



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 27, 2023 – 10:57 AM EDT

PDB ID : 3INM
Title : Crystal structure of human cytosolic NADP(+)-dependent isocitrate dehydrogenase R132H mutant in complex with NADPH, ALPHA-KETOGLUTARATE and CALCIUM(2+)
Authors : Fontano, E.; Brown, R.S.; Suto, R.K.; Bhyravbhatla, B.
Deposited on : 2009-08-12
Resolution : 2.10 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35
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

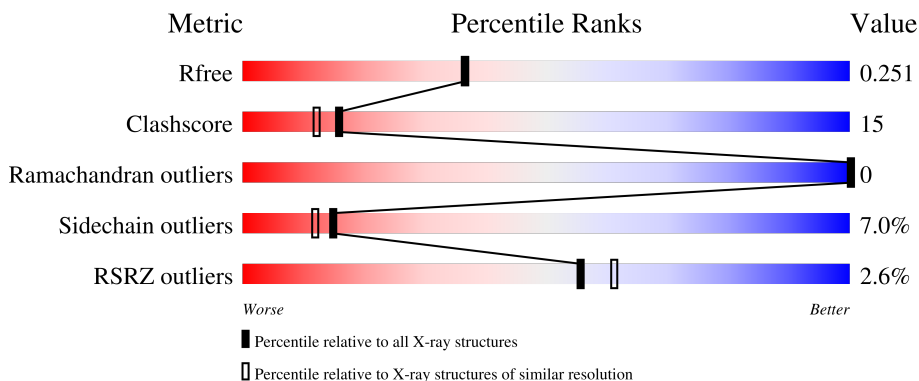
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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

Mol	Chain	Length	Quality of chain
1	A	425	
1	B	425	
1	C	425	

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
6	GOL	A	531	-	-	X	-

2 Entry composition i

There are 7 unique types of molecules in this entry. The entry contains 10205 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 Isocitrate dehydrogenase [NADP] cytoplasmic.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	407	Total 3225	C 2051	N 545	O 611	S 18	0	0	0
1	B	411	Total 3256	C 2071	N 551	O 616	S 18	0	0	0
1	C	407	Total 3225	C 2051	N 545	O 611	S 18	0	0	0

There are 36 discrepancies between the modelled and reference sequences:

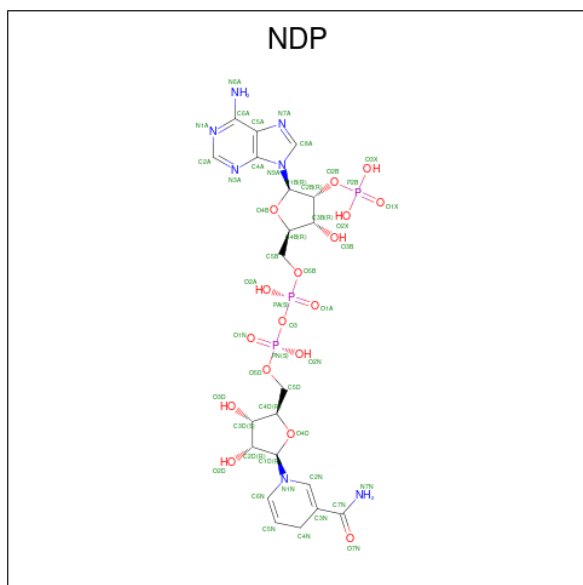
Chain	Residue	Modelled	Actual	Comment	Reference
A	132	HIS	ARG	engineered mutation	UNP O75874
A	415	SER	-	expression tag	UNP O75874
A	416	LEU	-	expression tag	UNP O75874
A	417	GLU	-	expression tag	UNP O75874
A	418	HIS	-	expression tag	UNP O75874
A	419	HIS	-	expression tag	UNP O75874
A	420	HIS	-	expression tag	UNP O75874
A	421	HIS	-	expression tag	UNP O75874
A	422	HIS	-	expression tag	UNP O75874
A	423	HIS	-	expression tag	UNP O75874
A	424	HIS	-	expression tag	UNP O75874
A	425	HIS	-	expression tag	UNP O75874
B	132	HIS	ARG	engineered mutation	UNP O75874
B	415	SER	-	expression tag	UNP O75874
B	416	LEU	-	expression tag	UNP O75874
B	417	GLU	-	expression tag	UNP O75874
B	418	HIS	-	expression tag	UNP O75874
B	419	HIS	-	expression tag	UNP O75874
B	420	HIS	-	expression tag	UNP O75874
B	421	HIS	-	expression tag	UNP O75874
B	422	HIS	-	expression tag	UNP O75874
B	423	HIS	-	expression tag	UNP O75874
B	424	HIS	-	expression tag	UNP O75874

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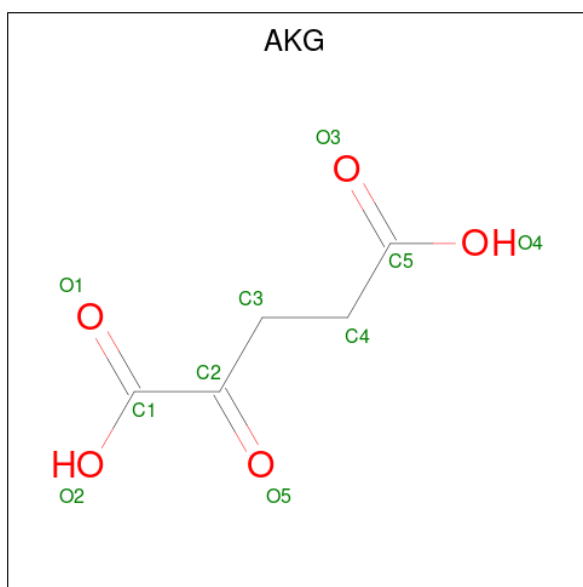
Chain	Residue	Modelled	Actual	Comment	Reference
B	425	HIS	-	expression tag	UNP O75874
C	132	HIS	ARG	engineered mutation	UNP O75874
C	415	SER	-	expression tag	UNP O75874
C	416	LEU	-	expression tag	UNP O75874
C	417	GLU	-	expression tag	UNP O75874
C	418	HIS	-	expression tag	UNP O75874
C	419	HIS	-	expression tag	UNP O75874
C	420	HIS	-	expression tag	UNP O75874
C	421	HIS	-	expression tag	UNP O75874
C	422	HIS	-	expression tag	UNP O75874
C	423	HIS	-	expression tag	UNP O75874
C	424	HIS	-	expression tag	UNP O75874
C	425	HIS	-	expression tag	UNP O75874

- Molecule 2 is NADPH DIHYDRO-NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NDP) (formula: $C_{21}H_{30}N_7O_{17}P_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
2	B	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
2	C	1	Total	C	N	O	P	0	0
			48	21	7	17	3		

- Molecule 3 is 2-OXOGLUTARIC ACID (three-letter code: AKG) (formula: $C_5H_6O_5$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 10 5 5	0	0
3	B	1	Total C O 10 5 5	0	0
3	C	1	Total C O 10 5 5	0	0

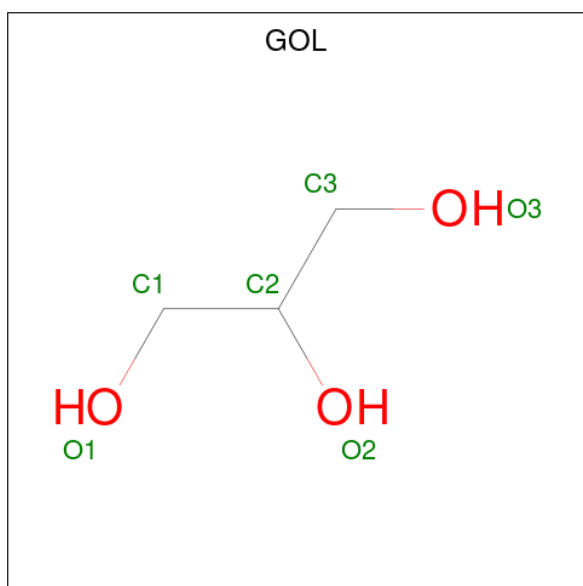
- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total Ca 1 1	0	0
4	B	1	Total Ca 1 1	0	0
4	C	1	Total Ca 1 1	0	0

- Molecule 5 is SODIUM ION (three-letter code: NA) (formula: Na).

