



wwPDB X-ray Structure Validation Summary Report ⓘ

Jan 2, 2024 – 09:33 pm GMT

PDB ID : 5FGA
Title : Yeast 20S proteasome beta5-K33A mutant (propeptide expressed in trans)
Authors : Huber, E.M.; Groll, M.
Deposited on : 2015-12-20
Resolution : 2.70 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.36
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

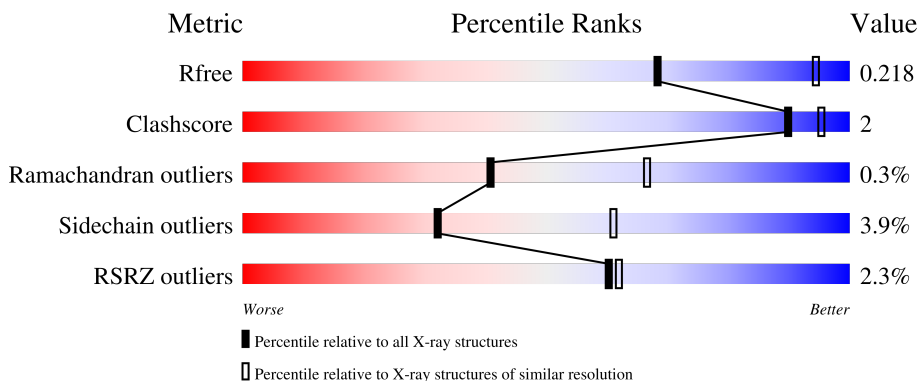
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

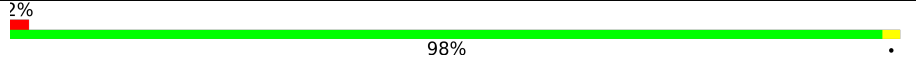
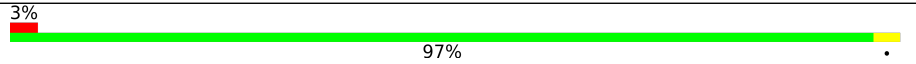
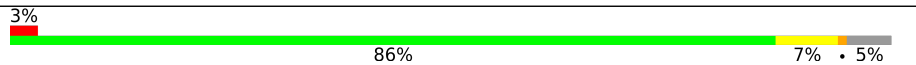

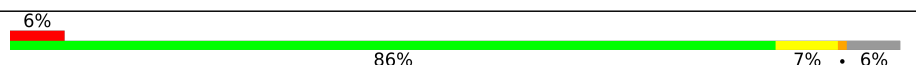
The reported resolution of this entry is 2.70 Å.

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	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

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

Mol	Chain	Length	Quality of chain
1	A	250	 2% 98%
1	O	250	 3% 97%
2	B	258	 3% 86% 7% 5%
2	P	258	 3% 86% 8% 5%
3	C	254	 6% 86% 7% 6%

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Mol	Chain	Length	Quality of chain
3	Q	254	7% 87% 7% • 6%
4	D	260	2% 85% 5% • 10%
4	R	260	3% 85% 5% 10%
5	E	234	% 93% 6% •
5	S	234	3% 92% 7% •
6	F	288	% 80% 5% 16%
6	T	288	2% 80% 5% 16%
7	G	252	% 88% 8% •
7	U	252	4% 88% 7% •
8	H	232	3% 90% 7% •
8	V	232	3% 88% 9% •
9	I	205	% 92% 8%
9	W	205	% 93% 6%
10	J	198	2% 91% 5% •••
10	X	198	3% 90% 7% •••
11	K	212	% 92% 6% •
11	Y	212	% 92% 6% •
12	L	222	% 94% 5%
12	Z	222	% 94% 5%
13	M	246	% 89% 5% 5%
13	a	246	% 92% • 6%
14	N	196	% 93% 7% •
14	b	196	% 97% •

2 Entry composition [i](#)

There are 17 unique types of molecules in this entry. The entry contains 49871 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
11	K	212	1640	1042	279	312	7	0	0	0
11	Y	212	1640	1042	279	312	7	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
K	33	ALA	LYS	engineered mutation	UNP P30656
Y	33	ALA	LYS	engineered mutation	UNP P30656

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

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

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
13	M	233	1824	1154	312	351	7	0	0	0
13	a	232	1815	1148	311	349	7	0	0	0

