

THE PAPAYA MOSAIC VIRUS (PAPMV) NANOPARTICLES; A PROMISING TOOL IN VACCINE DEVELOPMENT.

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There is a major need for the development of new technologies that will facilitate the speed of development of vaccine and show a very high safety profile. In the last 10 years, we have developed a new toll like receptor agonist (TLR) that can trigger innate immunity followed by a strong adaptive immune response. This new agonist targets specifically the TLR7/8 in the endosome of the immune cells. It is made of the coat protein (CP) of a plant virus self-assembled around an RNA that forms flexuous rod-shaped nanoparticles of 15x100nm. The highly repetitive and crystalline nature of the nanoparticles are attractive to immune cells leading to its internalization into the endosome where the nanoparticles are broken down by the harsh conditions of this compartment which liberate the RNA that trigger TLR7/8 to induce innate immunity. Therefore, we can use those nanoparticles as an adjuvant and improve the immune response to an antigen or as an immune modulator through the trigger of innate immunity that can induce protection to viral infection or improve the immune response to tumour. Finally, we have showed that we can engineer the nanoparticles into a vaccine platform through fusion of B or T cell epitope at its surface and elicits an efficient and protective immune response to the fused epitope. We will discuss the advantage of using this platform in vaccine development or cancer immunotherapy and show several examples where it has been shown to be efficient and promising.