



wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 1, 2016 – 05:50 AM GMT

PDB ID : 2UX4
Title : X-RAY HIGH RESOLUTION STRUCTURE OF THE PHOTOSYNTHETIC
REACTION CENTER FROM RB. SPHAEROIDES AT PH 9 IN THE
CHARGE-SEPARATED STATE, 2ND DATASET
Authors : Koepke, J.; Diehm, R.; Fritzsche, G.
Deposited on : 2007-03-26
Resolution : 2.51 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.
We welcome your comments at validation@mail.wwpdb.org
A user guide is available at
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7 (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

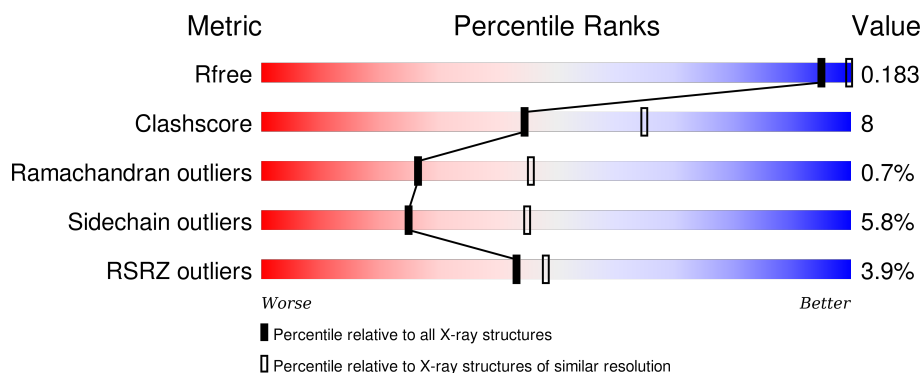
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.51 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	3553 (2.50-2.50)
Clashscore	102246	4242 (2.50-2.50)
Ramachandran outliers	100387	4156 (2.50-2.50)
Sidechain outliers	100360	4158 (2.50-2.50)
RSRZ outliers	91569	3562 (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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	H	260	<div> <div>3%</div> <div>83%</div> <div>8%</div> <div>7%</div> </div>
2	L	281	<div> <div>3%</div> <div>86%</div> <div>12%</div> <div></div> </div>
3	M	307	<div> <div>5%</div> <div>81%</div> <div>16%</div> <div></div> </div>

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
10	HTO	L	1290	-	-	-	X
13	SPO	M	1313	-	-	-	X
14	CDL	M	1314	-	-	-	X
4	GOL	H	1251	-	-	-	X
4	GOL	L	1292	-	-	-	X
5	BCL	L	1282	X	-	-	-
5	BCL	L	1288	X	-	-	-
5	BCL	M	1303	X	-	-	-
5	BCL	M	1304	X	-	-	-
6	LDA	L	1283	-	-	-	X
6	LDA	L	1284	-	-	-	X
6	LDA	L	1285	-	-	-	X
6	LDA	M	1305	-	-	-	X
6	LDA	M	1306	-	-	-	X
6	LDA	M	1307	-	-	-	X
6	LDA	M	1308	-	-	-	X
6	LDA	M	1309	-	-	-	X
8	UQ2	L	1287[A]	-	-	-	X
8	UQ2	L	1287[B]	-	-	-	X

2 Entry composition [i](#)

There are 15 unique types of molecules in this entry. The entry contains 7671 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 REACTION CENTER PROTEIN H CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	H	241	Total	C	N	O	S	0	3	1
			1846	1181	319	337	9			

- Molecule 2 is a protein called REACTION CENTER PROTEIN L CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	L	281	Total	C	N	O	S	0	0	0
			2232	1507	355	362	8			

- Molecule 3 is a protein called REACTION CENTER PROTEIN M CHAIN.

