wwPDB X-ray Structure Validation Summary Report (i)

Jun 12, 2025 – 02:11 PM EDT

PDB ID	:	9CUC / pdb_00009cuc
Title	:	Human STING G230A/R293Q variant bound to THIQi
Authors	:	Critton, D.A.
Deposited on	:	2024-07-26
Resolution	:	2.10 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 (i) 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 (i)) were used in the production of this report:

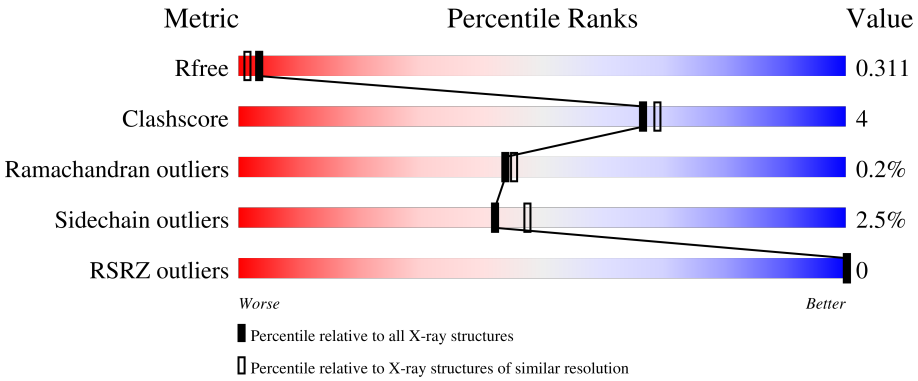
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.10 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	6234 (2.10-2.10)
Clashscore	180529	6893 (2.10-2.10)
Ramachandran outliers	177936	6839 (2.10-2.10)
Sidechain outliers	177891	6840 (2.10-2.10)
RSRZ outliers	164620	6234 (2.10-2.10)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	210	69% 7% 24%
1	B	210	63% 11% 26%
1	C	210	70% 6% 24%
1	D	210	65% 8% 27%
1	E	210	68% 8% 25%

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Mol	Chain	Length	Quality of chain
1	F	210	

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 7592 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 Stimulator of interferon genes protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	160	Total	C	N	O	S	0	3	0
			1233	793	207	226	7			
1	B	156	Total	C	N	O	S	0	5	0
			1229	790	211	222	6			
1	C	159	Total	C	N	O	S	0	3	0
			1219	786	202	224	7			
1	D	153	Total	C	N	O	S	0	5	0
			1196	769	203	218	6			
1	E	158	Total	C	N	O	S	0	3	0
			1215	784	201	223	7			
1	F	155	Total	C	N	O	S	0	5	0
			1217	781	210	220	6			

There are 156 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	132	MET	-	initiating methionine	UNP Q86WV6
A	133	GLY	-	expression tag	UNP Q86WV6
A	134	SER	-	expression tag	UNP Q86WV6
A	135	SER	-	expression tag	UNP Q86WV6
A	136	HIS	-	expression tag	UNP Q86WV6
A	137	HIS	-	expression tag	UNP Q86WV6
A	138	HIS	-	expression tag	UNP Q86WV6
A	139	HIS	-	expression tag	UNP Q86WV6
A	140	HIS	-	expression tag	UNP Q86WV6
A	141	HIS	-	expression tag	UNP Q86WV6
A	142	SER	-	expression tag	UNP Q86WV6
A	143	SER	-	expression tag	UNP Q86WV6
A	144	GLY	-	expression tag	UNP Q86WV6
A	145	GLU	-	expression tag	UNP Q86WV6
A	146	THR	-	expression tag	UNP Q86WV6
A	147	VAL	-	expression tag	UNP Q86WV6
A	148	ARG	-	expression tag	UNP Q86WV6

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Chain	Residue	Modelled	Actual	Comment	Reference
A	149	PHE	-	expression tag	UNP Q86WV6
A	150	GLN	-	expression tag	UNP Q86WV6
A	151	GLY	-	expression tag	UNP Q86WV6
A	152	HIS	-	expression tag	UNP Q86WV6
A	153	MET	-	expression tag	UNP Q86WV6
A	154	SER	-	expression tag	UNP Q86WV6
A	230	ALA	GLY	variant	UNP Q86WV6
A	232	ARG	HIS	conflict	UNP Q86WV6
A	293	GLN	ARG	variant	UNP Q86WV6
B	132	MET	-	initiating methionine	UNP Q86WV6
B	133	GLY	-	expression tag	UNP Q86WV6
B	134	SER	-	expression tag	UNP Q86WV6
B	135	SER	-	expression tag	UNP Q86WV6
B	136	HIS	-	expression tag	UNP Q86WV6
B	137	HIS	-	expression tag	UNP Q86WV6
B	138	HIS	-	expression tag	UNP Q86WV6
B	139	HIS	-	expression tag	UNP Q86WV6
B	140	HIS	-	expression tag	UNP Q86WV6
B	141	HIS	-	expression tag	UNP Q86WV6
B	142	SER	-	expression tag	UNP Q86WV6
B	143	SER	-	expression tag	UNP Q86WV6
B	144	GLY	-	expression tag	UNP Q86WV6
B	145	GLU	-	expression tag	UNP Q86WV6
B	146	THR	-	expression tag	UNP Q86WV6
B	147	VAL	-	expression tag	UNP Q86WV6
B	148	ARG	-	expression tag	UNP Q86WV6
B	149	PHE	-	expression tag	UNP Q86WV6
B	150	GLN	-	expression tag	UNP Q86WV6
B	151	GLY	-	expression tag	UNP Q86WV6
B	152	HIS	-	expression tag	UNP Q86WV6
B	153	MET	-	expression tag	UNP Q86WV6
B	154	SER	-	expression tag	UNP Q86WV6
B	230	ALA	GLY	variant	UNP Q86WV6
B	232	ARG	HIS	conflict	UNP Q86WV6
B	293	GLN	ARG	variant	UNP Q86WV6
C	132	MET	-	initiating methionine	UNP Q86WV6
C	133	GLY	-	expression tag	UNP Q86WV6
C	134	SER	-	expression tag	UNP Q86WV6
C	135	SER	-	expression tag	UNP Q86WV6
C	136	HIS	-	expression tag	UNP Q86WV6
C	137	HIS	-	expression tag	UNP Q86WV6
C	138	HIS	-	expression tag	UNP Q86WV6

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Chain	Residue	Modelled	Actual	Comment	Reference
C	139	HIS	-	expression tag	UNP Q86WV6
C	140	HIS	-	expression tag	UNP Q86WV6
C	141	HIS	-	expression tag	UNP Q86WV6
C	142	SER	-	expression tag	UNP Q86WV6
C	143	SER	-	expression tag	UNP Q86WV6
C	144	GLY	-	expression tag	UNP Q86WV6
C	145	GLU	-	expression tag	UNP Q86WV6
C	146	THR	-	expression tag	UNP Q86WV6
C	147	VAL	-	expression tag	UNP Q86WV6
C	148	ARG	-	expression tag	UNP Q86WV6
C	149	PHE	-	expression tag	UNP Q86WV6
C	150	GLN	-	expression tag	UNP Q86WV6
C	151	GLY	-	expression tag	UNP Q86WV6
C	152	HIS	-	expression tag	UNP Q86WV6
C	153	MET	-	expression tag	UNP Q86WV6
C	154	SER	-	expression tag	UNP Q86WV6
C	230	ALA	GLY	variant	UNP Q86WV6
C	232	ARG	HIS	conflict	UNP Q86WV6
C	293	GLN	ARG	variant	UNP Q86WV6
D	132	MET	-	initiating methionine	UNP Q86WV6
D	133	GLY	-	expression tag	UNP Q86WV6
D	134	SER	-	expression tag	UNP Q86WV6
D	135	SER	-	expression tag	UNP Q86WV6
D	136	HIS	-	expression tag	UNP Q86WV6
D	137	HIS	-	expression tag	UNP Q86WV6
D	138	HIS	-	expression tag	UNP Q86WV6
D	139	HIS	-	expression tag	UNP Q86WV6
D	140	HIS	-	expression tag	UNP Q86WV6
D	141	HIS	-	expression tag	UNP Q86WV6
D	142	SER	-	expression tag	UNP Q86WV6
D	143	SER	-	expression tag	UNP Q86WV6
D	144	GLY	-	expression tag	UNP Q86WV6
D	145	GLU	-	expression tag	UNP Q86WV6
D	146	THR	-	expression tag	UNP Q86WV6
D	147	VAL	-	expression tag	UNP Q86WV6
D	148	ARG	-	expression tag	UNP Q86WV6
D	149	PHE	-	expression tag	UNP Q86WV6
D	150	GLN	-	expression tag	UNP Q86WV6
D	151	GLY	-	expression tag	UNP Q86WV6
D	152	HIS	-	expression tag	UNP Q86WV6
D	153	MET	-	expression tag	UNP Q86WV6
D	154	SER	-	expression tag	UNP Q86WV6

