Full wwPDB X-ray Structure Validation Report ⓘ

Apr 9, 2026 – 09:58 PM UTC

PDB ID	:	9QJ0 / pdb_00009qj0
Title	:	Crystal structure of S-adenosyl-L-homocysteine hydrolase from P. aeruginosa: Q65A mutant soaked with adenosine and probed with rubidium to confirm disruption of a potassium binding site.
Authors	:	Malecki, P.H.; Wozniak, K.; Stepniewska, M.; Brzezinski, K.
Deposited on	:	2025-03-18
Resolution	:	2.40 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:

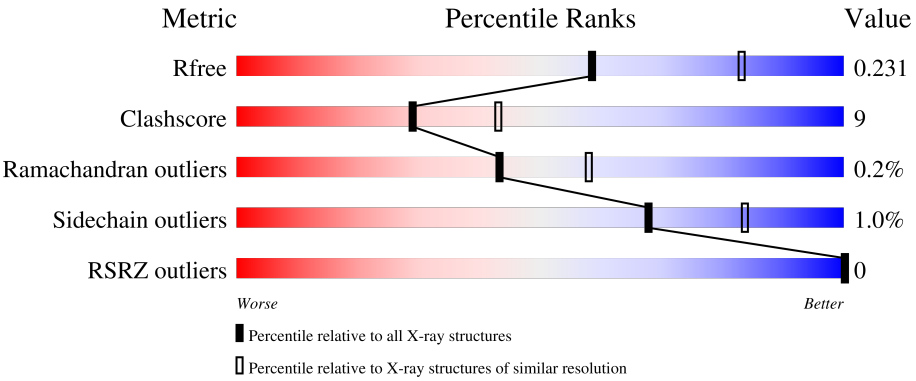
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal 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 (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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	4912 (2.40-2.40)
Clashscore	190562	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)
RSRZ outliers	180081	4916 (2.40-2.40)

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 <=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	472	73% 24% .
1	B	472	76% 21% ..
1	C	472	79% 18% .
1	D	472	80% 17% .

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Mol	Chain	Length	Quality of chain
1	H	472	78% 19%
1	I	472	79% 18%
1	J	472	78% 19%
1	K	472	79% 18%

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	PO4	A	504	-	-	X	-
4	PO4	C	503	-	-	X	-

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 30163 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 Adenosylhomocysteinase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	461	Total	C	N	O	S	0	2	0
			3561	2245	616	678	22			
1	B	461	Total	C	N	O	S	0	2	0
			3565	2247	618	679	21			
1	C	461	Total	C	N	O	S	0	2	0
			3560	2246	616	677	21			
1	D	461	Total	C	N	O	S	0	4	0
			3578	2255	621	680	22			
1	H	461	Total	C	N	O	S	0	2	0
			3567	2248	619	678	22			
1	I	461	Total	C	N	O	S	0	2	0
			3557	2243	614	679	21			
1	J	461	Total	C	N	O	S	0	3	0
			3570	2251	619	678	22			
1	K	461	Total	C	N	O	S	0	4	0
			3575	2254	617	681	23			

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	SER	-	expression tag	UNP Q9I685
A	-1	ASN	-	expression tag	UNP Q9I685
A	0	ALA	-	expression tag	UNP Q9I685
B	-2	SER	-	expression tag	UNP Q9I685
B	-1	ASN	-	expression tag	UNP Q9I685
B	0	ALA	-	expression tag	UNP Q9I685
C	-2	SER	-	expression tag	UNP Q9I685
C	-1	ASN	-	expression tag	UNP Q9I685
C	0	ALA	-	expression tag	UNP Q9I685
D	-2	SER	-	expression tag	UNP Q9I685
D	-1	ASN	-	expression tag	UNP Q9I685
D	0	ALA	-	expression tag	UNP Q9I685
H	-2	SER	-	expression tag	UNP Q9I685

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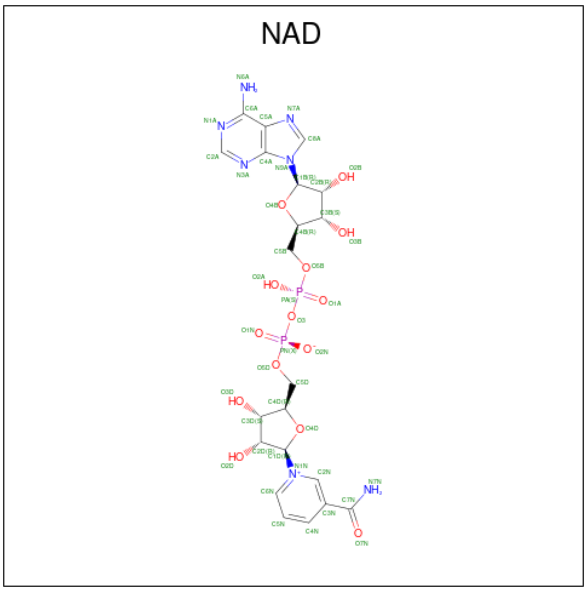
Chain	Residue	Modelled	Actual	Comment	Reference
H	-1	ASN	-	expression tag	UNP Q9I685
H	0	ALA	-	expression tag	UNP Q9I685
I	-2	SER	-	expression tag	UNP Q9I685
I	-1	ASN	-	expression tag	UNP Q9I685
I	0	ALA	-	expression tag	UNP Q9I685
J	-2	SER	-	expression tag	UNP Q9I685
J	-1	ASN	-	expression tag	UNP Q9I685
J	0	ALA	-	expression tag	UNP Q9I685
K	-2	SER	-	expression tag	UNP Q9I685
K	-1	ASN	-	expression tag	UNP Q9I685
K	0	ALA	-	expression tag	UNP Q9I685

- Molecule 2 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (CCD ID: NAD) (formula: $C_{21}H_{27}N_7O_{14}P_2$).



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

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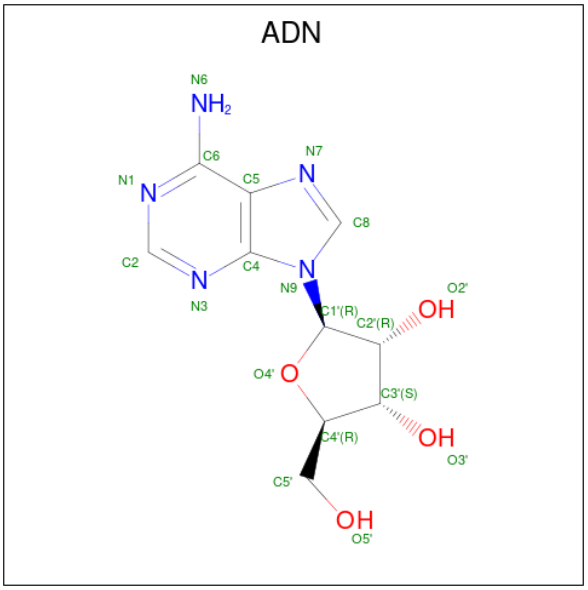
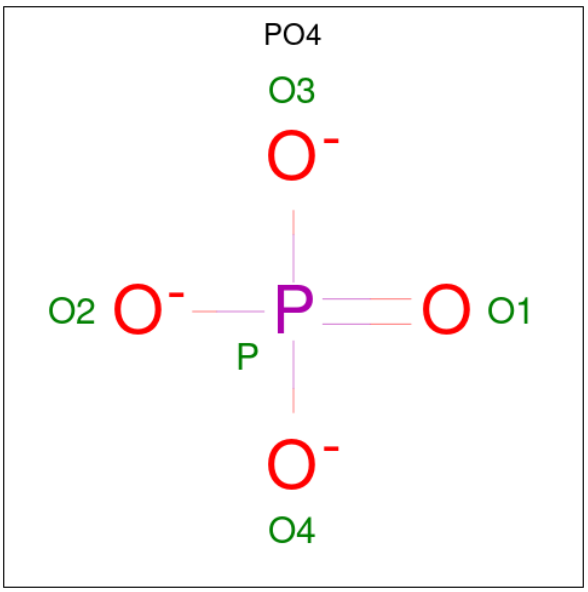
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	I	1	Total C N O P 44 21 7 14 2	0	0
2	J	1	Total C N O P 44 21 7 14 2	0	0
2	K	1	Total C N O P 44 21 7 14 2	0	0

- Molecule 3 is ADENOSINE (CCD ID: ADN) (formula: $C_{10}H_{13}N_5O_4$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O 19 10 5 4	0	1
3	B	1	Total C N O 19 10 5 4	0	1
3	C	1	Total C N O 19 10 5 4	0	1
3	D	1	Total C N O 19 10 5 4	0	0
3	H	1	Total C N O 19 10 5 4	0	0
3	I	1	Total C N O 19 10 5 4	0	0
3	J	1	Total C N O 19 10 5 4	0	0
3	K	1	Total C N O 19 10 5 4	0	0

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



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

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	135	Total O 136 136	0	2
5	B	147	Total O 147 147	0	0
5	C	119	Total O 120 120	0	2

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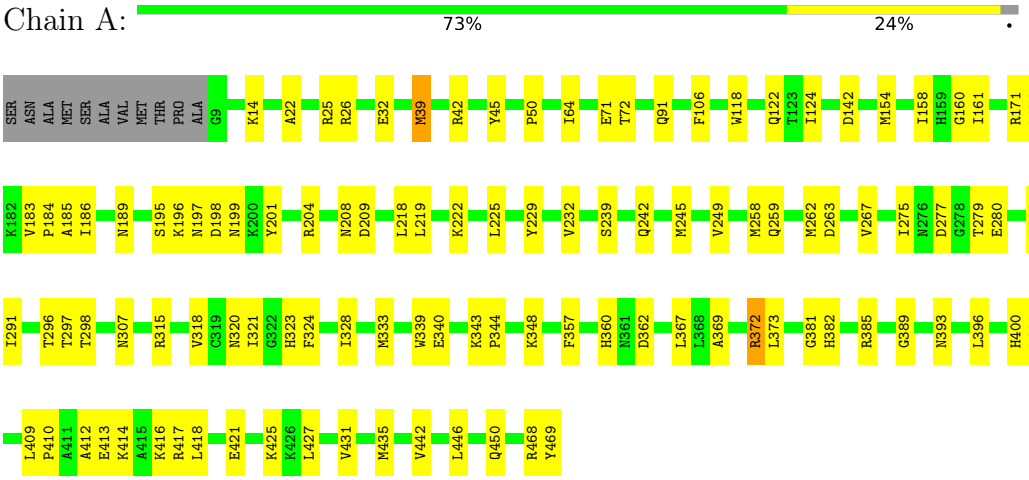
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	D	159	Total O 159 159	0	0
5	H	117	Total O 117 117	0	2
5	I	136	Total O 136 136	0	2
5	J	128	Total O 128 128	0	0
5	K	142	Total O 143 143	0	1

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.

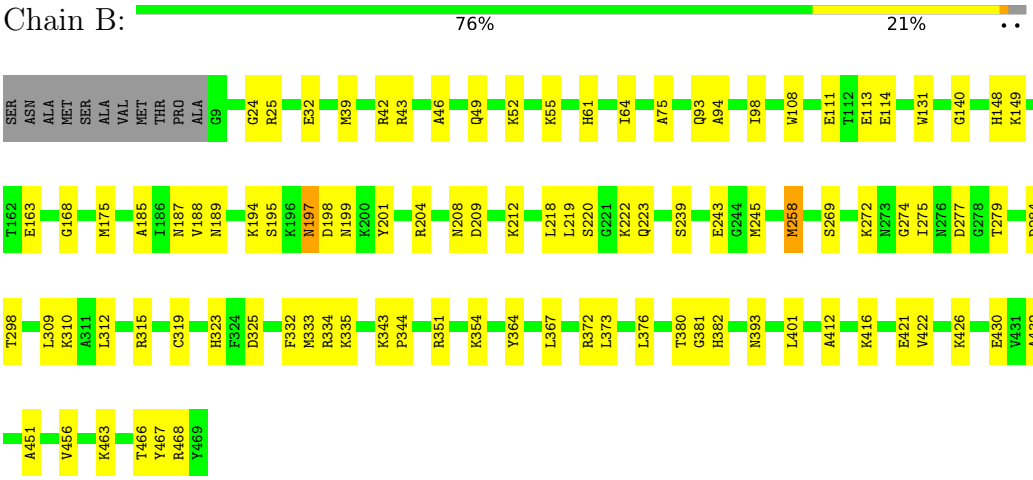
• Molecule 1: Adenosylhomocysteinase

Chain A:



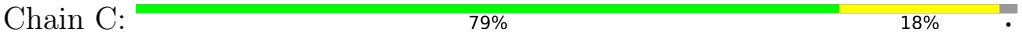
• Molecule 1: Adenosylhomocysteinase

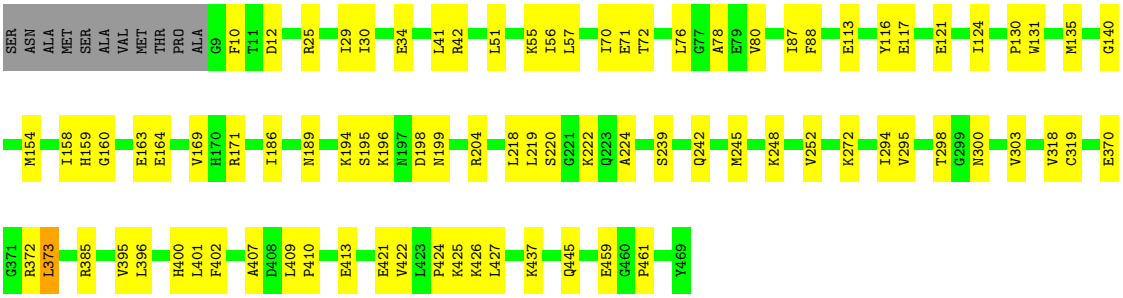
Chain B:



• Molecule 1: Adenosylhomocysteinase

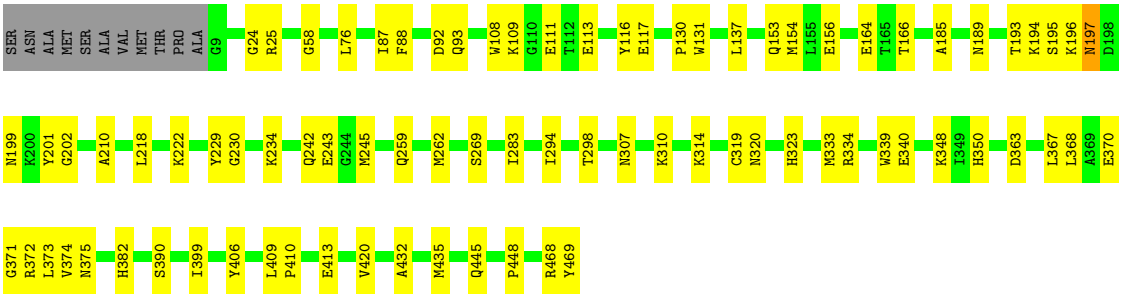
Chain C:





• Molecule 1: Adenosylhomocysteinase

Chain D:

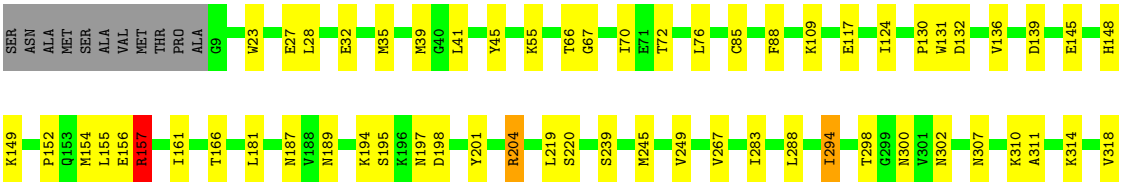


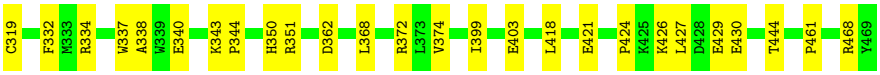
• Molecule 1: Adenosylhomocysteinase

Chain H:

• Molecule 1: Adenosylhomocysteinase

Chain I:



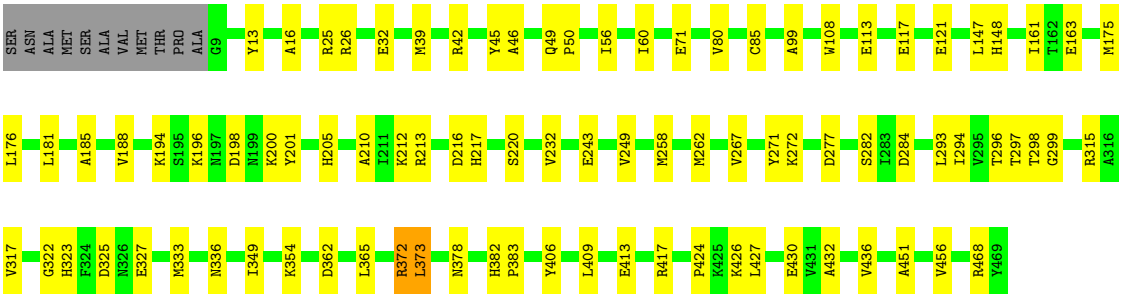


• Molecule 1: Adenosylhomocysteinase

Chain J:

• Molecule 1: Adenosylhomocysteinase

Chain K:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	111.02Å 211.62Å 111.65Å 90.00° 105.71° 90.00°	Depositor
Resolution (Å)	48.67 – 2.40 48.67 – 2.40	Depositor EDS
% Data completeness (in resolution range)	65.1 (48.67-2.40) 65.3 (48.67-2.40)	Depositor EDS
R_{merge}	0.38	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.04 (at 2.39Å)	Xtriage
Refinement program	PHENIX 1.21.2_5419+SVN	Depositor
R, R_{free}	0.164 , 0.229 0.166 , 0.231	Depositor DCC
R_{free} test set	673 reflections (0.35%)	wwPDB-VP
Wilson B-factor (Å^2)	24.6	Xtriage
Anisotropy	0.091	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 22.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.36$, $< L^2 > = 0.19$	Xtriage
Estimated twinning fraction	0.417 for l,-k,h	Xtriage
Reported twinning fraction	0.490 for -l,-k,-h	Depositor
Outliers	0 of 126104 reflections	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	30163	wwPDB-VP
Average B, all atoms (Å^2)	21.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.81% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PO4, NAD, ADN

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	0.43	0/3627	0.74	0/4904
1	B	0.44	0/3631	0.73	0/4909
1	C	0.41	0/3629	0.73	0/4906
1	D	0.45	0/3647	0.75	0/4930
1	H	0.41	0/3630	0.70	0/4907
1	I	0.45	0/3626	0.78	0/4903
1	J	0.43	0/3639	0.74	0/4919
1	K	0.44	0/3644	0.76	1/4926 (0.0%)
All	All	0.43	0/29073	0.74	1/39304 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	1
1	I	0	1
All	All	0	2

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	K	121	GLU	CA-CB-CG	-5.39	103.32	114.10

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	157	ARG	Sidechain
1	I	157	ARG	Sidechain

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	3561	0	3566	83	0
1	B	3565	0	3570	71	0
1	C	3560	0	3573	67	0
1	D	3578	0	3586	61	0
1	H	3567	0	3572	60	0
1	I	3557	0	3563	55	0
1	J	3570	0	3581	71	0
1	K	3575	0	3580	57	0
2	A	44	0	26	2	0
2	B	44	0	26	4	0
2	C	44	0	26	3	0
2	D	44	0	26	4	0
2	H	44	0	26	2	0
2	I	44	0	26	2	0
2	J	44	0	26	3	0
2	K	44	0	26	3	0
3	A	19	0	3	0	0
3	B	19	0	3	0	0
3	C	19	0	3	2	0
3	D	19	0	13	1	0
3	H	19	0	13	3	0
3	I	19	0	13	2	0
3	J	19	0	13	2	0
3	K	19	0	13	2	0
4	A	10	0	0	4	0
4	C	5	0	0	2	0
4	D	5	0	0	1	0
4	H	5	0	0	1	0
4	I	5	0	0	0	0
4	K	10	0	0	0	0
5	A	136	0	0	2	0
5	B	147	0	0	9	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	C	120	0	0	2	0
5	D	159	0	0	3	0
5	H	117	0	0	4	0
5	I	136	0	0	8	0
5	J	128	0	0	6	0
5	K	143	0	0	3	0
All	All	30163	0	28873	502	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 9.

