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Editorial

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Mini review section – Water-borne diseases are the ones caused by pathogenic microbes spread via contaminated water. Transmission of these pathogens occurs while using infected water for drinking, food preparation, and washing clothes, among others. Many developing countries do not have proper water treatment plants, especially in the rural areas. Majority of water-borne diseases worldwide mainly affect children due to poor hygiene and weak immunity. Most of these diseases are life-threatening.

Current Trends section – Clinical microbiology laboratories are the first line to combat and handle infectious diseases and antibiotic resistance, including newly emerging ones. Although most clinical laboratories still rely on conventional methods, a cascade of technological changes, driven by digital imaging and high-throughput sequencing, will revolutionize the management of clinical diagnostics for direct detection of bacteria and swift antimicrobial susceptibility testing.

In Profile Scientist – Mullis was born in Lenoir, North Carolina on December 28, 1944, to Cecil Banks Mullis and Bernice Barker Mullis. In 1985, Kary Mullis (1944-) is credited for inventing the process known as PCR, in which a small amount of DNA can be copied in large quantities over a short period of time. Mullis claimed that concept came to him in a flash of inspiration and that he invented PCR by accident. Idea occurred to him while he was driving home to California redwood for the weekend in April 1983 and later worked out the process at Cetus Laboratory.

Bug of the month – *Y Clostridium tetani* is a rod-shaped, Gram-positive bacterium, typically up to 0.5 µm wide and 2.5 µm long. It is motile by way of various flagella that surround its body. *C. tetani* cannot grow in the presence of oxygen. It grows best at temperatures ranging from 33 to 37°C. Tetanospasmin ("tetanus toxin") is one of the most potent toxins known, with an estimated lethal dose less than 2.5 nanograms per kilogram of body weight and is responsible for the symptoms of tetanus. Tetanospasmin spreads via the lymphatic system and bloodstream throughout the body, where it is taken up into various parts of the nervous system.

Did You Know? – Stem cells involved in making the pigment that gives hair its color behave much differently than other stem cells do, researchers report April 19 in *Nature*. Rather than staying put, these melanocyte stem cells travel up and down hair follicles all while oscillating between two different forms of maturity. But it's not the unusual behavior that leads to graying. It's when these stem cells stop their quirky ways that hair turns white.

Best Practices – Poor health and low energy levels can negatively impact every part of your life. Your creative spark can be destroyed, leaving you with zero inspiration and ideas. Work would become tedious and hard going, and your social life would become a shadow of what it used to be.**What you need to transform your life is a healthier lifestyle.** One that will bring back your natural energy and zest for life. It will not only improve your physical health but produce everlasting beneficial effects on your mental health as well. It will also create a positive environment for the people in your surroundings.

Tickle yourself enjoying the jokes in our **Relax Mood section**.

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Water Contaminants II

Water-borne diseases are the ones caused by pathogenic microbes spread via contaminated water. Transmission of these pathogens occurs while using infected water for drinking, food preparation, and washing clothes, among others. Many developing countries do not have proper water treatment plants, especially in the rural areas. In some places, the availability of water is so scarce that people have neither the time nor the money to afford the water purifiers or other water treatment mechanisms.

Majority of water-borne diseases worldwide mainly affect children due to poor hygiene and weak immunity. Most of these diseases are life-threatening. The knowledge of the different types of water-borne diseases has come to the forefront with the advent of globalization over the past few decades. Several pathogenic microorganisms which were previously unknown, have become the focus of major research in this field.

Most common water borne diseases

Typhoid fever

Typhoid fever, also called enteric fever, is caused by salmonella bacteria. Typhoid fever is rare in places where few people carry the bacteria. It also is rare where water is treated to kill germs and where human waste disposal is managed. Places with the highest number of cases or with regular outbreaks are in Africa and South Asia. It is a serious health threat, especially for children, in places where it is more common.

Food and water with the bacteria in it cause typhoid fever. Close contact with a person who is carrying the salmonella bacteria also can cause typhoid fever. Symptoms include:

- High fever.
- Headache.
- Stomach pain.
- Constipation or diarrhea.

Most people who have typhoid fever feel better about a week after they start treatment to kill bacteria. But without treatment, there is a small chance of death from typhoid fever complications. Vaccines against typhoid fever can provide some protection. But they can't protect against all cases of illness caused by other strains of salmonella. Vaccines can help lower risk of getting typhoid fever.

