



wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 15, 2017 – 03:42 am GMT

PDB ID : 1Y9D
Title : Pyruvate Oxidase variant V265A from *Lactobacillus plantarum*
Authors : Wille, G.; Ritter, M.; Weiss, M.S.; Konig, S.; Mantele, W.; Hubner, G.
Deposited on : 2004-12-15
Resolution : 2.20 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

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity	:	4.02b-467
Mogul	:	1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix)	:	1.9-1692
EDS	:	trunk28620
Percentile statistics	:	20161228.v01 (using entries in the PDB archive December 28th 2016)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	recalc28949

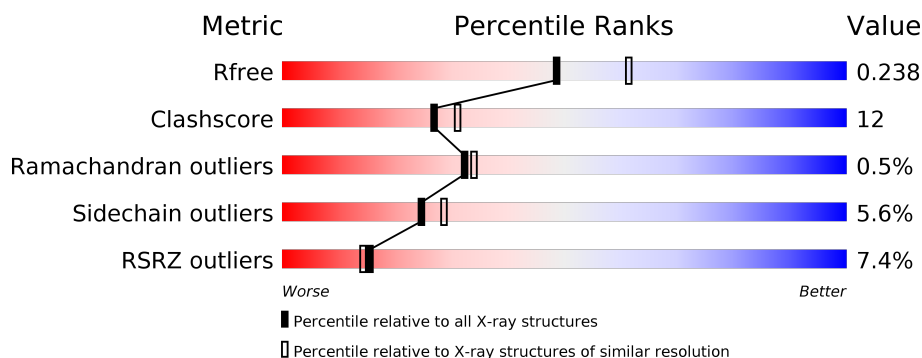
1 Overall quality at a glance

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	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	100719	4002 (2.20-2.20)
Clashscore	112137	4730 (2.20-2.20)
Ramachandran outliers	110173	4656 (2.20-2.20)
Sidechain outliers	110143	4657 (2.20-2.20)
RSRZ outliers	101464	4033 (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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	603	<div> <div>9%</div> <div> <div></div> <div>73%</div> <div>16%</div> <div>• 7%</div> </div> </div>
1	B	603	<div> <div>5%</div> <div> <div></div> <div>73%</div> <div>18%</div> <div>• 5%</div> </div> </div>
1	C	603	<div> <div>7%</div> <div> <div></div> <div>73%</div> <div>17%</div> <div>• 8%</div> </div> </div>
1	D	603	<div> <div>7%</div> <div> <div></div> <div>72%</div> <div>18%</div> <div>• 7%</div> </div> </div>

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 19404 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 Pyruvate oxidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	558	Total	C	N	O	S	0	0	0
			4298	2722	746	818	12			
1	B	572	Total	C	N	O	S	0	0	0
			4423	2804	767	839	13			
1	C	556	Total	C	N	O	S	0	0	0
			4282	2711	744	815	12			
1	D	560	Total	C	N	O	S	0	0	0
			4315	2732	748	823	12			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	265	ALA	VAL	ENGINEERED	UNP P37063
B	265	ALA	VAL	ENGINEERED	UNP P37063
C	265	ALA	VAL	ENGINEERED	UNP P37063
D	265	ALA	VAL	ENGINEERED	UNP P37063

- Molecule 2 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	1	Total	Mg	0	0
			1	1		
2	A	1	Total	Mg	0	0
			1	1		
2	D	1	Total	Mg	0	0
			1	1		
2	C	1	Total	Mg	0	0
			1	1		

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O₄S).

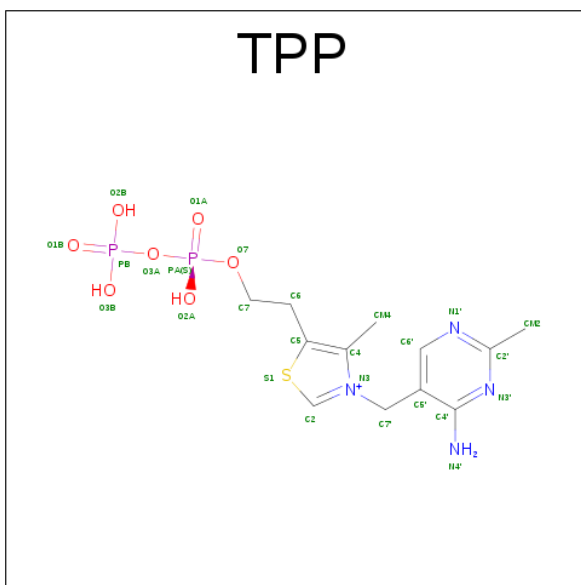


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	C	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	A	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0

- Molecule 4 is SODIUM ION (three-letter code: NA) (formula: Na).

