WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Feb 18, 2024 – 05:47 PM EST

PDB ID	:	4FYK
Title	:	Crystal structure of rcl with 5'-phiosphorothioate-adenosine
Authors	:	Labesse, G.; Padilla, A.; Kaminski, P.A.
Deposited on	:	2012-07-04
Resolution	:	1.79 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:

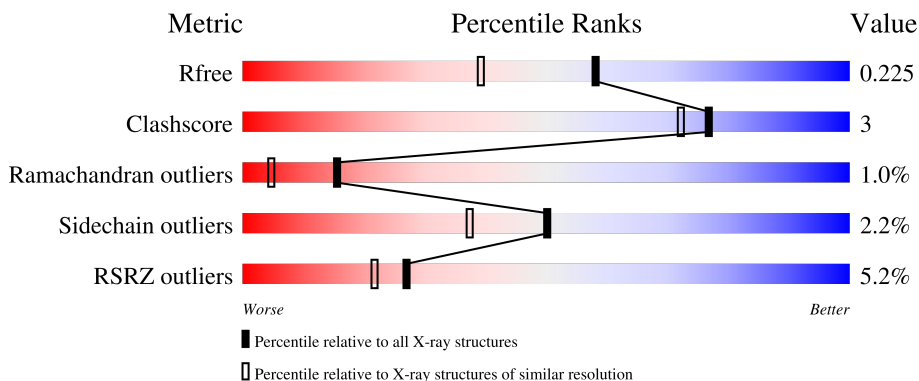|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 1.79 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
Rfree		0.225
Clashscore		3
Ramachandran outliers		1.0%
Sidechain outliers		2.2%
RSRZ outliers		5.2%

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))
R_{free}	130704	5950 (1.80-1.80)
Clashscore	141614	6793 (1.80-1.80)
Ramachandran outliers	138981	6697 (1.80-1.80)
Sidechain outliers	138945	6696 (1.80-1.80)
RSRZ outliers	127900	5850 (1.80-1.80)

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	152	5% / 75% / 8% / 17%
1	B	152	3% / 75% / 6% · / 18%
1	C	152	6% / 75% / 6% · / 18%
1	D	152	3% / 76% / · · / 18%

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 4790 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 Deoxyribonucleoside 5'-monophosphate N-glycosidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	126	Total	C	N	O	S	0	8	0
			1024	641	188	191	4			
1	B	124	Total	C	N	O	S	0	6	0
			1008	635	185	184	4			
1	C	125	Total	C	N	O	S	0	11	0
			1027	642	189	192	4			
1	D	124	Total	C	N	O	S	0	5	0
			998	629	180	185	4			

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	8	MET	-	expression tag	UNP O35820
A	9	ARG	-	expression tag	UNP O35820
A	10	ARG	-	expression tag	UNP O35820
A	69	ASN	ASP	engineered mutation	UNP O35820
A	152	VAL	-	expression tag	UNP O35820
A	153	GLU	-	expression tag	UNP O35820
A	154	HIS	-	expression tag	UNP O35820
A	155	HIS	-	expression tag	UNP O35820
A	156	HIS	-	expression tag	UNP O35820
A	157	HIS	-	expression tag	UNP O35820
A	158	HIS	-	expression tag	UNP O35820
A	159	HIS	-	expression tag	UNP O35820
B	8	MET	-	expression tag	UNP O35820
B	9	ARG	-	expression tag	UNP O35820
B	10	ARG	-	expression tag	UNP O35820
B	69	ASN	ASP	engineered mutation	UNP O35820
B	152	VAL	-	expression tag	UNP O35820
B	153	GLU	-	expression tag	UNP O35820
B	154	HIS	-	expression tag	UNP O35820
B	155	HIS	-	expression tag	UNP O35820
B	156	HIS	-	expression tag	UNP O35820

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Chain	Residue	Modelled	Actual	Comment	Reference
B	157	HIS	-	expression tag	UNP O35820
B	158	HIS	-	expression tag	UNP O35820
B	159	HIS	-	expression tag	UNP O35820
C	8	MET	-	expression tag	UNP O35820
C	9	ARG	-	expression tag	UNP O35820
C	10	ARG	-	expression tag	UNP O35820
C	69	ASN	ASP	engineered mutation	UNP O35820
C	152	VAL	-	expression tag	UNP O35820
C	153	GLU	-	expression tag	UNP O35820
C	154	HIS	-	expression tag	UNP O35820
C	155	HIS	-	expression tag	UNP O35820
C	156	HIS	-	expression tag	UNP O35820
C	157	HIS	-	expression tag	UNP O35820
C	158	HIS	-	expression tag	UNP O35820
C	159	HIS	-	expression tag	UNP O35820
D	8	MET	-	expression tag	UNP O35820
D	9	ARG	-	expression tag	UNP O35820
D	10	ARG	-	expression tag	UNP O35820
D	69	ASN	ASP	engineered mutation	UNP O35820
D	151	VAL	-	expression tag	UNP O35820
D	152	GLU	-	expression tag	UNP O35820
D	153	HIS	-	expression tag	UNP O35820
D	154	HIS	-	expression tag	UNP O35820
D	155	HIS	-	expression tag	UNP O35820
D	156	HIS	-	expression tag	UNP O35820
D	157	HIS	-	expression tag	UNP O35820
D	158	HIS	-	expression tag	UNP O35820

