



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 27, 2021 – 05:05 pm BST

PDB ID : 6ZTR
Title : Crystal Structure of the anti-human P-Cadherin Fab CQY684 in complex with human P-Cadherin(108-324)
Authors : Rondeau, J.M.; Lehmann, S.
Deposited on : 2020-07-20
Resolution : 2.10 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 : 2.18
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) : 2.18

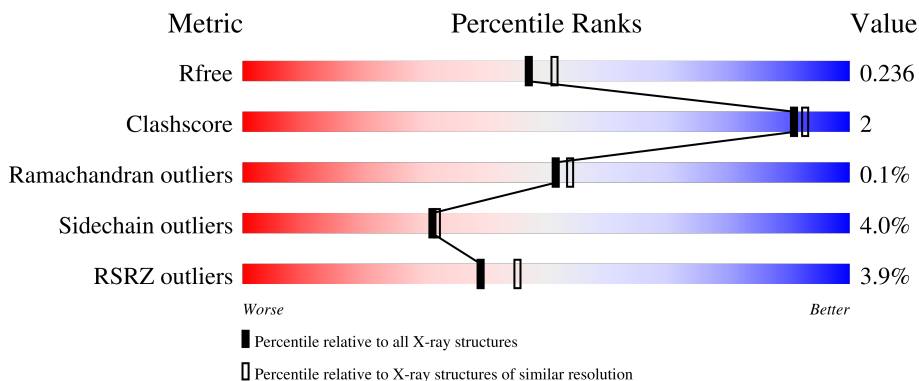
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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.



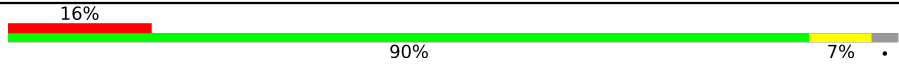
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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	244	<div style="display: flex; align-items: center;"> <div style="width: 5%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 88%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 6%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 6%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">88% 6% 6%</p>
1	H	244	<div style="display: flex; align-items: center;"> <div style="width: 5%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 89%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 6%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">89% 5% 6%</p>
2	B	213	<div style="display: flex; align-items: center;"> <div style="width: 89%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 10%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">89% 10% .</p>
2	L	213	<div style="display: flex; align-items: center;"> <div style="width: 89%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 9%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 2%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">89% 9% .</p>
3	I	219	<div style="display: flex; align-items: center;"> <div style="width: 5%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 92%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">5% 92% 5% .</p>

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Mol	Chain	Length	Quality of chain
3	J	219	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into three segments: a red segment on the left labeled '16%', a large green segment in the middle labeled '90%', and a small yellow segment on the right labeled '7%'. A small grey dot is visible at the end of the bar.</p>

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 10618 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 CQY684 Fab heavy-chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	229	Total	C	N	O	S	0	0	0
			1737	1096	293	344	4			
1	H	229	Total	C	N	O	S	0	0	0
			1737	1096	293	344	4			

- Molecule 2 is a protein called CQY684 Fab light-chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	210	Total	C	N	O	S	0	0	0
			1619	1016	271	327	5			
2	L	210	Total	C	N	O	S	0	0	0
			1619	1016	271	327	5			

- Molecule 3 is a protein called Cadherin-3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	I	214	Total	C	N	O	S	0	0	0
			1643	1031	271	337	4			
3	J	213	Total	C	N	O	S	0	0	0
			1635	1027	269	335	4			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	106	GLY	-	expression tag	UNP P22223
I	107	PRO	-	expression tag	UNP P22223
J	106	GLY	-	expression tag	UNP P22223
J	107	PRO	-	expression tag	UNP P22223

- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	I	3	Total Ca 3 3	0	0
4	J	3	Total Ca 3 3	0	0

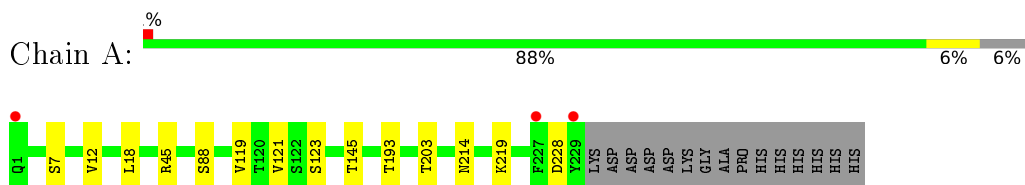
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	127	Total O 127 127	0	0
5	B	95	Total O 95 95	0	0
5	H	137	Total O 137 137	0	0
5	I	91	Total O 91 91	0	0
5	J	82	Total O 82 82	0	0
5	L	90	Total O 90 90	0	0

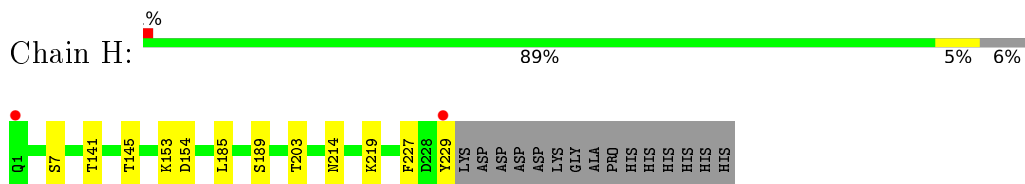
3 Residue-property plots [i](#)

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.