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Chain	Residue	Modelled	Actual	Comment	Reference
D	230	ALA	GLY	variant	UNP Q86WV6
D	232	ARG	HIS	conflict	UNP Q86WV6
D	293	GLN	ARG	variant	UNP Q86WV6
E	132	MET	-	initiating methionine	UNP Q86WV6
E	133	GLY	-	expression tag	UNP Q86WV6
E	134	SER	-	expression tag	UNP Q86WV6
E	135	SER	-	expression tag	UNP Q86WV6
E	136	HIS	-	expression tag	UNP Q86WV6
E	137	HIS	-	expression tag	UNP Q86WV6
E	138	HIS	-	expression tag	UNP Q86WV6
E	139	HIS	-	expression tag	UNP Q86WV6
E	140	HIS	-	expression tag	UNP Q86WV6
E	141	HIS	-	expression tag	UNP Q86WV6
E	142	SER	-	expression tag	UNP Q86WV6
E	143	SER	-	expression tag	UNP Q86WV6
E	144	GLY	-	expression tag	UNP Q86WV6
E	145	GLU	-	expression tag	UNP Q86WV6
E	146	THR	-	expression tag	UNP Q86WV6
E	147	VAL	-	expression tag	UNP Q86WV6
E	148	ARG	-	expression tag	UNP Q86WV6
E	149	PHE	-	expression tag	UNP Q86WV6
E	150	GLN	-	expression tag	UNP Q86WV6
E	151	GLY	-	expression tag	UNP Q86WV6
E	152	HIS	-	expression tag	UNP Q86WV6
E	153	MET	-	expression tag	UNP Q86WV6
E	154	SER	-	expression tag	UNP Q86WV6
E	230	ALA	GLY	variant	UNP Q86WV6
E	232	ARG	HIS	conflict	UNP Q86WV6
E	293	GLN	ARG	variant	UNP Q86WV6
F	132	MET	-	initiating methionine	UNP Q86WV6
F	133	GLY	-	expression tag	UNP Q86WV6
F	134	SER	-	expression tag	UNP Q86WV6
F	135	SER	-	expression tag	UNP Q86WV6
F	136	HIS	-	expression tag	UNP Q86WV6
F	137	HIS	-	expression tag	UNP Q86WV6
F	138	HIS	-	expression tag	UNP Q86WV6
F	139	HIS	-	expression tag	UNP Q86WV6
F	140	HIS	-	expression tag	UNP Q86WV6
F	141	HIS	-	expression tag	UNP Q86WV6
F	142	SER	-	expression tag	UNP Q86WV6
F	143	SER	-	expression tag	UNP Q86WV6
F	144	GLY	-	expression tag	UNP Q86WV6

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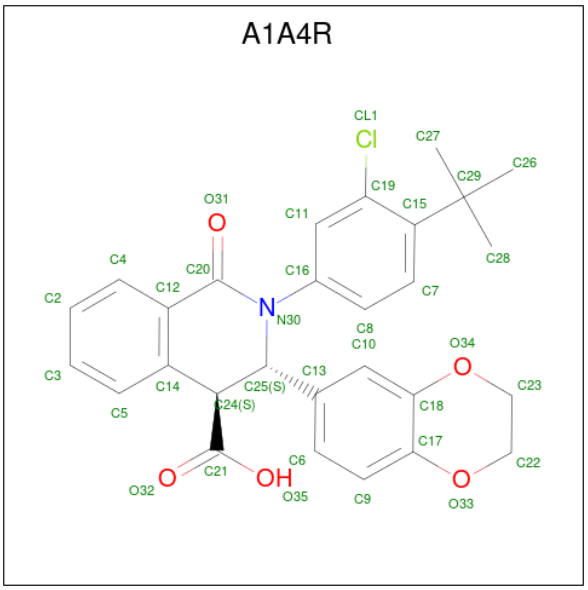
Chain	Residue	Modelled	Actual	Comment	Reference
F	145	GLU	-	expression tag	UNP Q86WV6
F	146	THR	-	expression tag	UNP Q86WV6
F	147	VAL	-	expression tag	UNP Q86WV6
F	148	ARG	-	expression tag	UNP Q86WV6
F	149	PHE	-	expression tag	UNP Q86WV6
F	150	GLN	-	expression tag	UNP Q86WV6
F	151	GLY	-	expression tag	UNP Q86WV6
F	152	HIS	-	expression tag	UNP Q86WV6
F	153	MET	-	expression tag	UNP Q86WV6
F	154	SER	-	expression tag	UNP Q86WV6
F	230	ALA	GLY	variant	UNP Q86WV6
F	232	ARG	HIS	conflict	UNP Q86WV6
F	293	GLN	ARG	variant	UNP Q86WV6

- Molecule 2 is (3S,4S)-2-(4-tert-butyl-3-chlorophenyl)-3-(2,3-dihydro-1,4-benzodioxin-6-yl)-1-oxo-1,2,3,4-tetrahydroisoquinoline-4-carboxylic acid (CCD ID: A1A4R) (formula: $C_{28}H_{26}ClNO_5$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	Cl	N	O	0	0
			35	28	1	1	5		
2	B	1	Total	C	Cl	N	O	0	0
			35	28	1	1	5		
2	C	1	Total	C	Cl	N	O	0	0
			35	28	1	1	5		
2	D	1	Total	C	Cl	N	O	0	0
			35	28	1	1	5		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	E	1	Total	C	Cl	N	O	0	0
			35	28	1	1	5		
2	F	1	Total	C	Cl	N	O	0	0
			35	28	1	1	5		

- Molecule 3 is water.

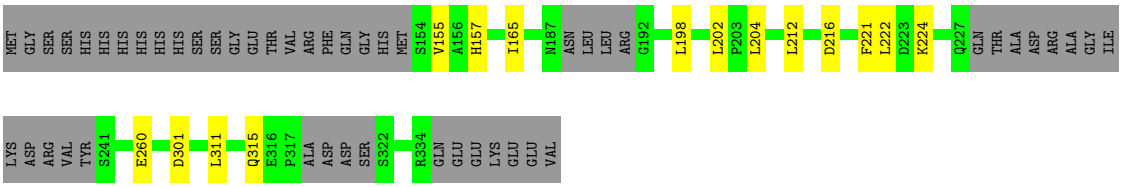
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	19	Total	O	0	0
			19	19		
3	B	17	Total	O	0	0
			17	17		
3	C	14	Total	O	0	0
			14	14		
3	D	8	Total	O	0	0
			8	8		
3	E	5	Total	O	0	0
			5	5		
3	F	10	Total	O	0	0
			10	10		

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

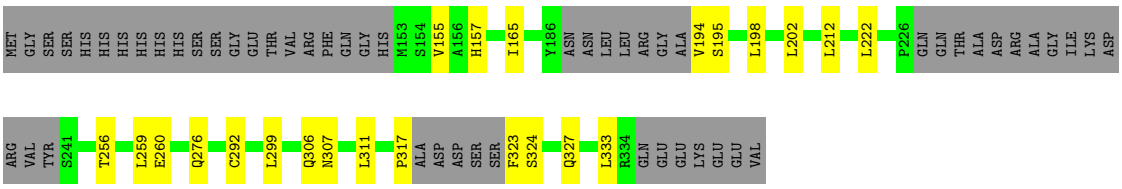
• Molecule 1: Stimulator of interferon genes protein

Chain A:



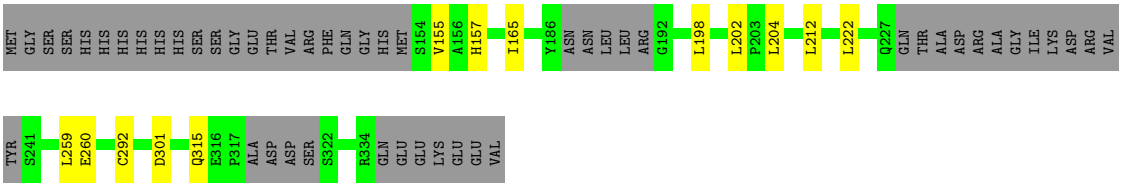
• Molecule 1: Stimulator of interferon genes protein

Chain B:



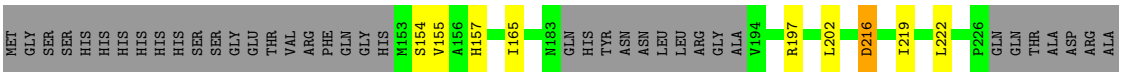
• Molecule 1: Stimulator of interferon genes protein

Chain C:



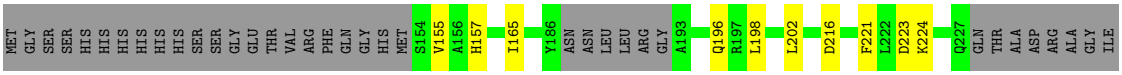
• Molecule 1: Stimulator of interferon genes protein

