

# Immune Epitope Database

## NEWSLETTER

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<http://www.iedb.org>

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### IEDB Version 2.6 Features a New Disease Finder

The major new feature of IEDB 2.6, released at the end of March 2011, is the Immune Mediated Disease Association search that was added as an experimental feature on the IEDB home page. It is available on the external site within the Search interface between the *Epitope Source* and the *Immune Recognition Context* field partitions. This query feature partition allows users to select a disease association based on the host disease state or status as captured in curation. Its functionality is similar to that of the molecule finder in that diseases are organized into a browsable tree structure. Upon the selection of host disease state/status, the system provides the user with a hierarchical *Disease Tree* that organizes the data at the highest level according to the five disease categories (Allergy, Autoimmunity, Infectious Disease, Transplant-related Disease and Allo-reactivity, and Additional Diseases by category) and then by the anatomical location of the disease (e.g. respiratory tract, gastrointestinal tract).

In this way the user can either type in the disease name or synonym (including ICD10 codes) of interest, or navigate the Disease Tree by disease manifestation and physical location to see what is available. A node for healthy subjects is also included. In the future, there are plans to implement the ability for the user to search for disease association by the epitope source antigen that has been computationally associated with a specified disease. Currently, Disease Association is functional for Allergy and Autoimmunity. Later in 2011, its functionality will be expanded to include transplant-related diseases and an improved categorization of allergic diseases. Further development will be driven by user and community feedback. Infectious disease searches are not planned to be facilitated by this finder as they are well accommodated by the Source Organism Finder.

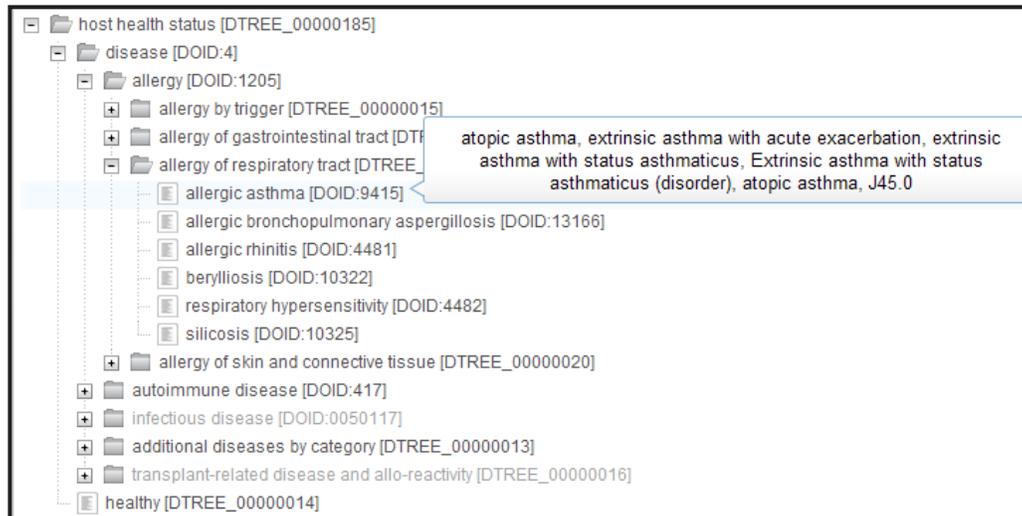
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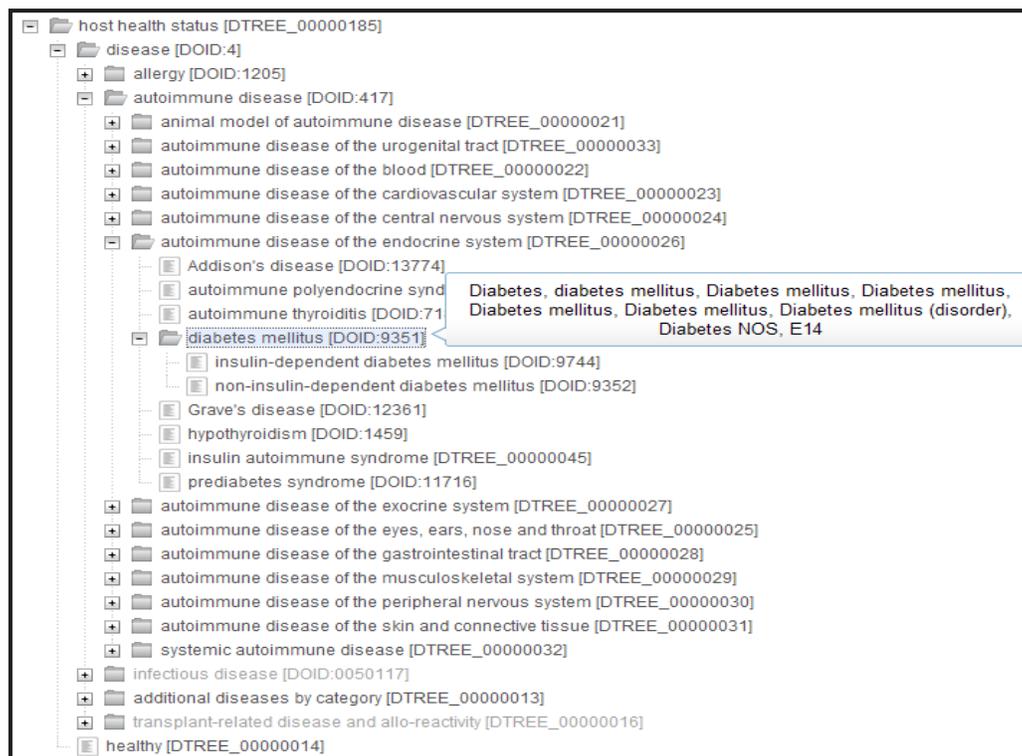
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Figure 1 shows the Disease Tree with allergic asthma highlighted. DOID refers to the Disease Ontology identifier. The DTREE designates an IEDB-specific identifier that will be updated later with a DOID number when the Disease Ontology incorporates the terms. A mouse-over balloon provides additional information on each node of the tree, as shown in the figure.



