



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 9, 2026 – 10:36 PM UTC

PDB ID : 7XSB / pdb_00007xsb
Title : Crystal structure of SARS-CoV-2 spike receptor binding domain bound with P5S-3B11 Fab
Authors : Wang, X.; Wang, Z.; Gao, M.
Deposited on : 2022-05-13
Resolution : 3.20 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

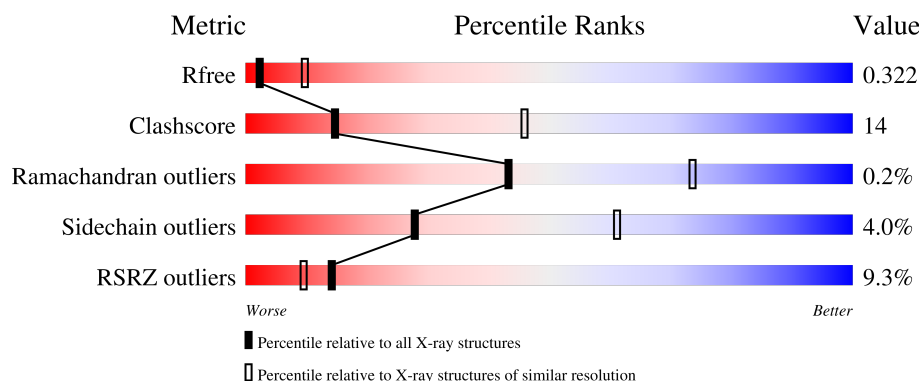
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.20 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	1466 (3.20-3.20)
Clashscore	190562	1573 (3.20-3.20)
Ramachandran outliers	187476	1548 (3.20-3.20)
Sidechain outliers	187428	1547 (3.20-3.20)
RSRZ outliers	180081	1466 (3.20-3.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	243	10% 49% 27% • 23%
1	B	243	49% 28% 23%
1	C	243	51% 25% • 22%
1	E	243	56% 21% • 22%
2	D	217	10% 57% 35% • 6%

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Mol	Chain	Length	Quality of chain
2	G	217	18%61%28%9%
2	H	217	9%62%30%6%
2	J	217	11%65%24%10%
3	F	216	12%76%21%.
3	I	216	18%75%20%.
3	K	216	10%69%29%.
3	L	216	12%72%23%.

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 18516 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Spike protein S1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	E	189	Total	C	N	O	S	0	1	0
			1513	972	252	281	8			
1	A	188	Total	C	N	O	S	0	1	0
			1505	968	250	279	8			
1	B	188	Total	C	N	O	S	0	1	0
			1502	966	250	278	8			
1	C	189	Total	C	N	O	S	0	1	0
			1513	972	252	281	8			

