Study: Right gut bacteria may protect against malnutrition

WASHINGTON: Manipulating what kinds of bacteria live in the gut might lead to a new way to treat millions of children suffering chronic malnutrition, says new research that suggests the right microbes can help get the most out of a poor diet.

Researchers culled intestinal bacteria from babies and toddlers in Malawi, where malnutrition is a serious problem, and transferred them into mice for study. Tweaking those gut microbes improved growth - even though the animals didn't eat more, or more nutritiously. We share our bodies with trillions of bacteria, a customized set called a microbiome that starts building at birth, and Thursday's work is the latest to illustrate how crucial it is to develop a healthy one. Among the findings: Certain nutrients in breast milk may help that happen.

Immune responses

"If we could hammer home a key point, microbiota count," said Dr Jeffrey Gordon of Washington University in St Louis, who led the series of experiments published in the journals Science and Cell. "Building healthy gut microbiota we think is important for health in the course of one's life." Gut bacteria do more than simply break down food for digestion. They synthesize particular vitamins and micronutrients, and influence immune responses, for example.

"A healthy microbiome will allow us to access calories we might not have been able to use before," explained Dr Ilseung Cho, a gastroenterologist and gut bacteria specialist at New York University School of Medicine, who wasn't involved in the new work. More research is needed before testing the approach in children, but Cho said the findings suggest there may be "very precise bacteria or very precise nutrient interventions that can unlock the microbiome and help it combat malnutrition."

While providing special "therapeutic foods" and vitamin supplements helps reduce deaths from malnutrition, Gordon said children still experience stunted growth and neurodevelopmental problems. His team turned to Malawi, where according to UNICEF almost half of children under 5 have growth stunted by malnutrition. The researchers already suspected gut bacteria played a role, based on previous research with pairs of Malawian twins, only some of whom were affected.

This time, working with more than 250 healthy or undernourished children, Gordon's team defined how a healthy gut microbiome normally develops - and found that the chronically malnourished tots harbored an immature one, too young for their age. Are those abnormal gut bacteria a result of the kids' malnutrition, or could they actually be contributing to it? To tell, the researchers transferred gut bacteria from either healthy or malnourished tots into different sets of germ-free baby mice, rodents born in sterile conditions so they lacked their own intestinal microbes. They received a mouse version of the typical Malawian diet, primarily corn flour with beans, peanuts and certain vegetables.

Markedly different

Despite eating the same calories, mice with the healthy gut bacteria gained more lean body mass, and showed healthier bone development and better metabolism in the liver, brain and muscles, the team reported in Science. "The growth of these animals is markedly different," Gordon said.

Can the unhealthy gut bacteria be repaired? The researchers switched up the cages so some healthy mice could live with some unhealthy ones and, through that yucky rodent trait of eating feces, trade their gut bacteria. Sure enough, some microbes the team had identified as particularly healthy invaded the intestines of the undernourished mice - and prevented their growth impairment. Two bugs with tongue-twisting names - Ruminococcus gnavus and Clostridium symbiosum - seemed key.

In the US, doctors sometimes perform fecal transplants to alter the gut bacteria of patients suffering certain intestinal diseases. When it comes to malnutrition, the goal would be to build healthy gut bacteria from the start. So the researchers next looked at babies' first food - breast milk - and found certain nutrients may play a role in how their microbiome develops. Breast milk from the mothers of the healthy Malawian babies harbors higher levels of sugars containing sialic acid, a nutrient linked to brain development, the team reported in Cell. Using a version of those sugars made from cow's milk, the researchers once again put gut bacteria from malnourished children into mice and supplemented some of the rodents' diets with the sugars. Sure enough, the supplemented mice grew better. Repeating the experiment with piglets showed the same benefit. It's not extra calories, Gordon stressed. Different strains of bacteria were interacting at different stages of the sugars' digestion, pointing to what he calls a complex food web in the gut. — AP

MALAWI: This photo provided by Washington University School of Medicine shows researchers measuring children's growth. — AP

Irradiated mosquitoes to help diminish Zika's power

Mission is stopping females from breeding

SEIBERSDORF: The atmosphere inside the laboratory on the outskirts of Vienna is literally buzzing with armies of male mosquitoes locked up inside net-covered boxes. Their sole mission in life: stop females from breeding. Better known for keeping a close watch on countries' nuclear activities, the International Atomic Energy Agency (IAEA) has joined the fight against Aedes aegypti-the notorious mosquito responsible for spreading dengue, chikungunya and now the Zika virus.

Experts from around the globe have been working strenuously in the IAEA's tightly-secured research facility in Seibersdorf, 30 kilometers south of the Austrian capital, to perfect something called the sterile insect technique, or SIT. The clue's in the name: male mosquitoes have their private parts zapped with a radioactive source before being released into nature to mate with wild females, which, as a result, will lay infertile eggs. The aim is to gradually reduce, if not suppress, their population.

