WORLDWIDE PDB

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Full wwPDB X-ray Structure Validation Report ⓘ

Apr 27, 2024 – 09:18 pm BST

PDB ID	:	6F7V
Title	:	Crystal structure of LkcE E64Q mutant in complex with LC-KA05
Authors	:	Dorival, J.; Risser, F.; Jacob, C.; Collin, S.; Drager, G.; Kirschning, A.; Paris, C.; Chagot, B.; Gruez, A.; Weissman, K.J.
Deposited on	:	2017-12-12
Resolution	:	3.03 Å(reported)

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

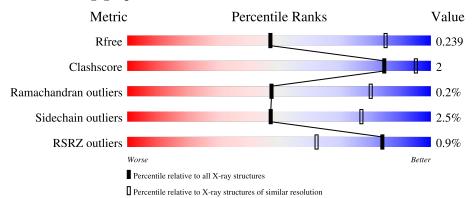|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 3.03 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.

■ 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	2752 (3.08-3.00)
Clashscore	141614	3096 (3.08-3.00)
Ramachandran outliers	138981	2986 (3.08-3.00)
Sidechain outliers	138945	2988 (3.08-3.00)
RSRZ outliers	127900	2636 (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	442	
1	B	442	

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 7122 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.
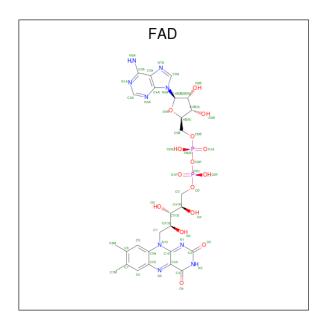
- Molecule 1 is a protein called LkcE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	430	Total 3397	C 2152	N 597	O 634	S 14	0	0	0
1	B	431	Total 3404	C 2157	N 598	O 635	S 14	0	0	0

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	GLY	-	expression tag	UNP G4V2H3
A	-2	PRO	-	expression tag	UNP G4V2H3
A	-1	GLY	-	expression tag	UNP G4V2H3
A	0	SER	-	expression tag	UNP G4V2H3
A	64	GLN	GLU	engineered mutation	UNP G4V2H3
B	-3	GLY	-	expression tag	UNP G4V2H3
B	-2	PRO	-	expression tag	UNP G4V2H3
B	-1	GLY	-	expression tag	UNP G4V2H3
B	0	SER	-	expression tag	UNP G4V2H3
B	64	GLN	GLU	engineered mutation	UNP G4V2H3

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).
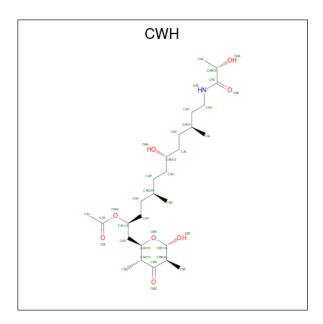
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	B	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

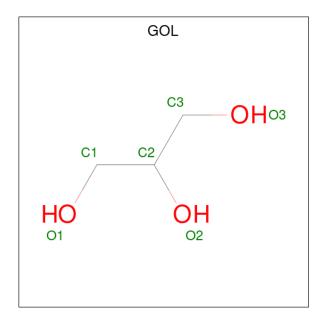| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Ca	0	0
			1	1		

- Molecule 4 is [(2 {S},5 {R},8 {S},11 {S})-1-[(2 {R},3 {R},5 {R},6 {S})-3,5-dimethyl-6-oxid anyl-4-oxidanylidene-oxan-2-yl]-5,11-dimeth yl-8-oxidanyl-13-[[(2 {S})-2-oxidanylpropanoyl] amino]tridecan-2-yl] ethanoate (three-letter code: CWH) (formula: $C_{27}H_{49}NO_8$) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total 36	C 27	N 1	O 8	0	0
4	B	1	Total 36	C 27	N 1	O 8	0	0

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).

