



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 16, 2023 – 11:27 am GMT

PDB ID : 3ZHS
Title : Crystal structure of the SucA domain of Mycobacterium smegmatis KGD, first post-decarboxylation intermediate from alpha-ketoglutarate
Authors : Wagner, T.; Barilone, N.; Bellinzoni, M.; Alzari, P.M.
Deposited on : 2012-12-24
Resolution : 2.10 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467
Mogul : 1.8.4, 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

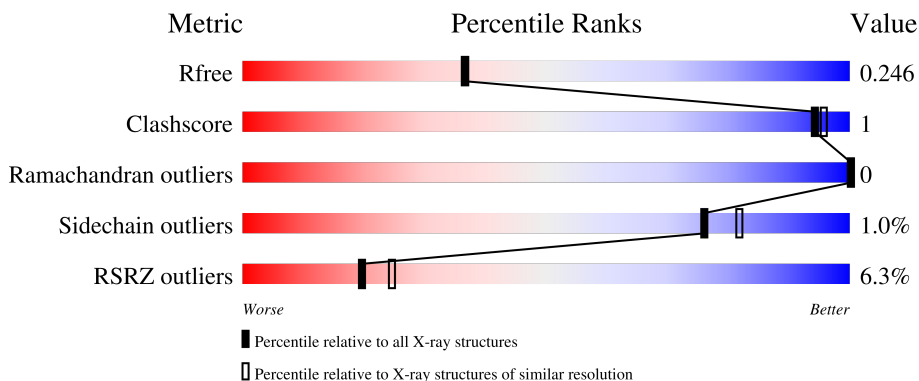
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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	868	 6% 89% 5% 6%
1	B	868	 5% 90% 6%
1	C	868	 5% 89% 7%
1	D	868	 7% 89% 7%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 26258 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.

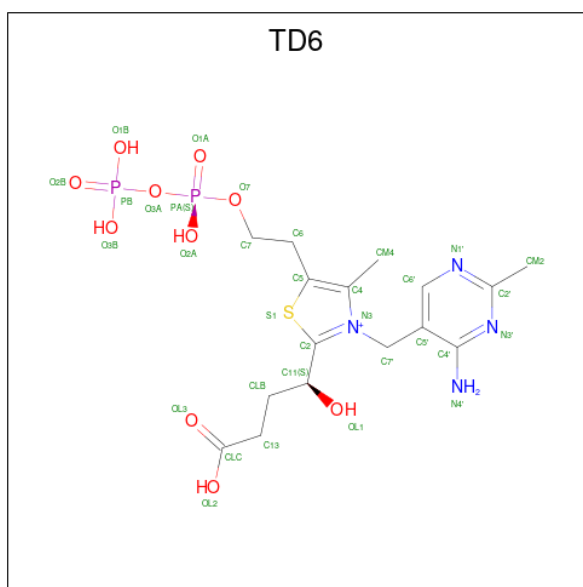
- Molecule 1 is a protein called MULTIFUNCTIONAL 2-OXOGLUTARATE METABOLISM ENZYME.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	817	Total 6319	C 3983	N 1114	O 1200	S 22	0	0	0
1	B	813	Total 6254	C 3946	N 1106	O 1179	S 23	0	0	0
1	C	808	Total 6280	C 3962	N 1108	O 1187	S 23	0	0	0
1	D	810	Total 6225	C 3926	N 1102	O 1173	S 24	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	360	GLY	-	expression tag	UNP A0R2B1
B	360	GLY	-	expression tag	UNP A0R2B1
C	360	GLY	-	expression tag	UNP A0R2B1
D	360	GLY	-	expression tag	UNP A0R2B1

- Molecule 2 is (4S)-4-{3-[(4-amino-2-methylpyrimidin-5-yl)methyl]-5-(2-[(S)-hydroxy(phosphonoxy)phosphoryl]oxy)ethyl)-4-methyl-1,3lambda 5 -thiazol-2-yl}-4-hydroxybutanoic acid (three-letter code: TD6) (formula: C₁₆H₂₅N₄O₁₀P₂S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	N	O	P			S
2	A	1	Total	C	N	O	P	S	0	0
			33	16	4	10	2	1		
2	B	1	Total	C	N	O	P	S	0	0
			33	16	4	10	2	1		
2	C	1	Total	C	N	O	P	S	0	0
			33	16	4	10	2	1		
2	D	1	Total	C	N	O	P	S	0	0
			33	16	4	10	2	1		

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
3	A	1	Total	Mg	0	0
			1	1		
3	B	1	Total	Mg	0	0
			1	1		
3	C	1	Total	Mg	0	0
			1	1		
3	D	1	Total	Mg	0	0
			1	1		

- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Ca		
4	A	1	Total	Ca	0	0
			1	1		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total Ca 1 1	0	0
4	C	1	Total Ca 1 1	0	0
4	D	1	Total Ca 1 1	0	0

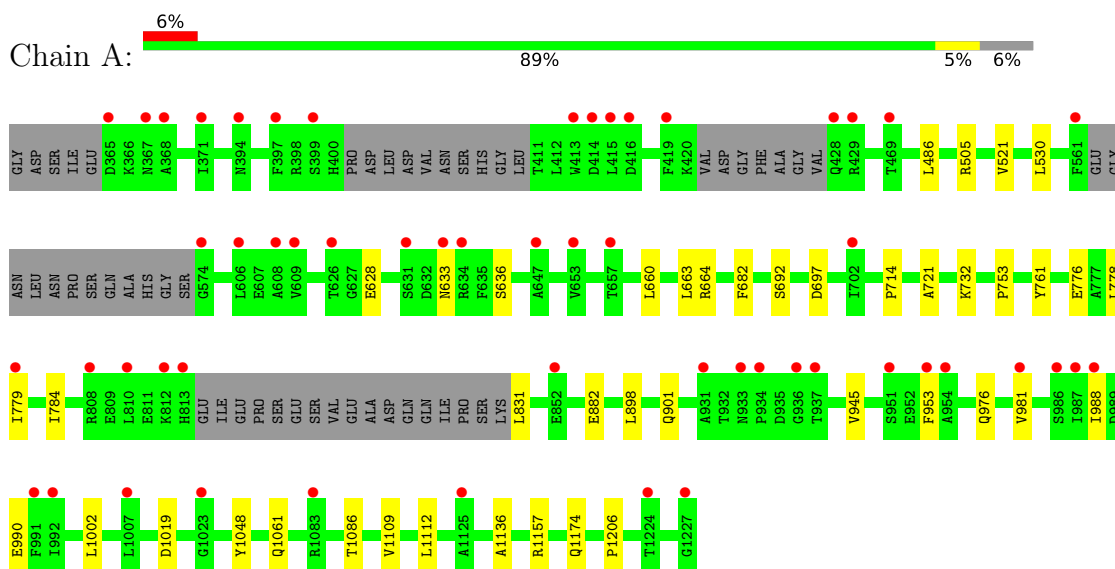
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	316	Total O 316 316	0	0
5	B	241	Total O 241 241	0	0
5	C	272	Total O 272 272	0	0
5	D	211	Total O 211 211	0	0

