Abstract:

Interleukin 15 has great application potential such as in the biological treatment of cancer. It is involved in a variety of immunological processes, the most important of these involve influencing and induction of NK cells and T-lymphocytes proliferation. However, its therapeutic usages are limited by a low stability and short half-life. For this reason, there are various approaches of stabilization and expansion of its biological activity being explored.

In this work, we analysed and developed a new approach, which uses viral nanostructures derived from major capsid VP1 protein of mouse polyomavirus as a carrier of IL-15. Moreover, VP1 proteins can be relatively easily modified and they are also capable to penetrate into the tumour cells.

There were prepared two variants of IL-15 together with control nanostructures in the baculovirus expression system, one was composed of IL-15 and the other of the IL-15 fusion protein and truncated variant of VP1. Protein constructs were characterized by electron microscopy and biochemical methods. The total protein yield of VP1ΔC-IL15-HIS fusion variant was higher (up to 53 mg/L of complete medium) than IL-15 alone (8,5 mg/L).

However, testing of the biological activity of the prepared proteins *in vitro* did not show any induction of proliferation on Jurkat and CTLL-2 cells even when using IL-15 produced in SF9 cells. The results of this work suggest that the baculovirus expression system is not suitable to produce functional variants of IL-15.

Key words: Interleukin 15, VLPs, mouse polyomavirus, capsid protein VP1, nanostructures, baculovirus expression system