



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 15, 2024 – 01:03 PM EDT

PDB ID : 1YQ4
Title : Avian respiratory complex ii with 3-nitropropionate and ubiquinone
Authors : Huang, L.; Sun, G.; Cobessi, D.; Wang, A.; Shen, J.T.; Tung, E.Y.; Anderson, V.E.; Berry, E.A.
Deposited on : 2005-02-01
Resolution : 2.33 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 : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 1.20.1
EDS : 2.37.1
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) : 2.37.1

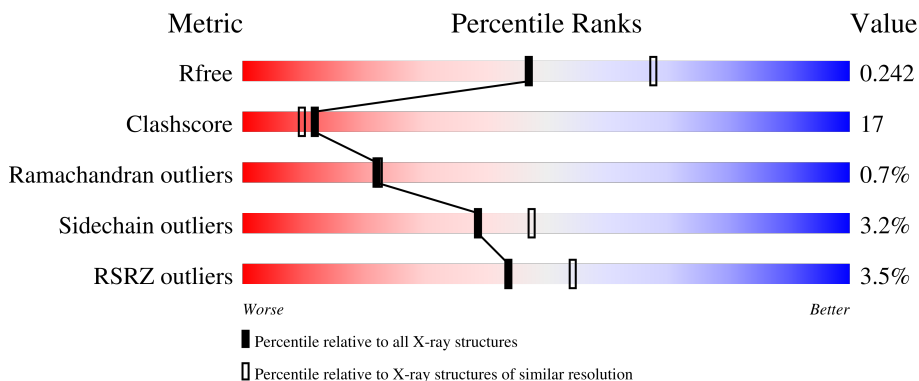
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.33 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	2096 (2.36-2.32)
Clashscore	141614	2193 (2.36-2.32)
Ramachandran outliers	138981	2159 (2.36-2.32)
Sidechain outliers	138945	2160 (2.36-2.32)
RSRZ outliers	127900	2067 (2.36-2.32)

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	621	 3% (poor fit), 66% (0 outliers), 31% (1 outlier), .. (2+ outliers)
2	B	252	 5% (poor fit), 60% (0 outliers), 33% (1 outlier), .. (2+ outliers)
3	C	141	 % (poor fit), 64% (0 outliers), 33% (1 outlier), .. (2+ outliers)
4	D	103	 2% (poor fit), 64% (0 outliers), 33% (1 outlier), .. (2+ outliers)

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 criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
10	GOL	B	1005	-	-	-	X
6	3NP	A	1002	-	X	-	-

2 Entry composition [i](#)

There are 15 unique types of molecules in this entry. The entry contains 9291 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 Succinate dehydrogenase flavoprotein subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	614	4736	2962	845	900	29	0	0	0

- Molecule 2 is a protein called succinate dehydrogenase Ip subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	242	1934	1222	327	363	22	0	0	0

- Molecule 3 is a protein called SUCCINATE DEHYDROGENASE CYTOCHROME B, LARGE SUBUNIT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	140	1074	706	179	185	4	0	0	1

- Molecule 4 is a protein called SUCCINATE DEHYDROGENASE CYTOCHROME B, SMALL SUBUNIT.

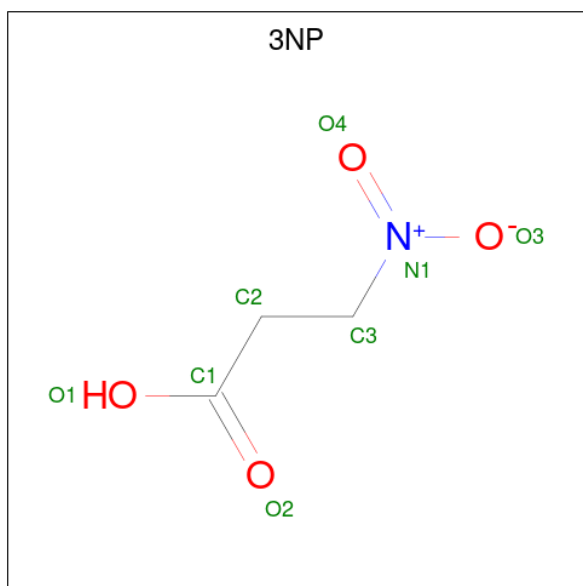
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	D	102	770	508	122	137	3	0	0	0

- Molecule 5 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
5	A	1	53	27	9	15	2	0	0

- Molecule 6 is 3-NITROPROPANOIC ACID (three-letter code: 3NP) (formula: $C_3H_5NO_4$).



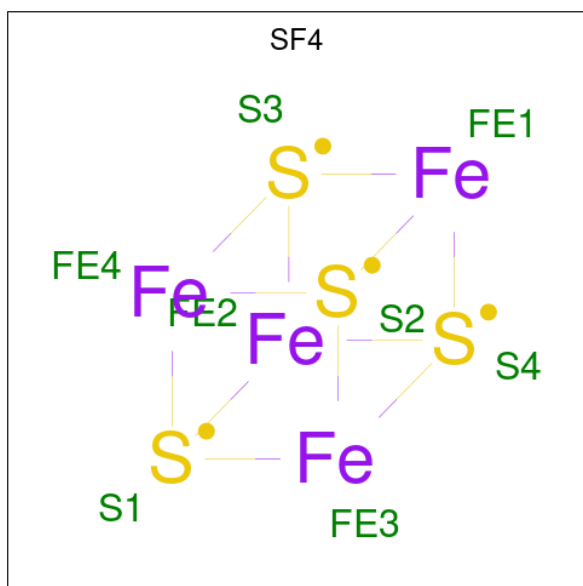
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
6	A	1	6	3	1	2	0	0	

- Molecule 7 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe_2S_2).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	Fe	S		
7	B	1	4	2	2	0	0

- Molecule 8 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe_4S_4).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	Fe	S		
8	B	1	8	4	4	0	0

- Molecule 9 is FE3-S4 CLUSTER (three-letter code: F3S) (formula: Fe_3S_4).



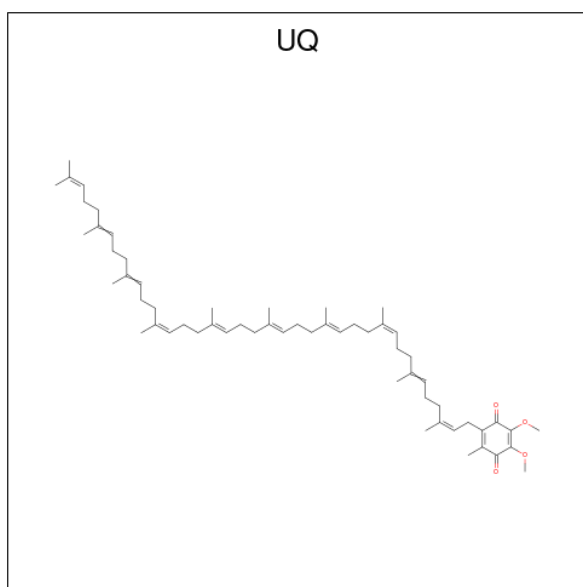
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	B	1	Total Fe S 7 3 4	0	0

- Molecule 10 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



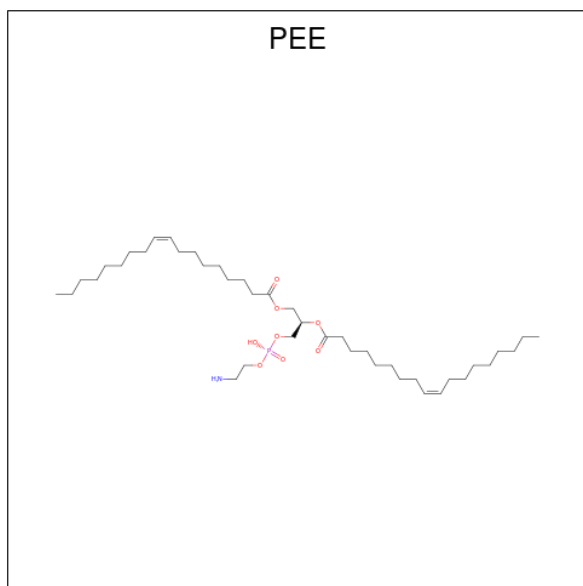
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	B	1	Total C O 6 3 3	0	0

- Molecule 11 is hexyl beta-D-glucopyranoside (three-letter code: JZR) (formula: C₁₂H₂₄O₆).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
13	C	1	Total	C	O	0	0
			14	10	4		

- Molecule 14 is 1,2-Dioleoyl-sn-glycero-3-phosphoethanolamine (three-letter code: PEE) (formula: $C_{41}H_{78}NO_8P$).

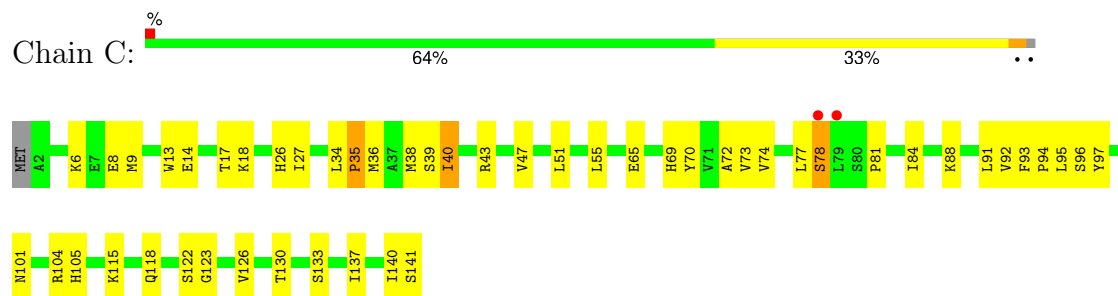


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
14	C	1	Total	C	O	0	0
			21	19	2		
14	D	1	Total	C		0	0
			24	24			

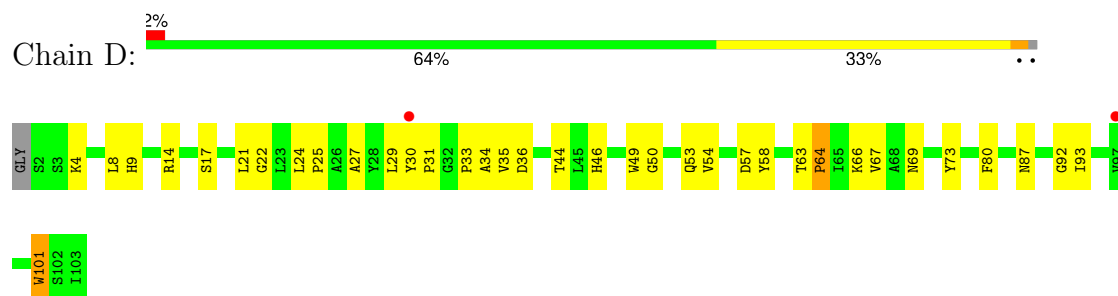
- Molecule 15 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	A	280	Total 280	O 280	0	0
15	B	159	Total 159	O 159	0	0
15	C	72	Total 72	O 72	0	0
15	D	64	Total 64	O 64	0	0

