



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 2, 2026 – 03:59 AM UTC

PDB ID : 6ATB / pdb_00006atb
Title : Crystal Structure of human NAMPT in complex with NVP-LOD812
Authors : Weihofen, W.A.; Thigale, S.
Deposited on : 2017-08-28
Resolution : 2.53 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

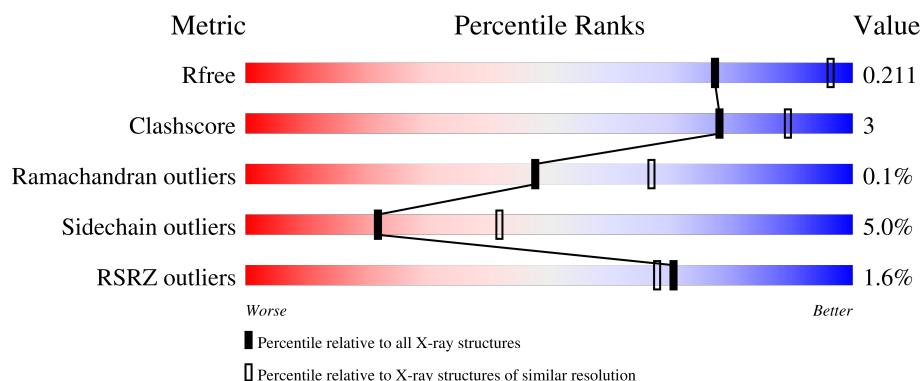
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.53 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	7383 (2.54-2.50)
Clashscore	190562	8079 (2.54-2.50)
Ramachandran outliers	187476	7944 (2.54-2.50)
Sidechain outliers	187428	7946 (2.54-2.50)
RSRZ outliers	180081	7387 (2.54-2.50)

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

Mol	Chain	Length	Quality of chain
1	A	501	
1	B	501	
1	C	501	
1	D	501	

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 16259 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 Nicotinamide phosphoribosyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	466	Total	C	N	O	S	0	0	0
			3729	2400	617	705	7			
1	B	470	Total	C	N	O	S	0	0	0
			3762	2421	621	713	7			
1	C	466	Total	C	N	O	S	0	0	0
			3729	2400	617	705	7			
1	D	468	Total	C	N	O	S	0	0	0
			3746	2411	619	709	7			

There are 40 discrepancies between the modelled and reference sequences:

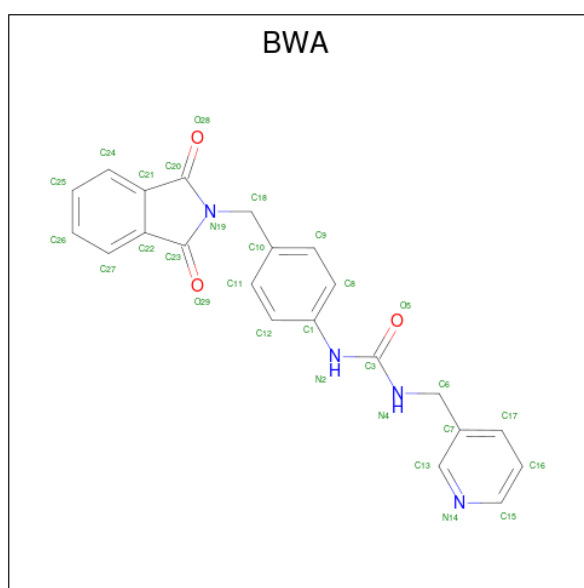
Chain	Residue	Modelled	Actual	Comment	Reference
A	492	LEU	-	expression tag	UNP P43490
A	493	GLU	-	expression tag	UNP P43490
A	494	HIS	-	expression tag	UNP P43490
A	495	HIS	-	expression tag	UNP P43490
A	496	HIS	-	expression tag	UNP P43490
A	497	HIS	-	expression tag	UNP P43490
A	498	HIS	-	expression tag	UNP P43490
A	499	HIS	-	expression tag	UNP P43490
A	500	HIS	-	expression tag	UNP P43490
A	501	HIS	-	expression tag	UNP P43490
B	492	LEU	-	expression tag	UNP P43490
B	493	GLU	-	expression tag	UNP P43490
B	494	HIS	-	expression tag	UNP P43490
B	495	HIS	-	expression tag	UNP P43490
B	496	HIS	-	expression tag	UNP P43490
B	497	HIS	-	expression tag	UNP P43490
B	498	HIS	-	expression tag	UNP P43490
B	499	HIS	-	expression tag	UNP P43490
B	500	HIS	-	expression tag	UNP P43490
B	501	HIS	-	expression tag	UNP P43490
C	492	LEU	-	expression tag	UNP P43490

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Chain	Residue	Modelled	Actual	Comment	Reference
C	493	GLU	-	expression tag	UNP P43490
C	494	HIS	-	expression tag	UNP P43490
C	495	HIS	-	expression tag	UNP P43490
C	496	HIS	-	expression tag	UNP P43490
C	497	HIS	-	expression tag	UNP P43490
C	498	HIS	-	expression tag	UNP P43490
C	499	HIS	-	expression tag	UNP P43490
C	500	HIS	-	expression tag	UNP P43490
C	501	HIS	-	expression tag	UNP P43490
D	492	LEU	-	expression tag	UNP P43490
D	493	GLU	-	expression tag	UNP P43490
D	494	HIS	-	expression tag	UNP P43490
D	495	HIS	-	expression tag	UNP P43490
D	496	HIS	-	expression tag	UNP P43490
D	497	HIS	-	expression tag	UNP P43490
D	498	HIS	-	expression tag	UNP P43490
D	499	HIS	-	expression tag	UNP P43490
D	500	HIS	-	expression tag	UNP P43490
D	501	HIS	-	expression tag	UNP P43490

- Molecule 2 is N-{4-[(1,3-dioxo-1,3-dihydro-2H-isoindol-2-yl)methyl]phenyl}-N'-[(pyridin-3-yl)methyl]urea (CCD ID: BWA) (formula: C₂₂H₁₈N₄O₃) (labeled as "Ligand of Interest" by depositor).



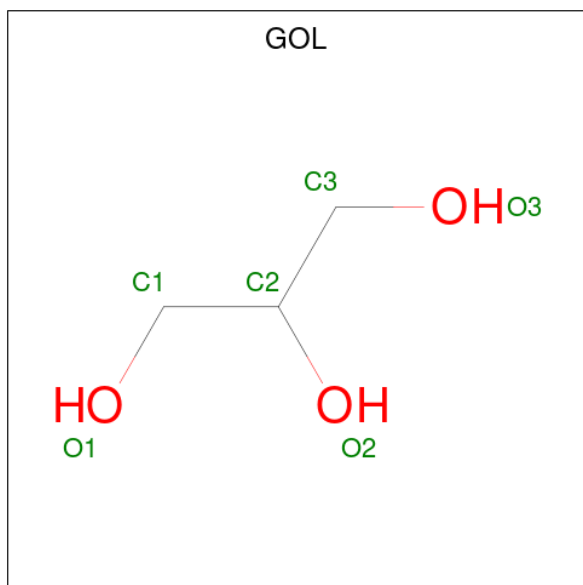
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			29	22	4	3		

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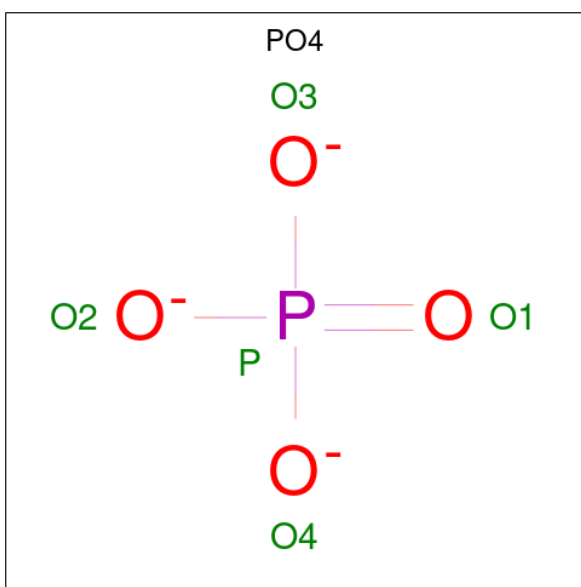
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	B	1	Total	C	N	O	0	0
			29	22	4	3		
2	C	1	Total	C	N	O	0	0
			29	22	4	3		
2	D	1	Total	C	N	O	0	0
			29	22	4	3		

