



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 13, 2017 – 10:44 pm GMT

PDB ID : 1XTL  
Title : Crystal structure of P104H mutant of SOD-like protein from *Bacillus subtilis*.  
Authors : Calderone, V.; Mangani, S.; Banci, L.; Benvenuti, M.; Bertini, I.; Viezzoli, M.S.; Fantoni, A.  
Deposited on : 2004-10-22  
Resolution : 2.00 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
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

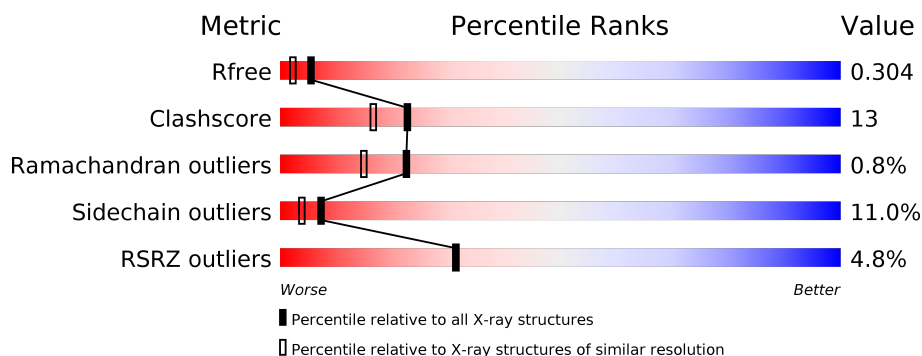
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 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	6609 (2.00-2.00)
Clashscore	112137	7775 (2.00-2.00)
Ramachandran outliers	110173	7679 (2.00-2.00)
Sidechain outliers	110143	7678 (2.00-2.00)
RSRZ outliers	101464	6696 (2.00-2.00)

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	175	<div> <div>5%</div> <div> <div></div> <div>59%</div> <div>21%</div> <div>5%</div> <div>13%</div> </div> </div>
1	B	175	<div> <div>3%</div> <div> <div></div> <div>62%</div> <div>13%</div> <div>8%</div> <div>13%</div> </div> </div>
1	C	175	<div> <div>4%</div> <div> <div></div> <div>59%</div> <div>21%</div> <div>5%</div> <div>13%</div> </div> </div>
1	D	175	<div> <div>5%</div> <div> <div></div> <div>59%</div> <div>18%</div> <div>9%</div> <div>13%</div> </div> </div>

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 4865 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 Hypothetical superoxide dismutase-like protein yojM.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	152	Total	C	N	O	S	1	0	0
			1136	705	203	224	4			
1	A	152	Total	C	N	O	S	2	0	0
			1136	705	203	224	4			
1	C	152	Total	C	N	O	S	1	0	0
			1136	705	203	224	4			
1	D	152	Total	C	N	O	S	1	0	0
			1136	705	203	224	4			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	104	HIS	PRO	ENGINEERED	UNP O31851
A	104	HIS	PRO	ENGINEERED	UNP O31851
C	104	HIS	PRO	ENGINEERED	UNP O31851
D	104	HIS	PRO	ENGINEERED	UNP O31851

- Molecule 2 is COPPER (II) ION (three-letter code: CU) (formula: Cu).

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

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

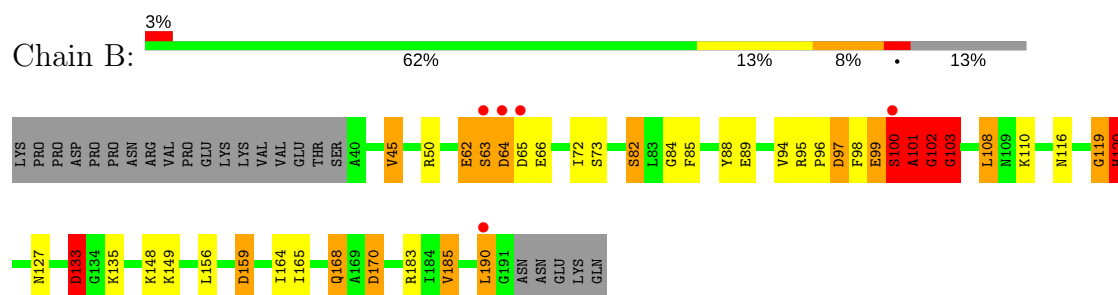
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	86	Total 86	O 86	0	0
4	B	84	Total 84	O 84	1	0
4	C	70	Total 70	O 70	1	0
4	D	67	Total 67	O 67	1	0

