



wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 31, 2017 – 04:31 AM EDT

PDB ID : 3MG7
Title : Structure of yeast 20S open-gate proteasome with Compound 8
Authors : Sintchak, M.D.
Deposited on : unknown
Resolution : 2.78 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

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity	:	4.02b-467
Mogul	:	1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix)	:	1.9-1692
EDS	:	rb-20030345
Percentile statistics	:	20161228.v01 (using entries in the PDB archive December 28th 2016)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	rb-20030345

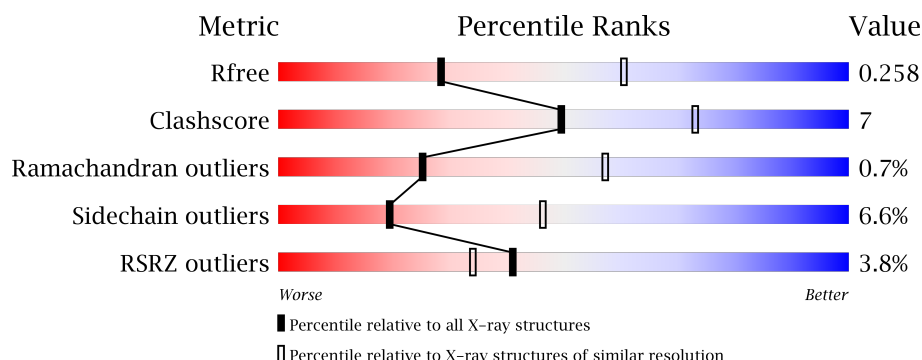
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.78 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.



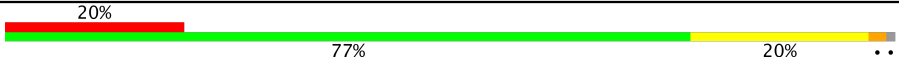
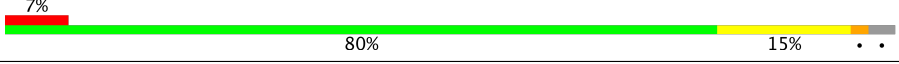



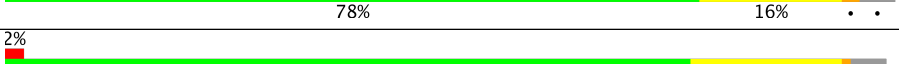
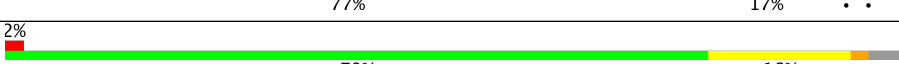
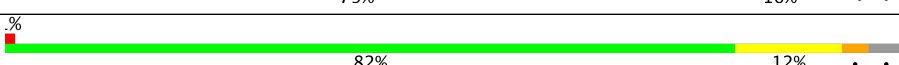
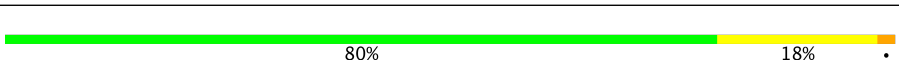
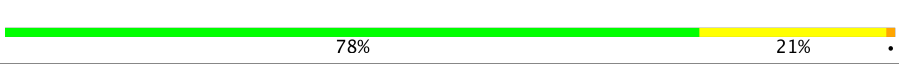
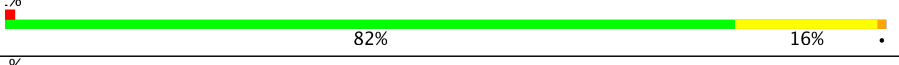
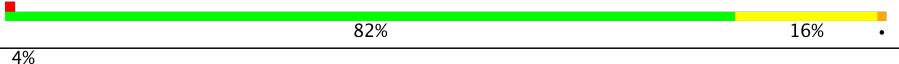
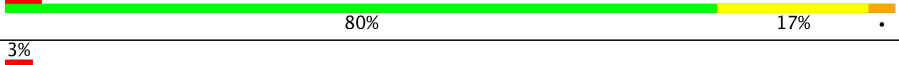

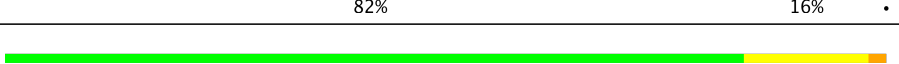






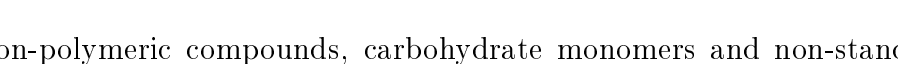

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	100719	3276 (2.80-2.76)
Clashscore	112137	3771 (2.80-2.76)
Ramachandran outliers	110173	3707 (2.80-2.76)
Sidechain outliers	110143	3709 (2.80-2.76)
RSRZ outliers	101464	3307 (2.80-2.76)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	250	
1	O	250	
2	B	245	
2	P	245	
3	C	243	

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Mol	Chain	Length	Quality of chain
3	Q	243	
4	D	250	
4	R	250	
5	E	234	
5	S	234	
6	F	248	
6	T	248	
7	G	252	
7	U	252	
8	H	222	
8	V	222	
9	I	205	
9	W	205	
10	J	198	
10	X	198	
11	K	212	
11	Y	212	
12	L	241	
12	Z	241	
13	1	266	
13	M	266	
14	2	196	
14	N	196	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
15	MG	F	242	-	-	-	X
15	MG	F	243	-	-	-	X
15	MG	I	196	-	-	-	X
15	MG	K	212	-	-	-	X
15	MG	L	195	-	-	-	X
17	MES	K	214	-	-	-	X

2 Entry composition

There are 18 unique types of molecules in this entry. The entry contains 49424 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 component Y7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
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 component Y13.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	235	Total	C	N	O	S	0	0	0
			1829	1158	303	365	3			
2	P	235	Total	C	N	O	S	0	0	0
			1829	1158	303	365	3			

