



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 01:59 PM UTC

PDB ID : 4LTC / pdb_00004ltc
Title : Crystal structure of yeast 20S proteasome in complex with enone carmaphyicin analogue 6
Authors : Stein, M.; Trivella, D.B.B.; Groll, M.
Deposited on : 2013-07-23
Resolution : 2.50 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

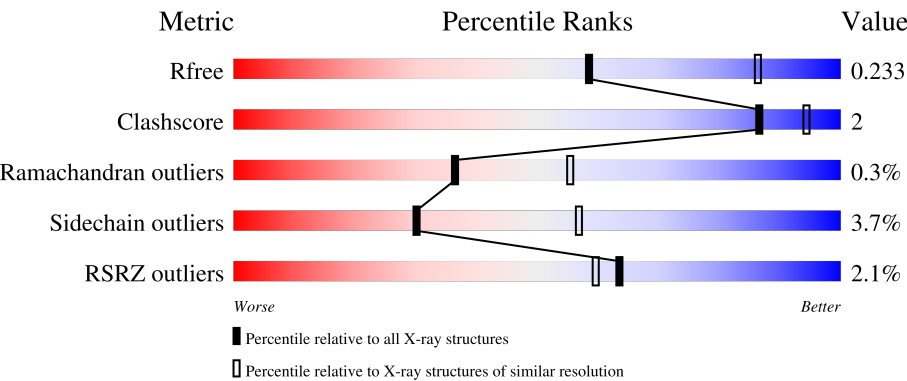
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R _{free}	180053	5829 (2.50-2.50)
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)
RSRZ outliers	180081	5833 (2.50-2.50)

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

Mol	Chain	Length	Quality of chain
1	A	250	<div><div>0%</div><div>94%</div><div>5%</div></div>
1	O	250	<div><div>2%</div><div>97%</div><div>.</div></div>
2	B	258	<div><div>4%</div><div>83%</div><div>10%</div><div>5%</div></div>
2	P	258	<div><div>3%</div><div>85%</div><div>8%</div><div>5%</div></div>
3	C	254	<div><div>4%</div><div>86%</div><div>8%</div><div>5%</div></div>

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	Q	254	 6% 87% 7% • 5%
4	D	260	 4% 86% 7% • 7%
4	R	260	 3% 86% 7% • 7%
5	E	234	 3% 88% 11%
5	S	234	 5% 89% 11%
6	F	287	 2% 78% 5% • 15%
6	T	287	 2% 80% 5% • 15%
7	G	252	 2% 88% 8% • •
7	U	252	 2% 87% 8% • •
8	H	232	 92% • •
8	V	232	 90% 6% •
9	I	205	 95% •
9	W	205	 96% •
10	J	198	 3% 95% 5%
10	X	198	 3% 95% • •
11	K	212	 89% 9% •
11	Y	212	 91% 8% •
12	L	222	 91% 7% •
12	Z	222	 91% 8% •
13	M	233	 92% 7% •
13	a	233	 91% 8% •
14	N	196	 96% • •
14	b	196	 94% 5% •

2 Entry composition

There are 16 unique types of molecules in this entry. The entry contains 52219 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	241	Total	C	N	O	S	0	0	0
			1890	1181	331	374	4			
3	Q	241	Total	C	N	O	S	0	0	0
			1890	1181	331	374	4			

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	242	Total	C	N	O	S	0	0	0
			1861	1162	314	378	7			
4	R	242	Total	C	N	O	S	0	0	0
			1861	1162	314	378	7			

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

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 Probable proteasome subunit alpha type-7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	F	244	Total	C	N	O	S	0	0	0
			1896	1205	330	357	4			
6	T	244	Total	C	N	O	S	0	0	0
			1896	1205	330	357	4			

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

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 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	198	Total	C	N	O	S	0	0	0
			1585	1005	269	305	6			

Continued on next page...

Continued from previous page...

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 subunit beta type-5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
11	K	212	Total	C	N	O	S	0	0	0
			1644	1045	280	312	7			
11	Y	212	Total	C	N	O	S	0	0	0
			1644	1045	280	312	7			

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

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

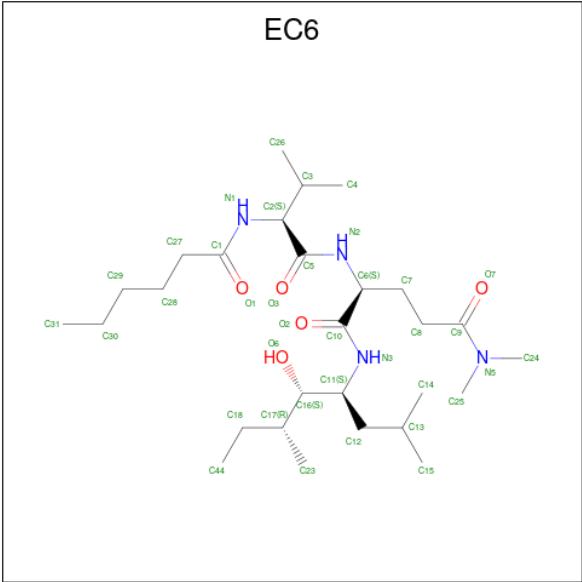
- Molecule 13 is a protein called Proteasome subunit beta type-7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
13	M	233	Total	C	N	O	S	0	0	0
			1824	1154	312	351	7			
13	a	233	Total	C	N	O	S	0	0	0
			1824	1154	312	351	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 N-hexanoyl-L-valyl-N 1 -[(4S,5S,6R)-5-hydroxy-2,6-dimethyloctan-4-yl]-N 5 , N 5 -dimethyl-L-glutamamide (CCD ID: EC6) (formula: C₂₈H₅₄N₄O₅).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
15	K	1	Total	C	N	O	0	0
			37	28	4	5		
15	Y	1	Total	C	N	O	0	0
			37	28	4	5		

- Molecule 16 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	A	99	Total	O	0	0
			99	99		
16	B	77	Total	O	0	0
			77	77		
16	C	85	Total	O	0	0
			85	85		
16	D	86	Total	O	0	0
			86	86		
16	E	57	Total	O	0	0
			57	57		
16	F	92	Total	O	0	0
			92	92		
16	G	121	Total	O	0	0
			121	121		
16	O	66	Total	O	0	0
			66	66		
16	P	75	Total	O	0	0
			75	75		
16	Q	73	Total	O	0	0
			73	73		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	R	85	Total 85	O 85	0	0
16	S	49	Total 49	O 49	0	0
16	T	89	Total 89	O 89	0	0
16	U	110	Total 110	O 110	0	0
16	H	101	Total 101	O 101	0	0
16	I	107	Total 107	O 107	0	0
16	J	103	Total 103	O 103	0	0
16	K	104	Total 104	O 104	0	0
16	L	110	Total 110	O 110	0	0
16	M	132	Total 132	O 132	0	0
16	N	101	Total 101	O 101	0	0
16	V	91	Total 91	O 91	0	0
16	W	104	Total 104	O 104	0	0
16	X	98	Total 98	O 98	0	0
16	Y	73	Total 73	O 73	0	0
16	Z	102	Total 102	O 102	0	0
16	a	111	Total 111	O 111	0	0
16	b	106	Total 106	O 106	0	0

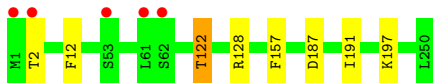
3 Residue-property plots [i](#)

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.

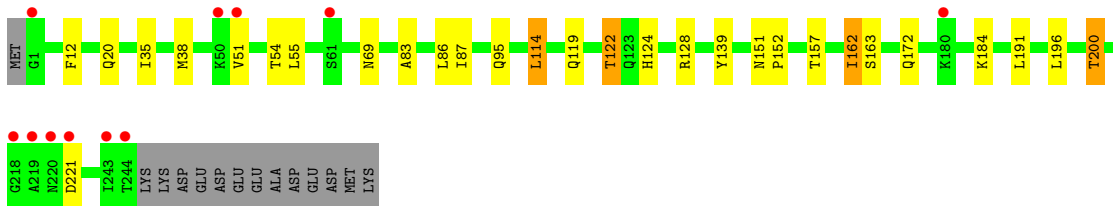
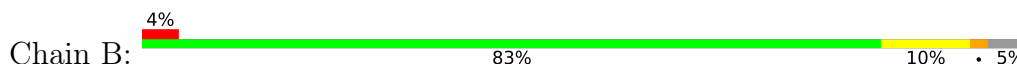
- Molecule 1: Proteasome subunit alpha type-2



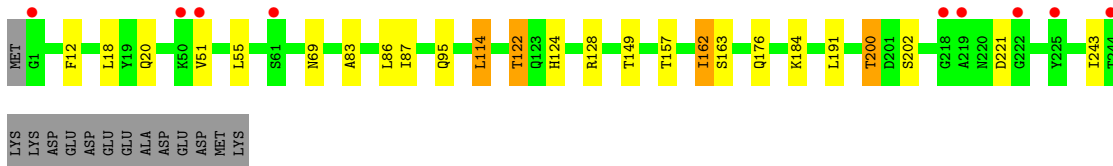
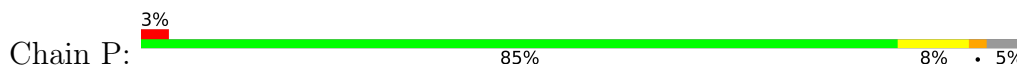
- Molecule 1: Proteasome subunit alpha type-2



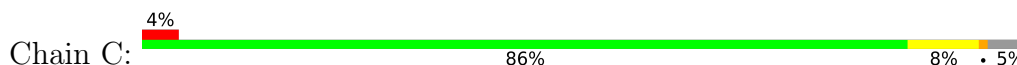
- Molecule 2: Proteasome subunit alpha type-3

