



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 16, 2024 – 04:20 pm BST

PDB ID : 8RSK
Title : Crystal structure of Methanobrevibacter oralis macrodomain in complex with Asn-ADPr
Authors : Ariza, A.
Deposited on : 2024-01-24
Resolution : 2.36 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 : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 3.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.002 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.38.2

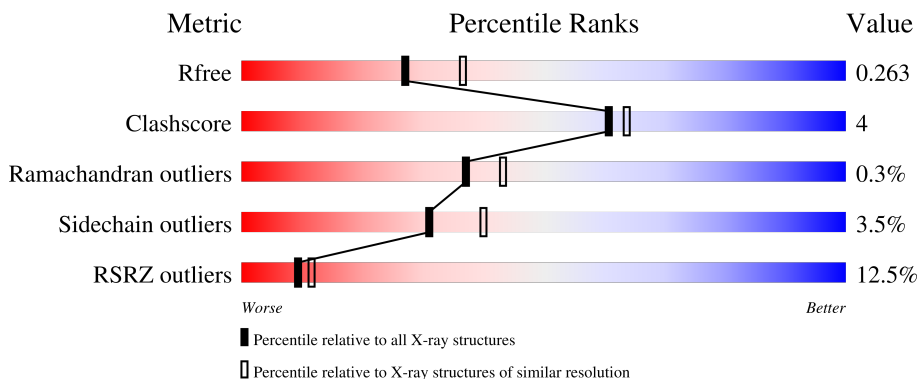
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.36 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}	164625	1460 (2.36-2.36)
Clashscore	180529	1571 (2.36-2.36)
Ramachandran outliers	177936	1559 (2.36-2.36)
Sidechain outliers	177891	1559 (2.36-2.36)
RSRZ outliers	164620	1460 (2.36-2.36)

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	262	
1	B	262	
1	C	262	

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 6647 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 O-acetyl-ADP-ribose deacetylase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	262	2096	1315	356	410	15	0	4	0
1	B	262	2096	1313	356	412	15	0	4	0
1	C	262	2096	1315	356	410	15	0	4	0

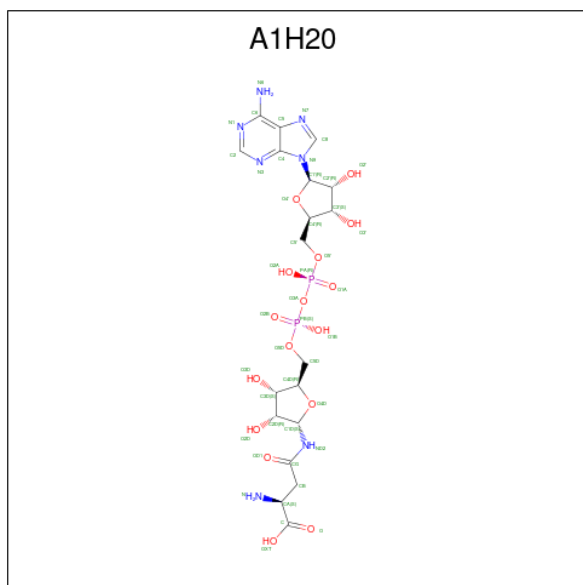
There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	expression tag	UNP A0A166ACJ5
A	0	PRO	-	expression tag	UNP A0A166ACJ5
B	-1	GLY	-	expression tag	UNP A0A166ACJ5
B	0	PRO	-	expression tag	UNP A0A166ACJ5
C	-1	GLY	-	expression tag	UNP A0A166ACJ5
C	0	PRO	-	expression tag	UNP A0A166ACJ5

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	3	Total 3	Zn 3	0	0
2	B	4	Total 4	Zn 4	0	0
2	C	2	Total 2	Zn 2	0	0

- Molecule 3 is (2 {S})-4-[[[(2 {S}),3 {R}),4 {S}),5 {R}))-5-[[[(2 {R}),3 {S}),4 {R}),5 {R}))-5-(6-am inopurin-9-yl)-3,4-bis(oxidanyl)oxolan-2-yl]methoxy-oxidanyl-phosphoryl]oxy-oxidanyl-phosphoryl]oxymethyl]-3,4-bis(oxidanyl)oxolan-2-yl]amino]-2-azanyl-4-oxidanylidene-butanoic acid (three-letter code: A1H20) (formula: C₁₉H₂₉N₇O₁₆P₂) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	44	19	7	16	2	0	0
3	B	1	44	19	7	16	2	0	0
3	C	1	44	19	7	16	2	0	0

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



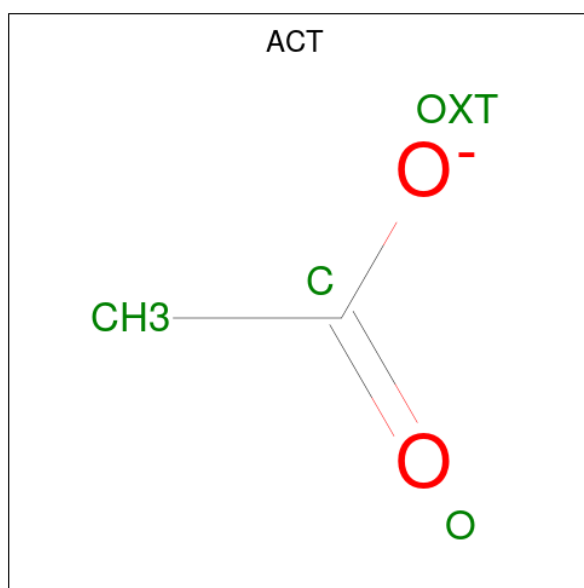
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
4	A	1	6	3	3	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		

- Molecule 5 is ACETATE ION (three-letter code: ACT) (formula: C₂H₃O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			4	2	2		
5	C	1	Total	C	O	0	0
			4	2	2		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	63	Total	O	0	0
			63	63		
6	B	55	Total	O	0	0
			55	55		