- Molecule 2 is ADENOSINE -5'-THIO-MONOPHOSPHATE (three-letter code: SRA) (formula: $C_{10}H_{14}N_5O_6PS$).
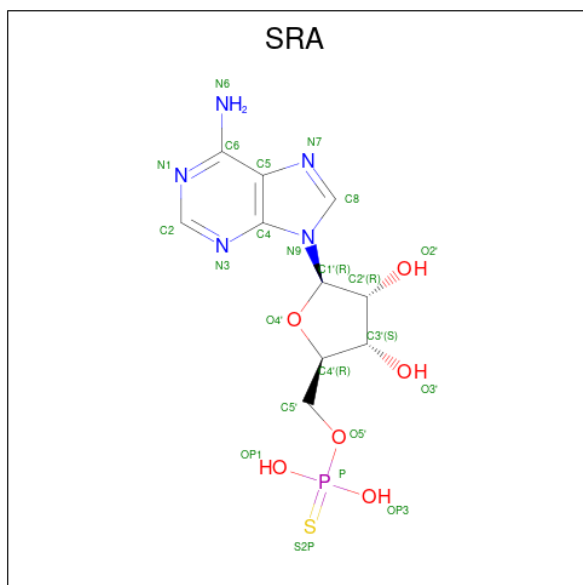
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	S	0	0
			23	10	5	6	1	1		
2	B	1	Total	C	N	O	P	S	0	0
			23	10	5	6	1	1		
2	C	1	Total	C	N	O	P	S	0	0
			23	10	5	6	1	1		
2	D	1	Total	C	N	O	P	S	0	0
			23	10	5	6	1	1		

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O_4S).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total 5	O 4	S 1	0	0
3	B	1	Total 5	O 4	S 1	0	0
3	D	1	Total 5	O 4	S 1	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	172	Total 172	O 172	0	0
4	B	165	Total 165	O 165	0	0
4	C	157	Total 157	O 157	0	0
4	D	132	Total 132	O 132	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: Deoxyribonucleoside 5'-monophosphate N-glycosidase

• Molecule 1: Deoxyribonucleoside 5'-monophosphate N-glycosidase

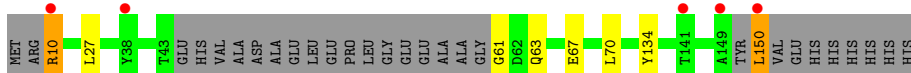• Molecule 1: Deoxyribonucleoside 5'-monophosphate N-glycosidase

• Molecule 1: Deoxyribonucleoside 5'-monophosphate N-glycosidase

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α, β, γ	86.38Å 128.77Å 57.51Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	35.90 – 1.79 35.87 – 1.79	Depositor EDS
% Data completeness (in resolution range)	92.4 (35.90-1.79) 92.4 (35.87-1.79)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	3.96 (at 1.79Å)	Xtriage
Refinement program	REFMAC 5.5.0102	Depositor
R, R_{free}	0.194 , 0.222 0.199 , 0.225	Depositor DCC
R_{free} test set	2882 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å²)	15.7	Xtriage
Anisotropy	0.625	Xtriage
Bulk solvent k_{sol}(e/Å³), B_{sol}(Å²)	0.34 , 51.4	EDS
L-test for twinning [2]	$<|L|> = 0.48$, $<L^2> = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	4790	wwPDB-VP
Average B, all atoms (Å²)	18.0	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 81.08 % 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 3.8587e-07. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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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: SO4, SRA

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	0.46	0/1071	0.60	0/1442
1	B	0.48	0/1052	0.63	0/1417
1	C	0.47	0/1085	0.61	0/1460
1	D	0.46	0/1036	0.62	0/1396
All	All	0.47	0/4244	0.62	0/5715

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 ⓘ

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	1024	0	999	7	0
1	B	1008	0	991	6	0
1	C	1027	0	999	6	0
1	D	998	0	980	6	0
2	A	23	0	12	1	0
2	B	23	0	12	0	0
2	C	23	0	12	0	0
2	D	23	0	12	0	0
3	A	5	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	5	0	0	0	0
3	D	5	0	0	0	0
4	A	172	0	0	1	0
4	B	165	0	0	1	0
4	C	157	0	0	1	1
4	D	132	0	0	5	1
All	All	4790	0	4017	25	1

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 3.

