



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 4, 2024 – 07:12 pm GMT

PDB ID : 4Y77
Title : Yeast 20S proteasome in complex with Ac-LAF-ep
Authors : Huber, E.M.; Groll, M.
Deposited on : 2015-02-13
Resolution : 2.50 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
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

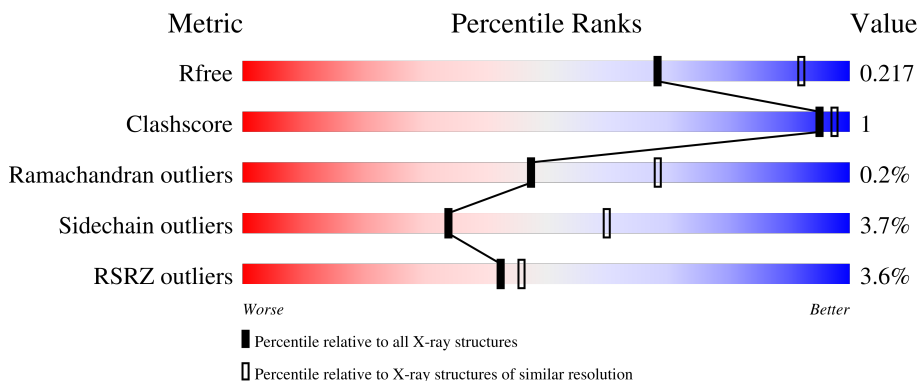
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments 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	5% (poor fit), 98% (0-1 outliers), 1% (2 outliers), 1% (3+ outliers)
1	O	250	4% (poor fit), 97% (0-1 outliers), 1% (2 outliers), 1% (3+ outliers)
2	B	258	6% (poor fit), 89% (0-1 outliers), 6% (2 outliers), 5% (3+ outliers)
2	P	258	6% (poor fit), 89% (0-1 outliers), 5% (2 outliers), 5% (3+ outliers)
3	C	254	8% (poor fit), 87% (0-1 outliers), 6% (2 outliers), 6% (3+ outliers)





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Mol	Chain	Length	Quality of chain
3	Q	254	12% 87% 6% • 6%
4	D	260	2% 86% • 10%
4	R	260	4% 85% 5% 10%
5	E	234	4% 92% 6% •
5	S	234	6% 91% 7% •
6	F	288	4% 80% 5% 16%
6	T	288	5% 80% 5% 16%
7	G	252	4% 90% 6% •
7	U	252	3% 90% 6% •
8	H	232	2% 91% • •
8	V	232	3% 91% • •
9	I	205	% 92% 7%
9	W	205	% 93% 5% •
10	J	198	2% 90% 7% • •
10	X	198	2% 91% 6% • •
11	K	212	95% 5%
11	Y	212	% 95% 5%
12	L	222	95% 5%
12	Z	222	% 95% 5%
13	M	246	2% 86% • • 9%
13	a	246	2% 88% • 9%
14	N	196	2% 95% 5%
14	b	196	% 98% •
15	c	5	80% 20%
15	d	5	80% 20%

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Mol	Chain	Length	Quality of chain
15	e	5	 80% 20%
15	f	5	 80% 20%
15	g	5	 80% 20%
15	h	5	 80% 20%

2 Entry composition

There are 19 unique types of molecules in this entry. The entry contains 50341 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
			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	224	Total	C	N	O	S	0	0	0
			1753	1108	300	338	7			
13	a	223	Total	C	N	O	S	0	0	0
			1745	1104	299	335	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 a protein called Ac-LAF-ep.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
15	c	5	Total	C	N	O	0	0	0
			31	23	3	5			
15	d	5	Total	C	N	O	0	0	0
			31	23	3	5			

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
15	e	5	Total 31	C 23	N 3	O 5	0	0	0
15	f	5	Total 31	C 23	N 3	O 5	0	0	0
15	g	5	Total 31	C 23	N 3	O 5	0	0	0
15	h	5	Total 31	C 23	N 3	O 5	0	0	0

- Molecule 16 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	G	1	Total 1	Mg 1	0	0
16	I	2	Total 2	Mg 2	0	0
16	K	1	Total 1	Mg 1	0	0
16	L	1	Total 1	Mg 1	0	0
16	N	1	Total 1	Mg 1	0	0
16	Z	1	Total 1	Mg 1	0	0

- Molecule 17 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
17	G	1	Total 1	Cl 1	0	0
17	U	1	Total 1	Cl 1	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	43	Total	O	0	0
			43	43		
19	B	33	Total	O	0	0
			33	33		
19	C	24	Total	O	0	0
			24	24		
19	D	24	Total	O	0	0
			24	24		
19	E	15	Total	O	0	0
			15	15		
19	F	32	Total	O	0	0
			32	32		
19	G	43	Total	O	0	0
			43	43		
19	H	40	Total	O	0	0
			40	40		
19	I	49	Total	O	0	0
			49	49		
19	J	42	Total	O	0	0
			42	42		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
19	K	57	Total O 57 57	0	0
19	L	42	Total O 42 42	0	0
19	M	30	Total O 30 30	0	0
19	N	29	Total O 29 29	0	0
19	O	26	Total O 26 26	0	0
19	P	23	Total O 23 23	0	0
19	Q	13	Total O 13 13	0	0
19	R	18	Total O 18 18	0	0
19	S	13	Total O 13 13	0	0
19	T	24	Total O 24 24	0	0
19	U	36	Total O 36 36	0	0
19	V	34	Total O 34 34	0	0
19	W	40	Total O 40 40	0	0
19	X	47	Total O 47 47	0	0
19	Y	50	Total O 50 50	0	0
19	Z	47	Total O 47 47	0	0
19	a	47	Total O 47 47	0	0
19	b	38	Total O 38 38	0	0
19	c	3	Total O 3 3	0	0
19	d	1	Total O 1 1	0	0
19	e	1	Total O 1 1	0	0

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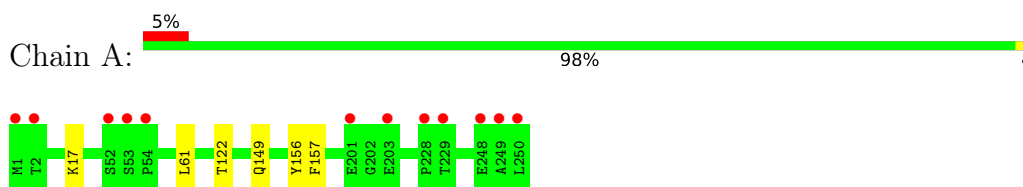
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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
19	f	1	Total O 1 1	0	0
19	g	2	Total O 2 2	0	0
19	h	2	Total O 2 2	0	0

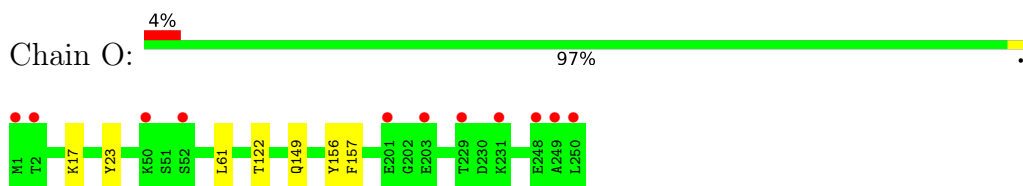
3 Residue-property plots [i](#)

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.

