



DAILY NEWS BULLETIN

LEADING HEALTH, POPULATION AND FAMILY WELFARE STORIES OF THE DAY
Friday 20190322

Brain zapping

Brain zapping may treat severe depression (The Tribune: 20190322)

<https://www.tribuneindia.com/news/health/brain-zapping-may-treat-severe-depression/746625.html>

Deep brain stimulation can provide long-lasting benefits for patients suffering from severe, treatment-resistant depression, a study has found.

Researchers from University of Freiburg and University Hospital Bonn in Germany used thin electrodes to stimulate a deep seated part of the reward system in the brains of 16 patients.

This led to a significant reduction of ratings of depression severity in all patients, it was reduced by half on average, according to a study published in the journal Neuropsychopharmacology.

For half of the study participants it was even reduced below the level regarded as the threshold for a depression requiring treatment.

Most of the patients experienced those positive stimulation effects within the first week, and they lasted throughout the course of the one-year study.

“The most compelling outcome from the study is the sustained efficacy in very severely ill patients,” said Thomas Schlapfer, from University of Freiburg.

“Most treatments in psychiatry cease to be efficacious after months and years, we demonstrated for the first time in demonstrating in a relatively large-scale study that deep brain stimulation is a real option for those patients suffering from treatment-resistant, severe depression,” said Schlapfer.

An estimated 10 to 30 per cent of all people with recurring depression do not respond to approved treatments. Deep brain stimulation could be a treatment option for some of these patients.

The 16 participants in the study had suffered from severe depression for eight to 22 years and had previously undergone an average of 18 drug therapies, 20 electroconvulsive therapies, and 70 hours of psychotherapy—without success.

Researchers implanted the deep brain stimulation systems in the patients medial forebrain bundle of the brain and used them to stimulate the medial forebrain bundle.

This brain region is involved in the perception and regulation of pleasure and reward and is thus also significant for motivation and the perceived quality of life.

The doctors evaluated the success of the therapy monthly with the help of the established Montgomery-Asberg Depression Rating Scale (MADRS), which scores of ten study participants already decreased significantly within the first week and remained at a low level.

All study participants reacted to the stimulation in the course of the study. Eight of the 16 patients had a MADRS score of under 10 points at the end of the study and thus were regarded as non-depressive.

“Our patients had struggled with severe depression for years with no signs of improvement,” said Schlapfer.

“Deep brain stimulation brought most of them significant relief within days, which lasted throughout the course of the therapy. Other forms of treatment like medication and psychotherapy often lose their effectiveness over the course of time,” he said.

“We know from a pilot study that the stimulation of this brain region is very promising and we are delighted about the replication of these significant effects,” researchers said. PTI

Meditation

Meditation in school boosts social-emotional learning (The Tribune: 20190322)

<https://www.tribuneindia.com/news/health/meditation-in-school-boosts-social-emotional-learning/746622.html>

Practising meditation as part of a school curriculum can improve the students’ social-emotional competency and reduce psychological distress, a study has found.

Social-emotional learning (SEL) is gaining increased recognition as an important goal of education. Competencies include self-awareness, self-management, social awareness, relationship skills, and goal-directed behaviour.

Developing these skills may help students perform better academically and enjoy enhanced emotional and social well being.

“There’s a strong body of research supporting the clear value of developing social-emotional competency for students,” said Laurent Valosek, Executive Director of the Center for Wellness and Achievement in Education (CWAE) in the US.

“Middle school is an especially formative time and poses a major opportunity to provide students with the tools to develop positive social relationships, responsible decision-making,

and healthy behaviours,” said Valosek, lead author of the study published in the journal Education.

“We’re encouraged by the results demonstrating the value of a Quiet Time programme to enhance social-emotional learning and mental health in middle school students,” Valosek said.

The study compared over a four-month period 51 sixth-grade students who took part in a Quiet Time programme with twice-daily practice of Transcendental Meditation to 50 students from a matched control school within the same West Coast urban public school district.

The study found a significant increase in overall social-emotional competency in the Quiet Time group compared to controls.

The effects were particularly pronounced with high-risk subgroups, which experienced a significant increase on social-emotional competency and a significant decrease on negative emotional symptoms compared to controls.

Results on the individual items indicate improvement in the Quiet Time group compared to controls in the areas of decision-making, goal-directed behaviour, personal responsibility, relationship skills, and optimistic thinking.

These results have implications for schools looking to implement evidence-based programmes for student social-emotional learning and mental health, researchers said. PTI

Alcoholism

Alcoholism successfully reversed in mice (The Tribune: 20190322)

<https://www.tribuneindia.com/news/health/alcoholism-successfully-reversed-in-mice/745608.html>

Scientists claim to have successfully reversed the desire to drink in alcohol-dependent rats, paving the way for future therapies to treat alcoholism in humans.

The team was able to use lasers to temporarily inactivate a specific neuronal population, reversing alcohol-seeking behaviour and even reducing the physical symptoms of withdrawal.

“This discovery is exciting -- it means we have another piece of the puzzle to explain the neural mechanism driving alcohol consumption,” said Olivier George, an associate professor at Scripps Research Institute in the US.

Although the laser treatment is far from ready for human use, George believes identifying these neurons opens the door to developing drug therapies or even gene therapies for alcohol addiction.

“We need compounds that are specific to this neuronal circuitry,” said George, senior author of the study published in the journal Nature Communications.

Previous research at Scripps Research has shown that transitioning from casual drinking to dependent drinking occurs alongside fundamental changes in how the brain sends signals.

These signals drive the intense cravings that make it so difficult for many people to scale back their alcohol consumption.

Researchers have been hunting for the brain cells that driving drinking in an alcohol-addicted rat model.

They found a neuronal "ensemble," or group of connected cells in a brain region called the central nucleus of the amygdala (CeA).

For the study, they tested the role of a subset of neurons in the ensemble, called corticotropin-releasing factor (CRF) neurons.

The laboratory had found that these CRF neurons make up 80 per cent of the ensemble.

Rats used in this study were surgically implanted with optic fibers aimed to shine light on the CRF neurons -- to inactivate them at the flip of a switch.

