Antibiotic resistant bugs found in the mouth 6 months after antibiotic use: study

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Taking a single course of a certain type of antibiotic gives rise to high levels of antibiotic resistant bacteria in the mouth, an effect that lasts for at least half a year, a new study has found.

The extraordinary persistence of the effect startled the scientists who discovered it and others in the field as well, and underscores the need for judicious use of these precious drugs, experts said.

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Senior author Dr. Herman Goossens said he and his co-authors assumed that if they followed the subjects in their study for six months they would see the rates of resistant bacteria in their mouths return to normal levels. But that didn't happen.

"We were pretty staggered by these data," said Goossens, a microbiologist at the University of Antwerp, in Belgium. "We never expected this."

Goossens said the findings suggest that even after a single — and short — course of antibiotics, a person could spread resistant strains of bacteria to close contacts within a household or a hospital for months.

The findings, reported Thursday in the journal The Lancet, are a sharp reminder of the power of antibiotics, suggested Eric Brown, a biochemist at McMaster University in Hamilton.

"So a quick course of antibiotics and a half a year later, you're still carrying resistant organisms. That's a little bit terrifying," said Brown, whose laboratory is working on alternative ways to kill bacteria, because of the rising problem of antibiotic resistance.

Treatment decisions

It also suggests doctors treating patients for bacterial infections should carefully consider which antibiotics they prescribe if those patients have taken antibiotics within the past year — the period Goossens thinks it might take for resistance levels to subside to normal after antibiotic use.

"If you're a doc who's about to treat a patient who has been treated before, it should have an impact on the decisions you make about what to give that patient," Brown said.

The study, which was partially funded by drug maker Abbott Laboratories, is the first to definitively show that antibiotic use is the major factor in the emergence of antibiotic resistance, Goossens said.

It seems a bit like proving the known.

Plenty of research has shown that as antibiotic use rises in a population, the rate of antibiotic-resistant infections rises as well. Based on those findings, infection control experts have been campaigning for years to get doctors to cut back on antibiotic use out of a fear that resistance is threatening the continued efficacy of these important drugs.

But because those studies looked across populations, researchers couldn't rule out other factors that might have been involved and therefore could only draw a link between antibiotics and antibiotic resistance.

Resistance in the mouth

Proving antibiotic use causes antibiotic resistance requires studying individuals, and that's what Goossens and his colleagues did.

A group of 224 healthy volunteers were randomly selected to receive either azithromycin or clarithromycin — both drugs from the macrolides class of antibiotics — or a fake treatment. Neither the volunteers nor the researchers knew who received which.

The back of the mouth of each participant was swabbed at the start of the study and then at regular intervals after the subject had completed the course of antibiotics. The swabs were tested to determine whether the streptococci in the mouth were susceptible or resistant to the antibiotics.

Surprisingly, the researchers found that roughly 28 per cent of the streptococci in the mouths of all subjects were resistant from the start. But whereas that level didn't change for participants who received a placebo, the proportion of antibiotic-resistant bacteria in the mouths of treated participants spiked to about 90 per cent shortly after treatment.

At six weeks out, the resistant bugs still made up about 60 per cent of streptococci and at six months, 50 per cent.

Should people in this position become infected with streptococci, which cause respiratory and other ailments, those infections might not respond to antibiotics. Furthermore it's known that bacteria can pass along resistance to other types of bacteria, again making affected people more vulnerable to resistant infections.

"It … should serve as a wake-up call for individual prescribing physicians, nurse practitioners, midwives, dentists and others that inappropriate use of antibiotics does have consequences," said Dr. John Conly, former chair of the Canadian Committee on Antibiotic Resistance and head of the department of medicine at Foothills Medical Centre in Calgary.