



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 12, 2026 – 10:21 AM EST

PDB ID : 9Q79 / pdb_00009q79
Title : Crystal structure of T. cruzi EIF4E6 in complex with EIF4G5 peptide and cap-4
Authors : Penteado, R.F.; Guimaraes, B.G.
Deposited on : 2025-08-22
Resolution : 2.30 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 : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
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) : 2.47

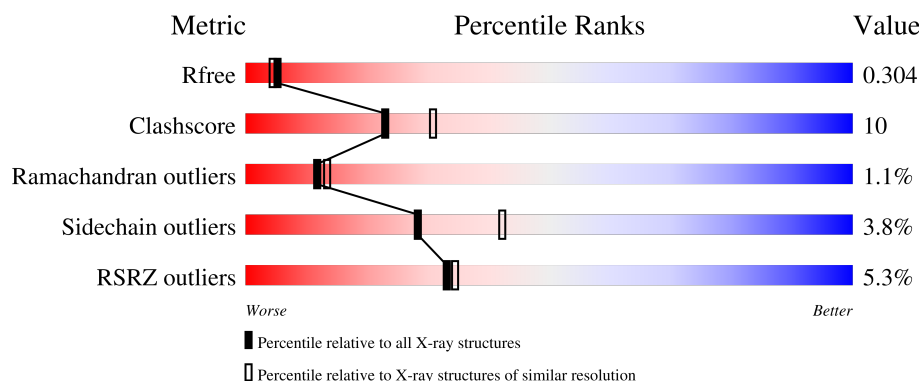
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	5963 (2.30-2.30)
Clashscore	180529	6698 (2.30-2.30)
Ramachandran outliers	177936	6640 (2.30-2.30)
Sidechain outliers	177891	6640 (2.30-2.30)
RSRZ outliers	164620	5963 (2.30-2.30)

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	186	 6% 66% 22% 11%
1	C	186	 4% 59% 26% 11%
1	E	186	 7% 64% 21% 12%
1	G	186	 2% 63% 24% 12%
2	B	49	 8% 67% 12% 18%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	D	49	2% 61% 24% 14%
2	F	49	2% 49% 24% 27%
2	H	49	2% 57% 20% 22%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 7136 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 Putative Eukaryotic translation initiation factor 4E type 6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	166	Total	C	N	O	S	39	4	0
			1387	898	236	249	4			
1	C	165	Total	C	N	O	S	42	1	0
			1357	882	227	244	4			
1	G	163	Total	C	N	O	S	52	1	0
			1341	868	228	241	4			
1	E	164	Total	C	N	O	S	49	5	0
			1375	889	237	245	4			

- Molecule 2 is a protein called Eukaryotic translation initiation factor 4 gamma 5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	40	Total	C	N	O	S	21	1	0
			334	215	57	60	2			
2	D	42	Total	C	N	O	S	18	0	0
			334	216	55	61	2			
2	H	38	Total	C	N	O	S	21	0	0
			310	200	51	57	2			
2	F	36	Total	C	N	O	S	16	1	0
			297	192	48	55	2			

There are 28 discrepancies between the modelled and reference sequences:

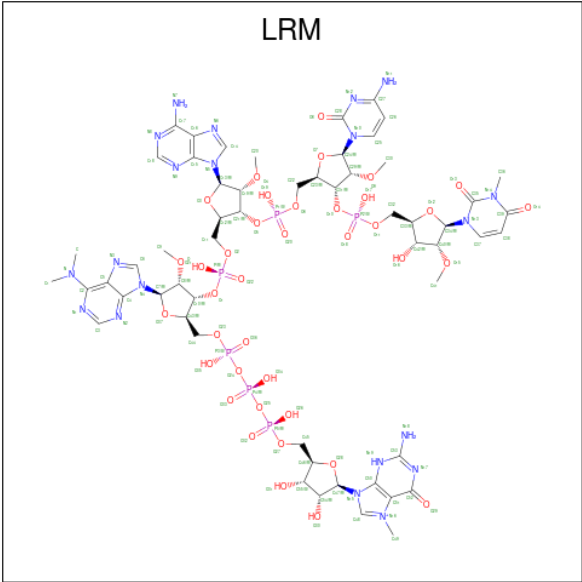
Chain	Residue	Modelled	Actual	Comment	Reference
B	70	MET	-	initiating methionine	UNP A0A2V2VHI6
B	113	HIS	-	expression tag	UNP A0A2V2VHI6
B	114	HIS	-	expression tag	UNP A0A2V2VHI6
B	115	HIS	-	expression tag	UNP A0A2V2VHI6
B	116	HIS	-	expression tag	UNP A0A2V2VHI6
B	117	HIS	-	expression tag	UNP A0A2V2VHI6
B	118	HIS	-	expression tag	UNP A0A2V2VHI6
D	70	MET	-	initiating methionine	UNP A0A2V2VHI6

Continued on next page...

Continued from previous page...

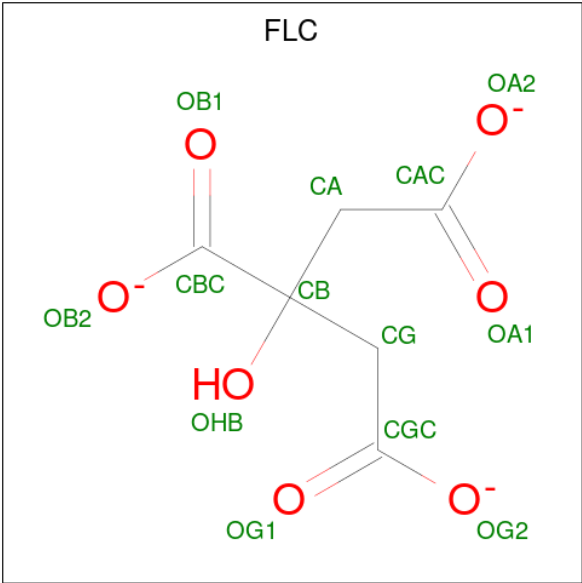
Chain	Residue	Modelled	Actual	Comment	Reference
D	113	HIS	-	expression tag	UNP A0A2V2VHI6
D	114	HIS	-	expression tag	UNP A0A2V2VHI6
D	115	HIS	-	expression tag	UNP A0A2V2VHI6
D	116	HIS	-	expression tag	UNP A0A2V2VHI6
D	117	HIS	-	expression tag	UNP A0A2V2VHI6
D	118	HIS	-	expression tag	UNP A0A2V2VHI6
H	70	MET	-	initiating methionine	UNP A0A2V2VHI6
H	113	HIS	-	expression tag	UNP A0A2V2VHI6
H	114	HIS	-	expression tag	UNP A0A2V2VHI6
H	115	HIS	-	expression tag	UNP A0A2V2VHI6
H	116	HIS	-	expression tag	UNP A0A2V2VHI6
H	117	HIS	-	expression tag	UNP A0A2V2VHI6
H	118	HIS	-	expression tag	UNP A0A2V2VHI6
F	70	MET	-	initiating methionine	UNP A0A2V2VHI6
F	113	HIS	-	expression tag	UNP A0A2V2VHI6
F	114	HIS	-	expression tag	UNP A0A2V2VHI6
F	115	HIS	-	expression tag	UNP A0A2V2VHI6
F	116	HIS	-	expression tag	UNP A0A2V2VHI6
F	117	HIS	-	expression tag	UNP A0A2V2VHI6
F	118	HIS	-	expression tag	UNP A0A2V2VHI6

