



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 05:05 AM UTC

PDB ID : 2Y4R / pdb_00002y4r
Title : CRYSTAL STRUCTURE OF 4-AMINO-4-DEOXYCHORISMATE LYASE
FROM PSEUDOMONAS AERUGINOSA
Authors : O'Rourke, P.E.F.; Eadsforth, T.C.; Fyfe, P.K.; Shepard, S.M.; Agacan, M.;
Hunter, W.N.
Deposited on : 2011-01-10
Resolution : 1.75 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	:	4-5-2 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

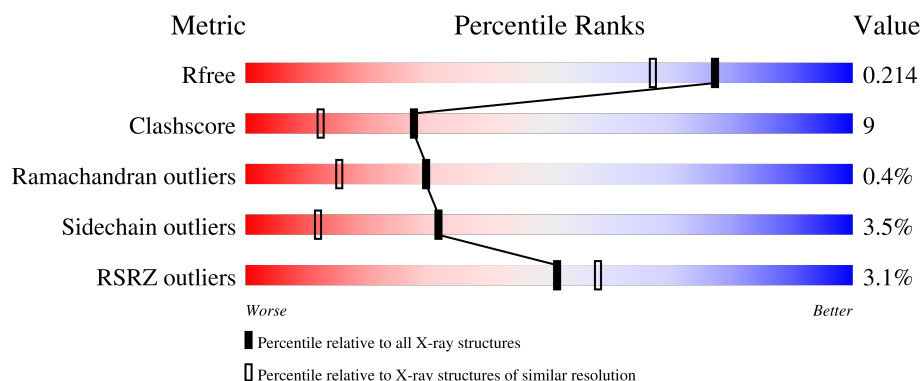
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

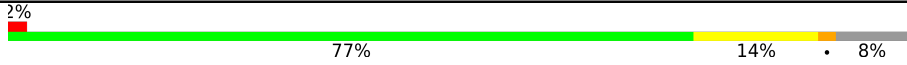
The reported resolution of this entry is 1.75 Å.

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	3183 (1.76-1.76)
Clashscore	190562	3299 (1.76-1.76)
Ramachandran outliers	187476	3274 (1.76-1.76)
Sidechain outliers	187428	3274 (1.76-1.76)
RSRZ outliers	180081	3183 (1.76-1.76)

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 $\leq 5\%$. 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	
1	B	292	

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	1140	-	X	-	-
2	PLP	B	1140	-	X	-	-

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 5004 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 4-AMINO-4-DEOXYCHORISMATE LYASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	270	Total	C	N	O	S	6	19	0
			2212	1406	405	391	10			
1	B	270	Total	C	N	O	S	6	12	0
			2166	1371	396	389	10			

There are 42 discrepancies between the modelled and reference sequences:

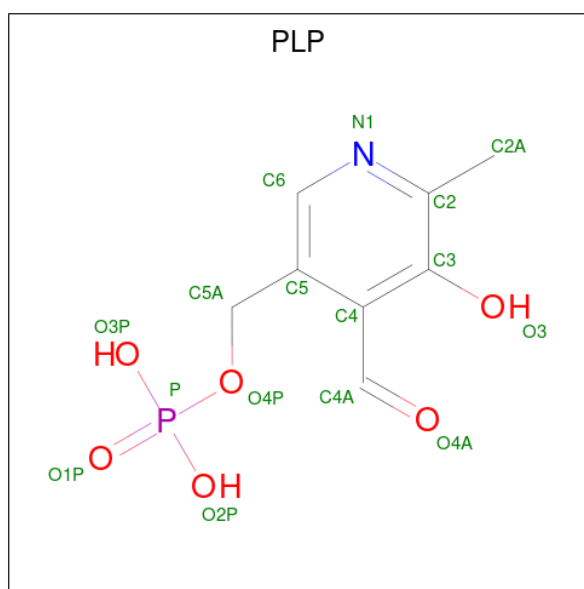
Chain	Residue	Modelled	Actual	Comment	Reference
A	-20	MET	-	expression tag	UNP Q9HZN6
A	-19	GLY	-	expression tag	UNP Q9HZN6
A	-18	SER	-	expression tag	UNP Q9HZN6
A	-17	SER	-	expression tag	UNP Q9HZN6
A	-16	HIS	-	expression tag	UNP Q9HZN6
A	-15	HIS	-	expression tag	UNP Q9HZN6
A	-14	HIS	-	expression tag	UNP Q9HZN6
A	-13	HIS	-	expression tag	UNP Q9HZN6
A	-12	HIS	-	expression tag	UNP Q9HZN6
A	-11	HIS	-	expression tag	UNP Q9HZN6
A	-10	SER	-	expression tag	UNP Q9HZN6
A	-9	SER	-	expression tag	UNP Q9HZN6
A	-8	GLY	-	expression tag	UNP Q9HZN6
A	-7	GLU	-	expression tag	UNP Q9HZN6
A	-6	ASN	-	expression tag	UNP Q9HZN6
A	-5	LEU	-	expression tag	UNP Q9HZN6
A	-4	TYR	-	expression tag	UNP Q9HZN6
A	-3	PHE	-	expression tag	UNP Q9HZN6
A	-2	GLN	-	expression tag	UNP Q9HZN6
A	-1	GLY	-	expression tag	UNP Q9HZN6
A	0	HIS	-	expression tag	UNP Q9HZN6
B	-20	MET	-	expression tag	UNP Q9HZN6
B	-19	GLY	-	expression tag	UNP Q9HZN6
B	-18	SER	-	expression tag	UNP Q9HZN6
B	-17	SER	-	expression tag	UNP Q9HZN6

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	HIS	-	expression tag	UNP Q9HZN6
B	-15	HIS	-	expression tag	UNP Q9HZN6
B	-14	HIS	-	expression tag	UNP Q9HZN6
B	-13	HIS	-	expression tag	UNP Q9HZN6
B	-12	HIS	-	expression tag	UNP Q9HZN6
B	-11	HIS	-	expression tag	UNP Q9HZN6
B	-10	SER	-	expression tag	UNP Q9HZN6
B	-9	SER	-	expression tag	UNP Q9HZN6
B	-8	GLY	-	expression tag	UNP Q9HZN6
B	-7	GLU	-	expression tag	UNP Q9HZN6
B	-6	ASN	-	expression tag	UNP Q9HZN6
B	-5	LEU	-	expression tag	UNP Q9HZN6
B	-4	TYR	-	expression tag	UNP Q9HZN6
B	-3	PHE	-	expression tag	UNP Q9HZN6
B	-2	GLN	-	expression tag	UNP Q9HZN6
B	-1	GLY	-	expression tag	UNP Q9HZN6
B	0	HIS	-	expression tag	UNP Q9HZN6

- 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		

- Molecule 3 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: $C_8H_{18}O_5$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			13	8	5		
3	A	1	Total	C	O	0	0
			13	8	5		
3	A	1	Total	C	O	0	0
			13	8	5		
3	B	1	Total	C	O	0	0
			13	8	5		
3	B	1	Total	C	O	0	0
			13	8	5		

- Molecule 4 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

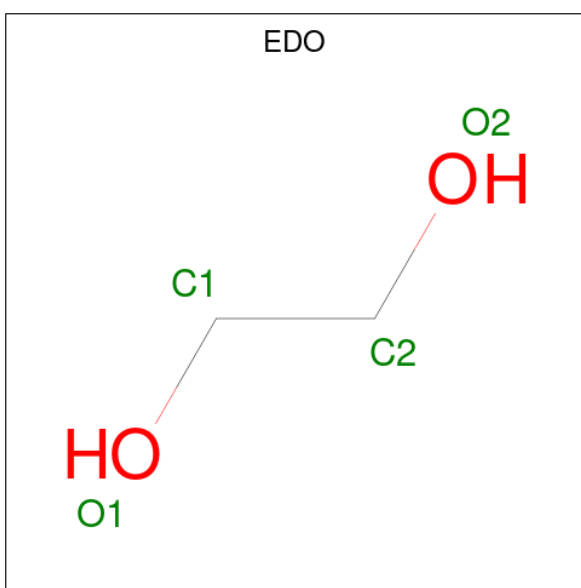
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	3	Total	Cl	0	0
			3	3		

