WORLDWIDE PDB PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 16, 2023 – 05:48 AM EDT

PDB ID	:	1YQ3
Title	:	Avian respiratory complex ii with oxaloacetate and ubiquinone
Authors	:	Huang, L.; Cobessi, D.; Tung, E.Y.; Berry, E.A.
Deposited on	:	2005-02-01
Resolution	:	2.20 Å(reported)

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

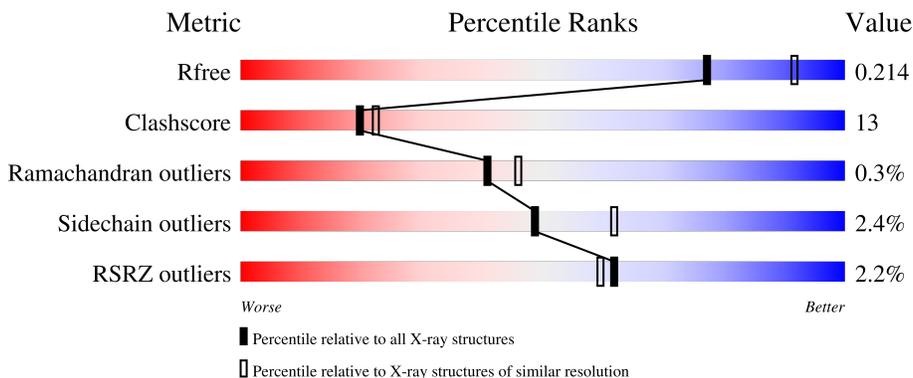|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35

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 2.20 Å.

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

Metric	Percentile Ranks	Value
Rfree		0.214
Clashscore		13
Ramachandran outliers		0.3%
Sidechain outliers		2.4%
RSRZ outliers		2.2%

Worse → *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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 <=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	2% / 73% / 24%
2	B	252	4% / 73% / 18%
3	C	141	3% / 70% / 28%
4	D	103	74% / 22%

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
12	GOL	B	1012	-	-	-	X
6	TEO	A	1002	X	-	X	-
7	UNL	B	1007	-	-	-	X

2   Entry composition ⓘ

There are 16 unique types of molecules in this entry. The entry contains 9576 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.

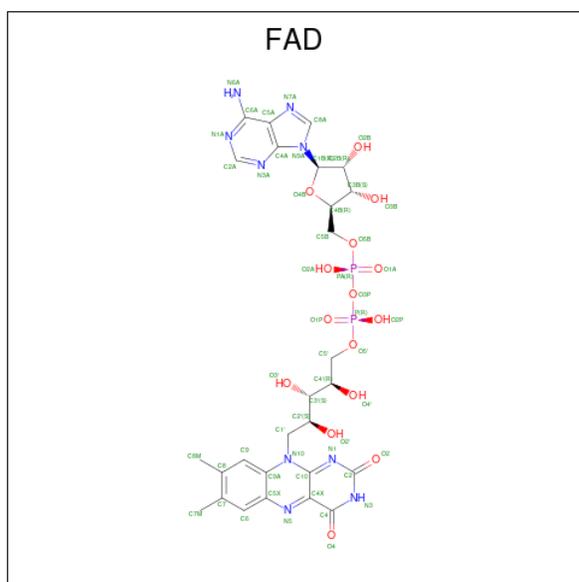| Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	242	1930	1220	327	361	22	0	0	0

- 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	1071	703	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: $C_{27}H_{33}N_9O_{15}P_2$).

FAD

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

- Molecule 6 is MALATE LIKE INTERMEDIATE (three-letter code: TEO) (formula: $C_4H_4O_5$).

TEO
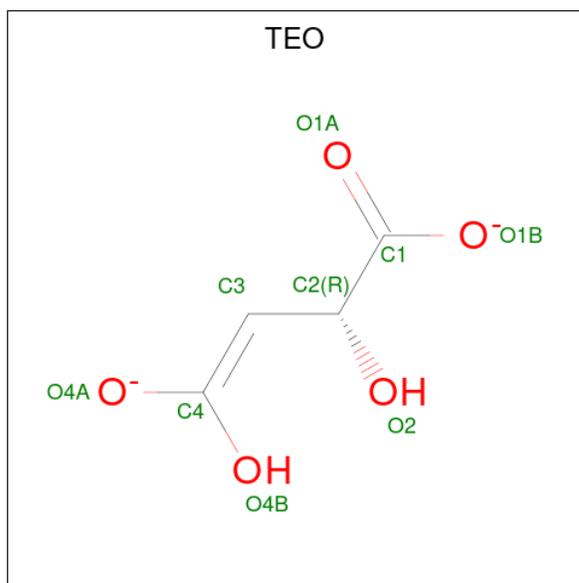
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
6	A	1	9	4	5	0	0

- Molecule 7 is UNKNOWN LIGAND (three-letter code: UNL) (formula:).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	15	Total 15	O 15	0	0
7	B	6	Total 6	O 6	0	0
7	C	4	Total 4	O 4	0	0
7	D	5	Total 5	O 5	0	0

- Molecule 8 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe_2S_2).
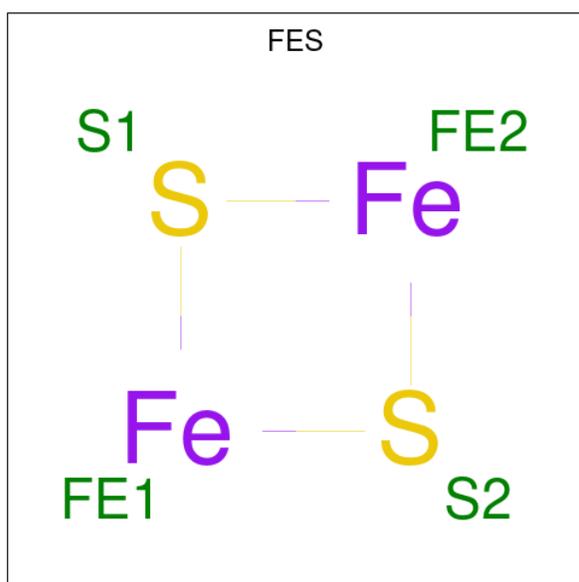
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	B	1	Total 4	Fe 2	S 2	0	0

- Molecule 9 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe_4S_4).
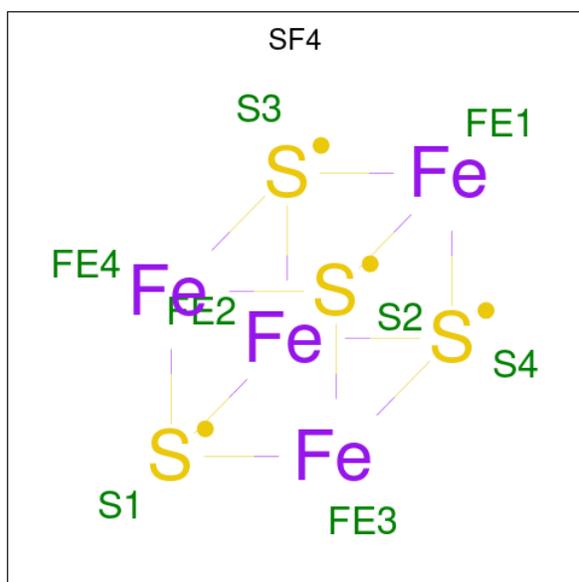
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	Fe	S		
9	B	1	8	4	4	0	0

- Molecule 10 is FE3-S4 CLUSTER (three-letter code: F3S) (formula: Fe_3S_4).
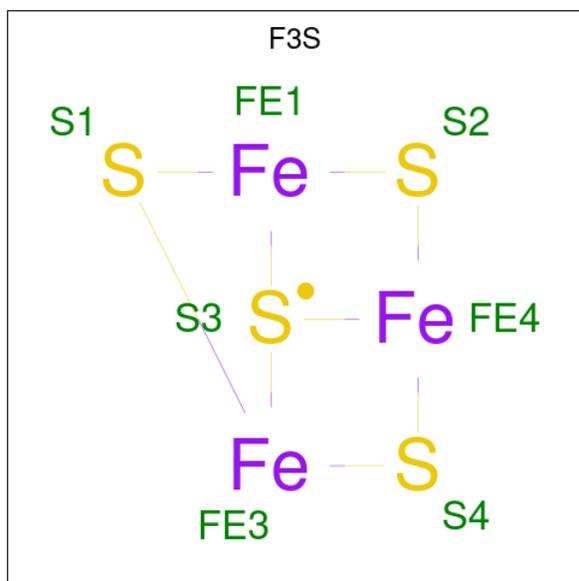
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	Fe	S		
10	B	1	7	3	4	0	0

- Molecule 11 is Coenzyme Q10, (2Z,6E,10Z,14E,18E,22E,26Z)-isomer (three-letter code: UQ) (formula: $C_{59}H_{90}O_4$).

