



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 02:03 PM UTC

PDB ID : 1TQW / pdb_00001tqw
Title : Golgi alpha-Mannosidase II In Complex With A Diastereomer of Seleno-Salacinol
Authors : Kuntz, D.A.; Ghavami, A.; Johnston, B.D.; Pinto, B.M.; Rose, D.R.
Deposited on : 2004-06-18
Resolution : 1.20 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

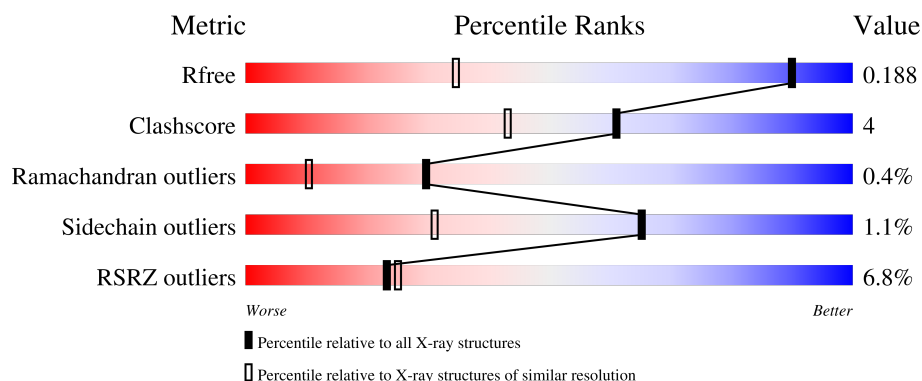
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.20 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	1216 (1.20-1.20)
Clashscore	190562	1265 (1.20-1.20)
Ramachandran outliers	187476	1226 (1.20-1.20)
Sidechain outliers	187428	1226 (1.20-1.20)
RSRZ outliers	180081	1214 (1.20-1.20)

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	1045	7% 88% 7% . .

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 9432 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.

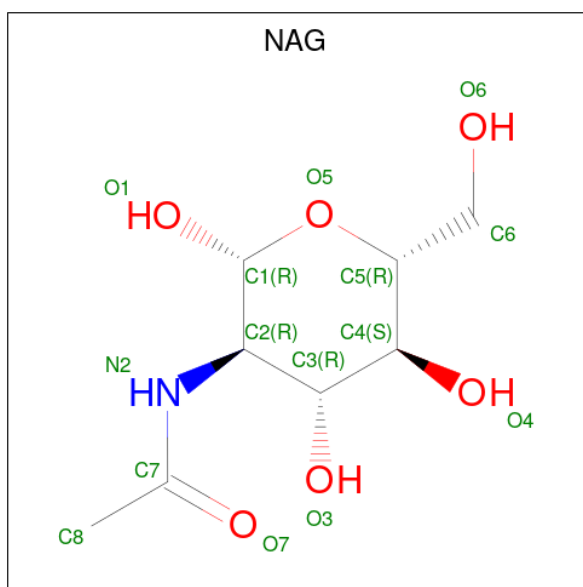
- Molecule 1 is a protein called Alpha-mannosidase II.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	1014	Total	C	N	O	S	0	31	0
			8290	5268	1456	1523	43			

There are 13 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	ARG	-	expression tag	UNP Q24451
A	2	SER	-	expression tag	UNP Q24451
A	3	SER	-	expression tag	UNP Q24451
A	4	HIS	-	expression tag	UNP Q24451
A	5	HIS	-	expression tag	UNP Q24451
A	6	HIS	-	expression tag	UNP Q24451
A	7	HIS	-	expression tag	UNP Q24451
A	8	HIS	-	expression tag	UNP Q24451
A	9	HIS	-	expression tag	UNP Q24451
A	10	GLY	-	expression tag	UNP Q24451
A	11	GLU	-	expression tag	UNP Q24451
A	12	PHE	-	expression tag	UNP Q24451
A	907	LYS	GLU	SEE REMARK 999	UNP Q24451

- Molecule 2 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).

