Full wwPDB X-ray Structure Validation Report ⓘ

Feb 24, 2025 – 03:16 pm GMT

PDB ID	:	8S0V
Title	:	Crystal structure of Cryptosporidium parvum - Trypanosoma cruzi mutant lysyl tRNA synthetase in complex with inhibitor
Authors	:	Dawson, A.; Wyllie, S.
Deposited on	:	2024-02-14
Resolution	:	1.60 Å(reported)

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

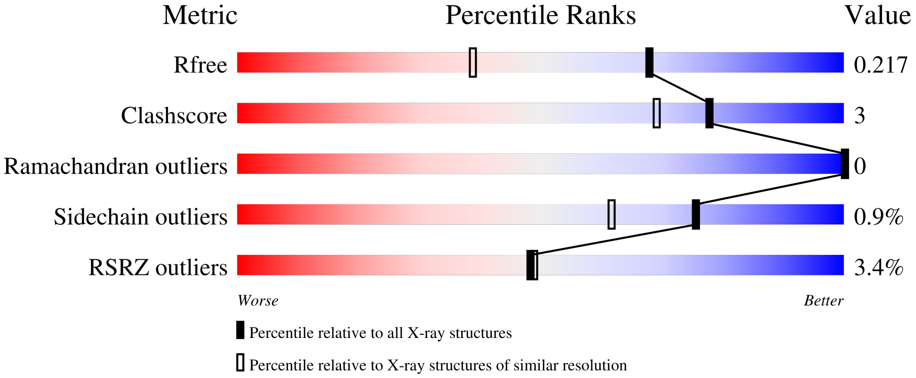
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41

1 Overall quality at a glance (i)

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

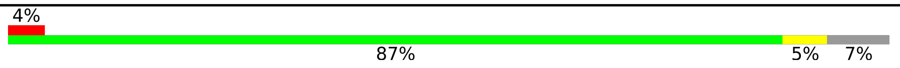
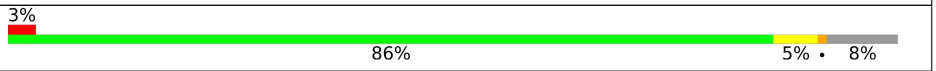
The reported resolution of this entry is 1.60 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	4274 (1.60-1.60)
Clashscore	180529	4682 (1.60-1.60)
Ramachandran outliers	177936	4583 (1.60-1.60)
Sidechain outliers	177891	4582 (1.60-1.60)
RSRZ outliers	164620	4272 (1.60-1.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=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	536	
1	B	536	

2 Entry composition ⓘ

There are 7 unique types of molecules in this entry. The entry contains 8910 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 Lysine–tRNA ligase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	496	4029	2584	670	747	28	0	2	0
1	B	495	4020	2579	669	744	28	0	2	0

There are 52 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	24	MET	-	initiating methionine	UNP Q5CR27
A	25	GLY	-	expression tag	UNP Q5CR27
A	26	SER	-	expression tag	UNP Q5CR27
A	27	SER	-	expression tag	UNP Q5CR27
A	28	HIS	-	expression tag	UNP Q5CR27
A	29	HIS	-	expression tag	UNP Q5CR27
A	30	HIS	-	expression tag	UNP Q5CR27
A	31	HIS	-	expression tag	UNP Q5CR27
A	32	HIS	-	expression tag	UNP Q5CR27
A	33	HIS	-	expression tag	UNP Q5CR27
A	34	SER	-	expression tag	UNP Q5CR27
A	35	SER	-	expression tag	UNP Q5CR27
A	36	GLY	-	expression tag	UNP Q5CR27
A	37	GLU	-	expression tag	UNP Q5CR27
A	38	ASN	-	expression tag	UNP Q5CR27
A	39	LEU	-	expression tag	UNP Q5CR27
A	40	TYR	-	expression tag	UNP Q5CR27
A	41	PHE	-	expression tag	UNP Q5CR27
A	42	GLN	-	expression tag	UNP Q5CR27
A	43	GLY	-	expression tag	UNP Q5CR27
A	44	HIS	-	expression tag	UNP Q5CR27
A	45	MET	-	expression tag	UNP Q5CR27
A	290	LEU	ILE	engineered mutation	UNP Q5CR27
A	309	SER	ALA	engineered mutation	UNP Q5CR27
A	310	VAL	MET	engineered mutation	UNP Q5CR27