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



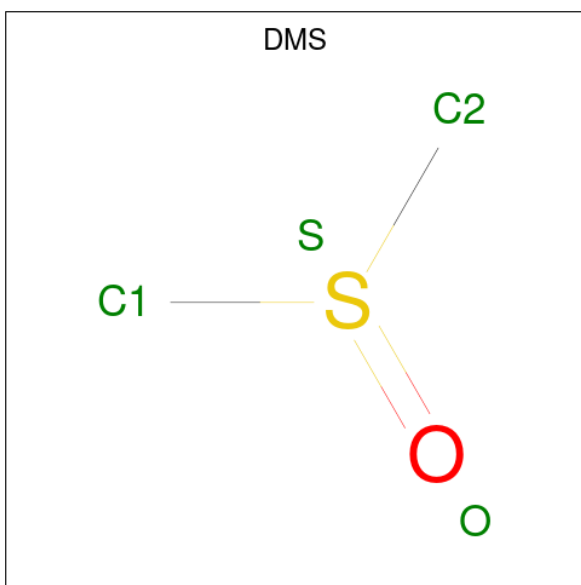
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		
3	C	1	Total	C	O	0	0
			6	3	3		
3	C	1	Total	C	O	0	0
			6	3	3		
3	D	1	Total	C	O	0	0
			6	3	3		

- Molecule 4 is PHOSPHATE ION (CCD ID: PO4) (formula: O_4P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	O	P	0	0
			5	4	1		
4	B	1	Total	O	P	0	0
			5	4	1		
4	C	1	Total	O	P	0	0
			5	4	1		
4	D	1	Total	O	P	0	0
			5	4	1		

- Molecule 5 is DIMETHYL SULFOXIDE (CCD ID: DMS) (formula: C_2H_6OS).



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

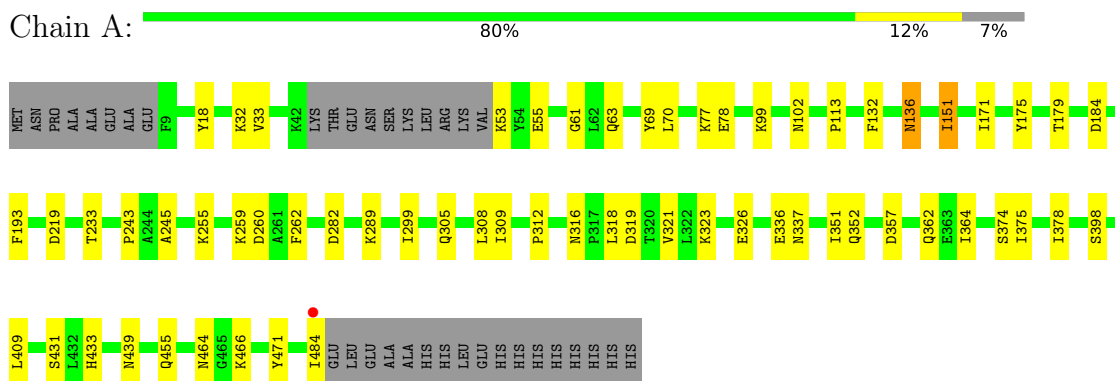
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	301	Total	O	0	0
			301	301		
6	B	299	Total	O	0	0
			299	299		
6	C	221	Total	O	0	0
			221	221		
6	D	302	Total	O	0	0
			302	302		

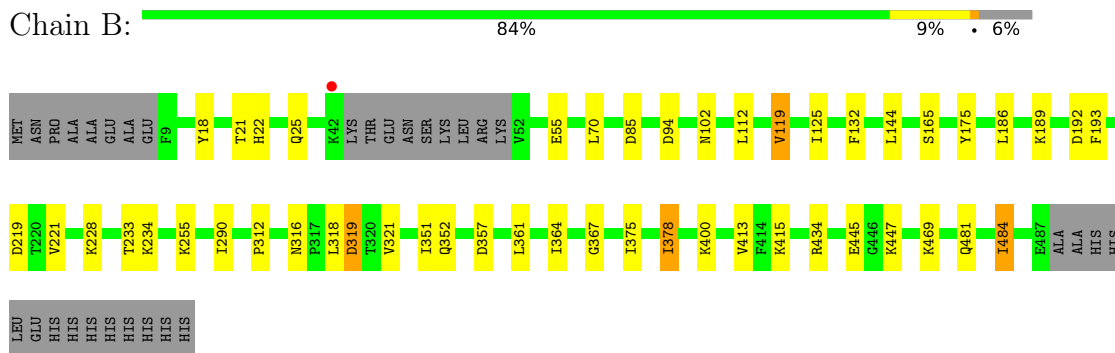
3 Residue-property plots [i](#)

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.

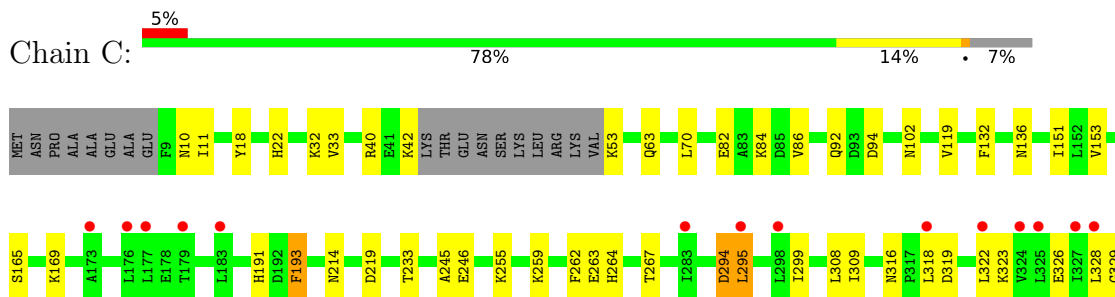
- Molecule 1: Nicotinamide phosphoribosyltransferase

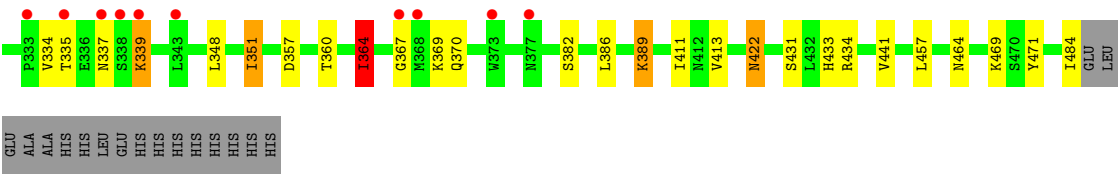


- Molecule 1: Nicotinamide phosphoribosyltransferase

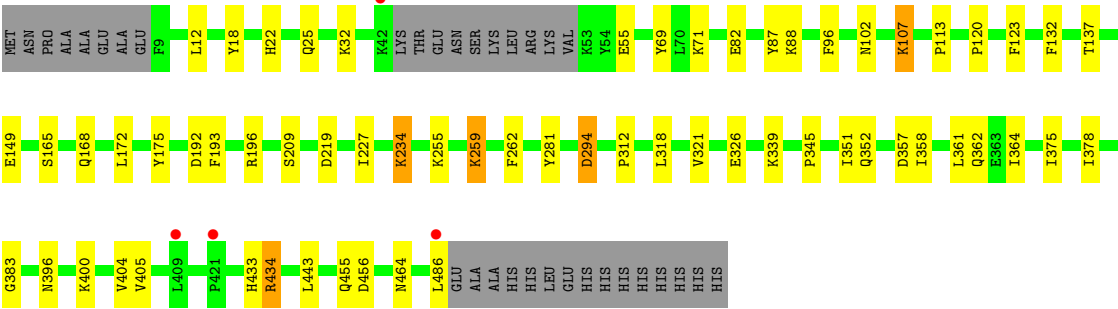
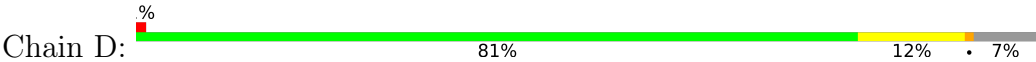


- Molecule 1: Nicotinamide phosphoribosyltransferase





● Molecule 1: Nicotinamide phosphoribosyltransferase



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	98.46Å 208.40Å 98.86Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	104.20 – 2.53 104.20 – 2.53	Depositor EDS
% Data completeness (in resolution range)	100.0 (104.20-2.53) 100.0 (104.20-2.53)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.91 (at 2.42Å)	Xtriage
Refinement program	BUSTER 2.11.2	Depositor
R, R_{free}	0.152 , 0.215 0.151 , 0.211	Depositor DCC
R_{free} test set	3897 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	32.9	Xtriage
Anisotropy	0.510	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 67.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.023 for l,-k,h	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	16259	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.69% 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: GOL, DMS, PO4, BWA