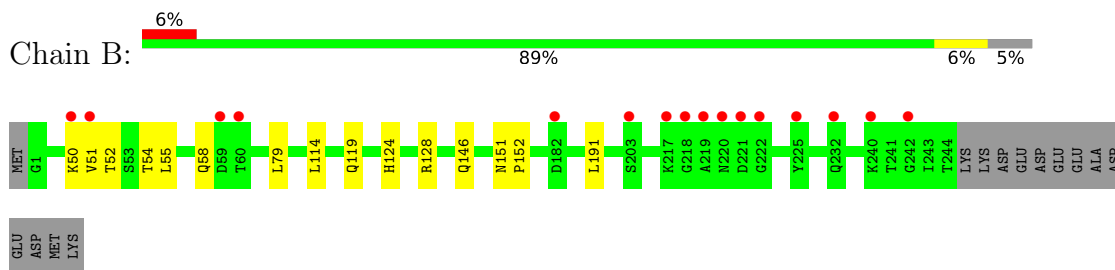
- Molecule 1: Proteasome subunit alpha type-2



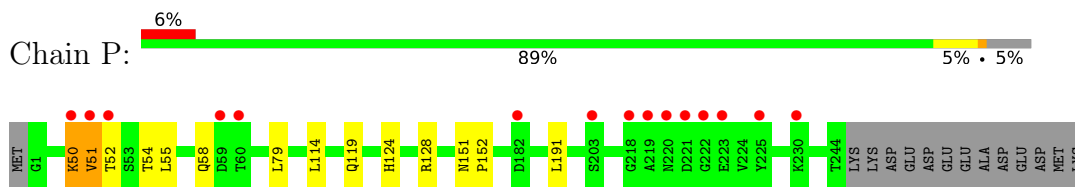
- Molecule 1: Proteasome subunit alpha type-2



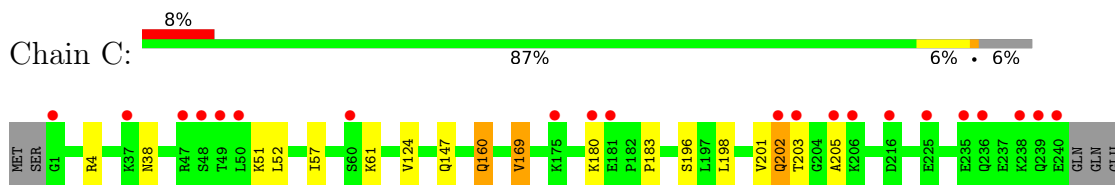
- Molecule 2: Proteasome subunit alpha type-3



- Molecule 2: Proteasome subunit alpha type-3




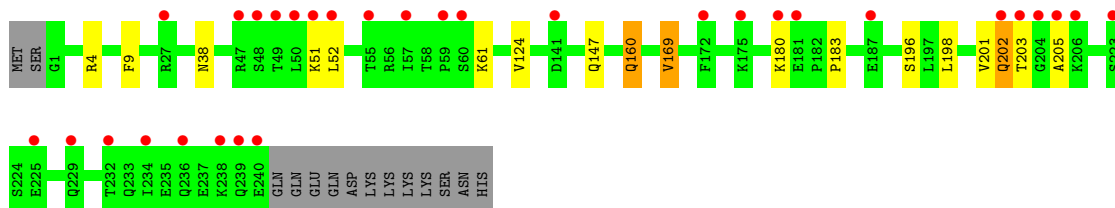
- Molecule 3: Proteasome subunit alpha type-4




GLN
ASP
LYS
LYS
LYS
LYS
SER
ASN
HIS

- Molecule 3: Proteasome subunit alpha type-4

Chain Q: 




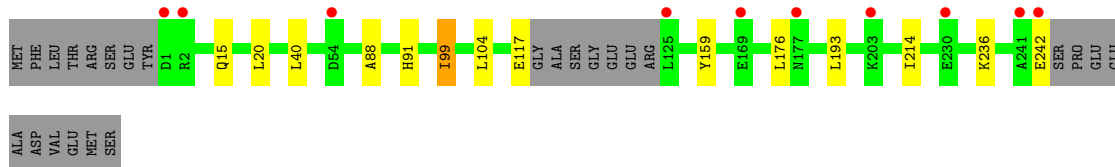
- Molecule 4: Proteasome subunit alpha type-5

Chain D: 

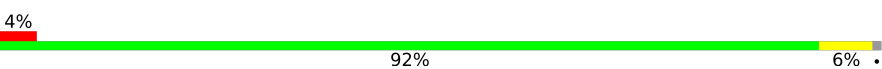


- Molecule 4: Proteasome subunit alpha type-5

Chain R: 

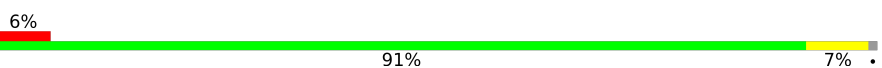


- Molecule 5: Proteasome subunit alpha type-6

Chain E: 




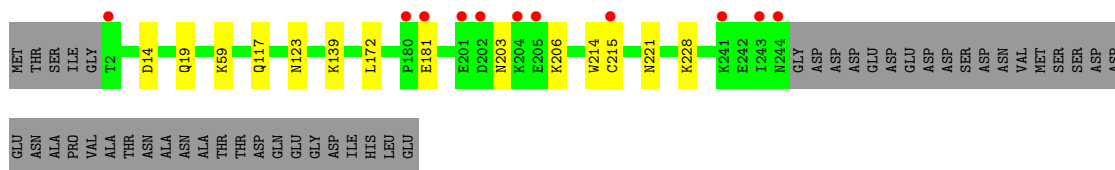
- Molecule 5: Proteasome subunit alpha type-6

Chain S: 

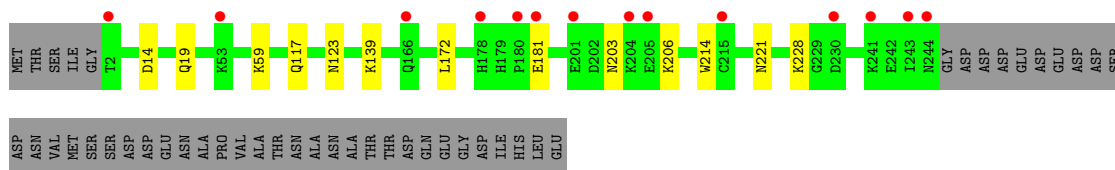
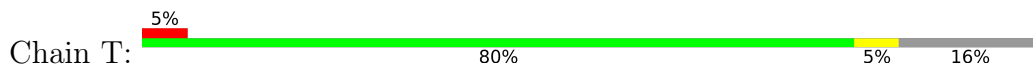


- Molecule 6: Probable proteasome subunit alpha type-7

Chain F: 



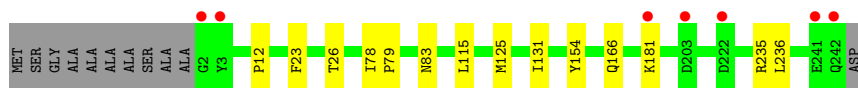
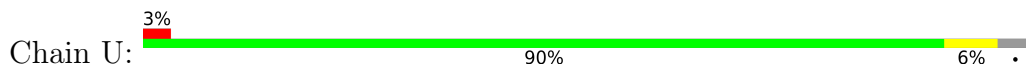
• Molecule 6: Probable proteasome subunit alpha type-7



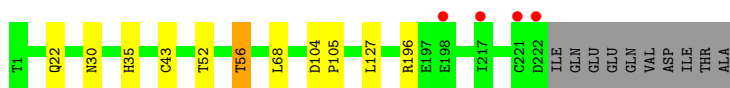
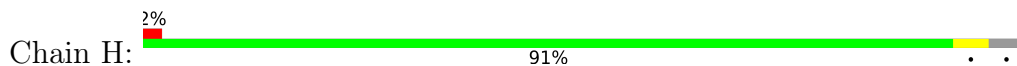
• Molecule 7: Proteasome subunit alpha type-1



