



wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 7, 2020 – 07:45 AM BST

PDB ID : 6M3C
Title : hAPC-h1573 Fab complex
Authors : Wang, X.; Wang, D.; Zhao, X.; Egner, U.
Deposited on : 2020-03-03
Resolution : 3.70 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 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	:	2.13.1
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)	:	2.13.1

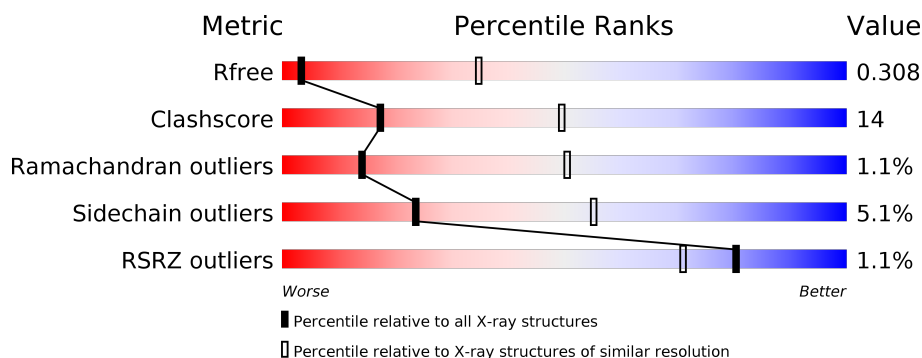
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.70 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	1049 (3.88-3.52)
Clashscore	141614	1027 (3.86-3.54)
Ramachandran outliers	138981	1069 (3.88-3.52)
Sidechain outliers	138945	1065 (3.88-3.52)
RSRZ outliers	127900	1578 (3.90-3.50)

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 $\leq 5\%$. 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	250	
1	C	250	
1	G	250	
2	B	155	
2	D	155	
2	I	155	

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Mol	Chain	Length	Quality of chain
3	E	218	<div><div><div>%</div><div><div></div><div>73%</div><div>26%</div></div><div></div></div></div>
3	J	218	<div><div><div></div><div>75%</div><div>23%</div><div></div></div></div>
3	L	218	<div><div><div></div><div>72%</div><div>27%</div><div></div></div></div>
4	F	221	<div><div><div>2%</div><div><div></div><div>64%</div><div>34%</div></div><div></div></div></div>
4	H	221	<div><div><div>%</div><div><div></div><div>58%</div><div>42%</div></div><div></div></div></div>
4	K	221	<div><div><div>2%</div><div><div></div><div>66%</div><div>33%</div></div><div></div></div></div>

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 16911 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 Vitamin K-dependent protein C heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	239	Total	C	N	O	S	0	0	0
			1883	1193	331	346	13			
1	C	239	Total	C	N	O	S	0	0	0
			1883	1193	331	346	13			
1	G	239	Total	C	N	O	S	0	0	0
			1883	1193	331	346	13			

- Molecule 2 is a protein called Vitamin K-dependent protein C light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	53	Total	C	N	O	S	0	0	0
			412	259	74	72	7			
2	D	53	Total	C	N	O	S	0	0	0
			412	259	74	72	7			
2	I	53	Total	C	N	O	S	0	0	0
			412	259	74	72	7			

- Molecule 3 is a protein called h1573 Fab H chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	L	218	Total	C	N	O	S	0	0	0
			1669	1043	278	342	6			
3	E	218	Total	C	N	O	S	0	0	0
			1669	1043	278	342	6			
3	J	218	Total	C	N	O	S	0	0	0
			1669	1043	278	342	6			

- Molecule 4 is a protein called h1573 Fab L chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	H	221	Total	C	N	O	S	0	0	0
			1673	1055	280	332	6			

