



# Full wwPDB X-ray Structure Validation Report ⓘ

Apr 12, 2022 – 01:16 pm BST

PDB ID : 7OCR  
Title : NADPH and fructose-6-phosphate bound to the dehydrogenase domain of the bifunctional mannitol-1-phosphate dehydrogenase/phosphatase MtlD from *Acinetobacter baumannii*  
Authors : Tam, H.K.; Mueller, V.; Pos, K.M.  
Deposited on : 2021-04-28  
Resolution : 2.60 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.

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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 : 1.8.4, CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.27  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0267  
CCP4 : 7.1.010 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.27

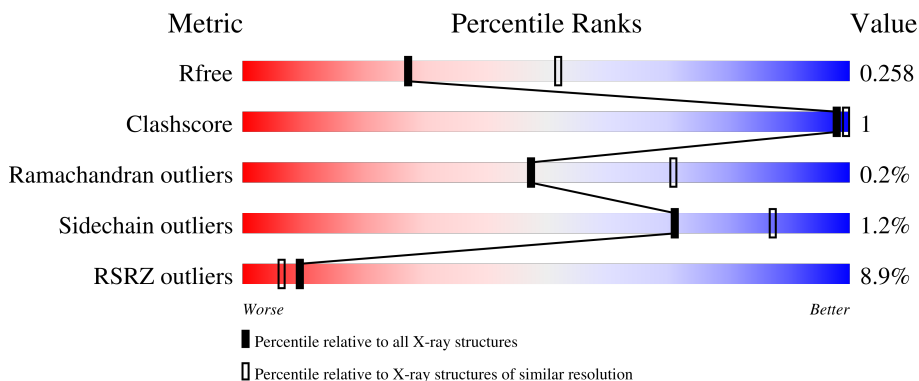
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.60 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	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

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	727	
1	B	727	

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
5	EDO	A	807	-	-	-	X

## 2 Entry composition i

There are 10 unique types of molecules in this entry. The entry contains 11282 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 HAD hydrolase, family IA, variant 3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	687	Total	C	N	O	S	0	0	0
			5540	3518	947	1042	33			
1	B	675	Total	C	N	O	S	0	0	0
			5448	3460	934	1022	32			

There are 26 discrepancies between the modelled and reference sequences:

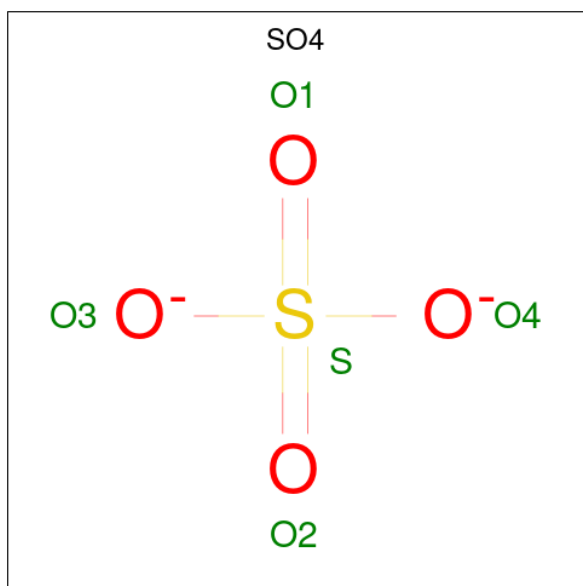
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	initiating methionine	UNP D0C7J2
A	2	VAL	-	expression tag	UNP D0C7J2
A	717	ALA	-	expression tag	UNP D0C7J2
A	718	ALA	-	expression tag	UNP D0C7J2
A	719	ALA	-	expression tag	UNP D0C7J2
A	720	LEU	-	expression tag	UNP D0C7J2
A	721	GLU	-	expression tag	UNP D0C7J2
A	722	HIS	-	expression tag	UNP D0C7J2
A	723	HIS	-	expression tag	UNP D0C7J2
A	724	HIS	-	expression tag	UNP D0C7J2
A	725	HIS	-	expression tag	UNP D0C7J2
A	726	HIS	-	expression tag	UNP D0C7J2
A	727	HIS	-	expression tag	UNP D0C7J2
B	1	MET	-	initiating methionine	UNP D0C7J2
B	2	VAL	-	expression tag	UNP D0C7J2
B	717	ALA	-	expression tag	UNP D0C7J2
B	718	ALA	-	expression tag	UNP D0C7J2
B	719	ALA	-	expression tag	UNP D0C7J2
B	720	LEU	-	expression tag	UNP D0C7J2
B	721	GLU	-	expression tag	UNP D0C7J2
B	722	HIS	-	expression tag	UNP D0C7J2
B	723	HIS	-	expression tag	UNP D0C7J2
B	724	HIS	-	expression tag	UNP D0C7J2
B	725	HIS	-	expression tag	UNP D0C7J2
B	726	HIS	-	expression tag	UNP D0C7J2

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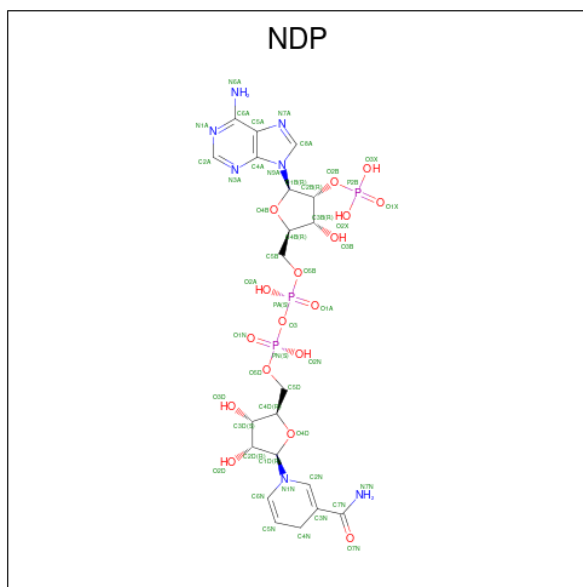
Chain	Residue	Modelled	Actual	Comment	Reference
B	727	HIS	-	expression tag	UNP D0C7J2