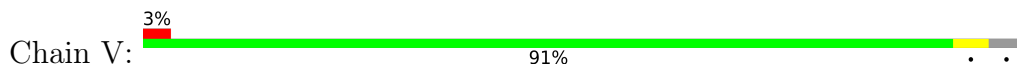
• Molecule 7: Proteasome subunit alpha type-1



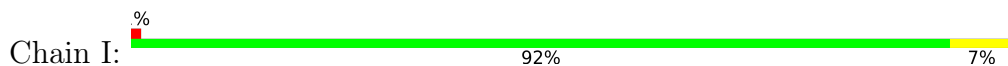
• Molecule 8: Proteasome subunit beta type-2



• Molecule 8: Proteasome subunit beta type-2



• Molecule 9: Proteasome subunit beta type-3

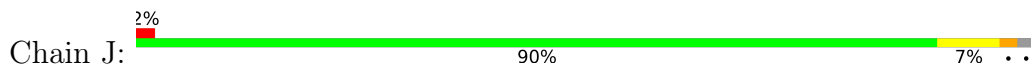




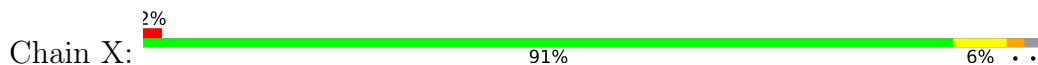
- Molecule 9: Proteasome subunit beta type-3



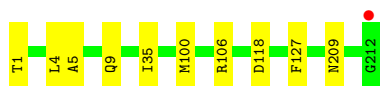
- Molecule 10: Proteasome subunit beta type-4



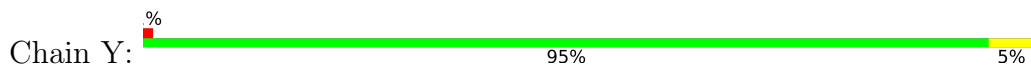
- Molecule 10: Proteasome subunit beta type-4



- Molecule 11: Proteasome subunit beta type-5



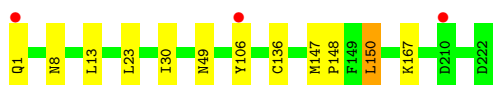
- Molecule 11: Proteasome subunit beta type-5



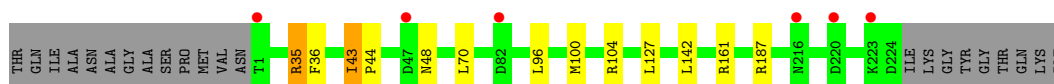
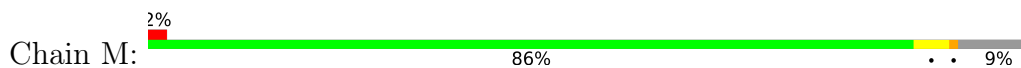
- Molecule 12: Proteasome subunit beta type-6



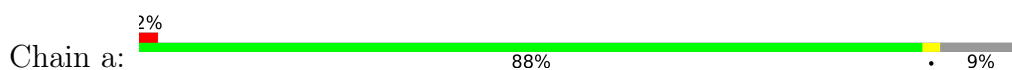
- Molecule 12: Proteasome subunit beta type-6



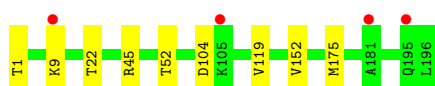
• Molecule 13: Proteasome subunit beta type-7



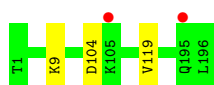
• Molecule 13: Proteasome subunit beta type-7



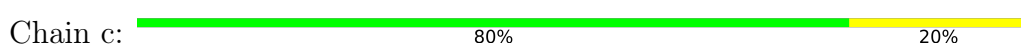
• Molecule 14: Proteasome subunit beta type-1



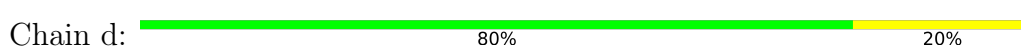
• Molecule 14: Proteasome subunit beta type-1




• Molecule 15: Ac-LAF-ep



• Molecule 15: Ac-LAF-ep




• Molecule 15: Ac-LAF-ep

Chain e:  80% 20%




● Molecule 15: Ac-LAF-ep

Chain f:  80% 20%




● Molecule 15: Ac-LAF-ep

Chain g:  80% 20%



● Molecule 15: Ac-LAF-ep

Chain h:  80% 20%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	135.45Å 300.30Å 145.22Å 90.00° 112.90° 90.00°	Depositor
Resolution (Å)	15.00 – 2.50 15.00 – 2.50	Depositor EDS
% Data completeness (in resolution range)	98.2 (15.00-2.50) 98.2 (15.00-2.50)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.47 (at 2.51Å)	Xtrriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.199 , 0.215 0.202 , 0.217	Depositor DCC
R_{free} test set	17933 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	51.2	Xtrriage
Anisotropy	0.030	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 35.5	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	50341	wwPDB-VP
Average B, all atoms (Å ²)	59.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.93% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

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

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	0.47	0/2642
2	B	0.27	0/1934	0.50	0/2618
2	P	0.27	0/1934	0.49	0/2618
3	C	0.28	0/1910	0.51	0/2586
3	Q	0.27	0/1910	0.51	0/2586
4	D	0.27	0/1837	0.48	0/2475
4	R	0.27	0/1837	0.48	0/2475
5	E	0.27	0/1800	0.48	0/2433
5	S	0.27	0/1800	0.48	0/2433
6	F	0.27	0/1932	0.46	0/2609
6	T	0.27	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	0.35	0/1715	0.51	0/2326
8	V	0.29	0/1726	0.49	0/2341
9	I	0.27	0/1611	0.48	0/2174
9	W	0.28	0/1611	0.49	0/2174
10	J	0.26	0/1589	0.49	0/2142
10	X	0.26	0/1589	0.49	0/2142
11	K	0.29	0/1681	0.52	1/2274 (0.0%)
11	Y	0.29	0/1681	0.52	1/2274 (0.0%)
12	L	0.27	0/1795	0.48	0/2420
12	Z	0.32	0/1795	0.48	0/2420
13	M	0.29	0/1783	0.52	0/2420
13	a	0.29	0/1775	0.52	0/2409
14	N	0.33	0/1541	0.51	1/2087 (0.0%)
14	b	0.33	0/1541	0.50	0/2087
15	c	0.78	0/13	1.33	0/17
15	d	1.14	0/13	1.11	0/17
15	e	1.17	0/13	1.37	0/17
15	f	0.66	0/13	1.26	0/17

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
15	g	1.15	0/13	1.19	0/17
15	h	0.98	0/13	1.12	0/17
All	All	0.29	0/50131	0.49	3/67786 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
11	Y	1	THR	N-CA-C	5.88	126.87	111.00
11	K	1	THR	N-CA-C	5.40	125.57	111.00
14	N	1	THR	N-CA-C	5.34	125.42	111.00

