



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 11:44 AM UTC

PDB ID : 2YKY / pdb_00002yky
Title : Structural Determinants of the Beta-Selectivity of a Bacterial Aminotransferase
Authors : Wybenga, G.G.; Crismaru, C.G.; Janssen, D.B.; Dijkstra, B.W.
Deposited on : 2011-05-30
Resolution : 1.69 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

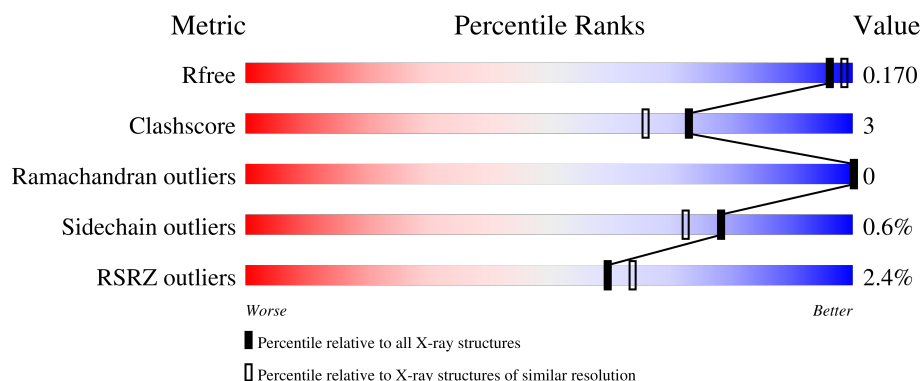
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.69 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	5551 (1.70-1.70)
Clashscore	190562	5924 (1.70-1.70)
Ramachandran outliers	187476	5846 (1.70-1.70)
Sidechain outliers	187428	5846 (1.70-1.70)
RSRZ outliers	180081	5554 (1.70-1.70)

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	465	
1	B	465	
1	C	465	

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	EDO	B	1446	-	-	X	-
2	EDO	B	1453	-	-	X	-

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 11030 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 BETA-TRANSAMINASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	426	Total	C	N	O	S	0	7	0
			3231	2017	594	604	16			
1	B	429	Total	C	N	O	S	0	9	0
			3267	2041	599	612	15			
1	C	431	Total	C	N	O	S	0	6	0
			3269	2040	601	612	16			

There are 60 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	expression tag	UNP A3EYF7
A	-18	GLY	-	expression tag	UNP A3EYF7
A	-17	SER	-	expression tag	UNP A3EYF7
A	-16	SER	-	expression tag	UNP A3EYF7
A	-15	HIS	-	expression tag	UNP A3EYF7
A	-14	HIS	-	expression tag	UNP A3EYF7
A	-13	HIS	-	expression tag	UNP A3EYF7
A	-12	HIS	-	expression tag	UNP A3EYF7
A	-11	HIS	-	expression tag	UNP A3EYF7
A	-10	HIS	-	expression tag	UNP A3EYF7
A	-9	SER	-	expression tag	UNP A3EYF7
A	-8	SER	-	expression tag	UNP A3EYF7
A	-7	GLY	-	expression tag	UNP A3EYF7
A	-6	LEU	-	expression tag	UNP A3EYF7
A	-5	VAL	-	expression tag	UNP A3EYF7
A	-4	PRO	-	expression tag	UNP A3EYF7
A	-3	ARG	-	expression tag	UNP A3EYF7
A	-2	GLY	-	expression tag	UNP A3EYF7
A	-1	SER	-	expression tag	UNP A3EYF7
A	0	HIS	-	expression tag	UNP A3EYF7
B	-19	MET	-	expression tag	UNP A3EYF7
B	-18	GLY	-	expression tag	UNP A3EYF7
B	-17	SER	-	expression tag	UNP A3EYF7

