



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 7, 2024 – 11:23 PM EST

PDB ID : 8V1L  
Title : Crystal structure of the NTF2L domain of human G3BP1 in complex with small molecule  
Authors : Hughes, M.P.; Taylor, J.P.  
Deposited on : 2023-11-20  
Resolution : 2.68 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](mailto: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>.

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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

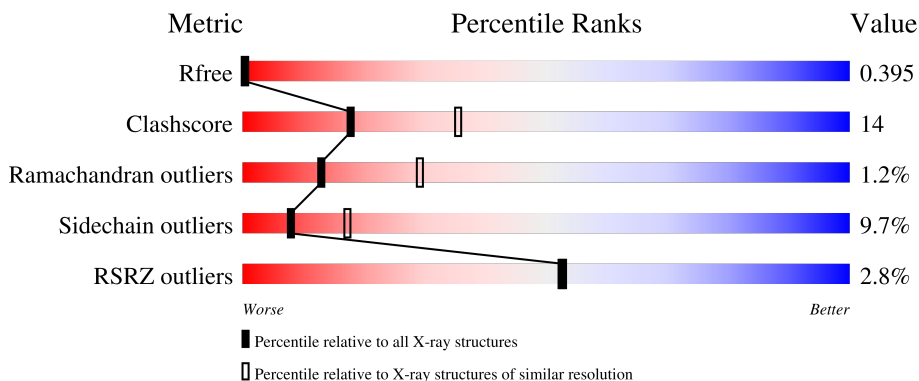
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.68 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.



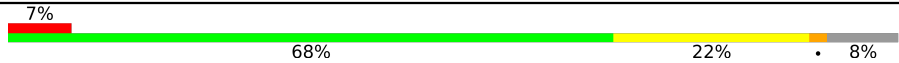
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	3863 (2.70-2.66)
Clashscore	141614	4210 (2.70-2.66)
Ramachandran outliers	138981	4141 (2.70-2.66)
Sidechain outliers	138945	4141 (2.70-2.66)
RSRZ outliers	127900	3780 (2.70-2.66)

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  $\geq 3$ , 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	139	 4% 53% 35% 9%
1	B	139	 % 71% 24% . .
1	C	139	 % 63% 23% 5% 9%
1	D	139	 60% 29% . 8%
1	E	139	 2% 61% 32% . .

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Mol	Chain	Length	Quality of chain
1	F	139	 <p>A horizontal bar chart representing the quality of the chain. The bar is divided into four segments: a small red segment at the beginning labeled '7%', a large green segment labeled '68%', a yellow segment labeled '22%', and a small grey segment at the end labeled '8%'.</p>

## 2 Entry composition [i](#)

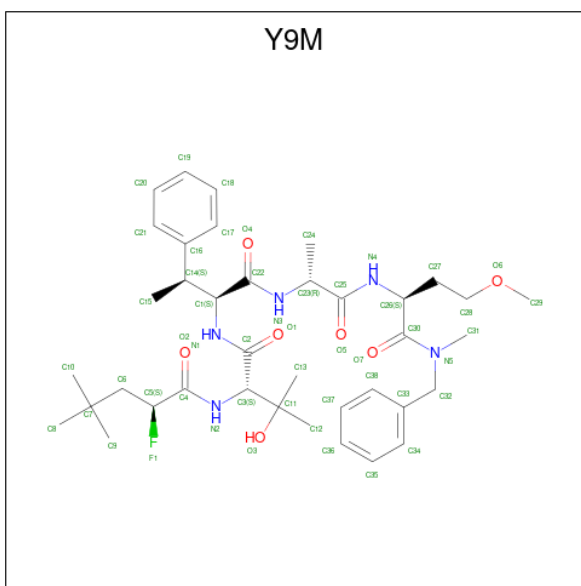
There are 3 unique types of molecules in this entry. The entry contains 6490 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Ras GTPase-activating protein-binding protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	126	Total 1004	C 641	N 179	O 178	S 6	0	1	0
1	B	133	Total 1044	C 661	N 188	O 190	S 5	0	1	0
1	C	127	Total 1010	C 647	N 179	O 179	S 5	0	2	0
1	D	128	Total 1013	C 641	N 182	O 185	S 5	0	0	0
1	E	134	Total 1023	C 650	N 181	O 187	S 5	0	2	0
1	F	128	Total 1013	C 645	N 184	O 178	S 6	0	2	0

- Molecule 2 is N-[(2S)-2-fluoro-4,4-dimethylpentanoyl]-3-hydroxy-L-valyl-(betaS)-beta-methyl-L-phenylalanyl-D-alanyl-N-benzyl-N,O-dimethyl-L-homoserinamide (three-letter code: Y9M) (formula: C<sub>38</sub>H<sub>56</sub>FN<sub>5</sub>O<sub>7</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	F	N	O	0	0
			51	38	1	5	7		
2	B	1	Total	C	F	N	O	0	0
			48	36	1	5	6		
2	C	1	Total	C	F	N	O	0	0
			45	32	1	5	7		
2	D	1	Total	C	F	N	O	0	0
			51	38	1	5	7		
2	E	1	Total	C	F	N	O	0	0
			45	32	1	5	7		
2	F	1	Total	C	F	N	O	0	0
			51	38	1	5	7		

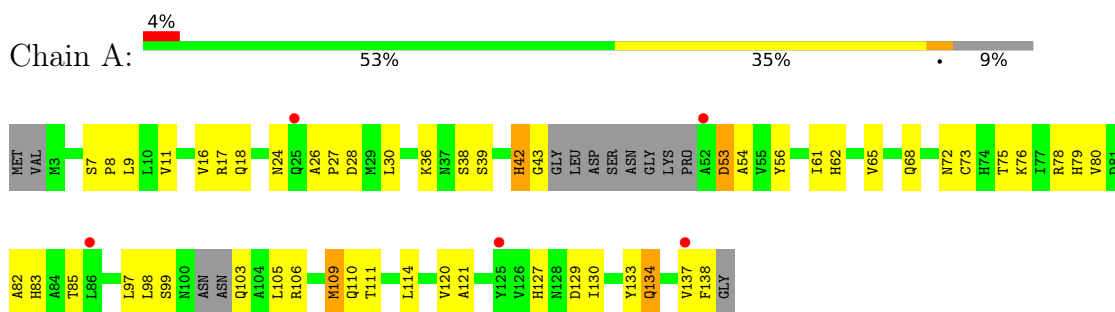
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	6	Total	O	0	0
			6	6		
3	B	10	Total	O	0	0
			10	10		
3	C	11	Total	O	0	0
			11	11		
3	D	16	Total	O	0	0
			16	16		
3	E	21	Total	O	0	0
			21	21		
3	F	28	Total	O	0	0
			28	28		

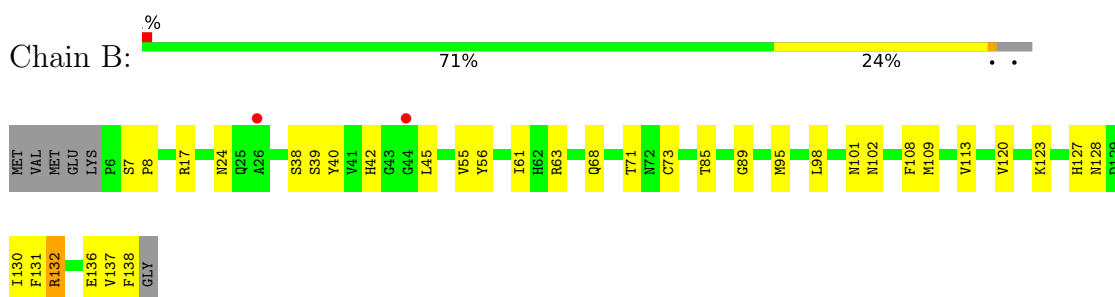
### 3 Residue-property plots [i](#)

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.

