

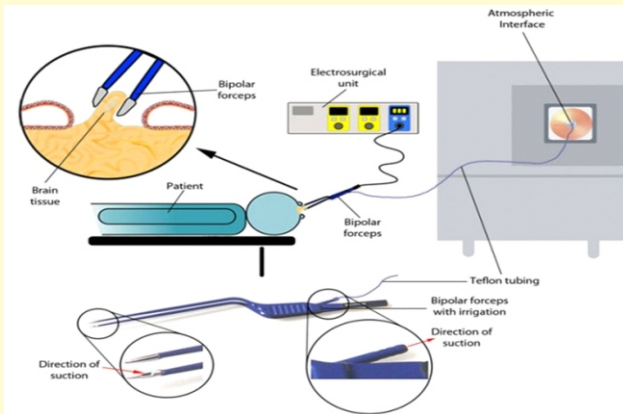
Second Edition
January - 2016

MICROBIOME

The background of the cover is a dark blue, almost black, space filled with various microscopic organisms. The most prominent feature is a large, spherical virus particle in the center, covered in numerous long, thin, hair-like spikes (spikes) that radiate outwards. Other smaller, similar virus particles are scattered throughout the scene, some in sharp focus and others blurred. In the upper right corner, there are faint, translucent images of what appear to be biological structures, possibly cells or tissues, rendered in a lighter blue hue. The overall aesthetic is scientific and futuristic.

**A NEWSLETTER BY THE DEPARTMENT OF MICROBIOLOGY
VIJAYA COLLEGE, RV ROAD, BANGALORE**

iKNIFE-INTELLIGENT SCALPEL



Dr. ZaltonTakats (PhD), a Hungarian research chemist associated with Semmelweis University, in Budapest invented an experimental, surgical knife, popularly called “iKnife”(synonyms: Onkoknife, intelligent scalpel) that can accurately test tissues as it contacts it during surgery and gives immediate information as to whether the tissue is cancerous or not. According to a study, co-written by the device's developers, the iKnife has the potential for shorter cancer surgeries

that remove all traces of tumour. In the first study to test the invention, the iKnife diagnosed tissue samples from 91 patients, with 100% accuracy, instantly providing information that normally takes up to half an hour to reveal using laboratory tests.

The “iKnife” is based on electro surgery, a technology invented in the 1920s that is commonly used today. The device uses an electrical current to cauterize surgical incisions as they are made while minimizing blood loss. In doing so, they vapourize the tissue, creating smoke.

Dr. ZaltonTakatas realized that this smoke would be a rich source of biological information. To create the “iKnife”, he connected an electro-surgical knife to a mass spectrometer, an analytical instrument used to identify chemicals that are present in a sample. Different kinds of cells produce thousands of metabolites of different concentrations, so the profile of chemicals in a biological sample can reveal information about the state of that tissue.

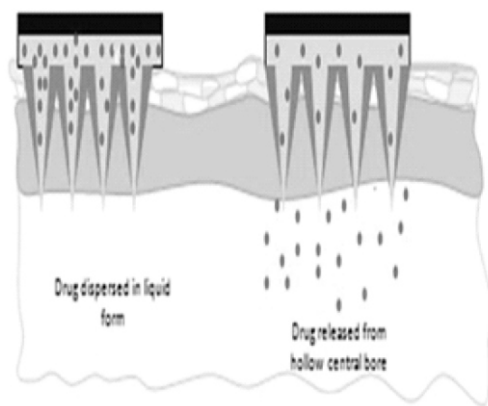
The researchers first used the “iKnife” to analyse tissue samples collected from 302 patients, recording the characteristics of various cancerous and non cancerous tissues, including brain, lungs, breast, stomach, colon and liver tumours to create a reference library. The “iKnife” works by matching its readings during surgery to the reference library to determine what type of tissue is being cut, giving a result in less than three seconds.

Although the current study on “iKnife” is focused on cancer diagnosis, Dr. Takats says that the device can identify many other features, such as tissue with an inadequate blood supply, or types of bacteria present in the tissue. He has also carried out experiments using it to distinguish horsemeat from beef.

