WORLDWIDE PDB

PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report ⓘ

Apr 28, 2024 – 02:18 pm BST

PDB ID	:	2X9G
Title	:	High resolution structure of TbPTR1 in complex with Pemetrexed
Authors	:	Dawson, A.; Barrack, K.L.; Tulloch, L.B.; Hunter, W.N.
Deposited on	:	2010-03-18
Resolution	:	1.10 Å(reported)

The following versions of software and data (see references ⓘ) were used in the production of this report:

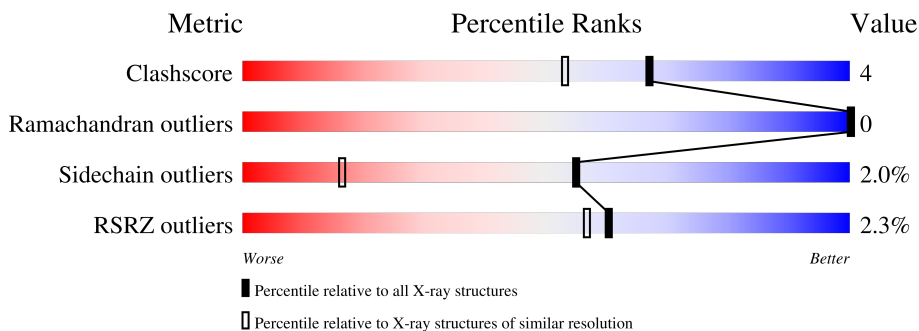|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 1.10 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	Percentile Ranks	Value
Clashscore		4
Ramachandran outliers		0
Sidechain outliers		2.0%
RSRZ outliers		2.3%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	1671 (1.14-1.06)
Ramachandran outliers	138981	1615 (1.14-1.06)
Sidechain outliers	138945	1613 (1.14-1.06)
RSRZ outliers	127900	1588 (1.14-1.06)

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

Mol	Chain	Length	Quality of chain
1	A	288	% 80% 7% · 13%
1	B	288	2% 79% 6% · 13%
1	C	288	3% 76% 10% ·· 12%
1	D	288	% 74% 10% · 14%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 16553 atoms, of which 7199 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 PTERIDINE REDUCTASE.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	251	Total	C	H	N	O	S	0	9	0
			3670	1202	1766	333	357	12			
1	B	250	Total	C	H	N	O	S	0	8	0
			3654	1193	1761	331	357	12			
1	C	252	Total	C	H	N	O	S	0	8	0
			3656	1195	1751	337	362	11			
1	D	249	Total	C	H	N	O	S	0	12	0
			3685	1206	1773	332	362	12			

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	expression tag	UNP O76290
A	-18	GLY	-	expression tag	UNP O76290
A	-17	SER	-	expression tag	UNP O76290
A	-16	SER	-	expression tag	UNP O76290
A	-15	HIS	-	expression tag	UNP O76290
A	-14	HIS	-	expression tag	UNP O76290
A	-13	HIS	-	expression tag	UNP O76290
A	-12	HIS	-	expression tag	UNP O76290
A	-11	HIS	-	expression tag	UNP O76290
A	-10	HIS	-	expression tag	UNP O76290
A	-9	SER	-	expression tag	UNP O76290
A	-8	SER	-	expression tag	UNP O76290
A	-7	GLY	-	expression tag	UNP O76290
A	-6	LEU	-	expression tag	UNP O76290
A	-5	VAL	-	expression tag	UNP O76290
A	-4	PRO	-	expression tag	UNP O76290
A	-3	ARG	-	expression tag	UNP O76290
A	-2	GLY	-	expression tag	UNP O76290
A	-1	SER	-	expression tag	UNP O76290
A	0	HIS	-	expression tag	UNP O76290
B	-19	MET	-	expression tag	UNP O76290

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-18	GLY	-	expression tag	UNP O76290
B	-17	SER	-	expression tag	UNP O76290
B	-16	SER	-	expression tag	UNP O76290
B	-15	HIS	-	expression tag	UNP O76290
B	-14	HIS	-	expression tag	UNP O76290
B	-13	HIS	-	expression tag	UNP O76290
B	-12	HIS	-	expression tag	UNP O76290
B	-11	HIS	-	expression tag	UNP O76290
B	-10	HIS	-	expression tag	UNP O76290
B	-9	SER	-	expression tag	UNP O76290
B	-8	SER	-	expression tag	UNP O76290
B	-7	GLY	-	expression tag	UNP O76290
B	-6	LEU	-	expression tag	UNP O76290
B	-5	VAL	-	expression tag	UNP O76290
B	-4	PRO	-	expression tag	UNP O76290
B	-3	ARG	-	expression tag	UNP O76290
B	-2	GLY	-	expression tag	UNP O76290
B	-1	SER	-	expression tag	UNP O76290
B	0	HIS	-	expression tag	UNP O76290
C	-19	MET	-	expression tag	UNP O76290
C	-18	GLY	-	expression tag	UNP O76290
C	-17	SER	-	expression tag	UNP O76290
C	-16	SER	-	expression tag	UNP O76290
C	-15	HIS	-	expression tag	UNP O76290
C	-14	HIS	-	expression tag	UNP O76290
C	-13	HIS	-	expression tag	UNP O76290
C	-12	HIS	-	expression tag	UNP O76290
C	-11	HIS	-	expression tag	UNP O76290
C	-10	HIS	-	expression tag	UNP O76290
C	-9	SER	-	expression tag	UNP O76290
C	-8	SER	-	expression tag	UNP O76290
C	-7	GLY	-	expression tag	UNP O76290
C	-6	LEU	-	expression tag	UNP O76290
C	-5	VAL	-	expression tag	UNP O76290
C	-4	PRO	-	expression tag	UNP O76290
C	-3	ARG	-	expression tag	UNP O76290
C	-2	GLY	-	expression tag	UNP O76290
C	-1	SER	-	expression tag	UNP O76290
C	0	HIS	-	expression tag	UNP O76290
D	-19	MET	-	expression tag	UNP O76290
D	-18	GLY	-	expression tag	UNP O76290
D	-17	SER	-	expression tag	UNP O76290

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-16	SER	-	expression tag	UNP O76290
D	-15	HIS	-	expression tag	UNP O76290
D	-14	HIS	-	expression tag	UNP O76290
D	-13	HIS	-	expression tag	UNP O76290
D	-12	HIS	-	expression tag	UNP O76290
D	-11	HIS	-	expression tag	UNP O76290
D	-10	HIS	-	expression tag	UNP O76290
D	-9	SER	-	expression tag	UNP O76290
D	-8	SER	-	expression tag	UNP O76290
D	-7	GLY	-	expression tag	UNP O76290
D	-6	LEU	-	expression tag	UNP O76290
D	-5	VAL	-	expression tag	UNP O76290
D	-4	PRO	-	expression tag	UNP O76290
D	-3	ARG	-	expression tag	UNP O76290
D	-2	GLY	-	expression tag	UNP O76290
D	-1	SER	-	expression tag	UNP O76290
D	0	HIS	-	expression tag	UNP O76290

- Molecule 2 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NAP) (formula: $C_{21}H_{28}N_7O_{17}P_3$).

