



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 02:43 PM UTC

PDB ID : 1W0Y / pdb_00001w0y
Title : tf7a_3771 complex
Authors : Banner, D.W.; D'Arcy, A.; Groebke-Zbinden, K.; Ackermann, J.; Kirchhofer, D.; Ji, Y.-H.; Tschopp, T.B.; Wallbaum, S.; Weber, L.
Deposited on : 2004-05-27
Resolution : 2.50 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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

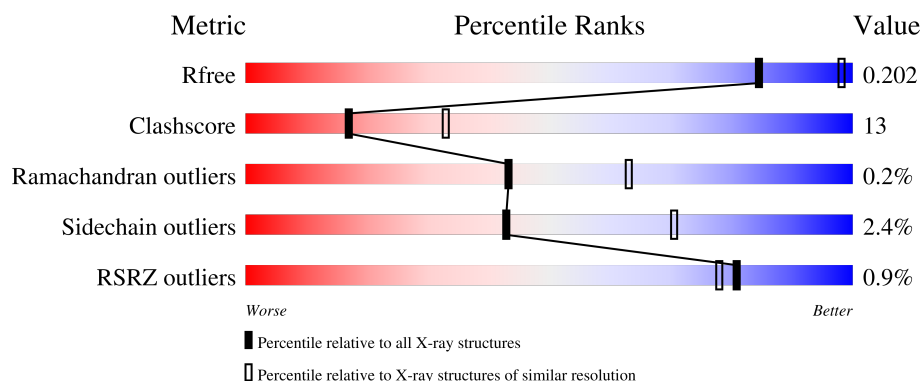
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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}	180053	5829 (2.50-2.50)
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)
RSRZ outliers	180081	5833 (2.50-2.50)

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	H	254	 72% 22% . .
2	L	142	 70% 28% .
3	T	210	 58% 29% . 10%

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 5060 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 BLOOD COAGULATION FACTOR VIIIA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	H	251	Total	C	N	O	S	25	0	0
			1955	1242	348	352	13			

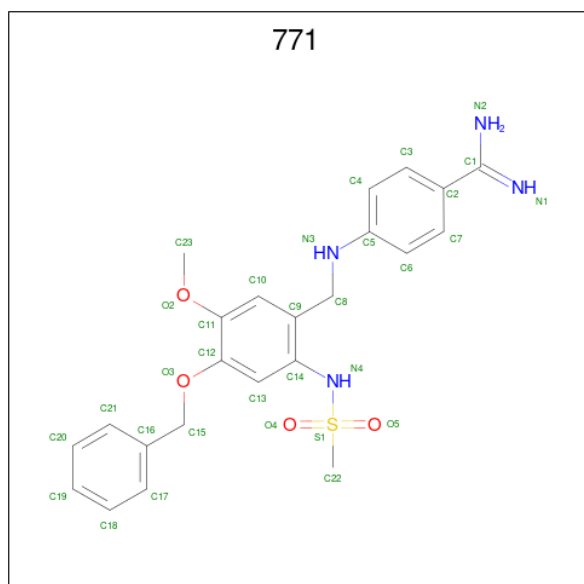
- Molecule 2 is a protein called BLOOD COAGULATION FACTOR VIIIA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	L	142	Total	C	N	O	S	10	0	0
			1132	682	189	246	15			

- Molecule 3 is a protein called TISSUE FACTOR.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	T	188	Total	C	N	O	S	26	0	0
			1533	977	246	305	5			

- Molecule 4 is 4-(4-BENZYLOXY-2-METHANESULFONYLAMINO-5-METHOXY-BENZYLAMINO)-BENZAMIDINE (CCD ID: 771) (formula: C₂₃H₂₆N₄O₄S).

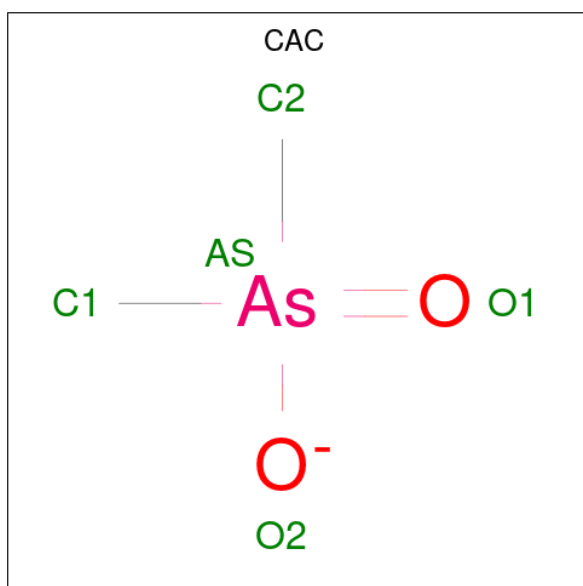


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	H	1	Total	C	N	O	S	0	0
			32	23	4	4	1		

- Molecule 5 is CALCIUM ION (CCD ID: CA) (formula: Ca).