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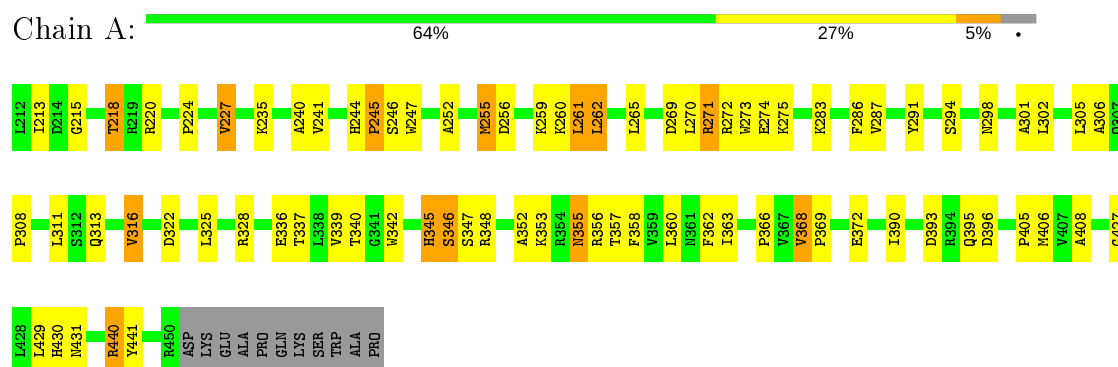
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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	F	221	Total	C	N	O	S	0	0	0
			1673	1055	280	332	6			
4	K	221	Total	C	N	O	S	0	0	0
			1673	1055	280	332	6			

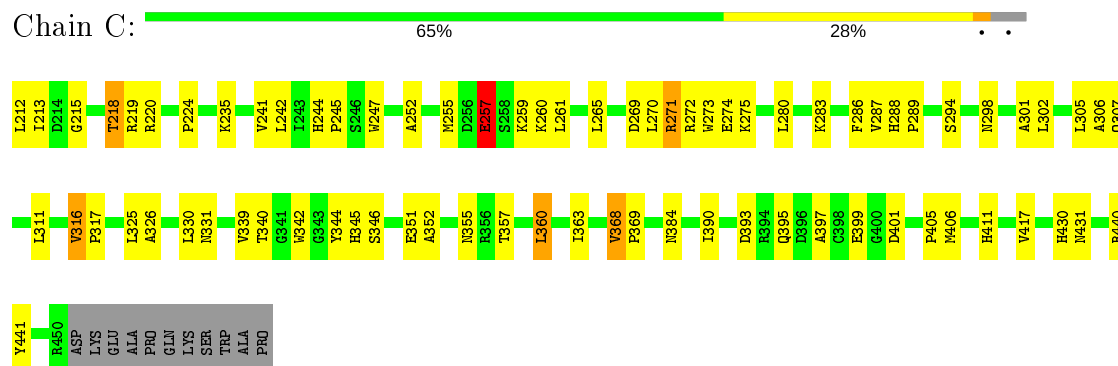
3 Residue-property plots [i](#)

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.

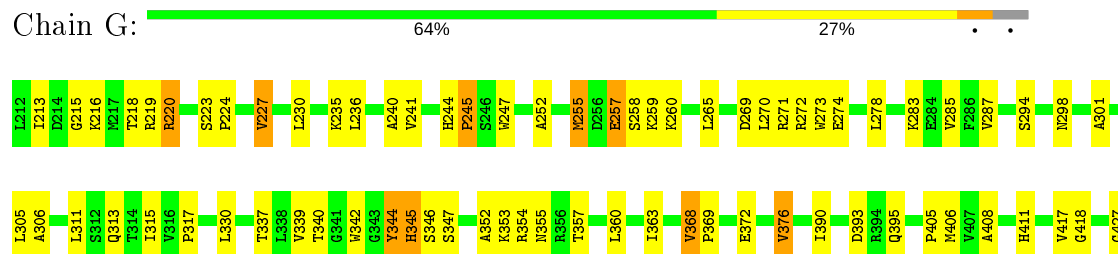
- Molecule 1: Vitamin K-dependent protein C heavy chain



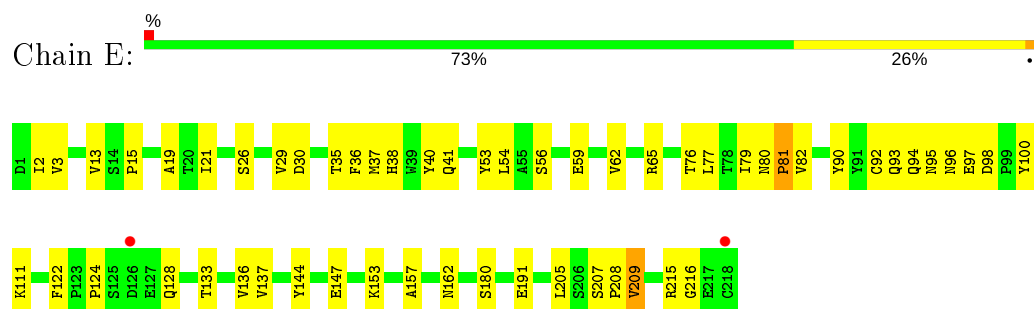
- Molecule 1: Vitamin K-dependent protein C heavy chain



