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# Viral mimetics in cancer therapy

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Viruses are nanoparticles in nature and they exhibit specificity for cell surface receptors on target cells. They trigger infections that are mediated by cross-molecular interactions between the peptides on the capsid proteins (ligands) and target surface cell proteins (receptors). Viruses have a high degree of tissue and cell penetrability based on the multivalency of ligand-receptor binding formed by the repetitive and regular architecture of viruses. Further, artificial viruses are man-made, biocompatible nanomaterials that exhibit virus-like characteristics and size which can function as potential cell-targeted carriers in molecular therapy. Metals, lipids, polymers and carbon nanotubes can be used for the fabrication of artificial viruses. However, viruses that are made up of proteins show high specificity. Viral-mimicking proteins are engineered with three cassettes, namely an N-terminal cationic peptide, a core scaffold protein and a C- C-terminal polyhistidine. While N-terminal cationic peptides are small peptides produced by the immune cells of bacteria, the C-terminal polyhistidine has proven to have effects on the stability and function of viruses. Further, scaffolding proteins are essential for catalysing and modulating the viral assembly. The multiple virus-like functions of these proteins have high molecular transport and intracellular delivery. These proteins exhibit plasticity which is ideal as they can act as a multifunctional vehicle for targeted transportation of specific drugs into the cell. The main advantages of these viral mimetics are longer circulation time and selective delivery into the target cancer cells. This aids in overcoming the current limitations of chemotherapy which include poor effectiveness and toxicity. The future of artificial viruses lies in coupling the viruses with antitumor compounds to kill the cancer cells.

*Keywords: Proteins, Peptides, Viral mimetics, Antitumour drugs*

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