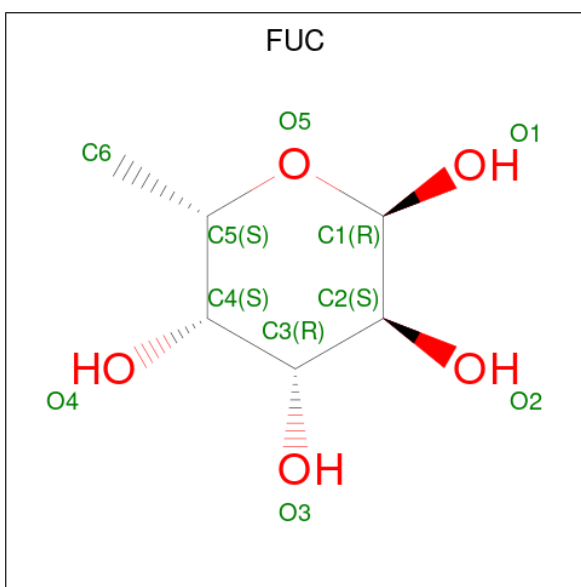
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	H	1	Total	Ca	0	0
			1	1		
5	L	8	Total	Ca	0	0
			8	8		

- Molecule 6 is CACODYLATE ION (CCD ID: CAC) (formula: C₂H₆AsO₂).



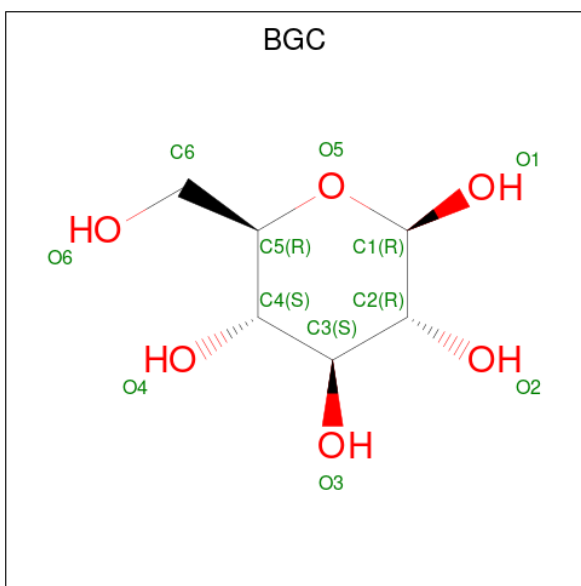
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	H	1	Total	As	C	O	0	0
			5	1	2	2		

- Molecule 7 is alpha-L-fucopyranose (CCD ID: FUC) (formula: C₆H₁₂O₅).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	L	1	Total	C	O	0	0
			10	6	4		

- Molecule 8 is beta-D-glucopyranose (CCD ID: BGC) (formula: $C_6H_{12}O_6$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	L	1	Total	C	O	0	0
			11	6	5		

- Molecule 9 is water.

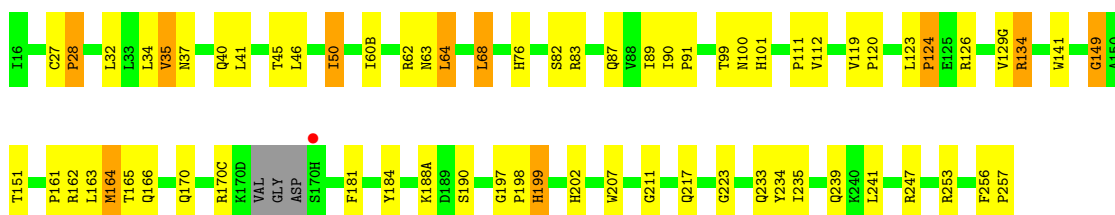
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	H	180	Total 180	O 180	0	0
9	L	76	Total 76	O 76	0	0
9	T	117	Total 117	O 117	0	0

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.

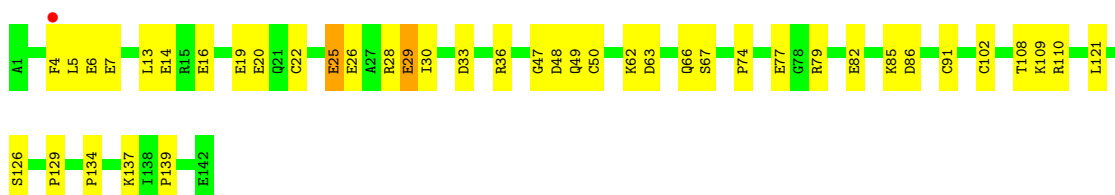
• Molecule 1: BLOOD COAGULATION FACTOR VIIIA

Chain H: 



