



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 14, 2017 – 06:34 pm GMT

PDB ID : 3PGV  
Title : Crystal structure of a haloacid dehalogenase-like hydrolase (KPN\_04322) from *Klebsiella pneumoniae* subsp. *pneumoniae* MGH 78578 at 2.39 Å resolution  
Authors : Joint Center for Structural Genomics (JCSG)  
Deposited on : 2010-11-02  
Resolution : 2.39 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

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity	:	4.02b-467
Mogul	:	1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix)	:	1.9-1692
EDS	:	trunk28620
Percentile statistics	:	20161228.v01 (using entries in the PDB archive December 28th 2016)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	recalc28949

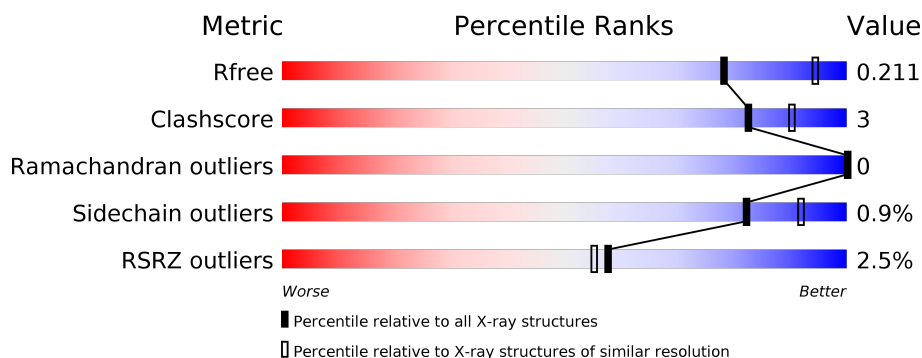
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.39 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))
$R_{free}$	100719	3166 (2.40-2.40)
Clashscore	112137	3674 (2.40-2.40)
Ramachandran outliers	110173	3616 (2.40-2.40)
Sidechain outliers	110143	3617 (2.40-2.40)
RSRZ outliers	101464	3195 (2.40-2.40)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . 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	285	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 1%, orange 1%, yellow 7%, green 84%, grey 9%);"></div> <div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <span>1%</span> <span>84%</span> <span>7%</span> <span>9%</span> </div> </div>
1	B	285	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 2%, orange 2%, yellow 5%, green 85%, grey 10%);"></div> <div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <span>2%</span> <span>85%</span> <span>5%</span> <span>10%</span> </div> </div>
1	C	285	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 6%, orange 6%, yellow 7%, green 84%, grey 9%);"></div> <div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <span>6%</span> <span>84%</span> <span>7%</span> <span>9%</span> </div> </div>
1	D	285	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, green 84%, yellow 6%, grey 10%);"></div> <div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <span>84%</span> <span>6%</span> <span>10%</span> </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 crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	EPE	B	269	-	-	-	X
3	EPE	C	270	-	-	-	X
4	GOL	A	272	-	-	-	X
4	GOL	B	273	-	-	-	X
4	GOL	C	274	-	-	-	X
5	EDO	A	276	-	-	-	X
5	EDO	A	277	-	-	-	X
5	EDO	A	278	-	-	-	X
5	EDO	A	287	-	-	-	X
5	EDO	C	286	-	-	-	X
5	EDO	C	288	-	-	-	X
5	EDO	D	279	-	-	-	X
5	EDO	D	282	-	-	-	X
5	EDO	D	283	-	-	-	X
5	EDO	D	285	-	-	-	X

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 8764 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 haloacid dehalogenase-like hydrolase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	259	Total	C	N	O	S	Se	0	3	0
			2065	1306	359	387	4	9			
1	B	257	Total	C	N	O	S	Se	0	4	0
			2048	1292	355	387	4	10			
1	C	258	Total	C	N	O	S	Se	0	2	0
			2023	1277	354	379	4	9			
1	D	257	Total	C	N	O	S	Se	0	3	0
			2044	1289	359	382	4	10			