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	0.84	0/3817	1.34	15/5171 (0.3%)
1	B	0.84	2/3850 (0.1%)	1.32	16/5216 (0.3%)
1	C	0.87	1/3817 (0.0%)	1.39	12/5171 (0.2%)
1	D	0.87	1/3834 (0.0%)	1.33	19/5194 (0.4%)
All	All	0.85	4/15318 (0.0%)	1.35	62/20752 (0.3%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	345	PRO	CA-C	6.02	1.55	1.51
1	B	125	ILE	CA-CB	5.39	1.58	1.54
1	B	119	VAL	CA-C	5.33	1.57	1.52
1	C	119	VAL	CA-C	5.13	1.58	1.52

All (62) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	193	PHE	CA-CB-CG	8.09	121.89	113.80
1	B	357	ASP	CA-CB-CG	7.28	119.88	112.60
1	A	184	ASP	CA-CB-CG	6.76	119.36	112.60
1	D	262	PHE	CA-CB-CG	6.67	120.47	113.80
1	C	357	ASP	CA-CB-CG	6.65	119.25	112.60
1	B	192	ASP	CA-CB-CG	6.58	119.18	112.60
1	C	132	PHE	CA-CB-CG	6.57	120.37	113.80
1	A	357	ASP	CA-CB-CG	6.43	119.03	112.60
1	A	262	PHE	CA-CB-CG	6.40	120.20	113.80
1	B	22	HIS	N-CA-C	6.36	119.19	111.82
1	D	396	ASN	CA-CB-CG	6.36	118.96	112.60
1	A	61	GLY	N-CA-C	6.31	122.32	114.37
1	B	132	PHE	CA-CB-CG	6.14	119.94	113.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	364	ILE	N-CA-CB	6.12	117.71	110.55
1	D	357	ASP	CA-CB-CG	6.01	118.61	112.60
1	A	193	PHE	CA-CB-CG	5.96	119.76	113.80
1	D	193	PHE	CA-CB-CG	5.90	119.70	113.80
1	B	193	PHE	CA-CB-CG	5.85	119.65	113.80
1	C	10	ASN	CA-CB-CG	5.81	118.41	112.60
1	A	378	ILE	N-CA-C	5.81	117.72	108.89
1	D	132	PHE	CA-CB-CG	5.75	119.55	113.80
1	C	264	HIS	CA-C-N	5.75	127.80	120.56
1	C	264	HIS	C-N-CA	5.75	127.80	120.56
1	D	456	ASP	CA-CB-CG	5.74	118.34	112.60
1	D	383	GLY	CA-C-N	5.70	126.31	119.98
1	D	383	GLY	C-N-CA	5.70	126.31	119.98
1	A	337	ASN	CA-CB-CG	5.69	118.29	112.60
1	A	282	ASP	CA-C-N	5.67	128.24	120.46
1	A	282	ASP	C-N-CA	5.67	128.24	120.46
1	D	22	HIS	N-CA-C	5.63	118.18	111.71
1	D	87	TYR	N-CA-C	5.62	117.41	111.28
1	A	69	TYR	N-CA-C	5.59	120.98	114.04
1	C	22	HIS	N-CA-C	5.57	118.28	111.82
1	B	234	LYS	N-CA-C	-5.52	105.34	111.36
1	A	99	LYS	CA-C-N	5.52	126.07	119.94
1	A	99	LYS	C-N-CA	5.52	126.07	119.94
1	C	262	PHE	CA-CB-CG	5.49	119.29	113.80
1	B	319	ASP	CA-CB-CG	5.48	118.08	112.60
1	B	290	ILE	N-CA-CB	5.45	116.81	110.65
1	C	464	ASN	N-CA-C	5.45	118.71	111.30
1	A	260	ASP	CA-C-N	5.44	127.83	120.65
1	A	260	ASP	C-N-CA	5.44	127.83	120.65
1	D	294	ASP	N-CA-C	5.43	117.19	111.28
1	D	69	TYR	N-CA-C	5.40	120.53	113.88
1	D	149	GLU	CB-CG-CD	5.32	121.64	112.60
1	B	378	ILE	N-CA-C	5.24	116.92	108.85
1	B	221	VAL	CA-C-N	5.22	127.54	120.38
1	B	221	VAL	C-N-CA	5.22	127.54	120.38
1	B	165	SER	CA-C-N	5.20	127.25	120.28
1	B	165	SER	C-N-CA	5.20	127.25	120.28
1	D	107	LYS	N-CA-C	5.20	117.03	111.36
1	D	234	LYS	N-CA-C	-5.20	105.79	111.82
1	D	71	LYS	N-CA-C	5.19	118.16	110.48
1	B	70	LEU	N-CA-C	5.14	119.68	113.41
1	B	85	ASP	CA-C-N	5.12	127.11	120.56

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	85	ASP	C-N-CA	5.12	127.11	120.56
1	C	70	LEU	N-CA-C	5.09	119.61	113.41
1	A	132	PHE	CA-CB-CG	5.05	118.86	113.80
1	D	192	ASP	CA-CB-CG	5.05	117.65	112.60
1	D	362	GLN	CA-C-N	5.04	127.00	120.44
1	D	362	GLN	C-N-CA	5.04	127.00	120.44
1	C	294	ASP	N-CA-C	5.02	117.13	111.11

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	A	3729	0	3712	21	0
1	B	3762	0	3744	13	0
1	C	3729	0	3712	34	0
1	D	3746	0	3729	23	0
2	A	29	0	0	0	0
2	B	29	0	0	0	0
2	C	29	0	0	0	0
2	D	29	0	0	0	0
3	A	6	0	8	0	0
3	B	6	0	8	0	0
3	C	12	0	16	1	0
3	D	6	0	8	1	0
4	A	5	0	0	0	0
4	B	5	0	0	0	0
4	C	5	0	0	0	0
4	D	5	0	0	0	0
5	C	4	0	6	0	0
6	A	301	0	0	1	0
6	B	299	0	0	2	0
6	C	221	0	0	0	0
6	D	302	0	0	1	0
All	All	16259	0	14943	84	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 3.