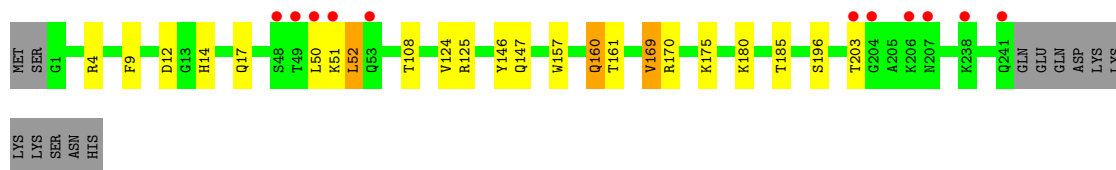


- Molecule 2: Proteasome subunit alpha type-3

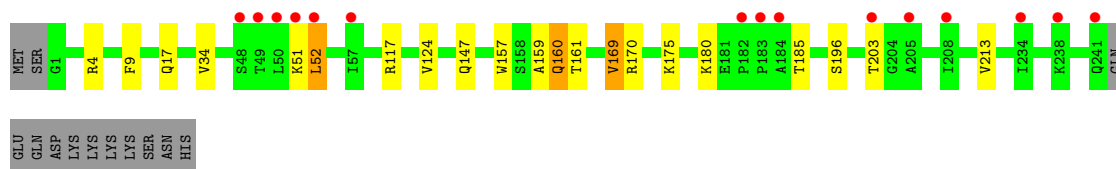
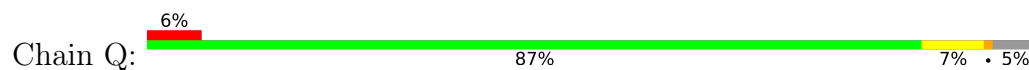


- Molecule 3: Proteasome subunit alpha type-4

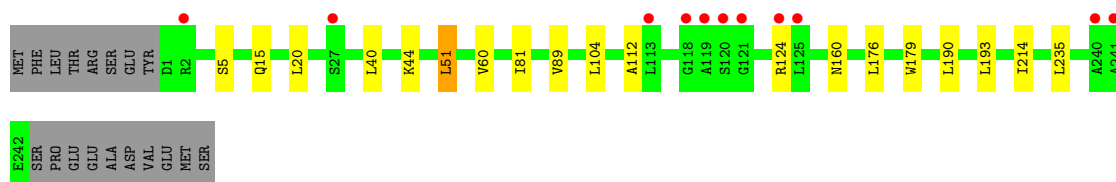
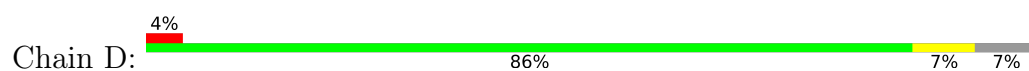




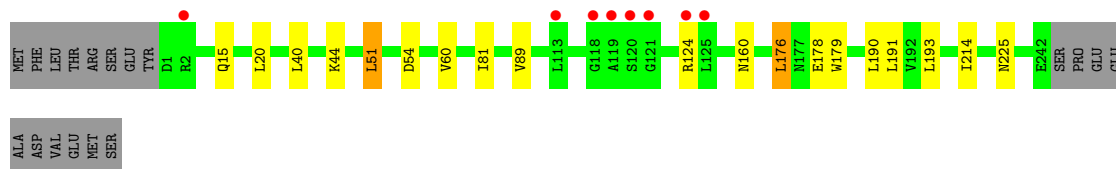
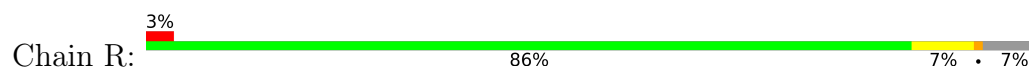
• Molecule 3: Proteasome subunit alpha type-4



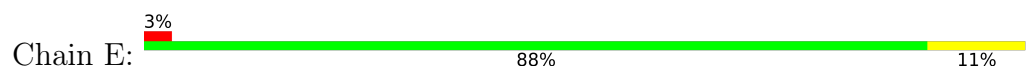
• Molecule 4: Proteasome subunit alpha type-5



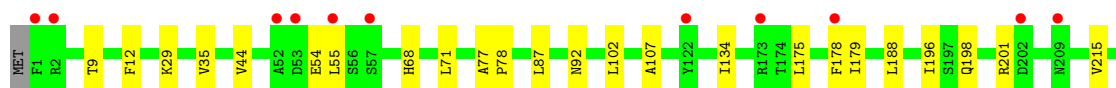
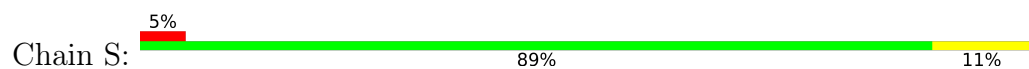
• Molecule 4: Proteasome subunit alpha type-5



• Molecule 5: Proteasome subunit alpha type-6

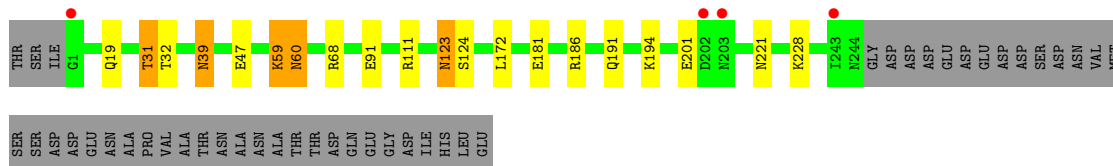
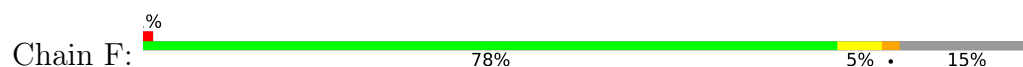


• Molecule 5: Proteasome subunit alpha type-6

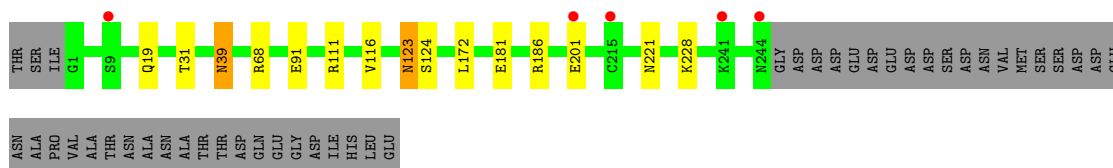
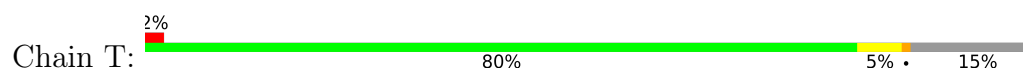




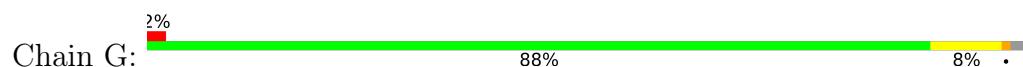
- Molecule 6: Probable proteasome subunit alpha type-7



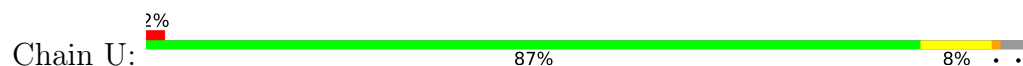
- Molecule 6: Probable proteasome subunit alpha type-7



- Molecule 7: Proteasome subunit alpha type-1



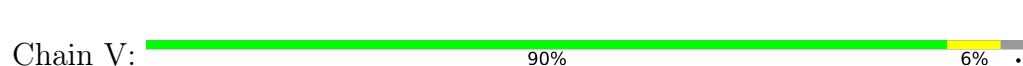
- Molecule 7: Proteasome subunit alpha type-1



- 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



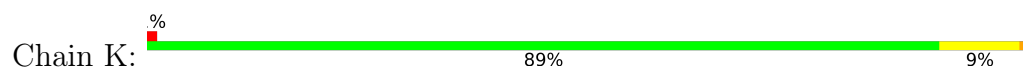
- Molecule 10: Proteasome subunit beta type-4



- Molecule 10: Proteasome subunit beta type-4



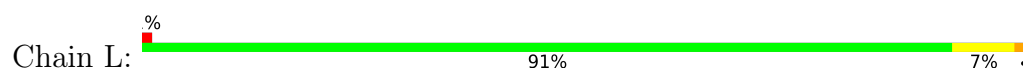
- Molecule 11: Proteasome subunit beta type-5



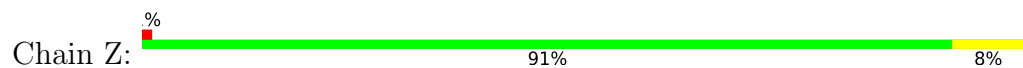
- Molecule 11: Proteasome subunit beta type-5



- Molecule 12: Proteasome subunit beta type-6



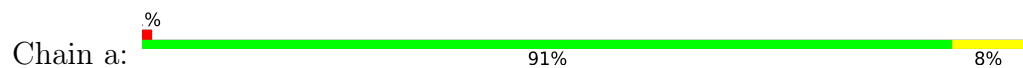
• Molecule 12: Proteasome subunit beta type-6



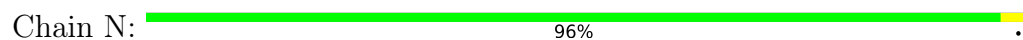
• Molecule 13: Proteasome subunit beta type-7



• 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, α , β , γ	135.17Å 300.23Å 144.38Å 90.00° 112.79° 90.00°	Depositor
Resolution (Å)	15.00 – 2.50 15.00 – 2.50	Depositor EDS
% Data completeness (in resolution range)	96.8 (15.00-2.50) 96.8 (15.00-2.50)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.09 (at 2.51Å)	Xtriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.204 , 0.233 0.206 , 0.233	Depositor DCC
R_{free} test set	17633 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	49.9	Xtriage
Anisotropy	0.144	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 45.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	52219	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.40% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: EC6