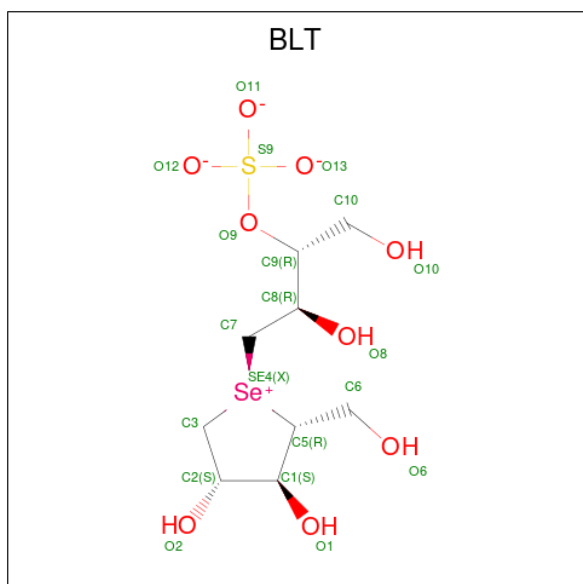


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn).

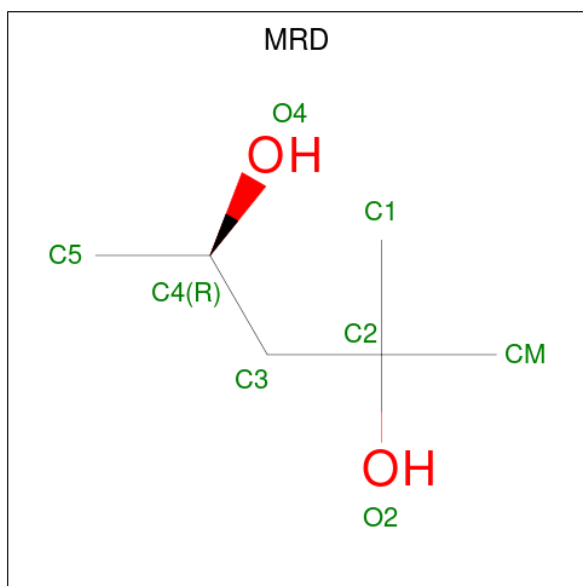
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Zn	0	0
			1	1		

- Molecule 4 is 1,4-DIDEOXY-1,4-[[2R,3R)-2,4-DIHYDROXY-3-(SULFOXY)BUTYL]EPISELENONIUMYLIDENE]-D-ARABINITOL INNER SALT (CCD ID: BLT) (formula: $C_9H_{18}O_9SSe$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	O	S	Se	0	0
			20	9	9	1	1		

- Molecule 5 is (4R)-2-METHYLPENTANE-2,4-DIOL (CCD ID: MRD) (formula: C₆H₁₄O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			8	6	2		
5	A	1	Total	C	O	0	0
			8	6	2		

