



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 20, 2026 – 01:02 PM UTC

PDB ID : 5CM0 / pdb\_00005cm0  
Title : Crystal structure of branched-chain aminotransferase from thermophilic archaea *Geoglobus acetivorans*  
Authors : Boyko, K.M.; Nikolaeva, A.Y.; Stekhanova, T.N.; Mardanov, A.V.; Rakitin, A.L.; Ravin, N.V.; Popov, V.O.  
Deposited on : 2015-07-16  
Resolution : 1.90 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](mailto: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>.

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

MolProbity : 4-5-2 with Phenix2.0  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtriage (Phenix) : 2.0  
EDS : 3.0  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
CCP4 : 9.0.010 (Gargrove)  
Density-Fitness : 1.0.12  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.49

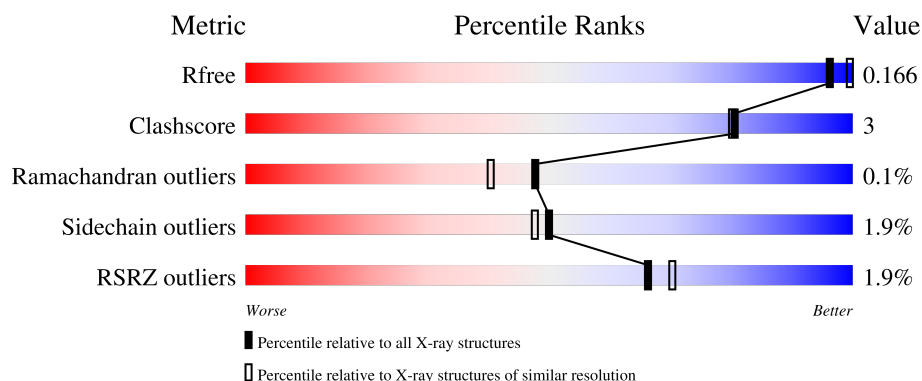
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.90 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))
$R_{free}$	180053	7789 (1.90-1.90)
Clashscore	190562	8410 (1.90-1.90)
Ramachandran outliers	187476	8333 (1.90-1.90)
Sidechain outliers	187428	8333 (1.90-1.90)
RSRZ outliers	180081	7790 (1.90-1.90)

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  $\geq 3$ , 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  $\leq 5\%$ . 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	292	<div> <div>2%</div> <div>87%</div> <div>8%</div> <div>..</div> </div>
1	B	292	<div> <div>2%</div> <div>90%</div> <div>7%</div> <div>..</div> </div>
1	C	292	<div> <div>%</div> <div>87%</div> <div>8%</div> <div>..</div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	PLP	A	301	-	X	-	-

## 2 Entry composition [i](#)

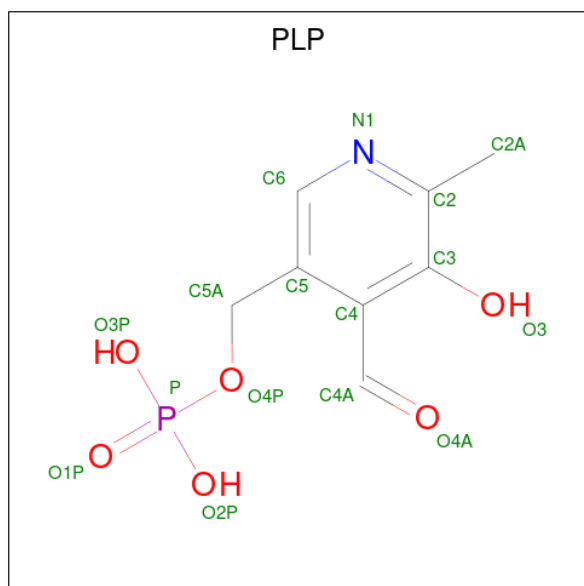
There are 4 unique types of molecules in this entry. The entry contains 7297 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Branched-chain transaminase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	282	Total	C	N	O	S	0	5	0
			2205	1409	376	415	5			
1	B	287	Total	C	N	O	S	0	3	0
			2236	1430	377	424	5			
1	C	280	Total	C	N	O	S	0	3	0
			2173	1390	368	410	5			

- Molecule 2 is PYRIDOXAL-5'-PHOSPHATE (CCD ID: PLP) (formula:  $C_8H_{10}NO_6P$ ).