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	0.40	0/1952	0.69	0/2642
1	O	0.40	0/1952	0.70	0/2642
2	B	0.41	0/1934	0.69	0/2618
2	P	0.40	0/1934	0.67	0/2618
3	C	0.40	0/1919	0.70	0/2598
3	Q	0.41	0/1919	0.69	0/2598
4	D	0.39	0/1886	0.66	0/2541
4	R	0.39	0/1886	0.66	0/2541
5	E	0.39	0/1823	0.66	0/2463
5	S	0.39	0/1823	0.63	0/2463
6	F	0.42	0/1936	0.69	0/2614
6	T	0.40	0/1936	0.69	0/2614
7	G	0.40	0/1959	0.67	0/2652
7	U	0.39	0/1959	0.67	0/2652
8	H	0.38	0/1715	0.67	0/2326
8	V	0.39	0/1715	0.69	0/2326
9	I	0.40	0/1611	0.69	0/2174
9	W	0.39	0/1611	0.68	0/2174
10	J	0.40	0/1613	0.64	0/2173
10	X	0.39	0/1613	0.65	0/2173
11	K	0.48	1/1681 (0.1%)	0.70	0/2274
11	Y	0.49	1/1681 (0.1%)	0.71	1/2274 (0.0%)
12	L	0.40	0/1795	0.67	0/2420
12	Z	0.40	0/1795	0.69	0/2420
13	M	0.41	0/1855	0.68	0/2514
13	a	0.40	0/1855	0.66	0/2514
14	N	0.39	0/1541	0.67	0/2087
14	b	0.38	0/1541	0.66	0/2087
All	All	0.40	2/50440 (0.0%)	0.68	1/68192 (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
11	K	0	1
11	Y	0	1
All	All	0	2

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
11	Y	1	THR	C-N	11.75	1.49	1.33
11	K	1	THR	C-N	11.73	1.49	1.33

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	Y	1	THR	CA-CB-CG2	5.07	119.12	110.50

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
11	K	1	THR	Peptide
11	Y	1	THR	Peptide

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1915	0	1929	7	0
1	O	1915	0	1929	4	0
2	B	1904	0	1904	15	0
2	P	1904	0	1904	12	0
3	C	1890	0	1903	15	0
3	Q	1890	0	1903	12	0
4	D	1861	0	1839	7	0
4	R	1861	0	1839	7	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	E	1795	0	1800	12	0
5	S	1795	0	1800	12	0
6	F	1896	0	1889	10	0
6	T	1896	0	1889	8	0
7	G	1921	0	1913	11	0
7	U	1921	0	1913	13	0
8	H	1684	0	1688	4	0
8	V	1684	0	1688	5	0
9	I	1581	0	1574	4	0
9	W	1581	0	1574	4	0
10	J	1585	0	1590	3	0
10	X	1585	0	1590	4	0
11	K	1644	0	1592	10	0
11	Y	1644	0	1592	8	0
12	L	1757	0	1711	15	0
12	Z	1757	0	1711	13	0
13	M	1824	0	1832	9	0
13	a	1824	0	1832	9	0
14	N	1512	0	1481	2	0
14	b	1512	0	1481	4	0
15	K	37	0	52	1	0
15	Y	37	0	52	2	0
16	A	99	0	0	0	0
16	B	77	0	0	0	0
16	C	85	0	0	0	0
16	D	86	0	0	1	0
16	E	57	0	0	0	0
16	F	92	0	0	1	0
16	G	121	0	0	0	0
16	H	101	0	0	0	0
16	I	107	0	0	0	0
16	J	103	0	0	1	0
16	K	104	0	0	1	0
16	L	110	0	0	2	0
16	M	132	0	0	0	0
16	N	101	0	0	0	0
16	O	66	0	0	0	0
16	P	75	0	0	1	0
16	Q	73	0	0	1	0
16	R	85	0	0	0	0
16	S	49	0	0	0	0
16	T	89	0	0	2	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
16	U	110	0	0	1	0
16	V	91	0	0	1	0
16	W	104	0	0	0	0
16	X	98	0	0	2	0
16	Y	73	0	0	0	0
16	Z	102	0	0	1	0
16	a	111	0	0	0	0
16	b	106	0	0	0	0
All	All	52219	0	49394	203	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 (203) 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)
7:G:92:ALA:HA	7:G:103:MET:HE2	1.58	0.85
7:U:92:ALA:HA	7:U:103:MET:HE2	1.59	0.84
6:T:91:GLU:HG2	6:T:111:ARG:HB3	1.64	0.80
7:G:103:MET:HE3	7:G:108:LEU:HD13	1.71	0.71
3:C:51:LYS:O	3:C:52:LEU:HB2	1.90	0.71
5:E:92:ASN:HD21	12:L:70:ASN:HD21	1.41	0.68
12:L:49:ASN:HD21	12:L:211:GLY:HA2	1.58	0.68
5:E:12:PHE:H	6:F:19:GLN:HE22	1.40	0.67
3:Q:160:GLN:HE21	3:Q:160:GLN:HA	1.58	0.67
7:U:103:MET:HE3	7:U:108:LEU:HD13	1.77	0.67
12:L:16:ALA:HB2	12:L:122:VAL:HG23	1.76	0.67
3:C:160:GLN:HE21	3:C:160:GLN:HA	1.60	0.66
4:D:89:VAL:HG11	11:K:65:LEU:HD22	1.79	0.65
5:S:12:PHE:H	6:T:19:GLN:HE22	1.45	0.63
6:T:116:VAL:HA	16:T:377:HOH:O	1.99	0.62
10:X:13:VAL:HG22	16:X:291:HOH:O	2.00	0.62
2:B:12:PHE:H	3:C:17:GLN:HE22	1.48	0.62
6:F:91:GLU:HG2	6:F:111:ARG:HB3	1.82	0.62
6:T:123:ASN:C	6:T:123:ASN:HD22	2.08	0.61
7:U:83:ASN:C	7:U:83:ASN:HD22	2.07	0.61
7:G:83:ASN:C	7:G:83:ASN:HD22	2.10	0.60
5:E:35:VAL:HG23	5:E:196:ILE:HD12	1.83	0.60
2:P:95:GLN:HE22	9:W:71:ASN:HD22	1.48	0.60
6:F:123:ASN:C	6:F:123:ASN:HD22	2.11	0.59
6:F:31:THR:HG21	6:F:47:GLU:O	2.03	0.57

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:S:92:ASN:HD21	12:Z:70:ASN:HD21	1.52	0.57
5:S:35:VAL:HG23	5:S:196:ILE:HD12	1.85	0.57
5:E:87:LEU:HD11	5:E:107:ALA:HB1	1.86	0.56
7:G:34:LEU:HD23	7:G:201:MET:HE3	1.87	0.56
12:Z:16:ALA:HB2	12:Z:122:VAL:HG23	1.86	0.56
5:E:92:ASN:HD21	12:L:70:ASN:ND2	2.03	0.56
12:Z:49:ASN:HD21	12:Z:211:GLY:HA2	1.72	0.55
5:S:87:LEU:HD11	5:S:107:ALA:HB1	1.88	0.54
5:E:92:ASN:ND2	12:L:70:ASN:HD21	2.05	0.54
6:F:39:ASN:C	6:F:39:ASN:HD22	2.15	0.54
2:P:18:LEU:HD13	2:P:122:THR:HG23	1.90	0.53
14:b:176:VAL:HG12	14:b:178:LEU:HD13	1.91	0.53
3:Q:51:LYS:O	3:Q:52:LEU:HB2	2.09	0.53
3:C:161:THR:HG21	3:C:169:VAL:HG13	1.92	0.52
3:C:169:VAL:HG23	3:C:196:SER:HB2	1.90	0.52
2:B:86:LEU:HB3	2:B:114:LEU:HD21	1.91	0.52
2:B:95:GLN:HE22	9:I:71:ASN:HD22	1.58	0.52
14:N:176:VAL:HG12	14:N:178:LEU:HD13	1.90	0.52
11:K:49:ALA:HA	15:K:301:EC6:H43	1.93	0.51
4:R:89:VAL:HG11	11:Y:65:LEU:HD22	1.93	0.51
3:Q:169:VAL:HG23	3:Q:196:SER:HB2	1.93	0.51
7:U:83:ASN:C	7:U:83:ASN:ND2	2.67	0.51
14:b:51:ASP:O	14:b:55:ILE:HG12	2.11	0.51
13:M:219:TRP:CH2	14:b:171:GLY:HA2	2.46	0.50
6:F:123:ASN:HD22	6:F:124:SER:N	2.08	0.50
2:P:124:HIS:HB3	3:Q:124:VAL:HG12	1.92	0.50
12:L:13:LEU:HD13	12:L:150:LEU:HD21	1.94	0.50
6:T:91:GLU:HG2	6:T:111:ARG:CB	2.39	0.50
13:a:48:ASN:HD22	13:a:48:ASN:H	1.59	0.50
7:G:83:ASN:C	7:G:83:ASN:ND2	2.70	0.50
5:S:92:ASN:HD21	12:Z:70:ASN:ND2	2.10	0.50
8:V:80:LEU:HD12	8:V:113:ILE:HD11	1.93	0.50
6:F:19:GLN:NE2	16:F:311:HOH:O	2.45	0.49
7:U:45:ILE:HG21	16:U:399:HOH:O	2.12	0.49
12:L:3:ASN:HD22	12:L:4:PRO:HD2	1.77	0.49
11:Y:86:LEU:C	11:Y:86:LEU:HD13	2.37	0.49
13:a:27:LEU:HD21	13:a:34:LEU:HD22	1.94	0.49
6:F:59:LYS:O	6:F:60:ASN:C	2.54	0.49
4:R:160:ASN:HB3	4:R:179:TRP:CE2	2.48	0.49
12:L:109:THR:HG23	16:L:306:HOH:O	2.11	0.49
11:Y:33:LYS:HE2	15:Y:301:EC6:H43	1.95	0.49

