



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 3, 2024 – 07:23 am GMT

PDB ID : 5JHR
Title : Yeast 20S proteasome in complex with the peptidic epoxyketone inhibitor 27
Authors : Huber, E.M.; Groll, M.
Deposited on : 2016-04-21
Resolution : 2.90 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
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
buster-report : 1.1.7 (2018)
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

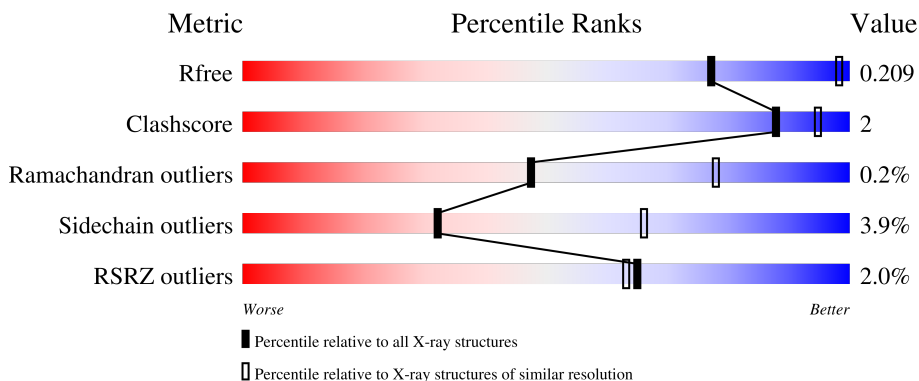
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.90 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	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (2.90-2.90)

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	250	 97%
1	O	250	 98%
2	B	258	 88% 6% 5%
2	P	258	 88% 5% 5%
3	C	254	 87% 6% 6%

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Mol	Chain	Length	Quality of chain
3	Q	254	6% 87% 6% • 6%
4	D	260	% 85% 5% 10%
4	R	260	2% 84% 6% 10%
5	E	234	2% 91% 7% •
5	S	234	5% 88% 10% •
6	F	288	2% 81% • 16%
6	T	288	2% 80% • • 16%
7	G	252	89% 7% •
7	U	252	% 89% 6% •
8	H	232	% 90% 6% •
8	V	232	% 90% 6% •
9	I	205	% 93% 6% •
9	W	205	% 93% 6% •
10	J	198	2% 87% 9% • • •
10	X	198	2% 87% 9% • • •
11	K	212	2% 88% 11% •
11	Y	212	3% 87% 11% •
12	L	222	93% 7%
12	Z	222	% 92% 8%
13	M	246	% 90% • • 5%
13	a	246	92% • 5%
14	N	196	% 96% •
14	b	196	% 98% •

2 Entry composition

There are 19 unique types of molecules in this entry. The entry contains 49654 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 Proteasome subunit alpha type-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	250	Total	C	N	O	S	0	0	0
			1915	1219	315	377	4			
1	O	250	Total	C	N	O	S	0	0	0
			1915	1219	315	377	4			

- Molecule 2 is a protein called Proteasome subunit alpha type-3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	244	Total	C	N	O	S	0	0	0
			1904	1201	321	379	3			
2	P	244	Total	C	N	O	S	0	0	0
			1904	1201	321	379	3			

- Molecule 3 is a protein called Proteasome subunit alpha type-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	240	Total	C	N	O	S	0	0	0
			1881	1176	329	372	4			
3	Q	240	Total	C	N	O	S	0	0	0
			1881	1176	329	372	4			

- Molecule 4 is a protein called Proteasome subunit alpha type-5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	D	235	Total	C	N	O	S	0	0	0
			1813	1136	304	366	7			
4	R	235	Total	C	N	O	S	0	0	0
			1813	1136	304	366	7			

- Molecule 5 is a protein called Proteasome subunit alpha type-6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	E	231	Total 1773	C 1114	N 307	O 348	S 4	0	0	0
5	S	231	Total 1773	C 1114	N 307	O 348	S 4	0	0	0

- Molecule 6 is a protein called Probable proteasome subunit alpha type-7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
6	F	243	Total 1892	C 1203	N 329	O 356	S 4	0	0	0
6	T	243	Total 1892	C 1203	N 329	O 356	S 4	0	0	0

- Molecule 7 is a protein called Proteasome subunit alpha type-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
7	G	241	Total 1907	C 1214	N 320	O 365	S 8	0	0	0
7	U	241	Total 1907	C 1214	N 320	O 365	S 8	0	0	0

- Molecule 8 is a protein called Proteasome subunit beta type-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
8	H	222	Total 1684	C 1061	N 293	O 323	S 7	0	0	0
8	V	222	Total 1691	C 1066	N 295	O 323	S 7	0	1	0

- Molecule 9 is a protein called Proteasome subunit beta type-3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
9	I	204	Total 1581	C 1010	N 258	O 305	S 8	0	0	0
9	W	204	Total 1581	C 1010	N 258	O 305	S 8	0	0	0

- Molecule 10 is a protein called Proteasome subunit beta type-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
10	J	195	Total 1561	C 992	N 264	O 299	S 6	0	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	X	195	Total	C	N	O	S	0	0	0
			1561	992	264	299	6			

- Molecule 11 is a protein called Proteasome subunit beta type-5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
11	K	212	Total	C	N	O	S	0	0	0
			1644	1045	280	312	7			
11	Y	212	Total	C	N	O	S	0	0	0
			1644	1045	280	312	7			

- Molecule 12 is a protein called Proteasome subunit beta type-6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
12	L	222	Total	C	N	O	S	0	0	0
			1757	1115	303	335	4			
12	Z	222	Total	C	N	O	S	0	0	0
			1757	1115	303	335	4			

- Molecule 13 is a protein called Proteasome subunit beta type-7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
13	M	233	Total	C	N	O	S	0	0	0
			1824	1154	312	351	7			
13	a	233	Total	C	N	O	S	0	0	0
			1824	1154	312	351	7			

- Molecule 14 is a protein called Proteasome subunit beta type-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
14	N	196	Total	C	N	O	S	0	0	0
			1512	955	250	300	7			
14	b	196	Total	C	N	O	S	0	0	0
			1512	955	250	300	7			

- Molecule 15 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	G	1	Total	Mg	0	0
			1	1		
15	I	2	Total	Mg	0	0
			2	2		

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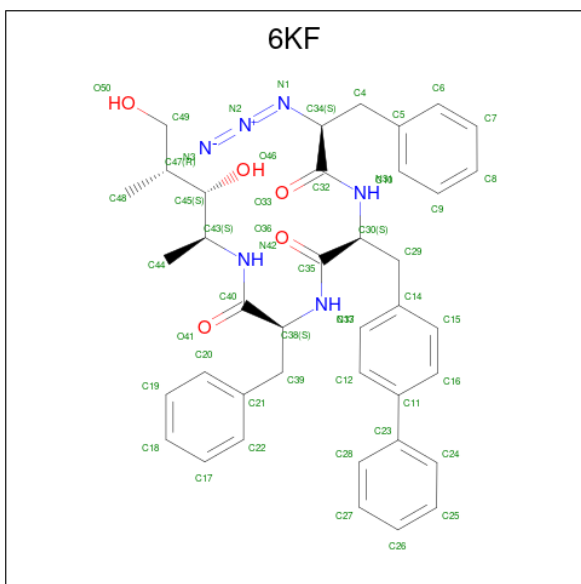
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	J	1	Total	Mg	0	0
			1	1		
15	K	1	Total	Mg	0	0
			1	1		
15	L	1	Total	Mg	0	0
			1	1		
15	N	1	Total	Mg	0	0
			1	1		
15	Z	1	Total	Mg	0	0
			1	1		

- Molecule 16 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	G	1	Total	Cl	0	0
			1	1		
16	U	2	Total	Cl	0	0
			2	2		

- Molecule 17 is (2S)-2-azido-N-[(2S)-3-(biphenyl-4-yl)-1-[[[(2S)-1-[(2S,3S,4R)-3,5-dihydroxy-4-methylpentan-2-yl]amino]-1-oxo-3-phenylpropan-2-yl]amino]-1-oxopropan-2-yl]-3-phenylpropanamide (non-preferred name) (three-letter code: 6KF) (formula: C₃₉H₄₄N₆O₅).



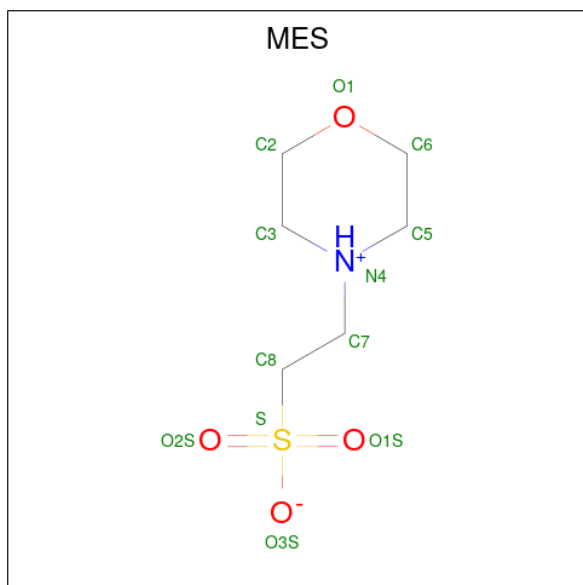
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
17	K	1	Total	C	N	O	0	0
			50	39	6	5		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
17	Y	1	50	39	6	5	0	0

- Molecule 18 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (three-letter code: MES) (formula: C₆H₁₃NO₄S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
18	K	1	12	6	1	4	1	0	0
18	Y	1	12	6	1	4	1	0	0

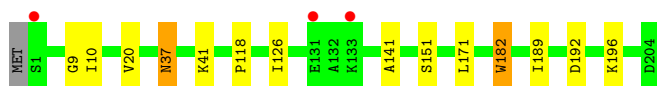
- Molecule 19 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
19	A	2	Total	O	0	0
			2	2		
19	B	7	Total	O	0	0
			7	7		
19	C	4	Total	O	0	0
			4	4		
19	E	3	Total	O	0	0
			3	3		
19	F	10	Total	O	0	0
			10	10		
19	G	7	Total	O	0	0
			7	7		

