Researchers find promising new targets for antibiotics

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University of Illinois at Chicago researchers have identified new sites on the bacterial cell's protein-making machinery where antibiotics can be delivered to treat infections.

"The primary challenge of antibiotic therapy has been fighting infections caused by the pathogens which became resistant to antibiotics," says Alexander Mankin, professor and associate director of UIC's Center for Pharmaceutical Biotechnology and lead investigator of the study. "Not a single class of drugs has escaped the inevitable emergence of resistance."

At present, Mankin said, "the constant development of new drugs is the only available strategy to keep up with the ever-growing variety of antibiotic-resistant pathogens."

Mankin and his research team are looking for new vulnerable sites on bacteria where drugs can be delivered to fight the infections.

"First we need to find the target, and then the weapons can be developed," he said.

In the study, which is published in the Journal of Biological Chemistry, UIC researchers divided a ribosome -- the main apparatus within the cell that makes protein, and one of the best antibiotic targets -- into specific sections. Random genetic mutations were engineered in each area, and the researchers looked for those alterations that stopped the ribosome from making proteins.

Of the thousands of mutations tested, 77 were detrimental to the function of the ribosome. The regions where those mutations lie can be targeted by new antibiotics, which may be used to treat such diseases as tuberculosis and pneumonia, Mankin said.

"If we find drugs that can bind to these regions, they will likely kill the pathogenic cell," he said.

According to Mankin, the development of microbial genomics brought new hope for the development of antibiotics, but few successful drug candidates have been produced using this method.

An alternative approach is to "follow the lead of nature, and develop new drugs that act on the targets in the course of evolution."

"The ribosome is the perfect target," he said. "More than half of all known antibiotics arrest cell growth by interfering with the ribosomal functions and inhibiting protein synthesis. This is an innovative concept, targeting new sites in the ribosome."

Source: University of Illinois at Chicago