All (25) 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:126[B]:GLY:O	1:C:127[B]:SER:HB2	1.72	0.89
1:D:63:GLN:NE2	4:D:378:HOH:O	2.07	0.85
1:D:61:GLY:N	4:D:338:HOH:O	2.18	0.76
1:C:126[B]:GLY:O	1:C:127[B]:SER:CB	2.39	0.68
1:A:126[A]:GLY:O	1:A:127[A]:SER:HB2	1.94	0.68
1:C:111:GLN:NE2	4:C:344:HOH:O	2.32	0.63
1:B:70:LEU:HD11	1:B:96:ARG:HH22	1.65	0.62
1:B:111[B]:GLN:OE1	4:B:453:HOH:O	2.16	0.61
1:C:27:LEU:HD21	1:C:134:TYR:OH	2.03	0.58
1:B:70:LEU:HD11	1:B:96:ARG:NH2	2.20	0.57
1:A:66:HIS:HE1	1:A:92:TYR:OH	1.91	0.53
1:C:12:VAL:HG22	1:C:78:VAL:CG1	2.39	0.52
1:B:27:LEU:HD21	1:B:134:TYR:OH	2.11	0.51
1:A:66:HIS:HD2	1:A:67[A]:GLU:OE1	1.96	0.48
1:D:150:LEU:HD11	4:D:404:HOH:O	2.12	0.48
1:D:10:ARG:NH1	4:D:404:HOH:O	2.34	0.47
1:A:61:GLY:N	4:A:422:HOH:O	2.47	0.46
1:B:67:GLU:HG3	1:B:68:GLN:N	2.32	0.45
1:D:150:LEU:HD21	4:D:404:HOH:O	2.18	0.44
1:C:30:ARG:NH1	1:C:140:GLU:OE1	2.51	0.43
1:A:27:LEU:HD21	1:A:134:TYR:OH	2.19	0.43
1:D:27:LEU:HD21	1:D:134:TYR:OH	2.19	0.42
1:A:18:ILE:HD12	2:A:201:SRA:C8	2.51	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:C:439:HOH:O	4:D:431:HOH:O[1_554]	2.06	0.14

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	130/152 (86%)	125 (96%)	4 (3%)	1 (1%)	19	7
1	B	126/152 (83%)	123 (98%)	2 (2%)	1 (1%)	19	7
1	C	131/152 (86%)	125 (95%)	1 (1%)	5 (4%)	3	0
1	D	125/152 (82%)	120 (96%)	5 (4%)	0	100	100
All	All	512/608 (84%)	493 (96%)	12 (2%)	7 (1%)	15	3

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	127[A]	SER
1	C	127[B]	SER
1	C	126[A]	GLY
1	C	126[B]	GLY
1	A	117	SER
1	B	117	SER
1	C	117	SER

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	108/122 (88%)	107 (99%)	1 (1%)	78	75
1	B	106/122 (87%)	102 (96%)	4 (4%)	33	18
1	C	109/122 (89%)	107 (98%)	2 (2%)	59	48
1	D	105/122 (86%)	100 (95%)	5 (5%)	25	11
All	All	428/488 (88%)	416 (97%)	12 (3%)	50	30

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	70	LEU
1	B	10	ARG
1	B	11[A]	SER
1	B	11[B]	SER
1	B	67	GLU
1	C	10[A]	ARG
1	C	10[B]	ARG
1	D	10	ARG
1	D	67[A]	GLU
1	D	67[B]	GLU
1	D	70	LEU
1	D	150	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	63	GLN
1	A	66	HIS
1	A	74	GLN
1	C	63	GLN
1	C	74	GLN
1	D	25	GLN
1	D	63	GLN
1	D	85	GLN

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)

7 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	SO4	D	202	-	4,4,4	0.14	0	6,6,6	0.15	0
2	SRA	D	201	-	22,25,25	3.16	7 (31%)	22,38,38	2.76	5 (22%)
2	SRA	B	201	-	22,25,25	3.84	9 (40%)	22,38,38	2.72	4 (18%)
2	SRA	C	201	-	22,25,25	3.13	6 (27%)	22,38,38	2.82	6 (27%)
2	SRA	A	201	-	22,25,25	3.36	9 (40%)	22,38,38	2.83	7 (31%)
3	SO4	A	202	-	4,4,4	0.15	0	6,6,6	0.17	0
3	SO4	B	202	-	4,4,4	0.14	0	6,6,6	0.13	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
2	SRA	D	201	-	-	0/6/26/26	0/3/3/3
2	SRA	A	201	-	-	1/6/26/26	0/3/3/3
2	SRA	B	201	-	-	1/6/26/26	0/3/3/3
2	SRA	C	201	-	-	0/6/26/26	0/3/3/3

All (31) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	201	SRA	C2-N3	10.76	1.49	1.32
2	D	201	SRA	C2-N3	9.82	1.47	1.32
2	C	201	SRA	C2-N3	9.53	1.47	1.32
2	A	201	SRA	C2-N3	9.23	1.47	1.32
2	B	201	SRA	C2-N1	8.27	1.49	1.33
2	B	201	SRA	P-S2P	8.06	2.08	1.90
2	D	201	SRA	C2-N1	7.84	1.48	1.33
2	A	201	SRA	C2-N1	7.55	1.48	1.33
2	C	201	SRA	C2-N1	6.91	1.46	1.33
2	C	201	SRA	P-S2P	6.33	2.04	1.90
2	A	201	SRA	P-S2P	5.78	2.03	1.90
2	B	201	SRA	P-OP1	-4.70	1.39	1.54
2	D	201	SRA	P-S2P	4.12	1.99	1.90
2	B	201	SRA	P-O5'	-4.05	1.47	1.58
2	A	201	SRA	P-O5'	-3.83	1.47	1.58
2	A	201	SRA	P-OP3	-3.70	1.43	1.54
2	A	201	SRA	P-OP1	-3.60	1.43	1.54
2	D	201	SRA	O4'-C1'	3.49	1.45	1.41
2	C	201	SRA	O4'-C1'	3.48	1.45	1.41
2	B	201	SRA	P-OP3	-2.97	1.45	1.54
2	A	201	SRA	O4'-C1'	2.94	1.45	1.41
2	B	201	SRA	O4'-C1'	2.86	1.45	1.41
2	D	201	SRA	P-O5'	-2.75	1.50	1.58
2	C	201	SRA	C5-C4	-2.72	1.33	1.40
2	A	201	SRA	C5-C4	-2.69	1.33	1.40
2	A	201	SRA	C6-C5	-2.43	1.34	1.43
2	C	201	SRA	C6-C5	-2.43	1.34	1.43
2	D	201	SRA	C5-C4	-2.37	1.34	1.40
2	D	201	SRA	C6-C5	-2.29	1.34	1.43
2	B	201	SRA	C5-C4	-2.29	1.34	1.40
2	B	201	SRA	C6-C5	-2.24	1.35	1.43

