Display of recombinant proteins on the capsid of baculovirus

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Introduction. The use of the viruses is acquiring more importance for the development of new applications in several areas[1]. The Insect Cell Baculovirus Expression System has been used to produce several secreted recombinant proteins, however, it also has been used to display recombinant protein in their capsids, for instance through the major capsid protein (VP39) [2].
Here, we have displayed a recombinant VP39 with affinity tags and demonstrate its functionality.

Methods. We synthetized affinity tags *de novo* through rounds of PCR and made DNA recombination in order to modify VP39 protein to display recombinant tags on the virus capsid. SF9 cells were utilized to produce three different Baculovirus (*Autographa californica multicapsid nucleopolyhedrovirus)* expressing: leucine zipper ACID, Leucine zipper BASE and histag. A baculovirus not expressing any recombinant tag in its capsid was used as control. Transmission electron microscopy and dynamic light scattering was used to determine the functionality of the recombinant tags.

Results. Figure 1 shows the interaction between the capsid of two different types of baculovirus (Leu CONTROL and Leu BASE). Figure 2 shows the western blot of the histag construction and several positive (protein containing histag) and negative (recombinant baculovirus without histag) controls. Figure 3 shows the baculovirus histag decorated with particles of Niquel.

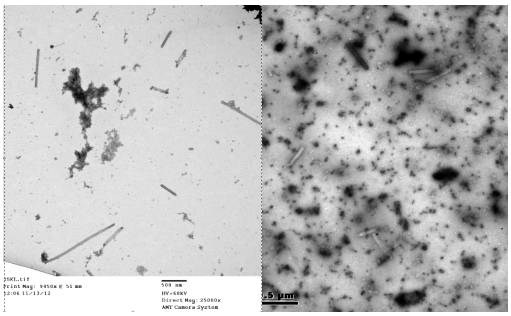

Figure 1. Baculovirus capsid not expressing any recombinant protein. It shows the capsids far one to the other.

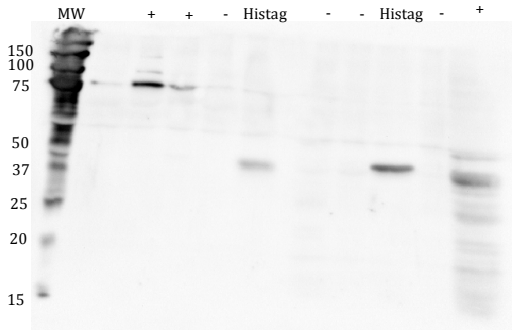

Figure 2. Western blot using antibody against Histag. The first "Histag" is the complete baculovirus, the second one its only the capsid without the envelop.

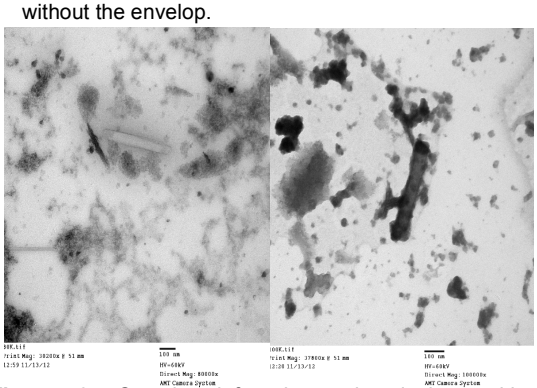

Figure 3. On the left, shows baculovirus without modifications. On the left, baculovirus capsid functionalized with niquel particles.

Conclusions. Modification on the amino terminal of VP39 protein can be accomplish without compromising the capsid assembling. These modifications (leucine zipper and histag) provide new characteristics to the baculovirus capsid.

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