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

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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	C	1	Total C O 6 3 3	0	0

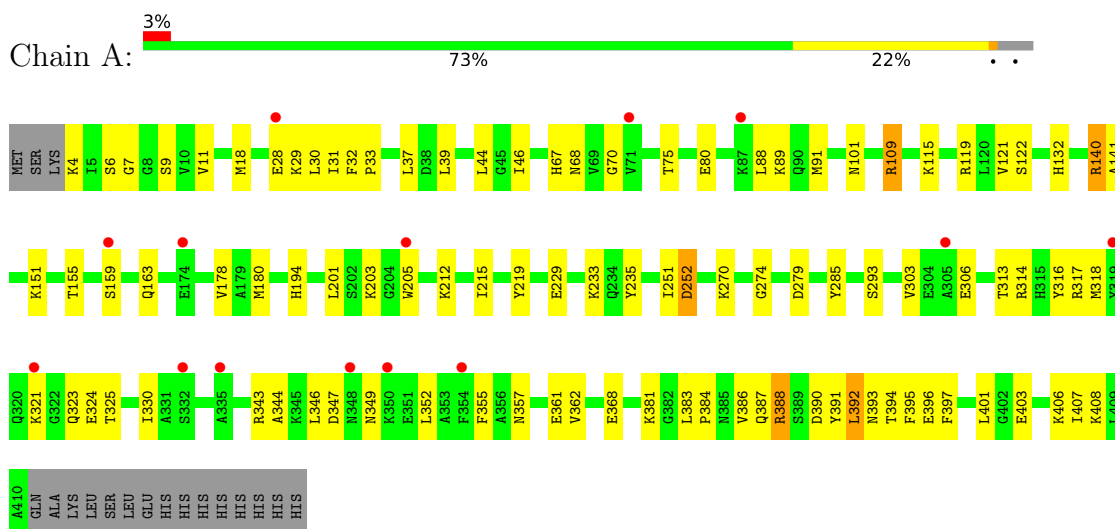
- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	112	Total O 112 112	0	0
7	B	112	Total O 112 112	0	0
7	C	77	Total O 77 77	0	0

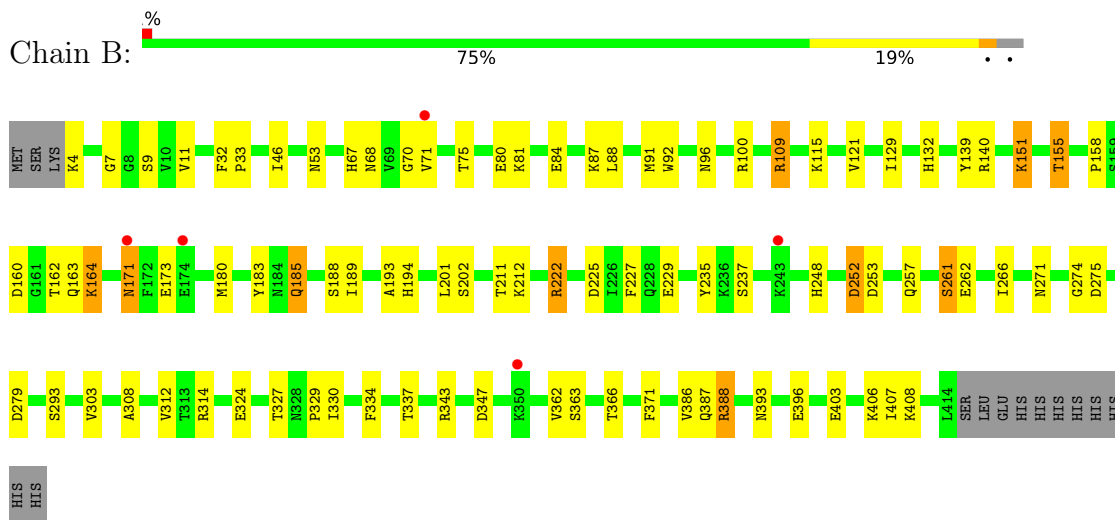
3 Residue-property plots [i](#)

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: Isocitrate dehydrogenase [NADP] cytoplasmic

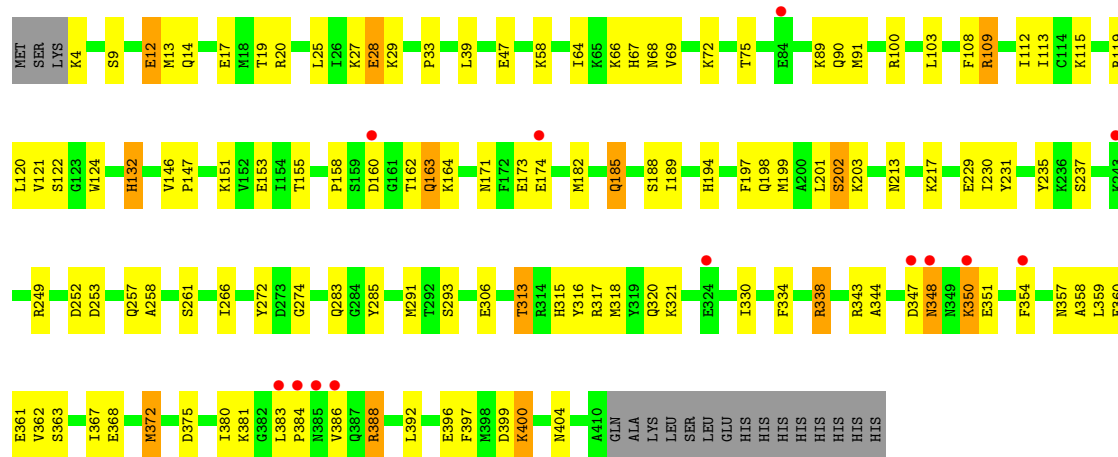


- Molecule 1: Isocitrate dehydrogenase [NADP] cytoplasmic



- Molecule 1: Isocitrate dehydrogenase [NADP] cytoplasmic





4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	96.12Å 274.69Å 116.50Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	24.91 – 2.10 24.91 – 2.10	Depositor EDS
% Data completeness (in resolution range)	92.4 (24.91-2.10) 92.4 (24.91-2.10)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.52 (at 2.10Å)	Xtrriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.220 , 0.262 0.215 , 0.251	Depositor DCC
R_{free} test set	4153 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	29.3	Xtrriage
Anisotropy	0.014	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 42.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	10205	wwPDB-VP
Average B, all atoms (Å ²)	33.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.14% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: CA, NDP, NA, AKG, GOL

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	0.70	0/3294	0.55	0/4444
1	B	0.79	1/3325 (0.0%)	0.58	1/4485 (0.0%)
1	C	0.80	3/3294 (0.1%)	0.57	0/4444
All	All	0.76	4/9913 (0.0%)	0.57	1/13373 (0.0%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	69	VAL	CB-CG2	-5.79	1.40	1.52
1	C	174	GLU	CB-CG	5.55	1.62	1.52
1	B	262	GLU	CG-CD	5.10	1.59	1.51
1	C	272	TYR	CD1-CE1	-5.08	1.31	1.39

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	7	GLY	N-CA-C	5.40	126.60	113.10

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	3225	0	3183	85	0
1	B	3256	0	3220	71	0
1	C	3225	0	3183	134	0
2	A	48	0	26	1	0
2	B	48	0	26	5	0
2	C	48	0	26	4	0
3	A	10	0	4	0	0
3	B	10	0	4	1	0
3	C	10	0	4	2	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
6	A	12	0	16	13	0
6	C	6	0	8	2	0
7	A	112	0	0	1	0
7	B	112	0	0	1	0
7	C	77	0	0	7	0
All	All	10205	0	9700	286	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 15.

All (286) 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:395:PHE:CD1	6:A:531:GOL:H12	1.46	1.47
1:C:388:ARG:O	1:C:388:ARG:HD3	1.20	1.32
1:A:388:ARG:HD2	1:A:388:ARG:O	1.16	1.29
1:A:395:PHE:HD1	6:A:531:GOL:C1	1.47	1.26
1:B:388:ARG:CD	1:B:388:ARG:O	1.89	1.21
1:C:388:ARG:HD3	1:C:388:ARG:C	1.57	1.20
1:C:350:LYS:O	1:C:350:LYS:HD3	1.41	1.17
1:C:199:MET:HE1	1:C:203:LYS:HE2	1.19	1.13
1:C:388:ARG:HG2	1:C:388:ARG:HH11	1.03	1.12
1:B:388:ARG:HG2	1:B:388:ARG:HH11	1.06	1.12
1:A:388:ARG:HD2	1:A:388:ARG:C	1.70	1.08
1:B:388:ARG:O	1:B:388:ARG:HD3	1.53	1.08
1:B:388:ARG:O	1:B:388:ARG:HD2	1.52	1.07
1:C:388:ARG:HH11	1:C:388:ARG:CG	1.64	1.06