There are 200 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	292	MET	-	initiating methionine	UNP P0DTC2
E	293	LEU	-	expression tag	UNP P0DTC2
E	294	LEU	-	expression tag	UNP P0DTC2
E	295	VAL	-	expression tag	UNP P0DTC2
E	296	ASN	-	expression tag	UNP P0DTC2
E	297	GLN	-	expression tag	UNP P0DTC2
E	298	SER	-	expression tag	UNP P0DTC2
E	299	HIS	-	expression tag	UNP P0DTC2
E	300	GLN	-	expression tag	UNP P0DTC2
E	301	GLY	-	expression tag	UNP P0DTC2
E	302	PHE	-	expression tag	UNP P0DTC2
E	303	ASN	-	expression tag	UNP P0DTC2
E	304	LYS	-	expression tag	UNP P0DTC2
E	305	GLU	-	expression tag	UNP P0DTC2
E	306	HIS	-	expression tag	UNP P0DTC2
E	307	THR	-	expression tag	UNP P0DTC2
E	308	SER	-	expression tag	UNP P0DTC2
E	309	LYS	-	expression tag	UNP P0DTC2
E	310	MET	-	expression tag	UNP P0DTC2
E	311	VAL	-	expression tag	UNP P0DTC2
E	312	SER	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
E	313	ALA	-	expression tag	UNP P0DTC2
E	314	ILE	-	expression tag	UNP P0DTC2
E	315	VAL	-	expression tag	UNP P0DTC2
E	316	LEU	-	expression tag	UNP P0DTC2
E	317	TYR	-	expression tag	UNP P0DTC2
E	318	VAL	-	expression tag	UNP P0DTC2
E	319	LEU	-	expression tag	UNP P0DTC2
E	320	LEU	-	expression tag	UNP P0DTC2
E	321	ALA	-	expression tag	UNP P0DTC2
E	322	ALA	-	expression tag	UNP P0DTC2
E	323	ALA	-	expression tag	UNP P0DTC2
E	324	ALA	-	expression tag	UNP P0DTC2
E	325	HIS	-	expression tag	UNP P0DTC2
E	326	SER	-	expression tag	UNP P0DTC2
E	327	ALA	-	expression tag	UNP P0DTC2
E	328	PHE	-	expression tag	UNP P0DTC2
E	329	ALA	-	expression tag	UNP P0DTC2
E	330	ALA	-	expression tag	UNP P0DTC2
E	331	ASP	-	expression tag	UNP P0DTC2
E	332	PRO	-	expression tag	UNP P0DTC2
E	417	ASN	LYS	variant	UNP P0DTC2
E	484	LYS	GLU	variant	UNP P0DTC2
E	501	TYR	ASN	variant	UNP P0DTC2
E	529	HIS	-	expression tag	UNP P0DTC2
E	530	HIS	-	expression tag	UNP P0DTC2
E	531	HIS	-	expression tag	UNP P0DTC2
E	532	HIS	-	expression tag	UNP P0DTC2
E	533	HIS	-	expression tag	UNP P0DTC2
E	534	HIS	-	expression tag	UNP P0DTC2
A	292	MET	-	initiating methionine	UNP P0DTC2
A	293	LEU	-	expression tag	UNP P0DTC2
A	294	LEU	-	expression tag	UNP P0DTC2
A	295	VAL	-	expression tag	UNP P0DTC2
A	296	ASN	-	expression tag	UNP P0DTC2
A	297	GLN	-	expression tag	UNP P0DTC2
A	298	SER	-	expression tag	UNP P0DTC2
A	299	HIS	-	expression tag	UNP P0DTC2
A	300	GLN	-	expression tag	UNP P0DTC2
A	301	GLY	-	expression tag	UNP P0DTC2
A	302	PHE	-	expression tag	UNP P0DTC2
A	303	ASN	-	expression tag	UNP P0DTC2
A	304	LYS	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	305	GLU	-	expression tag	UNP P0DTC2
A	306	HIS	-	expression tag	UNP P0DTC2
A	307	THR	-	expression tag	UNP P0DTC2
A	308	SER	-	expression tag	UNP P0DTC2
A	309	LYS	-	expression tag	UNP P0DTC2
A	310	MET	-	expression tag	UNP P0DTC2
A	311	VAL	-	expression tag	UNP P0DTC2
A	312	SER	-	expression tag	UNP P0DTC2
A	313	ALA	-	expression tag	UNP P0DTC2
A	314	ILE	-	expression tag	UNP P0DTC2
A	315	VAL	-	expression tag	UNP P0DTC2
A	316	LEU	-	expression tag	UNP P0DTC2
A	317	TYR	-	expression tag	UNP P0DTC2
A	318	VAL	-	expression tag	UNP P0DTC2
A	319	LEU	-	expression tag	UNP P0DTC2
A	320	LEU	-	expression tag	UNP P0DTC2
A	321	ALA	-	expression tag	UNP P0DTC2
A	322	ALA	-	expression tag	UNP P0DTC2
A	323	ALA	-	expression tag	UNP P0DTC2
A	324	ALA	-	expression tag	UNP P0DTC2
A	325	HIS	-	expression tag	UNP P0DTC2
A	326	SER	-	expression tag	UNP P0DTC2
A	327	ALA	-	expression tag	UNP P0DTC2
A	328	PHE	-	expression tag	UNP P0DTC2
A	329	ALA	-	expression tag	UNP P0DTC2
A	330	ALA	-	expression tag	UNP P0DTC2
A	331	ASP	-	expression tag	UNP P0DTC2
A	332	PRO	-	expression tag	UNP P0DTC2
A	417	ASN	LYS	variant	UNP P0DTC2
A	484	LYS	GLU	variant	UNP P0DTC2
A	501	TYR	ASN	variant	UNP P0DTC2
A	529	HIS	-	expression tag	UNP P0DTC2
A	530	HIS	-	expression tag	UNP P0DTC2
A	531	HIS	-	expression tag	UNP P0DTC2
A	532	HIS	-	expression tag	UNP P0DTC2
A	533	HIS	-	expression tag	UNP P0DTC2