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

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

- 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	I	2	Total Mg 2 2	0	0
15	K	1	Total Mg 1 1	0	0
15	L	1	Total Mg 1 1	0	0
15	N	1	Total Mg 1 1	0	0
15	W	1	Total Mg 1 1	0	0
15	Z	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 water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
17	A	20	Total O 20 20	0	0
17	B	14	Total O 14 14	0	0
17	C	20	Total O 20 20	0	0
17	D	16	Total O 16 16	0	0
17	E	10	Total O 10 10	0	0
17	F	18	Total O 18 18	0	0
17	G	23	Total O 23 23	0	0
17	H	25	Total O 25 25	0	0
17	I	16	Total O 16 16	0	0

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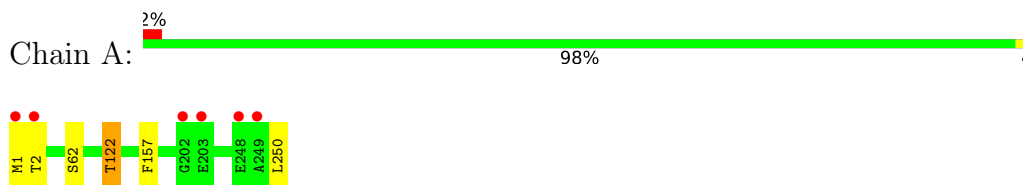
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
17	J	16	Total 16	O 16	0	0
17	K	17	Total 17	O 17	0	0
17	L	31	Total 31	O 31	0	0
17	M	24	Total 24	O 24	0	0
17	N	22	Total 22	O 22	0	0
17	O	7	Total 7	O 7	0	0
17	P	13	Total 13	O 13	0	0
17	Q	13	Total 13	O 13	0	0
17	R	17	Total 17	O 17	0	0
17	S	5	Total 5	O 5	0	0
17	T	19	Total 19	O 19	0	0
17	U	23	Total 23	O 23	0	0
17	V	18	Total 18	O 18	0	0
17	W	16	Total 16	O 16	0	0
17	X	15	Total 15	O 15	0	0
17	Y	25	Total 25	O 25	0	0
17	Z	19	Total 19	O 19	0	0
17	a	30	Total 30	O 30	0	0
17	b	20	Total 20	O 20	0	0

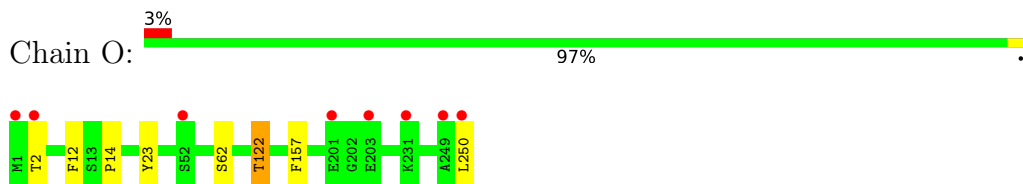
3 Residue-property plots [i](#)

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.

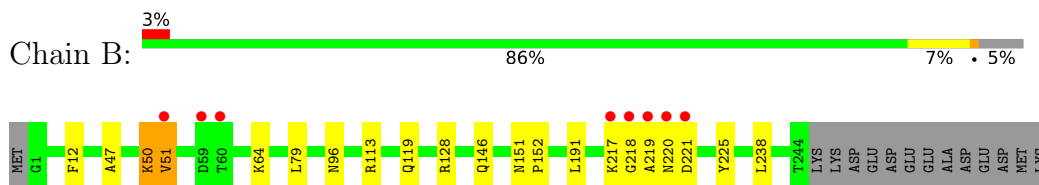
- Molecule 1: Proteasome subunit alpha type-2



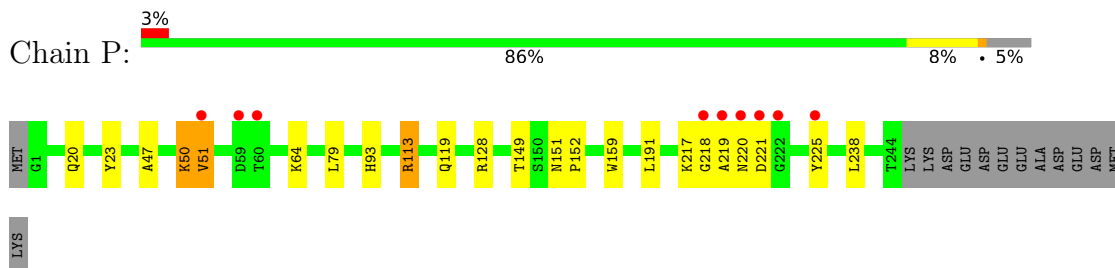
- Molecule 1: Proteasome subunit alpha type-2