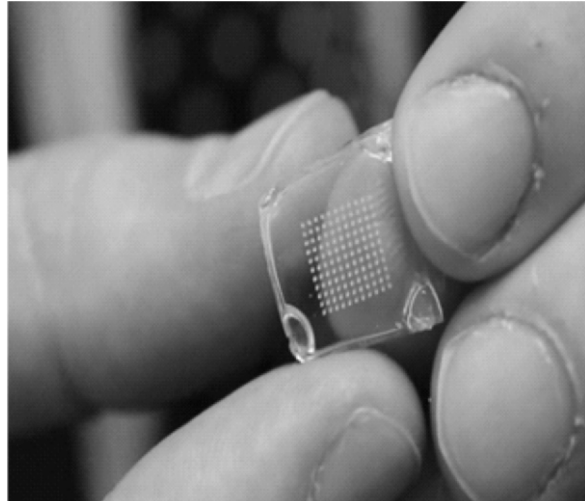
“The 'iKnife' has a very great potential to reduce tumour recurrence rate and enable more patients to survive”, says Dr.Takats.

**Meghana Shashikanth
K.V.SrilaxmiMadhuri
Sahana T.
VI Sem BcGMb**

DISSOLVABLE MICRO-NEEDLES FOR VACCINES



Figno.2 Hollow microneedle



Scientists from Osaka University, Japan have developed a new micro needle patch made of dissolvable material that could make flu vaccination easier, safer and less painful by eliminating needle-related risks of diseases and injuries. Vaccination prevents an estimated 2-3 million deaths every year. Mass vaccination for influenza, H1N1, Ebola is an essential priority of the World Health Organization (WHO). Most vaccines are injected using needles which require medical personnel with technical skills. Flu vaccines delivered using micro needles that dissolve in the skin can protect people against infection even better than the standard needle delivered vaccine. There is no sharp hazardous waste left over, they are not expensive than a syringe, and most importantly, tests on mice have shown that micro needle vaccinations are significantly long lasting than deeper injections delivered by syringe.

Micro needle patches called 'Microhyala' are self-applied band-aid style adhesives that can be applied to any area of the skin. The active area is an array of tiny needles, just 650 microns in length, or 0.65mm. They are made from a harmless dissolving polymer that is mixed with a freeze-dried vaccine. Hence, by the use of this micro needle eliminates the risk of infection caused by the disposal of used syringe and to certain extent medical waste can be managed.

Bindu.S
VI sem BcGMb

BITTERSWEET – ARTIFICIAL SWEETENERS MAY CAUSE UNWARRANTED CHANGES

To avoid the calories in sugar, dieters often sweeten foods and drinks with no-calorie substitutes, such as saccharin. But this fake sugar could have unintended consequences, a new study finds.

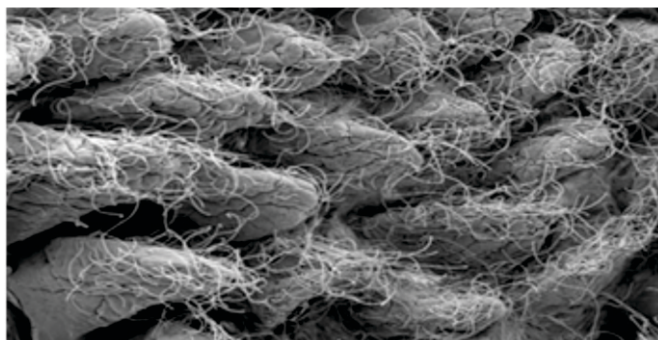
A team of Israeli scientists concluded from studies of mice that ingesting artificial sweeteners appear to change the population of intestinal bacteria that direct metabolism and this result suggests that the connection might also exist in humans.

It was found that mice that were fed with a daily dose of aspartame, sucralose or saccharin had abnormally high blood glucose levels, while another cluster of mice fed with natural sugars had normal blood glucose levels. The study also determined that the sweetener had the same effect regardless of whether mice were lean or overweight.

