

Abstract Submitted
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Using Fitness Landscapes for Rational Hepatitis C Immunogen Design GREGORY HART, ANDREW FERGUSON, University of Illinois at Urbana-Champaign — Hepatitis C virus afflicts 170 million people worldwide, 2-3% of the global population. Prophylactic vaccination offers the most realistic and cost effective hope of controlling this epidemic, particularly in the developing world where expensive drug therapies are unavailable. Despite 20 years of research, the high mutability of the virus, and lack of knowledge of what constitutes effective immune responses, have impeded development of an effective vaccine. Coupling data mining of sequence databases with the Potts model, we have developed a computational approach to systematically identify viral vulnerabilities and perform rational design of vaccine immunogens. We applied our approach to the nonstructural proteins NS3, NS4A, NS4B, and NS5A which are crucial for viral replication. The predictions of our model are in good accord with experimental measurements and clinical observations, and we have used our model to design immunogen candidates to elicit T-cell responses against vulnerable regions of these viral proteins.

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