The scientists spent several months to establish alcohol dependence in the mice. The CeA neuronal ensemble was active in these rats, compelling them to drink more.

The scientists then flipped on the lasers to inactivate the CRF neurons -- and the results were dramatic.

The rats immediately returned to their pre-dependent drinking levels, the team found.

Inactivating these neurons also reduced the physical symptoms of withdrawal, such as abnormal gait and shaking, researchers said.

The effect was even reversible. Turning off the lasers caused the rats to resume their dependent behaviour.

George said the next step in translating this work to humans is to find a way to selectively inhibit only these specific CRF neurons, perhaps using a novel or repurposed compound identified using high-throughput screening of large libraries of compounds. PTI

Coffee compounds

Coffee compounds may help fight prostate cancer (The Tribune: 20190322)

<https://www.tribuneindia.com/news/health/coffee-compounds-may-help-fight-prostate-cancer/745122.html>

Coffee is a complex mixture of compounds which has been shown to influence human health in both positive and negative ways. iStock

TOKYO: In a first, scientists have identified compounds found in coffee which may inhibit the growthThe study, published in the journal The Prostate, was carried out on drug-resistant cancer cells in cell culture and in a mouse model.

Coffee is a complex mixture of compounds which has been shown to influence human health in both positive and negative ways.

There is increasing evidence that drinking certain types of coffee is associated with a reduction in incidence of some cancers, including prostate cancers.

Researchers from Kanazawa University in Japan have studied the effects of two compounds found in coffee, kahweol acetate and cafestol, on prostate cancer cells and in animals, where they were able to inhibit growth in cells which are resistant to common anti-cancer drugs such as Cabazitaxel.

The researchers initially tested six compounds, naturally found in coffee, on the proliferation of human prostate cancer cells in a petri-dish.

They found that cells treated with kahweol acetate and cafestol grew more slowly than controls.

They then tested these compounds on prostate cancer cells which had been transplanted to 16 mice.

Four mice were controls, four were treated with kahweol acetate, four with cafestol, with the remaining mice being treated with a combination of kahweol acetate and cafestol.

“We found that kahweol acetate and cafestol inhibited the growth of the cancer cells in mice, but the combination seemed to work synergistically, leading to a significantly slower tumour growth than in untreated mice,” said Hiroaki Iwamoto from Kanazawa University.

“After 11 days, the untreated tumours had grown by around three and a half times the original volume, whereas the tumours in the mice treated with both compounds had grown by around just over one and a half times the original size,” said Iwamoto.

This is a pilot study, so this work shows that the use of these compounds is scientifically feasible, but needs further investigation, researchers said. It does not mean that the findings can yet be applied to humans.

“What it does show is that these compounds appear to have an effect on drug resistant cells prostate cancer cells in the right circumstances, and that they too need further investigation,” said Iwamoto.

“We are currently considering how we might test these findings in a larger sample, and then in humans,” he said.

Kahweol acetate and cafestol are hydrocarbons, naturally found in Arabica coffee. The coffee-making process has been found to affect whether these compounds remain in coffee after brewing (as with espresso), or whether they are stripped out (as when filtered).

“These are promising findings, but they should not make people change their coffee consumption. However, if we can confirm these results, we may have candidates to treat drug-resistant prostate cancer,” said Atsushi Mizokami, professor at Kanazawa University. PTI

Pills

Inactive' ingredients in most pills may cause allergic reactions: Study (The Tribune: 20190322)

<https://www.tribuneindia.com/news/health/-inactive-ingredients-in-most-pills-may-cause-allergic-reactions-study/744607.htm>

A vast majority of the most frequently prescribed medications contain at least one ingredient capable of causing an adverse allergic reaction, a US study has found.

Known as inactive ingredients, these components are added to improve the taste, shelf-life, absorption and other characteristics of a pill, but the researchers found that more than 90 per cent of all oral medications tested contained at least one ingredient that can cause allergic or gastrointestinal symptoms in sensitive individuals.

Such ingredients include lactose, peanut oil, gluten and chemical dyes, scientists said.

"When you're a clinician, the last thing you want to do is prescribe a medication that could cause an adverse reaction or allergic reaction in a patient," said C Giovanni Traverso, from Massachusetts Institute of Technology (MIT).

"This project was inspired by a real-life incident where a patient with Celiac disease was prescribed a medication and the formulation of the pill they picked up from the pharmacy had gluten in it," Traverso said.

"We wanted to understand the problem and drill down to characterise the entire universe of inactive ingredients across thousands of drugs," he said.

Researchers analysed data on the inactive ingredients found in 42,052 oral medications that contained more than 354,597 inactive ingredients.

Inactive ingredients are defined as substances that are added to a pill's formulation but are not intended or expected to have a direct biological or therapeutic effect.

Although such ingredients have been tested for safety at the population level, scattered case reports have suggested that inactive ingredients may cause adverse reactions in individuals who have allergies or intolerances.

"There are hundreds of different versions of pills or capsules that deliver the same medication using a different combination of inactive ingredients," said Daniel Reker, a postdoctoral fellow at MIT.

"This highlights how convoluted the possible choices of inactive ingredients are, but also suggests that there is a largely untapped opportunity today to specifically select the most appropriate version of a medication for a patient with unusual sensitivities," Reker said.

The team found a total of 38 inactive ingredients that have been described in the literature to cause allergic symptoms after oral exposure.

Researchers reported that 92.8 per cent of the medications they analysed contained at least one of these inactive ingredients.

The team found that inactive ingredients can cause an adverse reaction through an allergy or an intolerance.

It is unclear what amount of an ingredient is necessary to trigger a reaction in sensitive individuals—the content of lactose in a medication, for instance, may be too low to cause a reaction in many patients, except for those with severe lactose intolerance or those taking many medications containing lactose.

"While we call these ingredients 'inactive,' in many cases, they are not. While the doses may be low, we don't know what the threshold is for individuals to react in the majority of instances," said Traverso.