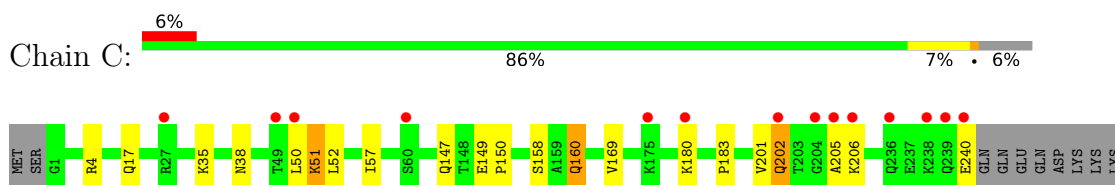
- Molecule 2: Proteasome subunit alpha type-3



- Molecule 2: Proteasome subunit alpha type-3

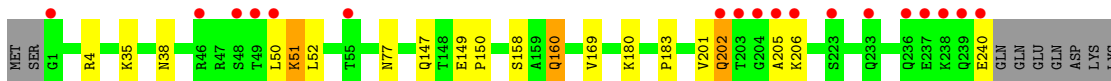
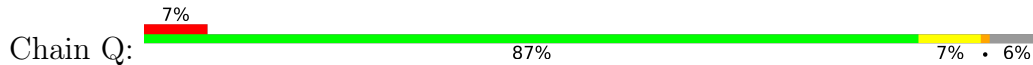


- Molecule 3: Proteasome subunit alpha type-4



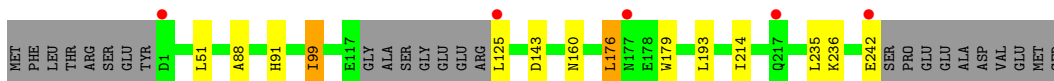
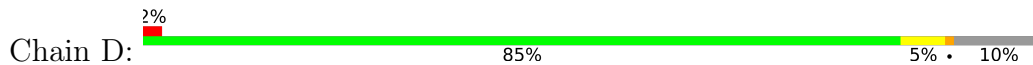
LYS
SER
ASN
HIS

● Molecule 3: Proteasome subunit alpha type-4

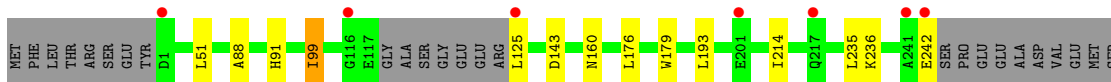
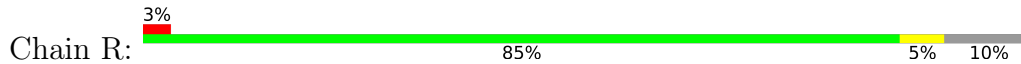


LYS
LYS
SER
ASN
HIS

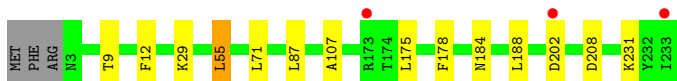
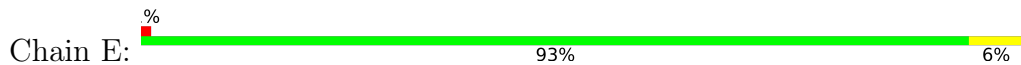
● Molecule 4: Proteasome subunit alpha type-5



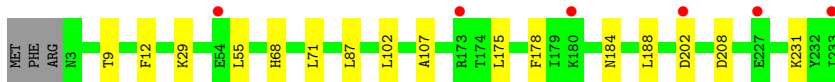
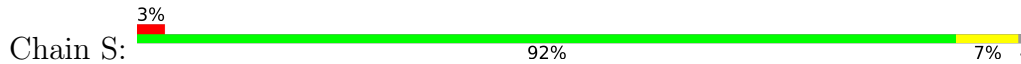
● Molecule 4: Proteasome subunit alpha type-5



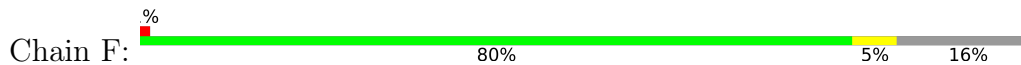
● Molecule 5: Proteasome subunit alpha type-6



