



## KSRCT IEEE-EMBS Student Chapter Newsletter

(K.S.Rangasamy College of Technology  
Institute of Electrical & Electronics Engineers  
Engineering in Medicine and Biology Society)



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### CONTENT

- Editors Desk
- Department Activities.
  - Conference cum Scientific Meet
  - Placement Drive
  - Release of Newsletter
- IEE-EMBS News.
- General Articles
  - Ready to Eat Rice without cooking
  - Climate Change Boosts Lethal Hendra Virus
  - Food We Eat Might Control Our Genes
  - Climate Change May Make Insect-Borne Diseases Harder to Control

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### Editors Desk

It gives us immense pleasure to present the first issue of KSRCT IEEE-EMBS



Newsletter, the measure of progress. We, the editorial board members of the KSRCT IEEE- EMBS Student Chapter are rejoiced to present the Newsletter published by the Department of Biotechnology, KSRCT.

We owe our special thanks to our Chairman Lion Dr.K.S. Rangasamy MJF, Principal Dr.K.Thyagarajah and the members of the various committees for their whole-hearted support .We also thank Shri.R.Srinivashaan, Secretary and Smt.Kavitha Srinivashaan, Assistant Secretary, K.S.R. Educational and Charitable Trust, Tiruchengode for their excellent support and constant encouragement in brining out this magazine successfully every semester.

## DEPARTMENT ACTIVITIES

### Conference cum Scientific Meet

P.Ponmurugan, I.Muthiah and B.Bagyalakshmi, Department of Biotechnology, K.S.R.C.T.



Triangle meeting at CSM-III

The journey of cooperation between industry and institute has taken different forms at different times. Historically, it started with simple interaction and gradually evolved to very close partnership overtime. There has been a wide variety of interactions practiced among industries and institutes which includes problem solving, curriculum development, study visits, scholarships, and apprenticeship training and incubation center. However, until the time that the concept of public private partnership has evolved, industry, has, by far, not been involved in taking sustainable financial, technical and operational risks in the design, financing and building and operation of educational projects. Therefore, public-private partnership has been regarded as a natural progression of relationship from

interaction elevated to structural partnership where the private sector assumes substantial operational risks in the design and implementation of educational projects.

### PLACEMENT DRIVE

Placement interview was conducted by Zifo Technologies, Chennai and Point Perfect Transcription Services (INDIA) Pvt. Ltd., Coimbatore. Three students were placed in Zifo Technologies, Chennai and four students were placed in Point Perfect Transcription Services (INDIA) Pvt. Ltd., Coimbatore



Campus placement by Zifo Technologies, Chennai.  
Conducted by Department of Biotechnology,  
KSRCT



Campus placement by Point Perfect Transcription Services (INDIA) Pvt. Ltd., Coimbatore. Conducted by Department of Biotechnology, KSRCT

### **Release of IEEE-EMBS Newsletter**

KSRCT IEEE-EMBS newsletter of volume 3, issue 2 was released by Mr.Amitesh Suman, Able India, Bangalore along with Principal Dr.K.Thiagarajah, Dr.P.Ponmurugan, Professor & Head, Ms.S.Poornima, Assistant Professor in Biotechnology.



Release of IEEE-EMBS Newsletter

### **GENERAL ARTICLE**

#### **Ready to Eat Rice without cooking**

Scientists of Central Rice Research Institute (CRRI), developed new rice variant named "Aghaono Bora", a soft rice or komal chawl, takes 45 minutes if soaked in normal water and if the water is lukewarm, it is ready in 15 minutes.

However, the soft rice varieties grown across Assam and the North-East, are ready to eat after they are soaked in plain water. it is a low-yielding crop that grows only in a cool climate.

The Scientists from CRRI, one of the premier research institutes on grains in the world, developed a hybrid of traditional soft rice with a high yielding

variety of regular rice, that could be grown in different climates across India. 103

"We wanted to see whether the same rice can be grown here and retain the same properties. We saw it behaves the same way. Simply soak it in water and the rice is ready to eat but the quality of water has to be clean and potable. The idea is to avoid any waterborne disease," said Tapan Kumar Adhya, director, CRRI. This rice variety, which comes under soft rice category, helps in saving fuel as it doesn't require any boiling.

In Orissa where 'pakhal' or cooked rice fermented in water is a hot favorite, the soft rice is expected to be a hit. It's environment-friendly and will save a huge amount of fuel and time.