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



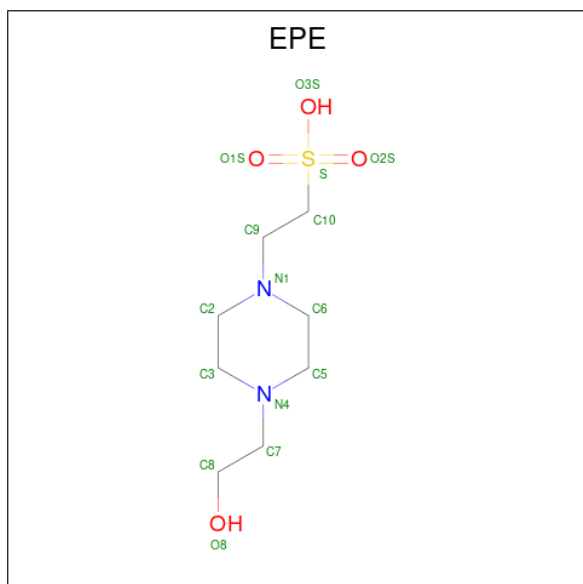
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total O S 5 4 1	0	0
2	A	1	Total O S 5 4 1	0	0

- Molecule 3 is NADPH DIHYDRO-NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NDP) (formula: C<sub>21</sub>H<sub>30</sub>N<sub>7</sub>O<sub>17</sub>P<sub>3</sub>) (labeled as "Ligand of Interest" by depositor).



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

- Molecule 4 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (three-letter code: EPE) (formula: C<sub>8</sub>H<sub>18</sub>N<sub>2</sub>O<sub>4</sub>S).



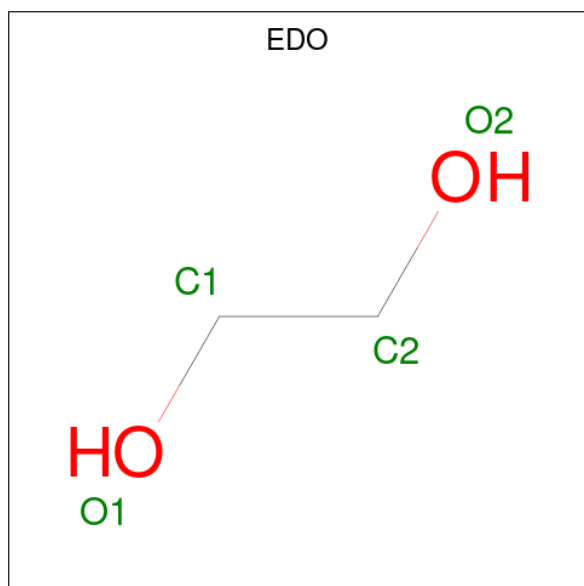
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
4	A	1	15	8	2	4	1	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
4	A	1	15	8	2	4	1	0	0

- Molecule 5 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula:  $C_2H_6O_2$ ).



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

- Molecule 6 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Cl		
6	A	4	4	4	0	0
6	B	3	3	3	0	0

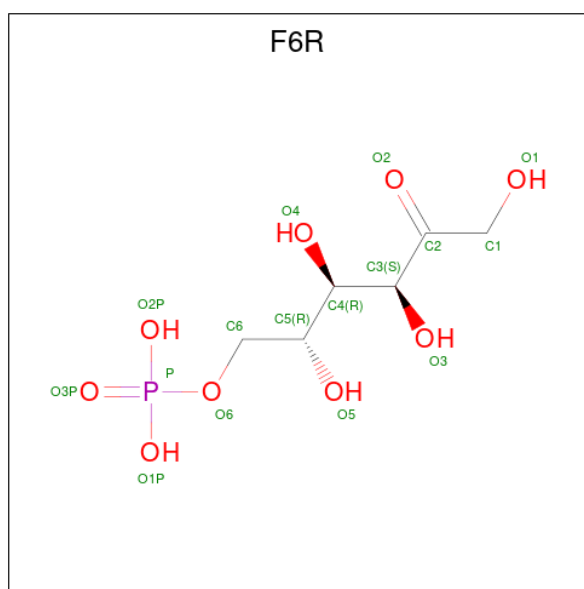
- Molecule 7 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total Mg 1 1	0	0
7	B	1	Total Mg 1 1	0	0

- Molecule 8 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total K 1 1	0	0

- Molecule 9 is FRUCTOSE -6-PHOSPHATE (three-letter code: F6R) (formula: C<sub>6</sub>H<sub>13</sub>O<sub>9</sub>P) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	B	1	Total C O P 16 6 9 1	0	0

- Molecule 10 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	72	Total O 72 72	0	0
10	B	36	Total O 36 36	0	0





## 4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	99.89Å 157.56Å 220.47Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.71 – 2.60 48.71 – 2.60	Depositor EDS
% Data completeness (in resolution range)	100.0 (48.71-2.60) 100.0 (48.71-2.60)	Depositor EDS
$R_{merge}$	0.14	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.72 (at 2.61Å)	Xtriage
Refinement program	REFMAC 5.8.0267	Depositor
R, $R_{free}$	0.230 , 0.258 0.230 , 0.258	Depositor DCC
$R_{free}$ test set	2616 reflections (4.87%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	64.3	Xtriage
Anisotropy	0.613	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	(Not available) , (Not available)	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	11282	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	89.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.26% 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: F6R, CL, EDO, EPE, SO4, MG, K, NDP

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	0.65	0/5644	0.68	0/7620
1	B	0.66	0/5549	0.68	0/7485
All	All	0.66	0/11193	0.68	0/15105

