

# The effects of variation in T6SS and bacteria on competition in host environment

September 17 2019

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A group of scientists studying the ways plant-associated bacteria interact were surprised to find that strains predicted to be more sensitive to bacteria were able to coexist with aggressor strains.

"Our findings are not consistent with a 'winner-take-all' result," says Jeff Chang, a scientist based at Oregon State University, " and may cause researchers to think differently about bacterial behaviors that are generally assumed to be hostile and open new directions to pursue on the role of microbe-microbe interactions in plant-microbe interactions."

This work is an international joint effort between Academia Sinica (Erh-Min Lai and Chih-Horng Kuo) and Oregon State University (Jeff Chang) led by 1st author Chih-Feng Wu. They used members of plant pathogenic *Agrobacterium tumefaciens* to examine how a type VI secretion system (T6SS), which is common among [bacteria](#) and used to deliver toxins into competing bacteria, affects competition between plant-associated bacteria. They competed different [strains](#) of these pathogens against each other to determine if aggressor strains could outcompete strains predicted to be sensitive to T6SS attack.

As stated above, the results were varied—sometimes the researchers were able to measure a [significant decrease](#) in the growth of sensitive strains. In other instances, sensitive strains were able to coexist with aggressor strains.

"These findings were consistent with computational simulations that

suggested parameters, such as the number of bacteria and how they are structured in an environment, which affect the probability in which two competing strains are physically interacting, can impact the aggressiveness of bacteria," Chang explains. "Our findings additionally suggest that the genetics of the competing strains and also the environment in which they are competing can also impact aggressiveness."

Since T6SS is present in ~25% [bacterial genomes](#) sequenced to date, this work provides a foundation for future study in identifying [genetic factors](#) beyond T6SS anti-bacterial weapons in determining the competition outcomes.

**More information:** Chih-Feng Wu et al, Plant-Pathogenic *Agrobacterium tumefaciens* Strains Have Diverse Type VI Effector-Immunity Pairs and Vary in In-Planta Competitiveness, *Molecular Plant-Microbe Interactions* (2019). [DOI: 10.1094/MPMI-01-19-0021-R](https://doi.org/10.1094/MPMI-01-19-0021-R)

Provided by American Phytopathological Society

Citation: The effects of variation in T6SS and bacteria on competition in host environment (2019, September 17) retrieved 23 April 2024 from <https://phys.org/news/2019-09-effects-variation-t6ss-bacteria-competition.html>

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