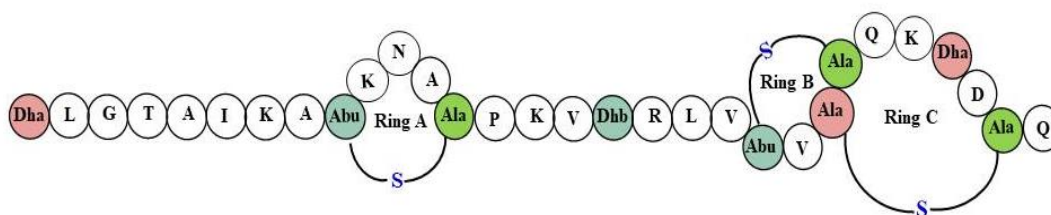


Dhaka University Scientists Discover a Novel Antibiotic 'Homicorcin' from Jute Endophytic Bacteria

Due to the increasing number of antibiotic resistance cases, the world is in an urgent need for novel compounds and innovative methods to minimize the spread and development of drug resistant infection. Recently a group of researchers from the Dept. of Biochemistry and Molecular Biology and Dept. of Genetic Engineering and Biotechnology, University of Dhaka discovered a novel antibiotic from jute endophytic bacteria after a long four years research.

Prof. Dr. Haseena Khan, the Principal Investigator of Molecular Biology Laboratory of the Dept. of Biochemistry and Molecular Biology, University of Dhaka has been working on jute endophytes since 2014. Endophytes are microorganisms, mostly fungi and bacteria that reside in plant tissues typically causing no apparent disease symptoms but, on the contrary maintain a symbiotic relationship with the host plants. The researchers have isolated a new endophytic bacteria *Staphylococcus hominis* strain MBL_AB63 from jute seed that secretes a novel antibiotic named 'Homicorcin'. Whole genome sequence of this strain was elucidated and the gene cluster of this novel antimicrobial peptide identified.



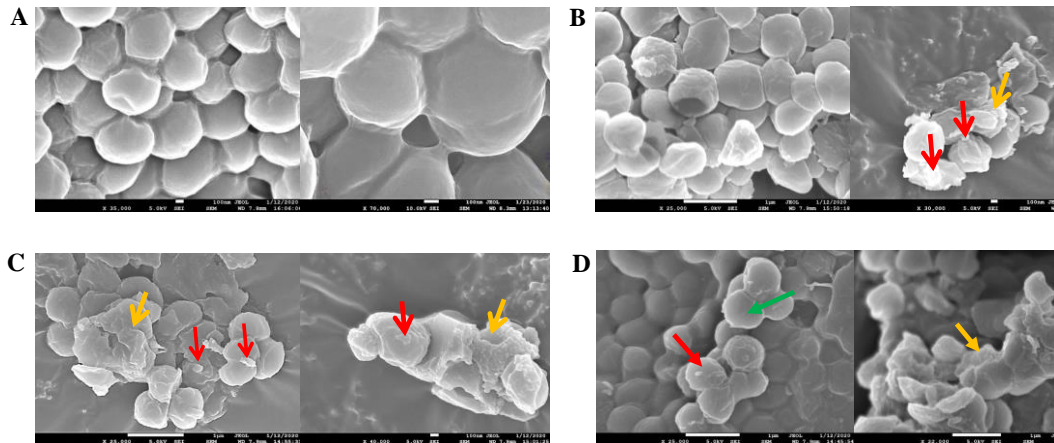
Structure of Homicorcin

(Source: Scientific Reports, <https://doi.org/10.1038/s41598-021-90613-9>)

Antibiotic purification is very challenging. It took almost two years to purify this compound. Prof. Dr. Md. Aftab Uddin took all the challenges to purify this compound. The antibiotic was found to be resistant at a wide range of pH and temperatures. It was also found to be active against antibiotic resistant MRSA (Methicillin-resistant *Staphylococcus aureus*) strain. Field Emission-Scanning Electron Microscopy (FE-SEM) revealed that this antibiotic destroys the cell membrane of target bacteria and causes cell lysis.

Homicorcin is a peptide antibiotic that belongs to lantipeptide group. It is difficult to develop resistance against peptide antibiotics, therefore they are considered as good alternatives to conventional antibiotics. Their structure can be modified easily using different *in vivo* molecular biology tools. This special class of antibiotic also possess different unusual amino acids in their structure that provide them superior structural stability and activity.

Apart from different advantages, lantibiotics have few limitations. One of them is their sensitivity to proteases. However, post translational modifications (PTMs) can be applied to make them resistant against proteases. In different studies it has been found that lantibiotics are highly active against different multi-drug resistant pathogens. Extensive research is needed to apply such antibiotics to the human body.



Anti-bacterial mechanism of Homicorcin

(Source: Scientific Reports, <https://doi.org/10.1038/s41598-021-90613-9>)

This research work was published in the journal Scientific Reports on 28 May 2021 (<https://www.nature.com/articles/s41598-021-90613-9>). This work has been done with the joint efforts of UGC Professor Dr. Haseena Khan and Prof. Dr. Mohammad Riazul Islam of the Department of Biochemistry and Molecular Biology, Prof. Dr. Md. Aftab Uddin of the Department of Genetic Engineering and Biotechnology, MS students of Molecular Biology Lab, Shammi Akter, Mahbuba Ferdous, Research Associate Badrul Haider, PhD researcher Al Amin and researchers from BCSIR. Scientists are now working to take the research further.