Full wwPDB X-ray Structure Validation Report ⓘ

May 17, 2020 – 04:53 am BST

PDB ID	:	6NMU
Title	:	Kick-Off Fab 115 anti-SIRP-alpha antibody in complex with SIRP-alpha Variant 1
Authors	:	Wibowo, A.S.; Carter, J.J.; Sim, J.
Deposited on	:	2019-01-11
Resolution	:	2.55 Å(reported)

This is a Full wwPDB X-ray Structure Validation 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 following versions of software and data (see references ⓘ) were used in the production of this report:

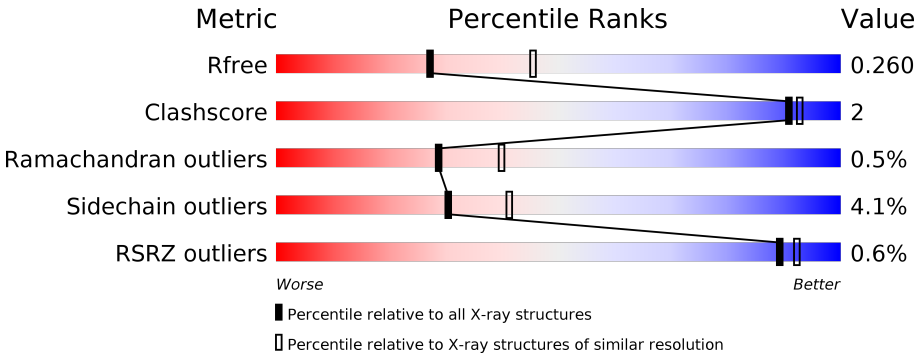
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.11
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.55 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}	130704	1284 (2.56-2.52)
Clashscore	141614	1332 (2.56-2.52)
Ramachandran outliers	138981	1315 (2.56-2.52)
Sidechain outliers	138945	1315 (2.56-2.52)
RSRZ outliers	127900	1272 (2.56-2.52)

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 on 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 <=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	215	93% 5%
1	L	215	89% 10%
2	B	228	88% 7%
2	H	228	89% 6%
3	C	127	2% 77% 9% 10%
3	S	127	2% 85% 10%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 8548 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 Fab 115 anti-SIRP-alpha antibody Variable Light Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	L	213	Total	C	N	O	S	0	0	0
			1643	1027	281	331	4			
1	A	213	Total	C	N	O	S	0	0	0
			1643	1027	281	331	4			

- Molecule 2 is a protein called Fab 115 anti-SIRP-alpha antibody Variable Heavy Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	215	Total	C	N	O	S	0	0	0
			1617	1019	270	322	6			
2	B	218	Total	C	N	O	S	0	0	0
			1636	1030	274	325	7			

- Molecule 3 is a protein called Tyrosine-protein phosphatase non-receptor type substrate 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	S	114	Total	C	N	O	S	0	0	0
			869	547	154	165	3			
3	C	114	Total	C	N	O	S	0	0	0
			869	547	154	165	3			

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
S	80	ALA	ASN	conflict	UNP P78324
S	120	THR	-	expression tag	UNP P78324
S	121	ARG	-	expression tag	UNP P78324
S	122	HIS	-	expression tag	UNP P78324
S	123	HIS	-	expression tag	UNP P78324
S	124	HIS	-	expression tag	UNP P78324
S	125	HIS	-	expression tag	UNP P78324
S	126	HIS	-	expression tag	UNP P78324

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Chain	Residue	Modelled	Actual	Comment	Reference
S	127	HIS	-	expression tag	UNP P78324
C	80	ALA	ASN	conflict	UNP P78324
C	120	THR	-	expression tag	UNP P78324
C	121	ARG	-	expression tag	UNP P78324
C	122	HIS	-	expression tag	UNP P78324
C	123	HIS	-	expression tag	UNP P78324
C	124	HIS	-	expression tag	UNP P78324
C	125	HIS	-	expression tag	UNP P78324
C	126	HIS	-	expression tag	UNP P78324
C	127	HIS	-	expression tag	UNP P78324

- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	L	65	Total O 65 65	0	0
4	H	42	Total O 42 42	0	0
4	S	32	Total O 32 32	0	0
4	A	57	Total O 57 57	0	0
4	B	55	Total O 55 55	0	0
4	C	20	Total O 20 20	0	0

3 Residue-property plots (i)

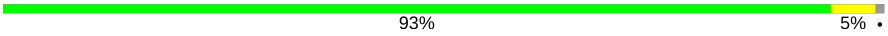
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are 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.