- Molecule 3 is 2-amino-9-[(2R,3R,4S,5R)-5-({[(R)-{[(R)-{(S)-{(2R,3R,4R,5R)-3-{{[(R)-{[(2R,3R,4R,5R)-3-{{[(S)-{[(2R,3R,4R,5R)-5-(4-amino-2-oxopyrimidin-1(2H)-yl)-3-{{[(S)-hydroxy{[(2R,3R,4R,5R)-3-hydroxy-4-methoxy-5-(3-methyl-2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)tetrahydrofuran-2-yl]methoxy}phosphoryl]oxy}-4-methoxytetrahydrofuran-2-yl]methoxy}(hydroxy)phosphoryl]oxy}-5-(6-amino-9H-purin-9-yl)-4-methoxytetrahydrofuran-2-yl]methoxy}(hydroxy)phosphoryl]oxy}-5-[6-(dimethylamino)-9H-purin-9-yl]-4-methoxytetrahydrofuran-2-yl]methoxy}(hydroxy)phosphoryl]oxy}(hydroxy)phosphoryl]oxy}(hydroxy)phosphoryl]oxy}methyl)-3,4-dihydroxytetrahydrofuran-2-yl]-7-methyl-6-oxo-6,9-dihydro-3H-purin-7-ium (CCD ID: LRM) (formula: C₅₆H₇₉N₂₀O₃₈P₆) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			120	56	20	38	6		
3	C	1	Total	C	N	O	P	0	0
			120	56	20	38	6		

- Molecule 4 is CITRATE ANION (CCD ID: FLC) (formula: $C_6H_5O_7$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	E	1	Total	C	O	0	0
			13	6	7		

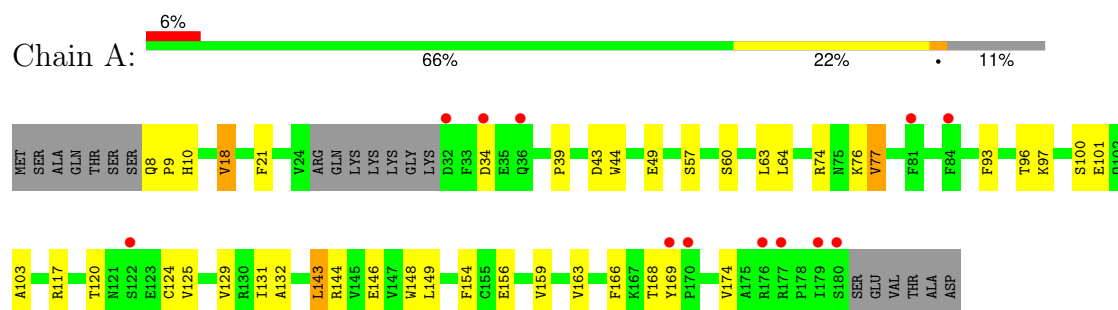
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	35	Total 35	O 35	0	0
5	C	37	Total 37	O 37	0	0
5	G	25	Total 25	O 25	0	0
5	B	8	Total 8	O 8	0	0
5	D	9	Total 9	O 9	0	0
5	H	7	Total 7	O 7	0	0
5	E	23	Total 23	O 23	0	0
5	F	4	Total 4	O 4	0	0

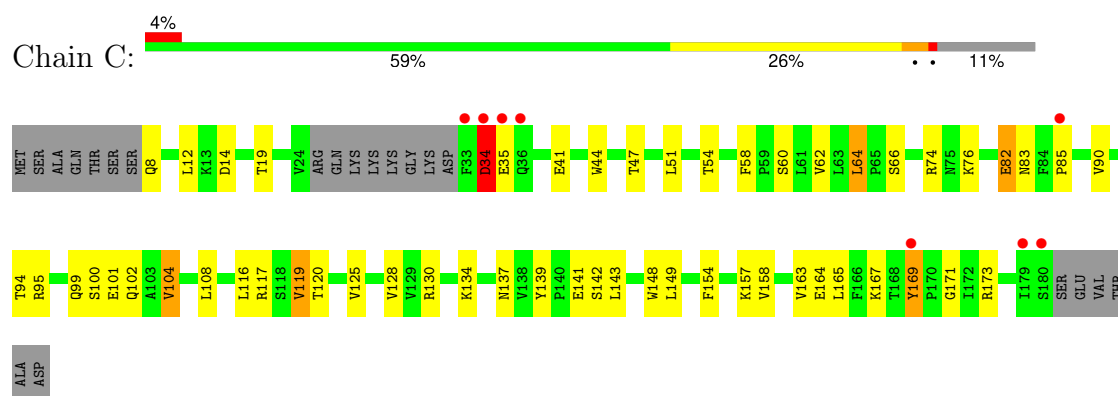
3 Residue-property plots [i](#)

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.

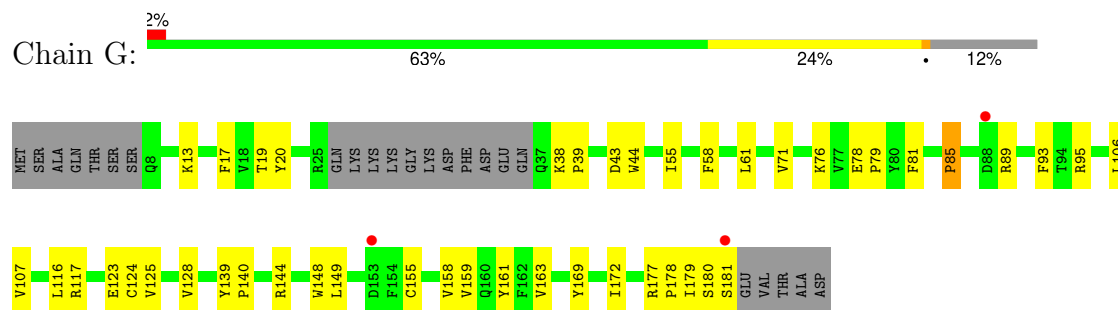
- Molecule 1: Putative Eukaryotic translation initiation factor 4E type 6