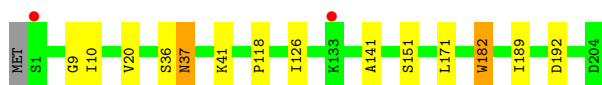
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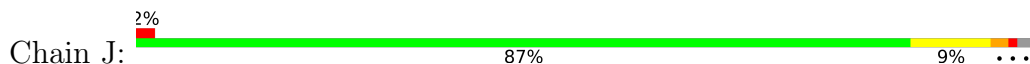
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
19	H	17	Total O 17 17	0	0
19	I	5	Total O 5 5	0	0
19	J	11	Total O 11 11	0	0
19	K	8	Total O 8 8	0	0
19	L	9	Total O 9 9	0	0
19	M	10	Total O 10 10	0	0
19	N	12	Total O 12 12	0	0
19	O	5	Total O 5 5	0	0
19	P	6	Total O 6 6	0	0
19	Q	9	Total O 9 9	0	0
19	R	3	Total O 3 3	0	0
19	S	3	Total O 3 3	0	0
19	T	4	Total O 4 4	0	0
19	U	8	Total O 8 8	0	0
19	V	6	Total O 6 6	0	0
19	W	11	Total O 11 11	0	0
19	X	17	Total O 17 17	0	0
19	Y	10	Total O 10 10	0	0
19	Z	7	Total O 7 7	0	0
19	a	12	Total O 12 12	0	0
19	b	10	Total O 10 10	0	0



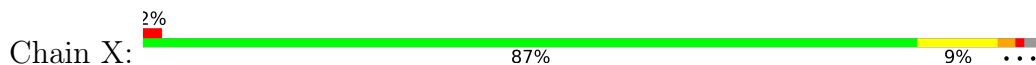
- Molecule 9: Proteasome subunit beta type-3



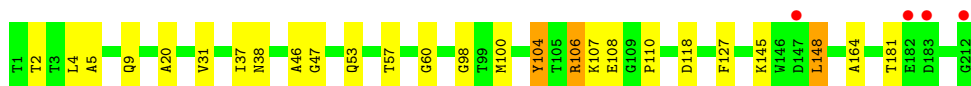
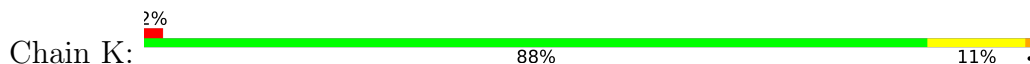
- Molecule 10: Proteasome subunit beta type-4



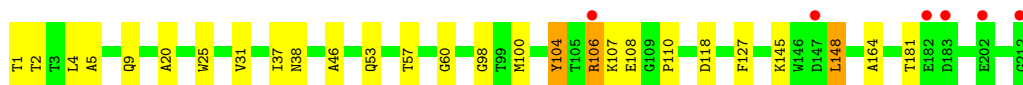
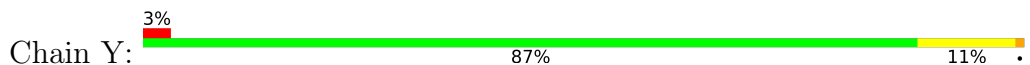
- Molecule 10: Proteasome subunit beta type-4



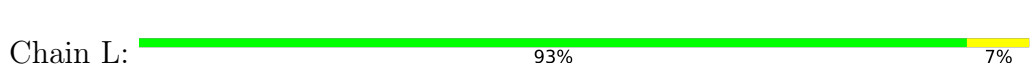
- Molecule 11: Proteasome subunit beta type-5



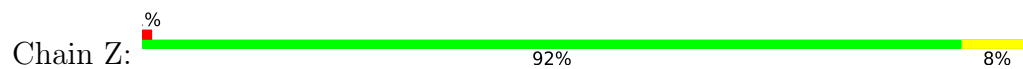
- Molecule 11: Proteasome subunit beta type-5



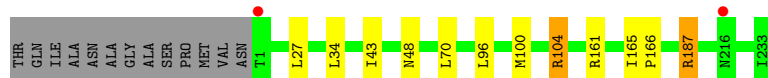
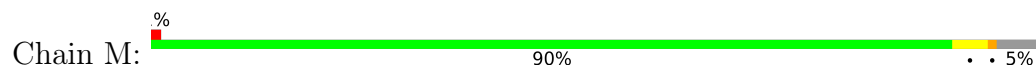
- Molecule 12: Proteasome subunit beta type-6



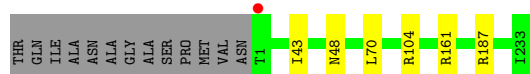
- Molecule 12: Proteasome subunit beta type-6



- Molecule 13: Proteasome subunit beta type-7



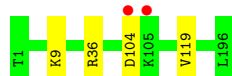
- Molecule 13: Proteasome subunit beta type-7



- Molecule 14: Proteasome subunit beta type-1



- Molecule 14: Proteasome subunit beta type-1



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	135.29Å 300.81Å 144.54Å 90.00° 112.95° 90.00°	Depositor
Resolution (Å)	15.00 – 2.90 15.00 – 2.90	Depositor EDS
% Data completeness (in resolution range)	97.8 (15.00-2.90) 97.9 (15.00-2.90)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.80 (at 2.91Å)	Xtrriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.181 , 0.206 0.186 , 0.209	Depositor DCC
R_{free} test set	11382 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	62.0	Xtrriage
Anisotropy	0.054	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 36.9	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	0.95	EDS
Total number of atoms	49654	wwPDB-VP
Average B, all atoms (Å ²)	68.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.30% 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](#)

Bond lengths and bond angles in the following residue types are not validated in this section: 6KF, MG, MES, CL

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	0.26	0/1952	0.48	0/2642
1	O	0.26	0/1952	0.48	0/2642
2	B	0.26	0/1934	0.50	0/2618
2	P	0.26	0/1934	0.50	0/2618
3	C	0.27	0/1910	0.51	0/2586
3	Q	0.27	0/1910	0.51	0/2586
4	D	0.26	0/1837	0.48	0/2475
4	R	0.26	0/1837	0.48	0/2475
5	E	0.26	0/1800	0.48	0/2433
5	S	0.26	0/1800	0.48	0/2433
6	F	0.27	0/1932	0.46	0/2609
6	T	0.26	0/1932	0.46	0/2609
7	G	0.27	0/1945	0.48	0/2634
7	U	0.27	0/1945	0.48	0/2634
8	H	0.26	0/1715	0.52	0/2326
8	V	0.26	0/1726	0.52	0/2341
9	I	0.28	0/1611	0.53	0/2174
9	W	0.28	0/1611	0.53	0/2174
10	J	0.28	0/1589	0.59	1/2142 (0.0%)
10	X	0.28	0/1589	0.59	2/2142 (0.1%)
11	K	0.28	0/1681	0.79	3/2274 (0.1%)
11	Y	0.29	0/1681	0.83	4/2274 (0.2%)
12	L	0.27	0/1795	0.51	0/2420
12	Z	0.27	0/1795	0.50	0/2420
13	M	0.27	0/1855	0.55	0/2514
13	a	0.27	0/1855	0.54	0/2514
14	N	0.25	0/1541	0.50	0/2087
14	b	0.25	0/1541	0.50	0/2087
All	All	0.27	0/50205	0.53	10/67883 (0.0%)

There are no bond length outliers.

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	Y	106	ARG	NE-CZ-NH2	-20.52	110.04	120.30
11	K	106	ARG	NE-CZ-NH1	-19.54	110.53	120.30
11	Y	106	ARG	NE-CZ-NH1	18.10	129.35	120.30
11	K	106	ARG	NE-CZ-NH2	17.25	128.92	120.30
10	X	174	MET	CA-CB-CG	10.12	130.50	113.30
10	J	174	MET	CA-CB-CG	9.79	129.95	113.30
11	Y	106	ARG	CD-NE-CZ	8.47	135.46	123.60
11	K	106	ARG	CD-NE-CZ	7.88	134.63	123.60
11	Y	106	ARG	CG-CD-NE	7.09	126.70	111.80
10	X	174	MET	N-CA-CB	6.00	121.39	110.60

