



# Full wwPDB X-ray Structure Validation Report ⓘ

Sep 13, 2023 – 11:23 AM EDT

PDB ID : 4Q3A  
Title : PyID cocrystallized with L-Lysine-Ne-3S-methyl-L-ornithine and NAD+  
Authors : Quitterer, F.; Beck, P.; Bacher, A.; Groll, M.  
Deposited on : 2014-04-11  
Resolution : 2.20 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 : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.35.1  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.35.1

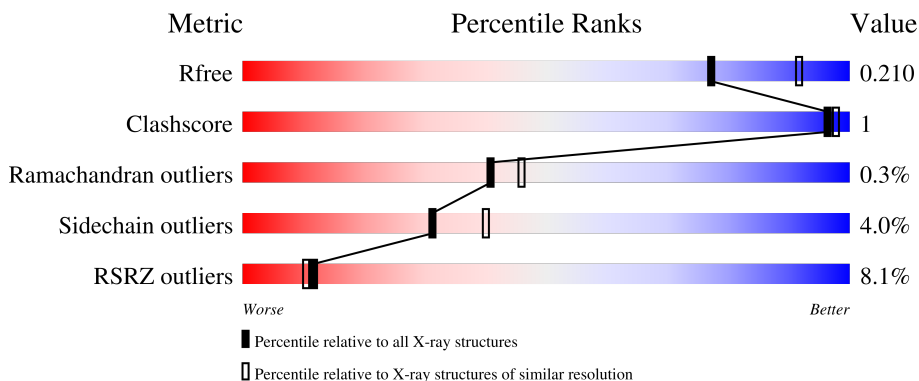
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.20 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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	260	 3% 94% 5%
1	B	260	 3% 94% 5%
1	C	260	 11% 95% 5%
1	D	260	 15% 92% 7%

## 2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 8575 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.

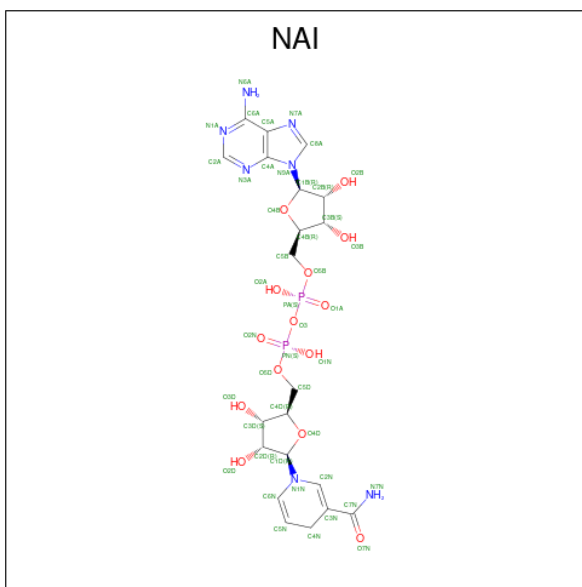
- Molecule 1 is a protein called PYLD, pyrrolysine synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	259	1956	1246	314	385	11	0	0	0
1	B	259	1956	1246	314	385	11	0	0	0
1	C	260	1958	1247	315	385	11	0	0	0
1	D	259	1956	1246	314	385	11	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	SER	-	expression tag	UNP Q46E80
B	0	SER	-	expression tag	UNP Q46E80
C	0	SER	-	expression tag	UNP Q46E80
D	0	SER	-	expression tag	UNP Q46E80

- Molecule 2 is 1,4-DIHYDRONICOTINAMIDE ADENINE DINUCLEOTIDE (three-letter code: NAI) (formula: C<sub>21</sub>H<sub>29</sub>N<sub>7</sub>O<sub>14</sub>P<sub>2</sub>).



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

- Molecule 3 is SODIUM ION (three-letter code: NA) (formula: Na).

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

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

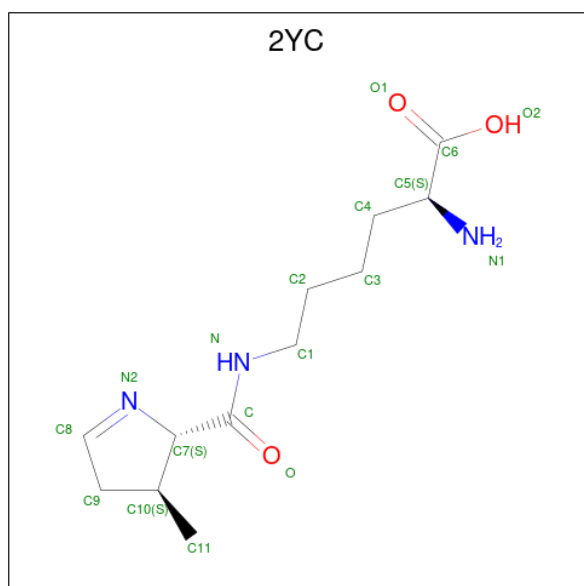
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
4	A	1	1	1	0	0

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

- Molecule 5 is N 6 -{[(2S,3S)-3-methyl-3,4-dihydro-2H-pyrrol-2-yl]carbonyl}-L-lysine (three-letter code: 2YC) (formula: C<sub>12</sub>H<sub>21</sub>N<sub>3</sub>O<sub>3</sub>).



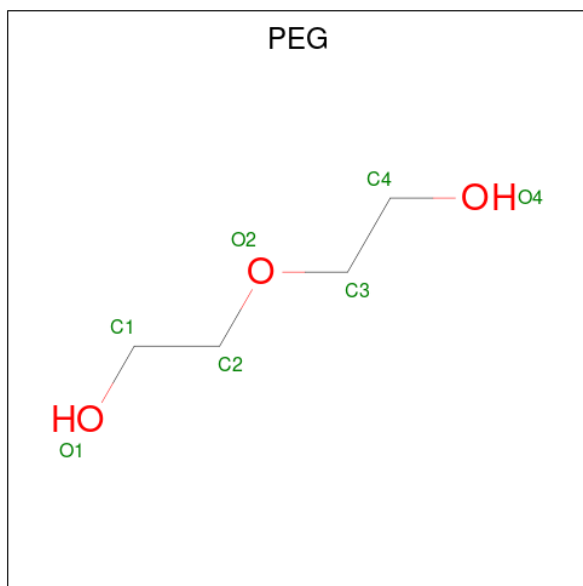
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C N O 18 12 3 3	0	0
5	B	1	Total C N O 18 12 3 3	0	0
5	C	1	Total C N O 18 12 3 3	0	0
5	D	1	Total C N O 18 12 3 3	0	0

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



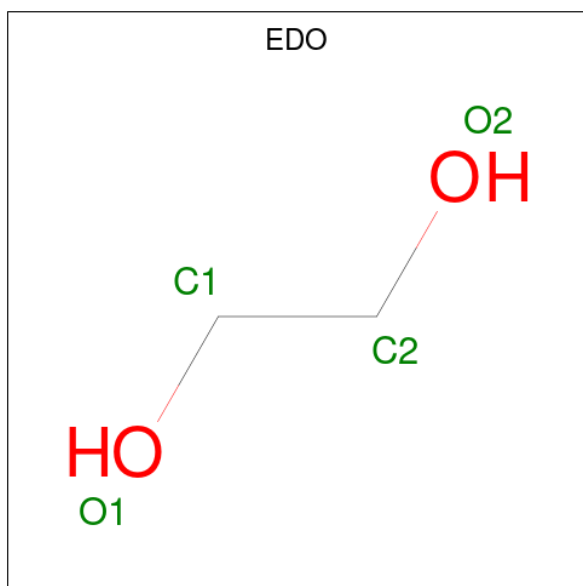
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 6 3 3	0	0
6	A	1	Total C O 6 3 3	0	0
6	A	1	Total C O 6 3 3	0	0
6	A	1	Total C O 6 3 3	0	0
6	A	1	Total C O 6 3 3	0	0
6	A	1	Total C O 6 3 3	0	0
6	A	1	Total C O 6 3 3	0	0
6	A	1	Total C O 6 3 3	0	0
6	B	1	Total C O 6 3 3	0	0
6	B	1	Total C O 6 3 3	0	0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

- Molecule 7 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula:  $C_4H_{10}O_3$ ).



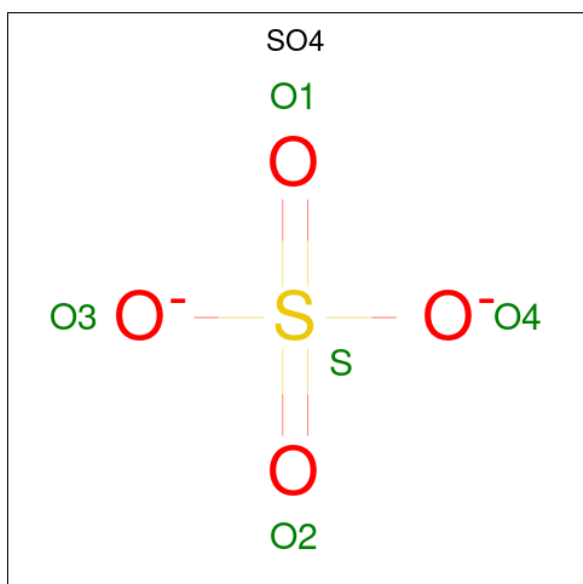
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total C O 7 4 3	0	0
7	B	1	Total C O 7 4 3	0	0
7	B	1	Total C O 7 4 3	0	0

- Molecule 8 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula:  $C_2H_6O_2$ ).



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

- Molecule 9 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).





Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	B	1	Total	O	S	0	0
			5	4	1		
9	B	1	Total	O	S	0	0
			5	4	1		

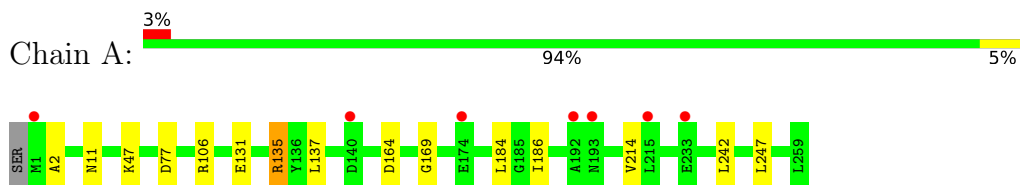
- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	132	Total	O	0	0
			132	132		
10	B	115	Total	O	0	0
			115	115		
10	C	46	Total	O	0	0
			46	46		
10	D	33	Total	O	0	0
			33	33		

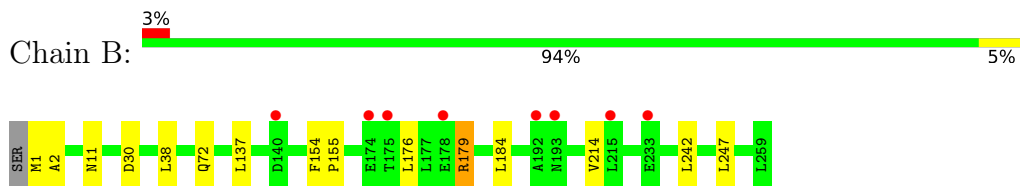
### 3 Residue-property plots [i](#)

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.

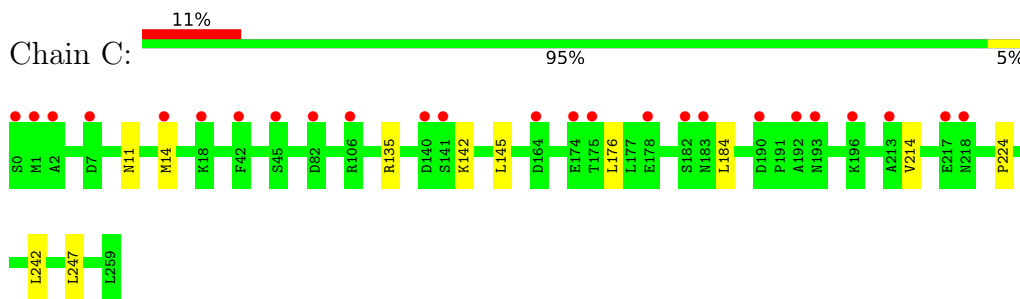
- Molecule 1: PYLD, pyrrolysine synthase



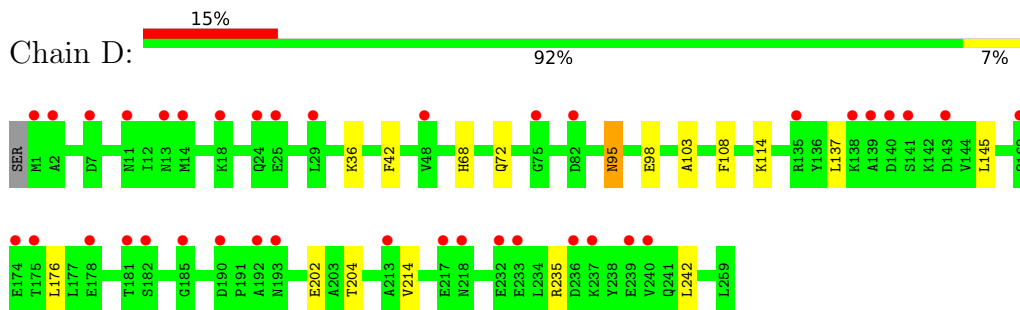
- Molecule 1: PYLD, pyrrolysine synthase



- Molecule 1: PYLD, pyrrolysine synthase



- Molecule 1: PYLD, pyrrolysine synthase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	87.49Å 259.85Å 48.66Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	15.00 – 2.20 14.98 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.6 (15.00-2.20) 99.6 (14.98-2.20)	Depositor EDS
$R_{merge}$	0.08	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.06 (at 2.20Å)	Xtrriage
Refinement program	REFMAC 5.7.0032	Depositor
R, $R_{free}$	0.169 , 0.204 0.178 , 0.210	Depositor DCC
$R_{free}$ test set	2854 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	32.1	Xtrriage
Anisotropy	0.015	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.43 , 57.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	8575	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	43.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.32% 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: MG, GOL, NA, 2YC, NAI, PEG, EDO, SO4

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	0.41	0/1992	0.63	2/2705 (0.1%)
1	B	0.41	0/1992	0.63	1/2705 (0.0%)
1	C	0.32	0/1994	0.54	2/2708 (0.1%)
1	D	0.32	0/1992	0.52	0/2705
All	All	0.37	0/7970	0.58	5/10823 (0.0%)

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	135	ARG	NE-CZ-NH2	6.53	123.57	120.30
1	A	135	ARG	NE-CZ-NH1	-6.22	117.19	120.30
1	C	135	ARG	NE-CZ-NH1	-5.49	117.56	120.30
1	B	30	ASP	CB-CG-OD1	5.32	123.09	118.30
1	C	135	ARG	NE-CZ-NH2	5.16	122.88	120.30

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1956	0	1950	4	0
1	B	1956	0	1950	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	1958	0	1951	1	0
1	D	1956	0	1950	7	0
2	A	44	0	27	0	0
2	B	44	0	27	0	0
2	C	44	0	27	1	0
2	D	44	0	27	1	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	18	0	20	0	0
5	B	18	0	20	0	0
5	C	18	0	20	0	0
5	D	18	0	20	0	0
6	A	42	0	56	0	0
6	B	36	0	48	0	0
6	C	6	0	8	0	0
7	A	7	0	10	0	0
7	B	14	0	20	0	0
8	A	12	0	18	0	0
8	B	28	0	42	1	0
8	C	12	0	18	0	0
9	B	10	0	0	1	0
10	A	132	0	0	1	0
10	B	115	0	0	1	0
10	C	46	0	0	0	0
10	D	33	0	0	0	0
All	All	8575	0	8209	16	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 1.

All (16) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:36:LYS:HE3	1:D:42:PHE:CE1	2.16	0.80
1:B:2:ALA:HB1	10:B:1062:HOH:O	2.04	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2:ALA:HB1	10:A:1045:HOH:O	2.07	0.55
1:D:95:ASN:N	1:D:95:ASN:HD22	2.11	0.48
1:A:169:GLY:HA3	1:A:186:ILE:HD12	1.97	0.46
1:B:179:ARG:NH1	8:B:919:EDO:O2	2.48	0.46
1:B:154:PHE:HB3	1:B:155:PRO:HD3	1.98	0.45
1:D:103:ALA:HB2	1:D:108:PHE:CD1	2.52	0.45
1:D:68:HIS:O	1:D:72:GLN:HG2	2.16	0.44
1:D:202:GLU:OE1	1:D:204:THR:HB	2.17	0.43
1:C:224:PRO:O	2:C:901:NAI:H2N	2.18	0.43
1:D:98:GLU:OE1	1:D:114:LYS:NZ	2.49	0.43
1:B:72:GLN:NE2	9:B:911:SO4:O4	2.51	0.42
1:D:204:THR:HG23	2:D:901:NAI:C8A	2.50	0.42
1:A:131:GLU:OE1	1:A:135:ARG:HD2	2.20	0.41
1:A:47:LYS:HA	1:A:77:ASP:O	2.21	0.41

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	257/260 (99%)	251 (98%)	5 (2%)	1 (0%)	34	37
1	B	257/260 (99%)	249 (97%)	7 (3%)	1 (0%)	34	37
1	C	258/260 (99%)	251 (97%)	6 (2%)	1 (0%)	34	37
1	D	257/260 (99%)	249 (97%)	8 (3%)	0	100	100
All	All	1029/1040 (99%)	1000 (97%)	26 (2%)	3 (0%)	41	46

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	247	LEU

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Mol	Chain	Res	Type
1	B	247	LEU
1	C	247	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	214/215 (100%)	207 (97%)	7 (3%)	38	49
1	B	214/215 (100%)	205 (96%)	9 (4%)	30	38
1	C	214/215 (100%)	205 (96%)	9 (4%)	30	38
1	D	214/215 (100%)	205 (96%)	9 (4%)	30	38
All	All	856/860 (100%)	822 (96%)	34 (4%)	31	40

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	ASN
1	A	106	ARG
1	A	137	LEU
1	A	164	ASP
1	A	184	LEU
1	A	214	VAL
1	A	242	LEU
1	B	1	MET
1	B	11	ASN
1	B	38	LEU
1	B	137	LEU
1	B	176	LEU
1	B	179	ARG
1	B	184	LEU
1	B	214	VAL
1	B	242	LEU
1	C	11	ASN
1	C	14	MET
1	C	142	LYS

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Mol	Chain	Res	Type
1	C	145	LEU
1	C	176	LEU
1	C	184	LEU
1	C	214	VAL
1	C	235	ARG
1	C	242	LEU
1	D	95	ASN
1	D	137	LEU
1	D	145	LEU
1	D	164	ASP
1	D	166	ARG
1	D	176	LEU
1	D	214	VAL
1	D	235	ARG
1	D	242	LEU

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

Mol	Chain	Res	Type
1	A	11	ASN
1	A	122	GLN
1	A	162	GLN
1	A	193	ASN
1	B	11	ASN
1	B	72	GLN
1	B	122	GLN
1	B	162	GLN
1	C	11	ASN
1	C	162	GLN
1	C	208	ASN
1	D	11	ASN
1	D	95	ASN
1	D	162	GLN
1	D	241	GLN

### 5.3.3 RNA

There are no RNA molecules in this entry.



