



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 29, 2025 – 10:16 AM EDT

PDB ID : 3QXB / pdb_00003qxb
Title : Crystal structure of a Putative Xylose isomerase (YP_426450.1) from RHO-DOSPIRILLUM RUBRUM ATCC 11170 at 1.90 Å resolution
Authors : Joint Center for Structural Genomics (JCSG)
Deposited on : 2011-03-01
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

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 Phenix2.0rc1
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

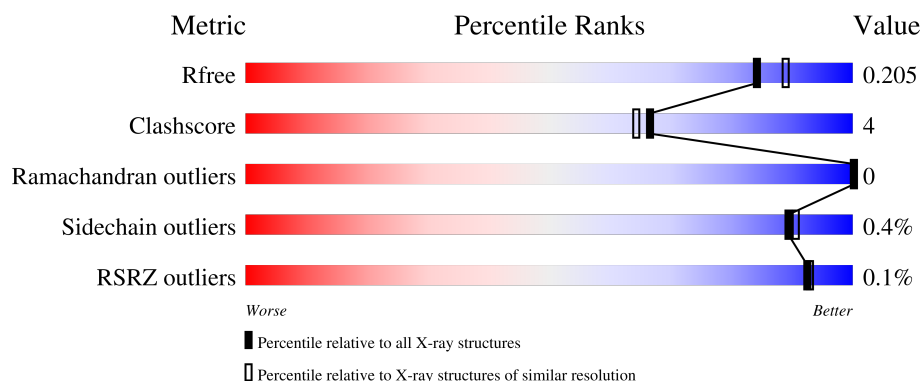
1 Overall quality at a glance

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}	164625	7293 (1.90-1.90)
Clashscore	180529	8090 (1.90-1.90)
Ramachandran outliers	177936	8022 (1.90-1.90)
Sidechain outliers	177891	8022 (1.90-1.90)
RSRZ outliers	164620	7292 (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 ≥ 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	316	 86% 8% 6%
1	B	316	 89% 5% 6%
1	C	316	 88% 5% 6%
1	D	316	 86% 7% 6%

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
6	ACT	A	368	-	-	X	-
6	ACT	D	371	-	-	X	-

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 10645 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 Putative Xylose isomerase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	297	Total	C	N	O	S	Se	0	4	0
			2408	1547	407	442	2	10			
1	B	296	Total	C	N	O	S	Se	0	3	0
			2390	1538	401	439	2	10			
1	C	296	Total	C	N	O	S	Se	0	6	0
			2417	1554	406	445	2	10			
1	D	296	Total	C	N	O	S	Se	0	2	0
			2365	1523	392	438	2	10			