A	534	HIS	-	expression tag	UNP P0DTC2
B	292	MET	-	initiating methionine	UNP P0DTC2
B	293	LEU	-	expression tag	UNP P0DTC2
B	294	LEU	-	expression tag	UNP P0DTC2
B	295	VAL	-	expression tag	UNP P0DTC2
B	296	ASN	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	297	GLN	-	expression tag	UNP P0DTC2
B	298	SER	-	expression tag	UNP P0DTC2
B	299	HIS	-	expression tag	UNP P0DTC2
B	300	GLN	-	expression tag	UNP P0DTC2
B	301	GLY	-	expression tag	UNP P0DTC2
B	302	PHE	-	expression tag	UNP P0DTC2
B	303	ASN	-	expression tag	UNP P0DTC2
B	304	LYS	-	expression tag	UNP P0DTC2
B	305	GLU	-	expression tag	UNP P0DTC2
B	306	HIS	-	expression tag	UNP P0DTC2
B	307	THR	-	expression tag	UNP P0DTC2
B	308	SER	-	expression tag	UNP P0DTC2
B	309	LYS	-	expression tag	UNP P0DTC2
B	310	MET	-	expression tag	UNP P0DTC2
B	311	VAL	-	expression tag	UNP P0DTC2
B	312	SER	-	expression tag	UNP P0DTC2
B	313	ALA	-	expression tag	UNP P0DTC2
B	314	ILE	-	expression tag	UNP P0DTC2
B	315	VAL	-	expression tag	UNP P0DTC2
B	316	LEU	-	expression tag	UNP P0DTC2
B	317	TYR	-	expression tag	UNP P0DTC2
B	318	VAL	-	expression tag	UNP P0DTC2
B	319	LEU	-	expression tag	UNP P0DTC2
B	320	LEU	-	expression tag	UNP P0DTC2
B	321	ALA	-	expression tag	UNP P0DTC2
B	322	ALA	-	expression tag	UNP P0DTC2
B	323	ALA	-	expression tag	UNP P0DTC2
B	324	ALA	-	expression tag	UNP P0DTC2
B	325	HIS	-	expression tag	UNP P0DTC2
B	326	SER	-	expression tag	UNP P0DTC2
B	327	ALA	-	expression tag	UNP P0DTC2
B	328	PHE	-	expression tag	UNP P0DTC2
B	329	ALA	-	expression tag	UNP P0DTC2
B	330	ALA	-	expression tag	UNP P0DTC2
B	331	ASP	-	expression tag	UNP P0DTC2
B	332	PRO	-	expression tag	UNP P0DTC2
B	417	ASN	LYS	variant	UNP P0DTC2
B	484	LYS	GLU	variant	UNP P0DTC2
B	501	TYR	ASN	variant	UNP P0DTC2
B	529	HIS	-	expression tag	UNP P0DTC2
B	530	HIS	-	expression tag	UNP P0DTC2
B	531	HIS	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	532	HIS	-	expression tag	UNP P0DTC2
B	533	HIS	-	expression tag	UNP P0DTC2
B	534	HIS	-	expression tag	UNP P0DTC2
C	292	MET	-	initiating methionine	UNP P0DTC2
C	293	LEU	-	expression tag	UNP P0DTC2
C	294	LEU	-	expression tag	UNP P0DTC2
C	295	VAL	-	expression tag	UNP P0DTC2
C	296	ASN	-	expression tag	UNP P0DTC2
C	297	GLN	-	expression tag	UNP P0DTC2
C	298	SER	-	expression tag	UNP P0DTC2
C	299	HIS	-	expression tag	UNP P0DTC2
C	300	GLN	-	expression tag	UNP P0DTC2
C	301	GLY	-	expression tag	UNP P0DTC2
C	302	PHE	-	expression tag	UNP P0DTC2
C	303	ASN	-	expression tag	UNP P0DTC2
C	304	LYS	-	expression tag	UNP P0DTC2
C	305	GLU	-	expression tag	UNP P0DTC2
C	306	HIS	-	expression tag	UNP P0DTC2
C	307	THR	-	expression tag	UNP P0DTC2
C	308	SER	-	expression tag	UNP P0DTC2
C	309	LYS	-	expression tag	UNP P0DTC2
C	310	MET	-	expression tag	UNP P0DTC2
C	311	VAL	-	expression tag	UNP P0DTC2
C	312	SER	-	expression tag	UNP P0DTC2
C	313	ALA	-	expression tag	UNP P0DTC2
C	314	ILE	-	expression tag	UNP P0DTC2
C	315	VAL	-	expression tag	UNP P0DTC2
C	316	LEU	-	expression tag	UNP P0DTC2
C	317	TYR	-	expression tag	UNP P0DTC2
C	318	VAL	-	expression tag	UNP P0DTC2
C	319	LEU	-	expression tag	UNP P0DTC2
C	320	LEU	-	expression tag	UNP P0DTC2
C	321	ALA	-	expression tag	UNP P0DTC2
C	322	ALA	-	expression tag	UNP P0DTC2
C	323	ALA	-	expression tag	UNP P0DTC2
C	324	ALA	-	expression tag	UNP P0DTC2
C	325	HIS	-	expression tag	UNP P0DTC2
C	326	SER	-	expression tag	UNP P0DTC2
C	327	ALA	-	expression tag	UNP P0DTC2
C	328	PHE	-	expression tag	UNP P0DTC2
C	329	ALA	-	expression tag	UNP P0DTC2
C	330	ALA	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	331	ASP	-	expression tag	UNP P0DTC2
C	332	PRO	-	expression tag	UNP P0DTC2
C	417	ASN	LYS	variant	UNP P0DTC2
C	484	LYS	GLU	variant	UNP P0DTC2
C	501	TYR	ASN	variant	UNP P0DTC2
C	529	HIS	-	expression tag	UNP P0DTC2
C	530	HIS	-	expression tag	UNP P0DTC2
C	531	HIS	-	expression tag	UNP P0DTC2
C	532	HIS	-	expression tag	UNP P0DTC2
C	533	HIS	-	expression tag	UNP P0DTC2
C	534	HIS	-	expression tag	UNP P0DTC2

