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Title: In-silico identification of the residues in the large and small subunit of RuBisCO for altering the carboxylation and oxidation activity.

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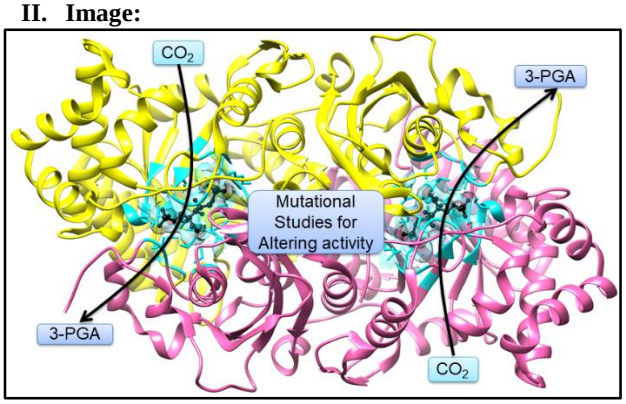
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I. Abstract:

RuBisCO assist both in the CO_2 fixation (carboxylation) as well as O_2 fixation (oxygenation) simultaneously. The former reaction occurs in the Calvin-Benson cycle (C3 cycle) while the latter exist in the photorespiration (C2 cycle). C3 cycle involves the assimilation of atmospheric CO_2 into plant product through photosynthesis while the C2 cycle involves carbon oxidation by the movement of the metabolites between chloroplast, peroxisome and mitochondria. Since both the pathways operates simultaneously, thereby causing catalytic inefficiency in the enzyme for the carboxylation and the oxygenation activity. Occurrence of both these activities is the rate limiting step for the RuBisCO and is an obvious target for altering the carboxylation and oxygenation activity. Detailed structural analysis of the enzyme both phylogenetically as well as structurally provided insights for altering the carboxylation and oxygenation activity of the enzyme. A large structural data from total of 113 plant species, having curated entries in the UniProt database were selected for phylogenetic and structural studies. By comparing the active site residues as well as others residues critical for interaction with the small subunit of the RuBisCO enzyme we found total of 8 residues which have been previously untapped and could be mutated to alter the activity of the enzyme. The studies presented in the present work may present novel approaches both for understanding and modulating the complex RuBisCO enzyme.

II. Image:



III. Reference:

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IV. Biography:

Tanuj Sharma has completed his PhD from CSIR-CDRI, Lucknow, India. He is working as Research Associate at Bioinformatics Centre, Forest Research Institute, Dehradun organization. He has published 18 papers in reputed journals and has been serving as a reviewer in 2 reputed journals.

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