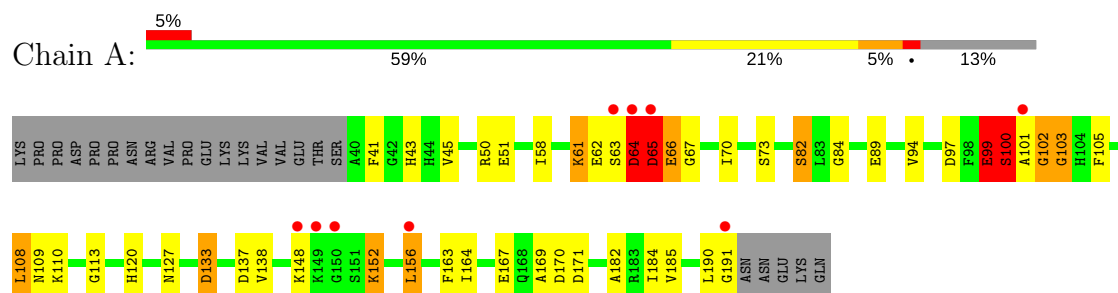
### 3 Residue-property plots [i](#)

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.

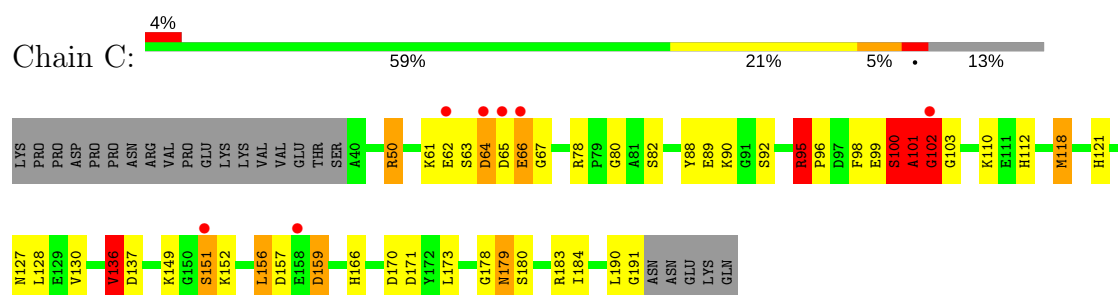
- Molecule 1: Hypothetical superoxide dismutase-like protein yojM



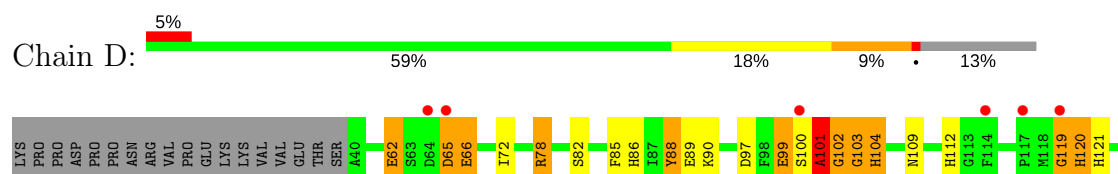
- Molecule 1: Hypothetical superoxide dismutase-like protein yojM

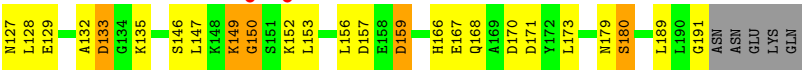


- Molecule 1: Hypothetical superoxide dismutase-like protein yojM



- Molecule 1: Hypothetical superoxide dismutase-like protein yojM





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	52.15Å 56.59Å 59.12Å 78.24° 89.91° 85.47°	Depositor
Resolution (Å)	38.92 – 2.00 38.96 – 2.00	Depositor EDS
% Data completeness (in resolution range)	100.0 (38.92-2.00) 87.6 (38.96-2.00)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	0.07	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.90 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.2.0005	Depositor
R, $R_{free}$	0.232 , 0.299 0.239 , 0.304	Depositor DCC
$R_{free}$ test set	3478 reflections (9.04%)	DCC
Wilson B-factor (Å <sup>2</sup> )	25.5	Xtriage
Anisotropy	0.792	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 54.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	4865	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.06% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, CU

