



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 03:19 PM UTC

PDB ID : 5U8W / pdb_00005u8w
Title : Dihydrolipoamide dehydrogenase (LpdG) from *Pseudomonas aeruginosa* bound to NADH
Authors : Glasser, N.R.; Wang, B.X.; Hoy, J.A.; Newman, D.K.
Deposited on : 2016-12-15
Resolution : 1.79 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

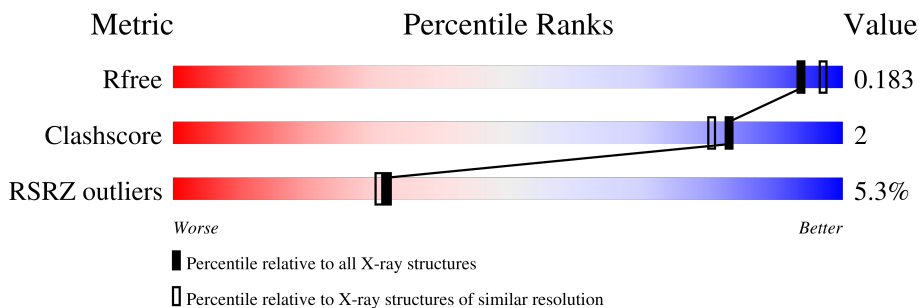
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

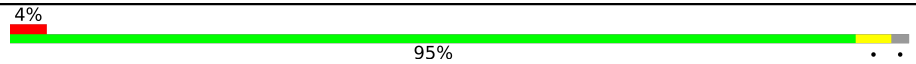
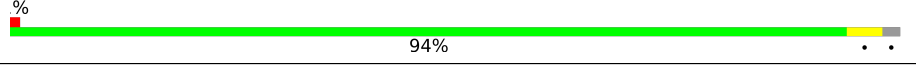
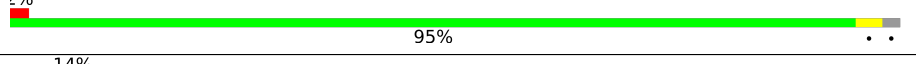
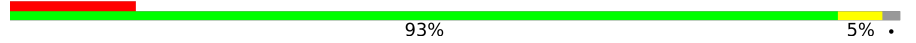
The reported resolution of this entry is 1.79 Å.

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	7662 (1.80-1.80)
Clashscore	190562	8479 (1.80-1.80)
RSRZ outliers	180081	7663 (1.80-1.80)

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	481	 4% 95%
1	B	481	 % 94%
1	C	481	 2% 95%
1	D	481	 14% 93% 5%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 29416 atoms, of which 14059 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 Dihydrolipoyl dehydrogenase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	473	6967	2190	3516	591	658	12	0	2	0
1	B	473	6888	2174	3452	587	663	12	0	2	0
1	C	473	6862	2168	3441	584	657	12	0	2	0
1	D	472	6653	2123	3300	573	645	12	0	1	0

There are 12 discrepancies between the modelled and reference sequences:

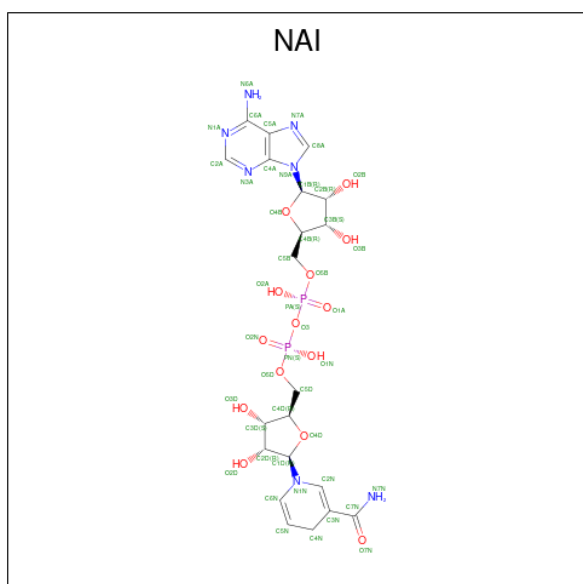
Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP A0A0H2Z9F5
A	-1	SER	-	expression tag	UNP A0A0H2Z9F5
A	0	HIS	-	expression tag	UNP A0A0H2Z9F5
B	-2	GLY	-	expression tag	UNP A0A0H2Z9F5
B	-1	SER	-	expression tag	UNP A0A0H2Z9F5
B	0	HIS	-	expression tag	UNP A0A0H2Z9F5
C	-2	GLY	-	expression tag	UNP A0A0H2Z9F5
C	-1	SER	-	expression tag	UNP A0A0H2Z9F5
C	0	HIS	-	expression tag	UNP A0A0H2Z9F5
D	-2	GLY	-	expression tag	UNP A0A0H2Z9F5
D	-1	SER	-	expression tag	UNP A0A0H2Z9F5
D	0	HIS	-	expression tag	UNP A0A0H2Z9F5

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (CCD ID: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).



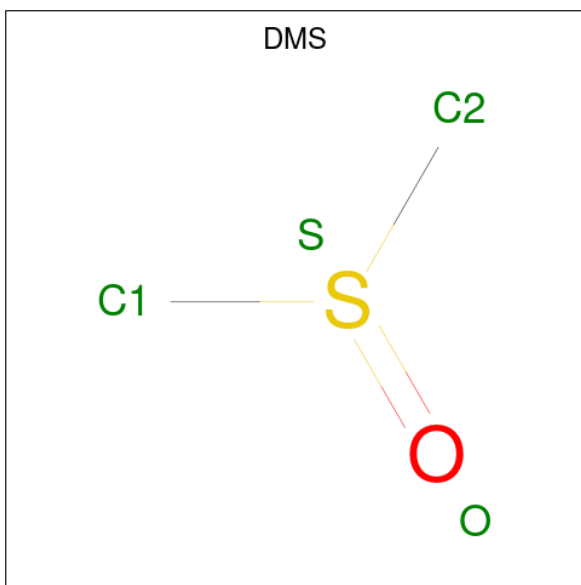
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf		
			Total	C	H	N	O			P	
2	A	1	Total	83	27	30	9	15	2	0	0
2	B	1	Total	83	27	30	9	15	2	0	0
2	C	1	Total	84	27	31	9	15	2	0	0
2	D	1	Total	84	27	31	9	15	2	0	0

- Molecule 3 is 1,4-DIHYDRONICOTINAMIDE ADENINE DINUCLEOTIDE (CCD ID: NAI) (formula: $C_{21}H_{29}N_7O_{14}P_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
3	A	1	Total	C	H	N	O	P	0	0
			71	21	27	7	14	2		
3	B	1	Total	C	H	N	O	P	0	0
			71	21	27	7	14	2		
3	C	1	Total	C	H	N	O	P	0	0
			71	21	27	7	14	2		
3	D	1	Total	C	H	N	O	P	0	0
			71	21	27	7	14	2		

- Molecule 4 is DIMETHYL SULFOXIDE (CCD ID: DMS) (formula: C₂H₆OS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
4	A	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	A	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	A	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	A	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	A	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	A	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	A	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	B	1	Total	C	H	O	S	0	0
			10	2	6	1	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	B	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	B	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	B	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	C	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	C	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	C	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	C	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	C	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	D	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	D	1	Total	C	H	O	S	0	0
			10	2	6	1	1		
4	D	1	Total	C	H	O	S	0	0
			10	2	6	1	1		

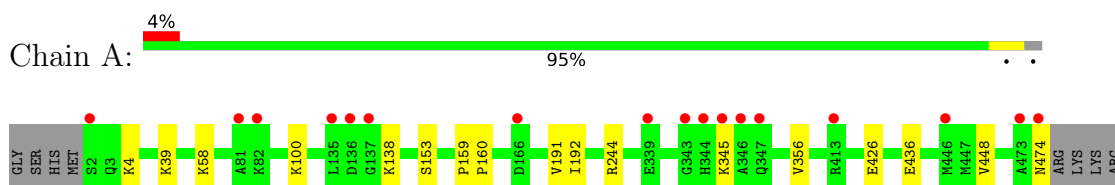
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	404	Total	O	0	0
			404	404		
5	B	398	Total	O	0	0
			398	398		
5	C	291	Total	O	0	0
			291	291		
5	D	135	Total	O	0	0
			135	135		

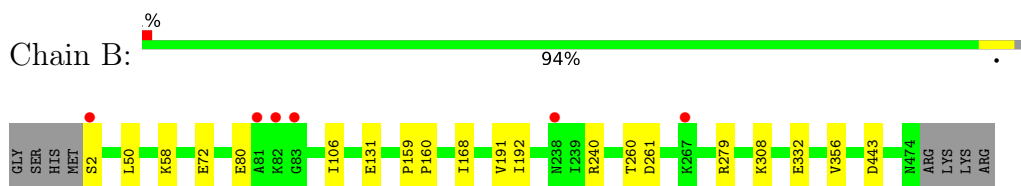
3 Residue-property plots [i](#)

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.

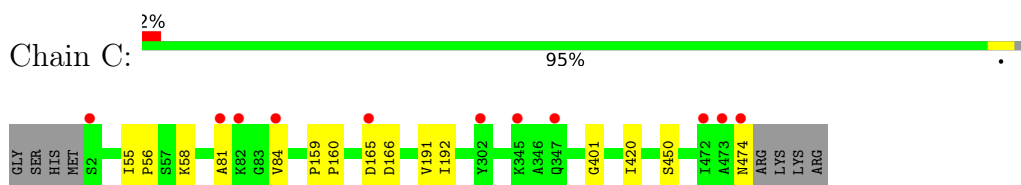
- Molecule 1: Dihydrolipoyl dehydrogenase



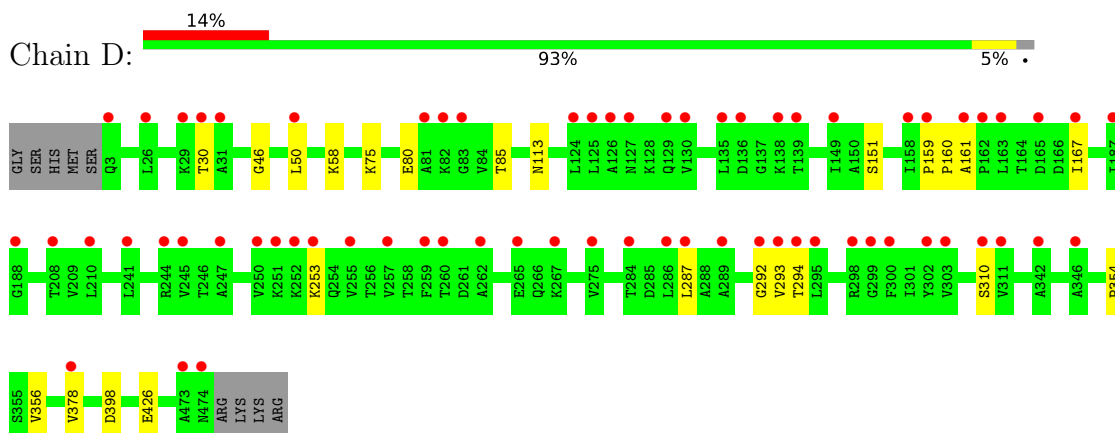
- Molecule 1: Dihydrolipoyl dehydrogenase



- Molecule 1: Dihydrolipoyl dehydrogenase



- Molecule 1: Dihydrolipoyl dehydrogenase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	65.51Å 117.83Å 139.73Å 90.00° 94.30° 90.00°	Depositor
Resolution (Å)	34.94 – 1.79 34.94 – 1.79	Depositor EDS
% Data completeness (in resolution range)	100.0 (34.94-1.79) 100.0 (34.94-1.79)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.00 (at 1.42Å)	Xtrriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.167 , 0.178 (Not available) , 0.183	Depositor DCC
R_{free} test set	4399 reflections (1.11%)	wwPDB-VP
Wilson B-factor (Å ²)	20.4	Xtrriage
Anisotropy	0.195	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.39 , 42.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	29416	wwPDB-VP
Average B, all atoms (Å ²)	44.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.81% 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: NAI, FAD, DMS

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	0.18	0/3509	0.39	0/4762
1	B	0.18	0/3494	0.39	0/4751
1	C	0.16	0/3479	0.36	0/4731
1	D	0.16	0/3408	0.34	0/4649
All	All	0.17	0/13890	0.37	0/18893

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	3451	3516	3520	18	1
1	B	3436	3452	3455	19	1
1	C	3421	3441	3444	10	0
1	D	3353	3300	3301	20	0
2	A	53	30	29	1	0
2	B	53	30	29	0	0
2	C	53	31	29	0	0
2	D	53	31	29	1	0
3	A	44	27	27	6	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	44	27	26	4	0
3	C	44	27	27	2	0
3	D	44	27	27	1	0
4	A	28	42	42	0	0
4	B	16	24	24	0	0
4	C	24	36	36	1	0
4	D	12	18	18	1	0
5	A	404	0	0	11	1
5	B	398	0	0	9	0
5	C	291	0	0	2	0
5	D	135	0	0	9	1
All	All	15357	14059	14063	68	2

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 2.

