wwPDB X-ray Structure Validation Summary Report (i)

Dec 10, 2023 – 02:44 pm GMT

PDB ID	:	2VXS
Title	:	Structure of IL-17A in complex with a potent, fully human neutralising antibody
Authors	:	Gerhardt, S.; Hargreaves, D.; Pauptit, R.A.; Davies, R.A.; Russell, C.; Welsh, F.; Tuske, S.J.; Coales, S.J.; Hamuro, Y.; Needham, M.R.C.; Langham, C.; Barker, W.; Bell, P.; Aziz, A.; Smith, M.J.; Dawson, S.; Abbott, W.M.
Deposited on	:	2008-07-09
Resolution	:	2.63 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 (i) 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 (i)) were used in the production of this report:

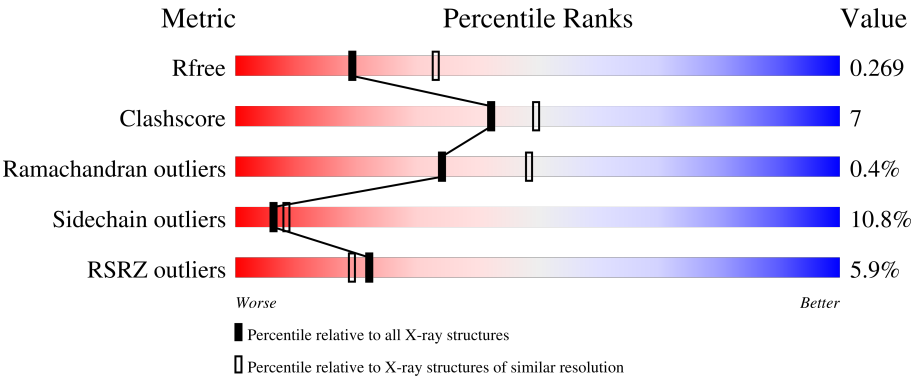
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 2.63 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	1426 (2.66-2.62)
Clashscore	141614	1472 (2.66-2.62)
Ramachandran outliers	138981	1446 (2.66-2.62)
Sidechain outliers	138945	1446 (2.66-2.62)
RSRZ outliers	127900	1408 (2.66-2.62)

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 <=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	137	8% 42% 18% · 37%
1	B	137	3% 42% 14% · 42%
1	C	137	9% 47% 9% · 42%
1	D	137	7% 44% 12% 44%

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Mol	Chain	Length	Quality of chain
2	H	225	4% 80% 14%
2	I	225	82% 12%
2	J	225	14% 68% 24% 6%
2	K	225	79% 16%
3	L	216	78% 17%
3	M	216	% 75% 22%
3	N	216	15% 78% 19%
3	O	216	3% 78% 19%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	SO4	B	1129	-	-	X	-

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 15669 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 INTERLEUKIN-17A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	86	Total	C	N	O	S	0	0	0
			679	424	124	126	5			
1	B	80	Total	C	N	O	S	0	0	0
			635	398	115	117	5			
1	C	80	Total	C	N	O	S	0	0	0
			642	402	117	118	5			
1	D	77	Total	C	N	O	S	0	0	0
			612	382	111	114	5			

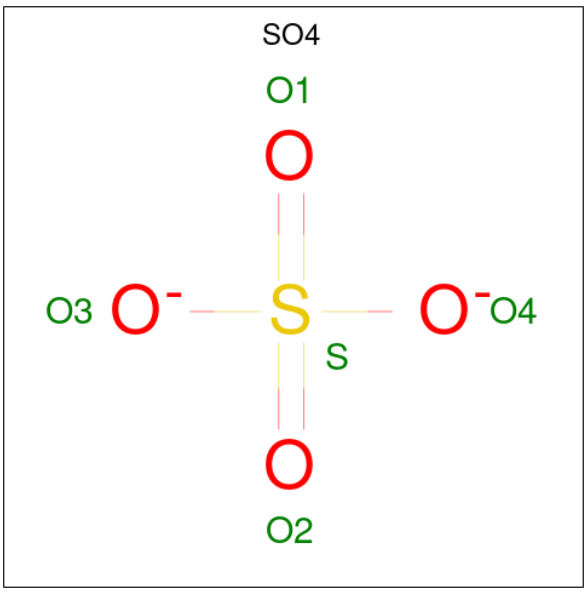
- Molecule 2 is a protein called FAB FRAGMENT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	216	Total	C	N	O	S	0	0	0
			1594	1001	273	313	7			
2	I	221	Total	C	N	O	S	0	0	0
			1620	1015	278	320	7			
2	J	211	Total	C	N	O	S	0	0	0
			1565	985	267	307	6			
2	K	217	Total	C	N	O	S	0	0	0
			1599	1005	275	313	6			

