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Archaeologists discover bread that predates agriculture by 4,000 years

Remains of a flatbread baked by hunter-gatherers 14,400 years ago

At an archaeological site in northeastern Jordan, researchers have discovered the charred remains of a flatbread baked by hunter-gatherers 14,400 years ago. It is the oldest direct evidence of bread found to date, predating the advent of agriculture by at least 4,000 years.

The findings suggest that bread production based on wild cereals may have encouraged hunter-gatherers to cultivate cereals, and thus contributed to the agricultural revolution in the Neolithic period.



A prehistoric stone fireplace in Jordan held extremely stale bits of flatbread baked before the advent of farming. Alexis Pantos

A team of researchers from the University of Copenhagen, University College London and University of Cambridge have analysed charred food remains from a 14,400-year-old Natufian hunter-gatherer site - a site known as Shubayqa 1 located in the Black Desert in northeastern Jordan. The results, which are [published today in the journal Proceedings of the National Academy of Sciences](#), provide the earliest empirical evidence for the production of bread:

"The presence of hundreds of charred food remains in the fireplaces from Shubayqa 1 is an exceptional find, and it has given us the chance to characterize 14,000-year-old food practices. The 24 remains analysed in this study show that wild ancestors of domesticated cereals such as barley, einkorn, and oat had been ground, sieved and kneaded prior to cooking. The remains are very similar to unleavened flatbreads identified at several Neolithic and

Roman sites in Europe and Turkey. So we now know that bread-like products were produced long before the development of farming. The next step is to evaluate if the production and consumption of bread influenced the emergence of plant cultivation and domestication at all," said University of Copenhagen archaeobotanist Amaia Arranz Otaegui, who is the first author of the study.

University of Copenhagen archaeologist Tobias Richter, who led the excavations at Shubayqa 1 in Jordan, explained:

"Natufian hunter-gatherers are of particular interest to us because they lived through a transitional period when people became more sedentary and their diet began to change. Flint sickle blades as well as ground stone tools found at Natufian sites in the Levant have long led archaeologists to suspect that people had begun to exploit plants in a different and perhaps more effective way. But the flat bread found at Shubayqa 1 is the earliest evidence of bread making recovered so far, and it shows that baking was invented before we had plant cultivation. So this evidence confirms some of our ideas. Indeed, it may be that the early and extremely time-consuming production of bread based on wild cereals may have been one of the key driving forces behind the later agricultural revolution where wild cereals were cultivated to provide more convenient sources of food."

Charred remains under the microscope

The charred food remains were analysed with electronic microscopy at a University College London lab by PhD candidate Lara Gonzalez Carratero (UCL Institute of Archaeology), who is an expert on prehistoric bread:

"The identification of 'bread' or other cereal-based products in archaeology is not straightforward. There has been a tendency to simplify classification without really testing it against an identification criteria. We have established a new set of criteria to identify flat bread, dough and porridge like products in the archaeological record. Using Scanning Electron Microscopy we

identified the microstructures and particles of each charred food remain," said Gonzalez Carratero.

"Bread involves labour intensive processing which includes dehusking, grinding of cereals and kneading and baking. That it was produced before farming methods suggests it was seen as special, and the desire to make more of this special food probably contributed to the decision to begin to cultivate cereals. All of this relies on new methodological developments that allow us to identify the remains of bread from very small charred fragments using high magnification," said Professor Dorian Fuller (UCL Institute of Archaeology).

Research into prehistoric food practices continues

A grant recently awarded to the University of Copenhagen team will ensure that research into food making during the transition to the Neolithic will continue: "The Danish Council for Independent Research has recently approved further funding for our work, which will allow us to investigate how people consumed different plants and animals in greater detail. Building on our research into early bread, this will in the future give us a better idea why certain ingredients were favoured over others and were eventually selected for cultivation," said Tobias Richter.

The Shubayqa project research was funded by the Independent Research Fund Denmark. Permission to excavate was granted by the Department of Antiquities of Jordan.

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Magnetized wire could be used to detect cancer in people, Stanford scientists report

Magnetic wire to snag scarce tumor cells could be a swift and effective tactic

A magnetic wire used to snag scarce and hard-to-capture tumor cells could prove to be a swift and effective tactic for early cancer detection, according to a study by researchers at the Stanford University School of Medicine.

The wire, which is threaded into a vein, attracts special magnetic nanoparticles engineered to glom onto tumor cells that may be roaming the bloodstream if you have a tumor somewhere in your body. With these tumor cells essentially magnetized, the wire can lure the cells out of the free-flowing bloodstream using the same force that holds family photos to your refrigerator.

The technique, which has only been used in pigs so far, attracts from 10-80 times more tumor cells than current blood-based cancer-detection methods, making it a potent tool to catch the disease earlier. The technique could even help doctors evaluate a patient's response to particular cancer treatments: If the therapy is working, tumor-cell levels in the blood should rise as the cells die and break away from the tumor, and then fall as the tumor shrinks.

For now, Sam Gambhir, MD, PhD, professor and chair of radiology and director of the Canary Center at Stanford for Cancer Early Detection, is focused on the wire as a cancer-detection method, but its reach could be much broader.

"It could be useful in any other disease in which there are cells or molecules of interest in the blood," said Gambhir, who developed the wire with the help of his colleagues. "For example, let's say you're checking for a bacterial infection, circulating tumor DNA or rare cells that are responsible for inflammation in any of these scenarios, the wire and nanoparticles help to enrich the signal, and therefore detect the disease or infection."

The study will be published online July 16 in *Nature Biomedical Engineering*. Gambhir is the senior author. Postdoctoral scholar Ophir Vermesh, MD, PhD; surgery resident Tianjia Jessie Ge, MD; and MD-PhD student Amin Aalipour share lead authorship.

No vial of blood necessary

Cells that have sloughed off the tumor and cruise the bloodstream freely, otherwise known as circulating tumor cells, can serve as cancer biomarkers, signaling the presence of the disease.

Why then, you might wonder, would you need an entirely new way to capture cells milling about the blood? Couldn't a simple blood draw siphon off the same floating tumor cells? Hypothetically, yes, but circulating tumor cells are often scarce, and a blood draw only samples a few milliliters of the total blood volume, which in adult humans is about 5 liters.

"These circulating tumor cells are so few that if you just take a regular blood sample, those test tubes likely won't even have a single circulating tumor cell in them," said Gambhir, the Virginia and D.K. Ludwig Professor of Clinical Investigation in Cancer Research. It would be like searching for a grain of sand in a bathtub, but only scooping out a few cups of water.

"So doctors end up saying, 'Okay, nothing's there.'"

That, Gambhir said, is where he sees the magnetic wire making a difference. For the wire, which is about the length of your pinky finger and the thickness of a paperclip, to work, circulating tumor cells must be effectively magnetized with nanoparticles. The nanoparticles contain an antibody that latches onto circulating tumor cells. Once the floating tumor cell and nanoparticle are hitched, the cell lugs the tiny magnet around with it, and when the cell-magnet complex flows past the wire, it's compelled by magnetic force to veer from its regular path in the bloodstream and stick to the wire. Then, the wire is removed from the vein, and the cells are stripped for analysis.

Gambhir and his team have yet to try out the wire in people, as they still have to file for approval from the Food and Drug Administration, but they have successfully tested it in pigs, placing the device in a vein near the pig's ear. That vein is fairly similar to veins in the human arm. When compared with a 5-millileter blood sample, the magnetic wire extracted 10-80 times more cancerous cells; compared with a different, commercially available wire-based detection method, the wire picked up 500 to 5,000 more tumor cells.

"We estimate that it would take about 80 tubes of blood to match what the wire is able to sample in 20 minutes," Gambhir said. Of course, he continued, it's not practical to remove 80 test tubes of blood from one person; that's more than a half-liter. "So, we're hoping this approach will enrich our detection capability and give us better insight into just how rare these circulating tumor cells are, and how early on they exist once the cancer is present."

A flexible wire

Gambhir said the technique could also be used to gather genetic information about tumors located in hard-to-biopsy places or to provide information about the efficacy of cancer treatments. Perhaps most intriguingly, the magnetic wire may even stand to evolve into a treatment in and of itself.

"If we can get this thing to be really good at sucking up cancer cells, you might consider an application where you leave the wire in longer term," Gambhir said. "That way it almost acts like a filter that grabs the cancer cells and prevents them from spreading to other parts of the body."

Now, Gambhir is working to ready the technique for humans, which involves approval for the nanoparticles. His lab is conducting toxicity studies in mice, paying close attention to what happens to leftover nanoparticles that don't bind. So far, there are no signs of toxicity, and the extras decay over the course of a few weeks, he said. Gambhir is also looking into nanoparticles that are already FDA-approved, working to tweak them for use with the wire. Once the technology is approved for humans, the goal is to develop it into a multi-pronged tool that will boost detection, diagnosis, treatment and evaluation of cancer therapy.

The work is an example of Stanford Medicine's focus on precision health, the goal of which is to anticipate and prevent disease in the healthy and precisely diagnose and treat disease in the ill.

The study's other Stanford authors are veterinary research coordinator Yamil Saenz, DVM; former graduate students Chin Chun Ooi, PhD, and Yue Guo, PhD; radiology and molecular imaging scientist Israt Alam, PhD; senior research scientist Seung-min Park, PhD; graduate student Charlie Adelson; postdoctoral scholars Hamed Arami, PhD, and Yoshiaki Mitsutake, PhD; assistant professor of comparative medicine Jose Vilches-Moure, DVM, PhD; life science technician Elias Godoy; research scientist Michael Bachmann, MD, ScD; preclinical laboratory managing director Jennifer Lyons; instructor of radiology Kerstin Mueller, PhD; life science technician Alfredo Green; Shan Wang, PhD, professor of materials science and engineering and of electrical engineering; and chemistry professor Edward Solomon, PhD, who is also a professor of photon science at SLAC National Accelerator Laboratory.

Gambhir is a member of Stanford Bio-X, the Stanford Cardiovascular Institute and the Stanford Neurosciences Institute.

The study was funded by National Institutes of Health (grants U54CA151459, R21CA185804 and S10 RR026714), the Canary Foundation and the Ben and Catherine Ivy Foundation.

Stanford's Department of Radiology also supported the work.

<http://bit.ly/2LaDIBJ>

CRISPR/Cas9 gene editing scissors are less accurate than we thought, but there are fixes

New study calls into question the precision of the technique

Author [Gaetan Burgio 1](#)

[CRISPR](#) gene editing technology is revolutionising medicine and biology. This technique allows scientists to edit DNA with more precision and greater ease than previous gene editing technology.

But a [new study](#) has called into question the precision of the technique.

The hope for gene editing is that it will be able to cure and correct diseases. To date, many successes have been reported, including curing [deafness in mice](#), and in altering cells to [cure cancer](#).

Some [17 clinical trials](#) in human patients are registered testing gene editing on leukaemias, brain cancers and sickle cell anaemia (where red blood cells are misshaped, causing them to die). Before implementing CRISPR technology in clinics to treat cancer or congenital disorders, we must address whether the technique is safe and accurate.

How does CRISPR work again?

CRISPR technology utilises molecular scissors (a bacteria enzyme called “Cas9”) to cut the DNA we want to target, and then we can paste DNA in to replace what we have removed. Cas9 recognises a specific segment of DNA among the entire human genome by utilising a guide, something like a map, that is linked to Cas9.

Cas9 can persist in the body for several hours to several weeks. While it remains in the body, Cas9 can cut and paste other segments of DNA (“off targets”) or the targeted segment of DNA over and over (“on target”).

What the new study found

A study published today in [Nature Biotechnology](#) explores the accuracy of the Cas9 scissors. Scientists at the Sanger Institute at Cambridge, UK sought to determine whether Cas9’s cut and paste process is accurate enough to be safely used in humans for treating disease.

To answer this important question, they examined in detail the DNA segments in mouse embryonic stem cells and human cells near the segment that was cut to see if they were affected.

They found that after the DNA was repaired (new DNA pasted into the “cut” segment), the scissors continued to cut the DNA over and over again. They found significant areas near the cut site where DNA had been removed, rearranged or inverted.

If a fragment of DNA is removed or inverted (the genes switched around), the gene modification could be dangerous, and even lead to disease. While this seems scary, this could potentially be overcome using new sequencing technologies.

Can we use different scissors?

There are a few options for getting around this problem. One option is to isolate the cells we wish to edit from the body and reinject only the ones we know have been correctly edited.

For example, lymphocytes (white blood cells) that are crucial to killing cancer cells could be taken out of the body, then modified using CRISPR to heighten their cancer-killing properties.

The DNA of these cells could be sequenced in detail, and only the cells accurately and specifically gene-modified would be selected and delivered back into the body to kill the cancer cells.

While this strategy is valid for cells we can isolate from the body, some cells, such as neurons and muscles, cannot be removed from the body. These types of cells might not be suitable for gene editing using Cas9 scissors.

Fortunately, researchers have discovered other forms of CRISPR systems that don't require the DNA to be cut.

Some CRISPR systems only cut the RNA, not the DNA (DNA contains genetic instructions, RNA convey the instructions on how to synthesise proteins).

As RNA remains in our cells only for a specific period of time before being degraded, this would allow us to control the timing and duration of the CRISPR system delivery and reverse it (so the scissors are only functional for a short period of time).

This was found to be successful for [dementia in mice](#). Similarly, some CRISPR systems simply change the letters of the DNA, rather than cutting them.

This was successful for specific mutations causing diseases such as [hereditary deafness in mice](#).

In short, before using CRISPR clinically, we still have a lot to learn about the effects of Cas9 scissors in the cells.

¹Geneticist and Group Leader, The John Curtin School of Medical Research, Australian National University

Disclosure statement

Gaetan Burgio receives funding from the National Health and Medical Research Council (NHMRC), the Australian Research Council (ARC), the National Collaborative Research Infrastructure Strategy (NCRIS) via the Australian Phenomics Network (APN) and the Natural Science Foundation in China (NSFC).

