



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 23, 2024 – 06:16 AM EDT

PDB ID : 4PPM
Title : Crystal structure of PigE: a transaminase involved in the biosynthesis of 2-methyl-3-n-amyI-pyrrole (MAP) from *Serratia* sp. FS14
Authors : Lou, X.D.; Ran, T.T.; Xu, D.Q.; Wang, W.W.
Deposited on : 2014-02-27
Resolution : 2.30 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.37.1
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.37.1

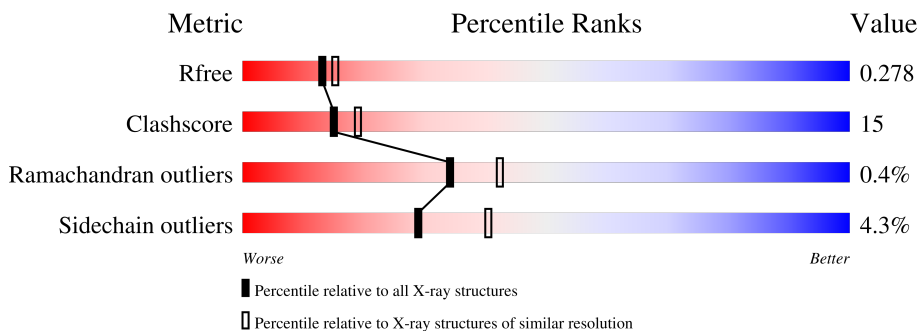
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	861	
1	B	861	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 7493 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 Aminotransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	464	3563	2265	617	657	24	0	0	0
1	B	462	3554	2263	615	652	24	0	0	0

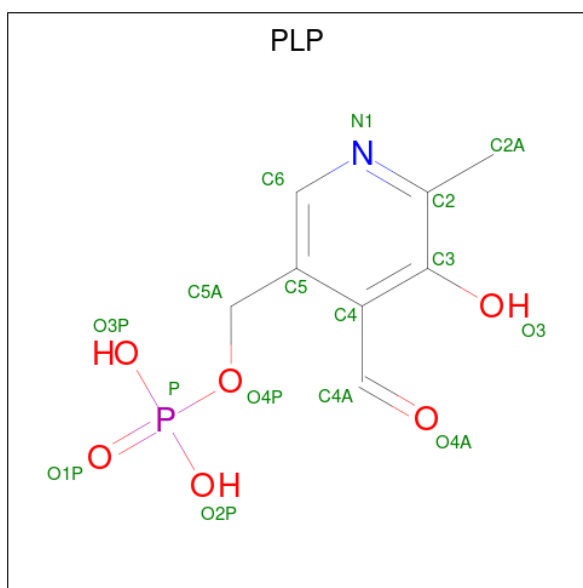
There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	854	LEU	-	EXPRESSION TAG	UNP A0A059ZJX2
A	855	GLU	-	EXPRESSION TAG	UNP A0A059ZJX2
A	856	HIS	-	EXPRESSION TAG	UNP A0A059ZJX2
A	857	HIS	-	EXPRESSION TAG	UNP A0A059ZJX2
A	858	HIS	-	EXPRESSION TAG	UNP A0A059ZJX2
A	859	HIS	-	EXPRESSION TAG	UNP A0A059ZJX2
A	860	HIS	-	EXPRESSION TAG	UNP A0A059ZJX2
A	861	HIS	-	EXPRESSION TAG	UNP A0A059ZJX2
B	854	LEU	-	EXPRESSION TAG	UNP A0A059ZJX2
B	855	GLU	-	EXPRESSION TAG	UNP A0A059ZJX2
B	856	HIS	-	EXPRESSION TAG	UNP A0A059ZJX2
B	857	HIS	-	EXPRESSION TAG	UNP A0A059ZJX2
B	858	HIS	-	EXPRESSION TAG	UNP A0A059ZJX2
B	859	HIS	-	EXPRESSION TAG	UNP A0A059ZJX2
B	860	HIS	-	EXPRESSION TAG	UNP A0A059ZJX2
B	861	HIS	-	EXPRESSION TAG	UNP A0A059ZJX2

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

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

- Molecule 3 is PYRIDOXAL-5'-PHOSPHATE (three-letter code: PLP) (formula: C₈H₁₀NO₆P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	15	8	1	5	1	0	0
3	B	1	15	8	1	5	1	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	A	160	160	160	0	0
4	B	184	184	184	0	0