- Molecule 2 is a protein called P5S-3B11 Heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	203	Total	C	N	O	S	0	0	0
			1552	987	266	293	6			
2	D	203	Total	C	N	O	S	0	0	0
			1552	987	266	293	6			
2	G	198	Total	C	N	O	S	0	0	0
			1505	959	259	281	6			
2	J	196	Total	C	N	O	S	0	0	0
			1508	961	258	283	6			

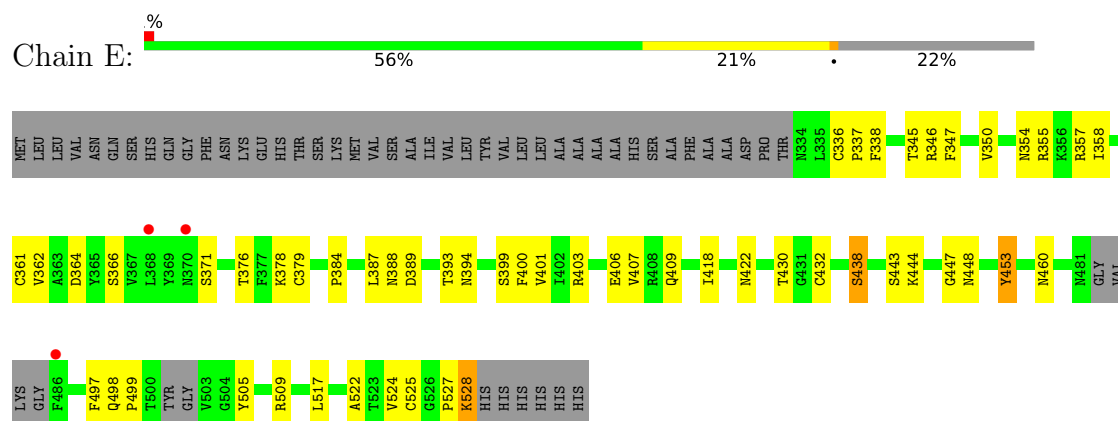
- Molecule 3 is a protein called P5S-3B11 Light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	L	212	Total	C	N	O	S	0	0	0
			1592	995	262	330	5			
3	F	212	Total	C	N	O	S	0	0	0
			1594	998	262	329	5			
3	I	212	Total	C	N	O	S	0	0	0
			1594	998	262	329	5			
3	K	212	Total	C	N	O	S	0	0	0
			1586	995	261	325	5			

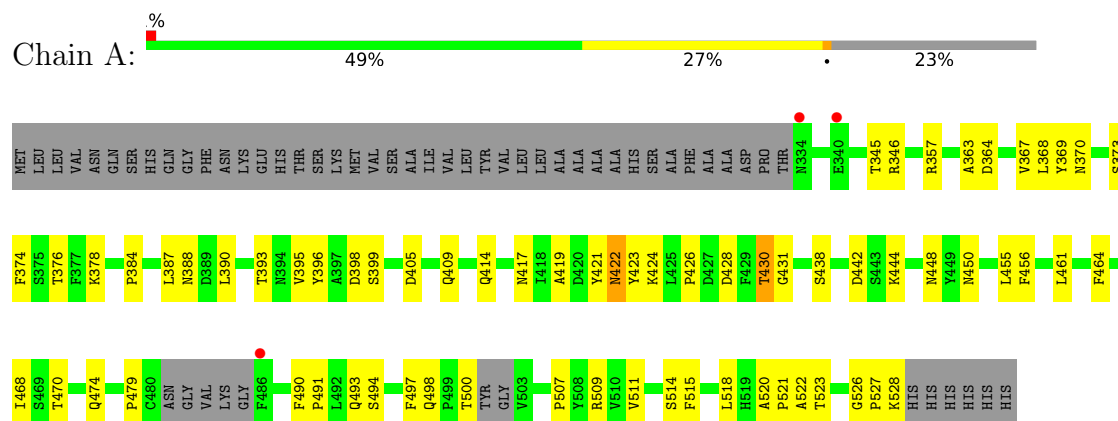
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