- Molecule 3: SUCCINATE DEHYDROGENASE CYTOCHROME B, LARGE SUBUNIT



- Molecule 4: SUCCINATE DEHYDROGENASE CYTOCHROME B, SMALL SUBUNIT



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	69.59Å 83.49Å 288.59Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	56.38 – 2.33 47.48 – 2.20	Depositor EDS
% Data completeness (in resolution range)	79.4 (56.38-2.33) 90.1 (47.48-2.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.11	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.02 (at 2.20Å)	Xtrriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.202 , 0.252 0.196 , 0.242	Depositor DCC
R_{free} test set	3830 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å ²)	42.5	Xtrriage
Anisotropy	0.414	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 54.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.41$, $\langle L^2 \rangle = 0.24$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	9291	wwPDB-VP
Average B, all atoms (Å ²)	49.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.74% 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: GOL, FAD, HEM, UQ, 3NP, FES, F3S, JZR, PEE, SF4

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	0.62	1/4837 (0.0%)	0.83	4/6550 (0.1%)
2	B	0.73	2/1976 (0.1%)	0.83	1/2666 (0.0%)
3	C	0.69	0/1103	0.76	0/1501
4	D	0.67	0/793	0.73	0/1089
All	All	0.66	3/8709 (0.0%)	0.81	5/11806 (0.0%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	185	MET	SD-CE	6.00	2.11	1.77
1	A	531	CYS	CB-SG	-5.84	1.72	1.81
2	B	215	CYS	CB-SG	5.37	1.91	1.82

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	422	ARG	NE-CZ-NH1	7.38	123.99	120.30
1	A	256	GLY	N-CA-C	-5.86	98.46	113.10
1	A	422	ARG	NE-CZ-NH2	-5.60	117.50	120.30
2	B	23	LYS	N-CA-C	-5.21	96.93	111.00
1	A	408	ARG	NE-CZ-NH2	-5.03	117.78	120.30

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	4736	0	4614	157	0
2	B	1934	0	1920	76	0
3	C	1074	0	1115	46	0
4	D	770	0	763	33	0
5	A	53	0	29	7	0
6	A	6	0	0	0	0
7	B	4	0	0	0	0
8	B	8	0	0	0	0
9	B	7	0	0	0	0
10	B	6	0	8	0	0
11	C	18	0	24	0	0
12	C	41	0	24	0	0
13	C	14	0	9	10	0
14	C	21	0	35	1	0
14	D	24	0	40	0	0
15	A	280	0	0	3	0
15	B	159	0	0	4	0
15	C	72	0	0	6	0
15	D	64	0	0	4	0
All	All	9291	0	8581	299	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 17.