Cholera

Cholera is a bacterial disease usually spread through contaminated water. Cholera causes severe diarrhea and dehydration. Left untreated, cholera can be fatal within hours, even in previously healthy people.

Modern sewage and water treatment have virtually eliminated cholera in industrialized countries. But cholera still exists in Africa, Southeast Asia and Haiti. The risk of a cholera epidemic is highest when poverty, war or natural disasters force people to live in crowded conditions without adequate sanitation.

Cholera is easily treated. Death from severe dehydration can be prevented with a simple and inexpensive rehydration solution.

Most people exposed to the cholera bacterium (Vibrio cholerae) don't become ill and don't know they've been infected. But because they shed cholera bacteria in their stool for seven to 14 days, they can still infect others through contaminated water. Most cases of cholera that cause symptoms cause mild or moderate diarrhea that's often hard to tell apart from diarrhea caused by other problems. Others develop more-serious signs and symptoms of cholera, usually within a few days of infection.

Symptoms of cholera infection can include:

Diarrhea. Cholera-related diarrhea comes on suddenly and can quickly cause dangerous fluid loss — as much as a quart (about 1 liter) an hour. Diarrhea due to cholera often has a pale, milky appearance that resembles water in which rice has been rinsed.

Nausea and vomiting. Vomiting occurs especially in the early stages of cholera and can last for hours.

Dehydration. Dehydration can develop within hours after cholera symptoms start and range from mild to severe. A loss of 10% or more of body weight indicates severe dehydration.

Signs and symptoms of cholera dehydration include irritability, fatigue, sunken eyes, a dry mouth, extreme thirst, dry and shriveled skin that's slow to bounce back when pinched into a fold, little or no urinating, low blood pressure, and an irregular heartbeat.

Dehydration can lead to a rapid loss of minerals in your blood that maintain the balance of fluids in your body. This is called an electrolyte imbalance.

Amoebiasis

Amebiasis is an infection of the intestines. It is caused by the microscopic parasite *Entamoeba histolytica*.

E histolytica can live in the large intestine (colon) without causing damage to the intestine. In some cases, it invades the colon wall, causing colitis, acute dysentery, or long-term (chronic) diarrhoea. The infection can also spread through the bloodstream to the liver. In rare cases, it can spread to the lungs, brain, or other organs.

This condition occurs worldwide. It is most common in tropical areas that have crowded living conditions and poor sanitation. Africa, Mexico, parts of South America, and India have major health problems due to this condition.

The parasite may spread:

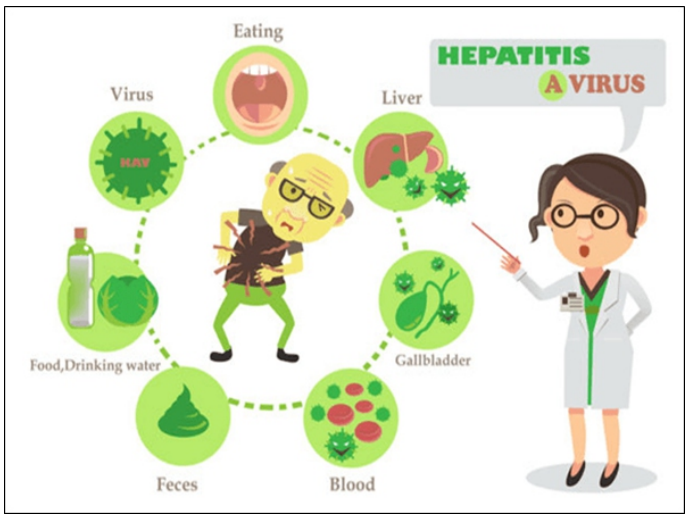
- Through food or water contaminated with stool
- Through fertilizer made of human waste
- From person to person, particularly by contact with the mouth or rectal area of an infected person

While most people have no symptoms, amebiasis can cause bloody diarrhea, colitis, and tissue destruction. The person can then spread the disease by releasing new cysts into the environment through infected feces. When symptoms do occur, they tend to appear 1 to 4 weeks after ingestion of the cysts. Symptoms at this stage tend to be mild and include loose stools and stomach cramping.

