



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 7, 2023 – 06:52 PM JST

PDB ID : 8HX7
Title : Crystal structure of 4-amino-4-deoxychorismate synthase from *Streptomyces venezuelae* co-crystallized with L-glutamine
Authors : Nakamichi, Y.; Watanabe, M.
Deposited on : 2023-01-04
Resolution : 1.95 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

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

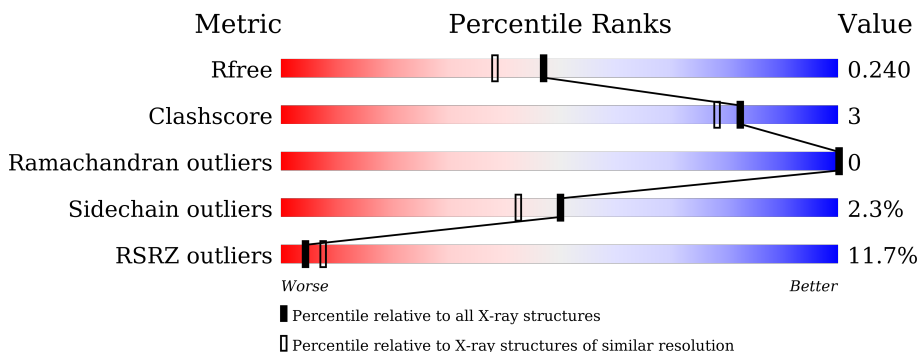
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.95 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	2580 (1.96-1.96)
Clashscore	141614	2705 (1.96-1.96)
Ramachandran outliers	138981	2678 (1.96-1.96)
Sidechain outliers	138945	2678 (1.96-1.96)
RSRZ outliers	127900	2539 (1.96-1.96)

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 $\leq 5\%$. 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	702	 12% (Poor fit) 86% (Green) 7% (Yellow) • 6% (Grey)
1	B	702	 10% (Poor fit) 86% (Green) 6% (Yellow) 7% (Grey)

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 10305 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 4-amino-4-deoxychorismate synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	659	5081	3190	911	962	18	0	1	0
1	B	652	5027	3153	903	954	17	0	0	0

There are 32 discrepancies between the modelled and reference sequences:

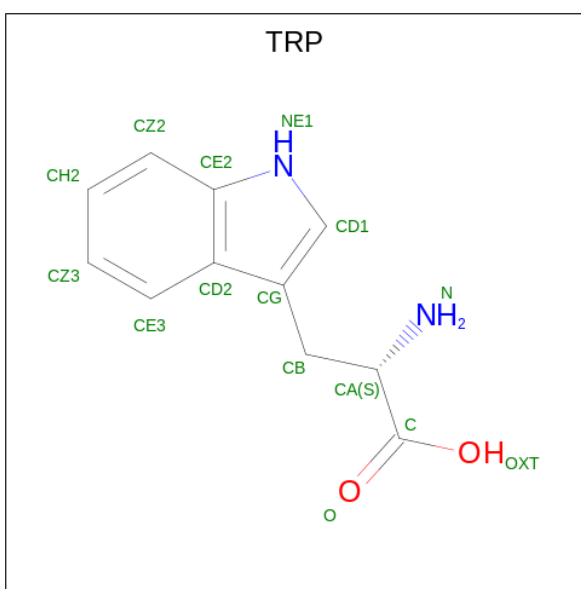
Chain	Residue	Modelled	Actual	Comment	Reference
A	-15	MET	-	initiating methionine	UNP Q6L8Q5
A	-14	ASN	-	expression tag	UNP Q6L8Q5
A	-13	HIS	-	expression tag	UNP Q6L8Q5
A	-12	LYS	-	expression tag	UNP Q6L8Q5
A	-11	VAL	-	expression tag	UNP Q6L8Q5
A	-10	HIS	-	expression tag	UNP Q6L8Q5
A	-9	HIS	-	expression tag	UNP Q6L8Q5
A	-8	HIS	-	expression tag	UNP Q6L8Q5
A	-7	HIS	-	expression tag	UNP Q6L8Q5
A	-6	HIS	-	expression tag	UNP Q6L8Q5
A	-5	HIS	-	expression tag	UNP Q6L8Q5
A	-4	ILE	-	expression tag	UNP Q6L8Q5
A	-3	GLU	-	expression tag	UNP Q6L8Q5
A	-2	GLY	-	expression tag	UNP Q6L8Q5
A	-1	ARG	-	expression tag	UNP Q6L8Q5
A	0	HIS	-	expression tag	UNP Q6L8Q5
B	-15	MET	-	initiating methionine	UNP Q6L8Q5
B	-14	ASN	-	expression tag	UNP Q6L8Q5
B	-13	HIS	-	expression tag	UNP Q6L8Q5
B	-12	LYS	-	expression tag	UNP Q6L8Q5
B	-11	VAL	-	expression tag	UNP Q6L8Q5
B	-10	HIS	-	expression tag	UNP Q6L8Q5
B	-9	HIS	-	expression tag	UNP Q6L8Q5
B	-8	HIS	-	expression tag	UNP Q6L8Q5
B	-7	HIS	-	expression tag	UNP Q6L8Q5