- Molecule 5 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



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

- Molecule 6 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



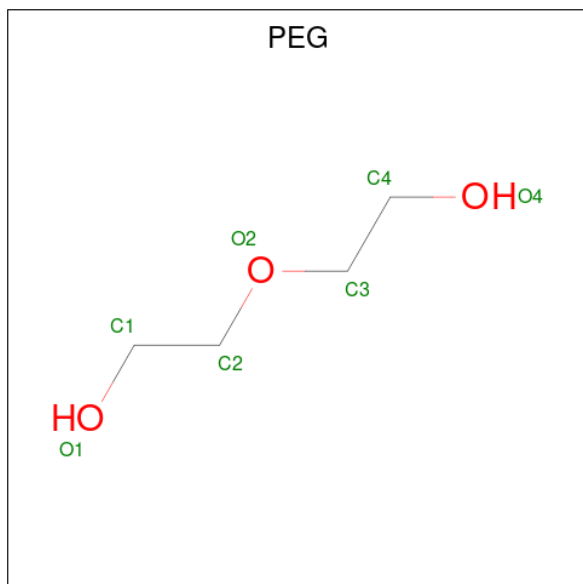
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			4	2	2		
6	A	1	Total	C	O	0	0
			4	2	2		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	B	1	Total	C	O	0	0
			4	2	2		

- Molecule 7 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	0	0
			7	4	3		
7	B	1	Total	C	O	0	0
			7	4	3		
7	B	1	Total	C	O	0	0
			7	4	3		

- Molecule 8 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

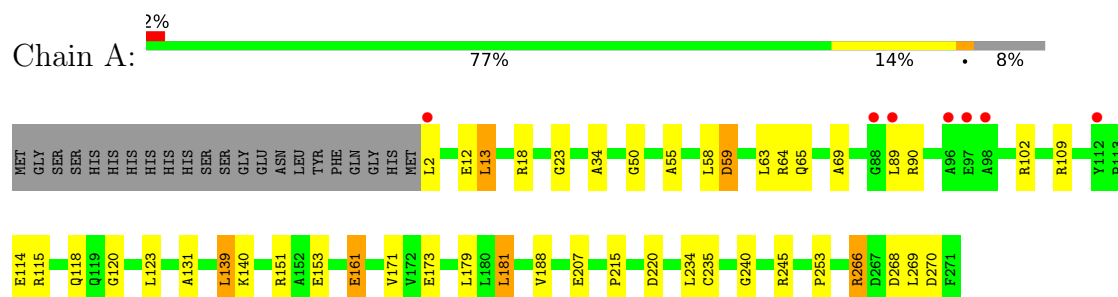
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	238	Total	O	0	0
			238	238		
9	B	235	Total	O	0	0
			235	235		

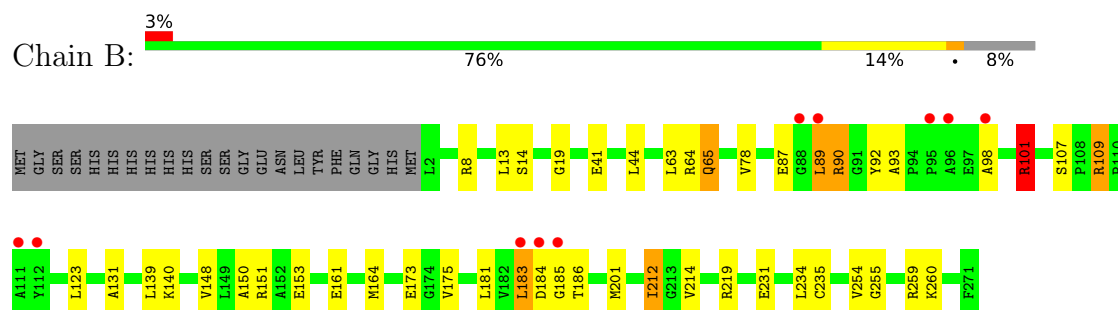
3 Residue-property plots

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: 4-AMINO-4-DEOXYCHORISMATE LYASE



• Molecule 1: 4-AMINO-4-DEOXYCHORISMATE LYASE



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	40.81Å 66.82Å 202.69Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	101.34 – 1.75 101.34 – 1.75	Depositor EDS
% Data completeness (in resolution range)	98.4 (101.34-1.75) 98.4 (101.34-1.75)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.96 (at 1.75Å)	Xtriage
Refinement program	REFMAC 5.5.0102	Depositor
R, R_{free}	0.167 , 0.215 0.166 , 0.214	Depositor DCC
R_{free} test set	2892 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å ²)	17.9	Xtriage
Anisotropy	0.030	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 46.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	5004	wwPDB-VP
Average B, all atoms (Å ²)	19.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.59% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: EDO, PG4, CL, PLP, SO4, GOL, PEG

