Evolution winning in bacteria vs antibiotics arms race

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Science is running out of new ways to attack harmful bacteria, while drug companies are abandoning antibiotic research and development, according to a University of Adelaide drug expert.

Speaking during Antibiotic Awareness Week (18-24 November), Dr Ian Musgrave from the University's School of Medical Sciences says whenever a new antibiotic is developed, harmful bacteria evolve to become resistant within a relatively short period of time.

"There's no doubt that evolution is winning the antibiotics arms race," says Dr Musgrave, a Senior Lecturer in Pharmacology.

"Bacteria are very good at mutating and developing resistance. What's more, bacteria can easily swap DNA, so these resistance mutations can be effectively 'downloaded' from one bacteria to the next. Bacteria can aquire multiple resistance genes this way."

He says science is now falling behind. "We can attack the metabolic pathways bacteria use, we can attack their DNA replication, or we can bust open their cell walls, but each time scientists develop something new, bacteria will evolve so that the same drugs might not be as effective in the following years. It's a vicious cycle, and we can't continue on it," he says.

Dr Musgrave says many drug companies are giving up on antibiotics. "Antibiotic research and drug development is crashing - it doesn't seem

to be as profitable any more and there's a lack of new drugs coming onto the market," he says.

The use of multi-drug cocktails, a method employed for HIV patients, could help. This approach attacks bacteria in different ways all at the same time. "However, this kind of treatment is likely to be expensive for the patient and could lead to additional adverse drug events," Dr Musgrave says.

He says one of the best ways to prevent bacteria from developing resistance is for patients to take their full dosage of antibiotics as prescribed by their doctor.

"Many people start taking antibiotics but then they feel better and don't see the point in taking them any more. The point is, they need to kill off all the harmful bacteria. If they don't do this, the bacteria can rapidly build up again and become resistant to the drug."

He says GPs should also make sure they're not prescribing antibiotics for uncomplicated viral conditions.

Antibiotic Awareness Week is a global initative to help people learn about antibiotic resistance and preserve these life-saving medicines.

"Anything we can do to limit the amount of unnecessary anitbiotics in the community will be helpful in preventing resistance," Dr Musgrave says. "For example, the use of antibiotics in agriculture is a controversial issue, and this can lead to resistant strains of disease that pass from animals to humans."

Provided by University of Adelaide