All (299) 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)
2:B:185:MET:SD	2:B:185:MET:CE	2.11	1.39
2:B:240:LYS:O	2:B:244:THR:HG23	1.71	0.88
1:A:277:ASN:HD21	1:A:281:GLU:HB3	1.39	0.85
1:A:401:ALA:N	1:A:402:SER:HA	1.91	0.85
1:A:181:LEU:HD21	1:A:211:ILE:HD11	1.57	0.84
1:A:32:ARG:NH2	1:A:422:ARG:HD2	1.95	0.82
2:B:214:ARG:HH22	4:D:53:GLN:HE22	1.26	0.80
1:A:112:ASN:HD22	2:B:138:GLY:H	1.28	0.79
2:B:214:ARG:HH12	4:D:53:GLN:NE2	1.80	0.79
3:C:101:ASN:HD21	3:C:104:ARG:HH11	1.31	0.78
1:A:164:ARG:HH22	2:B:137:GLN:HE22	1.31	0.78
1:A:216:TYR:H	1:A:366:ASN:ND2	1.83	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:43:ARG:NH1	13:C:144:UQ:HM21	1.99	0.77
13:C:144:UQ:HM23	4:D:58:TYR:OH	1.86	0.76
3:C:34:LEU:HB3	3:C:35:PRO:HD3	1.67	0.75
2:B:65:CYS:HB3	2:B:70:CYS:HB3	1.68	0.75
1:A:480:ALA:HB2	1:A:536:ILE:HD12	1.69	0.75
1:A:277:ASN:ND2	1:A:281:GLU:HB3	2.01	0.75
1:A:237:VAL:HG21	1:A:370:ILE:HG12	1.69	0.74
4:D:4:LYS:O	4:D:8:LEU:HG	1.88	0.73
1:A:103:ALA:HB3	1:A:104:PRO:HD3	1.71	0.73
3:C:101:ASN:ND2	3:C:104:ARG:HH11	1.88	0.72
3:C:140:ILE:HG22	3:C:141:SER:N	2.05	0.72
2:B:66:ARG:O	2:B:66:ARG:HG2	1.87	0.72
1:A:127:GLN:NE2	1:A:145:ARG:HA	2.04	0.72
2:B:216:HIS:HB2	15:C:1006:HOH:O	1.90	0.71
1:A:313:GLY:O	1:A:318:LYS:HD3	1.91	0.70
1:A:72:GLU:OE1	1:A:144:HIS:HD2	1.74	0.70
1:A:60:ALA:HB3	1:A:154:GLY:HA3	1.73	0.70
1:A:257:ILE:HD11	1:A:348:ALA:HB2	1.75	0.69
1:A:58:VAL:HG23	1:A:155:HIS:HA	1.75	0.69
3:C:65:GLU:HB2	3:C:70:TYR:CZ	2.28	0.68
1:A:360:LEU:HD12	1:A:361:PRO:HD2	1.76	0.68
1:A:237:VAL:HG12	1:A:242:LEU:HB2	1.74	0.68
1:A:284:MET:HE3	1:A:303:SER:HB2	1.75	0.68
3:C:93:PHE:HB3	3:C:94:PRO:CD	2.24	0.68
1:A:25:GLY:HA2	5:A:1001:FAD:H1B	1.76	0.67
3:C:65:GLU:HB2	3:C:70:TYR:CE1	2.29	0.67
3:C:96:SER:HG	3:C:133:SER:HG	1.41	0.66
1:A:266:GLU:HG3	1:A:269:ARG:NH2	2.10	0.66
3:C:26:HIS:CD2	3:C:27:ILE:H	2.14	0.66
3:C:101:ASN:HD21	3:C:104:ARG:NH1	1.94	0.66
1:A:417:LEU:HD21	5:A:1001:FAD:H5'2	1.78	0.65
2:B:214:ARG:HH12	4:D:53:GLN:HE21	1.44	0.65
3:C:69:HIS:O	3:C:73:VAL:HG23	1.96	0.65
2:B:216:HIS:NE2	4:D:57:ASP:OD2	2.30	0.65
2:B:18:ARG:NH2	2:B:56:ASP:OD2	2.30	0.65
3:C:43:ARG:CZ	13:C:144:UQ:HM21	2.27	0.64
13:C:144:UQ:HM33	13:C:144:UQ:HM22	1.79	0.64
1:A:58:VAL:HB	1:A:158:LEU:HD23	1.80	0.64
1:A:284:MET:CE	1:A:303:SER:HB2	2.28	0.64
1:A:331:GLN:NE2	1:A:335:THR:OG1	2.30	0.64
2:B:188:TYR:HD1	2:B:191:MET:CE	2.11	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:72:GLU:OE1	1:A:144:HIS:CD2	2.50	0.63
1:A:534:GLN:NE2	1:A:585:SER:OG	2.32	0.63
3:C:47:VAL:O	3:C:51:LEU:HG	1.98	0.62
3:C:105:HIS:ND1	15:C:1107:HOH:O	2.31	0.62
2:B:187:ALA:O	2:B:191:MET:HG3	2.00	0.62
4:D:34:ALA:HB3	15:D:1470:HOH:O	2.01	0.61
1:A:479:HIS:O	1:A:489:LEU:HD23	2.01	0.60
1:A:464:ARG:HB3	1:A:507:LYS:HE3	1.82	0.60
1:A:112:ASN:ND2	2:B:138:GLY:H	1.97	0.60
1:A:155:HIS:HD2	15:B:1007:HOH:O	1.84	0.60
2:B:188:TYR:HA	2:B:191:MET:CE	2.31	0.60
1:A:396:GLY:HA2	1:A:417:LEU:HD23	1.83	0.60
3:C:43:ARG:NH1	13:C:144:UQ:CM2	2.64	0.60
1:A:243:PRO:HB3	1:A:586:TYR:CZ	2.37	0.60
2:B:188:TYR:HA	2:B:191:MET:HE2	1.82	0.60
1:A:367:MET:HE3	1:A:407:ASN:HA	1.84	0.59
4:D:4:LYS:HE2	15:D:1217:HOH:O	2.02	0.59
1:A:164:ARG:HH22	2:B:137:GLN:NE2	1.98	0.59
1:A:564:SER:HB3	1:A:618:ILE:HD11	1.85	0.59
4:D:53:GLN:HE21	4:D:53:GLN:HA	1.67	0.59
1:A:266:GLU:HG3	1:A:269:ARG:CZ	2.33	0.58
2:B:16:ILE:HD12	2:B:33:TYR:CD1	2.38	0.58
2:B:214:ARG:NH2	4:D:53:GLN:HE22	1.97	0.58
1:A:268:CYS:HB3	1:A:325:LEU:HD21	1.85	0.58
1:A:578:HIS:O	1:A:581:LYS:HE2	2.04	0.58
1:A:410:GLY:O	1:A:411:ALA:HB3	2.02	0.58
4:D:63:THR:HB	4:D:64:PRO:HD3	1.86	0.58
1:A:220:TYR:CG	1:A:363:VAL:HG21	2.38	0.57
4:D:33:PRO:HG2	15:D:1079:HOH:O	2.03	0.57
4:D:53:GLN:NE2	4:D:53:GLN:HA	2.20	0.57
1:A:65:ASN:CG	1:A:133:GLN:HE22	2.07	0.57
1:A:401:ALA:N	1:A:402:SER:CA	2.67	0.57
2:B:219:MET:HE3	2:B:222:THR:HB	1.86	0.57
2:B:227:LYS:HB2	2:B:229:LEU:HD22	1.87	0.57
3:C:39:SER:OG	13:C:144:UQ:HM31	2.05	0.57
1:A:55:SER:O	1:A:58:VAL:HG12	2.05	0.56
1:A:328:LEU:HB2	1:A:333:LEU:HD21	1.86	0.56
2:B:10:ARG:HD3	2:B:38:ASN:HD21	1.71	0.56
2:B:21:PRO:HD2	2:B:109:LYS:HD2	1.86	0.56
2:B:147:GLU:CD	2:B:147:GLU:H	2.09	0.56
1:A:396:GLY:HA2	1:A:417:LEU:CD2	2.36	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:324:GLN:HG3	1:A:326:HIS:CE1	2.41	0.56
1:A:89:TRP:CD2	1:A:616:PRO:HA	2.40	0.56
3:C:13:TRP:O	3:C:17:THR:HG23	2.05	0.55
2:B:19:TRP:CZ3	2:B:21:PRO:HB3	2.42	0.55
2:B:154:GLY:H	2:B:157:GLU:CD	2.10	0.55
1:A:534:GLN:HG2	1:A:585:SER:HB2	1.87	0.55
1:A:367:MET:CE	1:A:407:ASN:HA	2.36	0.55
2:B:52:LYS:HG2	2:B:57:SER:HA	1.88	0.55
1:A:438:VAL:HG23	1:A:439:PRO:HD2	1.88	0.55
4:D:63:THR:O	4:D:67:VAL:HG23	2.07	0.55
1:A:16:ASP:OD1	1:A:203:ARG:HB2	2.06	0.55
3:C:74:VAL:HA	3:C:77:LEU:HD12	1.89	0.55
3:C:6:LYS:HA	3:C:9:MET:HE3	1.89	0.55
3:C:77:LEU:O	3:C:78:SER:C	2.45	0.55
1:A:559:ASP:OD2	1:A:580:ARG:HD3	2.08	0.54
2:B:191:MET:HE2	2:B:238:ILE:HG12	1.88	0.54
1:A:409:LEU:O	1:A:412:ASN:HB2	2.08	0.54
1:A:60:ALA:HA	5:A:1001:FAD:N5	2.22	0.54
2:B:16:ILE:HD12	2:B:33:TYR:HD1	1.72	0.54
3:C:34:LEU:HD23	15:C:1160:HOH:O	2.07	0.54
3:C:40:ILE:HA	13:C:144:UQ:HM32	1.89	0.54
1:A:58:VAL:O	1:A:58:VAL:HG22	2.09	0.53
2:B:92:ASP:OD1	2:B:94:SER:OG	2.23	0.53
4:D:27:ALA:HA	4:D:35:VAL:HG11	1.89	0.53
1:A:263:LEU:HB3	5:A:1001:FAD:HM73	1.91	0.53
1:A:562:ASP:OD1	1:A:562:ASP:C	2.47	0.53
1:A:339:GLY:HA3	15:A:1238:HOH:O	2.08	0.53
1:A:8:ILE:O	1:A:9:SER:HB3	2.09	0.53
1:A:60:ALA:HB3	1:A:154:GLY:CA	2.38	0.53
1:A:155:HIS:HE1	2:B:156:TYR:O	1.91	0.53
1:A:60:ALA:HA	5:A:1001:FAD:C5X	2.39	0.53
1:A:435:GLY:O	1:A:436:GLU:C	2.47	0.52
1:A:216:TYR:CD1	1:A:216:TYR:O	2.62	0.52
1:A:13:PRO:HA	15:A:1060:HOH:O	2.08	0.52
1:A:65:ASN:ND2	1:A:411:ALA:HB3	2.25	0.52
1:A:174:VAL:HG12	1:A:175:GLU:HG3	1.90	0.52
4:D:22:GLY:O	4:D:25:PRO:HG2	2.10	0.52
1:A:237:VAL:HG21	1:A:370:ILE:CG1	2.39	0.52
2:B:220:ASN:HD21	3:C:36:MET:CE	2.22	0.52
4:D:36:ASP:OD1	4:D:93:ILE:HB	2.09	0.52
1:A:10:THR:HG23	1:A:10:THR:O	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:221:PHE:HA	1:A:473:GLN:HB3	1.93	0.51
13:C:144:UQ:HM33	13:C:144:UQ:CM2	2.40	0.51
4:D:87:ASN:HA	4:D:92:GLY:HA2	1.92	0.51
1:A:378:VAL:HG21	1:A:392:LEU:HG	1.92	0.51
1:A:581:LYS:HD2	1:A:598:TYR:CB	2.40	0.51
3:C:26:HIS:CG	3:C:27:ILE:H	2.28	0.51
1:A:476:MET:SD	1:A:532:ALA:HB1	2.51	0.51
1:A:233:GLY:O	1:A:237:VAL:HG23	2.11	0.51
1:A:246:ASP:HB3	1:A:249:PHE:HD1	1.75	0.51
1:A:25:GLY:HA2	5:A:1001:FAD:C1B	2.41	0.50
1:A:164:ARG:NH2	2:B:137:GLN:HE22	2.05	0.50
1:A:263:LEU:HD22	1:A:364:HIS:HE1	1.76	0.50
2:B:52:LYS:CG	2:B:57:SER:HA	2.40	0.50
1:A:413:SER:O	1:A:416:ASP:HB3	2.11	0.50
3:C:140:ILE:CG2	3:C:141:SER:N	2.73	0.50
4:D:44:THR:HG21	4:D:80:PHE:HB2	1.94	0.50
2:B:119:TYR:O	2:B:123:LYS:HG3	2.11	0.50
1:A:189:ARG:HD2	1:A:439:PRO:HB2	1.94	0.50
2:B:168:CYS:SG	2:B:170:SER:HB2	2.51	0.50
1:A:464:ARG:O	1:A:467:GLU:N	2.45	0.50
2:B:198:TYR:O	2:B:202:ARG:HG3	2.11	0.50
3:C:14:GLU:O	3:C:18:LYS:HG2	2.10	0.50
1:A:574:PRO:HD2	1:A:577:GLU:HB2	1.93	0.50
1:A:58:VAL:CG2	1:A:155:HIS:HA	2.42	0.49
1:A:103:ALA:HA	1:A:415:LEU:HD11	1.94	0.49
3:C:88:LYS:HB3	4:D:101:TRP:CZ2	2.47	0.49
2:B:45:LEU:HD22	2:B:85:CYS:HB3	1.94	0.49
3:C:93:PHE:HB3	3:C:94:PRO:HD2	1.93	0.49
3:C:6:LYS:HA	3:C:9:MET:CE	2.42	0.49
1:A:500:TYR:CD1	1:A:533:LEU:HD11	2.48	0.49
1:A:351:ASP:C	1:A:351:ASP:OD1	2.52	0.48
1:A:35:PHE:HB2	1:A:168:TYR:CD1	2.47	0.48
1:A:90:LEU:O	1:A:582:HIS:CE1	2.67	0.48
1:A:90:LEU:O	1:A:582:HIS:HE1	1.96	0.48
1:A:283:PHE:CE1	1:A:284:MET:HE2	2.48	0.48
2:B:8:THR:HG22	2:B:8:THR:O	2.12	0.48
2:B:164:CYS:SG	2:B:165:SER:N	2.87	0.48
2:B:191:MET:CE	2:B:238:ILE:HG12	2.43	0.48
1:A:283:PHE:HE1	1:A:284:MET:HE2	1.78	0.48
3:C:39:SER:HA	15:C:1200:HOH:O	2.13	0.48
3:C:95:LEU:HD21	14:C:145:PEE:H39	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:492:GLY:O	1:A:496:LEU:HB2	2.14	0.48
4:D:24:LEU:N	4:D:25:PRO:HD2	2.29	0.48
1:A:207:LYS:HZ3	1:A:436:GLU:CD	2.18	0.47
1:A:237:VAL:CG1	1:A:242:LEU:HB2	2.40	0.47
2:B:147:GLU:CD	2:B:147:GLU:N	2.67	0.47
2:B:188:TYR:HD1	2:B:191:MET:HE3	1.78	0.47
1:A:199:GLY:HA2	1:A:513:ILE:HG13	1.95	0.47
1:A:302:ARG:HA	1:A:482:VAL:HG11	1.97	0.47
2:B:14:PHE:O	2:B:32:THR:HA	2.14	0.47
3:C:97:TYR:HA	3:C:130:THR:OG1	2.15	0.47
2:B:7:ALA:O	2:B:8:THR:HB	2.14	0.47
2:B:155:LEU:CD1	2:B:192:ILE:HD11	2.45	0.47
13:C:144:UQ:HM23	4:D:58:TYR:HH	1.79	0.47
2:B:123:LYS:HB3	15:C:1143:HOH:O	2.15	0.47
2:B:169:PRO:HA	2:B:172:TRP:CD2	2.50	0.47
3:C:72:ALA:O	3:C:73:VAL:C	2.51	0.47
1:A:37:LEU:HD21	1:A:428:ILE:HD12	1.97	0.47
1:A:125:ILE:HG21	1:A:147:CYS:HB3	1.96	0.46
2:B:10:ARG:HD3	2:B:38:ASN:ND2	2.31	0.46
2:B:221:CYS:O	2:B:224:THR:HG22	2.14	0.46
1:A:246:ASP:HB3	1:A:249:PHE:CD1	2.50	0.46
2:B:217:THR:HG22	2:B:217:THR:O	2.15	0.46
2:B:7:ALA:O	2:B:8:THR:CB	2.62	0.46
3:C:115:LYS:HB2	3:C:118:GLN:HG3	1.98	0.46
1:A:489:LEU:CD1	1:A:540:GLU:HA	2.45	0.46
1:A:65:ASN:OD1	1:A:133:GLN:NE2	2.41	0.46
2:B:23:LYS:HD2	15:B:1096:HOH:O	2.14	0.46
1:A:221:PHE:CA	1:A:473:GLN:HB3	2.46	0.46
4:D:21:LEU:O	4:D:25:PRO:HD2	2.16	0.46
2:B:139:LYS:O	2:B:140:GLU:HG2	2.16	0.46
1:A:253:HIS:O	1:A:361:PRO:HA	2.15	0.45
2:B:87:LYS:HE2	15:B:1063:HOH:O	2.15	0.45
2:B:123:LYS:HE3	3:C:8:GLU:OE1	2.16	0.45
1:A:463:ILE:O	1:A:506:LEU:HD23	2.17	0.45
2:B:225:CYS:SG	2:B:229:LEU:HB2	2.57	0.45
1:A:530:LEU:HD23	1:A:530:LEU:HA	1.75	0.45
2:B:56:ASP:C	2:B:58:THR:H	2.19	0.45
2:B:11:ILE:CG2	2:B:34:GLU:HB3	2.47	0.45
4:D:50:GLY:O	4:D:54:VAL:HG23	2.17	0.45
2:B:65:CYS:O	2:B:66:ARG:HB3	2.17	0.45
1:A:263:LEU:HD22	1:A:364:HIS:CE1	2.52	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:74:ALA:HB1	2:B:163:CYS:SG	2.57	0.45
3:C:38:MET:HE1	3:C:123:GLY:HA2	1.98	0.45
1:A:360:LEU:HD12	1:A:361:PRO:CD	2.47	0.45
4:D:69:ASN:HD22	4:D:69:ASN:HA	1.63	0.45
1:A:97:HIS:C	1:A:97:HIS:CD2	2.90	0.45
1:A:322:TYR:HB3	1:A:356:PRO:HB2	1.99	0.45
1:A:377:GLN:HG2	1:A:393:TYR:CE1	2.51	0.45
1:A:468:ALA:O	1:A:471:ASN:HB2	2.16	0.45
1:A:516:ASN:OD1	1:A:518:ASP:HB3	2.17	0.45
1:A:263:LEU:HD23	5:A:1001:FAD:H6	2.00	0.44
1:A:329:PRO:HD2	1:A:332:GLN:OE1	2.17	0.44
1:A:340:ILE:HD12	1:A:341:SER:N	2.33	0.44
4:D:9:HIS:HE1	4:D:49:TRP:CD1	2.35	0.44
4:D:24:LEU:HD23	4:D:24:LEU:HA	1.78	0.44
1:A:401:ALA:HB3	1:A:403:VAL:HG13	2.00	0.44
1:A:459:ALA:HB1	1:A:506:LEU:O	2.16	0.44
4:D:73:TYR:HB2	15:D:1528:HOH:O	2.17	0.44
1:A:84:VAL:HG22	1:A:93:GLN:HG2	1.99	0.44
1:A:401:ALA:H	1:A:402:SER:HA	1.78	0.44
1:A:496:LEU:HD23	1:A:496:LEU:HA	1.89	0.44
2:B:159:ILE:HG13	2:B:161:CYS:HB3	1.99	0.43
2:B:225:CYS:HA	2:B:226:PRO:HD2	1.74	0.43
1:A:63:GLY:HA3	1:A:146:CYS:SG	2.58	0.43
1:A:581:LYS:HD2	1:A:598:TYR:HB3	1.99	0.43
3:C:123:GLY:O	3:C:126:VAL:HB	2.19	0.43
4:D:29:LEU:C	4:D:30:TYR:CD1	2.92	0.43
2:B:214:ARG:HD3	4:D:57:ASP:OD1	2.17	0.43
4:D:63:THR:CB	4:D:64:PRO:HD3	2.48	0.43
1:A:89:TRP:CE2	1:A:616:PRO:HA	2.54	0.43
1:A:512:GLY:HA2	15:B:1123:HOH:O	2.17	0.43
3:C:55:LEU:HD23	3:C:55:LEU:HA	1.77	0.43
1:A:340:ILE:HD12	1:A:340:ILE:C	2.39	0.43
1:A:184:GLU:HB3	1:A:189:ARG:HE	1.83	0.43
1:A:414:LEU:HD23	1:A:414:LEU:HA	1.91	0.43
1:A:424:CYS:O	1:A:428:ILE:HG13	2.19	0.43
1:A:22:VAL:HG23	1:A:206:ALA:HB2	2.01	0.42
1:A:588:ASP:OD1	1:A:591:SER:OG	2.30	0.42
1:A:372:THR:HA	1:A:377:GLN:O	2.19	0.42
4:D:30:TYR:N	4:D:31:PRO:CD	2.83	0.42
1:A:257:ILE:HD11	1:A:348:ALA:CB	2.48	0.42
2:B:13:LYS:HA	2:B:33:TYR:O	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:27:ILE:HD12	3:C:27:ILE:HA	1.91	0.42
3:C:92:VAL:HG21	3:C:137:ILE:HG21	2.02	0.42
2:B:144:GLN:HG3	2:B:194:SER:OG	2.20	0.42
3:C:34:LEU:N	3:C:35:PRO:CD	2.83	0.42
1:A:128:ARG:HG2	1:A:146:CYS:HB3	2.01	0.42
1:A:264:ILE:HG21	1:A:323:LEU:HD23	2.02	0.42
1:A:351:ASP:OD1	1:A:353:THR:OG1	2.31	0.42
1:A:489:LEU:HD13	1:A:540:GLU:HA	2.02	0.42
1:A:337:LEU:N	1:A:338:PRO:CD	2.83	0.42
1:A:564:SER:CB	1:A:618:ILE:HD11	2.49	0.42
3:C:81:PRO:O	3:C:84:ILE:HB	2.20	0.42
4:D:17:SER:OG	4:D:46:HIS:CE1	2.73	0.42
1:A:491:GLU:HG2	1:A:495:LYS:HE3	2.01	0.41
3:C:122:SER:O	3:C:126:VAL:HG23	2.20	0.41
3:C:118:GLN:HG2	15:C:1337:HOH:O	2.20	0.41
1:A:422:ARG:O	1:A:423:ALA:C	2.57	0.41
1:A:494:GLU:O	1:A:495:LYS:C	2.59	0.41
1:A:157:LEU:HD23	1:A:157:LEU:C	2.40	0.41
2:B:169:PRO:HA	2:B:172:TRP:CE3	2.55	0.41
1:A:90:LEU:O	1:A:90:LEU:HG	2.21	0.41
1:A:99:MET:CE	1:A:403:VAL:HB	2.51	0.41
1:A:314:CYS:N	1:A:320:HIS:O	2.44	0.41
2:B:20:ASP:OD1	2:B:22:ASP:HB2	2.21	0.41
1:A:95:ALA:HA	1:A:374:TYR:HB2	2.03	0.41
3:C:65:GLU:O	3:C:70:TYR:HE1	2.04	0.41
1:A:78:TRP:HB3	15:A:1028:HOH:O	2.21	0.41
1:A:232:ASP:O	1:A:236:MET:HG3	2.21	0.41
1:A:607:ASN:ND2	1:A:610:ASP:HB2	2.36	0.41
2:B:238:ILE:O	2:B:242:MET:HG2	2.21	0.41
2:B:93:LEU:HD23	2:B:93:LEU:HA	1.86	0.40
2:B:132:LYS:HG2	2:B:197:ASP:HB3	2.02	0.40
2:B:184:LEU:HD23	2:B:184:LEU:HA	1.93	0.40
1:A:285:GLU:HG2	1:A:292:LYS:HD3	2.03	0.40
1:A:296:SER:O	1:A:300:VAL:HG23	2.21	0.40
1:A:298:ASP:OD2	1:A:547:GLY:HA2	2.21	0.40
1:A:19:PHE:O	1:A:206:ALA:HA	2.22	0.40
1:A:433:LYS:HA	1:A:433:LYS:HD2	1.87	0.40
1:A:586:TYR:HB2	1:A:595:THR:HB	2.03	0.40
2:B:210:PHE:O	2:B:211:SER:C	2.58	0.40
2:B:112:VAL:HA	2:B:113:PRO:HD2	1.89	0.40
2:B:218:ILE:HG12	13:C:144:UQ:O3	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	612/621 (99%)	569 (93%)	39 (6%)	4 (1%)	22	22
2	B	240/252 (95%)	227 (95%)	10 (4%)	3 (1%)	12	9
3	C	138/141 (98%)	130 (94%)	7 (5%)	1 (1%)	22	22
4	D	100/103 (97%)	94 (94%)	6 (6%)	0	100	100
All	All	1090/1117 (98%)	1020 (94%)	62 (6%)	8 (1%)	22	22