"Basically it's family planning for insects," said Jorge Hendrichs, director of the IAEA's insect pest control unit. The method has already proven successful in eradicating several pests, including the tsetse fly in Zanzibar and the fruit fly in most of northern Mexico. The recent Zika outbreak in Latin America and the Caribbean is now spurring governments to find ways of containing the epidemic. Several, such as worst-hit Brazil, are considering using SIT, which is most effective coupled with other methods including insecticide spraying and removing breeding sites.

VIENNA: This file photo taken on February 10, 2016 shows a lab worker holding a vial containing mosqitos of the kind "Aedes aegypti", that can carry zika virus at the IAEA Laboratories. — AFP

Moment of panic

The stench in the hot lab is overpowering, prompting several of the visiting journalists to cover their noses. "That's the smell of insects," grins Marc Vreysen who leads the Seibersdorf research team. In a large foyer, several trays on a table contain either wriggling larvae or hard-shelled pupae-"the stage when the mosquitoes get irradiated," Vreysen explains.

Another room has a row of shelves stacked with whirring cages. Small signs reveal their occupants' country of origin: Brazil, Indonesia, Thailand. There is a brief moment of panic when one manages to break free and circles wildly around the narrow space. The escape is short-lived, however, as the lone daredevil meets a scientist's expertly-swung electric fly swatter.

"Sometimes this happens. There are so many of them here," shrugs entomologist Rosemary Lees who works on the SIT team. In any case, a bite from a Zika-carrying mosquito would be primarily dangerous for pregnant women. While it causes only mild flu-like symptoms in most people, the virus is strongly suspected of sparking a recent surge in the number of children born with microcephaly-abnormally small heads and brains-to infected mothers.

Importantly, only female mosquitoes bite and transmit diseases. "The male feeds on flowers and nectar," says Lees. Right on cue, a lab assistant behind her starts to fill a sausage-shaped membrane with a thick, dark red liquid. "We use blood from pigs or cows," he is quick to point out, before gingerly placing the bag on top of a cage. Almost instantly, swarms of the parasitical insects shoot up and, piercing the membrane with their tube-shaped mouths, start to frantically suckle away.

Costly birth control

Countries may be itching to wipe out the bloodthirsty creatures, but several obstacles remain. One key challenge is how to separate the sexes before irradiation. There's also the size issue: the ratio of lab-reared to wild mosquitoes needs to be at least 20 or even 10 to 1 for SIT make inroads into the host population.

Plus a sterilized male's mating strength can quickly wane, says Vreysen: "Because we are rearing these insects at high density... this has in many cases a quality-reducing impact." Last but not least, SIT entails building industrial-scale rearing facilities-an expensive undertaking. Pilot studies in Mauritius and Sudan have proven SIT's effectiveness in small villages.

"By upscaling (the programme), you could maybe do trials in big cities in a couple of years from now," says Vreysen. IAEA member states affected by Zika will discuss using SIT at a meeting in Brazil next week. But Vreysen warns there is no quick fix: "This is not like the World Food Program: there is an outbreak of hunger in a country, they come in and dump food. We develop long-term, sustainable technologies." — AFP

Why the Zika virus is causing alarm

Global health officials have said the Zika virus is spreading in the Americas and could infect up to 4 million people. The race is on to develop a Zika vaccine. The following are some questions and answers about the virus and current outbreak.

How do people become infected?

Zika is transmitted to people through the bite of infected female mosquitoes, primarily the Aedes aegypti mosquito, the same type that spreads dengue, chikungunya and yellow fever. The Pan American Health Organization (PAHO) said Aedes mosquitoes are found in all countries in the Americas except Canada and continental Chile, and the virus will likely reach all countries and territories of the region where Aedes mosquitoes are found.

How do you treat Zika?

There is no treatment or vaccine for Zika infection. Companies and scientists are racing to develop a safe and effective vaccine for Zika, but the World Health Organization (WHO) said it would take at least 18 months to start large-scale clinical trials of potential preventative shots.

How dangerous is it?

The PAHO said there is no evidence that Zika can cause death, but some cases have been reported with more serious complications in patients with pre-existing medical conditions. The virus has been linked to microcephaly, a condition in newborns marked by abnormally small heads and brains that may not develop properly. It also has been associated with Guillain-Barre syndrome, a rare disorder in which the body's immune system attacks part of the nervous system. The suspected link between Zika and the two conditions could be confirmed within weeks, the WHO said.

How is Zika related to microcephaly?

Much remains unknown about Zika, including whether the virus actually causes microcephaly. Brazil said 508 cases of microcephaly have been confirmed, while 3,935 were still being investigated. Research in Brazil indicates the greatest microcephaly risk appears to be associated with infection during the first trimester of pregnancy. Recent studies from other countries have shown evidence of Zika in amniotic fluid, placenta and fetal brain tissue.

What are the symptoms of Zika infection?

People infected with Zika typically have a mild fever, skin rash, conjunctivitis, muscle and joint pain and fatigue that can last for two to seven days. As many as 80 percent of people infected never develop symptoms. The symptoms are similar to those of dengue or chikungunya, which are transmitted by the same type of mosquito.

How can Zika be contained?