<http://bit.ly/2zRCel3>

Study: Up To 2% of Earth's Oldest Mantle Rocks are Made from Diamond

Cratonic roots may contain 1 to 2 vol.% diamond

The ancient cores of Earth's continents are called [cratons](#). Shaped like inverted mountains, they can stretch as deep as 200 miles (320 km) through the Earth's crust and into its mantle; geologists refer to their deepest sections as 'roots.' According to [new research](#) published in the journal *Geochemistry, Geophysics, Geosystems*, cratonic roots may contain 1 to 2 vol.% diamond. Considering the total volume of cratonic roots, the study authors figure that about a quadrillion tons of diamond are scattered within these ancient rocks, 90 to 150 miles (145-241 km) below the surface.



Diamond in kimberlite. Parent Géry / CC BY-SA 3.0.

"This shows that diamond is not perhaps this exotic mineral, but on the geological scale of things, it's relatively common," said [Dr. Ulrich Faul](#), a researcher in the Department of Earth, Atmospheric, and Planetary Sciences at MIT.

"We can't get at them, but still, there is much more diamond there than we have ever thought before."

Dr. Faul and colleagues came to their conclusion after puzzling over an anomaly in seismic data.

For the past decades, geological agencies around the world have kept global records of seismic activity — essentially, sound waves traveling through the Earth that are triggered by earthquakes, tsunamis, explosions, and other ground-shaking sources.

Sound waves move at various speeds through the Earth, depending on the temperature, density, and composition of the rocks through which they travel.

Geologists have used this relationship between seismic velocity and rock composition to estimate the types of rocks that make up the Earth's crust and parts of the upper mantle. However, in using seismic data to map the Earth's interior, they have been unable to explain a curious anomaly: sound waves tend to speed up significantly when passing through the roots of ancient cratons.

Cratons are known to be colder and less dense than the surrounding mantle, which would in turn yield slightly faster sound waves, but not quite as fast as what has been measured.

"The velocities that are measured are faster than what we think we can reproduce with reasonable assumptions about what is there. Then we have to say, There is a problem. That's how this project started," Dr. Faul said.

The researchers aimed to identify the composition of cratonic roots that might explain the spikes in seismic speeds.

To do this, they first used seismic data to generate a 3D model of the velocities of seismic waves traveling through the Earth's major cratons. Next, they assembled virtual rocks, made from various combinations of minerals.

Then they calculated how fast sound waves would travel through each virtual rock, and found only one type of rock that produced the same velocities as what the seismologists measured: one that contains 1 to 2% diamond, in addition to [peridotite](#) (the predominant rock type of the Earth's upper mantle) and minor amounts of [eclogite](#) (representing subducted oceanic crust). This scenario represents at least 1,000 times more diamond than people had previously expected.

"Diamond in many ways is special. One of its special properties is, the sound velocity in diamond is more than twice as fast as in the dominant mineral in upper mantle rocks, olivine," Dr. Faul said.

The team found that a rock composition of 1 to 2% diamond would be just enough to produce the higher sound velocities that the seismologists measured. This small fraction of diamond would also

not change the overall density of a craton, which is naturally less dense than the surrounding mantle.

"They are like pieces of wood, floating on water," Dr. Faul said.

"Cratons are a tiny bit less dense than their surroundings, so they don't get subducted back into the Earth but stay floating on the surface. This is how they preserve the oldest rocks."

"So we found that you just need 1 to 2% diamond for cratons to be stable and not sink."

Joshua M. Garber et al. Multidisciplinary Constraints on the Abundance of Diamond and Eclogite in the Cratonic Lithosphere. Geochemistry, Geophysics, Geosystems, published online June 19, 2018; doi: 10.1029/2018GC007534

<http://bit.ly/2zVtSbV>

Ancient Papyrus Reveals Galen's Crazy Theory About 'Hysterical Suffocation'

2,000-year-old text deciphered for the first time.

By Megan Gannon, Live Science Contributor

An unreadable wad of ancient papyrus remained tucked away in a Swiss university's collection for nearly 400 years. Conservators have now peeled the pages apart, deciphering the 2,000-year-old text for the first time.

The message? A previously unknown text describing a bizarre theory on hysteria by the Greco-Roman physician Galen (A.D. 130–210), whose ideas about anatomy and [medicine](#) dominated Western science until the Middle Ages.



The ancient papyrus, shown here after it was cleaned and smoothed, holds medical text possibly written by the Roman physician Galen. University of

Basel

"We can now say that it's a medical text from late antiquity that describes the phenomenon of 'hysterical apnea,'" Sabine Huebner, a

professor of ancient history at the University of Basel, explained in an [announcement](#) of the find. "We therefore assume that it is either a text from the Roman physician Galen, or an unknown commentary on his work."

The text is thought to have been part of the collection of Basilius Amerbach, a professor of jurisprudence at the University of Basel in the 16th century. Amerbach was famous for having compiled thousands of artworks and cultural objects to fill his "cabinet of curiosities"—ancient coins, woodcuts, illustrated books, manuscripts and even a miniature [carving of a unicorn](#) in "unicorn" ivory (really, a walrus tusk). His collection was ultimately bought by the city and the University of Basel in 1661, and became the core of the Kunstmuseum Basel. Amerbach's array of objects went on public display beginning in 1671, sometimes earning it the distinction of the world's oldest municipal art collection.

This particular papyrus had eluded translation for centuries. It had writing on both sides that appeared backward, as if written in a mirror. A recent investigation by the Basel Digital Humanities Lab used ultraviolet and infrared light to look at the manuscript, showing that it was several layers of papyrus stuck together, perhaps to be reused as bookbinding. After a papyrus restorer separated the individual sheets, the Greek writing could finally be read.

"The majority of papyri are documents such as letters, contracts and receipts," Huebner said. "This is a literary text, however, and they are vastly more valuable."

There are already known texts in which Galen describes [hysteria](#), an affliction that is no longer recognized by doctors but had been diagnosed, predominantly in women, in the past. Galen wasn't convinced by another theory of the era, that hysteria was caused by a "wandering womb." Instead, he thought women became hysterical, and could suffer from "hysterical suffocation," or apnea, when they stopped having intercourse. The condition could make them "apnoic,

suffocated or spastic," according to one translation of Galen's text "On the Affected Parts."

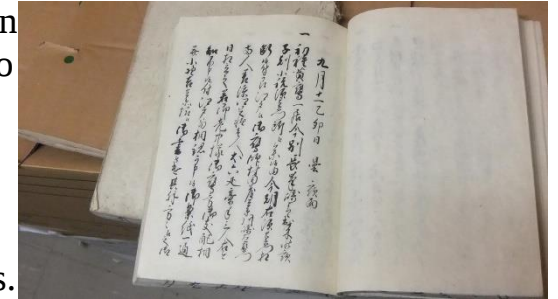
It's hardly the first time scholars have tried to recover a Galen text from a recycled manuscript. Earlier this year, particle physicists at a U.S. Department of Energy lab were trying to use high-energy [X-rays to reveal the rest of a Galen text](#) hidden on a manuscript that had been repurposed as book of Christian hymns.

<http://bit.ly/2Lz1BcF>

How does the sun's rotational cycle influence lightning activity on earth?

Researchers use records from the 1700s to find the answer

A collaborative research team in Japan has taken the first steps to understanding how the sun's rotational cycle influences lightning activity. They found answers in an unusual source--diaries dating back to the 1700s.



This is the original copy of the Diary of Hirosaki Clan Government Office preserved at the Hirosaki City Library. Takehiko Mikami

The research was published in the *Annales Geophysicae*, the open access peer-reviewed solar-terrestrial and planetary sciences journal of the European Geosciences Union on April 18th, 2018.

The team includes faculty members from several universities in Japan, as well as Ryuho Kataoka, an associate professor of the National Institute of Polar Research (NIPR). NIPR supports scientific research and observation of the polar regions and is associated with the Research Organization of Information and Systems (ROIS) in Japan.

"It is well known that long-term--centennial to millennial-scale--variations of solar activity influences terrestrial climate," said Hiroko Miyahara, first author on the paper, and an associate professor of

Humanities and Sciences/Museum Careers at Musashino Art University in Tokyo, Japan. "However, it is not well established whether the sun influences the daily or monthly weather."

Miyahara points to the 27-day solar rotational period, which is the average time it takes for the sun to rotate on its axis. Since the sun consists of plasma, the equator rotates quicker than its poles. When areas of high activity, such as sunspots, face Earth, there's an increase in ultraviolet rays and decrease in energetic particles showering the atmosphere.

Miyahara and her team set out to clarify if the 27-day cycle was reflected in meteorological phenomena, such as lightning activity on Earth. They turned to a set of diaries kept continuously for more than 150 years. A farm family in Hachioji (currently located in western part of Tokyo) kept the first diary called the, "Diary of Ishikawa Family," while the other is the, "Diary of Hirosaki Clan Government Office," a detailed log kept by a collective of civil servants from Hirosaki (currently located in the Aomori Prefecture) who were in residence in central Tokyo. The two locations are about 25 miles apart.

The researchers examined the records for mentions of thunder and lightning events between May and September, when the influence from the cold Siberian air mass is weak in Japan. They found peaks of lightning and thunder activity every 24 to 31 days, the same time window it takes the sunspots to rotate completely. It's a strong signal, especially when the yearly-average number of sunspots is high.

"The cyclic behavior of the sun is playing a very important role in the changes of weather in Japan," Miyahara said, noting that the rhythm of lightning activity amplifies as the level of solar activity increases.

Next, the team plans to study the detailed mechanism of the solar influence on meteorological events and analyze how the impact of solar activity might propagate to Japan.

"Our ultimate goal is to include the influence of solar activity in the weather forecast," Miyahara said. "It would improve the accuracy of the forecast, and it may even enable a longer-term weather forecast."

This research was supported by the Japan Society for the Promotion of Science KAKENHI 15H05816, 25287051, the Center for the Promotion of Integrated Sciences of SOKENDAI (Graduate University for Advanced Studies), and the Project to Build an International Collaborative Research for Pre-modern Japanese Texts headed by the National Institute of Japanese Literature.

Other contributors are Takehiko Mikami and Junpei Hirano, both of whom are faculty members of liberal arts at Teikyo University, Japan; Masumi Zaiki, a faculty member of economics at Seikei University; Minoru Yoshimura, an emeritus member at the University of Yamanashi; Yasuyuki Aono of the Graduate School of Life and Environmental Sciences at Osaka Prefecture University; and Kiyomi Iwahashi of the Center for Collaborative Research on Pre-modern Texts at the National Institute of Japanese Literature.

<http://bit.ly/2uE2kmm>

Omega 3 supplements have little or no heart or vascular health benefit

New Cochrane health evidence challenges belief that omega 3 supplements reduce risk of heart disease, stroke or death

New evidence published today shows there is little or no effect of omega 3 supplements on our risk of experiencing heart disease, stroke or death.

Omega 3 is a type of fat. Small amounts of omega 3 fats are essential for good health, and they can be found in the food that we eat. The main types of omega 3 fatty acids are; alphanolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA). ALA is normally found in fats from plant foods, such as nuts and seeds (walnuts and rapeseed are rich sources). EPA and DHA, collectively called long chain omega 3 fats, are naturally found in fatty fish, such as salmon and fish oils including cod liver oil.

Increased consumption of omega 3 fats is widely promoted globally because of a common belief that that it will protect against heart disease. There is more than one possible mechanism for how they might help prevent heart disease, including reducing blood pressure

or reducing cholesterol. Omega 3 fats are readily available as over-the-counter supplements and they are widely bought and used.

A new *Cochrane systematic review*, published today in the Cochrane Library, combines the results of seventy-nine randomised trials involving 112,059 people. These studies assessed effects of consuming additional omega 3 fat, compared to usual or lower omega 3, on diseases of the heart and circulation. Twenty-five studies were assessed as highly trustworthy because they were well designed and conducted.

The studies recruited men and women, some healthy and others with existing illnesses from North America, Europe, Australia and Asia. Participants were randomly assigned to increase their omega 3 fats or to maintain their usual intake of fat for at least a year. Most studies investigated the impact of giving a long-chain omega 3 supplement in a capsule form and compared it to a dummy pill. Only a few assessed whole fish intake. Most ALA trials added omega 3 fats to foods such as margarine and gave these enriched foods, or naturally ALA-rich foods such as walnuts, to people in the intervention groups, and usual (non-enriched) foods to other participants.

The Cochrane researchers found that increasing long-chain omega 3 provides little if any benefit on most outcomes that they looked at. They found high certainty evidence that long-chain omega 3 fats had little or no meaningful effect on the risk of death from any cause. The risk of death from any cause was 8.8% in people who had increased their intake of omega 3 fats, compared with 9% in people in the control groups.

They also found that taking more long-chain omega 3 fats (including EPA and DHA), primarily through supplements probably makes little or no difference to risk of cardiovascular events, coronary heart deaths, coronary heart disease events, stroke or heart irregularities. Long-chain omega 3 fats probably did reduce some blood fats, triglycerides and HDL cholesterol. Reducing triglycerides is likely

to be protective of heart diseases, but reducing HDL has the opposite effect. The researchers collected information on harms from the studies, but information on bleeding and blood clots was very limited. The systematic review suggests that eating more ALA through food or supplements probably has little or no effect on cardiovascular deaths or deaths from any cause. However, eating more ALA probably reduces the risk of heart irregularities from 3.3 to 2.6%. The review team found that reductions in cardiovascular events with ALA were so small that about 1000 people would need to increase consumption of ALA for one of them to benefit. Similar results were found for cardiovascular death. They did not find enough data from the studies to be able to measure the risk of bleeding or blood clots from using ALA.

Increasing long-chain omega 3 or ALA probably does not affect body weight or fatness.

Cochrane lead author, Dr. Lee Hooper from the University of East Anglia, UK said: "We can be confident in the findings of this review which go against the popular belief that long-chain omega 3 supplements protect the heart. This large systematic review included information from many thousands of people over long periods. Despite all this information, we don't see protective effects.