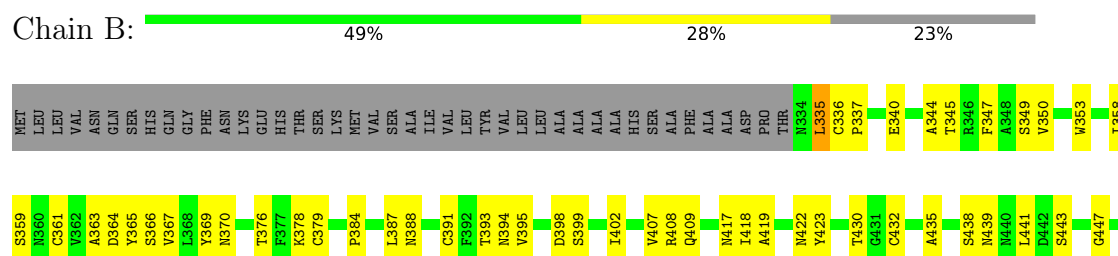
• Molecule 1: Spike protein S1



• Molecule 1: Spike protein S1



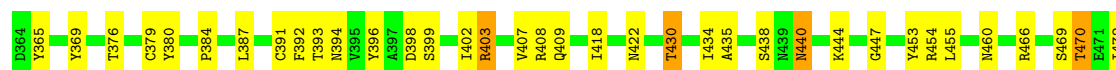
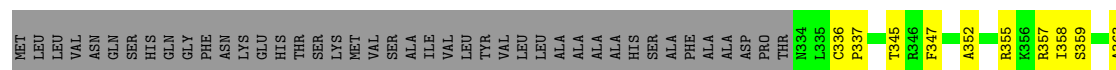
• Molecule 1: Spike protein S1





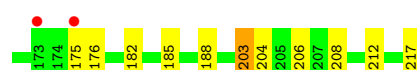
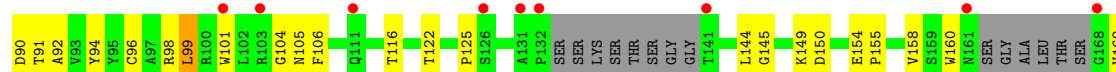
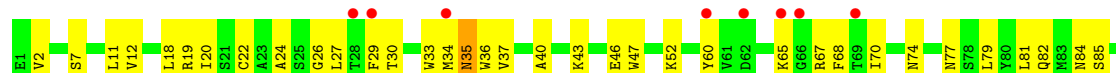
• Molecule 1: Spike protein S1

