

Systems Biology Approach Predicts the Immunogenicity of the Yellow Fever Vaccine in Humans

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Technology description

Technical Summary

Researchers at Emory University have identified a strategy to identify a series of biomarkers that predict the immunogenicity and antibody response to vaccine administration. This approach addresses a long-standing challenge in the development of vaccines - that of only being able to determine immunity or effectiveness long after vaccination and, often, only after being exposed to infection. The study, which used the yellow fever vaccine (YF-17D) as a model represents a long awaited step forward in vaccine immunology and predictive health.

The researchers used YF-17D to predict the body's ability shortly after immunization to stimulate a strong and enduring immunity. Researchers vaccinated 15 healthy individuals with YF-17D and studied the T cell and antibody responses in their blood. There was a striking variation in these responses between individuals. Analysis of gene expression patterns in white blood cells revealed in the majority of the individuals the vaccine induced a network of genes involved in the early innate immune response against viruses.

Dr. Bali Pulendran and his colleagues are now working to determine whether this approach can be used to predict the effectiveness of other vaccines, including flu vaccines, meningococcal vaccines etc. The ability to successfully predict the immunity and effectiveness of vaccines would facilitate the rapid evaluation of new and emerging vaccines, and the identification of individuals who are unlikely to be protected by a vaccine

Application area

Biomarkers for the identification of immunogenicity (including T cell immunity and antibody responses) to vaccine administration, useful for new vaccine development and diagnostic purposes.

Advantages

Unique gene expression signature that predicts immunogenicity of vaccine.

Unique gene expression signature that predicts antibody response to vaccine administration.

Useful for identification of individuals who are unlikely to be protected by a vaccine.

Institution

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