Contexte et résultats marquants

Objectifs:
- To develop a multi functional nano drug delivery system simple to administer and to manufacture, based on safe, biodegradable and biocompatible materials.
- To target the natural reservoirs of the HIV virus with antiretroviral drug loaded particles decorated with IgAs.

Polymer matrix with poly(lactic acid) from Anabior. Residual solvents maintained within the requirement of pharmacopeia. Colloidal polyelectrolyte complexes of chitosan and dextran sulfate (PECs) were stable in physiological media, as a result of the fine tuning of chitosan degree of acetylation and molar mass. The particle concentration during manufacturing was increased by a factor 15-30 by the new approach investigated within this project.

PLA particles were loaded with fluorescent markers. The fluorescence ranged from green to infra-red. Efavirenz (antiretroviral drug) was encapsulated with a 90% yield for a mass ratio of 5 to 45 mg per g of PLA with no alteration of particle size. PECs particles were loaded with Tenofovir at weight ratio of 10% with a quantitative adsorption yield.

Various types of IgAs were adsorbed on PLA or PECs particles. Conditions were developed to maintain the colloidal character of the particle dispersions. The presence of the ARD at high concentration in the polymer matrix may decrease the adsorption yields.

IgA antibodies were produced at B cell Design by immunization of HAMIGA mice with α4β7 antigen loaded onto PLA particles. Out of 20 clones, 2 were selected and allowed to produce respectively 20 mg and 8 mg of IgA. The specificities and affinities of these IgAs were demonstrated by ELISA and flow cytometry.

Efavirenz loaded PLA particles were tested in vitro for the protection against infection by the LAI viral strain of human peripheral blood mononuclear cells (PBMCs). Encapsulated Efavirenz featured a better protection than the soluble form of the antiretroviral drug.