



# Accessing the Data: Query, Reporting and Examples

[www.iedb.org](http://www.iedb.org)

Presented by: Randi Vita, M.D. Lead Ontology and Quality Manager

# Home Page Query

See our latest homology analysis of SARS-CoV-2 spike sequences to myocarditis-associated antigens [here](#).

## Welcome

The Immune Epitope Database (IEDB) is a freely available resource funded by NIAID. 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 disease, allergy, autoimmunity and transplantation. The IEDB also hosts tools to assist in the prediction and analysis of epitopes.

[Learn More](#)

## Upcoming Events & News

[Virtual User Workshops](#) Oct 28-29 &  
Nov 3-4, 2021

\* register [here](#)

[IEDB SARS-CoV-2 Epitope Analysis Videos](#)

## Summary Metrics

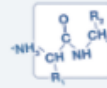
Peptidic Epitopes	1,141,006
Non-Peptidic Epitopes	3,123
T Cell Assays	416,504
B Cell Assays	1,146,166
MHC Ligand Assays	3,235,577
Epitope Source Organisms	4,079
Restricting MHC Alleles	941
References	22,357

## START YOUR SEARCH HERE ?

### Epitope ?

- Any
- Linear peptide
- Discontinuous
- Non-peptidic

Exact M  Ex: SIINFEKL



### Assay ?

- T Cell
- B Cell
- MHC Ligand

Ex: neutralization   
Outcome:  Positive  Negative



### Epitope Source ?

Organism

Ex: influenza, peanut

Antigen

Ex: core, capsid, myosin



### MHC Restriction ?

- Any
- Class I
- Class II
- Non-classical

Ex: HLA-A\*02:01



### Host ?

- Any
- Human
- Mouse
- Non-human primate

Ex: dog, camel



### Disease ?

- Any
- Infectious
- Allergic
- Autoimmune

Ex: asthma



## 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:

[Discotope](#)

[ElliPro](#)

### Epitope Analysis Tools ?

Analyze epitope sets of:

[Population Coverage](#)

[Conservation Across Antigens](#)

[Clusters with Similar Sequences](#)

# Epitope Search Pane

## Search by epitope sequence

**START YOUR SEARCH HERE ?**

**Epitope ?**

Any

Linear peptide

Exact Match

Discontinuous

Non-peptidic

**Assay ?**

T Cell

B Cell

MHC Ligand

Ex: neutralization

Outcome:  Positive

**Epitope Source ?**

Organism

Antigen

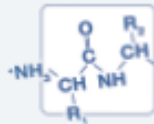
**MHC Restriction ?**

Any

Class I

Class II

Non-classical



**START YOUR SEARCH HERE ?**

**Epitope ?**

Any

Linear peptide

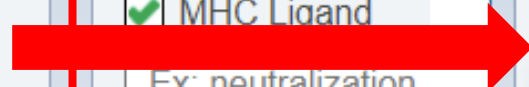
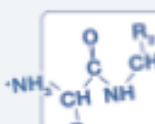
Exact Match

**Exact Matches**


- Substring
- Blast - 90%
- Blast - 80%
- Blast - 70%

**Epitope Source ?**


Organism




# Antigen Search Pane: Organism

**Epitope Source** ? 


Organism

Ex: influenza, peanut 


Antigen


Ex: core, capsid, myosin 



**Epitope Source** ? 

Organism

cord 

**MHC Restriction** ? 

Any

Class I

**Coronavirus (ID:11118)**

Alphacoronavirus (ID:693996, **Coronavirus**)

Betacoronavirus (ID:694002, **Coronavirus**)

Bat **coronavirus** (ID:1508220)

Yak **coronavirus** (ID:2501420)

Human coronavirus 229E (Coronavirus 229E) (ID:11137, **Coron...**)

Human coronavirus NL63 (Coronavirus NL63) (ID:277944, **Cor...**)

Middle East respiratory syndrome-related coronavirus (MERS c...

Severe acute respiratory syndrome-related coronavirus (Human...

Avian **coronavirus** (ID:694014)

# Antigen Search Pane: Antigen

The image shows two panels from the IEDB Antigen Search interface. The left panel, titled "Epitope Source", is highlighted with a red border. It contains two search sections: "Organism" with a text input field containing "Ex: influenza, peanut" and a "Find" button, and "Antigen" with a text input field containing "Ex: core, capsid, myosin" and a "Find" button. A red arrow points from the "Antigen" section to the right panel. The right panel, titled "Antigen", has a text input field containing "capsid". Below this field is a dropdown list of search results. The "MHC Restriction" section on the right of the right panel is also visible, with "Any MHC Restriction" selected.

**Epitope Source** ?

Organism

Ex: influenza, peanut Find

Antigen

Ex: core, capsid, myosin Find

**Antigen** ?

Organism

Ex: influenza, peanut

Antigen Name

capsid

**MHC Restriction** ?

Any MHC Restriction

MHC Class I

MHC Class II

MHC Nonclassical


Ex: HLA-A\*02:01 Find


- Nucleo**capsid** [Q91MK3] (Menangle pararubulavirus)
- Nucleo**capsid** [A0A0F6N4C5] (Bovine respirovirus 3 (Bovine pa...))
- Nucleo**capsid** [T1UFE7] (Human respirovirus 3 (Human parainf...))
- Nucleo**capsid** [Q83138] (Small ruminant morbillivirus (Pseudori...))
- Nucleo**capsid** [A0A0H5BN46] (Rinderpest morbillivirus (Rinder...))
- Capsid** protein [Q91PS7] (Torque teno virus 8)
- Capsid** protein [Q9JH33] (Torque teno virus 15)
- Capsid** protein [Q9DUB7] (Torque teno douroucouli virus)
- Capsid** protein [Q8QVL3] (Torque teno felis virus)
- Capsid** protein [Q8QVL9] (Torque teno sus virus 1a (Torque ten...))

# Host Search Pane

**Host** ? 

Any  
 Human  
 Mouse  
 Non-human primate

 Find

**HOST ORGANISM FINDER** ? 


Current Selection(s) Reset Apply

**Search By**

Name:


Organism ID:

Search

**Browse by Tree (Click to Select)** 

- Vertebrate
  - Ave (bird)
  - Fish
  - Mammal

# Assay Search Pane

**Assay ?** 

T Cell  
 B Cell  
 MHC Ligand

Ex: neutralization

Outcome:  Positive  Negative

**ASSAY FINDER ?**

Current Selection(s)

**Search By**

Name:

Method/Technique:

Measurement Of:

Units:

**Browse by Tree (Click to Select)**

- immune epitope assay
  - T cell assay
  - B cell assay
  - 3D structure
  - binding constant
  - biological activity
  - qualitative binding
  - MHC ligand assay

# MHC Restriction Search Pane

**MHC Restriction** ?

Any

Class I

Class II

Non-classical

Ex: HLA-A\*02:01 **Find**

**Browse by Tree (Click to Select)**


- MHC
  - MHC molecule
  - haplotype
  - serotype
  - mutant MHC molecule

**Browse by Tree (Click to Select)**

- MHC
  - MHC molecule
    - class I
      - black flying fox
      - bonobo
      - cat
        - FLA-E
          - FLA-E\*01801
      - cattle
      - chicken
      - chimpanzee
      - clawed frog
      - cotton-top tamarin
      - dog**
      - duck
      - gorilla
      - horse



# Disease Search Pane

**Disease** ? 

Any  
 Infectious  
 Allergic  
 Autoimmune

Ex: asthma

**Browse by Tree (Click to Select)**

- host health status
  - disease
    - additional diseases by category
    - allergic disease
    - animal model of disease
    - autoimmune disease
    - infectious disease
    - neoplasm
    - transplant-related disease and allo-reactivity
  - healthy
  - infection without disease

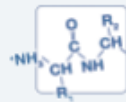
**Browse by Tree (Click to Select)**

- host health status
  - disease
    - additional diseases by category
    - allergic disease
      - allergic contact dermatitis
      - allergic contact dermatitis of eyelid
      - drug allergy
      - extrinsic asthma
      - gastrointestinal allergy
      - latex allergy
      - metal allergy
      - respiratory allergy
    - animal model of disease
    - autoimmune disease
    - infectious disease
    - neoplasm
    - transplant-related disease and allo-reactivity


# User Queries: How to see the differences between B and T cell responses AND identify SARS-CoV2 CD4 and CD8 T cell epitopes

Use **Epitope Source** search pane to view epitopes from SARS-CoV2


**START YOUR SEARCH HERE ?**

**Epitope ?** 


Any  
 Linear peptide  
Exact M ▾ Ex: SIINFEKL  
 Discontinuous  
 Non-peptidic

**Assay ?** 


T Cell  
 B Cell  
 MHC Ligand  
Ex: neutralization **Find**  
Outcome:  Positive  Negative

**Epitope Source ?** 


Organism  
Ex: influenza, peanut **Find**  
Antigen  
Ex: core, capsid, myosin **Find**

**MHC Restriction ?** 

Any  
 Class I  
 Class II  
 Non-classical  
Ex: HLA-A\*02:01 **Find**

**Host ?** 

Any  
 Human  
 Mouse  
 Non-human primate  
Ex: dog, camel **Find**

**Disease ?** 

Any  
 Infectious  
 Allergic  
 Autoimmune  
Ex: asthma **Find**

**Reset** **Search**

# User Queries: How to see the differences between B and T cell responses AND identify SARS-CoV2 CD4 and CD8 T cell epitopes

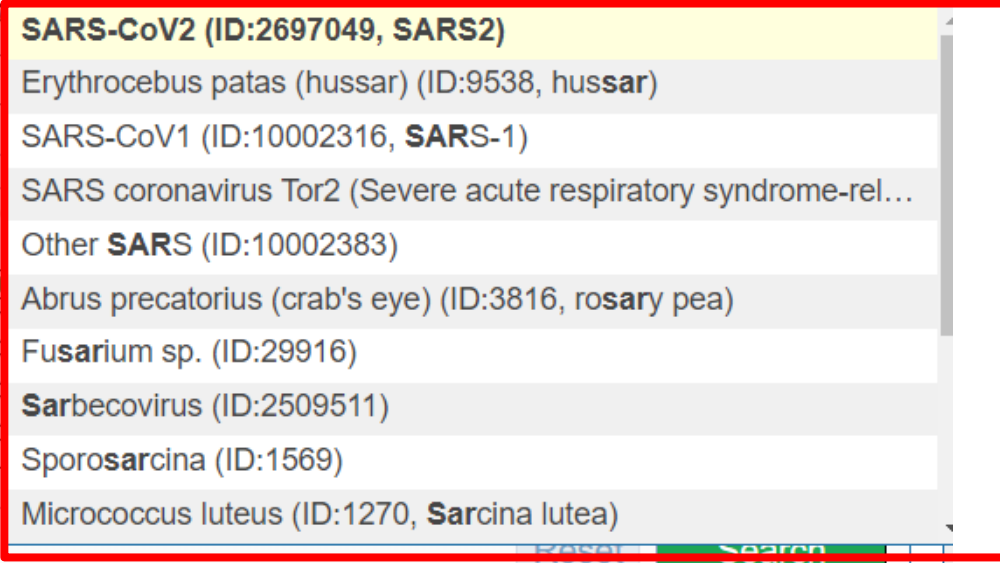
Start typing the organism name and autocomplete will provide options for which the IEDB has data

The screenshot shows the IEDB search interface with the following sections:

- START YOUR SEARCH HERE** (with a help icon)
- Epitope** (with a help icon and a chemical structure icon):
  - Any
  - Linear peptide
  - Exact M
  - Discontinuous
  - Non-peptidic
- Assay** (with a help icon and a pipette icon):
  - T Cell
  - B Cell
  - MHC Ligand
  - Ex: neutralization
  - Outcome:  Positive  Negative
- Epitope Source** (with a help icon and a protein structure icon):
  - Organism
- MHC Restriction** (with a help icon and a protein structure icon):
  - Any
  - Class I

The autocomplete dropdown for the organism field is highlighted with a red box and contains the following items:

- SARS-CoV2 (ID:2697049, SARS2)** (highlighted in yellow)
- Erythrocebus patas (hussar) (ID:9538, hussar)
- SARS-CoV1 (ID:10002316, SARS-1)
- SARS coronavirus Tor2 (Severe acute respiratory syndrome-rel...)
- Other SARS (ID:10002383)
- Abrus precatorius (crab's eye) (ID:3816, rosary pea)
- Fusarium sp. (ID:29916)
- Sarbecovirus (ID:2509511)
- Sporosarcina (ID:1569)
- Micrococcus luteus (ID:1270, Sarcina lutea)



# User Queries: How to see the differences between B and T cell responses AND identify SARS-CoV2 CD4 and CD8 T cell epitopes

Select SARS-CoV2

This is a multi-select field  
The number displays how many selections you have made

Once your query is built, click "Search"

\*\*You can select from all search panes or from none

START YOUR SEARCH HERE ?

