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Recombinant approach to develop ScFv antibodies and vaccines against viral diseases as Ebola, flu (AH1N1) and cancer (polyomavirus)

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Abstract

Currently, production of vaccines and diagnostic systems for infectious diseases has failed to provide a systematic vision that merges state-of-the-art technologies with industry to provide an effective commercial solution. Infectious and rapidly transmitted diseases, such as cancer, Ebola and influenza, should be a focus of interest for these prospects. While technological advances of recent years have been revolutionizing the life sciences industry, specifically in the biopharma field, these advances have been disproportional in terms of their applications towards infectious diseases. Working on the development, recombinant technology is needed for the production of chimeric proteins using mammalian, yeast, and bacterial cells modified for those purposes. Proteins developed through a process of molecular engineering, which begins with in silico bioinformatic processes, using validations and algorithms, subsequently through synthetic biology, molecular biology, genetic engineering, and Bioprocess development. The aim being, the scaling efforts towards pilot plant levels. The primary goal of these proteins is the development of integrated solutions that can be used as antigens or antibodies in diagnostic systems, as well treatments and vaccines. The main challenge is in the final application that results in the free exposure of epitopes for recognition between the antibody and the antigen of interest, which implies their effectiveness in terms of use. A secondary challenge is productivity rates in bio-production systems, which vary greatly depending on the platform used and the quality of the bioprocess developed. The recombinant proteins HA-RBD, tAg, scFv-13F6, scFv-13C6 and Fab-KZ52 were designed, developed, expressed and characterized by the integral use of molecular engineering and bioprocess engineering. The expressed proteins showed biological antibodies (HA-RBD and tAg) and antigen (scFv-13F6 and scFv-13C6) recognition, recognizing specific epitopes. Significantly tAg production occurred with a yield of 50 mg L-1 and HA-RBD protein was produced in 120 mg L-1.

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Biography

Luis Mario Rodriguez-Martinez has his expertise in Virology and Bioprocess Development. He is working with recombinants and their applications against viral diseases as Influenza, Ebola and Members of the Polyomaviride family like the newly discovered MCPyV. He is a Scientist and Innovation Manager with expertise in Prototype Technology projects those results in commercial technology (i.e. High fidelity DNA polymerase under commercialization, vaccines and Monoclonal antibodies,licensed). He is an Advisor of technological companies in USA and Mexico. He is part in Mexico from SNI (National Researchers System) from CONACYT.

