



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 08:51 AM UTC

PDB ID : 6XBB / pdb_00006xbb
Title : Crystal structure of Streptomyces sviveus SsDesB in complex with NADP+
Authors : Lountos, G.T.; Giddings, L.A.; Waugh, D.S.
Deposited on : 2020-06-05
Resolution : 2.37 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

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

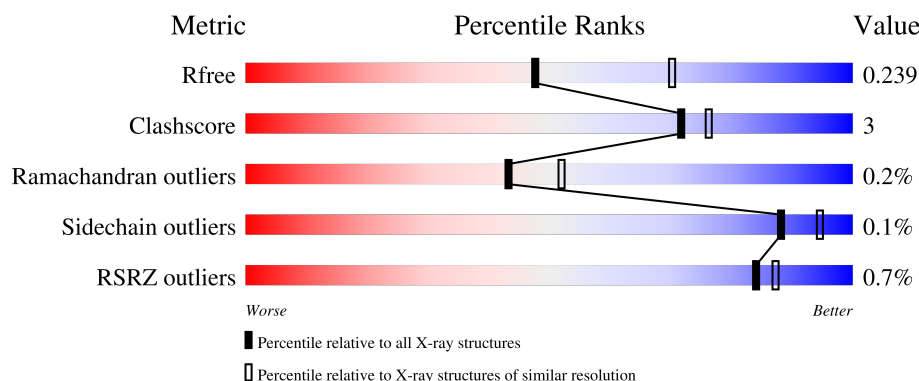
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.37 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	1596 (2.36-2.36)
Clashscore	190562	1663 (2.36-2.36)
Ramachandran outliers	187476	1646 (2.36-2.36)
Sidechain outliers	187428	1646 (2.36-2.36)
RSRZ outliers	180081	1598 (2.36-2.36)

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

Mol	Chain	Length	Quality of chain
1	A	425	 91% 8% .
1	B	425	 89% 9% .
1	C	425	 88% 10% .
1	D	425	 92% 6% .
1	E	425	 92% 6% .

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Mol	Chain	Length	Quality of chain
1	F	425	% 87%11%•
1	G	425	% 89%9%•
1	H	425	91%8%•

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 28784 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 Monooxygenase.

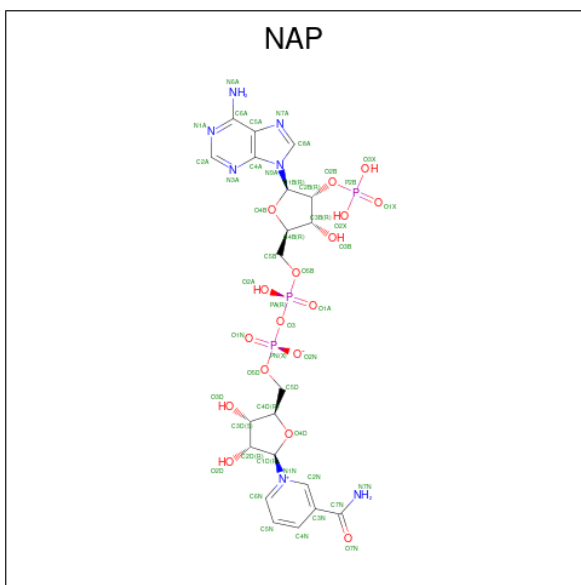
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	418	Total	C	N	O	S	0	0	0
			3353	2146	554	645	8			
1	B	416	Total	C	N	O	S	0	0	0
			3340	2138	552	642	8			
1	C	416	Total	C	N	O	S	0	0	0
			3340	2138	552	642	8			
1	D	417	Total	C	N	O	S	0	0	0
			3346	2141	553	644	8			
1	E	417	Total	C	N	O	S	0	0	0
			3346	2141	553	644	8			
1	F	416	Total	C	N	O	S	0	0	0
			3340	2138	552	642	8			
1	G	416	Total	C	N	O	S	0	0	0
			3340	2138	552	642	8			
1	H	420	Total	C	N	O	S	0	0	0
			3370	2155	557	650	8			

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (CCD ID: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	B	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	C	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	D	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	E	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	F	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	G	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	H	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

- Molecule 3 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (CCD ID: NAP) (formula: C₂₁H₂₈N₇O₁₇P₃) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total 48	C 21	N 7	O 17	P 3	0	0
3	B	1	Total 48	C 21	N 7	O 17	P 3	0	0
3	C	1	Total 48	C 21	N 7	O 17	P 3	0	0
3	D	1	Total 48	C 21	N 7	O 17	P 3	0	0
3	E	1	Total 48	C 21	N 7	O 17	P 3	0	0
3	F	1	Total 48	C 21	N 7	O 17	P 3	0	0
3	G	1	Total 48	C 21	N 7	O 17	P 3	0	0
3	H	1	Total 48	C 21	N 7	O 17	P 3	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	197	Total O 197 197	0	0
4	B	157	Total O 157 157	0	0
4	C	160	Total O 160 160	0	0
4	D	158	Total O 158 158	0	0

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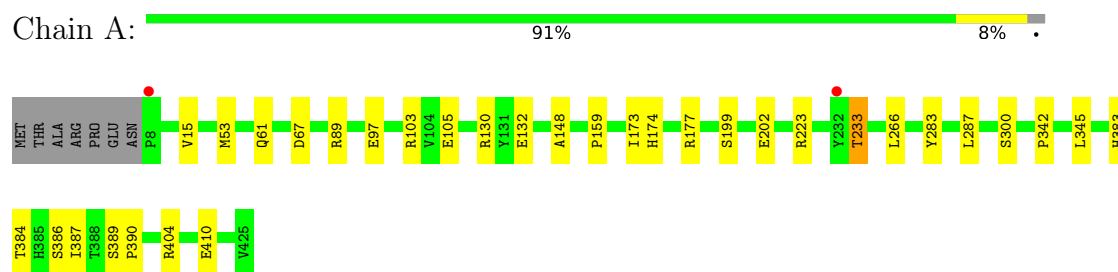
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	E	142	Total 142	O 142	0	0
4	F	132	Total 132	O 132	0	0
4	G	135	Total 135	O 135	0	0
4	H	120	Total 120	O 120	0	0

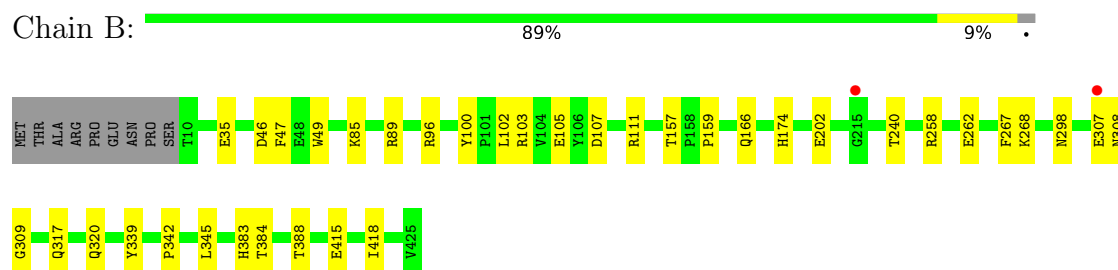
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

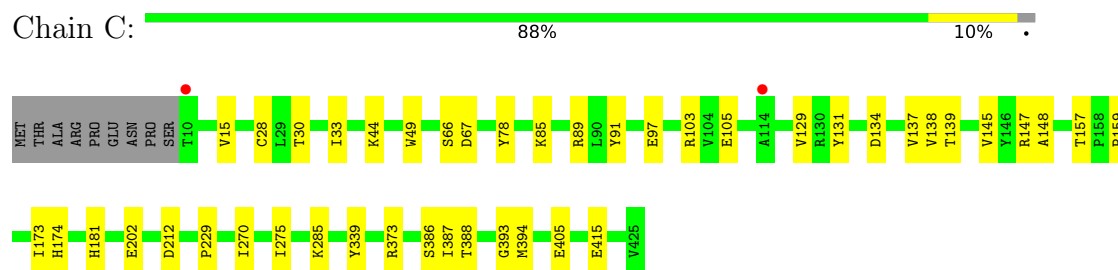
• Molecule 1: Monooxygenase



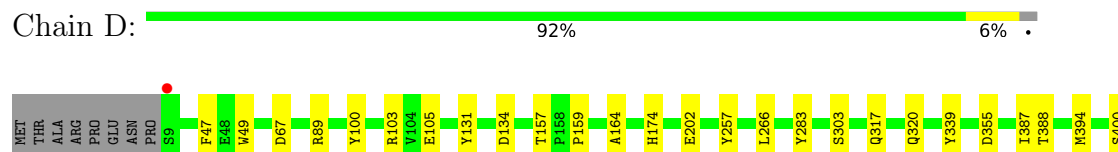
• Molecule 1: Monooxygenase



• Molecule 1: Monooxygenase

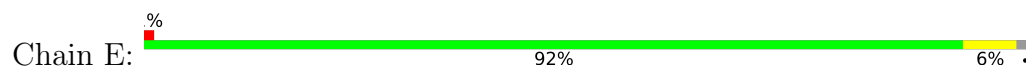


• Molecule 1: Monooxygenase

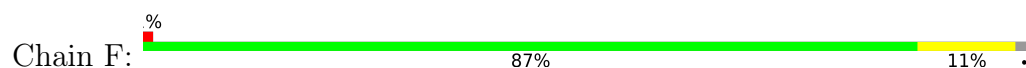




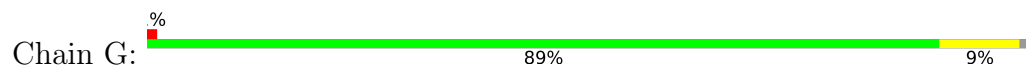
• Molecule 1: Monooxygenase



• Molecule 1: Monooxygenase



• Molecule 1: Monooxygenase



• Molecule 1: Monooxygenase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	84.12Å 153.43Å 141.31Å 90.00° 92.44° 90.00°	Depositor
Resolution (Å)	37.02 – 2.37 37.02 – 2.37	Depositor EDS
% Data completeness (in resolution range)	93.7 (37.02-2.37) 93.8 (37.02-2.37)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	0.05	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.64 (at 2.37Å)	Xtriage
Refinement program	PHENIX 1.16_3549	Depositor
R, R_{free}	0.189 , 0.239 0.190 , 0.239	Depositor DCC
R_{free} test set	6789 reflections (4.66%)	wwPDB-VP
Wilson B-factor (Å ²)	32.2	Xtriage
Anisotropy	0.123	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.27 , 22.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.026 for h,-k,-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	28784	wwPDB-VP
Average B, all atoms (Å ²)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 65.25 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 7.2939e-06. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: NAP, FAD

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	0.11	0/3439	0.29	0/4672
1	B	0.12	0/3425	0.29	0/4653
1	C	0.11	0/3425	0.29	0/4653
1	D	0.11	0/3431	0.28	0/4661
1	E	0.12	0/3431	0.30	0/4661
1	F	0.11	0/3425	0.30	0/4653
1	G	0.11	0/3425	0.29	0/4653
1	H	0.11	0/3456	0.28	0/4696
All	All	0.11	0/27457	0.29	0/37302