"The review provides good evidence that taking long-chain omega 3 (fish oil, EPA or DHA) supplements does not benefit heart health or reduce our risk of stroke or death from any cause. The most trustworthy studies consistently showed little or no effect of long-chain omega 3 fats on cardiovascular health. On the other hand, while oily fish is a healthy food, it is unclear from the small number of trials whether eating more oily fish is protective of our hearts.

"This systematic review did find moderate evidence that ALA, found in plant oils (such as rapeseed or canola oil) and nuts (particularly walnuts) may be slightly protective of some diseases of the heart and circulation. However, the effect is very small, 143 people would need

to increase their ALA intake to prevent one person developing arrhythmia. One thousand people would need to increase their ALA intake to prevent one person dying of coronary heart disease or experiencing a cardiovascular event. ALA is an essential fatty acid, an important part of a balanced diet, and increasing intakes may be slightly beneficial for prevention or treatment of cardiovascular disease."

Full citation: Abdelhamid AS, Brown TJ, Brainard JS, Biswas P, Thorpe GC, Moore HJ, Deane KHO, AlAbdulghafoor FK, Summerbell CD, Worthington HV, Song F, Hooper L. Omega 3 fatty acids for the primary and secondary prevention of cardiovascular disease. [Cochrane Database of Systematic Reviews 2018, Issue 5. Art. No.: CD003177. DOI: 10.1002/14651858.CD003177.pub3.](https://doi.org/10.1002/14651858.CD003177)

<http://bit.ly/2L7OL9b>

Liver Cancer Death Rates Rise As Overall Cancer Death Rates Fall in the US

U.S. death rates from liver cancer have risen steadily since 2000, resulting in the disease going from the ninth-leading cause of cancer death to the sixth, a new report finds.

By Sara G. Miller, Health Editor | July 17, 2018 07:01am ET

The change comes as U.S. [cancer death rates overall](#) — meaning rates for all combined cancers — have declined since 1990, according to the report, published today (July 17) by the Centers for Disease Control and Prevention.

But from 2000 to 2016, [liver cancer](#) death rates in adults ages 25 and up rose 43 percent, from 7.2 deaths per 100,000 people in 2000 to 10.3 deaths per 100,000 people in 2016, the report found. The rates increased for both men and women; however, the death rates for men were 2 to 2.5 times higher than the rates for women throughout the study period.

Death rates for other cancers — such as lung, colon and breast cancers — have fallen thanks to lower rates of people getting these cancers, as well as better ways to detect and treat these cancers, said

Dr. Jeffrey Drebin, chair of the Department of Surgery at Memorial Sloan Kettering Cancer Center in New York City and a liver cancer surgeon. Drebin was not involved with the new report.

Liver cancer, however, hasn't seen similar improvements, Drebin told Live Science. For example, the rates of people getting liver cancer haven't changed much, and the disease is still difficult to detect and, in many cases, treat.

Drebin noted that although the rates of [liver](#) cancer due to some causes — such as [hepatitis](#) B, a viral infection that causes inflammation of the liver — have decreased, the rates of the disease due to other causes — including obesity-related cirrhosis, or scarring of the liver — have gone up. Therefore, the rates of people getting liver cancer due to different causes are "probably balanced out," he said.

What's more, even though new drugs are available to treat hepatitis C, another viral infection that causes liver inflammation, these drugs "may not prevent the eventual development of liver cancer," Drebin said.

[Liver cancer death rates](#) were the highest in adults ages 75 and up during the entire study period, the report found. Death rates rose for adults in this age group during the study period, as well as for adults ages 65 to 74 and adults ages 55 to 64. Adults ages 45 to 54 saw an increase in death rates from 2000 to 2005, followed by a decrease in rates from 2012 to 2016. Liver cancer death rates for adults ages 25 to 44 did not change during the study period.

Drebin noted that liver cancer rates rise with age because of the long-term effects of liver inflammation. (In other words, the longer a person has inflammation of the liver, the more likely that person is to develop liver cancer.)

Looking at death rates by race and ethnicity, the report found that death rates rose in Hispanic, non-Hispanic black and non-Hispanic white adults from 2000 to 2016. Liver cancer death rates fell for one

group during the study period: non-Hispanic Asian or Pacific Islander. This group, however, had the highest liver cancer death rate of all the groups in 2000.

The report also found that, after adjusting for age, liver cancer death rates in 2016 were the highest in Washington, D.C. (16.8 deaths per 100,000 people) and the lowest in Vermont (6 deaths per 100,000 people).

The report is based on data from the National Vital Statistics System, a database that contains death certificates from all 50 states and the District of Columbia.

<http://bit.ly/2muCih5>

UK-Based Think Tank Says Editing Human Embryos Is 'Morally Permissible'

Could be "morally permissible" under certain circumstances

By Yasemin Saplakoglu, Staff Writer

A London-based bioethics think tank has released a [new report](#) concluding that editing the DNA of a human embryo, sperm or egg could be "morally permissible" under certain circumstances.

Representatives of the Nuffield Council on Bioethics wrote that genome editing "to influence the characteristics of future generations could be ethically acceptable" so long as it is used to secure "the welfare of a person who may be born as a consequence" of such editing and is "consistent with social justice and solidarity," among other considerations.

The debate over the ethics of editing embryo genomes has been ongoing since the advent of gene-editing technologies, but recent advances in gene editing — namely, CRISPR-Cas9 — have made the debate more prominent.

According to the Nuffield Council, scientists currently know of more than 4,000 inherited single-gene conditions, such as cystic fibrosis, that affect around 1 percent of births worldwide. Gene-editing

technology could help prevent these diseases, the Nuffield Council said.

However, the report urged scientists to conduct further research and discussion before moving forward with such steps. (The practice is currently unlawful in the U.S., the U.K. and many other countries, according to the Nuffield Council and [The New York Times](#).)

"We recommend that before any move is made to amend U.K. legislation to permit heritable genome editing interventions, there should be sufficient opportunity for broad and inclusive societal debate," the report said.

Still, the new report received pushback, [The Guardian](#) reported today (July 17). For example, beyond the issues surrounding designer babies, people are worried of the harms that could come from manipulating genes — tiny traces of ourselves that we will pass down to future generations, where they will continue to exert their influence. A study published yesterday (July 16) in the journal [Nature Biotechnology](#) found that CRISPR-Cas9 could be causing more harm than scientists previously thought, by [unintentionally deleting, rearranging or mutating](#) large chunks of DNA.

<http://bit.ly/2uBOKzS>

Archaeologists Find Pre-Clovis Projectile Points in Texas

At the Gault archaeological site in central Texas, archaeologists have unearthed a projectile point technology never previously seen in North America, which they date to be 16,000-20,000 years old.

The [findings](#), published in the journal *Science Advances*, suggest humans occupied the North American continent prior to Clovis — considered the first culture to use projectile points to hunt on the continent, and dated to around 11,000 years ago.

For decades, scientists believed the Western Hemisphere was settled by humans roughly 13,500 years ago, a theory based largely upon the widespread distribution of [Clovis artifacts](#) dated to that time.

In recent years, though, archaeological evidence has increasingly called into question the idea of ‘Clovis First.’

Now, Texas State University researcher Thomas Williams and colleagues, working at the [Gault site](#) northwest of Austin, has dated a significant assemblage of stone artifacts to 16,000-20,000 years of age, pushing back the timeline of the first human inhabitants of North America far before Clovis.

“Clovis artifacts are distinctive prehistoric stone tools so named because they were initially found near Clovis, New Mexico, in the 1920s but have since been identified throughout North and South America,” Dr. Williams said.

“The Gault projectile points are unique. We haven’t found anything else like them.”

“Combine that with the ages and the fact that it underlies a Clovis component and the Gault site provides a fantastic opportunity to study the earliest human occupants in the Americas.”

The presence of Clovis technology at the Gault site is well-documented.

Excavations below the Clovis deposits revealed well-stratified sediments containing artifacts — called Gault Assemblage — distinctly different from Clovis.

The finds include small projectile point technology, biface stone tools, blade-and-core tools, and flake tools.

Dr. Williams and co-authors compared Gault artifacts to Clovis tools and found that the blade-and-core traditions, in particular, are similar to Clovis blade-and-cores (meaning they continued into the time of Clovis), but biface traditions underwent significant changes in the Clovis level.

“Meanwhile, the early projectile point technology is ‘unrelated’ to Clovis at all,” they noted.

Based on optically stimulated luminescence dating, the Gault Assemblage sediment samples are approximately 16,000-20,000 years old.

“The Gault site, which encompasses a valley at the intersection of the Edwards Plateau and Blackland Prairie, would have had great appeal to early human arrivals,” the researchers said.

“Reliable springs provided ample water for both humans and wild game during drought, and high-quality chert (flint) outcroppings were valuable for use in crafting tools and projectile points.”

“Significantly, the Gault site excavation provides evidence pushing back earliest human habitation of North America by at least 2,500 years,” they said.

“Within a wider context, this evidence suggests that Clovis technology spread across an already well-established, indigenous population.”

Thomas J. Williams et al. 2018. Evidence of an early projectile point technology in North America at the Gault Site, Texas, USA. Science Advances 4 (7): eaar5954; doi: 10.1126/sciadv.aar5954

<http://bit.ly/2LweUKW>

Lab-grown meat could be in restaurants in 3 years (Update)

Dutch company said Tuesday it will pursue its plans to make and sell artificially grown meat to restaurants from 2021

A Dutch company that presented the world's first lab-grown beef burger five years ago said Tuesday it has received funding to pursue its plans to make and sell artificially grown meat to restaurants from 2021.



Alex Borland/public domain

Mosa Meat said it raised 7.5 million euros (\$8.8 million), mainly from M Ventures and Bell Food Group. M Ventures is an investment vehicle for German pharmaceuticals company Merck KGaA.

Bell Food is a European meat processing company based in Switzerland.

Smaller investors include Glass Wall Syndicate, which supports several companies looking into cultured meat or meat substitute products aimed at consumers concerned about the environmental and ethical impact of raising and slaughtering animals.

Maastricht-based Mosa Meat, which has in the past also received 1 million euros from Google co-founder Sergey Brin, said it hopes to sell its first products—most likely ground beef for burgers—in 2021. The aim is to achieve industrial-scale production 2-3 years later, with a typical hamburger patty costing about \$1.

Environmentalists have warned that the world's growing appetite for meat, particularly in emerging economies such as China, isn't sustainable because beef, pork and poultry require far greater resources than plant-based proteins.

Cows in particular also produce large amounts of greenhouse gas that contribute to global warming.

The big challenge is making meat that looks, feels and tastes like the real thing.

Mosa Meat uses a small sample of cells taken from a live animal. Those cells are fed with nutrients so that they grow into strands of muscle tissue. The company claims it could make up to 80,000 quarter pounders from a single sample.

With a number of startups and established players hoping to make cultured meat on a big scale in the coming years, a battle has broken out over the terms used to describe such products.

Some advocates have claimed the term "clean meat" while opponents in the traditional farm sector suggest "synthetic meat" is more appropriate.

<http://bit.ly/2LyTOM6>

Japan's love affair with fish began very early *Analyses show the use of ceramics was strongly linked to processing fish*

Andrew Masterson reports.

In Japan the rapid spread 11,000 years ago of a key new technology – pottery – was driven almost entirely by the need to store seafood.

This finding, [reported](#) in the journal *Proceedings of the National Academy of Sciences*, runs against expectations. It was assumed – although never investigated – that the sudden widespread adoption of pottery many years after its [first emergence in East Asia](#) around 20,000 years ago was because a warming climate made it necessary to store more and more terrestrial plant and animal food sources.



Post Ice Age Japanese pots, all used for storing seafood. Nara National Research Institute for Cultural Properties

To test this assumption, researchers led by archaeologist Alex Lucquin from the University of York in the UK conducted chemical analyses on more than 800 ancient pots retrieved from 46 sites across the Japanese archipelago.

The results were surprising. Regardless of whether the pots were found buried inland or near the coast, in every case the testing returned traces of seafood. The association remained robust even for the much more numerous pots made and used after the end of the last Ice Age, despite the consequent expansion of forests and the abundant food species that lived within them.

The testing was carried out by extracting fat molecules from charred surface deposits, and using them to identify different species. The most common result for the oldest pots was salmon, with other

marine and freshwater fish, as well as molluscs and even a few marine mammals being added to the haul as the climate warmed.

“Our results demonstrate that pottery had a strong association with the processing of fish, irrespective of the ecological setting,” says co-author Oliver Craig.

“Contrary to expectations, this association remained stable even after the onset of warming, including in more southerly areas, where expanding forests provided new opportunities for hunting and gathering.

“The results indicate that a broad array of fish was processed in the pottery after the end of the last Ice Age, corresponding to a period when hunter-gatherers began to settle in one place for longer periods and develop more intensive fishing strategies.”

<https://nyti.ms/2zRJGfU>

Blood Pressure Medicine Is Recalled

The [Food and Drug Administration](#) has announced a voluntary recall of a widely prescribed blood pressure medication made in China, reviving fears about the safety of imported drugs.

By [Sheila Kaplan](#)

Three companies that sell the generic drug, valsartan, in the United States agreed to recall it after the F.D.A. said it might be tainted by N-nitrosodimethylamine (NDMA), considered a probable human carcinogen. The agency is still investigating, but said the contamination was believed to be related to changes in the way that valsartan was manufactured.

All of the valsartan that is being recalled was made in China by the same company, Zhejiang Huahai Pharmaceutical Co. Ltd. It is distributed in the United States by three companies: Major Pharmaceuticals; Teva Pharmaceutical Industries, Ltd.; and Solco Healthcare. Solco, which is owned by Huahai Pharmaceutical, had about 45 percent of the market in 2017, according to John Brito, of Fore Pharma, the market research firm.

“We have carefully assessed the valsartan-containing medications sold in the United States, and we’ve found that the valsartan sold by these specific companies does not meet our safety standards,” said Dr. Janet Woodcock, director of the F.D.A.’s Center for Drug Evaluation and Research. “That is why we’ve asked these companies to take immediate action to protect patients.”