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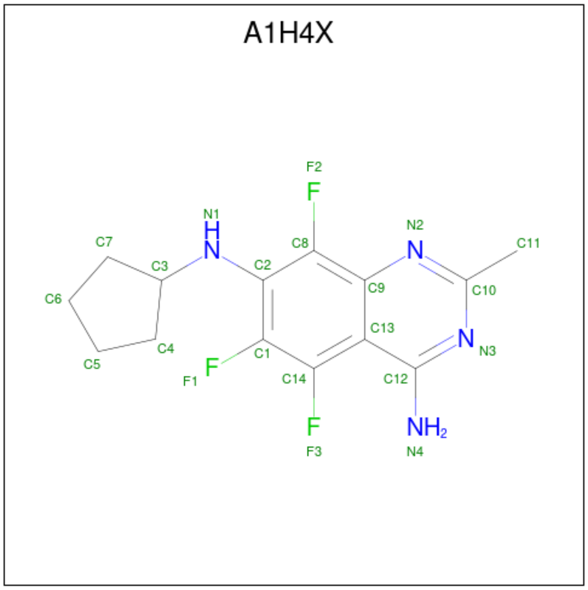
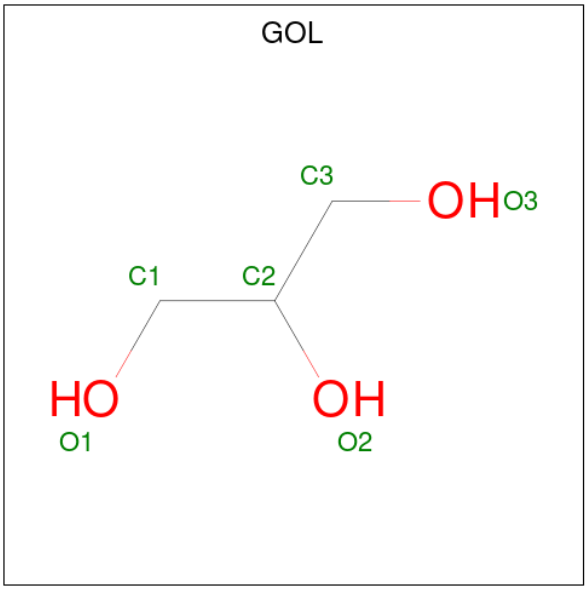
Chain	Residue	Modelled	Actual	Comment	Reference
A	538	LEU	ILE	engineered mutation	UNP Q5CR27
B	24	MET	-	initiating methionine	UNP Q5CR27
B	25	GLY	-	expression tag	UNP Q5CR27
B	26	SER	-	expression tag	UNP Q5CR27
B	27	SER	-	expression tag	UNP Q5CR27
B	28	HIS	-	expression tag	UNP Q5CR27
B	29	HIS	-	expression tag	UNP Q5CR27
B	30	HIS	-	expression tag	UNP Q5CR27
B	31	HIS	-	expression tag	UNP Q5CR27
B	32	HIS	-	expression tag	UNP Q5CR27
B	33	HIS	-	expression tag	UNP Q5CR27
B	34	SER	-	expression tag	UNP Q5CR27
B	35	SER	-	expression tag	UNP Q5CR27
B	36	GLY	-	expression tag	UNP Q5CR27
B	37	GLU	-	expression tag	UNP Q5CR27
B	38	ASN	-	expression tag	UNP Q5CR27
B	39	LEU	-	expression tag	UNP Q5CR27
B	40	TYR	-	expression tag	UNP Q5CR27
B	41	PHE	-	expression tag	UNP Q5CR27
B	42	GLN	-	expression tag	UNP Q5CR27
B	43	GLY	-	expression tag	UNP Q5CR27
B	44	HIS	-	expression tag	UNP Q5CR27
B	45	MET	-	expression tag	UNP Q5CR27
B	290	LEU	ILE	engineered mutation	UNP Q5CR27
B	309	SER	ALA	engineered mutation	UNP Q5CR27
B	310	VAL	MET	engineered mutation	UNP Q5CR27
B	538	LEU	ILE	engineered mutation	UNP Q5CR27

- Molecule 2 is {N}7-cyclopentyl-5,6,8-tris(fluoranyl)-2-methyl-quinazoline-4,7-diamine (three-letter code: A1H4X) (formula: $C_{14}H_{15}F_3N_4$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C F N 21 14 3 4	0	0
2	B	1	Total C F N 21 14 3 4	0	0

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

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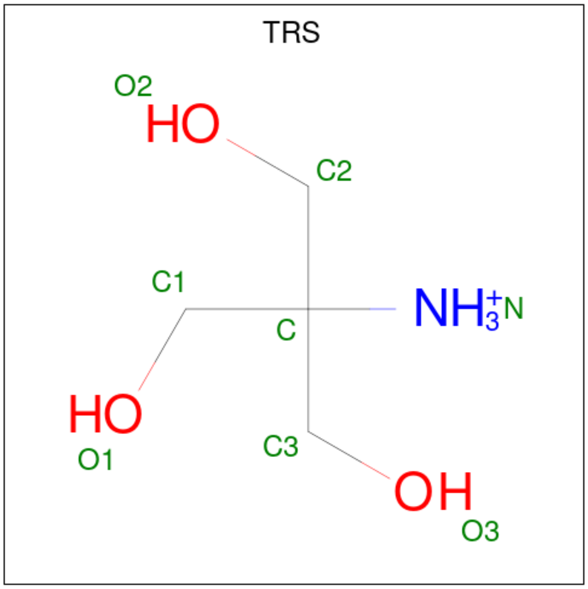
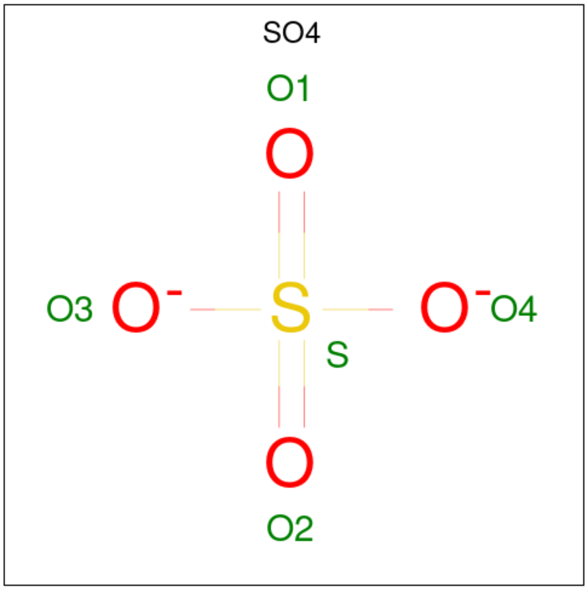
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	1	Total C O 6 3 3	0	0

- Molecule 4 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (three-letter code: TRS) (formula: $C_4H_{12}NO_3$).



