



wwPDB X-ray Structure Validation Summary Report ⓘ

Jan 4, 2024 – 07:51 am GMT

PDB ID : 5LAJ
Title : Ligand-induced Lys33-Thr1 crosslinking at the yeast proteasomal subunit beta5 by sulfonate esters
Authors : Groll, M.; Dubiella, C.; Cui, H.
Deposited on : 2016-06-14
Resolution : 2.90 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 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 : 2.36
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

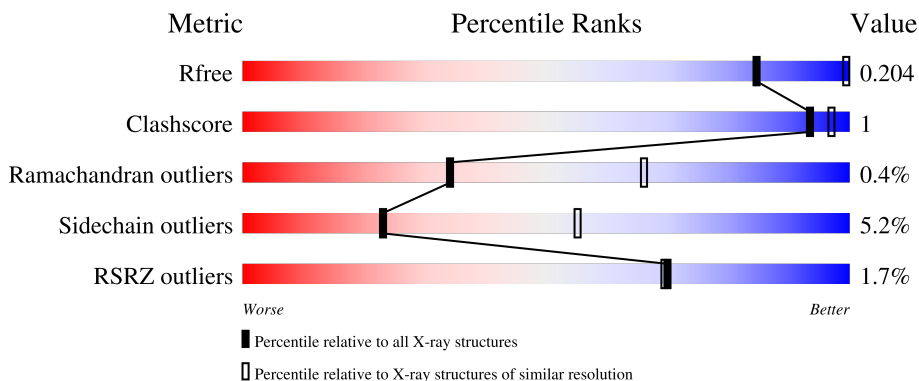
1 Overall quality at a glance

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	 2% 97%
1	O	250	 3% 97%
2	B	258	 3% 85% 9% 5%
2	P	258	 4% 87% 7% 5%
3	C	254	 4% 84% 9% 6%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	Q	254	 5% 83% 10% 6%
4	D	260	 83% 7% 10%
4	R	260	 83% 7% 10%
5	E	234	 88% 11%
5	S	234	 88% 11%
6	F	288	 77% 7% 16%
6	T	288	 77% 7% 16%
7	G	252	 89% 7%
7	U	252	 88% 8%
8	H	232	 3% 92% 6%
8	V	232	 3% 91% 6%
9	I	205	 93% 6%
9	W	205	 93% 6%
10	J	198	 89% 9%
10	X	198	 2% 88% 10%
11	K	212	 90% 9%
11	Y	212	 91% 8%
12	L	222	 94% 5%
12	Z	222	 94% 5%
13	M	246	 86% 6% 7%
13	a	246	 2% 89% 6%
14	N	196	 94% 5%
14	b	196	 96%

2 Entry composition

There are 16 unique types of molecules in this entry. The entry contains 49524 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 1915	C 1219	N 315	O 377	S 4	0	0	0
1	O	250	Total 1915	C 1219	N 315	O 377	S 4	0	0	0

- 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 1904	C 1201	N 321	O 379	S 3	0	0	0
2	P	244	Total 1904	C 1201	N 321	O 379	S 3	0	0	0

- 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 1881	C 1176	N 329	O 372	S 4	0	0	0
3	Q	240	Total 1881	C 1176	N 329	O 372	S 4	0	0	0

- 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 1813	C 1136	N 304	O 366	S 7	0	0	0
4	R	235	Total 1813	C 1136	N 304	O 366	S 7	0	0	0

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

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

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

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

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

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

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
8	H	226	Total	C	N	O	S	0	0	0
			1719	1082	298	332	7			
8	V	226	Total	C	N	O	S	0	0	0
			1719	1082	298	332	7			

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

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

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

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

Continued on next page...

Continued from previous page...

