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Three billion-year-old proteins resurrected

Washington, Feb 28, 2013, (IANS):

Scientists have resurrected two to three billion-year-old proteins from which the enzymes that armour superbugs against antibiotics have descended.

The achievement opens the door to a scientific "replay" of the evolution of antibiotic resistance with an eye to finding new ways to cope with the problem.

Jose M. Sanchez-Ruiz, Valeria A. Risso, from the University of Granada, Spain and Eric A. Gaucher, Georgia Institute of Technology explain that antibiotic resistance existed long before Alexander Fleming discovered the first antibiotic in 1928, the Journal of the American Chemical Society reports.

Genes that contain instructions for making the proteins responsible for antibiotic resistance have been found in 30,000-year-old permafrost sediment and other ancient sites, according to a Granada and Georgia statement.

Their research focused on the so-called beta-lactamases, enzymes responsible for resistance to the family of antibiotics that includes penicillin, which scientists believe originated billions of years ago.

Risso, Sanchez-Ruiz Gaucher used lab and statistical techniques to reconstruct the sequences of beta-lactamase proteins dating to Precambrian times, two to three billion years ago.

The team also synthesised the inferred ancestral enzymes and conducted studies on their stability, structure and function.

"The availability of laboratory resurrections of Precambrian beta-lactamases opens up new possibilities in the study of the emergence of antibiotic resistance," the report states.

The study co-authors also note that the extreme stability and catalytic features displayed by the two-three-billion-year-old lactamases suggest that resurrected Precambrian proteins have utility for the biotechnology industry.

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