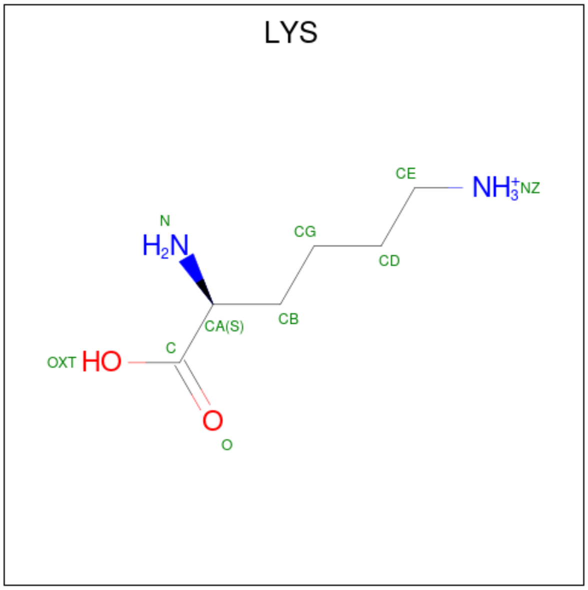
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C N O 8 4 1 3	0	0
4	B	1	Total C N O 8 4 1 3	0	0
4	B	1	Total C N O 8 4 1 3	0	0

- Molecule 5 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



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

- Molecule 6 is LYSINE (three-letter code: LYS) (formula: $C_6H_{15}N_2O_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C N O 9 6 2 1	0	0
6	B	1	Total C N O 9 6 2 1	0	0

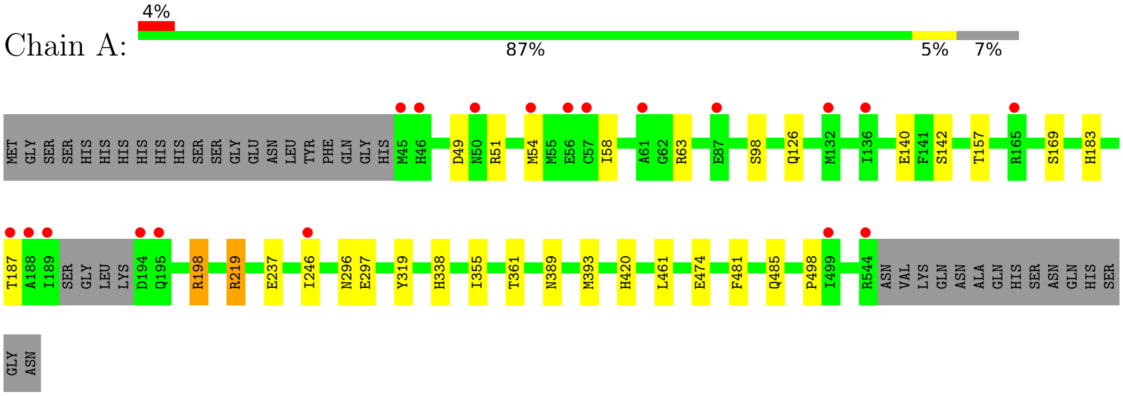
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
7	A	377	377	377	0	0
			Total	O		
7	B	377	377	377	0	0

