Full wwPDB X-ray Structure Validation Report (i)

Nov 14, 2023 – 02:49 AM JST

PDB ID	:	5Z05
Title	:	Crystal structure of signalling protein from buffalo (SPB-40) with an acetone induced conformation of Trp78 at 1.49 A resolution
Authors	:	Singh, P.K.; Chaudhary, A.; Tyagi, T.K.; Kaur, P.; Sharma, S.; Singh, T.P.
Deposited on	:	2017-12-18
Resolution	:	1.49 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 (i) 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 (i)) were used in the production of this report:

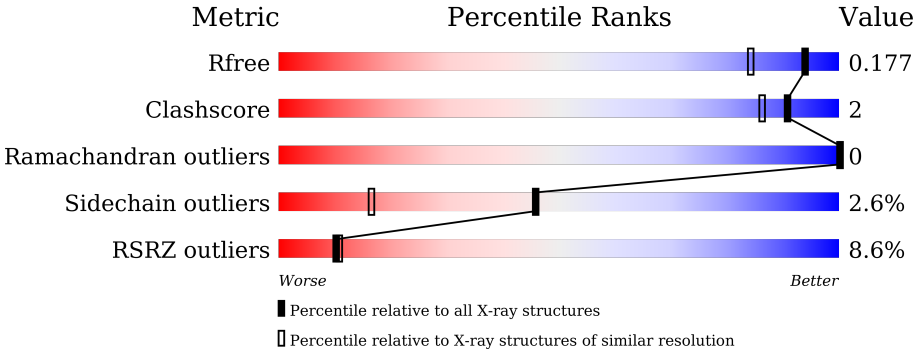
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 1.49 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2936 (1.50-1.50)
Clashscore	141614	3144 (1.50-1.50)
Ramachandran outliers	138981	3066 (1.50-1.50)
Sidechain outliers	138945	3064 (1.50-1.50)
RSRZ outliers	127900	2884 (1.50-1.50)

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 <=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	361	9% 75% 23% •
2	B	2	100%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 3336 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 Chitinase-3-like protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	361	2883	1846	499	529	9	0	2	0

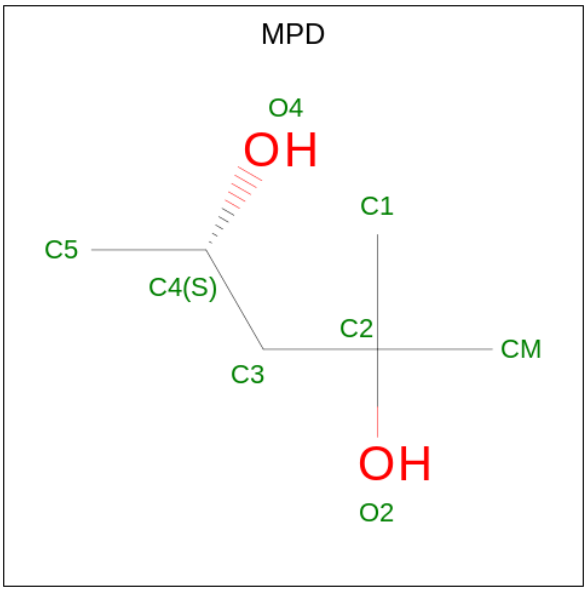
There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	ASP	deletion	UNP Q7YS85

- Molecule 2 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

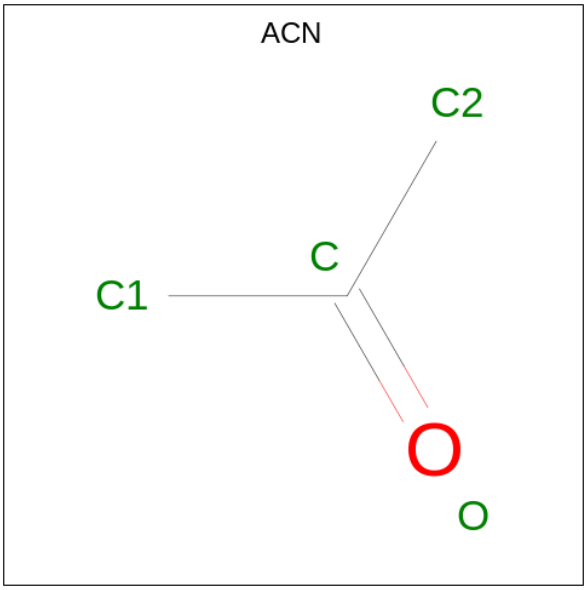
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	B	2	28	16	2	10	0	0	0

- Molecule 3 is (4S)-2-METHYL-2,4-PENTANEDIOL (three-letter code: MPD) (formula: $C_6H_{14}O_2$).



