wwPDB X-ray Structure Validation Summary Report (i)

Nov 24, 2025 – 09:19 am GMT

PDB ID	:	9QIT / pdb_00009qit
Title	:	Crystal structure of a D-lactate dehydrogenase in complex with D-lactate from Porcellio dilatatus
Authors	:	Borges, P.T.; Frazao, C.; Martins, L.O.
Deposited on	:	2025-03-17
Resolution	:	3.04 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 (i) 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 (i)) were used in the production of this report:

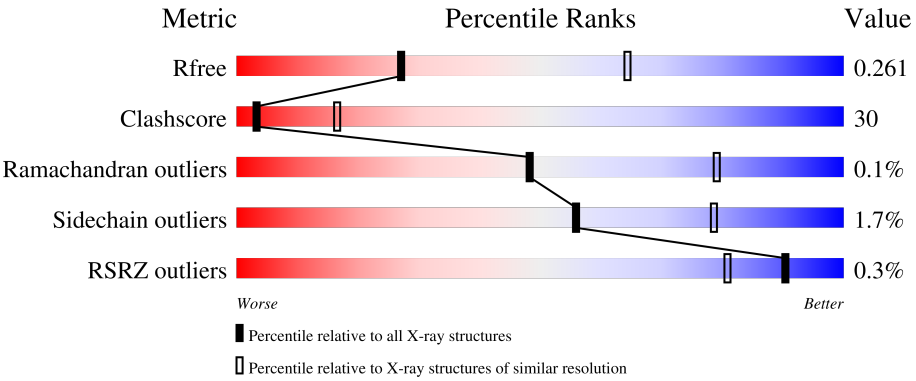
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 3.04 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}	164625	3418 (3.08-3.00)
Clashscore	180529	3811 (3.08-3.00)
Ramachandran outliers	177936	3656 (3.08-3.00)
Sidechain outliers	177891	3658 (3.08-3.00)
RSRZ outliers	164620	3430 (3.08-3.00)

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 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	464	54% 42%
1	B	464	54% 43%
1	C	464	55% 42%
1	D	464	61% 36%
1	E	464	54% 42%

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Mol	Chain	Length	Quality of chain
1	F	464	
1	G	464	
1	H	464	

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
2	GOL	E	502	-	-	X	-

2 Entry composition (i)

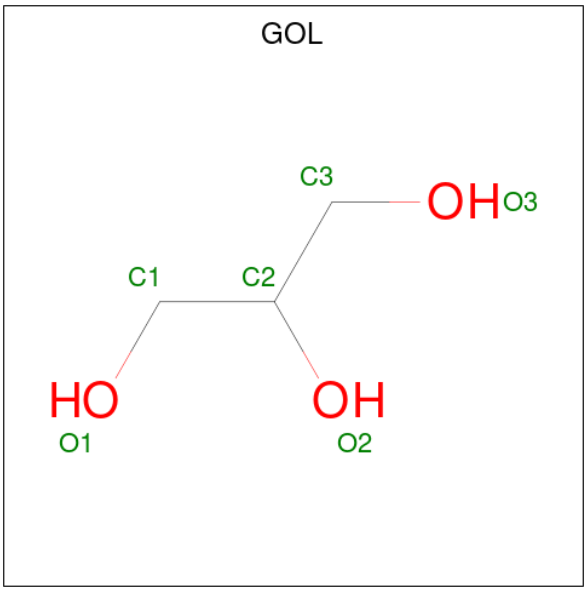
There are 5 unique types of molecules in this entry. The entry contains 27170 atoms, of which 72 are hydrogens and 0 are deuteriums.

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 Glycolate oxidase.

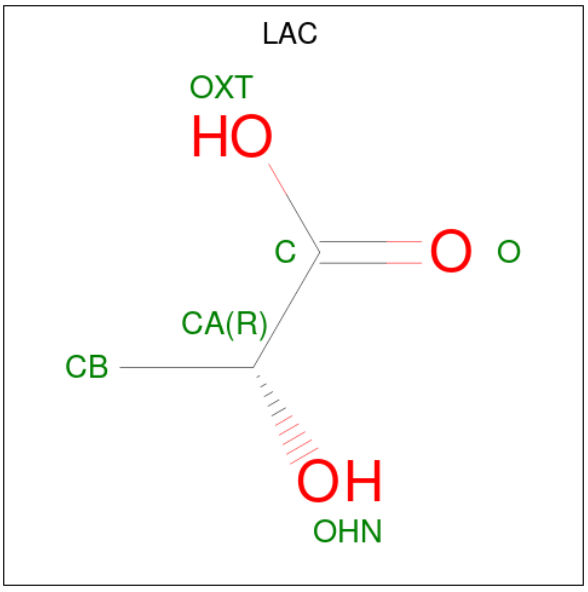
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	454	Total	C	N	O	S	0	0	0
			3358	2100	597	648	13			
1	B	455	Total	C	N	O	S	0	0	0
			3364	2103	598	650	13			
1	C	454	Total	C	N	O	S	0	0	0
			3358	2100	597	648	13			
1	D	454	Total	C	N	O	S	0	0	0
			3361	2102	597	648	14			
1	E	451	Total	C	N	O	S	0	0	0
			3341	2090	594	643	14			
1	F	454	Total	C	N	O	S	0	0	0
			3358	2100	597	648	13			
1	G	433	Total	C	N	O	S	0	0	0
			3190	1996	569	613	12			
1	H	444	Total	C	N	O	S	0	0	0
			3267	2042	580	633	12			

- Molecule 2 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



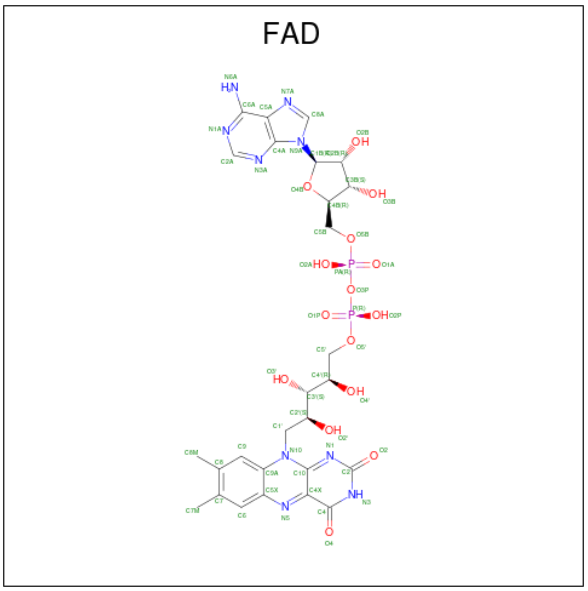
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C H O 14 3 8 3	0	0
2	E	1	Total C H O 14 3 8 3	0	0
2	F	1	Total C H O 14 3 8 3	0	0
2	G	1	Total C H O 14 3 8 3	0	0

- Molecule 3 is LACTIC ACID (CCD ID: LAC) (formula: $C_3H_6O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C H O 11 3 5 3	0	0
3	B	1	Total C H O 11 3 5 3	0	0
3	C	1	Total C H O 11 3 5 3	0	0
3	D	1	Total C H O 11 3 5 3	0	0
3	E	1	Total C H O 11 3 5 3	0	0
3	F	1	Total C H O 11 3 5 3	0	0
3	G	1	Total C H O 11 3 5 3	0	0
3	H	1	Total C H O 11 3 5 3	0	0

- Molecule 4 is FLAVIN-ADENINE DINUCLEOTIDE (CCD ID: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).



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

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	E	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
4	F	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
4	G	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
4	H	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

- Molecule 5 is FE (III) ION (CCD ID: FE) (formula: Fe).

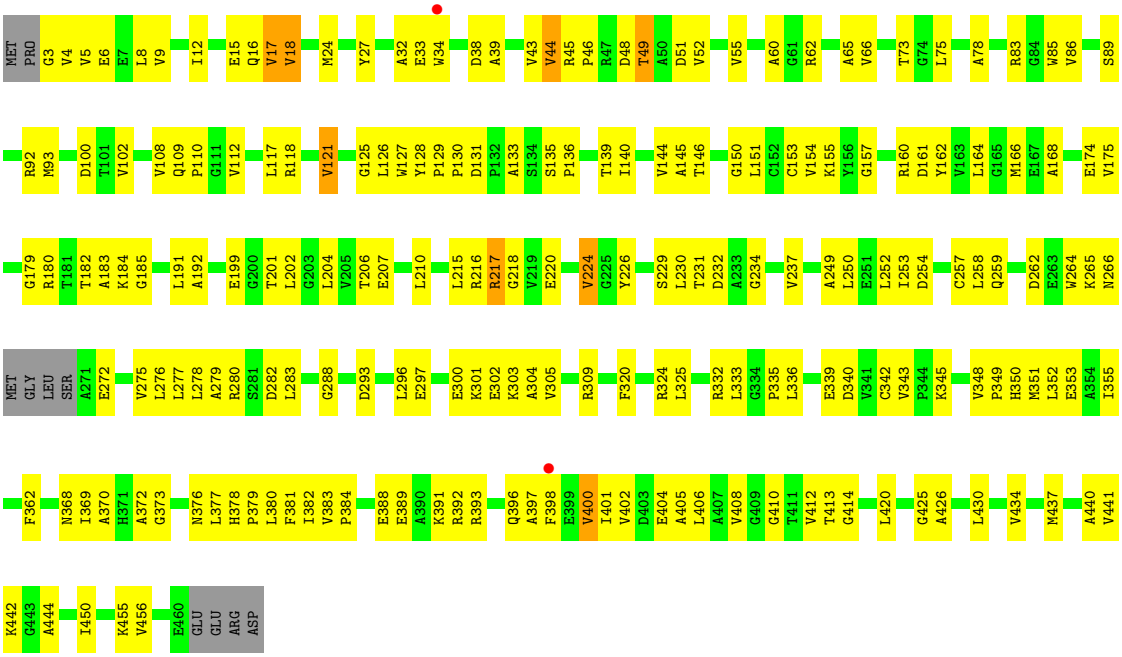
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Fe	0	0
			1	1		
5	E	1	Total	Fe	0	0
			1	1		
5	F	1	Total	Fe	0	0
			1	1		
5	G	1	Total	Fe	0	0
			1	1		
5	H	1	Total	Fe	0	0
			1	1		

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.

