



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 01:45 PM UTC

PDB ID : 6H0P / pdb\_00006h0p  
Title : The structure of C100A mutant of Arabidopsis thaliana UDP-apiose/UDP-x  
ylose synthase in complex with NADH and UDP-D-glucuronic acid  
Authors : Savino, S.; Mattevi, A.  
Deposited on : 2018-07-10  
Resolution : 3.47 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](mailto: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>.

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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

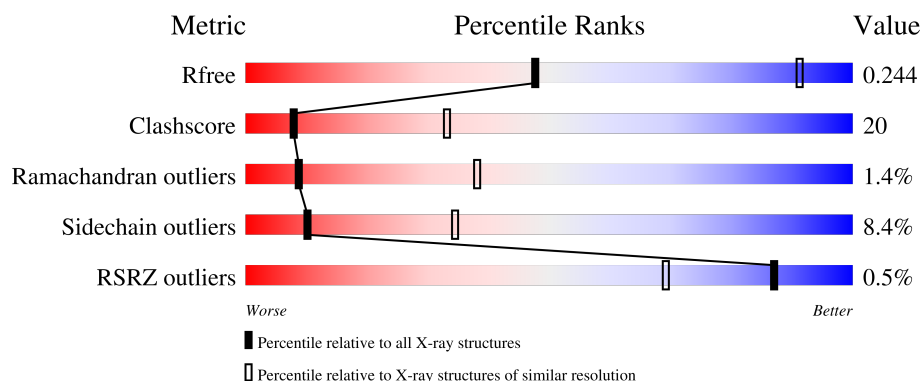
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.47 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	1083 (3.52-3.44)
Clashscore	190562	1139 (3.52-3.44)
Ramachandran outliers	187476	1111 (3.52-3.44)
Sidechain outliers	187428	1112 (3.52-3.44)
RSRZ outliers	180081	1082 (3.52-3.44)

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  $\geq 3$ , 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	389	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green, grey);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>%</span> <span>63%</span> <span>28%</span> <span>5%</span> <span>• •</span> </div> </div>
1	B	389	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green, grey);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>%</span> <span>66%</span> <span>23%</span> <span>6%</span> <span>6%</span> </div> </div>



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.

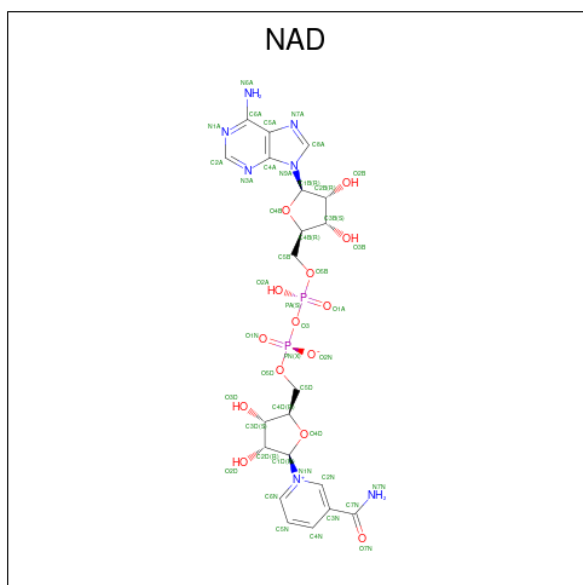
- Molecule 1 is a protein called UDP-D-apiose/UDP-D-xylose synthase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	375	Total 2892	C 1844	N 488	O 546	S 14	0	0	0
1	B	367	Total 2833	C 1808	N 478	O 534	S 13	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	100	ALA	CYS	engineered mutation	UNP Q9ZUY6
B	100	ALA	CYS	engineered mutation	UNP Q9ZUY6

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



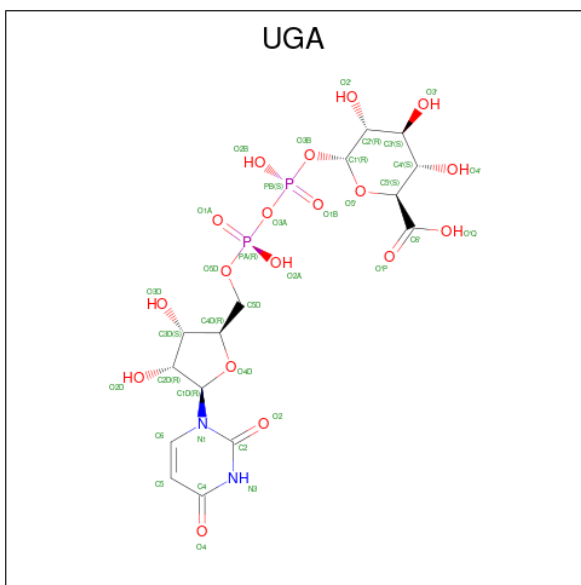
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			35	15	5	13	2		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	B	1	Total	C	N	O	P	0	0
			35	15	5	13	2		

- Molecule 3 is URIDINE-5'-DIPHOSPHATE-GLUCURONIC ACID (CCD ID: UGA) (formula:  $\text{C}_{15}\text{H}_{22}\text{N}_2\text{O}_{18}\text{P}_2$ ).

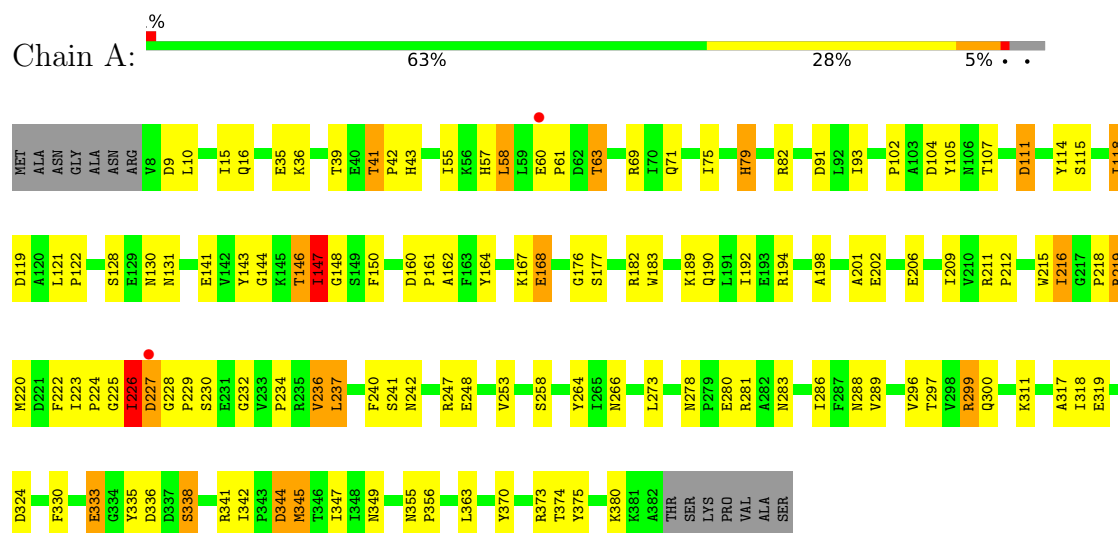


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total 37	C 15	N 2	O 18	P 2	0	0
3	B	1	Total 37	C 15	N 2	O 18	P 2	0	0

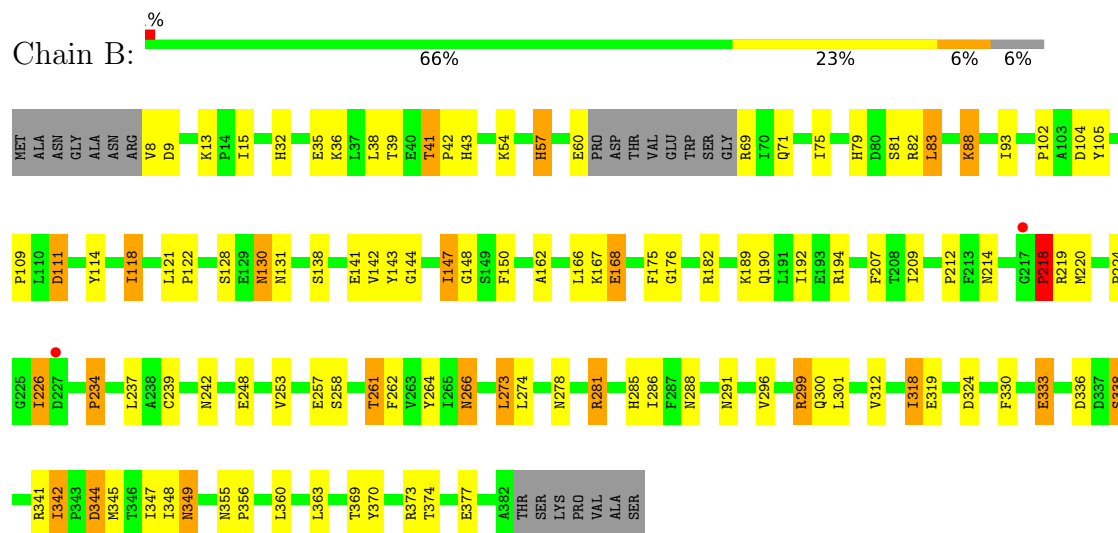
### 3 Residue-property plots [i](#)

