



Immune Epitope Database Overview

www.iedb.org

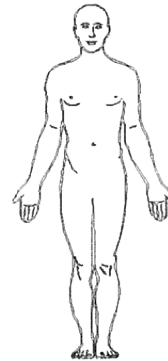
Presented by: Nima Salimi, Senior Curator

Immune Epitope Database

www.iedb.org

Database | Resource of experimentally-derived epitope information

- Allergens
- Infectious diseases
- Autoimmune diseases
- Transplantation / alloantigens
- ... and more



Containing data on almost **950,000 unique structures** analyzed in over **2 million assays** from more than **20,000 curated references.**

Consistent data entry requires well defined data structure

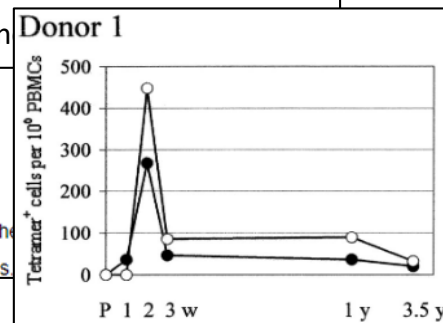
Quantitation of CD8+ T Cell Responses to Newly Identified HLA-A*0201–restricted T Cell Epitopes Conserved Among Vaccinia and Variola (Smallpox) Viruses

Masanori Terajima, John Cruz, Gregory Raines, Elizabeth D. Kilpatrick, Jeffrey S. Kennel, Francis A. Ennis

Materials And Methods

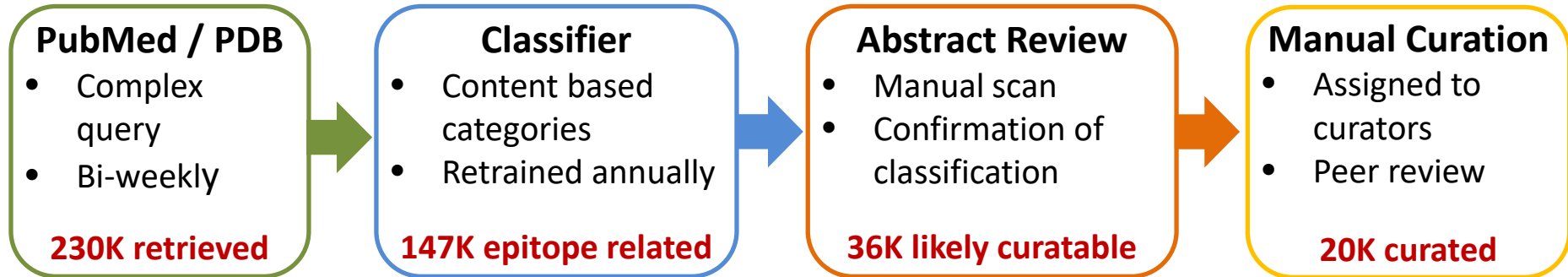
Donors.

Donors in this study were three HLA-A*0201–positive laboratory workers received primary immunization by scarification with the licensed smallpox vaccine, Dryvax®, as recommended by the Centers for Disease Control and Prevention for laboratory personnel working with vaccinia viruses.