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	SER	-	expression tag	UNP A3EYF7
B	-15	HIS	-	expression tag	UNP A3EYF7
B	-14	HIS	-	expression tag	UNP A3EYF7
B	-13	HIS	-	expression tag	UNP A3EYF7
B	-12	HIS	-	expression tag	UNP A3EYF7
B	-11	HIS	-	expression tag	UNP A3EYF7
B	-10	HIS	-	expression tag	UNP A3EYF7
B	-9	SER	-	expression tag	UNP A3EYF7
B	-8	SER	-	expression tag	UNP A3EYF7
B	-7	GLY	-	expression tag	UNP A3EYF7
B	-6	LEU	-	expression tag	UNP A3EYF7
B	-5	VAL	-	expression tag	UNP A3EYF7
B	-4	PRO	-	expression tag	UNP A3EYF7
B	-3	ARG	-	expression tag	UNP A3EYF7
B	-2	GLY	-	expression tag	UNP A3EYF7
B	-1	SER	-	expression tag	UNP A3EYF7
B	0	HIS	-	expression tag	UNP A3EYF7
C	-19	MET	-	expression tag	UNP A3EYF7
C	-18	GLY	-	expression tag	UNP A3EYF7
C	-17	SER	-	expression tag	UNP A3EYF7
C	-16	SER	-	expression tag	UNP A3EYF7
C	-15	HIS	-	expression tag	UNP A3EYF7
C	-14	HIS	-	expression tag	UNP A3EYF7
C	-13	HIS	-	expression tag	UNP A3EYF7
C	-12	HIS	-	expression tag	UNP A3EYF7
C	-11	HIS	-	expression tag	UNP A3EYF7
C	-10	HIS	-	expression tag	UNP A3EYF7
C	-9	SER	-	expression tag	UNP A3EYF7
C	-8	SER	-	expression tag	UNP A3EYF7
C	-7	GLY	-	expression tag	UNP A3EYF7
C	-6	LEU	-	expression tag	UNP A3EYF7
C	-5	VAL	-	expression tag	UNP A3EYF7
C	-4	PRO	-	expression tag	UNP A3EYF7
C	-3	ARG	-	expression tag	UNP A3EYF7
C	-2	GLY	-	expression tag	UNP A3EYF7
C	-1	SER	-	expression tag	UNP A3EYF7
C	0	HIS	-	expression tag	UNP A3EYF7

- Molecule 2 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



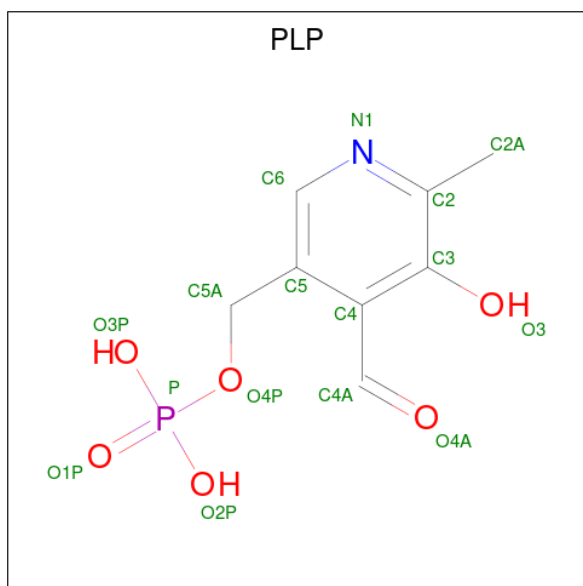
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	C	1	Total	C	O	0	0
			4	2	2		
2	C	1	Total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

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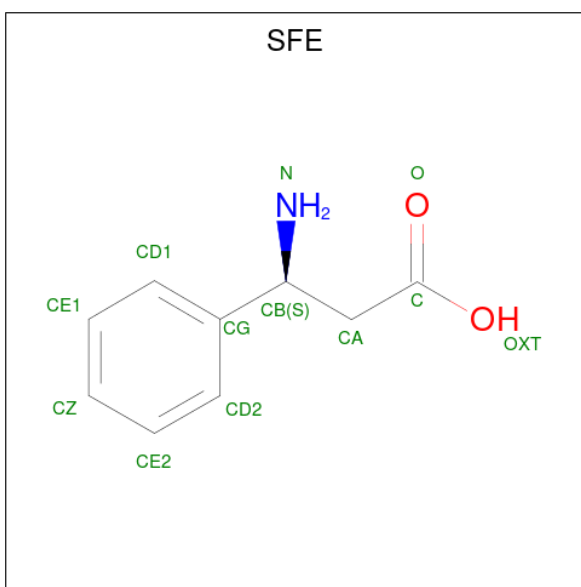
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	C	1	Total	C	O	0	0
			4	2	2		

- Molecule 3 is PYRIDOXAL-5'-PHOSPHATE (CCD ID: PLP) (formula: $C_8H_{10}NO_6P$).