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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 48 ligands modelled in this entry, 8 are monoatomic - leaving 40 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
6	GOL	B	905	-	5,5,5	0.15	0	5,5,5	0.33	0
6	GOL	A	905	-	5,5,5	0.26	0	5,5,5	0.36	0
9	SO4	B	912	-	4,4,4	0.34	0	6,6,6	0.15	0
5	2YC	A	904	-	14,18,18	1.34	1 (7%)	18,23,23	1.06	2 (11%)
8	EDO	B	919	-	3,3,3	0.50	0	2,2,2	0.21	0
2	NAI	A	901	4	42,48,48	1.02	2 (4%)	47,73,73	1.21	5 (10%)
8	EDO	B	915	-	3,3,3	0.51	0	2,2,2	0.14	0
2	NAI	D	901	4	42,48,48	0.99	2 (4%)	47,73,73	1.30	5 (10%)
8	EDO	C	907	-	3,3,3	0.50	0	2,2,2	0.27	0
7	PEG	B	914	-	6,6,6	0.46	0	5,5,5	0.26	0
6	GOL	B	907	-	5,5,5	0.55	0	5,5,5	0.36	0
8	EDO	A	914	-	3,3,3	0.49	0	2,2,2	0.29	0
6	GOL	C	905	-	5,5,5	0.38	0	5,5,5	0.28	0
6	GOL	A	906	-	5,5,5	0.41	0	5,5,5	0.56	0
8	EDO	B	920	-	3,3,3	0.47	0	2,2,2	0.29	0
9	SO4	B	911	-	4,4,4	0.66	0	6,6,6	0.21	0
5	2YC	D	904	-	14,18,18	0.72	0	18,23,23	1.32	3 (16%)
8	EDO	B	917	-	3,3,3	0.49	0	2,2,2	0.13	0
6	GOL	A	907	-	5,5,5	0.27	0	5,5,5	0.25	0
6	GOL	B	908	-	5,5,5	0.25	0	5,5,5	0.43	0
6	GOL	A	908	-	5,5,5	0.11	0	5,5,5	0.36	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
8	EDO	C	908	-	3,3,3	0.44	0	2,2,2	0.36	0
8	EDO	B	918	-	3,3,3	0.37	0	2,2,2	0.50	0
5	2YC	B	904	-	14,18,18	0.70	0	18,23,23	1.02	2 (11%)
8	EDO	A	913	-	3,3,3	0.44	0	2,2,2	0.41	0
8	EDO	C	906	-	3,3,3	0.51	0	2,2,2	0.22	0
6	GOL	B	910	-	5,5,5	0.15	0	5,5,5	0.28	0
6	GOL	B	906	-	5,5,5	0.24	0	5,5,5	0.48	0
6	GOL	A	910	-	5,5,5	0.33	0	5,5,5	0.31	0
2	NAI	B	901	4	42,48,48	1.00	2 (4%)	47,73,73	1.34	7 (14%)
7	PEG	A	912	-	6,6,6	0.49	0	5,5,5	0.13	0
8	EDO	B	921	-	3,3,3	0.42	0	2,2,2	0.38	0
6	GOL	B	909	-	5,5,5	0.42	0	5,5,5	0.44	0
6	GOL	A	911	-	5,5,5	0.33	0	5,5,5	0.28	0
8	EDO	A	915	-	3,3,3	0.42	0	2,2,2	0.30	0
2	NAI	C	901	4	42,48,48	1.00	3 (7%)	47,73,73	1.28	5 (10%)
7	PEG	B	913	-	6,6,6	0.50	0	5,5,5	0.47	0
6	GOL	A	909	-	5,5,5	0.34	0	5,5,5	0.72	0
5	2YC	C	904	-	14,18,18	0.57	0	18,23,23	1.17	2 (11%)
8	EDO	B	916	-	3,3,3	0.42	0	2,2,2	0.41	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
6	GOL	B	905	-	-	2/4/4/4	-
6	GOL	A	905	-	-	0/4/4/4	-
5	2YC	A	904	-	-	0/16/26/26	0/1/1/1
8	EDO	B	919	-	-	1/1/1/1	-
2	NAI	A	901	4	-	4/25/72/72	0/5/5/5
8	EDO	B	915	-	-	1/1/1/1	-
2	NAI	D	901	4	-	5/25/72/72	0/5/5/5
8	EDO	C	907	-	-	1/1/1/1	-
7	PEG	B	914	-	-	4/4/4/4	-
6	GOL	B	907	-	-	2/4/4/4	-
8	EDO	A	914	-	-	1/1/1/1	-
6	GOL	C	905	-	-	0/4/4/4	-
6	GOL	A	906	-	-	1/4/4/4	-
8	EDO	B	920	-	-	0/1/1/1	-
5	2YC	D	904	-	-	0/16/26/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	EDO	B	917	-	-	0/1/1/1	-
6	GOL	A	907	-	-	2/4/4/4	-
6	GOL	B	908	-	-	0/4/4/4	-
6	GOL	A	908	-	-	4/4/4/4	-
8	EDO	C	908	-	-	1/1/1/1	-
8	EDO	B	918	-	-	0/1/1/1	-
5	2YC	B	904	-	-	0/16/26/26	0/1/1/1
8	EDO	A	913	-	-	1/1/1/1	-
8	EDO	C	906	-	-	1/1/1/1	-
6	GOL	B	910	-	-	3/4/4/4	-
6	GOL	B	906	-	-	4/4/4/4	-
6	GOL	A	910	-	-	4/4/4/4	-
2	NAI	B	901	4	-	4/25/72/72	0/5/5/5
7	PEG	A	912	-	-	2/4/4/4	-
8	EDO	B	921	-	-	0/1/1/1	-
6	GOL	B	909	-	-	2/4/4/4	-
6	GOL	A	911	-	-	2/4/4/4	-
8	EDO	A	915	-	-	0/1/1/1	-
2	NAI	C	901	4	-	4/25/72/72	0/5/5/5
7	PEG	B	913	-	-	2/4/4/4	-
6	GOL	A	909	-	-	2/4/4/4	-
5	2YC	C	904	-	-	1/16/26/26	0/1/1/1
8	EDO	B	916	-	-	1/1/1/1	-

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	904	2YC	O1-C6	3.99	1.34	1.22
2	B	901	NAI	C6N-C5N	3.46	1.39	1.33
2	D	901	NAI	C6N-C5N	3.37	1.39	1.33
2	C	901	NAI	C6N-C5N	3.34	1.39	1.33
2	A	901	NAI	C6N-C5N	3.30	1.39	1.33
2	A	901	NAI	C5A-C4A	2.34	1.47	1.40
2	C	901	NAI	C2A-N3A	2.33	1.35	1.32
2	D	901	NAI	C5A-C4A	2.30	1.47	1.40
2	C	901	NAI	C5A-C4A	2.25	1.46	1.40
2	B	901	NAI	C5A-C4A	2.21	1.46	1.40

All (31) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	901	NAI	N3A-C2A-N1A	-4.22	122.08	128.68
2	A	901	NAI	N3A-C2A-N1A	-3.69	122.92	128.68
2	D	901	NAI	N3A-C2A-N1A	-3.68	122.93	128.68
2	C	901	NAI	N3A-C2A-N1A	-3.59	123.07	128.68
2	D	901	NAI	C4A-C5A-N7A	-3.42	105.83	109.40
5	D	904	2YC	C7-C-N	3.35	119.58	115.75
2	B	901	NAI	C1D-N1N-C2N	-3.30	115.62	121.11
2	C	901	NAI	PN-O3-PA	-3.22	121.77	132.83
2	C	901	NAI	C1D-N1N-C2N	-3.19	115.80	121.11
2	D	901	NAI	C1D-N1N-C2N	-3.15	115.87	121.11
2	B	901	NAI	PN-O3-PA	-3.01	122.50	132.83
2	D	901	NAI	PN-O3-PA	-2.90	122.87	132.83
2	C	901	NAI	C4A-C5A-N7A	-2.87	106.41	109.40
2	B	901	NAI	C4A-C5A-N7A	-2.86	106.42	109.40
2	A	901	NAI	PN-O3-PA	-2.84	123.07	132.83
2	B	901	NAI	C1B-N9A-C4A	-2.78	121.76	126.64
5	A	904	2YC	C7-C-N	2.75	118.89	115.75
5	D	904	2YC	O-C-C7	-2.74	117.05	120.30
5	B	904	2YC	C7-C-N	2.68	118.82	115.75
5	C	904	2YC	C7-C-N	2.60	118.72	115.75
5	C	904	2YC	O2-C6-O1	-2.51	118.38	124.09
2	A	901	NAI	C1D-N1N-C2N	-2.47	117.00	121.11
5	A	904	2YC	O2-C6-C5	2.20	120.86	113.38
2	D	901	NAI	C2D-C1D-N1N	2.14	118.67	113.30
5	D	904	2YC	O2-C6-O1	-2.13	119.25	124.09
2	C	901	NAI	C3N-C7N-N7N	2.13	121.45	117.67
2	A	901	NAI	C4A-C5A-N7A	-2.13	107.18	109.40
2	B	901	NAI	C2A-N1A-C6A	2.11	122.36	118.75
2	A	901	NAI	C1B-N9A-C4A	-2.10	122.96	126.64
2	B	901	NAI	O2A-PA-O1A	2.09	122.59	112.24
5	B	904	2YC	O2-C6-O1	-2.07	119.39	124.09

There are no chirality outliers.