- Molecule 3 is a protein called Proteasome component PRE6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	241	Total	C	N	O	S	0	0	0
			1891	1181	331	375	4			
3	Q	241	Total	C	N	O	S	0	0	0
			1891	1181	331	375	4			

- Molecule 4 is a protein called Proteasome component PUP2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	242	Total	C	N	O	S	0	0	0
			1862	1162	314	379	7			
4	R	242	Total	C	N	O	S	0	0	0
			1862	1162	314	379	7			

- Molecule 5 is a protein called Proteasome component PRE5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	E	233	Total	C	N	O	S	0	0	0
			1795	1129	312	350	4			
5	S	233	Total	C	N	O	S	0	0	0
			1795	1129	312	350	4			

- Molecule 6 is a protein called Proteasome component C1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	F	237	Total	C	N	O	S	0	0	0
			1848	1175	323	346	4			
6	T	237	Total	C	N	O	S	0	0	0
			1848	1175	323	346	4			

- Molecule 7 is a protein called Proteasome component C7-alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
7	G	243	Total	C	N	O	S	0	0	0
			1921	1221	322	370	8			
7	U	243	Total	C	N	O	S	0	0	0
			1921	1221	322	370	8			

- Molecule 8 is a protein called Proteasome component PUP1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
8	H	222	Total	C	N	O	S	0	0	0
			1685	1061	293	324	7			
8	V	222	Total	C	N	O	S	0	0	0
			1685	1061	293	324	7			

- Molecule 9 is a protein called Proteasome component PUP3.

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 component C11.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	J	198	Total	C	N	O	S	0	0	0
			1585	1005	269	305	6			

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	X	198	Total	C	N	O	S	0	0	0
			1585	1005	269	305	6			

- Molecule 11 is a protein called Proteasome component PRE2.

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 component C5.

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 component PRE4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
13	M	233	Total	C	N	O	S	0	0	0
			1824	1154	312	351	7			
13	1	233	Total	C	N	O	S	0	0	0
			1824	1154	312	351	7			

- Molecule 14 is a protein called Proteasome component PRE3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
14	N	196	Total	C	N	O	S	0	0	0
			1512	955	250	300	7			
14	2	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).

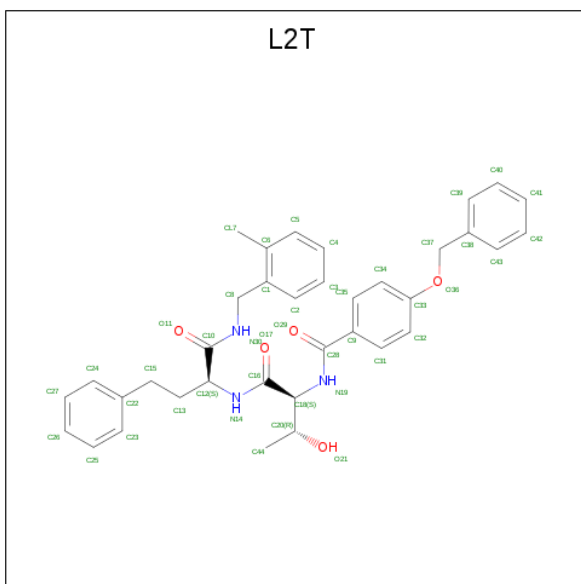
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	G	1	Total	Mg	0	0
			1	1		
15	K	1	Total	Mg	0	0
			1	1		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	H	1	Total	Mg	0	0
			1	1		
15	I	2	Total	Mg	0	0
			2	2		
15	N	1	Total	Mg	0	0
			1	1		
15	L	2	Total	Mg	0	0
			2	2		
15	F	2	Total	Mg	0	0
			2	2		

- Molecule 16 is 4-(benzyloxy)-N-[(1S,2R)-2-hydroxy-1-({(1S)-1-[(2-methylbenzyl)carbamoyl]-3-phenylpropyl}carbamoyl)propyl]benzamide (three-letter code: L2T) (formula: $C_{36}H_{39}N_3O_5$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
16	K	1	Total	C	N	O	0	0
			44	36	3	5		
16	Y	1	Total	C	N	O	0	0
			44	36	3	5		

- Molecule 17 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (three-letter code: MES) (formula: $C_6H_{13}NO_4S$).



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

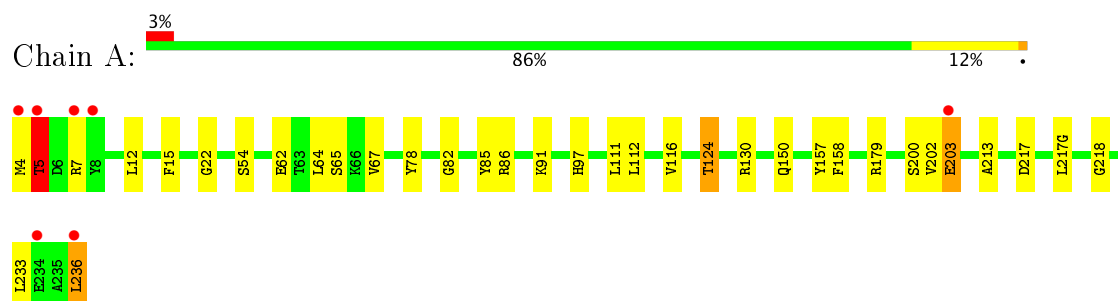
- Molecule 18 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
18	L	2	Total	O	0	0
			2	2		
18	Z	2	Total	O	0	0
			2	2		

