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Nasal vaccine using nanoparticles against toxoplasma gondii infection: A mechanistic study

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Nanoparticles can be used to deliver antigens to immune cells, therefore increasing their immunogenicity. A better knowledge of their mechanisms of interaction with cells and the biological fluids is necessary to fully understand their potential as delivery systems of antigens. Most of pathogens invade our organism using the mucosal route, therefore it is of interest of mimicking infection in order to elicit a protective immunity against infection.

We used nanoparticles made from starch hydrolysate (1), these nanoparticles were loaded with toxoplasma gondii antigens. After intra-nasal administration we observed that they deliver these antigens in airways and are capable of eliciting humoral and cellular responses without the use of adjuvant. A challenge study in comparison of cholera toxin used as adjuvant showed that only mice vaccinated with the nanoparticles were protected (2).

This lecture will give an overview of the mechanisms implied using nanoparticles to deliver antigens to the immune cells using the nasal route and will emphasize the interest of developing nanoparticulate carriers.

1. Dombu et al, Biomaterials, 2012
2. Dimier-Poisson et al Biomaterials 2015

Biography

A/Prof Lew-Tabor research includes genomic studies to develop new vaccines and diagnostic tests to combat beef cattle diseases in Northern Australia and other tropical/sub-tropical regions of the world. She has published over 60 peer reviewed journal publications and over 90 conference presentations nationally and internationally. She has been serving as an editorial board member for the International Journal of Parasitology. A/Prof Lew-Tabor was the recipient of the 2008 Queensland Smart Women Smart State Award for Women in Community/Public Sector- Science Category. She is the Conference Convenor for Dr. Didier BETBEDER has 20 years experience in drug delivery using colloids, ranging from basic research to clinical studies. He has extensive experience in Nanomedicine, and in particular of innovative nanoparticulate for developing prophylactic and therapeutic vaccines. With Biovector therapeutics, nasal flu vaccine formulations based on nanoparticles have been clinically trailed in collaboration with BioChem Pharma, SmithKline Beecham and Chiron.

He has been a Professor at the University of Artois and Lille 2 since 2001, his research focusing on drug delivery across biological barriers using nanoparticles. He was president of the French control release society from 2004-8, and has over 60 international publications and 21 patents to his name. The 9th International Tick and Tick-Borne Pathogen conference is to be held in 2017.

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