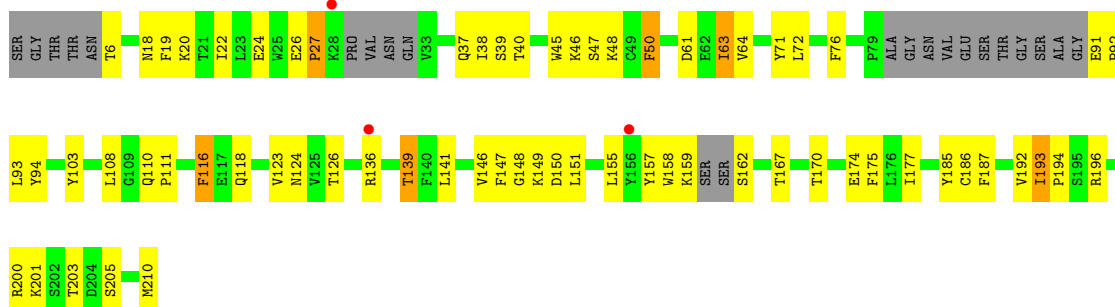
• Molecule 2: BLOOD COAGULATION FACTOR VIIIA

Chain L: 



• Molecule 3: TISSUE FACTOR

Chain T: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	71.34Å 82.38Å 123.96Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.99 – 2.50 19.99 – 2.50	Depositor EDS
% Data completeness (in resolution range)	(Not available) (19.99-2.50) 96.2 (19.99-2.50)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.99 (at 2.50Å)	Xtriage
Refinement program	CNX 2002	Depositor
R, R_{free}	0.199 , 0.258 (Not available) , 0.202	Depositor DCC
R_{free} test set	1252 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	20.7	Xtriage
Anisotropy	0.387	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 59.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	5060	wwPDB-VP
Average B, all atoms (Å ²)	22.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.65% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 771, CGU, BGC, CA, CAC, FUC

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	H	0.66	0/2004	1.14	12/2726 (0.4%)
2	L	0.55	0/1039	0.98	1/1389 (0.1%)
3	T	0.58	0/1565	1.10	9/2123 (0.4%)
All	All	0.61	0/4608	1.09	22/6238 (0.4%)

There are no bond length outliers.

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	H	134	ARG	N-CA-C	9.23	121.42	111.36
1	H	190	SER	N-CA-C	-8.78	96.75	110.36
3	T	193	ILE	CA-C-N	8.49	129.00	119.32
3	T	193	ILE	C-N-CA	8.49	129.00	119.32
1	H	197	GLY	CA-C-N	8.27	128.21	119.85
1	H	197	GLY	C-N-CA	8.27	128.21	119.85
1	H	129(G)	VAL	N-CA-C	-7.71	97.12	108.54
1	H	199	HIS	N-CA-C	-7.69	92.24	107.69
1	H	99	THR	N-CA-C	7.68	122.78	113.41
3	T	20	LYS	N-CA-C	-7.12	98.90	109.15
1	H	123	LEU	N-CA-C	-7.01	99.49	109.24
1	H	149	GLY	N-CA-C	6.88	129.48	113.18
3	T	146	VAL	N-CA-C	6.34	117.91	111.00
3	T	139	THR	N-CA-C	6.14	118.29	109.14
3	T	40	THR	N-CA-C	-6.05	101.04	110.42
3	T	50	PHE	N-CA-C	5.67	118.41	109.96
1	H	28	PRO	N-CA-C	5.59	121.11	113.84
3	T	63	ILE	N-CA-C	5.56	118.04	111.09
2	L	47	GLY	N-CA-C	-5.37	106.28	112.29
1	H	164	MET	N-CA-C	-5.30	103.02	110.50
1	H	165	THR	N-CA-C	5.02	116.75	111.28

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	T	22	ILE	CB-CA-C	-5.01	103.21	110.63

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	H	1955	0	1933	44	0
2	L	1132	0	990	25	0
3	T	1533	0	1492	49	0
4	H	32	0	25	0	0
5	H	1	0	0	0	0
5	L	8	0	0	0	0
6	H	5	0	0	0	0
7	L	10	0	10	0	0
8	L	11	0	10	0	0
9	H	180	0	0	4	0
9	L	76	0	0	0	0
9	T	117	0	0	0	0
All	All	5060	0	4460	114	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 13.