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	1915	0	1929	2	0
1	O	1915	0	1929	3	0
2	B	1904	0	1904	5	0
2	P	1904	0	1904	5	0
3	C	1881	0	1895	9	0
3	Q	1881	0	1895	9	0
4	D	1813	0	1797	3	0
4	R	1813	0	1797	5	0
5	E	1773	0	1775	4	0
5	S	1773	0	1775	6	0
6	F	1892	0	1883	3	0
6	T	1892	0	1883	2	0
7	G	1907	0	1901	4	0
7	U	1907	0	1901	4	0
8	H	1684	0	1685	3	0
8	V	1691	0	1692	4	0
9	I	1581	0	1574	7	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
9	W	1581	0	1574	9	0
10	J	1561	0	1569	10	0
10	X	1561	0	1569	8	0
11	K	1644	0	1592	5	0
11	Y	1644	0	1592	5	0
12	L	1757	0	1711	3	0
12	Z	1757	0	1711	3	0
13	M	1753	0	1754	4	0
13	a	1745	0	1750	0	0
14	N	1512	0	1478	2	0
14	b	1512	0	1478	0	0
15	c	31	0	34	0	0
15	d	31	0	33	0	0
15	e	31	0	34	0	0
15	f	31	0	34	0	0
15	g	31	0	33	0	0
15	h	31	0	34	0	0
16	G	1	0	0	0	0
16	I	2	0	0	0	0
16	K	1	0	0	0	0
16	L	1	0	0	0	0
16	N	1	0	0	0	0
16	Z	1	0	0	0	0
17	G	1	0	0	0	0
17	U	1	0	0	0	0
18	K	12	0	13	0	0
18	Y	12	0	13	0	0
19	A	43	0	0	0	0
19	B	33	0	0	0	0
19	C	24	0	0	0	0
19	D	24	0	0	0	0
19	E	15	0	0	0	0
19	F	32	0	0	1	0
19	G	43	0	0	0	0
19	H	40	0	0	0	0
19	I	49	0	0	0	0
19	J	42	0	0	1	0
19	K	57	0	0	0	0
19	L	42	0	0	0	0
19	M	30	0	0	0	0
19	N	29	0	0	0	0
19	O	26	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
19	P	23	0	0	0	0
19	Q	13	0	0	0	0
19	R	18	0	0	0	0
19	S	13	0	0	0	0
19	T	24	0	0	0	0
19	U	36	0	0	0	0
19	V	34	0	0	0	0
19	W	40	0	0	0	0
19	X	47	0	0	0	0
19	Y	50	0	0	0	0
19	Z	47	0	0	0	0
19	a	47	0	0	0	0
19	b	38	0	0	0	0
19	c	3	0	0	0	0
19	d	1	0	0	0	0
19	e	1	0	0	0	0
19	f	1	0	0	0	0
19	g	2	0	0	0	0
19	h	2	0	0	0	0
All	All	50341	0	49125	110	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.

All (110) 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:J:1:MET:O	10:J:2:ASP:HB2	1.85	0.75
10:X:1:MET:O	10:X:2:ASP:HB2	1.86	0.75
8:V:50:ALA:HB3	9:W:126:ILE:HD12	1.73	0.69
12:Z:13:LEU:HD13	12:Z:150:LEU:HD21	1.77	0.67
12:L:13:LEU:HD13	12:L:150:LEU:HD21	1.76	0.66
11:K:100:MET:HE3	11:K:127:PHE:HB2	1.82	0.61
4:R:99:ILE:HD11	4:R:104:LEU:HB2	1.83	0.61
8:V:50:ALA:CB	9:W:126:ILE:HD12	2.30	0.61
4:D:99:ILE:HD11	4:D:104:LEU:HB2	1.83	0.61
11:Y:5:ALA:HB3	11:Y:100:MET:HE2	1.83	0.60
11:Y:100:MET:HE3	11:Y:127:PHE:HB2	1.87	0.57
11:K:5:ALA:HB3	11:K:100:MET:HE2	1.88	0.56
13:M:35:ARG:HD2	13:M:36:PHE:CZ	2.41	0.56
7:G:23:PHE:O	7:G:26:THR:HB	2.07	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:U:23:PHE:O	7:U:26:THR:HB	2.07	0.55
3:Q:51:LYS:O	3:Q:52:LEU:HB2	2.07	0.55
3:C:51:LYS:O	3:C:52:LEU:HB2	2.07	0.54
3:C:160:GLN:HE21	3:C:160:GLN:HA	1.73	0.54
3:Q:160:GLN:HE21	3:Q:160:GLN:HA	1.73	0.53
11:Y:100:MET:CE	11:Y:127:PHE:HB2	2.38	0.52
11:K:100:MET:CE	11:K:127:PHE:HB2	2.39	0.52
10:X:16:ALA:HB2	10:X:161:LEU:HD21	1.93	0.51
8:H:35:HIS:CB	8:H:56:THR:HG21	2.41	0.50
10:J:16:ALA:HB2	10:J:161:LEU:HD21	1.93	0.50
8:V:50:ALA:HB3	9:W:126:ILE:CD1	2.40	0.50
3:C:201:VAL:O	3:C:202:GLN:CB	2.60	0.50
10:J:1:MET:O	10:J:2:ASP:CB	2.59	0.50
14:N:152:VAL:HA	14:N:175:MET:HE1	1.93	0.49
8:H:104:ASP:HB2	8:H:105:PRO:HD2	1.94	0.49
9:I:10:ILE:HG21	9:I:141:ALA:HB3	1.95	0.49
3:Q:201:VAL:O	3:Q:202:GLN:CB	2.60	0.49
3:C:201:VAL:HG13	3:C:202:GLN:N	2.28	0.49
9:W:36:SER:HB2	10:X:126:VAL:HG11	1.95	0.48
3:Q:201:VAL:HG13	3:Q:202:GLN:N	2.28	0.48
1:O:122:THR:HG22	2:P:128:ARG:HH21	1.79	0.48
10:J:93:ARG:NH1	19:J:201:HOH:O	2.43	0.47
10:J:174:MET:HA	10:X:174:MET:HA	1.96	0.47
8:V:104:ASP:HB2	8:V:105:PRO:HD2	1.95	0.47
9:W:20:VAL:HG13	9:W:118:PRO:HB3	1.96	0.47
9:I:20:VAL:HG13	9:I:118:PRO:HB3	1.96	0.47
12:L:8:ASN:HA	12:L:30:ILE:O	2.15	0.47
9:W:10:ILE:HG21	9:W:141:ALA:HB3	1.95	0.47
3:Q:201:VAL:O	3:Q:202:GLN:HB2	2.15	0.47
5:S:87:LEU:HD21	5:S:107:ALA:HB1	1.97	0.47
9:W:9:GLY:HA3	9:W:41:LYS:HE2	1.97	0.47
9:I:9:GLY:HA3	9:I:41:LYS:HE2	1.97	0.47
1:A:122:THR:HG22	2:B:128:ARG:HH21	1.80	0.46
10:J:67:TYR:CE1	10:J:75:LEU:HD13	2.50	0.46
10:X:1:MET:O	10:X:2:ASP:CB	2.59	0.46
9:I:98:ARG:O	9:I:126:ILE:HD11	2.15	0.46
5:E:9:THR:HG21	5:E:119:THR:HA	1.98	0.46
2:P:151:ASN:HB2	2:P:152:PRO:HD2	1.98	0.46
5:E:87:LEU:HD21	5:E:107:ALA:HB1	1.97	0.46
3:C:201:VAL:O	3:C:202:GLN:HB2	2.15	0.46
4:R:88:ALA:HA	4:R:99:ILE:HG21	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:151:ASN:HB2	2:B:152:PRO:HD2	1.98	0.46
9:I:101:PRO:HB3	9:I:126:ILE:HD12	1.98	0.46
5:S:12:PHE:H	6:T:19:GLN:HE22	1.63	0.46
4:D:88:ALA:HA	4:D:99:ILE:HG21	1.98	0.45
10:X:67:TYR:CE1	10:X:75:LEU:HD13	2.51	0.45
9:I:36:SER:HB2	10:J:126:VAL:HG11	1.99	0.45
6:F:215:CYS:HB3	19:F:305:HOH:O	2.17	0.45
12:Z:8:ASN:HA	12:Z:30:ILE:O	2.16	0.45
6:F:228:LYS:HE3	6:F:228:LYS:HB2	1.83	0.45
5:S:9:THR:HG21	5:S:119:THR:HA	1.98	0.45
4:D:91:HIS:HB3	4:D:99:ILE:CG2	2.46	0.45
4:R:91:HIS:HB3	4:R:99:ILE:CG2	2.47	0.45
4:R:159:TYR:CE2	5:S:56:SER:HB3	2.52	0.45
5:E:12:PHE:H	6:F:19:GLN:HE22	1.64	0.44
8:H:52:THR:O	8:H:56:THR:HB	2.17	0.44
2:P:124:HIS:HB3	3:Q:124:VAL:HG12	2.00	0.44
3:Q:169:VAL:HG23	3:Q:196:SER:HB2	1.99	0.44
9:W:20:VAL:HG23	9:W:189:ILE:HB	2.00	0.43
13:M:127:LEU:HG	13:M:142:LEU:HD12	2.00	0.43
2:B:151:ASN:HB2	2:B:152:PRO:CD	2.48	0.43
9:I:20:VAL:HG23	9:I:189:ILE:HB	2.00	0.43
3:C:169:VAL:HG23	3:C:196:SER:HB2	2.00	0.43
1:A:149:GLN:O	1:A:156:TYR:HA	2.19	0.43
5:E:175:LEU:HA	5:E:178:PHE:CE2	2.54	0.43
7:U:26:THR:HG21	7:U:131:ILE:HD12	2.01	0.43
12:Z:147:MET:N	12:Z:148:PRO:HD2	2.34	0.43
11:K:209:ASN:O	9:W:37:ASN:ND2	2.52	0.43
10:J:1:MET:HA	10:J:34:LYS:CE	2.49	0.42
10:X:1:MET:HA	10:X:34:LYS:CE	2.48	0.42
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
12:L:147:MET:N	12:L:148:PRO:HD2	2.34	0.42
7:U:78:ILE:N	7:U:79:PRO:CD	2.82	0.42
2:P:151:ASN:HB2	2:P:152:PRO:CD	2.49	0.42
7:G:26:THR:HG21	7:G:131:ILE:HD12	2.01	0.42
11:K:5:ALA:HB3	11:K:100:MET:CE	2.48	0.42
2:B:146:GLN:HG2	3:C:57:ILE:HG21	2.01	0.42
1:O:149:GLN:O	1:O:156:TYR:HA	2.20	0.41
3:Q:198:LEU:HA	3:Q:201:VAL:HG12	2.02	0.41
3:C:198:LEU:HA	3:C:201:VAL:HG12	2.02	0.41
13:M:96:LEU:O	13:M:100:MET:HG2	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
14:N:45:ARG:HD2	14:N:52:THR:HB	2.01	0.41
1:O:23:TYR:CD1	7:U:12:PRO:HA	2.56	0.41
2:B:124:HIS:HB3	3:C:124:VAL:HG12	2.01	0.41
11:Y:53:GLN:O	11:Y:57:THR:HG23	2.20	0.41
2:P:50:LYS:O	2:P:51:VAL:C	2.59	0.41
7:G:187:GLU:HG2	7:G:192:LYS:HB2	2.02	0.41
6:T:228:LYS:HB2	6:T:228:LYS:HE3	1.83	0.41
10:X:119:ILE:HG12	10:X:125:LYS:HG3	2.02	0.41
11:Y:5:ALA:HB3	11:Y:100:MET:CE	2.48	0.41
10:J:119:ILE:HG12	10:J:125:LYS:HG3	2.03	0.40
13:M:43:ILE:HA	13:M:44:PRO:HD3	1.98	0.40
3:Q:9:PHE:H	4:R:15:GLN:HE22	1.69	0.40
5:S:77:ALA:N	5:S:78:PRO:CD	2.85	0.40
10:J:1:MET:HA	10:J:34:LYS:HE3	2.04	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	54
2	P	242/258 (94%)	234 (97%)	7 (3%)	1 (0%)	34	54
3	C	238/254 (94%)	230 (97%)	5 (2%)	3 (1%)	12	21
3	Q	238/254 (94%)	230 (97%)	5 (2%)	3 (1%)	12	21
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

