Immune Epitope Database NEWSLETTER

Volume 2, Issue 3 http://www.immuneepitope.org October 2005

The Analysis Resource

One of the major tasks of the Immune Epitope Database contract is the development of an Analysis Resource, a comprehensive set of analysis and predictive tools. The purpose of the Analysis Resource of the IEDB is to provide computational tools that enhance the value of the IEDB database to the user and provide access to tools in one centralized location. Tool evaluation and documentation will be available on the IEDB website, making it easier for users to choose the appropriate tool for a given task.

The tools in the Analysis Resource fall into two categories – analytical tools and prediction tools. Analytical tools help extract and interpret data contained in the database. Tools to set up complex queries, which would be difficult or impossible to design using the standard query interface, fall in this category. Currently four tool candidates exist - population coverage, conservancy analysis, epitope visualization, and mapping B-cell epitopes to the Protein Database (PDB) structures. Predictive tools extrapolate beyond data held in the database. They can be used to predict epitopes in protein sequences or predict properties of known epitopes, such as their MHC binding affinity.

The IEDB will host new tools, which will be developed by team members with area expertise, as well as existing tools that will be nominated by the scientific community. All tools will undergo an evaluation.

For the initial release of the Analysis Resource, the IEDB team made an effort to select tools that would be relatively easy to implement and that would offer users a variety of functionality. We anticipate that this initial modest selection will be useful to a significant portion of the user community and serve as an impetus for users to offer suggestions for other tools. The prediction and analysis tools for the first release are listed in the accompanying tables.

continued on page 5

Inside This Issue

Analytical Tools Workshop

November 4, 2005 : Bethesda, Maryland

An Analytical Tools Workshop will be held on November 4, 2005 in Bethesda, Maryland in conjunction with the Immune Epitope Database and Discovery Workshop. The intent of this event is to bring together tool developers and users to provide feedback regarding the value of various T-cell and antibody epitope prediction tools for inclusion within the Immune Epitope Database (IEDB) Analysis Resource. This workshop is opened to invitees only. If you would like further information please contact Alison Deckhut Augustine, Ph.D. at adeckhut@niaid.nih.gov.

Science in the News

[epi- + Greek topos, *place, spot.*]

Did you know that the word "epitope" is derived from the prefix epi and the greek word "topos" meaning place or spot?

According to the NIH Toxicology Glossary E, the defininition of "epitope" is defined as follows:

ep·i·tope
n.

Any part of a molecule that acts as an antigenic determinant: a macromolecule can contain many different epitopes each capable of stimulating production of a different specific antibody.

NAGEL, B., Dellweg, H., and Gierasch, L.M. (eds.) (1992): Pure Appl. Chem., 64, 143-168.NAGEL, B., Dellweg, H., and Gierasch, L.M. (eds.) (1992): Pure Appl. Chem., 64, 143-168.

Improving Physicians' Knowledge about Diseases Caused by Bioterrorism Agents

In the event of an attack involving bioterrorism agents, will physicians be able to properly diagnose and treat infected patients? A study was conducted in the September 26 issue of the Archives of Internal Medicine found that this may not be the case. However, an online educational program, lead by Sara E. Cosgrove, M.D., M.S., of the Johns Hopkins University School of Medicine, Baltimore, may be the answer to improve physicians' knowledge about the diseases derived from agents such as smallpox and anthrax. Pre and post test scores for physicians who went through the online program indicated significant improvement in scores. This could mean that the program can be used to train physicans to learn how to diagnose and manage infection caused by Category A bioterrorism agents. Early recognition will allow for a timely treatment, which can in turn minimize the effects of such agents. For the article link, please visit: http://www.infozine.com/news/stories/op/storiesView/sid/10512/

continued from page 1

Prediction Tool Category	Details
MHC Class I binding prediction	• Artificial Neural Network (ANN) • Average Relative Binding (ARB) matrix • Stabilized Matrix Method (SMM)
MHC Class II binding prediction	• Average Relative Binding (ARB) matrix
Proteasomal cleavage prediction	• Implement based on MHCPathway by LIAI
TAP transport prediction	• Implement based on MHCPathway by LIAI
B cell epitope prediction Antigenic determinants predictions are based on amino acid property scales. These categories and popular specific scales are tentatively included. Listed scales may be removed or new scales may be added based on future evaluations.	• Hydrophobicity/hydrophilicity Hopp and Woods hydrophobicity scales Kyte and Doolittle hydropathy plot Parker hydrophilic scale • Flexibility Karplus and Schulz flexibility scale • Surface exposure Emini surface accessibility scale • Antigenicity Kolaskar and Tongaonkar antigenicity scale • Secondary structure Chou and Fasman beta turn prediction Chou and Fasman helix prediction

Analysis Tool Category	Description
Population coverage	Predict the degree of population coverage afforded by a given epitope or epitope set in different ethnicities
Conservancy analysis	Assess the degree of conservancy of a given epitope
EpitopeViewer	Visualize the 3D structure of epitope/antigen and/or its complex with immune receptor(s) as curated within the IEDB database and available in the PDB. Visualize sequences of epitope/antigen and immune receptor(s).
B-Cell mapping to PDB structures	Map B-cell linear epitopes to homologous structures in the PDB

If you would like to recommend a tool to the Immune Epitope and Database, please submit an email to tools@immuneepitope.org

Upcoming Conferences

7th Latin American Congress of Immunology
October 2-6, 2005
Sheraton Cordoba Hotel, Cordoba, Argentina

Website: http://www.alai2005.com

La Jolla Immunology Conference
October 18-20, 2005
The Salk Institute
Sept. 25-30, 2005

Website: http://www.liai.org

The 31st Annual New England Immunology Conference
November 5-6, 2005
Woods Hole, Massachusettes

Website: http://dms.dartmouth.edu/neic/

34th Annual Autumn Immunology Conference
November 19-21, 2005
Chicago Marriott Downtown, Chicago, IL

http://www.autumn-immunology-conference.org

Visitations

Dr. Hans-Georg Rammennsee
University of Tubingen
September 21, 2005

"MHC ligands and T cell epitopes - Do we want to know all of them?"