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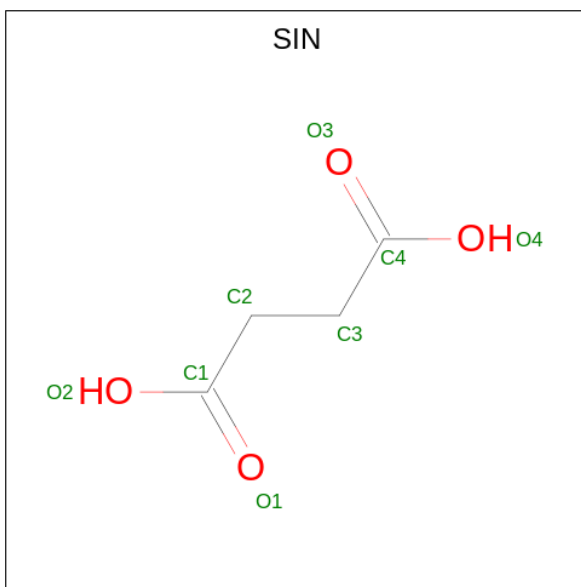
Chain	Residue	Modelled	Actual	Comment	Reference
B	-6	HIS	-	expression tag	UNP Q6L8Q5
B	-5	HIS	-	expression tag	UNP Q6L8Q5
B	-4	ILE	-	expression tag	UNP Q6L8Q5
B	-3	GLU	-	expression tag	UNP Q6L8Q5
B	-2	GLY	-	expression tag	UNP Q6L8Q5
B	-1	ARG	-	expression tag	UNP Q6L8Q5
B	0	HIS	-	expression tag	UNP Q6L8Q5

- Molecule 2 is TRYPTOPHAN (three-letter code: TRP) (formula: C₁₁H₁₂N₂O₂) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	15	11	2	2	0	0
2	B	1	15	11	2	2	0	0

- Molecule 3 is SUCCINIC ACID (three-letter code: SIN) (formula: C₄H₆O₄).



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

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	2	Total Mg 2 2	0	0
4	B	1	Total Mg 1 1	0	0

- Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total Cl 1 1	0	0

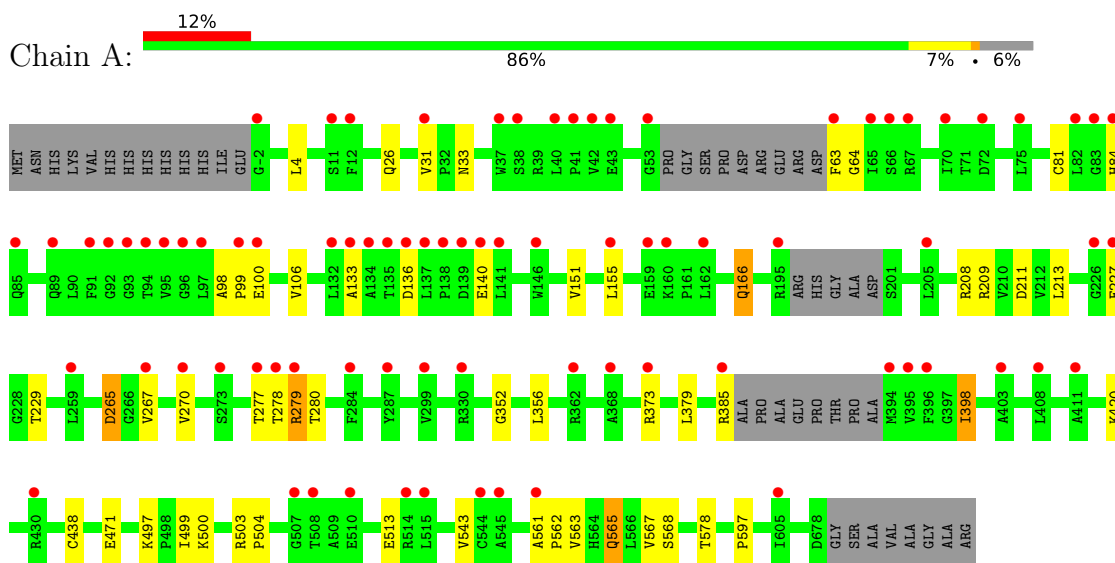
- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	88	Total O 88 88	0	0
6	B	59	Total O 59 59	0	0

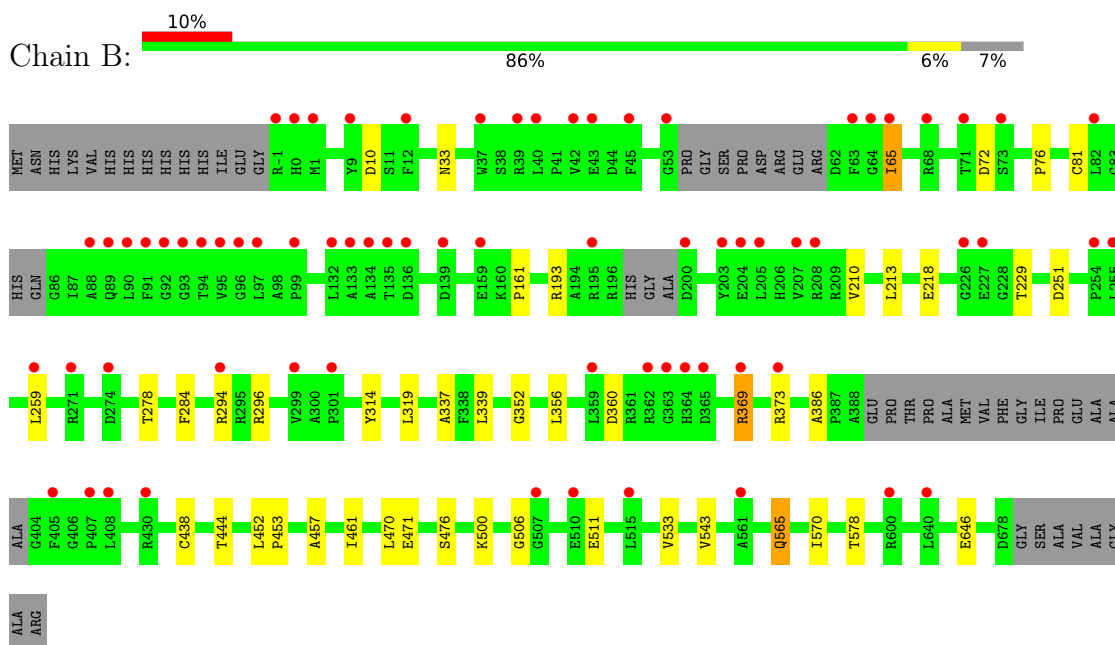
3 Residue-property plots [i](#)