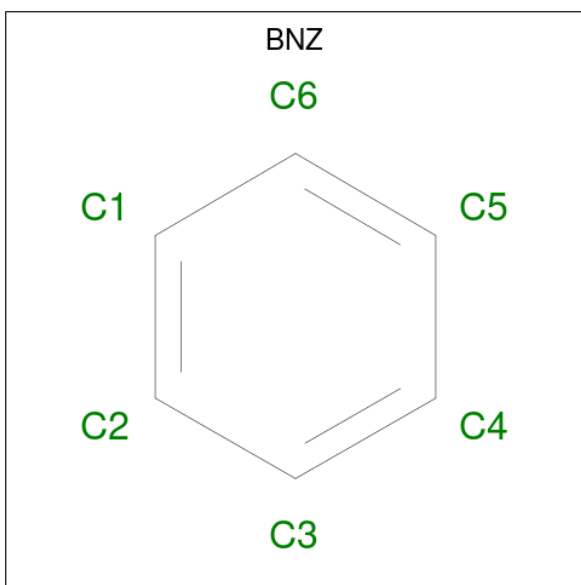
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			15	8	1	5	1		
3	B	1	Total	C	N	O	P	0	0
			15	8	1	5	1		
3	C	1	Total	C	N	O	P	0	0
			15	8	1	5	1		

- Molecule 4 is (3S)-3-amino-3-phenylpropanoic acid (CCD ID: SFE) (formula: $C_9H_{11}NO_2$).



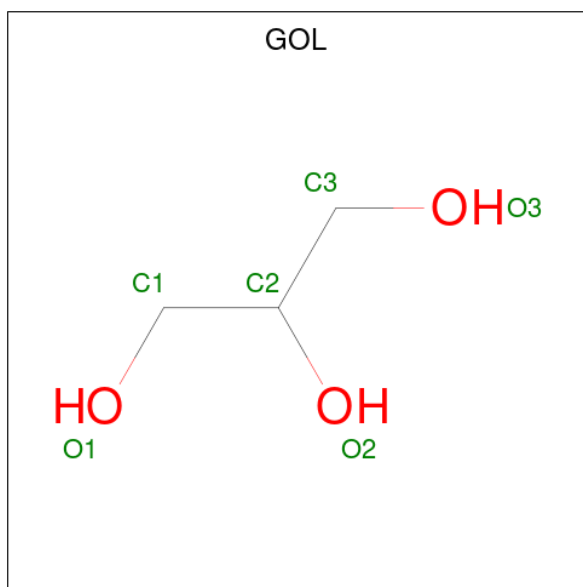
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			12	9	1	2		
4	A	1	Total	C	N	O	0	0
			12	9	1	2		
4	B	1	Total	C	N	O	0	0
			12	9	1	2		
4	C	1	Total	C	N	O	0	0
			12	9	1	2		

- Molecule 5 is BENZENE (CCD ID: BNZ) (formula: C_6H_6).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total C 6 6	0	0
5	C	1	Total C 6 6	0	0

- Molecule 6 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

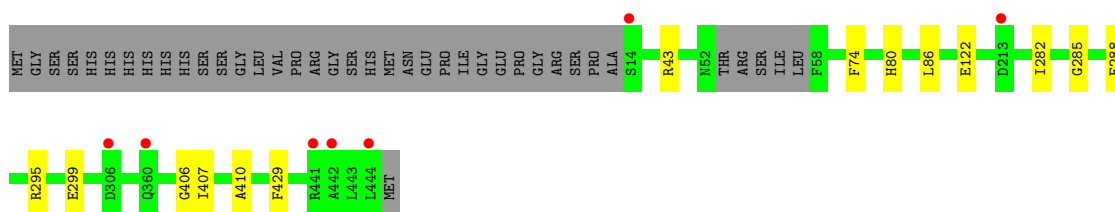
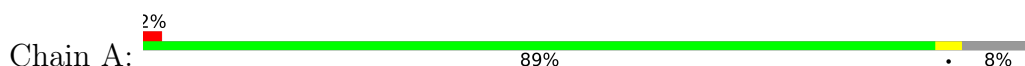
- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	406	Total O 406 406	0	0
7	B	346	Total O 346 346	0	0
7	C	334	Total O 334 334	0	0