Chain C: 51% 25% 22%



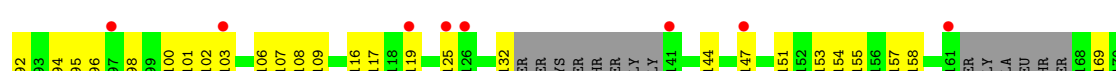
• Molecule 2: P5S-3B11 Heavy chain

Chain H: 9% 62% 30% 6%



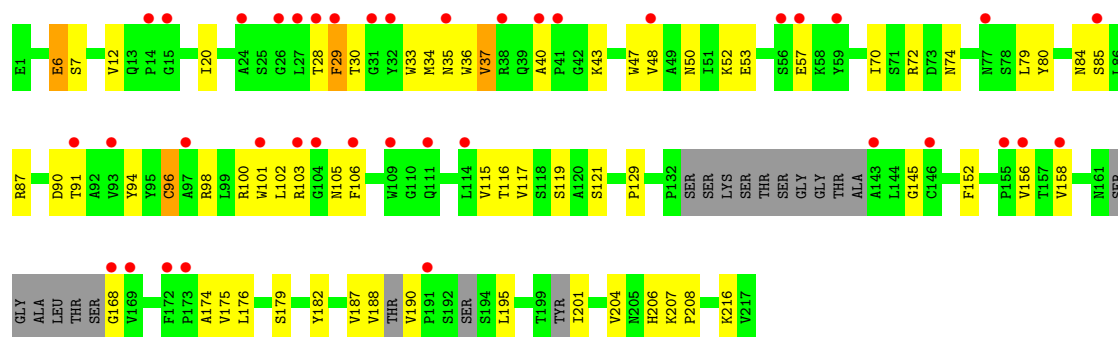
• Molecule 2: P5S-3B11 Heavy chain

Chain D: 10% 57% 35% 6%

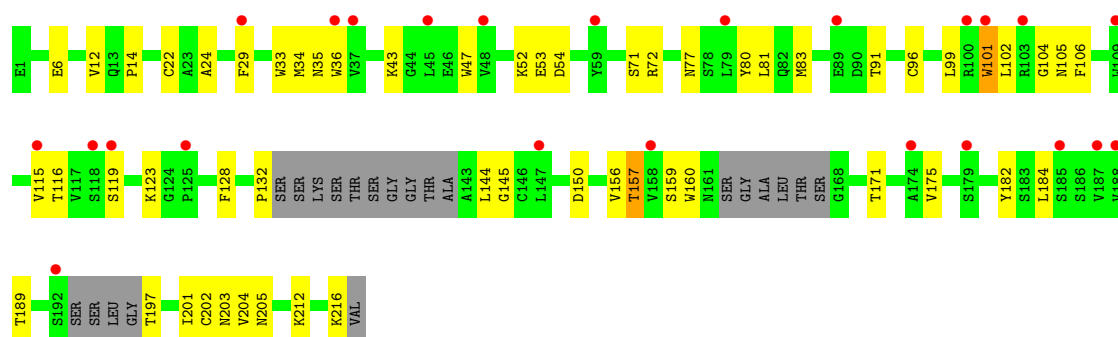


• Molecule 2: P5S-3B11 Heavy chain

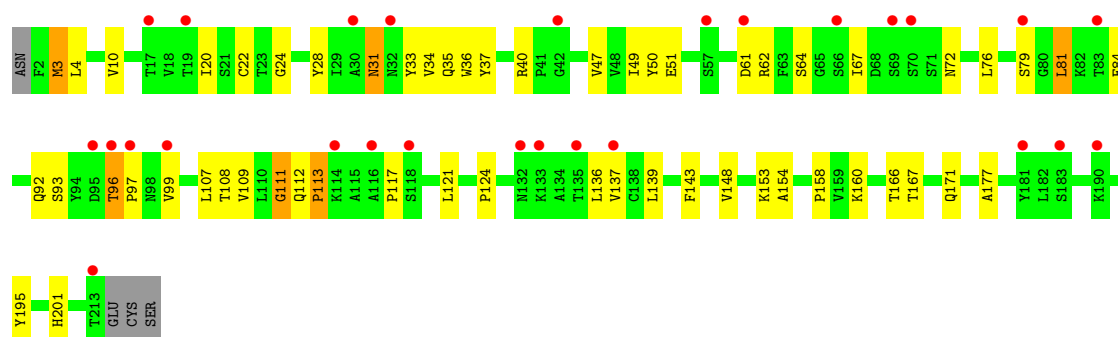
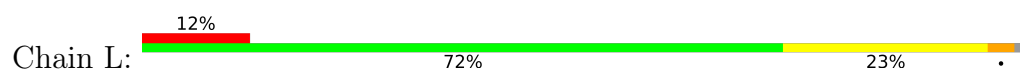
Chain G: 18% 61% 28% 9%



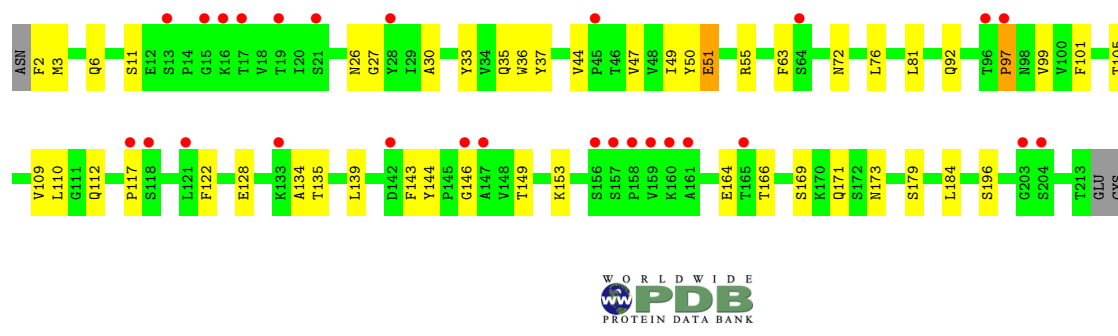
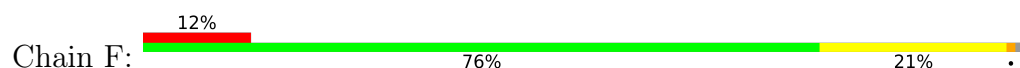
• Molecule 2: P5S-3B11 Heavy chain