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: 4-amino-4-deoxychorismate synthase



- Molecule 1: 4-amino-4-deoxychorismate synthase



4 Data and refinement statistics i

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	98.29Å 170.91Å 160.34Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.11 – 1.95 47.11 – 1.95	Depositor EDS
% Data completeness (in resolution range)	99.8 (47.11-1.95) 99.8 (47.11-1.95)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.50 (at 1.95Å)	Xtriage
Refinement program	REFMAC 5.8.0267	Depositor
R, R_{free}	0.210 , 0.240 0.213 , 0.240	Depositor DCC
R_{free} test set	4924 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	40.2	Xtriage
Anisotropy	0.491	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 58.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.008 for 1/2*h-1/2*k,-3/2*h-1/2*k,-l 0.020 for 1/2*h+1/2*k,3/2*h-1/2*k,-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	10305	wwPDB-VP
Average B, all atoms (Å ²)	71.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.94% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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: SIN, CL, MG, OCS

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	2/5183 (0.0%)	0.74	0/7035
1	B	0.64	0/5126	0.73	0/6957
All	All	0.66	2/10309 (0.0%)	0.74	0/13992

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	265	ASP	CG-OD2	5.90	1.39	1.25
1	A	265	ASP	CG-OD1	5.70	1.38	1.25

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	5081	0	4976	26	0
1	B	5027	0	4923	26	0
2	A	15	0	9	0	0
2	B	15	0	9	0	0
3	A	8	0	4	0	0
3	B	8	0	4	0	0
4	A	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	1	0	0	0	0
5	B	1	0	0	0	0
6	A	88	0	0	0	0
6	B	59	0	0	0	0
All	All	10305	0	9925	51	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 (51) 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:438:CYS:SG	1:A:500:LYS:NZ	2.59	0.75
1:A:565:GLN:HE21	1:A:565:GLN:HA	1.58	0.67
1:B:438:CYS:SG	1:B:500:LYS:NZ	2.71	0.62
1:B:360:ASP:OD2	1:B:369:ARG:NH2	2.34	0.61
1:B:213:LEU:HD22	1:B:352:GLY:HA2	1.91	0.52
1:B:259:LEU:HD21	1:B:284:PHE:HE1	1.74	0.52
1:B:229:THR:HA	1:B:471:GLU:O	2.10	0.51
1:A:597:PRO:HB3	1:B:10:ASP:OD1	2.10	0.51
1:B:314:TYR:CE2	1:B:337:ALA:HB3	2.46	0.50
1:B:356:LEU:HD22	1:B:356:LEU:N	2.27	0.50
1:A:267:VAL:HA	1:A:280:THR:O	2.11	0.49
1:B:218:GLU:HG3	1:B:386:ALA:CB	2.42	0.49
1:A:270:VAL:HG13	1:A:278:THR:HB	1.95	0.49
1:B:259:LEU:C	1:B:259:LEU:HD23	2.33	0.48
1:A:209:ARG:CZ	1:A:211:ASP:OD1	2.62	0.48
1:A:398:ILE:HD12	1:A:504:PRO:HG2	1.95	0.48
1:B:444:THR:HG22	1:B:646:GLU:HG2	1.96	0.48
1:A:98:ALA:HB1	1:A:99:PRO:HD2	1.96	0.47
1:B:543:VAL:HB	1:B:578:THR:HG21	1.97	0.47
1:B:452:LEU:HB3	1:B:453:PRO:HD3	1.98	0.46
1:A:155:LEU:HD12	1:A:155:LEU:C	2.35	0.46
1:B:457:ALA:O	1:B:461:ILE:HG12	2.16	0.46
1:A:4:LEU:HD11	1:A:31:VAL:CG2	2.46	0.45
1:A:84:HIS:CG	1:A:166:GLN:HG2	2.52	0.45
1:A:499:ILE:HG12	1:A:567:VAL:HG22	1.99	0.45
1:B:533:VAL:HA	1:B:570:ILE:HD11	1.98	0.45
1:A:356:LEU:HD21	1:A:379:LEU:CD1	2.47	0.45
1:A:265:ASP:HB2	1:A:267:VAL:HG22	1.99	0.44
1:A:543:VAL:HB	1:A:578:THR:HG21	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:229:THR:HA	1:A:471:GLU:O	2.18	0.44
1:A:26:GLN:HE21	1:A:26:GLN:HA	1.83	0.44
1:B:506:GLY:HA3	1:B:511:GLU:HB3	2.00	0.44
1:B:259:LEU:HD21	1:B:284:PHE:CE1	2.53	0.44
1:A:561:ALA:N	1:A:562:PRO:CD	2.81	0.43
1:A:270:VAL:O	1:A:277:THR:HA	2.19	0.43
1:A:209:ARG:NH2	1:A:211:ASP:OD1	2.51	0.42
1:B:251:ASP:HB3	1:B:339:LEU:HD21	2.01	0.42
1:A:497:LYS:HA	1:A:568:SER:O	2.18	0.42
1:A:133:ALA:HB1	1:A:151:VAL:HG13	2.01	0.42
1:B:33:ASN:HA	1:B:65:ILE:HG22	2.02	0.42
1:A:33:ASN:ND2	1:A:64:GLY:HA3	2.35	0.42
1:A:267:VAL:HG11	1:A:279:ARG:NH2	2.35	0.41
1:B:193:ARG:O	1:B:296:ARG:NH2	2.53	0.41
1:B:470:LEU:O	1:B:476:SER:HA	2.20	0.41
1:B:210:VAL:HG23	1:B:356:LEU:HD23	2.03	0.41
1:A:356:LEU:HD21	1:A:379:LEU:HD11	2.03	0.41
1:A:213:LEU:HD22	1:A:352:GLY:HA2	2.02	0.41
1:B:33:ASN:HA	1:B:65:ILE:CG2	2.51	0.41
1:B:565:GLN:HE21	1:B:565:GLN:HA	1.84	0.41
1:B:76:PRO:HA	1:B:161:PRO:O	2.21	0.40
1:B:319:LEU:HD23	1:B:319:LEU:HA	1.89	0.40

