



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 08:12 PM GMT

PDB ID : 4QZ5  
Title : yCP beta5-A49T-mutant in complex with ONX 0914  
Authors : Huber, E.M.; Heinemeyer, W.; Groll, M.  
Deposited on : 2014-07-27  
Resolution : 2.80 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](mailto: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.

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

MolProbity : 4.02b-467  
Mogul : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
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) : trunk26865

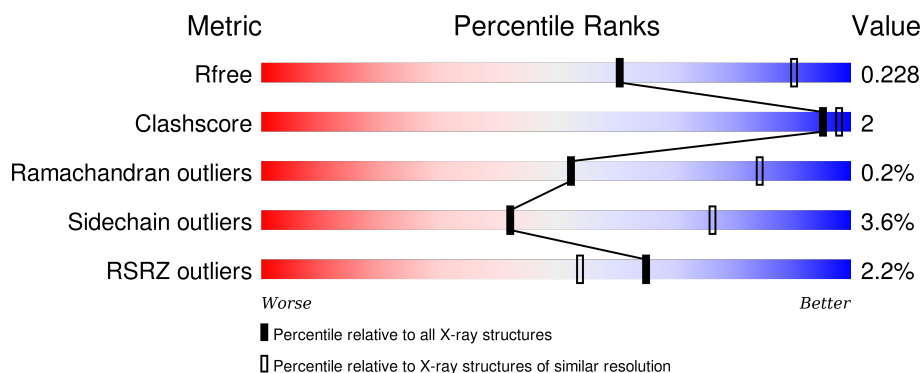
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.80 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.



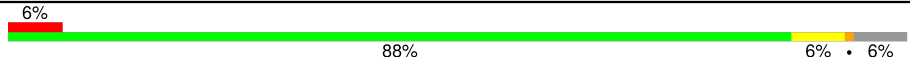













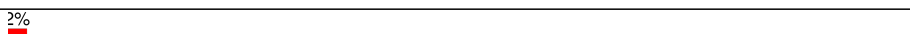
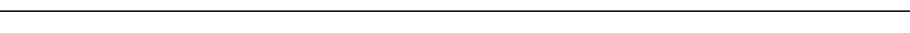
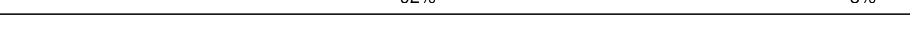

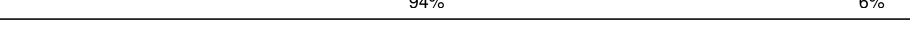
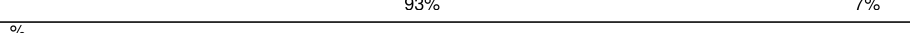


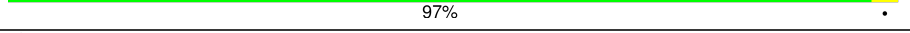
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	91344	2393 (2.80-2.80)
Clashscore	102246	2827 (2.80-2.80)
Ramachandran outliers	100387	2782 (2.80-2.80)
Sidechain outliers	100360	2784 (2.80-2.80)
RSRZ outliers	91569	2404 (2.80-2.80)

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  $\geq 3$ , 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	<div> <div>2%</div> <div>97%</div> <div>•</div> </div>
1	O	250	<div> <div>5%</div> <div>97%</div> <div>•</div> </div>
2	B	258	<div> <div>4%</div> <div>88%</div> <div>6% 5%</div> </div>
2	P	258	<div> <div>3%</div> <div>88%</div> <div>7% 5%</div> </div>
3	C	254	<div> <div>5%</div> <div>87%</div> <div>6% • 6%</div> </div>

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Mol	Chain	Length	Quality of chain
3	Q	254	
4	D	260	
4	R	260	
5	E	234	
5	S	234	
6	F	288	
6	T	288	
7	G	252	
7	U	252	
8	H	232	
8	V	232	
9	I	205	
9	W	205	
10	J	198	
10	X	198	
11	K	212	
11	Y	212	
12	L	222	
12	Z	222	
13	M	246	
13	a	246	
14	N	196	
14	b	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	Z	301	-	-	-	X
17	04C	H	301	-	-	-	X
17	04C	N	201	-	-	-	X
17	04C	V	301	-	-	-	X
18	MES	K	303	-	-	-	X
18	MES	Y	303	-	-	-	X

## 2 Entry composition

There are 19 unique types of molecules in this entry. The entry contains 49654 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Proteasome subunit alpha type-2.

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

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

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

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

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

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

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

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

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

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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
			1646	1046	280	313	7			
11	Y	212	Total	C	N	O	S	0	0	0
			1646	1046	280	313	7			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
K	49	THR	ALA	ENGINEERED MUTATION	UNP P30656
Y	49	THR	ALA	ENGINEERED MUTATION	UNP P30656

- 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	225	Total	C	N	O	S	0	0	0
			1761	1114	301	339	7			
13	a	225	Total	C	N	O	S	0	0	0
			1761	1114	301	339	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			

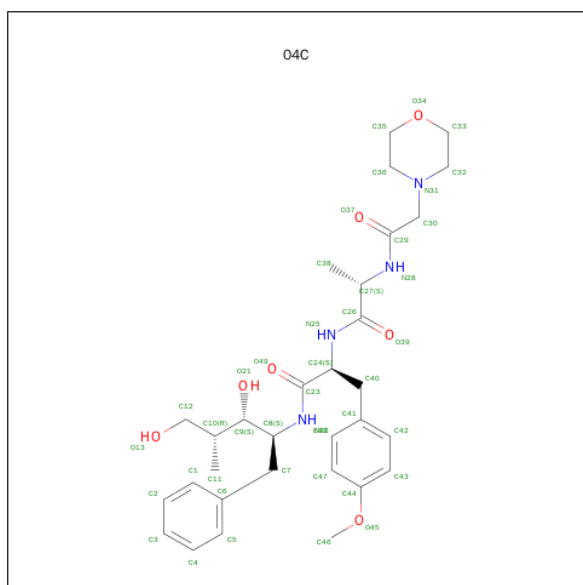
- Molecule 15 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
15	G	1	Total Mg 1 1	0	0
15	K	1	Total Mg 1 1	0	0
15	I	1	Total Mg 1 1	0	0
15	V	1	Total Mg 1 1	0	0
15	Z	1	Total Mg 1 1	0	0
15	N	1	Total Mg 1 1	0	0
15	Y	1	Total Mg 1 1	0	0

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

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

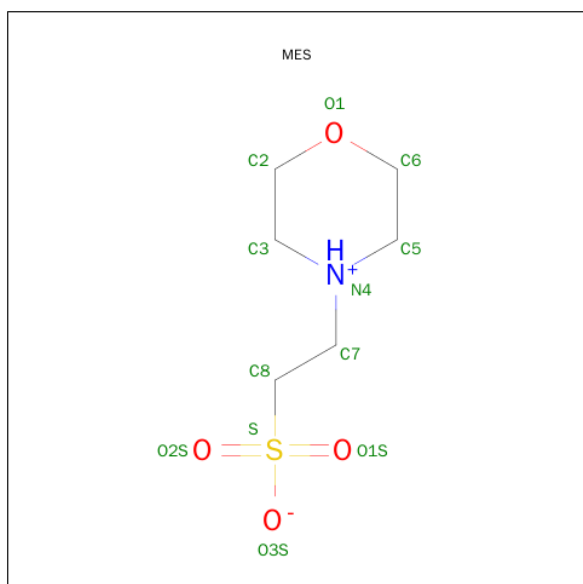
- Molecule 17 is 1,2,4-TRIDEOXY-4-METHYL-2-{[N-(MORPHOLIN-4-YLACETYL)-L-ALANYL-O-METHYL-L-TYROSYL]AMINO}-1-PHENYL-D-XYLITOL (three-letter code: 04C) (formula: C<sub>31</sub>H<sub>44</sub>N<sub>4</sub>O<sub>7</sub>).





Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
17	H	1	Total	C	N	O	0	0
			42	31	4	7		
17	K	1	Total	C	N	O	0	0
			42	31	4	7		
17	N	1	Total	C	N	O	0	0
			42	31	4	7		
17	V	1	Total	C	N	O	0	0
			42	31	4	7		
17	Y	1	Total	C	N	O	0	0
			42	31	4	7		
17	b	1	Total	C	N	O	0	0
			42	31	4	7		

- Molecule 18 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (three-letter code: MES) (formula: C<sub>6</sub>H<sub>13</sub>NO<sub>4</sub>S).



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

- Molecule 19 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
19	A	5	Total	O	0	0
			5	5		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
19	B	9	Total O 9 9	0	0
19	C	4	Total O 4 4	0	0
19	D	4	Total O 4 4	0	0
19	E	6	Total O 6 6	0	0
19	F	10	Total O 10 10	0	0
19	G	5	Total O 5 5	0	0
19	H	14	Total O 14 14	0	0
19	I	5	Total O 5 5	0	0
19	J	10	Total O 10 10	0	0
19	K	9	Total O 9 9	0	0
19	L	8	Total O 8 8	0	0
19	M	9	Total O 9 9	0	0
19	N	5	Total O 5 5	0	0
19	P	6	Total O 6 6	0	0
19	Q	5	Total O 5 5	0	0
19	R	2	Total O 2 2	0	0
19	S	1	Total O 1 1	0	0
19	T	7	Total O 7 7	0	0
19	U	5	Total O 5 5	0	0
19	V	9	Total O 9 9	0	0
19	W	4	Total O 4 4	0	0

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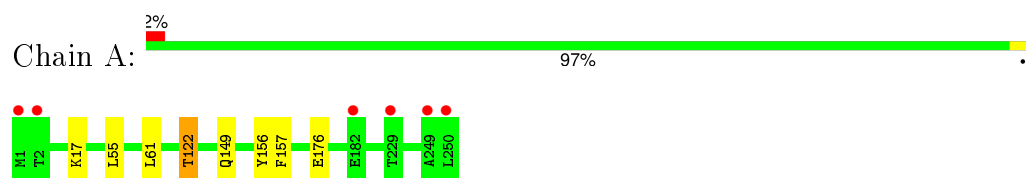
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
19	X	18	Total 18	O 18	0	0
19	Y	9	Total 9	O 9	0	0
19	Z	8	Total 8	O 8	0	0
19	a	11	Total 11	O 11	0	0
19	b	7	Total 7	O 7	0	0

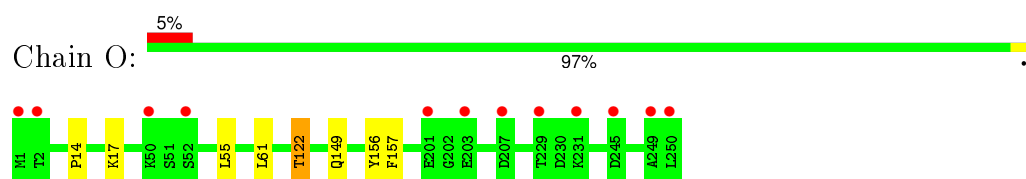
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

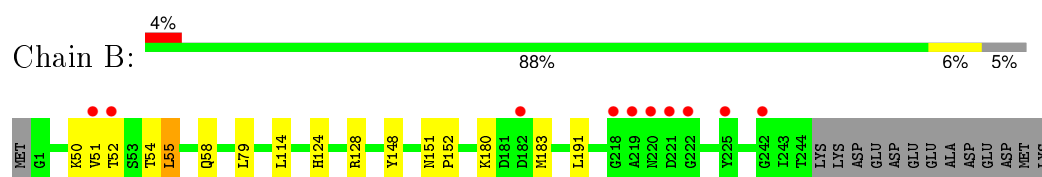
- Molecule 1: Proteasome subunit alpha type-2



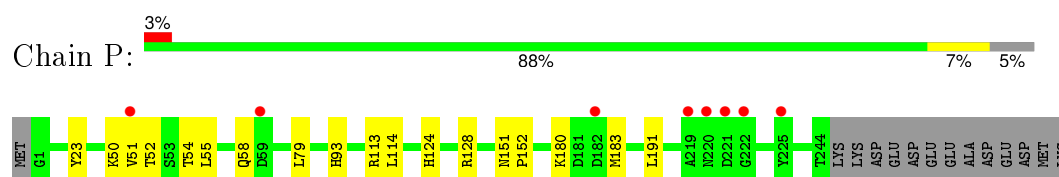
- Molecule 1: Proteasome subunit alpha type-2



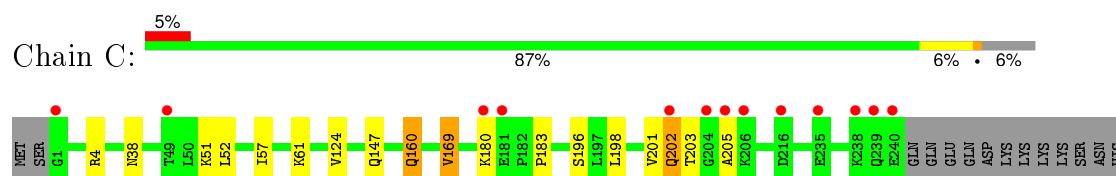
- Molecule 2: Proteasome subunit alpha type-3



- Molecule 2: Proteasome subunit alpha type-3



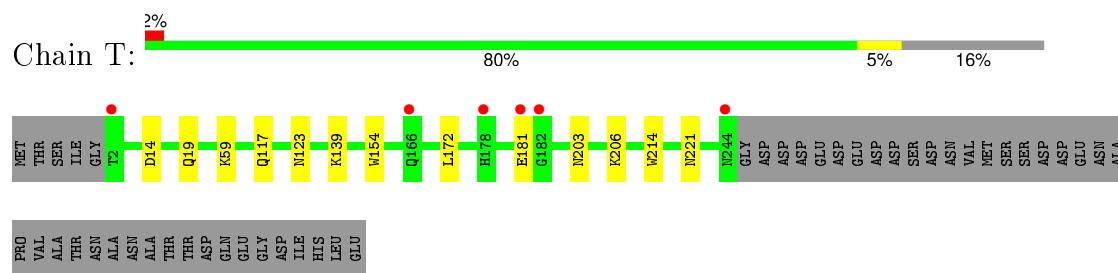
- Molecule 3: Proteasome subunit alpha type-4



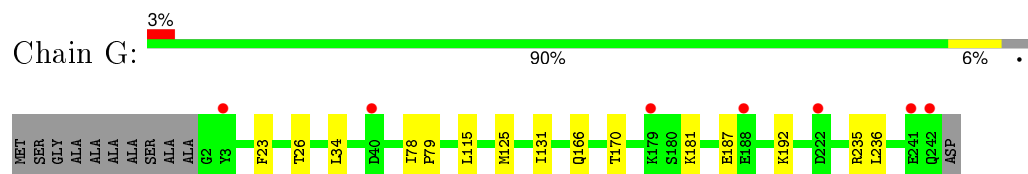
- Molecule 3: Proteasome subunit alpha type-4



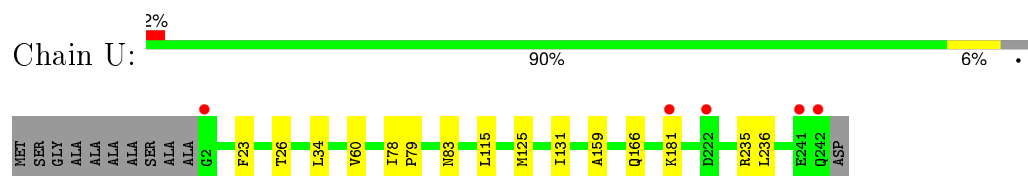
- Molecule 6: Probable proteasome subunit alpha type-7