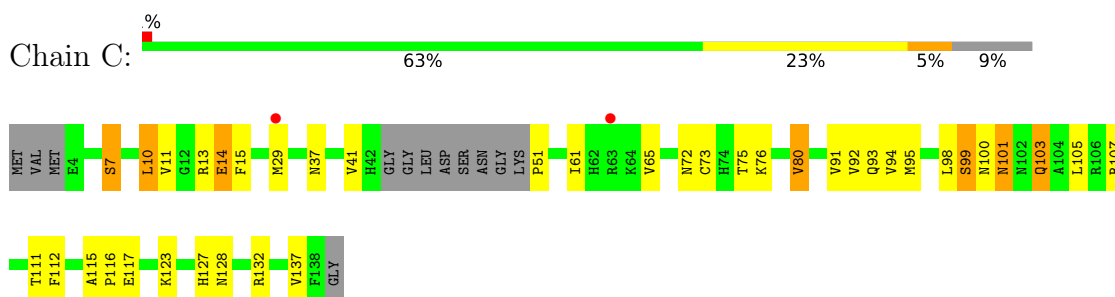
- Molecule 1: Ras GTPase-activating protein-binding protein 1



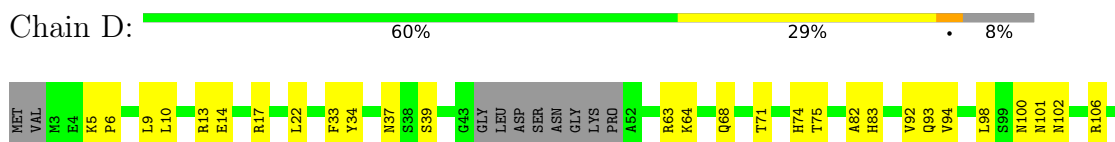
- Molecule 1: Ras GTPase-activating protein-binding protein 1



- Molecule 1: Ras GTPase-activating protein-binding protein 1

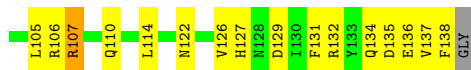
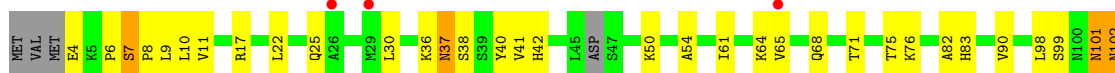


- Molecule 1: Ras GTPase-activating protein-binding protein 1

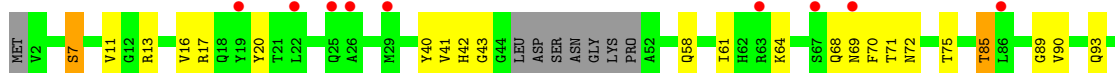




- Molecule 1: Ras GTPase-activating protein-binding protein 1



- Molecule 1: Ras GTPase-activating protein-binding protein 1



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	52.17Å 84.69Å 102.15Å 90.00° 91.26° 90.00°	Depositor
Resolution (Å)	46.87 – 2.68 46.87 – 2.68	Depositor EDS
% Data completeness (in resolution range)	96.5 (46.87-2.68) 96.5 (46.87-2.68)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.27 (at 2.69Å)	Xtrriage
Refinement program	REFMAC 5.8.0352	Depositor
R, $R_{free}$	0.276 , 0.395 0.278 , 0.395	Depositor DCC
$R_{free}$ test set	1165 reflections (4.80%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	39.6	Xtrriage
Anisotropy	0.098	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 49.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.000 for h,-k,-l	Xtrriage
$F_o, F_c$ correlation	0.87	EDS
Total number of atoms	6490	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	38.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 31.35 % 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 1.1232e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: Y9M

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	0.30	0/1030	0.66	0/1394
1	B	0.32	0/1073	0.67	0/1455
1	C	0.31	0/1041	0.66	0/1413
1	D	0.32	0/1037	0.64	0/1407
1	E	0.31	0/1054	0.64	0/1432
1	F	0.31	0/1039	0.64	0/1405
All	All	0.31	0/6274	0.65	0/8506

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	1
1	D	0	1
1	E	0	1
1	F	0	1
All	All	0	6

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	17	ARG	Sidechain
1	A	78	ARG	Sidechain

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Mol	Chain	Res	Type	Group
1	B	17	ARG	Sidechain
1	D	63	ARG	Sidechain
1	E	50	LYS	Peptide
1	F	13	ARG	Sidechain

## 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	1004	0	949	36	0
1	B	1044	0	978	29	0
1	C	1010	0	956	32	0
1	D	1013	0	940	33	0
1	E	1023	0	928	29	1
1	F	1013	0	954	20	1
2	A	51	0	0	1	0
2	B	48	0	0	0	0
2	C	45	0	0	3	0
2	D	51	0	0	1	0
2	E	45	0	0	1	0
2	F	51	0	0	3	0
3	A	6	0	0	2	0
3	B	10	0	0	0	0
3	C	11	0	0	1	0
3	D	16	0	0	2	0
3	E	21	0	0	3	0
3	F	28	0	0	3	0
All	All	6490	0	5705	165	1

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 14.

All (165) 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:F:17:ARG:NH2	3:F:301:HOH:O	1.93	1.00