All (502) 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:I:319:CYS:HB2	1:I:374:VAL:HG21	1.33	1.10
1:H:382:HIS:HB2	1:H:387:MET:HE3	1.54	0.88
1:B:275:ILE:HD11	1:J:48:GLN:HE22	1.38	0.87
1:J:406:TYR:HA	1:J:409:LEU:HD12	1.61	0.81
1:A:183:VAL:HG22	1:A:184:PRO:HD2	1.65	0.78
1:A:469:TYR:HB3	1:D:259:GLN:HE22	1.45	0.78
1:C:135:MET:HE1	1:C:159:HIS:HB2	1.68	0.75
1:D:406:TYR:HA	1:D:409:LEU:HD12	1.68	0.75
1:I:204:ARG:HA	1:I:239:SER:HB2	1.69	0.75
1:A:204:ARG:HA	1:A:239:SER:HB2	1.70	0.73
1:D:189:ASN:HA	1:D:194:LYS:HD2	1.70	0.73
1:I:189:ASN:HA	1:I:194:LYS:HD2	1.71	0.72
1:D:373:LEU:H	1:D:373:LEU:HD12	1.54	0.72
1:B:309:LEU:O	1:B:351:ARG:NH1	2.22	0.72
1:D:153:GLN:O	1:D:156:GLU:HG2	1.90	0.72
1:B:189:ASN:HA	1:B:194:LYS:HD2	1.73	0.71
1:A:275:ILE:HG12	1:D:445:GLN:OE1	1.91	0.71
1:C:370:GLU:O	1:C:372:ARG:NH1	2.24	0.70
1:A:360:HIS:NE2	4:A:504:PO4:O3	2.24	0.70
1:H:204:ARG:HA	1:H:239:SER:HB2	1.74	0.69
1:B:113:GLU:OE2	1:B:372:ARG:NH2	2.24	0.69
1:C:189:ASN:HA	1:C:194:LYS:HD2	1.73	0.69
1:J:424:PRO:HD2	1:J:427:LEU:HD12	1.75	0.69
1:C:135:MET:HE3	1:C:402:PHE:HD1	1.59	0.68
1:A:196:LYS:HE3	1:D:468:ARG:HB2	1.73	0.68
1:H:196:LYS:HE2	1:K:468:ARG:HB2	1.77	0.67
1:D:445:GLN:HG3	5:D:656:HOH:O	1.95	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:204:ARG:NE	1:A:242:GLN:OE1	2.27	0.67
1:I:148:HIS:HA	1:I:155:LEU:HD11	1.77	0.67
1:A:409:LEU:O	1:A:414:LYS:NZ	2.21	0.66
1:H:298:THR:HA	2:H:501:NAD:H52A	1.78	0.66
1:J:126:LYS:HE3	1:J:131:TRP:HD1	1.61	0.66
1:K:26:ARG:NH1	5:K:601:HOH:O	2.24	0.66
1:H:241[B]:ARG:NH1	1:H:263:ASP:O	2.28	0.66
1:C:135:MET:CE	1:C:159:HIS:HB2	2.25	0.66
1:K:148:HIS:CG	1:K:175:MET:HE1	2.31	0.65
1:B:219:LEU:O	1:B:245:MET:HG2	1.97	0.64
1:C:56:ILE:HB	1:C:80:VAL:HG12	1.78	0.64
1:J:49:GLN:HB3	1:J:52:LYS:HB2	1.78	0.64
1:J:225:LEU:HB3	1:J:294:ILE:HD12	1.80	0.64
1:B:295:VAL:HG22	1:B:319:CYS:SG	2.38	0.64
1:H:314:LYS:HE2	1:H:363:ASP:OD2	1.97	0.63
1:A:197:ASN:OD1	1:D:262:MET:HE3	1.99	0.63
1:K:210:ALA:HB1	1:K:378:ASN:HB2	1.81	0.63
1:B:275:ILE:HD11	1:J:48:GLN:NE2	2.13	0.62
2:J:501:NAD:C4N	3:J:502:ADN:H3'	2.29	0.62
1:A:45:TYR:HD2	1:A:50:PRO:HG3	1.64	0.62
1:D:210:ALA:HB1	1:D:374:VAL:HG22	1.80	0.62
1:A:222:LYS:HB2	1:A:245:MET:HE3	1.81	0.62
1:C:437:LYS:NZ	1:J:47:GLY:O	2.20	0.62
1:J:160:GLY:HA3	1:J:401:LEU:HD13	1.82	0.62
1:A:385:ARG:HD2	1:B:218:LEU:HD23	1.81	0.61
1:C:42:ARG:HG3	1:C:72:THR:HG23	1.81	0.61
1:H:349:ILE:HD11	1:H:367:LEU:HB2	1.83	0.61
1:C:30:ILE:HD11	1:D:348:LYS:HD2	1.81	0.61
1:H:386:ILE:HG22	1:H:387:MET:HE2	1.82	0.60
1:D:210:ALA:HB2	1:D:375:ASN:HA	1.82	0.60
1:D:25:ARG:NH1	4:D:503:PO4:O3	2.32	0.60
1:A:208:ASN:OD1	1:A:209:ASP:N	2.34	0.60
1:D:323:HIS:O	1:D:373:LEU:HD11	2.01	0.60
1:H:196:LYS:NZ	1:H:231:ASP:OD2	2.35	0.60
1:A:32:GLU:HB3	1:A:39:MET:HE2	1.83	0.60
1:A:298:THR:HA	2:A:501:NAD:H52A	1.84	0.60
1:H:382:HIS:CB	1:H:387:MET:HE3	2.29	0.60
1:I:55:LYS:NZ	1:I:132:ASP:OD2	2.32	0.59
1:J:298:THR:HA	2:J:501:NAD:H52A	1.83	0.59
1:A:160:GLY:HA3	1:A:401:LEU:HD13	1.84	0.59
1:C:410:PRO:HG2	1:C:413:GLU:HG2	1.84	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:248:LYS:HD2	5:C:626:HOH:O	2.02	0.59
1:K:25:ARG:NH2	1:K:71:GLU:OE2	2.31	0.59
1:I:156:GLU:O	1:I:157:ARG:NH1	2.36	0.58
1:J:223[B]:GLN:HE22	1:J:290:LYS:HG3	1.68	0.58
1:K:232:VAL:HG12	1:K:297:THR:HB	1.85	0.58
1:D:314:LYS:HD3	1:D:363:ASP:HA	1.86	0.58
1:B:298:THR:HA	2:B:501:NAD:H52A	1.85	0.58
1:I:198:ASP:OD2	3:I:502:ADN:O2'	2.22	0.57
1:J:189:ASN:O	1:J:195:SER:HB3	2.05	0.57
1:A:400:HIS:HB2	5:A:680:HOH:O	2.05	0.57
1:B:279:THR:HG21	1:J:424:PRO:HG2	1.86	0.57
1:A:232:VAL:HG12	1:A:297:THR:HB	1.86	0.57
1:A:296:THR:OG1	1:A:320:ASN:OD1	2.23	0.57
1:B:64:ILE:HD13	1:B:94:ALA:HB2	1.88	0.56
1:D:87:ILE:HG22	1:D:116:TYR:HB2	1.88	0.56
1:I:302:ASN:O	1:J:450:GLN:NE2	2.38	0.56
1:J:309:LEU:HD23	1:J:312:LEU:HD12	1.87	0.56
1:B:222:LYS:HB2	1:B:245:MET:HE3	1.86	0.56
1:C:10:PHE:CE1	1:C:12:ASP:HB3	2.41	0.56
1:I:187:ASN:N	1:I:421:GLU:O	2.23	0.56
1:D:88:PHE:O	1:D:109:LYS:NZ	2.33	0.56
2:B:501:NAD:H3D	5:B:706:HOH:O	2.05	0.56
1:I:145:GLU:HG3	1:I:149:LYS:HE2	1.86	0.56
1:A:195:SER:HA	1:A:199:ASN:OD1	2.06	0.56
1:D:218:LEU:O	1:D:222:LYS:HE2	2.06	0.56
1:H:195:SER:O	1:H:199:ASN:HB2	2.05	0.56
1:A:340:GLU:O	1:A:348:LYS:N	2.34	0.56
1:B:148:HIS:CG	1:B:175:MET:HE1	2.40	0.55
1:D:193:THR:HB	1:D:435:MET:HE1	1.88	0.55
1:J:223[B]:GLN:OE1	1:J:290:LYS:HE3	2.05	0.55
1:B:333:MET:HE1	1:B:367:LEU:HD22	1.88	0.55
1:D:130:PRO:HB3	1:D:154:MET:SD	2.47	0.55
1:H:349:ILE:HD11	1:H:367:LEU:CB	2.36	0.55
1:D:131:TRP:O	1:D:154:MET:HE3	2.06	0.55
1:D:164:GLU:OE2	1:D:390:SER:HB3	2.06	0.55
1:H:283:ILE:HG13	1:H:307:ASN:HB3	1.88	0.55
1:I:283:ILE:HG13	1:I:307:ASN:HB3	1.88	0.54
1:A:446:LEU:HD22	1:A:450:GLN:HB3	1.89	0.54
1:B:412:ALA:O	1:B:416:LYS:HG3	2.07	0.54
1:B:381:GLY:N	5:B:605:HOH:O	2.41	0.54
1:I:72:THR:O	1:I:76:LEU:HG	2.08	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:152:PRO:HA	1:I:155:LEU:HD12	1.89	0.54
1:B:275:ILE:HG13	1:J:45:TYR:CE1	2.43	0.54
1:D:319:CYS:HB3	1:D:368:LEU:HD12	1.90	0.54
1:B:24:GLY:HA3	1:B:93:GLN:O	2.07	0.54
1:B:294:ILE:HG21	1:B:312:LEU:HD11	1.90	0.54
1:C:421:GLU:HG3	1:C:422:VAL:N	2.23	0.54
1:I:124:ILE:HG23	1:I:154:MET:SD	2.48	0.54
1:I:145:GLU:O	1:I:149:LYS:HG3	2.08	0.54
1:K:406:TYR:HA	1:K:409:LEU:HD12	1.90	0.53
1:A:25:ARG:NH2	1:A:71:GLU:OE2	2.27	0.53
1:H:198:ASP:OD2	1:H:387:MET:HE1	2.08	0.53
1:B:310:LYS:HE3	1:B:332:PHE:CZ	2.43	0.53
1:C:135:MET:HE3	1:C:402:PHE:CD1	2.42	0.53
1:I:424:PRO:HD2	1:I:427:LEU:HD12	1.90	0.53
1:A:42:ARG:HG3	1:A:72:THR:HG23	1.89	0.53
1:C:124:ILE:HG23	1:C:154:MET:SD	2.49	0.53
1:H:243:GLU:O	1:I:204:ARG:NH1	2.42	0.53
1:B:315:ARG:HG2	1:B:364:TYR:CZ	2.44	0.53
1:I:310:LYS:HE3	1:I:332:PHE:CZ	2.44	0.53
1:K:315:ARG:NH1	1:K:362:ASP:HB2	2.24	0.53
1:C:426:LYS:HE2	1:C:459:GLU:O	2.09	0.53
1:H:203:CYS:SG	1:H:232:VAL:HG13	2.49	0.53
1:J:34:GLU:HA	1:J:385:ARG:NH2	2.24	0.53
1:J:108:TRP:NE1	5:J:604:HOH:O	2.28	0.53
1:A:287:LEU:O	1:A:290:LYS:HG2	2.08	0.53
1:D:197:ASN:HA	1:D:201:TYR:CD2	2.43	0.53
1:J:152:PRO:HA	1:J:155:LEU:HD12	1.91	0.53
1:J:309:LEU:O	1:J:351:ARG:NH1	2.41	0.53
1:A:229:TYR:OH	1:A:263:ASP:OD2	2.22	0.53
1:A:340:GLU:HB2	1:A:357:PHE:CZ	2.43	0.53
1:C:87:ILE:HD13	1:C:113:GLU:OE2	2.09	0.53
1:K:325:ASP:OD2	1:K:372:ARG:NH2	2.42	0.53
1:I:130:PRO:HG3	5:I:727:HOH:O	2.09	0.52
1:B:272:LYS:NZ	1:B:284:ASP:HA	2.24	0.52
1:C:195:SER:O	1:C:199:ASN:HB2	2.08	0.52
1:C:298:THR:HA	2:C:501:NAD:H52A	1.90	0.52
1:C:25:ARG:HD2	4:C:503:PO4:O3	2.10	0.52
1:J:126:LYS:HE3	1:J:131:TRP:CD1	2.41	0.52
1:H:39:MET:HE1	1:H:42:ARG:CZ	2.40	0.52
1:I:468:ARG:NH1	5:I:604:HOH:O	2.36	0.52
1:B:444:THR:HB	1:C:252:VAL:HG12	1.92	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:117:GLU:HB2	5:I:619:HOH:O	2.09	0.52
1:D:307:ASN:O	1:D:310:LYS:HG2	2.10	0.52
1:D:340:GLU:OE1	1:D:350:HIS:NE2	2.40	0.52
1:C:218:LEU:O	1:C:222:LYS:NZ	2.42	0.52
1:I:32:GLU:HB2	5:I:608:HOH:O	2.09	0.51
1:I:156:GLU:HG3	5:I:613:HOH:O	2.10	0.51
1:D:410:PRO:HD2	1:D:413:GLU:HB2	1.93	0.51
1:K:323:HIS:HA	1:K:373:LEU:HD11	1.92	0.51
1:A:333:MET:HE1	1:A:367:LEU:HD13	1.92	0.51
1:K:373:LEU:H	1:K:373:LEU:HD12	1.76	0.51
1:I:444:THR:N	5:I:602:HOH:O	2.44	0.51
1:C:224:ALA:HB2	1:C:245:MET:SD	2.50	0.51
1:K:212:LYS:O	1:K:216:ASP:N	2.40	0.51
1:B:187:ASN:N	1:B:421:GLU:O	2.32	0.51
1:J:118:TRP:O	1:J:122:GLN:HG2	2.11	0.51
1:A:323:HIS:HD2	1:A:324:PHE:CE2	2.29	0.50
1:D:334:ARG:HG3	1:D:339:TRP:CZ2	2.47	0.50
1:B:114:GLU:CD	1:B:114:GLU:H	2.19	0.50
1:H:302:ASN:OD1	1:H:329:ASP:HB2	2.11	0.50
1:K:113:GLU:O	1:K:117:GLU:HG2	2.12	0.50
1:A:64:ILE:N	1:A:91:GLN:OE1	2.29	0.50
1:J:130:PRO:HB3	1:J:154:MET:SD	2.51	0.50
1:C:51:LEU:HB3	1:C:78:ALA:HB2	1.93	0.50
1:H:39:MET:HE1	1:H:42:ARG:NH2	2.26	0.50
1:B:140:GLY:HA3	1:B:323:HIS:NE2	2.26	0.50
1:H:108:TRP:CE2	1:H:111:GLU:HG2	2.46	0.50
1:H:184:PRO:HB3	1:H:417:ARG:O	2.11	0.50
1:A:118:TRP:O	1:A:122:GLN:HG2	2.12	0.50
1:B:208:ASN:O	1:B:212:LYS:HG3	2.12	0.50
1:J:406:TYR:HA	1:J:409:LEU:CD1	2.39	0.50
1:B:160:GLY:HA3	1:B:401:LEU:HD13	1.94	0.50
1:B:344:PRO:HD2	5:B:719:HOH:O	2.12	0.50
1:J:409:LEU:O	1:J:414:LYS:NZ	2.45	0.50
1:A:468:ARG:HB2	1:D:196:LYS:HE3	1.94	0.50
1:H:269:SER:OG	1:H:274:GLY:HA2	2.12	0.50
1:H:25:ARG:NH1	4:H:503:PO4:O1	2.45	0.49
1:J:34:GLU:O	1:J:385:ARG:HA	2.12	0.49
1:J:81:ARG:HE	1:J:123:THR:HA	1.77	0.49
1:I:468:ARG:HB3	1:J:468:ARG:O	2.12	0.49
1:J:213:ARG:CZ	1:K:213:ARG:HG2	2.42	0.49
1:K:212:LYS:HD2	5:K:688:HOH:O	2.11	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:426:LYS:O	1:I:430:GLU:HG3	2.12	0.49
1:A:406:TYR:HA	1:A:409:LEU:HD12	1.93	0.49
1:C:295:VAL:HG22	1:C:319:CYS:SG	2.53	0.49
1:C:373:LEU:HD21	3:C:502[B]:ADN:H5'2	1.93	0.49
1:C:424:PRO:HD2	1:C:427:LEU:HD12	1.94	0.49
1:B:204:ARG:HA	1:B:239:SER:HB2	1.94	0.49
1:D:194:LYS:HD3	1:D:194:LYS:C	2.37	0.49
1:D:283:ILE:HG13	1:D:307:ASN:HB3	1.94	0.49
1:H:323:HIS:ND1	3:H:502:ADN:O5'	2.43	0.49
1:J:380:THR:OG1	1:K:216:ASP:OD1	2.21	0.49
1:A:199:ASN:ND2	2:A:501:NAD:H5N	2.28	0.49
1:B:218:LEU:O	1:B:222:LYS:HD2	2.13	0.49
1:J:155:LEU:HA	1:J:158:ILE:HD12	1.95	0.49
1:K:205:HIS:ND1	1:K:383:PRO:HD3	2.28	0.49
1:D:222:LYS:HB2	1:D:245:MET:HE3	1.94	0.49
1:J:32:GLU:HB3	1:J:39:MET:SD	2.53	0.49
1:B:49:GLN:OE1	1:B:52:LYS:NZ	2.43	0.49
1:C:294:ILE:HG22	1:C:318:VAL:HA	1.94	0.49
1:J:87:ILE:HG22	1:J:116:TYR:HB2	1.95	0.49
1:B:189:ASN:O	1:B:195:SER:HB3	2.12	0.48
1:C:219:LEU:O	1:C:245:MET:HG2	2.13	0.48
1:A:158:ILE:HG22	1:A:183:VAL:HG21	1.94	0.48
1:I:88:PHE:O	1:I:109:LYS:NZ	2.44	0.48
1:H:431:VAL:HG12	1:H:435:MET:HE2	1.96	0.48
1:J:195:SER:O	1:J:199:ASN:HB2	2.14	0.48
1:J:207:LEU:HB3	1:J:239:SER:OG	2.12	0.48
1:H:81:ARG:HE	1:H:123:THR:HA	1.79	0.48
1:I:219:LEU:O	1:I:245:MET:HG2	2.14	0.48
1:H:218:LEU:O	1:H:222:LYS:NZ	2.39	0.48
1:J:175:MET:HE3	1:J:181:LEU:HD13	1.95	0.48
1:K:56:ILE:HB	1:K:80:VAL:HG12	1.96	0.48
1:K:161:ILE:O	1:K:185:ALA:HA	2.14	0.48
1:B:49:GLN:NE2	1:B:75:ALA:O	2.38	0.48
1:B:194:LYS:HD3	1:B:194:LYS:C	2.38	0.48
1:C:154:MET:O	1:C:158:ILE:HG13	2.14	0.48
1:I:189:ASN:O	1:I:195:SER:HB3	2.13	0.48
1:I:220[B]:SER:OG	1:K:262:MET:O	2.31	0.48
2:H:501:NAD:H8A	5:H:640:HOH:O	2.14	0.48
1:J:332:PHE:HB2	5:J:654:HOH:O	2.13	0.48
1:B:335:LYS:O	1:B:354:LYS:HD2	2.14	0.48
1:D:189:ASN:OD1	1:D:194:LYS:NZ	2.33	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:K:32:GLU:HB3	1:K:39[A]:MET:SD	2.54	0.48
1:A:249:VAL:O	1:A:267:VAL:HA	2.14	0.48
1:D:298:THR:HA	2:D:501:NAD:H52A	1.96	0.48
1:I:314:LYS:NZ	1:I:362:ASP:OD2	2.36	0.48
1:A:161:ILE:O	1:A:185:ALA:HA	2.14	0.47
1:A:183:VAL:CG2	1:A:184:PRO:HD2	2.40	0.47
1:H:148:HIS:CG	1:H:175:MET:HE1	2.49	0.47
1:C:140:GLY:O	1:C:171:ARG:NH1	2.47	0.47
1:A:258[A]:MET:SD	1:D:193:THR:HG22	2.53	0.47
1:H:209:ASP:O	1:H:213:ARG:HG3	2.14	0.47
1:I:334:ARG:HG2	5:I:640:HOH:O	2.13	0.47
1:J:204:ARG:HA	1:J:239:SER:HB2	1.95	0.47
1:B:189:ASN:OD1	1:B:194:LYS:NZ	2.36	0.47
1:A:318:VAL:HG12	1:A:328:ILE:HD13	1.97	0.47
1:C:87:ILE:HG22	1:C:116:TYR:HB2	1.96	0.47
1:K:249:VAL:O	1:K:267:VAL:HA	2.15	0.47
1:A:142:ASP:OD1	1:A:171:ARG:NH2	2.40	0.47
1:B:42:ARG:O	1:B:46:ALA:HB2	2.14	0.47
1:B:463:LYS:HE2	1:B:467:TYR:CE2	2.49	0.47
1:H:332:PHE:HE2	1:H:337:TRP:CH2	2.31	0.47
1:D:333:MET:HE1	1:D:367:LEU:HD22	1.96	0.47
1:J:299:GLY:N	1:J:327:GLU:OE2	2.43	0.47
1:K:336:ASN:O	1:K:354:LYS:HB2	2.15	0.47
1:B:269:SER:OG	1:B:274:GLY:HA2	2.15	0.47
1:H:299:GLY:N	1:H:327:GLU:OE2	2.41	0.47
1:A:22:ALA:O	1:A:26:ARG:HG3	2.15	0.46
1:A:360:HIS:HE2	4:A:504:PO4:P	2.37	0.46
1:B:61:HIS:CE1	1:B:376:LEU:HD13	2.50	0.46
1:D:108:TRP:O	1:D:111:GLU:HG3	2.15	0.46
1:H:320:ASN:OD1	1:H:322:GLY:N	2.47	0.46
1:K:315:ARG:NH1	1:K:362:ASP:O	2.48	0.46
1:C:135:MET:CE	1:C:402:PHE:HA	2.45	0.46
1:D:202:GLY:HA3	1:D:382:HIS:ND1	2.29	0.46
2:D:501:NAD:C4N	3:D:502:ADN:H3'	2.45	0.46
1:J:197:ASN:OD1	1:J:386:ILE:HG23	2.16	0.46
1:K:432:ALA:O	1:K:436:VAL:HG23	2.16	0.46
1:D:193:THR:HB	1:D:435:MET:CE	2.45	0.46
2:I:501:NAD:C4N	3:I:502:ADN:H3'	2.46	0.46
1:D:58:GLY:HA2	1:D:137:LEU:O	2.15	0.46
1:J:55:LYS:HB3	1:J:131:TRP:CH2	2.51	0.46
1:C:204:ARG:HA	1:C:239:SER:HB2	1.96	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:396:LEU:HD23	1:C:396:LEU:HA	1.76	0.46
1:C:421:GLU:HG3	1:C:422:VAL:O	2.15	0.46
1:H:241[A]:ARG:NH1	5:H:605:HOH:O	2.36	0.46
1:J:194:LYS:HG2	1:J:390:SER:OG	2.16	0.46
1:D:92:ASP:OD2	5:D:601:HOH:O	2.21	0.46
1:A:26:ARG:NH2	5:A:610:HOH:O	2.48	0.46
1:H:402:PHE:O	1:H:405:LYS:HD2	2.15	0.46
1:K:16:ALA:HB2	1:K:108:TRP:HB2	1.97	0.46
1:C:373:LEU:HD12	1:C:373:LEU:H	1.80	0.45
1:H:60:ILE:HA	1:H:85:CYS:SG	2.55	0.45
1:A:39:MET:O	1:A:42:ARG:N	2.49	0.45
1:A:219:LEU:O	1:A:245:MET:HG2	2.17	0.45
1:B:108:TRP:CE2	1:B:111:GLU:HG2	2.51	0.45
1:C:160:GLY:HA3	1:C:401:LEU:HD13	1.98	0.45
1:B:325:ASP:HB3	1:B:372:ARG:HG2	1.98	0.45
1:I:55:LYS:HB3	1:I:131:TRP:CH2	2.51	0.45
1:I:294:ILE:HG23	1:I:318:VAL:HA	1.99	0.45
1:A:409:LEU:HD11	1:A:417:ARG:NH1	2.32	0.45
1:A:124:ILE:HG23	1:A:154:MET:SD	2.57	0.45
1:B:208:ASN:OD1	1:B:209:ASP:N	2.49	0.45
1:B:315:ARG:HG2	1:B:364:TYR:CE1	2.51	0.45
1:B:426:LYS:O	1:B:430:GLU:HG3	2.17	0.45
1:I:298:THR:HA	2:I:501:NAD:H52A	1.99	0.45
1:I:429:GLU:OE1	1:I:461:PRO:HA	2.16	0.45
1:K:212:LYS:NZ	1:K:243:GLU:OE2	2.41	0.45
1:A:343:LYS:HB2	1:A:344:PRO:CD	2.46	0.45
1:A:389:GLY:O	1:A:393:ASN:ND2	2.37	0.45
1:B:188:VAL:HG13	1:B:393:ASN:HB3	1.98	0.45
1:H:198:ASP:OD2	3:H:502:ADN:O2'	2.29	0.45
1:I:41:LEU:HD22	1:I:45:TYR:HE2	1.82	0.45
1:C:186:ILE:HA	1:C:421:GLU:O	2.17	0.45
1:H:50:PRO:HD2	1:H:76:LEU:HB3	1.98	0.45
1:H:160:GLY:HA3	1:H:401:LEU:HD13	1.99	0.45
1:K:272:LYS:HE3	1:K:284:ASP:HA	1.98	0.45
1:K:333:MET:HE2	1:K:349:ILE:HG21	1.97	0.45
1:A:242:GLN:NE2	1:B:243:GLU:OE2	2.50	0.45
1:A:283:ILE:HG13	1:A:307:ASN:HB3	1.98	0.45
1:D:113:GLU:O	1:D:117:GLU:HG2	2.16	0.45
1:H:210:ALA:HA	1:H:379:ALA:HB2	1.99	0.45
1:A:315:ARG:NH1	1:A:362:ASP:HB2	2.32	0.45
1:B:55:LYS:HB3	1:B:131:TRP:CH2	2.52	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:242:GLN:HB2	1:D:242:GLN:HB2	1.99	0.44
1:J:145:GLU:O	1:J:149:LYS:N	2.47	0.44
1:J:161:ILE:O	1:J:185:ALA:HA	2.17	0.44
1:K:200:LYS:HE3	1:K:201:TYR:CE1	2.53	0.44
1:K:298:THR:HA	2:K:501:NAD:H52A	1.99	0.44
1:A:259:GLN:NE2	1:D:469:TYR:O	2.44	0.44
1:A:369:ALA:O	1:A:372:ARG:HB2	2.17	0.44
1:C:34:GLU:CD	1:C:385:ARG:HH21	2.25	0.44
1:C:409:LEU:HB3	1:C:413:GLU:HB2	1.98	0.44
1:B:113:GLU:HG2	5:B:704:HOH:O	2.16	0.44
1:D:193:THR:HG21	1:D:432:ALA:HB2	1.99	0.44
1:C:29:ILE:HG12	4:C:503:PO4:O4	2.17	0.44
1:C:445:GLN:HE22	1:J:44:LYS:HG3	1.82	0.44
1:J:389:GLY:O	1:J:393:ASN:ND2	2.38	0.44
1:K:409:LEU:HD22	1:K:413:GLU:HB3	2.00	0.44
1:H:157:ARG:HA	1:H:157:ARG:HD2	1.92	0.44
1:I:337:TRP:CD1	1:I:351:ARG:HA	2.53	0.44
1:H:288:LEU:HD23	1:H:288:LEU:HA	1.73	0.44
1:H:317:VAL:HG23	5:H:612:HOH:O	2.18	0.44
1:I:340:GLU:HG3	5:I:632:HOH:O	2.18	0.44
1:J:142:ASP:HB2	5:J:641:HOH:O	2.17	0.44
1:C:159:HIS:CE1	1:C:407:ALA:HB3	2.53	0.44
1:I:66:THR:O	1:I:70:ILE:HG13	2.17	0.44
1:I:85:CYS:SG	1:I:139:ASP:HB3	2.58	0.44
1:K:293:LEU:HA	1:K:317:VAL:O	2.18	0.44
1:K:333:MET:HE1	1:K:365:LEU:HD12	1.99	0.44
1:A:218:LEU:O	1:A:222:LYS:NZ	2.42	0.44
1:C:300:ASN:HB3	1:C:303:VAL:HG11	1.99	0.44
1:H:441:GLY:HA2	1:K:267:VAL:O	2.18	0.44
1:K:176:LEU:HD13	1:K:181:LEU:HD23	1.99	0.44
1:A:198:ASP:OD1	1:A:382:HIS:NE2	2.51	0.43
1:I:23:TRP:NE1	1:I:27:GLU:OE2	2.51	0.43
1:A:410:PRO:HD2	1:A:413:GLU:OE1	2.18	0.43
1:B:277:ASP:HB2	1:J:427:LEU:HD21	1.99	0.43
1:H:56:ILE:HB	1:H:80:VAL:HG12	2.00	0.43
1:I:28:LEU:HD21	1:I:67:GLY:HA3	1.99	0.43
1:J:324:PHE:HB2	5:J:659:HOH:O	2.18	0.43
1:B:197:ASN:HA	1:B:201:TYR:CD2	2.54	0.43
1:D:334:ARG:HH22	1:D:370:GLU:HB3	1.83	0.43
1:H:293:LEU:HA	1:H:317:VAL:O	2.17	0.43
1:J:189:ASN:HA	1:J:194:LYS:HD2	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:K:501:NAD:C4N	3:K:502:ADN:H3'	2.48	0.43
1:C:55:LYS:HB3	1:C:131:TRP:CH2	2.52	0.43
1:H:382:HIS:N	3:H:502:ADN:HN61	2.16	0.43
1:I:368:LEU:HA	1:I:368:LEU:HD23	1.67	0.43
1:J:249:VAL:O	1:J:267:VAL:HA	2.18	0.43
1:B:343:LYS:NZ	5:B:602:HOH:O	2.24	0.43
1:C:130:PRO:HD2	5:C:635:HOH:O	2.18	0.43
2:C:501:NAD:C3N	3:C:502[B]:ADN:H5'1	2.49	0.43
1:D:195:SER:O	1:D:199:ASN:HB2	2.19	0.43
1:K:258[B]:MET:HE3	1:K:258[B]:MET:HB3	1.90	0.43
1:D:382:HIS:NE2	2:D:501:NAD:O7N	2.48	0.43
1:D:448:PRO:HG3	5:D:754:HOH:O	2.18	0.43
1:I:399:ILE:O	1:I:403:GLU:HG3	2.19	0.43
1:A:225:LEU:HB2	1:A:291:ILE:HD12	2.01	0.43
1:B:258:MET:HE3	1:B:258:MET:HB3	1.86	0.43
1:H:354:LYS:O	1:H:355:ASP:HB2	2.18	0.43
1:J:24:GLY:HA3	1:J:93:GLN:O	2.18	0.43
1:A:181:LEU:O	1:A:418:LEU:HD21	2.18	0.43
1:A:195:SER:OG	1:A:196:LYS:N	2.52	0.43
1:C:88:PHE:CD2	1:C:372:ARG:HD3	2.54	0.43
1:H:277:ASP:OD1	1:H:282:SER:HB3	2.19	0.43
1:H:449:LYS:O	1:H:452:GLU:HG2	2.18	0.43
1:A:14:LYS:O	1:A:106:PHE:HA	2.18	0.42
1:A:412:ALA:O	1:A:416:LYS:HG3	2.19	0.42
1:H:39:MET:HE2	1:H:39:MET:HA	2.00	0.42
1:J:283:ILE:HG13	1:J:307:ASN:HB3	2.00	0.42
1:C:425:LYS:HD2	1:C:461:PRO:HB3	2.01	0.42
1:J:42:ARG:CG	1:J:72:THR:HG23	2.49	0.42
1:K:413:GLU:O	1:K:417:ARG:HG2	2.19	0.42
1:K:451:ALA:HB1	1:K:456:VAL:O	2.20	0.42
1:C:242:GLN:NE2	1:D:243:GLU:OE2	2.52	0.42
1:J:399:ILE:O	1:J:403:GLU:HG3	2.20	0.42
1:B:194:LYS:O	1:B:198:ASP:HB3	2.20	0.42
1:H:205:HIS:ND1	1:H:383:PRO:HD3	2.34	0.42
1:J:409:LEU:HD11	1:J:417:ARG:HH11	1.84	0.42
1:A:25:ARG:NH1	4:A:503:PO4:O1	2.50	0.42
1:B:161:ILE:O	1:B:185:ALA:HA	2.19	0.42
1:B:187:ASN:O	1:B:422:VAL:HG12	2.20	0.42
1:I:300:ASN:HD21	1:J:450:GLN:HB3	1.83	0.42
1:B:466:THR:HG23	5:B:720:HOH:O	2.20	0.42
1:C:34:GLU:HA	1:C:385:ARG:NH2	2.35	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:229:TYR:CE2	1:D:234:LYS:HG2	2.54	0.42
1:I:288:LEU:HD12	1:I:311:ALA:HB3	2.01	0.42
1:A:280:GLU:HG2	1:A:307:ASN:OD1	2.20	0.42
1:I:197:ASN:HA	1:I:201:TYR:CD2	2.54	0.42
1:I:249:VAL:O	1:I:267:VAL:HA	2.19	0.42
1:K:46:ALA:O	1:K:49:GLN:NE2	2.43	0.42
1:I:181:LEU:O	1:I:418:LEU:HD21	2.19	0.42
1:K:45:TYR:CD1	1:K:50:PRO:HG3	2.55	0.42
1:K:271:TYR:HA	1:K:282:SER:O	2.20	0.42
1:K:296:THR:HB	1:K:327:GLU:OE1	2.20	0.42
1:A:297:THR:HG22	1:A:321:ILE:CG2	2.50	0.42
1:B:39:MET:HB3	1:B:43:ARG:NH1	2.34	0.42
1:B:163:GLU:CD	1:B:168:GLY:HA3	2.45	0.42
1:C:135:MET:HE3	1:C:402:PHE:HA	2.02	0.42
1:C:163:GLU:HG3	1:C:169:VAL:HG23	2.02	0.42
1:D:76:LEU:CD1	1:D:399:ILE:HD11	2.50	0.42
1:D:382:HIS:CD2	1:D:382:HIS:N	2.86	0.42
1:H:241[B]:ARG:HD3	1:H:265:PHE:CE1	2.55	0.42
1:I:194:LYS:HD3	1:I:194:LYS:C	2.45	0.42
1:J:382:HIS:NE2	2:J:501:NAD:O7N	2.53	0.42
1:K:294:ILE:O	1:K:294:ILE:HG23	2.20	0.42
1:A:172:LEU:HD23	1:A:175:MET:HE2	2.02	0.42
1:A:277:ASP:OD1	1:A:279:THR:OG1	2.34	0.42
1:A:333:MET:C	1:A:339:TRP:HE1	2.28	0.42
1:H:104:PRO:HG2	5:H:670:HOH:O	2.19	0.42
1:K:426:LYS:O	1:K:430:GLU:HG3	2.20	0.42
1:C:72:THR:O	1:C:76:LEU:HG	2.20	0.41
1:C:409:LEU:HD13	1:C:413:GLU:HB3	2.00	0.41
1:D:24:GLY:HA3	1:D:93:GLN:O	2.20	0.41
1:K:13:TYR:CG	1:K:99:ALA:HB1	2.55	0.41
1:B:223:GLN:HB3	5:B:603:HOH:O	2.19	0.41
1:C:25:ARG:NH2	1:C:71:GLU:OE2	2.49	0.41
1:C:194:LYS:C	1:C:194:LYS:HD3	2.45	0.41
1:D:230:GLY:H	2:D:501:NAD:H4B	1.85	0.41
1:K:194:LYS:HD3	1:K:194:LYS:C	2.46	0.41
1:A:400:HIS:O	1:A:404:GLN:HG2	2.21	0.41
1:A:431:VAL:O	1:A:435:MET:HG3	2.20	0.41
2:C:501:NAD:H6N	2:C:501:NAD:H2D	1.83	0.41
1:I:338:ALA:HB3	1:I:350:HIS:HB2	2.02	0.41
1:H:58:GLY:HA2	1:H:137:LEU:O	2.20	0.41
1:H:249:VAL:O	1:H:267:VAL:HA	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:351:ARG:HB2	1:H:363:ASP:OD1	2.21	0.41
1:I:136:VAL:HB	1:I:161:ILE:HG12	2.03	0.41
1:K:322:GLY:HA3	1:K:327:GLU:OE2	2.21	0.41
1:K:424:PRO:HD2	1:K:427:LEU:HD12	2.02	0.41
1:A:197:ASN:HA	1:A:201:TYR:CD2	2.55	0.41
1:B:451:ALA:HB1	1:B:456:VAL:O	2.20	0.41
1:J:60:ILE:HG13	1:J:139:ASP:OD2	2.21	0.41
1:J:205:HIS:HE1	1:K:217:HIS:O	2.03	0.41
1:J:268:VAL:HG11	5:J:672:HOH:O	2.21	0.41
1:J:325:ASP:HB3	1:J:372[B]:ARG:HD2	2.03	0.41
1:K:147:LEU:HA	1:K:147:LEU:HD23	1.84	0.41
1:A:189:ASN:O	1:A:195:SER:HB3	2.19	0.41
4:A:504:PO4:O4	1:B:25:ARG:HD2	2.20	0.41
1:B:32:GLU:HB3	1:B:39:MET:HE2	2.02	0.41
1:C:57:LEU:HD21	1:C:124:ILE:HA	2.02	0.41
1:D:154:MET:HE2	1:D:154:MET:HB3	1.79	0.41
1:H:173:LEU:HB3	1:H:177:LYS:HE3	2.01	0.41
1:J:207:LEU:HD22	1:J:236:SER:HB3	2.03	0.41
1:K:198:ASP:OD1	1:K:382:HIS:CD2	2.73	0.41
1:D:108:TRP:CE2	1:D:111:GLU:HG2	2.55	0.41
1:H:16:ALA:HB2	1:H:108:TRP:HB2	2.02	0.41
1:J:56:ILE:O	1:J:80:VAL:HA	2.20	0.41
1:K:60:ILE:HA	1:K:85:CYS:SG	2.60	0.41
1:A:262:MET:HG3	1:D:201:TYR:CD2	2.56	0.41
1:B:468:ARG:HB2	1:C:196[B]:LYS:HE3	2.03	0.41
1:H:404:GLN:HG3	1:H:417:ARG:HH11	1.86	0.41
1:A:39:MET:O	1:A:42:ARG:HB2	2.21	0.41
1:B:334:ARG:NH1	5:B:626:HOH:O	2.54	0.41
1:C:164:GLU:O	1:C:194:LYS:NZ	2.51	0.41
1:J:171:ARG:NH1	1:J:324:PHE:HZ	2.19	0.41
1:K:163:GLU:O	1:K:188:VAL:HB	2.21	0.41
1:A:442:VAL:HG12	1:D:269:SER:HB2	2.02	0.41
1:B:382:HIS:NE2	2:B:501:NAD:O7N	2.54	0.41
1:J:323:HIS:ND1	3:J:502:ADN:O5'	2.37	0.41
1:K:39[A]:MET:O	1:K:42:ARG:HB2	2.20	0.41
2:K:501:NAD:C3N	3:K:502:ADN:H5'2	2.51	0.41
1:A:425:LYS:HE2	1:A:425:LYS:HB2	1.86	0.40
1:C:113:GLU:O	1:C:117:GLU:HG2	2.21	0.40
1:D:185:ALA:HB3	1:D:420:VAL:HG22	2.03	0.40
1:D:320:ASN:HB3	1:D:371:GLY:O	2.22	0.40
1:H:198:ASP:HB2	1:H:390:SER:OG	2.21	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:35:MET:O	1:I:39:MET:HG2	2.21	0.40
1:J:39:MET:HE1	1:J:42:ARG:CZ	2.52	0.40
1:J:372[A]:ARG:HG2	5:J:634:HOH:O	2.21	0.40
1:C:70:ILE:HG23	1:C:80:VAL:HG21	2.02	0.40
1:C:189:ASN:O	1:C:195:SER:HB3	2.21	0.40
1:K:196:LYS:O	1:K:201:TYR:CE2	2.74	0.40
1:B:98:ILE:HD13	1:B:98:ILE:HA	1.86	0.40
1:B:195:SER:O	1:B:199:ASN:HB2	2.21	0.40
1:B:432:ALA:O	1:B:436:VAL:HG23	2.22	0.40
1:C:41:LEU:HD13	1:C:395:VAL:HB	2.04	0.40
1:B:380:THR:N	5:B:605:HOH:O	2.30	0.40
1:J:207:LEU:HB3	1:J:239:SER:CB	2.51	0.40
1:J:288:LEU:HD21	1:J:308:MET:HG2	2.04	0.40
1:A:186:ILE:HA	1:A:421:GLU:O	2.21	0.40
1:A:396:LEU:HD13	1:A:427:LEU:HD13	2.02	0.40
1:C:117:GLU:O	1:C:121:GLU:HG3	2.22	0.40
1:I:343:LYS:HB2	1:I:344:PRO:HD2	2.04	0.40
1:K:299:GLY:HA2	5:K:632:HOH: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	461/472 (98%)	450 (98%)	10 (2%)	1 (0%)	43	58
1	B	461/472 (98%)	446 (97%)	14 (3%)	1 (0%)	43	58
1	C	461/472 (98%)	447 (97%)	12 (3%)	2 (0%)	30	43
1	D	463/472 (98%)	449 (97%)	14 (3%)	0	100	100
1	H	461/472 (98%)	448 (97%)	12 (3%)	1 (0%)	43	58
1	I	461/472 (98%)	450 (98%)	11 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	J	462/472 (98%)	450 (97%)	12 (3%)	0	100	100
1	K	463/472 (98%)	448 (97%)	14 (3%)	1 (0%)	43	58
All	All	3693/3776 (98%)	3588 (97%)	99 (3%)	6 (0%)	43	58