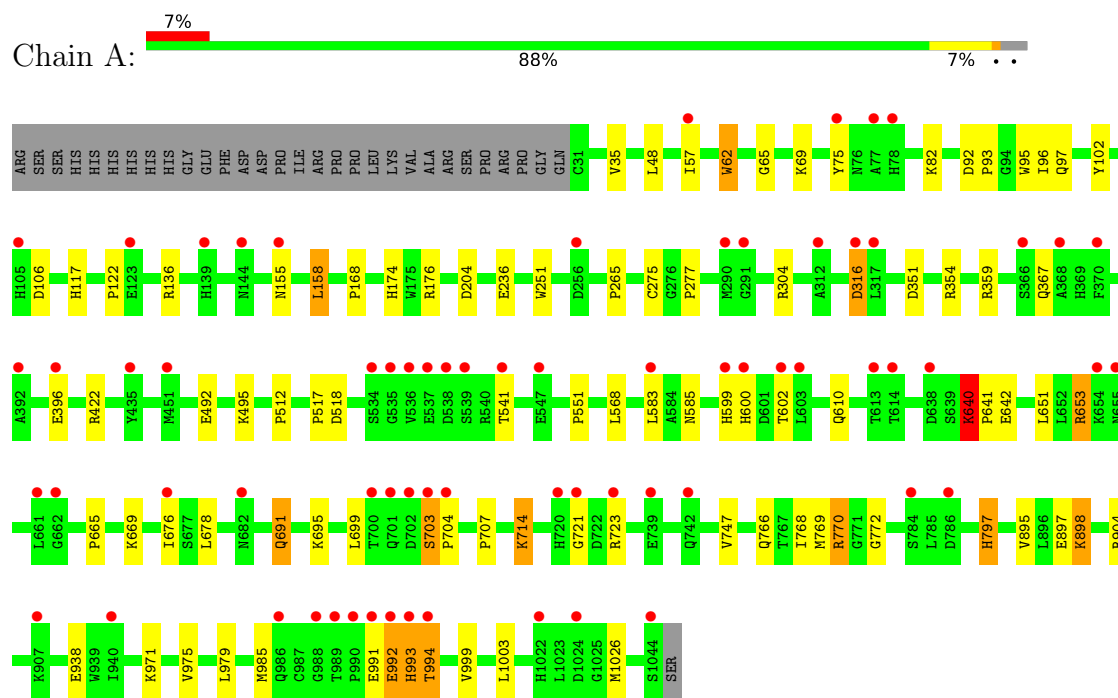
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	1091	Total	O	0	0
			1091	1091		

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: Alpha-mannosidase II



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	69.01Å 110.04Å 138.95Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.37 – 1.20 29.37 – 1.20	Depositor EDS
% Data completeness (in resolution range)	95.9 (29.37-1.20) 96.1 (29.37-1.20)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.98 (at 1.20Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.175 , 0.184 0.178 , 0.188	Depositor DCC
R_{free} test set	3270 reflections (1.01%)	wwPDB-VP
Wilson B-factor (Å ²)	8.7	Xtriage
Anisotropy	0.107	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 34.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	9432	wwPDB-VP
Average B, all atoms (Å ²)	12.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.33% 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: NAG, ZN, MRD, BLT

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	1.11	5/8673 (0.1%)	1.06	24/11769 (0.2%)

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
1	A	0	2

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	422	ARG	N-CA	6.68	1.51	1.46
1	A	422	ARG	C-O	5.88	1.26	1.23
1	A	359	ARG	CZ-NH1	5.13	1.40	1.32
1	A	938	GLU	C-O	-5.07	1.18	1.24
1	A	772	GLY	N-CA	5.03	1.49	1.44

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	665	PRO	N-CA-C	9.48	125.69	114.03
1	A	703	SER	N-CA-C	7.68	122.31	109.87
1	A	517	PRO	N-CA-C	7.35	122.72	111.19
1	A	35	VAL	N-CA-C	7.28	117.82	111.56
1	A	640	LYS	CA-C-N	6.40	126.31	119.85
1	A	640	LYS	C-N-CA	6.40	126.31	119.85
1	A	699	LEU	N-CA-C	6.35	118.28	111.36
1	A	518	ASP	N-CA-C	-5.83	97.67	107.99

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	993	HIS	N-CA-C	5.77	123.09	110.80
1	A	265	PRO	N-CA-C	5.52	123.84	112.47
1	A	277	PRO	N-CA-C	5.45	120.68	113.86
1	A	316	ASP	CB-CA-C	-5.37	102.45	110.88
1	A	770[A]	ARG	CA-C-N	-5.32	117.12	123.08
1	A	770[A]	ARG	C-N-CA	-5.32	117.12	123.08
1	A	770[B]	ARG	CA-C-N	-5.32	117.12	123.08
1	A	770[B]	ARG	C-N-CA	-5.32	117.12	123.08
1	A	691	GLN	CB-CG-CD	-5.23	103.71	112.60
1	A	122	PRO	N-CA-C	5.22	121.38	113.81
1	A	396	GLU	N-CA-C	-5.20	101.28	109.50
1	A	512	PRO	N-CA-C	5.19	121.49	113.75
1	A	168	PRO	N-CA-C	5.16	119.58	111.38
1	A	62	TRP	N-CA-C	-5.09	99.03	107.99
1	A	642	GLU	N-CA-C	5.08	116.82	111.28
1	A	35	VAL	CB-CA-C	-5.08	106.61	111.44

