



Full wwPDB X-ray Structure Validation Report ⓘ

May 13, 2020 – 02:34 am BST

PDB ID : 3ERP
Title : Structure of IDP01002, a putative oxidoreductase from and essential gene of *Salmonella typhimurium*
Authors : Singer, A.U.; Minasov, G.; Evdokimova, E.; Brunzelle, J.S.; Kudritska, M.; Edwards, A.M.; Anderson, W.F.; Savchenko, A.; Center for Structural Genomics of Infectious Diseases (CSGID)
Deposited on : 2008-10-02
Resolution : 1.55 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

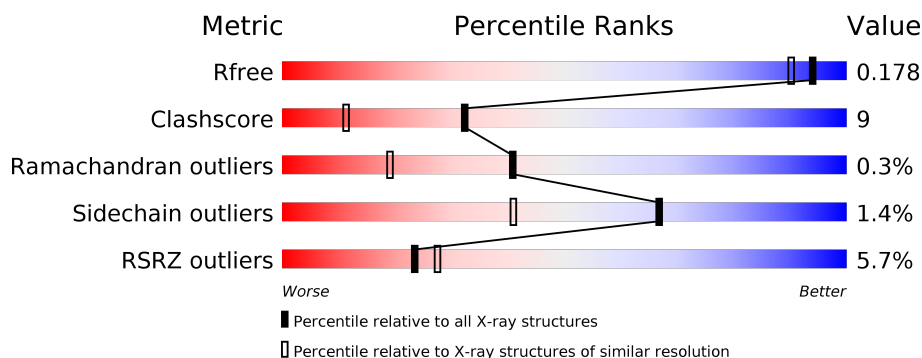
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.55 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}	130704	1483 (1.56-1.56)
Clashscore	141614	1529 (1.56-1.56)
Ramachandran outliers	138981	1498 (1.56-1.56)
Sidechain outliers	138945	1495 (1.56-1.56)
RSRZ outliers	127900	1465 (1.56-1.56)

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 ≥ 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	353	<div> <div>4%</div> <div> <div></div> <div>75%</div> <div>12%</div> <div>12%</div> </div> </div>
1	B	353	<div> <div>6%</div> <div> <div></div> <div>78%</div> <div>9%</div> <div>13%</div> </div> </div>

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
6	EDO	A	344	-	-	X	-
6	EDO	A	345	-	-	X	-
6	EDO	B	341	-	-	X	-
6	EDO	B	342	-	-	X	-

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 6536 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 oxidoreductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	312	Total	C	N	O	S	0	44	0
			2865	1800	515	539	11			
1	B	306	Total	C	N	O	S	0	30	0
			2694	1691	488	503	12			

There are 42 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-20	MET	-	expression tag	UNP Q8ZNA1
A	-19	GLY	-	expression tag	UNP Q8ZNA1
A	-18	SER	-	expression tag	UNP Q8ZNA1
A	-17	SER	-	expression tag	UNP Q8ZNA1
A	-16	HIS	-	expression tag	UNP Q8ZNA1
A	-15	HIS	-	expression tag	UNP Q8ZNA1
A	-14	HIS	-	expression tag	UNP Q8ZNA1
A	-13	HIS	-	expression tag	UNP Q8ZNA1
A	-12	HIS	-	expression tag	UNP Q8ZNA1
A	-11	HIS	-	expression tag	UNP Q8ZNA1
A	-10	SER	-	expression tag	UNP Q8ZNA1
A	-9	SER	-	expression tag	UNP Q8ZNA1
A	-8	GLY	-	expression tag	UNP Q8ZNA1
A	-7	ARG	-	expression tag	UNP Q8ZNA1
A	-6	GLU	-	expression tag	UNP Q8ZNA1
A	-5	ASN	-	expression tag	UNP Q8ZNA1
A	-4	LEU	-	expression tag	UNP Q8ZNA1
A	-3	TYR	-	expression tag	UNP Q8ZNA1
A	-2	PHE	-	expression tag	UNP Q8ZNA1
A	-1	GLN	-	expression tag	UNP Q8ZNA1
A	0	GLY	-	expression tag	UNP Q8ZNA1
B	-20	MET	-	expression tag	UNP Q8ZNA1
B	-19	GLY	-	expression tag	UNP Q8ZNA1
B	-18	SER	-	expression tag	UNP Q8ZNA1
B	-17	SER	-	expression tag	UNP Q8ZNA1