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	3353	0	3234	24	0
1	B	3340	0	3221	28	0
1	C	3340	0	3221	28	0
1	D	3346	0	3226	17	0
1	E	3346	0	3226	20	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	3340	0	3221	28	0
1	G	3340	0	3221	23	0
1	H	3370	0	3245	23	0
2	A	53	0	31	0	0
2	B	53	0	31	0	0
2	C	53	0	31	0	0
2	D	53	0	31	0	0
2	E	53	0	31	0	0
2	F	53	0	31	1	0
2	G	53	0	31	0	0
2	H	53	0	31	0	0
3	A	48	0	23	4	0
3	B	48	0	23	2	0
3	C	48	0	23	1	0
3	D	48	0	23	2	0
3	E	48	0	23	3	0
3	F	48	0	23	2	0
3	G	48	0	23	2	0
3	H	48	0	23	2	0
4	A	197	0	0	0	0
4	B	157	0	0	2	0
4	C	160	0	0	0	0
4	D	158	0	0	0	0
4	E	142	0	0	1	0
4	F	132	0	0	1	0
4	G	135	0	0	0	0
4	H	120	0	0	0	0
All	All	28784	0	26247	176	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (176) 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:F:317:GLN:OE1	1:F:320:GLN:N	2.04	0.90
1:H:169:ASP:HB2	1:H:306:HIS:HB3	1.72	0.72
1:H:190:SER:HB3	1:H:329:GLN:H	1.55	0.71
1:C:66:SER:HB2	1:C:393:GLY:HA2	1.74	0.70
1:D:317:GLN:OE1	1:D:320:GLN:N	2.14	0.68
1:A:130:ARG:NH1	1:A:132:GLU:OE1	2.27	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:174:HIS:H	1:A:177:ARG:NH2	1.94	0.65
1:A:404:ARG:HD3	1:A:410:GLU:HG3	1.79	0.65
1:A:103:ARG:NH2	3:A:502:NAP:H4N	2.12	0.64
1:F:157:THR:HG22	1:F:339:TYR:HB2	1.79	0.63
1:E:103:ARG:NH2	3:E:502:NAP:H4N	2.13	0.62
1:B:157:THR:HG22	1:B:339:TYR:HB2	1.81	0.61
1:C:129:VAL:HG22	1:C:138:VAL:HG22	1.84	0.60
1:F:317:GLN:CD	1:F:320:GLN:H	2.05	0.60
1:H:103:ARG:NH2	3:H:502:NAP:H4N	2.17	0.60
1:D:103:ARG:NH2	3:D:502:NAP:H4N	2.17	0.60
1:A:173:ILE:HA	1:A:177:ARG:HH21	1.67	0.60
1:C:103:ARG:NH2	3:C:502:NAP:H4N	2.17	0.59
1:G:103:ARG:NH2	3:G:502:NAP:H4N	2.18	0.58
1:A:89:ARG:NH1	1:A:105:GLU:OE2	2.37	0.58
1:C:103:ARG:NH2	1:C:202:GLU:OE1	2.36	0.58
1:G:137:VAL:HG22	1:G:147:ARG:HG2	1.84	0.58
1:C:373:ARG:NH2	1:C:405:GLU:O	2.37	0.57
1:B:258:ARG:NH1	1:B:262:GLU:OE2	2.36	0.57
1:H:196:SER:HB2	1:H:222:THR:HG1	1.69	0.57
1:B:268:LYS:NZ	3:B:502:NAP:O2A	2.36	0.57
1:B:107:ASP:OD2	1:B:111:ARG:NH2	2.36	0.56
1:F:130:ARG:NH1	1:F:132:GLU:OE1	2.39	0.56
1:A:223:ARG:HD3	1:A:300:SER:HB2	1.87	0.56
1:B:89:ARG:NH1	1:B:105:GLU:OE2	2.39	0.56
1:C:137:VAL:HG22	1:C:147:ARG:HG2	1.87	0.55
1:H:103:ARG:NH2	1:H:202:GLU:OE2	2.39	0.55
1:A:15:VAL:HG23	1:A:148:ALA:HB2	1.88	0.55
1:F:47:PHE:HE1	1:F:49:TRP:HB2	1.72	0.55
1:H:196:SER:HB2	1:H:222:THR:OG1	2.06	0.55
1:F:91:TYR:HB3	1:G:418:ILE:HD12	1.89	0.54
1:B:103:ARG:NH2	3:B:502:NAP:H4N	2.23	0.54
1:G:103:ARG:HH21	3:G:502:NAP:C7N	2.20	0.54
2:F:501:FAD:O2A	4:F:601:HOH:O	2.19	0.53
1:H:404:ARG:HD3	1:H:410:GLU:HG2	1.88	0.53
1:E:196:SER:HB2	1:E:222:THR:OG1	2.08	0.53
1:F:258:ARG:NH1	1:F:262:GLU:OE1	2.41	0.53
1:A:61:GLN:HG3	3:A:502:NAP:C7N	2.39	0.53
1:B:307:GLU:O	1:B:309:GLY:N	2.42	0.53
1:C:159:PRO:HB3	1:C:174:HIS:CE1	2.44	0.53
1:D:103:ARG:NH2	1:D:202:GLU:OE2	2.40	0.53
1:C:49:TRP:HZ3	1:C:103:ARG:HG2	1.73	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:157:THR:HG22	1:D:339:TYR:HB2	1.91	0.52
1:C:105:GLU:OE2	1:D:283:TYR:OH	2.20	0.52
1:E:322:LYS:HD2	1:G:425:VAL:HG23	1.90	0.52
1:G:159:PRO:HB3	1:G:174:HIS:CE1	2.45	0.52
1:A:283:TYR:OH	1:B:105:GLU:OE2	2.25	0.52
1:B:418:ILE:HD12	1:C:91:TYR:HB3	1.91	0.52
1:C:30:THR:HA	1:C:33:ILE:HD12	1.91	0.52
1:E:229:PRO:HB3	1:G:233:THR:HG21	1.92	0.52
1:A:103:ARG:HH22	1:A:202:GLU:CD	2.17	0.52
1:H:159:PRO:HB3	1:H:174:HIS:CE1	2.45	0.52
1:F:305:ARG:NH1	1:F:307:GLU:HG3	2.25	0.51
1:D:257:TYR:OH	1:D:355:ASP:OD2	2.26	0.51
1:G:388:THR:HB	1:G:394:MET:HG3	1.93	0.51
1:H:47:PHE:HE1	1:H:49:TRP:HB2	1.75	0.51
1:E:303:SER:HB2	1:E:314:ALA:HB3	1.93	0.51
1:G:303:SER:HB2	1:G:314:ALA:HB3	1.93	0.51
1:H:137:VAL:HG22	1:H:147:ARG:HD2	1.93	0.50
1:C:139:THR:HG22	1:C:145:VAL:HG22	1.91	0.50
1:E:103:ARG:HH21	3:E:502:NAP:H4N	1.75	0.50
1:A:342:PRO:HD2	1:A:345:LEU:HD12	1.93	0.50
1:G:256:ARG:O	1:G:260:THR:HG23	2.12	0.50
1:C:103:ARG:HH22	1:C:202:GLU:CD	2.19	0.50
1:F:159:PRO:HB3	1:F:174:HIS:CE1	2.46	0.50
1:H:383:HIS:CD2	1:H:384:THR:HG23	2.47	0.49
1:H:52:GLY:HA2	1:H:179:VAL:HG12	1.94	0.49
1:F:247:TYR:HD2	1:F:424:SER:HB2	1.77	0.49
1:G:312:THR:HG22	1:G:327:GLU:HG2	1.94	0.49
1:E:105:GLU:OE2	1:F:283:TYR:OH	2.27	0.49
1:B:47:PHE:HE1	1:B:49:TRP:HB2	1.78	0.48
1:C:212:ASP:OD2	1:C:285:LYS:NZ	2.42	0.48
1:D:159:PRO:HB3	1:D:174:HIS:CE1	2.49	0.48
1:H:47:PHE:CE1	1:H:49:TRP:HB2	2.48	0.48
1:F:328:SER:OG	1:F:330:GLY:O	2.31	0.48
1:C:15:VAL:HG23	1:C:148:ALA:HB2	1.96	0.47
1:F:342:PRO:HD2	1:F:345:LEU:HD12	1.95	0.47
1:G:107:ASP:OD2	1:G:111:ARG:NH2	2.45	0.47
1:B:159:PRO:HB3	1:B:174:HIS:CE1	2.49	0.47
1:G:33:ILE:HG21	1:G:407:LEU:HD11	1.96	0.47
1:H:63:PRO:HB3	1:H:99:PHE:HB3	1.96	0.47
1:F:61:GLN:HG2	3:F:502:NAP:N7N	2.29	0.47
1:F:317:GLN:NE2	1:F:320:GLN:HB2	2.29	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:213:VAL:HG23	1:G:214:HIS:CD2	2.50	0.47
1:H:386:SER:OG	1:H:387:ILE:N	2.47	0.47
1:A:266:LEU:HD23	1:A:387:ILE:HD13	1.97	0.46
1:A:97:GLU:OE2	1:D:100:TYR:OH	2.32	0.46
1:B:47:PHE:CE1	1:B:49:TRP:HB2	2.51	0.46
1:A:103:ARG:NH2	1:A:202:GLU:OE2	2.48	0.46
1:E:53:MET:O	1:E:103:ARG:NH1	2.49	0.46
1:A:103:ARG:HH21	3:A:502:NAP:C7N	2.29	0.46
1:F:36:LEU:HG	1:F:407:LEU:HD21	1.97	0.46
1:H:196:SER:H	3:H:502:NAP:H4B	1.80	0.46
1:A:233:THR:HG21	1:C:229:PRO:HB3	1.98	0.45
1:D:89:ARG:NH1	1:D:105:GLU:OE2	2.50	0.45
1:D:131:TYR:CZ	1:D:134:ASP:HA	2.51	0.45
1:B:317:GLN:HG2	1:B:320:GLN:HB3	1.99	0.45
1:D:164:ALA:HB1	1:D:303:SER:HA	1.98	0.45
1:H:103:ARG:HH22	1:H:202:GLU:CD	2.25	0.45
1:A:159:PRO:HB3	1:A:174:HIS:CE1	2.52	0.45
1:E:177:ARG:HD3	1:E:177:ARG:HA	1.71	0.45
1:F:327:GLU:H	1:F:327:GLU:CD	2.25	0.45
1:G:52:GLY:HA2	1:G:179:VAL:HG12	1.99	0.45
1:C:173:ILE:HG21	1:C:181:HIS:CG	2.52	0.45
1:H:15:VAL:HG23	1:H:148:ALA:HB2	1.99	0.45
1:A:383:HIS:CD2	1:A:384:THR:HG23	2.51	0.44
1:E:305:ARG:NH1	4:E:609:HOH:O	2.49	0.44
1:D:47:PHE:HE1	1:D:49:TRP:HB2	1.82	0.44
1:B:85:LYS:NZ	1:C:415:GLU:OE2	2.48	0.44
1:F:199:SER:OG	3:F:502:NAP:H5N	2.18	0.44
1:G:61:GLN:HE21	1:G:230:LEU:HD22	1.82	0.44
1:B:415:GLU:OE2	1:C:85:LYS:NZ	2.50	0.44
1:D:400:SER:HB3	1:D:414:VAL:HG22	1.99	0.44
1:F:182:ARG:O	1:F:186:VAL:HG22	2.16	0.44
1:F:128:GLU:HB3	1:F:139:THR:CG2	2.47	0.44
1:F:266:LEU:HB3	1:F:387:ILE:HG21	2.00	0.44
1:B:35:GLU:OE1	1:B:35:GLU:N	2.50	0.44
1:C:44:LYS:HA	1:C:44:LYS:HD3	1.75	0.44
1:C:157:THR:HG22	1:C:339:TYR:HB2	2.00	0.44
1:D:103:ARG:HH21	3:D:502:NAP:C7N	2.31	0.44
1:A:386:SER:OG	1:A:387:ILE:N	2.48	0.43
1:E:74:PRO:HG2	1:H:82:ASN:HA	2.00	0.43
1:C:131:TYR:OH	1:C:134:ASP:HA	2.19	0.43
1:B:103:ARG:NH2	1:B:202:GLU:OE2	2.52	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:47:PHE:CE1	1:D:49:TRP:HB2	2.53	0.43
1:E:103:ARG:HH22	1:E:202:GLU:CD	2.26	0.43
1:A:53:MET:O	1:A:103:ARG:NH1	2.51	0.43
1:B:100:TYR:OH	1:C:97:GLU:OE2	2.31	0.43
1:F:383:HIS:CD2	1:F:384:THR:HG23	2.54	0.43
1:D:388:THR:HB	1:D:394:MET:HG3	2.00	0.43
1:H:254:ALA:O	1:H:258:ARG:HG3	2.19	0.43
1:C:89:ARG:NH1	1:C:105:GLU:OE2	2.52	0.43
1:E:173:ILE:HD13	1:E:181:HIS:HB2	2.01	0.43
1:G:105:GLU:OE2	1:H:283:TYR:OH	2.22	0.43
1:G:131:TYR:CZ	1:G:134:ASP:HA	2.54	0.43
1:B:46:ASP:OD1	1:B:47:PHE:N	2.51	0.43
1:B:240:THR:HG23	1:B:388:THR:HG22	2.01	0.43
1:B:103:ARG:HH22	1:B:202:GLU:CD	2.26	0.43
1:C:28:CYS:HB3	1:C:78:TYR:CD2	2.54	0.43
1:D:266:LEU:HB2	1:D:387:ILE:HG21	2.01	0.43
1:F:189:GLU:HG2	1:F:329:GLN:CD	2.44	0.43
1:B:342:PRO:HD2	1:B:345:LEU:HD12	2.01	0.43
1:C:386:SER:OG	1:C:387:ILE:N	2.52	0.43
1:B:96:ARG:NH1	4:B:617:HOH:O	2.51	0.42
1:B:166:GLN:NE2	4:B:618:HOH:O	2.52	0.42
1:C:270:ILE:HB	1:C:275:ILE:HD11	2.00	0.42
1:F:346:ALA:HA	1:F:349:LYS:HG3	2.00	0.42
1:E:230:LEU:HD21	1:E:232:TYR:CZ	2.55	0.42
1:G:212:ASP:OD1	1:G:212:ASP:N	2.47	0.42
1:C:388:THR:HB	1:C:394:MET:HG3	2.01	0.42
1:E:159:PRO:HB3	1:E:174:HIS:CE1	2.54	0.42
1:E:144:ASP:N	1:E:144:ASP:OD1	2.50	0.42
1:G:379:ASN:OD1	1:G:380:ALA:N	2.39	0.42
1:B:298:ASN:O	1:B:317:GLN:HA	2.21	0.41
1:G:350:ASP:N	1:G:350:ASP:OD1	2.52	0.41
1:B:35:GLU:H	1:B:35:GLU:CD	2.29	0.41
1:G:15:VAL:HG13	1:G:39:ILE:HG23	2.01	0.41
1:F:33:ILE:HG12	1:F:411:TYR:CZ	2.56	0.41
1:F:425:VAL:HG21	1:H:324:PHE:CG	2.56	0.41
1:A:199:SER:OG	3:A:502:NAP:H5N	2.19	0.41
1:B:383:HIS:CD2	1:B:384:THR:HG23	2.55	0.41
1:E:218:LEU:HD12	1:E:218:LEU:HA	1.90	0.41
1:H:236:THR:HG21	1:H:266:LEU:HD22	2.01	0.41
1:A:389:SER:HB3	1:A:390:PRO:HD3	2.02	0.41
1:A:287:LEU:HD11	1:B:102:LEU:HD13	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:72:ALA:HB2	1:F:396:ALA:HB1	2.02	0.40
1:E:80:PHE:CE2	1:E:84:LEU:HD11	2.56	0.40
1:F:52:GLY:HA3	1:F:176:SER:O	2.21	0.40
1:E:150:HIS:CE1	1:E:373:ARG:HD3	2.57	0.40
1:E:264:LYS:NZ	3:E:502:NAP:O2X	2.53	0.40
1:G:52:GLY:HA3	1:G:176:SER:O	2.21	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	416/425 (98%)	402 (97%)	13 (3%)	1 (0%)	43	52
1	B	414/425 (97%)	396 (96%)	16 (4%)	2 (0%)	24	27
1	C	414/425 (97%)	394 (95%)	19 (5%)	1 (0%)	43	52
1	D	415/425 (98%)	396 (95%)	18 (4%)	1 (0%)	43	52
1	E	415/425 (98%)	399 (96%)	16 (4%)	0	100	100
1	F	414/425 (97%)	399 (96%)	14 (3%)	1 (0%)	43	52
1	G	414/425 (97%)	393 (95%)	21 (5%)	0	100	100
1	H	418/425 (98%)	398 (95%)	19 (4%)	1 (0%)	43	52
All	All	3320/3400 (98%)	3177 (96%)	136 (4%)	7 (0%)	43	52

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	308	ASN
1	A	67	ASP
1	F	67	ASP
1	H	67	ASP

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Mol	Chain	Res	Type
1	B	267	PHE
1	C	67	ASP
1	D	67	ASP

5.3.2 Protein sidechains ⓘ

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	361/367 (98%)	360 (100%)	1 (0%)	86	92
1	B	359/367 (98%)	359 (100%)	0	100	100
1	C	359/367 (98%)	359 (100%)	0	100	100
1	D	360/367 (98%)	360 (100%)	0	100	100
1	E	360/367 (98%)	360 (100%)	0	100	100
1	F	359/367 (98%)	359 (100%)	0	100	100
1	G	359/367 (98%)	357 (99%)	2 (1%)	78	87
1	H	363/367 (99%)	363 (100%)	0	100	100
All	All	2880/2936 (98%)	2877 (100%)	3 (0%)	88	94

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	233	THR
1	G	183	SER
1	G	313	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	166	GLN
1	B	284	GLN
1	C	214	HIS
1	C	263	GLN

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Mol	Chain	Res	Type
1	C	284	GLN
1	C	308	ASN
1	C	378	GLN
1	D	286	ASN
1	D	308	ASN
1	D	357	GLN
1	E	180	GLN
1	F	284	GLN
1	G	61	GLN
1	H	308	ASN
1	H	421	GLN

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](#)

16 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	$\# Z > 2$
2	FAD	G	501	-	58,58,58	0.32	0	85,89,89	0.30	0
3	NAP	C	502	-	50,52,52	3.84	18 (36%)	71,80,80	1.78	14 (19%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NAP	H	502	-	50,52,52	3.85	19 (38%)	71,80,80	1.77	13 (18%)
2	FAD	H	501	-	58,58,58	0.32	0	85,89,89	0.31	0
2	FAD	A	501	-	58,58,58	0.32	0	85,89,89	0.29	0
2	FAD	E	501	-	58,58,58	0.30	0	85,89,89	0.29	0
3	NAP	F	502	-	50,52,52	3.84	18 (36%)	71,80,80	1.78	13 (18%)
3	NAP	G	502	-	50,52,52	3.85	18 (36%)	71,80,80	1.80	14 (19%)
3	NAP	E	502	-	50,52,52	3.84	18 (36%)	71,80,80	1.76	11 (15%)
3	NAP	A	502	-	50,52,52	3.87	18 (36%)	71,80,80	1.77	12 (16%)
2	FAD	F	501	-	58,58,58	0.31	0	85,89,89	0.29	0
3	NAP	D	502	-	50,52,52	3.87	19 (38%)	71,80,80	1.78	14 (19%)
2	FAD	C	501	-	58,58,58	0.30	0	85,89,89	0.29	0
3	NAP	B	502	-	50,52,52	3.85	19 (38%)	71,80,80	1.80	15 (21%)
2	FAD	D	501	-	58,58,58	0.29	0	85,89,89	0.30	0
2	FAD	B	501	-	58,58,58	0.32	0	85,89,89	0.32	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
2	FAD	G	501	-	-	5/34/50/50	0/6/6/6
3	NAP	C	502	-	-	5/35/67/67	0/5/5/5
3	NAP	H	502	-	-	8/35/67/67	0/5/5/5
2	FAD	H	501	-	-	2/34/50/50	0/6/6/6
2	FAD	A	501	-	-	5/34/50/50	0/6/6/6
2	FAD	E	501	-	-	7/34/50/50	0/6/6/6
3	NAP	F	502	-	-	9/35/67/67	0/5/5/5
3	NAP	G	502	-	-	6/35/67/67	0/5/5/5
3	NAP	E	502	-	-	10/35/67/67	0/5/5/5
3	NAP	A	502	-	-	9/35/67/67	0/5/5/5
2	FAD	F	501	-	-	3/34/50/50	0/6/6/6
3	NAP	D	502	-	-	8/35/67/67	0/5/5/5
2	FAD	C	501	-	-	5/34/50/50	0/6/6/6
3	NAP	B	502	-	-	7/35/67/67	0/5/5/5
2	FAD	D	501	-	-	5/34/50/50	0/6/6/6
2	FAD	B	501	-	-	3/34/50/50	0/6/6/6