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	373	LEU
1	B	373	LEU
1	C	373	LEU
1	C	400	HIS
1	H	373	LEU
1	K	373	LEU

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	378/385 (98%)	376 (100%)	2 (0%)	81	91
1	B	378/385 (98%)	372 (98%)	6 (2%)	55	76
1	C	378/385 (98%)	376 (100%)	2 (0%)	81	91
1	D	380/385 (99%)	376 (99%)	4 (1%)	65	82
1	H	378/385 (98%)	373 (99%)	5 (1%)	61	80
1	I	378/385 (98%)	373 (99%)	5 (1%)	61	80
1	J	379/385 (98%)	377 (100%)	2 (0%)	81	91
1	K	380/385 (99%)	377 (99%)	3 (1%)	73	86
All	All	3029/3080 (98%)	3000 (99%)	29 (1%)	68	84

All (29) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	39	MET

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Mol	Chain	Res	Type
1	A	372	ARG
1	B	149	LYS
1	B	157	ARG
1	B	197	ASN
1	B	220	SER
1	B	258	MET
1	B	294	ILE
1	C	220	SER
1	C	272	LYS
1	D	166	THR
1	D	197	ASN
1	D	294	ILE
1	D	372	ARG
1	H	196	LYS
1	H	220	SER
1	H	372	ARG
1	H	400	HIS
1	H	459	GLU
1	I	157	ARG
1	I	166	THR
1	I	204	ARG
1	I	294	ILE
1	I	372	ARG
1	J	39	MET
1	J	197	ASN
1	K	220	SER
1	K	277	ASP
1	K	372	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	378	ASN
1	B	197	ASN
1	B	223	GLN
1	B	404	GLN
1	C	153	GLN
1	C	259	GLN
1	C	336	ASN
1	C	345	GLN
1	D	49	GLN
1	D	170	HIS

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Mol	Chain	Res	Type
1	D	273	ASN
1	D	345	GLN
1	D	404	GLN
1	H	122	GLN
1	H	217	HIS
1	I	122	GLN
1	I	336	ASN
1	J	49	GLN
1	J	336	ASN
1	J	404	GLN
1	J	445	GLN
1	K	48	GLN
1	K	129	GLN
1	K	223	GLN
1	K	378	ASN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

24 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	ADN	I	502	-	21,21,21	0.30	0	31,31,31	0.42	0
3	ADN	J	502	-	21,21,21	0.35	0	31,31,31	0.71	1 (3%)
4	PO4	I	503	-	4,4,4	1.81	1 (25%)	6,6,6	0.71	0
4	PO4	H	503	-	4,4,4	1.79	1 (25%)	6,6,6	0.49	0
2	NAD	J	501	-	46,48,48	0.37	0	64,73,73	0.34	0
2	NAD	H	501	-	46,48,48	0.36	0	64,73,73	0.36	0
4	PO4	K	504	-	4,4,4	1.65	1 (25%)	6,6,6	0.92	0
2	NAD	I	501	-	46,48,48	0.35	0	64,73,73	0.36	0
2	NAD	D	501	-	46,48,48	0.37	0	64,73,73	0.35	0
4	PO4	K	503	-	4,4,4	0.71	0	6,6,6	0.46	0
2	NAD	A	501	-	46,48,48	0.35	0	64,73,73	0.36	0
4	PO4	D	503	-	4,4,4	1.26	1 (25%)	6,6,6	0.82	0
3	ADN	H	502	-	21,21,21	0.24	0	31,31,31	0.47	0
3	ADN	K	502	-	21,21,21	0.30	0	31,31,31	0.61	0
2	NAD	C	501	-	46,48,48	0.36	0	64,73,73	0.36	0
4	PO4	A	504	-	4,4,4	1.70	1 (25%)	6,6,6	0.52	0
4	PO4	C	503	-	4,4,4	1.71	1 (25%)	6,6,6	1.12	0
4	PO4	A	503	-	4,4,4	1.37	1 (25%)	6,6,6	0.57	0
2	NAD	K	501	-	46,48,48	0.35	0	64,73,73	0.34	0
3	ADN	D	502	-	21,21,21	0.30	0	31,31,31	0.52	0
2	NAD	B	501	-	46,48,48	0.37	0	64,73,73	0.35	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ADN	K	502	-	-	0/6/22/22	0/3/3/3
3	ADN	I	502	-	-	4/6/22/22	0/3/3/3
2	NAD	C	501	-	-	13/30/62/62	0/5/5/5
2	NAD	J	501	-	-	15/30/62/62	0/5/5/5
3	ADN	H	502	-	-	2/6/22/22	0/3/3/3
3	ADN	J	502	-	-	2/6/22/22	0/3/3/3
2	NAD	I	501	-	-	13/30/62/62	0/5/5/5
2	NAD	H	501	-	-	12/30/62/62	0/5/5/5
2	NAD	D	501	-	-	13/30/62/62	0/5/5/5
2	NAD	A	501	-	-	11/30/62/62	0/5/5/5
2	NAD	K	501	-	-	13/30/62/62	0/5/5/5

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ADN	D	502	-	-	0/6/22/22	0/3/3/3
2	NAD	B	501	-	-	18/30/62/62	0/5/5/5

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	I	503	PO4	P-O1	3.30	1.58	1.50
4	A	504	PO4	P-O1	3.22	1.58	1.50
4	H	503	PO4	P-O1	3.13	1.57	1.50
4	C	503	PO4	P-O1	2.99	1.57	1.50
4	K	504	PO4	P-O1	2.94	1.57	1.50
4	A	503	PO4	P-O1	2.39	1.56	1.50
4	D	503	PO4	P-O1	2.26	1.55	1.50

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	J	502	ADN	C2'-C1'-N9	2.53	119.59	113.30

There are no chirality outliers.