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	HIS	-	expression tag	UNP Q8ZNA1
B	-15	HIS	-	expression tag	UNP Q8ZNA1
B	-14	HIS	-	expression tag	UNP Q8ZNA1
B	-13	HIS	-	expression tag	UNP Q8ZNA1
B	-12	HIS	-	expression tag	UNP Q8ZNA1
B	-11	HIS	-	expression tag	UNP Q8ZNA1
B	-10	SER	-	expression tag	UNP Q8ZNA1
B	-9	SER	-	expression tag	UNP Q8ZNA1
B	-8	GLY	-	expression tag	UNP Q8ZNA1
B	-7	ARG	-	expression tag	UNP Q8ZNA1
B	-6	GLU	-	expression tag	UNP Q8ZNA1
B	-5	ASN	-	expression tag	UNP Q8ZNA1
B	-4	LEU	-	expression tag	UNP Q8ZNA1
B	-3	TYR	-	expression tag	UNP Q8ZNA1
B	-2	PHE	-	expression tag	UNP Q8ZNA1
B	-1	GLN	-	expression tag	UNP Q8ZNA1
B	0	GLY	-	expression tag	UNP Q8ZNA1

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	B	1	Total Zn 1 1	0	0
2	A	1	Total Zn 1 1	0	0

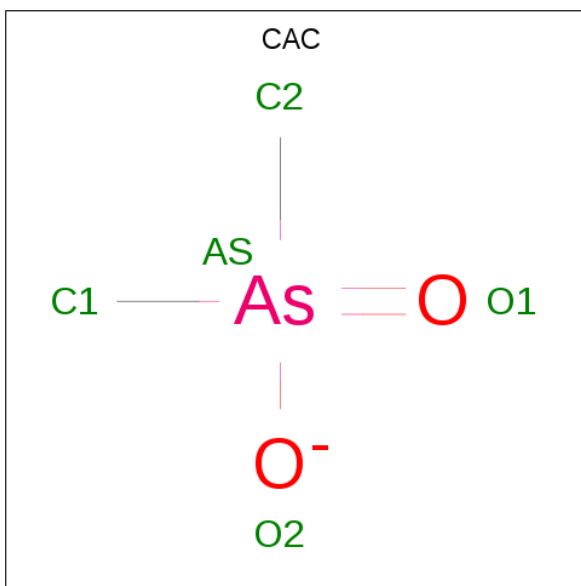
- Molecule 3 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	1	Total Na 1 1	0	0
3	A	1	Total Na 1 1	0	0

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

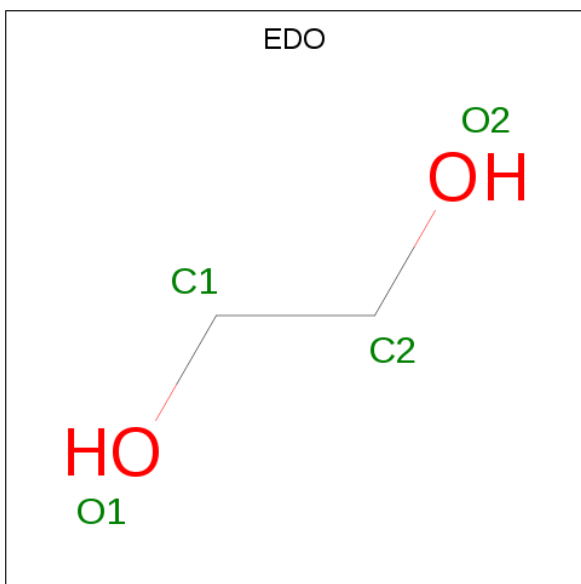
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	3	Total Cl 3 3	0	0
4	A	2	Total Cl 2 2	0	0

- Molecule 5 is CACODYLATE ION (three-letter code: CAC) (formula: $C_2H_6AsO_2$).



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

- Molecule 6 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).



