Full wwPDB X-ray Structure Validation Report ⓘ

Jun 24, 2024 – 10:38 AM EDT

PDB ID	:	6Z6I
Title	:	SARS-CoV-2 Macrodomain in complex with ADP-HPD
Authors	:	Zorzini, V.; Rack, J.; Ahel, I.
Deposited on	:	2020-05-28
Resolution	:	2.00 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:

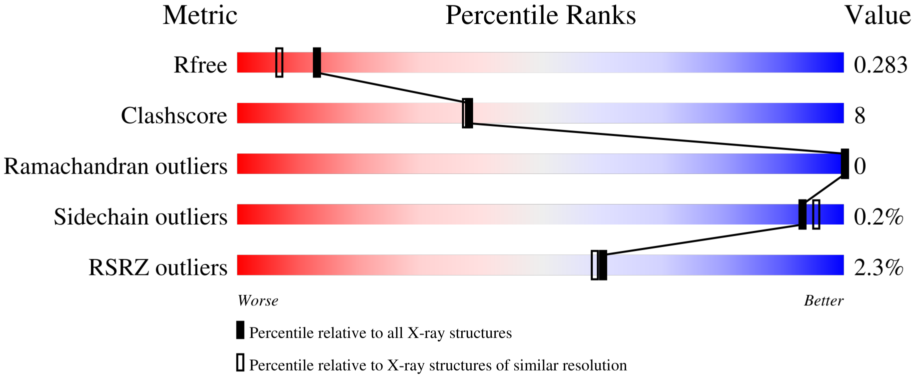
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

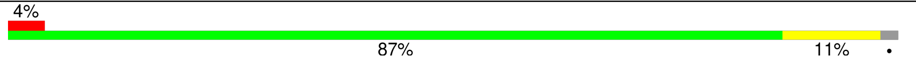
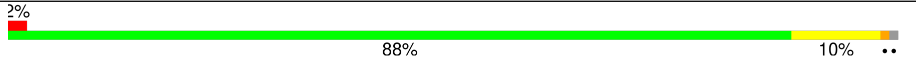
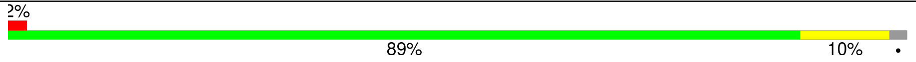
The reported resolution of this entry is 2.00 Å.

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	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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	176	
1	B	176	
1	C	176	
1	D	176	

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
3	EDO	A	402	-	-	X	X
3	EDO	A	405	-	-	X	-

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 6354 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.

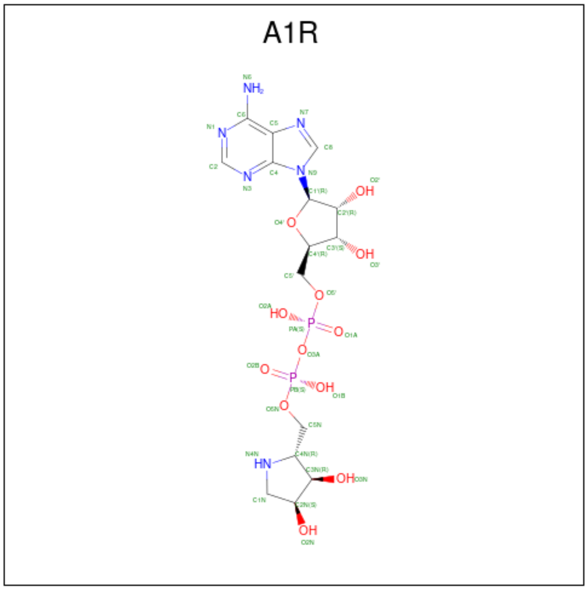
- Molecule 1 is a protein called Replicase polyprotein 1ab.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	172	Total 1292	C 822	N 217	O 247	S 6	0	3	0
1	B	173	Total 1273	C 812	N 214	O 242	S 5	0	1	0
1	C	174	Total 1308	C 831	N 223	O 249	S 5	0	2	0
1	D	173	Total 1282	C 812	N 218	O 247	S 5	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

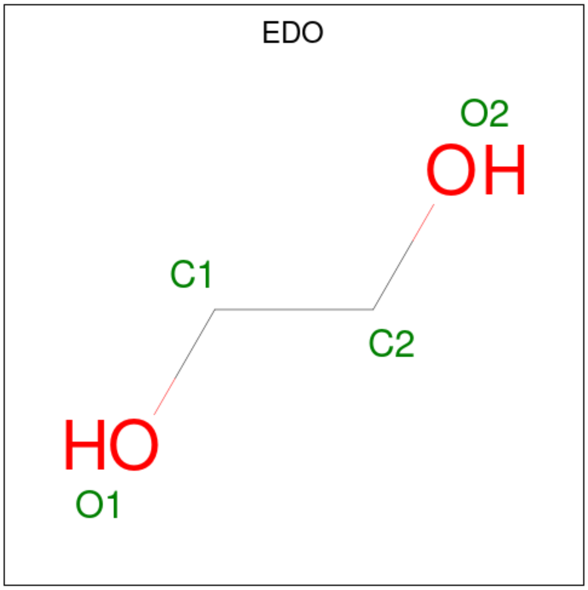
Chain	Residue	Modelled	Actual	Comment	Reference
A	204	GLY	-	expression tag	UNP P0DTD1
A	205	PRO	-	expression tag	UNP P0DTD1
B	204	GLY	-	expression tag	UNP P0DTD1
B	205	PRO	-	expression tag	UNP P0DTD1
C	204	GLY	-	expression tag	UNP P0DTD1
C	205	PRO	-	expression tag	UNP P0DTD1
D	204	GLY	-	expression tag	UNP P0DTD1
D	205	PRO	-	expression tag	UNP P0DTD1

- Molecule 2 is 5'-O-[(S)-{[(S)-{[(2R,3R,4S)-3,4-DIHYDROXYPYRROLIDIN-2-YL]METHOXY}(HYDROXY)PHOSPHORYL]OXY}(HYDROXY)PHOSPHORYL]ADENOSINE (three-letter code: A1R) (formula: $C_{15}H_{24}N_6O_{12}P_2$) (labeled as "Ligand of Interest" by depositor).



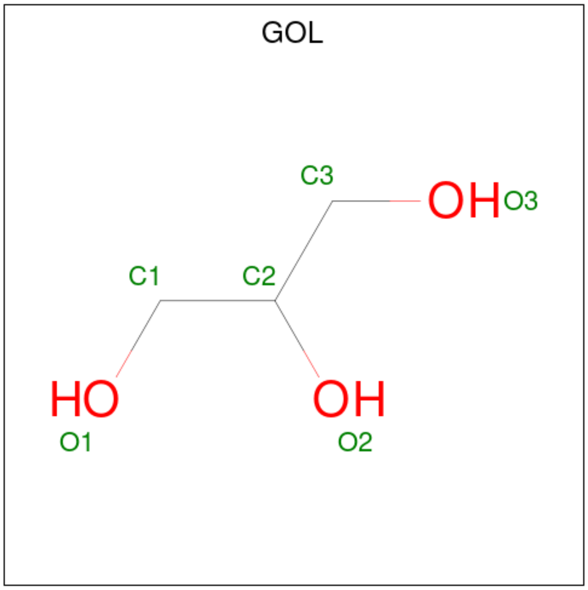
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C N O P 35 15 6 12 2	0	0
2	A	1	Total C N O P 35 15 6 12 2	0	0
2	B	1	Total C N O P 35 15 6 12 2	0	0
2	C	1	Total C N O P 35 15 6 12 2	0	0
2	C	1	Total C N O P 35 15 6 12 2	0	0
2	D	1	Total C N O P 35 15 6 12 2	0	0

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).



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

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).