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
			1643	1045	280	311	7			
11	Y	212	Total	C	N	O	S	0	0	0
			1643	1045	280	311	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	228	Total	C	N	O	S	0	0	0
			1786	1131	305	343	7			
13	a	231	Total	C	N	O	S	0	0	0
			1806	1142	309	348	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	3	Total	Mg	0	0
			3	3		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	J	1	Total 1	Mg 1	0	0
15	K	2	Total 2	Mg 2	0	0
15	L	1	Total 1	Mg 1	0	0
15	N	2	Total 2	Mg 2	0	0
15	Z	1	Total 1	Mg 1	0	0

- Molecule 16 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	A	8	Total 8	O 8	0	0
16	B	7	Total 7	O 7	0	0
16	C	7	Total 7	O 7	0	0
16	D	7	Total 7	O 7	0	0
16	E	6	Total 6	O 6	0	0
16	F	6	Total 6	O 6	0	0
16	G	7	Total 7	O 7	0	0
16	H	14	Total 14	O 14	0	0
16	I	5	Total 5	O 5	0	0
16	J	10	Total 10	O 10	0	0
16	K	9	Total 9	O 9	0	0
16	L	11	Total 11	O 11	0	0
16	M	8	Total 8	O 8	0	0
16	N	6	Total 6	O 6	0	0

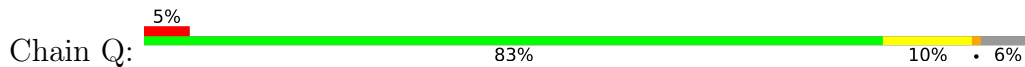
Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
16	O	2	Total O 2 2	0	0
16	P	9	Total O 9 9	0	0
16	Q	5	Total O 5 5	0	0
16	R	3	Total O 3 3	0	0
16	S	4	Total O 4 4	0	0
16	T	3	Total O 3 3	0	0
16	U	10	Total O 10 10	0	0
16	V	9	Total O 9 9	0	0
16	W	6	Total O 6 6	0	0
16	X	5	Total O 5 5	0	0
16	Y	9	Total O 9 9	0	0
16	Z	10	Total O 10 10	0	0
16	a	14	Total O 14 14	0	0
16	b	5	Total O 5 5	0	0

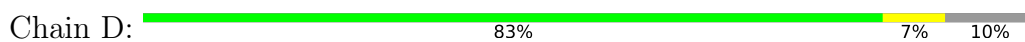
GLU
GLN
ASP
LYS
LYS
LYS
SER
ASN
HIS

• Molecule 3: Proteasome subunit alpha type-4



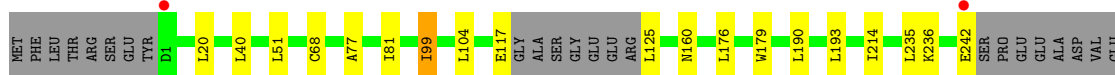
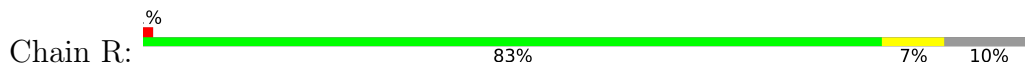
GLU
GLN
ASP
LYS
LYS
LYS
SER
ASN
HIS

• Molecule 4: Proteasome subunit alpha type-5



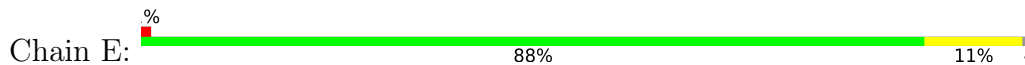
VAL
GLU
MET
SER

• Molecule 4: Proteasome subunit alpha type-5

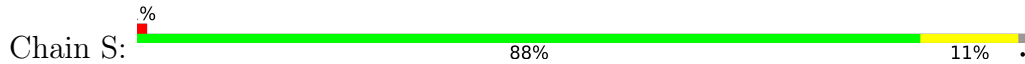


MET
SER

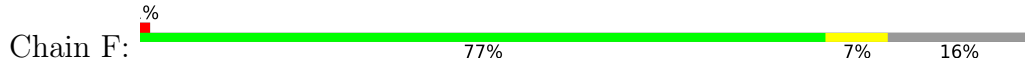
• Molecule 5: Proteasome subunit alpha type-6