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	265	THR
2	B	8	THR
3	C	78	SER
1	A	568	GLN
2	B	57	SER
2	B	64	SER
1	A	9	SER
1	A	443	PRO

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	498/506 (98%)	484 (97%)	14 (3%)	43	53
2	B	215/219 (98%)	207 (96%)	8 (4%)	34	43
3	C	117/119 (98%)	114 (97%)	3 (3%)	46	56
4	D	78/79 (99%)	74 (95%)	4 (5%)	24	29
All	All	908/923 (98%)	879 (97%)	29 (3%)	39	47

All (29) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	GLN
1	A	43	ASN
1	A	48	THR
1	A	72	GLU
1	A	128	ARG
1	A	130	PHE
1	A	243	PRO
1	A	360	LEU
1	A	402	SER
1	A	496	LEU
1	A	498	GLN
1	A	536	ILE
1	A	562	ASP
1	A	570	GLN
2	B	63	ARG
2	B	65	CYS
2	B	66	ARG
2	B	116	SER
2	B	131	LYS
2	B	170	SER
2	B	189	ARG
2	B	229	LEU
3	C	35	PRO
3	C	40	ILE
3	C	91	LEU
4	D	14	ARG
4	D	64	PRO
4	D	66	LYS
4	D	101	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	11	GLN
1	A	43	ASN
1	A	112	ASN
1	A	144	HIS
1	A	155	HIS
1	A	326	HIS
1	A	331	GLN
1	A	366	ASN
1	A	383	ASN
1	A	534	GLN
2	B	121	GLN
2	B	137	GLN
3	C	26	HIS
3	C	42	HIS
3	C	101	ASN
4	D	9	HIS
4	D	53	GLN
4	D	69	ASN

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](#)

11 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
8	SF4	B	1003	2	0,12,12	-	-	-		
7	FES	B	1002	2	0,4,4	-	-	-		
11	JZR	C	142	-	18,18,18	2.03	3 (16%)	23,23,23	1.01	2 (8%)
6	3NP	A	1002	1	5,5,7	3.73	3 (60%)	5,5,8	4.21	2 (40%)
9	F3S	B	1004	2	0,9,9	-	-	-		
10	GOL	B	1005	-	5,5,5	1.36	0	5,5,5	0.61	0
13	UQ	C	144	-	14,14,63	2.00	8 (57%)	20,20,79	0.45	0
14	PEE	D	104	-	22,22,50	1.55	4 (18%)	20,20,55	1.17	2 (10%)
12	HEM	C	143	3,4	40,48,50	1.61	7 (17%)	46,80,82	2.19	14 (30%)
5	FAD	A	1001	1	54,58,58	2.79	23 (42%)	71,89,89	1.71	18 (25%)
14	PEE	C	145	-	19,19,50	1.39	3 (15%)	19,19,55	0.85	2 (10%)

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
8	SF4	B	1003	2	-	-	0/6/5/5
7	FES	B	1002	2	-	-	0/1/1/1
11	JZR	C	142	-	-	3/9/29/29	0/1/1/1
6	3NP	A	1002	1	-	3/3/3/5	-
14	PEE	D	104	-	-	11/18/18/54	-
10	GOL	B	1005	-	-	3/4/4/4	-
13	UQ	C	144	-	-	2/4/28/87	0/1/1/1
9	F3S	B	1004	2	-	-	0/3/3/3
12	HEM	C	143	3,4	-	4/10/50/54	-
5	FAD	A	1001	1	-	11/30/50/50	0/6/6/6
14	PEE	C	145	-	-	11/17/17/54	-

