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Plant virus nanoparticles for immunotherapy?

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Plant virus nanoparticles (VNPs) are cheap to manufacture, safe, biodegradable, and effective as treatments. Plant virus nanoparticles have a wide range of applications, from epitope carriers for vaccines to cancer immunotherapy agents. VNPs and virus-like particles (VLPs) are both highly immunogenic and easily phagocytozed by antigen presenting cells (APCs), which in turn elicit antigen processing and the display of pathogenic epitopes on their surfaces. Because VLPs are made up of multiple copies of their capsid proteins, they have repetitive multivalent scaffolds that aid in antigen presentation. As a result, VLPs prove to be highly suitable platforms for the delivery and presentation of antigenic epitopes, resulting in a more robust immune response than their soluble counterparts. Because self-antigen tolerance is a challenge in the tumour microenvironment, VLPs are preferable platforms for delivering and displaying self-antigens as well as otherwise weakly immunogenic antigens. These properties, combined with their small size, allow VLPs to deliver vaccines to draining lymph nodes while also promoting APC interactions. Furthermore, many plant viral VLPs have inherent adjuvant properties, which eliminates the need for additional adjuvants to stimulate immune activity. Some of the highly immunogenic VLPs stimulate innate immune activity, which leads to adaptive immunity in tumour microenvironments. Plant viral VLPs are nontoxic, inherently stable, and can be mass-produced as well as modified with antigens and drugs, making them an appealing option for inducing anti-tumor immunity.

Biography

Kathleen Hefferon received her PhD in the Faculty of Medicine at the University of Toronto. She most recently held the title of Director of Operations, Human Metabolic Research Unit in the Division of Nutritional Sciences at Cornell University. She is a science writer for the Center for Hepatitis C Research at Rockefeller University.

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