• Molecule 3: P5S-3B11 Light chain



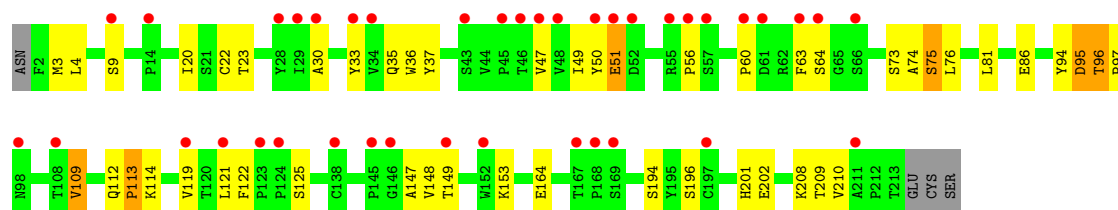
• Molecule 3: P5S-3B11 Light chain



SER

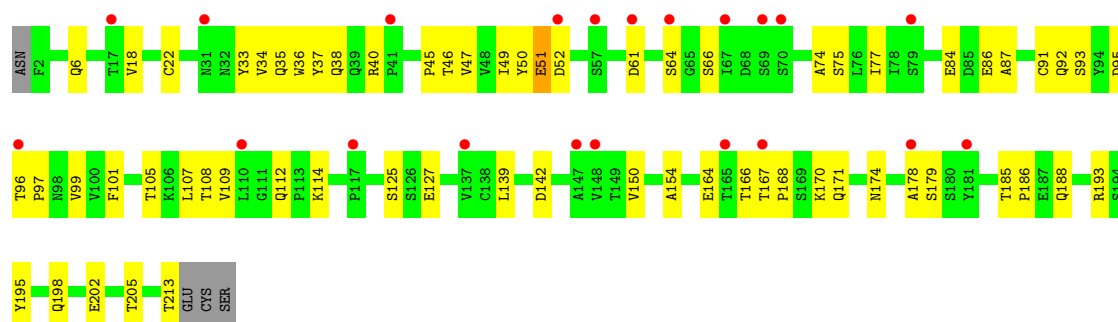
- Molecule 3: P5S-3B11 Light chain

Chain I: 



- Molecule 3: P5S-3B11 Light chain

Chain K: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	127.77Å 85.73Å 136.62Å 90.00° 90.39° 90.00°	Depositor
Resolution (Å)	46.82 – 3.20 46.82 – 3.20	Depositor EDS
% Data completeness (in resolution range)	98.0 (46.82-3.20) 98.2 (46.82-3.20)	Depositor EDS
R_{merge}	0.17	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.48 (at 3.19Å)	Xtriage
Refinement program	PHENIX (1.18.2_3874: ???)	Depositor
R, R_{free}	0.258 , 0.324 0.261 , 0.322	Depositor DCC
R_{free} test set	2378 reflections (4.85%)	wwPDB-VP
Wilson B-factor (Å ²)	75.2	Xtriage
Anisotropy	0.383	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 155.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	0.034 for h,-k,-l	Xtriage
F_o, F_c correlation	0.88	EDS
Total number of atoms	18516	wwPDB-VP
Average B, all atoms (Å ²)	117.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.81% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.53	0/1550	0.79	0/2108
1	B	0.58	1/1547 (0.1%)	0.87	0/2103
1	C	0.59	0/1558	0.86	0/2119
1	E	0.61	0/1558	0.83	0/2119
2	D	0.42	0/1589	0.69	0/2162
2	G	0.37	0/1538	0.65	0/2087
2	H	0.45	0/1589	0.75	0/2162
2	J	0.36	0/1544	0.59	0/2098
3	F	0.44	0/1634	0.72	3/2236 (0.1%)
3	I	0.38	0/1634	0.68	2/2236 (0.1%)
3	K	0.42	0/1626	0.71	3/2225 (0.1%)
3	L	0.51	0/1632	0.77	1/2235 (0.0%)
All	All	0.48	1/18999 (0.0%)	0.75	9/25890 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	472	ILE	C-N	-5.43	1.25	1.33

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	97	PRO	N-CA-CB	-6.22	96.72	103.25
3	F	51	GLU	CA-C-N	6.03	133.06	121.54
3	F	51	GLU	C-N-CA	6.03	133.06	121.54
3	K	186	PRO	N-CA-C	-5.76	105.52	113.53
3	K	51	GLU	CA-C-N	5.41	131.88	121.54

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1505	0	1427	49	0
1	B	1502	0	1423	43	0
1	C	1513	0	1433	54	0
1	E	1513	0	1433	33	0
2	D	1552	0	1526	59	0
2	G	1505	0	1470	60	0
2	H	1552	0	1526	58	0
2	J	1508	0	1478	47	0
3	F	1594	0	1523	40	0
3	I	1594	0	1523	42	0
3	K	1586	0	1512	48	0
3	L	1592	0	1514	40	0
All	All	18516	0	17788	504	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 14.