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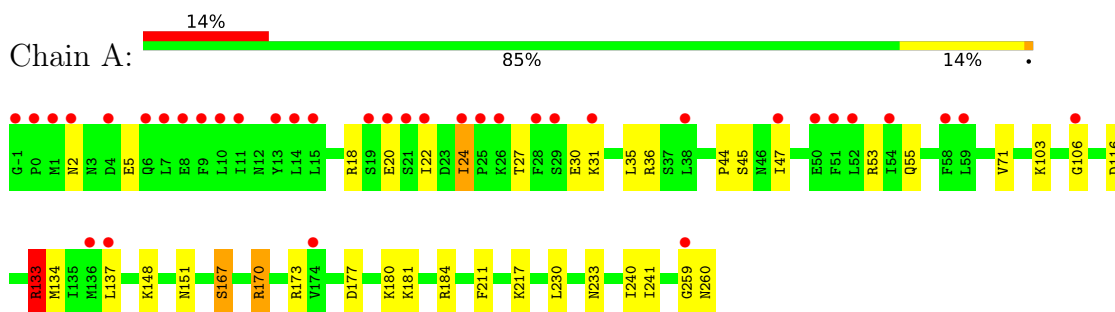
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	C	56	Total	O	0	0
			56	56		

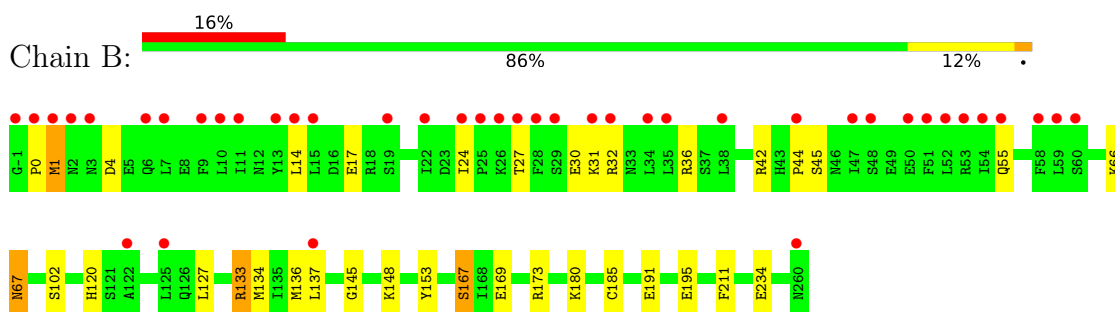
3 Residue-property plots [i](#)

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.

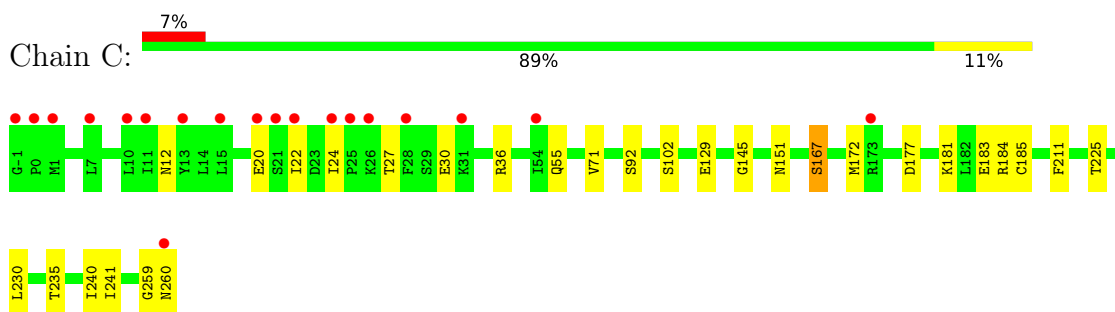
- Molecule 1: O-acetyl-ADP-ribose deacetylase



- Molecule 1: O-acetyl-ADP-ribose deacetylase



- Molecule 1: O-acetyl-ADP-ribose deacetylase



4 Data and refinement statistics i

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	104.15Å 110.44Å 104.61Å 90.00° 119.56° 90.00°	Depositor
Resolution (Å)	69.95 – 2.36 69.95 – 2.36	Depositor EDS
% Data completeness (in resolution range)	99.2 (69.95-2.36) 99.1 (69.95-2.36)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.44 (at 2.37Å)	Xtrriage
Refinement program	REFMAC 5.8.0415	Depositor
R, R_{free}	0.213 , 0.261 0.220 , 0.263	Depositor DCC
R_{free} test set	1960 reflections (4.64%)	wwPDB-VP
Wilson B-factor (Å ²)	36.8	Xtrriage
Anisotropy	0.518	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 39.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.013 for h,-k,-h-l	Xtrriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	6647	wwPDB-VP
Average B, all atoms (Å ²)	60.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.00% 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: A1H20, GOL, ZN, ACT

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	0.64	0/2140	0.95	0/2884
1	B	0.68	1/2140 (0.0%)	0.97	3/2883 (0.1%)
1	C	0.69	3/2140 (0.1%)	0.99	2/2883 (0.1%)
All	All	0.67	4/6420 (0.1%)	0.97	5/8650 (0.1%)

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
1	B	0	3
1	C	0	1
All	All	0	7

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	102	SER	CA-CB	-5.90	1.44	1.52
1	C	129	GLU	CD-OE1	5.83	1.32	1.25
1	C	183	GLU	CD-OE1	5.29	1.31	1.25
1	B	234	GLU	CD-OE1	5.04	1.31	1.25

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	36	ARG	NE-CZ-NH1	8.29	124.44	120.30
1	B	67[A]	ASN	CB-CA-C	5.80	122.00	110.40
1	B	67[B]	ASN	CB-CA-C	5.80	122.00	110.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	153	TYR	CB-CA-C	5.40	121.20	110.40
1	C	20	GLU	CB-CA-C	5.02	120.44	110.40

There are no chirality outliers.

All (7) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	133	ARG	Sidechain
1	A	170	ARG	Sidechain
1	A	53	ARG	Sidechain
1	B	133	ARG	Sidechain
1	B	32	ARG	Sidechain
1	B	36	ARG	Sidechain
1	C	184	ARG	Sidechain

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	2096	0	2092	24	0
1	B	2096	0	2085	18	0
1	C	2096	0	2092	11	0
2	A	3	0	0	0	0
2	B	4	0	0	0	0
2	C	2	0	0	0	0
3	A	44	0	0	0	0
3	B	44	0	0	0	0
3	C	44	0	0	0	0
4	A	12	0	16	5	0
4	B	6	0	8	1	0
4	C	18	0	24	3	0
5	A	4	0	3	0	0
5	C	4	0	3	0	0
6	A	63	0	0	3	0
6	B	55	0	0	4	0
6	C	56	0	0	0	0
All	All	6647	0	6323	53	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 4.