All (116) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	NAD	C5B-O5B-PA-O1A
2	A	501	NAD	C5B-O5B-PA-O2A
2	A	501	NAD	C5B-O5B-PA-O3
2	A	501	NAD	O4D-C1D-N1N-C2N
2	A	501	NAD	O4D-C1D-N1N-C6N
2	A	501	NAD	C2D-C1D-N1N-C2N
2	A	501	NAD	C2D-C1D-N1N-C6N
2	B	501	NAD	C5B-O5B-PA-O1A
2	B	501	NAD	C5B-O5B-PA-O2A
2	B	501	NAD	C5B-O5B-PA-O3
2	B	501	NAD	PN-O3-PA-O5B
2	B	501	NAD	C5D-O5D-PN-O3
2	B	501	NAD	C5D-O5D-PN-O1N
2	B	501	NAD	C5D-O5D-PN-O2N
2	B	501	NAD	O4D-C4D-C5D-O5D
2	B	501	NAD	O4D-C1D-N1N-C2N
2	B	501	NAD	O4D-C1D-N1N-C6N
2	B	501	NAD	C2D-C1D-N1N-C2N

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Mol	Chain	Res	Type	Atoms
2	B	501	NAD	C2D-C1D-N1N-C6N
2	C	501	NAD	C5B-O5B-PA-O1A
2	C	501	NAD	C5B-O5B-PA-O2A
2	C	501	NAD	C5B-O5B-PA-O3
2	C	501	NAD	PN-O3-PA-O5B
2	C	501	NAD	O4D-C1D-N1N-C2N
2	C	501	NAD	O4D-C1D-N1N-C6N
2	C	501	NAD	C2D-C1D-N1N-C2N
2	C	501	NAD	C2D-C1D-N1N-C6N
2	D	501	NAD	C5B-O5B-PA-O1A
2	D	501	NAD	C5B-O5B-PA-O3
2	D	501	NAD	O4D-C1D-N1N-C2N
2	D	501	NAD	O4D-C1D-N1N-C6N
2	D	501	NAD	C2D-C1D-N1N-C2N
2	D	501	NAD	C2D-C1D-N1N-C6N
2	H	501	NAD	C5B-O5B-PA-O1A
2	H	501	NAD	C5B-O5B-PA-O2A
2	H	501	NAD	C5B-O5B-PA-O3
2	H	501	NAD	O4D-C1D-N1N-C2N
2	H	501	NAD	O4D-C1D-N1N-C6N
2	H	501	NAD	C2D-C1D-N1N-C2N
2	H	501	NAD	C2D-C1D-N1N-C6N
2	I	501	NAD	C5B-O5B-PA-O1A
2	I	501	NAD	C5B-O5B-PA-O2A
2	I	501	NAD	C5B-O5B-PA-O3
2	I	501	NAD	PN-O3-PA-O5B
2	I	501	NAD	O4D-C1D-N1N-C2N
2	I	501	NAD	O4D-C1D-N1N-C6N
2	I	501	NAD	C2D-C1D-N1N-C2N
2	I	501	NAD	C2D-C1D-N1N-C6N
2	J	501	NAD	C5B-O5B-PA-O1A
2	J	501	NAD	C5B-O5B-PA-O2A
2	J	501	NAD	C5B-O5B-PA-O3
2	J	501	NAD	PN-O3-PA-O5B
2	J	501	NAD	O4D-C1D-N1N-C2N
2	J	501	NAD	O4D-C1D-N1N-C6N
2	J	501	NAD	C2D-C1D-N1N-C2N
2	J	501	NAD	C2D-C1D-N1N-C6N
2	K	501	NAD	C5B-O5B-PA-O1A
2	K	501	NAD	C5B-O5B-PA-O2A
2	K	501	NAD	C5B-O5B-PA-O3
2	K	501	NAD	C5D-O5D-PN-O3

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Mol	Chain	Res	Type	Atoms
2	K	501	NAD	O4D-C1D-N1N-C2N
2	K	501	NAD	O4D-C1D-N1N-C6N
2	K	501	NAD	C2D-C1D-N1N-C2N
2	K	501	NAD	C2D-C1D-N1N-C6N
3	J	502	ADN	O4'-C4'-C5'-O5'
3	J	502	ADN	C3'-C4'-C5'-O5'
3	I	502	ADN	C3'-C4'-C5'-O5'
3	H	502	ADN	C3'-C4'-C5'-O5'
3	I	502	ADN	O4'-C4'-C5'-O5'
2	B	501	NAD	C3D-C4D-C5D-O5D
3	H	502	ADN	O4'-C4'-C5'-O5'
2	H	501	NAD	O4B-C4B-C5B-O5B
2	K	501	NAD	O4B-C4B-C5B-O5B
2	K	501	NAD	C3B-C4B-C5B-O5B
2	H	501	NAD	C3B-C4B-C5B-O5B
2	A	501	NAD	O4B-C4B-C5B-O5B
2	I	501	NAD	O4B-C4B-C5B-O5B
2	A	501	NAD	C3B-C4B-C5B-O5B
2	D	501	NAD	PN-O3-PA-O5B
2	B	501	NAD	C2B-C1B-N9A-C8A
2	C	501	NAD	C2B-C1B-N9A-C8A
2	D	501	NAD	C2B-C1B-N9A-C8A
2	B	501	NAD	PA-O3-PN-O1N
2	I	501	NAD	PA-O3-PN-O1N
2	J	501	NAD	PA-O3-PN-O1N
2	D	501	NAD	C5B-O5B-PA-O2A
2	I	501	NAD	C5D-O5D-PN-O1N
2	J	501	NAD	C5D-O5D-PN-O1N
2	I	501	NAD	C3B-C4B-C5B-O5B
2	J	501	NAD	O4B-C4B-C5B-O5B
2	D	501	NAD	PA-O3-PN-O2N
2	K	501	NAD	PA-O3-PN-O2N
3	I	502	ADN	C2'-C1'-N9-C8
2	A	501	NAD	C2B-C1B-N9A-C8A
2	H	501	NAD	C4B-C5B-O5B-PA
2	K	501	NAD	C4B-C5B-O5B-PA
2	H	501	NAD	PA-O3-PN-O2N
2	C	501	NAD	C4B-C5B-O5B-PA
2	I	501	NAD	C4B-C5B-O5B-PA
2	D	501	NAD	C4B-C5B-O5B-PA
2	B	501	NAD	C4B-C5B-O5B-PA
2	J	501	NAD	C4B-C5B-O5B-PA

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Mol	Chain	Res	Type	Atoms
2	C	501	NAD	O4B-C1B-N9A-C8A
2	H	501	NAD	C2B-C1B-N9A-C8A
2	B	501	NAD	PA-O3-PN-O2N
2	B	501	NAD	O4B-C1B-N9A-C8A
2	D	501	NAD	O4B-C1B-N9A-C8A
2	C	501	NAD	O4B-C4B-C5B-O5B
2	D	501	NAD	O4B-C4B-C5B-O5B
2	J	501	NAD	C2B-C1B-N9A-C8A
3	I	502	ADN	O4'-C1'-N9-C8
2	K	501	NAD	C2B-C1B-N9A-C8A
2	A	501	NAD	PA-O3-PN-O1N
2	C	501	NAD	PA-O3-PN-O2N
2	J	501	NAD	PA-O3-PN-O2N
2	J	501	NAD	C3B-C4B-C5B-O5B

There are no ring outliers.

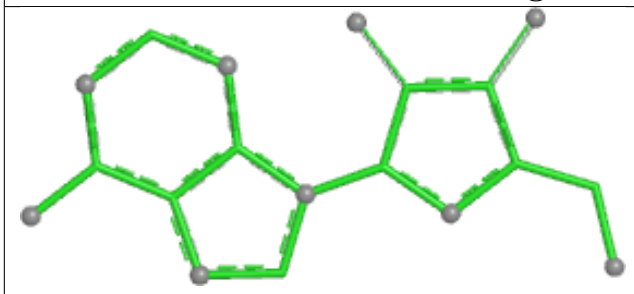
18 monomers are involved in 36 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	I	502	ADN	2	0
3	J	502	ADN	2	0
4	H	503	PO4	1	0
2	J	501	NAD	3	0
2	H	501	NAD	2	0
2	I	501	NAD	2	0
2	D	501	NAD	4	0
2	A	501	NAD	2	0
4	D	503	PO4	1	0
3	H	502	ADN	3	0
3	K	502	ADN	2	0
2	C	501	NAD	3	0
4	A	504	PO4	3	0
4	C	503	PO4	2	0
4	A	503	PO4	1	0
2	K	501	NAD	3	0
3	D	502	ADN	1	0
2	B	501	NAD	4	0

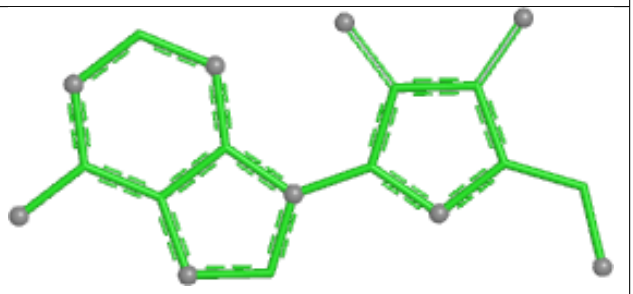
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

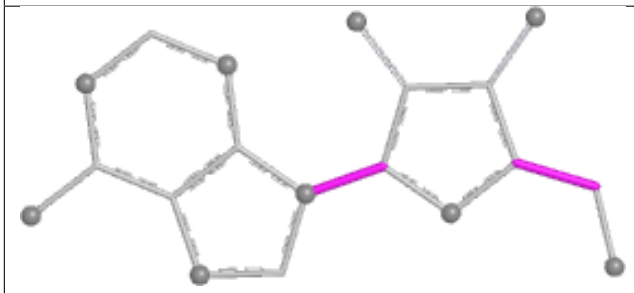
Ligand ADN I 502



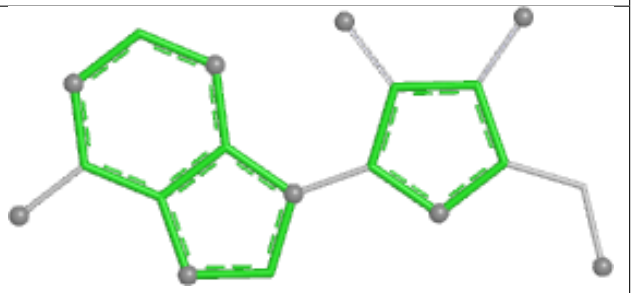
Bond lengths



Bond angles

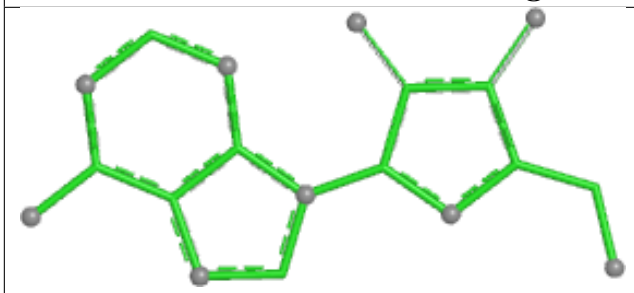


Torsions

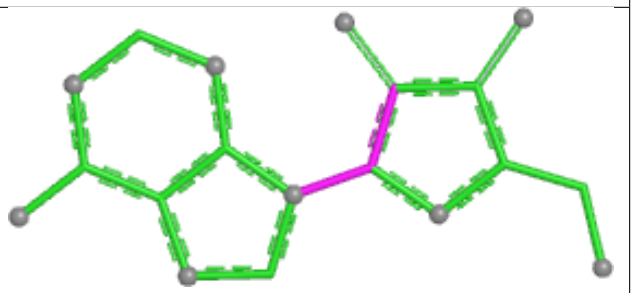


Rings

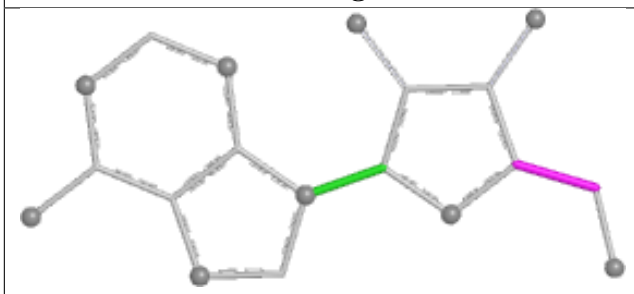
Ligand ADN J 502



Bond lengths



Bond angles



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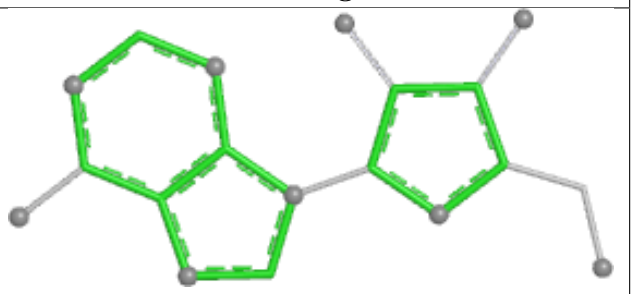
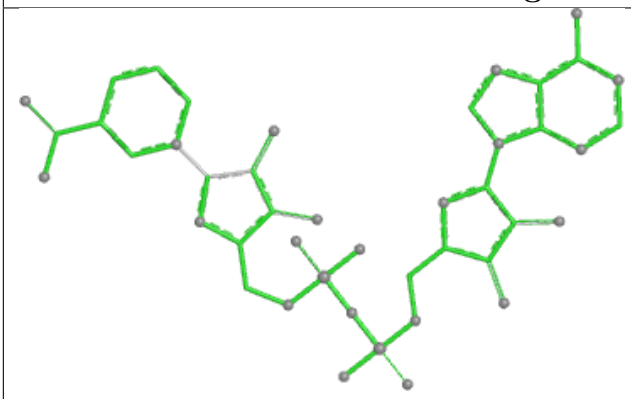
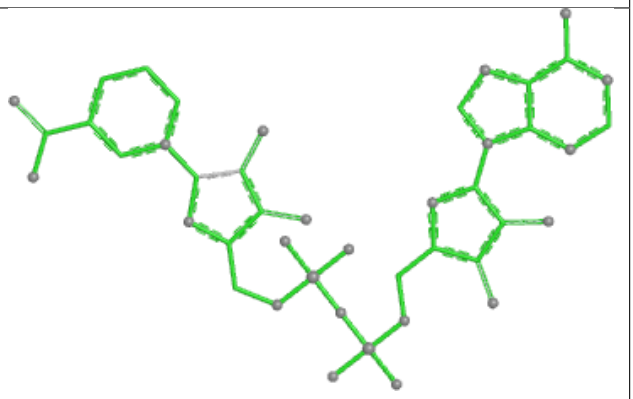