● Molecule 5: Proteasome subunit alpha type-6

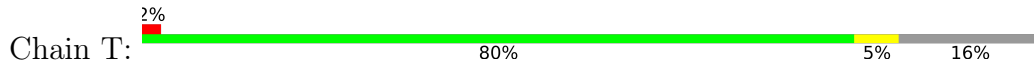


● Molecule 6: Probable proteasome subunit alpha type-7



THR ASN
ALA ALA
SER ILE
ILE ASN
ALA THR
THR ASP
ASP GLN
GLU GLU
GLY ASP
GLY ILE
HIS LEU
GLU

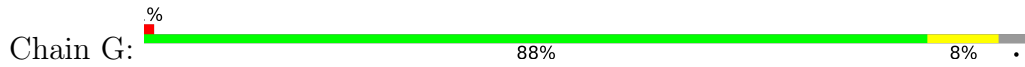
- Molecule 6: Probable proteasome subunit alpha type-7



MET THR
THR SER
ILE ALA
GLY ASN
T2 ALA
Q19 THR
Q117 ASP
M123 GLN
K139 GLY
G155 ASP
L172 ILE
F180 HIS
E181 LEU
L198 GLU
E201 ASP
D202 VAL
K206 MET
D207 SER
W214 THR
Q240 ASN
K241 ASP
E242 ASP
I243 LEU
N244 VAL
GLY

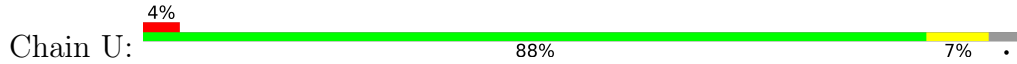
ALA THR
THR ASN
ALA ALA
ALA ASN
ALA THR
THR ASP
ASP GLN
GLU GLU
GLY ASP
ASP ILE
HIS LEU
GLU

- Molecule 7: Proteasome subunit alpha type-1



MET SER
GLY GLY
ALA ALA
ALA ALA
ALA ALA
SER SER
ALA ALA
ALA ALA
G2 THR
Y3 ASP
F23 ASP
T26 ASP
I63 ASP
R68 ASP
V73 ASP
N75 ASP
I78 ASP
P79 ASP
N83 ASP
L115 ASP
S116 ASP
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M125 ASP
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K165 ASP
L205 ASP
E208 ASP
E215 ASP
R235 ASP
L236 ASP
Q242 ASP

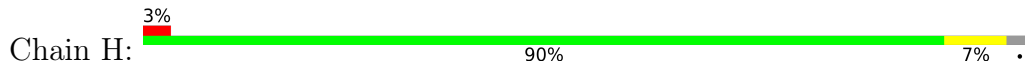
- Molecule 7: Proteasome subunit alpha type-1



MET SER
SER GLY
GLY ALA
ALA ALA
ALA ALA
SER SER
ALA ALA
ALA ALA
G2 THR
Y3 ASP
P12 ASP
F23 ASP
T26 ASP
F51 ASP
T59 ASP
V73 ASP
N75 ASP
I78 ASP
P79 ASP
N83 ASP
L115 ASP
S116 ASP
Q117 ASP
R122 ASP
M125 ASP
T133 ASP
K165 ASP
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T207 ASP
E208 ASP
D222 ASP
R235 ASP
L236 ASP
E241 ASP
Q242 ASP

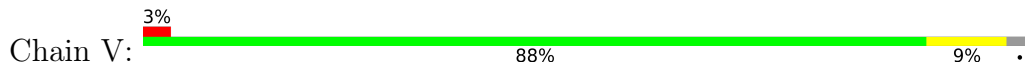
ASP

- Molecule 8: Proteasome subunit beta type-2



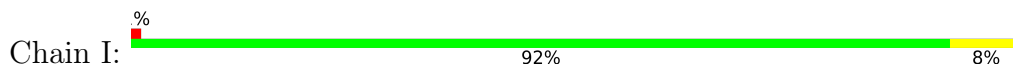
T1 THR
T2 ASP
I3 LEU
N30 ASP
L34 THR
C43 ASP
A44 ASP
T52 ASP
V55 ASP
T56 ASP
I63 ASP
L68 ASP
P74 ASP
I99 ASP
D104 ASP
P105 ASP
S112 ASP
L125 ASP
S126 ASP
L127 ASP
R196 ASP
E197 ASP
E198 ASP
I217 ASP
C221 ASP
D222 ASP
I223 ASP
Q224 ASP
E225 ASP
E226 ASP
GLN
VAL
ASP
ILE
THR
ALA