All (84) 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:C:153:VAL:CG1	1:D:196:ARG:HB2	2.19	0.72
1:A:299:ILE:HD12	1:A:308:LEU:HD22	1.70	0.71
1:A:245:ALA:HA	1:B:25:GLN:HE22	1.56	0.71
1:C:316:ASN:HD22	1:C:319:ASP:H	1.39	0.69
1:C:153:VAL:HG11	1:D:196:ARG:HB2	1.75	0.68
1:C:329:GLY:HA2	1:C:334:VAL:HG21	1.75	0.67
1:A:113:PRO:HA	1:A:464:ASN:HD22	1.59	0.66
1:C:382:SER:HB3	1:C:386:LEU:HB2	1.78	0.66
1:B:484:ILE:HD11	6:B:716:HOH:O	1.97	0.65
1:C:337:ASN:HD22	1:C:339:LYS:H	1.44	0.65
1:C:318:LEU:HD13	1:C:364:ILE:HA	1.79	0.65
1:D:321:VAL:HG23	1:D:352:GLN:HE21	1.62	0.64
1:B:312:PRO:HD2	1:B:351:ILE:O	1.98	0.63
1:A:316:ASN:HD22	1:A:319:ASP:H	1.48	0.61
1:C:32:LYS:HA	1:C:136:ASN:HD21	1.66	0.60
1:A:136:ASN:HD22	1:A:136:ASN:H	1.48	0.60
1:C:63:GLN:HE22	1:C:471:TYR:H	1.50	0.58
1:C:246:GLU:HB3	1:D:18:TYR:CE2	2.39	0.57
1:A:309:ILE:HG22	1:A:351:ILE:HG22	1.87	0.57
1:C:245:ALA:HA	1:D:25:GLN:HE22	1.68	0.57
1:C:299:ILE:HD12	1:C:308:LEU:HD22	1.87	0.56
1:C:246:GLU:HB3	1:D:18:TYR:HE2	1.70	0.55
1:D:175:TYR:HB3	1:D:375:ILE:HG13	1.89	0.54
1:A:439:ASN:HB3	6:A:754:HOH:O	2.08	0.53
1:D:318:LEU:HD13	1:D:364:ILE:HA	1.89	0.53
1:A:32:LYS:HA	1:A:136:ASN:HD21	1.73	0.53
1:D:55:GLU:H	1:D:55:GLU:CD	2.17	0.52
1:C:316:ASN:HB3	1:C:319:ASP:HB2	1.91	0.52
1:C:169:LYS:HD2	1:C:214:ASN:HB3	1.93	0.51
1:C:431:SER:OG	1:C:433:HIS:HE1	1.95	0.49
1:B:316:ASN:HB3	1:B:319:ASP:HB2	1.94	0.49
1:A:175:TYR:HB3	1:A:375:ILE:HG13	1.95	0.48
1:D:137:THR:OG1	1:D:464:ASN:ND2	2.43	0.48
1:B:189:LYS:NZ	6:B:702:HOH:O	2.45	0.48
1:C:33:VAL:H	1:C:136:ASN:HD21	1.61	0.48
1:D:255:LYS:HG2	1:D:281:TYR:CE1	2.48	0.48
1:C:165:SER:HB3	1:C:214:ASN:ND2	2.29	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:328:LEU:HD22	1:C:348:LEU:HD21	1.95	0.48
1:D:113:PRO:HA	1:D:464:ASN:HD22	1.79	0.48
1:C:40:ARG:NE	1:C:422:ASN:O	2.42	0.47
1:C:434:ARG:HG2	1:C:457:LEU:HD11	1.96	0.47
1:B:321:VAL:HG23	1:B:352:GLN:HE21	1.78	0.47
1:D:434:ARG:HH12	3:D:603:GOL:H12	1.79	0.47
1:C:360:THR:O	1:C:364:ILE:HG12	2.15	0.47
1:A:431:SER:OG	1:A:433:HIS:HE1	1.97	0.46
1:C:42:LYS:HA	1:C:422:ASN:HD21	1.81	0.46
1:C:136:ASN:HD22	1:C:136:ASN:H	1.64	0.46
1:D:12:LEU:HD23	1:D:96:PHE:HZ	1.81	0.46
1:A:70:LEU:HD21	1:A:151:ILE:HG21	1.99	0.45
1:A:299:ILE:CD1	1:A:308:LEU:HD22	2.44	0.45
1:A:312:PRO:HD2	1:A:351:ILE:O	2.17	0.45
1:C:329:GLY:HA2	1:C:334:VAL:CG2	2.46	0.45
1:A:33:VAL:H	1:A:136:ASN:HD21	1.64	0.45
1:C:309:ILE:HG22	1:C:351:ILE:HG22	1.99	0.45
1:B:318:LEU:HD13	1:B:364:ILE:HA	1.97	0.45
1:C:33:VAL:H	1:C:136:ASN:ND2	2.15	0.45
1:A:321:VAL:HG23	1:A:352:GLN:HE21	1.82	0.44
1:C:434:ARG:HH22	3:C:603:GOL:H12	1.82	0.44
1:D:312:PRO:HD2	1:D:351:ILE:O	2.16	0.44
1:B:318:LEU:HD11	1:B:367:GLY:HA3	1.98	0.44
1:D:32:LYS:HB3	1:D:405:VAL:HB	2.00	0.44
1:A:63:GLN:HE22	1:A:471:TYR:H	1.65	0.44
1:A:136:ASN:H	1:A:136:ASN:ND2	2.14	0.44
1:D:172:LEU:HD21	1:D:361:LEU:HD11	2.00	0.43
1:D:209:SER:HA	1:D:227:ILE:HD11	1.99	0.43
1:C:318:LEU:HD11	1:C:367:GLY:HA3	2.00	0.43
1:D:82:GLU:HG2	6:D:768:HOH:O	2.18	0.43
1:A:171:ILE:HD13	1:A:362:GLN:HB2	2.01	0.43
1:B:400:LYS:HE2	1:B:415:LYS:HD3	2.02	0.42
1:C:382:SER:CB	1:C:386:LEU:HB2	2.46	0.42
1:D:259:LYS:HD2	1:D:294:ASP:HB3	2.00	0.42
1:B:175:TYR:HB3	1:B:375:ILE:HG13	2.02	0.42
1:B:445:GLU:HB2	1:B:447:LYS:HE2	2.00	0.42
1:C:191:HIS:CD2	1:C:193:PHE:CE1	3.08	0.42
1:D:168:GLN:HG3	1:D:358:ILE:HD12	2.00	0.42
1:C:82:GLU:O	1:C:86:VAL:HG23	2.19	0.41
1:A:243:PRO:HA	1:B:21:THR:HG21	2.02	0.41
1:D:120:PRO:O	1:D:123:PHE:HB2	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:318:LEU:HD13	1:A:364:ILE:HA	2.02	0.41
1:C:259:LYS:HD2	1:C:294:ASP:HB3	2.02	0.41
1:C:263:GLU:HG3	1:C:295:LEU:HD21	2.03	0.41
1:A:179:THR:HB	1:A:374:SER:HA	2.04	0.40
1:B:112:LEU:HD22	1:B:144:LEU:HD21	2.04	0.40
1:D:433:HIS:CD2	1:D:443:LEU:HD12	2.56	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	462/501 (92%)	446 (96%)	16 (4%)	0	100	100
1	B	466/501 (93%)	451 (97%)	15 (3%)	0	100	100
1	C	462/501 (92%)	442 (96%)	19 (4%)	1 (0%)	43	62
1	D	464/501 (93%)	451 (97%)	13 (3%)	0	100	100
All	All	1854/2004 (92%)	1790 (96%)	63 (3%)	1 (0%)	48	67

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	389	LYS

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	410/440 (93%)	388 (95%)	22 (5%)	20	39
1	B	414/440 (94%)	397 (96%)	17 (4%)	27	50
1	C	410/440 (93%)	381 (93%)	29 (7%)	13	27
1	D	412/440 (94%)	397 (96%)	15 (4%)	31	55
All	All	1646/1760 (94%)	1563 (95%)	83 (5%)	22	42

All (83) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	TYR
1	A	53	LYS
1	A	55	GLU
1	A	77	LYS
1	A	78	GLU
1	A	102	ASN
1	A	136	ASN
1	A	151	ILE
1	A	219	ASP
1	A	233	THR
1	A	255	LYS
1	A	259	LYS
1	A	289	LYS
1	A	305	GLN
1	A	323	LYS
1	A	326	GLU
1	A	336	GLU
1	A	398	SER
1	A	409	LEU
1	A	455	GLN
1	A	466	LYS
1	A	484	ILE
1	B	18	TYR
1	B	55	GLU
1	B	94	ASP
1	B	102	ASN
1	B	119	VAL
1	B	186	LEU
1	B	219	ASP
1	B	228	LYS
1	B	233	THR

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Mol	Chain	Res	Type
1	B	255	LYS
1	B	361	LEU
1	B	378	ILE
1	B	413	VAL
1	B	434	ARG
1	B	469	LYS
1	B	481	GLN
1	B	484	ILE
1	C	11	ILE
1	C	18	TYR
1	C	53	LYS
1	C	84	LYS
1	C	92	GLN
1	C	94	ASP
1	C	102	ASN
1	C	151	ILE
1	C	219	ASP
1	C	233	THR
1	C	255	LYS
1	C	267	THR
1	C	295	LEU
1	C	322	LEU
1	C	323	LYS
1	C	326	GLU
1	C	335	THR
1	C	339	LYS
1	C	351	ILE
1	C	364	ILE
1	C	369	LYS
1	C	370	GLN
1	C	389	LYS
1	C	411	ILE
1	C	413	VAL
1	C	422	ASN
1	C	441	VAL
1	C	469	LYS
1	C	484	ILE
1	D	88	LYS
1	D	102	ASN
1	D	107	LYS
1	D	165	SER
1	D	219	ASP

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Mol	Chain	Res	Type
1	D	234	LYS
1	D	259	LYS
1	D	326	GLU
1	D	339	LYS
1	D	378	ILE
1	D	400	LYS
1	D	404	VAL
1	D	434	ARG
1	D	455	GLN
1	D	486	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (40) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	63	GLN
1	A	102	ASN
1	A	129	ASN
1	A	136	ASN
1	A	164	ASN
1	A	201	GLN
1	A	214	ASN
1	A	257	HIS
1	A	316	ASN
1	A	362	GLN
1	A	412	ASN
1	A	433	HIS
1	A	464	ASN
1	B	25	GLN
1	B	154	GLN
1	B	305	GLN
1	B	359	ASN
1	B	396	ASN
1	B	439	ASN
1	B	464	ASN
1	C	63	GLN
1	C	81	GLN
1	C	129	ASN
1	C	136	ASN
1	C	214	ASN
1	C	316	ASN
1	C	412	ASN
1	C	422	ASN