NAP
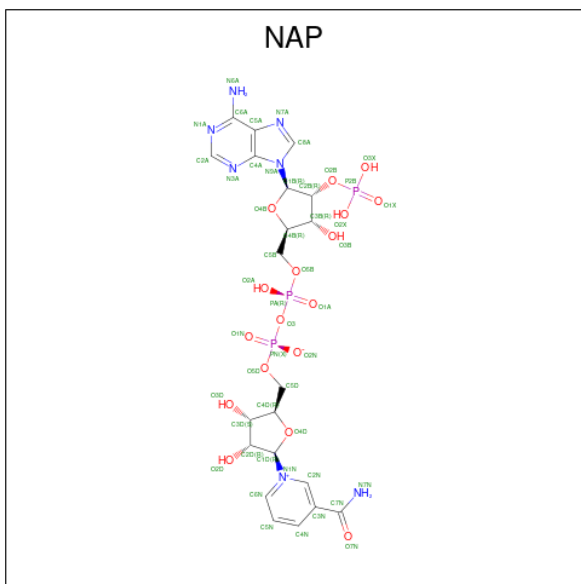
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	H	N	O	P	0	0
			66	21	18	7	17	3		
2	B	1	Total	C	H	N	O	P	0	0
			66	21	18	7	17	3		

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Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	C	1	Total	C	H	N	O	P	0	0
			66	21	18	7	17	3		
2	D	1	Total	C	H	N	O	P	0	0
			66	21	18	7	17	3		

- Molecule 3 is 2-{4-[2-(2-AMINO-4-OXO-4,7-DIHYDRO-3H-PYRROLO[2,3-D]PYRIMIDIN-5-YL)-ETHYL]-BENZOYLAMINO}-PENTANEDIOIC ACID (three-letter code: LYA) (formula: $C_{20}H_{21}N_5O_6$).
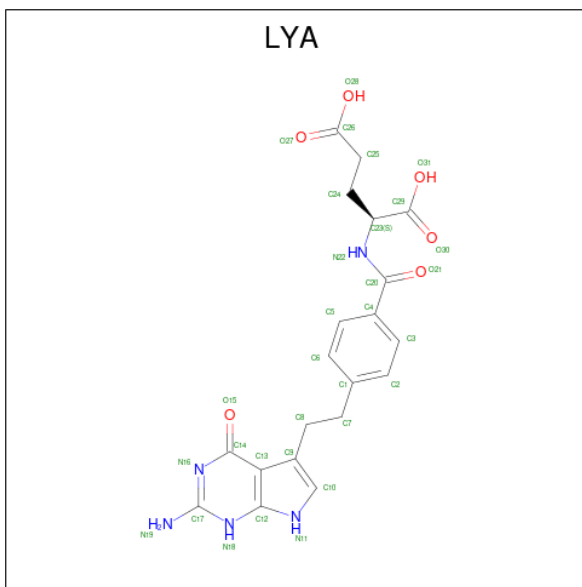
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	H	N	O	0	1
			62	26	19	6	11		
3	B	1	Total	C	H	N	O	0	1
			62	26	19	6	11		
3	C	1	Total	C	H	N	O	0	1
			62	26	19	6	11		
3	D	1	Total	C	H	N	O	0	1
			62	26	19	6	11		

- Molecule 4 is ACETATE ION (three-letter code: ACT) (formula: $C_2H_3O_2$).

ACT

OXT

O⁻

C

CH3

O

O

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

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	344	Total 344	O 344	0	0
5	B	380	Total 380	O 380	0	0
5	C	333	Total 333	O 333	0	0
5	D	315	Total 315	O 315	0	0

3 Residue-property plots ⓘ

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: PTERIDINE REDUCTASE
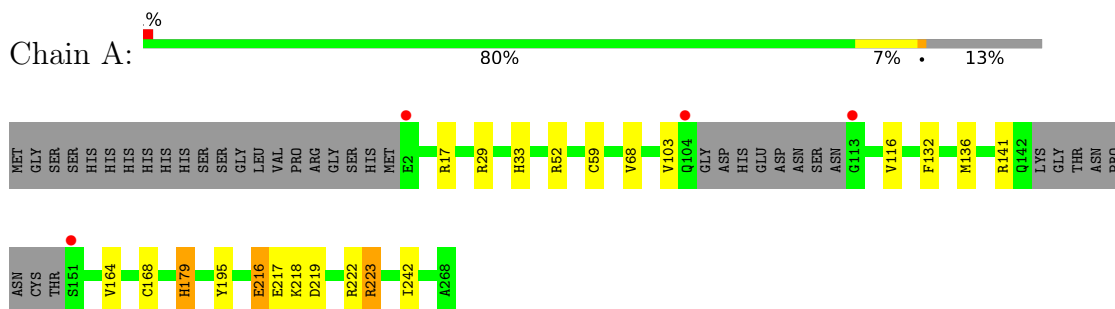
Chain A:

• Molecule 1: PTERIDINE REDUCTASE

Chain B:

• Molecule 1: PTERIDINE REDUCTASE

Chain C:

• Molecule 1: PTERIDINE REDUCTASE

Chain D:
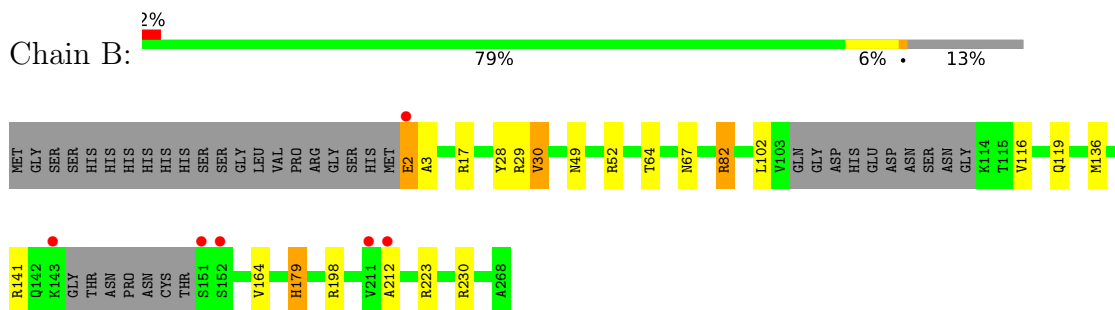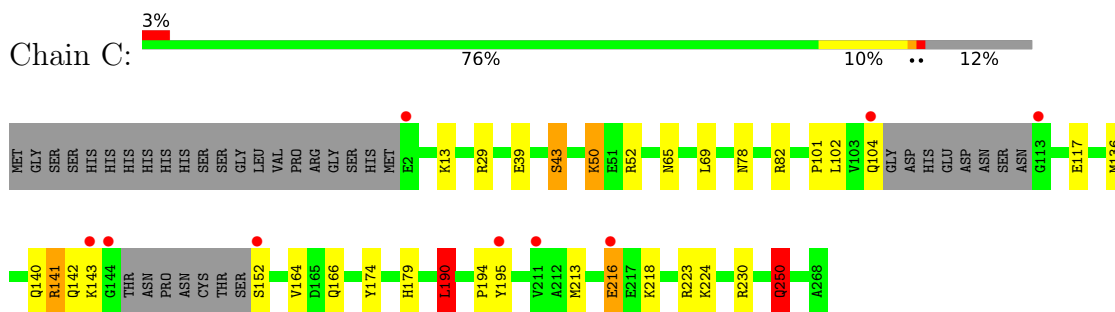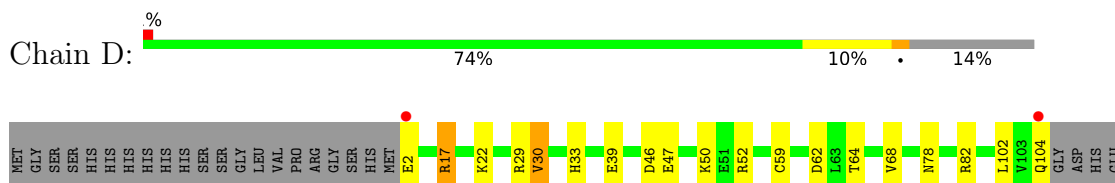
4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	74.72Å 90.57Å 82.58Å 90.00° 115.61° 90.00°	Depositor
Resolution (Å)	20.00 – 1.10 19.99 – 1.10	Depositor EDS
% Data completeness (in resolution range)	94.7 (20.00-1.10) 93.1 (19.99-1.10)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.17 (at 1.10Å)	Xtriage
Refinement program	SHELXL-97	Depositor
R, R_{free}	0.121 , 0.147 0.130 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å^2)	8.2	Xtriage
Anisotropy	0.637	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.39 , 64.1	EDS
L-test for twinning[2]	$< |L| > = 0.48, < L^2 > = 0.31$	Xtriage
Estimated twinning fraction	0.017 for h,-k,-h-l	Xtriage
F_o,F_c correlation	0.98	EDS
Total number of atoms	16553	wwPDB-VP
Average B, all atoms (Å^2)	15.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 20.67 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 8.2712e-03.*

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

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: ACT, LYA, NAP

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	0.67	0/1971	1.18	16/2675 (0.6%)
1	B	0.73	3/1958 (0.2%)	1.25	18/2656 (0.7%)
1	C	0.83	2/1966 (0.1%)	1.26	23/2664 (0.9%)
1	D	0.78	3/2002 (0.1%)	1.32	26/2718 (1.0%)
All	All	0.76	8/7897 (0.1%)	1.25	83/10713 (0.8%)

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	43[B]	SER	CA-CB	15.06	1.75	1.52
1	C	43[A]	SER	CA-CB	15.06	1.75	1.52
1	D	30[B]	VAL	CA-CB	8.51	1.72	1.54
1	D	30[A]	VAL	CA-CB	8.51	1.72	1.54
1	D	30[C]	VAL	CA-CB	8.51	1.72	1.54

The worst 5 of 83 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	230	ARG	CD-NE-CZ	19.22	150.51	123.60
1	C	141	ARG	NE-CZ-NH1	16.09	128.34	120.30
1	B	141	ARG	NE-CZ-NH2	-13.62	113.49	120.30
1	B	82	ARG	NE-CZ-NH1	12.88	126.74	120.30
1	C	141	ARG	CD-NE-CZ	12.74	141.43	123.60

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1904	1766	1932	12	0
1	B	1893	1761	1925	13	0
1	C	1905	1751	1923	15	0
1	D	1912	1773	1937	27	0
2	A	48	18	25	0	0
2	B	48	18	25	0	0
2	C	48	18	25	0	0
2	D	48	18	25	1	0
3	A	43	19	12	1	0
3	B	43	19	12	0	0
3	C	43	19	12	0	0
3	D	43	19	12	1	0
4	B	4	0	3	0	0
5	A	344	0	0	4	0
5	B	380	0	0	6	0
5	C	333	0	0	4	0
5	D	315	0	0	14	0
All	All	9354	7199	7868	62	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 4.

The worst 5 of 62 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:C:250[A]:GLN:HE21	1:D:236:GLN:HE21	1.30	0.80
1:B:212:ALA:HB3	5:B:2287:HOH:O	1.86	0.76
1:A:136[B]:MET:HG3	1:C:102:LEU:O	1.86	0.75
1:C:13:LYS:HE3	5:C:2005:HOH:O	1.91	0.70
1:D:220:LYS:O	1:D:223:ARG:HG3	1.92	0.69

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	255/288 (88%)	246 (96%)	9 (4%)	0	100	100
1	B	253/288 (88%)	244 (96%)	9 (4%)	0	100	100
1	C	254/288 (88%)	245 (96%)	9 (4%)	0	100	100
1	D	258/288 (90%)	250 (97%)	8 (3%)	0	100	100
All	All	1020/1152 (88%)	985 (97%)	35 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	207/231 (90%)	204 (99%)	3 (1%)	67	30
1	B	208/231 (90%)	205 (99%)	3 (1%)	67	30
1	C	207/231 (90%)	198 (96%)	9 (4%)	29	3
1	D	213/231 (92%)	208 (98%)	5 (2%)	50	12
All	All	835/924 (90%)	815 (98%)	20 (2%)	55	11

5 of 20 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	250[B]	GLN
1	D	104	GLN
1	D	179[B]	HIS

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Mol	Chain	Res	Type
1	D	179[A]	HIS
1	C	50	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	67	ASN
1	B	119	GLN
1	D	67	ASN
1	D	104	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

13 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
3	LYA	C	1270[A]	-	32,33,33	0.93	0	35,46,46	2.19	5 (14%)
3	LYA	C	1270[B]	-	32,33,33	0.94	0	35,46,46	2.41	11 (31%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z|>2	Counts	RMSZ	#|Z|>2
2	NAP	C	1269	-	45,52,52	0.91	2 (4%)	56,80,80	0.96	2 (3%)
3	LYA	A	1270[B]	-	32,33,33	1.02	2 (6%)	35,46,46	2.43	8 (22%)
2	NAP	B	1269	-	45,52,52	0.96	1 (2%)	56,80,80	1.14	5 (8%)
3	LYA	B	1270[A]	-	32,33,33	0.98	1 (3%)	35,46,46	2.34	5 (14%)
2	NAP	D	1269	-	45,52,52	0.98	1 (2%)	56,80,80	1.02	2 (3%)
4	ACT	B	1271	-	3,3,3	1.18	0	3,3,3	1.13	0
3	LYA	B	1270[B]	-	32,33,33	1.01	2 (6%)	35,46,46	2.43	8 (22%)
3	LYA	D	1270[A]	-	32,33,33	1.15	2 (6%)	35,46,46	2.70	13 (37%)
3	LYA	D	1270[B]	-	32,33,33	1.15	2 (6%)	35,46,46	2.55	10 (28%)
2	NAP	A	1269	-	45,52,52	0.99	3 (6%)	56,80,80	0.99	2 (3%)
3	LYA	A	1270[A]	-	32,33,33	0.97	1 (3%)	35,46,46	2.50	8 (22%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	LYA	C	1270[A]	-	-	12/22/22/22	0/3/3/3
3	LYA	C	1270[B]	-	-	6/22/22/22	0/3/3/3
2	NAP	C	1269	-	-	0/31/67/67	0/5/5/5
3	LYA	A	1270[B]	-	-	7/22/22/22	0/3/3/3
2	NAP	B	1269	-	-	0/31/67/67	0/5/5/5
3	LYA	B	1270[A]	-	-	5/22/22/22	0/3/3/3
2	NAP	D	1269	-	-	0/31/67/67	0/5/5/5
3	LYA	B	1270[B]	-	-	7/22/22/22	0/3/3/3
3	LYA	D	1270[A]	-	-	10/22/22/22	0/3/3/3
3	LYA	D	1270[B]	-	-	6/22/22/22	0/3/3/3
2	NAP	A	1269	-	-	0/31/67/67	0/5/5/5
3	LYA	A	1270[A]	-	-	6/22/22/22	0/3/3/3