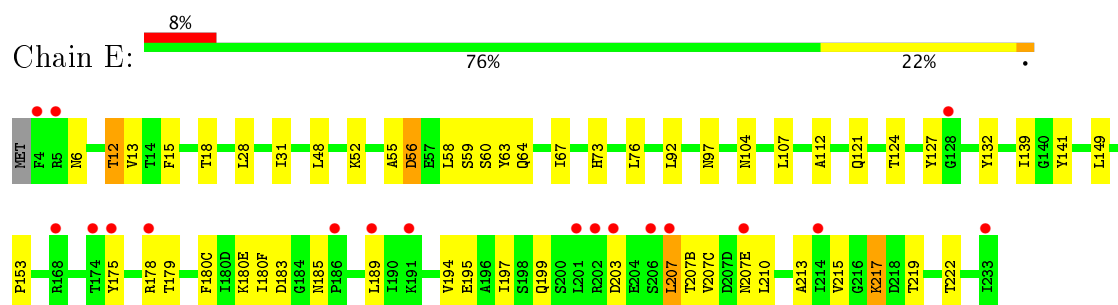
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

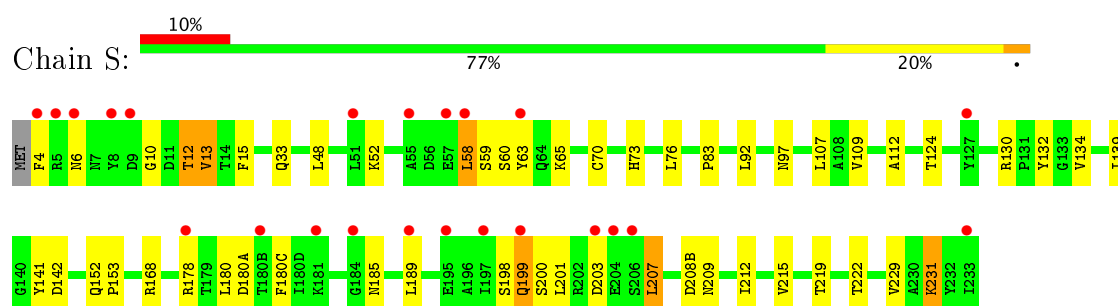
• Molecule 1: Proteasome component Y7



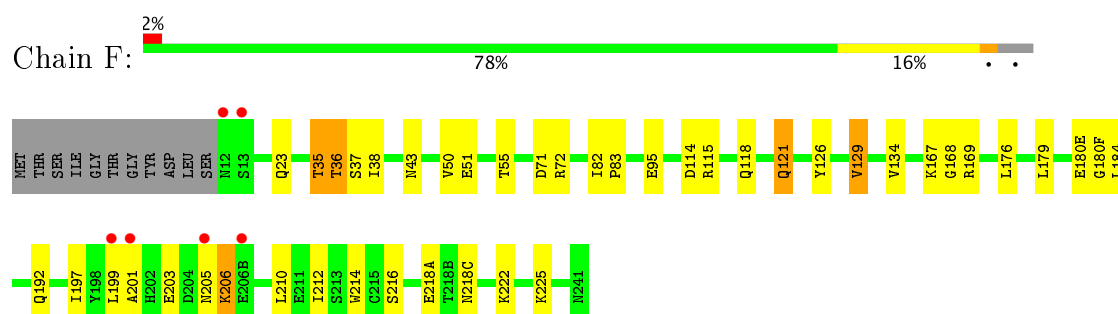
- Molecule 5: Proteasome component PRE5



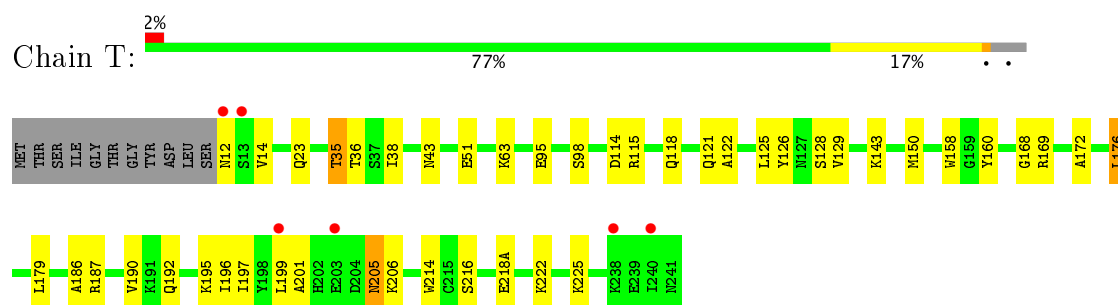
- Molecule 5: Proteasome component PRE5



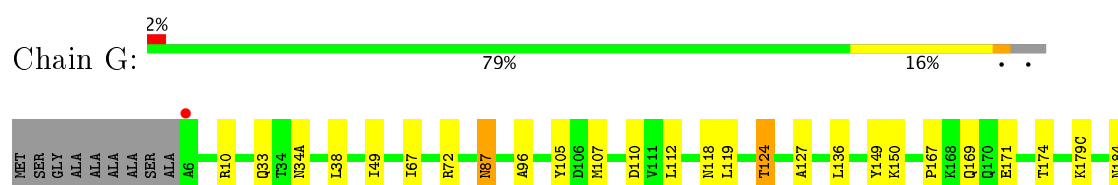
- Molecule 6: Proteasome component C1

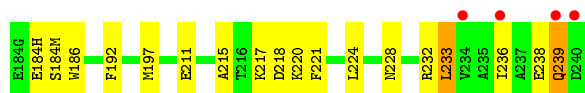


- Molecule 6: Proteasome component C1

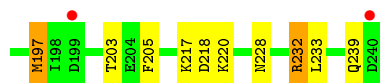
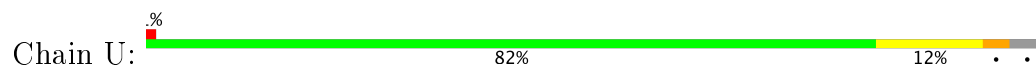