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	1915	0	1929	4	0
1	O	1915	0	1929	2	0
2	B	1904	0	1904	7	0
2	P	1904	0	1904	6	0
3	C	1881	0	1895	9	0
3	Q	1881	0	1895	9	0
4	D	1813	0	1797	4	0
4	R	1813	0	1797	8	0
5	E	1773	0	1775	4	0
5	S	1773	0	1775	9	0
6	F	1892	0	1883	0	0
6	T	1892	0	1883	3	0
7	G	1907	0	1901	6	0
7	U	1907	0	1901	5	0
8	H	1684	0	1688	4	0
8	V	1691	0	1695	4	0
9	I	1581	0	1574	7	0
9	W	1581	0	1574	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
10	J	1561	0	1569	29	0
10	X	1561	0	1569	32	0
11	K	1644	0	1592	14	0
11	Y	1644	0	1592	17	0
12	L	1757	0	1711	6	0
12	Z	1757	0	1711	7	0
13	M	1824	0	1832	5	0
13	a	1824	0	1832	0	0
14	N	1512	0	1481	2	0
14	b	1512	0	1481	0	0
15	G	1	0	0	0	0
15	I	2	0	0	0	0
15	J	1	0	0	0	0
15	K	1	0	0	0	0
15	L	1	0	0	0	0
15	N	1	0	0	0	0
15	Z	1	0	0	0	0
16	G	1	0	0	0	0
16	U	2	0	0	0	0
17	K	50	0	0	3	0
17	Y	50	0	0	3	0
18	K	12	0	13	2	0
18	Y	12	0	13	1	0
19	A	2	0	0	0	0
19	B	7	0	0	0	0
19	C	4	0	0	0	0
19	E	3	0	0	0	0
19	F	10	0	0	0	0
19	G	7	0	0	0	0
19	H	17	0	0	0	0
19	I	5	0	0	0	0
19	J	11	0	0	0	0
19	K	8	0	0	0	0
19	L	9	0	0	0	0
19	M	10	0	0	0	0
19	N	12	0	0	0	0
19	O	5	0	0	0	0
19	P	6	0	0	0	0
19	Q	9	0	0	0	0
19	R	3	0	0	0	0
19	S	3	0	0	0	0
19	T	4	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
19	U	8	0	0	0	0
19	V	6	0	0	0	0
19	W	11	0	0	0	0
19	X	17	0	0	1	0
19	Y	10	0	0	0	0
19	Z	7	0	0	0	0
19	a	12	0	0	0	0
19	b	10	0	0	0	0
All	All	49654	0	49095	194	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 (194) 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)
10:X:1:MET:HE1	10:X:47:ALA:HB1	1.42	1.02
10:X:1:MET:CE	10:X:47:ALA:HB1	1.90	1.00
10:J:1:MET:SD	10:J:47:ALA:HB1	2.02	0.98
10:J:1:MET:CE	10:J:47:ALA:HB1	1.94	0.97
10:X:1:MET:SD	10:X:47:ALA:HB1	2.05	0.96
17:Y:301:6KF:O46	18:Y:302:MES:O1S	1.85	0.94
10:J:1:MET:HE1	10:J:47:ALA:HB1	1.51	0.91
10:X:1:MET:HE1	10:X:47:ALA:CB	2.00	0.91
10:J:1:MET:HE1	10:J:47:ALA:CB	2.10	0.82
10:J:1:MET:CE	10:J:47:ALA:CB	2.65	0.72
10:X:1:MET:CE	10:X:47:ALA:CB	2.63	0.71
10:J:174:MET:N	10:J:174:MET:HE2	2.06	0.70
11:K:100:MET:HE3	11:K:127:PHE:HB2	1.73	0.69
10:X:174:MET:N	10:X:174:MET:HE2	2.08	0.68
11:K:47:GLY:HA2	18:K:303:MES:H82	1.76	0.67
12:L:13:LEU:HD13	12:L:150:LEU:HD21	1.78	0.66
11:Y:100:MET:HE3	11:Y:127:PHE:HB2	1.79	0.65
11:Y:5:ALA:HB3	11:Y:100:MET:HE2	1.77	0.65
12:Z:13:LEU:HD13	12:Z:150:LEU:HD21	1.78	0.64
11:Y:145:LYS:HG3	11:Y:148:LEU:HD13	1.82	0.62
4:R:99:ILE:HD11	4:R:104:LEU:HB2	1.82	0.61
4:D:99:ILE:HD11	4:D:104:LEU:HB2	1.83	0.61
11:K:5:ALA:HB3	11:K:100:MET:HE2	1.82	0.60
11:Y:100:MET:CE	11:Y:127:PHE:HB2	2.32	0.60
11:K:145:LYS:HG3	11:K:148:LEU:HD13	1.82	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:K:100:MET:CE	11:K:127:PHE:HB2	2.32	0.59
10:X:173:PRO:HB2	10:X:174:MET:HE2	1.85	0.59
10:J:173:PRO:HB2	10:J:174:MET:HE2	1.88	0.55
7:G:23:PHE:O	7:G:26:THR:HB	2.06	0.55
7:U:23:PHE:O	7:U:26:THR:HB	2.07	0.55
4:R:159:TYR:CE2	5:S:56:SER:HB3	2.42	0.55
9:W:20:VAL:HG13	9:W:118:PRO:HB3	1.89	0.55
3:C:160:GLN:HE21	3:C:160:GLN:HA	1.73	0.54
10:X:174:MET:N	10:X:174:MET:CE	2.71	0.54
3:Q:160:GLN:HE21	3:Q:160:GLN:HA	1.72	0.54
10:X:1:MET:CE	10:X:2:ASP:H	2.20	0.54
10:J:1:MET:O	10:J:2:ASP:CG	2.46	0.54
10:J:1:MET:CE	10:J:2:ASP:H	2.21	0.54
12:L:4:PRO:O	13:M:104:ARG:NH1	2.39	0.54
10:X:1:MET:O	10:X:2:ASP:CG	2.46	0.53
10:X:16:ALA:HB2	10:X:161:LEU:HD21	1.91	0.53
8:H:50:ALA:HB3	9:I:126:ILE:HD12	1.88	0.53
10:J:16:ALA:HB2	10:J:161:LEU:HD21	1.91	0.53
3:Q:51:LYS:O	3:Q:52:LEU:HB2	2.08	0.53
10:X:1:MET:HE2	10:X:2:ASP:H	1.72	0.53
9:I:20:VAL:HG13	9:I:118:PRO:HB3	1.89	0.53
10:J:174:MET:N	10:J:174:MET:CE	2.72	0.52
10:X:1:MET:SD	10:X:47:ALA:CB	2.91	0.52
3:C:51:LYS:O	3:C:52:LEU:HB2	2.08	0.52
9:W:20:VAL:HG23	9:W:189:ILE:HB	1.92	0.52
10:X:1:MET:HE2	10:X:2:ASP:N	2.25	0.52
3:C:201:VAL:O	3:C:202:GLN:CB	2.59	0.51
9:I:20:VAL:HG23	9:I:189:ILE:HB	1.91	0.51
10:J:1:MET:HA	10:J:1:MET:HE2	1.93	0.51
17:Y:301:6KF:N1	17:Y:301:6KF:C6	2.73	0.50
11:Y:1:THR:HG22	11:Y:2:THR:N	2.27	0.50
5:S:87:LEU:HD21	5:S:107:ALA:HB1	1.94	0.50
3:Q:201:VAL:O	3:Q:202:GLN:CB	2.59	0.50
11:Y:107:LYS:HG3	11:Y:108:GLU:HG3	1.94	0.50
10:J:67:TYR:CE1	10:J:75:LEU:HD13	2.48	0.49
8:V:50:ALA:HB3	9:W:126:ILE:HD12	1.94	0.49
1:A:176:GLU:HG2	2:B:55:LEU:HD13	1.94	0.48
11:Y:37:ILE:HG23	11:Y:60:GLY:HA2	1.95	0.48
10:J:1:MET:SD	10:J:47:ALA:CB	2.90	0.48
5:E:87:LEU:HD21	5:E:107:ALA:HB1	1.95	0.48
11:K:107:LYS:HG3	11:K:108:GLU:HG3	1.94	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:201:VAL:HG13	3:C:202:GLN:N	2.29	0.48
10:X:1:MET:CE	10:X:47:ALA:CA	2.91	0.48
3:Q:201:VAL:O	3:Q:202:GLN:HB2	2.14	0.48
10:X:67:TYR:CE1	10:X:75:LEU:HD13	2.48	0.48
11:K:37:ILE:HG23	11:K:60:GLY:HA2	1.95	0.48
12:L:8:ASN:HA	12:L:30:ILE:O	2.14	0.48
13:M:96:LEU:O	13:M:100:MET:HG2	2.14	0.48
11:Y:106:ARG:HA	11:Y:106:ARG:HD3	1.75	0.48
1:O:122:THR:HG22	2:P:128:ARG:HH21	1.79	0.47
8:V:52:THR:O	8:V:56:THR:HB	2.14	0.47
4:R:88:ALA:HA	4:R:99:ILE:HG21	1.96	0.47
10:X:174:MET:CE	10:X:174:MET:H	2.27	0.47
9:I:10:ILE:HG21	9:I:141:ALA:HB3	1.96	0.47
10:J:174:MET:HE2	10:J:174:MET:H	1.78	0.47
10:J:174:MET:HA	10:X:174:MET:HA	1.97	0.47
3:Q:201:VAL:HG13	3:Q:202:GLN:N	2.29	0.47
12:Z:147:MET:N	12:Z:148:PRO:HD2	2.30	0.47
3:C:201:VAL:O	3:C:202:GLN:HB2	2.14	0.47
8:H:104:ASP:HB2	8:H:105:PRO:HD2	1.97	0.47
10:J:1:MET:HE3	10:J:47:ALA:HA	1.96	0.47
11:Y:25:TRP:CH2	12:Z:144:SER:HA	2.50	0.47
12:Z:8:ASN:HA	12:Z:30:ILE:O	2.14	0.47
11:K:5:ALA:HB3	11:K:100:MET:CE	2.44	0.47
3:Q:169:VAL:HG23	3:Q:196:SER:HB2	1.96	0.47
9:W:36:SER:HB2	10:X:126:VAL:HG11	1.96	0.47
11:K:53:GLN:O	11:K:57:THR:HG23	2.15	0.47
10:J:1:MET:CE	10:J:47:ALA:CA	2.93	0.47
3:C:169:VAL:HG23	3:C:196:SER:HB2	1.96	0.46
9:W:10:ILE:HG21	9:W:141:ALA:HB3	1.96	0.46
11:Y:53:GLN:O	11:Y:57:THR:HG23	2.15	0.46
8:H:52:THR:O	8:H:56:THR:HB	2.15	0.46