#### **Climate Change Boosts Lethal Hendra Virus**

Heavy rains and floods in Australia may have helped the deadly disease cross from bats to humans and that has doctors concerned about climate change. It started with Vic Rail's horses, in September 1994. First one, then another, they died horrible deaths, 13 horses in all over the span of just two weeks, frothing from their noses and mouths, thrashing in agonizing pain. Weeks later Australian officials isolated a newly discovered virus they ultimately named Hendra, after the Brisbane suburb where Rail and his horses died. For 17 years, Hendra virus

smoldered in its host population of fruit bats killing nearly 50 horses and claiming three more human lives. Then in May, something happened. It was as if Hendra virus awoke from a slumber and roared fully into life. There have been more outbreaks of Hendra in 2011 /18 at last count than in the 16 previous years. Veterinary epidemiologists hunting the virus now know definitively that Australia's fruit bats (*Pteropus* sp.), also called flying foxes, spread the disease to horses, which then can infect humans. And while they don't know the exact cause of the huge escalation in outbreaks, they strongly suspect it has something to do with the heavy rainfall and big floods that drowned northeastern Australia from November 2010 to February 2011. And that has them looking nervously at climate change.

"The interesting change was the big floods in January," said Raina Plowright, a disease ecologist at the Pennsylvania State University's Center for Infectious Disease Dynamics. "Floods are expected more frequently with climate change so, if they are linked, climate change may increase disease." Hendra virus is just one of a number of newly emerged zoonotic diseases, so called because they have their origins in animals but somehow makes the leap to humans,

and in doing so, wreak enormous havoc. While zoonotic diseases may sound exotic, one of the most devastating is also one of the most familiar: AIDS, which made the jump from primates to humans sometime at the beginning of the 20th century, and now kills an estimated 2.7 million people a year. Hendra, far newer but fearsomely lethal, has claimed the lives of four of the seven people infected.

The alphabet soup of deadly and economically damaging zoonotic diseases is long and includes West Nile virus, avian influenza and SARS, or Severe Acute Respiratory Syndrome another disease thought to have jumped from bats to humans. World health officials concluded in 2004 that more than three-quarters of new, emerging or re-emerging human diseases today are caused by pathogens originating from Hendra virus Image 92animals or animal products. Overall, between 1940 and 2004, scientists estimate there have been more than 300 emerging disease events around the globe – a number that will likely grow as population grows. Increased food production and animal husbandry of waterfowl and pigs, which can harbor viruses like influenza, help explain the increasing emergence of these new, often virulent diseases, said Jan Slingenbergh, senior animal health officer and head of the emergency

prevention system for the Food and Agriculture Organization, or FAO, a United Nations program working for food security. Climate change adds yet another complicating factor, Slingenbergh said. It can expand the range of insects and arthropods that can transmit disease. Or, as may be the case with Hendra, it can cause ecological upheaval, adding to the likelihood that people will come into contact with virus-carrying animals. Animals on the wing – birds and bats are like sick people on airplanes, he added: they can travel long distances with their viral burden. "Whether it is about Hendra, Nipah or Ebola or some other bat-circulating virus or non-human primate virus, we know that sooner or later they are going to show up as novel infectious diseases in humans," Slingenbergh said. It's not possible to make a blanket statement about how climate change will affect outbreaks of zoonotic diseases, scientists say. The interplay between temperatures, rainfall and shifting habitats is too multifaceted to boil down into one overarching trend. Closer contact of wild and domestic animals as well as advanced detection technologies further complicate the picture. Big populations of migratory bats mingle with one another, which epidemiologists believe allows the bats to share a low level of Hendra

infection – conferring on the population as a whole something called herd immunity. But when normally migrating bats become sedentary, Hendra virus immunity may wane. "Our models predict that Hendra virus used to be like a slow burning fire with very little kindling, because it was everywhere," Plowright said. But now, it has "changed to a few big fires." The call that really put veterinarians and public health officials on high alert came in July, when Dusty the dog, who had been living on a property in Mount Alford where three horses were infected with Hendra, also was found to have the disease. While the dog did not seem to be contagious, the finding opened another, more troubling route for human infections. The virus also can lie dormant – Mark Preston, who helped perform an autopsy on a dead horse, died from the virus a year after he did the autopsy. And while Hendra is not now contagious in humans, when humans contract the disease, it has a lethality of close to 60 percent. Ebola, for comparison, has a fatality rate of 68 percent. The outbreaks have also become part of the political landscape: There have been calls to remove Queensland Premier Anna Bligh and Agriculture Minister Tim Mulherin.<sup>93</sup> One thing is certain, health experts say: As the planet grows hotter and more crowded, the range and severity of zoonotic outbreaks will increase.

Hendra, so far, has exacted a minor human toll. H5N1 avian flu, in contrast, required the culling of hundreds of millions of chickens, and cost Asia's farmers \$10 billion. World health officials, reading this trend, are trying to get ahead of it. They've issued a call to arms – "One Health," a global endeavor led by the FAO, the World Bank, the World Health Organization, the World Organisation for Animal Health and the United Nations Development Programme. More than 600 scientists and public health doctors are involved, pursuing the idea that the health of humans, animals and the environment are inextricably linked. The current tack - where doctors treat people, veterinarians handle animals, and biologists focus on plants - doesn't work, said the FAO's Slingenbergh. "The microbes do not recognize our compartmentalized approach." "An interdisciplinary approach is the only possible answer to stop this continuous generation of novel diseases."