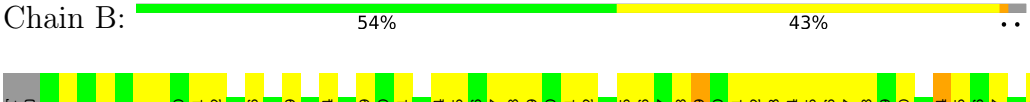
• Molecule 1: Glycolate oxidase

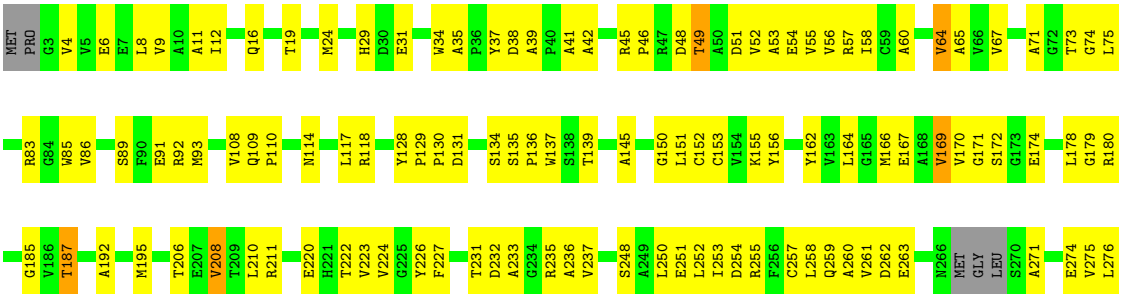
Chain A:

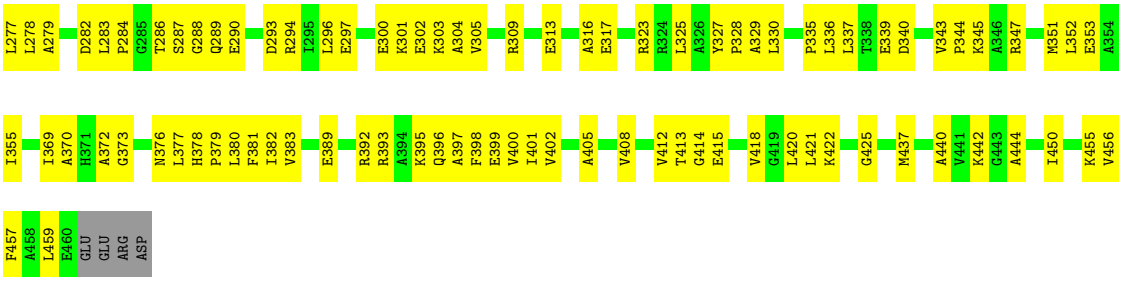


• Molecule 1: Glycolate oxidase

Chain B:

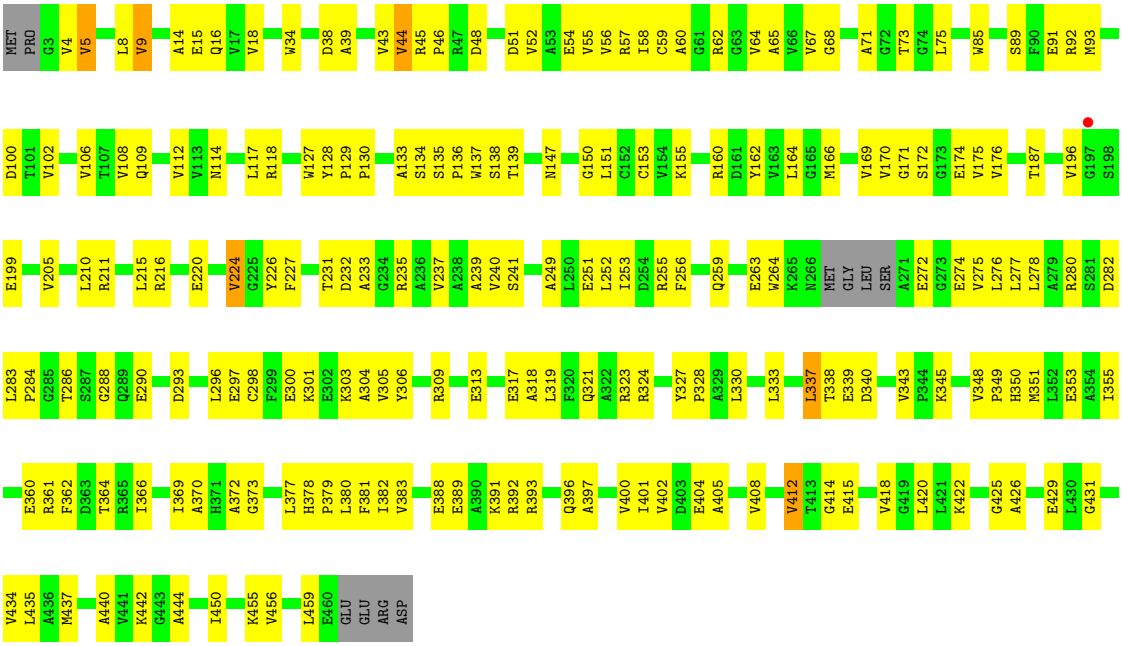






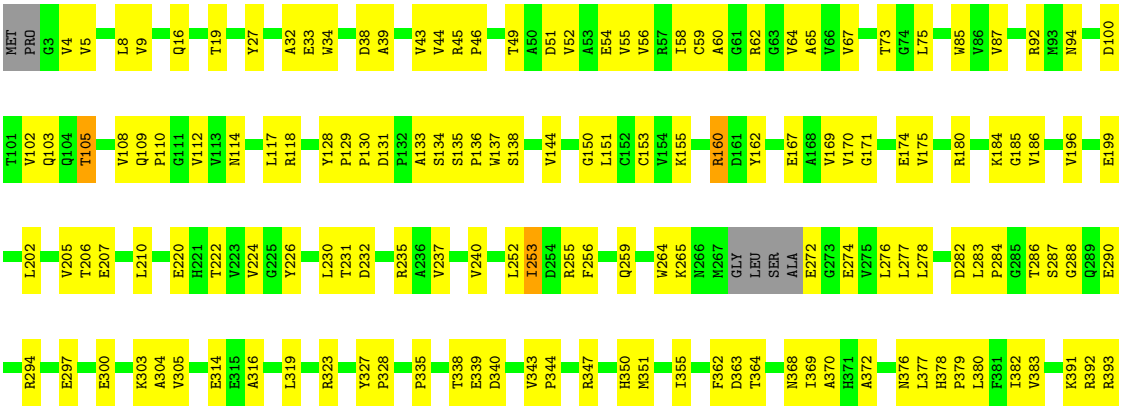
• Molecule 1: Glycolate oxidase

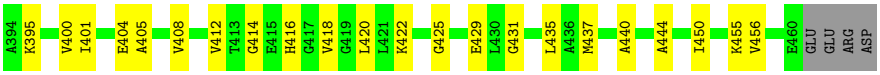
Chain C:



• Molecule 1: Glycolate oxidase

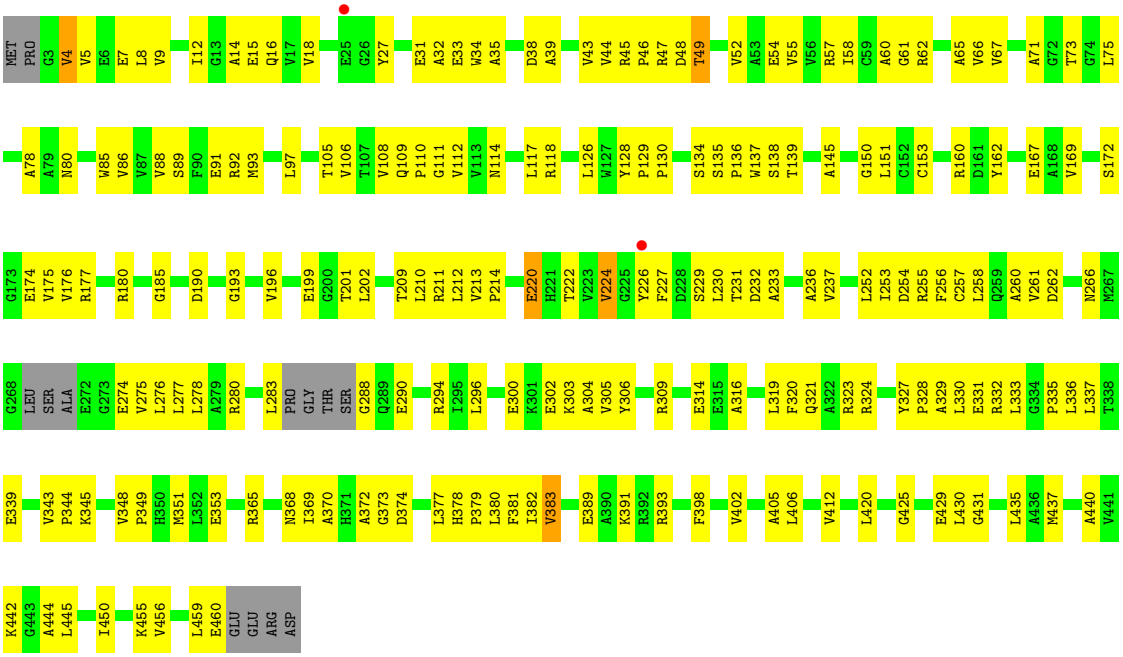
Chain D:





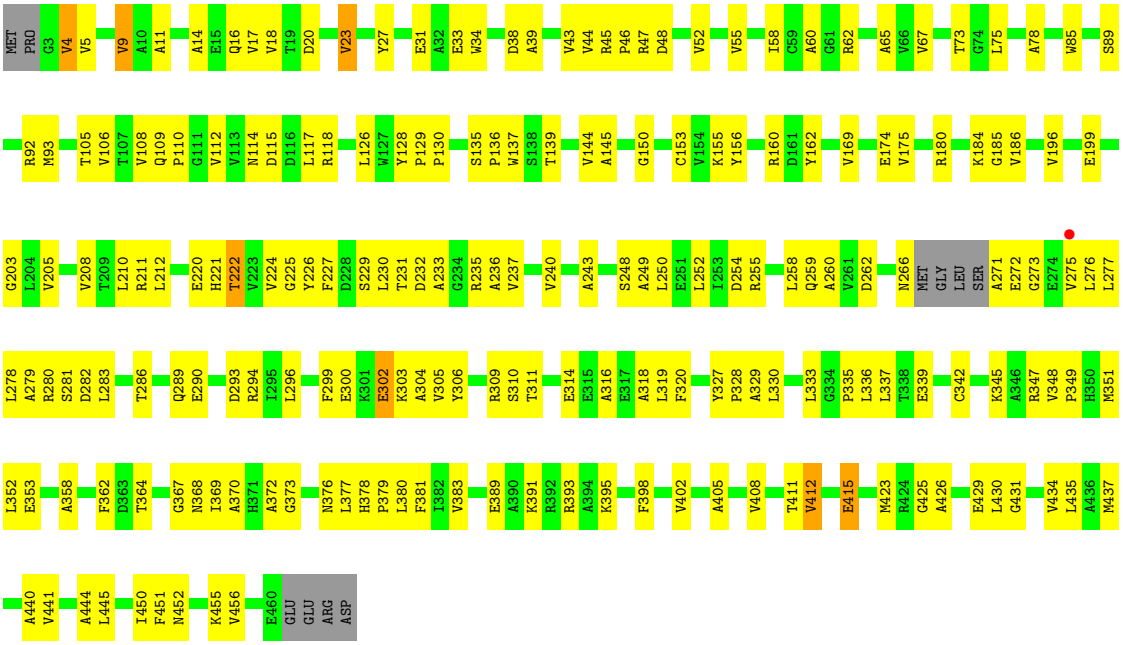
• Molecule 1: Glycolate oxidase

Chain E:



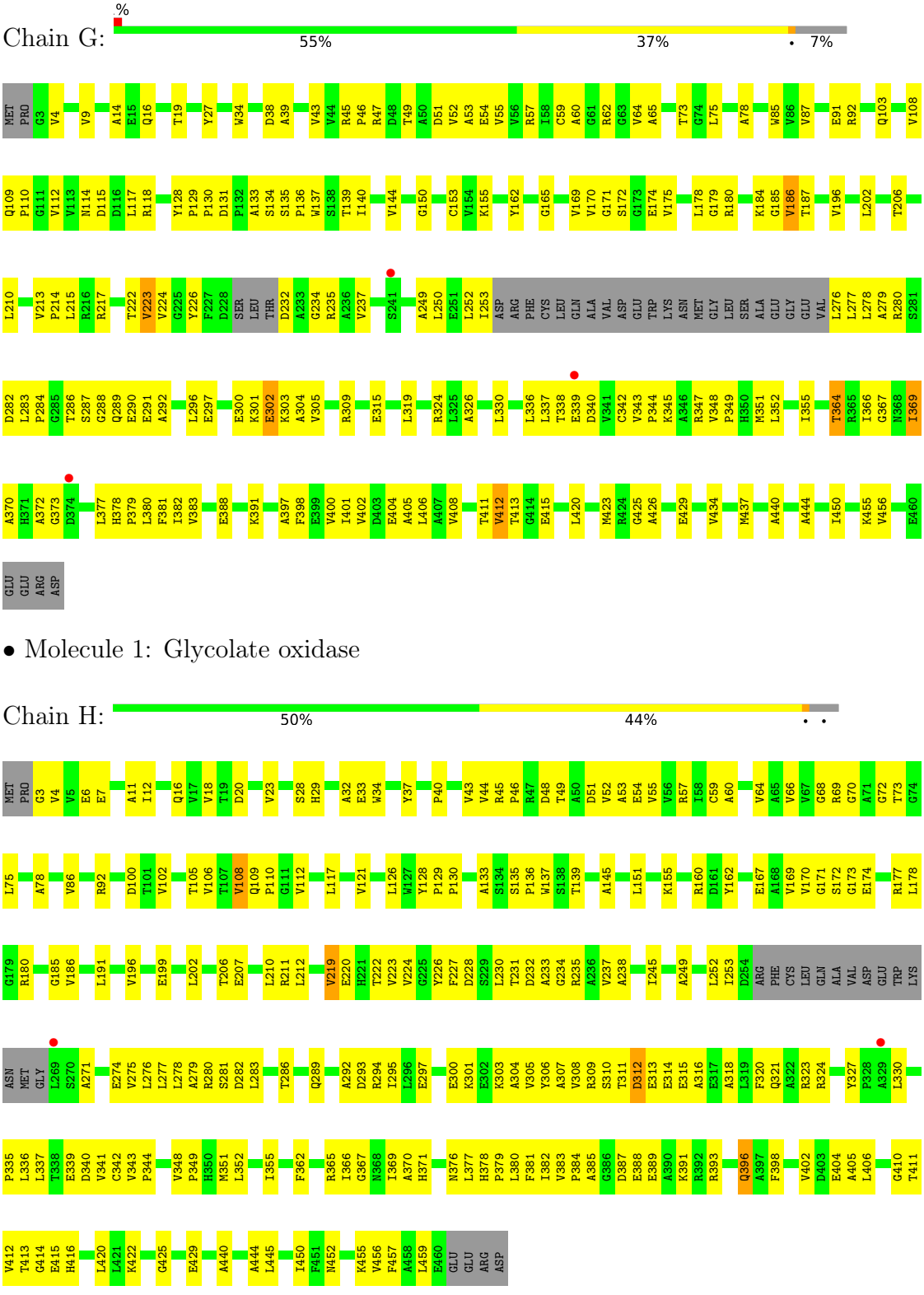
• Molecule 1: Glycolate oxidase

Chain F:



• Molecule 1: Glycolate oxidase

Chain G:



• Molecule 1: Glycolate oxidase

Chain H:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	127.22Å 109.64Å 143.44Å 90.00° 98.26° 90.00°	Depositor
Resolution (Å)	88.11 – 3.04 88.11 – 3.04	Depositor EDS
% Data completeness (in resolution range)	63.9 (88.11-3.04) 64.0 (88.11-3.04)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.90 (at 3.07Å)	Xtriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, R_{free}	0.207 , 0.263 0.207 , 0.261	Depositor DCC
R_{free} test set	2346 reflections (3.13%)	wwPDB-VP
Wilson B-factor (Å^2)	56.6	Xtriage
Anisotropy	0.091	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 60.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.41$, $< L^2 > = 0.24$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	27170	wwPDB-VP
Average B, all atoms (Å^2)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 49.56 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 7.3291e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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: LAC, FAD, GOL, FE

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	0.19	0/3414	0.26	0/4645
1	B	0.10	0/3420	0.25	0/4653
1	C	0.16	0/3414	0.24	0/4645
1	D	0.19	0/3417	0.25	0/4648
1	E	0.17	0/3395	0.24	0/4615
1	F	0.18	0/3414	0.26	0/4645
1	G	0.16	0/3242	0.27	0/4410
1	H	0.24	0/3320	0.30	0/4518
All	All	0.18	0/27036	0.26	0/36779

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	3358	0	3334	197	0
1	B	3364	0	3339	212	0
1	C	3358	0	3334	234	0
1	D	3361	0	3338	161	0
1	E	3341	0	3318	226	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	3358	0	3334	208	0
1	G	3190	0	3178	180	0
1	H	3267	0	3251	217	0
2	A	6	8	8	1	0
2	E	6	8	8	4	0
2	F	6	8	8	1	0
2	G	6	8	8	0	0
3	A	6	5	0	0	0
3	B	6	5	0	0	0
3	C	6	5	0	3	0
3	D	6	5	0	1	0
3	E	6	5	0	0	0
3	F	6	5	0	1	0
3	G	6	5	0	0	0
3	H	6	5	0	0	0
4	A	53	0	31	10	0
4	B	53	0	31	16	0
4	C	53	0	31	16	0
4	D	53	0	31	11	0
4	E	53	0	31	8	0
4	F	53	0	31	5	0
4	G	53	0	31	7	0
4	H	53	0	31	9	0
5	A	1	0	0	0	0
5	E	1	0	0	0	0
5	F	1	0	0	0	0
5	G	1	0	0	0	0
5	H	1	0	0	0	0
All	All	27098	72	26706	1611	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 30.