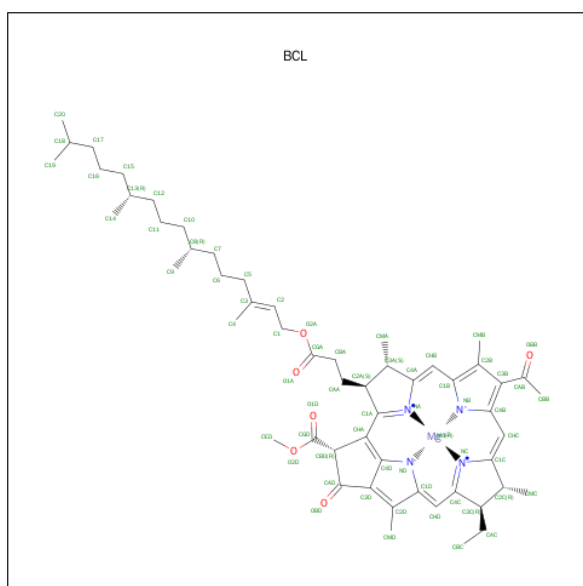
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	M	303	Total	C	N	O	S	0	0	1
			2409	1607	395	397	10			

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	H	1	Total	C	O	0	0
			6	3	3		
4	H	1	Total	C	O	0	0
			6	3	3		
4	H	1	Total	C	O	0	0
			6	3	3		
4	H	1	Total	C	O	0	0
			6	3	3		
4	L	1	Total	C	O	0	0
			6	3	3		
4	L	1	Total	C	O	0	0
			6	3	3		
4	M	1	Total	C	O	0	0
			6	3	3		

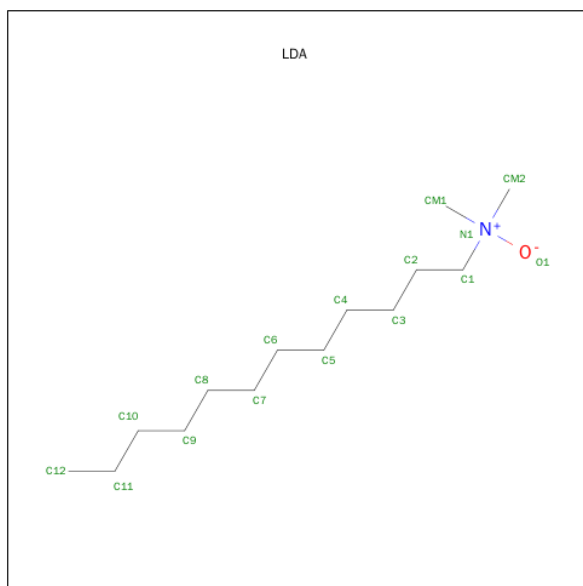
- Molecule 5 is BACTERIOCHLOROPHYLL A (three-letter code: BCL) (formula: $C_{55}H_{74}MgN_4O_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	L	1	Total	C	Mg	N	O	0
			66	55	1	4	6	0
5	L	1	Total	C	Mg	N	O	0
			66	55	1	4	6	0
5	M	1	Total	C	Mg	N	O	0
			66	55	1	4	6	0
5	M	1	Total	C	Mg	N	O	0
			66	55	1	4	6	0

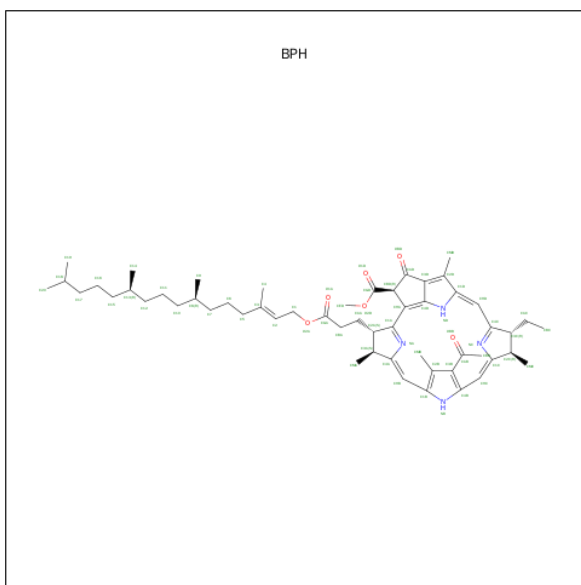
- Molecule 6 is LAURYL DIMETHYLAMINE-N-OXIDE (three-letter code: LDA) (formula:

C₁₄H₃₁NO).