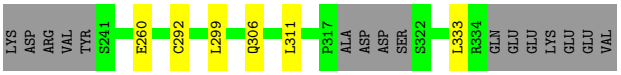
Chain D:



• Molecule 1: Stimulator of interferon genes protein

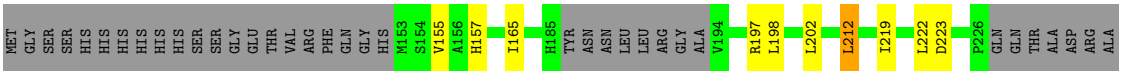
Chain E:





• Molecule 1: Stimulator of interferon genes protein

Chain F:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	66.53Å 70.59Å 119.83Å 90.00° 94.23° 90.00°	Depositor
Resolution (Å)	119.50 – 2.10 119.50 – 2.10	Depositor EDS
% Data completeness (in resolution range)	64.4 (119.50-2.10) 64.4 (119.50-2.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.61 (at 2.10Å)	Xtriage
Refinement program	BUSTER 2.11.8 (10-JUL-2024)	Depositor
R, R_{free}	0.301 , 0.321 0.290 , 0.311	Depositor DCC
R_{free} test set	2134 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å^2)	24.7	Xtriage
Anisotropy	0.082	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 22.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	7592	wwPDB-VP
Average B, all atoms (Å^2)	32.0	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 61.34 % 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 1.3290e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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: A1A4R

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	0.68	0/1261	1.04	1/1715 (0.1%)
1	B	0.68	0/1263	1.04	0/1716
1	C	0.67	0/1247	1.01	0/1697
1	D	0.68	0/1228	1.05	2/1669 (0.1%)
1	E	0.69	0/1243	1.05	3/1692 (0.2%)
1	F	0.67	0/1250	1.01	0/1698
All	All	0.68	0/7492	1.03	6/10187 (0.1%)

There are no bond length outliers.

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	216	ASP	CA-CB-CG	6.24	118.84	112.60
1	D	216	ASP	CA-CB-CG	5.93	118.53	112.60
1	E	223	ASP	CA-CB-CG	5.71	118.31	112.60
1	E	196	GLN	N-CA-C	5.41	120.83	113.37
1	A	216	ASP	CA-CB-CG	5.29	117.89	112.60

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	1233	0	1170	10	0
1	B	1229	0	1186	13	0
1	C	1219	0	1153	10	0
1	D	1196	0	1157	12	0
1	E	1215	0	1150	10	0
1	F	1217	0	1177	12	0
2	A	35	0	0	0	0
2	B	35	0	0	0	0
2	C	35	0	0	0	0
2	D	35	0	0	0	0
2	E	35	0	0	0	0
2	F	35	0	0	0	0
3	A	19	0	0	0	0
3	B	17	0	0	1	0
3	C	14	0	0	0	0
3	D	8	0	0	1	0
3	E	5	0	0	0	0
3	F	10	0	0	0	0
All	All	7592	0	6993	52	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 52 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:157[B]:HIS:CD2	1:D:155:VAL:HG13	2.26	0.71
1:E:155:VAL:HG13	1:F:157[B]:HIS:CD2	2.30	0.67
1:C:301:ASP:HB3	1:D:276:GLN:HG2	1.75	0.67
1:B:194:VAL:HG22	1:B:256:THR:HB	1.78	0.65
1:F:324:SER:HB3	1:F:327:GLN:HB2	1.79	0.64

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	155/210 (74%)	152 (98%)	3 (2%)	0	100 100
1	B	153/210 (73%)	147 (96%)	5 (3%)	1 (1%)	19 16
1	C	154/210 (73%)	150 (97%)	4 (3%)	0	100 100
1	D	150/210 (71%)	146 (97%)	3 (2%)	1 (1%)	19 16
1	E	153/210 (73%)	149 (97%)	4 (3%)	0	100 100
1	F	152/210 (72%)	149 (98%)	3 (2%)	0	100 100
All	All	917/1260 (73%)	893 (97%)	22 (2%)	2 (0%)	44 45

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	197	ARG
1	B	195	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	124/183 (68%)	122 (98%)	2 (2%)	58 65
1	B	127/183 (69%)	123 (97%)	4 (3%)	35 39
1	C	122/183 (67%)	120 (98%)	2 (2%)	58 65
1	D	124/183 (68%)	121 (98%)	3 (2%)	44 49
1	E	122/183 (67%)	120 (98%)	2 (2%)	58 65
1	F	126/183 (69%)	121 (96%)	5 (4%)	27 28
All	All	745/1098 (68%)	727 (98%)	18 (2%)	42 49

5 of 18 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	197	ARG

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	F	324	SER
1	F	223	ASP
1	D	154	SER
1	F	165	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 14 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	185	HIS
1	E	273	GLN
1	F	332	HIS
1	E	332	HIS
1	F	218	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

6 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	$\#\|Z\|>2$
2	A1A4R	A	4000	-	39,39,39	0.40	0	57,59,59	0.60	0
2	A1A4R	C	4000	-	39,39,39	0.41	0	57,59,59	0.58	0
2	A1A4R	D	4000	-	39,39,39	0.46	0	57,59,59	0.61	0
2	A1A4R	F	4000	-	39,39,39	0.40	0	57,59,59	0.60	0
2	A1A4R	E	4000	-	39,39,39	0.45	0	57,59,59	0.61	0
2	A1A4R	B	4000	-	39,39,39	0.45	0	57,59,59	0.60	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	A1A4R	A	4000	-	-	0/18/45/45	0/5/5/5
2	A1A4R	C	4000	-	-	0/18/45/45	0/5/5/5
2	A1A4R	D	4000	-	-	0/18/45/45	0/5/5/5
2	A1A4R	F	4000	-	-	0/18/45/45	0/5/5/5
2	A1A4R	E	4000	-	-	0/18/45/45	0/5/5/5
2	A1A4R	B	4000	-	-	0/18/45/45	0/5/5/5

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

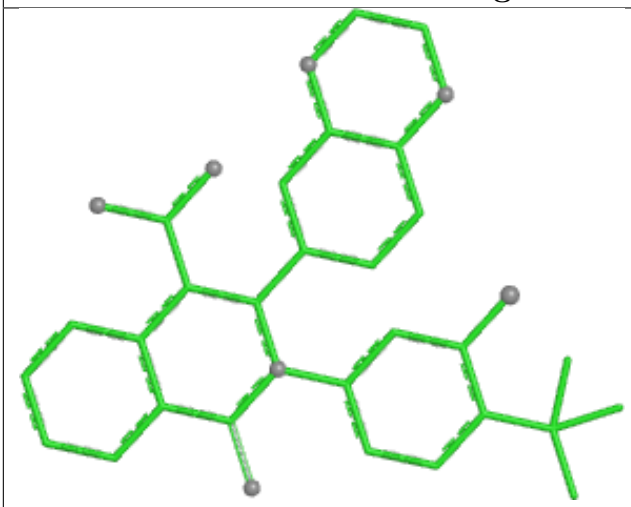
There are no torsion outliers.

There are no ring outliers.

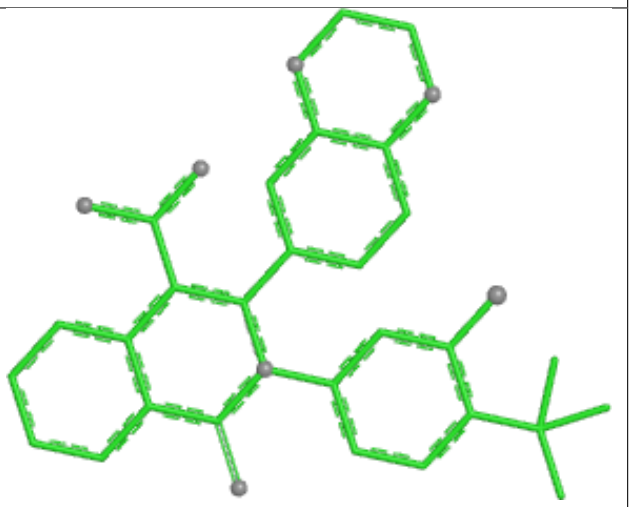
No monomer is involved in short contacts.