The worst 5 of 1611 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:F:378:HIS:NE2	1:F:415:GLU:OE2	1.62	1.31
1:A:220:GLU:HB3	1:A:280:ARG:HD3	1.26	1.16
1:H:253:ILE:HD11	1:H:276:LEU:HD23	1.35	1.06
1:B:166:MET:HE1	1:B:195:MET:HB2	1.40	1.03
1:C:339:GLU:HB3	1:C:379:PRO:HG2	1.38	1.02

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	450/464 (97%)	440 (98%)	9 (2%)	1 (0%)	44	74
1	B	451/464 (97%)	438 (97%)	13 (3%)	0	100	100
1	C	450/464 (97%)	434 (96%)	16 (4%)	0	100	100
1	D	450/464 (97%)	438 (97%)	12 (3%)	0	100	100
1	E	445/464 (96%)	432 (97%)	13 (3%)	0	100	100
1	F	450/464 (97%)	438 (97%)	11 (2%)	1 (0%)	44	74
1	G	427/464 (92%)	416 (97%)	10 (2%)	1 (0%)	44	74
1	H	440/464 (95%)	428 (97%)	11 (2%)	1 (0%)	44	74
All	All	3563/3712 (96%)	3464 (97%)	95 (3%)	4 (0%)	48	79

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	217	ARG
1	F	302	GLU
1	G	302	GLU
1	H	312	ASP

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	340/349 (97%)	333 (98%)	7 (2%)	48	74
1	B	341/349 (98%)	335 (98%)	6 (2%)	54	77
1	C	340/349 (97%)	334 (98%)	6 (2%)	54	77
1	D	341/349 (98%)	336 (98%)	5 (2%)	60	80
1	E	338/349 (97%)	332 (98%)	6 (2%)	54	77
1	F	340/349 (97%)	332 (98%)	8 (2%)	44	71
1	G	322/349 (92%)	316 (98%)	6 (2%)	52	76
1	H	331/349 (95%)	328 (99%)	3 (1%)	75	88
All	All	2693/2792 (96%)	2646 (98%)	47 (2%)	56	78

5 of 47 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	224	VAL
1	F	240	VAL
1	E	383	VAL
1	F	23	VAL
1	F	415	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 13 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	321	GLN
1	D	396	GLN
1	H	416	HIS
1	G	396	GLN
1	H	376	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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 25 ligands modelled in this entry, 5 are monoatomic - leaving 20 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	$\#\|Z\| > 2$
4	FAD	B	502	-	53,58,58	2.06	20 (37%)	68,89,89	1.89	20 (29%)
4	FAD	G	503	-	53,58,58	1.79	15 (28%)	68,89,89	1.71	13 (19%)
2	GOL	A	501	-	5,5,5	0.89	0	5,5,5	1.10	0
4	FAD	D	502	-	53,58,58	2.01	19 (35%)	68,89,89	1.94	19 (27%)
4	FAD	A	503	-	53,58,58	2.05	19 (35%)	68,89,89	1.96	24 (35%)
3	LAC	D	501	-	5,5,5	1.71	1 (20%)	4,6,6	1.00	0
3	LAC	A	502	5	5,5,5	1.69	1 (20%)	4,6,6	1.06	0
3	LAC	H	501	-	5,5,5	1.70	1 (20%)	4,6,6	0.99	0
3	LAC	E	501	-	5,5,5	1.70	1 (20%)	4,6,6	0.97	0
3	LAC	F	502	5	5,5,5	1.73	1 (20%)	4,6,6	1.08	0
4	FAD	F	503	-	53,58,58	2.02	19 (35%)	68,89,89	1.56	16 (23%)
2	GOL	G	501	-	5,5,5	0.95	0	5,5,5	1.16	1 (20%)
3	LAC	G	502	5	5,5,5	1.70	1 (20%)	4,6,6	0.96	0
2	GOL	F	501	-	5,5,5	0.84	0	5,5,5	1.07	0
4	FAD	E	503	-	53,58,58	1.79	16 (30%)	68,89,89	1.55	13 (19%)
4	FAD	H	502	-	53,58,58	1.81	15 (28%)	68,89,89	1.68	12 (17%)
4	FAD	C	502	-	53,58,58	1.79	15 (28%)	68,89,89	1.60	9 (13%)
3	LAC	C	501	-	5,5,5	1.72	1 (20%)	4,6,6	0.98	0
2	GOL	E	502	-	5,5,5	0.89	0	5,5,5	1.13	0
3	LAC	B	501	-	5,5,5	1.68	1 (20%)	4,6,6	0.95	0

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
4	FAD	B	502	-	-	7/30/50/50	0/6/6/6
4	FAD	G	503	-	-	13/30/50/50	0/6/6/6
2	GOL	A	501	-	-	2/4/4/4	-
4	FAD	D	502	-	-	9/30/50/50	0/6/6/6
4	FAD	A	503	-	-	6/30/50/50	0/6/6/6
3	LAC	D	501	-	-	4/4/4/4	-
3	LAC	A	502	5	-	2/4/4/4	-
3	LAC	H	501	-	-	2/4/4/4	-
3	LAC	E	501	-	-	2/4/4/4	-
3	LAC	F	502	5	-	4/4/4/4	-
4	FAD	F	503	-	-	13/30/50/50	0/6/6/6
2	GOL	G	501	-	-	1/4/4/4	-
3	LAC	G	502	5	-	2/4/4/4	-
2	GOL	F	501	-	-	3/4/4/4	-
4	FAD	E	503	-	-	7/30/50/50	0/6/6/6
4	FAD	H	502	-	-	14/30/50/50	0/6/6/6
4	FAD	C	502	-	-	10/30/50/50	0/6/6/6
3	LAC	C	501	-	-	0/4/4/4	-
2	GOL	E	502	-	-	2/4/4/4	-
3	LAC	B	501	-	-	2/4/4/4	-

The worst 5 of 146 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	503	FAD	C2B-C1B	-5.49	1.45	1.53
4	A	503	FAD	C4-N3	-5.16	1.29	1.38
4	D	502	FAD	C4-N3	-4.80	1.29	1.38
4	E	503	FAD	C4-N3	-4.64	1.30	1.38
4	F	503	FAD	C2-N3	-4.50	1.28	1.39

The worst 5 of 127 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	D	502	FAD	O2-C2-N1	-6.53	111.00	121.83
4	A	503	FAD	O4B-C1B-C2B	-6.21	97.86	106.93
4	B	502	FAD	C4'-C3'-C2'	-5.18	102.59	113.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	C	502	FAD	C4'-C3'-C2'	-5.04	102.87	113.36
4	H	502	FAD	O4B-C1B-C2B	-4.89	99.78	106.93

There are no chirality outliers.

5 of 105 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	GOL	C1-C2-C3-O3
2	E	502	GOL	C1-C2-C3-O3
2	F	501	GOL	C1-C2-C3-O3
3	F	502	LAC	O-C-CA-CB
3	F	502	LAC	OXT-C-CA-CB

There are no ring outliers.

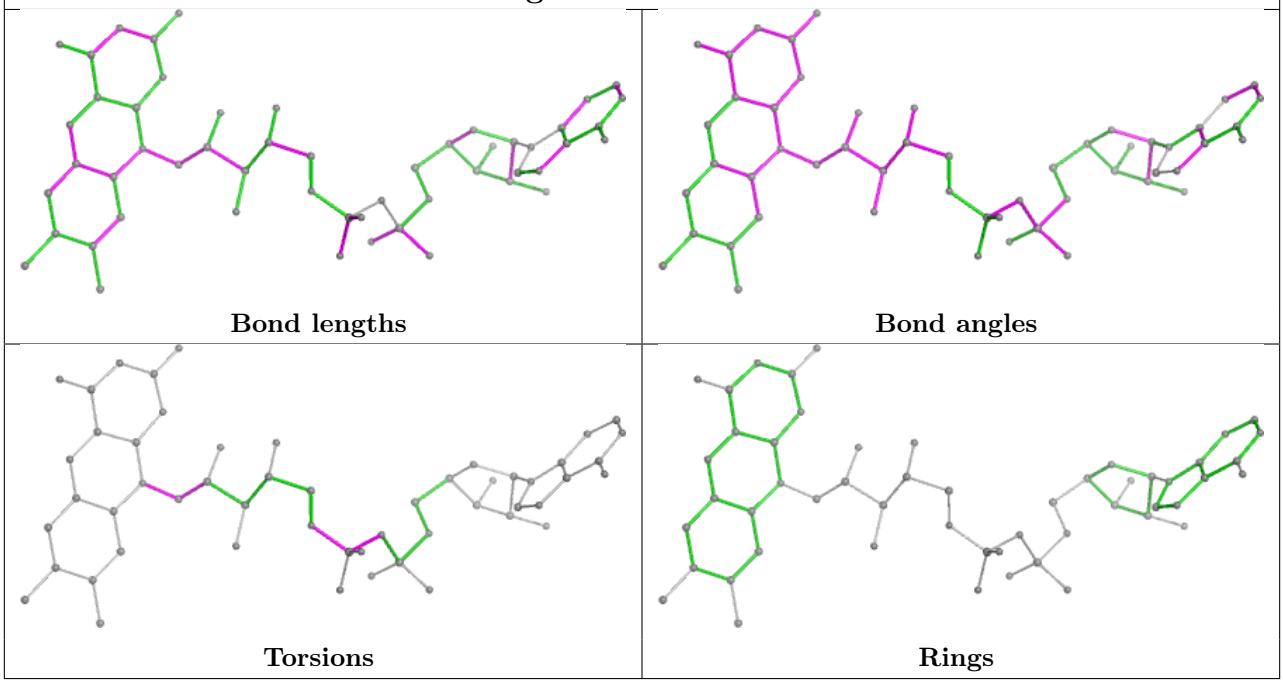
14 monomers are involved in 93 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	502	FAD	16	0
4	G	503	FAD	7	0
2	A	501	GOL	1	0
4	D	502	FAD	11	0
4	A	503	FAD	10	0
3	D	501	LAC	1	0
3	F	502	LAC	1	0
4	F	503	FAD	5	0
2	F	501	GOL	1	0
4	E	503	FAD	8	0
4	H	502	FAD	9	0
4	C	502	FAD	16	0
3	C	501	LAC	3	0
2	E	502	GOL	4	0