The worst 5 of 17 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	1270[A]	LYA	C14-N16	3.96	1.39	1.33
3	D	1270[B]	LYA	C14-N16	3.96	1.39	1.33
2	C	1269	NAP	C2N-N1N	3.62	1.39	1.35
3	B	1270[A]	LYA	C14-N16	3.37	1.38	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	1270[B]	LYA	C14-N16	3.37	1.38	1.33

The worst 5 of 79 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	1270[A]	LYA	C13-C14-N16	-10.25	115.00	124.09
3	A	1270[B]	LYA	C13-C14-N16	-10.25	115.00	124.09
3	B	1270[A]	LYA	C13-C14-N16	-10.20	115.04	124.09
3	B	1270[B]	LYA	C13-C14-N16	-10.20	115.04	124.09
3	D	1270[A]	LYA	C13-C14-N16	-9.53	115.64	124.09

There are no chirality outliers.

5 of 59 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	1270[A]	LYA	C7-C8-C9-C10
3	C	1270[A]	LYA	C23-C24-C25-C26
3	C	1270[B]	LYA	C7-C8-C9-C10
3	C	1270[A]	LYA	N22-C23-C24-C25
3	D	1270[A]	LYA	N22-C23-C24-C25

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1270[B]	LYA	1	0
2	D	1269	NAP	1	0
3	D	1270[A]	LYA	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 then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand LYA C 1270 (A)

Bond lengths

Bond angles

Torsions

Rings

Ligand LYA C 1270 (B)

Bond lengths

Bond angles

Torsions

Rings

Ligand NAP C 1269

Bond lengths

Bond angles

Torsions

Rings

Ligand LYA A 1270 (B)

Bond lengths

Bond angles

Torsions

Rings

wwPDB X-ray Structure Validation Summary Report

Ligand NAP B 1269

Bond lengths

Bond angles

Torsions

Rings

Ligand LYA B 1270 (A)

Bond lengths

Bond angles

Torsions

Rings

Ligand NAP D 1269

Bond lengths

Bond angles

Torsions

Rings

Ligand LYA B 1270 (B)

Bond lengths

Bond angles

Torsions

Rings

Ligand LYA D 1270 (A)

Bond lengths

Bond angles

Torsions

Rings

Ligand LYA D 1270 (B)

Bond lengths

Bond angles

Torsions

Rings

Ligand NAP A 1269

Bond lengths

Bond angles

Torsions

Rings

Ligand LYA A 1270 (A)

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

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	251/288 (87%)	-0.53	4 (1%)	72	68	6, 11, 26, 56	0
1	B	250/288 (86%)	-0.60	6 (2%)	59	55	6, 9, 24, 56	0
1	C	252/288 (87%)	-0.43	9 (3%)	42	39	6, 10, 28, 67	0
1	D	249/288 (86%)	-0.55	4 (1%)	72	68	6, 10, 25, 53	0
All	All	1002/1152 (86%)	-0.53	23 (2%)	60	57	6, 10, 26, 67	0

The worst 5 of 23 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	144	GLY	8.8
1	C	113	GLY	8.1
1	A	151	SER	6.8
1	A	113	GLY	6.4
1	C	143	LYS	5.8

6.2   Non-standard residues in protein, DNA, RNA chains ⓘ

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

6.3   Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4   Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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(Å²)	Q<0.9
3	LYA	D	1270[A]	31/31	0.94	0.12	8,16,32,37	17
3	LYA	D	1270[B]	31/31	0.94	0.12	8,16,24,32	17
3	LYA	C	1270[A]	31/31	0.96	0.10	7,17,32,35	17
3	LYA	C	1270[B]	31/31	0.96	0.10	7,15,24,31	17
3	LYA	A	1270[A]	31/31	0.96	0.11	8,16,26,34	17
3	LYA	A	1270[B]	31/31	0.96	0.11	8,16,23,31	17
3	LYA	B	1270[A]	31/31	0.98	0.07	6,13,19,21	17
3	LYA	B	1270[B]	31/31	0.98	0.07	6,13,19,23	17
2	NAP	A	1269	48/48	0.99	0.04	6,8,11,14	0
4	ACT	B	1271	4/4	0.99	0.04	12,13,13,14	0
2	NAP	B	1269	48/48	1.00	0.03	5,7,9,10	0
2	NAP	C	1269	48/48	1.00	0.04	5,7,9,10	0
2	NAP	D	1269	48/48	1.00	0.03	6,8,10,12	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 LYA D 1270 (A):