There are 76 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	MSE	-	expression tag	UNP Q2RUN2
A	-17	GLY	-	expression tag	UNP Q2RUN2
A	-16	SER	-	expression tag	UNP Q2RUN2
A	-15	ASP	-	expression tag	UNP Q2RUN2
A	-14	LYS	-	expression tag	UNP Q2RUN2
A	-13	ILE	-	expression tag	UNP Q2RUN2
A	-12	HIS	-	expression tag	UNP Q2RUN2
A	-11	HIS	-	expression tag	UNP Q2RUN2
A	-10	HIS	-	expression tag	UNP Q2RUN2
A	-9	HIS	-	expression tag	UNP Q2RUN2
A	-8	HIS	-	expression tag	UNP Q2RUN2
A	-7	HIS	-	expression tag	UNP Q2RUN2
A	-6	GLU	-	expression tag	UNP Q2RUN2
A	-5	ASN	-	expression tag	UNP Q2RUN2
A	-4	LEU	-	expression tag	UNP Q2RUN2
A	-3	TYR	-	expression tag	UNP Q2RUN2
A	-2	PHE	-	expression tag	UNP Q2RUN2
A	-1	GLN	-	expression tag	UNP Q2RUN2
A	0	GLY	-	expression tag	UNP Q2RUN2
B	-18	MSE	-	expression tag	UNP Q2RUN2
B	-17	GLY	-	expression tag	UNP Q2RUN2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	SER	-	expression tag	UNP Q2RUN2
B	-15	ASP	-	expression tag	UNP Q2RUN2
B	-14	LYS	-	expression tag	UNP Q2RUN2
B	-13	ILE	-	expression tag	UNP Q2RUN2
B	-12	HIS	-	expression tag	UNP Q2RUN2
B	-11	HIS	-	expression tag	UNP Q2RUN2
B	-10	HIS	-	expression tag	UNP Q2RUN2
B	-9	HIS	-	expression tag	UNP Q2RUN2
B	-8	HIS	-	expression tag	UNP Q2RUN2
B	-7	HIS	-	expression tag	UNP Q2RUN2
B	-6	GLU	-	expression tag	UNP Q2RUN2
B	-5	ASN	-	expression tag	UNP Q2RUN2
B	-4	LEU	-	expression tag	UNP Q2RUN2
B	-3	TYR	-	expression tag	UNP Q2RUN2
B	-2	PHE	-	expression tag	UNP Q2RUN2
B	-1	GLN	-	expression tag	UNP Q2RUN2
B	0	GLY	-	expression tag	UNP Q2RUN2
C	-18	MSE	-	expression tag	UNP Q2RUN2
C	-17	GLY	-	expression tag	UNP Q2RUN2
C	-16	SER	-	expression tag	UNP Q2RUN2
C	-15	ASP	-	expression tag	UNP Q2RUN2
C	-14	LYS	-	expression tag	UNP Q2RUN2
C	-13	ILE	-	expression tag	UNP Q2RUN2
C	-12	HIS	-	expression tag	UNP Q2RUN2
C	-11	HIS	-	expression tag	UNP Q2RUN2
C	-10	HIS	-	expression tag	UNP Q2RUN2
C	-9	HIS	-	expression tag	UNP Q2RUN2
C	-8	HIS	-	expression tag	UNP Q2RUN2
C	-7	HIS	-	expression tag	UNP Q2RUN2
C	-6	GLU	-	expression tag	UNP Q2RUN2
C	-5	ASN	-	expression tag	UNP Q2RUN2
C	-4	LEU	-	expression tag	UNP Q2RUN2
C	-3	TYR	-	expression tag	UNP Q2RUN2
C	-2	PHE	-	expression tag	UNP Q2RUN2
C	-1	GLN	-	expression tag	UNP Q2RUN2
C	0	GLY	-	expression tag	UNP Q2RUN2
D	-18	MSE	-	expression tag	UNP Q2RUN2
D	-17	GLY	-	expression tag	UNP Q2RUN2
D	-16	SER	-	expression tag	UNP Q2RUN2
D	-15	ASP	-	expression tag	UNP Q2RUN2
D	-14	LYS	-	expression tag	UNP Q2RUN2
D	-13	ILE	-	expression tag	UNP Q2RUN2

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-12	HIS	-	expression tag	UNP Q2RUN2
D	-11	HIS	-	expression tag	UNP Q2RUN2
D	-10	HIS	-	expression tag	UNP Q2RUN2
D	-9	HIS	-	expression tag	UNP Q2RUN2
D	-8	HIS	-	expression tag	UNP Q2RUN2
D	-7	HIS	-	expression tag	UNP Q2RUN2
D	-6	GLU	-	expression tag	UNP Q2RUN2
D	-5	ASN	-	expression tag	UNP Q2RUN2
D	-4	LEU	-	expression tag	UNP Q2RUN2
D	-3	TYR	-	expression tag	UNP Q2RUN2
D	-2	PHE	-	expression tag	UNP Q2RUN2
D	-1	GLN	-	expression tag	UNP Q2RUN2
D	0	GLY	-	expression tag	UNP Q2RUN2

- Molecule 2 is FE (III) ION (CCD ID: FE) (formula: Fe).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	2	Total Fe 2 2	0	2
2	B	2	Total Fe 2 2	0	2
2	C	2	Total Fe 2 2	0	2
2	D	2	Total Fe 2 2	0	2

