Interaction of polyomaviruses with proteasomal system of host cells

Abstract:

Viral family *Polyomaviridae* includes besides model organisms - mouse polyomavirus and SV40 virus, also human pathogens, for example, BK virus. Polyomaviruses are small non-enveloped viruses with double-stranded DNA. Understanding of their life cycle is important for their use in gene therapy and immunotherapy as well as for prevention and treatment of complications caused by these viruses. This thesis is focused on early phases of MPyV and SV40 infection studying, mainly on delivery of viral genome to nucleus and role of proteasomal system in this stage of infection. It was found out that inhibition of proteasomes by specific inhibitor leads to increase of early non-structural protein LT expression, which was chosen as marker for viral entry to the nucleus and successful viral expression. Relative localization of proteasomes and VP1 protein of MPyV and SV40 was monitored and it showed 10% colocalization of mentioned structures. Further, it was found out that proteasomal inhibitor MG-132 negatively influences the replication of both viral and cellular DNA. Next aim of this diploma thesis was to prepare antigen – unique part of VP2 protein of BKV – for producing antibody. Expression vector with inserted fragment of unique part of VP2-BKV was firstly created, which was fused to HisTag. Then this protein was successfully produced and isolated from bacteria BL21 by affinitive chromatography. Antigen suitable for preparing antibody was prepared.

Key words: mouse polyomavirus (MPyV), SV40 virus, BKV, VP2, proteasome, MG-132, epoxomicin, DNA, HisTag