All (53) 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:B:24:ILE:HB	6:B:451:HOH:O	1.73	0.88
1:A:134:MET:HE3	1:A:148:LYS:HD3	1.70	0.73
1:B:27:THR:HG23	1:B:30:GLU:OE2	1.89	0.72
1:C:27:THR:HG23	1:C:30:GLU:OE2	1.91	0.70
1:A:151[A]:ASN:ND2	4:A:305:GOL:H31	2.07	0.70
1:A:27:THR:HG23	1:A:30:GLU:OE2	1.91	0.70
1:A:151[B]:ASN:ND2	6:A:401:HOH:O	2.24	0.68
1:B:66:LYS:HB3	6:B:406:HOH:O	1.93	0.67
1:A:134:MET:CE	1:A:148:LYS:HD3	2.27	0.63
4:A:306:GOL:H31	1:B:191:GLU:OE2	2.00	0.61
1:C:259:GLY:O	1:C:260:ASN:HB2	2.04	0.57
1:B:134:MET:HE3	1:B:148:LYS:HD2	1.87	0.57
1:C:12:ASN:OD1	1:C:24:ILE:HD11	2.06	0.55
1:C:230:LEU:HD11	1:C:240:ILE:HD12	1.91	0.51
1:A:170:ARG:N	4:A:306:GOL:O1	2.44	0.51
1:A:18:ARG:HG2	1:A:18:ARG:HH11	1.76	0.50
1:B:14:LEU:HD22	1:B:42:ARG:HD2	1.93	0.50
1:A:151[A]:ASN:HD21	4:A:305:GOL:H31	1.77	0.49
1:B:167:SER:HB2	1:B:211:PHE:CD1	2.47	0.49
1:A:259:GLY:O	1:A:260:ASN:HB2	2.12	0.49
1:A:71:VAL:HG13	1:A:241:ILE:HD11	1.95	0.49
1:C:167:SER:HB2	1:C:211:PHE:CD1	2.48	0.49
1:A:233:ASN:HA	6:A:423:HOH:O	2.13	0.47
1:B:120:HIS:HD2	6:B:424:HOH:O	1.97	0.46
1:C:225:THR:HA	4:C:304:GOL:H32	1.97	0.46
1:C:151[A]:ASN:ND2	4:C:306:GOL:H11	2.31	0.46
1:B:134:MET:HE3	1:B:148:LYS:CD	2.46	0.45
1:A:151[A]:ASN:HD21	4:A:305:GOL:C3	2.29	0.45
1:A:2:ASN:OD1	1:A:5:GLU:OE1	2.35	0.44
1:A:230:LEU:HD11	1:A:240:ILE:HD12	1.99	0.44
1:A:133:ARG:O	1:A:137:LEU:HG	2.18	0.44
1:B:134:MET:CE	1:B:148:LYS:HD2	2.46	0.44
1:B:145:GLY:HA2	1:B:185:CYS:SG	2.58	0.43
1:B:191:GLU:O	1:B:195:GLU:HG3	2.18	0.43
1:A:180:LYS:HE3	1:A:184:ARG:HH22	1.83	0.43
1:B:191:GLU:OE1	6:B:401:HOH:O	2.21	0.43
1:C:145:GLY:HA2	1:C:185:CYS:SG	2.58	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:177:ASP:O	1:C:181:LYS:HG2	2.19	0.43
1:A:24[A]:ILE:HD11	1:A:31:LYS:HD3	2.00	0.43
1:B:24:ILE:HD11	1:B:31:LYS:CD	2.48	0.43
1:B:133:ARG:O	1:B:137:LEU:HG	2.19	0.43
1:A:217:LYS:HE3	6:A:418:HOH:O	2.19	0.43
1:A:106:GLY:HA2	1:A:116:ASP:OD1	2.19	0.42
1:B:120:HIS:CD2	1:B:127:LEU:HD23	2.54	0.42
1:A:167:SER:HB2	1:A:211:PHE:CD1	2.55	0.42
1:A:177:ASP:O	1:A:181:LYS:HG2	2.19	0.42
1:A:44:PRO:O	1:A:45:SER:HB3	2.20	0.42
1:B:102:SER:HB3	4:B:306:GOL:H12	2.01	0.42
1:C:225:THR:HG23	4:C:304:GOL:H32	2.02	0.41
1:B:44:PRO:O	1:B:45:SER:HB3	2.20	0.41
1:A:35:LEU:O	1:A:36:ARG:C	2.59	0.41
1:C:71:VAL:HG13	1:C:241[A]:ILE:HD11	2.02	0.41
1:A:106:GLY:HA2	1:A:116:ASP:CG	2.41	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	264/262 (101%)	253 (96%)	11 (4%)	0	100	100
1	B	264/262 (101%)	251 (95%)	11 (4%)	2 (1%)	16	17
1	C	264/262 (101%)	257 (97%)	7 (3%)	0	100	100
All	All	792/786 (101%)	761 (96%)	29 (4%)	2 (0%)	37	43

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	0	PRO

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Mol	Chain	Res	Type
1	B	1	MET

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	241/237 (102%)	231 (96%)	10 (4%)	26	33
1	B	241/237 (102%)	230 (95%)	11 (5%)	23	28
1	C	241/237 (102%)	235 (98%)	6 (2%)	42	53
All	All	723/711 (102%)	696 (96%)	27 (4%)	31	38

All (27) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	20	GLU
1	A	22	ILE
1	A	24[A]	ILE
1	A	24[B]	ILE
1	A	47	ILE
1	A	55	GLN
1	A	103	LYS
1	A	133	ARG
1	A	167	SER
1	A	173	ARG
1	B	1	MET
1	B	4	ASP
1	B	17	GLU
1	B	55	GLN
1	B	67[A]	ASN
1	B	67[B]	ASN
1	B	136	MET
1	B	167	SER
1	B	169	GLU
1	B	173	ARG
1	B	180	LYS

