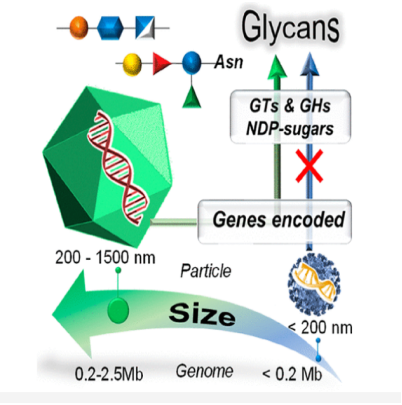
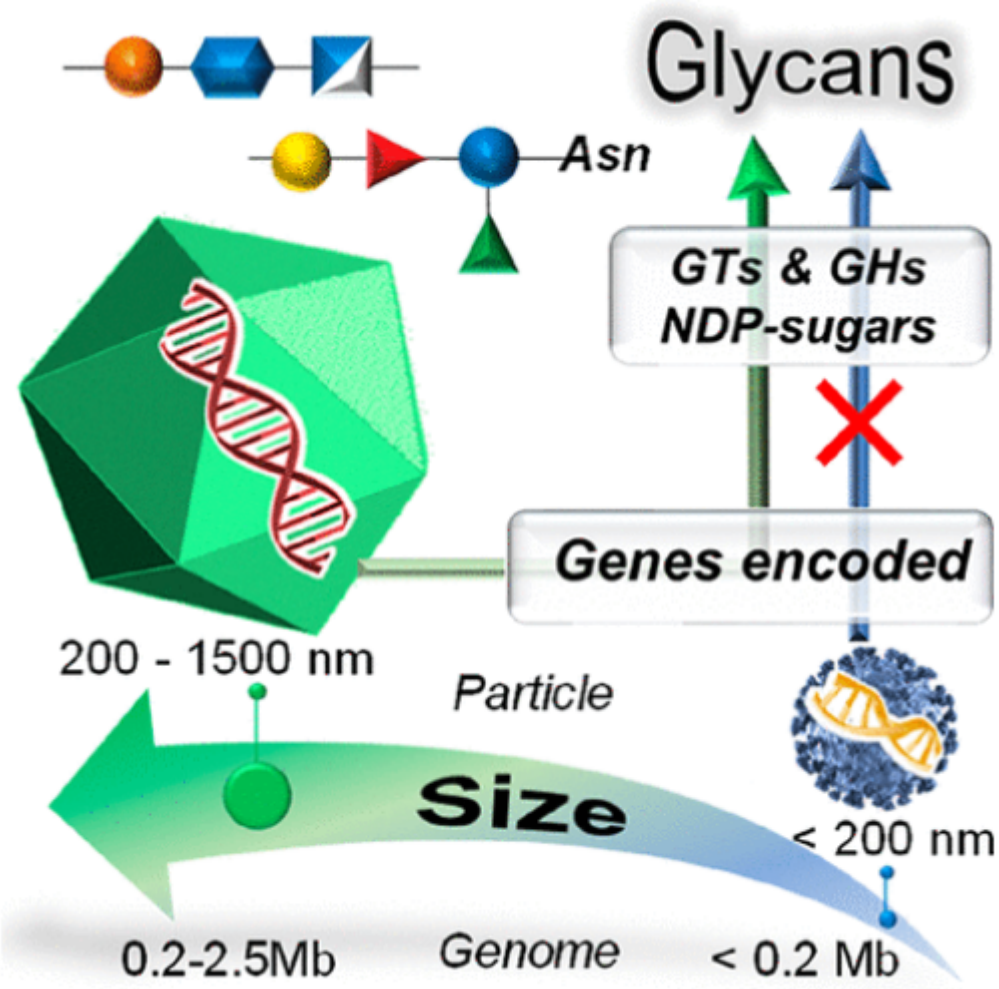


The Astounding World of Glycans from Giant Viruses

Description

Viruses are a heterogeneous ensemble of entities, all sharing the need for a suitable host to replicate. They are extremely diverse, varying in morphology, size, nature, and complexity of their genomic content. Typically, viruses use host-encoded glycosyltransferases and glycosidases to add and remove sugar residues from their glycoproteins. Thus, the structure of the glycans on the viral proteins has, to date, typically been considered to mimick those of the host. However, the recently discovered large and giant viruses differ from this paradigm. At least some of these viruses code for an (almost) autonomous glycosylation pathway. These viral genes include those that encode the production of activated sugars, glycosyltransferases, and other enzymes able to manipulate sugars at various levels.



This review focuses on large and giant viruses that produce carbohydrate-processing enzymes. A brief description of those harboring these features at the genomic level will be discussed, followed by the achievements reached in elucidating the glycan structures, the activity of the proteins able to manipulate sugars, and the organic synthesis of some of these virus-encoded glycans. During this progression, the authors comment on many of the challenging questions on this subject that remain to be addressed.

Category

1. News