UQ
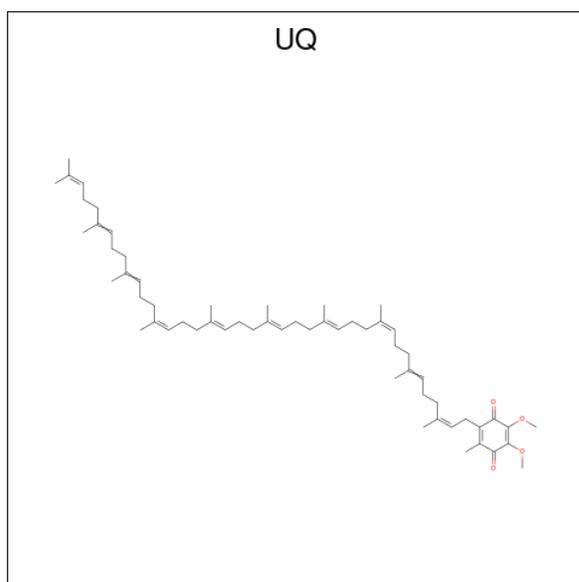
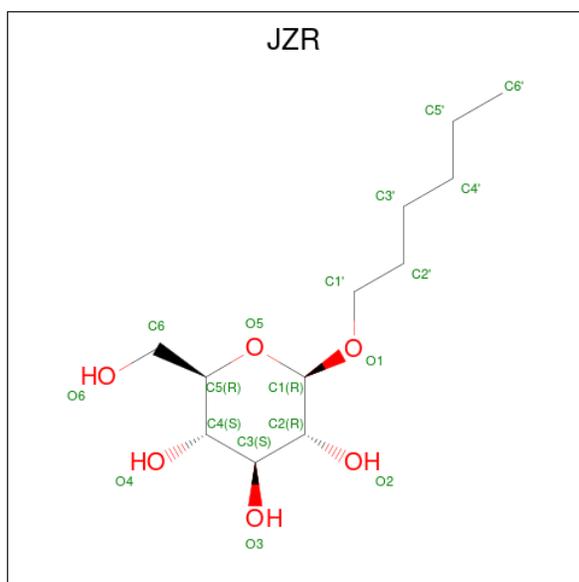| Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
11	B	1	Total	C	O	0	0
			14	10	4		

- Molecule 12 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).

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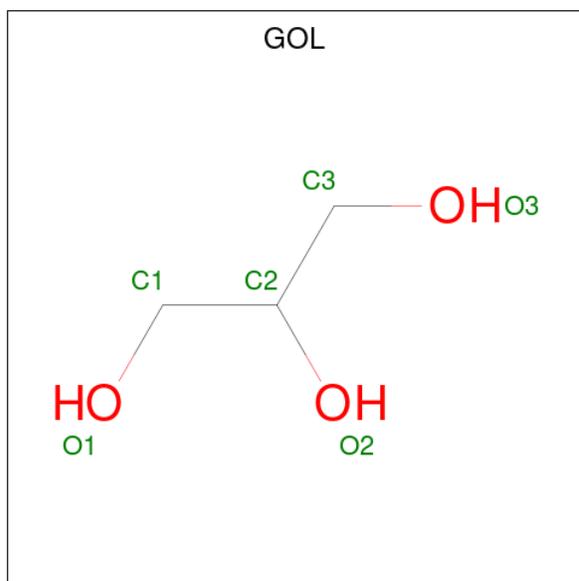
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
12	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 13 is hexyl beta-D-glucopyranoside (three-letter code: JZR) (formula: $C_{12}H_{24}O_6$).

JZR

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
13	C	1	Total	C	O	0	0
			18	12	6		

- Molecule 14 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).

HEM
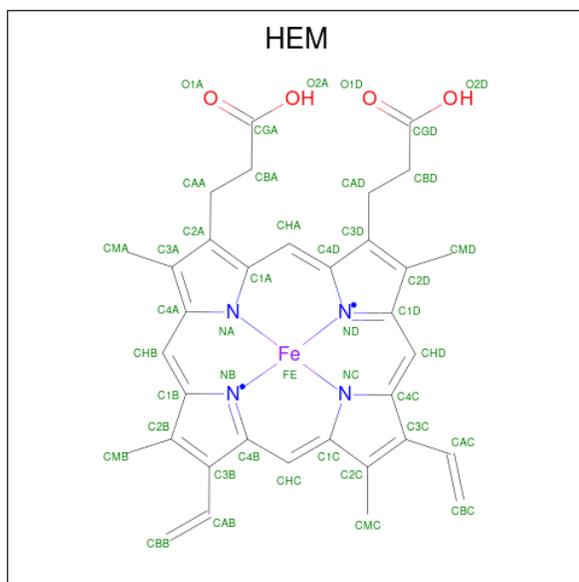
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
14	C	1	Total	C	Fe	N	O	0	0
			41	32	1	4	4		

- Molecule 15 is 1,2-dioleoyl-sn-glycero-3-phosphoethanolamine (three-letter code: PEE) (formula: $C_{41}H_{78}NO_8P$).

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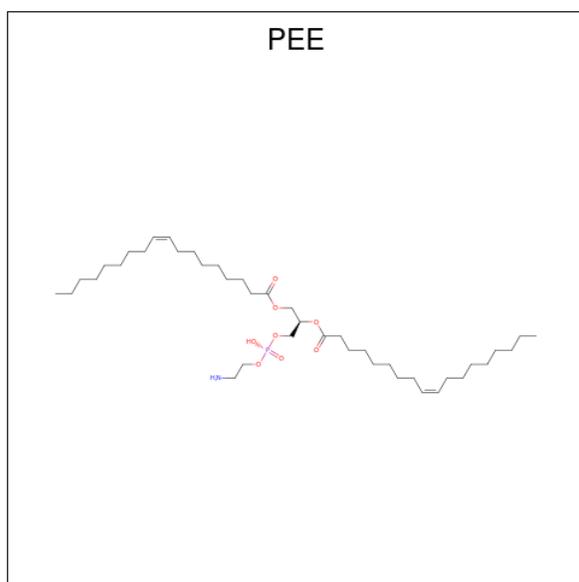
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
15	C	1	Total 21	C 19	O 2	0	0
15	D	1	Total 24	C 24		0	0

• Molecule 16 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	A	440	Total 440	O 440	0	0
16	B	213	Total 213	O 213	0	0
16	C	96	Total 96	O 96	0	0
16	D	85	Total 85	O 85	0	0