All (68) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:308:LYS:NZ	5:B:601:HOH:O	1.89	1.01
1:A:474:ASN:O	5:A:601:HOH:O	1.86	0.93
4:D:505:DMS:O	5:D:602:HOH:O	1.89	0.91
1:D:378:VAL:O	5:D:601:HOH:O	1.88	0.90
1:B:168:ILE:O	5:B:602:HOH:O	1.90	0.87
1:C:474:ASN:O	5:C:602:HOH:O	1.98	0.80
1:B:443:ASP:OD2	5:B:603:HOH:O	1.98	0.80
1:D:294:THR:O	5:D:603:HOH:O	1.99	0.80
1:B:72:GLU:OE2	5:B:604:HOH:O	2.05	0.74
1:D:113:ASN:OD1	5:D:605:HOH:O	2.05	0.74
1:A:436:GLU:OE1	5:A:602:HOH:O	2.04	0.74
1:D:398:ASP:OD1	5:D:604:HOH:O	2.03	0.74
1:D:161:ALA:O	5:D:606:HOH:O	2.07	0.71
1:A:244:ARG:NH1	5:A:607:HOH:O	2.26	0.68
1:A:138:LYS:N	5:A:606:HOH:O	2.24	0.68
1:D:30:THR:N	5:D:610:HOH:O	2.27	0.67
1:B:332:GLU:HG2	5:B:622:HOH:O	1.95	0.66
1:B:260:THR:OG1	5:B:605:HOH:O	2.14	0.65
1:A:100:LYS:NZ	5:A:608:HOH:O	2.32	0.62
1:A:39:LYS:NZ	5:A:609:HOH:O	2.33	0.62
1:D:293:VAL:HA	1:D:310:SER:OG	2.05	0.56
1:D:426:GLU:OE1	5:D:607:HOH:O	2.18	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:502:NAI:N6A	5:A:610:HOH:O	2.33	0.55
1:A:474:ASN:O	5:A:603:HOH:O	2.18	0.54
1:A:426:GLU:OE1	5:A:604:HOH:O	2.18	0.53
1:D:46:GLY:O	1:D:50:LEU:HD13	2.09	0.53
1:A:4:LYS:HG2	1:D:85:THR:HG21	1.92	0.52
1:D:294:THR:N	5:D:603:HOH:O	2.39	0.52
1:D:151:SER:O	2:D:501:FAD:H8A	2.09	0.51
1:C:58:LYS:N	1:C:58:LYS:HD3	2.24	0.51
1:B:240:ARG:NH2	1:B:261:ASP:OD2	2.45	0.50
1:B:72:GLU:OE1	5:B:606:HOH:O	2.20	0.49
1:B:131:GLU:OE1	5:B:607:HOH:O	2.20	0.49
1:C:165:ASP:OD2	1:C:166:ASP:N	2.40	0.49
1:D:287:LEU:HD22	1:D:293:VAL:HG21	1.93	0.49
1:B:58:LYS:N	1:B:58:LYS:HD3	2.28	0.48
1:A:191:VAL:HG22	3:A:502:NAI:H42N	1.94	0.48
1:B:191:VAL:HG22	3:B:502:NAI:H42N	1.95	0.48
1:A:448:VAL:HG22	1:B:332:GLU:HG3	1.95	0.48
1:B:80:GLU:HB2	5:B:773:HOH:O	2.14	0.48
1:B:192:ILE:HG12	3:B:502:NAI:H5N	1.94	0.48
1:A:192:ILE:HG12	3:A:502:NAI:H5N	1.96	0.47
1:B:50:LEU:HD22	1:B:106:ILE:HD11	1.96	0.47
1:B:50:LEU:CD2	1:B:106:ILE:HD11	2.46	0.46
4:C:507:DMS:O	5:C:603:HOH:O	2.19	0.46
1:D:159:PRO:N	1:D:160:PRO:CD	2.80	0.45
1:C:191:VAL:HG22	3:C:502:NAI:H42N	1.98	0.45
2:A:501:FAD:N5	3:A:502:NAI:H4N	2.32	0.44
1:B:159:PRO:N	1:B:160:PRO:CD	2.81	0.43
1:D:167:ILE:HD11	1:D:253:LYS:HA	2.00	0.43
1:D:58:LYS:N	1:D:58:LYS:HD3	2.33	0.43
1:A:153:SER:OG	5:A:605:HOH:O	2.21	0.43
1:D:75:LYS:CD	1:D:80:GLU:OE2	2.66	0.43
1:C:81:ALA:HB1	1:C:84:VAL:CG2	2.48	0.43
1:D:292:GLY:O	1:D:310:SER:OG	2.24	0.43
1:A:159:PRO:N	1:A:160:PRO:CD	2.82	0.42
1:B:356:VAL:O	3:B:502:NAI:N7N	2.52	0.42
1:B:279:ARG:HG3	3:B:502:NAI:H51N	2.01	0.42
1:A:191:VAL:CG1	3:A:502:NAI:H2D	2.50	0.42
1:A:138:LYS:CB	5:A:936:HOH:O	2.67	0.42
1:C:159:PRO:N	1:C:160:PRO:CD	2.83	0.42
1:C:192:ILE:HG12	3:C:502:NAI:H5N	2.02	0.42
1:D:356:VAL:O	3:D:502:NAI:N7N	2.53	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:356:VAL:O	3:A:502:NAI:N7N	2.52	0.41
1:C:401:GLY:HA3	1:C:420:ILE:O	2.21	0.41
1:A:58:LYS:N	1:A:58:LYS:HD3	2.36	0.41
1:C:55:ILE:HB	1:C:56:PRO:HD3	2.03	0.41
1:C:450:SER:OG	1:D:354:PRO:HB2	2.22	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:A:964:HOH:O	5:D:735:HOH:O[1_455]	2.12	0.08
1:A:345:LYS:HZ3	1:B:2:SER:O[2_746]	1.55	0.05

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

There are no protein backbone outliers to report in this entry.

5.3.2 Protein sidechains [i](#)

There are no protein residues with a non-rotameric sidechain to report in this entry.

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](#)

28 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
4	DMS	A	505	-	3,3,3	0.67	0	3,3,3	0.52	0
3	NAI	C	502	-	47,48,48	3.94	26 (55%)	64,73,73	2.64	16 (25%)
4	DMS	A	506	-	3,3,3	0.67	0	3,3,3	0.52	0
4	DMS	A	508	-	3,3,3	0.67	0	3,3,3	0.53	0
4	DMS	B	505	-	3,3,3	0.67	0	3,3,3	0.51	0
4	DMS	B	506	-	3,3,3	0.67	0	3,3,3	0.52	0
4	DMS	A	503	-	3,3,3	0.66	0	3,3,3	0.53	0
2	FAD	C	501	-	58,58,58	2.67	19 (32%)	85,89,89	2.00	21 (24%)
4	DMS	C	505	-	3,3,3	0.67	0	3,3,3	0.52	0
4	DMS	C	506	-	3,3,3	0.67	0	3,3,3	0.52	0
4	DMS	C	504	-	3,3,3	0.67	0	3,3,3	0.51	0
2	FAD	B	501	-	58,58,58	2.60	18 (31%)	85,89,89	2.00	22 (25%)
4	DMS	B	504	-	3,3,3	0.67	0	3,3,3	0.53	0
3	NAI	D	502	-	47,48,48	4.04	26 (55%)	64,73,73	2.63	14 (21%)
4	DMS	A	509	-	3,3,3	0.67	0	3,3,3	0.50	0
4	DMS	D	503	-	3,3,3	0.66	0	3,3,3	0.53	0
4	DMS	D	504	-	3,3,3	0.67	0	3,3,3	0.52	0
4	DMS	C	503	-	3,3,3	0.67	0	3,3,3	0.52	0
2	FAD	D	501	-	58,58,58	2.84	20 (34%)	85,89,89	2.08	22 (25%)
3	NAI	A	502	-	47,48,48	3.84	26 (55%)	64,73,73	2.62	17 (26%)
4	DMS	C	507	-	3,3,3	0.61	0	3,3,3	0.53	0
4	DMS	D	505	-	3,3,3	0.67	0	3,3,3	0.52	0
4	DMS	A	507	-	3,3,3	0.67	0	3,3,3	0.52	0
3	NAI	B	502	-	47,48,48	3.92	26 (55%)	64,73,73	2.78	18 (28%)
4	DMS	B	503	-	3,3,3	0.67	0	3,3,3	0.52	0
4	DMS	C	508	-	3,3,3	0.66	0	3,3,3	0.52	0
2	FAD	A	501	-	58,58,58	2.60	19 (32%)	85,89,89	2.00	20 (23%)
4	DMS	A	504	-	3,3,3	0.67	0	3,3,3	0.51	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	FAD	C	501	-	-	0/34/50/50	0/6/6/6
3	NAI	C	502	-	-	4/29/72/72	0/5/5/5
2	FAD	D	501	-	-	9/34/50/50	0/6/6/6
3	NAI	B	502	-	-	4/29/72/72	0/5/5/5
2	FAD	B	501	-	-	2/34/50/50	0/6/6/6
2	FAD	A	501	-	-	0/34/50/50	0/6/6/6
3	NAI	D	502	-	-	12/29/72/72	0/5/5/5
3	NAI	A	502	-	-	4/29/72/72	0/5/5/5