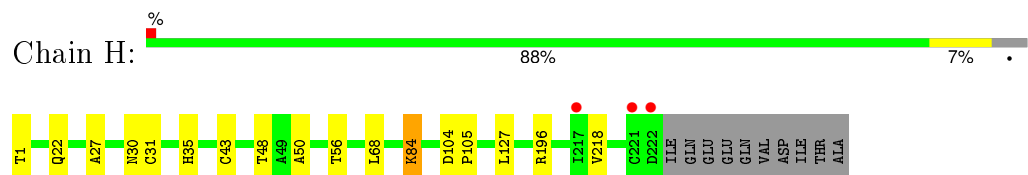
- Molecule 7: Proteasome subunit alpha type-1



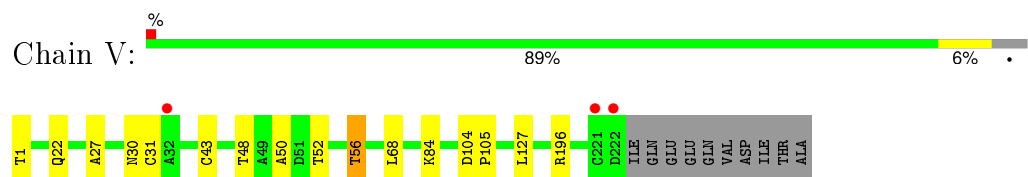
- Molecule 7: Proteasome subunit alpha type-1



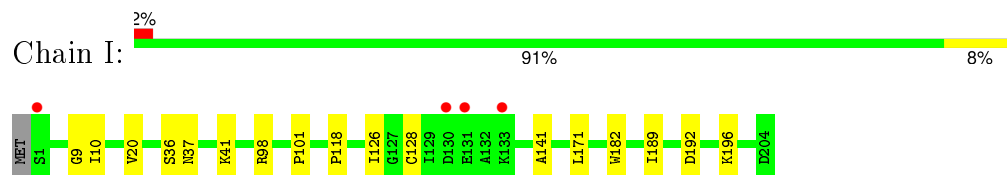
- Molecule 8: Proteasome subunit beta type-2



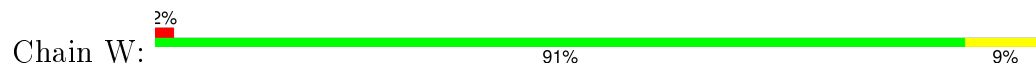
- Molecule 8: Proteasome subunit beta type-2

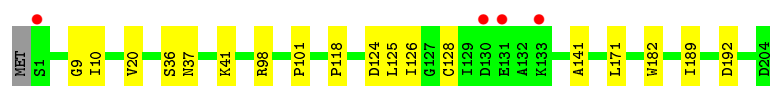


- Molecule 9: Proteasome subunit beta type-3

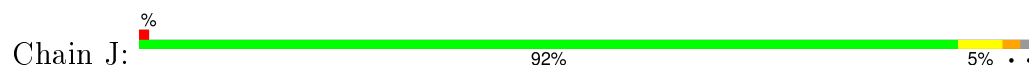


- Molecule 9: Proteasome subunit beta type-3

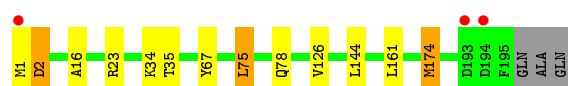
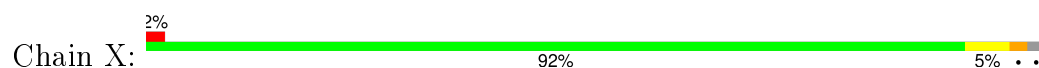




- Molecule 10: Proteasome subunit beta type-4



- Molecule 10: Proteasome subunit beta type-4



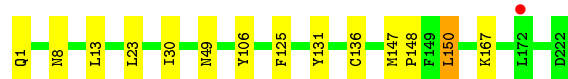
- Molecule 11: Proteasome subunit beta type-5



- Molecule 11: Proteasome subunit beta type-5



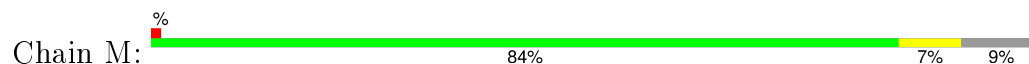
- Molecule 12: Proteasome subunit beta type-6

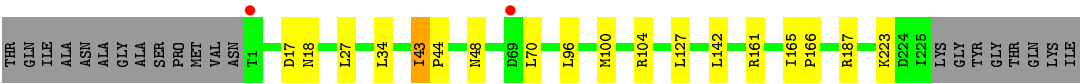


- Molecule 12: Proteasome subunit beta type-6

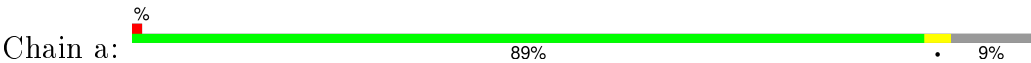


- Molecule 13: Proteasome subunit beta type-7





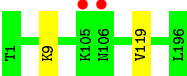
• Molecule 13: Proteasome subunit beta type-7



• Molecule 14: Proteasome subunit beta type-1



• Molecule 14: Proteasome subunit beta type-1





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	135.56Å 299.58Å 144.91Å 90.00° 112.81° 90.00°	Depositor
Resolution (Å)	15.00 – 2.80 15.00 – 2.80	Depositor EDS
% Data completeness (in resolution range)	99.0 (15.00-2.80) 99.0 (15.00-2.80)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.91 (at 2.81Å)	Xtriage
Refinement program	REFMAC 5.7.0032	Depositor
R, $R_{free}$	0.195 , 0.224 0.199 , 0.228	Depositor DCC
$R_{free}$ test set	12821 reflections (5.26%)	DCC
Wilson B-factor (Å <sup>2</sup> )	55.9	Xtriage
Anisotropy	0.013	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 51.2	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	0 of 256419 reflections	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	49654	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	64.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.19% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 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, 04C, MES, CL

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.27	0/1952	0.48	0/2642
1	O	0.27	0/1952	0.48	0/2642
2	B	0.27	0/1934	0.50	0/2618
2	P	0.27	0/1934	0.50	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	0.26	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	0.28	0/1932	0.46	0/2609
6	T	0.27	0/1932	0.46	0/2609
7	G	0.28	0/1945	0.48	0/2634
7	U	0.27	0/1945	0.49	0/2634
8	H	0.26	0/1715	0.50	1/2326 (0.0%)
8	V	0.26	0/1715	0.50	1/2326 (0.0%)
9	I	0.27	0/1611	0.49	0/2174
9	W	0.27	0/1611	0.48	0/2174
10	J	0.27	0/1589	0.49	0/2142
10	X	0.28	0/1589	0.49	0/2142
11	K	0.26	0/1683	0.51	0/2277
11	Y	0.26	0/1683	0.51	0/2277
12	L	0.27	0/1795	0.48	0/2420
12	Z	0.27	0/1795	0.48	0/2420
13	M	0.28	0/1791	0.52	0/2431
13	a	0.27	0/1791	0.52	0/2431
14	N	0.26	0/1541	0.49	0/2087
14	b	0.26	0/1541	0.49	0/2087
All	All	0.27	0/50070	0.49	2/67708 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	H	1	THR	N-CA-C	5.72	126.45	111.00
8	V	1	THR	N-CA-C	5.69	126.36	111.00