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

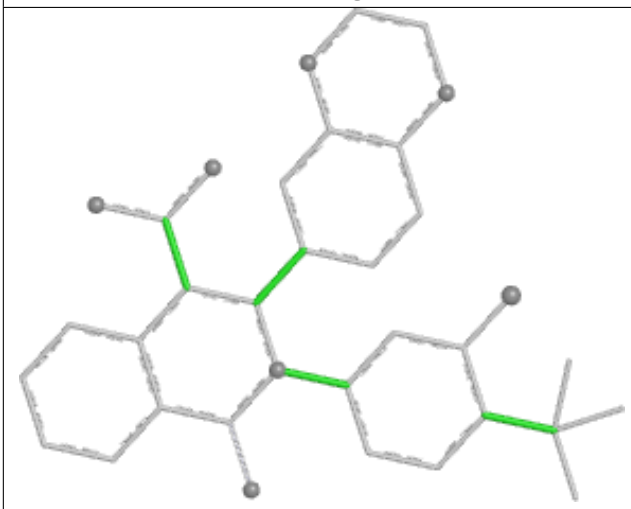
Ligand A1A4R A 4000



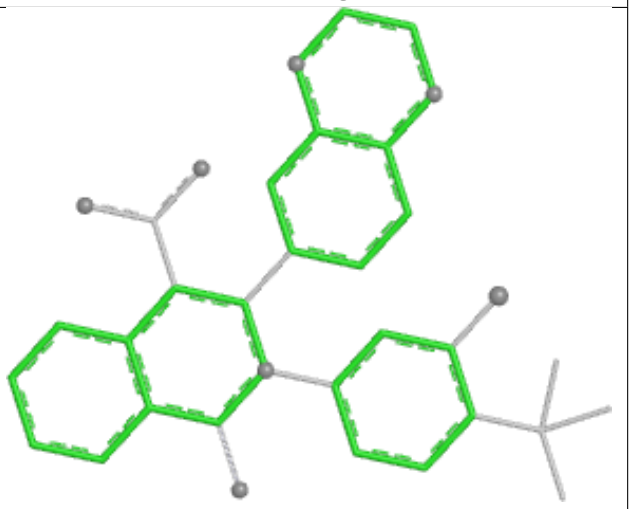
Bond lengths



Bond angles

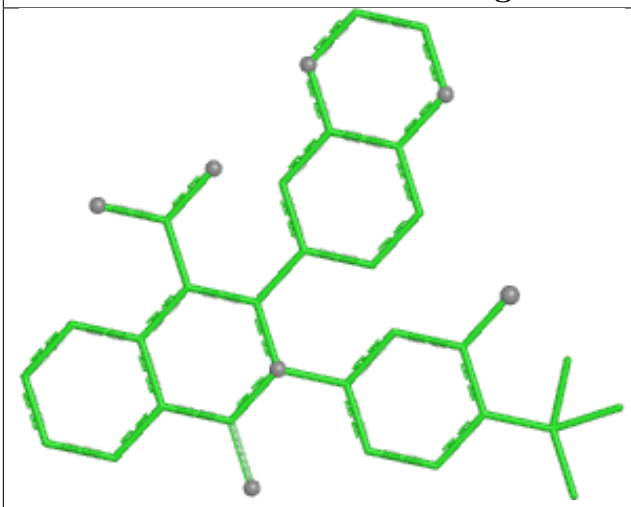


Torsions

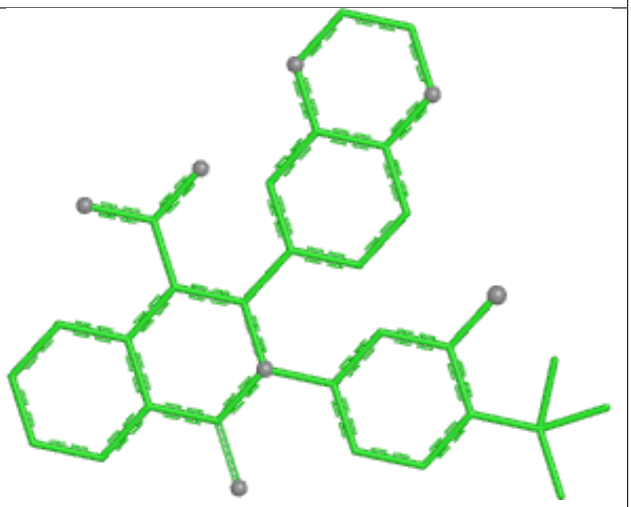


Rings

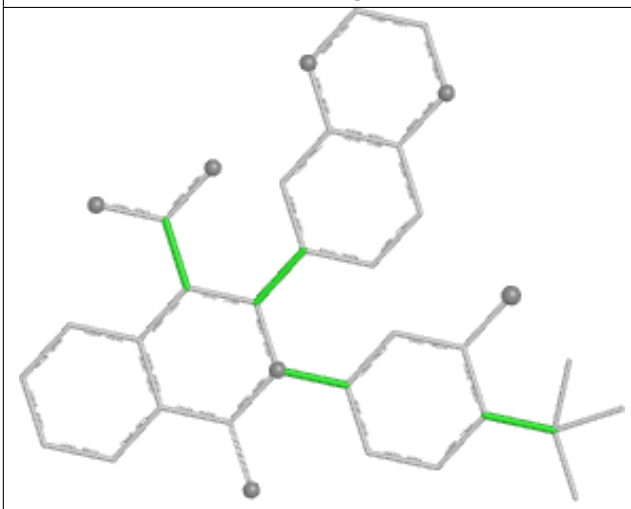
Ligand A1A4R C 4000



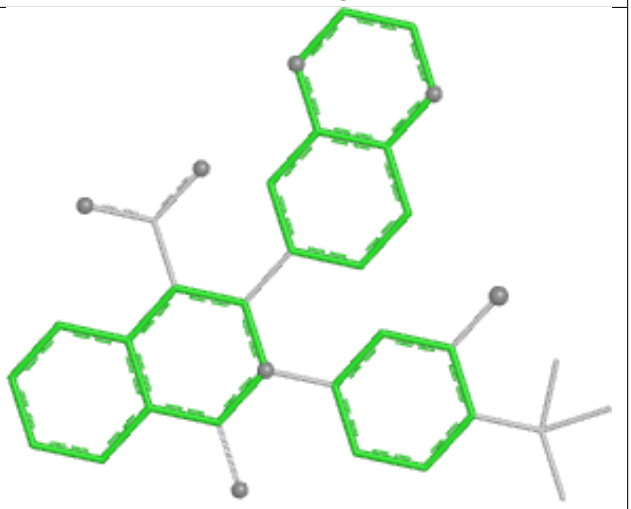
Bond lengths



Bond angles

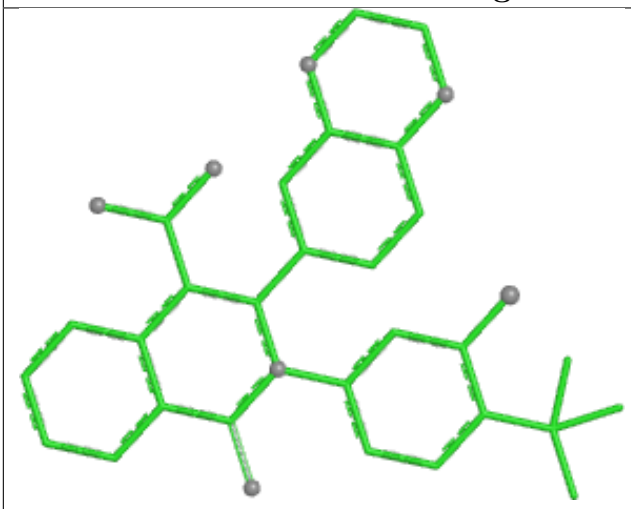


Torsions

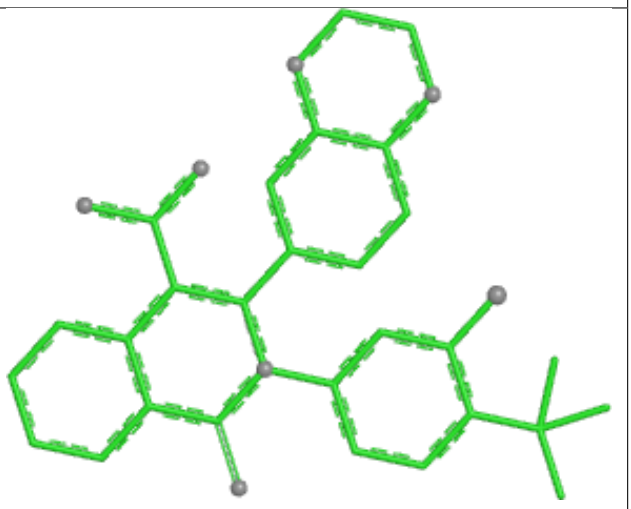


Rings

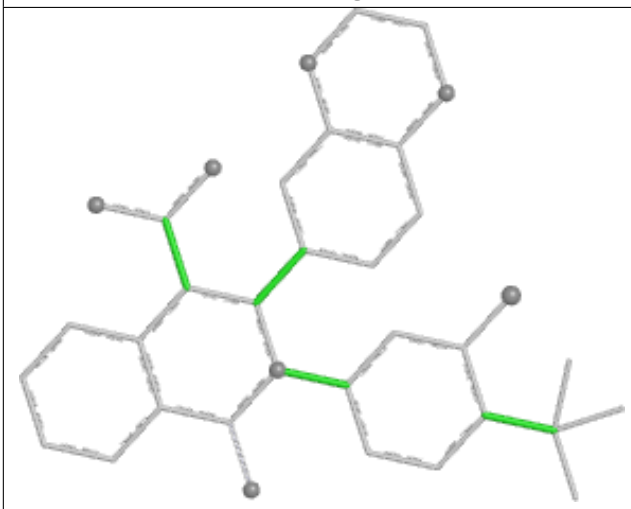
Ligand A1A4R D 4000



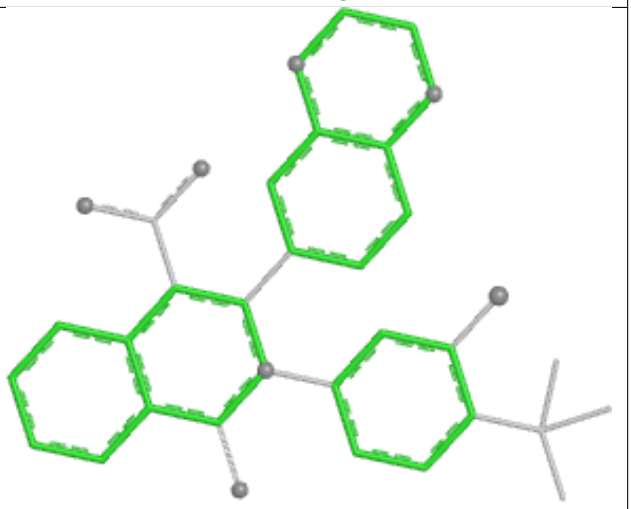
Bond lengths



Bond angles