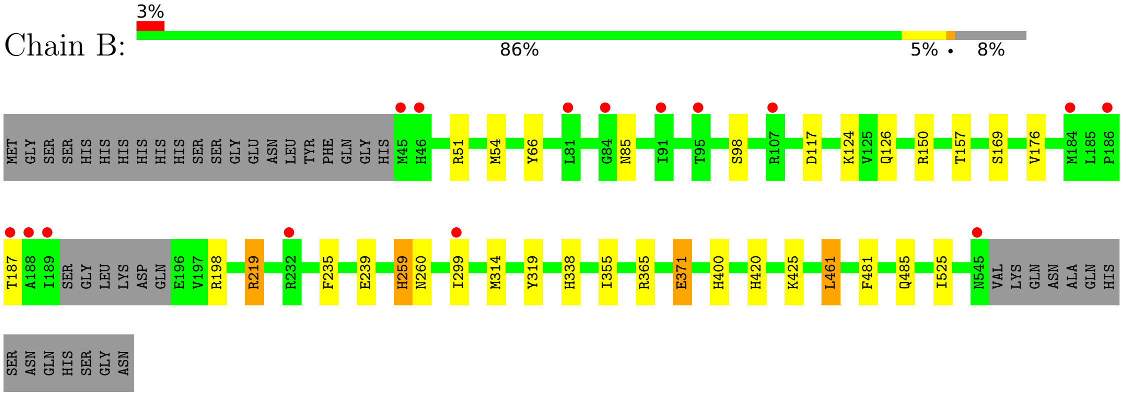
3 Residue-property plots ⓘ

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: Lysine–tRNA ligase



- Molecule 1: Lysine–tRNA ligase



4 Data and refinement statistics ⓘ

Property	**Value**	**Source**
Space group	P 2 21 21	Depositor
Cell constants a, b, c, α, β, γ	73.14Å 116.70Å 142.88Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	58.35 – 1.60 58.35 – 1.60	Depositor EDS
% Data completeness (in resolution range)	99.7 (58.35-1.60) 99.7 (58.35-1.60)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.79 (at 1.60Å)	Xtriage
Refinement program	REFMAC 5.8.0403	Depositor
R, R_{free}	0.184 , 0.208 0.194 , 0.217	Depositor DCC
R_{free} test set	8166 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å^2)	20.3	Xtriage
Anisotropy	0.241	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 34.8	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	0.96	EDS
Total number of atoms	8910	wwPDB-VP
Average B, all atoms (Å^2)	25.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.13% of the height of the origin peak. No significant pseudotranslation is detected.*

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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: GOL, TRS, A1H4X, SO4

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	0.62	1/4133 (0.0%)	0.83	1/5574 (0.0%)
1	B	0.61	2/4124 (0.0%)	0.84	1/5562 (0.0%)
All	All	0.61	3/8257 (0.0%)	0.84	2/11136 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
1	B	0	3
All	All	0	5

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	371	GLU	CD-OE1	-6.31	1.18	1.25
1	A	237	GLU	CD-OE1	6.03	1.32	1.25
1	B	239	GLU	CD-OE1	-5.50	1.19	1.25

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	365	ARG	NE-CZ-NH2	-7.36	116.62	120.30
1	A	219	ARG	CG-CD-NE	-7.01	97.07	111.80

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	198	ARG	Sidechain
1	A	219	ARG	Sidechain
1	B	150	ARG	Sidechain
1	B	198	ARG	Sidechain
1	B	219	ARG	Sidechain

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	4029	0	3988	24	0
1	B	4020	0	3982	23	0
2	A	21	0	0	0	0
2	B	21	0	0	0	0
3	A	12	0	16	0	0
3	B	6	0	8	0	0
4	A	8	0	12	0	0
4	B	16	0	24	0	0
5	A	5	0	0	1	0
6	A	9	0	12	0	0
6	B	9	0	12	0	0
7	A	377	0	0	5	0
7	B	377	0	0	7	0
All	All	8910	0	8054	43	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 3.

All (43) 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:A:51:ARG:HH21	1:A:54:MET:HE1	1.59	0.67
1:B:219:ARG:HG3	1:B:525:ILE:HD13	1.77	0.67
1:A:246:ILE:HD11	1:A:498:PRO:HG2	1.78	0.65
1:A:297:GLU:O	1:B:259:HIS:HE1	1.83	0.62
1:A:246:ILE:HD11	1:A:498:PRO:CG	2.30	0.61
1:A:338:HIS:HD2	7:A:1137:HOH:O	1.82	0.60

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Atom-1	**Atom-2**	**Interatomic distance (Å)**	**Clash overlap (Å)**
1:A:246:ILE:CD1	1:A:498:PRO:HG2	2.33	0.58
1:A:246:ILE:HD11	1:A:498:PRO:HB2	1.87	0.55
1:B:338:HIS:HD2	7:B:1148:HOH:O	1.88	0.55
1:A:140:GLU:OE1	1:A:142:SER:OG	2.24	0.55
1:A:58:ILE:HG23	1:A:63:ARG:HB2	1.89	0.55
1:A:420:HIS:HE1	7:A:1129:HOH:O	1.89	0.55
1:B:355:ILE:HD11	1:B:461:LEU:HD11	1.89	0.54
1:A:183:HIS:HD2	7:A:1143:HOH:O	1.90	0.54
1:B:117:ASP:OD2	1:B:124:LYS:HE3	2.07	0.54
1:A:198:ARG:NH2	7:A:806:HOH:O	2.41	0.53
1:B:51:ARG:HE	1:B:54:MET:HE2	1.74	0.52
1:B:219:ARG:HG3	1:B:525:ILE:CD1	2.39	0.51
1:A:296:ASN:HD21	1:B:260:ASN:HD22	1.59	0.50
1:B:299:ILE:HG23	7:B:960:HOH:O	2.12	0.49
1:A:246:ILE:HD11	1:A:498:PRO:CB	2.43	0.49
1:B:235:PHE:HZ	1:B:314:MET:CE	2.27	0.48
1:A:246:ILE:O	1:A:246:ILE:HG23	2.13	0.48
1:B:176:VAL:HG23	7:B:919:HOH:O	2.15	0.46
1:A:246:ILE:CD1	1:A:498:PRO:CG	2.94	0.45
1:B:400:HIS:HE1	7:B:827:HOH:O	1.98	0.45
1:A:296:ASN:HD21	1:B:260:ASN:ND2	2.15	0.44
1:A:361:THR:OG1	7:A:801:HOH:O	2.12	0.44
1:B:420:HIS:HE1	7:B:1140:HOH:O	2.00	0.44
1:B:371:GLU:OE2	1:B:425:LYS:NZ	2.32	0.44
1:A:389:ASN:O	1:A:393:MET:HG3	2.18	0.43
1:A:481:PHE:O	1:A:485[A]:GLN:HG2	2.19	0.43
1:B:98:SER:OG	1:B:157:THR:HG22	2.18	0.42
1:A:126:GLN:O	1:A:169:SER:HA	2.18	0.42
1:B:235:PHE:HZ	1:B:314:MET:HE3	1.84	0.42
1:B:481:PHE:O	1:B:485[A]:GLN:HG2	2.19	0.42
1:A:98:SER:OG	1:A:157:THR:HG22	2.20	0.42
1:B:259:HIS:HD2	7:B:1137:HOH:O	2.01	0.42
1:A:474:GLU:HG2	1:B:66:TYR:CE2	2.55	0.41
5:A:705:SO4:O3	1:B:260:ASN:HB3	2.20	0.41
1:B:299:ILE:CG2	7:B:960:HOH:O	2.68	0.41
1:A:355:ILE:HD11	1:A:461:LEU:HD11	2.03	0.41
1:B:126:GLN:O	1:B:169:SER:HA	2.20	0.41