4:D:88:ALA:HA	4:D:99:ILE:HG21	1.97	0.46
10:X:174:MET:HE2	10:X:174:MET:H	1.79	0.46
10:X:1:MET:HE2	19:X:204:HOH:O	2.16	0.46
10:X:3:ILE:HD13	10:X:168:LEU:HD13	1.97	0.46
4:R:158:ARG:HB3	5:S:57:SER:HB3	1.98	0.46
10:X:1:MET:HE2	10:X:1:MET:HA	1.98	0.46
12:L:147:MET:N	12:L:148:PRO:HD2	2.30	0.46
11:Y:104:TYR:CZ	11:Y:110:PRO:HD3	2.51	0.46
10:J:3:ILE:HD13	10:J:168:LEU:HD13	1.97	0.45
13:M:165:ILE:HB	13:M:166:PRO:HD3	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:Y:5:ALA:HB3	11:Y:100:MET:CE	2.44	0.45
11:K:104:TYR:CZ	11:K:110:PRO:HD3	2.51	0.45
4:R:160:ASN:HB3	4:R:179:TRP:CE2	2.52	0.45
5:S:9:THR:HG21	5:S:119:THR:HA	1.99	0.45
10:J:1:MET:C	10:J:2:ASP:CG	2.75	0.45
8:V:104:ASP:HB2	8:V:105:PRO:HD2	1.98	0.45
7:U:26:THR:HG21	7:U:131:ILE:HD12	1.99	0.45
9:W:9:GLY:HA3	9:W:41:LYS:HE2	1.98	0.45
10:J:1:MET:HE2	10:J:2:ASP:N	2.32	0.45
17:K:301:6KF:N1	12:L:127:PRO:HD2	2.32	0.45
17:K:301:6KF:O46	18:K:303:MES:O3S	2.35	0.45
5:E:9:THR:HG21	5:E:119:THR:HA	1.99	0.45
9:I:9:GLY:HA3	9:I:41:LYS:HE2	1.98	0.45
14:N:152:VAL:HA	14:N:175:MET:HE1	1.99	0.45
10:J:1:MET:HE2	10:J:2:ASP:H	1.82	0.44
4:R:91:HIS:HB3	4:R:99:ILE:CG2	2.47	0.44
1:A:122:THR:HG22	2:B:128:ARG:HH21	1.83	0.44
4:D:91:HIS:HB3	4:D:99:ILE:CG2	2.47	0.44
17:K:301:6KF:N1	17:K:301:6KF:C6	2.80	0.44
4:D:160:ASN:HB3	4:D:179:TRP:CE2	2.52	0.44
7:G:26:THR:HG21	7:G:131:ILE:HD12	1.99	0.44
11:K:2:THR:HG21	11:K:164:ALA:CB	2.48	0.44
3:C:198:LEU:HA	3:C:201:VAL:HG12	2.00	0.44
11:K:46:ALA:HB3	11:K:98:GLY:O	2.18	0.44
3:Q:198:LEU:HA	3:Q:201:VAL:HG12	2.00	0.44
10:X:1:MET:SD	10:X:48:GLY:N	2.90	0.44
11:Y:46:ALA:HB3	11:Y:98:GLY:O	2.17	0.43
11:K:20:ALA:HB2	11:K:31:VAL:HG21	2.00	0.43
11:Y:20:ALA:HB2	11:Y:31:VAL:HG21	2.00	0.43
1:A:149:GLN:O	1:A:156:TYR:HA	2.18	0.43
13:M:27:LEU:HD21	13:M:34:LEU:HD22	2.01	0.43
2:P:151:ASN:HB2	2:P:152:PRO:CD	2.48	0.43
2:P:151:ASN:HB2	2:P:152:PRO:HD2	2.01	0.43
10:J:174:MET:CE	10:J:174:MET:H	2.31	0.43
11:K:145:LYS:HG3	11:K:148:LEU:CD1	2.49	0.43
1:O:149:GLN:O	1:O:156:TYR:HA	2.19	0.43
2:B:93:HIS:HB3	2:B:113:ARG:HH21	1.83	0.43
2:B:151:ASN:HB2	2:B:152:PRO:CD	2.48	0.43
2:P:93:HIS:HB3	2:P:113:ARG:HH21	1.83	0.43
2:B:151:ASN:HB2	2:B:152:PRO:HD2	2.01	0.43
5:E:175:LEU:HA	5:E:178:PHE:CE2	2.54	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:G:78:ILE:N	7:G:79:PRO:CD	2.82	0.42
5:S:175:LEU:HA	5:S:178:PHE:CE2	2.54	0.42
7:U:78:ILE:N	7:U:79:PRO:CD	2.82	0.42
10:X:1:MET:C	10:X:2:ASP:CG	2.77	0.42
17:Y:301:6KF:N1	12:Z:127:PRO:HD2	2.34	0.42
13:M:187:ARG:NH1	8:V:139:GLU:OE1	2.49	0.42
10:X:173:PRO:CB	10:X:174:MET:HE2	2.47	0.42
11:Y:1:THR:CG2	11:Y:2:THR:N	2.83	0.42
11:Y:2:THR:HG21	11:Y:164:ALA:CB	2.48	0.42
10:J:1:MET:SD	10:J:48:GLY:N	2.92	0.42
7:G:187:GLU:HG2	7:G:192:LYS:HB2	2.01	0.42
4:R:9:PRO:HA	5:S:23:TYR:CD1	2.55	0.42
9:W:37:ASN:HB3	9:W:182:TRP:CE3	2.55	0.42
3:Q:2:TYR:CZ	3:Q:4:ARG:HB2	2.55	0.41
10:J:173:PRO:O	10:X:174:MET:HB3	2.20	0.41
3:C:2:TYR:CZ	3:C:4:ARG:HB2	2.56	0.41
10:X:1:MET:HE3	10:X:47:ALA:HA	2.02	0.41
11:Y:145:LYS:HG3	11:Y:148:LEU:CD1	2.48	0.41
10:J:173:PRO:CB	10:J:174:MET:HE2	2.50	0.41
12:Z:125:PHE:CD2	12:Z:131:TYR:HB3	2.56	0.41
2:B:14:PRO:HA	3:C:20:TYR:CD1	2.56	0.41
7:G:149:ASP:HB2	7:G:150:PRO:CD	2.51	0.41
8:H:218:VAL:CG2	9:I:196:LYS:HB2	2.50	0.41
2:P:180:LYS:O	2:P:183:MET:HB2	2.21	0.41
3:Q:11:PRO:HA	4:R:18:TYR:CD1	2.56	0.41
6:T:172:LEU:CD1	6:T:195:ILE:HD13	2.51	0.41
2:B:180:LYS:O	2:B:183:MET:HB2	2.21	0.41
2:P:50:LYS:O	2:P:51:VAL:C	2.59	0.41
5:S:12:PHE:H	6:T:19:GLN:HE22	1.68	0.41
6:T:14:ASP:HB2	6:T:16:ARG:HD3	2.03	0.40
5:E:68:HIS:HE1	5:E:102:LEU:O	2.03	0.40
10:J:147:HIS:HB2	10:J:160:LEU:HD11	2.03	0.40
12:L:195:HIS:HD2	12:L:197:GLN:H	1.69	0.40
7:U:149:ASP:HB2	7:U:150:PRO:CD	2.51	0.40
9:W:36:SER:CB	10:X:126:VAL:HG11	2.51	0.40
10:J:173:PRO:HB3	10:X:22:THR:HG21	2.04	0.40
14:N:176:VAL:HG12	14:N:178:LEU:HD13	2.03	0.40
5:S:131:LEU:HB2	5:S:146:PHE:HB3	2.03	0.40
1:A:55:LEU:HD12	7:G:170:THR:HG23	2.03	0.40
9:I:37:ASN:HB3	9:I:182:TRP:CE3	2.56	0.40
10:J:149:ARG:HB2	10:J:152:MET:HG3	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:S:68:HIS:HE1	5:S:102:LEU:O	2.04	0.40
7:U:187:GLU:HG2	7:U:192:LYS:HB2	2.02	0.40
10:X:147:HIS:HB2	10:X:160:LEU:HD11	2.04	0.40
10:X:149:ARG:HB2	10:X:152:MET:HG3	2.04	0.40
12:Z:195:HIS:HD2	12:Z:197:GLN:H	1.69	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	248/250 (99%)	242 (98%)	6 (2%)	0	100	100
1	O	248/250 (99%)	242 (98%)	6 (2%)	0	100	100
2	B	242/258 (94%)	234 (97%)	7 (3%)	1 (0%)	34	66
2	P	242/258 (94%)	234 (97%)	7 (3%)	1 (0%)	34	66
3	C	238/254 (94%)	229 (96%)	6 (2%)	3 (1%)	12	37
3	Q	238/254 (94%)	229 (96%)	6 (2%)	3 (1%)	12	37
4	D	231/260 (89%)	226 (98%)	5 (2%)	0	100	100
4	R	231/260 (89%)	226 (98%)	5 (2%)	0	100	100
5	E	229/234 (98%)	224 (98%)	5 (2%)	0	100	100
5	S	229/234 (98%)	224 (98%)	5 (2%)	0	100	100
6	F	241/288 (84%)	234 (97%)	7 (3%)	0	100	100
6	T	241/288 (84%)	234 (97%)	7 (3%)	0	100	100
7	G	239/252 (95%)	235 (98%)	4 (2%)	0	100	100
7	U	239/252 (95%)	234 (98%)	5 (2%)	0	100	100
8	H	220/232 (95%)	214 (97%)	6 (3%)	0	100	100
8	V	221/232 (95%)	215 (97%)	6 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
9	I	202/205 (98%)	195 (96%)	7 (4%)	0	100	100
9	W	202/205 (98%)	195 (96%)	7 (4%)	0	100	100
10	J	193/198 (98%)	187 (97%)	5 (3%)	1 (0%)	29	61
10	X	193/198 (98%)	187 (97%)	5 (3%)	1 (0%)	29	61
11	K	210/212 (99%)	200 (95%)	10 (5%)	0	100	100
11	Y	210/212 (99%)	200 (95%)	10 (5%)	0	100	100
12	L	220/222 (99%)	216 (98%)	4 (2%)	0	100	100
12	Z	220/222 (99%)	216 (98%)	4 (2%)	0	100	100
13	M	231/246 (94%)	222 (96%)	9 (4%)	0	100	100
13	a	231/246 (94%)	222 (96%)	9 (4%)	0	100	100
14	N	194/196 (99%)	188 (97%)	6 (3%)	0	100	100
14	b	194/196 (99%)	188 (97%)	6 (3%)	0	100	100
All	All	6277/6614 (95%)	6092 (97%)	175 (3%)	10 (0%)	47	78

