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Reprogramming of somatic cells to induced pluripotent stem cells using viral vectors for regenerative medicine therapy

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Human somatic cells can be reprogrammed into induced pluripotent stem cells (iPS). iPS cells have a regenerative potential similar to that of human embryonic stem cells (ES cells), which may serve as source of cells for tissue repair (transplantation), *in-vitro* disease modelling and drug toxicity assays. A number of methods have been developed for converting adult somatic cells into a pluripotent from which ethically acceptable patient specific mature cells of interest can be derived. Successful reprogramming of skin fibroblasts to iPS cells can be achieved by ectopic expression of stemness factors. Here, I will discuss the various conventional methods of reprogramming using lenti-virus, retro-virus, adeno-virus and sendai-virus as viral vectors. These methods although had a lot of disadvantages led to fast progress in the stem cell research fields. The pros and cons of the use of viruses for reprogramming will be discussed with the advancement in the field a lot of non-viral approaches, which has been recently introduced.

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Autophay and autophagy-related factors in herpesviral infection

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Autophagy constitutes a major catabolic hub for the quality control of intracellular entities of eukaryotic cells, and is emerging as an essential part of the host antiviral defense mechanism. However, in turn, viruses have evolved elegant strategies to co-opt various stages of the cellular autophagy pathway to establish virulence *in vivo*. This is particularly the case in the ubiquitous and persistent herpes virus infection. I will discuss recent findings regarding the crosstalk between the gamma-herpes virus family and the autophagy pathway. We have identified the key role of the anti-autophagic aspect of the virally encoded Bcl-2s in the chronic infection of oncogenic γ-herpes viruses and propose that cellular autophagy may have a substantial effect on viral persistence and may influence the *in vivo* fitness of viruses. Furthermore, some autophagy factors can also be hitchhiked by viruses for their efficient penetration into host cells. These discoveries expand upon known antiviral activities of the autophagy machinery and also suggest new approaches for treating some virally induced diseases.

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