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5540	0	5516	7	0
1	B	5448	0	5422	9	0
2	A	10	0	0	0	0
3	A	48	0	26	0	0
3	B	48	0	26	0	0
4	A	30	0	36	0	0
5	A	16	0	24	0	0
5	B	8	0	12	0	0
6	A	4	0	0	0	0
6	B	3	0	0	0	0
7	A	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	B	1	0	0	0	0
8	A	1	0	0	0	0
9	B	16	0	11	0	0
10	A	72	0	0	0	0
10	B	36	0	0	0	0
All	All	11282	0	11073	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:B:252:PHE:HB2	1:B:278:ALA:HB1	1.87	0.56
1:A:255:ILE:HD11	1:A:414:VAL:HG11	1.91	0.52
1:A:252:PHE:HB2	1:A:278:ALA:HB1	1.90	0.52
1:A:259:TYR:CE2	1:A:414:VAL:HG13	2.50	0.47
1:A:187:SER:O	1:A:188:LYS:HB2	2.16	0.44
1:A:175:GLU:HG2	1:A:180:GLY:C	2.37	0.44
1:B:250:HIS:CD2	1:B:336:LEU:HD11	2.54	0.43
1:B:336:LEU:HD13	1:B:344:GLU:HG3	2.01	0.43
1:B:286:ARG:HA	1:B:313:ILE:HG21	2.01	0.42
1:A:175:GLU:HG2	1:A:181:LEU:N	2.34	0.42
1:B:259:TYR:CE2	1:B:414:VAL:HG13	2.55	0.42
1:B:538:LEU:HD12	1:B:538:LEU:C	2.40	0.42
1:B:610:ASP:N	1:B:611:PRO:HD3	2.35	0.41
1:A:508:LEU:HD23	1:A:511:LEU:HD12	2.02	0.41
1:B:508:LEU:HD23	1:B:511:LEU:HD12	2.02	0.41
1:B:96:ILE:HG23	1:B:100:LEU:HD23	2.01	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	683/727 (94%)	650 (95%)	31 (4%)	2 (0%)	41	64
1	B	667/727 (92%)	635 (95%)	31 (5%)	1 (0%)	51	75
All	All	1350/1454 (93%)	1285 (95%)	62 (5%)	3 (0%)	47	71

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	188	LYS
1	A	455	CYS
1	B	656	GLU

### 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	606/642 (94%)	600 (99%)	6 (1%)	76	90
1	B	595/642 (93%)	587 (99%)	8 (1%)	69	86
All	All	1201/1284 (94%)	1187 (99%)	14 (1%)	71	87

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	121	ARG
1	A	141	ILE
1	A	215	MET
1	A	216	TYR
1	A	433	LYS
1	A	481	HIS
1	B	29	PHE
1	B	39	LEU
1	B	80	ARG
1	B	90	ARG

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Mol	Chain	Res	Type
1	B	139	ASP
1	B	339	GLN
1	B	510	LYS
1	B	619	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	532	ASN

### 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 monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

Of 23 ligands modelled in this entry, 10 are monoatomic - leaving 13 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
4	EPE	A	804	-	15,15,15	1.33	3 (20%)	18,20,20	2.12	4 (22%)
4	EPE	A	813	-	15,15,15	1.31	3 (20%)	18,20,20	2.15	5 (27%)
5	EDO	A	807	-	3,3,3	0.07	0	2,2,2	0.17	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	NDP	A	803	-	45,52,52	2.45	7 (15%)	53,80,80	1.61	10 (18%)
9	F6R	B	807	-	14,15,15	0.39	0	16,21,21	0.51	0
5	EDO	B	804	-	3,3,3	0.07	0	2,2,2	0.18	0
3	NDP	B	806	-	45,52,52	2.36	6 (13%)	53,80,80	1.60	11 (20%)
5	EDO	A	808	-	3,3,3	0.06	0	2,2,2	0.16	0
5	EDO	B	805	-	3,3,3	0.06	0	2,2,2	0.18	0
2	SO4	A	802	-	4,4,4	0.40	0	6,6,6	0.05	0
2	SO4	A	801	-	4,4,4	0.39	0	6,6,6	0.05	0
5	EDO	A	806	-	3,3,3	0.07	0	2,2,2	0.20	0
5	EDO	A	805	-	3,3,3	0.06	0	2,2,2	0.17	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
4	EPE	A	804	-	-	4/9/19/19	0/1/1/1
4	EPE	A	813	-	-	4/9/19/19	0/1/1/1
5	EDO	A	807	-	-	1/1/1/1	-
3	NDP	A	803	-	-	8/30/77/77	0/5/5/5
9	F6R	B	807	-	-	5/20/20/20	-
5	EDO	B	804	-	-	1/1/1/1	-
3	NDP	B	806	-	-	11/30/77/77	0/5/5/5
5	EDO	A	808	-	-	0/1/1/1	-
5	EDO	B	805	-	-	1/1/1/1	-
5	EDO	A	806	-	-	1/1/1/1	-
5	EDO	A	805	-	-	1/1/1/1	-

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	803	NDP	P2B-O2B	13.57	1.84	1.59
3	B	806	NDP	P2B-O2B	12.81	1.83	1.59
3	A	803	NDP	PN-O5D	4.65	1.78	1.59
3	B	806	NDP	PN-O5D	4.30	1.76	1.59
4	A	813	EPE	C10-S	3.63	1.82	1.77
4	A	804	EPE	C10-S	3.57	1.82	1.77
3	B	806	NDP	O2B-C2B	-2.91	1.33	1.44
3	B	806	NDP	C2A-N1A	2.80	1.39	1.33
3	A	803	NDP	C2A-N1A	2.72	1.39	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	803	NDP	C4A-N3A	2.70	1.39	1.35
3	A	803	NDP	O2B-C2B	-2.70	1.34	1.44
3	B	806	NDP	C4A-N3A	2.53	1.39	1.35
4	A	804	EPE	O2S-S	2.38	1.52	1.45
3	B	806	NDP	C7N-N7N	2.26	1.39	1.33
4	A	813	EPE	O1S-S	2.23	1.51	1.45
3	A	803	NDP	C2A-N3A	2.19	1.35	1.32
3	A	803	NDP	C7N-N7N	2.16	1.39	1.33
4	A	813	EPE	O2S-S	2.16	1.51	1.45
4	A	804	EPE	O1S-S	2.12	1.51	1.45