- Molecule 7: Proteasome component C7-alpha

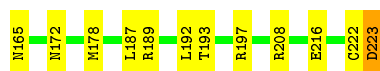
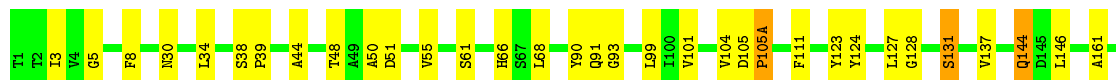




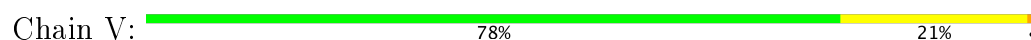
- Molecule 7: Proteasome component C7-alpha



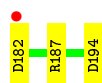
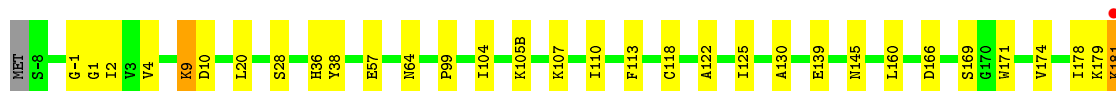
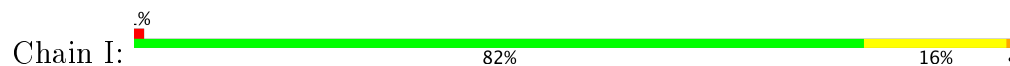
- Molecule 8: Proteasome component PUP1



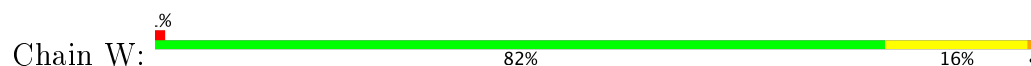
- Molecule 8: Proteasome component PUP1

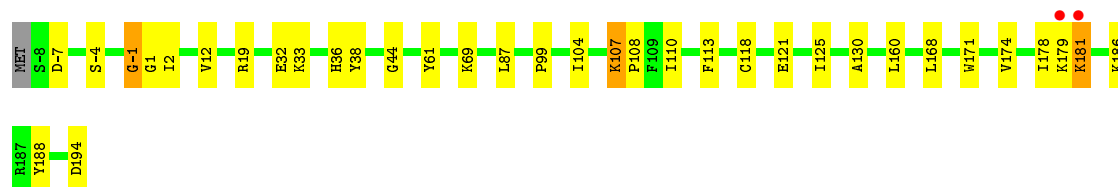


- Molecule 9: Proteasome component PUP3

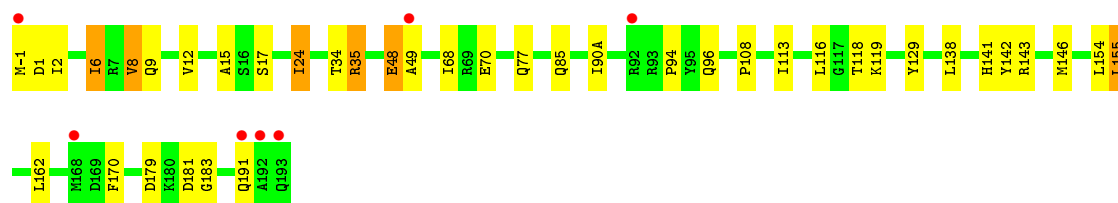
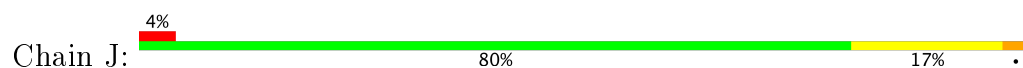


- Molecule 9: Proteasome component PUP3

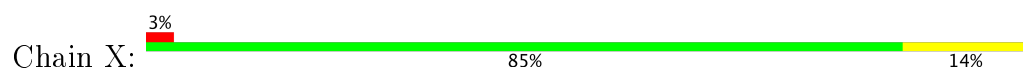




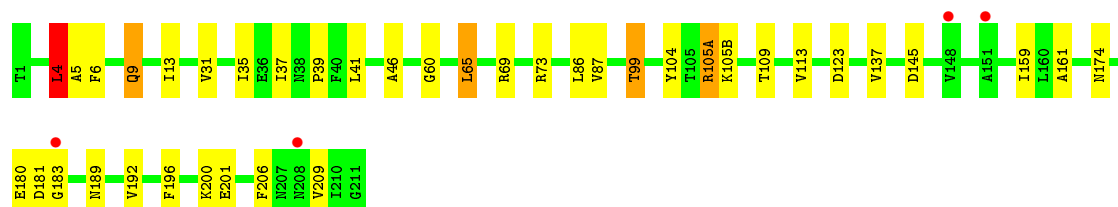
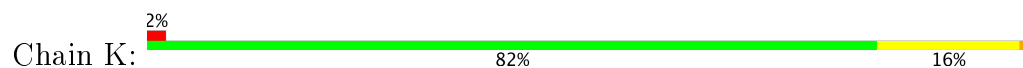
- Molecule 10: Proteasome component C11



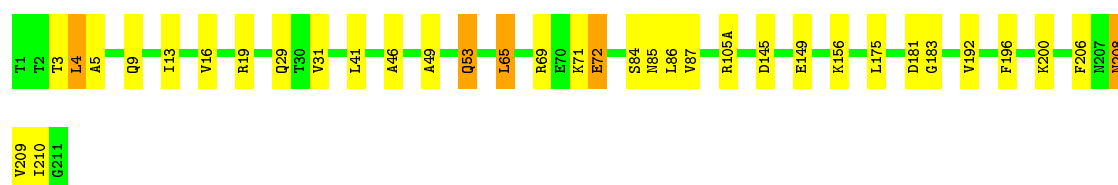
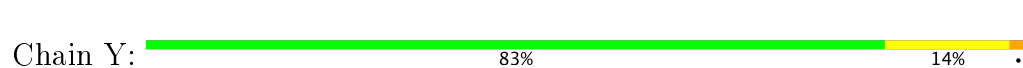
- Molecule 10: Proteasome component C11