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: Succinate dehydrogenase flavoprotein subunit
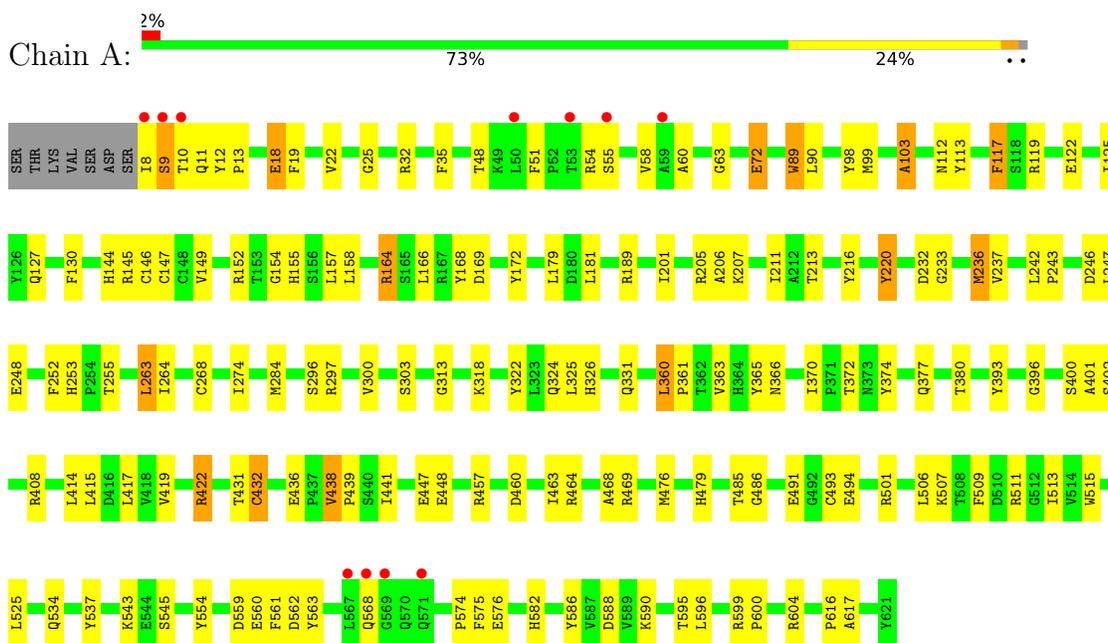
Chain A:

• Molecule 2: succinate dehydrogenase Ip subunit
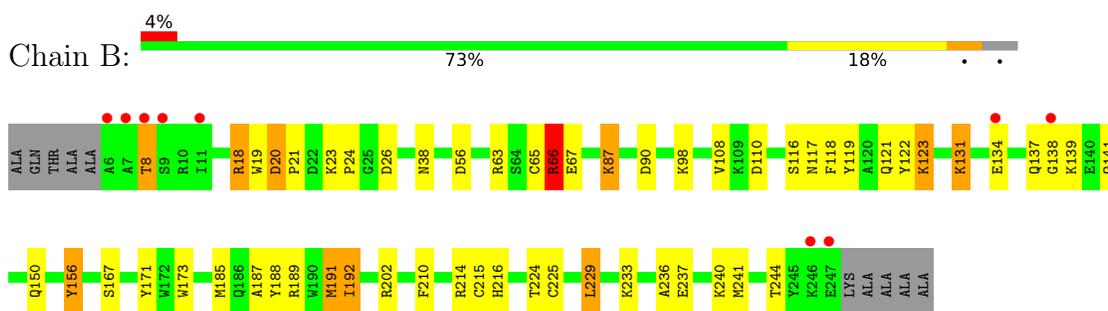
Chain B:

• Molecule 3: SUCCINATE DEHYDROGENASE CYTOCHROME B, LARGE SUBUNIT

Chain C:

R104 F114 V126 I137 A138 A139 I140 S141
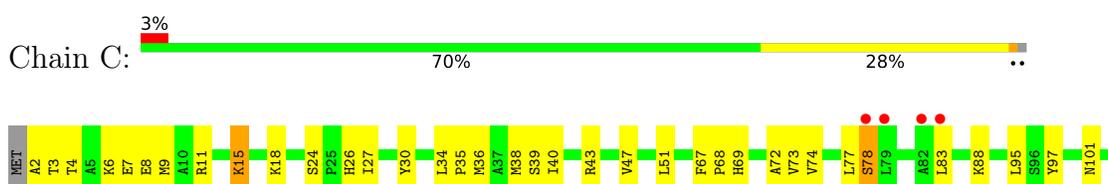
• Molecule 4: SUCCINATE DEHYDROGENASE CYTOCHROME B, SMALL SUBUNIT

Chain D:

74%　　　　　　　　22%

GLY S2 S3 K4 R14 L21 G22 L23 L24 P25 A26 A27 Y28 L29 Y30 P33 D36 L45 H46 Q53 D57 Y58 T63 P64 V67 Y73 D90 V91 K95 M99 L100 W101 S102 I103

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants	70.01Å 84.40Å 289.50Å	Depositor
a, b, c, α, β, γ	90.00° 90.00° 90.00°	
Resolution (Å)	38.66 – 2.20	Depositor
	38.66 – 2.20	EDS
% Data completeness	89.2 (38.66-2.20)	Depositor
(in resolution range)	89.3 (38.66-2.20)	EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.12	Depositor
$< I/\sigma(I) >$ [1]	2.69 (at 2.20Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.175 , 0.223	Depositor
	0.167 , 0.214	DCC
R_{free} test set	3842 reflections (4.88%)	wwPDB-VP
Wilson B-factor (Å^2)	39.5	Xtriage
Anisotropy	0.642	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 65.2	EDS
L-test for twinning[2]	$< |L| > = 0.46, < L^2 > = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	9576	wwPDB-VP
Average B, all atoms (Å^2)	44.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.22% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.

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

5   Model quality ⓘ

5.1   Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: PEE, UNL, GOL, HEM, UQ, FAD, FES, JZR, TEO, SF4, F3S

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	1.32	15/4837 (0.3%)	1.17	23/6550 (0.4%)
2	B	1.38	10/1972 (0.5%)	1.24	12/2661 (0.5%)
3	C	1.30	3/1100 (0.3%)	1.07	2/1497 (0.1%)
4	D	1.34	1/793 (0.1%)	1.05	1/1089 (0.1%)
All	All	1.33	29/8702 (0.3%)	1.16	38/11797 (0.3%)

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	5
3	C	0	1
4	D	0	1
All	All	0	7

The worst 5 of 29 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	494	GLU	CG-CD	8.65	1.65	1.51
2	B	215	CYS	CB-SG	8.55	1.96	1.82
1	A	22	VAL	CB-CG2	-8.31	1.35	1.52
2	B	191	MET	SD-CE	-8.28	1.31	1.77
1	A	220	TYR	CD2-CE2	8.02	1.51	1.39

The worst 5 of 38 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	18	ARG	NE-CZ-NH2	-16.70	111.95	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	422	ARG	NE-CZ-NH1	10.79	125.69	120.30
2	B	18	ARG	NE-CZ-NH1	10.29	125.45	120.30
1	A	119	ARG	NE-CZ-NH1	-9.73	115.43	120.30
1	A	422	ARG	NE-CZ-NH2	-8.70	115.95	120.30

There are no chirality outliers.

5 of 7 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	113	TYR	Sidechain
1	A	172	TYR	Sidechain
1	A	322	TYR	Sidechain
1	A	365	TYR	Sidechain
1	A	98	TYR	Sidechain

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4736	0	4616	110	0
2	B	1930	0	1916	53	0
3	C	1071	0	1106	39	0
4	D	770	0	763	30	0
5	A	53	0	29	6	0
6	A	9	0	2	4	0
7	A	15	0	0	0	0
7	B	6	0	0	0	0
7	C	4	0	0	0	0
7	D	5	0	0	1	0
8	B	4	0	0	0	0
9	B	8	0	0	0	0
10	B	7	0	0	0	0
11	B	14	0	9	13	0
12	B	6	0	8	0	0
13	C	18	0	24	1	0
14	C	41	0	24	1	0
15	C	21	0	35	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
15	D	24	0	40	4	0
16	A	440	0	0	18	0
16	B	213	0	0	7	0
16	C	96	0	0	7	0
16	D	85	0	0	2	0
All	All	9576	0	8572	219	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 13.