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z  > 5$	RMSZ	$\# Z  > 5$
1	A	1.55	13/1160 (1.1%)	1.38	19/1566 (1.2%)
1	B	1.47	10/1160 (0.9%)	1.67	24/1566 (1.5%)
1	C	1.54	10/1160 (0.9%)	1.86	20/1566 (1.3%)
1	D	1.60	14/1160 (1.2%)	1.64	23/1566 (1.5%)
All	All	1.54	47/4640 (1.0%)	1.65	86/6264 (1.4%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	4
1	B	0	4
1	C	0	4
1	D	0	5
All	All	0	17

All (47) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	150	GLY	C-O	19.51	1.54	1.23
1	C	95	ARG	NE-CZ	16.37	1.54	1.33
1	A	65	ASP	C-N	13.72	1.65	1.34
1	C	95	ARG	CD-NE	12.74	1.68	1.46
1	C	102	GLY	N-CA	10.39	1.61	1.46
1	A	51	GLU	CD-OE1	-10.33	1.14	1.25
1	B	50	ARG	CZ-NH2	-9.22	1.21	1.33
1	A	65	ASP	C-O	-9.18	1.05	1.23
1	D	102	GLY	N-CA	8.76	1.59	1.46
1	D	101	ALA	CA-CB	-8.48	1.34	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	100	SER	CB-OG	7.76	1.52	1.42
1	C	101	ALA	CA-CB	-7.75	1.36	1.52
1	C	102	GLY	CA-C	7.32	1.63	1.51
1	D	101	ALA	CA-C	6.62	1.70	1.52
1	D	159	ASP	CB-CG	-6.57	1.38	1.51
1	C	101	ALA	CA-C	6.46	1.69	1.52
1	C	100	SER	CB-OG	6.40	1.50	1.42
1	B	102	GLY	N-CA	6.38	1.55	1.46
1	B	45	VAL	CB-CG1	6.30	1.66	1.52
1	A	102	GLY	N-CA	6.29	1.55	1.46
1	B	101	ALA	CA-C	6.18	1.69	1.52
1	B	85	PHE	CE1-CZ	6.16	1.49	1.37
1	D	88	TYR	CE1-CZ	-6.11	1.30	1.38
1	D	72	ILE	CA-CB	6.09	1.68	1.54
1	B	45	VAL	CA-CB	6.05	1.67	1.54
1	A	100	SER	CA-CB	6.04	1.62	1.52
1	B	185	VAL	CA-CB	5.87	1.67	1.54
1	C	159	ASP	CB-CG	-5.81	1.39	1.51
1	A	182	ALA	CA-CB	5.68	1.64	1.52
1	D	102	GLY	CA-C	5.64	1.60	1.51
1	A	102	GLY	CA-C	5.63	1.60	1.51
1	D	100	SER	CA-CB	5.50	1.61	1.52
1	B	102	GLY	CA-C	5.44	1.60	1.51
1	B	119	GLY	N-CA	-5.44	1.37	1.46
1	D	82	SER	CB-OG	5.43	1.49	1.42
1	A	45	VAL	CA-CB	5.40	1.66	1.54
1	A	138	VAL	CB-CG1	-5.38	1.41	1.52
1	D	129	GLU	CG-CD	5.25	1.59	1.51
1	D	119	GLY	N-CA	-5.25	1.38	1.46
1	A	164	ILE	CA-CB	5.20	1.66	1.54
1	A	185	VAL	CA-CB	5.14	1.65	1.54
1	C	101	ALA	C-N	5.13	1.42	1.33
1	C	88	TYR	CD1-CE1	-5.13	1.31	1.39
1	D	101	ALA	C-N	5.12	1.42	1.33
1	A	103	GLY	C-O	-5.06	1.15	1.23
1	A	105	PHE	CD1-CE1	5.05	1.49	1.39
1	D	104	HIS	CA-CB	5.02	1.65	1.53