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

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	67	Total 67	O 67	0	0
6	B	69	Total 69	O 69	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: LkcE

- Molecule 1: LkcE

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α, β, γ	124.83Å 124.83Å 157.39Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.00 – 3.03 48.90 – 3.03	Depositor EDS
% Data completeness (in resolution range)	99.8 (48.00-3.03) 99.8 (48.90-3.03)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.80 (at 3.01Å)	Xtriage
Refinement program	REFMAC 5.8.0189	Depositor
R, R_{free}	0.191 , 0.247 0.194 , 0.239	Depositor DCC
R_{free} test set	1170 reflections (4.73%)	wwPDB-VP
Wilson B-factor (Å^2)	72.9	Xtriage
Anisotropy	0.360	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 46.6	EDS
L-test for twinning[2]	$< |L| > = 0.49, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	7122	wwPDB-VP
Average B, all atoms (Å^2)	70.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.57% 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: GOL, CA, FAD, CWH

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	0.61	0/3485	0.79	0/4724
1	B	0.60	0/3492	0.78	0/4734
All	All	0.60	0/6977	0.78	0/9458

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	3397	0	3274	15	0
1	B	3404	0	3283	16	0
2	A	53	0	31	2	0
2	B	53	0	31	1	0
3	A	1	0	0	0	0
4	A	36	0	0	1	0
4	B	36	0	0	0	0
5	B	6	0	8	0	0
6	A	67	0	0	1	0
6	B	69	0	0	0	0
All	All	7122	0	6627	31	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 2.

All (31) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:379:HIS:HB2	1:A:437:GLY:HA3	1.91	0.53
1:A:382:GLN:HG2	1:A:438:VAL:HG22	1.90	0.53
1:A:397:THR:HG22	4:A:503:CWH:OBF	2.09	0.53
1:B:332:HIS:HB3	1:B:333:PRO:HD3	1.90	0.53
1:B:304:CYS:SG	1:B:326:ARG:NH1	2.83	0.52
1:B:364:LEU:HD21	2:B:501:FAD:C9	2.41	0.51
1:B:382:GLN:HG2	1:B:438:VAL:HG22	1.93	0.51
1:A:262:LEU:HD13	1:A:276:LEU:HB2	1.93	0.50
1:B:52:THR:HG22	1:B:55:GLY:O	2.11	0.49
1:B:379:HIS:HB2	1:B:437:GLY:HA3	1.95	0.49
1:A:172:HIS:ND1	1:A:321:MET:SD	2.86	0.49
1:A:379:HIS:CB	1:A:437:GLY:HA3	2.43	0.49
1:A:62:GLY:O	1:A:64:GLN:HG2	2.13	0.48
1:B:262:LEU:HD13	1:B:276:LEU:HB2	1.95	0.48
1:A:140:GLN:OE1	1:A:140:GLN:HA	2.14	0.48
1:B:140:GLN:OE1	1:B:140:GLN:HA	2.14	0.47
1:B:316:ARG:HH21	1:B:319:GLU:HG2	1.80	0.46
1:A:62:GLY:HA2	2:A:501:FAD:HM72	1.97	0.46
1:B:74:LEU:O	1:B:78:LEU:HG	2.16	0.46
1:A:430:ARG:NH1	6:A:602:HOH:O	2.48	0.46
1:B:379:HIS:CB	1:B:437:GLY:HA3	2.46	0.46
1:A:44:HIS:HD2	1:A:362:TRP:CD1	2.36	0.43
1:A:63:VAL:HA	2:A:501:FAD:C4X	2.49	0.43
1:B:41:LEU:HD12	1:B:41:LEU:HA	1.90	0.43
1:B:223:ARG:HA	1:B:223:ARG:HD3	1.89	0.42
1:B:52:THR:OG1	1:B:337:VAL:HG13	2.19	0.42
1:A:402:ALA:O	1:A:405:SER:OG	2.33	0.42
1:A:76:ARG:HD3	1:A:76:ARG:HA	1.62	0.41
1:B:44:HIS:HD2	1:B:362:TRP:CD1	2.38	0.41
1:B:123:PHE:CE2	1:B:161:MET:HE1	2.55	0.41
1:A:41:LEU:HD12	1:A:41:LEU:HA	1.95	0.40

