UWM professor's startup takes aim at fire blight

T3 BioScience product would cut back antibiotic use

The Centers for Disease Control and Prevention estimates at least 2 million people in the United States become infected with antibiotic resistant bacteria each year and 23,000 die as a direct result of the infection.

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Ching-Hong Yang, professor of biological sciences at the University of Wisconsin-Milwaukee, knows the dangers of antibiotic resistant bacteria all too well. Not only is it his field of study, but also his father almost died from it two years ago.

Problems with antibiotic resistant bacteria have been attributed by some scientists to the overuse and misuse of antibiotics.

The product Yang is developing as chief scientific officer of Milwaukee-based T3 BioScience LLC aims to limit the use of antibiotics and come up with another way to protect pear and apple trees from fire blight.

The fire blight disease is caused by Erwinia amylovora, a pathogen that causes a light tan bacterial ooze from portions of dead bark. Eventually, dead leaves and fruit turn black, making portions of the tree appear scorched.

It can do massive damage. In 1998, Pacific Northwest growers experienced $68 million in losses from blight-damaged pear trees. In 2000, an outbreak in western Michigan resulted in $42 million in losses and 10 percent of the area's trees were killed.

In Wisconsin, fire blight has the potential to damage an apple crop that produced more than 40 million pounds of fruit in 2014, according to the Department of Agriculture, Trade and Consumer Protection. The danger is to the point that when Yang approached an orchard about doing field tests, the farmer wanted to pay him to do it.

The problem isn't just the disease, but also the antibiotics used to prevent its spread. The two commercially available antibiotics will soon be prohibited in the United States, since spraying them on crops contributes to antibiotic resistance.

T3 BioScience LLC
Milwaukee
Innovation:
Compound to prevent fire blight
www.t3bioscl.com

"My idea is that we can find some alternative way that can control the disease without using traditional, conventional antibiotics," Yang said.

To do that, Yang looks for the weak points in pathogens. His approach involves targeting the pathogen's type III secretion system (T3SS), which Yang described as a needlelike structure the pathogen uses as a weapon.

Leaves on an apple tree "scorched" by fire blight.

Yang has worked with colleagues to develop a compound that blocks the T3SS to prevent the infection of a plant.

"Instead of killing the bacteria, we just disarm it," he said.

T3Bioscience is conducting its last field test on apple and pear trees this spring. The past two field tests have proven that the product is comparable with commercialized antibiotics. The next step is to get U.S. Environmental Protection Agency approval, with the goal of having a market-ready product in two to three years.

"Our immediate objective is to help reduce excessive use of antibiotics in agriculture," said Daniel Burgin, chief executive officer of T3 BioScience.

The compound Yang created doesn't face a possible ban, like current antibiotics. It is sprayed on crops and could help farmers fight fire blight.

But Yang also sees opportunity for his work to potentially treat human infections. The T3SS is a part of a number of animal, human and plant pathogens.

T3 BioScience is one of 10 to 12 faculty-based startups that have formed from the work of the UWM Research Foundation, which was started a decade ago.

"It's a growing number," said Brian Thompson, foundation president.

Yang said he appreciates how the foundation has worked with him. It holds the patent on his work and licenses it to T3 BioScience. Thompson and senior licensing manager Jessica Silvaggi helped him take the work from idea to product.

"Number one, you have to start with a great researcher," Thompson said.

Yang received one of the foundation's catalyst grants, which are funded by the Bradley Foundation and support research with the potential for commercialization. Roughly $4 million has been award to 74 recipients over the past eight years.

The UWM Research Foundation now has about 40 patents in its portfolio, about half of which are subject to license or option agreements like Yang's.

Thompson said it is important for researchers to connect with someone with a business background. That's the case for Yang and Burgin. From there, the foundation can work with a company in an ongoing partnership.

"We have to make sure they're progressing. Until they start making sales they're sending us yearly reports," Silvaggi said. ■