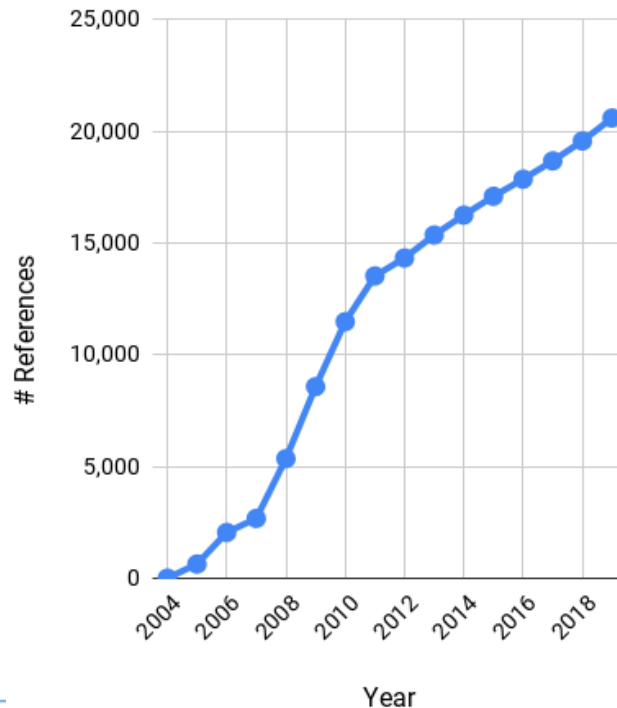


Epitope	Structure	Name	74A
		Chemical Type	Peptide / Protein
		Sequence	CLTEYILWV
		Domain / Region	Defined Epitope
	Source	Species	Vaccinia Virus Ankara
		Strain	Ankara (MVA)
		Antigen	Putative 21.7k protein
		Antigen Accession	2772819
Context	Immunization	Antigen Positions	79-87
		Immunized Species	Homo sapiens
		Immunogen Type	Source species
	Assay	Administration	Scarification
		Antigen Type	Epitope
		Assay Type	ELISPOT
		Response Measured	Cytokine Release-IFN-g
		MHC Allele	HLA-A*0201

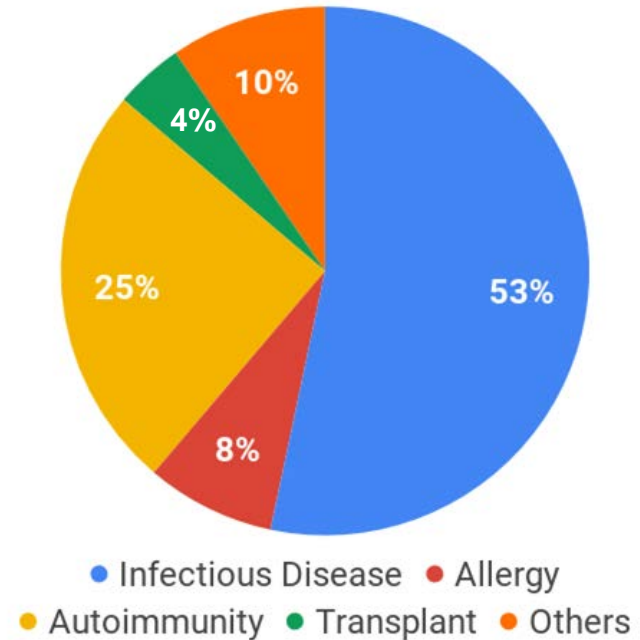
Literature curation



Growth of References in the IEDB



Categorical Breakdown of Curated References



IEDB.org: homepage & cumulative data



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Specialized Searches

Analysis Resource

Welcome

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[Learn More](#)

Upcoming Events

2-day User Workshop ([details](#)) Nov 7-8
* *webcast available*

Antibody Society Booth Dec 9-13
AAAAI 2020 Booth Mar 13-16
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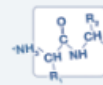
Summary Metrics

Peptidic Epitopes	592,423
Non-Peptidic Epitopes	2,810
T Cell Assays	364,879
B Cell Assays	484,136
MHC Ligand Assays	1,207,448
Epitope Source Organisms	3,761
Restricting MHC Alleles	785
References	20,589

START YOUR SEARCH HERE ?

Epitope ?

- Any Epitopes
 Linear Epitope
 Discontinuous Epitopes
 Non-peptidic Epitopes
- Exact M Ex: SIINFEKL



Assay ?

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



Ex: neutralization

Antigen ?

Organism



Antigen Name

MHC Restriction ?

- Any MHC Restriction
 MHC Class I
 MHC Class II
 MHC Nonclassical



Ex: HLA-A*02:01

Host ?

- Any Host
 Humans
 Mice
 Non-human Primates



Ex: dog, camel

Disease ?

- Any Disease
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Ex: asthma, diabetes

Reset

Search

Epitope Analysis Resource

T Cell Epitope Prediction ?

Scan an antigen sequence for amino acid patterns indicative of:

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- MHC I Immunogenicity

B Cell Epitope Prediction ?