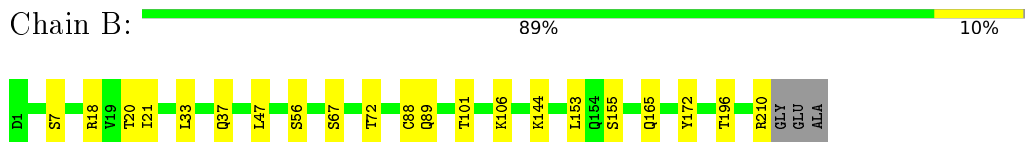
- Molecule 1: CQY684 Fab heavy-chain



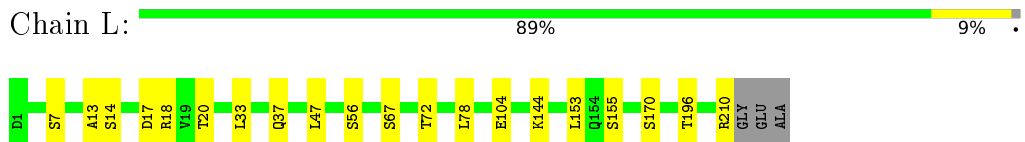
- Molecule 1: CQY684 Fab heavy-chain



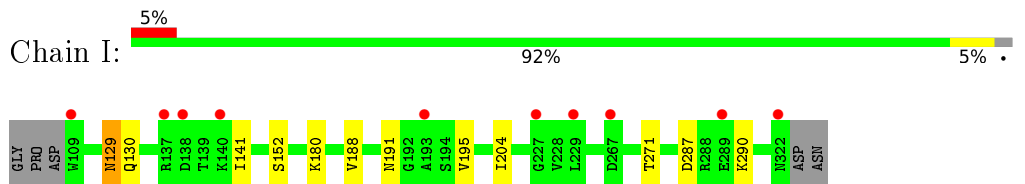
- Molecule 2: CQY684 Fab light-chain



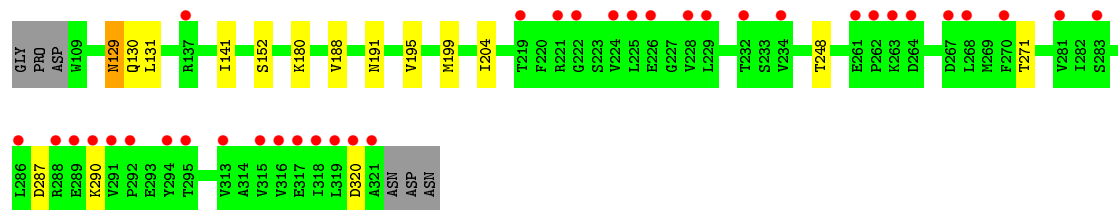
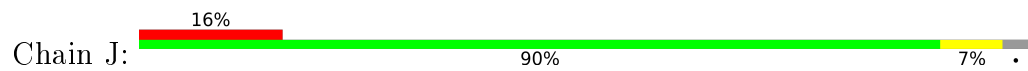
- Molecule 2: CQY684 Fab light-chain



- Molecule 3: Cadherin-3



- Molecule 3: Cadherin-3



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	172.69Å 77.80Å 133.41Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	72.49 – 2.10 72.49 – 2.10	Depositor EDS
% Data completeness (in resolution range)	100.0 (72.49-2.10) 100.0 (72.49-2.10)	Depositor EDS
R_{merge}	0.20	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.26 (at 2.10Å)	Xtrriage
Refinement program	BUSTER	Depositor
R, R_{free}	0.192 , 0.221 0.205 , 0.236	Depositor DCC
R_{free} test set	5273 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	36.5	Xtrriage
Anisotropy	0.580	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 45.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	10618	wwPDB-VP
Average B, all atoms (Å ²)	52.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.27% of the height of the origin peak. No significant pseudotranslation is detected.*

¹ Intensities estimated from amplitudes.

² Theoretical 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](#)

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

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	0.50	0/1781	0.73	0/2430
1	H	0.51	0/1781	0.74	0/2430
2	B	0.50	0/1654	0.71	0/2247
2	L	0.49	0/1654	0.70	0/2247
3	I	0.49	0/1678	0.67	0/2288
3	J	0.48	0/1670	0.67	0/2277
All	All	0.50	0/10218	0.70	0/13919

There are no bond length outliers.