All (86) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	95	ARG	NE-CZ-NH1	-36.48	102.06	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	95	ARG	NE-CZ-NH2	30.96	135.78	120.30
1	B	50	ARG	NE-CZ-NH2	29.43	135.02	120.30
1	D	78	ARG	NE-CZ-NH2	19.60	130.10	120.30
1	D	150	GLY	O-C-N	-18.00	93.89	122.70
1	B	50	ARG	NH1-CZ-NH2	-17.59	100.05	119.40
1	C	95	ARG	CD-NE-CZ	17.05	147.47	123.60
1	D	119	GLY	C-N-CA	13.47	155.37	121.70
1	B	119	GLY	C-N-CA	12.95	154.07	121.70
1	D	78	ARG	NH1-CZ-NH2	-11.06	107.23	119.40
1	B	159	ASP	CB-CG-OD2	-10.88	108.51	118.30
1	D	159	ASP	CB-CG-OD2	-10.65	108.71	118.30
1	C	102	GLY	C-N-CA	9.70	142.66	122.30
1	D	150	GLY	CA-C-O	-9.50	103.50	120.60
1	D	101	ALA	N-CA-CB	-9.18	97.25	110.10
1	D	102	GLY	C-N-CA	8.91	141.01	122.30
1	A	64	ASP	O-C-N	-8.90	108.46	122.70
1	C	159	ASP	CB-CG-OD2	-8.89	110.30	118.30
1	A	100	SER	N-CA-CB	8.71	123.57	110.50
1	C	78	ARG	NE-CZ-NH1	8.44	124.52	120.30
1	A	100	SER	N-CA-C	-8.36	88.43	111.00
1	C	102	GLY	CA-C-N	8.25	132.70	116.20
1	A	99	GLU	C-N-CA	7.98	141.65	121.70
1	C	101	ALA	N-CA-CB	-7.97	98.95	110.10
1	B	170	ASP	CB-CG-OD1	7.89	125.41	118.30
1	C	102	GLY	O-C-N	-7.78	109.98	123.20
1	D	102	GLY	CA-C-N	7.77	131.74	116.20
1	B	102	GLY	C-N-CA	7.67	138.40	122.30
1	D	133	ASP	CB-CG-OD2	7.63	125.17	118.30
1	B	159	ASP	CB-CG-OD1	7.26	124.84	118.30
1	A	100	SER	C-N-CA	7.14	139.55	121.70
1	C	100	SER	N-CA-CB	-7.13	99.80	110.50
1	B	102	GLY	CA-C-N	7.12	130.44	116.20
1	A	148	LYS	CD-CE-NZ	-7.06	95.45	111.70
1	A	102	GLY	C-N-CA	7.03	137.06	122.30
1	B	190	LEU	CA-CB-CG	7.02	131.46	115.30
1	D	102	GLY	O-C-N	-6.75	111.72	123.20
1	D	159	ASP	CB-CG-OD1	6.74	124.36	118.30
1	A	64	ASP	C-N-CA	-6.53	105.39	121.70
1	A	65	ASP	O-C-N	-6.43	112.41	122.70
1	C	171	ASP	CB-CG-OD1	6.42	124.08	118.30
1	B	103	GLY	N-CA-C	6.41	129.14	113.10
1	B	102	GLY	O-C-N	-6.41	112.31	123.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	100	SER	C-N-CA	6.39	137.67	121.70
1	D	189	LEU	CA-CB-CG	6.34	129.88	115.30
1	C	101	ALA	CA-C-N	6.33	128.87	116.20
1	A	65	ASP	CA-C-O	-6.29	106.90	120.10
1	D	133	ASP	CB-CG-OD1	-6.21	112.72	118.30
1	D	173	LEU	CA-CB-CG	6.12	129.38	115.30
1	B	120	HIS	CA-CB-CG	6.03	123.86	113.60
1	C	78	ARG	NE-CZ-NH2	-5.99	117.31	120.30
1	A	102	GLY	O-C-N	-5.94	113.11	123.20
1	B	50	ARG	NE-CZ-NH1	5.91	123.26	120.30
1	D	171	ASP	CB-CG-OD1	5.91	123.62	118.30
1	C	136	VAL	N-CA-C	-5.91	95.04	111.00
1	C	173	LEU	CB-CG-CD1	5.90	121.03	111.00
1	C	156	LEU	CA-CB-CG	5.86	128.79	115.30
1	D	101	ALA	CA-C-N	5.84	127.89	116.20
1	B	97	ASP	CB-CG-OD1	5.76	123.48	118.30
1	C	137	ASP	CB-CG-OD2	-5.76	113.12	118.30
1	A	99	GLU	O-C-N	-5.71	113.56	122.70
1	A	171	ASP	CB-CG-OD1	5.68	123.41	118.30
1	A	102	GLY	CA-C-N	5.64	127.49	116.20
1	B	108	LEU	CB-CG-CD1	5.59	120.50	111.00
1	A	137	ASP	CB-CG-OD2	5.58	123.32	118.30
1	B	133	ASP	N-CA-CB	-5.53	100.64	110.60
1	D	103	GLY	N-CA-C	5.46	126.74	113.10
1	C	100	SER	C-N-CA	5.45	135.33	121.70
1	D	100	SER	N-CA-CB	-5.44	102.34	110.50
1	D	132	ALA	C-N-CA	5.36	135.09	121.70
1	B	73	SER	CB-CA-C	5.33	120.22	110.10
1	B	148	LYS	CB-CA-C	5.33	121.06	110.40
1	B	64	ASP	CB-CA-C	5.32	121.03	110.40
1	A	65	ASP	CB-CA-C	5.31	121.02	110.40
1	D	119	GLY	CA-C-O	-5.26	111.12	120.60
1	B	100	SER	N-CA-CB	-5.26	102.61	110.50
1	A	100	SER	CA-C-N	5.25	128.75	117.20
1	C	173	LEU	CA-CB-CG	5.23	127.33	115.30
1	A	64	ASP	CA-C-N	5.23	128.70	117.20
1	B	170	ASP	N-CA-CB	-5.20	101.25	110.60
1	B	99	GLU	C-N-CA	5.13	134.54	121.70
1	A	100	SER	CA-CB-OG	5.10	124.96	111.20
1	D	65	ASP	CB-CG-OD2	-5.08	113.73	118.30
1	B	101	ALA	N-CA-CB	-5.04	103.04	110.10
1	C	50	ARG	NE-CZ-NH1	5.02	122.81	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	82	SER	N-CA-CB	5.00	118.01	110.50