The agency advised patients taking the drug to look at the manufacturer’s name on the label of their prescription bottle to determine if it is part of the recall. If the information is not there, patients should contact the pharmacy where they got it, the F.D.A. said.

The agency also said that patients taking valsartan, or medicines that use it as an ingredient, should continue taking it until they have a substitute. Their health care provider should be able to offer other treatment options, among them, another valsartan product that is not part of the recall. Other companies that market the drug, not subject to the recall, are Sun Pharma, Mylan, Jubilant, Aurobindo and Hetero, according to Fore Pharma.

“The recall is huge, based on the volume and the large number of patients it could have impacted,” said Mr. Brito, “but we believe this could get offset by other players stocking up in short term. Switch options are available for a hypertension patient.”

The safety of imported drugs has long been debated. The F.D.A. said it would continue to investigate the levels of NDMA in the recalled products, determine the possible effect on patients who have been taking them, and assess what measures can be taken to reduce or eliminate the impurity from future batches.

Solco declined to comment, but in a news release, acknowledged that the recall stemmed from detection of a trace amount of NDMA. A spokesman for Major Pharmaceuticals said they were recalling several lots and referred other questions to Teva, which supplies

valsartan that they package and sell. Teva did not return calls for comment.

The recall, which also includes valsartan-hydrochlorothiazide tablets, followed a [similar action taken by the European Medicines Agency](#).

Dr. Harry Lever, a cardiologist at the Cleveland Clinic, said he was concerned about quality control of generic medicines, like valsartan, made in China and India. He believes that manufacturers should be more transparent about where their active ingredients are made.

"It's not just valsartan," Dr. Lever said. "It's becoming very difficult for me to write prescriptions at all. There are so many drugs that are coming in from India and China and companies are buying and selling each other and you don't know what's what."

<https://go.nature.com/2mz5vat>

A mini-snake in amber is the oldest — and youngest — ever found

Specimen dating to 99 million years ago is the first known fossil of a baby snake.

A small, dark squiggle inside an ancient chunk of amber is the world's oldest known baby snake.

Measuring less than 5 centimetres long, the reptile was either a young juvenile or an embryo when it became encased in sap for posterity, according to a team led by Michael Caldwell at the University of Alberta in Edmonton, Canada.



A Cretaceous-era snake (artist's rendering) had either just emerged into the world or was still an embryo when engulfed by amber almost 100 million years ago. Cheung Chung Tat

The specimen, found in Myanmar, is about 99 million years old and represents a new species, which the researchers christened *Xiaophis myanmarensis*. Although the snake is missing its head and some

vertebrae, it is otherwise so well preserved that the researchers could count 97 minuscule vertebrae and determine that the reptile had overlapping, diamond-shaped scales.

Almost all other snakes known from the same time period lived in water. Bits of insect and plant found in the baby snake's amber coffin suggest that it made its home on land, perhaps in a forest.

[Sci. Adv. \(2018\)](#)

<http://bit.ly/2uzv7bE>

Neurons can carry more than one signal at a time ***Study sheds light on how the brain encodes complex information***

DURHAM, N.C. -- Back in the early days of telecommunications, engineers devised a clever way to send multiple telephone calls through a single wire at the same time. Called time-division multiplexing, this technique rapidly switches between sending pieces of each message.

New research from Duke University shows that neurons in the brain may be capable of a similar strategy.

In an experiment examining how monkeys respond to sound, a team of neuroscientists and statisticians found that a single neuron can encode information from two different sounds by switching between the signal associated with one sound and the signal associated with the other sound.

"The question we asked is, how do neurons preserve information about two different stimuli in the world at one time?" said Jennifer Groh, professor in the department of psychology and neuroscience, and in the department of neurobiology at Duke.

"We found that there are periods of time when a given neuron responds to one stimulus, and other periods of time where it responds to the other," Groh said. "They seem to be able to alternate between each one."

The results may explain how the brain processes complex information from the world around us, and may also provide insight

into some of our perceptual and cognitive limitations. The results appeared July 13 in *Nature Communications*.

To make the discovery, Groh and her team collaborated with Surya Tokdar, associate professor of statistical science at Duke, to develop and apply several new methods of analysis to their experimental data. Most studies of single neuron behavior investigate only one stimulus at a time, looking at how an individual neuron responds when the subject is played a single note or shown a single image.

But reality is rarely so simple. Our brains are capable of processing multiple stimuli at once -- such as listening to a friend at a party with music playing in the background, or picking out the buzz of a cicada from a symphony of trilling insects.

"It is not obvious how you go from single neurons encoding single objects, to neurons encoding multiple objects," said Valeria Caruso, a research scientist in Duke's department of psychology and neuroscience. "We wanted to provide an intermediate step, looking at how neurons encode small groups of objects."

To complicate matters, single-neuron studies have shown that many sensory neurons are broadly tuned, meaning each is capable of responding to sounds at a range of different frequencies. For example, the same neurons triggered by your friend's voice may also be triggered by the notes of your favorite tunes.

"If I am a neuron and I'm able to respond to both an image of a pillow and the couch it is resting on, how does the brain infer that both the pillow and the couch are present?" Groh said.

In the experiment, the researchers sat monkeys in a darkened room and trained them to look in the direction of sounds that they heard. The researchers played either one sound or two sounds, with each sound at a different frequency and coming from different locations.

When the researchers played two sounds together, the monkeys looked first in the direction of one sound, and then in the direction of

the other sound, indicating that the monkeys recognized the existence of two distinct sounds.

To find out how the monkeys' brains encoded both sounds simultaneously, the team used electrodes in the inferior colliculus, a key point in the brain's auditory pathway, to measure the small spikes in the local electric field caused by neurons firing.

The researchers investigated the response of single neurons to both individual sounds and to combined sounds. The standard practice in the field is to count how many spikes occur over a period of time and compute the average of a number of trials, Groh said. But this method obscures any fluctuations in activity that might indicate the neurons are switching back and forth between different stimuli.

The team applied a combination of advanced statistical methods, including a new method called a Dynamic Admixture Point Process model developed by Tokdar and his team, to extract more detailed patterns from the data.

They found that a single neuron could respond to one sound with one firing rate, and a second sound with a different firing rate. When both sounds were played simultaneously, it appeared to fluctuate between the two firing rates. Sometimes the fluctuations were fast enough that the neurons switched within a half second of the presentation of the sound, and in other cases the switching was slower.

The team repeated the statistical analysis on data from experiments conducted by Winrich Freiwald, a professor of neurosciences and behavior at The Rockefeller University. In these experiments, Freiwald investigated the firing rates of single neurons in a visual area of the cortex in response to images of one face or two faces. The analysis revealed the same switching pattern when two faces were present.

These findings provide clues to other circumstances where the brain has to do more than one thing at a time with a limited set of neurons. For example, our working memory -- the number of things we can

hold in our minds at one time -- is constrained to around five to seven items. While these experiments do not directly test working memory, the researchers think further studies may help explain these restrictions.

"Our working memory system is quite limited and no one really knows why," Groh said. "Perhaps that limit arises from some kind of cycling behavior where you are coding one thing at a time, and across a period of time, the number of things you can represent depends on how long you need to represent each one and how rapidly you can switch."

A digital version of this story can be accessed at: <https://today.duke.edu/2018/07/neurons-can-carry-more-one-signal-time>

This research was supported by the National Science Foundation (0924750), and the National Institutes of Health (5R01DC013906-02).

CITATION: "Single neurons may encode simultaneous stimuli by switching between activity patterns," Valeria C. Caruso, Jeff T. Mohl, Christopher Glynn, Jungah Lee, Shawn M. Willett, Azeem Zaman, Akinori F. Ebihara, Rolando Estrada, Winrich A. Freiwald, Surya T. Tokdar, and Jennifer M. Groh. Nature Communications, July 13, 2018. DOI: 10.1038/s41467-018-05121-8

<http://bit.ly/2L8sbqB>

Heart attack risk on the rise for pregnant women and death rate remains high

The risk of having a heart attack while pregnant, giving birth, or during the two months after delivery, continues to increase for American women, a new study finds.

As published online July 18 in the *Mayo Clinic Proceedings*, the study, led by NYU School of Medicine researchers, found that the risk of suffering a heart attack among pregnant women rose 25 percent from 2002 to 2014.

The researchers suggest that the trend among many women to have children later in life is one possible reason for the increase, as heart attack risk rises with age overall, and especially during pregnancy. More women, they say, are also obese and/or have diabetes, key risk factors for heart attack. Another factor that may explain the rising

numbers is that myocardial infarcts, the technical name for heart attacks, are easier to detect than a decade ago, as tests for early protein markers of related heart cell damage have improved and become more widely available.

"Our analysis, the largest review in a decade, serves as an important reminder of how stressful pregnancy can be on the female body and heart, causing a lot of physiological changes, and potentially unmasking risk factors that can lead to heart attack," says study senior investigator and interventional cardiologist Sripal Bangalore, MD, MHA.

As part of the study, researchers examined 49,829,753 births recorded in hospitals, where the majority of deliveries in the United States take place, and found that 1,061 heart attacks happened during labor and delivery. Another 922 women were hospitalized for myocardial infarction before birth, and 2,390 heart attacks occurred during the recovery period after birth.

Bangalore, an associate professor in the Department of Medicine at NYU Langone Health, says that although the absolute numbers of heart attacks and deaths from them remain low, the persistence of the relatively high death rate (unchanged at 4.5 percent of cases) comes despite advances in treating heart attacks with drug-coated stents and improved use of blood-thinning medications to prevent heart-vessel blockages.

"Our findings highlight the importance to women considering pregnancy to know their risk factors for heart disease beforehand," says study first author and interventional cardiologist Nathaniel Smilowitz, MD, an assistant professor at NYU Langone. "These patients should work out a plan with their physicians to monitor and control risk factors during pregnancy so that they can minimize their risk."

The study also provided further evidence that the risk of having a heart attack during pregnancy rises as women get older. A woman

between the ages of 35 to 39 who becomes pregnant is five times more likely to suffer a heart attack than a woman in her 20s, and women in their early 40s are 10 times more at risk than women in their 20s. Few women, they say, become pregnant after age 45.

Data for the study came from the U.S. Agency for Healthcare Research and Quality's National Inpatient Survey, for which 2014 was the last full year of data available at the time of the analysis. Specifically, rates for myocardial infarction were found to have increased from 7.1 for every 100,000 pregnancies in 2002 to 9.5 for every 100,000 pregnancies in 2014.

Funding support for the study was provided by NYU Langone. Smilowitz was also supported by National Institutes of Health training grant T32 HL098129.

In addition to Bangalore and Smilowitz, other NYU researchers involved in this study are Navdeep Gupta, MD; Yu Guo, MA; Judy Zhong, PhD; Catherine Weinberg, MD; and Harmony Reynolds, MD.

<http://bit.ly/2Lvpy4z>

CT scans may increase the risk of brain cancer

A new study in the Journal of the National Cancer Institute suggests that CT scans, commonly used in medical imaging, may increase the risk of brain tumors.

The use of computed tomography (CT) scans has increased dramatically over the last two decades. CT scans greatly improve diagnostic capabilities (which improve clinical outcomes) but they deliver higher radiation doses than other tests. Therefore, radiation protection is a concern, especially among children, who may receive higher radiation doses, are more susceptible to radiation-related malignancies than adults and have more time to show effects from the potential risk.

The most common malignancies caused by radioactivity among children and young adults are leukemia and brain tumors. Researchers therefore evaluated leukemia and brain tumor risks following exposure to radiation from CT scans in childhood.

For a nationwide group of 168,394 Dutch children who received one or more CT scans between 1979 and 2012, researchers obtained cancer incidence and vital status by record linkage. They surveyed all Dutch hospital-based radiology departments to ascertain eligibility and participation. In the Netherlands, pediatric CT scans are only performed in hospitals.

Overall cancer incidence was 1.5 times higher than expected. For all brain tumors combined, and for malignant and nonmalignant brain tumors separately, dose-response relationships were observed with radiation dose to the brain. Relative risks increased to between two and four for the highest dose category. The researchers observed no association for leukemia. Radiation doses to the bone marrow, where leukemia originates, were low.

The researchers caution that this pattern of excess cancer risk may be partly due to confounding by indication, because the incidence of brain tumors was higher in the cohort than in the general population. CT scans are sometimes used to identify conditions associated with an increased tumor risk; the reason these children had CT scans may be associated with their risk of developing cancer.

"Epidemiological studies of cancer risks from low doses of medical radiation are challenging, said the study's principal investigator, Michael Hauptmann. "Nevertheless, our careful evaluation of the data and evidence from other studies indicate that CT-related radiation exposure increases brain tumor risk. Careful justification of pediatric CT scans and dose optimization, as done in many hospitals, are essential to minimize risks."

The paper "Radiation Exposure From Pediatric CT Scans and Subsequent Cancer Risk in the Netherlands" is available at: <http://doi.org/10.1093/jnci/djy104>

<http://bit.ly/2Lp1GTu>

***Moderate alcohol consumption may boost male fertility
The question of whether alcohol intake affects male reproductive function is controversial.***

In a new [Andrology](#) study, moderate alcohol intake was linked with higher semen volume, sperm concentration, and total sperm count. In the study of 323 men patients, 9.6% were abstainers, 30.0% drank <1-3, 30.3% drank 4-7, and 30.0% drank ≥8 alcohol units per week. (1 unit = 125 mL wine or 330 mL beer or 30 mL spirits, all containing approximately 12.5 g of ethanol). Compared with men drinking <1-3 units per week, median semen volume was higher in the 4-7 units/week group, as was total sperm count. Association with sperm concentration was also significant, with a U-shaped trend in groups of alcohol intake.

"As regards low intake, our findings are consistent with other research. In Italy, alcohol consumption is common but usually limited to small quantities, and this applies in particular to men referring to our Infertility Clinic," said lead author Dr. Elena Ricci, of the Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, in Italy. "Since the dose makes the poison, they are counselled to limit but not avoid alcohol."

