



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 13, 2023 – 02:58 PM EDT

PDB ID : 4QZ
Title : Fab fragment of HIV vaccine-elicited CD4bs-directed antibody, GE356, from a non-human primate
Authors : Navis, M.; Tran, K.; Bale, S.; Phad, G.; Guenaga, J.; Wilson, R.; Soldemo, M.; McKee, K.; Sundling, C.; Mascola, J.; Li, Y.; Wyatt, R.T.; Hedestam, G.B.K.
Deposited on : 2014-04-10
Resolution : 1.93 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 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 : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.35.1
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) : 2.35.1

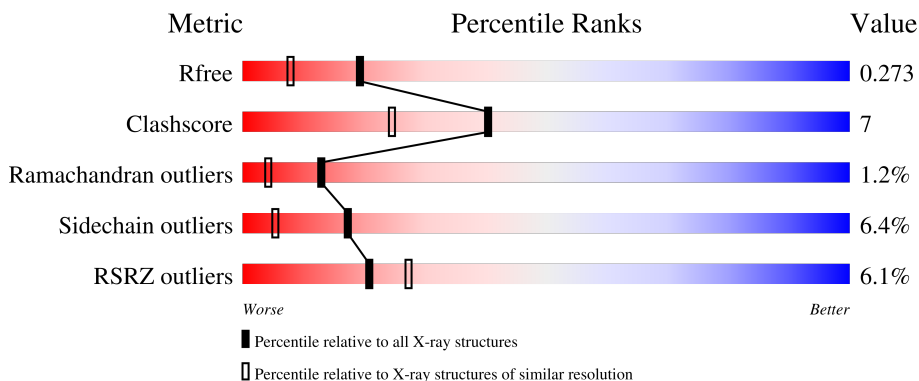
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.93 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	4310 (1.96-1.92)
Clashscore	141614	1023 (1.94-1.94)
Ramachandran outliers	138981	1007 (1.94-1.94)
Sidechain outliers	138945	1007 (1.94-1.94)
RSRZ outliers	127900	4250 (1.96-1.92)

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	233	 6% 80% 14% . .
1	H	233	 7% 77% 15% . .
2	B	212	 8% 83% 15% .
2	L	212	 3% 88% 11% .

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 6817 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 Heavy chain of Fab fragment of HIV vaccine-elicited CD4bs-directed antibody.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	H	224	Total	C	N	O	S	0	0	0
			1704	1077	288	331	8			
1	A	224	Total	C	N	O	S	0	0	0
			1704	1077	288	331	8			

- Molecule 2 is a protein called Light chain of Fab fragment of HIV vaccine-elicited CD4bs-directed antibody.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	L	212	Total	C	N	O	S	0	0	0
			1585	990	264	326	5			
2	B	212	Total	C	N	O	S	0	0	0
			1585	990	264	326	5			

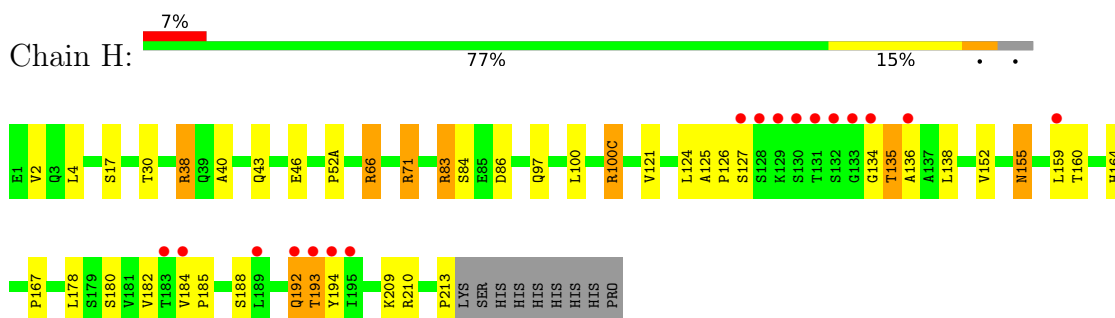
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	H	54	Total	O	0	0
			54	54		
3	L	82	Total	O	0	0
			82	82		
3	A	78	Total	O	0	0
			78	78		
3	B	25	Total	O	0	0
			25	25		