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: UDP-D-apiose/UDP-D-xylose synthase 1



- Molecule 1: UDP-D-apiose/UDP-D-xylose synthase 1



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	144.56Å 144.56Å 130.52Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	48.44 – 3.47 48.44 – 3.47	Depositor EDS
% Data completeness (in resolution range)	99.8 (48.44-3.47) 99.9 (48.44-3.47)	Depositor EDS
$R_{merge}$	0.15	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.66 (at 3.48Å)	Xtriage
Refinement program	REFMAC 5.8.0230	Depositor
R, $R_{free}$	0.196 , 0.239 0.203 , 0.244	Depositor DCC
$R_{free}$ test set	1073 reflections (5.15%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	122.3	Xtriage
Anisotropy	0.066	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.38 , 107.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	0.038 for -h,-k,l	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	5869	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	131.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.00% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: NAD, UGA

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z  > 5$	RMSZ	$\# Z  > 5$
1	A	1.00	6/2960 (0.2%)	1.29	11/4039 (0.3%)
1	B	0.99	5/2897 (0.2%)	1.34	17/3947 (0.4%)
All	All	1.00	11/5857 (0.2%)	1.32	28/7986 (0.4%)

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	A	0	2
1	B	0	2
All	All	0	4

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	218	PRO	C-O	-6.45	1.15	1.24
1	A	344	ASP	C-O	-5.95	1.16	1.24
1	A	237	LEU	N-CA	-5.85	1.39	1.46
1	A	319	GLU	N-CA	5.84	1.53	1.46
1	B	9	ASP	N-CA	5.64	1.52	1.45
1	A	380	LYS	N-CA	5.64	1.52	1.46
1	B	318	ILE	N-CA	5.59	1.52	1.46
1	B	138	SER	N-CA	-5.37	1.42	1.46
1	A	311	LYS	C-O	-5.29	1.18	1.24
1	B	319	GLU	N-CA	5.11	1.52	1.46
1	A	177	SER	CA-CB	-5.05	1.45	1.53

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	41	THR	N-CA-C	7.77	117.26	108.25
1	A	333	GLU	CB-CA-C	-6.67	100.61	110.95
1	B	41	THR	N-CA-C	6.47	115.75	108.25
1	B	261	THR	CB-CA-C	-6.45	99.45	110.16
1	A	374	THR	CA-CB-OG1	-6.44	99.94	109.60
1	B	212	PRO	CB-CA-C	-6.35	103.64	111.64
1	A	41	THR	CB-CA-C	-6.34	100.15	109.97
1	B	218	PRO	N-CA-CB	-6.32	96.61	103.25
1	B	9	ASP	CA-CB-CG	6.19	118.79	112.60
1	A	131	ASN	CB-CA-C	5.82	120.16	111.89
1	B	333	GLU	CB-CA-C	-5.81	101.95	110.95
1	B	218	PRO	N-CA-C	5.77	124.36	112.47
1	B	131	ASN	CB-CA-C	5.72	120.01	111.89
1	A	79	HIS	CB-CA-C	5.67	118.28	110.34
1	A	212	PRO	CB-CA-C	-5.60	104.59	111.64
1	B	104	ASP	CA-CB-CG	5.52	118.12	112.60
1	B	257	GLU	CB-CG-CD	5.50	121.95	112.60
1	B	266	ASN	CA-CB-CG	-5.47	107.13	112.60
1	A	160	ASP	CA-CB-CG	5.38	117.98	112.60
1	A	146	THR	CB-CA-C	-5.21	101.53	110.22
1	B	377	GLU	N-CA-C	-5.15	105.56	111.07
1	B	219	ARG	N-CA-CB	-5.14	103.18	110.79
1	B	285	HIS	N-CA-C	5.14	118.13	110.52
1	B	273	LEU	N-CA-CB	-5.12	102.59	110.01
1	A	91	ASP	CA-CB-CG	-5.09	107.51	112.60
1	B	83	LEU	N-CA-C	5.08	116.50	110.97
1	A	236	VAL	N-CA-C	5.07	119.89	109.34
1	B	226	ILE	N-CA-C	-5.04	107.63	111.62

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	299	ARG	Sidechain
1	A	373	ARG	Sidechain
1	B	299	ARG	Sidechain
1	B	373	ARG	Sidechain

## 5.2 Too-close contacts

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	2892	0	2780	135	0
1	B	2833	0	2742	100	0
2	A	35	0	19	0	0
2	B	35	0	19	0	0
3	A	37	0	19	1	0
3	B	37	0	18	3	0
All	All	5869	0	5597	226	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 20.

All (226) 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:A:218:PRO:HB3	1:A:370:TYR:CD2	1.44	1.53
1:A:55:ILE:O	1:A:58:LEU:CD1	1.72	1.37
1:B:224:PRO:HD2	1:B:242:ASN:ND2	1.51	1.25
1:A:55:ILE:O	1:A:58:LEU:HD12	1.10	1.23
1:A:55:ILE:HA	1:A:58:LEU:HD11	1.22	1.14
1:A:55:ILE:CA	1:A:58:LEU:HD11	1.77	1.14
1:A:218:PRO:HB3	1:A:370:TYR:CE2	1.83	1.14
1:A:55:ILE:C	1:A:58:LEU:CD1	2.26	1.08
1:A:215:TRP:C	1:A:216:ILE:HD13	1.78	1.07
1:A:224:PRO:HD2	1:A:242:ASN:HD22	1.13	1.07
1:B:141:GLU:OE2	1:B:182:ARG:NH2	1.86	1.07
1:A:218:PRO:CB	1:A:370:TYR:CD2	2.40	1.03
1:B:224:PRO:CD	1:B:242:ASN:HD22	1.72	1.01
1:A:141:GLU:CD	1:A:182:ARG:HH22	1.69	1.01
1:A:224:PRO:HD2	1:A:242:ASN:ND2	1.74	1.01
1:B:54:LYS:O	1:B:57:HIS:NE2	1.93	1.00
1:A:297:THR:H	1:A:300:GLN:NE2	1.61	0.97
1:A:55:ILE:C	1:A:58:LEU:HD12	1.88	0.97
1:A:218:PRO:CB	1:A:370:TYR:HD2	1.77	0.96
1:A:55:ILE:CA	1:A:58:LEU:CD1	2.43	0.96
1:A:253:VAL:HG22	1:A:330:PHE:HD2	1.30	0.95
1:A:190:GLN:HE21	1:A:194:ARG:HE	1.15	0.94
1:B:345:MET:O	1:B:349:ASN:HB2	1.68	0.93
1:B:224:PRO:HD2	1:B:242:ASN:HD22	0.78	0.93
1:A:202:GLU:OE2	1:B:109:PRO:CD	2.19	0.90