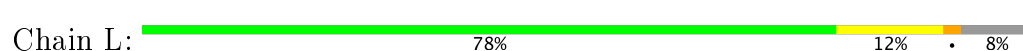
- Molecule 11: Proteasome component PRE2

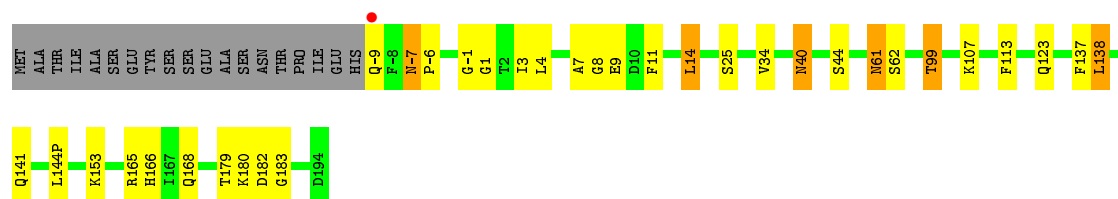


- Molecule 11: Proteasome component PRE2

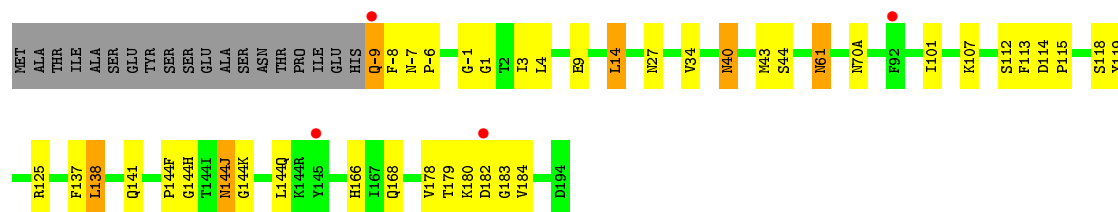
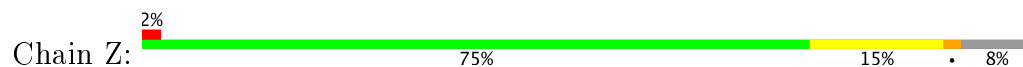


- Molecule 12: Proteasome component C5

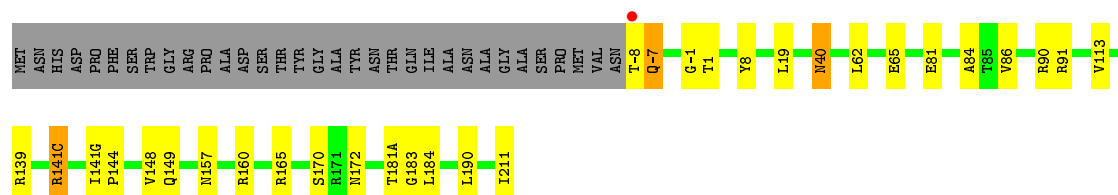
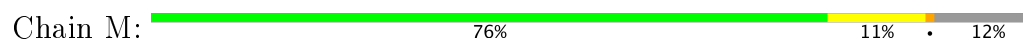




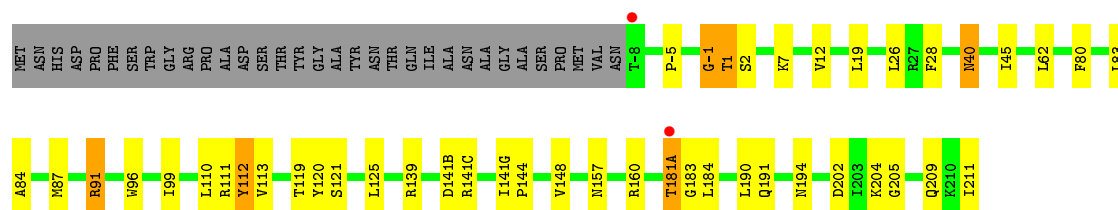
- Molecule 12: Proteasome component C5



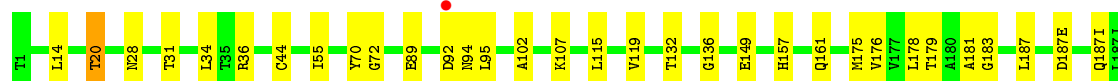
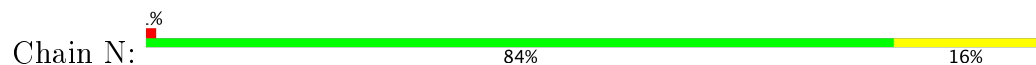
- Molecule 13: Proteasome component PRE4



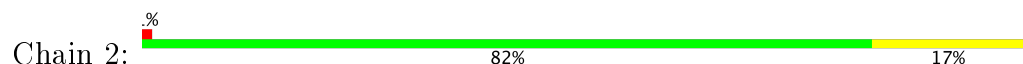
- Molecule 13: Proteasome component PRE4