### **Food We Eat Might Control Our Genes**

Scientists find rice microRNA inside human cells. You are what you eat. The old adage has for decades weighed on the minds of consumers who fret over responsible food choices. Yet what if it was literally true? What if material

from our food actually made its way into the innermost control centers of our cells, taking charge of fundamental gene expression? That is in fact what happens, according to a recent study of plant-animal microRNA transfer led by Chen-Yu Zhang of Nanjing University in China. MicroRNAs are short sequences of nucleotides the building blocks of genetic material. Although microRNAs do not code for proteins, they prevent specific genes from giving rise to the proteins they encode. Blood samples from 21 volunteers were tested for the presence of microRNAs from crop plants, such as rice, wheat, potatoes and cabbage. The results, published in the journal *Cell Research*, showed that the subjects' bloodstream contained approximately 30 different microRNAs from commonly eaten plants. It appears that they can also alter cell function: a specific rice microRNA was shown to bind to and inhibit the activity of receptors controlling the removal of LDL cholesterol from the bloodstream. Like vitamins and minerals, microRNA may represent a previously unrecognized type of functional molecule obtained from food. The revelation that plant microRNAs play a role in controlling human physiology highlights the fact that our bodies are highly integrated ecosystems. Zhang says the findings may also

illuminate our understanding of co-evolution, a process in which genetic changes in one species trigger changes in another. For example, our ability to digest the lactose in milk after infancy arose after we domesticated cattle. Could the plants we cultivated have altered us as well? Zhang's study is another reminder that nothing in nature exists in isolation.

### **Climate Change May Make Insect-Borne Diseases Harder to Control**

Warmer temperatures will combine with numerous other factors to make diseases like malaria and West Nile virus harder to control. Disease Control: Climate change will make it even harder to control insect-borne diseases like malaria. Image: Centers for Disease Control and Prevention. Climate change can influence how infectious diseases affect the world, particularly illnesses spread by vectors like mosquitoes. Now scientists have developed some understanding about how rainfall and temperature can influence malaria, dengue and West Nile virus infections as well as ways to combat them. Vector-borne diseases are among the most complex and vexing illnesses to manage, since so many elements are at play, like host resistance, the environment, urbanization

and the pathogens themselves. As a result, it's difficult to tease out any one factor to measure, and with the added effects of warming weather and shifting precipitation, ongoing disease-management efforts are becoming more complicated. "Climate change is not going to invent any new diseases; it's going to make controlling existing diseases harder," said Diarmid Campbell-Lendrum, head of the climate change team at the World Health Organization's headquarters. "We've been describing the links between climate change and health for quite a long time."

96 Diseases spread by mosquitoes are particularly affected by climate change, since the insects lay their eggs in standing water, be it in puddles, ponds, lakes or tide pools. Standing water varies with rainfall, humidity and temperature, with wetter weather typically showing a greater number of mosquitoes. When a female mosquito matures, she can spread infections by drawing blood from an infected host and transmitting the illness to a different host with another bite. Heat can also influence the how a pathogen is spread. In the case of the West Nile virus, rising temperatures work both in favor of and against the spread of the disease. "The [West Nile] pathogen the warmer the temperature, the faster it moves from the blood to being transmitted.



It usually takes a while for the virus to get into the mosquito's salivary glands," said Marm Kilpatrick, an assistant professor in ecology and evolutionary biology at the University of California, Santa Cruz. "The biting rate also gets faster. So those things are all going to give you more transmission."

On the other hand, hotter weather shortens the mosquito's life span. "What you basically have going on is three factors going in one direction and one factor in the [other] direction," said Kilpatrick, who published a paper on West Nile virus last month in the journal *Science*. "It's a little bit tricky to make a solid prediction." West Nile virus is an interesting case study because the disease originated in Africa and emerged in North America in 1999, relatively recently as far as diseases go. Because of this, researchers have tracked where the disease has spread over time. Kilpatrick found that the virus is most abundant in human-developed areas like cities and farms. He also found that the virus quickly adapted to use local mosquitoes in the United States, and hosts like robins played an important role in spreading the virus over long distances. However, Kilpatrick hesitates to link climate change directly to yearly changes in West Nile infection rates, since land use changes and infected

hosts move around. Nonetheless, lessons from climate change and West Nile can be applied to more prevalent diseases. "The same questions we're wondering about West Nile apply to malaria and dengue," said Kilpatrick. A killer with no cure spreads Dengue fever is one of the world's most common diseases, with one-third of the world living in endemic areas, according to the U.S. Centers for Disease Control and Prevention. It afflicts 900 million people worldwide, and the number is growing, according to Khoa T.D. Thai, a researcher at the Academic Medical Center in Amsterdam and at the Oxford University Clinical Research Unit in Ho Chi Minh City in Vietnam.