• Molecule 5: Proteasome subunit alpha type-6



• Molecule 6: Probable proteasome subunit alpha type-7

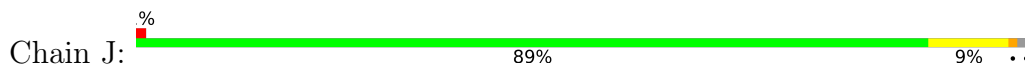




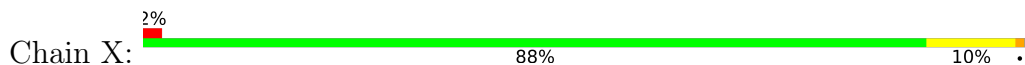
- Molecule 9: Proteasome subunit beta type-3



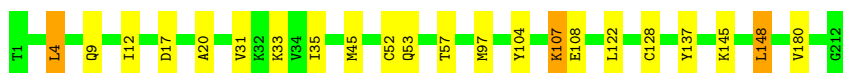
- Molecule 10: Proteasome subunit beta type-4



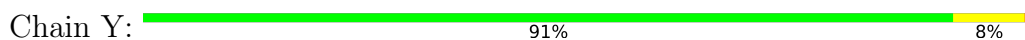
- Molecule 10: Proteasome subunit beta type-4



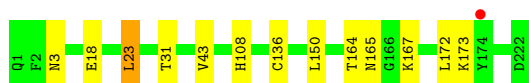
- Molecule 11: Proteasome subunit beta type-5



- Molecule 11: Proteasome subunit beta type-5



- Molecule 12: Proteasome subunit beta type-6




- Molecule 12: Proteasome subunit beta type-6

Chain Z:  94% 5%




• Molecule 13: Proteasome subunit beta type-7

Chain M:  86% 6% 7%

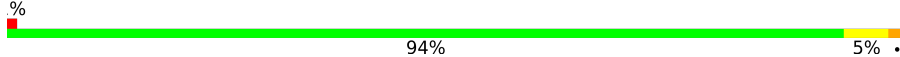


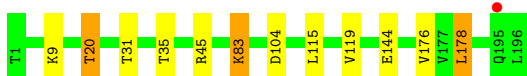
• Molecule 13: Proteasome subunit beta type-7

Chain a:  89% 6% 2%



• Molecule 14: Proteasome subunit beta type-1

Chain N:  94% 5%



• Molecule 14: Proteasome subunit beta type-1

Chain b:  96%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	137.25Å 300.53Å 146.42Å 90.00° 113.73° 90.00°	Depositor
Resolution (Å)	15.00 – 2.90 15.00 – 2.90	Depositor EDS
% Data completeness (in resolution range)	96.8 (15.00-2.90) 96.8 (15.00-2.90)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.69 (at 2.91Å)	Xtrriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.180 , 0.201 0.185 , 0.204	Depositor DCC
R_{free} test set	11489 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	64.6	Xtrriage
Anisotropy	0.056	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 50.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	49524	wwPDB-VP
Average B, all atoms (Å ²)	67.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.40% 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: MG

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	0.27	0/1952	0.48	0/2642
1	O	0.27	0/1952	0.48	0/2642
2	B	0.28	0/1934	0.51	0/2618
2	P	0.27	0/1934	0.52	0/2618
3	C	0.28	0/1910	0.53	0/2586
3	Q	0.28	0/1910	0.53	0/2586
4	D	0.27	0/1837	0.50	0/2475
4	R	0.27	0/1837	0.50	0/2475
5	E	0.27	0/1800	0.50	0/2433
5	S	0.27	0/1800	0.50	0/2433
6	F	0.28	0/1932	0.47	0/2609
6	T	0.28	0/1932	0.47	0/2609
7	G	0.28	0/1945	0.49	0/2634
7	U	0.28	0/1945	0.49	0/2634
8	H	0.26	0/1750	0.50	0/2373
8	V	0.25	0/1750	0.49	0/2373
9	I	0.27	0/1611	0.50	0/2174
9	W	0.27	0/1611	0.50	0/2174
10	J	0.27	0/1589	0.50	0/2142
10	X	0.27	0/1589	0.50	0/2142
11	K	0.26	0/1680	0.51	1/2272 (0.0%)
11	Y	0.26	0/1680	0.51	1/2272 (0.0%)
12	L	0.27	0/1795	0.49	0/2420
12	Z	0.27	0/1795	0.49	0/2420
13	M	0.27	0/1817	0.54	0/2465
13	a	0.27	0/1837	0.54	0/2492
14	N	0.26	0/1541	0.48	0/2087
14	b	0.26	0/1541	0.48	0/2087
All	All	0.27	0/50206	0.50	2/67887 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if

the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
2	B	0	1
2	P	0	1
All	All	0	2