"This pushes us to think about precision care and about the role for regulation and legislation when it comes to labelling medications that contain an ingredient that may cause an adverse reaction," he said. — PTI

Smoking

Smoking strong pot daily increases psychosis risks (New Kerala: 20190322)

<https://www.newkerala.com/news/read/116079/smoking-strong-pot-daily-increases-psychosis-risks.html>

: Amid growing decriminalisation of cannabis use, a new study warns that daily cannabis use, especially of high potency, is strongly linked to the risk of developing psychosis, a mental disorder characterised by a disconnection from reality.

The findings, published in the journal the Lancet Psychiatry, are consistent with previous studies showing smoking pot with a high concentration of THC -- over 10 per cent of the psychoactive substance within cannabis -- has more harmful effects on mental health than the use of weaker forms.

"As the legal status of cannabis changes in many countries and states, and as we consider the medicinal properties of some types of cannabis, it is of vital importance that we also consider the potential adverse effects that are associated with daily cannabis use, especially of high potency varieties," said lead author of the study Marta Di Forti from King's College London.

The new study looked at 11 sites across Europe and Brazil. First, the researchers estimated the prevalence of psychosis by identifying individuals with first episode of psychosis, presented to mental health services between 2010 and 2015.

Second, they compared 901 patients with first episode of psychosis with 1,237 healthy matched controls to understand the risk factors associated with psychosis.

The researchers collected information about participants' history of cannabis use and other recreational drugs.

Across the 11 sites, people who used cannabis on a daily basis were three times more likely to have a diagnosis of first episode psychosis, compared with people who had never used cannabis, the findings showed.

This increased to five times more likely for daily use of high potency cannabis.

Adhesive gel

Adhesive gel to repair eye injury without surgery (New Kerala: 20190322)

<https://www.newkerala.com/news/read/116031/adhesive-gel-to-repair-eye-injury-without-surgery.html>

American scientists have designed an adhesive gel that can seal wound or ulcers on the surface of the eye, thus sparing the need for eye surgery.

The study published on Wednesday in the journal "Science Advances" showed that the gel packed with light-activated chemicals can not only close the defect but also regenerate it, Xinhua news agency reported.

"We wanted this material to allow the cells of the cornea to mesh with the adhesive and to regenerate over time to mimic something as close to the native cornea as possible," said the paper's co-corresponding author Reza Dana, a professor of ophthalmology at Harvard Medical School.

The gel is clear and viscous in a dropper or syringe, but when exposed to blue light in a short time, it hardens to take on features of a native cornea, and the the cornea cells gradually grow into and become one with the gel, according to the study.

The gel is the first to use visible blue light as opposed to ultraviolet light, which carries a level of toxicity.

In a preclinical study, the researchers administered the gel at 20 per cent concentration to corneal defects of 3 mm, and applied visible light for four minutes, leading to a firm adhesion to the defect.

One day later, they observed a transparent, smooth eye surface without inflammation. Over time, the tissue regenerated and the new tissue showed few differences with the native one, according to the study.

The researchers expected to start clinical trials to test the technology in human patients in approximately one year.

Corneal injuries are a common cause of visual impairment worldwide, with more than 1.5 million new cases of corneal blindness reported every year. Some of them require corneal transplants that carry risks of post-transplant complications like infection or rejection.

High cholesterol,

Statins effective against cancer-linked weight loss (New Kerala: 20190322)

<https://www.newkerala.com/news/read/115995/balance-of-two-enzymes-may-help-treat-pancreatic-cancer.html>

Besides known to treat high cholesterol, statins can also be used to take care of rapid weight loss, weakness and wasting of the body due to cancer, Brazilian researchers have found.

The condition known as cachexia, or wasting syndrome, is common among patients with chronic diseases such as cancer, heart failure and AIDS.

A process of adipose tissue remodelling known as browning occurs in patients with cachexia and that browning significantly contributes to the rapid loss of weight and fat, according to researchers from the University of Mogi das Cruzes (UMC) in Brazil.

In experiments on mice, the team identified a key protein TLR4 (toll-like receptor 4) in this process and showed that "atorvastatin" -- a class of statins -- can attenuate its effects.

Treatment with atorvastatin proved effective in extending survival, attenuating adipose tissue remodeling and reducing tumour growth [by 49.7 per cent] in comparison with a control group not treated with the drug.

"We showed that atorvastatin had a direct effect on the action of TLR4, which inhibited adipose tissue browning and reduced tumour growth," said lead author Miguel Luiz Batista Junior, Professor at the varsity.

In the study, reported in the journal Scientific Reports, the team induced lung cancer in genetically modified mice (without TLR4) and in control wild-type mice (with TLR4).

"Adipose tissue was less altered in the genetically modified mice without TLR4. In other words, lack of the receptor significantly blocked the adipose tissue browning effect," Batista said.

But in mice treated with atorvastatin, the result was even better than that in genetically modified mice without TLR4.

Enzymes

Balance of two enzymes may help treat pancreatic cancer (New Kerala: 20190322)

<https://www.newkerala.com/news/read/115993/cardiovascular-events-cause-58pc-deaths-among-diabetics.html>

A new research has set the stage for clinicians to potentially use levels of a pancreatic cancer patient's PHLPP1 and PKC enzymes as a prognostic and for researchers to develop new therapeutic drugs that change the balance of the two enzymes as a means to treat the disease.

The study, published on Wednesday in *Molecular Cell*, was led by Alexandra Newton, professor in the Department of Pharmacology at the University of California, San Diego, School of Medicine, and Timothy Baffi, a graduate student in her lab, Xinhua news agency reported.

The new study built on the team's work in 2015 that found the enzyme PKC, which was believed in previous studies to promote tumour growth, actually suppressed it.

The latest study took the investigation a step further by uncovering how cells regulate PKC activity and discovered that any time an over-active PKC is inadvertently produced, the PHLPP1 "proofreader" tags it for destruction.

"That means the amount of PHLPP1 in your cells determines your amount of PKC," Newton said. "And it turns out those enzyme levels are especially important in pancreatic cancer."

