



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 05:01 AM UTC

PDB ID : 6VLY / pdb_00006vly
Title : Crystal structure of FabI-NADH complex from *Alistipes finegoldii*
Authors : Radka, C.D.; Seetharaman, J.; Rock, C.O.
Deposited on : 2020-01-27
Resolution : 1.86 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

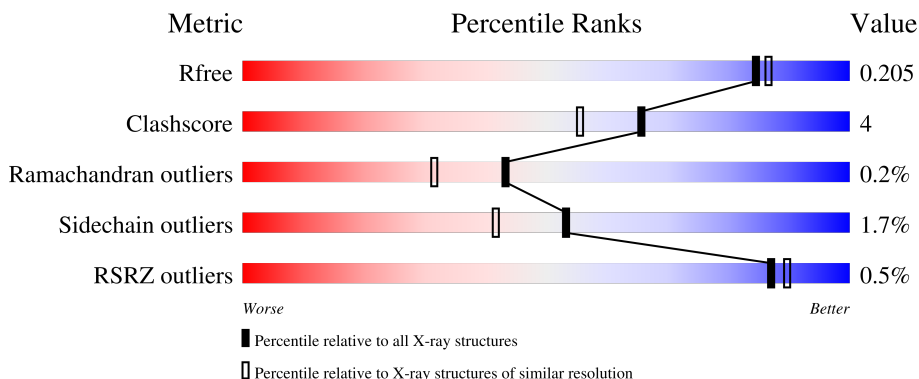
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.86 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	3428 (1.86-1.86)
Clashscore	190562	3579 (1.86-1.86)
Ramachandran outliers	187476	3553 (1.86-1.86)
Sidechain outliers	187428	3553 (1.86-1.86)
RSRZ outliers	180081	3429 (1.86-1.86)

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	309	 83% 10% 5%
1	B	309	 82% 10% 8%
1	C	309	 84% 7% 8%
1	D	309	 85% 7% 8%

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 10132 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 Enoyl-[acyl-carrier-protein] reductase [NADH].

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	293	Total 2265	C 1423	N 393	O 433	S 16	0	0	0
1	B	284	Total 2202	C 1384	N 379	O 424	S 15	0	0	0
1	C	283	Total 2193	C 1379	N 378	O 421	S 15	0	0	0
1	D	284	Total 2202	C 1384	N 379	O 424	S 15	0	0	0

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	initiating methionine	UNP A0A174E195
A	-18	GLY	-	expression tag	UNP A0A174E195
A	-17	SER	-	expression tag	UNP A0A174E195
A	-16	SER	-	expression tag	UNP A0A174E195
A	-15	HIS	-	expression tag	UNP A0A174E195
A	-14	HIS	-	expression tag	UNP A0A174E195
A	-13	HIS	-	expression tag	UNP A0A174E195
A	-12	HIS	-	expression tag	UNP A0A174E195
A	-11	HIS	-	expression tag	UNP A0A174E195
A	-10	HIS	-	expression tag	UNP A0A174E195
A	-9	SER	-	expression tag	UNP A0A174E195
A	-8	SER	-	expression tag	UNP A0A174E195
A	-7	GLY	-	expression tag	UNP A0A174E195
A	-6	LEU	-	expression tag	UNP A0A174E195
A	-5	VAL	-	expression tag	UNP A0A174E195
A	-4	PRO	-	expression tag	UNP A0A174E195
A	-3	ARG	-	expression tag	UNP A0A174E195
A	-2	GLY	-	expression tag	UNP A0A174E195
A	-1	SER	-	expression tag	UNP A0A174E195
A	0	HIS	-	expression tag	UNP A0A174E195
B	-19	MET	-	initiating methionine	UNP A0A174E195

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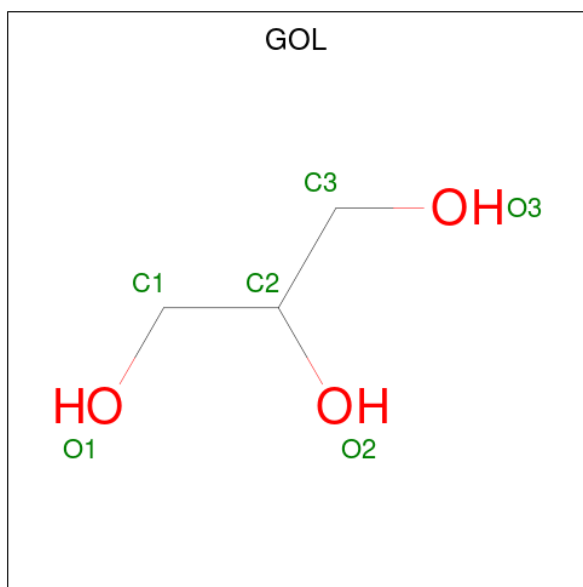
Chain	Residue	Modelled	Actual	Comment	Reference
B	-18	GLY	-	expression tag	UNP A0A174E195
B	-17	SER	-	expression tag	UNP A0A174E195
B	-16	SER	-	expression tag	UNP A0A174E195
B	-15	HIS	-	expression tag	UNP A0A174E195
B	-14	HIS	-	expression tag	UNP A0A174E195
B	-13	HIS	-	expression tag	UNP A0A174E195
B	-12	HIS	-	expression tag	UNP A0A174E195
B	-11	HIS	-	expression tag	UNP A0A174E195
B	-10	HIS	-	expression tag	UNP A0A174E195
B	-9	SER	-	expression tag	UNP A0A174E195
B	-8	SER	-	expression tag	UNP A0A174E195
B	-7	GLY	-	expression tag	UNP A0A174E195
B	-6	LEU	-	expression tag	UNP A0A174E195
B	-5	VAL	-	expression tag	UNP A0A174E195
B	-4	PRO	-	expression tag	UNP A0A174E195
B	-3	ARG	-	expression tag	UNP A0A174E195
B	-2	GLY	-	expression tag	UNP A0A174E195
B	-1	SER	-	expression tag	UNP A0A174E195
B	0	HIS	-	expression tag	UNP A0A174E195
C	-19	MET	-	initiating methionine	UNP A0A174E195
C	-18	GLY	-	expression tag	UNP A0A174E195
C	-17	SER	-	expression tag	UNP A0A174E195
C	-16	SER	-	expression tag	UNP A0A174E195
C	-15	HIS	-	expression tag	UNP A0A174E195
C	-14	HIS	-	expression tag	UNP A0A174E195
C	-13	HIS	-	expression tag	UNP A0A174E195
C	-12	HIS	-	expression tag	UNP A0A174E195
C	-11	HIS	-	expression tag	UNP A0A174E195
C	-10	HIS	-	expression tag	UNP A0A174E195
C	-9	SER	-	expression tag	UNP A0A174E195
C	-8	SER	-	expression tag	UNP A0A174E195
C	-7	GLY	-	expression tag	UNP A0A174E195
C	-6	LEU	-	expression tag	UNP A0A174E195
C	-5	VAL	-	expression tag	UNP A0A174E195
C	-4	PRO	-	expression tag	UNP A0A174E195
C	-3	ARG	-	expression tag	UNP A0A174E195
C	-2	GLY	-	expression tag	UNP A0A174E195
C	-1	SER	-	expression tag	UNP A0A174E195
C	0	HIS	-	expression tag	UNP A0A174E195
D	-19	MET	-	initiating methionine	UNP A0A174E195
D	-18	GLY	-	expression tag	UNP A0A174E195
D	-17	SER	-	expression tag	UNP A0A174E195