There are no bond angle outliers.

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	1737	0	1698	4	0
1	H	1737	0	1698	2	0
2	B	1619	0	1579	12	0
2	L	1619	0	1579	11	0
3	I	1643	0	1592	4	0
3	J	1635	0	1586	5	0
4	I	3	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	J	3	0	0	0	0
5	A	127	0	0	1	0
5	B	95	0	0	1	0
5	H	137	0	0	0	0
5	I	91	0	0	0	0
5	J	82	0	0	0	0
5	L	90	0	0	0	0
All	All	10618	0	9732	33	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 (33) 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:B:18:ARG:HB2	2:L:18:ARG:NH1	1.86	0.90
2:B:18:ARG:HD2	2:L:18:ARG:HH12	1.58	0.67
2:B:18:ARG:HB2	2:L:18:ARG:CZ	2.28	0.62
1:A:193:THR:HG23	5:A:301:HOH:O	1.99	0.62
2:B:21:ILE:HD12	2:B:101:THR:HG21	1.81	0.62
2:B:18:ARG:CB	2:L:18:ARG:NH1	2.65	0.55
2:L:20:THR:HG23	2:L:72:THR:HG23	1.90	0.54
2:B:18:ARG:HB2	2:L:18:ARG:HH12	1.71	0.53
2:B:20:THR:HG23	2:B:72:THR:HG23	1.92	0.52
2:B:165:GLN:HG3	2:B:172:TYR:CZ	2.45	0.51
2:L:144:LYS:HB3	2:L:196:THR:HB	1.95	0.49
3:I:180:LYS:HG3	3:I:204:ILE:HD13	1.94	0.48
2:L:14:SER:O	2:L:17:ASP:HB2	2.14	0.48
3:J:180:LYS:HG3	3:J:204:ILE:HD13	1.95	0.48
3:J:141:ILE:HD12	3:J:195:VAL:HG21	1.96	0.47
2:B:144:LYS:HB3	2:B:196:THR:HB	1.97	0.46
3:J:131:LEU:HD22	3:J:199:MET:HE3	1.98	0.45
2:B:20:THR:HG23	2:B:72:THR:CG2	2.47	0.44
1:H:154:ASP:HB3	1:H:185:LEU:HD13	2.00	0.43
2:L:37:GLN:HB2	2:L:47:LEU:HD11	1.99	0.43
3:J:129:ASN:HD22	3:J:130:GLN:H	1.66	0.43
3:I:141:ILE:HD12	3:I:195:VAL:HG21	1.99	0.43
3:I:287:ASP:HB3	3:I:290:LYS:HB2	2.01	0.43
2:L:20:THR:HG23	2:L:72:THR:CG2	2.47	0.43
3:J:287:ASP:HB3	3:J:290:LYS:HB2	2.01	0.42
2:B:37:GLN:HB2	2:B:47:LEU:HD11	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:I:129:ASN:HD22	3:I:130:GLN:H	1.68	0.42
1:A:18:LEU:HD12	1:A:119:VAL:HG11	2.01	0.42
1:H:227:PHE:HB2	1:H:229:TYR:CE2	2.56	0.41
1:A:193:THR:HG21	5:B:364:HOH:O	2.21	0.41
2:L:13:ALA:HB3	2:L:78:LEU:HD22	2.03	0.40
2:B:33:LEU:HD11	2:B:88:CYS:HB2	2.03	0.40
1:A:12:VAL:O	1:A:121:VAL:HA	2.22	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	227/244 (93%)	218 (96%)	8 (4%)	1 (0%)	34	32
1	H	227/244 (93%)	221 (97%)	6 (3%)	0	100	100
2	B	208/213 (98%)	200 (96%)	8 (4%)	0	100	100
2	L	208/213 (98%)	201 (97%)	7 (3%)	0	100	100
3	I	212/219 (97%)	201 (95%)	11 (5%)	0	100	100
3	J	211/219 (96%)	202 (96%)	9 (4%)	0	100	100
All	All	1293/1352 (96%)	1243 (96%)	49 (4%)	1 (0%)	51	54

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	228	ASP

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	197/210 (94%)	189 (96%)	8 (4%)	30	31
1	H	197/210 (94%)	189 (96%)	8 (4%)	30	31
2	B	185/186 (100%)	177 (96%)	8 (4%)	29	29
2	L	185/186 (100%)	176 (95%)	9 (5%)	25	23
3	I	185/189 (98%)	180 (97%)	5 (3%)	44	48
3	J	184/189 (97%)	177 (96%)	7 (4%)	33	34
All	All	1133/1170 (97%)	1088 (96%)	45 (4%)	31	32