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	51	VAL
3	C	202	GLN
10	J	3	ILE
2	P	51	VAL
3	Q	202	GLN
10	X	3	ILE
3	C	205	ALA
3	Q	205	ALA
3	C	183	PRO
3	Q	183	PRO

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	209/209 (100%)	205 (98%)	4 (2%)	57	84
1	O	209/209 (100%)	206 (99%)	3 (1%)	67	89
2	B	203/216 (94%)	195 (96%)	8 (4%)	32	66
2	P	203/216 (94%)	195 (96%)	8 (4%)	32	66
3	C	212/226 (94%)	203 (96%)	9 (4%)	30	63
3	Q	212/226 (94%)	203 (96%)	9 (4%)	30	63
4	D	194/215 (90%)	186 (96%)	8 (4%)	30	64
4	R	194/215 (90%)	186 (96%)	8 (4%)	30	64
5	E	190/193 (98%)	180 (95%)	10 (5%)	22	54
5	S	190/193 (98%)	179 (94%)	11 (6%)	20	50
6	F	201/239 (84%)	190 (94%)	11 (6%)	21	53
6	T	201/239 (84%)	190 (94%)	11 (6%)	21	53
7	G	206/210 (98%)	199 (97%)	7 (3%)	37	71
7	U	206/210 (98%)	199 (97%)	7 (3%)	37	71
8	H	181/190 (95%)	172 (95%)	9 (5%)	24	57
8	V	182/190 (96%)	173 (95%)	9 (5%)	25	57
9	I	172/173 (99%)	167 (97%)	5 (3%)	42	76
9	W	172/173 (99%)	167 (97%)	5 (3%)	42	76
10	J	173/175 (99%)	164 (95%)	9 (5%)	23	55
10	X	173/175 (99%)	164 (95%)	9 (5%)	23	55
11	K	169/169 (100%)	161 (95%)	8 (5%)	26	59
11	Y	169/169 (100%)	162 (96%)	7 (4%)	30	64
12	L	185/185 (100%)	178 (96%)	7 (4%)	33	67
12	Z	185/185 (100%)	178 (96%)	7 (4%)	33	67
13	M	199/208 (96%)	193 (97%)	6 (3%)	41	75
13	a	199/208 (96%)	193 (97%)	6 (3%)	41	75
14	N	162/162 (100%)	158 (98%)	4 (2%)	47	78
14	b	162/162 (100%)	158 (98%)	4 (2%)	47	78
All	All	5313/5540 (96%)	5104 (96%)	209 (4%)	32	66

All (209) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	17	LYS
1	A	61	LEU
1	A	122	THR
1	A	157	PHE
2	B	50	LYS
2	B	52	THR
2	B	54	THR
2	B	55	LEU
2	B	58	GLN
2	B	79	LEU
2	B	114	LEU
2	B	191	LEU
3	C	4	ARG
3	C	38	ASN
3	C	61	LYS
3	C	77	ASN
3	C	147	GLN
3	C	160	GLN
3	C	169	VAL
3	C	180	LYS
3	C	203	THR
4	D	20	LEU
4	D	40	LEU
4	D	99	ILE
4	D	176	LEU
4	D	193	LEU
4	D	214	ILE
4	D	236	LYS
4	D	242	GLU
5	E	9	THR
5	E	10	VAL
5	E	25	LEU
5	E	29	LYS
5	E	54	GLU
5	E	55	LEU
5	E	71	LEU
5	E	184	ASN
5	E	188	LEU
5	E	202	ASP
6	F	14	ASP
6	F	59	LYS
6	F	117	GLN
6	F	123	ASN

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Mol	Chain	Res	Type
6	F	139	LYS
6	F	172	LEU
6	F	181	GLU
6	F	203	ASN
6	F	206	LYS
6	F	214	TRP
6	F	221	ASN
7	G	83	ASN
7	G	115	LEU
7	G	125	MET
7	G	166	GLN
7	G	181	LYS
7	G	235	ARG
7	G	236	LEU
8	H	22	GLN
8	H	30	ASN
8	H	34	LEU
8	H	43	CYS
8	H	56	THR
8	H	57	GLN
8	H	68	LEU
8	H	127	LEU
8	H	196	ARG
9	I	37	ASN
9	I	151	SER
9	I	171	LEU
9	I	182	TRP
9	I	192	ASP
10	J	1	MET
10	J	23	ARG
10	J	35	THR
10	J	75	LEU
10	J	78	GLN
10	J	126	VAL
10	J	143	LEU
10	J	144	LEU
10	J	174	MET
11	K	4	LEU
11	K	9	GLN
11	K	38	ASN
11	K	104	TYR
11	K	106	ARG

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Mol	Chain	Res	Type
11	K	118	ASP
11	K	148	LEU
11	K	181	THR
12	L	1	GLN
12	L	23	LEU
12	L	49	ASN
12	L	106	TYR
12	L	136	CYS
12	L	150	LEU
12	L	167	LYS
13	M	43	ILE
13	M	48	ASN
13	M	70	LEU
13	M	104	ARG
13	M	161	ARG
13	M	187	ARG
14	N	9	LYS
14	N	36	ARG
14	N	104	ASP
14	N	119	VAL
1	O	17	LYS
1	O	61	LEU
1	O	157	PHE
2	P	50	LYS
2	P	52	THR
2	P	54	THR
2	P	55	LEU
2	P	58	GLN
2	P	79	LEU
2	P	114	LEU
2	P	191	LEU
3	Q	4	ARG
3	Q	38	ASN
3	Q	61	LYS
3	Q	77	ASN
3	Q	147	GLN
3	Q	160	GLN
3	Q	169	VAL
3	Q	180	LYS
3	Q	203	THR
4	R	20	LEU
4	R	40	LEU

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Mol	Chain	Res	Type
4	R	99	ILE
4	R	176	LEU
4	R	193	LEU
4	R	214	ILE
4	R	236	LYS
4	R	242	GLU
5	S	9	THR
5	S	10	VAL
5	S	25	LEU
5	S	29	LYS
5	S	54	GLU
5	S	55	LEU
5	S	71	LEU
5	S	184	ASN
5	S	188	LEU
5	S	202	ASP
5	S	207	VAL
6	T	14	ASP
6	T	59	LYS
6	T	117	GLN
6	T	123	ASN
6	T	139	LYS
6	T	172	LEU
6	T	181	GLU
6	T	203	ASN
6	T	206	LYS
6	T	214	TRP
6	T	221	ASN
7	U	83	ASN
7	U	115	LEU
7	U	125	MET
7	U	166	GLN
7	U	181	LYS
7	U	235	ARG
7	U	236	LEU
8	V	22	GLN
8	V	30	ASN
8	V	34	LEU
8	V	43	CYS
8	V	56	THR
8	V	57	GLN
8	V	68	LEU

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Mol	Chain	Res	Type
8	V	127	LEU
8	V	196	ARG
9	W	37	ASN
9	W	151	SER
9	W	171	LEU
9	W	182	TRP
9	W	192	ASP
10	X	1	MET
10	X	23	ARG
10	X	35	THR
10	X	75	LEU
10	X	78	GLN
10	X	126	VAL
10	X	143	LEU
10	X	144	LEU
10	X	174	MET
11	Y	4	LEU
11	Y	9	GLN
11	Y	38	ASN
11	Y	104	TYR
11	Y	118	ASP
11	Y	148	LEU
11	Y	181	THR
12	Z	1	GLN
12	Z	23	LEU
12	Z	49	ASN
12	Z	106	TYR
12	Z	136	CYS
12	Z	150	LEU
12	Z	167	LYS
13	a	43	ILE
13	a	48	ASN
13	a	70	LEU
13	a	104	ARG
13	a	161	ARG
13	a	187	ARG
14	b	9	LYS
14	b	36	ARG
14	b	104	ASP
14	b	119	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (103) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	94	HIS
2	B	20	GLN
2	B	95	GLN
2	B	119	GLN
2	B	123	GLN
2	B	155	ASN
2	B	176	GLN
3	C	38	ASN
3	C	77	ASN
3	C	147	GLN
3	C	160	GLN
4	D	15	GLN
4	D	100	ASN
4	D	146	GLN
4	D	225	ASN
5	E	68	HIS
5	E	92	ASN
5	E	99	ASN
5	E	116	GLN
5	E	120	GLN
5	E	151	ASN
5	E	184	ASN
6	F	19	GLN
6	F	86	ASN
6	F	117	GLN
6	F	191	GLN
6	F	240	GLN
7	G	6	HIS
7	G	83	ASN
7	G	114	ASN
7	G	117	GLN
7	G	121	GLN
7	G	167	GLN
8	H	22	GLN
8	H	35	HIS
10	J	55	GLN
10	J	146	HIS
10	J	147	HIS
11	K	9	GLN
11	K	85	ASN
11	K	176	ASN
12	L	3	ASN
12	L	49	ASN

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Mol	Chain	Res	Type
12	L	70	ASN
12	L	158	ASN
13	M	18	ASN
13	M	48	ASN
13	M	102	GLN
13	M	179	ASN
13	M	194	ASN
13	M	213	GLN
14	N	161	GLN
1	O	94	HIS
2	P	20	GLN
2	P	119	GLN
2	P	123	GLN
2	P	176	GLN
3	Q	38	ASN
3	Q	77	ASN
3	Q	147	GLN
3	Q	160	GLN
4	R	15	GLN
4	R	100	ASN
4	R	146	GLN
4	R	225	ASN
5	S	68	HIS
5	S	92	ASN
5	S	99	ASN
5	S	116	GLN
5	S	120	GLN
5	S	184	ASN
6	T	19	GLN
6	T	86	ASN
6	T	117	GLN
6	T	123	ASN
6	T	191	GLN
6	T	240	GLN
7	U	83	ASN
7	U	114	ASN
7	U	117	GLN
7	U	121	GLN
7	U	167	GLN
8	V	35	HIS
8	V	116	HIS
8	V	165	ASN

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Mol	Chain	Res	Type
10	X	55	GLN
10	X	86	GLN
10	X	146	HIS
10	X	147	HIS
11	Y	9	GLN
11	Y	85	ASN
11	Y	176	ASN
12	Z	3	ASN
12	Z	49	ASN
12	Z	70	ASN
12	Z	158	ASN
13	a	18	ASN
13	a	48	ASN
13	a	102	GLN
13	a	179	ASN
13	a	194	ASN
13	a	213	GLN
14	b	161	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 15 ligands modelled in this entry, 11 are monoatomic - leaving 4 for Mogul analysis.