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Mol	Chain	Res	Type
1	C	22	ILE
1	C	55	GLN
1	C	92	SER
1	C	167	SER
1	C	172	MET
1	C	235	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	154	ASN
1	A	162	HIS
1	B	120	HIS
1	B	151	ASN
1	B	154	ASN
1	B	162	HIS
1	C	154	ASN
1	C	162	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 20 ligands modelled in this entry, 9 are monoatomic - leaving 11 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	ACT	C	307	-	3,3,3	1.72	1 (33%)	3,3,3	0.74	0
5	ACT	A	307	-	3,3,3	1.12	0	3,3,3	1.51	1 (33%)
3	A1H20	B	305	2	40,47,47	2.44	13 (32%)	48,71,71	2.33	12 (25%)
4	GOL	A	305	-	5,5,5	0.16	0	5,5,5	0.46	0
4	GOL	C	304	-	5,5,5	0.33	0	5,5,5	0.56	0
4	GOL	C	305	-	5,5,5	0.24	0	5,5,5	0.51	0
4	GOL	C	306	-	5,5,5	0.08	0	5,5,5	0.34	0
4	GOL	A	306	-	5,5,5	0.14	0	5,5,5	0.45	0
3	A1H20	A	303	2	40,47,47	1.71	6 (15%)	48,71,71	2.54	20 (41%)
4	GOL	B	306	-	5,5,5	0.61	0	5,5,5	1.11	0
3	A1H20	C	303	2	40,47,47	1.78	5 (12%)	48,71,71	2.19	16 (33%)

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	A1H20	B	305	2	-	4/30/66/66	0/4/4/4
4	GOL	A	305	-	-	4/4/4/4	-
4	GOL	C	304	-	-	4/4/4/4	-
4	GOL	C	305	-	-	2/4/4/4	-
4	GOL	C	306	-	-	2/4/4/4	-
4	GOL	A	306	-	-	2/4/4/4	-
3	A1H20	A	303	2	-	4/30/66/66	0/4/4/4
4	GOL	B	306	-	-	1/4/4/4	-
3	A1H20	C	303	2	-	5/30/66/66	0/4/4/4

All (25) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	303	A1H20	C2'-C1'	-8.42	1.41	1.53
3	B	305	A1H20	C2'-C1'	-8.32	1.41	1.53
3	B	305	A1H20	OD1-CG	5.05	1.33	1.23
3	B	305	A1H20	C2-N3	4.63	1.39	1.32
3	A	303	A1H20	O4'-C1'	4.58	1.47	1.41

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	303	A1H20	C2'-C1'	-4.35	1.47	1.53
3	B	305	A1H20	O4'-C1'	4.28	1.47	1.41
3	B	305	A1H20	C2-N1	4.17	1.41	1.33
3	B	305	A1H20	CB-CG	4.15	1.61	1.51
3	A	303	A1H20	C8-N7	3.88	1.41	1.34
3	B	305	A1H20	O4D-C1D	3.40	1.48	1.43
3	A	303	A1H20	C2D-C3D	-3.23	1.44	1.53
3	B	305	A1H20	C4-N3	2.88	1.39	1.35
3	B	305	A1H20	PB-O2B	2.79	1.60	1.50
3	A	303	A1H20	O3D-C3D	2.77	1.49	1.43
3	C	303	A1H20	O4'-C1'	-2.71	1.37	1.41
5	C	307	ACT	CH3-C	2.66	1.60	1.49
3	C	303	A1H20	C2D-C3D	-2.42	1.46	1.53
3	B	305	A1H20	C1D-ND2	-2.28	1.40	1.43
3	C	303	A1H20	O4'-C4'	-2.22	1.40	1.45
3	B	305	A1H20	C5'-C4'	2.17	1.58	1.51
3	C	303	A1H20	O3D-C3D	2.08	1.47	1.43
3	B	305	A1H20	PA-O2A	-2.03	1.45	1.55
3	B	305	A1H20	C5-C4	2.01	1.46	1.40
3	A	303	A1H20	PB-O2B	2.00	1.58	1.50

All (49) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	305	A1H20	C1'-N9-C4	-6.98	114.37	126.64
3	C	303	A1H20	C1'-N9-C4	-6.51	115.20	126.64
3	A	303	A1H20	O4D-C1D-C2D	-6.46	99.44	106.23
3	B	305	A1H20	N6-C6-N1	5.70	130.41	118.57
3	A	303	A1H20	OD1-CG-CB	5.40	129.40	121.50
3	A	303	A1H20	C1'-N9-C4	-5.33	117.28	126.64
3	B	305	A1H20	C3'-C2'-C1'	-5.11	93.28	100.98
3	B	305	A1H20	C2'-C3'-C4'	4.98	112.32	102.64
3	A	303	A1H20	O4'-C1'-C2'	4.83	113.98	106.93
3	B	305	A1H20	C5-C6-N6	-4.72	113.18	120.35
3	C	303	A1H20	O4D-C4D-C5D	4.23	123.30	109.37
3	B	305	A1H20	PA-O3A-PB	-4.04	118.97	132.83
3	A	303	A1H20	O4D-C4D-C5D	4.01	122.58	109.37
3	C	303	A1H20	C4-C5-N7	-3.96	105.27	109.40
3	C	303	A1H20	O4D-C1D-C2D	-3.95	102.08	106.23
3	C	303	A1H20	C2'-C3'-C4'	3.84	110.11	102.64
3	C	303	A1H20	O5D-C5D-C4D	3.79	122.03	108.99
3	A	303	A1H20	C2'-C3'-C4'	3.75	109.92	102.64

