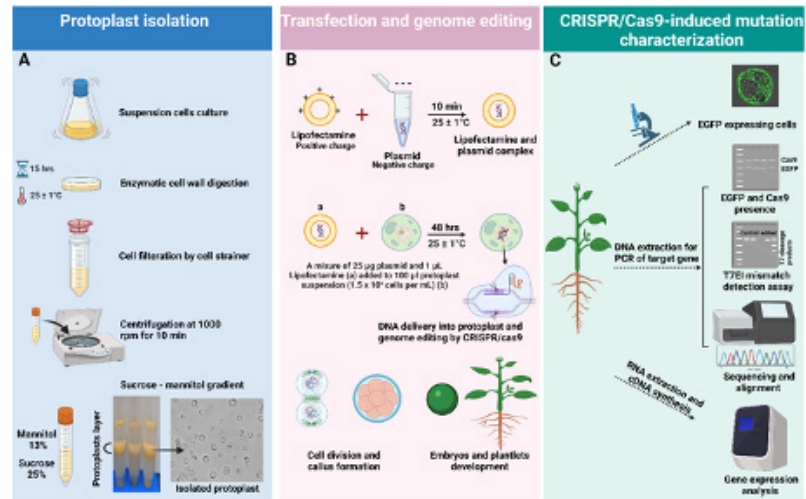


Utilizing Genetic-based Solutions for Developing Huanglongbing Resistant Citrus

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Take Home Message:

- Transgenic citrus can effectively protect against HLB.
- Transgenic rootstock mediated non-scion protection can lead to HLB tolerance in non-engineered scions.
- Genome editing can result in HLB tolerant non-transgenic citrus.

Effort Statement: In addition to the AtNPR1 transgene, we have also identified the NtSABP2 transgene to offer durable tolerance to HLB when over-expressed in citrus.

Summary: The overall goal of this project is to produce solutions that can be utilized to rapidly implement citrus improvement strategies to

combat Huanglongbing (HLB) in citrus. While resistant citrus cultivars are desirable, tolerance to the bacterium, allowing the plant to thrive in an HLB-endemic environment can be a more practical approach. The two main goals of this project are first, to understand and implement strategies that will allow the citrus plant to defend itself against HLB. This will be done primarily by engineering or genome editing citrus scion and rootstocks to have enhanced Systemic Acquired Resistance (SAR), so that trees can better protect themselves following infection. This SAR process is analogous to the innate immune system found in animals and can be

induced through the upregulation of several genes. Secondly, to understand the HLB resistance mechanism in some citrus relatives such as the Australian limes and utilize that knowledge to improve conventional citrus. The short-term outcome of this project will be in the development of HLB-tolerant breeding populations. At the end of this project, we will have produced and evaluated several populations of engineered or conventionally-bred citrus against HLB. Engineered rootstocks that can robustly protect the non-engineered scion against HLB will be made available for deregulation and stakeholder trials.

Funding:

