



Full wwPDB X-ray Structure Validation Report

Feb 28, 2014 – 10:28 AM GMT

PDB ID : 1VK3
Title : Crystal structure of Phosphoribosylformylglycinamidesynthase II (TM1246)
from *Thermotoga maritima* at 2.15 Å resolution
Authors : Joint Center for Structural Genomics (JCSG)
Deposited on : 2004-04-23
Resolution : 2.15 Å(reported)

This is a full wwPDB validation 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/ValidationPDFNotes.html>

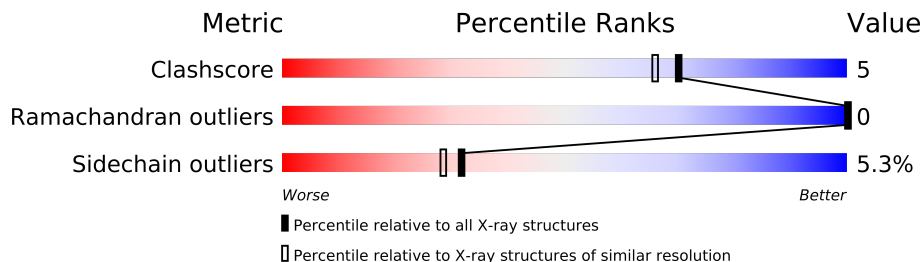
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.15 2013
Xtriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Percentile statistics : 21963
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : stable22683

1 Overall quality at a glance

The reported resolution of this entry is 2.15 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))
Clashscore	79885	1299 (2.18-2.14)
Ramachandran outliers	78287	1272 (2.18-2.14)
Sidechain outliers	78261	1272 (2.18-2.14)

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. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	615	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 4666 atoms, of which 0 are hydrogen and 0 are deuterium.

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 Phosphoribosylformylglycinamidesynthase II.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	586	4444	2840	753	832	3	16	0	1	0

There are 29 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-11	MET	-	LEADER SEQUENCE	UNP Q9X0X3
A	-10	GLY	-	LEADER SEQUENCE	UNP Q9X0X3
A	-9	SER	-	LEADER SEQUENCE	UNP Q9X0X3
A	-8	ASP	-	LEADER SEQUENCE	UNP Q9X0X3
A	-7	LYS	-	LEADER SEQUENCE	UNP Q9X0X3
A	-6	ILE	-	LEADER SEQUENCE	UNP Q9X0X3
A	-5	HIS	-	LEADER SEQUENCE	UNP Q9X0X3
A	-4	HIS	-	LEADER SEQUENCE	UNP Q9X0X3
A	-3	HIS	-	LEADER SEQUENCE	UNP Q9X0X3
A	-2	HIS	-	LEADER SEQUENCE	UNP Q9X0X3
A	-1	HIS	-	LEADER SEQUENCE	UNP Q9X0X3
A	0	HIS	-	LEADER SEQUENCE	UNP Q9X0X3
A	1	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	28	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	98	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	111	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	162	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	217	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	225	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	271	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	285	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	323	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	330	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	376	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	392	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	459	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	460	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
A	498	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3
A	580	MSE	MET	MODIFIED RESIDUE	UNP Q9X0X3

- Molecule 2 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Cl 1 1	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	221	Total O 221 221	0	0

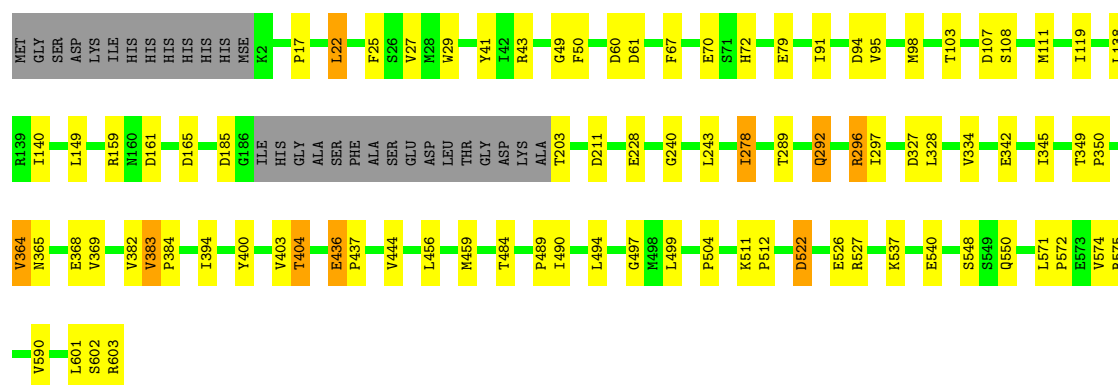
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

Note EDS was not executed.

• Molecule 1: Phosphoribosylformylglycinamidesynthase II

Chain A: 



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section will therefore be incomplete.

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	59.77Å 72.69Å 128.42Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	63.26 – 2.15	Depositor
% Data completeness (in resolution range)	90.6 (63.26-2.15)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	0.09	Depositor
Refinement program	REFMAC 5.2.0001	Depositor
R, R_{free}	0.186 , 0.254	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	4666	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: CL

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	0.53	0/4525	0.74	4/6122 (0.1%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	107	ASP	CB-CG-OD2	6.00	123.70	118.30
1	A	327	ASP	CB-CG-OD2	5.50	123.25	118.30
1	A	185	ASP	CB-CG-OD2	5.33	123.10	118.30
1	A	522	ASP	CB-CG-OD2	5.19	122.97	118.30

There are no chirality outliers.

