Clinical applications of virosomes in cancer immunotherapy

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Cancer immunotherapy is increasingly accepted as a treatment option for advanced stage disease. The identification of tumour-associated antigens in 1991 has prompted the development of antigen-specific immunotherapeutic strategies for a variety of cancers. Many of them result in some immunological responses in cancer patients; however, clinical results were not observed concomitantly with immunological responses; therefore, further improvements in the field of immunotherapy are urgently needed. Virosomes are lipidic envelopes devoid of genetic information, but which retain the antigenic profile and fusogenic properties from their viral origin. Virosomes are versatile antigen carriers and can be engineered to perform various tasks in cancer immunotherapy. Preclinical data have fostered the development of innovative clinical protocols. Hence, immunopotentiating reconstituted influenza virosomes will be assessed in breast and melanoma immunotherapy, and may contribute to the development of clinically effective cancer vaccines and ultimately improve patient outcomes. The objective of this review is to provide an overview of the potential clinical applications of virosomes as innovative and potentially effective reagents in active specific cancer immunotherapy.