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:279:ASP:OD2	1:B:252:ASP:HB3	1.57	1.03
1:A:252:ASP:HB3	1:B:279:ASP:OD2	1.61	1.00
1:C:392:LEU:HD11	1:C:397:PHE:CA	1.92	1.00
1:A:324:GLU:HA	6:A:531:GOL:O3	1.60	1.00
1:B:84:GLU:O	1:B:87:LYS:HE2	1.63	0.99
1:A:393:ASN:OD1	1:A:396:GLU:HG3	1.61	0.99
1:C:199:MET:HE1	1:C:203:LYS:CE	1.93	0.98
1:A:388:ARG:O	1:A:388:ARG:CD	2.12	0.96
1:C:388:ARG:O	1:C:388:ARG:CD	2.14	0.96
1:C:388:ARG:HG2	1:C:388:ARG:NH1	1.76	0.93
1:C:350:LYS:HD3	1:C:350:LYS:C	1.85	0.93
1:B:388:ARG:CD	1:B:388:ARG:C	2.31	0.93
1:A:194:HIS:HD2	1:A:235:TYR:OH	1.52	0.92
1:B:388:ARG:HG2	1:B:388:ARG:NH1	1.84	0.92
1:C:392:LEU:CD1	1:C:397:PHE:N	2.33	0.91
1:A:394:THR:HB	6:A:531:GOL:H11	1.53	0.91
1:C:392:LEU:HD11	1:C:397:PHE:CB	2.01	0.91
1:B:388:ARG:HD2	1:B:388:ARG:C	1.91	0.90
1:C:392:LEU:C	1:C:392:LEU:HD12	1.91	0.90
1:C:392:LEU:HD11	1:C:397:PHE:HB2	1.52	0.90
1:C:392:LEU:HD13	1:C:397:PHE:N	1.87	0.89
1:B:80:GLU:HG3	1:B:91:MET:HE2	1.54	0.88
1:B:388:ARG:HH11	1:B:388:ARG:CG	1.86	0.88
1:C:108:PHE:HB3	6:C:532:GOL:H31	1.56	0.87
1:B:158:PRO:HD2	1:B:163:GLN:O	1.74	0.86
1:B:160:ASP:CG	1:B:162:THR:HG23	1.95	0.86
1:C:388:ARG:C	1:C:388:ARG:CD	2.44	0.84
1:A:395:PHE:CD1	6:A:531:GOL:C1	2.35	0.83
1:B:140:ARG:HG2	1:B:183:TYR:OH	1.79	0.82
1:A:392:LEU:N	1:A:392:LEU:HD23	1.95	0.81
1:B:155:THR:CB	1:B:164:LYS:HZ1	1.93	0.81
1:C:120:LEU:HD12	1:C:283:GLN:O	1.81	0.81
1:B:80:GLU:HG3	1:B:91:MET:CE	2.10	0.80
1:B:225:ASP:O	1:B:229:GLU:HG3	1.82	0.80
1:B:362:VAL:HG23	1:B:408:LYS:HD2	1.62	0.80
1:C:343:ARG:HD2	1:C:347:ASP:OD2	1.83	0.79
1:C:115:LYS:HG3	1:C:368:GLU:OE2	1.84	0.78
1:B:155:THR:HB	1:B:164:LYS:HZ1	1.50	0.76
1:C:66:LYS:HE2	1:C:67:HIS:NE2	2.00	0.76
1:C:13:MET:CE	1:C:72:LYS:HB2	2.16	0.76
1:B:155:THR:HB	1:B:164:LYS:NZ	2.02	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:89:LYS:HE3	7:C:1134:HOH:O	1.86	0.75
1:A:397:PHE:CE2	1:A:401:LEU:HD11	2.20	0.74
1:A:7:GLY:HA3	1:A:37:LEU:HD23	1.70	0.74
1:A:388:ARG:C	1:A:388:ARG:CD	2.51	0.73
1:C:338:ARG:HG2	7:C:1137:HOH:O	1.89	0.73
1:A:115:LYS:HG2	1:A:368:GLU:OE2	1.88	0.73
1:C:29:LYS:NZ	1:C:399:ASP:OD1	2.22	0.73
1:B:185:GLN:O	1:B:189:ILE:HG13	1.89	0.73
1:A:325:THR:H	6:A:531:GOL:H32	1.55	0.72
1:C:12:GLU:OE2	1:C:27:LYS:NZ	2.22	0.72
1:A:28:GLU:OE1	1:A:29:LYS:HG2	1.89	0.72
1:C:66:LYS:HE3	1:C:67:HIS:CE1	2.24	0.72
1:C:392:LEU:HD13	1:C:396:GLU:HB2	1.72	0.71
1:C:350:LYS:O	1:C:350:LYS:CD	2.32	0.71
1:C:66:LYS:CE	1:C:67:HIS:CE1	2.73	0.71
1:B:80:GLU:CG	1:B:91:MET:HE2	2.21	0.71
1:C:388:ARG:CG	1:C:388:ARG:NH1	2.37	0.71
1:C:194:HIS:HD2	1:C:235:TYR:OH	1.73	0.70
1:C:47:GLU:OE1	1:C:47:GLU:N	2.17	0.69
1:A:229:GLU:HB3	1:A:233:LYS:NZ	2.08	0.69
1:C:13:MET:HE1	1:C:72:LYS:HB2	1.73	0.69
1:C:17:GLU:OE1	1:C:313:THR:HB	1.92	0.69
1:C:383:LEU:C	1:C:383:LEU:HD13	2.13	0.69
1:C:392:LEU:CD1	1:C:397:PHE:HB2	2.21	0.68
1:A:203:LYS:HD2	1:A:205:TRP:CZ3	2.29	0.68
1:B:194:HIS:HD2	1:B:235:TYR:OH	1.75	0.68
1:C:112:ILE:HD12	1:C:291:MET:N	2.08	0.68
1:C:199:MET:CE	1:C:203:LYS:CE	2.72	0.68
1:C:392:LEU:CD1	1:C:397:PHE:CA	2.70	0.68
1:C:108:PHE:CB	6:C:532:GOL:H31	2.23	0.68
1:C:367:ILE:HG23	1:C:372:MET:HE2	1.73	0.67
1:B:160:ASP:OD1	1:B:162:THR:HG23	1.94	0.67
1:A:203:LYS:HB3	1:A:205:TRP:CE3	2.29	0.67
1:C:383:LEU:N	1:C:384:PRO:CD	2.58	0.66
1:A:324:GLU:OE2	1:A:388:ARG:NH1	2.26	0.66
1:A:325:THR:H	6:A:531:GOL:C3	2.08	0.66
1:A:229:GLU:O	1:A:233:LYS:HE3	1.95	0.66
1:A:109:ARG:HD3	1:A:293:SER:OG	1.95	0.66
1:C:160:ASP:OD1	1:C:160:ASP:C	2.31	0.65
1:B:75:THR:H	2:B:501:NDP:H71N	1.42	0.65
1:C:392:LEU:HD11	1:C:397:PHE:HA	1.76	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:109:ARG:NH2	7:C:426:HOH:O	2.30	0.64
1:A:357:ASN:O	1:A:361:GLU:HG2	1.97	0.64
1:C:315:HIS:HA	1:C:318:MET:HE2	1.79	0.64
1:B:160:ASP:CG	1:B:162:THR:CG2	2.65	0.64
1:C:199:MET:CE	1:C:203:LYS:HE2	2.13	0.64
1:C:334:PHE:CZ	1:C:360:GLU:HG2	2.33	0.64
1:A:362:VAL:HG23	1:A:408:LYS:HD2	1.78	0.64
1:C:367:ILE:HG23	1:C:372:MET:CE	2.27	0.63
1:B:388:ARG:NH1	1:B:388:ARG:CG	2.50	0.63
1:A:229:GLU:HB3	1:A:233:LYS:HZ2	1.64	0.63
1:A:194:HIS:CD2	1:A:235:TYR:OH	2.44	0.63
1:A:28:GLU:OE1	1:A:29:LYS:CG	2.47	0.62
1:B:362:VAL:CG2	1:B:408:LYS:HD2	2.29	0.62
1:B:109:ARG:HD3	1:B:293:SER:OG	1.98	0.62
1:A:163:GLN:NE2	1:C:4:LYS:O	2.33	0.61
1:A:395:PHE:CE1	6:A:531:GOL:H12	2.24	0.61
1:C:66:LYS:HE2	1:C:67:HIS:CE1	2.36	0.61
1:C:185:GLN:HG2	1:C:188:SER:H	1.64	0.61
1:C:197:PHE:CZ	1:C:231:TYR:HB2	2.35	0.61
1:C:358:ALA:O	1:C:362:VAL:HG23	2.00	0.60
1:C:113:ILE:CD1	7:C:1060:HOH:O	2.48	0.60
1:B:171:ASN:OD1	1:B:171:ASN:N	2.33	0.60
1:B:327:THR:O	1:B:329:PRO:HD3	2.00	0.60
1:C:229:GLU:CG	1:C:230:ILE:N	2.64	0.60
1:C:392:LEU:HD13	1:C:396:GLU:CB	2.32	0.60
1:C:343:ARG:O	1:C:343:ARG:HD3	2.01	0.60
1:C:213:ASN:O	1:C:217:LYS:HA	2.02	0.60
1:C:344:ALA:O	1:C:348:ASN:N	2.35	0.60
1:C:392:LEU:CD1	1:C:397:PHE:H	2.15	0.59
1:A:119:ARG:HG2	1:A:285:TYR:HA	1.84	0.59
1:B:403:GLU:O	1:B:407:ILE:HD13	2.02	0.59
1:A:394:THR:HB	6:A:531:GOL:C1	2.30	0.59
1:C:89:LYS:CE	7:C:1134:HOH:O	2.44	0.59
1:C:249:ARG:NH1	1:C:257:GLN:CB	2.66	0.59
1:C:380:ILE:HG22	1:C:381:LYS:HD2	1.83	0.59
1:A:403:GLU:O	1:A:407:ILE:HD13	2.03	0.58
1:C:392:LEU:CD1	1:C:392:LEU:C	2.70	0.58
1:C:67:HIS:O	1:C:68:ASN:HB2	2.02	0.58
1:B:67:HIS:O	1:B:68:ASN:HB2	2.04	0.58
1:C:13:MET:HE3	1:C:72:LYS:HB2	1.84	0.58
1:A:80:GLU:HG3	1:A:91:MET:CE	2.33	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:211:THR:HG1	1:B:248:HIS:CE1	2.22	0.58
1:A:75:THR:O	2:A:501:NDP:H2N	2.04	0.57
1:B:185:GLN:HG2	1:B:188:SER:H	1.70	0.57
1:B:343:ARG:HD2	1:B:347:ASP:OD2	2.05	0.57
1:B:393:ASN:OD1	1:B:396:GLU:HG3	2.05	0.57
1:C:119:ARG:HG2	1:C:285:TYR:HA	1.87	0.57
1:C:392:LEU:HD12	1:C:392:LEU:O	2.03	0.57
1:A:383:LEU:N	1:A:384:PRO:HD2	2.21	0.56
1:B:253:ASP:O	1:B:257:GLN:HG2	2.05	0.56
1:B:132:HIS:CB	1:B:274:GLY:HA3	2.35	0.56
1:A:318:MET:CE	1:A:325:THR:HG22	2.35	0.56
1:A:46:ILE:HD11	1:A:88:LEU:HD11	1.88	0.56
1:C:383:LEU:HB3	1:C:384:PRO:HD3	1.87	0.56
1:A:393:ASN:CG	6:A:531:GOL:O1	2.45	0.55
1:A:119:ARG:NH2	1:A:122:SER:O	2.39	0.55
1:B:84:GLU:O	1:B:87:LYS:CE	2.46	0.55
1:C:113:ILE:HD11	7:C:1060:HOH:O	2.05	0.55
1:A:203:LYS:HD2	1:A:205:TRP:HZ3	1.70	0.54
