WORLDWIDE wwPDB PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report (i)

May 16, 2020 – 12:20 am BST

PDB ID	:	5UHG
Title	:	Crystal structure of Mycobacterium tuberculosis transcription initiation complex in complex with D-AAP1 and Rifampin
Authors	:	Lin, W.; Das, K.; Feng, Y.; Ebright, R.H.
Deposited on	:	2017-01-11
Resolution	:	3.97 Å(reported)

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

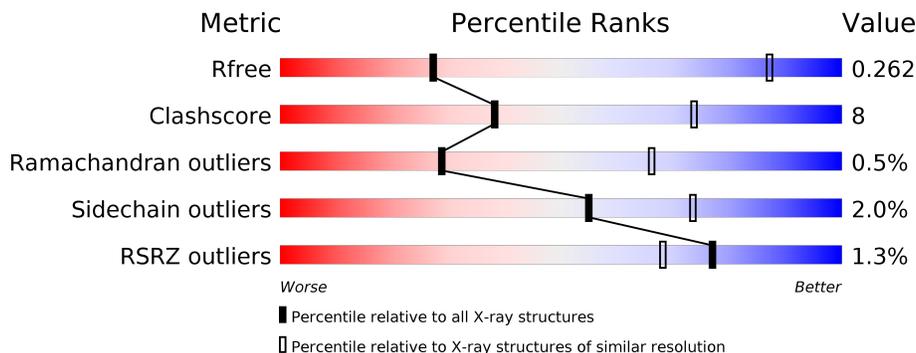|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

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 3.97 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	Percentile Ranks	Value
Rfree		0.262
Clashscore		8
Ramachandran outliers		0.5%
Sidechain outliers		2.0%
RSRZ outliers		1.3%

Worse — *Better*

▌ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1039 (4.26-3.70)
Clashscore	141614	1099 (4.26-3.70)
Ramachandran outliers	138981	1061 (4.26-3.70)
Sidechain outliers	138945	1053 (4.26-3.70)
RSRZ outliers	127900	1021 (4.30-3.66)

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 on the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	347	% 55% 9% 35%
1	B	347	3% 52% 14% 35%
2	C	1178	77% 18% •
3	D	1316	75% 20% • •
4	E	110	57% 15% • 26%
5	F	528	3% 48% 13% • 39%

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Mol	Chain	Length	Quality of chain
6	H	23	35% 61% •
7	G	16	25% 50% 25% 25%

2 Entry composition (i)

There are 11 unique types of molecules in this entry. The entry contains 26004 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 DNA-directed RNA polymerase subunit alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	224	Total 1704	C 1072	N 295	O 335	S 2	0	0	0
1	B	227	Total 1715	C 1080	N 291	O 342	S 2	0	0	0

- Molecule 2 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	1126	Total 8714	C 5454	N 1528	O 1693	S 39	0	0	0

- Molecule 3 is a protein called DNA-directed RNA polymerase subunit beta'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	D	1265	Total 9887	C 6188	N 1793	O 1866	S 40	0	0	0

- Molecule 4 is a protein called DNA-directed RNA polymerase subunit omega.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	E	81	Total 637	C 408	N 106	O 123	0	0	0

- Molecule 5 is a protein called RNA polymerase sigma factor SigA.

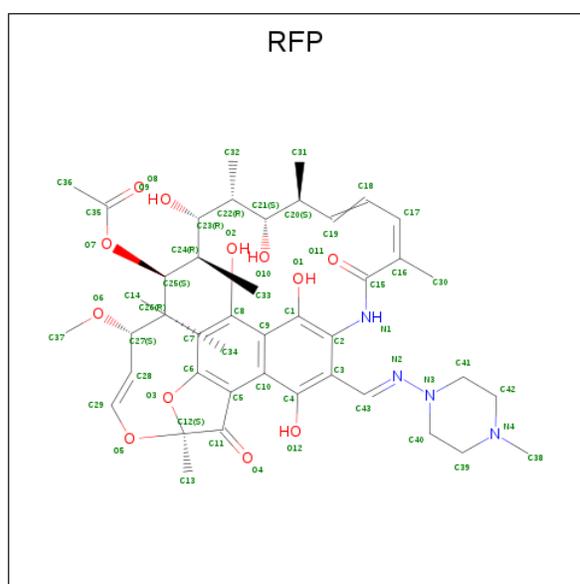| Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	F	321	Total 2541	C 1582	N 457	O 493	S 9	0	0	0