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:60:GLU:HA	1:A:63:THR:O	1.71	0.89
1:A:345:MET:O	1:A:349:ASN:HB2	1.72	0.88
1:B:190:GLN:HE21	1:B:194:ARG:HE	1.21	0.86
1:A:55:ILE:HB	1:A:58:LEU:HD13	1.55	0.86
1:A:253:VAL:CG2	1:A:330:PHE:HD2	1.90	0.84
1:A:57:HIS:CD2	1:A:58:LEU:HG	2.14	0.81
1:A:58:LEU:HD12	1:A:58:LEU:H	1.44	0.81
1:A:202:GLU:OE2	1:B:109:PRO:HD2	1.81	0.80
1:A:215:TRP:C	1:A:216:ILE:CD1	2.54	0.80
1:B:253:VAL:HG22	1:B:330:PHE:HD2	1.47	0.80
1:A:218:PRO:CB	1:A:370:TYR:CE2	2.61	0.79
1:B:281:ARG:HG2	1:B:281:ARG:HH11	1.45	0.79
1:B:344:ASP:C	1:B:344:ASP:OD1	2.28	0.76
1:A:215:TRP:O	1:A:216:ILE:CD1	2.33	0.76
1:B:141:GLU:O	1:B:144:GLY:N	2.18	0.75
1:A:55:ILE:O	1:A:58:LEU:HD13	1.82	0.74
1:A:36:LYS:NZ	1:A:266:ASN:ND2	2.37	0.73
1:A:57:HIS:HD2	1:A:58:LEU:CD1	2.01	0.73
1:A:222:PHE:CE1	1:A:229:PRO:HD2	2.23	0.73
1:A:224:PRO:CD	1:A:242:ASN:HD22	1.98	0.72
1:A:218:PRO:HB3	1:A:370:TYR:HD2	0.93	0.72
1:B:43:HIS:O	1:B:69:ARG:NH1	2.22	0.72
1:A:253:VAL:HG22	1:A:330:PHE:CD2	2.21	0.70
1:A:60:GLU:CA	1:A:63:THR:O	2.41	0.69
1:A:190:GLN:NE2	1:A:194:ARG:HE	1.88	0.69
1:B:370:TYR:O	1:B:370:TYR:CD1	2.45	0.69
1:B:141:GLU:HG3	1:B:341:ARG:NH2	2.08	0.69
1:A:215:TRP:O	1:A:216:ILE:HD13	1.93	0.68
1:A:226:ILE:N	1:A:226:ILE:HD13	2.07	0.68
1:A:58:LEU:HD12	1:A:58:LEU:N	2.07	0.68
1:B:88:LYS:HG3	1:B:130:ASN:OD1	1.94	0.68
1:A:198:ALA:O	1:A:201:ALA:N	2.26	0.67
1:A:190:GLN:HE21	1:A:194:ARG:NE	1.91	0.67
1:A:55:ILE:HB	1:A:58:LEU:CD1	2.25	0.66
1:B:209:ILE:HB	1:B:286:ILE:HG12	1.77	0.66
1:A:209:ILE:HB	1:A:286:ILE:HG12	1.79	0.65
1:A:215:TRP:O	1:A:216:ILE:HD12	1.97	0.65
1:A:55:ILE:CB	1:A:58:LEU:CD1	2.74	0.65
1:A:297:THR:H	1:A:300:GLN:HE21	1.43	0.65
1:A:141:GLU:OE1	1:A:182:ARG:NH2	2.29	0.65
1:A:36:LYS:NZ	1:A:266:ASN:HD21	1.94	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:190:GLN:NE2	1:B:194:ARG:HE	1.94	0.64
1:A:253:VAL:CG2	1:A:330:PHE:CD2	2.78	0.64
1:A:216:ILE:HD13	1:A:216:ILE:N	2.12	0.64
1:A:202:GLU:OE2	1:B:109:PRO:CG	2.46	0.64
1:B:253:VAL:CG2	1:B:330:PHE:HD2	2.09	0.64
1:A:345:MET:HE1	1:A:356:PRO:HD3	1.80	0.64
1:B:36:LYS:NZ	1:B:266:ASN:ND2	2.45	0.64
1:B:288:ASN:HD22	1:B:344:ASP:H	1.46	0.63
1:A:202:GLU:OE2	1:B:109:PRO:HG2	1.98	0.63
1:B:190:GLN:HE21	1:B:194:ARG:NE	1.95	0.63
1:B:167:LYS:HE2	1:B:347:ILE:HD11	1.79	0.62
1:B:182:ARG:HD2	1:B:336:ASP:O	2.00	0.62
1:A:57:HIS:CD2	1:A:58:LEU:CG	2.83	0.61
1:A:370:TYR:O	1:A:370:TYR:CD1	2.53	0.61
1:A:202:GLU:OE2	1:B:109:PRO:N	2.34	0.60
1:B:144:GLY:O	1:B:338:SER:OG	2.18	0.60
1:A:43:HIS:O	1:A:69:ARG:NH1	2.34	0.60
1:A:167:LYS:HG3	1:A:344:ASP:OD2	2.01	0.60
1:A:150:PHE:CD1	1:B:147:ILE:HD11	2.36	0.60
1:A:57:HIS:CD2	1:A:58:LEU:CD1	2.84	0.60
1:A:225:GLY:N	1:A:229:PRO:O	2.31	0.60
1:A:167:LYS:HE2	1:A:347:ILE:HD11	1.85	0.59
1:B:130:ASN:N	1:B:130:ASN:HD22	2.00	0.59
1:B:36:LYS:NZ	1:B:266:ASN:HD21	1.99	0.59
1:A:36:LYS:HZ1	1:A:266:ASN:ND2	2.00	0.58
1:A:297:THR:N	1:A:300:GLN:NE2	2.43	0.58
1:B:347:ILE:HD12	1:B:347:ILE:H	1.69	0.58
1:B:370:TYR:O	1:B:370:TYR:HD1	1.86	0.57
1:B:342:ILE:O	1:B:342:ILE:HG22	2.04	0.57
1:B:57:HIS:H	1:B:57:HIS:CD2	2.20	0.57
1:A:36:LYS:CE	1:A:266:ASN:HD22	2.17	0.57
1:A:182:ARG:HD2	1:A:336:ASP:O	2.05	0.57
1:A:227:ASP:OD2	1:A:375:TYR:CE1	2.57	0.57
1:B:234:PRO:HD2	1:B:239:CYS:SG	2.45	0.57
1:A:55:ILE:CB	1:A:58:LEU:HD13	2.30	0.57
1:A:299:ARG:NH2	1:A:324:ASP:OD1	2.38	0.57
1:A:10:LEU:H	1:A:278:ASN:HD21	1.50	0.56
1:B:168:GLU:OE2	1:B:288:ASN:N	2.31	0.56
1:B:349:ASN:HD21	1:B:355:ASN:HD21	1.52	0.56
1:B:182:ARG:CD	1:B:336:ASP:O	2.53	0.56
1:A:141:GLU:CD	1:A:182:ARG:NH2	2.53	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:35:GLU:O	1:A:39:THR:HG23	2.06	0.55
1:A:281:ARG:HH11	1:A:281:ARG:HG2	1.71	0.55
1:B:41:THR:HB	1:B:42:PRO:HD2	1.89	0.55
1:B:114:TYR:CE2	1:B:118:ILE:HD12	2.41	0.55
1:A:240:PHE:O	1:A:241:SER:C	2.49	0.54
1:A:57:HIS:HD2	1:A:58:LEU:HD11	1.72	0.54
1:A:182:ARG:CD	1:A:336:ASP:O	2.55	0.54
1:B:121:LEU:HB2	1:B:122:PRO:HD3	1.90	0.53
1:A:57:HIS:CD2	1:A:58:LEU:HD11	2.43	0.53
1:B:370:TYR:CD1	1:B:370:TYR:C	2.86	0.53
1:B:370:TYR:CE1	1:B:374:THR:OG1	2.62	0.53
1:A:216:ILE:CD1	1:A:216:ILE:N	2.72	0.52
1:A:141:GLU:HG3	1:A:341:ARG:NH2	2.25	0.52
1:A:35:GLU:OE1	1:A:219:ARG:NH1	2.42	0.52
1:A:55:ILE:CB	1:A:58:LEU:HD11	2.37	0.52
1:B:141:GLU:CG	1:B:341:ARG:NH2	2.73	0.51
1:A:223:ILE:N	1:A:227:ASP:OD1	2.43	0.51
1:B:370:TYR:HE1	1:B:374:THR:OG1	1.92	0.51
1:B:281:ARG:HG2	1:B:281:ARG:NH1	2.20	0.51
1:A:60:GLU:O	1:A:63:THR:O	2.28	0.51
1:A:297:THR:N	1:A:300:GLN:HE21	2.07	0.50
1:A:60:GLU:N	1:A:61:PRO:HD2	2.25	0.50
1:A:102:PRO:HA	1:A:105:TYR:CE2	2.47	0.50
1:B:182:ARG:HG2	1:B:182:ARG:HH21	1.76	0.50
1:B:253:VAL:HG22	1:B:330:PHE:CD2	2.37	0.50
1:B:264:TYR:CD1	1:B:363:LEU:HB2	2.47	0.50
1:A:41:THR:HG21	1:A:273:LEU:HD11	1.94	0.50
1:A:146:THR:O	1:A:147:ILE:C	2.55	0.49
1:A:206:GLU:HG2	1:A:283:ASN:ND2	2.27	0.49
1:B:182:ARG:NH1	3:B:402:UGA:O2B	2.45	0.49
1:A:206:GLU:HG2	1:A:283:ASN:HD22	1.76	0.49
1:A:114:TYR:CE2	1:A:118:ILE:HD12	2.48	0.49
1:A:370:TYR:CD1	1:A:370:TYR:C	2.91	0.49
1:B:262:PHE:CZ	1:B:301:LEU:HD22	2.47	0.49
1:B:57:HIS:CD2	1:B:57:HIS:N	2.81	0.48
1:B:220:MET:HE2	1:B:237:LEU:HB3	1.95	0.48
1:B:36:LYS:CE	1:B:266:ASN:HD22	2.26	0.48
1:A:225:GLY:C	1:A:226:ILE:HD13	2.38	0.48
1:B:218:PRO:HB3	1:B:370:TYR:CE2	2.48	0.48
1:B:299:ARG:NH2	1:B:324:ASP:OD1	2.46	0.48
1:A:121:LEU:HB2	1:A:122:PRO:HD3	1.94	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:147:ILE:HD11	1:B:150:PHE:CD1	2.48	0.48
1:A:247:ARG:NH2	1:A:317:ALA:O	2.47	0.47
1:A:161:PRO:HA	1:A:164:TYR:CZ	2.49	0.47
1:B:102:PRO:HA	1:B:105:TYR:CE2	2.50	0.47
1:B:347:ILE:HD12	1:B:347:ILE:N	2.29	0.47
1:A:147:ILE:CG2	1:A:148:GLY:N	2.78	0.47
1:A:182:ARG:HG2	1:A:182:ARG:HH21	1.80	0.47
1:B:344:ASP:C	1:B:345:MET:HG2	2.40	0.47
1:A:347:ILE:HD12	1:A:347:ILE:H	1.80	0.46
1:A:36:LYS:CE	1:A:266:ASN:ND2	2.77	0.46
1:B:312:VAL:HG13	1:B:369:THR:HG22	1.97	0.46
1:A:227:ASP:OD2	1:A:375:TYR:HE1	1.98	0.46
1:B:274:LEU:O	1:B:278:ASN:HB2	2.15	0.46
1:A:229:PRO:HG2	1:A:232:GLY:HA3	1.97	0.46
1:B:35:GLU:O	1:B:39:THR:HG23	2.16	0.46
1:B:38:LEU:HA	1:B:69:ARG:NH2	2.30	0.46
1:A:161:PRO:HA	1:A:164:TYR:CE2	2.51	0.46
1:A:218:PRO:CB	1:A:370:TYR:HE2	2.23	0.46
1:B:121:LEU:N	1:B:122:PRO:CD	2.78	0.46
1:B:189:LYS:O	1:B:192:ILE:HG22	2.16	0.46
1:A:36:LYS:HZ3	1:A:266:ASN:HD21	1.62	0.46
1:B:41:THR:HG21	1:B:273:LEU:HD11	1.98	0.46
1:A:189:LYS:O	1:A:192:ILE:HG22	2.16	0.45
1:A:222:PHE:CD1	1:A:228:GLY:HA3	2.51	0.45
1:A:264:TYR:CD1	1:A:363:LEU:HB2	2.52	0.45
1:A:296:VAL:HB	1:A:300:GLN:HE21	1.82	0.45
1:A:190:GLN:HE22	1:B:175:PHE:HD2	1.64	0.45
1:B:261:THR:O	1:B:261:THR:OG1	2.28	0.45
1:B:207:PHE:CD2	1:B:207:PHE:C	2.94	0.44
1:B:114:TYR:CD2	1:B:118:ILE:HD12	2.53	0.44
1:B:36:LYS:HZ3	1:B:266:ASN:HD21	1.61	0.44
1:A:41:THR:HB	1:A:42:PRO:HD2	2.00	0.44
1:B:291:ASN:HA	1:B:356:PRO:HG3	2.00	0.44
1:A:60:GLU:C	1:A:63:THR:O	2.61	0.44
1:B:114:TYR:HA	1:B:118:ILE:HG13	1.99	0.44
1:A:143:TYR:CZ	1:A:211:ARG:NH1	2.86	0.43
1:A:335:TYR:OH	3:A:402:UGA:O3D	2.34	0.43
1:B:253:VAL:HG23	3:B:402:UGA:C2	2.48	0.43
1:A:176:GLY:H	1:A:183:TRP:NE1	2.16	0.43
1:B:345:MET:HA	1:B:348:ILE:HG22	2.00	0.43
1:A:115:SER:HA	1:A:119:ASP:OD2	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:111:ASP:OD1	1:A:111:ASP:N	2.48	0.43
1:B:141:GLU:O	1:B:142:VAL:C	2.59	0.43
1:B:349:ASN:HD21	1:B:355:ASN:ND2	2.15	0.43
1:B:36:LYS:HZ1	1:B:266:ASN:ND2	2.14	0.42
1:B:60:GLU:OE2	1:B:60:GLU:HA	2.19	0.42
1:B:344:ASP:O	1:B:345:MET:CB	2.64	0.42
1:A:227:ASP:OD2	1:A:375:TYR:CZ	2.73	0.42
1:B:147:ILE:CG2	1:B:148:GLY:N	2.81	0.42
1:A:227:ASP:OD2	1:A:375:TYR:OH	2.32	0.42
1:B:253:VAL:CG2	1:B:330:PHE:CD2	2.97	0.42
1:A:296:VAL:HB	1:A:300:GLN:HB2	2.00	0.42
1:B:130:ASN:N	1:B:130:ASN:ND2	2.67	0.42
1:A:220:MET:HE2	1:A:237:LEU:HB3	2.01	0.42
1:A:144:GLY:O	1:A:338:SER:OG	2.34	0.42
1:B:36:LYS:CE	1:B:266:ASN:ND2	2.83	0.42
1:A:55:ILE:C	1:A:58:LEU:HD11	2.11	0.41
1:A:215:TRP:CZ2	1:A:289:VAL:HG11	2.55	0.41
1:A:226:ILE:HB	1:A:227:ASP:H	1.62	0.41
1:B:218:PRO:HB3	1:B:370:TYR:CD2	2.55	0.41
1:A:141:GLU:CG	1:A:341:ARG:NH2	2.83	0.41
1:B:143:TYR:CD1	1:B:166:LEU:HB3	2.55	0.41
1:A:168:GLU:OE2	1:A:288:ASN:N	2.39	0.41
1:A:347:ILE:HD12	1:A:347:ILE:N	2.35	0.41
1:A:349:ASN:HD21	1:A:355:ASN:HD21	1.67	0.41
1:B:57:HIS:H	1:B:57:HIS:HD2	1.66	0.41
1:B:111:ASP:OD1	1:B:111:ASP:N	2.54	0.41
1:B:296:VAL:HB	1:B:300:GLN:HB2	2.02	0.41
1:B:32:HIS:CE1	1:B:218:PRO:HB2	2.56	0.41
1:B:370:TYR:HE1	1:B:374:THR:HG1	1.57	0.41
1:B:81:SER:O	1:B:83:LEU:N	2.54	0.40
1:B:214:ASN:HA	3:B:402:UGA:O'P	2.21	0.40
1:A:104:ASP:HA	1:A:107:THR:OG1	2.21	0.40
1:A:194:ARG:NH2	1:B:176:GLY:O	2.53	0.40
1:A:9:ASP:HB2	1:A:278:ASN:HD21	1.85	0.40
1:B:8:VAL:HG23	1:B:13:LYS:O	2.21	0.40
1:B:360:LEU:O	1:B:363:LEU:HG	2.22	0.40
1:B:363:LEU:HD12	1:B:363:LEU:C	2.47	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

