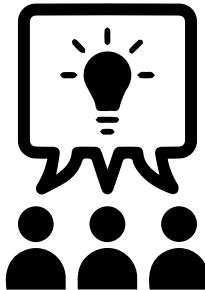


Closing Remarks & Survey

2020 IEDB Virtual User Workshop – Day 1

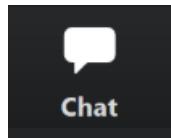
Thursday, November 5, 2020

We want to hear from you!



Improve our resources
through user feedback

Daily and post-event
feedback survey



<https://www.surveymonkey.com/r/YLZMS9B>



Please take some time to
complete the survey now

Recap of Day 1



IMMUNE EPITOPE DATABASE
AND ANALYSIS RESOURCE

Database Overview



Dr. Alessandro Sette
Principal Investigator

Welcome
The Immune Epitope Database (IEDB) is a freely available resource funded by NIADDK. It catalogs experimental data on antibody and T-cell epitopes studied in humans, non-human primates, and other animal species in the context of infectious diseases, allergies, autoimmunity, and transplantation. The IEDB also hosts tools to assist in the prediction and analysis of epitopes.

[Learn More](#)

Upcoming Events
An IEDB Case Study: TB Sept 3
* webinar recording [here](#)
FOODS Virtual booth Oct 28-31
User Workshop * register for workshop [here](#)

Summary Metrics
Peptide Epitopes 971,693
Non-Peptide Epitopes 3,051
T Cell Assays 283,614
Diseases 549
HLA Locus Regions 2,927,673
Epitope Source Organisms 3,977
Restricting MHC Alleles 858
References 21,579

START YOUR SEARCH HERE

Epitope
 Any Epitopes
 Linear Epitope
 Discontinuous Epitopes
 Exact to DRB1*0101
 Discontinuous Epitopes
 Non-peptide Epitopes

Assay
 Positive Assays Only
 T Cell Assays
 B Cell Assays
 MHC Ligand Assays

MHC Restriction
 Any MHC Restriction
 MHC Class I
 MHC Class II
 MHC Nonclassical
 Ex HLA-A*02:01

Antigen
 Organism
 Ex influenza, peanut
 MHC Restriction
 Disease
 Host
 Antigen Name
 Host
 Disease

Epitope Analysis Resource

T Cell Epitope Prediction
Scan an antigen sequence for amino acid patterns indicative of MHC I Binding
MHC II Binding
MHC I Processing (Proteasome, TAP)
MHC I Immunogenicity

B Cell Epitope Prediction
Predict linear B cell epitopes using: Antigen Sequence Properties
Predict discontinuous B cell epitopes using: Antigen Structure via EpiScope
EpiScope

Epitope Analysis Tools
Analyze epitope sets of: Population Coverage
Conservation Across Antigens
Clusters with Similar Sequences

Host
 Any Host
 Humans
 Mice
 Non-human Primates
 Ex dog, camel

Disease
 Any Disease
 Infectious Disease
 Allergic Disease
 Autoimmune Disease
 Ex asthma, diabetes

Reset **Search**

Current Filters

Epitope
 Any Epitopes
 Linear Epitope
 Discontinuous Epitopes
 Non-peptide Epitopes

Antigen
 Amino Acid Modification
 Has receptor sequence
 Type

Assay
 Positive Assays Only
 T Cell Assays
 B Cell Assays
 MHC Ligand Assays

Receptors
 MHC Class I

References
 No MHC restriction
 No epitope length filtering
 No epitope frequency filtering
 No epitope density filtering
 No epitope bias filtering
 No motif length filtering