M784	M785	M786	M787	M788	M789	A790	L791	M794	F795	C796	F799	V800	T801	L810	L811	F812	N816	S817	S818	T819	V820	I821	R822	I823	Q824	P825	I829	I834	F837	F841	A842	T843	V844	C845	E846	E847	L848	F851	L852	D853	L854	HIS	HIS	HIS	HIS	HIS	HIS		
H706	M710	F714	K715	Q716	E720	I721	R724	Y725	F726	V727	V728	S729	R732	G733	R734	M737	L738	G739	I740	Q741	F742	D743	A744	PHE	THR	THR	GLY	ALA	VAL	ASN	ALA	SER	ALA	ARG	GLU	PHE	A661	Q665	T670	R673	L675	V676	R696	E697	L771	F772	F773	D774	L780
G589	G590	V591	H592	I593	P594	P595	Q603	Q604	A490	P491	C606	R607	E608	T609	M614	V615	V618	Q619	T620	R624	V633	E637	P638	D639	V640	L641	M642	L643	S644	K645	S646	L651	I652	R660	A661	Q665	T670	R673	F674	L675	V676	R696	E697	Q701	D702	L703			
I473	P476	E484	R488	L489	A490	P491	R496	T504	V507	E508	A514	K520	P521	G522	L526	R527	N528	S529	Y530	T534	T541	G542	R543	D544	R547	R548	Y549	F550	T551	P552	D555	A556	V560	P561	F562	L568	A571	L458	K459	H460	Y461	C466	E588						
HIS	ASP	ILE	TYR	ALA	GLY	GLU	SER	ALA	ALA	ALA	A372	L373	P374	I381	Q387	T388	R397	Y398	M403	P404	H405	M406	V407	D408	F409	L410	K411	L412	Q413	C415	A422	L427	D430	M438	M446	H449	M450	P451	Q452	P453	V454	L458	K459	H460	Y461	C466			
ILE	VAL	LEU	ALA	LEU	ALA	ASN	ARG	ARG	GLU	ASP	PHE	ILE	LEU	GLY	ARG	TYR	LEU	ALA	PRO	GLU	PRO	GLY	ASP	VAL	LEU	ILE	GLU	ARG	THR	ALA	ALA	TYR	PRO	LYS	LEU	GLY	LEU	VAL	ILE	THR	ASP	ARG	ASN	ASN	ASN	LYS	ARG	TYR	THR
GLY	SER	ILE	PHE	ILE	ASP	VAL	ALA	LEU	PRO	ASP	ASP	ILE	ALA	SER	GLY	THR	LEU	THR	ALA	PRO	ALA	ALA	GLU	ASP	ASP	ILE	LEU	ILE	THR	ALA	VAL	VAL	LYS	GLY	LEU	GLY	LEU	VAL	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	
THR	CYS	GLU	GLY	VAL	VAL	ILE	LYS	TYR	MET	PRO	LEU	VAL	ALA	THR	LEU	ALA	MET	GLU	ALA	ASP	ALA	ARG	GLY	ILE	ILE	ALA	ALA	GLN	SER	ARG	TRP	VAL	VAL	LEU	GLY	GLY	VAL	VAL	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	

4 Data and refinement statistics i

Property	Value	Source
Space group	P 3 2 1	Depositor
Cell constants a, b, c, α , β , γ	228.10Å 228.10Å 67.10Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	19.89 – 2.30 19.89 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.8 (19.89-2.30) 99.9 (19.89-2.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.77 (at 2.30Å)	Xtrriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.238 , 0.272 0.251 , 0.278	Depositor DCC
R_{free} test set	4443 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	37.2	Xtrriage
Anisotropy	0.092	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 16.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.38$, $\langle L^2 \rangle = 0.21$	Xtrriage
Estimated twinning fraction	0.340 for -h,-k,l	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	7493	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.01% 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: PLP, MG

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	1.41	7/3633 (0.2%)	0.94	19/4920 (0.4%)
1	B	1.36	6/3626 (0.2%)	0.95	20/4912 (0.4%)
All	All	1.39	13/7259 (0.2%)	0.95	39/9832 (0.4%)