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	102	TYR	Sidechain
1	A	797[B]	HIS	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	8290	0	8088	67	2
2	A	14	0	13	0	0
3	A	1	0	0	0	0
4	A	20	0	12	0	0
5	A	16	0	28	3	0
6	A	1091	0	0	27	0
All	All	9432	0	8141	69	2

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 4.

All (69) 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:A:117[B]:HIS:NE2	6:A:1493:HOH:O	2.00	0.94
1:A:117[B]:HIS:HE1	1:A:354:ARG:HE	1.12	0.91
1:A:75[B]:TYR:HD1	6:A:1524:HOH:O	1.59	0.86
1:A:117[B]:HIS:CE1	1:A:354:ARG:HE	1.93	0.85
1:A:991:GLU:O	1:A:992:GLU:HG3	1.77	0.84
1:A:714:LYS:HD2	6:A:2347:HOH:O	1.78	0.84
1:A:678:LEU:HD12	1:A:769:MET:HE1	1.61	0.82
1:A:117[B]:HIS:CE1	6:A:1493:HOH:O	2.32	0.80
1:A:351:ASP:HA	6:A:1493:HOH:O	1.82	0.80
1:A:766[B]:GLN:NE2	6:A:1878:HOH:O	2.16	0.76
1:A:541:THR:HG23	6:A:2104:HOH:O	1.86	0.76
1:A:971[B]:LYS:HB2	1:A:971[B]:LYS:NZ	2.01	0.75
5:A:1100:MRD:H1C1	6:A:1634:HOH:O	1.86	0.74
1:A:992:GLU:HG2	6:A:2384:HOH:O	1.87	0.73
1:A:994:THR:HA	6:A:1938:HOH:O	1.86	0.73
1:A:599[A]:HIS:CD2	1:A:610:GLN:NE2	2.57	0.72
1:A:599[A]:HIS:CD2	1:A:610:GLN:HE21	2.08	0.71
1:A:117[B]:HIS:HE1	1:A:354:ARG:NE	1.86	0.71
1:A:707:PRO:HG2	1:A:797[B]:HIS:CE1	2.26	0.71
1:A:979:LEU:HD21	1:A:999:VAL:HG11	1.73	0.70
1:A:678:LEU:CD1	1:A:769:MET:HE1	2.21	0.69
1:A:82:LYS:HE3	6:A:1513:HOH:O	1.94	0.66
1:A:991:GLU:O	1:A:992:GLU:CG	2.44	0.66
1:A:992:GLU:OE2	1:A:992:GLU:C	2.40	0.64
5:A:1100:MRD:H1C3	6:A:1577:HOH:O	1.97	0.64
1:A:651:LEU:CD1	1:A:653:ARG:HG2	2.29	0.61
1:A:57[A]:ILE:HD11	6:A:1587:HOH:O	2.01	0.60
1:A:904:ARG:HG2	1:A:985:MET:SD	2.42	0.59
1:A:971[B]:LYS:HB2	1:A:971[B]:LYS:HZ3	1.65	0.58
1:A:136:ARG:HD3	6:A:1764:HOH:O	2.04	0.57
1:A:975:VAL:HG21	1:A:1003:LEU:CD1	2.35	0.56
1:A:251:TRP:C	1:A:251:TRP:CD1	2.83	0.56
1:A:895:VAL:HG12	1:A:897:GLU:HG3	1.90	0.54
1:A:1026[B]:MET:HE2	6:A:1942:HOH:O	2.08	0.54
1:A:106:ASP:OD1	5:A:1200:MRD:HMC3	2.07	0.53
1:A:703:SER:HB2	1:A:704:PRO:CD	2.39	0.53
1:A:155:ASN:ND2	6:A:1442:HOH:O	2.43	0.52
1:A:600:HIS:C	1:A:600:HIS:CD2	2.87	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:62:TRP:CD2	1:A:65:GLY:HA3	2.47	0.49
1:A:568:LEU:HD12	1:A:770[B]:ARG:HD3	1.93	0.49
