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Male triathletes may be putting their heart health at risk

Competitive male triathletes face a higher risk of a potentially harmful heart condition called myocardial fibrosis

CHICAGO - Competitive male triathletes face a higher risk of a potentially harmful heart condition called myocardial fibrosis, according to research being presented next week at the annual meeting of the Radiological Society of North America (RSNA). The increased risk, which was not evident in female triathletes, was directly associated with the athletes' amount of exercise.

Myocardial fibrosis is scarring of the heart. It usually affects the pumping chambers, also known as the ventricles. The condition might progress to heart failure. While regular exercise has beneficial effects on the cardiovascular system, previous studies have shown the presence of myocardial fibrosis in elite athletes.

"The clinical relevance of these scars is currently unclear," said study lead author Jitka Starekova, M.D., fellow in the Department for Diagnostic and Interventional Radiology and Nuclear Medicine at University Medical Center Hamburg-Eppendorf in Hamburg, Germany. "However, they might be a foundation for future heart failure and arrhythmia."

Dr. Starekova and colleagues recently studied a group of triathletes, including 55 men, average age 44, and 30 women, average age 43. The study group underwent cardiac MRI exams with the contrast agent gadolinium, which is taken up by both normal and injured heart muscle tissue. Gadolinium washes out quickly in normal heart tissue, but much more slowly in scarred tissue, revealing a difference in contrast between normal and injured heart muscle after approximately 10 minutes. This phenomenon, known as late gadolinium enhancement, is a useful tool for detection of myocardial fibrosis.

Evidence of myocardial fibrosis was apparent in the left ventricle -- the heart's main pumping chamber -- in 10 of 55 of the men, or 18 percent, but in none of the women.

These same athletes had completed significantly longer total, swimming and cycling distances and had higher peak exercise systolic blood pressure than their counterparts without myocardial fibrosis.

Lifetime competition history for the athletes showed that the number of completed Iron Man triathlons and the number of middle distance triathlons were significantly higher in the male triathlete population compared to the female triathlete population, suggesting that the fibrosis risk was likely associated with exercise level.

"Comparison of the exercise test results revealed that female triathletes had lower systolic blood pressure at peak exercise and achieved lower maximal power compared to male triathletes," Dr. Starekova noted. "Furthermore, comparison of the sport history showed that females had a tendency to complete shorter distances compared to male triathletes. This supports the concept that blood pressure and race distances could have an impact on formation of myocardial fibrosis."

There are several possible factors for the link between the amount of exercise and the risk of myocardial fibrosis, according to Dr. Starekova. Higher exercise-induced systolic blood pressure may result in greater myocardial mass, she said, and more exercise might expose the athlete to a higher risk of myocarditis, or inflammation of the heart muscle. These factors, in combination with repeatedly increased stress of the left ventricular wall due to exercise, could injure the heart muscle.

Other factors may be responsible for the striking difference in myocardial fibrosis risk between male and female triathletes, Dr. Starekova said, including the presence of testosterone.

"Although we cannot prove the exact mechanism for the development of myocardial fibrosis in triathletes, increased systolic blood pressure during exercise, the amount and extent of race distances and unnoticed myocarditis could be cofactors in the genesis of the condition," she said. "In other words, repetition of any extreme athletic activity may not be beneficial for everyone."

The researchers plan long-term follow-up studies to see if any cardiac events occur in the triathletes who had evidence of myocardial fibrosis.

Co-authors are Enver Tahir, M.D., Kai Muellerleile, M.D., Alexandra von Stritzky, M.D., Julia Muench, M.D., Maxim Avanesov, M.D., Julius Weinrich, M.D., Christian Stehning, Sebastian Bohnen, M.D., Ulf K. Radunski, M.D., Eric Freiwald, M.D., Stefan Blankenberg, M.D., Gerhard Adam, M.D., Axel Pressler, M.D., Monica Patten, M.D., and Gunnar K. Lund, M.D.

http://bbc.in/2hRodrC

New scanner 'like 100 MRIs in one' developed in Aberdeen

A new kind of scanner which has been likened to "100 MRIs in one" has been developed by a team at the University of Aberdeen.

Patients in Scotland have become the first in the world to be scanned with the Fast Field Cycling magnetic resonance imaging equipment.

The aim is to extract more information than a traditional MRI by switching the strength of the scanner's magnetic field during the procedure. It was developed over 10 years.

Magnetic resonance imaging uses strong magnetic fields and radio waves to produce detailed images of the inside of the body. The patients involved with the new equipment so far had all suffered strokes. It is hoped the extra information coming from Fast Field Cycling MRI will help doctors to better plan treatment and monitor recovery.

Prof David Lurie, who led the team, said: "Because Fast Field Cycling scanners can switch their magnetic field, it is almost like having 100 different MRI scanners in one. "This gives an extra dimension to the data collected from each patient, greatly expanding the diagnostic potential. "It is incredibly exciting to have imaged our first patients.

"This is a major step towards our technology being adopted by hospitals to benefit patients, which is the ultimate goal of our research."

One of the first patients in the study, 81-year-old Richard Johnson, said: "This is a very exciting project. "I am full of admiration for the development and construction of this sophisticated machine, and the aims behind it. I wouldn't have missed this interesting session for the world.

"I saw one of the early prototype Magnetic Resonance apparatuses around 1964 or 1965 - which is partly why I was so excited to be a guinea pig in, and to be lucky enough to be shown round, the new machine."

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Cinnamon turns up the heat on fat cells

New research from the University of Michigan Life Sciences Institute has determined how a common holiday spice--cinnamon--might be enlisted in the fight against obesity.

ANN ARBOR - Scientists had previously observed that cinnamaldehyde, an essential oil that gives cinnamon its flavor, appeared to protect mice against obesity and hyperglycemia. But the mechanisms underlying the effect were not well understood.

Researchers in the lab of Jun Wu, research assistant professor at the LSI, wanted to better understand cinnamaldehyde's action and determine whether it might be protective in humans, too.

"Scientists were finding that this compound affected metabolism," said Wu, who also is an assistant professor of molecular and integrative physiology at the U-M Medical School. "So we wanted to figure out how--what pathway might be involved, what it looked like in mice and what it looked like in human cells."

Their findings, which appear in the December issue of the journal Metabolism, indicated that cinnamaldehyde improves metabolic health by acting directly on fat cells, or adipocytes, inducing them to start burning energy through a process called thermogenesis.

Wu and her colleagues tested human adipocytes from volunteers representing a range of ages, ethnicities and body mass indices. When the cells were treated with cinnamaldehyde, the researchers noticed increased expression of several genes and enzymes that enhance lipid metabolism. They also observed an increase in Ucp1 and Fgf21,

which are important metabolic regulatory proteins involved in thermogenesis.

Adipocytes normally store energy in the form of lipids. This long-term storage was beneficial to our distant ancestors, who had much less access to high-fat foods and thus a much greater need to store fat. That fat could then be used by the body in times of scarcity or in cold temperatures, which induce adipocytes to convert stored energy into heat.

"It's only been relatively recently that energy surplus has become a problem," Wu said. "Throughout evolution, the opposite--energy deficiency--has been the problem. So any energy-consuming process usually turns off the moment the body doesn't need it."

With the rising obesity epidemic, researchers like Wu have been looking for ways to prompt fat cells to activate thermogenesis, turning those fat-burning processes back on.

Wu believes that cinnamaldehyde may offer one such activation method. And because it is already used widely in the food industry, it might be easier to convince patients to stick to a cinnamon-based treatment than to a traditional drug regimen.

"Cinnamon has been part of our diets for thousands of years, and people generally enjoy it," Wu said. "So if it can help protect against obesity, too, it may offer an approach to metabolic health that is easier for patients to adhere to."

Now, before anyone goes dumping tons of extra cinnamon in their egg nog in hopes of keeping holiday-season pounds at bay, Wu cautioned that further study is needed to determine how best to harness cinnamaldehyde's metabolic benefits without causing adverse side effects.

The research was supported by the Human Frontier Science Program, Edward Mallinckrodt Jr. Foundation, National Institutes of Health and American Heart Association.

Other study authors were: Juan Jiang, Margo Emont, Heejin Jun, Xiaona Qiao, Jiling Liao and Dong-il Kim, all of U-M.

The study is titled "Cinnamaldehyde induces fat cell-autonomous thermogenesis and metabolic reprogramming," DOI: 10.1016/j.metabol.2017.08.006.

http://bit.ly/2A5qpGT

Wall carvings in Saudi Arabia appear to offer earliest depiction of dogs

What may be the oldest depictions of dogs by human beings

November 21, 2017 by Bob Yirka report

(Phys.org)—A combined team of researchers from Max Planck University and the Saudi Commission for Tourism & National Heritage has documented what might be the oldest depictions of dogs by human beings. In their paper published in the Journal of Anthropological Archaeology , the team describes the wall engravings and the means by which they attempted to date them.