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	201	SRA	N3-C2-N1	-11.33	110.97	128.68
2	D	201	SRA	N3-C2-N1	-11.08	111.36	128.68
2	A	201	SRA	N3-C2-N1	-11.07	111.37	128.68
2	B	201	SRA	N3-C2-N1	-10.64	112.05	128.68
2	C	201	SRA	C3'-C2'-C1'	3.41	106.11	100.98
2	B	201	SRA	O5'-P-S2P	-3.14	104.16	115.88
2	A	201	SRA	O5'-P-S2P	-3.13	104.19	115.88
2	D	201	SRA	C3'-C2'-C1'	3.03	105.54	100.98

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	201	SRA	C3'-C2'-C1'	2.93	105.39	100.98
2	B	201	SRA	OP1-P-O5'	2.85	114.51	106.81
2	A	201	SRA	C3'-C2'-C1'	2.80	105.19	100.98
2	A	201	SRA	OP1-P-O5'	2.75	114.22	106.81
2	D	201	SRA	O5'-P-S2P	-2.56	106.31	115.88
2	C	201	SRA	O5'-P-S2P	-2.56	106.33	115.88
2	A	201	SRA	OP3-P-O5'	2.37	113.21	106.81
2	A	201	SRA	C1'-N9-C4	-2.27	122.65	126.64
2	A	201	SRA	C2-N1-C6	2.21	122.54	118.75
2	C	201	SRA	OP3-P-O5'	2.19	112.72	106.81
2	D	201	SRA	C4-C5-N7	-2.19	107.12	109.40
2	C	201	SRA	C2-N1-C6	2.16	122.45	118.75
2	C	201	SRA	C4-C5-N7	-2.02	107.29	109.40
2	D	201	SRA	OP3-P-O5'	2.01	112.22	106.81

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	201	SRA	C5'-O5'-P-S2P
2	B	201	SRA	C5'-O5'-P-S2P

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	201	SRA	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 SRA D 201