There are 76 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	MSE	-	leader sequence	UNP A6TGK6
A	-17	GLY	-	leader sequence	UNP A6TGK6
A	-16	SER	-	leader sequence	UNP A6TGK6
A	-15	ASP	-	leader sequence	UNP A6TGK6
A	-14	LYS	-	leader sequence	UNP A6TGK6
A	-13	ILE	-	leader sequence	UNP A6TGK6
A	-12	HIS	-	leader sequence	UNP A6TGK6
A	-11	HIS	-	leader sequence	UNP A6TGK6
A	-10	HIS	-	leader sequence	UNP A6TGK6
A	-9	HIS	-	leader sequence	UNP A6TGK6
A	-8	HIS	-	leader sequence	UNP A6TGK6
A	-7	HIS	-	leader sequence	UNP A6TGK6
A	-6	GLU	-	leader sequence	UNP A6TGK6
A	-5	ASN	-	leader sequence	UNP A6TGK6
A	-4	LEU	-	leader sequence	UNP A6TGK6
A	-3	TYR	-	leader sequence	UNP A6TGK6
A	-2	PHE	-	leader sequence	UNP A6TGK6
A	-1	GLN	-	leader sequence	UNP A6TGK6
A	0	GLY	-	leader sequence	UNP A6TGK6
B	-18	MSE	-	leader sequence	UNP A6TGK6
B	-17	GLY	-	leader sequence	UNP A6TGK6

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	SER	-	leader sequence	UNP A6TGK6
B	-15	ASP	-	leader sequence	UNP A6TGK6
B	-14	LYS	-	leader sequence	UNP A6TGK6
B	-13	ILE	-	leader sequence	UNP A6TGK6
B	-12	HIS	-	leader sequence	UNP A6TGK6
B	-11	HIS	-	leader sequence	UNP A6TGK6
B	-10	HIS	-	leader sequence	UNP A6TGK6
B	-9	HIS	-	leader sequence	UNP A6TGK6
B	-8	HIS	-	leader sequence	UNP A6TGK6
B	-7	HIS	-	leader sequence	UNP A6TGK6
B	-6	GLU	-	leader sequence	UNP A6TGK6
B	-5	ASN	-	leader sequence	UNP A6TGK6
B	-4	LEU	-	leader sequence	UNP A6TGK6
B	-3	TYR	-	leader sequence	UNP A6TGK6
B	-2	PHE	-	leader sequence	UNP A6TGK6
B	-1	GLN	-	leader sequence	UNP A6TGK6
B	0	GLY	-	leader sequence	UNP A6TGK6
C	-18	MSE	-	leader sequence	UNP A6TGK6
C	-17	GLY	-	leader sequence	UNP A6TGK6
C	-16	SER	-	leader sequence	UNP A6TGK6
C	-15	ASP	-	leader sequence	UNP A6TGK6
C	-14	LYS	-	leader sequence	UNP A6TGK6
C	-13	ILE	-	leader sequence	UNP A6TGK6
C	-12	HIS	-	leader sequence	UNP A6TGK6
C	-11	HIS	-	leader sequence	UNP A6TGK6
C	-10	HIS	-	leader sequence	UNP A6TGK6
C	-9	HIS	-	leader sequence	UNP A6TGK6
C	-8	HIS	-	leader sequence	UNP A6TGK6
C	-7	HIS	-	leader sequence	UNP A6TGK6
C	-6	GLU	-	leader sequence	UNP A6TGK6
C	-5	ASN	-	leader sequence	UNP A6TGK6
C	-4	LEU	-	leader sequence	UNP A6TGK6
C	-3	TYR	-	leader sequence	UNP A6TGK6
C	-2	PHE	-	leader sequence	UNP A6TGK6
C	-1	GLN	-	leader sequence	UNP A6TGK6
C	0	GLY	-	leader sequence	UNP A6TGK6
D	-18	MSE	-	leader sequence	UNP A6TGK6
D	-17	GLY	-	leader sequence	UNP A6TGK6
D	-16	SER	-	leader sequence	UNP A6TGK6
D	-15	ASP	-	leader sequence	UNP A6TGK6
D	-14	LYS	-	leader sequence	UNP A6TGK6
D	-13	ILE	-	leader sequence	UNP A6TGK6