All (180) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	502	NAI	C3B-C4B	-10.38	1.26	1.53
3	C	502	NAI	C3B-C4B	-10.35	1.26	1.53
3	B	502	NAI	C3B-C4B	-10.26	1.27	1.53
3	A	502	NAI	C3B-C4B	-10.14	1.27	1.53
2	D	501	FAD	O4B-C1B	8.65	1.62	1.42
2	B	501	FAD	O4B-C1B	8.37	1.61	1.42
2	C	501	FAD	O4B-C1B	8.33	1.61	1.42
3	D	502	NAI	C2B-C1B	-8.21	1.27	1.53
3	B	502	NAI	C2B-C1B	-8.17	1.27	1.53
3	C	502	NAI	C2B-C1B	-8.13	1.27	1.53
2	A	501	FAD	O4B-C1B	8.07	1.60	1.42
3	D	502	NAI	O4D-C1D	8.06	1.60	1.42
3	A	502	NAI	C2B-C1B	-8.01	1.28	1.53
2	D	501	FAD	C2B-C1B	-7.69	1.29	1.53
3	C	502	NAI	C2D-C1D	-7.58	1.29	1.53
3	A	502	NAI	C2D-C1D	-7.55	1.29	1.53
3	B	502	NAI	C2D-C1D	-7.54	1.29	1.53
3	D	502	NAI	C2N-C3N	7.45	1.55	1.35
2	B	501	FAD	C2B-C1B	-7.36	1.30	1.53
2	C	501	FAD	C2B-C1B	-7.36	1.30	1.53
3	C	502	NAI	O4D-C1D	7.33	1.58	1.42
3	D	502	NAI	C2D-C1D	-7.16	1.31	1.53
3	A	502	NAI	O4D-C1D	7.15	1.58	1.42
3	B	502	NAI	O4D-C1D	7.12	1.58	1.42
2	A	501	FAD	C2B-C1B	-7.12	1.31	1.53
3	C	502	NAI	C2N-C3N	7.05	1.54	1.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	502	NAI	C6N-C5N	7.02	1.54	1.33
3	C	502	NAI	C6N-C5N	6.98	1.54	1.33
3	B	502	NAI	C6N-C5N	6.97	1.54	1.33
3	A	502	NAI	C6N-C5N	6.92	1.54	1.33
3	A	502	NAI	C2N-C3N	6.81	1.53	1.35
3	B	502	NAI	C2N-C3N	6.77	1.53	1.35
2	D	501	FAD	O4B-C4B	-6.76	1.30	1.45
3	B	502	NAI	C6A-N6A	6.67	1.51	1.34
3	D	502	NAI	C6A-N6A	6.67	1.51	1.34
3	C	502	NAI	C6A-N6A	6.60	1.51	1.34
3	A	502	NAI	C6A-N6A	6.59	1.51	1.34
2	C	501	FAD	O4B-C4B	-6.49	1.30	1.45
2	A	501	FAD	O4B-C4B	-6.44	1.30	1.45
2	B	501	FAD	O4B-C4B	-6.18	1.31	1.45
3	C	502	NAI	O4D-C4D	-5.99	1.31	1.45
3	B	502	NAI	O4B-C1B	5.97	1.55	1.42
2	C	501	FAD	C4X-N5	5.94	1.43	1.30
3	D	502	NAI	PA-O3	5.92	1.65	1.59
2	D	501	FAD	C10-N1	5.91	1.45	1.33
3	A	502	NAI	O4D-C4D	-5.90	1.31	1.45
3	D	502	NAI	O4B-C1B	5.89	1.55	1.42
3	B	502	NAI	O4D-C4D	-5.85	1.32	1.45
3	D	502	NAI	O4D-C4D	-5.83	1.32	1.45
2	D	501	FAD	C9A-N10	5.83	1.51	1.41
2	A	501	FAD	C4X-N5	5.76	1.43	1.30
3	C	502	NAI	O4B-C1B	5.75	1.55	1.42
2	D	501	FAD	C4X-N5	5.71	1.43	1.30
2	B	501	FAD	C4X-N5	5.70	1.43	1.30
3	D	502	NAI	O4B-C4B	5.66	1.57	1.45
3	D	502	NAI	C2B-C3B	5.63	1.68	1.53
3	B	502	NAI	PA-O3	5.57	1.65	1.59
2	A	501	FAD	C10-N1	5.53	1.44	1.33
3	A	502	NAI	O4B-C1B	5.48	1.54	1.42
3	C	502	NAI	C2B-C3B	5.42	1.68	1.53
3	B	502	NAI	C2B-C3B	5.41	1.68	1.53
3	D	502	NAI	C7N-N7N	5.40	1.49	1.33
3	C	502	NAI	O4B-C4B	5.36	1.56	1.45
2	C	501	FAD	C10-N1	5.34	1.44	1.33
3	C	502	NAI	C7N-N7N	5.26	1.48	1.33
3	C	502	NAI	PA-O3	5.26	1.65	1.59
3	B	502	NAI	C7N-N7N	5.23	1.48	1.33
3	B	502	NAI	O4B-C4B	5.21	1.56	1.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	502	NAI	C7N-N7N	5.19	1.48	1.33
3	A	502	NAI	C2B-C3B	5.10	1.67	1.53
2	B	501	FAD	C10-N1	5.04	1.43	1.33
2	D	501	FAD	C2-N1	4.98	1.47	1.36
3	A	502	NAI	O4B-C4B	4.97	1.56	1.45
3	A	502	NAI	PA-O3	4.86	1.64	1.59
2	C	501	FAD	C2-N3	4.48	1.48	1.39
2	C	501	FAD	C9A-N10	4.46	1.48	1.41
2	D	501	FAD	C2-N3	4.45	1.48	1.39
2	A	501	FAD	C2-N3	4.39	1.48	1.39
2	B	501	FAD	C2-N3	4.30	1.48	1.39
2	C	501	FAD	C2-N1	4.26	1.46	1.36
2	A	501	FAD	C2-N1	4.21	1.46	1.36
2	B	501	FAD	C2-N1	4.14	1.46	1.36
2	B	501	FAD	C9A-N10	4.07	1.48	1.41
2	D	501	FAD	C6A-N6A	4.05	1.44	1.34
2	A	501	FAD	C9A-N10	4.04	1.48	1.41
2	D	501	FAD	O3B-C3B	-4.02	1.33	1.43
3	D	502	NAI	C6N-N1N	3.93	1.46	1.37
2	A	501	FAD	O3B-C3B	-3.85	1.33	1.43
2	B	501	FAD	C5X-N5	3.85	1.46	1.39
3	C	502	NAI	C6N-N1N	3.82	1.46	1.37
2	C	501	FAD	O3B-C3B	-3.80	1.33	1.43
3	A	502	NAI	C6N-N1N	3.79	1.46	1.37
2	C	501	FAD	C5X-N5	3.76	1.46	1.39
3	B	502	NAI	C6N-N1N	3.75	1.46	1.37
2	C	501	FAD	C6A-N6A	3.73	1.43	1.34
2	D	501	FAD	C5X-N5	3.68	1.46	1.39
2	B	501	FAD	O3B-C3B	-3.67	1.33	1.43
2	A	501	FAD	C5X-N5	3.65	1.46	1.39
2	B	501	FAD	C6A-N6A	3.60	1.43	1.34
2	A	501	FAD	C6A-N6A	3.60	1.43	1.34
3	D	502	NAI	PN-O3	3.59	1.63	1.59
3	B	502	NAI	PN-O3	3.28	1.63	1.59
3	D	502	NAI	C7N-C3N	3.19	1.55	1.48
2	D	501	FAD	C10-N10	3.19	1.44	1.37
3	C	502	NAI	PN-O3	3.15	1.62	1.59
2	B	501	FAD	O2B-C2B	3.04	1.50	1.43
3	D	502	NAI	C4N-C5N	3.03	1.56	1.49
3	C	502	NAI	C4N-C5N	3.01	1.56	1.49
2	D	501	FAD	O2B-C2B	2.99	1.50	1.43
3	B	502	NAI	C4N-C5N	2.96	1.56	1.49

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	502	NAI	C4N-C5N	2.84	1.56	1.49
3	C	502	NAI	O2D-C2D	2.84	1.50	1.43
3	D	502	NAI	C5A-N7A	-2.84	1.33	1.39
2	C	501	FAD	C4-N3	2.82	1.44	1.38
3	A	502	NAI	O2D-C2D	2.80	1.49	1.43
2	A	501	FAD	O2B-C2B	2.80	1.49	1.43
3	B	502	NAI	O2D-C2D	2.79	1.49	1.43
3	D	502	NAI	PN-O5D	2.76	1.70	1.59
3	C	502	NAI	C7N-C3N	2.75	1.54	1.48
2	B	501	FAD	C4-N3	2.73	1.44	1.38
2	C	501	FAD	O2B-C2B	2.69	1.49	1.43
3	A	502	NAI	C5A-N7A	-2.68	1.34	1.39
3	B	502	NAI	C7N-C3N	2.67	1.54	1.48
3	C	502	NAI	C5A-N7A	-2.65	1.34	1.39
3	C	502	NAI	PN-O5D	2.64	1.69	1.59
3	D	502	NAI	O2D-C2D	2.64	1.49	1.43
3	C	502	NAI	C5A-C4A	-2.58	1.34	1.39
3	A	502	NAI	C7N-C3N	2.56	1.54	1.48
3	A	502	NAI	C5A-C4A	-2.55	1.34	1.39
2	D	501	FAD	C4-N3	2.55	1.43	1.38
3	A	502	NAI	PN-O5D	2.53	1.69	1.59
2	B	501	FAD	C5A-C4A	-2.52	1.34	1.39
3	B	502	NAI	C5A-C4A	-2.52	1.34	1.39
3	D	502	NAI	C8A-N9A	-2.51	1.33	1.37
2	D	501	FAD	C2A-N1A	2.51	1.38	1.33
3	B	502	NAI	PN-O5D	2.50	1.69	1.59
3	B	502	NAI	C5A-N7A	-2.50	1.34	1.39
2	A	501	FAD	C4-N3	2.50	1.43	1.38
3	A	502	NAI	PN-O3	2.49	1.62	1.59
2	A	501	FAD	O2'-C2'	-2.48	1.38	1.43
3	A	502	NAI	C8A-N9A	-2.46	1.33	1.37
3	D	502	NAI	C5B-C4B	2.45	1.58	1.51
3	C	502	NAI	O7N-C7N	-2.44	1.18	1.24
3	C	502	NAI	C8A-N9A	-2.42	1.33	1.37
3	D	502	NAI	O7N-C7N	-2.42	1.18	1.24
3	D	502	NAI	C5A-C4A	-2.42	1.34	1.39
3	B	502	NAI	C8A-N9A	-2.42	1.33	1.37
2	A	501	FAD	C8A-N7A	2.40	1.36	1.31
2	C	501	FAD	C2A-N1A	2.38	1.38	1.33
3	C	502	NAI	C5B-C4B	2.37	1.58	1.51
2	D	501	FAD	C8A-N7A	2.36	1.36	1.31
2	C	501	FAD	O2'-C2'	-2.34	1.38	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	502	NAI	C4N-C3N	2.34	1.54	1.50
2	B	501	FAD	C8A-N7A	2.34	1.36	1.31
2	D	501	FAD	C1'-C2'	2.33	1.55	1.52
2	A	501	FAD	C5A-C4A	-2.31	1.35	1.39
3	B	502	NAI	C5B-C4B	2.30	1.58	1.51
2	C	501	FAD	C8A-N7A	2.30	1.36	1.31
2	C	501	FAD	C4A-N3A	2.29	1.38	1.34
3	D	502	NAI	C4N-C3N	2.29	1.54	1.50
3	B	502	NAI	O7N-C7N	-2.28	1.19	1.24
3	C	502	NAI	C4N-C3N	2.26	1.54	1.50
2	A	501	FAD	C2A-N1A	2.25	1.37	1.33
2	C	501	FAD	C5A-C4A	-2.24	1.35	1.39
3	A	502	NAI	O7N-C7N	-2.24	1.19	1.24
3	A	502	NAI	C4N-C3N	2.24	1.54	1.50
2	D	501	FAD	C5A-C4A	-2.21	1.35	1.39
2	B	501	FAD	O2'-C2'	-2.21	1.38	1.43
2	D	501	FAD	O2'-C2'	-2.19	1.38	1.43
3	D	502	NAI	O3D-C3D	-2.19	1.37	1.43
2	D	501	FAD	C6-C5X	2.18	1.43	1.40
2	A	501	FAD	C4A-N3A	2.16	1.38	1.34
2	B	501	FAD	C2A-N1A	2.13	1.37	1.33
3	A	502	NAI	C5B-C4B	2.13	1.58	1.51
3	A	502	NAI	O3D-C3D	-2.12	1.37	1.43
3	B	502	NAI	O3D-C3D	-2.12	1.37	1.43
2	B	501	FAD	C6-C5X	2.10	1.43	1.40
2	C	501	FAD	C5A-N7A	-2.09	1.35	1.39
3	C	502	NAI	O3D-C3D	-2.07	1.37	1.43
2	A	501	FAD	C2A-N3A	2.02	1.37	1.33

All (150) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	502	NAI	N6A-C6A-N1A	-11.19	93.45	118.38
3	D	502	NAI	N6A-C6A-N1A	-10.85	94.21	118.38
3	C	502	NAI	N6A-C6A-N1A	-10.56	94.85	118.38
3	A	502	NAI	N6A-C6A-N1A	-10.25	95.55	118.38
3	B	502	NAI	C5A-C6A-N6A	9.27	146.23	123.29
3	D	502	NAI	C5A-C6A-N6A	9.26	146.20	123.29
3	C	502	NAI	C5A-C6A-N6A	8.72	144.87	123.29
3	A	502	NAI	C5A-C6A-N6A	8.46	144.24	123.29
3	B	502	NAI	C4A-N9A-C1B	-6.93	110.42	126.63
3	C	502	NAI	C4A-N9A-C1B	-6.71	110.94	126.63