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

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	A	1	Total C O 4 2 2	0	0
6	B	1	Total C O 4 2 2	0	0
6	B	1	Total C O 5 2 3	0	1
6	B	1	Total C O 4 2 2	0	0
6	B	1	Total C O 4 2 2	0	0

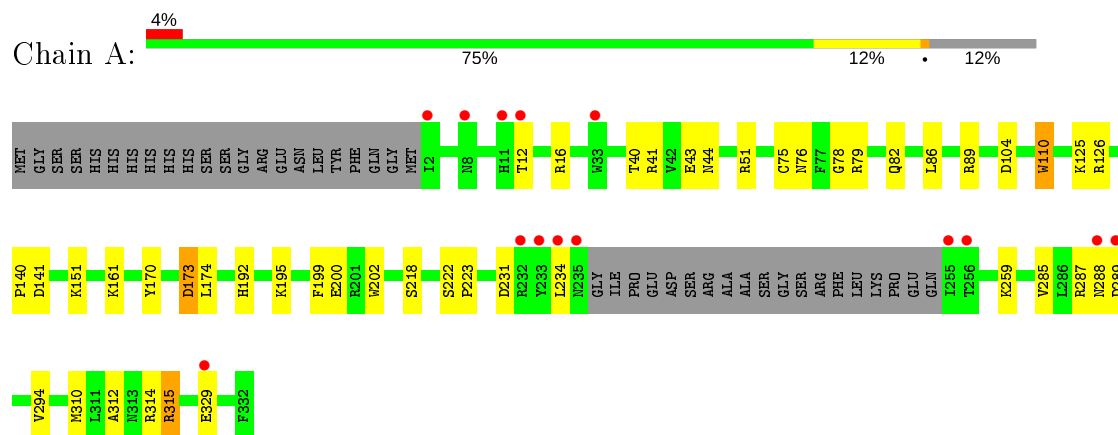
- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	448	Total O 483 483	0	67
7	B	396	Total O 422 422	0	47

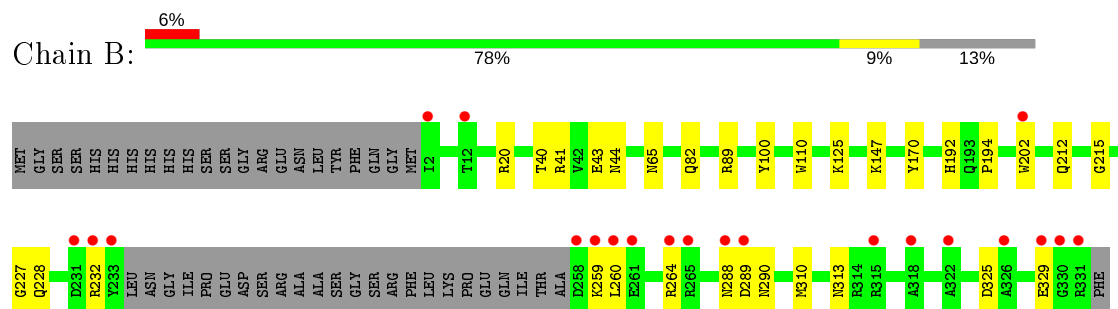
3 Residue-property plots [i](#)

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: Putative oxidoreductase



• Molecule 1: Putative oxidoreductase



4 Data and refinement statistics

Property	Value	Source
Space group	I 4	Depositor
Cell constants a, b, c, α , β , γ	127.10Å 127.10Å 120.49Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.96 – 1.55 29.86 – 1.55	Depositor EDS
% Data completeness (in resolution range)	96.8 (29.96-1.55) 96.8 (29.86-1.55)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.24 (at 1.55Å)	Xtriage
Refinement program	REFMAC 5.5.0051	Depositor
R, R_{free}	0.153 , 0.178 0.154 , 0.178	Depositor DCC
R_{free} test set	6743 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å ²)	17.2	Xtriage
Anisotropy	0.011	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 73.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.018 for -k,-h,-l	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	6536	wwPDB-VP
Average B, all atoms (Å ²)	23.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.54% 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: CAC, NA, ZN, EDO, CL

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	0.68	0/2937	0.77	3/3968 (0.1%)
1	B	0.69	0/2753	0.77	0/3722
All	All	0.69	0/5690	0.77	3/7690 (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	A	173[A]	ASP	CB-CG-OD1	5.80	123.52	118.30
1	A	173[B]	ASP	CB-CG-OD1	5.80	123.52	118.30
1	A	126	ARG	NE-CZ-NH2	-5.78	117.41	120.30