Rings

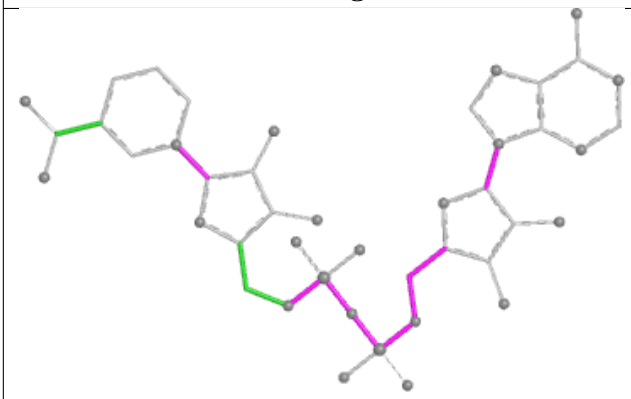
Ligand NAD J 501



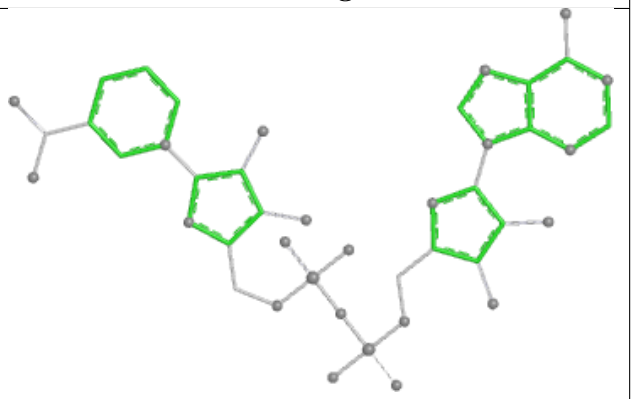
Bond lengths



Bond angles

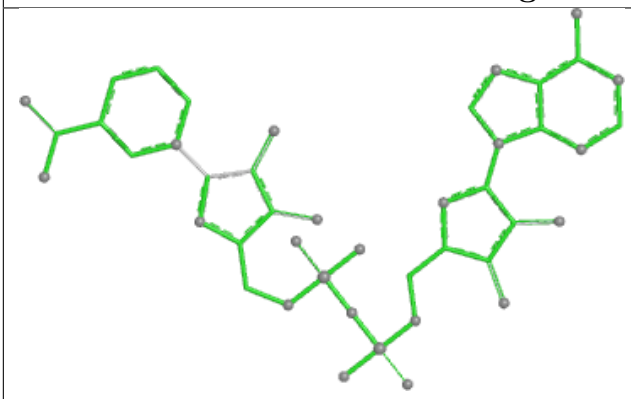


Torsions

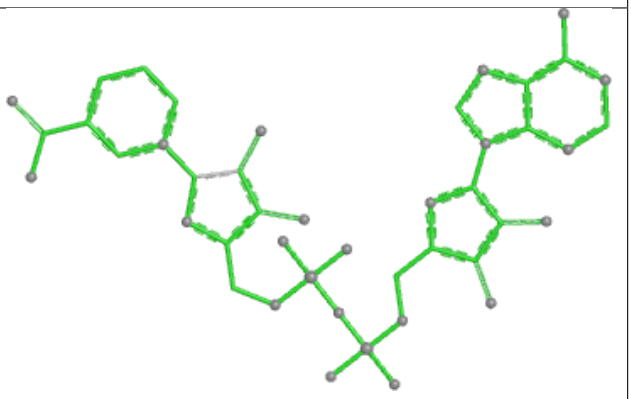


Rings

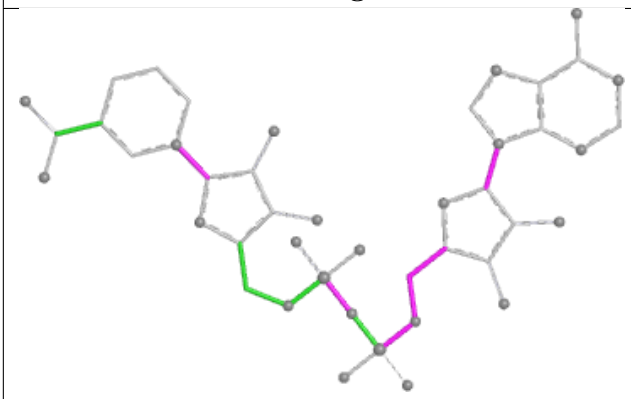
Ligand NAD H 501



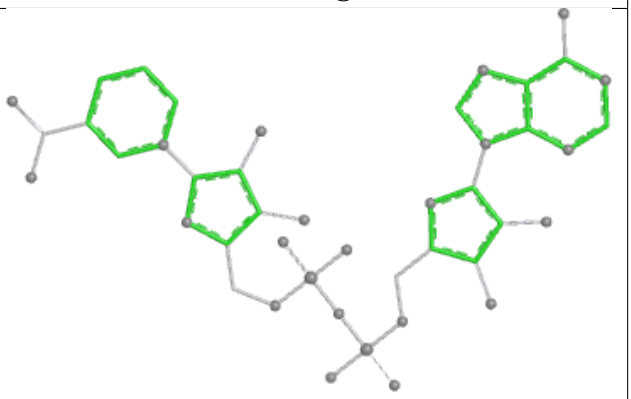
Bond lengths



Bond angles

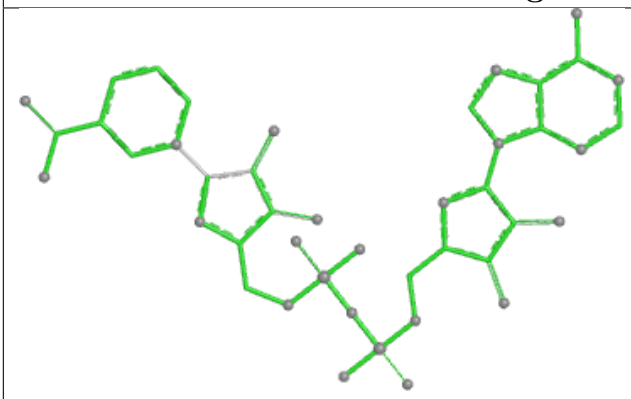


Torsions

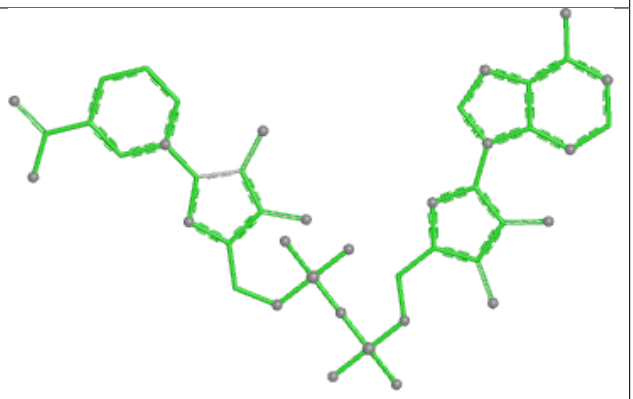


Rings

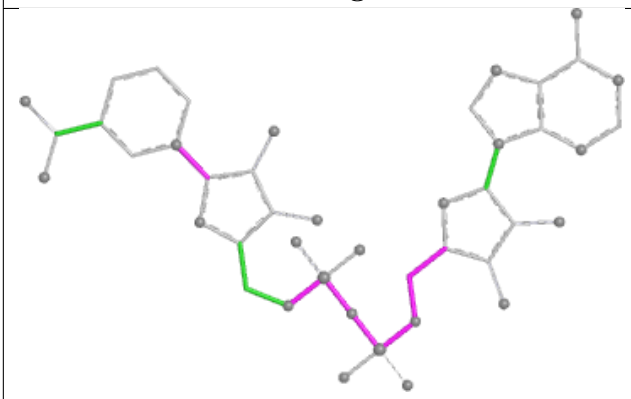
Ligand NAD I 501



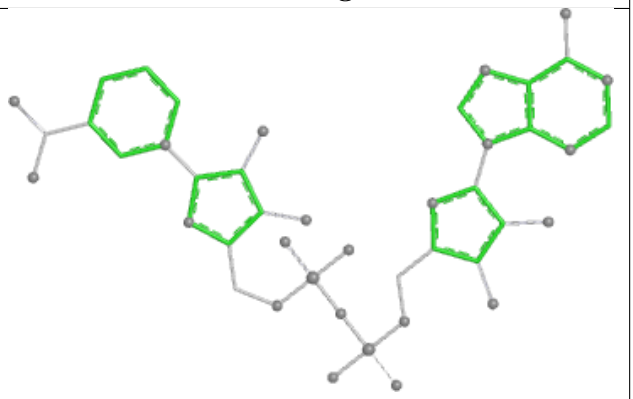
Bond lengths



Bond angles

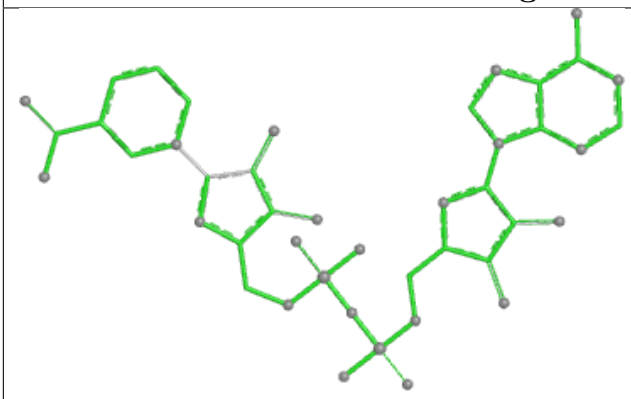


Torsions

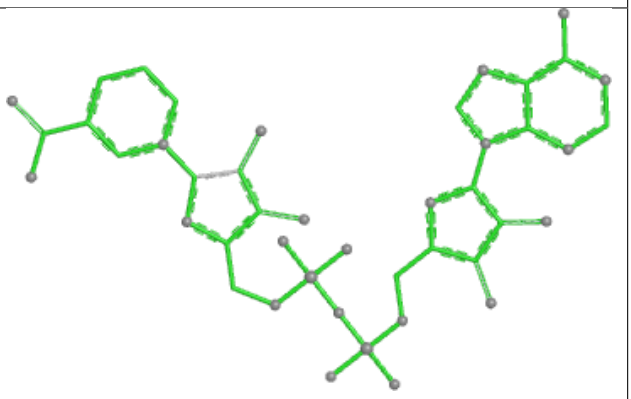


Rings

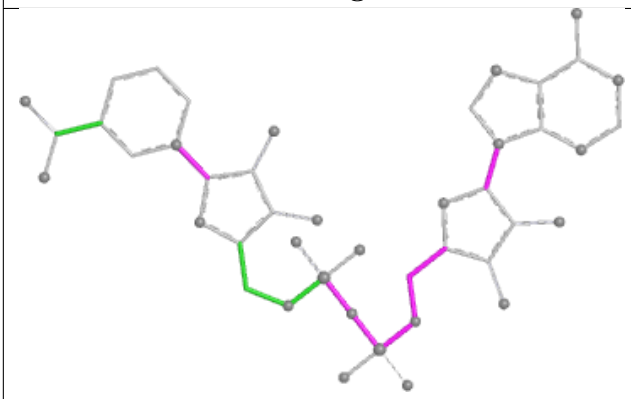
Ligand NAD D 501



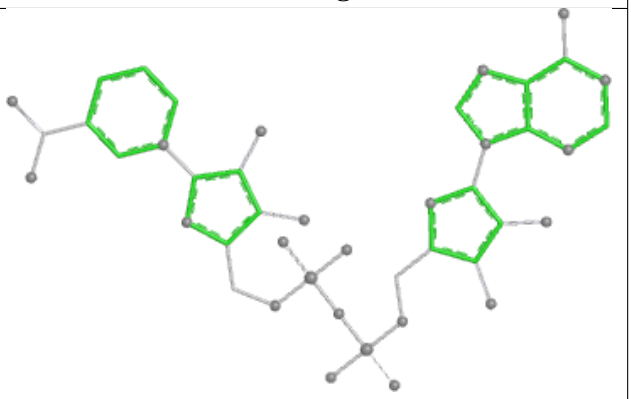
Bond lengths



Bond angles

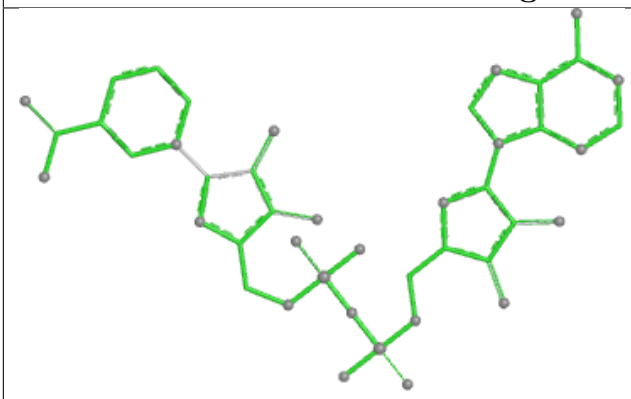


Torsions

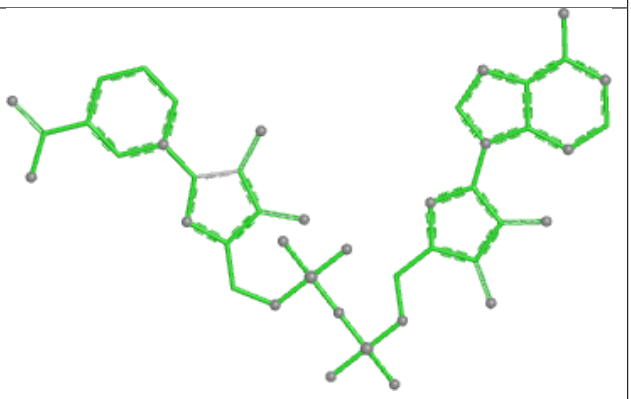


Rings

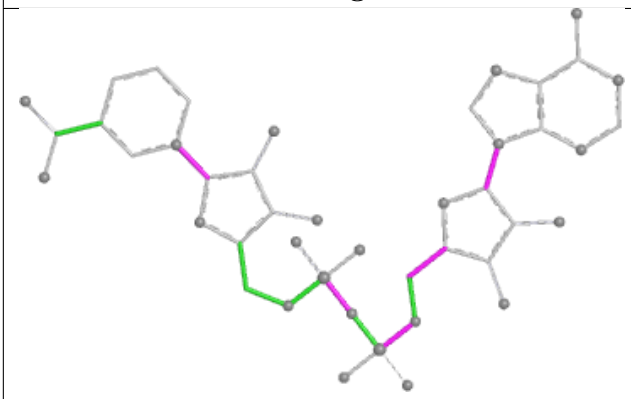
Ligand NAD A 501



Bond lengths



Bond angles



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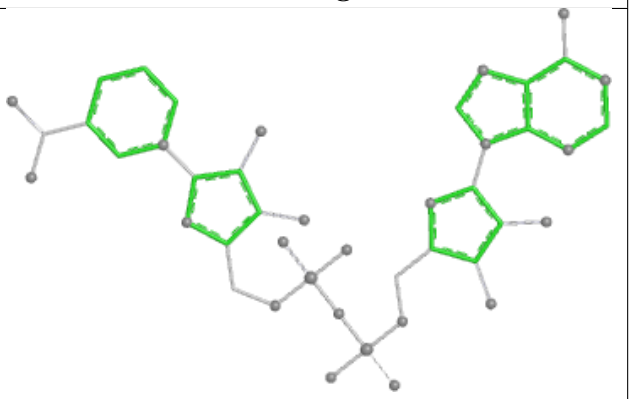
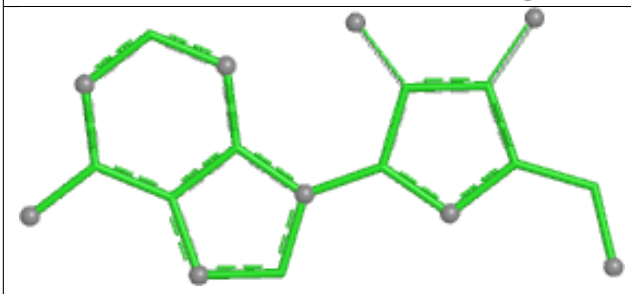
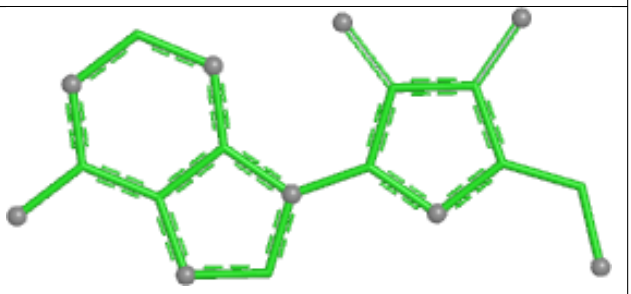