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	373/389 (96%)	340 (91%)	27 (7%)	6 (2%)	7	36
1	B	363/389 (93%)	331 (91%)	28 (8%)	4 (1%)	11	42
All	All	736/778 (95%)	671 (91%)	55 (8%)	10 (1%)	9	38

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	236	VAL
1	A	147	ILE
1	B	82	ARG
1	A	82	ARG
1	A	162	ALA
1	A	226	ILE
1	B	218	PRO
1	A	234	PRO
1	B	234	PRO
1	B	162	ALA

### 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	306/337 (91%)	279 (91%)	27 (9%)	9	33
1	B	301/337 (89%)	277 (92%)	24 (8%)	11	36
All	All	607/674 (90%)	556 (92%)	51 (8%)	10	34

All (51) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	15	ILE
1	A	16	GLN
1	A	58	LEU
1	A	63	THR
1	A	71	GLN
1	A	75	ILE
1	A	79	HIS
1	A	93	ILE
1	A	111	ASP
1	A	118	ILE
1	A	128	SER
1	A	130	ASN
1	A	147	ILE
1	A	168	GLU
1	A	216	ILE
1	A	219	ARG
1	A	226	ILE
1	A	227	ASP
1	A	230	SER
1	A	248	GLU
1	A	258	SER
1	A	280	GLU
1	A	318	ILE
1	A	333	GLU
1	A	338	SER
1	A	342	ILE
1	A	345	MET
1	B	15	ILE
1	B	57	HIS
1	B	71	GLN
1	B	75	ILE
1	B	79	HIS
1	B	88	LYS
1	B	93	ILE
1	B	111	ASP
1	B	118	ILE
1	B	128	SER
1	B	130	ASN
1	B	147	ILE
1	B	168	GLU
1	B	218	PRO
1	B	226	ILE