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

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula:  $C_3H_8O_3$ ).



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

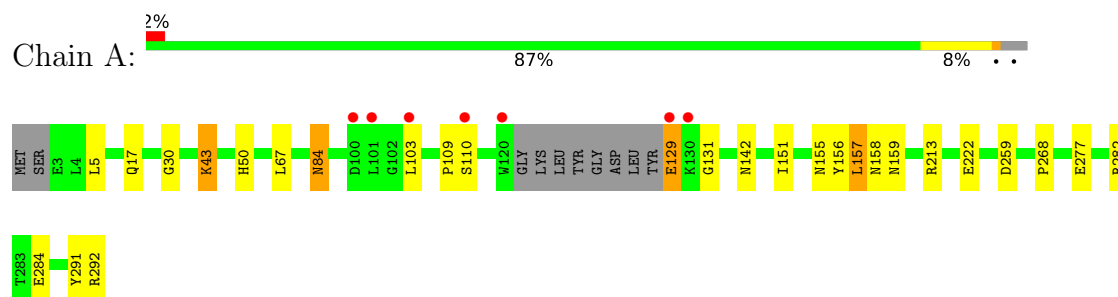
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	223	Total	O	0	0
			223	223		
4	B	211	Total	O	0	0
			211	211		
4	C	192	Total	O	0	0
			192	192		

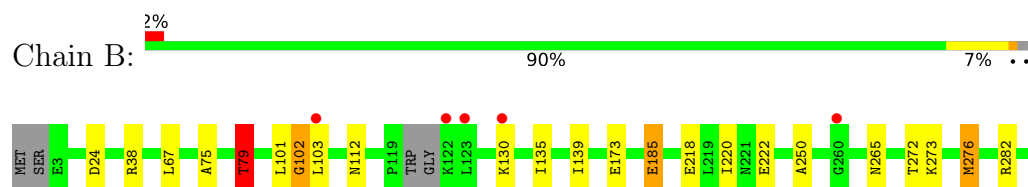
### 3 Residue-property plots

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.

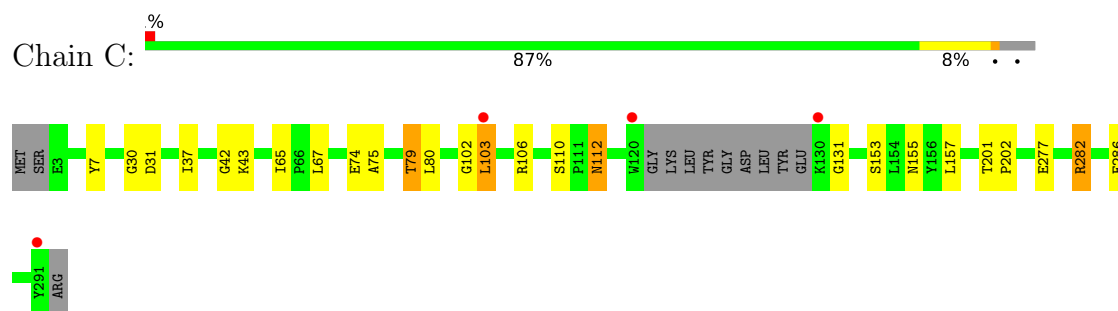
- Molecule 1: Branched-chain transaminase



- Molecule 1: Branched-chain transaminase



- Molecule 1: Branched-chain transaminase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	117.65Å 117.65Å 135.98Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	101.89 – 1.90 101.89 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.6 (101.89-1.90) 99.6 (101.89-1.90)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.31 (at 1.90Å)	Xtriage
Refinement program	REFMAC 5.8.0124	Depositor
R, $R_{free}$	0.151 , 0.188 0.166 , 0.166	Depositor DCC
$R_{free}$ test set	4229 reflections (4.92%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	30.2	Xtriage
Anisotropy	0.275	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 35.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.019 for -h,-k,l	Xtriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	7297	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	38.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.50% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: GOL, PLP