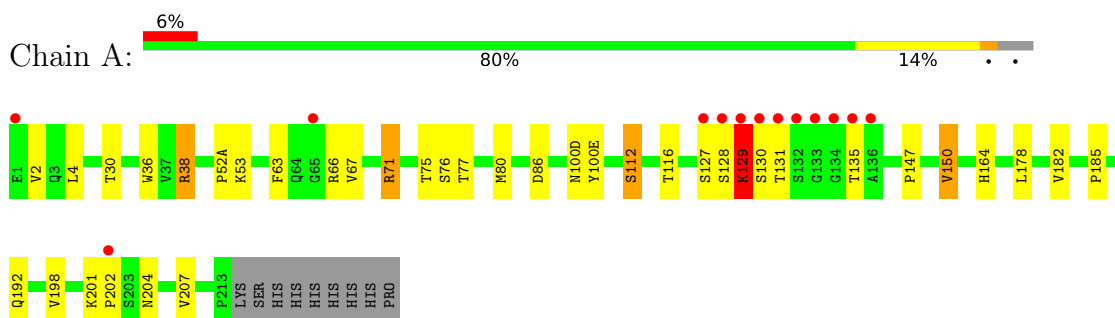
3 Residue-property plots [i](#)

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.

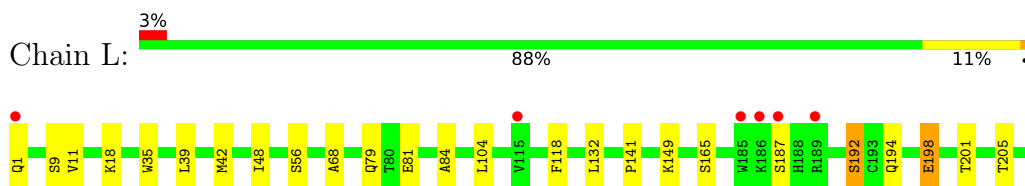
- Molecule 1: Heavy chain of Fab fragment of HIV vaccine-elicited CD4bs-directed antibody



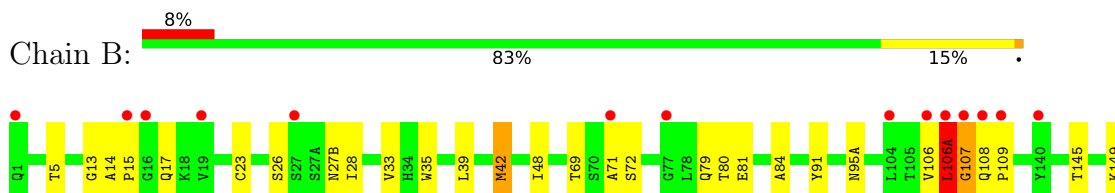
- Molecule 1: Heavy chain of Fab fragment of HIV vaccine-elicited CD4bs-directed antibody

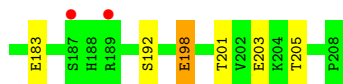


- Molecule 2: Light chain of Fab fragment of HIV vaccine-elicited CD4bs-directed antibody



- Molecule 2: Light chain of Fab fragment of HIV vaccine-elicited CD4bs-directed antibody





4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	48.24Å 67.91Å 69.98Å 92.39° 94.13° 109.69°	Depositor
Resolution (Å)	36.99 – 1.93 36.99 – 1.93	Depositor EDS
% Data completeness (in resolution range)	95.9 (36.99-1.93) 96.0 (36.99-1.93)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.04	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.51 (at 1.94Å)	Xtrriage
Refinement program	PHENIX (phenix.refine: 1.8.2_1309)	Depositor
R, R_{free}	0.232 , 0.272 0.233 , 0.273	Depositor DCC
R_{free} test set	3031 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å ²)	33.3	Xtrriage
Anisotropy	0.091	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 40.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6817	wwPDB-VP
Average B, all atoms (Å ²)	31.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.17% 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	0.33	0/1746	0.57	0/2376
1	H	0.32	0/1746	0.58	1/2376 (0.0%)
2	B	0.28	0/1624	0.52	0/2217
2	L	0.29	0/1624	0.50	0/2217
All	All	0.30	0/6740	0.54	1/9186 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	H	178	LEU	CA-CB-CG	5.21	127.27	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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	1704	0	1674	19	0
1	H	1704	0	1674	44	0
2	B	1585	0	1528	19	0
2	L	1585	0	1528	13	0
3	A	78	0	0	2	0
3	B	25	0	0	0	0
3	H	54	0	0	0	0
3	L	82	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	6817	0	6404	93	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 7.