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	1.40	9/2311 (0.4%)	1.20	3/3130 (0.1%)
1	B	1.40	5/2244 (0.2%)	1.21	8/3041 (0.3%)
All	All	1.40	14/4555 (0.3%)	1.21	11/6171 (0.2%)

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	139	LEU	C-N	8.41	1.44	1.33
1	B	90	ARG	CB-CG	-8.38	1.27	1.52
1	A	140	LYS	C-N	8.13	1.45	1.33
1	A	55	ALA	CA-CB	7.93	1.65	1.53
1	B	140	LYS	C-N	7.88	1.44	1.33
1	B	139	LEU	C-N	7.84	1.44	1.33
1	A	18	ARG	N-CA	6.12	1.54	1.46
1	B	148	VAL	CA-CB	5.97	1.61	1.54
1	A	69	ALA	CA-CB	5.47	1.61	1.53
1	A	171	VAL	CA-CB	5.41	1.60	1.54
1	B	44	LEU	C-O	5.38	1.30	1.24
1	A	34	ALA	CA-CB	5.30	1.61	1.53
1	A	23	GLY	C-O	5.18	1.29	1.24
1	A	220	ASP	CA-C	-5.02	1.46	1.52

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	90	ARG	CA-CB-CG	11.46	137.01	114.10
1	B	19	GLY	N-CA-C	-7.11	104.25	112.50
1	B	90	ARG	CB-CG-CD	6.74	126.81	111.30
1	A	140	LYS	CA-C-O	6.37	131.04	122.51
1	A	109	ARG	CA-C-N	-6.22	113.37	119.78

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	109	ARG	C-N-CA	-6.22	113.37	119.78
1	B	109	ARG	CA-C-N	-5.85	114.73	120.52
1	B	109	ARG	C-N-CA	-5.85	114.73	120.52
1	B	101	ARG	NE-CZ-NH1	5.37	126.87	121.50
1	B	214	VAL	CA-C-N	5.11	125.35	119.83
1	B	214	VAL	C-N-CA	5.11	125.35	119.83

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	2212	0	2300	34	0
1	B	2166	0	2221	42	0
2	A	15	0	6	1	0
2	B	15	0	6	1	0
3	A	39	0	54	6	0
3	B	26	0	36	3	0
4	A	3	0	0	0	0
5	A	5	0	0	0	0
5	B	5	0	0	0	0
6	A	8	0	12	2	0
6	B	4	0	6	0	0
7	A	7	0	10	2	0
7	B	14	0	20	2	0
8	A	6	0	8	1	0
8	B	6	0	8	3	0
9	A	238	0	0	10	0
9	B	235	0	0	5	0
All	All	5004	0	4687	83	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 9.

