



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 7, 2020 – 10:33 PM BST

PDB ID : 4MOE
Title : Pyranose 2-oxidase H450G mutant with 3-fluorinated glucose
Authors : Tan, T.C.; Spadiut, O.; Gandini, R.; Haltrich, D.; Divne, C.
Deposited on : 2013-09-12
Resolution : 2.00 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 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 : 2.13.1
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) : 2.13.1

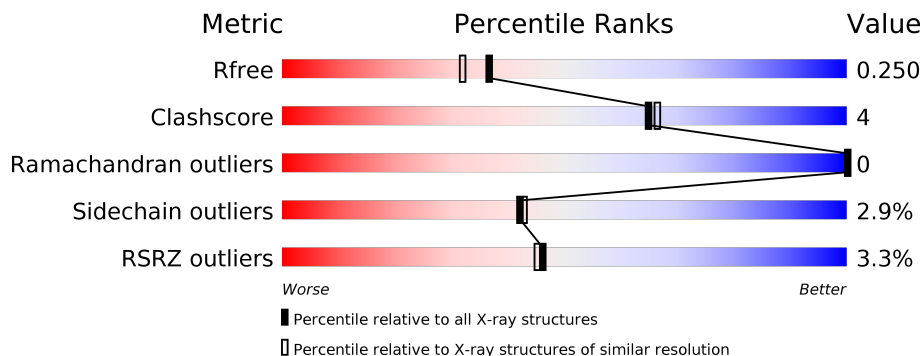
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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 $\leq 5\%$. 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	633	 3% 82% 8% • 9%
1	B	633	 % 79% 11% • 9%
1	C	633	 4% 78% 12% 9%
1	D	633	 4% 80% 10% • 9%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
5	MES	A	804	-	-	X	-

2 Entry composition i

There are 6 unique types of molecules in this entry. The entry contains 19611 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 Pyranose 2-oxidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	576	4536	2864	775	872	25	0	0	0
1	B	576	4536	2864	775	872	25	0	0	0
1	C	574	4520	2855	773	868	24	0	0	0
1	D	575	4527	2859	774	870	24	0	0	0

There are 52 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	2	ALA	SER	SEE REMARK 999	UNP Q7ZA32
A	450	GLY	HIS	engineered mutation	UNP Q7ZA32
A	623	ALA	-	expression tag	UNP Q7ZA32
A	624	ALA	-	expression tag	UNP Q7ZA32
A	625	ALA	-	expression tag	UNP Q7ZA32
A	626	LEU	-	expression tag	UNP Q7ZA32
A	627	GLU	-	expression tag	UNP Q7ZA32
A	628	HIS	-	expression tag	UNP Q7ZA32
A	629	HIS	-	expression tag	UNP Q7ZA32
A	630	HIS	-	expression tag	UNP Q7ZA32
A	631	HIS	-	expression tag	UNP Q7ZA32
A	632	HIS	-	expression tag	UNP Q7ZA32
A	633	HIS	-	expression tag	UNP Q7ZA32
B	2	ALA	SER	SEE REMARK 999	UNP Q7ZA32
B	450	GLY	HIS	engineered mutation	UNP Q7ZA32
B	623	ALA	-	expression tag	UNP Q7ZA32
B	624	ALA	-	expression tag	UNP Q7ZA32
B	625	ALA	-	expression tag	UNP Q7ZA32
B	626	LEU	-	expression tag	UNP Q7ZA32
B	627	GLU	-	expression tag	UNP Q7ZA32
B	628	HIS	-	expression tag	UNP Q7ZA32

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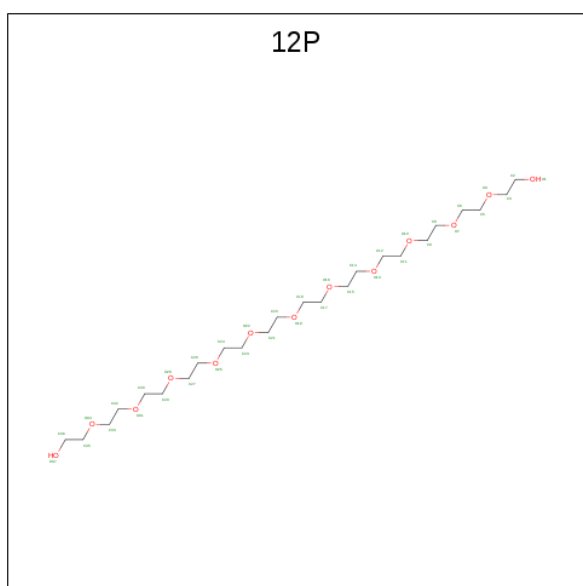
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Chain	Residue	Modelled	Actual	Comment	Reference
B	629	HIS	-	expression tag	UNP Q7ZA32
B	630	HIS	-	expression tag	UNP Q7ZA32
B	631	HIS	-	expression tag	UNP Q7ZA32
B	632	HIS	-	expression tag	UNP Q7ZA32
B	633	HIS	-	expression tag	UNP Q7ZA32
C	2	ALA	SER	SEE REMARK 999	UNP Q7ZA32
C	450	GLY	HIS	engineered mutation	UNP Q7ZA32
C	623	ALA	-	expression tag	UNP Q7ZA32
C	624	ALA	-	expression tag	UNP Q7ZA32
C	625	ALA	-	expression tag	UNP Q7ZA32
C	626	LEU	-	expression tag	UNP Q7ZA32
C	627	GLU	-	expression tag	UNP Q7ZA32
C	628	HIS	-	expression tag	UNP Q7ZA32
C	629	HIS	-	expression tag	UNP Q7ZA32
C	630	HIS	-	expression tag	UNP Q7ZA32
C	631	HIS	-	expression tag	UNP Q7ZA32
C	632	HIS	-	expression tag	UNP Q7ZA32
C	633	HIS	-	expression tag	UNP Q7ZA32
D	2	ALA	SER	SEE REMARK 999	UNP Q7ZA32
D	450	GLY	HIS	engineered mutation	UNP Q7ZA32
D	623	ALA	-	expression tag	UNP Q7ZA32
D	624	ALA	-	expression tag	UNP Q7ZA32
D	625	ALA	-	expression tag	UNP Q7ZA32
D	626	LEU	-	expression tag	UNP Q7ZA32
D	627	GLU	-	expression tag	UNP Q7ZA32
D	628	HIS	-	expression tag	UNP Q7ZA32
D	629	HIS	-	expression tag	UNP Q7ZA32
D	630	HIS	-	expression tag	UNP Q7ZA32
D	631	HIS	-	expression tag	UNP Q7ZA32
D	632	HIS	-	expression tag	UNP Q7ZA32
D	633	HIS	-	expression tag	UNP Q7ZA32

- Molecule 2 is DIHYDROFLAVINE-ADENINE DINUCLEOTIDE (three-letter code: FDA) (formula: C₂₇H₃₅N₉O₁₅P₂).

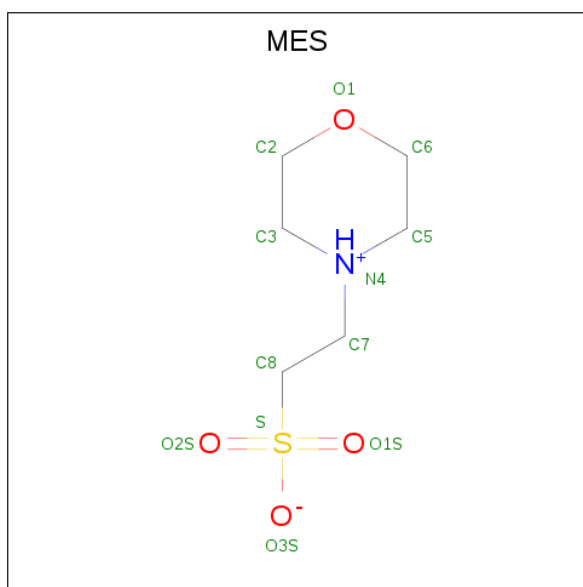
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	F	O	0	0
			12	6	1	5		
3	B	1	Total	C	F	O	0	0
			12	6	1	5		
3	C	1	Total	C	F	O	0	0
			12	6	1	5		
3	D	1	Total	C	F	O	0	0
			12	6	1	5		

- Molecule 4 is DODECAETHYLENE GLYCOL (three-letter code: 12P) (formula: $C_{24}H_{50}O_{13}$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			15	10	5		
4	A	1	Total	C	O	0	0
			14	9	5		
4	B	1	Total	C	O	0	0
			16	10	6		
4	B	1	Total	C	O	0	0
			11	8	3		

- Molecule 5 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (three-letter code: MES) (formula: $C_6H_{13}NO_4S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
5	A	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
5	B	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
5	C	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
5	D	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
5	D	1	Total	C	N	O	S	0	0
			12	6	1	4	1		

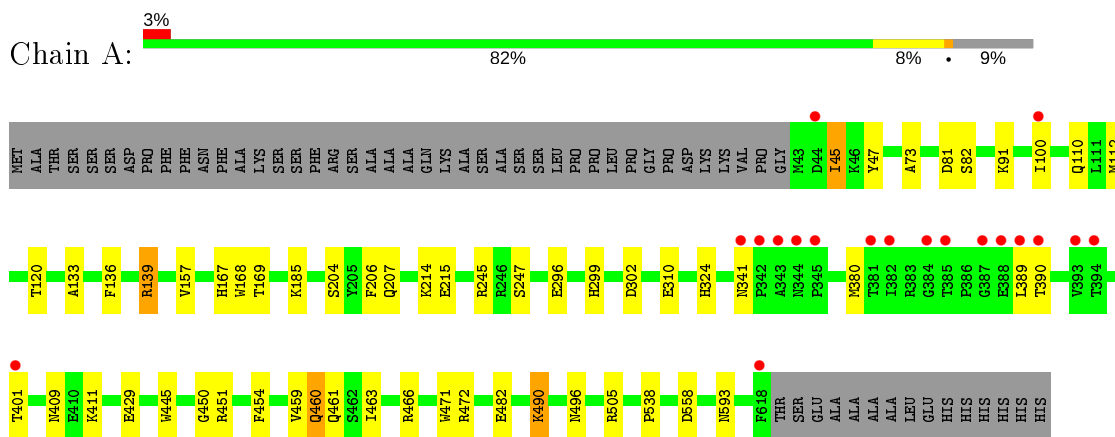
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
6	A	294	Total	O	0	0
			294	294		
6	B	369	Total	O	0	0
			369	369		
6	C	183	Total	O	0	0
			183	183		
6	D	270	Total	O	0	0
			270	270		

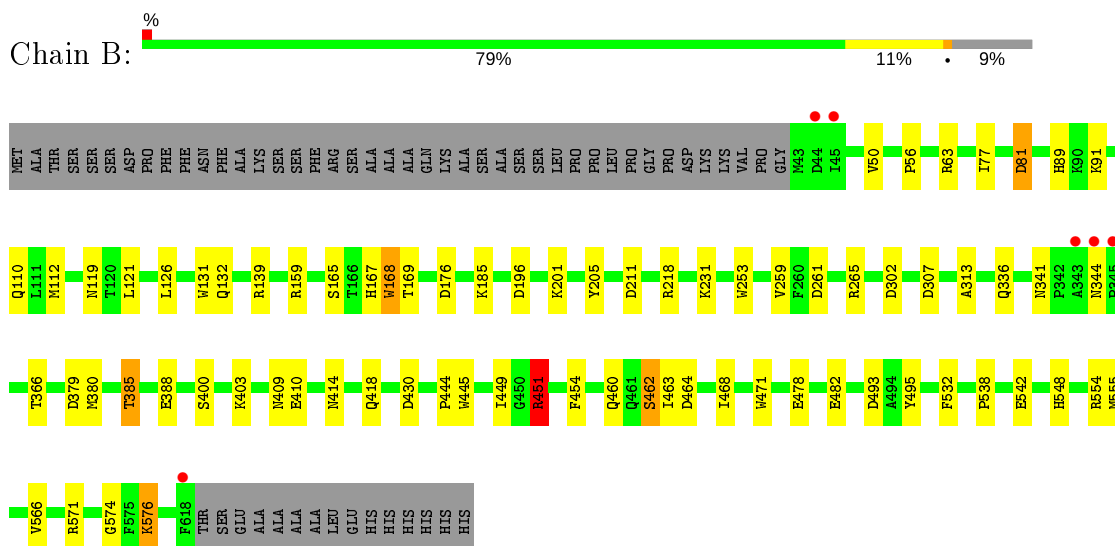
3 Residue-property plots [i](#)

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.