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	1.54	18/2273 (0.8%)	1.17	8/3080 (0.3%)
1	B	1.38	7/2291 (0.3%)	1.15	2/3105 (0.1%)
1	C	1.39	10/2226 (0.4%)	1.15	11/3022 (0.4%)
All	All	1.44	35/6790 (0.5%)	1.16	21/9207 (0.2%)

All (35) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	292[A]	ARG	N-CA	18.14	1.80	1.46
1	A	292[B]	ARG	N-CA	18.14	1.80	1.46
1	A	292[A]	ARG	CB-CG	10.02	1.82	1.52
1	A	292[B]	ARG	CB-CG	10.02	1.82	1.52
1	C	30	GLY	C-N	-9.59	1.21	1.33
1	C	74	GLU	N-CA	7.08	1.54	1.46
1	A	213	ARG	CA-C	6.70	1.61	1.52
1	A	110	SER	C-N	-6.52	1.25	1.33
1	A	151	ILE	N-CA	6.45	1.53	1.46
1	B	218	GLU	N-CA	6.39	1.53	1.46
1	B	276	MET	SD-CE	-6.29	1.63	1.79
1	C	37	ILE	N-CA	6.25	1.53	1.46
1	C	80	LEU	CA-C	6.13	1.60	1.52
1	B	265	ASN	CA-C	-6.06	1.44	1.52
1	A	30	GLY	C-O	6.00	1.30	1.24
1	B	185	GLU	C-O	5.98	1.30	1.24
1	C	43	LYS	CA-C	5.79	1.59	1.52
1	A	5	LEU	CA-C	5.68	1.59	1.52
1	B	38	ARG	N-CA	5.61	1.52	1.46
1	C	131	GLY	N-CA	5.51	1.50	1.44
1	B	130	LYS	CA-C	5.39	1.59	1.52
1	A	142	ASN	CA-C	5.29	1.59	1.52
1	A	110	SER	N-CA	-5.28	1.41	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	277	GLU	N-CA	5.27	1.52	1.46
1	C	31	ASP	C-N	-5.25	1.26	1.33
1	A	277	GLU	C-O	-5.23	1.18	1.24
1	A	30	GLY	C-N	-5.20	1.27	1.33
1	A	43	LYS	N-CA	5.20	1.52	1.46
1	A	131	GLY	N-CA	5.20	1.49	1.44
1	A	259	ASP	C-O	-5.18	1.17	1.23
1	C	65	ILE	CA-C	5.17	1.58	1.52
1	B	220	ILE	CA-CB	5.11	1.60	1.54
1	A	259	ASP	CA-C	5.08	1.59	1.53
1	A	158	ASN	N-CA	5.06	1.52	1.46
1	C	153	SER	CA-C	-5.03	1.46	1.52

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	292[A]	ARG	N-CA-CB	-7.32	98.06	110.50
1	A	292[B]	ARG	N-CA-CB	-7.32	98.06	110.50
1	A	84	ASN	N-CA-C	7.03	121.09	111.54
1	C	112	ASN	N-CA-CB	-6.72	99.14	110.83
1	A	109	PRO	CA-C-N	-6.37	115.13	122.52
1	A	109	PRO	C-N-CA	-6.37	115.13	122.52
1	B	103	LEU	N-CA-C	6.24	119.06	111.82
1	C	201	THR	CA-C-N	-6.07	115.23	119.66
1	C	201	THR	C-N-CA	-6.07	115.23	119.66
1	C	103	LEU	CB-CA-C	-5.84	99.45	110.67
1	C	110	SER	N-CA-C	5.81	121.64	108.74
1	C	42	GLY	N-CA-C	5.66	123.17	115.30
1	A	103	LEU	N-CA-C	5.60	118.15	111.71
1	C	103	LEU	N-CA-C	5.58	118.29	111.82
1	A	50	HIS	N-CA-C	5.39	117.16	111.28
1	A	110	SER	O-C-N	-5.34	117.00	121.44
1	C	202	PRO	O-C-N	5.33	123.76	121.31
1	B	79	THR	CB-CA-C	5.30	120.84	110.67
1	C	202	PRO	N-CA-C	5.03	115.30	110.47
1	C	102	GLY	CA-C-N	5.01	127.93	120.31
1	C	102	GLY	C-N-CA	5.01	127.93	120.31