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	Y	4	LEU	CA-CB-CG	5.20	127.27	115.30
11	K	4	LEU	CA-CB-CG	5.15	127.16	115.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	50	LYS	Peptide
2	P	50	LYS	Peptide

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	1	0
1	O	1915	0	1929	2	0
2	B	1904	0	1904	10	0
2	P	1904	0	1904	5	0
3	C	1881	0	1895	7	0
3	Q	1881	0	1895	7	0
4	D	1813	0	1797	4	0
4	R	1813	0	1797	3	0
5	E	1773	0	1775	6	0
5	S	1773	0	1775	6	0
6	F	1892	0	1883	4	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	T	1892	0	1883	4	0
7	G	1907	0	1901	3	0
7	U	1907	0	1901	5	0
8	H	1719	0	1719	2	0
8	V	1719	0	1719	3	0
9	I	1581	0	1574	7	0
9	W	1581	0	1574	6	0
10	J	1561	0	1569	7	0
10	X	1561	0	1569	8	0
11	K	1643	0	1591	9	0
11	Y	1643	0	1591	8	0
12	L	1757	0	1711	2	0
12	Z	1757	0	1711	2	0
13	M	1786	0	1790	5	0
13	a	1806	0	1808	0	0
14	N	1512	0	1481	6	0
14	b	1512	0	1481	0	0
15	G	1	0	0	0	0
15	I	3	0	0	0	0
15	J	1	0	0	0	0
15	K	2	0	0	0	0
15	L	1	0	0	0	0
15	N	2	0	0	0	0
15	Z	1	0	0	0	0
16	A	8	0	0	0	0
16	B	7	0	0	0	0
16	C	7	0	0	0	0
16	D	7	0	0	0	0
16	E	6	0	0	0	0
16	F	6	0	0	0	0
16	G	7	0	0	0	0
16	H	14	0	0	0	0
16	I	5	0	0	0	0
16	J	10	0	0	0	0
16	K	9	0	0	0	0
16	L	11	0	0	0	0
16	M	8	0	0	0	0
16	N	6	0	0	0	0
16	O	2	0	0	0	0
16	P	9	0	0	0	0
16	Q	5	0	0	0	0
16	R	3	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
16	S	4	0	0	0	0
16	T	3	0	0	0	0
16	U	10	0	0	0	0
16	V	9	0	0	0	0
16	W	6	0	0	0	0
16	X	5	0	0	0	0
16	Y	9	0	0	0	0
16	Z	10	0	0	0	0
16	a	14	0	0	0	0
16	b	5	0	0	0	0
All	All	49524	0	49056	119	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 1.

The worst 5 of 119 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)
3:C:51:LYS:O	3:C:52:LEU:HB2	1.99	0.61
10:X:126:VAL:HG12	10:X:128:LEU:HG	1.82	0.61
10:J:126:VAL:HG12	10:J:128:LEU:HG	1.82	0.61
3:Q:51:LYS:O	3:Q:52:LEU:HB2	1.99	0.61
2:B:12:PHE:H	3:C:17:GLN:HE22	1.49	0.61

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%)	240 (97%)	6 (2%)	2 (1%)	19 51
1	O	248/250 (99%)	240 (97%)	6 (2%)	2 (1%)	19 51