There are no chirality outliers.

All (17) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	102	GLY	Peptide
1	A	64	ASP	Mainchain,Peptide
1	A	99	GLU	Peptide
1	B	101	ALA	Peptide
1	B	102	GLY	Peptide
1	B	120	HIS	Sidechain
1	B	63	SER	Peptide
1	C	101	ALA	Peptide
1	C	102	GLY	Peptide
1	C	64	ASP	Peptide
1	C	95	ARG	Sidechain
1	D	101	ALA	Peptide
1	D	102	GLY	Peptide
1	D	119	GLY	Peptide
1	D	150	GLY	Mainchain
1	D	99	GLU	Peptide

## 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	1136	0	1077	35	0
1	B	1136	0	1076	26	0
1	C	1136	0	1076	27	0
1	D	1136	0	1075	29	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	3	0	0	0	0
3	B	3	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	2	0	0	0	0
3	D	2	0	0	0	0
4	A	86	0	0	7	0
4	B	84	0	0	8	0
4	C	70	0	0	4	0
4	D	67	0	0	4	0
All	All	4865	0	4304	115	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 13.

All (115) 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:A:65:ASP:CB	1:A:66:GLU:HB3	1.81	1.11
1:A:65:ASP:HB2	1:A:66:GLU:HB3	1.40	1.01
1:B:100:SER:HB3	4:B:1330:HOH:O	1.59	1.00
4:A:1344:HOH:O	1:D:101:ALA:HB2	1.75	0.87
1:A:100:SER:H	1:A:101:ALA:CA	1.88	0.87
1:B:99:GLU:HB3	1:C:99:GLU:OE2	1.81	0.81
1:C:100:SER:CB	4:C:1388:HOH:O	2.29	0.80
1:B:97:ASP:HB2	4:B:1379:HOH:O	1.81	0.80
1:D:65:ASP:HB3	1:D:66:GLU:HB3	1.63	0.80
1:A:65:ASP:HB3	1:A:66:GLU:HB3	1.64	0.79
1:C:100:SER:HB3	4:C:1388:HOH:O	1.82	0.79
1:A:100:SER:H	1:A:101:ALA:HA	1.46	0.78
1:D:133:ASP:HB2	1:D:135:LYS:H	1.49	0.77
1:D:86:HIS:ND1	1:D:104:HIS:NE2	2.34	0.74
1:A:156:LEU:HD22	1:A:191:GLY:HA3	1.68	0.74
1:B:168:GLN:CD	4:B:1406:HOH:O	2.26	0.73
1:C:64:ASP:HA	1:C:65:ASP:HB3	1.70	0.73
1:C:50:ARG:HG2	1:C:96:PRO:O	1.91	0.71
1:D:62:GLU:HG3	1:D:147:LEU:HD12	1.76	0.67
1:A:97:ASP:HB2	4:A:1343:HOH:O	1.94	0.67
1:D:86:HIS:ND1	1:D:104:HIS:CE1	2.63	0.66
1:D:127:ASN:HD21	1:D:170:ASP:HB3	1.61	0.66
1:A:100:SER:N	1:A:101:ALA:HA	2.11	0.66
1:D:157:ASP:O	1:D:191:GLY:HA3	1.95	0.66
1:D:86:HIS:CE1	1:D:104:HIS:CE1	2.84	0.66
1:A:64:ASP:HA	1:A:65:ASP:HB3	1.78	0.65