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	505	GLU	CD-OE2	-5.65	1.19	1.25
1	A	508	GLU	CD-OE1	-5.60	1.19	1.25
1	A	508	GLU	CD-OE2	-5.57	1.19	1.25
1	B	404	PRO	N-CD	5.52	1.55	1.47
1	B	552	PRO	N-CD	5.44	1.55	1.47
1	B	491	PRO	N-CD	5.42	1.55	1.47
1	B	476	PRO	N-CD	5.36	1.55	1.47
1	B	638	PRO	N-CD	5.20	1.55	1.47
1	A	726	PRO	N-CD	5.15	1.55	1.47
1	B	595	PRO	N-CD	5.12	1.55	1.47
1	A	404	PRO	N-CD	5.11	1.55	1.47
1	A	476	PRO	N-CD	5.08	1.54	1.47
1	A	521	PRO	N-CD	5.08	1.54	1.47

All (39) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	702	ASP	CB-CG-OD1	7.09	124.68	118.30
1	A	590	GLY	N-CA-C	6.99	130.58	113.10
1	A	593	ILE	C-N-CD	6.29	141.61	128.40
1	B	725	TYR	C-N-CD	6.16	141.34	128.40
1	A	594	PRO	C-N-CD	6.02	141.04	128.40
1	B	388	THR	C-N-CD	5.99	140.97	128.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	774	ASP	C-N-CD	5.93	140.85	128.40
1	B	373	LEU	C-N-CD	5.89	140.77	128.40
1	A	824	GLN	C-N-CD	5.85	140.68	128.40
1	A	583	GLU	C-N-CD	5.84	140.66	128.40
1	A	397	ARG	NE-CZ-NH1	-5.84	117.38	120.30
1	B	520	LYS	C-N-CD	5.81	140.60	128.40
1	A	637	GLU	C-N-CD	5.80	140.58	128.40
1	B	824	GLN	C-N-CD	5.76	140.49	128.40
1	A	466	GLY	C-N-CD	5.71	140.40	128.40
1	A	825	PRO	C-N-CD	5.64	140.25	128.40
1	B	560	VAL	C-N-CD	5.62	140.20	128.40
1	A	774	ASP	C-N-CD	5.59	140.13	128.40
1	A	652	ILE	C-N-CD	5.58	140.11	128.40
1	A	373	LEU	C-N-CD	5.54	140.04	128.40
1	A	520	LYS	C-N-CD	5.54	140.02	128.40
1	B	825	PRO	C-N-CD	5.53	140.02	128.40
1	B	772	LEU	C-N-CD	5.51	139.97	128.40
1	A	475	ILE	C-N-CD	5.50	139.95	128.40
1	B	652	ILE	C-N-CD	5.48	139.92	128.40
1	A	429	ASP	CB-CG-OD1	5.45	123.21	118.30
1	B	452	GLN	C-N-CD	5.41	139.77	128.40
1	B	594	PRO	C-N-CD	5.38	139.69	128.40
1	A	725	TYR	C-N-CD	5.34	139.61	128.40
1	A	450	ASN	C-N-CD	5.33	139.59	128.40
1	A	403	ASN	C-N-CD	5.32	139.57	128.40
1	B	696	ARG	NE-CZ-NH1	-5.29	117.65	120.30
1	B	450	ASN	C-N-CD	5.26	139.45	128.40
1	B	466	GLY	C-N-CD	5.22	139.36	128.40
1	B	490	ALA	C-N-CD	5.22	139.36	128.40
1	B	403	ASN	C-N-CD	5.13	139.18	128.40
1	B	637	GLU	C-N-CD	5.11	139.13	128.40
1	B	593	ILE	C-N-CD	5.09	139.09	128.40
1	A	584	PRO	CA-N-CD	-5.03	104.47	111.50

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen

atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3563	0	3567	100	0
1	B	3554	0	3558	132	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	15	0	6	0	0
3	B	15	0	6	0	0
4	A	160	0	0	5	0
4	B	184	0	0	6	0
All	All	7493	0	7137	216	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 15.