- Molecule 6 is a DNA chain called DNA (5'-D(*TP*AP*TP*AP*AP*TP*GP*GP*GP*AP*GP*CP*TP*GP*TP*CP*AP*CP*GP*GP*AP*TP*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	H	23	Total 476	C 227	N 91	O 136	P 22	0	0	0

- Molecule 7 is a DNA chain called DNA (5'-D(*CP*AP*TP*CP*CP*GP*TP*GP*AP*GP* TP*CP*CP*AP*GP*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
7	G	12	Total 241	C 116	N 43	O 71	P 11	0	0	0

- Molecule 8 is RIFAMPICIN (three-letter code: RFP) (formula: $C_{43}H_{58}N_4O_{12}$).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	C	1	Total 59	C 43	N 4	O 12	0	0

- Molecule 9 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	D	2	Total 2	Zn 2	0	0

- Molecule 10 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	D	1	Total 1	Mg 1	0	0

- Molecule 11 is Nalpha-(benzenecarbonyl)-N-(2-methylphenyl)-D-phenylalaninamide (three-letter code: 88G) (formula: $C_{23}H_{22}N_2O_2$).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
11	D	1	27	23	2	2	0	0

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA and DNA 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: DNA-directed RNA polymerase subunit alpha

- Molecule 1: DNA-directed RNA polymerase subunit alpha

- Molecule 2: DNA-directed RNA polymerase subunit beta

• Molecule 3: DNA-directed RNA polymerase subunit beta'

Chain D:

F1089 K1090 H1091 E1092 D1093 G1094 S1095 L1099 S1100 D1101 H1104 M1112 E1120 R1123 R1136 E1137 V1138 Q1139 R1143 A1144 Q1145 K1152 V1156 R1164 V1165 T1166 S1170 T1173 L1176 P1177 E1187 R1191 V1194 A1195 G1203 R1204 P1205 V1206 L1207 M1208 T1211

A1216 W1220 T1230 D1243 K1244 L1245 N1246 G1247 L1248 K1249 E1250 N1251 V1252 I1253 I1254 G1255 K1256 P1259 I1270 A1281 ALA TYR THR ILE PRO SER TYR GLU ASP GLN TYR TYR SER PRO ASP PHE GLY ALA ALA THR GLY ALA ALA VAL PRO LEU ASP ASP TYR GLY TYR SER ASP

TYR ARG

• **Molecule 4: DNA-directed RNA polymerase subunit omega**

Chain E:

| 57% | 15% | • | 26% |

MET SER ILE SER GLN SER ASP ALA SER LEU ALA ALA VAL PRO ALA VAL ASP GLN PHE ASP PRO SER SER GLY ALA SER GLY G28 P32 L33 G34 I35 T36 N37 I40 L43 V47 L53 Y56 R60 I75 L76 A95 E98 I99 D102 H106 T107

E108 GLY GLU

• **Molecule 5: RNA polymerase sigma factor SigA**

Chain F:

| 3% | | | | |
| 48% | 13% | • | 39% |

MET ALA ALA THR LYS ALA SER THR ALA THR ASP GLU VAL PRO VAL LYS ARG THR ALA THR LYS SER PRO ALA ALA SER PRO ALA ALA SER GLY ALA LYS THR GLY LYS ARG THR ALA LYS SER ALA GLY SER PRO ALA LYS ALA ARG ALA LYS PRO ALA ARG VAL LYS PRO

ALA SER PRO GLN ASP THR THR THR SER THR ILE ALA THR THR LYS ARG THR ARG THR ALA ALA ALA LYS SER SER ALA LYS ALA LYS PRO SER ALA ARG HIS ALA LYS PRO ARG ALA PRO ASP GLN GLN HIS GLU ALA ALA THR ASP PRO GLU GLY ALA LEU SER SER VAL GLU

