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Recently, the traditional concept of viral glycosylation has been subverted by the evidence that giant viruses can independently glycosylate their capsid. Mimivirus is the most prominent example, as it has been established that the fibrils around the viral capsid are covered by complex glycans, synthesized by proteins encoded by the virus itself [1]. Mimivirus paved the way for the study of the fibrils' glycosylation of the *Mimiviridae* family. Here, I will present the complexity of the fibrils' glycosylation by combining two different approaches: on one hand the carbohydrate chemistry to elucidate the constituent sugars and on the other hand the bioinformatic search of the genes encoding the enzymes for their production and modification. Mimivirus, Moumouvirus australiensis and Megavirus chilensis were used as prototypes of the A, B and C clade respectively. The glycosylation genes are organized in cluster for Mimivirus (nine genes) and M. chilensis (six genes) [1], while the clade B remained unexplored [2]. As result, we have proved, first, the presence of sugars also for M. australiensis (B clade), and then the occurrence of a complex cluster of twelve genes explaining the *in vivo* data. In addition, we have extended the gene cluster of Mimivirus from nine to twelve genes, thus proving that Mimivurs possesses all the enzymes for the sugars production and their modification.

Finally, a comparative proteomic analysis has revealed that the fibrils glycosylation is clade specific, except for the B clade in which a heterogeneous glycosylation occurs. Regarding the proposed genus *Tupanvirus* of the *Mimiviridae* [3], a bioinformatics research has identified the existence of a genomic region of 49 Kbp, in which at least 10 genes are involved in glycosylation, suggesting that even in this case the fibrils may be glycosylated. Definitively, the understanding of the glycosylation of the *Mimiviridae* family could be considered as a pilot study, which can be extended to other giant DNA viruses, such as Pandoravirus, Pithovirus, Mollivirus, a list in constant growth.

References

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