All (30) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	803	NDP	PN-O3-PA	-6.72	109.77	132.83
4	A	804	EPE	O2S-S-C10	6.38	114.59	106.92
3	B	806	NDP	PN-O3-PA	-6.22	111.50	132.83
4	A	813	EPE	O1S-S-C10	5.28	113.27	106.92
4	A	813	EPE	O3S-S-O1S	-4.43	100.44	111.27
4	A	804	EPE	O2S-S-O1S	-3.85	100.64	113.95
4	A	813	EPE	O3S-S-C10	3.73	111.79	105.77
3	B	806	NDP	O2B-P2B-O1X	-3.40	96.28	109.39
4	A	804	EPE	O1S-S-C10	3.25	110.83	106.92
3	A	803	NDP	O2B-P2B-O1X	-3.17	97.15	109.39
3	B	806	NDP	PA-O5B-C5B	-2.84	105.05	121.68
3	A	803	NDP	PA-O5B-C5B	-2.78	105.36	121.68
4	A	813	EPE	C9-N1-C2	2.58	117.84	111.23
3	B	806	NDP	O3X-P2B-O2X	2.53	117.32	107.64
3	A	803	NDP	O3X-P2B-O2X	2.47	117.09	107.64
4	A	804	EPE	C9-N1-C6	2.42	117.42	111.23
4	A	813	EPE	C6-N1-C2	2.41	114.25	108.83
3	B	806	NDP	C3N-C2N-N1N	-2.36	119.73	123.10
3	B	806	NDP	PN-O5D-C5D	-2.30	108.18	121.68
3	A	803	NDP	C2A-N1A-C6A	-2.28	114.85	118.75
3	B	806	NDP	C2A-N1A-C6A	-2.25	114.91	118.75
3	B	806	NDP	O7N-C7N-N7N	-2.22	117.68	122.88
3	A	803	NDP	O2N-PN-O1N	2.21	123.15	112.24
3	A	803	NDP	O4B-C4B-C3B	2.20	109.47	105.11
3	B	806	NDP	O4B-C4B-C3B	2.18	109.42	105.11
3	A	803	NDP	PN-O5D-C5D	-2.16	109.03	121.68
3	B	806	NDP	C5B-C4B-C3B	-2.14	107.17	115.18
3	B	806	NDP	O2N-PN-O1N	2.10	122.62	112.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	803	NDP	O5D-PN-O1N	-2.04	101.08	109.07
3	A	803	NDP	C3N-C2N-N1N	-2.02	120.22	123.10

There are no chirality outliers.

All (37) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	803	NDP	C2N-C3N-C7N-N7N
3	B	806	NDP	C5B-O5B-PA-O1A
3	B	806	NDP	C5B-O5B-PA-O3
3	B	806	NDP	O4B-C4B-C5B-O5B
3	B	806	NDP	C3B-C4B-C5B-O5B
3	B	806	NDP	O4D-C4D-C5D-O5D
3	B	806	NDP	C2N-C3N-C7N-N7N
4	A	804	EPE	C10-C9-N1-C6
4	A	804	EPE	N4-C7-C8-O8
4	A	804	EPE	S-C10-C9-N1
4	A	813	EPE	C10-C9-N1-C2
4	A	813	EPE	S-C10-C9-N1
9	B	807	F6R	O1-C1-C2-C3
9	B	807	F6R	O1-C1-C2-O2
9	B	807	F6R	C1-C2-C3-C4
9	B	807	F6R	O2-C2-C3-C4
9	B	807	F6R	O2-C2-C3-O3
4	A	813	EPE	N4-C7-C8-O8
3	A	803	NDP	O4B-C4B-C5B-O5B
3	B	806	NDP	C3D-C4D-C5D-O5D
3	A	803	NDP	C3B-C2B-O2B-P2B
3	A	803	NDP	C1B-C2B-O2B-P2B
5	B	804	EDO	O1-C1-C2-O2
3	A	803	NDP	O4D-C1D-N1N-C6N
4	A	804	EPE	C10-C9-N1-C2
4	A	813	EPE	C10-C9-N1-C6
3	A	803	NDP	C3B-C4B-C5B-O5B
5	A	805	EDO	O1-C1-C2-O2
3	B	806	NDP	PN-O3-PA-O5B
3	B	806	NDP	C2B-O2B-P2B-O3X
3	B	806	NDP	O4D-C1D-N1N-C6N
3	B	806	NDP	C2D-C1D-N1N-C6N
5	A	807	EDO	O1-C1-C2-O2
5	B	805	EDO	O1-C1-C2-O2
3	A	803	NDP	C5B-O5B-PA-O3