Rock art at Shuwaymis appears to show two dogs leashed to a hunter. **M. Guagnin et al., Journal Of Anthropological Archaeology, 5, 2017**

Prior research has suggested that humans first arrived in what is now Saudi Arabia approximately 10,000 years ago. Those first visitors were believed to be hunter-gatherers—researchers have found images of them carved into stone walls in the area. Prior research has also found evidence that people in the area domesticated animals and became herders approximately 7000 to 8000 years ago. They, too, have been depicted in stone etchings, and researchers have also found the bones of some of their livestock. Now, it appears that during the time between these two periods, people may have domesticated dogs and used them to hunt other animals for food. This new evidence is part of a collection of stone carvings the team has been studying at two sites in Saudi Arabia: Jubbah and Shuwaymis.

The stone carvings depict hunters, armed with bows, surrounded by dogs, some of which appear to be tethered to the waists of their human masters. It is not currently possible to directly date stone carvings, of

course, so the researchers had to use other types of evidence. They noted the weathering of the rock, for example, which can be used as an approximate aging test. But more importantly, they noted the location of the engravings and the sequence of engravings in the area. Those depicting tamed, leashed dogs appear to occur in a general timeline from approximately 8000 years ago. If the age of the engravings can be confirmed, it would push back the earliest depiction of leashed dogs by approximately 3000 years.

The researchers note that the dogs depicted in the rock bear a striking resemblance to modern Canaan dogs, which still live a feral existence in the area. They also acknowledge that a lot more research is required before a consensus can be reached regarding the age of the engravings.

More information: David Grimm. Oldest images of dogs show hunting, leashes, Science (2017). DOI: 10.1126/science.358.6365.854

Maria Guagnin et al. Pre-Neolithic evidence for dog-assisted hunting strategies in Arabia, Journal of Anthropological Archaeology (2017). DOI: 10.1016/j.jaa.2017.10.003 , www.sciencedirect.com/science/ … ii/S0278416517301174

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Sugar industry withheld evidence of sucrose's health effects nearly 50 years ago

Research terminated when evidence seemed to indicate that sucrose might be associated with heart disease and bladder cancer

A U.S. sugar industry trade group appears to have pulled the plug on a study that was producing animal evidence linking sucrose to disease nearly 50 years ago, researchers argue in a paper publishing on November 21 in the open access journal PLOS Biology.

Researchers Cristin Kearns, Dorie Apollonio and Stanton Glantz from the University of California at San Francisco reviewed internal sugar industry documents and discovered that the Sugar Research Foundation (SRF) funded animal research to evaluate sucrose's effects on cardiovascular health. When the evidence seemed to indicate that sucrose might be associated with heart disease and bladder cancer, they found, the foundation terminated the project without publishing the results.

In a previous analysis of the documents, Kearns and Glantz found that SRF had secretly funded a 1967 review article that downplayed evidence linking sucrose consumption to coronary heart disease. That SRF-funded review noted that gut microbes may explain why rats fed sugar had higher cholesterol levels than those fed starch, but dismissed the relevance of animal studies to understanding human disease.

In the new paper in PLOS Biology, the team reports that the following year, SRF (which had changed its name in 1968 to the International Sugar Research Foundation, or ISRF) launched a rat study called Project 259 'to measure the nutritional effects of the [bacterial] organisms in the intestinal tract' when sucrose was consumed, compared to starch.

The ISRF-funded research on rats by W.R.F. Pover of the University of Birmingham suggested that gut bacteria help mediate sugar's adverse cardiovascular effects. Pover also reported findings that might indicate an increased risk of bladder cancer. "This incidental finding of Project 259 demonstrated to ISRF that sucrose vs. starch consumption caused different metabolic effects," Kearns and her colleagues argue, "and suggested that sucrose, by stimulating urinary beta-glucuronidase, may have a role in the pathogenesis of bladder cancer."

The ISRF described the finding in a September 1969 internal document as "one of the first demonstrations of a biological difference between sucrose and starch fed rats." But soon after ISRF learned about these results--and shortly before the research project was complete--the group terminated funding for the project, and no findings from the work were published.

In the 1960s, scientists disagreed over whether sugar could elevate triglycerides relative to starch, and Project 259 would have bolstered the case that it could, the authors argue. What's more, terminating Project 259 echoed SRF's earlier efforts to downplay sugar's role in cardiovascular disease.

The results suggest that the current debate on the relative effects of sugar vs. starch may be rooted in more than 60 years of industry manipulation of science. Last year, the Sugar Association criticized a mouse study suggesting a link between sugar and increased tumor growth and metastasis, saying that "no credible link between ingested sugars and cancer has been established."

The analysis by Kearns and her colleagues of the industry's own documents, in contrast, suggests that the industry knew of animal research suggesting this link and halted funding to protect its commercial interests half a century ago.

"The kind of manipulation of research is similar what the tobacco industry does," according to co-author Stanton Glantz. "This kind of behavior calls into question sugar industry-funded studies as a reliable source of information for public policy making."

"Our study contributes to a wider body of literature documenting industry manipulation of science," the researchers write in the PLOS Biology paper. "Based on ISRF's interpretation of preliminary results, extending Project 259's funding would have been unfavorable to the sugar industry's commercial interests." SRF cut off funding before that could happen.

In your coverage please use this URL to provide access to the freely available article in PLOS Biology: http://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.2003460

Kearns CE, Apollonio D, Glantz SA (2017) Sugar industry sponsorship of germ-free rodent studies linking sucrose to hyperlipidemia and cancer: An historical analysis of internal documents. PLoS Biol 15(11): e2003460. https://doi.org/10.1371/journal.pbio.2003460

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Competing Interests: The authors have declared that no competing interests exist.

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Gastric acid suppressant lansoprazole may target tuberculosis

Inexpensive gastritis treatment could work against TB bacteria

A cheap and widely used drug, used to treat conditions such as heartburn, gastritis and ulcers, could work against the bacteria that cause tuberculosis (TB), according to new research from UCL and the London School of Hygiene & Tropical Medicine.

The study, published today in PLOS Medicine, found that people who used lansoprazole, as opposed to similar drugs omeprazole or pantoprazole, were a third less likely to develop TB.

In 2016, 10.4 million people fell ill with tuberculosis and it is in the top ten causes of death globally, killing more people than any other infectious disease. In England, there were a total of 5,664 TB cases in 2016 with London accounting for almost 40 per cent of all cases. According to a report by the London Assembly in 2015, one third of London's boroughs exceed the World Health Organisation "high incidence" threshold of 40 cases per 100,000 population per year and some boroughs have incidence levels as high as 113 per 100,000 people per year - significantly higher than countries such as Rwanda, Algeria, Iraq and Guatemala.

"It would be a major breakthrough to find a new drug with useful activity against Mycobacterium tuberculosis and a favourable side effect profile - particularly a drug like lansoprazole, which costs pennies," said first author Dr Tom Yates (UCL Institute for Global Health).

"Laboratory, animal and now epidemiological data are all consistent with lansoprazole acting against the bacteria that cause TB. While it is too early to say whether lansoprazole can be used to treat TB, we think there is a strong case for further study."

The researchers analysed data that had been routinely collected by general practices and hospitals in the UK and compared the incidence of TB in people taking lansoprazole with that in people taking

omeprazole or pantoprazole. This research was prompted by a laboratory study, described in a 2015 paper in Nature Communications, finding that lansoprazole was effective at killing Mycobacterium tuberculosis, whilst other drugs in the same class had no effect.

In total, there were 527,364 new users of lansoprazole and 923,500 new users of omeprazole or pantoprazole. The findings show that, among people using lansoprazole, there were 10 cases of TB per 100,000 person years compared to 15.3 cases among those using omeprazole or pantoprazole.

In many parts of the world, particularly in Southern Africa, Eastern Europe and Central Asia drug resistant tuberculosis is a major problem. Many of the existing drugs used to treat drug resistant TB have unacceptable side effects.

"We know that medications can have unintended effects; often these are harmful, but occasionally we also find unexpected benefits that may offer new hope for difficult to treat diseases," said senior author Dr Ian Douglas, Associate Professor of Pharmacoepidemiology, Electronic Health Records Group at the London School of Hygiene & Tropical Medicine.

"This study highlights how we can investigate possible new uses for medicines using the wealth of information recorded as part of routine healthcare in the UK. Tuberculosis is still a major health problem in many parts of the world, and the results of this study raise the possibility that lansoprazole, a well-established treatment for stomach complaints, may also be useful for treating tuberculosis."

The study was funded by Wellcome, the Medical Research Council, and GlaxoSmithKline.

http://bit.ly/2zEtHl2

Adult survivors of childhood cancer are more likely to develop high blood pressure

Bottom Line: ***People who survived childhood cancer were more than twice as likely as the general population to have high blood pressure (hypertension) as adults.***

Journal in Which the Study was Published: Cancer Epidemiology, Biomarkers & Prevention, a journal of the American Association for Cancer Research.

Author: Todd M. Gibson, PhD, assistant faculty member in the Epidemiology/Cancer Control department at St. Jude Children's Research Hospital in Memphis, Tennessee.

Background: Improvements in treatment have dramatically increased survival rates from pediatric cancers, with about 83 percent of children surviving at least five years and many becoming long-term survivors. Today, an estimated 420,000 Americans are adult survivors of childhood cancer.

However, many suffer long-term side effects. "High blood pressure is an important modifiable risk factor that increases risk of heart problems in everyone. Research has shown that high blood pressure can have an even greater negative impact on survivors of childhood cancer who were treated with cardiotoxic therapies such as anthracyclines or chest radiation," Gibson said.