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	303	A1H20	C3D-C2D-C1D	3.70	108.45	101.42
3	C	303	A1H20	O4'-C4'-C3'	-3.48	98.23	105.11
3	B	305	A1H20	CB-CG-ND2	-3.46	111.79	116.33
3	A	303	A1H20	O2D-C2D-C3D	-3.46	100.64	111.82
3	A	303	A1H20	C4-C5-N7	-3.41	105.85	109.40
3	A	303	A1H20	C4D-O4D-C1D	3.37	115.75	108.49
3	B	305	A1H20	O2D-C2D-C1D	3.36	121.25	110.02
3	C	303	A1H20	O4D-C4D-C3D	-3.34	98.51	105.11
3	A	303	A1H20	C1D-ND2-CG	3.31	128.28	122.45
3	C	303	A1H20	PA-O3A-PB	-3.31	121.48	132.83
3	A	303	A1H20	C3'-C2'-C1'	-3.19	96.18	100.98
3	A	303	A1H20	O3D-C3D-C2D	-3.19	101.52	111.82
3	C	303	A1H20	C5-C6-N6	3.14	125.13	120.35
3	A	303	A1H20	CB-CG-ND2	-3.12	112.23	116.33
3	A	303	A1H20	O1B-PB-O5D	3.01	121.70	107.75
3	A	303	A1H20	CA-CB-CG	2.96	121.27	112.73
3	B	305	A1H20	O4'-C4'-C3'	-2.88	99.42	105.11
3	C	303	A1H20	C3'-C2'-C1'	-2.85	96.69	100.98
3	A	303	A1H20	O2D-C2D-C1D	2.82	119.43	110.02
3	C	303	A1H20	C4D-O4D-C1D	2.82	114.56	108.49
3	A	303	A1H20	OD1-CG-ND2	-2.74	118.33	122.95
3	C	303	A1H20	C1D-ND2-CG	-2.64	117.80	122.45
3	B	305	A1H20	C1D-ND2-CG	2.55	126.95	122.45
3	C	303	A1H20	CB-CG-ND2	-2.44	113.13	116.33
3	A	303	A1H20	O4D-C4D-C3D	-2.39	100.39	105.11
3	A	303	A1H20	O5D-PB-O2B	-2.34	99.92	109.07
3	C	303	A1H20	CA-CB-CG	2.29	119.36	112.73
3	B	305	A1H20	CA-CB-CG	2.22	119.14	112.73
5	A	307	ACT	O-C-CH3	-2.06	114.30	122.33
3	B	305	A1H20	O4D-C4D-C5D	2.03	116.06	109.37
3	C	303	A1H20	O2D-C2D-C1D	2.00	116.70	110.02

There are no chirality outliers.

All (28) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	305	GOL	O1-C1-C2-C3
4	A	305	GOL	C1-C2-C3-O3
4	A	306	GOL	C1-C2-C3-O3
4	C	305	GOL	C1-C2-C3-O3
4	C	306	GOL	C1-C2-C3-O3
3	C	303	A1H20	C3'-C4'-C5'-O5'

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Mol	Chain	Res	Type	Atoms
3	A	303	A1H20	C3'-C4'-C5'-O5'
3	B	305	A1H20	O-C-CA-CB
3	B	305	A1H20	OXT-C-CA-CB
4	C	304	GOL	O1-C1-C2-C3
4	C	304	GOL	C1-C2-C3-O3
4	A	305	GOL	O1-C1-C2-O2
4	C	304	GOL	O1-C1-C2-O2
4	C	304	GOL	O2-C2-C3-O3
4	C	306	GOL	O2-C2-C3-O3
3	A	303	A1H20	O4'-C4'-C5'-O5'
3	C	303	A1H20	O-C-CA-CB
3	C	303	A1H20	OXT-C-CA-CB
3	C	303	A1H20	O4'-C4'-C5'-O5'
4	A	305	GOL	O2-C2-C3-O3
4	A	306	GOL	O2-C2-C3-O3
3	A	303	A1H20	O-C-CA-CB
3	B	305	A1H20	PA-O3A-PB-O2B
3	B	305	A1H20	C5'-O5'-PA-O3A
4	B	306	GOL	O2-C2-C3-O3
3	A	303	A1H20	OXT-C-CA-CB
4	C	305	GOL	O2-C2-C3-O3
3	C	303	A1H20	PA-O3A-PB-O1B

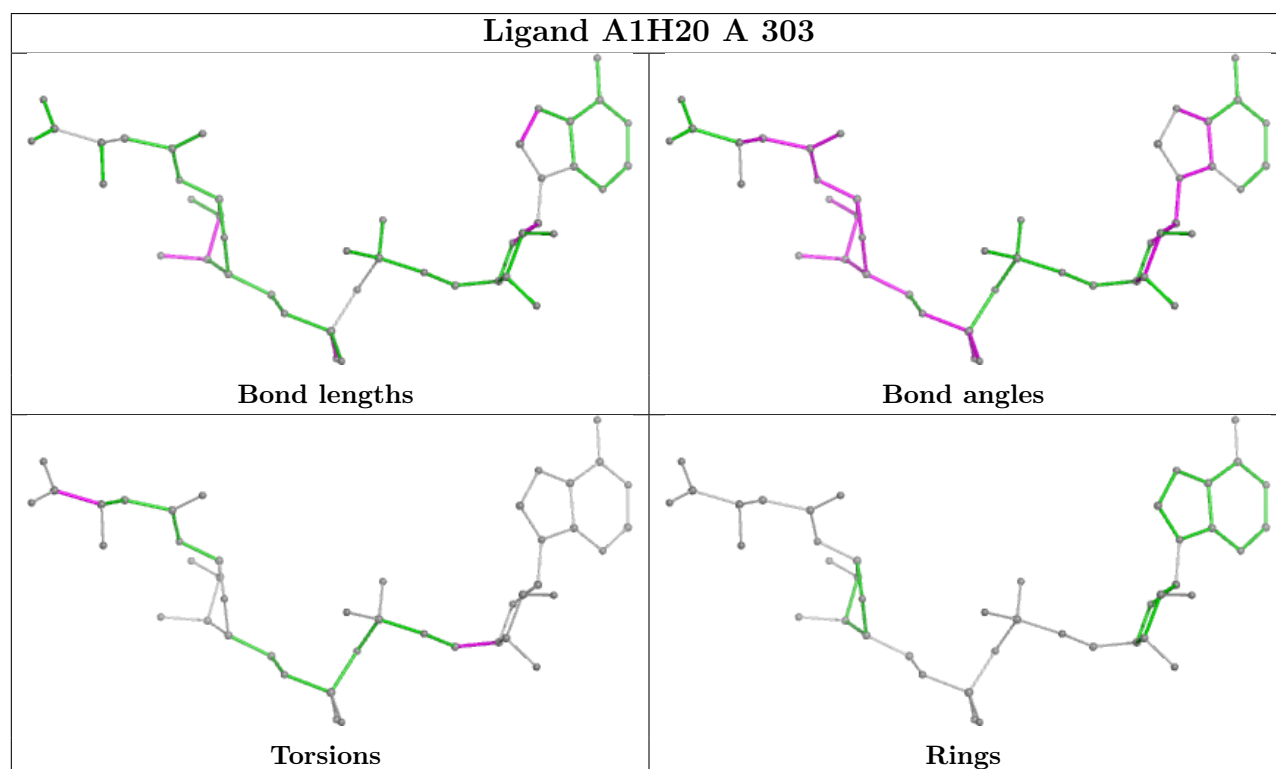
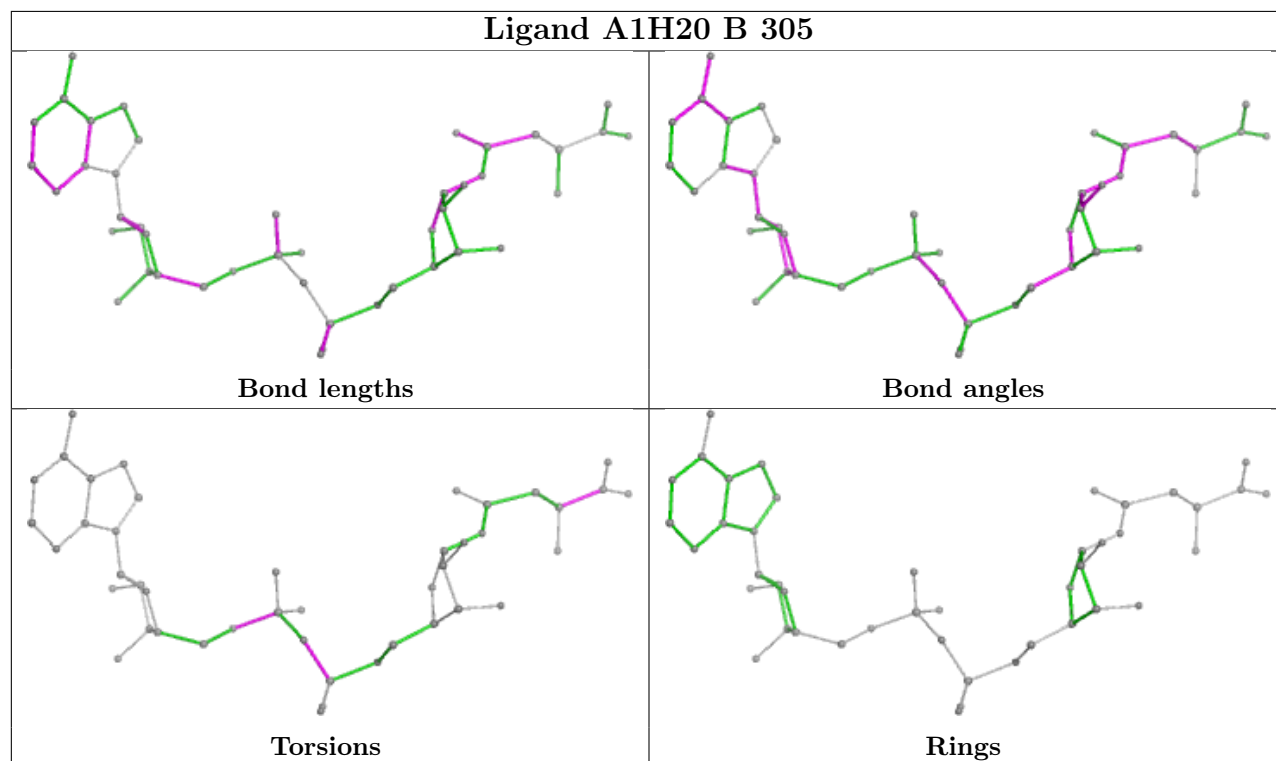
There are no ring outliers.