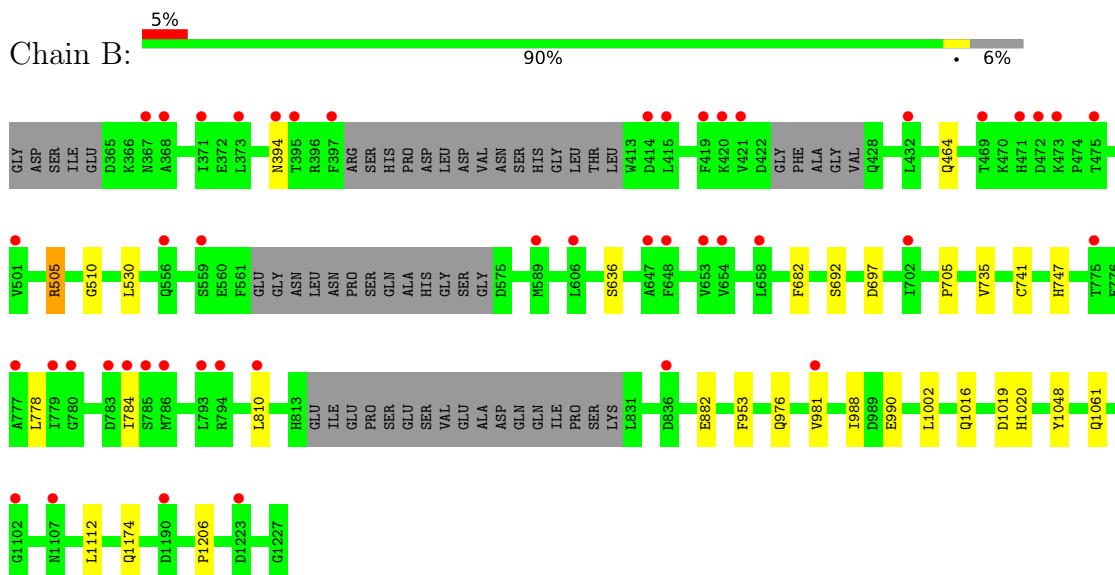
3 Residue-property plots

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: MULTIFUNCTIONAL 2-OXOGLUTARATE METABOLISM ENZYME

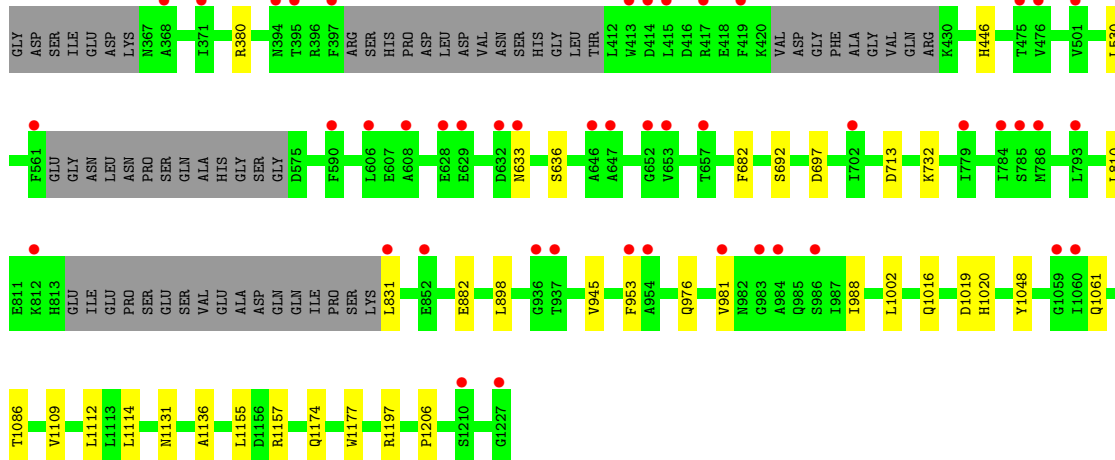


- Molecule 1: MULTIFUNCTIONAL 2-OXOGLUTARATE METABOLISM ENZYME




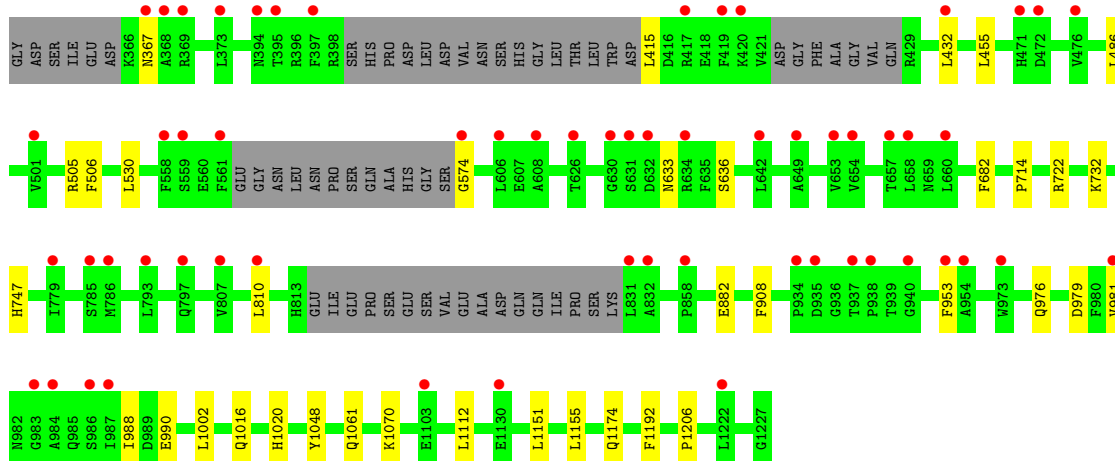
- Molecule 1: MULTIFUNCTIONAL 2-OXOGLUTARATE METABOLISM ENZYME

Chain C:  5% 89% 7%



• Molecule 1: MULTIFUNCTIONAL 2-OXOGLUTARATE METABOLISM ENZYME

Chain D:  7% 89% 7%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	80.85Å 83.71Å 159.94Å 99.89° 99.03° 100.20°	Depositor
Resolution (Å)	30.75 – 2.10 47.43 – 2.10	Depositor EDS
% Data completeness (in resolution range)	94.5 (30.75-2.10) 94.5 (47.43-2.10)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.04 (at 2.10Å)	Xtrriage
Refinement program	BUSTER 2.11.2	Depositor
R, R_{free}	0.200 , 0.228 0.215 , 0.246	Depositor DCC
R_{free} test set	10967 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	26.7	Xtrriage
Anisotropy	0.571	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 57.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.015 for -k,-h,-l	Xtrriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	26258	wwPDB-VP
Average B, all atoms (Å ²)	36.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 15.92% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: MG, CA, TD6

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	0.51	0/6448	0.62	0/8749
1	B	0.50	0/6381	0.62	0/8661
1	C	0.50	0/6407	0.63	0/8684
1	D	0.50	0/6351	0.62	0/8615
All	All	0.50	0/25587	0.62	0/34709

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	6319	0	6087	22	0
1	B	6254	0	6025	13	0
1	C	6280	0	6099	19	0
1	D	6225	0	6004	17	0
2	A	33	0	21	0	0
2	B	33	0	21	1	0
2	C	33	0	21	0	0
2	D	33	0	21	1	0
3	A	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	316	0	0	1	0
5	B	241	0	0	0	0
5	C	272	0	0	0	0
5	D	211	0	0	1	0
All	All	26258	0	24299	66	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 1.