How the Study Was Conducted and Results: To assess the prevalence of high blood pressure among survivors of childhood cancer, Gibson and colleagues examined 3,016 adults who were part of the St. Jude Lifetime Cohort Study, which provides ongoing medical assessments of childhood cancer survivors to advance knowledge of their long-term health outcomes. Participants were considered to have high blood pressure if their systolic blood pressure was 140 or greater, their diastolic blood pressure was 90 or greater, or if they had been previously diagnosed with hypertension and were taking antihypertensive medication.

The study showed that the prevalence of hypertension was 2.6 times higher among childhood cancer survivors than expected, based on age-, sex-, race- and body mass index-specific rates in the general population.

The prevalence of hypertension increased over time: At age 30, 13 percent of the survivors had hypertension; at 40, 37 percent had

hypertension, and by age 50, more than 70 percent of the survivors had hypertension. Gibson said the prevalence of hypertension in cancer survivors matched rates in the general population of people about a decade older.

Certain groups of survivors were the most likely to have hypertension: men; non-Hispanic blacks, older survivors, and those who were overweight or obese, the study showed.

The study found that exposure to radiotherapy or chemotherapy were not significantly associated with hypertension.

Author Comment: Gibson said the lack of association between high blood pressure and radiotherapy and chemotherapy was surprising, and suggests that the connection between childhood cancer survival and adult hypertension is multifactorial and worthy of future research. In the meantime, he said, clinicians should be mindful that survivors of childhood cancer are more likely than the general public to develop high blood pressure.

"The good news is that, unlike prior cancer therapy, high blood pressure is a modifiable risk factor," Gibson noted. "Research is needed to identify effective interventions to prevent hypertension in survivors, but our results emphasize the importance of blood pressure surveillance and management."

Limitations: Gibson said a limitation of the study is that it was based on blood pressure measurements that were taken at a single study visit. A clinical diagnosis of hypertension typically requires measurements taken at multiple intervals, he explained. Also, Gibson added, the St. Jude Lifetime Cohort is a group of cancer survivors who undergo frequent clinical follow-up, so its participants may have benefited from being monitored and may, therefore, be in better health than *survivors who have less comprehensive follow-up.*

To interview Todd Gibson, contact Julia Gunther at julia.gunther@aacr.org or 215-446-6896.

Funding & Disclosures: The study was funded by the National Cancer Institute and the American Lebanese Syrian Associated Charities. Gibson declares no conflicts of interest.

http://bbc.in/2hUkkT1

Choice of tipple 'determines different moods'

Different types of alcoholic drink change and shape your mood in different ways, says a study into drinking and emotions.

Spirits may make you feel angry, sexy or tearful, while red wine or beer may make you feel relaxed, say researchers.

They questioned nearly 30,000 people aged 18-34 from 21 different countries for the study in the journal BMJ Open.

All the respondents drank beer, wine and spirits, and many said each type of alcohol had a different effect on them.

While having a few drinks can be enjoyable, researchers hope their findings will help highlight the dangers of dependent drinking.

Angry outbursts

People build up tolerance to alcohol over time and can end up drinking more to feel the same "positive" effects that they enjoy.

But they also risk getting negative ones too, says researcher Prof Mark Bellis from Public Health Wales NHS Trust.

The anonymous online survey, which recruited respondents via newspaper and magazine adverts and social media, found:

- ***Red wine appeared to make people more lethargic than white wine***
- ***Respondents were most likely to report feeling relaxed when drinking red wine or beer***
- ***More than 40% said drinking spirits made them feel sexy***
- ***Over half said drinking spirits also gave them energy and confidence***
- ***But around a third said they felt aggressive when drinking spirits***
- ***Drinking spirits was more likely than all other drink types to be associated with feelings of aggression, illness, restlessness and tearfulness***
- ***Men were significantly more likely than women to associate feelings of aggression with all types of alcohol, particularly heavier drinkers***

However, the findings show only an association and do not explain the reasons for changes.

Prof Bellis said the setting in which the alcohol was consumed was an important factor that the study tried to take into consideration by asking about drinking at home and outside of the home.

"Young people will often drink spirits on a night out, whereas wine might be drunk more at home, with a meal.

"There will be an element of expectation too. Someone who wants to relax might choose to have a beer or a glass of wine."

He said the way different drinks are marketed and promoted might encourage people to select certain drinks to suit different moods, but that this could backfire if it triggered negative emotions.

"People may rely on alcohol to help them feel a certain way. People might drink to feel more confident or relaxed but they also risk other negative emotional responses too."

Prof Bellis and his colleagues at King's College London said the findings suggested that dependent drinkers might rely on alcohol to generate the positive emotions they associated with drinking - they were five times more likely to feel energised than low-risk drinkers.

He also said the study revealed a difference between men and women's emotional relationship with different alcoholic drinks.

"We got stronger emotional relationships with women across pretty well every type of emotion, except for aggression." Aggression, he said, was more likely to be felt among men.

Dr John Larsen, from Drinkaware, said: "This study highlights the importance of understanding why people choose to drink certain alcoholic drinks and what effect they expect these drinks will have on them.

"The UK chief medical officers' guideline for both men and women states that in order to keep health risks from alcohol to a low level it is safest not to be drinking more than 14 units a week on a regular basis." That equates to 12 single measures of spirits, six pints of beer or six 175ml glasses of wine a week.

Experts say setting a minimum unit price of 50 pence per unit would help cut alcohol-related deaths. A minimum price policy will come into force on 1 May 2018 in Scotland.

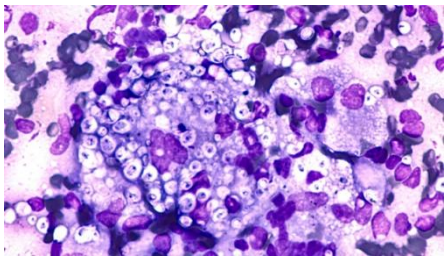
Legislation to establish a minimum price is currently under active consideration by the Welsh Government and by the Irish Senate. There are no plans yet to do the same in England, although the Home Office says the policy is under review.

http://bit.ly/2i5DEjG

Man Develops Rare Infection 30 Years After First Exposure

Uncommon fungal infection lingered in one man's body for 30 years only to be reactivated after heart transplant

By Cari Nierenberg, Live Science Contributor | November 22, 2017



An uncommon fungal infection appears to have lingered in one man's body for 30 years before making itself known in his brain — and a heart transplant may have played a role in making him sick, a new report of the man's case reveals.

Histoplasmas capsulatum usually infects a person's lungs. Here, the fungus is shown in a lung nodule. **David Litman/Shutterstock**

The 70-year-old man was diagnosed with histoplasmosis, an infection caused by inhaling the spores of a fungus called Histoplasma capsulatum.

Histoplasma is common in some parts of the U.S. — namely, around the Ohio and Mississippi River valleys — but not in the Southwest. Indeed, the case is unusual because the man lives in Arizona and he did not spend much time outside of the state. He likely picked up the infection during a brief visit to North Carolina three decades earlier, according to the case report, which was published Nov. 8 in the journal BMJ Case Reports.

Histoplasmas spores live in soil that may contain bird or bat droppings, and people can inhale these spores after dirt or dust containing the droppings gets disturbed, according to the Centers for Disease Control and Prevention (CDC). This can happen during activities, such as cleaning chicken coops, exploring caves, and landscaping or demolishing old buildings, the CDC says.

Histoplasmosis usually affects a person's lungs and causes flu-like symptoms, such as a fever, cough and fatigue, the CDC says, but the fungus can also spread to other organs.

But not everyone who inhales the spores gets sick, according to the CDC. In this man's case, he may have been more vulnerable to the infection because he was a heart-transplant recipient who received a donated organ in 1986.

Reactivating an infection

The man's heart transplant wasn't the source of the infection, but it may have been the reason the histoplasmosis infection was reactivated, said Dr. Carol Kauffman, an infectious-disease expert at the Veterans Affairs Ann Arbor Healthcare System in Michigan. Kauffman was not involved in the man's case, but has written extensively about histoplasmosis.

After an organ transplant, people must take drugs to suppress the immune system so that the body doesn't attack the new organ. These medications lowered the man's immunity and allowed the fungal spores that lay dormant in his body to grow again, Kauffman told Live Science.

The man learned of his infection when he went to see infectious-disease experts at the University of Arizona Health Sciences Center in Tucson because he had been feeling confused for four days, according to the case report.

Brain scans of the man's head revealed abnormal brain tissue, leading doctors to think that he might have had a tumor. Additional tests revealed that the man also had abnormal growths on his adrenal glands, which produce a variety of important hormones.

The doctors then performed a biopsy of the adrenal glands — which are located on top of a person's kidneys — and found areas of inflamed, dead tissue, which can be a symptom of histoplasmosis, according to the case report.

Lab tests and a fungal culture confirmed the man's diagnosis of disseminated histoplasmosis, the more severe and rarer form of the disease. ("Disseminated" means that the disease spread beyond the initial location of the infection, in this case, the lungs.)

Indeed, the man's initial symptoms — confusion and an "altered mental status" — were likely the result of the infection spreading to his brain, Kauffman said.