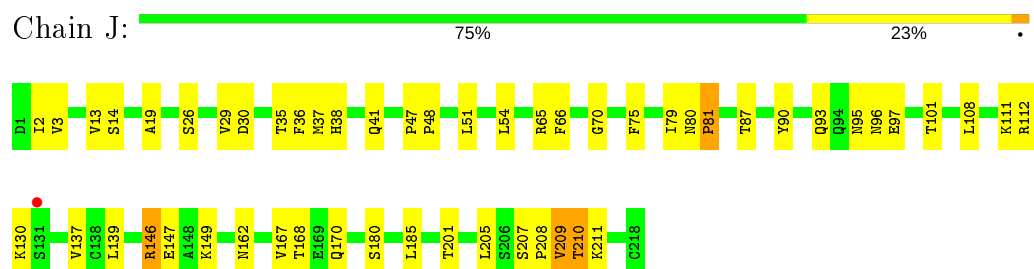
- Molecule 1: Vitamin K-dependent protein C heavy chain



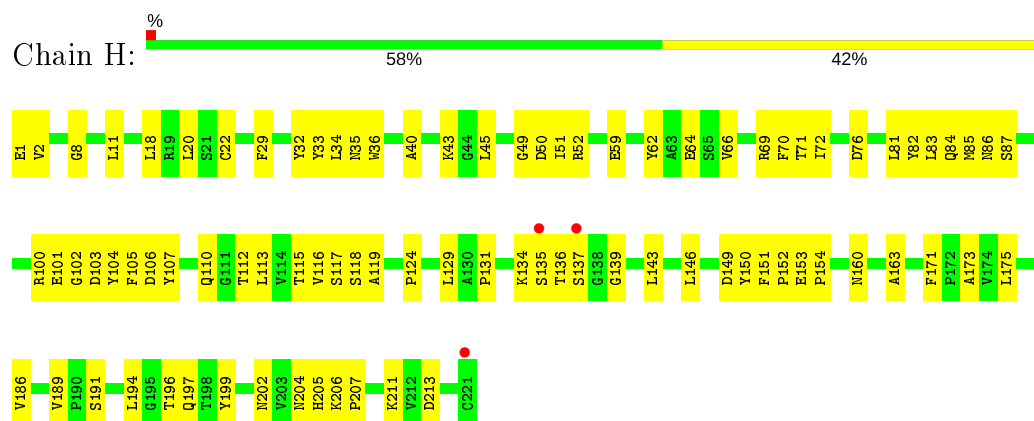
- Molecule 3: h1573 Fab H chain



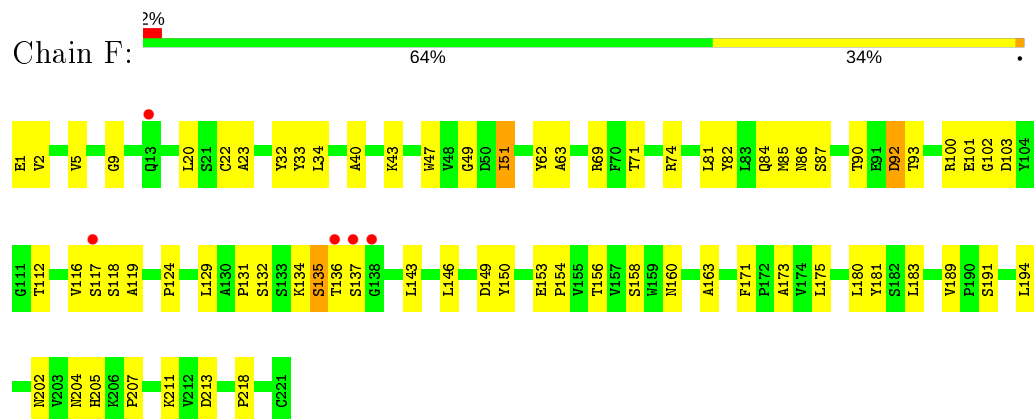
- Molecule 3: h1573 Fab H chain



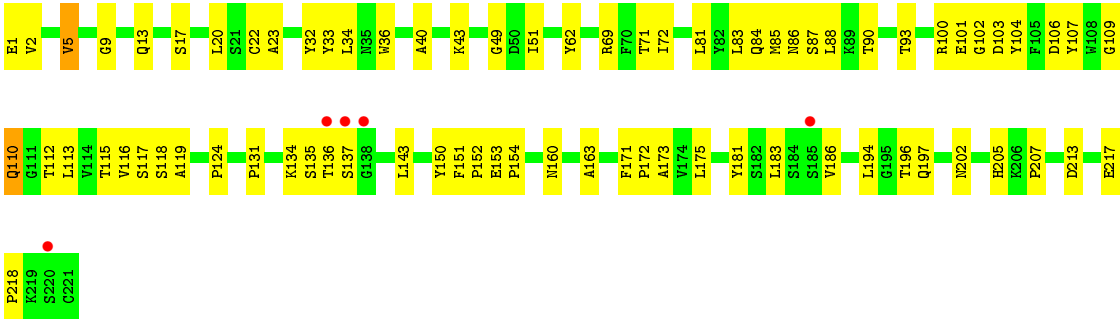
- Molecule 4: h1573 Fab L chain



- Molecule 4: h1573 Fab L chain



- Molecule 4: h1573 Fab L chain



4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	124.34Å 124.34Å 666.16Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	33.38 – 3.70 33.39 – 3.70	Depositor EDS
% Data completeness (in resolution range)	98.4 (33.38-3.70) 98.4 (33.39-3.70)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.76 (at 3.65Å)	Xtriage
Refinement program	PHENIX 1.9_1692	Depositor
R, R_{free}	0.278 , 0.302 0.287 , 0.308	Depositor DCC
R_{free} test set	2811 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	87.4	Xtriage
Anisotropy	0.450	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.27 , 52.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.85	EDS