**Figure 1. The Disease Tree with allergic asthma highlighted.**

Figure 2 shows the Disease Tree with diabetes highlighted.



**Figure 2. The Disease Tree with diabetes highlighted.**

Version 2.6 also added auto-complete functionality to the epitope and assay advanced search pages, improved the peptide MHC binding motif diagrams on the MHC Allele Information pages to support diagrams for multiple lengths, and implemented the new HLA nomenclature throughout the website.

## Data Submission Tool Wizard Now Available for T Cell Assays

An important new feature in the data submission tool (DST) was released in March 2011. The DST Wizard provides submitters with an on screen field-by-field guided submission experience. The user will be asked questions about the nature of their data and their answers will be used to fill out the data fields required for a valid data submission. The Wizard is recommended for first-time submitters, and for smaller data submissions consisting of fewer than 10 epitopes and 10 assays. The first release of the Wizard accommodates T cell assays. The wizard will be enhanced by the end of 2011 to also handle B cell, MHC binding, and MHC ligand elution assays.

The DST is designed to be used by researchers to facilitate submission of data to the IEDB without an in-depth knowledge of curation rules. The DST provides submitters with three methods to submit data: by utilizing a newly developed data submission wizard, via spreadsheet-style files, or by XML file. At present, the spreadsheet-style submission is the method of choice by almost all submitters. With this method, the submitter is provided with tab-delimited template files corresponding to the various types of data that can be submitted (MHC binding, MHC Ligand Elution, T cell, and/or B cell), as well as a submission file where important submission details are reported. These files serve as data entry forms where the submitter formats the data according to guidelines. All the preformatted template files can be downloaded from the download template files link. Upon completion, the submitter then submits the validated files to the IEDB, where IEDB personnel review and transfer the data to the IEDB website where it will be publicly accessible.

The DST Wizard provides the user with the option to export all data into these preformatted spreadsheets. This function is available in the lower left hand corner of the Wizard interface, and is called “download as spreadsheet files.” This enables the user to manipulate or augment the data submission more efficiently. The finalized spreadsheets can then be directly submitted via the spreadsheet submission option available in the user center.

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## Tidbits from the 2010 IEDB Annual Compendium

The sixth IEDB Annual Compendium of the Immune Epitope Database and Analysis Resource is available as a pdf file on the IEDB website. It can be accessed in the News section located in the lower right corner of the IEDB home page or at <http://iedb.zendesk.com/forums/95867/entries/20022226>. It consists of three sections. The first section contains a large, 47 page table of the antibody and T cell epitope information in the database as of 14 January 2010. New species and strains are indicated in the table, as are previously appearing species/strains with new T or B cell epitopes. The second section lists the many new features and changes found in IEDB 2.4 and 2.5, the two versions released in 2010, and describes the features on the IEDB website. The third section lists the 49 scientific articles published by the IEDB team from 2004 through 2010. It also includes a list of 277 references published in 2010 that cited at least one of the 49 IEDB papers.