**Epitope ?**

Any  
 Linear peptide  
Exact M   
 Discontinuous  
 Non-peptidic

**Assay ?**

T Cell  
 B Cell  
 MHC Ligand  
 Find  
Outcome:  Positive  Negative

**Epitope Source ?**

Organism  
 Find  
Antigen  
 Find

**MHC Restriction ?**

Any  
 Class I  
 Class II  
 Non-classical  
 Find

**Host ?**

Any  
 Human  
 Mouse  
 Non-human primate  
 Find

**Disease ?**

Any  
 Infectious  
 Allergic  
 Autoimmune  
 Find

Reset

# Results Page: Pending Filters/Current Filters

## Pending Filters

Reset Search

### Filter Options ?

Default

### Epitope ?

- Any
- Linear peptide
- Length
- Sequence
- Discontinuous
- Non-peptidic

3D structure available

Amino acid modification

### Epitope Source ?

Organism

SARS-CoV2 (ID:2697049, 1)

Antigen

Ex: core, capsid, myosin

Include related structure

Select multiple options

### Receptor ?

Has sequence

Current Filters:  Organism: SARS-CoV2 (ID:2697049, SARS2)  Include Positive Assays

Epitopes (6941)	Antigens (16)	Assays (15103)	Receptors (85061)	References (202)	
Go To Records Starting At <input type="text" value="1200"/> <input type="button" value="GO"/>					
6941 Records Found <input type="button" value="Previous"/> <input type="button" value="Page 1 of 278"/> <input type="button" value="Next"/> <input type="text" value="25"/> Per Page <input type="button" value="Export Results"/>					
Details	Epitope	Antigen	Organism	# References	# Assays
1309147	YLQPRTFLL	Spike glycoprotein	SARS-CoV2	17	62
37473	LLLDRLNQL	Nucleoprotein	SARS-CoV2	12	18
60242	SPRWYFYLL	Nucleoprotein	SARS-CoV2	10	56
1310756	QYIKWPWYI	Spike glycoprotein	SARS-CoV2	10	16
33667	KTFPTEPK	Nucleoprotein	SARS-CoV2	9	34
1309115	FTSDYYQLY	ORF3a protein	SARS-CoV2	8	14
1309137	SIAYTMSL	Spike glycoprotein	SARS-CoV2	8	14
1310598	LLLLDRLNQLESKMS	Nucleoprotein	SARS-CoV2	8	33
1310623	LTDEMIAQY	Spike glycoprotein	SARS-CoV2	8	19
16156	FIAGLIAIV	Spike glycoprotein	SARS-CoV2	7	13
21347	GMSRIGMEV	Nucleoprotein	SARS-CoV2	7	10
1313269	NYNLYRLF	Spike glycoprotein	SARS-CoV2	7	11
17385	FPRGQGVPI	Nucleoprotein	SARS-CoV2	6	8
28050	IPRRNVATL	Replicase polyprotein 1ab	SARS-CoV2	6	10
69657	VLNDILSRL	Spike glycoprotein	SARS-CoV2	6	7
72048	VYIGDPAQL	Replicase polyprotein 1ab	SARS-CoV2	6	15
190494	MEVTPSGTWL	Nucleoprotein	SARS-CoV2	6	18
1309132	NFSQILPDPSKPSKR	Spike glycoprotein	SARS-CoV2	6	22
1311180	LLYDANYFL	ORF3a protein	SARS-CoV2	6	13
1312062	YLATALLTL	Replicase polyprotein 1ab	SARS-CoV2	6	13
2998	AIWFIIQOV	Replicase polyprotein 1ab	SARS-CoV2	5	8

# Results Page: Pending Filters/Filter Options

**Pending Filters**

Reset Search

**Filter Options** ?

Default

Default

T Cell

B Cell

MHC

Any

Linear peptide

Length

Sequence

Discontinuous

Non-peptidic

3D structure available

Amino acid modification

**Epitope Source** ?

Organism

SARS-CoV2 (ID:2697049, 1)

Antigen

Ex: core, capsid, myosin

Include related structure


Select multiple options

Current Filters:  Organism: SARS-CoV2 (ID:2697049, SARS2)  Include Positive Assays

Epitopes (7053)		Antigens (17)		Assays (15920)		Rece (85)	
Go To Records Starting At <input type="text" value="1200"/> <input type="button" value="GO"/>							
7053 Records Found							
Page <input type="text" value="1"/> of 283							
Details	Epitope	Antigen	Organism				
1309147	YLQPRTFLL	Spike glycoprotein	SARS-CoV2				
37473	LLLDRLNQL	Nucleoprotein	SARS-CoV2				
60242	SPRWYFYLYL	Nucleoprotein	SARS-CoV2				
1310756	QYIKWPWYI	Spike glycoprotein	SARS-CoV2				
33667	KTFPPTPEPK	Nucleoprotein	SARS-CoV2				
1309137	SIIAYTMSL	Spike glycoprotein	SARS-CoV2				
1309115	FTSDYYQLY	ORF3a protein	SARS-CoV2				
1310598	LLLLDRLNQLLESKMS	Nucleoprotein	SARS-CoV2				
1310623	LTDEIAQY	Spike glycoprotein	SARS-CoV2				
16156	FIAGLIAIV	Spike glycoprotein	SARS-CoV2				
21347	GMSRIGMEV	Nucleoprotein	SARS-CoV2				
1313269	NYNYLYRLF	Spike glycoprotein	SARS-CoV2				
16737	FLLNKEMYL	Replicase polyprotein 1ab	SARS-CoV2				
17385	FPRGQGVPI	Nucleoprotein	SARS-CoV2				
28050	IPRRNVATL	Replicase polyprotein 1ab	SARS-CoV2				
69657	VLNDILSRL	Spike glycoprotein	SARS-CoV2				
72048	VYIGDPAQL	Replicase polyprotein 1ab	SARS-CoV2				


# Results Page: Filter Options - Default


Details ▾ Epitope

**Epitope** ? 

Any  
 Linear peptide  
Length  to   
Sequence    
 Discontinuous  
 Non-peptidic


3D structure available  
Amino acid modification

Epitope Source ?  21547 GMSRIGMEV


**Receptor** ? 

Has sequence  TCR  BCR  
Type  Name   
 Paired chains only

Chain  Region   
Sequence

Assay ? 

Amino acid modification 16156 FIAGLIAIV

**Epitope Source** ? 

Organism


Antigen

Include related structure

Analogs  
 Mimotopes  
 Neopeptides  
 Only neopeptides

Paired chains only

34851 LALLLDRL

**Reference** ? 

Any  
 Journal article  
 External submission

Author   
Title   
Date (Year)  to   
PMID

Reset Search

# Results Page: Filter Options –T cell

**TCR** ?

Has TCR sequence

Type  Name

Paired chains only

---

Chain  Region

Sequence

**MHC Restriction** ?

Any

Class I

Class II

Non-classical

Resolution

Evidence

**Host** ?

**T Cell Assay** ?

Outcome:  Positive  Negative

Any

Cytokine production

MHC multimer

In vivo

Direct ex vivo detection

**MHC Restriction** ?

Any

Class I

Class II

Non-classical

Resolution

Evidence

**Host** ?

Any

Human

Mouse

Non-human primate

Single allele present

T cell assay -MHC subset identification

T cell assay -Mismatched MHC molecules

MHC binding assay

MHC binding prediction



# Results Page: Filter Options – B cell

**Antibody/BCR** ⓘ

Has BCR sequence

Type  Name

Paired chains only

---

Chain  Region

Sequence

*(Note: The 'Chain' dropdown menu is highlighted with a red box, showing options: Any Type, heavy, light)*

**B Cell Assay** ⓘ

Outcome:  Positive  Negative

---

Any

Antibody binding

Neutralization


In vivo

---


Antibody isotype


*(Note: The radio button options and the 'Antibody isotype' dropdown are highlighted with red boxes)*


# Results Page: Filter Options – MHC


**MHC Assay** ? 


Outcome:  Positive  Negative

Any  
 Binding  
 Ligand elution/Mass spectrometry  
 Ex: crystallography 

**MHC Restriction** ? 

Any  
 Class I  
 Class II  
 Non-classical  
 Ex: HLA-A\*02:01 

Resolution  

Evidence  

# Results Page: Epitope Tab

Current Filters: ✕ Organism: SARS-CoV2 (ID:2697049, SARS2) ✕ Include Positive Assays

Epitopes (6941)
Antigens (16)
Assays (15103)
Receptors (85061)
References (202)

Go To Records Starting At   [Export Results](#)

6941 Records Found Page 1 of 278  Per Page

Details	Epitope	Antigen	Organism	# References	# Assays
1309147	YLQPRTFLL	Spike glycoprotein	SARS-CoV2	17	62
37473	LLLDRLNQL	Nucleoprotein	SARS-CoV2	12	18
60242	SPRWYFYLL	Nucleoprotein	SARS-CoV2	10	56
1310756	QYIKWPWYI	Spike glycoprotein	SARS-CoV2	10	16
33667	KTFPPTPEPK	Nucleoprotein	SARS-CoV2	9	34
1309115	FTSDYYQLY	ORF3a protein	SARS-CoV2	8	14
1309137	SIIAYTMSL	Spike glycoprotein	SARS-CoV2	8	14
1310598	LLLLDRLNQLQESKMS	Nucleoprotein	SARS-CoV2	8	33
1310623	LTDEMAIQY	Spike glycoprotein	SARS-CoV2	8	19
16156	FIAGLIAIV	Spike glycoprotein	SARS-CoV2	7	13
21347	GMSRIGMEV	Nucleoprotein	SARS-CoV2	7	10
1313269	NYNYLYRLF	Spike glycoprotein	SARS-CoV2	7	11
17385	FPRGQGVPI	Nucleoprotein	SARS-CoV2	6	8
28050	IPRRNVATL	Replicase polyprotein 1ab	SARS-CoV2	6	10
69657	VLNDILSRL	Spike glycoprotein	SARS-CoV2	6	7
72048	VYIGDPAQL	Replicase polyprotein 1ab	SARS-CoV2	6	15
190494	MEVTPSGTWL	Nucleoprotein	SARS-CoV2	6	18
1309132	NFSQILPDPSPKPSKR	Spike glycoprotein	SARS-CoV2	6	22
1311180	LLYDANYFL	ORF3a protein	SARS-CoV2	6	13
1312062	YLATALLTL	Replicase polyprotein 1ab	SARS-CoV2	6	13
2998	ALWEIQQVV	Replicase polyprotein 1ab	SARS-CoV2	5	8

# Results Page: Epitope Table Headers

Current Filters: ✕ Organism: SARS-CoV2 (ID:2697049, SARS2) ✕ Include Positive Assays

Epitopes (6941)
Antigens (16)
Assays (15103)
Receptors (85061)
References (202)

Go To Records Starting At   [Export Results](#)

6941 Records Found Page 1 of 278  Per Page

Details	Epitope	Antigen	Organism	# References	# Assays
1309147	YLQPRTFLL	Spike glycoprotein	SARS-CoV2	17	62
37473	LLLDRLNQL	Nucleoprotein	SARS-CoV2	12	18
60242	SPRWYFYLL	Nucleoprotein	SARS-CoV2	10	56
1310756	QYIKWPWYI	Spike glycoprotein	SARS-CoV2	10	16
33667	KTFPPTPEPK	Nucleoprotein	SARS-CoV2	9	34
1309115	FTSDYYQLY	ORF3a protein	SARS-CoV2	8	14
1309137	SIIAYTMSL	Spike glycoprotein	SARS-CoV2	8	14
1310598	LLLLDRLNQLESKMS	Nucleoprotein	SARS-CoV2	8	33
1310623	LTDEMAIQY	Spike glycoprotein	SARS-CoV2	8	19
16156	FIAGLIAIV	Spike glycoprotein	SARS-CoV2	7	13
21347	GMSRIGMEV	Nucleoprotein	SARS-CoV2	7	10
1313269	NYNYLYRLF	Spike glycoprotein	SARS-CoV2	7	11
17385	FPRGQGVPI	Nucleoprotein	SARS-CoV2	6	8
28050	IPRRNVATL	Replicase polyprotein 1ab	SARS-CoV2	6	10
69657	VLNDILSRL	Spike glycoprotein	SARS-CoV2	6	7
72048	VYIGDPAQL	Replicase polyprotein 1ab	SARS-CoV2	6	15
190494	MEVTPSGTWL	Nucleoprotein	SARS-CoV2	6	18
1309132	NFSQILPDPSPKPSKR	Spike glycoprotein	SARS-CoV2	6	22
1311180	LLYDANYFL	ORF3a protein	SARS-CoV2	6	13
1312062	YLATALLTL	Replicase polyprotein 1ab	SARS-CoV2	6	13
2998	ALWEIQQVV	Replicase polyprotein 1ab	SARS-CoV2	5	8

# Results Page: Epitope Details

## EPITOPE SUMMARY

YLQPRTFLL is a linear peptidic epitope (epitope ID 1309147) studied as part of Spike glycoprotein from SARS-CoV2. This epitope has been studied for immune reactivity in 19 publication(s), tested in 76 T cell assays, 3 MHC ligand assays and has 3D structure(s) 7N6E and 7N6D.

## COMPILED DATA

### MHC Ligand Assay(s) 3

MHC molecule	Positive / All
HLA-A*02:01	3/3

### T Cell Assay(s) 76

Assay Type	Positive / All
qualitative binding	33/37
IFN $\gamma$ release	9/10
dissociation constant KD	7/8
granzyme B release	4/4
activation	3/3
perforin release	3/3
TNF $\alpha$ release	3/3
cytotoxicity	2/3
granzyme A release	2/2
3D structure	1/1
degranulation	1/1
proliferation	1/1

# Results Page: Inline Filters

Current Filters: ✖ Organism: SARS-CoV2 (ID:2697049, SARS2) ✖ Include Positive Assays

Epitopes (6941)	Antigens (16)	Assays (15103)	Receptors (85061)	References (202)
--------------------	------------------	-------------------	----------------------	---------------------

Go To Records Starting At  GO

[Export Results](#)

6941 Records Found

Page  of 278 ▶▶ ◀◀

Per Page

Details	Epitope	Antigen	Organism	# References	# Assays
1309147	YLQPRTFLL	Spike glycoprotein	SARS-CoV2	17	62
37473	LLLDRNLQL	Nucleoprotein	SARS-CoV2	12	18
60242	SPRWYFYFL	Nucleoprotein	SARS-CoV2	10	56
1310756	QYIKWPWYI	Spike glycoprotein	SARS-CoV2	10	16
33667	KTFPTEPK	Nucleoprotein	SARS-CoV2	9	34
1309115	FTSDYYQLY	ORF3a protein	SARS-CoV2	8	14
1309137	SIIAYTMSL	Spike glycoprotein	SARS-CoV2	8	14
1310598	LLLLDRNLQLESKMS	Nucleoprotein	SARS-CoV2	8	33
1310623	LTDEMAIQY	Spike glycoprotein	SARS-CoV2	8	19
16156	FIAGLIAIV	Spike glycoprotein	SARS-CoV2	7	13
21347	GMSRIGMEV	Nucleoprotein	SARS-CoV2	7	10
1313269	NYNLYRLF	Spike glycoprotein	SARS-CoV2	7	11
17385	FPRGQGVPI	Nucleoprotein	SARS-CoV2	6	8
28050	IPRRNVATL	Replicase polyprotein 1ab	SARS-CoV2	6	10
69657	VLNDILSRL	Spike glycoprotein	SARS-CoV2	6	7
72048	VYIGDPAQL	Replicase polyprotein 1ab	SARS-CoV2	6	15
190494	MEVTPSGTWL	Nucleoprotein	SARS-CoV2	6	18
1309132	NFSQILPDPSPSKR	Spike glycoprotein	SARS-CoV2	6	22
1311180	LLYDANYFL	ORF3a protein	SARS-CoV2	6	13
1312062	YLATALTL	Replicase polyprotein 1ab	SARS-CoV2	6	13
2998	AIWFIOQVV	Replicase polyprotein 1ab	SARS-CoV2	5	8

# Results Page: Export

Current Filters: ✖ Organism: SARS-CoV2 (ID:2697049, SARS2) ✖ Include Positive Assays

Epitopes (6941)	Antigens (16)	Assays (15103)	Receptors (85061)	References (202)
--------------------	------------------	-------------------	----------------------	---------------------

