

Third Volume

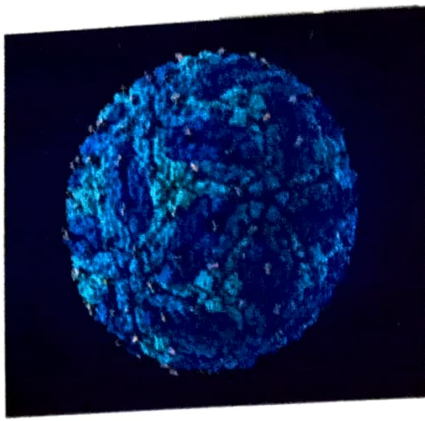
# MICROBIOME

The background of the cover features a composite image. The upper portion shows a close-up of a microscope's objective lenses and eyepiece, with a bright light source illuminating a slide. The lower portion shows a glowing blue DNA double helix structure, partially enclosed within a translucent, glowing blue cylindrical shape that resembles a cell or a protective sheath.

A NEWSLETTER BY THE DEPARTMENT OF MICROBIOLOGY  
Vijaya College, RV Road, Bengaluru



# ZIKA VIRUS



"ZIKA VIRUS" the latest villain, is threatening the society at an alarming rate. Zika was first identified in human beings in 1952 in Uganda. But in 2015, Zika outbreak was confirmed in Brazil and Colombia. Zika virus, which is spread through mosquito bites, tends to cause a low fever, skin rashes and conjunctivitis (pink eye). However, when contracted by pregnant women, the virus may be linked with microcephaly (underdeveloped skull and brain) in affected developing babies.

The heat of effects of Zika has spread throughout the world to such an extent that it has even affected RIO Olympics directly. Many top sports persons like Roger Federer have backed out from taking part in the Olympics. Brazil's health ministry have even launched Zika app on the occasion of Rio Olympics. The app will list information on how to prevent Zika infection, ask people about their health and if needed, tell them how to reach the nearest pharmacy or hospital via GPS. The app will also have Olympic-style video game quizzes about Zika. It is available in English, French, Spanish, Portuguese, Arabic, Chinese and Russian. Brazil's health ministry have also asked the females in the affected areas not to give birth to children for next two years as more than 4,700 microcephaly cases have been reported in Brazil since the outbreak of the virus.

The latest studies show that Zika virus can also be transmitted by sexual activities and Zika can also affect the adult brain causing a condition similar to Alzheimers. Zika virus won't infect all cell types of adult brain, but only two populations of adult brain cells that are very specific to the stem cells are affected.

Outbreaks of Zika are occurring in many countries and territories, and because the mosquitoes that spread Zika virus are found throughout the world, it is likely that outbreaks will spread to other countries. On Feb 1<sup>st</sup> 2016, the World Health Organization (WHO) declared a Public Health Emergency of International Concern because of clusters of microcephaly and other neurological disorders in some areas affected by Zika.

Latest news from Miami, Florida also confirms that Zika has already arrived in Miami Beaches for its summer vacation. Zika is now mainly spreading across the globe through infected travellers.

As for now, there are no vaccines for Zika virus. US experts from the National Institutes of Health say trials of a Zika vaccine will likely start in September this year. Depending on the results, larger trials could begin at the start of 2017 and the vaccine will be available to general public by 2018.

Zika virus having been spread across Brazil there are high chances for the Olympian athletes to be infected by them. As the Olympics come to an end, the athletes returning to their countries are showing symptoms of the Zika fever. Though, the Brazilian government has provided the best facilities including the app for medical help and providing mosquito repellents, the spread of the virus has been prevented or not, will be decided in near future. If it so happens then there will be an outbreak of Zika in almost all countries. Thus giving rise to a pandemic. Will the Rio Olympics facilitate the outbreak of Zika virus? This is something to be given a deep thought about.