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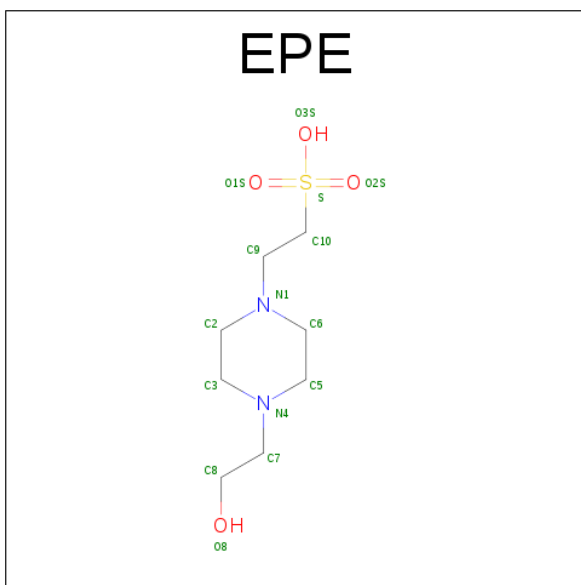
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Chain	Residue	Modelled	Actual	Comment	Reference
D	-12	HIS	-	leader sequence	UNP A6TGK6
D	-11	HIS	-	leader sequence	UNP A6TGK6
D	-10	HIS	-	leader sequence	UNP A6TGK6
D	-9	HIS	-	leader sequence	UNP A6TGK6
D	-8	HIS	-	leader sequence	UNP A6TGK6
D	-7	HIS	-	leader sequence	UNP A6TGK6
D	-6	GLU	-	leader sequence	UNP A6TGK6
D	-5	ASN	-	leader sequence	UNP A6TGK6
D	-4	LEU	-	leader sequence	UNP A6TGK6
D	-3	TYR	-	leader sequence	UNP A6TGK6
D	-2	PHE	-	leader sequence	UNP A6TGK6
D	-1	GLN	-	leader sequence	UNP A6TGK6
D	0	GLY	-	leader sequence	UNP A6TGK6

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

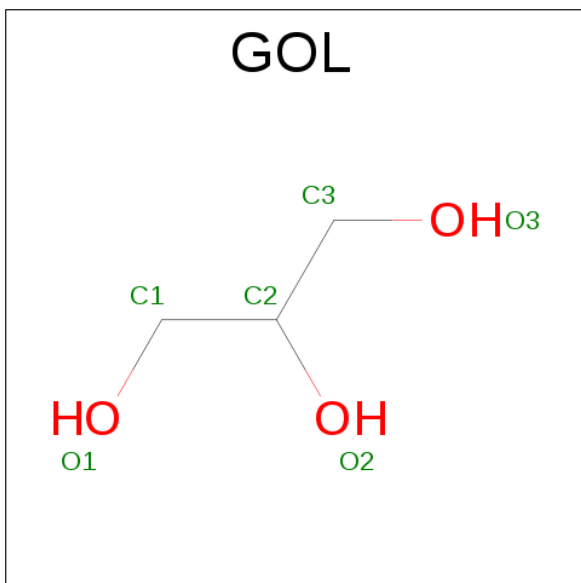
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	B	1	Total Ca 1 1	0	0
2	A	1	Total Ca 1 1	0	0
2	D	1	Total Ca 1 1	0	0
2	C	1	Total Ca 1 1	0	0

- Molecule 3 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (three-letter code: EPE) (formula: C<sub>8</sub>H<sub>18</sub>N<sub>2</sub>O<sub>4</sub>S).



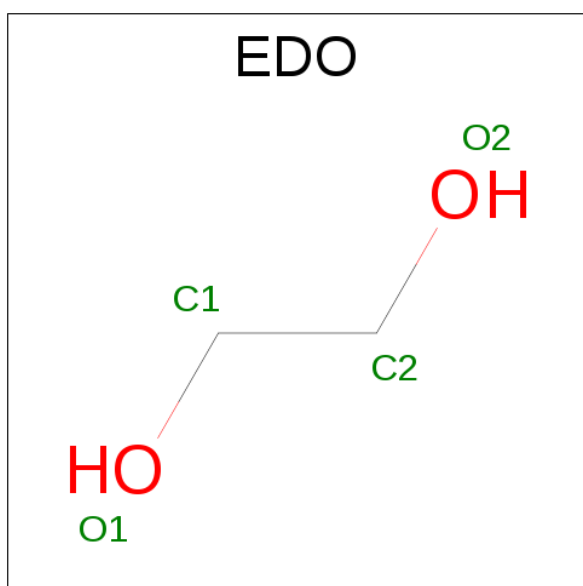
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	S	0	0
			13	7	2	3	1		
3	B	1	Total	C	N	O	S	0	0
			15	8	2	4	1		
3	C	1	Total	C	N	O	S	0	0
			14	8	2	3	1		
3	D	1	Total	C	N	O	S	0	0
			14	8	2	3	1		

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula:  $C_3H_8O_3$ ).



