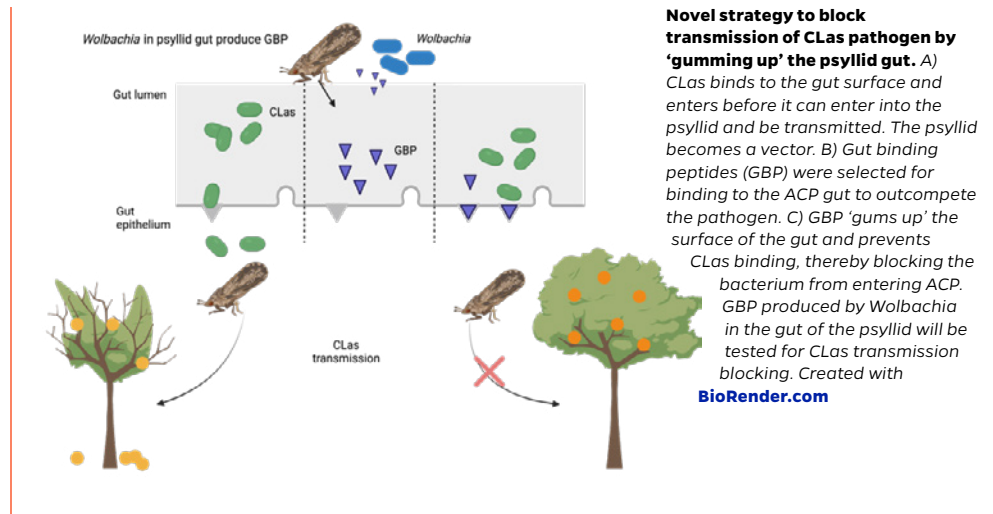


Paratransgenesis for Reducing Transmission of Vector-Borne *Candidatus Liberibacter asiaticus*

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Effort Statement: Identified several promising gut binding peptides that interfere with CLas transmission in feeding assays.

Summary: The overall objective of this research is to discover a novel, biological control-based tool for decreasing pathogen transmission by harnessing native psyllid microbial flora to reduce psyllid populations and/or pathogen prevalence. One strategy for stopping pathogen spread is to manipulate vector populations by replacing wild populations with altered populations that are unable to transmit a pathogen. The Asian citrus psyllid (ACP) harbor several symbiotic bacteria, including Wolbachia. Because these bacteria are present in all ACP and are not seemingly impacted

by the presence of *Liberibacter* (Las), they provide good candidates for a bacterial symbiont strategy, paratransgenesis. Paratransgenesis involves genetic manipulation of symbiotic bacteria commonly found in pathogen-transmitting vectors to export anti-pathogen molecules into the host vector. This offers several advantages over the alternative approach, i.e. modification of the vector genome, which involves insertion of novel genes into the heritable genetic material of the vector. In this project, we developed Wolbachia as a driver system for paratransgenesis. We demonstrated that Wolbachia can be used to introduce a phenotype-altering transgene into ACP. Wolbachia cell

lines were developed that expressed several unique genes. Paratransgenic transformation of ACP with a gene needed for Las transmission reduced CLas plant infection, as well as acquisition, suggesting that the paratransgenic Wolbachia may be a useful tool for disrupting of insect-transmitted pathogens.

Take Home Message:

- Gut binding peptides (GBPs) specifically interfere with CLas by preventing it from leaving the psyllid gut.
- Wolbachia, bacteria that live in the ACP, can be engineered with GBPs to create insects that can't transmit CLas.
- Development of resistance unlikely.

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