Go To Records Starting At  GO

Export Results

6941 Records Found

Page  of 278 ▶▶ ◀◀

Per Page

Details	Epitope	Antigen	Organism	# References	# Assays
1309147	YLQPRTFLL	Spike glycoprotein	SARS-CoV2	17	62
37473	LLLDRLNQL	Nucleoprotein	SARS-CoV2	12	18
60242	SPRWYFYFL	Nucleoprotein	SARS-CoV2	10	56
1310756	QYIKWPWYI	Spike glycoprotein	SARS-CoV2	10	16
33667	KTFPPTPEPK	Nucleoprotein	SARS-CoV2	9	34
1309115	FTSDYYQLY	ORF3a protein	SARS-CoV2	8	14
1309137	SIIAYTMSL	Spike glycoprotein	SARS-CoV2	8	14
1310598	LLLLDRLNQLESKMS	Nucleoprotein	SARS-CoV2	8	33
1310623	LTDEMQAAY	Spike glycoprotein	SARS-CoV2	8	19
16156	FIAGLIAIV	Spike glycoprotein	SARS-CoV2	7	13
21347	GMSRIGMEV	Nucleoprotein	SARS-CoV2	7	10
1313269	NYNLYRRLF	Spike glycoprotein	SARS-CoV2	7	11
17385	FPRGQGVPI	Nucleoprotein	SARS-CoV2	6	8
28050	IPRRNVATL	Replicase polyprotein 1ab	SARS-CoV2	6	10
69657	VLNDILSRL	Spike glycoprotein	SARS-CoV2	6	7
72048	VYIGDPAQL	Replicase polyprotein 1ab	SARS-CoV2	6	15
190494	MEVTPSGTTL	Nucleoprotein	SARS-CoV2	6	18
1309132	NFSQILPDPSPSKR	Spike glycoprotein	SARS-CoV2	6	22
1311180	LLYDANYFL	ORF3a protein	SARS-CoV2	6	13
1312062	YLATALLTL	Replicase polyprotein 1ab	SARS-CoV2	6	13
2998	AIWFIOQVV	Replicase polyprotein 1ab	SARS-CoV2	5	8

# Results Page: Export Options

Current Filters: ✕ Organism: SARS-CoV2 (ID:2697049, SARS2) ✕ Include Positive Assays

Epitopes (6941)    Antigens (16)    Assays (15103)    Receptors (85061)    References (202)

Go To Records Starting At      Export Results

6941 Records Found    Page  of 278     Per Page

Details	Epitope	Antigen	Org	Assays	Receptors
1309147	YLQPRFL	Spike glycoprotein	SARS-CoV2	10	16
37473	LLLDRLNQL	Nucleoprotein	SARS-CoV2	9	34
60242	SPRWYFYLL	Nucleoprotein	SARS-CoV2	8	14
1310756	QYIKWPWYI	Spike glycoprotein	SARS-CoV2	8	14
33667	KTFPPTPEK	Nucleoprotein	SARS-CoV2	8	33
1309115	FTSDYYQLY	ORF3a protein	SARS-CoV2	8	19
1309137	SIIAYTMSL	Spike glycoprotein	SARS-CoV2	7	13
1310598	LLLLDRLNQLESKMS	Nucleoprotein	SARS-CoV2	7	10
1310623	LTDEMIQY	Spike glycoprotein	SARS-CoV2	7	11
16156	FIAGLIAIV	Spike glycoprotein	SARS-CoV2	6	8
21347	GMSRIGMEV	Nucleoprotein	SARS-CoV2	6	10
1313269	NYNLYRLF	Spike glycoprotein	SARS-CoV2	6	7
17385	FPRGQGVPI	Nucleoprotein	SARS-CoV2	6	8
28050	IPRRNVATL	Replicase polyprotein 1ab	SARS-CoV2	6	10
69657	VLNDILSRL	Spike glycoprotein	SARS-CoV2	6	7

Export to CSV file.

Export to CSV file with IRIs.



# Results Page: Antigen Tab – Table Headers

Current Filters:  Organism: SARS-CoV2 (ID:2697049, SARS2)  Include Positive Assays

Epitopes  
(6941)

Antigens  
(16)

Assays  
(15103)

Receptors  
(85061)

References  
(202)

Go To Records Starting At

[Export Results](#)

16 Records Found

Page  of 1

Per Page

Antigen	Organism	# Epitopes	# Assays	# References
Spike glycoprotein	SARS-CoV2	2654	6173	181
Nucleoprotein	SARS-CoV2	568	1389	56
Membrane protein	SARS-CoV2	249	686	32
Replicase polyprotein 1ab	SARS-CoV2	1703	3113	28
ORF3a protein	SARS-CoV2	198	464	20
Envelope small membrane protein	SARS-CoV2	31	61	15
ORF7a protein	SARS-CoV2	70	115	14
ORF8 protein	SARS-CoV2	96	306	12
ORF6 protein	SARS-CoV2	32	69	10
Two components:Spike glycoprotein & Spike glycoprotein	SARS-CoV2	15	119	8
ORF10 protein	SARS-CoV2	21	43	7
Replicase polyprotein 1a	SARS-CoV2	1315	2544	3
ORF7b protein	SARS-CoV2	3	8	2
Other SARS-CoV2 protein	SARS-CoV2	3	3	1
ORF9b protein	SARS-CoV2	6	6	1
Two components:Nucleoprotein & Nucleoprotein	SARS-CoV2	1	3	1

16 Records Found

Page  of 1

Per Page

# Results Page: Assays Tab – Subtabs

Current Filters:  Organism: SARS-CoV2 (ID:2697049, SARS2)  Include Positive Assays

[Epitopes \(6941\)](#)
[Antigens \(16\)](#)
[Assays \(15103\)](#)
[Receptors \(85061\)](#)
[References \(202\)](#)

[T Cell Assays \(4203\)](#)
[B Cell Assays \(8945\)](#)
[MHC Ligand Assays \(1955\)](#)

Go To Records Starting At

Export Results

4203 Records Found 25 Per Page

Page 1 of 169

ID	Reference	Epitope	Host	Immunization	Assay Antigen	Antigen Epitope Relation	MHC Restriction	Assay Description
13836508	Jun Siong Low; Science 2021	LSRLDKVEAEVQIDR Spike glycoprotein (981-995) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	S protein S protein SARS coronavirus Urbani (SARS-CoV (Urbani strain))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive
13836509	Jun Siong Low; Science 2021	LSRLDKVEAEVQIDR Spike glycoprotein (981-995) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus OC43] spike protein [Human coronavirus OC43] Human coronavirus OC43 (Human coronavirus (strain OC43))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive
13835984	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	Spike glycoprotein Spike glycoprotein SARS-CoV2	Source Antigen	HLA class II	3H-thymidine proliferation Positive
13836273	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	S protein S protein SARS coronavirus Urbani (SARS-CoV (Urbani strain))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive
13836298	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus OC43] spike protein [Human coronavirus OC43] Human coronavirus OC43 (Human coronavirus (strain OC43))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive
13836456	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus NL63] spike protein [Human coronavirus NL63]	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive

# Results Page: Assays Tab – Table Headers

Current Filters: ✖ Organism: SARS-CoV2 (ID:2697049, SARS2) ✖ Include Positive Assays

Epitopes (6941)
Antigens (16)
Assays (15103)
Receptors (85061)
References (202)

T Cell Assays (4203)
B Cell Assays (8945)
MHC Ligand Assays (1955)

Go To Records Starting At   Export Results

4203 Records Found Page 1 of 169 25 Per Page


ID	Reference	Epitope	Host	Immunization	Assay Antigen	Antigen Epitope Relation	MHC Restriction	Assay Description
13836508	Jun Siong Low; Science 2021	LSRLDKVEAEVQIDR Spike glycoprotein (981-995) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	S protein S protein SARS coronavirus Urbani (SARS-CoV (Urbani strain))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive
13836509	Jun Siong Low; Science 2021	LSRLDKVEAEVQIDR Spike glycoprotein (981-995) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus OC43] spike protein [Human coronavirus OC43] Human coronavirus OC43 (Human coronavirus (strain OC43))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive
13835984	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	Spike glycoprotein Spike glycoprotein SARS-CoV2	Source Antigen	HLA class II	3H-thymidine proliferation Positive
13836273	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	S protein S protein SARS coronavirus Urbani (SARS-CoV (Urbani strain))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive
13836298	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus OC43] spike protein [Human coronavirus OC43] Human coronavirus OC43 (Human coronavirus (strain OC43))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive
13836456	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source	spike protein [Human coronavirus NL63] spike protein [Human	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive

# Results Page: Assays Tab – Assay Details

Current Filters: ✖ Organism: SARS-CoV2 (ID:2697049, SARS2) ✖ Include Positive Assays

Epitopes (6941)		Antigens (16)		Assays (15103)		Receptors (85061)		References (202)	
T Cell Assays (4203)		B Cell Assays (8945)		MHC Ligand Assays (1955)					
Go To Records Starting At <input type="text" value="A,b"/> <input type="button" value="GO"/>									
4203 Records Found <span>Page 1 of 169</span> <input type="button" value="25"/> Per Page									
ID	Reference	Epitope	Host	Immunization	Assay Antigen	Antigen Epitope Relation	MHC Restriction	Assay Description	
13836508	Jun Siong Low; Science 2021	LSRLDKVEAEVQIDR Spike glycoprotein (981-995) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	S protein S protein SARS coronavirus Urbani (SARS-CoV (Urbani strain))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive	
13836509	Jun Siong Low; Science 2021	LSRLDKVEAEVQIDR Spike glycoprotein (981-995) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus OC43] spike protein [Human coronavirus OC43] Human coronavirus OC43 (Human coronavirus (strain OC43))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive	
13835984	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	Spike glycoprotein Spike glycoprotein SARS-CoV2	Source Antigen	HLA class II	3H-thymidine proliferation Positive	
13836273	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	S protein S protein SARS coronavirus Urbani (SARS-CoV (Urbani strain))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive	
13836298	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus OC43] spike protein [Human coronavirus OC43] Human coronavirus OC43 (Human coronavirus (strain OC43))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive	
13836456	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source	spike protein [Human coronavirus NL63] spike protein [Human	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive	

# Results Page: Assays Tab – Assay Details Reference

Reference		
Reference Type	Literature	IEDB_Reference:1038797
Title	Clonal analysis of immunodominance and cross-reactivity of the CD4 T cell response to SARS-CoV-2.	
Authors	Jun Siong Low; Daniela Vaqueirinho; Federico Mele; Mathilde Foglierini; Josipa Jerak; Michela Perotti; David Jarrossay; Sandra Jovic; Laurent Perez; Rosalia Cacciatore; Tatiana Terrot; Alessandra Franzetti Pellanda; Maira Biggiogero; Christian Garzoni; Paolo Ferrari; Alessandro Ceschi; Antonio Lanzavecchia; Federica Sallusto; Antonino Cassotta	
Affiliations	Institute for Research in Biomedicine, Università della Svizzera Italiana, 6500 Bellinzona, Switzerland; Laboratory of Immunogenetics, Department of Transfusion Medicine and Immuno-Hematology, Fondazione I.R.C.C.S. Policlinico S. Matteo, 27100 Pavia, Italy; Clinical Trial Unit, Ente Ospedaliero Cantonale, 6500 Bellinzona, Switzerland; Clinic of Internal Medicine and Infectious Diseases, Clinica Luganese Moncucco, 6900 Lugano, Switzerland; Faculty of Biomedical Sciences, Università della Svizzera italiana, 6900 Lugano, Switzerland; Department of Internal Medicine, Ente Ospedaliero Cantonale, 6500 Bellinzona, Switzerland; Prince of Wales Hospital Clinical School, University of New South Wales, Sydney, New South Wales 2052, Australia; Division of Clinical Pharmacology and Toxicology, Institute of Pharmacological Sciences of Southern Switzerland, Ente Ospedaliero Cantonale, 6900 Lugano, Switzerland; Department of Clinical Pharmacology and Toxicology, University Hospital Zurich, 8091 Zurich, Switzerland; National Institute of Molecular Genetics, 20122 Milano, Italy; Institute for Research in Biomedicine, Università della Svizzera Italiana, 6500 Bellinzona, Switzerland. federica.sall...	
Journal	Science	<a href="#">PMID:34006597</a> 
Year	2021	
Abstract	The identification of CD4 <sup>+</sup> T cell epitopes is instrumental for the design of subunit vaccines for broad protection against coronaviruses. Here we demonstrate in COVID-19-recovered individuals a robust CD4 <sup>+</sup> T cell response to naturally processed SARS-CoV-2 spike (S) and nucleoprotein (N), including effector, helper, and memory T cells. By characterizing 2943 S-reactive T cell clones from 34 individuals, we found that 34% of clones and 93% of individuals recognized a conserved immunodominant S346-365 region within the RBD comprising nested HLA-DR- and HLA-DP-restricted epitopes. Using pre- and post-COVID-19 samples and S proteins from endemic coronaviruses, we identify cross-reactive T cells targeting multiple S protein sites. The immunodominant and cross-reactive epitopes identified can inform vaccination strategies to counteract emerging SARS-CoV-2 variants.	
Curation Last Updated	2021-08-17 20:01:02	

# Results Page: Assays Tab – Assay Details

## Epitope

Epitope		
Epitope ID	1310620	IEDB_epitope:1310620
Chemical Type	Linear peptide	
Linear Sequence	LSRLDKVEAEVQIDR	
Source Molecule Name	Spike glycoprotein	GenPept:P0DTC2.1 <a href="#">🔗</a>
Source Organism	SARS-CoV2	NCBITaxon:2697049 <a href="#">🔗</a>
Starting Position	981	
Ending Position	995	

Epitope Reference Details		
Epitope Structure Defines	Exact Epitope	
Epitope Name	SARS CoV2 S 981-995	
Location of Data in Reference	Supplementary Table S5	

# Results Page: Assays Tab – Assay Details

## Immunization

Immunization		
Host Organism	Homo sapiens (human)	<a href="#">NCBITaxon:9606</a>

1st In Vivo Process		
In Vivo Process Type	Occurrence of infectious disease	
Disease State	COVID-19	<a href="#">DOID:0080600</a>
Disease Stage	Post;	

1st Immunogen		
Epitope Relation	Source Organism	
Object Type	Organism	
Organism	SARS-CoV2	<a href="#">NCBITaxon:2697049</a>

In Vitro Administration		
In Vitro Process Type	Restimulation in vitro	
Responder Cell Type	PBMC	<a href="#">CL:2000001</a>
Stimulator Cell Type	PBMC	<a href="#">CL:2000001</a>

In Vitro Immunogen		
In Vitro Process Type	Source Antigen	
Chemical Type	Protein	
Molecule Name	Spike glycoprotein	<a href="#">GenPept:P0DTC2.1</a>
Organism	SARS-CoV2	<a href="#">NCBITaxon:2697049</a>

Immunization Comments		
Immunization Comments	Cells from COVID-19 individuals were stimulated with S protein. CSFE cells were expanded and restimulated with S protein from human beta (SARS-CoV, HKU1, and OC43) or alpha (NL63 and 229E) coronaviruses and proliferating T cells were cloned by limiting dilution.	