GLU LEU ASP ALA GLU PRO ASP LEU ASP ASP VAL GLU PRO GLY LEU GLU LEU ASP GLU SER ALA ASP LEU ASN LEU ASP ASP ASP LEU GLU ASP SER VAL ALA PRO ASP ASP ASP ALA LEU ASP SER GLY ASP GLU ASP HIS GLU ASP GLU LEU GLU ALA GLU ALA VAL ALA PRO GLY

GLN THR ALA ASP ASP GLU GLU ILE ALA GLU PRO THR GLU LYS ASP LYS ALA SER GLY ASP PHE VAL TRP ASP GLU D207 E210 A215 Y231 I235 L240 L241 N242 A243 L249 G256 L257 Y258 L262 L266 R269 G270 E271 R272 L273 P274 A275 A276 Q277

G288 H294 L295 R301 L302 S305 L306 M315 I321 I329 V332 K342 T345 Y346 A347 T348 W349 M350 I351 M359 A360 D361 R364 R367 I368 V373 K378 R381 L386 R392 E398 L399 A400 K401 E402 I405 S422 Q425

G428 ASP E430 G431 D432 S433 V448 V451 L456 L477 R487 T488 L489 D490 E491 I492 T499 R500 E501 R502 Q505 I506 K509 H513 L514 R515 H516 P517 S518 R519 S520 Q521 V522 L523 D528

• **Molecule 6: DNA (5'-D(*TP*AP*TP*AP*AP*TP*GP*GP*GP*AP*GP*CP*TP*GP*TP*CP
*AP*CP*GP*GP*AP*TP*G)-3')**

Chain H:

| 35% | 61% | • |

T1 A4 A5 T6 A10 G11 C12 T13 G14 T15 C16 A17 C18 G19 T22 G23

● Molecule 7: DNA (5'-D(*CP*AP*TP*CP*CP*GP*TP*GP*AP*GP*TP*CP*CP*AP*GP*G)-3')

Chain G:

4   Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	151.43Å 162.15Å 194.32Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.24 – 3.97 49.24 – 3.97	Depositor EDS
% Data completeness (in resolution range)	93.9 (49.24-3.97) 93.9 (49.24-3.97)	Depositor EDS
R_{merge}	0.24	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	2.85 (at 4.00Å)	Xtriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.223 , 0.260 0.227 , 0.262	Depositor DCC
R_{free} test set	2016 reflections (5.12%)	wwPDB-VP
Wilson B-factor (Å^2)	40.7	Xtriage
Anisotropy	0.301	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.26 , -22.0	EDS
L-test for twinning [2]	$<|L|>=0.42, <L^2>=0.24$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.82	EDS
Total number of atoms	26004	wwPDB-VP
Average B, all atoms (Å^2)	54.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.94% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1] Intensities estimated from amplitudes.

[2] Theoretical values of $<|L|>$, $<L^2>$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, RFP, 88G, MG

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	0.22	0/1730	0.45	0/2354
1	B	0.22	0/1741	0.44	0/2371
2	C	0.24	0/8873	0.42	1/12031 (0.0%)
3	D	0.24	0/10052	0.42	0/13591
4	E	0.31	0/650	0.44	0/886
5	F	0.23	0/2570	0.39	0/3464
6	H	0.52	0/535	0.92	1/826 (0.1%)
7	G	0.48	0/269	0.90	0/413
All	All	0.25	0/26420	0.45	2/35936 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	H	16	DC	P-O3'-C3'	6.80	127.86	119.70
2	C	48	LEU	CA-CB-CG	5.32	127.55	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1704	0	1741	20	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1715	0	1739	30	0
2	C	8714	0	8636	131	0
3	D	9887	0	9943	161	0
4	E	637	0	635	13	0
5	F	2541	0	2563	46	0
6	H	476	0	261	20	0
7	G	241	0	137	6	0
8	C	59	0	58	10	0
9	D	2	0	0	0	0
10	D	1	0	0	0	0
11	D	27	0	0	0	0
All	All	26004	0	25713	392	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 8.

