In war on germs, "backstabbers" could be our friends on the inside

Sept. 6, 2010
Courtesy of the University of Nottingham
and World Science staff

Days after scientists reported discovering "charitable" bacteria whose activities might help reveal new infection-fighting strategies, other researchers have announced an opposite sort of find.

Unlike the "charitable" bugs—which use their rare antibiotic-resistant abilities to help shield their whole group from antibiotic attack—the newly reported bacteria are said to be backstabbers. They free-ride on their own population of infectious bacteria, scientists say, burdening their group by not helping to produce a toxin that keeps the infection going.

This is of course nice for the afflicted patients, researchers add. By sabotaging their own companions, freeloading bacteria could make treatment easier for us, according to the study, presented at the Society for General Microbiology's autumn meeting on Sept. 6 at the University of Nottingham, U.K.

Bacteria are believed to cooperate by using a communication system called Quorum Sensing. During infection, bacteria use quorum sensing to coordinate the release of toxins.

The researchers, also from the University of Nottingham, found that in *Staphylococcus aureus* infections, bacteria defective in quorum sensing can "opt out" of toxin production. By doing so, they can invest more energy in reproducing—while taking advantage of the nutrient-rich infection maintained by their neighbours.

The freeloaders thus soon outnumber bacteria that are busy producing toxins, and the overall infection severity drops. "This opens up the interesting possibility of using these uncooperative bacteria to treat infection," said Eric Pollitt of the university, who is presenting the study. (Click here for a full-length interview with study collaborator Stephen P. Diggle).

The "backstabbers" are known as quorum sensing-deficient, or QS-deficient, bacteria.

The group tested the effects of these microbes by infecting waxworms with them. "We found that the QS-deficient bacteria could not only outgrow normal bacteria in the same population, but that they could also invade other, cooperating populations," explained Pollitt. "This means that we could potentially isolate QS-deficient bacteria and use them to treat clinical *S. aureus* infections."