All (114) 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)
3:T:6:THR:HG23	3:T:93:LEU:HD22	1.41	1.03
1:H:124:PRO:O	1:H:235:ILE:HD13	1.83	0.78
3:T:136:ARG:HG3	3:T:141:LEU:HD11	1.69	0.75
1:H:35:VAL:HG11	1:H:60(B):ILE:HD12	1.70	0.73
3:T:6:THR:CG2	3:T:93:LEU:HD22	2.20	0.69
1:H:235:ILE:O	1:H:239:GLN:HG3	1.93	0.68
2:L:77:GLU:HG2	3:T:61:ASP:OD2	1.95	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:T:194:PRO:HA	3:T:200:ARG:NH1	2.11	0.65
1:H:166:GLN:O	1:H:170:GLN:HG3	1.98	0.64
1:H:46:LEU:HD22	1:H:68:LEU:HD22	1.78	0.64
3:T:118:GLN:HG3	3:T:123:VAL:HG22	1.82	0.62
3:T:111:PRO:HG2	3:T:205:SER:HB3	1.82	0.61
3:T:116:PHE:HA	3:T:124:ASN:O	2.00	0.61
3:T:159:LYS:HZ3	3:T:162:SER:HB2	1.64	0.60
3:T:194:PRO:HA	3:T:200:ARG:HH11	1.67	0.60
3:T:76:PHE:HD1	3:T:94:TYR:HB3	1.67	0.59
3:T:47:SER:HB3	3:T:50:PHE:CE1	2.37	0.59
2:L:108:THR:OG1	2:L:109:LYS:N	2.37	0.58
2:L:33:ASP:OD1	2:L:36:ARG:HG3	2.05	0.57
1:H:46:LEU:HD22	1:H:68:LEU:CD2	2.34	0.57
1:H:62:ARG:C	1:H:63:ASN:HD22	2.14	0.56
1:H:32:LEU:HD21	1:H:34:LEU:HD21	1.86	0.56
1:H:134:ARG:O	1:H:161:PRO:HA	2.06	0.56
3:T:63:ILE:HD12	3:T:63:ILE:C	2.31	0.55
2:L:110:ARG:HD2	2:L:110:ARG:C	2.31	0.55
2:L:48:ASP:OD2	2:L:48:ASP:C	2.49	0.55
3:T:136:ARG:CG	3:T:141:LEU:HD11	2.34	0.55
1:H:50:ILE:HG22	1:H:111:PRO:HB3	1.88	0.55
1:H:68:LEU:HD13	1:H:112:VAL:HG11	1.89	0.55
3:T:136:ARG:O	3:T:139:THR:HG22	2.07	0.54
3:T:123:VAL:HG21	3:T:210:MET:HE1	1.89	0.54
3:T:151:LEU:HD12	3:T:192:VAL:O	2.08	0.54
3:T:108:LEU:HD21	3:T:193:ILE:CD1	2.38	0.54
1:H:35:VAL:HG22	1:H:41:LEU:HB2	1.90	0.53
1:H:126:ARG:NH1	1:H:233:GLN:NE2	2.56	0.53
3:T:192:VAL:HG13	3:T:201:LYS:HG2	1.90	0.53
1:H:202:HIS:HB2	1:H:207:TRP:CH2	2.43	0.53
3:T:47:SER:HB3	3:T:50:PHE:HE1	1.74	0.52
3:T:159:LYS:HG2	3:T:185:TYR:CE1	2.43	0.52
1:H:35:VAL:HG13	1:H:64:LEU:CD1	2.39	0.52
1:H:164:MET:CE	3:T:91:GLU:HB3	2.41	0.51
3:T:18:ASN:O	3:T:19:PHE:HB2	2.11	0.51
3:T:45:TRP:HH2	3:T:72:LEU:HD12	1.76	0.51
2:L:49:GLN:HG2	2:L:67:SER:N	2.25	0.51
1:H:37:ASN:ND2	1:H:63:ASN:OD1	2.44	0.51
2:L:13:LEU:HA	2:L:30:ILE:HD13	1.93	0.51
3:T:76:PHE:CD1	3:T:94:TYR:HB3	2.46	0.50
3:T:159:LYS:NZ	3:T:162:SER:HB2	2.26	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:170(C):ARG:HD3	9:H:2128:HOH:O	2.12	0.50
3:T:76:PHE:HD1	3:T:94:TYR:CB	2.23	0.50
3:T:110:GLN:HG3	3:T:203:THR:HG23	1.94	0.50
1:H:126:ARG:HH11	1:H:233:GLN:HE22	1.61	0.49
3:T:26:GLU:HB3	3:T:27:PRO:HA	1.95	0.49
3:T:155:LEU:O	3:T:167:THR:HA	2.13	0.49
3:T:193:ILE:O	3:T:196:ARG:HB2	2.13	0.49
1:H:35:VAL:HG11	1:H:60(B):ILE:CD1	2.40	0.48