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:U:34:LEU:C	7:U:34:LEU:HD12	2.38	0.48
6:T:39:ASN:HD22	6:T:39:ASN:C	2.21	0.48
3:Q:161:THR:HG21	3:Q:169:VAL:HG13	1.96	0.48
13:M:127:LEU:HG	13:M:142:LEU:HD12	1.94	0.48
1:A:128:ARG:HH21	7:G:120:THR:HG22	1.78	0.47
2:P:86:LEU:HB3	2:P:114:LEU:HD21	1.95	0.47
3:C:9:PHE:H	4:D:15:GLN:HE22	1.62	0.47
12:L:4:PRO:O	13:M:104:ARG:NH1	2.44	0.47
2:P:176:GLN:NE2	16:P:330:HOH:O	2.46	0.47
11:K:37:ILE:HB	11:K:41:LEU:HB3	1.94	0.47
12:L:13:LEU:CD1	12:L:150:LEU:HD21	2.44	0.47
3:Q:9:PHE:H	4:R:15:GLN:HE22	1.63	0.47
10:J:4:ILE:HG21	16:J:299:HOH:O	2.13	0.47
12:L:213:ARG:NH1	16:L:329:HOH:O	2.47	0.47
2:B:172:GLN:HG2	3:C:50:LEU:HD12	1.96	0.47
13:M:48:ASN:HD22	13:M:48:ASN:H	1.62	0.47
4:D:112:ALA:HB2	16:D:377:HOH:O	2.15	0.47
3:Q:160:GLN:HE22	3:Q:170:ARG:HE	1.62	0.47
5:S:92:ASN:ND2	12:Z:70:ASN:HD21	2.13	0.47
12:Z:4:PRO:O	13:a:104:ARG:NH1	2.42	0.47
2:B:124:HIS:HB3	3:C:124:VAL:HG12	1.97	0.47
12:Z:49:ASN:ND2	16:Z:316:HOH:O	2.48	0.47
8:V:210:THR:HG21	9:W:167:SER:HB3	1.97	0.47
6:T:123:ASN:HD22	6:T:124:SER:N	2.13	0.47
11:Y:37:ILE:HB	11:Y:41:LEU:HB3	1.97	0.46
3:Q:117:ARG:NH2	16:Q:309:HOH:O	2.47	0.46
14:N:51:ASP:O	14:N:55:ILE:HG12	2.15	0.46
1:A:12:PHE:H	2:B:20:GLN:HE22	1.62	0.46
12:Z:13:LEU:CD1	12:Z:150:LEU:HD21	2.45	0.46
12:Z:13:LEU:HD13	12:Z:150:LEU:HD21	1.98	0.46
4:D:160:ASN:HB3	4:D:179:TRP:CE2	2.50	0.46
3:C:160:GLN:HE22	3:C:170:ARG:HE	1.63	0.46
3:Q:160:GLN:HE21	3:Q:160:GLN:CA	2.27	0.46
7:G:78:ILE:N	7:G:79:PRO:CD	2.79	0.46
2:B:162:ILE:HD13	2:B:163:SER:O	2.16	0.45
3:C:157:TRP:CZ2	4:D:51:LEU:HD23	2.51	0.45
1:O:128:ARG:HH21	7:U:120:THR:HG22	1.81	0.45
11:K:86:LEU:C	11:K:86:LEU:HD13	2.42	0.45
10:J:21:VAL:HG11	11:K:122:LEU:HD11	1.98	0.45
4:D:104:LEU:C	4:D:104:LEU:HD13	2.42	0.45
9:I:81:ILE:CD1	9:I:85:THR:HB	2.45	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:U:78:ILE:N	7:U:79:PRO:CD	2.79	0.45
12:Z:195:HIS:HD2	12:Z:197:GLN:H	1.65	0.45
11:K:35:ILE:HB	16:K:497:HOH:O	2.16	0.45
13:M:17:ASP:OD1	13:M:18:ASN:N	2.50	0.45
8:V:84:LYS:HE2	8:V:119:THR:HG23	1.99	0.45
12:Z:147:MET:N	12:Z:148:PRO:HD2	2.32	0.45
14:b:38:HIS:O	14:b:39:ASP:C	2.59	0.45
8:H:104:ASP:HB2	8:H:105:PRO:CD	2.47	0.44
10:X:152:MET:HE2	10:X:156:GLU:HB3	1.98	0.44
4:R:176:LEU:HD22	5:S:55:LEU:HD13	1.98	0.44
11:Y:4:LEU:HD13	11:Y:161:ILE:HD11	2.00	0.44
3:Q:34:VAL:HG12	3:Q:159:ALA:HB1	2.00	0.44
6:T:19:GLN:NE2	16:T:308:HOH:O	2.48	0.44
13:M:165:ILE:HB	13:M:166:PRO:HD3	2.00	0.44
1:A:55:LEU:HD12	7:G:170:THR:HG23	2.00	0.43
5:S:44:VAL:HG21	5:S:188:LEU:HB3	1.99	0.43
7:U:44:VAL:CG1	7:U:135:VAL:HG11	2.47	0.43
1:A:122:THR:HG22	2:B:128:ARG:HH21	1.82	0.43
12:Z:3:ASN:HD22	12:Z:4:PRO:HD2	1.84	0.43
3:Q:157:TRP:CZ2	4:R:51:LEU:HD23	2.54	0.43
1:A:187:ASP:O	1:A:191:ILE:HG12	2.19	0.43
11:K:44:THR:HG21	11:K:100:MET:HE3	2.01	0.43
13:M:63:ILE:HD13	13:M:114:ILE:HD11	1.99	0.43
7:G:34:LEU:HD12	7:G:34:LEU:C	2.44	0.43
9:I:9:GLY:HA3	9:I:41:LYS:HE2	2.01	0.42
11:K:83:LEU:HD11	11:K:97:MET:HE1	2.00	0.42
7:G:72:MET:HE3	7:G:74:VAL:CG2	2.49	0.42
4:R:178:GLU:HB3	4:R:191:LEU:HD21	2.01	0.42
11:Y:38:ASN:HB2	11:Y:39:PRO:CD	2.49	0.42
10:X:174:MET:HB2	16:X:207:HOH:O	2.20	0.42
5:S:134:ILE:HD12	5:S:215:VAL:HG12	2.02	0.42
12:L:8:ASN:HA	12:L:30:ILE:O	2.20	0.42
8:V:62:ASN:HB3	8:V:82:MET:HE1	2.01	0.42
8:V:172:ASN:ND2	16:V:378:HOH:O	2.52	0.42
1:A:115:ALA:HB1	1:A:154:GLY:O	2.20	0.42
1:O:187:ASP:O	1:O:191:ILE:HG12	2.20	0.42
5:S:68:HIS:HE1	5:S:102:LEU:O	2.02	0.42
13:a:16:TYR:CE2	13:a:170:VAL:HG22	2.54	0.42
2:P:200:THR:HG22	2:P:202:SER:H	1.85	0.42
5:S:77:ALA:N	5:S:78:PRO:CD	2.83	0.42
7:U:106:ASP:HB3	7:U:146:TYR:CZ	2.54	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:I:62:LEU:HD12	9:I:104:VAL:HG11	2.02	0.42
11:K:3:THR:HG22	11:K:16:VAL:HG12	2.01	0.42
9:W:10:ILE:HG21	9:W:141:ALA:HB3	2.00	0.42
13:a:150:MET:HE1	13:a:187:ARG:HG3	2.02	0.42
5:E:118:ASN:HD22	5:E:118:ASN:N	2.17	0.42
5:S:175:LEU:HA	5:S:178:PHE:CE2	2.54	0.42
8:H:222:ASP:N	8:H:222:ASP:OD1	2.53	0.42
2:P:95:GLN:NE2	9:W:71:ASN:HD22	2.16	0.41
13:M:16:TYR:CE2	13:M:170:VAL:HG22	2.54	0.41
6:F:191:GLN:HE21	6:F:194:LYS:CE	2.33	0.41
7:G:149:ASP:HB2	7:G:150:PRO:CD	2.51	0.41
2:B:83:ALA:O	2:B:87:ILE:HG12	2.20	0.41
5:E:32:SER:O	5:E:61:LYS:NZ	2.53	0.41
6:F:91:GLU:HG3	6:F:111:ARG:HH11	1.85	0.41
2:P:12:PHE:H	3:Q:17:GLN:HE22	1.67	0.41
12:L:147:MET:N	12:L:148:PRO:HD2	2.34	0.41
13:M:179:ASN:HD22	13:M:182:ARG:HH11	1.67	0.41
13:a:127:LEU:HG	13:a:142:LEU:HD12	2.01	0.41
2:B:122:THR:CG2	3:C:125:ARG:HH21	2.33	0.41
2:P:83:ALA:O	2:P:87:ILE:HG12	2.20	0.41
4:R:60:VAL:HG21	4:R:81:ILE:HD13	2.02	0.41
12:L:126:ASP:HB3	12:L:130:SER:HB3	2.02	0.41
7:U:187:GLU:HG2	7:U:192:LYS:CB	2.50	0.41
13:a:17:ASP:OD1	13:a:18:ASN:N	2.53	0.41
2:B:35:ILE:HD12	2:B:196:LEU:HG	2.01	0.41
1:O:12:PHE:H	2:P:20:GLN:HE22	1.67	0.41
12:L:100:LYS:HD3	12:L:105:TYR:CZ	2.55	0.41
2:P:162:ILE:HD13	2:P:163:SER:O	2.20	0.41
2:B:139:TYR:CD1	2:B:139:TYR:C	2.99	0.41
5:E:9:THR:HG21	5:E:119:THR:HA	2.01	0.41
8:H:7:LYS:HG3	8:H:123:TYR:HA	2.02	0.41
3:C:51:LYS:O	3:C:52:LEU:CB	2.65	0.41
4:D:60:VAL:HG21	4:D:81:ILE:HD13	2.02	0.41
5:E:44:VAL:HG21	5:E:188:LEU:HB3	2.02	0.41
8:H:104:ASP:HB2	8:H:105:PRO:HD2	2.03	0.41
10:X:33:ASP:OD1	10:X:35:THR:HG22	2.20	0.41
11:Y:20:ALA:HB1	15:Y:301:EC6:H4	2.03	0.41
13:a:97:ALA:HA	13:a:130:VAL:HG21	2.03	0.41
3:C:12:ASP:OD2	3:C:14:HIS:ND1	2.54	0.41
5:E:1:PHE:O	5:E:3:ASN:N	2.54	0.41
7:U:187:GLU:HG2	7:U:192:LYS:HB3	2.03	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:J:89:ALA:O	10:J:92:ILE:HG22	2.20	0.41
11:Y:83:LEU:HD11	11:Y:97:MET:HE1	2.03	0.41
13:a:165:ILE:HB	13:a:166:PRO:HD3	2.03	0.41
3:C:51:LYS:HD2	3:C:52:LEU:N	2.35	0.40
7:U:149:ASP:HB2	7:U:150:PRO:CD	2.51	0.40
11:K:4:LEU:C	11:K:4:LEU:HD22	2.46	0.40
2:B:151:ASN:HB2	2:B:152:PRO:CD	2.50	0.40
2:B:196:LEU:O	2:B:200:THR:OG1	2.39	0.40
1:A:89:SER:OG	1:A:114:VAL:HG22	2.22	0.40
2:B:119:GLN:O	2:B:122:THR:HB	2.21	0.40
3:C:108:THR:HG21	3:C:146:TYR:HB3	2.03	0.40
1:O:122:THR:HG22	2:P:128:ARG:HH21	1.86	0.40
5:E:175:LEU:HA	5:E:178:PHE:CE2	2.57	0.40
12:Z:126:ASP:CB	12:Z:130:SER:HB3	2.51	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	248/250 (99%)	239 (96%)	8 (3%)	1 (0%)	30	49
1	O	248/250 (99%)	238 (96%)	9 (4%)	1 (0%)	30	49
2	B	242/258 (94%)	233 (96%)	7 (3%)	2 (1%)	16	31
2	P	242/258 (94%)	232 (96%)	8 (3%)	2 (1%)	16	31
3	C	239/254 (94%)	234 (98%)	3 (1%)	2 (1%)	16	31
3	Q	239/254 (94%)	232 (97%)	5 (2%)	2 (1%)	16	31
4	D	240/260 (92%)	234 (98%)	6 (2%)	0	100	100
4	R	240/260 (92%)	233 (97%)	7 (3%)	0	100	100
5	E	231/234 (99%)	224 (97%)	6 (3%)	1 (0%)	30	49