After giving antibiotics to the saccharin-fed mice in order to wipe out the intestinal bacteria, they observed that the mice's glucose metabolism recovered. Genetic analyses of the microbes in the mice's intestines revealed major differences in the microbial groups present in saccharin-fed mice compared with mice eating a regular diet.

It also affects humans, the study suggests. When seven healthy volunteers ate the FDA's maximum acceptable daily dose of saccharin for a week, four of the seven subjects showed a reduced glucose response in addition to an abrupt change in their gut microbes. Transferring faeces from two of these four people into mice induced the same problems in the rodents, suggesting that gut microbes were to blame.

The study suggests that artificial sweeteners enhance the populations of gut bacteria that are more efficient at pulling energy from our food and turning that energy into fat. In other words, artificial sweeteners may favour the growth of bacteria that make more calories available to us.



The string like filaments represents the gut microbiome of mouse

Sushmitha Srinivasan
VI sem BcGMB

A COMPOUND FOUND IN TURMERIC ENCOURAGES BRAIN TUMOR



Aromatic-tumerone, a major bioactive compound found in spice and turmeric, could be used to create future drugs to treat patients with neural impairment, such as sufferers of strokes and Alzheimer's disease.

Scientists from the Institute of Neuroscience and Medicine at the Research Centre Juelich in Germany studied the impact that aromatic-tumerone has on neural cells by injecting the compound into the brain of rats. Scans revealed that after being injected with the compound, the regions of the brain involved in nerve cell growth were more active.

The researchers also tested the impact of the compound directly on neural stem cells, which are cells that have the ability to transform into any type of brain cell and, in theory, should be able to repair damage or disease but it didn't seem to work so well in humans and other mammals. After treating rodent neural stem cells in different concentrations of aromatic-tumerone, the scientists found that the compound encouraged the growth of the neural stem cells - and higher the concentration, greater the growth.

The turmeric compounds also speed up the differentiation of the stem cells. The results are published in the journal *Stem Cell Research and Therapy*.

"It is interesting that it might be possible to boost the effectiveness of the stem cells with aromatic-turmerone. There are possibilities that this in turn can help boost repair in the brain."

Meghana Somasundar

Vaishnavi G.

V Sem BcGMB

A RE-EMERGING DISEASE IN SOUTH EAST ASIA SCRUB TYPHUS

BENGALURU: *Fever, rashes on the body, headache and joint pain – three kids admitted to Vani Vilas hospital recently had all the symptoms typical of dengue. But testes showed that they were not infected with dengue, but with another viral fever, "Scrub Typhus".*

A study had been taken up in 2007 in the Bangalore Baptist Hospital on 92 patients with pyrexia (fever) aged about 18-60 years. Immunocompromised patients were excluded. Out of the 92, 8 patients were positive for PCR typhus (8.7%). The other fevers seen in the other present study were enteric fever (3.3%), dengue (1.1%) and malaria (4.3%).

Scrub Typhus is a form of typhus caused by the intracellular parasite *Orientia tsutsugamushi*, a gram negative α - proteobacterium of family Rickettsiaceae. It was first isolated and identified in Japan (1930). The disease occurred among troops in Burma and Ceylon during the Second World War. Several members of the U.S. Army's 5307th composite unit died of the disease. This disease is caused due to mite bite and diagnosed only through blood analysis.

Symptoms of scrub Typhus are fever, rashes on the body, joint pains, headache, serious complications which include pneumonia, acute respiratory distress syndrome and acute renal failure.

Definitive treatment of this group of illness is relatively simple involving the use of single drug therapy with universally available antibiotics like Doxycycline, Chloramphenicol, Azithromycin, Roxithromycin, et cetera.

