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Crystal protein Cry5B as a novel and powerful anthelmintic

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Soil-transmitted helminths (STHs), most notably, hookworms, whipworms, and *Ascaris*, are nematodes that infect more than 1.5 billion of the poorest people and are amongst the leading causes of morbidity worldwide. Only two classes of de-worming drugs (anthelmintics) are available for treatment, and only one is commonly used in mass drug administrations. New anthelmintics are urgently needed to overcome emerging resistance and to produce higher cure rates. Crystal (Cry) proteins, in particular Cry5B, made by *Bacillus thuringiensis* (*Bt*) are promising new candidates. Cry5B has excellent anthelmintic properties against many free-living and parasitic nematodes, including *in vivo* efficacy against multiple STH infections in rodents (*Heligomasmidoes polygyrus* and *Ancylostoma ceylanicum*) and in pigs (*Ascaris suum*).

An enormous challenge for STHs, very different from most diseases worked on in the developing world, is the requirement that therapies be very cheap (the people infected are very poor and current drugs costs pennies a dose), massively scalable (over 4 billion people are at risk from infection), and have a long shelf life in harsh environments, that have high temperature and humidity and no cold chain.

We will update our progress in several key areas. We will present new data on the *in vivo* activity of Cry5B against a major human parasite in humans. We will also present data on the whether or not the immune system is required for Cry5B action *in vivo*. We will also present on our development efforts to produce a deployable version of Cry5B that is cheap, safe, scalable, and stable. These efforts are currently focused on bacterial engineering, expression, and formulation.

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