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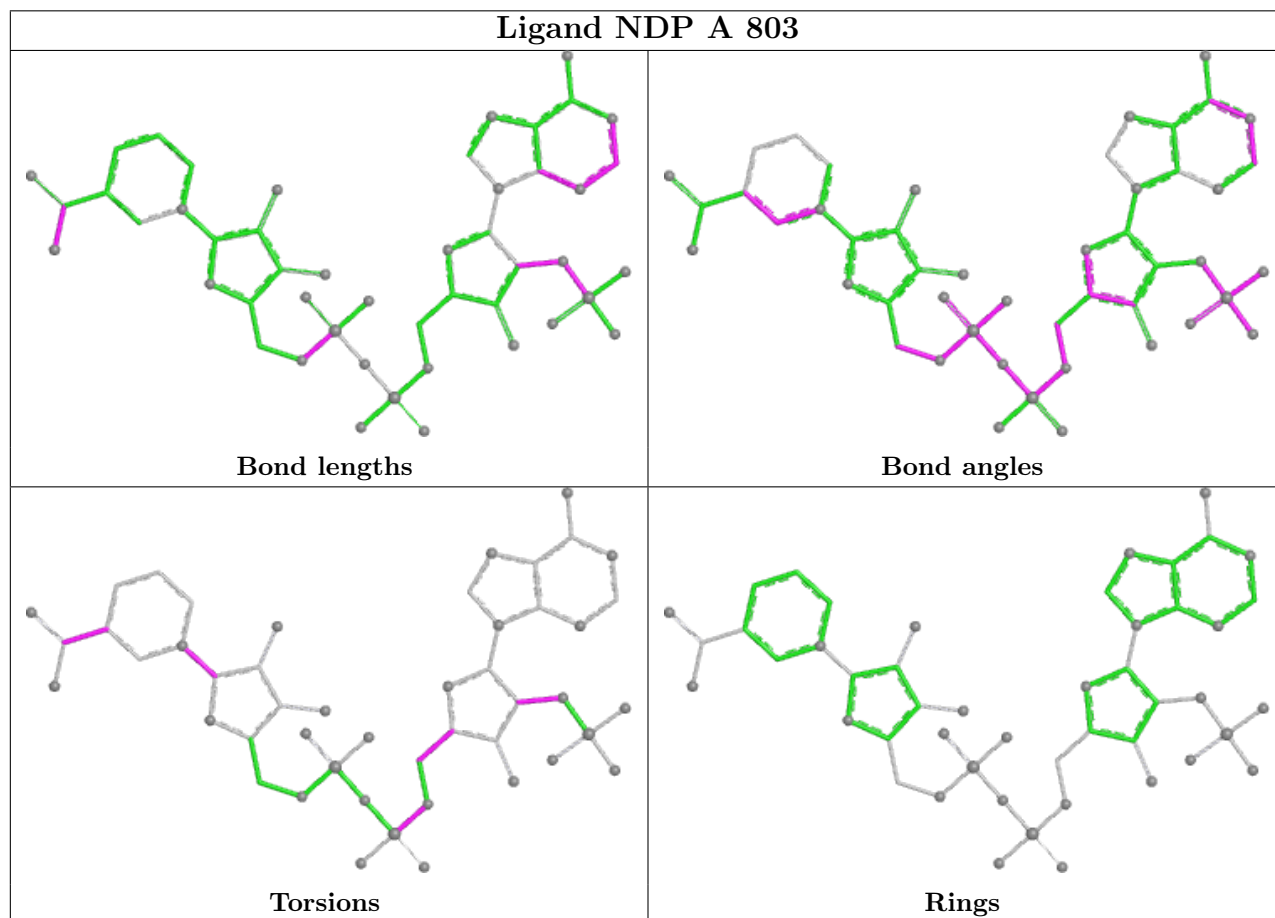
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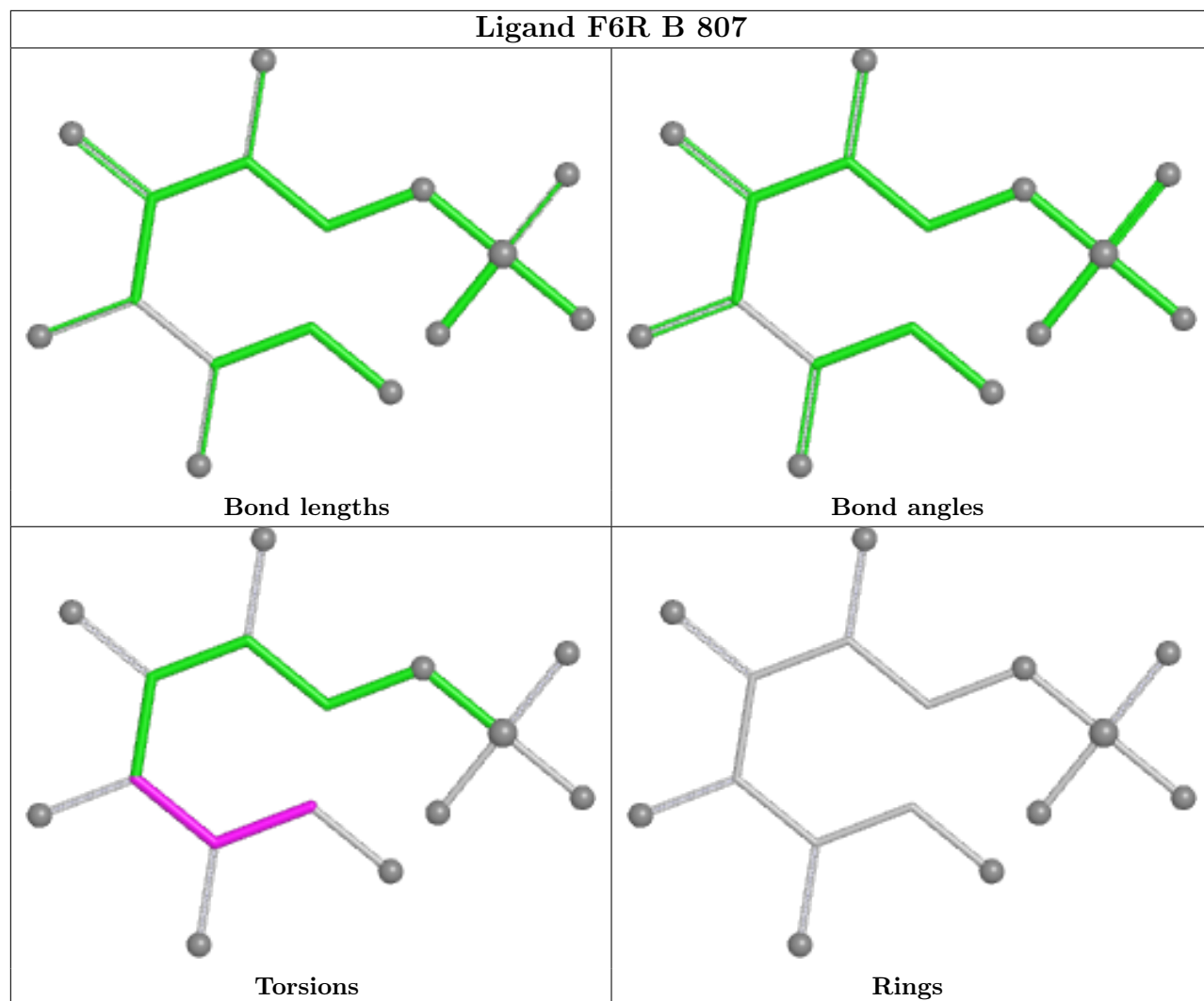
Mol	Chain	Res	Type	Atoms
3	A	803	NDP	C5B-O5B-PA-O1A
5	A	806	EDO	O1-C1-C2-O2