The case report authors said that histoplasmosis was an unusual diagnosis, considering that the man could recall only a short visit, more than 30 years earlier, to North Carolina, which is an endemic area, meaning an area where the disease is seen more regularly.

Kauffman noted that the report doesn't provide all of the details needed to know how the man first picked up the infection. For example, he might not remember all of his travels; and if he drove to North Carolina, he could have stopped along the way in endemic areas, she said.

The fungus can be in the soil in many places, and a person can be exposed to it without having a history of being in contact with birds, bats or caves, Kauffman said.

The man was given an antifungal medication to treat the infection, according to the case report.

http://bit.ly/2A9lwws

Opening windows and doors may improve sleep

Study finds opening windows before going to bed can improve sleep quality

A recent Indoor Air study found that opening windows or doors before going to bed can reduce carbon dioxide levels in bedrooms and improve sleep quality.

Participants subjective assessment of their sleep depth, which was obtained through questionnaires, correlated with carbon dioxide levels.

Objectively measured sleep efficiency and number of awakenings, which were assessed through senses worn during sleep, also correlated with carbon dioxide levels.

Lower carbon dioxide levels implied better sleep depth, sleep efficiency, and lesser number of awakenings.

http://bit.ly/2BpS7f9

Researchers find infectious prions in Creutzfeldt-Jakob disease patient skin

CJD patients also harbor infectious prions in their skin, albeit at lower levels

Creutzfeldt-Jakob disease (CJD)--the human equivalent of mad cow disease--is caused by rogue, misfolded protein aggregates termed prions, which are infectious and cause fatal damages in the patient's brain. CJD patients develop signature microscopic sponge-like holes in their brains. The initial signs of CJD include memory loss, behavior changes, movement disorder, and vision problems, which usually rapidly progress to death. According to the National Institutes of Health (NIH), 90 percent of CJD patients die within one year of onset, and hundreds of Americans are diagnosed annually. There is no available treatment or cure.

There are numerous types of prion diseases in humans, and CJD is the most common. About 90 percent of CJD cases have a sporadic origin. Prion infectivity is highly concentrated in CJD patient brain tissue. Inter-personal CJD transmission has occurred after patients were exposed to surgical tools previously contaminated by CJD brain tissues.

But in a Science Translational Medicine study published today, Case Western Reserve University School of Medicine researchers found that CJD patients also harbor infectious prions in their skin, albeit at lower levels. In the study, the researchers collected skin samples from 38 patients with assistance from the National Prion Disease Pathology Surveillance Center at Case Western Reserve School of Medicine and measured their prion levels. Using a highly sensitive in vitro assay developed and conducted by Byron Caughey's group at the NIH, they detected prion protein aggregates in the skin samples from all of CJD patients. Prion levels were 1,000-100,000 times lower in the skin than in the brain, and only detectable by this extremely sensitive assay. The researchers further demonstrated that such skin prions are infectious, since they are capable of causing disease in humanized mouse models.

This unexpected finding raises a host of issues. "It is well known that CJD is transmissible via surgical or medical procedures involving prion-infected brain tissue. Our finding of infectious prions in skin is important since it not only raises concerns about the potential for disease transmission via common surgeries not involving the brain, but also suggests that skin biopsies and autopsies may enhance pre-mortem and post-mortem CJD diagnosis," said Wenquan Zou, Associate Professor of Pathology and Neurology and Associate Director of the National Prion Disease Pathology Surveillance Center at Case Western Reserve School of Medicine. Zou led the study involving a consortium of research groups and researchers across Case Western Reserve School of Medicine, University Hospitals Cleveland Medical Center, the NIH, and the People's Republic of China.

"The level of prion infectivity detected in CJD skin was surprisingly significant, but still much lower than that in CJD brains," cautioned Qingzhong Kong, Associate Professor of Pathology and Neurology at Case Western Reserve School of Medicine. "Prion transmission risk from surgical instruments contaminated by skin prions should be much lower than that of instruments contaminated by brain tissue." In the study, the Kong group assisted by the Zou group demonstrated that CJD patient skin is infectious using humanized transgenic mouse models.

Current diagnostic tools for CJD rely on brain tissue samples collected at either biopsy or autopsy, or cerebral spinal fluid obtained by spinal taps. The new study may lay the foundation for less invasive techniques. "Using the skin instead of brain tissue for post-mortem diagnosis could be particularly helpful in cultures that discourage brain autopsy, such as China and India. These countries have the largest populations with the greatest number of patients, but brain autopsy is often not performed," said Zou.

"Further investigation is necessary to determine whether extra precautions should be taken during non-neurosurgeries of CJD patients, especially when surgical instruments will be reused," said Zou. Case Western Reserve School of Medicine researchers plan to further evaluate the potential risk of skin prion transmission through non-neurosurgeries, primarily using mouse models.

Funding for the study was provided by the Creutzfeldt-Jakob Disease Foundation and the National Institutes of Health (NIH) NS062787 and NS087588 to W.Q.Z.; NS062787 to W.Q.Z., Q.K., and J.G.S.; NS088604 to Q.K.; the Intramural Research Program of the NIAID, NIH to B.C.; as well as the Centers for Disease Control and Prevention Contract UR8/CCU515004 to J.G.S.

http://bit.ly/2i6Me1K

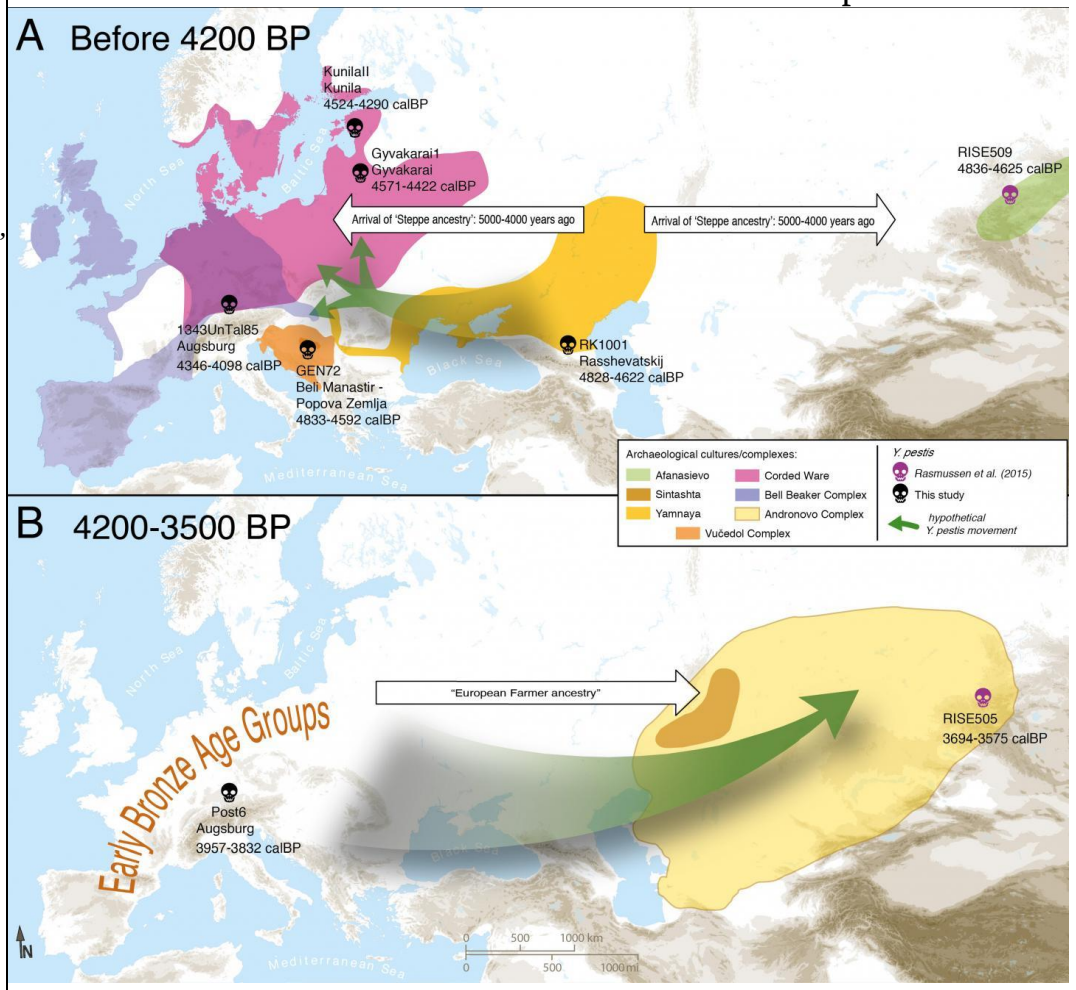
Plague likely a Stone Age arrival to central Europe

The plague-causing bacterium Yersinia pestis may have first come to Europe with the large-scale migration of steppe nomads in the Stone Age, millennia before the first known historical epidemics

A team of researchers led by scientists at the Max Planck Institute for the Science of Human History has sequenced the first six European genomes of the plague-causing bacterium Yersinia pestis dating from the Late Neolithic to the Bronze Age (4,800 to 3,700 years ago). Analysis of these samples, published in Current Biology, suggests that the Stone Age Plague entered Europe during the Neolithic with a large-scale migration of people from the Eurasian steppe.