The team observed 105 pancreatic cancer tumours to analyze the enzyme levels in each one. About 50 per cent of patients with low PHLPP1/high PKC lived longer than five-and-a-half years.

While still in the earliest stages, Newton hoped this information might one day aid pancreatic diagnostics and treatment.

Pancreatic cancer is caused by the abnormal and uncontrolled growth of cells in the pancreas, a large gland in the digestive system. It typically doesn't show symptoms in the early stages. Sufferers tend to develop signs, such as back pain and jaundice, when it has spread to other organs.

Cardiovascular events cause

Cardiovascular events cause 58pc deaths among diabetics (New Kerala: 20190322)

<https://www.newkerala.com/news/read/115993/cardiovascular-events-cause-58pc-deaths-among-diabetics.html>

Fifty-eight percent of deaths among people with type 2 diabetes are due to cardiovascular events, a leading Mexican expert has said.

"Patients who live with this disease have a greater risk of premature death or disability derived from cardiovascular events," Hector Sanchez Mijangos, President of the Mexican Diabetes Federation, told Efe news.

The specialist said that the high glucose levels associated with diabetes damage blood vessels, resulting in problems with blood pressure and vision, joint pain and other maladies.

Data from the World Health Organization indicate that more 442 million people suffer from type 2 diabetes.

Mexico's Health Secretariat has found that while roughly 13 million inhabitants of the Aztec nation are living with diabetes, only half of those afflicted know they have the disease.

In 2015 alone, according to Mijangos, there were more than 98,000 premature deaths in Mexico related to diabetes and the average age of those who died was 66.7 years old.

"This is regrettable, because these people could have lived roughly another 15 years," he said.

According to the 2012 National Health and Nutrition Survey, only 25 percent of Mexicans suffering with diabetes are managing their condition adequately.

That figure illustrates "why our greatest challenge continues to be access and adherence to treatment", Mijangos said.

To improve treatment options, Mexican health authorities in January issued an approval for the use of canagliflozin, a drug that helps reduce the amount of blood glucose reabsorbed by the kidneys, which in turns causes more glucose to be eliminated through urination.

"With this medicine, a person can lose 100 milligrams of glucose per day as well as about 400 kilocalories (4,000 calories) a day, which also helps with weight loss," Mijangos said.

The medicine likewise helps lower the amount of sodium in the body and reduce triglyceride levels and blood pressure.

A scientific trial involving more than 10,000 patients worldwide showed that when combined with conventional treatment, canagliflozin can reduce the incidence of cardiovascular events by up to 18 percent.

Breast implant safety

Breast implant safety put under scanner by FDA (New Kerala: 20190322)

<https://www.newkerala.com/news/read/115952/breast-implant-safety-put-under-scanner-by-fda.html>

After thousands of women reported that breast implants had caused them problems, like debilitating joint pain and fatigue, the US Food and Drug Administration (USFDA) and researchers have started re-examining its safety.

The FDA has begun to re-examine questions about implant safety that have long been disputed by doctors and implant manufacturers, and that most consumers thought had been resolved a decade or so ago, reported The New York Times.

This may be a long-awaited moment of validation for tens of thousands of women who were brushed off as neurotic, looking to cash in on lawsuits or just victims of chance who coincidentally became ill while having implants.

Millions of women used implants, which are silicone sacs filled with either salt water or silicone gel, to enlarge the breasts cosmetically or to rebuild them after a mastectomy for breast cancer.

On Tuesday, the agency warned two makers of breast implants that they had failed to conduct adequate long-term studies of implants' effects on women's health.

Those studies were mandated as a condition of approving the implants, and the agency cautioned devices could be taken off the market if the research wasn't properly carried out.

The agency also issued a statement on Friday, which applied to a broad array of medical devices, acknowledging implanted devices may make some people sick.

"A growing body of evidence suggests a small number of patients may have biological responses to certain types of materials in implantable or insertable devices," the agency said.

Those effects can include "inflammatory reactions and tissue changes causing pain and other symptoms that may interfere with their quality of life."

The FDA said it was gathering data to fill information gaps in the science "to further our understanding of medical device materials and improve the safety of devices for patients."

Silicone, used in implants, is one of the materials under scrutiny.

The agency will hold a two-day meeting next week about breast implants, hearing from researchers, patient advocacy groups and manufacturers.

About 400,000 women in the US get breast implants every year, including 300,000 for cosmetic reasons and 100,000 for reconstruction after mastectomies to treat or prevent breast cancer.

Worldwide, about 10 million women have breast implants.

Food and Nutrition

Eating fish may help reduce asthma risk 70pc: Study (New Kerala: 20190322)

<https://www.newkerala.com/news/read/115842/eating-fish-may-help-reduce-asthma-risk-70pc-study.html>

Eating fish oil, rich in omega 3 fatty acids, can help reduce the risk of asthma by nearly 70 per cent, finds a study.

Fish oil is known to be rich in polyunsaturated fatty acids (PUFAs) or n-3 and contains omega fatty acids 3 and 6, which play a central role in the normal development and functioning of the brain and central nervous system.

The study found that "certain types of n-3 (from marine oils) were significantly associated with a decreased risk of having asthma or asthma-like symptoms by up to 62 per cent, while high n-6 consumption (from vegetable oils) was associated with an increased risk by up to 67 per cent," said Andreas Lopata, Professor from the James Cook University in Australia.

Around 334 million people worldwide suffer from asthma, and about a quarter of a million people die from it every year.

"Even if you factor in contaminants, such as mercury found in some fish populations, the benefits of fish and seafood intake far more outweighs the potential risks," Lopata said, in the paper published in International Journal of Environmental Research and Public Health.

However, she stressed the need for further work to understand how the beneficial role of n-3 could be optimised and negative effects of n-6 be minimised.

For the study, the team included 642 people who worked in a fish processing factory in a village in South Africa.

Oesophageal cancer

Drinking hot tea increases risk of oesophageal cancer: Study (New Kerala: 20190322)

<https://www.newkerala.com/news/read/115813/drinking-hot-tea-increases-risk-of-oesophageal-cancer-study.html>

A recent study has found that the temperature of hot tea is linked with elevated risk of oesophageal cancer. However, previous studies had already established a link between drinking hot tea and oesophageal cancer.