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1915	0	1929	4	0
1	O	1915	0	1929	4	0
2	B	1904	0	1904	7	0
2	P	1904	0	1904	7	0
3	C	1881	0	1895	9	0
3	Q	1881	0	1895	8	0
4	D	1813	0	1797	4	0
4	R	1813	0	1797	4	0
5	E	1773	0	1775	4	0
5	S	1773	0	1775	7	0
6	F	1892	0	1883	0	0
6	T	1892	0	1883	2	0
7	G	1907	0	1901	6	0
7	U	1907	0	1901	6	0
8	H	1684	0	1685	7	0
8	V	1684	0	1685	5	0
9	I	1581	0	1574	9	0
9	W	1581	0	1574	10	0
10	J	1561	0	1569	9	0
10	X	1561	0	1569	8	0
11	K	1646	0	1594	11	0
11	Y	1646	0	1594	12	0
12	L	1757	0	1711	4	0
12	Z	1757	0	1711	5	0
13	M	1761	0	1765	6	0
13	a	1761	0	1765	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
14	N	1512	0	1478	3	0
14	b	1512	0	1478	0	0
15	G	1	0	0	0	0
15	I	1	0	0	0	0
15	K	1	0	0	0	0
15	N	1	0	0	0	0
15	V	1	0	0	0	0
15	Y	1	0	0	0	0
15	Z	1	0	0	0	0
16	G	1	0	0	0	0
16	U	1	0	0	0	0
17	H	42	0	42	3	0
17	K	42	0	42	5	0
17	N	42	0	42	3	0
17	V	42	0	42	4	0
17	Y	42	0	42	6	0
17	b	42	0	42	0	0
18	K	12	0	13	0	0
18	Y	12	0	13	0	0
19	A	5	0	0	0	0
19	B	9	0	0	0	0
19	C	4	0	0	0	0
19	D	4	0	0	0	0
19	E	6	0	0	0	0
19	F	10	0	0	0	0
19	G	5	0	0	0	0
19	H	14	0	0	1	0
19	I	5	0	0	0	0
19	J	10	0	0	0	0
19	K	9	0	0	0	0
19	L	8	0	0	0	0
19	M	9	0	0	0	0
19	N	5	0	0	0	0
19	P	6	0	0	0	0
19	Q	5	0	0	0	0
19	R	2	0	0	0	0
19	S	1	0	0	0	0
19	T	7	0	0	0	0
19	U	5	0	0	0	0
19	V	9	0	0	0	0
19	W	4	0	0	0	0
19	X	18	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
19	Y	9	0	0	0	0
19	Z	8	0	0	0	0
19	a	11	0	0	0	0
19	b	7	0	0	0	0
All	All	49654	0	49198	147	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 2.