Plague caused by Y. pestis has been responsible for major historical pandemics, including the infamous Black Death in the 14th century AD. By analyzing ancient forms of the disease, the researchers hope to learn more about the evolution of the plague and how it became more virulent over time.

For this study, the team analyzed over 500 tooth and bone samples from Germany, Russia, Hungary, Croatia, Lithuania, Estonia and Latvia and screened them for the presence of Y. pestis. They recovered full Y. pestis genomes from six individuals, greatly increasing the number of Y. pestis genomes available for study over this time period and providing an unprecedented opportunity to study how the disease evolved after its introduction into Europe.



***Map of proposed* Yersinia pestis *circulation throughout Eurasia. A) Entrance of Y. pestis into Europe from Central Eurasia with the expansion of Yamnaya pastoralists around 4,800 years ago. B) Circulation of Y. pestis to Southern Siberia from Europe. Only complete genomes are shown.* Aida Andrades Valtueña. Andrades Valtueña et al. (2017). The Stone Age Plague and its Persistence in Eurasia. *Current Biology*.**

Plague likely arrived in Central Europe at approximately the same time as steppe nomads

The scientists found that the Y. pestis genomes from this time period, which were found in different parts of Europe, were all fairly closely related. "This suggests that the plague either entered Europe multiple times during this period from the same reservoir, or entered once in the Stone Age and remained there," explains Aida Andrades Valtueña of the Max Planck Institute for the Science of Human History, first author of the study. In order to clarify which scenario was more likely, the scientists examined their data in the context of the existing archaeological and ancient DNA evidence regarding the movement of peoples during the same period.

Beginning around 4,800 years ago, there was a major expansion of people from the Caspian-Pontic Steppe into Europe. These people carried distinct genetic markers that allow their movements and genetic influence, present in essentially all modern-day Europeans, to be traced. Interestingly, the earliest indications of the plague in Europe coincide with the arrival of steppe ancestry in the human populations. This supports the concept that the plague spread along with the large-scale migration of steppe nomads. "In our view, the human genetic ancestry and admixture, in combination with the temporal series within the Late Neolithic-Bronze Age Y. pestis lineage, support the view that Y. pestis was possibly introduced to Europe from the steppe around 4,800 years ago, where it established a local reservoir before moving back towards Central Eurasia," explains Alexander Herbig of the Max Planck Institute for the Science of Human History, a corresponding author of the study.

Analysis confirms changes in plague virulence genes

The plague genomes recovered by the researchers confirm that changes were occurring during this period in genes related to plague virulence, as suggested in prior research. Further research will be needed to confirm how these changes affected the severity of the disease.

However, it is possible that Y. pestis was already capable of causing large-scale epidemics before it developed these traits. Johannes Krause, director of the Department of Archaeogenetics at the Max Planck Institute for the Science of Human History and lead author of the study, explains, "The threat of Y. pestis infections may have been one of the causes for the increased mobility during the late Neolithic-early Bronze Age period." In other words, the steppe people could have been moving to get away from the plague. Furthermore, the introduction of the disease in Europe could have played a role in the genetic turnover of European populations. "It's possible that certain European populations, or the steppe people, may have had a different level of immunity." Further research to analyze even more samples, from both Y. pestis and humans, from a broader temporal and geographic range will be needed to better answer these questions.

http://bit.ly/2A7jCfd

Comparison of primate brains hints at what makes us human

Detailed comparative analysis of human, chimpanzee and macaque brains reveals elements that make the our brain unique

A detailed comparative analysis of human, chimpanzee and macaque brains reveals elements that make the human brain unique, including cortical circuits underlying production of the neurotransmitter dopamine.

To pinpoint differences among primate brains, André M. M. Sousa et al. evaluated brain tissue samples from six humans, five chimpanzees, and five macaques. They generated transcriptional profiles of 247 tissue samples in total, representing several different brain regions (hippocampus, amygdala, striatum, mediodorsal nucleus of thalamus, cerebellar cortex, and neocortex).

The researchers found that 11.9% of messenger RNAs and 13.6% of microRNAs exhibited human-specific up-regulation or down-regulation of genes in at least one brain region.

Of particular note, the authors found that human brains exhibited significant up-regulation of two genes that encode enzymes involved in dopamine biosynthesis: tyrosine hydroxylase (TH) and dopa (3,4-

dihydroxyphenylalanine) decarboxylase (DDC). Dopamine is known to play a role in aspects of cognition and behavior, such as working memory, reasoning, reflective exploratory behavior, and overall intelligence.

This up-regulation of dopamine-related gene expression prompted the researchers to quantify and compare TH+ interneurons in 45 adult brains of nine primate species. The authors confirmed that humans, indeed, have a higher number of TH+ interneurons in both the dorsal caudate nucleus and putamen (striatum) when compared with the nonhuman primates analyzed in this study.

The authors discuss possible explanations for the differences in TH+ neurons for these brain regions, for example, differences related to neuron migration and/or differentiation.

Related Journal Article http://dx.doi.org/10.1126/science.aan3456

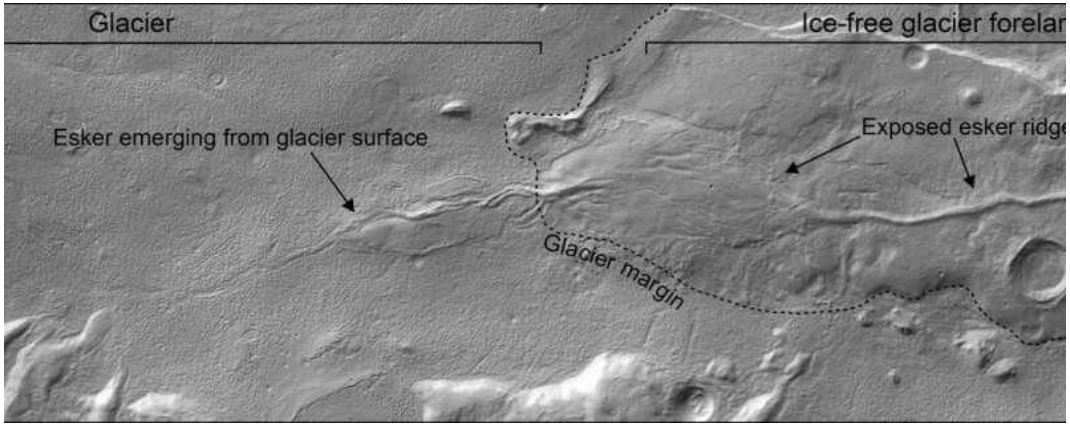
Translations ***日本のニュース*** ***Español*** ***中文***

http://bit.ly/2iT8Xve

Scientists discover evidence of recent water flows on Mars

A team of scientists led by The Open University has discovered evidence of recent glacial meltwater on Mars, despite the widely-held view that the recent climate was too cold for ice to melt.

November 23, 2017 by Darry Khajehpour



Credit: Frances Butcher an NASA, JPL-Caltech, MSSS

Planetary scientists from the OU, in collaboration with University College Dublin, the University of Cambridge and the University of Nantes (CNRS), have discovered a rare 'esker' on Mars – a ridge of sediment deposited by meltwater flowing beneath a glacier in the relatively recent past (about 110 million years ago), despite cold climates. The research has been published in the Journal of Geophysical Research: Planets.

Lead author of the research, PhD Researcher in Planetary Science, Frances Butcher, explains the significance of this discovery.

What are glaciers on Mars like, and where are they?

"Similar to Earth, Mars' poles are covered in large, solid ice caps, and the equator doesn't have any surface ice at all. The regions between the equator and the poles have thousands of water-ice glaciers that are similar to those found in mountainous regions on Earth. These 'mid-latitude' glaciers are the focus of our study, and are thought to be covered in a blanket of debris, perhaps only metres thick."

What have scientists thought in the past?

"It is widely thought that glaciers in Mars' mid-latitudes have always been too cold to have produced meltwater. This is because average temperatures on Mars are a chilly -55°C. However, our research suggests that underground volcanic activity, and heat generated by ice movements, may have caused rare, localised melting of ice beneath some of these mid-latitude glaciers in the past."

What is an 'esker'?

"Basically, the meltwater flowing through a glacier forms a tunnel through the ice, which then fills with sediment such as gravel, rocks, and sand. When the glacier retreats, this sediment is left behind as a ridge, known as an 'esker'."

Does liquid water flow on Mars today?

"Whilst there is no evidence that liquid water still exists under these glaciers today, the research gives important insights into environmental conditions that could have caused ice to melt in Mars' recent geological history."

What can the esker tell us about environmental conditions on Mars in recent geological history?

"Until now, only one other esker had been discovered emerging from the front of a mid-latitude glacier. Both eskers formed between 110 – 150 million years ago, which is very recent for geologists, and are located in deep rift valleys, which could explain why these specific glaciers produced meltwater despite cold climates on Mars. Similar to some rift valleys on Earth, we think that heat from underground volcanic activity warmed the beds of the glaciers that flow within them, causing ice to melt."

Why is this important for humans?

"If humans eventually travel to Mars, mid-latitude glaciers would be a relatively accessible source of ice that astronauts could process into water. Eskers could also provide sites of interest for scientific exploration close to these ice resources."