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	494/536 (92%)	484 (98%)	10 (2%)	0	100	100
1	B	493/536 (92%)	482 (98%)	11 (2%)	0	100	100
All	All	987/1072 (92%)	966 (98%)	21 (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	443/475 (93%)	440 (99%)	3 (1%)	81	70
1	B	442/475 (93%)	437 (99%)	5 (1%)	70	53
All	All	885/950 (93%)	877 (99%)	8 (1%)	75	62

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	49	ASP
1	A	187	THR
1	A	319	TYR
1	B	85	ASN
1	B	187	THR
1	B	259	HIS
1	B	319	TYR
1	B	461	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	183	HIS
1	A	228	ASN
1	A	244	ASN
1	A	260	ASN
1	A	338	HIS
1	A	400	HIS
1	A	420	HIS
1	A	477	GLN
1	B	46	HIS
1	B	50	ASN
1	B	126	GLN
1	B	259	HIS
1	B	260	ASN
1	B	338	HIS
1	B	400	HIS
1	B	420	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

11 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	$\#\|Z\|>2$
4	TRS	B	704	-	7,7,7	0.33	0	9,9,9	0.38	0
2	A1H4X	B	701	-	23,23,23	0.51	0	33,34,34	1.05	3 (9%)
4	TRS	A	704	-	7,7,7	0.22	0	9,9,9	0.45	0
3	GOL	A	702	-	5,5,5	0.09	0	5,5,5	0.18	0
2	A1H4X	A	701	-	23,23,23	0.55	0	33,34,34	0.97	1 (3%)
4	TRS	B	703	-	7,7,7	0.19	0	9,9,9	0.24	0
6	LYS	B	705	-	7,8,9	0.33	0	3,8,10	0.68	0
6	LYS	A	706	-	7,8,9	0.57	0	3,8,10	0.62	0
5	SO4	A	705	-	4,4,4	0.45	0	6,6,6	0.60	0
3	GOL	B	702	-	5,5,5	0.32	0	5,5,5	1.62	1 (20%)
3	GOL	A	703	-	5,5,5	0.27	0	5,5,5	0.75	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	TRS	B	704	-	-	6/9/9/9	-
2	A1H4X	B	701	-	-	0/4/11/11	0/3/3/3
4	TRS	A	704	-	-	6/9/9/9	-
3	GOL	A	702	-	-	1/4/4/4	-
2	A1H4X	A	701	-	-	0/4/11/11	0/3/3/3
4	TRS	B	703	-	-	0/9/9/9	-
6	LYS	B	705	-	-	0/6/7/9	-
6	LYS	A	706	-	-	0/6/7/9	-
3	GOL	B	702	-	-	4/4/4/4	-
3	GOL	A	703	-	-	4/4/4/4	-

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	701	A1H4X	C12-C13-C9	2.94	116.86	114.86
2	A	701	A1H4X	C10-N2-C9	2.58	117.52	115.45
2	B	701	A1H4X	C10-N2-C9	2.38	117.35	115.45
3	B	702	GOL	O2-C2-C3	2.22	118.92	109.12
2	B	701	A1H4X	C4-C3-N1	2.10	116.24	111.76

There are no chirality outliers.

All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	703	GOL	O1-C1-C2-C3
3	A	703	GOL	C1-C2-C3-O3
3	B	702	GOL	O1-C1-C2-C3
4	A	704	TRS	C1-C-C2-O2
4	A	704	TRS	C3-C-C2-O2
4	A	704	TRS	N-C-C2-O2
4	B	704	TRS	C2-C-C1-O1
4	B	704	TRS	C3-C-C1-O1
4	B	704	TRS	N-C-C1-O1
4	B	704	TRS	C1-C-C3-O3
4	B	704	TRS	C2-C-C3-O3
3	A	703	GOL	O1-C1-C2-O2
3	A	702	GOL	O1-C1-C2-C3
3	B	702	GOL	C1-C2-C3-O3
3	B	702	GOL	O1-C1-C2-O2
3	A	703	GOL	O2-C2-C3-O3
3	B	702	GOL	O2-C2-C3-O3
4	A	704	TRS	N-C-C1-O1
4	B	704	TRS	N-C-C3-O3
4	A	704	TRS	C3-C-C1-O1
4	A	704	TRS	C2-C-C1-O1