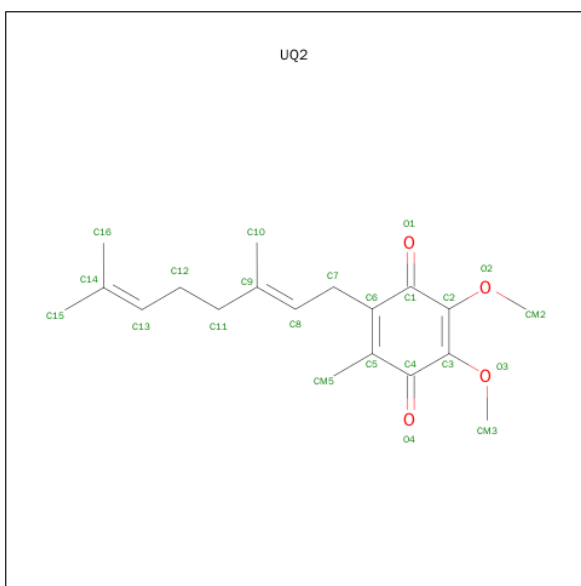
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	L	1	Total	C	N	O	0	0
			16	14	1	1		
6	L	1	Total	C	N	O	0	0
			16	14	1	1		
6	L	1	Total	C	N	O	0	0
			16	14	1	1		
6	M	1	Total	C	N	O	0	0
			16	14	1	1		
6	M	1	Total	C	N	O	0	0
			16	14	1	1		
6	M	1	Total	C	N	O	0	0
			16	14	1	1		
6	M	1	Total	C	N	O	0	0
			16	14	1	1		
6	M	1	Total	C	N	O	0	0
			16	14	1	1		

- Molecule 7 is BACTERIOPHEOPHYTIN A (three-letter code: BPH) (formula: C₅₅H₇₆N₄O₆).



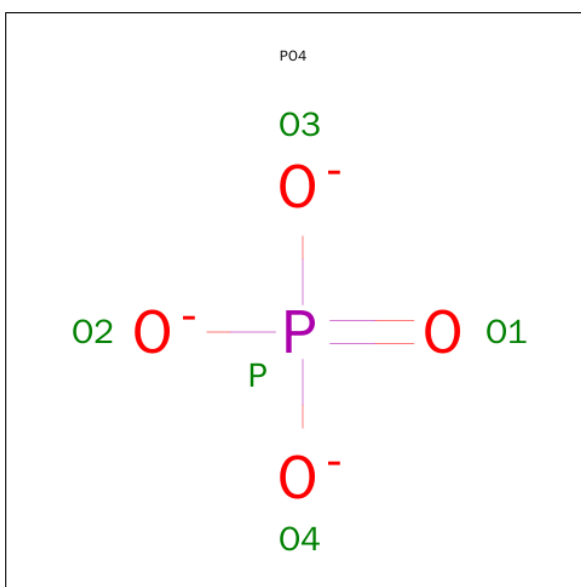
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	L	1	Total	C	N	O	0	0
			65	55	4	6		
7	M	1	Total	C	N	O	0	0
			65	55	4	6		

- Molecule 8 is UBIQUINONE-2 (three-letter code: UQ2) (formula: $C_{19}H_{26}O_4$).