Rubina Siddiqa

VI Sem BcGMB

SCRAMBLE

- ITNCACYAOARBE

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- YMICOOLROBIG

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- KEOHLEEUWEN

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- NILENCILINP

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- ISNTPETICA

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Eesha Bacchu R.
V Sem BcGMB

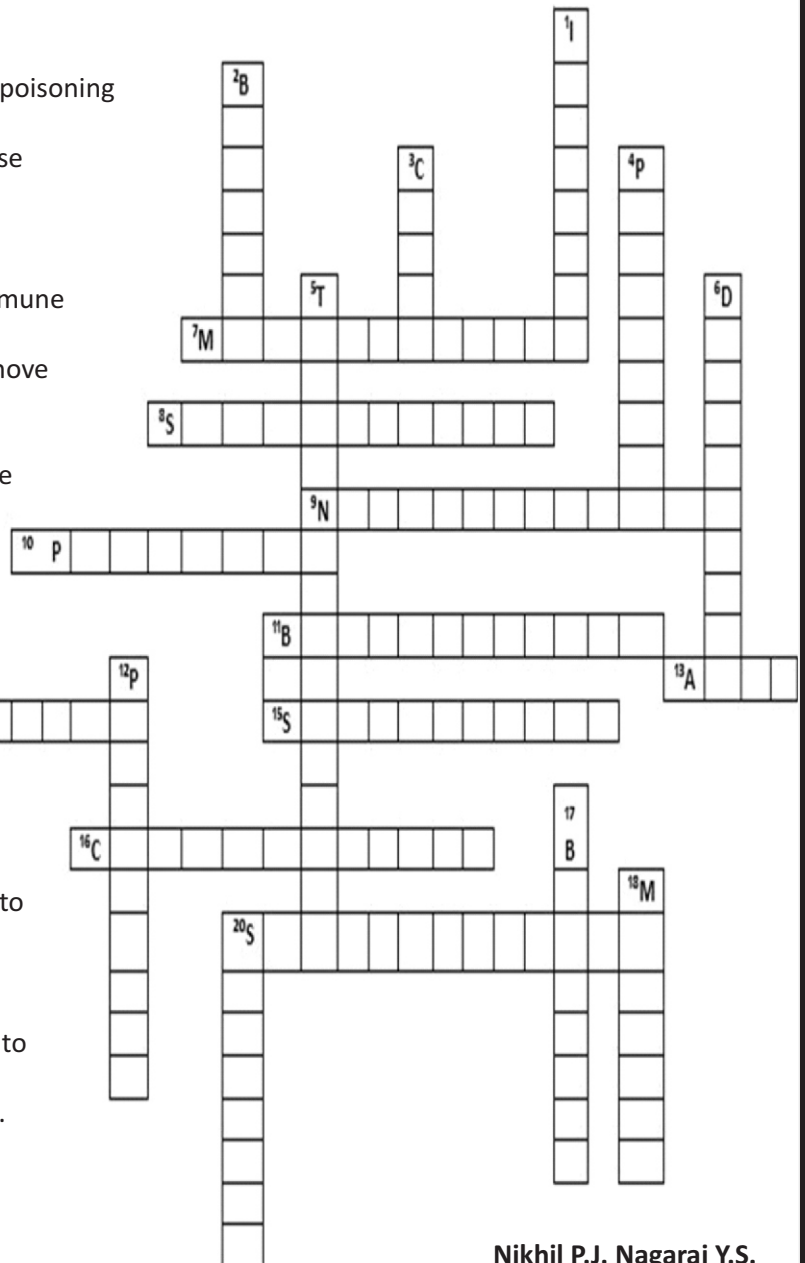
CLUES

ACROSS

- 7) Study of small organisms.
- 8) Bacteria that causes strep throat, blood poisoning and pus formation.
- 9) Bacteria that is not harmful/doesn't cause disease.
- 10) A type of pathogenic bacteria.
- 11) The scientific study of bacteria.
- 13) Disease that breaks down the body's immune system.
- 14) Hair like projections by which bacteria move about.
- 15) Bacteria that live on dead matter.
- 16) Common cold, hepatitis, and measles are examples of this type of disease.
- 19) During their inactive stage, certain bacteria form these outer coverings