# Results Page: Assays Tab – Assay Details

T Cell Assay		
Qualitative Measurement	Positive	
Method/Technique	3H-thymidine	<a href="#">OBI:1110180</a>
Measurement of	proliferation	

Effector Cells		
Effector Cell Tissue Type	Blood	<a href="#">UBERON:0000178</a>
Effector Cell Type	T cell CD4+	<a href="#">CL:0000624</a>
Effector Cell Culture Conditions	Cell Line / Clone	

Assayed TCR Molecule		
Assayed TCR Molecule Name	P34-NL63-A2	

Antigen Presenting Cells		
Cell Tissue Type	Blood	<a href="#">UBERON:0000178</a>
Cell Type	PBMC	<a href="#">CL:2000001</a>
Cell Culture Conditions	Direct Ex Vivo	



# Results Page: Assays Tab – Assay Details

MHC Allele		
MHC Allele Name	HLA class II	<a href="#">MRO:0001455</a>
MHC Evidence Code	T cell assay -T cell subset identification	

Antigen		
Epitope Relation	Taxonomic Sibling	
Chemical Type	Protein	
Molecule Name	S protein	<a href="#">GenPept:AAP13441.1</a>
Organism	SARS coronavirus Urbani (SARS-CoV (Urbani strain))	<a href="#">NCBITaxon:228330</a>

Assay Reference Details		
Assay Comments by IEDB Curator	Epitope-specific clones reacted with the antigen.	
Location of Assay Data in Reference	Table S5	

# Results Page: Receptors Tab – Subtabs & Groups

Current Filters:  Organism: SARS-CoV2 (ID:2697049, SARS2)  Include Positive Assays

Epitopes  
(6941)

Antigens  
(16)

Assays  
(15103)

Receptors  
(85061)

References  
(202)

T Cell Receptors  
(85034)

B Cell Receptors  
(27)

Go To Records Starting At

[Export Results](#)

85034 Records Found

Page  of 3402

Per Page

Group ID	Species	Type	Chain 1 CDR3	Chain 2 CDR3
8670	Homo sapiens (human)	αβ	not available	ASSIRSSYEQY
8675	Homo sapiens (human)	αβ	not available	ASSSVNEQF
8678	Homo sapiens (human)	αβ	not available	ASSIGVYGYT
8681	Homo sapiens (human)	αβ	not available	ASSIRSAYEQY
8684	Homo sapiens (human)	αβ	not available	ASSSRSSYEQY
8685	Homo sapiens (human)	αβ	not available	ASSTRSAYEQY
8686	Homo sapiens (human)	αβ	not available	ASSVRSSYEQY
8687	Homo sapiens (human)	αβ	not available	ASSIGSYGYT
8786	Homo sapiens (human)	αβ	not available	ASSSDSSYEQY
9083	Homo sapiens (human)	αβ	not available	SVGNEQF
9095	Homo sapiens (human)	αβ	not available	SVGDGNTGELF
9314	Homo sapiens (human)	αβ	not available	ASSLAGGYEQY
9337	Homo sapiens (human)	αβ	not available	SVERDTEAF
9447	Homo sapiens (human)	αβ	not available	ASSLGGTEAF
9563	Homo sapiens (human)	αβ	not available	ATSRDPGSYEQY
9702	Homo sapiens (human)	αβ	not available	ATSAGNTGELF
9713	Homo sapiens (human)	αβ	not available	ATSRGQGYEQY
9778	Homo sapiens (human)	αβ	not available	ASSPYSNQPQH
9813	Homo sapiens (human)	αβ	not available	SASTENTGELF
10007	Homo sapiens (human)	αβ	not available	ASSGYNEQF
10011	Homo sapiens (human)	αβ	not available	ASSEGSYEQY
10071	Homo sapiens (human)	αβ	not available	ASSLGGGPSYEQY
10169	Homo sapiens (human)	αβ	not available	ASSLYNEQF

# Results Page: Receptors Tab – Receptor Group

**T cell receptor (receptor group ID 8670)**

Alpha beta TCR with alpha chain CDR3 of AGAGSQGNLI and beta chain CDR3 of ASSIRSSYEYQ was reported in Homo sapiens (human). This TCR has accessions for alpha chain 5HHO\_D and beta chain 5HHO\_E and was shown in 3D Structures 5HHO and 5EUO.

alpha		beta		Epitopes (# assays)
Gene usage	CDR sequences	Gene usage	CDR sequences	
V:TRAV27*01 D: J:TRAJ42*01	CDR1:SVFSS CDR2:VVTGGGEV CDR3:AGAGSQGNLI	V:TRBV19*01 D: J:TRBJ2-7*01	CDR1:LNHDA CDR2:SQIVND CDR3:ASSIRSSYEYQ	GILEFVFTL (1)
V Domain: LEQSPQFLSIQEGENLIVYCNSSSVFSSLQ...		V Domain: GITQSPKYLFRKEGQNVTLSCQQLNHDM...		
V:TRAV27 D: J:TRAJ37	CDR1: CDR2: CDR3:AGAIGSSNTGKLI	V:TRBV19 D: J:TRBJ2-7	CDR1: CDR2: CDR3:ASSIRSSYEYQ	GILGFVFTL (3)
V Domain:		V Domain:		
V: D: J:	CDR1: CDR2: CDR3:	V:TRBV19 D: J:TRBJ2-7	CDR1: CDR2: CDR3:ASSIRSSYEYQ	GILGFVFTL (1), LLWNGPMAV (1), FLPFFSNVTWFHAI (2), VQPTEIVRFPNITNLCPF (1), YRARAGEAANF (1)
V Domain:		V Domain:		
V: D: J:	CDR1: CDR2: CDR3:	V:TRBV19 D: J:TRBJ2-7*01	CDR1: CDR2: CDR3:ASSIRSSYEYQ	GILGFVFTL (2)
V Domain:		V Domain:		
V: D: J:	CDR1: CDR2: CDR3:	V:TRBV30*01 D: J:TRBJ2-7*01	CDR1: CDR2: CDR3:ASSIRSSYEYQ	GILGFVFTL (2)
V Domain:		V Domain:		
V: D: J:	CDR1: CDR2: CDR3:	V:TRBV7-2*01 D: J:TRBJ2-7*01	CDR1: CDR2: CDR3:ASSIRSSYEYQ	GILGFVFTL (2)
V Domain:		V Domain:		
V: D: J:	CDR1: CDR2: CDR3:	V:TRBV25-1*01 D: J:TRBJ2-7*01	CDR1: CDR2: CDR3:ASSIRSSYEYQ	GILGFVFTL (2)
V Domain:		V Domain:		

**Epitope summary**

This TCR was studied for the following epitopes GILEFVFTL studied as part of Matrix protein 1 from Influenza A virus (epitope ID 538549, 1 publication, 1 assay), GILGFVFTL studied as part of Matrix protein 1 from Influenza A virus (epitope ID 20354, 2 publications, 8 assays), LLWNGPMAV studied as part of Genome polyprotein from Yellow fever virus (Flavivirus febricis) (epitope ID 121572, 1 publication, 1 assay), FLPFFSNVTWFHAI studied as part of Spike glycoprotein from SARS-CoV2 (epitope ID 1074888, 1 publication, 2 assays), VQPTEIVRFPNITNLCPF studied as part of Spike glycoprotein from SARS-CoV2 (epitope ID 1075108, 1 publication, 1 assay) and YRARAGEAANF studied as part of Replicase polyprotein 1ab from SARS-CoV1 (epitope ID 1075129, 1 publication, 1 assay).

# Results Page: References Tab – Table Headers

Current Filters: ✖ Organism: SARS-CoV2 (ID:2697049, SARS2) ✖ Include Positive Assays

Epitopes (6941)
Antigens (16)
Assays (15103)
Receptors (85061)
References (202)

Go To Records Starting At   Export Results

202 Records Found Page 1 of 9 25 Per Page

Ref ID	PMID	Author	Title	Journal	Date
1038788	33980582	Xiaojuan Liu; Yuzhong Li; Hongjian Xiao; Yanwei Bi; Yue Gong; Zhengrong R Hu; Yaxin Zeng; Ming Sun; Zhanlong L He; Shan Lu; Qihan Li; Wei Cun	Identification of T Cell Epitopes in the Spike Glycoprotein of Severe Acute Respiratory Syndrome Coronavirus 2 in Rhesus Macaques.	J Immunol	2021
1038873	34070152	Paul E Harris; Trevor Brasel; Christopher Massey; C V Herst; Scott Burkholz; Peter Lloyd; Tikoos Blankenberg; Thomas M Bey; Richard Carback; Thomas Hodge; Serban Ciotlos; Lu Wang; Jason E Comer; Reid M Rubsamen	A Synthetic Peptide CTL Vaccine Targeting Nucleocapsid Confers Protection from SARS-CoV-2 Challenge in Rhesus Macaques.	Vaccines (Basel)	2021
1038245	33594356	Michael Diamond; Rita Chen; Xuping Xie; James Case; Xianwen Zhang; Laura VanBlargan; Yang Liu; Jianying Liu; John Errico; Emma Winkler; Naveenchandra Suryadevara; Stephen Tahan; Jackson Turner; Wooseob Kim; Aaron Schmitz; Mahima Thapa; David Wang; Andrianus Boon; Dora Pinto; Rachel Presti; Jane O'Halloran; Alfred Kim; Parakkal Deepak; Daved Fremont; Davide Corti; Herbert Virgin; James Crowe; Lindsay Droit; Ali Ellebedy; Pei-Yong Shi; Pavlo Gilchuk	SARS-CoV-2 variants show resistance to neutralization by many monoclonal and serum-derived polyclonal antibodies.	Res Sq	2021
1037798	33521695	Alison Tarke; John Sidney; Conner K Kidd; Jennifer M Dan; Sydney I Ramirez; Esther Dawen Yu; Jose Mateus; Ricardo da Silva Antunes; Erin Moore; Paul Rubiro; Nils Methot; Elizabeth Phillips; Simon Mallal; April Frazier; Stephen A Rawlings; Jason A Greenbaum; Bjoern Peters; Davey M Smith; Shane Crotty; Daniela Weiskopf; Alba Grifoni; Alessandro Sette	Comprehensive analysis of T cell immunodominance and immunoprevalence of SARS-CoV-2 epitopes in COVID-19 cases. (includes author submission)	Cell Rep Med	2020
1037842	33325143	Ziwei Chen; Pinglang Ruan; Lili Wang; Xinmin Nie; Xuejun Ma; Yurong Tan	T and B cell Epitope analysis of SARS-CoV-2 S protein based on immunoinformatics and experimental research.	J Cell Mol Med	2021
1037906	33443088	Eunok Lee; Kerrie Sandgren; Gabriel Duette; Vicki V Stylianou; Rajiv Khanna; John-Sebastian Eden; Emily Blyth; David Gottlieb; Anthony L Cunningham; Sarah Palmer	Identification of SARS-CoV-2 Nucleocapsid and Spike T-Cell Epitopes for Assessing T-Cell Immunity.	J Virol	2021
1038034	33521593	Christopher Szeto; Demetra S M Chatzileontiadou; Andrea T Nguyen; Hannah Sloane; Christian A Lobos; Dhilshan Jayasinghe; Hanim Halim; Corey Smith; Alan Riboldi-Tunncliffe; Emma J Grant; Stephanie Gras	The presentation of SARS-CoV-2 peptides by the common HLA-A*02:01 molecule.	iScience	2021
1038382	33664060	Benedikt Agerer; Maximilian Koblishcke; Venugopal Gudipati; Luis Fernando Montaña-Gutierrez; Mark Smyth; Alexandra Popa; Jakob-Wendelin Genger; Lukas Ender; David M Florian; Vanessa Mühlgrabner; Marianne Czerniger; Stefan W Abeler; Anna Maria Huss; Lisa Ellen	SARS-CoV-2 mutations in MHC-I-restricted epitopes evade CD8 <sup>+</sup> T cell responses.	Sci Immunol	2021

# User Queries: How to see the differences between B and T cell responses AND identify SARS-CoV2 CD4 and CD8 T cell epitopes

# Results Page: Assays Tab – Subtabs

Current Filters: ✖ Organism: SARS-CoV2 (ID:2697049, SARS2) ✖ Include Positive Assays

Epitopes (6941)
Antigens (16)
Assays (15103)
Receptors (85061)
References (202)

T Cell Assays (4203)
B Cell Assays (8945)
MHC Ligand Assays (1955)

Go To Records Starting At   [Export Results](#)

4203 Records Found Page 1 of 169 25 Per Page

ID	Reference	Epitope	Host	Immunization	Assay Antigen	Antigen Epitope Relation	MHC Restriction	Assay Description
13836508	Jun Siong Low; Science 2021	LSRLDKVEAEVQIDR Spike glycoprotein (981-995) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	S protein S protein SARS coronavirus Urbani (SARS-CoV (Urbani strain))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive
13836509	Jun Siong Low; Science 2021	LSRLDKVEAEVQIDR Spike glycoprotein (981-995) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus OC43] spike protein [Human coronavirus OC43] Human coronavirus OC43 (Human coronavirus (strain OC43))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive
13835984	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	Spike glycoprotein Spike glycoprotein SARS-CoV2	Source Antigen	HLA class II	3H-thymidine proliferation Positive
13836273	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	S protein S protein SARS coronavirus Urbani (SARS-CoV (Urbani strain))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive
13836298	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus OC43] spike protein [Human coronavirus OC43] Human coronavirus OC43 (Human coronavirus (strain OC43))	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive
13836456	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source	spike protein [Human coronavirus NL63] spike protein [Human	Taxonomic Sibling	HLA class II	3H-thymidine proliferation Positive