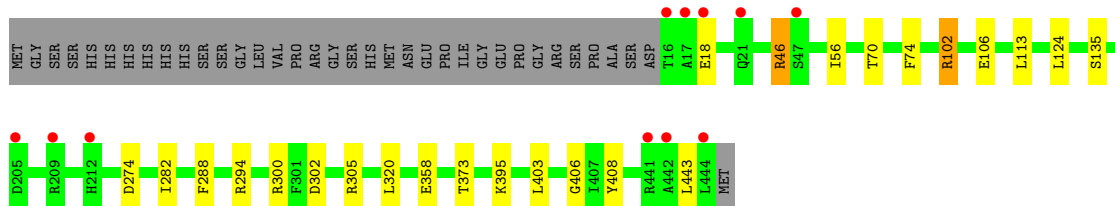
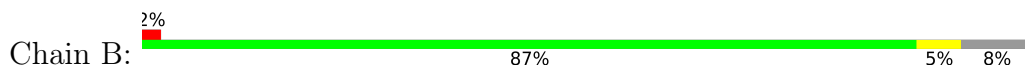
3 Residue-property plots [i](#)

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.

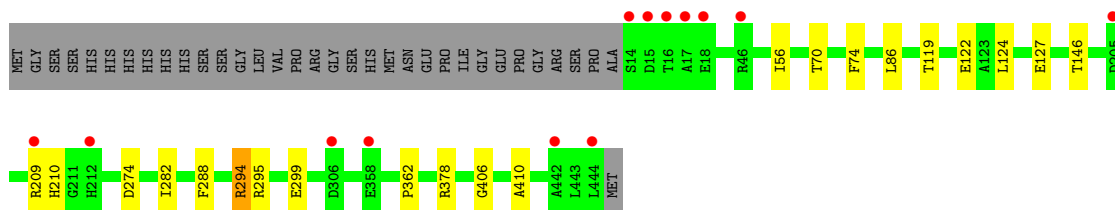
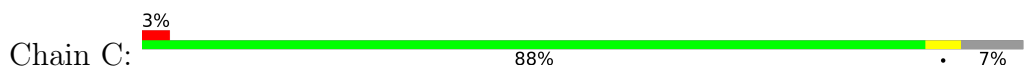
• Molecule 1: BETA-TRANSAMINASE



• Molecule 1: BETA-TRANSAMINASE



• Molecule 1: BETA-TRANSAMINASE



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	183.58Å 94.46Å 103.67Å 90.00° 113.83° 90.00°	Depositor
Resolution (Å)	47.42 – 1.69 47.42 – 1.69	Depositor EDS
% Data completeness (in resolution range)	99.9 (47.42-1.69) 99.9 (47.42-1.69)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.07 (at 1.69Å)	Xtriage
Refinement program	REFMAC 5.5.0102	Depositor
R, R_{free}	0.157 , 0.177 (Not available) , 0.170	Depositor DCC
R_{free} test set	9037 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	13.4	Xtriage
Anisotropy	0.039	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 36.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	11030	wwPDB-VP
Average B, all atoms (Å ²)	18.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.31% 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: GOL, EDO, SFE, PLP, BNZ

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	0.52	0/3302	0.73	0/4464
1	B	0.51	0/3342	0.73	0/4520
1	C	0.51	0/3332	0.73	0/4506
All	All	0.52	0/9976	0.73	0/13490

There are no bond length outliers.

There are no bond angle outliers.

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	3231	0	3152	12	0
1	B	3267	0	3194	33	0
1	C	3269	0	3188	18	0
2	A	4	0	6	0	0
2	B	32	0	48	20	0
2	C	24	0	36	1	0
3	A	15	0	6	0	0
3	B	15	0	6	0	0
3	C	15	0	6	0	0
4	A	24	0	19	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	12	0	9	3	0
4	C	12	0	9	3	0
5	B	6	0	6	0	0
5	C	6	0	6	0	0
6	C	12	0	16	3	0
7	A	406	0	0	2	0
7	B	346	0	0	6	0
7	C	334	0	0	2	0
All	All	11030	0	9707	64	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 3.