The worst 5 of 219 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:123:LYS:CE	2:B:123:LYS:NZ	1.68	1.51
1:A:476:MET:CE	1:A:476:MET:SD	2.01	1.48
2:B:185:MET:SD	2:B:185:MET:CE	2.01	1.47
2:B:123:LYS:HE3	3:C:8:GLU:OE1	1.62	0.98
1:A:164:ARG:HH22	2:B:137:GLN:HE22	1.03	0.94

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	612/621 (99%)	583 (95%)	28 (5%)	1 (0%)	47	55
2	B	240/252 (95%)	227 (95%)	12 (5%)	1 (0%)	34	37
3	C	138/141 (98%)	132 (96%)	5 (4%)	1 (1%)	22	22
4	D	100/103 (97%)	97 (97%)	3 (3%)	0	100	100
All	All	1090/1117 (98%)	1039 (95%)	48 (4%)	3 (0%)	41	46

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	8	THR
1	A	9	SER
3	C	78	SER

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	498/506 (98%)	488 (98%)	10 (2%)	55	69
2	B	214/219 (98%)	207 (97%)	7 (3%)	38	49
3	C	116/119 (98%)	114 (98%)	2 (2%)	60	74
4	D	78/79 (99%)	75 (96%)	3 (4%)	33	42
All	All	906/923 (98%)	884 (98%)	22 (2%)	49	62

5 of 22 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	189	ARG
3	C	3	THR
2	B	229	LEU
3	C	40	ILE
1	A	447	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 18 such sidechains are listed below:

Mol	Chain	Res	Type
3	C	42	HIS
4	D	53	GLN
4	D	9	HIS
1	A	383	ASN
3	C	26	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 41 ligands modelled in this entry, 30 are unknown - leaving 11 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z| > 2$	Counts	RMSZ	#$|Z| > 2$
13	JZR	C	142	-	18,18,18	2.16	6 (33%)	23,23,23	1.50	4 (17%)
15	PEE	D	104	-	22,22,50	1.58	4 (18%)	18,20,55	1.12	2 (11%)
14	HEM	C	143	4,3	40,48,50	3.21	17 (42%)	46,80,82	3.91	26 (56%)
12	GOL	B	1012	-	5,5,5	1.71	1 (20%)	5,5,5	0.87	0
6	TEO	A	1002	-	6,8,8	1.62	1 (16%)	4,10,10	2.19	2 (50%)
11	UQ	B	1005	-	14,14,63	2.24	6 (42%)	18,20,79	0.96	0
5	FAD	A	1001	1	53,58,58	2.24	23 (43%)	68,89,89	1.89	16 (23%)
15	PEE	C	144	-	19,19,50	2.03	4 (21%)	19,19,55	0.91	2 (10%)
8	FES	B	1002	2	0,4,4	-	-	-		
10	F3S	B	1004	2	0,9,9	-	-	-		
9	SF4	B	1003	2	0,12,12	-	-	-		

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
13	JZR	C	142	-	-	2/9/29/29	0/1/1/1
15	PEE	D	104	-	-	8/18/18/54	-
12	GOL	B	1012	-	-	3/4/4/4	-
6	TEO	A	1002	-	1/1/3/4	4/6/8/8	-
11	UQ	B	1005	-	-	1/4/28/87	0/1/1/1
10	F3S	B	1004	2	-	-	0/3/3/3
5	FAD	A	1001	1	-	9/30/50/50	0/6/6/6
15	PEE	C	144	-	-	12/17/17/54	-
8	FES	B	1002	2	-	-	0/1/1/1
14	HEM	C	143	4,3	-	1/10/50/54	-
9	SF4	B	1003	2	-	-	0/6/5/5

The worst 5 of 62 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
14	C	143	HEM	C1B-NB	8.43	1.54	1.40
14	C	143	HEM	CMB-C2B	7.48	1.66	1.50
14	C	143	HEM	CMC-C2C	7.26	1.68	1.51
5	A	1001	FAD	C10-N10	6.73	1.52	1.37
13	C	142	JZR	O1-C1	6.54	1.51	1.40

The worst 5 of 52 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
14	C	143	HEM	C4D-ND-C1D	-10.61	94.11	105.07
14	C	143	HEM	C3C-C2C-C1C	-10.06	99.93	106.85
14	C	143	HEM	C1B-NB-C4B	-9.95	94.79	105.07
14	C	143	HEM	C4B-CHC-C1C	7.61	132.60	122.56
14	C	143	HEM	C2B-C1B-NB	7.22	118.39	109.84

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
6	A	1002	TEO	C2

5 of 40 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1001	FAD	N10-C1'-C2'-O2'
5	A	1001	FAD	N10-C1'-C2'-C3'
5	A	1001	FAD	O4'-C4'-C5'-O5'

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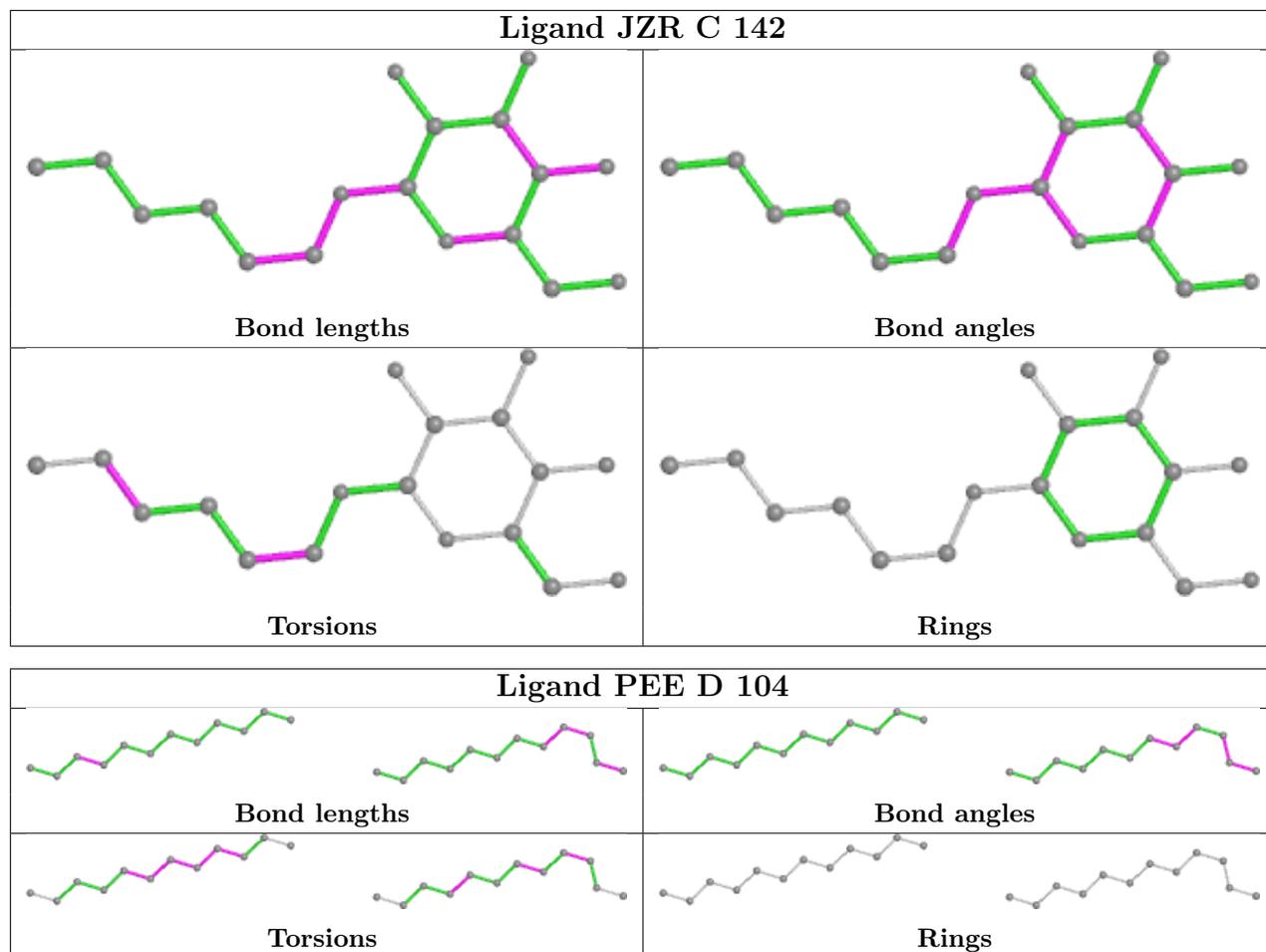| Mol	Chain	Res	Type	Atoms
5	A	1001	FAD	C5'-O5'-P-O2P
6	A	1002	TEO	C1-C2-C3-C4

There are no ring outliers.