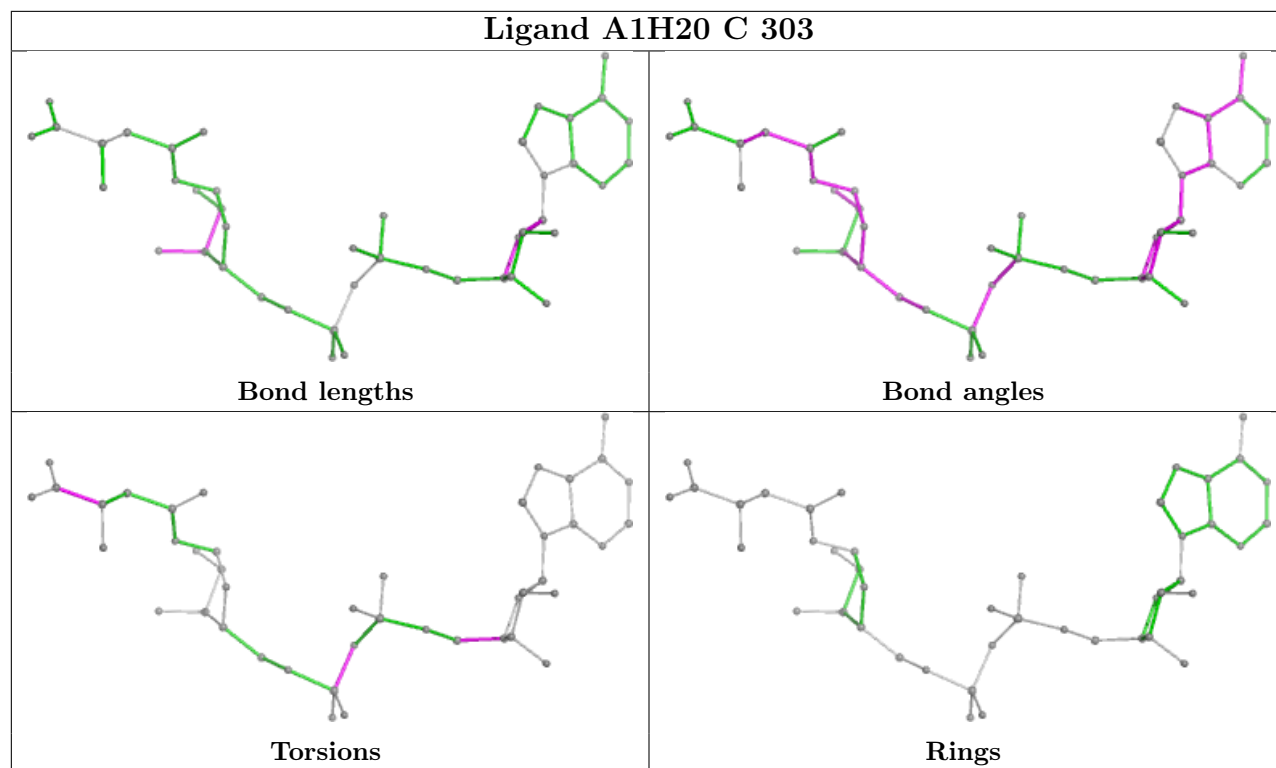
5 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	305	GOL	3	0
4	C	304	GOL	2	0
4	C	306	GOL	1	0
4	A	306	GOL	2	0
4	B	306	GOL	1	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	262/262 (100%)	0.76	37 (14%) 7 9	22, 53, 117, 162	4 (1%)
1	B	262/262 (100%)	0.85	42 (16%) 6 7	25, 51, 132, 172	4 (1%)
1	C	262/262 (100%)	0.52	19 (7%) 22 26	19, 49, 102, 154	4 (1%)
All	All	786/786 (100%)	0.71	98 (12%) 9 11	19, 51, 121, 172	12 (1%)