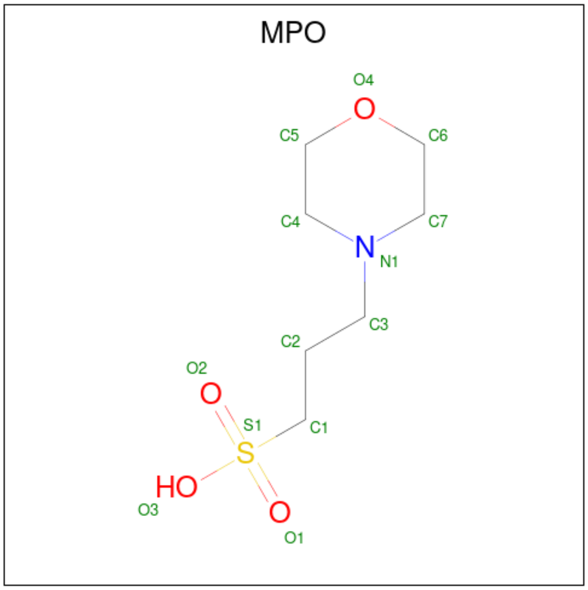


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 6 3 3	0	0
4	B	1	Total C O 6 3 3	0	0
4	C	1	Total C O 6 3 3	0	0
4	C	1	Total C O 6 3 3	0	0
4	D	1	Total C O 6 3 3	0	0

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

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

- Molecule 6 is 3[N-MORPHOLINO]PROPANE SULFONIC ACID (three-letter code: MPO) (formula: $C_7H_{15}NO_4S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
6	B	1	13	7	1	4	1	0	0

- Molecule 7 is water.

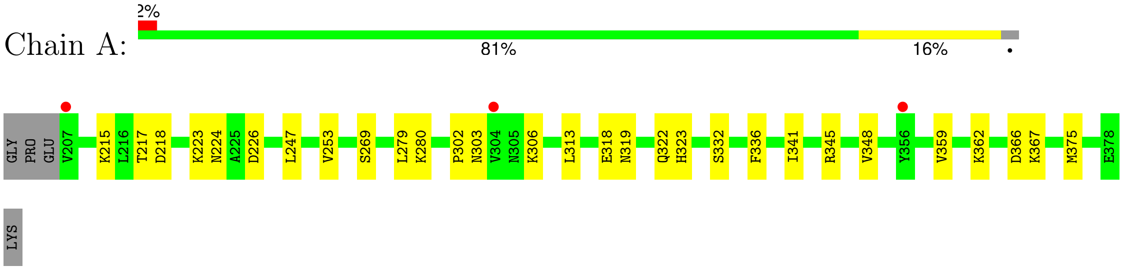
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
7	A	189	189	189	0	0
7	B	206	206	206	0	0
7	C	259	259	259	0	0
7	D	231	231	231	0	0

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.

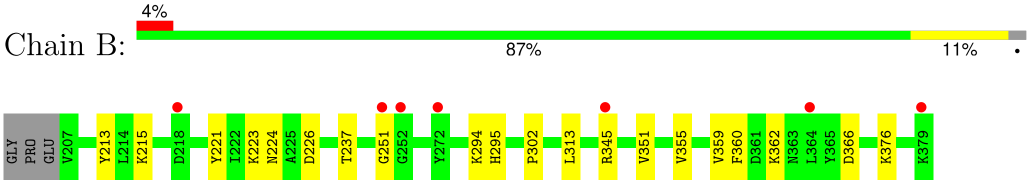
- Molecule 1: Replicase polyprotein 1ab

Chain A:



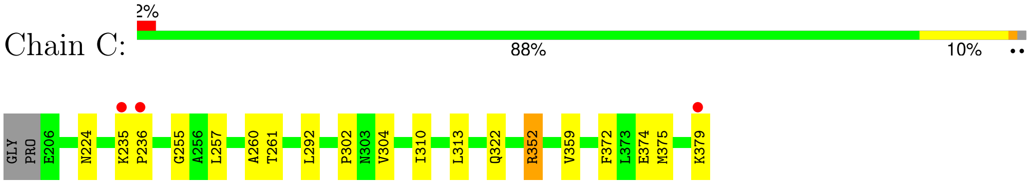
- Molecule 1: Replicase polyprotein 1ab

Chain B:



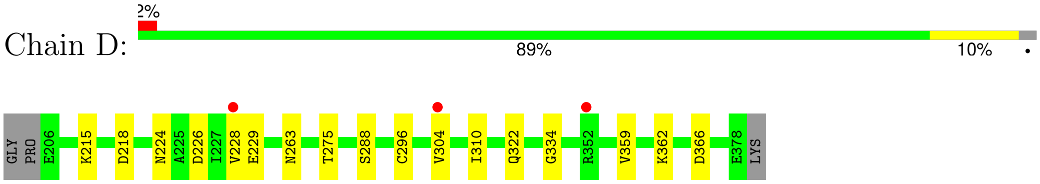
- Molecule 1: Replicase polyprotein 1ab

Chain C:



- Molecule 1: Replicase polyprotein 1ab

Chain D:



4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	59.82Å 83.10Å 84.36Å 90.00° 94.51° 90.00°	Depositor
Resolution (Å)	59.63 – 2.00 59.63 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.5 (59.63-2.00) 99.7 (59.63-2.00)	Depositor EDS
R_{merge}	0.30	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.59 (at 2.00Å)	Xtriage
Refinement program	PHENIX 1.13_2998	Depositor
R, R_{free}	0.229 , 0.279 0.239 , 0.283	Depositor DCC
R_{free} test set	2858 reflections (5.14%)	wwPDB-VP
Wilson B-factor (Å^2)	12.5	Xtriage
Anisotropy	1.145	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 57.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	6354	wwPDB-VP
Average B, all atoms (Å^2)	25.0	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 42.86 % 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 1.9178e-04. 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: EDO, MPO, GOL, NA, A1R

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	0/1323	0.65	0/1799
1	B	0.46	0/1298	0.63	0/1768
1	C	0.58	0/1336	0.76	0/1814
1	D	0.60	0/1304	0.69	0/1776
All	All	0.53	0/5261	0.69	0/7157

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	1292	0	1277	25	0
1	B	1273	0	1240	16	0
1	C	1308	0	1302	14	0
1	D	1282	0	1249	15	0
2	A	70	0	44	2	0
2	B	35	0	22	3	0
2	C	70	0	44	5	0
2	D	35	0	22	2	0
3	A	12	0	18	12	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	4	0	6	0	0
3	C	12	0	18	1	0
3	D	24	0	36	3	0
4	A	6	0	8	0	0
4	B	6	0	8	1	0
4	C	12	0	16	3	0
4	D	6	0	8	2	0
5	A	2	0	0	0	0
5	B	1	0	0	0	0
5	C	4	0	0	0	0
5	D	2	0	0	0	0
6	B	13	0	15	1	0
7	A	189	0	0	4	0
7	B	206	0	0	6	0
7	C	259	0	0	3	0
7	D	231	0	0	5	0
All	All	6354	0	5333	82	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 8.