Rings

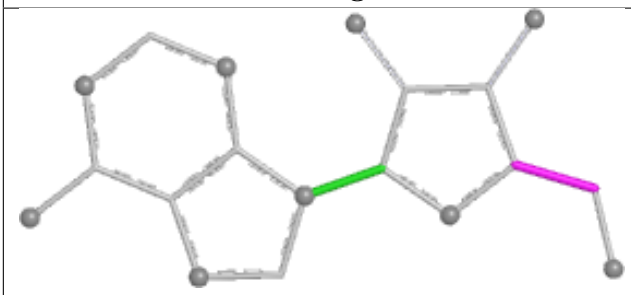
Ligand ADN H 502



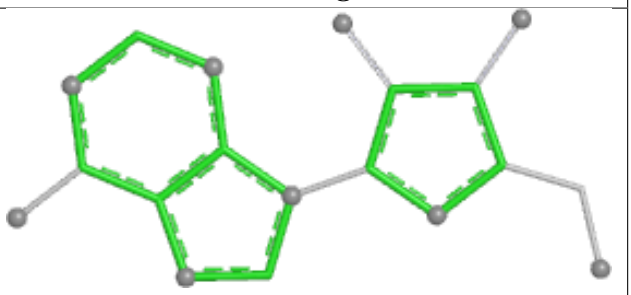
Bond lengths



Bond angles

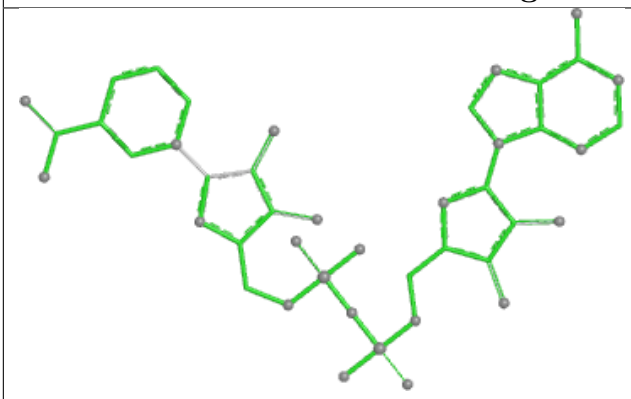


Torsions

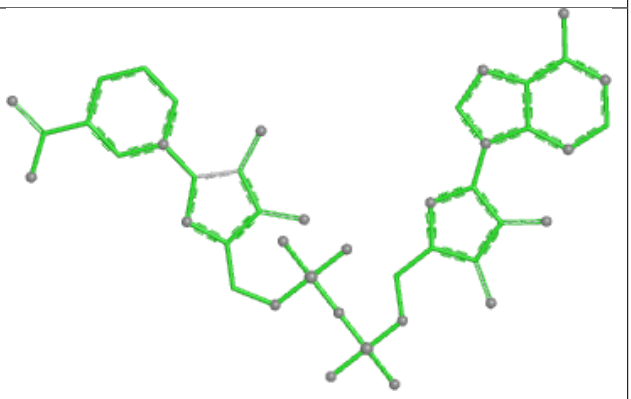


Rings

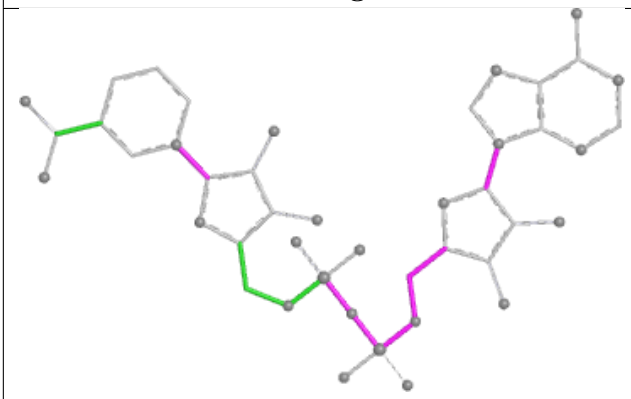
Ligand NAD C 501



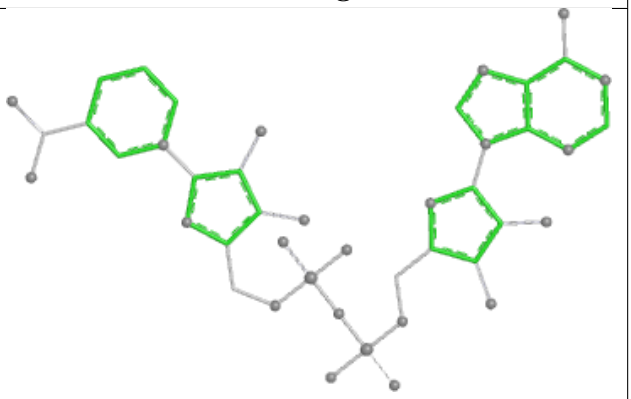
Bond lengths



Bond angles

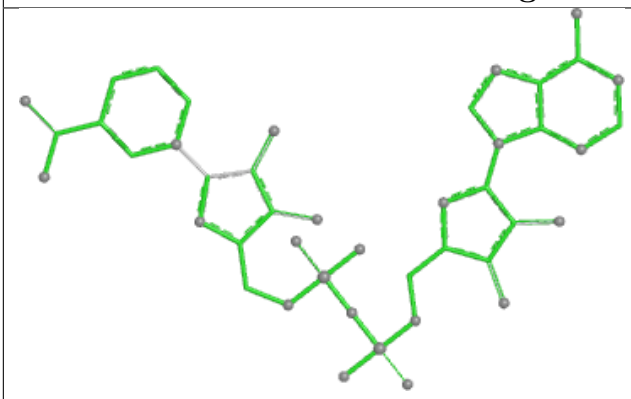


Torsions

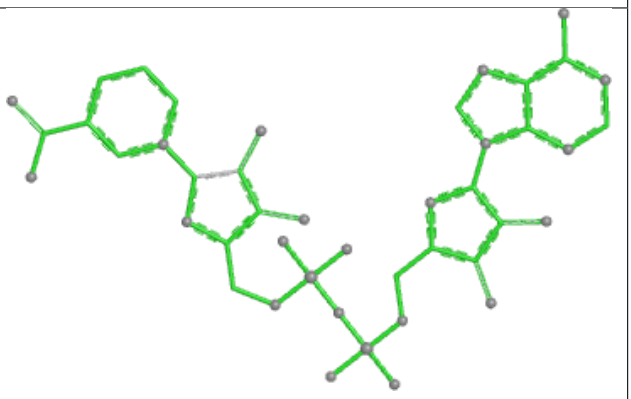


Rings

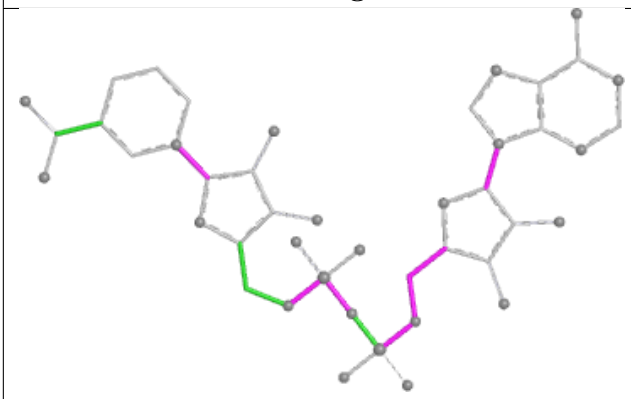
Ligand NAD K 501



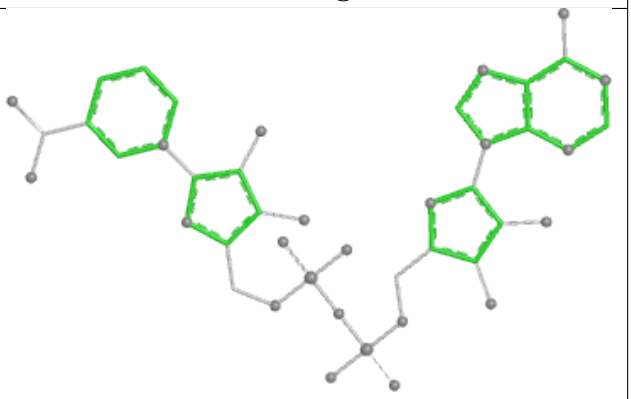
Bond lengths



Bond angles

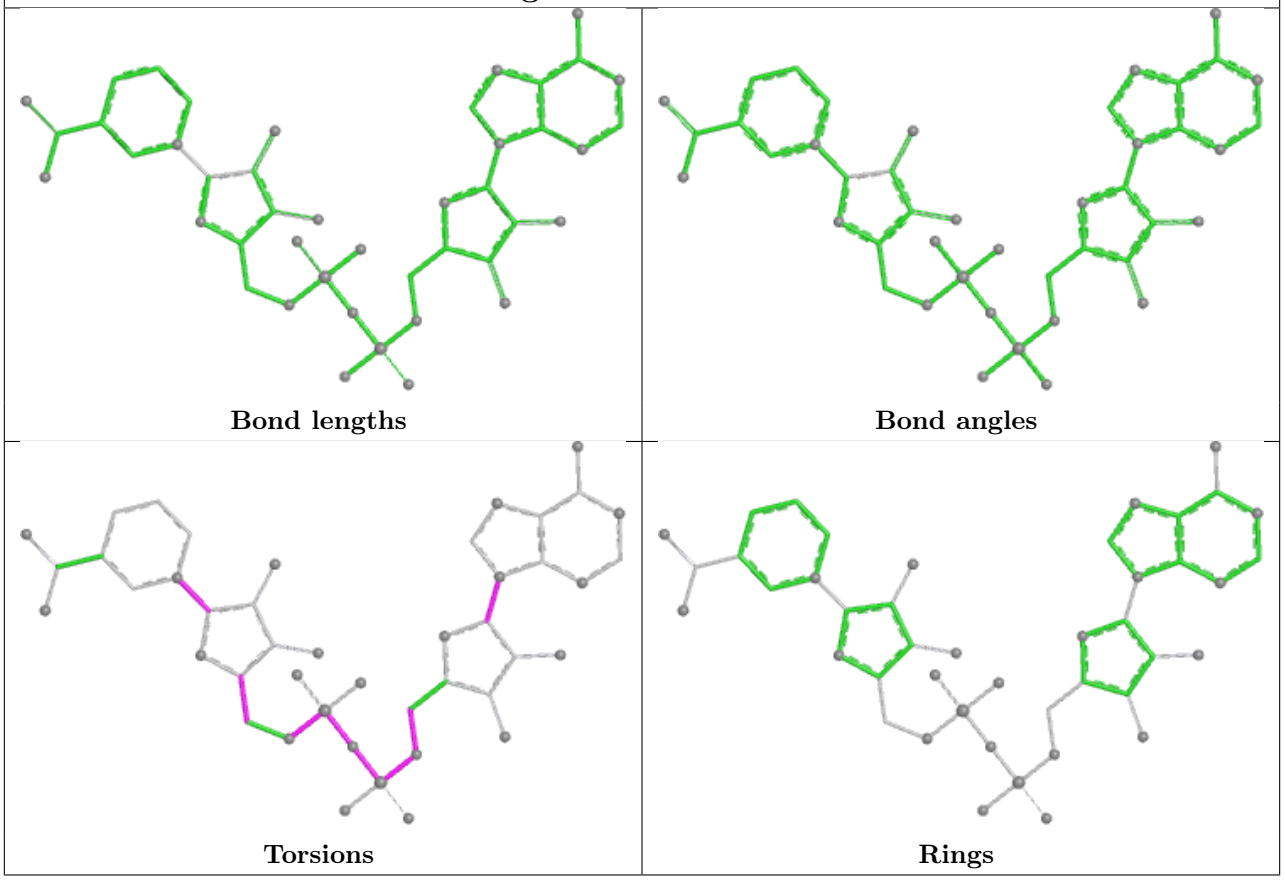


Torsions



Rings

Ligand NAD B 501



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, 95^{th} 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	461/472 (97%)	-1.81	0	100	100	5, 21, 39, 53	2 (0%)
1	B	461/472 (97%)	-1.84	0	100	100	5, 17, 30, 44	2 (0%)
1	C	461/472 (97%)	-1.77	0	100	100	5, 22, 48, 65	2 (0%)
1	D	461/472 (97%)	-1.84	0	100	100	5, 18, 31, 40	4 (0%)
1	H	461/472 (97%)	-1.74	0	100	100	6, 28, 51, 75	2 (0%)
1	I	461/472 (97%)	-1.82	0	100	100	7, 20, 33, 44	2 (0%)
1	J	461/472 (97%)	-1.80	0	100	100	6, 20, 40, 52	3 (0%)
1	K	461/472 (97%)	-1.83	0	100	100	9, 20, 32, 55	4 (0%)
All	All	3688/3776 (97%)	-1.81	0	100	100	5, 20, 41, 75	21 (0%)

There are no RSRZ outliers to report.

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

There are no oligosaccharides in this entry.

6.4 Ligands

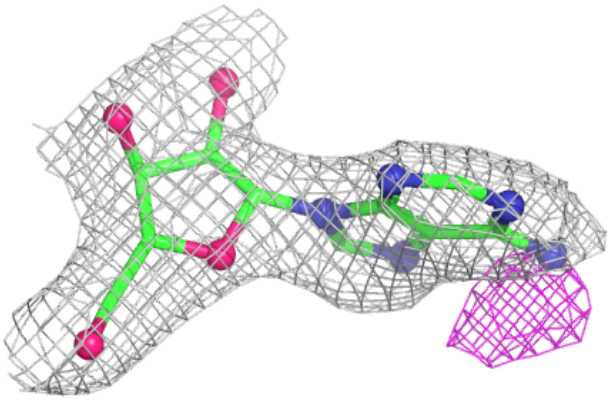
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

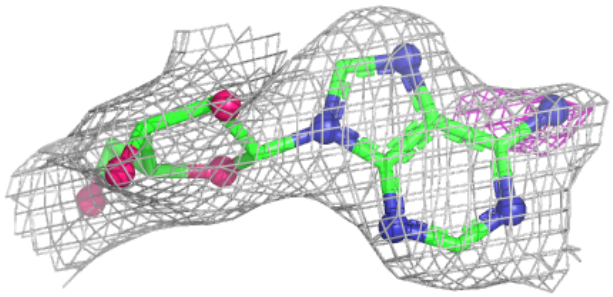
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	ADN	H	502	19/19	0.99	0.02	20,27,35,37	0
4	PO4	H	503	5/5	0.99	0.04	29,30,41,42	0
4	PO4	K	503	5/5	0.99	0.06	25,30,36,39	0
4	PO4	K	504	5/5	0.99	0.03	19,25,32,35	0
2	NAD	H	501	44/44	1.00	0.02	11,20,32,35	0
2	NAD	I	501	44/44	1.00	0.01	9,18,25,31	0
2	NAD	J	501	44/44	1.00	0.02	11,15,24,30	0
2	NAD	K	501	44/44	1.00	0.02	14,26,36,39	0
3	ADN	A	502[B]	19/19	1.00	0.02	14,22,32,36	0
3	ADN	B	502[B]	19/19	1.00	0.02	5,11,19,20	0
3	ADN	C	502[B]	19/19	1.00	0.02	15,24,29,31	0
3	ADN	D	502	19/19	1.00	0.02	7,13,23,28	0
2	NAD	A	501	44/44	1.00	0.01	4,13,23,29	0
3	ADN	I	502	19/19	1.00	0.01	7,13,18,25	0
3	ADN	J	502	19/19	1.00	0.02	11,19,25,28	0
3	ADN	K	502	19/19	1.00	0.02	9,15,23,23	0
4	PO4	A	503	5/5	1.00	0.04	20,22,23,39	0
4	PO4	A	504	5/5	1.00	0.06	13,23,32,39	0
4	PO4	C	503	5/5	1.00	0.04	17,20,33,33	0
4	PO4	D	503	5/5	1.00	0.04	10,11,14,16	0
2	NAD	B	501	44/44	1.00	0.02	10,19,31,40	0
4	PO4	I	503	5/5	1.00	0.04	15,21,28,36	0
2	NAD	C	501	44/44	1.00	0.02	5,17,27,33	0
2	NAD	D	501	44/44	1.00	0.02	11,19,31,45	0

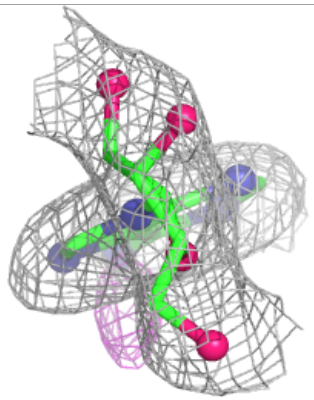
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around ADN H 502:

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

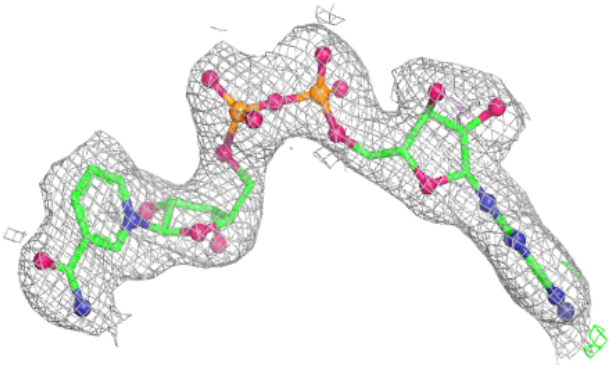


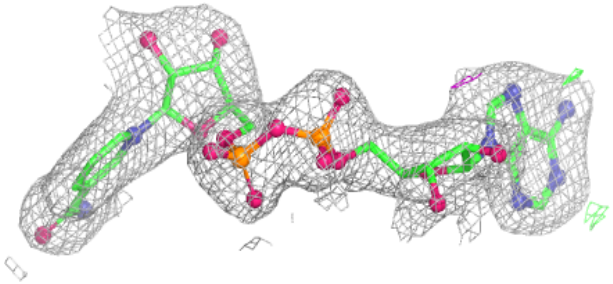


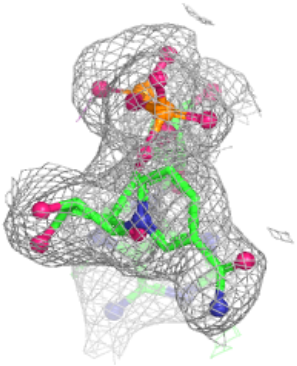


Electron density around NAD H 501:

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

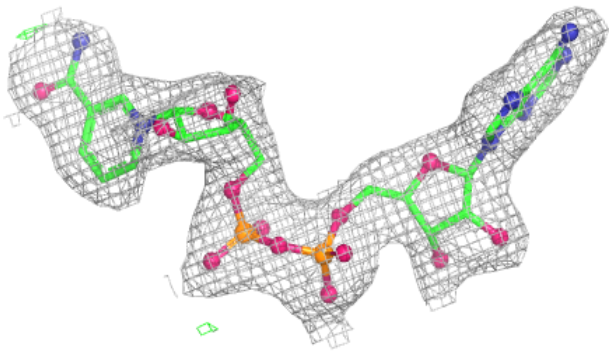


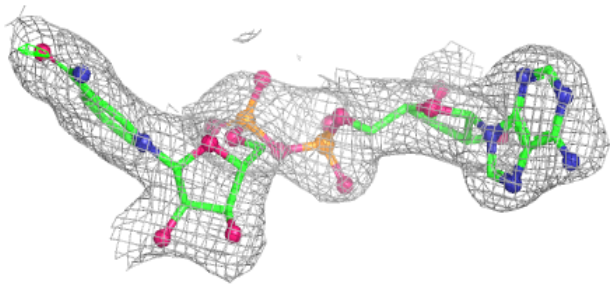


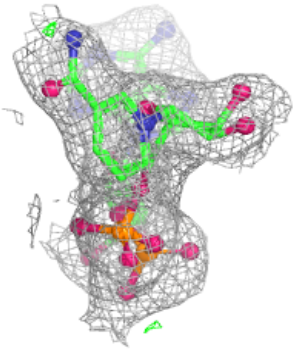


Electron density around NAD I 501:

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

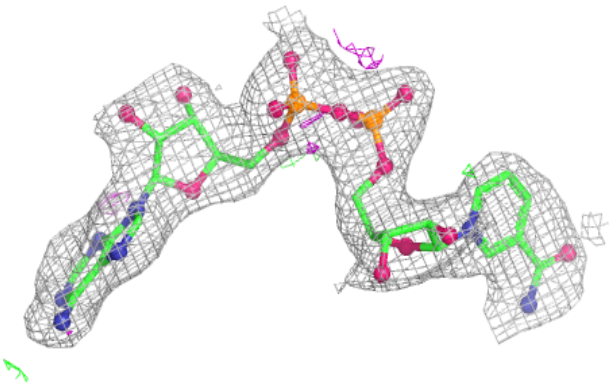


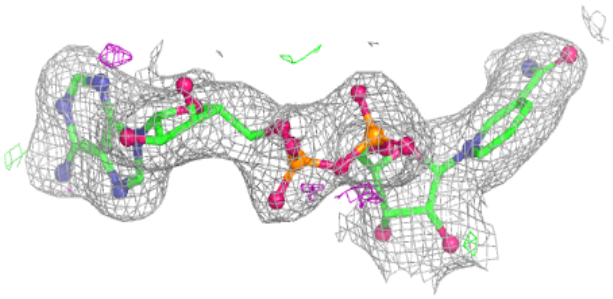


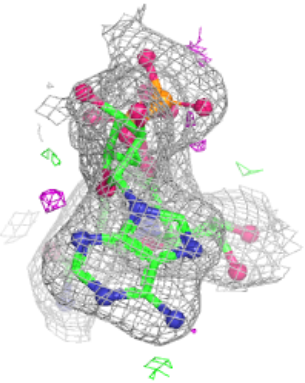


Electron density around NAD J 501:

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

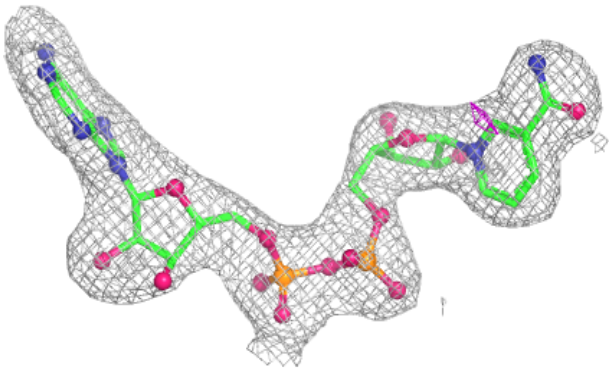


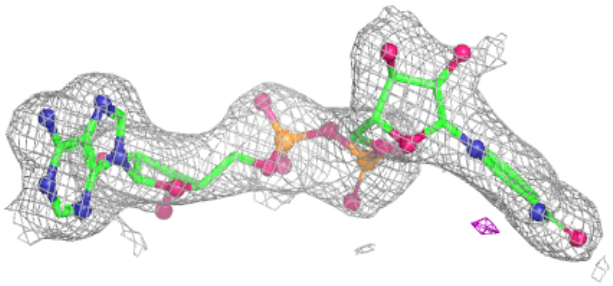


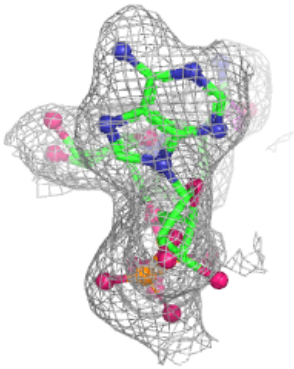


Electron density around NAD K 501:

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

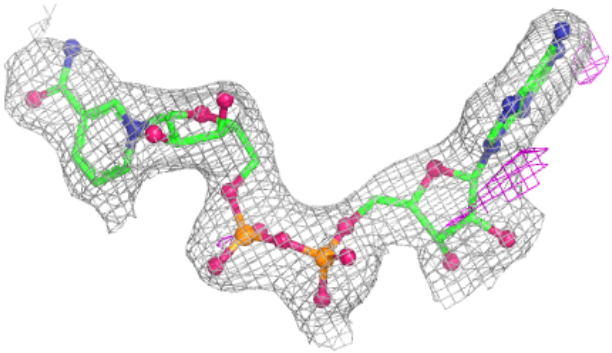


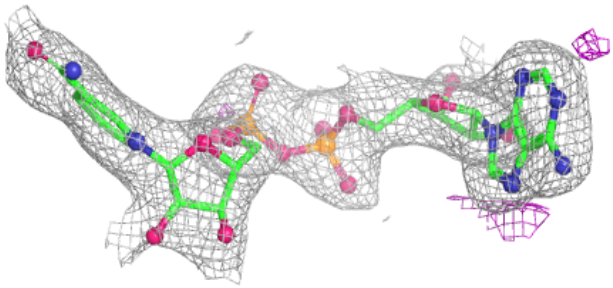


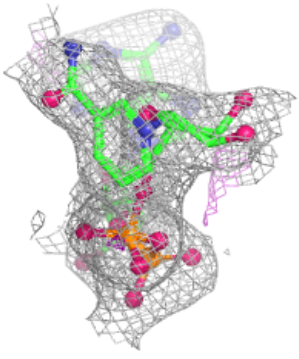


Electron density around NAD A 501:

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

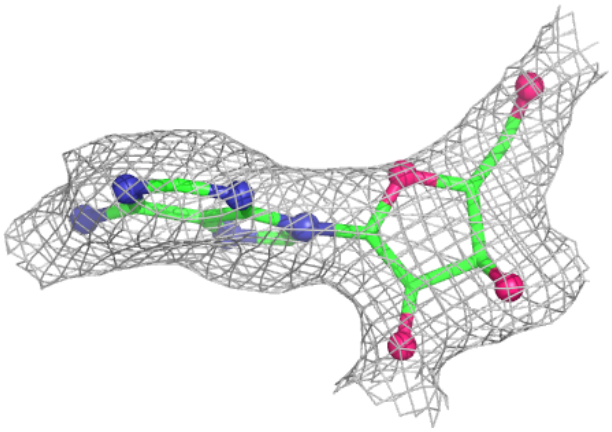


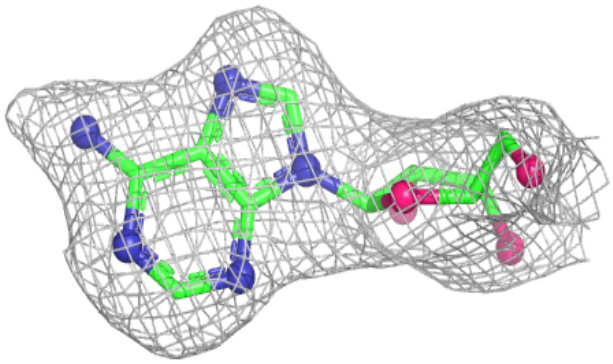


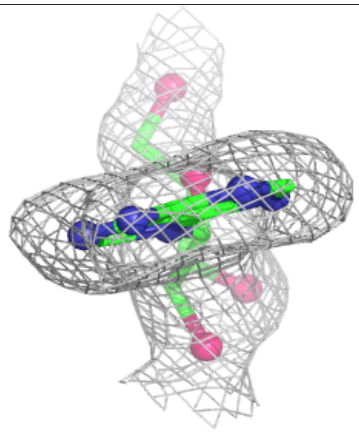


Electron density around ADN I 502:

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

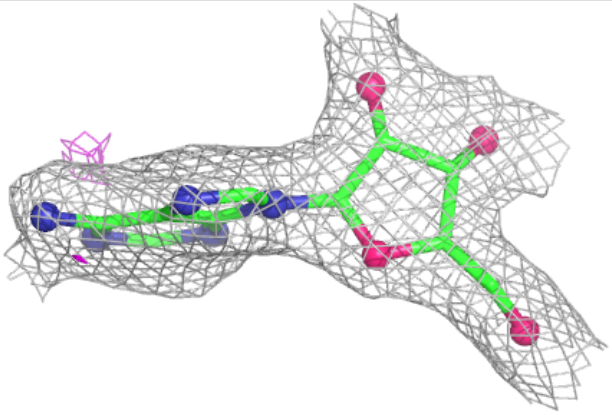


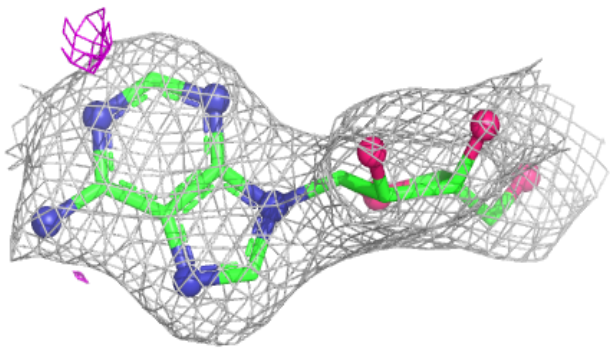


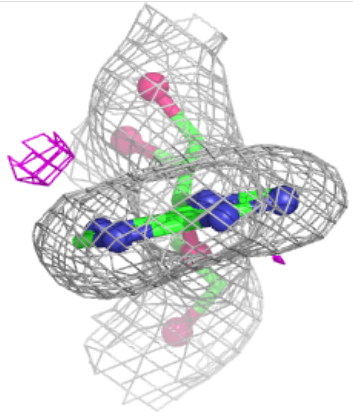


Electron density around ADN J 502:

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

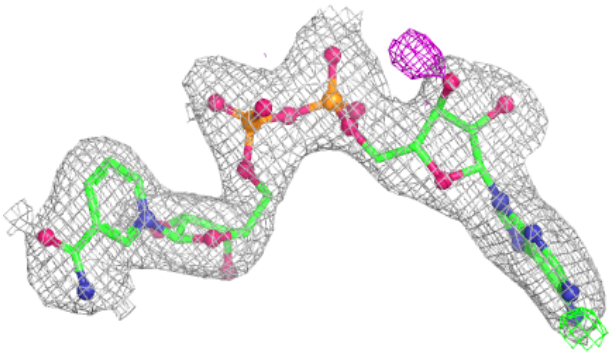


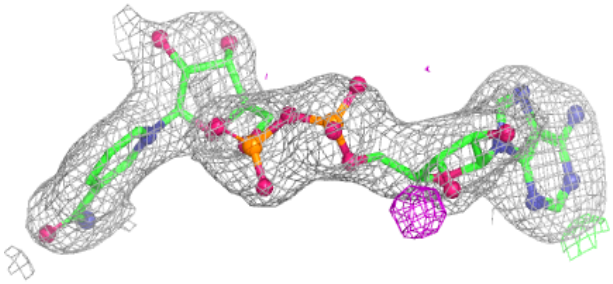


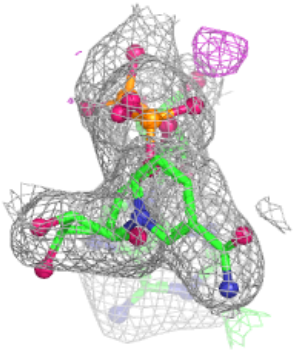


Electron density around NAD B 501:

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

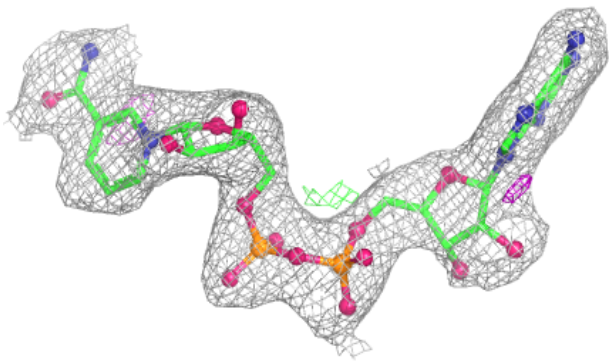


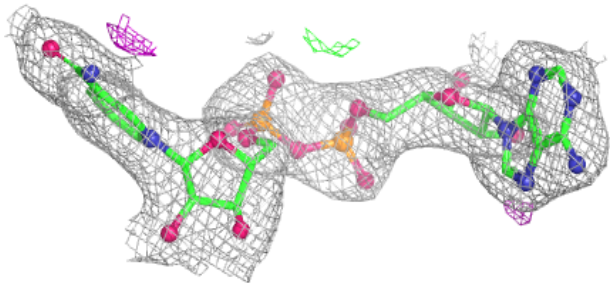


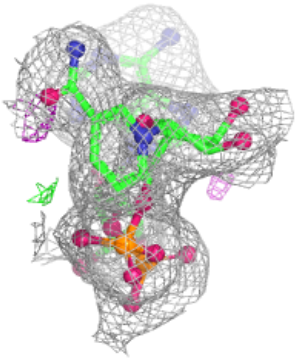


Electron density around NAD C 501:

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

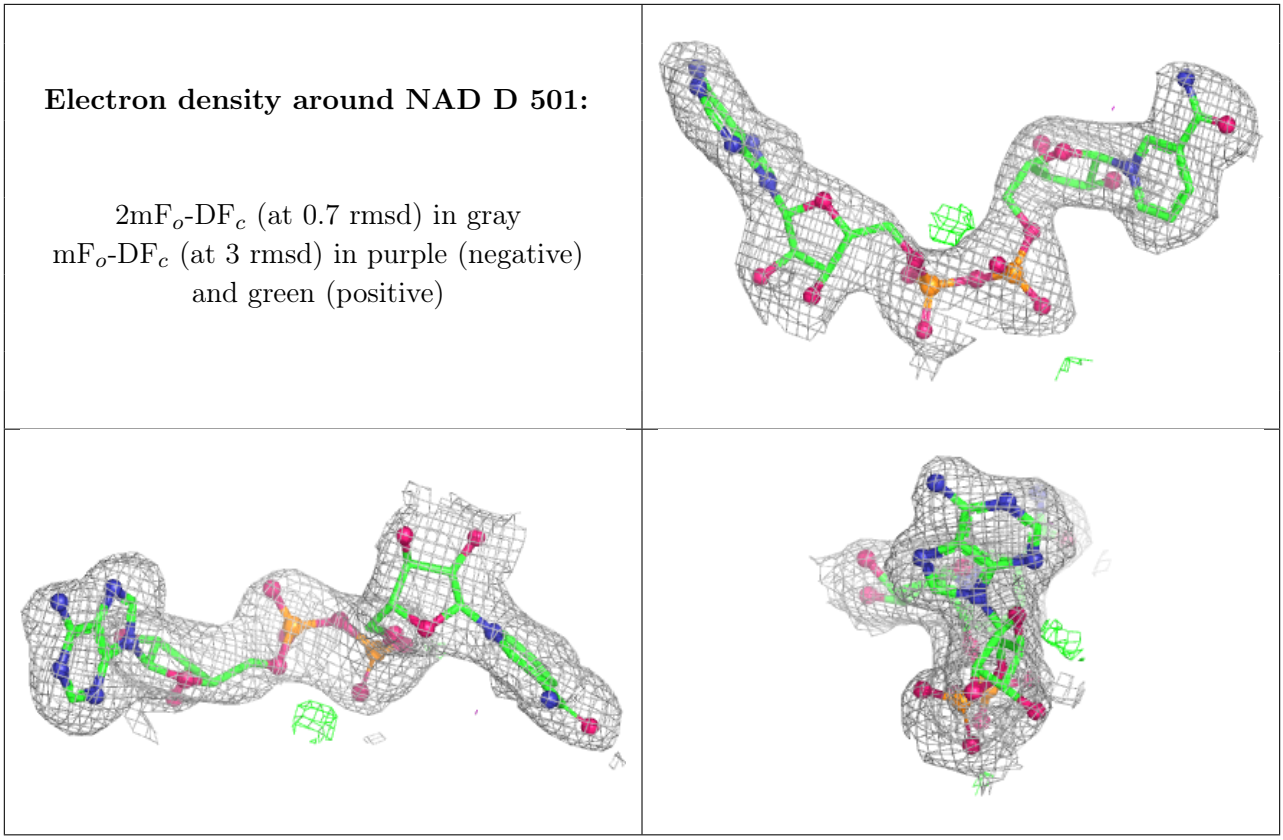






Electron density around NAD D 501:

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



6.5 Other polymers (i)

There are no such residues in this entry.