Novel human polyomaviruses in human cancers

Valorization

Polyomavirus is an emerging family of small DNA viruses with its members causing different cancers in animal models such as mice and hamsters. Although, the earlier discovered human polyomaviruses (BKPyV and JCPyV) were found associated with human diseases, there was no evidence that this family of viruses could cause cancer in humans until the discovery of MCPyV and the integrated status of the viral genome in more than 80% of MCC samples. Under representation of viruses as an etiopathogenic agents in human cancers and discovery of number of human polyomaviruses since early twenty first century has been the driving force for this doctoral thesis.

The studies conducted for this doctoral thesis advances our understanding of etiopathogenic role of human polyomaviruses, HPyV6, HPyV7, WUPyV in human cancers. The presence of HPyV6 and HPyV7 in significant percentage of keratoacanthomas and thymic epithelial tumors strongly suggests an etiopathogenic role for these viruses in the respective cancers. HPyV7 in thymic epithelial tumors also suggests the novel tropism of the virus in contrast to its widely observed skin tropism. The absence of tested (SV40, MCPyV, HPyV6, and HPyV7) polyomaviruses in chordomas and WUPyV in neoplastic tissues indicated that these viruses do not have an etiopathogenic role in those cancers. The identification of human polyomaviruses in samples would be made easy by the novel oligonucleotides described in chapter 7 of this thesis. In conjunction with genomic technologies, RCA and high through-put next generation sequencing, these oligonucleotides have the potential to serve as a discovery tool for identification of novel human polyomaviruses.

Future studies on identification of viral genome status will give further insights into the possible tumorigenic role of these human polyomaviruses. Taken together, contributions of this thesis not only have a significant impact in our understanding of known human polyomaviruses in human cancers, but also holds the potential to identify other novel potentially tumorigenic human polyomaviruses and detection of human polyomaviruses in clinical specimens