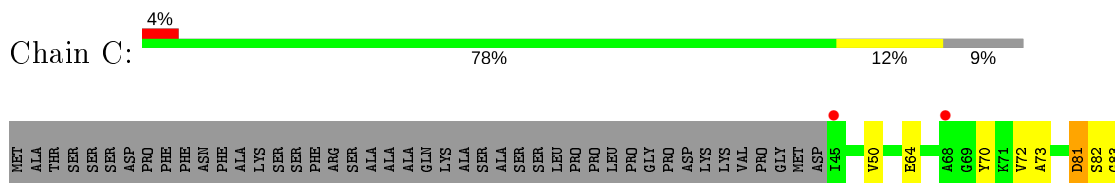
- Molecule 1: Pyranose 2-oxidase

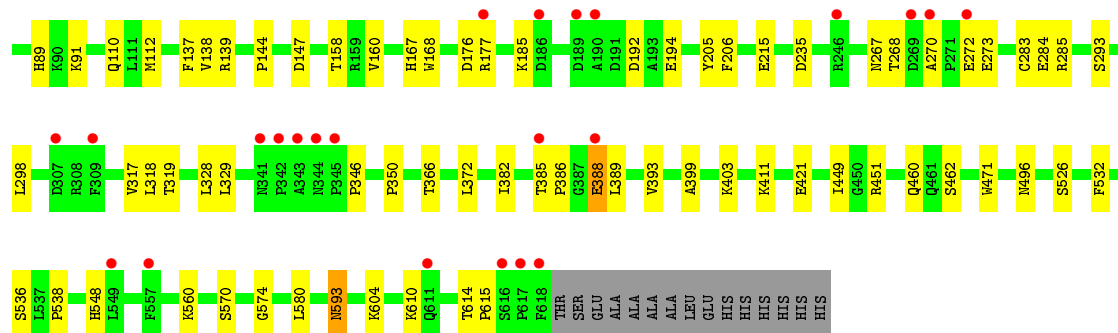


- Molecule 1: Pyranose 2-oxidase

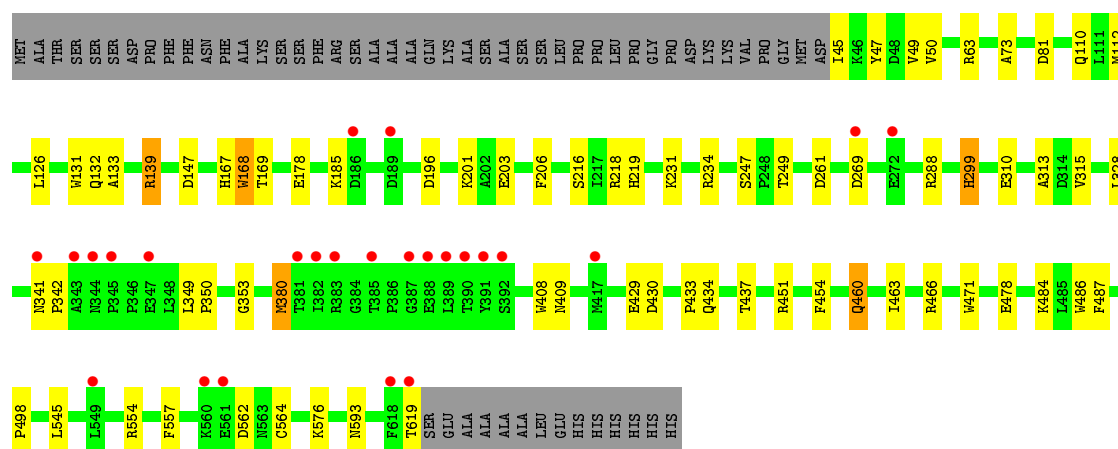
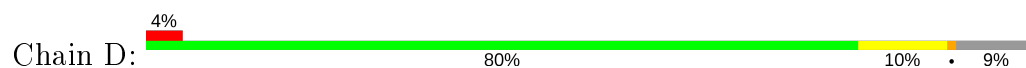


- Molecule 1: Pyranose 2-oxidase





- Molecule 1: Pyranose 2-oxidase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	100.07Å 102.74Å 137.69Å 90.00° 90.80° 90.00°	Depositor
Resolution (Å)	50.00 – 2.00 41.94 – 2.00	Depositor EDS
% Data completeness (in resolution range)	97.7 (50.00-2.00) 97.8 (41.94-2.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.32 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.195 , 0.242 0.202 , 0.250	Depositor DCC
R_{free} test set	3287 reflections (1.79%)	wwPDB-VP
Wilson B-factor (Å ²)	20.3	Xtriage
Anisotropy	0.100	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 49.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.019 for -k,-h,-l 0.022 for k,h,-l 0.028 for h,-k,-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	19611	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.69% 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: FDA, 12P, MES, G3F

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	1.07	5/4651 (0.1%)	1.02	10/6323 (0.2%)
1	B	1.14	8/4651 (0.2%)	1.07	21/6323 (0.3%)
1	C	0.89	3/4635 (0.1%)	0.89	6/6302 (0.1%)
1	D	1.02	6/4642 (0.1%)	0.98	13/6312 (0.2%)
All	All	1.04	22/18579 (0.1%)	0.99	50/25260 (0.2%)

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	1

All (22) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	168	TRP	CD2-CE2	7.54	1.50	1.41
1	A	445	TRP	CD2-CE2	7.07	1.49	1.41
1	B	482	GLU	CD-OE1	6.83	1.33	1.25
1	B	478	GLU	CD-OE1	6.54	1.32	1.25
1	A	471	TRP	CD2-CE2	6.11	1.48	1.41
1	B	131	TRP	CD2-CE2	6.01	1.48	1.41
1	B	253	TRP	CD2-CE2	5.83	1.48	1.41
1	D	408	TRP	CD2-CE2	5.75	1.48	1.41
1	C	536	SER	CB-OG	-5.67	1.34	1.42
1	D	486	TRP	CD2-CE2	5.65	1.48	1.41
1	A	482	GLU	CD-OE1	5.56	1.31	1.25
1	D	471	TRP	CD2-CE2	5.45	1.47	1.41
1	C	81	ASP	CB-CG	-5.37	1.40	1.51
1	D	203	GLU	CD-OE1	5.33	1.31	1.25

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	410	GLU	CD-OE1	5.25	1.31	1.25
1	A	310	GLU	CD-OE1	5.21	1.31	1.25
1	B	81	ASP	CB-CG	-5.18	1.40	1.51
1	B	168	TRP	CD2-CE2	5.14	1.47	1.41
1	B	542	GLU	CD-OE1	5.08	1.31	1.25
1	D	478	GLU	CD-OE2	5.06	1.31	1.25
1	C	147	ASP	CB-CG	5.04	1.62	1.51
1	A	296	GLU	CD-OE1	5.01	1.31	1.25

All (50) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	139	ARG	NE-CZ-NH2	-10.73	114.94	120.30
1	B	139	ARG	NE-CZ-NH2	-10.23	115.19	120.30
1	C	147	ASP	CB-CG-OD1	9.98	127.29	118.30
1	D	139	ARG	NE-CZ-NH1	9.84	125.22	120.30
1	B	451	ARG	NE-CZ-NH2	-9.45	115.57	120.30
1	A	139	ARG	NE-CZ-NH2	-9.24	115.68	120.30
1	A	139	ARG	NE-CZ-NH1	8.54	124.57	120.30
1	B	261	ASP	CB-CG-OD1	8.41	125.87	118.30
1	A	466	ARG	NE-CZ-NH2	-8.20	116.20	120.30
1	B	81	ASP	CB-CG-OD1	-8.01	111.09	118.30
1	B	307	ASP	CB-CG-OD1	7.59	125.13	118.30
1	B	493	ASP	CB-CG-OD1	7.39	124.95	118.30
1	B	139	ARG	NE-CZ-NH1	7.03	123.81	120.30
1	B	261	ASP	CB-CG-OD2	-6.97	112.02	118.30
1	D	451	ARG	NE-CZ-NH2	-6.94	116.83	120.30
1	A	245	ARG	NE-CZ-NH1	6.81	123.71	120.30
1	B	265	ARG	NE-CZ-NH1	6.78	123.69	120.30
1	A	302	ASP	CB-CG-OD1	6.73	124.35	118.30
1	C	81	ASP	CB-CG-OD1	-6.71	112.26	118.30
1	B	451	ARG	NE-CZ-NH1	6.64	123.62	120.30
1	C	235	ASP	CB-CG-OD1	6.50	124.15	118.30
1	D	466	ARG	NE-CZ-NH1	6.41	123.50	120.30
1	A	466	ARG	NE-CZ-NH1	6.36	123.48	120.30
1	B	211	ASP	CB-CG-OD1	6.32	123.99	118.30
1	D	147	ASP	CB-CG-OD1	6.25	123.92	118.30
1	D	451	ARG	NE-CZ-NH1	6.24	123.42	120.30
1	A	472	ARG	NE-CZ-NH1	6.23	123.42	120.30
1	B	571	ARG	NE-CZ-NH1	6.21	123.41	120.30
1	B	302	ASP	CB-CG-OD1	6.20	123.88	118.30
1	B	211	ASP	CB-CG-OD2	-5.92	112.97	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	245	ARG	NE-CZ-NH2	-5.83	117.39	120.30
1	B	464	ASP	CB-CG-OD1	5.82	123.54	118.30
1	C	372	LEU	CB-CG-CD1	-5.80	101.14	111.00
1	C	235	ASP	CB-CG-OD2	-5.79	113.09	118.30
1	B	196	ASP	CB-CG-OD1	5.78	123.50	118.30
1	B	493	ASP	CB-CG-OD2	-5.75	113.12	118.30
1	B	554	ARG	NE-CZ-NH1	5.72	123.16	120.30
1	D	261	ASP	CB-CG-OD1	5.67	123.40	118.30
1	C	176	ASP	CB-CG-OD2	5.63	123.37	118.30
1	B	379	ASP	CB-CG-OD2	-5.43	113.41	118.30
1	D	380	MET	CG-SD-CE	-5.38	91.59	100.20
1	B	176	ASP	CB-CG-OD1	5.33	123.10	118.30
1	D	63	ARG	NE-CZ-NH2	-5.31	117.64	120.30
1	D	288	ARG	NE-CZ-NH1	5.30	122.95	120.30
1	B	554	ARG	NE-CZ-NH2	-5.27	117.66	120.30
1	D	562	ASP	CB-CG-OD2	5.18	122.96	118.30
1	D	196	ASP	CB-CG-OD1	5.17	122.95	118.30
1	A	558	ASP	CB-CG-OD2	5.11	122.90	118.30
1	D	234	ARG	NE-CZ-NH1	5.05	122.83	120.30
1	A	472	ARG	NE-CZ-NH2	-5.04	117.78	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	81	ASP	Peptide

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	4536	0	4384	28	0
1	B	4536	0	4384	37	0
1	C	4520	0	4371	47	0
1	D	4527	0	4378	30	0
2	A	53	0	30	2	0
2	B	53	0	30	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	53	0	29	3	0
2	D	53	0	30	3	0
3	A	12	0	11	1	0
3	B	12	0	11	2	0
3	C	12	0	11	3	0
3	D	12	0	11	2	0
4	A	29	0	34	0	0
4	B	27	0	33	0	0
5	A	12	0	13	10	0
5	B	12	0	13	0	0
5	C	12	0	13	1	0
5	D	24	0	26	1	0
6	A	294	0	0	1	0
6	B	369	0	0	3	0
6	C	183	0	0	1	0
6	D	270	0	0	2	0
All	All	19611	0	17812	147	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 4.

