



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 16, 2023 – 10:09 AM JST

PDB ID : 6LK2
Title : Crystal structure of *Providencia alcalifaciens* 3-dehydroquinase synthase (DHQS) in complex with Mg²⁺, NAD and chlorogenic acid
Authors : Neetu, N.; Katiki, M.; Kumar, P.
Deposited on : 2019-12-17
Resolution : 2.50 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 : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

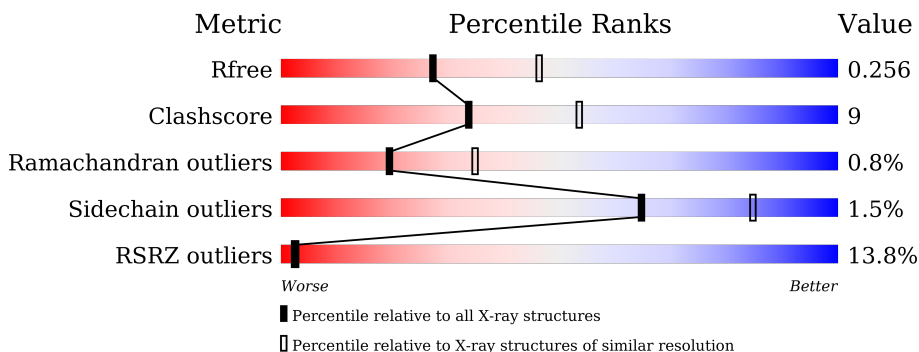
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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	375	 2% 83% 12% • 5%
1	B	375	 3% 84% 11% 5%
1	C	375	 21% 70% 21% • 8%
1	D	375	 25% 65% 23% • 10%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	7LH	C	403	-	-	-	X
4	7LH	D	403	-	-	-	X
6	PEG	B	405	-	-	-	X

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 11335 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 3-dehydroquinate synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	357	2719	1729	460	511	19	0	0	0
1	B	358	2731	1737	462	514	18	0	0	0
1	C	344	2629	1676	441	495	17	0	0	0
1	D	338	2585	1647	434	488	16	0	0	0

There are 52 discrepancies between the modelled and reference sequences:

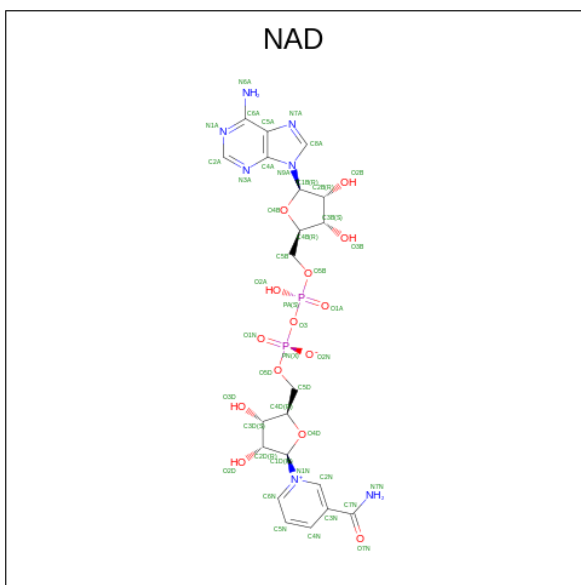
Chain	Residue	Modelled	Actual	Comment	Reference
A	-12	HIS	-	expression tag	UNP X6Q997
A	-11	HIS	-	expression tag	UNP X6Q997
A	-10	HIS	-	expression tag	UNP X6Q997
A	-9	HIS	-	expression tag	UNP X6Q997
A	-8	HIS	-	expression tag	UNP X6Q997
A	-7	HIS	-	expression tag	UNP X6Q997
A	-6	GLU	-	expression tag	UNP X6Q997
A	-5	ASN	-	expression tag	UNP X6Q997
A	-4	LEU	-	expression tag	UNP X6Q997
A	-3	TYR	-	expression tag	UNP X6Q997
A	-2	PHE	-	expression tag	UNP X6Q997
A	-1	GLN	-	expression tag	UNP X6Q997
A	0	GLY	-	expression tag	UNP X6Q997
B	-12	HIS	-	expression tag	UNP X6Q997
B	-11	HIS	-	expression tag	UNP X6Q997
B	-10	HIS	-	expression tag	UNP X6Q997
B	-9	HIS	-	expression tag	UNP X6Q997
B	-8	HIS	-	expression tag	UNP X6Q997
B	-7	HIS	-	expression tag	UNP X6Q997
B	-6	GLU	-	expression tag	UNP X6Q997
B	-5	ASN	-	expression tag	UNP X6Q997

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-4	LEU	-	expression tag	UNP X6Q997
B	-3	TYR	-	expression tag	UNP X6Q997
B	-2	PHE	-	expression tag	UNP X6Q997
B	-1	GLN	-	expression tag	UNP X6Q997
B	0	GLY	-	expression tag	UNP X6Q997
C	-12	HIS	-	expression tag	UNP X6Q997
C	-11	HIS	-	expression tag	UNP X6Q997
C	-10	HIS	-	expression tag	UNP X6Q997
C	-9	HIS	-	expression tag	UNP X6Q997
C	-8	HIS	-	expression tag	UNP X6Q997
C	-7	HIS	-	expression tag	UNP X6Q997
C	-6	GLU	-	expression tag	UNP X6Q997
C	-5	ASN	-	expression tag	UNP X6Q997
C	-4	LEU	-	expression tag	UNP X6Q997
C	-3	TYR	-	expression tag	UNP X6Q997
C	-2	PHE	-	expression tag	UNP X6Q997
C	-1	GLN	-	expression tag	UNP X6Q997
C	0	GLY	-	expression tag	UNP X6Q997
D	-12	HIS	-	expression tag	UNP X6Q997
D	-11	HIS	-	expression tag	UNP X6Q997
D	-10	HIS	-	expression tag	UNP X6Q997
D	-9	HIS	-	expression tag	UNP X6Q997
D	-8	HIS	-	expression tag	UNP X6Q997
D	-7	HIS	-	expression tag	UNP X6Q997
D	-6	GLU	-	expression tag	UNP X6Q997
D	-5	ASN	-	expression tag	UNP X6Q997
D	-4	LEU	-	expression tag	UNP X6Q997
D	-3	TYR	-	expression tag	UNP X6Q997
D	-2	PHE	-	expression tag	UNP X6Q997
D	-1	GLN	-	expression tag	UNP X6Q997
D	0	GLY	-	expression tag	UNP X6Q997

- Molecule 2 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: C₂₁H₂₇N₇O₁₄P₂) (labeled as "Ligand of Interest" by depositor).

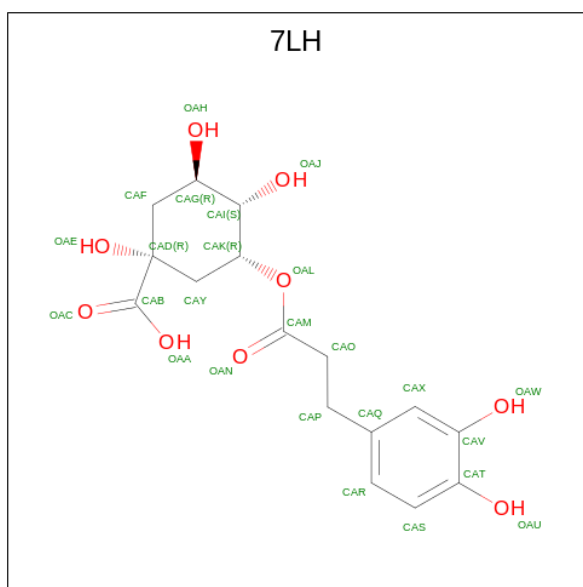


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	N	O			P
2	A	1	44	21	7	14	2	0	0
2	B	1	44	21	7	14	2	0	0
2	C	1	44	21	7	14	2	0	0
2	D	1	44	21	7	14	2	0	0

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

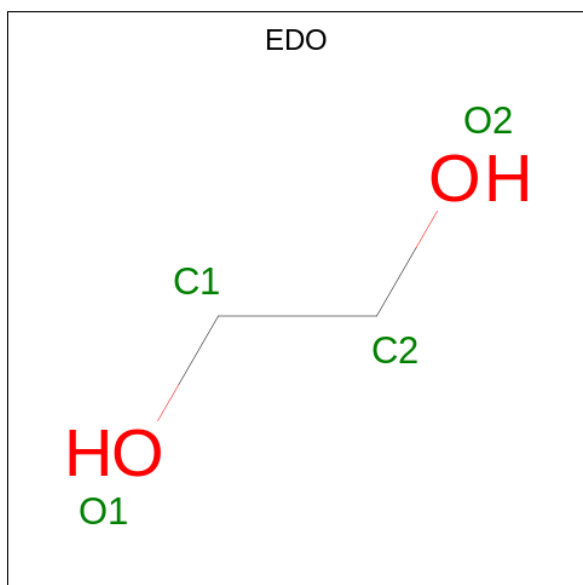
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
3	A	1	1	1	0	0
3	B	1	1	1	0	0
3	C	1	1	1	0	0
3	D	1	1	1	0	0

- Molecule 4 is (1R,3R,4S,5R)-3-[3-[3,4-bis(oxidanyl)phenyl]propanoyloxy]-1,4,5-tris(oxidanyl)cyclohexane-1-carboxylic acid (three-letter code: 7LH) (formula: C₁₆H₂₀O₉) (labeled as "Ligand of Interest" by depositor).



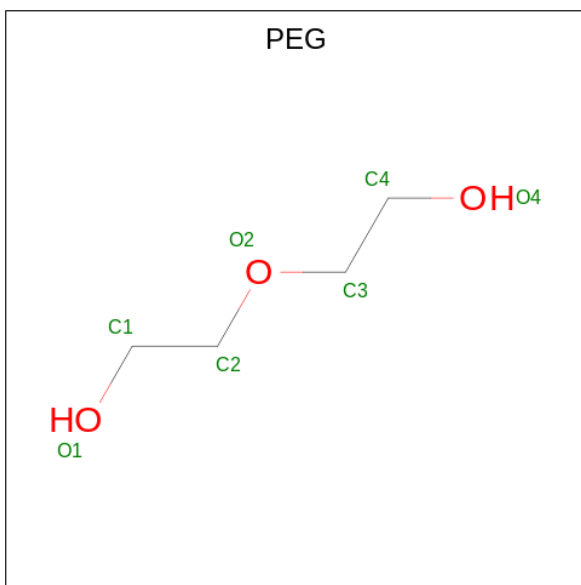
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	C O	0	0
			25	16 9		
4	B	1	Total	C O	0	0
			25	16 9		
4	C	1	Total	C O	0	0
			25	16 9		
4	D	1	Total	C O	0	0
			25	16 9		

- Molecule 5 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).



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

- Molecule 6 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: C₄H₁₀O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	B	1	Total	C	O	0	0
			7	4	3		


- Molecule 7 is water.

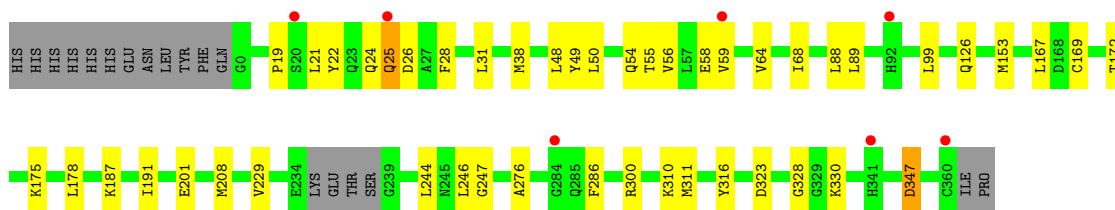
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	150	Total	O	0	0
			150	150		
7	B	138	Total	O	0	0
			138	138		
7	C	51	Total	O	0	0
			51	51		
7	D	29	Total	O	0	0
			29	29		

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.

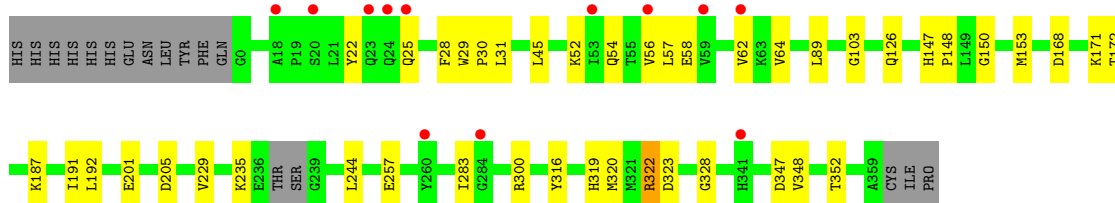
- Molecule 1: 3-dehydroquinate synthase

Chain A: 



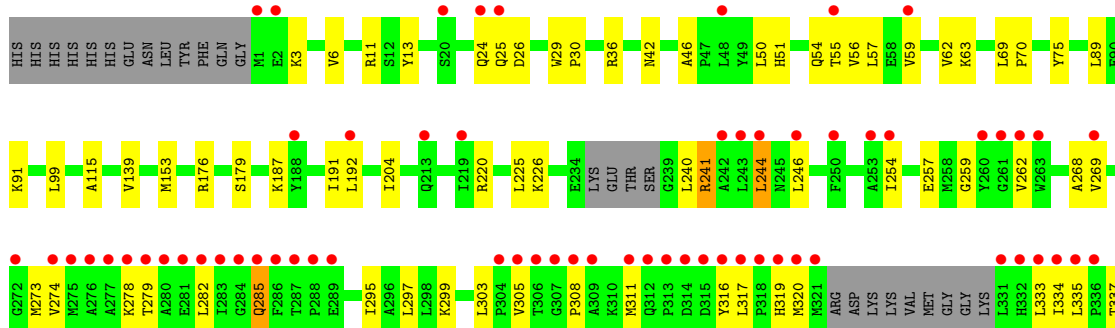
- Molecule 1: 3-dehydroquinate synthase

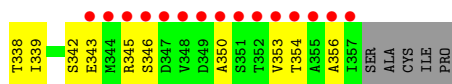
Chain B: 



