



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 10, 2023 – 11:54 PM EDT

PDB ID : 4K2H
Title : Crystal structure of C103A mutant of DJ-1 superfamily protein STM1931 from *Salmonella typhimurium*
Authors : Shumilin, I.A.; Niedzialkowska, E.; Domagalski, M.J.; Stam, J.; Anderson, W.F.; Minor, W.; Center for Structural Genomics of Infectious Diseases (CS-GID)
Deposited on : 2013-04-09
Resolution : 2.20 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 : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.35.1
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) : 2.35.1

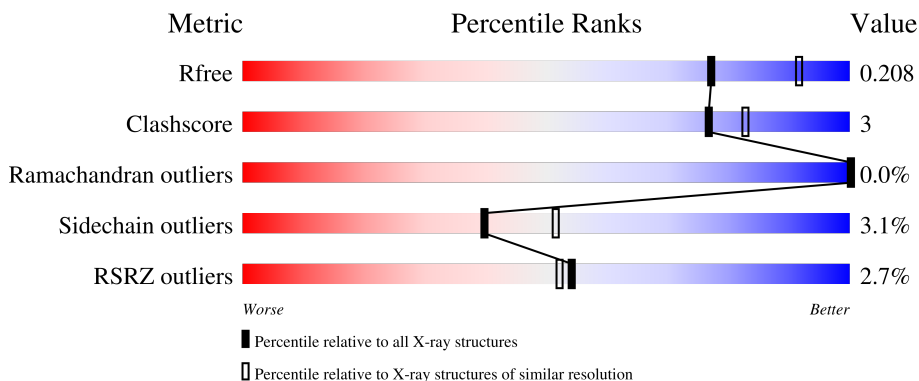
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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	188	 89% 8% ..
1	B	188	 90% 7% ..
1	C	188	 91% 7% ..
1	D	188	 91% 7% ..
1	E	188	 91% 7% .

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Mol	Chain	Length	Quality of chain
1	F	188	<p>3% 91% 7% ..</p>
1	G	188	<p>4% 90% 9% ..</p>
1	H	188	<p>8% 90% 8% ..</p>
1	I	188	<p>3% 92% 6% ..</p>
1	J	188	<p>3% 93% 5% .</p>
1	K	188	<p>5% 91% 7% .</p>
1	L	188	<p>4% 87% 11% ..</p>
1	M	188	<p>2% 91% 6% ..</p>
1	N	188	<p>1% 91% 7% .</p>

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 20792 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 Intracellular protease/amidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	185	1390	886	242	257	5	0	1	0
1	B	185	1397	892	245	255	5	0	2	0
1	C	185	1396	890	242	259	5	0	2	0
1	D	186	1404	895	243	261	5	0	3	0
1	E	185	1398	891	245	257	5	0	2	0
1	F	185	1390	886	242	257	5	0	1	0
1	G	186	1398	891	246	256	5	0	1	0
1	H	185	1385	883	242	255	5	0	0	0
1	I	185	1446	918	255	267	6	0	9	0
1	J	185	1396	890	243	258	5	0	2	0
1	K	185	1399	892	246	256	5	0	2	0
1	L	185	1396	890	245	256	5	0	2	0
1	M	185	1404	895	245	259	5	0	3	0
1	N	185	1396	890	242	259	5	0	2	0

There are 56 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	SER	-	expression tag	UNP Q8ZNU7