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
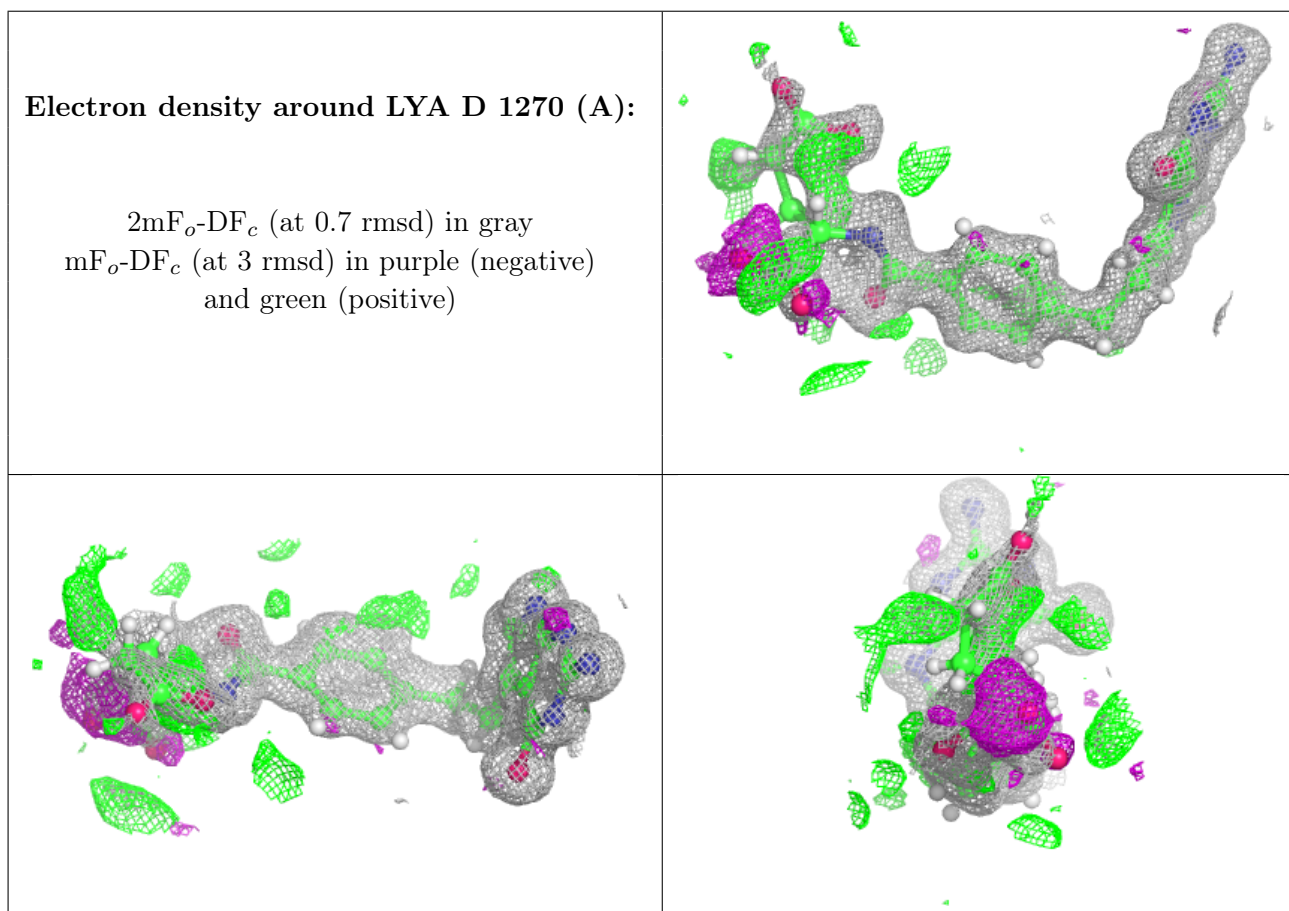
Electron density around LYA D 1270 (B):

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
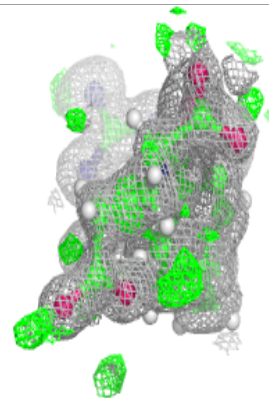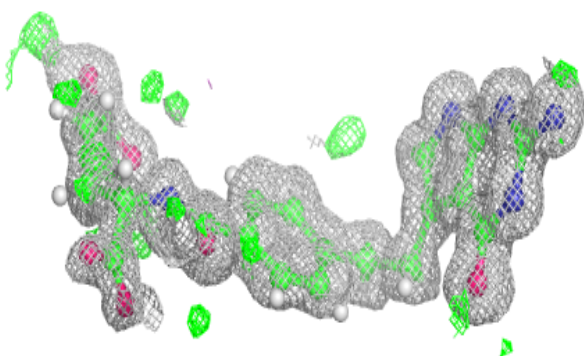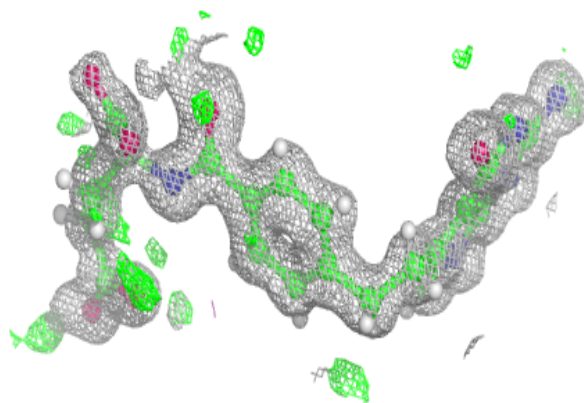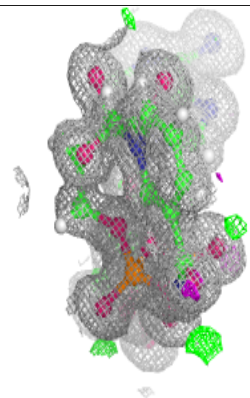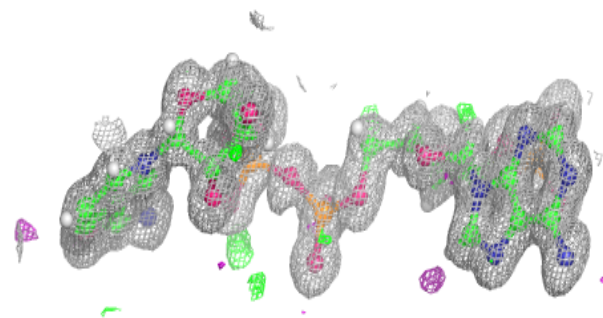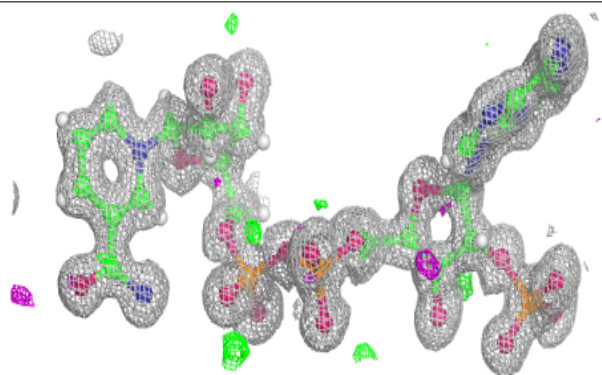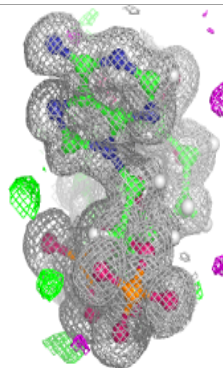and green (positive)
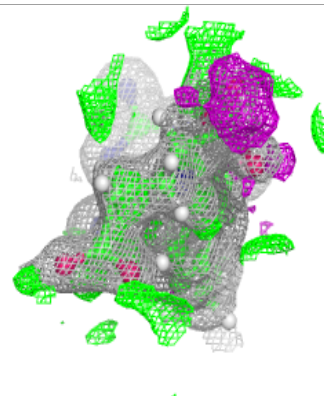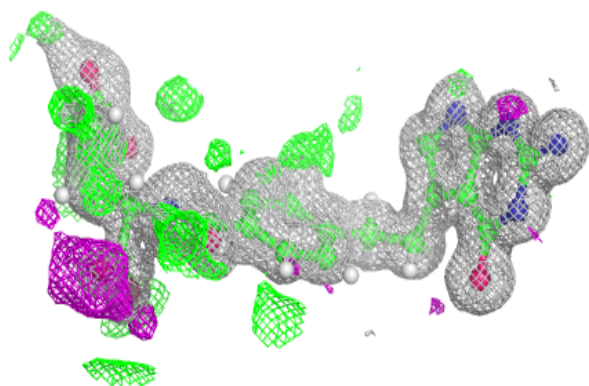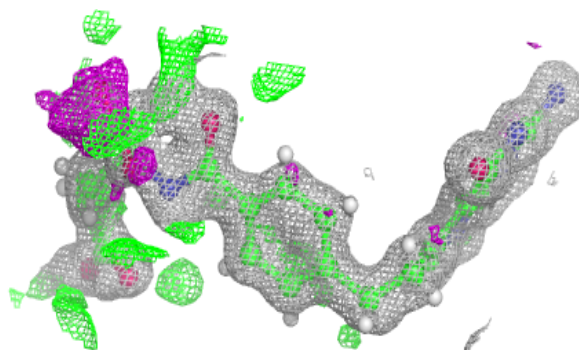
Electron density around LYA C 1270 (A):