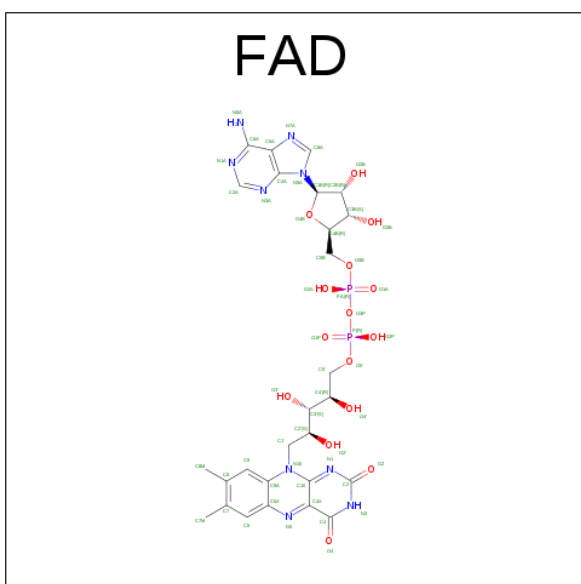
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total Na 1 1	0	0
4	A	1	Total Na 1 1	0	0

- Molecule 5 is THIAMINE DIPHOSPHATE (three-letter code: TPP) (formula: C₁₂H₁₉N₄O₇P₂S).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
5	A	1	Total 26	C 12	N 4	O 7	P 2	S 1	0	0
5	B	1	Total 26	C 12	N 4	O 7	P 2	S 1	0	0
5	C	1	Total 26	C 12	N 4	O 7	P 2	S 1	0	0
5	D	1	Total 26	C 12	N 4	O 7	P 2	S 1	0	0

- Molecule 6 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $\text{C}_{27}\text{H}_{33}\text{N}_9\text{O}_{15}\text{P}_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	A	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
6	B	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
6	C	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
6	D	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

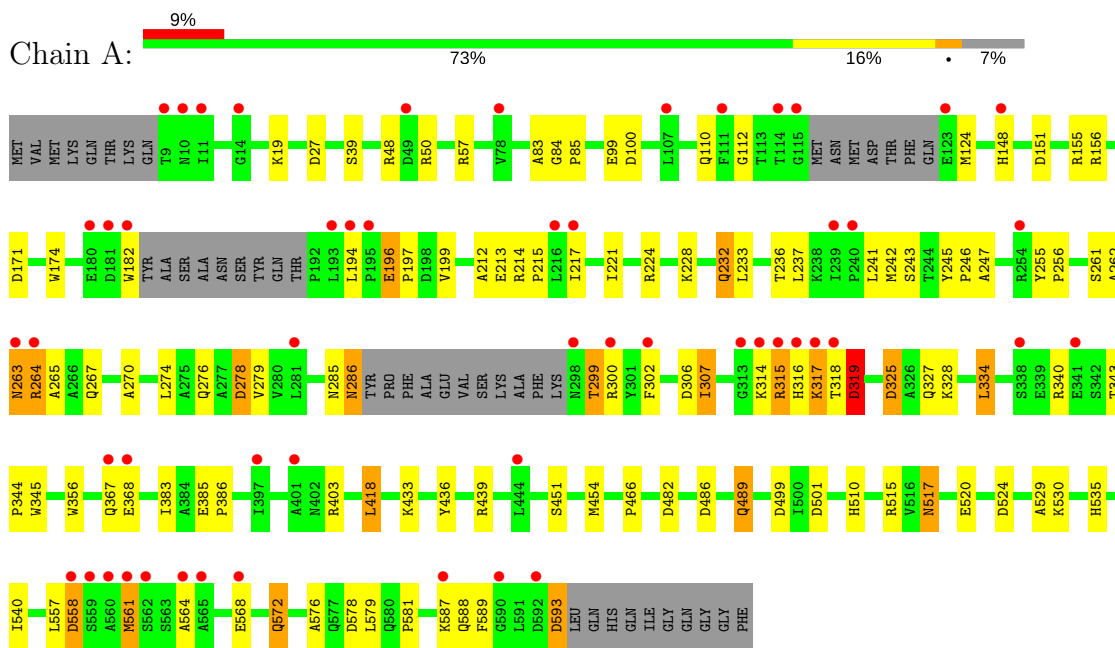
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	402	Total	O	0	0
			402	402		
7	B	532	Total	O	0	0
			532	532		
7	C	426	Total	O	0	0
			426	426		
7	D	488	Total	O	0	0
			488	488		

