

Theoretical Study on Targeted Penetration of Influenza A Virus to Induce the Destruction of Cancer Cell

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Oncolytic virus is used for targeted cancer therapy and it is functionalized to target and destroy cancer cell by replication of virus in the cell . Although oncolytic virus was expected to have low side effect due to application of autoimmunity, accurate targeting of cancer cell and high-efficiency of treatment have not been achieved. In this study, hemagglutinin (HA), the surface protein of Influenza A virus, was modified to target pancreatic cancer cell. Improvement of the targeting accuracy was expected by coating DOTAP (N-[1-(2,3-dioleoyloxy)propyl]-N,N,N-trimethylammonium) on the surface of influenza A virus. For this theoretical study, coarse-grained molecular dynamics was employed, and cancer cell membrane was modeled with four different lipids, cholesterol and sialic acid, which was receptor of influenza A virus. Cancer cell membrane was shown stronger adsorption with HA than normal cell due to interaction between lysine and arginine of HA, which were positively charged, and POPS of cancer cell. Oncolytic virus coated with DOTAP was shown effective due to strong adsorption on the cancer cell membrane originated from charge interaction between DOTAP and POPS .