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
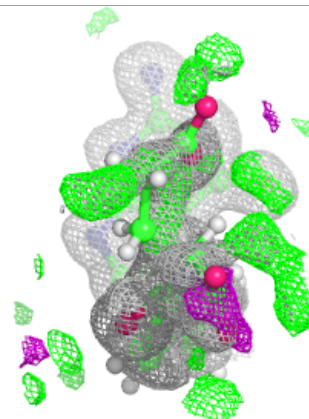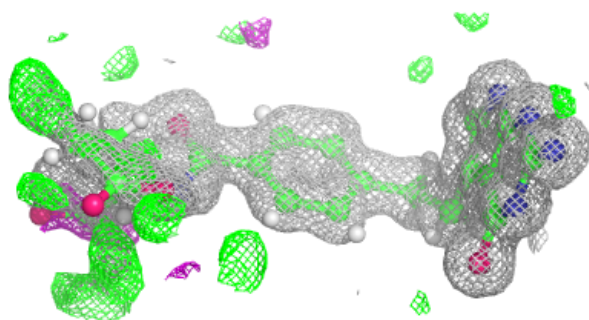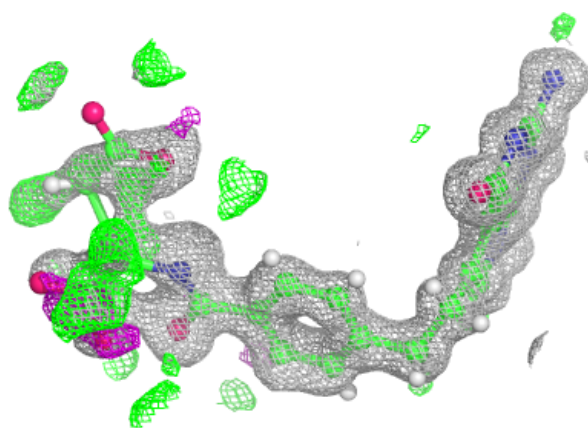
Electron density around LYA C 1270 (B):

$2mF_o$-DF_c (at 0.7 rmsd) in gray
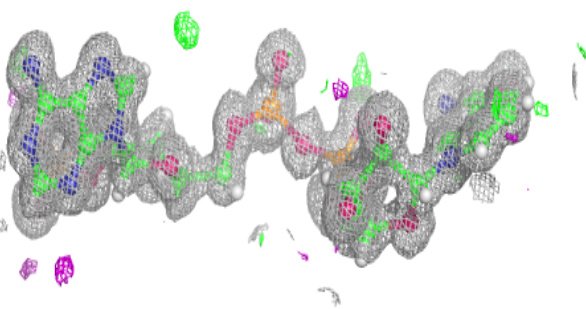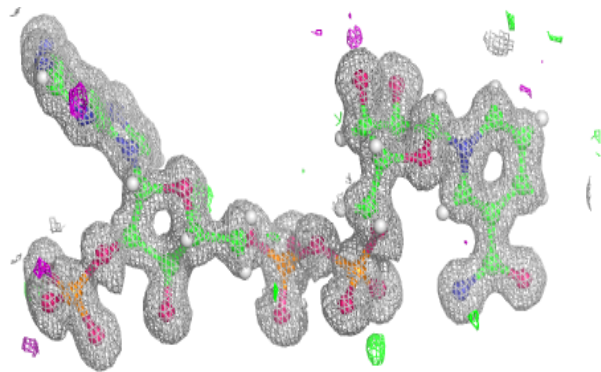mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
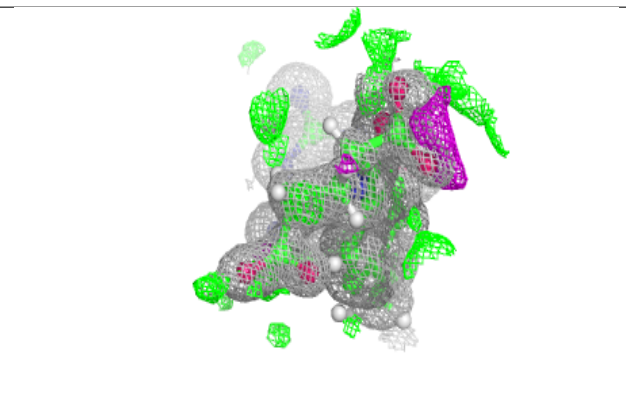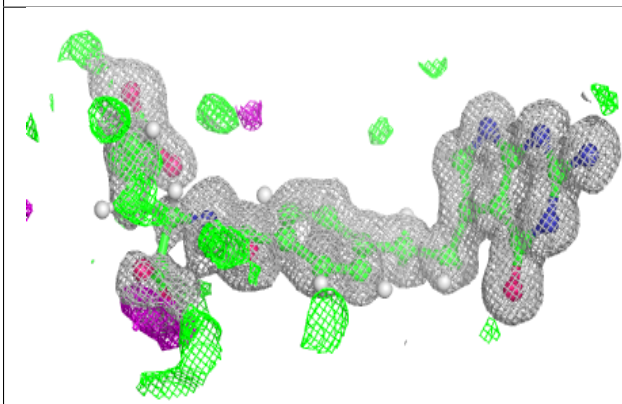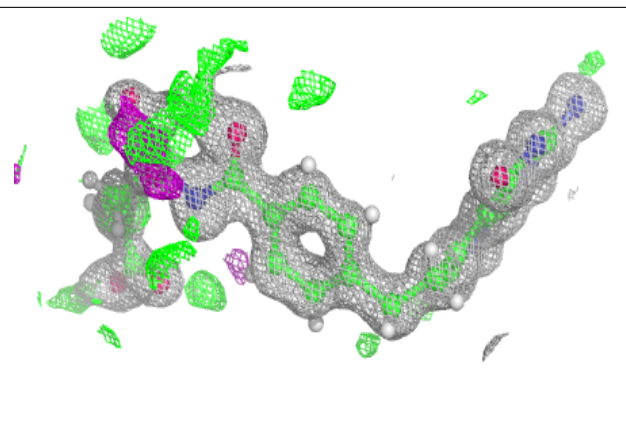
Electron density around LYA A 1270 (A):