All (51) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1001	FAD	PA-O3P	-11.25	1.47	1.59
5	A	1001	FAD	P-O3P	6.63	1.66	1.59
11	C	142	JZR	O1-C1	6.09	1.50	1.40
6	A	1002	3NP	C2-C1	-5.82	1.37	1.50
5	A	1001	FAD	PA-O2A	-5.12	1.31	1.55
12	C	143	HEM	CAB-C3B	-5.01	1.40	1.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	1002	3NP	C3-C2	-4.92	1.31	1.51
5	A	1001	FAD	PA-O1A	-4.86	1.34	1.50
14	D	104	PEE	C39-C38	4.10	1.55	1.31
5	A	1001	FAD	C10-N10	3.97	1.45	1.37
5	A	1001	FAD	C4A-N3A	3.95	1.41	1.35
14	D	104	PEE	C19-C18	3.95	1.54	1.31
5	A	1001	FAD	C2A-N3A	3.89	1.38	1.32
5	A	1001	FAD	C9-C8	3.83	1.44	1.39
12	C	143	HEM	CAC-C3C	-3.78	1.42	1.51
5	A	1001	FAD	C5'-C4'	-3.78	1.46	1.51
5	A	1001	FAD	C9A-C5X	3.66	1.47	1.41
5	A	1001	FAD	C6-C7	3.66	1.44	1.39
14	C	145	PEE	C22-C21	-3.40	1.34	1.51
14	C	145	PEE	O2-C10	3.39	1.42	1.30
5	A	1001	FAD	C2'-C3'	-3.08	1.48	1.53
13	C	144	UQ	C7-C6	3.01	1.56	1.50
6	A	1002	3NP	O2-C1	2.96	1.31	1.22
12	C	143	HEM	CAD-C3D	2.94	1.58	1.51
11	C	142	JZR	O5-C1	2.91	1.49	1.41
13	C	144	UQ	C6-C1	2.81	1.56	1.47
5	A	1001	FAD	C4X-N5	2.74	1.36	1.30
5	A	1001	FAD	C10-N1	2.72	1.38	1.33
5	A	1001	FAD	O5'-C5'	-2.68	1.34	1.44
5	A	1001	FAD	C8-C7	2.68	1.47	1.40
13	C	144	UQ	O3-C3	2.65	1.43	1.36
12	C	143	HEM	CMC-C2C	2.59	1.57	1.51
12	C	143	HEM	C4B-C3B	2.59	1.49	1.44
14	C	145	PEE	C11-C10	2.54	1.56	1.50
5	A	1001	FAD	C9-C9A	2.49	1.43	1.39
13	C	144	UQ	C3-C4	2.46	1.55	1.48
14	D	104	PEE	C17-C18	-2.45	1.36	1.50
5	A	1001	FAD	C2A-N1A	2.32	1.38	1.33
5	A	1001	FAD	PA-O5B	-2.30	1.50	1.59
5	A	1001	FAD	C4'-C3'	2.30	1.57	1.53
5	A	1001	FAD	C1'-N10	2.29	1.53	1.47
13	C	144	UQ	CM5-C5	2.29	1.55	1.50
11	C	142	JZR	O1-C1'	2.27	1.49	1.43
13	C	144	UQ	C2-C1	2.25	1.55	1.48
14	D	104	PEE	C21-C20	-2.25	1.34	1.49
5	A	1001	FAD	C6-C5X	2.23	1.43	1.40
13	C	144	UQ	C5-C4	2.15	1.54	1.47
5	A	1001	FAD	C1'-C2'	2.14	1.55	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	C	143	HEM	C2C-C3C	-2.11	1.34	1.41
12	C	143	HEM	C2C-C1C	2.10	1.47	1.42
13	C	144	UQ	O2-C2	2.03	1.41	1.36

All (40) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	1002	3NP	C3-C2-C1	8.65	131.71	112.98
5	A	1001	FAD	N3A-C2A-N1A	-6.78	119.46	128.67
12	C	143	HEM	C4B-CHC-C1C	6.52	131.17	122.56
12	C	143	HEM	C3D-C4D-ND	4.54	115.15	110.17
12	C	143	HEM	C4C-CHD-C1D	4.03	127.88	122.56
12	C	143	HEM	CAB-C3B-C4B	3.74	130.88	125.03
5	A	1001	FAD	O2P-P-O3P	3.52	116.80	107.27
5	A	1001	FAD	C4-C4X-N5	3.33	122.81	118.21
12	C	143	HEM	C1B-NB-C4B	-3.26	101.34	105.21
12	C	143	HEM	C4D-C3D-C2D	-3.24	102.18	106.89
12	C	143	HEM	CMB-C2B-C1B	3.23	130.08	125.03
12	C	143	HEM	CAD-C3D-C4D	3.16	130.21	124.70
12	C	143	HEM	CHA-C4D-ND	-3.12	120.51	124.37
12	C	143	HEM	C3C-C2C-C1C	-3.08	104.74	106.85
5	A	1001	FAD	C5X-N5-C4X	3.04	123.00	118.09
14	D	104	PEE	C21-C20-C19	3.00	127.21	112.96
5	A	1001	FAD	C5X-C9A-N10	-2.94	115.31	117.97
6	A	1002	3NP	C2-C3-N1	2.84	135.24	114.54
12	C	143	HEM	C2B-C1B-NB	2.84	113.11	109.84
5	A	1001	FAD	O4B-C1B-N9A	2.83	112.50	108.75
5	A	1001	FAD	C1'-C2'-C3'	2.76	117.13	109.66
14	C	145	PEE	C22-C21-C20	2.74	127.04	113.86
14	D	104	PEE	C16-C17-C18	2.71	127.80	112.60
5	A	1001	FAD	C4-N3-C2	-2.64	120.96	125.64
5	A	1001	FAD	C4'-C3'-C2'	-2.62	109.21	113.57
5	A	1001	FAD	C4X-C4-N3	2.60	119.88	113.25
5	A	1001	FAD	C10-N1-C2	2.58	122.43	116.85
12	C	143	HEM	C4D-ND-C1D	-2.52	102.22	105.21
5	A	1001	FAD	O3'-C3'-C2'	-2.45	103.37	108.93
5	A	1001	FAD	C9-C9A-N10	2.35	125.01	121.85
5	A	1001	FAD	C10-C4X-N5	-2.34	120.02	124.81
14	C	145	PEE	C23-C22-C21	2.30	125.99	114.37
5	A	1001	FAD	C7M-C7-C6	-2.29	115.53	119.57
12	C	143	HEM	CMD-C2D-C1D	2.21	128.49	125.03
11	C	142	JZR	O1-C1'-C2'	2.21	116.87	109.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	1001	FAD	O2'-C2'-C3'	-2.20	104.09	109.25
5	A	1001	FAD	C1B-N9A-C4A	-2.18	122.81	126.64
12	C	143	HEM	C1B-C2B-C3B	-2.10	105.13	107.09
11	C	142	JZR	C1'-O1-C1	2.04	117.16	113.68
5	A	1001	FAD	O4'-C4'-C5'	-2.04	105.50	109.99

There are no chirality outliers.

All (48) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1001	FAD	N10-C1'-C2'-O2'
5	A	1001	FAD	O4'-C4'-C5'-O5'
5	A	1001	FAD	C5'-O5'-P-O1P
5	A	1001	FAD	C5'-O5'-P-O2P
5	A	1001	FAD	C5'-O5'-P-O3P
5	A	1001	FAD	PA-O3P-P-O5'
6	A	1002	3NP	C1-C2-C3-N1
14	D	104	PEE	C17-C18-C19-C20
14	D	104	PEE	C37-C38-C39-C40
10	B	1005	GOL	C1-C2-C3-O3
14	C	145	PEE	C11-C12-C13-C14
10	B	1005	GOL	O2-C2-C3-O3
14	C	145	PEE	C12-C13-C14-C15
11	C	142	JZR	O1-C1'-C2'-C3'
14	D	104	PEE	C33-C34-C35-C36
14	C	145	PEE	C23-C24-C25-C26
14	C	145	PEE	C22-C23-C24-C25
5	A	1001	FAD	C3'-C4'-C5'-O5'
14	C	145	PEE	C17-C18-C19-C20
14	C	145	PEE	C19-C20-C21-C22
14	D	104	PEE	C32-C33-C34-C35
14	D	104	PEE	C10-C11-C12-C13
14	D	104	PEE	C15-C16-C17-C18
14	D	104	PEE	C38-C39-C40-C41
14	D	104	PEE	C31-C32-C33-C34
14	D	104	PEE	C35-C36-C37-C38
12	C	143	HEM	C2A-CAA-CBA-CGA
5	A	1001	FAD	N10-C1'-C2'-C3'
13	C	144	UQ	C4-C3-O3-CM3
11	C	142	JZR	C2'-C3'-C4'-C5'
14	D	104	PEE	C34-C35-C36-C37
11	C	142	JZR	C3'-C4'-C5'-C6'

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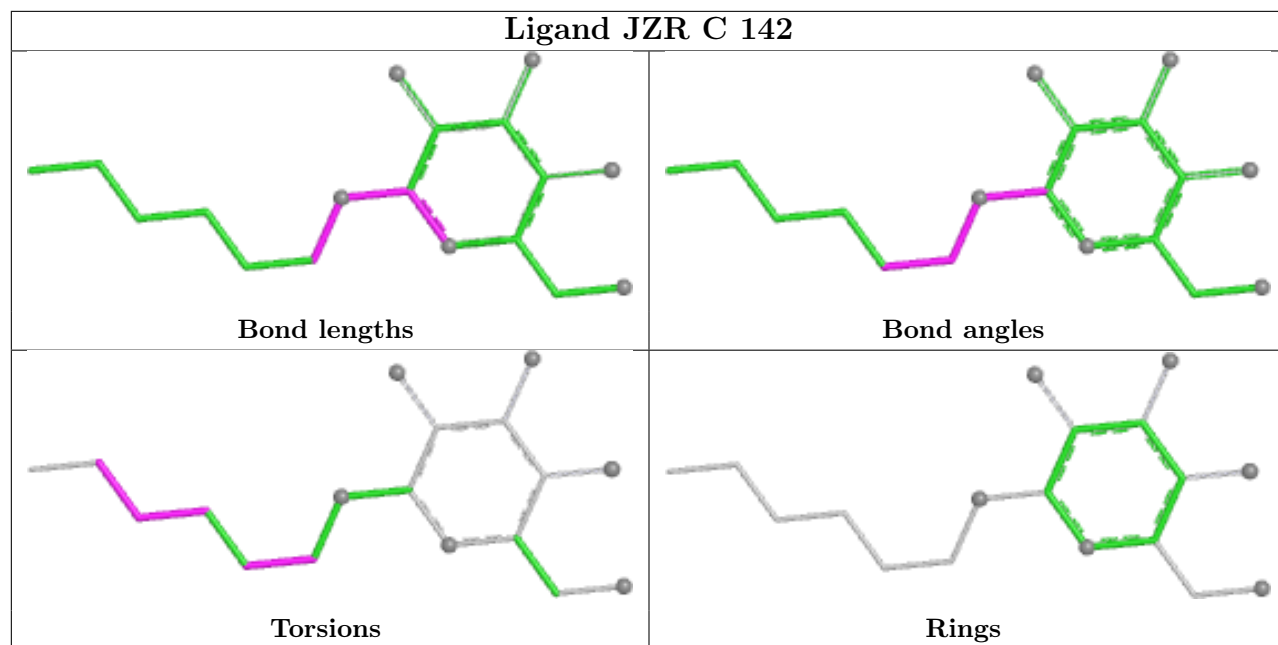
Mol	Chain	Res	Type	Atoms
14	C	145	PEE	O2-C10-C11-C12
14	C	145	PEE	C24-C25-C26-C27
13	C	144	UQ	C2-C3-O3-CM3
14	C	145	PEE	O4-C10-C11-C12
12	C	143	HEM	CAD-CBD-CGD-O2D
14	C	145	PEE	C14-C15-C16-C17
14	C	145	PEE	C16-C17-C18-C19
10	B	1005	GOL	O1-C1-C2-O2
12	C	143	HEM	CAD-CBD-CGD-O1D
14	D	104	PEE	C36-C37-C38-C39
5	A	1001	FAD	PA-O3P-P-O1P
5	A	1001	FAD	O4B-C4B-C5B-O5B
6	A	1002	3NP	O1-C1-C2-C3
12	C	143	HEM	CAA-CBA-CGA-O2A
5	A	1001	FAD	PA-O3P-P-O2P
6	A	1002	3NP	O2-C1-C2-C3