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:103:GLN:HE21	1:C:103:GLN:HA	1.40	0.85
1:E:6:PRO:CD	1:E:122:ASN:HD21	1.97	0.78
1:A:99:SER:HB2	1:A:103:GLN:O	1.84	0.77
1:A:42:HIS:CG	1:A:68:GLN:HE22	2.05	0.74
1:D:14:GLU:OE1	1:D:17:ARG:NH2	2.20	0.73
1:D:137:VAL:HG12	1:D:137:VAL:O	1.89	0.71
1:D:137:VAL:O	1:D:137:VAL:CG1	2.41	0.69
1:C:103:GLN:HE21	1:C:103:GLN:CA	2.06	0.68
1:F:93:GLN:O	3:F:302:HOH:O	2.11	0.68
1:F:7:SER:O	1:F:11:VAL:HG23	1.94	0.68
1:A:61:ILE:O	1:A:65:VAL:HG23	1.94	0.66
1:C:101:ASN:OD1	1:E:25:GLN:NE2	2.29	0.66
1:D:9:LEU:HB2	3:D:312:HOH:O	1.98	0.64
1:A:99:SER:CB	1:A:103:GLN:O	2.46	0.62
1:E:22:LEU:HD23	1:E:30:LEU:HD12	1.82	0.61
1:C:103:GLN:HA	1:C:103:GLN:NE2	2.14	0.61
1:E:7:SER:O	1:E:11:VAL:HG23	2.00	0.61
1:A:130:ILE:HG22	1:C:93:GLN:NE2	2.15	0.61
1:B:40:TYR:HB3	1:B:61:ILE:HG12	1.84	0.60
1:E:10:LEU:CB	3:E:310:HOH:O	2.50	0.60
1:C:123:LYS:NZ	2:C:201:Y9M:O5	2.32	0.59
1:D:115:ALA:HB3	1:D:125:TYR:CE1	2.38	0.59
1:A:97:LEU:HB3	1:A:105:LEU:HB3	1.85	0.59
1:F:61:ILE:HG23	3:F:308:HOH:O	2.03	0.59
1:B:71:THR:OG1	1:B:101:ASN:OD1	2.21	0.58
1:D:132:ARG:NH1	1:D:136:GLU:OE1	2.37	0.57
1:E:110:GLN:NE2	1:E:129:ASP:OD1	2.37	0.57
1:E:37:ASN:ND2	1:E:127:HIS:CE1	2.73	0.57
1:B:85:THR:HG22	1:B:89:GLY:C	2.25	0.56
1:C:123:LYS:HG3	2:C:201:Y9M:O3	2.05	0.56
1:A:26:ALA:HA	3:A:302:HOH:O	2.06	0.56
1:E:101:ASN:O	1:E:102:ASN:CB	2.55	0.55
1:D:22:LEU:HD23	1:D:33:PHE:CZ	2.42	0.55
1:D:64:LYS:C	1:D:68:GLN:HE21	2.09	0.55
1:D:132:ARG:HH11	1:D:132:ARG:HA	1.70	0.55
1:A:42:HIS:O	1:A:43:GLY:C	2.44	0.55
1:A:134:GLN:HA	1:C:95:MET:CE	2.38	0.54
1:D:134:GLN:HG2	1:D:138:PHE:CD2	2.43	0.54
1:D:123:LYS:NZ	2:D:201:Y9M:O5	2.25	0.54
1:E:38:SER:HA	1:E:127:HIS:O	2.08	0.54
1:A:79:HIS:CD2	1:A:80:VAL:N	2.76	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:98[A]:LEU:HD23	1:C:99:SER:N	2.24	0.53
1:C:98[B]:LEU:HD23	1:C:99:SER:N	2.24	0.53
1:E:83:HIS:O	1:E:90:VAL:HG13	2.08	0.53
1:E:114:LEU:CD2	1:E:126:VAL:HG22	2.39	0.53
1:A:138:PHE:CE2	1:C:107:ARG:HG2	2.44	0.53
1:B:95:MET:HE1	1:D:134:GLN:HA	1.92	0.52
1:B:95:MET:CE	1:D:134:GLN:HA	2.40	0.51
1:E:17:ARG:HG2	1:E:17:ARG:HH11	1.74	0.51
1:E:98[A]:LEU:HD23	1:E:99:SER:N	2.26	0.51
1:E:98[B]:LEU:HD23	1:E:99:SER:N	2.26	0.51
1:B:42:HIS:O	1:B:131:PHE:O	2.28	0.51
1:D:74:HIS:NE2	1:D:102:ASN:ND2	2.59	0.51
1:F:68:GLN:O	1:F:70:PHE:N	2.43	0.51
1:A:111:THR:HG23	1:C:111:THR:HG21	1.93	0.51
1:B:38:SER:HA	1:B:127:HIS:O	2.11	0.51
1:B:132:ARG:HH11	1:B:132:ARG:HG3	1.75	0.51
1:E:61:ILE:O	1:E:65:VAL:HG23	2.11	0.51
1:A:39:SER:HB2	1:A:54:ALA:HB1	1.92	0.51
1:E:41:VAL:HG22	1:E:54:ALA:HB2	1.93	0.50
1:B:85:THR:OG1	1:D:113:VAL:HG11	2.11	0.50
1:A:103:GLN:OE1	1:F:132:ARG:NH2	2.43	0.50
2:E:201:Y9M:O6	2:E:201:Y9M:N4	2.44	0.50
1:F:85:THR:HG22	1:F:89:GLY:CA	2.42	0.50
1:B:120:VAL:O	1:B:123:LYS:HB3	2.12	0.50
1:C:7:SER:O	1:C:11:VAL:HG23	2.12	0.49
1:F:123:LYS:NZ	2:F:201:Y9M:O5	2.44	0.49
1:A:9:LEU:HA	1:A:82:ALA:HB3	1.94	0.49
1:E:6:PRO:HD3	1:E:122:ASN:HD21	1.75	0.49
1:D:5:LYS:O	3:D:301:HOH:O	2.18	0.49
1:C:73:CYS:SG	1:C:98[B]:LEU:HD21	2.53	0.48
1:A:134:GLN:HA	1:C:95:MET:HE1	1.95	0.48
1:A:85:THR:HA	1:C:127:HIS:CD2	2.49	0.48
1:A:110:GLN:NE2	1:A:129:ASP:OD1	2.41	0.48
1:B:130:ILE:HG22	1:D:93:GLN:NE2	2.29	0.47
1:C:73:CYS:SG	1:C:98[A]:LEU:HD21	2.53	0.47
1:B:73:CYS:SG	1:B:98[B]:LEU:HD21	2.54	0.47
1:C:103:GLN:CA	1:C:103:GLN:NE2	2.77	0.47
1:E:42:HIS:HA	1:E:131:PHE:HB3	1.96	0.47
1:D:82:ALA:C	1:D:83:HIS:ND1	2.68	0.47
1:F:85:THR:HG22	1:F:89:GLY:C	2.34	0.47
1:B:73:CYS:SG	1:B:98[A]:LEU:HD21	2.54	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:6:PRO:HD2	1:E:122:ASN:HD21	1.79	0.47
1:F:112:PHE:HA	1:F:128:ASN:O	2.15	0.47
1:D:132:ARG:NH2	1:D:136:GLU:OE1	2.48	0.47
1:E:137:VAL:HG12	1:E:138:PHE:N	2.30	0.47
1:B:24:ASN:ND2	1:B:73:CYS:O	2.39	0.46
1:B:113:VAL:HB	1:B:128:ASN:HB2	1.97	0.46
1:B:101:ASN:O	1:B:102:ASN:C	2.53	0.46
1:F:58:GLN:HE22	2:F:201:Y9M:C29	2.28	0.46
1:A:106:ARG:HB2	1:A:133:TYR:CE1	2.51	0.46
2:F:201:Y9M:O6	2:F:201:Y9M:N4	2.49	0.46
1:B:45:LEU:HD21	1:B:136:GLU:HB3	1.98	0.46
1:C:61:ILE:O	1:C:65:VAL:HG23	2.15	0.46
1:A:134:GLN:O	1:A:137:VAL:O	2.34	0.46
1:B:55:VAL:C	1:B:56:TYR:CD1	2.90	0.46
1:B:109:MET:SD	1:D:109:MET:HB3	2.56	0.46
1:A:127:HIS:HD2	1:A:127:HIS:O	2.00	0.45
1:D:94:VAL:O	1:D:109:MET:HA	2.16	0.45
1:E:8:PRO:HA	1:E:11:VAL:HB	1.98	0.45
1:D:118:GLY:O	1:D:119:SER:HB3	2.16	0.45
1:A:75:THR:HG22	1:A:76:LYS:H	1.82	0.45
1:B:42:HIS:CB	1:B:68:GLN:HE22	2.29	0.45
1:D:113:VAL:HG23	1:D:128:ASN:HB2	1.98	0.45
1:B:108:PHE:CG	1:B:131:PHE:CE2	3.05	0.45
1:A:127:HIS:O	1:A:127:HIS:CD2	2.70	0.45
1:F:42[B]:HIS:CG	1:F:68:GLN:OE1	2.70	0.44
1:E:122:ASN:HD22	1:E:122:ASN:HA	1.53	0.44
1:F:16:VAL:O	1:F:20:TYR:HD2	2.00	0.44
1:F:97:LEU:HB3	1:F:105:LEU:HB3	1.99	0.44
1:A:53:ASP:OD1	1:A:53:ASP:N	2.43	0.44
1:D:114:LEU:CD2	1:D:126:VAL:HG22	2.47	0.44
1:D:22:LEU:HD23	1:D:33:PHE:CE2	2.53	0.44
1:E:40:TYR:CB	1:E:61:ILE:HG12	2.48	0.44
1:F:40:TYR:CE1	1:F:64:LYS:HG3	2.53	0.44
1:C:14:GLU:HG2	1:D:10:LEU:HD23	2.00	0.43
1:A:98[A]:LEU:HD23	1:A:133:TYR:OH	2.18	0.43
1:C:7:SER:CB	1:C:10:LEU:HD22	2.48	0.43
1:B:7:SER:HA	1:B:8:PRO:HD3	1.89	0.43
1:B:42:HIS:HB3	1:B:68:GLN:HE22	1.84	0.43
1:C:72:ASN:ND2	3:C:304:HOH:O	2.51	0.43
1:D:109:MET:HG3	1:D:109:MET:O	2.18	0.43
1:D:100:ASN:O	1:D:101:ASN:C	2.57	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:9:LEU:HB2	3:E:314:HOH:O	2.16	0.43
1:A:24:ASN:ND2	1:A:73:CYS:O	2.48	0.43
1:A:27:PRO:HD2	3:A:302:HOH:O	2.19	0.43
1:A:120:VAL:HG12	1:A:121:ALA:O	2.19	0.43
1:B:56:TYR:CD1	1:B:56:TYR:N	2.87	0.43
1:E:134:GLN:O	1:E:138:PHE:HB2	2.18	0.43
1:C:80:VAL:HG22	1:C:94:VAL:HG22	2.01	0.42
1:F:99:SER:CB	1:F:105:LEU:HD23	2.50	0.42
1:F:90:VAL:HB	1:F:114:LEU:HB2	2.00	0.42
1:B:132:ARG:HH12	1:B:136:GLU:HB2	1.84	0.42
1:A:137:VAL:HG12	1:A:138:PHE:N	2.35	0.42
1:E:40:TYR:HB2	1:E:61:ILE:HG12	2.02	0.42
1:A:82:ALA:C	1:A:83:HIS:HD1	2.23	0.42
1:B:95:MET:HB2	1:D:137:VAL:HG11	2.02	0.42
1:A:7:SER:O	1:A:11:VAL:HG23	2.19	0.42
1:C:100:ASN:O	1:C:101:ASN:C	2.58	0.42
1:C:101:ASN:O	1:C:103:GLN:HG2	2.20	0.42
1:C:92:VAL:HG12	1:C:94:VAL:HG23	2.01	0.42
1:F:85:THR:HG22	1:F:89:GLY:HA3	2.01	0.42
1:D:92:VAL:HG12	1:D:94:VAL:HG23	2.02	0.41
1:A:98[B]:LEU:HD23	1:A:133:TYR:OH	2.20	0.41
1:F:71:THR:O	1:F:72:ASN:C	2.58	0.41
1:A:42:HIS:CB	1:A:68:GLN:HE22	2.32	0.41
1:E:75:THR:OG1	3:E:301:HOH:O	2.04	0.41
1:A:114:LEU:HD13	2:A:201:Y9M:C20	2.50	0.41
1:E:9:LEU:HA	1:E:82:ALA:HB3	2.02	0.41
1:C:15:PHE:HA	2:C:201:Y9M:C18	2.51	0.41
1:C:99:SER:CB	1:C:105:LEU:HD23	2.51	0.41
1:D:33:PHE:HB2	1:D:34:TYR:CE1	2.55	0.41
1:B:137:VAL:O	1:B:138:PHE:C	2.59	0.41
1:C:112:PHE:HA	1:C:128:ASN:O	2.20	0.41
1:C:115:ALA:O	1:C:116:PRO:C	2.59	0.40
1:A:38:SER:O	1:A:56:TYR:HA	2.22	0.40
1:A:109:MET:CE	1:C:93:GLN:HG3	2.52	0.40
1:C:98[B]:LEU:HD23	1:C:99:SER:O	2.21	0.40
1:F:134:GLN:HE21	1:F:134:GLN:HB3	1.71	0.40
1:D:17:ARG:HG2	1:D:17:ARG:HH11	1.86	0.40
1:E:64:LYS:O	1:E:68:GLN:HG3	2.21	0.40
1:B:73:CYS:SG	1:B:98[A]:LEU:HD11	2.61	0.40
1:B:73:CYS:SG	1:B:98[B]:LEU:HD11	2.61	0.40
1:D:114:LEU:HD21	1:D:126:VAL:HG22	2.03	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:107:ARG:NH1	1:F:134:GLN:OE1[2_446]	2.06	0.14