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

- Molecule 4 is ACETONE (three-letter code: ACN) (formula: C_3H_6O).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 4 3 1	0	0

- Molecule 5 is water.

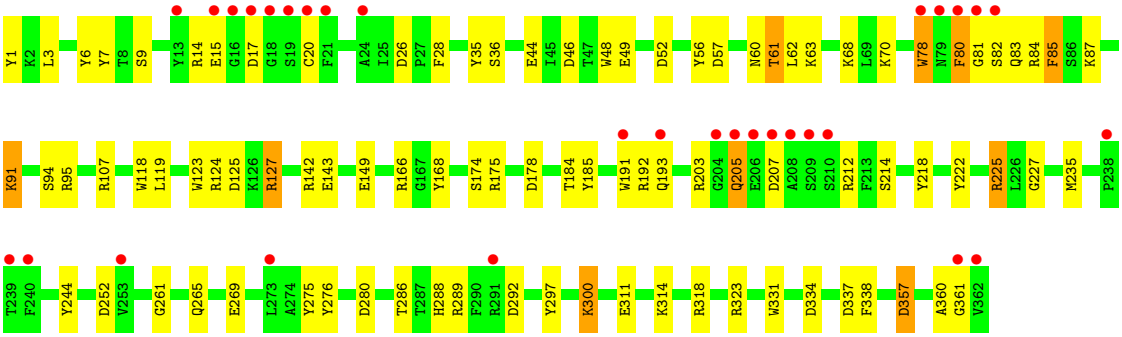
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
5	A	413	413	413	0	0

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.

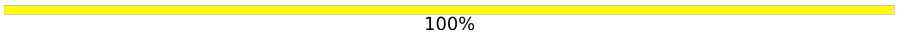
• Molecule 1: Chitinase-3-like protein 1

Chain A:



• Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	60.46Å 66.52Å 105.85Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	56.32 – 1.49 28.09 – 1.49	Depositor EDS
% Data completeness (in resolution range)	98.5 (56.32-1.49) 98.5 (28.09-1.49)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.03	Depositor
$< I/\sigma(I) >$ [1]	2.56 (at 1.50Å)	Xtriage
Refinement program	REFMAC 5.8.0189	Depositor
R, R_{free}	0.147 , 0.176 0.148 , 0.177	Depositor DCC
R_{free} test set	3488 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å^2)	20.4	Xtriage
Anisotropy	0.291	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.41 , 51.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	3336	wwPDB-VP
Average B, all atoms (Å^2)	27.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.37% of the height of the origin peak. No significant pseudotranslation is detected.*

[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ 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, ACN, MPD

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	1.91	74/2972 (2.5%)	1.75	68/4031 (1.7%)

