Full wwPDB X-ray Structure Validation Report (i)

Jan 31, 2016 – 07:32 PM GMT

PDB ID	:	1G58
Title	:	CRYSTAL STRUCTURE OF 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE GOLD DERIVATIVE
Authors	:	Liao, D.-I.; Calabrese, J.C.; Wawrzak, Z.; Viitanen, P.V.; Jordan, D.B.
Deposited on	:	2000-10-30
Resolution	:	1.55 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
http://wwpdb.org/validation/2016/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

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

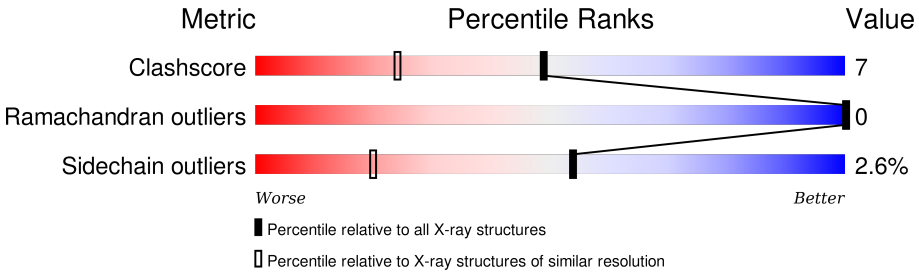
MolProbity	:	4.02b-467
Mogul	:	1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20151230.v01 (using entries in the PDB archive December 30th 2015)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	trunk26865

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 1.55 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	102246	1014 (1.56-1.56)
Ramachandran outliers	100387	1704 (1.58-1.54)
Sidechain outliers	100360	1702 (1.58-1.54)

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 <=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.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	217	65% 22% • 10%
1	B	217	66% 22% • 10%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 3225 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 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	196	Total	C	N	O	S	0	0	0
			1463	907	259	284	13			
1	B	196	Total	C	N	O	S	0	0	0
			1461	906	259	283	13			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	2	ALA	ASN	CLONING ARTIFACT	UNP P0A7J0
B	2	ALA	ASN	CLONING ARTIFACT	UNP P0A7J0

- Molecule 2 is GOLD ION (three-letter code: AU) (formula: Au).

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

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	136	Total	O	0	0
			136	136		
3	B	163	Total	O	0	0
			163	163		

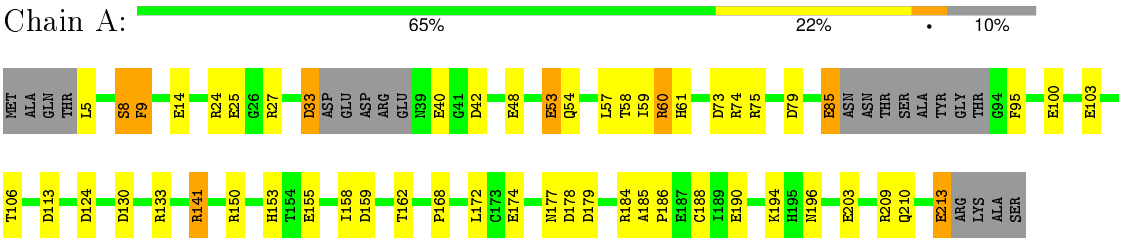
3 Residue-property plots (i)

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

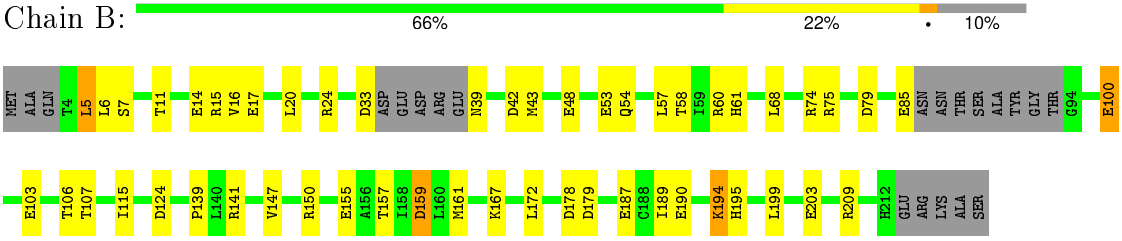
- Molecule 1: 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE

Chain A:



- Molecule 1: 3,4-DIHYDROXY-2-BUTANONE 4-PHOSPHATE SYNTHASE

Chain B:



4 Data and refinement statistics (i)

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

Property	Value	Source
Space group	P 31	Depositor
Cell constants a, b, c, α, β, γ	78.22Å 78.22Å 69.88Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	25.00 – 1.55	Depositor
% Data completeness (in resolution range)	90.5 (25.00-1.55)	Depositor
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	TNT V. 5-E	Depositor
R, R_{free}	0.185 , 0.231	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3225	wwPDB-VP
Average B, all atoms (Å^2)	21.0	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: AU

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	1.15	12/1481 (0.8%)	1.62	33/2003 (1.6%)
1	B	1.11	12/1479 (0.8%)	1.63	29/2001 (1.4%)
All	All	1.13	24/2960 (0.8%)	1.62	62/4004 (1.5%)

All (24) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	213	GLU	CD-OE2	9.08	1.35	1.25
1	A	190	GLU	CD-OE2	8.53	1.35	1.25
1	B	103	GLU	CD-OE2	7.80	1.34	1.25
1	A	174	GLU	CD-OE2	7.68	1.34	1.25
1	B	155	GLU	CD-OE2	7.40	1.33	1.25
1	B	100	GLU	CD-OE2	7.35	1.33	1.25
1	B	190	GLU	CD-OE1	-7.13	1.17	1.25
1	A	103	GLU	CD-OE2	7.02	1.33	1.25
1	A	14	GLU	CD-OE2	6.80	1.33	1.25
1	B	203	GLU	CD-OE2	6.58	1.32	1.25
1	A	53	GLU	CD-OE2	6.27	1.32	1.25
1	A	25	GLU	CD-OE2	6.24	1.32	1.25
1	A	85	GLU	CD-OE2	6.20	1.32	1.25
1	B	48	GLU	CD-OE2	6.07	1.32	1.25
1	B	85	GLU	CD-OE2	5.86	1.32	1.25
1	B	17	GLU	CD-OE2	5.83	1.32	1.25
1	B	53	GLU	CD-OE2	5.68	1.31	1.25
1	A	100	GLU	CD-OE2	5.60	1.31	1.25
1	B	141	ARG	CZ-NH1	5.54	1.40	1.33
1	A	40	GLU	CD-OE2	5.51	1.31	1.25
1	B	48	GLU	CD-OE1	-5.30	1.19	1.25
1	A	155	GLU	CD-OE2	5.23	1.31	1.25
1	A	48	GLU	CD-OE2	5.18	1.31	1.25
1	B	187	GLU	CD-OE2	5.17	1.31	1.25