The worst 5 of 392 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:D:913:ASP:OD2	3:D:914:PRO:HD2	1.35	1.24
6:H:16:DC:N3	7:G:12:DG:N1	2.17	0.91
3:D:908:GLY:O	3:D:909:THR:OG1	1.91	0.88
6:H:16:DC:O2	7:G:12:DG:N2	2.15	0.79
3:D:905:ALA:HB3	3:D:908:GLY:O	1.83	0.78

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	222/347 (64%)	210 (95%)	11 (5%)	1 (0%)	29 66

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	225/347 (65%)	207 (92%)	15 (7%)	3 (1%)	12	47
2	C	1124/1178 (95%)	1055 (94%)	63 (6%)	6 (0%)	29	66
3	D	1261/1316 (96%)	1200 (95%)	56 (4%)	5 (0%)	34	70
4	E	79/110 (72%)	77 (98%)	2 (2%)	0	100	100
5	F	317/528 (60%)	300 (95%)	16 (5%)	1 (0%)	41	74
All	All	3228/3826 (84%)	3049 (94%)	163 (5%)	16 (0%)	29	66

5 of 16 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	D	678	PRO
1	A	184	GLU
2	C	47	PRO
3	D	593	PRO
3	D	892	GLN

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	192/297 (65%)	190 (99%)	2 (1%)	76	85
1	B	192/297 (65%)	191 (100%)	1 (0%)	88	93
2	C	948/998 (95%)	935 (99%)	13 (1%)	67	80
3	D	1048/1095 (96%)	1020 (97%)	28 (3%)	44	66
4	E	68/90 (76%)	66 (97%)	2 (3%)	42	64
5	F	269/427 (63%)	261 (97%)	8 (3%)	41	64
All	All	2717/3204 (85%)	2663 (98%)	54 (2%)	55	73

5 of 54 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	D	441	CYS

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Mol	Chain	Res	Type
3	D	653	HIS
5	F	361	ASP
3	D	535	ASP
3	D	583	THR

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

Mol	Chain	Res	Type
2	C	451	HIS
3	D	375	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 carbohydrates in this entry.

5.6 Ligand geometry (i)

Of 5 ligands modelled in this entry, 3 are monoatomic - leaving 2 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	#$|Z| > 2$
11	88G	D	1404	-	29,29,29	1.80	4 (13%)	38,38,38	0.88	2 (5%)
8	RFP	C	1201	-	63,63,63	2.59	12 (19%)	94,94,94	2.22	18 (19%)

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
11	88G	D	1404	-	-	0/20/20/20	0/3/3/3
8	RFP	C	1201	-	-	23/60/85/85	0/5/5/5

The worst 5 of 16 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	C	1201	RFP	O4-C11	11.18	1.40	1.21
8	C	1201	RFP	C43-N2	8.15	1.50	1.27
8	C	1201	RFP	C17-C16	7.33	1.55	1.34
11	D	1404	88G	CAA-CAW	-5.46	1.40	1.51
8	C	1201	RFP	C3-C43	5.38	1.56	1.46

The worst 5 of 20 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	C	1201	RFP	C38-N4-C42	8.22	122.95	110.66
8	C	1201	RFP	C43-N2-N3	-7.71	109.61	120.43
8	C	1201	RFP	C2-C3-C43	-7.57	116.48	124.17
8	C	1201	RFP	C30-C16-C17	-6.62	107.40	123.42
8	C	1201	RFP	O3-C6-C7	5.30	130.26	121.14