- Molecule 8: Proteasome subunit beta type-2



T1 THR
T2 ASP
I3 LEU
N30 ASP
L34 THR
C43 ASP
A44 ASP
T52 ASP
V55 ASP
T56 ASP
I63 ASP
L68 ASP
P74 ASP
L80 ASP
I99 ASP
D104 ASP
P105 ASP
S112 ASP
I113 ASP
T119 ASP
L125 ASP
S126 ASP
L127 ASP
D145 ASP
R196 ASP
C221 ASP
D222 ASP
I223 ASP
Q224 ASP
E225 ASP
E226 ASP
GLN
VAL
ASP
ILE
THR
ALA

- Molecule 9: Proteasome subunit beta type-3

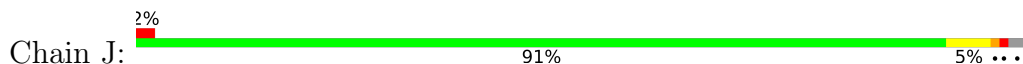




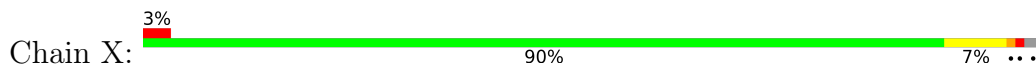
- Molecule 9: Proteasome subunit beta type-3



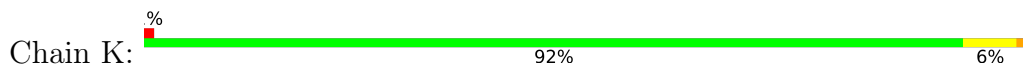
- Molecule 10: Proteasome subunit beta type-4



- Molecule 10: Proteasome subunit beta type-4



- Molecule 11: Proteasome subunit beta type-5



- Molecule 11: Proteasome subunit beta type-5



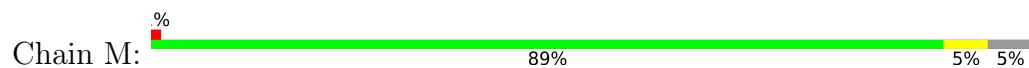
- Molecule 12: Proteasome subunit beta type-6



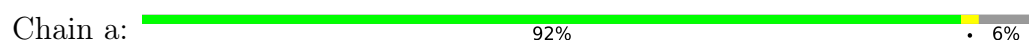
- Molecule 12: Proteasome subunit beta type-6



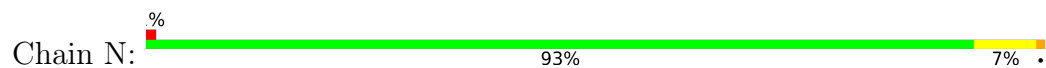
- Molecule 13: Proteasome subunit beta type-7



- 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, α , β , γ	135.35Å 300.50Å 144.44Å 90.00° 113.10° 90.00°	Depositor
Resolution (Å)	15.00 – 2.70 15.00 – 2.70	Depositor EDS
% Data completeness (in resolution range)	98.6 (15.00-2.70) 98.6 (15.00-2.70)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.69 (at 2.69Å)	Xtrriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.188 , 0.214 0.193 , 0.218	Depositor DCC
R_{free} test set	14192 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	54.0	Xtrriage
Anisotropy	0.107	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 38.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	49871	wwPDB-VP
Average B, all atoms (Å ²)	63.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.57% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality i

5.1 Standard geometry i

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.26	0/1952	0.46	0/2642
1	O	0.26	0/1952	0.46	0/2642
2	B	0.27	0/1934	0.49	0/2618
2	P	0.27	0/1934	0.50	0/2618
3	C	0.27	0/1910	0.51	0/2586
3	Q	0.27	0/1910	0.50	0/2586
4	D	0.26	0/1837	0.47	0/2475
4	R	0.26	0/1837	0.47	0/2475
5	E	0.26	0/1800	0.47	0/2433
5	S	0.26	0/1800	0.47	0/2433
6	F	0.27	0/1932	0.45	0/2609
6	T	0.26	0/1932	0.45	0/2609
7	G	0.27	0/1945	0.47	0/2634
7	U	0.26	0/1945	0.47	0/2634
8	H	0.25	0/1750	0.48	0/2373
8	V	0.25	0/1750	0.48	0/2373
9	I	0.27	0/1611	0.50	0/2174
9	W	0.27	0/1611	0.50	0/2174
10	J	0.39	1/1589 (0.1%)	0.76	5/2142 (0.2%)
10	X	0.36	0/1589	0.73	3/2142 (0.1%)
11	K	0.26	0/1677	0.50	0/2270
11	Y	0.26	0/1677	0.50	0/2270
12	L	0.26	0/1795	0.49	0/2420
12	Z	0.26	0/1795	0.49	0/2420
13	M	0.27	0/1855	0.52	0/2514
13	a	0.27	0/1846	0.51	0/2503
14	N	0.25	0/1541	0.49	0/2087
14	b	0.25	0/1541	0.48	0/2087
All	All	0.27	1/50247 (0.0%)	0.51	8/67943 (0.0%)