All (147) 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)
11:Y:31:VAL:HG11	17:Y:301:04C:C4	2.14	0.78
11:K:31:VAL:HG11	17:K:301:04C:C4	2.15	0.77
10:X:1:MET:O	10:X:2:ASP:HB2	1.87	0.75
10:J:1:MET:O	10:J:2:ASP:HB2	1.86	0.73
11:Y:31:VAL:HG11	17:Y:301:04C:H42	1.73	0.70
11:K:31:VAL:HG11	17:K:301:04C:H42	1.74	0.70
12:Z:13:LEU:HD13	12:Z:150:LEU:HD21	1.74	0.70
12:L:13:LEU:HD13	12:L:150:LEU:HD21	1.74	0.68
11:K:100:MET:HE3	11:K:127:PHE:HB2	1.78	0.64
11:Y:5:ALA:HB3	11:Y:100:MET:HE2	1.83	0.60
4:R:99:ILE:HD11	4:R:104:LEU:HB2	1.84	0.60
17:N:201:04C:H24	17:N:201:04C:H8	1.83	0.59
11:Y:100:MET:HE3	11:Y:127:PHE:HB2	1.85	0.59
4:D:99:ILE:HD11	4:D:104:LEU:HB2	1.85	0.59
3:Q:51:LYS:O	3:Q:52:LEU:HB2	2.05	0.57
3:C:51:LYS:O	3:C:52:LEU:HB2	2.05	0.57
8:H:50:ALA:HB2	9:I:128:CYS:HB2	1.87	0.56
3:C:160:GLN:HA	3:C:160:GLN:HE21	1.72	0.55
10:J:174:MET:HA	10:X:174:MET:HA	1.89	0.54
11:K:5:ALA:HB3	11:K:100:MET:HE2	1.90	0.54
3:Q:160:GLN:HE21	3:Q:160:GLN:HA	1.72	0.53
11:K:49:THR:HG22	17:K:301:04C:C4	2.38	0.53
11:Y:49:THR:HG22	17:Y:301:04C:C4	2.39	0.52
14:N:152:VAL:HA	14:N:175:MET:HE1	1.91	0.52
8:H:35:HIS:ND1	19:H:413:HOH:O	2.34	0.52
10:J:16:ALA:HB2	10:J:161:LEU:HD21	1.92	0.52
7:G:23:PHE:O	7:G:26:THR:HB	2.09	0.52
11:K:100:MET:CE	11:K:127:PHE:HB2	2.40	0.52
10:X:16:ALA:HB2	10:X:161:LEU:HD21	1.92	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:U:23:PHE:O	7:U:26:THR:HB	2.10	0.51
11:Y:170:TYR:O	17:Y:301:04C:H33	2.10	0.51
11:K:170:TYR:O	17:K:301:04C:H33	2.10	0.51
10:X:1:MET:O	10:X:2:ASP:CB	2.59	0.51
8:V:22:GLN:HG3	8:V:27:ALA:HB2	1.93	0.51
8:H:22:GLN:HG3	8:H:27:ALA:HB2	1.93	0.50
1:O:122:THR:HG22	2:P:128:ARG:HH21	1.77	0.50
11:Y:53:GLN:O	11:Y:57:THR:OG1	2.28	0.50
11:Y:100:MET:CE	11:Y:127:PHE:HB2	2.40	0.50
9:W:36:SER:HB2	10:X:126:VAL:HG11	1.93	0.50
3:C:201:VAL:O	3:C:202:GLN:CB	2.60	0.50
9:W:20:VAL:HG13	9:W:118:PRO:HB3	1.94	0.49
3:Q:201:VAL:O	3:Q:202:GLN:CB	2.60	0.49
2:P:124:HIS:HB3	3:Q:124:VAL:HG12	1.94	0.49
3:C:201:VAL:HG13	3:C:202:GLN:N	2.28	0.49
3:Q:201:VAL:HG13	3:Q:202:GLN:N	2.28	0.48
9:I:20:VAL:HG13	9:I:118:PRO:HB3	1.94	0.48
10:J:1:MET:O	10:J:2:ASP:CB	2.58	0.48
8:H:104:ASP:HB2	8:H:105:PRO:HD2	1.96	0.48
5:S:87:LEU:HD21	5:S:107:ALA:HB1	1.96	0.48
9:I:10:ILE:HG21	9:I:141:ALA:HB3	1.96	0.47
1:A:122:THR:HG22	2:B:128:ARG:HH21	1.80	0.47
8:H:218:VAL:CG2	9:I:196:LYS:HB2	2.45	0.47
3:Q:201:VAL:O	3:Q:202:GLN:HB2	2.14	0.47
5:S:12:PHE:H	6:T:19:GLN:HE22	1.62	0.47
9:I:9:GLY:HA3	9:I:41:LYS:HE2	1.97	0.47
14:N:48:SER:HB2	17:N:201:04C:H25	1.97	0.47
5:E:9:THR:HG21	5:E:119:THR:HA	1.97	0.47
5:E:87:LEU:HD21	5:E:107:ALA:HB1	1.97	0.46
11:K:49:THR:HG22	17:K:301:04C:C5	2.45	0.46
9:W:10:ILE:HG21	9:W:141:ALA:HB3	1.96	0.46
8:V:104:ASP:HB2	8:V:105:PRO:HD2	1.97	0.46
3:C:169:VAL:HG23	3:C:196:SER:HB2	1.96	0.46
10:J:1:MET:HA	10:J:34:LYS:CE	2.45	0.46
4:R:88:ALA:HA	4:R:99:ILE:HG21	1.97	0.46
4:D:88:ALA:HA	4:D:99:ILE:HG21	1.97	0.46
3:Q:169:VAL:HG23	3:Q:196:SER:HB2	1.97	0.46
3:C:201:VAL:O	3:C:202:GLN:HB2	2.14	0.46
12:L:8:ASN:HA	12:L:30:ILE:O	2.15	0.46
13:M:27:LEU:HD21	13:M:34:LEU:HD22	1.97	0.46
11:Y:49:THR:HG22	17:Y:301:04C:C5	2.46	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:S:9:THR:HG21	5:S:119:THR:HA	1.98	0.46
10:J:67:TYR:CE1	10:J:75:LEU:HD13	2.51	0.45
10:X:67:TYR:CE1	10:X:75:LEU:HD13	2.51	0.45
10:X:1:MET:HA	10:X:34:LYS:CE	2.46	0.45
4:R:160:ASN:HB3	4:R:179:TRP:CE2	2.51	0.45
12:Z:8:ASN:HA	12:Z:30:ILE:O	2.17	0.45
17:N:201:04C:O21	17:N:201:04C:O13	2.25	0.45
3:C:198:LEU:HA	3:C:201:VAL:HG12	1.99	0.45
5:E:175:LEU:HA	5:E:178:PHE:CE2	2.52	0.45
9:W:9:GLY:HA3	9:W:41:LYS:HE2	1.98	0.45
11:K:1:THR:CG2	11:K:3:THR:HG23	2.47	0.45
7:U:26:THR:HG21	7:U:131:ILE:HD12	1.99	0.45
3:Q:198:LEU:HA	3:Q:201:VAL:HG12	1.99	0.45
8:V:50:ALA:HB2	9:W:128:CYS:HB2	1.99	0.45
2:B:124:HIS:HB3	3:C:124:VAL:HG12	1.98	0.45
5:S:175:LEU:HA	5:S:178:PHE:CE2	2.52	0.45
9:W:98:ARG:O	9:W:126:ILE:HD11	2.17	0.45
10:J:1:MET:HA	10:J:34:LYS:HE3	1.99	0.44
9:I:98:ARG:O	9:I:126:ILE:HD11	2.18	0.44
2:B:151:ASN:HB2	2:B:152:PRO:CD	2.47	0.44
17:V:301:04C:H19	17:V:301:04C:H36	1.99	0.44
7:G:26:THR:HG21	7:G:131:ILE:HD12	1.99	0.44
11:K:37:ILE:HG23	11:K:60:GLY:HA2	1.99	0.44
2:P:151:ASN:HB2	2:P:152:PRO:CD	2.48	0.44
11:Y:37:ILE:HG23	11:Y:60:GLY:HA2	1.99	0.44
1:A:55:LEU:HD12	7:G:170:THR:HG23	1.99	0.44
9:W:20:VAL:HG23	9:W:189:ILE:HB	2.00	0.44
4:D:160:ASN:HB3	4:D:179:TRP:CE2	2.52	0.44
8:H:84:LYS:HE3	14:N:57:ASP:OD2	2.18	0.44
17:H:301:04C:H19	17:H:301:04C:H36	1.99	0.43
9:I:36:SER:HB2	10:J:126:VAL:HG11	1.99	0.43
11:Y:1:THR:CG2	11:Y:3:THR:HG23	2.47	0.43
2:B:180:LYS:O	2:B:183:MET:HB2	2.18	0.43
6:T:154:TRP:CZ3	7:U:60:VAL:HA	2.53	0.43
12:Z:147:MET:N	12:Z:148:PRO:HD2	2.33	0.43
8:H:48:THR:OG1	17:H:301:04C:H24	2.18	0.43
10:J:23:ARG:NH2	11:K:120:THR:OG1	2.51	0.43
4:D:91:HIS:HB3	4:D:99:ILE:CG2	2.48	0.43
1:O:149:GLN:O	1:O:156:TYR:HA	2.19	0.43
9:I:20:VAL:HG23	9:I:189:ILE:HB	2.00	0.43
7:G:78:ILE:N	7:G:79:PRO:CD	2.82	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:M:96:LEU:O	13:M:100:MET:HG2	2.19	0.43
7:G:34:LEU:HD23	7:G:34:LEU:C	2.39	0.42
12:L:147:MET:N	12:L:148:PRO:HD2	2.33	0.42
13:M:165:ILE:HB	13:M:166:PRO:HD3	2.01	0.42
2:P:180:LYS:O	2:P:183:MET:HB2	2.19	0.42
1:A:149:GLN:O	1:A:156:TYR:HA	2.18	0.42
13:M:17:ASP:OD1	13:M:18:ASN:N	2.52	0.42
9:I:101:PRO:HB3	9:I:126:ILE:HD12	2.02	0.42
10:X:1:MET:HA	10:X:34:LYS:HE3	2.00	0.42
9:W:101:PRO:HB3	9:W:126:ILE:HD12	2.02	0.42
17:V:301:04C:H1	9:W:124:ASP:HB2	2.02	0.42
1:A:176:GLU:HG2	2:B:55:LEU:HD13	2.01	0.42
17:H:301:04C:H29	17:H:301:04C:H41	1.86	0.42
4:R:91:HIS:HB3	4:R:99:ILE:CG2	2.49	0.42
7:U:78:ILE:N	7:U:79:PRO:CD	2.83	0.42
8:V:48:THR:OG1	17:V:301:04C:H24	2.20	0.42
13:M:43:ILE:HA	13:M:44:PRO:HD3	1.95	0.42
17:V:301:04C:H5	9:W:125:LEU:HD22	2.02	0.41
2:B:151:ASN:HB2	2:B:152:PRO:HD2	2.02	0.41
7:U:34:LEU:C	7:U:34:LEU:HD23	2.40	0.41
12:L:125:PHE:CD2	12:L:131:TYR:HB3	2.56	0.41
12:Z:125:PHE:CD2	12:Z:131:TYR:HB3	2.56	0.41
11:Y:31:VAL:HG11	17:Y:301:04C:C3	2.51	0.41
2:P:151:ASN:HB2	2:P:152:PRO:HD2	2.03	0.41
5:S:77:ALA:N	5:S:78:PRO:CD	2.84	0.41
2:B:148:TYR:OH	3:C:57:ILE:HB	2.21	0.41
7:G:187:GLU:HG2	7:G:192:LYS:HB2	2.03	0.41
12:Z:100:LYS:HD3	12:Z:105:TYR:CZ	2.56	0.40
8:V:52:THR:O	8:V:56:THR:HB	2.21	0.40
2:P:93:HIS:HB3	2:P:113:ARG:HH21	1.85	0.40
13:M:127:LEU:HG	13:M:142:LEU:HD12	2.03	0.40
1:O:55:LEU:HB3	7:U:159:ALA:O	2.21	0.40
5:S:68:HIS:HE1	5:S:102:LEU:O	2.05	0.40
5:S:131:LEU:HB2	5:S:146:PHE:HB3	2.03	0.40
5:E:68:HIS:HE1	5:E:102:LEU:O	2.05	0.40
1:O:14:PRO:HA	2:P:23:TYR:CD1	2.57	0.40

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	248/250 (99%)	241 (97%)	7 (3%)	0	100	100
1	O	248/250 (99%)	241 (97%)	7 (3%)	0	100	100
2	B	242/258 (94%)	234 (97%)	7 (3%)	1 (0%)	39	74
2	P	242/258 (94%)	234 (97%)	7 (3%)	1 (0%)	39	74
3	C	238/254 (94%)	230 (97%)	5 (2%)	3 (1%)	15	44
3	Q	238/254 (94%)	230 (97%)	5 (2%)	3 (1%)	15	44
4	D	231/260 (89%)	226 (98%)	5 (2%)	0	100	100
4	R	231/260 (89%)	226 (98%)	5 (2%)	0	100	100
5	E	229/234 (98%)	224 (98%)	5 (2%)	0	100	100
5	S	229/234 (98%)	224 (98%)	5 (2%)	0	100	100
6	F	241/288 (84%)	234 (97%)	7 (3%)	0	100	100
6	T	241/288 (84%)	235 (98%)	6 (2%)	0	100	100
7	G	239/252 (95%)	236 (99%)	3 (1%)	0	100	100
7	U	239/252 (95%)	235 (98%)	4 (2%)	0	100	100
8	H	220/232 (95%)	215 (98%)	5 (2%)	0	100	100
8	V	220/232 (95%)	215 (98%)	5 (2%)	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%)	34	69
10	X	193/198 (98%)	188 (97%)	4 (2%)	1 (0%)	34	69
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%)	217 (99%)	3 (1%)	0	100	100
13	M	223/246 (91%)	217 (97%)	6 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
13	a	223/246 (91%)	217 (97%)	6 (3%)	0	100	100
14	N	194/196 (99%)	187 (96%)	7 (4%)	0	100	100
14	b	194/196 (99%)	187 (96%)	7 (4%)	0	100	100
All	All	6260/6614 (95%)	6102 (98%)	148 (2%)	10 (0%)	52	84