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	426/442 (96%)	410 (96%)	15 (4%)	1 (0%)	47	80
1	B	427/442 (97%)	409 (96%)	17 (4%)	1 (0%)	47	80
All	All	853/884 (96%)	819 (96%)	32 (4%)	2 (0%)	47	80

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	299	GLY
1	B	299	GLY

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	363/372 (98%)	351 (97%)	12 (3%)	38	71
1	B	364/372 (98%)	358 (98%)	6 (2%)	62	85
All	All	727/744 (98%)	709 (98%)	18 (2%)	47	77

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	9	ARG
1	A	56	THR
1	A	64	GLN
1	A	76	ARG

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Mol	Chain	Res	Type
1	A	97	PRO
1	A	114	GLU
1	A	118	GLU
1	A	155	SER
1	A	208	HIS
1	A	210	TYR
1	A	314	LEU
1	A	382	GLN
1	B	97	PRO
1	B	210	TYR
1	B	269	ASP
1	B	334	TYR
1	B	339	SER
1	B	382	GLN

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

5.3.3   RNA ⓘ

There are no RNA molecules in this entry.

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

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 6 ligands modelled in this entry, 1 is monoatomic - leaving 5 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	CWH	A	503	-	36,36,36	1.73	5 (13%)	43,48,48	1.52	8 (18%)
2	FAD	A	501	-	53,58,58	1.34	7 (13%)	68,89,89	1.66	14 (20%)
4	CWH	B	502	-	36,36,36	1.52	4 (11%)	43,48,48	1.35	8 (18%)
5	GOL	B	503	-	5,5,5	0.69	0	5,5,5	0.30	0
2	FAD	B	501	-	53,58,58	1.44	6 (11%)	68,89,89	1.58	17 (25%)

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	CWH	A	503	-	-	11/33/53/53	0/1/1/1
2	FAD	A	501	-	-	4/30/50/50	0/6/6/6
4	CWH	B	502	-	-	10/33/53/53	0/1/1/1
5	GOL	B	503	-	-	2/4/4/4	-
2	FAD	B	501	-	-	5/30/50/50	0/6/6/6

All (22) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	503	CWH	CBB-CBA	-5.60	1.42	1.51
2	B	501	FAD	C9A-C5X	5.43	1.50	1.41
4	A	503	CWH	CAZ-CBA	-5.20	1.43	1.51
4	B	502	CWH	CAZ-CBA	-5.04	1.43	1.51
4	B	502	CWH	CBB-CBA	-4.40	1.44	1.51
2	A	501	FAD	C9A-C5X	4.11	1.48	1.41
2	A	501	FAD	C5X-N5	-3.72	1.32	1.39
2	B	501	FAD	C5X-N5	-3.32	1.33	1.39
2	A	501	FAD	C4-N3	-3.26	1.32	1.38
2	A	501	FAD	C8-C7	3.05	1.48	1.40
2	B	501	FAD	C8-C7	2.94	1.48	1.40
4	A	503	CWH	OBH-CAY	2.70	1.50	1.44
4	B	502	CWH	CAV-CAU	2.60	1.58	1.52
2	B	501	FAD	C4-N3	-2.52	1.34	1.38
2	A	501	FAD	C2-N3	-2.31	1.33	1.39
4	B	502	CWH	OBH-CAY	2.28	1.49	1.44
4	A	503	CWH	CAV-CAU	2.25	1.57	1.52
2	B	501	FAD	C10-N10	2.22	1.42	1.37
2	B	501	FAD	C1'-C2'	-2.22	1.49	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	FAD	C5A-C4A	2.15	1.46	1.40
4	A	503	CWH	CAO-CAP	2.03	1.58	1.53
2	A	501	FAD	O4-C4	2.01	1.27	1.23