- Molecule 3 is a protein called FAB FRAGMENT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	L	213	Total	C	N	O	S	0	0	0
			1606	1006	266	329	5			
3	M	215	Total	C	N	O	S	0	0	0
			1621	1014	268	333	6			
3	N	213	Total	C	N	O	S	0	0	0
			1606	1006	266	329	5			
3	O	214	Total	C	N	O	S	0	0	0
			1616	1011	267	332	6			

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total O S 5 4 1	0	0
4	B	1	Total O S 5 4 1	0	0
4	B	1	Total O S 5 4 1	0	0
4	C	1	Total O S 5 4 1	0	0
4	D	1	Total O S 5 4 1	0	0
4	I	1	Total O S 5 4 1	0	0
4	I	1	Total O S 5 4 1	0	0
4	L	1	Total O S 5 4 1	0	0
4	L	1	Total O S 5 4 1	0	0
4	M	1	Total O S 5 4 1	0	0
4	N	1	Total O S 5 4 1	0	0
4	O	1	Total O S 5 4 1	0	0

- Molecule 5 is water.

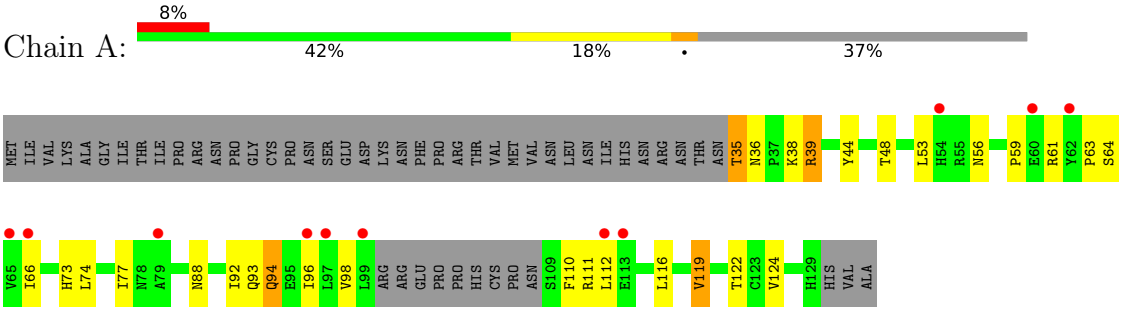
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	9	Total O 9 9	0	0
5	B	15	Total O 15 15	0	0
5	C	4	Total O 4 4	0	0
5	D	2	Total O 2 2	0	0
5	H	19	Total O 19 19	0	0
5	I	52	Total O 52 52	0	0
5	J	7	Total O 7 7	0	0
5	K	28	Total O 28 28	0	0
5	L	17	Total O 17 17	0	0
5	M	31	Total O 31 31	0	0
5	N	10	Total O 10 10	0	0
5	O	20	Total O 20 20	0	0

3 Residue-property plots (i)

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.