All (10) Ramachandran outliers are listed below:

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

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%)	65	91
1	O	209/209 (100%)	205 (98%)	4 (2%)	65	91
2	B	203/216 (94%)	195 (96%)	8 (4%)	39	74
2	P	203/216 (94%)	195 (96%)	8 (4%)	39	74
3	C	212/226 (94%)	204 (96%)	8 (4%)	40	74
3	Q	212/226 (94%)	204 (96%)	8 (4%)	40	74
4	D	194/215 (90%)	185 (95%)	9 (5%)	33	67
4	R	194/215 (90%)	185 (95%)	9 (5%)	33	67
5	E	190/193 (98%)	181 (95%)	9 (5%)	32	67

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
5	S	190/193 (98%)	180 (95%)	10 (5%)	28	61
6	F	201/239 (84%)	190 (94%)	11 (6%)	27	59
6	T	201/239 (84%)	190 (94%)	11 (6%)	27	59
7	G	206/210 (98%)	200 (97%)	6 (3%)	50	83
7	U	206/210 (98%)	199 (97%)	7 (3%)	44	78
8	H	181/190 (95%)	173 (96%)	8 (4%)	35	69
8	V	181/190 (95%)	173 (96%)	8 (4%)	35	69
9	I	172/173 (99%)	168 (98%)	4 (2%)	58	88
9	W	172/173 (99%)	168 (98%)	4 (2%)	58	88
10	J	173/175 (99%)	167 (96%)	6 (4%)	43	77
10	X	173/175 (99%)	167 (96%)	6 (4%)	43	77
11	K	170/170 (100%)	164 (96%)	6 (4%)	43	77
11	Y	170/170 (100%)	163 (96%)	7 (4%)	37	72
12	L	185/185 (100%)	178 (96%)	7 (4%)	40	74
12	Z	185/185 (100%)	178 (96%)	7 (4%)	40	74
13	M	193/208 (93%)	186 (96%)	7 (4%)	42	76
13	a	193/208 (93%)	186 (96%)	7 (4%)	42	76
14	N	162/162 (100%)	160 (99%)	2 (1%)	78	95
14	b	162/162 (100%)	160 (99%)	2 (1%)	78	95
All	All	5302/5542 (96%)	5109 (96%)	193 (4%)	42	76

All (193) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	17	LYS
1	A	61	LEU
1	A	122	THR
1	A	157	PHE
2	B	50	LYS
2	B	52	THR
2	B	54	THR
2	B	55	LEU
2	B	58	GLN
2	B	79	LEU
2	B	114	LEU

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Mol	Chain	Res	Type
2	B	191	LEU
3	C	4	ARG
3	C	38	ASN
3	C	61	LYS
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	71	LEU
5	E	184	ASN
5	E	188	LEU
5	E	207	VAL
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	115	LEU
7	G	125	MET
7	G	166	GLN
7	G	181	LYS

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Mol	Chain	Res	Type
7	G	235	ARG
7	G	236	LEU
8	H	30	ASN
8	H	31	CYS
8	H	43	CYS
8	H	56	THR
8	H	68	LEU
8	H	84	LYS
8	H	127	LEU
8	H	196	ARG
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	57	THR
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	43	ILE
13	M	48	ASN
13	M	70	LEU
13	M	104	ARG
13	M	161	ARG
13	M	187	ARG
13	M	223	LYS
14	N	9	LYS
14	N	119	VAL

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Mol	Chain	Res	Type
1	O	17	LYS
1	O	61	LEU
1	O	122	THR
1	O	157	PHE
2	P	50	LYS
2	P	52	THR
2	P	54	THR
2	P	55	LEU
2	P	58	GLN
2	P	79	LEU
2	P	114	LEU
2	P	191	LEU
3	Q	4	ARG
3	Q	38	ASN
3	Q	61	LYS
3	Q	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
5	S	207	VAL
6	T	14	ASP
6	T	59	LYS
6	T	117	GLN

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Mol	Chain	Res	Type
6	T	123	ASN
6	T	139	LYS
6	T	172	LEU
6	T	181	GLU
6	T	203	ASN
6	T	206	LYS
6	T	214	TRP
6	T	221	ASN
7	U	83	ASN
7	U	115	LEU
7	U	125	MET
7	U	166	GLN
7	U	181	LYS
7	U	235	ARG
7	U	236	LEU
8	V	30	ASN
8	V	31	CYS
8	V	43	CYS
8	V	56	THR
8	V	68	LEU
8	V	84	LYS
8	V	127	LEU
8	V	196	ARG
9	W	37	ASN
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	7	ARG
11	Y	9	GLN
11	Y	35	ILE
11	Y	57	THR
11	Y	106	ARG
11	Y	118	ASP
12	Z	1	GLN
12	Z	23	LEU

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Mol	Chain	Res	Type
12	Z	49	ASN
12	Z	106	TYR
12	Z	136	CYS
12	Z	150	LEU
12	Z	167	LYS
13	a	43	ILE
13	a	48	ASN
13	a	70	LEU
13	a	104	ARG
13	a	161	ARG
13	a	187	ARG
13	a	223	LYS
14	b	9	LYS
14	b	119	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (90) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	94	HIS
2	B	20	GLN
2	B	119	GLN
2	B	123	GLN
2	B	176	GLN
3	C	38	ASN
3	C	77	ASN
3	C	147	GLN
3	C	160	GLN
4	D	15	GLN
4	D	91	HIS
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	118	ASN
5	E	120	GLN
5	E	184	ASN
6	F	19	GLN
6	F	117	GLN
6	F	191	GLN
6	F	240	GLN

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Mol	Chain	Res	Type
7	G	6	HIS
7	G	83	ASN
7	G	114	ASN
7	G	117	GLN
7	G	121	GLN
7	G	167	GLN
7	G	175	ASN
8	H	66	HIS
10	J	55	GLN
11	K	85	ASN
11	K	176	ASN
12	L	3	ASN
12	L	70	ASN
12	L	158	ASN
13	M	18	ASN
13	M	48	ASN
13	M	102	GLN
13	M	194	ASN
13	M	213	GLN
1	O	94	HIS
2	P	20	GLN
2	P	119	GLN
2	P	123	GLN
2	P	176	GLN
3	Q	38	ASN
3	Q	77	ASN
3	Q	147	GLN
3	Q	160	GLN
4	R	15	GLN
4	R	146	GLN
4	R	225	ASN
5	S	68	HIS
5	S	92	ASN
5	S	99	ASN
5	S	116	GLN
5	S	118	ASN
5	S	120	GLN
5	S	184	ASN
6	T	19	GLN
6	T	86	ASN
6	T	117	GLN
6	T	123	ASN

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Mol	Chain	Res	Type
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
7	U	175	ASN
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	70	ASN
12	Z	158	ASN
13	a	18	ASN
13	a	48	ASN
13	a	102	GLN
13	a	179	ASN
13	a	194	ASN
13	a	213	GLN
14	b	161	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