All (147) 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:A:133:ALA:CB	5:A:804:MES:H71	1.53	1.35
1:A:133:ALA:HB3	5:A:804:MES:H71	1.16	1.14
1:A:133:ALA:HB2	5:A:804:MES:H71	1.40	1.00
1:A:133:ALA:CB	5:A:804:MES:C7	2.46	0.92
1:D:460:GLN:HE22	1:D:463:ILE:H	1.13	0.92
1:A:133:ALA:HB3	5:A:804:MES:C7	2.03	0.89
1:A:460:GLN:HE22	1:A:463:ILE:H	1.14	0.87
1:A:110:GLN:HE21	1:A:167:HIS:HD1	1.23	0.86
1:D:110:GLN:HE21	1:D:167:HIS:HD1	1.25	0.85
1:D:131:TRP:CH2	1:D:133:ALA:HB2	2.17	0.80
1:C:270:ALA:HB1	1:C:273:GLU:HG3	1.65	0.78
1:B:110:GLN:HE21	1:B:167:HIS:HD1	1.31	0.76
1:B:385:THR:HG23	1:B:388:GLU:OE1	1.88	0.74
1:A:45:ILE:HD12	1:A:45:ILE:H	1.54	0.70
1:C:329:LEU:HD11	1:C:580:LEU:HD11	1.74	0.70
1:C:110:GLN:HE21	1:C:167:HIS:HD1	1.40	0.69
1:A:133:ALA:HB2	5:A:804:MES:C7	2.19	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:385:THR:CG2	1:B:388:GLU:OE1	2.42	0.68
1:C:460:GLN:NE2	1:C:462:SER:HB3	2.08	0.68
1:A:133:ALA:HB2	5:A:804:MES:O1S	1.93	0.68
1:C:548:HIS:NE2	3:C:802:G3F:O2	2.26	0.67
1:C:460:GLN:HE21	1:C:462:SER:HB3	1.60	0.67
1:B:451:ARG:NH1	6:B:1264:HOH:O	2.27	0.66
1:B:126:LEU:HD12	1:B:132:GLN:CG	2.26	0.66
1:B:126:LEU:HD12	1:B:132:GLN:HG3	1.77	0.65
1:C:270:ALA:HB1	1:C:273:GLU:CG	2.26	0.65
1:C:215:GLU:O	1:C:411:LYS:NZ	2.29	0.65
1:B:218:ARG:HG3	1:B:430:ASP:OD2	1.97	0.65
1:B:119:ASN:HD21	1:B:121:LEU:HD12	1.62	0.65
1:B:81:ASP:OD1	1:B:81:ASP:N	2.29	0.63
1:D:216:SER:HB3	1:D:219:HIS:HB3	1.79	0.63
1:A:459:VAL:HG13	1:A:461:GLN:NE2	2.13	0.63
1:D:50:VAL:HG13	1:D:313:ALA:HB2	1.80	0.63
2:A:801:FDA:N5	3:A:802:G3F:H2	2.16	0.61
1:D:185:LYS:HE3	1:D:557:PHE:CG	2.35	0.61
1:C:194:GLU:OE2	1:C:604:LYS:NZ	2.35	0.60
1:A:450:GLY:O	1:A:451:ARG:HD2	2.01	0.59
1:B:414:ASN:O	1:B:418:GLN:HG2	2.02	0.59
2:C:801:FDA:N5	3:C:802:G3F:H2	2.17	0.59
1:A:139:ARG:HD3	5:A:804:MES:H81	1.85	0.58
1:D:249:THR:HG21	1:D:429:GLU:OE1	2.03	0.58
1:B:574:GLY:O	1:B:576:LYS:NZ	2.38	0.57
1:A:91:LYS:HD2	1:A:100:ILE:HD11	1.86	0.57
1:B:63:ARG:HD2	1:B:259:VAL:O	2.06	0.56
1:C:50:VAL:HG12	1:C:73:ALA:HB3	1.87	0.55
2:D:801:FDA:N5	3:D:802:G3F:H2	2.22	0.55
1:D:132:GLN:OE1	5:D:803:MES:N4	2.38	0.55
1:B:56:PRO:HD3	1:B:165:SER:HB3	1.89	0.54
1:B:336:GLN:NE2	1:B:344:ASN:O	2.41	0.54
1:C:385:THR:O	1:C:388:GLU:HG2	2.07	0.54
1:D:341:ASN:HD22	1:D:342:PRO:HD2	1.73	0.54
1:C:388:GLU:OE1	1:C:388:GLU:HA	2.08	0.53
1:D:126:LEU:CD1	1:D:132:GLN:CG	2.86	0.53
1:C:593:ASN:HB3	2:C:801:FDA:C2	2.38	0.53
1:A:490:LYS:O	1:A:490:LYS:HE3	2.09	0.53
1:A:538:PRO:HG2	1:C:538:PRO:HG2	1.91	0.52
1:C:158:THR:HG22	1:C:160:VAL:HG22	1.91	0.52
1:D:126:LEU:HD12	1:D:132:GLN:HG3	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:169:THR:H	2:D:801:FDA:HN5	1.57	0.52
1:B:201:LYS:HE2	1:B:205:TYR:OH	2.09	0.52
1:D:545:LEU:HD12	6:D:1109:HOH:O	2.10	0.52
1:B:77:ILE:HD11	1:B:495:TYR:CD2	2.46	0.51
1:C:614:THR:HG22	1:C:615:PRO:O	2.10	0.51
1:D:460:GLN:HE22	1:D:463:ILE:N	1.94	0.51
1:D:49:VAL:HG22	1:D:315:VAL:HB	1.93	0.51
2:B:801:FDA:N5	3:B:802:G3F:H2	2.26	0.51
1:C:346:PRO:HG2	1:C:350:PRO:HA	1.93	0.50
1:B:159:ARG:HA	2:B:801:FDA:O2B	2.11	0.50
1:C:177:ARG:NH2	1:C:192:ASP:OD2	2.44	0.50
1:A:215:GLU:O	1:A:411:LYS:NZ	2.37	0.50
1:A:490:LYS:O	1:A:490:LYS:CE	2.59	0.49
1:C:283:CYS:HB3	1:C:298:LEU:HD11	1.95	0.49
1:B:169:THR:O	1:B:169:THR:CG2	2.60	0.49
1:D:185:LYS:HE3	1:D:557:PHE:CD2	2.48	0.49
1:A:157:VAL:HG21	1:A:324:HIS:HE1	1.78	0.49
1:D:178:GLU:HG3	6:D:1140:HOH:O	2.14	0.48
1:B:89:HIS:CE1	1:B:91:LYS:HB2	2.49	0.48
1:D:218:ARG:HG3	1:D:430:ASP:OD2	2.13	0.48
1:B:169:THR:O	1:B:169:THR:HG22	2.13	0.47
1:C:460:GLN:HE21	1:C:462:SER:CB	2.27	0.47
1:A:505:ARG:HD3	6:A:1120:HOH:O	2.15	0.47
1:C:138:VAL:HG21	1:C:144:PRO:HG3	1.97	0.47
1:C:285:ARG:HA	1:C:328:LEU:HD11	1.96	0.47
1:C:284:GLU:C	1:C:328:LEU:CD1	2.83	0.47
1:C:329:LEU:HD11	1:C:580:LEU:CD1	2.44	0.47
1:C:548:HIS:CE1	3:C:802:G3F:HO2	2.27	0.47
1:D:554:ARG:O	1:D:564:CYS:HB2	2.15	0.47
1:B:126:LEU:CD1	1:B:132:GLN:CG	2.93	0.46
1:C:285:ARG:HA	1:C:328:LEU:CD1	2.45	0.46
1:C:399:ALA:O	5:C:803:MES:O3S	2.34	0.46
1:C:137:PHE:CE2	1:C:139:ARG:HG3	2.51	0.46
1:C:267:ASN:O	1:C:268:THR:C	2.53	0.46
1:C:388:GLU:CA	1:C:388:GLU:OE1	2.63	0.46
1:C:366:THR:HG21	1:C:526:SER:HB2	1.98	0.46
1:C:317:VAL:HG12	1:C:319:THR:HG23	1.98	0.46
1:D:131:TRP:CZ3	1:D:133:ALA:HB2	2.50	0.46
1:D:126:LEU:HD13	1:D:132:GLN:HG2	1.98	0.46
1:A:204:SER:O	1:A:207:GLN:NE2	2.43	0.46
1:A:45:ILE:CD1	1:A:45:ILE:H	2.18	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:344:ASN:N	1:B:344:ASN:HD22	2.14	0.46
1:C:70:TYR:OH	1:C:610:LYS:HA	2.15	0.46
1:D:299:HIS:CE1	1:D:310:GLU:HG2	2.52	0.45
1:C:389:LEU:HA	1:C:389:LEU:HD12	1.65	0.45
1:C:293:SER:HA	1:C:574:GLY:O	2.16	0.45
1:B:532:PHE:CE1	1:B:538:PRO:HG3	2.51	0.44
1:B:380:MET:HE2	1:B:409:ASN:OD1	2.18	0.44
1:C:64:GLU:OE1	1:C:205:TYR:OH	2.32	0.44
1:B:548:HIS:CE1	3:B:802:G3F:HO2	2.31	0.44
1:C:382:ILE:HG12	1:C:393:VAL:HG22	2.00	0.44
1:B:380:MET:CE	1:B:409:ASN:OD1	2.66	0.43
1:B:444:PRO:HD2	1:B:445:TRP:CZ3	2.53	0.43
1:C:385:THR:O	1:C:386:PRO:C	2.57	0.43
1:A:380:MET:HE1	1:A:409:ASN:HB3	2.00	0.43
1:A:490:LYS:C	1:A:490:LYS:HE2	2.38	0.43
1:A:169:THR:HB	2:A:801:FDA:O4	2.19	0.43
1:D:487:PHE:HB3	1:D:498:PRO:HB2	1.99	0.43
1:C:81:ASP:O	1:C:83:GLY:N	2.48	0.43
5:A:804:MES:H82	1:B:462:SER:O	2.19	0.42
1:C:421:GLU:CD	1:C:421:GLU:H	2.23	0.42
1:D:380:MET:HE1	1:D:409:ASN:HA	2.01	0.42
1:D:47:TYR:CD2	1:D:73:ALA:HB2	2.54	0.42
1:A:47:TYR:CD2	1:A:73:ALA:HB2	2.55	0.42
1:B:380:MET:HE1	1:B:409:ASN:HA	2.01	0.42
1:B:555:MET:HA	1:B:566:VAL:O	2.19	0.42
1:C:532:PHE:CZ	1:C:538:PRO:HG3	2.55	0.42
1:D:437:THR:O	1:D:437:THR:HG23	2.20	0.42
1:B:167:HIS:CD2	1:B:167:HIS:C	2.93	0.42
1:C:70:TYR:O	1:C:72:VAL:HG23	2.20	0.42
1:B:366:THR:O	1:B:468:ILE:HA	2.20	0.41
1:D:328:LEU:C	1:D:328:LEU:HD23	2.40	0.41
1:A:120:THR:HA	1:A:136:PHE:CD1	2.55	0.41
1:B:451:ARG:CZ	6:B:1264:HOH:O	2.67	0.41
1:C:449:ILE:HG12	1:C:471:TRP:CE3	2.56	0.41
2:D:801:FDA:C5X	3:D:802:G3F:H2	2.51	0.41
5:A:804:MES:O3S	1:B:463:ILE:HD13	2.21	0.41
1:B:50:VAL:HG13	1:B:313:ALA:HB2	2.02	0.41
1:C:318:LEU:HB2	1:C:580:LEU:HD22	2.01	0.41
1:C:570:SER:HB3	1:C:580:LEU:O	2.20	0.41
1:D:349:LEU:N	1:D:350:PRO:HD3	2.35	0.41
1:C:89:HIS:ND1	1:C:91:LYS:HB3	2.36	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:270:ALA:HB1	1:C:273:GLU:CD	2.41	0.41
1:D:433:PRO:C	1:D:434:GLN:HG2	2.42	0.40
1:B:218:ARG:HD2	6:B:1034:HOH:O	2.22	0.40
2:C:801:FDA:H8A	6:C:933:HOH:O	2.20	0.40
1:A:214:LYS:HG3	1:A:215:GLU:HG3	2.03	0.40
1:B:449:ILE:HG12	1:B:471:TRP:CE3	2.56	0.40
1:D:353:GLY:O	1:D:484:LYS:HA	2.21	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	574/633 (91%)	560 (98%)	14 (2%)	0	100	100
1	B	574/633 (91%)	558 (97%)	16 (3%)	0	100	100
1	C	572/633 (90%)	551 (96%)	21 (4%)	0	100	100
1	D	573/633 (90%)	556 (97%)	17 (3%)	0	100	100
All	All	2293/2532 (91%)	2225 (97%)	68 (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	503/547 (92%)	485 (96%)	18 (4%)	35	34
1	B	503/547 (92%)	490 (97%)	13 (3%)	46	48
1	C	501/547 (92%)	489 (98%)	12 (2%)	49	51
1	D	502/547 (92%)	486 (97%)	16 (3%)	39	38
All	All	2009/2188 (92%)	1950 (97%)	59 (3%)	42	43