# Results Page: Additional Filters - Differences Between B and T Cell Responses

Select multiple options

---

**Receptor** ?

Has sequence

Type Any Type

Paired chains only

---

Chain Any Type

Sequence Exact Matches

---

**Assay** ?

Outcome:  Positive  Negative

T Cell

B Cell

MHC Ligand

Ex: IL-2 release Find

Ex: ELISA Find

Ex: purified MHC binding Find

---

**MHC Restriction** ?

Any

Class I

Class II

Non-classical

Ex: HLA-A\*02:01 Find

Resolution

Evidence

---

**Host** ?

13836298	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	restimulation in vitro	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus OC43] spike protein [Human coronavirus OC43] Human coronavirus OC43 (Human coronavirus (strain OC43))	Taxonomic Sibli
13836456	Jun Siong Low; Science 2021	SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus NL63] spike protein [Human coronavirus NL63] Human coronavirus NL63 (Coronavirus NL63)	Taxonomic Sibli
		SFIEDLLFNKVTLD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	S [Human coronavirus 229E] S [Human coronavirus 229E] Human coronavirus 229E (Coronavirus 229E)	Taxonomic Sibli
		RDISTEIQAGSTPC Spike glycoprotein (466-485) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	RDISTEIQAGSTPC NGVEG Spike glycoprotein (466-485) SARS-CoV2	Epitope
13836464	Jun Siong Low; Science 2021	LSRLDKVEAEVQIDR LITGR Spike glycoprotein (981-1000) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	Spike glycoprotein Spike glycoprotein SARS-CoV2	Source Antigen
13836466	Jun Siong Low; Science 2021	LSRLDKVEAEVQIDR LITGR Spike glycoprotein (981-1000) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus OC43] spike protein [Human coronavirus OC43] Human coronavirus OC43 (Human coronavirus (strain OC43))	Taxonomic Sibli
13836467	Jun Siong Low;		Homo sapiens	Infectious disease via	Infectious disease via	Spike glycoprotein	Taxonomic Sibli



# Results Page: Additional Filters - Differences Between B and T Cell Responses

T cell assays only = T cell epitopes (1,907 epitopes)

**Pending Filters**

**Filter Options**  Default

**Epitope**  Any

**Pending Filters**  Organism: SARS-CoV2 (ID:2697049, SARS2)  Include Positive Assays  No B cell assays  No MHC assays

**Epitopes** (6941) **Antigens** (16) **Assays** (15103) **Receptors** (85061)

T Cell Assays (4203) B Cell Assays (8945) MHC Ligand Assays (1955)

Go To Records Starting At A,b

4203 Records Found Page 1 of 169

ID	Reference	Epitope	Host	Immunization	Assay Antigen	Antigen Epitope Relation	MHC Restriction
----	-----------	---------	------	--------------	---------------	--------------------------	-----------------

**Pending Filters**

**Filter Options**  Default

**Epitope**  Any  Linear peptide Length Sequence  Discontinuous  Non-peptidic  3D structure available Amino acid modification

**Current Filters:**  Organism: SARS-CoV2 (ID:2697049, SARS2)  Include Positive Assays  No B cell assays  No MHC assays

**Epitopes** (1907) **Antigens** (11) **Assays** (4203) **Receptors** (85034)

T Cell Assays (4203) B Cell Assays (0) MHC Ligand Assays (0)

Go To Records Starting At A,b

4203 Records Found Page 1 of 169

ID	Reference	Epitope	Host	Immunization	Assay Antigen	Antigen Epitope Relation	MHC Restriction
13836508	Jun Siong Low; Science 2021	LSRLDKVEAEVQIDR Spike glycoprotein (981-995) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	S protein S protein SARS coronavirus Urbani (SARS-CoV (Urbani strain))	Taxonomic Sibling	HLA class II
13836509	Jun Siong Low; Science 2021	LSRLDKVEAEVQIDR Spike glycoprotein (981-995) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus OC43] spike protein [Human coronavirus OC43] Human coronavirus OC43 (Human)	Taxonomic Sibling	HLA class II



# Results Page: Additional Filters - Differences Between B and T Cell Responses

**B cell assays only = B cell epitopes (4,250 epitopes)**

Current Filters:  Organism: SARS-CoV2 (ID:2697049, SARS2)  Include Positive Assays  No T cell assays  No MHC assays

Epitopes (4250)
  Antigens (14)
  Assays (8945)
  Receptors (27)
  References (140)

T Cell Assays (0)
  B Cell Assays (8945)
  MHC Ligand Assays (0)

Go To Records Starting At   [Export Results](#)

8945 Records Found     Per Page

ID	Reference	Epitope	Host	Immunization	Assay Antigen	Antigen Epitope Relation	Assay Description
7690571	Chek Meng Poh; Nat Commun 2020	TESNKKFLPFQQFGRDIA surface glycoprotein [Severe acute respiratory syndrome coronavirus 2] (553-570) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism)	TESNKKFLPFQQFGRDIA surface glycoprotein [Severe acute respiratory syndrome coronavirus 2] (553-570) SARS-CoV2	Epitope	antigen inhibition qualitative binding Positive
7690585	Chek Meng Poh; Nat Commun 2020	PSKPSKRSFIEDLLFNKV surface glycoprotein [Severe acute respiratory syndrome coronavirus 2] (809-826) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism)	PSKPSKRSFIEDLLFNKV surface glycoprotein [Severe acute respiratory syndrome coronavirus 2] (809-826) SARS-CoV2	Epitope	antigen inhibition qualitative binding Positive
12801858	Anna Z Wec; Science 2020	Y369, N370, S371, A372, F374, F377, K378, C379, Y3... surface glycoprotein [Severe acute respiratory syndrome coronavirus 2] SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to Severe acute respiratory syndrome-related coronavirus (Human coronavirus (strain SARS)) (Taxonomic Sibling)	surface glycoprotein [Severe acute respiratory syndrome coronavirus 2] surface glycoprotein [Severe acute respiratory syndrome coronavirus 2] SARS-CoV2	Source Antigen	binding assay dissociation constant KD Positive

# User Queries: How to see the differences between B and T cell responses AND identify SARS-CoV2 CD4 and CD8 T cell epitopes

**Assay ?**

Outcome:  Positive

T Cell  
 B Cell  
 MHC Ligand

13836457	Jun Siong Low; Science 2021	SFIEDLLFNKVTLAD Spike glycoprotein (816-830) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	S [Human coronavirus 229E] S [Human coronavirus 229E] Human coronavirus 229E (Coronavirus 229E)	Taxonomic Sibling	HLA class II
13849429	Jun Siong Low; Science 2021	RDISTEIQAGSTPC NGVEG Spike glycoprotein (466-485) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	RDISTEIQAGSTPC NGVEG Spike glycoprotein (466-485) SARS-CoV2	Epitope	HLA class II
		SRLDKVEAEVQIDR ITGR Spike glycoprotein (81-1000) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	Spike glycoprotein Spike glycoprotein SARS-CoV2	Source Antigen	HLA class II
		SRLDKVEAEVQIDR ITGR Spike glycoprotein (81-1000) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	spike protein [Human coronavirus OC43] spike protein [Human coronavirus OC43] Human coronavirus OC43 (Human coronavirus (strain OC43))	Taxonomic Sibling	HLA class II
13836467	Jun Siong Low; Science 2021	LSRLDKVEAEVQIDR LITGR Spike glycoprotein (981-1000) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism) followed by restimulation in vitro	Spike glycoprotein Spike glycoprotein Human coronavirus HKU1 (isolate N5)	Taxonomic Sibling	HLA class II

**MHC Restriction ?**

Any  
 Class I  
 Class II  
 Non-classical

Ex: HLA-A\*02:01 Find

Resolution: Any

Evidence: Select multiple options

**Host ?**

Any  
 Human  
 Mouse

# User Queries: How to see the differences between B and T cell responses AND identify CD8 T cell epitopes (1,273)

Current Filters: ✕ Organism: SARS-CoV2 (ID:2697049, SARS2) ✕ Include Positive Assays ✕ No B cell assays ✕ No MHC assays ✕ MHC Restriction Type: Class I

Epitopes (1273)    Antigens (11)    Assays (2588)    Receptors (85026)    References (49)

Go To Records Starting At      Export Results

1273 Records Found    Page  of 51    25 Per Page

Details	Epitope	Antigen	Organism	# References	# Assays
1309147	YLQPRTFLL	Spike glycoprotein	SARS-CoV2	16	60
37473	LLLDRLNQL	Nucleoprotein	SARS-CoV2	12	16
60242	SPRWYFYLY	Nucleoprotein	SARS-CoV2	10	54
1310756	QYIKWPWYI	Spike glycoprotein	SARS-CoV2	10	16
16156	FIAGLIAIV	Spike glycoprotein	SARS-CoV2	7	13
21347	GMSRIGMEV	Nucleoprotein	SARS-CoV2	7	8
33667	KTFPPTPEPK	Nucleoprotein	SARS-CoV2	7	30
1309115	FTSDYYQLY	ORF3a protein	SARS-CoV2	7	13
1310623	LTDEMAQY	Spike glycoprotein	SARS-CoV2	7	18
17385	FPRGQGVPI	Nucleoprotein	SARS-CoV2	6	8
28050	IPRRNVATL	Replicase polyprotein 1ab	SARS-CoV2	6	10
72048	VYIGDPAQL	Replicase polyprotein 1ab	SARS-CoV2	6	14
190494	MEVTPSGTWL	Nucleoprotein	SARS-CoV2	6	17
1313269	NYNYLYRLF	Spike glycoprotein	SARS-CoV2	6	10
34851	LALLLLDRL	Nucleoprotein	SARS-CoV2	5	12
69657	VLNDILSRL	Spike glycoprotein	SARS-CoV2	5	6

# User Queries: How to see the differences between B and T cell responses AND identify CD4 T cell epitopes (613)

Current Filters:  Organism: SARS-CoV2 (ID:2697049, SARS2)  Include Positive Assays  No B cell assays  No MHC assays  MHC Restriction Type: Class II

Epitopes (613)    Antigens (11)    Assays (1494)    Receptors (8)    References (26)

Go To Records Starting At      Export Results

613 Records Found    Page  of 25     Per Page

Details	Epitope	Antigen	Organism	# References	# Assays
1309132	NFSQILPDPSKPSKR	Spike glycoprotein	SARS-CoV2	5	11
1310598	LLLLDRLNQLESKMS	Nucleoprotein	SARS-CoV2	5	16
1310622	LSYYKLGASQRVAGD	Membrane protein	SARS-CoV2	5	20
1131160	DDQIGYYRRATRRIR	Nucleoprotein	SARS-CoV2	4	11
1310286	ASAFFGMSRIGMEVT	Nucleoprotein	SARS-CoV2	4	14
1310430	FYVYSRVKNLNSSRV	Envelope small membrane protein	SARS-CoV2	4	8
1310865	TRFQTLALHRSYLT	Spike glycoprotein	SARS-CoV2	4	12
1071580	NLLLQYGSFCTQLNR	Spike glycoprotein	SARS-CoV2	3	7
1309110	CTFEYVSQPFLMDLE	Spike glycoprotein	SARS-CoV2	3	10
1309140	TDEMIAQYTSALLAG	Spike glycoprotein	SARS-CoV2	3	6
1310428	FYSKWYIRVGARKSA	ORF8 protein	SARS-CoV2	3	16
1310476	HWFVTQRNFYEPQII	Spike glycoprotein	SARS-CoV2	3	8
1310488	IGYYRRATRRIRGGD	Nucleoprotein	SARS-CoV2	3	8
1310503	IPFAMQMAYRFNGIG	Spike glycoprotein	SARS-CoV2	3	9
1310517	IWNLDYIINLIKNL	ORF6 protein	SARS-CoV2	3	6
1310701	NVTWFHAIHVSQTNG	Spike glycoprotein	SARS-CoV2	3	4
1310780	RWYFYFLGTGPEAGL	Nucleoprotein	SARS-CoV2	3	9

# User Queries: How to see the differences between B and T cell responses

## Immunome Browser

Current Filters:  Organism: SARS-CoV2 (ID:2697049, SARS2)  Include Positive Assays  No T cell assays  No MHC assays

Epitopes (4343) **Antigens (13)** Assays (9476) Receptors (27) References (147)

Go To Records Starting At   [Export Results](#)

13 Records Found   Page  of 1    Per Page

Antigen	Organism	# Epitopes	# Assays	# References
Spike glycoprotein	SARS-CoV2	1408	4119	137
Nucleoprotein	SARS-CoV2	377	588	17
Two components:Spike glycoprotein & Spike glycoprotein	SARS-CoV2	15	119	8
Replicase polyprotein 1ab	SARS-CoV2	2163	4030	7
Membrane protein	SARS-CoV2	119	160	6
ORF3a protein	SARS-CoV2	103	194	5

# User Queries: How to see the differences between B and T cell responses

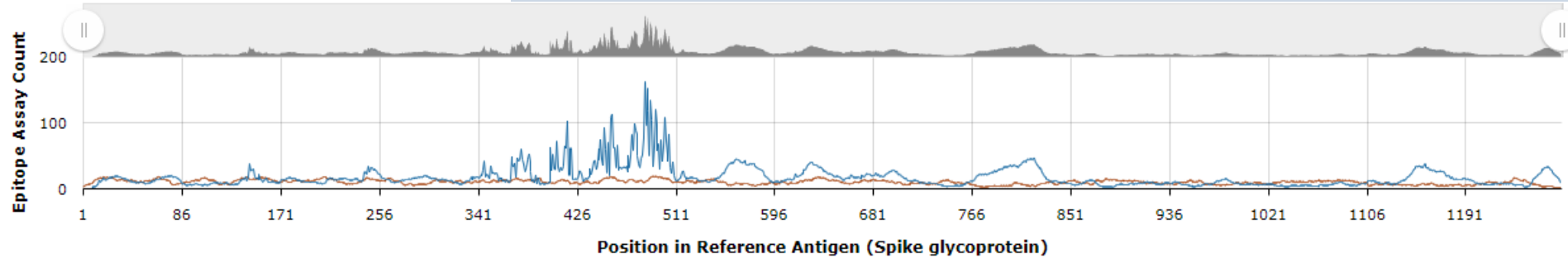
## B cell

Immunome Browser ?