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Mol	Chain	Res	Type
1	B	248	GLU
1	B	258	SER
1	B	281	ARG
1	B	318	ILE
1	B	333	GLU
1	B	338	SER
1	B	342	ILE
1	B	344	ASP
1	B	349	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (30) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	57	HIS
1	A	71	GLN
1	A	73	HIS
1	A	130	ASN
1	A	136	HIS
1	A	190	GLN
1	A	203	ASN
1	A	242	ASN
1	A	243	ASN
1	A	259	GLN
1	A	266	ASN
1	A	278	ASN
1	A	285	HIS
1	A	294	ASN
1	A	300	GLN
1	A	349	ASN
1	A	372	HIS
1	B	71	GLN
1	B	73	HIS
1	B	79	HIS
1	B	190	GLN
1	B	203	ASN
1	B	242	ASN
1	B	243	ASN
1	B	266	ASN
1	B	285	HIS
1	B	288	ASN
1	B	294	ASN
1	B	355	ASN

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Mol	Chain	Res	Type
1	B	372	HIS

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

4 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	NAD	A	401	-	38,38,48	1.59	8 (21%)	53,58,73	2.43	19 (35%)
2	NAD	B	401	-	38,38,48	1.71	10 (26%)	53,58,73	2.61	19 (35%)
3	UGA	A	402	-	38,39,39	1.59	7 (18%)	56,60,60	2.00	13 (23%)
3	UGA	B	402	-	38,39,39	1.34	6 (15%)	56,60,60	1.97	14 (25%)

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	NAD	A	401	-	-	5/22/51/62	0/4/4/5
2	NAD	B	401	-	-	3/22/51/62	0/4/4/5
3	UGA	A	402	-	-	3/25/61/61	0/3/3/3
3	UGA	B	402	-	-	5/25/61/61	0/3/3/3

All (31) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	401	NAD	PA-O3	4.32	1.64	1.59
2	A	401	NAD	PN-O3	4.21	1.64	1.59
2	B	401	NAD	PN-O3	4.20	1.64	1.59
3	A	402	UGA	PA-O3A	4.15	1.64	1.59
3	A	402	UGA	PB-O3A	3.95	1.63	1.59
2	A	401	NAD	C1D-C2D	3.71	1.58	1.51
2	A	401	NAD	PA-O3	3.62	1.63	1.59
2	A	401	NAD	C5A-C4A	3.42	1.45	1.39
2	B	401	NAD	C4A-N9A	-3.40	1.30	1.37
2	B	401	NAD	C5A-N7A	-3.34	1.33	1.39
3	A	402	UGA	C4-N3	-3.32	1.32	1.38
2	B	401	NAD	C1D-C2D	3.19	1.57	1.51
3	A	402	UGA	C2-N1	2.99	1.43	1.38
3	B	402	UGA	C2-N1	2.97	1.43	1.38
2	B	401	NAD	C5A-C4A	2.92	1.44	1.39
2	A	401	NAD	C4A-N9A	-2.82	1.31	1.37
3	B	402	UGA	PA-O3A	2.61	1.62	1.59
3	B	402	UGA	PB-O3A	2.54	1.62	1.59
2	A	401	NAD	C8A-N7A	2.53	1.36	1.31
3	B	402	UGA	C6-C5	2.47	1.40	1.35
2	B	401	NAD	C8A-N9A	-2.45	1.33	1.37
3	A	402	UGA	C6-C5	2.43	1.40	1.35
3	A	402	UGA	C5'-C6'	-2.32	1.48	1.53
3	B	402	UGA	C4-N3	-2.28	1.34	1.38
2	B	401	NAD	C5A-C6A	2.22	1.47	1.41
2	A	401	NAD	C5A-N7A	-2.18	1.35	1.39
3	B	402	UGA	C5'-C6'	-2.17	1.48	1.53
2	B	401	NAD	C2D-C3D	-2.13	1.50	1.53
3	A	402	UGA	C2-N3	-2.10	1.34	1.38
2	A	401	NAD	C5A-C6A	2.06	1.46	1.41
2	B	401	NAD	C8A-N7A	2.05	1.35	1.31

All (65) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	401	NAD	O4D-C4D-C3D	8.64	112.61	104.63
2	A	401	NAD	O4D-C4D-C3D	7.32	111.39	104.63
3	A	402	UGA	N3-C2-N1	7.07	124.09	114.89
2	B	401	NAD	C5A-C4A-N3A	-6.41	117.89	126.72
3	B	402	UGA	N3-C2-N1	6.00	122.71	114.89
3	A	402	UGA	C6-N1-C2	-5.34	114.50	121.00
2	B	401	NAD	O2D-C2D-C3D	-5.17	101.25	111.43
2	B	401	NAD	C1D-C2D-C3D	5.08	109.76	101.63
2	A	401	NAD	N3A-C2A-N1A	-4.89	121.18	128.58
2	B	401	NAD	C4A-C5A-N7A	-4.61	105.31	110.58
2	A	401	NAD	O2D-C2D-C1D	4.45	124.75	110.89
3	A	402	UGA	C4-N3-C2	-4.33	121.24	126.61
3	B	402	UGA	C1'-C2'-C3'	4.27	119.00	110.01
2	B	401	NAD	C2A-N3A-C4A	4.21	122.12	111.83
2	A	401	NAD	C4A-N9A-C8A	4.04	109.98	105.74
3	A	402	UGA	O2-C2-N3	-4.03	114.05	121.49
3	B	402	UGA	C6-N1-C2	-4.00	116.13	121.00
3	B	402	UGA	O2B-PB-O3A	-3.99	96.48	107.27
3	B	402	UGA	O2-C2-N3	-3.98	114.15	121.49
3	B	402	UGA	C4-N3-C2	-3.97	121.68	126.61
2	A	401	NAD	C2A-N3A-C4A	3.97	121.52	111.83
2	B	401	NAD	N3A-C4A-N9A	3.93	133.85	127.17
2	A	401	NAD	O4B-C1B-N9A	3.89	115.56	108.09
2	A	401	NAD	C5A-C4A-N3A	-3.85	121.42	126.72
2	A	401	NAD	C1D-C2D-C3D	3.80	107.71	101.63
2	B	401	NAD	O2N-PN-O1N	3.56	128.98	112.44
2	A	401	NAD	C6A-C5A-N7A	3.51	138.87	132.09
2	A	401	NAD	O2D-C2D-C3D	-3.48	104.57	111.43
2	A	401	NAD	C4A-N9A-C1B	-3.48	118.50	126.63
2	B	401	NAD	N3A-C2A-N1A	-3.42	123.41	128.58
2	A	401	NAD	C5D-C4D-C3D	-3.39	103.03	115.21
2	A	401	NAD	N3A-C4A-N9A	3.37	132.89	127.17
2	B	401	NAD	O4B-C1B-N9A	3.32	114.46	108.09
3	A	402	UGA	C1D-N1-C2	3.29	123.50	117.59
3	A	402	UGA	C1'-C2'-C3'	3.25	116.85	110.01
2	B	401	NAD	C5D-C4D-C3D	-3.19	103.73	115.21
3	B	402	UGA	C2D-C3D-C4D	-3.15	96.53	102.61
2	A	401	NAD	N9A-C8A-N7A	-3.11	109.52	113.94
3	B	402	UGA	O2'-C2'-C3'	-3.06	103.17	110.38
2	B	401	NAD	C5A-N7A-C8A	3.05	108.24	103.45
3	A	402	UGA	O2A-PA-O3A	3.05	115.51	107.27
2	A	401	NAD	C6A-C5A-C4A	-3.01	113.06	117.18
2	B	401	NAD	O2D-C2D-C1D	2.95	120.07	110.89

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	401	NAD	O2N-PN-O3	-2.93	99.35	107.27
2	B	401	NAD	C6A-C5A-N7A	2.93	137.74	132.09
3	B	402	UGA	C3'-C4'-C5'	-2.89	104.34	109.30
3	B	402	UGA	O3'-C3'-C4'	-2.78	103.82	110.38
2	B	401	NAD	N9A-C8A-N7A	-2.75	110.04	113.94
3	B	402	UGA	O4'-C4'-C5'	2.67	115.86	109.76
3	A	402	UGA	C1'-O5'-C5'	2.65	116.58	112.23
3	A	402	UGA	O2D-C2D-C3D	-2.55	103.64	111.82
3	B	402	UGA	C1'-O5'-C5'	2.44	116.23	112.23
3	A	402	UGA	O3'-C3'-C4'	-2.43	104.65	110.38
2	B	401	NAD	O2A-PA-O5B	2.42	118.53	107.57
2	A	401	NAD	C2B-C3B-C4B	2.37	107.18	102.61
3	B	402	UGA	O3D-C3D-C2D	2.33	119.30	111.82
3	A	402	UGA	C2D-C1D-N1	2.31	119.69	113.25
2	B	401	NAD	C4A-N9A-C8A	2.30	108.15	105.74
3	A	402	UGA	C2D-C3D-C4D	-2.29	98.19	102.61
2	A	401	NAD	O2N-PN-O1N	2.27	123.00	112.44
2	B	401	NAD	C5A-C4A-N9A	2.25	108.27	105.81
2	A	401	NAD	C4A-C5A-N7A	-2.20	108.07	110.58
3	A	402	UGA	O5'-C1'-O3B	2.17	114.21	111.36
2	A	401	NAD	C5A-N7A-C8A	2.08	106.72	103.45
3	B	402	UGA	C2D-C1D-N1	2.05	118.95	113.25