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	2865	0	2779	52	0
1	B	2694	0	2609	49	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	2	0	0	0	0
4	B	3	0	0	0	0
5	A	5	0	0	0	0
5	B	5	0	0	0	0
6	A	36	0	54	15	0
6	B	17	0	24	16	0
7	A	483	0	0	11	0
7	B	422	0	0	11	0
All	All	6536	0	5466	99	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 (99) 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:288[B]:ASN:ND2	1:B:289[B]:ASP:H	1.46	1.12
1:A:40:THR:HA	6:A:344:EDO:H21	1.37	1.06
1:B:288[B]:ASN:CG	1:B:289[B]:ASP:H	1.72	0.93
1:B:288[B]:ASN:ND2	1:B:289[B]:ASP:N	2.15	0.92
1:B:82[B]:GLN:HG3	7:B:586:HOH:O	1.71	0.89
1:B:41[B]:ARG:HE	1:B:44[B]:ASN:HD21	1.22	0.88
1:B:202[B]:TRP:CD1	6:B:342:EDO:H11	2.14	0.82
1:A:202:TRP:CZ2	7:A:715[B]:HOH:O	2.34	0.80
1:A:78:GLY:O	1:A:82[B]:GLN:HG2	1.81	0.80
1:B:40[B]:THR:HG22	1:B:41[B]:ARG:N	1.96	0.79
1:B:41[B]:ARG:HE	1:B:44[B]:ASN:ND2	1.81	0.77
1:A:40:THR:HA	6:A:344:EDO:C2	2.15	0.75
1:B:202[B]:TRP:CD1	6:B:342:EDO:H22	2.23	0.73
1:B:40[B]:THR:HG22	1:B:41[B]:ARG:H	1.54	0.72
1:B:202[B]:TRP:CD1	6:B:342:EDO:C2	2.73	0.71
1:B:82[A]:GLN:NE2	7:B:685:HOH:O	2.22	0.71
1:B:288[B]:ASN:CG	1:B:289[B]:ASP:N	2.41	0.69
1:B:227:GLY:HA3	1:B:232:ARG:HH11	1.60	0.66
1:A:40:THR:CA	6:A:344:EDO:H21	2.20	0.66
1:B:202[B]:TRP:HD1	6:B:342:EDO:H22	1.59	0.65
1:A:259[B]:LYS:HD3	7:A:438:HOH:O	1.96	0.65
1:A:110:TRP:HB3	1:A:141[B]:ASP:OD2	1.96	0.65
1:A:195[B]:LYS:HE3	1:A:200[B]:GLU:HG3	1.77	0.65
1:B:202[B]:TRP:CD1	6:B:342:EDO:C1	2.81	0.64
1:B:40[B]:THR:CG2	1:B:41[B]:ARG:H	2.10	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:20[B]:ARG:HG3	7:B:723:HOH:O	1.98	0.63
1:A:16:ARG:HH22	1:A:289[B]:ASP:HA	1.62	0.63
1:B:40[B]:THR:CG2	1:B:41[B]:ARG:N	2.61	0.62
1:A:223:PRO:HG3	1:A:294[A]:VAL:HG22	1.82	0.61
1:B:41[B]:ARG:CZ	6:B:341:EDO:H21	2.31	0.61
1:A:79:ARG:HB2	6:A:345:EDO:H11	1.84	0.60
1:A:151[B]:LYS:HD2	7:A:454:HOH:O	2.02	0.60
1:A:202:TRP:HZ2	7:A:715[B]:HOH:O	1.80	0.60
1:B:20[B]:ARG:HG2	1:B:215:GLY:HA3	1.88	0.56
1:B:202[B]:TRP:HD1	6:B:342:EDO:C2	2.16	0.56
1:A:16:ARG:NH2	1:A:289[B]:ASP:HA	2.22	0.55
1:A:125:LYS:HE3	7:A:351:HOH:O	2.06	0.55
1:A:314[A]:ARG:H	1:A:315:ARG:HH21	1.54	0.54
1:B:65[A]:ASN:ND2	7:B:884:HOH:O	2.39	0.54
1:B:65[B]:ASN:ND2	7:B:838:HOH:O	2.41	0.53
1:B:202[B]:TRP:HD1	6:B:342:EDO:H11	1.72	0.53
1:B:41[B]:ARG:HG3	6:B:341:EDO:C2	2.39	0.53
1:A:161[B]:LYS:NZ	7:A:767[B]:HOH:O	2.39	0.52
1:B:288[A]:ASN:C	1:B:290[A]:ASN:H	2.11	0.52
1:A:314[A]:ARG:H	1:A:315:ARG:NH2	2.09	0.51
1:A:173[B]:ASP:OD1	6:A:340:EDO:H11	2.11	0.51
1:A:287[B]:ARG:HG3	1:A:288[B]:ASN:N	2.25	0.51
