Title: Bacteria-targeting vaccine in prevention of cardiovascular and cardio-thrombotic diseases

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Keywords:
Immunology, molecular biology, cardiovascular diseases, bacteria

Abstract
Cardiovascular diseases (CVDs) are the leading cause of death in the world, causing ~18 million cases every year. Although high levels of LDL-cholesterol and unhealthy lifestyle are known risk factors for CVDs, also bacteria have been demonstrated to induce atherogenesis and platelet aggregation *in vivo*. Here our aim is to develop bacteria-targeting vaccine that could prevent cardiovascular complications.

Bacterial targets were selected based on metagenomic and immunohistochemical findings from human coronary artery plaques and thrombus samples. Recombinant bacterial proteins were produced in *E. coli* and their immunogenicity was studied in BALB/c mice. B cell response was studied from the serum by determining antigen-specific IgG titers with ELISA, and T cell response was determined from splenocytes using cytokine based FluoroSpot assay.

We designed and produced five bacterial surface proteins from selected species to be used as antigens. Protein purity (~100%), endotoxin (<1.5 EU/µg) and DNA levels (<10 ng/dose) were acceptable for preclinical studies. While antigen-specific T cell responses were not detected in our immunizations, we obtained high IgG titers with three antigens (end point titer >100,000) and detectable levels of antibodies with the other two antigens.

Our results suggest that our bacteria-targeting vaccine candidates are immunogenic. Next, our aim is to improve the immunogenicity of the antigens using VLP display and study whether antigen-specific antibodies can prevent platelet aggregation and bacterial attachment to the vasculature. Our study can lead to novel bacteria-targeted vaccine against cardiovascular diseases and have significant socioeconomical impact around the world.