

— Keynote Address —

The Immune Epitope Database and Analysis Resource: From Vision to Blueprint

Alessandro Sette

alex@liai.org

La Jolla Institute for Allergy and Immunology, 3030 Bunker Hill Street, Suite 326,
San Diego, California 92109, USA

Over the last twenty years, the amount of information related to epitopes recognized in the course of T and B cell-mediated immune responses has dramatically increased. As of June 2004, a PubMed search using the word “epitope”, reveals a total of 5,173 records prior to 1975 and 17,088 records in 1975-1984 period. The number of records jumps to 30,948 for 1985-1994, and has already reached 32,154 for the 1995-2004 period (with a large fraction of the 2004 records still to come).

Epitope-based techniques are utilized by scientists involved in vaccine development to characterize immune responses in experimental settings, following infection, or in response to vaccination. The purpose of these evaluations is to develop correlates of immunity or therapy and guide the development of vaccines and drugs targeting infectious pathogens. Knowledge of the epitopes recognized in the course of natural infection or as a result of vaccination, is also key for our capacity to develop bioinformatic tools and accurately analyze, model and predict immune responses. Recent concerns over emerging diseases and bioterrorism emphasized the need for information regarding the key epitopes recognized by the immune system.

Despite this growing need, a centralized resource to store and access relevant information is not available. Our goal is the creation of the Immune Epitope Database and Analysis Resource (IEDB), a comprehensive knowledge center comprised of a repository of immune epitope data and associated analysis tools. The IEDB is sponsored by the National Institute for Allergy and Infectious Diseases (NIAID) and will host data relating to both B and T cell epitopes from infectious pathogens as well as experimental and self-antigens (RTP-NIH-NIAID-DAIT-03/31; <http://www.niaid.nih.gov/contract/archive/>). Priority will be placed on class A-C pathogens and emerging diseases. Epitopes recognized in humans, non-human primates, rodent and other animal species are included. We envision that this resource center will be freely available on the Internet, and that a prototype will be available and operational in the fourth quarter of 2005.

A crucial component of the project is to involve and solicit feedback from the scientific community in the design of the IEDB’s scope and capability. In addition to responding to direct feedback from the community, the IEDB will be produced in a manner that encourages the incorporation of analytical tools and data derived by research labs at-large.

Herein, we present the main principles and considerations, both at the immunological and bioinformatic level, utilized in its design. In particular, we emphasize the specific immunological perspective and the bioinformatic, software and logical database concepts applied to the design of the IEDB, to solicit feedback from the immunological and bioinformatic communities.