- Molecule 1: Putative Eukaryotic translation initiation factor 4E type 6

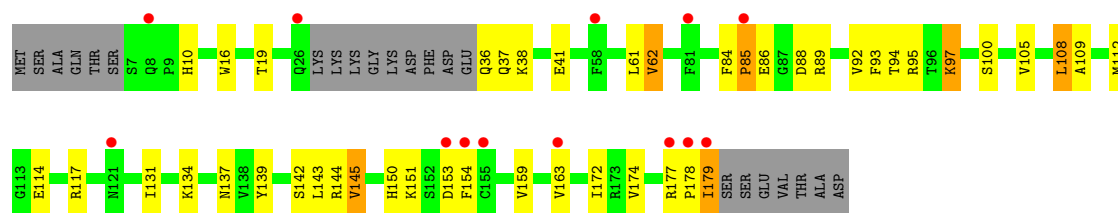


- Molecule 1: Putative Eukaryotic translation initiation factor 4E type 6

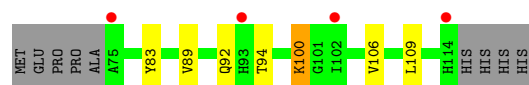


- Molecule 1: Putative Eukaryotic translation initiation factor 4E type 6





- Molecule 2: Eukaryotic translation initiation factor 4 gamma 5



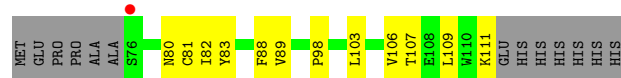
- Molecule 2: Eukaryotic translation initiation factor 4 gamma 5



- Molecule 2: Eukaryotic translation initiation factor 4 gamma 5



- Molecule 2: Eukaryotic translation initiation factor 4 gamma 5



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	81.21Å 93.24Å 119.65Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.62 – 2.30 46.62 – 2.30	Depositor EDS
% Data completeness (in resolution range)	73.9 (46.62-2.30) 74.0 (46.62-2.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.76 (at 2.29Å)	Xtriage
Refinement program	PHENIX (1.21.2_5419: ???)	Depositor
R, R_{free}	0.234 , 0.304 0.234 , 0.304	Depositor DCC
R_{free} test set	1562 reflections (5.13%)	wwPDB-VP
Wilson B-factor (Å ²)	28.6	Xtriage
Anisotropy	0.188	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 57.4	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	0.92	EDS
Total number of atoms	7136	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 47.10 % 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 1.0417e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: FLC, LRM

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	0.54	0/1435	0.85	2/1952 (0.1%)
1	C	0.62	0/1398	0.98	10/1904 (0.5%)
1	E	0.58	0/1422	0.91	3/1934 (0.2%)
1	G	0.60	0/1378	0.89	0/1876
2	B	0.56	0/345	0.85	0/467
2	D	0.54	0/346	0.99	2/471 (0.4%)
2	F	0.51	0/306	0.87	0/416
2	H	0.57	0/320	0.90	0/434
All	All	0.58	0/6950	0.91	17/9454 (0.2%)

There are no bond length outliers.

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	137	ASN	N-CA-C	-6.68	101.26	110.35
2	D	72	PRO	CA-C-N	6.49	127.95	119.84
2	D	72	PRO	C-N-CA	6.49	127.95	119.84
1	C	64	LEU	CA-C-N	-6.33	113.25	119.90
1	C	64	LEU	C-N-CA	-6.33	113.25	119.90
1	E	84	PHE	CA-C-N	5.92	127.24	119.84
1	E	84	PHE	C-N-CA	5.92	127.24	119.84
1	C	8	GLN	CA-C-N	5.53	125.46	119.76
1	C	8	GLN	C-N-CA	5.53	125.46	119.76
1	C	169	TYR	CA-C-N	5.41	124.59	118.97
1	C	169	TYR	C-N-CA	5.41	124.59	118.97
1	C	119	VAL	N-CA-C	-5.40	108.58	113.71
1	C	58	PHE	CA-C-N	-5.34	114.74	120.03
1	C	58	PHE	C-N-CA	-5.34	114.74	120.03
1	A	8	GLN	CA-C-N	5.12	125.09	120.03
1	A	8	GLN	C-N-CA	5.12	125.09	120.03

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	150	HIS	N-CA-C	-5.08	102.97	110.48

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1387	0	1374	27	0
1	C	1357	0	1341	31	0
1	E	1375	0	1368	33	0
1	G	1341	0	1326	26	0
2	B	334	0	320	4	0
2	D	334	0	321	5	0
2	F	297	0	288	10	0
2	H	310	0	296	6	0
3	A	120	0	0	0	0
3	C	120	0	0	0	0
4	E	13	0	5	0	0
5	A	35	0	0	0	0
5	B	8	0	0	0	0
5	C	37	0	0	0	0
5	D	9	0	0	0	0
5	E	23	0	0	0	0
5	F	4	0	0	0	0
5	G	25	0	0	1	0
5	H	7	0	0	0	0
All	All	7136	0	6639	133	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 10.