Predict linear B cell epitopes using:

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Predict discontinuous B cell epitopes using antigen structure via:

- Discoptoe
- EIIIPro

Epitope Analysis Tools ?

Analyze epitope sets of:

- Population Coverage
- Conservation Across Antigens
- Clusters with Similar Sequences

IEDB.org: homepage & search interface



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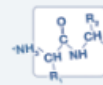
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Example query: HCV T cell epitopes in humans

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Ex: neutralization Find

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Organism

Hepatitis C virus (ID:11103, 1)

Antigen Name

Ex: core, capsid, myosin

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Ex: HLA-A*02:01 Find

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Results summarized in tables

Current Filters: Positive Assays Only Organism: Hepatitis C virus (ID:11103, Hepacivirus C) No B cell assays No MHC ligand assays Host: Homo sapiens (human)

Epitopes (1684) Antigens (3) Assays (4479) Receptors (376) References (271)

Go To Records Starting At 1200 Export Results

1684 Records Found Page 1 of 68 25 Per Page

Details	Epitope	Antigen	Organism	# References	# Assays
6435	NGVCWTV	Genome polyprotein	Hepatitis C virus	95	256
32208	KLVALGINAV	Genome polyprotein	Hepatitis C virus	87	236
74798	YLLPRRGPRLL	Genome polyprotein	Hepatitis C virus	34	71
3019	ALYDVVTKL	Genome polyprotein	Hepatitis C virus	29	63
9203	DLMGYIPLV	Genome polyprotein	Hepatitis C virus	26	40
37286	LLFNILGGWV	Genome polyprotein	Hepatitis C virus	26	38
24762	HSKKKCDEL	Genome polyprotein	Hepatitis C virus	20	61
21079	GLQDCTMLV	Genome polyprotein	Hepatitis C virus	19	25
4917	ATDALMTGY	Genome polyprotein	Hepatitis C virus	17	41
7292	CVNGVCWTV	Genome polyprotein	Hepatitis C virus	17	34
716	ADLMGYIPLV	Genome polyprotein	Hepatitis C virus	16	20
21757	GPRLGVRAT	Genome polyprotein	Hepatitis C virus	16	27
37097	LLALLSCLTV	Genome polyprotein	Hepatitis C virus	16	25
26954	ILAGYGAGV	Genome polyprotein	Hepatitis C virus	14	17
4197	ARMILMTHF	Genome polyprotein	Hepatitis C virus	13	30
27011	ILDSFDPLV	Genome polyprotein	Hepatitis C virus	13	15
59336	SLMAFTAAV	Genome polyprotein	Hepatitis C virus	13	15
24479	HPNIEEVAL	Genome polyprotein	Hepatitis C virus	12	20
32209	KLVALGVNAV	Genome polyprotein	Hepatitis C virus	11	18
37127	LLCPAGHAV	Genome polyprotein	Hepatitis C virus	11	14
4916	ATDALMTGF	Genome polyprotein	Hepatitis C virus	10	15
32167	KLSGLGLNAV	Genome polyprotein	Hepatitis C virus	10	28
59240	SLLAPGAKQNV	Genome polyprotein	Hepatitis C virus	10	11
69751	VLSDFKTWL	Genome polyprotein	Hepatitis C virus	9	12
32165	KLSGLGINAV	Genome polyprotein	Hepatitis C virus	8	53




1684 Records Found Page 1 of 68 25 Per Page

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Detail pages summarize relevant information

EPITOPE SUMMARY
CINGVCWTV is a linear peptidic epitope (epitope ID 6435) studied as part of Genome polyprotein from Hepatitis C virus. This epitope has been studied for immune reactivity in 116 publication(s), tested in 324 T cell assays, 1 B cell assay, 15 MHC ligand assays and has 3D structure(s) 3MRG.