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	651/702 (93%)	623 (96%)	28 (4%)	0	100	100
1	B	641/702 (91%)	618 (96%)	23 (4%)	0	100	100
All	All	1292/1404 (92%)	1241 (96%)	51 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	529/560 (94%)	512 (97%)	17 (3%)	39	27
1	B	524/560 (94%)	517 (99%)	7 (1%)	69	65
All	All	1053/1120 (94%)	1029 (98%)	24 (2%)	50	42

All (24) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	63	PHE
1	A	100	GLU
1	A	106	VAL
1	A	136	ASP
1	A	140	GLU
1	A	166	GLN
1	A	208	ARG
1	A	227	GLU
1	A	279	ARG
1	A	373	ARG
1	A	385	ARG
1	A	398	ILE
1	A	420	LYS
1	A	503	ARG
1	A	513	GLU
1	A	563	VAL
1	A	565	GLN
1	B	65	ILE
1	B	72	ASP
1	B	278	THR
1	B	294	ARG
1	B	369	ARG
1	B	373	ARG
1	B	565	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	26	GLN
1	A	130	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

2 non-standard protein/DNA/RNA residues 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
1	OCS	B	81	1	7,8,9	1.02	1 (14%)	6,11,13	1.59	1 (16%)
1	OCS	A	81	1	7,8,9	1.42	1 (14%)	6,11,13	2.05	2 (33%)

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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	OCS	B	81	1	-	1/4/7/9	-
1	OCS	A	81	1	-	1/4/7/9	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	81	OCS	OD1-SG	3.39	1.55	1.45
1	B	81	OCS	OD2-SG	2.39	1.56	1.47

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	81	OCS	OD1-SG-CB	-3.59	102.67	106.94
1	B	81	OCS	OD2-SG-CB	-3.22	100.61	105.74
1	A	81	OCS	OD2-SG-OD3	3.20	119.08	111.27

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	81	OCS	N-CA-CB-SG
1	B	81	OCS	N-CA-CB-SG

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 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	SIN	B	702	-	7,7,7	1.10	0	8,8,8	1.07	0
2	TRP	A	701	-	14,16,16	0.75	0	16,22,22	1.17	2 (12%)
2	TRP	B	701	-	14,16,16	0.77	0	16,22,22	1.02	1 (6%)
3	SIN	A	702	-	7,7,7	1.06	0	8,8,8	1.02	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	SIN	B	702	-	-	3/5/5/5	-
2	TRP	A	701	-	-	0/7/8/8	0/2/2/2
2	TRP	B	701	-	-	0/7/8/8	0/2/2/2
3	SIN	A	702	-	-	3/5/5/5	-

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	701	TRP	OXT-C-CA	2.53	122.01	113.38
2	A	701	TRP	OXT-C-O	-2.20	119.09	124.09
2	B	701	TRP	OXT-C-CA	2.10	120.53	113.38

There are no chirality outliers.

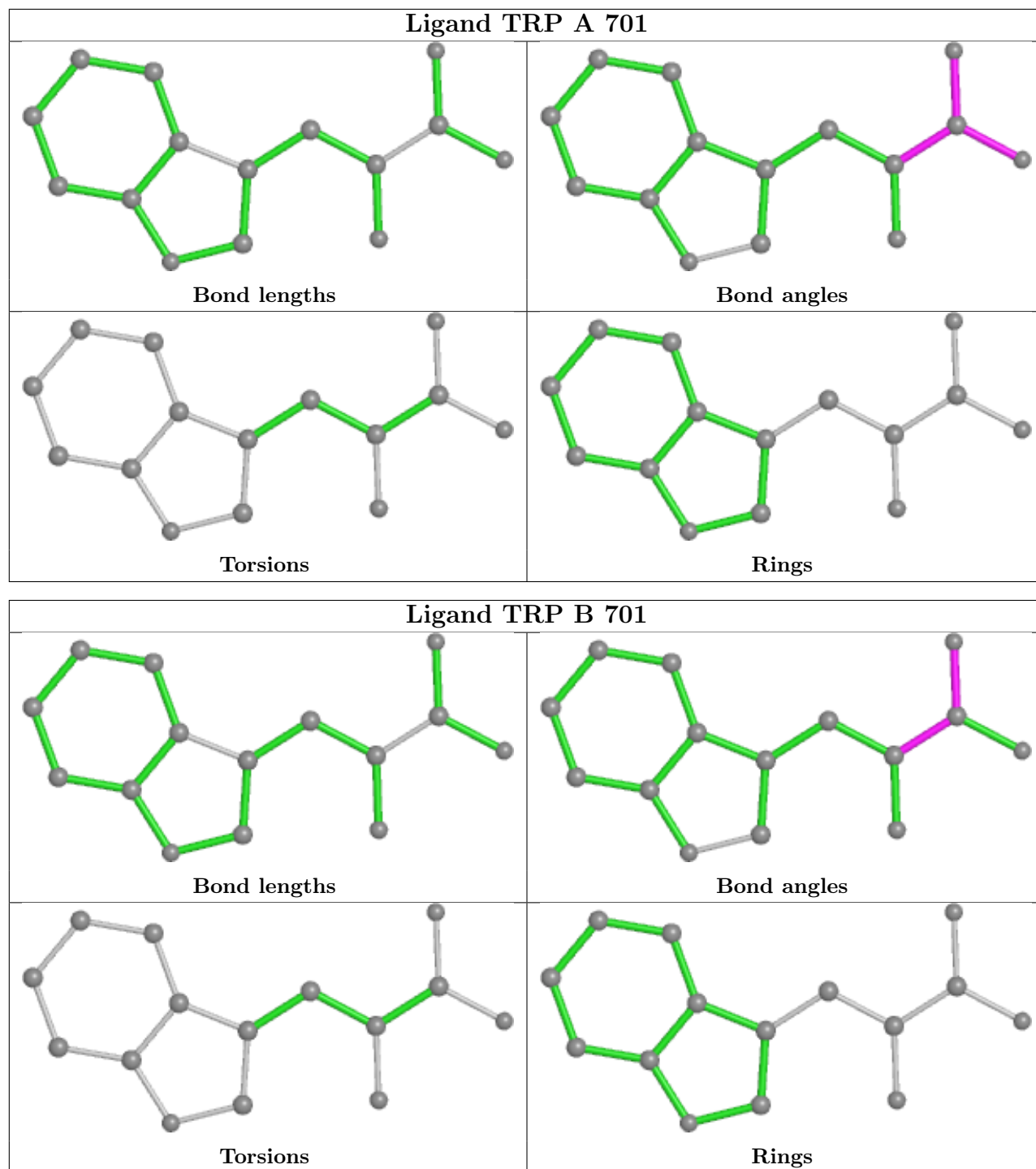
All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	702	SIN	C1-C2-C3-C4
3	B	702	SIN	C2-C3-C4-O3
3	B	702	SIN	C2-C3-C4-O4
3	A	702	SIN	O1-C1-C2-C3
3	A	702	SIN	O2-C1-C2-C3
3	A	702	SIN	C2-C3-C4-O4