3:T:126:THR:HG23	3:T:174:GLU:HG2	1.93	0.48
3:T:170:THR:HG22	3:T:175:PHE:CE2	2.48	0.48
2:L:48:ASP:OD2	2:L:50:CYS:HB2	2.13	0.48
1:H:256:PHE:HA	1:H:257:PRO:C	2.38	0.48
2:L:137:LYS:O	2:L:139:PRO:HD3	2.13	0.48
1:H:202:HIS:HB2	1:H:207:TRP:CZ3	2.48	0.48
2:L:129:PRO:HB3	2:L:134:PRO:HG3	1.96	0.48
1:H:89:ILE:HG21	1:H:241:LEU:HD13	1.95	0.47
1:H:101:HIS:HA	1:H:234:TYR:OH	2.14	0.47
3:T:63:ILE:HD12	3:T:64:VAL:N	2.30	0.47
3:T:103:TYR:OH	3:T:150:ASP:OD1	2.21	0.47
2:L:62:LYS:HD2	2:L:63:ASP:N	2.29	0.46
1:H:126:ARG:NH1	1:H:233:GLN:HE22	2.11	0.46
2:L:16:CGU:O	2:L:22:CYS:HB3	2.15	0.46
3:T:157:TYR:CE1	3:T:177:ILE:HD12	2.50	0.46
1:H:141:TRP:O	1:H:151:THR:HB	2.16	0.46
1:H:76:HIS:HB3	9:H:2048:HOH:O	2.15	0.46
1:H:35:VAL:CG1	1:H:64:LEU:HD13	2.45	0.45
1:H:119:VAL:HG13	1:H:120:PRO:HD2	1.99	0.45
3:T:108:LEU:HD21	3:T:193:ILE:HD12	1.97	0.45
2:L:48:ASP:OD2	2:L:50:CYS:N	2.41	0.45
2:L:82:GLU:OE1	2:L:82:GLU:N	2.39	0.45
2:L:13:LEU:HA	2:L:30:ILE:CD1	2.47	0.44
1:H:199:HIS:HB3	1:H:211:GLY:CA	2.47	0.44
1:H:45:THR:OG1	1:H:198:PRO:HB3	2.16	0.44
1:H:35:VAL:HG13	1:H:64:LEU:HD13	1.98	0.44
2:L:91:CYS:SG	2:L:102:CYS:C	3.01	0.44
1:H:90:ILE:HG23	1:H:91:PRO:HD2	2.01	0.43
2:L:79:ARG:NH1	3:T:24:GLU:OE1	2.48	0.43
3:T:158:TRP:CE2	3:T:186:CYS:HB2	2.53	0.43
1:H:35:VAL:CG1	1:H:60(B):ILE:HD12	2.43	0.43
3:T:38:ILE:HG12	3:T:39:SER:N	2.33	0.43
3:T:116:PHE:CD1	3:T:116:PHE:N	2.86	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:L:4:PHE:CE2	2:L:5:LEU:HG	2.53	0.43
2:L:25:CGU:OE22	2:L:25:CGU:HA	2.18	0.43
2:L:49:GLN:N	2:L:49:GLN:CD	2.77	0.43
3:T:157:TYR:HB3	3:T:187:PHE:HD1	1.84	0.43
1:H:239:GLN:NE2	9:H:2170:HOH:O	2.53	0.42
1:H:34:LEU:HD23	1:H:40:GLN:HA	2.00	0.42
1:H:82:SER:C	1:H:83:ARG:HG2	2.45	0.42
1:H:162:ARG:C	1:H:163:LEU:HD12	2.44	0.42
3:T:91:GLU:HA	3:T:92:PRO:HD3	1.87	0.42
2:L:66:GLN:O	2:L:67:SER:HB3	2.20	0.42
3:T:71:TYR:CD1	3:T:71:TYR:N	2.88	0.42
3:T:118:GLN:HG3	3:T:123:VAL:CG2	2.49	0.41
2:L:121:LEU:HD12	2:L:126:SER:HB2	2.03	0.41
1:H:181:PHE:CD2	1:H:181:PHE:C	2.99	0.41
2:L:85:LYS:HE2	3:T:61:ASP:OD2	2.21	0.41
1:H:253:ARG:NH2	9:H:2173:HOH:O	2.41	0.41
3:T:147:PHE:O	3:T:148:GLY:C	2.63	0.41
1:H:184:TYR:CD1	1:H:188(A):LYS:HB2	2.55	0.41
3:T:37:GLN:HA	3:T:46:LYS:O	2.21	0.41
1:H:27:CYS:N	1:H:28:PRO:CD	2.84	0.40
1:H:87:GLN:HE22	1:H:247:ARG:H	1.70	0.40
3:T:48:LYS:HB3	3:T:48:LYS:HE3	1.86	0.40
2:L:4:PHE:CZ	2:L:5:LEU:HG	2.57	0.40
1:H:170(C):ARG:HD2	1:H:223:GLY:HA3	2.02	0.40
2:L:28:ARG:NH1	2:L:29:CGU:OE11	2.54	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	H	247/254 (97%)	235 (95%)	11 (4%)	1 (0%)	30 49