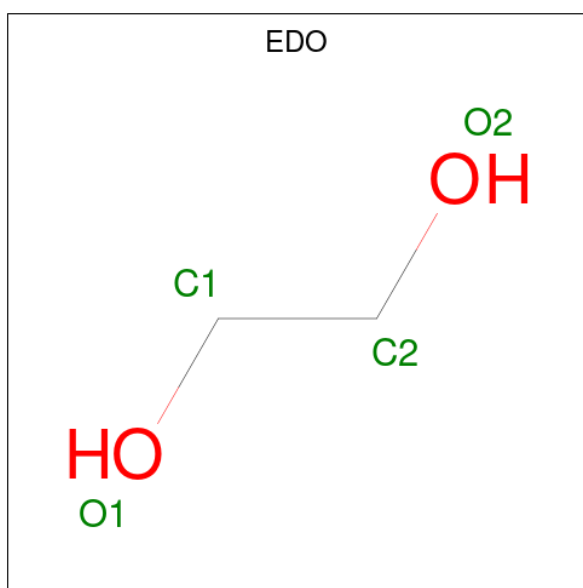
- Molecule 3 is MANGANESE (II) ION (CCD ID: MN) (formula: Mn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	2	Total Mn 2 2	0	2
3	B	2	Total Mn 2 2	0	2
3	C	2	Total Mn 2 2	0	2
3	D	2	Total Mn 2 2	0	2

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

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

- Molecule 5 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



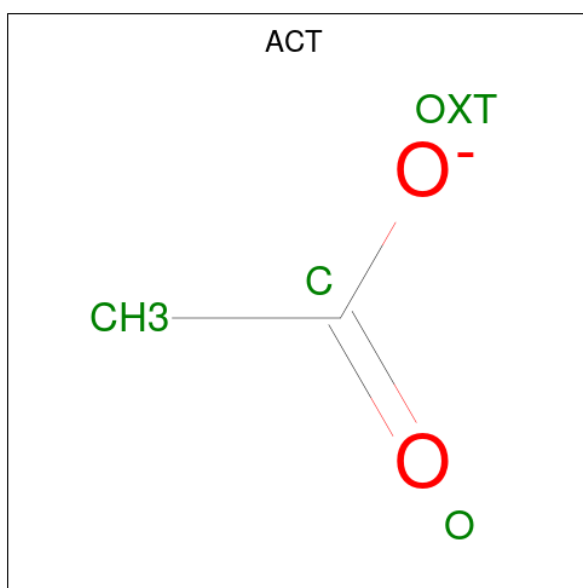
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 4 2 2	0	0
5	A	1	Total C O 4 2 2	0	0
5	A	1	Total C O 4 2 2	0	0
5	A	1	Total C O 4 2 2	0	0
5	A	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0

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

- Molecule 6 is ACETATE ION (CCD ID: ACT) (formula: $C_2H_3O_2$).



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

- Molecule 7 is water.

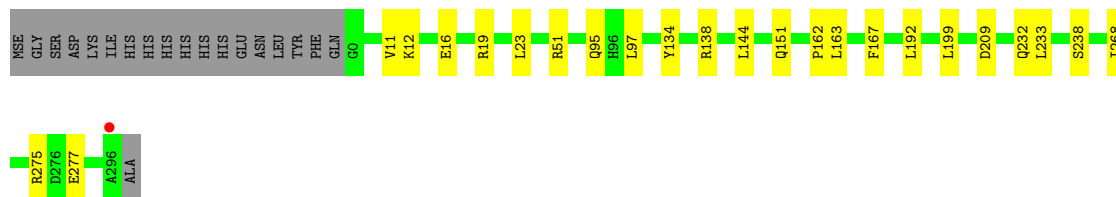
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	255	Total 256	O 256	0	1
7	B	247	Total 247	O 247	0	0
7	C	251	Total 252	O 252	0	1
7	D	219	Total 221	O 221	0	2

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: Putative Xylose isomerase

Chain A: 



• Molecule 1: Putative Xylose isomerase

Chain B: 