COMPILED DATA	
MHC Ligand Assay(s) 15	
MHC molecule	Positive / All
HLA-A*02:01	8/9
HLA-A2	2/2
HLA-A*02:02	1/1
HLA-A*02:06	1/1
HLA-A*68:02	1/1
HLA-A*02:03	0/1
B Cell Assay(s) 1	
Assay Type	Positive / All
qualitative binding	0/1
T Cell Assay(s) 324	
Assay Type	Positive / All
IFNg release	101/115
qualitative binding	85/89
cytotoxicity	44/46
IL-2 release	20/22
TNFa release	16/16
CCL4/MIP-1b release	10/10
proliferation	7/8
degranulation	3/4
IL-4 release	2/4
IL-10 release	3/3
granzyme B release	1/3
IL-17A release	1/1
IL-22 release	1/1
perforin release	1/1
TNF release	1/1

EXTERNAL RESOURCES	
Resource	Link
 ANALYSIS TOOLS IEADB.ORG IEDB-AR: MHC-I Processing ↗	Predict MHC class I processing ↗
 ANALYSIS TOOLS IEADB.ORG IEDB-AR: MHC-I ↗	Predict MHC class I binding affinity ↗
 ANALYSIS TOOLS IEADB.ORG IEDB-AR: B cell scales ↗	Predict B cell epitopes ↗

Also available for:

- Assays
- Receptors
- References

Antigens: identifying protein source of epitopes

Current Filters: Positive Assays Only Organism: Hepatitis C virus (ID:11103, Hepacivirus C) No B cell assays No MHC ligand assays Host: Homo sapiens (human)

Epitopes (1684) Antigens (3) Assays (4479) Receptors (376) References (271)


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Antigen	Organism	# Epitopes	# Assays	# References
Genome polyprotein	Hepatitis C virus	1672	4412	269
Other Hepatitis C virus protein	Hepatitis C virus	13	43	6
F protein	Hepatitis C virus	8	24	3

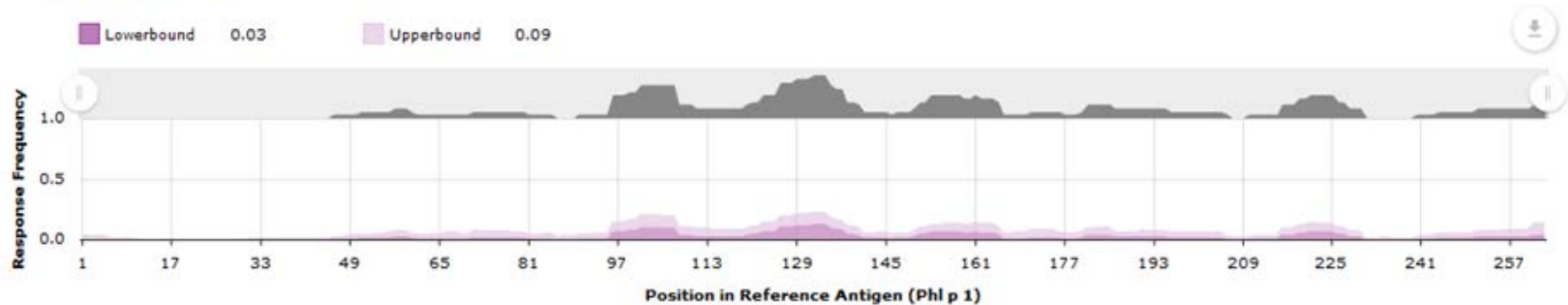
3 Records Found Page 1 of 1 25 Per Page

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ImmunomeBrowser: visualization on reference proteins

Response Frequency [?](#)



Epitope Assay Counts [?](#)



Also available as standalone tool on AR!

Assays: experiments in which epitopes were tested

Current Filters: Positive Assays Only Organism: Hepatitis C virus (ID:11103, Hepacivirus C) No B cell assays No MHC ligand assays Host: Homo sapiens (human)