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

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

Mol	Chain	#Chirality outliers	#Planarity outliers
10	J	0	2
10	X	0	1
All	All	0	3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	J	1	MET	SD-CE	8.51	2.25	1.77

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
10	J	1	MET	CG-SD-CE	15.16	124.46	100.20
10	X	1	MET	CB-CA-C	-15.09	80.22	110.40
10	X	1	MET	CG-SD-CE	13.91	122.46	100.20
10	J	1	MET	CB-CA-C	-12.72	84.96	110.40
10	J	1	MET	CA-CB-CG	-9.42	97.29	113.30

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
10	J	1	MET	Mainchain
10	J	2	ASP	Peptide
10	X	1	MET	Mainchain

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	2	0
1	O	1915	0	1929	4	0
2	B	1904	0	1904	10	0
2	P	1904	0	1904	12	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	1881	0	1895	7	0
3	Q	1881	0	1895	5	0
4	D	1813	0	1797	5	0
4	R	1813	0	1797	5	0
5	E	1773	0	1775	4	0
5	S	1773	0	1775	4	0
6	F	1892	0	1883	3	0
6	T	1892	0	1883	3	0
7	G	1907	0	1901	6	0
7	U	1907	0	1901	6	0
8	H	1719	0	1719	8	0
8	V	1719	0	1719	14	0
9	I	1581	0	1574	8	0
9	W	1581	0	1574	6	0
10	J	1561	0	1568	13	0
10	X	1561	0	1569	21	0
11	K	1640	0	1587	8	0
11	Y	1640	0	1587	8	0
12	L	1757	0	1711	3	0
12	Z	1757	0	1711	3	0
13	M	1824	0	1832	5	0
13	a	1815	0	1821	0	0
14	N	1512	0	1481	7	0
14	b	1512	0	1481	0	0
15	G	1	0	0	0	0
15	I	2	0	0	0	0
15	K	1	0	0	0	0
15	L	1	0	0	0	0
15	N	1	0	0	0	0
15	W	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	A	20	0	0	0	0
17	B	14	0	0	1	0
17	C	20	0	0	0	0
17	D	16	0	0	0	0
17	E	10	0	0	0	0
17	F	18	0	0	0	0
17	G	23	0	0	0	0
17	H	25	0	0	0	0
17	I	16	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
17	J	16	0	0	1	0
17	K	17	0	0	1	0
17	L	31	0	0	0	0
17	M	24	0	0	1	0
17	N	22	0	0	0	0
17	O	7	0	0	0	0
17	P	13	0	0	2	0
17	Q	13	0	0	0	0
17	R	17	0	0	0	0
17	S	5	0	0	0	0
17	T	19	0	0	0	0
17	U	23	0	0	0	0
17	V	18	0	0	0	0
17	W	16	0	0	0	0
17	X	15	0	0	1	0
17	Y	25	0	0	1	0
17	Z	19	0	0	0	0
17	a	30	0	0	0	0
17	b	20	0	0	0	0
All	All	49871	0	49102	162	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.

The worst 5 of 162 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:SD	10:J:1:MET:CE	2.25	1.25
10:X:1:MET:O	10:X:1:MET:CE	1.68	1.15
10:X:3:ILE:HD11	10:X:168:LEU:HD13	1.15	1.11
8:V:80:LEU:HG	8:V:113:ILE:HD11	1.33	1.11
13:M:2:GLN:NE2	17:M:301:HOH:O	1.88	1.06