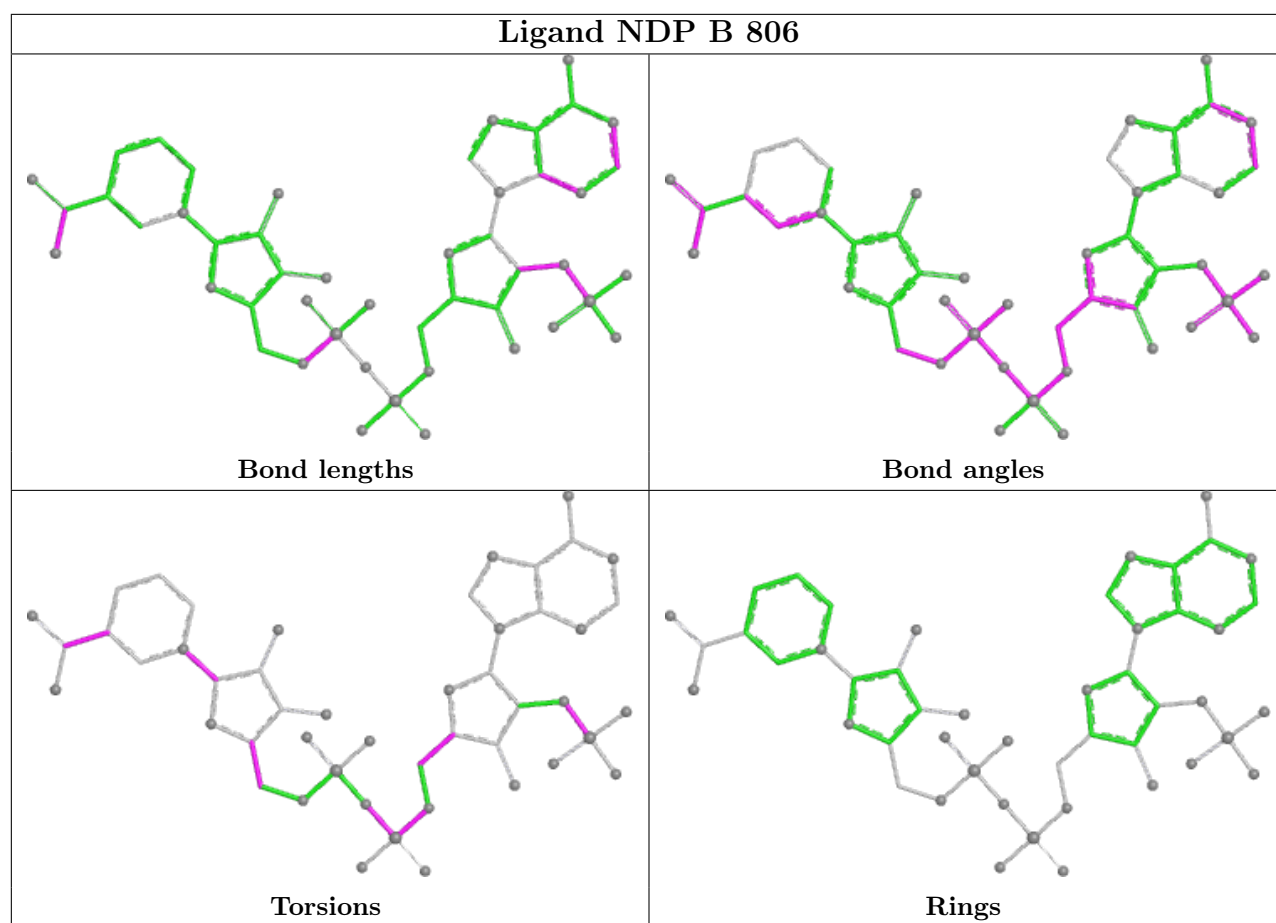
There are no ring outliers.

No monomer is involved in short contacts.

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, 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	687/727 (94%)	0.67	51 (7%) 14 10	47, 80, 134, 157	0
1	B	675/727 (92%)	0.78	70 (10%) 6 4	55, 88, 142, 177	0
All	All	1362/1454 (93%)	0.73	121 (8%) 9 6	47, 84, 138, 177	0

All (121) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	689	ILE	6.4
1	A	362	THR	6.4
1	B	39	LEU	6.0
1	B	49	LEU	5.9
1	B	83	GLU	5.3
1	B	208	ALA	5.0
1	B	197	ILE	4.8
1	B	191	THR	4.6
1	A	455	CYS	4.6
1	B	77	ILE	4.6
1	B	44	PHE	4.5
1	A	353	TYR	4.5
1	B	454	ASP	4.4
1	A	679	ARG	4.2
1	B	464	ASN	4.1
1	B	40	ILE	4.0
1	A	361	GLU	4.0
1	A	601	LYS	4.0
1	B	5	PHE	4.0
1	A	688	LEU	4.0
1	B	29	PHE	3.8
1	B	174	PHE	3.8
1	A	454	ASP	3.7
1	A	360	LEU	3.6