All (64) 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:C:362:PRO:HA	1:C:378:ARG:HD2	1.58	0.85
1:B:294:ARG:HG3	2:B:1446:EDO:C1	2.11	0.80
1:B:113:LEU:HD22	2:B:1445:EDO:H22	1.64	0.80
1:A:80:HIS:HB3	2:B:1447:EDO:H21	1.65	0.79
1:A:285:GLY:O	2:B:1445:EDO:H11	1.84	0.78
1:C:124:LEU:HD22	6:C:1452:GOL:H11	1.68	0.76
1:B:135:SER:HB2	2:B:1446:EDO:H21	1.69	0.74
1:C:56:ILE:HD12	4:C:1547:SFE:CE2	2.19	0.73
1:B:56:ILE:HD12	4:B:1548:SFE:CZ	2.19	0.73
1:C:56:ILE:HD12	4:C:1547:SFE:CZ	2.19	0.72
2:B:1449:EDO:H11	2:B:1454:EDO:H21	1.72	0.71
1:B:46:ARG:HG2	1:B:46:ARG:HH11	1.56	0.70
1:C:294:ARG:HH11	1:C:294:ARG:HG2	1.61	0.66
1:C:56:ILE:CD1	4:C:1547:SFE:CE2	2.76	0.64
1:B:56:ILE:CD1	4:B:1548:SFE:CE2	2.78	0.62
1:B:56:ILE:HD12	4:B:1548:SFE:CE2	2.30	0.61
1:C:70[A]:THR:HG22	7:C:2055:HOH:O	1.99	0.60
1:B:358:GLU:HG3	7:B:2290:HOH:O	2.02	0.59
1:C:274:ASP:HA	1:C:294:ARG:HD3	1.83	0.59
1:B:46:ARG:HH11	1:B:46:ARG:CG	2.14	0.59
1:A:299:GLU:HG2	7:B:2033:HOH:O	2.02	0.59
1:B:395:LYS:NZ	2:B:1453:EDO:H22	2.19	0.57
1:B:294:ARG:HG3	2:B:1446:EDO:H12	1.85	0.57
1:C:209:ARG:HD2	1:C:210:HIS:NE2	2.19	0.56
1:B:395:LYS:NZ	2:B:1453:EDO:C2	2.70	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:395:LYS:HZ2	2:B:1453:EDO:C2	2.20	0.54
1:B:373:THR:HG21	2:B:1453:EDO:H21	1.90	0.53
2:B:1452:EDO:C2	7:B:2170:HOH:O	2.56	0.53
1:B:320:LEU:HD12	2:B:1445:EDO:H21	1.92	0.52
1:C:406:GLY:HA2	2:C:1449:EDO:H11	1.91	0.52
1:B:294:ARG:HG3	2:B:1446:EDO:H11	1.90	0.51
1:A:43:ARG:HH22	1:B:124:LEU:HD21	1.74	0.51
1:B:294:ARG:CG	2:B:1446:EDO:H12	2.40	0.51
1:B:282:ILE:HB	1:B:288:PHE:CE2	2.47	0.49
1:B:403:LEU:HD21	1:B:408:TYR:CD2	2.48	0.49
1:C:124:LEU:CD2	6:C:1452:GOL:H11	2.40	0.49
1:A:43:ARG:HH22	1:B:124:LEU:CD2	2.25	0.48
1:A:86:LEU:HD13	1:A:410:ALA:HB2	1.94	0.48
1:C:127:GLU:HB2	6:C:1452:GOL:H2	1.96	0.48
1:C:282:ILE:HB	1:C:288:PHE:CE2	2.49	0.47
1:C:294:ARG:HH11	1:C:294:ARG:CG	2.26	0.47
1:C:86:LEU:HD13	1:C:410:ALA:HB2	1.97	0.47
1:B:102:ARG:HD2	7:B:2095:HOH:O	2.15	0.46
1:B:300:ARG:HA	1:B:305:ARG:HD3	1.97	0.46
1:B:406:GLY:HA2	2:B:1449:EDO:H22	1.97	0.46
1:A:282:ILE:HB	1:A:288:PHE:CE2	2.50	0.46
1:A:407:ILE:HD13	1:A:429:PHE:HA	1.98	0.46
1:B:46:ARG:CG	1:B:46:ARG:NH1	2.78	0.46
1:B:274:ASP:HA	2:B:1446:EDO:H11	1.99	0.45
1:B:102:ARG:HH11	1:B:102:ARG:CG	2.31	0.44
1:A:43:ARG:NH2	1:B:124:LEU:CD2	2.81	0.43
1:B:70[B]:THR:HG22	7:B:2050:HOH:O	2.17	0.43
2:B:1453:EDO:H12	7:B:2203:HOH:O	2.17	0.43
1:C:146:THR:HG23	7:C:2142:HOH:O	2.17	0.43
1:B:18:GLU:HG2	1:B:443:LEU:HD21	2.01	0.42
1:B:302:ASP:O	1:B:305:ARG:HG2	2.20	0.42
1:A:295:ARG:NH2	7:A:2308:HOH:O	2.53	0.41
1:A:122:GLU:HG3	7:A:2160:HOH:O	2.20	0.41
1:C:295:ARG:O	1:C:299:GLU:HG3	2.20	0.41
1:B:294:ARG:HG3	2:B:1446:EDO:C2	2.50	0.41
1:C:119:THR:O	1:C:122:GLU:HG2	2.21	0.41
1:B:102:ARG:NH1	1:B:106:GLU:OE2	2.54	0.40
1:A:406:GLY:HA2	2:B:1447:EDO:H22	2.04	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	431/465 (93%)	420 (97%)	11 (3%)	0	100	100
1	B	436/465 (94%)	425 (98%)	11 (2%)	0	100	100
1	C	435/465 (94%)	424 (98%)	11 (2%)	0	100	100
All	All	1302/1395 (93%)	1269 (98%)	33 (2%)	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	320/346 (92%)	319 (100%)	1 (0%)	86	83
1	B	325/346 (94%)	322 (99%)	3 (1%)	70	62
1	C	324/346 (94%)	322 (99%)	2 (1%)	78	72
All	All	969/1038 (93%)	963 (99%)	6 (1%)	78	72