1:C:350:LYS:C	1:C:350:LYS:CD	2.67	0.54
1:A:30:LEU:O	1:A:355:PHE:HZ	1.90	0.54
1:C:185:GLN:CG	1:C:188:SER:H	2.22	0.53
1:C:75:THR:O	2:C:501:NDP:H2N	2.08	0.53
1:A:115:LYS:HE3	7:A:1218:HOH:O	2.07	0.53
1:B:75:THR:O	2:B:501:NDP:H2N	2.08	0.53
1:C:359:LEU:HD12	1:C:359:LEU:O	2.09	0.53
1:A:101:ASN:OD1	1:A:140:ARG:HG3	2.09	0.52
1:B:80:GLU:CG	1:B:91:MET:CE	2.81	0.52
1:C:400:LYS:HE2	1:C:404:ASN:HD21	1.73	0.52
1:A:178:VAL:HG13	1:B:222:ARG:HD3	1.92	0.52
1:A:395:PHE:H	6:A:531:GOL:C1	2.22	0.52
1:B:129:ILE:HB	1:B:266:ILE:HD12	1.92	0.52
2:B:501:NDP:H42N	3:B:511:AKG:C2	2.39	0.52
1:A:80:GLU:HG3	1:A:91:MET:HE2	1.92	0.51
1:C:249:ARG:HH12	1:C:257:GLN:HB3	1.75	0.51
1:C:109:ARG:HD3	1:C:293:SER:OG	2.10	0.51
1:B:334:PHE:HA	1:B:337:THR:OG1	2.10	0.51
1:C:121:VAL:CG1	1:C:124:TRP:CE3	2.93	0.51
1:B:139:TYR:HD1	1:B:271:ASN:HD21	1.57	0.51
1:C:330:ILE:HD12	1:C:363:SER:HB3	1.91	0.51
1:B:46:ILE:HD11	1:B:88:LEU:HD11	1.93	0.50
1:C:375:ASP:OD1	1:C:375:ASP:N	2.44	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:362:VAL:CG2	1:A:408:LYS:HD2	2.40	0.50
1:C:229:GLU:HG3	1:C:230:ILE:N	2.26	0.50
1:C:253:ASP:O	1:C:257:GLN:HG2	2.12	0.50
1:A:317:ARG:O	1:A:321:LYS:HG3	2.12	0.50
1:B:139:TYR:HD1	1:B:271:ASN:ND2	2.10	0.50
1:A:387:GLN:O	1:A:390:ASP:HB2	2.12	0.49
1:C:158:PRO:HD2	1:C:163:GLN:O	2.13	0.49
1:B:96:ASN:O	1:B:100:ARG:HG3	2.12	0.49
1:C:334:PHE:CE2	1:C:360:GLU:HG2	2.48	0.49
1:B:330:ILE:HD12	1:B:363:SER:HB3	1.95	0.48
1:C:20:ARG:HH11	1:C:20:ARG:CG	2.26	0.48
1:B:252:ASP:OD1	1:B:252:ASP:N	2.35	0.48
1:C:20:ARG:HH11	1:C:20:ARG:HG2	1.78	0.48
1:C:160:ASP:OD1	1:C:162:THR:HG23	2.13	0.48
1:A:318:MET:HE3	1:A:325:THR:HG22	1.96	0.48
1:C:64:ILE:HG21	1:C:103:LEU:HD11	1.95	0.48
1:A:397:PHE:CE2	1:A:401:LEU:CD1	2.95	0.48
1:C:266:ILE:N	1:C:266:ILE:HD13	2.29	0.47
1:C:343:ARG:HD3	1:C:343:ARG:C	2.33	0.47
1:B:53:ASN:HA	1:B:92:TRP:CH2	2.49	0.47
1:C:121:VAL:HG11	1:C:124:TRP:CZ3	2.50	0.47
1:A:67:HIS:O	1:A:68:ASN:HB2	2.13	0.47
1:C:75:THR:H	2:C:501:NDP:H71N	1.63	0.47
1:C:121:VAL:HG11	1:C:124:TRP:CE3	2.49	0.47
1:A:32:PHE:N	1:A:33:PRO:HD2	2.29	0.47
1:C:100:ARG:NH2	3:C:511:AKG:O1	2.45	0.47
1:C:67:HIS:O	1:C:343:ARG:NH2	2.48	0.47
1:C:383:LEU:N	1:C:384:PRO:HD3	2.30	0.47
1:A:11:VAL:O	1:A:70:GLY:HA2	2.16	0.46
1:B:32:PHE:N	1:B:33:PRO:CD	2.78	0.46
1:A:46:ILE:CD1	1:A:88:LEU:HD11	2.46	0.46
1:C:12:GLU:OE2	1:C:14:GLN:HG3	2.16	0.46
1:C:119:ARG:NH2	1:C:122:SER:O	2.43	0.46
1:A:344:ALA:HB2	1:A:352:LEU:HB3	1.98	0.46
1:A:392:LEU:N	1:A:392:LEU:CD2	2.69	0.46
1:C:132:HIS:CB	1:C:274:GLY:HA3	2.46	0.46
1:A:212:LYS:HD3	1:A:251:ILE:HG22	1.97	0.46
1:B:80:GLU:CD	1:B:91:MET:CE	2.84	0.46
1:A:6:SER:O	1:A:349:ASN:ND2	2.49	0.46
1:A:219:TYR:CD2	1:B:180:MET:HG2	2.50	0.45
1:C:151:LYS:HG2	1:C:153:GLU:HG3	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:198:GLN:O	1:C:202:SER:HB2	2.17	0.45
1:C:132:HIS:C	1:C:132:HIS:CD2	2.90	0.45
1:A:317:ARG:O	1:A:321:LYS:CG	2.64	0.45
1:B:11:VAL:O	1:B:70:GLY:HA2	2.17	0.45
1:A:215:ILE:HD12	1:B:139:TYR:CE2	2.52	0.44
1:A:324:GLU:CA	6:A:531:GOL:O3	2.50	0.44
1:C:249:ARG:NH1	1:C:257:GLN:HB2	2.32	0.44
1:C:388:ARG:HH11	1:C:388:ARG:HG3	1.71	0.44
1:B:80:GLU:CD	1:B:91:MET:HE1	2.38	0.44
1:B:314:ARG:HD2	2:B:501:NDP:O3B	2.16	0.44
1:A:67:HIS:O	1:A:343:ARG:NH2	2.51	0.44
1:A:219:TYR:CE2	1:B:180:MET:HG2	2.52	0.44
1:A:391:TYR:C	1:A:392:LEU:HD23	2.38	0.44
1:A:393:ASN:OD1	6:A:531:GOL:O1	2.35	0.44
1:A:132:HIS:CB	1:A:274:GLY:HA3	2.48	0.44
2:B:501:NDP:O3B	2:B:501:NDP:O3X	2.33	0.44
1:C:383:LEU:C	1:C:383:LEU:CD1	2.85	0.43
1:A:18:MET:HB2	1:A:316:TYR:HB2	2.00	0.43
1:B:151:LYS:HB2	1:B:151:LYS:HE2	1.38	0.43
1:C:392:LEU:HD13	1:C:396:GLU:C	2.36	0.43
1:A:321:LYS:HB2	1:A:323:GLN:HE21	1.83	0.43
1:A:324:GLU:CD	1:A:388:ARG:HH12	2.20	0.43
1:A:330:ILE:HD13	1:A:330:ILE:HA	1.84	0.43
1:C:182:MET:HB2	7:C:1142:HOH:O	2.18	0.43
1:C:28:GLU:O	1:C:33:PRO:HD3	2.19	0.43
1:C:185:GLN:O	1:C:189:ILE:HG13	2.18	0.43
1:C:316:TYR:CE2	1:C:320:GLN:NE2	2.87	0.43
1:C:20:ARG:CG	1:C:20:ARG:NH1	2.81	0.43
1:C:58:LYS:HB2	1:C:58:LYS:HE3	1.76	0.43
1:C:357:ASN:O	1:C:361:GLU:HG2	2.19	0.43
1:B:257:GLN:O	1:B:261:SER:HB3	2.19	0.42
1:C:313:THR:HG22	2:C:501:NDP:H51N	2.00	0.42
1:C:383:LEU:HD13	1:C:383:LEU:O	2.18	0.42
1:C:39:LEU:HD23	1:C:39:LEU:HA	1.90	0.42
1:B:193:ALA:HA	1:B:227:PHE:CZ	2.55	0.42
1:C:194:HIS:CD2	1:C:235:TYR:OH	2.63	0.42
1:B:343:ARG:CD	1:B:347:ASP:OD2	2.68	0.42
1:B:308:ALA:HB3	7:B:1096:HOH:O	2.19	0.42
1:B:266:ILE:HD13	1:B:266:ILE:N	2.33	0.42
1:B:324:GLU:CD	1:B:388:ARG:HH12	2.23	0.42
1:C:317:ARG:HD3	1:C:317:ARG:HA	1.88	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:354:PHE:CD1	1:C:354:PHE:C	2.93	0.42
1:B:275:ASP:C	1:B:275:ASP:OD1	2.57	0.42
1:C:258:ALA:O	1:C:261:SER:HB3	2.20	0.42
1:A:383:LEU:N	1:A:384:PRO:CD	2.83	0.42
1:C:381:LYS:HE3	1:C:381:LYS:HB3	1.77	0.42
1:C:146:VAL:HA	1:C:147:PRO:HD3	1.80	0.42
2:C:501:NDP:H42N	3:C:511:AKG:C2	2.50	0.42
1:A:343:ARG:HD2	1:A:347:ASP:OD2	2.19	0.41
1:A:406:LYS:HG2	1:A:407:ILE:HD12	2.02	0.41
1:A:44:LEU:HD23	1:A:44:LEU:N	2.35	0.41
1:A:393:ASN:CG	1:A:396:GLU:HG3	2.36	0.41
1:C:13:MET:HE3	1:C:13:MET:HB2	1.73	0.41
1:C:151:LYS:HE3	1:C:151:LYS:HB2	1.46	0.41
1:A:270:LYS:HB3	1:A:270:LYS:HE2	1.90	0.41
1:B:366:THR:HG22	1:B:371:PHE:HB2	2.02	0.41
1:C:249:ARG:HH12	1:C:257:GLN:CB	2.29	0.41
1:C:67:HIS:O	1:C:68:ASN:CB	2.69	0.41
1:C:229:GLU:CG	1:C:230:ILE:HG13	2.51	0.41
1:A:346:LEU:HD23	1:A:346:LEU:HA	1.86	0.41
1:A:397:PHE:CZ	1:A:401:LEU:HD11	2.54	0.41
1:B:71:VAL:O	1:B:71:VAL:HG23	2.20	0.41
1:C:121:VAL:HG11	1:C:124:TRP:CD2	2.56	0.41
1:C:171:ASN:ND2	1:C:173:GLU:OE1	2.54	0.41
1:C:321:LYS:HB3	1:C:321:LYS:HE3	1.91	0.41
1:A:141:ALA:CB	1:A:180:MET:HE3	2.52	0.40
1:C:25:LEU:O	1:C:29:LYS:HG3	2.20	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	405/425 (95%)	391 (96%)	14 (4%)	0	100	100
1	B	409/425 (96%)	399 (98%)	10 (2%)	0	100	100
1	C	405/425 (95%)	388 (96%)	17 (4%)	0	100	100
All	All	1219/1275 (96%)	1178 (97%)	41 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	344/361 (95%)	323 (94%)	21 (6%)	18	16
1	B	347/361 (96%)	322 (93%)	25 (7%)	14	11
1	C	344/361 (95%)	318 (92%)	26 (8%)	13	10
All	All	1035/1083 (96%)	963 (93%)	72 (7%)	15	12