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 than 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.



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, 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	658/702 (93%)	1.04	82 (12%) 3 6	42, 67, 115, 142	0
1	B	651/702 (92%)	0.89	71 (10%) 5 9	44, 67, 102, 134	0
All	All	1309/1404 (93%)	0.96	153 (11%) 4 7	42, 67, 108, 142	0

All (153) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	84	HIS	8.6
1	A	93	GLY	7.6
1	A	94	THR	7.1
1	A	37	TRP	7.0
1	B	134	ALA	6.9
1	A	134	ALA	6.5
1	B	63	PHE	6.1
1	B	95	VAL	6.0
1	A	396	PHE	5.6
1	A	136	ASP	5.5
1	B	9	TYR	5.4
1	A	92	GLY	5.4
1	A	95	VAL	5.3
1	A	96	GLY	5.3
1	A	137	LEU	5.2
1	B	363	GLY	5.2
1	A	83	GLY	5.1
1	A	195	ARG	5.1
1	A	507	GLY	5.0
1	B	255	LEU	4.8
1	B	301	PRO	4.8
1	A	510	GLU	4.8
1	A	395	VAL	4.7
1	B	200	ASP	4.6

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Mol	Chain	Res	Type	RSRZ
1	A	135	THR	4.6
1	B	37	TRP	4.5
1	B	159	GLU	4.5
1	B	91	PHE	4.5
1	B	259	LEU	4.4
1	B	274	ASP	4.4
1	A	85	GLN	4.4
1	A	273	SER	4.3
1	A	226	GLY	4.2
1	A	91	PHE	4.1
1	A	65	ILE	4.1
1	B	362	ARG	4.0
1	A	133	ALA	4.0
1	A	43	GLU	4.0
1	B	369	ARG	3.9
1	B	99	PRO	3.9
1	A	162	LEU	3.9
1	A	63	PHE	3.9
1	B	97	LEU	3.8
1	A	100	GLU	3.8
1	A	430	ARG	3.8
1	B	294	ARG	3.8
1	B	90	LEU	3.7
1	A	97	LEU	3.7
1	A	515	LEU	3.7
1	B	364	HIS	3.7
1	A	259	LEU	3.7
1	A	82	LEU	3.6
1	A	159	GLU	3.6
1	B	299	VAL	3.6
1	A	139	ASP	3.5
1	A	42	VAL	3.5
1	A	140	GLU	3.5
1	B	227	GLU	3.5
1	A	278	THR	3.5
1	B	408	LEU	3.4
1	A	38	SER	3.4
1	B	94	THR	3.4
1	B	92	GLY	3.4
1	B	136	ASP	3.4
1	A	99	PRO	3.3
1	A	12	PHE	3.2

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Mol	Chain	Res	Type	RSRZ
1	B	271	ARG	3.2
1	B	203	TYR	3.2
1	A	561	ALA	3.2
1	A	299	VAL	3.2
1	A	141	LEU	3.1
1	B	93	GLY	3.1
1	A	132	LEU	3.1
1	A	508	THR	3.1
1	B	207	VAL	3.0
1	A	227	GLU	3.0
1	B	71	THR	3.0
1	B	135	THR	3.0
1	A	138	PRO	3.0
1	B	507	GLY	2.9
1	A	362	ARG	2.9
1	B	373	ARG	2.9
1	B	561	ALA	2.9
1	A	279	ARG	2.9
1	A	514	ARG	2.8
1	B	82	LEU	2.8
1	B	133	ALA	2.8
1	B	139	ASP	2.8
1	A	40	LEU	2.8
1	B	359	LEU	2.8
1	A	411	ALA	2.7
1	A	89	GLN	2.7
1	B	407	PRO	2.7
1	B	195	ARG	2.7
1	B	65	ILE	2.6
1	B	89	GLN	2.6
1	A	403	ALA	2.6
1	B	68	ARG	2.6
1	B	64	GLY	2.6
1	A	70	ILE	2.6
1	B	365	ASP	2.6
1	B	40	LEU	2.6
1	B	205	LEU	2.6
1	B	39	ARG	2.5
1	B	430	ARG	2.5
1	B	12	PHE	2.5
1	A	394	MET	2.5
1	A	385	ARG	2.5