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	ASN	-	expression tag	UNP Q8ZNU7
A	0	ALA	-	expression tag	UNP Q8ZNU7
A	103	ALA	CYS	engineered mutation	UNP Q8ZNU7
B	-2	SER	-	expression tag	UNP Q8ZNU7
B	-1	ASN	-	expression tag	UNP Q8ZNU7
B	0	ALA	-	expression tag	UNP Q8ZNU7
B	103	ALA	CYS	engineered mutation	UNP Q8ZNU7
C	-2	SER	-	expression tag	UNP Q8ZNU7
C	-1	ASN	-	expression tag	UNP Q8ZNU7
C	0	ALA	-	expression tag	UNP Q8ZNU7
C	103	ALA	CYS	engineered mutation	UNP Q8ZNU7
D	-2	SER	-	expression tag	UNP Q8ZNU7
D	-1	ASN	-	expression tag	UNP Q8ZNU7
D	0	ALA	-	expression tag	UNP Q8ZNU7
D	103	ALA	CYS	engineered mutation	UNP Q8ZNU7
E	-2	SER	-	expression tag	UNP Q8ZNU7
E	-1	ASN	-	expression tag	UNP Q8ZNU7
E	0	ALA	-	expression tag	UNP Q8ZNU7
E	103	ALA	CYS	engineered mutation	UNP Q8ZNU7
F	-2	SER	-	expression tag	UNP Q8ZNU7
F	-1	ASN	-	expression tag	UNP Q8ZNU7
F	0	ALA	-	expression tag	UNP Q8ZNU7
F	103	ALA	CYS	engineered mutation	UNP Q8ZNU7
G	-2	SER	-	expression tag	UNP Q8ZNU7
G	-1	ASN	-	expression tag	UNP Q8ZNU7
G	0	ALA	-	expression tag	UNP Q8ZNU7
G	103	ALA	CYS	engineered mutation	UNP Q8ZNU7
H	-2	SER	-	expression tag	UNP Q8ZNU7
H	-1	ASN	-	expression tag	UNP Q8ZNU7
H	0	ALA	-	expression tag	UNP Q8ZNU7
H	103	ALA	CYS	engineered mutation	UNP Q8ZNU7
I	-2	SER	-	expression tag	UNP Q8ZNU7
I	-1	ASN	-	expression tag	UNP Q8ZNU7
I	0	ALA	-	expression tag	UNP Q8ZNU7
I	103	ALA	CYS	engineered mutation	UNP Q8ZNU7
J	-2	SER	-	expression tag	UNP Q8ZNU7
J	-1	ASN	-	expression tag	UNP Q8ZNU7
J	0	ALA	-	expression tag	UNP Q8ZNU7
J	103	ALA	CYS	engineered mutation	UNP Q8ZNU7
K	-2	SER	-	expression tag	UNP Q8ZNU7
K	-1	ASN	-	expression tag	UNP Q8ZNU7
K	0	ALA	-	expression tag	UNP Q8ZNU7

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Chain	Residue	Modelled	Actual	Comment	Reference
K	103	ALA	CYS	engineered mutation	UNP Q8ZNU7
L	-2	SER	-	expression tag	UNP Q8ZNU7
L	-1	ASN	-	expression tag	UNP Q8ZNU7
L	0	ALA	-	expression tag	UNP Q8ZNU7
L	103	ALA	CYS	engineered mutation	UNP Q8ZNU7
M	-2	SER	-	expression tag	UNP Q8ZNU7
M	-1	ASN	-	expression tag	UNP Q8ZNU7
M	0	ALA	-	expression tag	UNP Q8ZNU7
M	103	ALA	CYS	engineered mutation	UNP Q8ZNU7
N	-2	SER	-	expression tag	UNP Q8ZNU7
N	-1	ASN	-	expression tag	UNP Q8ZNU7
N	0	ALA	-	expression tag	UNP Q8ZNU7
N	103	ALA	CYS	engineered mutation	UNP Q8ZNU7

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

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Zn 1 1	0	0
2	B	1	Total Zn 1 1	0	0
2	C	1	Total Zn 1 1	0	0
2	D	1	Total Zn 1 1	0	0
2	E	1	Total Zn 1 1	0	0
2	F	1	Total Zn 1 1	0	0
2	G	1	Total Zn 1 1	0	0
2	H	1	Total Zn 1 1	0	0
2	I	1	Total Zn 1 1	0	0
2	J	1	Total Zn 1 1	0	0
2	K	1	Total Zn 1 1	0	0
2	L	1	Total Zn 1 1	0	0
2	M	1	Total Zn 1 1	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	N	1	Total	Zn	0	0
			1	1		

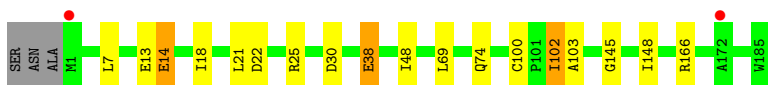
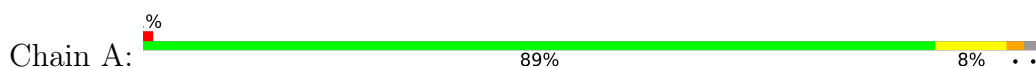
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	90	Total	O	0	0
			90	90		
3	B	143	Total	O	0	0
			143	143		
3	C	126	Total	O	0	0
			126	126		
3	D	81	Total	O	0	0
			81	81		
3	E	110	Total	O	0	0
			110	110		
3	F	77	Total	O	0	0
			77	77		
3	G	51	Total	O	0	0
			51	51		
3	H	56	Total	O	0	0
			56	56		
3	I	67	Total	O	0	0
			67	67		
3	J	76	Total	O	0	0
			76	76		
3	K	47	Total	O	0	0
			47	47		
3	L	54	Total	O	0	0
			54	54		
3	M	76	Total	O	0	0
			76	76		
3	N	129	Total	O	0	0
			129	129		

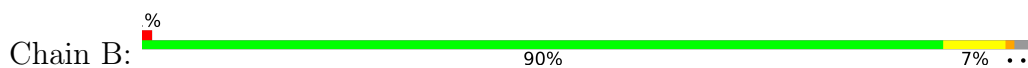
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