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	L	131/142 (92%)	120 (92%)	11 (8%)	0	100	100
3	T	180/210 (86%)	168 (93%)	12 (7%)	0	100	100
All	All	558/606 (92%)	523 (94%)	34 (6%)	1 (0%)	43	63

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	H	149	GLY

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	H	214/216 (99%)	207 (97%)	7 (3%)	33	61
2	L	115/115 (100%)	113 (98%)	2 (2%)	53	78
3	T	177/193 (92%)	174 (98%)	3 (2%)	53	78
All	All	506/524 (97%)	494 (98%)	12 (2%)	43	70

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

Mol	Chain	Res	Type
1	H	35	VAL
1	H	50	ILE
1	H	64	LEU
1	H	68	LEU
1	H	100	ASN
1	H	124	PRO
1	H	217	GLN
2	L	74	PRO
2	L	86	ASP
3	T	27	PRO
3	T	116	PHE
3	T	149	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	H	37	ASN
1	H	40	GLN
1	H	60(D)	ASN
1	H	63	ASN
1	H	87	GLN
1	H	100	ASN
1	H	159	ASN
1	H	202	HIS
1	H	233	GLN
1	H	239	GLN
2	L	56	GLN
2	L	80	ASN
2	L	84	HIS
3	T	114	GLN
3	T	199	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

9 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	$\# Z > 2$
2	CGU	L	7	2,5	9,11,12	1.37	1 (11%)	10,14,16	1.01	0
2	CGU	L	16	2,5	9,11,12	1.09	0	10,14,16	0.89	0
2	CGU	L	19	2,5	9,11,12	1.45	2 (22%)	10,14,16	1.20	0
2	CGU	L	20	2,5	9,11,12	1.27	1 (11%)	10,14,16	1.06	1 (10%)
2	CGU	L	29	2,5	9,11,12	1.24	0	10,14,16	1.48	1 (10%)
2	CGU	L	26	2,5	9,11,12	1.28	0	10,14,16	1.22	1 (10%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	CGU	L	6	2,5	9,11,12	1.66	1 (11%)	10,14,16	1.05	1 (10%)
2	CGU	L	14	2,5	9,11,12	1.89	1 (11%)	10,14,16	1.31	2 (20%)
2	CGU	L	25	2,5	9,11,12	1.43	1 (11%)	10,14,16	0.97	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	CGU	L	7	2,5	-	3/13/14/16	-
2	CGU	L	16	2,5	-	5/13/14/16	-
2	CGU	L	19	2,5	-	2/13/14/16	-
2	CGU	L	20	2,5	-	0/13/14/16	-
2	CGU	L	29	2,5	-	0/13/14/16	-
2	CGU	L	26	2,5	-	2/13/14/16	-
2	CGU	L	6	2,5	-	4/13/14/16	-
2	CGU	L	14	2,5	-	4/13/14/16	-
2	CGU	L	25	2,5	-	0/13/14/16	-

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	L	14	CGU	CG-CD2	-4.82	1.46	1.52
2	L	6	CGU	CG-CD2	3.27	1.56	1.52
2	L	19	CGU	CG-CD2	2.71	1.55	1.52
2	L	25	CGU	CG-CD2	2.61	1.55	1.52
2	L	7	CGU	CG-CD1	2.58	1.55	1.52
2	L	19	CGU	OE22-CD2	-2.16	1.23	1.30
2	L	20	CGU	CG-CD2	2.16	1.54	1.52

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	L	29	CGU	CB-CG-CD2	-3.46	106.09	113.11
2	L	14	CGU	OE21-CD2-CG	-2.76	110.96	120.19
2	L	26	CGU	CB-CG-CD2	-2.50	108.02	113.11
2	L	14	CGU	OE22-CD2-OE21	2.19	129.06	124.08
2	L	20	CGU	CB-CG-CD1	-2.18	108.68	113.11
2	L	6	CGU	OE22-CD2-OE21	-2.15	119.20	124.08

There are no chirality outliers.

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	L	6	CGU	CA-CB-CG-CD1
2	L	6	CGU	CA-CB-CG-CD2
2	L	16	CGU	O-C-CA-CB
2	L	16	CGU	OE22-CD2-CG-CD1
2	L	7	CGU	OE21-CD2-CG-CB
2	L	7	CGU	OE22-CD2-CG-CB
2	L	16	CGU	OE21-CD2-CG-CB
2	L	16	CGU	OE22-CD2-CG-CB
2	L	26	CGU	OE21-CD2-CG-CB
2	L	26	CGU	OE22-CD2-CG-CB
2	L	7	CGU	OE11-CD1-CG-CD2
2	L	16	CGU	OE21-CD2-CG-CD1
2	L	6	CGU	OE21-CD2-CG-CB
2	L	14	CGU	OE11-CD1-CG-CB
2	L	14	CGU	OE12-CD1-CG-CB
2	L	19	CGU	OE11-CD1-CG-CB
2	L	19	CGU	OE12-CD1-CG-CB
2	L	6	CGU	OE22-CD2-CG-CD1
2	L	14	CGU	OE11-CD1-CG-CD2
2	L	14	CGU	OE12-CD1-CG-CD2