All (82) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:296:CYS:HB3	7:D:521:HOH:O	1.42	1.19
1:A:318:GLU:OE1	3:A:405:EDO:H21	1.47	1.12
3:A:405:EDO:H11	7:A:513:HOH:O	1.56	1.04
1:A:322[B]:GLN:HG3	1:A:323:HIS:CD2	1.99	0.98
1:A:318:GLU:OE1	3:A:405:EDO:C2	2.27	0.83
1:A:322[B]:GLN:HG3	1:A:323:HIS:NE2	2.03	0.73
1:B:345:ARG:NH2	7:B:503:HOH:O	2.25	0.70
1:A:322[B]:GLN:CG	1:A:323:HIS:CD2	2.74	0.69
1:A:280:LYS:H	3:A:402:EDO:H12	1.59	0.67
1:A:341:ILE:HD11	1:A:367:LYS:HE2	1.79	0.65
1:A:319:ASN:O	1:A:322[B]:GLN:HG2	1.97	0.64
1:B:376:LYS:NZ	7:B:504:HOH:O	2.29	0.64
1:C:352:ARG:HG2	2:C:407:A1R:N7	2.13	0.64
1:C:255:GLY:HA2	3:C:403:EDO:H12	1.79	0.63
1:D:322:GLN:N	1:D:322:GLN:OE1	2.32	0.63
1:C:304:VAL:HG21	1:C:310:ILE:HD13	1.80	0.61
1:B:226:ASP:OD2	2:B:401:A1R:N6	2.32	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:288:SER:HA	4:D:402:GOL:H31	1.83	0.59
1:D:228:VAL:HG11	7:D:696:HOH:O	2.02	0.59
1:A:280:LYS:H	3:A:402:EDO:C1	2.16	0.58
1:D:226:ASP:OD1	2:D:401:A1R:N6	2.29	0.57
1:C:322:GLN:N	1:C:322:GLN:OE1	2.38	0.57
7:C:604:HOH:O	1:D:229:GLU:HG3	2.05	0.57
3:A:405:EDO:C1	7:A:513:HOH:O	2.29	0.56
1:D:263:ASN:ND2	7:D:505:HOH:O	2.35	0.54
1:A:224:ASN:HA	1:A:359:VAL:O	2.07	0.54
1:A:302:PRO:HD2	1:A:313:LEU:HD13	1.88	0.53
4:C:402:GOL:H31	4:C:406:GOL:H32	1.90	0.53
1:B:302:PRO:HD2	1:B:313:LEU:HD13	1.91	0.53
1:A:223:LYS:HG3	3:A:403:EDO:H11	1.90	0.52
1:A:362:LYS:HE3	1:A:366:ASP:OD2	2.09	0.52
1:B:362:LYS:HE3	1:B:366:ASP:OD2	2.09	0.52
1:C:352:ARG:HD2	4:C:406:GOL:O2	2.09	0.52
1:C:379:LYS:HE2	7:C:642:HOH:O	2.09	0.51
1:D:275:THR:HG21	7:D:682:HOH:O	2.10	0.50
1:D:215:LYS:NZ	1:D:218:ASP:HA	2.27	0.50
1:B:345:ARG:CZ	7:B:503:HOH:O	2.58	0.50
1:B:251:GLY:O	2:B:401:A1R:H1N1	2.11	0.50
3:A:402:EDO:H22	7:A:580:HOH:O	2.10	0.50
1:A:215:LYS:HZ3	1:A:218:ASP:HA	1.77	0.49
1:D:322:GLN:CB	3:D:405:EDO:H22	2.43	0.49
1:A:226:ASP:HB2	2:A:406:A1R:C8	2.44	0.48
1:A:253:VAL:HG23	2:A:401:A1R:O1A	2.13	0.48
4:B:402:GOL:H32	7:B:517:HOH:O	2.12	0.48
1:B:360:PHE:HA	7:B:515:HOH:O	2.14	0.48
1:A:279:LEU:HD22	3:A:402:EDO:H21	1.96	0.48
1:D:224:ASN:HA	1:D:359:VAL:O	2.15	0.46
1:A:215:LYS:NZ	1:A:218:ASP:HA	2.31	0.46
2:C:407:A1R:O2A	3:D:408:EDO:O2	2.28	0.45
1:D:304:VAL:HG21	1:D:310:ILE:HD13	1.97	0.45
2:D:401:A1R:O3N	3:D:404:EDO:H11	2.17	0.45
1:A:332:SER:HA	1:A:336:PHE:HB2	1.98	0.45
1:A:217:THR:HG21	1:A:348:VAL:HG13	1.99	0.44
1:B:224:ASN:HA	1:B:359:VAL:O	2.17	0.44
1:A:318:GLU:OE1	3:A:405:EDO:C1	2.66	0.43
1:C:260:ALA:HB3	1:C:292:LEU:HD11	2.01	0.43
1:B:351:VAL:HG11	1:B:355:VAL:HG21	2.00	0.43
1:B:351:VAL:HG11	1:B:355:VAL:CG2	2.48	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:215:LYS:HZ3	1:D:218:ASP:HA	1.84	0.43
2:B:401:A1R:N6	6:B:403:MPO:H61	2.34	0.43
1:C:352:ARG:HG2	2:C:407:A1R:C8	2.49	0.43
1:C:374:GLU:HG3	7:C:530:HOH:O	2.19	0.43
1:B:215:LYS:HG3	1:B:221:TYR:CE1	2.53	0.42
1:A:247:LEU:HB3	1:A:269:SER:HB3	2.01	0.42
1:B:360:PHE:CA	7:B:515:HOH:O	2.68	0.42
1:A:223:LYS:CG	3:A:403:EDO:H11	2.50	0.42
1:A:303:ASN:ND2	1:A:306:LYS:HG3	2.35	0.42
1:C:372:PHE:HA	1:C:375:MET:HG2	2.01	0.42
1:C:302:PRO:HD2	1:C:313:LEU:HD13	2.02	0.41
1:C:224:ASN:HA	1:C:359:VAL:O	2.20	0.41
1:B:237:THR:O	1:B:294:LYS:HB3	2.19	0.41
2:C:407:A1R:O2B	2:C:407:A1R:N4N	2.36	0.41
1:C:257:LEU:O	1:C:261:THR:HG23	2.21	0.41
1:B:294:LYS:HG2	1:B:295:HIS:CD2	2.55	0.41
3:A:403:EDO:H21	7:A:563:HOH:O	2.20	0.41
4:C:402:GOL:H31	4:C:406:GOL:C3	2.51	0.41
1:D:362:LYS:HE3	1:D:366:ASP:OD2	2.21	0.41
4:D:402:GOL:H12	7:D:666:HOH:O	2.19	0.41
2:C:407:A1R:H1N2	1:D:334:GLY:HA2	2.03	0.40
1:A:345:ARG:HG3	1:A:375:MET:HE1	2.03	0.40
1:B:213:TYR:CD2	1:B:223:LYS:HB2	2.56	0.40
1:C:235:LYS:N	1:C:236:PRO:CD	2.85	0.40

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	173/176 (98%)	168 (97%)	5 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	172/176 (98%)	170 (99%)	2 (1%)	0	100	100
1	C	174/176 (99%)	170 (98%)	4 (2%)	0	100	100
1	D	171/176 (97%)	166 (97%)	5 (3%)	0	100	100
All	All	690/704 (98%)	674 (98%)	16 (2%)	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	139/147 (95%)	139 (100%)	0	100	100
1	B	132/147 (90%)	132 (100%)	0	100	100
1	C	141/147 (96%)	140 (99%)	1 (1%)	84	88
1	D	136/147 (92%)	136 (100%)	0	100	100
All	All	548/588 (93%)	547 (100%)	1 (0%)	93	95