All (72) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	LYS
1	A	9	SER
1	A	31	ILE
1	A	39	LEU
1	A	89	LYS
1	A	109	ARG
1	A	121	VAL
1	A	140	ARG
1	A	151	LYS
1	A	155	THR
1	A	159	SER
1	A	201	LEU
1	A	252	ASP
1	A	303	VAL
1	A	306	GLU

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Mol	Chain	Res	Type
1	A	313	THR
1	A	314	ARG
1	A	381	LYS
1	A	386	VAL
1	A	388	ARG
1	A	392	LEU
1	B	4	LYS
1	B	9	SER
1	B	81	LYS
1	B	109	ARG
1	B	115	LYS
1	B	121	VAL
1	B	151	LYS
1	B	155	THR
1	B	164	LYS
1	B	171	ASN
1	B	173	GLU
1	B	185	GLN
1	B	201	LEU
1	B	202	SER
1	B	212	LYS
1	B	222	ARG
1	B	237	SER
1	B	252	ASP
1	B	261	SER
1	B	303	VAL
1	B	312	VAL
1	B	386	VAL
1	B	387	GLN
1	B	388	ARG
1	B	406	LYS
1	C	9	SER
1	C	12	GLU
1	C	19	THR
1	C	28	GLU
1	C	90	GLN
1	C	91	MET
1	C	109	ARG
1	C	132	HIS
1	C	155	THR
1	C	163	GLN
1	C	164	LYS

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Mol	Chain	Res	Type
1	C	185	GLN
1	C	201	LEU
1	C	202	SER
1	C	237	SER
1	C	252	ASP
1	C	306	GLU
1	C	313	THR
1	C	338	ARG
1	C	348	ASN
1	C	350	LYS
1	C	351	GLU
1	C	372	MET
1	C	386	VAL
1	C	388	ARG
1	C	400	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	96	ASN
1	A	132	HIS
1	A	194	HIS
1	A	323	GLN
1	A	348	ASN
1	B	14	GLN
1	B	194	HIS
1	B	323	GLN
1	C	90	GLN
1	C	132	HIS
1	C	170	HIS
1	C	171	ASN
1	C	194	HIS
1	C	277	GLN
1	C	323	GLN
1	C	357	ASN

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 15 ligands modelled in this entry, 6 are monoatomic - leaving 9 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
2	NDP	C	501	-	45,52,52	1.38	4 (8%)	53,80,80	1.23	2 (3%)
3	AKG	A	511	-	9,9,9	2.17	1 (11%)	11,11,11	1.53	2 (18%)
2	NDP	B	501	-	45,52,52	1.53	4 (8%)	53,80,80	1.06	1 (1%)
3	AKG	B	511	-	9,9,9	1.85	1 (11%)	11,11,11	1.46	2 (18%)
6	GOL	A	532	-	5,5,5	0.43	0	5,5,5	0.62	0
6	GOL	A	531	-	5,5,5	0.49	0	5,5,5	0.35	0
6	GOL	C	532	-	5,5,5	0.68	0	5,5,5	0.69	0
2	NDP	A	501	-	45,52,52	1.51	5 (11%)	53,80,80	1.11	2 (3%)
3	AKG	C	511	-	9,9,9	1.82	1 (11%)	11,11,11	1.60	2 (18%)