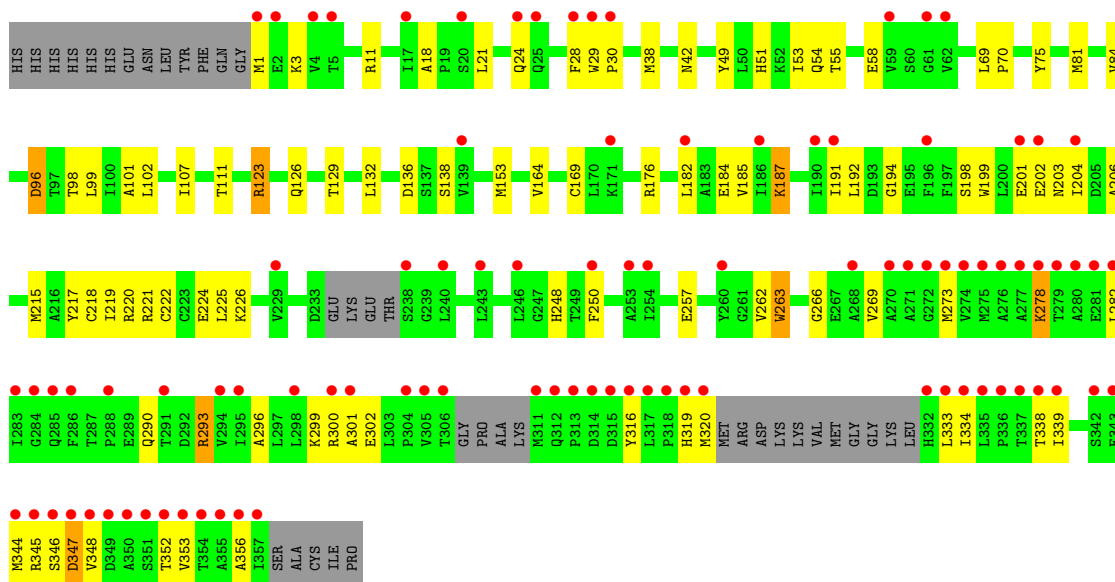
- Molecule 1: 3-dehydroquinate synthase

Chain C: 





● Molecule 1: 3-dehydroquinate synthase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	89.64Å 60.83Å 143.07Å 90.00° 93.75° 90.00°	Depositor
Resolution (Å)	47.59 – 2.50 48.00 – 2.50	Depositor EDS
% Data completeness (in resolution range)	98.7 (47.59-2.50) 98.7 (48.00-2.50)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.60 (at 2.51Å)	Xtrriage
Refinement program	PHENIX 1.11.1_2575	Depositor
R, R_{free}	0.205 , 0.255 0.208 , 0.256	Depositor DCC
R_{free} test set	2679 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å ²)	58.8	Xtrriage
Anisotropy	0.374	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 55.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	11335	wwPDB-VP
Average B, all atoms (Å ²)	69.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.08% 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: PEG, MG, NAD, EDO, 7LH

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	0.35	0/2768	0.51	0/3754
1	B	0.26	0/2780	0.52	0/3769
1	C	0.26	0/2677	0.53	0/3635
1	D	0.32	0/2631	0.54	0/3572
All	All	0.30	0/10856	0.52	0/14730

There are no bond length outliers.

There are no bond angle outliers.

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	2719	0	2755	34	0
1	B	2731	0	2769	26	0
1	C	2629	0	2656	56	0
1	D	2585	0	2606	73	0
2	A	44	0	26	1	0
2	B	44	0	26	0	0
2	C	44	0	26	0	0
2	D	44	0	26	0	0
3	A	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	25	0	0	0	0
4	B	25	0	0	0	0
4	C	25	0	0	0	0
4	D	25	0	0	2	0
5	A	12	0	18	3	0
5	B	4	0	6	0	0
6	B	7	0	10	0	0
7	A	150	0	0	2	0
7	B	138	0	0	5	0
7	C	51	0	0	1	0
7	D	29	0	0	2	0
All	All	11335	0	10924	187	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 9.

All (187) 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:278:LYS:NZ	1:D:356:ALA:HA	1.62	1.13
1:D:278:LYS:HZ2	1:D:356:ALA:HA	0.99	1.11
1:D:201:GLU:HB3	1:D:293:ARG:HH12	1.20	1.03
1:D:201:GLU:CB	1:D:293:ARG:HH12	1.77	0.98
1:D:81:MET:O	1:D:84:VAL:HG12	1.75	0.85
1:C:139:VAL:HG13	1:C:226:LYS:HD3	1.59	0.82
1:D:198:SER:HA	1:D:293:ARG:NH2	1.95	0.81
1:D:201:GLU:CB	1:D:293:ARG:NH1	2.45	0.79
1:C:192:LEU:HD13	1:C:225:LEU:HD22	1.66	0.78
1:C:335:LEU:HD13	1:C:345:ARG:HG3	1.68	0.75
1:D:201:GLU:O	1:D:201:GLU:HG3	1.90	0.72
1:D:282:LEU:HD12	1:D:352:THR:HG23	1.72	0.71
1:B:150:GLY:HA3	1:B:153:MET:HE1	1.74	0.70
1:D:185:VAL:HG23	1:D:222:CYS:SG	2.31	0.69
1:A:310:LYS:H	1:A:310:LYS:HD2	1.58	0.68
1:C:246:LEU:HD23	1:C:273:MET:HE2	1.76	0.68
1:D:333:LEU:HD12	1:D:334:ILE:H	1.59	0.67
1:D:198:SER:HA	1:D:293:ARG:HH22	1.57	0.67
1:C:254:ILE:HD12	1:C:311:MET:HE3	1.75	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:187:LYS:HA	1:C:273:MET:HE1	1.80	0.64
1:C:191:ILE:CD1	1:C:192:LEU:HG	2.28	0.63
1:D:296:ALA:O	1:D:300:ARG:HG3	1.99	0.63
1:D:21:LEU:HD22	1:D:164:VAL:HG13	1.81	0.62
1:D:54:GLN:O	1:D:58:GLU:HG3	2.00	0.61
1:C:295:ILE:HG23	1:C:305:VAL:HG11	1.82	0.60
1:B:45:LEU:HD13	1:B:103:GLY:HA2	1.84	0.60
1:B:201:GLU:O	1:B:300:ARG:NH2	2.35	0.60
1:B:257:GLU:HG2	1:B:319:HIS:NE2	2.17	0.59
1:D:176:ARG:NH2	1:D:262:VAL:O	2.34	0.59
1:A:201:GLU:O	1:A:300:ARG:NH2	2.35	0.58
1:C:254:ILE:HG23	1:C:268:ALA:HB1	1.86	0.58
1:D:248:HIS:NE2	4:D:403:7LH:OAH	2.36	0.58
1:C:191:ILE:HD12	1:C:192:LEU:HG	1.84	0.57
1:B:89:LEU:HD21	1:D:153:MET:HE2	1.86	0.56
1:B:168:ASP:O	1:B:171:LYS:HG2	2.06	0.56
1:D:278:LYS:HD3	1:D:356:ALA:O	2.05	0.56
1:C:269:VAL:O	1:C:273:MET:HG3	2.06	0.56
1:A:48:LEU:HD13	1:A:172:THR:HG21	1.87	0.55
1:C:11:ARG:NH2	7:C:503:HOH:O	2.39	0.55
1:D:11:ARG:HH11	1:D:11:ARG:HA	1.70	0.55
1:A:24:GLN:O	7:A:501:HOH:O	2.18	0.55
1:B:28:PHE:O	1:B:31:LEU:HB2	2.06	0.55
1:D:194:GLY:HA2	1:D:339:ILE:HG22	1.89	0.55
1:D:201:GLU:HB2	1:D:293:ARG:NH1	2.20	0.55
1:C:274:VAL:O	1:C:278:LYS:HG3	2.06	0.55
1:A:55:THR:O	1:A:59:VAL:HG23	2.07	0.54
1:C:257:GLU:HG2	1:C:319:HIS:NE2	2.23	0.54
1:C:254:ILE:CD1	1:C:311:MET:HE3	2.37	0.53
1:D:185:VAL:HG21	1:D:218:CYS:SG	2.48	0.53
1:D:300:ARG:C	1:D:302:GLU:H	2.11	0.53
1:A:310:LYS:H	1:A:310:LYS:CD	2.21	0.53
1:D:187:LYS:O	1:D:191:ILE:HG12	2.09	0.53
1:C:36:ARG:HH11	1:C:36:ARG:HG2	1.74	0.53
1:C:176:ARG:NH2	1:C:262:VAL:O	2.32	0.52
1:B:205:ASP:OD1	7:B:501:HOH:O	2.18	0.52
1:B:283:ILE:HD11	1:B:352:THR:HG21	1.91	0.52
1:D:221:ARG:O	1:D:225:LEU:HD23	2.10	0.52
1:A:276:ALA:HB2	5:A:405:EDO:H22	1.91	0.52
1:A:54:GLN:O	1:A:58:GLU:HG3	2.09	0.52
1:D:29:TRP:CG	1:D:30:PRO:HA	2.45	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:247:GLY:N	5:A:405:EDO:H11	2.26	0.51
1:D:98:THR:OG1	1:D:123:ARG:HG3	2.10	0.51
1:A:153:MET:HE2	1:C:89:LEU:HD21	1.92	0.51
1:A:126:GLN:OE1	7:A:502:HOH:O	2.19	0.51
1:C:295:ILE:O	1:C:299:LYS:HG3	2.10	0.51
1:D:257:GLU:HG2	1:D:319:HIS:NE2	2.26	0.51
1:B:54:GLN:HG3	1:B:64:VAL:HG11	1.94	0.50
1:D:182:LEU:HA	1:D:185:VAL:HG12	1.93	0.50
1:A:54:GLN:HG3	1:A:64:VAL:HG11	1.93	0.50
1:B:126:GLN:OE1	7:B:502:HOH:O	2.20	0.50
1:D:344:MET:SD	1:D:345:ARG:N	2.85	0.50
1:C:274:VAL:HG21	1:C:305:VAL:HG13	1.93	0.50
1:D:290:GLN:HE22	1:D:338:THR:HG23	1.76	0.50
1:C:191:ILE:HD12	1:C:192:LEU:CG	2.42	0.49
1:C:254:ILE:HD13	1:C:308:PRO:HD2	1.93	0.49
1:D:278:LYS:HZ3	1:D:356:ALA:HA	1.69	0.49
1:C:36:ARG:HH11	1:C:63:LYS:HD3	1.78	0.49
1:A:172:THR:HG22	2:A:401:NAD:H2A	1.93	0.49
1:C:338:THR:OG1	1:C:339:ILE:N	2.45	0.49
1:B:235:LYS:NZ	7:B:508:HOH:O	2.46	0.49
1:D:28:PHE:HD2	1:D:164:VAL:HG21	1.77	0.49
1:A:24:GLN:HG2	1:A:25:GLN:OE1	2.13	0.48
1:D:300:ARG:O	1:D:302:GLU:N	2.45	0.48
1:C:241:ARG:O	1:C:244:LEU:HD12	2.12	0.48
1:D:217:TYR:HD1	1:D:220:ARG:CZ	2.25	0.48
1:C:36:ARG:NH2	1:C:91:LYS:O	2.46	0.48
1:D:338:THR:HG22	1:D:339:ILE:H	1.78	0.48
1:A:175:LYS:NZ	1:A:178:LEU:HD23	2.29	0.48
1:A:229:VAL:HG11	1:A:244:LEU:HD21	1.95	0.48
1:C:278:LYS:O	1:C:282:LEU:HG	2.13	0.48
1:C:70:PRO:HB2	1:C:75:TYR:CE2	2.49	0.48
1:D:70:PRO:HB2	1:D:75:TYR:CE2	2.48	0.48
1:D:346:SER:O	1:D:347:ASP:HB2	2.13	0.48
1:B:54:GLN:O	1:B:58:GLU:HG3	2.13	0.47
1:C:317:LEU:HD11	1:C:354:THR:HG22	1.96	0.47
1:D:262:VAL:HG13	1:D:263:TRP:H	1.79	0.47
1:A:38:MET:HB3	1:A:99:LEU:HD23	1.97	0.47
1:A:21:LEU:HD12	1:A:21:LEU:O	2.14	0.47
1:B:22:TYR:O	1:B:56:VAL:HG21	2.15	0.47
1:D:199:TRP:CH2	1:D:217:TYR:HD2	2.33	0.47
1:A:28:PHE:O	1:A:31:LEU:HB2	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:350:ALA:O	1:C:353:VAL:HG12	2.15	0.46
1:A:175:LYS:NZ	1:A:208:MET:SD	2.80	0.46
1:C:333:LEU:HD12	1:C:334:ILE:H	1.79	0.46
1:D:53:ILE:HD12	1:D:102:LEU:HD13	1.97	0.46
1:C:6:VAL:HG21	1:C:13:TYR:CZ	2.51	0.46
1:D:28:PHE:CD2	1:D:164:VAL:HG21	2.50	0.46
1:A:175:LYS:HZ2	1:A:178:LEU:HD23	1.79	0.46
1:C:179:SER:O	1:C:303:LEU:HD21	2.16	0.46
1:D:49:TYR:OH	1:D:169:CYS:HA	2.16	0.46
1:D:136:ASP:O	1:D:226:LYS:NZ	2.42	0.46
1:A:50:LEU:HD22	1:A:68:ILE:HD11	1.97	0.45
1:B:57:LEU:O	1:B:62:VAL:HG22	2.16	0.45
1:C:24:GLN:HE21	1:C:26:ASP:H	1.63	0.45
1:B:300:ARG:HD2	7:B:501:HOH:O	2.16	0.45
1:C:99:LEU:HD12	1:C:115:ALA:HB2	1.96	0.45
1:C:316:TYR:HB3	1:C:320:MET:HE2	1.99	0.45
1:D:221:ARG:HG3	1:D:225:LEU:HD23	1.98	0.45
1:A:187:LYS:O	1:A:191:ILE:HG12	2.15	0.45
1:C:51:HIS:O	1:C:55:THR:OG1	2.24	0.45
1:C:254:ILE:CG2	1:C:268:ALA:HB1	2.46	0.45
1:C:57:LEU:HB3	1:C:62:VAL:CG2	2.47	0.45
1:A:330:LYS:HG2	1:A:347:ASP:OD1	2.16	0.45
1:B:187:LYS:O	1:B:191:ILE:HG12	2.17	0.45
1:D:191:ILE:HG13	1:D:192:LEU:HG	1.97	0.45
1:D:269:VAL:O	1:D:273:MET:HG3	2.17	0.45
1:D:101:ALA:HB2	1:D:111:THR:HB	1.99	0.45
1:A:24:GLN:NE2	1:A:26:ASP:H	2.15	0.44
1:A:19:PRO:HD3	1:A:167:LEU:HD12	2.00	0.44
1:A:323:ASP:OD2	1:A:328:GLY:HA3	2.18	0.44
1:D:126:GLN:OE1	1:D:138:SER:HA	2.17	0.44
1:C:204:ILE:HD12	1:C:297:LEU:HD12	1.99	0.44
1:D:42:ASN:HA	1:D:69:LEU:O	2.18	0.44
1:D:70:PRO:HB2	1:D:75:TYR:CZ	2.52	0.44
1:C:29:TRP:CG	1:C:30:PRO:HA	2.52	0.44
1:C:56:VAL:O	1:C:59:VAL:HG12	2.18	0.43
1:D:300:ARG:C	1:D:302:GLU:N	2.72	0.43
1:D:184:GLU:OE1	7:D:501:HOH:O	2.21	0.43
1:A:89:LEU:HD21	1:C:153:MET:HE2	2.00	0.43
1:B:172:THR:O	7:B:503:HOH:O	2.20	0.43
1:A:247:GLY:H	5:A:405:EDO:H11	1.83	0.43
1:C:50:LEU:O	1:C:51:HIS:HB3	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:191:ILE:HA	1:C:342:SER:HB2	2.00	0.43
1:C:279:THR:HG23	1:C:356:ALA:HB2	2.01	0.43
1:D:220:ARG:O	1:D:224:GLU:HG3	2.18	0.43
1:A:22:TYR:O	1:A:56:VAL:HG11	2.19	0.43
1:C:46:ALA:O	1:C:50:LEU:HB3	2.19	0.43
1:C:70:PRO:HB2	1:C:75:TYR:CZ	2.54	0.42
1:D:250:PHE:CZ	1:D:353:VAL:HG13	2.55	0.42
1:B:147:HIS:CG	1:B:148:PRO:HD2	2.54	0.42
1:C:246:LEU:HD23	1:C:273:MET:CE	2.48	0.42
1:C:285:GLN:HG3	1:C:285:GLN:O	2.19	0.42
1:D:203:ASN:O	1:D:206:ALA:N	2.53	0.42
1:B:52:LYS:HE3	1:B:52:LYS:HB2	1.69	0.42
1:B:323:ASP:OD2	1:B:328:GLY:HA3	2.19	0.42
1:B:29:TRP:CG	1:B:30:PRO:HA	2.54	0.42
1:D:30:PRO:HG2	1:D:123:ARG:NH2	2.34	0.42
4:D:403:7LH:CAI	7:D:501:HOH:O	2.63	0.42
1:C:259:GLY:O	1:C:262:VAL:HG22	2.20	0.42
1:A:191:ILE:HG23	1:A:246:LEU:HD22	2.02	0.41
1:A:311:MET:HE1	1:A:316:TYR:CE1	2.55	0.41
1:B:316:TYR:O	1:B:320:MET:HG3	2.20	0.41
1:D:96:ASP:N	1:D:96:ASP:OD1	2.53	0.41
1:D:182:LEU:HD23	1:D:185:VAL:HG11	2.01	0.41
1:D:215:MET:O	1:D:219:ILE:HG12	2.21	0.41
1:D:266:GLY:HA2	1:D:269:VAL:HG12	2.03	0.41
1:C:191:ILE:CG2	1:C:246:LEU:HD22	2.50	0.41
1:C:337:THR:HG21	1:C:343:GLU:HG3	2.03	0.41
1:C:42:ASN:HA	1:C:69:LEU:O	2.21	0.41
1:D:51:HIS:O	1:D:55:THR:HG23	2.19	0.41
1:D:203:ASN:O	1:D:204:ILE:C	2.55	0.41
1:A:88:LEU:HD21	1:A:99:LEU:HD21	2.03	0.41
1:C:51:HIS:HA	1:C:54:GLN:HB3	2.03	0.41
1:D:28:PHE:CE1	1:D:53:ILE:HG23	2.55	0.41
1:D:38:MET:HB3	1:D:99:LEU:HD23	2.03	0.41
1:D:217:TYR:HD1	1:D:220:ARG:NH2	2.19	0.41
1:B:191:ILE:HG13	1:B:192:LEU:HG	2.03	0.41
1:B:229:VAL:HG21	1:B:244:LEU:HD21	2.03	0.41
1:B:322:ARG:NH1	1:B:323:ASP:OD1	2.45	0.41
1:C:316:TYR:HB3	1:C:320:MET:CE	2.51	0.41
1:D:42:ASN:HB3	1:D:107:ILE:HD11	2.01	0.41
1:D:345:ARG:HG2	1:D:348:VAL:HG22	2.02	0.41
1:A:49:TYR:OH	1:A:169:CYS:HA	2.21	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:129:THR:HA	1:D:169:CYS:SG	2.61	0.40
1:D:1:MET:HA	1:D:18:ALA:HB2	2.04	0.40
1:D:316:TYR:O	1:D:320:MET:HG2	2.21	0.40
1:D:338:THR:HG22	1:D:339:ILE:N	2.37	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	353/375 (94%)	343 (97%)	8 (2%)	2 (1%)	25	43
1	B	354/375 (94%)	342 (97%)	9 (2%)	3 (1%)	19	35
1	C	338/375 (90%)	323 (96%)	11 (3%)	4 (1%)	13	24
1	D	330/375 (88%)	320 (97%)	8 (2%)	2 (1%)	25	43
All	All	1375/1500 (92%)	1328 (97%)	36 (3%)	11 (1%)	19	35