All (62) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	907	GOL	C1-C2-C3-O3
6	A	909	GOL	C1-C2-C3-O3
6	A	909	GOL	O2-C2-C3-O3
6	A	910	GOL	C1-C2-C3-O3
6	A	910	GOL	O2-C2-C3-O3
6	B	906	GOL	O1-C1-C2-O2
6	B	906	GOL	C1-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
6	B	907	GOL	C1-C2-C3-O3
6	B	906	GOL	O2-C2-C3-O3
7	A	912	PEG	O2-C3-C4-O4
7	A	912	PEG	O1-C1-C2-O2
7	B	914	PEG	O1-C1-C2-O2
6	A	908	GOL	O1-C1-C2-C3
6	A	908	GOL	C1-C2-C3-O3
6	A	910	GOL	O1-C1-C2-C3
6	B	905	GOL	O1-C1-C2-C3
6	B	906	GOL	O1-C1-C2-C3
6	B	909	GOL	O1-C1-C2-C3
6	B	910	GOL	C1-C2-C3-O3
6	A	908	GOL	O1-C1-C2-O2
6	A	910	GOL	O1-C1-C2-O2
6	B	905	GOL	O1-C1-C2-O2
8	A	913	EDO	O1-C1-C2-O2
8	B	919	EDO	O1-C1-C2-O2
8	C	907	EDO	O1-C1-C2-O2
8	C	908	EDO	O1-C1-C2-O2
6	A	907	GOL	O2-C2-C3-O3
7	B	914	PEG	O2-C3-C4-O4
6	B	907	GOL	O2-C2-C3-O3
2	D	901	NAI	C2D-C1D-N1N-C2N
7	B	913	PEG	C1-C2-O2-C3
6	B	909	GOL	O2-C2-C3-O3
2	D	901	NAI	O4D-C1D-N1N-C2N
8	B	915	EDO	O1-C1-C2-O2
2	A	901	NAI	C2D-C1D-N1N-C2N
7	B	913	PEG	C4-C3-O2-C2
2	A	901	NAI	O4D-C1D-N1N-C2N
2	C	901	NAI	O4D-C1D-N1N-C2N
2	B	901	NAI	C2D-C1D-N1N-C2N
2	B	901	NAI	O4D-C1D-N1N-C2N
6	A	908	GOL	O2-C2-C3-O3
6	B	910	GOL	O2-C2-C3-O3
7	B	914	PEG	C1-C2-O2-C3
2	C	901	NAI	C2D-C1D-N1N-C2N
2	D	901	NAI	C2D-C1D-N1N-C6N
2	D	901	NAI	O4D-C1D-N1N-C6N
8	C	906	EDO	O1-C1-C2-O2
6	B	910	GOL	O1-C1-C2-C3
8	B	916	EDO	O1-C1-C2-O2

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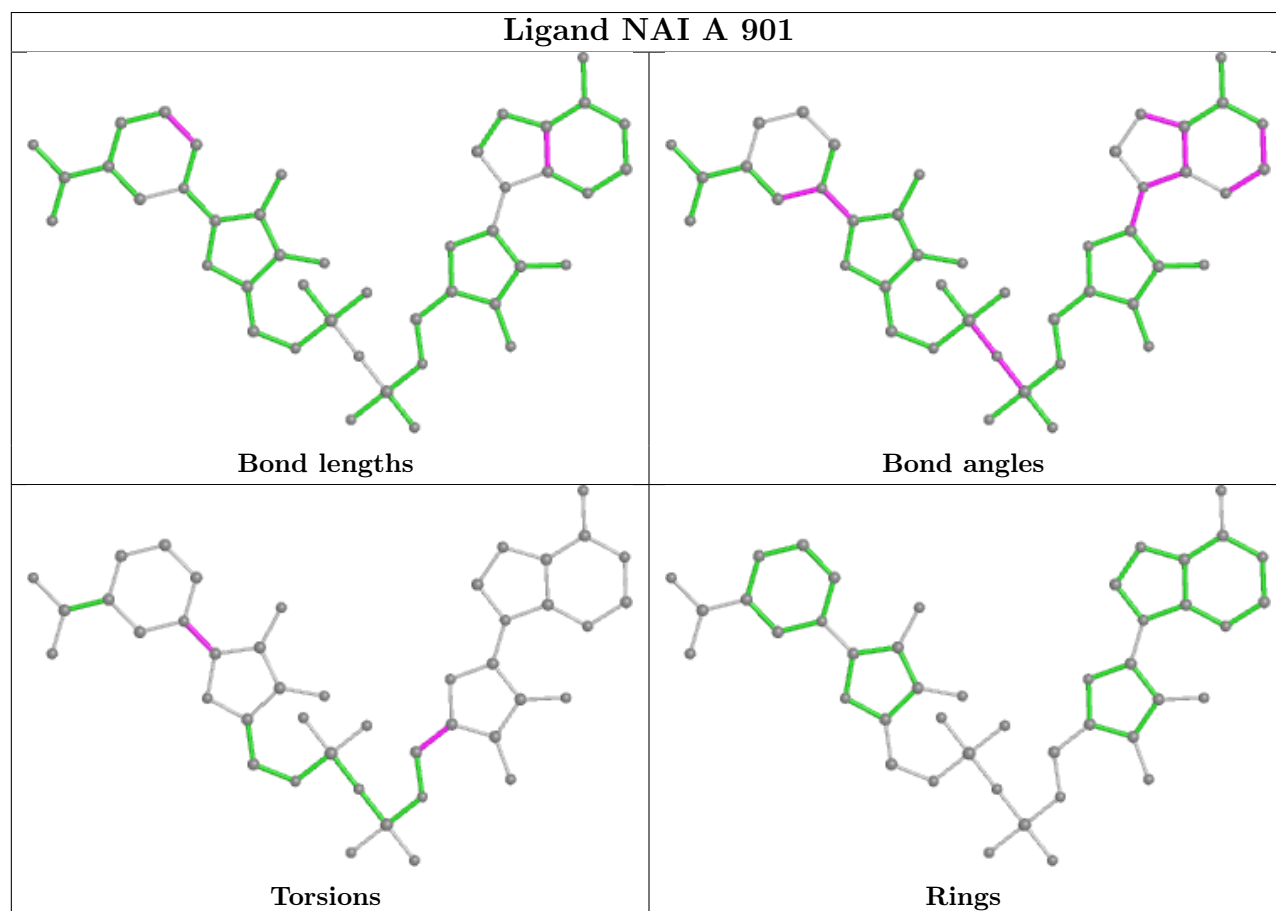
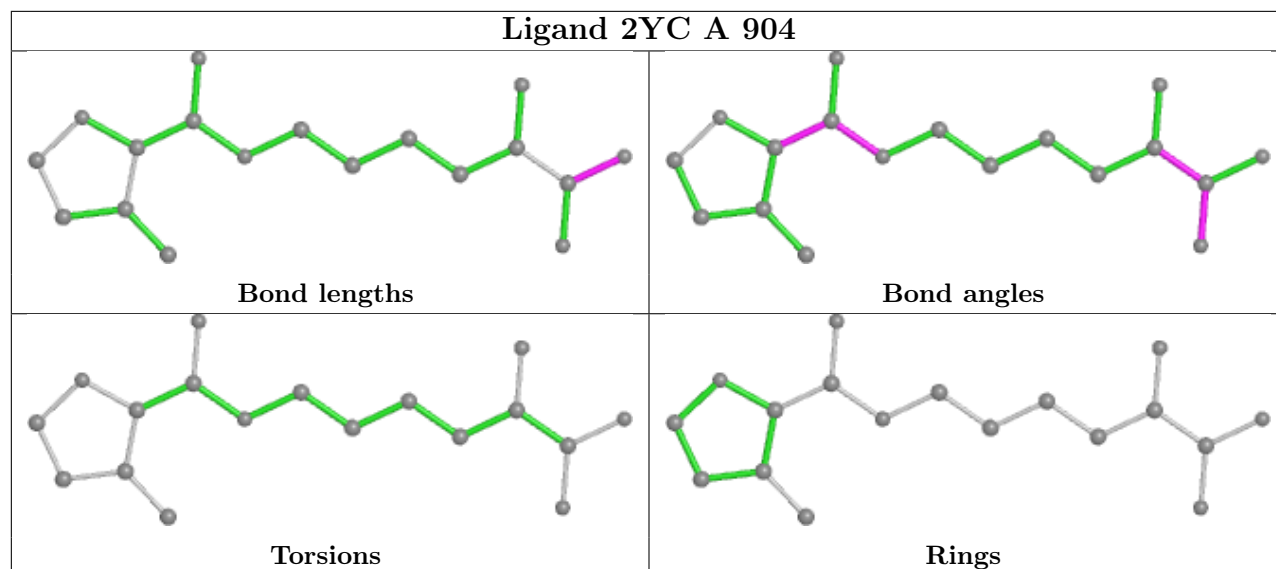
Mol	Chain	Res	Type	Atoms
6	A	906	GOL	O2-C2-C3-O3
6	A	911	GOL	O1-C1-C2-O2
2	C	901	NAI	O4B-C4B-C5B-O5B
6	A	911	GOL	O1-C1-C2-C3
5	C	904	2YC	N1-C5-C6-O2
2	C	901	NAI	O4D-C1D-N1N-C6N
2	A	901	NAI	O4B-C4B-C5B-O5B
2	B	901	NAI	O4B-C4B-C5B-O5B
2	D	901	NAI	O4B-C4B-C5B-O5B
8	A	914	EDO	O1-C1-C2-O2
2	B	901	NAI	O4D-C1D-N1N-C6N
2	A	901	NAI	C2D-C1D-N1N-C6N
7	B	914	PEG	C4-C3-O2-C2