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	NDP	C	501	-	-	9/30/77/77	0/5/5/5
3	AKG	A	511	-	-	2/9/9/9	-
2	NDP	B	501	-	-	8/30/77/77	0/5/5/5
3	AKG	B	511	-	-	2/9/9/9	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	GOL	A	532	-	-	2/4/4/4	-
6	GOL	A	531	-	-	0/4/4/4	-
6	GOL	C	532	-	-	1/4/4/4	-
2	NDP	A	501	-	-	10/30/77/77	0/5/5/5
3	AKG	C	511	-	-	0/9/9/9	-

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	NDP	O7N-C7N	6.52	1.39	1.24
2	A	501	NDP	O7N-C7N	6.03	1.38	1.24
3	A	511	AKG	C2-C1	-5.78	1.45	1.53
2	C	501	NDP	O7N-C7N	5.75	1.38	1.24
3	B	511	AKG	C2-C1	-4.55	1.47	1.53
3	C	511	AKG	C2-C1	-4.51	1.47	1.53
2	A	501	NDP	C2A-N3A	3.95	1.38	1.32
2	A	501	NDP	C6N-C5N	3.86	1.40	1.33
2	B	501	NDP	C6N-C5N	3.74	1.40	1.33
2	C	501	NDP	C6N-C5N	3.38	1.39	1.33
2	B	501	NDP	C2A-N3A	3.25	1.37	1.32
2	A	501	NDP	C2A-N1A	2.74	1.39	1.33
2	C	501	NDP	C2A-N3A	2.25	1.35	1.32
2	B	501	NDP	PN-O2N	-2.14	1.45	1.55
2	C	501	NDP	C2A-N1A	2.02	1.37	1.33
2	A	501	NDP	PN-O2N	-2.00	1.45	1.55

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	501	NDP	N3A-C2A-N1A	-5.88	119.48	128.68
2	B	501	NDP	N3A-C2A-N1A	-5.43	120.19	128.68
2	A	501	NDP	N3A-C2A-N1A	-5.33	120.35	128.68
2	A	501	NDP	C1D-N1N-C2N	-3.15	115.87	121.11
3	C	511	AKG	C3-C4-C5	-3.00	107.15	113.60
3	A	511	AKG	C3-C4-C5	-2.95	107.25	113.60
3	A	511	AKG	O1-C1-C2	-2.40	118.51	121.72
3	B	511	AKG	C3-C4-C5	-2.38	108.49	113.60
3	C	511	AKG	O1-C1-C2	-2.23	118.75	121.72
2	C	501	NDP	O2B-C2B-C1B	-2.22	102.13	110.10
3	B	511	AKG	C3-C2-C1	2.12	119.91	115.97

There are no chirality outliers.

All (34) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	NDP	C5B-O5B-PA-O3
2	A	501	NDP	PA-O3-PN-O5D
2	A	501	NDP	C5D-O5D-PN-O2N
2	B	501	NDP	C5B-O5B-PA-O3
2	B	501	NDP	PA-O3-PN-O5D
2	C	501	NDP	C5B-O5B-PA-O1A
2	C	501	NDP	C5B-O5B-PA-O2A
2	C	501	NDP	C5B-O5B-PA-O3
2	C	501	NDP	PA-O3-PN-O5D
2	C	501	NDP	C5D-O5D-PN-O2N
6	A	532	GOL	C1-C2-C3-O3
6	A	532	GOL	O2-C2-C3-O3
2	B	501	NDP	C1B-C2B-O2B-P2B
2	A	501	NDP	C2D-C1D-N1N-C2N
2	B	501	NDP	C2D-C1D-N1N-C2N
2	A	501	NDP	C5D-O5D-PN-O3
2	C	501	NDP	C5D-O5D-PN-O3
2	A	501	NDP	C5B-O5B-PA-O1A
2	A	501	NDP	C5B-O5B-PA-O2A
2	A	501	NDP	C5D-O5D-PN-O1N
2	B	501	NDP	C5B-O5B-PA-O1A
2	B	501	NDP	C5B-O5B-PA-O2A
2	C	501	NDP	C5D-O5D-PN-O1N
2	A	501	NDP	O4D-C1D-N1N-C2N
2	B	501	NDP	O4D-C1D-N1N-C2N
2	C	501	NDP	C2D-C1D-N1N-C2N
2	C	501	NDP	O4D-C1D-N1N-C2N
2	B	501	NDP	C3B-C2B-O2B-P2B
3	B	511	AKG	C3-C4-C5-O4
2	A	501	NDP	C1B-C2B-O2B-P2B
3	B	511	AKG	C3-C4-C5-O3
3	A	511	AKG	C3-C4-C5-O4
6	C	532	GOL	C1-C2-C3-O3
3	A	511	AKG	C3-C4-C5-O3

There are no ring outliers.

7 monomers are involved in 26 short contacts:

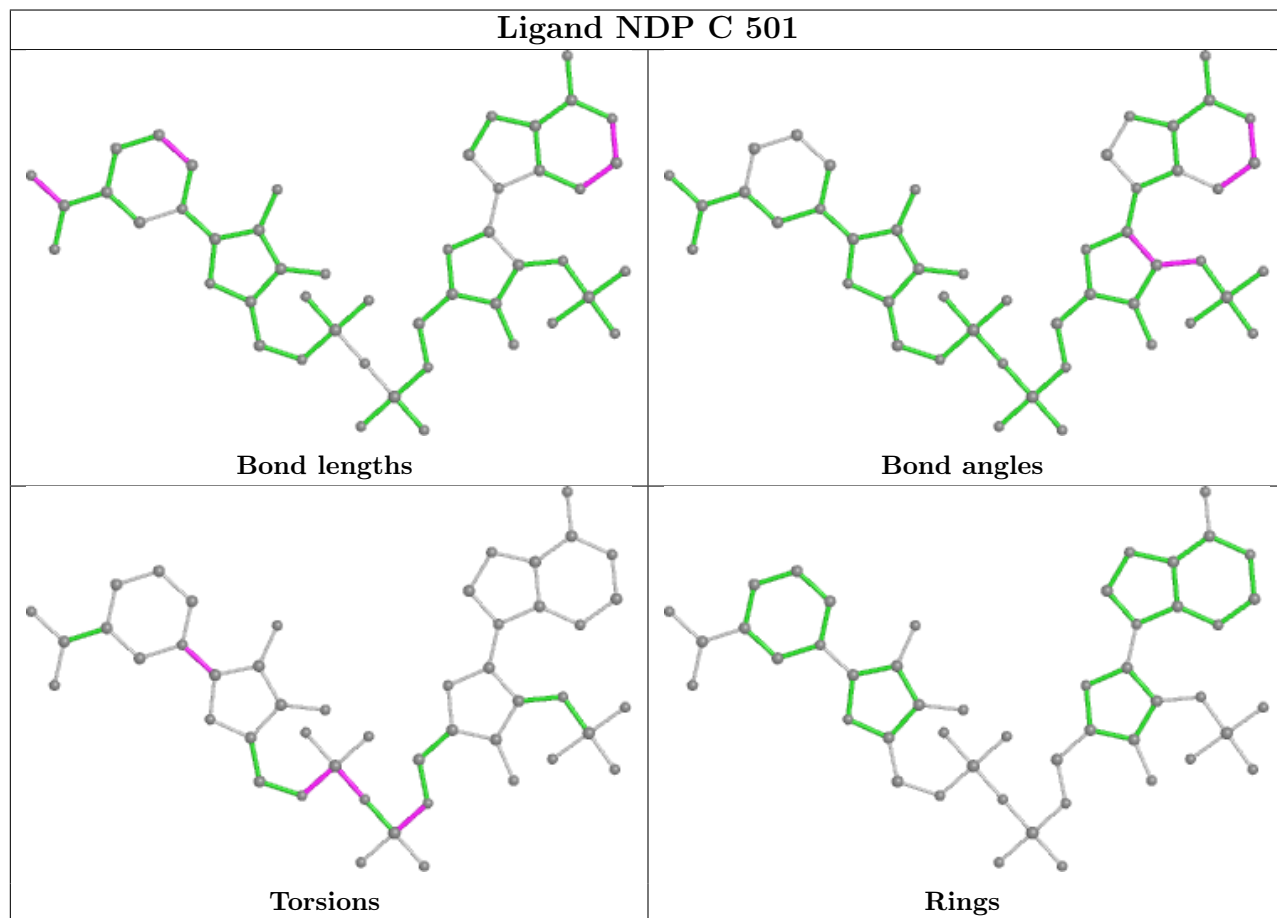
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	501	NDP	4	0
2	B	501	NDP	5	0