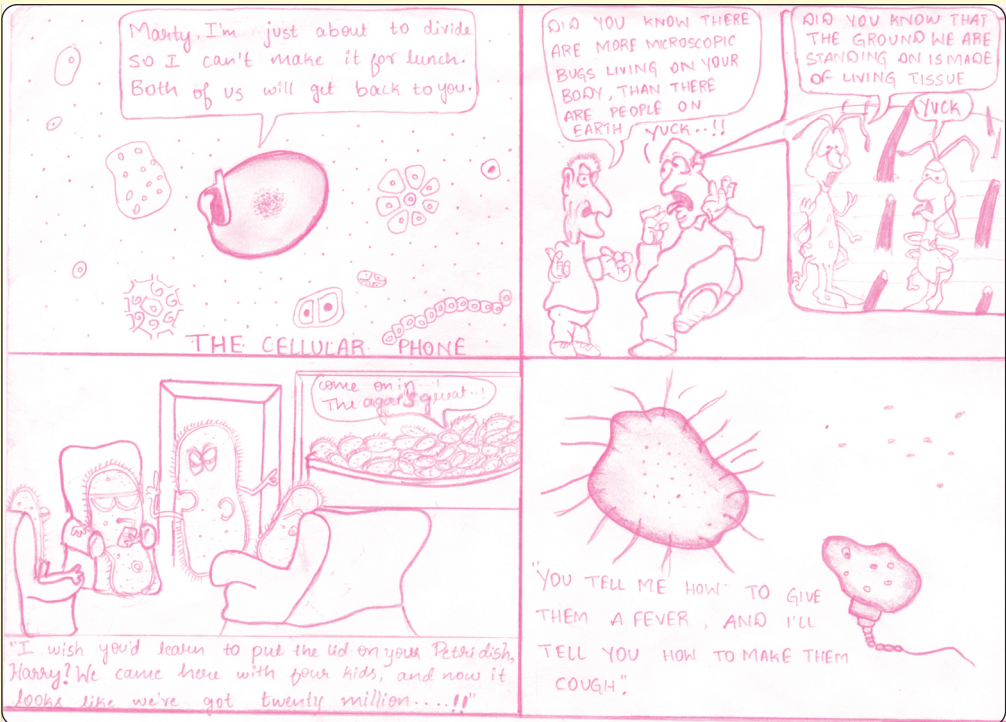
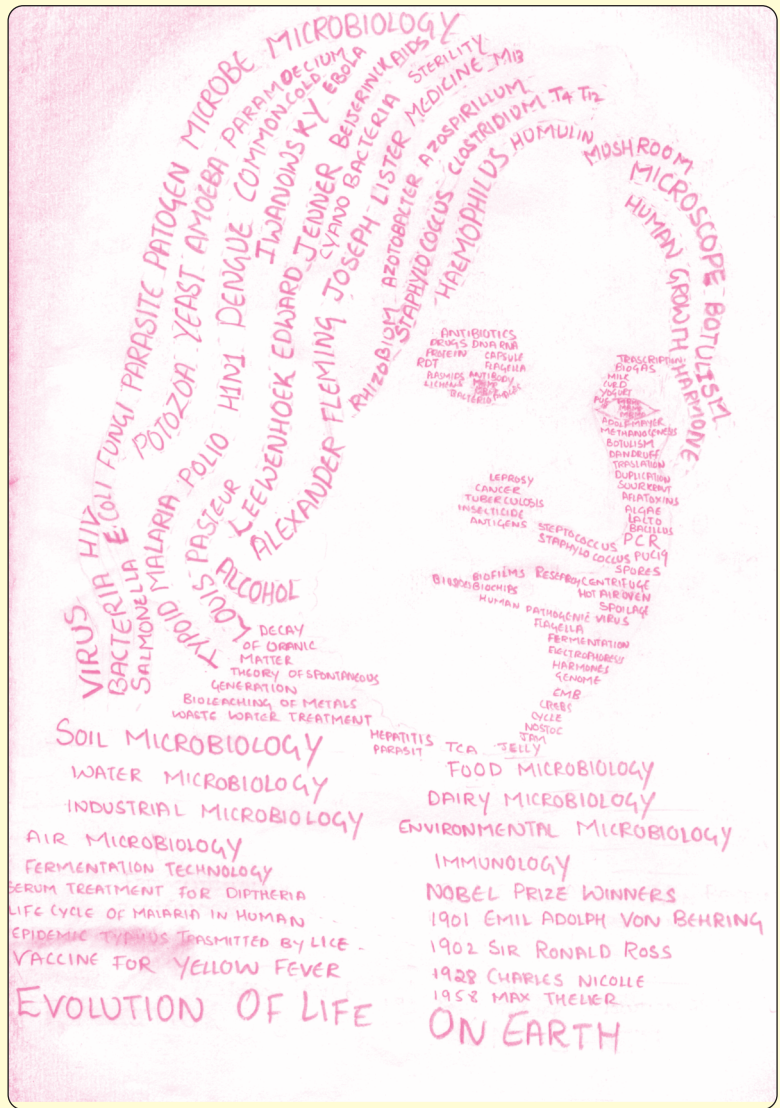
DOWN