All (59) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	45	ILE
1	A	82	SER
1	A	112	MET
1	A	168	TRP
1	A	185	LYS
1	A	206	PHE
1	A	247	SER
1	A	299	HIS
1	A	341	ASN
1	A	389	LEU
1	A	390	THR
1	A	401	THR
1	A	429	GLU
1	A	454	PHE
1	A	460	GLN
1	A	490	LYS
1	A	496	ASN
1	A	593	ASN
1	B	112	MET
1	B	168	TRP
1	B	185	LYS
1	B	231	LYS
1	B	341	ASN
1	B	385	THR
1	B	400	SER
1	B	403	LYS
1	B	451	ARG
1	B	454	PHE
1	B	460	GLN
1	B	462	SER
1	B	576	LYS
1	C	82	SER
1	C	112	MET

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Mol	Chain	Res	Type
1	C	168	TRP
1	C	185	LYS
1	C	206	PHE
1	C	272	GLU
1	C	388	GLU
1	C	403	LYS
1	C	451	ARG
1	C	496	ASN
1	C	560	LYS
1	C	593	ASN
1	D	45	ILE
1	D	81	ASP
1	D	112	MET
1	D	139	ARG
1	D	168	TRP
1	D	201	LYS
1	D	206	PHE
1	D	231	LYS
1	D	247	SER
1	D	269	ASP
1	D	299	HIS
1	D	454	PHE
1	D	460	GLN
1	D	576	LYS
1	D	593	ASN
1	D	619	THR

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

Mol	Chain	Res	Type
1	A	132	GLN
1	A	263	GLN
1	A	460	GLN
1	A	461	GLN
1	B	110	GLN
1	B	237	GLN
1	B	263	GLN
1	B	341	ASN
1	B	344	ASN
1	B	563	ASN
1	B	611	GLN
1	C	105	ASN

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Mol	Chain	Res	Type
1	C	341	ASN
1	C	344	ASN
1	C	460	GLN
1	D	108	GLN
1	D	263	GLN
1	D	299	HIS
1	D	341	ASN
1	D	344	ASN
1	D	460	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](#)

17 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	$\# Z > 2$
5	MES	B	804	-	12,12,12	1.76	1 (8%)	14,16,16	1.76	4 (28%)
5	MES	C	803	-	12,12,12	2.26	1 (8%)	14,16,16	1.62	2 (14%)
4	12P	A	803	-	14,14,36	0.72	0	13,13,35	1.11	1 (7%)
5	MES	D	803	-	12,12,12	1.94	2 (16%)	14,16,16	3.21	3 (21%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	G3F	D	802	-	12,12,12	0.90	0	17,17,17	1.44	2 (11%)
3	G3F	C	802	-	12,12,12	1.28	1 (8%)	17,17,17	1.78	6 (35%)
3	G3F	B	802	-	12,12,12	1.07	1 (8%)	17,17,17	3.02	4 (23%)
3	G3F	A	802	-	12,12,12	1.25	2 (16%)	17,17,17	1.66	4 (23%)
4	12P	B	805	-	10,10,36	0.83	0	9,9,35	0.88	0
4	12P	A	805	-	13,13,36	0.68	0	12,12,35	0.48	0
5	MES	D	804	-	12,12,12	2.07	1 (8%)	14,16,16	2.21	5 (35%)
2	FDA	C	801	1	51,58,58	1.60	12 (23%)	60,89,89	2.92	22 (36%)
2	FDA	B	801	1	51,58,58	1.90	14 (27%)	60,89,89	4.61	23 (38%)
2	FDA	A	801	1	51,58,58	1.73	7 (13%)	60,89,89	4.93	24 (40%)
4	12P	B	803	-	15,15,36	0.50	0	14,14,35	0.68	0
5	MES	A	804	-	12,12,12	2.05	2 (16%)	14,16,16	3.07	8 (57%)
2	FDA	D	801	1	51,58,58	1.56	8 (15%)	60,89,89	3.95	18 (30%)

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
5	MES	B	804	-	-	0/6/14/14	0/1/1/1
5	MES	C	803	-	-	4/6/14/14	0/1/1/1
4	12P	A	803	-	-	3/12/12/34	-
5	MES	D	803	-	-	1/6/14/14	0/1/1/1
3	G3F	D	802	-	-	0/2/22/22	0/1/1/1
3	G3F	C	802	-	-	1/2/22/22	0/1/1/1
3	G3F	B	802	-	-	0/2/22/22	0/1/1/1
3	G3F	A	802	-	-	0/2/22/22	0/1/1/1
4	12P	B	805	-	-	4/8/8/34	-
4	12P	A	805	-	-	3/11/11/34	-
5	MES	D	804	-	-	1/6/14/14	0/1/1/1
2	FDA	C	801	1	-	1/30/50/50	0/6/6/6
2	FDA	B	801	1	-	4/30/50/50	0/6/6/6
2	FDA	A	801	1	-	2/30/50/50	0/6/6/6
4	12P	B	803	-	-	3/13/13/34	-
5	MES	A	804	-	-	1/6/14/14	0/1/1/1
2	FDA	D	801	1	-	2/30/50/50	0/6/6/6

All (52) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	C	803	MES	C8-S	-7.40	1.67	1.77
2	B	801	FDA	C4X-C10	6.74	1.45	1.38
5	D	804	MES	C8-S	-6.30	1.68	1.77
2	A	801	FDA	C4-C4X	5.96	1.51	1.41
5	A	804	MES	C8-S	-5.84	1.69	1.77
5	D	803	MES	C8-S	-5.25	1.70	1.77
5	B	804	MES	C8-S	-5.13	1.70	1.77
2	A	801	FDA	C5X-N5	4.71	1.43	1.35
2	D	801	FDA	C2B-C1B	-4.36	1.47	1.53
2	B	801	FDA	C2A-N3A	4.06	1.38	1.32
2	B	801	FDA	C8M-C8	3.86	1.58	1.51
2	A	801	FDA	C2-N1	-3.84	1.30	1.38
2	C	801	FDA	C4-C4X	3.77	1.47	1.41
2	C	801	FDA	C10-N1	3.66	1.38	1.33
2	A	801	FDA	C9A-N10	3.40	1.43	1.38
3	A	802	G3F	C3-C4	3.37	1.55	1.52
3	C	802	G3F	C3-C4	3.28	1.55	1.52
2	C	801	FDA	C2A-N3A	3.25	1.37	1.32
2	B	801	FDA	C4A-N3A	-3.21	1.31	1.35
2	D	801	FDA	C2A-N3A	3.16	1.37	1.32
2	D	801	FDA	C4-C4X	3.14	1.46	1.41
5	A	804	MES	O1S-S	3.08	1.54	1.45
2	B	801	FDA	O3B-C3B	-3.04	1.35	1.43
2	D	801	FDA	C4'-C3'	3.01	1.59	1.53
2	C	801	FDA	O4B-C4B	-2.99	1.38	1.45
2	B	801	FDA	O4B-C4B	-2.97	1.38	1.45
2	B	801	FDA	C4-N3	2.85	1.38	1.33
2	C	801	FDA	C4X-C10	2.84	1.41	1.38
2	D	801	FDA	C3B-C4B	-2.70	1.46	1.53
2	C	801	FDA	C2B-C3B	-2.62	1.46	1.53
2	C	801	FDA	O3B-C3B	-2.61	1.36	1.43
3	B	802	G3F	C3-C2	-2.60	1.50	1.52
2	C	801	FDA	C2B-C1B	-2.58	1.49	1.53
2	B	801	FDA	C6-C5X	2.54	1.45	1.41
2	D	801	FDA	C2B-C3B	-2.52	1.46	1.53
2	B	801	FDA	C4'-C3'	2.47	1.58	1.53
2	A	801	FDA	C10-N1	2.45	1.36	1.33
2	C	801	FDA	O2B-C2B	-2.44	1.37	1.43
2	A	801	FDA	C2A-N1A	2.35	1.38	1.33
2	C	801	FDA	C1'-N10	2.23	1.50	1.48
2	C	801	FDA	C2A-N1A	2.23	1.38	1.33
2	D	801	FDA	C2A-N1A	2.20	1.38	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	801	FDA	O3B-C3B	-2.18	1.37	1.43
2	B	801	FDA	C2B-C1B	-2.17	1.50	1.53
2	C	801	FDA	C5'-C4'	2.15	1.54	1.51
3	A	802	G3F	O1-C1	2.14	1.46	1.39
2	B	801	FDA	C2B-C3B	-2.14	1.47	1.53
2	B	801	FDA	C7M-C7	2.12	1.55	1.51
2	A	801	FDA	C2A-N3A	2.12	1.35	1.32
5	D	803	MES	O1S-S	2.11	1.51	1.45
2	B	801	FDA	O4'-C4'	-2.03	1.39	1.43
2	B	801	FDA	O4-C4	2.01	1.29	1.24