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
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%)	235 (98%)	4 (2%)	0	100	100
8	H	220/232 (95%)	213 (97%)	7 (3%)	0	100	100
8	V	221/232 (95%)	214 (97%)	7 (3%)	0	100	100
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%)	189 (98%)	3 (2%)	1 (0%)	29	48
10	X	193/198 (98%)	189 (98%)	3 (2%)	1 (0%)	29	48
11	K	210/212 (99%)	207 (99%)	3 (1%)	0	100	100
11	Y	210/212 (99%)	207 (99%)	3 (1%)	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	222/246 (90%)	216 (97%)	6 (3%)	0	100	100
13	a	221/246 (90%)	216 (98%)	5 (2%)	0	100	100
14	N	194/196 (99%)	189 (97%)	5 (3%)	0	100	100
14	b	194/196 (99%)	189 (97%)	5 (3%)	0	100	100
15	c	2/5 (40%)	2 (100%)	0	0	100	100
15	d	2/5 (40%)	2 (100%)	0	0	100	100
15	e	2/5 (40%)	2 (100%)	0	0	100	100
15	f	2/5 (40%)	2 (100%)	0	0	100	100
15	g	2/5 (40%)	2 (100%)	0	0	100	100
15	h	2/5 (40%)	2 (100%)	0	0	100	100
All	All	6270/6644 (94%)	6115 (98%)	145 (2%)	10 (0%)	47	68

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	51	VAL
3	C	202	GLN
10	J	2	ASP

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Mol	Chain	Res	Type
2	P	51	VAL
3	Q	202	GLN
10	X	2	ASP
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%)	206 (99%)	3 (1%)	67 86
1	O	209/209 (100%)	206 (99%)	3 (1%)	67 86
2	B	203/216 (94%)	194 (96%)	9 (4%)	28 52
2	P	203/216 (94%)	194 (96%)	9 (4%)	28 52
3	C	212/226 (94%)	204 (96%)	8 (4%)	33 58
3	Q	212/226 (94%)	204 (96%)	8 (4%)	33 58
4	D	194/215 (90%)	185 (95%)	9 (5%)	27 50
4	R	194/215 (90%)	185 (95%)	9 (5%)	27 50
5	E	190/193 (98%)	181 (95%)	9 (5%)	26 49
5	S	190/193 (98%)	181 (95%)	9 (5%)	26 49
6	F	201/239 (84%)	190 (94%)	11 (6%)	21 41
6	T	201/239 (84%)	190 (94%)	11 (6%)	21 41
7	G	206/210 (98%)	198 (96%)	8 (4%)	32 57
7	U	206/210 (98%)	198 (96%)	8 (4%)	32 57
8	H	181/190 (95%)	174 (96%)	7 (4%)	32 57
8	V	182/190 (96%)	175 (96%)	7 (4%)	33 58
9	I	172/173 (99%)	167 (97%)	5 (3%)	42 69
9	W	172/173 (99%)	166 (96%)	6 (4%)	36 62