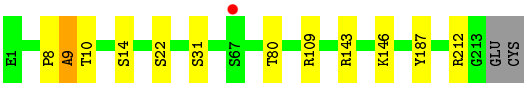
- Molecule 1: Fab 115 anti-SIRP-alpha antibody Variable Light Chain

Chain L:

- Molecule 1: Fab 115 anti-SIRP-alpha antibody Variable Light Chain

Chain A:





- Molecule 2: Fab 115 anti-SIRP-alpha antibody Variable Heavy Chain

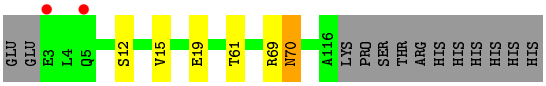
Chain H:

- Molecule 2: Fab 115 anti-SIRP-alpha antibody Variable Heavy Chain

Chain B:

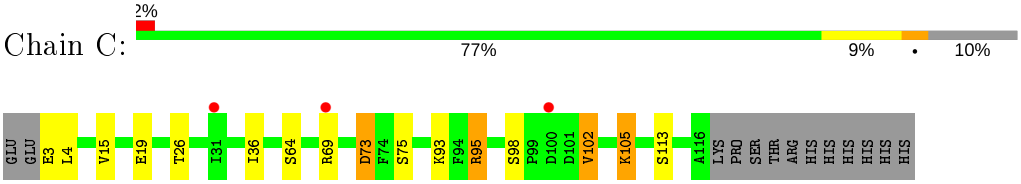
- Molecule 3: Tyrosine-protein phosphatase non-receptor type substrate 1

Chain S:



- Molecule 3: Tyrosine-protein phosphatase non-receptor type substrate 1

Chain C:


2%
77%
9%
10%
GLU
GLU
E3
L4
V15
E19
T26
I31
I36
S64
R69
D73
F74
S75
K93
F94
R95
S98
P99
D100
D101
V102
K105
S113
A116
LYS
PRO
SER
THR
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4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	56.93Å 71.74Å 77.73Å 98.89° 103.26° 90.07°	Depositor
Resolution (Å)	74.70 – 2.55 42.58 – 2.55	Depositor EDS
% Data completeness (in resolution range)	94.0 (74.70-2.55) 94.0 (42.58-2.55)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.13	Depositor
$< I/\sigma(I) >$ [1]	2.14 (at 2.54Å)	Xtriage
Refinement program	REFMAC 5.8.0158	Depositor
R, R_{free}	0.193 , 0.261 0.197 , 0.260	Depositor DCC
R_{free} test set	1835 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å^2)	38.4	Xtriage
Anisotropy	0.066	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.29 , 34.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	8548	wwPDB-VP
Average B, all atoms (Å^2)	40.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.25% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

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	0.61	0/1680	0.76	1/2284 (0.0%)
1	L	0.60	0/1680	0.80	3/2284 (0.1%)
2	B	0.59	0/1675	0.75	0/2279
2	H	0.60	0/1656	0.75	1/2255 (0.0%)
3	C	0.57	0/886	0.79	1/1201 (0.1%)
3	S	0.55	0/886	0.82	0/1201
All	All	0.59	0/8463	0.77	6/11504 (0.1%)

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	L	54	ARG	NE-CZ-NH1	5.74	123.17	120.30
1	L	61	ARG	NE-CZ-NH1	5.72	123.16	120.30
1	A	109	ARG	NE-CZ-NH2	-5.34	117.63	120.30
1	L	54	ARG	NE-CZ-NH2	-5.29	117.66	120.30
2	H	72	ARG	NE-CZ-NH1	5.25	122.92	120.30
3	C	95	ARG	NE-CZ-NH1	5.04	122.82	120.30

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	1643	0	1593	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	L	1643	0	1593	8	0
2	B	1636	0	1577	6	0
2	H	1617	0	1556	4	0
3	C	869	0	869	5	0
3	S	869	0	869	2	0
4	A	57	0	0	1	0
4	B	55	0	0	0	0
4	C	20	0	0	0	0
4	H	42	0	0	0	0
4	L	65	0	0	1	0
4	S	32	0	0	0	0
All	All	8548	0	8057	27	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 2.