The worst 5 of 504 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:33:TRP:HB2	2:H:99:LEU:HD11	1.30	1.09
2:J:14:PRO:HD2	2:J:119:SER:HB3	1.51	0.89
1:A:369:TYR:HE2	2:G:101:TRP:HB2	1.37	0.87
3:I:96:THR:HG23	3:I:97:PRO:HD3	1.58	0.85
2:G:207:LYS:HG3	2:G:208:PRO:HD3	1.58	0.85

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	183/243 (75%)	173 (94%)	10 (6%)	0	100	100
1	B	183/243 (75%)	176 (96%)	7 (4%)	0	100	100
1	C	184/243 (76%)	174 (95%)	10 (5%)	0	100	100
1	E	184/243 (76%)	175 (95%)	9 (5%)	0	100	100
2	D	197/217 (91%)	190 (96%)	7 (4%)	0	100	100
2	G	186/217 (86%)	182 (98%)	4 (2%)	0	100	100
2	H	197/217 (91%)	188 (95%)	9 (5%)	0	100	100
2	J	188/217 (87%)	184 (98%)	4 (2%)	0	100	100
3	F	210/216 (97%)	202 (96%)	7 (3%)	1 (0%)	24	59
3	I	210/216 (97%)	200 (95%)	9 (4%)	1 (0%)	24	59
3	K	210/216 (97%)	201 (96%)	8 (4%)	1 (0%)	24	59
3	L	210/216 (97%)	203 (97%)	6 (3%)	1 (0%)	24	59
All	All	2342/2704 (87%)	2248 (96%)	90 (4%)	4 (0%)	43	73

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	F	97	PRO
3	L	113	PRO
3	K	112	GLN
3	I	113	PRO

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	165/207 (80%)	157 (95%)	8 (5%)	23	56
1	B	164/207 (79%)	157 (96%)	7 (4%)	26	59
1	C	166/207 (80%)	159 (96%)	7 (4%)	26	60

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	166/207 (80%)	158 (95%)	8 (5%)	23	56
2	D	171/182 (94%)	160 (94%)	11 (6%)	16	48
2	G	164/182 (90%)	157 (96%)	7 (4%)	26	59
2	H	171/182 (94%)	167 (98%)	4 (2%)	44	70
2	J	166/182 (91%)	158 (95%)	8 (5%)	23	56
3	F	182/188 (97%)	180 (99%)	2 (1%)	65	79
3	I	182/188 (97%)	177 (97%)	5 (3%)	39	68
3	K	179/188 (95%)	173 (97%)	6 (3%)	32	64
3	L	182/188 (97%)	173 (95%)	9 (5%)	22	55
All	All	2058/2308 (89%)	1976 (96%)	82 (4%)	28	61

5 of 82 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	G	28	THR
2	J	101	TRP
2	G	37	VAL
3	I	96	THR
2	J	197	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 24 such sidechains are listed below:

Mol	Chain	Res	Type
2	D	50	ASN
3	F	38	GLN
2	D	205	ASN
3	F	39	GLN
1	C	460	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	188/243 (77%)	-0.03	3 (1%) 70 51	39, 66, 102, 149	1 (0%)
1	B	188/243 (77%)	-0.13	0 100 100	33, 60, 92, 134	1 (0%)
1	C	189/243 (77%)	-0.14	0 100 100	36, 56, 83, 115	1 (0%)
1	E	189/243 (77%)	-0.08	3 (1%) 70 51	38, 58, 92, 128	1 (0%)
2	D	203/217 (93%)	0.81	21 (10%) 12 8	45, 115, 212, 319	0
2	G	198/217 (91%)	1.26	39 (19%) 3 2	48, 179, 286, 344	0
2	H	203/217 (93%)	0.82	19 (9%) 14 9	35, 104, 211, 304	0
2	J	196/217 (90%)	0.97	24 (12%) 8 6	56, 181, 314, 408	0
3	F	212/216 (98%)	0.87	27 (12%) 8 6	37, 118, 214, 330	0
3	I	212/216 (98%)	1.18	39 (18%) 3 3	71, 173, 298, 331	0
3	K	212/216 (98%)	0.88	21 (9%) 13 8	31, 148, 294, 415	0
3	L	212/216 (98%)	0.92	27 (12%) 8 6	28, 105, 203, 299	0
All	All	2402/2704 (88%)	0.63	223 (9%) 14 9	28, 100, 256, 415	4 (0%)

The worst 5 of 223 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	G	29	PHE	8.3
3	L	70	SER	5.9
3	K	31	ASN	5.8
2	G	97	ALA	5.6
2	G	41	PRO	5.2

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.