All (62) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	141	ARG	NE-CZ-NH2	-16.99	111.81	120.30
1	A	141	ARG	NE-CZ-NH2	-11.25	114.67	120.30
1	B	60	ARG	NE-CZ-NH1	9.88	125.24	120.30
1	A	42	ASP	CB-CG-OD2	-9.87	109.42	118.30
1	A	24	ARG	NE-CZ-NH2	-9.34	115.63	120.30
1	A	42	ASP	CB-CG-OD1	9.21	126.59	118.30
1	A	178	ASP	CB-CG-OD1	9.05	126.45	118.30
1	B	74	ARG	NE-CZ-NH1	9.04	124.82	120.30
1	B	75	ARG	NE-CZ-NH1	8.85	124.72	120.30
1	B	75	ARG	NE-CZ-NH2	-8.78	115.91	120.30
1	B	24	ARG	NE-CZ-NH1	8.53	124.56	120.30
1	B	60	ARG	NE-CZ-NH2	-8.32	116.14	120.30
1	B	141	ARG	NE-CZ-NH1	8.27	124.44	120.30
1	A	27	ARG	NE-CZ-NH2	-8.25	116.17	120.30
1	A	178	ASP	CB-CG-OD2	-8.03	111.07	118.30
1	B	209	ARG	NE-CZ-NH2	-7.69	116.45	120.30
1	B	24	ARG	NE-CZ-NH2	-7.54	116.53	120.30
1	B	150	ARG	NE-CZ-NH2	-7.48	116.56	120.30
1	A	79	ASP	CB-CG-OD2	-7.33	111.70	118.30
1	A	150	ARG	NE-CZ-NH2	-7.32	116.64	120.30
1	B	159	ASP	CB-CG-OD1	7.32	124.88	118.30
1	B	42	ASP	CB-CG-OD1	7.18	124.76	118.30
1	B	79	ASP	CB-CG-OD2	-7.08	111.93	118.30
1	A	124	ASP	CB-CG-OD2	-7.02	111.98	118.30
1	B	79	ASP	CB-CG-OD1	6.87	124.48	118.30
1	B	124	ASP	CB-CG-OD2	-6.79	112.19	118.30
1	A	179	ASP	CB-CG-OD1	6.74	124.37	118.30
1	A	141	ARG	NE-CZ-NH1	6.71	123.66	120.30
1	B	209	ARG	NE-CZ-NH1	6.70	123.65	120.30
1	B	179	ASP	CB-CG-OD2	-6.69	112.28	118.30
1	A	33	ASP	CB-CG-OD2	-6.53	112.42	118.30
1	A	159	ASP	CB-CG-OD1	6.52	124.17	118.30
1	A	33	ASP	CB-CG-OD1	6.50	124.15	118.30
1	B	179	ASP	CB-CG-OD1	6.47	124.12	118.30
1	B	39	ASN	N-CA-CB	6.42	122.16	110.60
1	A	9	PHE	CB-CG-CD1	-6.28	116.41	120.80
1	A	130	ASP	CB-CG-OD2	-6.23	112.69	118.30
1	B	42	ASP	CB-CG-OD2	-6.22	112.71	118.30
1	A	179	ASP	CB-CG-OD2	-6.18	112.74	118.30
1	A	113	ASP	CB-CG-OD1	6.08	123.78	118.30
1	A	24	ARG	CD-NE-CZ	6.08	132.11	123.60
1	A	60	ARG	NE-CZ-NH1	6.07	123.34	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	33	ASP	CB-CG-OD1	6.02	123.72	118.30
1	A	53	GLU	CG-CD-OE1	5.92	130.13	118.30
1	B	43	MET	CB-CA-C	-5.75	98.91	110.40
1	B	178	ASP	CB-CG-OD2	-5.73	113.14	118.30
1	A	209	ARG	NE-CZ-NH1	5.73	123.16	120.30
1	A	74	ARG	NE-CZ-NH1	5.70	123.15	120.30
1	A	196	ASN	N-CA-CB	5.68	120.83	110.60
1	A	209	ARG	NE-CZ-NH2	-5.68	117.46	120.30
1	B	60	ARG	CD-NE-CZ	5.60	131.44	123.60
1	A	95	PHE	CB-CG-CD2	-5.51	116.94	120.80
1	B	150	ARG	NE-CZ-NH1	5.51	123.06	120.30
1	B	74	ARG	NE-CZ-NH2	-5.41	117.59	120.30
1	B	178	ASP	CB-CG-OD1	5.39	123.15	118.30
1	B	39	ASN	CB-CA-C	-5.37	99.66	110.40
1	A	73	ASP	CB-CG-OD2	-5.22	113.60	118.30
1	A	133	ARG	NE-CZ-NH2	-5.20	117.70	120.30
1	A	113	ASP	CB-CG-OD2	-5.16	113.65	118.30
1	A	75	ARG	NE-CZ-NH1	5.09	122.84	120.30
1	A	48	GLU	CB-CA-C	-5.03	100.33	110.40
1	A	106	THR	CA-CB-CG2	-5.03	105.36	112.40

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	1463	0	1458	23	0
1	B	1461	0	1459	19	0
2	A	1	0	0	1	0
2	B	1	0	0	0	0
3	A	136	0	0	5	0
3	B	163	0	0	4	0
All	All	3225	0	2917	42	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 7.