All (147) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	502	NAP	O4D-C1D	16.54	1.62	1.40
3	A	502	NAP	O4D-C1D	16.50	1.62	1.40
3	G	502	NAP	O4D-C1D	16.46	1.62	1.40
3	E	502	NAP	O4D-C1D	16.46	1.62	1.40
3	B	502	NAP	O4D-C1D	16.43	1.62	1.40
3	H	502	NAP	O4D-C1D	16.41	1.62	1.40
3	C	502	NAP	O4D-C1D	16.40	1.62	1.40
3	F	502	NAP	O4D-C1D	16.34	1.62	1.40
3	B	502	NAP	C2B-C1B	-9.24	1.30	1.53
3	A	502	NAP	C2B-C1B	-9.20	1.30	1.53
3	H	502	NAP	C2B-C1B	-9.20	1.30	1.53
3	E	502	NAP	C2B-C1B	-9.19	1.30	1.53
3	F	502	NAP	C2B-C1B	-9.17	1.30	1.53
3	C	502	NAP	C2B-C1B	-9.15	1.30	1.53
3	G	502	NAP	C2B-C1B	-9.14	1.30	1.53
3	D	502	NAP	C2B-C1B	-9.08	1.30	1.53
3	D	502	NAP	O4B-C1B	8.77	1.62	1.42
3	G	502	NAP	O4B-C1B	8.73	1.62	1.42
3	B	502	NAP	O4B-C1B	8.72	1.62	1.42
3	A	502	NAP	O4B-C1B	8.70	1.62	1.42
3	H	502	NAP	O4B-C1B	8.67	1.62	1.42
3	E	502	NAP	O4B-C1B	8.66	1.62	1.42
3	F	502	NAP	O4B-C1B	8.66	1.62	1.42
3	C	502	NAP	O4B-C1B	8.62	1.61	1.42
3	G	502	NAP	C7N-N7N	7.04	1.45	1.33
3	C	502	NAP	C7N-N7N	7.00	1.45	1.33
3	A	502	NAP	C7N-N7N	6.97	1.45	1.33
3	E	502	NAP	C7N-N7N	6.97	1.45	1.33
3	B	502	NAP	C7N-N7N	6.97	1.45	1.33
3	F	502	NAP	C7N-N7N	6.93	1.45	1.33
3	H	502	NAP	C7N-N7N	6.91	1.45	1.33
3	D	502	NAP	C7N-N7N	6.91	1.45	1.33
3	C	502	NAP	O4B-C4B	-6.27	1.31	1.45
3	C	502	NAP	O4D-C4D	-6.25	1.31	1.45
3	H	502	NAP	O4B-C4B	-6.20	1.31	1.45
3	E	502	NAP	O4D-C4D	-6.18	1.31	1.45
3	F	502	NAP	O4D-C4D	-6.17	1.31	1.45
3	B	502	NAP	O4B-C4B	-6.17	1.31	1.45
3	E	502	NAP	O4B-C4B	-6.15	1.31	1.45
3	A	502	NAP	O4D-C4D	-6.15	1.31	1.45
3	D	502	NAP	O4D-C4D	-6.15	1.31	1.45
3	A	502	NAP	O4B-C4B	-6.14	1.31	1.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	502	NAP	O4D-C4D	-6.14	1.31	1.45
3	A	502	NAP	PA-O3	6.13	1.66	1.59
3	F	502	NAP	O4B-C4B	-6.12	1.31	1.45
3	H	502	NAP	O4D-C4D	-6.11	1.31	1.45
3	D	502	NAP	PA-O3	6.10	1.66	1.59
3	G	502	NAP	O4B-C4B	-6.08	1.31	1.45
3	G	502	NAP	O4D-C4D	-6.07	1.31	1.45
3	B	502	NAP	PA-O3	6.06	1.66	1.59
3	D	502	NAP	O4B-C4B	-6.04	1.31	1.45
3	F	502	NAP	PA-O3	5.99	1.66	1.59
3	E	502	NAP	PA-O3	5.96	1.65	1.59
3	H	502	NAP	PA-O3	5.96	1.65	1.59
3	G	502	NAP	PA-O3	5.95	1.65	1.59
3	D	502	NAP	PN-O3	5.94	1.65	1.59
3	B	502	NAP	PN-O3	5.88	1.65	1.59
3	H	502	NAP	PN-O3	5.84	1.65	1.59
3	C	502	NAP	PA-O3	5.84	1.65	1.59
3	A	502	NAP	PN-O3	5.78	1.65	1.59
3	G	502	NAP	PN-O3	5.72	1.65	1.59
3	F	502	NAP	PN-O3	5.71	1.65	1.59
3	C	502	NAP	PN-O3	5.54	1.65	1.59
3	E	502	NAP	PN-O3	5.51	1.65	1.59
3	A	502	NAP	C6A-N6A	4.35	1.45	1.34
3	G	502	NAP	C6A-N6A	4.33	1.45	1.34
3	B	502	NAP	C6A-N6A	4.33	1.45	1.34
3	D	502	NAP	C6A-N6A	4.32	1.45	1.34
3	F	502	NAP	C6A-N6A	4.32	1.45	1.34
3	E	502	NAP	C6A-N6A	4.30	1.45	1.34
3	C	502	NAP	C6A-N6A	4.30	1.45	1.34
3	H	502	NAP	C6A-N6A	4.29	1.45	1.34
3	D	502	NAP	P2B-O2B	3.31	1.65	1.59
3	G	502	NAP	P2B-O2B	3.28	1.65	1.59
3	E	502	NAP	P2B-O2B	3.22	1.65	1.59
3	A	502	NAP	P2B-O2B	3.22	1.65	1.59
3	F	502	NAP	P2B-O2B	3.21	1.65	1.59
3	H	502	NAP	P2B-O2B	3.18	1.65	1.59
3	C	502	NAP	P2B-O2B	3.14	1.65	1.59
3	B	502	NAP	P2B-O2B	2.90	1.64	1.59
3	F	502	NAP	O2D-C2D	2.89	1.50	1.43
3	F	502	NAP	C5A-C4A	-2.86	1.34	1.39
3	G	502	NAP	O2D-C2D	2.86	1.50	1.43
3	A	502	NAP	C5A-C4A	-2.85	1.34	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	502	NAP	C5A-C4A	-2.85	1.34	1.39
3	H	502	NAP	O2D-C2D	2.85	1.50	1.43
3	E	502	NAP	O2D-C2D	2.85	1.50	1.43
3	C	502	NAP	O2D-C2D	2.84	1.50	1.43
3	E	502	NAP	C5A-C4A	-2.83	1.34	1.39
3	B	502	NAP	O7N-C7N	-2.83	1.18	1.24
3	B	502	NAP	O2D-C2D	2.83	1.50	1.43
3	D	502	NAP	O2D-C2D	2.83	1.50	1.43
3	H	502	NAP	O3B-C3B	-2.82	1.36	1.43
3	H	502	NAP	C5A-C4A	-2.82	1.34	1.39
3	A	502	NAP	O2D-C2D	2.81	1.49	1.43
3	A	502	NAP	O7N-C7N	-2.81	1.18	1.24
3	C	502	NAP	C5A-C4A	-2.79	1.34	1.39
3	A	502	NAP	O3D-C3D	-2.79	1.36	1.43
3	D	502	NAP	C5A-C4A	-2.78	1.34	1.39
3	G	502	NAP	O7N-C7N	-2.78	1.19	1.24
3	C	502	NAP	O3D-C3D	-2.78	1.36	1.43
3	D	502	NAP	O7N-C7N	-2.78	1.19	1.24
3	A	502	NAP	O3B-C3B	-2.77	1.36	1.43
3	E	502	NAP	O7N-C7N	-2.76	1.19	1.24
3	H	502	NAP	O7N-C7N	-2.76	1.19	1.24
3	E	502	NAP	O3D-C3D	-2.75	1.36	1.43
3	G	502	NAP	O3D-C3D	-2.75	1.36	1.43
3	C	502	NAP	O7N-C7N	-2.75	1.19	1.24
3	G	502	NAP	C5A-C4A	-2.75	1.34	1.39
3	B	502	NAP	O3D-C3D	-2.75	1.36	1.43
3	F	502	NAP	O3B-C3B	-2.74	1.36	1.43
3	F	502	NAP	O3D-C3D	-2.74	1.36	1.43
3	D	502	NAP	O3D-C3D	-2.74	1.36	1.43
3	D	502	NAP	O3B-C3B	-2.72	1.36	1.43
3	H	502	NAP	O3D-C3D	-2.72	1.36	1.43
3	F	502	NAP	O7N-C7N	-2.71	1.19	1.24
3	C	502	NAP	O3B-C3B	-2.71	1.36	1.43
3	B	502	NAP	O3B-C3B	-2.70	1.36	1.43
3	E	502	NAP	O3B-C3B	-2.69	1.36	1.43
3	G	502	NAP	O3B-C3B	-2.68	1.36	1.43
3	G	502	NAP	C5A-N7A	-2.48	1.34	1.39
3	H	502	NAP	C5A-N7A	-2.47	1.34	1.39
3	E	502	NAP	C5A-N7A	-2.45	1.34	1.39
3	D	502	NAP	C5A-N7A	-2.43	1.34	1.39
3	F	502	NAP	C5A-N7A	-2.41	1.34	1.39
3	C	502	NAP	C5A-N7A	-2.40	1.34	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	502	NAP	C5A-N7A	-2.39	1.34	1.39
3	B	502	NAP	C5A-N7A	-2.35	1.34	1.39
3	H	502	NAP	C3N-C7N	2.35	1.54	1.50
3	G	502	NAP	C3N-C7N	2.33	1.54	1.50
3	D	502	NAP	C3N-C7N	2.32	1.54	1.50
3	A	502	NAP	C4N-C3N	-2.28	1.36	1.39
3	F	502	NAP	C4N-C3N	-2.26	1.36	1.39
3	C	502	NAP	C3N-C7N	2.23	1.53	1.50
3	D	502	NAP	C4N-C3N	-2.21	1.36	1.39
3	E	502	NAP	C4N-C3N	-2.19	1.36	1.39
3	C	502	NAP	C4N-C3N	-2.19	1.36	1.39
3	A	502	NAP	C3N-C7N	2.18	1.53	1.50
3	G	502	NAP	C4N-C3N	-2.15	1.36	1.39
3	H	502	NAP	C4N-C3N	-2.14	1.36	1.39
3	B	502	NAP	C4N-C3N	-2.09	1.36	1.39
3	B	502	NAP	C8A-N9A	-2.07	1.34	1.37
3	B	502	NAP	C3N-C7N	2.07	1.53	1.50
3	E	502	NAP	C3N-C7N	2.07	1.53	1.50
3	D	502	NAP	C8A-N9A	-2.07	1.34	1.37
3	F	502	NAP	C8A-N9A	-2.05	1.34	1.37
3	H	502	NAP	C8A-N9A	-2.05	1.34	1.37

All (106) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	502	NAP	N6A-C6A-N1A	-5.87	105.30	118.38
3	G	502	NAP	N6A-C6A-N1A	-5.86	105.33	118.38
3	D	502	NAP	N6A-C6A-N1A	-5.85	105.34	118.38
3	G	502	NAP	N3A-C2A-N1A	-5.78	119.83	128.58
3	C	502	NAP	N6A-C6A-N1A	-5.78	105.51	118.38
3	H	502	NAP	N3A-C2A-N1A	-5.73	119.91	128.58
3	E	502	NAP	N3A-C2A-N1A	-5.73	119.91	128.58
3	A	502	NAP	N6A-C6A-N1A	-5.73	105.62	118.38
3	E	502	NAP	N6A-C6A-N1A	-5.71	105.66	118.38
3	B	502	NAP	N3A-C2A-N1A	-5.70	119.95	128.58
3	C	502	NAP	N3A-C2A-N1A	-5.68	119.99	128.58
3	F	502	NAP	N3A-C2A-N1A	-5.67	120.00	128.58
3	F	502	NAP	N6A-C6A-N1A	-5.65	105.80	118.38
3	D	502	NAP	N3A-C2A-N1A	-5.63	120.06	128.58
3	A	502	NAP	N3A-C2A-N1A	-5.59	120.12	128.58
3	H	502	NAP	N6A-C6A-N1A	-5.57	105.98	118.38
3	D	502	NAP	C5A-C4A-N3A	-4.87	120.02	126.72

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	H	502	NAP	C5A-C4A-N3A	-4.79	120.12	126.72
3	C	502	NAP	C5A-C4A-N3A	-4.79	120.12	126.72
3	B	502	NAP	C5A-C4A-N3A	-4.79	120.12	126.72
3	F	502	NAP	C5A-C4A-N3A	-4.78	120.14	126.72
3	G	502	NAP	C5A-C4A-N3A	-4.76	120.16	126.72
3	A	502	NAP	C5A-C4A-N3A	-4.76	120.17	126.72
3	E	502	NAP	C5A-C4A-N3A	-4.76	120.17	126.72
3	B	502	NAP	C5A-C6A-N6A	4.56	134.57	123.29
3	D	502	NAP	C5A-C6A-N6A	4.55	134.54	123.29
3	G	502	NAP	C5A-C6A-N6A	4.54	134.52	123.29
3	A	502	NAP	C5A-C6A-N6A	4.54	134.51	123.29
3	C	502	NAP	C5A-C6A-N6A	4.50	134.44	123.29
3	E	502	NAP	C5A-C6A-N6A	4.42	134.23	123.29
3	F	502	NAP	C5A-C6A-N6A	4.40	134.18	123.29
3	A	502	NAP	N9A-C8A-N7A	-4.36	107.75	113.94
3	B	502	NAP	N9A-C8A-N7A	-4.35	107.76	113.94
3	H	502	NAP	C5A-C6A-N6A	4.34	134.02	123.29
3	C	502	NAP	N9A-C8A-N7A	-4.28	107.87	113.94
3	F	502	NAP	N9A-C8A-N7A	-4.27	107.88	113.94
3	E	502	NAP	N9A-C8A-N7A	-4.25	107.90	113.94
3	H	502	NAP	N9A-C8A-N7A	-4.24	107.92	113.94
3	G	502	NAP	N9A-C8A-N7A	-4.22	107.95	113.94
3	D	502	NAP	N9A-C8A-N7A	-4.17	108.02	113.94
3	G	502	NAP	C2A-N3A-C4A	3.38	120.08	111.83
3	B	502	NAP	C2A-N3A-C4A	3.37	120.07	111.83
3	D	502	NAP	C2A-N3A-C4A	3.36	120.05	111.83
3	C	502	NAP	C2A-N3A-C4A	3.36	120.03	111.83
3	E	502	NAP	C2A-N3A-C4A	3.33	119.98	111.83
3	H	502	NAP	C2A-N3A-C4A	3.33	119.97	111.83
3	F	502	NAP	C2A-N3A-C4A	3.33	119.97	111.83
3	A	502	NAP	C2A-N3A-C4A	3.27	119.82	111.83
3	A	502	NAP	C5A-N7A-C8A	3.00	108.17	103.45
3	B	502	NAP	C5A-N7A-C8A	2.98	108.13	103.45
3	C	502	NAP	C5A-N7A-C8A	2.96	108.10	103.45
3	G	502	NAP	C5A-N7A-C8A	2.96	108.10	103.45
3	H	502	NAP	N3A-C4A-N9A	2.94	132.16	127.17
3	E	502	NAP	C5A-N7A-C8A	2.93	108.05	103.45
3	F	502	NAP	C5A-N7A-C8A	2.90	108.01	103.45
3	H	502	NAP	C5A-N7A-C8A	2.90	108.01	103.45
3	D	502	NAP	C5A-N7A-C8A	2.90	108.00	103.45
3	F	502	NAP	N3A-C4A-N9A	2.87	132.05	127.17
3	D	502	NAP	N3A-C4A-N9A	2.81	131.95	127.17

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	E	502	NAP	N3A-C4A-N9A	2.80	131.93	127.17
3	A	502	NAP	N3A-C4A-N9A	2.76	131.86	127.17
3	B	502	NAP	N3A-C4A-N9A	2.74	131.83	127.17
3	C	502	NAP	N3A-C4A-N9A	2.74	131.83	127.17
3	G	502	NAP	N3A-C4A-N9A	2.73	131.81	127.17
3	G	502	NAP	C3N-C7N-N7N	2.48	120.80	117.74
3	A	502	NAP	C3N-C7N-N7N	2.45	120.76	117.74
3	G	502	NAP	O7N-C7N-N7N	-2.44	119.09	122.62
3	B	502	NAP	C4A-C5A-N7A	-2.43	107.80	110.58
3	F	502	NAP	C4A-N9A-C8A	2.41	108.27	105.74
3	B	502	NAP	P2B-O2B-C2B	-2.41	116.99	123.43
3	C	502	NAP	C4A-C5A-N7A	-2.41	107.83	110.58
3	B	502	NAP	C4A-N9A-C8A	2.40	108.26	105.74
3	H	502	NAP	C4A-N9A-C8A	2.40	108.25	105.74
3	A	502	NAP	C4A-N9A-C8A	2.38	108.24	105.74
3	A	502	NAP	C4A-C5A-N7A	-2.37	107.87	110.58
3	G	502	NAP	C4A-C5A-N7A	-2.37	107.88	110.58
3	D	502	NAP	C4A-C5A-N7A	-2.34	107.90	110.58
3	C	502	NAP	C4A-N9A-C8A	2.30	108.15	105.74
3	E	502	NAP	C4A-N9A-C8A	2.29	108.15	105.74
3	H	502	NAP	P2B-O2B-C2B	-2.29	117.32	123.43
3	D	502	NAP	O7N-C7N-N7N	-2.28	119.32	122.62
3	E	502	NAP	C4A-C5A-N7A	-2.26	108.00	110.58
3	F	502	NAP	C4A-C5A-N7A	-2.23	108.03	110.58
3	G	502	NAP	C4A-N9A-C8A	2.19	108.04	105.74
3	D	502	NAP	C4A-N9A-C8A	2.19	108.04	105.74
3	A	502	NAP	O7N-C7N-N7N	-2.18	119.46	122.62
3	H	502	NAP	O7N-C7N-N7N	-2.18	119.47	122.62
3	H	502	NAP	C4A-C5A-N7A	-2.17	108.10	110.58
3	F	502	NAP	P2B-O2B-C2B	-2.17	117.64	123.43
3	H	502	NAP	C3N-C7N-N7N	2.16	120.41	117.74
3	F	502	NAP	C4D-O4D-C1D	-2.16	107.94	109.92
3	D	502	NAP	C3N-C7N-N7N	2.15	120.38	117.74
3	E	502	NAP	C4D-O4D-C1D	-2.13	107.98	109.92
3	B	502	NAP	C4D-O4D-C1D	-2.11	108.00	109.92
3	C	502	NAP	P2B-O2B-C2B	-2.08	117.87	123.43
3	C	502	NAP	O7N-C7N-N7N	-2.08	119.61	122.62
3	C	502	NAP	C4D-O4D-C1D	-2.06	108.04	109.92
3	C	502	NAP	C5A-C4A-N9A	2.06	108.05	105.81
3	B	502	NAP	C5A-C4A-N9A	2.05	108.05	105.81
3	D	502	NAP	P2B-O2B-C2B	-2.05	117.95	123.43
3	B	502	NAP	C4A-N9A-C1B	-2.05	121.85	126.63

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	G	502	NAP	C5A-C4A-N9A	2.04	108.04	105.81
3	D	502	NAP	C5A-C4A-N9A	2.04	108.03	105.81
3	F	502	NAP	C2B-C1B-N9A	-2.02	110.42	113.75
3	G	502	NAP	O4B-C1B-N9A	2.02	111.97	108.09
3	B	502	NAP	O7N-C7N-N7N	-2.00	119.72	122.62

There are no chirality outliers.