All (126) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	801	FDA	C4-N3-C2	28.98	139.61	115.14
2	B	801	FDA	C4-N3-C2	25.42	136.60	115.14
2	D	801	FDA	C4-N3-C2	23.49	134.97	115.14
2	A	801	FDA	C4X-C4-N3	-16.37	101.04	123.43
2	B	801	FDA	C4X-C4-N3	-14.29	103.89	123.43
2	C	801	FDA	C4-C4X-C10	-13.13	111.26	119.95
2	D	801	FDA	C4X-C4-N3	-12.26	106.67	123.43
2	B	801	FDA	C1'-N10-C9A	11.86	127.63	118.29
5	D	803	MES	O2S-S-C8	10.14	119.13	106.92
2	C	801	FDA	C4-N3-C2	8.58	122.38	115.14
3	B	802	G3F	F3-C3-C2	-8.04	101.72	108.85
2	A	801	FDA	C1'-N10-C9A	7.86	124.48	118.29
2	A	801	FDA	N3A-C2A-N1A	-7.67	116.69	128.68
3	B	802	G3F	F3-C3-C4	7.56	115.57	108.85
5	A	804	MES	O1S-S-C8	6.72	115.01	106.92
5	A	804	MES	O2S-S-C8	6.48	114.72	106.92
2	D	801	FDA	C1'-N10-C9A	6.34	123.28	118.29
2	A	801	FDA	C10-C4X-N5	-5.96	117.14	121.26
2	B	801	FDA	C5X-C9A-N10	5.85	121.96	117.72
2	A	801	FDA	C4-C4X-C10	5.78	123.78	119.95
2	B	801	FDA	N3A-C2A-N1A	-5.55	120.01	128.68
2	D	801	FDA	N3A-C2A-N1A	-5.44	120.17	128.68
2	C	801	FDA	C4-C4X-N5	5.36	124.73	118.60
5	D	804	MES	O2S-S-C8	-5.17	100.69	106.92
2	B	801	FDA	C9A-N10-C10	-4.70	115.75	121.91
2	C	801	FDA	N3A-C2A-N1A	-4.67	121.39	128.68
5	D	803	MES	O3S-S-C8	-4.65	98.25	105.77
2	D	801	FDA	C9A-C5X-N5	-4.60	115.17	122.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	801	FDA	C4X-N5-C5X	4.58	121.34	116.77
2	C	801	FDA	C5X-C9A-N10	4.40	120.91	117.72
2	C	801	FDA	C1'-N10-C10	4.25	122.21	118.41
2	B	801	FDA	O4B-C4B-C5B	4.10	122.87	109.37
2	B	801	FDA	C5A-C6A-N6A	4.01	126.45	120.35
5	B	804	MES	C6-C5-N4	3.98	116.14	110.10
5	D	804	MES	O1S-S-C8	-3.98	102.13	106.92
2	A	801	FDA	C7M-C7-C6	-3.97	110.83	120.34
2	C	801	FDA	O4B-C1B-C2B	3.88	112.59	106.93
3	D	802	G3F	F3-C3-C4	3.80	112.22	108.85
2	B	801	FDA	O2B-C2B-C3B	3.79	124.09	111.82
2	D	801	FDA	O4B-C4B-C5B	3.75	121.72	109.37
5	C	803	MES	O2S-S-C8	3.73	111.41	106.92
2	A	801	FDA	O4B-C1B-C2B	3.69	112.32	106.93
2	B	801	FDA	O2B-C2B-C1B	3.66	124.38	110.85
2	B	801	FDA	C4-C4X-N5	-3.65	114.42	118.60
2	D	801	FDA	O3B-C3B-C4B	3.60	121.45	111.05
3	B	802	G3F	O2-C2-C1	3.59	117.48	109.16
2	C	801	FDA	C9A-N10-C10	-3.53	117.28	121.91
2	C	801	FDA	C4X-C4-N3	-3.47	118.68	123.43
2	B	801	FDA	C4-C4X-C10	3.45	122.23	119.95
3	C	802	G3F	C4-C3-C2	-3.42	107.28	111.34
2	D	801	FDA	C9A-N10-C10	-3.18	117.74	121.91
3	A	802	G3F	C3-C4-C5	3.18	113.85	109.66
5	A	804	MES	O1-C2-C3	-3.09	105.00	111.80
2	B	801	FDA	O4B-C1B-C2B	3.03	111.36	106.93
2	D	801	FDA	O2B-C2B-C1B	2.96	121.80	110.85
2	C	801	FDA	O4B-C4B-C5B	2.95	119.08	109.37
5	A	804	MES	O1-C6-C5	-2.95	105.31	111.80
2	D	801	FDA	C5B-C4B-C3B	2.89	126.02	115.18
2	A	801	FDA	O2B-C2B-C3B	2.89	121.17	111.82
2	B	801	FDA	C2B-C3B-C4B	2.88	108.25	102.64
2	C	801	FDA	C7-C6-C5X	-2.86	117.16	121.22
3	C	802	G3F	O6-C6-C5	-2.86	101.49	111.29
5	D	804	MES	C6-C5-N4	2.82	114.38	110.10
2	C	801	FDA	C5B-C4B-C3B	2.80	125.67	115.18
2	C	801	FDA	C1'-N10-C9A	2.80	120.49	118.29
2	B	801	FDA	O5'-C5'-C4'	-2.79	101.91	109.36
2	A	801	FDA	C5'-C4'-C3'	-2.78	106.83	112.20
2	B	801	FDA	C7-C6-C5X	-2.75	117.32	121.22
5	C	803	MES	O1S-S-C8	2.75	110.22	106.92
5	B	804	MES	O2S-S-C8	2.72	110.19	106.92

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	801	FDA	O4B-C4B-C3B	2.71	110.47	105.11
2	C	801	FDA	O4B-C4B-C3B	2.71	110.47	105.11
2	A	801	FDA	C2A-N1A-C6A	2.68	123.34	118.75
2	A	801	FDA	O4B-C4B-C5B	2.68	118.18	109.37
2	A	801	FDA	C4X-N5-C5X	2.67	119.44	116.77
3	A	802	G3F	O2-C2-C3	2.62	114.87	109.68
3	C	802	G3F	C3-C4-C5	2.58	113.06	109.66
2	C	801	FDA	O2B-C2B-C1B	2.57	120.35	110.85
2	A	801	FDA	C4-C4X-N5	-2.57	115.66	118.60
2	B	801	FDA	C5B-C4B-C3B	2.56	124.77	115.18
5	A	804	MES	O3S-S-C8	-2.56	101.63	105.77
5	A	804	MES	O3S-S-O2S	-2.54	105.08	111.27
3	A	802	G3F	O5-C1-C2	-2.50	105.82	110.28
2	C	801	FDA	O2B-C2B-C3B	2.48	119.83	111.82
5	D	804	MES	C2-C3-N4	-2.46	106.37	110.10
2	A	801	FDA	C9-C8-C7	-2.44	115.80	119.91
3	C	802	G3F	O5-C1-C2	2.41	114.59	110.28
5	B	804	MES	O1-C2-C3	-2.40	106.51	111.80
2	A	801	FDA	C5X-C9A-N10	-2.39	115.98	117.72
2	B	801	FDA	C10-C4X-N5	2.39	122.91	121.26
3	C	802	G3F	F3-C3-C4	2.38	110.97	108.85
2	C	801	FDA	O2P-P-O1P	2.37	123.98	112.24
2	D	801	FDA	C4X-C10-N10	-2.35	117.88	120.30
5	A	804	MES	C6-C5-N4	-2.34	106.55	110.10
2	A	801	FDA	N6A-C6A-N1A	2.32	123.39	118.57
2	D	801	FDA	C7-C6-C5X	-2.30	117.96	121.22
2	C	801	FDA	O3B-C3B-C4B	2.30	117.70	111.05
5	D	804	MES	O3S-S-O1S	2.29	116.86	111.27
2	A	801	FDA	O2'-C2'-C3'	2.28	114.65	109.10
2	A	801	FDA	C9A-N10-C10	-2.28	118.92	121.91
2	D	801	FDA	O3'-C3'-C4'	-2.27	103.34	108.81
3	A	802	G3F	C3-C2-C1	2.26	114.90	110.95
2	A	801	FDA	O3B-C3B-C4B	2.25	117.55	111.05
5	A	804	MES	C2-C3-N4	-2.22	106.73	110.10
2	D	801	FDA	O4B-C1B-C2B	2.20	110.14	106.93
5	B	804	MES	O3S-S-O1S	-2.20	105.91	111.27
3	D	802	G3F	O5-C1-C2	-2.18	106.40	110.28
2	B	801	FDA	C7M-C7-C6	-2.16	115.18	120.34
4	A	803	12P	C3-O4-C5	2.14	120.55	112.90
2	C	801	FDA	C8M-C8-C9	-2.12	115.26	120.34
2	B	801	FDA	O2'-C2'-C1'	2.10	114.64	109.59
2	A	801	FDA	C5B-C4B-C3B	2.10	123.03	115.18

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	802	G3F	O1-C1-C2	-2.09	103.14	109.03
5	D	803	MES	O1S-S-C8	2.08	109.42	106.92
2	B	801	FDA	C9-C9A-C5X	-2.08	116.33	119.88
2	D	801	FDA	C1B-N9A-C4A	-2.07	123.01	126.64
2	D	801	FDA	C3B-C2B-C1B	2.06	104.09	100.98
2	D	801	FDA	O2A-PA-O1A	2.06	122.44	112.24
2	A	801	FDA	C1'-N10-C10	-2.06	116.56	118.41
2	C	801	FDA	O2A-PA-O1A	2.06	122.41	112.24
2	A	801	FDA	C8M-C8-C9	-2.04	115.46	120.34
3	B	802	G3F	O4-C4-C5	2.04	114.36	109.30
2	B	801	FDA	C6-C5X-C9A	2.04	121.72	119.05
2	B	801	FDA	C4A-C5A-N7A	-2.04	107.28	109.40
2	C	801	FDA	O2'-C2'-C3'	2.03	114.04	109.10
2	D	801	FDA	C4-C4X-N5	-2.02	116.28	118.60

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	C	803	MES	N4-C7-C8-S
5	C	803	MES	C7-C8-S-O2S
5	D	803	MES	N4-C7-C8-S
5	D	804	MES	C8-C7-N4-C5
2	B	801	FDA	PA-O3P-P-O5'
4	B	805	12P	O10-C11-C12-O13
4	B	803	12P	O13-C14-C15-O16
4	B	803	12P	O1-C2-C3-O4
4	A	805	12P	O13-C14-C15-O16
4	B	805	12P	C5-C6-O7-C8
2	D	801	FDA	O4B-C4B-C5B-O5B
4	A	805	12P	O10-C11-C12-O13
4	B	805	12P	O7-C8-C9-O10
3	C	802	G3F	C4-C5-C6-O6
2	D	801	FDA	PA-O3P-P-O5'
4	A	805	12P	O7-C8-C9-O10
4	A	803	12P	C15-C14-O13-C12
2	A	801	FDA	C5'-O5'-P-O3P
5	C	803	MES	C7-C8-S-O1S
4	B	803	12P	C5-C6-O7-C8
2	B	801	FDA	P-O3P-PA-O1A
4	A	803	12P	C11-C12-O13-C14
4	B	805	12P	C11-C12-O13-C14

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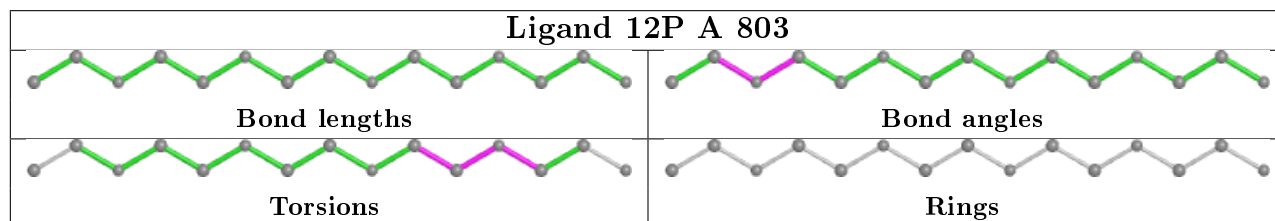
Mol	Chain	Res	Type	Atoms
5	C	803	MES	C7-C8-S-O3S
4	A	803	12P	O10-C11-C12-O13
2	B	801	FDA	O4B-C4B-C5B-O5B
2	C	801	FDA	O4B-C4B-C5B-O5B
2	A	801	FDA	O4B-C4B-C5B-O5B
2	B	801	FDA	P-O3P-PA-O2A
5	A	804	MES	N4-C7-C8-S