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

- Molecule 5 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



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	C	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 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0

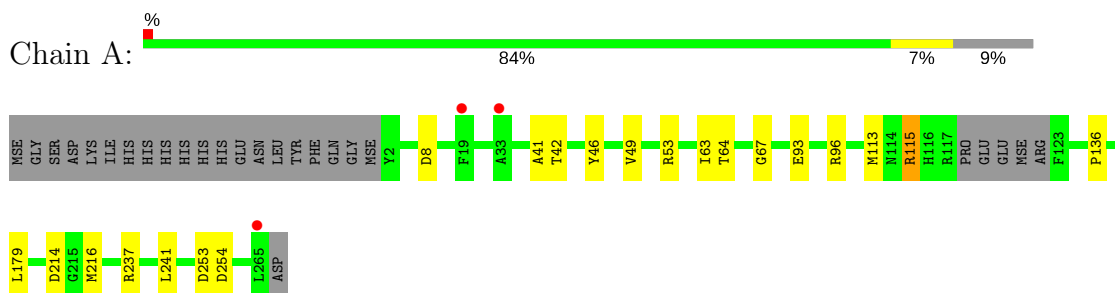
- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	108	Total O 108 108	0	0
6	B	102	Total O 102 102	0	0
6	C	76	Total O 76 76	0	0
6	D	142	Total O 142 142	0	0

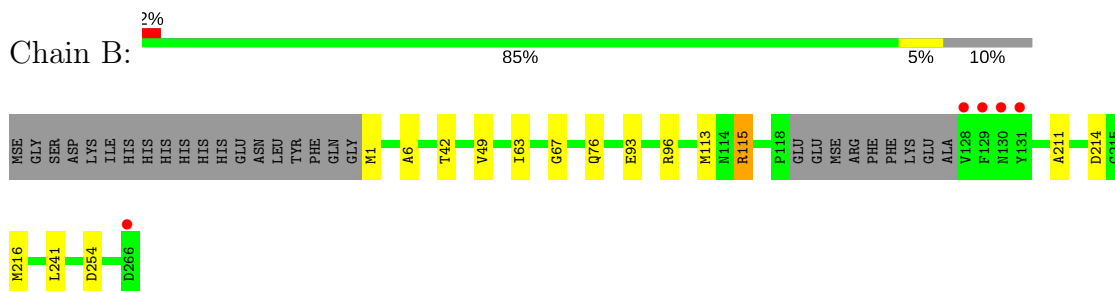
### 3 Residue-property plots [i](#)

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

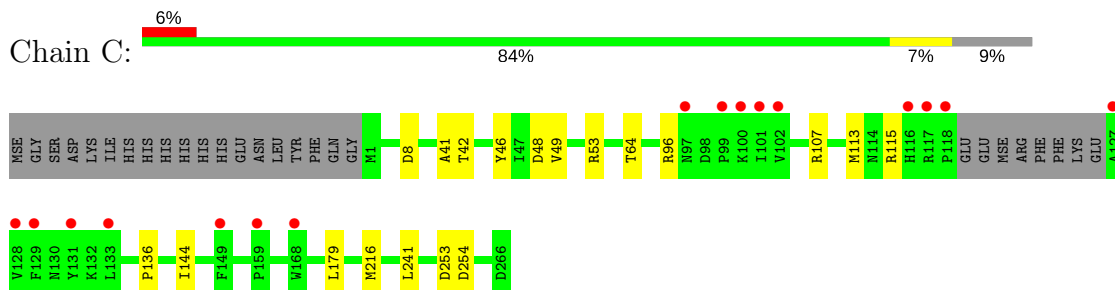
- Molecule 1: haloacid dehalogenase-like hydrolase



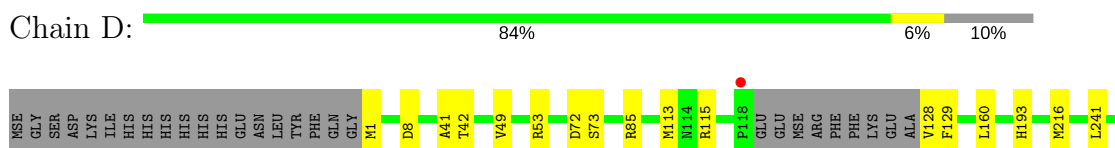
- Molecule 1: haloacid dehalogenase-like hydrolase