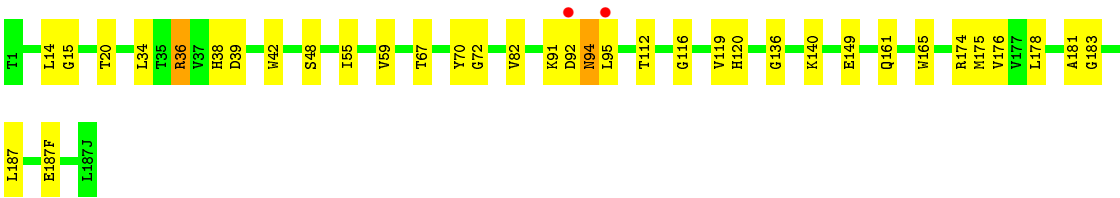


- Molecule 14: Proteasome component PRE3



- Molecule 14: Proteasome component PRE3





4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	136.02Å 300.38Å 145.81Å 90.00° 113.73° 90.00°	Depositor
Resolution (Å)	48.68 – 2.78 48.68 – 2.78	Depositor EDS
% Data completeness (in resolution range)	95.8 (48.68-2.78) 95.8 (48.68-2.78)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.96 (at 2.77Å)	Xtriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.217 , 0.259 0.217 , 0.258	Depositor DCC
R_{free} test set	5191 reflections (2.07%)	DCC
Wilson B-factor (Å ²)	58.1	Xtriage
Anisotropy	0.051	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 25.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.53$, $\langle L^2 \rangle = 0.37$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	49424	wwPDB-VP
Average B, all atoms (Å ²)	58.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.48% 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: MG, L2T, 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	0.41	0/1951	0.56	0/2639
1	O	0.42	0/1951	0.55	0/2639
2	B	0.42	0/1857	0.57	0/2513
2	P	0.40	0/1857	0.55	0/2513
3	C	0.41	0/1918	0.56	0/2591
3	Q	0.41	0/1918	0.57	0/2591
4	D	0.42	0/1883	0.61	1/2529 (0.0%)
4	R	0.40	0/1884	0.58	1/2532 (0.0%)
5	E	0.40	0/1819	0.57	0/2451
5	S	0.39	0/1821	0.57	0/2457
6	F	0.43	0/1885	0.55	0/2540
6	T	0.43	0/1886	0.57	0/2543
7	G	0.45	0/1956	0.57	0/2643
7	U	0.45	0/1958	0.57	0/2649
8	H	0.40	0/1714	0.56	0/2320
8	V	0.40	0/1714	0.56	0/2320
9	I	0.46	0/1608	0.60	0/2165
9	W	1.03	1/1609 (0.1%)	0.69	1/2168 (0.0%)
10	J	0.43	0/1611	0.58	0/2167
10	X	0.43	0/1611	0.59	0/2167
11	K	0.42	0/1680	0.58	1/2271 (0.0%)
11	Y	0.42	0/1680	0.59	1/2271 (0.0%)
12	L	0.43	0/1793	0.56	0/2414
12	Z	0.43	0/1793	0.57	0/2414
13	1	0.69	1/1853 (0.1%)	0.81	2/2507 (0.1%)
13	M	0.42	0/1852	0.63	0/2504
14	2	0.42	0/1538	0.56	0/2078
14	N	0.45	0/1538	0.54	0/2078
All	All	0.46	2/50138 (0.0%)	0.59	7/67674 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	W	-1	GLY	C-N	37.20	2.00	1.33
13	1	-1	GLY	C-N	23.09	1.87	1.34

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
13	1	-1	GLY	O-C-N	-25.36	82.12	122.70
9	W	-1	GLY	O-C-N	-16.35	95.40	123.20
4	D	59	LEU	CA-CB-CG	6.11	129.36	115.30
4	R	59	LEU	CA-CB-CG	5.96	129.02	115.30
11	Y	4	LEU	CA-CB-CG	5.63	128.26	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1915	0	1925	24	0
1	O	1915	0	1925	34	0
2	B	1829	0	1828	30	0
2	P	1829	0	1828	30	0
3	C	1891	0	1899	24	0
3	Q	1891	0	1899	36	0
4	D	1862	0	1832	25	0
4	R	1862	0	1833	27	0
5	E	1795	0	1793	29	0
5	S	1795	0	1795	29	0
6	F	1848	0	1842	24	0
6	T	1848	0	1843	30	0
7	G	1921	0	1907	28	0
7	U	1921	0	1909	24	0
8	H	1685	0	1686	29	0
8	V	1685	0	1686	36	0
9	I	1581	0	1574	29	0
9	W	1581	0	1574	26	0
10	J	1585	0	1591	29	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
10	X	1585	0	1591	15	0
11	K	1644	0	1594	23	0
11	Y	1644	0	1594	18	0
12	L	1757	0	1712	23	0
12	Z	1757	0	1712	29	0
13	1	1824	0	1833	31	0
13	M	1824	0	1833	23	0
14	2	1512	0	1478	25	0
14	N	1512	0	1478	22	0
15	F	2	0	0	0	0
15	G	1	0	0	0	0
15	H	1	0	0	0	0
15	I	2	0	0	0	0
15	K	1	0	0	0	0
15	L	2	0	0	0	0
15	N	1	0	0	0	0
16	K	44	0	39	5	0
16	Y	44	0	39	2	0
17	K	12	0	13	1	0
17	Y	12	0	13	1	0
18	L	2	0	0	0	0
18	Z	2	0	0	0	0
All	All	49424	0	49098	660	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 7.

The worst 5 of 660 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)
16:K:213:L2T:C6	16:K:213:L2T:CL7	1.75	1.60
13:1:-1:GLY:C	13:1:1:THR:N	1.87	1.28
11:K:181:ASP:C	11:K:183:GLY:HA2	1.64	1.16
9:W:-1:GLY:C	9:W:1:GLY:N	2.00	1.15
13:1:-1:GLY:C	13:1:1:THR:H1	1.45	1.12

