28th Lecture on Molecular Engine
第28回発動分子科学セミナー

Prof. Dr. Shyamalava MAZUMDAR

Department of Chemical Sciences,
Tata Institute of Fundamental Research
(T.I.F.R.),INDIA

"Development of artificial metalloenzymes for novel in vitro applications "

Biocatalytic processes by far provide the best eco-friendly ways to synthesize fine chemicals. Metalloenzymes are known to catalyze chemical reactions with exceptionally high regio and enantioselectivity and with faster reaction kinetics. Metalloenzymes become more desirable than conventional chemical catalysts for the chemical transformation of the substrate having multiple functional groups. Due to their high selectivity, metalloenzymes perform chemical modification at a particular site without hampering other more reactive functional groups on the substrates. One limitation of the metalloenzymes is that they show a narrow substrate range and often do not catalyze the transformation of non-native substrates. Recent advancements in the field, such as 'directed evolution' and 'rational enzyme design', have substantially expanded the substrate horizon of the metalloenzymes. Furthermore, the catalytic activity of the metalloenzymes is limited to the inherent activity of their natural metal co-factor. To expand the reaction scope of the metalloenzymes, researchers have replaced natural co-factor with abiotic metal co-factor. Despite all the remarkable properties, metalloenzymes have not substantially contributed at an industrial scale. The talk would discuss various aspects of the metalloenzymes, such as their structure, functions, the role of the metal center in the catalytic activity, current limitations, and challenges for industrial-scale applications and highlight our recent efforts in this challenging area.

日時：2022年11月15日（火）
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場所：B2棟　426大会議室
連絡先：上野　隆史（内線 5844）

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