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	FAD	C7M-C7-C6	-6.57	107.99	119.57
3	B	502	NAI	C1B-N9A-C8A	6.46	141.42	127.09
3	D	502	NAI	C4A-N9A-C1B	-6.42	111.63	126.63
2	C	501	FAD	C7M-C7-C6	-6.41	108.29	119.57
3	A	502	NAI	C4A-N9A-C1B	-6.32	111.84	126.63
2	D	501	FAD	N6A-C6A-N1A	-6.30	104.34	118.38
3	D	502	NAI	C1B-N9A-C8A	6.28	141.03	127.09
2	D	501	FAD	C7M-C7-C6	-6.11	108.81	119.57
3	C	502	NAI	C1B-N9A-C8A	6.10	140.64	127.09
2	A	501	FAD	N6A-C6A-N1A	-5.97	105.07	118.38
2	A	501	FAD	N3A-C2A-N1A	-5.97	119.55	128.58
2	B	501	FAD	N3A-C2A-N1A	-5.85	119.72	128.58
2	C	501	FAD	N3A-C2A-N1A	-5.81	119.79	128.58
2	B	501	FAD	C7M-C7-C6	-5.78	109.38	119.57
3	B	502	NAI	N3A-C2A-N1A	-5.78	119.84	128.58
3	C	502	NAI	N3A-C2A-N1A	-5.77	119.84	128.58
3	A	502	NAI	N3A-C2A-N1A	-5.75	119.88	128.58
2	B	501	FAD	N6A-C6A-N1A	-5.70	105.68	118.38
2	C	501	FAD	N6A-C6A-N1A	-5.61	105.88	118.38
3	A	502	NAI	C1B-N9A-C8A	5.55	139.42	127.09
2	D	501	FAD	C7M-C7-C8	5.49	131.98	120.76
3	D	502	NAI	N3A-C2A-N1A	-5.41	120.40	128.58
2	D	501	FAD	C5A-C6A-N6A	5.26	136.30	123.29
3	C	502	NAI	C5A-C4A-N3A	-5.14	119.64	126.72
2	A	501	FAD	C7M-C7-C8	5.11	131.19	120.76
3	B	502	NAI	C5A-C4A-N3A	-5.10	119.69	126.72
2	C	501	FAD	C7M-C7-C8	5.08	131.14	120.76
3	A	502	NAI	C5A-C4A-N3A	-5.04	119.78	126.72
3	D	502	NAI	C5A-C4A-N3A	-5.02	119.80	126.72
2	A	501	FAD	C5A-C6A-N6A	4.87	135.35	123.29
2	D	501	FAD	N3A-C2A-N1A	-4.83	121.27	128.58
2	C	501	FAD	C5A-C4A-N3A	-4.77	120.15	126.72
2	B	501	FAD	C7M-C7-C8	4.51	129.97	120.76
2	D	501	FAD	C5'-C4'-C3'	4.49	120.68	112.22
2	C	501	FAD	C5A-C6A-N6A	4.45	134.31	123.29
2	B	501	FAD	C5A-C4A-N3A	-4.45	120.59	126.72
2	B	501	FAD	C5A-C6A-N6A	4.44	134.29	123.29
2	A	501	FAD	C5A-C4A-N3A	-4.35	120.72	126.72
2	C	501	FAD	N9A-C8A-N7A	-4.04	108.21	113.94
3	A	502	NAI	N9A-C8A-N7A	-4.01	108.24	113.94
3	C	502	NAI	N9A-C8A-N7A	-4.01	108.25	113.94
3	A	502	NAI	N3A-C4A-N9A	4.00	133.96	127.17

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	501	FAD	N9A-C8A-N7A	-3.98	108.29	113.94
3	B	502	NAI	N9A-C8A-N7A	-3.97	108.30	113.94
2	B	501	FAD	O4B-C1B-N9A	-3.92	100.56	108.09
2	A	501	FAD	N9A-C8A-N7A	-3.87	108.44	113.94
3	C	502	NAI	N3A-C4A-N9A	3.80	133.63	127.17
2	D	501	FAD	C5X-C9A-N10	3.75	121.36	117.97
2	B	501	FAD	C5X-C9A-N10	3.71	121.32	117.97
2	D	501	FAD	C4-N3-C2	-3.66	119.14	125.64
2	D	501	FAD	C5A-C4A-N3A	-3.63	121.72	126.72
2	D	501	FAD	N9A-C8A-N7A	-3.60	108.83	113.94
2	D	501	FAD	C2'-C1'-N10	3.55	126.96	110.20
2	A	501	FAD	O4B-C1B-N9A	-3.50	101.37	108.09
3	B	502	NAI	C2A-N3A-C4A	3.44	120.22	111.83
3	B	502	NAI	N3A-C4A-N9A	3.40	132.95	127.17
3	C	502	NAI	C2A-N3A-C4A	3.37	120.07	111.83
3	A	502	NAI	C2A-N3A-C4A	3.34	119.98	111.83
3	D	502	NAI	N3A-C4A-N9A	3.32	132.82	127.17
2	B	501	FAD	C2A-N3A-C4A	3.32	119.94	111.83
2	C	501	FAD	N3A-C4A-N9A	3.27	132.73	127.17
3	D	502	NAI	N9A-C8A-N7A	-3.23	109.35	113.94
3	B	502	NAI	C3N-C2N-N1N	-3.23	118.47	123.20
2	C	501	FAD	C2A-N3A-C4A	3.22	119.69	111.83
3	A	502	NAI	C3N-C2N-N1N	-3.17	118.55	123.20
2	C	501	FAD	O4B-C1B-N9A	-3.16	102.01	108.09
2	A	501	FAD	C2A-N3A-C4A	3.12	119.46	111.83
2	C	501	FAD	C4-N3-C2	-3.11	120.11	125.64
3	D	502	NAI	C2A-N3A-C4A	3.09	119.39	111.83
2	C	501	FAD	C5X-C9A-N10	2.97	120.65	117.97
2	D	501	FAD	C4-C4X-C10	2.89	121.89	116.93
2	B	501	FAD	C4'-C3'-C2'	-2.89	108.77	113.57
2	C	501	FAD	C4X-C10-N10	2.85	120.56	116.48
2	A	501	FAD	C4X-C10-N10	2.83	120.54	116.48
2	D	501	FAD	C4X-C10-N10	2.83	120.53	116.48
3	A	502	NAI	C4A-N9A-C8A	2.83	108.71	105.74
2	B	501	FAD	C4X-C10-N10	2.81	120.51	116.48
2	B	501	FAD	N3A-C4A-N9A	2.79	131.91	127.17
2	A	501	FAD	C4-N3-C2	-2.78	120.71	125.64
3	B	502	NAI	C5A-N7A-C8A	2.77	107.81	103.45
2	B	501	FAD	C4-N3-C2	-2.76	120.75	125.64
2	D	501	FAD	C4X-C10-N1	-2.70	117.96	124.59
3	C	502	NAI	C5A-N7A-C8A	2.69	107.68	103.45
2	B	501	FAD	C9-C9A-N10	-2.69	118.24	121.85

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	502	NAI	C4B-O4B-C1B	-2.67	103.57	109.47
2	D	501	FAD	C2A-N3A-C4A	2.67	118.35	111.83
2	D	501	FAD	C1'-C2'-C3'	2.66	116.87	109.66
2	A	501	FAD	N3A-C4A-N9A	2.64	131.65	127.17
3	C	502	NAI	C3N-C2N-N1N	-2.61	119.37	123.20
2	B	501	FAD	C9A-C5X-N5	-2.59	119.70	122.45
3	A	502	NAI	C5A-N7A-C8A	2.55	107.45	103.45
2	D	501	FAD	C5A-C4A-N9A	2.54	108.58	105.81
2	B	501	FAD	O4-C4-C4X	-2.53	119.85	126.53
3	C	502	NAI	C4A-N9A-C8A	2.52	108.39	105.74
2	C	501	FAD	C4'-C3'-C2'	-2.52	109.38	113.57
2	D	501	FAD	O4-C4-C4X	-2.49	119.96	126.53
2	A	501	FAD	C5X-C9A-N10	2.47	120.20	117.97
3	A	502	NAI	O4B-C1B-N9A	-2.46	103.36	108.09
2	D	501	FAD	C4X-C4-N3	2.46	119.52	113.25
2	C	501	FAD	C5A-N7A-C8A	2.45	107.30	103.45
2	C	501	FAD	O4-C4-C4X	-2.40	120.19	126.53
3	B	502	NAI	C2B-C3B-C4B	2.40	107.24	102.61
3	D	502	NAI	C6A-C5A-C4A	2.39	120.44	117.18
2	C	501	FAD	C4X-C4-N3	2.38	119.32	113.25
2	D	501	FAD	C9A-N10-C10	-2.38	117.12	120.75
2	C	501	FAD	C4A-N9A-C8A	2.38	108.23	105.74
3	D	502	NAI	C4B-O4B-C1B	-2.38	104.22	109.47
3	D	502	NAI	C3B-C2B-C1B	2.37	105.94	101.46
2	A	501	FAD	O4-C4-C4X	-2.36	120.31	126.53
2	C	501	FAD	C9A-C5X-N5	-2.35	119.96	122.45
3	C	502	NAI	C2B-C3B-C4B	2.34	107.13	102.61
2	A	501	FAD	C5A-N7A-C8A	2.33	107.11	103.45
2	B	501	FAD	C2B-C1B-N9A	2.33	119.09	113.30
3	D	502	NAI	C5A-N7A-C8A	2.32	107.09	103.45
2	B	501	FAD	C4A-N9A-C8A	2.30	108.15	105.74
3	B	502	NAI	O2A-PA-O3	2.28	113.44	107.27
3	D	502	NAI	C2B-C3B-C4B	2.28	107.02	102.61
2	A	501	FAD	C10-C4X-N5	-2.27	120.17	124.81
2	A	501	FAD	C4'-C3'-C2'	-2.27	109.79	113.57
3	B	502	NAI	C3B-C2B-C1B	2.24	105.71	101.46
3	B	502	NAI	C4B-O4B-C1B	-2.24	104.51	109.47
3	B	502	NAI	C4A-N9A-C8A	2.23	108.08	105.74
3	B	502	NAI	C1D-N1N-C2N	-2.22	117.48	121.14
2	C	501	FAD	C10-C4X-N5	-2.20	120.31	124.81
3	C	502	NAI	C4B-O4B-C1B	-2.18	104.64	109.47
3	A	502	NAI	O2A-PA-O3	2.18	113.17	107.27

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	501	FAD	C6A-C5A-C4A	2.18	120.16	117.18
2	A	501	FAD	C2B-C1B-N9A	2.18	118.72	113.30
2	B	501	FAD	C5A-N7A-C8A	2.18	106.87	103.45
3	C	502	NAI	C3B-C2B-C1B	2.17	105.56	101.46
2	B	501	FAD	C4X-C4-N3	2.17	118.77	113.25
3	A	502	NAI	C6A-C5A-C4A	2.17	120.14	117.18
2	A	501	FAD	C4X-C4-N3	2.12	118.66	113.25
3	C	502	NAI	C6A-C5A-C4A	2.12	120.07	117.18
2	D	501	FAD	C4A-C5A-N7A	-2.09	108.19	110.58
3	B	502	NAI	O4B-C1B-N9A	-2.07	104.11	108.09
3	A	502	NAI	C1D-N1N-C2N	-2.05	117.76	121.14
2	D	501	FAD	C5A-N7A-C8A	2.04	106.65	103.45
2	A	501	FAD	C4A-N9A-C8A	2.03	107.87	105.74
2	B	501	FAD	C10-C4X-N5	-2.01	120.70	124.81

There are no chirality outliers.