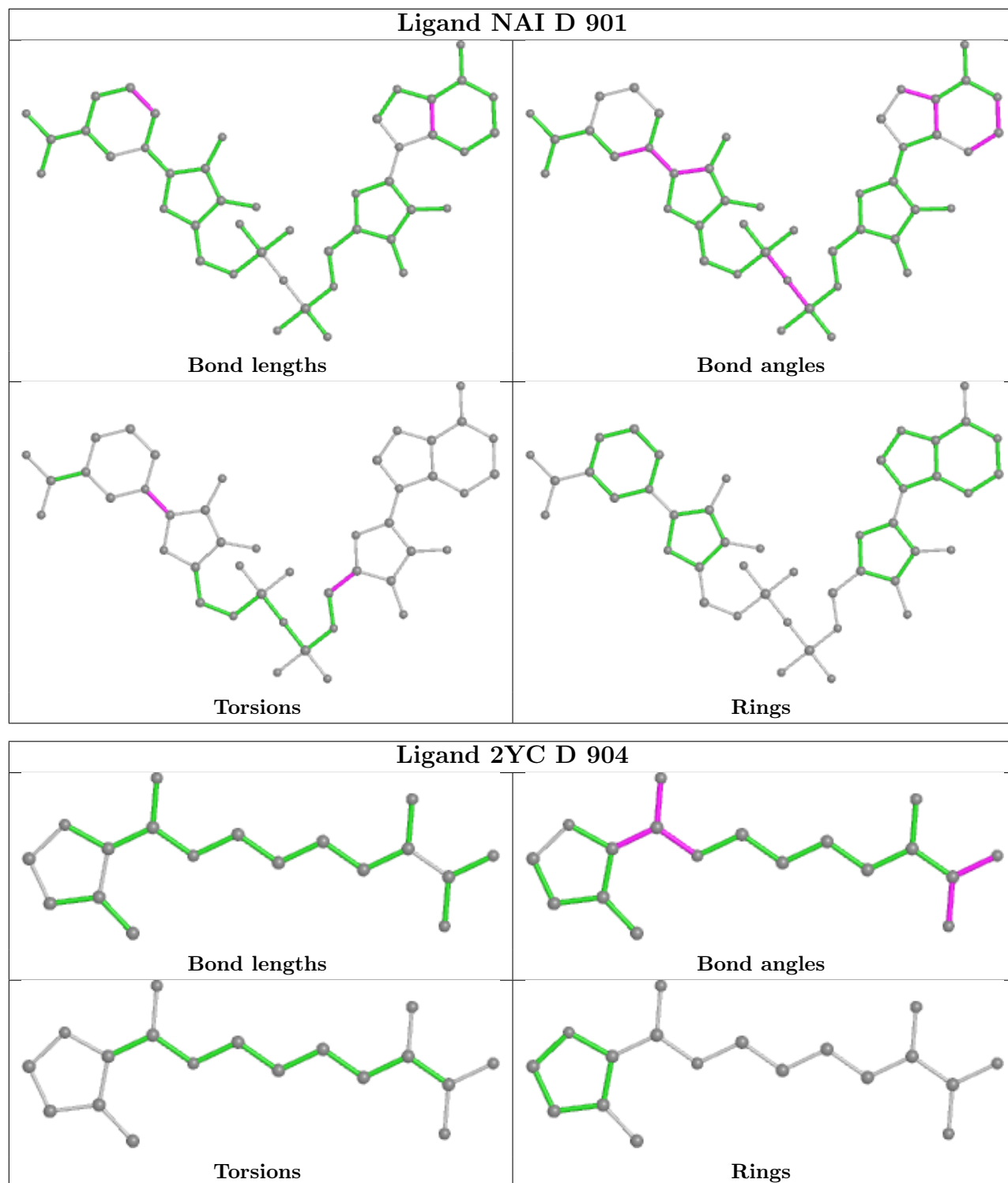
There are no ring outliers.

4 monomers are involved in 4 short contacts:

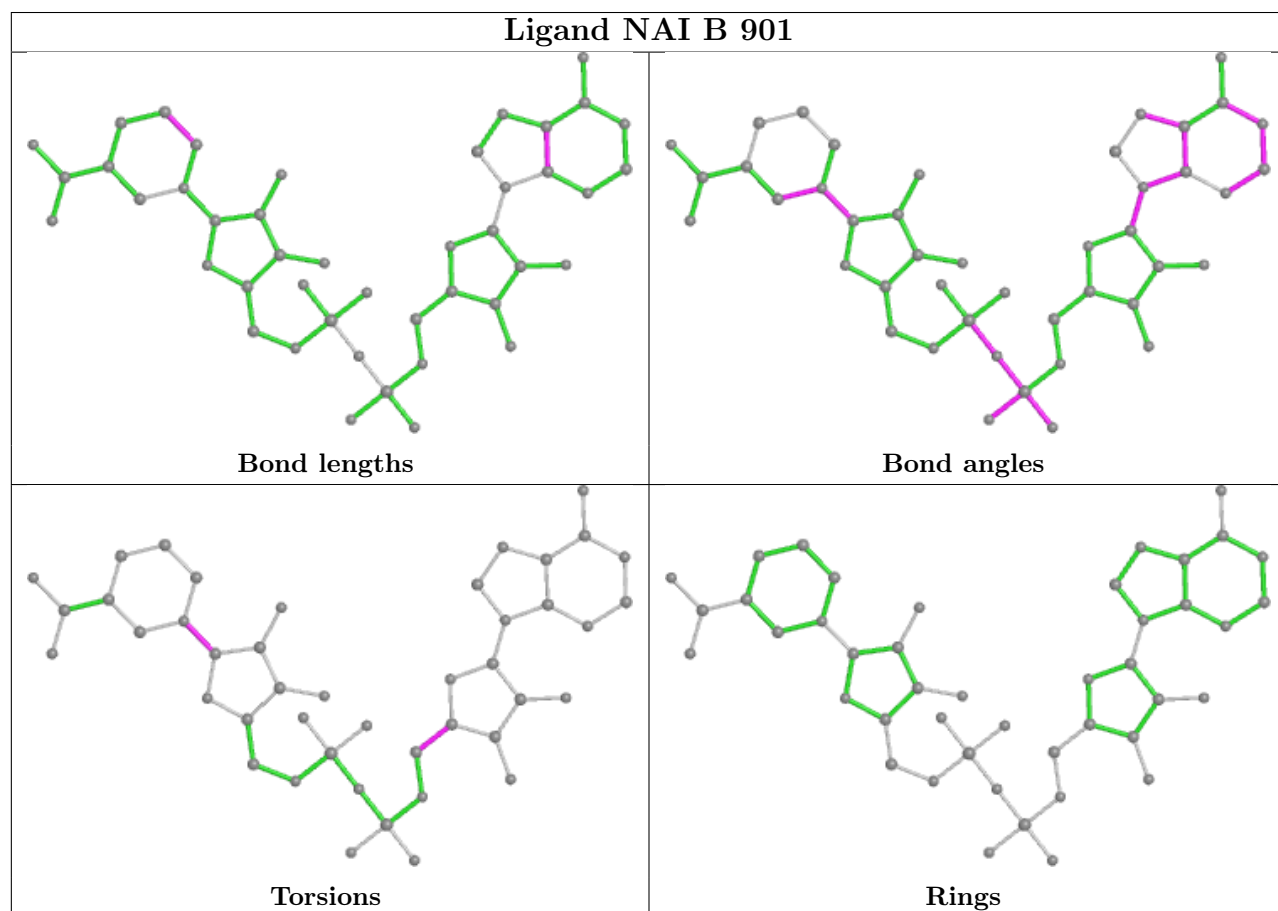
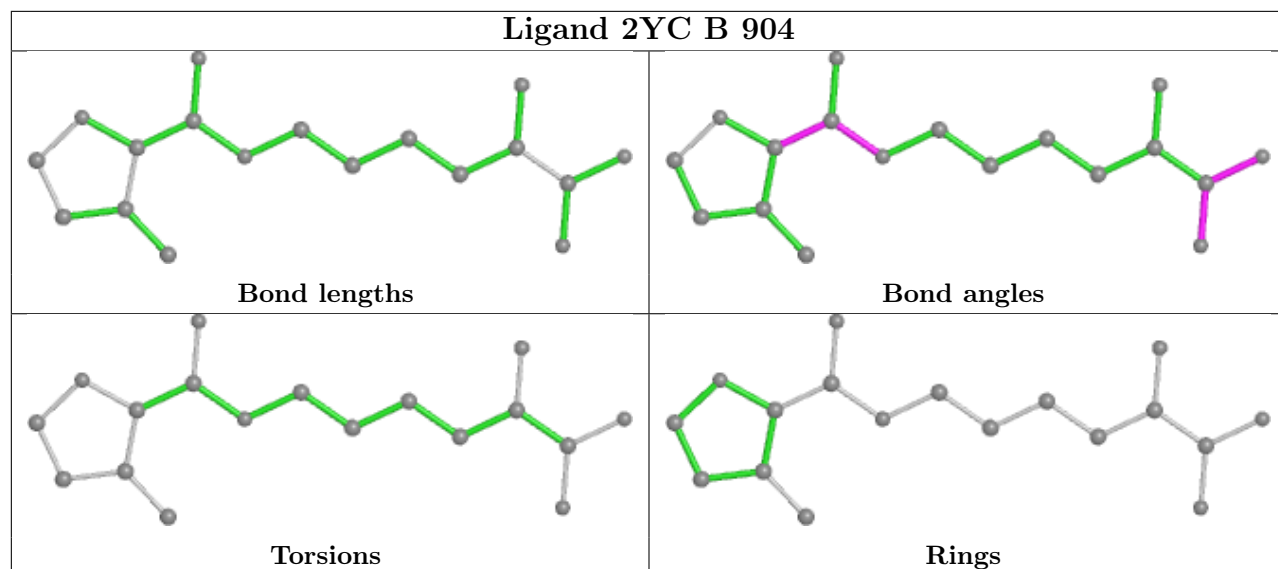
Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	B	919	EDO	1	0
2	D	901	NAI	1	0
9	B	911	SO4	1	0
2	C	901	NAI	1	0