All (216) 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:727:PHE:HB3	1:A:744:GLN:NE2	1.44	1.32
1:A:588:GLU:O	1:A:816:ASN:HB2	1.43	1.14
1:B:388:THR:HG22	4:B:1037:HOH:O	1.55	1.06
1:A:727:PHE:CB	1:A:744:GLN:HE21	1.69	1.05
1:A:727:PHE:HB3	1:A:744:GLN:HE21	0.89	1.04
1:B:514:ALA:HB2	1:B:614:MET:HE1	1.39	1.02
1:A:588:GLU:HG3	1:A:815:ALA:HB3	1.47	0.96
1:A:727:PHE:CB	1:A:744:GLN:NE2	2.30	0.93
1:A:397:ARG:HD3	1:B:484:GLU:OE2	1.70	0.91
1:A:589:GLY:O	1:A:592:HIS:CD2	2.26	0.89
1:B:438:MET:HB2	1:B:810:LEU:O	1.73	0.88
1:A:413:GLN:O	1:A:801:THR:HG23	1.75	0.86
1:A:545:LYS:CE	1:A:815:ALA:O	2.25	0.84
1:B:660:ARG:HD2	4:B:1182:HOH:O	1.79	0.81
1:A:850:THR:O	1:A:854:LEU:HD13	1.81	0.80
1:B:543:ARG:HD3	1:B:816:ASN:HB3	1.64	0.80
1:B:843:THR:O	1:B:846:GLU:HG2	1.81	0.80
1:B:854:LEU:HD13	1:B:854:LEU:H	1.46	0.78
1:A:842:ALA:O	1:A:846:GLU:HG3	1.82	0.78
1:B:372:ALA:HB3	1:B:373:LEU:HA	1.65	0.77
1:A:588:GLU:O	1:A:816:ASN:CB	2.29	0.75
1:A:699:LEU:HD12	1:B:381:ILE:CD1	2.17	0.75
1:B:422:ALA:HB2	1:B:427:LEU:HD23	1.68	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:588:GLU:CG	1:A:815:ALA:HB3	2.18	0.74
1:B:785:ASP:O	1:B:788:GLU:N	2.21	0.74
1:B:741:GLN:HG3	1:B:742:PHE:N	2.03	0.73
1:B:588:GLU:O	1:B:816:ASN:HB2	1.89	0.73
1:B:661:ALA:O	1:B:665:GLN:HG2	1.89	0.72
1:B:409:PHE:O	1:B:412:LEU:HB3	1.90	0.71
1:B:740:ILE:HD12	1:B:823:ILE:HD11	1.72	0.70
1:A:563:GLY:HA2	1:A:598:TYR:CE1	2.27	0.70
1:B:603:GLN:HE21	1:B:607:ARG:NH2	1.90	0.69
1:B:817:SER:HB3	4:B:1062:HOH:O	1.93	0.69
1:A:484:GLU:OE2	1:B:397:ARG:NE	2.20	0.68
1:A:817:SER:OG	1:A:819:THR:HG22	1.94	0.68
1:A:545:LYS:HE2	1:A:815:ALA:O	1.94	0.67
1:A:740:ILE:HG13	1:A:823:ILE:HD13	1.76	0.67
1:B:526:LEU:HD13	1:B:562:PHE:HD1	1.60	0.67
1:A:633:TRP:CE2	1:A:734:ARG:HD3	2.30	0.67
1:A:675:LEU:HD21	1:B:406:MET:CE	2.25	0.67
1:B:372:ALA:HB3	1:B:373:LEU:CA	2.26	0.66
1:B:484:GLU:O	1:B:488:ARG:HG2	1.96	0.66
1:B:799:PHE:CE1	1:B:844:VAL:HG12	2.31	0.66
1:A:721:ILE:HD11	1:A:838:VAL:HG13	1.78	0.65
1:B:799:PHE:HE2	1:B:841:PHE:CD1	2.13	0.65
1:B:568:LEU:HD23	1:B:605:LEU:HD23	1.79	0.65
1:B:721:ILE:O	1:B:724:ARG:HB2	1.97	0.65
1:A:675:LEU:HD21	1:B:406:MET:HE2	1.78	0.65
1:B:590:GLY:O	1:B:732:ARG:NH2	2.23	0.64
1:B:526:LEU:HD13	1:B:562:PHE:CD1	2.33	0.64
1:B:843:THR:O	1:B:847:GLU:HG3	1.99	0.63
1:A:569:ARG:NH1	1:A:608:GLU:OE1	2.28	0.63
1:A:721:ILE:CD1	1:A:838:VAL:HG13	2.29	0.62
1:A:741:GLN:HE22	1:A:819:THR:HG23	1.63	0.62