SARS-CoV2 - Spike glycoprotein (UniProt:P0DTC2)

Pending Filters

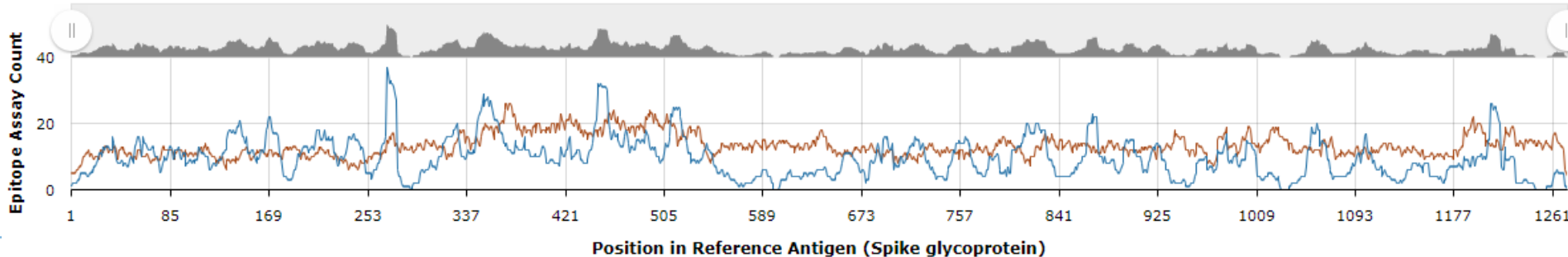
Negative  Positive



## T cell

Pending Filters

Negative  Positive



# User Queries: How to see the differences between B and T cell responses

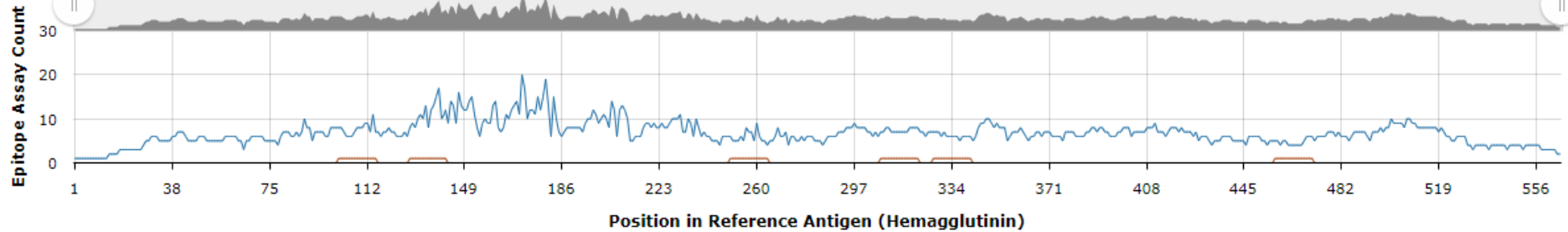
## B cell

Influenza A virus - Hemagglutinin ([UniProt:P03452](#))

Pending Filters

Negative

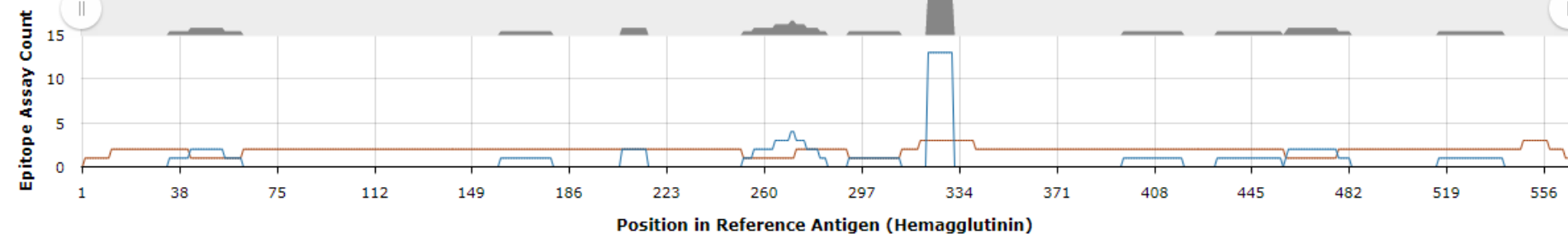
Positive



## T cell

Negative

Positive



# User Queries: How to see spike specific T cell epitopes induced by infection

Build query:  
T cell  
epitopes  
from SARS-  
COV2 in  
donors with  
COVID19

The screenshot shows the IEDB search interface with the following settings:

- START YOUR SEARCH HERE**
- Epitope**: Any (selected), Linear peptide, Discontinuous, Non-peptidic. Exact M: SIINFEEKL.
- Assay**: T Cell (checked), B Cell, MHC Ligand. Outcome: Positive (checked), Negative.
- Epitope Source**: Organism: SARS-CoV2 (ID:26971) (checked and circled in red with a '1'). Antigen: core, capsid, myosin.
- MHC Restriction**: Any (selected), Class I, Class II, Non-classical. Ex: HLA-A\*02:01.
- Host**: Any (selected), Human, Mouse, Non-human primate, dog, camel.
- Disease**: Any, Infectious, Allergic, Autoimmune, covi (checked and circled in red).
  - COVID-19 (ID:DOID:0080600, COVID19)
  - cystic fibrosis (ID:DOID:1485, mucoviscidosis)
  - asymptomatic COVID-19 infection (ID:ONTIE:0003546)

**Epitope Analysis Resources**

- T Cell Epitope Prediction**: Scan an antigen sequence for patterns indicative of:
  - MHC I Binding
  - MHC II Binding
  - MHC I Processing (Proteas)
  - MHC I Immunogenicity
- B Cell Epitope Prediction**: Predict linear B cell epitopes using:
  - Antigen Sequence PropertiesPredict discontinuous B cell epitope structure via:
  - DiscoTope
  - ElliPro
- Epitope Analysis Tools**: Analyze epitope sets of:
  - Population Coverage
  - Conservation Across Antigens
  - Clusters with Similar Sequences



# User Queries: How to see **spike specific** T cell epitopes induced by infection

**Limit query:** SARS-COV2 spike protein filter

Current Filters: ✗ Organism: SARS-CoV2 (ID:2697049, SARS2) ✗ Include Positive Assays ✗ No B cell assays ✗ No MHC assays ✗ Disease Data: COVID-19 (ID:DOID:0080600, COVID19)

Epitopes (1364)	Antigens (11)	Assays (2593)	Receptors (13317)	References (35)	
Go To Records Starting At <input type="text" value="1200"/> <input type="button" value="GO"/>					
1364 Records Found					
Page <input type="text" value="1"/> of 55					
Export Results					
25 Per Page					
Details	Epitope	Antigen	Organism	# References	# Assays
	YLQPRFTLL	Spike glycoprotein	SARS-CoV2	14	50
	SPRWYFYLL	Nucleoprotein	SARS-CoV2	9	33
	LLLDRLNQL	Nucleoprotein	SARS-CoV2	8	11
	QYIKWPWYI	Spike glycoprotein	SARS-CoV2	8	11
	KTFPPTPEPK	Nucleoprotein	SARS-CoV2	7	30
	FTSDYYQLY	ORF3a protein	SARS-CoV2	7	13
	LTDEMIQAY	Spike glycoprotein	SARS-CoV2	7	13
	FIAGLIAIV	Spike glycoprotein	SARS-CoV2	6	7
	MEVTPSGTWL	Nucleoprotein	SARS-CoV2	6	17
	FPRGQGVPI	Nucleoprotein	SARS-CoV2	5	7
	GMSRIGMEV	Nucleoprotein	SARS-CoV2	5	5
	IPRRNVATL	Replicase polyprotein 1ab	SARS-CoV2	5	6
	VLNDILSRL	Spike glycoprotein	SARS-CoV2	5	5
	VYIGDPQI	Replicase polyprotein 1ab	SARS-CoV2	5	6

# User Queries: How to see spike specific T cell epitopes induced by infection

## Limit query: SARS-COV2 spike protein filter

Current Filters: ✖ Organism: SARS-CoV2 (ID:2697049, SARS2) ✖ **Antigen: Spike glycoprotein** ✖ Include Positive Assays ✖ No B cell assays ✖ No MHC assays  
✖ Disease Data: COVID-19 (ID:DOID:0080600, COVID19)

Epitopes (464)    Antigens (1)    Assays (890)    Receptors (2188)    References (29)

Go To Records Starting At      Export Results

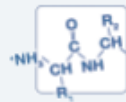
464 Records Found    Page  of 19     Per Page

Details	Epitope	Antigen	Organism	# References	# Assays
1309147	YLQPRTFLL	Spike glycoprotein	SARS-CoV2	14	50
1310756	QYIKWPWYI	Spike glycoprotein	SARS-CoV2	8	11
1310623	LTDEMIQAY	Spike glycoprotein	SARS-CoV2	7	13
16156	FIAGLIAIV	Spike glycoprotein	SARS-CoV2	6	7
69657	VLNDILSRL	Spike glycoprotein	SARS-CoV2	5	5
1313269	NYNLYRLF	Spike glycoprotein	SARS-CoV2	5	8
1309132	NFSQILPDPSPKSKR	Spike glycoprotein	SARS-CoV2	4	10
1311170	KCYGVSPTK	Spike glycoprotein	SARS-CoV2	4	8
2801	ALNTLVKQL	Spike glycoprotein	SARS-CoV2	3	3
54680	RLNEVAKNL	Spike glycoprotein	SARS-CoV2	3	3
71663	VWFLHVTYV	Spike glycoprotein	SARS-CoV2	3	4
1074915	GTHWFVTQR	Spike glycoprotein	SARS-CoV2	3	3
1074981	LPQGSFAL	Spike glycoprotein	SARS-CoV2	3	4
1075075	TLDSKTQSL	Spike alvcooprotein	SARS-CoV2	3	4


# User Queries: How can we assess the protective capability of the epitopes of the database?

Look for epitopes that were tested for in vivo protection assays


**START YOUR SEARCH HERE ?**

**Epitope ?** 


Any  
 Linear peptide  
Exact M  Ex: SIINFEKL  
 Discontinuous  
 Non-peptidic

**Assay ?** 


T Cell  
 B Cell  
 MHC Ligand  
Ex: neutralization    
Outcome:  Positive  Negative

**Epitope Source ?** 


Organism  
Ex: influenza, peanut    
Antigen  
Ex: core, capsid, myosin

**MHC Restriction ?** 

Any  
 Class I  
 Class II  
 Non-classical  
Ex: HLA-A\*02:01

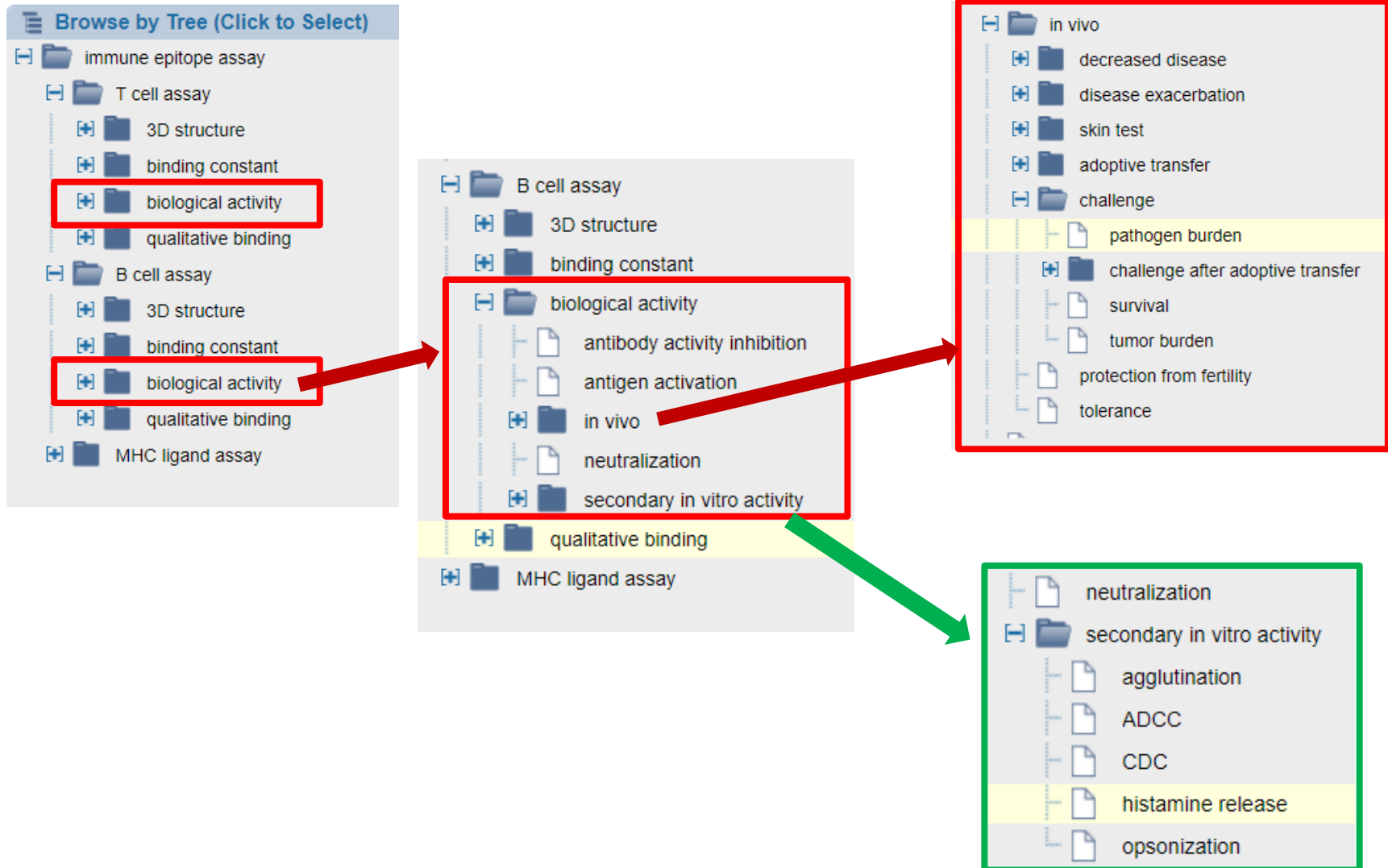
**Host ?** 

Any  
 Human  
 Mouse  
 Non-human primate  
Ex: dog, camel

**Disease ?** 

Any  
 Infectious  
 Allergic  
 Autoimmune  
Ex: asthma

# User Queries: How can we assess the protective capability of the epitopes of the database?



# User Queries: How can we assess the protective capability of the epitopes of the database?

Current Filters: ✖ Organism: SARS-CoV2 (ID:2697049, SARS2) ✖ Include Positive Assays ✖ B Cell Assays: decreased disease, challenge

Epitopes (48)    Antigens (2)    Assays (54)    Receptors (3)    References (31)

Go To Records Starting At   [Export Results](#)