All (83) 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:150:ALA:CB	1:B:164[C]:MET:HE1	1.59	1.33
1:B:150:ALA:CB	1:B:164[C]:MET:CE	2.09	1.31
1:B:150:ALA:HB2	1:B:164[C]:MET:HE1	1.15	1.13
1:B:150:ALA:HB2	1:B:164[C]:MET:CE	1.80	1.05
1:B:150:ALA:HB1	1:B:164[C]:MET:CE	1.93	0.94
1:B:89:LEU:HD12	1:B:90:ARG:H	1.35	0.92
3:A:1272:PG4:H11	9:A:2232:HOH:O	1.77	0.85
1:B:150:ALA:HB1	1:B:164[C]:MET:HE3	1.60	0.83
1:B:150:ALA:CB	1:B:164[C]:MET:HE3	2.07	0.81
1:A:173[B]:GLU:OE1	2:A:1140:PLP:N1	2.16	0.78
1:B:150:ALA:HB3	1:B:164[C]:MET:HE1	1.64	0.78
7:B:1277:PEG:H22	7:B:1277:PEG:O4	1.83	0.77
1:B:164[C]:MET:HE3	1:B:175:VAL:HG22	1.65	0.76
1:B:78[A]:VAL:CG1	1:B:107:SER:HB2	2.15	0.76
3:B:1273:PG4:H72	9:B:2230:HOH:O	1.87	0.74
6:A:1279:EDO:H22	9:A:2238:HOH:O	1.88	0.73
1:A:2[A]:LEU:HD12	9:A:2001:HOH:O	1.88	0.72
1:B:101:ARG:HG3	1:B:101:ARG:HH11	1.58	0.67
1:A:266:ARG:HH11	1:A:266:ARG:HG2	1.58	0.67
1:A:181[A]:LEU:HG	1:A:188:VAL:HB	1.78	0.66
1:B:173[B]:GLU:OE1	2:B:1140:PLP:N1	2.29	0.65
1:A:215:PRO:HA	9:A:2185:HOH:O	1.98	0.64
1:B:89:LEU:HD12	1:B:90:ARG:N	2.10	0.63
1:B:78[A]:VAL:HG12	1:B:107:SER:HB2	1.81	0.62
1:B:65[B]:GLN:NE2	9:B:2059:HOH:O	2.34	0.60
1:A:268:ASP:HB3	6:A:1278:EDO:O2	2.02	0.59
3:A:1273:PG4:H72	9:A:2112:HOH:O	2.03	0.59
1:B:89:LEU:CD1	1:B:90:ARG:H	2.14	0.58
1:A:12[A]:GLU:OE1	9:A:2008:HOH:O	2.17	0.58
1:B:153:GLU:HG2	3:B:1273:PG4:H31	1.87	0.57
1:A:58:LEU:HD21	1:A:63[A]:LEU:CD2	2.37	0.54
1:A:153:GLU:HG2	3:A:1273:PG4:H71	1.89	0.54
3:B:1273:PG4:H52	9:B:2227:HOH:O	2.08	0.54
1:A:64[B]:ARG:HH11	1:A:65[B]:GLN:HE22	1.53	0.54
1:B:183:LEU:HD22	1:B:219:ARG:HH22	1.74	0.52
1:A:123:LEU:HD21	1:A:234:LEU:HD11	1.92	0.52
1:B:183:LEU:HD22	1:B:219:ARG:NH2	2.24	0.52
1:A:13[A]:LEU:HD12	1:B:13:LEU:HD23	1.91	0.52
1:A:207[B]:GLU:HG3	7:A:1280:PEG:O4	2.09	0.51
1:A:131:ALA:HB1	1:B:131:ALA:HB1	1.91	0.51
1:A:89[B]:LEU:HG	1:A:90:ARG:N	2.25	0.51
1:B:63:LEU:O	1:B:63:LEU:HG	2.07	0.51

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:109:ARG:HB3	9:B:2091:HOH:O	2.11	0.51
1:B:254:VAL:HG11	1:B:259:ARG:CZ	2.41	0.50
1:B:184:ASP:C	1:B:186:THR:H	2.19	0.50
1:A:12[B]:GLU:OE1	1:B:14:SER:HA	2.11	0.50
1:B:41[B]:GLU:OE2	1:B:64[B]:ARG:NH1	2.37	0.50
1:A:114[A]:GLU:HG3	1:A:118:GLN:CD	2.36	0.50
1:A:63[A]:LEU:HD13	1:A:102:ARG:HD2	1.95	0.49
1:B:93:ALA:H	8:B:1278:GOL:H12	1.78	0.48
1:B:78[A]:VAL:HG13	1:B:107:SER:HB2	1.95	0.47
1:A:120:GLY:HA3	1:A:245:ARG:HG2	1.98	0.46
3:A:1273:PG4:H72	3:A:1273:PG4:H51	1.58	0.46
1:B:123:LEU:HD21	1:B:234:LEU:HD11	1.98	0.45
1:A:2[A]:LEU:HD11	9:A:2003:HOH:O	2.16	0.45
1:B:93:ALA:HB2	8:B:1278:GOL:H32	1.99	0.45
1:A:215:PRO:CA	9:A:2185:HOH:O	2.60	0.45
1:A:161:GLU:HG3	1:A:234:LEU:HD13	1.98	0.44
1:A:50:GLY:HA2	1:A:139:LEU:HD22	1.99	0.44
1:A:58:LEU:HD21	1:A:63[A]:LEU:HD22	1.98	0.44
8:A:1281:GOL:H31	1:B:151:ARG:HE	1.81	0.44
1:B:150:ALA:HB3	1:B:164[C]:MET:CE	2.25	0.44
1:B:201:MET:HG3	1:B:235:CYS:HB2	2.00	0.43
1:A:253:PRO:HG2	9:A:2198:HOH:O	2.18	0.43
1:A:235:CYS:HA	1:A:240:GLY:O	2.19	0.43
1:A:58:LEU:HD21	1:A:63[A]:LEU:HD23	2.00	0.43
1:A:269:LEU:O	1:A:270:ASP:HB2	2.18	0.43
1:B:184:ASP:C	1:B:186:THR:N	2.75	0.43
3:A:1274:PG4:H61	7:A:1280:PEG:H22	2.01	0.42
1:A:179:LEU:C	1:A:179:LEU:HD23	2.46	0.41
1:B:92:TYR:N	8:B:1278:GOL:H12	2.36	0.41
1:B:98:ALA:CB	9:B:2072:HOH:O	2.67	0.41
1:A:151:ARG:HD2	1:A:151:ARG:HA	1.87	0.41
3:A:1273:PG4:C7	9:A:2112:HOH:O	2.64	0.41
1:B:231:GLU:CD	1:B:255:GLY:HA3	2.47	0.41
1:B:151:ARG:HA	1:B:151:ARG:HD2	1.86	0.40
7:B:1277:PEG:O4	7:B:1277:PEG:C2	2.62	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	287/292 (98%)	279 (97%)	8 (3%)	0	100	100
1	B	281/292 (96%)	273 (97%)	6 (2%)	2 (1%)	18	7
All	All	568/584 (97%)	552 (97%)	14 (2%)	2 (0%)	30	15