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	352	ARG

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

Mol	Chain	Res	Type
1	A	363	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 34 ligands modelled in this entry, 9 are monoatomic - leaving 25 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	$\#\|Z\| > 2$
3	EDO	C	403	-	3,3,3	0.41	0	2,2,2	0.34	0
4	GOL	A	404	-	5,5,5	0.29	0	5,5,5	0.34	0
2	A1R	A	406	-	34,38,38	1.30	3 (8%)	36,58,58	1.52	2 (5%)
2	A1R	B	401	-	34,38,38	0.99	2 (5%)	36,58,58	0.83	0
3	EDO	C	405	-	3,3,3	0.42	0	2,2,2	0.33	0
3	EDO	D	405	-	3,3,3	0.46	0	2,2,2	0.58	0
2	A1R	C	407	-	34,38,38	1.31	3 (8%)	36,58,58	1.63	4 (11%)
4	GOL	C	402	-	5,5,5	0.21	0	5,5,5	0.96	0
4	GOL	C	406	-	5,5,5	0.42	0	5,5,5	0.54	0
2	A1R	C	401	-	34,38,38	1.01	0	36,58,58	1.14	2 (5%)
3	EDO	A	402	-	3,3,3	0.44	0	2,2,2	0.50	0
4	GOL	B	402	-	5,5,5	0.30	0	5,5,5	0.25	0
3	EDO	B	404	-	3,3,3	0.42	0	2,2,2	0.27	0
3	EDO	D	407	-	3,3,3	0.43	0	2,2,2	0.19	0
2	A1R	D	401	-	34,38,38	0.95	0	36,58,58	0.90	1 (2%)
3	EDO	A	403	-	3,3,3	0.42	0	2,2,2	0.37	0
6	MPO	B	403	-	13,13,13	1.40	3 (23%)	17,17,17	2.14	8 (47%)
4	GOL	D	402	-	5,5,5	0.53	0	5,5,5	0.63	0
3	EDO	A	405	-	3,3,3	0.46	0	2,2,2	0.35	0
3	EDO	D	406	-	3,3,3	0.70	0	2,2,2	0.71	0
3	EDO	C	404	-	3,3,3	0.44	0	2,2,2	0.22	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
3	EDO	D	404	5	3,3,3	0.43	0	2,2,2	0.36	0
3	EDO	D	403	-	3,3,3	0.42	0	2,2,2	0.36	0
2	A1R	A	401	-	34,38,38	1.01	2 (5%)	36,58,58	0.97	1 (2%)
3	EDO	D	408	-	3,3,3	0.43	0	2,2,2	0.37	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
3	EDO	C	403	-	-	1/1/1/1	-
4	GOL	A	404	-	-	4/4/4/4	-
2	A1R	A	406	-	-	12/18/51/51	0/4/4/4
2	A1R	B	401	-	-	2/18/51/51	0/4/4/4
3	EDO	C	405	-	-	1/1/1/1	-
3	EDO	D	405	-	-	0/1/1/1	-
2	A1R	C	407	-	-	7/18/51/51	0/4/4/4
4	GOL	C	402	-	-	2/4/4/4	-
4	GOL	C	406	-	-	4/4/4/4	-
2	A1R	C	401	-	-	3/18/51/51	0/4/4/4
3	EDO	A	402	-	-	0/1/1/1	-
4	GOL	B	402	-	-	4/4/4/4	-
3	EDO	B	404	-	-	1/1/1/1	-
3	EDO	D	407	-	-	0/1/1/1	-
2	A1R	D	401	-	-	2/18/51/51	0/4/4/4
3	EDO	A	403	-	-	0/1/1/1	-
6	MPO	B	403	-	-	4/7/15/15	0/1/1/1
4	GOL	D	402	-	-	0/4/4/4	-
3	EDO	A	405	-	-	0/1/1/1	-
3	EDO	D	406	-	-	1/1/1/1	-
3	EDO	C	404	-	-	0/1/1/1	-
3	EDO	D	404	5	-	0/1/1/1	-
3	EDO	D	403	-	-	1/1/1/1	-
2	A1R	A	401	-	-	2/18/51/51	0/4/4/4
3	EDO	D	408	-	-	0/1/1/1	-

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	407	A1R	PB-O3A	3.79	1.63	1.59
2	C	407	A1R	PA-O3A	3.71	1.63	1.59
2	A	406	A1R	PA-O3A	3.61	1.63	1.59
2	A	406	A1R	PB-O3A	3.27	1.63	1.59
6	B	403	MPO	C1-S1	2.96	1.81	1.77
2	A	401	A1R	O4'-C1'	2.79	1.44	1.40
2	A	406	A1R	O4'-C1'	2.59	1.44	1.40
2	B	401	A1R	O4'-C1'	2.33	1.43	1.40
6	B	403	MPO	O1-S1	2.30	1.51	1.45
2	A	401	A1R	C2-N3	2.28	1.35	1.32
2	B	401	A1R	PB-O3A	2.14	1.61	1.59
2	C	407	A1R	C1'-N9	-2.14	1.44	1.49
6	B	403	MPO	O2-S1	2.14	1.51	1.45

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	407	A1R	C4'-O4'-C1'	-7.39	103.16	109.92
2	A	406	A1R	O4'-C1'-N9	5.27	115.74	108.75
2	A	406	A1R	C4'-O4'-C1'	-4.14	106.14	109.92
6	B	403	MPO	C2-C1-S1	-4.03	107.07	113.25
6	B	403	MPO	O2-S1-O1	-4.00	100.81	113.82
6	B	403	MPO	O3-S1-C1	2.95	111.78	106.00
6	B	403	MPO	C7-N1-C4	2.92	115.14	108.84
6	B	403	MPO	O1-S1-C1	2.92	111.14	106.73
2	C	407	A1R	C1N-C2N-C3N	2.56	106.09	103.40
6	B	403	MPO	C6-C7-N1	2.55	114.00	110.12
2	A	401	A1R	O2N-C2N-C3N	2.51	116.37	111.43
2	C	401	A1R	C4-C5-N7	2.46	111.94	109.34
6	B	403	MPO	O2-S1-C1	2.41	110.36	106.73
6	B	403	MPO	C2-C3-N1	-2.20	107.74	113.93
2	C	401	A1R	O3N-C3N-C2N	2.12	116.99	111.97
2	D	401	A1R	C5N-C4N-C3N	-2.11	110.12	113.75
2	C	407	A1R	O2A-PA-O3A	-2.07	101.68	107.27
2	C	407	A1R	O3A-PA-O1A	2.03	116.82	110.70

There are no chirality outliers.

All (51) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	406	A1R	C5'-O5'-PA-O1A
2	A	406	A1R	C5'-O5'-PA-O2A

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Mol	Chain	Res	Type	Atoms
2	A	406	A1R	C5'-O5'-PA-O3A
2	A	406	A1R	C5N-O5N-PB-O3A
2	A	406	A1R	C5N-O5N-PB-O1B
2	A	406	A1R	C5N-O5N-PB-O2B
2	A	406	A1R	N4N-C4N-C5N-O5N
2	A	406	A1R	C3N-C4N-C5N-O5N
2	C	407	A1R	PB-O3A-PA-O5'
2	C	407	A1R	N4N-C4N-C5N-O5N
2	C	407	A1R	C3N-C4N-C5N-O5N
4	A	404	GOL	C1-C2-C3-O3
4	A	404	GOL	O2-C2-C3-O3
4	C	406	GOL	O1-C1-C2-C3
4	C	406	GOL	C1-C2-C3-O3
6	B	403	MPO	C2-C1-S1-O1
4	A	404	GOL	O1-C1-C2-O2
2	B	401	A1R	C3'-C4'-C5'-O5'
6	B	403	MPO	C2-C3-N1-C4
6	B	403	MPO	C2-C3-N1-C7
2	B	401	A1R	O4'-C4'-C5'-O5'
2	A	406	A1R	C4'-C5'-O5'-PA
4	A	404	GOL	O1-C1-C2-C3
4	B	402	GOL	O1-C1-C2-C3
4	B	402	GOL	C1-C2-C3-O3
4	C	402	GOL	C1-C2-C3-O3
4	C	406	GOL	O1-C1-C2-O2
2	C	401	A1R	O4'-C4'-C5'-O5'
2	D	401	A1R	C3'-C4'-C5'-O5'
3	D	406	EDO	O1-C1-C2-O2
2	D	401	A1R	O4'-C4'-C5'-O5'
4	B	402	GOL	O2-C2-C3-O3
4	C	406	GOL	O2-C2-C3-O3
2	A	401	A1R	C3'-C4'-C5'-O5'
2	A	401	A1R	O4'-C4'-C5'-O5'
2	C	401	A1R	C3'-C4'-C5'-O5'
3	C	403	EDO	O1-C1-C2-O2
3	C	405	EDO	O1-C1-C2-O2
2	A	406	A1R	C4N-C5N-O5N-PB
2	C	407	A1R	C5'-O5'-PA-O1A
2	C	407	A1R	C4'-C5'-O5'-PA
6	B	403	MPO	C2-C1-S1-O3
2	A	406	A1R	PB-O3A-PA-O2A
3	D	403	EDO	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
4	B	402	GOL	O1-C1-C2-O2
4	C	402	GOL	O2-C2-C3-O3
3	B	404	EDO	O1-C1-C2-O2
2	A	406	A1R	PB-O3A-PA-O1A
2	C	401	A1R	PB-O3A-PA-O2A
2	C	407	A1R	C4N-C5N-O5N-PB
2	C	407	A1R	PA-O3A-PB-O1B