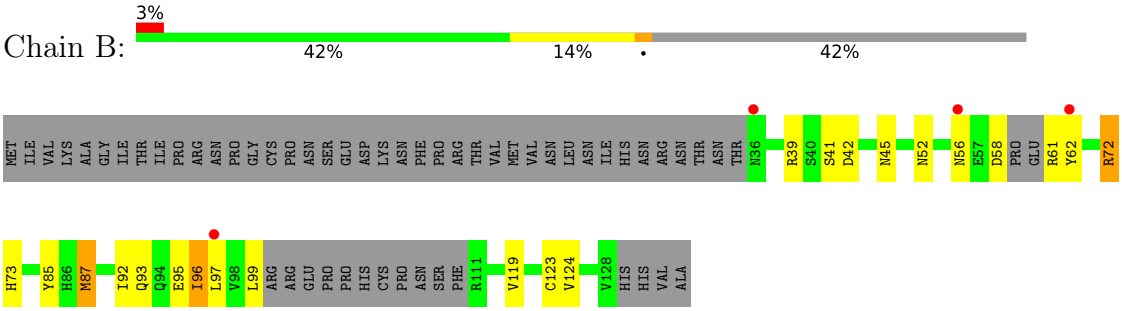
• Molecule 1: INTERLEUKIN-17A

Chain A:



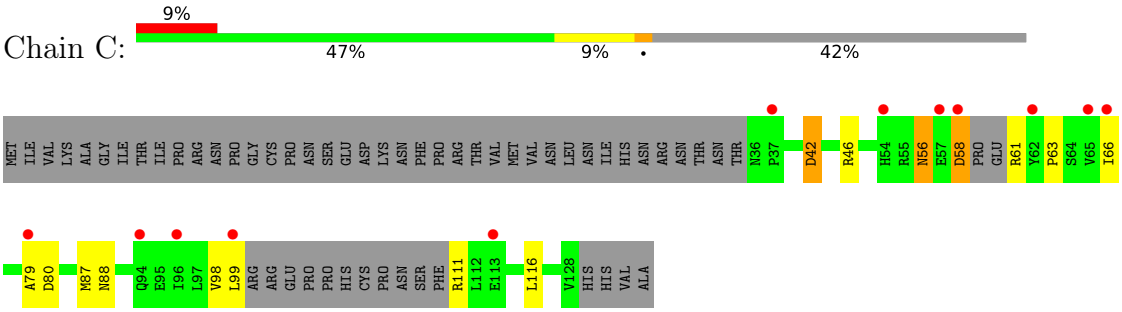
• Molecule 1: INTERLEUKIN-17A

Chain B:



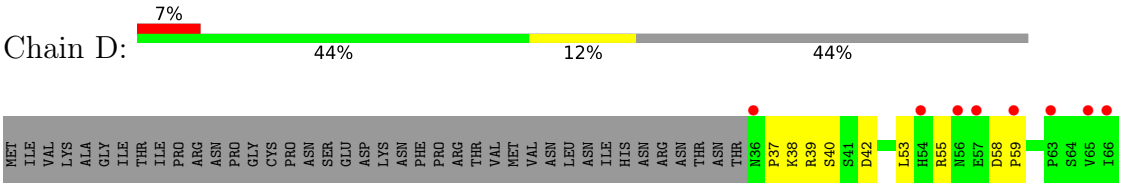
• Molecule 1: INTERLEUKIN-17A

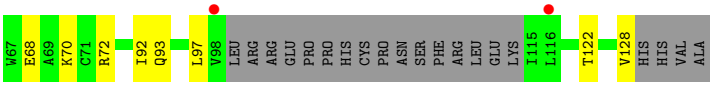
Chain C:



• Molecule 1: INTERLEUKIN-17A

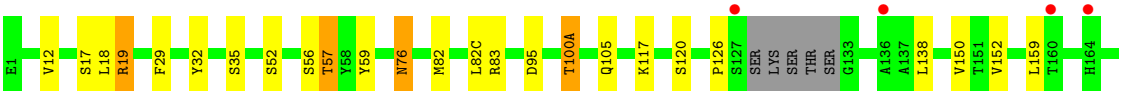
Chain D:

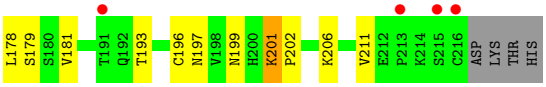




• Molecule 2: FAB FRAGMENT

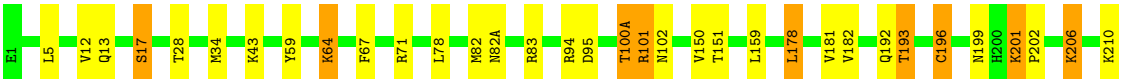
Chain H:

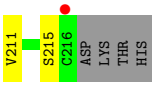




• Molecule 2: FAB FRAGMENT

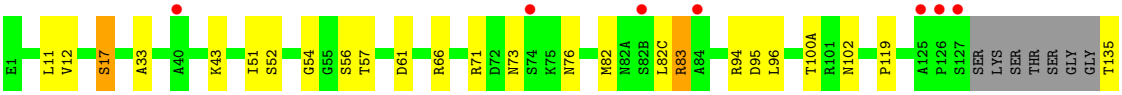
Chain I:

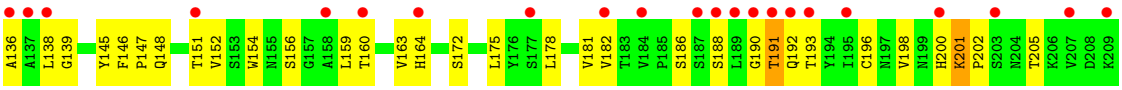


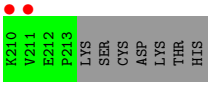


• Molecule 2: FAB FRAGMENT

Chain J:

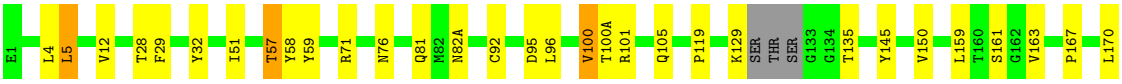






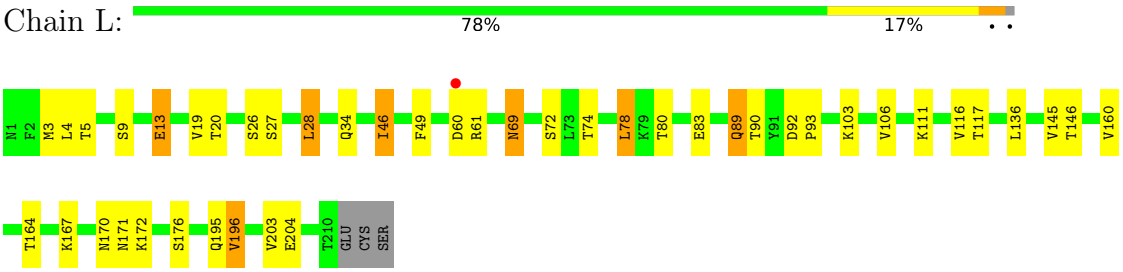
• Molecule 2: FAB FRAGMENT

Chain K:



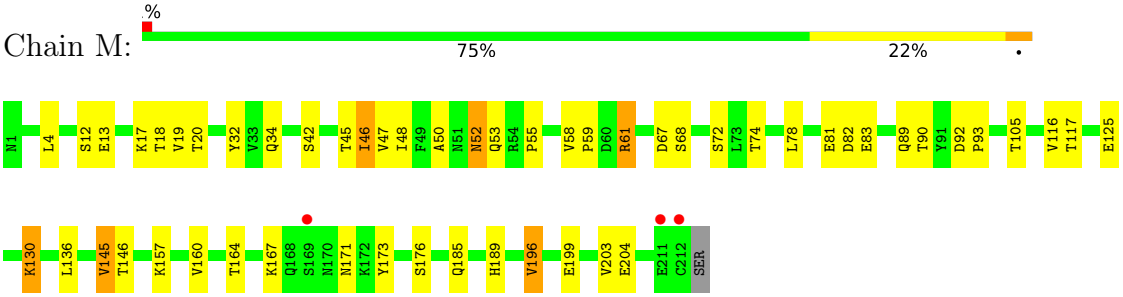
• Molecule 3: FAB FRAGMENT

Chain L:



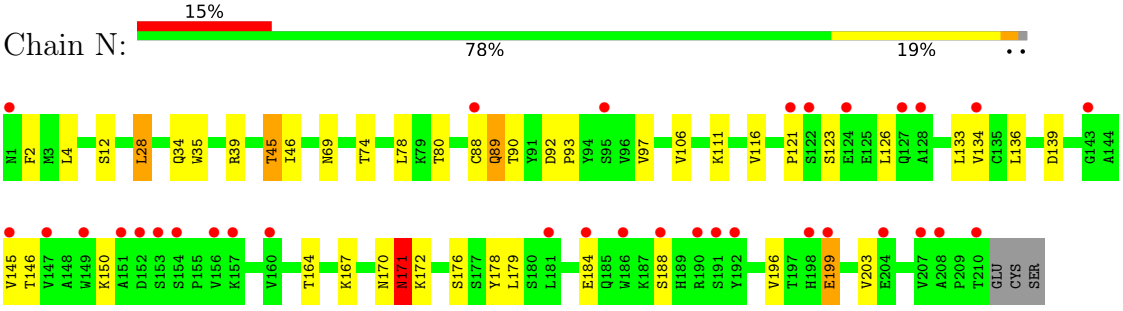
• Molecule 3: FAB FRAGMENT

Chain M:



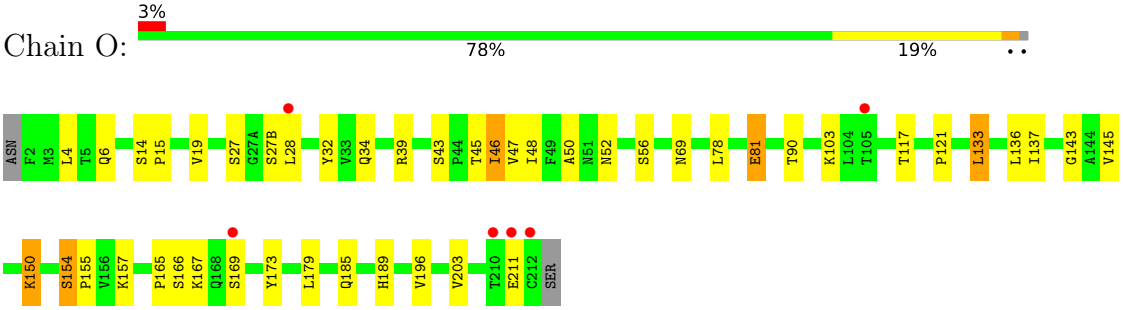
• Molecule 3: FAB FRAGMENT

Chain N:



• Molecule 3: FAB FRAGMENT

Chain O:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	98.47Å 66.71Å 203.79Å 90.00° 91.65° 90.00°	Depositor
Resolution (Å)	204.12 – 2.63 101.85 – 2.63	Depositor EDS
% Data completeness (in resolution range)	99.9 (204.12-2.63) 99.9 (101.85-2.63)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.10 (at 2.62Å)	Xtriage
Refinement program	REFMAC 5.5.0036	Depositor
R, R_{free}	0.213 , 0.264 0.217 , 0.269	Depositor DCC
R_{free} test set	3976 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å^2)	36.1	Xtriage
Anisotropy	0.108	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 58.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.30$	Xtriage
Estimated twinning fraction	0.025 for h,-k,-l	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	15669	wwPDB-VP
Average B, all atoms (Å^2)	43.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.68% 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

Bond lengths and bond angles in the following residue types are not validated in this section: SO4

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	0.51	0/694	0.65	0/946
1	B	0.46	0/648	0.58	0/881
1	C	0.46	0/655	0.63	0/889
1	D	0.44	0/627	0.58	0/856
2	H	0.59	0/1629	0.66	0/2216
2	I	0.63	1/1656 (0.1%)	0.73	0/2255
2	J	0.49	0/1600	0.64	0/2179
2	K	0.56	0/1634	0.69	0/2222
3	L	0.56	0/1647	0.65	0/2251
3	M	0.58	0/1662	0.65	0/2271
3	N	0.48	0/1647	0.58	0/2251
3	O	0.52	0/1657	0.62	0/2264
All	All	0.54	1/15756 (0.0%)	0.65	0/21481

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	I	196	CYS	CB-SG	-5.95	1.72	1.81

There are no bond angle outliers.