All (27) 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)
1:A:8:PRO:O	4:A:301:HOH:O	2.01	0.79
2:B:8:GLY:O	2:B:18:LEU:HD11	2.05	0.57
1:L:37:GLN:HB2	1:L:47:LEU:HD11	1.86	0.56
1:L:109:ARG:NH1	1:L:110:THR:O	2.35	0.55
3:C:4:LEU:O	3:C:105:LYS:NZ	2.45	0.50
3:S:69:ARG:O	3:S:70:ASN:ND2	2.45	0.50
2:B:52:ASN:O	2:B:72:ARG:NH1	2.45	0.50
3:C:64:SER:OG	3:C:73:ASP:OD1	2.16	0.49
2:B:157:THR:CG2	2:B:205:ASN:HB3	2.43	0.48
1:L:33:LEU:HD13	1:L:34:ALA:N	2.29	0.47
3:S:15:VAL:HG22	3:S:19:GLU:HB2	1.98	0.45
3:C:36:ILE:HD13	3:C:93:LYS:HA	1.97	0.45
3:C:95:ARG:HG2	3:C:102:VAL:HG23	1.98	0.45
3:C:15:VAL:HG22	3:C:19:GLU:HB3	1.97	0.45
1:L:125:GLN:HG3	2:H:128:PHE:CE2	2.51	0.45
2:B:132:PRO:HG3	2:B:195:LEU:HD22	1.99	0.44
1:L:137:LEU:HD12	1:L:137:LEU:N	2.33	0.43
2:B:157:THR:HG23	2:B:205:ASN:HB3	2.01	0.43
1:L:42:GLN:NE2	4:L:302:HOH:O	2.42	0.43
1:A:8:PRO:O	1:A:9:ALA:CB	2.67	0.43
1:L:187:TYR:CE2	1:L:212:ARG:HD3	2.54	0.42
2:H:157:THR:HG23	2:H:205:ASN:HB3	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:99:GLN:HB3	2:H:101:ASP:O	2.19	0.42
2:B:49:SER:HB2	2:B:59:ASP:O	2.21	0.41
1:A:187:TYR:CE2	1:A:212:ARG:HD3	2.56	0.41
2:H:101:ASP:HB2	2:H:104:SER:HB2	2.03	0.41
1:L:91:TYR:N	1:L:91:TYR:CD1	2.89	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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	211/215 (98%)	202 (96%)	8 (4%)	1 (0%)	29	40
1	L	211/215 (98%)	198 (94%)	13 (6%)	0	100	100
2	B	214/228 (94%)	204 (95%)	8 (4%)	2 (1%)	17	24
2	H	211/228 (92%)	204 (97%)	7 (3%)	0	100	100
3	C	112/127 (88%)	104 (93%)	7 (6%)	1 (1%)	17	24
3	S	112/127 (88%)	105 (94%)	6 (5%)	1 (1%)	17	24
All	All	1071/1140 (94%)	1017 (95%)	49 (5%)	5 (0%)	29	40

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	9	ALA
2	B	52	ASN
3	S	70	ASN
2	B	105	PHE
3	C	98	SER

5.3.2 Protein sidechains (i)

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	184/186 (99%)	177 (96%)	7 (4%)	33	45
1	L	184/186 (99%)	176 (96%)	8 (4%)	29	39
2	B	182/191 (95%)	175 (96%)	7 (4%)	33	45
2	H	180/191 (94%)	174 (97%)	6 (3%)	38	51
3	C	93/106 (88%)	85 (91%)	8 (9%)	10	13
3	S	93/106 (88%)	91 (98%)	2 (2%)	52	66
All	All	916/966 (95%)	878 (96%)	38 (4%)	30	41

All (38) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	L	22	SER
1	L	24	ARG
1	L	31	SER
1	L	56	THR
1	L	77	SER
1	L	106	GLU
1	L	126	LEU
1	L	192	VAL
2	H	35	ASN
2	H	101	ASP
2	H	104	SER
2	H	203	ASN
2	H	207	LYS
2	H	220	LYS
3	S	12	SER
3	S	61	THR
1	A	10	THR
1	A	14	SER
1	A	22	SER
1	A	31	SER
1	A	80	THR
1	A	143	ARG

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Mol	Chain	Res	Type
1	A	146	LYS
2	B	52	ASN
2	B	58	THR
2	B	121	SER
2	B	134	SER
2	B	135	LYS
2	B	202	CYS
2	B	210	ASN
3	C	3	GLU
3	C	26	THR
3	C	69	ARG
3	C	73	ASP
3	C	75	SER
3	C	102	VAL
3	C	105	LYS
3	C	113	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
2	H	52	ASN
2	H	84	ASN
2	H	205	ASN
1	A	27	GLN
2	B	52	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no carbohydrates in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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, 95^{th} 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	213/215 (99%)	-0.07	1 (0%) 91 94	20, 36, 59, 74	0
1	L	213/215 (99%)	-0.17	0 100 100	17, 34, 57, 68	0
2	B	218/228 (95%)	-0.10	0 100 100	21, 39, 63, 84	0
2	H	215/228 (94%)	-0.16	0 100 100	20, 39, 59, 83	0
3	C	114/127 (89%)	0.03	3 (2%) 56 62	30, 47, 80, 111	0
3	S	114/127 (89%)	0.08	2 (1%) 68 74	30, 44, 77, 85	0
All	All	1087/1140 (95%)	-0.09	6 (0%) 89 92	17, 39, 65, 111	0

All (6) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	C	31	ILE	3.8
3	S	3	GLU	3.4
3	S	5	GLN	2.7
3	C	100	ASP	2.6
3	C	69	ARG	2.4
1	A	67	SER	2.0

6.2 Non-standard residues in protein, DNA, RNA chains

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

6.3 Carbohydrates

There are no carbohydrates in this entry.

6.4 Ligands

There are no ligands in this entry.

6.5 Other polymers

There are no such residues in this entry.