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	25	GLN
1	C	240	LEU
1	C	346	SER
1	A	25	GLN
1	B	347	ASP
1	A	347	ASP
1	D	301	ALA
1	D	347	ASP
1	B	348	VAL
1	C	25	GLN
1	C	241	ARG

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	291/309 (94%)	290 (100%)	1 (0%)	92	97
1	B	292/309 (94%)	291 (100%)	1 (0%)	92	97
1	C	282/309 (91%)	278 (99%)	4 (1%)	67	86
1	D	278/309 (90%)	267 (96%)	11 (4%)	31	56
All	All	1143/1236 (92%)	1126 (98%)	17 (2%)	65	85

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	286	PHE
1	B	322	ARG
1	C	3	LYS
1	C	220	ARG
1	C	244	LEU
1	C	285	GLN
1	D	3	LYS
1	D	24	GLN
1	D	96	ASP
1	D	123	ARG
1	D	132	LEU
1	D	187	LYS
1	D	202	GLU
1	D	263	TRP
1	D	278	LYS
1	D	293	ARG
1	D	299	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	24	GLN
1	A	341	HIS

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Mol	Chain	Res	Type
1	B	341	HIS
1	C	24	GLN
1	D	23	GLN
1	D	51	HIS
1	D	245	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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 17 ligands modelled in this entry, 4 are monoatomic - leaving 13 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	$\# Z > 2$
4	7LH	B	403	3	26,26,26	1.11	4 (15%)	35,38,38	1.59	5 (14%)
5	EDO	B	404	-	3,3,3	0.45	0	2,2,2	0.31	0
4	7LH	A	403	3	26,26,26	1.10	3 (11%)	35,38,38	1.43	4 (11%)
2	NAD	C	401	-	42,48,48	5.15	17 (40%)	50,73,73	1.98	7 (14%)
6	PEG	B	405	-	6,6,6	0.48	0	5,5,5	0.30	0
2	NAD	D	401	-	42,48,48	5.16	17 (40%)	50,73,73	2.03	8 (16%)
2	NAD	A	401	-	42,48,48	5.13	18 (42%)	50,73,73	1.99	7 (14%)
5	EDO	A	405	-	3,3,3	0.42	0	2,2,2	0.37	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	7LH	C	403	3	26,26,26	1.11	4 (15%)	35,38,38	1.39	3 (8%)
4	7LH	D	403	3	26,26,26	1.23	3 (11%)	35,38,38	3.09	10 (28%)
5	EDO	A	406	-	3,3,3	0.43	0	2,2,2	0.35	0
2	NAD	B	401	-	42,48,48	5.16	17 (40%)	50,73,73	2.05	9 (18%)
5	EDO	A	404	-	3,3,3	0.44	0	2,2,2	0.35	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
4	7LH	B	403	3	-	6/15/33/33	0/2/2/2
5	EDO	B	404	-	-	1/1/1/1	-
4	7LH	A	403	3	-	6/15/33/33	0/2/2/2
2	NAD	C	401	-	-	12/26/62/62	0/5/5/5
6	PEG	B	405	-	-	3/4/4/4	-
2	NAD	D	401	-	-	12/26/62/62	0/5/5/5
2	NAD	A	401	-	-	10/26/62/62	0/5/5/5
5	EDO	A	405	-	-	1/1/1/1	-
4	7LH	C	403	3	-	3/15/33/33	0/2/2/2
4	7LH	D	403	3	-	4/15/33/33	0/2/2/2
5	EDO	A	406	-	-	0/1/1/1	-
2	NAD	B	401	-	-	9/26/62/62	0/5/5/5
5	EDO	A	404	-	-	0/1/1/1	-

All (83) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	401	NAD	C2B-C1B	-15.25	1.30	1.53
2	B	401	NAD	C2B-C1B	-15.23	1.30	1.53
2	C	401	NAD	C2B-C1B	-15.21	1.30	1.53
2	A	401	NAD	O4B-C1B	15.09	1.62	1.41
2	A	401	NAD	C2B-C1B	-15.09	1.30	1.53
2	D	401	NAD	O4B-C1B	15.04	1.62	1.41
2	C	401	NAD	O4B-C1B	15.04	1.62	1.41
2	B	401	NAD	O4B-C1B	15.03	1.62	1.41
2	D	401	NAD	O4D-C1D	14.51	1.61	1.41
2	B	401	NAD	C2D-C1D	-14.48	1.31	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	401	NAD	O4D-C1D	14.44	1.61	1.41
2	C	401	NAD	C2D-C1D	-14.33	1.32	1.53
2	C	401	NAD	O4D-C1D	14.29	1.61	1.41
2	A	401	NAD	C2D-C1D	-14.24	1.32	1.53
2	D	401	NAD	C2D-C1D	-14.18	1.32	1.53
2	B	401	NAD	O4D-C1D	14.04	1.60	1.41
2	B	401	NAD	C7N-N7N	7.14	1.46	1.33
2	C	401	NAD	C7N-N7N	7.11	1.46	1.33
2	D	401	NAD	C7N-N7N	7.10	1.46	1.33
2	A	401	NAD	C7N-N7N	6.98	1.46	1.33
2	B	401	NAD	O4D-C4D	-6.44	1.30	1.45
2	C	401	NAD	O4D-C4D	-6.37	1.30	1.45
2	D	401	NAD	O4D-C4D	-6.35	1.30	1.45
2	D	401	NAD	O4B-C4B	-5.80	1.32	1.45
2	B	401	NAD	O4B-C4B	-5.76	1.32	1.45
2	C	401	NAD	O4B-C4B	-5.74	1.32	1.45
2	A	401	NAD	O4D-C4D	-5.72	1.32	1.45
2	A	401	NAD	O4B-C4B	-5.59	1.32	1.45
2	B	401	NAD	O7N-C7N	-4.34	1.15	1.24
2	A	401	NAD	O7N-C7N	-4.33	1.15	1.24
2	C	401	NAD	O7N-C7N	-4.31	1.15	1.24
2	D	401	NAD	O7N-C7N	-4.26	1.16	1.24
2	B	401	NAD	O2D-C2D	3.77	1.51	1.43
2	B	401	NAD	C3N-C7N	3.74	1.56	1.50
2	D	401	NAD	O2D-C2D	3.61	1.51	1.43
2	A	401	NAD	C3N-C7N	3.57	1.55	1.50
2	C	401	NAD	O2D-C2D	3.55	1.51	1.43
2	D	401	NAD	C3N-C7N	3.54	1.55	1.50
2	C	401	NAD	C3N-C7N	3.51	1.55	1.50
2	A	401	NAD	C4N-C3N	-3.32	1.33	1.39
2	C	401	NAD	C6A-N6A	3.17	1.45	1.34
2	B	401	NAD	C4N-C3N	-3.16	1.33	1.39
2	D	401	NAD	C4N-C3N	-3.15	1.33	1.39
2	C	401	NAD	C4N-C3N	-3.14	1.33	1.39
2	D	401	NAD	C6A-N6A	3.11	1.45	1.34
2	B	401	NAD	C6A-N6A	3.09	1.45	1.34
2	A	401	NAD	C6A-N6A	3.07	1.45	1.34
2	A	401	NAD	O2D-C2D	3.03	1.50	1.43
4	B	403	7LH	OAL-CAK	-3.00	1.41	1.46
4	A	403	7LH	OAL-CAK	-2.98	1.41	1.46
2	B	401	NAD	C5A-C4A	-2.97	1.33	1.40
4	C	403	7LH	OAL-CAK	-2.93	1.41	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	401	NAD	C5A-C4A	-2.92	1.33	1.40
2	D	401	NAD	O2B-C2B	2.89	1.49	1.43
2	A	401	NAD	O2B-C2B	2.85	1.49	1.43
2	B	401	NAD	O2B-C2B	2.85	1.49	1.43
2	A	401	NAD	C5A-C4A	-2.84	1.33	1.40
2	C	401	NAD	O2B-C2B	2.82	1.49	1.43
2	C	401	NAD	C5A-C4A	-2.79	1.33	1.40
2	C	401	NAD	C2A-N3A	2.75	1.36	1.32
4	D	403	7LH	OAL-CAM	2.75	1.42	1.34
2	D	401	NAD	C2A-N3A	2.66	1.36	1.32
2	A	401	NAD	C2A-N3A	2.65	1.36	1.32
2	A	401	NAD	O3D-C3D	-2.52	1.37	1.43
2	B	401	NAD	C2A-N3A	2.50	1.36	1.32
4	D	403	7LH	OAL-CAK	-2.42	1.42	1.46
2	D	401	NAD	O3B-C3B	-2.41	1.37	1.43
2	C	401	NAD	O3B-C3B	-2.39	1.37	1.43
2	A	401	NAD	O3B-C3B	-2.37	1.37	1.43
2	A	401	NAD	C5D-C4D	2.34	1.58	1.51
2	B	401	NAD	O3B-C3B	-2.32	1.37	1.43
4	C	403	7LH	OAL-CAM	2.19	1.40	1.34
2	B	401	NAD	O3D-C3D	-2.13	1.38	1.43
4	B	403	7LH	OAL-CAM	2.13	1.40	1.34
2	D	401	NAD	O3D-C3D	-2.11	1.38	1.43
4	A	403	7LH	OAL-CAM	2.09	1.40	1.34
4	A	403	7LH	OAU-CAT	2.08	1.40	1.36
2	C	401	NAD	O3D-C3D	-2.08	1.38	1.43
4	B	403	7LH	OAU-CAT	2.07	1.40	1.36
4	C	403	7LH	OAU-CAT	2.07	1.40	1.36
4	C	403	7LH	OAW-CAV	2.06	1.40	1.36
4	B	403	7LH	OAW-CAV	2.03	1.40	1.36
4	D	403	7LH	OAE-CAD	-2.01	1.39	1.43

All (53) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	403	7LH	CAG-CAI-CAK	-11.69	98.32	109.97
2	B	401	NAD	C5A-C6A-N6A	9.44	134.69	120.35
2	D	401	NAD	C5A-C6A-N6A	9.33	134.52	120.35
2	C	401	NAD	C5A-C6A-N6A	9.26	134.43	120.35
2	A	401	NAD	C5A-C6A-N6A	9.15	134.25	120.35
4	D	403	7LH	CAF-CAD-CAY	-7.88	105.67	110.72
2	B	401	NAD	N6A-C6A-N1A	-6.34	105.42	118.57