All (66) 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:C:1112:LEU:HD21	1:C:1155:LEU:HD22	1.77	0.65
1:A:981:VAL:HG22	1:A:988:ILE:HD11	1.84	0.59
1:A:1157:ARG:NH2	1:C:1086:THR:O	2.33	0.58
1:C:1109:VAL:HG21	1:C:1136:ALA:HB2	1.84	0.58
1:C:380:ARG:NH1	1:D:455:LEU:O	2.33	0.56
1:C:981:VAL:HG22	1:C:988:ILE:HD11	1.89	0.54
1:D:1151:LEU:O	1:D:1155:LEU:HG	2.08	0.52
1:B:505:ARG:HA	1:B:747:HIS:O	2.09	0.52
1:D:415:LEU:HA	1:D:432:LEU:HD12	1.91	0.52
1:D:981:VAL:HG22	1:D:988:ILE:HD11	1.91	0.52
1:B:882:GLU:HB2	1:B:1048:TYR:HE2	1.75	0.51
1:A:486:LEU:HD11	1:A:714:PRO:HG3	1.93	0.50
1:A:1086:THR:O	1:C:1157:ARG:NH2	2.40	0.50
1:A:753:PRO:HB2	1:A:761:TYR:CD1	2.46	0.50
1:B:530:LEU:HD22	1:B:636:SER:HA	1.94	0.49
1:B:981:VAL:HG22	1:B:988:ILE:HD11	1.94	0.48
1:A:778:LEU:HB3	1:A:784:ILE:HG12	1.96	0.48
1:C:446:HIS:ND1	1:C:713:ASP:OD2	2.47	0.47
1:D:506:PHE:CZ	1:D:574:GLY:HA2	2.50	0.46
1:A:1109:VAL:HG21	1:A:1136:ALA:HB2	1.97	0.46
1:A:628:GLU:HG2	1:A:664:ARG:O	2.16	0.46
1:A:1019:ASP:OD1	1:B:990:GLU:OE1	2.34	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:530:LEU:HD22	1:C:636:SER:HA	1.98	0.45
1:D:882:GLU:HB2	1:D:1048:TYR:HE2	1.81	0.45
1:D:722:ARG:NH1	5:D:3087:HOH:O	2.50	0.45
1:A:692:SER:HB2	1:A:697:ASP:OD2	2.17	0.45
1:D:633:ASN:O	1:D:732:LYS:HE3	2.17	0.45
1:A:776:GLU:HA	1:A:779:ILE:HD12	1.99	0.44
1:A:882:GLU:HB2	1:A:1048:TYR:HE2	1.82	0.44
1:D:486:LEU:HD11	1:D:714:PRO:HG3	1.99	0.44
1:C:1112:LEU:HD23	1:C:1114:LEU:HD11	2.00	0.44
1:D:530:LEU:HD22	1:D:636:SER:HA	2.00	0.44
1:D:908:PHE:CZ	1:D:1070:LYS:HG2	2.52	0.44
1:D:1002:LEU:HB3	1:D:1061:GLN:HB2	2.00	0.43
1:A:660:LEU:HA	1:A:663:LEU:HD12	2.01	0.43
1:A:1174:GLN:OE1	1:A:1206:PRO:HA	2.18	0.43
1:D:505:ARG:HA	1:D:747:HIS:O	2.19	0.43
1:D:1155:LEU:HD11	1:D:1192:PHE:CZ	2.54	0.43
1:D:1174:GLN:OE1	1:D:1206:PRO:HA	2.19	0.43
1:B:705:PRO:HG2	1:B:735:VAL:HG13	2.01	0.42
1:C:692:SER:HB2	1:C:697:ASP:OD2	2.20	0.42
1:C:633:ASN:O	1:C:732:LYS:HE2	2.19	0.42
1:B:1016:GLN:HB3	1:B:1020:HIS:HB2	2.01	0.42
1:A:990:GLU:OE1	1:B:1019:ASP:OD1	2.38	0.42
1:C:1112:LEU:CD2	1:C:1155:LEU:HD22	2.46	0.42
1:C:1019:ASP:OD1	1:D:990:GLU:OE1	2.37	0.42
1:C:1002:LEU:HB3	1:C:1061:GLN:CB	2.50	0.42
1:C:1016:GLN:HB3	1:C:1020:HIS:HB2	2.02	0.42
1:D:1016:GLN:HB3	1:D:1020:HIS:HB2	2.01	0.42
1:A:521:VAL:HG23	1:A:721:ALA:HB1	2.02	0.41
1:A:898:LEU:O	1:A:945:VAL:HA	2.20	0.41
1:B:1002:LEU:HB3	1:B:1061:GLN:HB2	2.03	0.41
1:A:505:ARG:HG2	5:A:3024:HOH:O	2.21	0.41
1:B:1174:GLN:OE1	1:B:1206:PRO:HA	2.21	0.41
1:C:898:LEU:O	1:C:945:VAL:HA	2.19	0.41
1:C:1174:GLN:OE1	1:C:1206:PRO:HA	2.20	0.41
1:A:633:ASN:O	1:A:732:LYS:HE2	2.21	0.41
1:C:1177:TRP:CD1	1:C:1197:ARG:HD3	2.56	0.41
1:A:901:GLN:OE1	2:B:2001:TD6:H6'	2.21	0.40
1:C:882:GLU:HB2	1:C:1048:TYR:HE2	1.86	0.40
1:B:692:SER:HB2	1:B:697:ASP:OD2	2.22	0.40
2:D:2001:TD6:H6	2:D:2001:TD6:HM4	1.97	0.40
1:B:778:LEU:HB3	1:B:784:ILE:HG12	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:510:GLY:O	1:B:741:CYS:HB2	2.22	0.40
1:A:530:LEU:HD22	1:A:636:SER:HA	2.03	0.40
1:A:1002:LEU:HB3	1:A:1061:GLN:HB2	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	807/868 (93%)	786 (97%)	21 (3%)	0	100	100
1	B	803/868 (92%)	784 (98%)	19 (2%)	0	100	100
1	C	798/868 (92%)	777 (97%)	21 (3%)	0	100	100
1	D	800/868 (92%)	779 (97%)	21 (3%)	0	100	100
All	All	3208/3472 (92%)	3126 (97%)	82 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	649/726 (89%)	644 (99%)	5 (1%)	81	86
1	B	638/726 (88%)	630 (99%)	8 (1%)	69	75

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	649/726 (89%)	643 (99%)	6 (1%)	78	84
1	D	634/726 (87%)	627 (99%)	7 (1%)	73	79
All	All	2570/2904 (88%)	2544 (99%)	26 (1%)	76	82

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	682	PHE
1	A	831	LEU
1	A	953	PHE
1	A	976	GLN
1	A	1112	LEU
1	B	394	ASN
1	B	464	GLN
1	B	505	ARG
1	B	682	PHE
1	B	810	LEU
1	B	953	PHE
1	B	976	GLN
1	B	1112	LEU
1	C	682	PHE
1	C	810	LEU
1	C	831	LEU
1	C	953	PHE
1	C	976	GLN
1	C	1131	ASN
1	D	367	ASN
1	D	682	PHE
1	D	810	LEU
1	D	953	PHE
1	D	976	GLN
1	D	979	ASP
1	D	1112	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 12 ligands modelled in this entry, 8 are monoatomic - leaving 4 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	TD6	B	2001	3	29,34,34	1.62	4 (13%)	35,50,50	1.85	8 (22%)
2	TD6	D	2001	3	29,34,34	1.66	4 (13%)	35,50,50	1.94	8 (22%)
2	TD6	C	2001	3	29,34,34	1.55	4 (13%)	35,50,50	1.84	8 (22%)
2	TD6	A	2001	3	29,34,34	1.54	4 (13%)	35,50,50	1.94	8 (22%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	TD6	B	2001	3	-	4/21/26/26	0/2/2/2
2	TD6	D	2001	3	-	4/21/26/26	0/2/2/2
2	TD6	C	2001	3	-	6/21/26/26	0/2/2/2
2	TD6	A	2001	3	-	4/21/26/26	0/2/2/2

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	2001	TD6	C2-N3	6.54	1.50	1.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	2001	TD6	C2-N3	6.40	1.49	1.35
2	B	2001	TD6	C2-N3	6.36	1.49	1.35
2	C	2001	TD6	C2-N3	6.19	1.49	1.35
2	D	2001	TD6	C5-S1	-4.17	1.66	1.74
2	B	2001	TD6	C5-S1	-3.80	1.67	1.74
2	C	2001	TD6	C5-S1	-3.70	1.67	1.74
2	D	2001	TD6	OL2-CLC	-2.83	1.21	1.30
2	D	2001	TD6	OL3-CLC	2.69	1.31	1.22
2	B	2001	TD6	OL2-CLC	-2.66	1.21	1.30
2	A	2001	TD6	OL3-CLC	2.65	1.30	1.22
2	A	2001	TD6	C5-S1	-2.61	1.69	1.74
2	C	2001	TD6	OL3-CLC	2.61	1.30	1.22
2	B	2001	TD6	OL3-CLC	2.42	1.30	1.22
2	C	2001	TD6	OL2-CLC	-2.41	1.22	1.30
2	A	2001	TD6	OL2-CLC	-2.39	1.22	1.30