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-16	SER	-	expression tag	UNP A0A174E195
D	-15	HIS	-	expression tag	UNP A0A174E195
D	-14	HIS	-	expression tag	UNP A0A174E195
D	-13	HIS	-	expression tag	UNP A0A174E195
D	-12	HIS	-	expression tag	UNP A0A174E195
D	-11	HIS	-	expression tag	UNP A0A174E195
D	-10	HIS	-	expression tag	UNP A0A174E195
D	-9	SER	-	expression tag	UNP A0A174E195
D	-8	SER	-	expression tag	UNP A0A174E195
D	-7	GLY	-	expression tag	UNP A0A174E195
D	-6	LEU	-	expression tag	UNP A0A174E195
D	-5	VAL	-	expression tag	UNP A0A174E195
D	-4	PRO	-	expression tag	UNP A0A174E195
D	-3	ARG	-	expression tag	UNP A0A174E195
D	-2	GLY	-	expression tag	UNP A0A174E195
D	-1	SER	-	expression tag	UNP A0A174E195
D	0	HIS	-	expression tag	UNP A0A174E195

- Molecule 2 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



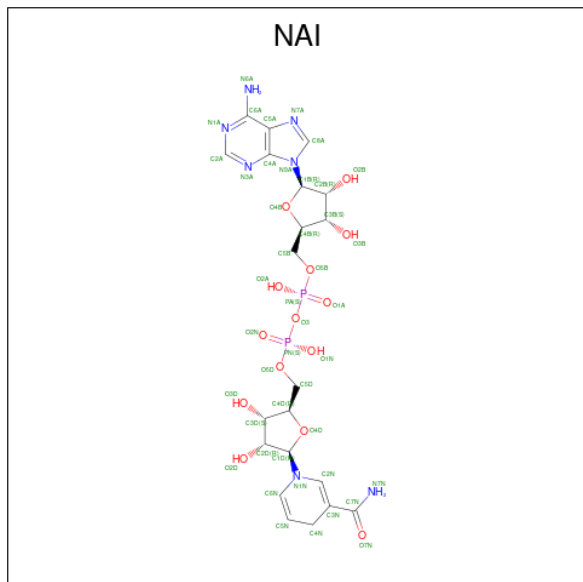
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			6	3	3		
2	B	1	Total	C	O	0	0
			6	3	3		
2	B	1	Total	C	O	0	0
			6	3	3		

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

- Molecule 3 is 1,4-DIHYDRONICOTINAMIDE ADENINE DINUCLEOTIDE (CCD ID: NAI) (formula: C₂₁H₂₉N₇O₁₄P₂) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
3	B	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
3	C	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
3	D	1	Total	C	N	O	P	0	0
			44	21	7	14	2		

- Molecule 4 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total Cl 1 1	0	0

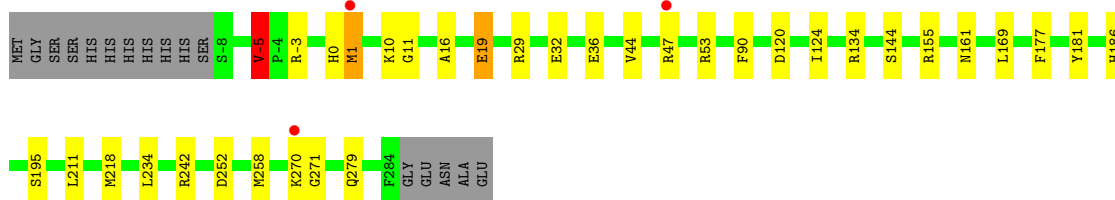
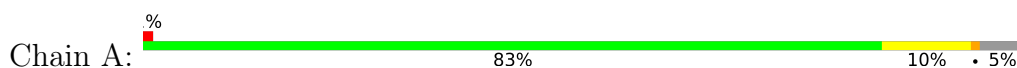
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	246	Total O 246 246	0	0
5	B	262	Total O 262 262	0	0
5	C	269	Total O 269 269	0	0
5	D	268	Total O 268 268	0	0

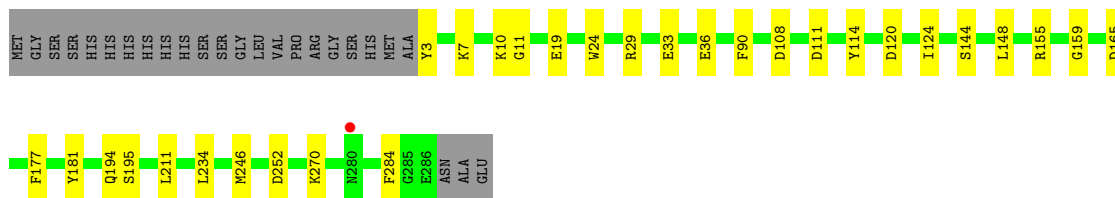
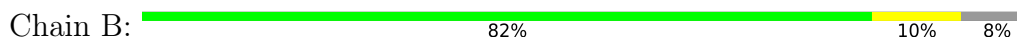
3 Residue-property plots [i](#)

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.

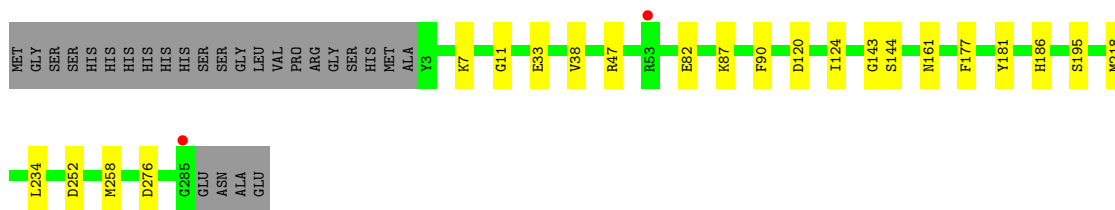
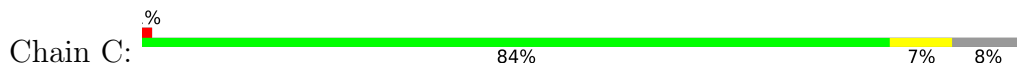
- Molecule 1: Enoyl-[acyl-carrier-protein] reductase [NADH]



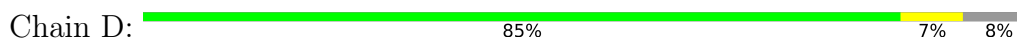
- Molecule 1: Enoyl-[acyl-carrier-protein] reductase [NADH]



- Molecule 1: Enoyl-[acyl-carrier-protein] reductase [NADH]



- Molecule 1: Enoyl-[acyl-carrier-protein] reductase [NADH]



MET
GLY
SER
SER
HIS
HIS
HIS
HIS
HIS
HIS
SER
SER
GLY
LEU
VAL
PRO
ARG
GLY
SER
HIS
MET
ALA
Y3
K25
R29
E33
F90
V101
R102
R134
S144
R155
G159
F177
Y181
Q194
S195
A201
L211
M218
L234
M258

M260
E266
ASN
ALA
GLU

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	75.31Å 111.54Å 150.54Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.09 – 1.86 29.09 – 1.86	Depositor EDS
% Data completeness (in resolution range)	98.3 (29.09-1.86) 98.4 (29.09-1.86)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.02 (at 1.85Å)	Xtrriage
Refinement program	REFMAC 5.8.0258	Depositor
R, R_{free}	0.158 , 0.197 0.170 , 0.205	Depositor DCC
R_{free} test set	5169 reflections (4.82%)	wwPDB-VP
Wilson B-factor (Å ²)	24.7	Xtrriage
Anisotropy	0.101	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 50.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	10132	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.19% 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: CL, GOL, NAI

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	1.06	0/2306	1.23	1/3109 (0.0%)
1	B	1.06	0/2241	1.21	0/3021
1	C	1.09	2/2232 (0.1%)	1.25	0/3009
1	D	1.04	0/2241	1.23	0/3021
All	All	1.06	2/9020 (0.0%)	1.23	1/12160 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	38	VAL	C-O	5.35	1.29	1.24
1	C	143	GLY	C-O	5.34	1.29	1.23

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	-5	VAL	N-CA-CB	5.99	116.16	109.99

There are no chirality outliers.