What about life on Mars? Could these mid-latitude glaciers support life?

"Conditions on Mars are extremely hostile for life, and we currently do not know if life ever existed anywhere on the planet. Therefore it seems unlikely that mid-latitude glaciers support life, or have ever done so. However, in cold, high-radiation environments on Earth, the beds of glaciers can be protective safe-havens for microbial life.

"Glaciers on Mars could, in effect, act like a huge shield, protecting the ground and ice at their beds from the harmful radiation that bombards the surface of the planet. If life did emerge on Mars, there is a chance that the beds of glaciers could have provided sheltered niches for life."

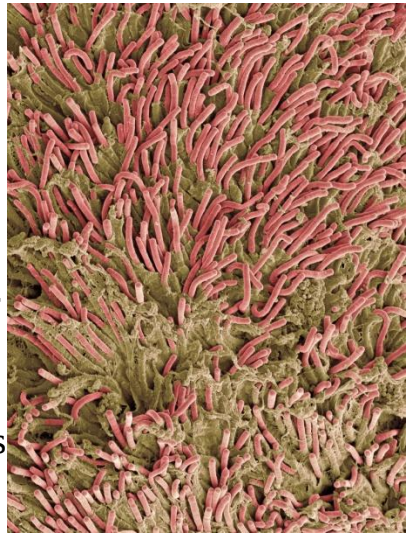
More information: Frances E. G. Butcher et al. Recent basal melting of a mid-latitude glacier on Mars, Journal of Geophysical Research: Planets (2017). DOI: 10.1002/2017JE005434

http://nyti.ms/2iRRT95

Why Is This Bacterium Hiding in Human Tumors?

Whether Fusobacterium nucleatum causes colon tumors is unknown. But a new study hints that it may be 'an integral part of the cancer.'

By Gina Kolata Nov. 23, 2017



A mysterious bacterium found in up to half of all colon tumors also travels with the cancer as it spreads, researchers reported on Thursday.

Whether the bacterium, called Fusobacterium nucleatum, actually plays a role in causing or spurring the growth of cancer is not known. But the new study, published in the journal Science, also shows that an antibiotic that squelches this organism slows the growth of cancer cells in mice.

A colored scanning electron micrograph of dental plaque, with Fusobacterium nucleatum shown in red. The bacteria, found in the mouth, are also found in half of all colon tumors and travel with the cancer as it spreads, according to a new study. **Credit Steve Gschmeissner/Science Source**

Scientists are increasingly suspicious that there may be a link: another type of bacteria has been discovered in pancreatic cancer cells. In both types of cancer, most tumors host bacteria; however, only a small proportion of the cells in any single tumor are infected.

"The whole idea of bacteria in tumors is fascinating and unexpected," said Dr. Bert Vogelstein, a colon cancer researcher at Johns Hopkins.

The colon cancer story began in 2011, when Dr. Matthew Meyerson of the Dana-Farber Cancer Institute and Dr. Robert A. Holt of Simon Fraser University in British Columbia independently reported finding Fusobacteria, which normally inhabit the mouth, in human colon cancers.

That instigated a rush to confirm. Researchers around the world reported finding Fusobacteria in colon cancers, but their work only raised more questions. The new paper, by Dr. Meyerson and his colleagues, provides some answers.

The group looked at human colon cancers that had spread to the liver. The liver tumors were surgically removed and examined as long as two years after the patient's initial colon cancer surgery.

The tumors that had been infected with Fusobacteria in the colon continued to be infected even after spreading to the liver, the researchers found. Liver cancer cells containing the bacteria did not appear to be newly infected, Dr. Meyerson said.

Colon tumors that did not originally have the bacteria did not have them after spreading to the liver. The researchers also looked for the bacteria in cancers that arose first in the liver, not in the colon. They found none.

"By far the most likely explanation is that the cancer metastasizes to the liver and carries this microbiome with it," Dr. Meyerson said. "The bacteria are not there by chance."

"It's kind of amazing that the bacteria are such an integral part of the cancer," he added.

Dr. David Relman, a microbiologist and infectious disease specialist at Stanford and the Palo Alto VA, agreed: "This really suggests they may be traveling with the cancer."

Dr. Meyerson and his colleagues also transplanted human colon cancers into mice. The cancers grew. The scientists plucked out pieces of the tumors and transplanted them to other mice, where once again they grew.

The researchers did this repeatedly, moving the cancers through four generations of mice. The Fusobacteria remained with the cancers.

Yet when they treated the mice with an antibiotic — metronidazole — that kills Fusobacteria, the tumors grew much more slowly. As a control, the researchers treated some mice with erythromycin, an antibiotic that Fusobacteria resist. Tumor growth was unaffected.

So should colon cancer patients whose tumors contain Fusobacteria take metronidazole? Should scientists be racing to develop a vaccine against Fusobacteria to prevent colon cancer?

Not so fast, said Emma Allen-Vercoe of the University of Guelph, who is studying the bacterium's role in colon cancer.

The problem with antibiotics is that they kill lots of bacteria, not just Fusobacteria. The other species may be important, Dr. Allen-Vercoe said, and may even slow the progression of colon cancer.

"We don't know enough yet to be able to predict the effects of a given antibiotic, and since everyone has a different gut microbiota, such a therapy will likely be hit and miss," she said.

Another problem, said Dr. Holt, is that patients would have to take the antibiotic indefinitely, because Fusobacteria are constantly being reintroduced into the mouth. If a person stopped antibiotic treatment, the bacteria could once again get into their tumor cells.

As for a vaccine, Dr. Allen-Vercoe said, not all strains of Fusobacteria are linked to cancer. "Of the few strains that are, there is no clear consensus on why they are behaving pathogenically," she added. "And so there is no clear target for a vaccine strategy."

Dr. Vogelstein suggests that instead of directly causing cancer, Fusobacteria might be altering patients' immune response — and perhaps their response to treatments that use the immune system to destroy cancers.

Alternately, perhaps the bacteria are acting more directly by secreting chemicals that spur growth in nearby cancer cells, Dr. Relman said.

"It is not unreasonable to say Fusobacterium is promoting or contributing to colon cancer," he said.

Are Fusobacteria guilty of causing cancer? If this were a criminal case, where the jury had to be convinced beyond a reasonable doubt, Dr. Meyerson said he would have to acquit.

But if it were a civil case, judged on the preponderance of the evidence, his vote would be different: Fusobacteria are guilty.

http://bit.ly/2zFWp4N

Flies' disease-carrying potential may be greater than thought, researchers say

Flies can be more than pesky picnic crashers, they may be potent pathogen carriers, too, according to an international team of researchers.

In a study of the microbiomes of 116 houseflies and blowflies from three different continents, researchers found, in some cases, these flies carried hundreds of different species of bacteria, many of which are harmful to humans. Because flies often live close to humans, scientists have long suspected they played a role in carrying and spreading diseases, but this study, which was originally initiated at Penn State's Eberly College of Science, adds further proof, as well as insights into the extent of that threat.

"We believe that this may show a mechanism for pathogen transmission that has been overlooked by public health officials, and flies may contribute to the rapid transmission of pathogens in outbreak situations," said Donald Bryant, Ernest C. Pollard Professor of Biotechnology and professor of biochemistry and molecular biology, Penn State.

According to Stephan Schuster, former professor of biochemistry and molecular biology, Penn State, and now research director at Nanyang Technological University, Singapore, the researchers were able to investigate the microbial content of individual fly body parts, including legs and wings. The legs appear to transfer most of the microbial organisms from one surface to another, he added.

"The legs and wings show the highest microbial diversity in the fly body, suggesting that bacteria use the flies as airborne shuttles," said Schuster. "It may be that bacteria survive their journey, growing and spreading on a new surface. In fact, the study shows that each step of hundreds that a fly has taken leaves behind a microbial colony track, if the new surface supports bacterial growth."

Blowflies and houseflies -- both carrion fly species -- are often exposed to unhygienic matter because they use feces and decaying organic matter to nurture their young, where they could pick up bacteria that could act as pathogens to humans, plants and animals. The study also indicates that blowflies and houseflies share over 50 percent of their microbiome, a mixture of host-related microorganisms and those acquired from the environments they inhabit. Surprisingly, flies collected from stables carried fewer pathogens than those collected from urban environments.

The researchers, who report their findings in the current issue of Scientific Reports, found 15 instances of the human pathogen Helicobacter pylori, a pathogen often causing ulcers in the human gut, largely in the blowfly samples collected in Brazil. The known route of transmission of Helicobacter has never considered flies as a possible vector for the disease, said Schuster.

The potential, then, for flies to carry diseases may increase when more people are present.

"It will really make you think twice about eating that potato salad that's been sitting out at your next picnic," Bryant said. "It might be better to have that picnic in the woods, far away from urban environments, not a central park."

Ana Carolina Junqueira, professor of genetics and genomics at the Federal University of Rio De Janeiro and previous postdoctoral fellow at the Singapore Centre for Environmental Life Sciences Engineering (SCELSE), said that the novel genomic and computational methods used for the study allowed the team an unprecedented look at the microbial community carried by flies.