- Molecule 1: haloacid dehalogenase-like hydrolase



- Molecule 1: haloacid dehalogenase-like hydrolase





## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	118.57Å 61.96Å 169.41Å 90.00° 94.19° 90.00°	Depositor
Resolution (Å)	46.78 – 2.39 46.75 – 2.39	Depositor EDS
% Data completeness (in resolution range)	(Not available) (46.78-2.39) 99.3 (46.75-2.39)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.20 (at 2.39Å)	Xtriage
Refinement program	BUSTER 2.8.0	Depositor
R, $R_{free}$	0.167 , 0.211 0.172 , 0.211	Depositor DCC
$R_{free}$ test set	2450 reflections (5.31%)	DCC
Wilson B-factor (Å <sup>2</sup> )	31.7	Xtriage
Anisotropy	0.853	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 46.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	8764	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	43.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.94% 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, CA, EPE, 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	0.49	0/2108	0.36	0/2835
1	B	0.52	0/2093	0.36	0/2814
1	C	0.50	0/2062	0.35	0/2775
1	D	0.52	0/2086	0.35	0/2805
All	All	0.51	0/8349	0.36	0/11229

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	2065	0	2007	14	0
1	B	2048	0	2002	11	0
1	C	2023	0	1962	10	0
1	D	2044	0	1995	15	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	13	0	13	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	15	0	18	1	0
3	C	14	0	15	0	0
3	D	14	0	15	0	0
4	A	6	0	7	2	0
4	B	6	0	7	1	0
4	C	6	0	7	0	0
4	D	6	0	7	0	0
5	A	20	0	30	1	0
5	B	8	0	12	0	0
5	C	8	0	12	0	0
5	D	36	0	54	5	0
6	A	108	0	0	0	0
6	B	102	0	0	0	0
6	C	76	0	0	0	0
6	D	142	0	0	0	0
All	All	8764	0	8163	47	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 (47) 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:D:72:ASP:HB2	5:D:284:EDO:H11	1.64	0.78
1:B:76[B]:GLN:HG3	1:D:85:ARG:HD3	1.71	0.73
1:A:214:ASP:OD2	4:A:272:GOL:H2	1.91	0.70
1:A:96:ARG:HD3	1:A:136:PRO:HG3	1.74	0.69
1:D:1:MSE:HE2	1:D:1:MSE:HA	1.78	0.66
1:B:1:MSE:HA	1:B:1:MSE:HE2	1.78	0.65
1:A:49:VAL:O	1:A:53[A]:ARG:HG2	2.02	0.60
1:C:96:ARG:HD3	1:C:136:PRO:HG3	1.84	0.59
1:D:42:THR:HG21	1:D:49:VAL:HG11	1.84	0.58
1:B:113:MSE:HE3	1:B:115:ARG:O	2.03	0.58
1:C:42:THR:HG21	1:C:49:VAL:HG11	1.88	0.56
1:A:42:THR:HG21	1:A:49:VAL:HG11	1.88	0.56
1:D:128:VAL:HG13	1:D:129:PHE:H	1.71	0.55
1:B:42:THR:HG21	1:B:49:VAL:HG11	1.88	0.55
1:D:241:LEU:HD13	5:D:291:EDO:H12	1.89	0.54
1:A:113:MSE:HE3	1:A:115:ARG:O	2.08	0.54
1:C:113:MSE:HE3	1:C:115:ARG:O	2.09	0.53
1:D:73:SER:H	5:D:284:EDO:H22	1.72	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:216:MSE:HE1	1:A:241:LEU:HD22	1.95	0.49
1:C:107:ARG:HG3	1:C:144:ILE:HD13	1.93	0.49
1:B:76[B]:GLN:CG	1:D:85:ARG:HD3	2.41	0.49
1:D:49:VAL:O	1:D:53[B]:ARG:HG2	2.12	0.48
1:A:179:LEU:HD11	1:C:253:ASP:HA	1.96	0.47
1:D:193:HIS:HB3	5:D:282:EDO:H22	1.95	0.47
1:D:160:LEU:HB2	5:D:281:EDO:H22	1.95	0.47
1:B:216:MSE:HE1	1:B:241:LEU:HD22	1.97	0.47
1:B:93:GLU:OE1	1:B:96:ARG:HD3	2.15	0.46
1:D:216:MSE:HE1	1:D:241:LEU:HD22	1.98	0.46
1:C:46:TYR:HA	1:C:64:THR:HG21	1.98	0.45
1:C:216:MSE:HE1	1:C:241:LEU:HD22	2.00	0.43
1:A:93:GLU:OE1	1:A:96:ARG:HD3	2.18	0.43
1:A:253:ASP:HA	1:C:179:LEU:HD11	2.01	0.43
1:A:237:ARG:HB3	5:A:278:EDO:H21	2.01	0.42
1:C:8:ASP:HA	1:C:41:ALA:O	2.20	0.42
3:B:269:EPE:H81	3:B:269:EPE:H32	1.92	0.42
1:D:8:ASP:HA	1:D:41:ALA:O	2.20	0.41
1:A:63:ILE:HG23	1:A:67:GLY:HA2	2.02	0.41
1:B:6:ALA:O	1:B:211:ALA:HA	2.20	0.41
1:B:1:MSE:HA	1:B:1:MSE:CE	2.49	0.41
1:B:214:ASP:OD2	4:B:273:GOL:H2	2.20	0.41
1:A:46:TYR:HA	1:A:64:THR:HG21	2.02	0.41
1:A:8:ASP:HA	1:A:41:ALA:O	2.21	0.41
1:B:63:ILE:HG23	1:B:67:GLY:HA2	2.03	0.41
1:D:1:MSE:CE	1:D:1:MSE:HA	2.48	0.40
1:A:214:ASP:CG	4:A:272:GOL:H2	2.41	0.40
1:C:49:VAL:O	1:C:53:ARG:HG2	2.21	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	258/285 (90%)	250 (97%)	8 (3%)	0	100	100
1	B	257/285 (90%)	249 (97%)	8 (3%)	0	100	100
1	C	256/285 (90%)	250 (98%)	6 (2%)	0	100	100
1	D	256/285 (90%)	248 (97%)	8 (3%)	0	100	100
All	All	1027/1140 (90%)	997 (97%)	30 (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	219/230 (95%)	217 (99%)	2 (1%)	82	92
1	B	220/230 (96%)	218 (99%)	2 (1%)	82	92
1	C	212/230 (92%)	210 (99%)	2 (1%)	82	92
1	D	217/230 (94%)	214 (99%)	3 (1%)	71	86
All	All	868/920 (94%)	859 (99%)	9 (1%)	82	91