Epitopes (1684)		Antigens (3)		Assays (4479)		Receptors (376)		References (271)	
T Cell Assays (4479)		B Cell Assays (0)		MHC Ligand Assays (0)					
Go To Records Starting At <input type="text" value="A,b"/> <input type="button" value="GO"/>									Export Results
4479 Records Found									25 Per Page
Page 1 of 180									
ID	Reference	Epitope	Host	Immunization	Assay Antigen	Antigen Epitope Relation	MHC Restriction	Assay Description	
1845030	Matthew F Cusick; Clin Dev Immunol 2011	VIKGGRRHLIFCHP KKKCD polyprotein [Hepatitis C virus] (87-104) Hepacivirus C	Homo sapiens	Infectious disease via exposure to Hepacivirus C (Source Organism)	VIKGGRRHLIFCHP KKKCD polyprotein [Hepatitis C virus] (87-104) Hepacivirus C	Epitope	HLA-DRB1*15:01	3H-thymidine proliferation Positive-Low	
1845031	Matthew F Cusick; Clin Dev Immunol 2011	VIKGGRRHLIFCHS EKKCD polyprotein Hepacivirus C	Homo sapiens	Infectious disease via exposure to Hepacivirus C (Source Organism)	VIKGGRRHLIFCHS EKKCD polyprotein Hepacivirus C	Epitope	HLA-DRB1*15:01	3H-thymidine proliferation Positive-Low	
1845029	Matthew F Cusick; Clin Dev Immunol 2011	VIKGGRRHLIFCRS KKKCD NS3 (5-22) Hepacivirus C	Homo sapiens	Infectious disease via exposure to Hepacivirus C (Source Organism)	VIKGGRRHLIFCRS KKKCD NS3 (5-22) Hepacivirus C	Epitope	HLA-DRB1*15:01	3H-thymidine proliferation Positive-Low	
1320094	J T Gerlach; J Virol 2005	AAYAAQGYKVLVL NP SVAAT polyprotein (1242-1261) Hepacivirus C	Homo sapiens	Infectious disease via exposure to Hepacivirus C (Source Organism)	AAYAAQGYKVLVL NP SVAAT polyprotein (1242-1261) Hepacivirus C	Epitope	HLA class II	3H-thymidine proliferation Positive	
1328498	V Lamonaca; Hepatology 1999	ADLMGYIPLVGAP LG GAARA Genome polyprotein (131-	Homo sapiens	Infectious disease via exposure to Hepacivirus C (Taxonomic Parent)	ADLMGYIPLVGAP LG GAARA Genome polyprotein (131-150)	Epitope	HLA class II	3H-thymidine proliferation Positive	

Epitope-specific B cell and T cell receptors

Current Filters: ✖ Positive Assays Only ✖ Organism: Hepatitis C virus (ID:11103, Hepacivirus C) ✖ No B cell assays ✖ No MHC ligand assays ✖ Host: Homo sapiens (human)

Epitopes (1684) Antigens (3) Assays (4479) Receptors (376) References (271)

T Cell Receptors (376) B Cell Receptors (0)

Go To Records Starting At 1200

Export Results

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Group ID	Species	Type	Chain 1 CDR3	Chain 2 CDR3
636	Homo sapiens (human)	αβ	ALSDPVNDR	ASSLRGRGDQPQH
1623	Homo sapiens (human)	αβ	AVEDTGGFKTI	ASSSSMESGNTIY
1624	Homo sapiens (human)	αβ	AMREHTSGTYKYI	ASSDSLVRGYQETQY
1625	Homo sapiens (human)	αβ	AFMITGAGSYQLT	ASSLQEWDPNRYGYT
1626	Homo sapiens (human)	αβ	ALSVVNQAGTALI	ASSLVENTEAF
8500	Homo sapiens (human)	αβ	not available	ASSQGGDRGDPGDGYT
16605	Homo sapiens (human)	αβ	not available	ASTRDTEAF
17790	Homo sapiens (human)	αβ	not available	ASSLSGTGELF
17791	Homo sapiens (human)	αβ	not available	SAPGPGVSVEKLF
17792	Homo sapiens (human)	αβ	not available	ASSSGQGNIQY
17793	Homo sapiens (human)	αβ	not available	ASSQEPSGSWGEQY
17794	Homo sapiens (human)	αβ	not available	ASSQAAGVGYPTFAF
17795	Homo sapiens (human)	αβ	not available	AISRDSIQFGNTIY
17796	Homo sapiens (human)	αβ	not available	ASSQEQQGAPGELF
17797	Homo sapiens (human)	αβ	not available	ASSRGPDEAF
17798	Homo sapiens (human)	αβ	not available	ASSFGDQY
17799	Homo sapiens (human)	αβ	not available	ATSDQSQREY
17800	Homo sapiens (human)	αβ	not available	ASSYLFGDANTGELF
17801	Homo sapiens (human)	αβ	not available	ASSLTCDRTHSVYGYT
17802	Homo sapiens (human)	αβ	not available	AWRLGSGEKLF
17803	Homo sapiens (human)	αβ	not available	SAWTGSATEAF
17804	Homo sapiens (human)	αβ	not available	ASSLGTQTYEQY
17805	Homo sapiens (human)	αβ	not available	ATSDAPGTGIPYEY
17806	Homo sapiens (human)	αβ	not available	ASSPGTSDPANYGYT
17807	Homo sapiens (human)	αβ	not available	ASSDPLAGGNEQY