"This is the first study that depicts the entire microbial DNA content of insect vectors using unbiased methods," Junqueira said. "Blowflies and houseflies are considered major mechanical vectors worldwide, but their full potential for microbial transmission was never analyzed comprehensively using modern molecular techniques and deep DNA sequencing."

Flies may not be all bad, however. The researchers suggest they could turn into helpers for human society, perhaps even serving as living drones that can act as an early-warning system for diseases.

"For one, the environmental sequencing of flies may use the insects as proxies that can inform on the microbial content of any given environment that otherwise would be hard or impossible to sample," said Schuster. "In fact, the flies could be intentionally released as autonomous bionic drones into even the smallest spaces and crevices and, upon being recaptured, inform about any biotic material they have encountered."

The Singapore Ministry of Education, the Singapore Center for Environmental Life Sciences Engineering, and the United Nations supported this work.

Bryant, Schuster and Junqueira also worked with Aakrosh Ratan, assistant professor, Center for Public Health Genomics, University of Virginia; Enzo Acerbi, research fellow, Daniela I. Drautz-Moses, senior research fellow, Balakrishnan N.V. Premkrishnan, research associate, and Rikky W. Purbojati, ?research assistant, all of the Singapore Centre for Environmental Life Sciences Engineering, Nanyang Technological University; Nicolas E. Gaultier, research associate, and Paul I. Costea, postdoctoral fellow, both of the European Molecular Biology Laboratory; Bodo Linz, assistant professor of veterinary medicine, University of Georgia; Ana Maria L. Azeredo-Espin, professor of genetics, evolution and bioagents, and Daniel F. Paulo, doctoral student in molecular biology and genetic engineering, both of State University of Campinas; Poorani Subramanian, computational biology specialist, University of Maryland, and Nur A. Hasan, vice president of research and development, CosmosID Inc. and adjunct associate professor in bioinformatics and computational biology, both of University of Maryland; Rita R. Colwell, founder, CosmosID Inc. and Distinguished University Professor in the Institute for Advanced Computer Studies, University of Maryland and Johns Hopkins Bloomberg School of Public Health; and Peer Bork, group leader, senior scientists and head of Structural and Computational Biology, European Molecular Biology Unit.

http://bit.ly/2n682w4

Experts call prickly pear cactus a 'miracle' crop for dry regions

Experts say the prickly pear cactus - which decorates homes around the world - could help alleviate hunger in arid regions due to its multiple uses.

ROME – "It's impossible to describe how many things you can get out of this plant. … I really believe it's a miracle crop," said Paolo Inglese, a professor at Italy's University of Palermo.

As climate change brings erratic rainfall and prolonged droughts, countries should look to the cactus pear, which can grow in desert conditions, experts said.

Its fruits and flat pads can be eaten by humans and animals. Its seeds, fruits and stem have high levels of nutrients, vitamins, minerals and antioxidants. The insects that live and feed on it provide dye for textiles, foods and cosmetics.

A prickly pear cactus bearing fruit. **Senza Senso, Via Wikimedia Commons / Cc By 2.0**

Cactus pear plantations can function not only as water reserves but also absorb carbon dioxide in arid and semi-arid regions.

The cactus is already a well-established ingredient in Latin American cuisine, where it is eaten fresh, cooked or pickled. However, its use as fodder is less widespread.

The plant is now being cultivated in a handful of countries, including Brazil, Ethiopia, South Africa, Jordan, Morocco and India.

Jose Dubeux Jr., associate professor at the University of Florida, said the cactus's high water content is ideal for animal consumption in dry areas and could help conserve scarce water sources for humans.

They are also easy to grow.

"If you take a cactus pad and you throw it like a Frisbee, it will land flat and make roots from whatever it is that touches the soil," said Mounir Louhaichi, principal scientist at the International Center for Agricultural Research in the Dry Areas (ICARDA). "It can grow anywhere. It doesn't need irrigation, because it's made out of water. It makes use of marginal land. "That's why it's a miracle plant."

A new book, co-published by the United Nations Food and Agriculture Organization and ICARDA, says the rural poor and smallholders are most heavily affected by changes in the climate. "If

people are to survive in these ever harsher conditions, their crops need to withstand drought, high temperatures and poor soils," it says, adding that the prickly pear is ideal for such conditions.

http://bit.ly/2i7FrES

A Flat Earther's Steamy Attempt at Proof

Plus, why some flat earth enthusiasts claim forests aren't real. Seriously.

By Dana Hunter

Final Frontier Voyager. **Credit: George Grie Wikimedia (CC BY-SA 3.0)**

Today, a man plans to launch himself in a homemade steam-powered rocket as part of his quest to prove the earth is flat *Steam*-powered.

Yeah.

Now, to be fair, the idea of a steam-powered rocket isn't *quite* as daft as belief in a flat earth.

True, steam isn't likely to get anyone high enough to see the curvature of the earth. Chances are remote that anyone could overcome the pesky power-to-weight ratio that keeps steam from ruling the skies. But NASA has been investigating the use of steam in spacecraft, which may end up being an efficient way to propel and steer our way through space. And who knows? Maybe someday, there will be a technological breakthrough in steam technology that will have us boiling water to reach the stars.

It's certainly more possible than an amateur crank and complete science denier proving that 2,000+ years of science and observation were wrong about the shape of the planet.

How can people in this day and age believe in such an easily-disproved idea? In Mike Hughes's case, it appears to be very motivated reasoning. When he ran out of backers for his steam-powered rocket dreams, he turned to an untapped resource: flat earthers. People yearning to prove their beliefs to be true gave him thousands of dollars – and if this second, ambitious test flight is more successful than the one that left Hughes reliant on a walker for weeks, they'll probably give him thousands more.

Modern day flat earthers are determined to prove us spherical earthers wrong. They cling to every hint they can find that supports their idea, no matter how dubiously. They rely on the appearance of flatness (you don't see the curvature of the earth until you're at a pretty high altitude – the lower limit seems to be about 50,000 feet). They retreat into claims of conspiracy when faced with evidence of a curved Earth (yep – it's all a media-government-elite false-flag mind-control thing). They sometimes point to metaphors in holy books like the Bible and say that settles it (spheres don't have corners, and this verse says the earth has corners – checkmate, spherisists!). They'll even deny satellites exist. And, of course, they seized upon the recent eclipse to "prove" their position.

But there's also a plaintive, yearning motivation that can be found in the words of Mike Sargent:

"They want you to think you're insignificant, a speck on the earth, a cosmic mistake.... The flat earth says you are special, we are special, there is a creator, this isn't some accident."

Yeah, there's that human need to be in the center of it all, planned for and necessary, rather than a chance happening in a vast cosmos. (I've been prey to it, too, but over time I've come to revel in my status as a minute cosmic coincidence.)

As far as why the "elites" would be so invested in pushing a round earth conspiracy, Bob Knodel believes he knows: "They want complete mind control."

Yep. We who consult science for truths about the universe are just mind-controlled sheeple. Including students who film a spherical earth from a balloon and stuff. That camera was probably in on it, the elitist jerk.

Flat earth theories are, of course, out of this world, and it may seem they've got to be out of whacky ideas after all the contortions and

conspiracy theorizing they have to do in order to deny overwhelming evidence, but they're evolving into ever stranger forms. One of the latest? Forests. Specifically: they deny that any such thing as a forest exists.

Seriously. This is a brand-new idea being floated within the flat earth community, and it claims that the trees we see now aren't *real* trees – they're just really tall bushes. Volcanic plugs, in this view, are the stony stumps of the real trees, which towered hundreds of kilometers over the (flat) landscape. Also stumps: "mesas, plateaux, flat-topped mountains, [and] chunks of isolated cliffs..."

The purveyor of this notion assures us that "After watching [his] video, [we] will reverse [our] concept of forests by 360 degrees." This is probably true, since reversing said number of degrees brings up right back to where we started. But please do let me know if, after watching his video, you no longer believe in rocks.

Flat earthers will probably always be with us. Considering that no amount of evidence ever convinces them, and the cry of "It's a conspiracy!" that greets every photo, video, spaceflight, equation, and other item of proof we have, arguing with one will probably just frustrate you. If you do decide to engage, just take a lesson from Alfred Russel Wallace's woeful wager and don't place any bets on the outcome.

Meanwhile, I'd like to recommend to Mr. Hughes that, should he ever find his funds from flat earthers drying up, he turn to the steampunk community for assistance. I'm pretty sure some of them would invest the heck out of a project like a steam-powered rocket to the stratosphere. And the aesthetic is *way* cooler.

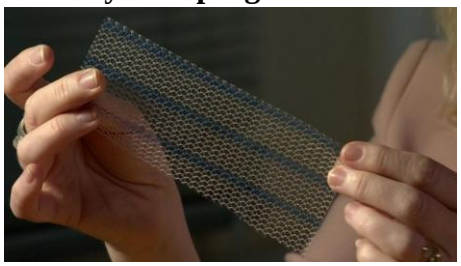
"Steampunk Rocket in Space." **Credit: Mr Thinktank *Flickr* (CC BY 2.0)**

http://bbc.in/2n7eAL4

Vaginal mesh operations should be banned, says NICE

Health watchdog NICE is to recommend that vaginal mesh operations should be banned from treating organ prolapse in England

By Anna Collinson Reporter, Victoria Derbyshire programme



The health watchdog NICE is to recommend that vaginal mesh operations should be banned from treating organ prolapse in England, the BBC's Victoria Derbyshire show has learned.