Search

271 Records Found

Ref ID	PubMed	Author	Date
1035239	16786095	Jones-Harmon, Emma Stevens, Kaliq Mottram, Jessica Harmer, Emily Gledhill, Richard Moore, Tim Travers, Andrew Thakar, Jing Tang, Michael McMichael, Edward Jones, Robert Thomas, Michael J. Dunn, James R. C. D. Hope, Paul Zemmelman, Michael H. van der Veen, Mark P. Doherty, Peter Berkan, George Hinsel, Louise G. E. Doherty, Michael Herberman, Maite Holtzman, Robert Thomas	2018
1034806	30622109	Achir Srichai, Erha Salim Alzeti, Mohammad Reza Zafar, Michael Mahmoodi Kardish, Farzad Asadi, Farshid Moaveni, Umar Pal, Zemmelman, Michael H. van der Veen, Mark P. Doherty, Louise G. E. Doherty, Michael Herberman, Maite Holtzman, Robert Thomas, James R. C. D. Hope	2018
1035306	30872915	Karma Carvalho Coimbra, Silvana Sartori, Ana Paula Oliveira Pavao, Janaína S. de Souza, Khaili Nasrullah, Anna Slobodnicki, Tatiane Góes, Mariana M. de Souza, Renata C. S. Góes, Tiago T. Lemos, Lucas M. Ribeiro-Silva	2019
1034271	30298541	Vivienne Yixi Wan, Xianyu Kit, Jun Wang, Mingming Li, Hui Li, Zhanyang Jiang, Junling Peng, Qiang Li, Feng Jiang, Junjie Yang	2018
1033512	29387915	Hendrik Loeffenburger, Fransiska H. M. Loeffenburger, Stephan Böcker, Matthias Margell, Thomas Riedel, Stephan W. Lohmann, Christof Heumann, Hans-Joachim Krahl	2018
1033499	30053426	Leith V. Stoeber, Ricardo J. S. da Cunha, Daniel A. S. Lira, Andreia M. M. M. da Cunha, Maria M. M. M. da Cunha, Mônica E. Borelli, Zezé Dantas, Ana Lúcia M. M. da Cunha, Dong Marvin Y. Gee, Karen M. Jude, Taek-Jae Kim, Daniel S. J. Lai, James R. Heath, Bruce D. Campbell, Michael S. Gordon, George J. Loh	2018
1033298	29429873	Stéphanie J. Andriès, Jean-Louis Gazeau, Anne Karine Cassardou	2018

Recap of Day 1



IMMUNE EPITOPE DATABASE
AND ANALYSIS RESOURCE

How Data are Retrieved, Entered, Organized, and Accessing the Data

Epitope Search Pane

Epitope (Ex: SIINFEKL)

Assay (Ex: ELISA)

Antigen (Ex: influenza, peanut)

MHC Restriction (Ex: HLA)



User Query: How can we search or analyze the allergen peptides binding to MHC class I or class II molecules?

Assay (Ex: ELISA)

MHC Ligand Assays (Ex: purified MHC binding)

ASSAY FINDER (Ex: MHC binding assay)

Dr. Randi Vita
Lead Ontology & Quality
Manager

HOST ORGANISM FINDER

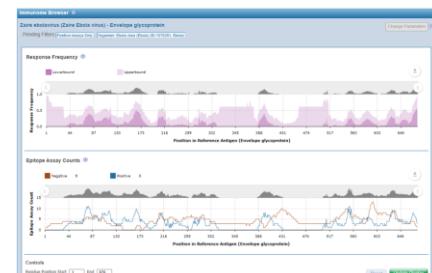
Search By Name: macaque Organism ID: Ex: 9615

Browse by Tree (Click to Select)

Search Results (Click to Select)

Organism Name	Synonyms	Organism ID
Macaca (macaque)	macaque, Macaca, macaques	9539
Macaca arctoides (bear macaque)	stump-tailed macaque, Macaca arctoides, bear macaque	9540
Macaca cyclopis (Taiwan macaque)	Taiwan macaque, Macaca cyclops	78449
Macaca mulatta (rhesus macaque)	Rhesus monkey, rhesus macaque, rhesus monkeys, rhesus macaques, Macaca mulatta	9544
Macaca radiata (bonnet macaque)	Macaca radiata, bonnet macaque	9548

User Query: Full analysis of Ebola virus



Recap of Day 1



A resource for SARS-CoV-2 mutation tracking and analysis:
The LANL/GISAID COVID pipeline



Dr. Bette Korber
Laboratory Fellow



Dr. Will Fischer
Staff Scientist

Recap of Day 1



IMMUNE EPITOPE DATABASE
AND ANALYSIS RESOURCE

Analysis Resource Overview



Dr. Bjoern Peters
Co-Principal Investigator

Analysis Tools



Dr. Alessandro Sette
Principal Investigator

IEDB Analysis Resource

Overview | T Cell Tools | B Cell Tools | Analysis Tools | Tools-API | Usage | Download | Data

Epitope Prediction and Analysis Tools

Welcome to the Immune Epitope Database Analysis Resource. This site provides a collection of tools for the prediction and analysis of immune epitopes. It serves as a companion site to the [Immune Epitope Database \(IEDB\)](#), a manually curated database of experimentally characterized immune epitopes.