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	679	0	651	16	0
1	B	635	0	613	14	0
1	C	642	0	624	8	0
1	D	612	0	584	7	0
2	H	1594	0	1570	18	0
2	I	1620	0	1590	21	0
2	J	1565	0	1541	27	0
2	K	1599	0	1579	25	0
3	L	1606	0	1547	18	1
3	M	1621	0	1557	27	1
3	N	1606	0	1547	21	0
3	O	1616	0	1553	27	0
4	A	5	0	0	1	0
4	B	10	0	0	2	0
4	C	5	0	0	0	0
4	D	5	0	0	0	0
4	I	10	0	0	0	0
4	L	10	0	0	0	0
4	M	5	0	0	0	0
4	N	5	0	0	0	0
4	O	5	0	0	0	0
5	A	9	0	0	0	0
5	B	15	0	0	0	0
5	C	4	0	0	0	0
5	D	2	0	0	0	0
5	H	19	0	0	2	0
5	I	52	0	0	0	0
5	J	7	0	0	0	0
5	K	28	0	0	0	0
5	L	17	0	0	0	0
5	M	31	0	0	0	0
5	N	10	0	0	3	0
5	O	20	0	0	1	0
All	All	15669	0	14956	211	1

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 7.

The worst 5 of 211 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:I:94:ARG:HH11	2:I:102:ASN:ND2	1.57	1.00

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:I:94:ARG:HH11	2:I:102:ASN:HD21	0.95	0.92
3:O:34:GLN:HE21	3:O:50:ALA:H	1.17	0.91
3:M:34:GLN:HE21	3:M:50:ALA:H	1.22	0.87
2:I:201:LYS:HD3	2:I:202:PRO:HD3	1.55	0.87

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:L:9:SER:OG	3:M:67:ASP:OD1[2_745]	2.08	0.12

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	82/137 (60%)	77 (94%)	3 (4%)	2 (2%)	6 7
1	B	74/137 (54%)	74 (100%)	0	0	100 100
1	C	74/137 (54%)	71 (96%)	2 (3%)	1 (1%)	11 15
1	D	73/137 (53%)	69 (94%)	3 (4%)	1 (1%)	11 15
2	H	212/225 (94%)	204 (96%)	8 (4%)	0	100 100
2	I	219/225 (97%)	212 (97%)	7 (3%)	0	100 100
2	J	207/225 (92%)	195 (94%)	10 (5%)	2 (1%)	15 22
2	K	213/225 (95%)	208 (98%)	5 (2%)	0	100 100
3	L	211/216 (98%)	201 (95%)	9 (4%)	1 (0%)	29 43
3	M	213/216 (99%)	202 (95%)	11 (5%)	0	100 100
3	N	211/216 (98%)	200 (95%)	9 (4%)	2 (1%)	17 26
3	O	212/216 (98%)	202 (95%)	10 (5%)	0	100 100
All	All	2001/2312 (86%)	1915 (96%)	77 (4%)	9 (0%)	34 48

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	110	PHE
1	D	38	LYS
3	L	60	ASP
1	A	59	PRO
2	J	156	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	77/128 (60%)	68 (88%)	9 (12%)	5 7
1	B	73/128 (57%)	62 (85%)	11 (15%)	3 3
1	C	74/128 (58%)	67 (90%)	7 (10%)	8 11
1	D	71/128 (56%)	65 (92%)	6 (8%)	10 15
2	H	178/187 (95%)	162 (91%)	16 (9%)	9 14
2	I	181/187 (97%)	160 (88%)	21 (12%)	5 7
2	J	175/187 (94%)	154 (88%)	21 (12%)	5 6
2	K	178/187 (95%)	159 (89%)	19 (11%)	6 9
3	L	184/188 (98%)	162 (88%)	22 (12%)	5 6
3	M	186/188 (99%)	161 (87%)	25 (13%)	4 4
3	N	184/188 (98%)	172 (94%)	12 (6%)	17 26
3	O	186/188 (99%)	166 (89%)	20 (11%)	6 8
All	All	1747/2012 (87%)	1558 (89%)	189 (11%)	6 8

5 of 189 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	L	46	ILE
3	M	78	LEU
3	L	74	THR
3	L	196	VAL

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Mol	Chain	Res	Type
3	M	157	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 52 such sidechains are listed below:

Mol	Chain	Res	Type
3	L	109	GLN
3	M	89	GLN
3	O	109	GLN
3	L	129	ASN
3	M	34	GLN

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 monosaccharides in this entry.