## 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	121/139 (87%)	106 (88%)	14 (12%)	1 (1%)	19	40
1	B	132/139 (95%)	115 (87%)	17 (13%)	0	100	100
1	C	125/139 (90%)	113 (90%)	10 (8%)	2 (2%)	9	22
1	D	124/139 (89%)	109 (88%)	12 (10%)	3 (2%)	6	13
1	E	132/139 (95%)	117 (89%)	14 (11%)	1 (1%)	19	40
1	F	124/139 (89%)	109 (88%)	13 (10%)	2 (2%)	9	22
All	All	758/834 (91%)	669 (88%)	80 (11%)	9 (1%)	13	29

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	119	SER
1	E	102	ASN
1	F	69	ASN
1	D	118	GLY
1	C	101	ASN
1	A	8	PRO
1	F	43	GLY
1	C	80	VAL
1	D	6	PRO

### 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	104/121 (86%)	93 (89%)	11 (11%)	6 14
1	B	108/121 (89%)	105 (97%)	3 (3%)	43 70
1	C	105/121 (87%)	89 (85%)	16 (15%)	3 6
1	D	105/121 (87%)	95 (90%)	10 (10%)	8 18
1	E	101/121 (84%)	88 (87%)	13 (13%)	4 9
1	F	103/121 (85%)	96 (93%)	7 (7%)	16 33
All	All	626/726 (86%)	566 (90%)	60 (10%)	8 18

All (60) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	16	VAL
1	A	18	GLN
1	A	28	ASP
1	A	30	LEU
1	A	36	LYS
1	A	42	HIS
1	A	53	ASP
1	A	62	HIS
1	A	72	ASN
1	A	109	MET
1	A	134	GLN
1	B	39	SER
1	B	63	ARG
1	B	132	ARG
1	C	7	SER
1	C	10	LEU
1	C	13	ARG
1	C	14	GLU
1	C	29	MET
1	C	37	ASN
1	C	41	VAL
1	C	51	PRO

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	C	75	THR
1	C	76	LYS
1	C	91	VAL
1	C	99	SER
1	C	103	GLN
1	C	117	GLU
1	C	132	ARG
1	C	137	VAL
1	D	13	ARG
1	D	37	ASN
1	D	39	SER
1	D	71	THR
1	D	75	THR
1	D	98	LEU
1	D	106	ARG
1	D	132	ARG
1	D	134	GLN
1	D	135	ASP
1	E	4	GLU
1	E	7	SER
1	E	36	LYS
1	E	37	ASN
1	E	71	THR
1	E	76	LYS
1	E	101	ASN
1	E	105	LEU
1	E	106	ARG
1	E	107	ARG
1	E	132	ARG
1	E	135	ASP
1	E	136	GLU
1	F	7	SER
1	F	41	VAL
1	F	75	THR
1	F	85	THR
1	F	109	MET
1	F	129	ASP
1	F	134	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (21) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	58	GLN
1	A	68	GLN
1	A	93	GLN
1	A	127	HIS
1	A	134	GLN
1	B	68	GLN
1	C	58	GLN
1	C	72	ASN
1	C	103	GLN
1	D	37	ASN
1	D	58	GLN
1	D	68	GLN
1	D	102	ASN
1	D	127	HIS
1	E	37	ASN
1	E	68	GLN
1	E	122	ASN
1	E	127	HIS
1	E	128	ASN
1	F	122	ASN
1	F	134	GLN

### 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 monosaccharides 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	Y9M	B	201	-	46,49,52	0.27	0	58,70,73	0.97	2 (3%)
2	Y9M	C	201	-	42,45,52	0.37	0	51,64,73	0.83	2 (3%)
2	Y9M	A	201	-	49,52,52	0.29	0	60,73,73	0.88	2 (3%)
2	Y9M	E	201	-	42,45,52	0.26	0	51,64,73	0.57	0
2	Y9M	D	201	-	49,52,52	0.27	0	60,73,73	0.94	3 (5%)
2	Y9M	F	201	-	49,52,52	0.28	0	60,73,73	0.49	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	Y9M	B	201	-	-	14/62/63/67	0/2/2/2
2	Y9M	C	201	-	-	16/62/63/67	0/1/1/2
2	Y9M	A	201	-	-	6/66/67/67	0/2/2/2
2	Y9M	E	201	-	-	7/62/63/67	0/1/1/2
2	Y9M	D	201	-	-	6/66/67/67	0/2/2/2
2	Y9M	F	201	-	-	16/66/67/67	0/2/2/2

There are no bond length outliers.

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	201	Y9M	C7-C6-C5	-5.32	110.12	116.70
2	A	201	Y9M	C7-C6-C5	-5.29	110.15	116.70
2	D	201	Y9M	C7-C6-C5	-3.89	111.89	116.70
2	D	201	Y9M	C12-C11-C3	-3.44	106.19	111.29
2	C	201	Y9M	C13-C11-C3	3.02	115.77	111.29
2	B	201	Y9M	C12-C11-C3	-2.40	107.73	111.29
2	C	201	Y9M	C26-C30-N5	2.19	121.19	118.57
2	A	201	Y9M	C13-C11-C3	-2.01	108.31	111.29
2	D	201	Y9M	C27-C26-C30	2.00	114.79	109.80

There are no chirality outliers.

All (65) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	201	Y9M	C13-C11-C3-C2
2	B	201	Y9M	O3-C11-C3-C2
2	B	201	Y9M	C13-C11-C3-N2
2	B	201	Y9M	O3-C11-C3-N2
2	B	201	Y9M	O7-C30-N5-C32
2	C	201	Y9M	N2-C4-C5-F1
2	C	201	Y9M	O2-C4-C5-F1
2	C	201	Y9M	N4-C26-C27-C28
2	C	201	Y9M	C30-C26-C27-C28
2	C	201	Y9M	C13-C11-C3-C2
2	C	201	Y9M	O3-C11-C3-C2
2	D	201	Y9M	O2-C4-C5-F1
2	D	201	Y9M	N4-C26-C27-C28
2	D	201	Y9M	C30-C26-C27-C28
2	E	201	Y9M	C5-C4-N2-C3
2	F	201	Y9M	N2-C4-C5-F1
2	F	201	Y9M	O2-C4-C5-F1
2	F	201	Y9M	C5-C6-C7-C8
2	F	201	Y9M	C5-C6-C7-C10
2	F	201	Y9M	C5-C6-C7-C9
2	E	201	Y9M	O2-C4-N2-C3
2	E	201	Y9M	C23-C25-N4-C26
2	E	201	Y9M	O5-C25-N4-C26
2	B	201	Y9M	C5-C4-N2-C3
2	A	201	Y9M	C27-C28-O6-C29
2	E	201	Y9M	N4-C26-C27-C28
2	F	201	Y9M	N4-C26-C27-C28
2	C	201	Y9M	C27-C28-O6-C29
2	D	201	Y9M	C27-C28-O6-C29
2	A	201	Y9M	C5-C4-N2-C3
2	D	201	Y9M	C5-C4-N2-C3
2	A	201	Y9M	C26-C27-C28-O6
2	B	201	Y9M	O2-C4-N2-C3
2	C	201	Y9M	O2-C4-N2-C3
2	B	201	Y9M	C12-C11-C3-C2
2	F	201	Y9M	C24-C23-C25-O5
2	C	201	Y9M	C13-C11-C3-N2
2	B	201	Y9M	N3-C23-C25-O5
2	F	201	Y9M	N3-C23-C25-O5
2	C	201	Y9M	C5-C4-N2-C3
2	F	201	Y9M	N1-C1-C14-C16
2	B	201	Y9M	N3-C23-C25-N4