All (47) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	501	FAD	N3A-C2A-N1A	-5.15	120.63	128.68
2	B	501	FAD	N3A-C2A-N1A	-4.85	121.10	128.68
4	A	503	CWH	OAW-CAX-CBJ	4.24	118.90	111.09
2	A	501	FAD	C1B-N9A-C4A	-3.93	119.74	126.64
4	A	503	CWH	OAN-CAM-CAL	-3.77	98.43	109.21
2	B	501	FAD	C4X-C10-N1	-3.32	117.03	124.73
2	A	501	FAD	C4X-C10-N1	-3.31	117.04	124.73
2	B	501	FAD	C1B-N9A-C4A	-3.23	120.96	126.64
2	A	501	FAD	C4X-C10-N10	3.09	121.00	116.48
4	A	503	CWH	CAL-CAK-CAI	-3.07	102.65	115.27
2	A	501	FAD	C2A-N1A-C6A	3.03	123.94	118.75
2	B	501	FAD	O5'-C5'-C4'	-2.99	101.39	109.36
4	B	502	CWH	CAP-CAO-CAM	2.96	119.41	113.11
4	A	503	CWH	CBB-CBA-CAZ	2.90	120.11	116.39
2	B	501	FAD	O2'-C2'-C1'	-2.86	102.88	109.80
4	A	503	CWH	CAL-CAM-CAO	2.84	120.35	113.83
2	B	501	FAD	C5X-N5-C4X	2.82	122.77	118.07
4	B	502	CWH	OAN-CAM-CAL	-2.78	101.26	109.21
2	A	501	FAD	C10-N1-C2	2.71	122.32	116.90
2	B	501	FAD	C9-C9A-N10	2.70	125.49	121.84
2	A	501	FAD	O2'-C2'-C1'	-2.64	103.42	109.80
4	B	502	CWH	CBE-CBB-CBA	2.63	117.10	111.68
2	B	501	FAD	P-O3P-PA	-2.58	123.96	132.83
2	B	501	FAD	C10-N1-C2	2.57	122.05	116.90
2	A	501	FAD	C9-C9A-N10	2.52	125.25	121.84
2	B	501	FAD	O4-C4-C4X	-2.50	119.98	126.60
4	A	503	CWH	CAT-CAS-CAQ	-2.49	105.03	115.27
2	A	501	FAD	C10-C4X-N5	-2.45	119.65	124.86
2	B	501	FAD	N10-C10-N1	2.44	125.37	118.35
2	A	501	FAD	O2-C2-N1	-2.44	117.78	121.83
2	B	501	FAD	O2B-C2B-C3B	2.42	119.64	111.82
4	B	502	CWH	OAW-CAX-CBJ	2.41	115.52	111.09
2	A	501	FAD	P-O3P-PA	-2.28	125.00	132.83
2	B	501	FAD	O4'-C4'-C3'	2.27	114.61	109.10
2	A	501	FAD	C4-C4X-N5	2.27	121.46	118.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	FAD	C6-C5X-C9A	2.26	122.14	118.94
4	B	502	CWH	CAS-CAT-CAU	-2.24	109.87	114.03
4	B	502	CWH	CBB-CBA-CAZ	2.20	119.20	116.39
2	B	501	FAD	C9A-C5X-N5	-2.19	120.05	122.43
4	A	503	CWH	CAV-CAU-CAT	2.18	116.20	112.91
4	A	503	CWH	CBC-OBH-CAY	2.18	117.77	113.66
4	B	502	CWH	CAL-CAK-CAI	-2.15	106.45	115.27
2	B	501	FAD	C4X-C4-N3	2.15	118.64	113.19
4	B	502	CWH	CBE-CBB-CBC	-2.13	109.32	112.84
2	A	501	FAD	C5X-N5-C4X	2.13	121.61	118.07
2	B	501	FAD	C2A-N1A-C6A	2.12	122.39	118.75
2	B	501	FAD	C6-C5X-C9A	2.06	121.85	118.94

There are no chirality outliers.