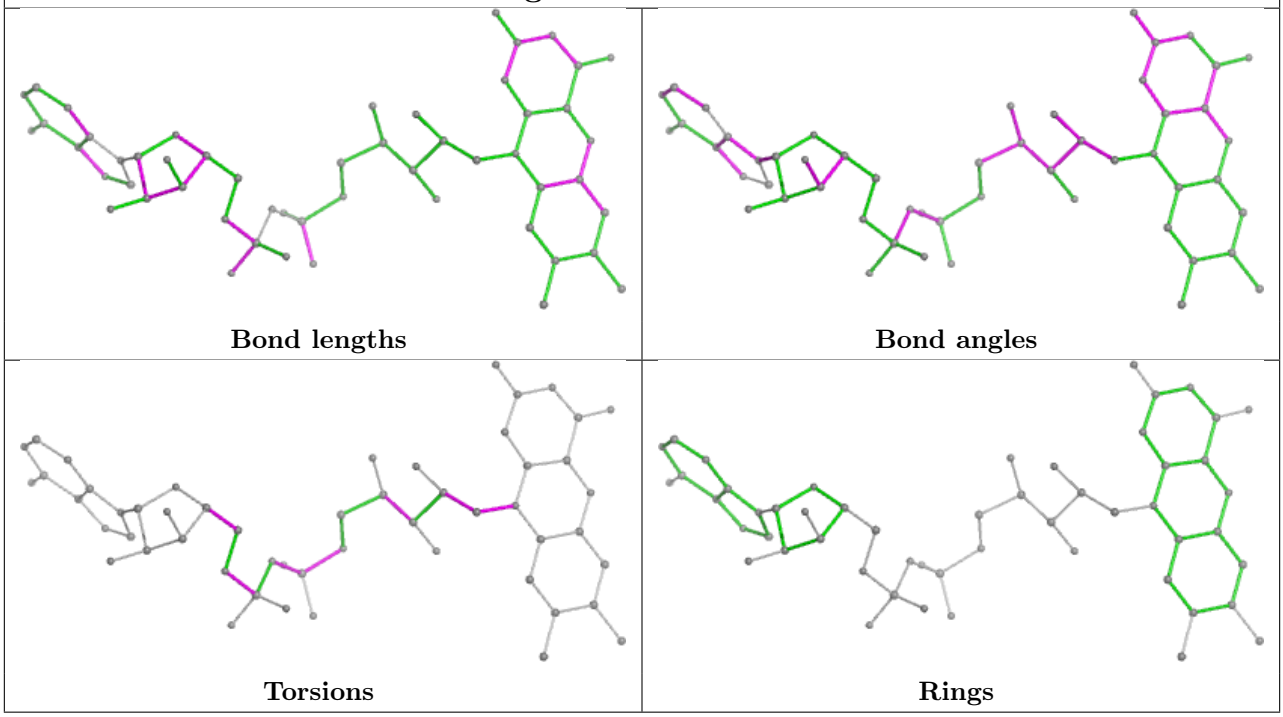
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

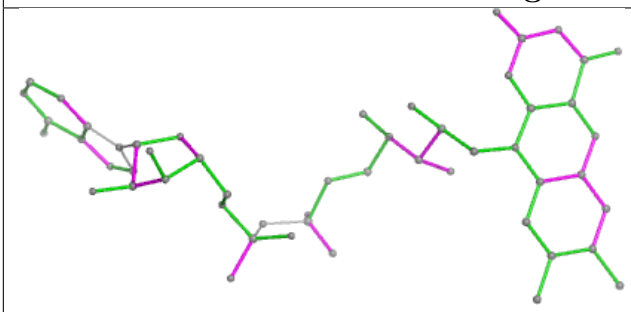
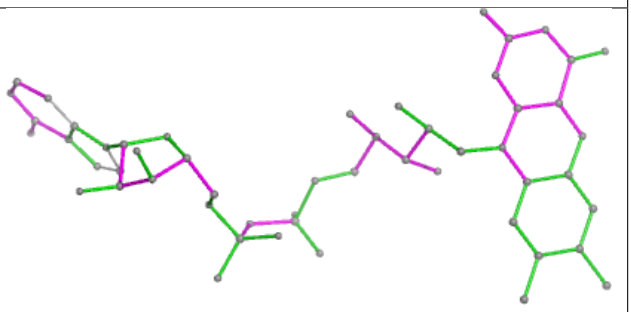
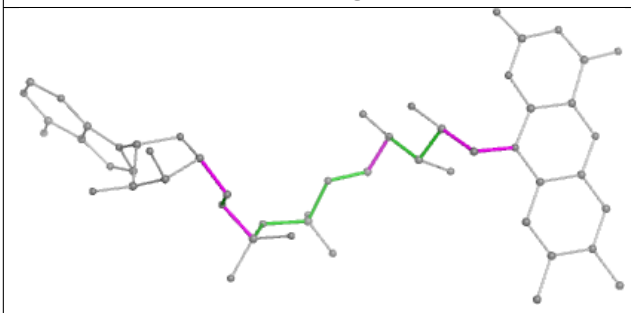
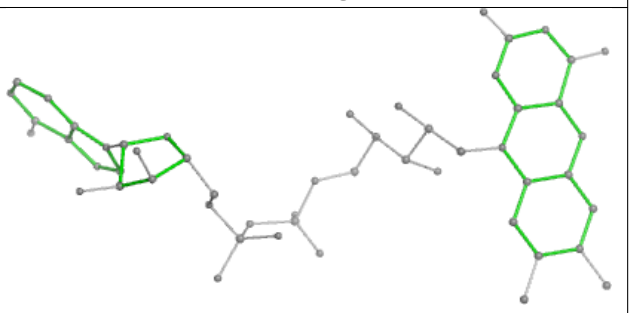
The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

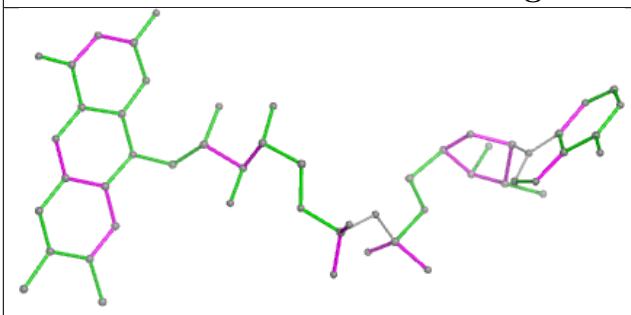
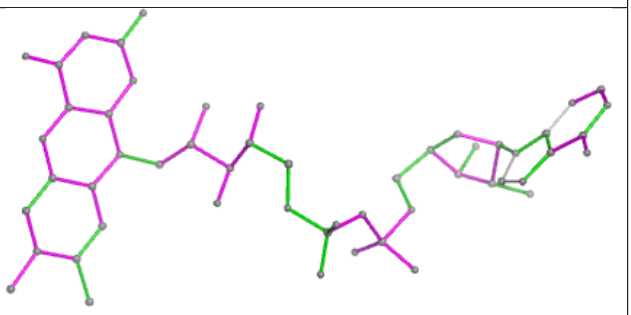
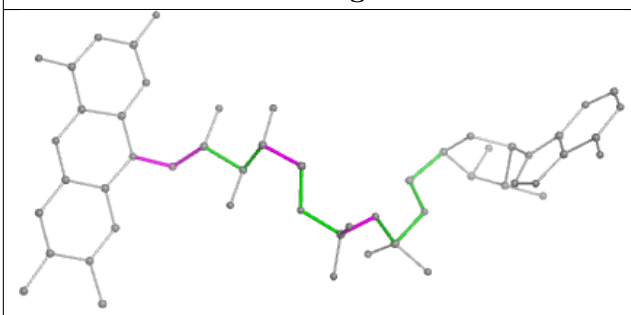
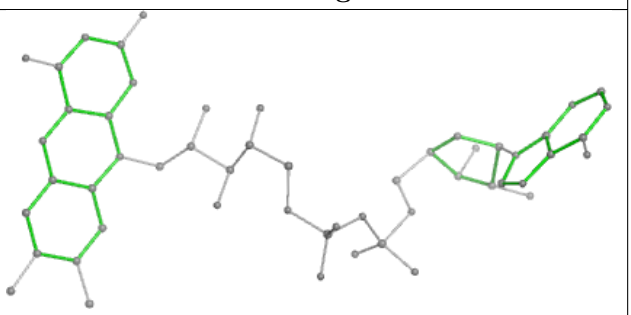
Ligand FAD B 502