Bond lengths

Bond angles

Torsions

Rings

Ligand SRA B 201

Bond lengths

Bond angles

Torsions

Rings

Ligand SRA C 201

Ligand SRA A 201
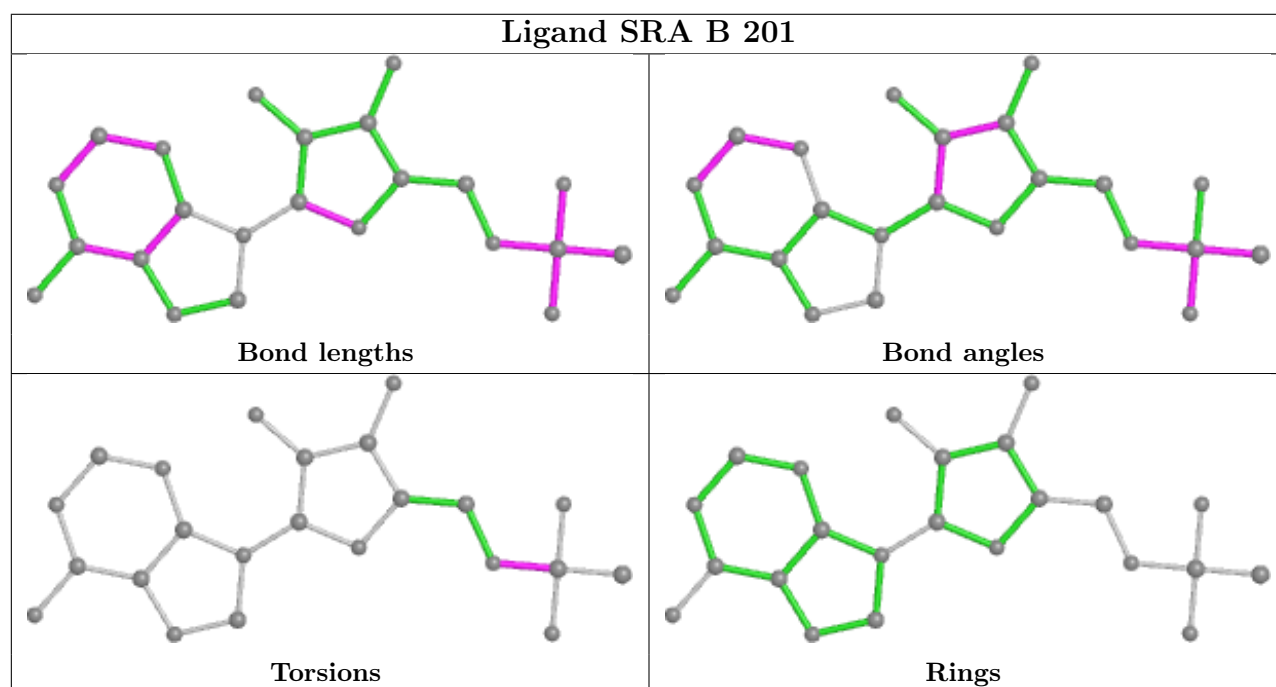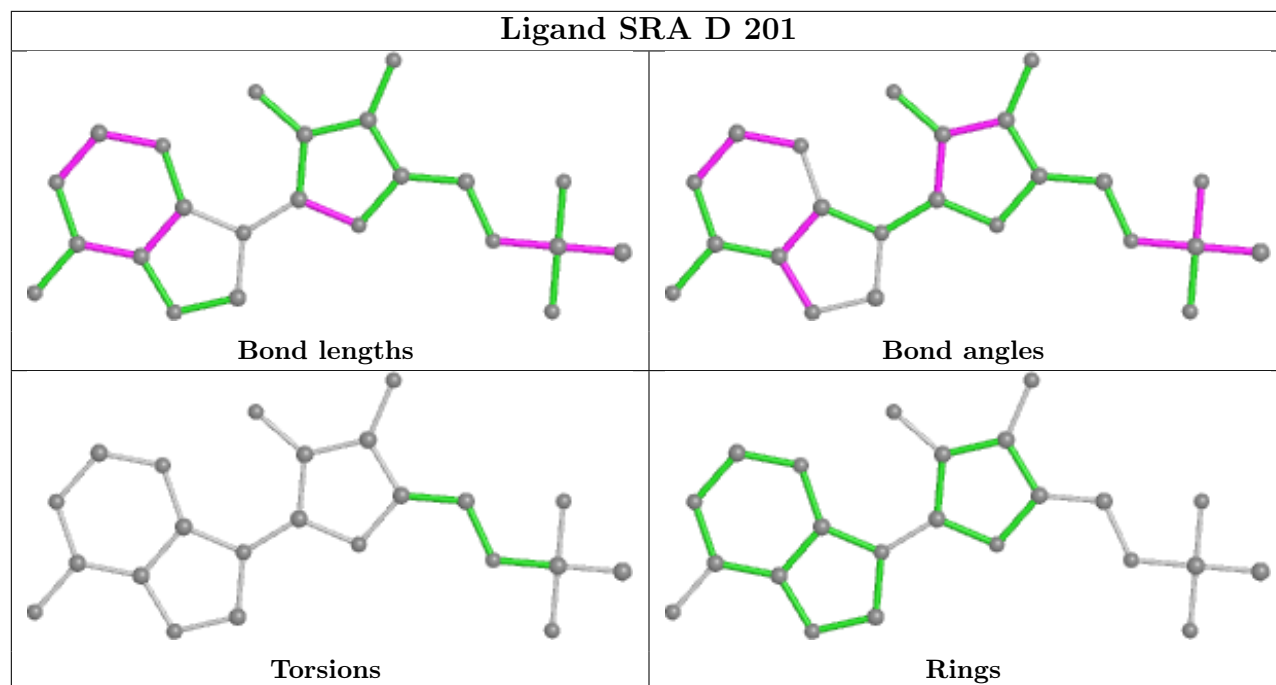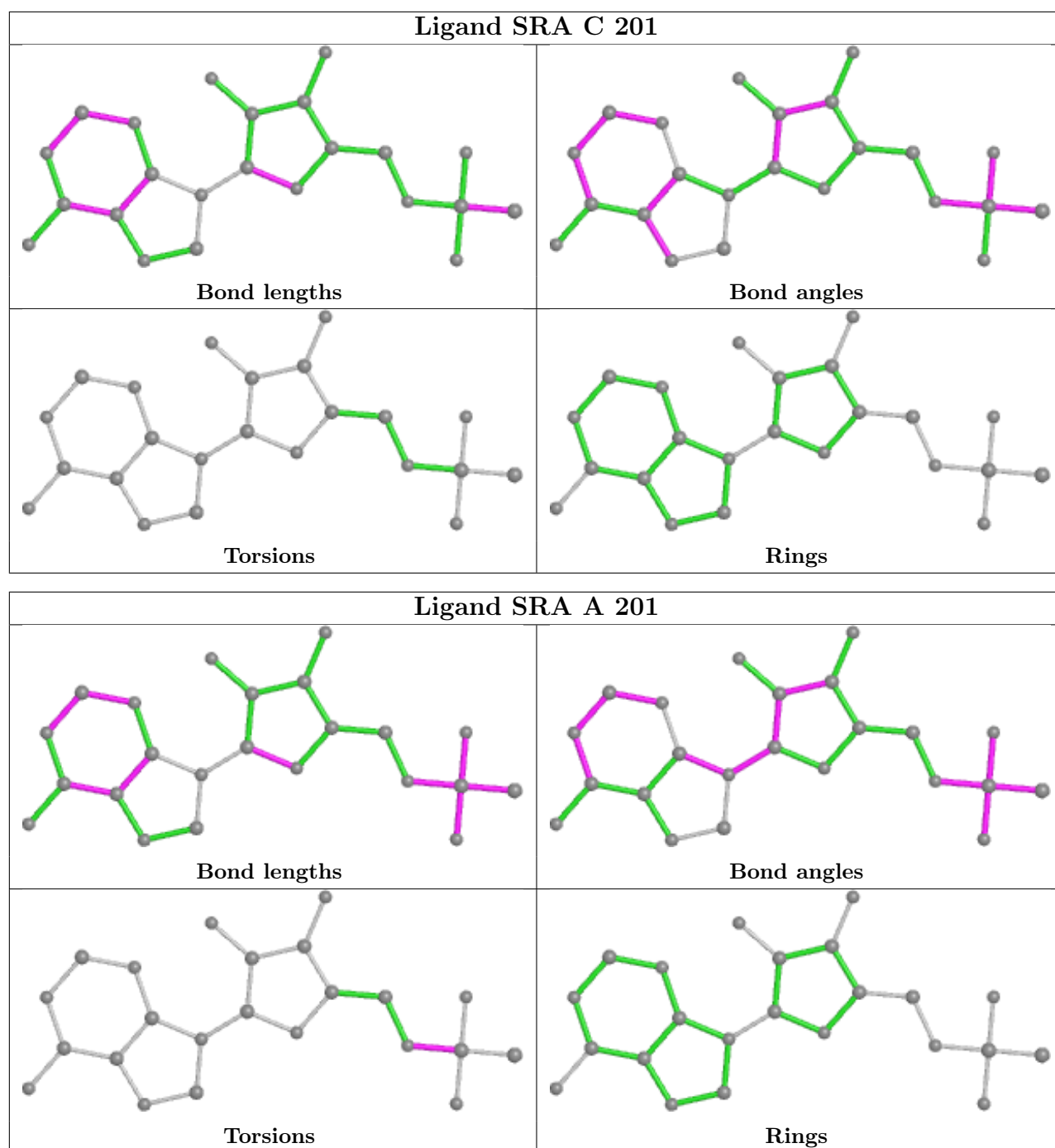
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	126/152 (82%)	0.49	7 (5%)	24	19	5, 15, 26, 34	7 (5%)
1	B	124/152 (81%)	0.27	5 (4%)	38	32	6, 13, 23, 38	6 (4%)
1	C	125/152 (82%)	0.50	9 (7%)	15	12	6, 14, 26, 35	3 (2%)
1	D	124/152 (81%)	0.26	5 (4%)	38	32	7, 14, 23, 31	8 (6%)
All	All	499/608 (82%)	0.38	26 (5%)	27	22	5, 14, 26, 38	24 (4%)