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	L	16	CGU	1	0
2	L	29	CGU	1	0
2	L	25	CGU	1	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 13 ligands modelled in this entry, 9 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
6	CAC	H	1260	-	2,4,4	0.55	0	4,6,6	1.10	0
8	BGC	L	1161	2	11,11,12	0.93	0	15,15,17	2.25	6 (40%)
7	FUC	L	1143	2	10,10,11	1.29	2 (20%)	14,14,16	1.26	1 (7%)
4	771	H	1258	-	34,34,34	1.56	3 (8%)	43,47,47	1.49	5 (11%)

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
8	BGC	L	1161	2	-	0/2/19/22	0/1/1/1
7	FUC	L	1143	2	-	-	0/1/1/1
4	771	H	1258	-	-	5/21/21/21	0/3/3/3

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	H	1258	771	S1-N4	6.14	1.71	1.63
7	L	1143	FUC	C2-C3	2.60	1.56	1.52
4	H	1258	771	C3-C2	2.24	1.42	1.39
4	H	1258	771	C14-C9	2.21	1.43	1.40
7	L	1143	FUC	O3-C3	2.19	1.48	1.43

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	H	1258	771	C2-C1-N2	6.10	127.27	118.01
8	L	1161	BGC	C1-O5-C5	-5.57	104.72	112.19
8	L	1161	BGC	O5-C1-C2	3.27	118.60	110.79
4	H	1258	771	C23-O2-C11	2.98	121.89	117.51
4	H	1258	771	O4-S1-O5	-2.90	114.99	118.87
4	H	1258	771	O4-S1-N4	2.59	112.28	107.10
7	L	1143	FUC	O4-C4-C3	-2.57	104.32	110.38
8	L	1161	BGC	C3-C4-C5	-2.52	105.66	110.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	H	1258	771	C22-S1-N4	-2.49	103.77	106.56
8	L	1161	BGC	O5-C5-C6	2.37	112.27	107.66
8	L	1161	BGC	C2-C3-C4	-2.23	106.94	110.86
8	L	1161	BGC	O3-C3-C2	2.16	114.47	110.05

There are no chirality outliers.

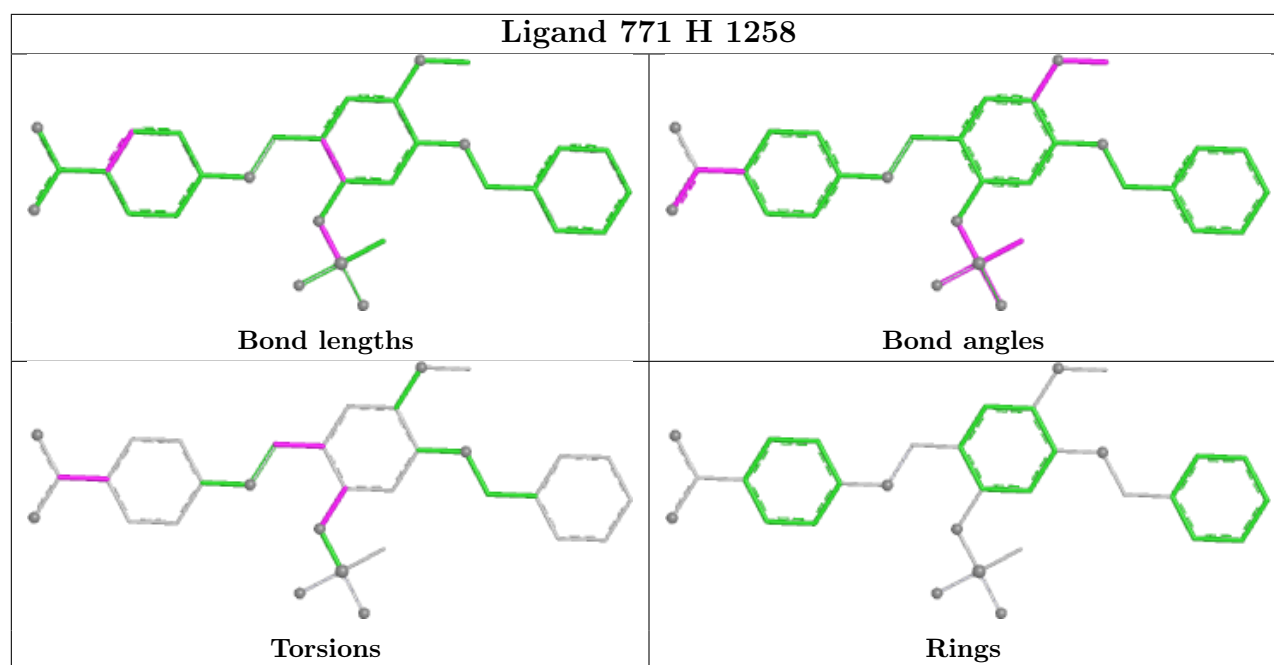
All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	H	1258	771	N3-C8-C9-C14
4	H	1258	771	N3-C8-C9-C10
4	H	1258	771	C9-C14-N4-S1
4	H	1258	771	C13-C14-N4-S1
4	H	1258	771	N2-C1-C2-C7