There are no chirality outliers.
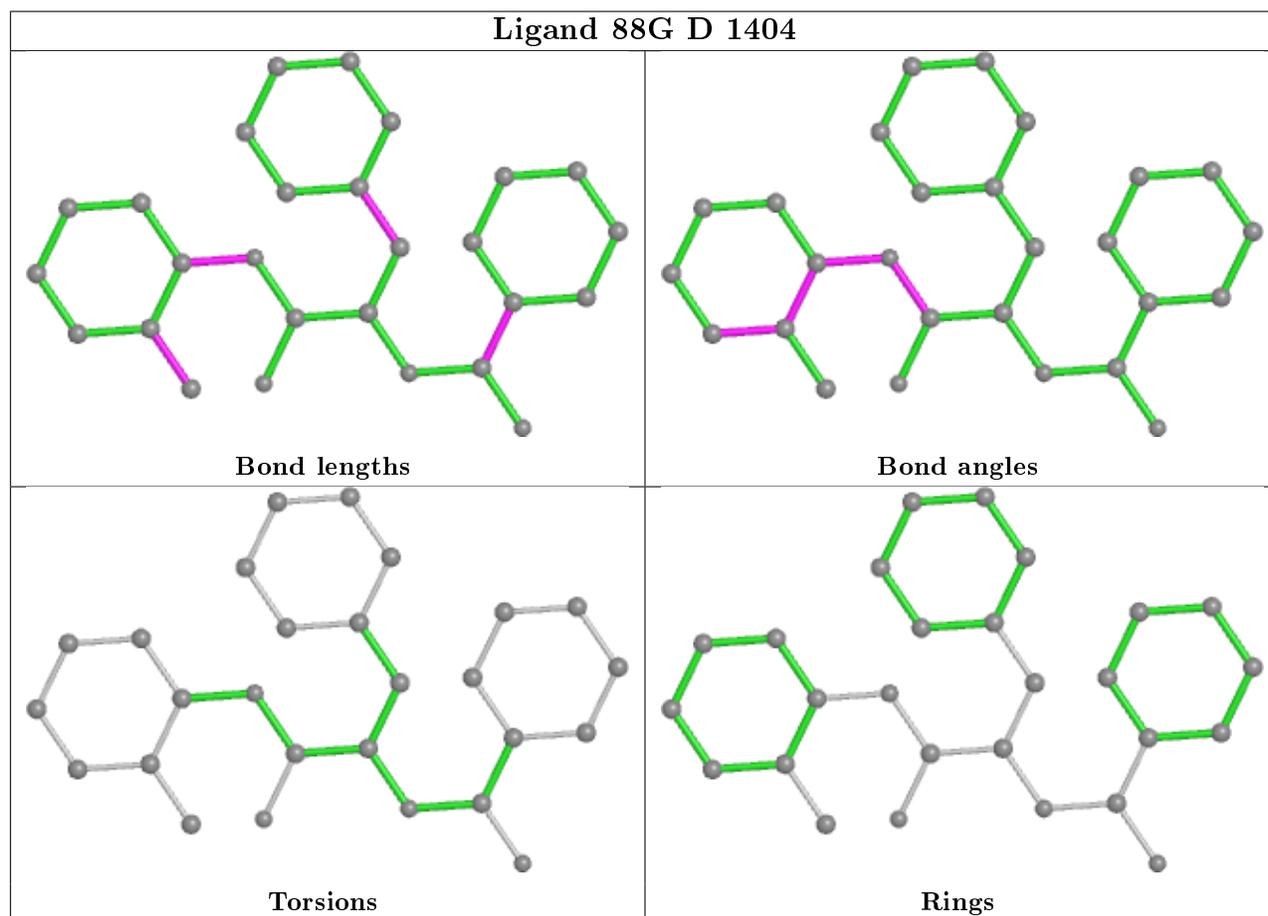
5 of 23 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	C	1201	RFP	C4-C3-C43-N2
8	C	1201	RFP	C11-C12-O5-C29
8	C	1201	RFP	O3-C12-O5-C29
8	C	1201	RFP	C26-C27-C28-C29
8	C	1201	RFP	C27-C28-C29-O5

There are no ring outliers.