The mesh is made of polypropolene - the same material used to make certain drinks bottles

Draft guidelines from NICE say the implants should only be used for research - and not routine operations.

Some implants can cut into the vagina and women have been left in permanent pain, unable to walk, work or have sex.

One expert said it is highly likely the NHS will take up the recommendation. However, the organisation is not compelled to act on findings it receives from NICE.

Both NHS England and NICE declined to comment.

'Life-changing consequences'

In the documents - to be published after consultation in December - NICE said there were "serious but well-recognised safety concerns" and that "evidence of long-term efficacy [for implants treating organ prolapse] is inadequate in quality and quantity".

It added that "when complications occur, these can be serious and have life-changing consequences", but said "most commentaries received from patients reported satisfaction with the procedure".

One woman, Margie Maguire, 41 - told the Victoria Derbyshire programme she cannot have any more children or walk unaided because of the damage caused by the mesh.

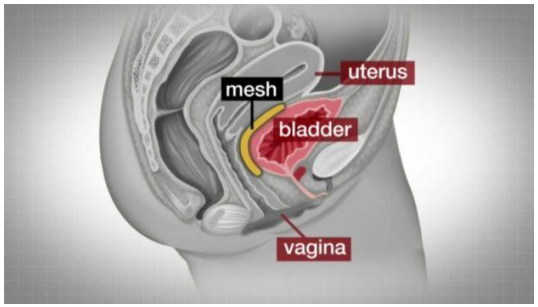
"I have chronic pelvic pain on a daily basis and I'm on nine different medications when I have a pain attack. "These can last from two to six hours at a time and is like having a heart attack," she said.

Kate Langley told the programme in April she had been admitted to hospital 53 times to try to end the pain, but - like many women - the mesh was so near the nerve it could not be fully removed. She has been left with nerve damage and in permanent pain by the implants, giving up her business as a childminder because the pain was so intense.

The surgeon who first examined her, she explained, "could see the [mesh] tape had come through my vagina - protruding through".

The plastic meshes are made of polypropylene - the same material used to make certain drinks bottles - and manufactured by many different companies. They are used to support organs such as the vagina, uterus, bowel, bladder or urethra which have prolapsed after childbirth.

The University of Oxford's Prof Carl Heneghan, an expert in the subject, said the draft guidelines were an admission that health services had "got this wrong" - calling the use of mesh a "catastrophe".



Mesh implants are used to treat organ prolapse and urinary incontinence

He described the draft guidelines as a "backdoor ban" on implants that would effectively end their use. But he said it had come too late.

"Seven years I have been watching this emerge - it is absolutely farcical how bad it is. Either they're burying their heads in the sand or they don't know what they're doing."

He called for a registry to be created for everyone who had been treated with the implants so that their effects could be fully understood.

In April, the BBC learned more than 800 UK women are taking legal action against the NHS and the makers of vaginal mesh implants.

The NICE documents suggest "randomised controlled trial data showed no added benefit of using mesh compared with native tissue repair".

Between April 2007 and March 2015, more than 92,000 women had vaginal mesh implants in England, according to NHS data from the Hospital Episodes Statistics. About one in 11 women has experienced problems, the data suggests.

The use of vaginal mesh to treat urinary incontinence is not mentioned in the draft NICE guidelines. Use of the implants to treat both organ prolapse and urinary incontinence has already been suspended in Scotland. The mesh is also used routinely in hernia repair despite concerns it is leaving many patients in chronic pain.

The Department of Health declined to comment.

http://bbc.in/2jsw3rY

Give child 'super-spreaders' flu vaccine, say experts

Children should be given the flu vaccine before Christmas to prevent them putting older relatives at risk of infection, NHS bosses have warned.

Doctors say the virus can spread more easily at schools and nurseries, which puts grandparents and others at risk of getting ill over the festive season. Those with heart or lung conditions and pregnant family members can be especially vulnerable, the NHS warned.

Dr Paul Cosford said the vaccine was "quick, easy and painless".

The children's flu vaccine is offered as a yearly nasal spray to young children to help protect them against flu. Children aged two and three are able to get the vaccine free on the NHS, via GP practices.

An expansion of the scheme means children in reception class and primary school years one, two, three and four are also all eligible for the vaccine.

'Best protection'

According to the latest NHS figures, just 18% of school-age children have had the nasal spray immunisation.

Dr Cosford, Public Health England's medical director, said flu causes 8,000 deaths a year in England and Wales. "The vaccine is the best protection there is against flu," he added. "The nasal spray vaccine last year reduced children's risk of flu by 65% meaning they were less likely to spread it to relatives and others they come into close contact with. He called for parents to give consent for eligible school-aged children to receive the vaccine in school.

Prof Keith Willett, NHS England's medical director for acute care, said children were "super-spreaders" and the flu season "traditionally reaches its peak" at Christmas.

http://bit.ly/2Abzvlu

High levels of natural immune suppressor correlate with poor survival in the most common leukemia

Patients diagnosed with the most common form of leukemia who also have high levels of an enzyme known to suppress the immune system are most likely to die early, researchers say.

AUGUSTA, Ga. - High levels of this enzyme, indoleamine 2,3 dioxygenase, or IDO, at diagnosis also identify those who might benefit most by taking an IDO inhibitor along with their standard therapy, they report in the Nature journal Scientific Reports.

"We want to help people who are not responding to treatment and are dying very soon after their diagnosis," said Dr. Ravindra Kolhe, breast and molecular pathologist and director of the Georgia Esoteric & Molecular Labs LLC in the Department of Pathology at the Medical College of Georgia at Augusta University.

A review of 40 patients with acute myeloid leukemia, or AML, found increased IDO expression in the bone marrow biopsy, performed to diagnose their disease, correlated with lower overall survival rates and early mortality.

It also indicates that IDO expression should routinely be measured when the diagnostic bone marrow biopsy is performed, Kolhe says.

An early phase clinical study already is underway to begin to explore the IDO inhibitor's clinical potential in these patients. Sites include the Georgia Cancer Center at MCG as well as Johns Hopkins University and the University of Maryland Schools of Medicine, both in Baltimore. NewLinks Genetics Corp., a biopharmaceutical company based in Ames, Iowa that produces the inhibitor Indoximod, is funding the study.

"We wanted to look at what makes this leukemia so aggressive that initial induction chemotherapy is not working," Kolhe says. "Early relapse tends to predict early mortality in these patients and one of the things we looked at was IDO," says the study's corresponding author.

While everyone has the IDO gene, it's the cancer cells in this scenario that activate the disabler of the immune response that is also used by the fetus and solid tumors, he says.

Stem cells in the bone marrow are supposed to mature into a variety of cells that enable our blood and immune system function. Instead in AML, stem cells get stuck in an in-between, undifferentiated state called blasts.

"It's very normal to go to the blast step, providing it matures from there," Kolhe says. "In leukemia, stem cells get limboed in the blast state so you don't get any maturation. That means there are low platelets so you get clotting problems, you have low neutrophils so you have infections, you have less red blood cells so you get anemic," he says.

In fact, bleeding is a major cause of death for patients and often, significant gum bleeding is the first indicator.

The MCG researcher found one thing the blasts are producing is IDO.

"The patients who died at six months had a high expression of IDO while the blasts produced relatively little IDO in the patients who lived five years or more," Kolhe says.

"Most of the time, we don't know why patients are not responding to chemotherapy," he says. But when the researchers adjusted for other risk factors for AML, like increased age and severe anemia, IDO levels were a standout.

"Right now we know it's high in patients who die at six months and we show that it's an independent indicator if you adjust for other known variables," Kolhe says.

Next questions include whether high IDO directly affects resistance to chemotherapy, which occurs in patients who do not survive.

An MCG research team led by Dr. David Munn, pediatric hematologist/oncologist, and Dr. Andrew Mellor, immunologist, reported in 1998 in the journal Science that during pregnancy, cells in the placenta trigger an isolated suppression of the mother's immune system so it won't reject the genetically foreign fetus. They showed that IDO locally disables the mother's immune system by degrading tryptophan, an amino acid essential to survival of T cells, orchestrators of the immune system's response.

Later work would show that tumors - and leukemia - also use IDO to hide from the immune response. Conversely, some organ transplant patients who inexplicably express higher levels of IDO, have lower rejection rates of their new organ.

Kolhe, who completed his pathology residency at MCG and AU Health in 2012, got interested in IDO as at least one explanation for very different patient outcomes from the same treatments for the same disease.

Most patients with AML are at least age 45 at the time of diagnosis and it's slightly more common in men than women, according to the American Cancer Society. Induction therapy is given to get the patient into remission, and is typically followed by more chemotherapy to help ensure it stays dormant. Some patients may also receive a stem cell transplant.

The published research was funded by a grant to Kolhe from the MCG Foundation. He is currently pursuing National Institutes of Health funding for further studies.

Clinical trials of an IDO inhibitor already are underway in other cancers, including a study in children with brain tumors, led by Dr. Theodore Johnson, pediatric hematologist/oncologist and 2004 MD/PhD graduate of MCG, at the Georgia Cancer Center and Children's Hospital of Georgia.