

Invited Speakers

Structural basis of glycosyl transfer reactions

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Marcelo will discuss the contribution of his group in investigating the structural and mechanistic properties of enzymes involved in glycosyl transfer reactions. First, he will be focused in the ADP-Glc pyrophosphorylase (AGPase), the enzyme that catalyzes the biosynthesis of the nucleotide sugar ADP-Glc. AGPase, is considered the main regulatory step in glycogen and starch production in bacteria and plants. He will discuss structures of the homotetrameric AGPase from *Escherichia coli* in complex with its physiological positive and negative allosteric regulators, fructose-1,6-bisphosphate (FBP) and AMP. They propose a model in which the energy reporters regulate AGPase catalytic activity by intraprotomer interactions and inter-protomer crosstalk, with a sensory motif and two regulatory loops playing a prominent role. Secondly, they provided for the first time the atomic coordinates of a native Michaelis complex for a glycosyltransferase in the absence of any substrate derivative or protein mutant. Moreover, through a series of unique structural snapshots of the glycosyltransferase GpgS, they visualized how the enzyme guides the substrates into the reaction center and unveiled the mechanism of product release, involving multiple conformational changes not only in the substrates/products but also in the enzyme.