There are no planarity outliers.

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	2265	0	2242	22	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	2202	0	2171	18	0
1	C	2193	0	2165	13	0
1	D	2202	0	2171	16	0
2	A	6	0	8	1	0
2	B	18	0	24	3	0
2	C	12	0	16	0	0
2	D	12	0	16	5	0
3	A	44	0	27	0	0
3	B	44	0	27	0	0
3	C	44	0	27	0	0
3	D	44	0	27	0	0
4	B	1	0	0	0	0
5	A	246	0	0	6	0
5	B	262	0	0	3	0
5	C	269	0	0	5	0
5	D	268	0	0	9	0
All	All	10132	0	8921	69	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 (69) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:280:ASN:HB2	5:D:595:HOH:O	1.70	0.92
1:D:102:ARG:NH2	5:D:401:HOH:O	2.20	0.74
1:A:186:HIS:HD2	5:A:519:HOH:O	1.73	0.69
1:B:3:TYR:N	5:B:402:HOH:O	2.28	0.66
1:B:155:ARG:NH2	5:B:401:HOH:O	2.28	0.66
1:A:1:MET:HE2	5:D:553:HOH:O	1.96	0.64
1:D:3:TYR:N	5:D:403:HOH:O	2.29	0.64
1:A:155:ARG:NH2	5:A:402:HOH:O	2.34	0.59
1:D:155:ARG:NH2	5:D:404:HOH:O	2.35	0.59
1:B:270:LYS:HE3	1:B:284:PHE:O	2.02	0.58
1:D:159:GLY:H	2:D:302:GOL:H2	1.67	0.57
1:B:29:ARG:HB3	1:B:234:LEU:HD11	1.85	0.57
1:D:29:ARG:HB3	1:D:234:LEU:HD11	1.88	0.55
1:C:47:ARG:NH1	5:C:402:HOH:O	2.32	0.55
1:D:218:MET:O	1:D:258:MET:HG3	2.08	0.54
1:B:11:GLY:HA3	1:B:90:PHE:CE1	2.44	0.52
2:B:302:GOL:H12	5:B:590:HOH:O	2.08	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:29:ARG:HB3	1:A:234:LEU:HD11	1.92	0.52
1:A:16:ALA:N	5:A:404:HOH:O	2.43	0.51
1:A:1:MET:HE3	5:A:452:HOH:O	2.11	0.51
1:C:186:HIS:HD2	5:C:405:HOH:O	1.94	0.49
1:A:218:MET:O	1:A:258:MET:HG3	2.12	0.49
1:C:47:ARG:HD3	5:C:631:HOH:O	2.12	0.49
1:A:11:GLY:HA3	1:A:90:PHE:CE1	2.48	0.48
1:D:101:VAL:HG11	2:D:301:GOL:H32	1.95	0.48
1:A:-5:VAL:HG22	1:A:-3:ARG:NH1	2.30	0.46
1:A:270:LYS:HD3	1:A:271:GLY:N	2.30	0.46
1:C:33:GLU:HG3	1:C:234:LEU:HD13	1.98	0.45
1:A:90:PHE:HA	1:A:144:SER:O	2.16	0.45
1:A:211:LEU:C	1:A:211:LEU:HD23	2.41	0.45
1:D:33:GLU:HG3	1:D:234:LEU:HD13	1.99	0.44
1:C:11:GLY:HA3	1:C:90:PHE:CE1	2.51	0.44
1:A:44:VAL:HG23	5:A:594:HOH:O	2.17	0.44
1:B:120:ASP:HA	1:B:124:ILE:HB	1.98	0.44
1:B:246:MET:HE1	1:C:258:MET:SD	2.58	0.44
1:D:90:PHE:HA	1:D:144:SER:O	2.18	0.44
1:B:111:ASP:HB3	1:B:114:TYR:CD2	2.53	0.44
1:A:242:ARG:NH1	5:A:405:HOH:O	2.44	0.43
1:A:19:GLU:H	1:A:19:GLU:CD	2.26	0.43
1:A:169:LEU:HD12	1:B:165:ASP:HB3	2.00	0.43
2:A:301:GOL:O3	1:C:276:ASP:OD2	2.23	0.43
2:B:301:GOL:O2	2:B:302:GOL:O1	2.24	0.43
1:C:218:MET:O	1:C:258:MET:HG3	2.18	0.43
1:D:211:LEU:C	1:D:211:LEU:HD23	2.43	0.43
1:C:87:LYS:NZ	5:C:413:HOH:O	2.50	0.43
1:A:134:ARG:NH1	1:B:108:ASP:HB2	2.34	0.43
1:C:120:ASP:HA	1:C:124:ILE:HB	2.01	0.42
1:A:10:LYS:HA	1:A:36:GLU:O	2.19	0.42
1:B:211:LEU:C	1:B:211:LEU:HD23	2.43	0.42
1:A:0:HIS:HE1	1:A:32:GLU:OE1	2.03	0.42
1:B:90:PHE:HA	1:B:144:SER:O	2.20	0.42
1:C:195:SER:OG	1:C:252:ASP:HA	2.20	0.42
1:D:3:TYR:N	5:D:413:HOH:O	2.52	0.42
1:B:195:SER:OG	1:B:252:ASP:HA	2.20	0.41
1:C:82:GLU:OE1	5:C:401:HOH:O	2.22	0.41
1:B:33:GLU:HG3	1:B:234:LEU:HD13	2.02	0.41
1:D:201:ALA:O	2:D:301:GOL:H31	2.21	0.41
1:D:194:GLN:HG3	1:D:195:SER:O	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:10:LYS:HA	1:B:36:GLU:O	2.20	0.41
2:D:302:GOL:C1	5:D:402:HOH:O	2.66	0.41
1:A:279:GLN:HG2	1:D:134:ARG:HH12	1.85	0.41
1:A:120:ASP:HA	1:A:124:ILE:HB	2.02	0.40
1:A:195:SER:OG	1:A:252:ASP:HA	2.21	0.40
1:B:19:GLU:HA	1:B:24:TRP:CD2	2.55	0.40
1:B:159:GLY:H	2:B:303:GOL:H2	1.86	0.40
1:C:90:PHE:HA	1:C:144:SER:O	2.20	0.40
1:B:194:GLN:HG3	1:B:195:SER:O	2.21	0.40
1:D:25:LYS:NZ	5:D:417:HOH:O	2.53	0.40
2:D:302:GOL:H12	5:D:402: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	291/309 (94%)	279 (96%)	11 (4%)	1 (0%)	36 25
1	B	282/309 (91%)	273 (97%)	9 (3%)	0	100 100
1	C	281/309 (91%)	274 (98%)	6 (2%)	1 (0%)	30 17
1	D	282/309 (91%)	274 (97%)	8 (3%)	0	100 100
All	All	1136/1236 (92%)	1100 (97%)	34 (3%)	2 (0%)	43 31

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	161	ASN
1	C	161	ASN

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	240/253 (95%)	233 (97%)	7 (3%)	37	22
1	B	233/253 (92%)	229 (98%)	4 (2%)	53	42
1	C	232/253 (92%)	229 (99%)	3 (1%)	61	51
1	D	233/253 (92%)	231 (99%)	2 (1%)	70	64
All	All	938/1012 (93%)	922 (98%)	16 (2%)	53	42

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	-5	VAL
1	A	1	MET
1	A	19	GLU
1	A	47	ARG
1	A	53	ARG
1	A	177	PHE
1	A	181	TYR
1	B	7	LYS
1	B	148	LEU
1	B	177	PHE
1	B	181	TYR
1	C	7	LYS
1	C	177	PHE
1	C	181	TYR
1	D	177	PHE
1	D	181	TYR