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
10	J	173/175 (99%)	167 (96%)	6 (4%)	36	62
10	X	173/175 (99%)	167 (96%)	6 (4%)	36	62
11	K	169/169 (100%)	164 (97%)	5 (3%)	41	68
11	Y	169/169 (100%)	164 (97%)	5 (3%)	41	68
12	L	185/185 (100%)	178 (96%)	7 (4%)	33	58
12	Z	185/185 (100%)	178 (96%)	7 (4%)	33	58
13	M	192/208 (92%)	185 (96%)	7 (4%)	35	61
13	a	191/208 (92%)	185 (97%)	6 (3%)	40	67
14	N	162/162 (100%)	158 (98%)	4 (2%)	47	73
14	b	162/162 (100%)	159 (98%)	3 (2%)	57	80
15	c	1/1 (100%)	1 (100%)	0	100	100
15	d	1/1 (100%)	1 (100%)	0	100	100
15	e	1/1 (100%)	1 (100%)	0	100	100
15	f	1/1 (100%)	1 (100%)	0	100	100
15	g	1/1 (100%)	1 (100%)	0	100	100
15	h	1/1 (100%)	1 (100%)	0	100	100
All	All	5304/5546 (96%)	5109 (96%)	195 (4%)	34	60

All (195) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	17	LYS
1	A	61	LEU
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	119	GLN
2	B	191	LEU
3	C	4	ARG
3	C	38	ASN
3	C	61	LYS

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Mol	Chain	Res	Type
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	117	GLU
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
6	F	14	ASP
6	F	59	LYS
6	F	117	GLN
6	F	123	ASN
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	154	TYR
7	G	166	GLN
7	G	181	LYS
7	G	235	ARG
7	G	236	LEU

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Mol	Chain	Res	Type
8	H	22	GLN
8	H	30	ASN
8	H	43	CYS
8	H	56	THR
8	H	68	LEU
8	H	127	LEU
8	H	196	ARG
9	I	20	VAL
9	I	37	ASN
9	I	171	LEU
9	I	182	TRP
9	I	192	ASP
10	J	23	ARG
10	J	35	THR
10	J	75	LEU
10	J	78	GLN
10	J	144	LEU
10	J	174	MET
11	K	4	LEU
11	K	9	GLN
11	K	35	ILE
11	K	106	ARG
11	K	118	ASP
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	35	ARG
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	22	THR
14	N	104	ASP
14	N	119	VAL
1	O	17	LYS

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Mol	Chain	Res	Type
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	119	GLN
2	P	191	LEU
3	Q	4	ARG
3	Q	38	ASN
3	Q	61	LYS
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
4	R	99	ILE
4	R	117	GLU
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
6	T	14	ASP
6	T	59	LYS
6	T	117	GLN
6	T	123	ASN
6	T	139	LYS

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Mol	Chain	Res	Type
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	154	TYR
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	43	CYS
8	V	56	THR
8	V	68	LEU
8	V	127	LEU
8	V	196	ARG
9	W	20	VAL
9	W	37	ASN
9	W	126	ILE
9	W	171	LEU
9	W	182	TRP
9	W	192	ASP
10	X	23	ARG
10	X	35	THR
10	X	75	LEU
10	X	78	GLN
10	X	144	LEU
10	X	174	MET
11	Y	4	LEU
11	Y	9	GLN
11	Y	35	ILE
11	Y	106	ARG
11	Y	118	ASP
12	Z	1	GLN
12	Z	23	LEU
12	Z	49	ASN
12	Z	106	TYR

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Mol	Chain	Res	Type
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	104	ASP
14	b	119	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (106) 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	116	GLN
3	C	120	GLN
3	C	147	GLN
3	C	160	GLN
4	D	15	GLN
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	184	ASN
6	F	19	GLN
6	F	86	ASN
6	F	117	GLN
6	F	191	GLN

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Mol	Chain	Res	Type
6	F	240	GLN
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	30	ASN
8	H	57	GLN
8	H	66	HIS
8	H	189	ASN
10	J	55	GLN
11	K	85	ASN
11	K	176	ASN
12	L	3	ASN
12	L	49	ASN
12	L	70	ASN
12	L	158	ASN
13	M	2	GLN
13	M	18	ASN
13	M	48	ASN
13	M	102	GLN
13	M	108	ASN
13	M	194	ASN
13	M	213	GLN
14	N	53	GLN
14	N	161	GLN
1	O	94	HIS
2	P	20	GLN
2	P	95	GLN
2	P	119	GLN
2	P	123	GLN
2	P	176	GLN
3	Q	38	ASN
3	Q	77	ASN
3	Q	116	GLN
3	Q	120	GLN
3	Q	147	GLN
3	Q	160	GLN
4	R	15	GLN
4	R	146	GLN
4	R	225	ASN

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Mol	Chain	Res	Type
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	22	GLN
8	V	57	GLN
8	V	66	HIS
10	X	55	GLN
10	X	86	GLN
10	X	118	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	2	GLN
13	a	18	ASN
13	a	48	ASN
13	a	102	GLN
13	a	108	ASN
13	a	179	ASN
13	a	194	ASN
13	a	213	GLN
14	b	161	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

6 non-standard protein/DNA/RNA residues are modelled in this entry.

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
15	PHL	e	4	15,14	11,11,11	1.88	1 (9%)	11,13,13	1.49	2 (18%)
15	PHL	d	4	11,15	11,11,11	1.66	1 (9%)	11,13,13	1.66	3 (27%)
15	PHL	c	4	15,8	11,11,11	1.64	1 (9%)	11,13,13	1.47	3 (27%)
15	PHL	f	4	15,8	11,11,11	1.63	1 (9%)	11,13,13	1.42	2 (18%)
15	PHL	g	4	11,15	11,11,11	1.75	1 (9%)	11,13,13	1.47	3 (27%)
15	PHL	h	4	15,14	11,11,11	1.91	1 (9%)	11,13,13	1.88	2 (18%)

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
15	PHL	e	4	15,14	-	3/6/6/6	0/1/1/1
15	PHL	d	4	11,15	-	2/6/6/6	0/1/1/1
15	PHL	c	4	15,8	-	4/6/6/6	0/1/1/1
15	PHL	f	4	15,8	-	4/6/6/6	0/1/1/1
15	PHL	g	4	11,15	-	2/6/6/6	0/1/1/1
15	PHL	h	4	15,14	-	4/6/6/6	0/1/1/1

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
15	h	4	PHL	CB-CG	-5.85	1.37	1.51
15	e	4	PHL	CB-CG	-5.66	1.37	1.51
15	g	4	PHL	CB-CG	-5.35	1.38	1.51
15	c	4	PHL	CB-CG	-5.33	1.38	1.51
15	f	4	PHL	CB-CG	-5.23	1.38	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
15	d	4	PHL	CB-CG	-5.02	1.39	1.51

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
15	h	4	PHL	CB-CA-C	-3.69	105.55	112.21
15	h	4	PHL	CG-CB-CA	3.64	120.19	113.24
15	e	4	PHL	CB-CA-C	-3.33	106.19	112.21
15	d	4	PHL	CG-CB-CA	3.28	119.50	113.24
15	g	4	PHL	CB-CA-C	-3.06	106.68	112.21
15	d	4	PHL	CB-CA-C	-3.03	106.72	112.21
15	c	4	PHL	CB-CA-C	-3.01	106.77	112.21
15	f	4	PHL	CB-CA-C	-2.84	107.07	112.21
15	g	4	PHL	CG-CB-CA	2.35	117.72	113.24
15	f	4	PHL	O-C-CA	-2.25	102.61	111.52
15	c	4	PHL	O-C-CA	-2.13	103.09	111.52
15	c	4	PHL	CG-CB-CA	2.13	117.30	113.24
15	e	4	PHL	CG-CB-CA	2.12	117.28	113.24
15	g	4	PHL	O-C-CA	-2.11	103.17	111.52
15	d	4	PHL	O-C-CA	-2.10	103.20	111.52

There are no chirality outliers.

