulnerable to heart disease as age is a key predisposing factor, especially if you have common risk factors such as diabetes, high blood pressure and obesity. "Since he had none of these factors, it's most likely that his family history has played a role. His father Chandi Ganguly had acute heart problems," Dr Sarkar says. Apparently Ganguly senior, who suffered from diabetes, had had multiple heart attacks. But should not Ganguly junior, who follows a restricted diet and a regular exercise regimen, have been spared?

While middle-aged adults are exercising more these days and living longer, new research from the University of British Columbia, Canada, suggests that even the fittest among them are not immune to cardiovascular disease — and they often don't have any symptoms. The study, published recently in *BMJ Open Sport and Exercise Medicine*, highlights how important it is for middle-aged athletes to have their doctor check their cardiovascular risk factors, especially if they have high blood pressure, high cholesterol or a family history of cardiovascular disease.

For the study, researchers followed 798 "master athletes" — aged 35 and older — who engage in moderate to vigorous physical activity at least three days a week. The participants hailed from a range of sports, including running, cycling, triathlon, rowing and hockey. Of them 94 (11 per cent) were found to have significant cardiovascular disease. Ten participants were found to have severe coronary artery disease (a 70 per cent or greater blockage in their artery) despite not having any symptoms. Among the 94 athletes, 44 were found to have a family history of heart disease.

Many different types of heart disease can be passed down through families. Some are caused by just

Fitness doesn't guarantee a healthy heart as Sourav Ganguly's recent setback illustrates.

Sujata Mukherjee explains the reasons behind it



Different types of heart disease can be passed down through families, some caused by a few genetic changes

one or a few genetic changes that have a very strong effect such as a fairly uncommon disorder called hypertrophic cardiomyopathy that mostly affects the muscles of the heart. "One common example is familial hypercholesterolemia, which causes very high cholesterol levels and may lead to premature coronary artery disease — blockages in key arteries supplying blood to the heart — occurring before the age of

50," says Dr Suvro Banerjee, a senior cardiologist in Calcutta. High levels of cholesterol in the blood can be detected to a large extent through a lipid profile test. According to some news reports, Ganguly had last undergone such a test for very many years. Ideally, people over 40 should get their blood lipid profile tested at least once a year.

Familial hypercholesterolemia is an inherited condition charac-

terised by very high levels of cholesterol in the blood. Cholesterol, a waxy, fat-like substance produced in the body and obtained from foods that come from animals (particularly egg yolks, meat, poultry, fish and dairy products), is required by the body to make cell membranes, certain hormones and compounds that aid in fat digestion. In people with familial hypercholesterolemia, the body is unable to get rid of extra cholesterol, and it builds up in the blood. The excess cholesterol is deposited on the inner walls of blood vessels, particularly the arteries that supply blood to the heart (coronary arteries), forming clumps (plaques) that narrow and harden artery walls. As the plaques get bigger, they can clog the arteries and restrict flow of blood to the heart. The build-up of plaques in coronary arteries causes a form of chest pain called angina and greatly increases a person's risk of having a heart attack. Ganguly suffered from angina while working out on the treadmill.

Familial hypercholesterolemia is usually caused by mutations in three genes — LDLR, APOB or PCSK9. Changes in the LDLR gene are the most common cause of this condition," says Dr Banerjee. The LDLR gene provides instructions for making a protein called low-density lipoprotein receptor. This type of receptor binds to particles called low-density lipoproteins (LDLs, known commonly as bad cholesterol), which are the primary carriers of cholesterol in the bloodstream. By removing LDLs from the bloodstream, these receptors play a critical role in regulating cholesterol levels. Some LDLR gene mutations reduce the number of low-density lipoprotein receptors produced within cells.

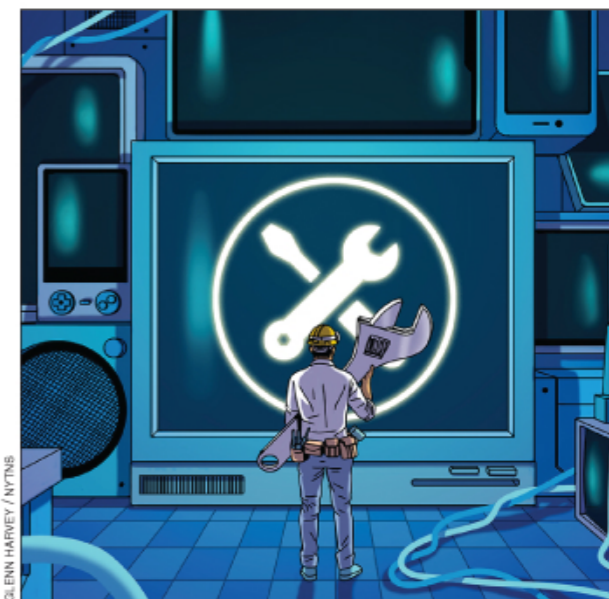
Less commonly, familial hypercholesterolemia is caused by mutations in the APOB or PCSK9 gene. Proteins produced from these genes are essential for the normal function of low-density lipoprotein receptors. Mutations in any of these genes prevent cells from making functional receptors or alter the receptors' function. "Hypercholesterolemia results when low-density lipoprotein receptors are unable to remove cholesterol from the blood effectively. High LDLs in the blood make people vulnerable to heart diseases at a younger age," explains Dr Banerjee.

According to him, people with a high level of LDL are prescribed medicines such as statins to bring it down. If the problem lies with the PCSK9 gene, the patient is prescribed two monthly injections. However, as yet there is no remedy to fix a faulty APOB gene. Research is on to develop an anti-APOB drug. Until then, statins remain the prescribed solution.