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	242/258 (94%)	234 (97%)	4 (2%)	4 (2%)	9	31
2	P	242/258 (94%)	233 (96%)	5 (2%)	4 (2%)	9	31
3	C	238/254 (94%)	231 (97%)	4 (2%)	3 (1%)	12	37
3	Q	238/254 (94%)	231 (97%)	4 (2%)	3 (1%)	12	37
4	D	231/260 (89%)	227 (98%)	4 (2%)	0	100	100
4	R	231/260 (89%)	227 (98%)	4 (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%)	236 (98%)	5 (2%)	0	100	100
6	T	241/288 (84%)	237 (98%)	4 (2%)	0	100	100
7	G	239/252 (95%)	236 (99%)	3 (1%)	0	100	100
7	U	239/252 (95%)	237 (99%)	2 (1%)	0	100	100
8	H	224/232 (97%)	217 (97%)	6 (3%)	1 (0%)	34	66
8	V	224/232 (97%)	217 (97%)	6 (3%)	1 (0%)	34	66
9	I	202/205 (98%)	196 (97%)	6 (3%)	0	100	100
9	W	202/205 (98%)	196 (97%)	6 (3%)	0	100	100
10	J	193/198 (98%)	188 (97%)	5 (3%)	0	100	100
10	X	193/198 (98%)	188 (97%)	5 (3%)	0	100	100
11	K	210/212 (99%)	203 (97%)	7 (3%)	0	100	100
11	Y	210/212 (99%)	203 (97%)	7 (3%)	0	100	100
12	L	220/222 (99%)	216 (98%)	3 (1%)	1 (0%)	29	61
12	Z	220/222 (99%)	216 (98%)	3 (1%)	1 (0%)	29	61
13	M	226/246 (92%)	219 (97%)	7 (3%)	0	100	100
13	a	229/246 (93%)	222 (97%)	5 (2%)	2 (1%)	17	48
14	N	194/196 (99%)	190 (98%)	4 (2%)	0	100	100
14	b	194/196 (99%)	190 (98%)	4 (2%)	0	100	100
All	All	6277/6614 (95%)	6118 (98%)	135 (2%)	24 (0%)	34	66

5 of 24 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	2	THR
2	B	218	GLY

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	B	222	GLY
3	C	202	GLN
1	O	2	THR

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%)	205 (98%)	4 (2%)	57	84
2	B	203/216 (94%)	193 (95%)	10 (5%)	25	57
2	P	203/216 (94%)	193 (95%)	10 (5%)	25	57
3	C	212/226 (94%)	195 (92%)	17 (8%)	12	33
3	Q	212/226 (94%)	195 (92%)	17 (8%)	12	33
4	D	194/215 (90%)	180 (93%)	14 (7%)	14	39
4	R	194/215 (90%)	180 (93%)	14 (7%)	14	39
5	E	190/193 (98%)	173 (91%)	17 (9%)	9	29
5	S	190/193 (98%)	174 (92%)	16 (8%)	11	31
6	F	201/239 (84%)	187 (93%)	14 (7%)	15	41
6	T	201/239 (84%)	187 (93%)	14 (7%)	15	41
7	G	206/210 (98%)	195 (95%)	11 (5%)	22	54
7	U	206/210 (98%)	195 (95%)	11 (5%)	22	54
8	H	185/190 (97%)	177 (96%)	8 (4%)	29	62
8	V	185/190 (97%)	177 (96%)	8 (4%)	29	62
9	I	172/173 (99%)	168 (98%)	4 (2%)	50	80
9	W	172/173 (99%)	168 (98%)	4 (2%)	50	80
10	J	173/175 (99%)	166 (96%)	7 (4%)	31	65
10	X	173/175 (99%)	166 (96%)	7 (4%)	31	65
11	K	168/169 (99%)	161 (96%)	7 (4%)	30	63

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
11	Y	168/169 (99%)	161 (96%)	7 (4%)	30	63
12	L	185/185 (100%)	176 (95%)	9 (5%)	25	57
12	Z	185/185 (100%)	176 (95%)	9 (5%)	25	57
13	M	195/208 (94%)	186 (95%)	9 (5%)	27	60
13	a	197/208 (95%)	188 (95%)	9 (5%)	27	60
14	N	162/162 (100%)	155 (96%)	7 (4%)	29	62
14	b	162/162 (100%)	155 (96%)	7 (4%)	29	62
All	All	5312/5540 (96%)	5037 (95%)	275 (5%)	23	55

5 of 275 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
8	V	196	ARG
10	X	35	THR
13	a	43	ILE
9	I	171	LEU
8	H	196	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 97 such sidechains are listed below:

Mol	Chain	Res	Type
3	Q	147	GLN
6	T	86	ASN
4	R	15	GLN
5	S	99	ASN
6	T	240	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](#)