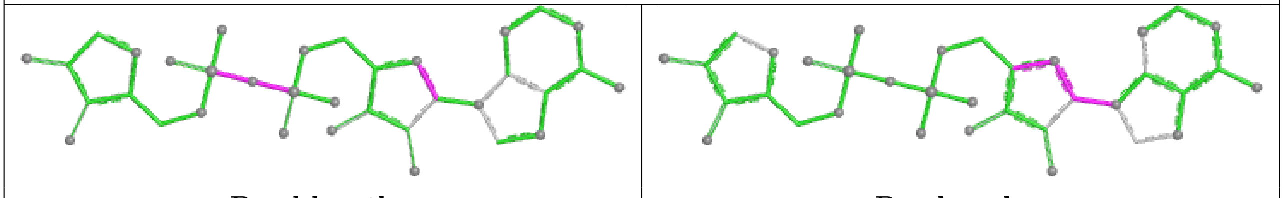
There are no ring outliers.

17 monomers are involved in 32 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	403	EDO	1	0
2	A	406	A1R	1	0
2	B	401	A1R	3	0
3	D	405	EDO	1	0
2	C	407	A1R	5	0
4	C	402	GOL	2	0
4	C	406	GOL	3	0
3	A	402	EDO	4	0
4	B	402	GOL	1	0
2	D	401	A1R	2	0
3	A	403	EDO	3	0
6	B	403	MPO	1	0
4	D	402	GOL	2	0
3	A	405	EDO	5	0
3	D	404	EDO	1	0
2	A	401	A1R	1	0
3	D	408	EDO	1	0

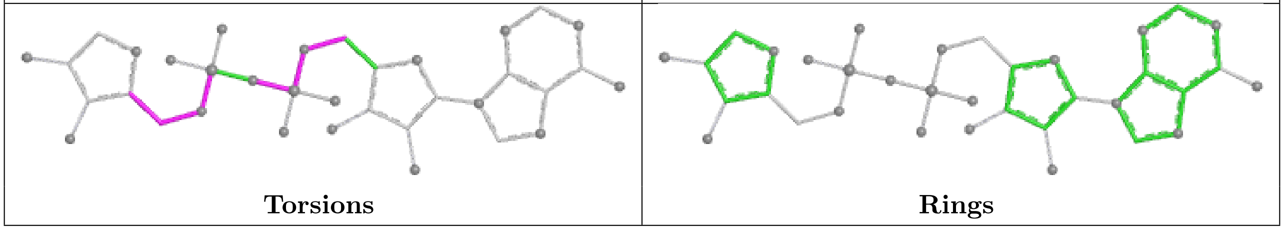
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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 A1R A 406