- Sneha Bhatt

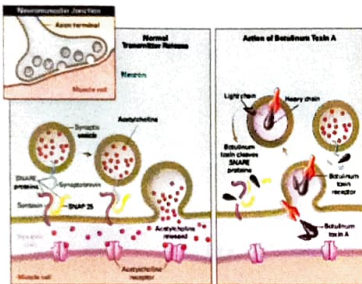


# Can the neurotoxin botulinum become a magic drug or a bioweapon ?

We live in a society which is obsessed with looking young and beautiful. As women and celebrities age they feel the need to maintain their youthful appearance to live upto the society standards. Hence people are obsessed with trying to get rid of their wrinkles through the use of many therapies and treatments. One such treatment is the use of the Botox treatment. This Botox is produced by the bacteria *Clostridium botulinum*; the same bacteria producing the "neurotoxin" which may be used as bioweapon.

*Clostridium botulinum* is the name of group of bacteria commonly found, that grow well in low oxygen condition. They produce a neurotoxin protein called "Botulinum toxin". This Botulinum toxin poses a major bioweapon threat because of its extreme potency and lethality, its ease of production, quick transport and misuse.

## MECHANISM



Botulinum toxin consists of 7 AB endotoxins, which are considered to be the most potent biological toxin known to man. It is demonstrated that one milligram of botulinum toxin is sufficient enough to kill more than one million guinea pigs.

The biologically active toxin complex binds to presynaptic membrane on the terminal of stimulatory motor neurons at the neuromuscular junction, blocking the release of acetylcholine.

Because

transmission of nerve impulse to the muscle is through acetylcholine interaction with a muscle receptor, the botulinum-poisoned muscle

cannot receive an excitatory signal and contraction is prevented. This results in flaccid paralysis and death by suffocation which is characteristic botulism.

One of the most fascinating aspects in the field of botulinum toxin research in recent years has been application of the potent toxin in treatment of cervical dystonia (painful condition in which the muscle of neck contract involuntarily and causes head to twist), blepharospams (involuntary tight closure of eyelids), axillary hyperhidrosis (abnormally increased sweating), strabismus (abnormal alignment of eyes), bruxism (involuntary habitual grinding of teeth and jaw clenching) and gastric cancer.

In cosmetic application, botulinum toxin is used as Botox. Botox injection can be used to prevent development of wrinkles by paralyzing facial muscle. It can also be used for smoothing of glabellar lines (also called as frown lines).

Botulinum toxins are of great interest to medical and scientific communities. Despite causing disease and being the threat as a bioweapon they still have a wide range of applications at pharmaceuticals.

- Shreya. S and Pallavi. S. L

# Magical Kiwi

The need for kiwi fruit has increased in the market recently .This is because people now realize the importance of Kiwi fruit. Native to Northern China, it was first brought and cultivated in New Zealand and was known as the Chinese gooseberry.

Kiwi fruits are nutrient rich food, as they are high in nutrients and low in calories. The health benefits of consuming this fruit include: maintaining healthy skin tone and texture, reducing blood pressure and prevents heart disease and strokes.

Collagen is dependent on vitamin C present in kiwi fruit as an essential nutrient that works in our bodies as an antioxidant to help prevent damage caused by the sun, pollution and smoke, to smoothen wrinkles and improve overall skin texture.

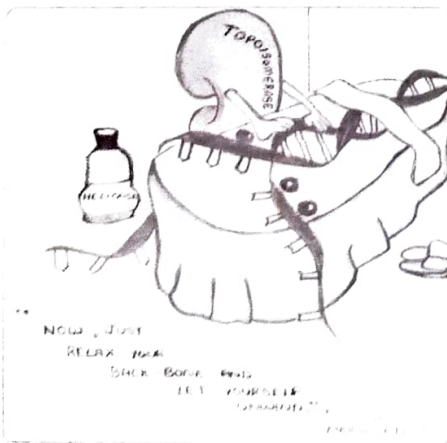
The fiber and potassium in kiwi supports heart health. Because of their high potassium content, kiwi can help negate the effects of sodium in the body. High potassium consumption reduces the risk of stroke, protection against loss of muscle mass, prevention of bone mineral density, and reduction in the formation of kidney stones. Also they prevent constipation.

Kiwi is also high in serotonin which boosts learning memory and mood and also helps regulate human appetite. It also contains phytochemical lutein. Lutein is a carotenoid vitamin that prevents age related blindness.