Of 11 ligands modelled in this entry, 11 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 [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	5 (2%) 65 63	38, 54, 92, 131	0
1	O	250/250 (100%)	-0.36	7 (2%) 53 49	46, 64, 109, 144	0
2	B	244/258 (94%)	-0.35	8 (3%) 46 41	40, 61, 109, 177	0
2	P	244/258 (94%)	-0.22	10 (4%) 37 32	47, 65, 115, 178	0
3	C	240/254 (94%)	-0.18	11 (4%) 32 29	41, 66, 134, 164	0
3	Q	240/254 (94%)	-0.04	13 (5%) 25 22	46, 76, 156, 178	0
4	D	235/260 (90%)	-0.37	1 (0%) 92 93	48, 68, 104, 145	0
4	R	235/260 (90%)	-0.27	2 (0%) 84 84	50, 72, 112, 144	0
5	E	231/234 (98%)	-0.29	3 (1%) 77 77	52, 72, 109, 149	0
5	S	231/234 (98%)	-0.21	3 (1%) 77 77	53, 78, 122, 168	0
6	F	243/288 (84%)	-0.45	4 (1%) 72 71	42, 60, 107, 146	0
6	T	243/288 (84%)	-0.34	4 (1%) 72 71	44, 69, 128, 164	0
7	G	241/252 (95%)	-0.50	1 (0%) 92 93	41, 56, 93, 134	0
7	U	241/252 (95%)	-0.44	3 (1%) 79 79	43, 59, 97, 130	0
8	H	226/232 (97%)	-0.34	6 (2%) 54 50	43, 55, 94, 170	0
8	V	226/232 (97%)	-0.22	8 (3%) 44 38	45, 60, 99, 185	0
9	I	204/205 (99%)	-0.65	1 (0%) 91 91	38, 52, 82, 111	0
9	W	204/205 (99%)	-0.60	1 (0%) 91 91	40, 56, 91, 114	0
10	J	195/198 (98%)	-0.48	2 (1%) 82 82	39, 58, 86, 144	0
10	X	195/198 (98%)	-0.42	3 (1%) 73 73	39, 61, 90, 150	0
11	K	212/212 (100%)	-0.47	0 100 100	42, 58, 83, 100	0
11	Y	212/212 (100%)	-0.51	0 100 100	41, 56, 81, 104	0
12	L	222/222 (100%)	-0.53	1 (0%) 91 91	42, 58, 92, 141	0
12	Z	222/222 (100%)	-0.47	1 (0%) 91 91	34, 57, 90, 129	0

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
13	M	228/246 (92%)	-0.52	2 (0%) 84 84	37, 56, 85, 102	0
13	a	231/246 (93%)	-0.50	4 (1%) 70 69	38, 57, 86, 109	0
14	N	196/196 (100%)	-0.55	1 (0%) 91 91	38, 52, 85, 121	0
14	b	196/196 (100%)	-0.49	1 (0%) 91 91	40, 53, 85, 119	0
All	All	6337/6614 (95%)	-0.39	106 (1%) 70 69	34, 61, 106, 185	0

The worst 5 of 106 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
8	V	224	GLN	9.0
10	X	1	MET	8.7
3	Q	206	LYS	7.6
8	V	226	GLU	7.5
3	Q	49	THR	7.5

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
15	MG	I	302	1/1	0.71	0.22	110,110,110,110	0
15	MG	N	202	1/1	0.81	0.38	69,69,69,69	0
15	MG	K	302	1/1	0.86	0.48	70,70,70,70	0
15	MG	N	201	1/1	0.94	0.12	50,50,50,50	0
15	MG	Z	301	1/1	0.96	0.28	64,64,64,64	0
15	MG	J	201	1/1	0.97	0.21	50,50,50,50	0
15	MG	G	301	1/1	0.97	0.07	55,55,55,55	0

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
15	MG	L	301	1/1	0.97	0.07	67,67,67,67	0
15	MG	K	301	1/1	0.99	0.10	57,57,57,57	0
15	MG	I	303	1/1	0.99	0.06	46,46,46,46	0
15	MG	I	301	1/1	0.99	0.46	71,71,71,71	0

6.5 Other polymers [i](#)

There are no such residues in this entry.