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

Mol	Chain	Res	Type
1	A	0	HIS
1	A	186	HIS
1	A	248	ASN

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Mol	Chain	Res	Type
1	B	186	HIS
1	B	278	HIS
1	C	213	ASN
1	C	227	ASN
1	D	248	ASN
1	D	278	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 13 ligands modelled in this entry, 1 is monoatomic - leaving 12 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
3	NAI	C	303	-	47,48,48	1.39	4 (8%)	64,73,73	1.77	18 (28%)
2	GOL	B	303	-	5,5,5	0.24	0	5,5,5	0.79	0
3	NAI	A	302	-	47,48,48	1.74	7 (14%)	64,73,73	1.87	14 (21%)
2	GOL	D	301	-	5,5,5	0.44	0	5,5,5	0.56	0
2	GOL	B	301	-	5,5,5	0.11	0	5,5,5	0.25	0
2	GOL	C	302	-	5,5,5	0.23	0	5,5,5	0.82	0
3	NAI	B	304	-	47,48,48	1.26	6 (12%)	64,73,73	1.86	18 (28%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	GOL	D	302	-	5,5,5	0.31	0	5,5,5	1.05	0
3	NAI	D	303	-	47,48,48	1.31	5 (10%)	64,73,73	1.82	17 (26%)
2	GOL	B	302	-	5,5,5	0.32	0	5,5,5	0.48	0
2	GOL	C	301	-	5,5,5	0.18	0	5,5,5	0.40	0
2	GOL	A	301	-	5,5,5	0.20	0	5,5,5	0.58	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	NAI	C	303	-	-	6/29/72/72	0/5/5/5
2	GOL	B	303	-	-	2/4/4/4	-
3	NAI	A	302	-	-	5/29/72/72	0/5/5/5
2	GOL	D	301	-	-	2/4/4/4	-
2	GOL	B	301	-	-	0/4/4/4	-
2	GOL	C	302	-	-	2/4/4/4	-
3	NAI	B	304	-	-	6/29/72/72	0/5/5/5
2	GOL	D	302	-	-	2/4/4/4	-
3	NAI	D	303	-	-	6/29/72/72	0/5/5/5
2	GOL	B	302	-	-	1/4/4/4	-
2	GOL	C	301	-	-	2/4/4/4	-
2	GOL	A	301	-	-	2/4/4/4	-

All (22) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	302	NAI	PA-O3	6.76	1.66	1.59
3	A	302	NAI	PN-O3	6.08	1.66	1.59
3	C	303	NAI	C5A-C4A	4.38	1.46	1.39
3	B	304	NAI	PA-O3	4.21	1.64	1.59
3	C	303	NAI	PN-O3	3.71	1.63	1.59
3	D	303	NAI	PA-O3	3.51	1.63	1.59
3	D	303	NAI	C5A-C6A	3.40	1.50	1.41
3	A	302	NAI	C5A-C4A	3.27	1.44	1.39
3	D	303	NAI	PN-O3	3.25	1.63	1.59
3	B	304	NAI	C5A-C4A	3.14	1.44	1.39
3	D	303	NAI	C5A-C4A	3.10	1.44	1.39
3	C	303	NAI	PA-O3	3.01	1.62	1.59

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	304	NAI	C8A-N9A	-2.80	1.32	1.37
3	C	303	NAI	C4A-N9A	-2.79	1.31	1.37
3	B	304	NAI	C4N-C5N	-2.51	1.42	1.49
3	A	302	NAI	C4A-N9A	-2.48	1.32	1.37
3	A	302	NAI	C5A-C6A	2.30	1.47	1.41
3	B	304	NAI	C5A-C6A	2.29	1.47	1.41
3	D	303	NAI	C8A-N7A	2.25	1.36	1.31
3	B	304	NAI	PN-O3	2.23	1.61	1.59
3	A	302	NAI	C6N-C5N	2.15	1.39	1.33
3	A	302	NAI	C8A-N9A	-2.13	1.33	1.37

All (67) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	302	NAI	C4A-N9A-C8A	5.18	111.18	105.74
3	B	304	NAI	C4A-C5A-N7A	-4.84	105.05	110.58
3	A	302	NAI	C5A-C4A-N3A	-4.81	120.09	126.72
3	C	303	NAI	C4A-N9A-C8A	4.80	110.78	105.74
3	D	303	NAI	C5A-C4A-N3A	-4.74	120.19	126.72
3	B	304	NAI	C5A-C4A-N3A	-4.73	120.21	126.72
3	A	302	NAI	N3A-C4A-N9A	4.61	135.01	127.17
3	A	302	NAI	N3A-C2A-N1A	-4.59	121.64	128.58
3	C	303	NAI	N3A-C4A-N9A	3.98	133.93	127.17
3	D	303	NAI	N3A-C4A-N9A	3.96	133.90	127.17
3	B	304	NAI	N3A-C4A-N9A	3.96	133.89	127.17
3	C	303	NAI	C5A-C4A-N3A	-3.91	121.33	126.72
3	D	303	NAI	C6N-N1N-C2N	3.85	123.44	119.32
3	B	304	NAI	C4A-N9A-C8A	3.83	109.76	105.74
3	B	304	NAI	C5A-N7A-C8A	3.70	109.27	103.45
3	A	302	NAI	C6N-N1N-C2N	3.62	123.19	119.32
3	A	302	NAI	C2A-N3A-C4A	3.59	120.59	111.83
3	D	303	NAI	C4A-N9A-C8A	3.59	109.50	105.74
3	D	303	NAI	C2A-N3A-C4A	3.54	120.49	111.83
3	C	303	NAI	O4D-C1D-N1N	3.45	114.66	108.08
3	B	304	NAI	O3-PA-O1A	-3.34	100.67	110.70
3	B	304	NAI	C2A-N3A-C4A	3.30	119.89	111.83
3	B	304	NAI	C6N-N1N-C2N	3.24	122.78	119.32
3	A	302	NAI	N9A-C8A-N7A	-3.22	109.37	113.94
3	C	303	NAI	N3A-C2A-N1A	-3.20	123.73	128.58
3	B	304	NAI	C6A-C5A-N7A	3.13	138.13	132.09
3	D	303	NAI	N3A-C2A-N1A	-3.12	123.86	128.58
3	C	303	NAI	N9A-C8A-N7A	-3.12	109.51	113.94