All (133) 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:E:112:MET:H	1:E:112:MET:HE2	1.46	0.81
1:E:163:VAL:HG12	1:E:174:VAL:HB	1.66	0.77
1:C:51:LEU:HD21	1:C:108:LEU:HB3	1.70	0.74
1:E:19:THR:HG22	1:E:41:GLU:HA	1.68	0.74
1:E:109:ALA:HA	2:F:88:PHE:CD2	2.26	0.71
1:C:19:THR:HG22	1:C:41:GLU:HA	1.76	0.68
1:A:117:ARG:HH21	1:A:124:CYS:HB2	1.59	0.68
1:C:44:TRP:O	2:D:99:PRO:HG2	1.96	0.66
1:G:38:LYS:HB3	1:G:39:PRO:HD2	1.81	0.61
1:E:62:VAL:HG11	1:E:97:LYS:HA	1.83	0.60
1:A:21:PHE:CE2	1:A:39:PRO:HG3	2.36	0.60
1:C:119:VAL:HG12	1:C:157:LYS:HB3	1.85	0.59
1:A:125:VAL:HG12	1:A:149:LEU:HB3	1.83	0.59
1:E:61:LEU:HD22	1:E:131:ILE:HG21	1.85	0.59
1:C:128:VAL:HB	1:C:148:TRP:HB2	1.85	0.59
1:G:44:TRP:CH2	1:G:76:LYS:HB2	2.39	0.58
2:H:94:THR:OG1	2:H:96:GLU:HG2	2.04	0.57
2:F:103:LEU:O	2:F:107:THR:HG23	2.03	0.57
1:A:57:SER:HB2	2:B:106:VAL:HG21	1.86	0.56
1:A:163:VAL:HG22	1:A:174:VAL:HB	1.88	0.56
1:C:44:TRP:CH2	1:C:76:LYS:HB2	2.41	0.55
2:D:97:SER:HB3	2:D:103:LEU:HD22	1.88	0.55
1:A:9:PRO:HA	1:A:49:GLU:OE2	2.07	0.55
1:C:99:GLN:NE2	1:C:171:GLY:HA3	2.21	0.54
1:A:132:ALA:O	1:A:143:LEU:HD22	2.06	0.54
1:E:105:VAL:HG12	2:F:89:VAL:HG22	1.89	0.53
1:C:94:THR:HG21	1:C:100:SER:HA	1.89	0.53
2:F:98:PRO:HG2	2:F:103:LEU:HB2	1.90	0.53
1:E:112:MET:O	1:E:114:GLU:HG2	2.08	0.53
1:E:89:ARG:HG3	1:E:179[B]:ILE:HG12	1.91	0.53
1:E:93:PHE:CE1	1:E:144:ARG:HG3	2.44	0.53
1:G:55:ILE:HG23	1:G:61:LEU:HD11	1.90	0.52
1:E:112:MET:HE2	1:E:112:MET:N	2.20	0.52
1:G:81:PHE:CD1	1:G:179:ILE:HG23	2.45	0.51
2:H:102:ILE:O	2:H:106:VAL:HG13	2.11	0.51
1:A:93:PHE:CE1	1:A:144:ARG:HG3	2.46	0.51
1:G:13:LYS:HG2	1:G:117:ARG:NH2	2.25	0.51
2:F:80:ASN:ND2	2:F:82:ILE:HD12	2.26	0.51
1:C:95:ARG:HH22	1:C:173:ARG:HH21	1.60	0.50
1:A:117:ARG:NH2	1:A:124:CYS:HB2	2.24	0.50
1:G:95:ARG:HG2	1:G:139:TYR:CG	2.46	0.50
1:C:14:ASP:HB2	1:C:74:ARG:HH11	1.77	0.50

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:100[A]:SER:HB2	1:E:143:LEU:HD22	1.93	0.49
1:C:102:GLN:HG3	1:C:169:TYR:CE2	2.47	0.49
1:G:17:PHE:CG	1:G:76:LYS:HG3	2.47	0.49
1:C:90:VAL:HG21	1:C:158:VAL:HG12	1.94	0.49
1:C:95:ARG:HG2	1:C:139:TYR:CG	2.48	0.49
1:E:100[B]:SER:HB2	1:E:143:LEU:HD22	1.94	0.49
1:C:99:GLN:HE22	1:C:171:GLY:HA3	1.78	0.49
1:C:104:VAL:O	1:C:108:LEU:HG	2.13	0.49
1:A:103:ALA:HA	1:A:166:PHE:CE1	2.47	0.48
1:A:60:SER:HB3	1:A:63:LEU:HG	1.95	0.48
2:H:98:PRO:HG2	2:H:103:LEU:HB2	1.94	0.48
1:E:94:THR:HG22	1:E:172:ILE:HG12	1.95	0.48
1:G:125:VAL:HG12	1:G:149:LEU:HD22	1.95	0.48
1:E:153:ASP:C	1:E:154:PHE:HD1	2.22	0.48
1:E:108:LEU:HA	1:E:112:MET:CE	2.44	0.48
2:H:76:SER:HA	2:H:87:GLU:OE1	2.14	0.47
1:C:95:ARG:HG2	1:C:139:TYR:CD1	2.50	0.47
1:E:86:GLU:HB2	1:E:151:LYS:HB2	1.96	0.47
1:A:97:LYS:O	1:A:101:GLU:HG3	2.15	0.47
1:A:159:VAL:O	1:A:163:VAL:HG23	2.14	0.47
1:G:169:TYR:HB3	1:G:172:ILE:HD12	1.96	0.47
1:E:16:TRP:CD1	1:E:112:MET:HG3	2.50	0.47
1:E:108:LEU:HG	1:E:112:MET:HE3	1.96	0.47
1:C:134:LYS:O	1:C:142:SER:HB2	2.15	0.47
1:C:82:GLU:C	1:C:83:ASN:HD22	2.23	0.46
1:E:134:LYS:O	1:E:142:SER:HB2	2.15	0.46
1:A:156:GLU:O	1:A:159:VAL:HB	2.15	0.46
1:G:58:PHE:HB3	5:G:203:HOH:O	2.15	0.46
1:A:44:TRP:CH2	1:A:76:LYS:HB2	2.51	0.46
1:C:12:LEU:HG	1:C:47:THR:HA	1.98	0.45
1:G:123:GLU:HG2	1:G:124:CYS:H	1.82	0.45
1:E:159:VAL:O	1:E:163:VAL:HG13	2.16	0.45
2:D:102:ILE:O	2:D:106:VAL:HG22	2.17	0.45
1:A:131:ILE:HG23	1:A:143:LEU:HD11	1.99	0.45
1:C:117:ARG:HA	1:C:120:THR:OG1	2.17	0.44
1:E:16:TRP:NE1	1:E:112:MET:HG3	2.32	0.44
1:A:168:THR:HG23	1:A:169:TYR:CD2	2.53	0.44
1:G:93:PHE:CE1	1:G:144:ARG:HG3	2.52	0.44
1:E:10:HIS:HB3	2:F:83:TYR:CE2	2.52	0.44
1:C:34:ASP:HB2	1:C:35:GLU:H	1.58	0.44
1:C:149:LEU:HD11	1:C:158:VAL:HG11	1.99	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:154:PHE:HD1	1:C:157:LYS:HD2	1.82	0.44
1:G:85:PRO:HA	1:G:181:SER:O	2.18	0.44
1:A:129:VAL:HA	1:A:146:GLU:O	2.17	0.44
1:C:83:ASN:HD22	1:C:83:ASN:N	2.15	0.44
1:A:18:VAL:HG23	1:A:43:ASP:O	2.18	0.43
1:G:13:LYS:HD2	2:H:80:ASN:O	2.18	0.43
1:A:93:PHE:CD1	1:A:144:ARG:HG3	2.53	0.43
1:G:43:ASP:OD2	2:H:100:LYS:HG3	2.17	0.43
1:E:92:VAL:HB	1:E:145:VAL:HG13	1.99	0.43
1:C:164:GLU:O	1:C:167:LYS:HG3	2.18	0.43
1:G:19:THR:HG22	1:G:20:TYR:N	2.34	0.43
1:A:64:LEU:HD23	1:A:64:LEU:HA	1.84	0.42
2:F:109:LEU:HA	2:F:109:LEU:HD12	1.77	0.42
1:C:51:LEU:O	1:C:54:THR:HB	2.19	0.42
1:E:114:GLU:HB3	1:E:117:ARG:HE	1.84	0.42
1:G:158:VAL:O	1:G:161:TYR:HB3	2.20	0.42
2:B:100[A]:LYS:HA	2:B:100[A]:LYS:HD3	1.63	0.42
1:G:89:ARG:HD2	1:G:148:TRP:NE1	2.34	0.42
1:A:10:HIS:HB3	2:B:83:TYR:CE2	2.55	0.42
2:D:78:PRO:HB2	2:D:80:ASN:OD1	2.19	0.42
1:C:125:VAL:HG23	1:C:149:LEU:HD22	2.02	0.42
1:G:78:GLU:HA	1:G:79:PRO:HD3	1.89	0.42
1:A:120:THR:HA	1:A:154:PHE:CD1	2.55	0.41
1:G:159:VAL:O	1:G:163:VAL:HG23	2.20	0.41
1:E:85:PRO:HB2	1:E:86:GLU:H	1.71	0.41
1:C:165:LEU:HD23	1:C:165:LEU:HA	1.84	0.41
1:E:36:GLN:HG2	1:E:37:GLN:H	1.86	0.41
2:F:80:ASN:O	2:F:81:CYS:HB2	2.19	0.41
1:E:95:ARG:HG2	1:E:139:TYR:CG	2.55	0.41
1:E:177[B]:ARG:HA	1:E:178[B]:PRO:HD2	1.88	0.41
2:F:103:LEU:HA	2:F:106:VAL:HG12	2.03	0.41
1:A:74:ARG:O	1:A:77:VAL:HG12	2.21	0.41
1:C:64:LEU:HD23	1:C:64:LEU:HA	1.89	0.41
1:G:19:THR:HG22	1:G:20:TYR:H	1.86	0.41
1:A:143:LEU:HD22	1:A:143:LEU:HA	1.91	0.41
1:G:177:ARG:HA	1:G:178:PRO:HD3	1.90	0.41
1:E:89:ARG:HG3	1:E:179[A]:ILE:HG13	2.03	0.41
1:E:108:LEU:HD12	1:E:112:MET:HE1	2.02	0.40
1:G:106:LEU:HD23	1:G:106:LEU:HA	1.89	0.40
2:B:89:VAL:O	2:B:92:GLN:HG2	2.20	0.40
1:E:10:HIS:HB3	2:F:83:TYR:CZ	2.56	0.40