All (97) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	FAD	C5B-O5B-PA-O2A
2	B	501	FAD	PA-O3P-P-O5'
2	C	501	FAD	C5B-O5B-PA-O2A
2	C	501	FAD	C5B-O5B-PA-O3P
2	D	501	FAD	C5B-O5B-PA-O2A
2	D	501	FAD	C5B-O5B-PA-O3P
2	E	501	FAD	C5B-O5B-PA-O2A
2	E	501	FAD	C5B-O5B-PA-O3P
2	G	501	FAD	C5B-O5B-PA-O2A
3	A	502	NAP	C5D-O5D-PN-O3
3	A	502	NAP	C5D-O5D-PN-O2N
3	C	502	NAP	C2N-C3N-C7N-O7N
3	C	502	NAP	C2N-C3N-C7N-N7N
3	D	502	NAP	C2N-C3N-C7N-O7N
3	D	502	NAP	C2N-C3N-C7N-N7N
3	G	502	NAP	C2N-C3N-C7N-O7N
3	G	502	NAP	C2N-C3N-C7N-N7N
3	H	502	NAP	C2N-C3N-C7N-N7N
3	C	502	NAP	C4N-C3N-C7N-O7N
3	C	502	NAP	C4N-C3N-C7N-N7N
3	D	502	NAP	C4N-C3N-C7N-N7N
3	G	502	NAP	C4N-C3N-C7N-O7N
3	G	502	NAP	C4N-C3N-C7N-N7N
3	D	502	NAP	C4N-C3N-C7N-O7N
3	H	502	NAP	C4N-C3N-C7N-N7N
3	A	502	NAP	C2N-C3N-C7N-O7N
3	A	502	NAP	C2N-C3N-C7N-N7N
3	H	502	NAP	C2N-C3N-C7N-O7N
3	H	502	NAP	C4N-C3N-C7N-O7N
3	A	502	NAP	C4N-C3N-C7N-O7N
3	A	502	NAP	C4N-C3N-C7N-N7N
2	A	501	FAD	O4B-C4B-C5B-O5B

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Mol	Chain	Res	Type	Atoms
2	C	501	FAD	O4B-C4B-C5B-O5B
2	D	501	FAD	O4B-C4B-C5B-O5B
2	E	501	FAD	O4B-C4B-C5B-O5B
2	G	501	FAD	O4B-C4B-C5B-O5B
2	A	501	FAD	C3B-C4B-C5B-O5B
2	C	501	FAD	C3B-C4B-C5B-O5B
2	D	501	FAD	C3B-C4B-C5B-O5B
2	G	501	FAD	C3B-C4B-C5B-O5B
2	H	501	FAD	O4B-C4B-C5B-O5B
2	B	501	FAD	O4B-C4B-C5B-O5B
2	E	501	FAD	C3B-C4B-C5B-O5B
2	F	501	FAD	O4B-C4B-C5B-O5B
3	E	502	NAP	C3B-C4B-C5B-O5B
3	E	502	NAP	C2N-C3N-C7N-O7N
3	E	502	NAP	C4N-C3N-C7N-O7N
3	E	502	NAP	C4N-C3N-C7N-N7N
2	F	501	FAD	C3B-C4B-C5B-O5B
2	H	501	FAD	C3B-C4B-C5B-O5B
2	B	501	FAD	C3B-C4B-C5B-O5B
3	E	502	NAP	O4B-C4B-C5B-O5B
3	F	502	NAP	C4N-C3N-C7N-N7N
3	E	502	NAP	C2N-C3N-C7N-N7N
3	F	502	NAP	C2N-C3N-C7N-O7N
3	F	502	NAP	C4N-C3N-C7N-O7N
3	F	502	NAP	C2N-C3N-C7N-N7N
3	B	502	NAP	PA-O3-PN-O5D
3	D	502	NAP	PA-O3-PN-O5D
3	E	502	NAP	PA-O3-PN-O5D
3	G	502	NAP	PA-O3-PN-O5D
3	H	502	NAP	PA-O3-PN-O5D
3	A	502	NAP	C2B-O2B-P2B-O1X
3	C	502	NAP	C2B-O2B-P2B-O1X
3	G	502	NAP	C2B-O2B-P2B-O1X
2	A	501	FAD	C5B-O5B-PA-O1A
2	A	501	FAD	C5B-O5B-PA-O3P
2	C	501	FAD	C5B-O5B-PA-O1A
2	D	501	FAD	C5B-O5B-PA-O1A
2	E	501	FAD	C5B-O5B-PA-O1A
2	G	501	FAD	C5B-O5B-PA-O1A
2	G	501	FAD	C5B-O5B-PA-O3P
3	E	502	NAP	C5B-O5B-PA-O1A
2	E	501	FAD	C2'-C3'-C4'-O4'

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Mol	Chain	Res	Type	Atoms
3	F	502	NAP	C3B-C2B-O2B-P2B
3	A	502	NAP	O4B-C4B-C5B-O5B
3	B	502	NAP	O4B-C4B-C5B-O5B
3	H	502	NAP	O4B-C4B-C5B-O5B
3	B	502	NAP	C1B-C2B-O2B-P2B
3	F	502	NAP	C1B-C2B-O2B-P2B
3	B	502	NAP	C2B-O2B-P2B-O1X
3	D	502	NAP	C2B-O2B-P2B-O1X
3	F	502	NAP	C2B-O2B-P2B-O1X
3	H	502	NAP	C2B-O2B-P2B-O1X
3	B	502	NAP	C3B-C2B-O2B-P2B
3	B	502	NAP	PN-O3-PA-O2A
3	D	502	NAP	PN-O3-PA-O2A
3	E	502	NAP	PN-O3-PA-O1A
3	F	502	NAP	PN-O3-PA-O2A
2	E	501	FAD	O3'-C3'-C4'-O4'
3	A	502	NAP	C3B-C4B-C5B-O5B
3	B	502	NAP	C3B-C4B-C5B-O5B
3	D	502	NAP	C2B-O2B-P2B-O2X
3	F	502	NAP	C2B-O2B-P2B-O2X
3	H	502	NAP	C2B-O2B-P2B-O2X
3	E	502	NAP	C2B-O2B-P2B-O1X
2	F	501	FAD	O2'-C2'-C3'-C4'

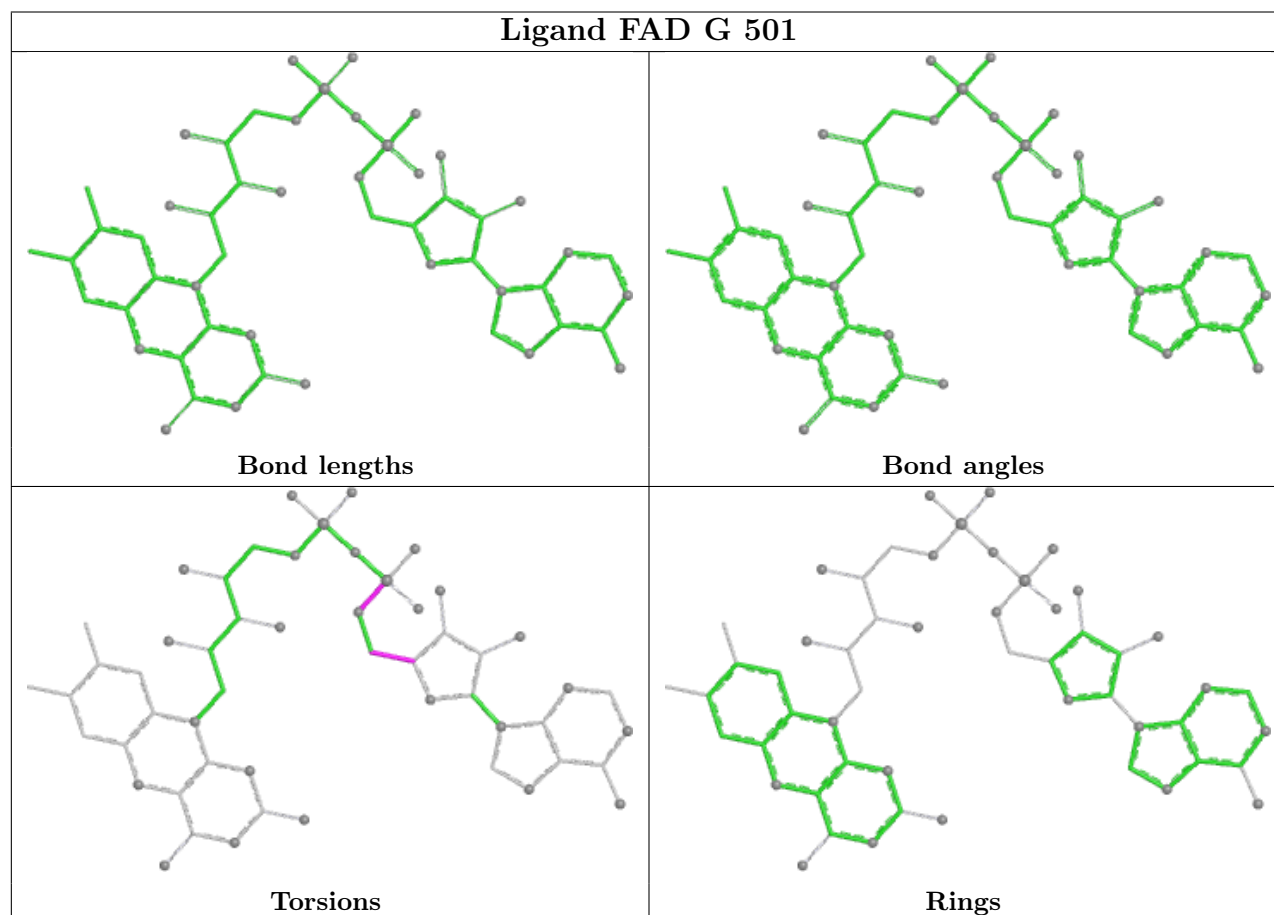
There are no ring outliers.

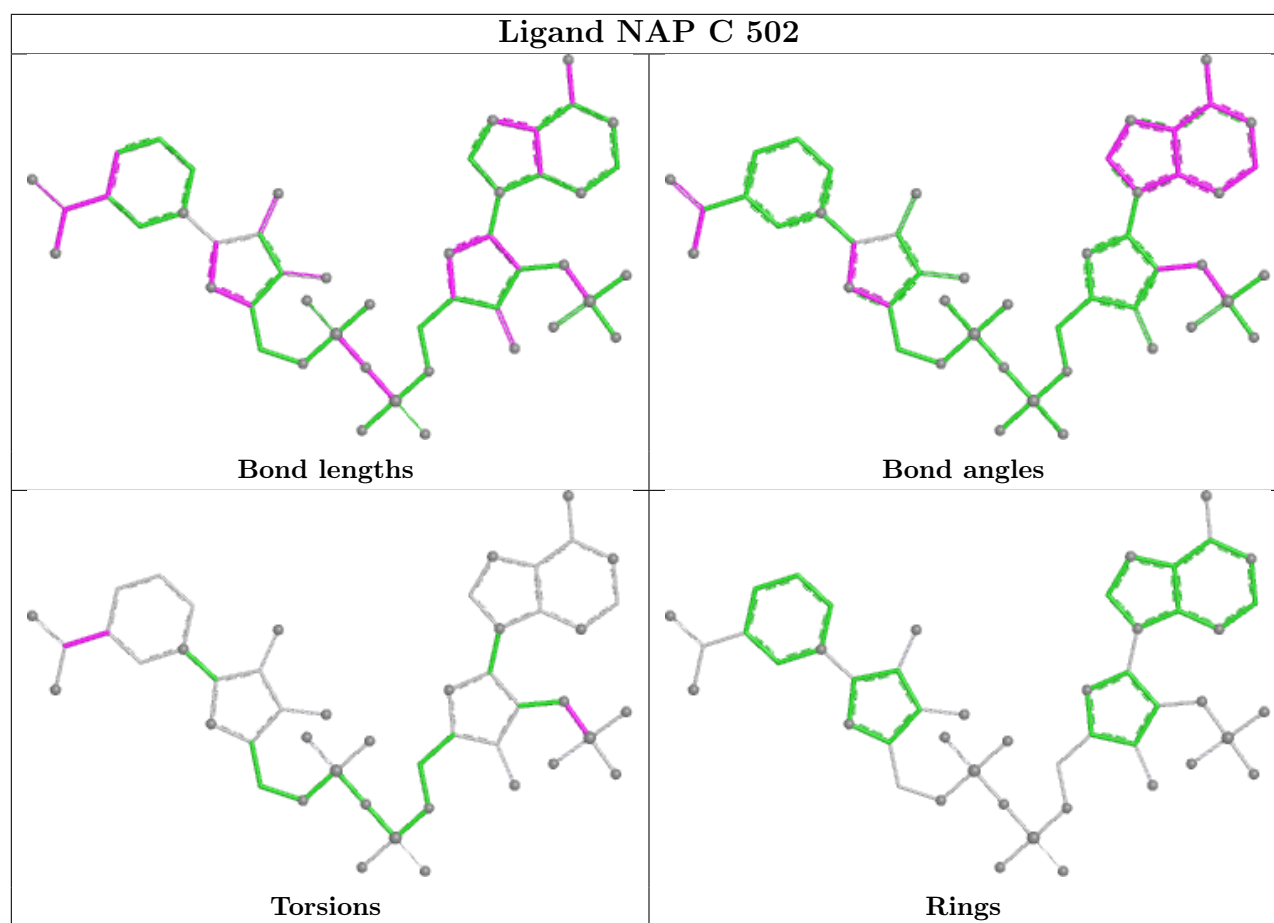
9 monomers are involved in 19 short contacts:

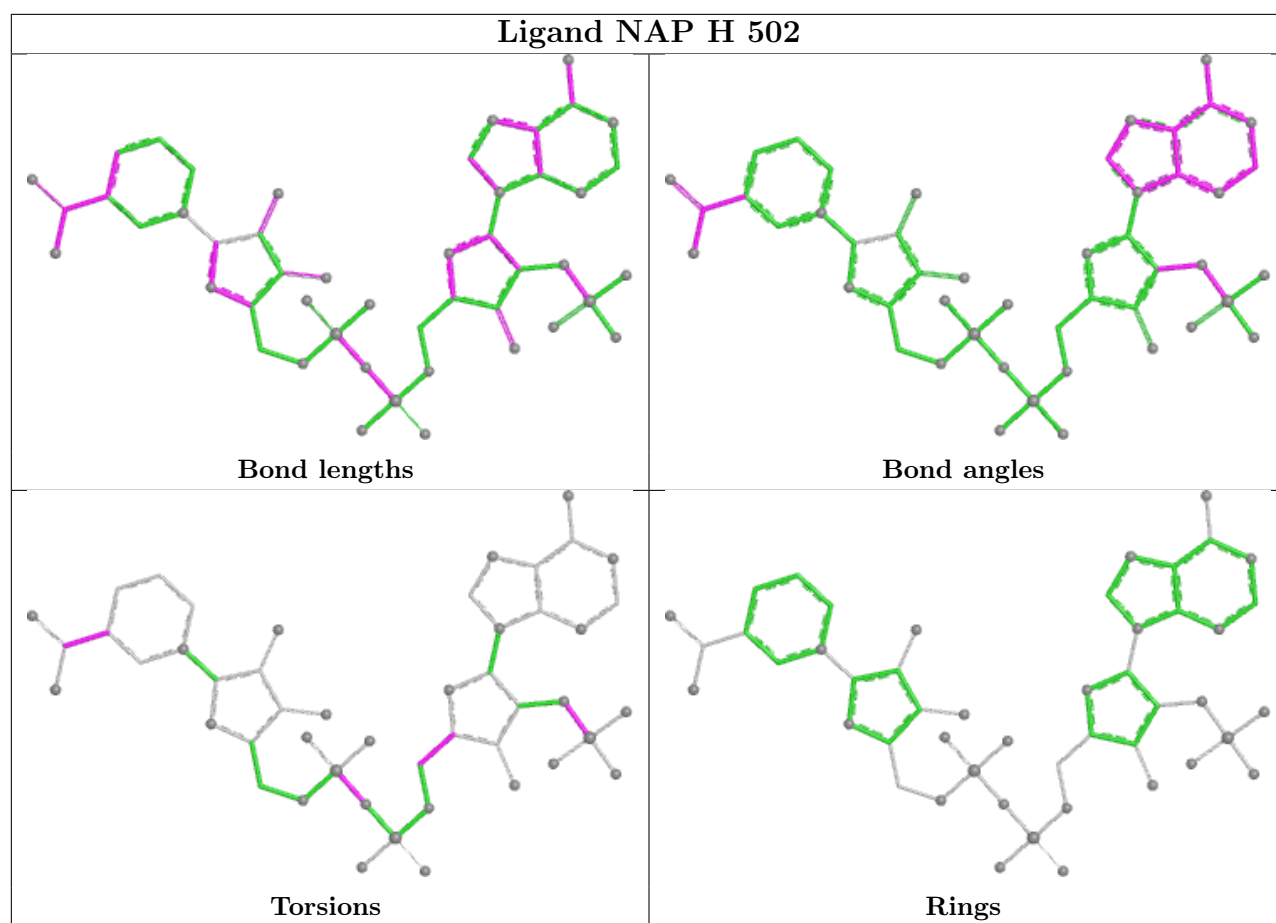
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	502	NAP	1	0
3	H	502	NAP	2	0
3	F	502	NAP	2	0
3	G	502	NAP	2	0
3	E	502	NAP	3	0
3	A	502	NAP	4	0
2	F	501	FAD	1	0
3	D	502	NAP	2	0
3	B	502	NAP	2	0

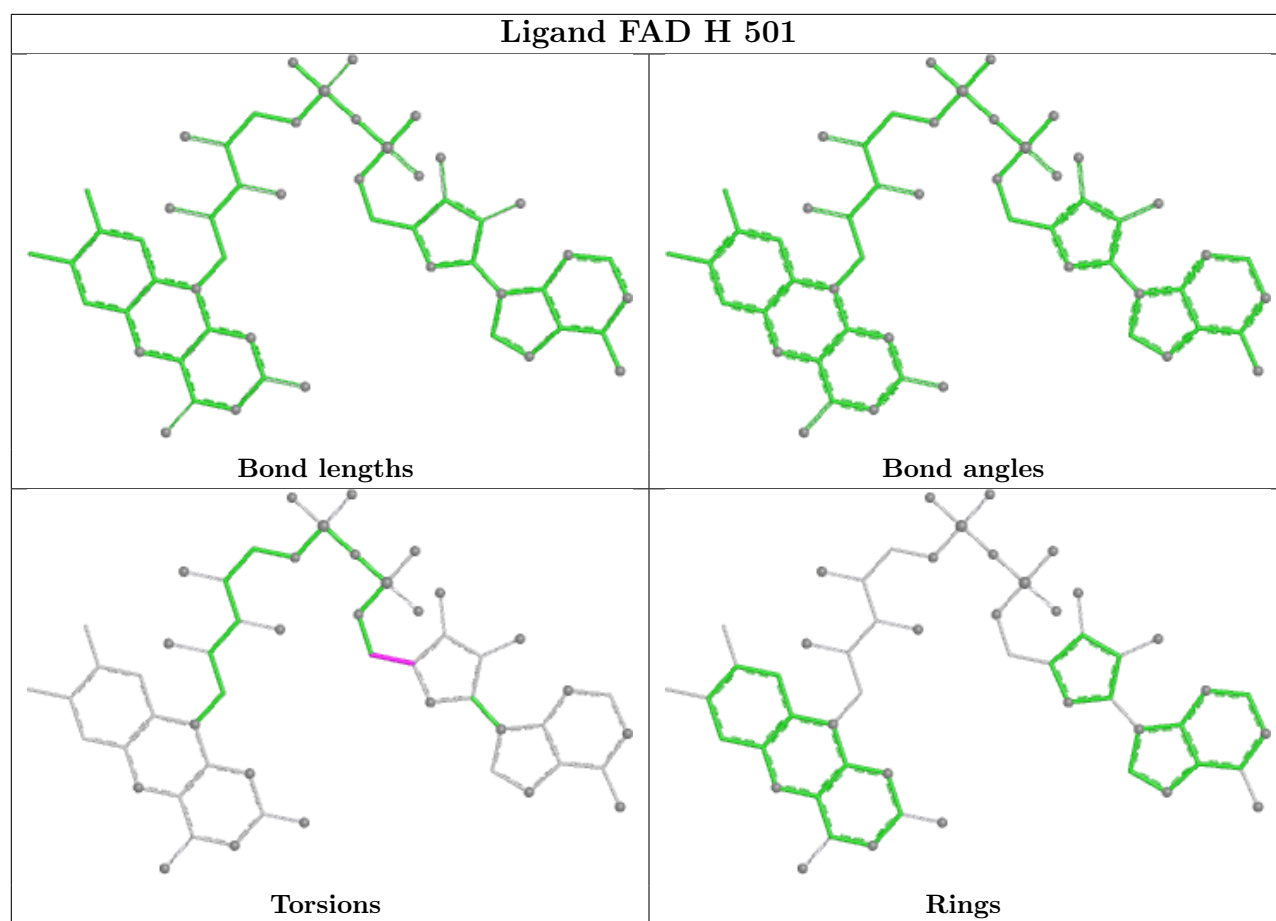
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is