All (93) 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:H:192:GLN:HB2	1:H:193:THR:CA	1.41	1.38
1:H:192:GLN:CB	1:H:193:THR:HA	1.54	1.34
1:H:192:GLN:CG	1:H:193:THR:HG23	1.57	1.34
1:H:192:GLN:HG3	1:H:193:THR:CG2	1.86	1.06
1:H:192:GLN:HG3	1:H:193:THR:HG23	0.93	0.92
1:H:192:GLN:HB2	1:H:193:THR:CB	2.00	0.90
1:H:192:GLN:CB	1:H:193:THR:HG23	2.03	0.89
1:H:192:GLN:CG	1:H:193:THR:CG2	2.53	0.81
1:H:192:GLN:HB2	1:H:193:THR:CG2	2.12	0.79
1:H:192:GLN:CB	1:H:193:THR:CA	2.31	0.78
1:H:192:GLN:HB2	1:H:193:THR:HA	0.75	0.74
1:H:159:LEU:HD11	1:H:194:TYR:HE1	1.55	0.72
2:B:106:VAL:O	2:B:107:GLY:N	2.23	0.71
1:A:128:SER:HA	1:A:131:THR:HG23	1.74	0.69
2:B:80:THR:HA	2:B:106:VAL:HG21	1.75	0.67
1:H:192:GLN:CB	1:H:193:THR:CG2	2.71	0.67
1:H:159:LEU:CD1	1:H:194:TYR:HE1	2.08	0.66
2:B:13:GLY:O	2:B:106(A):LEU:N	2.28	0.66
1:A:128:SER:O	1:A:129:LYS:HB3	1.97	0.65
1:H:126:PRO:HG3	1:H:138:LEU:HB3	1.81	0.63
1:A:75:THR:O	1:A:77:THR:N	2.33	0.62
2:B:149:LYS:NZ	2:B:203:GLU:OE1	2.33	0.62
1:A:198:VAL:HB	1:A:207:VAL:HG23	1.82	0.61
2:L:39:LEU:HD23	2:L:84:ALA:HB2	1.83	0.61
1:H:38:ARG:NH2	1:H:86:ASP:OD1	2.32	0.60
2:B:14:ALA:HA	2:B:106(A):LEU:O	2.01	0.60
1:H:38:ARG:HG3	1:H:46:GLU:HB3	1.85	0.58
1:H:159:LEU:CD1	1:H:194:TYR:CE1	2.88	0.57
1:H:155:ASN:HD22	1:H:155:ASN:N	2.02	0.57
1:H:138:LEU:HD21	1:H:194:TYR:CD2	2.41	0.56
1:A:135:THR:HA	1:A:185:PRO:HA	1.86	0.56
1:A:112:SER:HA	3:A:371:HOH:O	2.07	0.55
1:A:38:ARG:NH2	1:A:86:ASP:OD1	2.40	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:30:THR:HA	1:H:52(A):PRO:HB2	1.87	0.55
2:L:194:GLN:HG3	2:L:201:THR:HG23	1.90	0.53
1:H:66:ARG:NH2	1:H:86:ASP:OD2	2.28	0.53
2:L:11:VAL:HG23	2:L:104:LEU:HD13	1.91	0.53
1:H:40:ALA:HB3	1:H:43:GLN:HG3	1.90	0.52
1:H:52(A):PRO:O	1:H:71:ARG:HD3	2.10	0.52
2:L:39:LEU:HB2	2:L:42:MET:HG3	1.93	0.51
1:H:83:ARG:NE	1:H:84:SER:H	2.09	0.51
2:L:187:SER:O	2:L:187:SER:OG	2.25	0.50
2:B:35:TRP:HB2	2:B:48:ILE:HB	1.93	0.49
1:H:192:GLN:CB	1:H:193:THR:CB	2.82	0.49
2:L:35:TRP:HB2	2:L:48:ILE:HB	1.93	0.49
2:B:14:ALA:O	2:B:17:GLN:HG2	2.13	0.49
1:H:184:VAL:HG11	1:H:194:TYR:CZ	2.48	0.49
2:L:9:SER:HB2	3:L:307:HOH:O	2.12	0.49
2:B:80:THR:CA	2:B:106:VAL:HG21	2.43	0.49