The tools contained fall into the following categories:

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This set of tools includes MHC class I & II binding predictions, as well as peptide processing predictions and immunogenicity predictions.
- B Cell Epitope Prediction Tools**
The tools here are intended to predict regions of proteins that are likely to be recognized as epitopes in the context of a B cell response.
- Analysis Tools**
The epitope analysis tools are intended for the detailed analysis of a known epitope sequence or group of sequences.

IEDB Analysis Resource

Overview | T Cell Tools | B Cell Tools | **Analysis Tools** | Tools-API | Usage | Download | Datasets | Contribute Tools | References

Analysis Tools

This tool is intended for the detailed analysis of a known epitope sequence or group of sequences.

Population Coverage
This tool calculates the fraction of individuals predicted to respond to a given set of epitopes with known MHC restrictions. The calculation is made on the basis of HLA genotypic frequencies assuming non-linkage disequilibrium between HLA loci.

Epitope Conservancy
This tool calculates the degree of conservancy of an epitope within a given protein sequence set at different degrees of sequence identity. The degree of conservation is defined as the fraction of protein sequences containing the epitope at a given degree of sequence identity.

Epitope Cluster Analysis
This tool groups epitopes into clusters based on sequence identity. A cluster is defined as a group of sequences which have a sequence similarity greater than the minimum sequence identity threshold specified.

Computational Methods for Mapping Mimotopes to Protein Antigens
This page provides information on available methods for mimotope mapping, how to search the IEDB for mimotopes, and an example of a mimotope dataset and the results of its mapping, using the available web servers hosted outside the IEDB.

RATE (Restrictor Analysis Tool for Epitopes)
This tool is used for determining whether one can infer HLA restriction for a set of given epitopes from large datasets of T cell responses in HLA typed subjects. The tool takes two data files, one containing the alleles expressed by the subjects and the other containing the epitopes in the project. The tool then calculates the relative frequency of each epitope across all subjects using Fisher's exact test. The calculated relative frequency similar to observed ratio. The tool was developed with a focus on HLA II alleles but can also be applied to class I.

Tool for Clustering Peptides
This tool groups epitopes into clusters based on sequence identity. A cluster is defined as a group of sequences which have a sequence similarity greater than the minimum sequence identity threshold specified. User can also select the minimum and maximum number of peptides and also one of the three approaches for clustering of peptides.

Immunoedtresser
The tool is helpful to aggregate and visualize immune reactivity from epitope data in different assays/donors in given reference proteins using user-defined identity thresholds. The tool also accepts predicted epitopes.

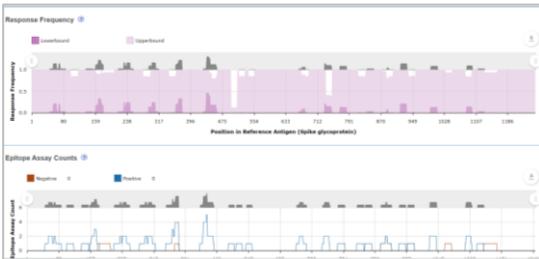
Tools under AR Labo
These tools are experimental and are not quite ready for production yet. They are intended for further research, update and testing.

Recap of Day 1



IMMUNE EPITOPE DATABASE
AND ANALYSIS RESOURCE

Using the IEDB-AR to Identify Candidates in SARS-CoV-2



Dr. Alba Grifoni
LJI Research Faculty/Instructor

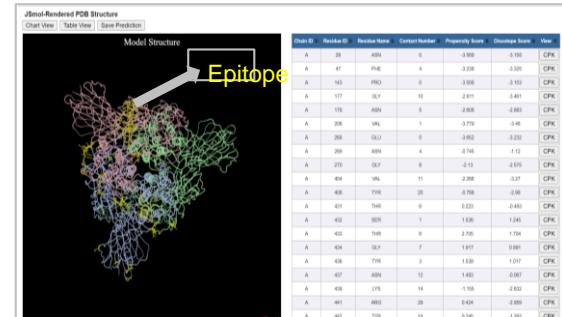
Current Filters: <input checked="" type="checkbox"/> Positive Assays Only					
Organism: Severe acute respiratory syndrome-related coronavirus (Human coronavirus (strain SARS)) (ID:694009, SARS)					
<input checked="" type="checkbox"/> No B cell assays <input checked="" type="checkbox"/> No MHC ligand assays <input checked="" type="checkbox"/> MHC Restriction Type: Class II					
Epitopes (90)	Antigens (3)	Assays (178)	Receptors (0)	Receptors (14)	References
Go To Records Starting At 1200 <input type="button" value="Next"/>	Export Results <input type="button" value="CSV"/>				
90 Records Found	<input type="button" value="Previous"/> <input type="button" value="Next"/> Page 1 of 4 <input type="button" value="First"/> <input type="button" value="Last"/>	25	Per Page		
Details	Epitope	Antigen	Organism	# References	# Assays
32340	KMKELSPRWWY FYYLG	Nucleoprotein	Severe acute respiratory syndrome-related coronavirus (Human coronavirus (strain SARS))	2	2
46680	NYNYKRYRLR	Spike glycoprotein	Severe acute respiratory syndrome-related coronavirus	2	3