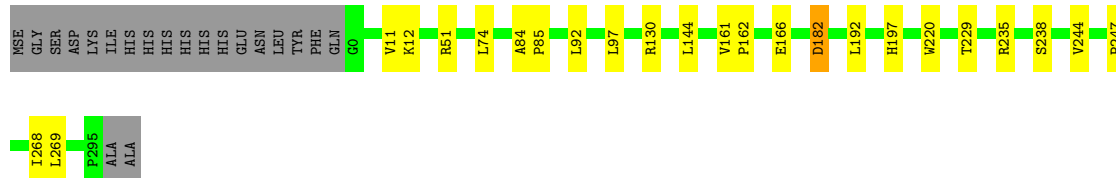
• Molecule 1: Putative Xylose isomerase

Chain C: 



• Molecule 1: Putative Xylose isomerase

Chain D: 



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	76.19Å 94.90Å 173.20Å 90.00° 93.04° 90.00°	Depositor
Resolution (Å)	29.68 – 1.90 29.68 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.7 (29.68-1.90) 99.7 (29.68-1.90)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	0.10	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.35 (at 1.91Å)	Xtriage
Refinement program	REFMAC 5.5.0110	Depositor
R, R_{free}	0.150 , 0.192 0.167 , 0.205	Depositor DCC
R_{free} test set	4830 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	19.7	Xtriage
Anisotropy	0.268	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 43.1	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	10645	wwPDB-VP
Average B, all atoms (Å ²)	27.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 13.35% 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: MN, ACT, FE, CL, EDO

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	0.97	0/2466	0.87	0/3343
1	B	1.00	0/2448	0.89	1/3319 (0.0%)
1	C	0.96	0/2475	0.88	1/3355 (0.0%)
1	D	0.93	0/2423	0.88	1/3290 (0.0%)
All	All	0.96	0/9812	0.88	3/13307 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	129	ARG	CG-CD-NE	-7.15	96.28	112.00
1	C	129	ARG	CG-CD-NE	-5.96	98.89	112.00
1	D	235	ARG	N-CA-C	5.22	117.05	111.36

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	2408	0	2322	18	0
1	B	2390	0	2316	13	0
1	C	2417	0	2340	22	0
1	D	2365	0	2271	31	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
3	A	2	0	0	0	0
3	B	2	0	0	0	0
3	C	2	0	0	0	0
3	D	2	0	0	0	0
4	A	2	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	20	0	30	2	0
5	B	12	0	18	2	0
5	C	12	0	18	1	0
5	D	8	0	12	1	0
6	A	4	0	3	2	0
6	B	4	0	3	0	0
6	C	4	0	3	0	0
6	D	4	0	3	2	0
7	A	256	0	0	3	1
7	B	247	0	0	0	0
7	C	252	0	0	3	0
7	D	221	0	0	0	0
All	All	10645	0	9339	68	1

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 4.