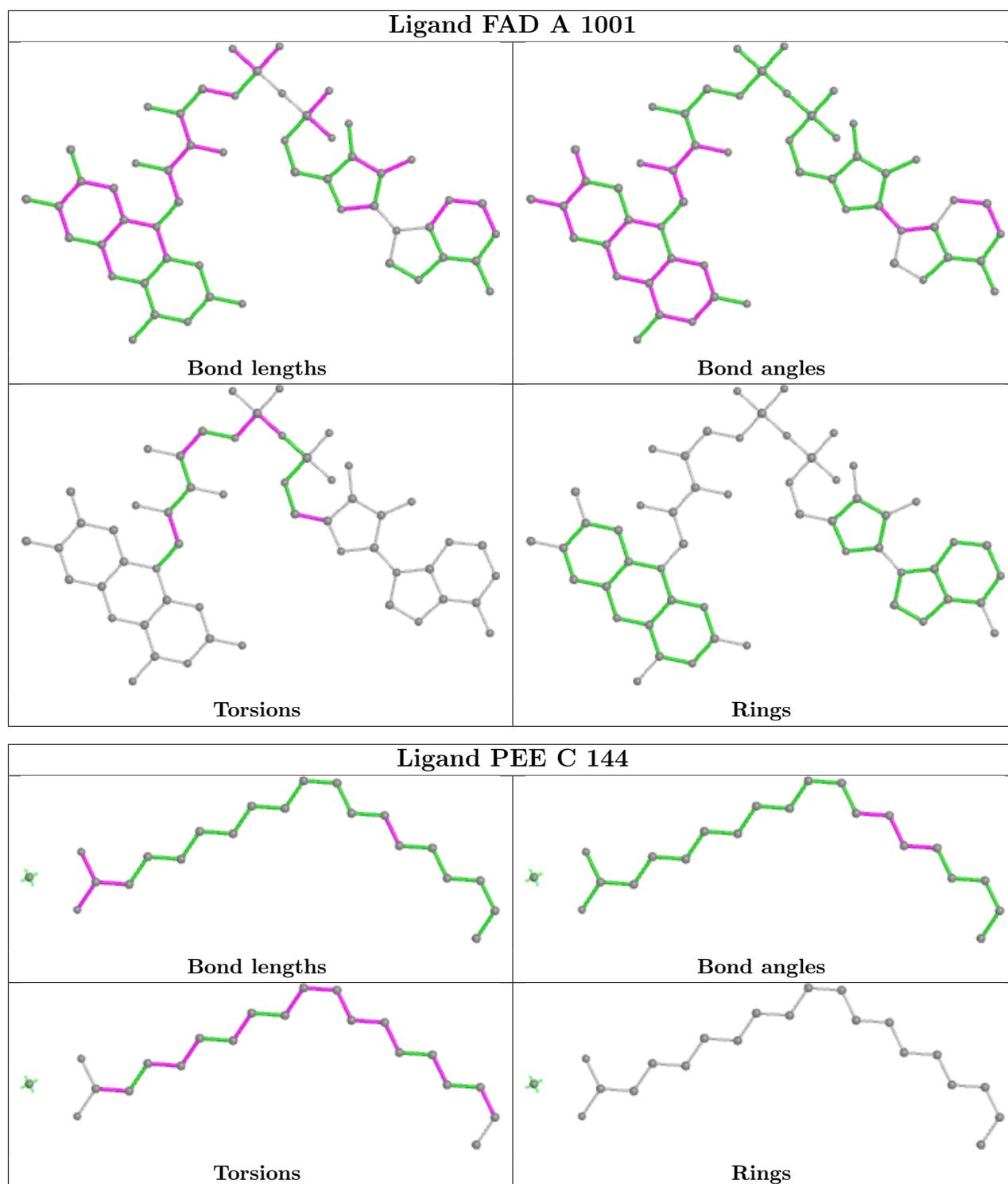7 monomers are involved in 32 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
13	C	142	JZR	1	0
15	D	104	PEE	4	0
14	C	143	HEM	1	0
6	A	1002	TEO	4	0
11	B	1005	UQ	13	0
5	A	1001	FAD	6	0
15	C	144	PEE	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 then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand JZR C 142