1:B:325:ASP:O	1:B:329:GLU:HG2	2.11	0.50
1:B:41[B]:ARG:HG3	6:B:341:EDO:H21	1.92	0.50
1:B:41[A]:ARG:H	6:B:341:EDO:H22	1.76	0.50
1:B:82[B]:GLN:CG	7:B:586:HOH:O	2.44	0.50
1:A:51[B]:ARG:NH2	7:A:515:HOH:O	2.45	0.49
1:B:170:TYR:O	1:B:192:HIS:HE1	1.95	0.49
1:A:315:ARG:HD3	1:B:259:LYS:HE3	1.95	0.49
1:A:104[A]:ASP:H	6:A:346:EDO:H22	1.78	0.49
1:A:312:ALA:HB1	1:B:202[B]:TRP:HH2	1.77	0.48
1:A:170:TYR:O	1:A:192:HIS:HE1	1.96	0.48
1:A:287[B]:ARG:CG	1:A:288[B]:ASN:N	2.76	0.48
1:B:147[A]:LYS:HD2	7:B:848:HOH:O	2.13	0.48
1:A:202:TRP:CH2	7:A:715[B]:HOH:O	2.63	0.48
1:A:110:TRP:CD2	6:A:343:EDO:H22	2.48	0.47
1:A:12:THR:O	1:A:12:THR:HG22	2.13	0.47
1:A:140:PRO:HB3	1:A:174[B]:LEU:CD2	2.45	0.47
1:B:202[B]:TRP:HD1	6:B:342:EDO:C1	2.24	0.47
1:B:40[A]:THR:HA	6:B:341:EDO:H22	1.95	0.47
1:B:41[B]:ARG:NE	1:B:44[B]:ASN:ND2	2.58	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:41[B]:ARG:NH1	6:B:341:EDO:H21	2.29	0.47
1:A:195[B]:LYS:HG3	1:A:222[B]:SER:HB3	1.97	0.47
1:A:314[B]:ARG:H	1:A:315:ARG:HH21	1.60	0.47
1:A:79:ARG:HB2	6:A:345:EDO:C1	2.45	0.47
1:B:228:GLN:NE2	7:B:705:HOH:O	2.49	0.46
1:A:199:PHE:CE2	1:A:259[A]:LYS:HD2	2.52	0.46
1:A:329[A]:GLU:HG3	7:A:569:HOH:O	2.16	0.46
1:A:104[A]:ASP:HB2	6:A:346:EDO:H22	1.98	0.45
1:A:222[A]:SER:N	1:A:223:PRO:CD	2.80	0.44
1:A:104[A]:ASP:H	6:A:346:EDO:C2	2.31	0.44
1:B:260:LEU:HG	1:B:264:ARG:NH1	2.32	0.44
1:B:202[B]:TRP:NE1	6:B:342:EDO:H11	2.33	0.44
1:B:43[A]:GLU:HG3	7:B:802:HOH:O	2.17	0.44
1:A:151[A]:LYS:NZ	7:A:482:HOH:O	2.51	0.44
1:A:76:ASN:OD1	6:A:345:EDO:H21	2.18	0.44
1:A:285:VAL:HG11	1:A:294[B]:VAL:HG12	2.00	0.43
1:A:259[B]:LYS:HG3	7:A:653:HOH:O	2.19	0.42
1:A:43[A]:GLU:HG3	1:A:44:ASN:N	2.34	0.42
1:B:147[B]:LYS:HG2	7:B:538:HOH:O	2.20	0.42
1:B:100:TYR:HD1	6:B:340[B]:EDO:H21	1.85	0.42
1:A:231[B]:ASP:HA	1:A:234:LEU:HD12	2.02	0.42
1:B:41[B]:ARG:NE	1:B:44[B]:ASN:HD21	2.03	0.42
1:B:125:LYS:HE3	7:B:613:HOH:O	2.18	0.42
1:B:288[A]:ASN:HB2	1:B:290[A]:ASN:HB2	2.02	0.42
1:A:75[B]:CYS:O	6:A:345:EDO:H12	2.20	0.41
1:A:79:ARG:CB	6:A:345:EDO:H11	2.50	0.41
1:A:75[A]:CYS:O	6:A:345:EDO:H12	2.20	0.41
1:A:82[B]:GLN:HA	1:A:86[B]:LEU:HG	2.02	0.41
1:A:192:HIS:O	1:A:218:SER:HA	2.21	0.41
1:A:41:ARG:CG	6:A:344:EDO:H11	2.51	0.40
1:A:12:THR:O	1:A:12:THR:CG2	2.68	0.40
1:A:314[B]:ARG:H	1:A:315:ARG:NH2	2.18	0.40
1:B:192:HIS:HD2	1:B:194:PRO:HD3	1.86	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	352/353 (100%)	342 (97%)	9 (3%)	1 (0%)	41	19
1	B	331/353 (94%)	322 (97%)	8 (2%)	1 (0%)	41	19
All	All	683/706 (97%)	664 (97%)	17 (2%)	2 (0%)	41	19