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	401	NAD	N6A-C6A-N1A	-6.28	105.55	118.57
2	A	401	NAD	N6A-C6A-N1A	-6.19	105.73	118.57
2	C	401	NAD	N6A-C6A-N1A	-6.17	105.76	118.57
4	B	403	7LH	CAF-CAD-CAY	5.77	114.41	110.72
4	D	403	7LH	OAA-CAB-CAD	5.73	123.00	113.05
2	B	401	NAD	N3A-C2A-N1A	-5.66	119.83	128.68
2	A	401	NAD	N3A-C2A-N1A	-5.63	119.89	128.68
2	D	401	NAD	N3A-C2A-N1A	-5.55	120.00	128.68
2	C	401	NAD	N3A-C2A-N1A	-5.51	120.06	128.68
4	D	403	7LH	OAL-CAM-CAO	4.93	122.13	111.50
4	A	403	7LH	CAF-CAD-CAY	4.32	113.49	110.72
4	B	403	7LH	OAA-CAB-CAD	4.26	120.45	113.05
4	D	403	7LH	OAJ-CAI-CAK	4.25	119.84	109.30
4	A	403	7LH	OAA-CAB-CAD	4.19	120.33	113.05
4	C	403	7LH	OAL-CAM-CAO	4.18	120.52	111.50
4	C	403	7LH	CAF-CAD-CAY	4.18	113.40	110.72
4	C	403	7LH	OAA-CAB-CAD	4.05	120.08	113.05
4	A	403	7LH	OAL-CAM-CAO	3.94	120.00	111.50
4	B	403	7LH	OAL-CAM-CAO	3.83	119.77	111.50
4	D	403	7LH	CAD-CAF-CAG	-3.47	106.17	112.54
4	D	403	7LH	CAF-CAD-CAB	2.72	115.92	109.96
2	D	401	NAD	PN-O3-PA	-2.63	123.80	132.83
4	D	403	7LH	OAA-CAB-OAC	-2.55	115.72	123.82
2	D	401	NAD	C3D-C2D-C1D	2.44	104.65	100.98
2	B	401	NAD	C3N-C7N-N7N	2.35	120.57	117.75
2	C	401	NAD	PN-O3-PA	-2.29	124.95	132.83
2	A	401	NAD	PN-O3-PA	-2.29	124.96	132.83
2	B	401	NAD	C3B-C2B-C1B	2.29	104.42	100.98
2	C	401	NAD	C3B-C2B-C1B	2.28	104.42	100.98
2	A	401	NAD	C3B-C2B-C1B	2.28	104.41	100.98
2	C	401	NAD	C3N-C7N-N7N	2.28	120.48	117.75
2	A	401	NAD	C3D-C2D-C1D	2.26	104.39	100.98
2	A	401	NAD	C6N-N1N-C2N	-2.26	119.92	121.97
2	B	401	NAD	PN-O3-PA	-2.24	125.14	132.83
2	B	401	NAD	O7N-C7N-N7N	-2.24	119.40	122.58
4	D	403	7LH	OAJ-CAI-CAG	2.24	114.28	109.99
4	A	403	7LH	CAK-OAL-CAM	-2.20	113.55	117.83
2	D	401	NAD	C3B-C2B-C1B	2.18	104.26	100.98
2	D	401	NAD	C6N-N1N-C2N	-2.13	120.03	121.97
4	B	403	7LH	CAK-OAL-CAM	-2.13	113.69	117.83
2	B	401	NAD	C6N-N1N-C2N	-2.11	120.05	121.97
4	B	403	7LH	OAC-CAB-CAD	-2.10	119.28	122.25

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	401	NAD	C3N-C7N-N7N	2.10	120.27	117.75
2	C	401	NAD	C3D-C2D-C1D	2.03	104.03	100.98
2	B	401	NAD	C3D-C2D-C1D	2.02	104.02	100.98
4	D	403	7LH	OAN-CAM-CAO	-2.01	115.87	123.73

There are no chirality outliers.

All (67) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	NAD	C5D-O5D-PN-O3
2	A	401	NAD	O4D-C1D-N1N-C6N
2	B	401	NAD	C5D-O5D-PN-O3
2	B	401	NAD	C5D-O5D-PN-O1N
2	B	401	NAD	O4D-C1D-N1N-C6N
2	C	401	NAD	O4D-C1D-N1N-C6N
2	D	401	NAD	C5B-O5B-PA-O1A
2	D	401	NAD	C5B-O5B-PA-O2A
2	D	401	NAD	O4D-C1D-N1N-C2N
2	D	401	NAD	O4D-C1D-N1N-C6N
2	D	401	NAD	C2D-C1D-N1N-C2N
2	D	401	NAD	C2D-C1D-N1N-C6N
4	C	403	7LH	CAO-CAM-OAL-CAK
4	C	403	7LH	OAN-CAM-OAL-CAK
4	D	403	7LH	CAM-CAO-CAP-CAQ
2	B	401	NAD	C3D-C4D-C5D-O5D
4	C	403	7LH	CAM-CAO-CAP-CAQ
2	A	401	NAD	O4D-C4D-C5D-O5D
2	A	401	NAD	C3D-C4D-C5D-O5D
2	B	401	NAD	O4D-C4D-C5D-O5D
6	B	405	PEG	O2-C3-C4-O4
2	C	401	NAD	C2N-C3N-C7N-O7N
2	C	401	NAD	O4B-C4B-C5B-O5B
2	C	401	NAD	C2N-C3N-C7N-N7N
2	C	401	NAD	C3B-C4B-C5B-O5B
2	B	401	NAD	PA-O3-PN-O1N
2	D	401	NAD	C3D-C4D-C5D-O5D
2	C	401	NAD	C4N-C3N-C7N-O7N
5	B	404	EDO	O1-C1-C2-O2
2	C	401	NAD	C4N-C3N-C7N-N7N
2	A	401	NAD	O4B-C4B-C5B-O5B
2	C	401	NAD	C3D-C4D-C5D-O5D
2	D	401	NAD	PA-O3-PN-O1N

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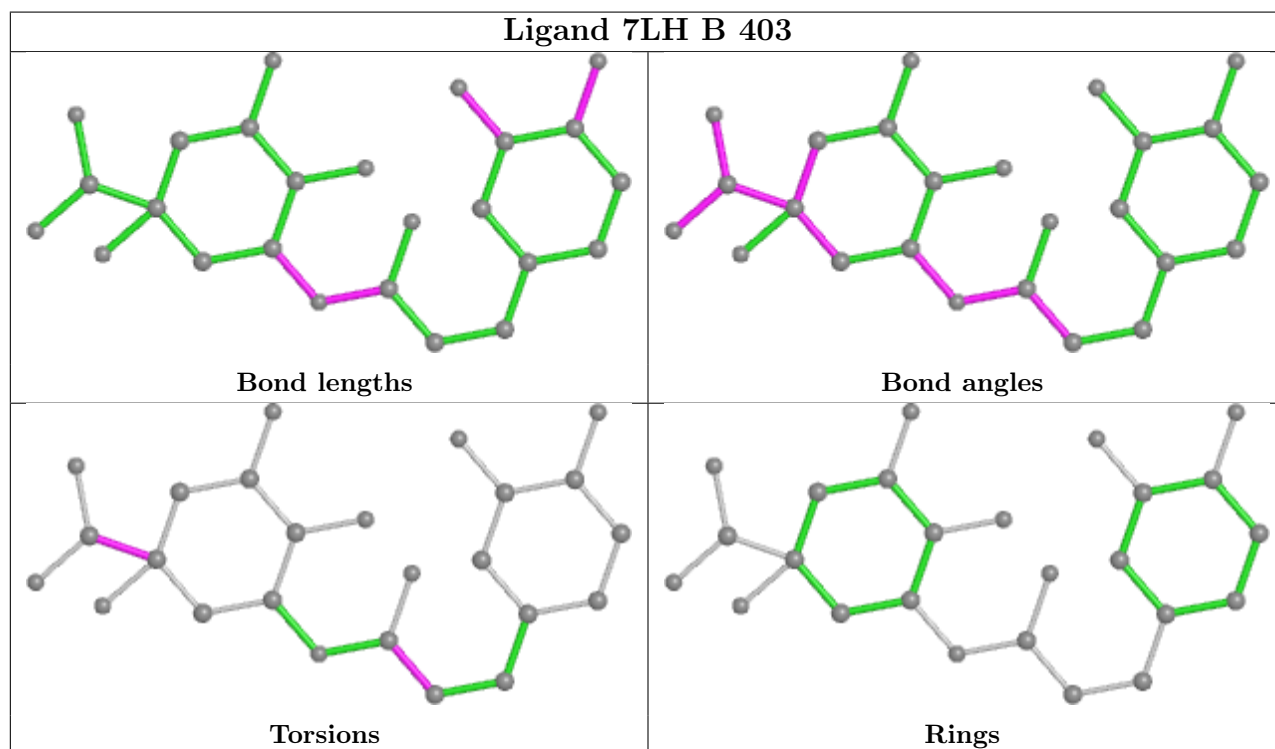
Mol	Chain	Res	Type	Atoms
2	A	401	NAD	C5D-O5D-PN-O1N
2	A	401	NAD	C5D-O5D-PN-O2N
2	D	401	NAD	C5D-O5D-PN-O2N
5	A	405	EDO	O1-C1-C2-O2
2	A	401	NAD	C3B-C4B-C5B-O5B
6	B	405	PEG	C4-C3-O2-C2
4	D	403	7LH	OAL-CAM-CAO-CAP
2	B	401	NAD	O4B-C4B-C5B-O5B
6	B	405	PEG	C1-C2-O2-C3
4	B	403	7LH	OAA-CAB-CAD-CAY
4	B	403	7LH	OAC-CAB-CAD-CAF
4	B	403	7LH	OAA-CAB-CAD-CAF
4	D	403	7LH	CAO-CAP-CAQ-CAR
4	A	403	7LH	CAO-CAP-CAQ-CAX
4	D	403	7LH	CAO-CAP-CAQ-CAX
2	B	401	NAD	C3B-C4B-C5B-O5B
4	A	403	7LH	CAO-CAP-CAQ-CAR
4	A	403	7LH	OAC-CAB-CAD-CAF
4	A	403	7LH	OAA-CAB-CAD-CAF
2	A	401	NAD	PA-O3-PN-O1N
2	A	401	NAD	PA-O3-PN-O2N
2	B	401	NAD	PA-O3-PN-O2N
2	C	401	NAD	PA-O3-PN-O1N
2	D	401	NAD	O4D-C4D-C5D-O5D
2	C	401	NAD	O4D-C4D-C5D-O5D
2	D	401	NAD	C5B-O5B-PA-O3
2	D	401	NAD	C5D-O5D-PN-O3
4	B	403	7LH	OAL-CAM-CAO-CAP
2	C	401	NAD	C5D-O5D-PN-O1N
2	C	401	NAD	C4B-C5B-O5B-PA
4	A	403	7LH	OAA-CAB-CAD-CAY
4	B	403	7LH	OAC-CAB-CAD-CAY
4	B	403	7LH	OAN-CAM-CAO-CAP
4	A	403	7LH	OAL-CAM-CAO-CAP

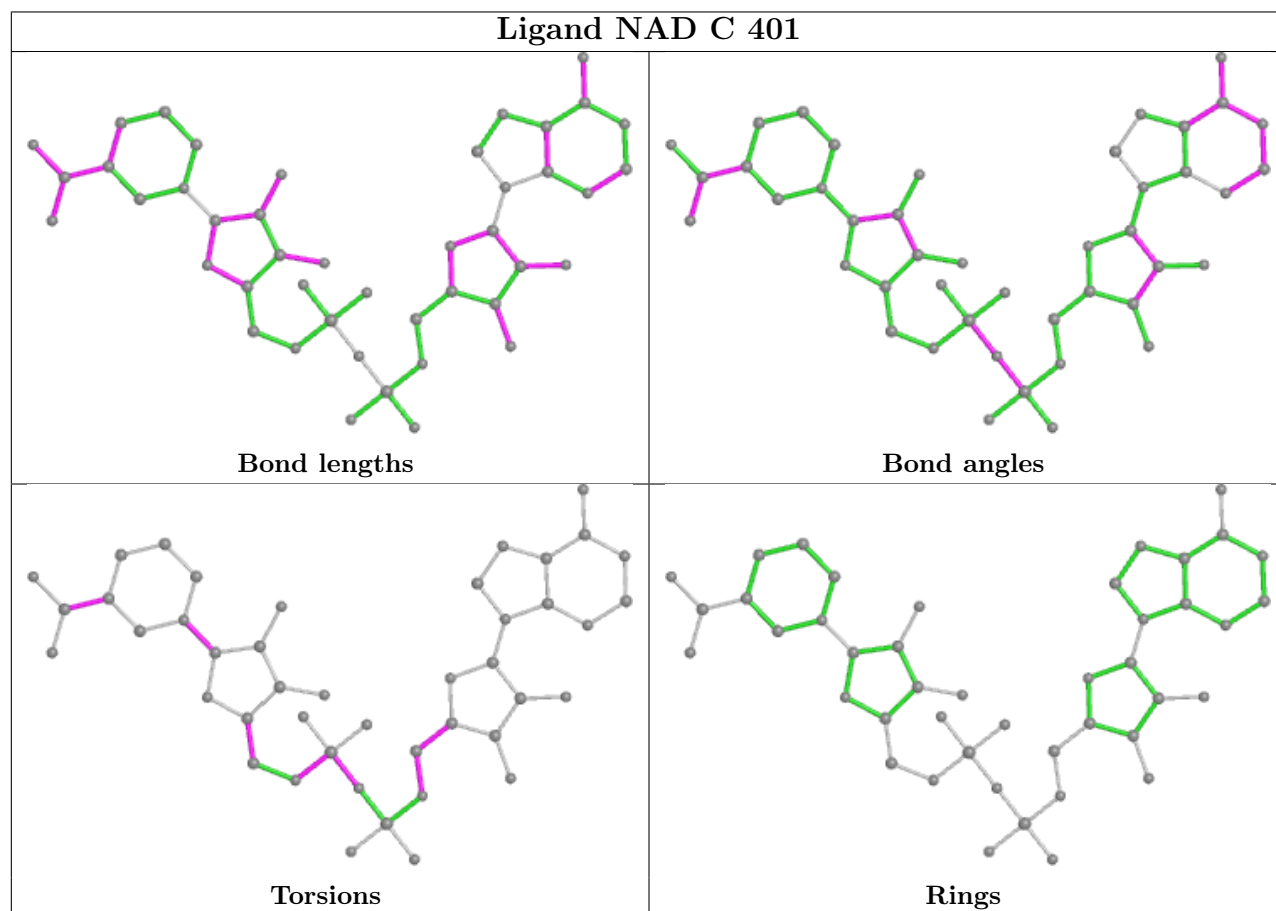
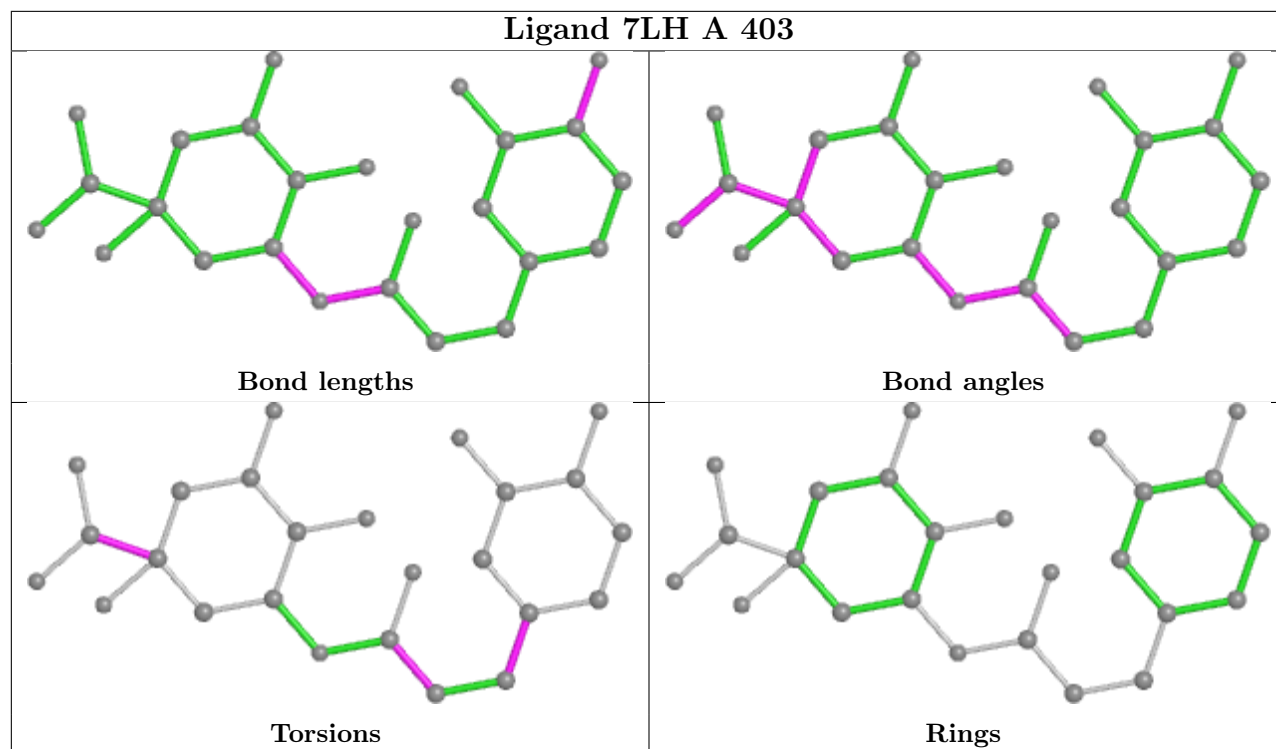
There are no ring outliers.