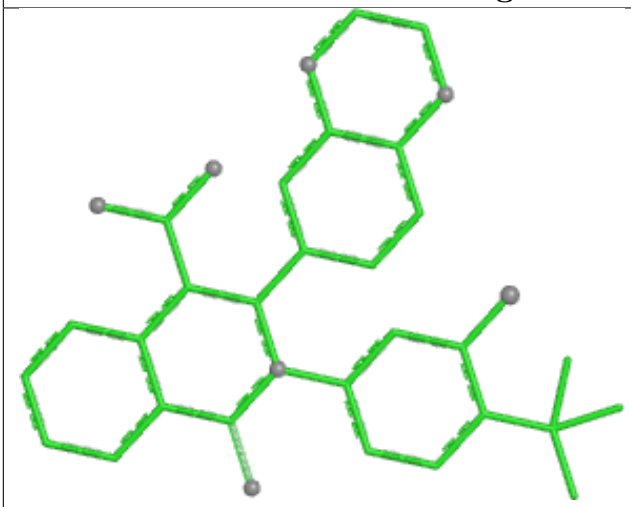


Torsions

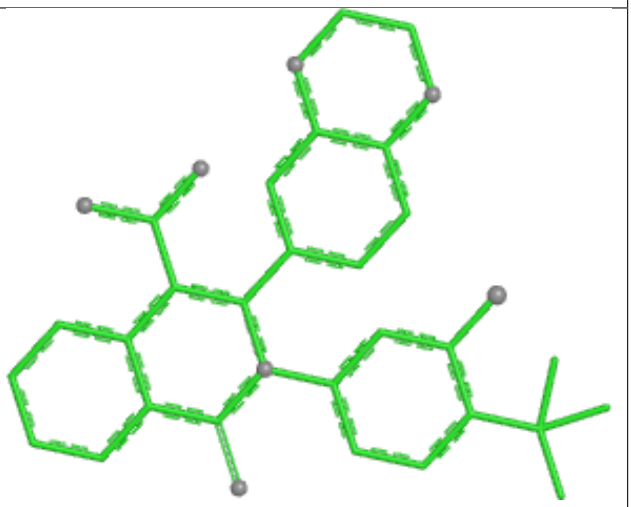


Rings

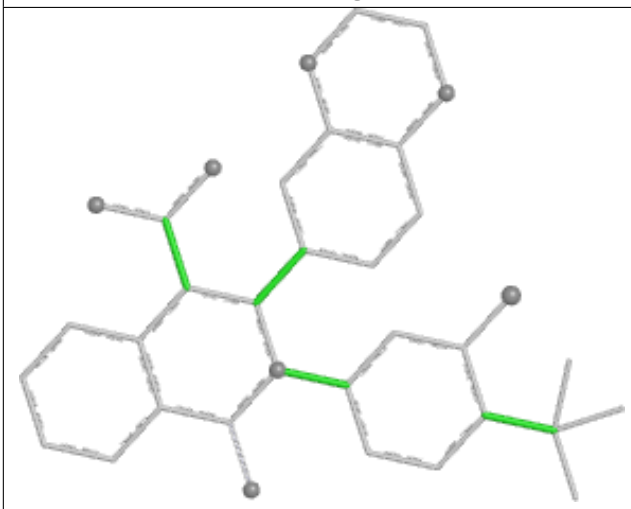
Ligand A1A4R F 4000



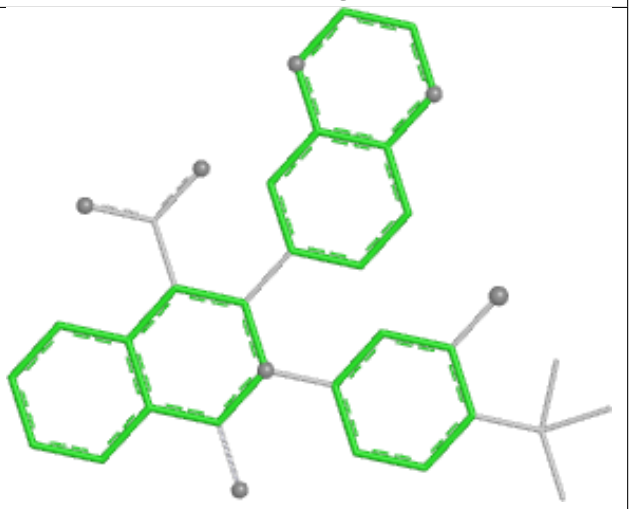
Bond lengths



Bond angles

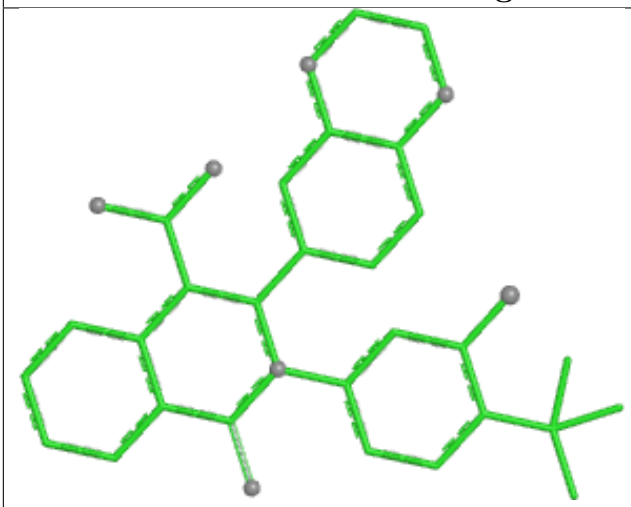


Torsions

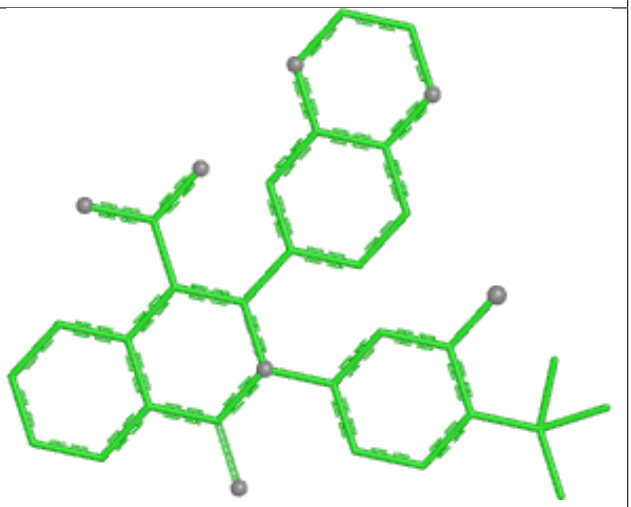


Rings

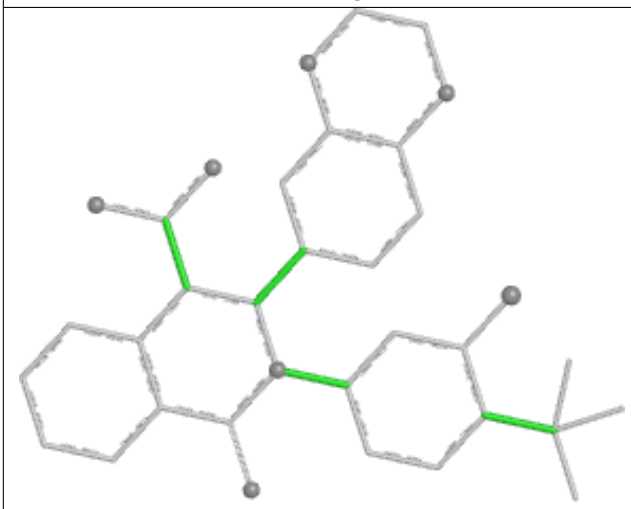
Ligand A1A4R E 4000



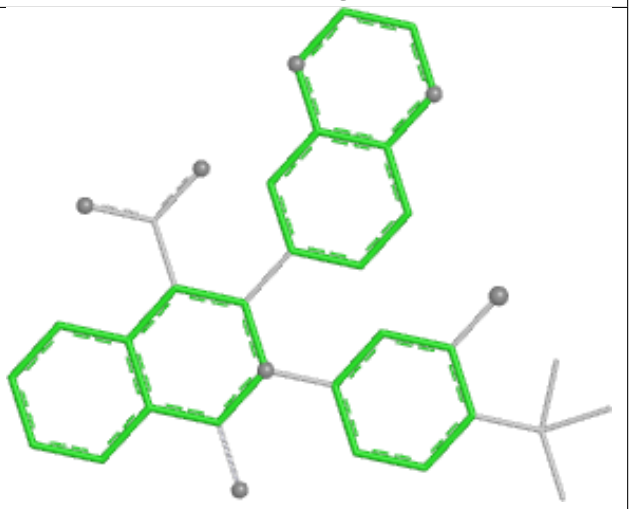
Bond lengths



Bond angles

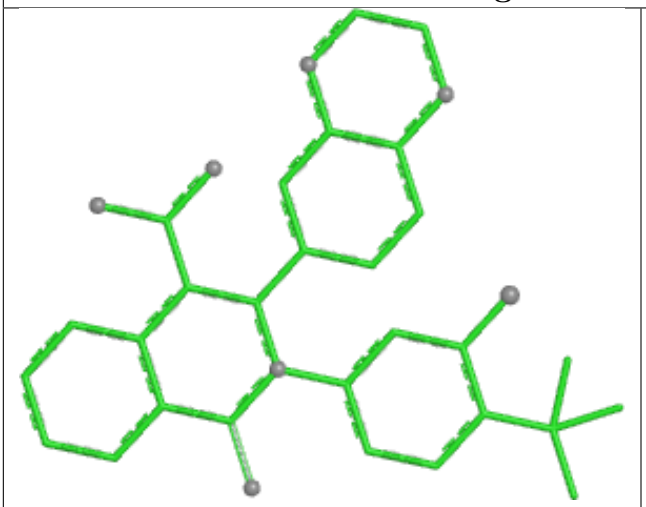


Torsions

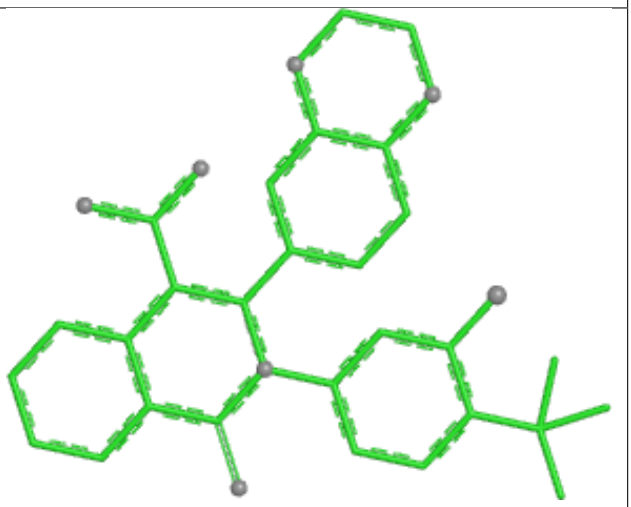


Rings

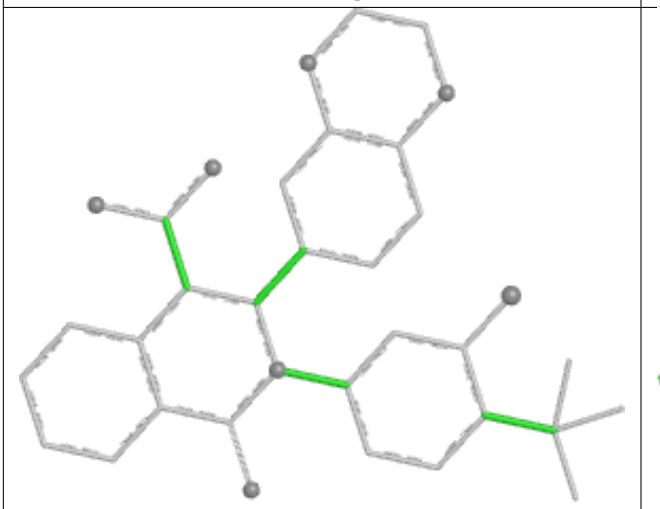
Ligand A1A4R B 4000



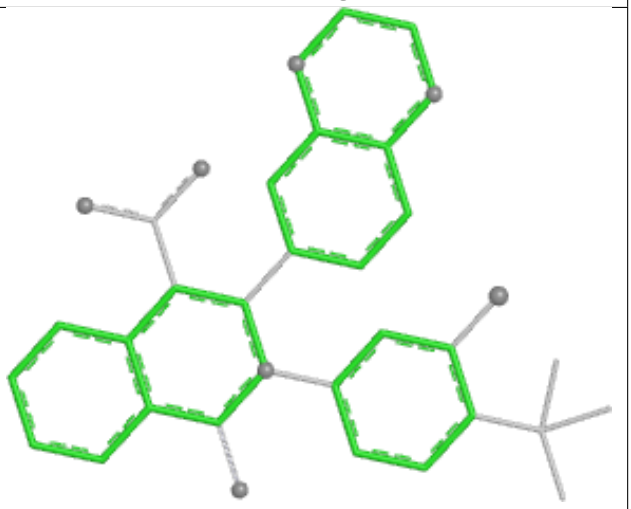
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{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	160/210 (76%)	-1.35	0	100	100	10, 30, 43, 55	3 (1%)
1	B	156/210 (74%)	-1.31	0	100	100	10, 29, 46, 52	5 (3%)
1	C	159/210 (75%)	-1.27	0	100	100	11, 33, 48, 52	3 (1%)
1	D	153/210 (72%)	-1.23	0	100	100	13, 34, 52, 62	5 (3%)
1	E	158/210 (75%)	-1.22	0	100	100	11, 35, 49, 75	3 (1%)
1	F	155/210 (73%)	-1.24	0	100	100	11, 32, 52, 55	5 (3%)
All	All	941/1260 (74%)	-1.27	0	100	100	10, 32, 49, 75	24 (2%)

There are no RSRZ outliers to report.

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, 95^{th} 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
2	A1A4R	C	4000	35/35	0.99	0.03	18,19,20,20	0

