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Academia Sinica Newsletter (2011/05/03) Resistance to antibiotics and the consequent evolution of "superbugs" is posing a serious dilemma for medical professionals and pharmaceutical researchers. While more and more microbes are becoming resistant to available antibiotics, fewer and fewer new drugs are being approved for use. Such a situation has created an urgent demand for different ways of looking at the development of antibiotics. A research team led by Dr. Tsung-Lin LI, an Assistant Research Fellow at the Genomics Research Center, Academia Sinica, recently inadvertently stumbled upon a new strategy for producing more effective antibiotics, by slightly changing the chemical structure of an existing antibiotic by expanding microbial enzyme activities. Their findings were published online in the top journal Nature Chemical Biology on April 10, 2011.

Many antibiotics in common use today are semi-synthetically produced. Originally, however, these compounds were isolated from microbes (such as bacteria and fungi). In the natural setting, microbes use such compounds to defend themselves from other microorganisms. One class of antibiotics, called glycopeptide antibiotics, such as vancomycin and teicoplanin, are usually used by physicians as drugs of last-resort because, in addition to destroying bacteria they are also toxic to human cells. In recent years, however, there have been many reports bacterial resistance, even against these drugs.

Dr. LI and his colleagues looked into the biosynthesis of a glycopeptide antibiotic called A40926, the natural defense product of the bacterium Nonomuraea. They tinkered with the molecular machinery responsible for the compound's natural production by slightly altering the enzymes involved in the process. They ended up with several compounds that differed chemically, only slightly from the original antibiotic. These analogs were tested in mice infected with antibiotic-resistant Enterococcus bacteria and one, in particular, was found very effective at reducing the bacteria counts.

Worth mentioning, the discovery is a particularly important achievement for the first author of the article, Mr. Yu-Chen LIU, who has yet to obtain his PhD at the Institute of Biochemical Sciences at National Taiwan University.

The finding represents a possible new approach in the search for means to produce new drugs to fight bacteria, and researchers hope that in the future such biosynthetic engineering can be applied to other microbe-antibiotic systems.

Related Website:
http://www.the-scientist.com/news/display/58111/

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Further Information:
Academia Sinica Newsletter 2011/05/03

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