1:B:165:ILE:HB	1:B:185:VAL:HB	1.78	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:65:ASP:HB2	1:A:66:GLU:CB	2.22	0.63
1:A:108:LEU:HD11	1:A:152:LYS:HE2	1.82	0.62
1:A:84:GLY:HA2	1:A:127:ASN:HD22	1.65	0.62
1:A:62:GLU:HG2	4:A:1349:HOH:O	2.02	0.59
1:D:78:ARG:HD3	4:D:1349:HOH:O	2.02	0.59
1:D:112:HIS:HB2	1:D:121:HIS:CE1	2.37	0.59
1:C:65:ASP:HB2	1:C:66:GLU:HB3	1.84	0.59
1:A:65:ASP:HB2	1:A:66:GLU:OE1	2.01	0.59
1:D:99:GLU:O	1:D:101:ALA:HA	2.03	0.58
1:A:64:ASP:HA	1:A:65:ASP:CB	2.33	0.58
1:C:127:ASN:HD21	1:C:170:ASP:H	1.50	0.58
1:A:94:VAL:HB	1:A:100:SER:HB3	1.85	0.57
1:B:62:GLU:HG2	4:B:1411:HOH:O	2.03	0.57
1:B:94:VAL:HB	1:B:100:SER:HB2	1.85	0.57
1:C:99:GLU:O	1:C:101:ALA:HA	2.05	0.57
1:A:100:SER:HB3	4:A:1355:HOH:O	2.05	0.57
1:C:64:ASP:HA	1:C:65:ASP:CB	2.32	0.56
1:B:110:LYS:HD2	4:B:1408:HOH:O	2.04	0.56
1:B:99:GLU:O	1:B:101:ALA:HA	2.05	0.56
1:A:89:GLU:OE2	1:A:103:GLY:HA3	2.06	0.55
1:A:156:LEU:HD22	1:A:191:GLY:CA	2.34	0.55
1:A:65:ASP:CB	1:A:66:GLU:CB	2.71	0.55
1:C:92:SER:HB3	1:C:101:ALA:H	1.72	0.54
1:C:89:GLU:OE2	1:C:103:GLY:HA3	2.08	0.54
1:B:116:ASN:HB3	1:B:119:GLY:HA3	1.90	0.54
1:B:110:LYS:HE3	4:B:1408:HOH:O	2.08	0.54
1:D:62:GLU:HB2	4:D:1388:HOH:O	2.07	0.54
1:C:178:GLY:O	1:C:179:ASN:CB	2.53	0.53
1:A:113:GLY:O	1:A:120:HIS:HB3	2.09	0.53
1:C:102:GLY:O	1:C:183:ARG:NH1	2.41	0.53
1:B:84:GLY:HA2	1:B:127:ASN:HD22	1.75	0.51
1:A:99:GLU:O	1:A:101:ALA:HA	2.09	0.51
1:C:90:LYS:HD3	1:C:101:ALA:CB	2.39	0.51
1:B:62:GLU:CG	4:B:1411:HOH:O	2.56	0.51
1:C:128:LEU:HB3	1:C:136:VAL:HG21	1.93	0.50
1:B:89:GLU:OE2	1:B:103:GLY:HA3	2.12	0.50
1:A:43:HIS:CD2	4:A:1369:HOH:O	2.64	0.50
1:A:43:HIS:HE1	4:A:1363:HOH:O	1.95	0.50
1:B:133:ASP:HB3	1:B:135:LYS:H	1.77	0.49
1:A:99:GLU:OE2	4:A:1374:HOH:O	2.20	0.49
1:D:127:ASN:HD21	1:D:170:ASP:CB	2.25	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:98:PHE:C	1:B:100:SER:H	2.14	0.49
1:C:80:GLY:HA2	1:C:130:VAL:O	2.13	0.49
1:C:98:PHE:C	1:C:100:SER:H	2.15	0.49
1:D:149:LYS:HG3	1:D:149:LYS:O	2.12	0.48
1:D:133:ASP:HB2	1:D:135:LYS:N	2.24	0.48
1:A:82:SER:HB2	1:A:169:ALA:HB2	1.95	0.48