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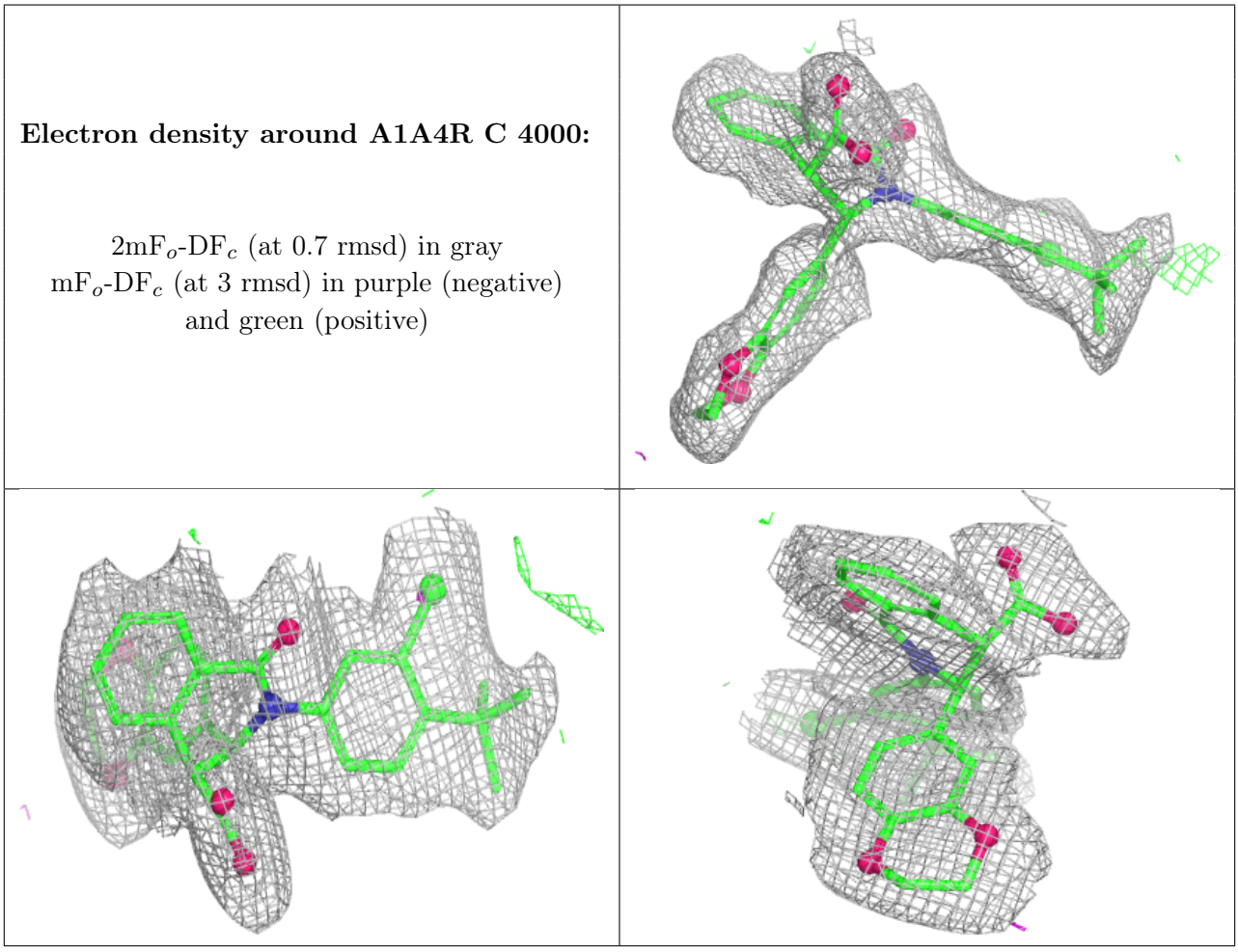
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	A1A4R	D	4000	35/35	0.99	0.03	19,22,25,25	0
2	A1A4R	E	4000	35/35	0.99	0.03	15,19,22,23	0
2	A1A4R	F	4000	35/35	0.99	0.02	17,17,19,20	0
2	A1A4R	A	4000	35/35	1.00	0.02	14,15,17,17	0
2	A1A4R	B	4000	35/35	1.00	0.02	15,16,19,19	0

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.

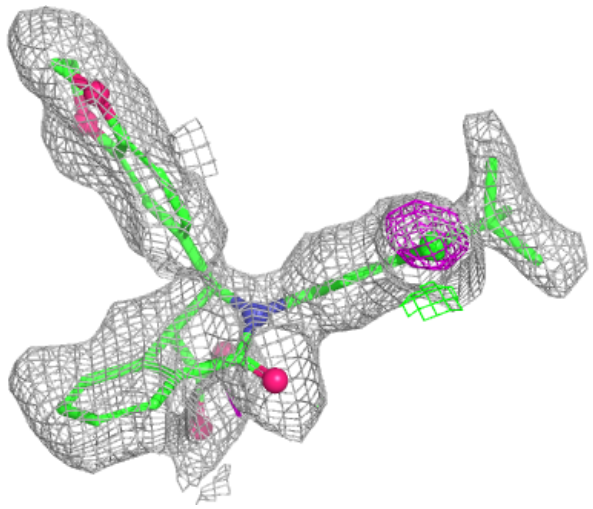
Electron density around A1A4R C 4000:

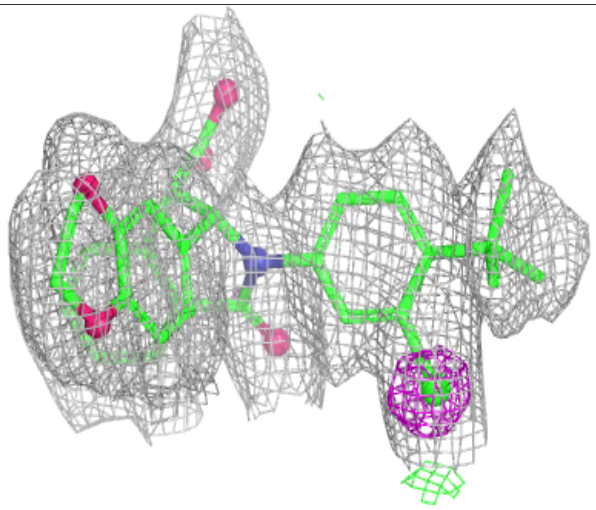
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

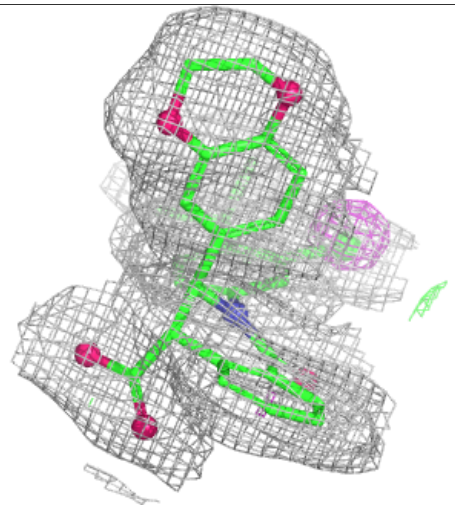


Electron density around A1A4R D 4000:

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

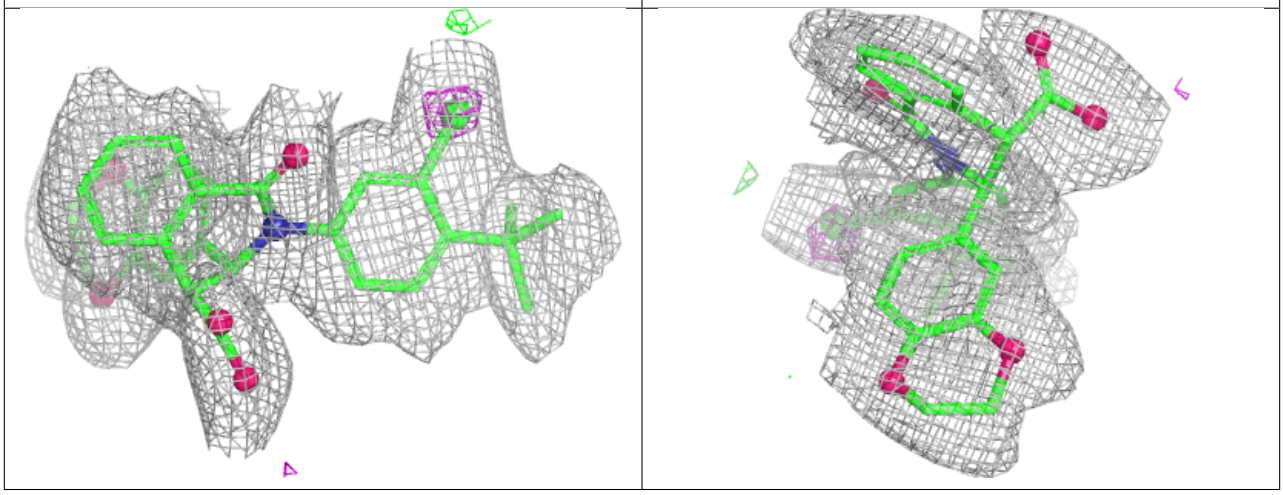






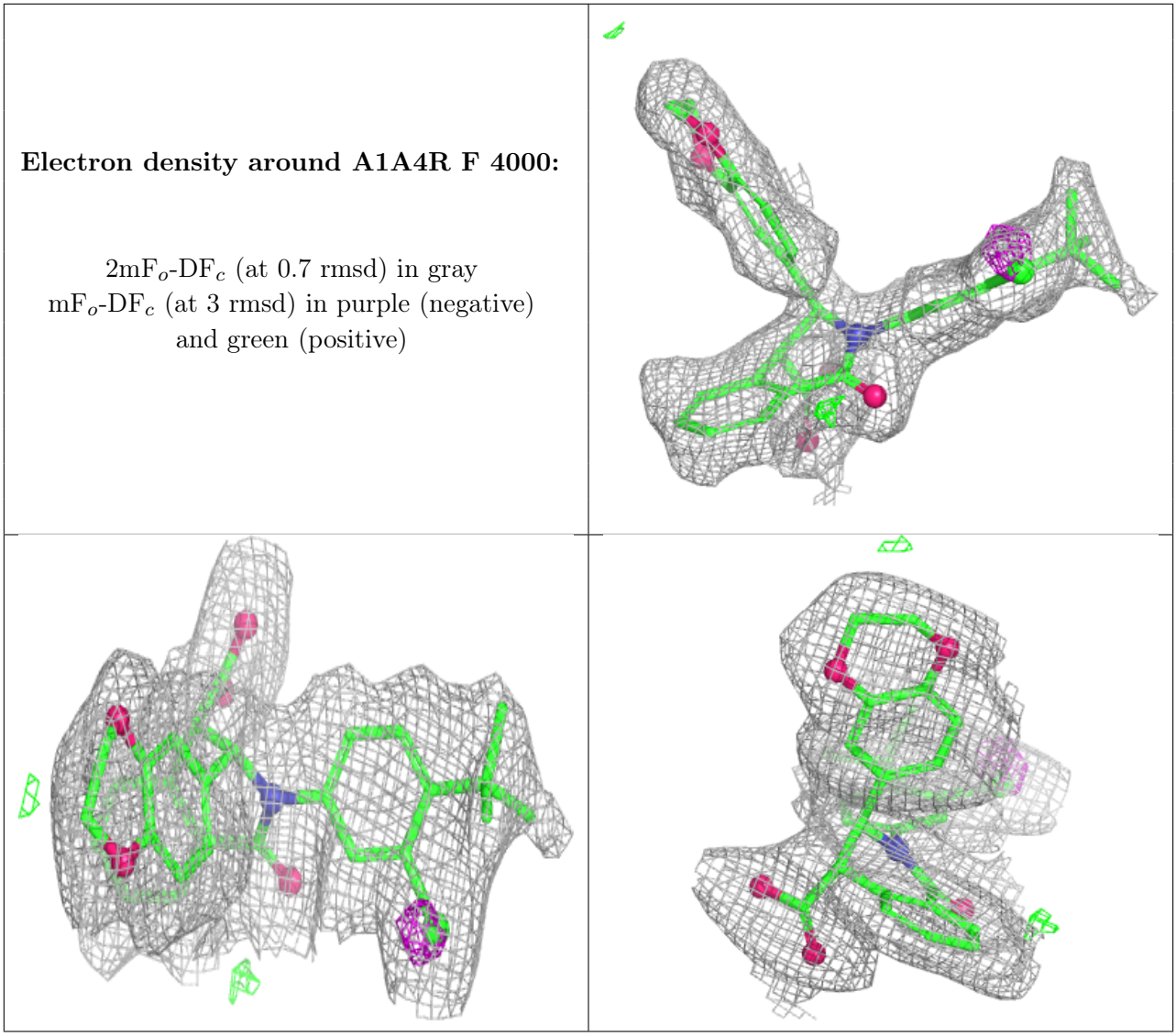
Electron density around A1A4R E 4000:

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



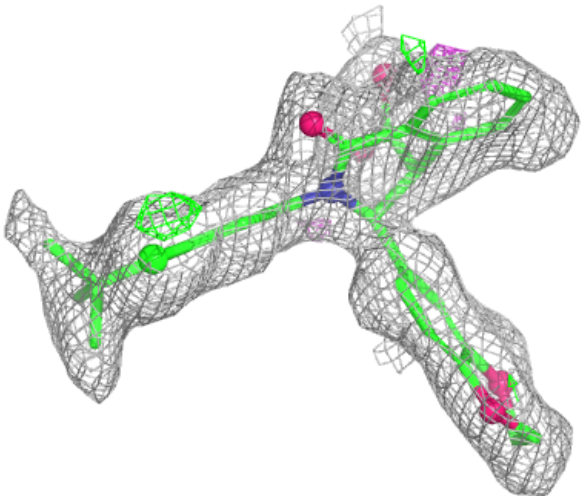
Electron density around A1A4R F 4000:

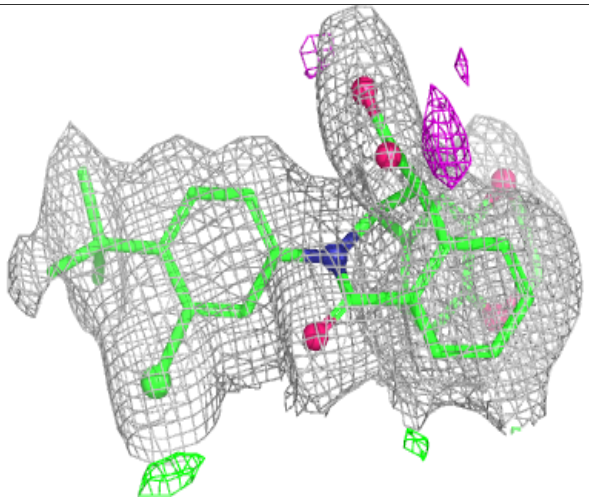
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

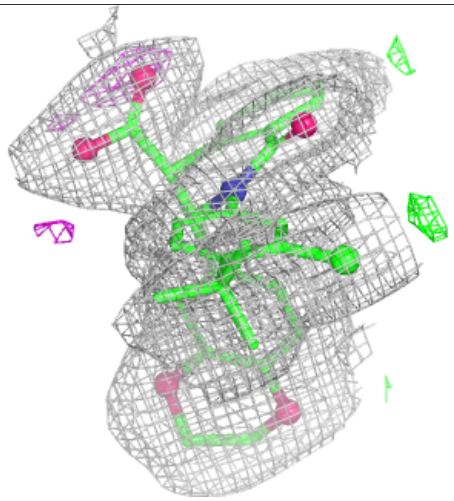


Electron density around A1A4R A 4000:

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

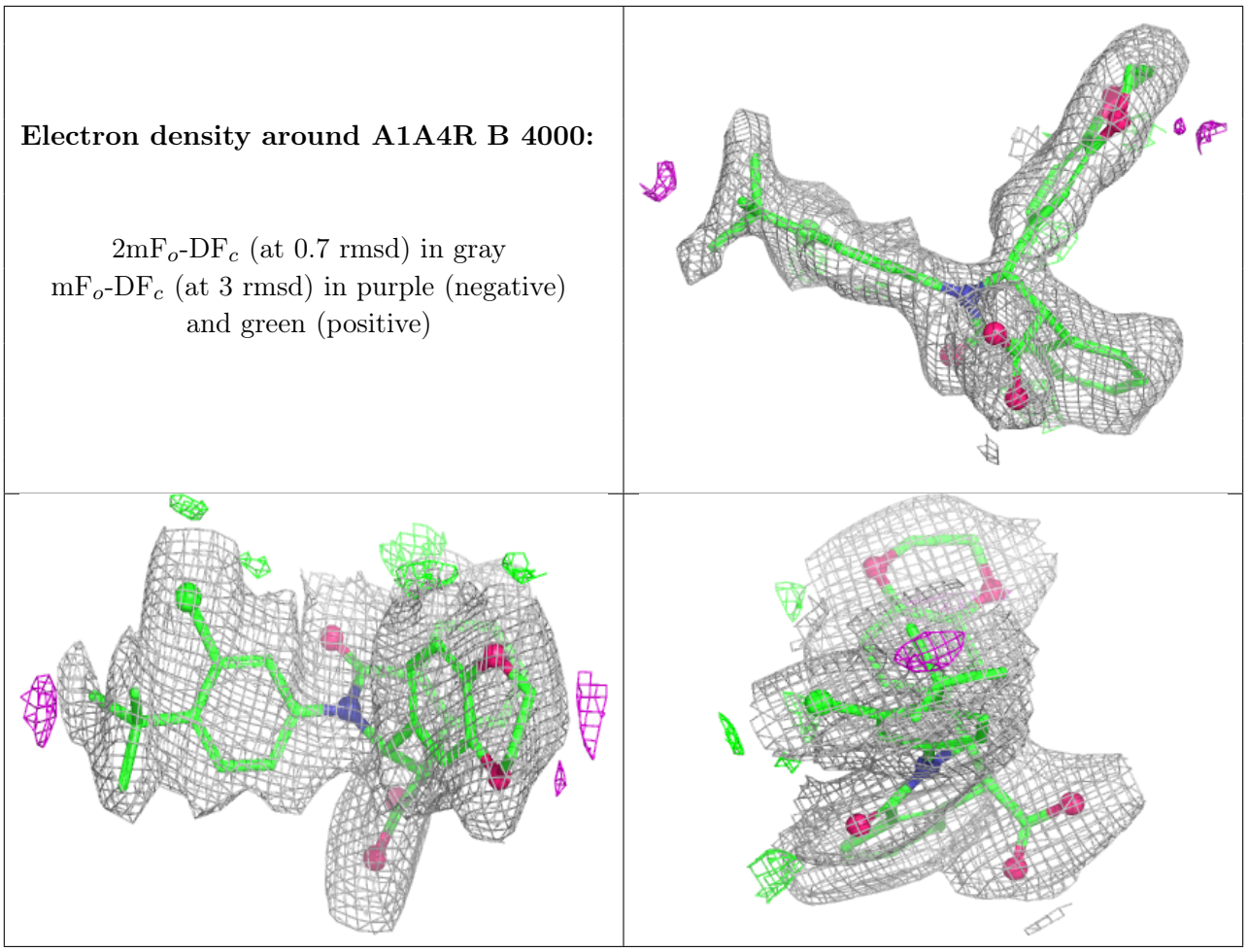






Electron density around A1A4R B 4000:

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



6.5 Other polymers (i)

There are no such residues in this entry.