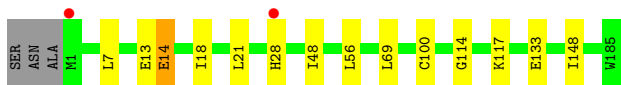
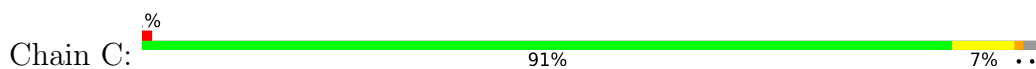
- Molecule 1: Intracellular protease/amidase



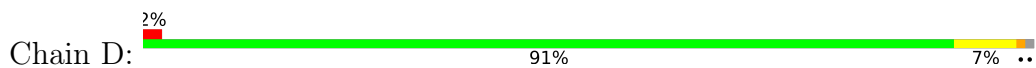
- Molecule 1: Intracellular protease/amidase



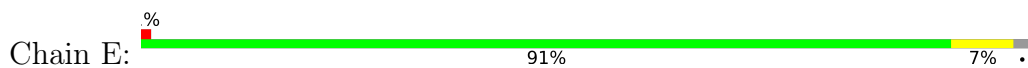
- Molecule 1: Intracellular protease/amidase



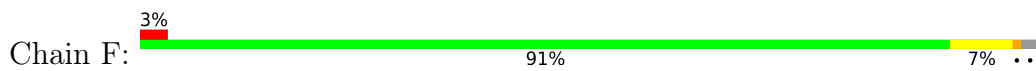
- Molecule 1: Intracellular protease/amidase



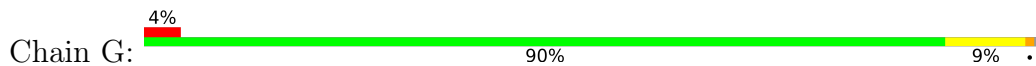
- Molecule 1: Intracellular protease/amidase



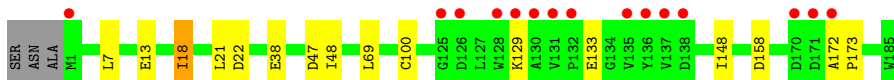
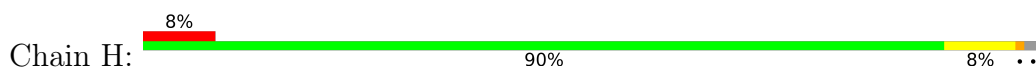
- Molecule 1: Intracellular protease/amidase



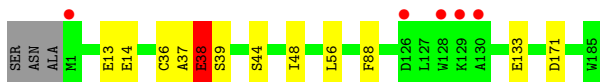
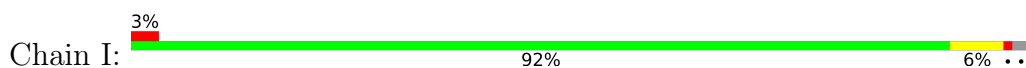
- Molecule 1: Intracellular protease/amidase



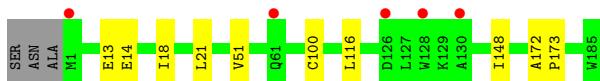
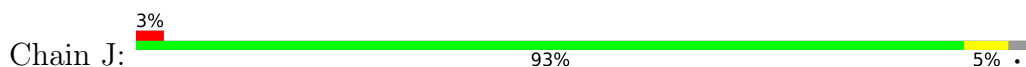
- Molecule 1: Intracellular protease/amidase



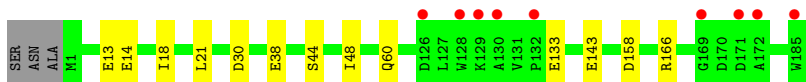
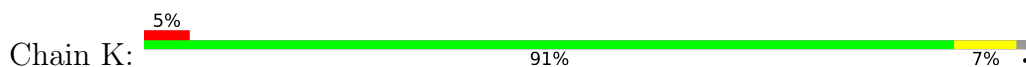
- Molecule 1: Intracellular protease/amidase



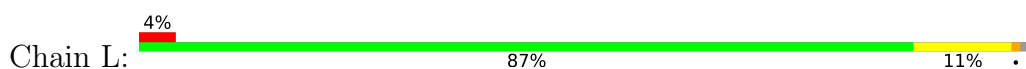
- Molecule 1: Intracellular protease/amidase



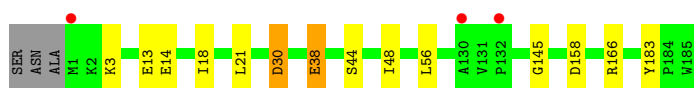
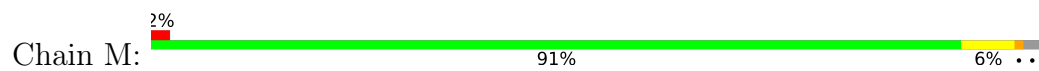
- Molecule 1: Intracellular protease/amidase