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	246/250 (98%)	234 (95%)	9 (4%)	3 (1%)	15	41
1	O	246/250 (98%)	235 (96%)	10 (4%)	1 (0%)	38	70
2	B	231/245 (94%)	216 (94%)	10 (4%)	5 (2%)	8	24
2	P	231/245 (94%)	218 (94%)	8 (4%)	5 (2%)	8	24
3	C	235/243 (97%)	229 (97%)	5 (2%)	1 (0%)	38	70
3	Q	235/243 (97%)	228 (97%)	3 (1%)	4 (2%)	11	31
4	D	232/250 (93%)	219 (94%)	11 (5%)	2 (1%)	20	50
4	R	234/250 (94%)	216 (92%)	17 (7%)	1 (0%)	38	70
5	E	223/234 (95%)	211 (95%)	8 (4%)	4 (2%)	10	29
5	S	227/234 (97%)	211 (93%)	12 (5%)	4 (2%)	10	29
6	F	231/248 (93%)	217 (94%)	14 (6%)	0	100	100
6	T	233/248 (94%)	222 (95%)	10 (4%)	1 (0%)	38	70
7	G	235/252 (93%)	224 (95%)	10 (4%)	1 (0%)	38	70
7	U	239/252 (95%)	234 (98%)	3 (1%)	2 (1%)	22	53
8	H	216/222 (97%)	207 (96%)	8 (4%)	1 (0%)	32	65
8	V	216/222 (97%)	205 (95%)	11 (5%)	0	100	100
9	I	196/205 (96%)	188 (96%)	8 (4%)	0	100	100
9	W	198/205 (97%)	190 (96%)	8 (4%)	0	100	100
10	J	193/198 (98%)	183 (95%)	8 (4%)	2 (1%)	18	47
10	X	193/198 (98%)	184 (95%)	6 (3%)	3 (2%)	11	33
11	K	208/212 (98%)	202 (97%)	5 (2%)	1 (0%)	32	65
11	Y	208/212 (98%)	198 (95%)	9 (4%)	1 (0%)	32	65
12	L	216/241 (90%)	212 (98%)	4 (2%)	0	100	100
12	Z	216/241 (90%)	208 (96%)	7 (3%)	1 (0%)	32	65
13	1	227/266 (85%)	217 (96%)	9 (4%)	1 (0%)	38	70

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
13	M	225/266 (85%)	215 (96%)	9 (4%)	1 (0%)	38	70
14	2	188/196 (96%)	181 (96%)	7 (4%)	0	100	100
14	N	188/196 (96%)	181 (96%)	7 (4%)	0	100	100
All	All	6166/6524 (94%)	5885 (95%)	236 (4%)	45 (1%)	25	57

5 of 45 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	54	VAL
5	E	6	ASN
5	E	203	ASP
5	E	217	LYS
7	G	239	GLN

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	209/209 (100%)	195 (93%)	14 (7%)	19	45
1	O	209/209 (100%)	198 (95%)	11 (5%)	26	57
2	B	195/204 (96%)	181 (93%)	14 (7%)	17	41
2	P	195/204 (96%)	180 (92%)	15 (8%)	15	37
3	C	213/215 (99%)	193 (91%)	20 (9%)	10	27
3	Q	213/215 (99%)	200 (94%)	13 (6%)	22	50
4	D	198/206 (96%)	186 (94%)	12 (6%)	22	50
4	R	198/206 (96%)	187 (94%)	11 (6%)	25	54
5	E	192/193 (100%)	174 (91%)	18 (9%)	10	27
5	S	192/193 (100%)	175 (91%)	17 (9%)	11	30
6	F	196/205 (96%)	181 (92%)	15 (8%)	15	37
6	T	196/205 (96%)	181 (92%)	15 (8%)	15	37
7	G	207/210 (99%)	189 (91%)	18 (9%)	12	31

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
7	U	207/210 (99%)	192 (93%)	15 (7%)	17	41
8	H	181/181 (100%)	173 (96%)	8 (4%)	33	65
8	V	181/181 (100%)	172 (95%)	9 (5%)	28	60
9	I	172/173 (99%)	164 (95%)	8 (5%)	30	62
9	W	172/173 (99%)	163 (95%)	9 (5%)	27	58
10	J	175/175 (100%)	164 (94%)	11 (6%)	21	49
10	X	175/175 (100%)	165 (94%)	10 (6%)	24	54
11	K	169/169 (100%)	154 (91%)	15 (9%)	11	30
11	Y	169/169 (100%)	155 (92%)	14 (8%)	13	34
12	L	185/201 (92%)	175 (95%)	10 (5%)	26	56
12	Z	185/201 (92%)	177 (96%)	8 (4%)	33	66
13	1	199/224 (89%)	184 (92%)	15 (8%)	16	38
13	M	199/224 (89%)	190 (96%)	9 (4%)	32	64
14	2	162/162 (100%)	155 (96%)	7 (4%)	33	66
14	N	162/162 (100%)	152 (94%)	10 (6%)	21	50
All	All	5306/5454 (97%)	4955 (93%)	351 (7%)	19	46

5 of 351 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
12	L	61	ASN
2	P	121	GLN
12	Z	61	ASN
13	M	40	ASN
14	N	119	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 151 such sidechains are listed below:

Mol	Chain	Res	Type
14	N	38	HIS
4	R	108	ASN
13	1	40	ASN
14	N	157	HIS
2	P	177	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 ⓘ

There are no carbohydrates in this entry.

5.6 Ligand geometry ⓘ

Of 14 ligands modelled in this entry, 10 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$
16	L2T	K	213	-	47,47,47	1.98	2 (4%)	61,62,62	0.81	1 (1%)
17	MES	K	214	-	12,12,12	1.93	1 (8%)	14,16,16	1.74	2 (14%)
16	L2T	Y	212	-	47,47,47	1.90	2 (4%)	61,62,62	0.82	1 (1%)
17	MES	Y	213	-	12,12,12	2.09	1 (8%)	14,16,16	1.83	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
16	L2T	K	213	-	-	0/39/39/39	0/4/4/4
17	MES	K	214	-	-	0/6/14/14	0/1/1/1
16	L2T	Y	212	-	-	0/39/39/39	0/4/4/4
17	MES	Y	213	-	-	0/6/14/14	0/1/1/1

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
17	Y	213	MES	C8-S	-6.84	1.67	1.77
17	K	214	MES	C8-S	-6.22	1.68	1.77
16	K	213	L2T	C37-C38	-4.77	1.39	1.50
16	Y	212	L2T	C37-C38	-4.21	1.40	1.50
16	Y	212	L2T	CL7-C6	11.54	1.73	1.51

