Directed evolution: create high affinity protein ligands for controlling plant pathogens and pests

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Crop yield losses due to pathogens and pests are a major threat for food security and sustainable agriculture worldwide. GM approaches and resistant varieties have been widely used to control plant pests and pathogens. However, pathogen and insect resistance against GM traits and resistant varieties are becoming serious issues.

Inspired by the directed evolution work by Dr. David Liu in Harvard Unversity, our business Innatrix is developing continuous and non-continuous laboratory evolution systems for the production of high-affinity, high specificity protein ligands, which we expect to serve as inhibitors. An advantage of our methodology is that it can produce new inhibitors quickly (given the sequence of the resistant target) once resistance occurs. We have created our own evolution selection system (patent pending) using *E.coli* and M13 phage. Innatrix has also invented a proprietary automation apparatus named the EvoStat™. The EvoStat™ provides advanced control of cultural conditions, reporting, recording, simulations, state of the evolution, and remote access, which enables us to easily explore the evolution of ligands to different targets or many evolution conditions in parallel.