All (42) 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:57:LEU:HD12	1:A:61:HIS:HD2	1.49	0.77
1:A:57:LEU:CD1	1:A:61:HIS:HD2	1.97	0.76
1:B:167:LYS:NZ	3:B:420:HOH:O	2.21	0.73
1:A:54:GLN:O	1:A:58:THR:HG23	1.89	0.72
1:A:203:GLU:HG2	3:A:428:HOH:O	1.89	0.72
1:A:85:GLU:HG2	3:A:353:HOH:O	1.89	0.71
1:B:195:HIS:ND1	3:B:449:HOH:O	2.25	0.69
1:A:158:ILE:O	1:A:162:THR:HG23	1.93	0.68
1:A:188:CYS:SG	2:A:302:AU:AU	2.25	0.64
1:B:54:GLN:O	1:B:58:THR:HG23	2.03	0.58
1:B:5:LEU:HB3	1:B:189:ILE:HD13	1.86	0.56
1:A:5:LEU:HB2	3:A:375:HOH:O	2.07	0.54
1:A:177:ASN:ND2	1:A:184:ARG:HH12	2.06	0.53
1:B:11:THR:OG1	1:B:14:GLU:HG3	2.08	0.53
1:A:184:ARG:NH2	3:A:366:HOH:O	2.40	0.52
1:B:5:LEU:HB3	1:B:189:ILE:CD1	2.40	0.52
1:B:167:LYS:HE2	3:B:412:HOH:O	2.09	0.51
1:B:172:LEU:HD12	1:B:172:LEU:C	2.30	0.51
1:A:8:SER:HB2	1:A:9:PHE:CD1	2.45	0.51
1:A:59:ILE:O	3:A:391:HOH:O	2.20	0.51
1:B:106:THR:OG1	1:B:107:THR:N	2.45	0.50
1:A:210:GLN:HA	1:A:213:GLU:HG3	1.94	0.49
1:A:57:LEU:CD1	1:A:61:HIS:CD2	2.87	0.48
1:B:57:LEU:HD12	1:B:61:HIS:HD2	1.79	0.48
1:B:194:LYS:HE3	3:B:388:HOH:O	2.13	0.47
1:A:33:ASP:HB2	1:A:153:HIS:CE1	2.49	0.47
1:B:57:LEU:CD1	1:B:61:HIS:HD2	2.28	0.47
1:A:60:ARG:NH1	1:A:60:ARG:HG3	2.30	0.46
1:A:60:ARG:HD2	1:A:60:ARG:HA	1.70	0.46
1:A:172:LEU:C	1:A:172:LEU:HD12	2.36	0.45
1:B:194:LYS:HB2	1:B:194:LYS:HE2	1.47	0.45
1:A:57:LEU:HD11	1:A:61:HIS:HD2	1.80	0.45
1:A:57:LEU:HD11	1:A:61:HIS:CD2	2.54	0.43
1:A:185:ALA:N	1:A:186:PRO:HD2	2.34	0.43
1:A:162:THR:HG22	1:A:168:PRO:HB3	2.00	0.43
1:A:141:ARG:C	1:A:141:ARG:HD2	2.39	0.43
1:B:157:THR:O	1:B:161:MET:HG2	2.20	0.41
1:B:147:VAL:HG22	1:B:159:ASP:OD2	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:6:LEU:CD1	1:B:199:LEU:HD22	2.51	0.41
1:B:16:VAL:O	1:B:20:LEU:HG	2.21	0.41
1:B:68:LEU:O	1:B:139:PRO:HA	2.21	0.41
1:B:11:THR:O	1:B:15:ARG:HG3	2.21	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	190/217 (88%)	188 (99%)	2 (1%)	0	100	100
1	B	190/217 (88%)	187 (98%)	3 (2%)	0	100	100
All	All	380/434 (88%)	375 (99%)	5 (1%)	0	100	100

There are no Ramachandran outliers to report.

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	154/171 (90%)	151 (98%)	3 (2%)	65	33
1	B	154/171 (90%)	149 (97%)	5 (3%)	46	13
All	All	308/342 (90%)	300 (97%)	8 (3%)	54	20

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	8	SER
1	A	53	GLU
1	A	194	LYS
1	B	5	LEU
1	B	7	SER
1	B	100	GLU
1	B	115	ILE
1	B	194	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	61	HIS
1	A	132	ASN
1	A	177	ASN
1	B	61	HIS
1	B	132	ASN

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 carbohydrates in this entry.

5.6 Ligand geometry

Of 2 ligands modelled in this entry, 2 are 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.

No monomer is involved in short contacts.

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.