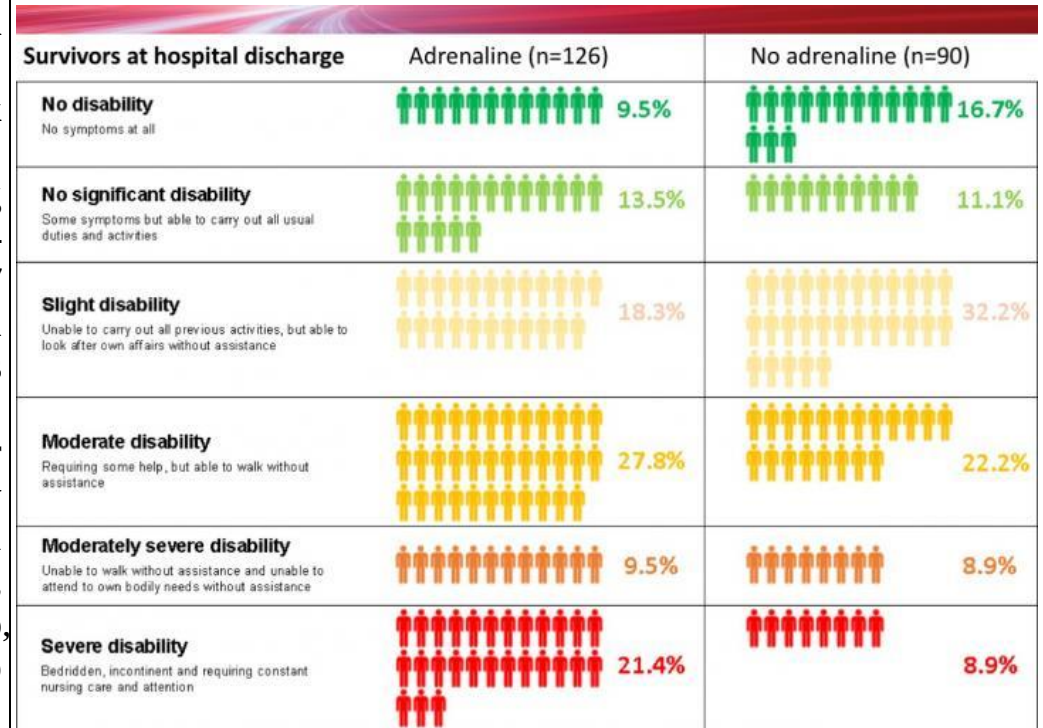
<http://bit.ly/2zWWqup>

Using adrenaline in cardiac arrests results in less than one percent more people leaving hospital alive

But nearly doubles the survivors' risk of severe brain damage

A clinical trial of the use of adrenaline in cardiac arrests has found that its use results in less than 1% more people leaving hospital alive - but almost doubles the risk of severe brain damage for survivors of cardiac arrest. The research raises important questions about the future use of adrenaline in such cases and will necessitate debate amongst healthcare professionals, patients and the public.

Each year 30,000 people sustain a cardiac arrest in the UK and less than one in ten survive. The best chance of survival comes if the cardiac arrest is recognised quickly, someone starts cardiopulmonary resuscitation (CPR) and defibrillation (electric shock treatment) is applied without delay.



Classified by modified Rankin Scale 100% 100%

Infographic detailing result findings, University of Warwick

The application of adrenaline is one of the last things tried in attempts to treat cardiac arrest. It increases blood flow to the heart and increases the chance of restoring a heartbeat. However it also reduces blood flow in very small blood vessels in the brain, which may worsen brain damage. Observational studies, involving over 500,000 patients, have reported worse long-term survival and more brain damage among survivors who were treated with adrenaline.

Despite these issues, until now, there have been no definitive studies of the effectiveness of adrenaline as a treatment for cardiac arrest. This led the International Liaison Committee on Resuscitation to call for a placebo-controlled trial to establish if adrenaline was beneficial or harmful in the treatment of cardiac arrest. This "Pre-hospital Assessment of the Role of Adrenaline: Measuring the Effectiveness

of Drug administration In Cardiac arrest (PARAMEDIC2)" trial was undertaken to determine if adrenaline is beneficial or harmful as a treatment for out of hospital cardiac arrest.

The trial was funded by the National Institute for Health Research, sponsored by the University of Warwick and led by researchers in the University's Clinical Trials Units - part of Warwick Medical School. The trial ran from December 2014 through October 2017. It was conducted in 5 National Health Service Ambulance Trusts in the United Kingdom, and included 8000 patients who were in cardiac arrest. Patients were allocated randomly to be given either adrenaline or a salt-water placebo and all those involved in the trial including the ambulance crews and paramedics were unaware which of these two treatments the patient received.

The results of the trial have now been published in the *New England Journal of Medicine (NEJM)* on Thursday 19th July 2018 in an article entitled "A Randomized Trial of Epinephrine in Out-of-Hospital Cardiac Arrest".

Of 4012 patients given adrenaline, 130 (3.2%) were alive at 30 days compared with 94 (2.4%) of the 3995 patients who were given placebo. However, of the 128 patients who had been given adrenaline and who survived to hospital discharge 39 (30.1%) had severe brain damage, compared with 16 (18.7%) among the 91 survivors who had been given a placebo. In this study a poor neurological outcome (severe brain damage) was defined as someone who was in a vegetative state requiring constant nursing care and attention, or unable to walk and look after their own bodily needs without assistance.

The reasons why more patients survived with adrenaline and yet had an increased chance of severe brain damage are not completely understood. One explanation is that although adrenaline increases blood flow in large blood vessels, it paradoxically impairs blood flow in very small blood vessels, and may worsen brain injury after the

heart has been restarted. An alternative explanation is that the brain is more sensitive than the heart to periods without blood and oxygen and although the heart can recover from such an insult, the brain is irreversibly damaged.

Professor Gavin Perkins Professor of Critical Care Medicine in Warwick Medical School at the University of Warwick (and the lead author on the paper) said:

"We have found that the benefits of adrenaline are small - one extra survivor for every 125 patients treated - but the use of adrenaline almost doubles the risk of a severe brain damage amongst survivors."

"Patients may be less willing to accept burdensome treatments if the chances of recovery are small or the risk of survival with severe brain damage is high. Our own work with patients and the public before starting the trial identified survival without brain damage is more important to patients than survival alone. The findings of this trial will require careful consideration by the wider community and those responsible for clinical practice guidelines for cardiac arrest."

Professor Jerry Nolan, from the Royal United Hospital Bath (and a co-author on the paper) said:

"This trial has answered one of the longest standing questions in resuscitation medicine. Taking the results in context of other studies, it highlights the critical importance of the community response to cardiac arrest. Unlike adrenaline, members of the public can make a much bigger difference to survival through learning how to recognise cardiac arrest, perform CPR and deliver an electric shock with a defibrillator."

Notes for editors

2) Epinephrine is the US drug name for adrenaline

3) The most effective treatments are recognising cardiac arrest and dialling 999 (1 extra survivor for every 11 people treated), starting CPR (1 extra survivor for every 15 people treated), public access defibrillation (1 extra survivor for every 5 people treated). Current guidelines advise that adrenaline is given if these initial treatments are unsuccessful : <https://www.resus.org.uk/resuscitation-guidelines/adult-advanced-life-support>

4) The study was designed and run in accordance with the EU Clinical Trials Directive, UK Clinical Trials Regulations and principles of Good Clinical Practice. It was Funded by the National Institute for Health Research HTA Programme (12/127), ISRCTN73485024 and was sponsored by the University of Warwick. The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health and Social Care.

5)The participating ambulance services were: London Ambulance Service, North East Ambulance Service, South Central Ambulance Service, the Welsh Ambulance Service, and the West Midlands Ambulance Service

6)The authors of the PARAMEDIC 2 paper were: Gavin Perkins, Chen Ji, Charles Deakin, Tom Quinn, Jerry P Nolan, Charlotte Scomparin, Scott Regan, John Long, Anne Slowther, Helen Pocock, John JM Black, Fionna Moore, Rachael T Fothergill, Nigel Rees, Lyndsey O'Shea, Mark Docherty, Imogen Gunson, Kye Han, Karl Charlton, Judith Finn, Stavros Petrou, Nigel Stallard, Simon Gates, Ranjit Lall.

7)The PARAMEDIC2 research team were supported by: NIHR Comprehensive Research Network, Health Care and Research Wales, University of Warwick, Kingston University and St George's, University of London, NIHR Southampton Respiratory Biomedical Research Unit, University of Bristol, University Hospitals Birmingham, Royal United Hospital, Bath, South East Coast Ambulance Service, Curtin University, Perth, Australia, Monash University, Melbourne, Australia, The Intensive Care Foundation

8) The reach funder was the National Institute for Health Research (NIHR): improving the health and wealth of the nation through research. Established by the Department of Health and Social Care, the NIHR: funds high quality research to improve health trains and supports health researchers provides world-class research facilities works with the life sciences industry and charities to benefit all involves patients and the public at every step

<http://bit.ly/2NvCQ1t>

Shroud of Turin Is a Fake, Bloodstains Suggest Modern forensic techniques suggests the bloodstains on the shroud are completely unrealistic

By Charles Q. Choi, Live Science Contributor

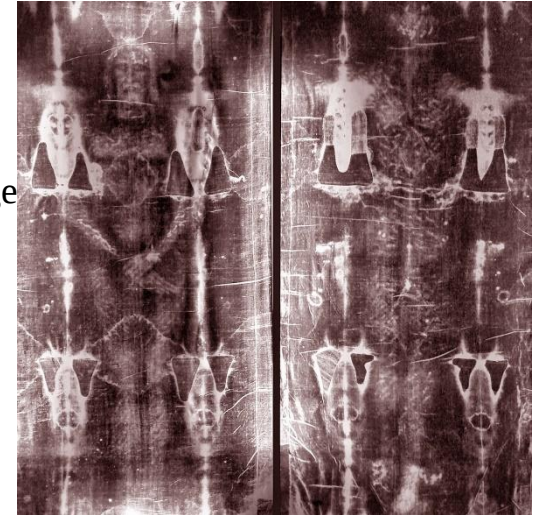
The Shroud of Turin is said by some to be the burial cloth of Jesus and by others a medieval forgery. Now, a new study using modern forensic techniques suggests the bloodstains on the shroud are completely unrealistic, supporting arguments that it is a fake.

The [Shroud of Turin](#) is an ancient linen cloth about 15 feet long by 4 feet wide (4.4 by 1.1 meters) that bears the image of what appears to be a crucified man's body. On display at the Cathedral of Saint John the Baptist in Turin, Italy, it is one of many shrouds claimed over the centuries to be the one true burial cloth of Jesus.

But in 1988, [scientists carbon-dated the shroud's origins to between A.D. 1260 and 1390](#), supporting claims that it is merely a hoax, as [Jesus' life](#) is thought to have come to an end in A.D. 33. Still, whether or not the shroud is a fake is still [a hotly debated question](#).

To help shed light on this controversy, researchers strove to use modern forensic techniques on the shroud. They focused on the bloodstains from the supposed [crucifixion wounds](#) on the linen, aiming to reconstruct the most likely position of the arms and body within the shroud.

The scientists applied blood — both human and synthetic — onto a live volunteer to see how blood would run in rivulets down his skin as he lay with his arms and body in various positions. Furthermore, Jesus was supposedly stabbed in the side with the Holy Spear as he hung on the cross, according to the Gospel of St. John. As such, to mimic a spear wound, the researchers stuck a sponge on a wooden plank, soaked the sponge with synthetic blood and jabbed this fake spear into the side of a mannequin to see how the blood ran down the body. They finally compared all these bloodstain patterns with ones seen on the shroud.



The Shroud of Turin is believed by some to be the burial cloth of Jesus of Nazareth. Currently, the cloth is on display at the Cathedral of Saint John the Baptist in Turin, Italy. Universal History Archive/UIG via Getty images

They found that if one examined all the bloodstains on the shroud together, "you realize these cannot be real bloodstains from a person who was crucified and then put into a grave, but actually handmade by the artist that created the shroud," study lead author Matteo Borrini, a forensic anthropologist at Liverpool John Moores University in England, told Live Science.

For instance, two short rivulets of the blood on the back of the left hand of the shroud are only consistent with a person standing with their arms held at a 45-degree angle. In contrast, the forearm bloodstains found on the shroud match a person standing with their arms held nearly vertically. A person couldn't be in these two positions at once.

The scientists did find that the bloodstains on the front of the chest did match those from a spear wound. However, the stains on the lower back — which supposedly came from the spear wound while the body was positioned on its back — were completely unrealistic, they said.

"If you look at the bloodstains as a whole, just as you would when working at a crime scene, you realize they contradict each other," Borrini said. "That points to the artificial origin of these stains." All in all, this research shows "how we can apply forensic techniques not only to new forensic cases, but also to ancient mysteries," Borrini said. The scientists detailed [their findings](#) online July 10 in the Journal of Forensic Sciences.