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Mol	Chain	Res	Type	RSRZ
1	B	208	ARG	2.5
1	A	72	ASP	2.5
1	A	270	VAL	2.5
1	B	96	GLY	2.4
1	A	373	ARG	2.4
1	B	-1	ARG	2.4
1	B	600	ARG	2.4
1	A	545	ALA	2.3
1	B	45	PHE	2.3
1	A	31	VAL	2.3
1	B	640	LEU	2.3
1	A	11[A]	SER	2.3
1	B	53	GLY	2.3
1	B	254	PRO	2.2
1	A	155	LEU	2.2
1	A	408	LEU	2.2
1	A	287	TYR	2.2
1	A	284	PHE	2.2
1	A	53	GLY	2.2
1	A	330	ARG	2.2
1	B	132	LEU	2.2
1	A	66	SER	2.2
1	B	204	GLU	2.2
1	B	510	GLU	2.2
1	B	1	MET	2.2
1	A	67	ARG	2.2
1	B	0	HIS	2.1
1	B	515	LEU	2.1
1	A	-2	GLY	2.1
1	A	146	TRP	2.1
1	A	267	VAL	2.1
1	A	75	LEU	2.1
1	B	88	ALA	2.1
1	A	160	LYS	2.1
1	B	405	PHE	2.1
1	B	226	GLY	2.1
1	A	277	THR	2.1
1	A	41	PRO	2.1
1	A	605	ILE	2.1
1	B	73	SER	2.0
1	B	42	VAL	2.0
1	A	205	LEU	2.0

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Mol	Chain	Res	Type	RSRZ
1	A	368	ALA	2.0
1	A	544	CYS	2.0
1	B	43	GLU	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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
1	OCS	B	81	9/10	0.85	0.13	59,67,72,73	0
1	OCS	A	81	9/10	0.91	0.16	72,81,85,85	0

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

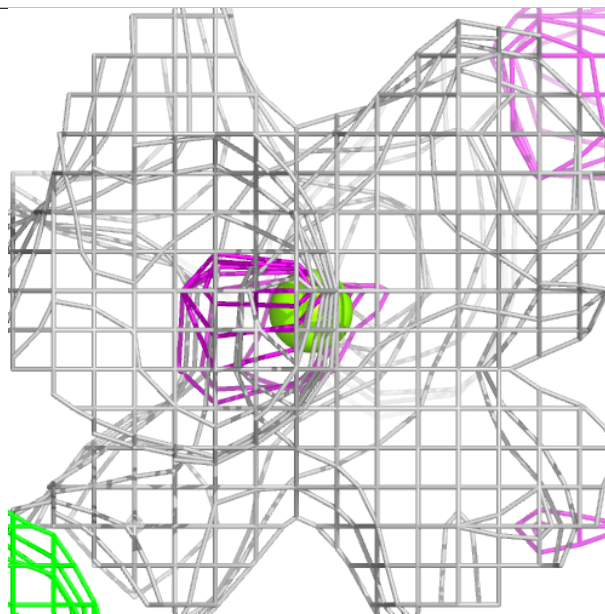
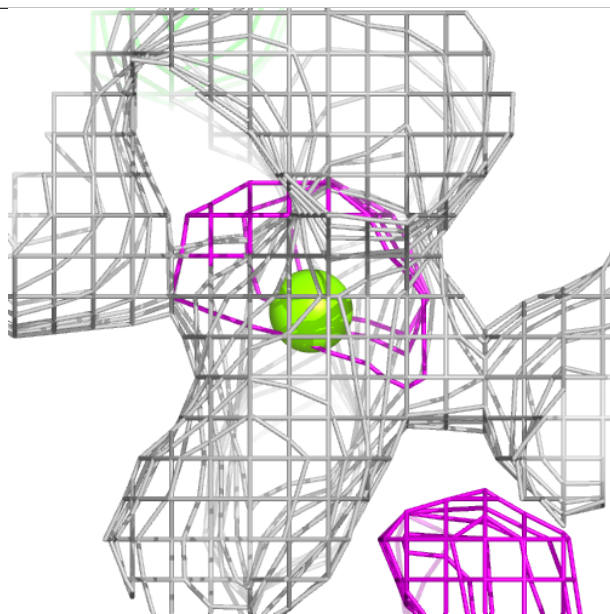
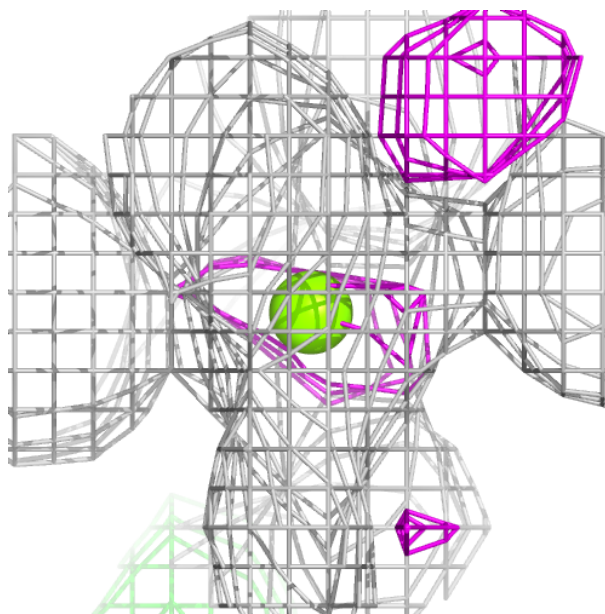
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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	SIN	B	702	8/8	0.90	0.19	63,68,69,71	0
4	MG	B	703	1/1	0.90	0.20	58,58,58,58	0
3	SIN	A	702	8/8	0.91	0.15	51,54,59,59	0
4	MG	A	704	1/1	0.92	0.21	64,64,64,64	0
4	MG	A	703	1/1	0.92	0.13	58,58,58,58	0
2	TRP	B	701	15/15	0.96	0.12	54,55,56,56	0
2	TRP	A	701	15/15	0.96	0.12	42,43,47,49	0
5	CL	B	704	1/1	0.98	0.11	78,78,78,78	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.

