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Decoding immune evading mechanisms of pathogens: Reordering of immunodominance for new and improved vaccines

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Abstract

Over the last 250 years, the use of vaccines, a mainstay of preventative medicine and public health has proven to be one of the most successful and cost-effective medical interventions ever discovered. Despite these great advances to human and animal health of the past 5 decades; the basic technology on which it was created from does not for the most part work against the many remaining pathogens of humans and animals. This is mainly due to evolved immune evading strategies making them inherently resistant due to strain-restricted immunity/antigenic variation/poor memory/disease-enhancement/incomplete and/or shortened immunity and thus represents a major gap in our understanding of the complex evasion mechanisms evolved by the pathogens.

"Deceptive Imprinting" is at the heart of a new understating of how mutable pathogens create a molecular diversion (decoy) at the level of both the innate and acquired immune host defense systems-- much like how metallic chaff would confuse a radar system trying to locate a missile or plane. On an immunologic level immunodominance and antigenic variation are coupled such that host immune responses are directed to less or non-protective B and T cell epitopes. To circumvent this host evading mechanism we have developed a first generation technology called Immune Refocusing that has been designed specifically to reorder the non-protective immunodominance by identifying/mapping the decoy epitopes and molecularly removing or attenuating it thus redirecting the host immune system to the more protective regions of the microbe.

This lecture will bring together new paradigm shifting first principals of Deceptive Imprinting, immunology, new insight from querying pathogen genomes through "Pressure Point" Technology and application of the technology of Immune Refocusing. These paradigm shifting scientific insights have opened up fresh new approaches to technical advancement and the development of new antigens that can be used for vaccines and deriving new monoclonal antibodies toward inducing improved and broader protective immunity.

Biography

Dr. Nara currently holds the Endowed Eugene Lloyd Chair, Professor in Vaccinology, founding Center Director for the Center for Advanced Host Defense, Immunobiotics, and Translational Comparative Medicine in the Department of Biomedical Sciences, in the College of Veterinary Medicine at Iowa State University, adjunct professor Microbiology, Carver College of Medicine, University of Iowa and also is the Chief Executive Officer, President, Chairman & co-founder of Biological Mimetics, Inc. **Dr. Nara** holds a M.Sc. in Immuno-pharmacology, a combined Doctor of Veterinary Medicine and Ph.D. (retro-virology/oncogenesis) from The Ohio State University, 4 year combined residency in Comparative Pathology and NIH post-doctoral Fellowship at the Armed Forces Institute of Pathology and a NIH respectively.