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	182	THR	3.6
1	B	124	ILE	3.6
1	B	353	TYR	3.5
1	A	363	CYS	3.5
1	A	450	ILE	3.5
1	A	673	LEU	3.4
1	B	76	GLU	3.3
1	A	646	TYR	3.3
1	A	652	PHE	3.3
1	B	116	VAL	3.1
1	B	48	TYR	3.1
1	A	690	GLN	3.1
1	B	27	LEU	3.1
1	A	660	ALA	3.0
1	B	74	TYR	2.9
1	B	177	SER	2.9
1	B	461	ASP	2.9
1	A	685	LEU	2.9
1	A	691	TYR	2.9
1	B	41	GLY	2.8
1	B	190	LEU	2.8
1	A	659	LYS	2.8
1	B	66	ARG	2.7
1	B	694	SER	2.7
1	A	403	ILE	2.7
1	B	651	GLN	2.7
1	B	544	LEU	2.7
1	B	200	PRO	2.6
1	A	381	LEU	2.6
1	B	356	PHE	2.6
1	A	350	LYS	2.6
1	A	380	TYR	2.6
1	A	393	LEU	2.6
1	A	404	LEU	2.6
1	B	652	PHE	2.6
1	A	635	TYR	2.6
1	A	452	ILE	2.6
1	A	323	LEU	2.6
1	A	392	GLU	2.6
1	A	83	GLU	2.5
1	B	409	PHE	2.5
1	B	47	GLU	2.5

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	456	ASN	2.5
1	B	51	GLN	2.5
1	B	460	PRO	2.5
1	B	42	GLN	2.5
1	B	455	CYS	2.5
1	A	382	VAL	2.5
1	B	178	GLU	2.4
1	B	209	HIS	2.4
1	B	660	ALA	2.4
1	B	395	ASN	2.4
1	A	359	GLN	2.4
1	B	198	LYS	2.4
1	B	10	VAL	2.4
1	B	172	LEU	2.4
1	A	680	GLN	2.3
1	B	64	ALA	2.3
1	B	323	LEU	2.3
1	A	457	LYS	2.3
1	B	57	ALA	2.3
1	A	656	GLU	2.3
1	B	683	ALA	2.3
1	A	645	GLY	2.3
1	B	386	LEU	2.3
1	A	653	LEU	2.3
1	A	686	VAL	2.3
1	A	567	ILE	2.2
1	A	684	GLU	2.2
1	B	207	LYS	2.2
1	A	482	ILE	2.2
1	B	196	ASP	2.2
1	A	388	GLU	2.2
1	A	445	GLU	2.2
1	B	453	GLU	2.2
1	B	654	GLU	2.2
1	A	629	ILE	2.2
1	A	675	THR	2.2
1	B	399	VAL	2.2
1	B	456	ASN	2.2
1	B	657	GLU	2.1
1	B	33	GLN	2.1
1	A	662	GLU	2.1
1	B	679	ARG	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	380	TYR	2.1
1	B	365	GLU	2.1
1	A	639	LEU	2.1
1	B	156	ILE	2.0
1	B	15	PHE	2.0
1	B	3	LEU	2.0
1	A	391	LEU	2.0
1	B	393	LEU	2.0
1	A	341	ILE	2.0
1	B	575	ALA	2.0
1	B	34	GLN	2.0
1	B	157	PHE	2.0
1	B	445	GLU	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( $\text{\AA}^2$ )	Q<0.9
5	EDO	B	805	4/4	0.44	0.38	97,99,99,100	0
4	EPE	A	804	15/15	0.72	0.39	73,74,76,77	0
5	EDO	A	808	4/4	0.75	0.30	79,80,82,82	0
5	EDO	A	806	4/4	0.76	0.18	84,84,84,85	0
5	EDO	A	807	4/4	0.80	0.42	74,75,75,76	0
4	EPE	A	813	15/15	0.81	0.29	99,102,106,106	0
6	CL	B	803	1/1	0.82	0.17	85,85,85,85	0
8	K	A	815	1/1	0.82	0.19	90,90,90,90	0
5	EDO	B	804	4/4	0.83	0.25	117,118,118,119	0
5	EDO	A	805	4/4	0.88	0.29	77,78,78,79	0