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	115	ARG
1	A	254	ASP
1	B	115	ARG
1	B	254	ASP
1	C	48	ASP
1	C	254	ASP
1	D	115[A]	ARG
1	D	115[B]	ARG
1	D	254	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:



Mol	Chain	Res	Type
1	A	162	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 carbohydrates in this entry.

### 5.6 Ligand geometry [i](#)

Of 30 ligands modelled in this entry, 4 are monoatomic - leaving 26 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	$\# Z  > 2$
3	EPE	A	268	2	13,13,15	1.59	1 (7%)	16,18,20	2.78	7 (43%)
4	GOL	A	272	2	5,5,5	0.56	0	5,5,5	0.47	0
5	EDO	A	276	-	3,3,3	0.58	0	2,2,2	0.20	0
5	EDO	A	277	-	3,3,3	0.49	0	2,2,2	0.37	0
5	EDO	A	278	-	3,3,3	0.39	0	2,2,2	0.39	0
5	EDO	A	287	-	3,3,3	0.48	0	2,2,2	0.34	0
5	EDO	A	293	-	3,3,3	0.56	0	2,2,2	0.31	0
3	EPE	B	269	2	15,15,15	1.54	2 (13%)	18,20,20	2.41	4 (22%)
4	GOL	B	273	2	5,5,5	0.61	0	5,5,5	0.42	0
5	EDO	B	289	-	3,3,3	0.45	0	2,2,2	0.36	0
5	EDO	B	290	-	3,3,3	0.52	0	2,2,2	0.27	0
3	EPE	C	270	2	14,14,15	1.69	2 (14%)	17,19,20	2.43	5 (29%)
4	GOL	C	274	2	5,5,5	0.57	0	5,5,5	0.33	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	EDO	C	286	-	3,3,3	0.46	0	2,2,2	0.39	0
5	EDO	C	288	-	3,3,3	0.47	0	2,2,2	0.31	0
3	EPE	D	271	2	14,14,15	1.72	3 (21%)	17,19,20	2.42	4 (23%)
4	GOL	D	275	2	5,5,5	0.49	0	5,5,5	0.45	0
5	EDO	D	279	-	3,3,3	0.49	0	2,2,2	0.32	0
5	EDO	D	280	-	3,3,3	0.47	0	2,2,2	0.36	0
5	EDO	D	281	-	3,3,3	0.36	0	2,2,2	0.34	0
5	EDO	D	282	-	3,3,3	0.45	0	2,2,2	0.44	0
5	EDO	D	283	-	3,3,3	0.59	0	2,2,2	0.30	0
5	EDO	D	284	-	3,3,3	0.53	0	2,2,2	0.24	0
5	EDO	D	285	-	3,3,3	0.56	0	2,2,2	0.28	0
5	EDO	D	291	-	3,3,3	0.57	0	2,2,2	0.22	0
5	EDO	D	292	-	3,3,3	0.45	0	2,2,2	0.37	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	EPE	A	268	2	-	0/6/16/19	0/1/1/1
4	GOL	A	272	2	-	0/4/4/4	0/0/0/0
5	EDO	A	276	-	-	0/1/1/1	0/0/0/0
5	EDO	A	277	-	-	0/1/1/1	0/0/0/0
5	EDO	A	278	-	-	0/1/1/1	0/0/0/0
5	EDO	A	287	-	-	0/1/1/1	0/0/0/0