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:148:TRP:CD1	1:A:148:TRP:N	2.89	0.40
1:G:128:VAL:HB	1:G:148:TRP:HB2	2.03	0.40
1:G:139:TYR:HA	1:G:140:PRO:HD2	1.94	0.40
1:E:88:ASP:HA	1:E:178[B]:PRO:HA	2.04	0.40
1:A:96:THR:O	1:A:100:SER:HB3	2.22	0.40
1:C:62:VAL:HB	1:C:141:GLU:HG2	2.03	0.40
1:C:164:GLU:HA	1:C:167:LYS:HE2	2.02	0.40
1:G:81:PHE:HD1	1:G:179:ILE:HG23	1.87	0.40
2:D:106:VAL:HG12	2:D:110:TRP:HZ3	1.87	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	166/186 (89%)	153 (92%)	12 (7%)	1 (1%)	22	27
1	C	162/186 (87%)	149 (92%)	10 (6%)	3 (2%)	6	6
1	E	164/186 (88%)	149 (91%)	13 (8%)	2 (1%)	11	12
1	G	160/186 (86%)	148 (92%)	10 (6%)	2 (1%)	10	11
2	B	39/49 (80%)	36 (92%)	3 (8%)	0	100	100
2	D	40/49 (82%)	37 (92%)	2 (5%)	1 (2%)	4	3
2	F	35/49 (71%)	32 (91%)	3 (9%)	0	100	100
2	H	36/49 (74%)	34 (94%)	2 (6%)	0	100	100
All	All	802/940 (85%)	738 (92%)	55 (7%)	9 (1%)	12	13

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	34	ASP

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	C	85	PRO
2	D	73	PRO
1	E	85	PRO
1	A	34	ASP
1	G	155	CYS
1	C	66	SER
1	G	85	PRO
1	E	137	ASN

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	156/169 (92%)	153 (98%)	3 (2%)	52	69
1	C	152/169 (90%)	142 (93%)	10 (7%)	14	19
1	E	155/169 (92%)	148 (96%)	7 (4%)	23	34
1	G	150/169 (89%)	146 (97%)	4 (3%)	40	57
2	B	37/44 (84%)	33 (89%)	4 (11%)	5	6
2	D	37/44 (84%)	35 (95%)	2 (5%)	18	27
2	F	34/44 (77%)	33 (97%)	1 (3%)	37	54
2	H	35/44 (80%)	35 (100%)	0	100	100
All	All	756/852 (89%)	725 (96%)	31 (4%)	28	39

All (31) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	VAL
1	A	77	VAL
1	A	143	LEU
1	C	34	ASP
1	C	60	SER
1	C	82	GLU
1	C	101	GLU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	C	104	VAL
1	C	116[A]	LEU
1	C	116[B]	LEU
1	C	130	ARG
1	C	143	LEU
1	C	163	VAL
1	G	71	VAL
1	G	107	VAL
1	G	116	LEU
1	G	180	SER
2	B	94	THR
2	B	100[A]	LYS
2	B	100[B]	LYS
2	B	109	LEU
2	D	92	GLN
2	D	108	GLU
1	E	38	LYS
1	E	62	VAL
1	E	97	LYS
1	E	108	LEU
1	E	145	VAL
1	E	179[A]	ILE
1	E	179[B]	ILE
2	F	111	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	83	ASN
1	C	99	GLN
1	C	137	ASN
2	H	92	GLN
2	F	77	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

3 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$
3	LRM	C	201	-	120,132,132	0.73	2 (1%)	149,204,204	0.83	5 (3%)
4	FLC	E	201	-	12,12,12	1.02	0	17,17,17	1.18	1 (5%)
3	LRM	A	201	-	120,132,132	0.75	3 (2%)	149,204,204	0.86	5 (3%)

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	LRM	C	201	-	-	15/77/169/169	0/13/13/13
4	FLC	E	201	-	-	8/16/16/16	-
3	LRM	A	201	-	-	10/77/169/169	0/13/13/13

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	201	LRM	C48-N16	3.43	1.39	1.33
3	C	201	LRM	C48-N15	3.41	1.39	1.33
3	A	201	LRM	C48-N15	3.38	1.39	1.33

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	201	LRM	C48-N16	3.02	1.38	1.33
3	A	201	LRM	C2-N1	2.29	1.35	1.32

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	201	LRM	C43-O37-C7	-3.18	107.01	109.92
3	C	201	LRM	C3-N1-C2	2.56	119.35	116.84
3	C	201	LRM	C16-C17-N7	2.56	124.22	120.31
3	C	201	LRM	C29-C24-N10	-2.52	109.46	114.24
3	C	201	LRM	C8-C7-N4	2.46	118.03	112.56
4	E	201	FLC	OA1-CAC-CA	-2.21	116.69	122.95
3	A	201	LRM	C8-C10-C43	-2.17	98.75	103.78
3	A	201	LRM	O29-C52-N17	-2.15	116.96	120.23
3	C	201	LRM	O29-C52-N17	-2.13	116.99	120.23
3	A	201	LRM	C3-N1-C2	2.12	118.92	116.84
3	A	201	LRM	C16-C17-N7	2.01	123.38	120.31

There are no chirality outliers.