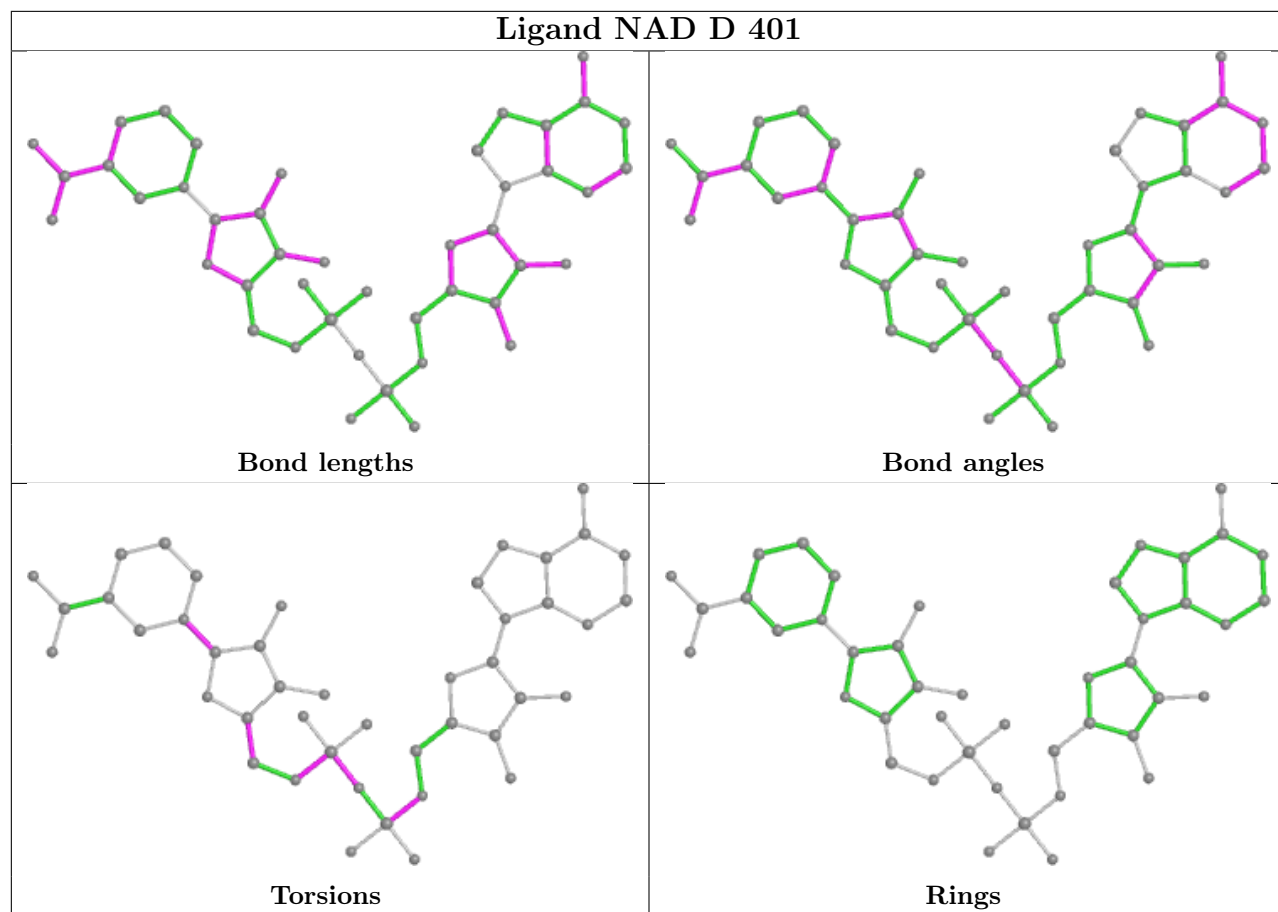
3 monomers are involved in 6 short contacts:

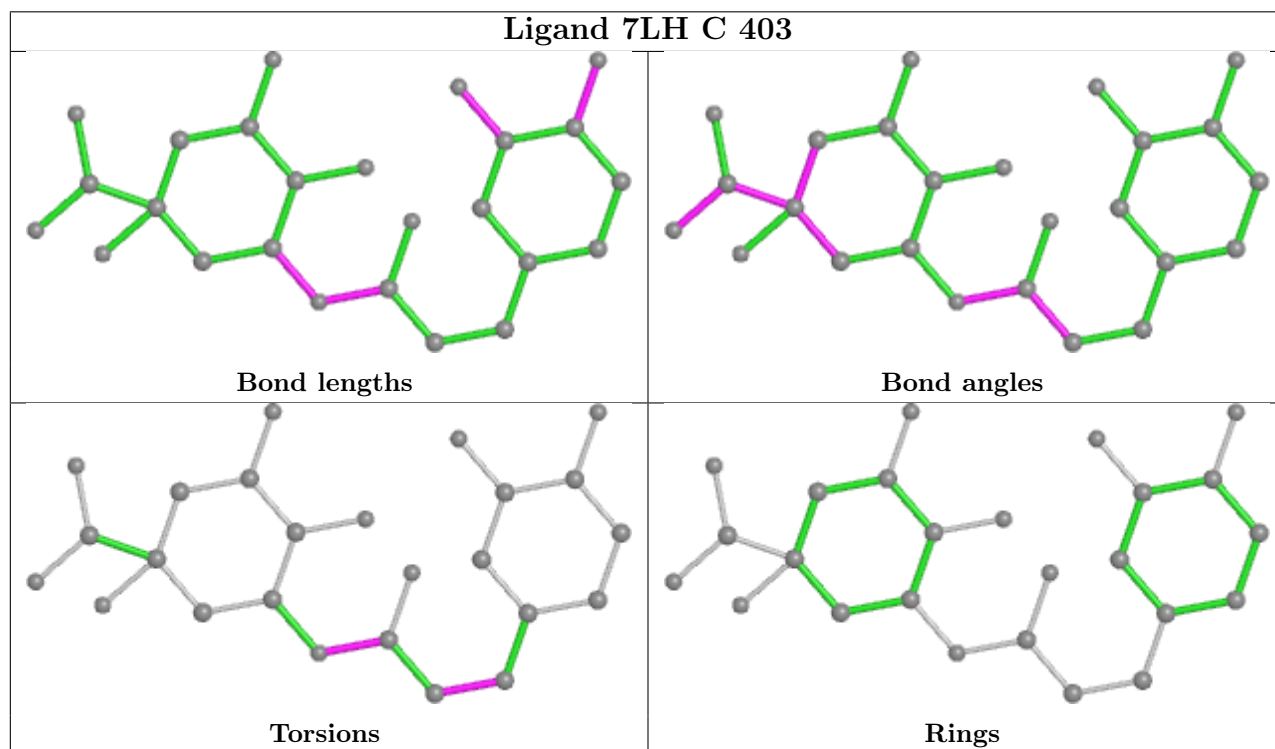
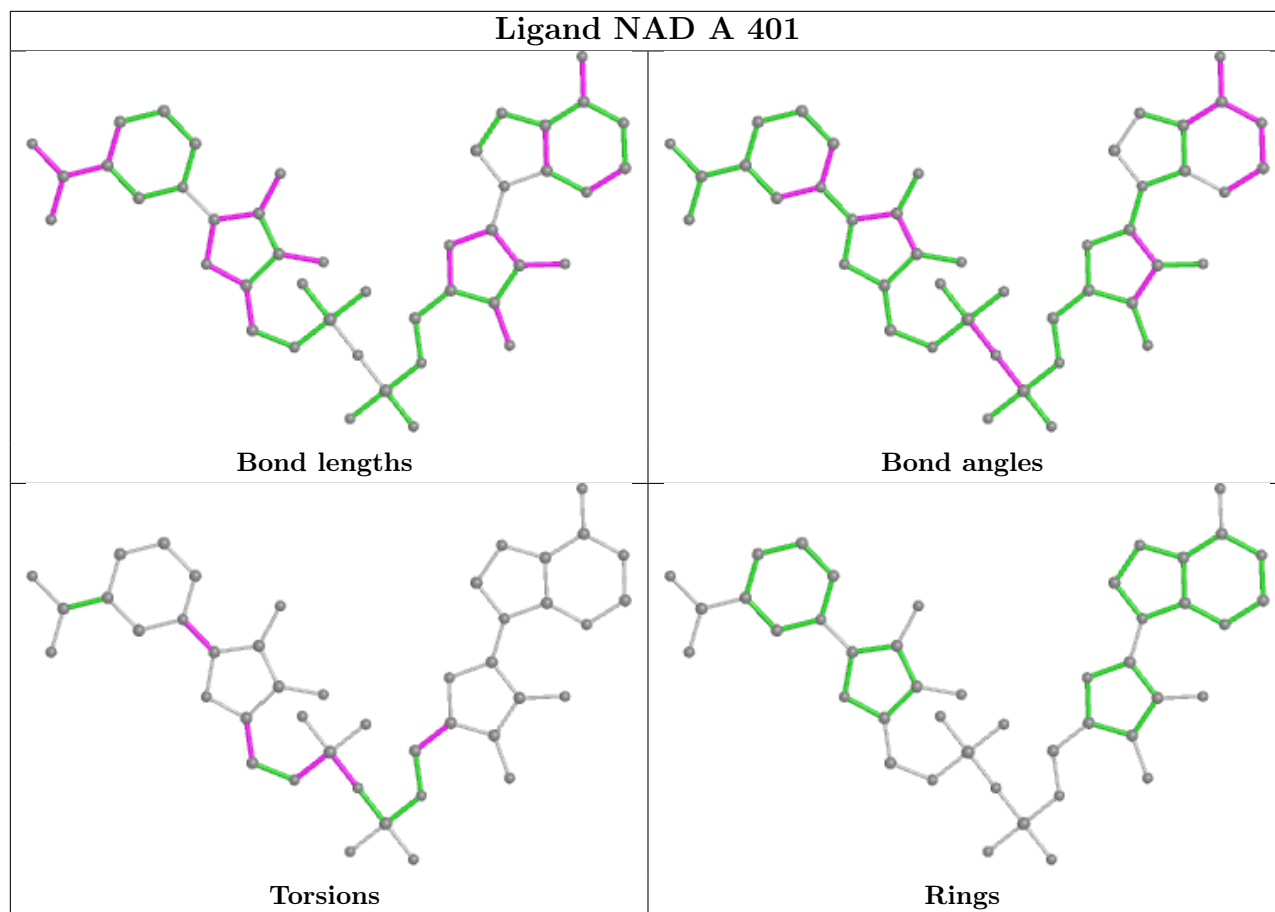
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	401	NAD	1	0
5	A	405	EDO	3	0
4	D	403	7LH	2	0