Total number of atoms	16911	wwPDB-VP
Average B, all atoms (Å ²)	107.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.84% 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 ⓘ

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	0.29	0/1928	0.65	1/2615 (0.0%)
1	C	0.29	0/1928	0.64	0/2615
1	G	0.29	0/1928	0.64	0/2615
2	B	0.31	0/425	0.70	0/575
2	D	0.29	0/425	0.64	0/575
2	I	0.31	0/425	0.63	0/575
3	E	0.25	0/1706	0.48	0/2321
3	J	0.24	0/1706	0.46	0/2321
3	L	0.25	0/1706	0.47	0/2321
4	F	0.24	0/1713	0.48	0/2329
4	H	0.25	0/1713	0.49	0/2329
4	K	0.23	0/1713	0.47	0/2329
All	All	0.27	0/17316	0.55	1/23520 (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	A	261	LEU	CA-CB-CG	5.75	128.53	115.30

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	1883	0	1853	64	0
1	C	1883	0	1853	44	0
1	G	1883	0	1853	51	1
2	B	412	0	381	16	0
2	D	412	0	381	11	0
2	I	412	0	381	8	0
3	E	1669	0	1605	38	1
3	J	1669	0	1605	44	0
3	L	1669	0	1605	47	0
4	F	1673	0	1629	52	0
4	H	1673	0	1629	68	0
4	K	1673	0	1629	51	0
All	All	16911	0	16404	460	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 14.