DiscoTope: Structure-based Antibody Prediction

Step 1: Please enter the 4-letter PDB ID
Or upload a PDB file (example: 1z40)
 No file chosen

Step 2: Please enter PDB Chain ID

Step 3: Select version



User Workshop Structure

Day 1

START YOUR SEARCH HERE ?

Epitope 	Assay 
<input checked="" type="radio"/> Any Epitopes	<input checked="" type="checkbox"/> Positive Assays Only
<input type="radio"/> Linear Epitope	<input checked="" type="checkbox"/> T Cell Assays
Exact IV <input type="button" value="Ex: SIINFEKL"/>	<input checked="" type="checkbox"/> B Cell Assays
<input type="radio"/> Discontinuous Epitopes	<input checked="" type="checkbox"/> MHC Ligand Assays
<input type="radio"/> Non-peptidic Epitopes	Ex: neutralization <input type="button" value="Find"/>
<hr/>	
Antigen 	MHC Restriction 
Organism	<input checked="" type="radio"/> Any MHC Restriction
Ex: influenza, peanut	<input type="radio"/> MHC Class I
Antigen Name	<input type="radio"/> MHC Class II
Ex: core, capsid, myosin	<input type="radio"/> MHC Nonclassical
	Ex: HLA-A*02:01 <input type="button" value="Find"/>
<hr/>	
Host 	Disease 
<input checked="" type="radio"/> Any Host	<input checked="" type="radio"/> Any Disease
<input type="radio"/> Humans	<input type="radio"/> Infectious Disease
<input type="radio"/> Mice	<input type="radio"/> Allergic Disease
<input type="radio"/> Non-human Primates	<input type="radio"/> Autoimmune Disease
Ex: dog, camel <input type="button" value="Find"/>	Ex: asthma, diabet <input type="button" value="Find"/>
<hr/>	
<input type="button" value="Reset"/>	<input type="button" value="Search"/>

Process Overview and Database

Day 2

IEDB Analysis Resource

[Overview](#) [T Cell Tools](#) [B Cell Tools](#) [Analysis Tools](#) [Tools-API](#) [Usage](#) [Download](#) [Data](#)

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Analysis Resource

Preview of Day 2

Start Time	End Time	Topic	Speaker
08:00	08:05	Welcome	Nina Blazeska <i>IEDB Project Manager</i>
08:05	09:05	MHC Binding Predictions	Bjoern Peters <i>IEDB Co-Principal Investigator</i>
09:05	09:20	<u>Section 1:</u> Q&A	
09:20	09:30	Break	
09:30	10:00	T Cell Processing & Immunogenicity Predictions	Bjoern Peters <i>IEDB Co-Principal Investigator</i> Austin Crinklaw <i>Tools Research Technician</i>
10:00	10:15	T Cell Tool Spotlight: TCRMatch	Will Chronister <i>Bioinformatics Postdoctoral Researcher</i>
10:15	10:45	Structure Tools: LYRA & SCEptRe	Paolo Marcatili <i>DTU Associate Professor</i>
10:45	11:00	<u>Section 2:</u> Q&A	
11:00	11:30	Break	

Preview of Day 2

Start Time	End Time	Topic	Speaker
11:00	11:30	Break	
11:30	12:00	NIH Resources for Researchers: HIV Sequence & Immunology Databases	Brian Foley & Elizabeth-Sharon Fung Los Alamos National Laboratory
12:00	12:10	<u>Section 3:</u> Q&A	
12:10	12:55	B Cell Epitope Prediction	Bjoern Peters IEDB Co-Principal Investigator
12:55	13:10	IEDB Tools 3.0: Future of Tools	Jason Greenbaum Bioinformatics Core Director
13:10	13:20	<u>Section 4:</u> Q&A	
13:20	13:30	Closing Remarks & Feedback Survey	Nina Blazeska IEDB Project Manager
13:30	14:00	<u>Optional Q&A Session</u> This will be to answer any remaining questions from the day	



Optional Q&A

This will be to answer any remaining questions from the day