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	NAD	C5B-O5B-PA-O1A
3	A	402	UGA	C5D-O5D-PA-O3A
3	A	402	UGA	C5D-O5D-PA-O2A
3	B	402	UGA	C5D-O5D-PA-O3A
3	B	402	UGA	C5D-O5D-PA-O2A
2	B	401	NAD	O4D-C4D-C5D-O5D
2	B	401	NAD	C3D-C4D-C5D-O5D
2	A	401	NAD	O4D-C4D-C5D-O5D
2	A	401	NAD	C3D-C4D-C5D-O5D
3	B	402	UGA	C5D-O5D-PA-O1A
2	B	401	NAD	C4B-C5B-O5B-PA
2	A	401	NAD	C4B-C5B-O5B-PA
3	B	402	UGA	C1'-O3B-PB-O2B
3	A	402	UGA	PA-O3A-PB-O2B
2	A	401	NAD	PA-O3-PN-O1N

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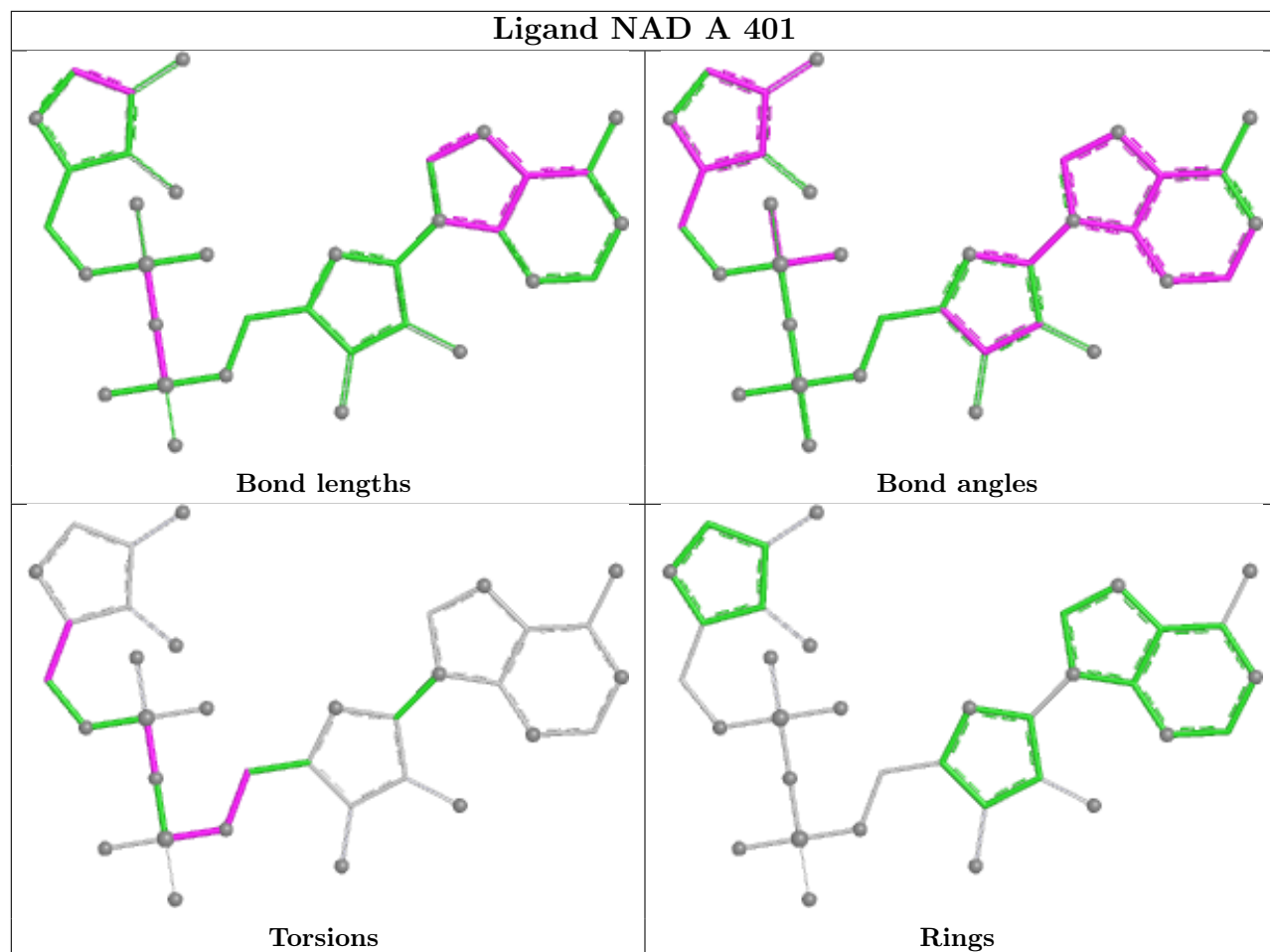
Mol	Chain	Res	Type	Atoms
3	B	402	UGA	PA-O3A-PB-O2B

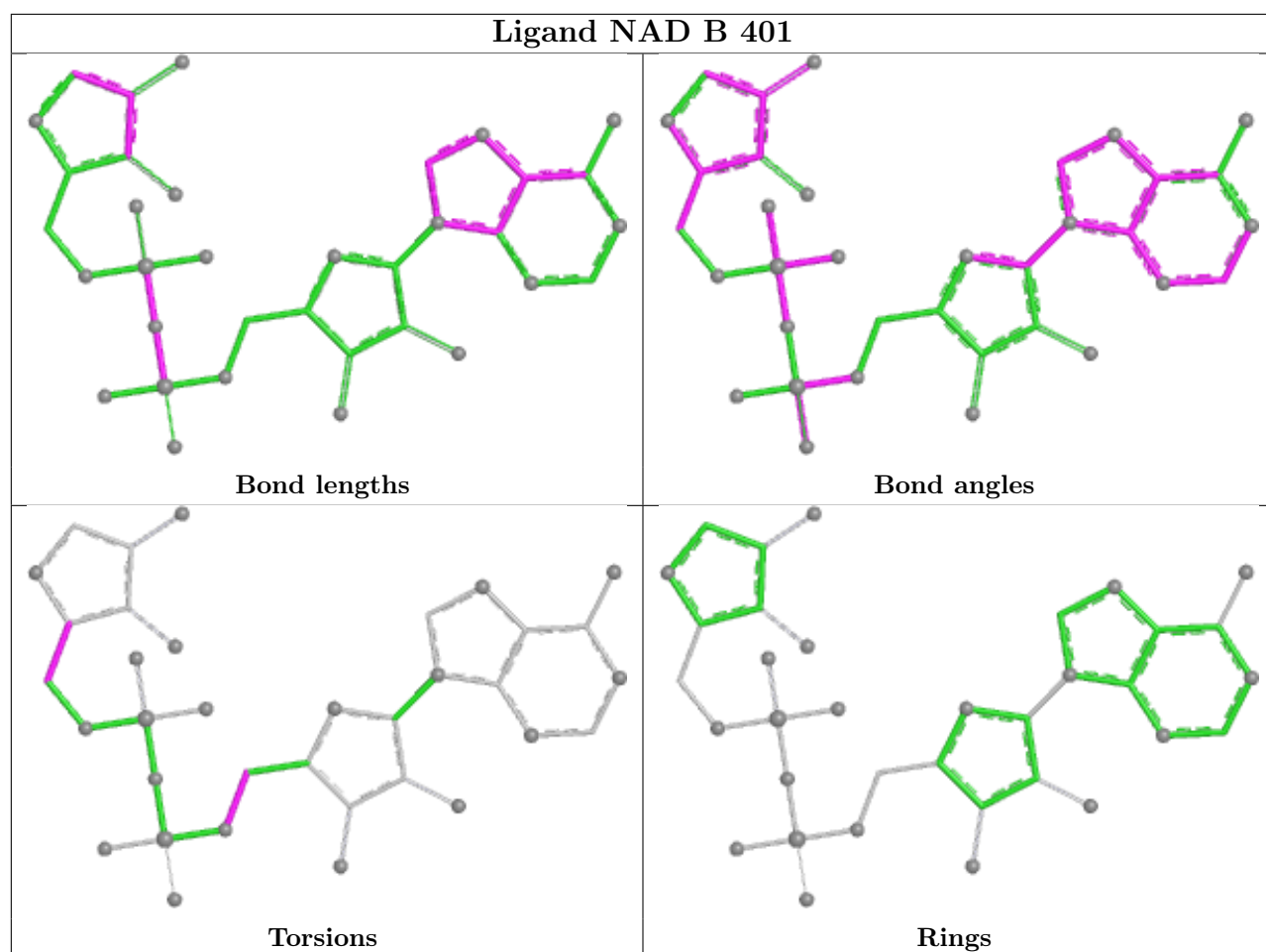
There are no ring outliers.