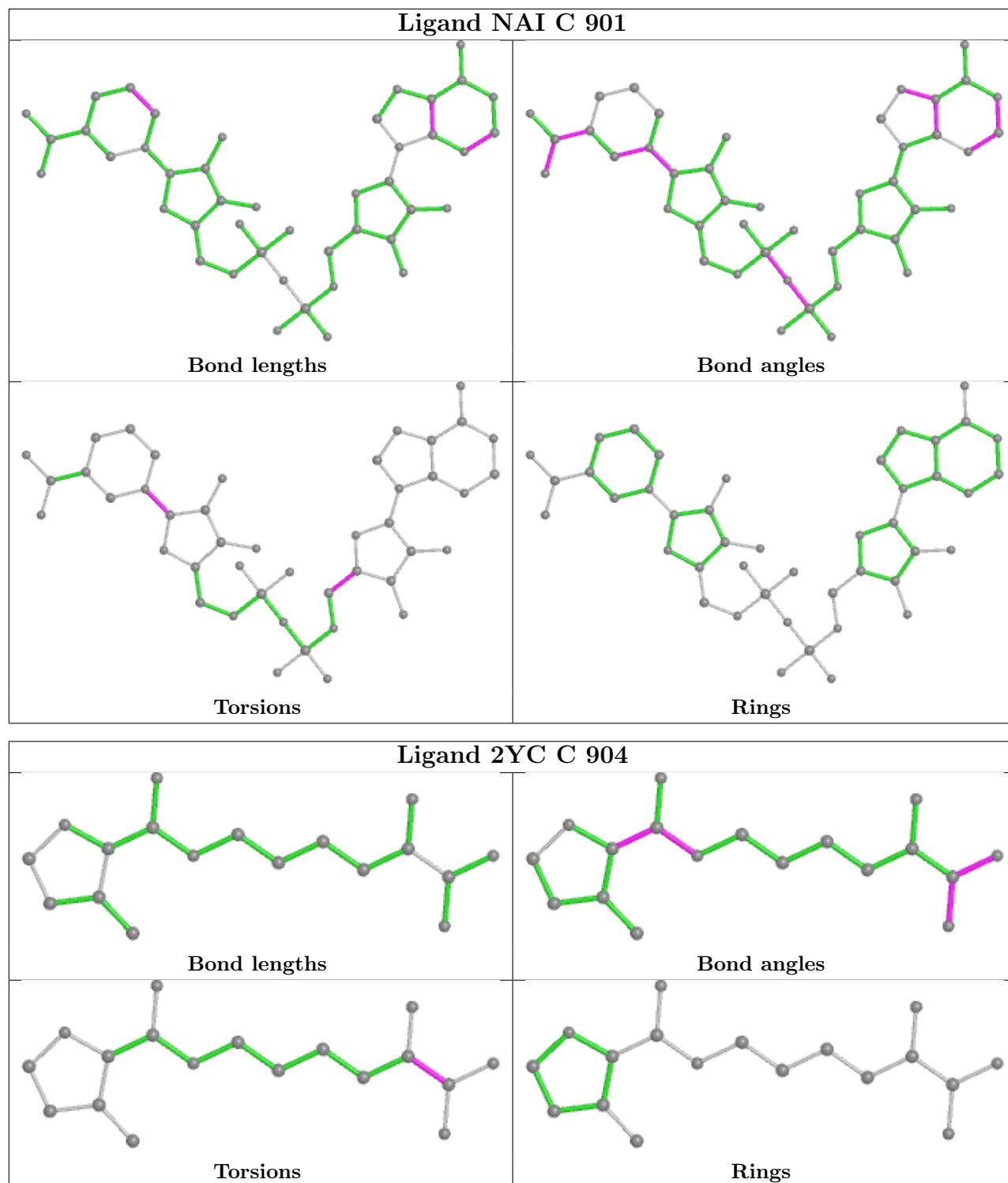
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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











## 5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues

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<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	259/260 (99%)	-0.09	7 (2%) 54 52	19, 26, 50, 67	0
1	B	259/260 (99%)	-0.08	8 (3%) 49 47	19, 28, 58, 79	0
1	C	260/260 (100%)	0.41	29 (11%) 5 4	35, 49, 77, 94	0
1	D	259/260 (99%)	0.61	40 (15%) 2 1	36, 57, 85, 105	0
All	All	1037/1040 (99%)	0.21	84 (8%) 12 10	19, 42, 77, 105	0

All (84) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	192	ALA	9.7
1	C	192	ALA	8.5
1	B	192	ALA	7.6
1	C	140	ASP	6.7
1	D	140	ASP	6.1
1	C	193	ASN	5.7
1	D	2	ALA	5.2
1	D	182	SER	5.2
1	D	14	MET	5.1
1	D	164	ASP	4.8
1	D	1	MET	4.5
1	A	192	ALA	4.2
1	D	190	ASP	4.2
1	C	2	ALA	4.1
1	C	14	MET	3.8
1	D	218	ASN	3.7
1	C	0	SER	3.7
1	D	175	THR	3.7
1	D	185	GLY	3.6
1	C	7	ASP	3.6
1	D	193	ASN	3.6

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	C	174	GLU	3.6
1	B	140	ASP	3.5
1	C	218	ASN	3.5
1	D	232	GLU	3.5
1	C	236	ASP	3.4
1	C	235	ARG	3.4
1	C	233	GLU	3.3
1	D	174	GLU	3.3
1	C	190	ASP	3.3
1	C	1	MET	3.2
1	D	143	ASP	3.1
1	D	24	GLN	3.1
1	A	140	ASP	3.0
1	D	29	LEU	3.0
1	C	182	SER	3.0
1	C	175	THR	3.0
1	A	1	MET	2.9
1	D	178	GLU	2.9
1	B	193	ASN	2.9
1	C	164	ASP	2.9
1	D	181	THR	2.9
1	D	82	ASP	2.9
1	D	75	GLY	2.8
1	D	239	GLU	2.8
1	C	141	SER	2.8
1	C	18	LYS	2.8
1	C	232	GLU	2.7
1	D	141	SER	2.7
1	D	166	ARG	2.7
1	C	42	PHE	2.7
1	D	25	GLU	2.6
1	C	178	GLU	2.6
1	D	13	ASN	2.6
1	D	236	ASP	2.6
1	A	193	ASN	2.5
1	B	175	THR	2.5
1	D	213	ALA	2.5
1	A	233	GLU	2.4
1	D	233	GLU	2.4
1	B	178	GLU	2.4
1	C	106	ARG	2.3
1	C	217	GLU	2.3

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Mol	Chain	Res	Type	RSRZ
1	D	138	LYS	2.3
1	B	233	GLU	2.3
1	D	7	ASP	2.3
1	A	174	GLU	2.3
1	D	240	VAL	2.3
1	A	215	LEU	2.3
1	D	135	ARG	2.3
1	D	11	ASN	2.2
1	D	162	GLN	2.2
1	C	82	ASP	2.2
1	B	174	GLU	2.2
1	D	237	LYS	2.2
1	C	183	ASN	2.2
1	D	48	VAL	2.1
1	C	196	LYS	2.1
1	D	139	ALA	2.1
1	B	215	LEU	2.1
1	C	213	ALA	2.0
1	D	217	GLU	2.0
1	C	45	SER	2.0
1	D	18	LYS	2.0

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

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

## 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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
8	EDO	C	907	4/4	0.52	0.21	61,63,65,67	0
7	PEG	B	914	7/7	0.54	0.26	63,65,67,68	0