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	74	PHE
1	B	46	ARG
1	B	74	PHE
1	B	102	ARG
1	C	74	PHE

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Mol	Chain	Res	Type
1	C	294	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	68	GLN
1	A	75	GLN
1	B	392	GLN

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 ⓘ

26 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	$\# Z > 2$
3	PLP	B	1448	4	15,15,16	1.73	3 (20%)	21,22,23	1.53	5 (23%)
3	PLP	C	1447	4	15,15,16	1.70	2 (13%)	21,22,23	1.38	4 (19%)
2	EDO	B	1447	-	3,3,3	0.34	0	2,2,2	0.60	0
4	SFE	B	1548	3	11,12,12	1.12	1 (9%)	13,15,15	0.92	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	SFE	C	1547	3	11,12,12	1.17	0	13,15,15	0.95	0
4	SFE	A	1546	3	11,12,12	1.04	0	13,15,15	0.94	0
2	EDO	C	1449	-	3,3,3	0.45	0	2,2,2	0.20	0
2	EDO	C	1446	-	3,3,3	0.45	0	2,2,2	0.34	0
2	EDO	C	1451	-	3,3,3	0.40	0	2,2,2	0.38	0
2	EDO	C	1454	-	3,3,3	0.34	0	2,2,2	0.49	0
6	GOL	C	1450	-	5,5,5	0.39	0	5,5,5	0.50	0
2	EDO	B	1453	-	3,3,3	0.24	0	2,2,2	0.72	0
2	EDO	C	1445	-	3,3,3	0.45	0	2,2,2	0.27	0
2	EDO	B	1449	-	3,3,3	0.45	0	2,2,2	0.17	0
2	EDO	B	1446	-	3,3,3	0.32	0	2,2,2	0.34	0
5	BNZ	B	1451	-	6,6,6	0.86	0	6,6,6	0.10	0
2	EDO	C	1448	-	3,3,3	0.45	0	2,2,2	0.41	0
2	EDO	B	1450	-	3,3,3	0.30	0	2,2,2	0.62	0
2	EDO	B	1445	-	3,3,3	0.36	0	2,2,2	0.53	0
2	EDO	B	1454	-	3,3,3	0.44	0	2,2,2	0.42	0
3	PLP	A	1446	4	15,15,16	1.65	2 (13%)	21,22,23	1.48	4 (19%)
2	EDO	A	1445	-	3,3,3	0.44	0	2,2,2	0.29	0
6	GOL	C	1452	-	5,5,5	0.48	0	5,5,5	0.32	0
4	SFE	A	1447	-	11,12,12	0.88	0	13,15,15	0.96	1 (7%)
2	EDO	B	1452	-	3,3,3	0.31	0	2,2,2	0.48	0
5	BNZ	C	1453	-	6,6,6	0.93	0	6,6,6	0.12	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
3	PLP	B	1448	4	-	0/6/6/8	0/1/1/1
3	PLP	C	1447	4	-	0/6/6/8	0/1/1/1
2	EDO	B	1447	-	-	1/1/1/1	-
4	SFE	B	1548	3	-	2/8/8/8	0/1/1/1
4	SFE	C	1547	3	-	1/8/8/8	0/1/1/1
4	SFE	A	1546	3	-	0/8/8/8	0/1/1/1
2	EDO	C	1449	-	-	1/1/1/1	-
2	EDO	C	1446	-	-	0/1/1/1	-
2	EDO	C	1451	-	-	0/1/1/1	-
2	EDO	C	1454	-	-	0/1/1/1	-
6	GOL	C	1450	-	-	2/4/4/4	-
2	EDO	B	1453	-	-	1/1/1/1	-
2	EDO	C	1445	-	-	1/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	EDO	B	1449	-	-	1/1/1/1	-
2	EDO	B	1446	-	-	1/1/1/1	-
5	BNZ	B	1451	-	-	-	0/1/1/1
2	EDO	C	1448	-	-	1/1/1/1	-
2	EDO	B	1450	-	-	0/1/1/1	-
2	EDO	B	1445	-	-	0/1/1/1	-
2	EDO	B	1454	-	-	0/1/1/1	-
3	PLP	A	1446	4	-	0/6/6/8	0/1/1/1
2	EDO	A	1445	-	-	1/1/1/1	-
6	GOL	C	1452	-	-	2/4/4/4	-
4	SFE	A	1447	-	-	2/8/8/8	0/1/1/1
2	EDO	B	1452	-	-	1/1/1/1	-
5	BNZ	C	1453	-	-	-	0/1/1/1