Hepatitis A

Hepatitis A is a viral infection that causes liver inflammation and damage. Inflammation is swelling that occurs when tissues of the body become injured or infected. Inflammation can damage organs. Viruses invade normal cells in your body. Many viruses cause infections that can be spread from person to person. The hepatitis A virus typically spreads through contact with food or water that has been contaminated by an infected person's stool.

Hepatitis A is an acute or short-term infection, which means people usually get better without treatment after a few weeks. In rare cases, hepatitis A can be severe and lead to liver failure and the need for an emergency liver transplant to survive. Hepatitis A does not lead to long-term complications, such as cirrhosis, because the infection only lasts a short time.



Giardiasis

Giardiasis is a diarrheal disease caused by the microscopic parasite *Giardia duodenalis* (or *"Giardia"* for short). Once a person or animal has been infected with *Giardia*, the parasite lives in the intestines and is passed in stool.

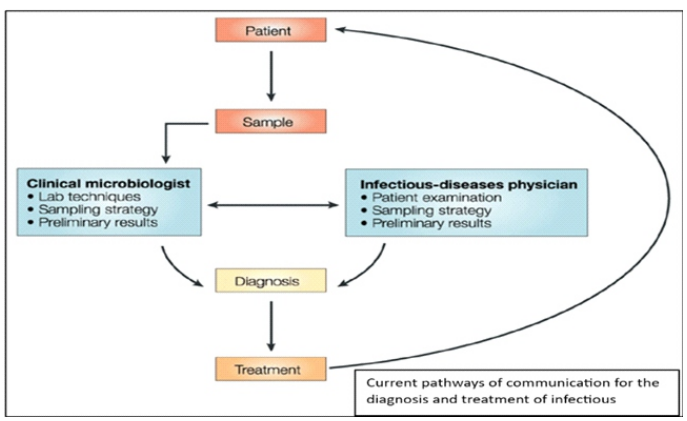
You can get giardiasis if you swallow the *Giardia* parasite (germ). *Giardia*—or poop from people or animals infected with *Giardia*—can contaminate anything it touches. *Giardia* spreads very easily; even getting tiny amounts of poop in your mouth could make you sick.

Giardiasis can be spread by:

- Swallowing unsafe food or water contaminated with *Giardia* germs
- Having close contact with someone who has giardiasis, particularly in childcare settings
- Traveling within areas that have poor sanitation
- Transferring *Giardia* germs picked up from contaminated surfaces (such as bathroom handles, changing tables, diaper pails, or toys) into your mouth
- Having contact with infected animals or animal environments contaminated with poop.

What does the future hold for clinical microbiology?

Clinical microbiology laboratories are the first line to combat and handle infectious diseases and antibiotic resistance, including newly emerging ones. Although most clinical laboratories still rely on conventional methods, a cascade of technological changes, driven by digital imaging and high-throughput sequencing, will revolutionize the management of clinical diagnostics for direct detection of bacteria and swift antimicrobial susceptibility testing. Importantly, such technological advancements occur in the golden age of machine learning where computers are no longer acting passively in data mining, but once trained, can also help physicians in making decisions for diagnostics and optimal treatment administration. The further potential of physically integrating new technologies in an automation chain, combined to machine-learning-based software for data analyses, is seducing and would indeed lead to a faster management in infectious diseases.



Current technologies in clinical microbiology

Detection of microorganisms in clinical specimens. One of the main challenges of clinical microbiology is the identification of microorganisms in clinical specimens. This can be achieved using the following methods: i) growth of microorganisms in culture, using media or cell lines, with varying incubation times, temperatures and atmospheres. ii) detection of microorganisms within infected tissues by light or electron microscopy; and iii) detection and identification of previously unknown DNA or RNA fragments or antigens. The most appropriate test depends on the incidence of infection, how contagious the agent is and the health consequences for the patient and the community.

Cell-culture systems have made a crucial contribution to the diagnosis of infectious diseases that are caused by viruses and intracellular bacteria. Such systems have not only made the direct isolation and identification of microorganisms possible, but have also enabled the production of antigens for serological assays, evaluation of the efficacy of antimicrobial agents and the production of vaccines.

The most spectacular advance in the diagnosis of infectious diseases has been the recent introduction of molecular detection methods, especially PCR and RT-PCR (PCR after reverse transcription of RNA). Molecular techniques also enable the detection of multiple infectious agents — including bacteria, viruses and fung . microarrays (which can detect all potential agents in an infection) and quantitative assays, such as real-time PCR.