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
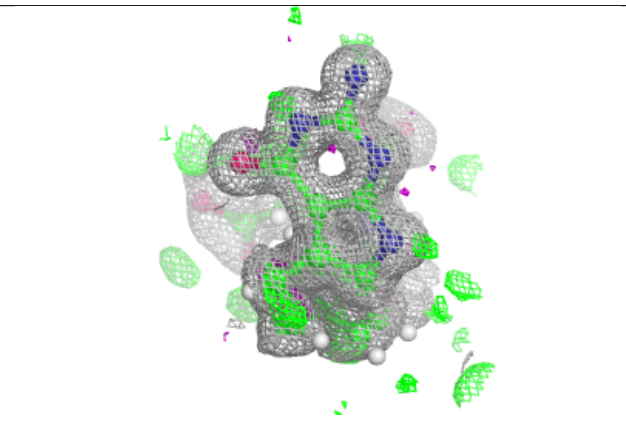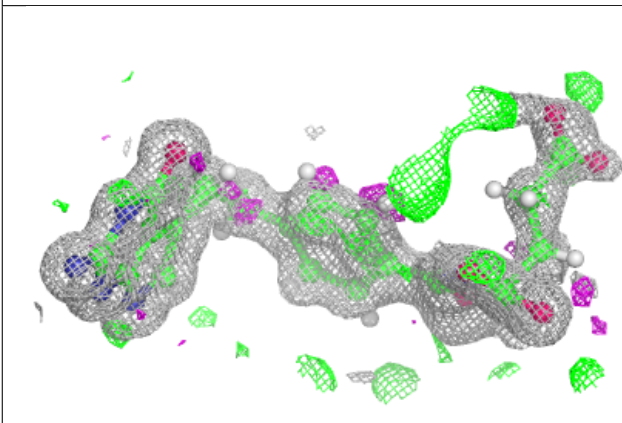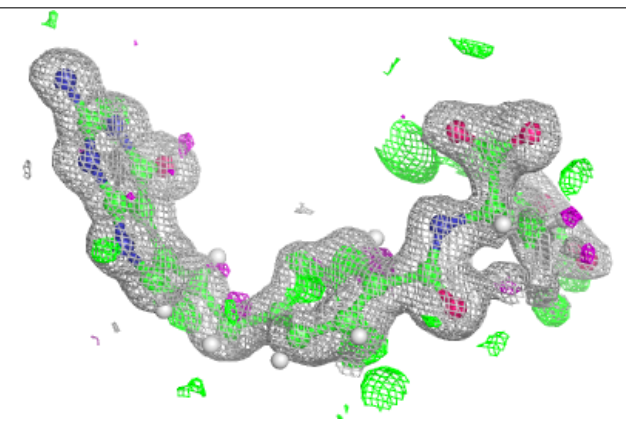
Electron density around LYA A 1270 (B):

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
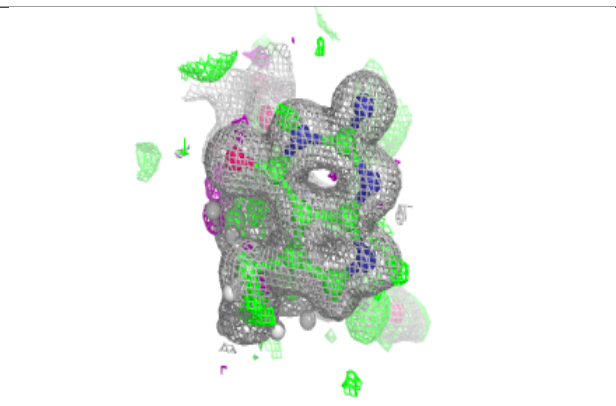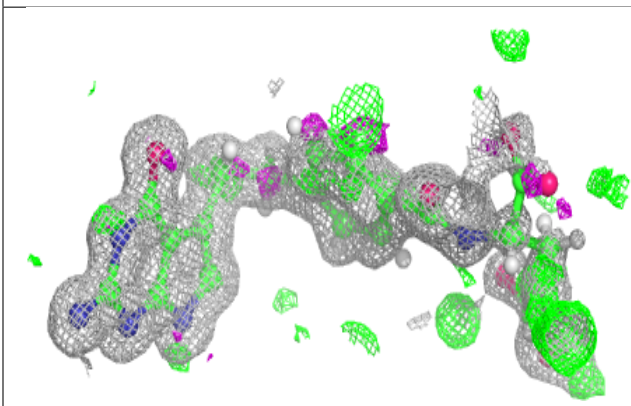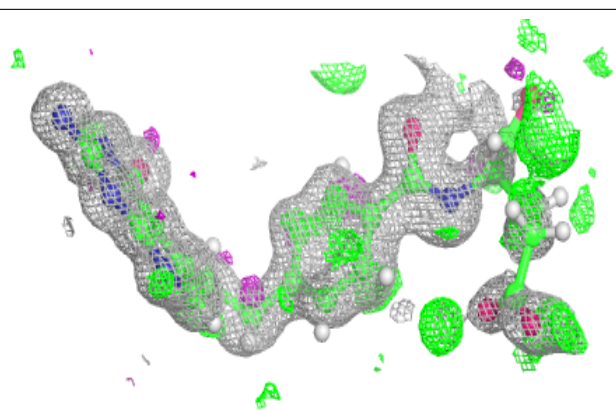
Electron density around LYA B 1270 (A):