All (19) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
15	d	4	PHL	CA-CB-CG-CD1
15	g	4	PHL	CA-CB-CG-CD1
15	d	4	PHL	CA-CB-CG-CD2
15	g	4	PHL	CA-CB-CG-CD2
15	c	4	PHL	CA-CB-CG-CD2
15	c	4	PHL	CA-CB-CG-CD1
15	e	4	PHL	CA-CB-CG-CD2
15	f	4	PHL	N-CA-CB-CG
15	h	4	PHL	N-CA-CB-CG
15	f	4	PHL	CA-CB-CG-CD2
15	e	4	PHL	CA-CB-CG-CD1
15	f	4	PHL	CA-CB-CG-CD1
15	h	4	PHL	CA-CB-CG-CD1
15	h	4	PHL	CA-CB-CG-CD2
15	c	4	PHL	C-CA-CB-CG
15	f	4	PHL	C-CA-CB-CG
15	h	4	PHL	C-CA-CB-CG

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Mol	Chain	Res	Type	Atoms
15	c	4	PHL	N-CA-CB-CG
15	e	4	PHL	N-CA-CB-CG

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 11 ligands modelled in this entry, 9 are monoatomic - leaving 2 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	K	302	-	12,12,12	2.26	1 (8%)	14,16,16	1.27	2 (14%)
18	MES	Y	301	-	12,12,12	2.25	1 (8%)	14,16,16	1.29	2 (14%)

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	K	302	-	-	0/6/14/14	0/1/1/1
18	MES	Y	301	-	-	0/6/14/14	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
18	K	302	MES	C8-S	-7.58	1.66	1.77

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
18	Y	301	MES	C8-S	-7.56	1.66	1.77

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
18	K	302	MES	O3S-S-C8	3.06	110.72	105.77
18	Y	301	MES	O3S-S-C8	2.90	110.46	105.77
18	Y	301	MES	O2S-S-C8	2.74	110.21	106.92
18	K	302	MES	O2S-S-C8	2.38	109.78	106.92

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%)	-0.19	12 (4%) 30 32	35, 50, 89, 128	0
1	O	250/250 (100%)	-0.08	11 (4%) 34 37	41, 57, 102, 132	0
2	B	244/258 (94%)	0.00	16 (6%) 18 19	36, 54, 108, 166	0
2	P	244/258 (94%)	0.09	15 (6%) 21 22	40, 57, 110, 166	0
3	C	240/254 (94%)	0.10	21 (8%) 10 10	35, 57, 121, 159	0
3	Q	240/254 (94%)	0.47	31 (12%) 3 3	45, 75, 157, 213	0
4	D	235/260 (90%)	-0.11	5 (2%) 63 66	41, 61, 94, 141	0
4	R	235/260 (90%)	0.01	10 (4%) 35 38	46, 65, 103, 153	0
5	E	231/234 (98%)	-0.00	9 (3%) 39 42	44, 65, 99, 140	0
5	S	231/234 (98%)	0.19	13 (5%) 24 25	46, 74, 118, 155	0
6	F	243/288 (84%)	-0.15	11 (4%) 33 36	40, 60, 110, 142	0
6	T	243/288 (84%)	0.17	14 (5%) 23 24	40, 72, 125, 164	0
7	G	241/252 (95%)	-0.18	10 (4%) 37 40	36, 52, 96, 150	0
7	U	241/252 (95%)	-0.14	7 (2%) 51 55	39, 55, 89, 140	0
8	H	222/232 (95%)	-0.03	4 (1%) 68 71	36, 51, 78, 121	0
8	V	222/232 (95%)	-0.04	6 (2%) 54 58	39, 54, 78, 132	0
9	I	204/205 (99%)	-0.50	3 (1%) 73 75	31, 44, 73, 95	0
9	W	204/205 (99%)	-0.43	3 (1%) 73 75	32, 47, 77, 100	0
10	J	195/198 (98%)	-0.40	3 (1%) 73 75	32, 44, 70, 117	0
10	X	195/198 (98%)	-0.35	3 (1%) 73 75	35, 47, 73, 125	0
11	K	212/212 (100%)	-0.42	1 (0%) 91 91	31, 45, 69, 90	0
11	Y	212/212 (100%)	-0.37	3 (1%) 75 77	34, 47, 74, 99	0
12	L	222/222 (100%)	-0.38	0 100 100	33, 49, 75, 101	0
12	Z	222/222 (100%)	-0.31	3 (1%) 75 77	35, 49, 77, 105	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
13	M	224/246 (91%)	-0.36	6 (2%) 54 58	30, 49, 74, 94	0
13	a	223/246 (90%)	-0.37	4 (1%) 68 71	32, 49, 73, 93	0
14	N	196/196 (100%)	-0.38	4 (2%) 65 68	32, 45, 73, 100	0
14	b	196/196 (100%)	-0.38	2 (1%) 82 84	33, 46, 75, 96	0
15	c	2/5 (40%)	-0.06	0 100 100	67, 67, 67, 69	0
15	d	2/5 (40%)	-0.48	0 100 100	62, 62, 62, 71	0
15	e	2/5 (40%)	-0.62	0 100 100	53, 53, 53, 64	0
15	f	2/5 (40%)	0.87	0 100 100	70, 70, 70, 76	0
15	g	2/5 (40%)	0.17	0 100 100	62, 62, 62, 73	0
15	h	2/5 (40%)	-0.39	0 100 100	56, 56, 56, 68	0
All	All	6329/6644 (95%)	-0.15	230 (3%) 42 46	30, 54, 101, 213	0

All (230) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	P	219	ALA	12.3
8	V	222	ASP	11.1
8	H	222	ASP	9.6
2	P	222	GLY	9.6
2	B	219	ALA	9.3
2	B	220	ASN	9.1
8	H	221	CYS	8.5
2	P	220	ASN	8.3
3	Q	50	LEU	7.6
8	V	221	CYS	7.5
1	A	1	MET	7.5
2	P	51	VAL	7.2
1	O	1	MET	7.2
3	Q	49	THR	6.9
3	Q	48	SER	6.6
2	B	221	ASP	6.6
4	D	241	ALA	6.5
3	Q	239	GLN	6.2
5	E	202	ASP	6.0
2	P	221	ASP	6.0
3	Q	206	LYS	5.6
1	O	249	ALA	5.6
5	S	202	ASP	5.4

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Mol	Chain	Res	Type	RSRZ
4	D	242	GLU	5.4
3	Q	51	LYS	5.3
3	C	49	THR	5.1
10	X	1	MET	5.1
2	B	51	VAL	4.9
10	J	194	ASP	4.8
7	U	242	GLN	4.6
3	Q	240	GLU	4.6
3	Q	236	GLN	4.5
10	X	194	ASP	4.5
13	a	1	THR	4.5
6	F	244	ASN	4.4
5	S	233	ILE	4.4
4	R	241	ALA	4.3
1	A	249	ALA	4.3
3	C	206	LYS	4.3
7	U	222	ASP	4.2
5	E	233	ILE	4.1
2	P	52	THR	4.0
3	Q	238	LYS	4.0
6	F	243	ILE	4.0
3	C	202	GLN	4.0
3	Q	205	ALA	4.0
2	P	59	ASP	3.9
2	B	222	GLY	3.9
1	A	250	LEU	3.9
3	C	50	LEU	3.9
10	J	1	MET	3.9
2	P	218	GLY	3.8
11	Y	212	GLY	3.8
13	M	1	THR	3.8
7	G	3	TYR	3.7
2	B	242	GLY	3.7
3	C	239	GLN	3.6
6	T	243	ILE	3.6
10	X	193	ASP	3.6
3	C	238	LYS	3.5
7	G	2	GLY	3.5
1	O	201	GLU	3.5
1	O	52	SER	3.5
9	W	1	SER	3.5
3	Q	202	GLN	3.5