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	H	251/254 (98%)	-0.68	1 (0%) 88 86	6, 13, 31, 43	11 (4%)
2	L	133/142 (93%)	-0.14	1 (0%) 82 80	12, 26, 44, 52	10 (7%)
3	T	188/210 (89%)	-0.26	3 (1%) 70 67	11, 22, 45, 54	18 (9%)
All	All	572/606 (94%)	-0.42	5 (0%) 81 78	6, 19, 41, 54	39 (6%)

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	L	4	PHE	2.5
1	H	170(H)	SER	2.4
3	T	28	LYS	2.4
3	T	136	ARG	2.3
3	T	156	TYR	2.1

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
2	CGU	L	25	12/13	0.87	0.11	24,34,36,37	0
2	CGU	L	6	12/13	0.89	0.11	28,34,39,41	0
2	CGU	L	19	12/13	0.91	0.08	31,35,38,38	0
2	CGU	L	7	12/13	0.92	0.09	28,32,33,33	0
2	CGU	L	29	12/13	0.92	0.09	31,34,38,40	0
2	CGU	L	14	12/13	0.94	0.07	31,35,37,38	0
2	CGU	L	20	12/13	0.95	0.07	31,32,35,36	0
2	CGU	L	26	12/13	0.96	0.07	24,26,29,32	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	CGU	L	16	12/13	0.96	0.06	20,24,27,28	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

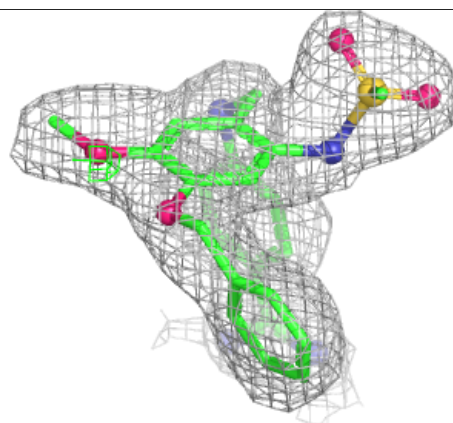
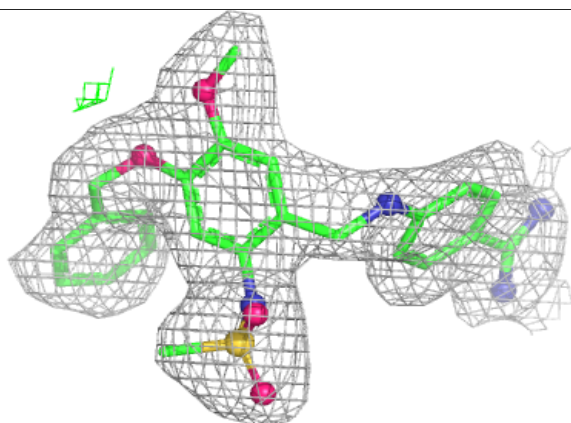
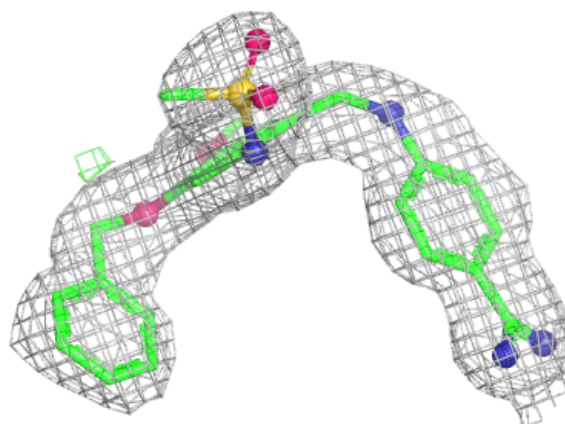
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
8	BGC	L	1161	11/12	0.88	0.11	33,34,38,42	0
6	CAC	H	1260	5/5	0.92	0.23	50,51,52,52	5
5	CA	L	1160	1/1	0.94	0.07	56,56,56,56	0
5	CA	L	1157	1/1	0.94	0.06	23,23,23,23	0
7	FUC	L	1143	10/11	0.94	0.06	28,29,31,34	0
5	CA	L	1158	1/1	0.94	0.04	46,46,46,46	0
4	771	H	1258	32/32	0.97	0.06	10,22,32,33	0
5	CA	L	1154	1/1	0.97	0.03	36,36,36,36	0
5	CA	H	1259	1/1	0.98	0.08	34,34,34,34	0
5	CA	L	1156	1/1	0.99	0.03	21,21,21,21	0
5	CA	L	1153	1/1	0.99	0.04	34,34,34,34	0
5	CA	L	1155	1/1	0.99	0.02	34,34,34,34	0
5	CA	L	1159	1/1	0.99	0.02	35,35,35,35	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 771 H 1258:

$2mF_o-DF_c$ (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.