1 monomer is involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	C	1201	RFP	10	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand 88G D 1404

Bond lengths

Bond angles

Torsions

Rings

Ligand RFP C 1201

Bond lengths

Bond angles

Torsions

Rings
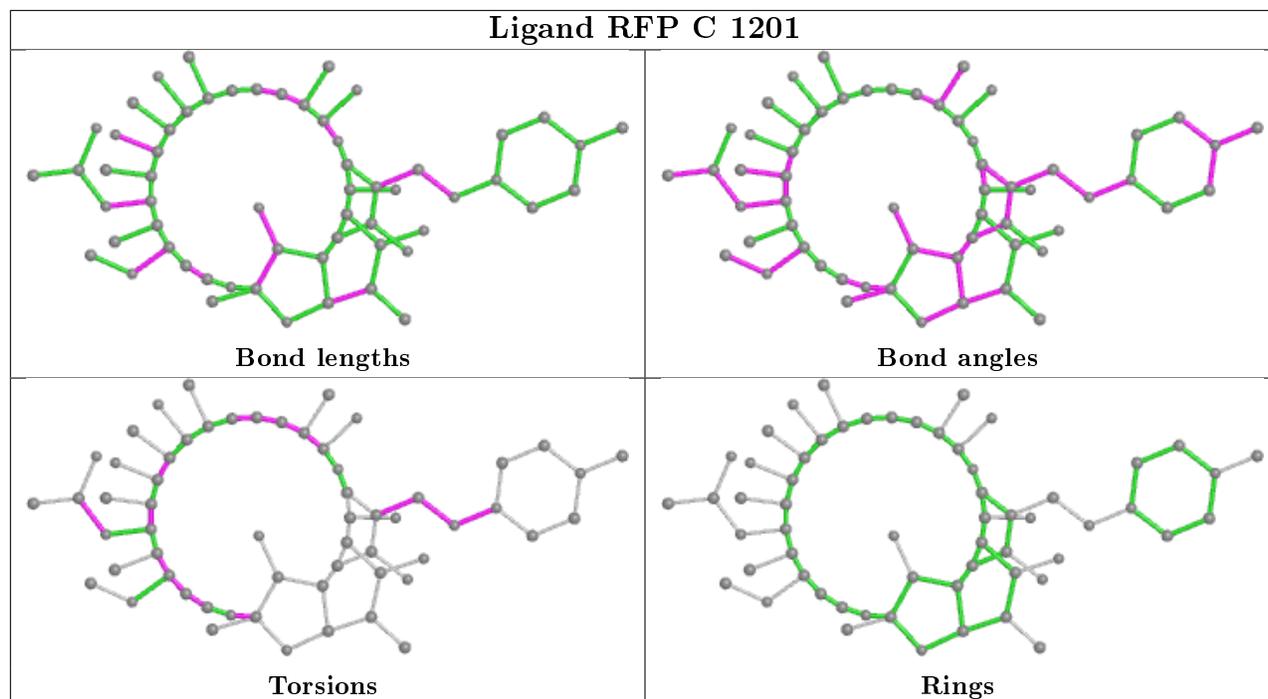
5.7 Other polymers (i)

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	A	224/347 (64%)	-0.23	3 (1%)	77	68	12, 52, 117, 140	0
1	B	227/347 (65%)	0.24	11 (4%)	30	25	45, 88, 136, 159	0
2	C	1126/1178 (95%)	-0.31	5 (0%)	92	87	3, 34, 116, 141	0
3	D	1265/1316 (96%)	-0.40	2 (0%)	95	93	4, 35, 101, 148	0
4	E	81/110 (73%)	-0.47	0	100	100	18, 41, 71, 92	0
5	F	321/528 (60%)	0.06	17 (5%)	26	23	7, 62, 159, 183	0
6	H	23/23 (100%)	0.09	0	100	100	27, 124, 234, 273	0
7	G	12/16 (75%)	1.71	4 (33%)	0	0	134, 224, 283, 283	0
All	All	3279/3865 (84%)	-0.26	42 (1%)	77	68	3, 43, 123, 283	0

The worst 5 of 42 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
7	G	14	DG	5.3
1	B	156	GLY	4.4
7	G	15	DT	4.0
7	G	16	DC	3.9
5	F	488	THR	3.9