48 Records Found    Page  of 2     Per Page

Details	Epitope	Antigen	Organism	# References	# Assays
1075136	R403, Q409, T415, G416, K417, D420, Y421, L455, F4...	Spike glycoprotein	SARS-CoV2	1	1
1083498	R403, D405, E406, R408, Q409, T415, G416, K417, D4...	Spike glycoprotein	SARS-CoV2	1	1
1181324	L455, A475, G502	Spike glycoprotein	SARS-CoV2	1	1
1310239	R346, N440, L441, K444, V445, G446, N448, Y449, Q4...	Spike glycoprotein	SARS-CoV2	1	1
1311114	L455, Y473, A475, G476, S477, E484, G485, F486, N4...	Spike glycoprotein	SARS-CoV2	1	1
1311119	A: G446, Y449, L452, L455, F456, E484, G485, F486,...	Two components:Spike glycoprotein & Spike glycoprotein	SARS-CoV2	1	1
1311244	K444, G446, Y449, N450, L452, N481, G482, V483, E4...	Spike glycoprotein	SARS-CoV2	1	1
1311251	Y369, A372, S373, F374, S375, T376, F377, K378, C3...	Spike glycoprotein	SARS-CoV2	1	1
1314086	F486, N487	Spike glycoprotein	SARS-CoV2	1	1
1334436	L455, T470, E471, N481, G482, V483, E484, G485, F4...	Spike glycoprotein	SARS-CoV2	1	1
1334437	Y369, N370, S371, A372, S373, F374, S375, T376, F3...	Spike glycoprotein	SARS-CoV2	1	1
1334440	R403, T415, G416, K417, D420, Y421, Y453, L455, F4...	Spike glycoprotein	SARS-CoV2	1	1

# User Queries: How can we assess the protective capability of the epitopes of the database?

Current Filters: ✖ Organism: SARS-CoV2 (ID:2697049, SARS2) ✖ Include Positive Assays ✖ B Cell Assays: decreased disease, challenge

Epitopes (48)    Antigens (2)    Assays (54)    Receptors (3)    References (31)

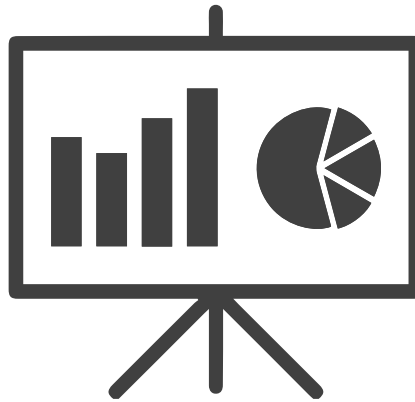
T Cell Assays (0)    **B Cell Assays (54)**    MHC Ligand Assays (0)

Go To Records Starting At      **Export Results**

54 Records Found    Page  of 3    25 Per Page

ID	Reference	Epitope	Host	Immunization	Assay Antigen	Antigen Epitope Relation	Assay Description
12991686	Dapeng Li; Cell 2021	A27, Y28, T29, N30, F32, N61, W64, H66, I68, H69, ... surface glycoprotein [Severe acute respiratory syndrome coronavirus 2] SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism)	SARS-CoV2 SARS-CoV2	Source Organism	in vivo assay pathogen burden after challenge after adoptive transfer <b>Positive-Intermediate</b>
16360059	Dora Pinto; Science 2021	SFKEELDKYF surface glycoprotein [Severe acute respiratory syndrome coronavirus 2] (1147-1156) SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism)	Severe acute respiratory syndrome coronavirus 2 Belgium/hCoV105 19/reg-1920/2021 Severe acute respiratory syndrome coronavirus 2 Belgium/hCoV105 19/reg-1920/2021	Taxonomic Child	in vivo assay pathogen burden after challenge after adoptive transfer <b>Positive-Low</b>
12165964	M Alejandra Tortorici; Science 2020	L455, Y473, A475, G476, S477, E484, G485, F486, N4... surface glycoprotein [Severe acute respiratory syndrome coronavirus 2] SARS-CoV2	Homo sapiens (human)	Infectious disease via exposure to SARS-CoV2 (Source Organism)	Severe acute respiratory syndrome coronavirus 2 Belgium/GHB-03021/2020 Severe acute respiratory syndrome coronavirus 2	Taxonomic Child	in vivo assay pathogen burden after challenge after adoptive transfer <b>Positive</b>

# Additional Slides



# Exports - Headers

Top Header Row = Field Group

2<sup>nd</sup> Header Row = Field

Stable URL for every epitope



Amino acid modifications

Position in protein

Non-peptidic epitopes

Epitope IRI	Epitope Object Type	Epitope Description	Epitope Modified Residue(s)	Epitope Epitope Modification (s)	Epitope Starting Position	Epitope Ending Position	Epitope Non-peptidic epitope IRI	Epitope Epitope Synonyms
<a href="http://www.iedb.org/epitope/4156">http://www.iedb.org/epitope/4156</a>	Linear peptide	ARHTPVNSW			2820	2828		
<a href="http://www.iedb.org/epitope/4197">http://www.iedb.org/epitope/4197</a>	Linear peptide	ARMILMTHF			2841	2849		
<a href="http://www.iedb.org/epitope/13263">http://www.iedb.org/epitope/13263</a>	Linear peptide	ELRSRYWAI			380	388		
<a href="http://www.iedb.org/epitope/17661">http://www.iedb.org/epitope/17661</a>	Linear peptide	FRYNGLIHR			38	46		
<a href="http://www.iedb.org/epitope/21982">http://www.iedb.org/epitope/21982</a>	Linear peptide	GRAAICGKY			2936	2944		
<a href="http://www.iedb.org/epitope/22072">http://www.iedb.org/epitope/22072</a>	Linear peptide	GRIDKPILK			173	181		
<a href="http://www.iedb.org/epitope/24701">http://www.iedb.org/epitope/24701</a>	Linear peptide	HRQSIWITW			82	90		
<a href="http://www.iedb.org/epitope/24702">http://www.iedb.org/epitope/24702</a>	Linear peptide	HRQSIWITWH			82	91		
<a href="http://www.iedb.org/epitope/33140">http://www.iedb.org/epitope/33140</a>	Linear peptide	KRGILTLY			63	71		
<a href="http://www.iedb.org/epitope/33170">http://www.iedb.org/epitope/33170</a>	Linear peptide	KRKKAYADF						
<a href="http://www.iedb.org/epitope/33250">http://www.iedb.org/epitope/33250</a>	Linear peptide	KRWIILGLNK			262	271		
<a href="http://www.iedb.org/epitope/33260">http://www.iedb.org/epitope/33260</a>	Linear peptide	KRYKSIVKY			86	94		
<a href="http://www.iedb.org/epitope/55529">http://www.iedb.org/epitope/55529</a>	Linear peptide	RRARLSAERY			243	253		
<a href="http://www.iedb.org/epitope/55556">http://www.iedb.org/epitope/55556</a>	Linear peptide	RRFFPYVY			127	135		
<a href="http://www.iedb.org/epitope/55565">http://www.iedb.org/epitope/55565</a>	Linear peptide	RRFVNVVPTF			114	123		
<a href="http://www.iedb.org/epitope/55620">http://www.iedb.org/epitope/55620</a>	Linear peptide	RRIYDLIEL			258	266		
<a href="http://www.iedb.org/epitope/55763">http://www.iedb.org/epitope/55763</a>	Linear peptide	RRVKEVVKK			175	183		
<a href="http://www.iedb.org/epitope/55779">http://www.iedb.org/epitope/55779</a>	Linear peptide	RRYPDAVYL			438	446		
<a href="http://www.iedb.org/epitope/55785">http://www.iedb.org/epitope/55785</a>	Linear peptide	RRYQKSTEL			53	61		
<a href="http://www.iedb.org/epitope/60777">http://www.iedb.org/epitope/60777</a>	Linear peptide	SRQRQAIPY			2145	2153		



# Exports – Epitope Source Antigen

Source protein isoform of epitope,  
author specified, 100% identical

Reference proteome source protein of  
epitope, groups all same proteins, not  
100% identical

Epitope Antigen Name	Epitope Antigen IRI	Epitope Parent Protein	Epitope Parent Protein IRI
polyprotein	<a href="http://www.ncbi.nlm.nih.gov/protein/ABR25251.1">http://www.ncbi.nlm.nih.gov/protein/ABR25251.1</a>	sp P27958 POLG_HCVH Genome polyprotein OS=Hepatitis C virus genotype 1a (isolate H)	<a href="http://www.uniprot.org/uniprot/P27958">http://www.uniprot.org/uniprot/P27958</a>
polyprotein	<a href="http://www.ncbi.nlm.nih.gov/protein/ABR25251.1">http://www.ncbi.nlm.nih.gov/protein/ABR25251.1</a>	sp P27958 POLG_HCVH Genome polyprotein OS=Hepatitis C virus genotype 1a (isolate H)	<a href="http://www.uniprot.org/uniprot/P27958">http://www.uniprot.org/uniprot/P27958</a>
NP	<a href="http://www.ncbi.nlm.nih.gov/protein/Q91UL1">http://www.ncbi.nlm.nih.gov/protein/Q91UL1</a>	sp P03466 NCAP_I34A1 Nucleoprotein OS=Influenza A virus (strain A/Puerto Rico/8/1934 H1N1)	<a href="http://www.uniprot.org/uniprot/P03466">http://www.uniprot.org/uniprot/P03466</a>
60S ribosomal protein L28 isoform 2	<a href="http://www.ncbi.nlm.nih.gov/protein/NP_000982.2">http://www.ncbi.nlm.nih.gov/protein/NP_000982.2</a>	sp P46779 RL28_HUMAN 60S ribosomal protein L28 OS=Homo sapiens OX=9606 GN=RPL28 PE=1 SV=3	<a href="http://www.uniprot.org/uniprot/P46779">http://www.uniprot.org/uniprot/P46779</a>
polyprotein	<a href="http://www.ncbi.nlm.nih.gov/protein/ABY67667.1">http://www.ncbi.nlm.nih.gov/protein/ABY67667.1</a>	sp P27958 POLG_HCVH Genome polyprotein OS=Hepatitis C virus genotype 1a (isolate H)	<a href="http://www.uniprot.org/uniprot/P27958">http://www.uniprot.org/uniprot/P27958</a>
60S ribosomal protein L8	<a href="http://www.ncbi.nlm.nih.gov/protein/NP_000964.1">http://www.ncbi.nlm.nih.gov/protein/NP_000964.1</a>	sp P62917 RL8_HUMAN 60S ribosomal protein L8 OS=Homo sapiens OX=9606 GN=RPL8 PE=1 SV=2	<a href="http://www.uniprot.org/uniprot/P62917">http://www.uniprot.org/uniprot/P62917</a>
K1 glycoprotein	<a href="http://www.ncbi.nlm.nih.gov/protein/AAT44989.1">http://www.ncbi.nlm.nih.gov/protein/AAT44989.1</a>	sp Q2HRD5 K1_HHV8P Protein K1 OS=Human herpesvirus 8 type P (isolate GK18) OX=868565	<a href="http://www.uniprot.org/uniprot/Q2HRD5">http://www.uniprot.org/uniprot/Q2HRD5</a>
K1 glycoprotein [Human herpesvirus 8]	<a href="http://www.ncbi.nlm.nih.gov/protein/AAT44977.1">http://www.ncbi.nlm.nih.gov/protein/AAT44977.1</a>	sp Q2HRD5 K1_HHV8P Protein K1 OS=Human herpesvirus 8 type P (isolate GK18) OX=868565	<a href="http://www.uniprot.org/uniprot/Q2HRD5">http://www.uniprot.org/uniprot/Q2HRD5</a>
alpha-actin	<a href="http://www.ncbi.nlm.nih.gov/protein/AAA51577.1">http://www.ncbi.nlm.nih.gov/protein/AAA51577.1</a>	sp P62736 ACTA_HUMAN Actin, aortic smooth muscle OS=Homo sapiens OX=9606 GN=ACTA2 PE=1	<a href="http://www.uniprot.org/uniprot/P62736">http://www.uniprot.org/uniprot/P62736</a>
cytochrome c oxidase I	<a href="https://ontology.iedb.org/ontology/ONTIE_0002983">https://ontology.iedb.org/ontology/ONTIE_0002983</a>	sp P00395 COX1_HUMAN Cytochrome c oxidase subunit 1 OS=Homo sapiens OX=9606 GN=MT-CO1	<a href="http://www.uniprot.org/uniprot/P00395">http://www.uniprot.org/uniprot/P00395</a>
gag protein	<a href="http://www.ncbi.nlm.nih.gov/protein/AAX81417.1">http://www.ncbi.nlm.nih.gov/protein/AAX81417.1</a>	sp P03349 GAG_HV1A2 Gag polyprotein OS=Human immunodeficiency virus type 1 group M subtype B (isolate ARV2/SF2) OX=11685 GN=gag PE=1 SV=3	<a href="http://www.uniprot.org/uniprot/P03349">http://www.uniprot.org/uniprot/P03349</a>