All (98) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	7	LEU	5.0
1	B	22	ILE	4.8
1	B	1	MET	4.7
1	B	10	LEU	4.6
1	B	54	ILE	4.5
1	B	34	LEU	4.5
1	B	52	LEU	4.3
1	A	22	ILE	4.3
1	A	10	LEU	4.2
1	B	11	ILE	4.1
1	B	25	PRO	4.1
1	B	9	PHE	4.0
1	B	58	PHE	4.0
1	B	28	PHE	3.9
1	B	-1	GLY	3.9
1	C	24	ILE	3.9
1	A	24[A]	ILE	3.8
1	C	22	ILE	3.8
1	C	26	LYS	3.8
1	A	14	LEU	3.7
1	C	-1	GLY	3.6
1	C	0	PRO	3.6
1	B	3[A]	ASN	3.5

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Mol	Chain	Res	Type	RSRZ
1	A	7	LEU	3.5
1	B	14	LEU	3.5
1	A	28	PHE	3.5
1	B	2	ASN	3.4
1	A	11	ILE	3.4
1	A	21	SER	3.4
1	A	54	ILE	3.3
1	A	0	PRO	3.3
1	A	31	LYS	3.3
1	B	31	LYS	3.3
1	B	24	ILE	3.2
1	A	9	PHE	3.2
1	A	51	PHE	3.2
1	B	137	LEU	3.2
1	C	54	ILE	3.2
1	B	0	PRO	3.2
1	B	51	PHE	3.2
1	A	-1	GLY	3.2
1	B	6	GLN	3.1
1	B	47	ILE	3.1
1	C	1	MET	3.1
1	B	32	ARG	3.1
1	C	11	ILE	3.0
1	B	59	LEU	2.9
1	A	259	GLY	2.9
1	B	35	LEU	2.9
1	B	48	SER	2.9
1	A	136	MET	2.8
1	B	38	LEU	2.8
1	B	29	SER	2.8
1	A	1	MET	2.8
1	B	13	TYR	2.8
1	C	31	LYS	2.7
1	A	13	TYR	2.7
1	A	15	LEU	2.7
1	C	173	ARG	2.7
1	B	27	THR	2.6
1	A	38	LEU	2.6
1	A	137	LEU	2.6
1	C	25	PRO	2.6
1	A	2	ASN	2.5
1	A	174	VAL	2.5

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Mol	Chain	Res	Type	RSRZ
1	B	122	ALA	2.5
1	A	4	ASP	2.5
1	C	28	PHE	2.4
1	A	8[A]	GLU	2.4
1	C	21	SER	2.4
1	A	52	LEU	2.4
1	B	15	LEU	2.4
1	A	106	GLY	2.4
1	A	6	GLN	2.4
1	A	20	GLU	2.3
1	B	44	PRO	2.3
1	B	260	ASN	2.3
1	C	15	LEU	2.3
1	C	7	LEU	2.3
1	B	53	ARG	2.3
1	A	47	ILE	2.3
1	A	19	SER	2.2
1	A	59	LEU	2.2
1	A	25	PRO	2.2
1	A	58	PHE	2.2
1	C	260	ASN	2.2
1	C	13	TYR	2.2
1	A	29	SER	2.2
1	B	55	GLN	2.1
1	B	26	LYS	2.1
1	C	20	GLU	2.1
1	B	19	SER	2.1
1	A	26	LYS	2.1
1	B	50	GLU	2.1
1	B	60	SER	2.1
1	A	50	GLU	2.0
1	B	125	LEU	2.0
1	C	10	LEU	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 monosaccharides in this entry.

6.4 Ligands [i](#)

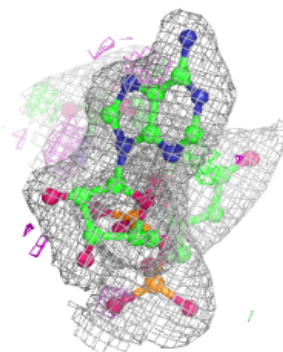
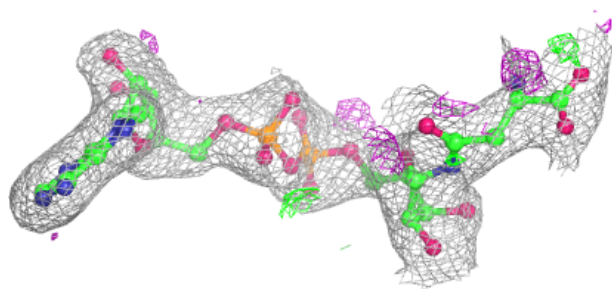
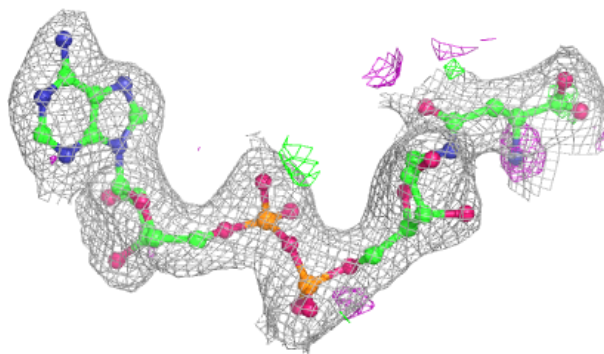
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	GOL	C	304	6/6	0.63	0.26	74,104,109,111	0
4	GOL	A	305	6/6	0.78	0.19	53,83,101,113	0
5	ACT	C	307	4/4	0.78	0.17	57,61,62,75	0
4	GOL	A	306	6/6	0.82	0.21	62,72,94,117	0
4	GOL	C	306	6/6	0.84	0.15	49,73,77,80	0
4	GOL	B	306	6/6	0.84	0.24	48,53,63,65	0
4	GOL	C	305	6/6	0.85	0.19	64,86,89,104	0
5	ACT	A	307	4/4	0.90	0.29	58,61,83,101	0
3	A1H2O	C	303	44/44	0.96	0.07	32,37,44,46	0
3	A1H2O	B	305	44/44	0.97	0.06	26,32,35,39	0
3	A1H2O	A	303	44/44	0.97	0.06	28,33,38,43	0
2	ZN	C	301	1/1	0.98	0.03	36,36,36,36	0
2	ZN	A	304	1/1	0.98	0.04	51,51,51,51	0
2	ZN	C	302	1/1	0.99	0.03	33,33,33,33	1
2	ZN	B	301	1/1	0.99	0.05	42,42,42,42	0
2	ZN	B	302	1/1	0.99	0.03	35,35,35,35	0
2	ZN	B	303	1/1	0.99	0.03	40,40,40,40	0
2	ZN	B	304	1/1	0.99	0.03	36,36,36,36	1
2	ZN	A	301	1/1	0.99	0.02	32,32,32,32	0
2	ZN	A	302	1/1	1.00	0.01	35,35,35,35	1