All (32) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	FAD	N10-C1'-C2'-O2'
2	A	501	FAD	N10-C1'-C2'-C3'
2	B	501	FAD	N10-C1'-C2'-O2'
2	B	501	FAD	N10-C1'-C2'-C3'
4	A	503	CWH	OAW-CAU-CAV-CAY
4	A	503	CWH	CAT-CAU-CAV-CAY
4	A	503	CWH	CAS-CAT-CAU-OAW
4	A	503	CWH	OBI-CAX-OAW-CAU
4	A	503	CWH	CBJ-CAX-OAW-CAU
4	A	503	CWH	CAK-CAL-CAM-CAO
4	A	503	CWH	CAG-CAH-CAI-CAJ
4	B	502	CWH	OAW-CAU-CAV-CAY
4	B	502	CWH	CAT-CAU-CAV-CAY
4	B	502	CWH	OBI-CAX-OAW-CAU
4	B	502	CWH	CBJ-CAX-OAW-CAU
4	B	502	CWH	CAG-CAH-CAI-CAJ
5	B	503	GOL	C1-C2-C3-O3
4	A	503	CWH	CAS-CAT-CAU-CAV
5	B	503	GOL	O2-C2-C3-O3
4	A	503	CWH	OAN-CAM-CAO-CAP
2	A	501	FAD	PA-O3P-P-O5'
2	B	501	FAD	O4B-C4B-C5B-O5B
4	B	502	CWH	CAM-CAO-CAP-CAQ
4	A	503	CWH	CAL-CAM-CAO-CAP
4	B	502	CWH	CAL-CAM-CAO-CAP

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Mol	Chain	Res	Type	Atoms
4	B	502	CWH	CAK-CAL-CAM-CAO
2	A	501	FAD	O4B-C4B-C5B-O5B
2	B	501	FAD	C3B-C4B-C5B-O5B
2	B	501	FAD	C5'-O5'-P-O1P
4	A	503	CWH	CAH-CAI-CAK-CAL
4	B	502	CWH	OAN-CAM-CAO-CAP
4	B	502	CWH	CAK-CAL-CAM-OAN

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	503	CWH	1	0
2	A	501	FAD	2	0
2	B	501	FAD	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 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.
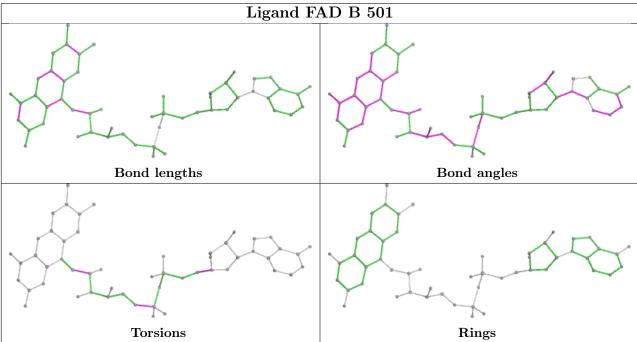
Ligand CWH A 503

Bond lengths

Bond angles

Torsions

Rings

Ligand FAD A 501

Bond lengths

Bond angles

Torsions

Rings

Ligand CWH B 502

| Bond lengths | Bond angles |

| Torsions | Rings |

Ligand FAD B 501

| Bond lengths | Bond angles |

| Torsions | Rings |

5.7　Other polymers ⓘ

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(Å²)	Q<0.9
1	A	430/442 (97%)	-0.12	3 (0%)	87	69	40, 72, 106, 142	0
1	B	431/442 (97%)	-0.11	5 (1%)	79	53	39, 63, 95, 125	0
All	All	861/884 (97%)	-0.11	8 (0%)	84	62	39, 68, 103, 142	0

All (8) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	268	SER	4.2
1	A	5	GLU	2.7
1	B	99	GLU	2.5
1	A	4	VAL	2.4
1	B	267	THR	2.4
1	A	250	ASP	2.1
1	B	5	GLU	2.1
1	B	96	PHE	2.1