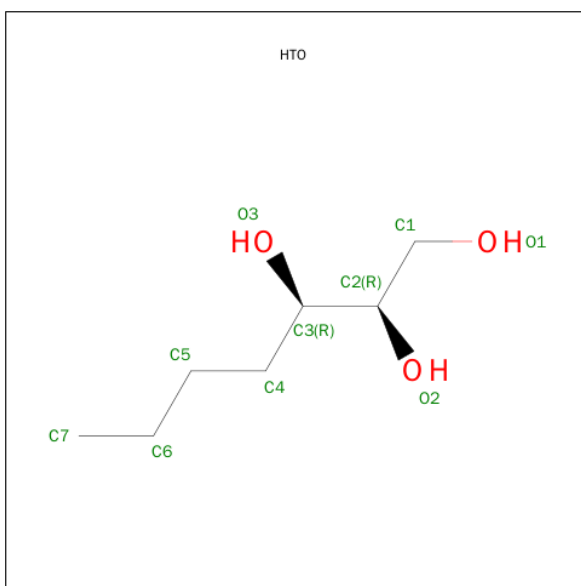
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	L	1	Total	C	O	0	1
			46	38	8		

- Molecule 9 is PHOSPHATE ION (three-letter code: PO4) (formula: O_4P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	L	1	Total	O	P	0	0
			5	4	1		

- Molecule 10 is HEPTANE-1,2,3-TRIOL (three-letter code: HTO) (formula: $C_7H_{16}O_3$).

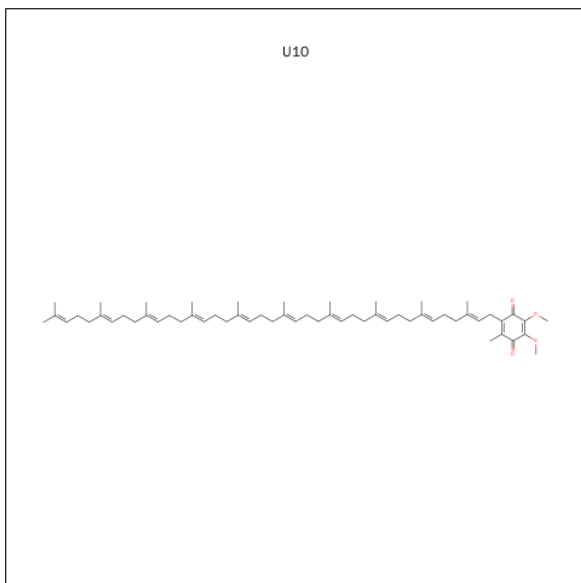


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
10	L	1	Total	C	O	0	0
			10	7	3		

- Molecule 11 is FE (III) ION (three-letter code: FE) (formula: Fe).

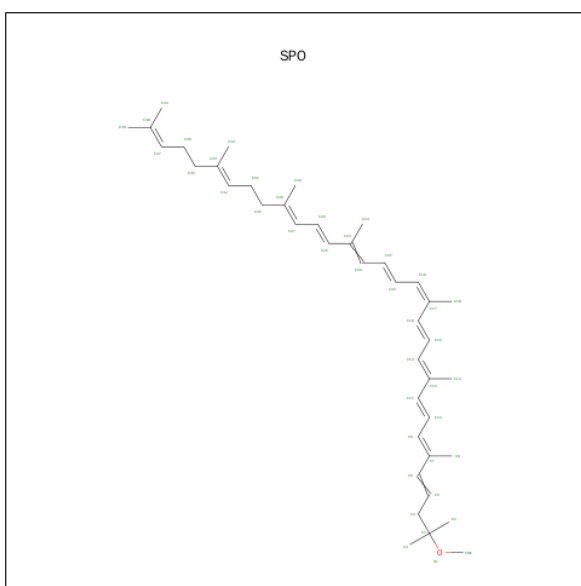
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	M	1	Total	Fe	0	0
			1	1		

- Molecule 12 is UBIQUINONE-10 (three-letter code: U10) (formula: $C_{59}H_{90}O_4$).