There are no planarity outliers.

5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4444	0	4436	41	0
2	A	1	0	0	0	0
3	A	221	0	0	1	0
All	All	4666	0	4436	41	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 5.

All (41) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:138:LEU:HB3	1:A:364:VAL:HG23	1.70	0.74
1:A:95:VAL:HA	1:A:98:MSE:HE3	1.71	0.72
1:A:149:LEU:HD21	1:A:490:ILE:HD13	1.74	0.69
1:A:365:ASN:HB3	1:A:368:GLU:HB2	1.76	0.67
1:A:444:VAL:HG13	1:A:459:MSE:HE1	1.78	0.66
1:A:444:VAL:HG13	1:A:459:MSE:CE	2.28	0.64
1:A:512:PRO:HA	1:A:601:LEU:O	2.00	0.61
1:A:49:GLY:O	1:A:50:PHE:HB2	2.02	0.59
1:A:17:PRO:HB2	1:A:22:LEU:HD13	1.84	0.58
1:A:459:MSE:HE3	1:A:494:LEU:HB2	1.85	0.58
1:A:60:ASP:O	1:A:61:ASP:HB2	2.04	0.57
1:A:43:ARG:NH2	1:A:342:GLU:OE1	2.37	0.56
1:A:383:VAL:HG22	1:A:384:PRO:HD2	1.87	0.56
1:A:108:SER:HB2	1:A:404:THR:HG21	1.89	0.55
1:A:228:GLU:OE1	1:A:296:ARG:NH1	2.41	0.53
1:A:602:SER:O	1:A:603:ARG:HB2	2.10	0.52
1:A:590:VAL:HG23	1:A:590:VAL:O	2.10	0.51
1:A:70:GLU:HB2	1:A:91:ILE:HD13	1.94	0.49
1:A:526:GLU:CD	1:A:526:GLU:H	2.15	0.49
1:A:27:VAL:HG11	1:A:240:GLY:HA2	1.95	0.49
1:A:25:PHE:O	1:A:29:TRP:HB2	2.12	0.49
1:A:243:LEU:HD22	1:A:278:ILE:HD11	1.94	0.48
1:A:537:LYS:O	1:A:540:GLU:HG2	2.14	0.47
1:A:119:ILE:HG21	1:A:369:VAL:HG12	1.95	0.47
1:A:289:THR:HG21	1:A:297:ILE:HD12	1.96	0.47
1:A:394:ILE:HD11	1:A:400:TYR:CD1	2.50	0.47
1:A:403:VAL:O	1:A:497:GLY:HA2	2.15	0.46
1:A:243:LEU:CD2	1:A:278:ILE:HD11	2.46	0.46
1:A:49:GLY:O	1:A:50:PHE:CB	2.64	0.45
1:A:436:GLU:HA	1:A:437:PRO:HD3	1.90	0.44
1:A:292:GLN:NE2	3:A:676:HOH:O	2.46	0.44
1:A:159:ARG:HB3	1:A:161:ASP:OD1	2.18	0.42
1:A:394:ILE:HD11	1:A:400:TYR:HD1	1.84	0.42
1:A:111:MSE:O	1:A:140:ILE:HA	2.21	0.41
1:A:382:VAL:HG21	1:A:504:PRO:HB3	2.02	0.41
1:A:522:ASP:OD1	1:A:527:ARG:NH2	2.48	0.41
1:A:571:LEU:HA	1:A:572:PRO:HD3	1.89	0.41
1:A:41:TYR:CE1	1:A:345:ILE:HB	2.56	0.40
1:A:349:THR:HA	1:A:350:PRO:HD3	1.96	0.40

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:60:ASP:O	1:A:61:ASP:CB	2.70	0.40
1:A:484:THR:HG22	1:A:489:PRO:HA	2.03	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	583/615 (95%)	565 (97%)	18 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	470/496 (95%)	445 (95%)	25 (5%)	32	28

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	22	LEU
1	A	67	PHE
1	A	72	HIS
1	A	79	GLU
1	A	94	ASP
1	A	103	THR
1	A	165	ASP
1	A	203	THR

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	211	ASP
1	A	278	ILE
1	A	292	GLN
1	A	296	ARG
1	A	328	LEU
1	A	334	VAL
1	A	364	VAL
1	A	383	VAL
1	A	404	THR
1	A	436	GLU
1	A	456	LEU
1	A	499	LEU
1	A	511	LYS
1	A	548	SER
1	A	550	GLN
1	A	574	VAL
1	A	575	ARG

Some 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 chains 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 carbohydrates in this entry.

5.6 Ligand geometry ⓘ

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

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 ⓘ

EDS was not executed - this section will therefore be empty.

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

EDS was not executed - this section will therefore be empty.

6.3 Carbohydrates ⓘ

EDS was not executed - this section will therefore be empty.

6.4 Ligands ⓘ

EDS was not executed - this section will therefore be empty.

6.5 Other polymers ⓘ

EDS was not executed - this section will therefore be empty.