Detection of antibodies. Serum is easy to obtain, store and send on filter paper for analysis. The indirect diagnosis of infectious diseases by the detection of specific antibodies will continue to be a key approach for clinical microbiologists. 'At-doctor' serology tests would be useful for the rapid determination of the status of a patient and for speedy decision-making regarding post-exposure prophylaxis and treatment. In addition, the rapid detection of specific IgMs during epidemics could help to improve isolation measures for patients who are suspected to be infected. Antigenic microarrays will enable testing for several pathogens in parallel using little serum and few reagents. All the pathogens that are known to be causative agents of a particular clinical syndrome could therefore be tested for simultaneously using an antigenic microarray. Moreover, the versatility of this new assay will allow emerging pathogens to be quickly incorporated into the test.

Antimicrobial-susceptibility testing. Two strategies are available for determining antimicrobial susceptibility: phenotypic and genomic methods. Phenotypic methods for bacteria include dilution and disc-diffusion methods, and real-time PCR has been used for fastidious bacteria that can only be grown in tissue culture.

FCM has proved to be very useful in studying the physiological effects of antimicrobial agents on bacterial cells. It can also be used for antimicrobial-susceptibility testing and can indicate bactericidal and bacteriostatic effects.

Microbial surveillance and reporting. Automated methods for microbial identification will allow epidemiological trends to be followed more easily in hospitals and in the community. Similarly, automation in the molecular diagnosis of resistance to key antibiotics could allow bacterial resistance in hospitals to be surveyed online. This information can be updated weekly to provide data that are pertinent to the infection-control department (where one exists), and also to clinical physicians.

Clinical microbiology laboratories Some of the work that is now carried out in laboratories could be ceded to patients and doctors with the commercial development of self-testing kits, such as those that detect HIV infection using saliva or blood spots and those that diagnose group A streptococcus throat infections. The number of available 'at-doctor' tests might increase and could potentially include the detection of group B streptococci in the vaginas of pregnant women and detection of *S. aureus* in the nasal passages of patients and healthcare workers. These tests could be made available at outpatient clinics.

Sampling strategy and choice of laboratory tests. The sampling strategies that are used in clinical microbiology need to improve

in the future for several reasons. Requests for laboratory tests to diagnose infectious diseases depend largely on the knowledge of the physicians who are caring for patients. As a result, there is considerable variability in the appropriateness of the samples submitted and, therefore, in the accuracy of the resulting laboratory diagnoses.

Digital pictures. A key development in clinical microbiology has been in the technology that is available to produce digital pictures, which enables image libraries to be established and readily exchanged. This includes pictures taken during clinical examinations when cutaneous signs are present, light-, confocal- and electron-microscopy pictures, and images of microarray analyses. Although it is still rare, microbiology reports can be enhanced with digital images of the organisms that are involved. The inclusion of digital photographs of Gram-stain and acid-fast-stain preparations is technically possible, and precedents for providing such images have already been set by current pathology and radiology information systems.

Kary Mullis

Mullis was born in Lenoir, North Carolina on December 28, 1944, to Cecil Banks Mullis and Bernice Barker Mullis. He grew up in Columbia, South Carolina, where he attended Dreher High School, graduating in the class of 1962. He recalled his interest in chemistry beginning when he learned how to chemically synthesize and build solid fuel propulsion rockets as a high school student during the 1960s.

He earned a Bachelor of Science in chemistry from the Georgia Institute of Technology in Atlanta in 1966, during which time he married his first wife, Richards Haley, and started a business. His doctoral dissertation was on the structure of the bacterial siderophore schizokinen. J. B. Neilands was known for his groundbreaking work on siderophores, and Mullis was a part of that with his characterization of schizokinen. Following his graduation, Mullis completed postdoctoral fellowships in pediatric cardiology at the University of Kansas Medical Center (1973-1977) and pharmaceutical chemistry at the University of California, San Francisco (1977-1979).