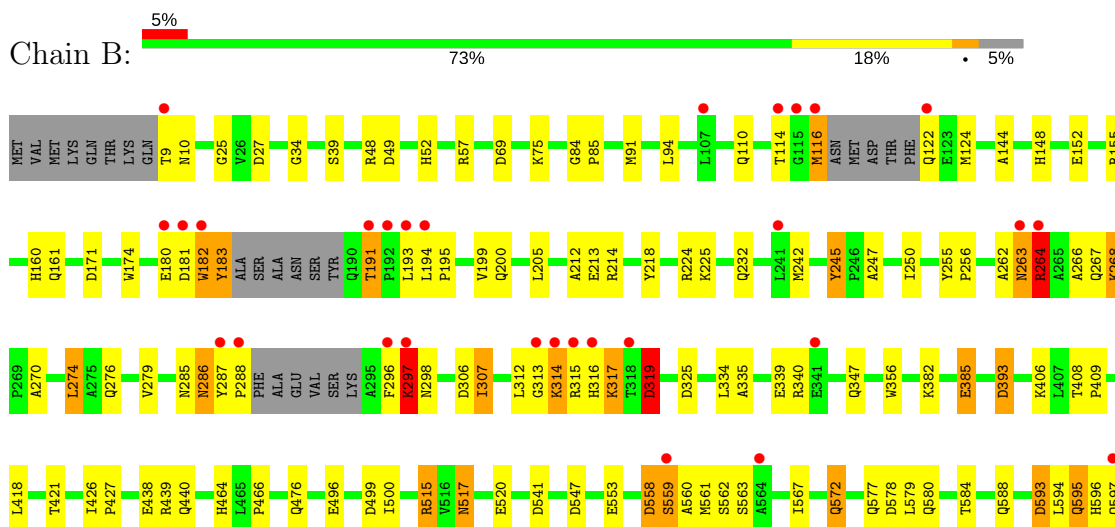
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: Pyruvate oxidase

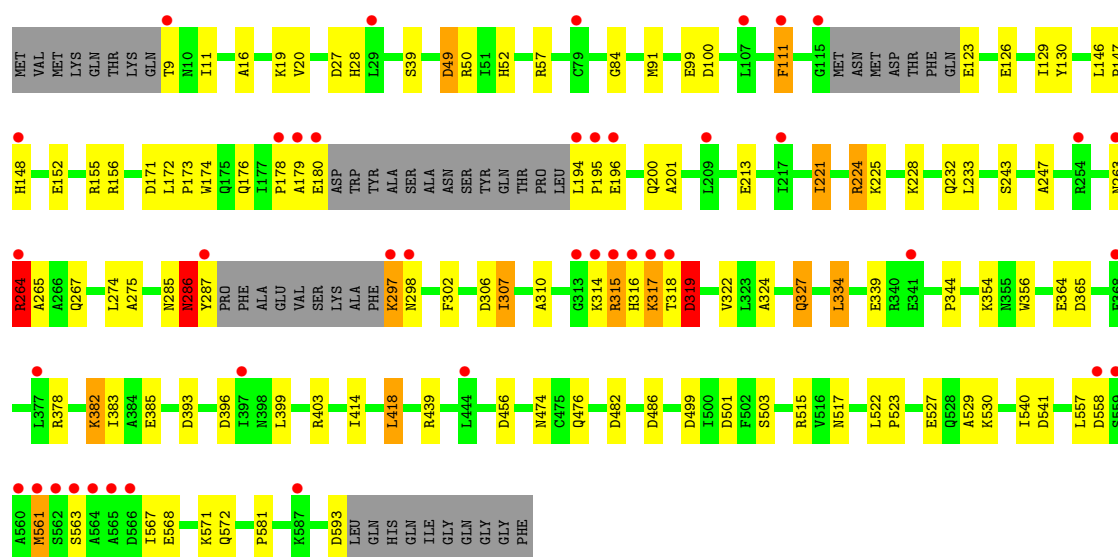
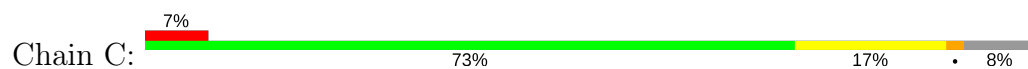