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	1448	PLP	O3-C3	-5.53	1.24	1.36
3	C	1447	PLP	O3-C3	-5.51	1.24	1.36
3	A	1446	PLP	O3-C3	-5.15	1.25	1.36
3	B	1448	PLP	C2A-C2	2.36	1.54	1.50
3	B	1448	PLP	C4A-C4	2.18	1.56	1.51
3	A	1446	PLP	C2A-C2	2.16	1.53	1.50
4	B	1548	SFE	CA-C	2.06	1.56	1.51
3	C	1447	PLP	C2A-C2	2.04	1.53	1.50

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1448	PLP	C6-C5-C4	3.68	121.11	118.10
3	C	1447	PLP	C6-C5-C4	3.27	120.78	118.10
3	A	1446	PLP	C4A-C4-C5	-3.25	117.59	120.94
3	A	1446	PLP	C6-C5-C4	3.09	120.63	118.10
3	A	1446	PLP	C4A-C4-C3	2.86	125.29	120.52
3	B	1448	PLP	C4A-C4-C3	2.68	124.99	120.52
3	B	1448	PLP	C4A-C4-C5	-2.60	118.26	120.94
3	C	1447	PLP	C4A-C4-C5	-2.40	118.47	120.94
3	C	1447	PLP	C4A-C4-C3	2.37	124.47	120.52
3	B	1448	PLP	C5-C6-N1	-2.24	120.19	123.83
3	A	1446	PLP	C5A-C5-C6	-2.16	115.83	119.36
3	C	1447	PLP	C5-C6-N1	-2.10	120.41	123.83
4	A	1447	SFE	O-C-CA	-2.05	116.54	122.84

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1448	PLP	C5A-C5-C6	-2.00	116.10	119.36

There are no chirality outliers.

All (18) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	C	1450	GOL	O1-C1-C2-O2
6	C	1450	GOL	O1-C1-C2-C3
6	C	1452	GOL	O1-C1-C2-C3
2	B	1447	EDO	O1-C1-C2-O2
2	B	1453	EDO	O1-C1-C2-O2
2	B	1452	EDO	O1-C1-C2-O2
6	C	1452	GOL	O1-C1-C2-O2
4	B	1548	SFE	N-CB-CG-CD2
2	A	1445	EDO	O1-C1-C2-O2
2	B	1446	EDO	O1-C1-C2-O2
2	B	1449	EDO	O1-C1-C2-O2
2	C	1448	EDO	O1-C1-C2-O2
2	C	1449	EDO	O1-C1-C2-O2
4	A	1447	SFE	N-CB-CG-CD2
4	A	1447	SFE	N-CB-CG-CD1
4	B	1548	SFE	N-CB-CG-CD1
4	C	1547	SFE	N-CB-CG-CD2
2	C	1445	EDO	O1-C1-C2-O2

There are no ring outliers.