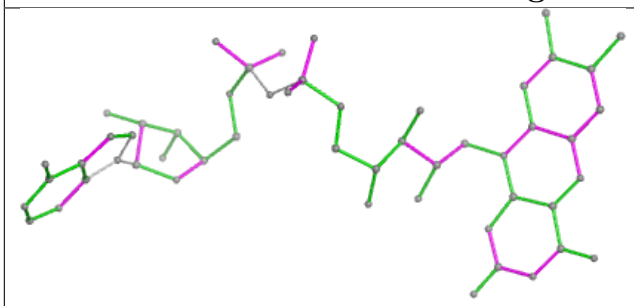
Ligand FAD G 503



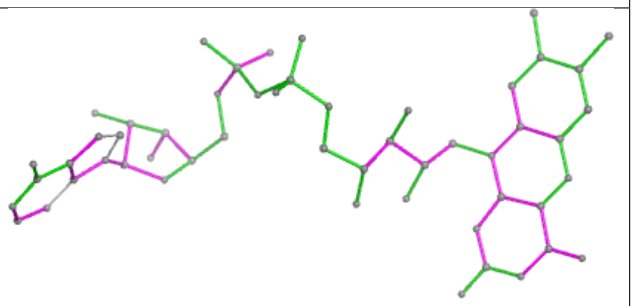
Ligand FAD D 502	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand FAD A 503	
 Bond lengths	 Bond angles
 Torsions	 Rings