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%)	239 (96%)	8 (3%)	1 (0%)	34	60
1	O	248/250 (99%)	239 (96%)	8 (3%)	1 (0%)	34	60
2	B	242/258 (94%)	236 (98%)	2 (1%)	4 (2%)	9	23
2	P	242/258 (94%)	236 (98%)	2 (1%)	4 (2%)	9	23
3	C	238/254 (94%)	232 (98%)	3 (1%)	3 (1%)	12	30
3	Q	238/254 (94%)	232 (98%)	3 (1%)	3 (1%)	12	30
4	D	231/260 (89%)	228 (99%)	3 (1%)	0	100	100
4	R	231/260 (89%)	228 (99%)	3 (1%)	0	100	100
5	E	229/234 (98%)	222 (97%)	7 (3%)	0	100	100
5	S	229/234 (98%)	222 (97%)	7 (3%)	0	100	100
6	F	241/288 (84%)	238 (99%)	3 (1%)	0	100	100
6	T	241/288 (84%)	238 (99%)	3 (1%)	0	100	100
7	G	239/252 (95%)	237 (99%)	2 (1%)	0	100	100
7	U	239/252 (95%)	237 (99%)	2 (1%)	0	100	100
8	H	224/232 (97%)	218 (97%)	6 (3%)	0	100	100
8	V	224/232 (97%)	217 (97%)	7 (3%)	0	100	100
9	I	202/205 (98%)	196 (97%)	6 (3%)	0	100	100
9	W	202/205 (98%)	196 (97%)	6 (3%)	0	100	100
10	J	193/198 (98%)	188 (97%)	5 (3%)	0	100	100
10	X	193/198 (98%)	188 (97%)	5 (3%)	0	100	100
11	K	210/212 (99%)	206 (98%)	4 (2%)	0	100	100
11	Y	210/212 (99%)	206 (98%)	4 (2%)	0	100	100
12	L	220/222 (99%)	215 (98%)	5 (2%)	0	100	100
12	Z	220/222 (99%)	215 (98%)	5 (2%)	0	100	100
13	M	231/246 (94%)	222 (96%)	9 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
13	a	230/246 (94%)	221 (96%)	9 (4%)	0	100	100
14	N	194/196 (99%)	190 (98%)	4 (2%)	0	100	100
14	b	194/196 (99%)	190 (98%)	4 (2%)	0	100	100
All	All	6283/6614 (95%)	6132 (98%)	135 (2%)	16 (0%)	41	66

5 of 16 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	51	VAL
2	B	221	ASP
3	C	202	GLN
2	P	51	VAL
2	P	221	ASP

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	209/209 (100%)	205 (98%)	4 (2%)	57	82
1	O	209/209 (100%)	205 (98%)	4 (2%)	57	82
2	B	203/216 (94%)	197 (97%)	6 (3%)	41	70
2	P	203/216 (94%)	197 (97%)	6 (3%)	41	70
3	C	212/226 (94%)	202 (95%)	10 (5%)	26	54
3	Q	212/226 (94%)	201 (95%)	11 (5%)	23	49
4	D	194/215 (90%)	184 (95%)	10 (5%)	23	49
4	R	194/215 (90%)	184 (95%)	10 (5%)	23	49
5	E	190/193 (98%)	181 (95%)	9 (5%)	26	54
5	S	190/193 (98%)	181 (95%)	9 (5%)	26	54
6	F	201/239 (84%)	191 (95%)	10 (5%)	24	51
6	T	201/239 (84%)	191 (95%)	10 (5%)	24	51
7	G	206/210 (98%)	196 (95%)	10 (5%)	25	52

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
7	U	206/210 (98%)	196 (95%)	10 (5%)	25	52
8	H	185/190 (97%)	178 (96%)	7 (4%)	33	62
8	V	185/190 (97%)	178 (96%)	7 (4%)	33	62
9	I	172/173 (99%)	169 (98%)	3 (2%)	60	84
9	W	172/173 (99%)	169 (98%)	3 (2%)	60	84
10	J	173/175 (99%)	168 (97%)	5 (3%)	42	71
10	X	173/175 (99%)	168 (97%)	5 (3%)	42	71
11	K	168/168 (100%)	160 (95%)	8 (5%)	25	53
11	Y	168/168 (100%)	160 (95%)	8 (5%)	25	53
12	L	185/185 (100%)	177 (96%)	8 (4%)	29	57
12	Z	185/185 (100%)	177 (96%)	8 (4%)	29	57
13	M	199/208 (96%)	192 (96%)	7 (4%)	36	65
13	a	198/208 (95%)	192 (97%)	6 (3%)	41	70
14	N	162/162 (100%)	157 (97%)	5 (3%)	40	69
14	b	162/162 (100%)	156 (96%)	6 (4%)	34	63
All	All	5317/5538 (96%)	5112 (96%)	205 (4%)	32	61