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Mol	Chain	Res	Type	RSRZ
2	P	50	LYS	3.5
7	G	242	GLN	3.5
3	Q	55	THR	3.4
6	T	166	GLN	3.4
7	G	222	ASP	3.4
6	T	181	GLU	3.4
3	C	48	SER	3.4
4	R	125	LEU	3.3
3	C	175	LYS	3.3
3	C	236	GLN	3.3
2	P	203	SER	3.3
7	U	181	LYS	3.3
5	S	180	LYS	3.3
1	O	250	LEU	3.3
2	P	225	TYR	3.3
9	W	133	LYS	3.3
3	Q	223	SER	3.3
13	M	47	ASP	3.3
3	Q	225	GLU	3.2
6	F	181	GLU	3.2
1	O	231	LYS	3.2
1	A	2	THR	3.2
3	Q	180	LYS	3.2
6	T	244	ASN	3.2
3	C	205	ALA	3.2
7	U	241	GLU	3.2
14	b	105	LYS	3.1
4	R	1	ASP	3.1
14	N	105	LYS	3.1
4	D	1	ASP	3.1
1	O	50	LYS	3.1
2	B	217	LYS	3.1
3	C	225	GLU	3.0
4	R	242	GLU	3.0
1	A	248	GLU	3.0
6	T	2	THR	3.0
9	I	1	SER	3.0
3	C	180	LYS	3.0
4	D	2	ARG	3.0
1	A	201	GLU	3.0
5	S	173	ARG	3.0
5	S	201	ARG	3.0

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Mol	Chain	Res	Type	RSRZ
5	S	3	ASN	3.0
7	U	3	TYR	3.0
6	F	215	CYS	3.0
7	G	241	GLU	3.0
7	G	240	ALA	3.0
5	E	123	GLY	3.0
3	C	181	GLU	2.9
6	F	201	GLU	2.9
5	E	201	ARG	2.9
3	C	235	GLU	2.9
6	F	205	GLU	2.9
14	b	195	GLN	2.9
3	Q	187	GLU	2.9
2	B	225	TYR	2.8
3	Q	229	GLN	2.8
6	T	205	GLU	2.8
2	B	218	GLY	2.8
7	U	2	GLY	2.8
7	G	179	LYS	2.8
13	M	216	ASN	2.8
11	Y	106	ARG	2.8
6	T	178	HIS	2.7
3	C	1	GLY	2.7
5	E	122	TYR	2.7
3	C	37	LYS	2.7
3	Q	141	ASP	2.7
7	G	68	ARG	2.6
2	B	60	THR	2.6
9	I	133	LYS	2.6
13	a	223	LYS	2.6
12	Z	1	GLN	2.6
3	Q	175	LYS	2.6
2	B	232	GLN	2.6
5	S	29	LYS	2.6
5	S	52	ALA	2.6
5	S	210	LEU	2.6
2	P	230	LYS	2.5
2	P	182	ASP	2.5
2	P	60	THR	2.5
4	D	125	LEU	2.5
6	T	215	CYS	2.5
6	T	201	GLU	2.5

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Mol	Chain	Res	Type	RSRZ
6	T	241	LYS	2.5
4	R	230	GLU	2.5
5	E	218	ASP	2.5
13	a	216	ASN	2.5
13	M	223	LYS	2.5
1	O	2	THR	2.5
11	K	212	GLY	2.5
3	Q	181	GLU	2.5
8	H	198	GLU	2.5
6	F	202	ASP	2.5
3	C	203	THR	2.5
2	B	203	SER	2.4
1	A	229	THR	2.4
3	C	60	SER	2.4
3	Q	60	SER	2.4
5	S	54	GLU	2.4
7	G	181	LYS	2.4
8	V	217	ILE	2.4
3	Q	172	PHE	2.4
2	B	182	ASP	2.4
14	N	9	LYS	2.4
4	R	54	ASP	2.4
10	J	193	ASP	2.4
7	G	188	GLU	2.3
6	F	2	THR	2.3
6	F	180	PRO	2.3
1	O	229	THR	2.3
3	Q	47	ARG	2.3
4	R	2	ARG	2.3
5	S	51	ASN	2.3
1	O	203	GLU	2.3
2	B	50	LYS	2.3
1	A	52	SER	2.2
3	Q	57	ILE	2.2
3	C	240	GLU	2.2
9	I	131	GLU	2.2
8	V	173	VAL	2.2
6	T	204	LYS	2.2
14	N	195	GLN	2.2
3	Q	204	GLY	2.2
3	Q	27	ARG	2.2
1	A	54	PRO	2.2

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Mol	Chain	Res	Type	RSRZ
3	Q	52	LEU	2.2
1	O	248	GLU	2.2
8	V	121	VAL	2.2
5	E	54	GLU	2.2
2	B	240	LYS	2.2
14	N	181	ALA	2.2
6	T	53	LYS	2.2
5	S	123	GLY	2.2
12	Z	106	TYR	2.2
4	R	203	LYS	2.2
9	W	192	ASP	2.2
2	B	59	ASP	2.1
3	C	216	ASP	2.1
13	a	220	ASP	2.1
3	Q	234	ILE	2.1
2	P	223	GLU	2.1
1	A	203	GLU	2.1
4	R	169	GLU	2.1
3	Q	59	PRO	2.1
6	F	241	LYS	2.1
8	V	9	ASN	2.1
5	E	180	LYS	2.1
6	T	230	ASP	2.1
1	A	228	PRO	2.1
6	F	204	LYS	2.1
8	H	217	ILE	2.1
4	R	177	ASN	2.1
5	E	3	ASN	2.1
6	T	180	PRO	2.0
3	Q	203	THR	2.0
7	U	203	ASP	2.0
13	M	220	ASP	2.0
3	Q	232	THR	2.0
11	Y	1	THR	2.0
1	A	53	SER	2.0
3	C	47	ARG	2.0
5	S	163	ARG	2.0
12	Z	210	ASP	2.0
13	M	82	ASP	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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	PHL	c	4	11/11	0.90	0.17	72,77,80,80	0
15	PHL	f	4	11/11	0.90	0.19	73,79,82,82	0
15	PHL	e	4	11/11	0.95	0.16	54,57,60,60	0
15	PHL	g	4	11/11	0.95	0.20	64,68,73,75	0
15	PHL	d	4	11/11	0.96	0.22	60,63,73,73	0
15	PHL	h	4	11/11	0.97	0.17	57,59,64,64	0

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
16	MG	Z	301	1/1	0.92	0.42	65,65,65,65	0
18	MES	Y	301	12/12	0.92	0.18	50,80,84,86	0
18	MES	K	302	12/12	0.93	0.20	48,80,87,89	0
16	MG	I	301	1/1	0.94	0.30	61,61,61,61	0
16	MG	K	301	1/1	0.95	0.08	42,42,42,42	0
16	MG	N	201	1/1	0.96	0.07	41,41,41,41	0
16	MG	G	301	1/1	0.97	0.04	44,44,44,44	0
17	CL	G	302	1/1	0.98	0.15	30,30,30,30	0
17	CL	U	301	1/1	0.98	0.17	30,30,30,30	0
16	MG	I	302	1/1	0.98	0.05	43,43,43,43	0
16	MG	L	301	1/1	0.98	0.04	49,49,49,49	0

6.5 Other polymers [i](#)

There are no such residues in this entry.