Development of the polymerase chain reaction (PCR) has been a breakthrough in the analysis of genetic information. Such analysis earlier required quite a large amount of DNA sample. In 1985, Kary Mullis (1944-) is credited for inventing the process known as PCR, in which a small amount of DNA can be copied in large quantities over a short period of time. Mullis claimed that concept came to him in a flash of inspiration and that he invented PCR by accident. Idea occurred to him while he was driving home to California redwood for the weekend in April 1983 and later worked out the process at Cetus Laboratory with some colleagues where he was working. Mullis described the detailed technique for the first time in December 1985 issue of Science and received a patent for it in 1987. The process has multiple applications in medicine, genetics, and forensic medicine.

PCR, because of its ability to extract DNA from fossils, has become the basis of a scientific discipline paleobiology. Forensic scientists use it to identify crime suspects or victims from traces of blood, and other biological material left at a crime scene via DNA comparison. In Medicine PCR makes it possible to identify the causative agent of a bacterial or viral infection directly from a very small sample of material. PCR is also used to screen for genetic disorders. It is an important tool in gene sequencing. Union Cabinet has cleared a DNA profiling bill (July 2019), for establishing a regulatory board to control the use of DNA technology.

Mullis joined the Cetus Corporation at Emeryville, California (1979) as a DNA chemist. During the time he carried out research on the synthesis of oligonucleotides synthesis for use as probes and primers. Mullis work was based on the work of 1968 Nobel Prize winner Hargobind Khorana (1922- 2011) and associates Nirenberg and Holley, for their part in the genetic code. discovery. Khorana was the first scientist to chemically synthesize oligonucleotides. PCR uses three ingredients.1- Sample of double stranded DNA segment to be copied (the template DNA), 2-oligonucleotide “primers” (short segments of single-stranded DNA, each of which is complementary to the template DNA nucleotides). 3- Key enzyme- thermo-resistant DNA polymerase (Taq) is then added. When these ingredients are heated, the template DNA separates into 2 strands. The mixture is then cooled, allowing the primers to attach themselves to the complementary sites on the template strands. Enzyme Taq DNA polymerase is able to begin copying the template strands by adding nucleotides onto the ends of the primers, producing two molecules of double-stranded DNA. Repeating this cycle increases the amount of DNA exponentially. Few cycles, yields large number of copies of original DNA. Repeated thermal cycling led to the automation with thermocycling machine (1984) of the initially slow and laborious PCR technique

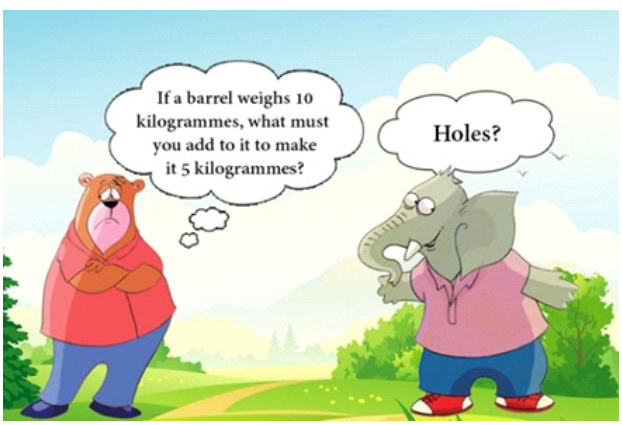
In 1993, Nobel Prize in chemistry was awarded jointly to Kary Banks Mullis (1944-) for his invention of the PCR and Michael Smith (1932-) for developing procedure of site-directed mutagenesis. Kary Mullis received many other rewards and in 1998, was inducted into the US National Inventors Hall of Fame for his invention of PCR.

Jokes

According to unofficial sources, a new simplified income-tax form contains only four lines:

1. What was your income for the year?
2. What were your expenses?
3. How much have you left?
4. Send it in.

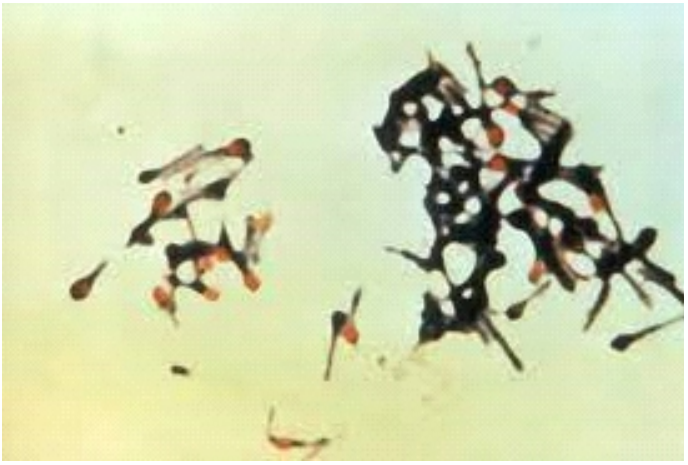
I visited my friend at his new house. He told me to make myself at home. So I threw him out. I hate having visitors.