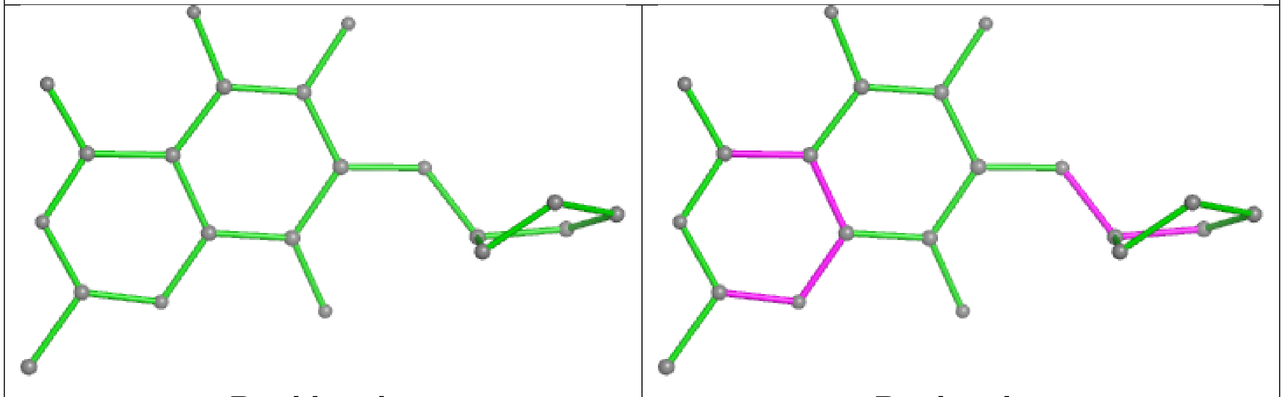
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	705	SO4	1	0

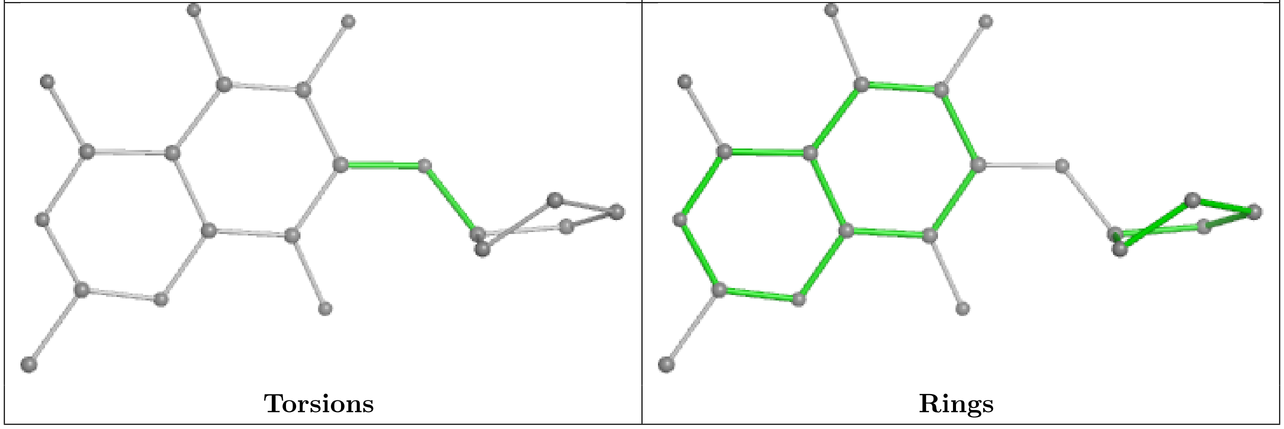
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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 A1H4X B 701