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
16	K	213	L2T	O36-C37-C38	2.29	115.95	109.20
17	K	214	MES	O2S-S-C8	2.85	109.24	106.79
16	Y	212	L2T	O36-C37-C38	3.32	118.96	109.20
17	Y	213	MES	O3S-S-C8	4.10	111.09	106.06
17	Y	213	MES	O2S-S-C8	4.13	110.34	106.79

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
16	K	213	L2T	5	0
17	K	214	MES	1	0
16	Y	212	L2T	2	0
17	Y	213	MES	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
5	E	4
4	D	4
9	W	3

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Mol	Chain	Number of breaks
14	N	3
14	2	3
4	R	3
13	M	3
13	1	3
9	I	3
7	G	3
10	X	2
5	S	2
10	J	2
8	V	2
12	Z	2
12	L	2
3	Q	2
8	H	2
3	C	2
6	F	2
2	P	1
11	K	1
2	B	1
1	A	1
7	U	1
6	T	1
1	O	1
11	Y	1

The worst 5 of 60 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	D	123(G):GLU	C	125:GLU	N	4.65
1	C	203:THR	C	206:GLY	N	4.56
1	R	123(G):GLU	C	125:GLU	N	4.48
1	J	-1:MET	C	1:ASP	N	4.02
1	X	-1:MET	C	1:ASP	N	3.71

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	250/250 (100%)	0.13	7 (2%) 53 47	37, 54, 80, 110	0
1	O	250/250 (100%)	0.27	15 (6%) 23 16	41, 62, 88, 115	0
2	B	235/245 (95%)	0.21	8 (3%) 46 38	41, 60, 92, 106	0
2	P	235/245 (95%)	0.29	7 (2%) 51 44	39, 63, 97, 108	0
3	C	241/243 (99%)	0.54	26 (10%) 6 4	43, 69, 110, 125	0
3	Q	241/243 (99%)	0.91	48 (19%) 1 1	45, 74, 121, 140	0
4	D	242/250 (96%)	0.42	17 (7%) 17 11	40, 65, 101, 122	0
4	R	242/250 (96%)	0.43	17 (7%) 17 11	41, 65, 101, 129	0
5	E	233/234 (99%)	0.34	18 (7%) 14 9	48, 63, 91, 111	0
5	S	233/234 (99%)	0.48	23 (9%) 8 5	46, 64, 97, 125	0
6	F	237/248 (95%)	0.06	6 (2%) 58 51	39, 57, 95, 107	0
6	T	237/248 (95%)	0.12	6 (2%) 58 51	38, 58, 85, 109	0
7	G	243/252 (96%)	0.08	5 (2%) 64 58	36, 51, 80, 111	0
7	U	243/252 (96%)	-0.05	3 (1%) 79 75	35, 51, 73, 101	0
8	H	222/222 (100%)	-0.07	0 100 100	34, 48, 65, 99	0
8	V	222/222 (100%)	-0.06	1 (0%) 90 89	39, 52, 72, 107	0
9	I	204/205 (99%)	-0.03	2 (0%) 82 79	36, 48, 66, 82	0
9	W	204/205 (99%)	0.06	2 (0%) 82 79	35, 51, 69, 86	0
10	J	198/198 (100%)	0.09	7 (3%) 44 37	38, 51, 68, 127	0
10	X	198/198 (100%)	0.10	6 (3%) 51 44	39, 53, 68, 125	0
11	K	212/212 (100%)	-0.04	4 (1%) 67 62	36, 50, 69, 88	0
11	Y	212/212 (100%)	-0.13	0 100 100	36, 51, 70, 77	0
12	L	222/241 (92%)	-0.05	1 (0%) 90 89	36, 51, 71, 82	0
12	Z	222/241 (92%)	0.02	4 (1%) 69 64	34, 50, 72, 83	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
13	1	233/266 (87%)	-0.10	2 (0%) 84 81	34, 48, 63, 67	0
13	M	233/266 (87%)	-0.06	1 (0%) 92 91	36, 51, 65, 71	0
14	2	196/196 (100%)	-0.12	2 (1%) 82 79	34, 46, 64, 79	0
14	N	196/196 (100%)	-0.13	1 (0%) 90 89	37, 45, 60, 76	0
All	All	6336/6524 (97%)	0.14	239 (3%) 41 34	34, 54, 91, 140	0

The worst 5 of 239 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	D	123(C)	GLY	12.1
4	R	123(E)	SER	11.5
4	R	123(F)	GLY	11.0
3	C	7	GLY	10.8
4	R	123(C)	GLY	10.7

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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
15	MG	K	212	1/1	0.93	0.28	9.39	55,55,55,55	0
15	MG	F	242	1/1	0.70	0.41	9.15	74,74,74,74	0
15	MG	F	243	1/1	0.79	0.82	6.95	118,118,118,118	0
15	MG	I	196	1/1	0.69	0.31	5.14	68,68,68,68	0
15	MG	L	195	1/1	0.82	0.24	3.85	66,66,66,66	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(\AA^2)	Q<0.9
17	MES	K	214	12/12	0.92	0.20	2.48	90,90,90,90	0
17	MES	Y	213	12/12	0.95	0.20	1.94	97,98,98,98	0
16	L2T	Y	212	44/44	0.93	0.22	1.81	49,51,56,57	1
16	L2T	K	213	44/44	0.92	0.21	1.68	45,47,55,55	1
15	MG	L	196	1/1	0.88	0.19	0.83	52,52,52,52	0
15	MG	H	224	1/1	0.93	0.15	-0.27	57,57,57,57	0
15	MG	G	241	1/1	0.93	0.10	-1.83	54,54,54,54	0
15	MG	N	188	1/1	0.93	0.11	-1.95	50,50,50,50	0
15	MG	I	195	1/1	0.87	0.58	-	72,72,72,72	0

6.5 Other polymers [i](#)

There are no such residues in this entry.