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	2205	0	2179	10	0
1	B	2236	0	2212	14	0
1	C	2173	0	2151	10	0
2	A	15	0	6	1	0
2	B	15	0	6	1	0
2	C	15	0	6	0	0
3	A	6	0	8	1	0
3	C	6	0	8	0	0
4	A	223	0	0	0	1
4	B	211	0	0	6	2
4	C	192	0	0	3	1
All	All	7297	0	6576	31	4

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 3.

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:157:LEU:H	1:C:155:ASN:HD21	1.28	0.77
1:B:273:LYS:HA	1:B:276:MET:HE3	1.67	0.75
1:B:102:GLY:HA2	4:B:403:HOH:O	1.91	0.71
1:A:155:ASN:HD21	1:C:157:LEU:H	1.39	0.70
1:B:102:GLY:N	4:B:403:HOH:O	2.27	0.67
1:A:129:GLU:HG2	1:A:268:PRO:HG2	1.77	0.66
1:B:272:THR:HG22	1:B:276:MET:HE2	1.78	0.66
1:C:112:ASN:CG	4:C:401:HOH:O	2.43	0.62
1:B:102:GLY:CA	4:B:403:HOH:O	2.47	0.62
1:B:101:LEU:C	4:B:403:HOH:O	2.43	0.61
1:C:112:ASN:ND2	4:C:401:HOH:O	2.37	0.58
1:B:282:ARG:HD2	1:B:286:GLU:OE2	2.05	0.56
1:B:250:ALA:HB3	4:B:520:HOH:O	2.06	0.56
1:B:173:GLU:OE2	4:B:402:HOH:O	2.18	0.55
1:B:75:ALA:O	1:B:79:THR:CG2	2.56	0.54
1:B:75:ALA:O	1:B:79:THR:HG22	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:43:LYS:NZ	1:A:284:GLU:O	2.45	0.49
1:B:185:GLU:OE1	2:B:301:PLP:N1	2.46	0.49
1:C:75:ALA:O	1:C:79:THR:CG2	2.63	0.47
1:A:129:GLU:HB2	3:A:302:GOL:C1	2.45	0.46
1:A:222:GLU:OE2	1:A:282:ARG:NH2	2.49	0.46
1:B:24:ASP:OD2	1:B:112:ASN:ND2	2.48	0.43
1:C:282:ARG:HD2	1:C:286:GLU:OE2	2.18	0.43
1:B:222:GLU:OE2	1:B:282:ARG:NH2	2.51	0.43
1:C:75:ALA:O	1:C:79:THR:HG23	2.19	0.42
1:A:157:LEU:H	1:C:155:ASN:ND2	2.06	0.42
1:A:159:ASN:H	1:A:159:ASN:HD22	1.68	0.41
1:A:156:TYR:OH	2:A:301:PLP:O3	2.35	0.41
1:C:7:TYR:HB2	1:C:79:THR:HG21	2.01	0.41
1:C:106:ARG:NH1	4:C:404:HOH:O	2.51	0.41

All (4) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:427:HOH:O	4:B:427:HOH:O[5_554]	0.56	1.64
4:A:592:HOH:O	4:A:592:HOH:O[5_554]	0.82	1.38
4:C:431:HOH:O	4:C:431:HOH:O[5_554]	0.84	1.36
4:B:495:HOH:O	4:B:495:HOH:O[5_554]	1.20	1.00