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	2001	TD6	PA-O3A-PB	7.30	157.89	132.83
2	D	2001	TD6	PA-O3A-PB	7.30	157.89	132.83
2	B	2001	TD6	PA-O3A-PB	7.00	156.84	132.83
2	C	2001	TD6	PA-O3A-PB	6.94	156.63	132.83
2	A	2001	TD6	C6-C5-C4	-4.49	123.83	127.43
2	D	2001	TD6	C6-C5-C4	-4.26	124.01	127.43
2	C	2001	TD6	C6-C5-C4	-3.60	124.54	127.43
2	B	2001	TD6	C6-C5-C4	-3.25	124.83	127.43
2	C	2001	TD6	OL3-CLC-C13	-3.24	112.68	123.08
2	A	2001	TD6	OL3-CLC-C13	-3.13	113.03	123.08
2	B	2001	TD6	OL3-CLC-C13	-2.99	113.47	123.08
2	C	2001	TD6	OL2-CLC-C13	2.98	123.62	114.03
2	D	2001	TD6	OL3-CLC-C13	-2.91	113.74	123.08
2	D	2001	TD6	O7-PA-O1A	2.90	120.40	109.07
2	A	2001	TD6	OL2-CLC-C13	2.87	123.25	114.03
2	D	2001	TD6	OL2-CLC-C13	2.86	123.23	114.03
2	B	2001	TD6	OL2-CLC-C13	2.82	123.10	114.03
2	B	2001	TD6	O7-PA-O1A	2.78	119.93	109.07
2	A	2001	TD6	O1B-PB-O3A	-2.73	95.46	104.64
2	B	2001	TD6	C5-C4-N3	2.65	113.21	107.66
2	D	2001	TD6	C5-C4-N3	2.65	113.20	107.66
2	A	2001	TD6	C5-C4-N3	2.64	113.19	107.66
2	A	2001	TD6	O7-PA-O1A	2.63	119.34	109.07

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	2001	TD6	C5-C4-N3	2.50	112.88	107.66
2	D	2001	TD6	O1B-PB-O3A	-2.47	96.35	104.64
2	B	2001	TD6	O1B-PB-O3A	-2.46	96.38	104.64
2	C	2001	TD6	O7-PA-O1A	2.35	118.25	109.07
2	C	2001	TD6	O1B-PB-O3A	-2.26	97.06	104.64
2	B	2001	TD6	C13-CLB-C11	2.19	117.70	114.45
2	D	2001	TD6	O3B-PB-O2B	2.09	118.85	110.68
2	A	2001	TD6	O3B-PB-O2B	2.04	118.69	110.68
2	C	2001	TD6	O3B-PB-O2B	2.03	118.65	110.68

There are no chirality outliers.

All (18) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	2001	TD6	OL1-C11-CLB-C13
2	C	2001	TD6	OL1-C11-CLB-C13
2	A	2001	TD6	PA-O3A-PB-O2B
2	C	2001	TD6	PA-O3A-PB-O2B
2	D	2001	TD6	PA-O3A-PB-O2B
2	B	2001	TD6	PA-O3A-PB-O1B
2	C	2001	TD6	PA-O3A-PB-O1B
2	D	2001	TD6	PA-O3A-PB-O1B
2	B	2001	TD6	PA-O3A-PB-O2B
2	B	2001	TD6	CLB-C13-CLC-OL2
2	D	2001	TD6	CLB-C13-CLC-OL2
2	A	2001	TD6	CLB-C13-CLC-OL2
2	C	2001	TD6	CLB-C13-CLC-OL2
2	C	2001	TD6	CLB-C13-CLC-OL3
2	B	2001	TD6	CLB-C13-CLC-OL3
2	A	2001	TD6	CLB-C13-CLC-OL3
2	D	2001	TD6	CLB-C13-CLC-OL3
2	C	2001	TD6	C7-O7-PA-O1A

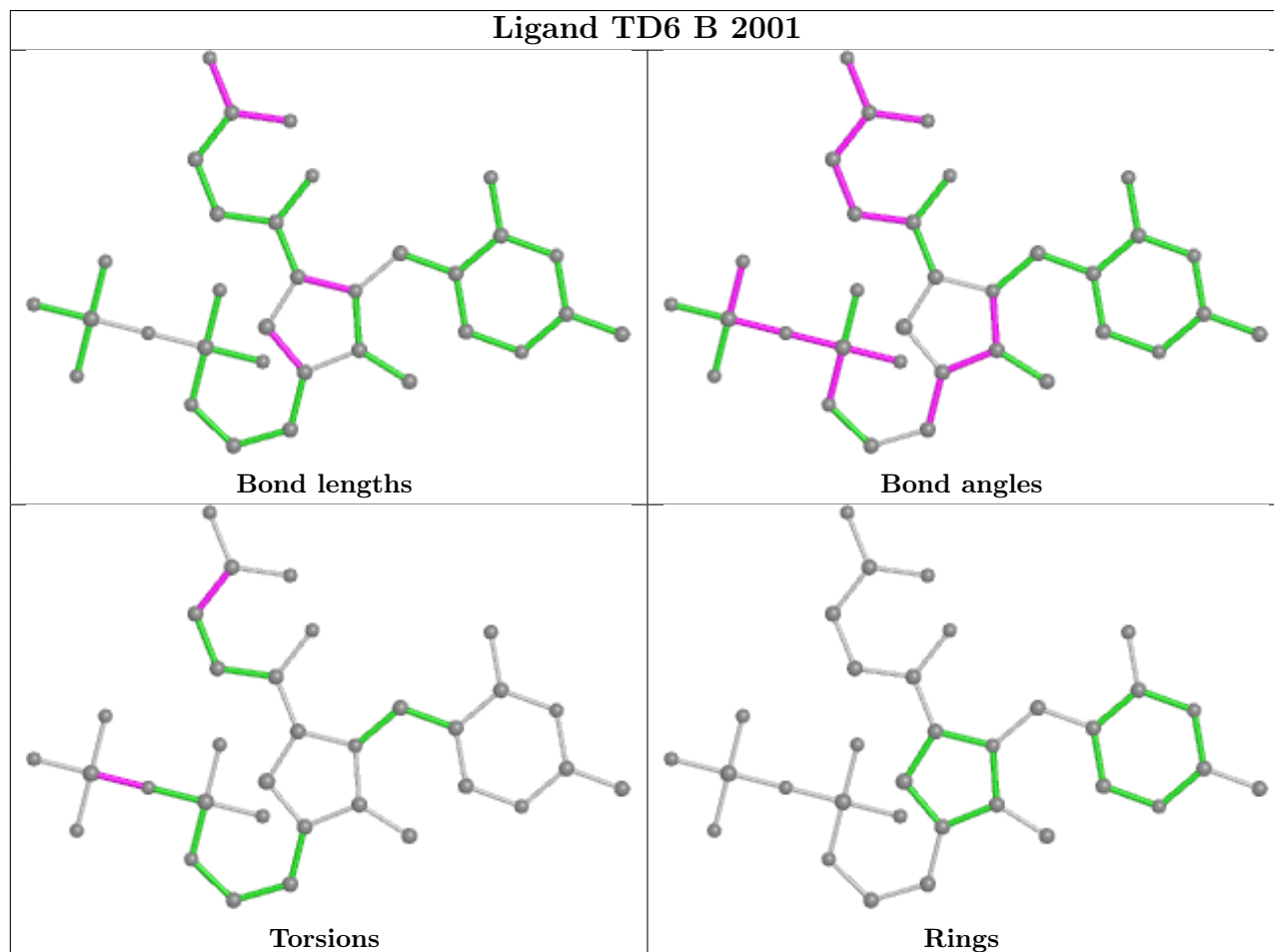
There are no ring outliers.