• Molecule 1: Pyruvate oxidase

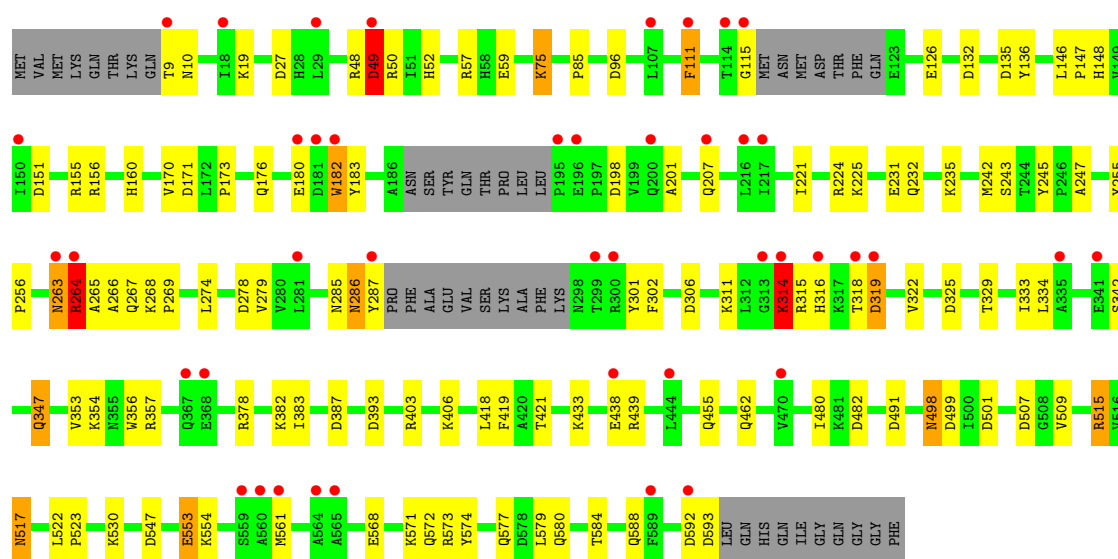
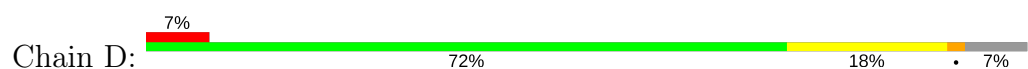


ILE
GLY
GLN
GLY
GLY
PHE

• Molecule 1: Pyruvate oxidase



• Molecule 1: Pyruvate oxidase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	94.66Å 155.78Å 100.75Å 90.00° 92.92° 90.00°	Depositor
Resolution (Å)	27.30 – 2.20 27.32 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.7 (27.30-2.20) 99.7 (27.32-2.20)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.48 (at 2.20Å)	Xtriage
Refinement program	REFMAC 5.2.0003	Depositor
R, R_{free}	0.178 , 0.238 0.179 , 0.238	Depositor DCC
R_{free} test set	7369 reflections (5.28%)	DCC
Wilson B-factor (Å ²)	39.5	Xtriage
Anisotropy	0.048	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 61.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.027 for h,-k,-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	19404	wwPDB-VP
Average B, all atoms (Å ²)	46.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.42% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: NA, MG, SO4, FAD, TPP

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	0.74	0/4383	0.89	14/5964 (0.2%)
1	B	0.92	2/4513 (0.0%)	0.94	16/6141 (0.3%)
1	C	0.82	0/4365	0.90	14/5937 (0.2%)
1	D	0.82	1/4401 (0.0%)	0.91	24/5988 (0.4%)
All	All	0.83	3/17662 (0.0%)	0.91	68/24030 (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	1
1	B	0	2
1	C	0	2
1	D	0	1
All	All	0	6

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	268	LYS	CE-NZ	7.43	1.67	1.49
1	B	268	LYS	CD-CE	5.81	1.65	1.51
1	D	182	TRP	CB-CG	5.10	1.59	1.50

The worst 5 of 68 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	27	ASP	CB-CG-OD2	8.35	125.81	118.30
1	D	27	ASP	CB-CG-OD2	8.10	125.59	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	439	ARG	NE-CZ-NH2	-8.06	116.27	120.30
1	A	524	ASP	CB-CG-OD2	7.47	125.03	118.30
1	D	491	ASP	CB-CG-OD2	6.92	124.52	118.30

There are no chirality outliers.