5	EDO	A	293	-	-	0/1/1/1	0/0/0/0
3	EPE	B	269	2	-	0/9/19/19	0/1/1/1
4	GOL	B	273	2	-	0/4/4/4	0/0/0/0
5	EDO	B	289	-	-	0/1/1/1	0/0/0/0
5	EDO	B	290	-	-	0/1/1/1	0/0/0/0
3	EPE	C	270	2	-	0/8/18/19	0/1/1/1
4	GOL	C	274	2	-	0/4/4/4	0/0/0/0
5	EDO	C	286	-	-	0/1/1/1	0/0/0/0
5	EDO	C	288	-	-	0/1/1/1	0/0/0/0
3	EPE	D	271	2	-	0/8/18/19	0/1/1/1
4	GOL	D	275	2	-	0/4/4/4	0/0/0/0
5	EDO	D	279	-	-	0/1/1/1	0/0/0/0
5	EDO	D	280	-	-	0/1/1/1	0/0/0/0
5	EDO	D	281	-	-	0/1/1/1	0/0/0/0
5	EDO	D	282	-	-	0/1/1/1	0/0/0/0
5	EDO	D	283	-	-	0/1/1/1	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	EDO	D	284	-	-	0/1/1/1	0/0/0/0
5	EDO	D	285	-	-	0/1/1/1	0/0/0/0
5	EDO	D	291	-	-	0/1/1/1	0/0/0/0
5	EDO	D	292	-	-	0/1/1/1	0/0/0/0

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	269	EPE	C3-N4	2.01	1.52	1.47
3	D	271	EPE	C3-N4	2.02	1.52	1.47
3	D	271	EPE	C5-N4	2.03	1.52	1.47
3	C	270	EPE	C3-N4	2.20	1.52	1.47
3	B	269	EPE	C10-S	3.43	1.82	1.77
3	A	268	EPE	C10-S	3.90	1.83	1.77
3	C	270	EPE	C10-S	4.10	1.83	1.77
3	D	271	EPE	C10-S	4.62	1.84	1.77

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	271	EPE	O3S-S-O1S	-4.24	101.64	111.37
3	B	269	EPE	O3S-S-O1S	-3.80	102.66	111.37
3	A	268	EPE	O3S-S-O2S	-3.64	103.02	111.37
3	A	268	EPE	O3S-S-O1S	-3.56	103.21	111.37
3	C	270	EPE	O3S-S-O1S	-3.48	103.40	111.37
3	B	269	EPE	O3S-S-O2S	-3.40	103.57	111.37
3	C	270	EPE	O3S-S-C10	-2.86	102.54	106.06
3	A	268	EPE	C9-N1-C2	-2.74	104.22	111.26
3	D	271	EPE	O3S-S-O2S	-2.74	105.09	111.37
3	C	270	EPE	O3S-S-O2S	-2.50	105.63	111.37
3	A	268	EPE	C5-N4-C3	-2.28	106.42	109.47
3	A	268	EPE	O2S-S-O1S	2.10	121.12	113.86
3	A	268	EPE	O1S-S-C10	4.29	110.48	106.79
3	C	270	EPE	O2S-S-C10	4.87	110.97	106.79
3	D	271	EPE	O2S-S-C10	4.97	111.06	106.79
3	B	269	EPE	O2S-S-C10	5.55	111.56	106.79
3	D	271	EPE	O1S-S-C10	5.77	111.74	106.79
3	B	269	EPE	O1S-S-C10	5.97	111.92	106.79
3	C	270	EPE	O1S-S-C10	6.12	112.05	106.79
3	A	268	EPE	O2S-S-C10	6.55	112.42	106.79