The study, which appeared in the International Journal of Cancer, has examined this association between hot tea and oesophageal cancer by prospectively and objectively measuring tea drinking temperature and following 50,045 individuals aged 40 to 75 years for a median of 10 years.

During follow-up, 317 new cases of oesophageal cancer were identified. Compared with drinking less than 700 ml of tea per day at less than 60degC, drinking 700 ml per day or more at a higher temperature (60degC or higher) was associated with a 90 per cent higher risk of oesophageal cancer.

A lot of people enjoy drinking tea, coffee, or other hot beverages. However, according to this study, drinking very hot tea can increase the risk of oesophageal cancer. It is, therefore, advisable to wait until the hot beverage has cooled down before drinking it.

Skin diseases

Skin diseases more common in elderly men: Study (New Kerala: 20190322)

<https://www.newkerala.com/news/read/115623/skin-diseases-more-common-in-elderly-men-study.html>

Ranked as the fourth most common cause of human illness, skin diseases increasing with age are more frequent in elderly men than in women, say researchers.

The study, published in the Journal of the European Academy of Dermatology and Venereology, showed that skin diseases are more prevalent than thought earlier, but many affected people do not consult a physician.

Over 70 per cent elderly men were found suffering from skin diseases, which is more than women (58 per cent).

"Skin diseases might be even more prevalent than previously thought. Considering their significant impact on individual, family and social life, as well as their heavy economic burden caused by inadequate self- or non-physician treatment, the public health importance of skin diseases is underappreciated," said Alexander Zink, of the Technical University of Munich.

For the study, the team included 2,701 individuals.

Of these, at least one skin abnormality was observed in 1,662 of the participants (64.5 per cent).

The most common diagnoses were actinic keratosis (26.6 per cent), rosacea (25.5 per cent), and eczema (11.7 per cent).

But nearly two-thirds of the affected participants were unaware of their abnormal skin findings.

"Information and awareness campaigns are needed to better address this neglected issue and to reduce the global burden of skin diseases," Zink added.

Tumor acidity

How does tumor acidity help cancer spread? (Medical News Today: 20190322)

<https://www.medicalnewstoday.com/articles/324767.php>

By probing what happens to cells in acid regions of tumors, scientists have uncovered new information about cancer's invasiveness and spread. The discovery could lead to better treatments for aggressive tumors.

illustration of tumor spreading

A new study explores how an acidic environment drives tumor spread.

Researchers at the Massachusetts Institute of Technology (MIT) in Cambridge found that acidic, or low-pH, tumor regions alter gene expression in cancer cells in ways that make them more aggressive.

In a paper that appears in the journal Cancer Research, they describe how, by reducing tumor acidity, they were able to reverse the process in mice.

"Tumor acidosis," says first study author Nazanin Rohani Ph.D., who was a postdoctoral researcher in the Koch Institute for Integrative Cancer Research at MIT when she completed the work, "gives rise to the expression of molecules involved in cell invasion and migration.

"This reprogramming, which is an intracellular response to a drop in extracellular pH, gives the cancer cells the ability to survive under low-pH conditions and proliferate."

Metastasis and tumor environment

Metastasis is the complex process through which cancer cells become mobile, detach themselves from primary tumors, invade nearby tissue, migrate, and then set up secondary tumors in other parts of the body.

Around 9 in 10 of all deaths to cancer "are related to metastasis." Without metastasis, cancer would be a much more manageable and less severe disease.

There was a time when scientists believed that the potential for tumors to metastasize depended only on alterations to cancerous cells.

Since then, however, researchers have learned that the "malignant progression of cancer" also depends on cancerous cells participating in an "intricate network of interactions" with other parts of the tissue that surrounds them, or the tumor microenvironment.

There is now a good understanding among scientists that tumors are not simply collections of multiplying cancerous cells, but "living entities," comprising many different types of cell. In fact, the complexity of tumor tissue "may even exceed" the complexity of healthy tissues.

The study that Dr. Rohani and her colleagues undertook adds to the growing body of knowledge about tumor microenvironments and their contribution to metastasis.

Mapping tumor acidity

Previous research had already established that acidity in the tumor microenvironment had a powerful effect on cancer invasiveness. However, what was not clear was how acidity varied in a tumor, and how it might alter genes to make tumor cells more invasive.

Before the recent study, the prevailing view was that high acidity in tumors occurred mainly in oxygen-starved areas with a poor blood supply.

New cell-tracking technique sheds light on breast cancer spread

New cell-tracking technique sheds light on breast cancer spread

Cellular barcoding could be a promising way to pick out the cancer cells that drive metastasis in breast tumors.

For their investigation, the MIT researchers used a "pH-probe" to map acidity in breast cancer tumors in mice.

When the pH-probe detects a cell in an acidic environment, it inserts a small protein molecule into the cell's membrane. In this way, the researchers can tag and identify cells in acidic regions of the tumors.

To its surprise, the team found that acid regions were not only present in hypoxic, or oxygen-starved, pockets inside tumors. The surfaces of tumors — where they connect to the stroma, or "structural tissue" that surrounds them — also contained acidic regions.

This discovery suggested that oxygen-starvation was not the main reason for acidity in tumors. On closer investigation, the scientists found a different cause of microenvironment acidity at the tumor surface.

Reducing tumor acidity

It appeared that the metabolism of many of the cells on the surface of the breast tumors had changed to aerobic glycolysis. This type of metabolism produces lactic acid, which made the tumor microenvironment more acidic.

In these acidic tumor surface regions, the cells had altered their genes to switch on processes that favor invasion and metastasis.

The activated genes included one that is involved in embryo development and produces a protein that aids cell migration via the bloodstream. Another was one that makes tumor cells more able to penetrate their surrounding tissue.

In another set of experiments, the team found that reducing the acidity of the tumor microenvironment returned the gene expressions almost back to normal.

The researchers reduced tumor acidity in the mice by adding sodium bicarbonate to their drinking water. Other studies have also found that this reduces metastasis in mice.