Bond lengths

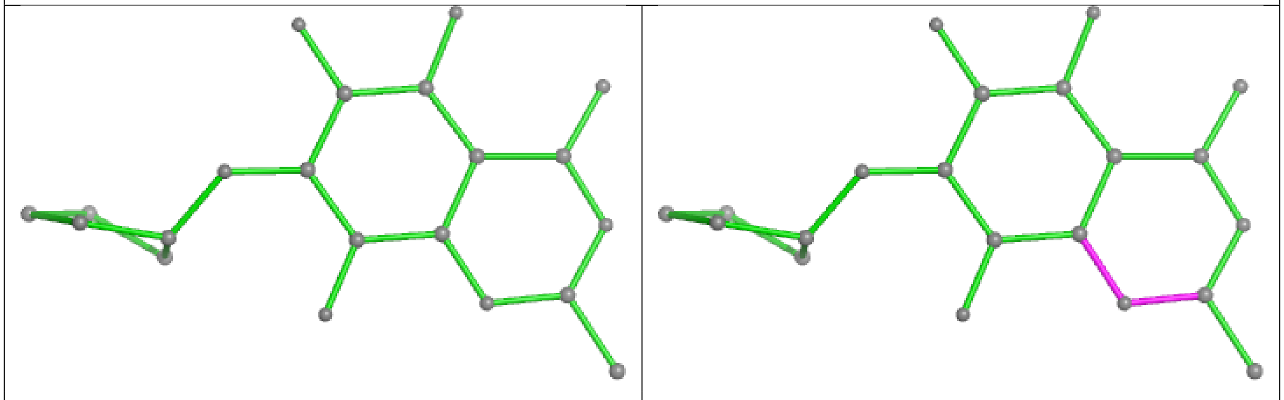
Bond angles



Torsions

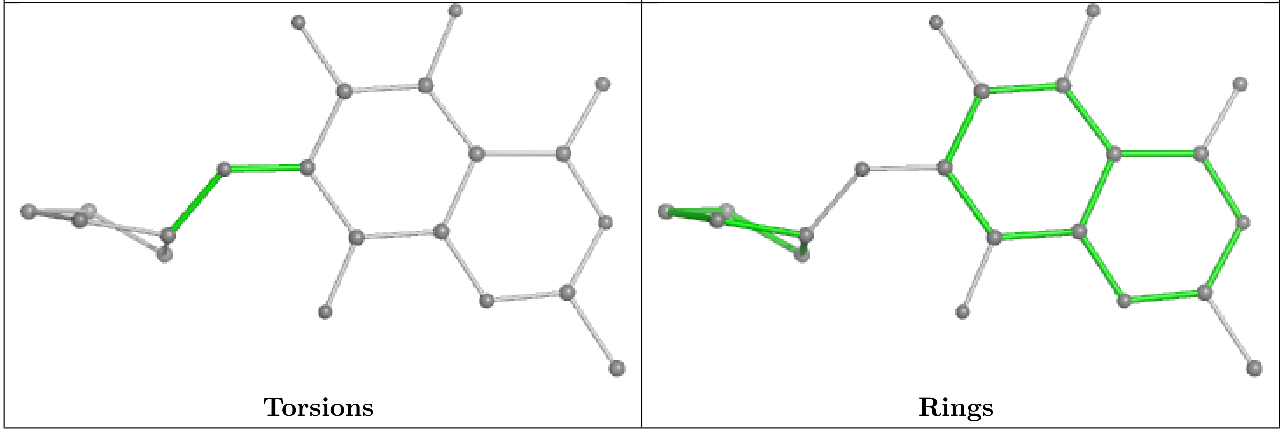
Rings

Ligand A1H4X A 701



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, 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	496/536 (92%)	0.21	19 (3%)	44	44	12, 21, 41, 77	2 (0%)
1	B	495/536 (92%)	0.25	15 (3%)	52	53	11, 22, 46, 82	2 (0%)
All	All	991/1072 (92%)	0.23	34 (3%)	48	49	11, 22, 44, 82	4 (0%)

All (34) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	189	ILE	5.8
1	B	189	ILE	5.7
1	A	187	THR	4.7
1	B	187	THR	4.5
1	A	46	HIS	4.4
1	B	45	MET	3.8
1	A	188	ALA	3.7
1	A	45	MET	3.4
1	A	544	ARG	3.4
1	A	246	ILE	3.4
1	B	188	ALA	3.4
1	A	57	CYS	3.3
1	A	195	GLN	3.2
1	A	165	ARG	3.0
1	B	46	HIS	2.9
1	A	87	GLU	2.6
1	B	81	LEU	2.5
1	A	54	MET	2.5
1	A	136	ILE	2.5
1	B	91	ILE	2.5
1	B	545	ASN	2.5
1	A	194	ASP	2.4
1	A	50	ASN	2.3
1	B	84	GLY	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	186	PRO	2.2
1	A	132	MET	2.2
1	A	61	ALA	2.2
1	B	232	ARG	2.2
1	B	95	THR	2.1
1	B	299	ILE	2.1
1	B	107	ARG	2.1
1	B	184	MET	2.1
1	A	56	GLU	2.1
1	A	499	ILE	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 ⓘ

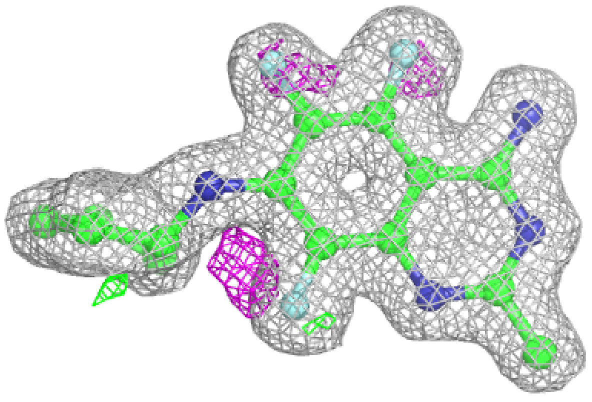
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled '$Q< 0.9$' lists the number of atoms with occupancy less than 0.9.