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
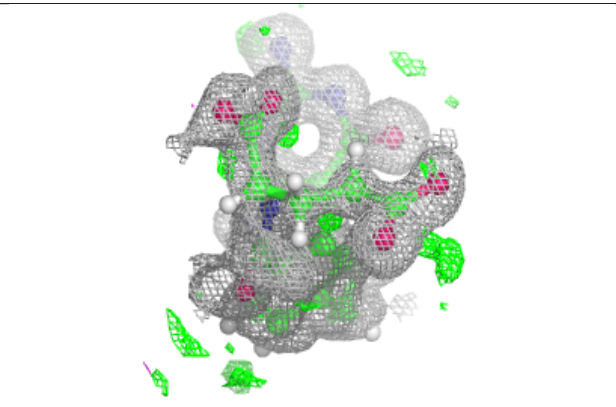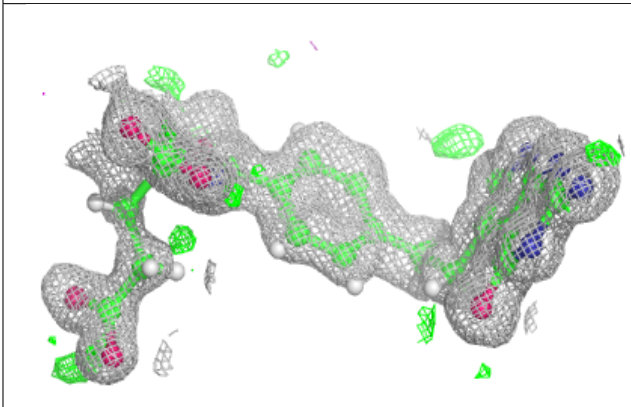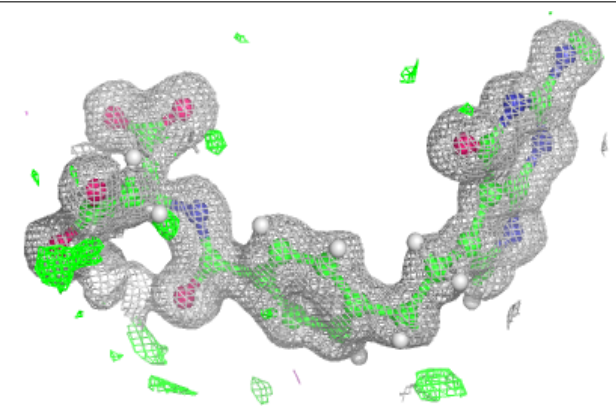
Electron density around LYA B 1270 (B):

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

Electron density around NAP A 1269:

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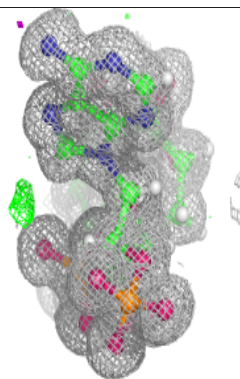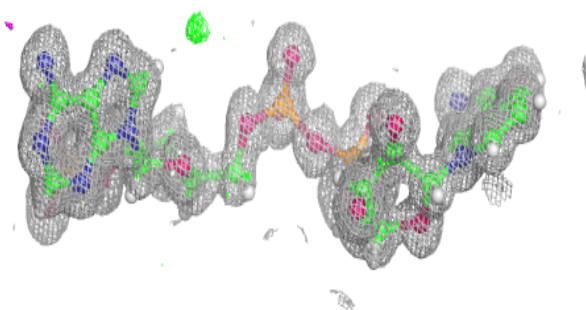mF_o-DF_c (at 3 rmsd) in purple (negative)
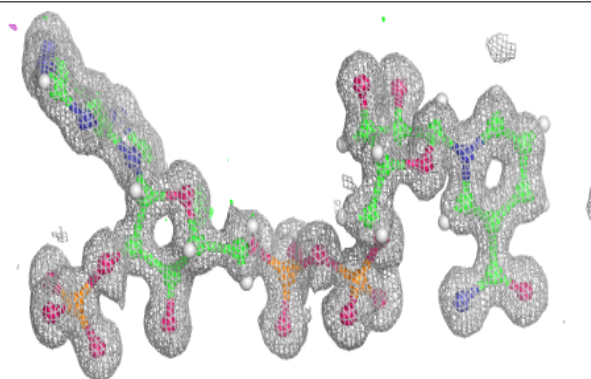and green (positive)

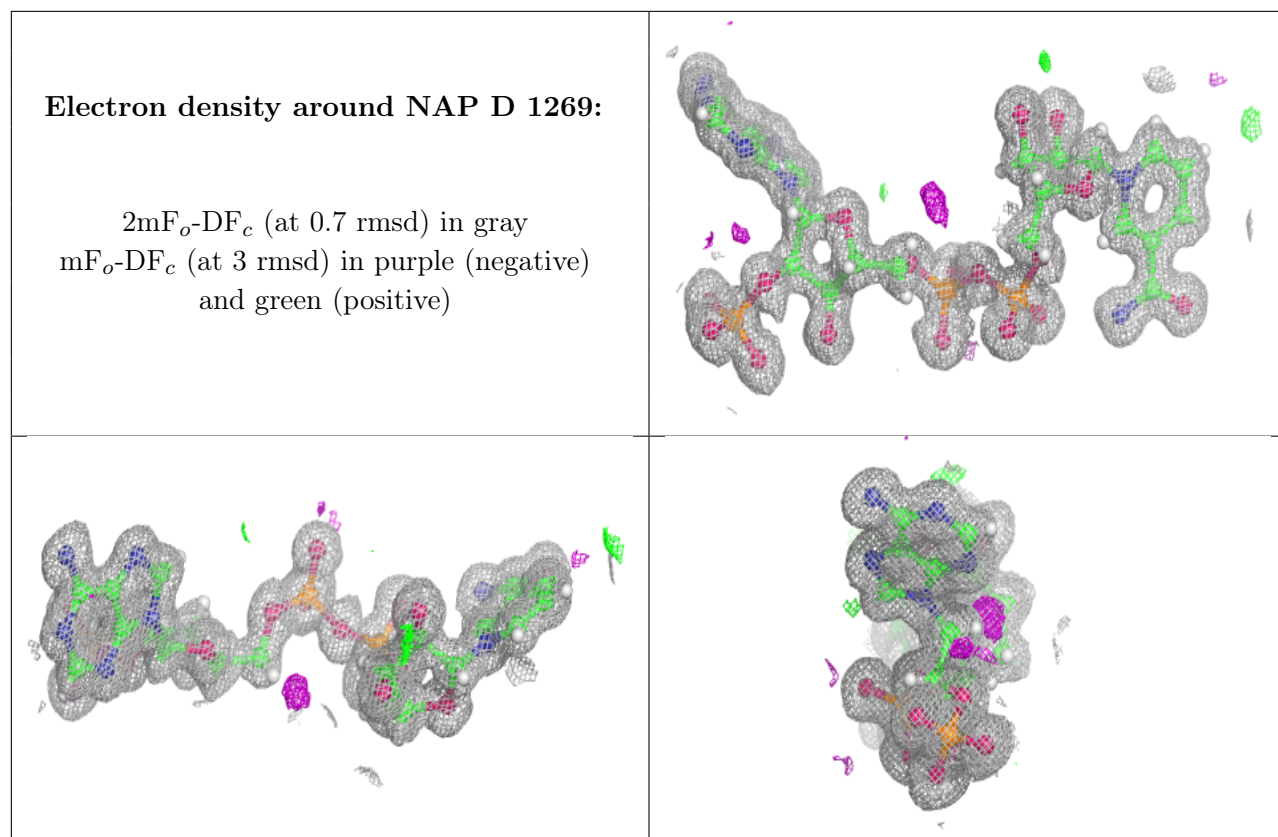**Electron density around NAP B 1269:**

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

Electron density around NAP C 1269:

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

Electron density around NAP D 1269:

$2mF_o$-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 ⓘ

There are no such residues in this entry.