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	304	NAI	O4D-C1D-N1N	2.99	113.78	108.08
3	C	303	NAI	O3-PA-O1A	-2.98	101.73	110.70
3	D	303	NAI	C4B-O4B-C1B	-2.97	102.91	109.47
3	C	303	NAI	C3D-C2D-C1D	-2.94	95.89	101.46
3	C	303	NAI	C6N-N1N-C2N	2.94	122.46	119.32
3	C	303	NAI	O4B-C1B-N9A	2.94	113.73	108.09
3	A	302	NAI	O4B-C1B-N9A	2.92	113.70	108.09
3	B	304	NAI	N9A-C8A-N7A	-2.89	109.84	113.94
3	D	303	NAI	N9A-C8A-N7A	-2.88	109.84	113.94
3	A	302	NAI	C4A-C5A-N7A	-2.83	107.34	110.58
3	B	304	NAI	N3A-C2A-N1A	-2.80	124.34	128.58
3	C	303	NAI	C4B-O4B-C1B	-2.74	103.42	109.47
3	D	303	NAI	O3-PA-O1A	-2.71	102.55	110.70
3	B	304	NAI	C4B-O4B-C1B	-2.69	103.52	109.47
3	D	303	NAI	O4D-C1D-N1N	2.69	113.21	108.08
3	C	303	NAI	C4A-C5A-N7A	-2.57	107.65	110.58
3	D	303	NAI	O4B-C1B-N9A	2.53	112.94	108.09
3	D	303	NAI	C4A-C5A-N7A	-2.52	107.70	110.58
3	B	304	NAI	O4B-C1B-N9A	2.52	112.93	108.09
3	C	303	NAI	C2A-N3A-C4A	2.51	117.97	111.83
3	C	303	NAI	C5A-N7A-C8A	2.47	107.33	103.45
3	D	303	NAI	C6A-C5A-N7A	2.47	136.85	132.09
3	C	303	NAI	C2A-N1A-C6A	2.40	122.67	118.73
3	D	303	NAI	C5A-N7A-C8A	2.36	107.17	103.45
3	A	302	NAI	C5A-N7A-C8A	2.35	107.15	103.45
3	A	302	NAI	C4B-O4B-C1B	-2.32	104.35	109.47
3	D	303	NAI	C3N-C7N-N7N	2.31	121.76	117.67
3	D	303	NAI	O2A-PA-O1A	2.28	123.05	112.44
3	A	302	NAI	C2A-N1A-C6A	2.22	122.37	118.73
3	B	304	NAI	O1N-PN-O3	-2.21	101.30	107.27
3	C	303	NAI	O2A-PA-O1A	2.18	122.59	112.44
3	B	304	NAI	O7N-C7N-C3N	-2.14	116.87	120.90
3	A	302	NAI	C6A-C5A-N7A	2.12	136.17	132.09
3	B	304	NAI	O4B-C1B-C2B	-2.09	102.15	106.62
3	B	304	NAI	O1N-PN-O2N	2.08	122.12	112.44
3	A	302	NAI	O4D-C1D-C2D	-2.06	102.20	106.62
3	D	303	NAI	C3D-C2D-C1D	-2.06	97.57	101.46
3	C	303	NAI	C1D-N1N-C2N	-2.03	117.79	121.14
3	C	303	NAI	C6A-C5A-N7A	2.01	135.96	132.09

There are no chirality outliers.

All (36) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	301	GOL	C1-C2-C3-O3
2	B	303	GOL	C1-C2-C3-O3
2	B	303	GOL	O2-C2-C3-O3
2	C	301	GOL	C1-C2-C3-O3
2	C	302	GOL	C1-C2-C3-O3
2	D	301	GOL	C1-C2-C3-O3
2	D	302	GOL	C1-C2-C3-O3
2	D	302	GOL	O2-C2-C3-O3
3	A	302	NAI	PN-O3-PA-O5B
3	A	302	NAI	C5D-O5D-PN-O3
3	A	302	NAI	C5D-O5D-PN-O1N
3	B	304	NAI	PN-O3-PA-O5B
3	B	304	NAI	C5D-O5D-PN-O3
3	B	304	NAI	C5D-O5D-PN-O1N
3	B	304	NAI	C5D-O5D-PN-O2N
3	C	303	NAI	PN-O3-PA-O5B
3	C	303	NAI	C5D-O5D-PN-O3
3	C	303	NAI	C5D-O5D-PN-O1N
3	C	303	NAI	C5D-O5D-PN-O2N
3	D	303	NAI	C5D-O5D-PN-O3
3	D	303	NAI	C5D-O5D-PN-O1N
3	D	303	NAI	C5D-O5D-PN-O2N
2	C	302	GOL	O2-C2-C3-O3
2	A	301	GOL	O2-C2-C3-O3
2	C	301	GOL	O2-C2-C3-O3
2	D	301	GOL	O2-C2-C3-O3
3	D	303	NAI	PN-O3-PA-O5B
3	D	303	NAI	O4D-C1D-N1N-C6N
3	B	304	NAI	O4D-C1D-N1N-C6N
3	C	303	NAI	O4D-C1D-N1N-C6N
3	A	302	NAI	O4D-C1D-N1N-C6N
2	B	302	GOL	O1-C1-C2-O2
3	A	302	NAI	C2D-C1D-N1N-C6N
3	B	304	NAI	C2D-C1D-N1N-C6N
3	C	303	NAI	C2D-C1D-N1N-C6N
3	D	303	NAI	C2D-C1D-N1N-C6N

There are no ring outliers.

6 monomers are involved in 9 short contacts:

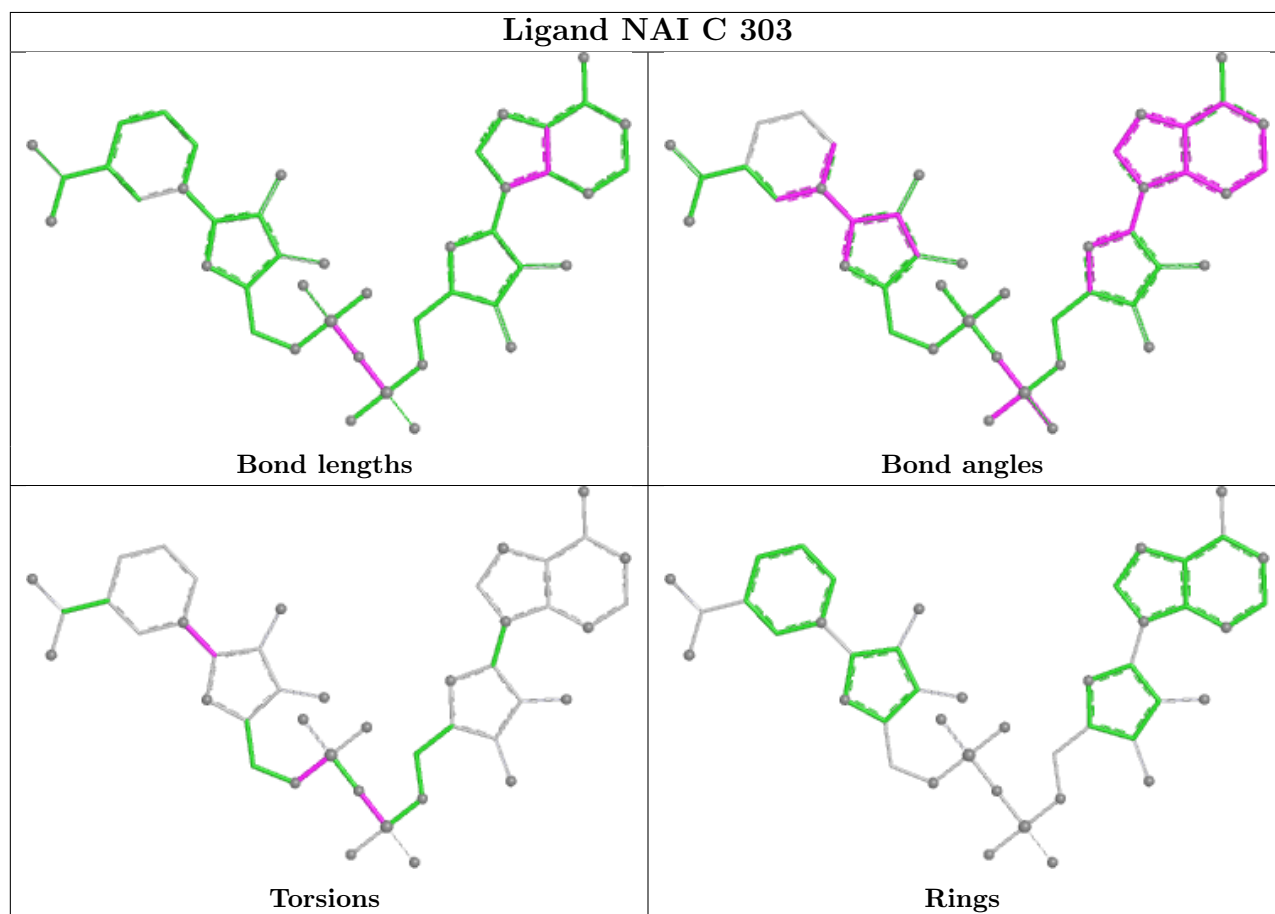
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	303	GOL	1	0
2	D	301	GOL	2	0