All (26) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	126[A]	GLY	6.3
1	B	150	TYR	5.7
1	C	59	ALA	4.2
1	A	141	THR	3.7
1	C	10[A]	ARG	3.7
1	A	59	ALA	3.7
1	C	148	GLU	3.5
1	A	126[A]	GLY	3.4
1	C	44	GLU	3.4
1	A	45	HIS	3.2
1	A	145	ARG	3.2
1	A	148	GLU	3.1
1	D	149	ALA	2.9
1	B	149	ALA	2.8
1	D	10	ARG	2.8
1	C	141	THR	2.7
1	B	64	PHE	2.7
1	B	61	GLY	2.5
1	C	127[A]	SER	2.3
1	D	141	THR	2.3
1	A	38	TYR	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	141	THR	2.1
1	C	83	VAL	2.1
1	C	111	GLN	2.1
1	D	150	LEU	2.0
1	D	38	TYR	2.0

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($\mathring{A}^2$)	Q<0.9
3	SO4	A	202	5/5	0.69	0.24	51,51,51,51	5
3	SO4	D	202	5/5	0.74	0.22	45,45,46,46	5
3	SO4	B	202	5/5	0.83	0.16	37,38,38,39	5
2	SRA	C	201	23/23	0.96	0.09	5,9,13,13	0
2	SRA	B	201	23/23	0.96	0.09	8,12,16,16	0