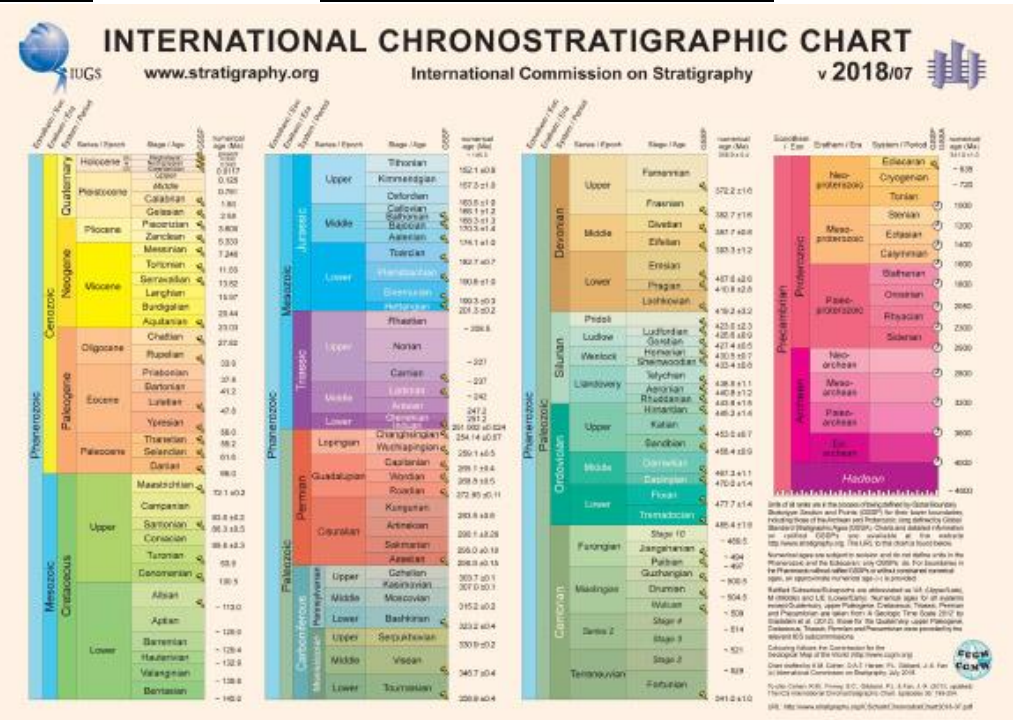
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Meghalayan: Collapse of Ancient Agricultural Civilizations Defines Holocene's Youngest Stage

The Meghalayan, the youngest stage of the current Holocene epoch, began at the time when ancient agricultural societies experienced an abrupt and critical mega-drought and cooling 4,200 years ago, according to the [International Commission on Stratigraphy \(ICS\)](#), which is responsible for standardizing the [Geologic Time Scale](#).

Agricultural-based societies that developed in several regions after the end of the last Ice Age were impacted severely by the 200-year climatic event that [resulted in the collapse of civilizations](#) and human migrations in Egypt, Greece, Syria, Palestine, Mesopotamia, the Indus Valley, and the Yangtze River Valley. Evidence of this climatic event has been found on all seven continents.

The ICS experts approved the definition of the beginning of the Meghalayan based on the timing of this event. Furthermore, they approved proposals for two other ages: the Northgrippian and the Greenlandian with beginnings defined at climatic events that happened about 8,300 years and 11,700 years ago, respectively.



International chronostratigraphic chart 2018. International Commission on Stratigraphy.

The three ages comprise the [Holocene epoch](#), which represents the time since the end of the last Ice Age.

"The Meghalayan Age is unique among the many intervals of the Geologic Time Scale in that its beginning coincides with a global cultural event produced by a global climatic event," said Long Beach State University's Professor Stanley Finney, Secretary General of the International Union of Geological Sciences (IUGS).

"The convergence of stratigraphy and human cultural evolution is extraordinary," added Brock University's Professor Martin Head, Chair of the International Commission on Quaternary Stratigraphy.

"This decision is a significant moment in the history of Holocene climate and archaeology science," said Yale University Professor Harvey Weiss.

Units of the Geologic Time Scale are based on sedimentary strata that have accumulated over time and contain within them sediment types, fossils and chemical isotopes that record the passage of time as well as the physical and biological events that produced them.

The three new ages of the Holocene are represented by a wealth of sediment that accumulated worldwide on the sea floor, on lake bottoms, as glacial ice, and as calcite layers in stalactites and stalagmites.

Those intervals of sedimentary strata on which the ages are based are referred to as stages, and together the strata of three new stages comprise the Holocene.



Portion of the Indian stalagmite that was sectioned and analyzed layer by layer, and contains the layers chosen to define the beginning of the Meghalayan Age, 4,200 years ago. International Commission on Stratigraphy.

The lower boundary of the Greenlandian and Northgrippian stages are defined at specific levels in Greenland ice cores.

The lower boundary of the Meghalayan Stage is defined at a specific level in a stalagmite from a [cave in the state of Meghalaya in northeast India](#). The ice cores and the stalagmite are now identified as international geostandards, and have been placed in protected archives accessible for further study.

<http://bit.ly/2JJ4m9s>

Ancient American farmers supplemented poor diet through fungus infection

Eating only maize leads to disease, and why the Basketmaker II people didn't fall ill has long been a mystery. Now it's been solved.

Andrew Masterson reports.

A mystery concerning how some of North America's first farmers survived on a diet that appears manifestly inadequate may have been solved.

The ancestral Pueblo people who lived in what is now known as the Four Corners region of the southwestern United States shifted from a nomadic to a settled lifestyle centred on crop-growing around 400BCE.



Corn smut: disfiguring but delicious. Carmen Hauser / Getty Images

The primary crop cultivated was maize (known in the US as corn), which accounted for an estimated 80% of calorific intake.

During the ensuing 800 years – a stretch known as the Basketmaker II period – the settlers' diet contained very little meat. This was perhaps a cultural choice. Basketmaker II people became efficient turkey farmers, but the birds were raised primarily for their feathers, used in the manufacture of blankets, and for certain ritual purposes. They were not eaten.

The nutritional components of Basketmaker II cuisine has been well established through a number of analyses, including radio-isotope sampling conducted at burial sites. [A study published in 2013](#), for instance, found that while maize comprised the massive bulk of food intake, it was accompanied by small amounts of wild plants, including yucca, and – more so in men than women – occasional bits of wild rabbit.

Over all, the Pueblo menu should have been dangerously low in a number of essential nutrients, particularly niacin, tryptophan and lysine – the lack of which leads to a range of ailments, including pellagra, an often fatal disease that results in diarrhoea, dermatitis and dementia.

However, no Basketmaker II human remains ever tested have [shown evidence](#) of such an illness. This fact leads to the obvious conclusion that the people must have been able somehow to access the crucial nutrients. There is evidence that at least one community boiled maize in limestone, which would have made some amino acids locked up in the corn more biologically available – but even then the amounts would still have been too small to meet dietary needs.

Now, however, archaeologist and biological anthropologist Jenna Battillo from the Southern Methodist University in Texas may well have found the answer to puzzle.

It turns out to be an organism that today is considered a menace by commercial maize farmers: a fungus called *Ustilago maydis*, or, more prosaically, corn smut.

Analysing “human paleofaeces” found at a Basketmaker II site known as Turkey Penn Ruin in Utah, Battillo found plentiful evidence of *U. maydis* spores. This, [she writes in a paper](#) published in the *Journal of Archaeological Science: Reports*, indicates that the fungus was included as an intentional part of the diet.

There is considerable later evidence to back up the suggestion. The fungus, which forms distinctive lumps or “galls” on maize heads, is today a popular food in Mexico, where it is known as *huitlacoche*. It is also popular among some communities in Central America.

Battillo cites a number of studies that found corn smut was historically considered a delicacy among southern and meso-American societies, including the Aztec, Maya and Hopi.

U. maydis causes loss of vitality and weight as well as cosmetic disfigurement in maize and is therefore hated by commercial growers. About 4% of the US crop is lost to the fungus each year – well down from the estimated 80% that blighted farms in the nineteenth and twentieth centuries.

For the Basketmaker II people, however, the fungus infection was very positive – indeed, quite literally, a lifesaver.

Battillo reports that corn smut alters the nutrient content of corn. It increases the protein levels from as low as 3% to as high as 19%. It also dramatically boosts the levels of lysine, and introduces 16 other essential amino acids. The only one missing is tryptophan, for which no data is available – Battillo suggests limestone boiling and input from other minor food sources might have been sufficient to provide the average four milligrams a day required to maintain health.

And while the new research seems to answer the question of how Basketmaker II people supplemented their nutrient-poor maize diet, it still leaves another matter unresolved.

The evidence, says Battillo, cannot determine whether the early farmer communities intentionally introduced or encouraged corn smut on their plants, or whether infections happened by accident and were simply tolerated.

In either scenario, she concludes, “the ubiquity of the spores in paleofaeces from Turkey Pen Ruin strongly supports intentional consumption”.

<http://bit.ly/2uHDDp8>

Treating dementia with the healing waves of sound ***Ultrasound applied to the brain could help treat patients with dementia.***

Ultrasound waves applied to the whole brain improve cognitive dysfunction in mice with conditions simulating vascular dementia and Alzheimer's disease. The research, conducted by scientists at Tohoku University in Japan, suggests that this type of therapy may also benefit humans.

The team, led by cardiologist Hiroaki Shimokawa, found that applying low-intensity pulsed ultrasound (LIPUS) to the whole brain of the mice improved blood vessel formation and nerve cell regeneration without having obvious side effects.

"The LIPUS therapy is a non-invasive physiotherapy that could apply to high-risk elderly patients without the need for surgery or anaesthesia, and could be used repeatedly," says Shimokawa.

Dementia affects about 50 million people worldwide, with 10 million new cases occurring every year. But there are currently no curative treatments available for vascular dementia or Alzheimer's disease, the most common causes of dementia. Also, the cells lining the brain's blood vessels are tightly packed, forming a blood-brain barrier that prevents large molecules from crossing into the brain tissue. This limits the types of drugs and cell therapies that could be made available to treat dementia.

Shimokawa and his team had conducted previous studies showing that LIPUS improved blood vessel formation in pigs with myocardial ischemia, a condition where there is reduced blood flow to the heart. Other studies have reported that LIPUS increases the production of proteins involved in nerve cell survival and growth, in addition to a role in promoting nerve regeneration. Focusing LIPUS treatment on a region in the brain called the hippocampus, which is involved in memory, has also been found to improve dementia in mice, but the details of how it does this need to be more fully investigated.

The Tohoku University team wanted to find out if whole-brain rather than focused LIPUS is effective in treating mouse models of dementia, and if it was, what was happening at the molecular levels to achieve this.

They found that cognitive impairment markedly improved in mice with conditions similar to vascular dementia and Alzheimer's disease when LIPUS was applied to the whole brain three times a day for 20 minutes each time. The mice with vascular dementia received the treatment on the first, third and fifth days following a surgical procedure that limited the brain's blood supply. The mice with a condition simulating Alzheimer's disease in humans received 11 LIPUS treatments over a period of three months.

At the molecular level, genes related to the cells lining blood vessels were turned on. Also, there was increased expression of an enzyme involved in blood vessel formation and a protein involved in nerve cell survival and growth.

The researchers conclude that their study, [recently published in the journal *Brain Stimulation*](#), provides the first experimental evidence that whole-brain LIPUS therapy markedly improves cognitive dysfunctions without serious side effects by enhancing specific cells related to dementia's pathology.

The first clinical trials to evaluate the effectiveness and safety of the LIPUS treatment are already underway.

<http://bit.ly/2LqLTDB>

Most common shoulder operation is no more beneficial than placebo surgery

One of the most common surgical procedures in the Western world is probably unnecessary, suggests a new study

The Finnish Shoulder Impingement Arthroscopy Controlled Trial (FIMPACT) compared surgical treatment of shoulder impingement syndrome to placebo surgery. Two years after the procedure the study participants, both those in the group who underwent surgery and the ones in the placebo group, had equally little shoulder pain and were equally satisfied with the overall situation of their shoulder. "These results show that this type of surgery is not an effective form of treatment for this most common shoulder complaint. With results as crystal clear as this, we expect that this will lead to major changes in contemporary treatment practices," said the study's principal investigators chief surgeon Mika Paavola and professor Teppo Järvinen from the Helsinki University Hospital and University of Helsinki.

Shoulder problems are very common and place a significant burden on the health care system. The most common diagnosis for shoulder pain that requires treatment is shoulder impingement, and the most

common surgical treatment is decompression through keyhole surgery (i.e., arthroscopy Merriam Webster Dictionary: a minimally invasive surgical procedure involving visual examination of the interior of a joint with an arthroscope to diagnose or treat various conditions or injuries of a joint and especially to repair or remove damaged or diseased tissue or bone).

"With nearly 21,000 decompression surgeries done in UK every year, and ten times that many in the United States, the impact of this study is huge," explained adjunct professor Simo Taimela, the research director of the Finnish Centre for Evidence-Based Orthopedics (FICEBO) at the University of Helsinki.

This research confirms previous randomised studies showing that keyhole decompression surgery of the shoulder does not alleviate the symptoms of patients any better than physiotherapy. Paradoxically, however, the number of decompression surgeries has increased significantly, even though solid proof of the impact of the surgery on the symptoms has been lacking.

The FIMPACT study involved 189 patients suffering from persistent shoulder pain for at least three months despite receiving conservative treatment, physiotherapy and steroid injections. Patients were randomised to receive one of three different treatment options, subacromial decompression surgery, placebo surgery (diagnostic arthroscopy, which involved arthroscopic examination of the shoulder joint but no therapeutic procedures) or supervised exercise therapy.

No one involved in the study - including the patients, the persons involved in their care after surgery, and the researchers who analysed the results - knew which patient was in the decompression or placebo group.

Two years after the start of the study, patients were asked about shoulder pain and other symptoms they had experienced, as well as their satisfaction with the treatment and its results. The patients in

the decompression or placebo groups were also asked which group they believed they had been in - actual surgery or placebo.

Overall, shoulder pain was substantially improved in all three groups from the start of the trial. However, decompression surgery offered no greater benefit to shoulder pain than placebo surgery. The patients in the diagnostic arthroscopy group were no more likely than those in the decompression group to guess that they had had a placebo procedure.

The group that received exercise therapy also improved over time, to the point that patients who initially had decompression surgery were only slightly more improved than those who had physiotherapy only. Although this latter finding could be interpreted as evidence to support decompression surgery, the authors did not find the difference in improvement to be clinically significant.