### 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

### 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

### 5.6 Ligand geometry [i](#)

Of 17 ligands modelled in this entry, 9 are monoatomic - leaving 8 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$
17	04C	H	301	8	43,44,44	1.29	4 (9%)	55,58,58	1.10	4 (7%)
17	04C	K	301	11	43,44,44	1.29	3 (6%)	55,58,58	1.33	7 (12%)
18	MES	K	303	-	11,12,12	0.66	0	14,16,16	1.65	2 (14%)
17	04C	N	201	14	43,44,44	1.22	3 (6%)	55,58,58	1.28	8 (14%)
17	04C	V	301	8	43,44,44	1.27	3 (6%)	55,58,58	1.09	5 (9%)
17	04C	Y	301	11	43,44,44	1.31	3 (6%)	55,58,58	1.36	7 (12%)
18	MES	Y	303	-	11,12,12	0.69	0	14,16,16	1.58	2 (14%)
17	04C	b	201	14	43,44,44	1.23	3 (6%)	55,58,58	1.25	8 (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
17	04C	H	301	8	-	0/44/52/52	0/3/3/3
17	04C	K	301	11	-	0/44/52/52	0/3/3/3
18	MES	K	303	-	-	0/6/14/14	0/1/1/1
17	04C	N	201	14	-	0/44/52/52	0/3/3/3
17	04C	V	301	8	-	0/44/52/52	0/3/3/3
17	04C	Y	301	11	-	0/44/52/52	0/3/3/3
18	MES	Y	303	-	-	0/6/14/14	0/1/1/1
17	04C	b	201	14	-	0/44/52/52	0/3/3/3

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
17	K	301	04C	C40-C41	-4.53	1.40	1.51
17	N	201	04C	C40-C41	-4.30	1.40	1.51
17	b	201	04C	C40-C41	-4.23	1.40	1.51
17	Y	301	04C	C40-C41	-4.22	1.40	1.51
17	H	301	04C	C40-C41	-4.09	1.41	1.51
17	Y	301	04C	C7-C6	-4.07	1.41	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
17	V	301	04C	C40-C41	-4.06	1.41	1.51
17	K	301	04C	C7-C6	-4.00	1.41	1.51
17	H	301	04C	C7-C6	-3.61	1.42	1.51
17	b	201	04C	C7-C6	-3.53	1.42	1.51
17	N	201	04C	C7-C6	-3.52	1.42	1.51
17	V	301	04C	C7-C6	-3.34	1.43	1.51
17	H	301	04C	C11-C10	2.08	1.58	1.53
17	b	201	04C	C10-C9	4.04	1.61	1.53
17	N	201	04C	C10-C9	4.05	1.61	1.53
17	K	301	04C	C10-C9	4.52	1.62	1.53
17	H	301	04C	C10-C9	4.57	1.62	1.53
17	V	301	04C	C10-C9	4.62	1.62	1.53
17	Y	301	04C	C10-C9	4.91	1.62	1.53

All (43) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
17	N	201	04C	C11-C10-C12	-4.31	104.18	109.86
17	Y	301	04C	O13-C12-C10	-4.00	102.87	111.34
17	b	201	04C	C11-C10-C12	-3.91	104.71	109.86
17	Y	301	04C	C7-C8-N22	-3.45	106.37	110.14
17	K	301	04C	O13-C12-C10	-3.44	104.05	111.34
17	N	201	04C	C29-C30-N31	-3.32	104.82	113.20
17	H	301	04C	O34-C33-C32	-3.22	104.46	111.84
17	K	301	04C	C7-C8-N22	-3.20	106.65	110.14
17	b	201	04C	C29-C30-N31	-3.13	105.29	113.20
17	V	301	04C	O34-C33-C32	-3.07	104.80	111.84
17	H	301	04C	C11-C10-C12	-2.87	106.08	109.86
17	K	301	04C	C30-N31-C36	-2.87	106.83	111.07
17	K	301	04C	C41-C40-C24	-2.82	105.20	113.41
17	K	301	04C	C7-C8-C9	-2.80	104.92	111.14
17	Y	301	04C	C41-C40-C24	-2.80	105.27	113.41
17	Y	301	04C	C7-C8-C9	-2.77	104.99	111.14
17	Y	301	04C	C30-N31-C36	-2.76	106.99	111.07
17	b	201	04C	C35-C36-N31	-2.74	105.97	110.12
17	N	201	04C	C35-C36-N31	-2.71	106.01	110.12
17	K	301	04C	O34-C33-C32	-2.69	105.67	111.84
17	Y	301	04C	O34-C33-C32	-2.61	105.86	111.84
17	b	201	04C	C7-C8-N22	-2.60	107.30	110.14
17	Y	301	04C	C46-O45-C44	-2.59	111.46	117.51
17	K	301	04C	C46-O45-C44	-2.57	111.50	117.51
17	V	301	04C	C11-C10-C12	-2.57	106.47	109.86

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
17	N	201	04C	O34-C33-C32	-2.48	106.16	111.84
17	b	201	04C	O34-C33-C32	-2.46	106.19	111.84
17	N	201	04C	C7-C8-N22	-2.44	107.47	110.14
17	V	301	04C	C46-O45-C44	-2.42	111.86	117.51
17	H	301	04C	C46-O45-C44	-2.34	112.03	117.51
17	V	301	04C	C30-N31-C36	-2.25	107.74	111.07
17	H	301	04C	C30-N31-C36	-2.22	107.78	111.07
17	b	201	04C	C7-C6-C1	-2.09	116.52	120.90
17	N	201	04C	C7-C6-C1	-2.07	116.57	120.90
17	N	201	04C	C41-C40-C24	-2.06	107.40	113.41
17	b	201	04C	C41-C40-C24	-2.04	107.46	113.41
17	V	301	04C	C7-C6-C5	2.00	125.09	120.90
17	N	201	04C	C7-C6-C5	2.33	125.77	120.90
17	b	201	04C	C7-C6-C5	2.37	125.87	120.90
18	K	303	MES	O2S-S-C8	2.78	109.27	106.91
18	Y	303	MES	O2S-S-C8	3.15	109.59	106.91
18	Y	303	MES	O1S-S-C8	4.08	110.39	106.91
18	K	303	MES	O1S-S-C8	4.67	110.89	106.91

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5 monomers are involved in 21 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
17	H	301	04C	3	0
17	K	301	04C	5	0
17	N	201	04C	3	0
17	V	301	04C	4	0
17	Y	301	04C	6	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data ⓘ

### 6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	250/250 (100%)	-0.30	6 (2%) 62 50	41, 57, 99, 139	0
1	O	250/250 (100%)	-0.23	12 (4%) 34 23	43, 63, 106, 142	0
2	B	244/258 (94%)	-0.25	10 (4%) 41 29	39, 59, 106, 169	0
2	P	244/258 (94%)	-0.28	8 (3%) 50 38	42, 61, 108, 167	0
3	C	240/254 (94%)	-0.19	13 (5%) 29 19	38, 62, 125, 161	0
3	Q	240/254 (94%)	-0.04	16 (6%) 21 12	45, 76, 153, 202	0
4	D	235/260 (90%)	-0.38	1 (0%) 93 90	41, 64, 95, 140	0
4	R	235/260 (90%)	-0.33	7 (2%) 54 41	49, 69, 108, 153	0
5	E	231/234 (98%)	-0.22	6 (2%) 59 47	46, 69, 106, 150	0
5	S	231/234 (98%)	-0.25	5 (2%) 65 54	47, 70, 108, 139	0
6	F	243/288 (84%)	-0.19	8 (3%) 50 38	44, 66, 116, 149	0
6	T	243/288 (84%)	-0.27	6 (2%) 61 48	42, 67, 118, 154	0
7	G	241/252 (95%)	-0.21	7 (2%) 55 43	43, 63, 104, 152	0
7	U	241/252 (95%)	-0.31	5 (2%) 67 56	42, 60, 96, 144	0
8	H	222/232 (95%)	-0.10	3 (1%) 78 69	42, 60, 96, 140	0
8	V	222/232 (95%)	-0.11	3 (1%) 78 69	43, 64, 95, 143	0
9	I	204/205 (99%)	-0.63	4 (1%) 68 58	35, 50, 81, 104	0
9	W	204/205 (99%)	-0.59	4 (1%) 68 58	37, 52, 83, 99	0
10	J	195/198 (98%)	-0.65	2 (1%) 84 77	34, 48, 73, 118	0
10	X	195/198 (98%)	-0.66	3 (1%) 76 68	37, 50, 78, 127	0
11	K	212/212 (100%)	-0.61	1 (0%) 91 88	25, 52, 77, 95	0
11	Y	212/212 (100%)	-0.61	1 (0%) 91 88	20, 52, 80, 106	0
12	L	222/222 (100%)	-0.54	1 (0%) 91 88	37, 54, 82, 108	0
12	Z	222/222 (100%)	-0.54	1 (0%) 91 88	35, 54, 83, 109	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
13	M	225/246 (91%)	-0.46	2 (0%) 85 79	35, 56, 82, 100	0
13	a	225/246 (91%)	-0.50	2 (0%) 85 79	36, 54, 81, 111	0
14	N	196/196 (100%)	-0.38	0 100 100	32, 56, 86, 108	0
14	b	196/196 (100%)	-0.37	2 (1%) 84 77	31, 55, 83, 103	0
All	All	6320/6614 (95%)	-0.36	139 (2%) 65 54	20, 59, 102, 202	0