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Mol	Chain	Res	Type	Atoms
2	F	201	Y9M	N3-C23-C25-N4
2	E	201	Y9M	C30-C26-C27-C28
2	F	201	Y9M	C30-C26-C27-C28
2	E	201	Y9M	C11-C3-N2-C4
2	C	201	Y9M	O1-C2-C3-N2
2	C	201	Y9M	N1-C2-C3-N2
2	A	201	Y9M	C27-C26-C30-O7
2	B	201	Y9M	C24-C23-C25-O5
2	C	201	Y9M	C27-C26-C30-N5
2	F	201	Y9M	C24-C23-C25-N4
2	F	201	Y9M	C12-C11-C3-C2
2	F	201	Y9M	C27-C26-C30-O7
2	A	201	Y9M	N5-C32-C33-C38
2	C	201	Y9M	C27-C26-C30-O7
2	D	201	Y9M	C27-C26-C30-O7
2	B	201	Y9M	C30-C26-N4-C25
2	B	201	Y9M	C12-C11-C3-N2
2	F	201	Y9M	C12-C11-C3-N2
2	B	201	Y9M	C24-C23-C25-N4
2	A	201	Y9M	N5-C32-C33-C34
2	C	201	Y9M	N4-C26-C30-O7
2	C	201	Y9M	O3-C11-C3-N2
2	F	201	Y9M	O3-C11-C3-N2

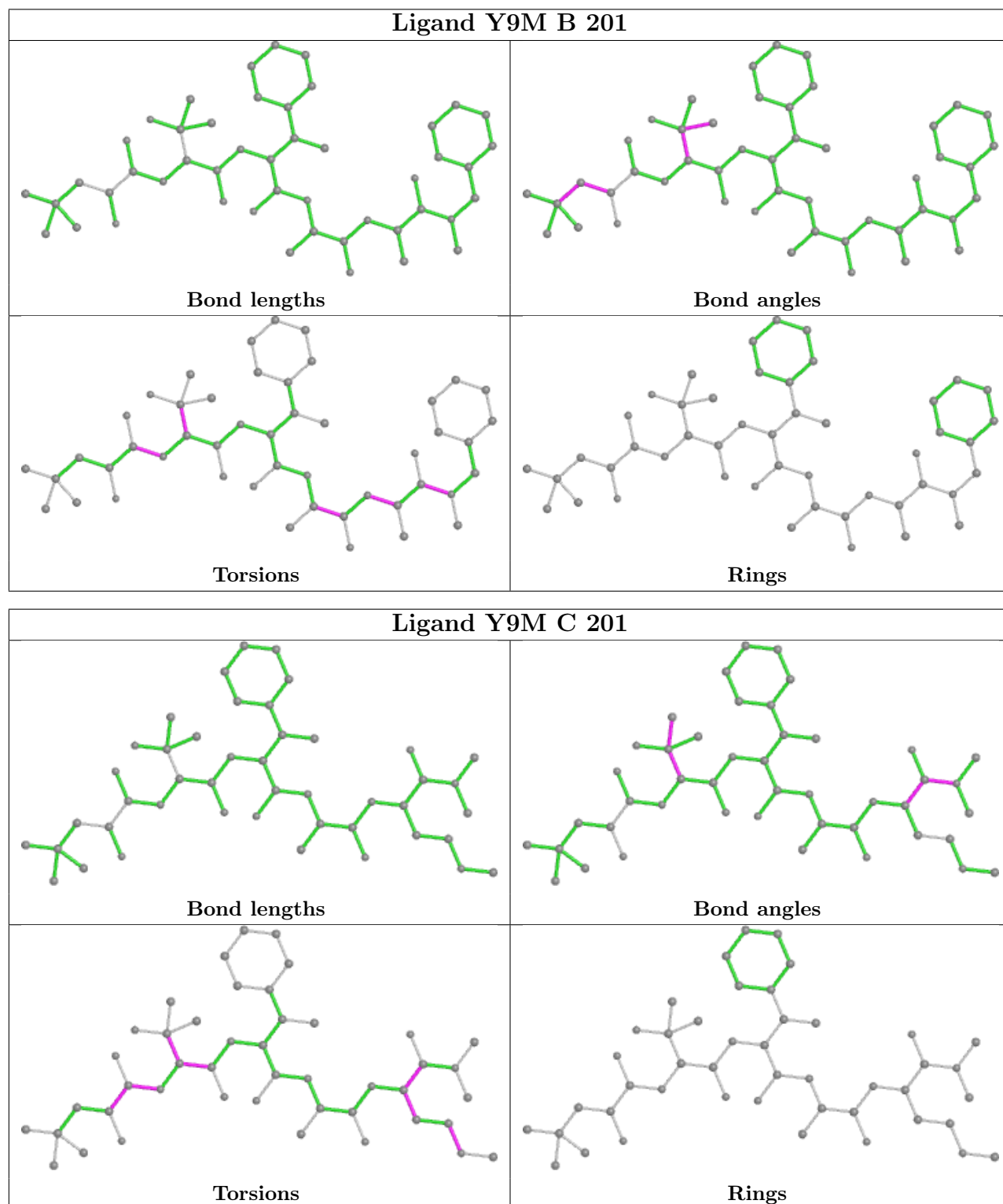
There are no ring outliers.