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Mol	Chain	Res	Type
1	C	433	HIS
1	C	483	ASN
1	D	25	GLN
1	D	164	ASN
1	D	201	GLN
1	D	214	ASN
1	D	352	GLN
1	D	370	GLN
1	D	396	ASN
1	D	412	ASN
1	D	439	ASN
1	D	464	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

14 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	GOL	D	603	-	5,5,5	0.12	0	5,5,5	0.05	0
3	GOL	A	602	-	5,5,5	0.07	0	5,5,5	0.37	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	BWA	C	602	-	32,32,32	1.32	2 (6%)	44,44,44	1.76	11 (25%)
2	BWA	B	601	-	32,32,32	1.35	4 (12%)	44,44,44	1.93	12 (27%)
3	GOL	C	603	-	5,5,5	0.05	0	5,5,5	0.17	0
3	GOL	B	602	-	5,5,5	0.02	0	5,5,5	0.23	0
2	BWA	D	602	-	32,32,32	1.35	2 (6%)	44,44,44	1.87	11 (25%)
4	PO4	A	603	-	4,4,4	1.37	1 (25%)	6,6,6	0.45	0
2	BWA	A	601	-	32,32,32	1.16	2 (6%)	44,44,44	1.86	11 (25%)
4	PO4	B	603	-	4,4,4	1.19	0	6,6,6	0.65	0
5	DMS	C	601	-	3,3,3	0.29	0	3,3,3	0.14	0
3	GOL	C	604	-	5,5,5	0.09	0	5,5,5	0.60	0
4	PO4	D	601	-	4,4,4	1.31	1 (25%)	6,6,6	0.38	0
4	PO4	C	605	-	4,4,4	1.44	1 (25%)	6,6,6	0.56	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	GOL	D	603	-	-	0/4/4/4	-
3	GOL	A	602	-	-	0/4/4/4	-
2	BWA	C	602	-	-	0/13/29/29	0/4/4/4
2	BWA	B	601	-	-	0/13/29/29	0/4/4/4
3	GOL	C	603	-	-	0/4/4/4	-
3	GOL	B	602	-	-	0/4/4/4	-
2	BWA	D	602	-	-	0/13/29/29	0/4/4/4
2	BWA	A	601	-	-	0/13/29/29	0/4/4/4
3	GOL	C	604	-	-	0/4/4/4	-

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	602	BWA	C20-N19	-3.49	1.35	1.39
2	C	602	BWA	C20-N19	-3.20	1.35	1.39
2	B	601	BWA	C23-N19	-3.02	1.36	1.39
2	B	601	BWA	C20-N19	-2.92	1.36	1.39
2	C	602	BWA	C23-N19	-2.91	1.36	1.39
2	A	601	BWA	C20-N19	-2.84	1.36	1.39
4	C	605	PO4	P-O1	2.84	1.57	1.50
2	D	602	BWA	C23-N19	-2.72	1.36	1.39
2	A	601	BWA	C23-N19	-2.61	1.36	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	601	PO4	P-O1	2.55	1.56	1.50
4	A	603	PO4	P-O1	2.43	1.56	1.50
2	B	601	BWA	C6-C7	2.16	1.56	1.51
2	B	601	BWA	C16-C17	2.01	1.42	1.38

All (45) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601	BWA	C21-C20-N19	4.87	109.48	105.88
2	D	602	BWA	C22-C23-N19	4.73	109.38	105.88
2	B	601	BWA	C22-C23-N19	4.66	109.32	105.88
2	A	601	BWA	C22-C23-N19	4.42	109.15	105.88
2	C	602	BWA	C22-C23-N19	4.39	109.13	105.88
2	C	602	BWA	C21-C20-N19	4.23	109.01	105.88
2	B	601	BWA	C21-C20-N19	4.23	109.01	105.88
2	D	602	BWA	C21-C20-N19	4.01	108.84	105.88
2	D	602	BWA	C15-N14-C13	3.89	123.66	116.85
2	D	602	BWA	O29-C23-N19	3.65	128.48	124.79
2	B	601	BWA	O28-C20-N19	3.54	128.37	124.79
2	C	602	BWA	C15-N14-C13	3.52	123.02	116.85
2	D	602	BWA	O29-C23-C22	-3.38	122.11	128.66
2	A	601	BWA	O29-C23-N19	3.33	128.16	124.79
2	B	601	BWA	C15-N14-C13	3.32	122.66	116.85
2	A	601	BWA	O28-C20-N19	3.28	128.11	124.79
2	A	601	BWA	O28-C20-C21	-3.24	122.39	128.66
2	B	601	BWA	O29-C23-N19	3.23	128.06	124.79
2	B	601	BWA	O29-C23-C22	-3.16	122.54	128.66
2	A	601	BWA	C23-N19-C20	-3.16	109.33	112.02
2	B	601	BWA	O28-C20-C21	-3.15	122.56	128.66
2	D	602	BWA	C7-C6-N4	-3.15	106.44	113.07
2	D	602	BWA	C21-C22-C23	-3.09	105.55	108.26
2	A	601	BWA	O29-C23-C22	-3.08	122.69	128.66
2	C	602	BWA	C21-C22-C23	-2.94	105.69	108.26
2	B	601	BWA	C21-C22-C23	-2.86	105.75	108.26
2	C	602	BWA	C7-C6-N4	-2.84	107.09	113.07
2	A	601	BWA	C7-C6-N4	-2.83	107.11	113.07
2	C	602	BWA	O28-C20-N19	2.78	127.61	124.79
2	A	601	BWA	C22-C21-C20	-2.77	105.83	108.26
2	C	602	BWA	O28-C20-C21	-2.73	123.37	128.66
2	C	602	BWA	O29-C23-C22	-2.67	123.48	128.66
2	B	601	BWA	C22-C21-C20	-2.66	105.93	108.26
2	C	602	BWA	C22-C21-C20	-2.62	105.96	108.26

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601	BWA	C21-C22-C23	-2.61	105.97	108.26
2	B	601	BWA	C23-N19-C20	-2.52	109.87	112.02
2	D	602	BWA	C22-C21-C20	-2.48	106.08	108.26
2	C	602	BWA	O29-C23-N19	2.42	127.24	124.79
2	D	602	BWA	C24-C21-C20	2.39	133.60	129.59
2	A	601	BWA	C15-N14-C13	2.34	120.95	116.85
2	D	602	BWA	C23-N19-C20	-2.30	110.05	112.02
2	D	602	BWA	C6-N4-C3	2.29	126.12	121.56
2	C	602	BWA	C23-N19-C20	-2.27	110.08	112.02
2	B	601	BWA	C7-C6-N4	-2.26	108.31	113.07
2	B	601	BWA	C12-C1-N2	-2.05	113.54	120.41

There are no chirality outliers.