Bond lengths

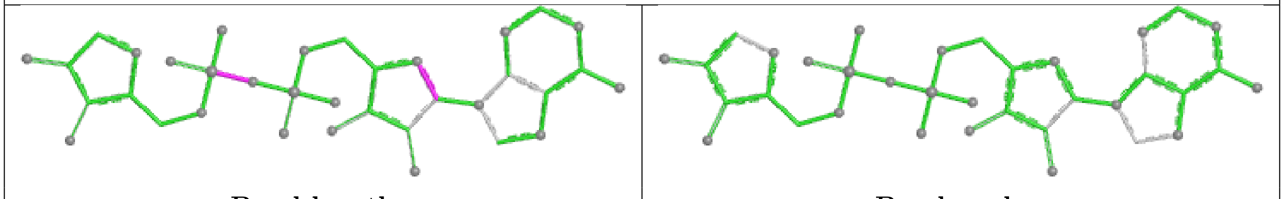
Bond angles



Torsions

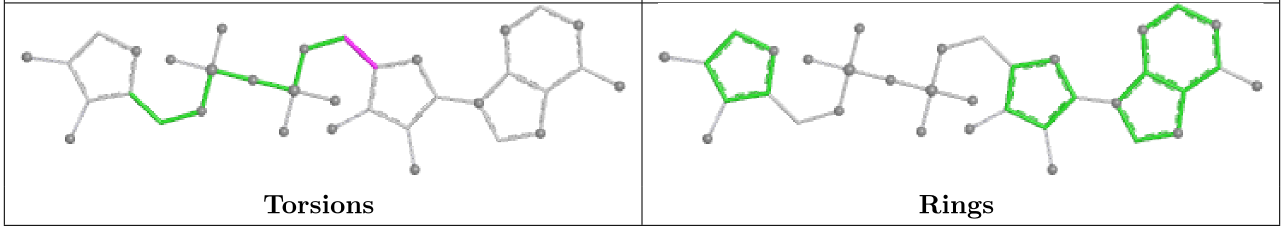
Rings

Ligand A1R B 401



Bond lengths

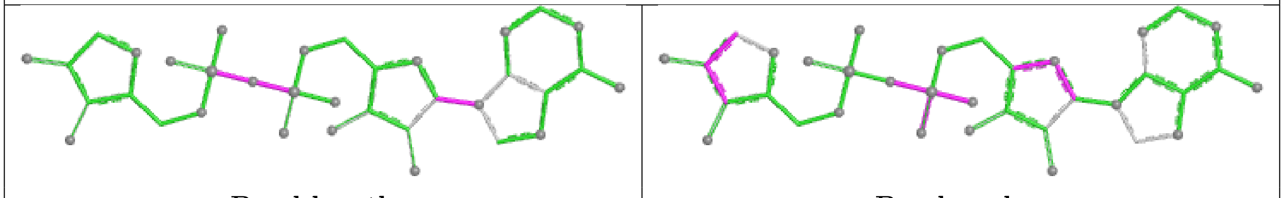
Bond angles



Torsions

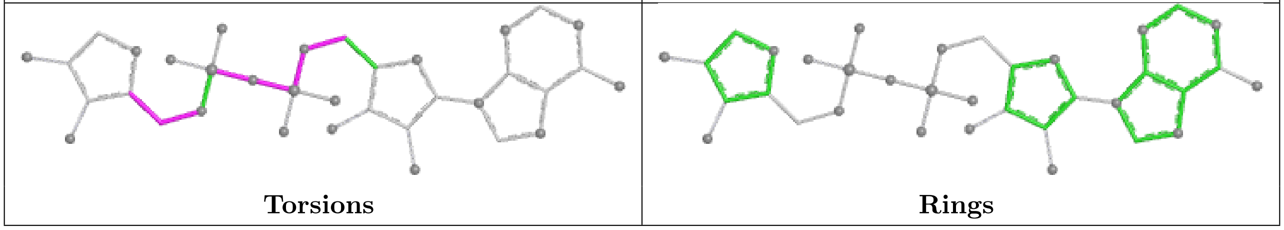
Rings

Ligand A1R C 407



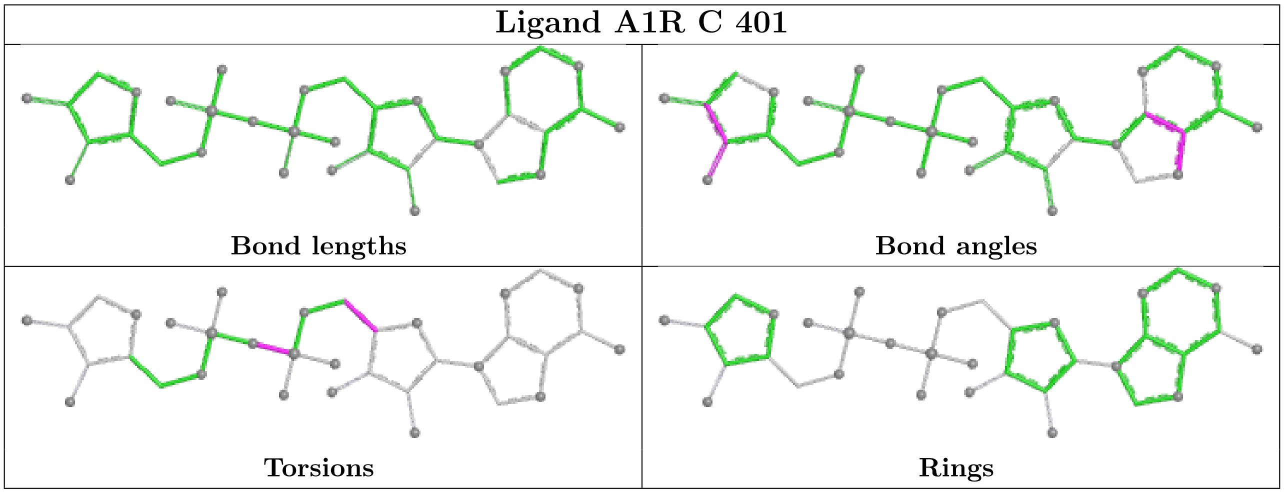
Bond lengths

Bond angles



Torsions

Rings

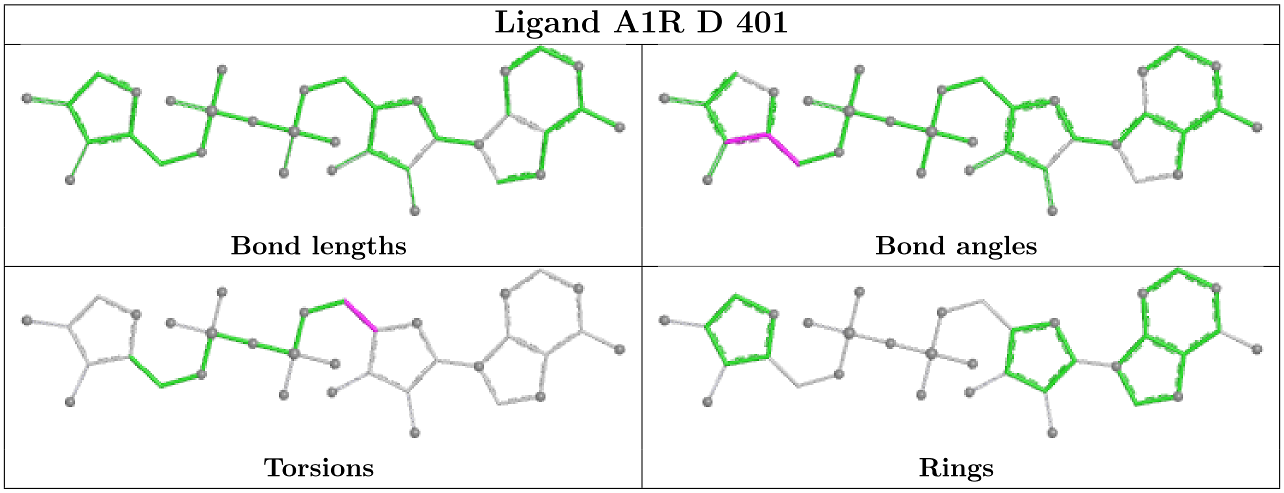

Ligand A1R C 401

Bond lengths

Bond angles

Torsions

Rings

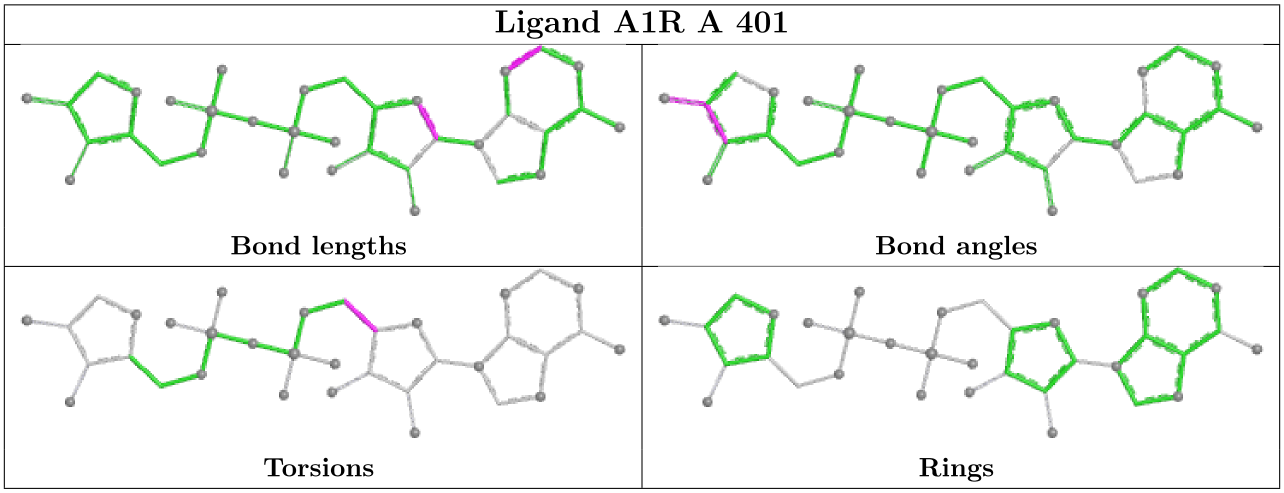

Ligand A1R D 401

Bond lengths

Bond angles

Torsions

Rings


Ligand A1R A 401

Bond lengths

Bond angles

Torsions

Rings

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, 95^{th} 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	172/176 (97%)	0.75	3 (1%)	70	68	24, 30, 40, 54	0
1	B	173/176 (98%)	0.76	7 (4%)	38	37	24, 31, 44, 51	1 (0%)
1	C	174/176 (98%)	0.43	3 (1%)	70	68	11, 15, 30, 57	0
1	D	173/176 (98%)	0.42	3 (1%)	70	68	12, 16, 32, 50	0
All	All	692/704 (98%)	0.59	16 (2%)	60	59	11, 26, 39, 57	1 (0%)