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	3

All (74) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	36	SER	CB-OG	-13.37	1.24	1.42
1	A	91	LYS	CE-NZ	-10.66	1.22	1.49
1	A	7	TYR	CZ-OH	10.58	1.55	1.37
1	A	81	GLY	N-CA	9.62	1.60	1.46
1	A	56	TYR	CE2-CZ	-8.84	1.27	1.38
1	A	227	GLY	CA-C	-8.63	1.38	1.51
1	A	9	SER	CA-CB	-8.54	1.40	1.52
1	A	191	TRP	CE3-CZ3	7.85	1.51	1.38
1	A	85	PHE	CD1-CE1	-7.64	1.24	1.39
1	A	6	TYR	CE2-CZ	-7.52	1.28	1.38
1	A	280	ASP	CB-CG	-7.52	1.35	1.51
1	A	225	ARG	CG-CD	7.51	1.70	1.51
1	A	49	GLU	CD-OE1	-7.49	1.17	1.25
1	A	174	SER	CB-OG	-7.46	1.32	1.42
1	A	191	TRP	CE2-CZ2	7.37	1.52	1.39
1	A	63	LYS	CD-CE	-7.32	1.32	1.51
1	A	20	CYS	C-O	7.32	1.37	1.23
1	A	361	GLY	CA-C	7.19	1.63	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	35	TYR	CE1-CZ	-7.16	1.29	1.38
1	A	84	ARG	CZ-NH2	-7.01	1.24	1.33
1	A	20	CYS	CB-SG	-7.01	1.70	1.82
1	A	357	ASP	CB-CG	6.76	1.66	1.51
1	A	82	SER	CB-OG	6.73	1.50	1.42
1	A	244	TYR	CE1-CZ	-6.71	1.29	1.38
1	A	214	SER	CB-OG	-6.68	1.33	1.42
1	A	1	TYR	CB-CG	6.68	1.61	1.51
1	A	94	SER	CB-OG	6.58	1.50	1.42
1	A	44	GLU	CG-CD	-6.41	1.42	1.51
1	A	311[A]	GLU	CD-OE1	6.40	1.32	1.25
1	A	311[B]	GLU	CD-OE1	6.40	1.32	1.25
1	A	261	GLY	N-CA	6.39	1.55	1.46
1	A	265	GLN	CD-OE1	6.17	1.37	1.24
1	A	331	TRP	CE3-CZ3	6.17	1.49	1.38
1	A	142	ARG	CZ-NH1	6.13	1.41	1.33
1	A	80	PHE	CG-CD1	-6.11	1.29	1.38
1	A	222	TYR	CE2-CZ	-6.10	1.30	1.38
1	A	300	LYS	CB-CG	-5.97	1.36	1.52
1	A	314	LYS	CD-CE	-5.94	1.36	1.51
1	A	142	ARG	CD-NE	5.92	1.56	1.46
1	A	118	TRP	C-O	-5.87	1.12	1.23
1	A	60	ASN	CG-ND2	5.83	1.47	1.32
1	A	63	LYS	CB-CG	-5.83	1.36	1.52
1	A	123	TRP	CE3-CZ3	5.82	1.48	1.38
1	A	218	TYR	CG-CD1	-5.64	1.31	1.39
1	A	78	TRP	CB-CG	-5.64	1.40	1.50
1	A	35	TYR	CE2-CZ	-5.63	1.31	1.38
1	A	360	ALA	C-O	5.60	1.33	1.23
1	A	84	ARG	C-O	5.57	1.33	1.23
1	A	192	ARG	C-N	-5.57	1.21	1.34
1	A	56	TYR	CZ-OH	5.51	1.47	1.37
1	A	15	GLU	CD-OE2	5.47	1.31	1.25
1	A	142	ARG	NE-CZ	5.47	1.40	1.33
1	A	142	ARG	CG-CD	5.43	1.65	1.51
1	A	61	THR	C-O	5.40	1.33	1.23
1	A	323	ARG	CZ-NH2	-5.40	1.26	1.33
1	A	48	TRP	CD1-NE1	5.39	1.47	1.38
1	A	297	TYR	CG-CD2	-5.38	1.32	1.39
1	A	143	GLU	CD-OE2	5.37	1.31	1.25
1	A	119	LEU	C-O	5.35	1.33	1.23
1	A	225	ARG	NE-CZ	5.34	1.40	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	85	PHE	CD2-CE2	5.26	1.49	1.39
1	A	297	TYR	CE1-CZ	-5.23	1.31	1.38
1	A	118	TRP	CG-CD1	5.22	1.44	1.36
1	A	28	PHE	CB-CG	-5.21	1.42	1.51
1	A	166	ARG	NE-CZ	5.21	1.39	1.33
1	A	124	ARG	CD-NE	-5.17	1.37	1.46
1	A	127	ARG	CZ-NH1	5.16	1.39	1.33
1	A	338	PHE	CG-CD1	-5.13	1.31	1.38
1	A	17	ASP	CB-CG	5.04	1.62	1.51
1	A	142	ARG	CZ-NH2	5.04	1.39	1.33
1	A	1	TYR	CG-CD1	5.02	1.45	1.39
1	A	185	TYR	CE2-CZ	-5.01	1.32	1.38
1	A	311[A]	GLU	CG-CD	5.01	1.59	1.51
1	A	311[B]	GLU	CG-CD	5.01	1.59	1.51

