

Engineered proteins to protect plants and animals from parasites

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Project Description:

We are discovering and designing proteins that selectively kill invertebrate pests and parasites but are safe for humans and other animals. These proteins can help protect crops from pests, which cause more than \$200 billion in losses every year. They can also potentially protect humans from nematode parasites, which infect over a billion people globally.

In the case of plants, crops that defend themselves from invertebrates using pesticidal proteins are already planted on hundreds of millions of acres around the world — but resistance is growing and not all pests can be controlled. For example, there are no proteins that protect plants from parasitic nematodes on the market (and only one in development) despite the damage these root-destroying pests cause.

That's why we need more pesticidal proteins with new modes of action. Emerging computational and synthetic biology tools now make it possible to discover candidate pesticidal proteins from new sources and to make them in the lab. Protein design tools have undergone a revolution, but they still struggle with complex functions beyond simple binding.

In this project you will use protein design tools combined with high-throughput *in vivo* screening to test large numbers of protein candidates. Your results may contribute to solving a major agricultural and medical challenge while improving tools with broad applications in biotechnology.