Novel method for enzymatic production of cyclic-diGMP

Novel enzymes that enable synthesis of large quantities of cyclic-diGMP at low cost

Background
Cyclic bis (3’,5’) diguanylate monophosphate or (cyclic-diGMP) is a bacterial secondary messenger involved in the regulation of various cellular processes that have medical and agricultural implications including biofilm formation, regulation of virulence factors, and cell mobility. There is also a growing interest in understanding the underlying mechanisms by which cyclic-diGMP regulates these processes in the scientific community. Current enzymatic methods for cyclic-diGMP production involve the enzymes diguanylate cyclases. However, existing methods for producing cyclic-diGMP are flawed, and thus new methods for producing high concentrations of cyclic-diGMP are needed.

Technology
Dr. Elizabeth Boon, Associate professor in the Department of Chemistry at Stony Brook University, has identified variants of the bi-functional diguanylate cyclase-phosphodiesterase enzymes enable the production of large quantities of cyclic-diGMP. Using these novel enzymes make it possible to synthesize large quantities of cyclic-diGMP from guanosine triphosphate (GTP) at low cost. Additionally, these enzyme variants retain enzymatic activity for over several months making them ideal for long term storage and repeated cyclic-diGMP syntheses.

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Advantages
• Production of large concentrations of cyclic-diGMP
• Easy production of cyclic-diGMP from GTP and/or labeled GTP
• Low cost and reduced time for production

Applications
• Research use
• Potential for therapeutic uses
• Development of Biofilms

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