# Exports – Epitope Source Organism

## Source organism of epitope, author specified

## Reference proteome species of epitope, groups all same

Epitope Organism Name	Epitope Organism IRI	Epitope Parent Organism	Epitope Parent Organism IRI
Hepacivirus C	<a href="http://purl.obolibrary.org/obo/NCBITaxon_11103">http://purl.obolibrary.org/obo/NCBITaxon_11103</a>	Hepacivirus C	<a href="http://purl.obolibrary.org/obo/NCBITaxon_11103">http://purl.obolibrary.org/obo/NCBITaxon_11103</a>
Hepacivirus C	<a href="http://purl.obolibrary.org/obo/NCBITaxon_11103">http://purl.obolibrary.org/obo/NCBITaxon_11103</a>	Hepacivirus C	<a href="http://purl.obolibrary.org/obo/NCBITaxon_11103">http://purl.obolibrary.org/obo/NCBITaxon_11103</a>
Influenza A virus (A/X-31(H3N2))	<a href="http://purl.obolibrary.org/obo/NCBITaxon_132504">http://purl.obolibrary.org/obo/NCBITaxon_132504</a>	Influenza A virus	<a href="http://purl.obolibrary.org/obo/NCBITaxon_11320">http://purl.obolibrary.org/obo/NCBITaxon_11320</a>
Homo sapiens	<a href="http://purl.obolibrary.org/obo/NCBITaxon_9606">http://purl.obolibrary.org/obo/NCBITaxon_9606</a>	Homo sapiens	<a href="http://purl.obolibrary.org/obo/NCBITaxon_9606">http://purl.obolibrary.org/obo/NCBITaxon_9606</a>
Hepacivirus C	<a href="http://purl.obolibrary.org/obo/NCBITaxon_11103">http://purl.obolibrary.org/obo/NCBITaxon_11103</a>	Hepacivirus C	<a href="http://purl.obolibrary.org/obo/NCBITaxon_11103">http://purl.obolibrary.org/obo/NCBITaxon_11103</a>
Homo sapiens	<a href="http://purl.obolibrary.org/obo/NCBITaxon_9606">http://purl.obolibrary.org/obo/NCBITaxon_9606</a>	Homo sapiens	<a href="http://purl.obolibrary.org/obo/NCBITaxon_9606">http://purl.obolibrary.org/obo/NCBITaxon_9606</a>
Human gammaherpesvirus 8	<a href="http://purl.obolibrary.org/obo/NCBITaxon_37296">http://purl.obolibrary.org/obo/NCBITaxon_37296</a>	Human gammaherpesvirus 8	<a href="http://purl.obolibrary.org/obo/NCBITaxon_37296">http://purl.obolibrary.org/obo/NCBITaxon_37296</a>
Human gammaherpesvirus 8	<a href="http://purl.obolibrary.org/obo/NCBITaxon_37296">http://purl.obolibrary.org/obo/NCBITaxon_37296</a>	Human gammaherpesvirus 8	<a href="http://purl.obolibrary.org/obo/NCBITaxon_37296">http://purl.obolibrary.org/obo/NCBITaxon_37296</a>
Homo sapiens	<a href="http://purl.obolibrary.org/obo/NCBITaxon_9606">http://purl.obolibrary.org/obo/NCBITaxon_9606</a>	Homo sapiens	<a href="http://purl.obolibrary.org/obo/NCBITaxon_9606">http://purl.obolibrary.org/obo/NCBITaxon_9606</a>
Homo sapiens	<a href="http://purl.obolibrary.org/obo/NCBITaxon_9606">http://purl.obolibrary.org/obo/NCBITaxon_9606</a>	Homo sapiens	<a href="http://purl.obolibrary.org/obo/NCBITaxon_9606">http://purl.obolibrary.org/obo/NCBITaxon_9606</a>
Human immunodeficiency virus 1	<a href="http://purl.obolibrary.org/obo/NCBITaxon_11676">http://purl.obolibrary.org/obo/NCBITaxon_11676</a>	Human immunodeficiency virus 1	<a href="http://purl.obolibrary.org/obo/NCBITaxon_11676">http://purl.obolibrary.org/obo/NCBITaxon_11676</a>

# Exports – Source of Data

Top Header row = Field Group (Reference, Epitope, etc.)  
 2<sup>nd</sup> Header Row = Field (terms may repeat)

Stable URL for every assay and reference



Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Epitope	Epitope	Epitope	Epitope
Assay IRI	Reference IRI	Type	PubMed	Authors	Journal	Date	Title	Submission I	Epitope IRI	Object Type	Description	Starting
http://www.iec	http://www.iec	Literature	7542549	L G Tussey; S Ro	Immunity	1995	Different MHC class I alleles con	http://www.iec	Linear peptide	ELRSRYWAI	380	
http://www.iec	http://www.iec	Literature	12634388	Justin Stebbing; J	Virol	2003	Kaposi's sarcoma-associated he	http://www.iec	Linear peptide	HRQSIWITWH	82	
http://www.iec	http://www.iec	Literature	12634388	Justin Stebbing; J	Virol	2003	Kaposi's sarcoma-associated he	http://www.iec	Linear peptide	HRQSIWITW	82	
http://www.iec	http://www.iec	Literature	9820497	J M Brooks; R A	J Immunol	1998	HLA-B27 subtype polymorphism	http://www.iec	Linear peptide	RRARSLAERY	243	
http://www.iec	http://www.iec	Literature	9820497	J M Brooks; R A	J Immunol	1998	HLA-B27 subtype polymorphism	http://www.iec	Linear peptide	RRIYDLIEL	258	
http://www.iec	http://www.iec	Submission		Mikkel Harndahl; Kasper Lambe		2009	Large scale anal	1000422	http://www.iec	Linear peptide	SRQRQAIPY	2145
http://www.iec	http://www.iec	Literature	12122005	Manuel Ramos; J	Biol Chem	2002	Molecular mimicry of an HLA-B2	http://www.iec	Linear peptide	RRKSSGGKGGSY	333	
http://www.iec	http://www.iec	Literature	12122005	Manuel Ramos; J	Biol Chem	2002	Molecular mimicry of an HLA-B2	http://www.iec	Linear peptide	RRFKEGGRGGKY	211	
http://www.iec	http://www.iec	Literature	9820524	A Paradel; M G J	Immunol	1998	The same natural ligand is invol	http://www.iec	Linear peptide	RRFFPYV	127	
http://www.iec	http://www.iec	Literature	9820524	A Paradel; M G J	Immunol	1998	The same natural ligand is invol	http://www.iec	Linear peptide	RRFFPYVY	127	
http://www.iec	http://www.iec	Literature	23978718	Katja Nitschke; J	Hepatol	2014	HLA-B*27 subtype specificity de	http://www.iec	Linear peptide	ARHTPVNSW	2820	
http://www.iec	http://www.iec	Literature	23978718	Katja Nitschke; J	Hepatol	2014	HLA-B*27 subtype specificity de	http://www.iec	Linear peptide	ARMILMTHF	2841	
http://www.iec	http://www.iec	Literature	23978718	Katja Nitschke; J	Hepatol	2014	HLA-B*27 subtype specificity de	http://www.iec	Linear peptide	GRAAICGKY	2936	
http://www.iec	http://www.iec	Literature	23978718	Katja Nitschke; J	Hepatol	2014	HLA-B*27 subtype specificity de	http://www.iec	Linear peptide	SRYWAIRTR	383	
http://www.iec	http://www.iec	Literature	23978718	Katja Nitschke; J	Hepatol	2014	HLA-B*27 subtype specificity de	http://www.iec	Linear peptide	KRWIILGLNK	262	
http://www.iec	http://www.iec	Literature	25268942	Alejandro Barrig	PLoS One	2014	A common minimal motif for th	http://www.iec	Linear peptide	VRNKDLNLT	169	
http://www.iec	http://www.iec	Literature	25268942	Alejandro Barrig	PLoS One	2014	A common minimal motif for th	http://www.iec	Linear peptide	KRLPADVLKK	150	
http://www.iec	http://www.iec	Literature	25268942	Alejandro Barrig	PLoS One	2014	A common minimal motif for th	http://www.iec	Linear peptide	HRQDINGKEM	100	

# Exports – Assay Types

Top Header row = Field Group (Reference, Epitope, etc.)

2<sup>nd</sup> Header Row = Field (terms may repeat)

Separate method and assay group columns allow sorting

IRI is linked to ontology term for assay (OBI ontology)



Assay	Assay	Assay	Assay	Assay	Assay	Assay	Assay	Assay
Location of assay data in the manuscript	Method/Technique	Assay Group	Units	Assay Type IRI	Qualitative Measure	Measurement Inequality	Quantitative measurement	
Fig. 4A	lysate MHC/direct/radioactivity	qualitative binding		<a href="http://purl.obolibrary.org/obo/OBI_0001556">http://purl.obolibrary.org/obo/OBI_0001556</a>	Positive			
Figure 4	cellular MHC/direct/fluorescence	qualitative binding		<a href="http://purl.obolibrary.org/obo/OBI_0001606">http://purl.obolibrary.org/obo/OBI_0001606</a>	Positive			
Figure 4	cellular MHC/direct/fluorescence	qualitative binding		<a href="http://purl.obolibrary.org/obo/OBI_0001606">http://purl.obolibrary.org/obo/OBI_0001606</a>	Positive			
Figures 2 and 5, table III	cellular MHC/direct/fluorescence	half life	min	<a href="http://purl.obolibrary.org/obo/OBI_0001559">http://purl.obolibrary.org/obo/OBI_0001559</a>	Positive		2520	
Figures 2 and 5, table III	cellular MHC/direct/fluorescence	half life	min	<a href="http://purl.obolibrary.org/obo/OBI_0001559">http://purl.obolibrary.org/obo/OBI_0001559</a>	Positive		2220	
	purified MHC/direct/fluorescence	dissociation constant KD (~EC50)	nM	<a href="http://purl.obolibrary.org/obo/OBI_0001543">http://purl.obolibrary.org/obo/OBI_0001543</a>	Positive-Low	>	5000	
Figure 4 and table II	cellular MHC/direct/fluorescence	half maximal effective concentration (EC50)	nM	<a href="http://purl.obolibrary.org/obo/OBI_0001561">http://purl.obolibrary.org/obo/OBI_0001561</a>	Positive		5000	
Figure 4 and table II	cellular MHC/direct/fluorescence	half maximal effective concentration (EC50)	nM	<a href="http://purl.obolibrary.org/obo/OBI_0001561">http://purl.obolibrary.org/obo/OBI_0001561</a>	Positive		7000	
Figure 4	cellular MHC/direct/fluorescence	half maximal effective concentration (EC50)	nM	<a href="http://purl.obolibrary.org/obo/OBI_0001561">http://purl.obolibrary.org/obo/OBI_0001561</a>	Positive-High	=	4000	
Figure 4	cellular MHC/direct/fluorescence	half maximal effective concentration (EC50)	nM	<a href="http://purl.obolibrary.org/obo/OBI_0001561">http://purl.obolibrary.org/obo/OBI_0001561</a>	Positive-High	=	3000	
Figures 2 and 4	cellular MHC/direct/fluorescence	qualitative binding		<a href="http://purl.obolibrary.org/obo/OBI_0001606">http://purl.obolibrary.org/obo/OBI_0001606</a>	Positive-High			
Figure 2	cellular MHC/direct/fluorescence	qualitative binding		<a href="http://purl.obolibrary.org/obo/OBI_0001606">http://purl.obolibrary.org/obo/OBI_0001606</a>	Positive-High			
Figure 2	cellular MHC/direct/fluorescence	qualitative binding		<a href="http://purl.obolibrary.org/obo/OBI_0001606">http://purl.obolibrary.org/obo/OBI_0001606</a>	Positive-High			
Figure 2	cellular MHC/direct/fluorescence	qualitative binding		<a href="http://purl.obolibrary.org/obo/OBI_0001606">http://purl.obolibrary.org/obo/OBI_0001606</a>	Positive-Low			
Figure 2	cellular MHC/direct/fluorescence	qualitative binding		<a href="http://purl.obolibrary.org/obo/OBI_0001606">http://purl.obolibrary.org/obo/OBI_0001606</a>	Positive-High			
Figure 7 and Tables 1, 2, ar	cellular MHC/direct/fluorescence	half maximal effective concentration (EC50)	nM	<a href="http://purl.obolibrary.org/obo/OBI_0001561">http://purl.obolibrary.org/obo/OBI_0001561</a>	Positive-Low	=	94000	
Figure 7 and Tables 1, 2, ar	cellular MHC/direct/fluorescence	half maximal effective concentration (EC50)	nM	<a href="http://purl.obolibrary.org/obo/OBI_0001561">http://purl.obolibrary.org/obo/OBI_0001561</a>	Positive-Low	=	136000	
Figure 7 and Tables 1, 2, ar	cellular MHC/direct/fluorescence	half maximal effective concentration (EC50)	nM	<a href="http://purl.obolibrary.org/obo/OBI_0001561">http://purl.obolibrary.org/obo/OBI_0001561</a>	Positive-Low	=	132000	
Figure 7 and Tables 1, 2, 3,	cellular MHC/direct/fluorescence	half maximal effective concentration (EC50)	nM	<a href="http://purl.obolibrary.org/obo/OBI_0001561">http://purl.obolibrary.org/obo/OBI_0001561</a>	Positive-Interm	=	43000	
Figure 7 and Tables 1, 2, 3,	cellular MHC/direct/fluorescence	half maximal effective concentration (EC50)	nM	<a href="http://purl.obolibrary.org/obo/OBI_0001561">http://purl.obolibrary.org/obo/OBI_0001561</a>	Positive-High	=	9000	
Figure 7 and Tables 1, 2, ar	cellular MHC/direct/fluorescence	half maximal effective concentration (EC50)	nM	<a href="http://purl.obolibrary.org/obo/OBI_0001561">http://purl.obolibrary.org/obo/OBI_0001561</a>	Positive-Low	=	77000	
Table 2	cellular MHC/direct/fluorescence	half maximal effective concentration (EC50)	nM	<a href="http://purl.obolibrary.org/obo/OBI_0001561">http://purl.obolibrary.org/obo/OBI_0001561</a>	Positive-High	=	16000	

# Results Page: Discontinuous Epitopes

**B cell assays only = B cell epitopes**

Epitopes (4347)		Antigens (13)		Assays (9492)		Receptors (27)		References (149)	
Go To Records Starting At <input type="text" value="1200"/> <input type="button" value="GO"/>						Export Results			
4347 Records Found						Page <input type="text" value="1"/> of 174		25 Per Page	
Details	Epitope	Antigen	Organism	# References	# Assays				
	E484	Spike glycoprotein	SARS-CoV2	4	12				
	N501	Spike glycoprotein	SARS-CoV2	4	11				
	ECDIPIGAGICASYQ	Spike glycoprotein	SARS-CoV2	3	4				
	KPSKRSFIEDLLFNK	Spike glycoprotein	SARS-CoV2	3	5				
	TESNKKFLPFQQFGRDIA	Spike glycoprotein	SARS-CoV2	3	4				
	R346, N440, L441, K444, V445, G446, N448, Y449, Q4...	Spike glycoprotein	SARS-CoV2	3	19				
	AIVLQLPQGTTLPKG	Nucleoprotein	SARS-CoV2	3	6				
	CASYQTQTNSPRRAR	Spike glycoprotein	SARS-CoV2	3	6				
	QRVAGDSGFAAYSRY	Membrane protein	SARS-CoV2	3	4				
	F486, N487	Spike glycoprotein	SARS-CoV2	3	13				
	FSQILPDPSPKSKRSFIE	Spike glycoprotein	SARS-CoV2	3	5				
	E484	Spike glycoprotein	SARS-CoV2	3	9				
	K417	Spike glycoprotein	SARS-CoV2	3	6				
	EPIYDEPTTTTSVPL	ORF3a protein	SARS-CoV2	3	6				
	AVKLQNNELSPVALR	Replicase polyprotein 1ab	SARS-CoV2	2	4				

# User Query: What protein are B cell epitope residues in reference to?

Epitope		
Epitope ID	1314086	IEDB_epitope:1314086
Chemical Type	Discontinuous peptide	
Source Name	surface glycoprotein [Severe acute respiratory syndrome coronavirus 2]	GenPept:QHD43416.1 
Source Organism	SARS-CoV2	NCBITaxon:2697049 
Discontinuous Residues	F486, N487	

Epitope Reference Details		
Epitope Structure Defines	Partial Epitope	
Epitope Name	Epitope of COV2-2196 on SARS-CoV-2	
Reference Region	F486, N487	
Location of Data in Reference	Figure 3	