1:B:785:ASP:O	1:B:788:GLU:HB3	1.99	0.62
1:B:639:ASP:OD1	1:B:660:ARG:NH2	2.33	0.61
1:B:854:LEU:H	1:B:854:LEU:CD1	2.13	0.61
1:B:446:ASN:OD1	1:B:624:ARG:NH2	2.34	0.61
1:A:579:ALA:HA	1:A:611:VAL:HG13	1.83	0.60
1:B:619:GLN:OE1	1:B:824:GLN:NE2	2.34	0.60
1:B:799:PHE:CE2	1:B:841:PHE:CE1	2.89	0.60
1:B:591:VAL:O	1:B:591:VAL:HG13	2.01	0.60
1:A:373:LEU:HD23	1:A:374:PRO:CD	2.32	0.60
1:B:670:THR:OG1	1:B:673:ARG:HG3	2.02	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:770:LYS:HD3	1:B:771:PHE:CE2	2.37	0.60
1:B:496:ARG:NH1	1:B:665:GLN:HE22	2.01	0.59
1:A:652:ILE:HD12	1:A:690:VAL:HG21	1.85	0.59
1:B:398:TYR:HD1	1:B:407:VAL:CG2	2.15	0.59
1:B:727:PHE:O	1:B:743:ASP:N	2.32	0.59
1:A:699:LEU:CD1	1:B:381:ILE:CD1	2.82	0.58
1:B:799:PHE:CE2	1:B:841:PHE:CD1	2.91	0.58
1:B:615:VAL:HG21	1:B:638:PRO:HG3	1.84	0.57
1:B:496:ARG:NH1	1:B:665:GLN:NE2	2.53	0.57
1:B:398:TYR:CD1	1:B:407:VAL:CG2	2.87	0.57
1:A:742:PHE:CE2	1:A:799:PHE:CE1	2.92	0.57
1:B:571:ALA:O	1:B:574:ARG:HG3	2.04	0.57
1:A:426:GLN:HE21	1:A:434:ALA:HB1	1.70	0.55
1:A:373:LEU:HD23	1:A:374:PRO:HD3	1.87	0.55
1:B:530:TYR:HA	1:B:541:THR:HG23	1.88	0.55
1:A:612:LEU:HD21	1:A:663:LEU:HD21	1.89	0.55
1:B:372:ALA:CB	1:B:373:LEU:CA	2.85	0.54
1:A:668:TYR:HA	1:A:673:ARG:HB3	1.89	0.54
1:B:720:GLU:HB2	4:B:1151:HOH:O	2.08	0.54
1:A:545:LYS:NZ	1:A:815:ALA:O	2.41	0.53
1:A:744:GLN:O	1:A:745:ALA:HB3	2.09	0.53
1:B:541:THR:O	1:B:547:ARG:HD2	2.08	0.53
1:A:589:GLY:O	1:A:592:HIS:HD2	1.85	0.53
1:A:668:TYR:CE1	1:A:676:VAL:CG1	2.91	0.53
1:B:790:ALA:O	1:B:794:MET:HG3	2.08	0.53
1:A:441:GLY:N	4:A:1067:HOH:O	2.33	0.53
1:A:548:ARG:NH2	4:A:1147:HOH:O	2.41	0.53
1:A:710:MET:HE2	1:A:834:ILE:HD12	1.90	0.53
1:A:742:PHE:HE2	1:A:799:PHE:CE1	2.27	0.52
1:B:591:VAL:HG13	1:B:732:ARG:HB2	1.90	0.52
1:A:589:GLY:O	1:A:592:HIS:NE2	2.42	0.52
1:B:555:ASP:O	1:B:556:ALA:HB3	2.10	0.52
1:B:799:PHE:CD1	1:B:848:LEU:HD12	2.45	0.52
1:B:507:VAL:HG22	1:B:642:MET:SD	2.50	0.51
1:A:710:MET:HE2	1:A:834:ILE:CD1	2.41	0.51
1:B:854:LEU:CD1	1:B:854:LEU:N	2.73	0.51
1:B:633:TRP:CB	1:B:734:ARG:NH1	2.74	0.51
1:A:641:LEU:HG	1:A:642:MET:N	2.26	0.51
1:B:727:PHE:O	1:B:742:PHE:HA	2.11	0.51
1:B:710:MET:HE3	1:B:834:ILE:HD12	1.93	0.51
1:A:840:ALA:O	1:A:844:VAL:HG23	2.11	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:397:ARG:CD	1:B:484:GLU:OE2	2.53	0.50
1:A:767:THR:OG1	1:A:768:THR:N	2.43	0.50
1:A:594:PRO:HG2	1:A:599:LEU:HD11	1.93	0.50
1:A:727:PHE:CA	1:A:744:GLN:NE2	2.74	0.50