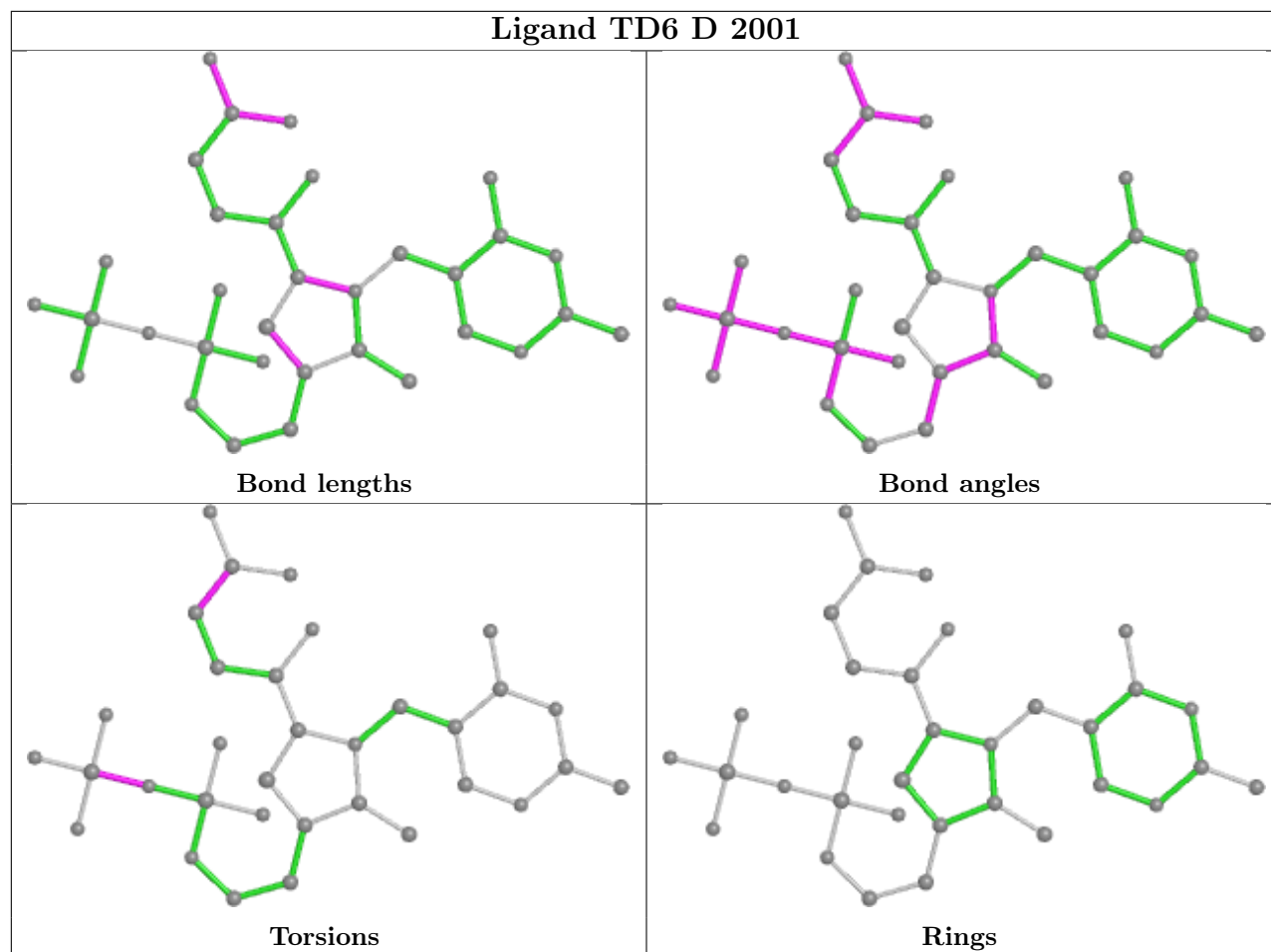
2 monomers are involved in 2 short contacts:

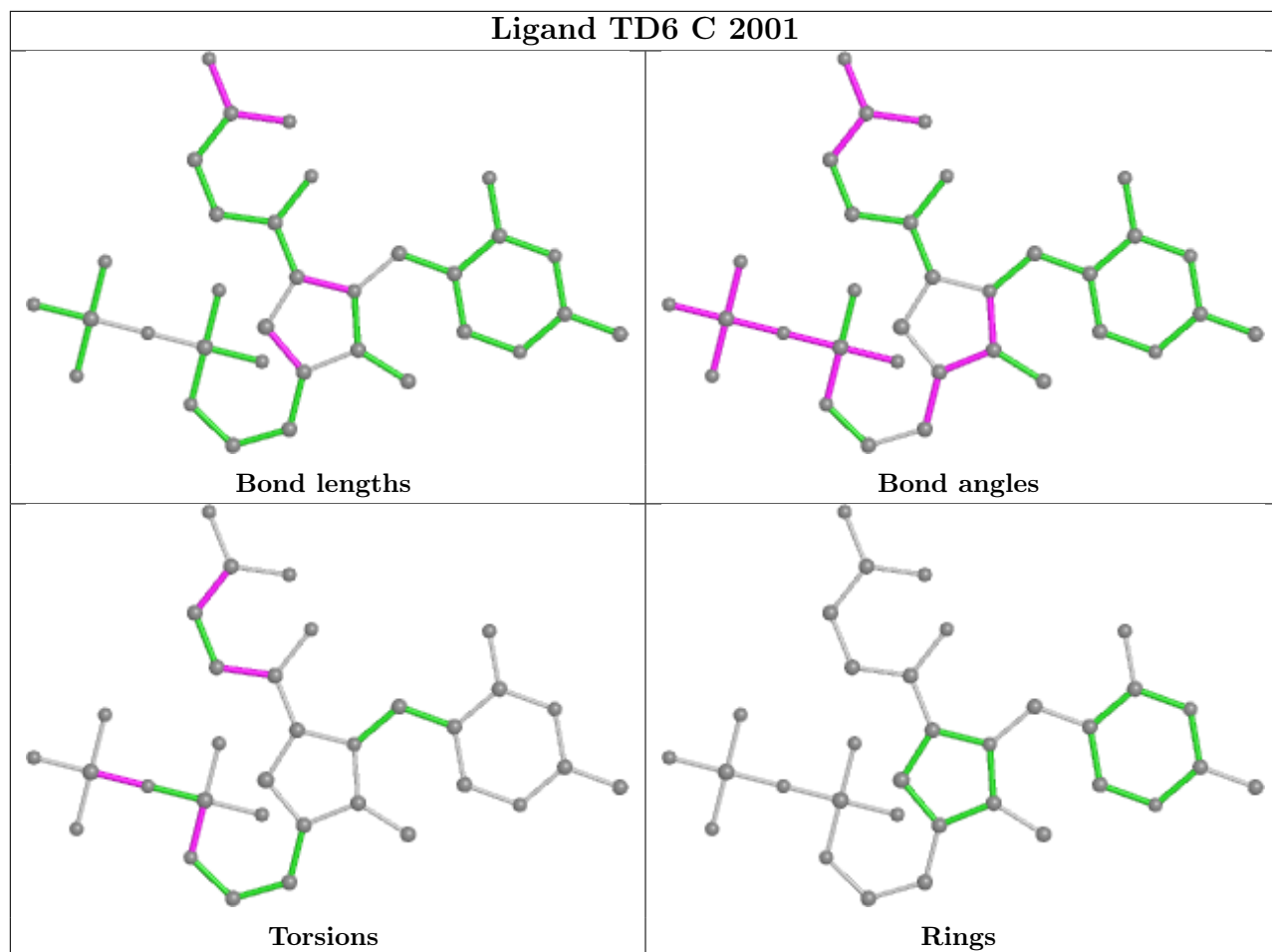
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	2001	TD6	1	0
2	D	2001	TD6	1	0