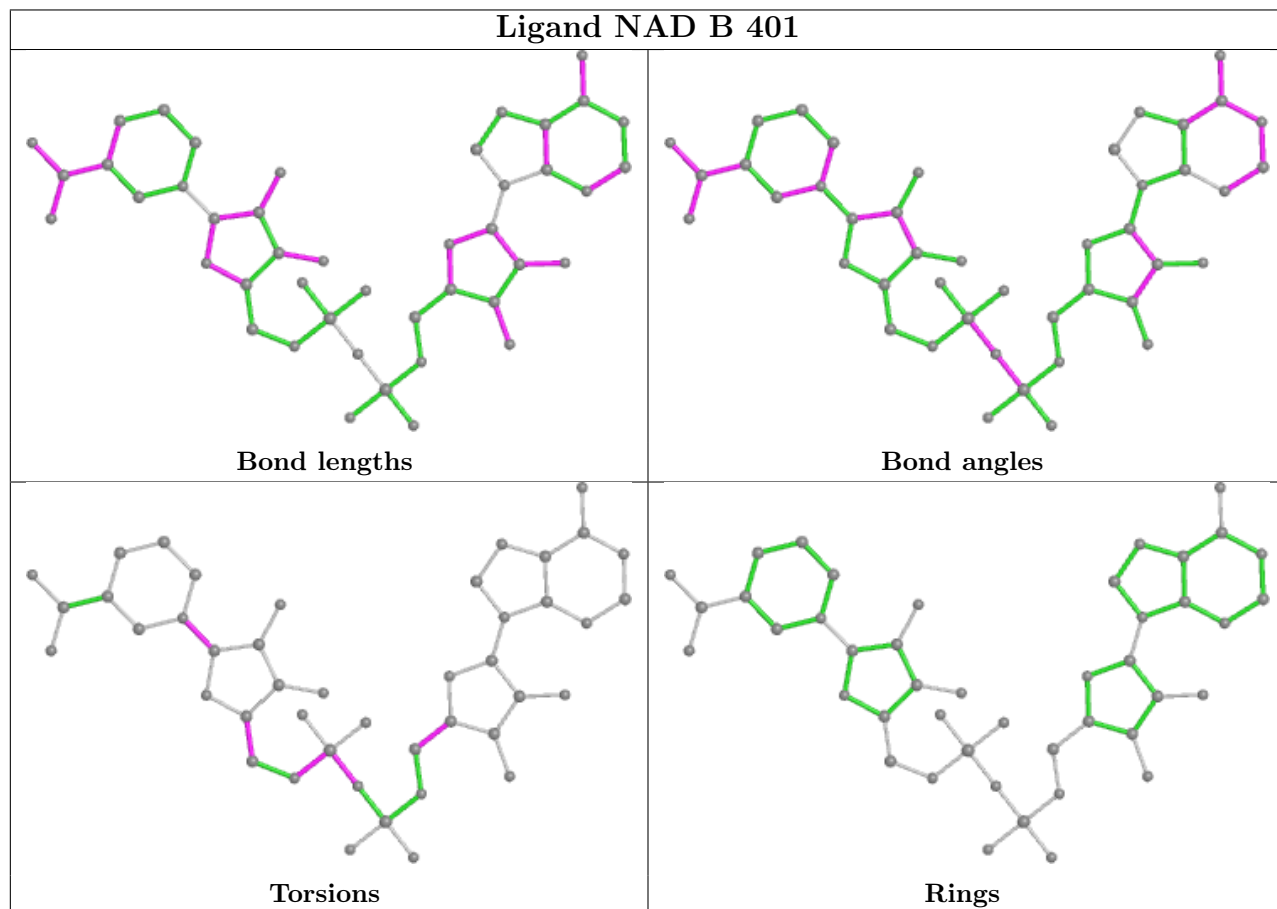
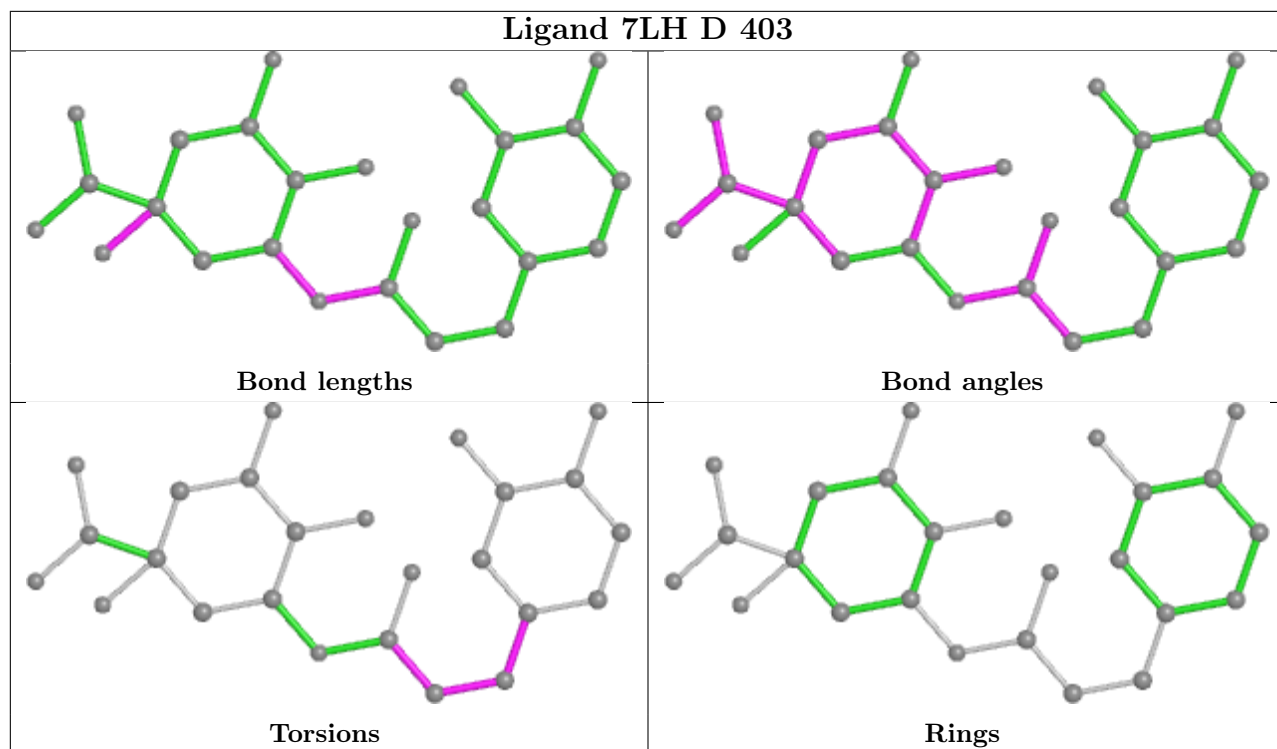
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.











5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	357/375 (95%)	0.37	7 (1%) 65 68	34, 46, 69, 107	0
1	B	358/375 (95%)	0.41	12 (3%) 45 48	37, 50, 72, 109	0
1	C	344/375 (91%)	1.33	79 (22%) 0 0	40, 80, 138, 147	0
1	D	338/375 (90%)	1.56	95 (28%) 0 0	46, 99, 138, 144	0
All	All	1397/1500 (93%)	0.91	193 (13%) 2 2	34, 60, 129, 147	0

All (193) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	353	VAL	10.7
1	C	353	VAL	10.6
1	D	282	LEU	10.3
1	D	333	LEU	9.4
1	D	274	VAL	9.3
1	D	335	LEU	9.1
1	C	355	ALA	9.1
1	C	317	LEU	8.8
1	C	274	VAL	8.4
1	D	250	PHE	8.4
1	D	316	TYR	8.4
1	D	355	ALA	8.3
1	C	313	PRO	8.1
1	D	348	VAL	7.8
1	C	283	ILE	7.0
1	B	260	TYR	6.9
1	C	250	PHE	6.9
1	C	59	VAL	6.8
1	C	335	LEU	6.8
1	D	336	PRO	6.6
1	D	315	ASP	6.3

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Mol	Chain	Res	Type	RSRZ
1	C	357	ILE	6.3
1	C	348	VAL	6.3
1	C	351	SER	6.3
1	C	311	MET	6.3
1	D	346	SER	6.1
1	D	357	ILE	6.0
1	C	285	GLN	5.8
1	C	314	ASP	5.8
1	C	286	PHE	5.8
1	D	286	PHE	5.7
1	D	351	SER	5.7
1	D	59	VAL	5.7
1	D	254	ILE	5.7
1	C	333	LEU	5.6
1	D	345	ARG	5.6
1	A	360	CYS	5.5
1	C	356	ALA	5.5
1	D	284	GLY	5.5
1	C	352	THR	5.4
1	D	277	ALA	5.4
1	A	20	SER	5.3
1	D	276	ALA	5.2
1	D	283	ILE	5.2
1	C	275	MET	5.2
1	B	284	GLY	5.1
1	C	309	ALA	5.1
1	C	331	LEU	5.1
1	D	350	ALA	5.1
1	C	243	LEU	5.0
1	D	268	ALA	5.0
1	C	321	MET	4.9
1	D	260	TYR	4.9
1	D	349	ASP	4.9
1	D	317	LEU	4.8
1	D	332	HIS	4.8
1	C	347	ASP	4.8
1	C	319	HIS	4.7
1	C	254	ILE	4.7
1	D	280	ALA	4.7
1	C	350	ALA	4.7
1	C	320	MET	4.6
1	C	346	SER	4.6

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Mol	Chain	Res	Type	RSRZ
1	D	25	GLN	4.6
1	D	334	ILE	4.5
1	C	287	THR	4.4
1	C	312	GLN	4.4
1	C	276	ALA	4.4
1	D	288	PRO	4.3
1	D	281	GLU	4.2
1	D	320	MET	4.2
1	C	354	THR	4.2
1	C	307	GLY	4.2
1	D	300	ARG	4.2
1	C	262	VAL	4.1
1	C	308	PRO	4.1
1	C	332	HIS	4.1
1	C	349	ASP	4.1
1	D	354	THR	4.0
1	C	280	ALA	4.0
1	C	246	LEU	4.0
1	C	344	MET	4.0
1	C	261	GLY	3.9
1	A	341	HIS	3.9
1	D	294	VAL	3.9
1	C	316	TYR	3.9
1	D	201	GLU	3.8
1	D	272	GLY	3.8
1	C	345	ARG	3.7
1	D	191	ILE	3.7
1	C	305	VAL	3.7
1	D	318	PRO	3.6
1	A	25	GLN	3.6
1	C	282	LEU	3.6
1	C	1	MET	3.6
1	D	275	MET	3.6
1	D	305	VAL	3.6
1	D	337	THR	3.6
1	C	263	TRP	3.5
1	C	318	PRO	3.5
1	D	196	PHE	3.4
1	D	61	GLY	3.4
1	C	277	ALA	3.3
1	A	284	GLY	3.3
1	C	278	LYS	3.3

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Mol	Chain	Res	Type	RSRZ
1	D	306	THR	3.3
1	C	25	GLN	3.2
1	D	243	LEU	3.2
1	D	312	GLN	3.2
1	D	295	ILE	3.2
1	C	279	THR	3.1
1	B	23	GLN	3.1
1	D	1	MET	3.1
1	D	190	ILE	3.1
1	C	336	PRO	3.1
1	D	301	ALA	3.1
1	D	356	ALA	3.1
1	B	341	HIS	3.0
1	C	269	VAL	3.0
1	C	219	ILE	3.0
1	D	24	GLN	3.0
1	D	278	LYS	3.0
1	B	62	VAL	3.0
1	C	253	ALA	2.9
1	D	319	HIS	2.9
1	D	304	PRO	2.9
1	D	273	MET	2.9
1	D	311	MET	2.9
1	D	342	SER	2.9
1	C	306	THR	2.8
1	B	20	SER	2.8
1	D	4	VAL	2.8
1	D	279	THR	2.8
1	D	352	THR	2.8
1	B	25	GLN	2.8
1	C	288	PRO	2.8
1	C	334	ILE	2.8
1	D	186	ILE	2.8
1	C	315	ASP	2.8
1	D	339	ILE	2.7
1	D	271	ALA	2.7
1	D	314	ASP	2.7
1	D	204	ILE	2.7
1	B	56	VAL	2.6
1	C	2	GLU	2.6
1	D	2	GLU	2.6
1	D	285	GLN	2.6

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Mol	Chain	Res	Type	RSRZ
1	D	347	ASP	2.6
1	D	298	LEU	2.5
1	B	53	ILE	2.5
1	D	344	MET	2.5
1	D	240	LEU	2.5
1	C	24	GLN	2.5
1	C	213	GLN	2.5
1	C	272	GLY	2.5
1	B	59	VAL	2.5
1	C	20	SER	2.5
1	D	20	SER	2.4
1	C	289	GLU	2.4
1	D	182	LEU	2.4
1	D	343	GLU	2.4
1	D	139	VAL	2.4
1	C	260	TYR	2.4
1	D	313	PRO	2.4
1	A	59	VAL	2.4
1	D	338	THR	2.4
1	C	48	LEU	2.3
1	D	246	LEU	2.3
1	C	343	GLU	2.3
1	C	242	ALA	2.3
1	C	188	TYR	2.3
1	D	17	ILE	2.2
1	D	28	PHE	2.2
1	D	253	ALA	2.2
1	D	270	ALA	2.2
1	D	171	LYS	2.2
1	D	62	VAL	2.2
1	D	229	VAL	2.2
1	C	192	LEU	2.2
1	D	202	GLU	2.2
1	C	55	THR	2.2
1	D	29	TRP	2.1
1	D	5	THR	2.1
1	B	24	GLN	2.1
1	C	244	LEU	2.1
1	D	238	SER	2.1
1	C	281	GLU	2.1
1	C	284	GLY	2.1
1	D	30	PRO	2.1

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Mol	Chain	Res	Type	RSRZ
1	D	291	THR	2.0
1	A	92	HIS	2.0
1	B	18	ALA	2.0
1	C	304	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 monosaccharides in this entry.

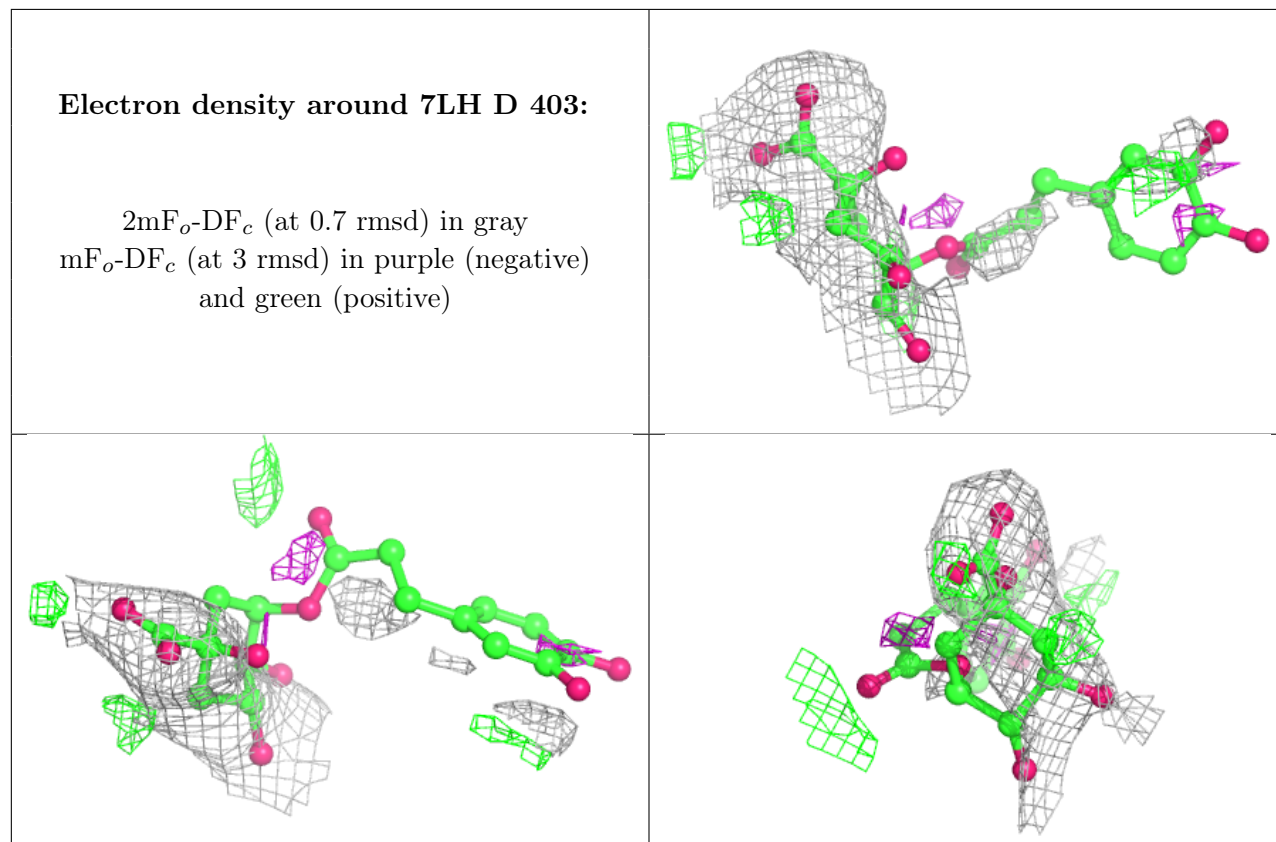
6.4 Ligands [i](#)