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	89	LEU
1	B	185	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	233/232 (100%)	224 (96%)	9 (4%)	28	9
1	B	226/232 (97%)	215 (95%)	11 (5%)	22	6
All	All	459/464 (99%)	439 (96%)	20 (4%)	32	7

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	13[A]	LEU
1	A	13[B]	LEU
1	A	59[A]	ASP
1	A	59[B]	ASP

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	115	ARG
1	A	161	GLU
1	A	181[A]	LEU
1	A	181[B]	LEU
1	A	266	ARG
1	B	8	ARG
1	B	65[A]	GLN
1	B	65[B]	GLN
1	B	87	GLU
1	B	101	ARG
1	B	161	GLU
1	B	181	LEU
1	B	183	LEU
1	B	212[A]	ILE
1	B	212[B]	ILE
1	B	260	LYS

Sometimes 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 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 oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 20 ligands modelled in this entry, 3 are monoatomic - leaving 17 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	$\# Z > 2$
6	EDO	A	1278	-	3,3,3	0.25	0	2,2,2	1.29	0
6	EDO	A	1279	-	3,3,3	0.39	0	2,2,2	1.13	0
8	GOL	A	1281	-	5,5,5	0.63	0	5,5,5	0.81	0
3	PG4	B	1272	-	12,12,12	0.50	0	11,11,11	0.75	0
8	GOL	B	1278	-	5,5,5	0.84	0	5,5,5	1.19	1 (20%)
2	PLP	B	1140	1	15,15,16	1.53	3 (20%)	21,22,23	2.53	12 (57%)
7	PEG	B	1277	-	6,6,6	0.55	0	5,5,5	0.91	0
3	PG4	B	1273	-	12,12,12	0.73	0	11,11,11	1.20	2 (18%)
2	PLP	A	1140	1	15,15,16	1.85	5 (33%)	21,22,23	2.30	12 (57%)
7	PEG	A	1280	-	6,6,6	0.40	0	5,5,5	0.91	0
3	PG4	A	1274	-	12,12,12	0.55	0	11,11,11	0.68	0
6	EDO	B	1276	-	3,3,3	0.30	0	2,2,2	0.43	0
7	PEG	B	1274	-	6,6,6	0.45	0	5,5,5	0.83	0
3	PG4	A	1272	-	12,12,12	0.49	0	11,11,11	1.02	1 (9%)
3	PG4	A	1273	-	12,12,12	0.60	0	11,11,11	1.03	0
5	SO4	A	1277	-	4,4,4	0.71	0	6,6,6	0.62	0
5	SO4	B	1275	-	4,4,4	0.49	0	6,6,6	1.10	1 (16%)

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
6	EDO	A	1278	-	-	1/1/1/1	-
6	EDO	A	1279	-	-	1/1/1/1	-
8	GOL	A	1281	-	-	4/4/4/4	-
3	PG4	B	1272	-	-	0/10/10/10	-
8	GOL	B	1278	-	-	0/4/4/4	-
2	PLP	B	1140	1	-	5/6/6/8	0/1/1/1
7	PEG	B	1277	-	-	1/4/4/4	-
3	PG4	B	1273	-	-	5/10/10/10	-
2	PLP	A	1140	1	-	5/6/6/8	0/1/1/1
7	PEG	A	1280	-	-	2/4/4/4	-
3	PG4	A	1274	-	-	3/10/10/10	-
6	EDO	B	1276	-	-	0/1/1/1	-
7	PEG	B	1274	-	-	3/4/4/4	-

