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An HIV vaccine based on immune network theory

The symmetrical immune network theory is a theory of the regulation of the adaptive immune system. The theory recently led to a two-component HIV vaccine concept. In that paper, we described complexes of an anti-HIV antibody and an HIV antigen as a potential HIV vaccine. Of particular interest in this context is the monoclonal anti-HIV antibody 1F7, which binds to at least six well characterized monoclonal broadly neutralizing anti-HIV antibodies (BnAbs). 1F7 is an IgM/κ antibody raised against HIVIG. 73% of HIV infected persons and many SIV infected macaques make antibodies that bind to 1F7. We have tested the concept in a simple experiment involving 10 rabbits. There was an immune response in some of the rabbits that was broad in the sense that when the immunogen was complex of 1F7 and gp120 or gp41, the immune response included both anti-gp120 and anti-gp41 antibodies. A broad response in this sense was seen also in a rabbit immunized with a mixture of 1F7 and the BnAb B12. Two rabbits were immunized with complexes of 1F7 and gp120. After three immunizations, both of these rabbits made antibodies that neutralized the virus from which the gp120 was derived, namely HXB2. This result provides support for the two-component HIV vaccine concept. It also shows that rabbits are a suitable model for testing the ability of vaccines to induce neutralizing antibodies.

Biography

Geoffrey W. Hoffmann is a theoretical biologist, primarily interested in the development of the symmetrical immune network theory. He completed his Ph.D. at the Max Planck Institute for Biophysical Chemistry in Gottingen, Germany in 1972. He did post-doctoral work at the IBM Research Laboratory in San Jose, California and at the Max Planck Institute for Biophysical Chemistry. He was a member of the Basel Institute for Immunology for four years before joining the faculty in the Physics and Microbiology Departments of the University of British Columbia in 1979. He is chairman and chief scientist of Network Immunology Inc.

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