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
5	S	231/234 (99%)	222 (96%)	8 (4%)	1 (0%)	30	49
6	F	242/287 (84%)	234 (97%)	6 (2%)	2 (1%)	16	31
6	T	242/287 (84%)	233 (96%)	9 (4%)	0	100	100
7	G	241/252 (96%)	233 (97%)	6 (2%)	2 (1%)	16	31
7	U	241/252 (96%)	236 (98%)	3 (1%)	2 (1%)	16	31
8	H	220/232 (95%)	215 (98%)	5 (2%)	0	100	100
8	V	220/232 (95%)	214 (97%)	6 (3%)	0	100	100
9	I	202/205 (98%)	195 (96%)	7 (4%)	0	100	100
9	W	202/205 (98%)	197 (98%)	5 (2%)	0	100	100
10	J	196/198 (99%)	189 (96%)	7 (4%)	0	100	100
10	X	196/198 (99%)	190 (97%)	6 (3%)	0	100	100
11	K	210/212 (99%)	205 (98%)	4 (2%)	1 (0%)	24	43
11	Y	210/212 (99%)	203 (97%)	6 (3%)	1 (0%)	24	43
12	L	220/222 (99%)	214 (97%)	6 (3%)	0	100	100
12	Z	220/222 (99%)	213 (97%)	7 (3%)	0	100	100
13	M	231/233 (99%)	223 (96%)	8 (4%)	0	100	100
13	a	231/233 (99%)	223 (96%)	7 (3%)	1 (0%)	30	49
14	N	194/196 (99%)	187 (96%)	7 (4%)	0	100	100
14	b	194/196 (99%)	186 (96%)	8 (4%)	0	100	100
All	All	6312/6586 (96%)	6111 (97%)	180 (3%)	21 (0%)	36	55

All (21) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	C	52	LEU
7	G	242	GLN
3	Q	52	LEU
5	E	201	ARG
7	G	2	GLY
5	S	201	ARG
7	U	2	GLY
7	U	242	GLN
6	F	60	ASN
11	K	209	ASN
2	B	221	ASP

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
3	C	203	THR
6	F	59	LYS
2	P	51	VAL
2	P	221	ASP
11	Y	209	ASN
2	B	51	VAL
1	O	2	THR
3	Q	203	THR
1	A	2	THR
13	a	229	GLY

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%)	50 76
1	O	209/209 (100%)	206 (99%)	3 (1%)	59 81
2	B	203/216 (94%)	192 (95%)	11 (5%)	20 41
2	P	203/216 (94%)	192 (95%)	11 (5%)	20 41
3	C	213/226 (94%)	206 (97%)	7 (3%)	33 61
3	Q	213/226 (94%)	205 (96%)	8 (4%)	29 56
4	D	198/215 (92%)	187 (94%)	11 (6%)	19 39
4	R	198/215 (92%)	187 (94%)	11 (6%)	19 39
5	E	192/193 (100%)	183 (95%)	9 (5%)	23 47
5	S	192/193 (100%)	185 (96%)	7 (4%)	31 58
6	F	201/238 (84%)	190 (94%)	11 (6%)	19 40
6	T	201/238 (84%)	191 (95%)	10 (5%)	22 44
7	G	207/210 (99%)	200 (97%)	7 (3%)	32 60
7	U	207/210 (99%)	200 (97%)	7 (3%)	32 60
8	H	181/190 (95%)	177 (98%)	4 (2%)	45 73
8	V	181/190 (95%)	176 (97%)	5 (3%)	38 66

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
9	I	172/173 (99%)	168 (98%)	4 (2%)	44	72
9	W	172/173 (99%)	168 (98%)	4 (2%)	44	72
10	J	175/175 (100%)	170 (97%)	5 (3%)	37	65
10	X	175/175 (100%)	170 (97%)	5 (3%)	37	65
11	K	169/169 (100%)	159 (94%)	10 (6%)	18	37
11	Y	169/169 (100%)	161 (95%)	8 (5%)	23	47
12	L	185/185 (100%)	178 (96%)	7 (4%)	29	56
12	Z	185/185 (100%)	179 (97%)	6 (3%)	34	62
13	M	199/199 (100%)	192 (96%)	7 (4%)	32	58
13	a	199/199 (100%)	192 (96%)	7 (4%)	32	58
14	N	162/162 (100%)	157 (97%)	5 (3%)	35	62
14	b	162/162 (100%)	157 (97%)	5 (3%)	35	62
All	All	5332/5520 (97%)	5133 (96%)	199 (4%)	30	57