Remember, you can change your odds of having a heart attack regardless of your genetic risks. For some, that might involve statins and other medication. "But everybody benefits from a good diet and regular exercise," points out Dr Banerjee.



Tech that still needs fixing



To put it lightly, 2020 was rough. More than ever, we turned to our personal tech this year to help find respite, stay healthy and remain connected with the people we care about. Still, there was plenty of tech that let us down.

For the past few years, I've reviewed the tech that vastly improved and the tech that needed fixing. Here were the lows in 2020.

Creepy gadgets

You would think that an artificially intelligent drone that flies around your house to record video is something out of an Orwellian sci-fi movie. But Amazon introduced it as a real product, which says a lot about its product philosophy. The tech isn't necessarily bad at what it does, but it lacks empathy.

The drone isn't expected to be released until 2021, but we can see the creepy factor in some of Amazon's gadgets this year. Most famously, Ring, the Amazon-owned company that makes surveillance cameras including Internet-connected doorbells, came under fire for several scandals, including one that involved four employees who inappropriately watched customers' videos.

More recently, Amazon released Halo, its fitness-tracking bracelet, which took creepy to a new level. It has a tiny microphone that listens in on your conversations to tell you how your mood sounds to other people. (For me, the Halo reported that I was disgusted and irritated when I talked to my wife about what a bad idea the product was.)

It also has an app that snaps photos of your half-naked body to measure your body fat, which I found to be a very negative motivational tool. Amazon has done better before. Its Kindle continues to be the most delightful product for reading. Let's hope its new gadgets are part of a temporary experiment, not a lasting trend.

Foldable phones

This year, phone makers like Samsung, Motorola and Huawei promoted so-called foldable smartphones that can be folded or unfolded to decrease or increase their screen size. For that benefit, you get these trade-offs: The devices cost more than \$1,300 (about Rs 95,500), the screen technology is fragile and the hinges used for folding will eventu-

ally break. Over time, foldable phones also get tedious to use: before you can use it, you have to unfold it and scan your fingerprint or face. Foldables are a reinvention of an old idea. They function like the clamshell phones from the 1990s and early aughts. But has anyone asked for clamshell cell-phones to make a comeback?

5G

Have you heard that 5G is superfast? Probably, because phone carriers have spent millions of dollars marketing the next-generation wireless technology.

Unfortunately, the reality of 5G is more complicated. The technology can be faster than its predecessor, 4G, but with lots of caveats.

There are two main flavours of 5G: a version that is extremely fast — zippy

The screen is fragile and the hinges will eventually break



Calendar can spam you too

I repeatedly get a notification from my iPhone's Calendar app asking me to instal a security update. Sometimes, I get this notification hourly. Kalyan Chakrabarti

This is spam and you have to treat it like you would an unwanted email. Tap on the notification so that it opens the solicitation in the Calendar app. On the event details page, you will see a line asking you to report the dubious invitation as junk. Tap on it, report it as junk and delete the event.

If you do not see the option to report it as junk, tap on the event in the Calendar app and decline or delete it. If this option is also missing, there is no option to do this, then this has been imported from another Calendar app. Check that third-party app and see how you can report it as spam there.

If you are still unsuccessful, you have to hide the account from which you are getting this notification.

Open the Calendar app and tap on Calendars at the bottom. Choose the background from which you are getting the spam, tap on it so that the check mark disappears.

Background change

I am not able to change the background in Google Meet during an online class. I am using the latest version of Chrome on Windows 7. Nilabjo Biswas

You will not be able to change the background if you are using Google Meet for Education. All other users can change the background if the administrator has not restricted the use of this feature.

If you do not see the option to change the background, open Chrome's Settings and click on Advanced at the bottom. Under System, enable hardware acceleration.

A lot of other Windows 7 users have not been able to change the

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background. I would suggest you consider upgrading to Windows 10 if your computer supports it. Windows 7 is already obsolete and Microsoft does not support it anymore.

You could try a Chrome extension called Virtual Backgrounds for Google Meet, which you will find in the Chrome Web Store. Click on the three vertical dots on the top right in Chrome and choose More Tools — Extensions. When the Extensions page is displayed, click on Open Chrome Web Store at the bottom left. Here, search for the extension that I mentioned.

You will be told if this extension is compatible with your computer.

Disappearing messages

How do I use disappearing messages in WhatsApp? I have an Android phone. Aanya Mitra

Make sure you have an updated version of WhatsApp. Open Play Store on your phone and tap on the hamburger icon on the top right. Select "My apps and games". The phone will immediately check for updates. Press on Update all.

Next, open WhatsApp and tap on the name of the recipient or group at the top of the conversation. Once the profile page opens, turn on "Disappearing messages".

In group conversations, only administrators have the right to turn on "disappearing messages".

Once this option is turned on, the message will disappear in seven days so read it before that. If you reply to a disappearing message, the quoted text will remain in the chat even after seven days.

When a disappearing message is forwarded to a chat with disappearing messages off, the message will not vanish in the forwarded chat.

Videos and pictures you receive in WhatsApp will be automatically downloaded to your phone even if disappearing messages are turned on. To save storage space you can turn off auto-download in WhatsApp Settings — Storage and Data.

Format lost

Whenever I copy and paste text from the web to a Word document, the formatting gets messed up. Oishi Patel

To keep your document clean, press Control+Shift+V instead of Control+V to paste it. For a Mac it is Option+Command+Shift+V.

Send in your problems to askdoss2020@gmail.com with TechTonic as the subject line