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RESEARCH REPORT 2012

MAKING ANTIBIOTICS OBSOLETE?

With antibiotic resistance outpacing the rate of new drug discovery, how will you recover from your next infection?

UWM microbiologist Ching-Hong Yang has come up with an alternative for fighting infection. Instead of killing the disease-causing bacteria, why not simply disarm them?

Yang has developed a compound that turns off the “switch” on a pathogen’s infection machinery. And the compound isn’t just for human use—it’s designed to fight infection in plants, too, piquing the interest of those in agriculture.

“I’ve never seen anything that is even close to a commercial application like this,” says John Frieden, a biologist and research and development manager with the Agribusiness Division of Wilbur-Ellis. The company is testing Yang’s compound in crops with an eye toward commercialization. Another company is testing it for human therapeutic uses.

Using the genome of certain plants as a roadmap, Yang’s lab members analyzed the defense pathways to identify all the precursors to infection. Then they used that information to develop a group of small molecules that interrupt one channel in that intricate pathway system.

“These bacteria are very smart,” says Yang. “They grow a narrow appendage that acts as a ‘needle,’ injecting the virulence factors, such as toxins, into the host cell, and suppressing its defense communication.”

Yang’s discovery keeps the pathogen’s “needle” from forming, shutting down infection before it can begin.

He and collaborator Xin Chen, a professor of chemistry at Changzhou University in China, have found the compound equally effective on two virulent bacteria that affect plants and one that attacks humans, causing many hospital-related infections.

But they have reason to believe the compound will work well against far more bacteria, because it targets a component found in the chromosome of many different kinds of disease-causing bacteria. Yang also believes the compound and its derivatives can both offer a broad spectrum of activity and be unique to a specific pathogen—just like antibiotics.





Ching-Hong Yang, associate professor of biological sciences, has developed a way to treat infection without the worry of antibiotic resistance.