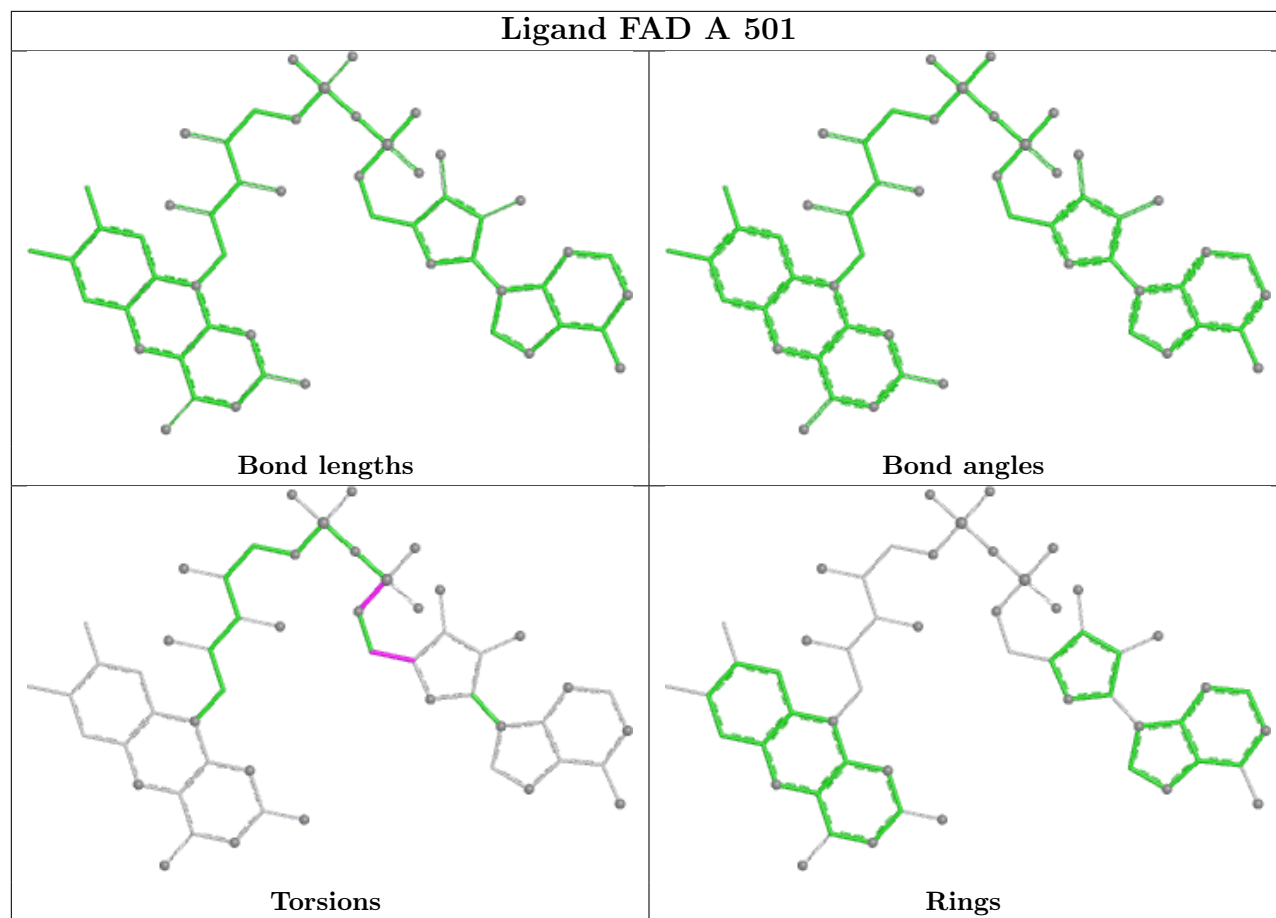
within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question 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.

