Why tuberculosis?

Imagine that 1 in 3 people worldwide are infected with the bacterium that causes tuberculosis. Current therapies are losing effectiveness as bacteria are becoming increasingly resistant to the drugs that treat disease. Better diagnostics are also needed to monitor infection rates and emergence of drug resistance.

The Center for Rare and Neglected Diseases helped assemble a team at Notre Dame to address the issue of finding new drugs and developing new diagnostics. It is committed to pushing research forward by funding seed projects.

Seeding research projects

The CRND accepts proposals from faculty for seed funding. The idea is that an initial investment will allow projects to take root and grow. Once the project has grown out of its initial phase, it can be funded by a larger government grant. A seed project returns the initial investment and grows the research at Notre Dame.

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Promoting research on tuberculosis
**Drug Discovery**
Dr. Marvin Miller and his group have designed a method to easily and cheaply synthesize potential anti-tuberculosis agents. They knew these agents were effective in in vitro and cellular models but required expertise on campus to help move the project to the next logical step, testing in animal models. CRND facilitated discussions with Drs. Jeff Schorey and Patricia Champion, both of whom have expertise characterizing the molecular mechanisms of tuberculosis pathogenesis in cellular and animal models. CRND has also purchased a key piece of equipment that allows testing these agents in a highly relevant physiological context. With these pieces in place, the team has already begun testing a number of molecules as potential therapeutics.

**Exosomes for use in vaccines**
CRND is supporting a postdoctoral fellow to work on an interdisciplinary collaboration between Drs. Jeff Schorey and Basar Bilgicer with the aim of developing a new vaccine. While the current vaccine protects against childhood disease, it does not protect against pulmonary disease in adults. Schorey and Bilgicer propose building a vaccine based on exosomes, specialized vesicles naturally produced during tuberculosis infection. Exosomes contain dozens of proteins and other antigenic components specific to TB bacteria, so they make perfect vehicles to elicit an immune response. Schorey and Bilgicer are currently testing different chemistries for a vaccine formulation that is “slow-releasing.” Schorey is also developing exosomes for use in diagnostics.