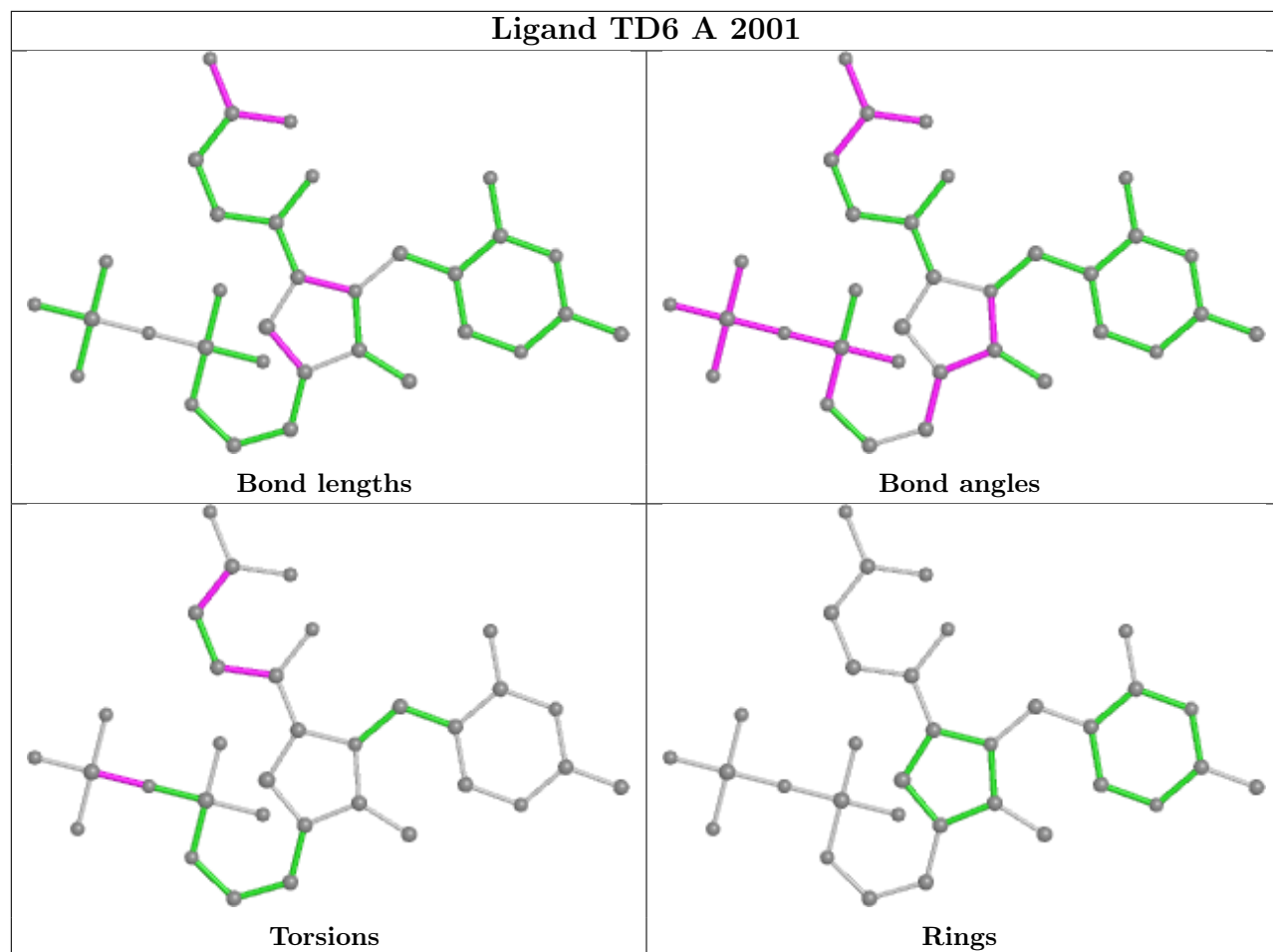
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

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

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	817/868 (94%)	0.24	54 (6%) 18 23	15, 32, 59, 82	0
1	B	813/868 (93%)	0.25	46 (5%) 23 29	15, 32, 66, 101	0
1	C	808/868 (93%)	0.26	47 (5%) 23 28	18, 35, 64, 92	0
1	D	810/868 (93%)	0.43	59 (7%) 15 19	17, 35, 66, 96	0
All	All	3248/3472 (93%)	0.29	206 (6%) 20 24	15, 33, 64, 101	0

All (206) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	399	SER	7.1
1	C	368	ALA	6.6
1	D	810	LEU	6.4
1	D	368	ALA	6.0
1	B	810	LEU	5.7
1	B	421	VAL	5.7
1	D	574	GLY	5.1
1	D	935	ASP	5.1
1	D	831	LEU	4.9
1	B	779	ILE	4.8
1	C	779	ILE	4.6
1	D	419	PHE	4.6
1	B	371	ILE	4.5
1	B	394	ASN	4.4
1	B	367	ASN	4.4
1	A	413	TRP	4.3
1	C	784	ILE	4.3
1	A	368	ALA	4.3
1	A	810	LEU	4.2
1	D	779	ILE	4.2
1	B	368	ALA	4.2

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Mol	Chain	Res	Type	RSRZ
1	B	419	PHE	4.1
1	B	501	VAL	4.0
1	D	631	SER	4.0
1	D	367	ASN	4.0
1	C	785	SER	3.9
1	C	633	ASN	3.8
1	C	371	ILE	3.8
1	B	785	SER	3.8
1	D	373	LEU	3.7
1	D	501	VAL	3.7
1	B	1102	GLY	3.7
1	B	395	THR	3.7
1	C	397	PHE	3.6
1	D	987	ILE	3.5
1	D	786	MET	3.5
1	A	626	THR	3.4
1	B	432	LEU	3.4
1	D	934	PRO	3.4
1	D	937	THR	3.4
1	D	559	SER	3.4
1	B	775	THR	3.4
1	B	472	ASP	3.3
1	C	953	PHE	3.3
1	D	420	LYS	3.3
1	D	561	PHE	3.3
1	A	779	ILE	3.2
1	C	983	GLY	3.2
1	C	1210	SER	3.2
1	D	653	VAL	3.2
1	A	371	ILE	3.2
1	C	812	LYS	3.2
1	A	419	PHE	3.2
1	D	632	ASP	3.2
1	C	413	TRP	3.2
1	C	984	ALA	3.1
1	A	702	ILE	3.1
1	A	574	GLY	3.1
1	C	394	ASN	3.1
1	C	629	GLU	3.1
1	D	981	VAL	3.1
1	B	414	ASP	3.0
1	C	419	PHE	3.0