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
Go To Records Starting At 1200

Export Results

References: source of information


Pending Filters

Reset Search


Epitope 

Any Epitopes
 Linear Epitope
 Discontinuous Epitopes
 Non-peptidic Epitopes

3D structure available
 Amino Acid Modification


Antigen 

Organism

Hepatitis C virus (ID:11103) 

Antigen Name


Ex: core, capsid, myosin

Receptor 


Has receptor sequence
 Type: Any Type

Chain: Any Type

Sequence: Exact Matches

Assay 



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


MHC Restriction 

Any MHC Restriction
 MHC Class I

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Ref ID	PMID	Author	Title	Abstract	Date
1035030	30769005	Janine Kemming; Emma Reeves; Katja Nitschke; Vanessa Widmeier; Florian Emmerich; Tobias Hermle; Emma Gostick; Andreas Walker; Jörg Timm; David A Price; Malke Hofmann; Robert Thimme; Edward James; Christoph Neumann-Haefelin	ERAP1 allotypes shape the epitope repertoire of virus-specific CD8 ⁺ T cell responses in acute hepatitis C virus infection.	BACKGROUND & AIMS: Endoplasmic reticulum aminopeptidase 1 (ERAP1) polymorphisms are linked with human leukocyte antigen (HLA) class I-associated autoinflammatory disorders, including ankylosing spondy... more...	2019
1034808	30622109	Anita Schuch; Elahe Salimi Alizei; Kathrin Heim; Dominik Wieland; Michael Muthamia Kiraithe; Janine Kemming; Stan Llewellyn-Lacey; Özlem Sogukpinar; Yi Ni; Stephan Urban; Peter Zimmermann; Michael Nassal; Florian Emmerich; David A Price; Bertram Bengsch; Hendrik Luxenburger; Christoph Neumann-Haefelin; Malke Hofmann; Robert Thimme	Phenotypic and functional differences of HBV core-specific versus HBV polymerase-specific CD8 ⁺ T cells in chronically HBV-infected patients with low viral load.	OBJECTIVE: A hallmark of chronic HBV (cHBV) infection is the presence of impaired HBV-specific CD8 ⁺ T cell responses. Functional T cell exhaustion induced by persistent antigen stimulation is consider... more...	2019
1035306	30972915	Kamila Caraballo Cortés; Sylvia Osuch; Karol Perlejewski; Agnieszka Pawelczyk; Justyna Kaźmierczak; Maciej Janiak; Joanna Jabłońska; Khalil Nazzal; Anna Stelmaszczyk-Emmel; Hanna Berak; Iwona Bukowska-Oško; Marcin Paciorek; Tomasz Laskus; Marek Radkowski	Expression of programmed cell death protein 1 and T-cell immunoglobulin- and mucin-domain-containing molecule-3 on peripheral blood CD4 ⁺ CD8 ⁺ double positive T cells in patients with chronic hepatitis C virus infection and in subjects who spontaneously cleared the virus.	Chronic hepatitis C virus (HCV) infection is characterized by increased proportion of CD4 ⁺ CD8 ⁺ double positive (DP) T cells, but their role in this infection is unclear. In chronic hepatitis C, immune... more...	2019
1034271	30260541	Youchen Xia; Wen Pan; Xiaoyu Ke; Kathrin Skibbe; Andreas Walker; Daniel Hoffmann; Yiping Lu; Xuecheng Yang; Xuemei Feng; Qiaoxia Tong; Jörg Timm; Dongliang Yang	Differential escape of HCV from CD8 ⁺ T cell selection pressure between China and Germany depends on the presenting HLA class I molecule.	Adaptation of hepatitis C virus (HCV) to CD8 ⁺ T cell selection pressure is well described, however, it is unclear if HCV differentially adapts in different populations. Here, we studied HLA... more...	2019
1033512	29397015	Hendrik Luxenburger; Franziska Graß; Janina Baermann; Tobias Boettler; Matthias Marget; Florian Emmerich; Marcus Panning; Robert Thimme; Katja Nitschke; Christoph Neumann-Haefelin	Differential virus-specific CD8 ⁺ T-cell epitope repertoire in hepatitis C virus genotype 1 versus 4.	Virus-specific CD8 ⁺ T-cell responses play an important role in the outcome of hepatitis C virus (HCV) infection. To date, most HCV-specific CD8 ⁺ T-cell epitopes have been defined... more...	2018
1033499	30053426	Leah V Sibener; Ricardo A Fernandes; Elizabeth M Kolawole; Catherine B Carbone; Fan Liu; Darren McAfee; Michael E Birnbaum; Xinbo Yang; Laura F Su; Wong Yu; Shen Dong; Marvin H Gee; Kevin M Jude; Mark M Davis; Jay T Groves; William A Goddard 3rd; James R Heath; Brian D Evavold; Ronald D Vale; K Christopher Garcia	Isolation of a Structural Mechanism for Uncoupling T Cell Receptor Signaling from Peptide-MHC Binding.	TCR-signaling strength generally correlates with peptide-MHC binding affinity; however, exceptions exist. We find high-affinity, yet non-stimulatory, interactions occur with high frequency in the huma... more...	2018
1032898	29429978	Slobodan Culina; Ana Ines Lalanne; Georgia Afonso; Karen Cerosaletti;	Islet-reactive CD8 ⁺ T cell frequencies in the pancreas, but not in blood.	The human leukocyte antigen-A2 (HLA-A2)-restricted zinc transporter	2018