1:A:63:PHE:HB3	1:A:67:VAL:HG23	1.95	0.48
2:B:192:SER:HG	2:B:205:THR:HG1	1.57	0.48
1:H:185:PRO:O	1:H:188:SER:OG	2.30	0.47
1:A:52(A):PRO:O	1:A:71:ARG:HD3	2.14	0.47
2:L:141:PRO:HD2	2:L:198:GLU:OE2	2.14	0.47
2:L:149:LYS:HB2	2:L:192:SER:OG	2.15	0.47
1:H:83:ARG:HA	1:H:83:ARG:HD2	1.76	0.47
1:H:100:LEU:O	1:H:100(C):ARG:NH1	2.47	0.46
1:H:121:VAL:O	1:H:209:LYS:NZ	2.48	0.46
2:L:1:GLN:OE1	2:L:1:GLN:N	2.37	0.46
2:B:15:PRO:HD3	2:B:107:GLY:HA3	1.96	0.46
1:H:192:GLN:HB3	1:H:193:THR:HA	1.77	0.46
1:H:152:VAL:HG11	1:H:180:SER:HB2	1.98	0.46
1:A:36:TRP:CE2	1:A:80:MET:HB2	2.51	0.45
1:A:63:PHE:HB3	1:A:67:VAL:CG2	2.46	0.45
1:A:192:GLN:HG2	3:A:316:HOH:O	2.16	0.44
2:B:106:VAL:O	2:B:106:VAL:HG12	2.17	0.44
1:H:126:PRO:HD2	1:H:213:PRO:HA	2.00	0.44
1:H:83:ARG:CD	1:H:84:SER:H	2.32	0.43
1:H:125:ALA:HA	1:H:126:PRO:HD3	1.89	0.43
2:L:79:GLN:HB3	2:L:81:GLU:OE1	2.19	0.43
2:B:39:LEU:HB2	2:B:42:MET:HG3	2.01	0.43
1:A:30:THR:HA	1:A:52(A):PRO:HB2	2.00	0.43
2:B:91:TYR:OH	2:B:95(A):ASN:OD1	2.27	0.43
2:B:5:THR:O	2:B:23:CYS:HA	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:182:VAL:HG22	1:H:184:VAL:HG13	2.00	0.42
2:B:33:VAL:HG21	2:B:71:ALA:HB2	2.02	0.42
1:H:188:SER:O	1:H:193:THR:HG21	2.19	0.42
1:A:53:LYS:HA	1:A:53:LYS:HD2	1.76	0.42
1:H:134:GLY:HA2	1:H:135:THR:OG1	2.19	0.42
2:B:39:LEU:HD23	2:B:84:ALA:HB2	2.02	0.42
2:B:79:GLN:HB3	2:B:81:GLU:OE1	2.20	0.42
1:H:182:VAL:HG22	1:H:184:VAL:CG1	2.50	0.41
1:H:52(A):PRO:HA	1:H:71:ARG:HG2	2.03	0.41
1:A:128:SER:O	1:A:129:LYS:CB	2.67	0.41
1:A:129:LYS:HE3	1:A:129:LYS:HB2	1.71	0.41
1:A:147:PRO:HD2	1:A:202:PRO:HB2	2.02	0.41
2:B:106(A):LEU:HD22	2:B:106(A):LEU:HA	1.82	0.41
1:H:38:ARG:HD2	1:H:46:GLU:OE1	2.20	0.41
1:A:150:VAL:HG22	1:A:178:LEU:HD21	2.02	0.41
1:A:201:LYS:HB2	1:A:202:PRO:HD3	2.03	0.41
2:B:27(B):ASN:OD1	2:B:28:ILE:N	2.42	0.41
1:H:124:LEU:HB3	2:L:118:PHE:CD1	2.56	0.40
1:H:167:PRO:HG2	2:L:165:SER:OG	2.21	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	222/233 (95%)	209 (94%)	10 (4%)	3 (1%)	11	3
1	H	222/233 (95%)	212 (96%)	9 (4%)	1 (0%)	29	17
2	B	210/212 (99%)	195 (93%)	10 (5%)	5 (2%)	6	0
2	L	210/212 (99%)	203 (97%)	6 (3%)	1 (0%)	29	17
All	All	864/890 (97%)	819 (95%)	35 (4%)	10 (1%)	13	4