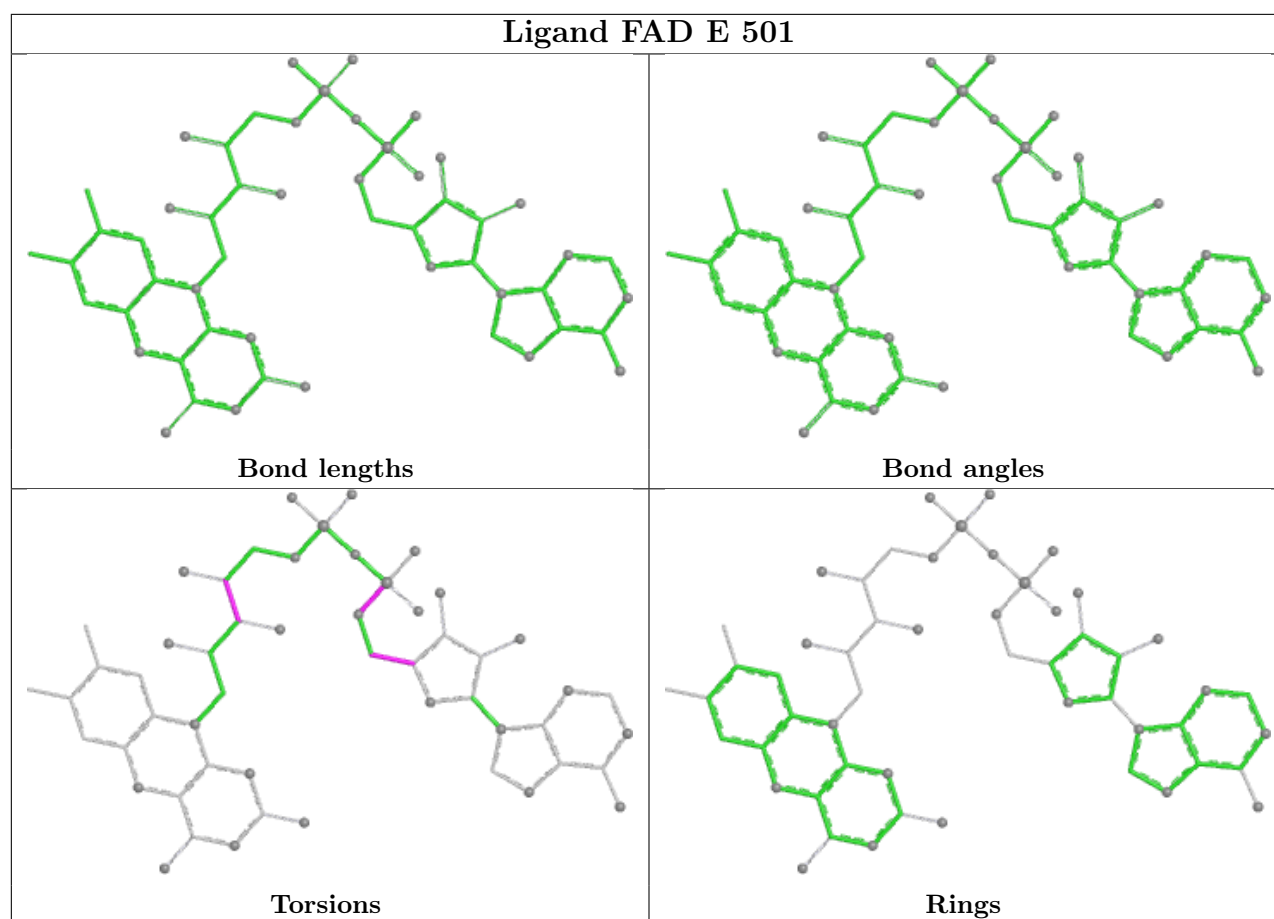


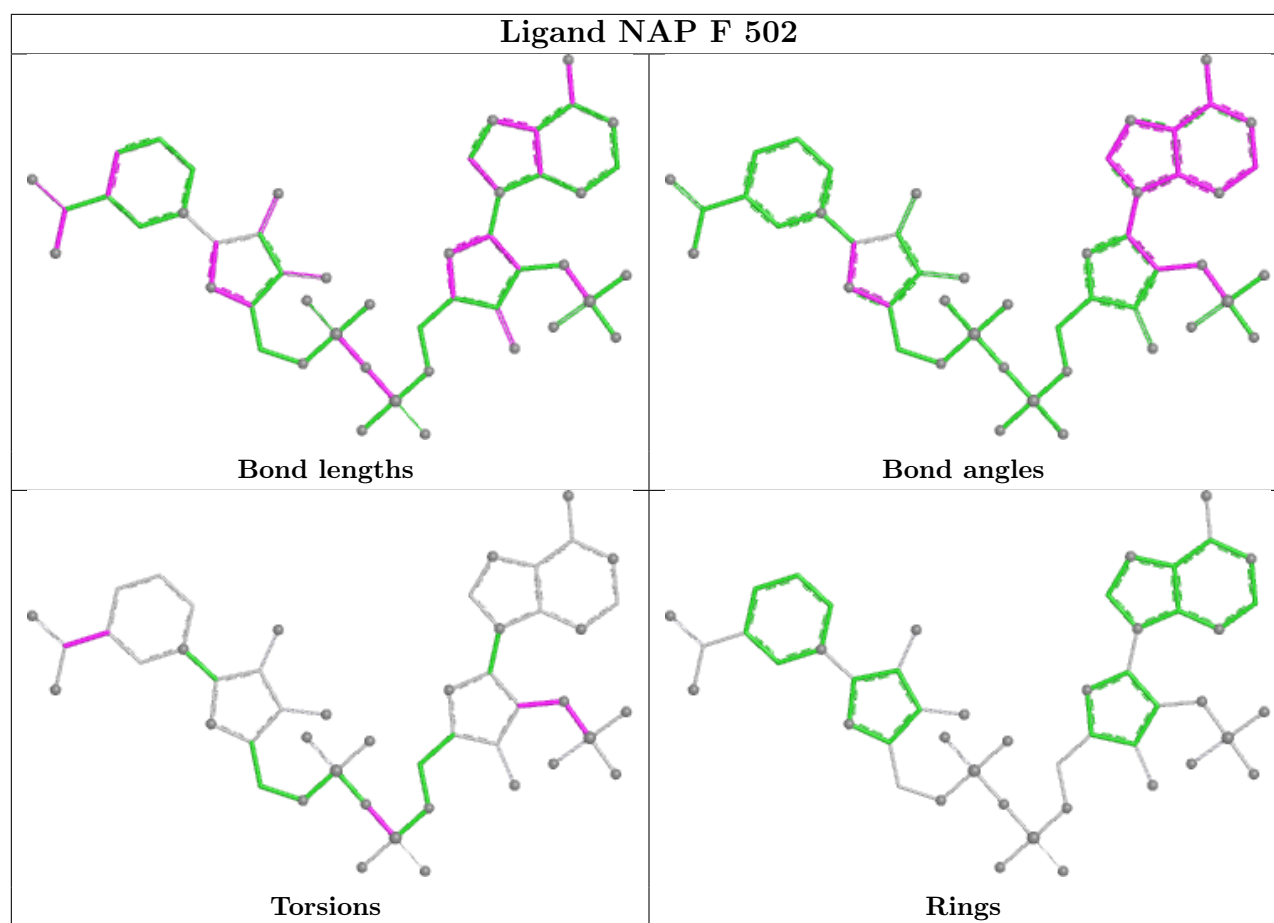


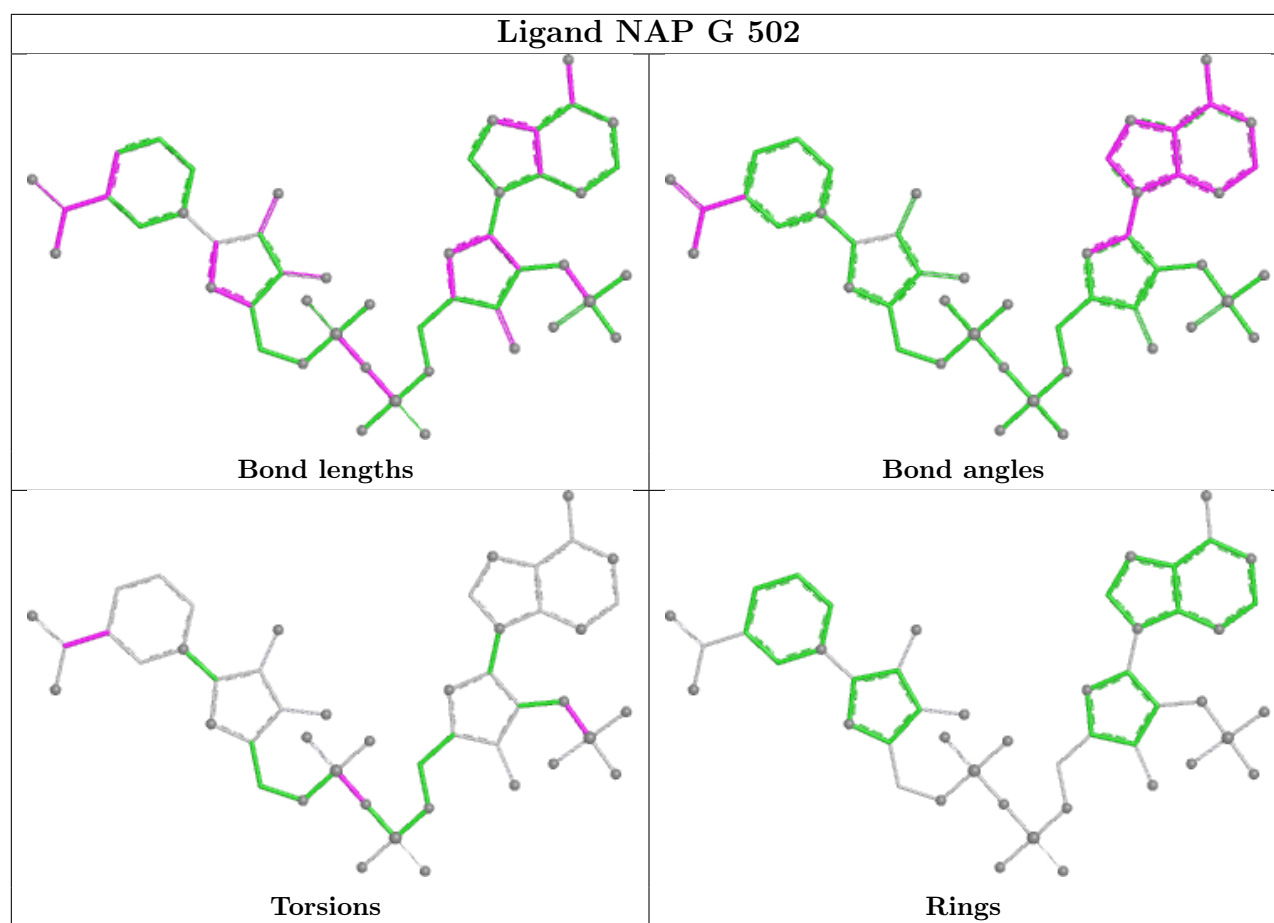


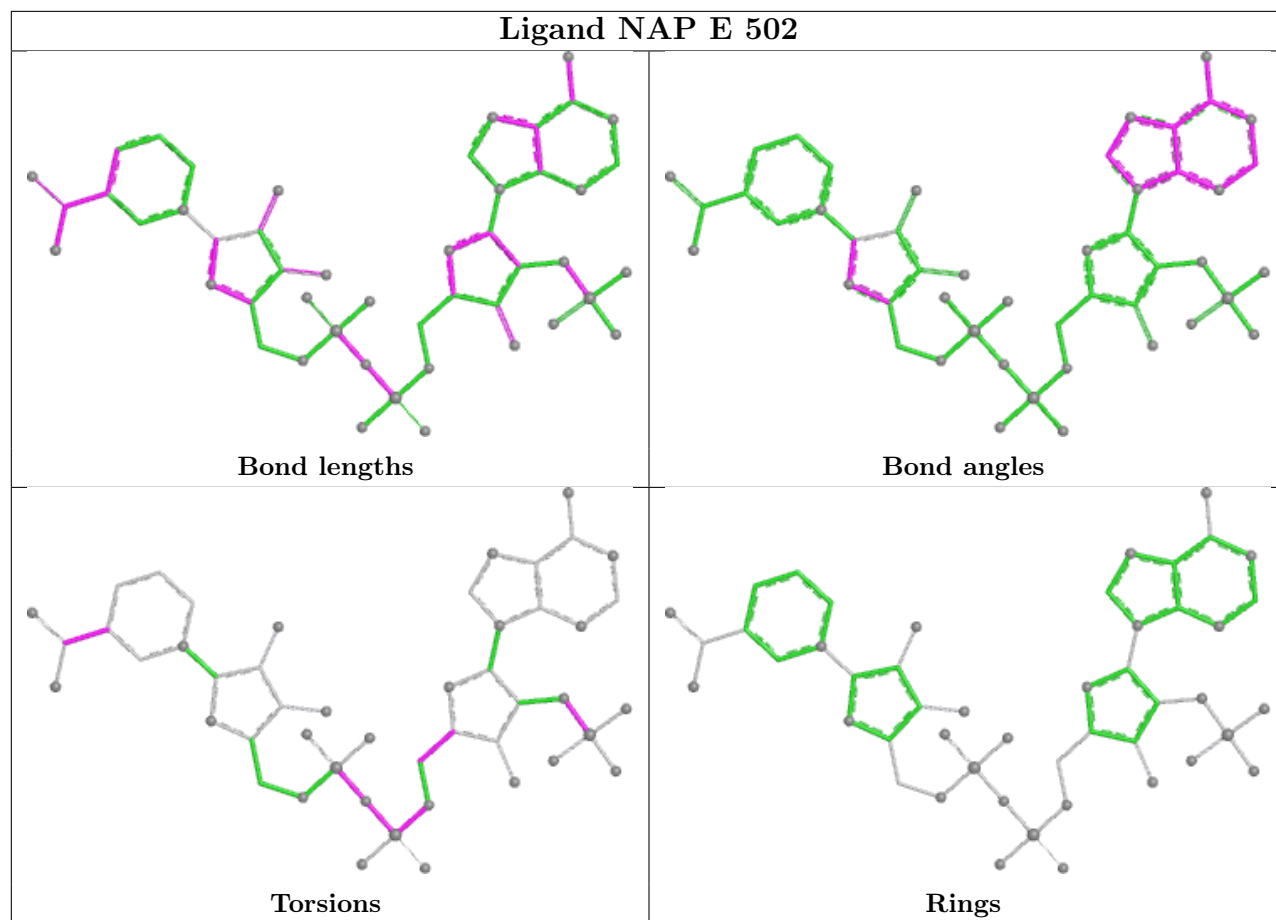


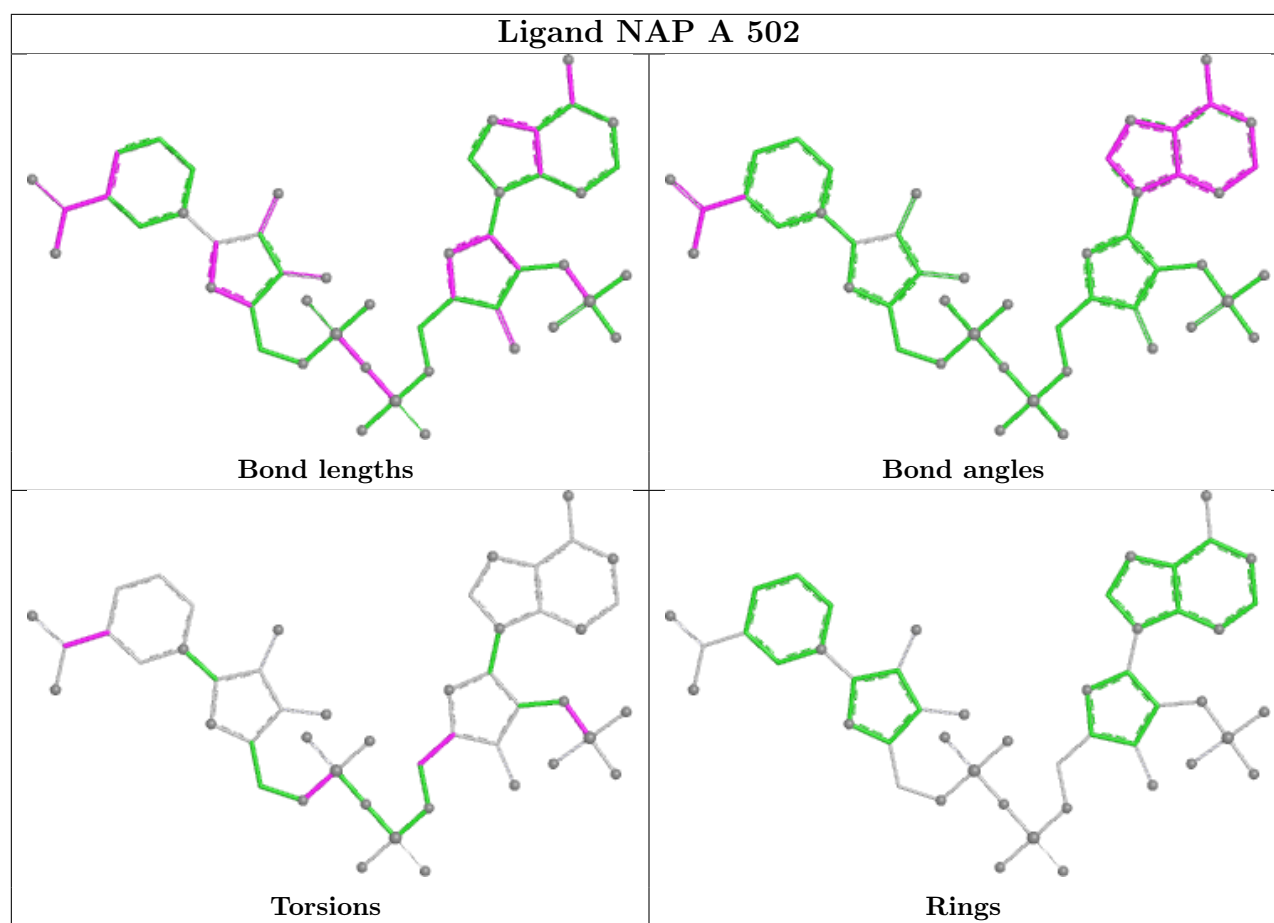


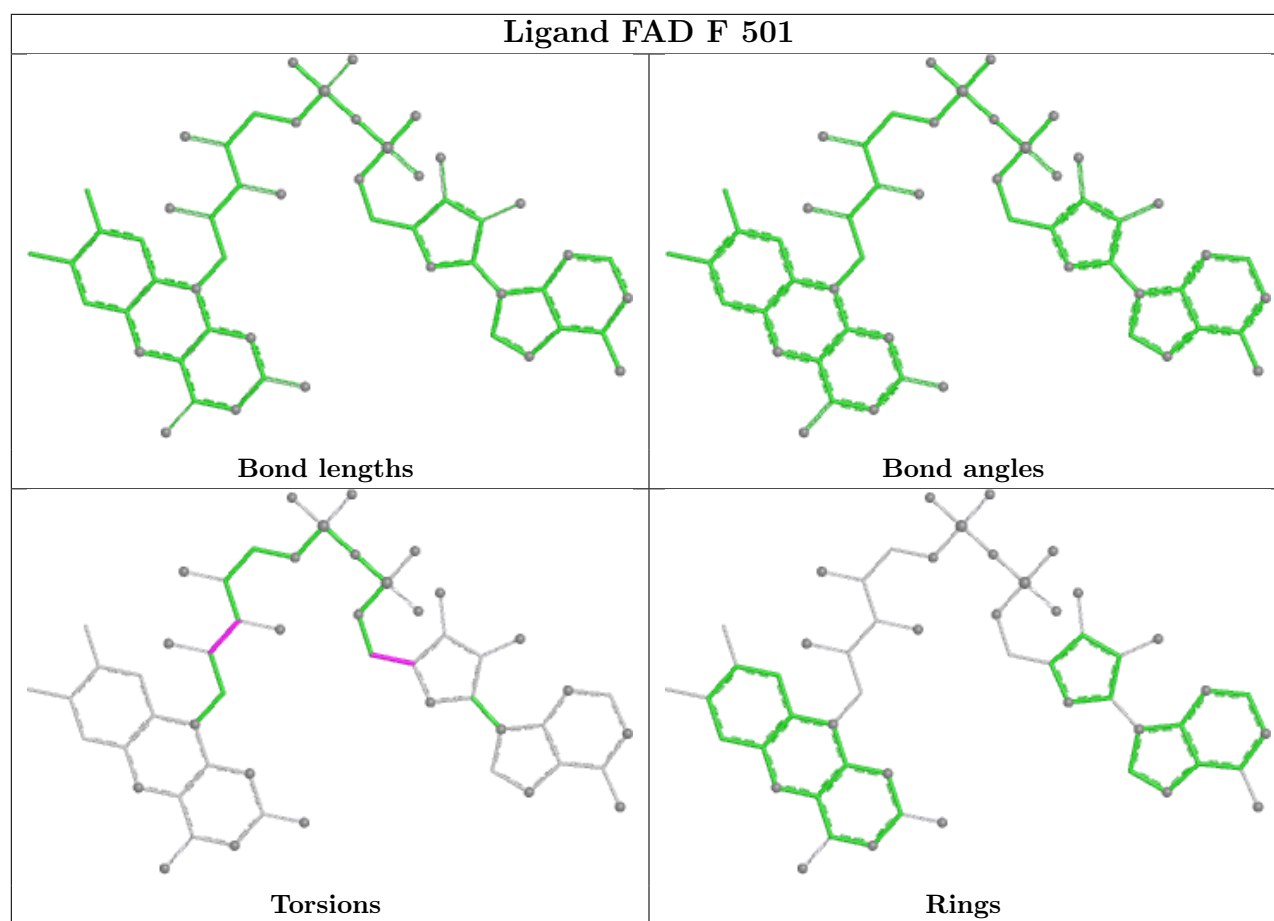


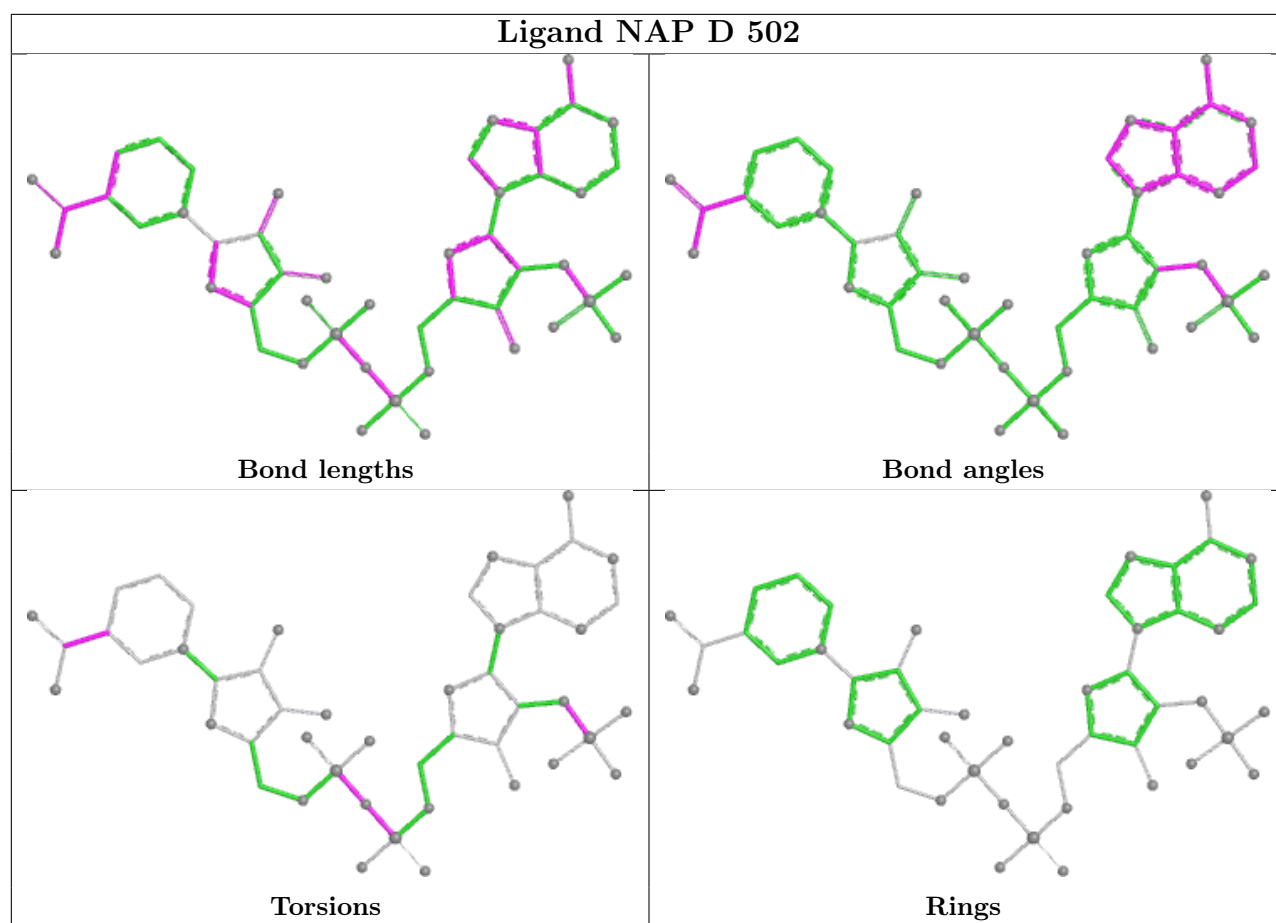


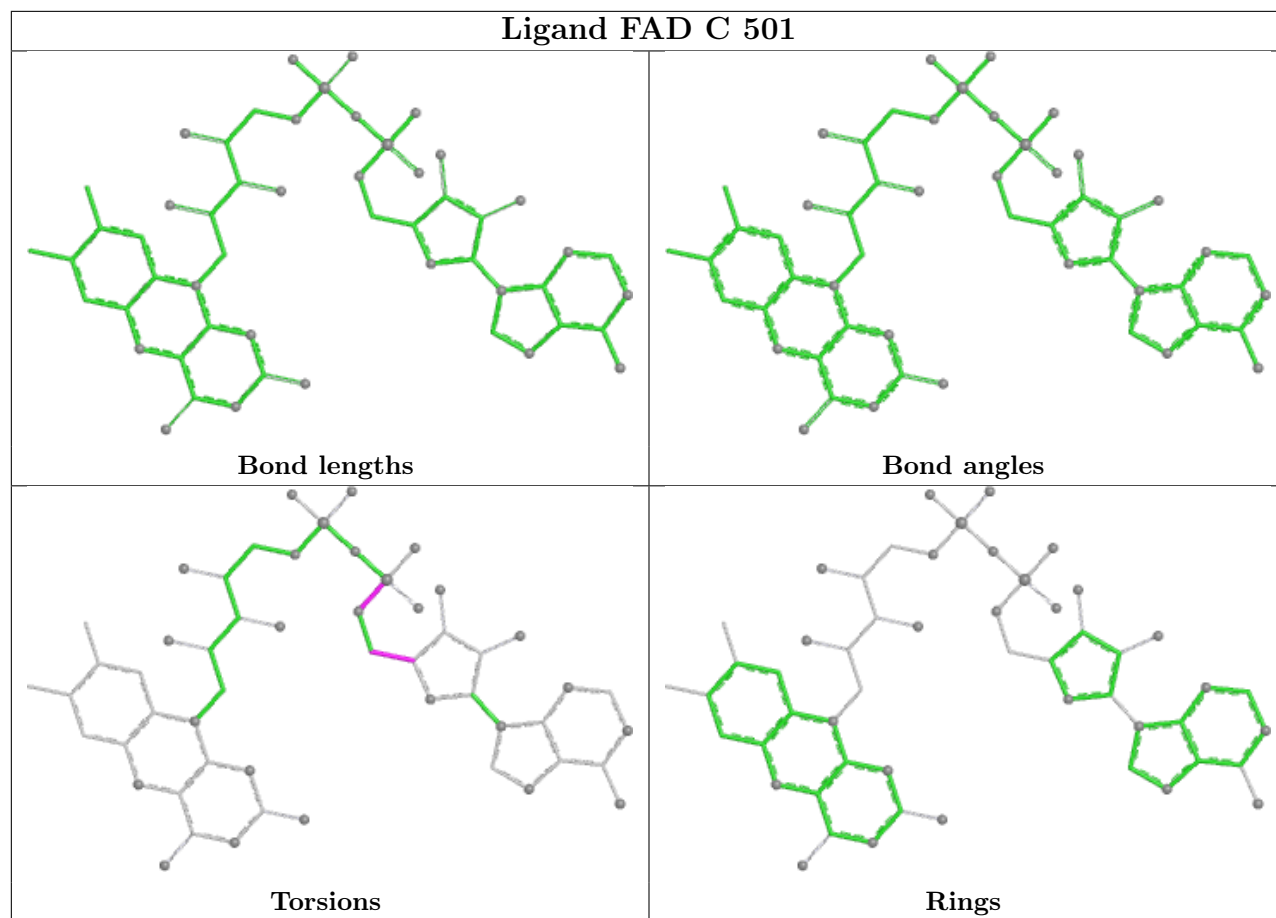


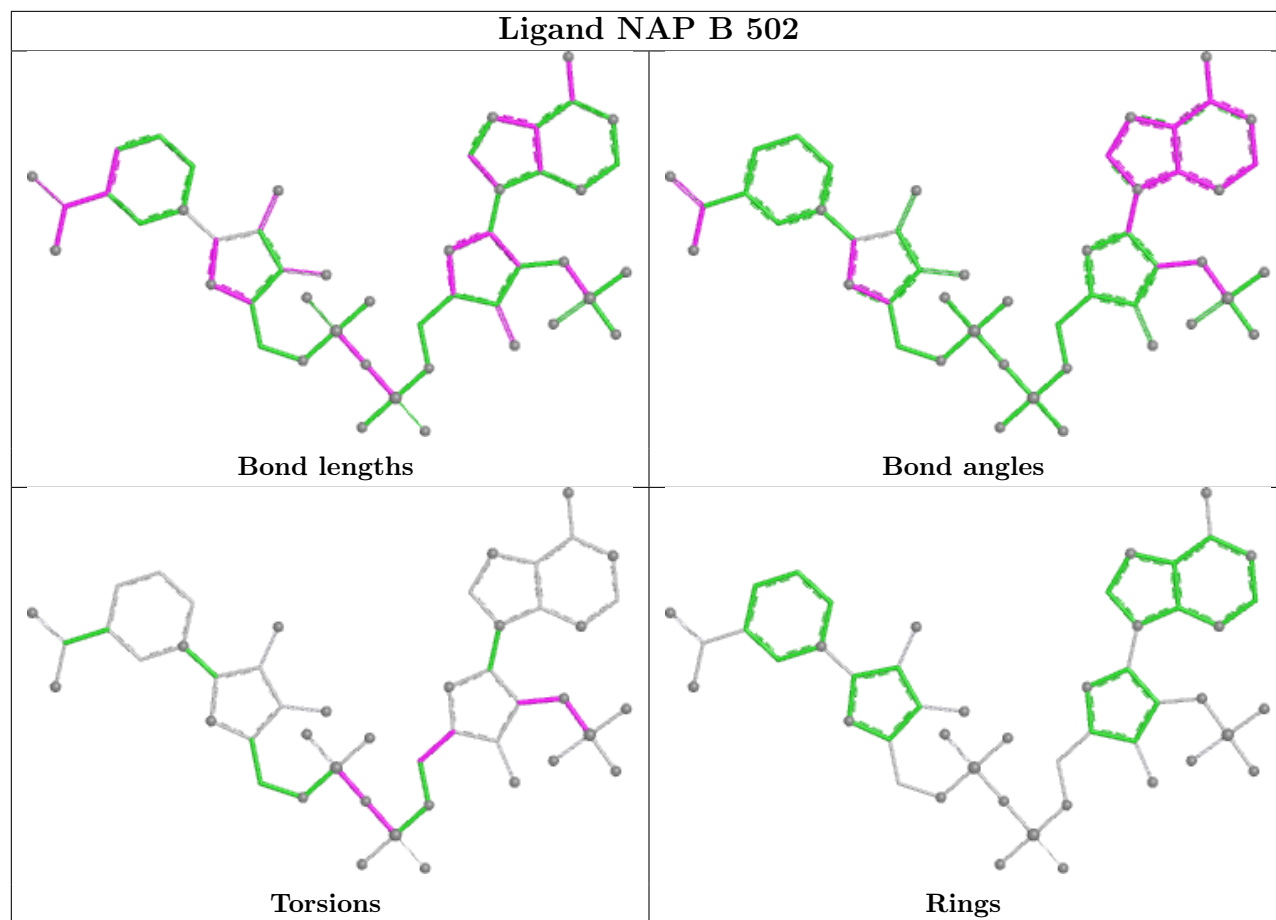


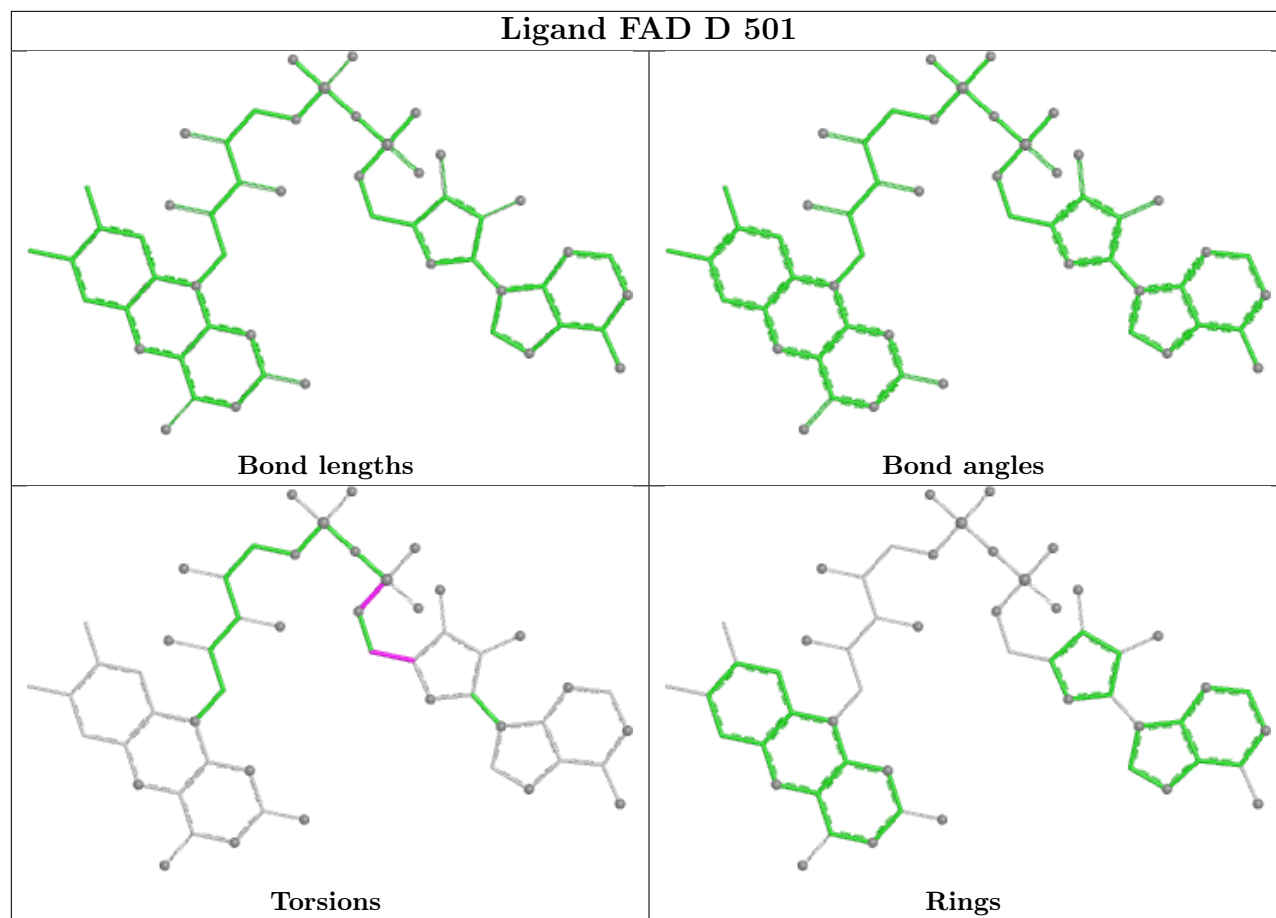


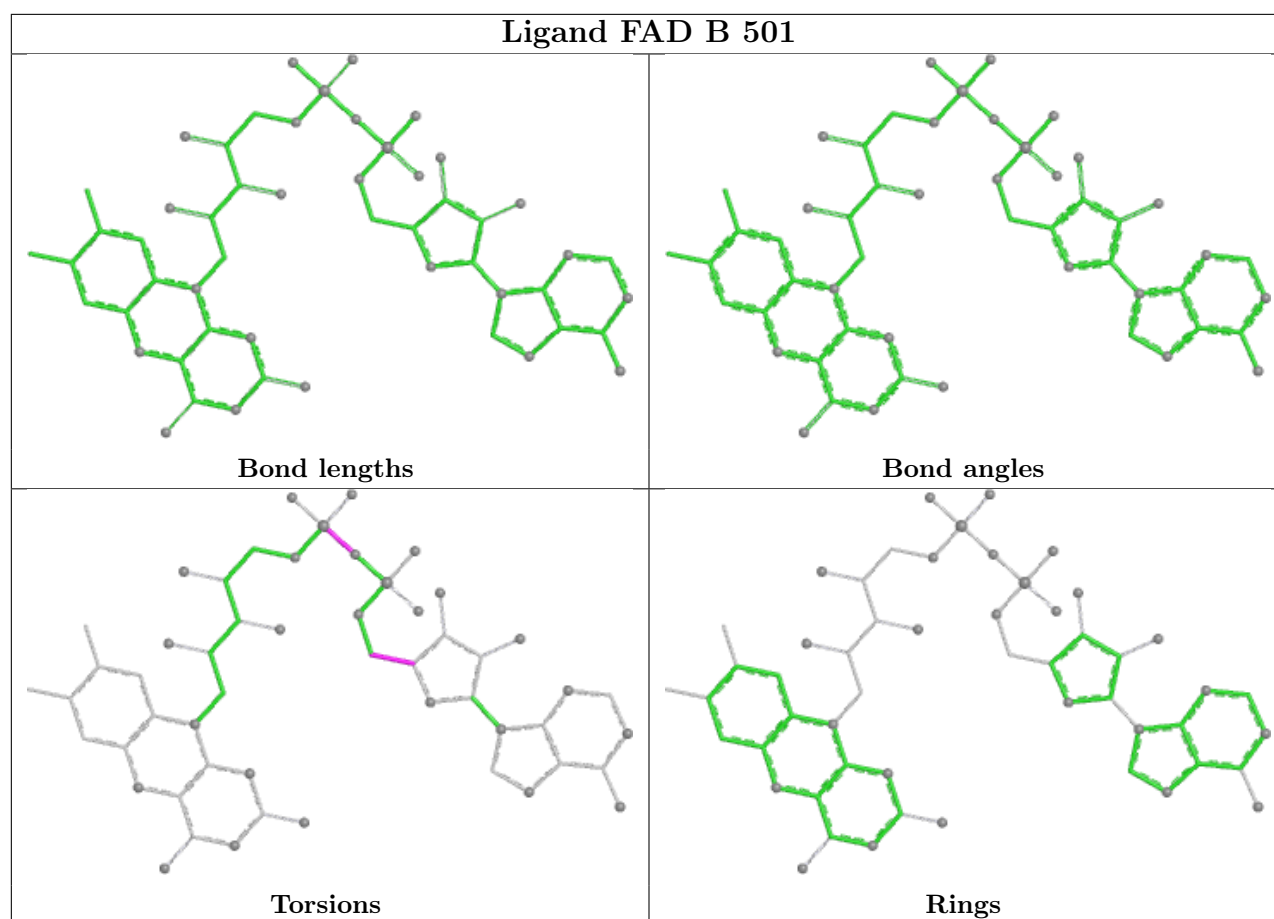












5.7 Other polymers [i](#)

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	418/425 (98%)	-0.12	2 (0%) 87 90	17, 30, 44, 76	0
1	B	416/425 (97%)	-0.13	2 (0%) 87 90	20, 31, 49, 61	0
1	C	416/425 (97%)	0.06	2 (0%) 87 90	20, 32, 51, 67	0
1	D	417/425 (98%)	-0.01	1 (0%) 91 92	22, 35, 50, 62	0
1	E	417/425 (98%)	0.01	5 (1%) 76 81	19, 32, 51, 67	0
1	F	416/425 (97%)	0.20	3 (0%) 84 87	23, 39, 56, 76	0
1	G	416/425 (97%)	0.25	5 (1%) 76 81	23, 35, 53, 73	0
1	H	420/425 (98%)	0.07	2 (0%) 87 90	21, 37, 58, 72	0
All	All	3336/3400 (98%)	0.04	22 (0%) 84 87	17, 34, 52, 76	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	8	PRO	4.8
1	C	114	ALA	4.4
1	G	10	THR	2.9
1	B	307	GLU	2.8
1	E	232	TYR	2.8
1	A	232	TYR	2.7
1	H	425	VAL	2.6
1	B	215	GLY	2.6
1	E	309	GLY	2.5
1	F	425	VAL	2.5
1	G	189	GLU	2.5
1	C	10	THR	2.4
1	G	232	TYR	2.3
1	D	9	SER	2.3
1	G	403	ILE	2.3