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 ⓘ

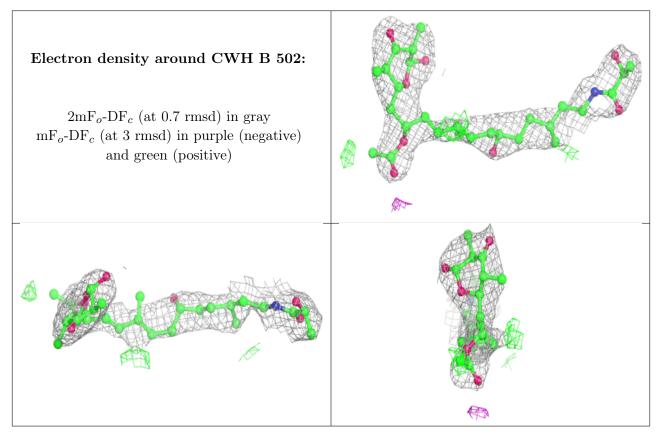There are no monosaccharides in this entry.

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
5	GOL	B	503	6/6	0.82	0.21	61,76,82,84	0
4	CWH	B	502	36/36	0.92	0.26	71,80,97,104	0
4	CWH	A	503	36/36	0.92	0.25	54,66,95,99	0
2	FAD	A	501	53/53	0.95	0.20	50,64,96,101	0
3	CA	A	502	1/1	0.97	0.81	129,129,129,129	1
2	FAD	B	501	53/53	0.97	0.17	48,59,68,74	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.
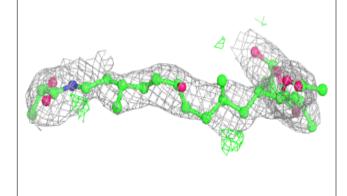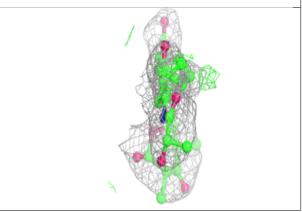

Electron density around CWH B 502:

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

Electron density around CWH 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)

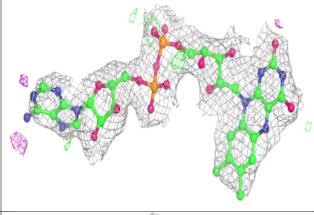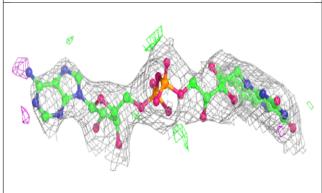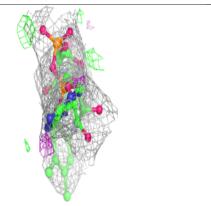Electron density around FAD A 501:

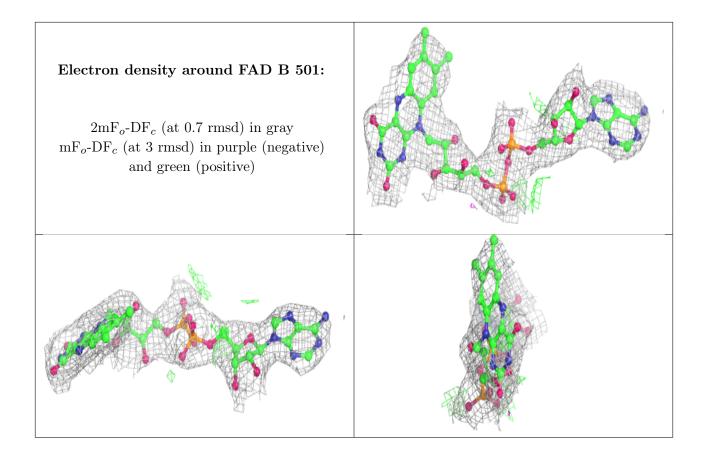2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around FAD B 501:

$2mF_o$-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.