All (68) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	225	ARG	NE-CZ-NH2	15.71	128.15	120.30
1	A	84	ARG	NE-CZ-NH2	-13.88	113.36	120.30
1	A	323	ARG	NE-CZ-NH1	-13.61	113.49	120.30
1	A	178	ASP	CB-CG-OD2	10.86	128.07	118.30
1	A	175	ARG	NE-CZ-NH1	10.81	125.70	120.30
1	A	168	TYR	CB-CG-CD1	-10.78	114.53	121.00
1	A	91	LYS	CD-CE-NZ	10.26	135.30	111.70
1	A	252	ASP	CB-CG-OD2	-9.70	109.57	118.30
1	A	252	ASP	CB-CG-OD1	9.03	126.43	118.30
1	A	168	TYR	CB-CG-CD2	8.93	126.36	121.00
1	A	26	ASP	CB-CG-OD2	-8.93	110.27	118.30
1	A	26	ASP	CB-CG-OD1	8.85	126.26	118.30
1	A	84	ARG	O-C-N	-8.80	108.62	122.70
1	A	142	ARG	NE-CZ-NH2	-8.12	116.24	120.30
1	A	142	ARG	CD-NE-CZ	7.97	134.76	123.60
1	A	280	ASP	CB-CG-OD1	7.75	125.27	118.30
1	A	84	ARG	NE-CZ-NH1	7.73	124.17	120.30
1	A	318	ARG	NE-CZ-NH1	-7.60	116.50	120.30
1	A	207	ASP	CB-CG-OD1	7.49	125.04	118.30
1	A	192	ARG	C-N-CA	-7.46	103.04	121.70
1	A	127	ARG	NE-CZ-NH2	-7.38	116.61	120.30
1	A	289	ARG	NE-CZ-NH1	-7.12	116.74	120.30
1	A	56	TYR	CB-CG-CD2	-7.04	116.77	121.00
1	A	56	TYR	CB-CG-CD1	6.94	125.17	121.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	107	ARG	NE-CZ-NH1	-6.79	116.90	120.30
1	A	323	ARG	NE-CZ-NH2	6.75	123.68	120.30
1	A	127	ARG	NE-CZ-NH1	6.68	123.64	120.30
1	A	61	THR	OG1-CB-CG2	6.52	124.99	110.00
1	A	95	ARG	NE-CZ-NH1	6.35	123.48	120.30
1	A	49	GLU	CG-CD-OE1	6.31	130.92	118.30
1	A	334	ASP	CB-CG-OD2	-6.30	112.63	118.30
1	A	318	ARG	NE-CZ-NH2	6.20	123.40	120.30
1	A	300	LYS	CG-CD-CE	6.16	130.38	111.90
1	A	52	ASP	CB-CG-OD2	-6.02	112.88	118.30
1	A	185	TYR	CB-CG-CD1	6.00	124.60	121.00
1	A	60	ASN	CB-CA-C	5.99	122.38	110.40
1	A	3	LEU	O-C-N	5.98	132.27	122.70
1	A	14	ARG	NE-CZ-NH1	5.93	123.26	120.30
1	A	80	PHE	CB-CG-CD1	5.87	124.91	120.80
1	A	300	LYS	CD-CE-NZ	-5.80	98.36	111.70
1	A	225	ARG	NE-CZ-NH1	-5.79	117.41	120.30
1	A	49	GLU	OE1-CD-OE2	-5.77	116.38	123.30
1	A	235	MET	CG-SD-CE	-5.69	91.09	100.20
1	A	338	PHE	CB-CG-CD1	5.69	124.78	120.80
1	A	28	PHE	CB-CG-CD2	5.63	124.75	120.80
1	A	14	ARG	NE-CZ-NH2	-5.62	117.49	120.30
1	A	276	TYR	CZ-CE2-CD2	-5.61	114.75	119.80
1	A	85	PHE	CG-CD1-CE1	5.55	126.91	120.80
1	A	87	LYS	CB-CG-CD	5.55	126.03	111.60
1	A	6	TYR	CD1-CE1-CZ	-5.51	114.84	119.80
1	A	225	ARG	CB-CG-CD	5.50	125.91	111.60
1	A	337	ASP	CB-CG-OD2	-5.49	113.36	118.30
1	A	125	ASP	CB-CG-OD1	-5.41	113.44	118.30
1	A	62	LEU	N-CA-CB	5.31	121.02	110.40
1	A	7	TYR	CB-CG-CD2	-5.26	117.84	121.00
1	A	46	ASP	CB-CG-OD1	-5.18	113.64	118.30
1	A	17	ASP	CB-CG-OD2	-5.17	113.64	118.30
1	A	193	GLN	CB-CA-C	5.16	120.72	110.40
1	A	52	ASP	CB-CG-OD1	5.15	122.93	118.30
1	A	61	THR	CA-C-N	5.11	128.45	117.20
1	A	142	ARG	NE-CZ-NH1	5.11	122.85	120.30
1	A	56	TYR	CD1-CE1-CZ	-5.09	115.22	119.80
1	A	36	SER	O-C-N	-5.07	114.59	122.70
1	A	85	PHE	CZ-CE2-CD2	-5.07	114.02	120.10
1	A	80	PHE	CG-CD1-CE1	5.05	126.36	120.80
1	A	61	THR	C-N-CA	5.02	134.26	121.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	178	ASP	CB-CG-OD1	-5.01	113.79	118.30
1	A	275	TYR	CB-CG-CD2	-5.01	117.99	121.00