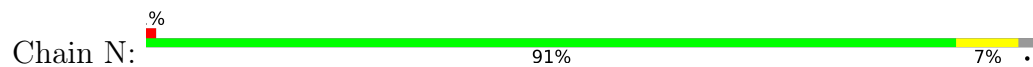
- Molecule 1: Intracellular protease/amidase



● Molecule 1: Intracellular protease/amidase



● Molecule 1: Intracellular protease/amidase



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	179.66Å 113.75Å 175.71Å 90.00° 109.33° 90.00°	Depositor
Resolution (Å)	36.71 – 2.20 36.68 – 2.14	Depositor EDS
% Data completeness (in resolution range)	94.8 (36.71-2.20) 91.7 (36.68-2.14)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.21 (at 2.14Å)	Xtrriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.172 , 0.205 0.179 , 0.208	Depositor DCC
R_{free} test set	8505 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	37.7	Xtrriage
Anisotropy	0.101	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 44.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	20792	wwPDB-VP
Average B, all atoms (Å ²)	42.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 24.26 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 3.9722e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: ZN

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	0.57	0/1422	0.71	1/1937 (0.1%)
1	B	0.62	0/1432	0.74	0/1950
1	C	0.60	0/1431	0.70	0/1949
1	D	0.53	0/1442	0.67	0/1964
1	E	0.59	0/1433	0.71	1/1951 (0.1%)
1	F	0.51	0/1422	0.65	0/1937
1	G	0.46	0/1430	0.66	0/1947
1	H	0.48	0/1414	0.62	0/1926
1	I	0.50	0/1484	0.65	0/2019
1	J	0.52	0/1431	0.71	0/1949
1	K	0.50	0/1434	0.64	0/1952
1	L	0.52	0/1431	0.66	1/1948 (0.1%)
1	M	0.51	0/1442	0.64	0/1963
1	N	0.59	0/1431	0.72	0/1949
All	All	0.54	0/20079	0.68	3/27341 (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	E	25	ARG	NE-CZ-NH1	5.55	123.08	120.30
1	L	120	ARG	NE-CZ-NH2	-5.11	117.75	120.30
1	A	25	ARG	NE-CZ-NH1	5.01	122.80	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	1390	0	1400	9	0
1	B	1397	0	1418	8	0
1	C	1396	0	1406	9	0
1	D	1404	0	1416	10	0
1	E	1398	0	1413	8	0
1	F	1390	0	1400	9	0
1	G	1398	0	1414	12	0
1	H	1385	0	1396	8	0
1	I	1446	0	1459	15	0
1	J	1396	0	1408	9	0
1	K	1399	0	1417	7	0
1	L	1396	0	1414	16	0
1	M	1404	0	1419	9	0
1	N	1396	0	1406	11	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
2	E	1	0	0	0	0
2	F	1	0	0	0	0
2	G	1	0	0	0	0
2	H	1	0	0	0	0
2	I	1	0	0	0	0
2	J	1	0	0	0	0
2	K	1	0	0	0	0
2	L	1	0	0	0	0
2	M	1	0	0	0	0
2	N	1	0	0	0	0
3	A	90	0	0	1	0
3	B	143	0	0	2	0
3	C	126	0	0	1	0
3	D	81	0	0	1	0
3	E	110	0	0	2	0
3	F	77	0	0	1	0
3	G	51	0	0	2	0
3	H	56	0	0	2	0
3	I	67	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	J	76	0	0	0	0
3	K	47	0	0	1	0
3	L	54	0	0	0	0
3	M	76	0	0	0	0
3	N	129	0	0	1	0
All	All	20792	0	19786	119	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 (119) 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:L:59[B]:ARG:HG2	1:L:59[B]:ARG:HH21	0.97	1.12
1:I:48:ILE:HD11	1:J:21:LEU:HD22	1.35	1.03
1:L:59[B]:ARG:HH21	1:L:59[B]:ARG:CG	1.75	0.99
1:L:59[B]:ARG:HG2	1:L:59[B]:ARG:NH2	1.80	0.94