1:B:673:ARG:HA	1:B:676:VAL:HG23	1.93	0.50
1:A:588:GLU:HG3	1:A:815:ALA:CB	2.31	0.50
1:A:617:GLU:HG3	1:A:641:LEU:HD11	1.94	0.50
1:B:430:ASP:HB2	4:B:1122:HOH:O	2.11	0.49
1:A:548:ARG:NH1	4:A:1101:HOH:O	2.45	0.49
1:A:699:LEU:CD1	1:B:381:ILE:HD11	2.42	0.49
1:B:854:LEU:HD13	1:B:854:LEU:N	2.22	0.49
1:A:616:ASP:HA	1:A:642:MET:HB2	1.95	0.49
1:B:461:TYR:CE2	1:B:466:GLY:HA3	2.48	0.49
1:B:824:GLN:O	1:B:824:GLN:HG2	2.12	0.49
1:B:458:LEU:HD11	1:B:652:ILE:HD11	1.94	0.48
1:B:543:ARG:CD	1:B:816:ASN:HB3	2.40	0.48
1:B:780:LEU:O	1:B:784:MET:HB2	2.13	0.48
1:A:796:CYS:O	1:A:799:PHE:HB2	2.13	0.48
1:B:846:GLU:CG	1:B:847:GLU:N	2.77	0.48
1:A:853:ASP:C	1:A:854:LEU:HD12	2.34	0.48
1:A:742:PHE:HE1	1:A:821:ILE:HG13	1.79	0.48
1:B:796:CYS:SG	1:B:819:THR:HA	2.54	0.48
1:A:467:PRO:O	1:A:685:ASN:HB2	2.14	0.48
1:A:579:ALA:CA	1:A:611:VAL:HG13	2.43	0.48
1:A:618:VAL:HG12	1:A:645:LYS:HD2	1.96	0.47
1:B:588:GLU:HB3	1:B:816:ASN:H	1.79	0.47
1:B:697:GLU:OE2	1:B:701:GLN:NE2	2.41	0.47
1:B:741:GLN:HG3	1:B:742:PHE:H	1.76	0.47
1:B:620:THR:HG22	1:B:737:MET:HE1	1.97	0.47
1:A:391:ARG:NH2	1:A:416:ASP:O	2.44	0.47
1:A:675:LEU:HD21	1:B:406:MET:HE1	1.95	0.47
1:A:496:ARG:NH1	1:A:664:TRP:CE3	2.83	0.47
1:B:799:PHE:CZ	1:B:844:VAL:HG12	2.50	0.47
1:A:850:THR:O	1:A:850:THR:HG22	2.15	0.47
1:A:836:ARG:NH1	4:A:1083:HOH:O	2.39	0.46
1:B:604:GLN:HE21	1:B:604:GLN:N	2.13	0.46
1:B:706:HIS:O	1:B:710:MET:HB2	2.15	0.46
1:A:740:ILE:HG13	1:A:823:ILE:CD1	2.45	0.46
1:A:400:GLN:O	1:B:496:ARG:NH2	2.49	0.46
1:A:648:SER:HB2	1:A:652:ILE:O	2.15	0.46
1:B:413:GLN:O	1:B:801:THR:HG23	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:572:LEU:HG	1:A:611:VAL:HG21	1.97	0.46
1:B:742:PHE:HE1	1:B:821:ILE:HG13	1.81	0.46
1:A:534:THR:HG22	1:B:508:GLU:HG2	1.98	0.45
1:B:696:ARG:HD3	1:B:696:ARG:C	2.36	0.45
1:B:848:LEU:O	1:B:852:LEU:HB2	2.15	0.45
1:B:373:LEU:HB3	1:B:374:PRO:CD	2.46	0.45
1:B:837:PHE:CD1	1:B:837:PHE:C	2.89	0.45
1:A:662:ASP:OD1	1:A:663:LEU:N	2.49	0.45
1:B:618:VAL:CG1	1:B:645:LYS:HD2	2.47	0.45
1:A:824:GLN:O	1:A:824:GLN:HG2	2.17	0.45
1:A:773:PRO:CB	1:A:775:PRO:HD2	2.47	0.45
1:B:675:LEU:HD23	1:B:675:LEU:HA	1.72	0.45
1:B:588:GLU:HB2	1:B:816:ASN:CG	2.38	0.44
1:A:584:PRO:O	1:A:585:ILE:HG13	2.17	0.44
1:A:740:ILE:CG1	1:A:823:ILE:HD13	2.45	0.44
1:B:454:VAL:HG12	1:B:651:LEU:HD12	1.99	0.44
1:B:851:PHE:O	1:B:851:PHE:CG	2.70	0.44
1:A:528:ASN:OD1	1:A:543:ARG:HD3	2.17	0.44
1:B:620:THR:HG22	1:B:737:MET:CE	2.47	0.44