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	76	SER
1	A	129	LYS
2	B	106(A)	LEU
2	B	26	SER
2	B	109	PRO
2	B	198	GLU
1	H	136	ALA
2	L	68	ALA
1	A	127	SER
2	B	107	GLY

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	190/199 (96%)	175 (92%)	15 (8%)	12 3
1	H	190/199 (96%)	173 (91%)	17 (9%)	9 2
2	B	178/178 (100%)	169 (95%)	9 (5%)	24 9
2	L	178/178 (100%)	172 (97%)	6 (3%)	37 22
All	All	736/754 (98%)	689 (94%)	47 (6%)	17 5

All (47) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	H	2	VAL
1	H	4	LEU
1	H	17	SER
1	H	38	ARG
1	H	66	ARG
1	H	71	ARG
1	H	83	ARG
1	H	97	GLN
1	H	100(C)	ARG
1	H	127	SER

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Mol	Chain	Res	Type
1	H	135	THR
1	H	155	ASN
1	H	160	THR
1	H	164	HIS
1	H	192	GLN
1	H	193	THR
1	H	210	ARG
2	L	18	LYS
2	L	56	SER
2	L	132	LEU
2	L	192	SER
2	L	198	GLU
2	L	205	THR
1	A	2	VAL
1	A	4	LEU
1	A	38	ARG
1	A	66	ARG
1	A	71	ARG
1	A	100(D)	ASN
1	A	100(E)	TYR
1	A	112	SER
1	A	116	THR
1	A	129	LYS
1	A	130	SER
1	A	150	VAL
1	A	164	HIS
1	A	182	VAL
1	A	204	ASN
2	B	42	MET
2	B	69	THR
2	B	72	SER
2	B	106(A)	LEU
2	B	108	GLN
2	B	145	THR
2	B	183	GLU
2	B	198	GLU
2	B	201	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	H	155	ASN

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Mol	Chain	Res	Type
2	L	194	GLN
1	A	204	ASN
2	B	108	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](#)

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

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, 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	224/233 (96%)	0.46	13 (5%) 23 29	11, 25, 51, 100	0
1	H	224/233 (96%)	0.73	17 (7%) 13 19	10, 31, 63, 112	0
2	B	212/212 (100%)	0.73	16 (7%) 14 20	17, 41, 59, 84	0
2	L	212/212 (100%)	0.22	7 (3%) 46 54	9, 23, 50, 66	0
All	All	872/890 (97%)	0.54	53 (6%) 21 27	9, 29, 58, 112	0

All (53) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	133	GLY	15.4
2	B	106(A)	LEU	10.0
1	H	132	SER	9.7
1	H	131	THR	9.6
1	A	132	SER	8.6
1	H	129	LYS	8.6
1	A	134	GLY	8.0
1	A	128	SER	7.8
1	H	134	GLY	7.7
1	H	130	SER	7.6
2	B	1	GLN	7.4
1	A	135	THR	7.3
2	B	107	GLY	7.0
1	A	129	LYS	6.4
1	H	127	SER	5.9
1	H	128	SER	5.8
1	H	192	GLN	5.6
2	B	109	PRO	4.9
2	B	16	GLY	4.6
2	B	106	VAL	4.4
1	A	131	THR	4.2

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Mol	Chain	Res	Type	RSRZ
2	L	189	ARG	4.2
2	B	108	GLN	4.2
1	A	130	SER	4.1
1	H	133	GLY	4.1
1	H	195	ILE	3.9
1	H	194	TYR	3.8
1	H	184	VAL	3.5
1	H	136	ALA	3.4
2	B	140	TYR	3.2
2	B	104	LEU	3.1
2	B	27	SER	3.0
2	B	189	ARG	2.8
1	A	136	ALA	2.8
1	H	193	THR	2.7
2	L	186	LYS	2.7
2	B	77	GLY	2.7
1	A	127	SER	2.7
1	A	1	GLU	2.7
2	B	15	PRO	2.5
2	B	19	VAL	2.4
1	H	159	LEU	2.3
1	H	183	THR	2.3
2	B	71	ALA	2.3
2	B	187	SER	2.2
1	H	189	LEU	2.2
2	L	185	TRP	2.1
2	L	1	GLN	2.1
1	A	65	GLY	2.1
1	A	202	PRO	2.1
2	L	208	PRO	2.1
2	L	187	SER	2.0
2	L	115	VAL	2.0

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 monosaccharides 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.