The worst 5 of 460 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:C:345:HIS:CD2	1:C:357:THR:OG1	2.02	1.11
1:C:345:HIS:CD2	1:C:357:THR:HG1	1.70	1.08
2:D:145:GLY:O	2:D:158:ARG:NH2	2.08	0.87
4:F:132:SER:HB2	4:F:134:LYS:HZ3	1.40	0.86
1:G:345:HIS:CD2	1:G:357:THR:HG1	1.96	0.84

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:E:216:GLY:O	1:G:216:LYS:NZ[7_655]	2.17	0.03

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	237/250 (95%)	219 (92%)	16 (7%)	2 (1%)	19	56
1	C	237/250 (95%)	220 (93%)	14 (6%)	3 (1%)	12	47
1	G	237/250 (95%)	217 (92%)	19 (8%)	1 (0%)	34	69
2	B	51/155 (33%)	44 (86%)	7 (14%)	0	100	100
2	D	51/155 (33%)	42 (82%)	9 (18%)	0	100	100
2	I	51/155 (33%)	43 (84%)	7 (14%)	1 (2%)	7	39
3	E	216/218 (99%)	194 (90%)	19 (9%)	3 (1%)	11	45
3	J	216/218 (99%)	192 (89%)	21 (10%)	3 (1%)	11	45
3	L	216/218 (99%)	193 (89%)	20 (9%)	3 (1%)	11	45
4	F	219/221 (99%)	186 (85%)	30 (14%)	3 (1%)	11	45
4	H	219/221 (99%)	187 (85%)	30 (14%)	2 (1%)	17	54
4	K	219/221 (99%)	186 (85%)	31 (14%)	2 (1%)	17	54
All	All	2169/2532 (86%)	1923 (89%)	223 (10%)	23 (1%)	14	50

5 of 23 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	355	ASN
4	H	117	SER
1	C	257	GLU
4	F	117	SER
4	K	117	SER

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	206/215 (96%)	181 (88%)	25 (12%)	5	24
1	C	206/215 (96%)	184 (89%)	22 (11%)	6	30
1	G	206/215 (96%)	183 (89%)	23 (11%)	6	28

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	B	45/136 (33%)	40 (89%)	5 (11%)	6	28
2	D	45/136 (33%)	40 (89%)	5 (11%)	6	28
2	I	45/136 (33%)	43 (96%)	2 (4%)	28	58
3	E	189/189 (100%)	187 (99%)	2 (1%)	73	85
3	J	189/189 (100%)	185 (98%)	4 (2%)	53	74
3	L	189/189 (100%)	188 (100%)	1 (0%)	88	94
4	F	188/188 (100%)	184 (98%)	4 (2%)	53	74
4	H	188/188 (100%)	187 (100%)	1 (0%)	88	94
4	K	188/188 (100%)	186 (99%)	2 (1%)	73	85
All	All	1884/2184 (86%)	1788 (95%)	96 (5%)	24	55

5 of 96 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	305	LEU
1	C	440	ARG
2	I	158	ARG
1	C	311	LEU
1	C	346	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 7 such sidechains are listed below:

Mol	Chain	Res	Type
3	E	93	GLN
4	K	13	GLN
3	E	96	ASN
1	A	345	HIS
1	G	313	GLN

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 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 [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	239/250 (95%)	-0.21	0 100 100	51, 88, 109, 127	0
1	C	239/250 (95%)	-0.08	0 100 100	53, 97, 122, 134	0
1	G	239/250 (95%)	-0.14	0 100 100	51, 93, 113, 125	0
2	B	53/155 (34%)	0.11	2 (3%) 40 30	30, 103, 126, 133	0
2	D	53/155 (34%)	0.39	3 (5%) 23 16	30, 149, 185, 193	0
2	I	53/155 (34%)	0.34	2 (3%) 40 30	30, 122, 156, 166	0
3	E	218/218 (100%)	-0.17	3 (1%) 75 64	86, 96, 113, 118	0
3	J	218/218 (100%)	-0.04	1 (0%) 91 85	90, 114, 199, 225	0
3	L	218/218 (100%)	-0.36	0 100 100	72, 87, 131, 153	0
4	F	221/221 (100%)	-0.10	5 (2%) 60 48	92, 114, 137, 143	0
4	H	221/221 (100%)	-0.23	3 (1%) 75 64	78, 101, 129, 147	0
4	K	221/221 (100%)	0.16	5 (2%) 60 48	99, 147, 172, 189	0
All	All	2193/2532 (86%)	-0.10	24 (1%) 80 71	30, 101, 163, 225	0

The worst 5 of 24 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	K	138	GLY	6.7
4	K	137	SER	5.3
2	D	136	SER	4.6
4	H	137	SER	4.4
2	D	155	VAL	4.1

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.