All (68) 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:74:LEU:CD2	1:D:74[B]:LEU:HD11	1.71	1.19
1:C:74:LEU:HD21	1:D:74[B]:LEU:HD11	1.15	1.15
1:C:74:LEU:HD11	1:D:74[B]:LEU:HD21	1.17	1.07
1:C:74:LEU:HD21	1:D:74[B]:LEU:CD1	1.85	1.07
1:C:74:LEU:CD1	1:D:74[B]:LEU:HD21	1.88	1.02
1:C:74:LEU:HD11	1:D:74[B]:LEU:CD2	1.88	1.01
1:C:74:LEU:HD23	1:D:74[B]:LEU:HD11	1.64	0.78
1:D:182:ASP:OD2	1:D:220:TRP:CZ3	2.38	0.76
1:C:98:LYS:NZ	7:C:1169:HOH:O	2.20	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:74:LEU:CG	1:D:74[B]:LEU:HD21	2.19	0.72
1:C:74:LEU:HD21	1:D:74[B]:LEU:HD21	1.73	0.69
1:B:249:ARG:HH21	5:B:356:EDO:C2	2.08	0.66
1:C:74:LEU:HD21	1:D:74[B]:LEU:CD2	2.25	0.65
1:C:74:LEU:CD2	1:D:74[B]:LEU:HD21	2.26	0.65
1:A:275:ARG:NH2	1:A:277:GLU:OE2	2.30	0.64
1:B:249:ARG:HH21	5:B:356:EDO:H22	1.66	0.61
1:C:74:LEU:HD21	1:D:74[B]:LEU:CG	2.30	0.61
1:C:11[B]:VAL:HG12	1:C:12:LYS:HG3	1.85	0.59
1:A:11:VAL:HG12	1:A:12:LYS:HG3	1.85	0.58
1:D:11:VAL:HG12	1:D:12:LYS:HG3	1.87	0.56
1:C:147:TYR:O	1:C:150[B]:ARG:HB2	2.06	0.55
1:A:199:LEU:CD2	1:A:209:ASP:HA	2.38	0.54
1:D:238:SER:HA	1:D:268:ILE:HD12	1.90	0.54
1:D:162:PRO:HD3	1:D:197:HIS:CG	2.44	0.53
1:D:182:ASP:OD2	1:D:220:TRP:CH2	2.62	0.53
1:A:95:GLN:HE22	1:B:45:PRO:HG2	1.73	0.52
1:D:182:ASP:OD2	1:D:220:TRP:HZ3	1.87	0.51
7:C:768:HOH:O	1:D:11:VAL:HG13	2.10	0.50
1:C:88:GLU:OE2	1:D:51:ARG:NH1	2.44	0.50
1:B:275[A]:ARG:HH11	1:B:275[A]:ARG:HG3	1.77	0.50
1:C:23:LEU:C	1:C:23:LEU:HD23	2.37	0.49
1:B:11:VAL:HG12	1:B:12:LYS:HG3	1.96	0.48
1:C:74:LEU:CD2	1:D:74[B]:LEU:CD1	2.59	0.47
1:A:16:GLU:HG2	5:A:360:EDO:C1	2.45	0.47
1:D:161:VAL:HG21	1:D:166:GLU:OE1	2.15	0.47
1:C:162:PRO:HD3	1:C:197:HIS:CG	2.50	0.47
1:A:277:GLU:HG2	7:A:570:HOH:O	2.14	0.47
1:B:192:LEU:C	1:B:192:LEU:HD23	2.40	0.47
1:A:138[B]:ARG:HH11	1:A:138[B]:ARG:HG2	1.80	0.47
1:A:167:PHE:CG	6:A:368:ACT:H1	2.50	0.46
1:D:229:THR:O	1:D:244:VAL:HG22	2.15	0.46
5:C:357:EDO:H21	7:C:1135:HOH:O	2.16	0.46
1:D:130:ARG:HH21	6:D:371:ACT:H1	1.81	0.45
1:B:162:PRO:HD3	1:B:197:HIS:CG	2.51	0.45
1:D:97:LEU:HD23	1:D:144:LEU:HD13	1.99	0.45
1:A:51[A]:ARG:HD2	1:B:88:GLU:OE1	2.17	0.45
1:A:151:GLN:NE2	7:A:1230:HOH:O	2.50	0.44
1:D:130:ARG:HE	6:D:371:ACT:H3	1.83	0.44
1:A:162:PRO:C	1:A:163:LEU:HD12	2.42	0.44
1:A:134:TYR:CG	6:A:368:ACT:H2	2.52	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:275[A]:ARG:HH11	1:B:275[A]:ARG:CG	2.31	0.43
1:A:97:LEU:HD23	1:A:144:LEU:HD13	2.01	0.43
1:B:162:PRO:C	1:B:163:LEU:HD12	2.44	0.43
1:B:98:LYS:HG2	1:B:147:TYR:CE2	2.55	0.42
1:C:44:TRP:CD2	1:D:92:LEU:HD13	2.54	0.42
1:B:37:TYR:CD2	1:B:72:GLY:HA2	2.55	0.42
1:A:16:GLU:HG2	5:A:360:EDO:H12	2.00	0.42
1:A:23:LEU:C	1:A:23:LEU:HD23	2.44	0.42
1:D:84:ALA:HB1	1:D:85:PRO:HD2	2.01	0.41
1:D:74[B]:LEU:HD12	1:D:74[B]:LEU:O	2.20	0.41
1:C:192:LEU:HD21	1:C:225:HIS:CG	2.55	0.41
1:A:192:LEU:HD23	1:A:192:LEU:C	2.46	0.41
1:C:97:LEU:HD23	1:C:144:LEU:HD13	2.01	0.41
1:D:192:LEU:HD23	1:D:192:LEU:C	2.46	0.41
1:A:238:SER:HA	1:A:268:ILE:HD12	2.03	0.41
1:A:232:GLN:O	1:A:233:LEU:HD23	2.20	0.41
1:D:269:LEU:O	5:D:364:EDO:H22	2.21	0.40
7:A:826:HOH:O	1:B:11:VAL:HG13	2.21	0.40