2 monomers are involved in 4 short contacts:

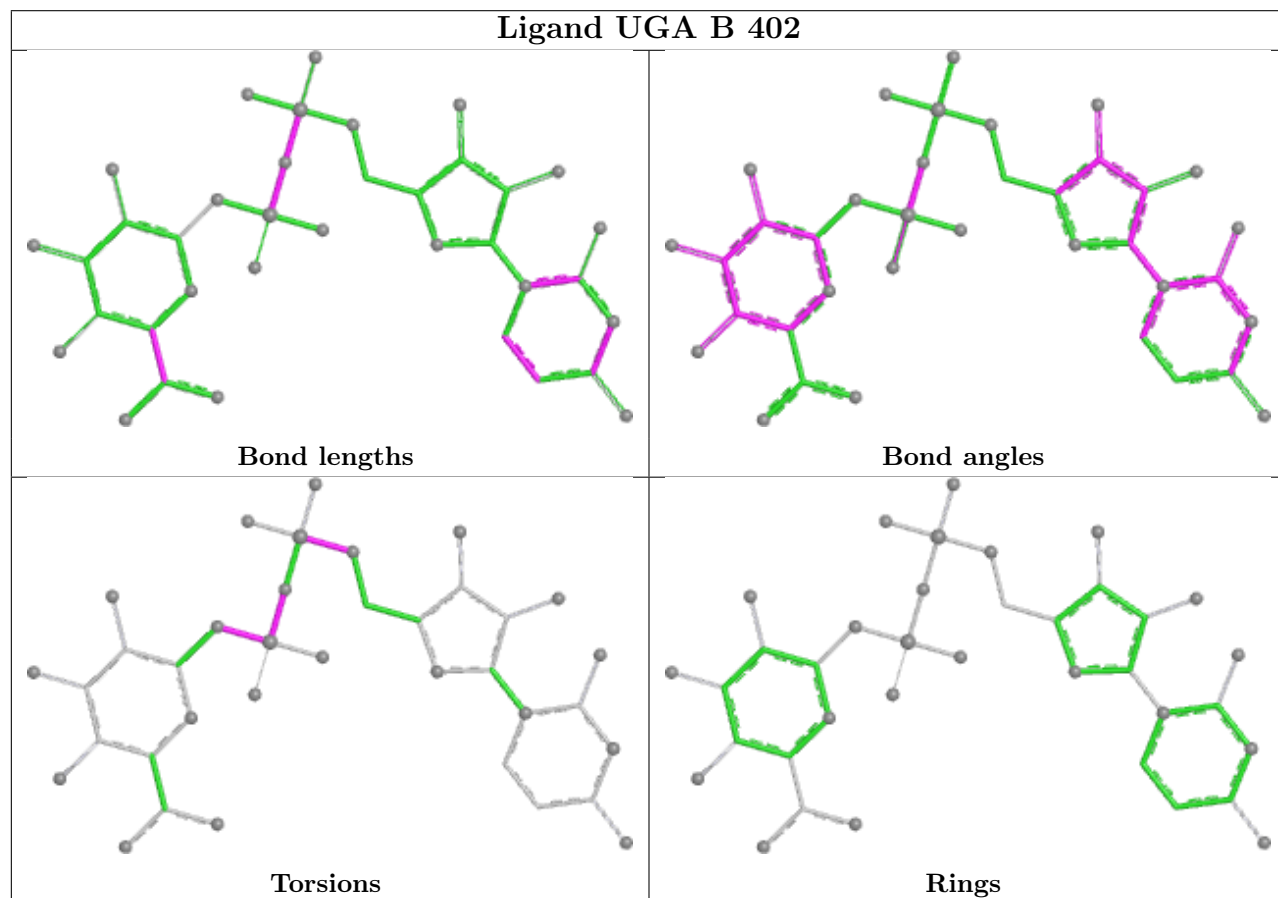
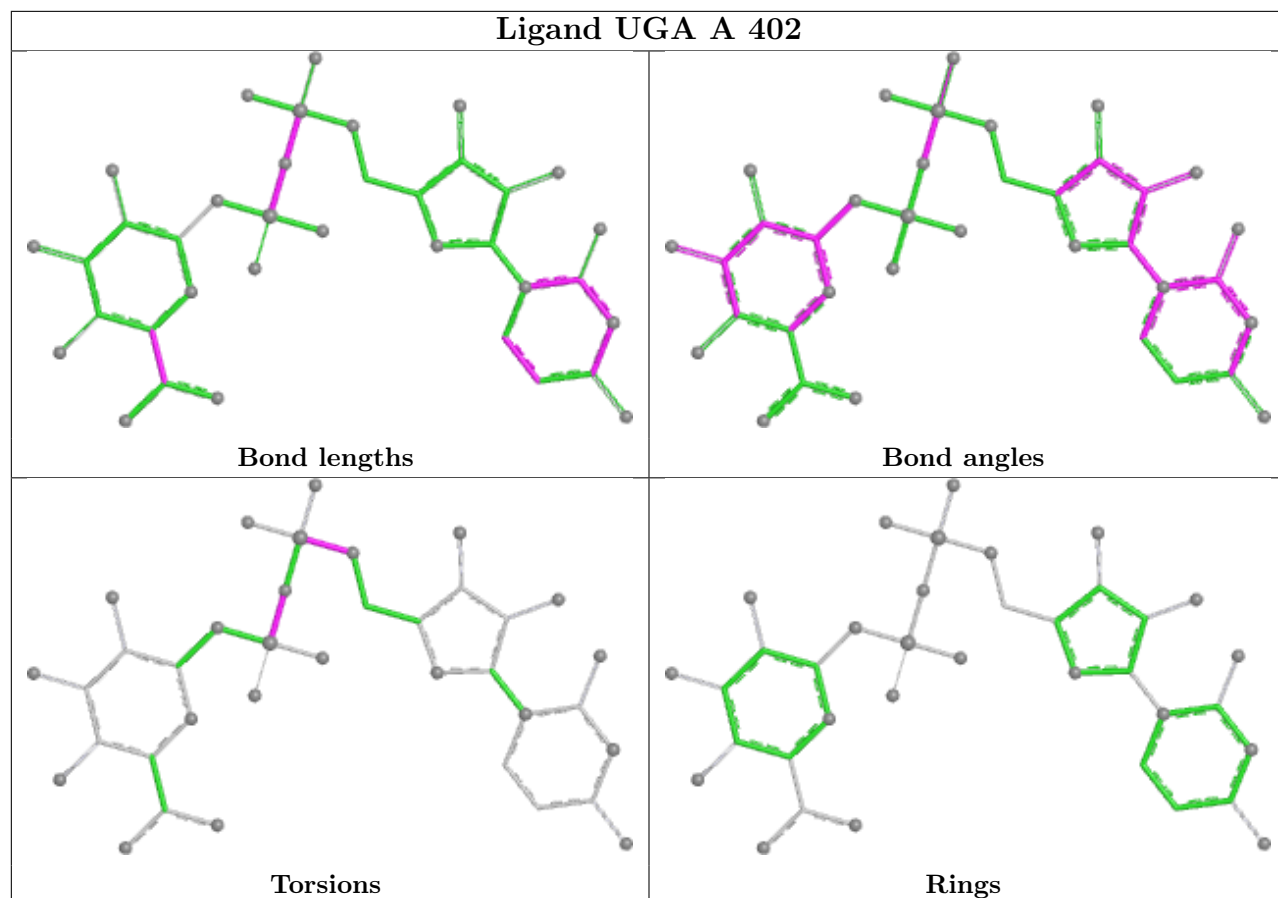
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	402	UGA	1	0
3	B	402	UGA	3	0

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









## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> 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 <sup>2</sup> )	Q < 0.9
1	A	375/389 (96%)	-0.36	2 (0%)	87 69	98, 124, 154, 183	0
1	B	367/389 (94%)	-0.33	2 (0%)	87 69	87, 134, 169, 198	0
All	All	742/778 (95%)	-0.35	4 (0%)	87 69	87, 130, 165, 198	0

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	60	GLU	3.2
1	B	227	ASP	3.0
1	A	227	ASP	2.8
1	B	217	GLY	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, 95<sup>th</sup> 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.