5 of 6 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	264	ARG	Peptide
1	B	264	ARG	Peptide
1	B	312	LEU	Peptide
1	C	264	ARG	Peptide
1	C	265	ALA	Peptide

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	4298	0	4260	97	0
1	B	4423	0	4377	116	0
1	C	4282	0	4249	94	0
1	D	4315	0	4264	99	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	5	0	0	0	0
3	B	5	0	0	0	0
3	C	5	0	0	0	0
3	D	5	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
5	A	26	0	16	0	0
5	B	26	0	16	1	0
5	C	26	0	16	0	0
5	D	26	0	16	1	0
6	A	27	0	12	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	B	27	0	12	1	0
6	C	27	0	12	1	0
6	D	27	0	12	1	0
7	A	402	0	0	37	0
7	B	532	0	0	46	0
7	C	426	0	0	25	0
7	D	488	0	0	40	0
All	All	19404	0	17262	401	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 12.

The worst 5 of 401 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:B:268:LYS:NZ	1:B:268:LYS:CE	1.67	1.53
1:B:286:ASN:HB2	7:B:3415:HOH:O	1.16	1.32
1:D:318:THR:HG22	7:D:3379:HOH:O	1.39	1.23
1:A:155:ARG:HD3	7:A:3196:HOH:O	1.53	1.08
7:A:3092:HOH:O	1:B:155:ARG:HD3	1.55	1.07

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	550/603 (91%)	529 (96%)	19 (4%)	2 (0%)	38	41
1	B	564/603 (94%)	537 (95%)	20 (4%)	7 (1%)	15	12
1	C	548/603 (91%)	517 (94%)	30 (6%)	1 (0%)	51	58
1	D	552/603 (92%)	530 (96%)	21 (4%)	1 (0%)	51	58

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	2214/2412 (92%)	2113 (95%)	90 (4%)	11 (0%)	32	34

5 of 11 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	263	ASN
1	B	10	ASN
1	B	263	ASN
1	B	314	LYS
1	B	317	LYS

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	446/484 (92%)	422 (95%)	24 (5%)	26	30
1	B	459/484 (95%)	431 (94%)	28 (6%)	22	25
1	C	444/484 (92%)	419 (94%)	25 (6%)	25	29
1	D	446/484 (92%)	423 (95%)	23 (5%)	27	32
All	All	1795/1936 (93%)	1695 (94%)	100 (6%)	25	29

5 of 100 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	515	ARG
1	C	224	ARG
1	D	517	ASN
1	B	517	ASN
1	B	595	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 35 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	476	GLN
1	C	101	HIS
1	D	347	GLN
1	B	517	ASN
1	B	572	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 18 ligands modelled in this entry, 6 are monoatomic - leaving 12 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	$\# Z > 2$
5	TPP	A	2602	2	21,27,27	1.39	3 (14%)	25,40,40	1.74	7 (28%)
6	FAD	A	2603	-	25,29,58	1.18	2 (8%)	24,45,89	2.36	4 (16%)
3	SO4	A	2804	-	4,4,4	0.34	0	6,6,6	0.21	0
5	TPP	B	2702	2	21,27,27	1.26	3 (14%)	25,40,40	2.28	9 (36%)
6	FAD	B	2703	-	25,29,58	1.15	2 (8%)	24,45,89	2.22	5 (20%)
3	SO4	B	2904	-	4,4,4	0.15	0	6,6,6	0.42	0
3	SO4	C	2604	-	4,4,4	0.39	0	6,6,6	0.31	0
5	TPP	C	2802	2	21,27,27	1.36	3 (14%)	25,40,40	1.93	8 (32%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	FAD	C	2803	-	25,29,58	1.15	3 (12%)	24,45,89	2.33	2 (8%)
3	SO4	D	2704	-	4,4,4	0.20	0	6,6,6	0.85	0
5	TPP	D	2902	2	21,27,27	1.18	2 (9%)	25,40,40	1.93	8 (32%)
6	FAD	D	2903	-	25,29,58	1.24	3 (12%)	24,45,89	2.50	1 (4%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the chemical component dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	TPP	A	2602	2	-	0/16/17/17	0/2/2/2
6	FAD	A	2603	-	-	0/12/32/50	0/3/3/6
3	SO4	A	2804	-	-	0/0/0/0	0/0/0/0
5	TPP	B	2702	2	-	0/16/17/17	0/2/2/2
6	FAD	B	2703	-	-	0/12/32/50	0/3/3/6
3	SO4	B	2904	-	-	0/0/0/0	0/0/0/0
3	SO4	C	2604	-	-	0/0/0/0	0/0/0/0
5	TPP	C	2802	2	-	0/16/17/17	0/2/2/2
6	FAD	C	2803	-	-	0/12/32/50	0/3/3/6
3	SO4	D	2704	-	-	0/0/0/0	0/0/0/0
5	TPP	D	2902	2	-	0/16/17/17	0/2/2/2
6	FAD	D	2903	-	-	0/12/32/50	0/3/3/6