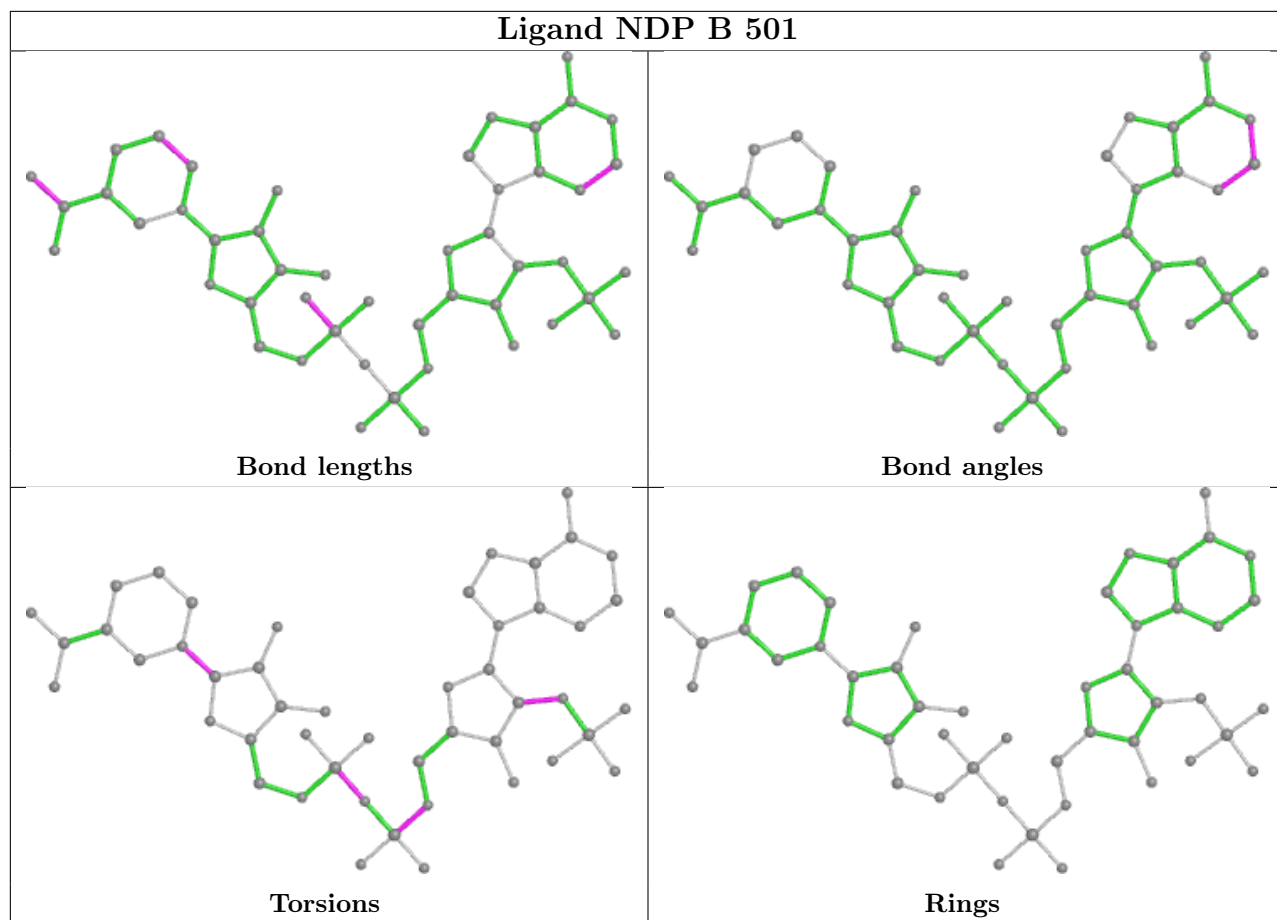
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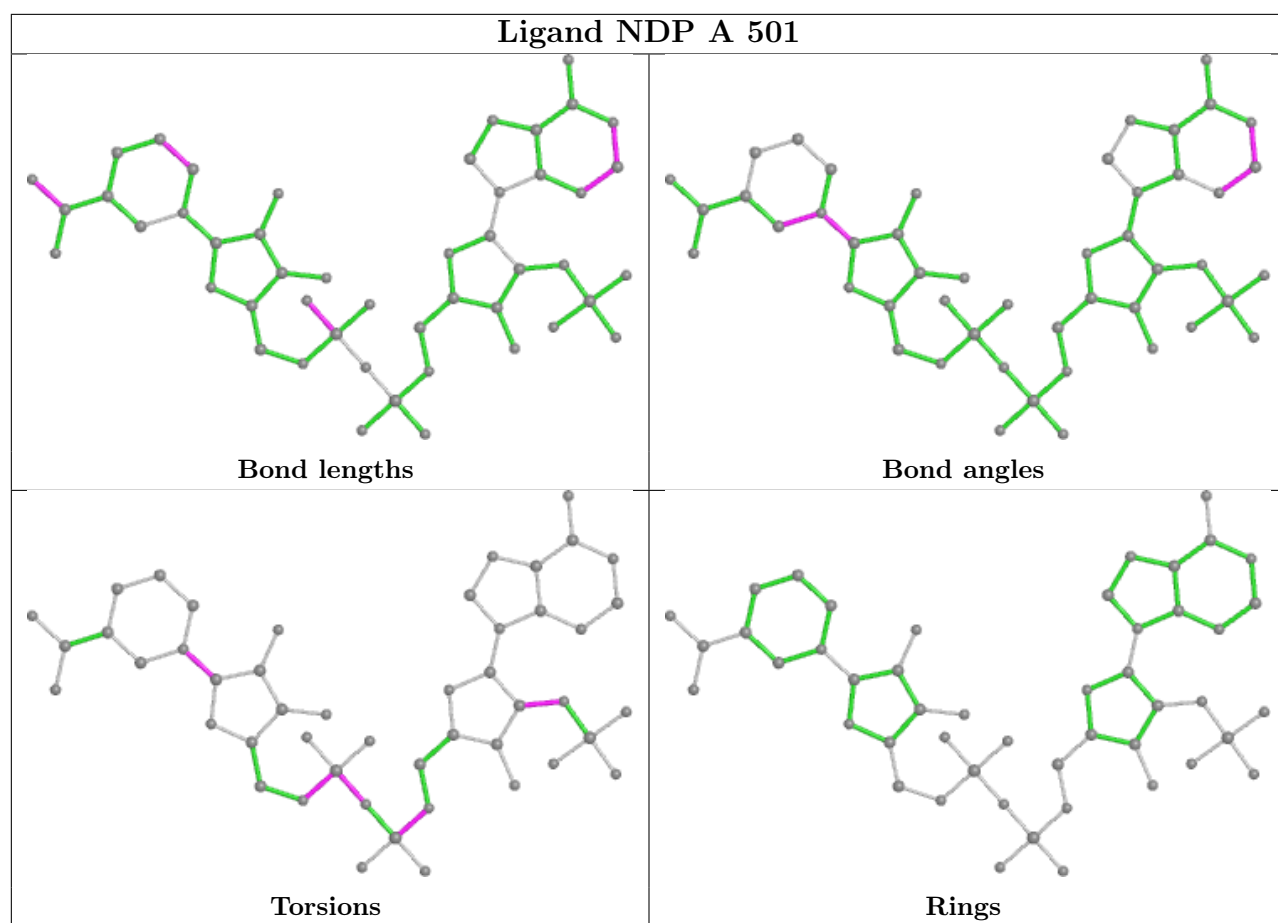
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	511	AKG	1	0
6	A	531	GOL	13	0
6	C	532	GOL	2	0
2	A	501	NDP	1	0
3	C	511	AKG	2	0

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







5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	407/425 (95%)	0.16	14 (3%) 45 51	19, 32, 45, 54	0
1	B	411/425 (96%)	0.04	5 (1%) 79 82	19, 29, 42, 50	0
1	C	407/425 (95%)	0.26	13 (3%) 47 54	23, 34, 49, 59	0
All	All	1225/1275 (96%)	0.15	32 (2%) 56 61	19, 32, 45, 59	0