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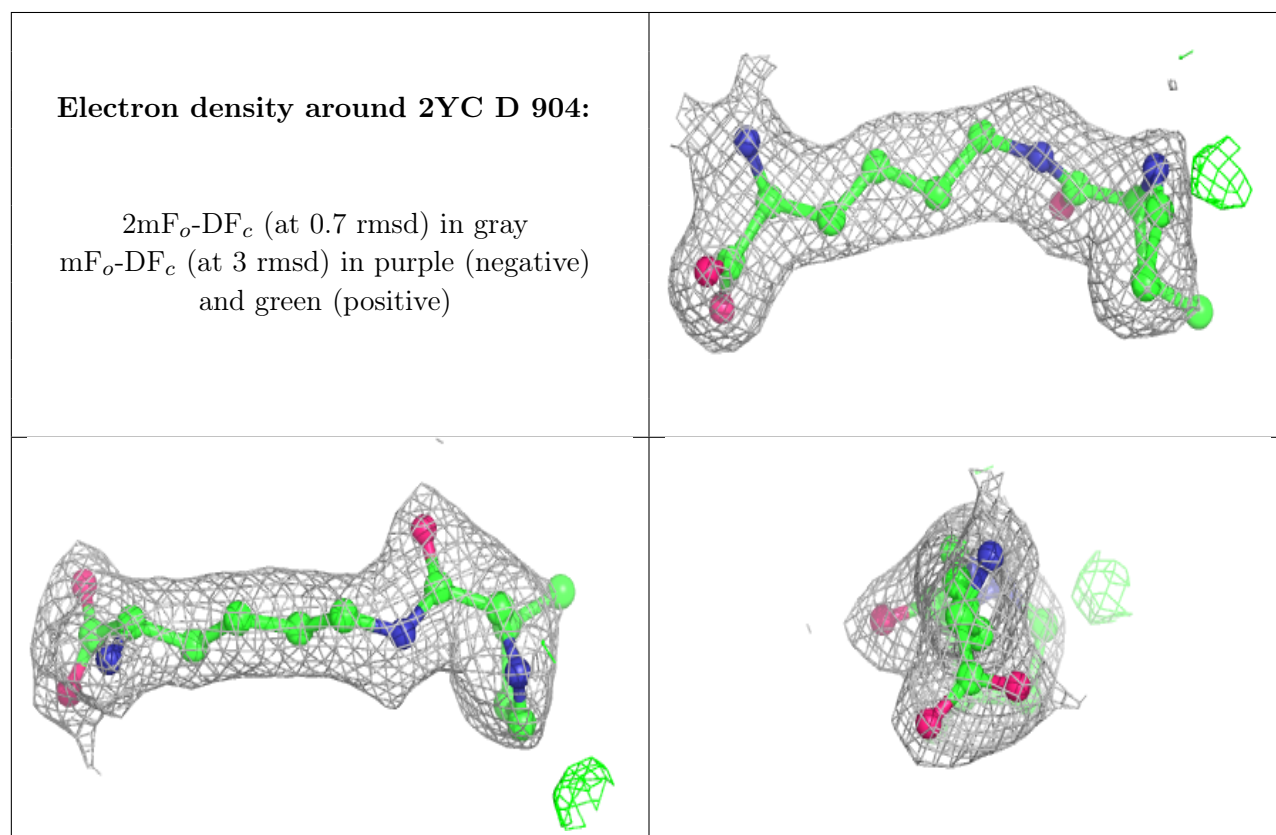
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
7	PEG	B	913	7/7	0.62	0.27	57,59,60,60	0
8	EDO	C	908	4/4	0.72	0.19	61,62,63,64	0
8	EDO	B	917	4/4	0.73	0.29	59,61,62,67	0
8	EDO	C	906	4/4	0.73	0.25	55,57,58,59	0
7	PEG	A	912	7/7	0.74	0.30	44,51,52,54	0
8	EDO	B	916	4/4	0.74	0.19	56,56,57,58	0
6	GOL	A	905	6/6	0.74	0.33	41,46,49,56	0
8	EDO	A	913	4/4	0.76	0.18	50,52,55,58	0
3	NA	D	902	1/1	0.77	0.19	53,53,53,53	0
6	GOL	A	911	6/6	0.78	0.18	60,65,66,68	0
6	GOL	A	909	6/6	0.79	0.21	45,48,49,51	0
8	EDO	A	914	4/4	0.80	0.14	55,58,58,59	0
8	EDO	B	915	4/4	0.80	0.18	58,60,62,63	0
8	EDO	B	920	4/4	0.80	0.16	58,60,60,63	0
6	GOL	A	910	6/6	0.81	0.21	51,55,56,58	0
8	EDO	B	919	4/4	0.81	0.13	61,62,62,63	0
6	GOL	B	909	6/6	0.82	0.18	48,51,52,52	0
9	SO4	B	911	5/5	0.83	0.18	51,51,55,68	0
9	SO4	B	912	5/5	0.84	0.34	75,82,84,87	0
6	GOL	A	907	6/6	0.85	0.23	56,57,58,59	0
6	GOL	B	906	6/6	0.86	0.21	40,50,54,55	0
6	GOL	B	905	6/6	0.86	0.32	47,52,53,62	0
6	GOL	C	905	6/6	0.86	0.26	49,50,52,54	0
8	EDO	B	921	4/4	0.88	0.11	64,64,65,67	0
6	GOL	B	907	6/6	0.89	0.15	25,31,35,39	0
6	GOL	A	906	6/6	0.90	0.30	40,41,43,43	0
8	EDO	A	915	4/4	0.91	0.13	67,68,68,71	0
5	2YC	D	904	18/18	0.91	0.15	41,44,51,52	0
6	GOL	B	908	6/6	0.92	0.11	34,36,36,37	0
5	2YC	C	904	18/18	0.92	0.17	44,45,53,53	0
6	GOL	B	910	6/6	0.92	0.16	37,43,44,47	0
6	GOL	A	908	6/6	0.93	0.15	40,46,46,51	0
8	EDO	B	918	4/4	0.94	0.18	45,45,46,46	0
2	NAI	D	901	44/44	0.94	0.12	38,42,49,50	0
3	NA	A	902	1/1	0.94	0.10	39,39,39,39	0
5	2YC	B	904	18/18	0.95	0.18	24,25,26,27	0
3	NA	C	902	1/1	0.95	0.21	50,50,50,50	0
3	NA	B	902	1/1	0.95	0.09	36,36,36,36	0
4	MG	C	903	1/1	0.95	0.08	52,52,52,52	0
4	MG	D	903	1/1	0.95	0.08	63,63,63,63	0
5	2YC	A	904	18/18	0.96	0.15	22,23,25,25	0
2	NAI	B	901	44/44	0.96	0.10	23,30,37,42	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	NAI	C	901	44/44	0.96	0.09	38,41,53,57	0
2	NAI	A	901	44/44	0.96	0.10	21,25,32,35	0
4	MG	A	903	1/1	0.97	0.10	30,30,30,30	0
4	MG	B	903	1/1	0.99	0.06	33,33,33,33	0

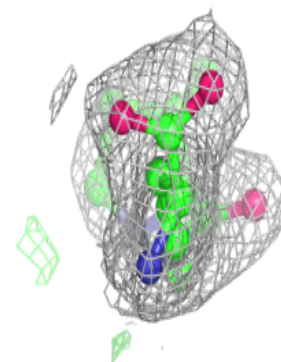
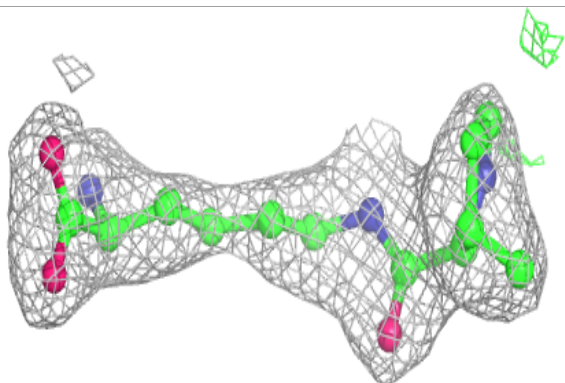
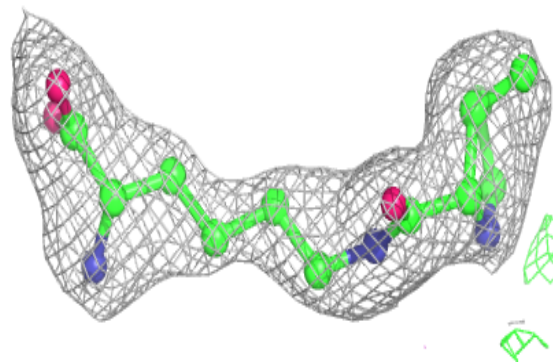
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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



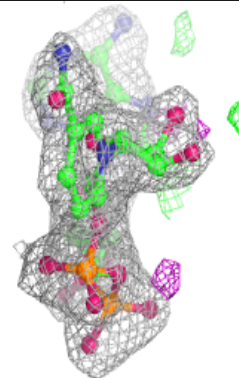
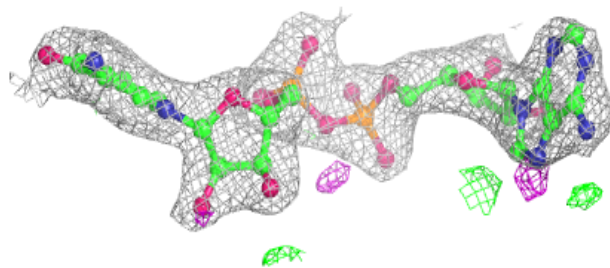
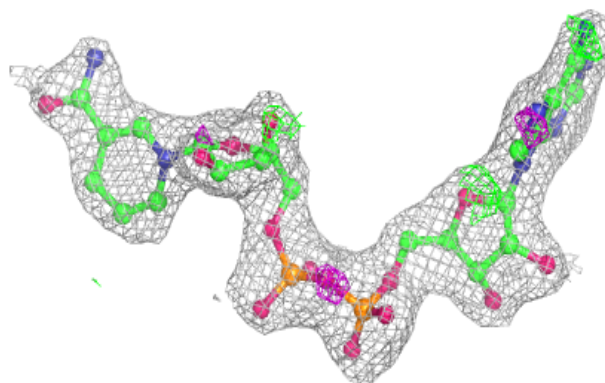