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	205	GLN	Peptide
1	A	300	LYS	Mainchain
1	A	80	PHE	Sidechain

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	2883	0	2811	10	0
2	B	28	0	25	0	0
3	A	8	0	14	0	0
4	A	4	0	6	2	0
5	A	413	0	0	5	0
All	All	3336	0	2856	10	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 (10) 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:127:ARG:NH2	5:A:505:HOH:O	2.26	0.69
1:A:57:ASP:O	1:A:61:THR:HG23	1.95	0.66
1:A:78:TRP:HZ3	4:A:404:ACN:H22	1.60	0.65
1:A:269:GLU:OE2	5:A:501:HOH:O	2.14	0.64
1:A:78:TRP:CZ3	4:A:404:ACN:H22	2.36	0.60
1:A:70:LYS:HE2	5:A:587:HOH:O	2.04	0.56
1:A:357:ASP:HB2	5:A:649:HOH:O	2.05	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:286:THR:HG22	1:A:288:HIS:NE2	2.26	0.51
1:A:205:GLN:HG3	1:A:292:ASP:OD2	2.15	0.46
1:A:149:GLU:OE1	5:A:503:HOH:O	2.22	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	361/361 (100%)	348 (96%)	13 (4%)	0	100 100

There are no Ramachandran outliers to report.

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	304/302 (101%)	296 (97%)	8 (3%)	46 16

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	68	LYS
1	A	83	GLN
1	A	85	PHE

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Mol	Chain	Res	Type
1	A	91	LYS
1	A	184	THR
1	A	203	ARG
1	A	212	ARG
1	A	225	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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)

2 monosaccharides 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	$\#\|Z\| > 2$
2	NAG	B	1	2,1	14,14,15	3.29	6 (42%)	17,19,21	2.77	9 (52%)
2	NAG	B	2	2	14,14,15	1.61	4 (28%)	17,19,21	2.54	8 (47%)

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
2	NAG	B	1	2,1	-	1/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	B	2	2	-	0/6/23/26	0/1/1/1

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1	NAG	O5-C1	-7.10	1.32	1.43
2	B	1	NAG	C1-C2	-6.18	1.43	1.52
2	B	1	NAG	C4-C5	-4.72	1.43	1.53
2	B	1	NAG	O4-C4	3.98	1.52	1.43
2	B	1	NAG	O5-C5	3.86	1.51	1.43
2	B	2	NAG	C1-C2	3.28	1.57	1.52
2	B	2	NAG	C3-C2	-2.62	1.46	1.52
2	B	1	NAG	C3-C2	2.59	1.58	1.52
2	B	2	NAG	O3-C3	2.56	1.49	1.43
2	B	2	NAG	C2-N2	-2.17	1.42	1.46

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	1	NAG	C4-C3-C2	-5.40	103.11	111.02
2	B	2	NAG	C4-C3-C2	-5.01	103.68	111.02
2	B	2	NAG	C1-O5-C5	4.97	118.93	112.19
2	B	1	NAG	C2-N2-C7	-3.96	117.27	122.90
2	B	1	NAG	O5-C5-C4	-3.89	101.37	110.83
2	B	2	NAG	O5-C5-C6	3.77	113.11	107.20
2	B	1	NAG	O5-C5-C6	-3.76	101.32	107.20
2	B	1	NAG	C6-C5-C4	3.58	121.40	113.00
2	B	1	NAG	C1-O5-C5	-3.58	107.34	112.19
2	B	2	NAG	O4-C4-C3	-3.50	102.26	110.35
2	B	2	NAG	C1-C2-N2	2.77	115.21	110.49
2	B	1	NAG	O4-C4-C3	-2.71	104.09	110.35
2	B	2	NAG	C6-C5-C4	-2.38	107.42	113.00
2	B	1	NAG	O7-C7-C8	-2.37	117.66	122.06
2	B	1	NAG	O4-C4-C5	-2.25	103.72	109.30
2	B	2	NAG	O3-C3-C2	2.23	114.08	109.47
2	B	2	NAG	O5-C5-C4	-2.02	105.92	110.83

There are no chirality outliers.