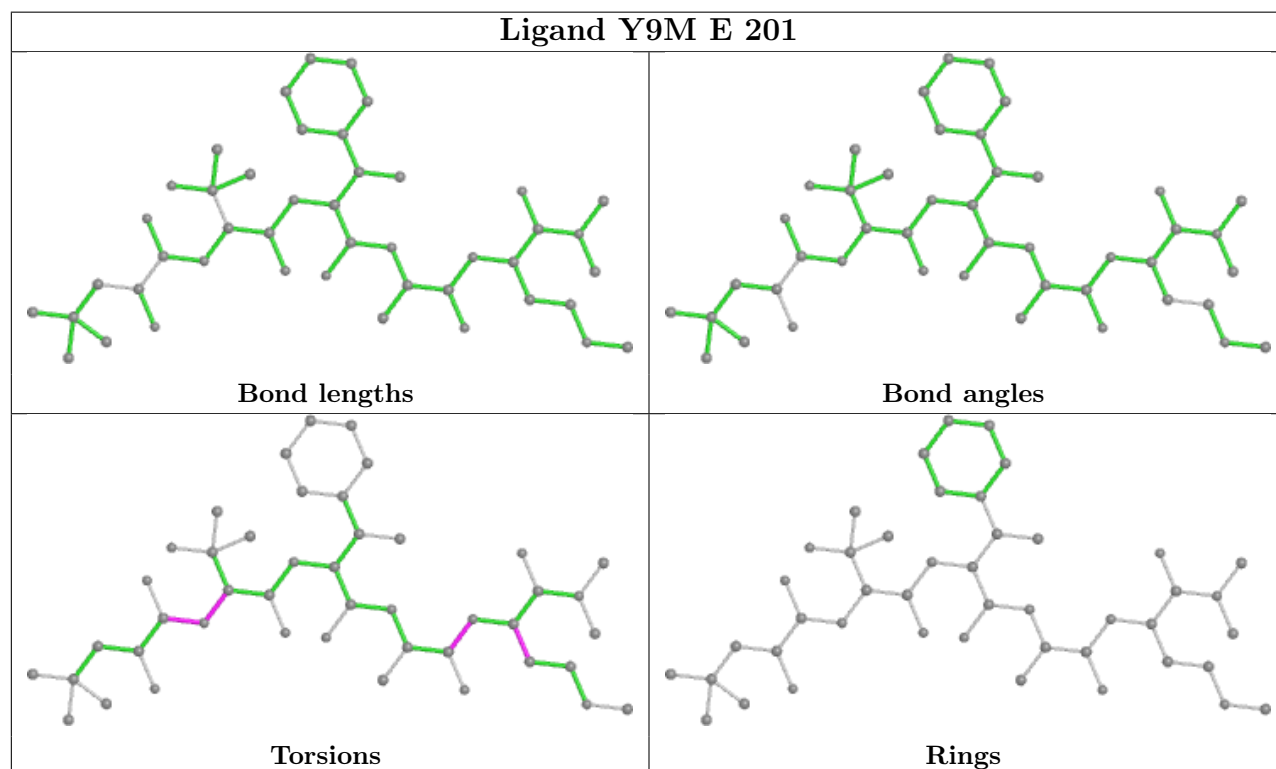
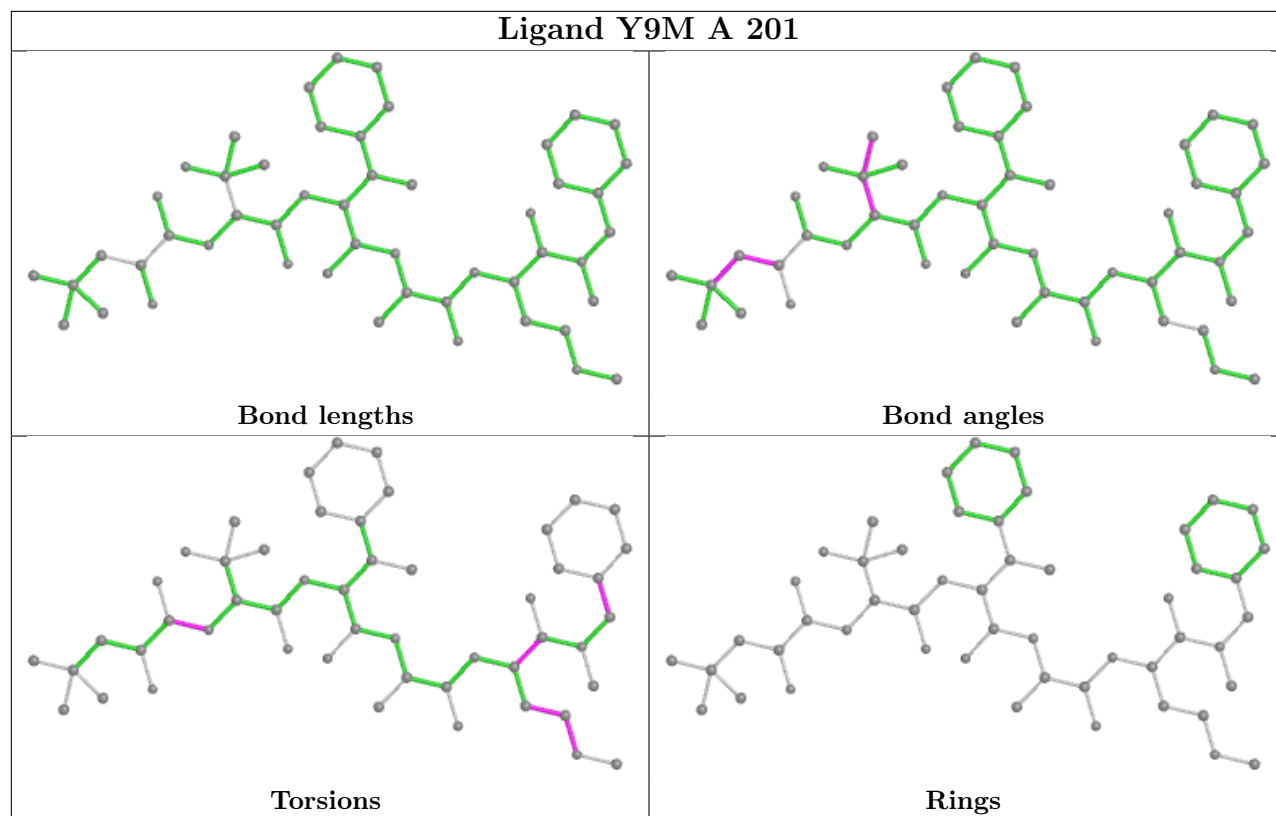
5 monomers are involved in 9 short contacts:

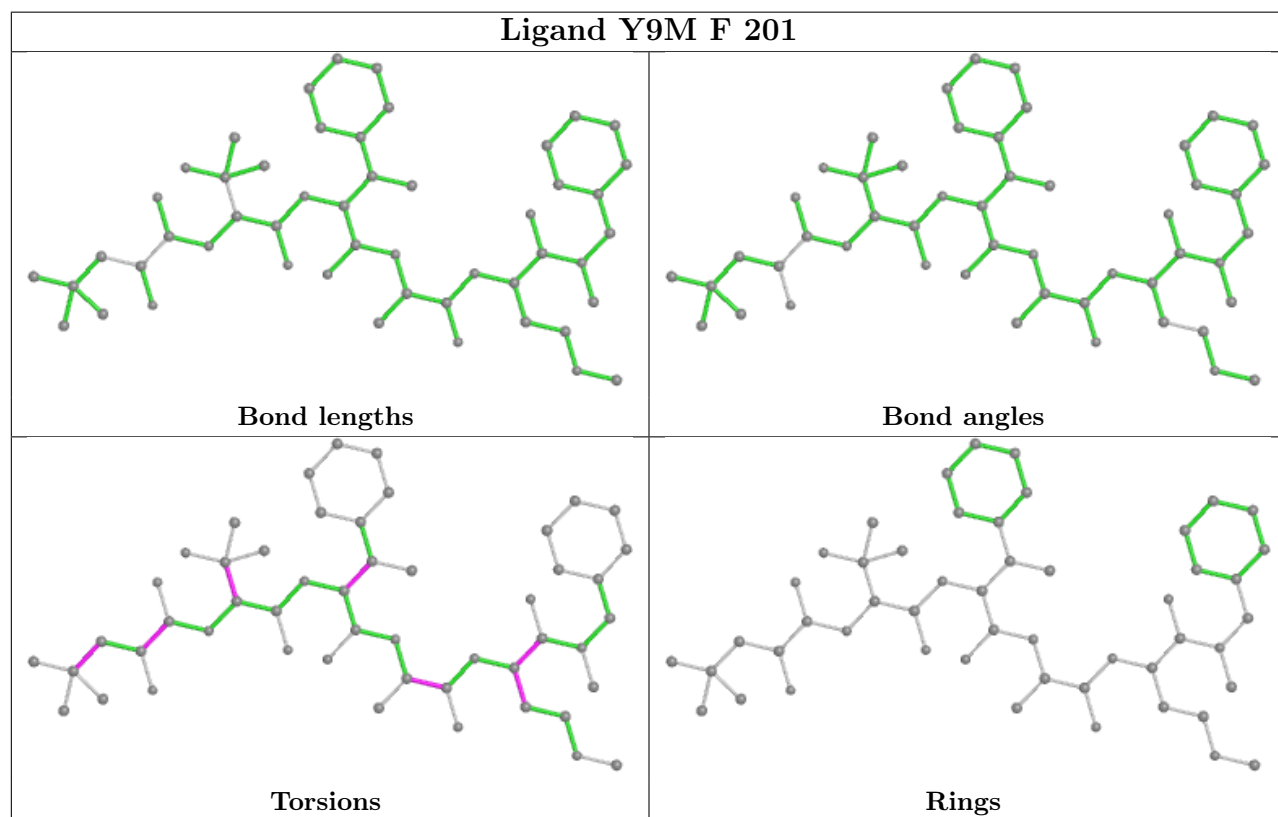
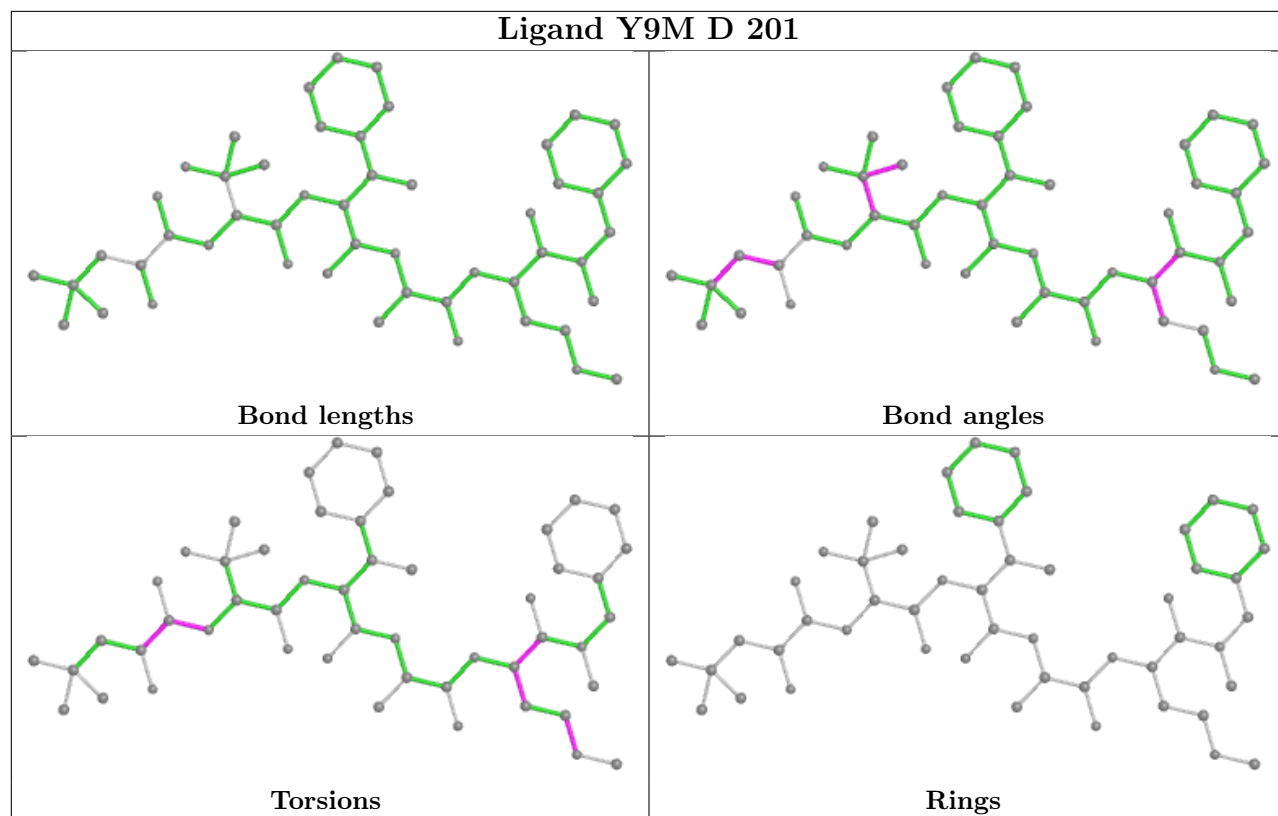
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	201	Y9M	3	0
2	A	201	Y9M	1	0
2	E	201	Y9M	1	0
2	D	201	Y9M	1	0
2	F	201	Y9M	3	0