All (35) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	501	FAD	N10-C1'-C2'-O2'
2	D	501	FAD	N10-C1'-C2'-C3'
2	D	501	FAD	C2'-C3'-C4'-O4'
2	D	501	FAD	C2'-C3'-C4'-C5'
2	D	501	FAD	O3'-C3'-C4'-O4'
3	A	502	NAI	O4D-C1D-N1N-C2N
3	B	502	NAI	C5B-O5B-PA-O1A
3	C	502	NAI	O4D-C1D-N1N-C2N
3	D	502	NAI	O4D-C4D-C5D-O5D
3	D	502	NAI	C3D-C4D-C5D-O5D
3	B	502	NAI	O4D-C1D-N1N-C2N
2	D	501	FAD	O3'-C3'-C4'-C5'
3	D	502	NAI	O4D-C1D-N1N-C2N
3	D	502	NAI	C2D-C1D-N1N-C2N
3	D	502	NAI	C2D-C1D-N1N-C6N
3	D	502	NAI	PN-O3-PA-O1A
3	B	502	NAI	C2B-C1B-N9A-C8A
3	C	502	NAI	C2B-C1B-N9A-C8A
2	D	501	FAD	C5'-O5'-P-O3P
3	C	502	NAI	C5B-O5B-PA-O1A
3	D	502	NAI	C5B-O5B-PA-O1A
3	D	502	NAI	C5D-O5D-PN-O3
3	D	502	NAI	C5D-O5D-PN-O1N

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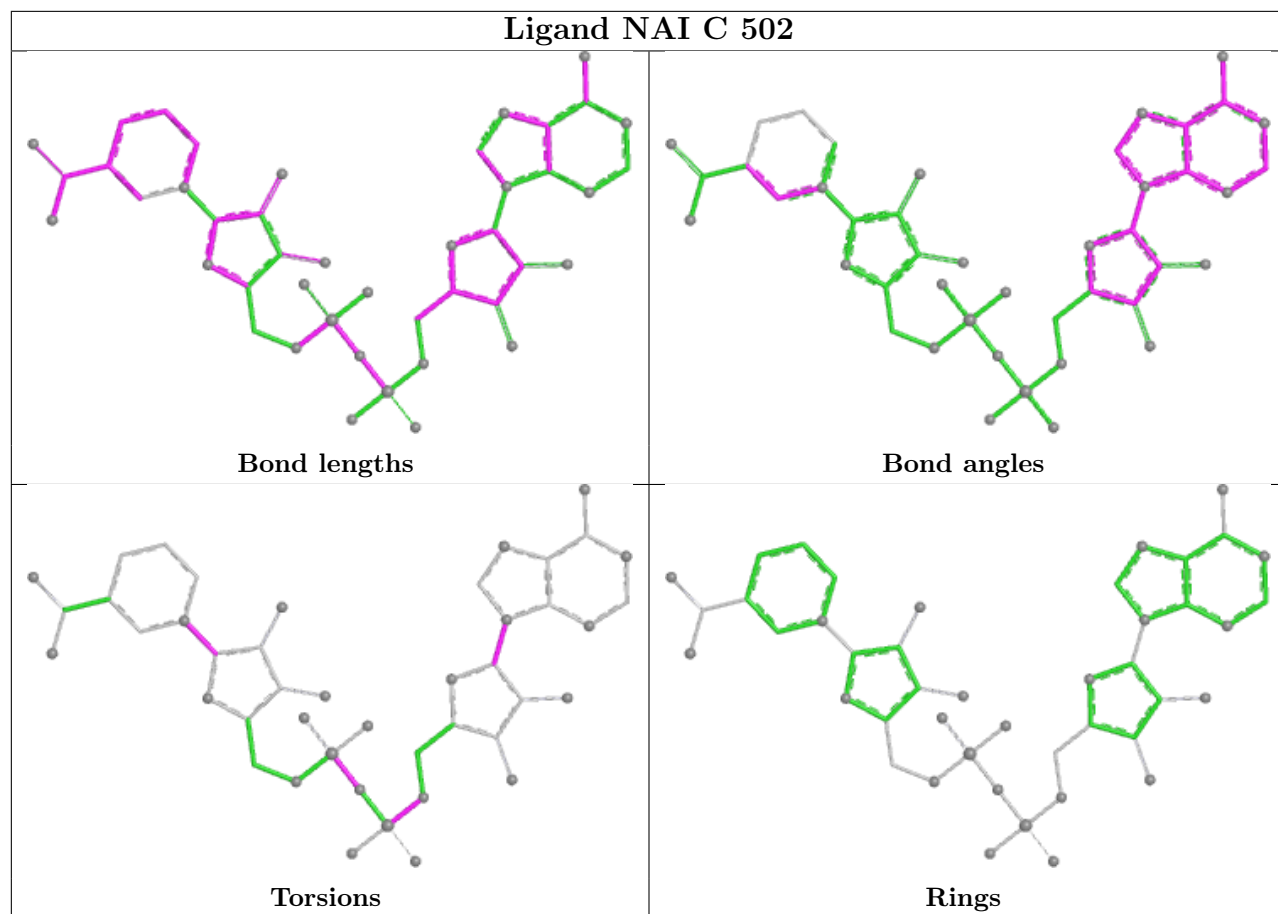
Mol	Chain	Res	Type	Atoms
3	D	502	NAI	C5D-O5D-PN-O2N
3	A	502	NAI	C2B-C1B-N9A-C8A
2	D	501	FAD	O4B-C4B-C5B-O5B
2	B	501	FAD	PA-O3P-P-O5'
2	D	501	FAD	C3B-C4B-C5B-O5B
3	A	502	NAI	O4B-C4B-C5B-O5B
3	A	502	NAI	PA-O3-PN-O1N
3	B	502	NAI	PA-O3-PN-O1N
3	C	502	NAI	PA-O3-PN-O1N
3	D	502	NAI	PN-O3-PA-O2A
2	B	501	FAD	O4B-C4B-C5B-O5B
3	D	502	NAI	O4B-C4B-C5B-O5B

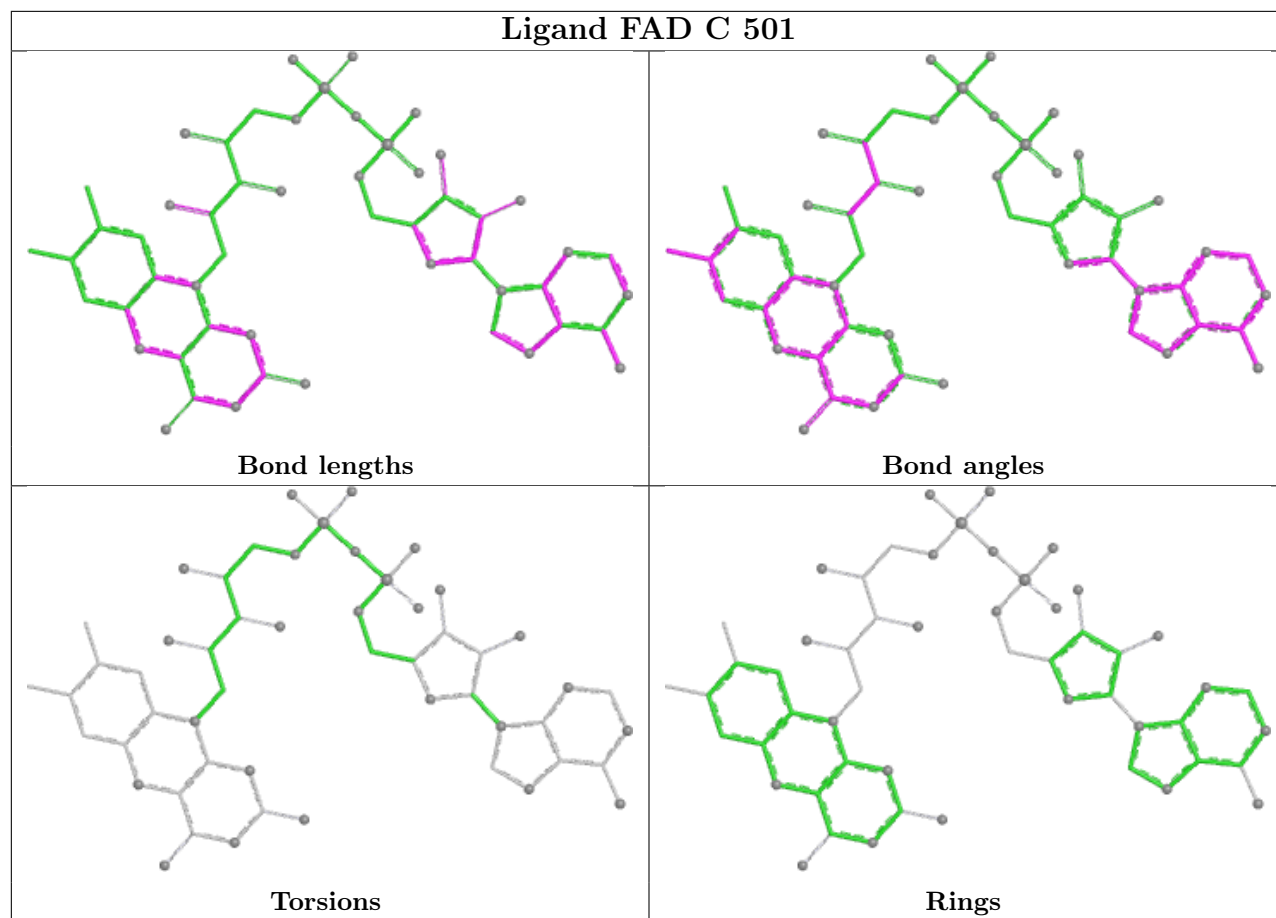
There are no ring outliers.

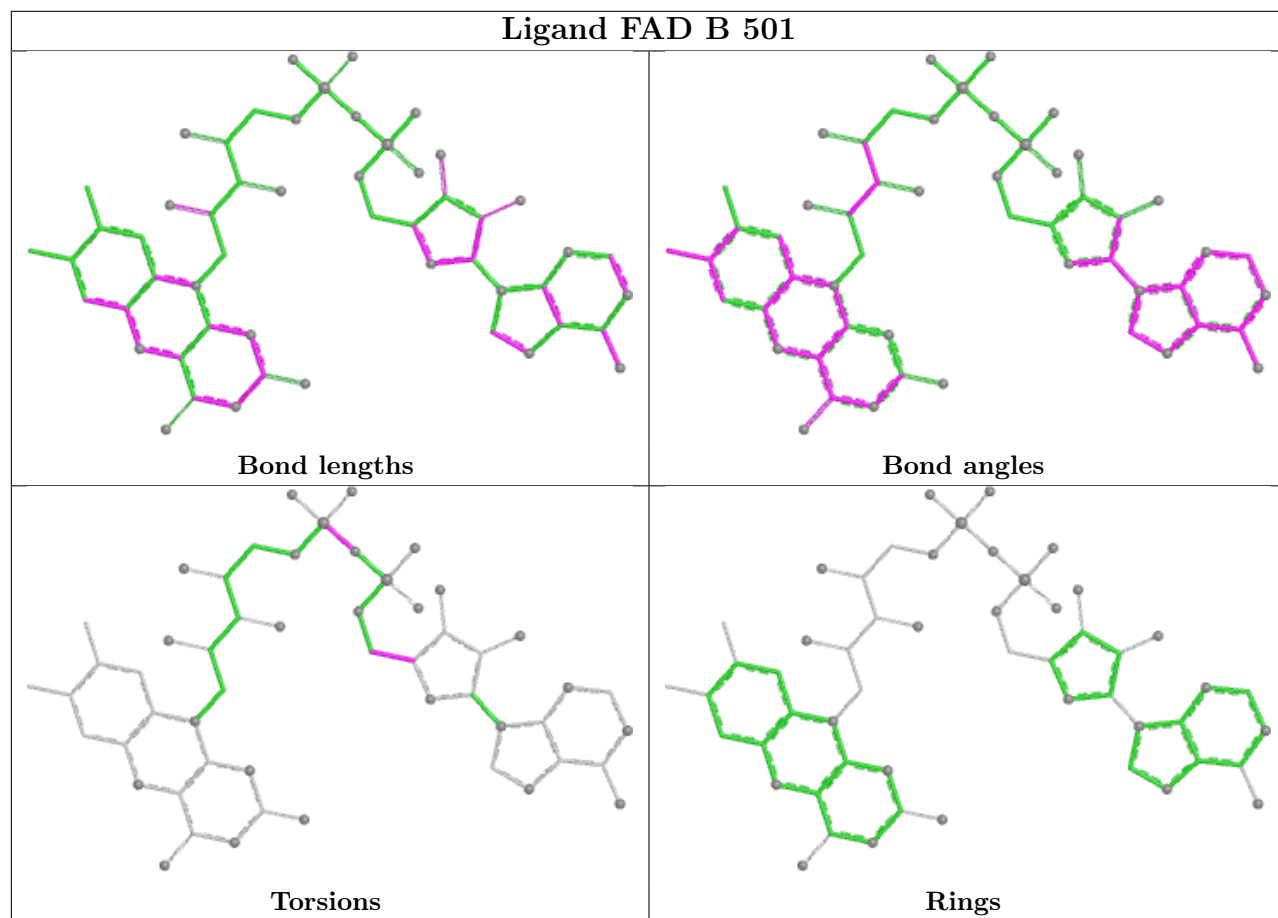
8 monomers are involved in 16 short contacts:

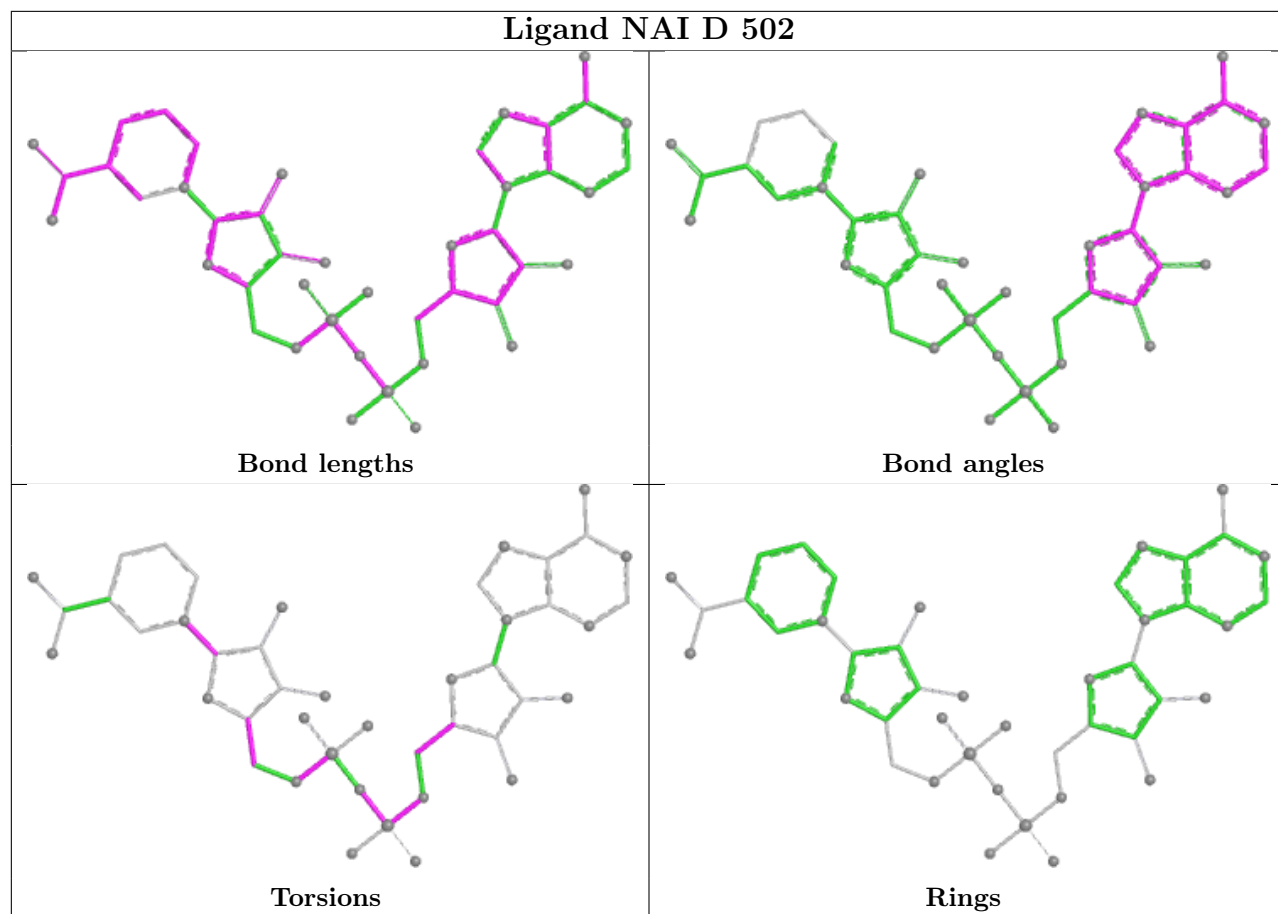
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	502	NAI	2	0
3	D	502	NAI	1	0
2	D	501	FAD	1	0
3	A	502	NAI	6	0
4	C	507	DMS	1	0
4	D	505	DMS	1	0
3	B	502	NAI	4	0
2	A	501	FAD	1	0

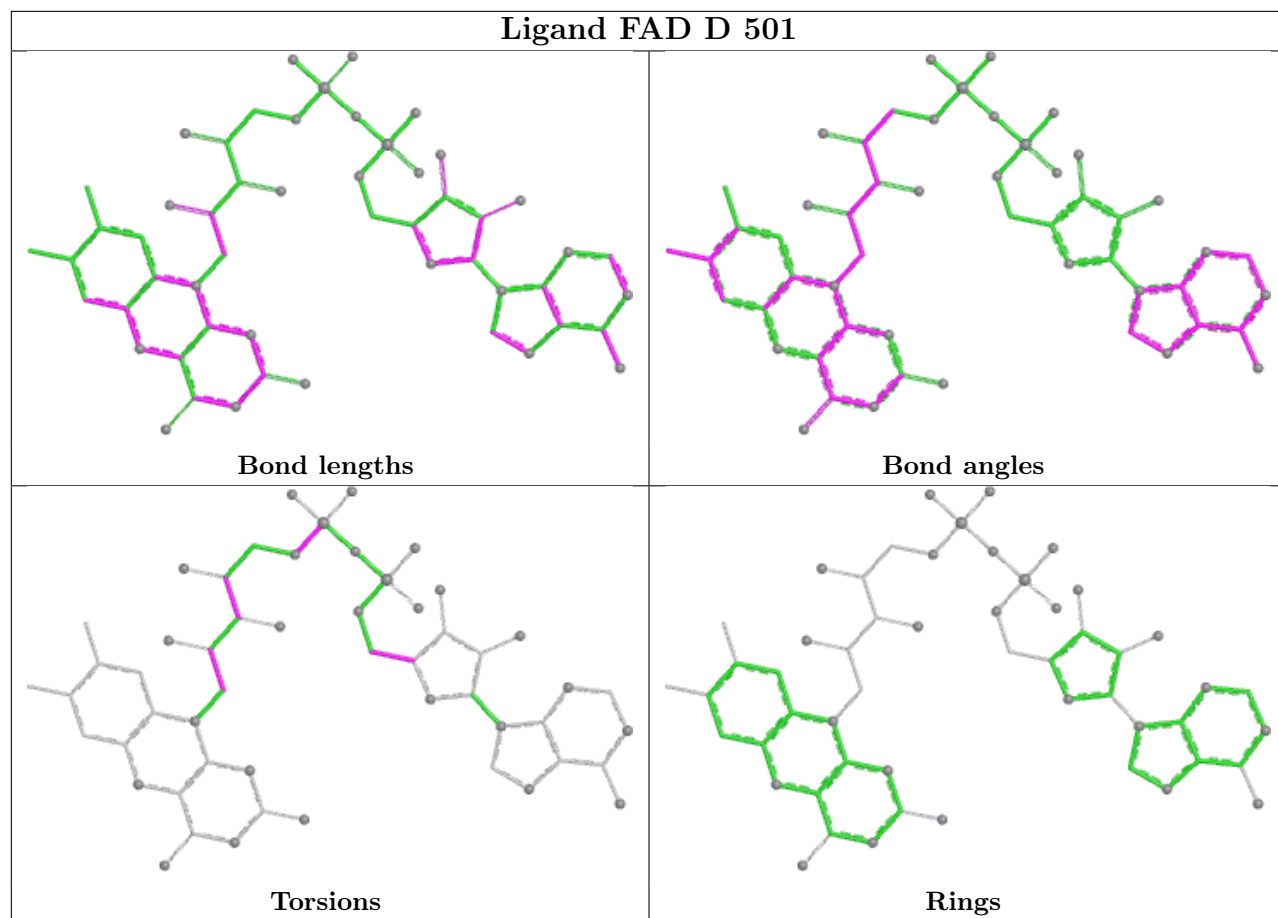
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