5 of 205 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	Q	51	LYS
6	T	123	ASN
14	b	9	LYS
3	Q	169	VAL
4	R	235	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 108 such sidechains are listed below:

Mol	Chain	Res	Type
2	P	58	GLN
5	S	92	ASN
12	Z	49	ASN
2	P	119	GLN
3	Q	160	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 10 ligands modelled in this entry, 10 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	250/250 (100%)	-0.38	6 (2%) 59 60	40, 52, 85, 126	0
1	O	250/250 (100%)	-0.30	8 (3%) 47 48	46, 62, 105, 133	0
2	B	244/258 (94%)	-0.22	8 (3%) 46 46	40, 60, 101, 155	0
2	P	244/258 (94%)	-0.18	9 (3%) 41 41	48, 65, 106, 153	0
3	C	240/254 (94%)	-0.11	14 (5%) 23 22	41, 64, 124, 154	0
3	Q	240/254 (94%)	0.06	18 (7%) 14 12	49, 74, 154, 181	0
4	D	235/260 (90%)	-0.38	5 (2%) 63 65	44, 64, 96, 137	0
4	R	235/260 (90%)	-0.29	7 (2%) 50 51	47, 67, 106, 141	0
5	E	231/234 (98%)	-0.28	3 (1%) 77 78	47, 65, 101, 143	0
5	S	231/234 (98%)	-0.20	6 (2%) 56 57	49, 72, 109, 150	0
6	F	243/288 (84%)	-0.40	4 (1%) 72 74	42, 57, 107, 130	0
6	T	243/288 (84%)	-0.31	6 (2%) 57 59	41, 66, 121, 148	0
7	G	241/252 (95%)	-0.48	2 (0%) 86 87	36, 53, 87, 134	0
7	U	241/252 (95%)	-0.33	9 (3%) 41 41	44, 59, 88, 132	0
8	H	226/232 (97%)	-0.32	8 (3%) 44 44	38, 52, 87, 154	0
8	V	226/232 (97%)	-0.26	7 (3%) 49 49	42, 55, 92, 169	0
9	I	204/205 (99%)	-0.56	2 (0%) 82 83	40, 52, 78, 97	0
9	W	204/205 (99%)	-0.51	3 (1%) 73 76	43, 54, 83, 104	0
10	J	195/198 (98%)	-0.37	3 (1%) 73 76	40, 55, 81, 128	0
10	X	195/198 (98%)	-0.28	5 (2%) 56 57	36, 59, 84, 145	0
11	K	212/212 (100%)	-0.38	2 (0%) 84 85	40, 57, 79, 100	0
11	Y	212/212 (100%)	-0.44	0 100 100	45, 57, 80, 100	0
12	L	222/222 (100%)	-0.53	1 (0%) 91 92	40, 53, 86, 123	0
12	Z	222/222 (100%)	-0.51	2 (0%) 84 85	41, 53, 85, 122	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
13	M	233/246 (94%)	-0.60	2 (0%) 84 85	36, 52, 74, 91	0
13	a	232/246 (94%)	-0.54	1 (0%) 92 93	37, 52, 72, 90	0
14	N	196/196 (100%)	-0.60	2 (1%) 82 83	36, 47, 74, 103	0
14	b	196/196 (100%)	-0.59	2 (1%) 82 83	37, 49, 76, 108	0
All	All	6343/6614 (95%)	-0.36	145 (2%) 60 62	36, 58, 100, 181	0

The worst 5 of 145 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	221	ASP	7.5
3	Q	50	LEU	7.1
8	V	224	GLN	7.1
10	X	1	MET	6.7
2	B	219	ALA	6.6

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
15	MG	I	301	1/1	0.93	0.39	72,72,72,72	0
15	MG	W	301	1/1	0.94	0.48	73,73,73,73	0
15	MG	I	302	1/1	0.95	0.13	57,57,57,57	0
15	MG	Z	301	1/1	0.96	0.40	61,61,61,61	0
15	MG	N	201	1/1	0.97	0.10	49,49,49,49	0
15	MG	K	301	1/1	0.98	0.05	56,56,56,56	0
15	MG	G	301	1/1	0.98	0.09	63,63,63,63	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
15	MG	L	301	1/1	0.99	0.05	58,58,58,58	0
16	CL	U	301	1/1	0.99	0.14	46,46,46,46	0
16	CL	G	302	1/1	1.00	0.12	39,39,39,39	0

6.5 Other polymers [i](#)

There are no such residues in this entry.