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

8 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	272	GOL	2	0
5	A	278	EDO	1	0
3	B	269	EPE	1	0
4	B	273	GOL	1	0
5	D	281	EDO	1	0
5	D	282	EDO	1	0
5	D	284	EDO	2	0
5	D	291	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, 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	250/285 (87%)	-0.13	3 (1%) 79 77	26, 40, 62, 85	0
1	B	247/285 (86%)	-0.24	5 (2%) 65 63	25, 35, 58, 87	0
1	C	248/285 (87%)	0.06	16 (6%) 20 18	27, 46, 88, 110	0
1	D	247/285 (86%)	-0.09	1 (0%) 92 91	27, 37, 58, 89	0
All	All	992/1140 (87%)	-0.10	25 (2%) 58 55	25, 39, 70, 110	0

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	127	ALA	4.6
1	B	128	VAL	4.5
1	C	118	PRO	4.4
1	C	129	PHE	3.6
1	C	97	ASN	3.5
1	A	265	LEU	3.2
1	C	102	VAL	3.2
1	C	128	VAL	3.1
1	B	130	ASN	3.0
1	A	33	ALA	2.9
1	B	129	PHE	2.9
1	C	149	PHE	2.6
1	C	131	TYR	2.4
1	C	117	ARG	2.4
1	B	266	ASP	2.4
1	C	116	HIS	2.4
1	A	19	PHE	2.4
1	D	118	PRO	2.3
1	C	99	PRO	2.3
1	B	131	TYR	2.2
1	C	101	ILE	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	133	LEU	2.2
1	C	100	LYS	2.2
1	C	168	TRP	2.1
1	C	159	PRO	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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
5	EDO	C	288	4/4	0.85	0.36	20.89	66,68,69,70	0
5	EDO	D	285	4/4	0.93	0.26	8.38	58,60,60,61	0
5	EDO	C	286	4/4	0.88	0.20	7.08	55,57,58,62	0
5	EDO	D	279	4/4	0.94	0.21	6.67	53,54,55,56	0
3	EPE	B	269	15/15	0.93	0.20	5.19	55,59,62,65	0
4	GOL	B	273	6/6	0.95	0.17	4.68	47,48,48,49	0
5	EDO	A	276	4/4	0.89	0.18	4.09	51,51,52,53	0
4	GOL	C	274	6/6	0.96	0.20	3.71	49,51,52,53	0
5	EDO	D	283	4/4	0.90	0.20	3.68	53,53,56,58	0
5	EDO	A	278	4/4	0.95	0.16	3.57	48,50,52,53	0
5	EDO	A	277	4/4	0.88	0.23	3.36	56,57,58,61	0
5	EDO	A	287	4/4	0.86	0.23	2.93	58,58,59,69	0
5	EDO	D	282	4/4	0.95	0.22	2.87	43,45,49,59	0
4	GOL	A	272	6/6	0.97	0.15	2.74	39,42,42,43	0
3	EPE	C	270	14/15	0.96	0.17	2.37	49,55,57,57	0
3	EPE	D	271	14/15	0.96	0.17	1.70	48,54,56,56	0
5	EDO	D	281	4/4	0.97	0.20	1.53	37,37,39,50	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
5	EDO	D	280	4/4	0.94	0.17	1.16	51,51,51,55	0
5	EDO	B	289	4/4	0.93	0.15	0.45	41,43,45,56	0
4	GOL	D	275	6/6	0.97	0.13	0.42	34,36,36,37	0
3	EPE	A	268	13/15	0.98	0.15	0.32	48,52,53,54	0
5	EDO	D	292	4/4	0.91	0.11	-1.00	58,59,62,65	0
2	CA	D	267	1/1	0.98	0.09	-1.36	36,36,36,36	0
2	CA	A	267	1/1	0.99	0.09	-1.64	37,37,37,37	0
2	CA	B	267	1/1	0.99	0.04	-4.84	41,41,41,41	0
2	CA	C	267	1/1	0.99	0.03	-5.01	46,46,46,46	0
5	EDO	D	284	4/4	0.85	0.26	-	58,60,63,64	0
5	EDO	A	293	4/4	0.70	0.26	-	65,66,66,70	0
5	EDO	D	291	4/4	0.65	0.27	-	59,59,60,66	0
5	EDO	B	290	4/4	0.88	0.18	-	65,67,68,71	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.