12 monomers are involved in 31 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1447	EDO	2	0
4	B	1548	SFE	3	0
4	C	1547	SFE	3	0
4	A	1546	SFE	1	0
2	C	1449	EDO	1	0
2	B	1453	EDO	5	0
2	B	1449	EDO	2	0
2	B	1446	EDO	7	0
2	B	1445	EDO	3	0
2	B	1454	EDO	1	0
6	C	1452	GOL	3	0
2	B	1452	EDO	1	0

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

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	426/465 (91%)	-0.22	7 (1%) 70 75	6, 16, 25, 37	7 (1%)
1	B	429/465 (92%)	-0.24	11 (2%) 57 61	3, 15, 25, 40	9 (2%)
1	C	431/465 (92%)	-0.26	13 (3%) 52 56	6, 15, 26, 41	6 (1%)
All	All	1286/1395 (92%)	-0.24	31 (2%) 59 64	3, 15, 26, 41	22 (1%)

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	47[A]	SER	9.0
1	C	14	SER	3.9
1	B	209	ARG	3.6
1	C	17	ALA	3.4
1	A	306	ASP	3.0
1	B	212	HIS	2.9
1	A	441	ARG	2.8
1	B	205	ASP	2.8
1	C	212	HIS	2.8
1	A	444	LEU	2.7
1	C	15	ASP	2.7
1	B	16	THR	2.6
1	C	209	ARG	2.6
1	B	17	ALA	2.5
1	C	46	ARG	2.5
1	A	360	GLN	2.4
1	C	444	LEU	2.4
1	C	358	GLU	2.4
1	B	441	ARG	2.3
1	B	444	LEU	2.3
1	C	306	ASP	2.3
1	B	21	GLN	2.2
1	C	16	THR	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	442	ALA	2.2
1	A	14	SER	2.2
1	C	18	GLU	2.1
1	C	442	ALA	2.1
1	B	18	GLU	2.1
1	A	442	ALA	2.1
1	A	213	ASP	2.0
1	C	205	ASP	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 ⓘ

There are no oligosaccharides in this entry.

6.4 Ligands ⓘ

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(Å ²)	Q<0.9
2	EDO	C	1448	4/4	0.81	0.23	34,36,36,39	0
4	SFE	A	1447	12/12	0.81	0.15	30,33,37,37	0
6	GOL	C	1450	6/6	0.83	0.27	55,55,55,55	0
2	EDO	B	1445	4/4	0.85	0.30	30,32,32,33	0
2	EDO	B	1453	4/4	0.86	0.27	30,31,31,31	0
2	EDO	B	1449	4/4	0.86	0.18	25,28,28,32	0
2	EDO	C	1449	4/4	0.89	0.16	23,27,28,32	0
4	SFE	B	1548	12/12	0.89	0.12	19,21,26,26	0
5	BNZ	B	1451	6/6	0.89	0.11	28,29,29,29	0
5	BNZ	C	1453	6/6	0.89	0.11	26,26,26,26	0
2	EDO	C	1454	4/4	0.89	0.17	29,32,33,35	0
6	GOL	C	1452	6/6	0.89	0.12	26,30,31,32	0
2	EDO	B	1446	4/4	0.90	0.26	26,28,29,31	0
4	SFE	C	1547	12/12	0.90	0.12	18,21,25,26	0
2	EDO	C	1446	4/4	0.91	0.15	32,32,33,33	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	EDO	B	1452	4/4	0.92	0.15	27,30,30,31	0
2	EDO	B	1447	4/4	0.92	0.15	30,30,31,32	0
2	EDO	B	1454	4/4	0.92	0.15	20,22,22,23	0
2	EDO	C	1451	4/4	0.92	0.13	22,28,29,32	0
4	SFE	A	1546	12/12	0.93	0.10	17,19,22,22	0
2	EDO	C	1445	4/4	0.93	0.13	24,29,30,31	0
2	EDO	B	1450	4/4	0.94	0.10	21,22,22,22	0
2	EDO	A	1445	4/4	0.94	0.13	25,27,27,27	0
3	PLP	C	1447	15/16	0.98	0.05	11,11,13,15	0
3	PLP	B	1448	15/16	0.99	0.04	11,11,13,15	0
3	PLP	A	1446	15/16	0.99	0.04	11,12,13,16	0

6.5 Other polymers [i](#)

There are no such residues in this entry.