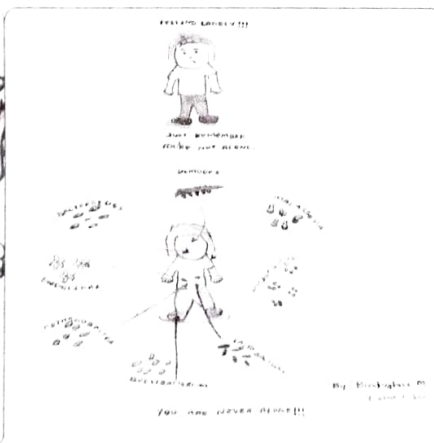
The cost of kiwi fruit is so high but consumption of at least one kiwi fruit a day keeps our body and mind healthy.



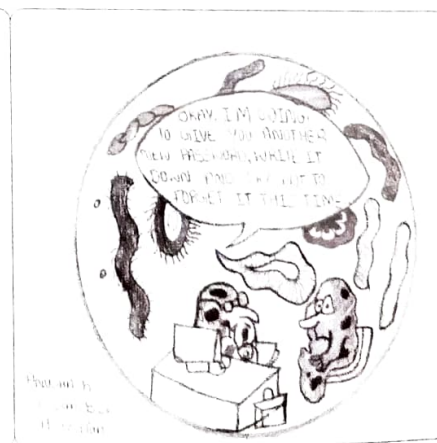
- Kavia Raj K



-Marudwati.J



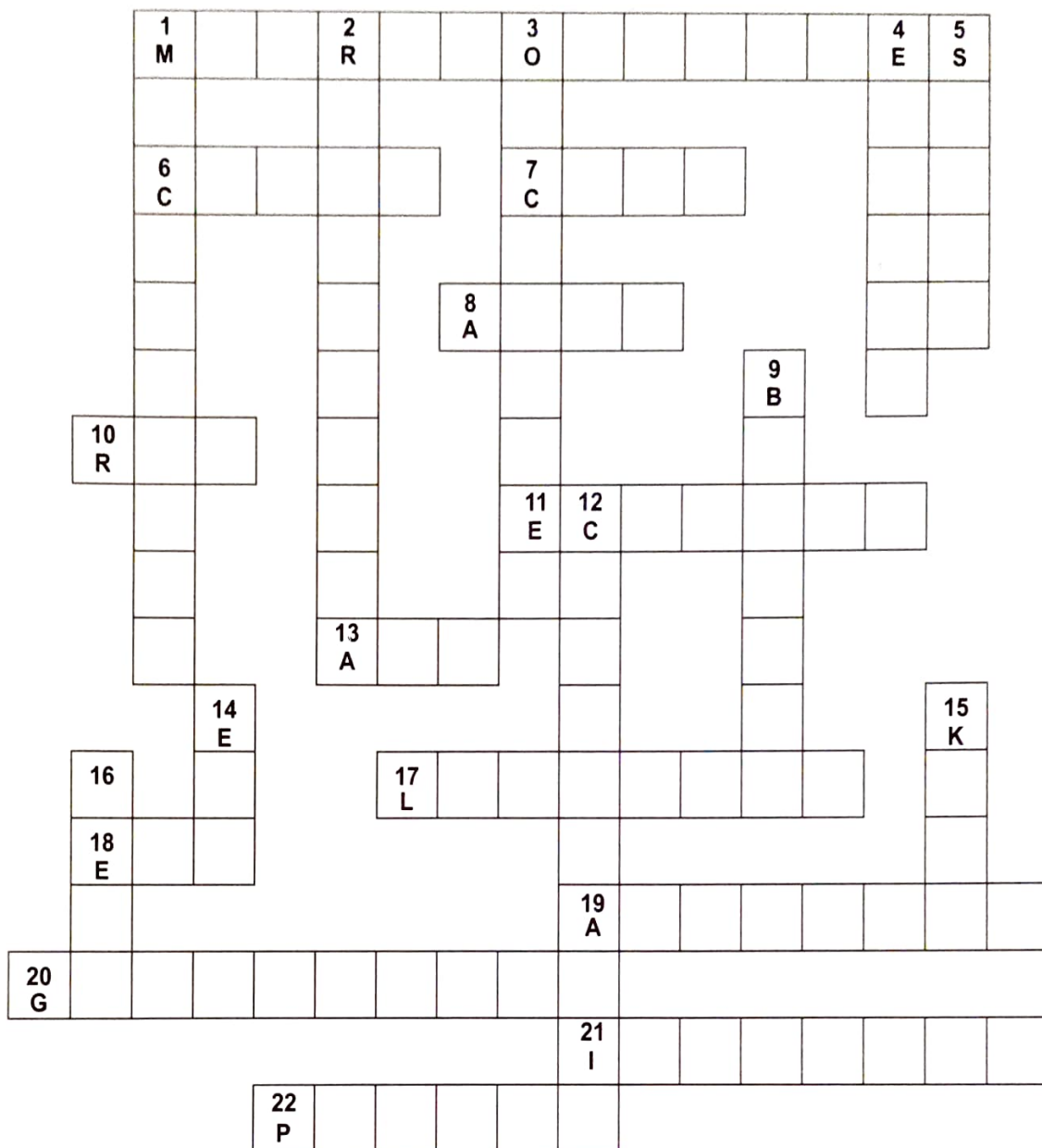
- Bindhushree.M



- Anusha. R



# CROSS WORD



## ACROSS

- 1 A Molecule containing more than 1000 atoms
- 6 Watson and \_\_\_\_\_?
- 7 A solid /fluid filled sac or pocket
- 8 Vital for solid media preparation
- 10 Molecular scissors
- 11 Study of ecosystem
- 13 Energy currency
- 17 An enzyme capable of hydrolysing bacterial cell wall
- 18 Used to access the electrical function of the heart
- 19 Can live in the absence of oxygen
- 20 A gelatinous polymer surrounding the cell
- 21 Resistance : \_\_\_\_\_
- 22 Type of protein in the outer member of gram negative cell wall

## DOWN

- 1 A unit of measurement equal to  $10^{-5}$  m
- 2 A disease caused by ticks
- 3 A gene than can bring about malignant transformation
- 4 A study of cause of disease
- 5 A carbohydrate protein complex that project from the surface of certain viruses
- 9 A microbial community that usually form a slimy layer on a surface
- 12 Movement in response to the presence of chemicals
- 14 Measures the brain wave
- 15 Discovered the tri carboxylic acid cycle
- 16 Structural and functional unit of the body

**Mythri J  
Rashmi M  
Vaishnavi P K**

## Amazing Facts

- A newly discovered species of rust-eating bacteria will have consumed the wreck of Titanic within 20 years
