Flies can help in public health surveillance: Study

Research led by Professor Stephan Schuster has found that the blowfly, one of the most common flies here that love to feed on rotting meat, carries hundreds of species of bacteria, mostly concentrated on its legs and wings. PHOTO: STEPHAN SCHUSTER

Bacteria they carry indicate the diseases present, say researchers

Science could soon unleash a most incongruous army in the war against disease - one composed of filthy flies.

Researchers have found that because flies are the very vessels that transport harmful and sometimes deadly bacteria, the insects can also be used to monitor the diseases circulating in the environment.

Research led by Professor Stephan Schuster, a geneticist at Nanyang Technological University (NTU), found that houseflies and blowflies - the most common flies here, which love to feed on rotting meat - carry hundreds of species of bacteria, mostly concentrated on their legs and wings. He found that they even carry the pathogen Helicobacter pylori, which causes stomach ulcers in humans and is the most common risk factor for gastric cancer.

“Our study shows how bacteria can 'fly' around, hitching a ride on common flies,” said Prof Schuster, a research director at the Singapore Centre for Environmental Life Sciences Engineering at NTU. “They pick up the microbiome (micro-organisms in a particular environment) on their feet, spread them across their wings in a similar way to how we might comb our hair, and then proceed to contaminate every surface that they land on.”

He believes the flies can be used in public health surveillance programmes, where they can uncover the types of bacteria present in a particular environment.
Prof Schuster and his team of international researchers suggest that sterile flies, bred in the absence of any micro-organisms, will be able to effectively pick up the latent microorganisms present when they are released into any environment.

After the flies are collected using bait traps, their microorganisms would then be sequenced, giving a picture of what diseases are spreading, thereby acting as an early warning system, the researchers said.

HOW FLIES TRANSPORT BACTERIA

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"This could be particularly useful in agriculture, Prof Schuster added. "Through regular monitoring, if we knew that a particular pathogen is affecting the crops and is becoming an outbreak, then farmers could organise a targeted treatment that eradicates only that pathogen, leaving the other parts of the ecosystem intact."

He and his team sequenced the genetic material of 116 houseflies and blowflies from Brazil, the United States and Singapore, along with all the micro-organisms they were carrying. Their findings were published in scientific journal Scientific Reports yesterday.

The flies were lured with a piece of rotting fish. Then a piece of dry ice was held close to them, causing them to freeze, falling untouched and uncontaminated into a container. Once in a sterile environment, each fly was defrosted and its various body parts separated, crushed and put into a gene sequencing machine. The resulting data was then sorted out by a supercomputer.

Dr Ana Carolina Martins Junqueira, first author of the paper and an entomologist (insect expert) at NTU, said flies are an important part of nature’s ecosystem as they are also pollinators like bees.

"Carion flies have microscopic hairs on every part of the body, excluding the eye, and these bristles make them the perfect carrier for pollen and also bacteria. It is an evolutionarily optimised vehicle for the dispersal of micro-organisms in the environment," added Dr Junqueira, who is also a faculty member at the Federal University of Rio de Janeiro.