2	SRA	D	201	23/23	0.97	0.08	8,11,19,20	0
2	SRA	A	201	23/23	0.97	0.09	6,10,12,14	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.
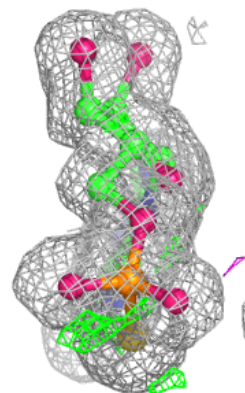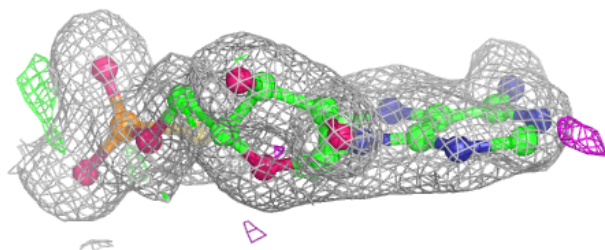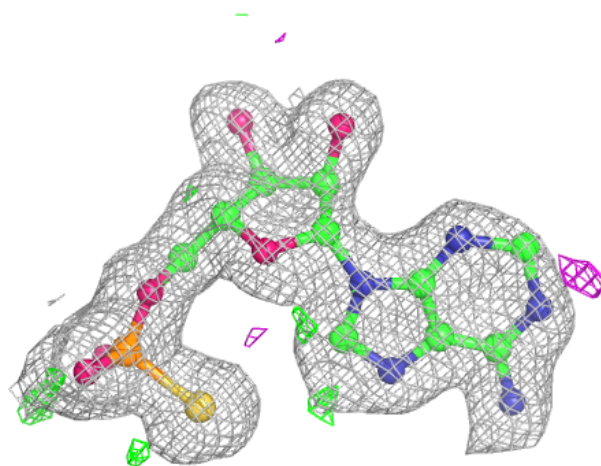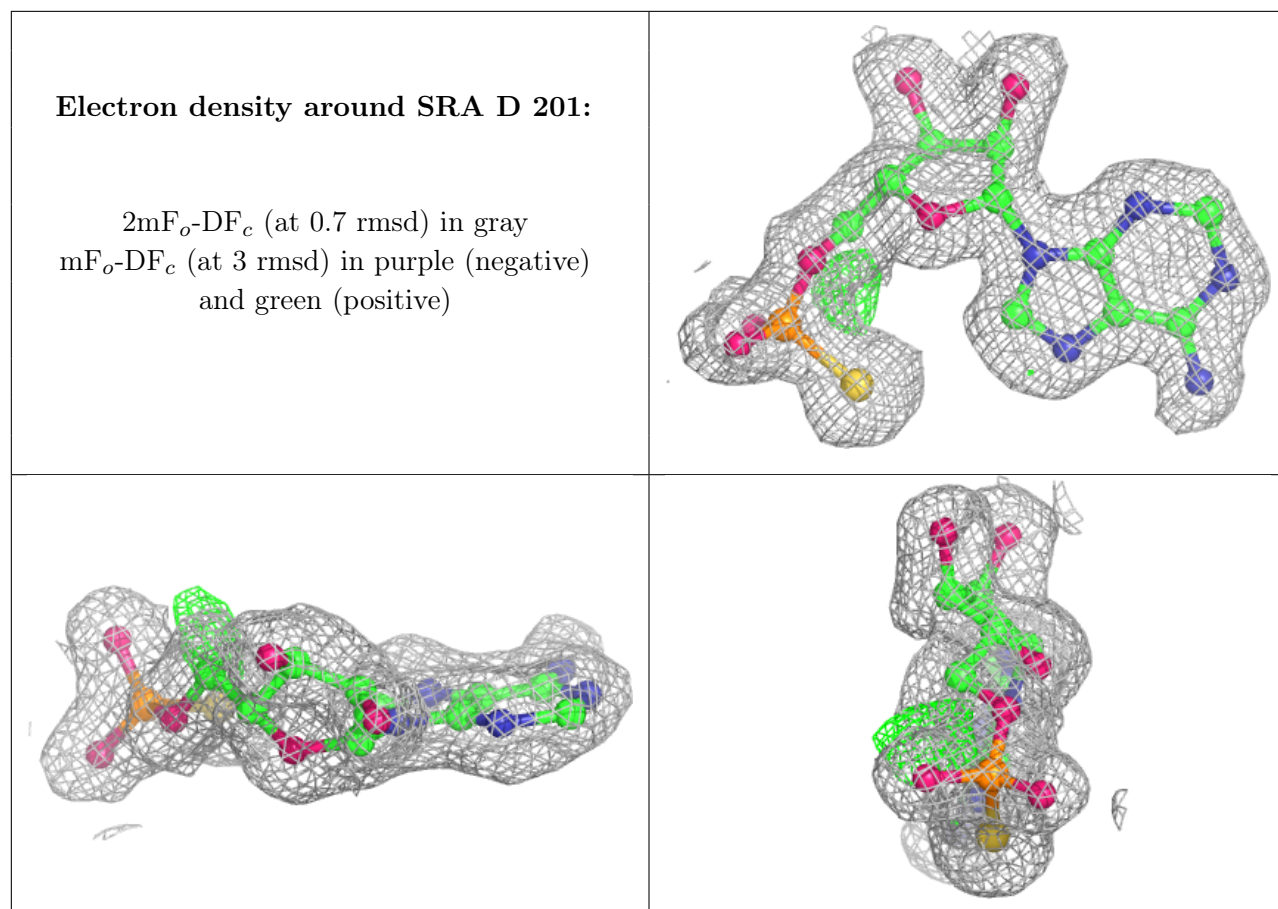
Electron density around SRA C 201:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
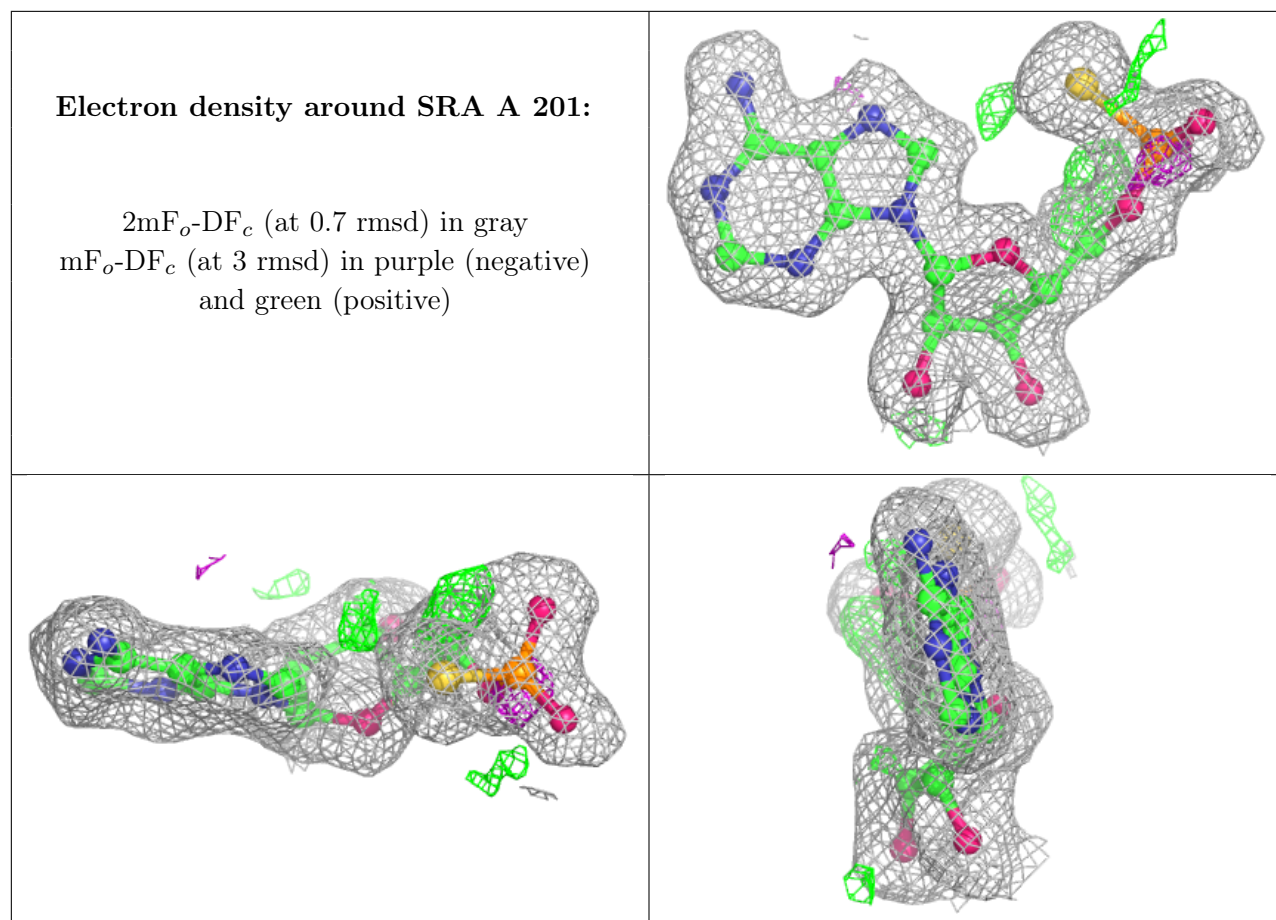and green (positive)
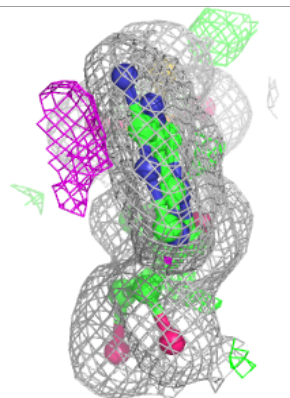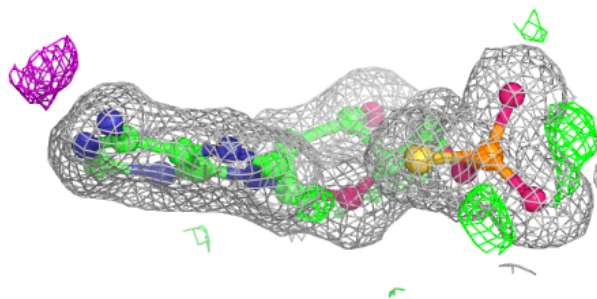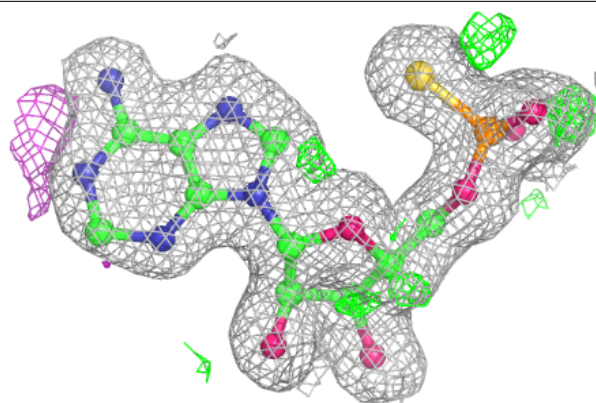
Electron density around SRA B 201:

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

Electron density around SRA D 201:

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

Electron density around SRA A 201:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.