All (199) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	59	GLU
1	A	122	THR
1	A	157	PHE
1	A	197	LYS
2	B	38	MET
2	B	54	THR
2	B	55	LEU
2	B	69	ASN
2	B	114	LEU
2	B	122	THR
2	B	157	THR
2	B	162	ILE
2	B	184	LYS
2	B	191	LEU
2	B	200	THR
3	C	4	ARG
3	C	147	GLN
3	C	160	GLN
3	C	169	VAL
3	C	175	LYS
3	C	180	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
3	C	185	THR
4	D	5	SER
4	D	20	LEU
4	D	40	LEU
4	D	44	LYS
4	D	51	LEU
4	D	124	ARG
4	D	176	LEU
4	D	190	LEU
4	D	193	LEU
4	D	214	ILE
4	D	235	LEU
5	E	8	ASP
5	E	9	THR
5	E	29	LYS
5	E	54	GLU
5	E	71	LEU
5	E	179	ILE
5	E	198	GLN
5	E	227	GLU
5	E	231	LYS
6	F	31	THR
6	F	32	THR
6	F	39	ASN
6	F	68	ARG
6	F	123	ASN
6	F	172	LEU
6	F	181	GLU
6	F	186	ARG
6	F	201	GLU
6	F	221	ASN
6	F	228	LYS
7	G	83	ASN
7	G	115	LEU
7	G	120	THR
7	G	171	THR
7	G	221	LYS
7	G	235	ARG
7	G	236	LEU
1	O	122	THR
1	O	157	PHE
1	O	197	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	P	55	LEU
2	P	69	ASN
2	P	114	LEU
2	P	122	THR
2	P	149	THR
2	P	157	THR
2	P	162	ILE
2	P	184	LYS
2	P	191	LEU
2	P	200	THR
2	P	243	ILE
3	Q	4	ARG
3	Q	147	GLN
3	Q	160	GLN
3	Q	169	VAL
3	Q	175	LYS
3	Q	180	LYS
3	Q	185	THR
3	Q	213	VAL
4	R	20	LEU
4	R	40	LEU
4	R	44	LYS
4	R	51	LEU
4	R	54	ASP
4	R	124	ARG
4	R	176	LEU
4	R	190	LEU
4	R	193	LEU
4	R	214	ILE
4	R	225	ASN
5	S	9	THR
5	S	29	LYS
5	S	54	GLU
5	S	71	LEU
5	S	179	ILE
5	S	198	GLN
5	S	231	LYS
6	T	31	THR
6	T	39	ASN
6	T	68	ARG
6	T	123	ASN
6	T	172	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
6	T	181	GLU
6	T	186	ARG
6	T	201	GLU
6	T	221	ASN
6	T	228	LYS
7	U	34	LEU
7	U	83	ASN
7	U	115	LEU
7	U	120	THR
7	U	221	LYS
7	U	235	ARG
7	U	236	LEU
8	H	34	LEU
8	H	56	THR
8	H	68	LEU
8	H	196	ARG
9	I	37	ASN
9	I	81	ILE
9	I	171	LEU
9	I	182	TRP
10	J	1	MET
10	J	35	THR
10	J	71	GLU
10	J	110	LYS
10	J	127	GLU
11	K	4	LEU
11	K	9	GLN
11	K	65	LEU
11	K	69	ARG
11	K	73	ARG
11	K	87	VAL
11	K	97	MET
11	K	99	THR
11	K	147	ASP
11	K	195	GLU
12	L	1	GLN
12	L	23	LEU
12	L	30	ILE
12	L	49	ASN
12	L	109	THR
12	L	126	ASP
12	L	150	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
13	M	48	ASN
13	M	70	LEU
13	M	104	ARG
13	M	170	VAL
13	M	171	GLN
13	M	206	LEU
13	M	226	LYS
14	N	83	LYS
14	N	107	LYS
14	N	119	VAL
14	N	126	ILE
14	N	178	LEU
8	V	30	ASN
8	V	34	LEU
8	V	56	THR
8	V	68	LEU
8	V	196	ARG
9	W	37	ASN
9	W	81	ILE
9	W	171	LEU
9	W	182	TRP
10	X	13	VAL
10	X	35	THR
10	X	71	GLU
10	X	110	LYS
10	X	127	GLU
11	Y	4	LEU
11	Y	9	GLN
11	Y	65	LEU
11	Y	73	ARG
11	Y	87	VAL
11	Y	99	THR
11	Y	147	ASP
11	Y	195	GLU
12	Z	1	GLN
12	Z	23	LEU
12	Z	30	ILE
12	Z	49	ASN
12	Z	109	THR
12	Z	150	LEU
13	a	48	ASN
13	a	70	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
13	a	104	ARG
13	a	138	SER
13	a	170	VAL
13	a	206	LEU
13	a	226	LYS
14	b	83	LYS
14	b	107	LYS
14	b	119	VAL
14	b	126	ILE
14	b	178	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (166) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	30	GLN
1	A	94	HIS
2	B	20	GLN
2	B	69	ASN
2	B	95	GLN
2	B	119	GLN
2	B	123	GLN
2	B	155	ASN
2	B	176	GLN
2	B	220	ASN
2	B	232	GLN
3	C	17	GLN
3	C	77	ASN
3	C	116	GLN
3	C	120	GLN
3	C	147	GLN
3	C	160	GLN
3	C	233	GLN
4	D	15	GLN
4	D	106	GLN
4	D	146	GLN
4	D	160	ASN
4	D	198	GLN
4	D	217	GLN
4	D	225	ASN
5	E	99	ASN
5	E	116	GLN
5	E	118	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
5	E	120	GLN
5	E	184	ASN
6	F	19	GLN
6	F	39	ASN
6	F	86	ASN
6	F	117	GLN
6	F	123	ASN
6	F	191	GLN
7	G	30	ASN
7	G	83	ASN
7	G	114	ASN
7	G	117	GLN
7	G	121	GLN
7	G	166	GLN
7	G	167	GLN
7	G	175	ASN
7	G	231	ASN
1	O	30	GLN
2	P	20	GLN
2	P	69	ASN
2	P	88	ASN
2	P	95	GLN
2	P	119	GLN
2	P	123	GLN
2	P	155	ASN
2	P	172	GLN
2	P	220	ASN
2	P	232	GLN
3	Q	17	GLN
3	Q	77	ASN
3	Q	116	GLN
3	Q	120	GLN
3	Q	147	GLN
3	Q	160	GLN
4	R	15	GLN
4	R	100	ASN
4	R	146	GLN
4	R	160	ASN
4	R	198	GLN
4	R	225	ASN
5	S	30	GLN
5	S	68	HIS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
5	S	99	ASN
5	S	116	GLN
5	S	118	ASN
5	S	120	GLN
5	S	151	ASN
5	S	165	GLN
5	S	184	ASN
6	T	19	GLN
6	T	39	ASN
6	T	86	ASN
6	T	117	GLN
6	T	123	ASN
6	T	191	GLN
6	T	203	ASN
7	U	30	ASN
7	U	83	ASN
7	U	114	ASN
7	U	117	GLN
7	U	121	GLN
7	U	166	GLN
7	U	175	ASN
7	U	231	ASN
8	H	30	ASN
8	H	66	HIS
8	H	144	GLN
8	H	165	ASN
8	H	172	ASN
8	H	189	ASN
9	I	88	GLN
10	J	37	GLN
10	J	55	GLN
10	J	63	ASN
10	J	191	GLN
11	K	9	GLN
11	K	85	ASN
11	K	143	ASN
11	K	176	ASN
11	K	188	HIS
11	K	208	ASN
12	L	1	GLN
12	L	3	ASN
12	L	49	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
12	L	70	ASN
12	L	79	HIS
12	L	80	ASN
12	L	158	ASN
12	L	165	ASN
13	M	2	GLN
13	M	18	ASN
13	M	48	ASN
13	M	102	GLN
13	M	108	ASN
13	M	171	GLN
13	M	179	ASN
13	M	194	ASN
13	M	213	GLN
14	N	38	HIS
14	N	141	ASN
8	V	30	ASN
8	V	57	GLN
8	V	66	HIS
8	V	144	GLN
8	V	165	ASN
8	V	172	ASN
8	V	189	ASN
8	V	194	ASN
9	W	44	HIS
9	W	63	ASN
9	W	88	GLN
10	X	37	GLN
10	X	55	GLN
10	X	63	ASN
10	X	118	GLN
10	X	147	HIS
10	X	191	GLN
11	Y	9	GLN
11	Y	85	ASN
11	Y	143	ASN
11	Y	176	ASN
12	Z	3	ASN
12	Z	49	ASN
12	Z	70	ASN
12	Z	76	HIS
12	Z	79	HIS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
12	Z	80	ASN
12	Z	165	ASN
13	a	2	GLN
13	a	18	ASN
13	a	48	ASN
13	a	102	GLN
13	a	108	ASN
13	a	171	GLN
13	a	179	ASN
14	b	38	HIS
14	b	69	GLN
14	b	141	ASN

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
15	EC6	K	301	11	36,36,36	1.44	3 (8%)	45,47,47	1.63	8 (17%)
15	EC6	Y	301	11	36,36,36	1.37	3 (8%)	45,47,47	1.51	7 (15%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
15	EC6	K	301	11	-	17/52/52/52	-
15	EC6	Y	301	11	-	20/52/52/52	-

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
15	K	301	EC6	C17-C16	4.55	1.61	1.53
15	Y	301	EC6	C17-C16	4.01	1.60	1.53
15	K	301	EC6	C12-C11	3.79	1.58	1.53
15	Y	301	EC6	C12-C11	3.70	1.58	1.53
15	K	301	EC6	C16-C11	3.44	1.59	1.53
15	Y	301	EC6	C16-C11	2.53	1.57	1.53

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
15	Y	301	EC6	O3-C5-C2	-4.22	112.19	120.75
15	K	301	EC6	O3-C5-C2	-3.95	112.72	120.75
15	K	301	EC6	C12-C11-N3	-3.67	105.49	110.20
15	K	301	EC6	O1-C1-C27	-3.18	116.25	122.02
15	Y	301	EC6	C11-N3-C10	-3.13	117.80	123.25
15	K	301	EC6	C18-C17-C16	3.05	116.49	111.71
15	K	301	EC6	O7-C9-C8	-2.94	113.32	121.26
15	K	301	EC6	C23-C17-C18	-2.87	104.58	111.81
15	Y	301	EC6	O7-C9-C8	-2.85	113.55	121.26
15	Y	301	EC6	O2-C10-C6	-2.59	115.06	120.48
15	K	301	EC6	C11-N3-C10	-2.37	119.12	123.25
15	Y	301	EC6	C26-C3-C2	2.24	117.30	111.16
15	K	301	EC6	C13-C12-C11	2.20	119.99	115.54
15	Y	301	EC6	C13-C12-C11	2.09	119.76	115.54
15	Y	301	EC6	O1-C1-C27	-2.06	118.29	122.02

There are no chirality outliers.

All (37) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
15	K	301	EC6	C8-C9-N5-C24

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
15	K	301	EC6	C16-C11-C12-C13
15	K	301	EC6	C11-C16-C17-C23
15	K	301	EC6	C11-C16-C17-C18
15	Y	301	EC6	O1-C1-N1-C2
15	Y	301	EC6	C8-C9-N5-C24
15	Y	301	EC6	C8-C9-N5-C25
15	Y	301	EC6	O7-C9-N5-C24
15	Y	301	EC6	O7-C9-N5-C25
15	Y	301	EC6	C11-C16-C17-C23
15	Y	301	EC6	C11-C16-C17-C18
15	Y	301	EC6	C5-C2-C3-C26
15	Y	301	EC6	C23-C17-C18-C44
15	Y	301	EC6	N1-C2-C3-C26
15	Y	301	EC6	C5-C2-C3-C4
15	Y	301	EC6	N1-C2-C3-C4
15	K	301	EC6	O7-C9-N5-C25
15	K	301	EC6	C5-C2-C3-C4
15	K	301	EC6	O1-C1-N1-C2
15	Y	301	EC6	O2-C10-C6-C7
15	K	301	EC6	N1-C2-C3-C4
15	K	301	EC6	N1-C2-C3-C26
15	K	301	EC6	O2-C10-C6-C7
15	Y	301	EC6	O2-C10-N3-C11
15	Y	301	EC6	C1-C27-C28-C29
15	Y	301	EC6	C16-C17-C18-C44
15	K	301	EC6	C1-C27-C28-C29
15	K	301	EC6	O6-C16-C17-C23
15	Y	301	EC6	O6-C16-C17-C23
15	K	301	EC6	C28-C29-C30-C31
15	K	301	EC6	O6-C16-C17-C18
15	Y	301	EC6	O6-C16-C17-C18
15	K	301	EC6	N3-C11-C12-C13
15	K	301	EC6	C5-C2-C3-C26
15	Y	301	EC6	C27-C28-C29-C30
15	K	301	EC6	O2-C10-C6-N2
15	Y	301	EC6	O2-C10-C6-N2

There are no ring outliers.