1:A:1026[A]:MET:HE3	6:A:1942:HOH:O	2.13	0.49
1:A:797[B]:HIS:HB2	6:A:1825:HOH:O	2.12	0.48
1:A:766[B]:GLN:HG2	1:A:768:ILE:HG13	1.96	0.47
1:A:602:THR:HG22	6:A:2467:HOH:O	2.15	0.47
1:A:551:PRO:HG2	6:A:2394:HOH:O	2.16	0.46
1:A:174:HIS:CE1	1:A:176:ARG:HD3	2.50	0.46
1:A:651:LEU:HD12	1:A:653:ARG:HG2	1.98	0.46
1:A:69:LYS:HE2	6:A:1655:HOH:O	2.16	0.45
1:A:703:SER:HB2	1:A:704:PRO:HD2	1.99	0.44
1:A:640:LYS:HA	1:A:641:PRO:HD3	1.85	0.44
1:A:367:GLN:HG3	6:A:1691:HOH:O	2.18	0.43
1:A:158:LEU:HD23	1:A:158:LEU:C	2.44	0.42
1:A:991:GLU:C	1:A:992:GLU:HG3	2.42	0.42
1:A:669[A]:LYS:HG3	6:A:2461:HOH:O	2.18	0.42
1:A:492:GLU:OE1	1:A:495:LYS:NZ	2.44	0.42
1:A:797[B]:HIS:HB2	6:A:1826:HOH:O	2.18	0.42
1:A:48:LEU:HD11	1:A:236:GLU:HG2	2.01	0.42
1:A:75[B]:TYR:CD1	6:A:1524:HOH:O	2.45	0.41
1:A:75[B]:TYR:HE1	6:A:1525:HOH:O	2.02	0.41
1:A:155:ASN:C	1:A:155:ASN:OD1	2.62	0.41
1:A:676:ILE:HD13	1:A:747:VAL:HG21	2.01	0.41
1:A:304[A]:ARG:NH1	1:A:304[A]:ARG:HG3	2.35	0.41
1:A:640:LYS:HG3	6:A:2006:HOH:O	2.20	0.41
1:A:721:GLY:O	1:A:723:ARG:HD2	2.21	0.41
1:A:96:ILE:HD12	1:A:97:GLN:HG3	2.03	0.41
1:A:304[A]:ARG:HG3	1:A:304[A]:ARG:HH11	1.86	0.41
1:A:92:ASP:HA	1:A:93:PRO:HD3	1.96	0.40
1:A:898:LYS:HA	1:A:898:LYS:HD2	1.83	0.40
1:A:583:LEU:HD12	1:A:583:LEU:HA	1.93	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:316:ASP:OD1	1:A:797[B]:HIS:ND1[2_565]	1.88	0.32
1:A:316:ASP:OD1	1:A:797[B]:HIS:CE1[2_565]	2.05	0.15

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	1043/1045 (100%)	1017 (98%)	22 (2%)	4 (0%)	30	10

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	993	HIS
1	A	994	THR
1	A	95	TRP
1	A	204	ASP

5.3.2 Protein sidechains

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	932/929 (100%)	922 (99%)	10 (1%)	65	31

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	158	LEU
1	A	275	CYS
1	A	585	ASN
1	A	640	LYS
1	A	653	ARG
1	A	691	GLN
1	A	695	LYS

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Mol	Chain	Res	Type
1	A	714	LYS
1	A	898	LYS
1	A	992	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	144	ASN
1	A	347	ASN
1	A	367	GLN
1	A	371	ASN
1	A	610	GLN
1	A	698	GLN
1	A	919	HIS
1	A	923	GLN
1	A	993	HIS

