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Abstract

Controlled release of Nano liposome-encapsulated metformin-HCL loaded in PCL-Chitosan/ PVA core-shell nanofibers for wound healing applications

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Abstract:
Nano-structures composed of DNA molecules, jewels of nanotechnology to make vaccines tests on nanoparticles. What's so special about DNA? The complementarity between its nitrogenous bases, versatility, biocompatibility and the possibility of large-scale production, are all characteristics that make DNA a perfect candidate to "build" Individual forms of DNA can be induced to self-assemble in " nano-machines "for the execution of certain tasks in an automated manner, or in" nano-cages "for the transport of drugs in specific areas of the body. They can also function as biosensors, to intercept the presence of molecules of interest in the body, allowing the early diagnosis or monitoring of diseases. But among the many applications, the one explored in this study is the use of "nano-scaffolding" of DNA that allow to position other molecules with nanometer precision. How to design a particle-based vaccine? A nano-scaffold is just what it takes to generate a good particle-based vaccine, a technology increasingly used among next-generation vaccines. A vaccine is made up of one or more parts of the target to be countered, the so-called antigens. Apparently, good results are obtained by fixing the antigens on the surface of a nano-particle, according to a precise and rigorous arrangement. Rigidly organized molecular patterns are indeed common in nature and the immune system has a unique ability to react against these structures.

Efforts are therefore concentrated on creating the best spatial scheme, which stimulates the strongest immune response. But why is it so important that the antigens are arranged in a certain way? Antibodies are among the molecules responsible for the immune response. They are typically Y-shaped, with the antigen binding sites located on the short arms. Consequently, an antibody is able to bind two antigens at the same time, maximizing the response, but only if they are at the "right" distance: if they are too close or too far apart, a single antibody may not be able to interact with both at the same time. When assembling antigens on the surface of a particle vaccine, it should be known that only those spaced optimally will elicit the best immune response. DNA origami made it possible to fabricate tiny surfaces or "scaffolding", on which antigens could be placed on each other, with nanometer precision. The ability of the various antibodies to interact with these antigens was then

measured. The study helped define the optimal between two antigens so that they can be bound at the same antibody distance, and oscillate between 3 and 17 nanometers. It would have been impossible to get such a precise result with any other method.

DNA nanotechnology is a completely revolutionary approach to designing next-generation vaccines and antibodies against various diseases.Key Words: Nano-fibers, HCL loaded in PCL-Chitosan, PVA core-shell nanofibers.

Biography:

Faraz Chogan is an experienced Researcher with a demonstrated history of working in the nanotechnology industry. Skilled in Bioinformatics, and Biotechnology. Strong research professional with a Doctor of Philosophy (Ph.D.) focused in Pharmaceutical Nanotechnology from University of Tehran.

Recent Publications:

1. Design, fabrication, and optimization of a dual function three-layer scaffold for controlled release of metformin hydrochloride to alleviate fibrosis and accelerate wound healing.
2. Synthesis of PLGA/chitosan/zeolites and PLGA/chitosan/metal organic frameworks nanofibers for targeted delivery of Paclitaxel toward prostate cancer cells death.
3. Graphene oxide-l-arginine nanogel: A pH-sensitive fluorouracil nanocarrier.

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