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
18	MES	Y	302	-	12,12,12	2.54	1 (8%)	14,16,16	1.84	6 (42%)
17	6KF	K	301	11	52,53,53	1.69	5 (9%)	67,70,70	1.23	8 (11%)
18	MES	K	303	-	12,12,12	2.63	1 (8%)	14,16,16	1.80	3 (21%)
17	6KF	Y	301	11	52,53,53	1.73	6 (11%)	67,70,70	1.48	7 (10%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
18	MES	Y	302	-	-	3/6/14/14	0/1/1/1
17	6KF	K	301	11	-	16/53/53/53	0/4/4/4
18	MES	K	303	-	-	4/6/14/14	0/1/1/1
17	6KF	Y	301	11	-	19/53/53/53	0/4/4/4

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
18	K	303	MES	C8-S	-9.05	1.64	1.77
18	Y	302	MES	C8-S	-8.72	1.65	1.77
17	K	301	6KF	C47-C45	7.43	1.66	1.53
17	Y	301	6KF	N2-N1	-6.45	1.06	1.23
17	Y	301	6KF	C39-C21	-5.43	1.38	1.51
17	K	301	6KF	C29-C14	-4.94	1.39	1.51
17	Y	301	6KF	C29-C14	-4.91	1.39	1.51
17	Y	301	6KF	C4-C5	-4.75	1.39	1.51
17	K	301	6KF	C39-C21	-4.34	1.40	1.51
17	Y	301	6KF	C11-C23	-3.95	1.39	1.49
17	K	301	6KF	C4-C5	-3.94	1.41	1.51
17	K	301	6KF	C11-C23	-3.41	1.40	1.49
17	Y	301	6KF	C47-C45	2.97	1.58	1.53

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
17	Y	301	6KF	C34-N1-N2	7.08	122.69	115.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
17	K	301	6KF	C34-N1-N2	5.33	120.84	115.24
17	Y	301	6KF	C44-C43-N42	-4.49	101.95	109.70
17	Y	301	6KF	C45-C43-N42	4.14	117.58	109.56
18	K	303	MES	O1S-S-C8	4.06	111.81	106.92
17	K	301	6KF	C21-C39-C38	-3.40	104.00	113.39
17	K	301	6KF	C44-C43-N42	-2.94	104.63	109.70
18	Y	302	MES	O3S-S-C8	2.83	110.35	105.77
17	K	301	6KF	C4-C34-N1	2.67	113.71	109.30
17	K	301	6KF	C45-C43-N42	2.54	114.48	109.56
18	Y	302	MES	O2S-S-C8	2.49	109.92	106.92
17	Y	301	6KF	C43-N42-C40	-2.47	118.43	122.67
18	Y	302	MES	C5-N4-C3	2.40	114.22	108.83
18	Y	302	MES	C7-N4-C3	-2.37	105.19	111.23
17	K	301	6KF	C29-C14-C13	-2.34	116.27	120.91
17	K	301	6KF	C29-C14-C15	2.28	125.43	120.91
17	K	301	6KF	C48-C47-C49	-2.23	106.94	109.88
17	Y	301	6KF	C21-C39-C38	-2.19	107.34	113.39
18	K	303	MES	O3S-S-C8	2.17	109.28	105.77
17	Y	301	6KF	C29-C30-N31	-2.09	106.38	110.79
18	Y	302	MES	O3S-S-O2S	-2.09	106.18	111.27
18	Y	302	MES	O1S-S-C8	2.08	109.42	106.92
18	K	303	MES	O1-C6-C5	-2.07	107.24	111.80
17	Y	301	6KF	C29-C14-C15	2.01	124.90	120.91

There are no chirality outliers.

All (42) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
17	K	301	6KF	N1-C34-C4-C5
17	K	301	6KF	C43-C45-C47-C48
17	K	301	6KF	C43-C45-C47-C49
17	Y	301	6KF	C32-C34-N1-N2
17	Y	301	6KF	N1-C34-C4-C5
17	Y	301	6KF	N42-C43-C45-O46
17	Y	301	6KF	C43-C45-C47-C48
17	Y	301	6KF	C43-C45-C47-C49
17	Y	301	6KF	C45-C47-C49-O50
17	Y	301	6KF	C48-C47-C49-O50
18	K	303	MES	C7-C8-S-O2S
18	K	303	MES	C7-C8-S-O3S
17	Y	301	6KF	O46-C45-C47-C48
17	Y	301	6KF	C32-C34-C4-C5

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Mol	Chain	Res	Type	Atoms
17	Y	301	6KF	C44-C43-C45-O46
17	Y	301	6KF	C15-C14-C29-C30
17	K	301	6KF	O46-C45-C47-C48
17	K	301	6KF	O46-C45-C47-C49
17	K	301	6KF	C13-C14-C29-C30
17	Y	301	6KF	C13-C14-C29-C30
17	K	301	6KF	C15-C14-C29-C30
17	Y	301	6KF	C44-C43-C45-C47
18	Y	302	MES	C8-C7-N4-C3
17	Y	301	6KF	N37-C38-C40-O41
17	K	301	6KF	C34-N1-N2-N3
17	K	301	6KF	C44-C43-C45-C47
17	K	301	6KF	N42-C43-C45-C47
17	Y	301	6KF	N42-C43-C45-C47
17	K	301	6KF	C32-C34-N1-N2
17	Y	301	6KF	N37-C38-C40-N42
18	K	303	MES	C7-C8-S-O1S
17	K	301	6KF	C44-C43-C45-O46
18	Y	302	MES	C8-C7-N4-C5
17	Y	301	6KF	O46-C45-C47-C49
17	K	301	6KF	N37-C38-C39-C21
17	Y	301	6KF	C39-C38-C40-O41
17	K	301	6KF	N37-C38-C40-O41
17	K	301	6KF	N42-C43-C45-O46
18	Y	302	MES	N4-C7-C8-S
17	Y	301	6KF	C4-C34-N1-N2
18	K	303	MES	C8-C7-N4-C5
17	K	301	6KF	N37-C38-C40-N42

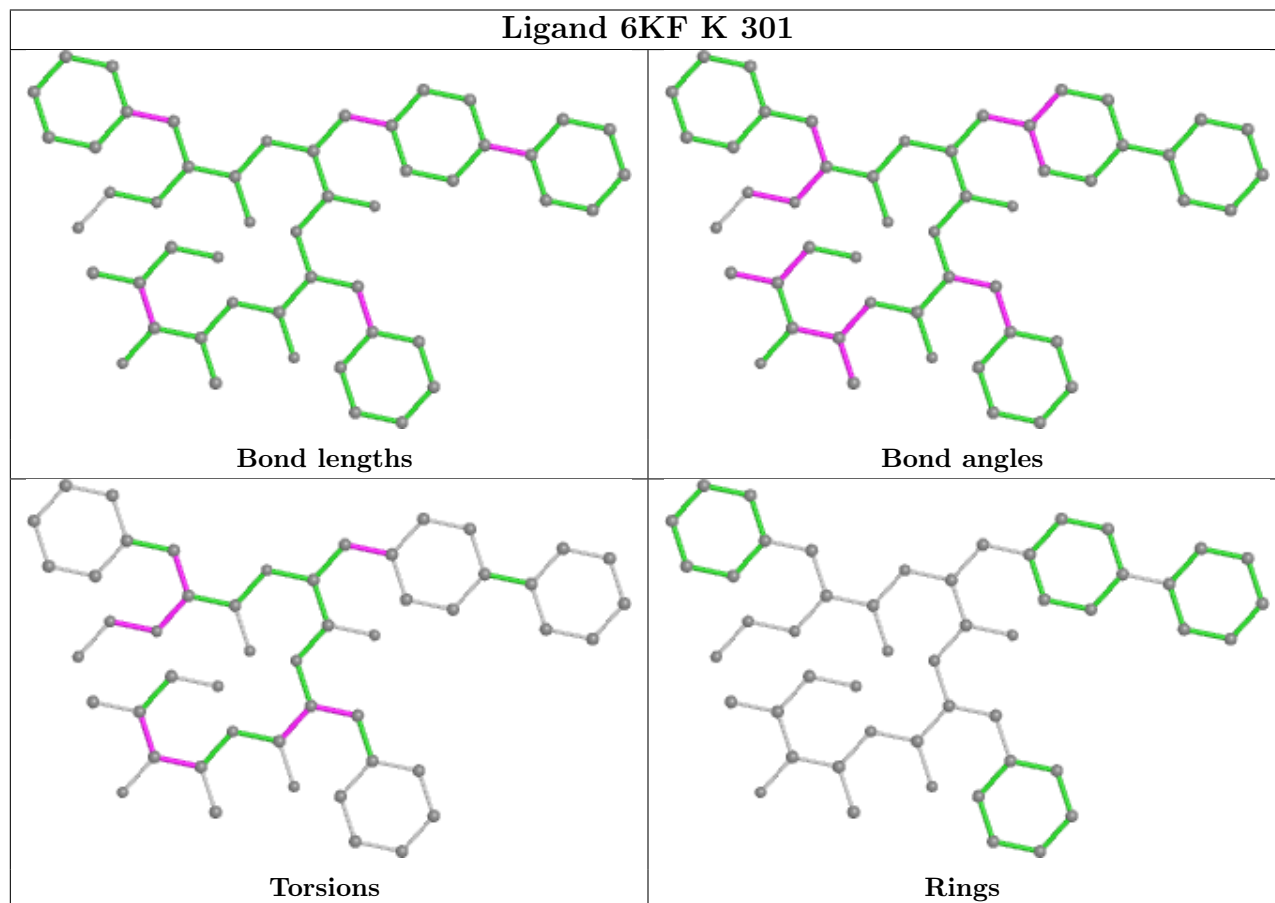
There are no ring outliers.