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](#)

Of 5 ligands modelled in this entry, 1 is monoatomic - leaving 4 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	MRD	A	1200	-	7,7,7	0.38	0	9,10,10	0.46	0
2	NAG	A	1046	1	14,14,15	0.77	0	17,19,21	1.21	2 (11%)
5	MRD	A	1100	-	7,7,7	0.83	0	9,10,10	0.64	0
4	BLT	A	1300	3	9,20,20	1.27	0	10,29,29	1.49	2 (20%)

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
5	MRD	A	1200	-	-	4/5/5/5	-
2	NAG	A	1046	1	-	6/6/23/26	0/1/1/1
5	MRD	A	1100	-	-	2/5/5/5	-
4	BLT	A	1300	3	-	0/10/33/33	0/1/1/1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1046	NAG	C1-O5-C5	3.53	116.91	112.19
4	A	1300	BLT	O6-C6-C5	-2.78	105.25	111.48
2	A	1046	NAG	O5-C1-C2	2.23	114.75	111.29
4	A	1300	BLT	C7-C8-C9	2.23	117.59	112.77

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1046	NAG	C8-C7-N2-C2
2	A	1046	NAG	O7-C7-N2-C2
5	A	1100	MRD	C2-C3-C4-O4
5	A	1100	MRD	C2-C3-C4-C5
5	A	1200	MRD	C2-C3-C4-O4
2	A	1046	NAG	O5-C5-C6-O6
2	A	1046	NAG	C4-C5-C6-O6
2	A	1046	NAG	C3-C2-N2-C7
5	A	1200	MRD	C1-C2-C3-C4
5	A	1200	MRD	CM-C2-C3-C4
5	A	1200	MRD	C2-C3-C4-C5

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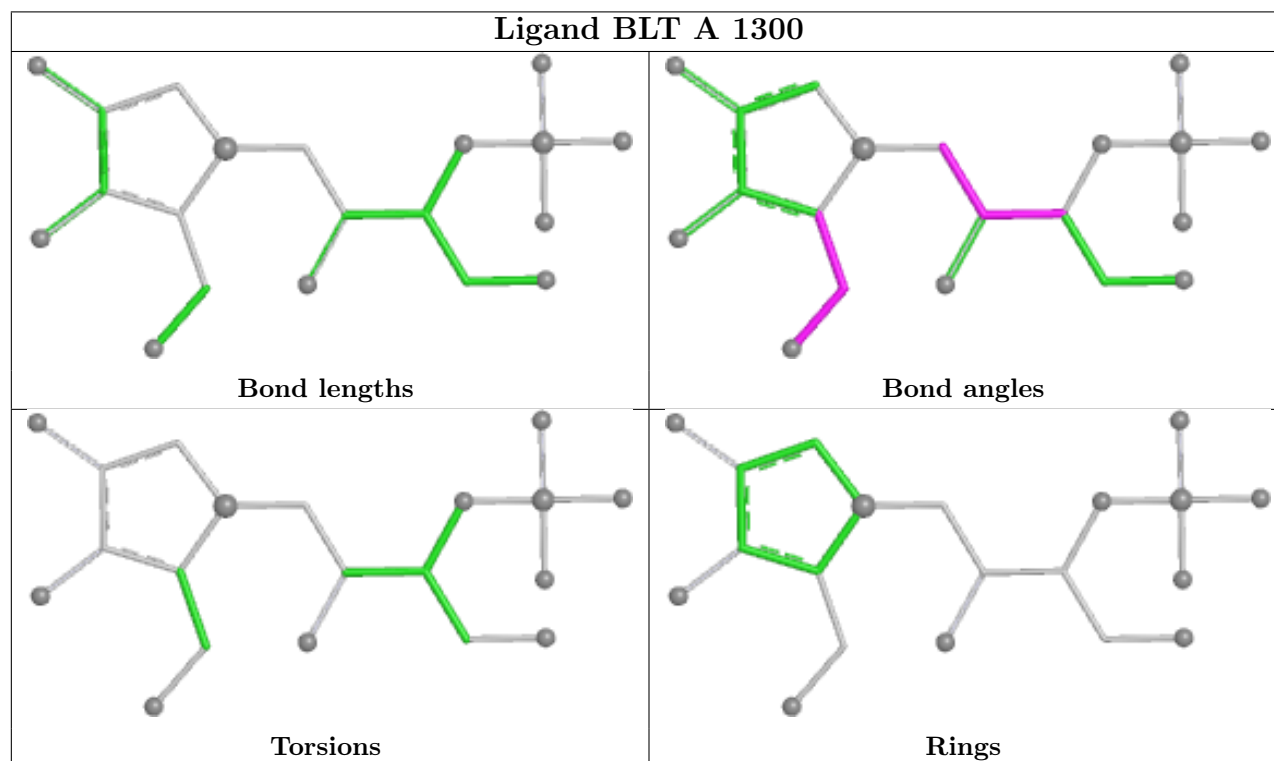
Mol	Chain	Res	Type	Atoms
2	A	1046	NAG	C1-C2-N2-C7