All (33) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	201	LRM	C7-C8-O-C9
3	A	201	LRM	C44-O23-P3-O36
3	C	201	LRM	C13-C19-O4-C20
3	C	201	LRM	C24-C29-O9-C30
3	C	201	LRM	C44-O23-P3-O24
3	C	201	LRM	C44-O23-P3-O35
3	C	201	LRM	C45-O27-P5-O25
3	C	201	LRM	C32-O11-P2-O18
4	E	201	FLC	CG-CB-CBC-OB1
4	E	201	FLC	CG-CB-CBC-OB2
4	E	201	FLC	OHB-CB-CBC-OB1
4	E	201	FLC	OHB-CB-CBC-OB2
3	A	201	LRM	O27-C45-C46-O28
3	A	201	LRM	O27-C45-C46-C55
3	C	201	LRM	O11-C32-C33-O12
3	C	201	LRM	P4-O24-P3-O35
3	A	201	LRM	C44-O23-P3-O24
3	A	201	LRM	C44-O23-P3-O35
3	C	201	LRM	C45-O27-P5-O32
4	E	201	FLC	CA-CB-CBC-OB1

Continued on next page...

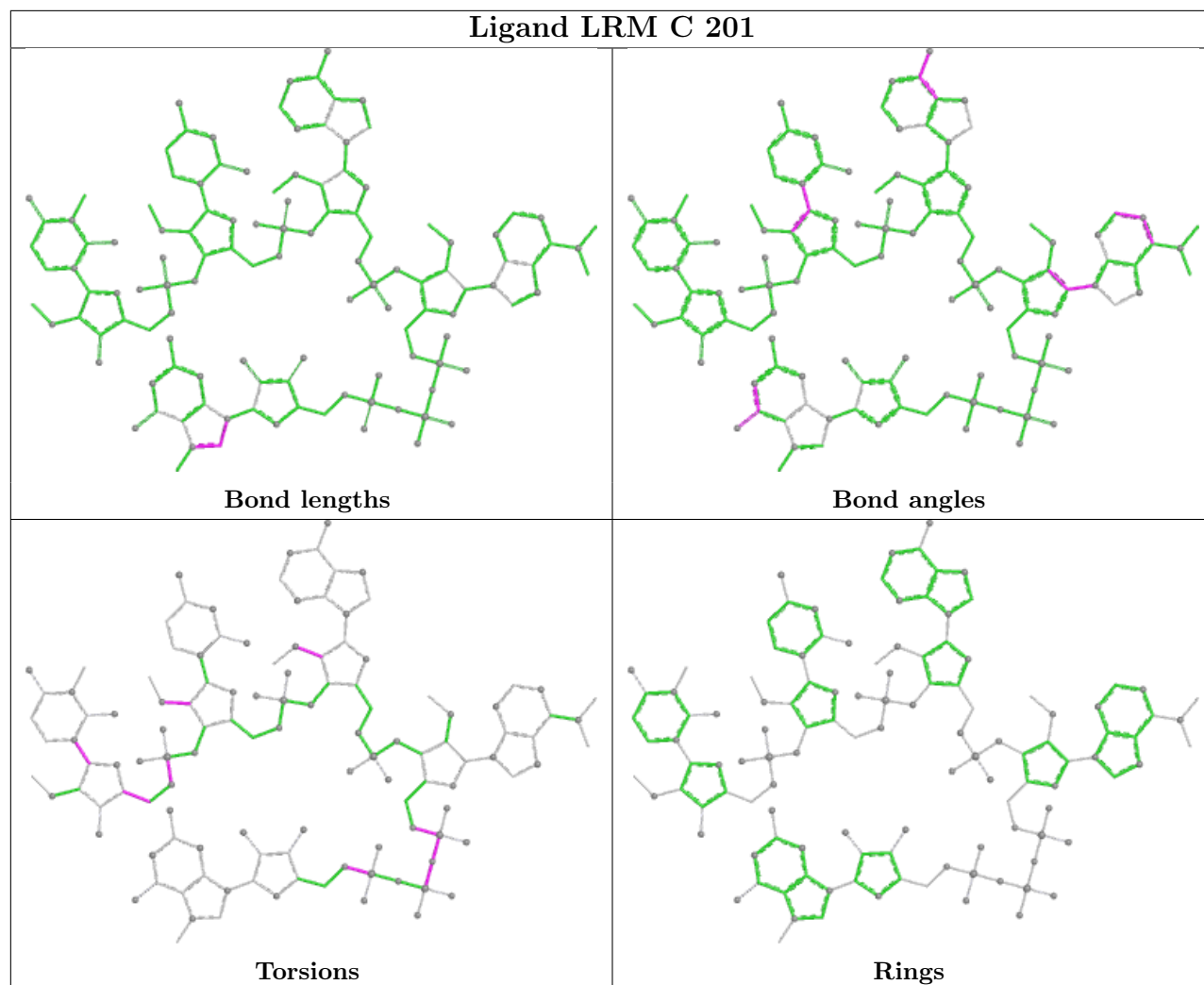
Continued from previous page...