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 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	126/139 (90%)	0.33	5 (3%) 38 36	21, 38, 57, 70	0
1	B	133/139 (95%)	0.07	2 (1%) 73 74	18, 34, 50, 63	0
1	C	127/139 (91%)	0.25	2 (1%) 72 73	19, 36, 58, 74	0
1	D	128/139 (92%)	0.16	0 100 100	19, 34, 54, 59	0
1	E	134/139 (96%)	0.16	3 (2%) 62 61	24, 40, 60, 69	0
1	F	128/139 (92%)	0.41	10 (7%) 13 11	22, 39, 63, 71	0
All	All	776/834 (93%)	0.23	22 (2%) 53 52	18, 37, 59, 74	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	25	GLN	4.4
1	F	86	LEU	4.2
1	A	125	TYR	3.9
1	F	26	ALA	3.5
1	F	67	SER	3.3
1	A	86	LEU	3.2
1	F	22	LEU	3.0
1	F	29	MET	2.9
1	F	19	TYR	2.9
1	A	25	GLN	2.6
1	B	26	ALA	2.5
1	E	26	ALA	2.5
1	E	29	MET	2.5
1	C	29	MET	2.4
1	A	137	VAL	2.4
1	F	69	ASN	2.3
1	A	52	ALA	2.2
1	F	113	VAL	2.1
1	B	44	GLY	2.1

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Mol	Chain	Res	Type	RSRZ
1	F	63	ARG	2.1
1	E	65	VAL	2.1
1	C	63	ARG	2.1

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

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

## 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 6.4 Ligands [i](#)

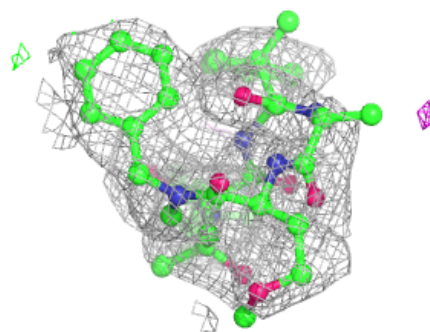
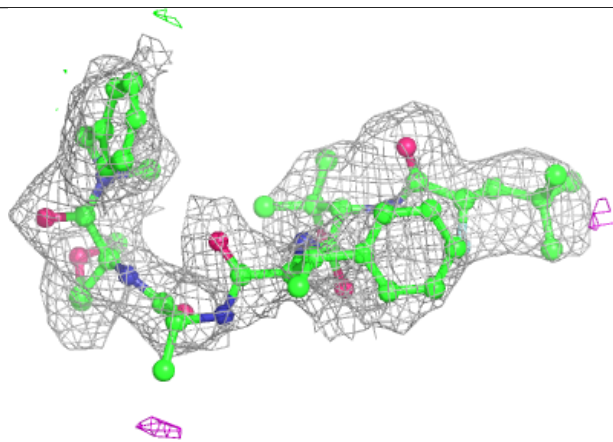
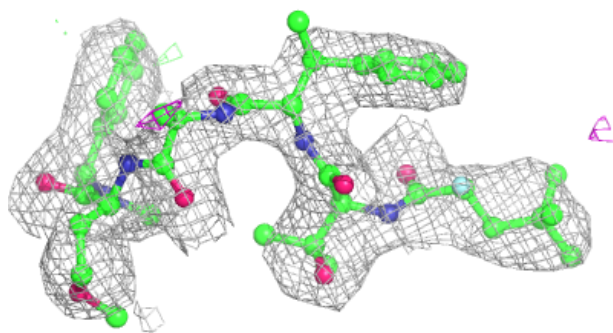
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	Y9M	D	201	51/51	0.85	0.26	34,41,52,54	0
2	Y9M	B	201	48/51	0.87	0.25	39,53,60,62	0
2	Y9M	C	201	45/51	0.87	0.23	44,52,57,59	0
2	Y9M	A	201	51/51	0.87	0.21	35,47,57,59	0
2	Y9M	E	201	45/51	0.88	0.23	34,43,59,69	0
2	Y9M	F	201	51/51	0.89	0.26	30,39,54,57	0

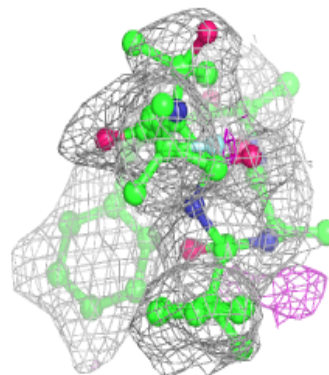
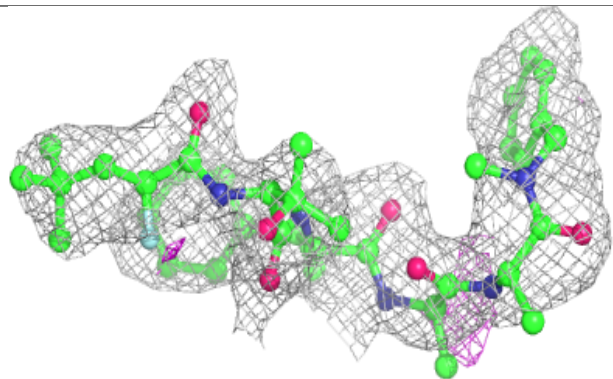
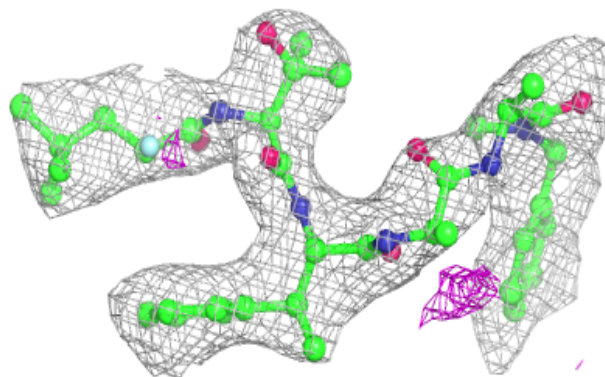
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around Y9M D 201:**