5.6 Ligand geometry (i)

12 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	SO4	L	1211	-	4,4,4	0.16	0	6,6,6	0.37	0
4	SO4	N	1211	-	4,4,4	0.15	0	6,6,6	0.18	0
4	SO4	B	1130	-	4,4,4	0.16	0	6,6,6	0.13	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	SO4	O	1213	-	4,4,4	0.17	0	6,6,6	0.14	0
4	SO4	L	1212	-	4,4,4	0.09	0	6,6,6	0.11	0
4	SO4	A	1130	-	4,4,4	0.21	0	6,6,6	0.26	0
4	SO4	C	1129	-	4,4,4	0.09	0	6,6,6	0.17	0
4	SO4	B	1129	-	4,4,4	0.22	0	6,6,6	0.51	0
4	SO4	D	1129	-	4,4,4	0.17	0	6,6,6	0.26	0
4	SO4	I	1217	-	4,4,4	0.17	0	6,6,6	0.20	0
4	SO4	M	1213	-	4,4,4	0.16	0	6,6,6	0.17	0
4	SO4	I	1218	-	4,4,4	0.29	0	6,6,6	0.34	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1130	SO4	1	0
4	B	1129	SO4	2	0

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

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	86/137 (62%)	0.90	11 (12%) 3 2	33, 51, 62, 64	0
1	B	80/137 (58%)	0.74	4 (5%) 28 25	35, 50, 63, 65	0
1	C	80/137 (58%)	1.05	12 (15%) 2 1	34, 50, 63, 65	0
1	D	77/137 (56%)	0.91	10 (12%) 3 2	34, 48, 64, 65	0
2	H	216/225 (96%)	0.53	8 (3%) 41 38	29, 39, 47, 65	0
2	I	221/225 (98%)	0.47	1 (0%) 91 90	29, 39, 48, 79	0
2	J	211/225 (93%)	1.13	31 (14%) 2 1	31, 39, 46, 56	0
2	K	217/225 (96%)	0.41	1 (0%) 91 90	30, 39, 47, 66	0
3	L	213/216 (98%)	0.43	1 (0%) 91 90	32, 45, 55, 62	0
3	M	215/216 (99%)	0.45	3 (1%) 75 73	33, 45, 55, 80	0
3	N	213/216 (98%)	0.99	33 (15%) 2 1	33, 46, 55, 62	0
3	O	214/216 (99%)	0.49	6 (2%) 53 49	33, 45, 55, 74	0
All	All	2043/2312 (88%)	0.66	121 (5%) 22 19	29, 43, 58, 80	0

The worst 5 of 121 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	J	127	SER	7.5
2	J	210	LYS	6.3
2	J	187	SER	6.2
3	N	184	GLU	5.9
2	J	189	LEU	5.3

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 (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	SO4	N	1211	5/5	0.86	0.22	93,94,94,94	0
4	SO4	L	1212	5/5	0.90	0.29	85,85,85,85	0
4	SO4	A	1130	5/5	0.90	0.26	66,68,68,68	0
4	SO4	I	1218	5/5	0.92	0.29	74,74,76,77	0
4	SO4	L	1211	5/5	0.92	0.19	65,65,66,67	0
4	SO4	B	1130	5/5	0.92	0.31	82,82,83,84	0
4	SO4	D	1129	5/5	0.92	0.44	67,69,69,70	0
4	SO4	O	1213	5/5	0.93	0.26	69,69,69,70	0
4	SO4	I	1217	5/5	0.94	0.29	74,74,75,75	0
4	SO4	B	1129	5/5	0.95	0.26	53,53,55,55	0
4	SO4	C	1129	5/5	0.96	0.24	80,80,80,81	0
4	SO4	M	1213	5/5	0.97	0.12	68,70,70,71	0

6.5 Other polymers (i)

There are no such residues in this entry.