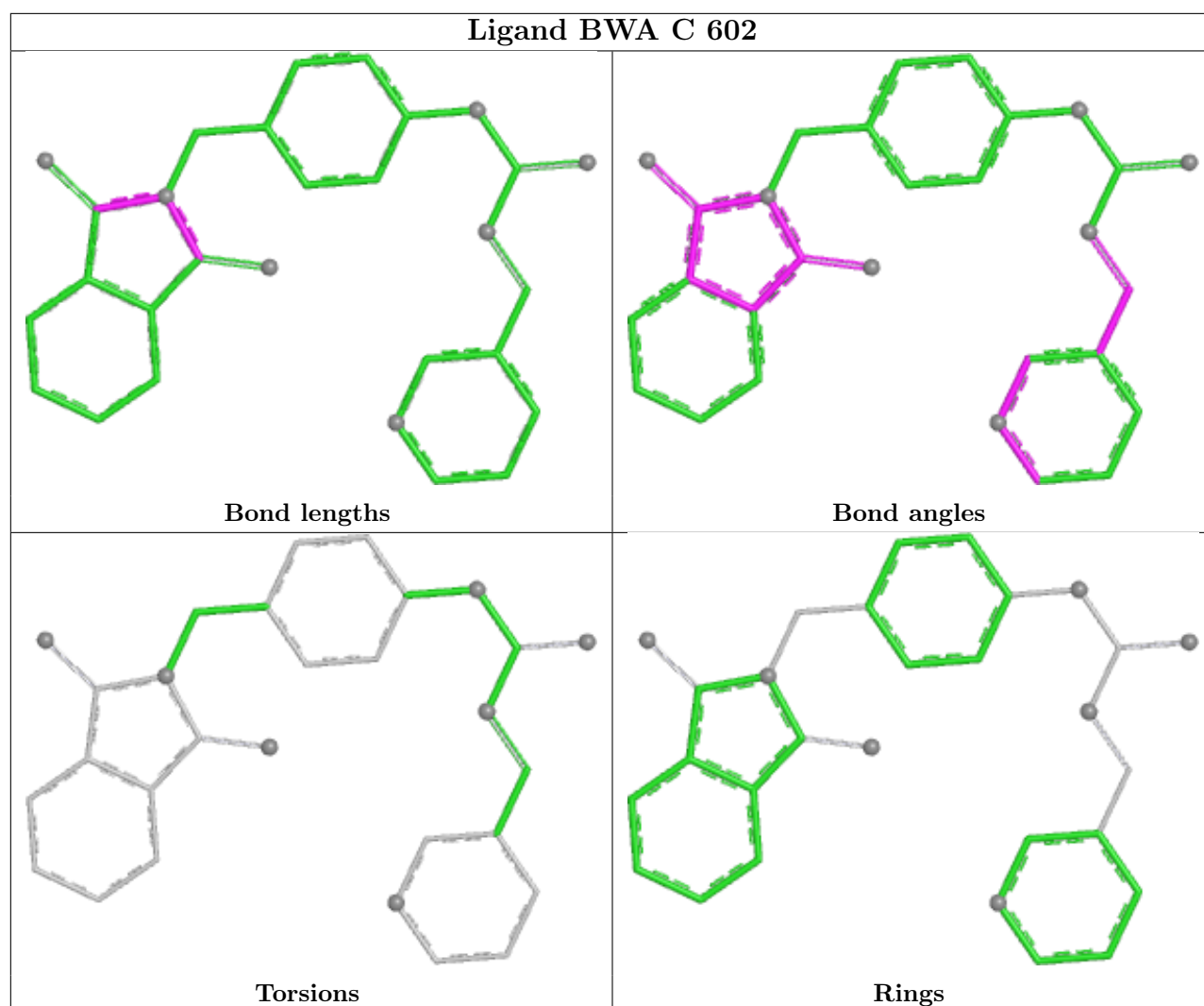
There are no torsion outliers.

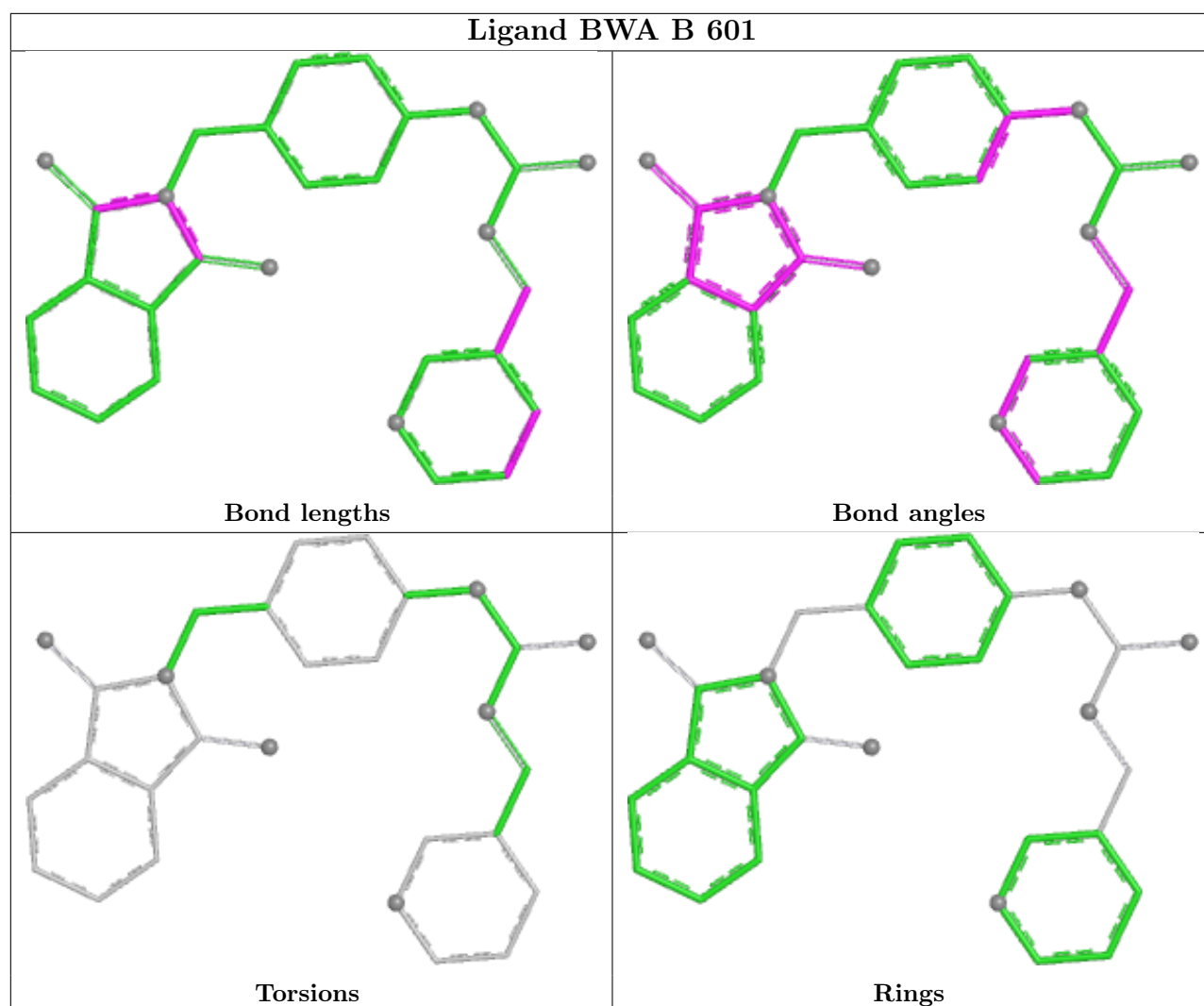
There are no ring outliers.

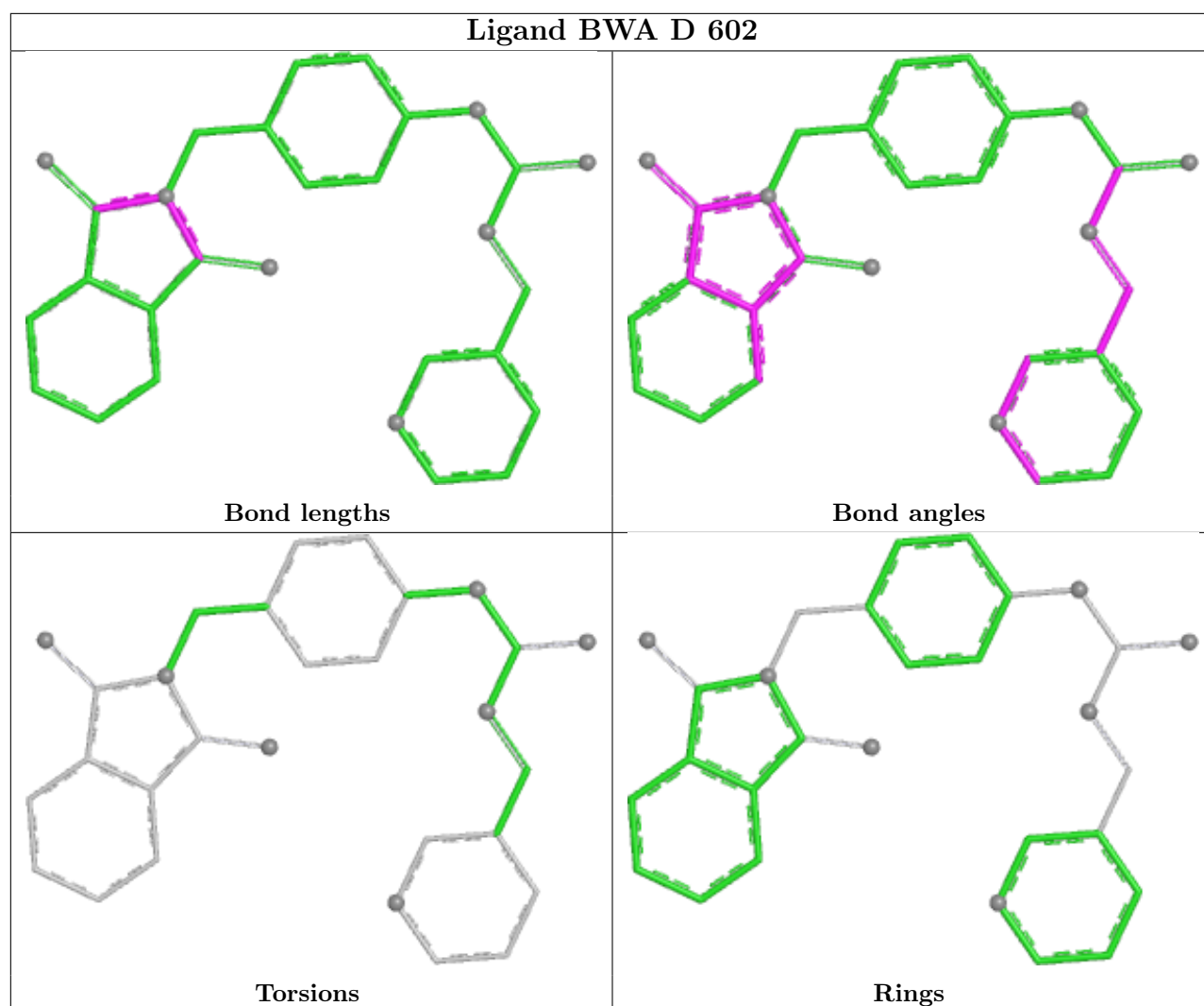
2 monomers are involved in 2 short contacts:

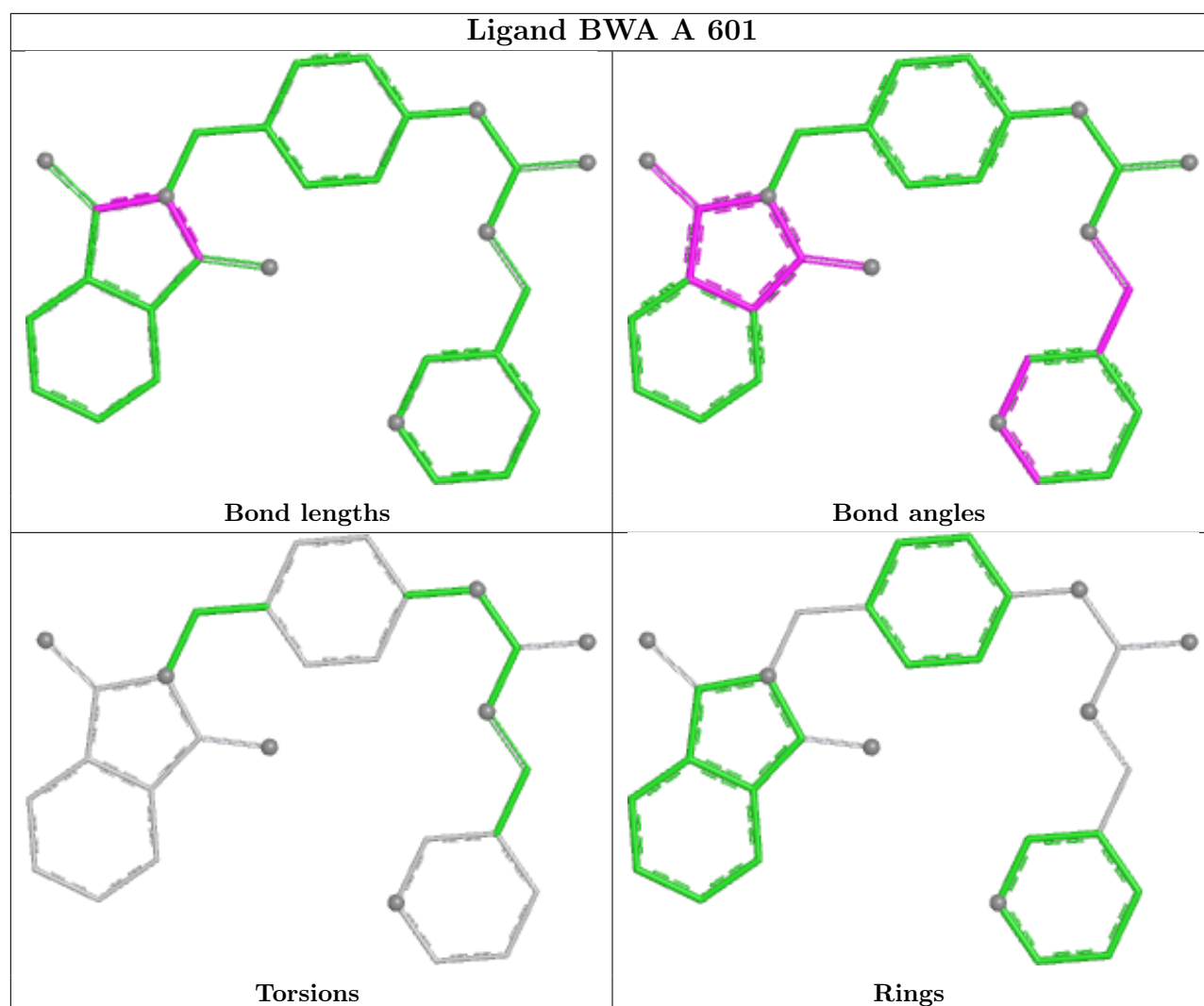
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	603	GOL	1	0
3	C	603	GOL	1	0

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	466/501 (93%)	-0.54	1 (0%) 91 90	21, 35, 55, 84	0
1	B	470/501 (93%)	-0.51	1 (0%) 91 90	20, 34, 55, 83	0
1	C	466/501 (93%)	-0.01	24 (5%) 33 29	20, 40, 78, 102	0
1	D	468/501 (93%)	-0.55	4 (0%) 81 79	18, 32, 64, 91	0
All	All	1870/2004 (93%)	-0.41	30 (1%) 70 68	18, 35, 69, 102	0

All (30) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	179	THR	4.1
1	D	486	LEU	3.3
1	A	484	ILE	3.0
1	C	183	LEU	3.0
1	C	324	VAL	2.8
1	C	343	LEU	2.8
1	D	409	LEU	2.8
1	C	295	LEU	2.7
1	C	373	TRP	2.7
1	C	173	ALA	2.7
1	C	176	LEU	2.6
1	C	177	LEU	2.5
1	C	328	LEU	2.5
1	C	367	GLY	2.5
1	C	377	ASN	2.5
1	C	283	ILE	2.4
1	C	335	THR	2.3
1	C	368	MET	2.3
1	C	318	LEU	2.3
1	C	322	LEU	2.3
1	C	339	LYS	2.3

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Mol	Chain	Res	Type	RSRZ
1	C	337	ASN	2.2
1	C	325	LEU	2.2
1	C	327	ILE	2.2
1	C	298	LEU	2.1
1	B	42	LYS	2.1
1	C	333	PRO	2.1
1	D	42	LYS	2.0
1	C	338	SER	2.0
1	D	421	PRO	2.0