Senior study author Frank B. Gertler, who is a professor of biology at MIT, says that humans do not tolerate sodium bicarbonate, and so it would not be a suitable potential treatment for them.

"Other methods that would more focally target acidification could be of great value."

Cardiovascular health

Why your gut may hold the key to cardiovascular health (Medical News Today: 20190322)

<https://www.medicalnewstoday.com/articles/324769.php>

New research, which appears in *The Journal of Physiology*, examines the role that gut bacteria might play in preserving the health of our arteries.

Your gut may control the health of your arteries and heart, suggests new research.

An increasing number of studies suggest that the bacteria in our guts hold the key to healthy aging.

For instance, a recent conference that Medical News Today reported on featured research in the worm *Caenorhabditis elegans*. The results suggested that colonizing the gut with specific

strains of bacteria, for example, can delay aging and prevent a host of age-related chronic diseases.

Now, research in mice strengthens the idea that gut bacteria mediate the aging process. Specifically, scientists have examined the link between the composition of the gut microbiota in mice and vascular aging.

Vienna Brunt, a postdoctoral researcher in the Department of Integrative Physiology at the University of Colorado, Boulder, is the study's lead author. Doug Seals, a professor and the director of the university's Integrative Physiology of Aging Laboratory, is the senior author.

Studying gut bacteria and vascular health

Brunt and colleagues administered a "cocktail of broad-spectrum, poorly absorbed antibiotics" to a group of young mice and a group of old mice. They added the antibiotics to the drinking water of the rodents for a period of 3–4 weeks to suppress their gut microbiota.

Next, the researchers examined the health of the rodents' vascular systems by measuring their arterial stiffness and the health of the endothelium — that is, the layer of cells that line the inside of the arteries.

Brunt and her team also examined the rodents' blood samples for markers of inflammation and oxidative stress, such as harmful free radicals.

Oxidative stress occurs when the body produces too many free radicals and does not have enough antioxidants to degrade them. Studies indicate that this phenomenon contributes to hypertension, cardiovascular disease, and aging in general.

The researchers also measured levels of nitric oxide, a compound that expands the blood vessels. Finally, they examined the "age-related changes" in each rodent's gut microbiota.

At the end of the study period, the scientists found that the old mice benefited greatly from the antibiotic treatment, while the intervention had no effect on young mice.

Specifically, "When you suppressed the microbiome of the old mice, their vascular health was restored to that of young mice," reports Prof. Seals.

How old age influences gut health

Next, the scientists set out to identify certain age-related changes in the microbiota of rodents. Their aim was to understand how suppressing the microbiota may preserve vascular health.

To do so, they genetically sequenced the fecal samples of another group of old mice and compared them with those of young mice.

"In general, in the old mice, we saw an increased prevalence of microbes that are pro-inflammatory and have been previously associated with diseases," says lead author Brunt.

These included taxa of microbes that previous studies had linked with gut dysbiosis — an imbalance between the "friendly" bacteria in our guts and other pathogens.

Interaction between immunity and gut bacteria influences aging

Interaction between immunity and gut bacteria influences aging

New research examines how an imbalance in gut bacteria may drive aging.

For example, the study found that the old mice had a higher concentration of proteobacteria — a major class that includes well-known pathogens such as *Escherichia coli*, *Salmonella*, and *Campylobacter* bacteria.

The scientists also analyzed blood plasma levels of a compound called trimethylamine N-oxide, or TMAO. This is a "gut-derived metabolite," which means that it is a compound produced when microorganisms in the gut break down nutrients from food.

Although the role of TMAO in chronic disease remains uncertain, some previous studies found high levels of TMAO in people with "cardiovascular disease, kidney disease, type 2 diabetes mellitus, and cancer."

Specifically, recent studies have suggested that TMAO interacts with platelets and raises the risk of stroke and heart attack.

In the current study, the old mice had three times as much TMAO in their blood as the young mice, and the researchers found that antibiotic treatment suppressed TMAO levels.

Brunt and her team conclude:

"The results of the present study provide the first evidence for the gut microbiome being an important mediator of age-related arterial dysfunction and oxidative stress."

Fountain of youth may lie in the gut

The findings, continue the authors, also indicate "that therapeutic strategies targeting gut microbiome health may hold promise for preserving arterial function and reducing cardiovascular risk with aging in humans."

The researchers suggest that eating foods rich in probiotics, such as kefir, yogurt, or kimchi, may help preserve cardiovascular health well into old age.

Prof. Seals comments on the results, saying, "We have long known that oxidative stress and inflammation are involved in making arteries unhealthy over time, but we didn't know why arteries begin to get inflamed and stressed. Something is triggering this."

"We now suspect that, with age, the gut microbiota begins producing toxic molecules, including TMAO, which get into the bloodstream, cause inflammation and oxidative stress, and damage tissue," he continues.

In other words, say the authors, "The fountain of youth may actually lie in the gut."

"This is the first study to show that changes in the gut microbiome with aging have an adverse impact on vascular health. [...] It opens up a whole new avenue of potential interventions to prevent cardiovascular disease."

Parkinson's disease

Do people with Parkinson's disease smell different? (Medical News Today: 20190322)

Using the skills of a "super smeller," researchers have identified how Parkinson's disease alters the way a person smells. They hope that the discovery will help aid early diagnosis.

Older adult holding hands

A recent study investigated the links between odor and Parkinson's.

Parkinson's is a progressive neurodegenerative condition.

The National Institutes of Health (NIH) estimate that around half a million people in the United States are living with the condition.

Parkinson's disease tends to affect older adults.

The population of the United States is growing older, so the number of Parkinson's cases is likely to increase in line.

Despite decades of intense research, there is still no cure for the condition, and there is no reliable diagnostic test.

The need for new diagnostics

Currently, treatment cannot begin until the telltale motor signs, such as tremor and rigidity, appear. However, the breakdown of nervous tissue starts around 6 years before people notice any clinical signs.

Finding a reliable way of diagnosing Parkinson's disease earlier would mean that treatment could begin sooner and, perhaps, that we could keep the condition at bay for longer.