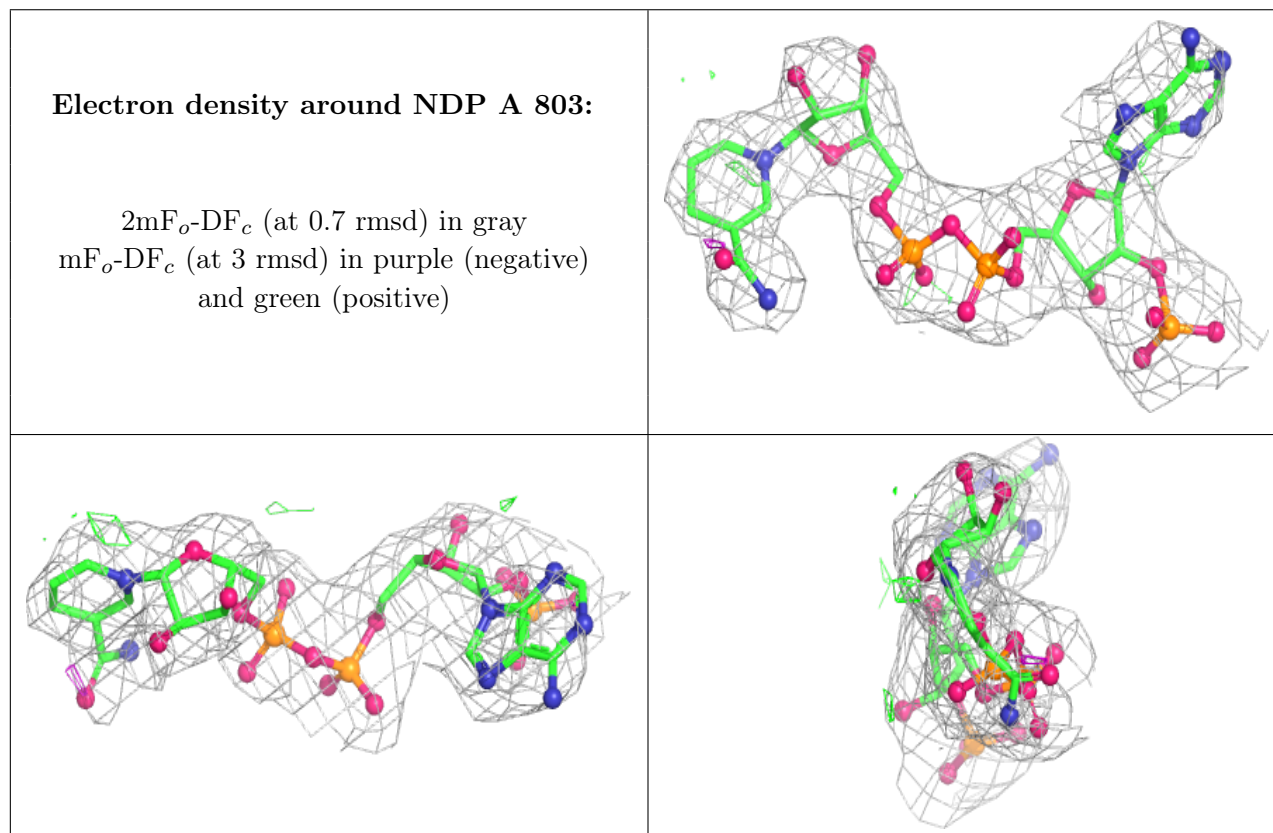
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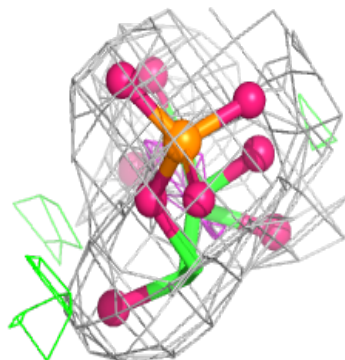
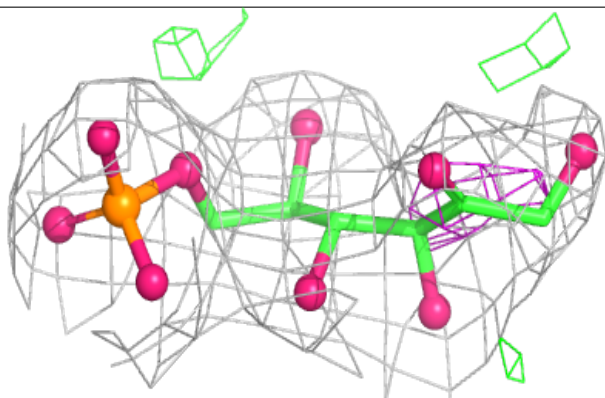
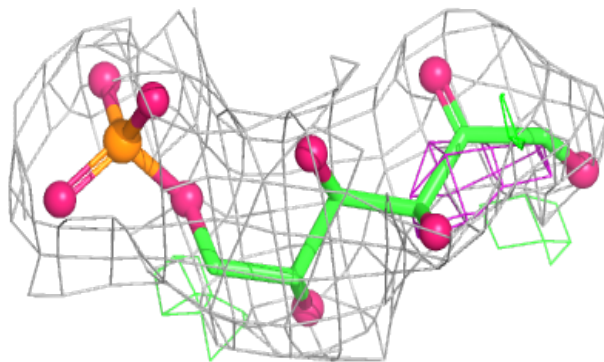
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
7	MG	B	808	1/1	0.88	0.17	88,88,88,88	0
2	SO4	A	801	5/5	0.88	0.18	108,108,108,108	0
6	CL	A	812	1/1	0.89	0.25	67,67,67,67	0
3	NDP	A	803	48/48	0.90	0.17	91,96,103,107	0
2	SO4	A	802	5/5	0.92	0.14	115,115,115,115	0
6	CL	B	802	1/1	0.93	0.24	50,50,50,50	0
6	CL	A	809	1/1	0.93	0.25	75,75,75,75	0
7	MG	A	814	1/1	0.94	0.32	60,60,60,60	0
6	CL	A	811	1/1	0.94	0.19	75,75,75,75	0
6	CL	B	801	1/1	0.94	0.14	64,64,64,64	0
9	F6R	B	807	16/16	0.94	0.19	70,70,71,72	0
3	NDP	B	806	48/48	0.96	0.16	62,70,84,86	0
6	CL	A	810	1/1	0.97	0.11	57,57,57,57	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.

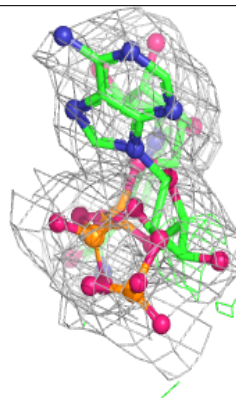
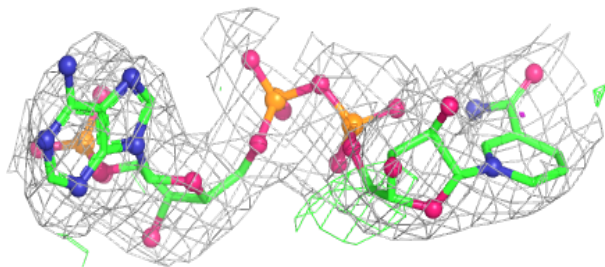
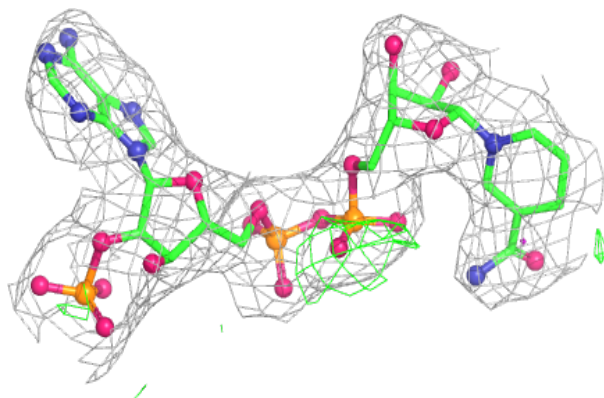


**Electron density around F6R B 807:**

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

**Electron density around NDP B 806:**

$2mF_o-DF_c$  (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.