All (16) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	252	GLY	4.5
1	B	218	ASP	4.1
1	A	304	VAL	3.4
1	D	304	VAL	3.2
1	A	207	VAL	2.8
1	B	251	GLY	2.7
1	A	356	TYR	2.7
1	D	352	ARG	2.7
1	B	379	LYS	2.6
1	B	345	ARG	2.5
1	C	379	LYS	2.3
1	B	272	TYR	2.3
1	D	228	VAL	2.1
1	B	364	LEU	2.1
1	C	236	PRO	2.1
1	C	235	LYS	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(Å^2)	Q<0.9
3	EDO	D	407	4/4	0.56	0.30	38,39,42,44	0
3	EDO	C	404	4/4	0.62	0.22	37,37,39,42	0
2	A1R	A	406	35/35	0.65	0.36	22,33,55,56	35
3	EDO	A	405	4/4	0.66	0.35	34,36,40,41	0
3	EDO	A	402	4/4	0.67	0.43	30,33,34,37	0
3	EDO	D	408	4/4	0.67	0.21	39,41,41,44	0
2	A1R	C	407	35/35	0.68	0.34	10,20,40,42	35
6	MPO	B	403	13/13	0.72	0.39	48,55,76,79	0
4	GOL	A	404	6/6	0.74	0.32	35,40,42,45	0
3	EDO	B	404	4/4	0.75	0.24	42,43,46,49	0
3	EDO	C	405	4/4	0.76	0.21	23,30,31,32	0
4	GOL	B	402	6/6	0.77	0.27	34,50,55,59	0
5	NA	D	410	1/1	0.80	0.17	45,45,45,45	0
3	EDO	D	406	4/4	0.80	0.26	36,37,37,37	0
3	EDO	D	405	4/4	0.81	0.24	20,29,37,39	0
4	GOL	D	402	6/6	0.81	0.21	30,35,37,42	0
4	GOL	C	406	6/6	0.85	0.41	26,32,36,41	0
4	GOL	C	402	6/6	0.86	0.29	28,30,38,44	0
3	EDO	A	403	4/4	0.87	0.12	27,30,37,44	0
3	EDO	C	403	4/4	0.89	0.24	30,31,32,34	0
5	NA	A	408	1/1	0.89	0.16	47,47,47,47	0
3	EDO	D	403	4/4	0.90	0.16	27,32,33,38	0
3	EDO	D	404	4/4	0.92	0.19	13,15,15,27	0
5	NA	B	405	1/1	0.92	0.08	25,25,25,25	0
2	A1R	A	401	35/35	0.93	0.14	24,25,27,32	0
5	NA	C	411	1/1	0.93	0.09	26,26,26,26	0
2	A1R	C	401	35/35	0.94	0.13	10,11,16,18	0
2	A1R	B	401	35/35	0.94	0.13	25,27,31,32	0
5	NA	C	410	1/1	0.94	0.11	33,33,33,33	0
5	NA	A	407	1/1	0.95	0.07	25,25,25,25	0
5	NA	C	408	1/1	0.95	0.12	26,26,26,26	0
2	A1R	D	401	35/35	0.95	0.13	12,12,15,20	0

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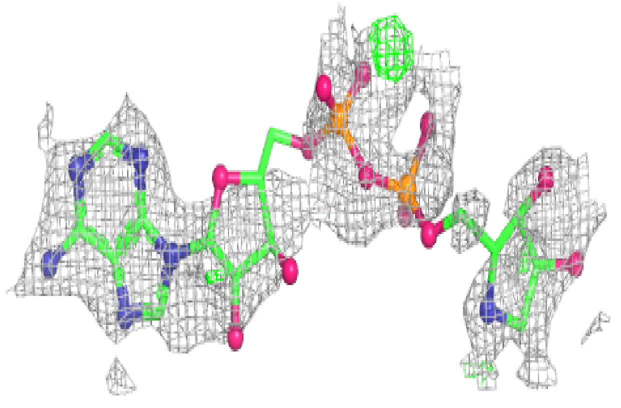
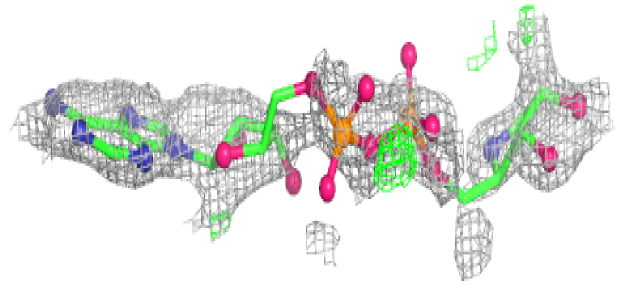
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
5	NA	C	409	1/1	0.97	0.07	21,21,21,21	0
5	NA	D	409	1/1	0.97	0.09	14,14,14,14	0

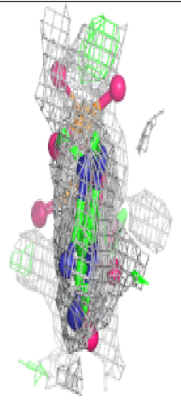
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around A1R A 406:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)

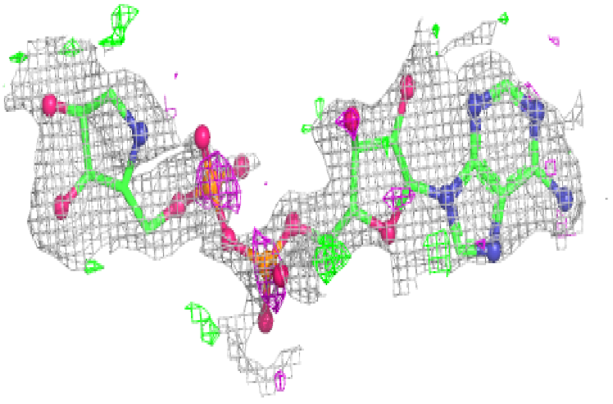


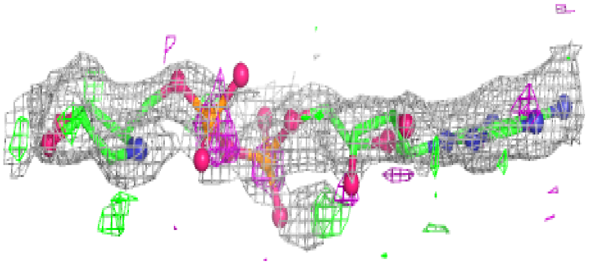


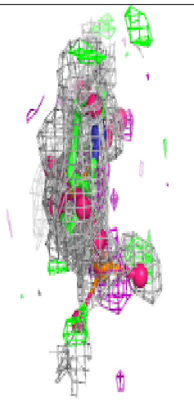


Electron density around A1R C 407:

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

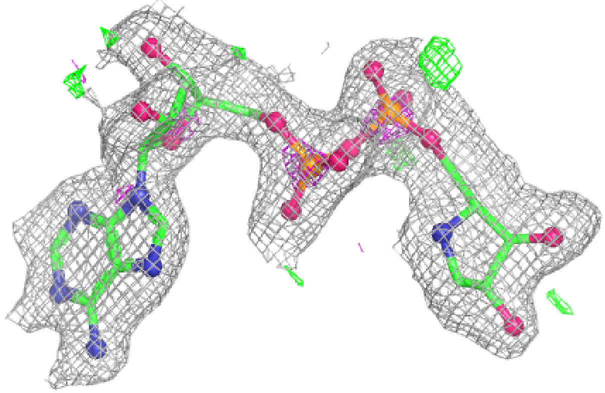


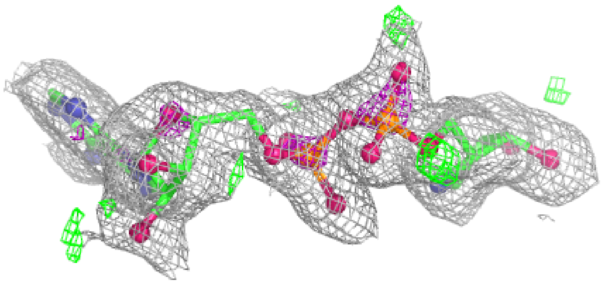


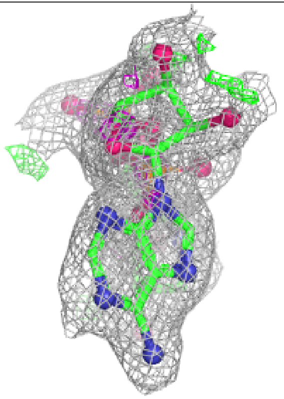


Electron density around A1R A 401:

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

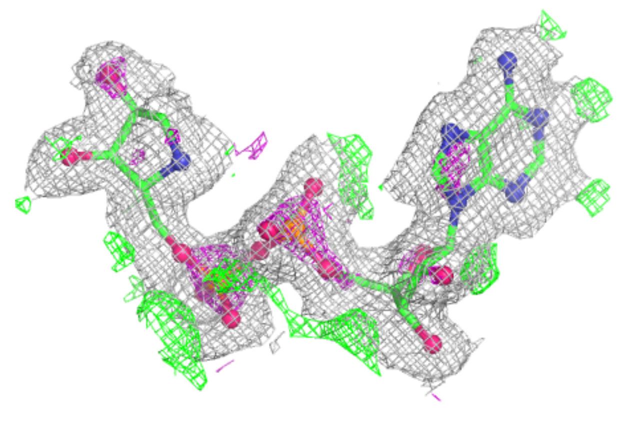


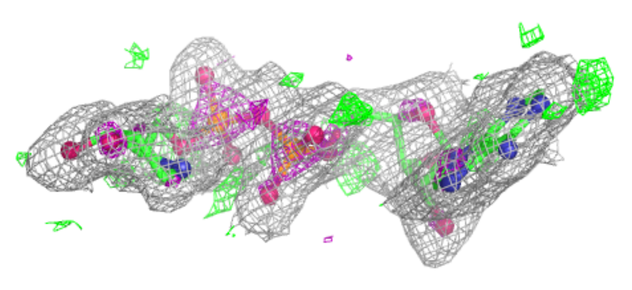


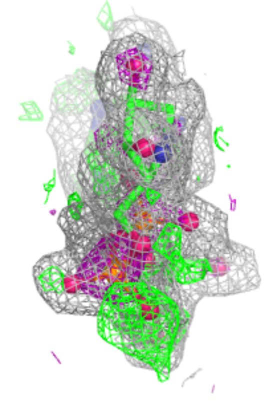


Electron density around A1R C 401:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)

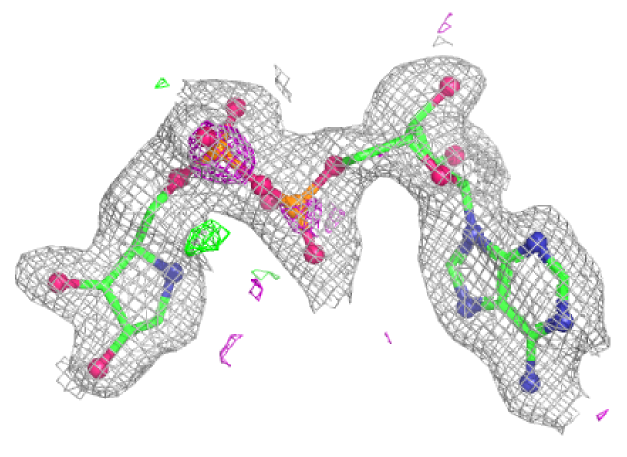


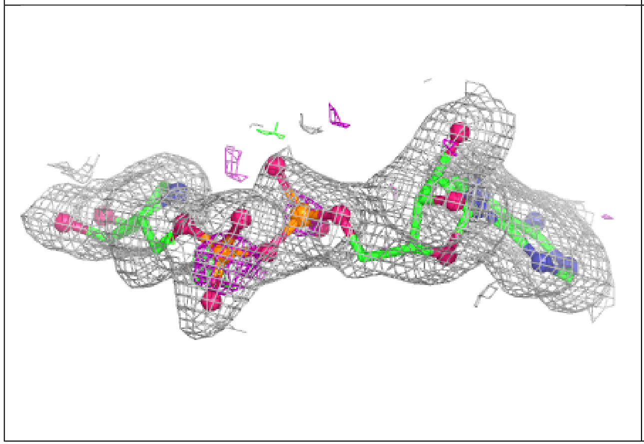


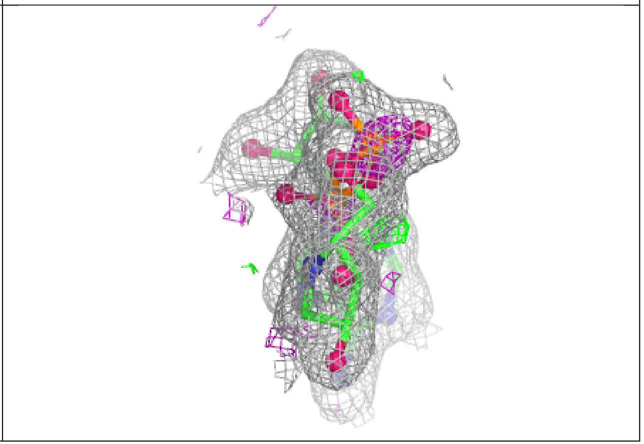


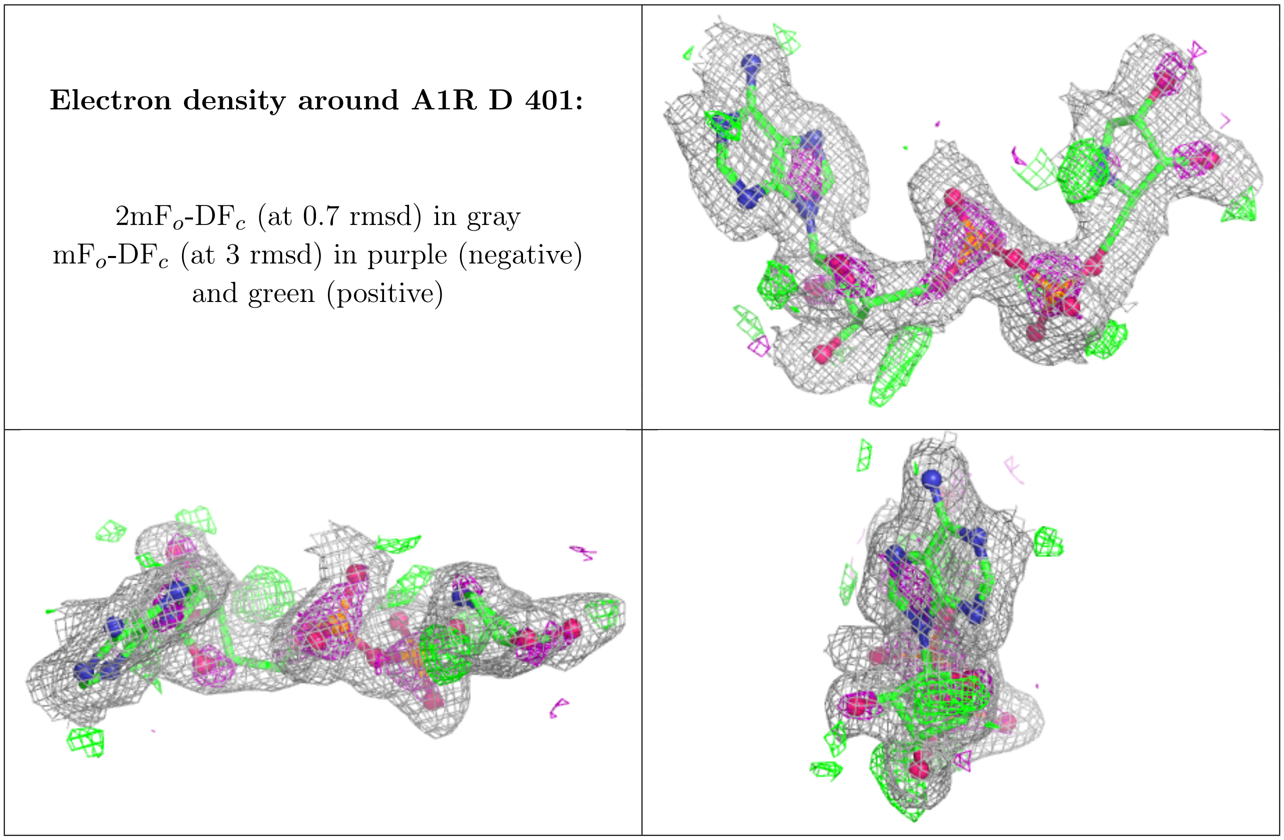
Electron density around A1R B 401:

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 A1R D 401:

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.