- Honey is a natural reservoir for the Botulism bacteria. Adults can naturally process it but infants can't and this is why you shouldn't give honey to babies.
- 20% of office coffee mugs contain faecal bacteria
- Babies are born with no bacteria in their bodies
- In 2013, a bacteria was found in new Zealand that's resistant to every single antibiotic known.
- Horseshoe crab blood is worth USD 15000/L due to its ability to detect bacteria.
- New bacteria grows on a kitchen sponge every 20 minutes

Shilpa. P. H

### SCRAMBLE ANSWERS:

1. MYCOPLASMA 2. ENDOSPORE 3. GLYCOCALYX 4. FERMENTATION

## DEPARTMENTAL ACTIVITIES - 2016

- Poornima K. scored 99.37% in Microbiology of 2nd Semester Bangalore University examination.
- Shreya S devadiga & team of V Sem was awarded 'SwachhBharathPrabhari' at national conference on Municipal Solid Waste Management held in Indian Institute of Science on 23rd & 24th February 2016
- An Educational tour was arranged to Goa for final year students from 23rd February to 27th February 2016. The places visited were CSIR National Institute of Oceanography, Goa University, BITS-Goa & CIPLA.
- A group of Final year students had participated in Workshop on Microbial and Molecular Techniques organized by Jain University on 15th & 16th February 2016
- A group of 3rd Semester students had undergone Training on Plant Tissue Culture at Shreedhar Bhats Laboratory from 9th June to 18th June 2016
- An Industrial visit was organized for 3rd Sem & 5th Sem students on 26th August 2016 to visit Namdhari Seeds Research Center, Heritage Wine Production Center & Indo-American Hybrid Seeds pvt. Ltd.



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