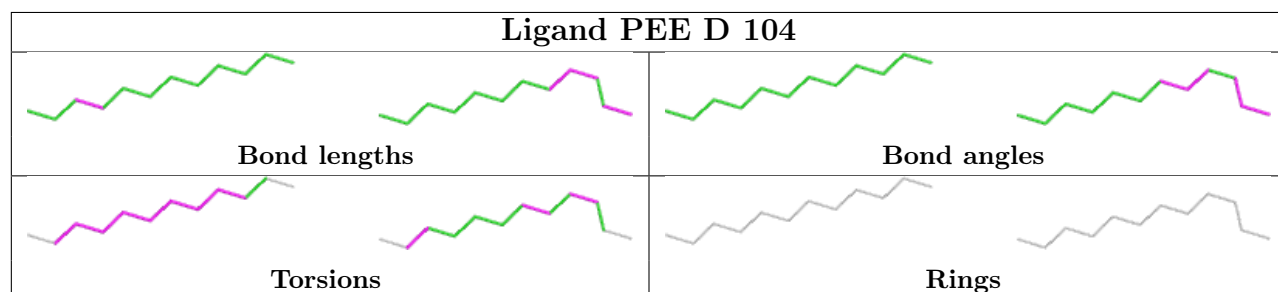
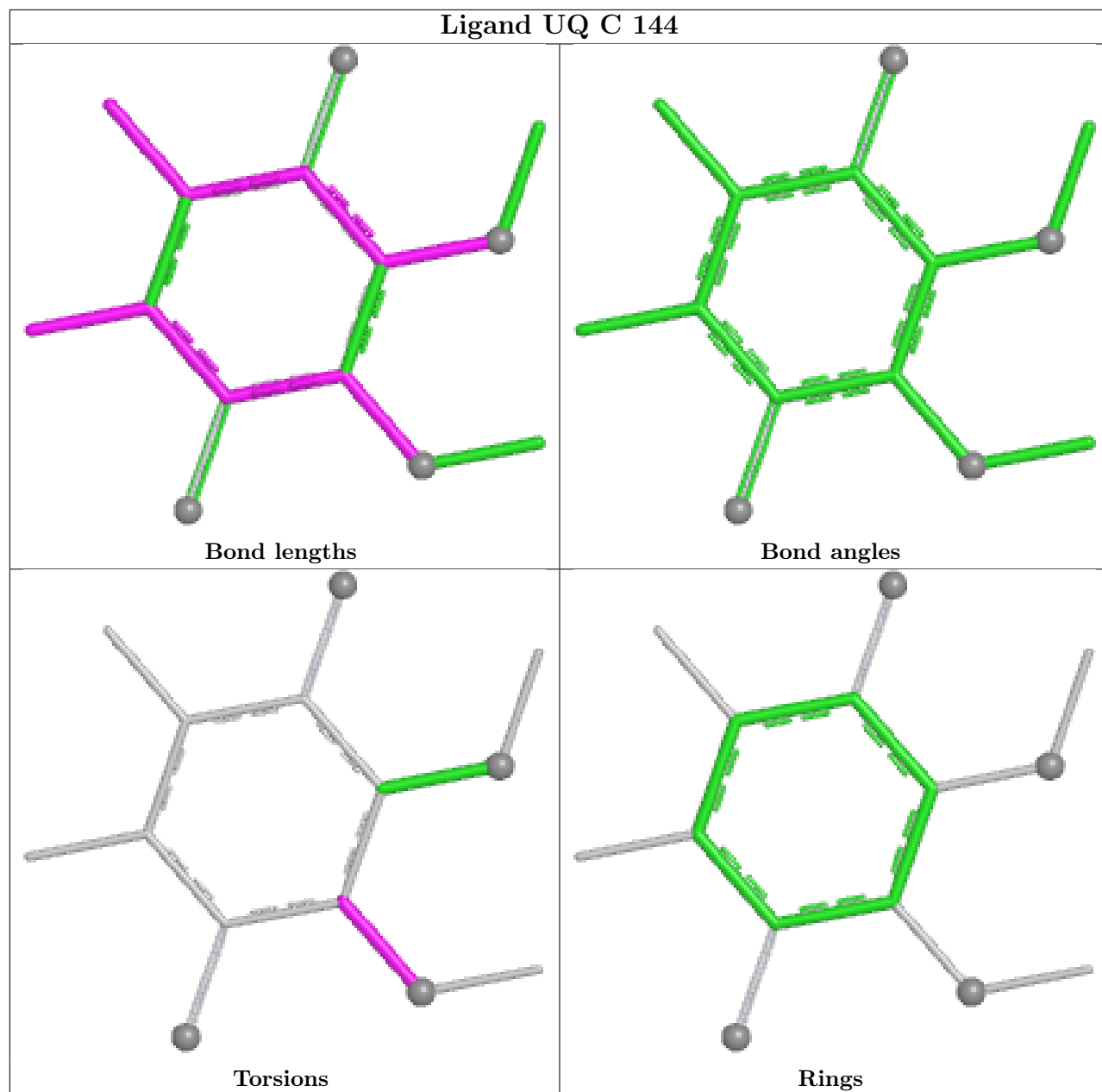
There are no ring outliers.

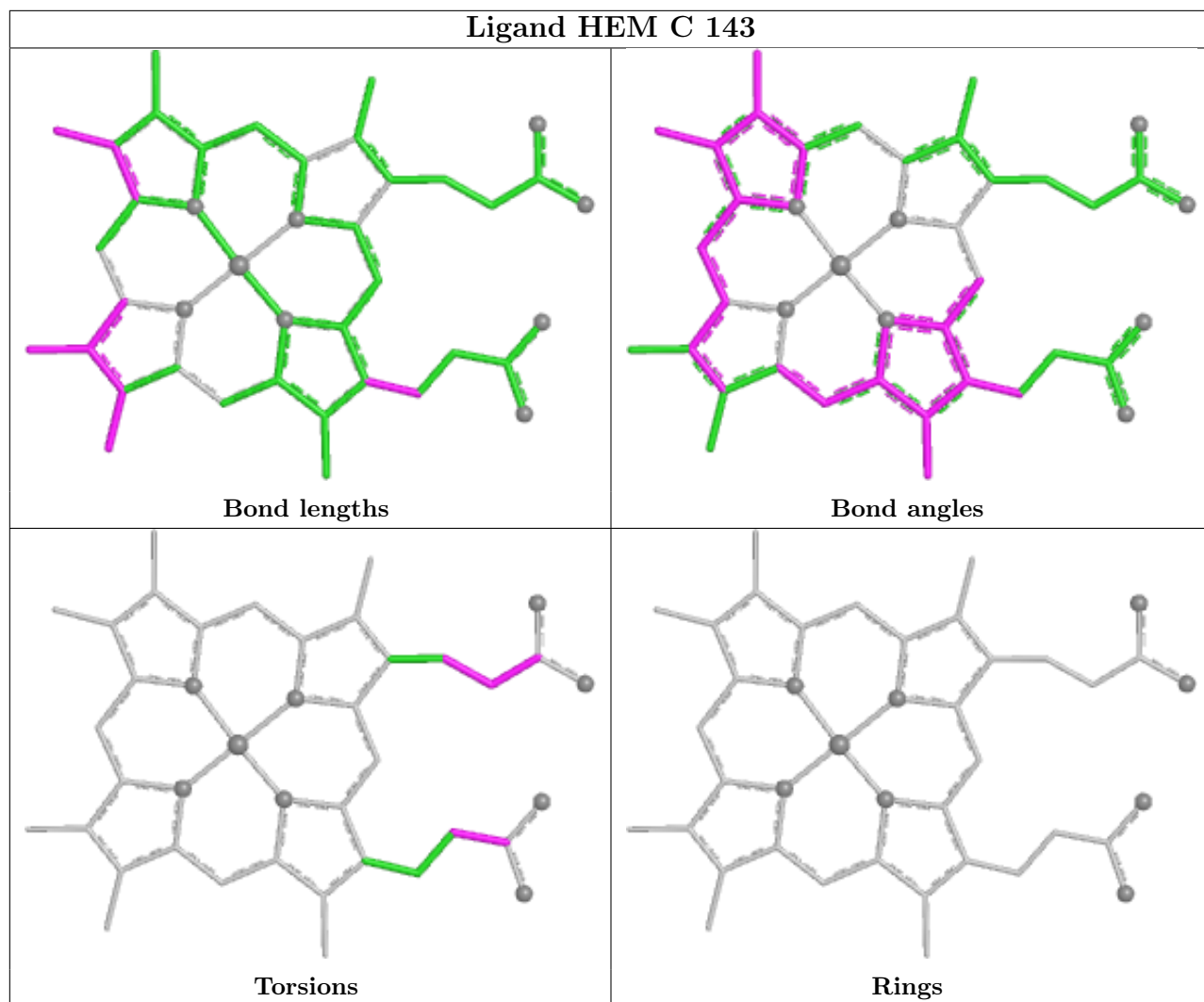
3 monomers are involved in 18 short contacts:

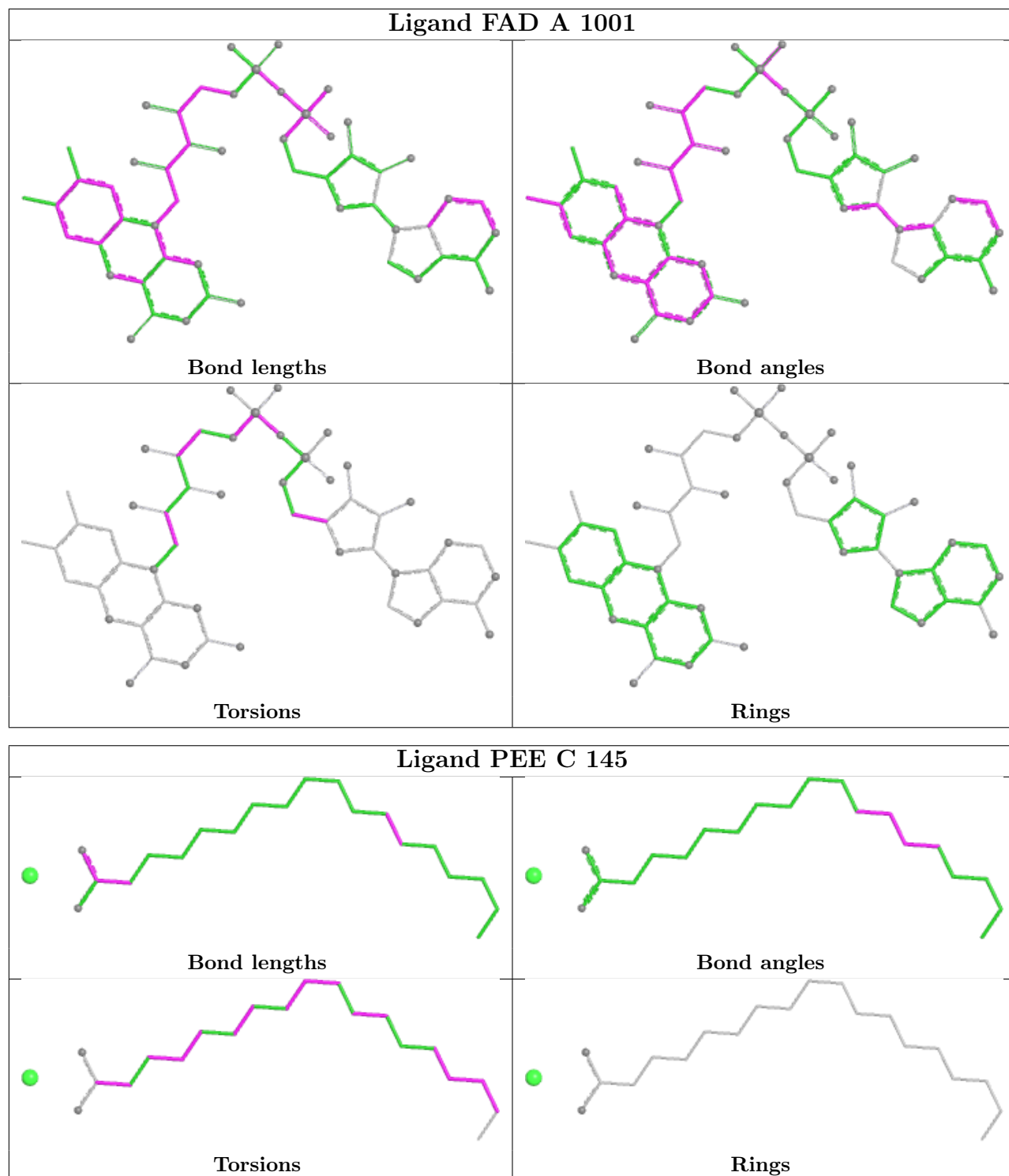
Mol	Chain	Res	Type	Clashes	Symm-Clashes
13	C	144	UQ	10	0
5	A	1001	FAD	7	0
14	C	145	PEE	1	0

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

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	614/621 (98%)	-0.13	21 (3%) 45 55	26, 47, 74, 152	0
2	B	242/252 (96%)	-0.09	13 (5%) 25 36	24, 40, 84, 124	0
3	C	140/141 (99%)	-0.48	2 (1%) 75 82	25, 45, 76, 91	0
4	D	102/103 (99%)	-0.46	2 (1%) 65 74	29, 42, 68, 84	0
All	All	1098/1117 (98%)	-0.20	38 (3%) 44 54	24, 45, 75, 152	0

All (38) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	7	ALA	6.4
1	A	8	ILE	5.7
2	B	6	ALA	5.6
1	A	9	SER	5.5
2	B	8	THR	5.1
2	B	134	GLU	4.0
1	A	10	THR	3.8
1	A	59	ALA	3.6
3	C	79	LEU	3.5
1	A	228	THR	3.2
2	B	9	SER	3.2
1	A	57	THR	3.2
1	A	226	ALA	2.9
1	A	55	SER	2.9
1	A	224	THR	2.9
2	B	70	CYS	2.9
1	A	230	THR	2.8
1	A	234	THR	2.8
1	A	53	THR	2.8
1	A	316	PRO	2.7
2	B	11	ILE	2.7

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Mol	Chain	Res	Type	RSRZ
2	B	159	ILE	2.6
1	A	225	SER	2.6
2	B	247	GLU	2.6
2	B	65	CYS	2.5
1	A	213	THR	2.4
2	B	246	LYS	2.3
1	A	276	ILE	2.3
1	A	433	LYS	2.2
4	D	30	TYR	2.2
1	A	60	ALA	2.2
4	D	97	VAL	2.1
3	C	78	SER	2.1
1	A	567	LEU	2.1
2	B	245	TYR	2.1
1	A	568	GLN	2.0
1	A	413	SER	2.0
2	B	137	GLN	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.

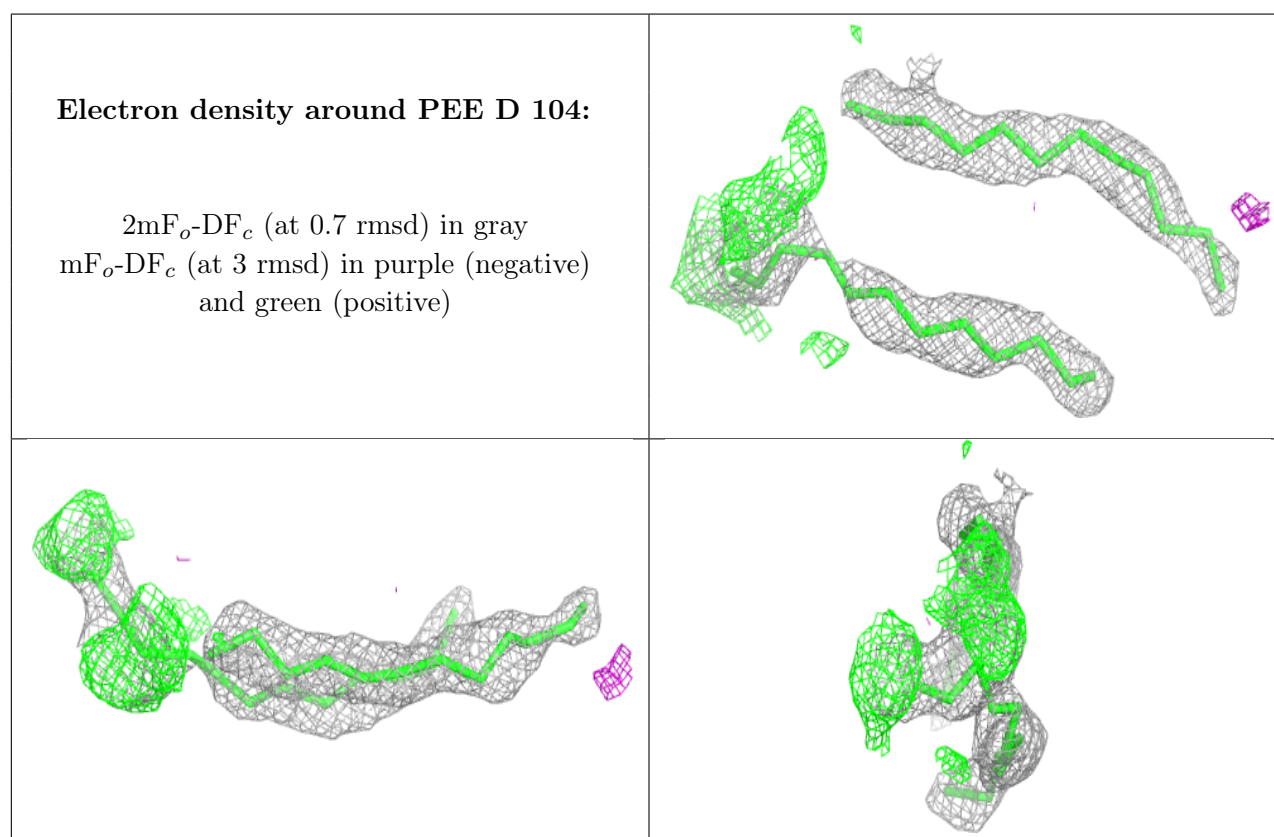
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
10	GOL	B	1005	6/6	0.31	0.59	156,160,161,162	0
14	PEE	D	104	24/51	0.80	0.28	53,72,98,99	0
14	PEE	C	145	21/51	0.84	0.23	45,74,88,92	0
13	UQ	C	144	14/63	0.84	0.44	90,99,109,113	0
11	JZR	C	142	18/18	0.93	0.15	38,48,61,63	0
5	FAD	A	1001	53/53	0.98	0.23	18,32,43,52	0

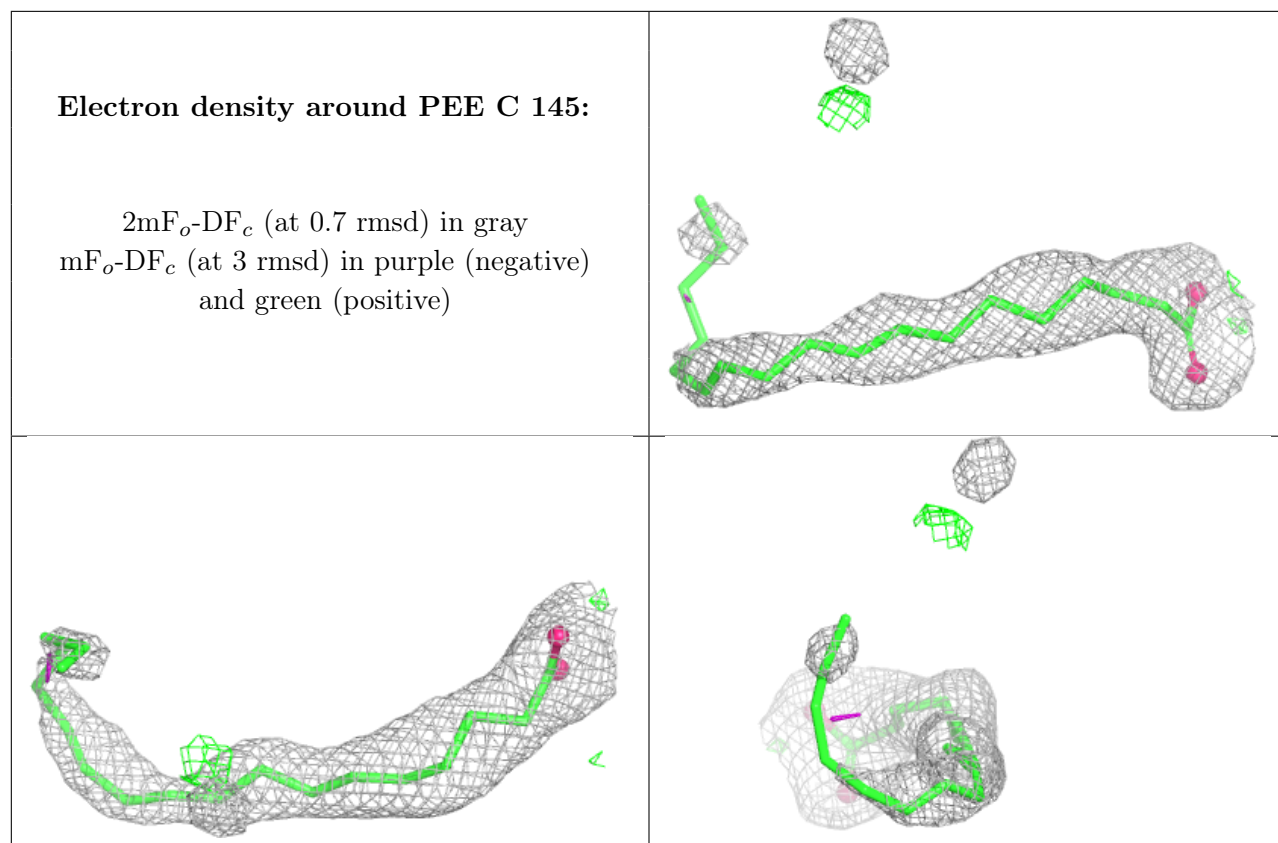
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
6	3NP	A	1002	6/8	0.98	0.19	38,39,44,47	0
12	HEM	C	143	41/43	0.98	0.10	29,41,65,67	0
8	SF4	B	1003	8/8	0.99	0.14	32,34,38,38	0
9	F3S	B	1004	7/7	0.99	0.11	26,27,28,30	0
7	FES	B	1002	4/4	1.00	0.15	30,32,34,37	0