"Based on these results, we should question the current line of treatment according to which patients with shoulder pain attributed to shoulder impingement are treated with decompression surgery, as it seems clear that instead of surgery, the treatment of such patients should hinge on nonoperative means," Järvinen states. "By ceasing the procedures which have proven ineffective, we would avoid performing hundreds of thousands useless surgeries every year in the world", Järvinen points out. "Fortunately, there seems to be light at the end of the tunnel as the NHS in England just released a statement that they will start restricting funding for 'unnecessary procedures' and the list includes subacromial decompression. We applaud this initiative and encourage other countries to follow this lead".

"We have to spend taxpayers' money responsibly. If we are spending money on procedures that are not effective, that money is deprived from treatments that are clinically effective and would provide benefits to patients. One component in becoming more efficient is to make sure we are not undertaking unnecessary procedures", Dr. Taimela concludes.

The FIMPACT research project includes the Helsinki and Tampere University Hospitals in Finland. [The study is published in *The BMJ* on 19 July 2018.](#)

<http://bit.ly/2NxldhW>

Wait, just a second, is your doctor listening?

Analysis of clinical encounters shows that doctors spend little time first listening to their patients and interrupt them often

On average, patients get about 11 seconds to explain the reasons for their visit before they are interrupted by their doctors. Also, only one in three doctors provides their patients with adequate opportunity to describe their situation.

The pressure to rush consultations affects specialists more than primary care doctors says Naykky Singh Ospina of the University of Florida, Gainesville and the Mayo Clinic in the US. She led research that investigated the clinical encounters between doctors and their patients, how the conversation between them starts, and whether patients are able to set the agenda.

[The study is in the *Journal of General Internal Medicine*](#) which is the official journal of the Society of General Internal Medicine and is published by Springer.

The researchers analyzed the initial few minutes of consultations between 112 patients and their doctors.

These encounters were videotaped in various US clinics during training sessions for doctors. In their analyses, Singh Ospina and her colleagues noted whether, for instance, doctors invited patients to set the agenda through opening questions such as "How are you?" or "What can I do for you?" The researchers also recorded whether patients were interrupted when answering such questions, and in what manner.

In just over one third of the time (36 per cent), patients were able to put their agendas first. But patients who did get the chance to list

their ailments were still interrupted seven out of every ten times, on average within 11 seconds of them starting to speak.

In this study, patients who were not interrupted completed their opening statements within about six seconds.

Primary care doctors allowed more time than specialists and tended to interrupt less. According to Singh Ospina, specialists might often skip the introductory step of agenda setting because they already know why a patient has been referred.

"However, even in a specialty visit concerning a specific matter, it is invaluable to understand why the patients think they are at the appointment and what specific concerns they have related to the condition or its management," adds Singh Ospina.

She acknowledges that the frequency of interruptions not only depends on the type of practice being visited, but also relates to the complexity of each patient.

"If done respectfully and with the patient's best interest in mind, interruptions to the patient's discourse may clarify or focus the conversation, and thus benefit patients," she agrees. "Yet, it seems rather unlikely that an interruption, even to clarify or focus, could be beneficial at the early stage in the encounter."

Time constraints, not enough training on how to communicate with patients, and burnout experienced by physicians may stand in the way of a more patient-centred approach.

Singh Ospina would like to see further studies exploring a possible link between a patient being given a chance to set his or her agenda, and the ultimate experience and outcomes of their visit to their doctor.

"Our results suggest that we are far from achieving patient-centred care," she says.

Reference: Singh Ospina, N. et al (2018). Eliciting the Patient's Agenda- Secondary Analysis of Recorded Clinical Encounters, Journal of General Internal Medicine DOI: 10.1007/s11606-018-4540-5

<http://bit.ly/2LuDQFK>

Complementary medicine for cancer can decrease survival

People receiving complementary therapy for curable cancers refuse part their conventional cancer treatment, and thus more likely to die

New Haven, Conn.-- People who received complementary therapy for curable cancers were more likely to refuse at least one component of their conventional cancer treatment, and were more likely to die as a result, according to researchers from Yale Cancer Center and the Cancer Outcomes, Public Policy and Effectiveness Research Center (COPPER) at Yale School of Medicine. [The findings were reported today online in JAMA Oncology.](#)

Use of complementary medicine -- medical therapies that fall beyond the scope of scientific medicine -- is growing in the United States and often used by patients with cancer. Although many patients believe that a combination of complementary medicine and conventional cancer treatment will provide the greatest chance at a cure, there is limited research evaluating the effectiveness of complementary medicines. It is also unknown whether patients who use complementary medicines use them to improve their response to conventional medical therapies, or use them in lieu of recommended conventional therapies.

"Past research into why patients use non-medical complementary treatments has shown the majority of cancer patients who use complementary medicines believe their use will result in improved survival," said the study's senior author, James Yu, M.D., associate professor of therapeutic radiology at Yale Cancer Center. "We became interested in this topic after we reviewed the literature, and found that there was scant evidence to support this belief."

To investigate complementary medicine use and its impact on survival and treatment adherence, the researchers studied 1,290

patients with breast, prostate, lung, or colorectal cancer in the National Cancer Database (NCDB) -- a joint project of the Commission on Cancer of the American College of Surgeons and the American Cancer Society. The NCDB represents approximately 70% of newly diagnosed cancers nationwide. Researchers compared 258 patients who used complementary medicine to 1,032 who did not.

The researchers studied de-identified patients diagnosed over a 10-year period, from 2004 to 2013. By collecting the outcomes of patients who received complementary medicine in addition to conventional cancer treatments, they found a greater risk of death. Interestingly, they noted, despite having received some conventional cancer therapy, these patients were more likely to refuse other aspects of recommended care like chemotherapy, surgery, radiation and/or hormone therapy. The researchers concluded patients who chose to use complementary medicines as cancer treatment, were more likely to refuse other conventional cancer treatments and as a result, had a higher risk of death than those who used no complementary medicine.

"The fact that complementary medicine use is associated with higher refusal of proven cancer treatments as well as increased risk of death should give providers and patients pause," said lead author Skyler Johnson, M.D., chief resident in radiation oncology at Yale School of Medicine. "Unfortunately, there is a great deal of confusion about the role of complementary therapies. Although they may be used to support patients experiencing symptoms from cancer treatment, it looks as though they are either being marketed or understood to be effective cancer treatments."

Cary Gross, M.D., co-author of the study, called for further research, "The sources of misinformation need to be better understood, so that patients aren't being sold a false bill of goods."

Henry Park, M.D., is also a study author.

<http://bit.ly/2Le7aBk>

Paralyzed mice with spinal cord injury made to walk again

Small-molecule drug reactivates dormant nerve pathways; could complement regenerative strategies

Most people with spinal cord injury are paralyzed from the injury site down, even when the cord isn't completely severed. Why don't the spared portions of the spinal cord keep working? Researchers at [Boston Children's Hospital](#) now provide insight into why these nerve pathways remain quiet. They also show that a small-molecule compound, given systemically, can revive these circuits in paralyzed mice, restoring their ability to walk.

The study, led by [Zhigang He, PhD](#), in Boston Children's [F.M. Kirby Neurobiology Center](#), [was published online July 19 by the journal Cell](#). "For this fairly severe type of spinal cord injury, this is most significant functional recovery we know of," says He. "We saw 80 percent of mice treated with this compound recover their stepping ability."

Waking up dormant spinal circuits

Many animal studies looking to repair spinal cord damage have focused on getting nerve fibers, or axons, to regenerate, or to getting new axons to sprout from healthy ones. While impressive axon regeneration and sprouting have been achieved, by He's lab and others, their impacts on the animals' motor function after a severe injury are less clear. Some studies have tried using neuromodulators such as serotonergic drugs to simulate the spinal circuits, but have gotten only transient, uncontrolled limb movement.

He and colleagues took another approach, inspired by the success of epidural electrical stimulation-based strategies, the only treatment known to be effective in patients with spinal cord injury. This treatment applies a current to the lower portion of the spinal cord;

combined with rehabilitation training, it has enabled some patients to regain movement.

"Epidural stimulation seems to affect the excitability of neurons," says He. "However, in these studies, when you turn off the stimulation, the effect is gone. We tried to come up with a pharmacologic approach to mimic the stimulation and better understand how it works."

He, first author Bo Chen and colleagues selected a handful of compounds that are already known to alter the excitability of neurons, and are able to cross the blood-brain barrier. They gave each compound to paralyzed mice in groups of 10 via intraperitoneal injection. All mice had severe spinal cord injury, but with some nerves intact. Each group (plus a control group given placebo) was treated for eight to ten weeks.

Inhibiting inhibition by re-activating KCC2

One compound, called CLP290, had the most potent effect, enabling paralyzed mice to regain stepping ability after four to five weeks of treatment. Electromyography recordings showed that the two relevant groups of hindlimb muscles were active. The animals' walking scores remained higher than the controls' up to two weeks after stopping treatment. Side effects were minimal.

CLP290 is known to activate a protein called KCC2, found in cell membranes, that transports chloride out of neurons. The new research shows that inhibitory neurons in the injured spinal cord are crucial to recovery of motor function. After spinal cord injury, these neurons produce dramatically less KCC2. As a result, He and colleagues found, they can't properly respond to signals from the brain. Unable to process inhibitory signals, they respond only to excitatory signals that tell them to keep firing. And since these neurons' signals are inhibitory, the result is too much inhibitory signaling in the overall spinal circuit. In effect, the brain's commands telling the limbs to move aren't relayed.

By restoring KCC2, with either CLP290 or genetic techniques, the inhibitory neurons can again receive inhibitory signals from the brain, so they fire less. This shifts the overall circuit back toward excitation, the researchers found, making it more responsive to input from the brain. This had the effect of reanimating spinal circuits disabled by the injury. "Restoring inhibition will allow the whole system to be excited more easily," He explains.

"Too much excitation not good, and too much inhibition is not good either. You really need to get a balance. This hasn't been demonstrated in a rigorous way in spinal cord injury before."

Combination treatment?

He and colleagues are now investigating other compounds that act as KCC2 agonists. They believe such drugs, or perhaps gene therapy to restore KCC2, could be combined with epidural stimulation to maximize a patient's function after spinal cord injury.

"We are very excited by this direction," says He. "We want to test this kind of treatment in a more clinically relevant model of spinal cord injury and better understand how KCC2 agonists work."

Bo Chen, Yi Li (Boston Children's Hospital) and Bin Yu (Nantong University, China) were co-first authors on the paper. Xiosong Gu (Nantong University) and Zhigang He are co-senior authors. Coauthors were Zicong Zhang, Benedikt Brommer, Philip Raymond Williams, Yuanyuan Liu, Shane Vincent Hegarty, Junjie Zhu and Yiming Zhang (Boston Children's Hospital); Songlin Zhou (Nantong University); Hong Guo and Yi Lu (Brigham and Women's Hospital, Boston).

The study was supported by the National Major Project of Research and Development of China (2017YFA0104701), the National Institute of Neurological Disorders and Stroke (NS096294), the Craig Neilsen Foundation, the Paralyzed Veterans of America Research Foundation and the Dr. Miriam and Sheldon G. Adelson Medical Research Foundation.

<http://bit.ly/2zYr5if>

Yeast species used in food industry causes disease in humans

A major cause of drug-resistant clinical yeast infections is the same species previously regarded as non-pathogenic and commonly used in the biotechnology and food industries.

The study, published on July 19th in the open-access journal *PLOS Pathogens*, was led by Alexander Douglass of University College Dublin in Ireland.

Candida krusei is a drug-resistant yeast species and one of the five most prevalent causes of clinical yeast infections. It responsible for significant levels of morbidity and mortality in immunocompromised patients.

By contrast, a yeast species called *Pichia kudriavzevii* has been considered to be safe because it has been used for centuries to make food products such as fermented cassava and cacao, fermented milk, and maize beverages. It

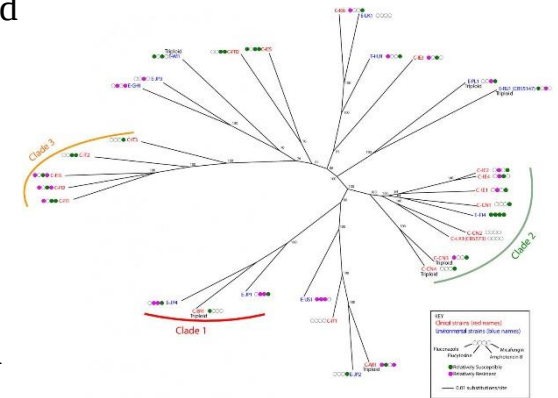
also has a growing role in biotechnology for the production of bioethanol and high-value chemicals. But to date, relatively little genetic or genomic investigation has been carried out on strains of *C.*

krusei and *P. kudriavzevii*.

A phylogenetic tree of strains was constructed from data from a filtered set of 150,306 SNP sites, using RRHS and Maximum Likelihood (see Methods).

Branch supports represent pseudo-bootstrap values. Strains named in red are clinical isolates, and strains named in blue are environmental. For each strain, four circles indicate relative resistance (magenta) or relative sensitivity (green) to four drugs as shown in the key. Douglass AP et al. (2018)

To address this gap in knowledge, Douglass and colleagues sequenced the genomes of 30 clinical and environmental strains of these two species. The results show conclusively that they are the same species, with genomes that are 99.6% identical in DNA sequence. Moreover, the two species show similar levels of resistance to antifungal drugs. The findings suggest that industrial yeast strains are capable of causing disease in humans, and caution



may be needed in the use of drug-resistant *P. kudriavzevii* strains for biotechnology and food applications.

"It may be advisable to consider non-pathogenic *Pichia* species as possible alternatives for some industrial applications," Douglass said.

"It would also be advisable to set limits on the levels of drug-resistance permissible in *P. kudriavzevii* strains that are used in industry, particularly the food industry."

"If I suggested using drug-resistant *Candida albicans* to make food, I would be stopped immediately," said Professor Ken Wolfe, principal investigator of the study. "But with drug-resistant *Candida krusei*, nobody bats an eyelid because the food makers use a different name for it."

<http://bit.ly/2LCA9L6>

Glucose Improves Memory in Older Adults: Study
A small dose of glucose can improve memory in older adults, motivate them to work harder and puts them in a good mood when performing difficult tasks, according to a new study published in the journal Psychology and Aging.