1:N:60:GLN:HE21	1:N:61:GLN:HE22	1.18	0.91
1:E:48:ILE:HD11	1:F:21:LEU:HD22	1.55	0.86
1:G:48:ILE:HD11	1:H:21:LEU:HD22	1.60	0.83
1:I:38[A]:GLU:OE2	1:I:39[A]:SER:HB2	1.77	0.83
1:G:108[A]:ARG:NH1	3:G:318:HOH:O	2.12	0.73
1:F:41:ALA:HB2	1:J:51:VAL:HG21	1.72	0.71
1:I:36[B]:CYS:SG	1:I:56:LEU:HD22	2.34	0.66
1:I:38[A]:GLU:OE2	1:I:39[A]:SER:N	2.30	0.65
1:A:48:ILE:HD11	1:B:21:LEU:HD22	1.79	0.65
1:D:60:GLN:NE2	1:E:112:ALA:O	2.31	0.63
1:G:48:ILE:HD13	1:H:18:ILE:HD12	1.81	0.63
1:M:48:ILE:HD11	1:N:21:LEU:HD22	1.80	0.62
1:L:59[B]:ARG:CG	1:L:59[B]:ARG:NH2	2.44	0.62
1:B:60:GLN:O	1:B:91:ARG:NH2	2.32	0.62
1:I:48:ILE:HD13	1:J:18:ILE:HD12	1.82	0.61
1:I:48:ILE:HD11	1:J:21:LEU:CD2	2.23	0.59
1:A:14:GLU:HG3	1:A:48:ILE:HD12	1.84	0.59
1:I:38[A]:GLU:OE2	1:I:39[A]:SER:CB	2.50	0.58
1:K:60[B]:GLN:HA	1:K:60[B]:GLN:OE1	2.03	0.57
1:B:117:LYS:HG3	1:B:117:LYS:O	2.05	0.56
1:A:145:GLY:O	1:A:166:ARG:NH1	2.34	0.56
1:I:14:GLU:HG3	1:I:48:ILE:HD12	1.86	0.56
1:C:28:HIS:CD2	3:C:345:HOH:O	2.59	0.56
1:M:21:LEU:HD22	1:N:48:ILE:HD11	1.88	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:120:ARG:HD2	3:F:346:HOH:O	2.06	0.55
1:A:38:GLU:H	1:A:38:GLU:CD	2.10	0.54
1:L:38:GLU:H	1:L:38:GLU:CD	2.11	0.54
1:K:143:GLU:OE1	1:K:166:ARG:NH1	2.38	0.54
1:A:100:CYS:HA	1:A:148:ILE:O	2.09	0.53
1:I:37[B]:ALA:O	1:I:39[B]:SER:N	2.31	0.53
1:G:100:CYS:HA	1:G:148:ILE:O	2.08	0.53
1:L:60:GLN:O	1:L:91:ARG:NH2	2.42	0.53
1:H:7:LEU:HD12	1:H:69:LEU:CD2	2.39	0.52
1:D:41:ALA:HB2	1:L:51:VAL:HG21	1.91	0.52
1:M:158[A]:ASP:OD1	1:M:183:TYR:OH	2.27	0.52
1:C:100:CYS:HA	1:C:148:ILE:O	2.09	0.52
1:K:143:GLU:HG3	3:K:331:HOH:O	2.09	0.52
1:C:117:LYS:O	1:C:117:LYS:HG3	2.09	0.51
1:J:172:ALA:HB3	1:J:173:PRO:HD3	1.92	0.51
1:A:102:ILE:HG13	1:A:103:ALA:N	2.26	0.51
1:D:21:LEU:HD23	1:D:21:LEU:C	2.31	0.51
1:C:21:LEU:HD22	1:D:48:ILE:HD11	1.94	0.50
1:L:14:GLU:HG3	1:L:48:ILE:HD12	1.94	0.49
1:E:100:CYS:HA	1:E:148:ILE:O	2.12	0.49
1:E:21:LEU:C	1:E:21:LEU:HD23	2.33	0.49
1:D:21:LEU:HD21	1:D:25:ARG:HD2	1.94	0.49
1:L:102:ILE:HG13	1:L:103:ALA:N	2.28	0.49
1:K:21:LEU:C	1:K:21:LEU:HD23	2.33	0.48
1:F:41:ALA:HB2	1:J:51:VAL:CG2	2.43	0.48
1:N:108:ARG:NE	3:N:337:HOH:O	2.46	0.48
1:M:48:ILE:HD12	1:N:18:ILE:HD12	1.95	0.48
1:B:30:ASP:HB3	3:B:428:HOH:O	2.13	0.47
1:E:36:CYS:HB2	3:E:325:HOH:O	2.13	0.47
1:G:108[A]:ARG:HD2	3:G:318:HOH:O	2.13	0.47
1:J:14:GLU:O	1:J:18:ILE:HG12	2.15	0.47
1:C:48:ILE:HD11	1:D:21:LEU:HD22	1.96	0.47
1:I:37[B]:ALA:C	1:I:39[B]:SER:H	2.16	0.47
1:C:114:GLY:HA2	1:C:133[B]:GLU:CD	2.35	0.47
1:L:7:LEU:HD12	1:L:69:LEU:CD2	2.44	0.47
1:B:126:ASP:HB2	1:B:129:LYS:HE2	1.96	0.46
1:C:14:GLU:HG2	1:D:18:ILE:HG23	1.96	0.46
1:E:48:ILE:HD13	1:F:18:ILE:HD12	1.97	0.46
1:N:14:GLU:O	1:N:18:ILE:HG12	2.15	0.46
1:C:7:LEU:HD12	1:C:69:LEU:CD2	2.45	0.46
1:N:19:VAL:HG11	1:N:156:VAL:HG13	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:38:GLU:HG2	3:H:306:HOH:O	2.15	0.46