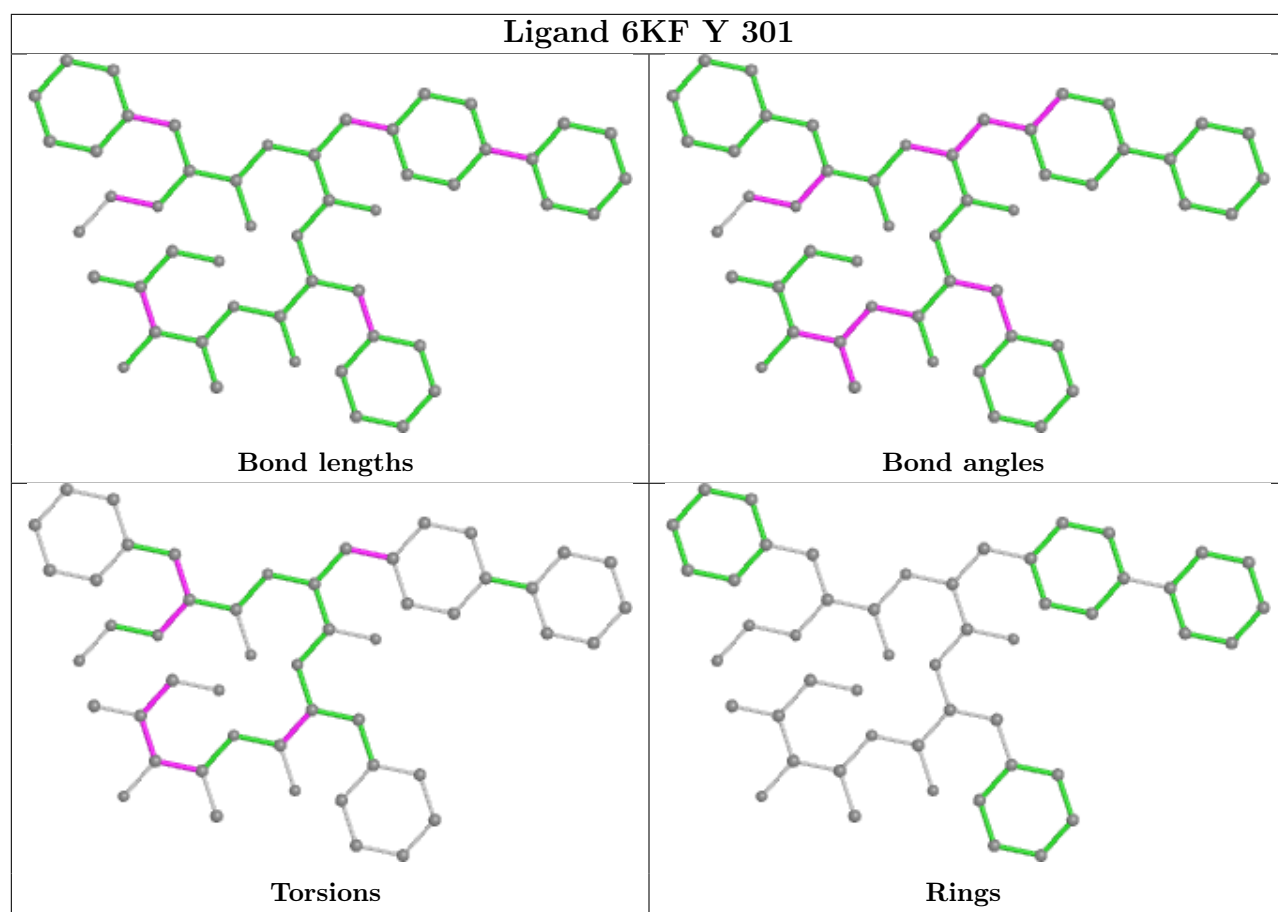
4 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
18	Y	302	MES	1	0
17	K	301	6KF	3	0
18	K	303	MES	2	0
17	Y	301	6KF	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is

within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





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	250/250 (100%)	-0.39	2 (0%) 86 86	41, 56, 95, 136	0
1	O	250/250 (100%)	-0.37	6 (2%) 59 56	46, 64, 110, 142	0
2	B	244/258 (94%)	-0.24	8 (3%) 46 41	41, 61, 113, 167	0
2	P	244/258 (94%)	-0.24	9 (3%) 41 37	46, 66, 114, 167	0
3	C	240/254 (94%)	-0.22	9 (3%) 40 36	41, 64, 126, 165	0
3	Q	240/254 (94%)	0.07	16 (6%) 17 13	52, 82, 161, 205	0
4	D	235/260 (90%)	-0.38	3 (1%) 77 77	46, 67, 101, 151	0
4	R	235/260 (90%)	-0.23	5 (2%) 63 61	53, 74, 113, 163	0
5	E	231/234 (98%)	-0.28	5 (2%) 62 59	50, 73, 110, 155	0
5	S	231/234 (98%)	-0.06	11 (4%) 30 27	54, 83, 132, 170	0
6	F	243/288 (84%)	-0.40	7 (2%) 51 47	45, 67, 115, 146	0
6	T	243/288 (84%)	-0.25	5 (2%) 63 61	48, 77, 134, 168	0
7	G	241/252 (95%)	-0.44	1 (0%) 92 93	42, 58, 102, 153	0
7	U	241/252 (95%)	-0.42	3 (1%) 79 79	46, 62, 96, 143	0
8	H	222/232 (95%)	-0.38	2 (0%) 84 84	45, 58, 89, 127	0
8	V	222/232 (95%)	-0.34	3 (1%) 75 75	47, 61, 92, 142	0
9	I	204/205 (99%)	-0.63	3 (1%) 73 73	40, 55, 89, 107	0
9	W	204/205 (99%)	-0.56	2 (0%) 82 82	41, 57, 91, 113	0
10	J	195/198 (98%)	-0.49	3 (1%) 73 73	39, 55, 82, 124	0
10	X	195/198 (98%)	-0.44	4 (2%) 63 61	42, 58, 83, 139	0
11	K	212/212 (100%)	-0.45	4 (1%) 66 65	42, 59, 92, 111	0
11	Y	212/212 (100%)	-0.41	6 (2%) 53 49	45, 62, 96, 123	0
12	L	222/222 (100%)	-0.56	0 100 100	41, 57, 89, 118	0
12	Z	222/222 (100%)	-0.46	3 (1%) 75 75	42, 59, 94, 125	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
13	M	233/246 (94%)	-0.57	2 (0%) 84 84	36, 56, 81, 103	0
13	a	233/246 (94%)	-0.57	1 (0%) 92 93	39, 56, 81, 98	0
14	N	196/196 (100%)	-0.54	2 (1%) 82 82	43, 53, 82, 107	0
14	b	196/196 (100%)	-0.58	2 (1%) 82 82	41, 52, 80, 102	0
All	All	6336/6614 (95%)	-0.38	127 (2%) 65 63	36, 62, 110, 205	0

All (127) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	220	ASN	9.3
8	V	222	ASP	8.9
10	J	1	MET	8.0
10	X	1	MET	7.3
2	P	219	ALA	6.8
3	Q	49	THR	6.5
2	P	220	ASN	6.2
3	C	206	LYS	6.2
2	B	51	VAL	6.2
2	B	221	ASP	6.0
2	B	219	ALA	5.9
3	Q	50	LEU	5.8
1	A	1	MET	5.4
5	S	202	ASP	5.1
8	H	221	CYS	4.9
3	Q	206	LYS	4.9
2	P	222	GLY	4.7
1	O	1	MET	4.7
11	Y	212	GLY	4.5
8	V	221	CYS	4.4
8	H	222	ASP	4.2
3	Q	239	GLN	4.1
10	X	194	ASP	4.1
2	P	221	ASP	4.1
5	E	202	ASP	3.9
4	D	241	ALA	3.9
2	P	218	GLY	3.9
1	O	249	ALA	3.9
4	R	241	ALA	3.8
13	a	1	THR	3.6
3	C	238	LYS	3.6
9	W	1	SER	3.5

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Mol	Chain	Res	Type	RSRZ
2	P	51	VAL	3.5
6	F	202	ASP	3.4
3	C	49	THR	3.2
3	Q	238	LYS	3.2
7	U	241	GLU	3.2
5	S	52	ALA	3.2
2	P	52	THR	3.1
7	U	222	ASP	3.1
4	D	242	GLU	3.0
6	T	2	THR	3.0
3	Q	48	SER	2.9
1	O	201	GLU	2.9
11	K	182	GLU	2.9
3	Q	237	GLU	2.9
3	C	50	LEU	2.9
4	R	242	GLU	2.8
5	S	54	GLU	2.8
2	P	59	ASP	2.8
13	M	1	THR	2.8
7	U	242	GLN	2.8
6	T	181	GLU	2.8
3	Q	236	GLN	2.8
6	F	205	GLU	2.7
10	J	194	ASP	2.7
3	C	175	LYS	2.6
14	b	105	LYS	2.6
3	Q	60	SER	2.6
5	S	180	LYS	2.5
6	T	53	LYS	2.5
9	I	1	SER	2.5
3	Q	240	GLU	2.5
5	S	225	ASP	2.5
9	I	133	LYS	2.5
6	F	201	GLU	2.5
4	R	125	LEU	2.5
4	R	230	GLU	2.5
5	E	201	ARG	2.5
3	C	202	GLN	2.5
5	S	3	ASN	2.4
14	N	181	ALA	2.4
1	O	2	THR	2.4
6	T	230	ASP	2.4

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Mol	Chain	Res	Type	RSRZ
11	K	147	ASP	2.4
12	Z	210	ASP	2.4
11	K	212	GLY	2.4
14	b	104	ASP	2.4
2	B	242	GLY	2.4
1	O	52	SER	2.4
3	Q	55	THR	2.3
9	W	133	LYS	2.3
11	Y	106	ARG	2.3
11	Y	147	ASP	2.3
4	D	125	LEU	2.3
3	C	60	SER	2.3
12	Z	165	ASN	2.3
11	Y	183	ASP	2.3
2	B	218	GLY	2.3
5	S	233	ILE	2.3
11	K	183	ASP	2.2
3	Q	202	GLN	2.2
5	S	187	GLU	2.2
5	S	173	ARG	2.2
8	V	145	ASP	2.2
1	O	203	GLU	2.2
11	Y	202	GLU	2.2
5	S	194	GLU	2.2
9	I	131	GLU	2.2
5	E	233	ILE	2.2
3	Q	1	GLY	2.1
3	Q	175	LYS	2.1
3	Q	223	SER	2.1
14	N	104	ASP	2.1
1	A	249	ALA	2.1
6	F	243	ILE	2.1
12	Z	167	LYS	2.1
10	X	174	MET	2.1
2	B	203	SER	2.1
3	Q	187	GLU	2.1
11	Y	182	GLU	2.1
6	T	166	GLN	2.1
13	M	216	ASN	2.1
6	F	181	GLU	2.1
3	C	240	GLU	2.1
2	P	225	TYR	2.1

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Mol	Chain	Res	Type	RSRZ
7	G	68	ARG	2.1
4	R	239	GLU	2.1
5	S	51	ASN	2.1
3	C	225	GLU	2.0
6	F	215	CYS	2.0
10	J	174	MET	2.0
6	F	244	ASN	2.0
10	X	193	ASP	2.0
5	E	54	GLU	2.0
5	E	227	GLU	2.0
2	B	182	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.

