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# Carbohydrate Biochemistry

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This Virtual Special issue of Carbohydrate Research marks the first symposium on the chemistry, biology and application of lytic polysaccharide monooxygenases (LPMOs), held in Copenhagen on 15-17. November 2016. LPMOs have emerged in the past ten years as new enzymes involved in biomass and complex carbohydrate degradation. Unlike glycoside hydrolases, LPMOs are copper-containing metalloenzymes which break the glycosidic linkage by oxidation and thus are able to operate in synergy with other carbohydrate modifying enzymes in degrading recalcitrant substrates. Considering they are single class of enzymes, LPMOs have attracted intense interest from the scientific community, initially primarily from industrial and applied scientists focused on biomass degradation, but increasingly also biochemists, structural biologists, plant biologists, microbiologists, bioinformaticians and bioinorganic chemists. The strong interest in this research area was reflected in participation to the symposium by around 100 academic and industrial scientists from around the world, representing the major groups working in the field and diverse disciplines. The selected reviews and original articles contributed to this VSI reflect well the diversity of the scientific community working on LPMOs, with contributions on topics including expression, purification, structure, assay, mechanism and classification of LPMOs. I take this opportunity to thank the Conference Chairs, Katja S. Johansen and Claus Felby from the University of Copenhagen, as well as the rest of the organizing committee and all participants, for making the event a success, and look forward to the second symposium, planned on 7-9. Enhanced Recovery Surgery (ERAS) is a multi-modal approach in improving medical and nursing outcomes to optimize patient perioperative processes and improve outcomes. Gastrointestinal resection of gastric cancer to the patient to bring physical and psychological stress, leading to metabolic disorders, the traditional preoperative fasting increased the degree of this reaction. The core is the occurrence of postoperative insulin resistance, a direct impact on the development of complications and clinical outcome. Preoperative oral carbohydrate updates the preoperative treatment measures, which can effectively regulate the metabolic response of patients with gastric cancer, improve the occurrence of postoperative insulin resistance, support the ultimate goal of ERAS program to promote the rapid recovery of the body, shorten the hospital stay. However, this reform of traditional clinical practice has not yet been broadened and standardized. To review the current status of preoperative oral carbohydrates in patients with gastric cancer under the concept of Enhanced Recovery Surgery, including the relationship between preoperative fasting and insulin resistance, the relationship between oral carbohydrate and insulin resistance before surgery and possible mechanisms, safety of oral carbohydrate before surgery, program and application effects (healing effects, immunity and inflammation, nutrition and body temperature), nursing interventions, etc., in order to provide guidance for the implementation of preoperative oral carbohydrates in patients with gastric cancer in clinical gastric cancer. Carbohydrates exist in nature as monosaccharides, oligosaccharides or polysaccharides. Scytovirin, a cyanobacterium derived carbohydrate binding protein, acts as a potent HIV-1 entry inhibitor and could hold promise as a potential topical microbicide. Viral specificity is achieved as Scytovirin recognizes carbohydrate moieties rarely found in the extracellular matrix, but which are abundant on viral proteins. With the goal to improve the anti-viral capacity of Scytovirin, we here analyze the factors contributing to the Scytovirin anti-viral effect. We show that aromatic substitutions in the lower affinity C-terminal domain of Scytovirin lead to tighter carbohydrate binding. Several other mutations or an addition to the N-terminal abolish carbohydrate binding and abrogate the antiviral effect. Moreover, the increased binding affinity translates directly to improved antiviral efficacy.

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**Received** September 8, 2020; **Accepted** September 18, 2020; **Published** September 25, 2020

**Citation:** Vishakh (2020) Carbohydrate Biochemistry. Biochem Physiol 9: 281.

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