

The bacteria you want

Some bacteria, such as *Streptococcus salivarius*, are worth having. It lives on the tongue. It can provide sweet breath, and if taken as a lozenge before a flight, the immune system is jolted. Interferon in the saliva increase and there is short-term protection against viruses which are ubiquitous on aircraft with people in close proximity for long periods.

Robyn Williams: Imagine I'm going to be on a plane in a couple of hours, and these days I'm sensitive to it. You can actually time it; you count down to ten and someone sneezes publicly (in other words, not privately) and I feel like turning around and saying, 'Thank you for sharing.' Do you have that feeling?

John Tagg: And often I think, why do people say, 'Bless you'? I feel like saying, 'Curse you!' Truly. Because it's almost inevitable, as soon as you're locked into one of those metal envelopes in the sky someone is going to sneeze on you or in your vicinity. It's most unpleasant.

Robyn Williams: Unpleasant it is, but what to do about it? John Tagg is Professor of Microbiology at the University of Otago in Dunedin, and he has some good germs to fight the bad ones.

John Tagg: There is a possibility. As a result of an outcome of our work over the last 30 years we have identified some friendly bacteria; they're called *Streptococcus salivarius*. Mostly people may think of *Streptococcus* as a bad guy, 'Strep' sore throat, but we've been working with the cousins of *Strep pyogenes*, the bad one, the one that causes sore throats. *Salivarius* is distinctly helpful, it lives on the tongue, that's the only place on the planet where you will find *Streptococcus salivarius*, and if we can get its numbers up it can do several good things for you. It can give you sweet breath, it can actually be a treatment for halitosis, but in the case of people about to embark on a flight, if you take a slug of *Strep salivarius* lozenges, what it does is actually give your local immune system a bit of shake-up, a bit of a jolt. What we find is that some of the things called interferons in your saliva actually increase about three or four hours after you take this slug of *Strep salivarius*, and we think this is a way to provide some short-term protection against the viruses in that person.

Robyn Williams: Is this Strep alive?

John Tagg: It is alive but it doesn't necessarily need to be alive for this purpose of stimulating the immune system. We think that even the dead *Strep salivarius*, because of the content of their cell wall, can bring about this immune stimulatory effect. But mostly when we deliver this bacterium to people's mouths we like it to be in the viable form because we want it to set up residence on your tongue, to set up a camp there to make lots of other little *Strep salivarius*. This actually produces something called BLIS. BLIS is the acronym for bacteriocin-like inhibitory substance. So BLIS is a happy little term for these natural antibiotics that bacteria produce to kill the relatives. So we find that bacteria in nature have evolved strategies for dealing with their closest competitors. The bacteria that are their closest competitors are other *Streptococci*, so we've found a friendly *Streptococcus*, *Strep salivarius*, that produces these natural antibiotics that actually target the bad guys, *Strep pyogenes*, the one that causes Strep sore throat.

Robyn Williams: The one thing that puzzles me however is that when I'm on the plane hearing someone sneeze behind me, what they're distributing is not Strep but virus. You're suggesting that this stimulation to the immune system would make us more reactive to virus infection as well?

John Tagg: Yes, that's another effect that we have noticed just recently. Our first drive was specifically to try to interfere with other *Streptococcal* infections, but what we found was that if you take enough of these *Strep salivarius* over a short period of time, the cell wall fragments of these bacteria that are

present in the preparations actually will stimulate the local immune system to produce these cytokines, these local defenders of our cells against virus attack. So that's an exciting recent revelation, I suppose, from our research.

Robyn Williams: And to what extent do they do this? Have you done trials? Have you found the proportion of people who are protected or how long they are protected and what from?

John Tagg: There's a need to do some longer, more extensive trials now. So the work is still in a preliminary phase. We've done work with immunologists here at the University of Otago, so we have confirmed that there is a cytokine response to the implantation of these bacteria into the oral cavity. What we need to do now is some more prospective trials where we look at the degree of protection that people will get when they are delivered this organism.

Robyn Williams: I know that people happily take yoghurt which has got nice germs in it. Has there been any abreaction to your suggestion? Do people go, 'Oh yuk, I'm not taking that'?

John Tagg: Often people think, 'Germs? Why would you knowingly take germs into your mouth?' I think partly the press is to blame for this. Bacteria have generally had bad press. If you look at all the media, the glossy magazines, we are urged, are we not, to rid our homes, rid our bodies of germs. Everything that we can spray or douse our body crevices with to get rid of the dastardly bacteria, we are doing ourselves and our homes and our family a service if..

Robyn Williams: When in fact if you got rid of all of them you'd be dead.

John Tagg: You would because we actually need the germs there to stimulate our immune system, we need the germs there to provide the first line of defence against the bad guys. So people sometimes find it a bit abhorrent, but our body really is encased with layers of microbes that contain more cells than our own body cells.

Robyn Williams: Yes, I think we've got one trillion body cells and something between 10 and 100 trillion germs on us.

John Tagg: That's true, and some people find that an absolutely disgusting thought, but this is something that is very beneficial for us. We need those germs, they are literally our closest friends, they are our personal army of protectors against the few malevolent bacteria that are out there, the few misfits in the bacterial community that would do us harm.

Robyn Williams: How's the commercialisation of this been going in New Zealand?

John Tagg: Wonderful. It was about the year 2000 that the company BLIS Technology was first established. The first product to market was Throat Guard. This is Strep salivarius cells freeze-dried into lozenges. There's two good times to take these lozenges. Number one is after a course of antibiotics. So people who've been on antibiotics, an effect of that is to actually decimate your friendly bacteria as well as taking out the bad guys that cause the infection.

Robyn Williams: That's why I don't take them myself.

John Tagg: No, if you can avoid them it's a wonderful thing to do. So what people need to realise is, though, when you do need to take antibiotics, sure, it may eliminate the infecting organism but it's also going to have a catastrophic effect as far as your personal army of defenders is concerned. I tell my students, when you're coming off a course of antibiotics, choose your intimate friends very carefully because you're very likely to pick up some new organisms at that stage. So what we really need to do, as you're coming off a course of antibiotics is to take K12 Throat Guard to repopulate the mouth with this friendly BLIS producing bacteria. That then gives you a head start in protection against the malevolent bacteria that you might be confronted with subsequently.

Robyn Williams: Is it available outside of New Zealand?

John Tagg: It's sold in Australia. Actually a dentist selling out of Sydney sells it as a halitosis preventative. It's sold in the United States, and it's about to be sold internationally. So the world will soon be overtaken by lots of these little Strep salivarius K12, these friendly bacteria, hopefully.

Robyn Williams: John Tagg with some good germs for world travellers. He's Professor of Microbiology at the University of Otago in Dunedin.