1:N:172:ALA:HB3	1:N:173:PRO:HD3	1.97	0.46
1:B:39:SER:CB	3:B:379:HOH:O	2.64	0.45
1:B:59[A]:ARG:HG2	1:B:59[A]:ARG:HH21	1.82	0.45
1:E:126:ASP:HB2	1:E:129:LYS:HE3	1.98	0.45
1:I:14:GLU:HB3	1:I:44:SER:CB	2.47	0.45
1:G:14:GLU:HB3	1:G:44:SER:HB2	1.99	0.45
1:M:145:GLY:O	1:M:166:ARG:NH1	2.37	0.44
1:H:129:LYS:HB3	3:H:318:HOH:O	2.17	0.44
1:M:14:GLU:HB3	1:M:44:SER:HB2	2.00	0.44
1:F:38:GLU:HG3	3:I:363:HOH:O	2.17	0.44
1:G:14:GLU:HB3	1:G:44:SER:CB	2.47	0.44
1:G:21:LEU:C	1:G:21:LEU:HD23	2.38	0.44
1:D:146:ASN:HB3	3:D:351:HOH:O	2.17	0.44
1:F:143:GLU:OE2	1:F:166:ARG:NH2	2.50	0.44
1:H:172:ALA:HB3	1:H:173:PRO:HD3	1.99	0.43
1:K:14:GLU:HB3	1:K:44:SER:HB2	2.00	0.43
1:N:100:CYS:HA	1:N:148:ILE:O	2.18	0.43
1:M:14:GLU:HB3	1:M:44:SER:CB	2.49	0.43
1:M:3:LYS:HA	1:M:30:ASP:O	2.19	0.43
1:D:27:LEU:HD13	1:D:164:SER:HB3	2.00	0.42
1:C:21:LEU:C	1:C:21:LEU:HD23	2.39	0.42
1:M:38:GLU:H	1:M:38:GLU:CD	2.22	0.42
1:A:74:GLN:HG3	3:A:349:HOH:O	2.20	0.42
1:G:18:ILE:HD12	1:H:48:ILE:CD1	2.50	0.42
1:G:40:ARG:HD2	1:G:52:ALA:O	2.20	0.42
1:K:48:ILE:HD11	1:L:21:LEU:HD22	2.01	0.42
1:L:143:GLU:OE2	1:L:166:ARG:NH2	2.49	0.42
1:A:21:LEU:C	1:A:21:LEU:HD23	2.41	0.42
1:N:21:LEU:C	1:N:21:LEU:HD23	2.39	0.42
1:H:100:CYS:HA	1:H:148:ILE:O	2.20	0.42
1:I:38[B]:GLU:CD	1:I:38[B]:GLU:N	2.73	0.41
1:L:70:PRO:HA	1:L:102:ILE:HG23	2.01	0.41
1:G:47:ASP:O	1:G:49:PRO:HD3	2.20	0.41
1:L:100:CYS:HA	1:L:148:ILE:O	2.19	0.41
1:I:38[A]:GLU:OE2	1:I:39[A]:SER:CA	2.69	0.41
1:A:7:LEU:HD12	1:A:69:LEU:CD2	2.51	0.41
1:D:100:CYS:HA	1:D:148:ILE:O	2.20	0.41
1:J:116:LEU:HD23	1:J:116:LEU:HA	1.94	0.41
1:I:38[A]:GLU:CD	1:I:39[A]:SER:N	2.74	0.41
1:L:56:LEU:O	1:L:60:GLN:HG3	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:100:CYS:HA	1:B:148:ILE:O	2.21	0.41
1:E:108[A]:ARG:NH2	3:E:391:HOH:O	2.38	0.41
1:K:14:GLU:HG2	1:L:18:ILE:HG23	2.02	0.41
1:N:14:GLU:HG3	1:N:48:ILE:HD12	2.03	0.41
1:F:56:LEU:HD11	1:F:88:PHE:CD1	2.56	0.41
1:F:14:GLU:HB3	1:F:44:SER:CB	2.51	0.40
1:G:18:ILE:HD13	1:G:18:ILE:HA	1.86	0.40
1:I:56:LEU:HD11	1:I:88:PHE:CG	2.57	0.40
1:J:100:CYS:HA	1:J:148:ILE:O	2.22	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	184/188 (98%)	177 (96%)	7 (4%)	0	100	100
1	B	185/188 (98%)	180 (97%)	5 (3%)	0	100	100
1	C	185/188 (98%)	177 (96%)	8 (4%)	0	100	100
1	D	187/188 (100%)	183 (98%)	4 (2%)	0	100	100
1	E	185/188 (98%)	181 (98%)	4 (2%)	0	100	100
1	F	184/188 (98%)	179 (97%)	5 (3%)	0	100	100
1	G	185/188 (98%)	179 (97%)	6 (3%)	0	100	100
1	H	183/188 (97%)	177 (97%)	6 (3%)	0	100	100
1	I	192/188 (102%)	183 (95%)	7 (4%)	2 (1%)	15	14
1	J	185/188 (98%)	181 (98%)	4 (2%)	0	100	100
1	K	185/188 (98%)	179 (97%)	6 (3%)	0	100	100
1	L	185/188 (98%)	180 (97%)	5 (3%)	0	100	100
1	M	186/188 (99%)	182 (98%)	4 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	N	185/188 (98%)	183 (99%)	2 (1%)	0	100	100
All	All	2596/2632 (99%)	2521 (97%)	73 (3%)	2 (0%)	100	60