Doctors have used odor to aid their diagnoses for centuries. For instance, some people claim that scrofula smells similar to stale beer, while typhoid fever produces an aroma reminiscent of baked bread.

However, until recently, no odor had been associated with a neurodegenerative condition of any kind.

Introducing Joy Milne

Joy Milne is a "super smeller." These people are hypersensitive to aromas and particularly adept at discriminating between them. In 1986, doctors diagnosed Parkinson's disease in Milne's husband, Les. Since then, Milne has been able to distinguish a specific odor associated with Parkinson's.

Recently, a group of researchers teamed up with Milne to try and distinguish what chemicals might be causing this particular odor. They recently published their findings in the journal ACS Central Science.

Are we facing a Parkinson's pandemic?

Are we facing a Parkinson's pandemic?

Evidence is emerging that Parkinson's disease is becoming a pandemic.

Firstly, the scientists needed to pin down where the smell originated. They noticed that it was most intense on the upper back and forehead but not the armpits. This means that the odor is probably not from sweat but from sebum, which is a waxy liquid that sebaceous glands in the skin create.

Scientists already know that the production of sebum increases in Parkinson's disease; they call this seborrhea. Led by Perdita Barran, the researchers set about trying to understand what chemicals in the sebum might be causing the changes in odor.

Next, the team collected sebum samples from the upper backs of 60 individuals. Some people had Parkinson's disease and some did not.

A 'musky' aroma

Using mass spectrometry, the scientists analyzed the sebum samples to identify any chemicals that were elevated in people with Parkinson's disease. They demonstrated that there was a significant difference between the volatile chemicals in the sebum of people with Parkinson's disease and those without.

Three compounds seemed to play a key role in the distinct aroma: hippuric acid, eicosane, and octadecanal.

Crucially, there were no significant differences between people with Parkinson's who were taking medication and people with Parkinson's who had never taken medication for the condition. This means that the change in odor is probably not due to medication.

When the team presented these chemicals to Milne, she was able to identify the "musky" aroma of Parkinson's disease.

The scientists carried out this study using a limited number of participants, so they will need to continue their work. However, they are hopeful that this might be a unique way of detecting Parkinson's much earlier than is currently possible. They write:

"Identification and quantification of the compounds that are associated with this distinctive [Parkinson's disease] odor could enable rapid, early screening of [Parkinson's disease] as well as provide insights into molecular changes that occur as the disease progresses."

Why the change in smell?

The researchers did not design their study to find out why hippuric acid, eicosane, and octadecanal levels are elevated in the sebum of people with Parkinson's disease. However, the authors discuss some possible causes.

For instance, earlier studies had confirmed that there are links between various skin conditions and Parkinson's disease. The authors explain how some research suggests that certain microbes are more common on the skin of people with Parkinson's.

Malassezia spp. — a yeast present on human skin — often appears in increased amounts in people with Parkinson's.

According to the study authors, these changes in yeast and bacterial populations may alter skin microflora and physiology in ways that are "highly specific" to Parkinson's disease.

These findings open the door to an entirely new way of approaching the diagnosis of Parkinson's disease; they might also offer fresh insight into how the condition progresses.

Osteoarthritis

This 'caterpillar fungus' may help treat osteoarthritis (Medical News Today: 20190322)

<https://www.medicalnewstoday.com/articles/324761.php>

A parasitic fungus that infects caterpillars and various other insects may hold the key to better treatments for osteoarthritis, a condition characterized by pain and stiffness in a person's joints. This, at least, is what new research from the United Kingdom suggests.

image of the Cordyceps militaris fungus

A parasitic fungus could offer an improved treatment for osteoarthritis.

Osteoarthritis is the most common form of arthritis, and more than 30 million adults in the United States have it, according to the Centers for Disease Control and Prevention (CDC).

This is a chronic condition, and while it is currently incurable, treatments can address some of the symptoms.

A person with osteoarthritis may benefit from taking anti-inflammatory drugs, undergoing physical therapy, and making some lifestyle changes. These interventions can help reduce pain and inflammation and improve a person's physical flexibility.

Now, researchers from the University of Nottingham in the UK have turned to a parasitic fungus that, they believe, could lead to new and better treatments for osteoarthritis.

The fungus — called *Cordyceps militaris* — colonizes the caterpillars of *Haepialus* moths, as well as other insects. Traditionally, and according to some research, *C. militaris* can bring many health benefits, including by acting as an anti-inflammatory.

The University of Nottingham researchers have focused, specifically, on the potential benefits of cordycepin, a compound derived from this fungus, which, they say, has a unique anti-inflammatory effect that makes it an important candidate in the treatment of osteoarthritis.

"The natural compound cordycepin is derived from a caterpillar fungus which is famous in the Far East for its medicinal properties," explains the study's lead author, associate professor Cornelia de Moor, Ph.D.

In the new research — the results of which appear in the journal *Scientific Reports* — de Moor and colleagues studied the effects of cordycepin in mouse and rat models of osteoarthritis and found that it can both reduce pain and stop the condition from progressing.

"Intriguingly," the researcher adds, "[the compound] does this by a different mechanism than any other known anti-inflammatory painkiller," which, she contends, "means that medicines derived from cordycepin may help patients for whom other treatments have failed."

'The founder of a new class of painkillers'

In osteoarthritis, the synovial membrane — which lines certain joints, including knee joints — becomes inflamed, which causes pain and discomfort.

Moreover, synovial inflammation happens as a result of the loss of cartilage surrounding the bones that come together in the joint, meaning that those bones become more exposed to damage.

Everything you need to know about osteoarthritis

Everything you need to know about osteoarthritis

What causes osteoarthritis, and what treatments are available?

In the current study, the research team found that, in osteoarthritis, individuals see increased expression of a protein called polyadenylation factor CPSF4, which is linked with synovial inflammation.

Essentially, CPSF4, in conjunction with other proteins, calls for the activation of macrophages, a type of immune cell that contributes to inflammation.

When the scientists administered cordycepin, orally, to the rodents with osteoarthritis, they saw that the compound blocked the mechanism set into motion by excess CPSF4 levels, and thus it suppressed inflammation.