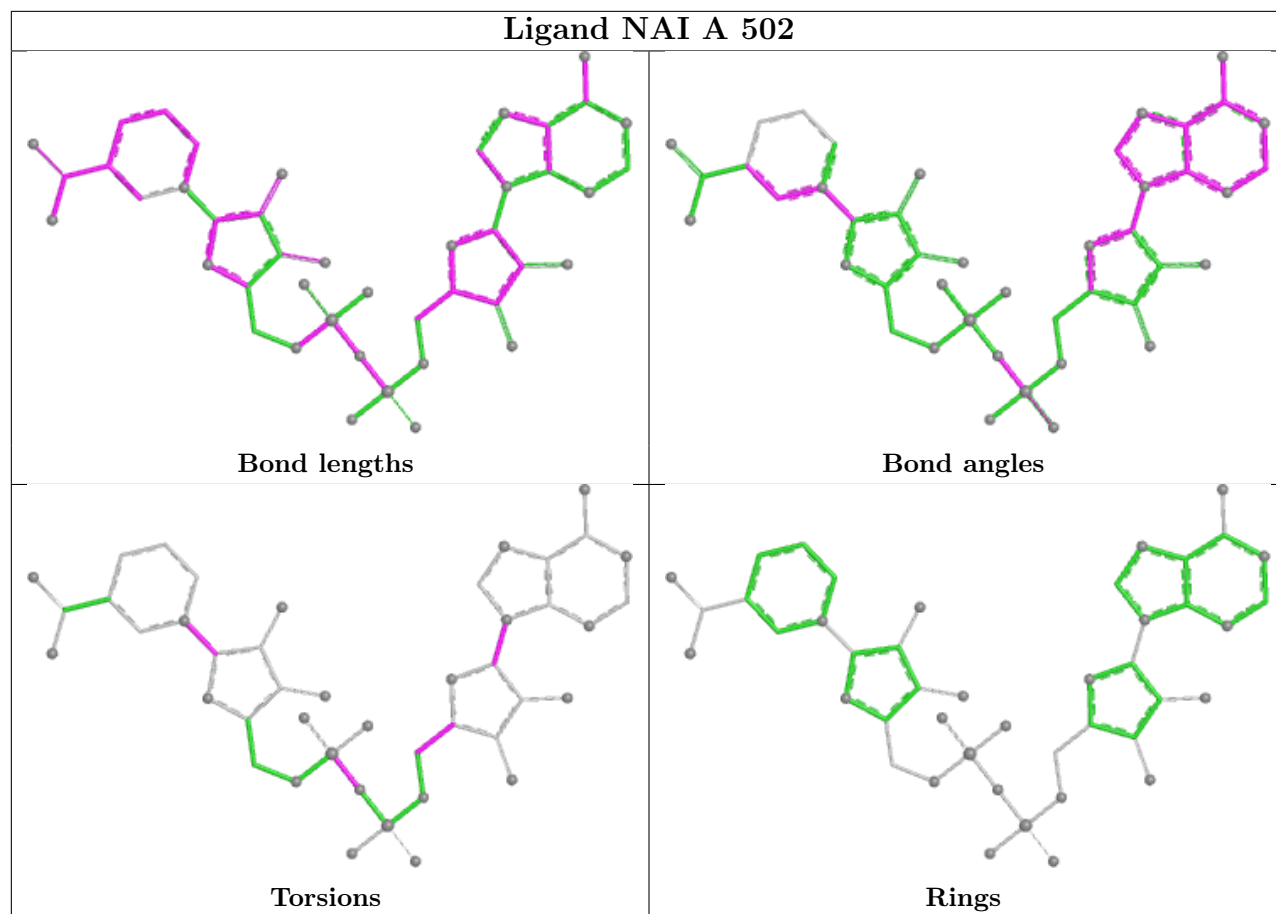


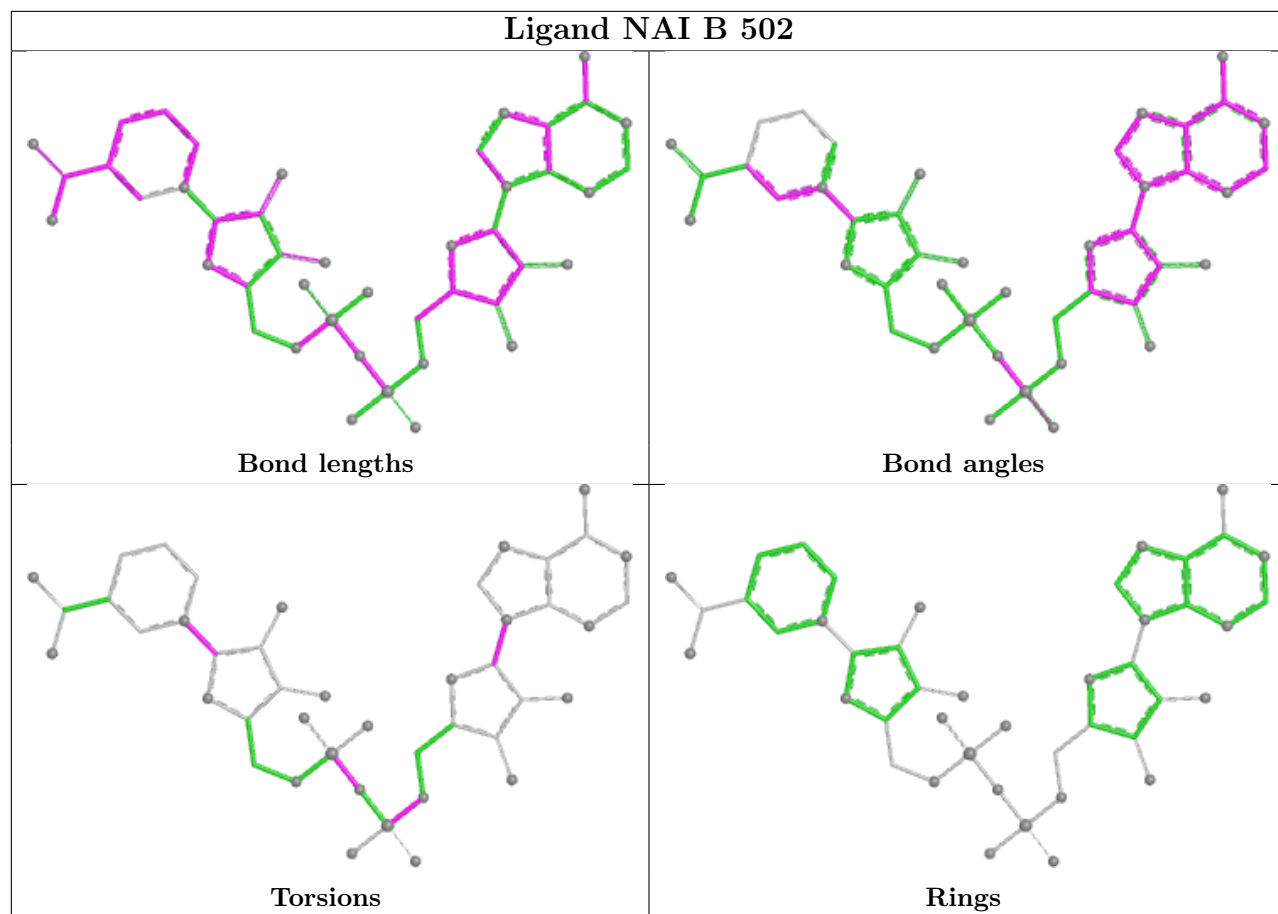


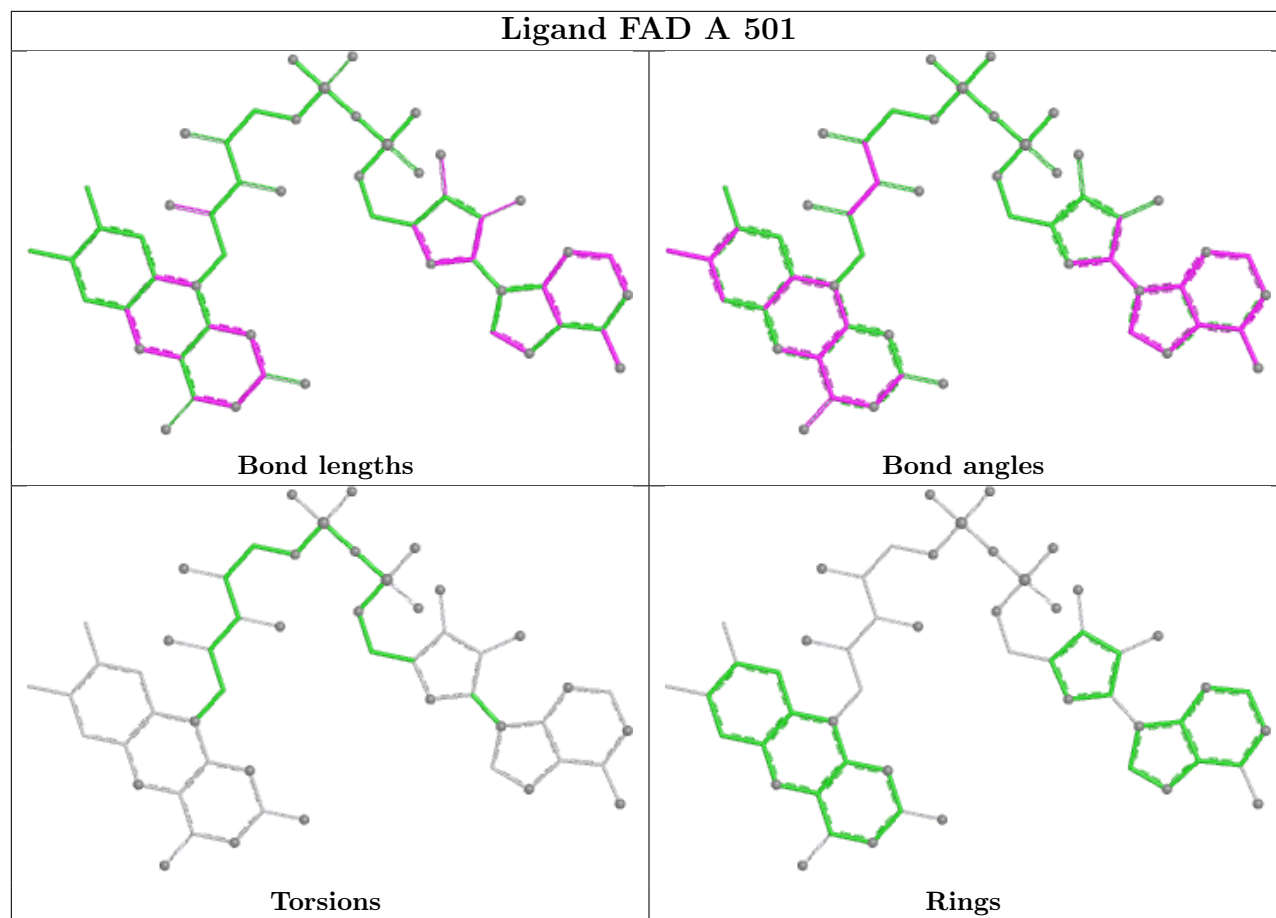












5.7 Other polymers [i](#)

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	473/481 (98%)	-0.18	17 (3%) 46 46	15, 32, 60, 95	2 (0%)
1	B	473/481 (98%)	-0.29	6 (1%) 75 75	13, 32, 63, 85	2 (0%)
1	C	473/481 (98%)	-0.05	11 (2%) 61 61	21, 39, 64, 98	2 (0%)
1	D	472/481 (98%)	0.88	67 (14%) 6 5	30, 58, 97, 131	1 (0%)
All	All	1891/1924 (98%)	0.09	101 (5%) 32 31	13, 39, 81, 131	7 (0%)

All (101) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	31	ALA	6.4
1	D	81	ALA	5.7
1	D	136	ASP	4.7
1	A	135	LEU	4.6
1	B	81	ALA	4.5
1	D	161	ALA	4.3
1	D	295	LEU	4.3
1	B	82	LYS	4.3
1	D	82	LYS	4.2
1	D	3	GLN	4.2
1	D	287	LEU	4.1
1	D	83	GLY	3.9
1	D	127	ASN	3.8
1	D	310	SER	3.8
1	C	82	LYS	3.7
1	D	252	LYS	3.6
1	D	302	TYR	3.5
1	C	81	ALA	3.5
1	D	30	THR	3.5
1	D	29	LYS	3.4
1	A	137	GLY	3.4

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Mol	Chain	Res	Type	RSRZ
1	D	135	LEU	3.4
1	A	343	GLY	3.4
1	A	2	SER	3.4
1	C	347	GLN	3.3
1	D	260	THR	3.3
1	D	284	THR	3.3
1	D	50	LEU	3.3
1	C	474	ASN	3.3
1	A	473	ALA	3.2
1	D	265	GLU	3.2
1	D	293	VAL	3.2
1	D	473	ALA	3.2
1	D	138	LYS	3.1
1	D	187	ILE	3.0
1	A	82	LYS	3.0
1	B	267	LYS	3.0
1	D	165	ASP	3.0
1	D	286	LEU	2.9
1	D	255	VAL	2.9
1	D	126	ALA	2.9
1	B	2	SER	2.9
1	D	378	VAL	2.9
1	D	162	PRO	2.9
1	D	129	GLN	2.8
1	A	344	HIS	2.8
1	C	84	VAL	2.8
1	D	163	LEU	2.8
1	D	210	LEU	2.8
1	D	167	ILE	2.8
1	D	247	ALA	2.8
1	C	345	LYS	2.8
1	D	251	LYS	2.7
1	D	257	VAL	2.7
1	D	253	LYS	2.7
1	B	83	GLY	2.7
1	D	244	ARG	2.6
1	A	474	ASN	2.6
1	C	2	SER	2.6
1	D	158	ILE	2.5
1	D	159	PRO	2.5
1	D	303	VAL	2.5
1	A	136	ASP	2.5

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Mol	Chain	Res	Type	RSRZ
1	D	294	THR	2.5
1	D	474	ASN	2.4
1	A	346	ALA	2.4
1	D	311	VAL	2.4
1	D	292	GLY	2.4
1	D	298	ARG	2.3
1	A	166	ASP	2.3
1	D	139	THR	2.3
1	D	26	LEU	2.3
1	D	125	LEU	2.3
1	D	250	VAL	2.3
1	A	347	GLN	2.3
1	C	302	TYR	2.3
1	C	472	ILE	2.3
1	D	245	VAL	2.3
1	A	81	ALA	2.2
1	A	345	LYS	2.2
1	D	289	ALA	2.2
1	D	241	LEU	2.2
1	D	299	GLY	2.2
1	C	473	ALA	2.2
1	D	342	ALA	2.2
1	D	267	LYS	2.2
1	D	130	VAL	2.1
1	D	346	ALA	2.1
1	D	149	ILE	2.1
1	A	413	ARG	2.1
1	D	275	VAL	2.1
1	D	124	LEU	2.1
1	D	262	ALA	2.1
1	A	446	MET	2.1
1	B	238	ASN	2.0
1	C	165	ASP	2.0
1	D	208	THR	2.0
1	A	339	GLU	2.0
1	D	188	GLY	2.0
1	D	259	PHE	2.0
1	D	300	PHE	2.0

6.2 Non-standard residues in protein, DNA, RNA chains

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.