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	I	38[A]	GLU
1	I	38[B]	GLU

5.3.2 Protein sidechains [i](#)

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	142/143 (99%)	135 (95%)	7 (5%)	25	31
1	B	143/143 (100%)	138 (96%)	5 (4%)	36	46
1	C	143/143 (100%)	139 (97%)	4 (3%)	43	56
1	D	144/143 (101%)	139 (96%)	5 (4%)	36	46
1	E	143/143 (100%)	140 (98%)	3 (2%)	53	67
1	F	142/143 (99%)	138 (97%)	4 (3%)	43	56
1	G	142/143 (99%)	136 (96%)	6 (4%)	30	38
1	H	141/143 (99%)	135 (96%)	6 (4%)	29	36
1	I	148/143 (104%)	143 (97%)	5 (3%)	37	47
1	J	143/143 (100%)	142 (99%)	1 (1%)	84	91
1	K	143/143 (100%)	137 (96%)	6 (4%)	30	38
1	L	143/143 (100%)	139 (97%)	4 (3%)	43	56
1	M	144/143 (101%)	139 (96%)	5 (4%)	36	46
1	N	143/143 (100%)	142 (99%)	1 (1%)	84	91
All	All	2004/2002 (100%)	1942 (97%)	62 (3%)	40	51

All (62) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	13	GLU
1	A	14	GLU
1	A	18	ILE
1	A	22	ASP
1	A	30	ASP
1	A	38	GLU
1	A	102	ILE
1	B	13	GLU
1	B	14	GLU
1	B	22	ASP
1	B	39	SER
1	B	61	GLN
1	C	13	GLU
1	C	14	GLU
1	C	18	ILE
1	C	56	LEU
1	D	13	GLU
1	D	14	GLU
1	D	18	ILE
1	D	30	ASP
1	D	133	GLU
1	E	13	GLU
1	E	18	ILE
1	E	39	SER
1	F	13	GLU
1	F	18	ILE
1	F	22	ASP
1	F	133	GLU
1	G	13	GLU
1	G	14	GLU
1	G	22	ASP
1	G	38	GLU
1	G	56	LEU
1	G	74	GLN
1	H	13	GLU
1	H	18	ILE
1	H	22	ASP
1	H	47	ASP
1	H	133	GLU
1	H	158	ASP
1	I	13	GLU
1	I	38[A]	GLU
1	I	38[B]	GLU

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Mol	Chain	Res	Type
1	I	133	GLU
1	I	171	ASP
1	J	13	GLU
1	K	13	GLU
1	K	18	ILE
1	K	30	ASP
1	K	38	GLU
1	K	133	GLU
1	K	158	ASP
1	L	1	MET
1	L	13	GLU
1	L	18	ILE
1	L	102	ILE
1	M	13	GLU
1	M	18	ILE
1	M	30	ASP
1	M	38	GLU
1	M	56	LEU
1	N	13	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	I	61	GLN
1	N	60	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 monosaccharides 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, 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	185/188 (98%)	-0.41	2 (1%) 80 79	24, 35, 53, 71	0
1	B	185/188 (98%)	-0.44	1 (0%) 91 90	23, 30, 48, 76	0
1	C	185/188 (98%)	-0.49	2 (1%) 80 79	23, 31, 48, 73	0
1	D	186/188 (98%)	-0.34	3 (1%) 72 70	23, 37, 58, 92	0
1	E	185/188 (98%)	-0.52	2 (1%) 80 79	24, 32, 49, 62	0
1	F	185/188 (98%)	-0.31	5 (2%) 54 52	28, 40, 65, 80	0
1	G	186/188 (98%)	-0.25	8 (4%) 35 33	28, 47, 80, 99	0
1	H	185/188 (98%)	0.02	15 (8%) 12 10	31, 49, 83, 100	0
1	I	185/188 (98%)	-0.45	5 (2%) 54 52	29, 40, 62, 78	0
1	J	185/188 (98%)	-0.48	5 (2%) 54 52	26, 39, 64, 81	0
1	K	185/188 (98%)	-0.16	9 (4%) 29 28	27, 48, 87, 101	0
1	L	185/188 (98%)	-0.17	8 (4%) 35 33	26, 46, 83, 99	0
1	M	185/188 (98%)	-0.43	3 (1%) 72 70	25, 39, 64, 80	0
1	N	185/188 (98%)	-0.53	2 (1%) 80 79	25, 33, 50, 74	0
All	All	2592/2632 (98%)	-0.35	70 (2%) 54 52	23, 38, 70, 101	0