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	PG4	A	1272	-	-	3/10/10/10	-
3	PG4	A	1273	-	-	6/10/10/10	-

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1140	PLP	O3-C3	-4.12	1.27	1.36
2	B	1140	PLP	O3-C3	-3.14	1.29	1.36
2	A	1140	PLP	C5-C4	3.02	1.43	1.40
2	A	1140	PLP	P-O3P	-2.55	1.45	1.54
2	B	1140	PLP	C5-C4	2.47	1.43	1.40
2	A	1140	PLP	C2-N1	2.17	1.37	1.33
2	A	1140	PLP	C3-C2	-2.06	1.38	1.41
2	B	1140	PLP	P-O3P	-2.03	1.47	1.54

All (29) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1140	PLP	O3P-P-O4P	-4.12	95.92	106.67
2	B	1140	PLP	C5A-C5-C6	-4.06	112.75	119.36
2	A	1140	PLP	C5A-C5-C6	-3.64	113.42	119.36
2	B	1140	PLP	C4-C3-C2	-3.49	114.67	119.89
2	B	1140	PLP	C5-C6-N1	-3.46	118.21	123.83
2	A	1140	PLP	O4P-C5A-C5	3.44	115.81	109.36
2	A	1140	PLP	O3P-P-O4P	-3.29	98.09	106.67
2	A	1140	PLP	C5-C6-N1	-3.29	118.48	123.83
2	B	1140	PLP	O4P-C5A-C5	3.24	115.42	109.36
2	A	1140	PLP	C6-C5-C4	3.21	120.73	118.10
2	B	1140	PLP	O4P-P-O1P	-2.89	98.63	106.44
2	B	1140	PLP	C6-N1-C2	2.87	124.40	119.20
3	A	1272	PG4	O2-C2-C1	-2.77	97.92	110.11
2	B	1140	PLP	C2A-C2-C3	2.77	124.04	120.80
2	A	1140	PLP	O4P-P-O1P	-2.67	99.22	106.44
2	A	1140	PLP	C2A-C2-C3	2.66	123.92	120.80
2	B	1140	PLP	O3-C3-C2	2.62	123.01	117.58
2	B	1140	PLP	C5A-C5-C4	2.49	127.56	122.64
2	A	1140	PLP	O3P-P-O2P	2.44	116.94	107.80
3	B	1273	PG4	O4-C7-C8	2.37	120.55	110.11
8	B	1278	GOL	O3-C3-C2	-2.30	100.01	110.38
2	B	1140	PLP	C3-C4-C5	2.29	121.34	118.59
2	B	1140	PLP	O2P-P-O4P	2.26	112.56	106.67
2	A	1140	PLP	O3-C3-C2	2.21	122.17	117.58

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1273	PG4	O3-C5-C6	2.20	120.39	110.35
2	A	1140	PLP	O2P-P-O4P	2.17	112.33	106.67
2	A	1140	PLP	C2A-C2-N1	-2.13	113.63	117.64
2	A	1140	PLP	C4-C3-C2	-2.12	116.71	119.89
5	B	1275	SO4	O4-S-O2	2.05	120.28	109.56

There are no chirality outliers.

All (39) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1140	PLP	C4-C5-C5A-O4P
2	A	1140	PLP	C6-C5-C5A-O4P
2	A	1140	PLP	C5A-O4P-P-O2P
2	A	1140	PLP	C5A-O4P-P-O3P
2	B	1140	PLP	C4-C5-C5A-O4P
2	B	1140	PLP	C6-C5-C5A-O4P
2	B	1140	PLP	C5A-O4P-P-O1P
2	B	1140	PLP	C5A-O4P-P-O2P
2	B	1140	PLP	C5A-O4P-P-O3P
8	A	1281	GOL	O1-C1-C2-C3
8	A	1281	GOL	C1-C2-C3-O3
3	A	1272	PG4	C5-C6-O4-C7
3	A	1274	PG4	C5-C6-O4-C7
3	A	1273	PG4	C3-C4-O3-C5
8	A	1281	GOL	O1-C1-C2-O2
8	A	1281	GOL	O2-C2-C3-O3
3	A	1272	PG4	O1-C1-C2-O2
3	A	1273	PG4	O1-C1-C2-O2
3	A	1274	PG4	O4-C7-C8-O5
3	B	1273	PG4	O2-C3-C4-O3
7	B	1274	PEG	O2-C3-C4-O4
3	A	1273	PG4	O3-C5-C6-O4
3	B	1273	PG4	O4-C7-C8-O5
3	A	1273	PG4	O2-C3-C4-O3
6	A	1279	EDO	O1-C1-C2-O2
2	A	1140	PLP	C5A-O4P-P-O1P
7	A	1280	PEG	C1-C2-O2-C3
3	B	1273	PG4	O1-C1-C2-O2
3	A	1272	PG4	C1-C2-O2-C3
7	B	1274	PEG	C4-C3-O2-C2
7	A	1280	PEG	C4-C3-O2-C2
7	B	1274	PEG	O1-C1-C2-O2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
3	B	1273	PG4	C6-C5-O3-C4
3	A	1274	PG4	C6-C5-O3-C4
3	A	1273	PG4	C5-C6-O4-C7
6	A	1278	EDO	O1-C1-C2-O2
3	A	1273	PG4	C1-C2-O2-C3
7	B	1277	PEG	C4-C3-O2-C2
3	B	1273	PG4	C3-C4-O3-C5