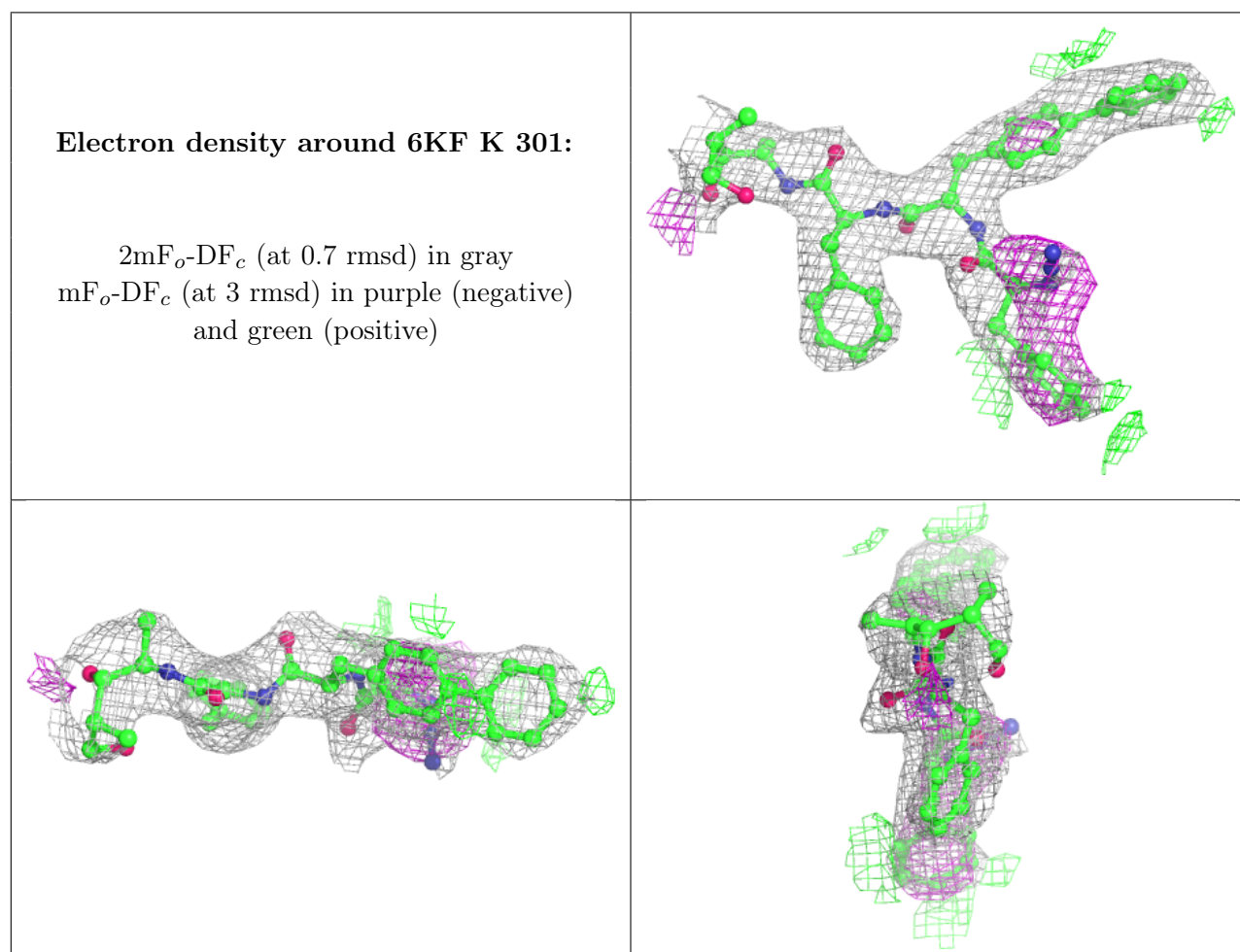
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
17	6KF	K	301	50/50	0.87	0.25	52,66,78,85	0
17	6KF	Y	301	50/50	0.87	0.26	54,68,80,83	0
15	MG	N	201	1/1	0.93	0.14	55,55,55,55	0
15	MG	K	302	1/1	0.94	0.10	55,55,55,55	0
18	MES	Y	302	12/12	0.94	0.32	80,85,89,95	0
15	MG	G	301	1/1	0.95	0.17	53,53,53,53	0
18	MES	K	303	12/12	0.96	0.33	80,86,88,99	0
15	MG	L	301	1/1	0.96	0.10	72,72,72,72	0
15	MG	J	201	1/1	0.97	0.12	30,30,30,30	0
16	CL	U	301	1/1	0.97	0.23	48,48,48,48	0
15	MG	I	301	1/1	0.98	0.14	50,50,50,50	0
16	CL	U	302	1/1	0.98	0.27	30,30,30,30	0

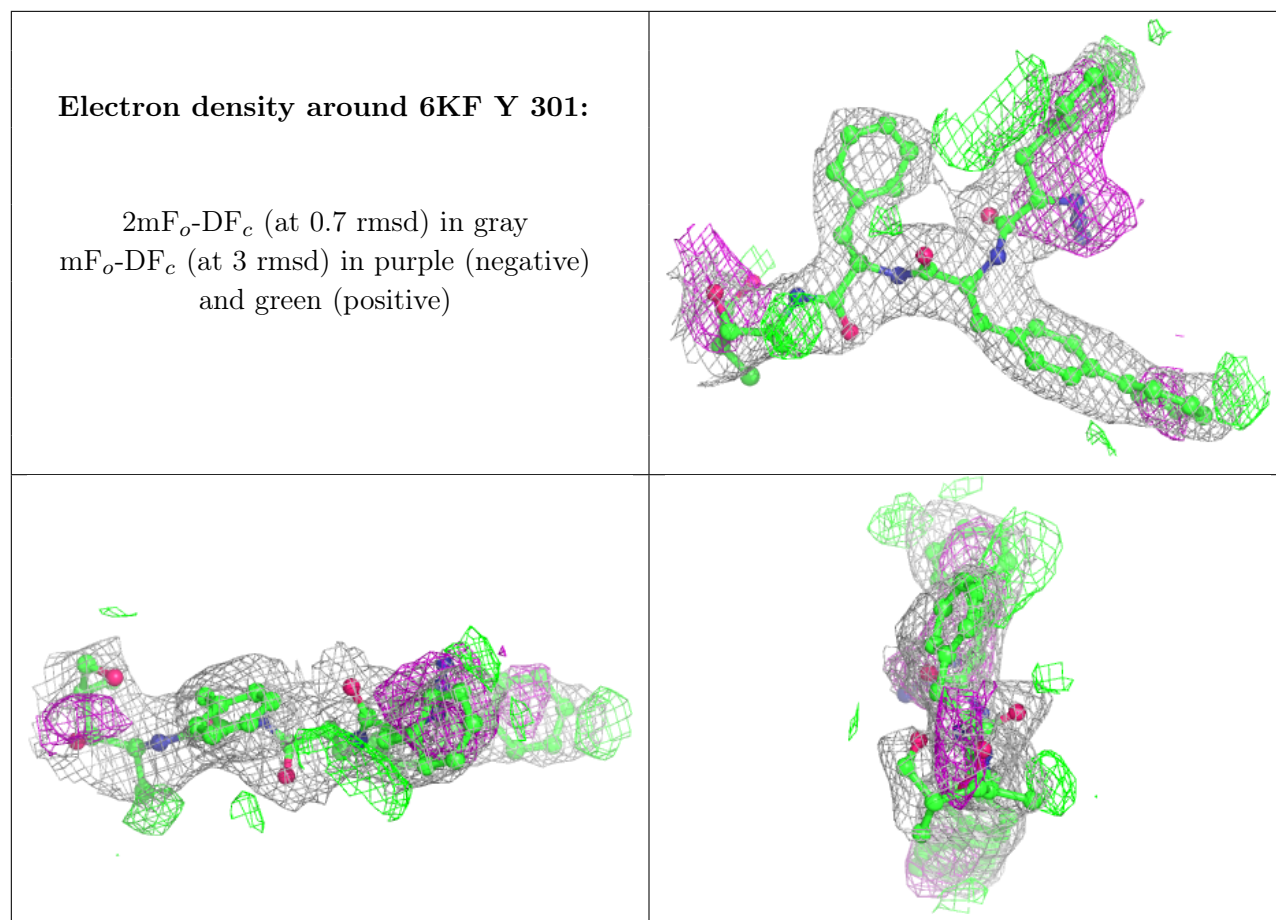
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
15	MG	I	302	1/1	0.99	0.07	50,50,50,50	0
15	MG	Z	301	1/1	0.99	0.12	54,54,54,54	0
16	CL	G	302	1/1	0.99	0.14	42,42,42,42	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.





6.5 Other polymers [i](#)

There are no such residues in this entry.