1:B:127:ASN:HD21	1:B:170:ASP:H	1.62	0.48
1:B:95:ARG:HB3	1:B:96:PRO:HA	1.95	0.48
1:A:109:ASN:HB2	1:D:109:ASN:OD1	2.14	0.48
1:B:110:LYS:CE	4:B:1408:HOH:O	2.62	0.48
1:A:50:ARG:CZ	1:A:184:ILE:HG22	2.43	0.47
1:C:157:ASP:O	1:C:191:GLY:HA3	2.13	0.47
1:D:152:LYS:HG2	1:D:153:LEU:HD23	1.96	0.47
1:A:63:SER:HB3	1:A:67:GLY:O	2.14	0.47
1:D:90:LYS:HD3	1:D:101:ALA:CB	2.44	0.47
1:D:88:TYR:CZ	1:D:104:HIS:HD2	2.32	0.47
1:C:95:ARG:HG2	1:C:98:PHE:CE1	2.49	0.46
1:D:127:ASN:HD21	1:D:170:ASP:H	1.62	0.46
1:A:70:ILE:HD13	1:A:163:PHE:HE1	1.79	0.46
1:C:63:SER:HB3	1:C:67:GLY:O	2.15	0.46
1:D:156:LEU:HD13	1:D:156:LEU:O	2.16	0.46
1:B:102:GLY:O	1:B:183:ARG:NH1	2.47	0.45
1:C:151:SER:HA	4:C:1368:HOH:O	2.15	0.45
1:D:62:GLU:N	4:D:1388:HOH:O	2.29	0.45
1:C:65:ASP:HA	1:C:66:GLU:HA	1.76	0.44
1:D:66:GLU:N	1:D:66:GLU:OE1	2.51	0.43
1:C:118:MET:HA	1:C:118:MET:HE3	2.01	0.43
1:A:41:PHE:CE2	1:A:61:LYS:HB3	2.54	0.43
1:D:85:PHE:HB2	1:D:128:LEU:HG	2.00	0.43
1:A:127:ASN:HD21	1:A:170:ASP:H	1.67	0.42
1:A:65:ASP:HA	1:A:66:GLU:HA	1.60	0.42
1:D:168:GLN:HE21	1:D:168:GLN:HB2	1.73	0.42
1:B:72:ILE:HD11	1:B:165:ILE:HD11	2.02	0.42
1:D:166:HIS:CG	1:D:180:SER:HB2	2.55	0.42
1:C:166:HIS:HB3	1:C:180:SER:O	2.20	0.41
1:D:89:GLU:OE2	1:D:103:GLY:HA3	2.20	0.41
1:B:84:GLY:HA2	1:B:127:ASN:ND2	2.35	0.41
1:B:127:ASN:HD21	1:B:170:ASP:CB	2.34	0.41
1:C:127:ASN:ND2	1:C:170:ASP:H	2.18	0.41
1:C:90:LYS:CE	4:C:1330:HOH:O	2.68	0.41
1:B:88:TYR:CE1	1:B:164:ILE:HB	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:99:GLU:HA	1:B:183:ARG:NH1	2.36	0.41
1:A:94:VAL:HB	1:A:100:SER:CB	2.49	0.41
1:B:64:ASP:HA	1:B:65:ASP:HA	1.67	0.41
1:C:112:HIS:HB2	1:C:121:HIS:CE1	2.55	0.41
1:D:62:GLU:HG2	4:D:1371:HOH:O	2.20	0.40
1:A:99:GLU:N	1:A:100:SER:OG	2.55	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	150/175 (86%)	138 (92%)	10 (7%)	2 (1%)	14	7
1	B	150/175 (86%)	139 (93%)	10 (7%)	1 (1%)	25	18
1	C	150/175 (86%)	137 (91%)	13 (9%)	0	100	100
1	D	150/175 (86%)	137 (91%)	11 (7%)	2 (1%)	14	7
All	All	600/700 (86%)	551 (92%)	44 (7%)	5 (1%)	22	15