All (1) torsion outliers are listed below:

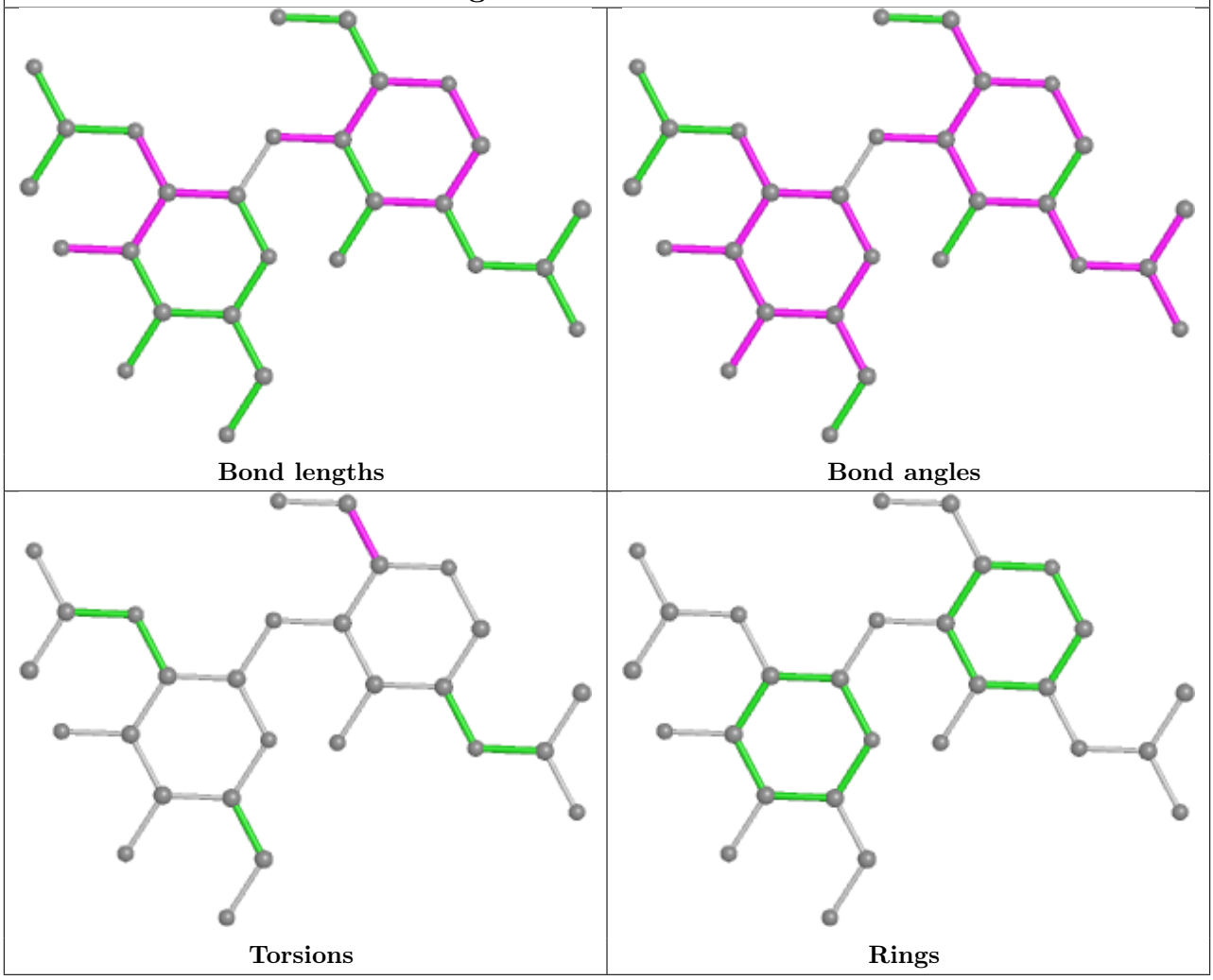
Mol	Chain	Res	Type	Atoms
2	B	1	NAG	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