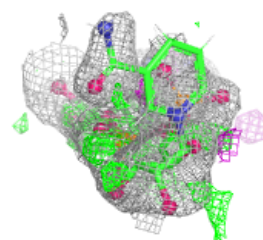
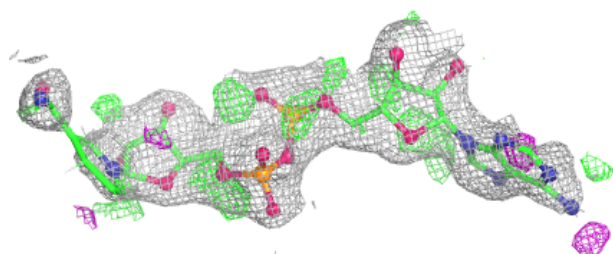
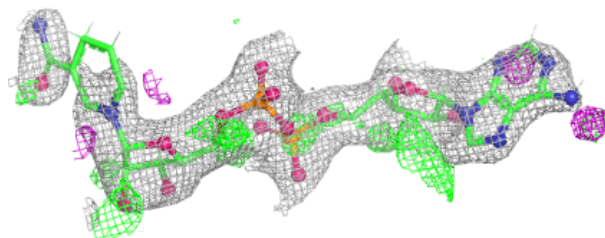
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	DMS	D	505	4/4	0.83	0.33	92,135,137,137	0
4	DMS	A	507	4/4	0.86	0.23	82,98,100,100	0
4	DMS	B	505	4/4	0.86	0.20	73,87,88,88	0
4	DMS	C	506	4/4	0.86	0.20	83,99,102,102	0
4	DMS	D	503	4/4	0.86	0.21	76,91,94,94	0
3	NAI	D	502	44/44	0.86	0.14	61,69,83,87	0
4	DMS	A	505	4/4	0.87	0.25	56,67,77,77	0
4	DMS	A	503	4/4	0.87	0.20	70,87,88,88	0
4	DMS	B	506	4/4	0.88	0.20	72,86,92,92	0
4	DMS	B	504	4/4	0.88	0.16	62,83,84,84	0
2	FAD	D	501	53/53	0.89	0.14	31,57,71,76	0
4	DMS	D	504	4/4	0.89	0.15	68,81,84,84	0
4	DMS	C	507	4/4	0.89	0.21	76,97,98,98	0
4	DMS	C	508	4/4	0.90	0.18	68,87,90,90	0
4	DMS	A	508	4/4	0.91	0.15	52,69,72,72	0
4	DMS	C	503	4/4	0.91	0.17	60,75,77,77	0
4	DMS	B	503	4/4	0.92	0.15	54,65,70,70	0
3	NAI	B	502	44/44	0.93	0.10	28,44,56,60	0
4	DMS	A	504	4/4	0.93	0.14	57,69,77,77	0
4	DMS	C	505	4/4	0.93	0.13	61,77,79,79	0
3	NAI	C	502	44/44	0.94	0.10	34,42,51,56	0
4	DMS	C	504	4/4	0.94	0.14	62,75,81,81	0
4	DMS	A	509	4/4	0.94	0.14	46,61,65,65	0
3	NAI	A	502	44/44	0.95	0.09	24,32,43,51	0
4	DMS	A	506	4/4	0.96	0.12	52,73,74,74	0
2	FAD	B	501	53/53	0.97	0.06	17,23,29,32	0
2	FAD	C	501	53/53	0.97	0.06	24,29,36,39	0
2	FAD	A	501	53/53	0.97	0.07	21,27,32,36	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.

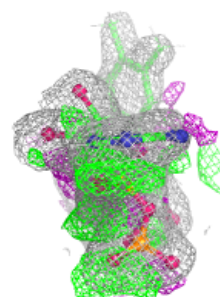
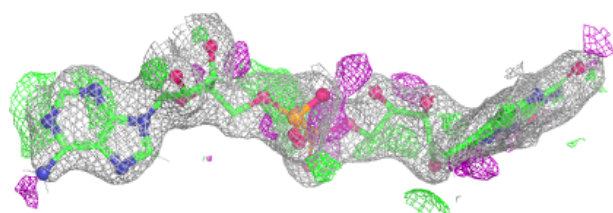
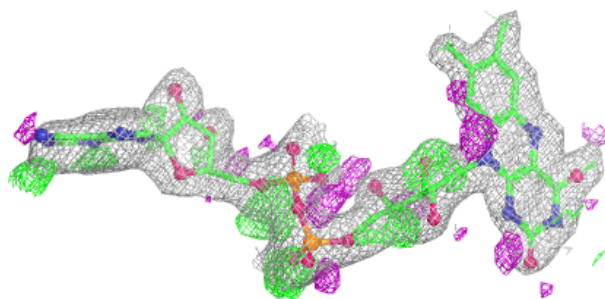
Electron density around NAI D 502:

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



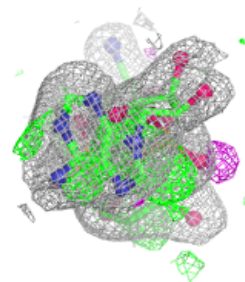
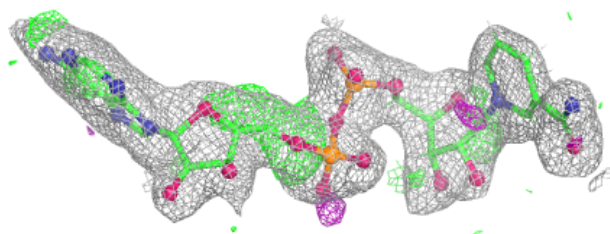
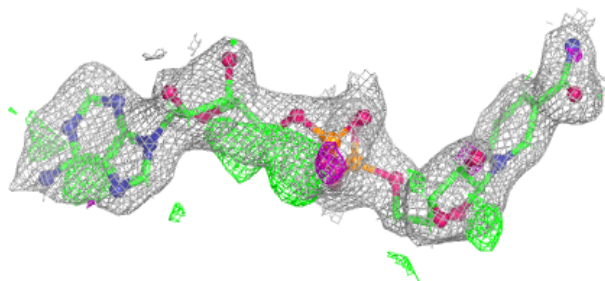
Electron density around FAD D 501:

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

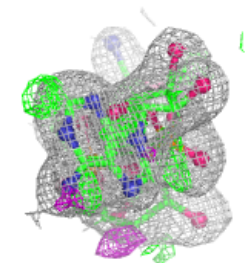
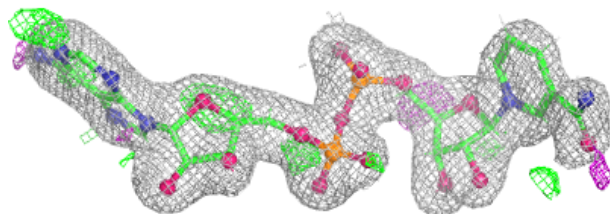
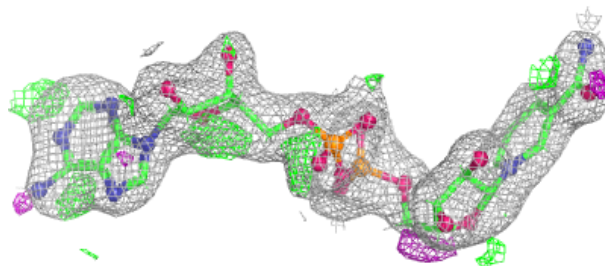


Electron density around NAI B 502:

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

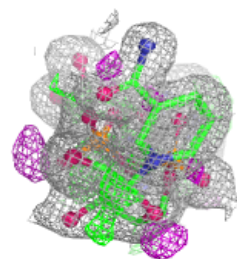
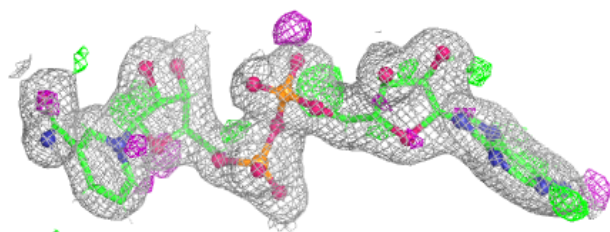
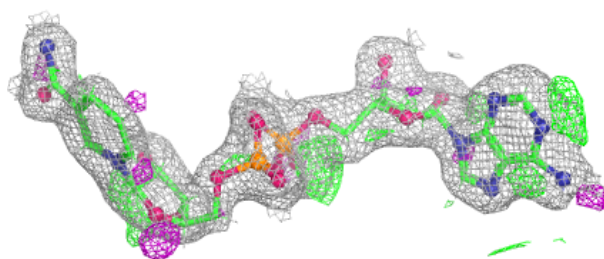
**Electron density around NAI C 502:**

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

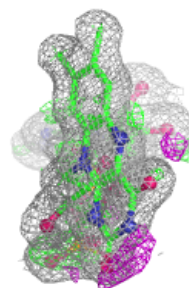
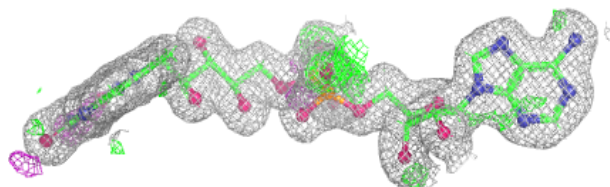
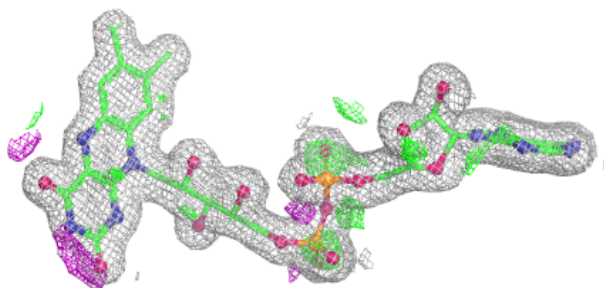


Electron density around NAI A 502:

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and green (positive)

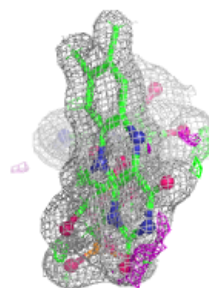
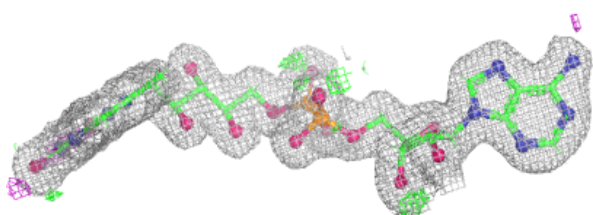
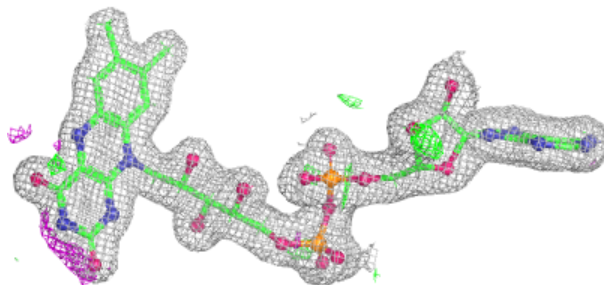
**Electron density around FAD B 501:**

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

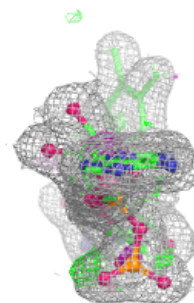
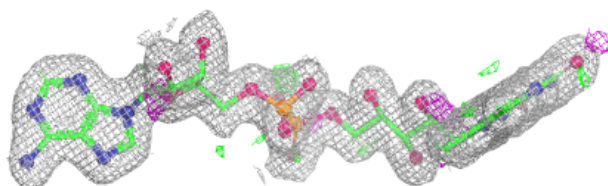
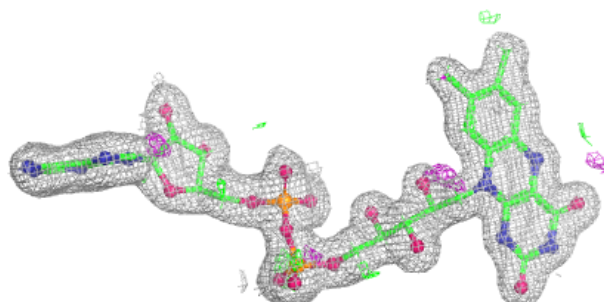


Electron density around FAD C 501:

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

**Electron density around FAD A 501:**

$2mF_o-DF_c$ (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.