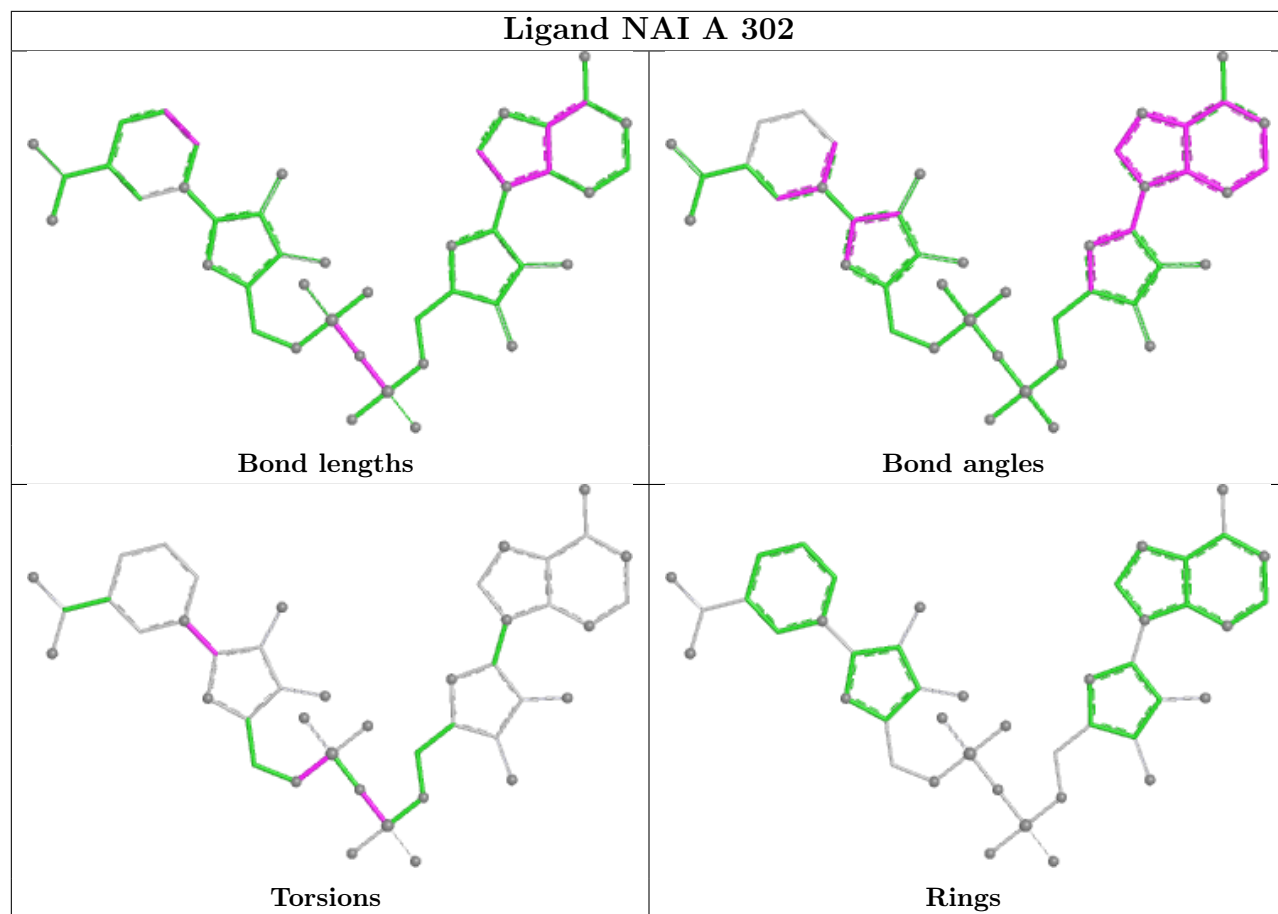
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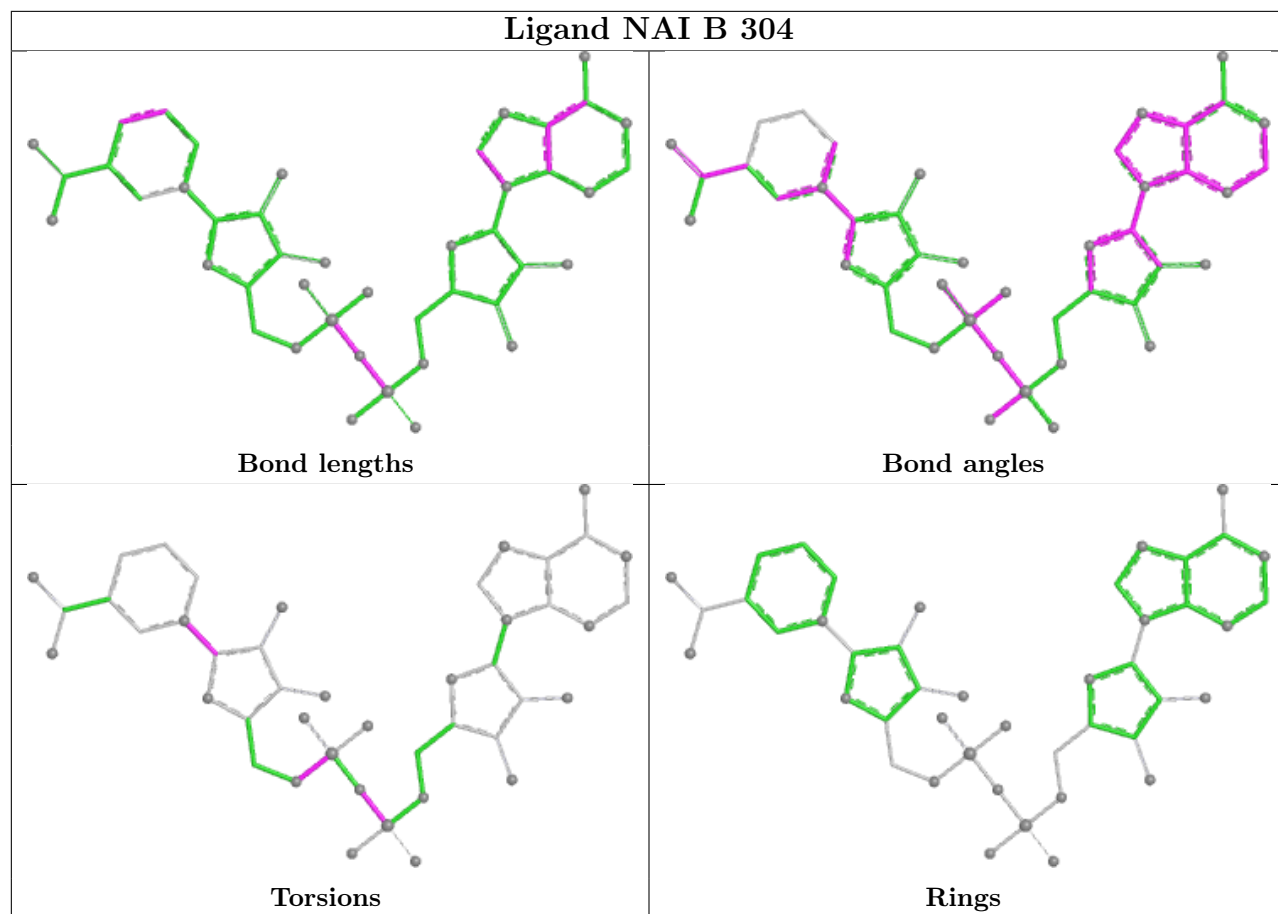
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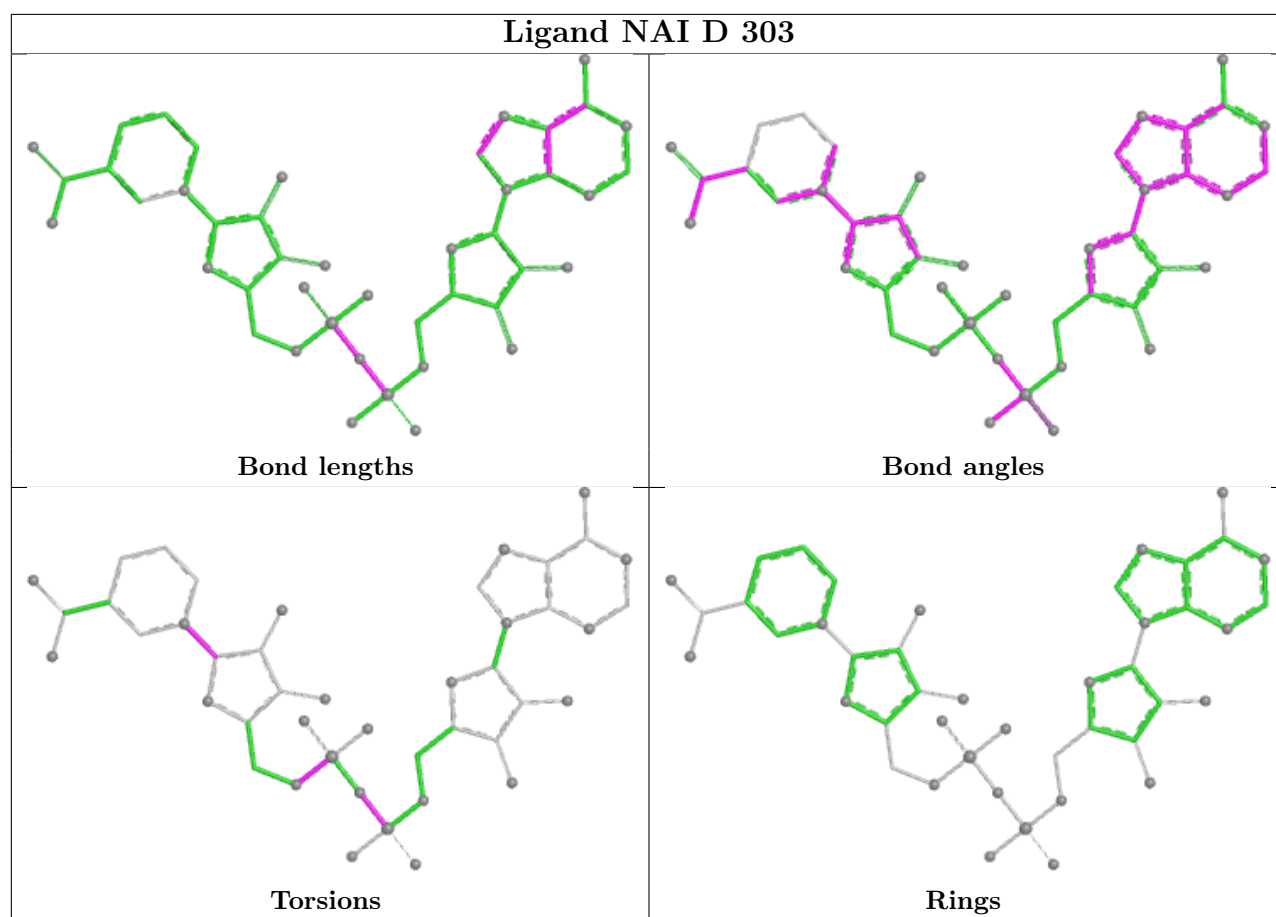
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	301	GOL	1	0
2	D	302	GOL	3	0
2	B	302	GOL	2	0
2	A	301	GOL	1	0