Santa invested 2 lakhs
In a business and
suffered huge losses.
Do u know what the business was?
He opened a saloon in punjab!

Career advice we can all use

Clostridium tetani



Clostridium tetani is a common soil bacterium and the causative agent of tetanus. Vegetative cells of *Clostridium tetani* are usually rod-shaped and up to 2.5 µm long, but they become enlarged and tennis racket- or drumstick-shaped when forming spores. *C. tetani* spores are extremely hardy and can be found globally in soil or in the gastrointestinal tract of animals. If inoculated into a wound, *C. tetani* can grow and produce a potent toxin, tetanospasmin, which interferes with motor neurons, causing tetanus. The toxin's action can be prevented with tetanus toxoid vaccines, which are often administered to children worldwide.

Clostridium tetani is a rod-shaped, Gram-positive bacterium, typically up to 0.5 µm wide and 2.5 µm long. It is motile by way of various flagella that surround its body. *C. tetani* cannot grow in the presence of oxygen. It grows best at temperatures ranging from 33 to 37°C.

Upon exposure to various conditions, *C. tetani* can shed its flagella and form a spore. Each cell can form a single spore, generally at one end of the cell, giving the cell a distinctive drumstick shape. *C. tetani* spores are extremely hardy and are resistant to heat, various antiseptics, and boiling for several minutes. The spores are long-lived and are distributed worldwide in soils as well as in the intestines of various livestock and companion animals.

Clostridium tetani is classified within the genus *Clostridium*, a broad group of over 150 species of Gram-positive bacteria. *C. tetani* falls within a cluster of nearly 100 species that are more closely related to each other than they are to any other genus. This cluster includes other pathogenic *Clostridium* species such as *C. botulinum* and *C. perfringens*. The closest relative to *C. tetani* is *C. cochlearium*. Other *Clostridium* species can be divided into a number of genetically related groups, many of which are more closely related to members of other genera than they are to *C. tetani*. Examples of this include the human pathogen *C. difficile*, which is more closely related to members of genus *Peptostreptococcus* than to *C. tetani*.

While *C. tetani* is frequently benign in the soil or in the intestinal tracts of animals, it can sometimes cause the severe disease tetanus. Disease generally begins with spores entering the body through a wound. In deep wounds, such as those from a puncture or contaminated needle injection the combination of tissue death and limited exposure to surface air can result in a very low-oxygen environment, allowing *C. tetani* spores to germinate and grow. As *C. tetani* grows at the wound site, it releases the toxins tetanolysin and tetanospasmin as cells lyse. The function of tetanolysin is unclear, although it may help *C. tetani* to establish infection within a wound. Tetanospasmin ("tetanus toxin") is one of the most potent toxins known, with an estimated lethal dose less than 2.5 nanograms per kilogram of body weight, and is responsible for the symptoms of tetanus. Tetanospasmin spreads via the lymphatic system and bloodstream throughout the body, where it is taken up into various parts of the nervous system.

In the nervous system, tetanospasmin acts by blocking the release of the inhibitory neurotransmitters glycine and gamma-aminobutyric acid at motor nerve endings. This blockade leads to the widespread activation of motor neurons and spasming of muscles throughout the body. These muscle spasms generally begin at the top of the body and move down, beginning about 8 days after infection with lockjaw, followed by spasms of the abdominal muscles and the limbs. Muscle spasms continue for several weeks.

The gene encoding tetanospasmin is found on a plasmid carried by many strains of *C. tetani*; strains of bacteria lacking the plasmid are unable to produce toxin. The function of tetanospasmin in bacterial physiology is unknown.