2 monomers are involved in 3 short contacts:

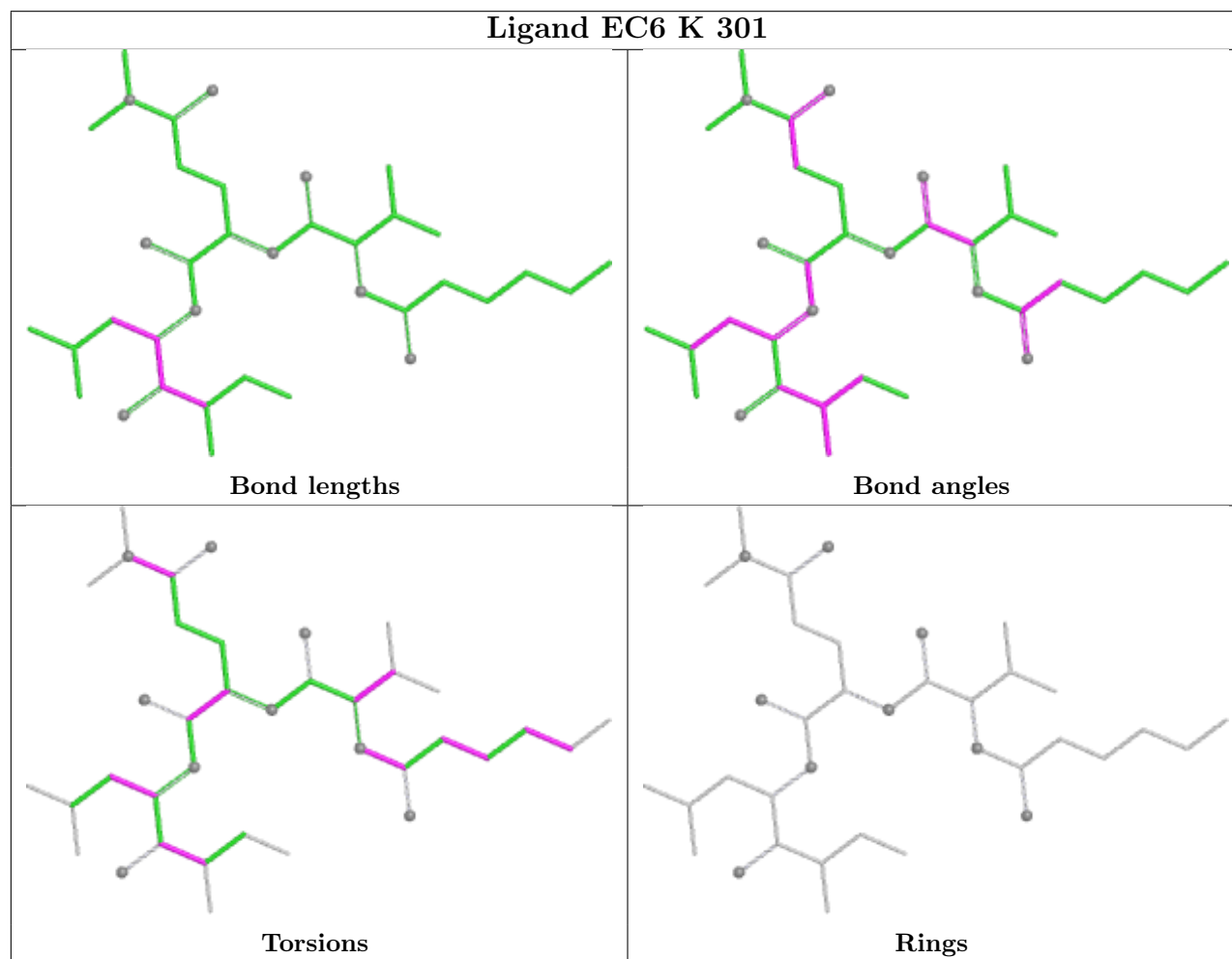
Mol	Chain	Res	Type	Clashes	Symm-Clashes
15	K	301	EC6	1	0

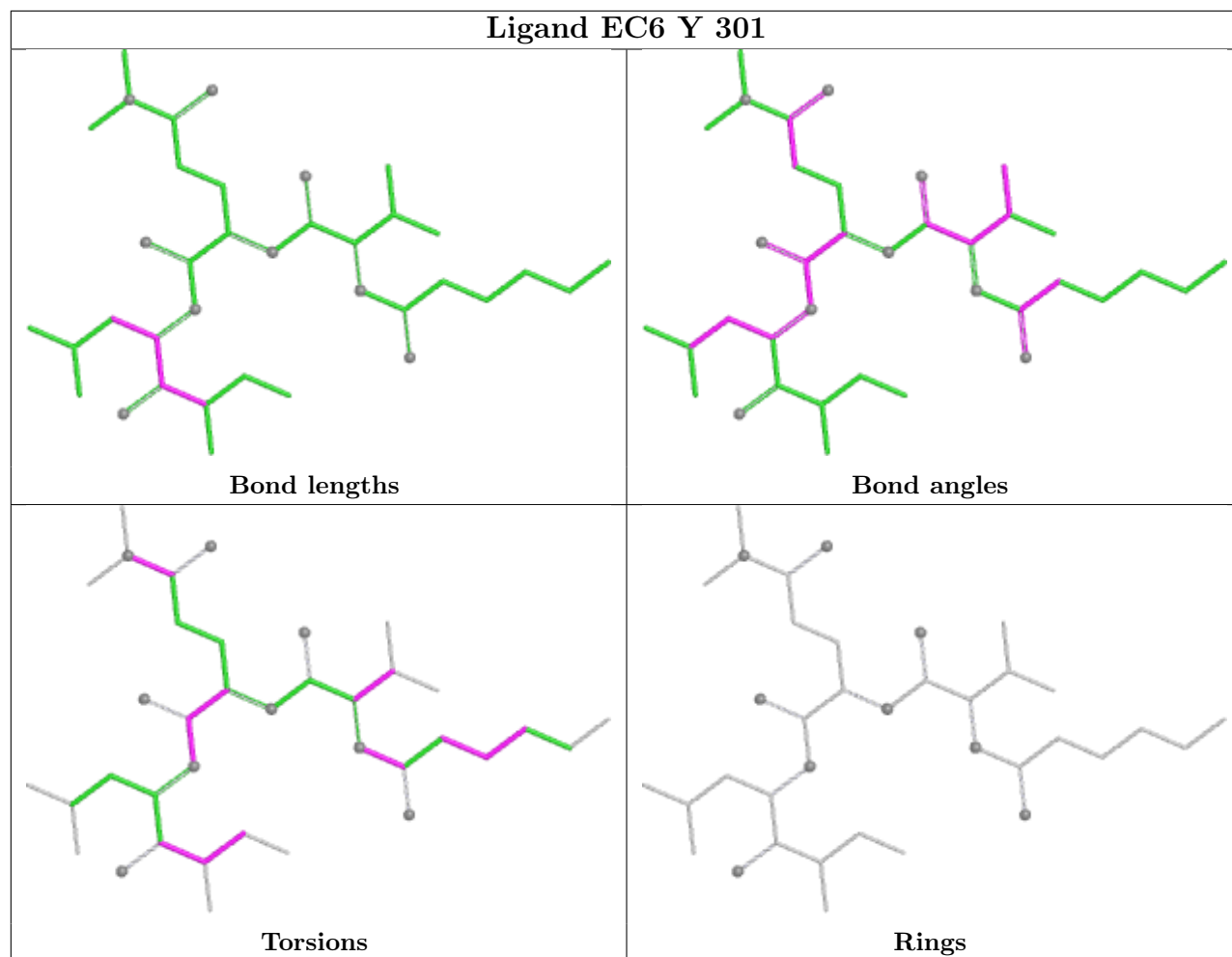
Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Clashes	Symm-Clashes
15	Y	301	EC6	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





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, 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%)	-0.21	2 (0%) 82 80	38, 50, 81, 128	0
1	O	250/250 (100%)	-0.12	5 (2%) 65 61	43, 57, 94, 127	0
2	B	244/258 (94%)	0.01	11 (4%) 38 33	39, 55, 99, 138	0
2	P	244/258 (94%)	0.12	9 (3%) 45 40	45, 58, 100, 146	0
3	C	241/254 (94%)	0.09	11 (4%) 37 33	39, 58, 114, 137	0
3	Q	241/254 (94%)	0.33	15 (6%) 26 23	48, 69, 133, 150	0
4	D	242/260 (93%)	0.06	11 (4%) 38 33	41, 59, 107, 145	0
4	R	242/260 (93%)	0.08	8 (3%) 49 45	44, 62, 102, 149	0
5	E	233/234 (99%)	0.01	6 (2%) 57 52	44, 58, 85, 123	0
5	S	233/234 (99%)	0.35	11 (4%) 36 32	48, 70, 100, 123	0
6	F	244/287 (85%)	-0.14	4 (1%) 70 67	38, 55, 92, 121	0
6	T	244/287 (85%)	0.05	5 (2%) 65 61	47, 63, 103, 130	0
7	G	243/252 (96%)	-0.19	4 (1%) 70 67	37, 51, 84, 135	0
7	U	243/252 (96%)	-0.14	4 (1%) 70 67	43, 55, 80, 121	0
8	H	222/232 (95%)	-0.21	1 (0%) 87 85	37, 48, 68, 113	0
8	V	222/232 (95%)	-0.20	1 (0%) 87 85	39, 50, 74, 125	0
9	I	204/205 (99%)	-0.43	2 (0%) 79 76	32, 46, 64, 90	0
9	W	204/205 (99%)	-0.39	1 (0%) 87 85	36, 48, 69, 87	0
10	J	198/198 (100%)	-0.26	5 (2%) 58 54	38, 49, 68, 143	0
10	X	198/198 (100%)	-0.20	6 (3%) 52 48	40, 52, 71, 148	0
11	K	212/212 (100%)	-0.27	2 (0%) 81 78	36, 49, 73, 85	0
11	Y	212/212 (100%)	-0.26	1 (0%) 87 85	38, 50, 76, 91	0
12	L	222/222 (100%)	-0.25	3 (1%) 73 70	36, 48, 73, 102	0
12	Z	222/222 (100%)	-0.25	3 (1%) 73 70	36, 49, 72, 99	0