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	100	SER
1	D	120	HIS
1	A	133	ASP
1	D	62	GLU
1	B	103	GLY



### 5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	120/143 (84%)	107 (89%)	13 (11%)	7	4
1	B	120/143 (84%)	106 (88%)	14 (12%)	6	3
1	C	120/143 (84%)	103 (86%)	17 (14%)	4	2
1	D	120/143 (84%)	111 (92%)	9 (8%)	16	10
All	All	480/572 (84%)	427 (89%)	53 (11%)	7	4

All (53) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	45	VAL
1	B	62	GLU
1	B	63	SER
1	B	66	GLU
1	B	82	SER
1	B	100	SER
1	B	108	LEU
1	B	120	HIS
1	B	133	ASP
1	B	149	LYS
1	B	156	LEU
1	B	159	ASP
1	B	168	GLN
1	B	190	LEU
1	A	58	ILE
1	A	61	LYS
1	A	65	ASP
1	A	66	GLU
1	A	73	SER
1	A	82	SER
1	A	108	LEU
1	A	110	LYS
1	A	133	ASP
1	A	152	LYS

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Mol	Chain	Res	Type
1	A	156	LEU
1	A	167	GLU
1	A	190	LEU
1	C	61	LYS
1	C	62	GLU
1	C	66	GLU
1	C	82	SER
1	C	95	ARG
1	C	100	SER
1	C	110	LYS
1	C	118	MET
1	C	136	VAL
1	C	149	LYS
1	C	151	SER
1	C	152	LYS
1	C	156	LEU
1	C	159	ASP
1	C	179	ASN
1	C	184	ILE
1	C	190	LEU
1	D	66	GLU
1	D	97	ASP
1	D	120	HIS
1	D	146	SER
1	D	149	LYS
1	D	159	ASP
1	D	167	GLU
1	D	179	ASN
1	D	180	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	75	ASN
1	B	86	HIS
1	B	127	ASN
1	A	43	HIS
1	A	127	ASN
1	C	44	HIS
1	C	127	ASN
1	D	127	ASN
1	D	168	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 14 ligands modelled in this entry, 14 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

### 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, 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	152/175 (86%)	0.37	9 (5%)	23 23	16, 25, 36, 55	2 (1%)
1	B	152/175 (86%)	0.26	5 (3%)	47 47	16, 24, 37, 50	0
1	C	152/175 (86%)	0.22	7 (4%)	33 33	16, 26, 39, 46	0
1	D	152/175 (86%)	0.27	8 (5%)	27 27	14, 26, 39, 45	0
All	All	608/700 (86%)	0.28	29 (4%)	31 31	14, 25, 39, 55	2 (0%)

All (29) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	65	ASP	7.3
1	B	65	ASP	6.9
1	B	64	ASP	6.6
1	C	64	ASP	5.8
1	D	64	ASP	5.7
1	A	64	ASP	5.7
1	A	150	GLY	4.5
1	A	191	GLY	4.2
1	A	63	SER	4.0
1	C	65	ASP	3.9
1	D	117	PRO	3.7
1	D	65	ASP	3.1
1	B	63	SER	2.8
1	A	148	LYS	2.7
1	D	150	GLY	2.6
1	D	114	PHE	2.4
1	C	158	GLU	2.3
1	D	152	LYS	2.3
1	C	151	SER	2.3
1	C	66	GLU	2.3
1	D	119	GLY	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	100	SER	2.3
1	D	100	SER	2.2
1	C	62	GLU	2.2
1	A	156	LEU	2.2
1	A	149	LYS	2.1
1	B	190	LEU	2.1
1	C	102	GLY	2.0
1	A	101	ALA	2.0

## 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
3	ZN	B	1172	1/1	1.00	0.10	-0.68	29,29,29,29	0
3	ZN	A	1327	1/1	0.99	0.10	-1.49	26,26,26,26	0
3	ZN	A	1331	1/1	0.98	0.09	-1.52	41,41,41,41	0
2	CU	D	1177	1/1	0.96	0.10	-1.72	29,29,29,29	0
3	ZN	B	1329	1/1	0.99	0.07	-2.16	39,39,39,39	0
3	ZN	C	1176	1/1	0.99	0.08	-2.33	23,23,23,23	0
3	ZN	B	1326	1/1	1.00	0.07	-2.46	26,26,26,26	0
3	ZN	D	1178	1/1	0.99	0.06	-3.03	22,22,22,22	0
3	ZN	A	1174	1/1	1.00	0.07	-3.05	25,25,25,25	0
2	CU	C	1175	1/1	0.99	0.06	-4.55	34,34,34,34	0
3	ZN	C	1328	1/1	0.99	0.03	-6.50	39,39,39,39	0
3	ZN	D	1330	1/1	0.99	0.04	-10.03	40,40,40,40	0
2	CU	B	1171	1/1	0.98	0.05	-	27,27,27,27	0
2	CU	A	1173	1/1	0.98	0.05	-	27,27,27,27	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.