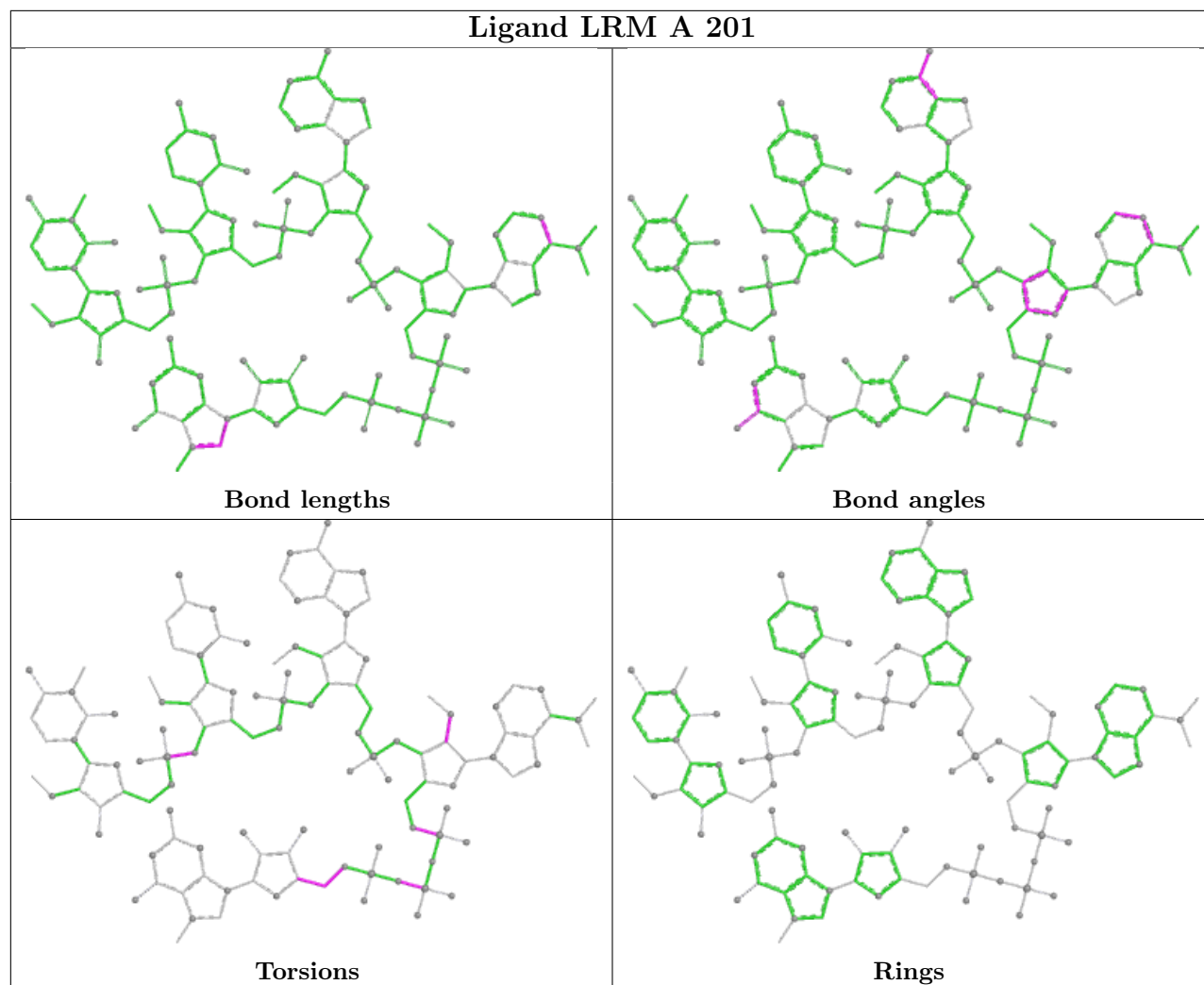
Mol	Chain	Res	Type	Atoms
4	E	201	FLC	CA-CB-CBC-OB2
3	C	201	LRM	O12-C34-N13-C37
3	C	201	LRM	C40-C34-N13-C37
3	C	201	LRM	P3-O24-P4-O33
4	E	201	FLC	CB-CG-CGC-OG2
3	A	201	LRM	C46-C45-O27-P5
4	E	201	FLC	CB-CG-CGC-OG1
3	A	201	LRM	P5-O25-P4-O34
3	A	201	LRM	C31-O10-P2-O18
3	A	201	LRM	C31-O10-P2-O17
3	C	201	LRM	P4-O24-P3-O36
3	C	201	LRM	O12-C34-N13-C35
3	C	201	LRM	P3-O24-P4-O34

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	166/186 (89%)	0.50	12 (7%) 23 24	16, 28, 53, 78	16 (9%)
1	C	165/186 (88%)	0.42	8 (4%) 36 37	13, 26, 53, 70	15 (9%)
1	E	164/186 (88%)	0.46	13 (7%) 20 22	14, 26, 55, 76	17 (10%)
1	G	163/186 (87%)	0.36	3 (1%) 67 68	16, 27, 54, 58	15 (9%)
2	B	40/49 (81%)	0.49	4 (10%) 14 15	12, 28, 57, 66	6 (15%)
2	D	42/49 (85%)	0.46	1 (2%) 59 61	11, 28, 55, 71	5 (11%)
2	F	36/49 (73%)	0.45	1 (2%) 55 56	15, 31, 41, 43	5 (13%)
2	H	38/49 (77%)	0.32	1 (2%) 57 58	18, 28, 47, 51	6 (15%)
All	All	814/940 (86%)	0.44	43 (5%) 33 34	11, 27, 54, 78	85 (10%)

All (43) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	72	PRO	4.1
1	E	153	ASP	3.9
1	A	180	SER	3.7
1	A	36	GLN	3.6
1	E	178[A]	PRO	3.3
1	C	180	SER	3.3
2	B	75	ALA	3.3
1	A	179	ILE	3.0
1	A	32	ASP	3.0
1	G	153	ASP	3.0
1	E	85	PRO	3.0
1	G	181	SER	2.9
1	C	33	PHE	2.9
1	C	36	GLN	2.9
1	G	88	ASP	2.8
1	E	8	GLN	2.8

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	E	179[A]	ILE	2.8
2	B	102	ILE	2.7
2	F	76	SER	2.6
1	C	169	TYR	2.4
1	C	34	ASP	2.4
1	C	179	ILE	2.4
1	E	81	PHE	2.4
1	A	34	ASP	2.3
1	A	169	TYR	2.3
1	E	163	VAL	2.3
1	A	170	PRO	2.3
1	E	58	PHE	2.3
1	E	155	CYS	2.3
1	E	121	ASN	2.3
1	C	85	PRO	2.2
1	E	177[A]	ARG	2.1
2	B	114	HIS	2.1
1	E	26	GLN	2.1
1	A	176	ARG	2.0
1	A	84	PHE	2.0
1	E	154	PHE	2.0
1	A	122	SER	2.0
2	H	76	SER	2.0
1	A	177[A]	ARG	2.0
1	C	35	GLU	2.0
1	A	81	PHE	2.0
2	B	93	HIS	2.0

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 oligosaccharides in this entry.