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	110	TRP
1	B	110	TRP

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	304/294 (103%)	301 (99%)	3 (1%)	76	57
1	B	284/294 (97%)	279 (98%)	5 (2%)	59	31
All	All	588/588 (100%)	580 (99%)	8 (1%)	67	41

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	89	ARG
1	A	310	MET
1	A	315	ARG
1	B	89	ARG

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Mol	Chain	Res	Type
1	B	212[A]	GLN
1	B	212[B]	GLN
1	B	310	MET
1	B	313	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	192	HIS
1	B	192	HIS
1	B	228	GLN
1	B	313	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 25 ligands modelled in this entry, 9 are monoatomic - leaving 16 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	CAC	B	338	3	0,4,4	0.00	-	0,6,6	0.00	-

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	EDO	A	346	-	3,3,3	0.60	0	2,2,2	0.16	0
6	EDO	A	342	-	3,3,3	0.69	0	2,2,2	0.19	0
6	EDO	B	340[A]	-	3,3,3	0.55	0	2,2,2	0.44	0
6	EDO	A	345	-	3,3,3	0.48	0	2,2,2	0.45	0
6	EDO	A	344	-	3,3,3	0.37	0	2,2,2	0.66	0
6	EDO	A	341	-	3,3,3	0.49	0	2,2,2	0.35	0
6	EDO	B	341	-	3,3,3	0.34	0	2,2,2	0.54	0
6	EDO	A	340	-	3,3,3	0.43	0	2,2,2	0.25	0
6	EDO	B	339	-	3,3,3	0.42	0	2,2,2	0.27	0
6	EDO	B	342	-	3,3,3	0.38	0	2,2,2	0.43	0
5	CAC	A	337[A]	3	0,4,4	0.00	-	0,6,6	0.00	-
6	EDO	A	343	-	3,3,3	0.46	0	2,2,2	0.02	0
6	EDO	A	338	-	3,3,3	0.74	0	2,2,2	0.95	0
6	EDO	B	340[B]	-	3,3,3	0.50	0	2,2,2	0.11	0
6	EDO	A	339	-	3,3,3	0.45	0	2,2,2	0.54	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
6	EDO	A	346	-	-	0/1/1/1	-
6	EDO	A	342	-	-	0/1/1/1	-
6	EDO	B	340[A]	-	-	0/1/1/1	-
6	EDO	A	345	-	-	1/1/1/1	-
6	EDO	A	344	-	-	1/1/1/1	-
6	EDO	A	341	-	-	0/1/1/1	-
6	EDO	B	341	-	-	1/1/1/1	-
6	EDO	A	340	-	-	0/1/1/1	-
6	EDO	B	339	-	-	0/1/1/1	-
6	EDO	B	342	-	-	0/1/1/1	-
6	EDO	A	343	-	-	1/1/1/1	-
6	EDO	A	338	-	-	0/1/1/1	-
6	EDO	B	340[B]	-	-	1/1/1/1	-
6	EDO	A	339	-	-	0/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	343	EDO	O1-C1-C2-O2
6	A	344	EDO	O1-C1-C2-O2
6	B	340[B]	EDO	O1-C1-C2-O2
6	B	341	EDO	O1-C1-C2-O2
6	A	345	EDO	O1-C1-C2-O2

There are no ring outliers.