Bond lengths

Bond angles

Torsions

Rings

Ligand PEE D 104

Bond lengths

Bond angles

Torsions

Rings

Ligand HEM C 143

Bond lengths

Bond angles

Torsions

Rings

Ligand UQ B 1005

Bond lengths

Bond angles

Torsions

Rings

Ligand FAD A 1001

Bond lengths

Bond angles

Torsions

Rings

Ligand PEE C 144

Bond lengths

Bond angles

Torsions

Rings
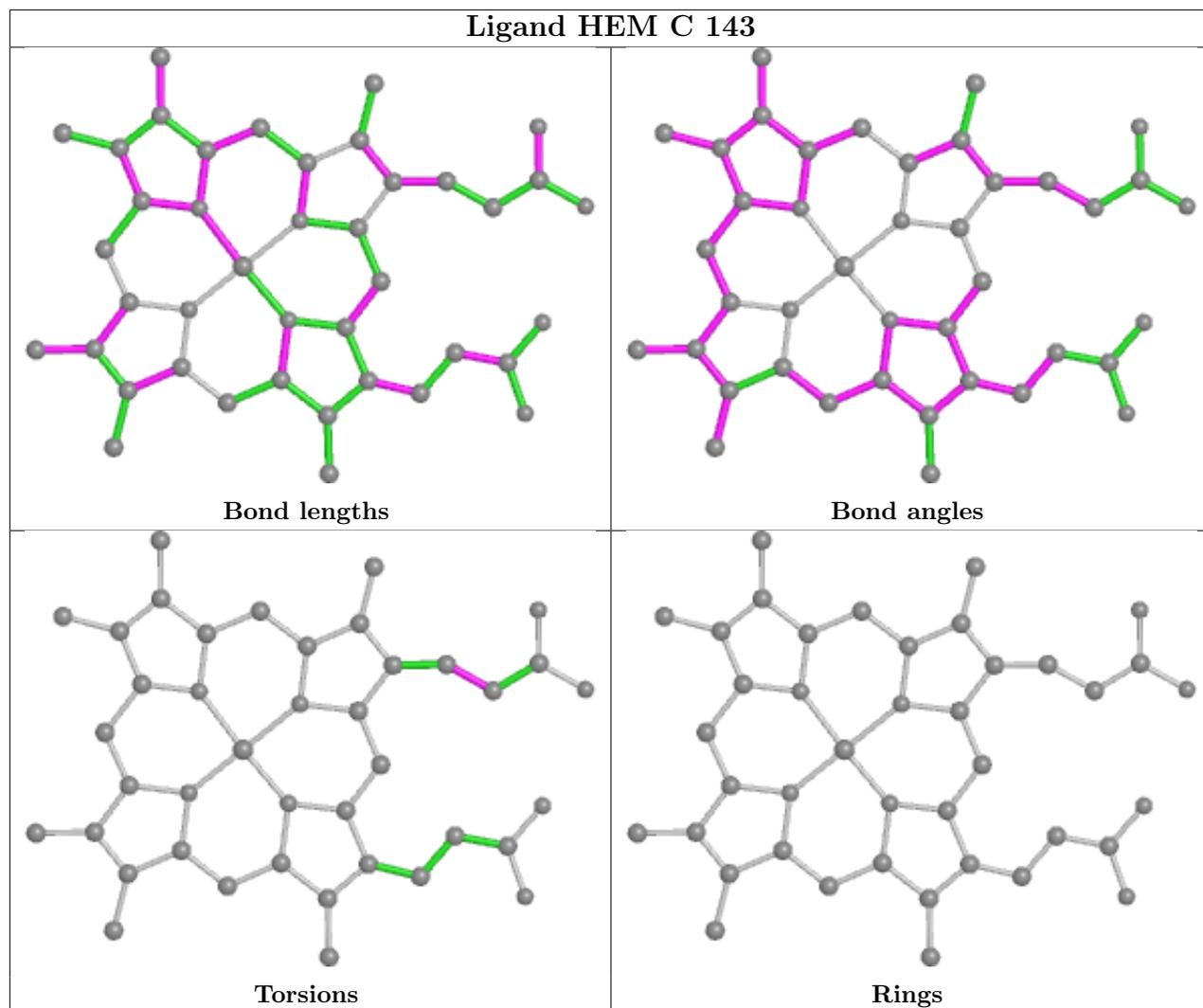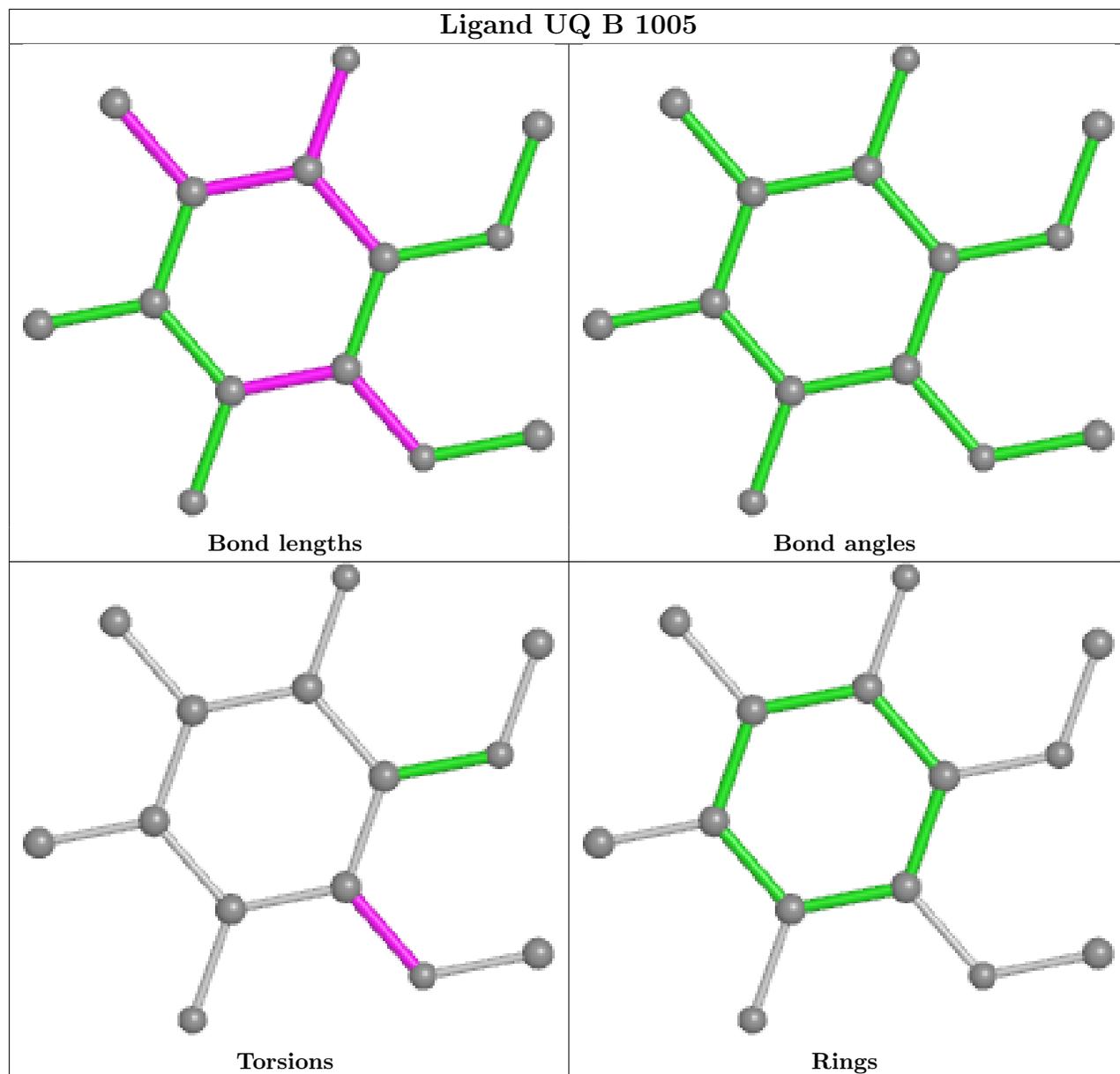
5.7   Other polymers ⓘ

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	614/621 (98%)	-0.33	11 (1%)	68	66	27, 42, 64, 130	0
2	B	242/252 (96%)	-0.27	9 (3%)	41	39	25, 37, 66, 105	0
3	C	140/141 (99%)	-0.57	4 (2%)	51	49	28, 42, 69, 80	0
4	D	102/103 (99%)	-0.79	0	100	100	33, 40, 61, 72	0
All	All	1098/1117 (98%)	-0.39	24 (2%)	62	59	25, 41, 66, 130	0

The worst 5 of 24 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	8	ILE	7.9
2	B	7	ALA	6.9
1	A	9	SER	6.8
2	B	6	ALA	6.3
2	B	8	THR	3.9

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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
12	GOL	B	1012	6/6	0.40	0.75	112,113,114,114	0
7	UNL	C	203	1/-	0.61	0.27	61,61,61,61	0
7	UNL	A	1016	1/-	0.68	0.24	63,63,63,63	0
7	UNL	A	1007	1/-	0.69	0.15	66,66,66,66	0
7	UNL	B	1010	1/-	0.70	0.22	75,75,75,75	0
7	UNL	A	1004	1/-	0.71	0.15	63,63,63,63	0
7	UNL	D	209	1/-	0.72	0.23	61,61,61,61	0
7	UNL	D	205	1/-	0.74	0.27	59,59,59,59	0
7	UNL	C	211	1/-	0.76	0.15	68,68,68,68	0
7	UNL	A	1015	1/-	0.76	0.10	76,76,76,76	0
7	UNL	D	204	1/-	0.78	0.13	65,65,65,65	0
7	UNL	B	1007	1/-	0.78	0.58	63,63,63,63	0
7	UNL	B	1008	1/-	0.80	0.12	59,59,59,59	0
11	UQ	B	1005	14/63	0.80	0.37	59,72,82,86	0
7	UNL	B	1011	1/-	0.80	0.15	50,50,50,50	0
15	PEE	C	144	21/51	0.81	0.17	56,64,74,77	0
7	UNL	A	1003	1/-	0.82	0.21	65,65,65,65	0
7	UNL	A	1017	1/-	0.83	0.34	66,66,66,66	0
7	UNL	A	1006	1/-	0.85	0.25	47,47,47,47	0
7	UNL	A	1010	1/-	0.86	0.24	58,58,58,58	0
7	UNL	A	1008	1/-	0.86	0.09	58,58,58,58	0
7	UNL	C	226	1/-	0.87	0.11	56,56,56,56	0
7	UNL	B	1009	1/-	0.89	0.31	60,60,60,60	0
15	PEE	D	104	24/51	0.89	0.13	47,62,73,77	0
7	UNL	B	1006	1/-	0.91	0.07	57,57,57,57	0
7	UNL	A	1009	1/-	0.91	0.12	65,65,65,65	0
7	UNL	A	1013	1/-	0.92	0.23	77,77,77,77	0
7	UNL	C	212	1/-	0.92	0.54	76,76,76,76	0
7	UNL	A	1012	1/-	0.93	0.42	63,63,63,63	0
13	JZR	C	142	18/18	0.94	0.13	41,47,63,67	0
7	UNL	D	228	1/-	0.95	0.30	59,59,59,59	0
7	UNL	A	1005	1/-	0.95	0.23	64,64,64,64	0
7	UNL	A	1011	1/-	0.96	0.22	54,54,54,54	0
7	UNL	A	1014	1/-	0.96	0.10	59,59,59,59	0
6	TEO	A	1002	9/9	0.98	0.19	35,37,38,42	0
7	UNL	D	218	1/-	0.98	0.14	47,47,47,47	0
14	HEM	C	143	41/43	0.99	0.09	32,36,44,49	0
9	SF4	B	1003	8/8	0.99	0.08	31,32,35,36	0
5	FAD	A	1001	53/53	0.99	0.20	23,32,37,37	0
8	FES	B	1002	4/4	1.00	0.11	31,33,34,34	0
10	F3S	B	1004	7/7	1.00	0.11	28,29,31,31	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers

as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.
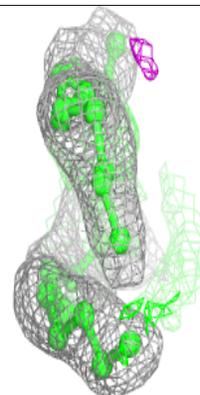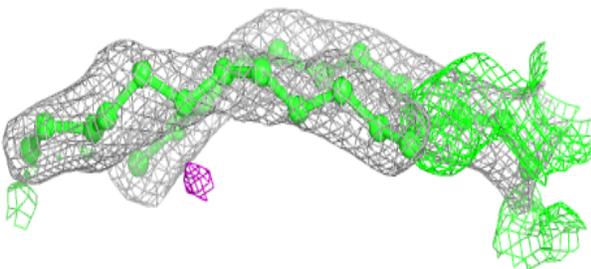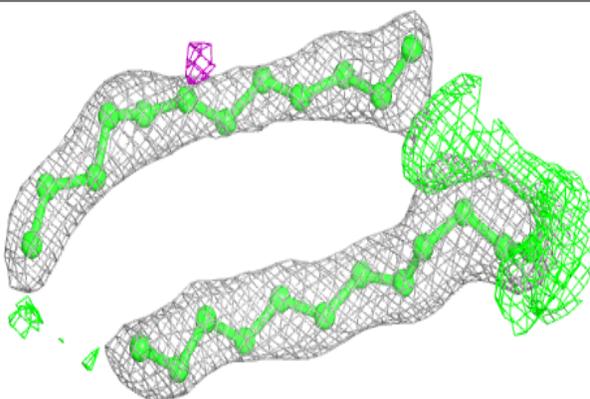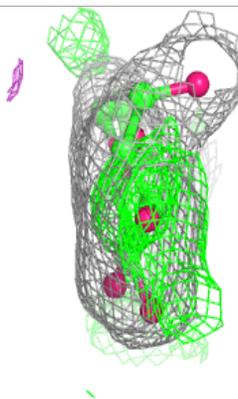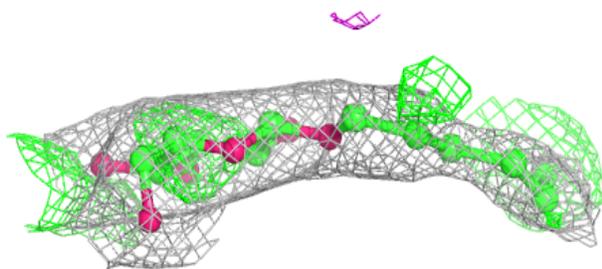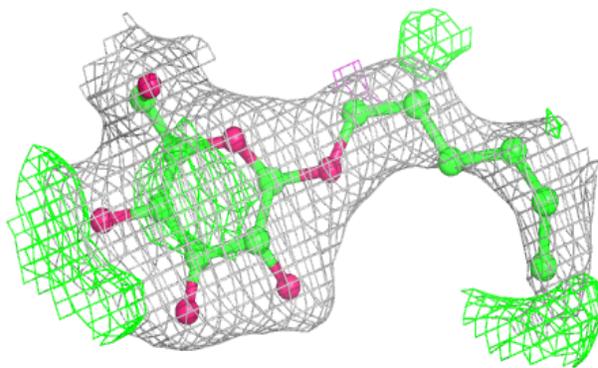
Electron density around UQ B 1005:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
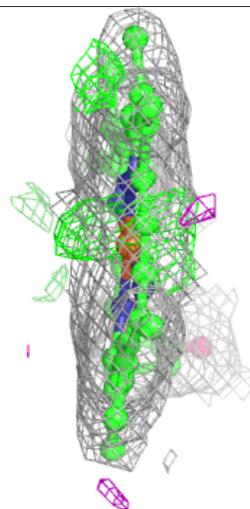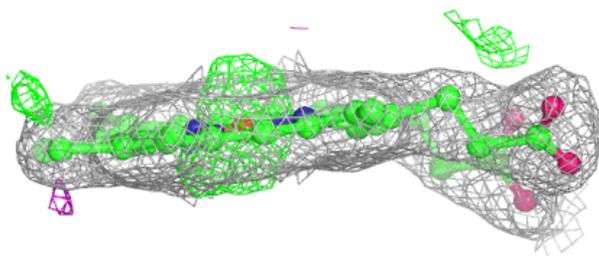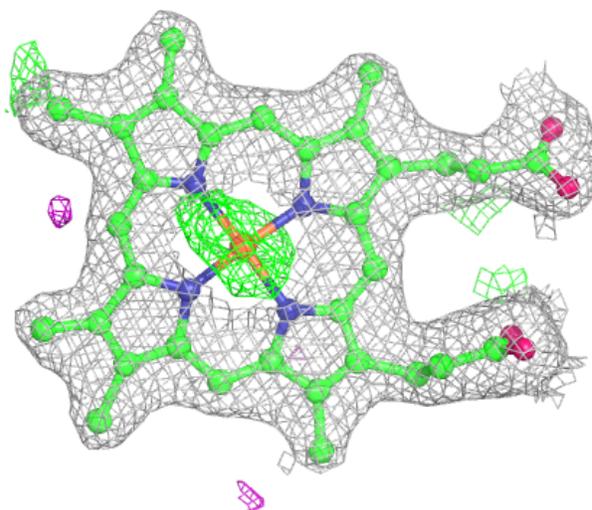mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
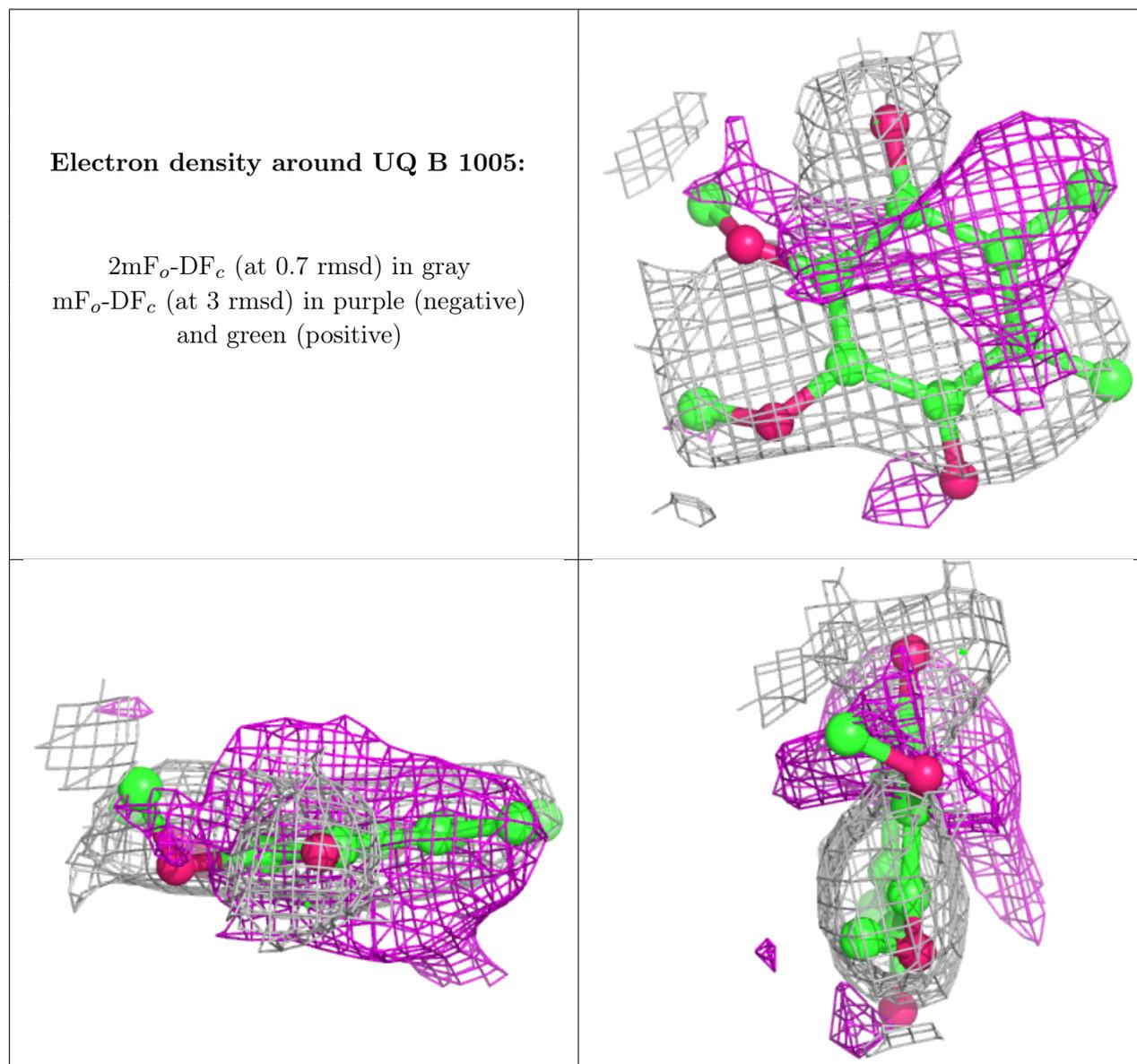