## 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	282/292 (97%)	274 (97%)	8 (3%)	0	100	100
1	B	286/292 (98%)	277 (97%)	8 (3%)	1 (0%)	36	29
1	C	279/292 (96%)	270 (97%)	9 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	847/876 (97%)	821 (97%)	25 (3%)	1 (0%)	48 40

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	102	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	235/247 (95%)	230 (98%)	5 (2%)	47 44
1	B	235/247 (95%)	231 (98%)	4 (2%)	53 52
1	C	229/247 (93%)	225 (98%)	4 (2%)	53 52
All	All	699/741 (94%)	686 (98%)	13 (2%)	50 47

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	17	GLN
1	A	67	LEU
1	A	84	ASN
1	A	129	GLU
1	A	157	LEU
1	B	67	LEU
1	B	79	THR
1	B	135	ILE
1	B	139	ILE
1	C	67	LEU
1	C	79	THR
1	C	103	LEU
1	C	282	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	142	ASN
1	A	155	ASN
1	A	159	ASN
1	A	179	HIS
1	A	180	ASN
1	A	196	ASN
1	A	285	ASN
1	B	84	ASN
1	B	142	ASN
1	B	155	ASN
1	B	159	ASN
1	B	196	ASN
1	B	285	ASN
1	C	112	ASN
1	C	142	ASN
1	C	155	ASN
1	C	159	ASN
1	C	179	HIS
1	C	196	ASN

### 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 oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

5 ligands are modelled in this entry.

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	$\# Z  > 2$
2	PLP	B	301	1	15,15,16	2.33	5 (33%)	21,22,23	2.67	9 (42%)
3	GOL	A	302	-	5,5,5	0.42	0	5,5,5	0.91	0
2	PLP	C	301	1	15,15,16	2.84	6 (40%)	21,22,23	2.01	6 (28%)
2	PLP	A	301	1	15,15,16	2.69	4 (26%)	21,22,23	2.54	11 (52%)
3	GOL	C	302	-	5,5,5	0.43	0	5,5,5	0.61	0

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
2	PLP	B	301	1	-	0/6/6/8	0/1/1/1
3	GOL	A	302	-	-	4/4/4/4	-
2	PLP	C	301	1	-	0/6/6/8	0/1/1/1
2	PLP	A	301	1	-	5/6/6/8	0/1/1/1
3	GOL	C	302	-	-	2/4/4/4	-

All (15) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	301	PLP	C3-C2	7.26	1.48	1.41
2	A	301	PLP	C3-C2	6.41	1.47	1.41
2	A	301	PLP	C5-C4	6.05	1.47	1.40
2	C	301	PLP	C5-C4	6.05	1.47	1.40
2	B	301	PLP	C3-C2	5.54	1.46	1.41
2	B	301	PLP	C5-C4	4.22	1.45	1.40
2	A	301	PLP	C3-C4	4.03	1.47	1.40
2	B	301	PLP	O4P-C5A	-3.09	1.33	1.44
2	C	301	PLP	C3-C4	3.01	1.45	1.40
2	A	301	PLP	O4P-C5A	-2.77	1.34	1.44
2	B	301	PLP	C3-C4	2.75	1.45	1.40
2	B	301	PLP	P-O4P	2.50	1.68	1.60
2	C	301	PLP	O4P-C5A	-2.37	1.36	1.44
2	C	301	PLP	C6-C5	2.28	1.42	1.37
2	C	301	PLP	C5A-C5	2.17	1.56	1.50