All (139) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	220	ASN	10.5
8	H	222	ASP	7.8
8	V	222	ASP	7.7
2	P	219	ALA	6.9
2	P	220	ASN	6.7
8	H	221	CYS	6.5
2	P	222	GLY	6.1
8	V	221	CYS	5.7
2	B	219	ALA	5.6
1	O	1	MET	5.3
2	B	221	ASP	5.2
5	S	202	ASP	5.1
1	A	1	MET	5.0
2	P	221	ASP	4.9
1	O	249	ALA	4.7
11	Y	212	GLY	4.6
3	Q	239	GLN	4.5
3	Q	49	THR	4.4
3	Q	50	LEU	4.4
1	O	2	THR	4.3
10	X	1	MET	4.0
3	C	49	THR	3.9
9	W	131	GLU	3.9
3	Q	206	LYS	3.9
5	E	202	ASP	3.9
2	P	51	VAL	3.8
3	C	206	LYS	3.8
6	T	2	THR	3.8
6	F	202	ASP	3.8
2	B	51	VAL	3.7
4	R	241	ALA	3.7
7	U	242	GLN	3.7

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Mol	Chain	Res	Type	RSRZ
6	F	205	GLU	3.7
3	Q	238	LYS	3.5
3	C	239	GLN	3.5
3	Q	240	GLU	3.4
9	I	131	GLU	3.4
2	B	222	GLY	3.4
9	W	1	SER	3.3
4	D	242	GLU	3.3
13	M	1	THR	3.3
3	Q	202	GLN	3.3
10	X	193	ASP	3.2
4	R	1	ASP	3.2
6	F	182	GLY	3.2
1	O	229	THR	3.1
3	Q	225	GLU	3.1
1	A	2	THR	3.1
10	X	194	ASP	3.1
3	C	216	ASP	3.1
10	J	1	MET	3.1
4	R	230	GLU	3.0
2	P	59	ASP	3.0
3	Q	48	SER	3.0
5	E	123	GLY	3.0
3	Q	51	LYS	3.0
9	I	130	ASP	3.0
9	W	133	LYS	3.0
11	K	212	GLY	3.0
1	A	249	ALA	2.9
7	U	222	ASP	2.9
6	F	244	ASN	2.9
6	T	244	ASN	2.9
7	G	222	ASP	2.9
8	H	217	ILE	2.9
1	O	231	LYS	2.9
9	W	130	ASP	2.9
1	A	229	THR	2.9
2	B	218	GLY	2.8
6	T	182	GLY	2.8
1	O	52	SER	2.8
3	C	1	GLY	2.8
2	B	52	THR	2.8
3	C	235	GLU	2.7

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
6	F	243	ILE	2.7
13	a	224	ASP	2.7
2	P	225	TYR	2.7
5	S	180	LYS	2.7
13	a	1	THR	2.7
9	I	133	LYS	2.6
5	S	225	ASP	2.6
6	T	178	HIS	2.6
1	O	201	GLU	2.6
14	b	105	LYS	2.6
3	C	202	GLN	2.6
7	G	3	TYR	2.6
14	b	106	ASN	2.5
4	R	2	ARG	2.5
7	U	181	LYS	2.5
6	F	180	PRO	2.5
2	B	242	GLY	2.5
9	I	1	SER	2.4
1	O	50	LYS	2.4
1	O	250	LEU	2.4
5	E	233	ILE	2.4
2	B	225	TYR	2.4
3	C	238	LYS	2.4
3	Q	236	GLN	2.3
7	G	242	GLN	2.3
5	E	3	ASN	2.3
4	R	242	GLU	2.3
5	E	218	ASP	2.3
7	G	241	GLU	2.3
2	B	182	ASP	2.3
5	S	3	ASN	2.3
7	G	179	LYS	2.3
8	V	32	ALA	2.3
2	P	182	ASP	2.3
10	J	194	ASP	2.3
3	Q	180	LYS	2.3
6	F	215	CYS	2.3
4	R	125	LEU	2.2
13	M	69	ASP	2.2
3	C	240	GLU	2.2
5	E	201	ARG	2.2
1	O	207	ASP	2.2

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Mol	Chain	Res	Type	RSRZ
3	C	204	GLY	2.2
7	G	188	GLU	2.2
12	L	172	LEU	2.2
7	G	40	ASP	2.2
6	T	181	GLU	2.2
7	U	2	GLY	2.2
3	C	180	LYS	2.1
7	U	241	GLU	2.1
4	R	203	LYS	2.1
3	Q	60	SER	2.1
12	Z	210	ASP	2.1
1	O	203	GLU	2.1
5	S	173	ARG	2.1
1	A	182	GLU	2.1
3	Q	223	SER	2.1
3	Q	59	PRO	2.1
1	A	250	LEU	2.0
1	O	245	ASP	2.0
3	C	181	GLU	2.0
3	Q	141	ASP	2.0
3	C	205	ALA	2.0
6	F	177	ASP	2.0
6	T	166	GLN	2.0

## 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

## 6.3 Carbohydrates [i](#)

There are no 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, 95<sup>th</sup> 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( $\text{\AA}^2$ )	Q<0.9
18	MES	K	303	12/12	0.91	0.37	9.47	61,86,89,98	0
18	MES	Y	303	12/12	0.89	0.35	8.52	57,83,86,86	0
17	04C	H	301	42/42	0.71	0.58	7.73	40,57,79,83	0
15	MG	Z	301	1/1	0.94	0.39	7.00	71,71,71,71	0
17	04C	V	301	42/42	0.78	0.59	6.00	40,51,90,100	0
17	04C	N	201	42/42	0.93	0.21	2.67	30,38,47,52	0
17	04C	Y	301	42/42	0.95	0.16	1.46	19,36,59,61	0
17	04C	b	201	42/42	0.93	0.19	1.19	29,38,53,59	0
17	04C	K	301	42/42	0.95	0.16	0.69	23,39,56,58	0
15	MG	N	202	1/1	0.97	0.17	0.38	48,48,48,48	0
15	MG	G	301	1/1	0.95	0.11	-0.92	54,54,54,54	0
15	MG	V	302	1/1	0.98	0.14	-1.06	66,66,66,66	0
15	MG	Y	302	1/1	0.98	0.07	-1.45	54,54,54,54	0
15	MG	K	302	1/1	0.99	0.06	-1.68	58,58,58,58	0
15	MG	I	301	1/1	0.98	0.07	-1.94	48,48,48,48	0
16	CL	U	301	1/1	0.98	0.15	-	42,42,42,42	0
16	CL	G	302	1/1	0.98	0.14	-	43,43,43,43	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.