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å ²)	Q<0.9
13	M	233/233 (100%)	-0.37	1 (0%)	88	86	34, 48, 63, 77	0
13	a	233/233 (100%)	-0.33	2 (0%)	81	78	36, 49, 65, 80	0
14	N	196/196 (100%)	-0.39	0	100	100	37, 44, 65, 91	0
14	b	196/196 (100%)	-0.39	0	100	100	37, 46, 65, 87	0
All	All	6368/6586 (96%)	-0.13	134 (2%)	63	59	32, 53, 93, 150	0

All (134) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	D	118	GLY	9.6
4	D	119	ALA	7.1
4	R	119	ALA	6.9
12	L	174	TYR	6.6
3	C	50	LEU	6.2
4	R	118	GLY	6.2
3	Q	50	LEU	6.1
12	Z	174	TYR	6.0
4	D	125	LEU	5.9
2	P	219	ALA	5.4
5	E	1	PHE	5.2
10	J	197	ALA	5.1
5	S	1	PHE	5.0
4	D	124	ARG	4.9
4	D	113	LEU	4.6
4	R	113	LEU	4.6
2	B	219	ALA	4.5
10	X	197	ALA	4.5
4	R	125	LEU	4.3
3	Q	52	LEU	4.2
2	P	51	VAL	4.2
9	W	1	SER	4.1
3	Q	205	ALA	4.0
4	R	120	SER	4.0
4	R	124	ARG	4.0
2	B	51	VAL	4.0
1	A	1	MET	3.8
7	G	1	ALA	3.7
3	Q	49	THR	3.6
9	I	1	SER	3.6
10	X	198	GLN	3.6
4	R	121	GLY	3.5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
5	S	2	ARG	3.5
4	D	120	SER	3.5
7	U	243	ASP	3.4
13	a	1	THR	3.4
10	X	196	GLN	3.4
7	U	1	ALA	3.4
3	Q	51	LYS	3.3
8	V	222	ASP	3.3
2	P	1	GLY	3.3
4	D	240	ALA	3.2
1	O	1	MET	3.2
7	G	239	ILE	3.1
3	Q	48	SER	3.1
2	B	244	THR	3.0
10	J	196	GLN	3.0
3	C	51	LYS	3.0
13	M	1	THR	3.0
11	K	209	ASN	2.9
2	P	225	TYR	2.9
3	C	49	THR	2.9
10	X	1	MET	2.9
1	O	53	SER	2.8
1	A	2	THR	2.8
1	O	61	LEU	2.8
10	J	1	MET	2.8
10	X	174	MET	2.8
11	K	182	GLU	2.8
6	F	203	ASN	2.7
2	P	61	SER	2.7
5	E	2	ARG	2.7
8	H	222	ASP	2.7
4	D	121	GLY	2.7
6	F	1	GLY	2.7
2	B	50	LYS	2.7
3	Q	203	THR	2.7
2	B	243	ILE	2.6
2	B	61	SER	2.6
5	S	52	ALA	2.6
3	Q	241	GLN	2.6
3	C	206	LYS	2.6
3	Q	238	LYS	2.6
13	a	69	ASP	2.6

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	O	2	THR	2.6
3	C	53	GLN	2.5
12	Z	106	TYR	2.5
2	P	218	GLY	2.5
3	C	48	SER	2.5
5	E	202	ASP	2.5
11	Y	182	GLU	2.5
2	P	50	LYS	2.5
3	C	203	THR	2.5
6	T	9	SER	2.5
2	B	221	ASP	2.5
3	C	238	LYS	2.4
3	Q	208	ILE	2.4
2	P	244	THR	2.4
5	S	178	PHE	2.4
2	B	1	GLY	2.4
2	P	222	GLY	2.4
7	G	243	ASP	2.4
10	J	174	MET	2.4
2	B	220	ASN	2.4
3	Q	57	ILE	2.3
5	E	30	GLN	2.3
5	S	53	ASP	2.3
12	Z	173	LYS	2.3
3	C	207	ASN	2.3
2	B	218	GLY	2.3
6	F	202	ASP	2.3
3	Q	184	ALA	2.3
6	T	215	CYS	2.3
3	Q	234	ILE	2.2
4	R	2	ARG	2.2
5	S	122	TYR	2.2
5	S	202	ASP	2.2
12	L	173	LYS	2.2
4	D	2	ARG	2.2
4	D	241	ALA	2.2
5	S	209	ASN	2.2
6	F	243	ILE	2.2
6	T	244	ASN	2.1
7	U	2	GLY	2.1
1	O	62	SER	2.1
6	T	241	LYS	2.1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
5	E	207	VAL	2.1
5	S	173	ARG	2.1
12	L	106	TYR	2.1
3	Q	182	PRO	2.1
3	C	241	GLN	2.1
5	E	209	ASN	2.1
5	S	57	SER	2.1
3	C	204	GLY	2.1
6	T	201	GLU	2.1
2	B	180	LYS	2.1
10	X	194	ASP	2.1
10	J	198	GLN	2.0
5	S	55	LEU	2.0
7	G	236	LEU	2.0
7	U	188	GLU	2.0
3	Q	183	PRO	2.0
9	I	192	ASP	2.0
4	D	27	SER	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 oligosaccharides 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.

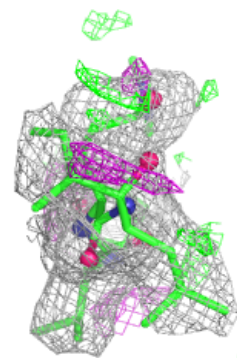
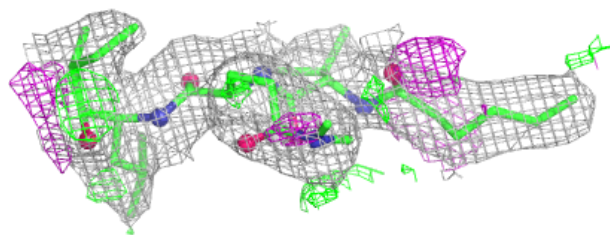
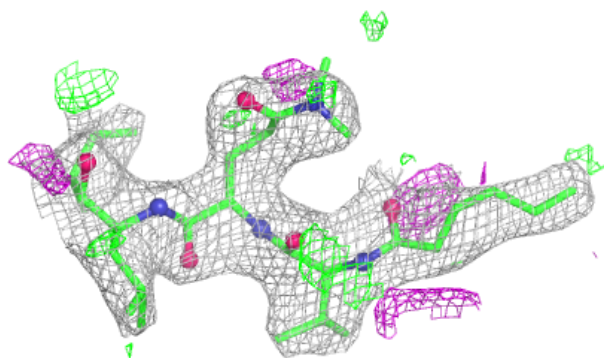
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
15	EC6	Y	301	37/37	0.86	0.12	52,59,75,76	0
15	EC6	K	301	37/37	0.89	0.12	47,54,69,69	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers

as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

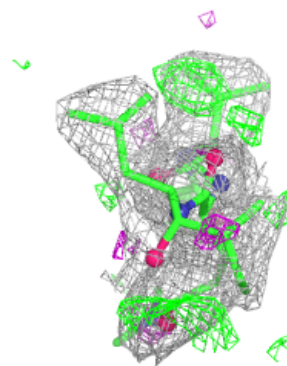
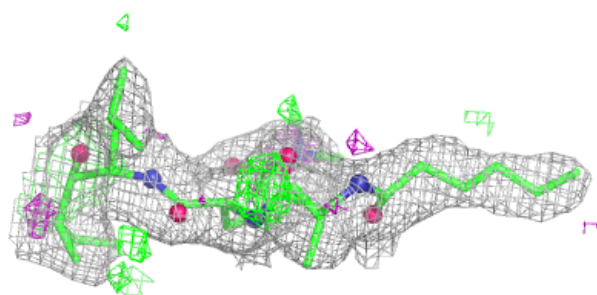
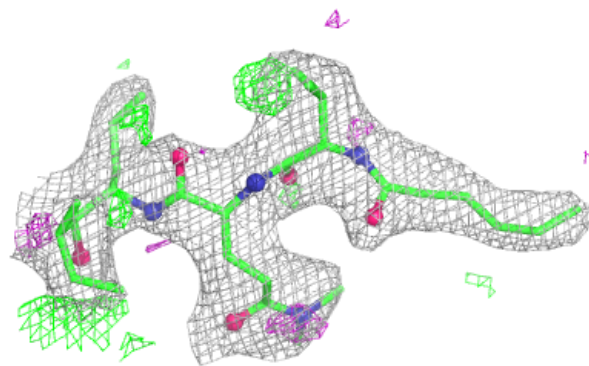
Electron density around EC6 Y 301:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around EC6 K 301:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers ⓘ

There are no such residues in this entry.