**Electron density around 2YC C 904:**

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

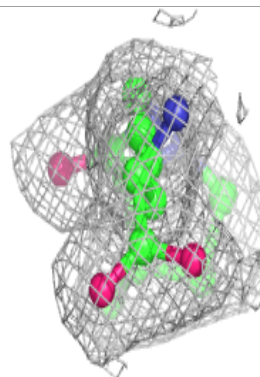
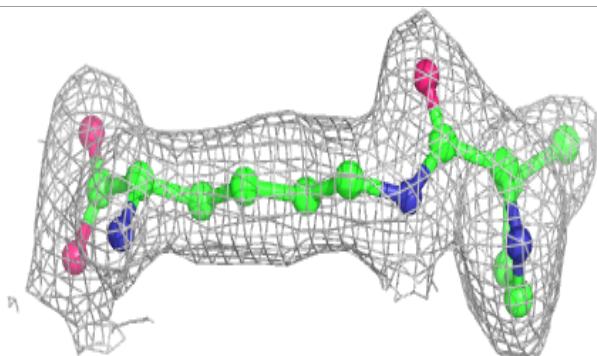
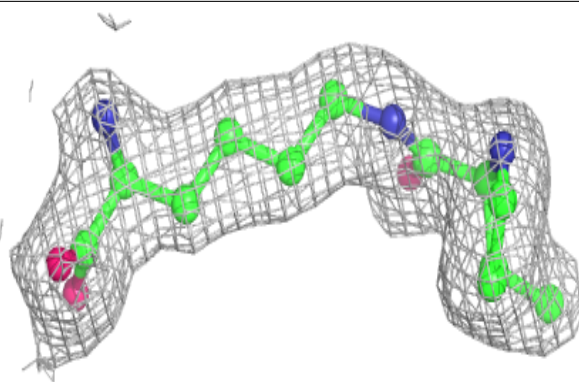
**Electron density around NAI D 901:**

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

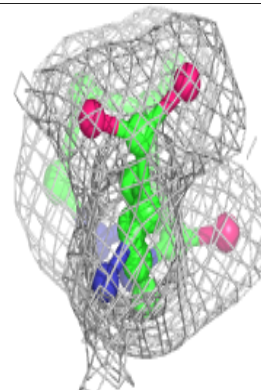
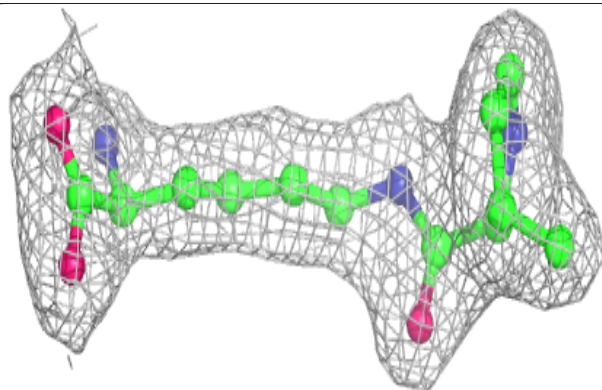
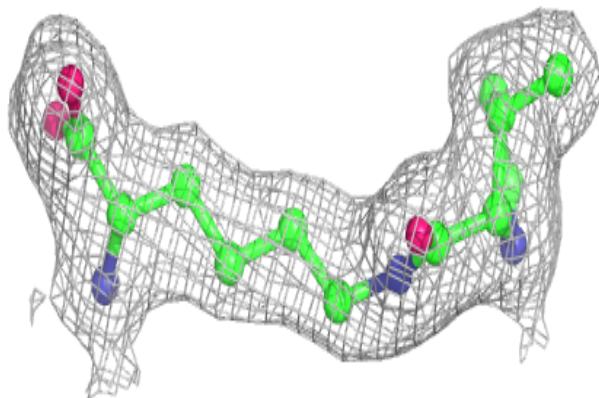


**Electron density around 2YC B 904:**

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

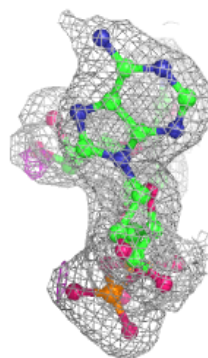
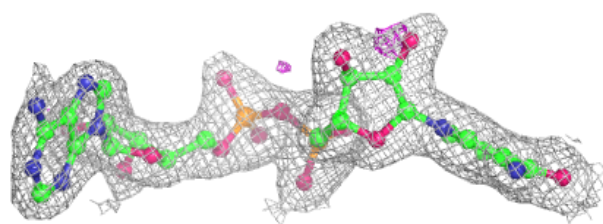
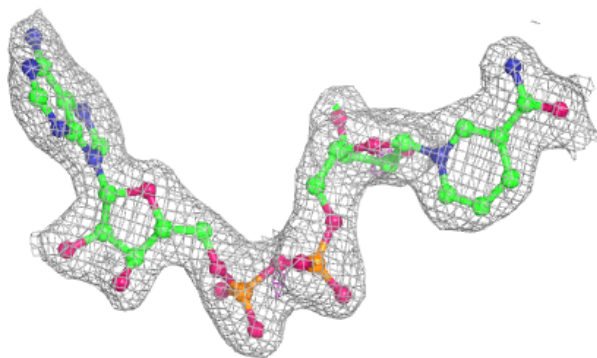
**Electron density around 2YC A 904:**

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

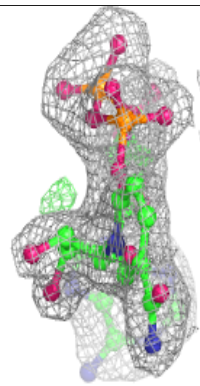
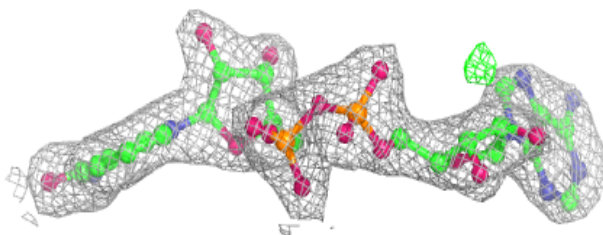
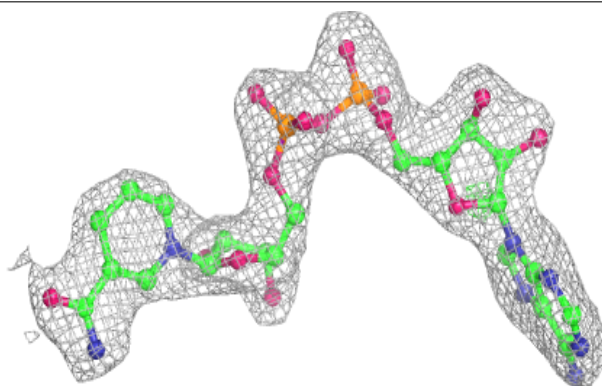


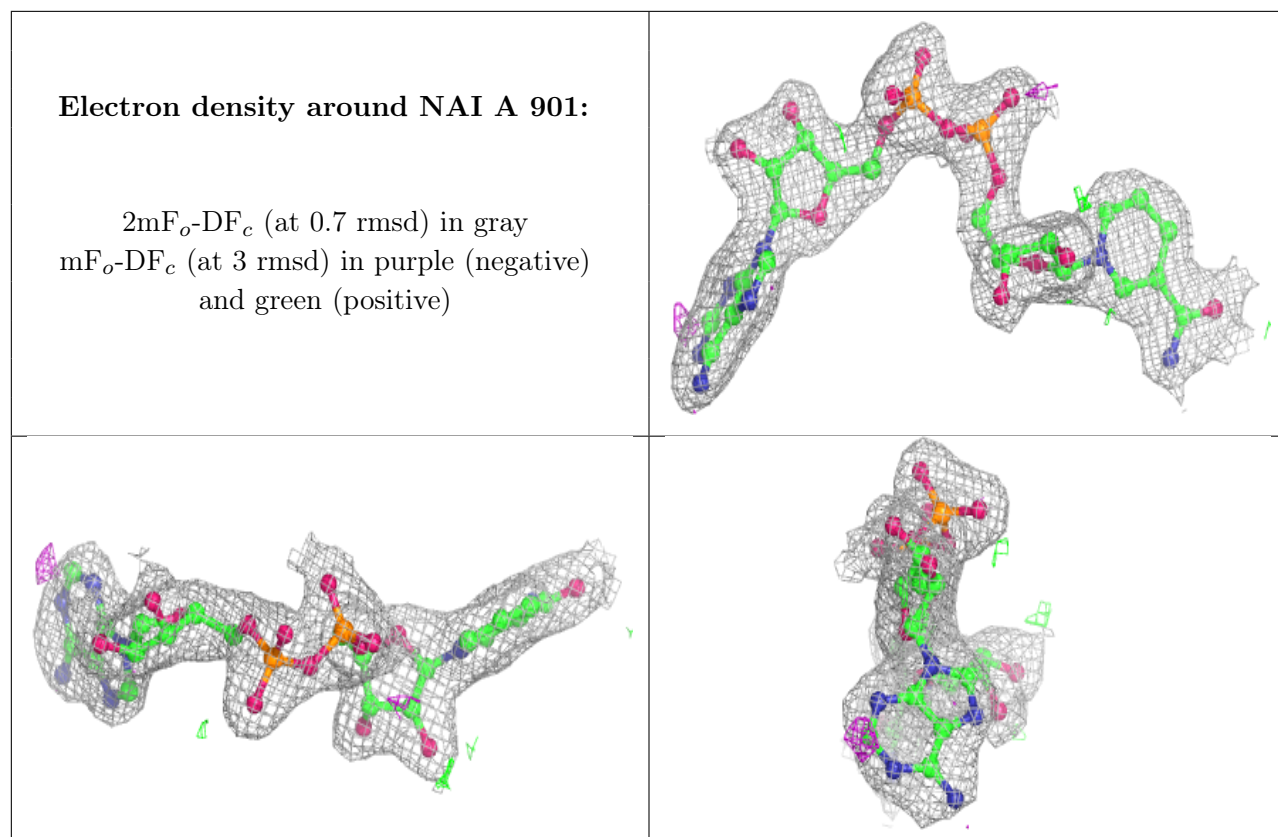
**Electron density around NAI B 901:**

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

**Electron density around NAI C 901:**

$2mF_o-DF_c$  (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.