The worst 5 of 21 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	2703	FAD	C2B-C1B	-2.15	1.50	1.53
6	C	2803	FAD	O4B-C4B	-2.03	1.40	1.45
6	D	2903	FAD	C2A-N1A	2.00	1.37	1.33
5	A	2602	TPP	C6'-C5'	2.20	1.42	1.37
5	C	2802	TPP	C2'-N3'	2.21	1.38	1.34

The worst 5 of 44 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	D	2903	FAD	N3A-C2A-N1A	-11.37	118.96	128.86
6	C	2803	FAD	N3A-C2A-N1A	-10.12	120.05	128.86
6	A	2603	FAD	N3A-C2A-N1A	-9.83	120.30	128.86
6	B	2703	FAD	N3A-C2A-N1A	-9.14	120.90	128.86
5	C	2802	TPP	N1'-C2'-N3'	-4.11	118.48	125.59

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

6 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	2603	FAD	2	0
5	B	2702	TPP	1	0
6	B	2703	FAD	1	0
6	C	2803	FAD	1	0
5	D	2902	TPP	1	0
6	D	2903	FAD	1	0

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	558/603 (92%)	0.31	53 (9%) 9 8	28, 46, 80, 96	0
1	B	572/603 (94%)	0.03	29 (5%) 29 27	22, 37, 69, 87	0
1	C	556/603 (92%)	0.22	42 (7%) 15 13	27, 43, 71, 91	0
1	D	560/603 (92%)	0.25	43 (7%) 14 13	25, 42, 78, 93	0
All	All	2246/2412 (93%)	0.20	167 (7%) 15 14	22, 42, 75, 96	0

The worst 5 of 167 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	316	HIS	15.6
1	A	316	HIS	14.4
1	D	318	THR	13.6
1	C	318	THR	12.7
1	A	318	THR	10.4

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(\AA^2)	Q<0.9
2	MG	C	2801	1/1	0.87	0.18	1.87	40,40,40,40	0
6	FAD	C	2803	27/53	0.94	0.13	-0.12	37,43,61,64	0
5	TPP	C	2802	26/26	0.97	0.11	-0.21	27,36,37,38	0
4	NA	A	2605	1/1	0.97	0.12	-0.24	48,48,48,48	0
2	MG	A	2601	1/1	0.94	0.10	-0.28	38,38,38,38	0
6	FAD	D	2903	27/53	0.92	0.13	-0.39	46,51,68,69	0
5	TPP	B	2702	26/26	0.98	0.09	-0.47	21,28,31,32	0
6	FAD	A	2603	27/53	0.95	0.11	-0.48	47,52,60,62	0
6	FAD	B	2703	27/53	0.98	0.08	-0.57	31,34,45,48	0
5	TPP	A	2602	26/26	0.98	0.09	-0.62	26,32,36,37	0
3	SO4	C	2604	5/5	0.99	0.07	-0.62	41,42,43,44	0
5	TPP	D	2902	26/26	0.98	0.09	-0.67	21,27,31,33	0
3	SO4	B	2904	5/5	1.00	0.06	-0.70	33,34,35,39	0
2	MG	B	2701	1/1	0.98	0.07	-0.72	31,31,31,31	0
2	MG	D	2901	1/1	0.99	0.08	-0.87	32,32,32,32	0
3	SO4	A	2804	5/5	0.99	0.06	-0.88	45,46,46,47	0
3	SO4	D	2704	5/5	0.99	0.08	-1.14	34,36,38,39	0
4	NA	B	2705	1/1	0.95	0.08	-2.44	42,42,42,42	0

6.5 Other polymers [i](#)

There are no such residues in this entry.