Scientific session:

Nuclear Compartments and Gene Expression

Title:

Mouse polyomavirus affects nuclear lamina in late phase of infection

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One of the important components of nuclear cytoskeleton is nuclear lamina. It is composed of intermediate filaments V, A type lamins (lamin A/C) and B type lamins (lamin B1 and B2). Although nuclear lamina maintains the structural integrity of the nucleus, it plays an important role in fine-tuning of DNA related processes, e. g. replication or transcription and is also a natural barrier for viruses replicating in the nucleus. Hence, viruses evolved different mechanisms ensuring exploitation of the lamina for their own purposes.

In this study, we followed the changes of lamina in cells infected with mouse polyomavirus (MPyV). At late times post infection, MPyV major capsid protein, VP1, accumulates in a close proximity of nuclear lamina. We were interested if replication of MPyV in cells affects nuclear lamina and if the lamina plays a role in virus replication. Despite that the defects in lamin A/C and B1 staining were observed, the nuclear lamina breakdown was not proven. After i*n situ* fractionation, VP1 and the viral non-structural protein large T antigen (responsible for viral genome replication) were found together with lamin A/C and lamin B1 in the last insoluble fraction, indicating possible complex formation. In addition, VP1 protein together with lamin B1, was found in the last insoluble fraction after *in situ* fractionation of cells with lamin A knockdown (LMNA KO), suggesting that lamin B1 serves as a scaffold for virus replication centres formation. Further, during the course of the infection, the level of lamin A/C was decreasing and level of lamin B1 was increasing. Moreover, the higher solubility of lamin A/C was observed and changes in lamin A/C phosphorylation were detected in the infected cells. Also, in LMNA KO cells, the transcription of viral genes was decreased. These data suggest that MPyV infection affects lamin A/C network which becomes solubilized and that the solubilization of lamin A/C is required for efficient viral gene transcription.

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