All (32) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	174	GLU	4.0
1	A	71	VAL	3.3
1	A	205	TRP	3.2
1	C	383	LEU	3.1
1	C	354	PHE	2.9
1	A	350	LYS	2.8
1	A	28	GLU	2.8
1	B	71	VAL	2.7
1	A	354	PHE	2.7
1	A	174	GLU	2.5
1	B	243	LYS	2.5
1	C	243	LYS	2.5
1	C	174	GLU	2.5
1	A	305	ALA	2.5
1	C	384	PRO	2.4
1	C	385	ASN	2.4
1	A	332	SER	2.4
1	C	347	ASP	2.4
1	A	321	LYS	2.3
1	A	335	ALA	2.3
1	C	84	GLU	2.3
1	A	87	LYS	2.2
1	C	160	ASP	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	324	GLU	2.1
1	B	350	LYS	2.1
1	C	350	LYS	2.1
1	B	171	ASN	2.1
1	A	159	SER	2.1
1	C	348	ASN	2.1
1	C	386	VAL	2.1
1	A	348	ASN	2.0
1	A	319	TYR	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, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

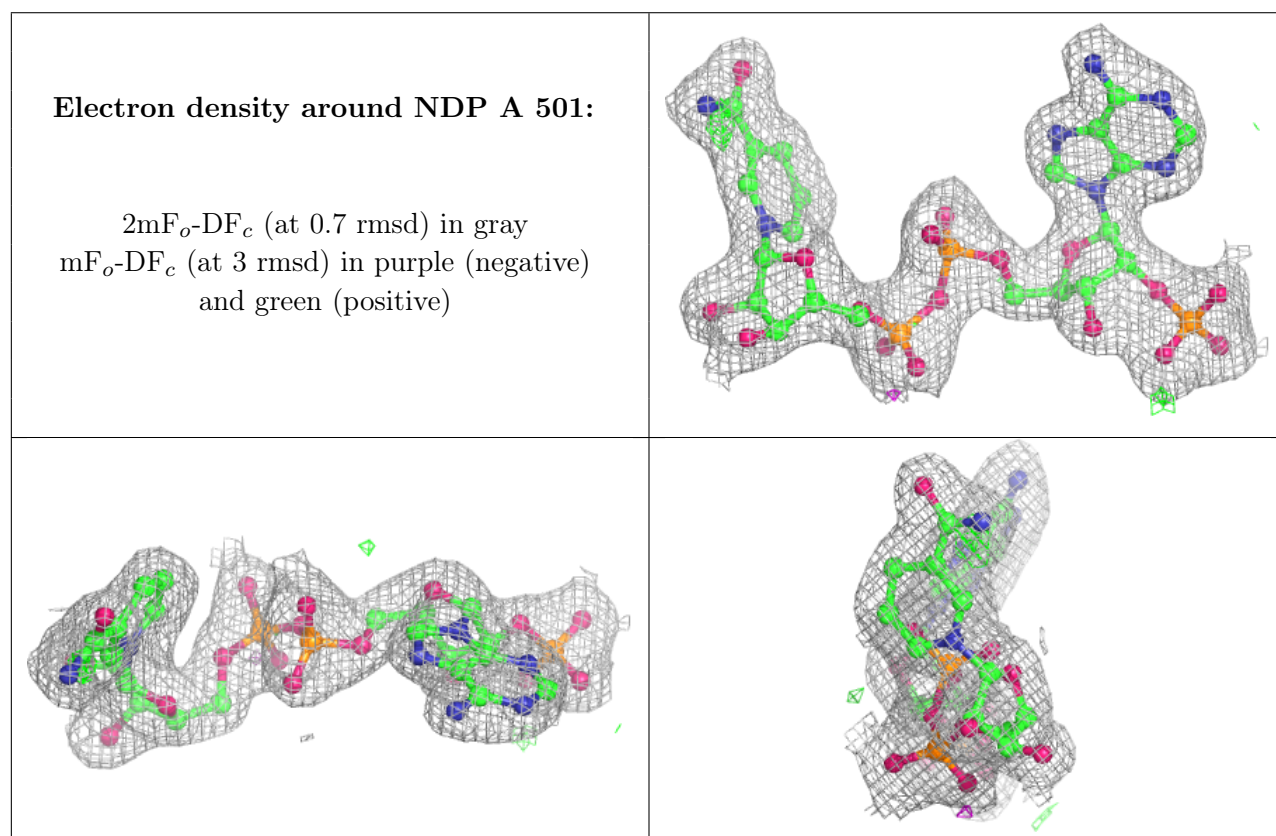
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
6	GOL	C	532	6/6	0.76	0.30	32,34,35,36	0
6	GOL	A	531	6/6	0.79	0.40	29,34,36,37	0
6	GOL	A	532	6/6	0.85	0.26	28,33,36,43	0
5	NA	B	522	1/1	0.88	0.14	30,30,30,30	0
3	AKG	C	511	10/10	0.89	0.15	38,44,48,49	0
3	AKG	A	511	10/10	0.92	0.14	35,41,45,47	0
3	AKG	B	511	10/10	0.93	0.14	32,37,41,45	0
5	NA	C	522	1/1	0.95	0.11	30,30,30,30	0
5	NA	A	522	1/1	0.95	0.09	30,30,30,30	0
2	NDP	A	501	48/48	0.96	0.12	20,28,36,40	0
2	NDP	C	501	48/48	0.97	0.12	22,29,34,37	0
2	NDP	B	501	48/48	0.97	0.11	19,24,32,37	0
4	CA	A	521	1/1	0.97	0.04	35,35,35,35	0
4	CA	B	521	1/1	0.98	0.08	33,33,33,33	0

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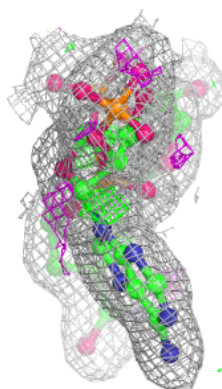
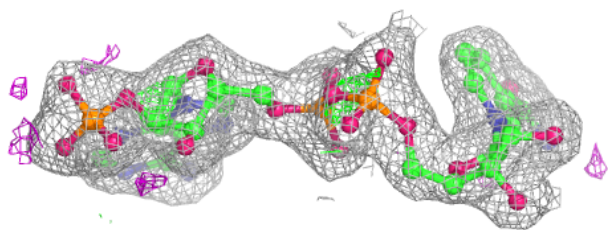
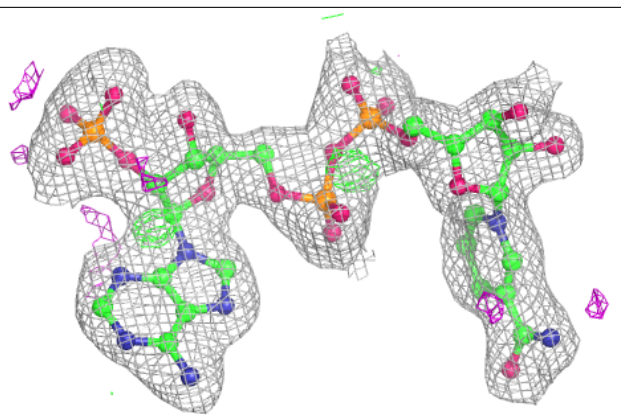
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	CA	C	521	1/1	0.99	0.12	41,41,41,41	0

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.

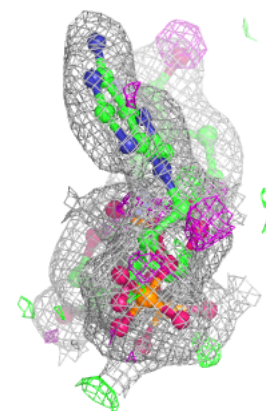
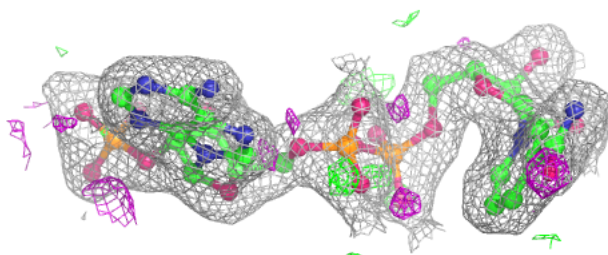
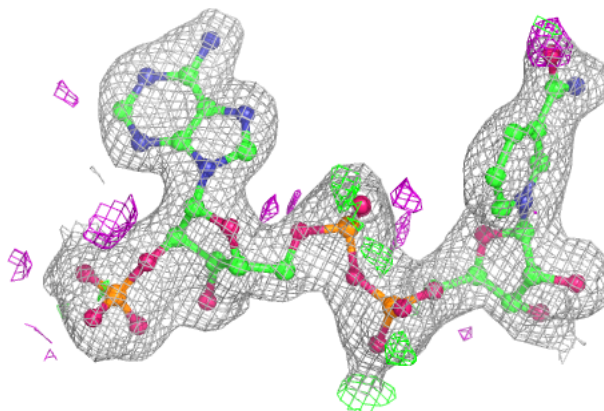


Electron density around NDP C 501:

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

**Electron density around NDP 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)



6.5 Other polymers [i](#)

There are no such residues in this entry.