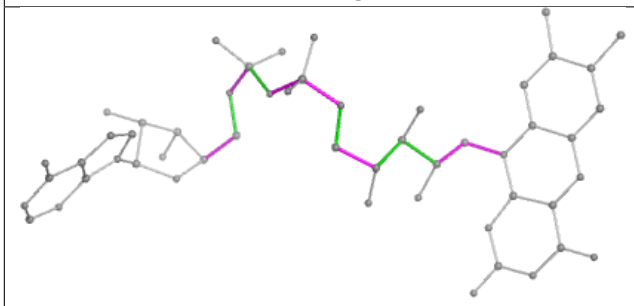
Ligand FAD F 503



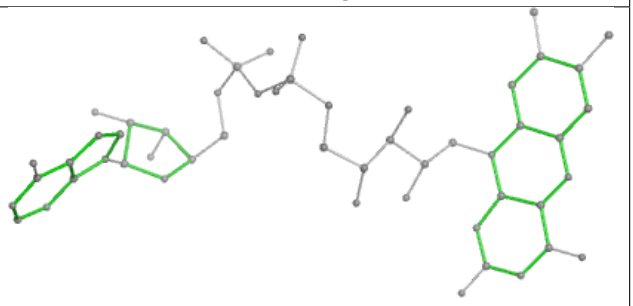
Bond lengths



Bond angles

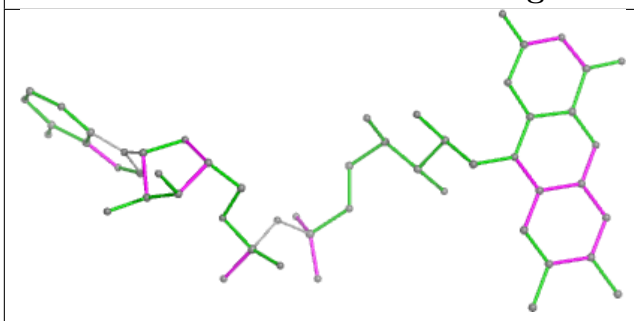


Torsions

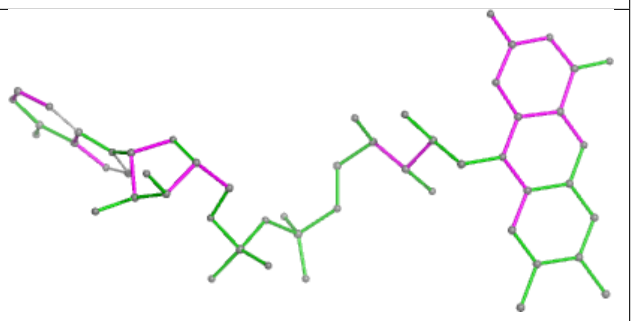


Rings

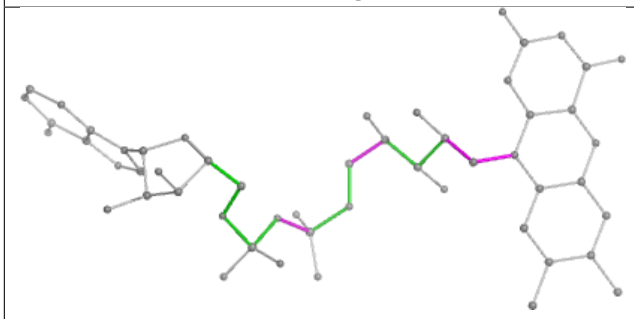
Ligand FAD E 503



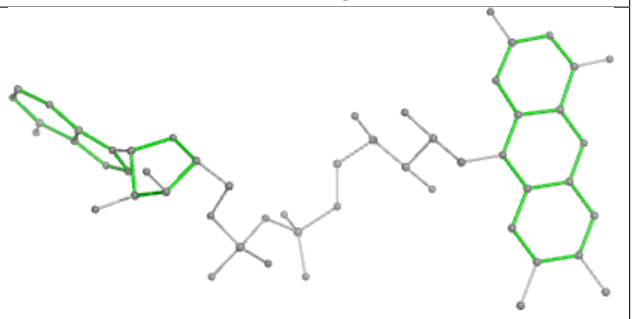
Bond lengths



Bond angles

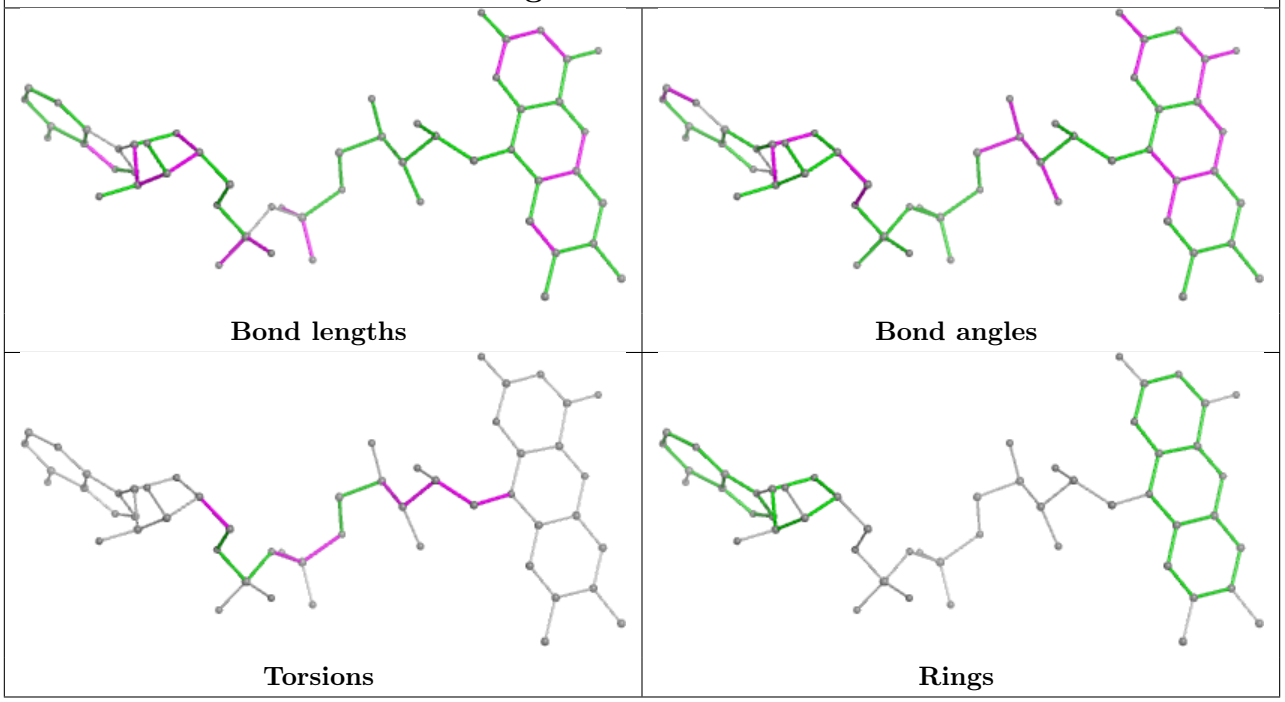


Torsions

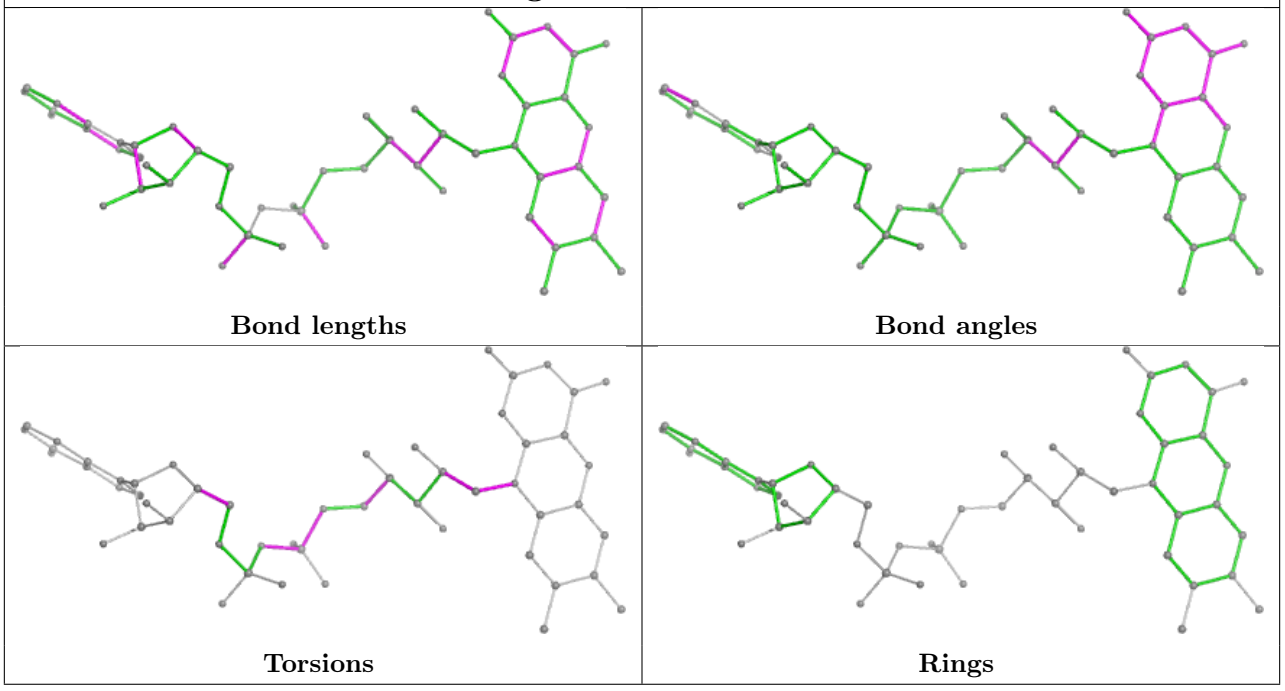


Rings

Ligand FAD H 502



Ligand FAD C 502



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, 95^{th} 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	454/464 (97%)	-0.23	2 (0%) 89 77	27, 53, 102, 122	0
1	B	455/464 (98%)	-0.45	0 100 100	13, 35, 116, 153	0
1	C	454/464 (97%)	-0.16	1 (0%) 92 84	34, 57, 115, 141	0
1	D	454/464 (97%)	-0.51	0 100 100	18, 45, 83, 124	0
1	E	451/464 (97%)	-0.18	2 (0%) 89 77	32, 64, 109, 134	0
1	F	454/464 (97%)	-0.44	1 (0%) 92 84	15, 44, 101, 146	0
1	G	433/464 (93%)	-0.10	3 (0%) 84 68	30, 55, 123, 158	0
1	H	444/464 (95%)	-0.40	2 (0%) 87 74	13, 41, 100, 143	0
All	All	3599/3712 (96%)	-0.31	11 (0%) 90 81	13, 51, 110, 158	0

The worst 5 of 11 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	269	LEU	3.1
1	G	241	SER	3.0
1	G	339	GLU	2.9
1	C	197	GLY	2.6
1	G	374	ASP	2.5

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 oligosaccharides in this entry.

6.4 Ligands (i)

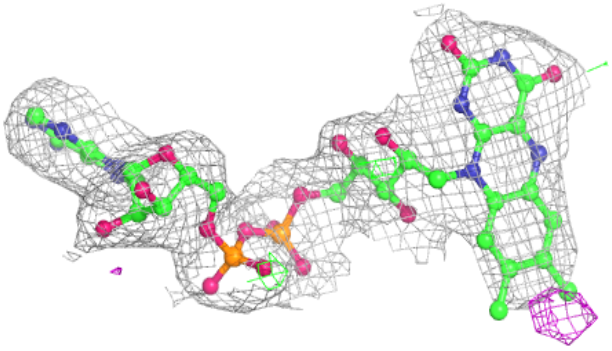
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

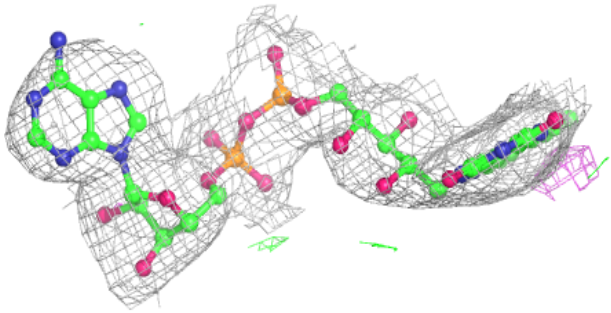
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	GOL	G	501	6/6	0.77	0.11	43,60,72,73	0
3	LAC	B	501	6/6	0.82	0.19	49,55,65,66	0
3	LAC	C	501	6/6	0.87	0.25	57,67,82,82	0
2	GOL	E	502	6/6	0.88	0.15	64,79,87,91	0
2	GOL	F	501	6/6	0.89	0.14	36,47,62,65	0
3	LAC	D	501	6/6	0.89	0.26	35,43,52,54	0
5	FE	E	504	1/1	0.89	0.15	89,89,89,89	0
3	LAC	G	502	6/6	0.90	0.14	65,80,95,95	0
3	LAC	A	502	6/6	0.90	0.14	44,58,66,69	0
2	GOL	A	501	6/6	0.91	0.20	54,66,80,91	0
3	LAC	F	502	6/6	0.91	0.13	38,47,52,61	0
3	LAC	H	501	6/6	0.92	0.12	53,66,81,84	0
5	FE	A	504	1/1	0.94	0.12	80,80,80,80	0
3	LAC	E	501	6/6	0.94	0.23	58,69,80,85	0
4	FAD	C	502	53/53	0.95	0.08	23,40,52,54	0
4	FAD	D	502	53/53	0.96	0.07	23,32,39,44	0
4	FAD	E	503	53/53	0.96	0.06	26,39,49,52	0
4	FAD	F	503	53/53	0.96	0.07	14,25,39,42	0
4	FAD	H	502	53/53	0.96	0.07	17,29,39,44	0
4	FAD	B	502	53/53	0.96	0.08	10,22,35,37	0
4	FAD	A	503	53/53	0.96	0.07	22,33,42,47	0
5	FE	F	504	1/1	0.96	0.21	62,62,62,62	0
4	FAD	G	503	53/53	0.97	0.06	24,38,48,52	0
5	FE	G	504	1/1	0.98	0.06	78,78,78,78	0
5	FE	H	503	1/1	0.99	0.04	63,63,63,63	0

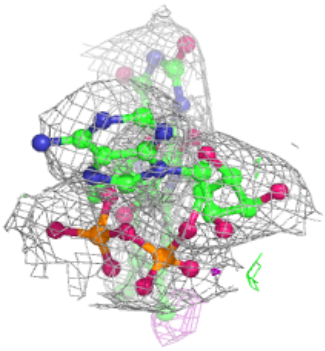
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around FAD C 502:

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

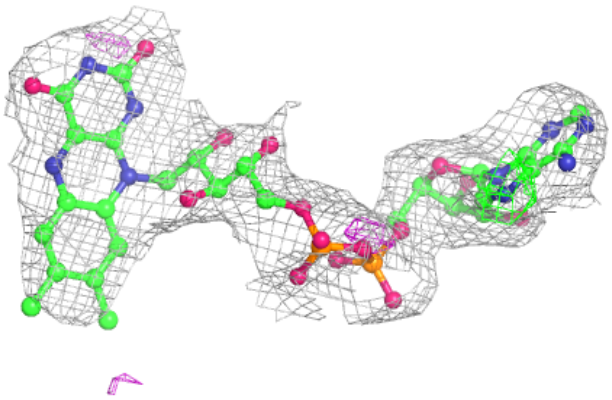


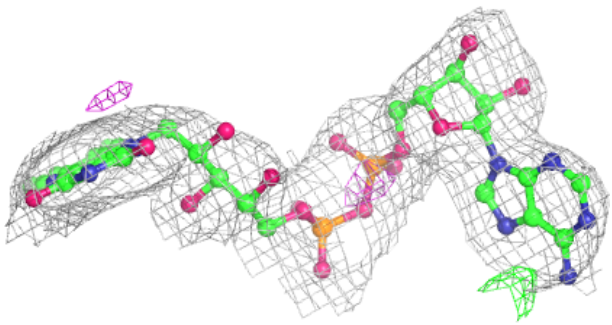


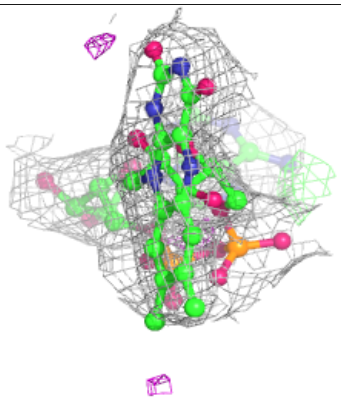


Electron density around FAD D 502:

$2mF_o$-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 E 503:

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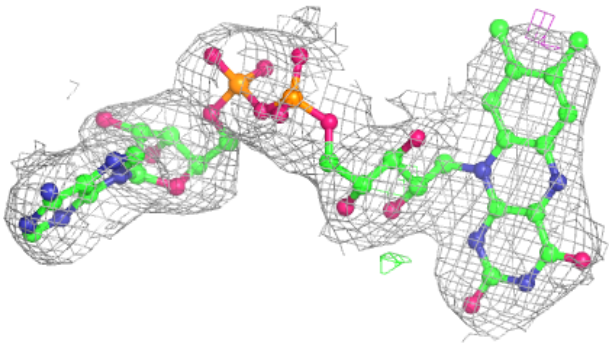
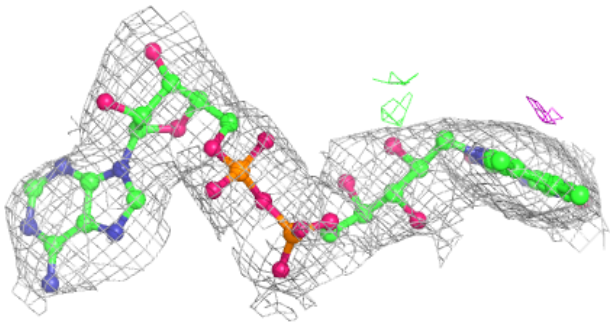
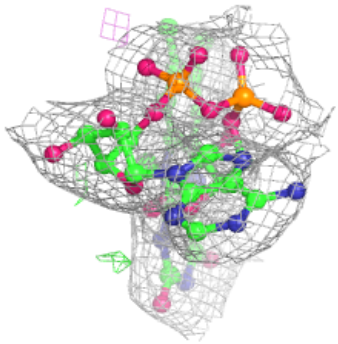
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