1:A:398:TYR:OH	4:A:1004:HOH:O	2.20	0.44
1:A:380:PHE:CZ	1:B:488:ARG:HG3	2.53	0.44
1:A:555:ASP:O	1:A:556:ALA:HB3	2.17	0.44
1:A:699:LEU:HD12	1:B:381:ILE:HD13	1.98	0.44
1:A:620:THR:HB	1:A:630:ALA:HB2	1.99	0.44
1:B:388:THR:CG2	4:B:1037:HOH:O	2.34	0.43
1:A:452:GLN:HB3	1:A:453:PRO:HD3	1.99	0.43
1:B:473:ILE:HD12	1:B:473:ILE:HA	1.88	0.43
1:B:791:LEU:HD23	1:B:791:LEU:HA	1.73	0.43
1:B:411:LYS:HE3	1:B:411:LYS:HB3	1.83	0.43
1:B:527:ARG:O	1:B:528:ASN:HB2	2.16	0.43
1:A:413:GLN:O	1:A:415:CYS:SG	2.74	0.43
1:A:459:LYS:HG2	1:B:459:LYS:HG2	2.00	0.43
1:B:413:GLN:OE1	1:B:801:THR:OG1	2.37	0.43
1:B:721:ILE:HD13	1:B:842:ALA:HB2	2.00	0.43
1:A:730:GLU:OE2	1:A:732:ARG:NH2	2.50	0.43
1:B:413:GLN:HB3	1:B:415:CYS:SG	2.59	0.43
1:B:633:TRP:CG	1:B:734:ARG:NH1	2.87	0.43
1:A:526:LEU:HD11	1:A:582:ILE:HG22	2.00	0.43
1:B:618:VAL:HG12	1:B:645:LYS:HD2	2.00	0.43
1:A:436:LEU:HB2	1:A:836:ARG:NH1	2.34	0.42
1:A:741:GLN:NE2	1:A:819:THR:HG23	2.32	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:795:PHE:O	1:A:798:LYS:HB3	2.19	0.42
1:B:710:MET:CE	1:B:834:ILE:HD12	2.48	0.42
1:B:733:GLY:HA3	1:B:738:LEU:HD23	2.02	0.42
1:B:769:TRP:HA	1:B:772:LEU:HD12	2.02	0.42
1:B:504:THR:HG21	1:B:534:THR:HG23	2.01	0.42
1:B:387:GLN:HG2	1:B:388:THR:N	2.34	0.41
1:B:701:GLN:HB2	1:B:703:LEU:HG	2.02	0.41
1:B:422:ALA:CB	1:B:427:LEU:HD23	2.44	0.41
1:A:543:ARG:HB2	1:A:816:ASN:ND2	2.35	0.41
1:B:829:ILE:HG12	1:B:834:ILE:HG13	2.03	0.41
1:B:422:ALA:HB1	1:B:449:HIS:CG	2.56	0.41
1:B:603:GLN:HG2	1:B:604:GLN:NE2	2.35	0.41
1:A:446:ASN:HB3	1:A:827:LEU:HD12	2.03	0.41
1:B:614:MET:CE	1:B:640:VAL:HG21	2.50	0.41
1:B:673:ARG:HA	1:B:676:VAL:CG2	2.51	0.41
1:A:454:VAL:HG12	1:A:651:LEU:HD12	2.03	0.41
1:B:544:ASP:OD2	1:B:548:ARG:NH2	2.53	0.41
1:B:790:ALA:O	1:B:794:MET:CG	2.69	0.41
1:A:486:LEU:HD23	1:A:486:LEU:HA	1.95	0.41
1:B:530:TYR:CG	1:B:588:GLU:HG3	2.56	0.41
1:B:696:ARG:HD3	1:B:696:ARG:O	2.21	0.41
1:B:522:GLY:HA2	1:B:556:ALA:O	2.21	0.40
1:B:851:PHE:O	1:B:851:PHE:CD2	2.74	0.40
1:B:496:ARG:HH11	1:B:665:GLN:HE22	1.69	0.40
1:B:852:LEU:HD23	1:B:852:LEU:HA	1.71	0.40
1:A:579:ALA:HA	1:A:611:VAL:CG1	2.50	0.40
1:A:722:ALA:HB1	1:A:728:VAL:HG12	2.02	0.40
1:A:381:ILE:HD11	1:B:489:LEU:HD11	2.04	0.40
1:A:675:LEU:HD11	1:B:406:MET:HE1	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	460/861 (53%)	432 (94%)	26 (6%)	2 (0%)	34	42
1	B	458/861 (53%)	440 (96%)	16 (4%)	2 (0%)	34	42
All	All	918/1722 (53%)	872 (95%)	42 (5%)	4 (0%)	34	42