1	H	215	GLY	2.2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	E	9	SER	2.2
1	F	307	GLU	2.2
1	E	424	SER	2.1
1	F	346	ALA	2.1
1	E	343	GLU	2.1
1	G	353	VAL	2.0

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

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

6.3 Carbohydrates [i](#)

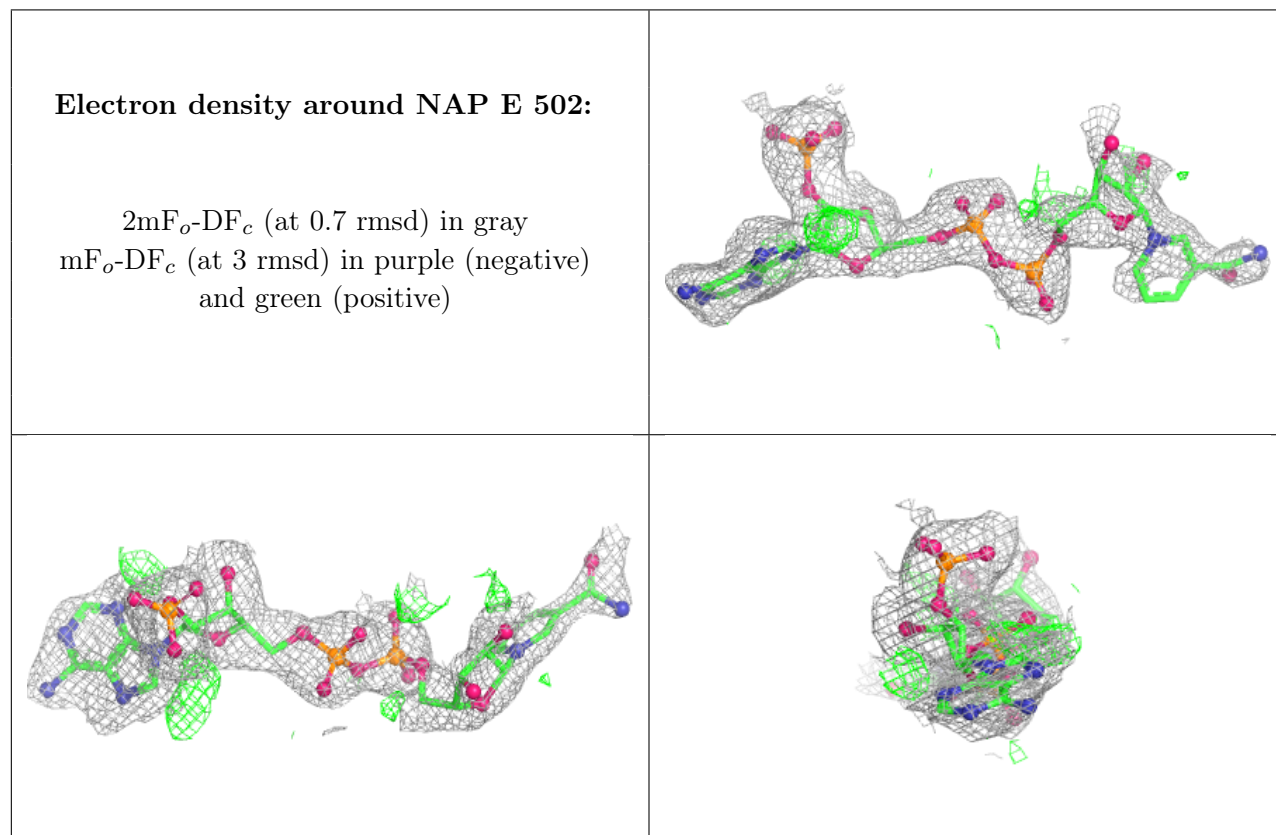
There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

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

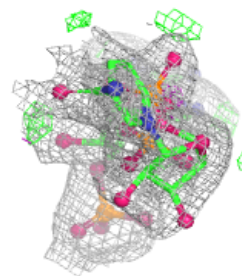
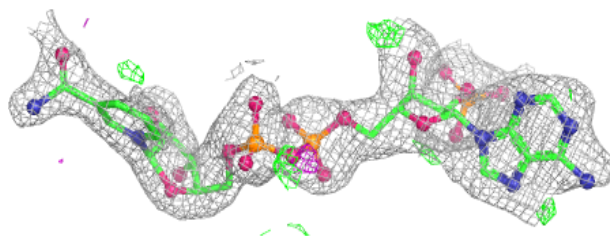
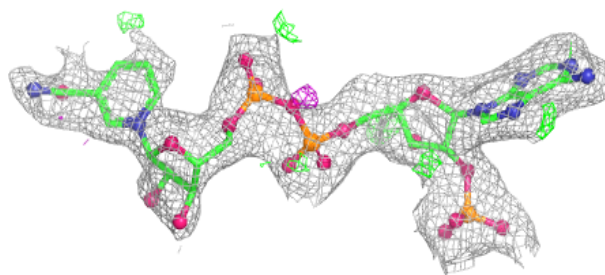
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	NAP	E	502	48/48	0.87	0.12	26,36,40,45	48
3	NAP	G	502	48/48	0.88	0.11	31,38,43,44	48
3	NAP	C	502	48/48	0.91	0.10	24,34,44,46	48
3	NAP	A	502	48/48	0.92	0.10	23,30,38,42	48
3	NAP	D	502	48/48	0.92	0.10	29,39,42,45	48
2	FAD	F	501	53/53	0.93	0.08	30,37,46,47	0
3	NAP	F	502	48/48	0.93	0.09	30,40,47,51	48
3	NAP	B	502	48/48	0.93	0.09	19,33,40,41	48
3	NAP	H	502	48/48	0.94	0.09	28,39,43,44	48
2	FAD	E	501	53/53	0.95	0.07	21,28,36,37	0
2	FAD	A	501	53/53	0.95	0.07	21,28,34,36	0
2	FAD	G	501	53/53	0.95	0.07	22,31,42,48	0
2	FAD	H	501	53/53	0.95	0.07	27,35,40,46	0
2	FAD	B	501	53/53	0.95	0.07	23,30,35,37	0
2	FAD	C	501	53/53	0.95	0.08	22,31,43,44	0
2	FAD	D	501	53/53	0.96	0.07	25,32,39,42	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.