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	1200	MRD	1	0
5	A	1100	MRD	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	1014/1045 (97%)	0.23	69 (6%)	23 25	5, 10, 19, 57	32 (3%)

All (69) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	993	HIS	6.6
1	A	990	PRO	5.2
1	A	702	ASP	5.0
1	A	701	GLN	4.7
1	A	991	GLU	4.6
1	A	720	HIS	4.5
1	A	534	SER	4.4
1	A	602	THR	4.2
1	A	583	LEU	4.2
1	A	682	ASN	4.1
1	A	538	ASP	3.9
1	A	600	HIS	3.7
1	A	784	SER	3.7
1	A	290	MET	3.6
1	A	78	HIS	3.5
1	A	638	ASP	3.4
1	A	676	ILE	3.4
1	A	703	SER	3.2
1	A	435	TYR	3.2
1	A	547	GLU	3.1
1	A	655	ASN	3.1
1	A	451	MET	3.1
1	A	396	GLU	3.1
1	A	537	GLU	3.1
1	A	539	SER	3.1
1	A	75[A]	TYR	3.1
1	A	994	THR	3.0

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Mol	Chain	Res	Type	RSRZ
1	A	541	THR	2.9
1	A	992	GLU	2.9
1	A	986	GLN	2.8
1	A	662	GLY	2.8
1	A	536	VAL	2.8
1	A	739	GLU	2.8
1	A	654	LYS	2.7
1	A	613	THR	2.7
1	A	1024	ASP	2.7
1	A	940	ILE	2.7
1	A	599[A]	HIS	2.6
1	A	392	ALA	2.6
1	A	1022	HIS	2.6
1	A	366	SER	2.4
1	A	704	PRO	2.4
1	A	144	ASN	2.4
1	A	723	ARG	2.4
1	A	1044	SER	2.4
1	A	256	ASP	2.4
1	A	316	ASP	2.4
1	A	155	ASN	2.4
1	A	603	LEU	2.4
1	A	614	THR	2.4
1	A	989	THR	2.4
1	A	370	PHE	2.4
1	A	291	GLY	2.3
1	A	742	GLN	2.3
1	A	368	ALA	2.3
1	A	700	THR	2.3
1	A	312	ALA	2.2
1	A	123	GLU	2.2
1	A	57[A]	ILE	2.2
1	A	317	LEU	2.2
1	A	139	HIS	2.2
1	A	535	GLY	2.2
1	A	661	LEU	2.1
1	A	721	GLY	2.1
1	A	988	GLY	2.1
1	A	77	ALA	2.1
1	A	786	ASP	2.1
1	A	105	HIS	2.1
1	A	907	LYS	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](#)