"Over the years, studies have shown that actively engaging with difficult cognitive tasks is a prerequisite for the maintenance of cognitive health in older age," said study first author [Konstantinos Mantantzis](#), a Ph.D. student in the Department of Psychology at the University of Warwick, UK.

"Therefore, the implications of uncovering the mechanisms that determine older adults' levels of engagement cannot be understated." Mantantzis and colleagues examined whether glucose can help older adults to exert more effort under high difficulty conditions, and if so, whether such increase is accompanied by a change in positive affect. Fifty-three young (aged 18-27) and 58 older (aged 65-82) participants consumed a glucose or a placebo drink (with artificial sweetener) and completed a memory-search task at three levels of difficulty.

The scientists measured participants' levels of engagement with the task, their memory score, mood, and their own perception of effort.

They found that increasing energy through a glucose drink can help both young and older adults to try harder compared to those who had the artificial sweetener.

For young adults, that's where it ended, though: glucose did not improve either their mood or their memory performance.

However, older adults who had a glucose drink showed significantly better memory and more positive mood compared to older adults who consumed the artificial sweetener.

Moreover, although objective measures of task engagement showed that older adults in the glucose group put more effort into the task than those who consumed the artificial sweetener, their own self-reports showed that they did not feel as if they had tried any harder.

"Short-term energy availability in the form of raised blood sugar levels could be an important factor in older adults' motivation to perform a task at their highest capacity," the researchers said.

"Heightened motivation, in turn, could explain the fact that increased blood sugar levels also increase older adults' sense of self-confidence, decrease self-perceptions of effort, and improve mood."

"However, more research is needed to disentangle these factors in order to fully understand how energy availability affects cognitive engagement, and to develop clear dietary guidelines for older adults."

"Our results bring us a step closer to understanding what motivates older adults to exert effort and finding ways of increasing their willingness to try hard even if a task seems impossible to perform," said senior author [Dr. Friederike Schlaghecken](#), also from the Department of Psychology at the University of Warwick.

K. Mantantzis et al. Gain without pain: Glucose promotes cognitive engagement and protects positive affect in older adults. Psychology and Aging, published online July 12, 2018; doi: 10.1037/pag0000270

<http://bit.ly/2uH7yOi>

Woman Tried to Treat Athlete's Foot with Raw Garlic. It Burned Through Her Toe.

A woman in England learned the hard way that it's not safe to treat a foot fungus infection by covering it with slices of raw garlic, according to a new report of the woman's case.

By Laura Geggel, Senior Writer | July 20, 2018 09:58am ET

Instead of treating her athlete's foot, the garlic severely burned and blistered the woman's skin, ultimately landing her in a doctor's office, the case report said. (Athlete's foot is a skin infection caused by fungus.)

It's not uncommon for people to turn to home remedies for medical treatment. Given that people have used garlic (*Allium sativum*) as a health treatment for thousands of years, it's no wonder the 45-year-old woman decided to use raw garlic to try treating her fungal infection, which was affecting the nail on her left big toe and the skin around it, said case report senior author Dr. Kai Wong, aplastic surgeon at Oxford University Hospitals National Health Service Foundation Trust.

So, the woman went ahead and sliced up [raw garlic](#). She then applied the slices to her toe for up to 4 hours a day over the course of four weeks.

It didn't work. When she finally went to the doctor's office, she still had the fungal infection, as well as red and painfully blistered skin on her foot, said Wong, who treated the woman. Luckily, the woman made a full recovery (at least from the chemical burn). The doctors rinsed the woman's burned foot with water and then dressed it with bandages. Her skin healed after two weeks.

Garlic burns

It appears that the woman's painful symptoms were caused by the garlic's sulfur-containing compounds, including a compound called diallyl disulfide, Wong told Live Science.

"Basically, the strongest agent [in garlic] is the diallyl disulfide chemical," said Dr. Lisa Maier, a clinical associate professor of dermatology at the University of Washington School of Medicine who was not involved with the case report.

"That can do two things. It can either irritate the skin, causing a [garlic burn](#). It can also cause an allergic contact dermatitis, which is more of a true allergy [that people develop], and then you can get more of a rash or an eczema."



A 45-year-old woman got burns and blisters on her toe after trying to treat her athlete's foot with raw garlic. Sharp O. et al/BMJ Case Reports 2018

In fact, cooks and people who work with food have reported getting garlic burns after handling the raw bulb. The severity of the burn depends on the amount of time spent handling garlic, the freshness and amount of the garlic and whether that person has a pre-existing skin condition or skin sensitivity, the case report said.

While treating the woman, her doctors advised her to use the standard treatment for her [fungal infection](#), Wong said.

In general, nonprescription ointments with antifungals, such as terbinafine and clotrimazole, can treat athlete's foot, so long as the nail isn't infected too, Maier told Live Science. But if the nail is involved, "the most effective way to treat those [infections] are with oral antifungals, and that would need to be prescribed by a physician."

There are studies indicating that a garlic-derived compound known as ajoene can treat athlete's foot (but not nail fungus). A 1996 study in the [journal Mycoses](#) and a 2000 study in the [Journal of the American Academy of Dermatology](#) showed that ajoene had some success in treating foot fungus. But both of these studies were small

(just 34 and 47 people, respectively), and more work is needed to test the compound's effectiveness, Wong said. The case report was published online July 3 in the [journal BMJ Case Reports](#).

<http://bit.ly/2LrL0e2>

I got a hoax academic paper about how UK politicians wipe their bums published

Hypothesis: rightist politicians wipe their bum with their left hand, while leftist politicians wipe with their right hand

July 20, 2018 by Gary Lewis, [The Conversation](#)

I had what seemed like rather a good idea a few weeks back. Building on some prominent findings in social psychology, I hypothesised that politicians on the right would wipe their bum with their left hand; and that politicians on the left would wipe with their right hand.



Surely a socialist. Kapustin Igor/Shutterstock.com

Ludicrous? Yes – absolutely. But for once my goal wasn't to run a bona fide scientific study. Instead, I wanted to see if any "[journal](#)" would publish my ass-wiping "findings."

For those who haven't yet come across the term, "predatory journals" are becoming a bit of a nuisance in science. They actively masquerade as legitimate mainstream journals, often with similar layouts and names – although they very likely have essentially zero threshold for publication, despite typically claiming to operate with rigorous [peer review](#) processes. Most academics will know the irritation of receiving multiple spam emails per day soliciting manuscripts or inviting one to join editorial boards of unfamiliar journals. Much more importantly, though, these predatory journals

are undermining the credibility of scientific publishing because the research they publish appears to be largely unvetted.

So partly out of frustration with this situation, but also out of curiosity, I wanted to see just how low the bar for publication might be. This is the story of my "study."

Which hand do you use?

There is a well-known theory in [social psychology](#) – so-called unconscious social priming. The basic idea is that words or concepts can prime our behaviours. The best-known [finding](#) in this field is the report that presenting participants with words to do with old age ("bingo," "knits") made them walk more slowly afterwards compared to a control condition (although also see this [paper](#) for a more rounded perspective as several findings in this field of research have been controversial in their own right).

So it seemed to me that there was an obvious prediction for political science – specifically, that politicians from the right should wipe their ass with their right hand (and vice versa).

But there was a snag to my theory. We know that the right side of the brain controls the left side of the body, and vice versa. And in a stunning feat of logic, I realised that the theory had things the wrong way around. Politicians from the right would surely wipe with their left hand, and those from the political left with their right hand. And as we shall see, this careful reasoning paid off handsomely.

My (fictional) research assistant camped outside the Houses of Parliament and essentially stalked "MPs." She used a large folder of pictures to identify these politicians' left vs right leaning tendencies. And when a potential participant was seen on the street, the research assistant walked up alongside the politician, indicated that she was a psychological scientist doing a study, provided a brief consent form, and then asked which hand they wiped their bottom with.

This yielded nine (fictional) participants in total, including "Boris Johnski" and "Teresa Maybe," although one data point had to be

discarded – that of "Nigel F. "Arage." He, rather meanly, told my research assistant to "bog off" when asked the hand-wiping question. And so his data was necessarily excluded from the analysis.

But that didn't matter – because the data from our sample of eight fully confirmed the theory. Politicians do indeed wipe their asses with the contralateral hand. I could scarcely believe my eyes – but of course the statistics never lie.

Time to publish

So I had everything I needed to write a manuscript. And I decided to submit my ass wiping findings to the first possibly predatory journal that emailed me. Hardly any time had passed and a publisher came over the horizon – [Crimson Publishers](#). Soon after that, the manuscript was completed and submitted – I even added in an "anonymous" peer reviewer of my own, "Dr. I.P. Daly," who was none other than my dear and extremely witty colleague and friend, Professor Ryan McKay – and then things started to get really interesting.

Having submitted the bogus manuscript, I soon got an email informing me that the manuscript was safely received and under review. Just a few days later, I was informed that it was accepted for publication. With a request for US\$581.

I told the journal I couldn't afford any publication fees. So they dropped it to US\$99 (for "web hosting charges"). I was tempted – but I've learned that you should never accept the first counter offer. So I went for broke. And it turns out that the paper was so groundbreaking that they agreed to publish it for free: "We do understand from you [sic] end. As per your previous conversation, I had a session with financial manager and have decided to provide complete waiver." It must have been a truly magnificent session with the financial manager. On contacting the journal for comment in relation to this story, my editor was told: "Coming to publication fee

the authors who are insufficient with funds, we do provide waivers according to their request [sic]."

And so the article, "[Testing inter-hemispheric social priming theory in a sample of professional politicians – a brief report](#)", by one Gerry Jay Louis from the "Institute of Interdisciplinary Political and Fecal Science," was published. (Note: the paper is no longer available on Crimson's website. They swiftly removed it when The Conversation got in touch with them for comment on this story, saying: "As per our Editorial Board Member's suggestion we have retracted the article which you have mentioned from our journal, as you can glance our website for your convenience [sic].")

Nevertheless, it seems by initially publishing my study, this publisher didn't live up to its own peer review policies. On their website, [they say](#): "The Peer Review Policy is the most essential tool in assessing the quality of publication process that analyzes, validates, and integrates new research findings [sic]." I received not a single peer review comment from the journal, far less a request to revise my manuscript. (The journal told The Conversation: "We do strictly follow double blinded peer review process for all the articles that we receive.")

Some people have asked why they agreed to publish it for free given their business model is presumably built on extracting publication fees. I don't have a strong answer to that question, but my hunch is that the waiver is just a cheap way to bulk out the journal in order to make it more attractive to other prospective authors.

Cleaning up the mess

Why is this sort of thing a problem? In a nutshell, predatory journals are contaminating the scientific literature by providing ostensibly rigorous reports of studies that in reality are often far from acceptable. Work published in such journals is occasionally used in serious public debates, [such as on climate change](#). They present a serious credibility problem for science.

Of additional concern, it turns out that many academics actually struggle to identify the rogue journals from the bona fide. A [recent piece](#) in Nature makes this point only too clearly – many senior scientists have published their work in these outlets, and paid thousands of dollars for publishing fees. Indeed, the journal in which I published my hoax paper has authors based at well-regarded institutions like Rutgers, Princeton, and Florida State University. (I am not implying that their papers are necessarily bogus in any way: in fact, they often seem to be regular articles that might well have been accepted in more mainstream outlets.)

I am not the first to publish such a hoax paper. There are [several lovely examples](#) already out there. My contribution may only be the unusual blending of political science and faecal hygiene (which is probably the main reason that this story ended up [going viral on social media](#)). But it's clearly a message that can't hurt to be heard [by more academics](#), who might otherwise prop up these scamsters with their meagre research funds. And everyone else take heed, too: sometimes you don't need a Ph.D. (or even any

<http://bit.ly/2JMI07a>

In breakthrough, Japanese researchers use AI to identify early stage stomach cancer with high accuracy

Two Japanese national research institutes have succeeded in using artificial intelligence to identify early stage stomach cancer with a high accuracy rate.

The breakthrough may help extend the lives of patients in Japan, where stomach cancer is one of the leading causes of death. According to the National Cancer Center, 45,531 people died of stomach cancer in 2016. According to Riken and the National Cancer Center, it took AI only 0.004 seconds to judge whether an endoscopic image showed early stage cancer or normal stomach tissue. AI correctly detected cancer in 80 percent of cancer images, while the accuracy rate was 95 percent for normal tissue.

The accuracy rates were as high as those of veteran doctors, the institutes said Saturday, adding that they will aim to put AI into practical use as a device to support doctors in making diagnoses.

Stomach cancer causes few symptoms and is often found only after it reaches an advanced stage. At an early stage, even specialists have a difficult time distinguishing the cancer from inflammation.

For the AI project, a team of researchers prepared 100 endoscopic images of early stage stomach cancer and 100 images of normal stomach tissue to test AI capabilities in a method known as deep learning. The results of a large-scale study released in January 2016 showed that those diagnosed with cancer stand a 58.2 percent chance of surviving another 10 years, according to the National Cancer Center. The survival rate for five years is 63.1 percent.

By degree of progression, however, the five-year rate for all types of cancers found at stage one was found to be 90.1 percent, with the 10-year rate standing at 86.3 percent. In stage four cases, where cancer has spread to other tissues or organs, the five-year survival rate is only 17.4 percent and the 10-year rate a mere 12.2 percent.

AI is demonstrating its medical worth in other nations as well.

A computer running AI software defeated two teams of doctors in recognizing maladies from magnetic resonance images during the CHAIN Cup in Beijing in June — a contest billed as a world first.

And Britain's National Health Service is working with the AI company Babylon, which says its medical chatbot already outperforms medical trainees on sample questions for the national doctors' exams.

The chatbot is a key feature of Babylon's "GP at Hand" app, which has over 50,000 users in the U.K. The firm also has over 2 million members in its health care service in Rwanda. It is collaborating with the tech giants Samsung and Tencent to expand its app offerings and plans further rollouts around the world.