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

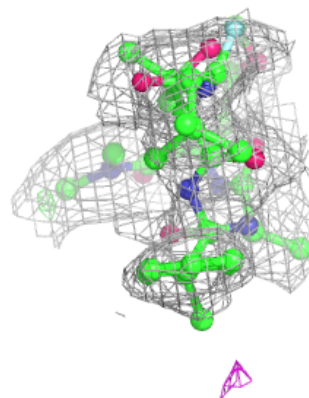
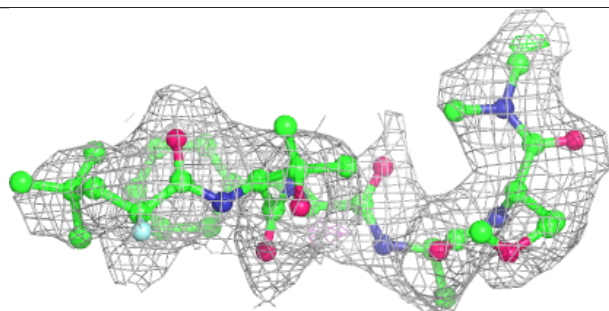
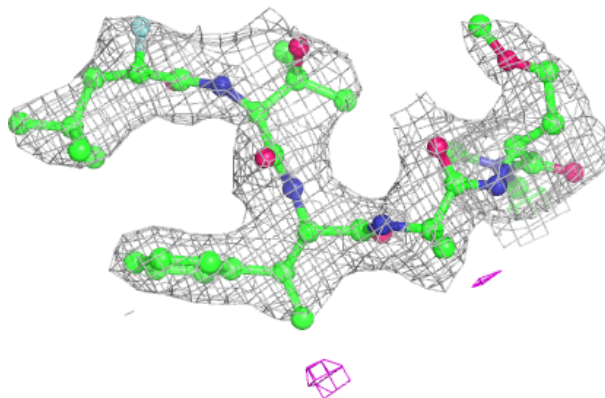
**Electron density around Y9M B 201:**

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

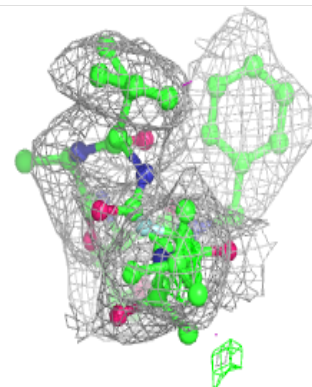
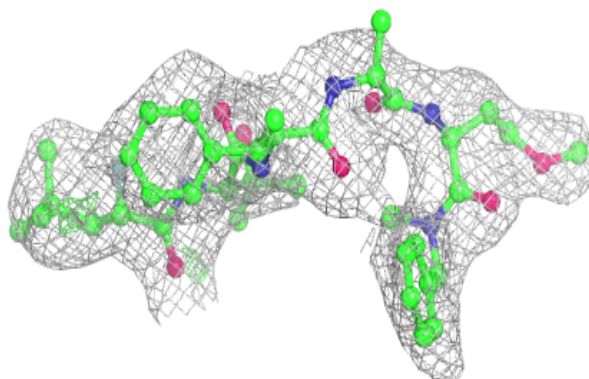
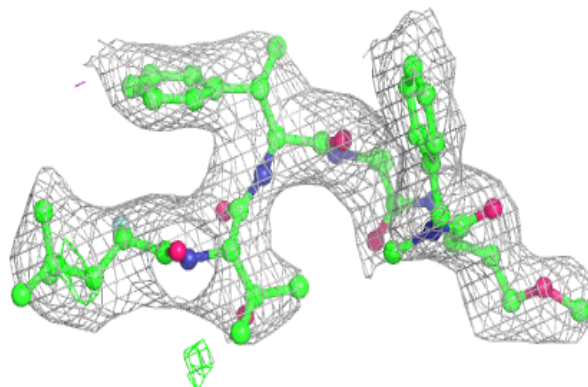


**Electron density around Y9M C 201:**

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

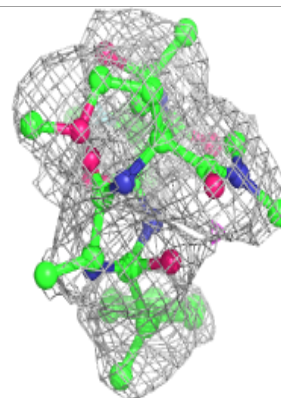
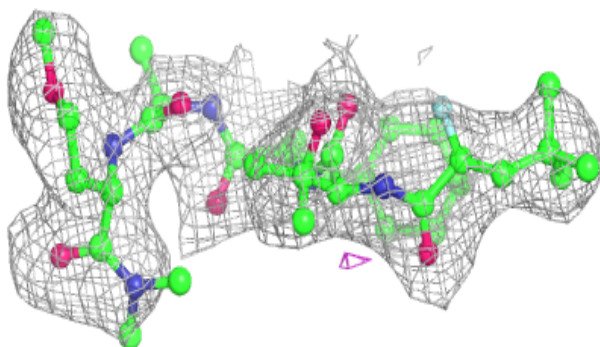
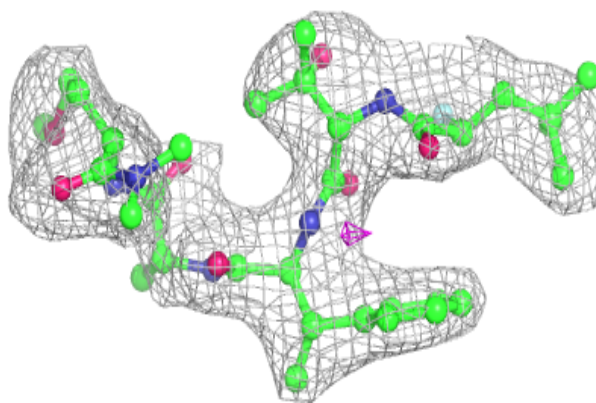
**Electron density around Y9M A 201:**

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

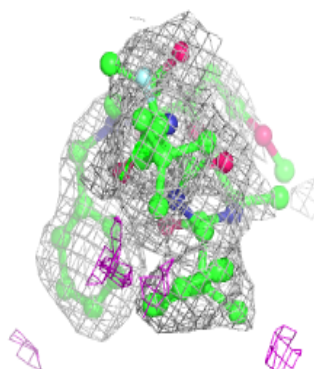
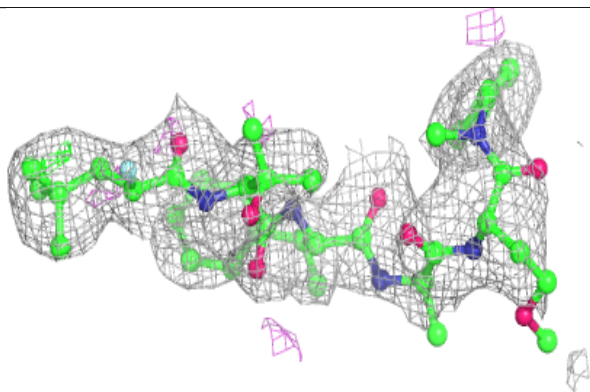
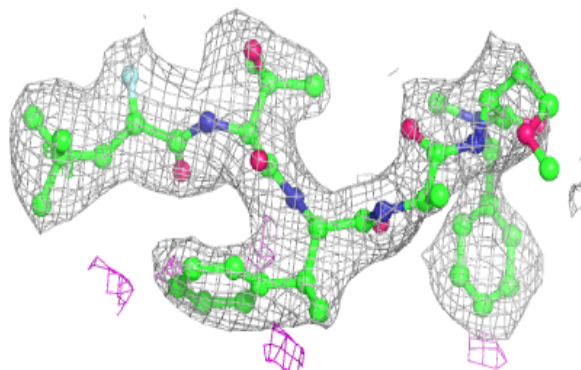


**Electron density around Y9M E 201:**

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

**Electron density around Y9M F 201:**

$2mF_o-DF_c$  (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.