All (1) 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)
7:A:1303:HOH:O	7:A:1303:HOH:O[2_556]	2.10	0.10

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	299/316 (95%)	292 (98%)	7 (2%)	0	100	100
1	B	297/316 (94%)	287 (97%)	10 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	301/316 (95%)	293 (97%)	8 (3%)	0	100	100
1	D	296/316 (94%)	289 (98%)	7 (2%)	0	100	100
All	All	1193/1264 (94%)	1161 (97%)	32 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	242/246 (98%)	241 (100%)	1 (0%)	89	90
1	B	243/246 (99%)	243 (100%)	0	100	100
1	C	246/246 (100%)	245 (100%)	1 (0%)	89	90
1	D	239/246 (97%)	237 (99%)	2 (1%)	79	80
All	All	970/984 (99%)	966 (100%)	4 (0%)	89	90

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	19	ARG
1	C	209	ASP
1	D	182	ASP
1	D	247	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	95	GLN
1	A	151	GLN
1	A	232	GLN
1	A	241	GLN
1	B	241	GLN

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Mol	Chain	Res	Type
1	C	232	GLN
1	D	232	GLN

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](#)

Of 38 ligands modelled in this entry, 21 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	$\# Z > 2$
5	EDO	B	361	-	3,3,3	0.56	0	2,2,2	0.66	0
5	EDO	B	356	-	3,3,3	0.26	0	2,2,2	1.23	0
5	EDO	B	363	-	3,3,3	0.42	0	2,2,2	0.49	0
5	EDO	A	355	-	3,3,3	0.34	0	2,2,2	1.05	0
6	ACT	D	371	-	3,3,3	1.18	0	3,3,3	1.39	0
6	ACT	A	368	-	3,3,3	0.83	0	3,3,3	0.94	0
5	EDO	C	362	-	3,3,3	0.53	0	2,2,2	0.09	0
5	EDO	A	360	-	3,3,3	0.37	0	2,2,2	0.16	0
5	EDO	C	366	-	3,3,3	0.48	0	2,2,2	0.36	0
5	EDO	C	357	-	3,3,3	0.14	0	2,2,2	0.34	0
5	EDO	D	364	-	3,3,3	0.51	0	2,2,2	0.31	0
5	EDO	D	367	-	3,3,3	0.40	0	2,2,2	0.20	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	EDO	A	358	-	3,3,3	0.62	0	2,2,2	0.53	0
5	EDO	A	365	-	3,3,3	0.41	0	2,2,2	0.46	0
5	EDO	A	359	-	3,3,3	0.35	0	2,2,2	0.58	0
6	ACT	B	369	-	3,3,3	0.89	0	3,3,3	1.56	0
6	ACT	C	370	-	3,3,3	0.94	0	3,3,3	1.43	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
5	EDO	B	361	-	-	1/1/1/1	-
5	EDO	B	356	-	-	0/1/1/1	-
5	EDO	B	363	-	-	0/1/1/1	-
5	EDO	A	355	-	-	1/1/1/1	-
5	EDO	C	362	-	-	0/1/1/1	-
5	EDO	A	360	-	-	1/1/1/1	-
5	EDO	C	366	-	-	1/1/1/1	-
5	EDO	C	357	-	-	0/1/1/1	-
5	EDO	D	364	-	-	1/1/1/1	-
5	EDO	D	367	-	-	0/1/1/1	-
5	EDO	A	358	-	-	0/1/1/1	-
5	EDO	A	365	-	-	0/1/1/1	-
5	EDO	A	359	-	-	1/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	359	EDO	O1-C1-C2-O2
5	A	360	EDO	O1-C1-C2-O2
5	B	361	EDO	O1-C1-C2-O2
5	D	364	EDO	O1-C1-C2-O2
5	A	355	EDO	O1-C1-C2-O2
5	C	366	EDO	O1-C1-C2-O2

There are no ring outliers.