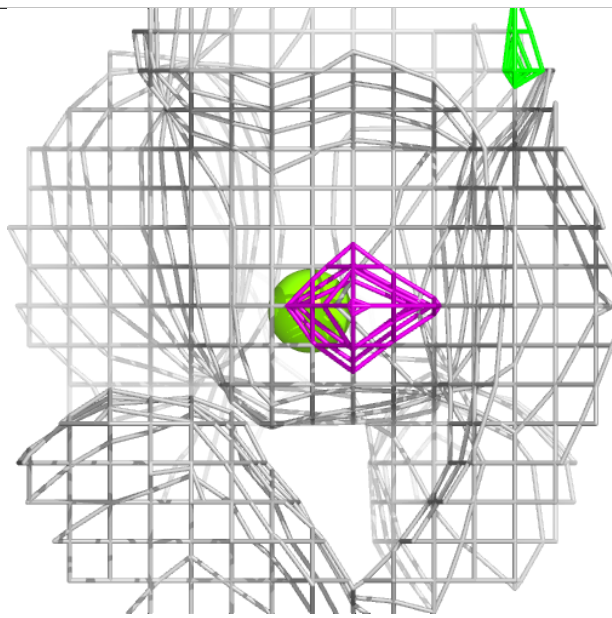
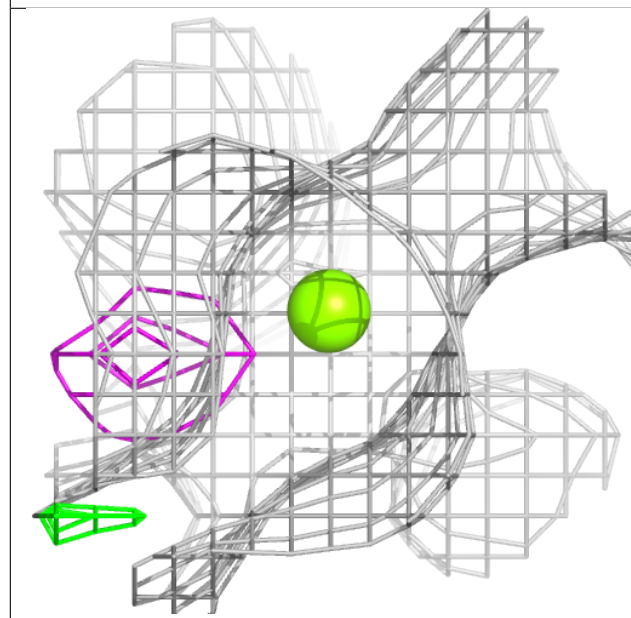
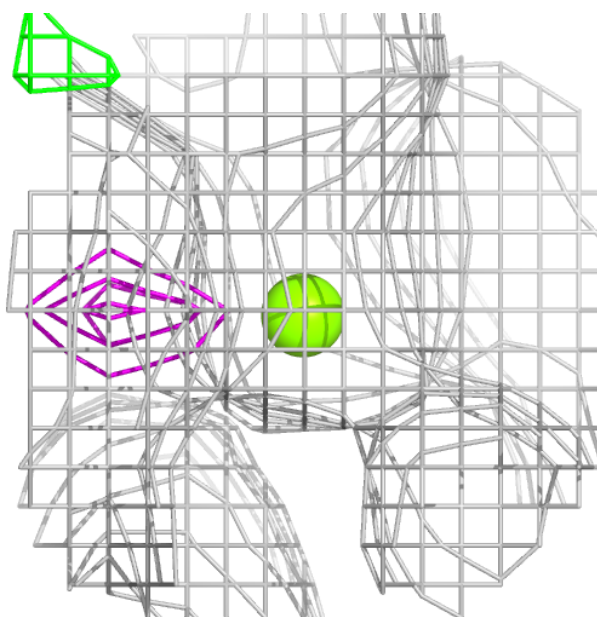
Electron density around MG B 703:

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



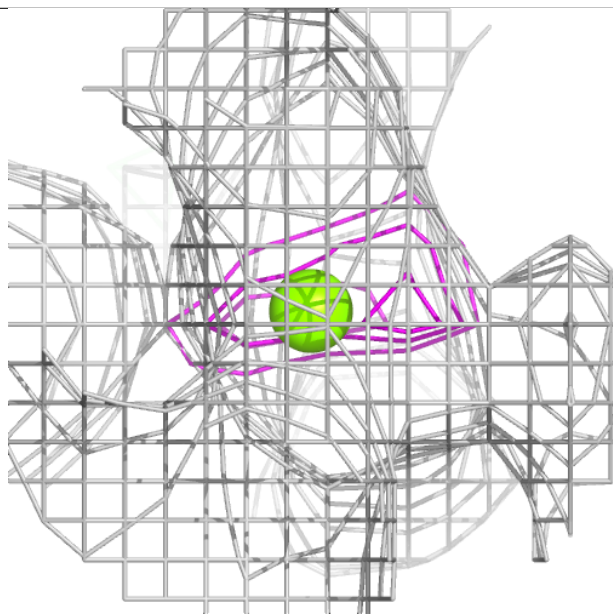
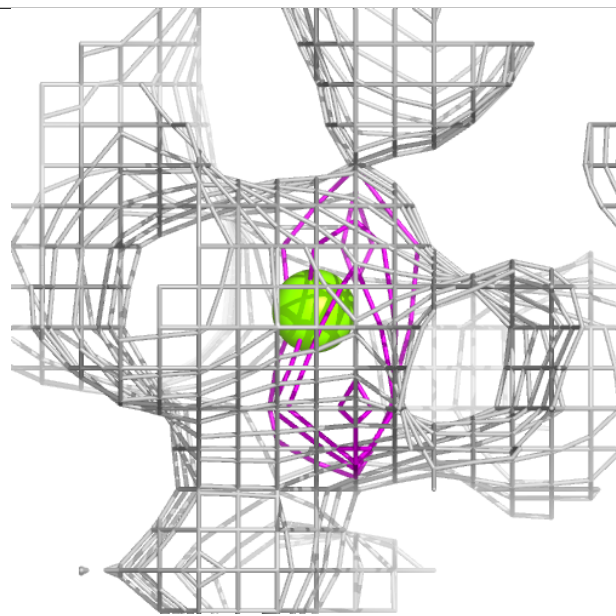
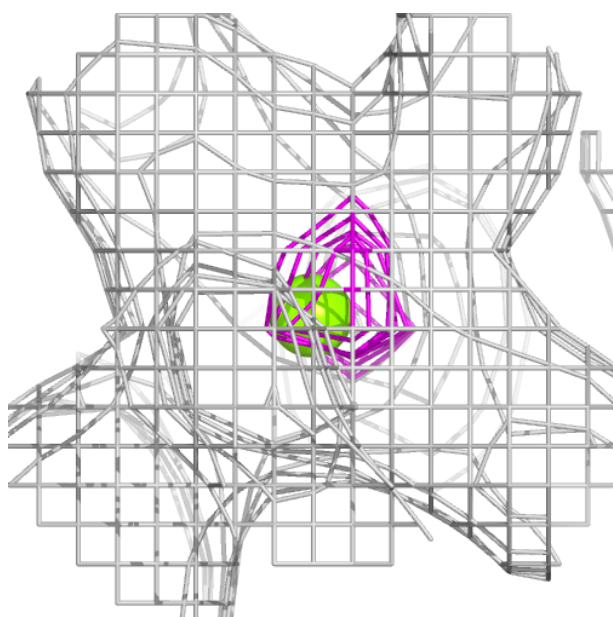
Electron density around MG A 704:

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



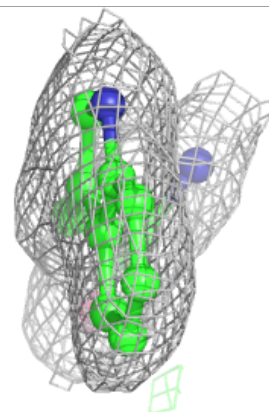
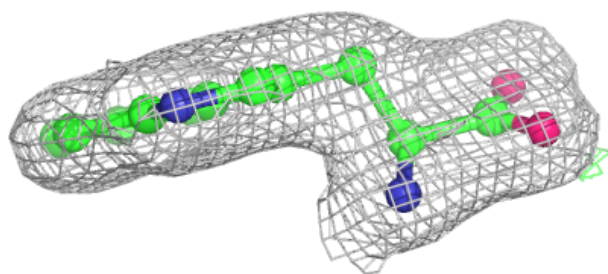
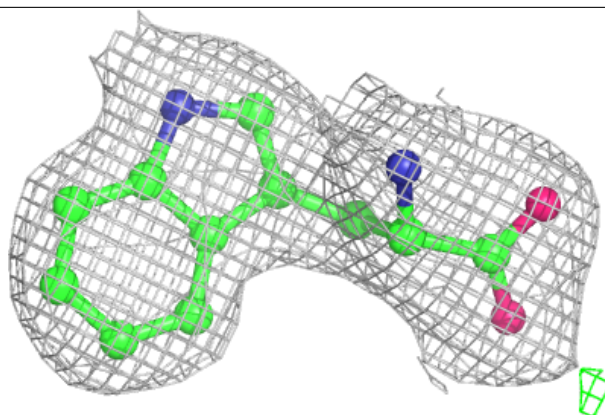
Electron density around MG A 703:

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

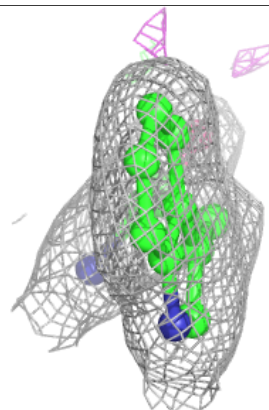
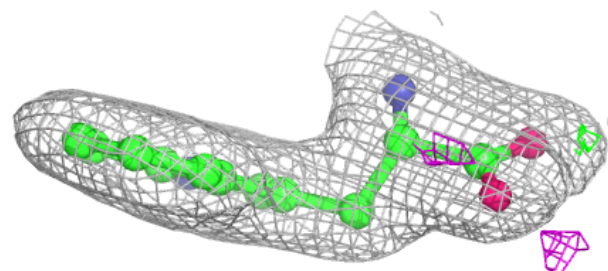
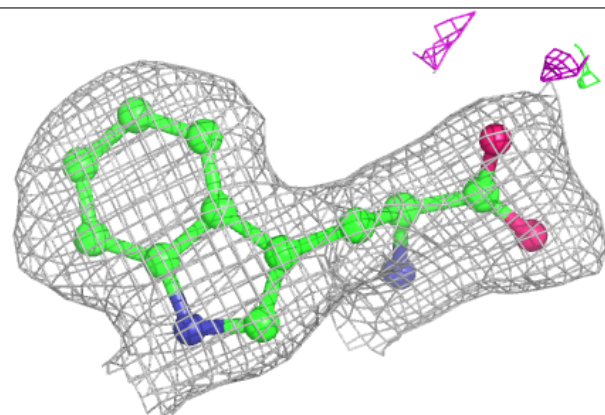


Electron density around TRP B 701:

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

**Electron density around TRP 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)



6.5 Other polymers [i](#)

There are no such residues in this entry.