Treatment and prevention

Clostridium tetani is susceptible to several antibiotics, including chloramphenicol, clindamycin, erythromycin, penicillin G, and tetracycline. However, the usefulness of treating *C. tetani* infections with antibiotics remains unclear. Instead, tetanus is often treated with tetanus immune globulin to bind up circulating tetanospasmin. Additionally, benzodiazepines or muscle relaxants may be given to reduce the effects of the muscle spasms. Damage from *C. tetani* infection is generally prevented by administration of a tetanus vaccine consisting of tetanospasmin inactivated by formaldehyde, called tetanus toxoid. This is made commercially by growing large quantities of *C. tetani* in fermenters, then purifying the toxin and inactivating in 40% formaldehyde for 4-6 weeks. The toxoid is generally coadministered with diphtheria toxoid and some form of pertussis vaccine as DPT vaccine or DTaP. This is given in several doses spaced out over months or years to elicit an immune response that protects the host from the effects of the toxin.

Mouse hair turns gray when certain stem cells get stuck

Stem cells involved in making the pigment that gives hair its color behave much differently than other stem cells do, researchers report April 19 in *Nature*. Rather than staying put, these melanocyte stem cells travel up and down hair follicles all while oscillating between two different forms of maturity. But it's not the unusual behavior that leads to graying. It's when these stem cells stop their quirky ways that hair turns white.

That movement is really strange behavior for stem cells, says William Lowry, a hair follicle biologist at UCLA. Stem cells usually settle into a niche, or compartment, dividing when they need to, he says. “Their progeny go off and do interesting things … whereas the stem cells typically stay put.”

Stem cells are immature cells that make more of themselves and give rise to cells that will mature to perform specific tasks. Melanocyte stem cells can become melanocytes, the cells that make pigments which give hair and skin their color.

Qi Sun and Mayumi Ito Suzuki, stem cell biologists at New York University Grossman School of Medicine, didn't set out to study gray hair. They wanted to know how melanocyte stem cells in the hair follicle behave. The researchers had previously implicated such cells in melanoma skin cancer.

To understand the life cycle of melanocyte stem cells, Sun watched the same patch of hair follicles on a mouse again and again over the mouse's lifetime. She saw that melanocyte stem cells move out of a compartment at the base of the follicle and up into the follicle bulge. Then the cells turn around and head back to the base.

That is not the cells' only odd behavior. The stem cells mature, or differentiate, into an intermediate form that ultimately gives rise to melanocytes, the cells that make the pigment melanin, which colors hair. For other stem cells, once they start maturing there is no going back. But melanocyte stem cells can toggle between the less-mature and more-mature states.

Being able to slide between the two states is necessary for hair to keep its color, Sun and colleagues report. The intermediate state is needed for migration to the base of the growing hair shaft, where some of the cells develop into melanocytes to color the hair. And the stem cell state regenerates a pool of stem cells that can then mature to touch up the roots.

The stem cells must move because proteins that help control cell maturity and proliferation are found in different compartments of the hair follicle. A protein called WNT made by cells in the compartment at the base of the follicle causes stem cells to mature into melanocytes, the researchers found. But too much WNT activity prevented the stem cells from sliding back into their regenerative state.

As mice aged, or if the researchers plucked hairs to make them grow faster, more and more worn-out melanocyte stem cells got stuck in the hair follicle bulge. There they couldn't mature into the intermediate stage to travel back to the base compartment where they could have formed melanocytes. That led to depletion of the color-producing cells, causing the hair to turn gray.

The graying could be reversed though. Getting the cells moving and starting the maturation cycle again gave hair back its color, the team found. Previous research has shown that periods of stress deplete melanocytes and temporarily cause hair to gray.

In principle, this sort of behavior from melanocyte stem cells may cause humans' hair to turn gray too, says Rui Yi, a stem cell biologist at Northwestern University Feinberg School of Medicine in Chicago, who was not involved in the research. Until researchers can observe human hair follicles over time, he says, it's not possible to say for sure.

Habits For Healthy Lifestyle

Poor health and low energy levels can negatively impact every part of your life. Your creative spark can be destroyed, leaving you with zero inspiration and ideas. Work would become tedious and hard going, and your social life would become a shadow of what it used to be.What you need to transform your life is a healthier lifestyle**.** One that will bring back your natural energy and zest for life. It will not only improve your physical health but produce everlasting beneficial effects on your mental health as well. It will also create a positive environment for the people in your surroundings.

Implementing daily healthy habits that benefit your body has a positive ripple effect on your mind and soul as well. Tiny modifications here and there can greatly improve your quality of life in so many ways.

