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Insights: Publications

Electrometabolic Pathways: Recent Developments in Bioelectrocatalytic Cascades

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In biological systems, the majority of chemistry occurs in enzymatic pathways. Pathways are essentially cascades of protein catalysts used for catabolism or metabolism. However, in cellular-free systems, catalytic cascades have been rarely studied until recently. This review will introduce the lessons that can be learned from in vivo enzymatic pathways and novel enzymatic pathways that have been developed for synthetic biology of electrochemical energy production and conversion. This review will also discuss the recent bio-inspired developments to utilize catalytic cascades for non-biological applications ranging from energy conversion to biosensing and the electrochemical production of important chemicals such as methanol from carbon dioxide and ammonia from agricultural waste runoff.