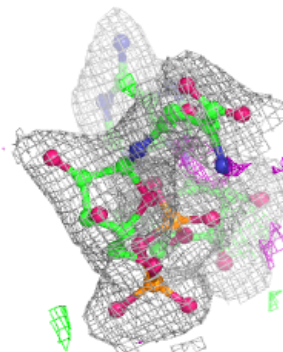
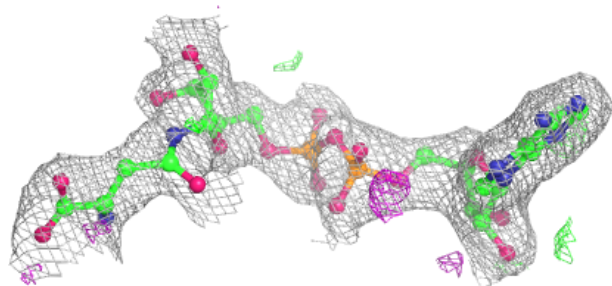
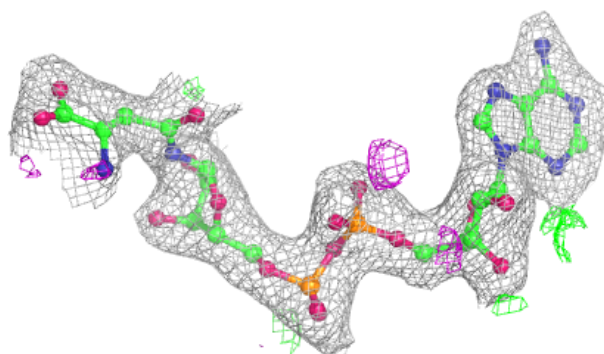
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

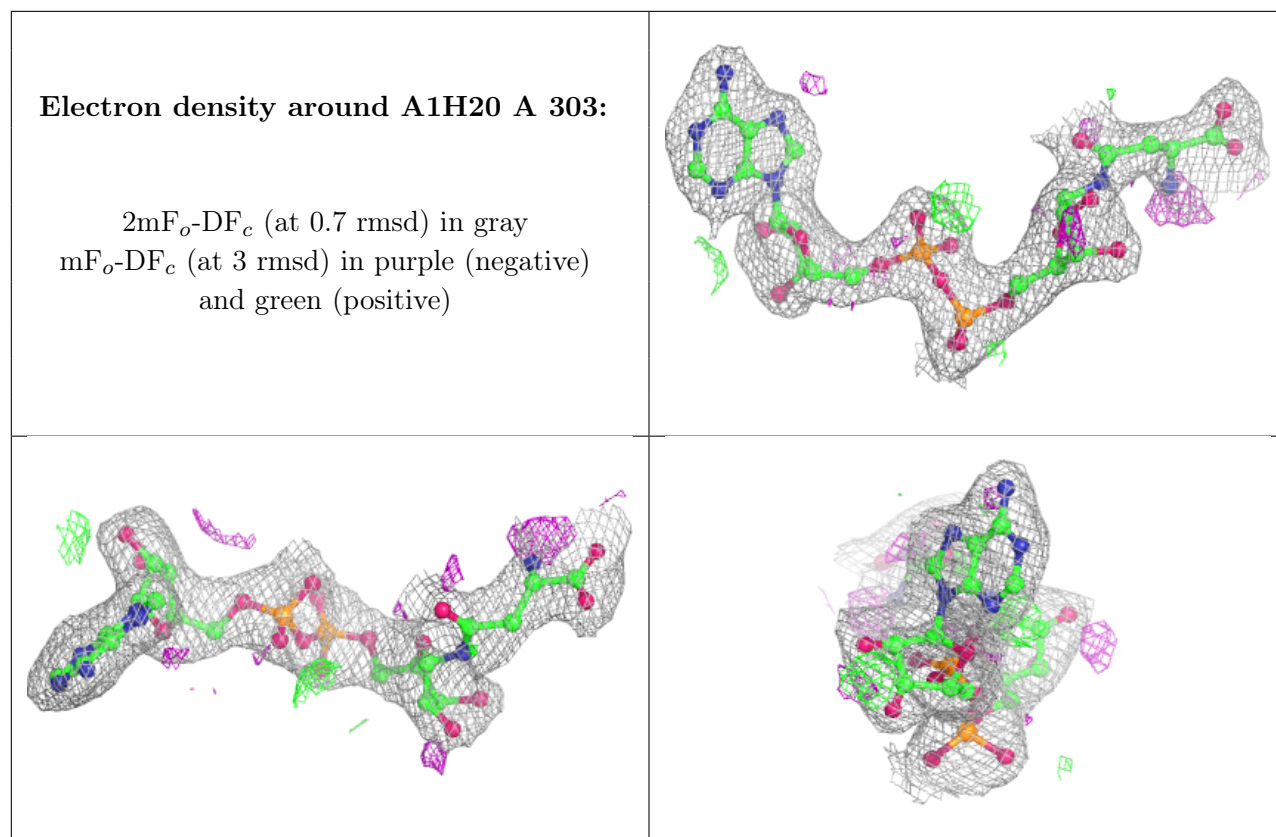
Electron density around A1H20 C 303:

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

**Electron density around A1H20 B 305:**

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





6.5 Other polymers [i](#)

There are no such residues in this entry.