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 [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	293/309 (94%)	-0.14	3 (1%) 79 83	16, 25, 45, 75	0
1	B	284/309 (91%)	-0.42	1 (0%) 88 91	15, 21, 36, 53	0
1	C	283/309 (91%)	-0.33	2 (0%) 84 87	15, 22, 41, 61	0
1	D	284/309 (91%)	-0.47	0 100 100	14, 20, 36, 61	0
All	All	1144/1236 (92%)	-0.34	6 (0%) 87 90	14, 22, 40, 75	0

All (6) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1	MET	4.2
1	C	53	ARG	2.6
1	B	280	ASN	2.5
1	C	285	GLY	2.3
1	A	270	LYS	2.2
1	A	47	ARG	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.

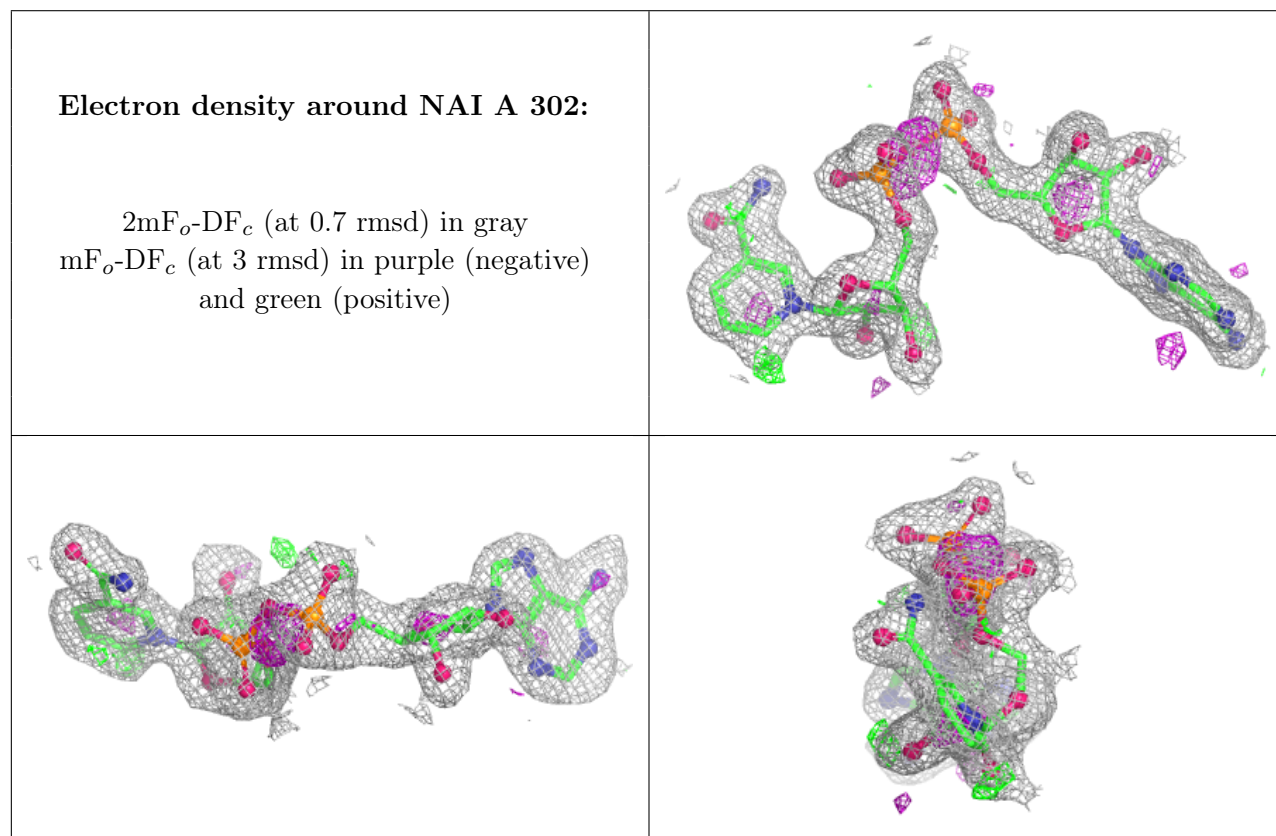
6.4 Ligands [i](#)

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.

