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Nanotechnology and mucosal vaccines

José Crecente Campo
Universidade de Santiago de Compostela, Spain

Vaccination has been, without any doubt, the greatest success of medicine in preventing diseases. Infections that centuries or even decades ago caused decimation of whole cities and countries nowadays are old ghosts of the past or have much less impact in human beings. In the constant effort of science to increase quality of life, vaccines based on living or attenuated microorganisms that provoked severe side effects have evolved to vaccines based on safer antigens, like purified proteins, peptides and plasmids. However, these last compounds are much less immunogenic and for that reason the use of adjuvants is becoming imperative in the development of modern vaccines. Among these adjuvants, nanoparticulated systems have emerged as ideal candidates, thanks to the advantages they can offer like (i) to protect the integrity of the antigen, (ii) to improve and prolong the antigen presentation to the immune system cells and (iii) to modulate the immune response towards the cellular or humoral arm. Besides, nanosystems can be an ideal platform to administer vaccines through the mucosal routes with some important benefits like (i) better mucosal response, (ii) needle-free vaccination, (iii) better compliance of the patient, and (iv) easier production. Nanotechnology is providing us more and more sophisticated platforms like nanoparticles, ISCOMs, nanocapsules, bilosomes, etc., and probably, in the near future we will see a mucosal nanovaccine in the market.

Biography

José Crecente Campo is a Researcher at the University of Santiago de Compostela (USC). He holds several degrees in Industrial Engineering, Science Food and Chemistry apart from a Master's degree in Drug Discovery and Development and a PhD in Organic Chemistry. He has also worked as a visiting Scientist at Cambridge University in the group of Prof. Steven Ley. Over the last 3 years he has been associated to the laboratory of Prof. Alonso, at the USC, where he has been involved in the formulation of proteins and antigens. Currently, he is involved in 4 vaccine-related projects, among them a NIH project and a EU (NANOPILOT) project, both oriented to the preclinical development and scaling-up of nanovaccines.

josecrecentecampo@hotmail.com

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