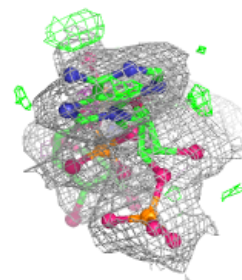
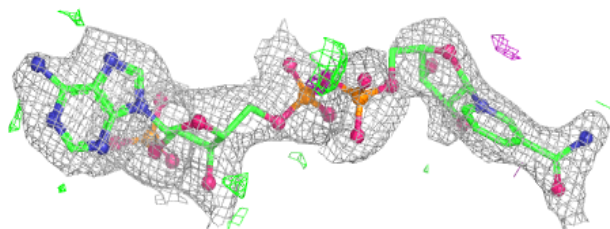
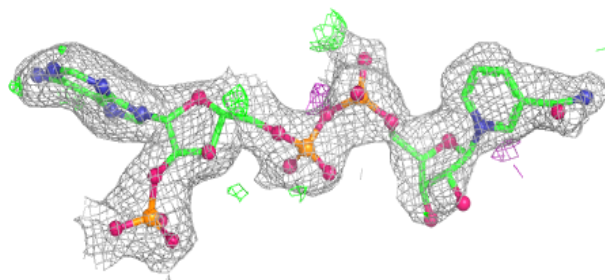


Electron density around NAP G 502:

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

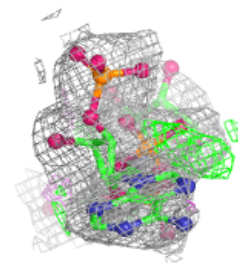
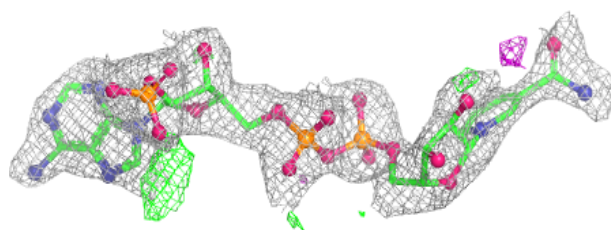
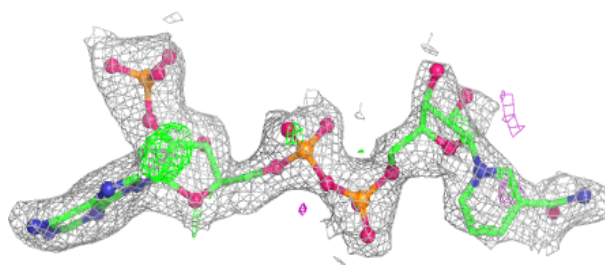
**Electron density around NAP C 502:**

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

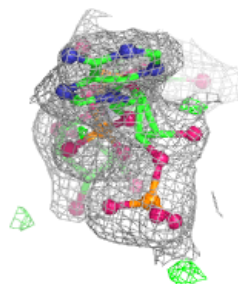
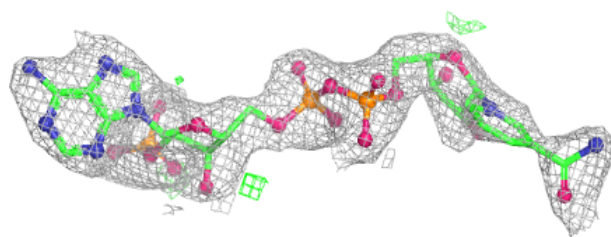
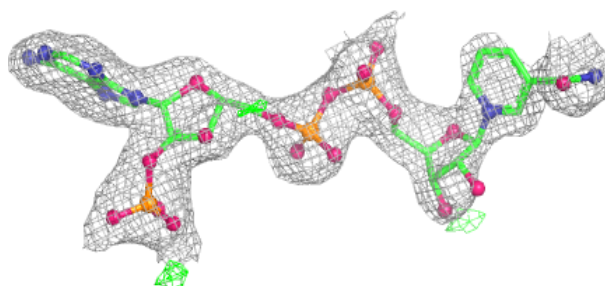


Electron density around NAP A 502:

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

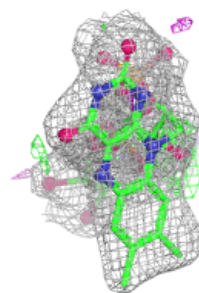
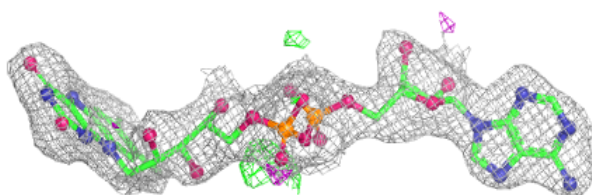
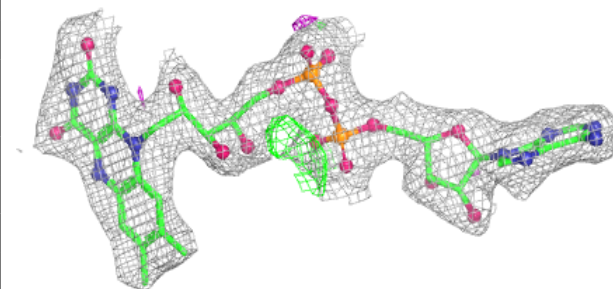
**Electron density around NAP D 502:**

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

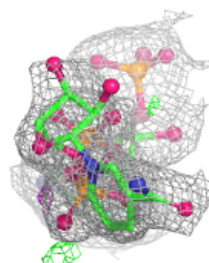
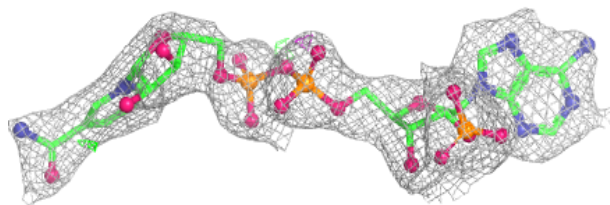
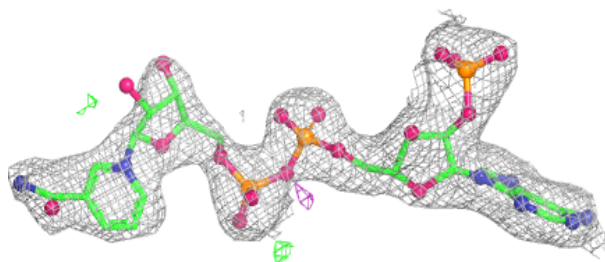


Electron density around FAD F 501:

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

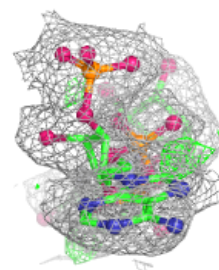
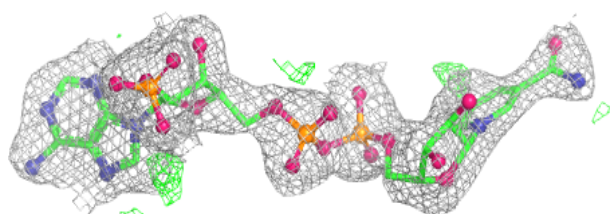
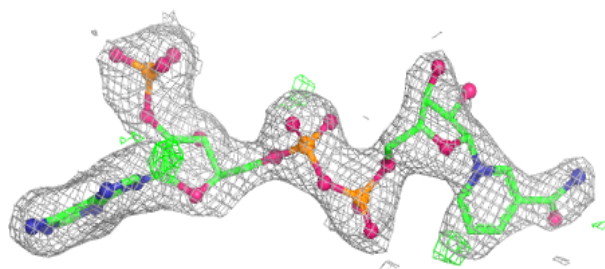
**Electron density around NAP F 502:**

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

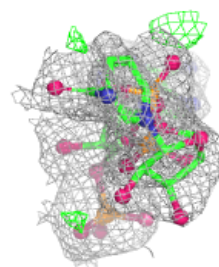
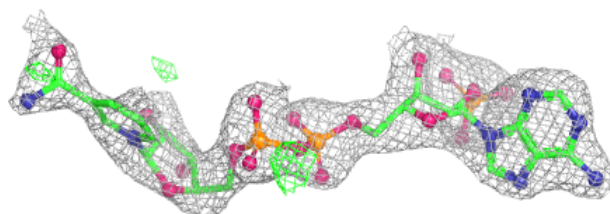
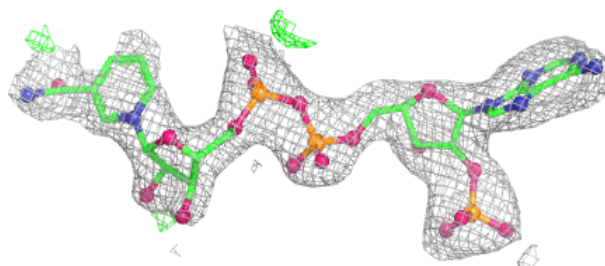


Electron density around NAP B 502:

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

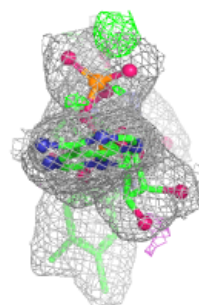
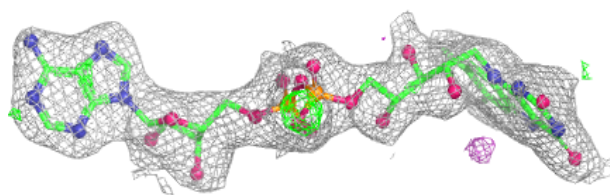
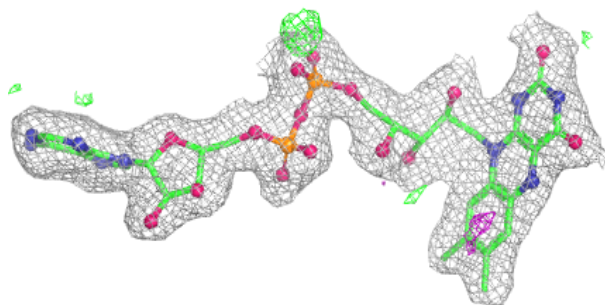
**Electron density around NAP H 502:**

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

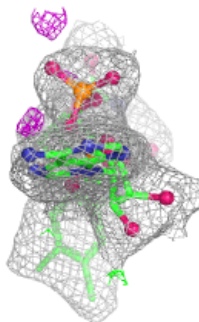
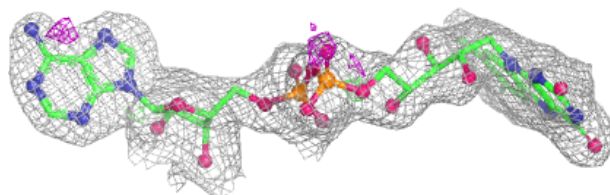
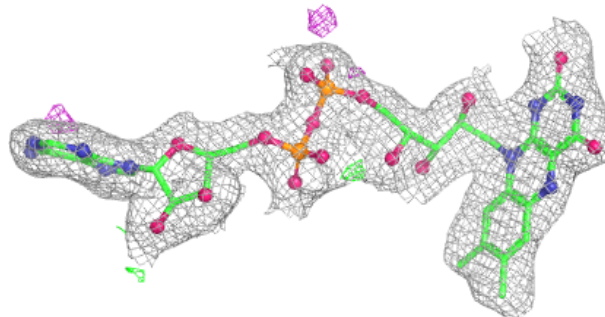


Electron density around FAD E 501:

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

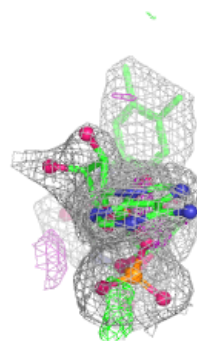
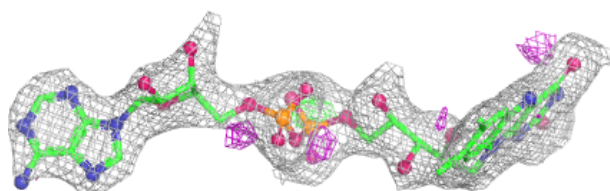
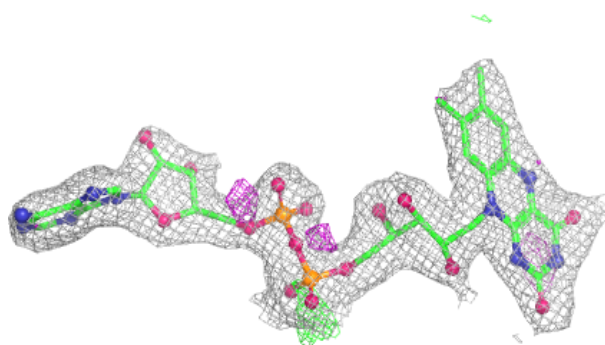
**Electron density around FAD A 501:**

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

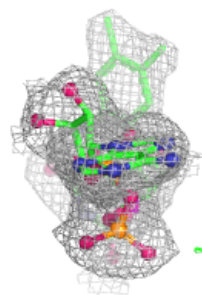
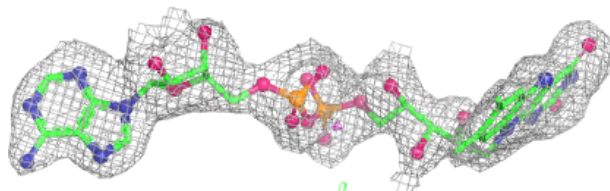
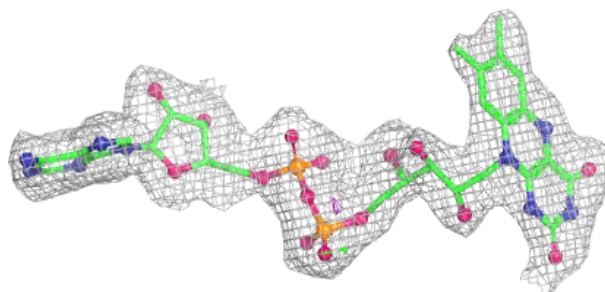


Electron density around FAD G 501:

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

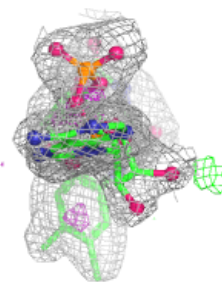
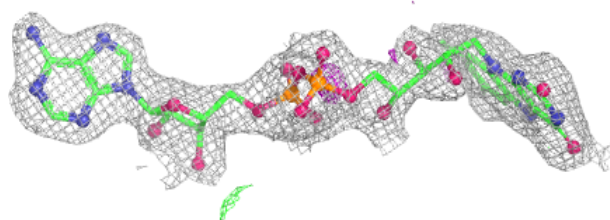
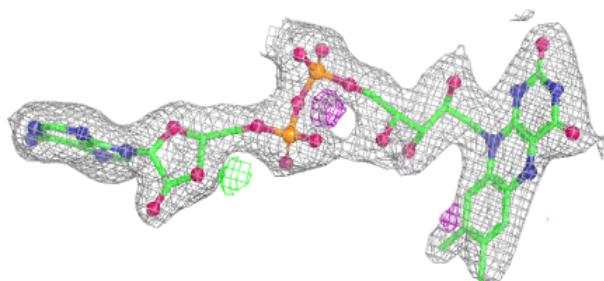
**Electron density around FAD H 501:**

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and green (positive)

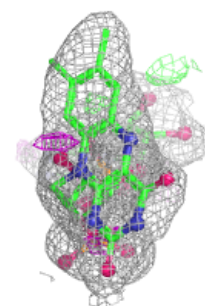
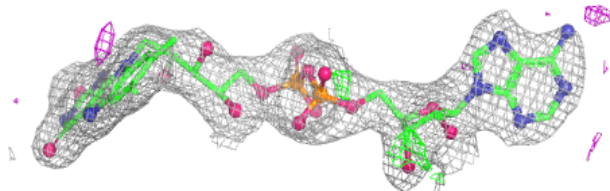
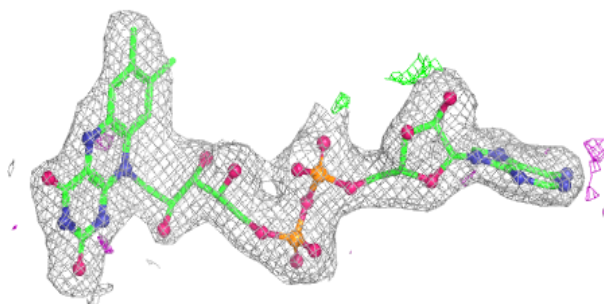


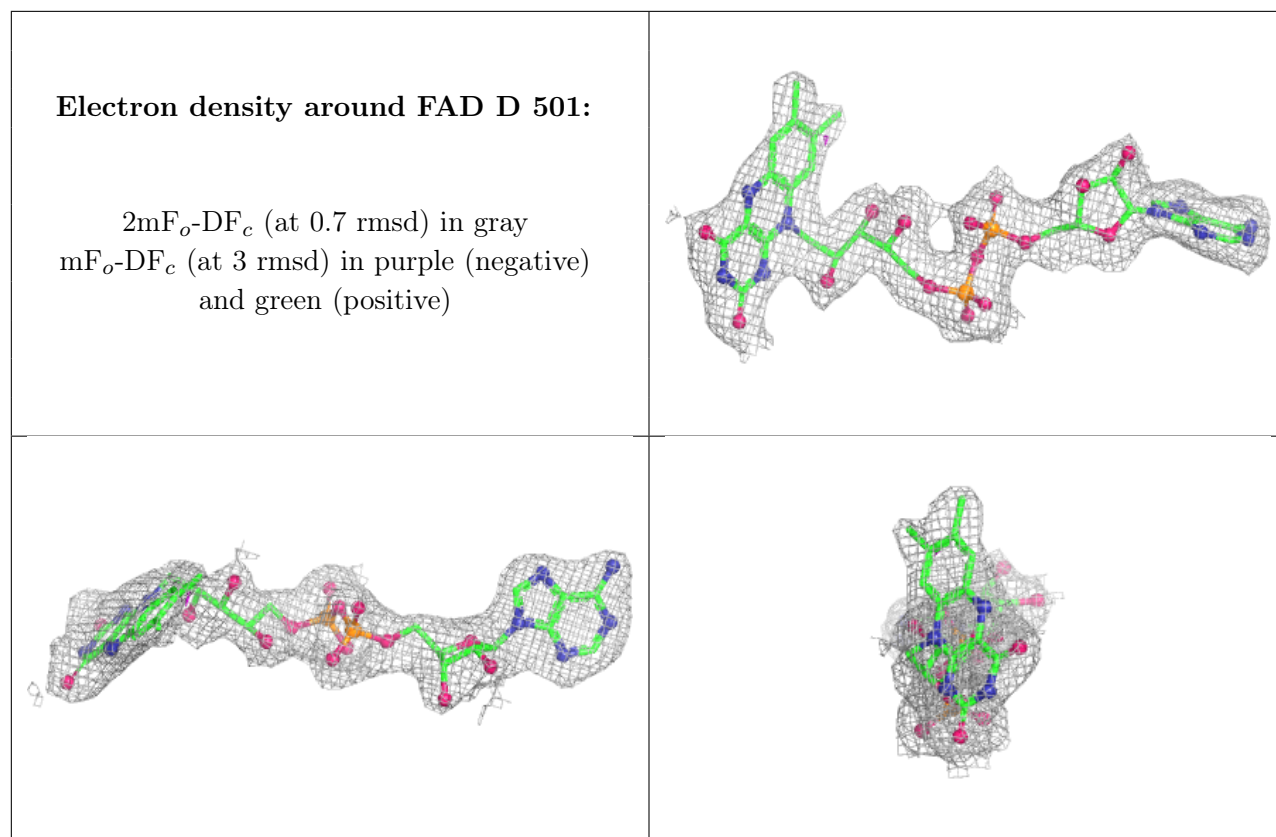
Electron density around FAD B 501:

$2mF_o-DF_c$ (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)





6.5 Other polymers [i](#)

There are no such residues in this entry.