Help integrated throughout the website



Help

More IEDB

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Solution Center: help.iedb.org

Accessible through header and footer on every page or submit via email to help@iedb.org

The image shows two screenshots of the IEDB Solutions Center website. The left screenshot displays the main forum page with a search bar and a grid of article categories. The right screenshot shows the 'Submit a request' form with fields for email, subject, and description, along with an attachment area and a submit button.

IEDB Solutions Center Forum

Search

IEDB Publications
IEDB-related publications authored by members of the IEDB team

General

Future features
Possible new features or enhancements to existing ones derived from user help requests

Promoted articles

Comprehensive Review of Human Plasmodium falciparum-Specific CD8+ T Cell Epitopes (2019)	Citing the IEDB	Getting Started
IEDB Annual Compendium for 2018	2019 User Workshop	IEDB FAIRness
IEDB Outreach Events for 2019	IEDB Analysis Resource v2.21 release notes (26 Mar 2019)	IEDB v3.10.0 release notes
IEDB v3.10.0 release notes	IEDB Analysis Resource v2.20 release notes (14 Aug 2018)	IEDB v3.6.0 Release Notes (16 December 2016)
IEDB 3.3 Release Notes (5 February 2016)	IEDB User Documentation Release 3	User Workshop Webcasts
A New Format for the Details Pages		

IMMUNE EPITOPE DATABASE AND ANALYSIS RESOURCE

Submit a request Sign in

IEDB Solutions Center > Submit a request

Search

Submit a request

Your email address*

Subject*

Description*

Please enter the details of your request. A member of our support staff will respond as soon as possible.

Attachments

Add file or drop files here

Submit

Our goals for this user workshop

We want your input to make the IEDB better:

- Learn about real-life applications for the IEDB
- Identify and prioritize problems with the user interface, documentation, functionality etc.

We want to enable you to get the most out of the IEDB:

- The primary IEDB success metric is usage
- Best compliment for our program is if IEDB data & tools help in your research (citations)