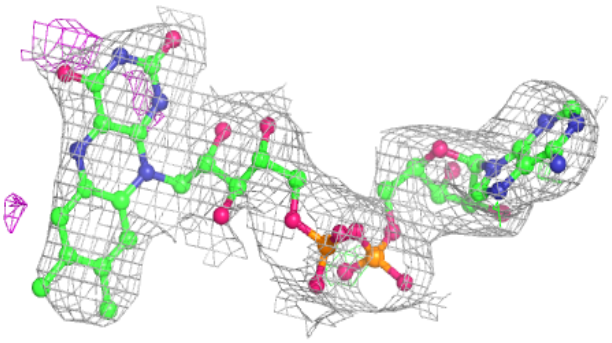


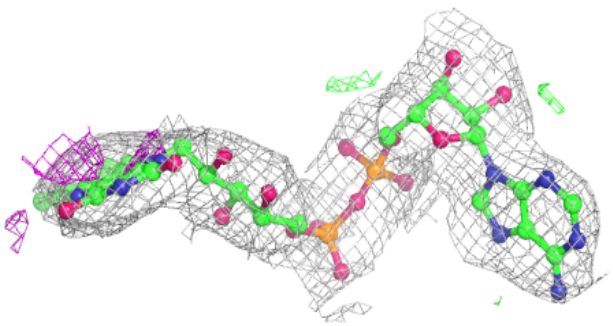


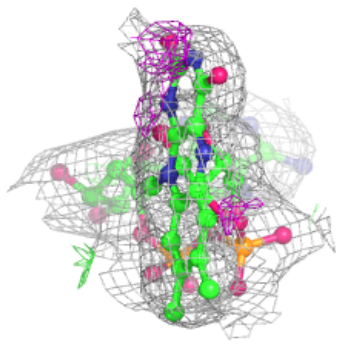


Electron density around FAD F 503:

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

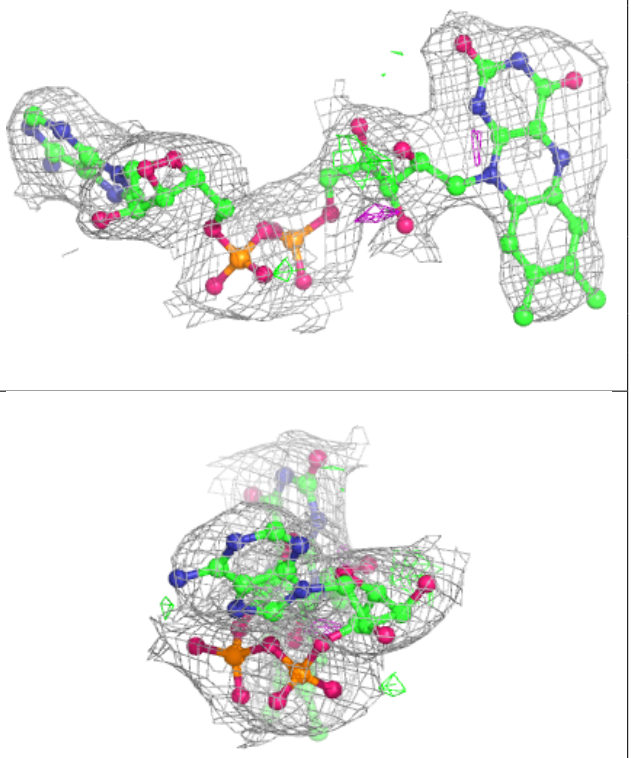






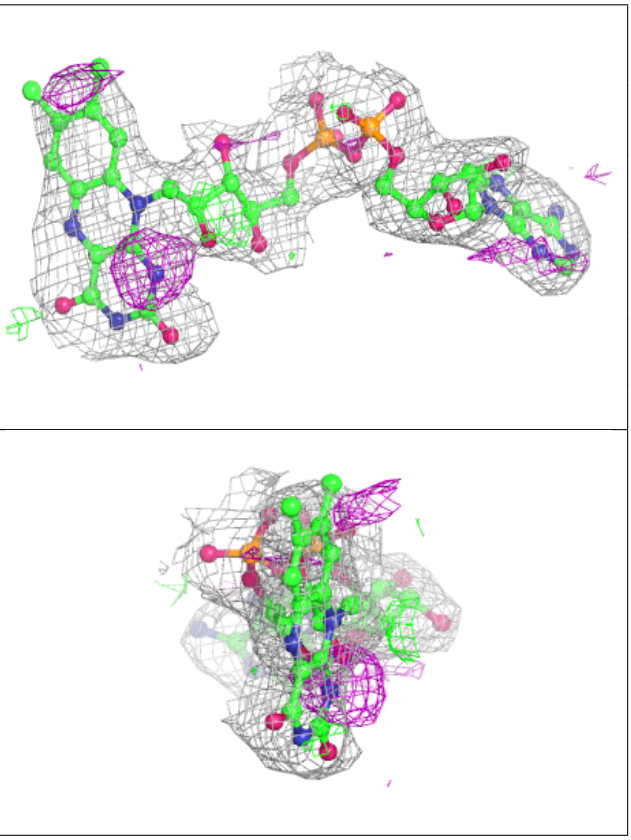
Electron density around FAD H 502:

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



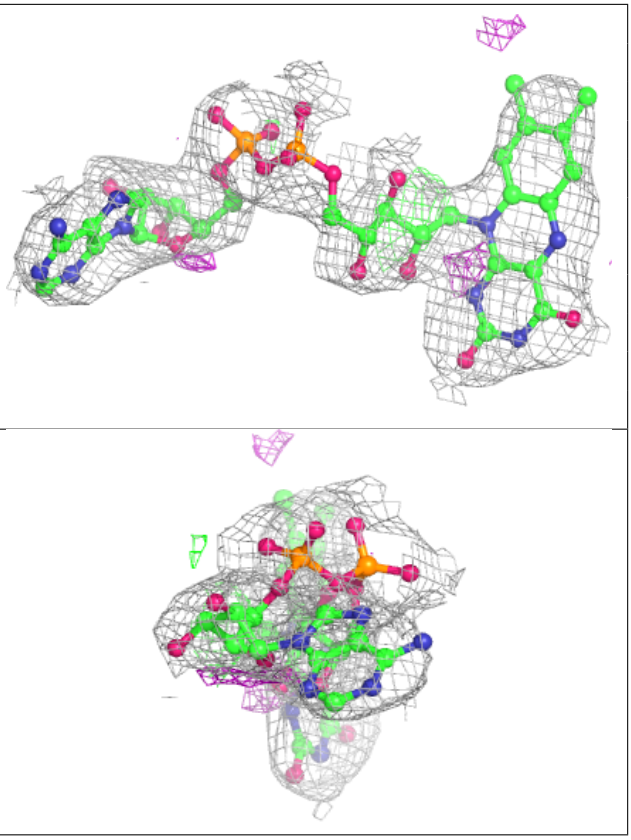
Electron density around FAD B 502:

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



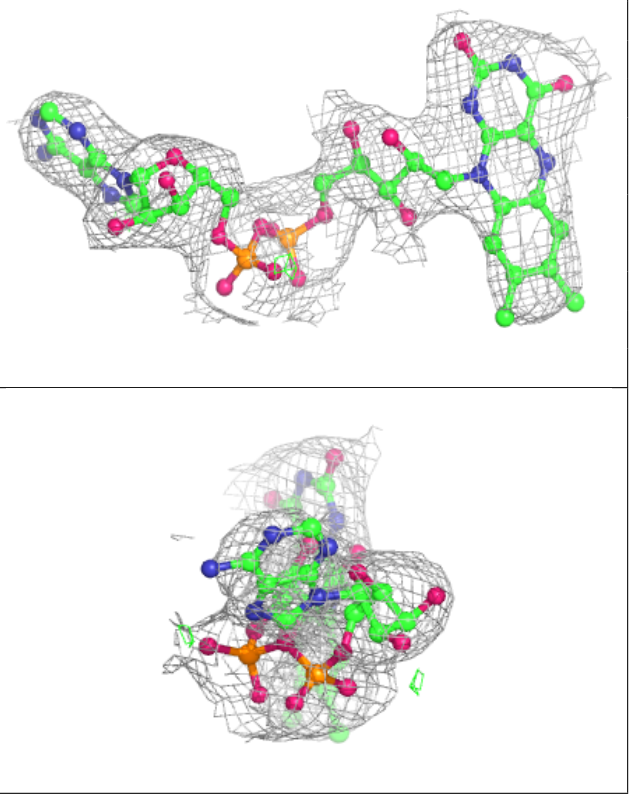
Electron density around FAD A 503:

$2mF_o$-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 G 503:

$2mF_o$-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.