



LIAI Overview of Scientific Research Achievements

In the 18 years since its establishment, the La Jolla Institute for Allergy & Immunology (LIAI) has emerged as a world leader in immunology research. LIAI scientists have contributed profoundly to the study of the immune system and the Institute was recently ranked among the top five in the world in molecular biology and genetics. LIAI's researchers have made a number of important findings that may one day yield successful treatments for infections and debilitating diseases related to immune system function. Among their more notable recent achievements are:

- Potential cure for recent-onset type 1 diabetes. In the spring of 2006, Matthias von Herrath, M.D., and his research team announced a major finding on a potential cure for early stage type 1 (insulin-dependent) diabetes. Dr. von Herrath's study used a combination of a vaccine and an immunosuppressant drug in mice, and found it reversed recent onset type 1 diabetes in the majority of animals tested. Particularly exciting -- the diabetes never reoccurred in the lifespan of the mice. Clinical trials of the combined treatment are planned for 2007 and 2008.
- Potential broad spectrum influenza treatment, including avian flu. A potential treatment for the H5N1 avian flu involving human flu-fighting antibodies was conceived by LIAI scientist Hilde Cheroutre, Ph.D., and initiated through a collaborative effort of LIAI and Gemini Science, a biopharmaceutical research and development company and LIAI industry partner. Laboratory testing of the antibodies has produced preliminary positive results against numerous flu strains, including the H5N1 avian flu. Gemini initiated preclinical studies of the antibody in 2006.
- Molecular switch that may prevent autoimmunity. Carl Ware, Ph.D., and Chris Benedict, Ph.D., discovered in 2005 that different members of the herpes virus family target a molecule called BTLA and interfere with its binding to a second molecule, HVEM, in order to evade immune responses. While the viruses use this pathway to inhibit a beneficial immune response, a similar targeting could be used to prevent the destructive immune responses that characterize autoimmune diseases.
- Glycolipids that may stimulate the immune response to cancers. Mitchell Kronenberg, Ph.D., and an international team of scientists, have identified a glycolipid that naturally triggers an immune response from the body's natural killer (NK) T cells. The finding, made in 2005, sheds light on the powerful, but little understood, workings of NK T cells and will help scientists explore the possible use of glycolipids to stimulate natural or innate immune responses to cancers and infections.
- Rheumatoid arthritis discovery. In a 2004 study, led by Yun-Cai Liu, Ph.D., and others, researchers discovered that the molecule (Cbl-b) plays a critical role in preventing the development of arthritis. The researchers found, in controlled laboratory studies of mice, that the Cbl-b molecule affected the T cell's immune response, giving the immune system the ability to "tolerate" arthritis antigens. Mice without Cbl-b could not tolerate these substances and they developed rheumatoid arthritis. The finding may have important implications for the future development of therapies for autoimmune disorders such as rheumatoid arthritis.
- Allergy Trigger. In a recent series of papers, the laboratory of Toshiaki Kawakami, M.D., Ph.D., has identified the surprising means by which a molecule called IgE, regulates the survival and activation of mast cells and basophils, two key players in the allergic response. Dr. Kimi Ishizaka, the founding Scientific Director of the Institute, originally discovered the IgE molecule more than 30 years ago. The identification of this new mechanism of action of IgE provides targets for drug development to prevent allergic disease.

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