Move more and sit less : Whether working out is something you look forward to or something you dread, you probably can't deny that exercising just makes you feel better. Not only does exercise give you an energy boost and help you manage your weight, it also reduces your risk of several health conditions and improves your mental well-being. But staying active doesn't just begin and end with the 30 minutes you dedicate to your workout. It also means reducing the amount of time you're sitting all day. You can't and probably shouldn't exercise all day. But you can make an effort to stay active throughout the day while still getting your work done.
Here are a few ways to move more and sit less:

- Park at the back of the parking lot
- Take a five-minute walk
- Use a standing desk and shuffle from side to side if you work at a computer
- Take the stairs instead of the elevator

Set yourself up for sleep success: You already know what happens when you don't get enough quality sleep — you're low on energy, you can't concentrate, you're less productive and the list goes on. Lack of sleep actually affects more than how you feel the next day. Over time, insufficient sleep affects your overall health and can lead to a variety of chronic health conditions.

But there's a lot more to getting a good night's sleep than just going to bed on time or keeping your room dark.
Here are tips for improving your sleep:

- Train your brain and body by sticking to a consistent sleep schedule
- Keep your bedroom quiet, dark and cool
- Use your bed for sleep, not for watching TV or reading a book
- Limit afternoon naps and caffeine
- Avoid alcohol and screentime before bed.

Stay hydrated :We all know how easy it is to grab another can of soda or cup of coffee instead of another glass of water. With the wide array of beverages available these days, water always seems like the boring option.

Your body relies on water to perform a laundry list of vital tasks, including supporting your brain function, helping circulate blood throughout your body and regulating your body temperature. Since you're constantly losing water throughout the day as you breathe, sweat and use the restroom, it's critical that you replace the water you lose.
Here are tips for staying hydrated:

- Know how much water you need to consume every day
- Make drinking a glass of water part of your normal routine
- Carry a water bottle
- Try unsweetened sparkling water or flavor your water by adding fresh fruits, vegetables and herbs
- Track your water intake using an app
- Choose hydrating snacks, such as cucumbers, celery, strawberries or watermelon
- Distribute your water intake throughout the day (playing catch up at the end of the day doesn't negate the fact that you were dehydrated all day).

Reward yourself the right way : After a long week of work, a hard workout or some other goal or challenge you've met, it's natural to want to reward yourself. Rewards are important. A reward makes you feel good, encourages you to continue to make good choices and, frankly, you deserve it.

But if the reward you choose is inherently unhealthy, is it truly a reward? Whether it's eating an entire family-size bag of chips, drinking two too many glasses of wine or binge-watching TV all weekend, not all rewards are actually rewarding to your body and brain.

Rather than overdoing it on unhealthy indulgences, consider making your reward something that you not only enjoy, but are grateful for. It could be a person, a pet, a hobby or just some nice weather — whatever it is, invest your time there as your reward.

A lot goes into forming and maintaining healthy habits. By starting small and choosing habits that are easy to stick to no matter where you are, your likelihood of making healthy choices day in and day out greatly increases.

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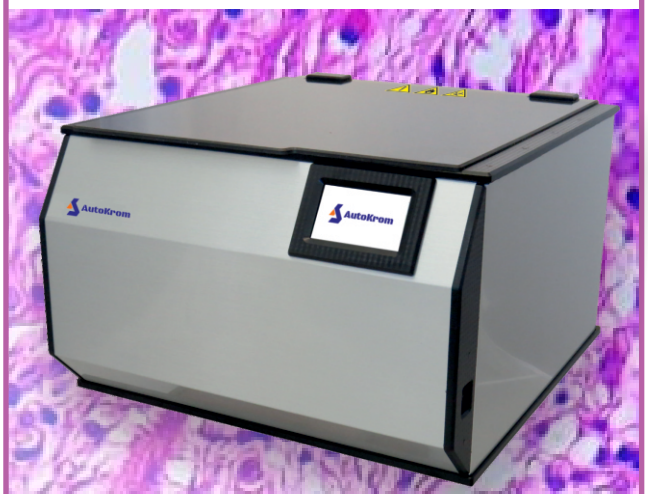

BENEFITS

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~ Enhances cytoplasmic clarity and transparency.
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Highlights of the coming issue

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