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Mol	Chain	Res	Type	RSRZ
1	A	1007	LEU	3.0
1	B	397	PHE	2.9
1	D	471	HIS	2.9
1	D	432	LEU	2.9
1	B	556	GLN	2.9
1	B	786	MET	2.9
1	A	365	ASP	2.8
1	D	472	ASP	2.8
1	A	937	THR	2.8
1	B	647	ALA	2.8
1	D	785	SER	2.8
1	D	973	TRP	2.8
1	A	653	VAL	2.8
1	B	415	LEU	2.8
1	D	953	PHE	2.7
1	D	608	ALA	2.7
1	D	369	ARG	2.7
1	D	938	PRO	2.7
1	B	653	VAL	2.7
1	D	654	VAL	2.7
1	A	631	SER	2.7
1	B	559	SER	2.7
1	C	1227	GLY	2.7
1	B	777	ALA	2.7
1	C	417	ARG	2.7
1	A	394	ASN	2.7
1	D	807	VAL	2.6
1	A	429	ARG	2.6
1	A	367	ASN	2.6
1	B	373	LEU	2.6
1	B	648	PHE	2.6
1	A	1227	GLY	2.6
1	C	476	VAL	2.6
1	D	954	ALA	2.6
1	D	797	GLN	2.6
1	B	794	ARG	2.6
1	D	1103	GLU	2.6
1	A	953	PHE	2.6
1	A	428	GLN	2.6
1	C	632	ASP	2.6
1	C	937	THR	2.6
1	B	793	LEU	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	397	PHE	2.5
1	A	1125	ALA	2.5
1	B	784	ILE	2.5
1	B	471	HIS	2.5
1	A	954	ALA	2.5
1	D	626	THR	2.5
1	C	628	GLU	2.5
1	A	633	ASN	2.5
1	A	931	ALA	2.5
1	C	647	ALA	2.5
1	C	653	VAL	2.5
1	C	786	MET	2.5
1	D	558	PHE	2.5
1	C	981	VAL	2.4
1	A	608	ALA	2.4
1	C	646	ALA	2.4
1	D	397	PHE	2.4
1	C	1059	GLY	2.4
1	B	654	VAL	2.4
1	B	1190	ASP	2.4
1	D	984	ALA	2.4
1	B	658	LEU	2.4
1	C	415	LEU	2.4
1	A	1083	ARG	2.4
1	C	1060	ILE	2.4
1	D	657	THR	2.4
1	B	473	LYS	2.4
1	A	1023	GLY	2.4
1	C	702	ILE	2.3
1	A	647	ALA	2.3
1	A	812	LYS	2.3
1	A	988	ILE	2.3
1	D	793	LEU	2.3
1	D	832	ALA	2.3
1	B	469	THR	2.3
1	B	783	ASP	2.3
1	A	606	LEU	2.3
1	C	606	LEU	2.3
1	C	936	GLY	2.3
1	D	606	LEU	2.3
1	C	501	VAL	2.3
1	C	831	LEU	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	416	ASP	2.2
1	A	991	PHE	2.2
1	A	1224	THR	2.2
1	B	475	THR	2.2
1	C	395	THR	2.2
1	D	395	THR	2.2
1	C	986	SER	2.2
1	D	983	GLY	2.2
1	B	589	MET	2.2
1	D	1222	LEU	2.2
1	C	852	GLU	2.2
1	D	634	ARG	2.2
1	B	420	LYS	2.2
1	A	933	ASN	2.2
1	B	1107	ASN	2.2
1	D	630	GLY	2.2
1	A	934	PRO	2.2
1	A	469	THR	2.2
1	A	936	GLY	2.2
1	A	609	VAL	2.2
1	D	394	ASN	2.2
1	A	414	ASP	2.2
1	D	649	ALA	2.2
1	D	658	LEU	2.1
1	C	652	GLY	2.1
1	A	852	GLU	2.1
1	A	415	LEU	2.1
1	B	836	ASP	2.1
1	A	561	PHE	2.1
1	A	951	SER	2.1
1	B	1223	ASP	2.1
1	D	940	GLY	2.1
1	D	986	SER	2.1
1	C	475	THR	2.1
1	A	813	HIS	2.1
1	A	992	ILE	2.1
1	B	702	ILE	2.1
1	B	780	GLY	2.1
1	A	981	VAL	2.1
1	D	476	VAL	2.1
1	D	417	ARG	2.1
1	A	986	SER	2.1

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Mol	Chain	Res	Type	RSRZ
1	D	642	LEU	2.1
1	C	954	ALA	2.1
1	B	606	LEU	2.0
1	C	793	LEU	2.0
1	A	657	THR	2.0
1	B	981	VAL	2.0
1	A	808	ARG	2.0
1	D	660	LEU	2.0
1	C	657	THR	2.0
1	C	561	PHE	2.0
1	C	590	PHE	2.0
1	C	414	ASP	2.0
1	D	858	PRO	2.0
1	D	1130	GLU	2.0
1	A	987	ILE	2.0
1	C	608	ALA	2.0
1	A	634	ARG	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 monosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	TD6	B	2001	33/33	0.96	0.15	12,23,48,50	0
2	TD6	C	2001	33/33	0.96	0.14	19,23,46,49	0
2	TD6	D	2001	33/33	0.96	0.15	13,24,48,53	0
3	MG	D	2002	1/1	0.96	0.10	19,19,19,19	0
4	CA	C	2003	1/1	0.96	0.05	33,33,33,33	0
3	MG	C	2002	1/1	0.97	0.12	14,14,14,14	0

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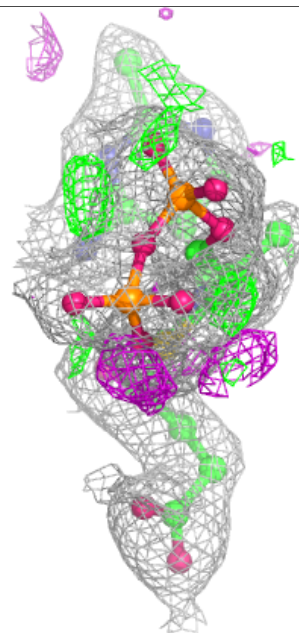
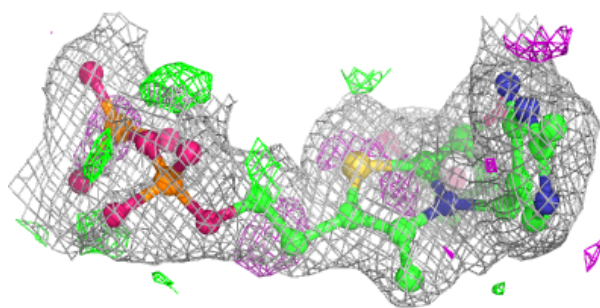
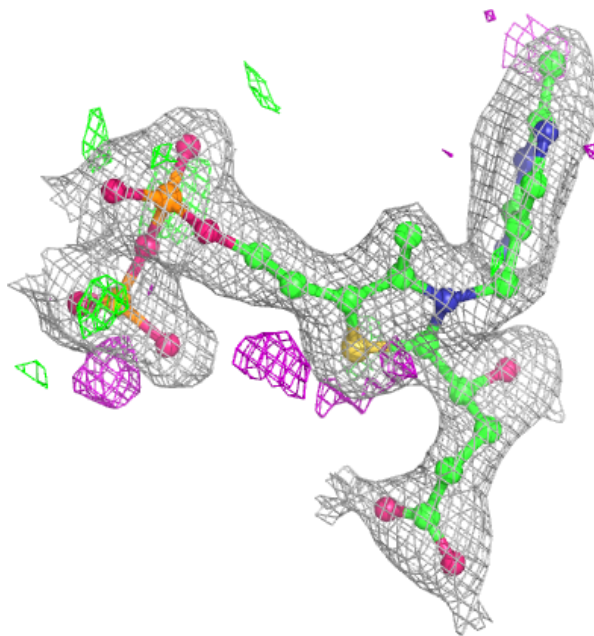
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	TD6	A	2001	33/33	0.97	0.14	15,21,46,48	0
3	MG	B	2002	1/1	0.97	0.06	17,17,17,17	0
4	CA	A	2003	1/1	0.98	0.06	29,29,29,29	0
3	MG	A	2002	1/1	0.98	0.10	12,12,12,12	0
4	CA	B	2003	1/1	0.99	0.04	29,29,29,29	0
4	CA	D	2003	1/1	0.99	0.03	31,31,31,31	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.

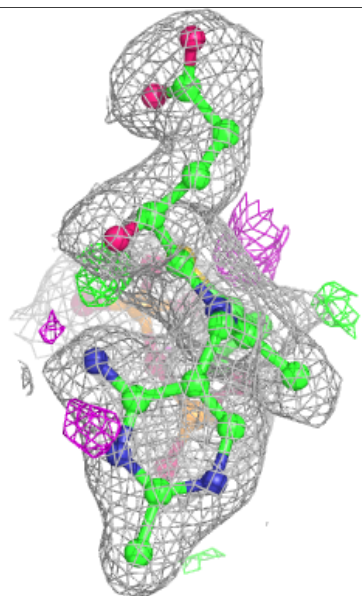
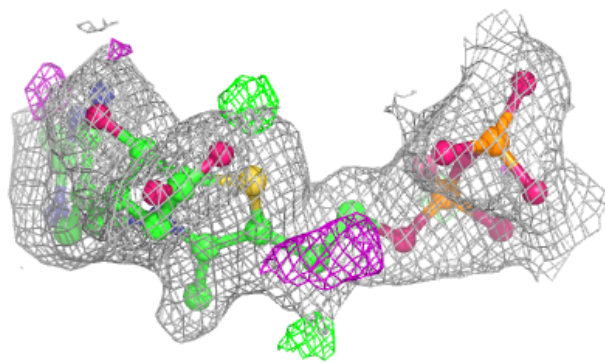
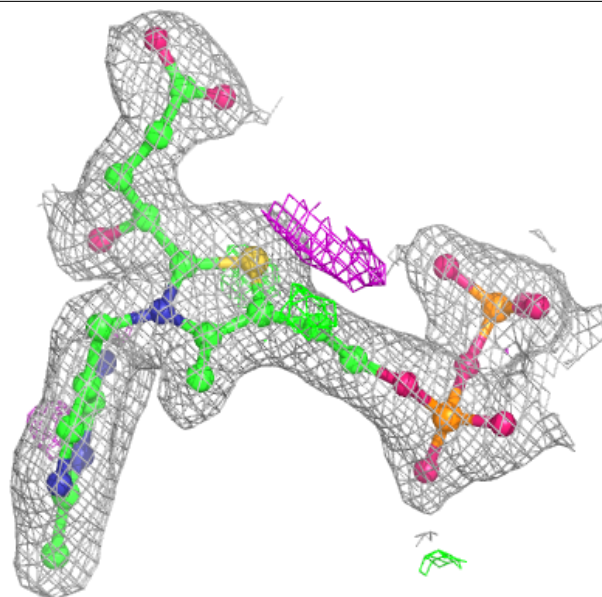
Electron density around TD6 B 2001:

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



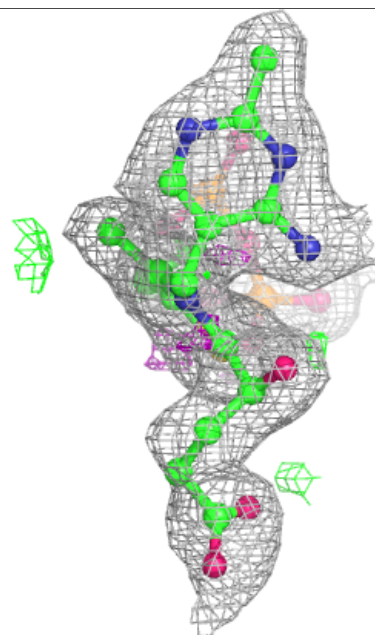
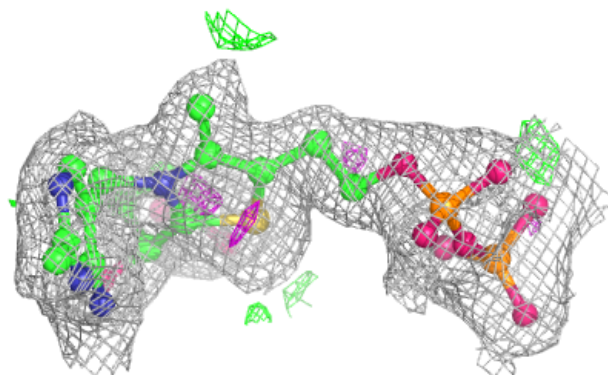
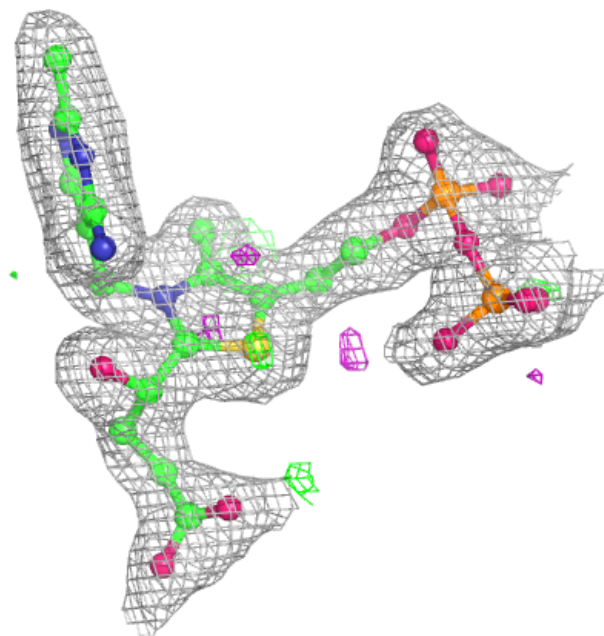
Electron density around TD6 C 2001:

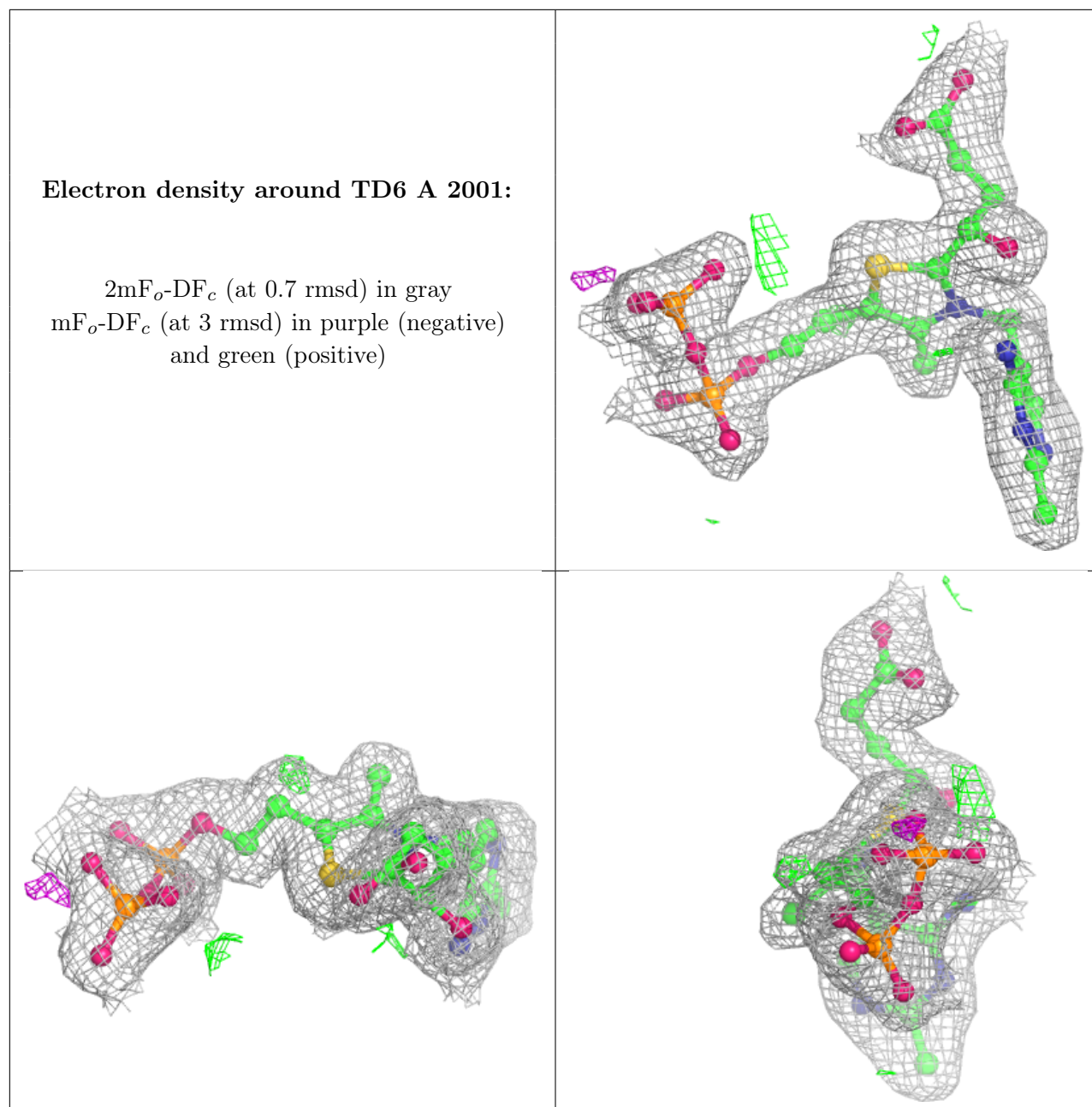
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around TD6 D 2001:

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





6.5 Other polymers [i](#)

There are no such residues in this entry.