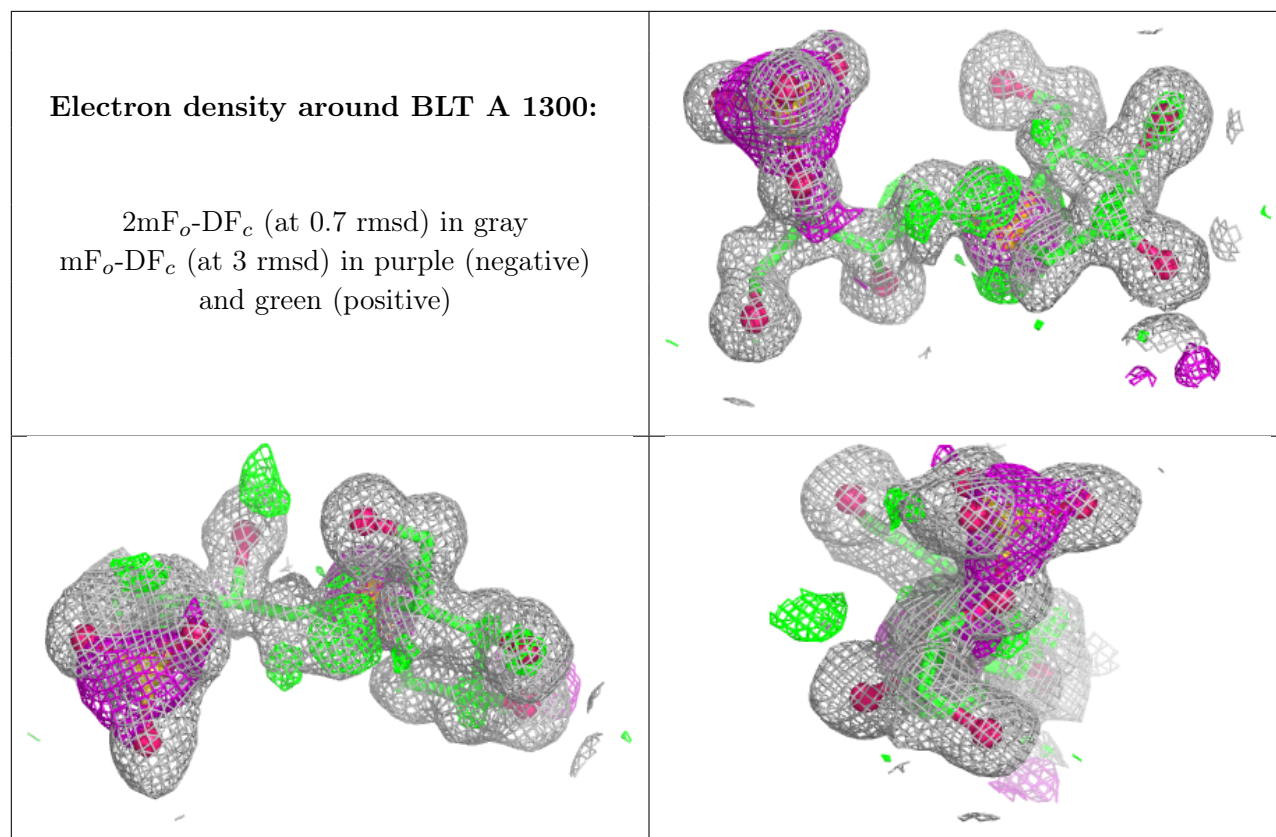
There are no oligosaccharides in this entry.

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($\text{\AA}^2$)	Q<0.9
2	NAG	A	1046	14/15	0.52	0.27	52,60,60,60	0
5	MRD	A	1200	8/8	0.69	0.21	34,35,35,35	0
5	MRD	A	1100	8/8	0.94	0.09	10,12,15,17	0
4	BLT	A	1300	20/20	0.95	0.14	6,16,21,21	0
3	ZN	A	1400	1/1	1.00	0.01	6,6,6,6	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.



6.5 Other polymers [i](#)

There are no such residues in this entry.