Electron density around PEE C 144:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
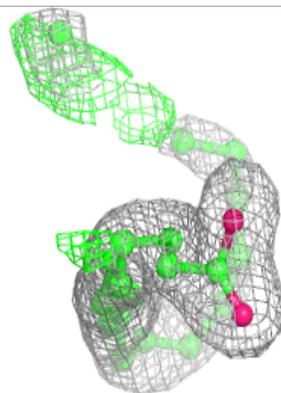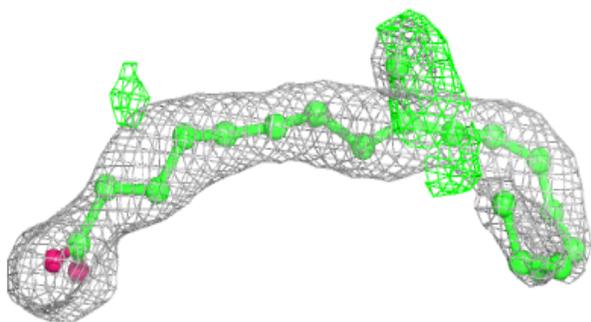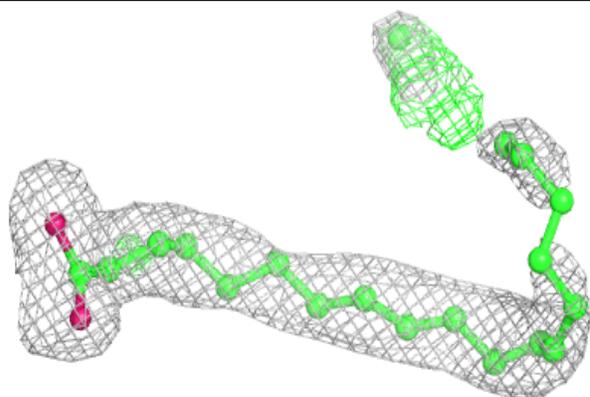
Electron density around PEE D 104:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
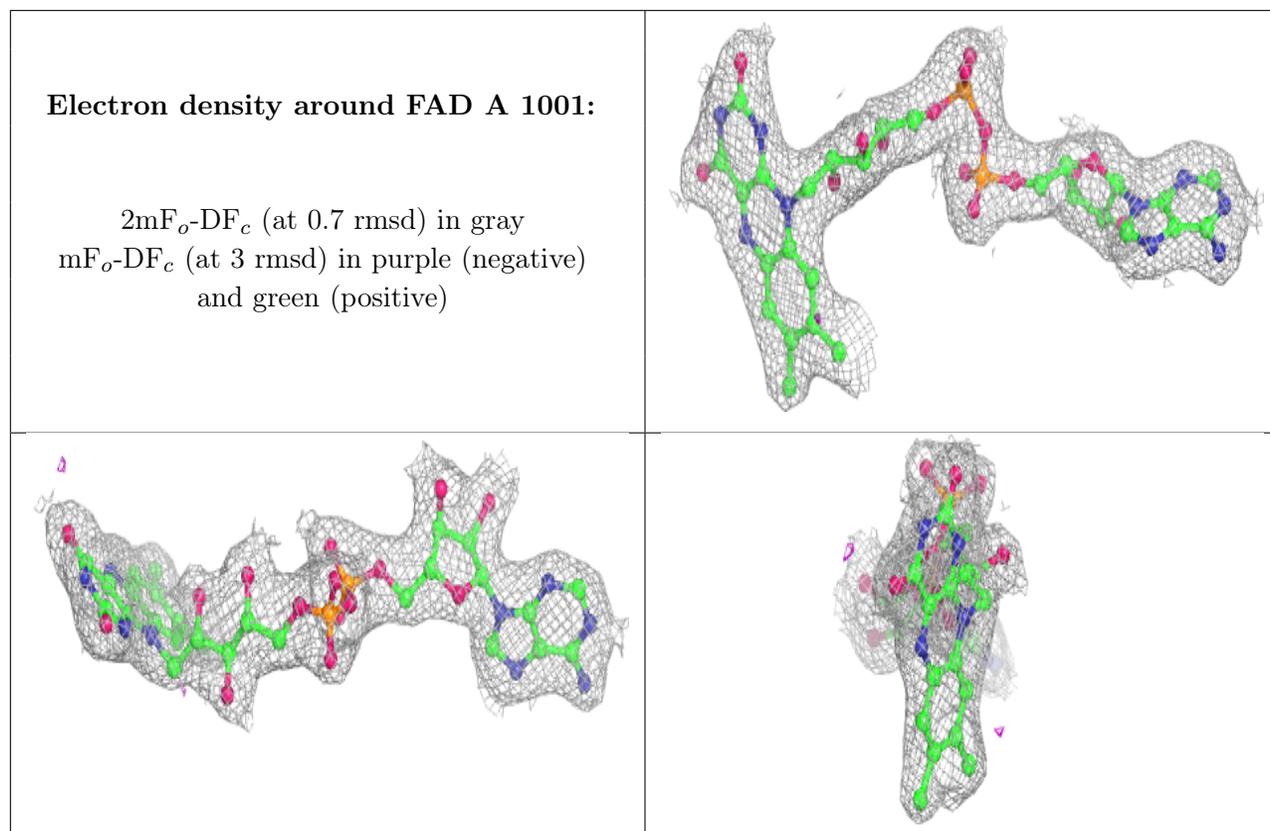
Electron density around JZR C 142:

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

Electron density around HEM C 143:

$2mF_o$-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 ⓘ

There are no such residues in this entry.