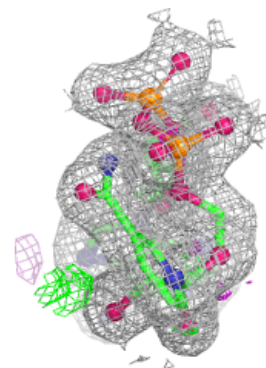
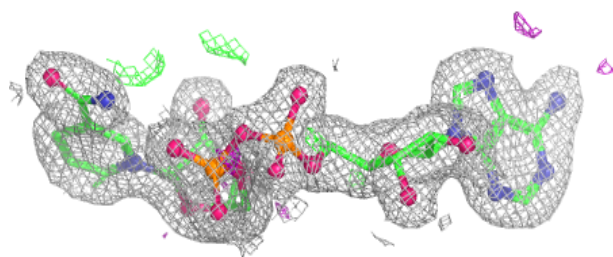
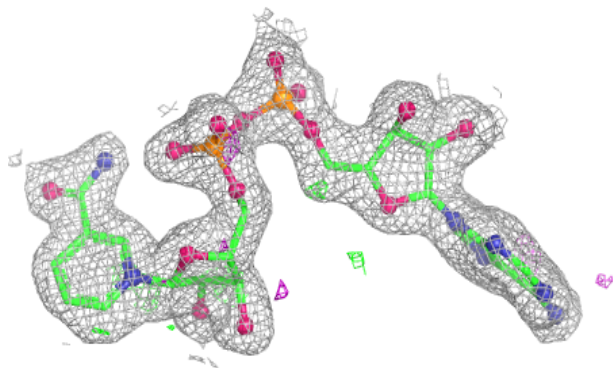
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	GOL	D	301	6/6	0.79	0.16	31,41,42,45	0
2	GOL	C	302	6/6	0.87	0.14	22,27,35,36	0
2	GOL	B	302	6/6	0.88	0.12	21,24,36,45	0
2	GOL	C	301	6/6	0.88	0.10	32,41,42,46	0
2	GOL	B	303	6/6	0.89	0.11	22,26,33,36	0
2	GOL	A	301	6/6	0.89	0.14	26,31,35,39	0
2	GOL	D	302	6/6	0.90	0.10	18,22,25,28	0
3	NAI	A	302	44/44	0.94	0.08	26,32,35,39	0
2	GOL	B	301	6/6	0.95	0.07	22,26,27,34	0
3	NAI	C	303	44/44	0.97	0.06	20,25,30,34	0
3	NAI	B	304	44/44	0.98	0.04	16,19,21,22	0
3	NAI	D	303	44/44	0.98	0.04	16,18,19,20	0
4	CL	B	305	1/1	0.99	0.03	21,21,21,21	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.

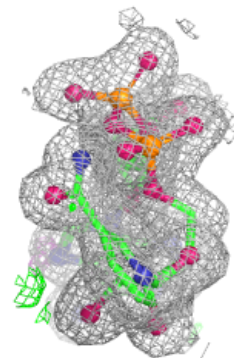
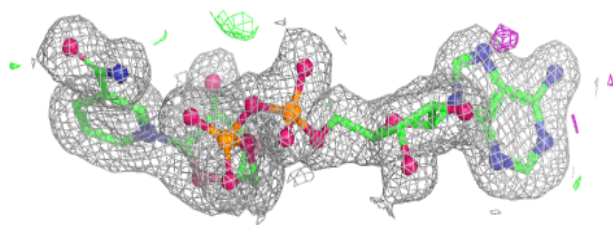
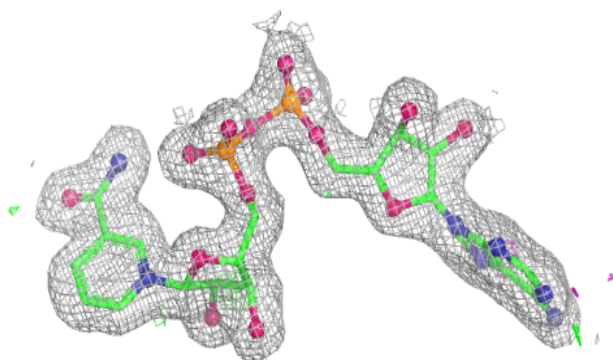


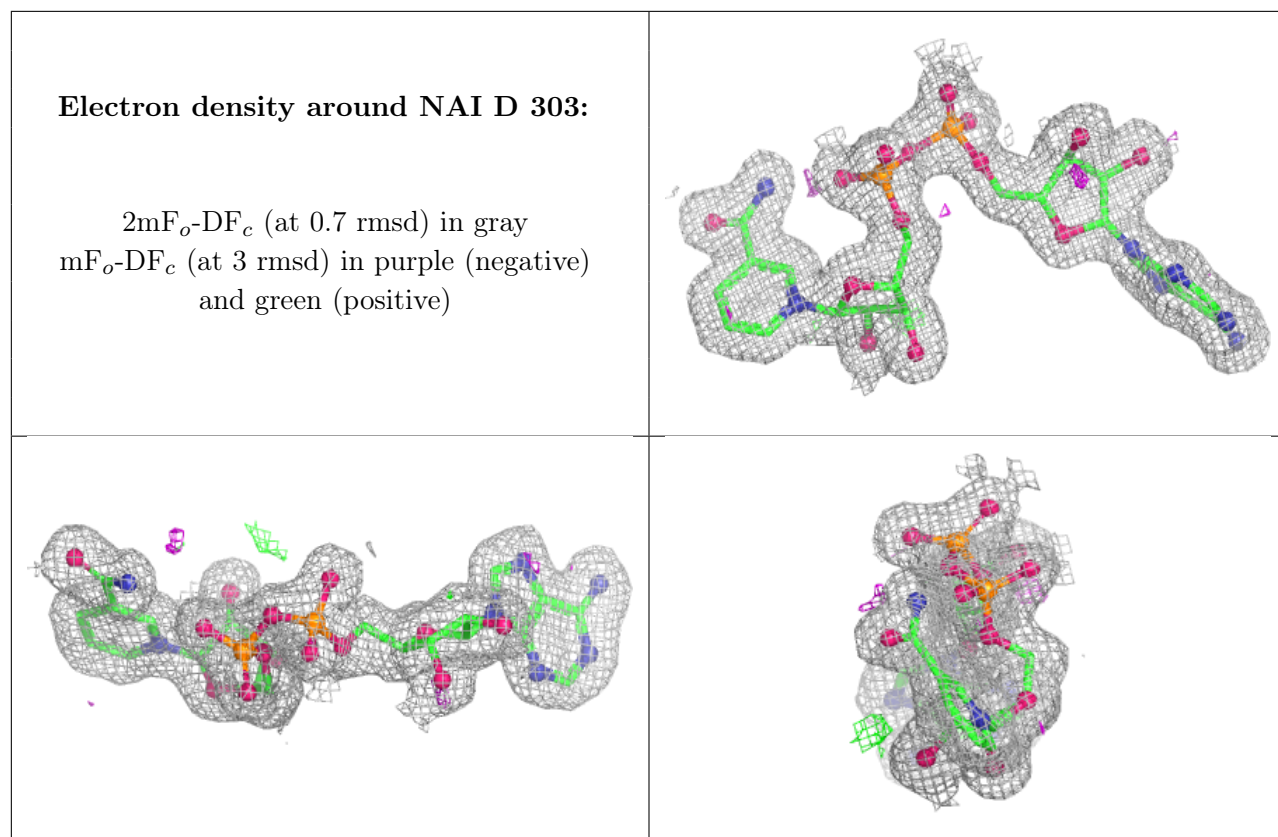
Electron density around NAI C 303:

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

**Electron density around NAI B 304:**

$2mF_o-DF_c$ (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.