Moreover, cordycepin also appeared to reduce pain and prevent further damage related to the progression of osteoarthritis.

Stephen Simpson, Ph.D., a researcher who specializes in immunology and inflammation and who works for Versus Arthritis, a UK-based registered charity that funded the current study, notes that the current findings may just be the game-changer that people with osteoarthritis need.

"Persistent pain is life-changing for people with arthritis. This is not good enough, and so we are delighted to support this research that has led to these fascinating findings," says Simpson.

"Although in its early stages, the study has great potential for helping people suffering [the] pain of musculoskeletal conditions, and [it] demonstrates the high value and impact of novel discovery-led research on understanding and treating diseases," he adds.

The study's authors concur, expressing hope that the compound they are studying may eventually provide better treatments with fewer side effects.

"We hope that cordycepin will prove to be the founder of a new class of painkiller: the polyadenylation inhibitors. There is a long way to go before a cordycepin-derived medicine reaches patients, but our work is very promising — we are very excited about the prospects."

Dementia risk

Study links severe gum disease to raised dementia risk Medical News Today: 20190322)

<https://www.medicalnewstoday.com/articles/324760.php>

Could taking good care of gums and teeth also help to protect the brain? A recent study has added to growing evidence of a link between severe gum disease, or periodontitis, and a raised risk of dementia.

senior woman flossing

New research suggests that keeping your gums healthy may prevent dementia.

Using data from an extensive national health insurance screening program, investigators from Seoul National University in South Korea examined the relationship between chronic periodontitis and dementia.

In a paper that now features in the Journal of the American Geriatrics Society, the researchers describe how they found a modest link between severe gum disease and dementia, which is consistent with some previous studies.

The researchers also point out that their "retrospective cohort study" is likely the first to establish that lifestyle factors, such as alcohol consumption, smoking, and exercise, did not appear to have any effect on the connection.

The term dementia describes a decline in mental capacity – such as increasing difficulty with memory and reasoning – that becomes so severe that it disrupts daily living. Alzheimer's disease is the most common cause of dementia.

Need to reduce dementia risk factors

A joint 2012 report by the World Health Organization (WHO) and Alzheimer's Disease International stated that dementia is a global "public health priority."

The report stated that there were 35.6 million people worldwide living with dementia in 2012. It also estimated that the global prevalence of dementia would increase threefold by 2050.

How do oral bacteria make colorectal cancer more aggressive?

How do oral bacteria make colorectal cancer more aggressive?

A common mouth bacterium hastens colorectal cancer by spurring the growth of already cancerous cells.

In their study paper, the researchers discuss the potential impact that reducing dementia risk factors could make to this projected massive burden.

The researchers cite a 2014 study that suggested that decreasing dementia risk factors by 20 percent could reduce the anticipated 2050 prevalence of dementia by more than 15 percent. "One such risk factor," they suggest, "is chronic periodontitis."

Periodontitis is a common human disease in which the gums and the structures that support the teeth become inflamed due to bacterial infection. It usually starts as gingivitis, or inflammation of the gums.

Although the human mouth is home to a wide range of bacteria, when conditions are right, the bacteria populations can increase dramatically to cause inflammation. This usually happens when bits of food and bacteria deposit on tooth surfaces to form plaque.

The bacterial colonies in the plaque grow and produce toxins that trigger inflammation responses in the gums. If untreated, the inflammation becomes persistent and destroys bone, causing tooth loss.

Higher risk of developing dementia

Several animal and human studies have suggested links between chronic periodontitis and dementia. The authors of the new study refer to a retrospective investigation that found participants with chronic periodontitis had a "significantly higher risk" of developing Alzheimer's disease than those without it.

However, they also note that these previous studies have been limited by small sample sizes, and by the fact that they did not consider forms of dementia outside of Alzheimer's disease.

For the new investigation, the team analyzed 2005–2015 health data on 262,349 people aged 50 and older from South Korea's National Health Insurance Service-Health Screening Cohort.

The analysis revealed that people who had received a diagnosis of chronic periodontitis had a 6 percent higher risk of developing dementia than those who had not. The risk was particularly significant for those who developed Alzheimer's disease.

Due to the study's design limitations, the findings cannot prove that periodontitis causes dementia; they can only suggest a link.

This leaves open the possibility of reverse causality. For example, could it be that pre-diagnosed early stages of dementia cause lapses in oral hygiene that lead to gum disease?

3 potential biological explanations

If, however, the causal direction should be that periodontitis leads to dementia, the authors propose three biological ways in which it could come about.

The first mechanism through which periodontitis could cause dementia would involve bacteria from the infected gums entering the bloodstream and then crossing the blood-brain barrier into the brain. These could then trigger brain tissue inflammation and even spur production of the toxic proteins that are hallmarks of Alzheimer's disease.

Medical News Today recently reported research that makes a convincing case for such a causal link. In that study, researchers revealed that *Porphyromonas gingivalis*, a bacterium that drives gum disease, can also be present in the brains of people with Alzheimer's disease.

The second mechanism would be a similar process in that the gum infection could set up a "systemic inflammatory state" that releases agents that promote inflammation. These agents could also cross the blood-brain barrier to trigger inflammation in brain tissue, which, if prolonged, can also contribute to toxic protein buildup.

The researchers suggest that the third mechanism would occur through damage to the lining of blood vessels. They note that evidence from previous research showed that such damage has ties to an increase in toxic proteins in the brain.

The authors write:

"In conclusion, [chronic periodontitis] appeared to be associated with increased risk for dementia even after taking into consideration lifestyle behaviors including smoking, alcohol intake, and physical activity."

They call for further research to look into whether the prevention and treatment of chronic periodontitis could reduce the risk of developing dementia.

In a short editor's note, Drs. Joseph G. Ouslander and Mary Ganguli comment that these findings, "in combination with the recently published report on *P. gingivalis*, should make us all think more seriously about optimizing our own and our patients' oral hygiene practices and dental care, with the added potential of perhaps protecting our brain health as well."