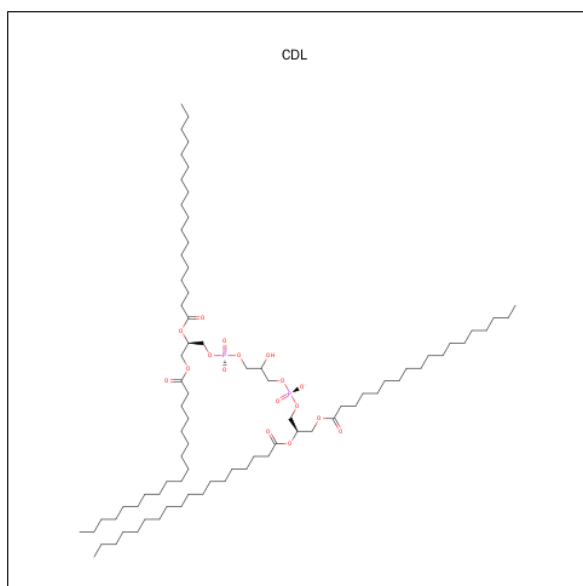
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
12	M	1	Total	C	O	0	0
			48	44	4		

- Molecule 13 is SPHEROIDENE (three-letter code: SPO) (formula: $C_{41}H_{60}O$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
13	M	1	Total	C	O	0	0
			42	41	1		

- Molecule 14 is CARDIOLIPIN (three-letter code: CDL) (formula: $C_{81}H_{156}O_{17}P_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
14	M	1	Total	C	O	P	0	0
			81	62	17	2		

- Molecule 15 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	H	149	Total	O	0	0
			149	149		
15	L	111	Total	O	0	0
			111	111		
15	M	111	Total	O	0	0
			111	111		

4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	139.58Å 139.58Å 184.96Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	50.00 – 2.51 29.45 – 2.51	Depositor EDS
% Data completeness (in resolution range)	97.6 (50.00-2.51) 90.9 (29.45-2.51)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.81 (at 2.51Å)	Xtriage
Refinement program	REFMAC 5.1.24	Depositor
R, R_{free}	0.190 , 0.211 0.184 , 0.183	Depositor DCC
R_{free} test set	3493 reflections (5.67%)	DCC
Wilson B-factor (Å ²)	38.1	Xtriage
Anisotropy	0.301	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 53.2	EDS
Estimated twinning fraction	0.022 for -h,-k,l	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	0 of 69781 reflections	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	7671	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.82% 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, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: BCL, GOL, LDA, CDL, BPH, PO4, HTO, FE, SPO, U10, UQ2

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	H	0.53	0/1906	0.74	4/2591 (0.2%)
2	L	0.56	0/2320	0.64	2/3175 (0.1%)
3	M	0.54	0/2501	0.63	0/3415
All	All	0.54	0/6727	0.66	6/9181 (0.1%)

There are no bond length outliers.

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	L	213	ASP	CB-CG-OD2	6.87	124.49	118.30
1	H	82	ASP	CB-CG-OD2	6.09	123.78	118.30
1	H	11	ASP	CB-CG-OD2	5.91	123.62	118.30
1	H	139	GLY	N-CA-C	-5.89	98.37	113.10
1	H	231	ASP	CB-CG-OD2	5.67	123.40	118.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	H	1846	0	1861	16	0
2	L	2232	0	2187	26	0
3	M	2409	0	2321	37	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	H	24	0	32	1	0
4	L	12	0	16	1	0
4	M	6	0	8	2	0
5	L	132	0	148	7	0
5	M	132	0	148	24	0
6	L	48	0	93	7	0
6	M	96	0	186	10	0
7	L	65	0	76	7	0
7	M	65	0	76	12	0
8	L	46	0	52	6	0
9	L	5	0	0	0	0
10	L	10	0	16	0	0
11	M	1	0	0	0	0
12	M	48	0	63	0	0
13	M	42	0	60	4	0
14	M	81	0	82	2	0
15	H	149	0	0	3	0
15	L	111	0	0	1	0
15	M	111	0	0	1	0
All	All	7671	0	7425	116	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 8.