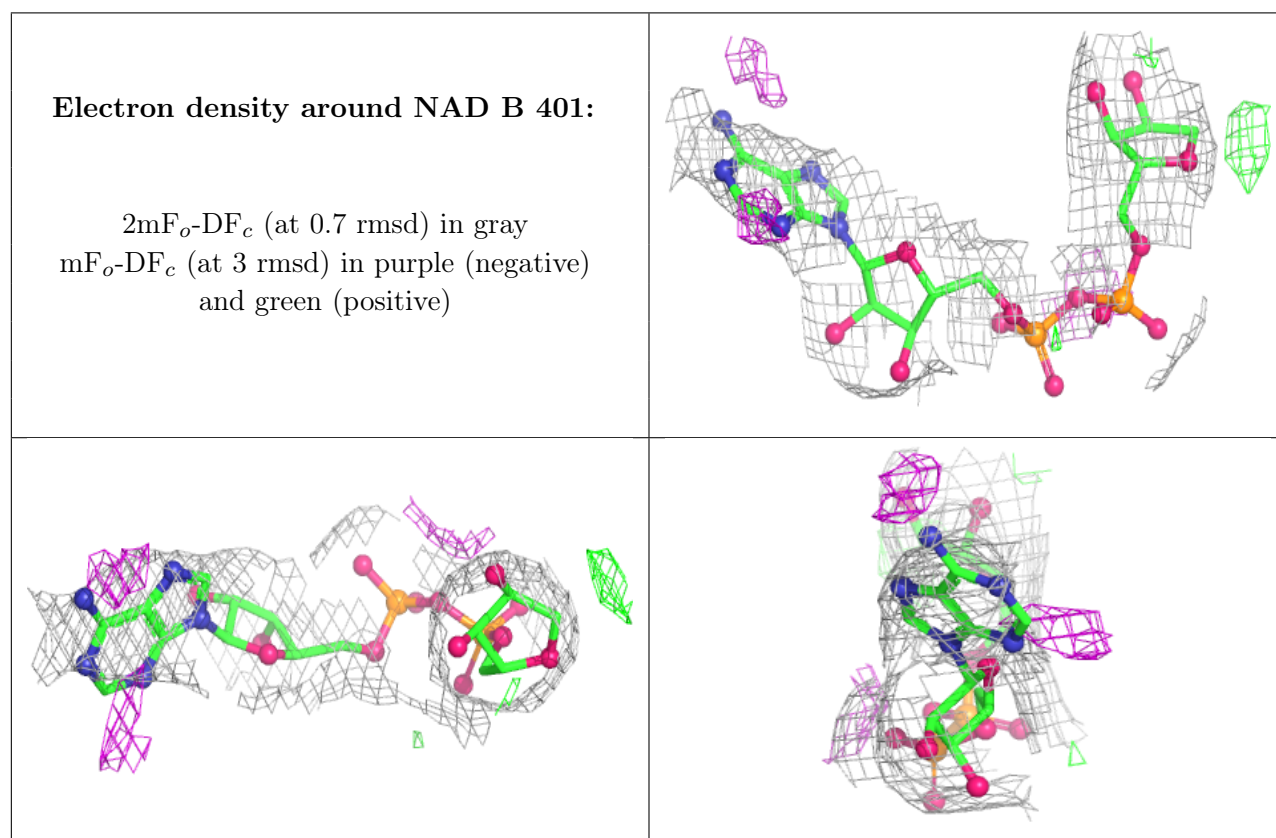
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q < 0.9
2	NAD	B	401	35/44	0.94	0.08	91,134,155,160	0

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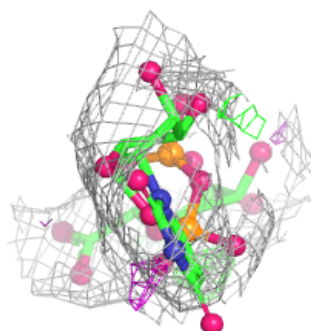
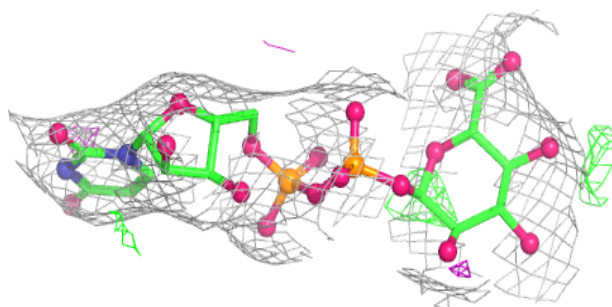
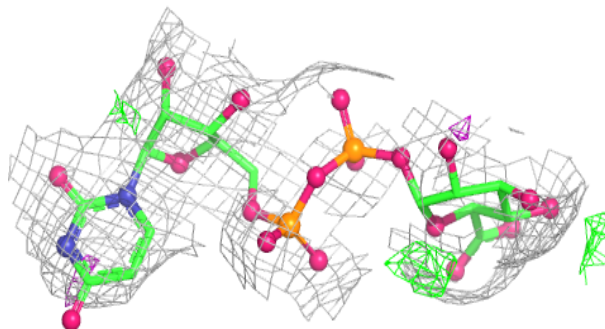
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
3	UGA	B	402	37/37	0.96	0.08	103,116,137,160	0
3	UGA	A	402	37/37	0.97	0.07	117,133,164,196	0
2	NAD	A	401	35/44	0.97	0.06	93,121,137,143	0

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.

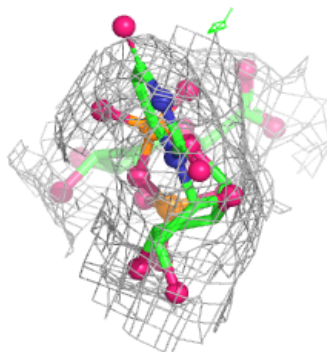
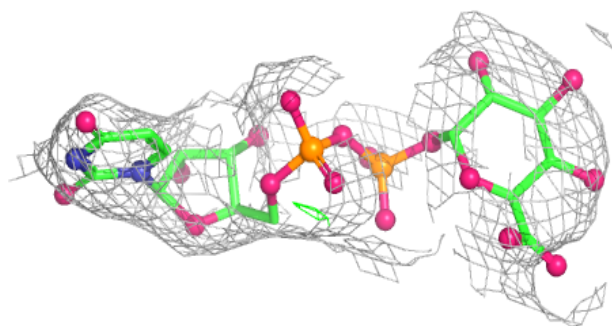
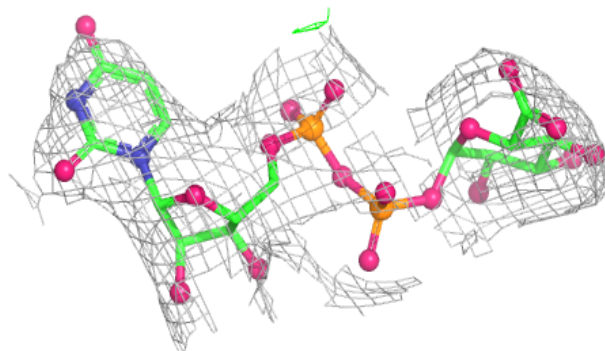


**Electron density around UGA B 402:**

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

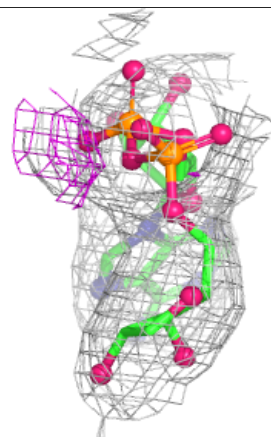
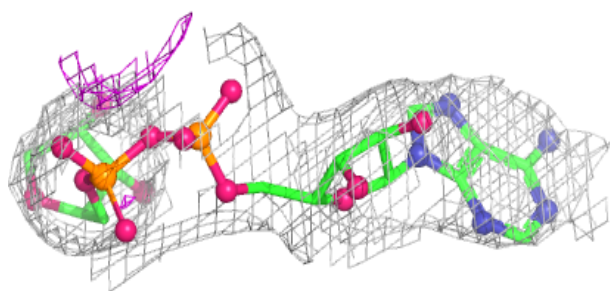
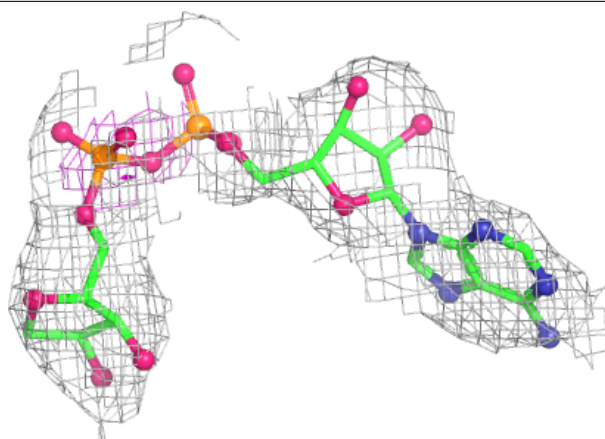
**Electron density around UGA A 402:**

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



**Electron density around NAD A 401:**

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



## 6.5 Other polymers [i](#)

There are no such residues in this entry.