Dr. Robert Preissner
Institute of Biochemistry, Charité
October 26, 2005

"Prediction of Non-Linear Epitopes"

Journals & Articles

Recommended Reading

The Journal of Immunology
2005, 174: 3344-3351
PMID: 15749866

S. M. Mansour Haeryfar, Richard J. DiPaolo, David C. Tscharke1, Jack R. Bennink, and Jonathan W. Yewdell

Regulatory T Cells Suppress CD8+ T Cell Responses Induced by Direct Priming and Cross-Priming and Moderate Immunodominance Disparities

Laura's Review: Interesting approach on the role of regulatory T cells (Tregs) in the establishment of immunodominance hierarchies, scoping several immunodominant and subdominant epitopes from 3 distinct pathogens. It provides strong evidence, both from in vitro and in vivo analysis, of the differential activity of Tregs on the response against these epitopes, with an overall effect of moderating immunodominance disparities by preferentially suppressing responses to immunodominant epitopes.

The Journal of Experimental Medicine
Volume 200, Number 11, December 6 2004 1479-1489
PMID: 15557351

Arati B. Kamath, Joshua Woodworth, Xiaowei Xiong, Chad Taylor, Yu Weng, and Samuel M. Behar

Cytolytic CD8+ T cells recognizing CFP10 are recruited to the lung after Mycobacterium tuberculosis infection.

Nima's Review: While effective immunity against Mycobacterium tuberculosis relies upon both CD4+ and CD8+ T cell responses, few Mycobacterium tuberculosis antigen epitopes that elicit CD8+ responses have been identified. This study describes the identification of an MHC class I-restricted epitope which elicits CD8+ T cells that are recruited to the lungs, and it further demonstrates the ability of the epitope to elicit cytolytic responses in vivo.

continued on page 5

continued from page 4

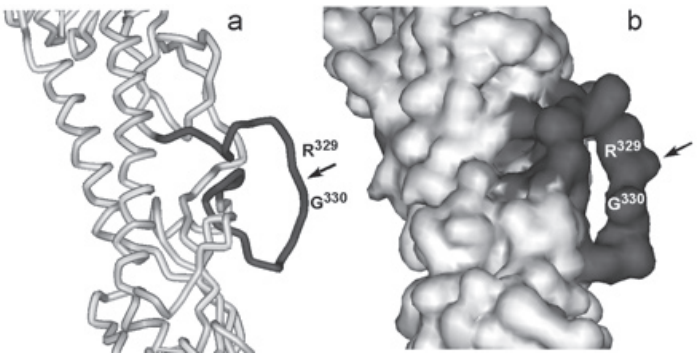

FIG. 1. (a) Alpha-carbon trace and (b) solvent-accessible surface of the cleavage site region (dark grey) of the HA0 precursor of the HA from the A/Hong Kong/68 influenza virus

Journal of Virology
June 2005, p. 7380-7388, Vol. 79, No. 12
PMID: 15919893

Bianchi E, Liang X, Ingallinella P, Finotto M, Chastain MA, Fan J, Fu TM, Song HC, Horton MS, Freed DC, Manger W, Wen E, Shi L, Ionescu R, Price C, Wenger M, Emini EA, Cortese R, Ciliberto G, Shiver JW, Pessi A.

Universal Influenza B Vaccine Based on the Maturational Cleavage Site of the Hemagglutinin Precursor

Russell's Review: The maturational cleavage site of the influenza B virus hemagglutinin precursor is highly conserved because it must remain a suitable substrate for host-encoded proteases and maintain a functional fusion domain. In this paper, the authors demonstrate that a peptide conjugate vaccine based on this sequence can elicit a protective antibody response against lethal challenge with viruses belonging to either of the currently circulationg influenza B virus lineages.

Contact Information

The Immune Epitope Database is supported by a contract from the National Institute of Allergy & Infectious Disease, NIH, DHHS (Contract #HHSN266200400006C). The newsletter is distributed four times a year. We welcome communication from the users of the IEDB database and invite suggestions for articles in future issues. Upon deployment of the database, we will actively solicit tool and epitope submissions. To subscribe to the IEDB newsletter or contact project staff, send your email information to the email address below.

Immune Epitope Database and Analysis Resource
c/o La Jolla Institute for Allergy & Immunology
10355 Science Center Drive
La Jolla, CA 92121
(858) 558-3500

Email: contact@immuneepitope.org

Principal Investigator:
Alessandro Sette, Ph.D. - alex@liai.org

Project Director:
Stephen Wilson, Ph.D. - swilson@liai.org

Contributors:
Nima Salimi
Laura Zarebski, Ph.D.
Russell Chan, Ph.D.

Writers:
Jody Dang
Ward Fleri, Ph.D.

Production:
Jody Dang
Michael Scarpelli