The worst 5 of 116 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)
1:H:248:ARG:HA	1:H:249:LYS:HB2	1.25	1.10
1:H:248:ARG:HA	1:H:249:LYS:CB	1.95	0.96
3:M:197:PHE:HZ	5:M:1304:BCL:HBB2	1.39	0.87
3:M:197:PHE:CZ	5:M:1304:BCL:HBB2	2.15	0.80
7:L:1286:BPH:HBB2	3:M:210:TYR:HB3	1.66	0.77

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	H	242/260 (93%)	233 (96%)	8 (3%)	1 (0%)	39	61
2	L	279/281 (99%)	270 (97%)	9 (3%)	0	100	100
3	M	301/307 (98%)	287 (95%)	9 (3%)	5 (2%)	11	19
All	All	822/848 (97%)	790 (96%)	26 (3%)	6 (1%)	26	46

5 of 6 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	H	249	LYS
3	M	301	HIS
3	M	52	LEU
3	M	195	ASN
3	M	30	SER

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	H	198/208 (95%)	189 (96%)	9 (4%)	34	59
2	L	220/220 (100%)	202 (92%)	18 (8%)	14	27
3	M	236/240 (98%)	224 (95%)	12 (5%)	29	52
All	All	654/668 (98%)	615 (94%)	39 (6%)	25	43

5 of 39 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	L	153	HIS
2	L	207	ARG
3	M	199	ASN
2	L	158	SER
2	L	170	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 8 such sidechains are listed below:

Mol	Chain	Res	Type
2	L	183	ASN
3	M	199	ASN
3	M	187	ASN
2	L	170	ASN
3	M	77	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 30 ligands modelled in this entry, 1 is monoatomic - leaving 29 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
4	GOL	H	1251	-	5,5,5	0.49	0	5,5,5	0.77	0
4	GOL	H	1252	-	5,5,5	0.35	0	5,5,5	0.20	0
4	GOL	H	1253	-	5,5,5	0.32	0	5,5,5	0.25	0
4	GOL	H	1254	-	5,5,5	0.35	0	5,5,5	0.24	0
5	BCL	L	1282	2	53,74,74	2.06	6 (11%)	57,115,115	2.07	14 (24%)
6	LDA	L	1283	-	15,15,15	3.76	2 (13%)	16,17,17	0.80	1 (6%)
6	LDA	L	1284	-	15,15,15	3.81	2 (13%)	16,17,17	0.54	0
6	LDA	L	1285	-	15,15,15	3.89	2 (13%)	16,17,17	0.93	1 (6%)
7	BPH	L	1286	-	64,70,70	3.00	17 (26%)	73,101,101	1.66	13 (17%)
8	UQ2	L	1287[A]	-	23,23,23	2.72	8 (34%)	28,31,31	1.50	6 (21%)
8	UQ2	L	1287[B]	-	23,23,23	2.81	7 (30%)	28,31,31	1.12	3 (10%)
5	BCL	L	1288	2	53,74,74	2.08	6 (11%)	57,115,115	1.84	12 (21%)
9	PO4	L	1289	-	4,4,4	0.41	0	6,6,6	0.27	0
10	HTO	L	1290	-	9,9,9	0.41	0	8,10,10	0.60	0
4	GOL	L	1291	-	5,5,5	0.27	0	5,5,5	0.52	0
4	GOL	L	1292	-	5,5,5	0.32	0	5,5,5	0.21	0
5	BCL	M	1303	3	53,74,74	2.13	5 (9%)	57,115,115	1.86	11 (19%)
5	BCL	M	1304	3	53,74,74	2.13	6 (11%)	57,115,115	1.97	13 (22%)
6	LDA	M	1305	-	15,15,15	3.88	1 (6%)	16,17,17	0.86	1 (6%)
6	LDA	M	1306	-	15,15,15	3.80	2 (13%)	16,17,17	0.82	1 (6%)
6	LDA	M	1307	-	15,15,15	3.76	2 (13%)	16,17,17	0.76	0
6	LDA	M	1308	-	15,15,15	3.81	2 (13%)	16,17,17	0.70	0
6	LDA	M	1309	-	15,15,15	3.71	2 (13%)	16,17,17	0.70	0
7	BPH	M	1311	-	64,70,70	2.98	17 (26%)	73,101,101	1.79	13 (17%)
12	U10	M	1312	-	48,48,63	3.05	12 (25%)	58,61,79	1.77	13 (22%)
13	SPO	M	1313	-	40,41,41	4.15	12 (30%)	45,50,50	2.02	11 (24%)
14	CDL	M	1314	-	80,80,99	2.26	18 (22%)	82,92,111	4.00	14 (17%)
4	GOL	M	1315	-	5,5,5	0.29	0	5,5,5	0.30	0
6	LDA	M	1709	-	15,15,15	3.76	2 (13%)	16,17,17	0.60	0