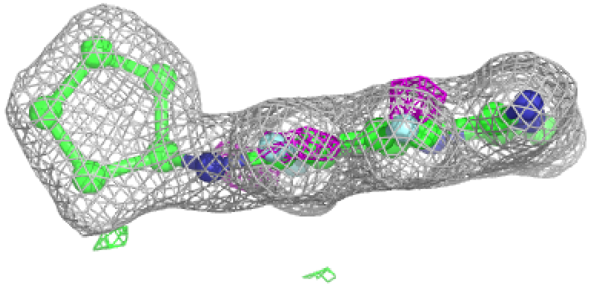
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
4	TRS	A	704	8/8	0.73	0.17	38,43,49,53	0
4	TRS	B	704	8/8	0.78	0.15	39,40,43,49	0
6	LYS	A	706	9/10	0.85	0.09	15,16,20,21	0
6	LYS	B	705	9/10	0.86	0.08	17,18,19,22	0
3	GOL	A	702	6/6	0.87	0.13	35,39,44,44	0
3	GOL	A	703	6/6	0.89	0.12	28,30,36,38	0
4	TRS	B	703	8/8	0.93	0.09	24,29,32,34	0
3	GOL	B	702	6/6	0.93	0.09	21,23,23,27	0
2	A1H4X	A	701	21/21	0.94	0.07	17,21,25,27	0
2	A1H4X	B	701	21/21	0.95	0.07	17,20,25,27	0
5	SO4	A	705	5/5	0.96	0.09	21,21,28,29	5

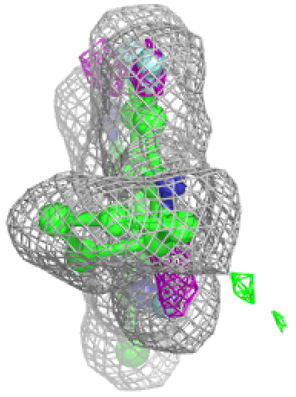
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around A1H4X A 701:

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

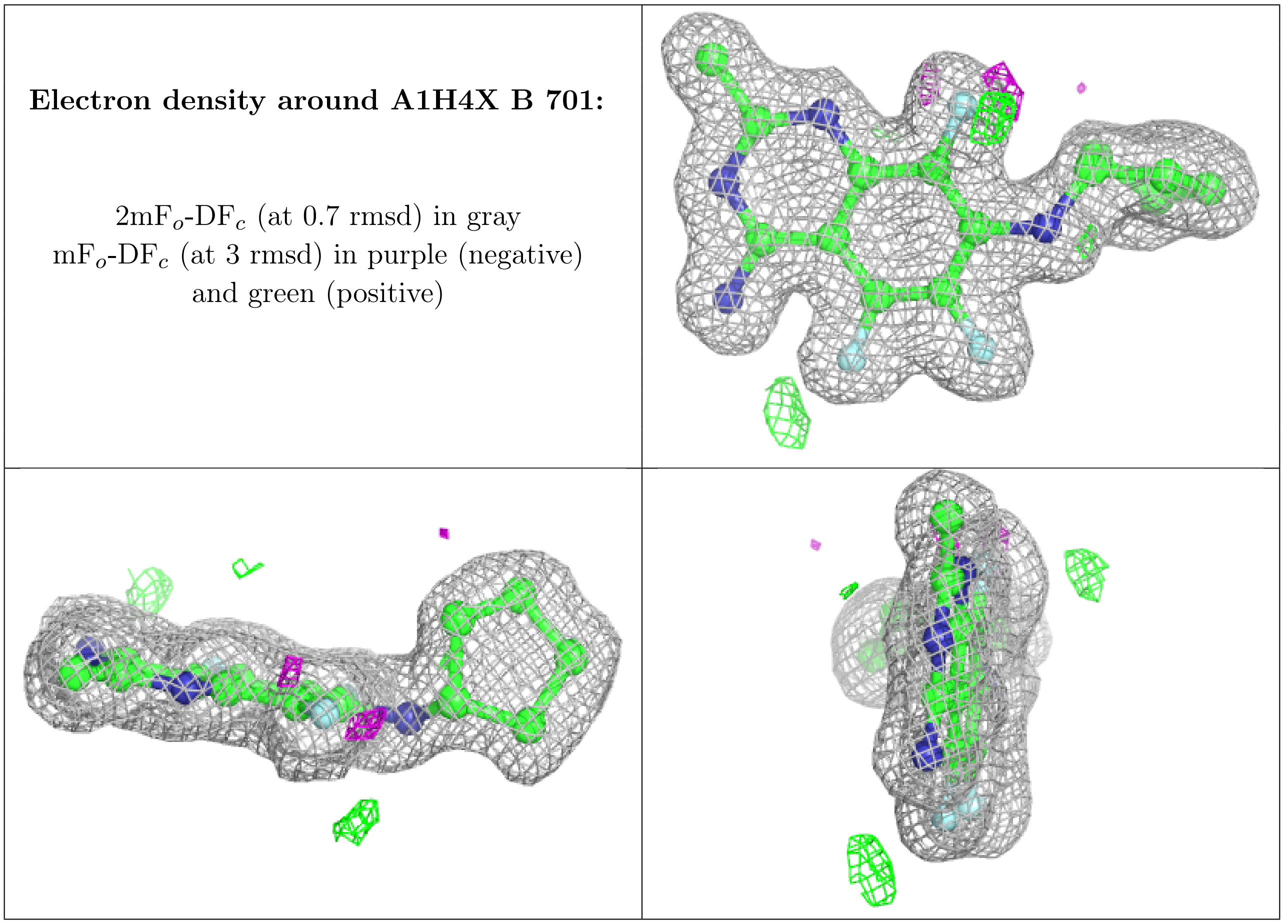






Electron density around A1H4X B 701:

$2mF_o$-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.