8 monomers are involved in 31 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	346	EDO	3	0
6	A	345	EDO	6	0
6	A	344	EDO	4	0
6	B	341	EDO	6	0
6	A	340	EDO	1	0
6	B	342	EDO	9	0
6	A	343	EDO	1	0
6	B	340[B]	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

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	312/353 (88%)	-0.10	14 (4%) 33 38	12, 17, 30, 62	1 (0%)
1	B	306/353 (86%)	0.05	21 (6%) 16 20	11, 18, 46, 71	1 (0%)
All	All	618/706 (87%)	-0.02	35 (5%) 23 27	11, 18, 42, 71	2 (0%)

All (35) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	233	TYR	9.6
1	A	235	ASN	7.5
1	A	255	ILE	6.6
1	B	232	ARG	6.0
1	B	260	LEU	5.8
1	B	330	GLY	5.7
1	B	331	ARG	5.5
1	A	233	TYR	5.0
1	B	326	ALA	4.6
1	A	234	LEU	3.9
1	A	232	ARG	3.8
1	B	231	ASP	3.7
1	B	318	ALA	3.7
1	B	264	ARG	3.7
1	A	2	ILE	3.6
1	B	329	GLU	3.3
1	B	265	ARG	3.2
1	B	315	ARG	3.0
1	A	12	THR	2.8
1	B	2	ILE	2.7
1	B	289[A]	ASP	2.7
1	A	11	HIS	2.6
1	A	33[A]	TRP	2.6
1	A	256	THR	2.5

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Mol	Chain	Res	Type	RSRZ
1	B	12	THR	2.5
1	A	288[A]	ASN	2.5
1	A	289[A]	ASP	2.4
1	B	258	ASP	2.3
1	B	202[A]	TRP	2.3
1	B	261	GLU	2.3
1	B	322	ALA	2.3
1	B	288[A]	ASN	2.2
1	A	329[A]	GLU	2.1
1	B	259	LYS	2.1
1	A	8[A]	ASN	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. 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	EDO	A	346	4/4	0.71	0.26	40,42,43,50	0
6	EDO	A	345	4/4	0.73	0.32	40,42,46,48	0
6	EDO	A	338	4/4	0.90	0.12	21,23,24,26	0
6	EDO	B	340[A]	4/4	0.91	0.13	21,26,29,33	1
6	EDO	A	341	4/4	0.91	0.14	30,40,41,43	0
6	EDO	A	343	4/4	0.91	0.20	38,41,43,46	0
6	EDO	B	340[B]	4/4	0.91	0.13	22,26,29,33	1
6	EDO	B	341	4/4	0.93	0.25	24,24,38,50	0
6	EDO	A	342	4/4	0.93	0.11	27,27,28,28	0
6	EDO	A	340	4/4	0.94	0.11	33,35,35,37	0
6	EDO	A	344	4/4	0.94	0.24	21,30,37,37	0
6	EDO	A	339	4/4	0.94	0.09	21,23,24,31	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
6	EDO	B	342	4/4	0.95	0.11	35,39,40,40	0
3	NA	B	334	1/1	0.96	0.05	28,28,28,28	0
2	ZN	A	333	1/1	0.97	0.03	24,24,24,24	1
5	CAC	A	337[A]	5/5	0.97	0.11	17,18,25,30	5
4	CL	A	336	1/1	0.98	0.06	38,38,38,38	0
6	EDO	B	339	4/4	0.98	0.19	32,32,34,35	0
5	CAC	B	338	5/5	0.98	0.09	16,18,27,29	5
4	CL	A	335	1/1	0.98	0.04	22,22,22,22	0
3	NA	A	334	1/1	0.98	0.05	35,35,35,35	0
4	CL	B	337	1/1	0.99	0.05	35,35,35,35	0
4	CL	B	336	1/1	0.99	0.05	30,30,30,30	0
2	ZN	B	333	1/1	0.99	0.03	19,19,19,19	1
4	CL	B	335	1/1	1.00	0.02	22,22,22,22	0

6.5 Other polymers [i](#)

There are no such residues in this entry.