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
4	GOL	H	1251	-	-	0/4/4/4	0/0/0/0
4	GOL	H	1252	-	-	0/4/4/4	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	H	1253	-	-	0/4/4/4	0/0/0/0
4	GOL	H	1254	-	-	0/4/4/4	0/0/0/0
5	BCL	L	1282	2	2/2/21/25	0/37/137/137	0/0/9/9
6	LDA	L	1283	-	-	0/13/13/13	0/0/0/0
6	LDA	L	1284	-	-	0/13/13/13	0/0/0/0
6	LDA	L	1285	-	-	0/13/13/13	0/0/0/0
7	BPH	L	1286	-	-	0/54/105/105	0/1/6/6
8	UQ2	L	1287[A]	-	-	0/15/39/39	0/1/1/1
8	UQ2	L	1287[B]	-	-	0/15/39/39	0/1/1/1
5	BCL	L	1288	2	2/2/21/25	0/37/137/137	0/0/9/9
9	PO4	L	1289	-	-	0/0/0/0	0/0/0/0
10	HTO	L	1290	-	-	0/10/10/10	0/0/0/0
4	GOL	L	1291	-	-	0/4/4/4	0/0/0/0
4	GOL	L	1292	-	-	0/4/4/4	0/0/0/0
5	BCL	M	1303	3	2/2/21/25	0/37/137/137	0/0/9/9
5	BCL	M	1304	3	2/2/21/25	0/37/137/137	0/0/9/9
6	LDA	M	1305	-	-	0/13/13/13	0/0/0/0
6	LDA	M	1306	-	-	0/13/13/13	0/0/0/0
6	LDA	M	1307	-	-	0/13/13/13	0/0/0/0
6	LDA	M	1308	-	-	0/13/13/13	0/0/0/0
6	LDA	M	1309	-	-	0/13/13/13	0/0/0/0
7	BPH	M	1311	-	-	0/54/105/105	0/1/6/6
12	U10	M	1312	-	-	0/45/69/87	0/1/1/1
13	SPO	M	1313	-	-	0/47/47/47	0/0/0/0
14	CDL	M	1314	-	-	0/91/91/110	0/0/0/0
4	GOL	M	1315	-	-	0/4/4/4	0/0/0/0
6	LDA	M	1709	-	-	0/13/13/13	0/0/0/0

The worst 5 of 131 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	L	1285	LDA	O1-N1	-14.77	1.25	1.39
6	M	1305	LDA	O1-N1	-14.64	1.25	1.39
6	M	1306	LDA	O1-N1	-14.47	1.25	1.39
6	M	1308	LDA	O1-N1	-14.46	1.25	1.39
6	L	1284	LDA	O1-N1	-14.46	1.25	1.39

The worst 5 of 127 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	L	1282	BCL	CMB-C2B-C1B	-7.12	116.58	128.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	M	1303	BCL	CMB-C2B-C1B	-6.94	116.88	128.36
5	M	1304	BCL	CMB-C2B-C1B	-6.86	117.01	128.36
5	L	1288	BCL	CMB-C2B-C1B	-6.76	117.18	128.36
13	M	1313	SPO	C4-C5-C6	-5.70	116.56	124.67

5 of 8 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
5	M	1304	BCL	C8
5	M	1304	BCL	C13
5	L	1282	BCL	C8
5	L	1282	BCL	C13
5	M	1303	BCL	C8

There are no torsion outliers.

There are no ring outliers.