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	7LH	D	403	25/25	0.48	0.62	101,140,148,162	0
4	7LH	C	403	25/25	0.61	0.49	93,133,162,172	0
3	MG	D	402	1/1	0.64	0.08	102,102,102,102	0
6	PEG	B	405	7/7	0.68	0.48	65,69,77,80	0
5	EDO	A	406	4/4	0.86	0.37	57,58,63,72	0
4	7LH	A	403	25/25	0.87	0.20	47,68,90,137	0
3	MG	C	402	1/1	0.90	0.11	75,75,75,75	0
4	7LH	B	403	25/25	0.91	0.16	54,76,93,117	0
5	EDO	A	405	4/4	0.93	0.22	37,44,49,59	0
2	NAD	D	401	44/44	0.93	0.18	64,81,94,96	0
5	EDO	A	404	4/4	0.93	0.24	49,50,50,53	0
5	EDO	B	404	4/4	0.95	0.21	48,50,51,56	0
3	MG	A	402	1/1	0.95	0.23	36,36,36,36	0
2	NAD	C	401	44/44	0.96	0.21	47,62,71,75	0
2	NAD	B	401	44/44	0.96	0.18	35,51,58,60	0
2	NAD	A	401	44/44	0.97	0.17	34,43,49,52	0
3	MG	B	402	1/1	0.99	0.17	38,38,38,38	0

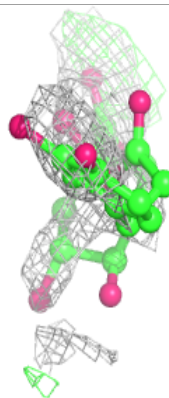
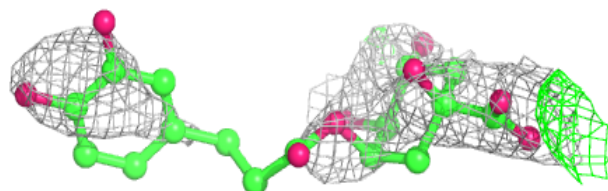
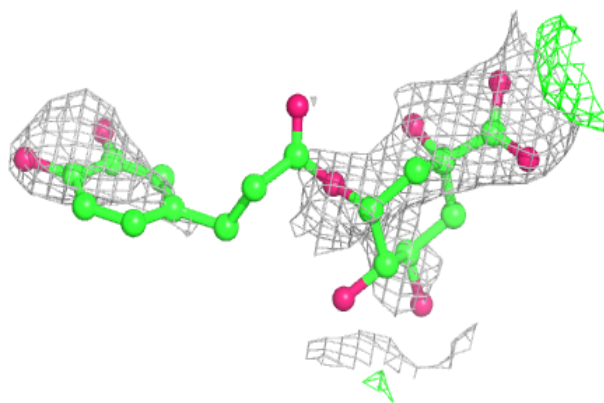
The following is a graphical depiction of the model fit to experimental electron density of all

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.



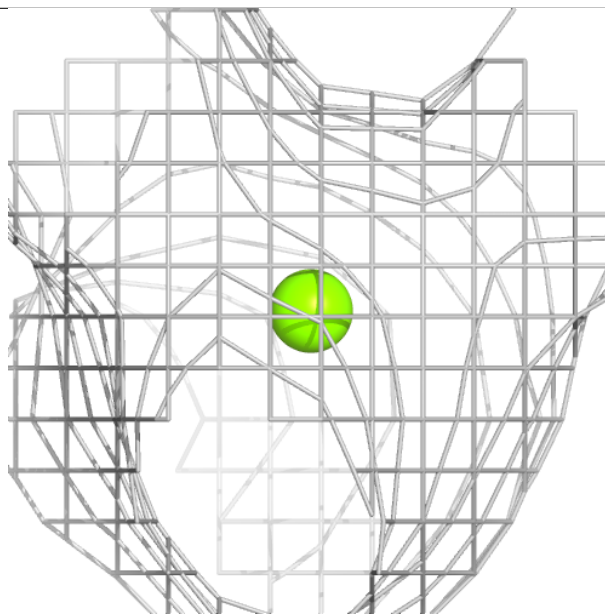
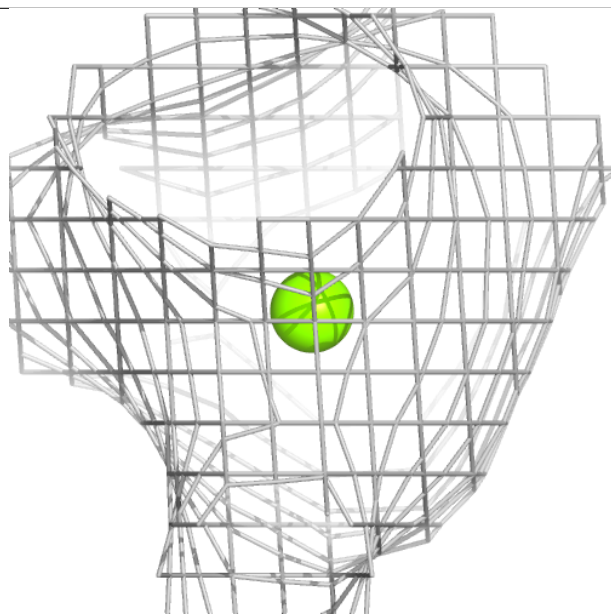
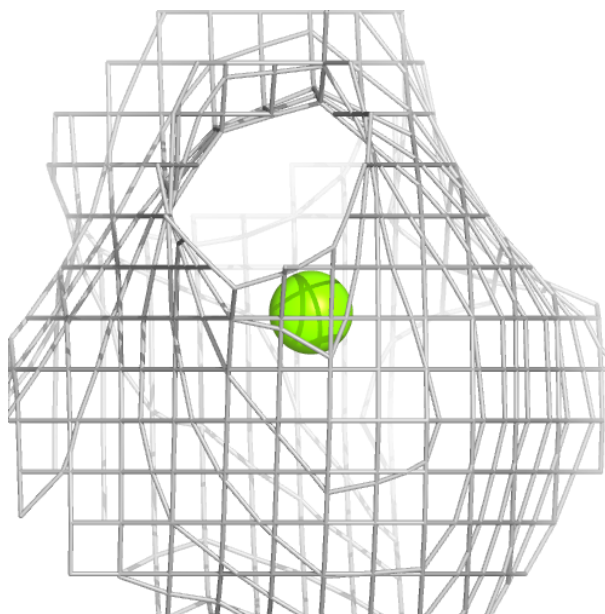
Electron density around 7LH C 403:

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



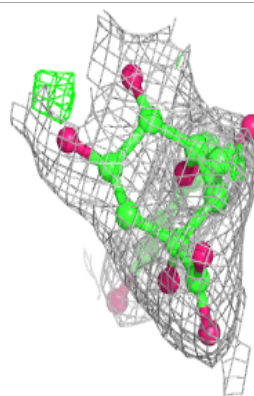
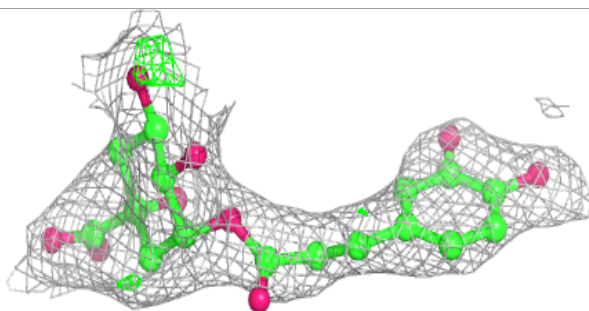
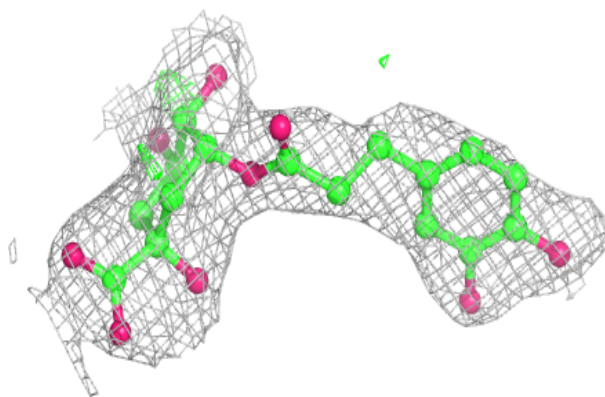
Electron density around MG D 402:

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



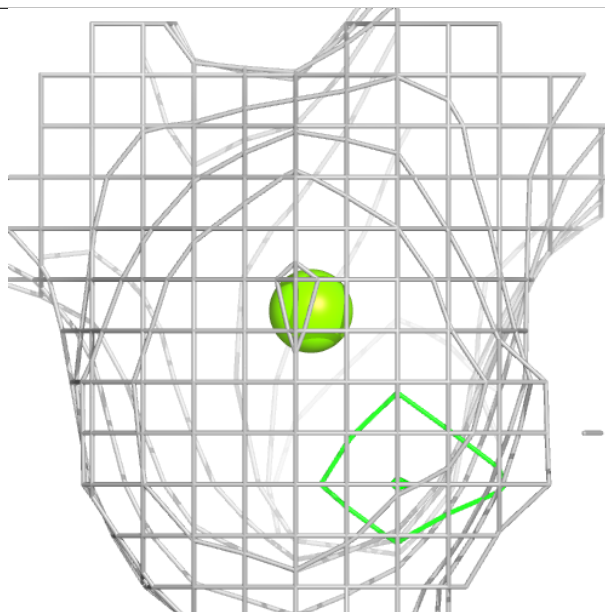
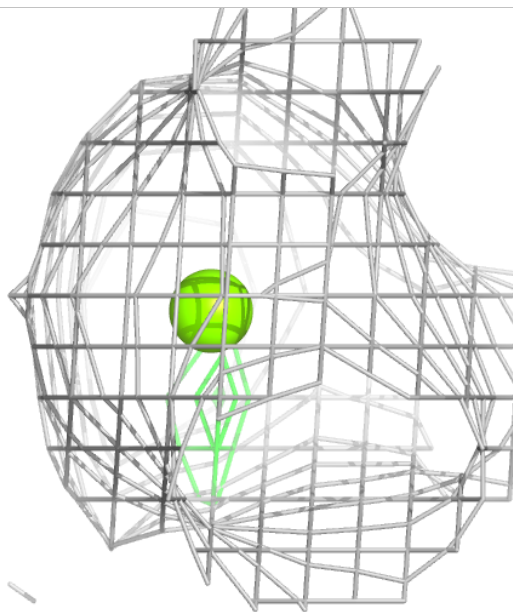
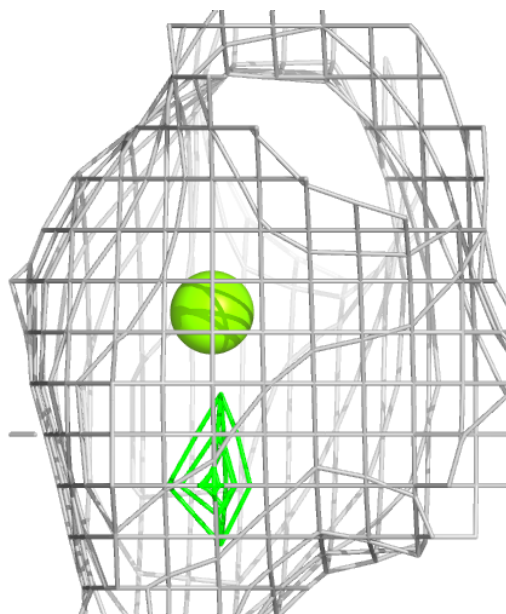
Electron density around 7LH A 403:

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



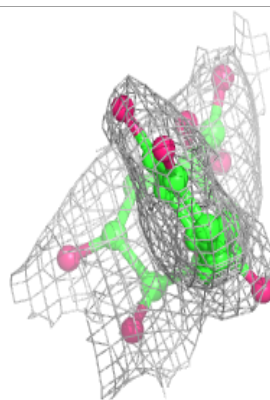
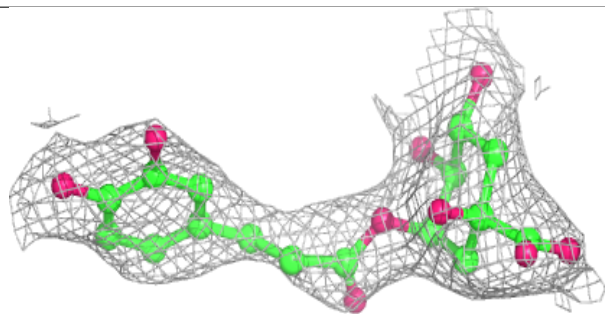
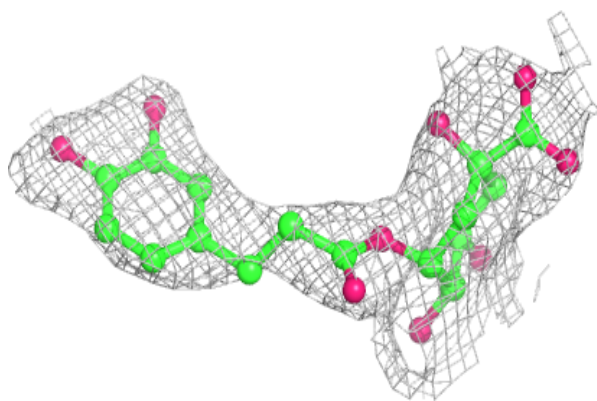
Electron density around MG C 402:

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

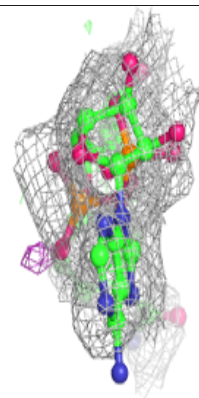
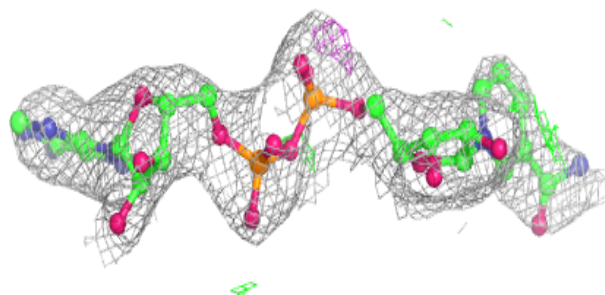
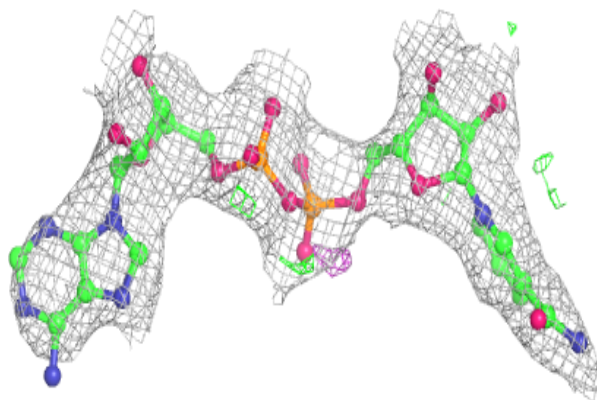