Many new references and pathogens were added to the IEDB in 2010. Of the 2,439 species/strains listed, 419 were added in 2010. In addition, the number of B cell epitopes increased by 4,660, from 20,653 to 25,313, and the number of T cell epitopes increased by 8,198, from 44,285 to 52,483.

## The IEDB at Upcoming Conferences

The IEDB exhibit booth will return to the Annual Meeting of the American Association of Immunologists this May 14 - 16. The exhibit booth will be staffed on all three days, Saturday through Monday, from 9:30 to 4:30. Two senior curators and a bioinformatician will be available to demonstrate the features of the website and the Analysis Resource, answer questions from users, and introduce the IEDB resource to potential new users. An exhibitor's workshop will also be presented on Saturday, May 14, 11:00 – 12:00. This will be another opportunity for meeting attendees to learn more about the IEDB and ask questions.

The IEDB will also be present at FOCIS 2011, the annual meeting of the Federation of Clinical Immunology Societies. The meeting will take place at the Marriott Wardman Park in Washington, D.C., June 23 – 26. The exhibit hall will be open Thursday evening and Friday afternoon and evening. Two IEDB senior curators will staff the booth. Special emphasis will be placed on the large quantity of autoimmune epitopes curated since last year's meeting and now available in the database.

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## Recent Publications

### **Towards Defining Molecular Determinants Recognized by Adaptive Immunity in Allergic Disease: An Inventory of the Available Data**

Vaughan K, Greenbaum J, Kim Y, Vita R, Chung J, Peters B, Goodman R, Grey H, Sette A.

Journal of Allergy, Volume 2010 (2010), Article ID 628026, Epub 2011 Feb 13

PMCID: PMC3042621; PMID: 21403821

Adaptive immune responses associated with allergic reactions recognize antigens from a broad spectrum of plants and animals. Herein a meta-analysis was performed on allergy-related data from the immune epitope database (IEDB) to provide a current inventory and highlight knowledge gaps and areas for future work. The analysis identified over 4,500 allergy-related epitopes derived from 270 different allergens. Overall, the distribution of the data followed expectations based on the nature of allergic responses. Namely, the majority of epitopes were defined for B cells/antibodies and IgE-mediated reactivity, and relatively fewer T-cell epitopes, mostly CD4+/class II. Interestingly, the majority of food allergen epitopes were B-cells epitopes whereas a fairly even number of B- and T-cell epitopes were defined for airborne allergens. In addition, epitopes from nonhuman hosts were mostly T-cell epitopes. Overall, coverage of known allergens is sparse with data available for only ~17% of all allergens listed by the IUIS database. Thus, further research would be required to provide a more balanced representation across different allergen categories. Furthermore, inclusion of non-peptidic epitopes in the IEDB also allows for inventory and analysis of immunological data associated with drug and contact allergen epitopes. Finally, our analysis also underscores that only a handful of epitopes have thus far been investigated for their immunotherapeutic potential.

## Curation Update

Curation of data relating to peptidic epitopes for all infectious diseases, allergens, and autoimmune diseases, and non-peptidic epitopes for allergens is current for references appearing in PubMed as of the end of 31 December 2010. A query for new potentially relevant epitope references is run quarterly to update the database. Curation of non-peptidic epitopes for all autoimmune and infectious diseases is in progress and will be completed in summer 2011. The curation of transplant and alloantigen references for both peptidic and non-peptidic epitopes is ongoing and is over 50% complete. As of April 2011, data from approximately 12,300 references have been incorporated into the IEDB. The IEDB contains data for over 81,000 epitopes, 2,678 epitope source organisms, and 577 restricting MHC alleles. Users are invited to bring references to our attention that are potentially relevant to the IEDB but do not appear in the database. References that are deemed to meet the IEDB criteria for curation will be queued for processing in accordance to our NIAID-directed priorities (Category A-C priority pathogens, emerging and re-emerging infectious diseases, other infectious diseases, allergies, autoimmune diseases, and transplantation). The IEDB does not curate cancer and HIV references. Citations should be sent to [help@iedb.org](mailto:help@iedb.org).

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## Contact Information

The Immune Epitope Database and Analysis Resource is supported by a contract from the National Institute of Allergy and 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. To subscribe to the IEDB newsletter or to contact project staff, send your email information to the email address below.

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