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

There are no non-standard protein/DNA/RNA residues in this entry.
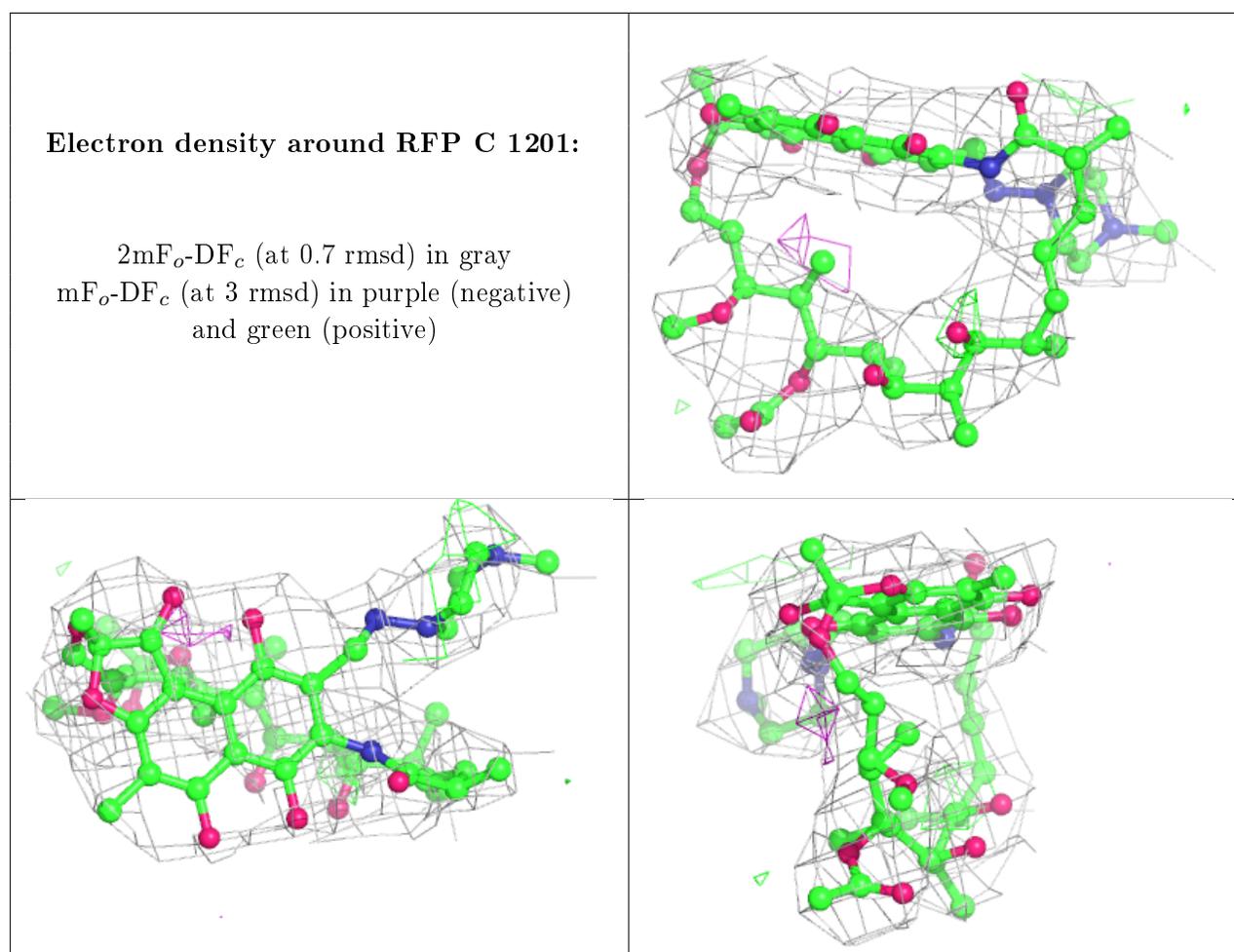
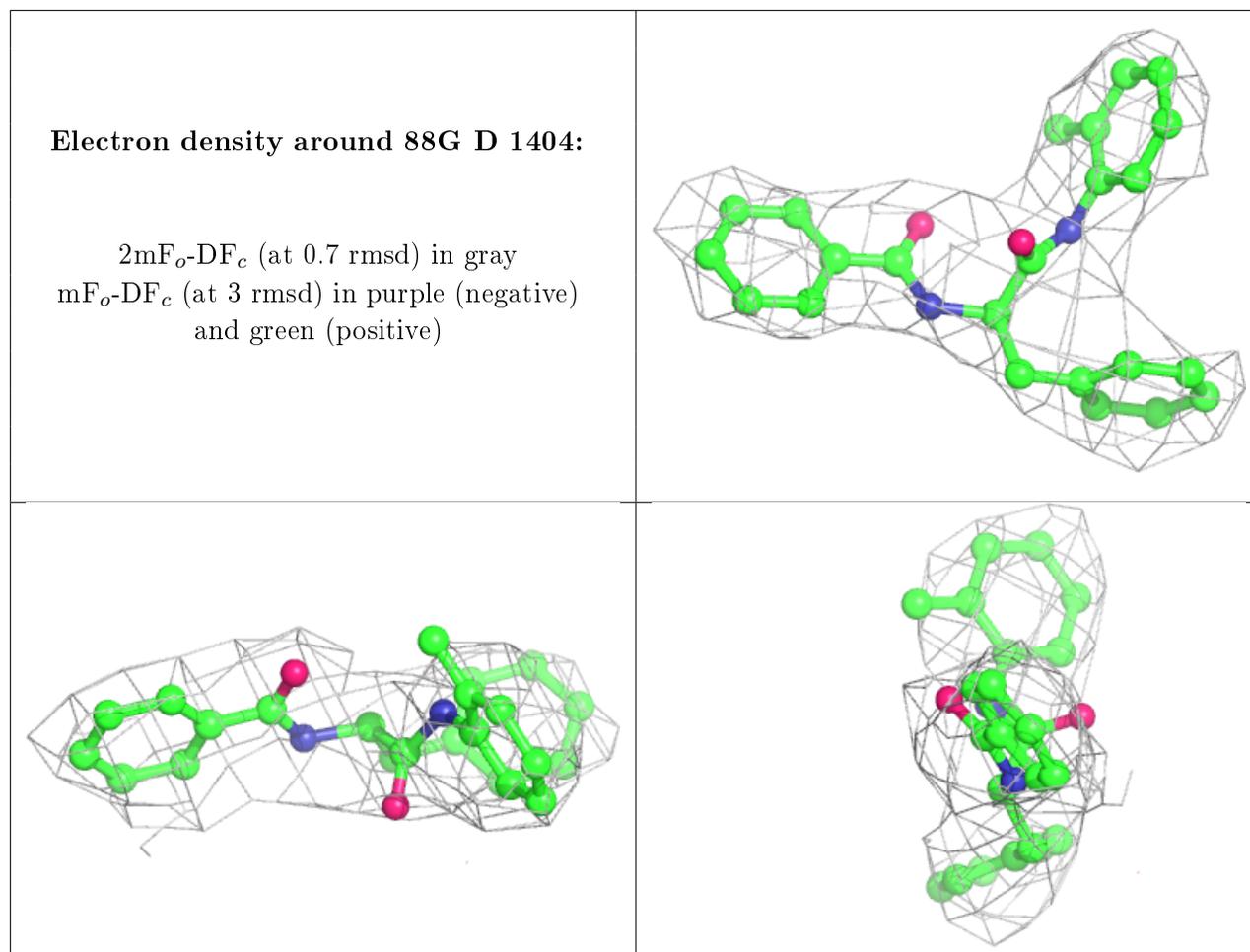## 6.3 Carbohydrates (i)

There are no carbohydrates in this entry.

6.4 Ligands (i)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
8	RFP	C	1201	59/59	0.95	0.27	22,26,50,66	0
10	MG	D	1403	1/1	0.96	0.13	5,5,5,5	0
11	88G	D	1404	27/27	0.97	0.35	27,35,40,43	0
9	ZN	D	1401	1/1	0.98	0.07	34,34,34,34	0
9	ZN	D	1402	1/1	0.99	0.10	52,52,52,52	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 RFP C 1201:

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

Electron density around 88G D 1404:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.