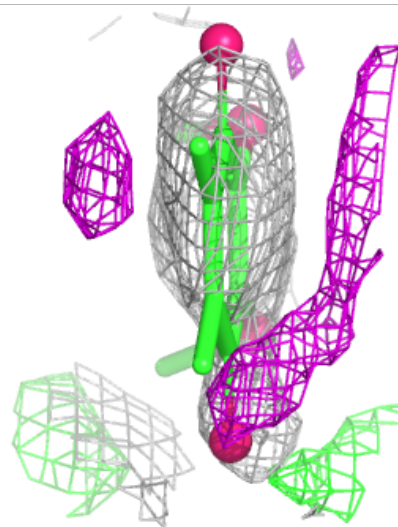
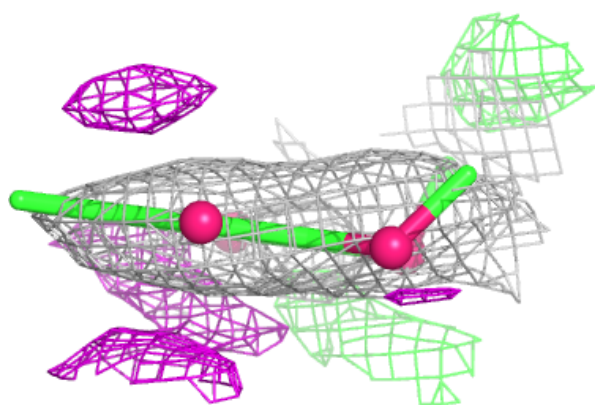
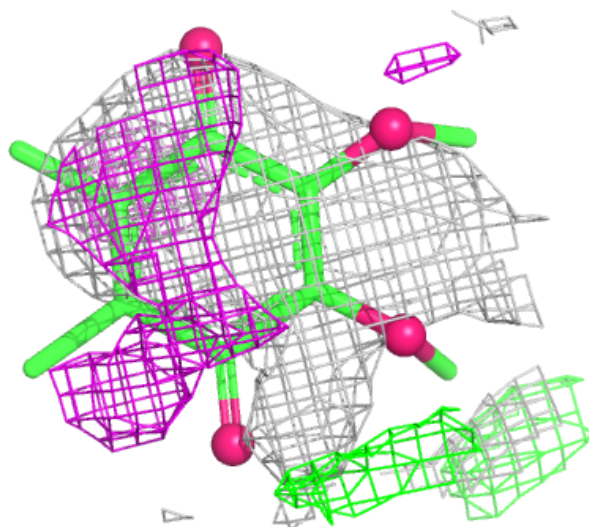
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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





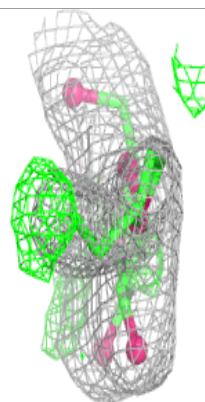
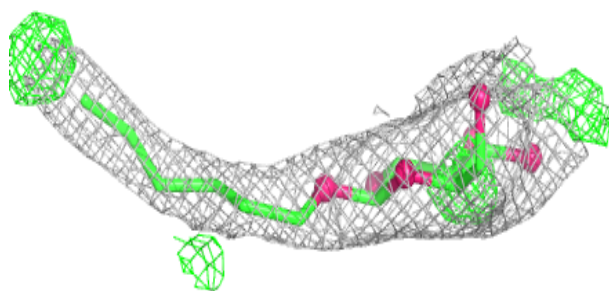
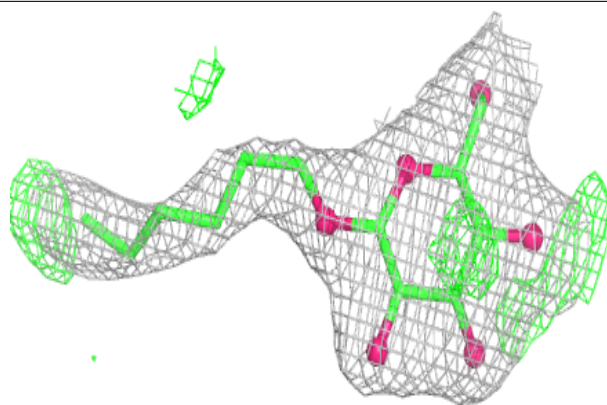
Electron density around UQ C 144:

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

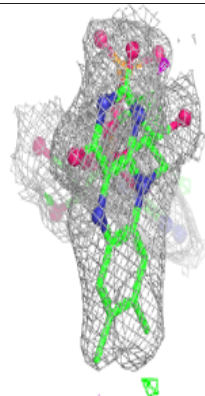
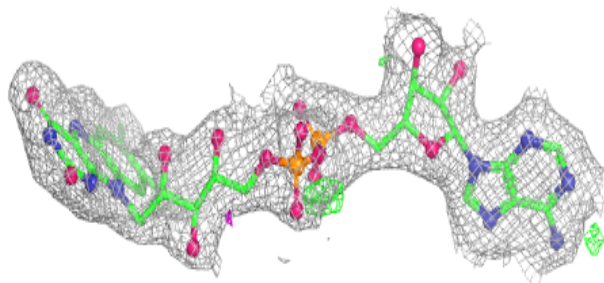
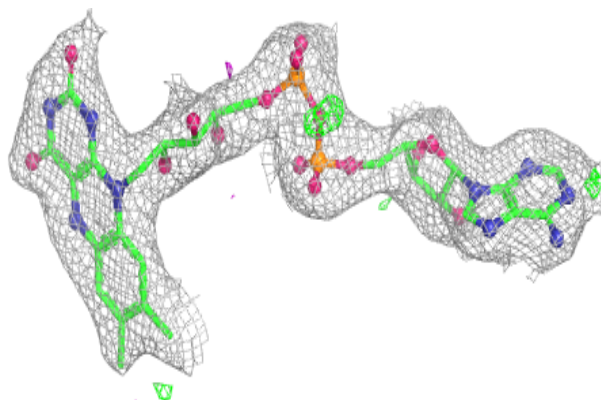


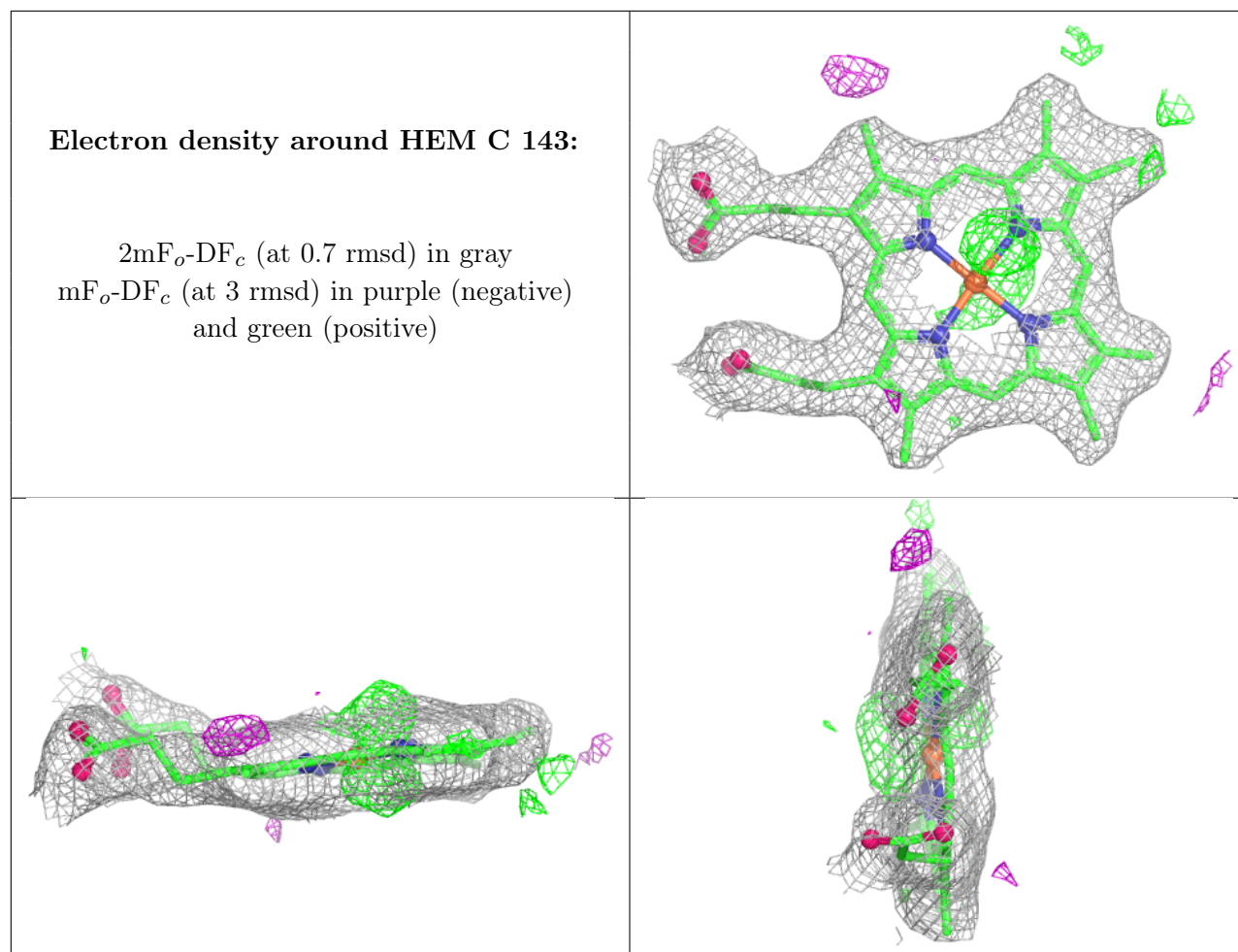
Electron density around JZR C 142:

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

**Electron density around FAD A 1001:**

$2mF_o-DF_c$ (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.