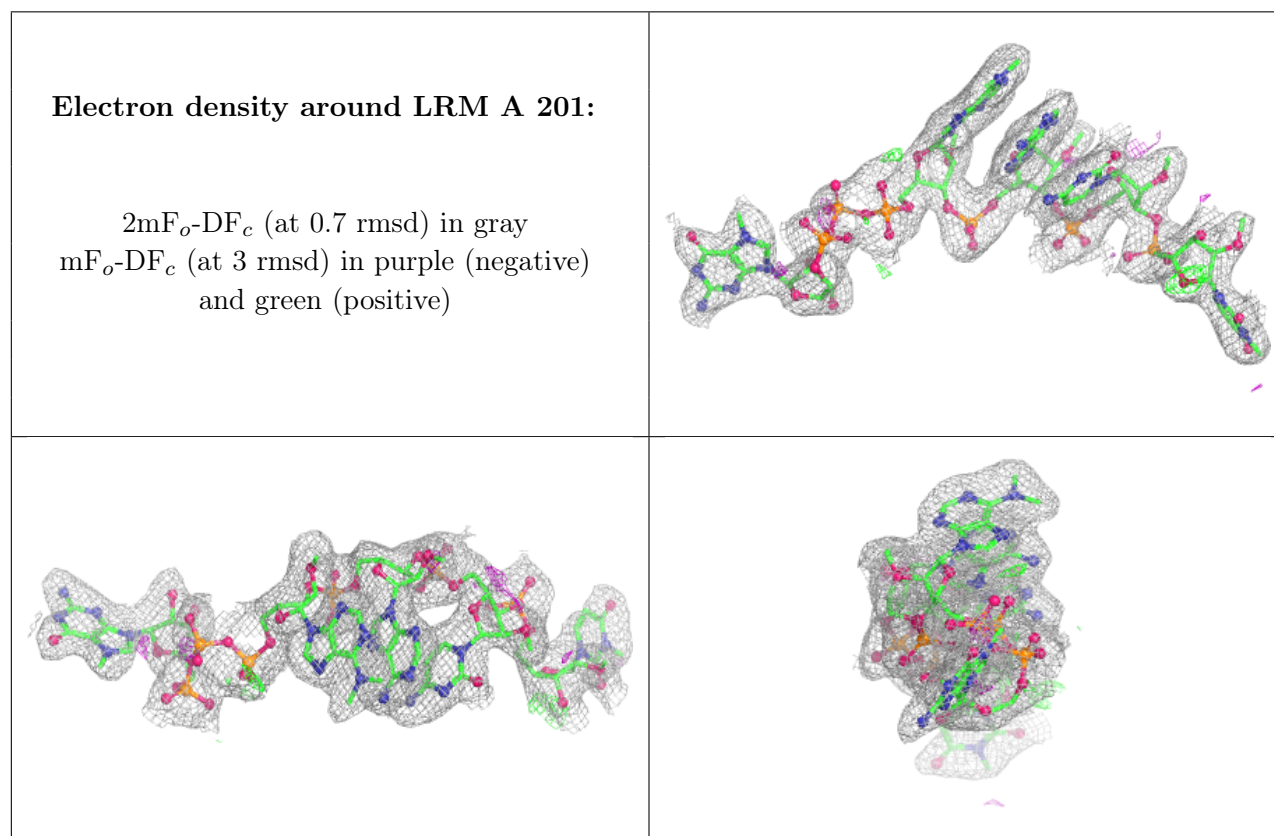
6.4 Ligands [i](#)

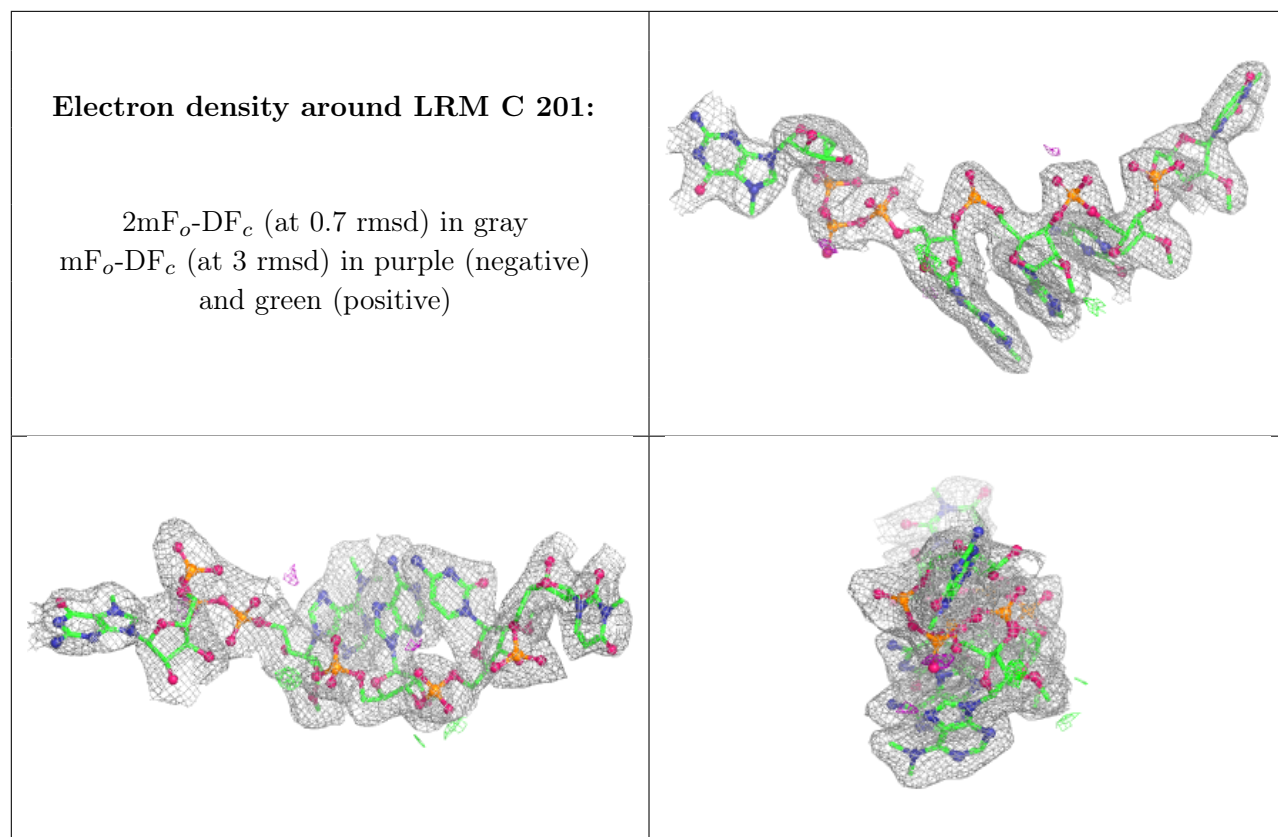
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

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
4	FLC	E	201	13/13	0.79	0.11	54,56,63,64	0
3	LRM	A	201	120/120	0.93	0.09	19,28,52,68	0
3	LRM	C	201	120/120	0.94	0.09	20,27,57,66	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.





6.5 Other polymers [i](#)

There are no such residues in this entry.