20 monomers are involved in 72 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	H	1251	GOL	1	0
5	L	1282	BCL	4	0
6	L	1283	LDA	1	0
6	L	1284	LDA	2	0
6	L	1285	LDA	4	0
7	L	1286	BPH	7	0
8	L	1287[A]	UQ2	5	0
8	L	1287[B]	UQ2	1	0
5	L	1288	BCL	5	0
4	L	1291	GOL	1	0
5	M	1303	BCL	11	0
5	M	1304	BCL	15	0
6	M	1305	LDA	3	0
6	M	1307	LDA	5	0
6	M	1308	LDA	2	0
6	M	1309	LDA	3	0
7	M	1311	BPH	12	0
13	M	1313	SPO	4	0
14	M	1314	CDL	2	0
4	M	1315	GOL	2	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 [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	H	241/260 (92%)	-0.35	9 (3%)	45	50	33, 43, 53, 85	0
2	L	281/281 (100%)	-0.49	8 (2%)	56	61	30, 39, 61, 68	0
3	M	303/307 (98%)	-0.33	15 (4%)	32	37	29, 44, 69, 76	0
All	All	825/848 (97%)	-0.39	32 (3%)	43	48	29, 42, 63, 85	0

The worst 5 of 32 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	250	SER	6.6
3	M	1	ALA	5.7
1	H	249	LYS	4.7
1	H	251	VAL	4.7
3	M	148	TRP	4.5

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

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

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors

of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(Å ²)	Q<0.9
6	LDA	L	1285	16/16	0.67	0.41	81.15	106,109,111,111	0
6	LDA	M	1309	16/16	0.12	0.55	23.00	94,102,110,110	0
6	LDA	M	1308	16/16	0.53	0.39	20.13	90,97,105,105	0
10	HTO	L	1290	10/10	0.74	0.36	10.78	74,77,77,78	0
6	LDA	L	1283	16/16	0.27	0.48	9.55	86,103,111,111	0
4	GOL	H	1251	6/6	0.83	0.23	9.00	65,68,70,71	0
6	LDA	M	1305	16/16	0.80	0.28	8.47	50,63,70,71	0
6	LDA	L	1284	16/16	0.59	0.32	8.26	98,102,109,109	0
8	UQ2	L	1287[B]	23/23	0.84	0.31	6.00	40,43,47,48	23
8	UQ2	L	1287[A]	23/23	0.84	0.31	5.82	39,42,51,52	23
6	LDA	M	1306	16/16	0.80	0.33	5.02	72,74,84,84	0
14	CDL	M	1314	81/100	0.50	0.50	4.78	96,107,120,121	0
6	LDA	M	1307	16/16	0.80	0.24	2.91	64,68,77,77	0
13	SPO	M	1313	42/42	0.86	0.21	2.82	38,51,68,71	0
4	GOL	L	1292	6/6	0.80	0.25	2.26	85,87,87,87	0
7	BPH	M	1311	65/65	0.91	0.17	1.67	35,42,94,95	0
12	U10	M	1312	48/63	0.93	0.15	1.47	30,39,68,69	0
5	BCL	M	1304	66/66	0.97	0.16	1.01	25,31,53,59	0
5	BCL	M	1303	66/66	0.96	0.14	0.82	26,31,80,81	0
7	BPH	L	1286	65/65	0.98	0.13	0.75	25,30,39,40	0
9	PO4	L	1289	5/5	0.95	0.26	0.69	103,103,103,103	0
4	GOL	L	1291	6/6	0.90	0.18	0.58	47,52,53,54	0
5	BCL	L	1288	66/66	0.97	0.13	0.39	25,30,48,52	0
5	BCL	L	1282	66/66	0.97	0.12	-0.08	30,34,51,54	0
11	FE	M	1310	1/1	0.99	0.02	-3.81	32,32,32,32	0
4	GOL	H	1253	6/6	0.74	0.41	-	102,103,104,104	0
4	GOL	M	1315	6/6	0.80	0.22	-	85,86,86,87	0
6	LDA	M	1709	16/16	0.40	0.49	-	92,100,107,107	0
4	GOL	H	1254	6/6	0.79	0.21	-	102,102,103,103	0
4	GOL	H	1252	6/6	0.88	0.31	-	88,89,89,89	0

6.5 Other polymers ⓘ

There are no such residues in this entry.