6 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	356	EDO	2	0
6	D	371	ACT	2	0
6	A	368	ACT	2	0
5	A	360	EDO	2	0
5	C	357	EDO	1	0
5	D	364	EDO	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, 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	287/316 (90%)	-0.50	1 (0%) 90 91	12, 26, 41, 56	4 (1%)
1	B	286/316 (90%)	-0.54	0 100 100	11, 24, 37, 47	3 (1%)
1	C	286/316 (90%)	-0.49	0 100 100	8, 25, 36, 44	6 (2%)
1	D	286/316 (90%)	-0.44	0 100 100	11, 27, 41, 57	2 (0%)
All	All	1145/1264 (90%)	-0.49	1 (0%) 92 93	8, 26, 39, 57	15 (1%)

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	296	ALA	2.4

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 monosaccharides 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(Å ²)	Q<0.9
6	ACT	D	371	4/4	0.65	0.26	53,53,53,54	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
5	EDO	B	361	4/4	0.76	0.16	38,42,43,48	0
5	EDO	B	356	4/4	0.77	0.17	40,43,44,45	0
5	EDO	A	359	4/4	0.83	0.15	57,58,58,59	0
5	EDO	D	367	4/4	0.85	0.18	42,44,46,48	0
6	ACT	A	368	4/4	0.88	0.17	40,41,41,42	0
5	EDO	A	355	4/4	0.88	0.14	43,43,43,44	0
6	ACT	B	369	4/4	0.89	0.12	34,34,37,38	0
5	EDO	B	363	4/4	0.89	0.13	37,40,42,45	0
5	EDO	A	360	4/4	0.90	0.12	33,39,40,43	0
5	EDO	C	366	4/4	0.90	0.11	36,38,39,40	0
5	EDO	A	358	4/4	0.91	0.10	31,32,35,37	0
4	CL	D	354	1/1	0.92	0.10	41,41,41,41	0
5	EDO	C	362	4/4	0.93	0.10	41,46,47,47	0
6	ACT	C	370	4/4	0.93	0.10	38,39,40,40	0
5	EDO	A	365	4/4	0.93	0.10	29,29,31,34	0
5	EDO	D	364	4/4	0.94	0.09	32,36,38,43	0
4	CL	B	352	1/1	0.94	0.09	37,37,37,37	0
5	EDO	C	357	4/4	0.94	0.10	27,31,32,37	0
3	MN	B	303[A]	1/1	0.98	0.04	30,30,30,30	1
4	CL	C	353	1/1	0.98	0.05	36,36,36,36	0
2	FE	A	304[B]	1/1	0.99	0.04	31,31,31,31	1
3	MN	C	303[A]	1/1	0.99	0.04	26,26,26,26	1
3	MN	D	303[A]	1/1	0.99	0.04	28,28,28,28	1
4	CL	A	351	1/1	0.99	0.04	34,34,34,34	0
2	FE	B	304[B]	1/1	0.99	0.04	30,30,30,30	1
2	FE	C	304[B]	1/1	0.99	0.04	26,26,26,26	1
2	FE	D	304[B]	1/1	0.99	0.04	27,27,27,27	1
3	MN	A	303[A]	1/1	0.99	0.04	31,31,31,31	1
2	FE	B	301[A]	1/1	1.00	0.03	22,22,22,22	1
3	MN	C	302[B]	1/1	1.00	0.03	23,23,23,23	1
2	FE	D	301[A]	1/1	1.00	0.04	26,26,26,26	1
3	MN	D	302[B]	1/1	1.00	0.04	26,26,26,26	1
2	FE	A	301[A]	1/1	1.00	0.02	26,26,26,26	1
4	CL	A	350	1/1	1.00	0.02	24,24,24,24	0
3	MN	A	302[B]	1/1	1.00	0.02	25,25,25,25	1
2	FE	C	301[A]	1/1	1.00	0.03	23,23,23,23	1
3	MN	B	302[B]	1/1	1.00	0.03	22,22,22,22	1

6.5 Other polymers ⓘ

There are no such residues in this entry.