There are no ring outliers.

12 monomers are involved in 20 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	1278	EDO	1	0
6	A	1279	EDO	1	0
8	A	1281	GOL	1	0
8	B	1278	GOL	3	0
2	B	1140	PLP	1	0
7	B	1277	PEG	2	0
3	B	1273	PG4	3	0
2	A	1140	PLP	1	0
7	A	1280	PEG	2	0
3	A	1274	PG4	1	0
3	A	1272	PG4	1	0
3	A	1273	PG4	4	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 ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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	270/292 (92%)	-0.43	7 (2%) 57 63	5, 14, 29, 44	20 (7%)
1	B	270/292 (92%)	-0.24	10 (3%) 45 51	5, 18, 34, 46	13 (4%)
All	All	540/584 (92%)	-0.33	17 (3%) 51 58	5, 15, 33, 46	33 (6%)

All (17) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	89	LEU	3.9
1	A	112	TYR	3.2
1	A	89[A]	LEU	3.2
1	B	98	ALA	3.1
1	B	183	LEU	3.0
1	A	96	ALA	3.0
1	A	98	ALA	3.0
1	B	185	GLY	2.9
1	A	88	GLY	2.8
1	A	97	GLU	2.8
1	A	2[A]	LEU	2.5
1	B	88	GLY	2.5
1	B	96	ALA	2.4
1	B	184	ASP	2.3
1	B	95	PRO	2.3
1	B	112	TYR	2.2
1	B	111	ALA	2.0

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

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, 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	B-factors($\text{\AA}^2$)	Q<0.9
7	PEG	B	1277	7/7	0.77	0.15	45,47,50,53	0
8	GOL	B	1278	6/6	0.79	0.17	37,41,41,44	0
4	CL	A	1282	1/1	0.80	0.17	57,57,57,57	0
6	EDO	A	1279	4/4	0.84	0.10	32,33,39,40	0
3	PG4	B	1273	13/13	0.85	0.11	27,32,42,44	0
8	GOL	A	1281	6/6	0.86	0.12	34,41,44,50	0
6	EDO	A	1278	4/4	0.86	0.11	26,29,30,32	0
3	PG4	A	1273	13/13	0.87	0.14	21,36,54,54	0
7	PEG	B	1274	7/7	0.89	0.12	38,40,41,42	0
7	PEG	A	1280	7/7	0.90	0.10	27,34,43,45	0
3	PG4	A	1272	13/13	0.91	0.12	17,27,50,54	0
6	EDO	B	1276	4/4	0.92	0.11	39,39,41,44	0
4	CL	A	1276	1/1	0.93	0.11	65,65,65,65	0
3	PG4	B	1272	13/13	0.93	0.09	19,28,37,38	0
5	SO4	A	1277	5/5	0.94	0.19	16,32,33,33	0
5	SO4	B	1275	5/5	0.94	0.14	19,28,34,36	0
3	PG4	A	1274	13/13	0.95	0.08	17,25,37,42	0
4	CL	A	1275	1/1	0.96	0.09	55,55,55,55	0
2	PLP	A	1140	15/16	0.97	0.06	12,18,24,28	0
2	PLP	B	1140	15/16	0.98	0.07	15,22,26,27	0

6.5 Other polymers [i](#)

There are no such residues in this entry.