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How does bacteria become drug resistant?

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Singapore: According to a news article by the South China Morning Post, researchers in Fudan University's Shanghai Medical College have discovered the mechanism of why certain bacteria develop resistance to antibiotics. This development could help scientists to prolong the useful life of existing drugs without having to develop expensive replacements. The study was funded by the Ministry of Science and Technology, Ministry of Education and Shanghai's municipal government.

The research team, led by Professor Alastair Murchie, a British molecular biologist, said in a paper in the peer-reviewed journal Cell, that they had found a special section of ribonucleic acid (RNA), called a riboswitch, in some infectious bacteria that could make antibiotics useless. The riboswitch could recognize aminoglycoside antibiotics and release a protein to render the antibiotics inactive.

Prof Murchie said that while aminoglycoside antibiotics accounted for only about 20 percent of all antibiotics, the research was important because drug resistance remained a significant threat due to the way it evolved and emerged. Another member of the team, Dr Chen Dongrong, said that the team then spent three years identifying the aminoglycoside antibiotic that triggered the response and were testing other antibiotics to prove their hypothesis.

They found that in a normal bacterial cell, the riboswitch controlled a gene responsible for resistance but was switched off because the bacteria did not need to protect itself from the antibiotic. However, when the cell was threatened by an antibiotic, the drug would bind with the riboswitch to rearrange its structure and antibiotic resistance was switched on.

The emergence of drug-resistant bacteria in China (and also in the world) is primarily due to The over-prescription and usage of antibiotics. Xinhua had reported in December that a survey by Peking University revealed that the per capita consumption of antibiotics was 138 grams a year during 2011 in China, which is 10 times the global average.