Oligosaccharide Chain B



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	$\#\|Z\| > 2$
3	MPD	A	401	-	7,7,7	2.35	2 (28%)	9,10,10	1.81	3 (33%)
4	ACN	A	404	-	3,3,3	0.90	0	3,3,3	1.40	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
3	MPD	A	401	-	-	2/5/5/5	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	401	MPD	C3-C2	-5.29	1.39	1.53
3	A	401	MPD	C1-C2	2.31	1.59	1.52

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	401	MPD	C1-C2-C3	3.05	124.16	109.96
3	A	401	MPD	O2-C2-C1	-2.98	98.53	108.08
3	A	401	MPD	O2-C2-CM	-2.21	100.97	108.08

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	401	MPD	C2-C3-C4-O4
3	A	401	MPD	C2-C3-C4-C5

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	404	ACN	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	A	361/361 (100%)	0.42	31 (8%) 10 11	15, 23, 42, 90	0

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	208	ALA	12.9
1	A	209	SER	12.3
1	A	362	VAL	11.5
1	A	207	ASP	10.9
1	A	206	GLU	9.2
1	A	78	TRP	6.9
1	A	81	GLY	5.4
1	A	210	SER	4.6
1	A	80	PHE	4.3
1	A	205	GLN	4.2
1	A	253	VAL	3.9
1	A	13	TYR	3.6
1	A	20	CYS	3.6
1	A	15	GLU	3.5
1	A	291	ARG	3.4
1	A	82	SER	3.3
1	A	16	GLY	3.3
1	A	361	GLY	3.3
1	A	193	GLN	3.3
1	A	79	ASN	3.0
1	A	21	PHE	2.9
1	A	24	ALA	2.7
1	A	18	GLY	2.5
1	A	19	SER	2.4
1	A	191	TRP	2.2
1	A	240	PHE	2.1
1	A	273	LEU	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	204	GLY	2.1
1	A	238	PRO	2.1
1	A	17	ASP	2.1
1	A	239	THR	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)

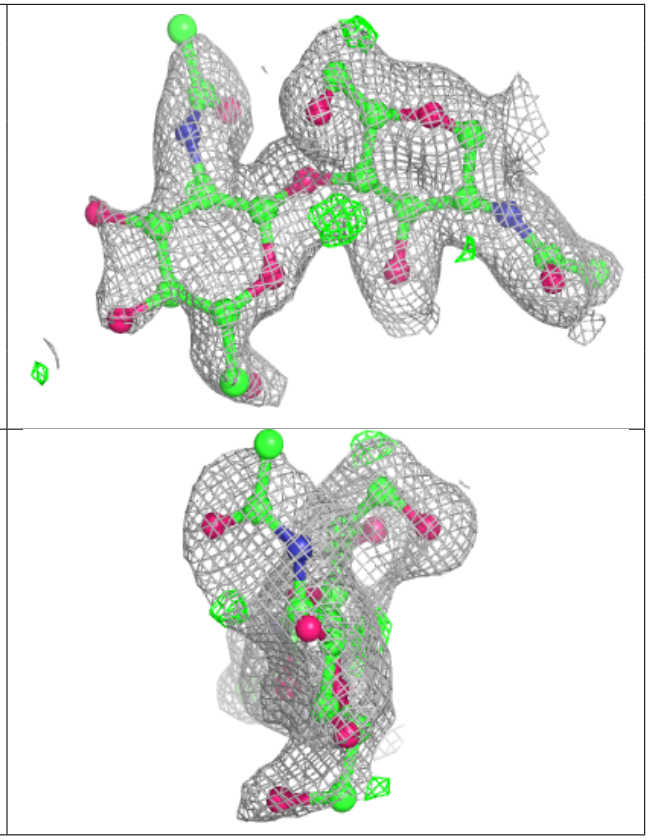
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	NAG	B	2	14/15	0.81	0.35	45,54,59,61	0
2	NAG	B	1	14/15	0.93	0.09	25,31,37,39	0

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around Chain B:

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



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
4	ACN	A	404	4/4	0.90	0.11	31,33,34,36	0
3	MPD	A	401	8/8	0.91	0.10	22,24,26,27	0

6.5 Other polymers (i)

There are no such residues in this entry.