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

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

6.3 Carbohydrates [i](#)

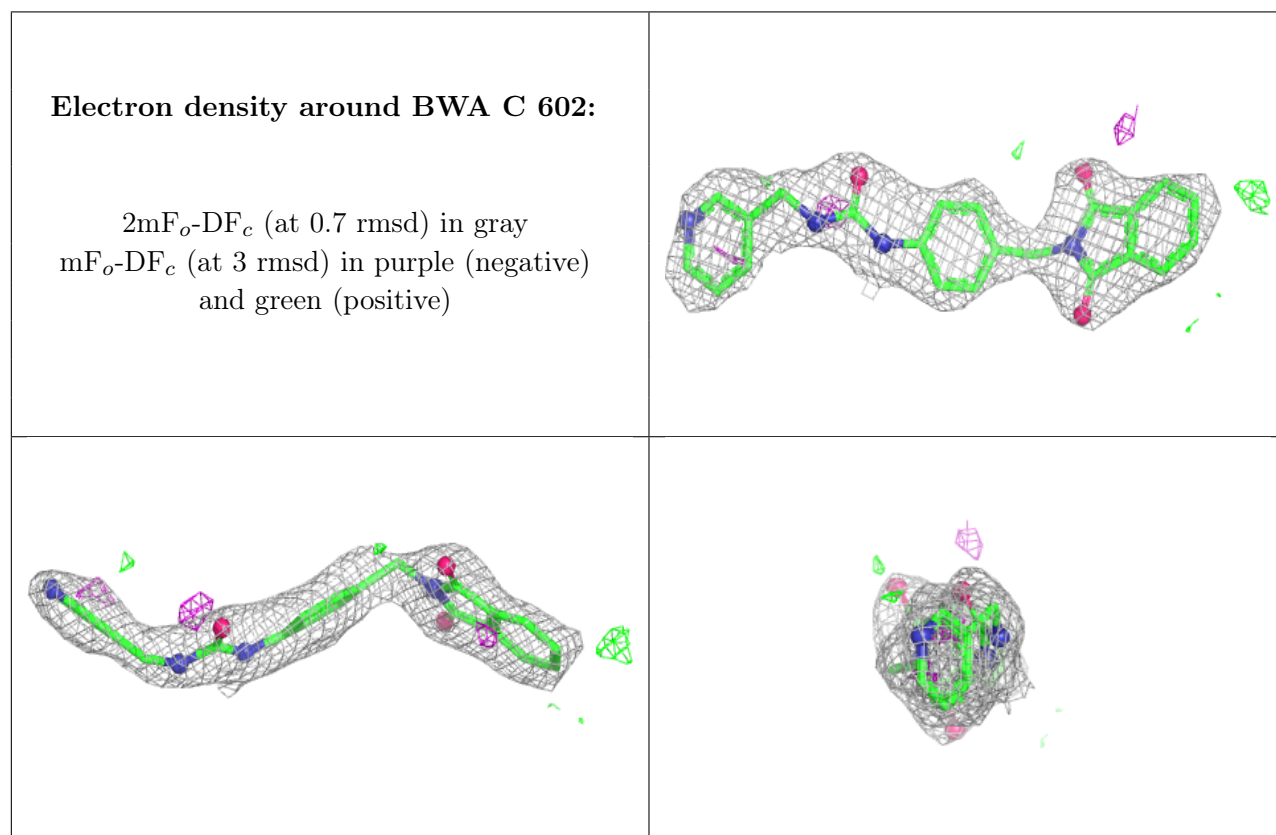
There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

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

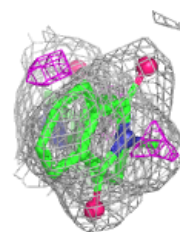
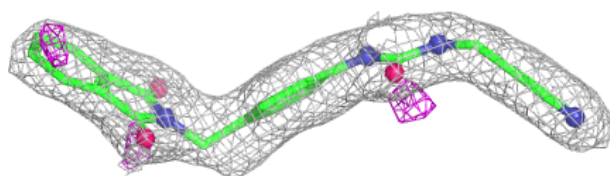
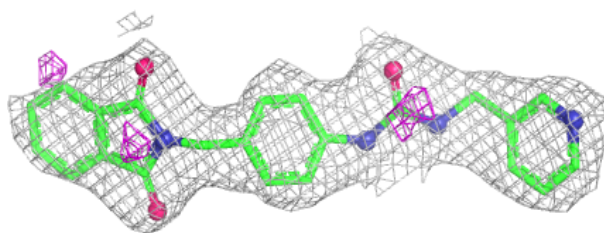
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	PO4	D	601	5/5	0.81	0.13	126,126,127,127	0
5	DMS	C	601	4/4	0.83	0.21	103,103,104,104	0
3	GOL	C	603	6/6	0.84	0.17	62,67,68,69	0
3	GOL	A	602	6/6	0.87	0.12	52,54,60,63	0
3	GOL	B	602	6/6	0.88	0.12	53,54,57,59	0
3	GOL	C	604	6/6	0.88	0.14	63,66,66,67	0
4	PO4	A	603	5/5	0.89	0.16	71,73,75,76	0
2	BWA	C	602	29/29	0.91	0.09	40,51,53,56	0
3	GOL	D	603	6/6	0.92	0.10	49,55,58,62	0
4	PO4	B	603	5/5	0.93	0.12	73,73,75,75	0
2	BWA	A	601	29/29	0.95	0.07	24,35,45,47	0
4	PO4	C	605	5/5	0.95	0.13	66,67,68,68	0
2	BWA	B	601	29/29	0.96	0.07	24,28,51,55	0
2	BWA	D	602	29/29	0.96	0.07	18,30,39,41	0

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

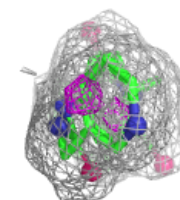
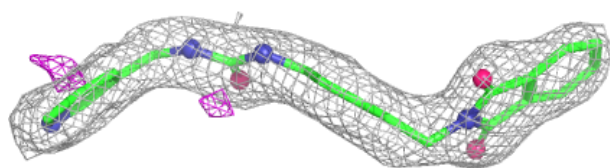
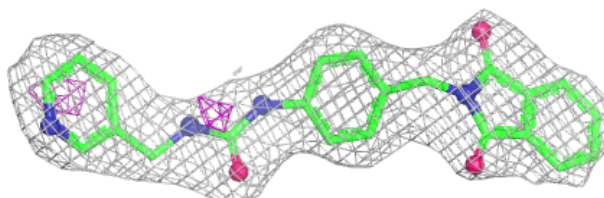


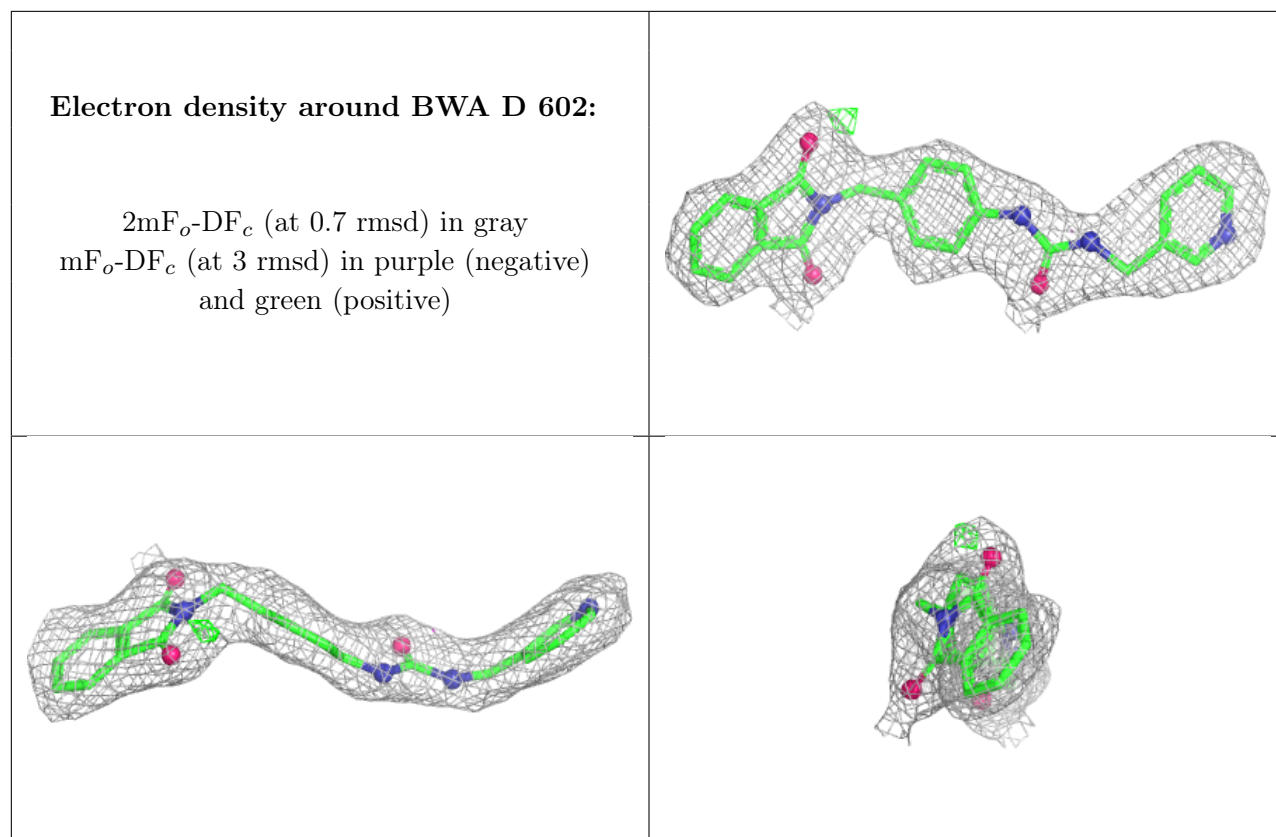
Electron density around BWA A 601:

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

**Electron density around BWA B 601:**

$2mF_o-DF_c$ (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.