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	645	LYS
1	B	645	LYS
1	A	644	SER
1	B	644	SER

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	372/692 (54%)	360 (97%)	12 (3%)	39	54
1	B	371/692 (54%)	351 (95%)	20 (5%)	22	30
All	All	743/1384 (54%)	711 (96%)	32 (4%)	29	40

All (32) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	373	LEU
1	A	521	PRO
1	A	565	LEU
1	A	584	PRO
1	A	588	GLU
1	A	600	GLN
1	A	641	LEU
1	A	696	ARG
1	A	714	PHE
1	A	791	LEU
1	A	836	ARG
1	A	855	GLU

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Mol	Chain	Res	Type
1	B	413	GLN
1	B	415	CYS
1	B	521	PRO
1	B	528	ASN
1	B	544	ASP
1	B	550	PHE
1	B	572	LEU
1	B	609	THR
1	B	646	SER
1	B	714	PHE
1	B	716	GLN
1	B	729	SER
1	B	743	ASP
1	B	765	TRP
1	B	787	MET
1	B	799	PHE
1	B	810	LEU
1	B	812	PHE
1	B	845	CYS
1	B	854	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	426	GLN
1	A	452	GLN
1	A	741	GLN
1	A	744	GLN
1	A	777	GLN
1	A	805	GLN
1	B	665	GLN
1	B	824	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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 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
3	PLP	A	902	1	15,15,16	2.86	9 (60%)	20,22,23	1.94	6 (30%)
3	PLP	B	902	1	15,15,16	2.68	8 (53%)	20,22,23	1.67	4 (20%)

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
3	PLP	A	902	1	-	2/6/6/8	0/1/1/1
3	PLP	B	902	1	-	1/6/6/8	0/1/1/1

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	902	PLP	C5-C4	6.07	1.47	1.40
3	B	902	PLP	C5-C4	5.58	1.46	1.40
3	A	902	PLP	C3-C2	4.34	1.45	1.40
3	B	902	PLP	C3-C2	4.28	1.45	1.40
3	A	902	PLP	P-O3P	-3.78	1.40	1.54
3	A	902	PLP	P-O2P	-3.66	1.40	1.54
3	B	902	PLP	P-O2P	-3.60	1.41	1.54
3	B	902	PLP	P-O3P	-3.38	1.41	1.54
3	A	902	PLP	P-O1P	-3.26	1.40	1.50
3	B	902	PLP	P-O1P	-3.04	1.40	1.50
3	B	902	PLP	C4A-C4	-2.89	1.45	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	902	PLP	C3-C4	2.75	1.45	1.40
3	B	902	PLP	O3-C3	-2.46	1.31	1.37
3	A	902	PLP	O3-C3	-2.33	1.31	1.37
3	B	902	PLP	C3-C4	2.18	1.44	1.40
3	A	902	PLP	P-O4P	-2.09	1.53	1.60
3	A	902	PLP	C4A-C4	-2.02	1.47	1.51

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	902	PLP	C4A-C4-C5	5.05	126.13	120.94
3	B	902	PLP	O3P-P-O2P	3.12	119.54	107.64
3	B	902	PLP	O4P-C5A-C5	2.72	114.54	109.35
3	A	902	PLP	C3-C4-C5	-2.69	115.83	118.74
3	A	902	PLP	O3P-P-O2P	2.66	117.79	107.64
3	B	902	PLP	C4A-C4-C5	2.62	123.64	120.94
3	B	902	PLP	C6-N1-C2	2.56	123.90	119.17
3	A	902	PLP	O4P-C5A-C5	2.40	113.92	109.35
3	A	902	PLP	C6-N1-C2	2.39	123.59	119.17
3	A	902	PLP	C2A-C2-N1	2.00	121.59	117.67

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	902	PLP	C6-C5-C5A-O4P
3	A	902	PLP	C4-C5-C5A-O4P
3	B	902	PLP	C5A-O4P-P-O1P

There are no ring outliers.

No monomer is involved in short contacts.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.