Electron density around 7LH B 403:

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

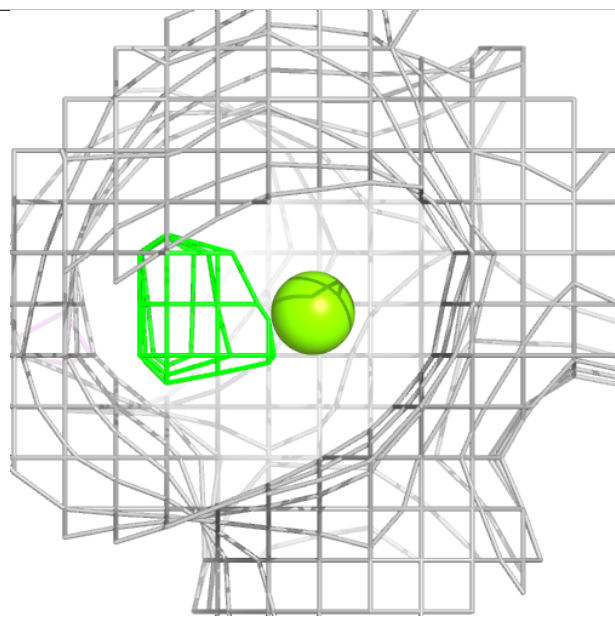
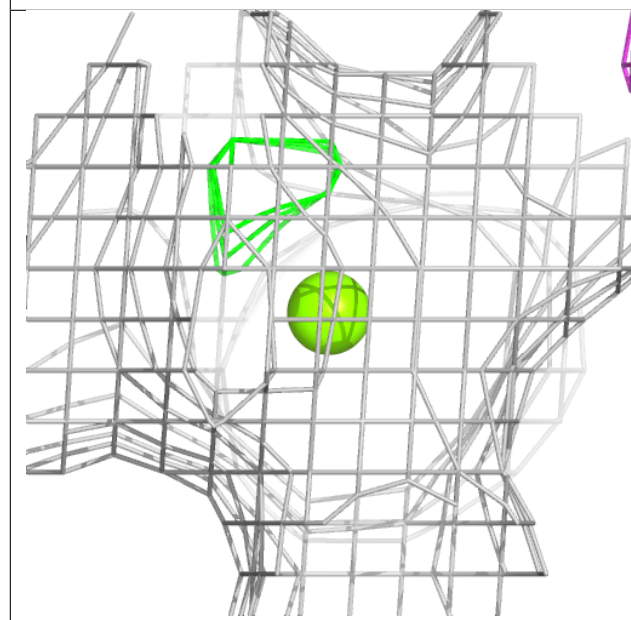
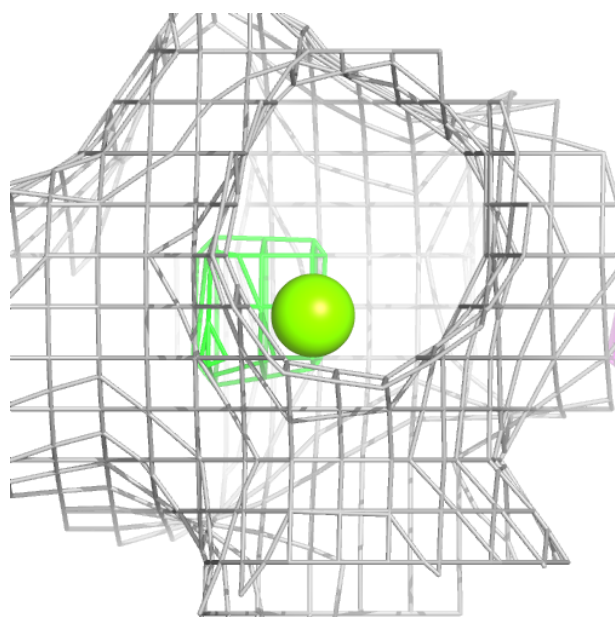
**Electron density around NAD D 401:**

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



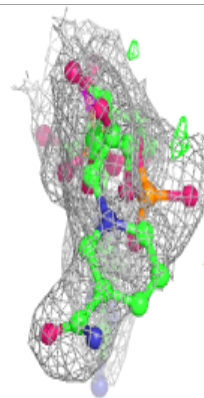
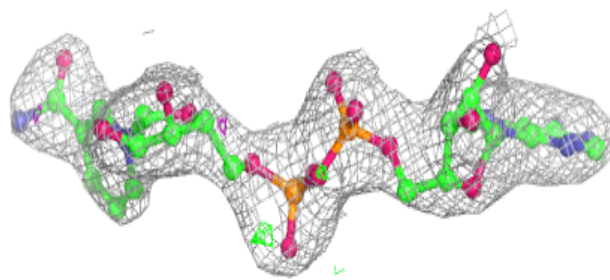
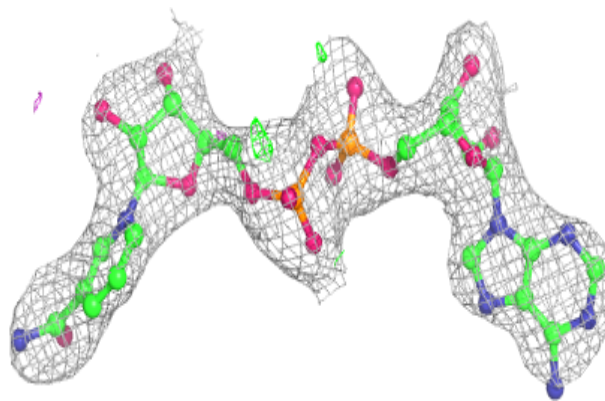
Electron density around MG A 402:

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

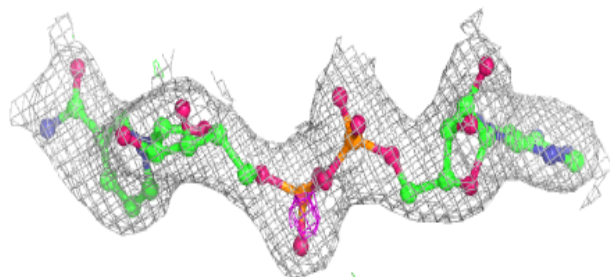
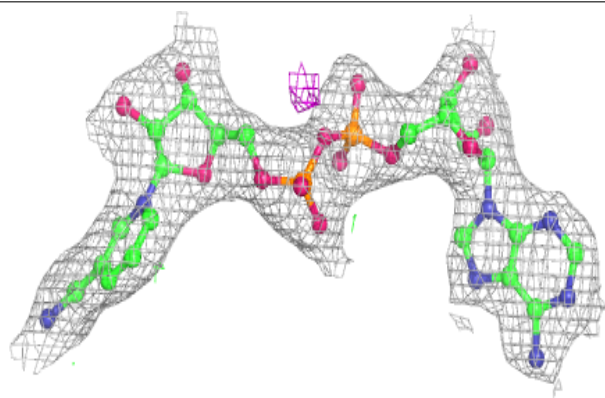


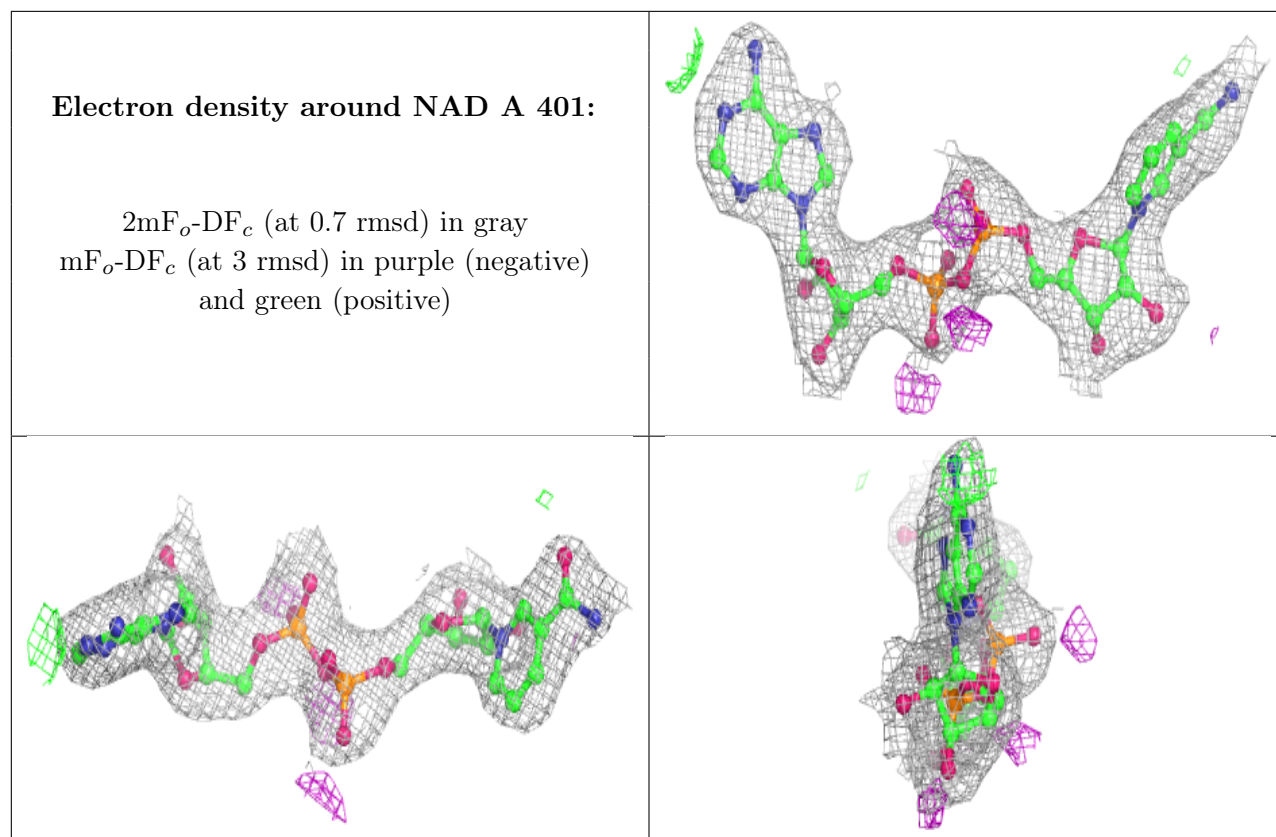
Electron density around NAD C 401:

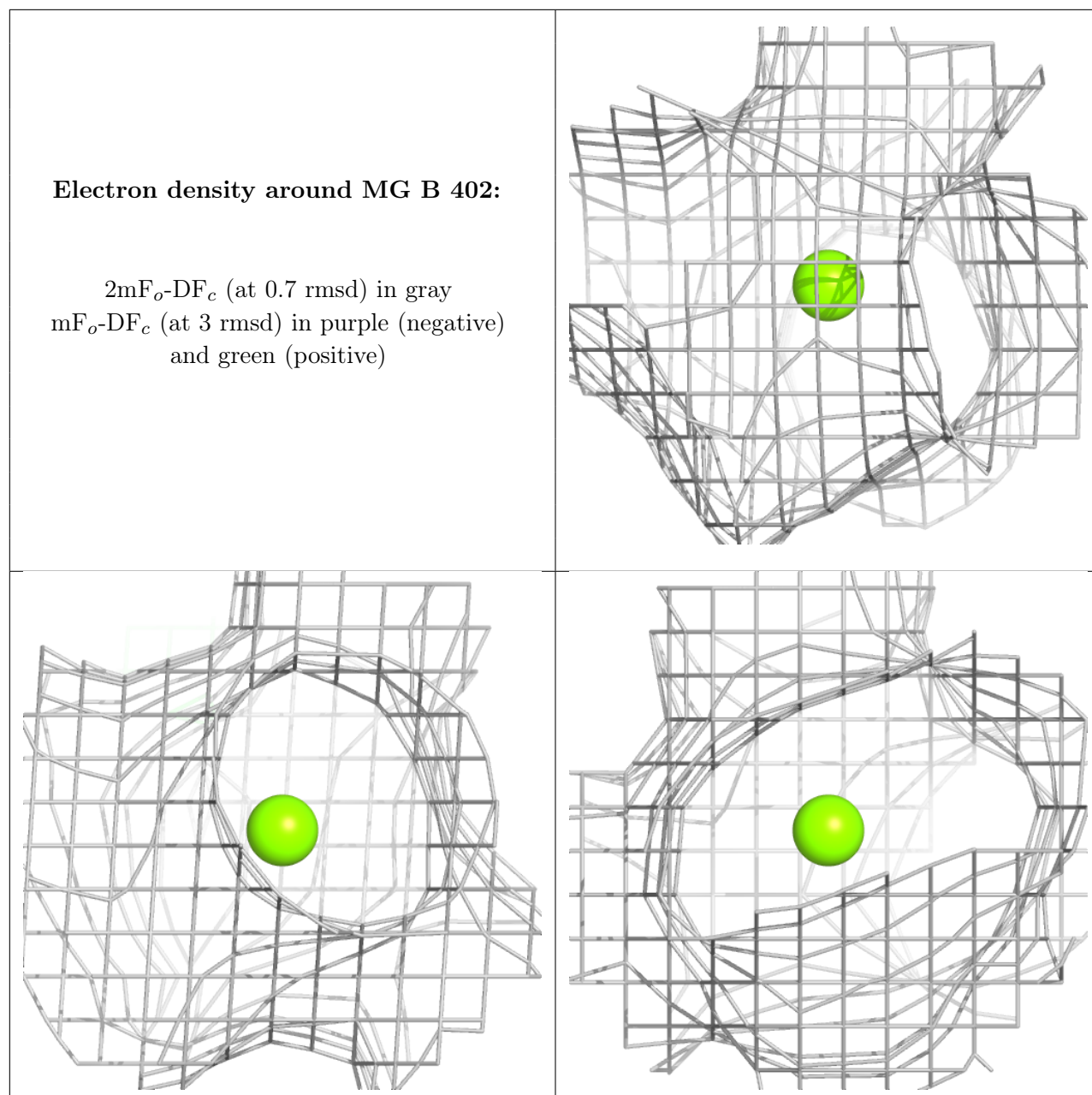
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

**Electron density around NAD B 401:**

$2mF_o-DF_c$ (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.