Efforts to control the spread of the virus focus on eliminating mosquito breeding sites and taking precautions against mosquito bites such as using insect repellent and mosquito nets. U.S. and international health officials have advised pregnant women to avoid travel to Latin American and Caribbean countries where they may be exposed to Zika.

How widespread is the outbreak?

Zika outbreaks have been reported in at least 30 countries or territories, according to the US Centers for Disease Control and Prevention. Brazil has been the nation most affected.

What is the history of the Zika virus?

The Zika virus is found in tropical locales with large mosquito populations. Outbreaks of Zika have been recorded in Africa, the Americas, Southern Asia and the Western Pacific. The virus was first identified in Uganda in 1947 in rhesus monkeys and was first identified in people in 1952 in Uganda and Tanzania, according to the WHO.

Can Zika be transmitted through sexual contact?

Two cases of possible person-to-person sexual transmission have been described, but the PAHO said more evidence is needed to confirm if sexual contact is a means of Zika transmission. British health officials reported Zika was found in a man's semen two months after he was infected, suggesting the virus may linger in semen long after infection symptoms fade. The WHO has advised women, particularly pregnant women, to use condoms. The PAHO said Zika can be transmitted through blood, but this is an infrequent transmission mechanism. There is no evidence Zika can be transmitted to babies through breast milk. What other complications are associated with Zika? The WHO says because no big Zika outbreaks were recorded before 2007, little is known about complications caused by infection. During an outbreak of Zika from 2013-2014 in French Polynesia, national health authorities reported an unusual increase in Guillain-Barre syndrome. Health authorities in Brazil have reported an increase in Guillain-Barre syndrome.

Long-term health consequences of Zika infection are unclear. Other uncertainties surround the incubation period of the virus and how Zika interacts with other viruses that are transmitted by mosquitoes, such as dengue. — Reuters

One in three US adults not getting sleep

ATLANTA: Did you get enough sleep last night? If not, you are not alone. More than one out of three American adults do not get enough sleep, according to a study released Thursday from the US Centers for Disease Control and Prevention. "That's a big problem" says, Dr. Nancy Collop, director of the Emory Sleep Center at Emory University School of Medicine in Atlanta, who is familiar with the study. "You don't function as well, your ability to pay attention is reduced, and it can have serious, long term side effects. It can change your metabolism for the worse."

At least seven hours of sleep is considered healthy for adults aged 18 to 60, according to the American Academy of Sleep Medicine and the Sleep Research Society. CDC analyzed data from a 2014 survey of 444,306 adults and found 65.2 percent of respondents reported getting that amount of sleep. "Lifestyle changes such as going to bed at the same time each night; rising at the same time each morning; and turning off or removing televisions, computers, mobile devices from the bedroom, can help people get the healthy sleep they need," said Dr. Wayne Giles, director of the CDC's Division of Population Health, in a statement. Getting less than seven hours a night is associated with an increased risk of obesity, diabetes, high blood pressure, heart disease, stroke and frequent mental distress, the study shows. Conducted by the CDC's Morbidity and Mortality Weekly Report, the study is the first of its kind to look at all 50 US states and the District of Columbia. The study found that among those most likely to get great sleep were married or have a job, with 67 percent and 65 percent respectively saying they get enough. Only 56 percent of divorced adults said they get enough sleep, and just over half of jobless adults sleep seven hours a night regularly. Among the best sleepers were college graduates, with 72 percent reporting seven hours or more. The study found geographical differences as well as ethnic disparities. Hawaiian residents get less sleep than those living in South Dakota, the study found. Non-Hispanic whites sleep better than non-Hispanic black residents, with 67 and 54 percent respectively. — Reuters

US ends enhanced airport screening for Ebola virus

WASHINGTON: The United States announced Thursday it will end enhanced screening of passengers for potential Ebola virus infection from West Africa after an epidemic that killed more than 11,000 people.

On Friday, Guinea will be removed "from the list of nations affected by Ebola for which travelers are subject to enhanced US visa and port-of-entry screening," said the US Centers for Disease Control and Prevention. "Guinea will be the last of the affected countries in West Africa to be removed from enhanced entry screening measures."

The change means that travelers from Guinea-as well as Liberia and Sierra Leone-will be able to enter the United States through any available port of entry, instead of being routed to one of five specially selected airports.

"Travelers departing Guinea will remain subject to outbound screening measures, and the United States will continue to support Guinea's Ebola prevention and detection measures, including at its primary international airport in Conakry," said the CDC. "Travelers from Guinea, Liberia, and Sierra Leone are still encouraged to watch their health for 21 days after leaving one of these countries and to contact their local health departments or seek healthcare if they develop symptoms consistent with Ebola."

Guinea was declared free of Ebola by the World Health Organization on December 29, 2015. The US Department of Homeland Security said the enhanced travel measures were taken in response to the public health emergency faced in 2014, the peak year of the Ebola outbreak in West Africa.

"During this time not a single traveler exhibiting Ebola symptoms is known to have entered the country undetected," the DHS said in a statement. "Over the past 16 months, DHS has screened more than 42,000 travelers from Ebola-affected countries." — AFP