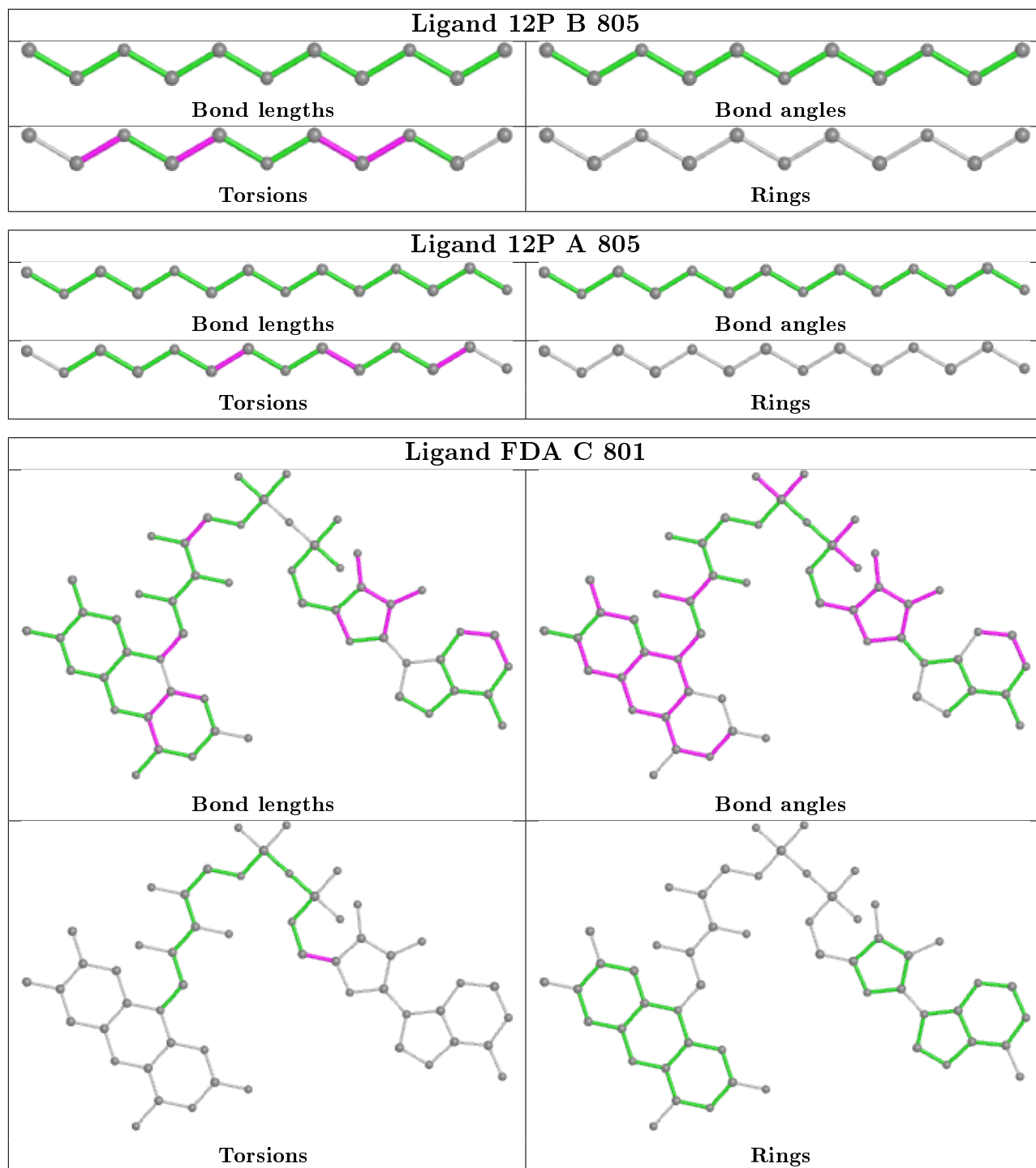
There are no ring outliers.

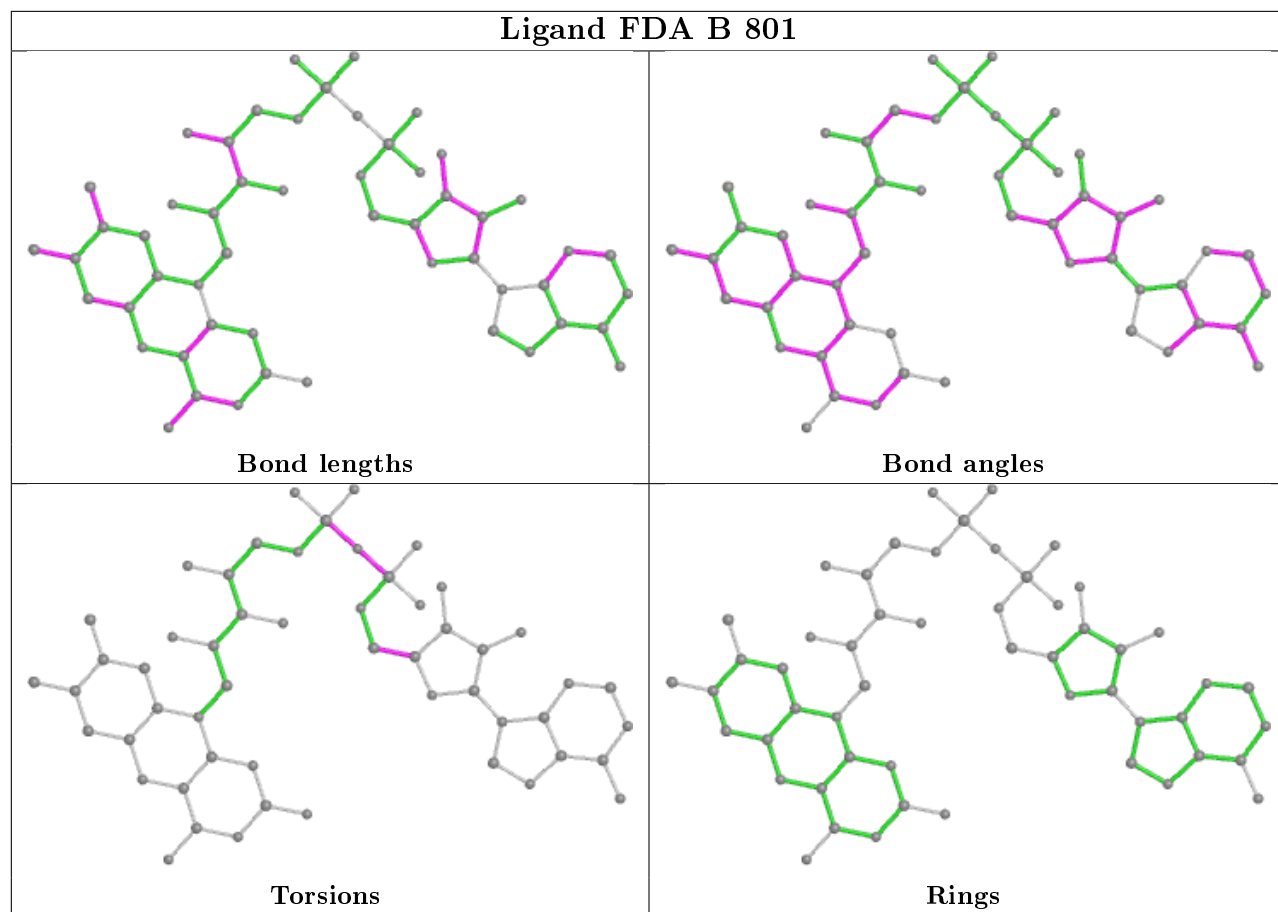
11 monomers are involved in 25 short contacts:

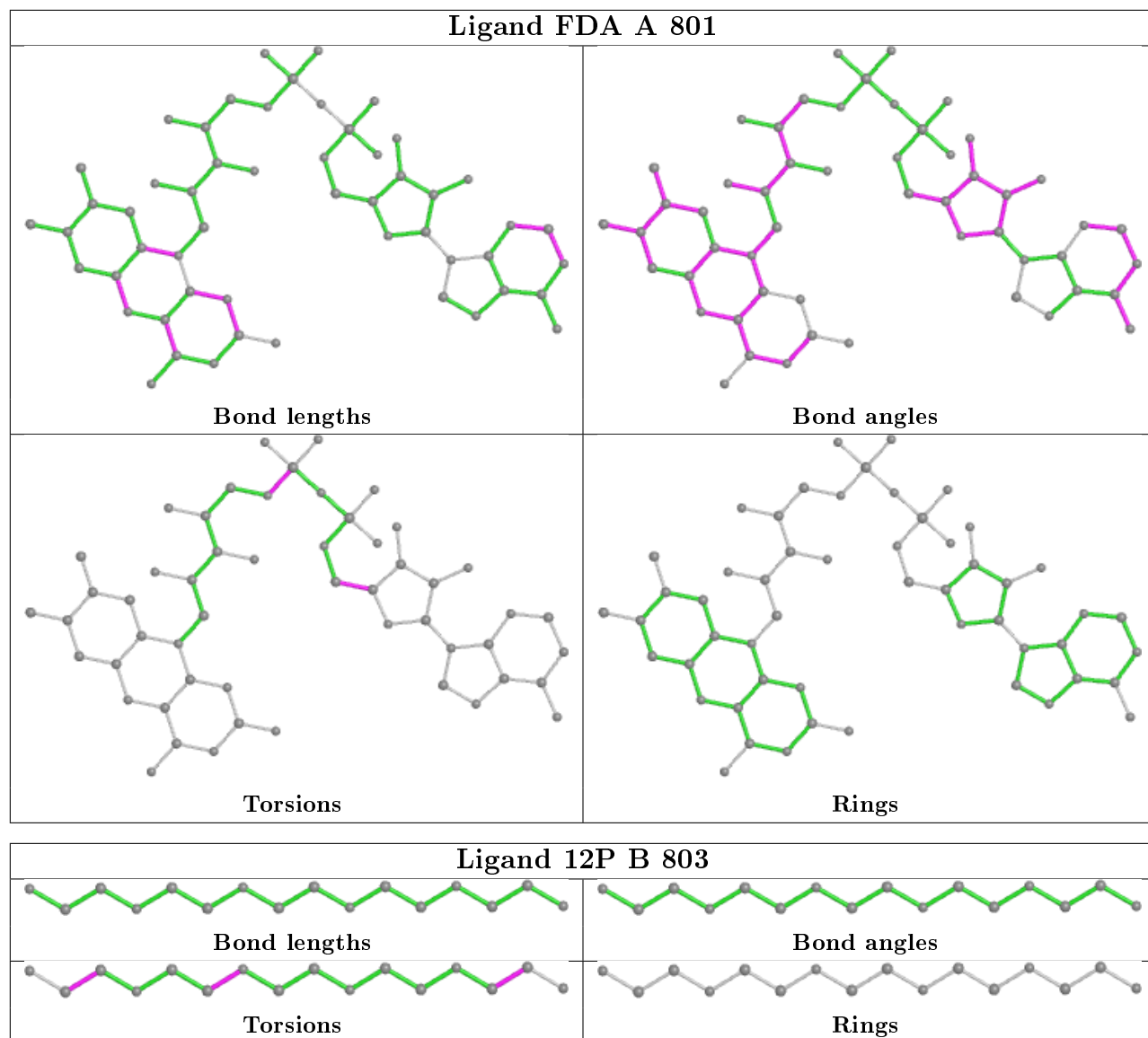
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	C	803	MES	1	0
5	D	803	MES	1	0
3	D	802	G3F	2	0
3	C	802	G3F	3	0
3	B	802	G3F	2	0
3	A	802	G3F	1	0
2	C	801	FDA	3	0
2	B	801	FDA	2	0
2	A	801	FDA	2	0
5	A	804	MES	10	0
2	D	801	FDA	3	0