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	301	PLP	O4P-C5A-C5	6.23	121.04	109.36
2	B	301	PLP	C2A-C2-C3	-5.83	113.97	120.80
2	A	301	PLP	O4P-P-O1P	-4.98	92.99	106.44
2	A	301	PLP	O4P-C5A-C5	4.52	117.83	109.36
2	B	301	PLP	O4P-P-O1P	-4.40	94.56	106.44
2	C	301	PLP	O3P-P-O4P	-4.28	95.51	106.67
2	B	301	PLP	C6-C5-C4	4.00	121.38	118.10
2	C	301	PLP	O4P-C5A-C5	3.92	116.70	109.36
2	A	301	PLP	C6-N1-C2	3.74	125.98	119.20
2	A	301	PLP	C5A-C5-C6	-3.47	113.70	119.36
2	B	301	PLP	C2A-C2-N1	3.45	124.15	117.64
2	C	301	PLP	C6-N1-C2	3.33	125.24	119.20
2	C	301	PLP	O3P-P-O2P	3.00	119.05	107.80
2	A	301	PLP	O2P-P-O1P	2.91	122.17	110.83
2	A	301	PLP	O3P-P-O2P	2.59	117.50	107.80
2	A	301	PLP	O3P-P-O4P	-2.55	100.01	106.67
2	A	301	PLP	C4A-C4-C5	2.52	123.53	120.94
2	A	301	PLP	C2A-C2-N1	2.50	122.35	117.64
2	C	301	PLP	C2A-C2-N1	2.39	122.15	117.64
2	A	301	PLP	C6-C5-C4	2.30	119.98	118.10
2	C	301	PLP	O3P-P-O1P	2.26	119.65	110.83
2	B	301	PLP	C5A-C5-C4	-2.17	118.36	122.64
2	A	301	PLP	C5-C6-N1	-2.16	120.32	123.83
2	B	301	PLP	O3-C3-C2	2.16	122.05	117.58
2	B	301	PLP	O3P-P-O2P	2.01	115.32	107.80
2	B	301	PLP	C3-C4-C5	-2.00	116.19	118.59

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	301	PLP	C4-C5-C5A-O4P
2	A	301	PLP	C6-C5-C5A-O4P
2	A	301	PLP	C5A-O4P-P-O2P
2	A	301	PLP	C5A-O4P-P-O3P
3	A	302	GOL	O1-C1-C2-C3
3	A	302	GOL	C1-C2-C3-O3
3	A	302	GOL	O2-C2-C3-O3
3	C	302	GOL	O1-C1-C2-C3
3	A	302	GOL	O1-C1-C2-O2
3	C	302	GOL	O1-C1-C2-O2
2	A	301	PLP	C5A-O4P-P-O1P

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	301	PLP	1	0
3	A	302	GOL	1	0
2	A	301	PLP	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	282/292 (96%)	-0.13	7 (2%) 58 62	21, 34, 50, 85	4 (1%)
1	B	287/292 (98%)	0.01	5 (1%) 69 72	21, 35, 54, 65	3 (1%)
1	C	280/292 (95%)	0.19	4 (1%) 73 76	21, 38, 58, 72	3 (1%)
All	All	849/876 (96%)	0.02	16 (1%) 66 70	21, 35, 55, 85	10 (1%)

All (16) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	130	LYS	3.2
1	A	129	GLU	2.7
1	B	123	LEU	2.6
1	B	260	GLY	2.6
1	A	130	LYS	2.5
1	C	120	TRP	2.5
1	C	291	TYR	2.5
1	B	122	LYS	2.3
1	A	101	LEU	2.3
1	A	110	SER	2.2
1	B	130	LYS	2.2
1	A	120	TRP	2.2
1	A	100	ASP	2.2
1	C	103	LEU	2.2
1	A	103	LEU	2.1
1	B	103	LEU	2.1

### 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 oligosaccharides 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. The B-factors column lists the minimum, median, 95<sup>th</sup> 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( $\text{\AA}^2$ )	Q<0.9
3	GOL	A	302	6/6	0.86	0.15	58,64,68,73	0
3	GOL	C	302	6/6	0.87	0.13	63,68,71,74	0
2	PLP	C	301	15/16	0.97	0.06	28,32,34,37	0
2	PLP	A	301	15/16	0.98	0.06	27,29,34,42	0
2	PLP	B	301	15/16	0.99	0.05	26,30,33,34	0

### 6.5 Other polymers [i](#)

There are no such residues in this entry.