- 1) The body's ability to resist infection.
- 2) Bacteria that are rod shaped.
- 3) Rarely shows self movement.
- 4) People showing signs of contagious disease or condition should be referred to a_____.
- 5) Spiral bacteria that causes syphilis.
- 6) Grows in pairs and causes pneumonia.
- 12) Bacteria that causes disease/harmful to the body.
- 16) Virus transmitted by blood or body fluid.
- 17) Also known as germs or microbes.
- 18) The process during which the bacteria divides.
- 20) Bacteria with a spiral shape. 20) Bacteria that are found in clusters.



Nikhil P.J. Nagaraj Y.S.
VI Sem BcGMB

Bindu S.
VI Sem Bsc 'H'



Aparna G.
VI Sem BCGMb

AMAZING FACTS OF MICROBES

- 1) The largest bacteria found so far can actually be seen without the use of a microscope- *Thiomargarita namibiensis* and *Epulopiscium fishelsoni*.
- 2) Beef tapeworm is the largest parasite, which can grow 7 ½ meters! Imagine that living in your gut.
- 3) All the bacteria in our body collectively weigh about four pounds.
- 4) The smell of rain' is caused by a micro-organism called *Actinomyces*.
- 5) A clean mouth has about 1000 to 10,0000 bacteria on each tooth.
- 6) Chocolate has an anti-bacterial effect and protects against tooth decay.
- 7) Tap water has a shelf life of 6 months; after chlorine dissipates the bacteria start to grow.
- 8) There is a breed of bacteria that resides in hair spray.
- 9) Most antibiotics are made from bacteria.

Nikhil P.J.Naresh S.

V sem BcGMb

ACHIEVEMENTS OF STUDENTS

- Bindu S. scored – 95% in IV Sem Microbiology and stood first in Microbiology at the University level.
- Vinaya R.Adki and Sushmitha Srinivasan of V Sem Microbiology has selected for Indian Academy of Science SUMMER RESEARCH FELLOWSHIP 2015
- Madhuri, Meghana, Sahana, Nikhil and Nagaraj of V Sem Microbiology presented a poster on “Synthesis, characterization and evaluation of phytogenic Zinc nanoparticles” in an International conference on “Advanced Lecture Series in Ocular Pharmacology-1 Recent trends with a focus on Nanomedicine” held at SIT, Tumakuru on 8th and 9th August, 2015.
- Vaishnavi P Kulkarni and group of III sem Microbiology presented a paper on “Garbage Enzyme –An Alternative Treatment Of Waste Water” and secured 2nd place in a National Conference on “New Approaches and Concepts In Microbial Biotechnology” held at Maharani's Science College for women on 29th and 30th September, 2015.

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