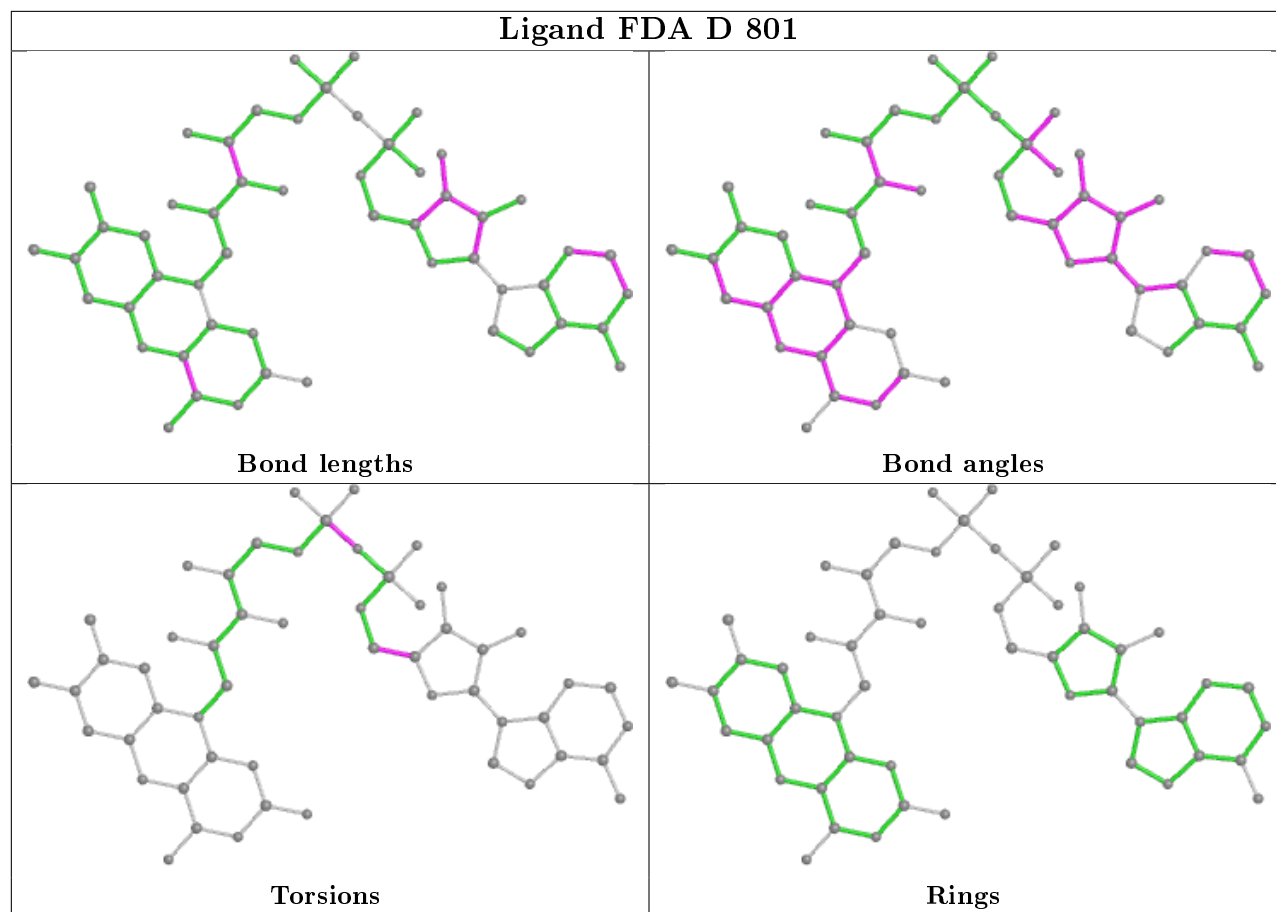
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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

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	576/633 (90%)	-0.11	19 (3%) 46 45	12, 19, 43, 72	0
1	B	576/633 (90%)	-0.26	6 (1%) 82 81	11, 18, 34, 59	0
1	C	574/633 (90%)	0.15	25 (4%) 34 33	15, 33, 56, 81	0
1	D	575/633 (90%)	-0.08	25 (4%) 35 34	13, 23, 44, 71	0
All	All	2301/2532 (90%)	-0.07	75 (3%) 46 45	11, 23, 49, 81	0

All (75) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	389	LEU	6.9
1	A	382	ILE	6.2
1	D	343	ALA	6.0
1	D	385	THR	5.9
1	C	343	ALA	5.8
1	C	345	PRO	5.4
1	D	382	ILE	5.0
1	A	388	GLU	4.6
1	D	345	PRO	4.5
1	A	393	VAL	4.5
1	A	343	ALA	4.5
1	A	390	THR	4.3
1	C	618	PHE	4.3
1	A	385	THR	4.2
1	D	383	ARG	4.2
1	A	618	PHE	4.1
1	B	618	PHE	4.1
1	B	343	ALA	4.0
1	D	390	THR	4.0
1	A	342	PRO	3.9
1	C	270	ALA	3.9

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Mol	Chain	Res	Type	RSRZ
1	D	344	ASN	3.8
1	D	391	TYR	3.6
1	D	619	THR	3.5
1	C	68	ALA	3.4
1	A	389	LEU	3.4
1	C	557	PHE	3.3
1	C	341	ASN	3.3
1	A	345	PRO	3.2
1	A	44	ASP	3.1
1	D	618	PHE	3.1
1	C	344	ASN	3.0
1	A	341	ASN	2.9
1	C	342	PRO	2.9
1	D	186	ASP	2.9
1	C	190	ALA	2.9
1	D	388	GLU	2.9
1	D	381	THR	2.8
1	B	45	ILE	2.8
1	A	384	GLY	2.8
1	B	345	PRO	2.8
1	D	560	LYS	2.7
1	A	394	THR	2.6
1	D	189	ASP	2.6
1	A	344	ASN	2.6
1	C	616	SER	2.6
1	D	272	GLU	2.6
1	C	45	ILE	2.5
1	B	44	ASP	2.5
1	C	309	PHE	2.5
1	B	344	ASN	2.4
1	C	189	ASP	2.4
1	D	392	SER	2.4
1	A	401	THR	2.4
1	C	177	ARG	2.4
1	C	272	GLU	2.4
1	A	387	GLY	2.4
1	C	307	ASP	2.4
1	D	341	ASN	2.4
1	D	387	GLY	2.3
1	C	617	PRO	2.3
1	A	381	THR	2.3
1	C	269	ASP	2.3

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Mol	Chain	Res	Type	RSRZ
1	D	347	GLU	2.2
1	C	611	GLN	2.2
1	C	549	LEU	2.2
1	D	561	GLU	2.1
1	C	385	THR	2.1
1	A	100	ILE	2.1
1	D	269	ASP	2.1
1	C	246	ARG	2.1
1	C	186	ASP	2.1
1	C	388	GLU	2.0
1	D	417	MET	2.0
1	D	549	LEU	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.

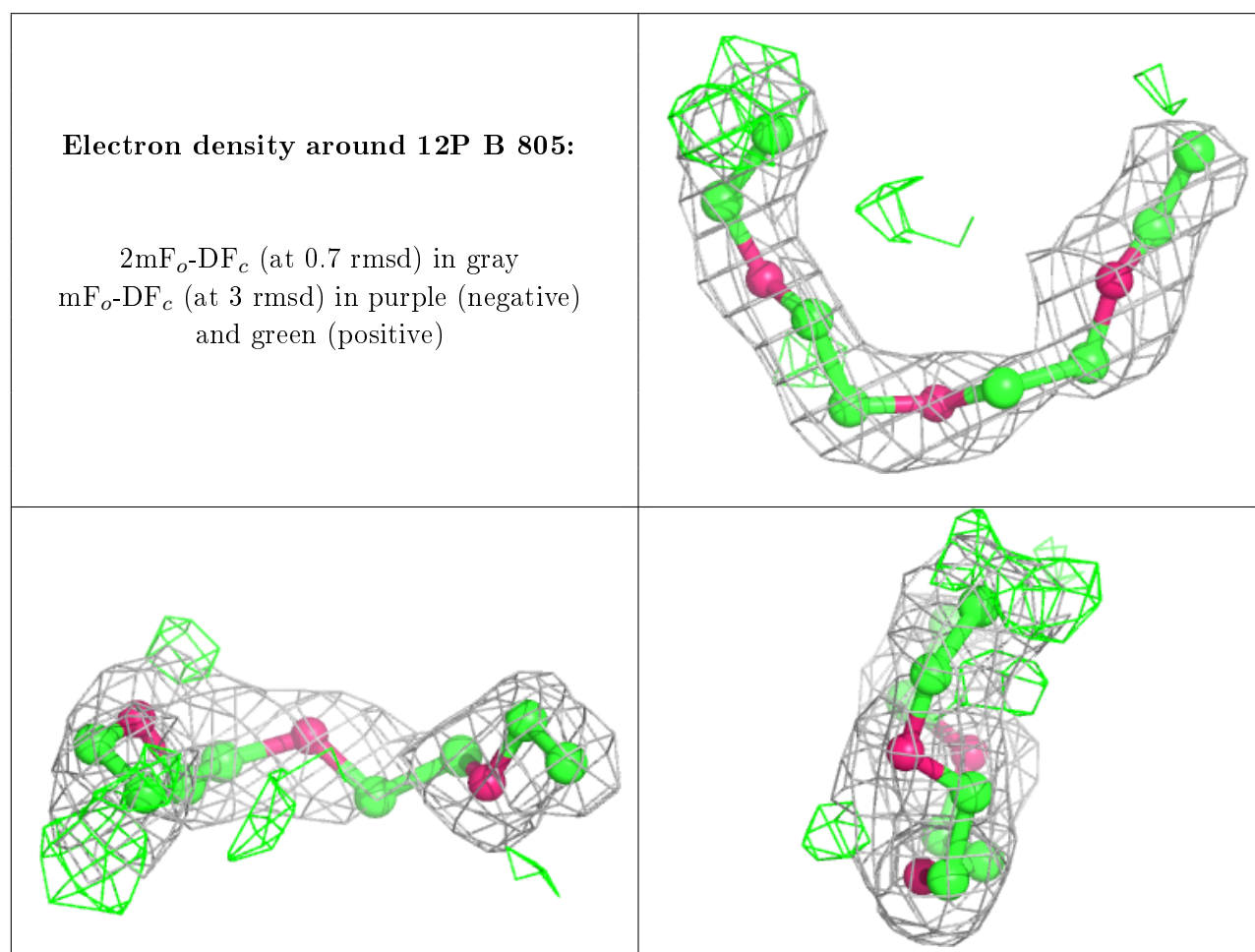
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	MES	C	803	12/12	0.60	0.30	74,83,106,113	0
4	12P	B	805	11/37	0.82	0.18	38,44,46,47	0
4	12P	A	803	15/37	0.88	0.16	27,32,45,47	0
3	G3F	C	802	12/12	0.89	0.14	29,35,37,38	0
4	12P	A	805	14/37	0.91	0.13	27,32,37,39	0
5	MES	A	804	12/12	0.91	0.24	28,41,47,53	0
5	MES	D	804	12/12	0.92	0.20	31,34,40,40	0
4	12P	B	803	16/37	0.93	0.15	31,34,65,69	0
3	G3F	D	802	12/12	0.94	0.12	23,24,28,28	0
3	G3F	A	802	12/12	0.95	0.10	20,22,25,26	0
2	FDA	C	801	53/53	0.96	0.12	16,24,29,33	0

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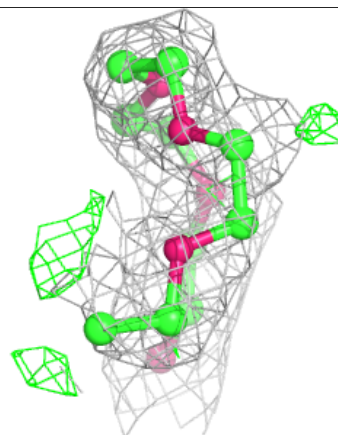
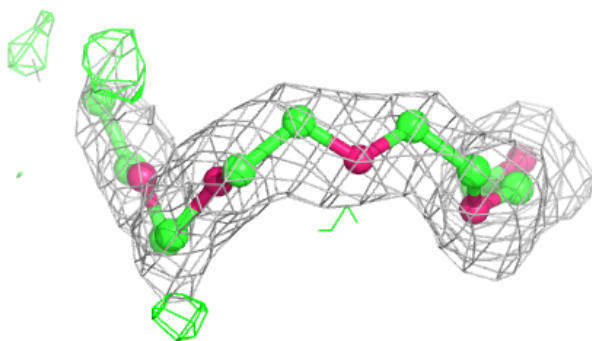
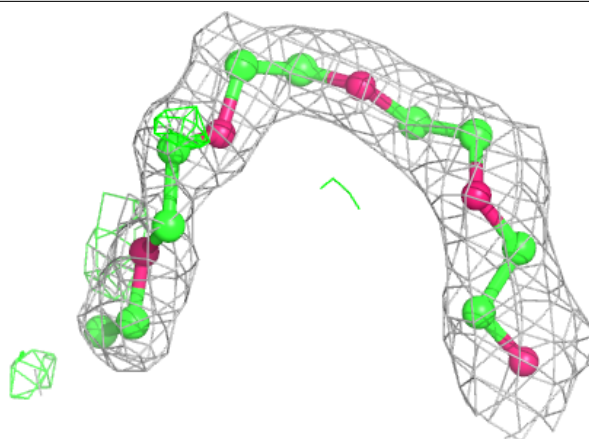
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	MES	D	803	12/12	0.97	0.13	24,30,32,33	0
3	G3F	B	802	12/12	0.97	0.07	22,24,25,25	0
5	MES	B	804	12/12	0.97	0.16	27,29,36,36	0
2	FDA	D	801	53/53	0.97	0.11	10,15,21,31	0
2	FDA	A	801	53/53	0.98	0.12	6,10,14,17	0
2	FDA	B	801	53/53	0.98	0.10	7,10,14,17	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.