All (70) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	0	ALA	6.8
1	L	1	MET	5.2
1	H	1	MET	5.2
1	H	128	TRP	4.9
1	L	128	TRP	4.9
1	D	1	MET	4.7
1	K	128	TRP	4.4
1	H	129	LYS	4.2

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Mol	Chain	Res	Type	RSRZ
1	G	128	TRP	3.8
1	L	126	ASP	3.7
1	H	172	ALA	3.6
1	K	172	ALA	3.6
1	H	135	VAL	3.6
1	H	137	VAL	3.6
1	L	130	ALA	3.5
1	G	129	LYS	3.4
1	B	1	MET	3.4
1	H	130	ALA	3.3
1	K	129	LYS	3.2
1	J	128	TRP	3.1
1	D	0	ALA	3.0
1	I	128	TRP	3.0
1	I	1	MET	3.0
1	J	1	MET	3.0
1	L	125	GLY	2.9
1	J	126	ASP	2.9
1	H	125	GLY	2.9
1	N	126	ASP	2.9
1	F	128	TRP	2.8
1	H	126	ASP	2.8
1	L	129	LYS	2.8
1	K	126	ASP	2.7
1	G	130	ALA	2.7
1	J	130	ALA	2.7
1	L	127	LEU	2.7
1	H	131	VAL	2.6
1	G	175	ARG	2.5
1	C	1	MET	2.5
1	H	136	TYR	2.5
1	K	169	GLY	2.4
1	A	1	MET	2.4
1	F	1	MET	2.4
1	H	132	PRO	2.4
1	I	126	ASP	2.4
1	G	1	MET	2.4
1	G	126	ASP	2.3
1	G	176	GLU	2.3
1	N	1	MET	2.3
1	K	185	TRP	2.3
1	F	132	PRO	2.3

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Mol	Chain	Res	Type	RSRZ
1	M	130	ALA	2.2
1	E	126	ASP	2.2
1	H	170	ASP	2.2
1	L	61	GLN	2.2
1	I	129	LYS	2.2
1	C	28	HIS	2.1
1	A	172	ALA	2.1
1	D	130	ALA	2.1
1	K	171	ASP	2.1
1	M	132	PRO	2.1
1	F	126	ASP	2.1
1	F	129	LYS	2.1
1	I	130	ALA	2.1
1	E	132	PRO	2.0
1	K	132	PRO	2.0
1	H	138	ASP	2.0
1	H	171	ASP	2.0
1	J	61	GLN	2.0
1	M	1	MET	2.0
1	K	130	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 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
2	ZN	C	201	1/1	0.99	0.08	35,35,35,35	0
2	ZN	D	201	1/1	0.99	0.11	30,30,30,30	0
2	ZN	F	201	1/1	0.99	0.13	34,34,34,34	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	ZN	G	201	1/1	0.99	0.08	47,47,47,47	0
2	ZN	K	201	1/1	0.99	0.08	43,43,43,43	0
2	ZN	L	201	1/1	0.99	0.09	38,38,38,38	0
2	ZN	M	201	1/1	0.99	0.09	33,33,33,33	0
2	ZN	N	201	1/1	0.99	0.08	37,37,37,37	0
2	ZN	I	201	1/1	1.00	0.07	39,39,39,39	0
2	ZN	J	201	1/1	1.00	0.09	40,40,40,40	0
2	ZN	E	201	1/1	1.00	0.08	36,36,36,36	0
2	ZN	A	201	1/1	1.00	0.10	30,30,30,30	0
2	ZN	B	201	1/1	1.00	0.09	34,34,34,34	0
2	ZN	H	201	1/1	1.00	0.08	43,43,43,43	0

6.5 Other polymers [\(i\)](#)

There are no such residues in this entry.