All (45) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	7	SER
1	A	45	ARG
1	A	88	SER
1	A	123	SER
1	A	145	THR
1	A	203	THR
1	A	214	ASN
1	A	219	LYS
2	B	7	SER
2	B	56	SER
2	B	67	SER
2	B	89	GLN
2	B	106	LYS
2	B	153	LEU
2	B	155	SER
2	B	210	ARG
1	H	7	SER
1	H	141	THR
1	H	145	THR
1	H	153	LYS
1	H	189	SER
1	H	203	THR

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Mol	Chain	Res	Type
1	H	214	ASN
1	H	219	LYS
3	I	129	ASN
3	I	152	SER
3	I	188	VAL
3	I	191	ASN
3	I	271	THR
3	J	129	ASN
3	J	152	SER
3	J	188	VAL
3	J	191	ASN
3	J	248	THR
3	J	271	THR
3	J	320	ASP
2	L	7	SER
2	L	33	LEU
2	L	56	SER
2	L	67	SER
2	L	104	GLU
2	L	153	LEU
2	L	155	SER
2	L	170	SER
2	L	210	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	3	GLN
1	A	32	GLN
1	A	85	GLN
1	A	87	ASN
2	B	27	GLN
2	B	89	GLN
1	H	3	GLN
1	H	32	GLN
1	H	81	GLN
1	H	87	ASN
3	I	126	GLN
3	I	129	ASN
3	I	236	GLN
3	J	129	ASN
2	L	37	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](#)

Of 6 ligands modelled in this entry, 6 are monoatomic - leaving 0 for Mogul analysis.

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.

No monomer is involved in short contacts.

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	229/244 (93%)	-0.25	3 (1%) 77 80	31, 45, 65, 89	0
1	H	229/244 (93%)	-0.18	2 (0%) 84 86	28, 44, 67, 96	0
2	B	210/213 (98%)	-0.20	0 100 100	28, 45, 68, 85	0
2	L	210/213 (98%)	-0.12	0 100 100	26, 49, 76, 92	0
3	I	214/219 (97%)	0.15	10 (4%) 31 37	28, 53, 109, 139	0
3	J	213/219 (97%)	0.60	36 (16%) 1 2	27, 54, 133, 177	0
All	All	1305/1352 (96%)	-0.01	51 (3%) 39 45	26, 47, 99, 177	0

All (51) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	J	225	LEU	7.0
3	J	137	ARG	6.7
3	J	318	ILE	6.5
3	J	286	LEU	6.0
3	J	321	ALA	5.6
3	J	229	LEU	4.9
3	J	288	ARG	4.8
3	J	315	VAL	4.5
3	J	319	LEU	4.4
3	I	289	GLU	4.4
3	J	292	PRO	4.3
3	J	291	VAL	4.2
3	J	289	GLU	4.1
3	J	270	PHE	3.8
3	J	317	GLU	3.6
1	A	1	GLN	3.5
1	H	229	TYR	3.3
3	J	295	THR	3.3
3	I	137	ARG	3.3

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Mol	Chain	Res	Type	RSRZ
3	J	294	TYR	3.3
3	I	229	LEU	3.2
3	J	261	GLU	3.2
3	J	283	SER	3.1
3	J	224	VAL	3.1
3	I	193	ALA	3.0
3	J	267	ASP	3.0
3	I	138	ASP	3.0
3	J	281	VAL	3.0
1	A	227	PHE	2.9
3	I	227	GLY	2.9
3	J	262	PRO	2.9
3	J	313	VAL	2.8
3	J	226	GLU	2.8
3	J	228	VAL	2.7
3	J	320	ASP	2.6
3	J	264	ASP	2.6
3	J	290	LYS	2.4
3	J	232	THR	2.4
3	J	263	LYS	2.4
3	I	140	LYS	2.3
3	J	316	VAL	2.3
3	J	234	VAL	2.2
3	I	109	TRP	2.2
3	J	221	ARG	2.2
1	A	229	TYR	2.1
3	J	222	GLY	2.1
3	J	268	LEU	2.1
3	J	219	THR	2.1
3	I	322	ASN	2.0
1	H	1	GLN	2.0
3	I	267	ASP	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](#)

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, 95th 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	CA	I	401	1/1	0.99	0.11	32,32,32,32	0
4	CA	I	402	1/1	0.99	0.14	30,30,30,30	0
4	CA	I	403	1/1	0.99	0.10	32,32,32,32	0
4	CA	J	402	1/1	0.99	0.12	34,34,34,34	0
4	CA	J	403	1/1	0.99	0.11	35,35,35,35	0
4	CA	J	401	1/1	1.00	0.14	33,33,33,33	0

6.5 Other polymers [i](#)

There are no such residues in this entry.