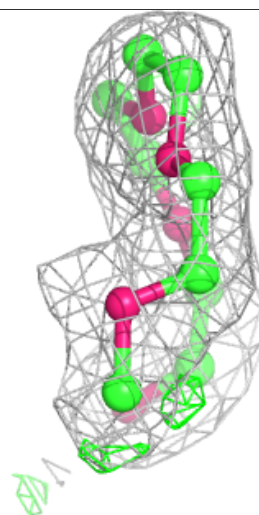
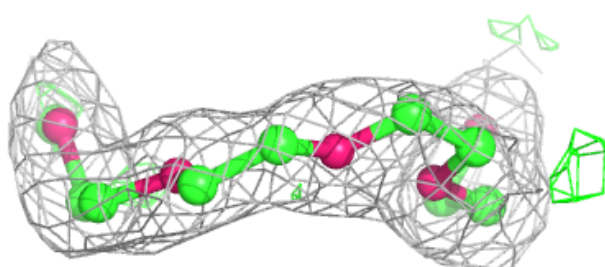
Electron density around 12P A 803:

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



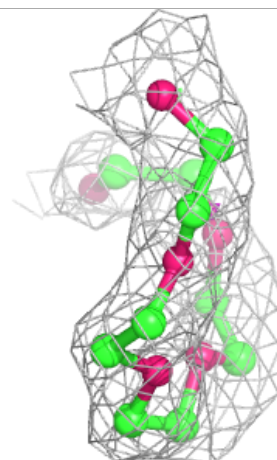
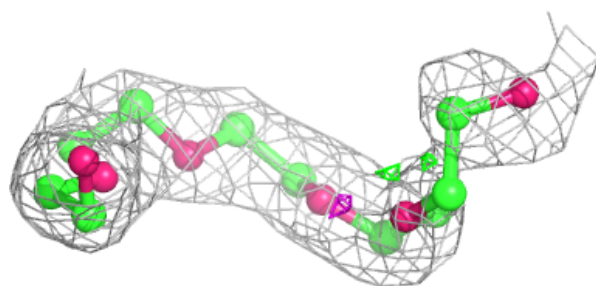
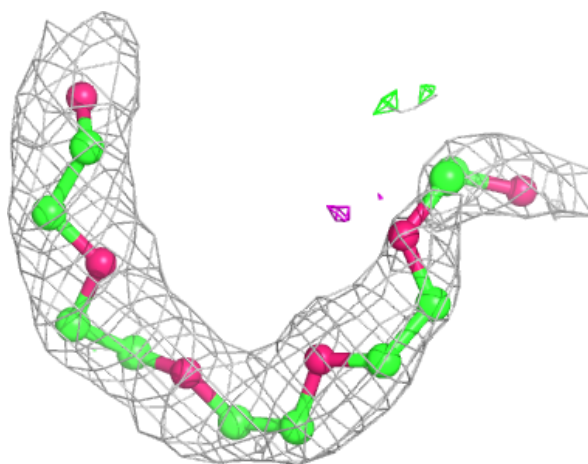
Electron density around 12P A 805:

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



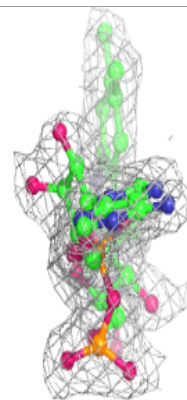
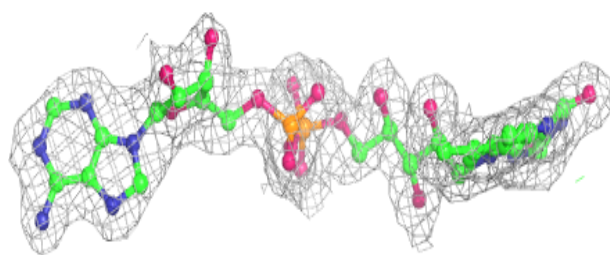
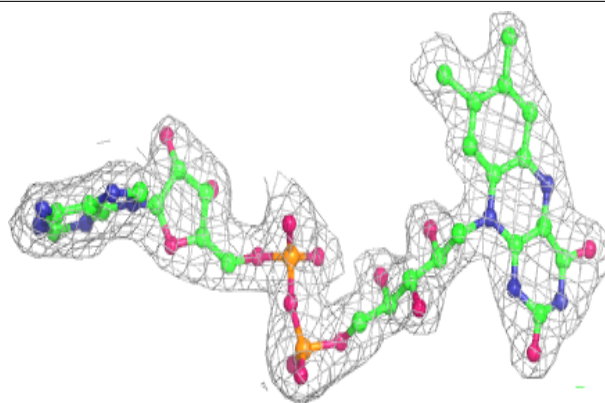
Electron density around 12P B 803:

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

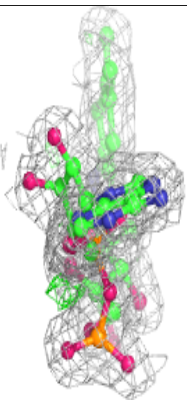
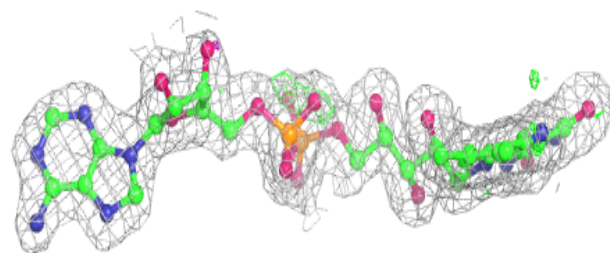
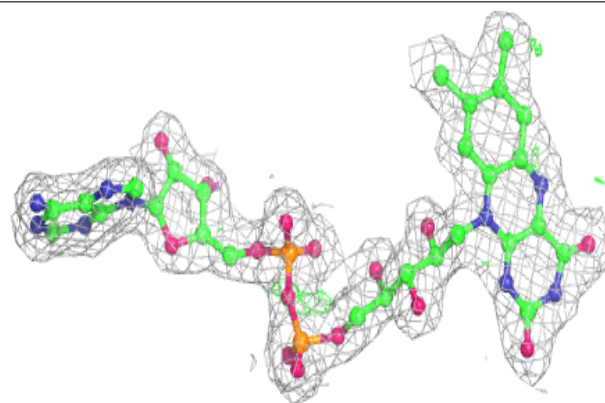


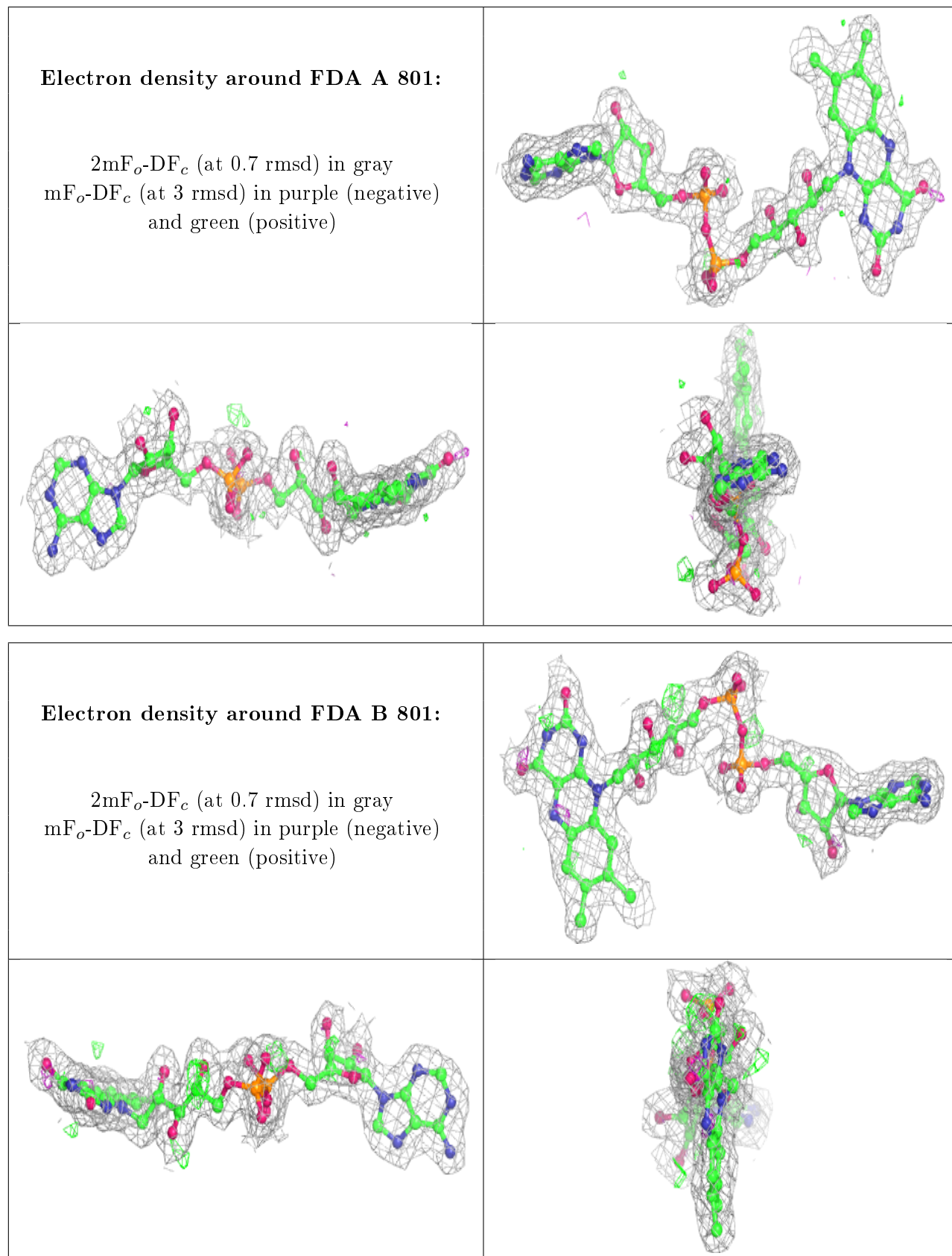
Electron density around FDA C 801:

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

**Electron density around FDA D 801:**

$2mF_o-DF_c$ (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.