



# wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 7, 2023 – 11:55 PM EDT

PDB ID : 4QF6  
Title : Structure of Aldehyde Dehydrogenase from Bacillus cereus, E194S mutant  
Authors : Ngo, H.P.T.; Hong, S.H.; Oh, D.K.; Kang, L.W.  
Deposited on : 2014-05-19  
Resolution : 1.90 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

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<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>.

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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) : 1.13  
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

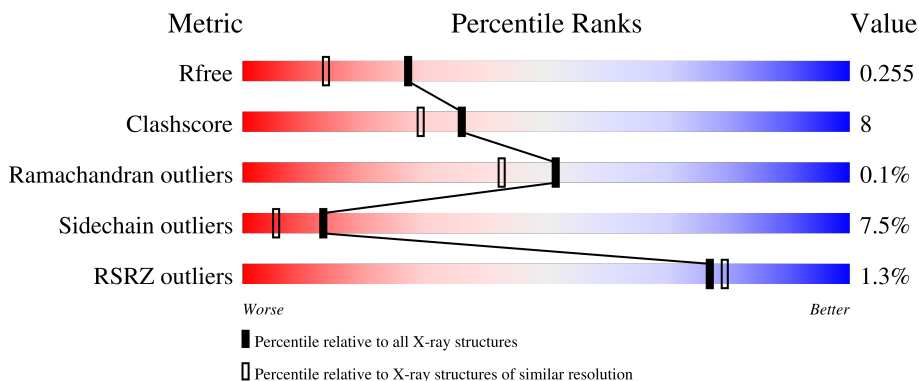
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.90 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	6207 (1.90-1.90)
Clashscore	141614	6847 (1.90-1.90)
Ramachandran outliers	138981	6760 (1.90-1.90)
Sidechain outliers	138945	6760 (1.90-1.90)
RSRZ outliers	127900	6082 (1.90-1.90)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	494	81% 15% ...
1	B	494	83% 13% ...
1	C	494	84% 13% ...
1	D	494	85% 12% ...
1	E	494	85% 12% ...

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Mol	Chain	Length	Quality of chain
1	F	494	 80% 17% ..
1	G	494	%  80% 17% ...
1	H	494	%  80% 16% ...
1	I	494	%  81% 16% ..
1	J	494	%  81% 15% ...
1	K	494	4%  76% 18% ..
1	L	494	5%  74% 19% 5% .

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 47191 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 Aldehyde dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	491	3791	2414	630	733	14	0	1	0
1	B	491	3791	2414	630	733	14	0	1	0
1	C	491	3793	2415	630	734	14	0	1	0
1	D	489	3787	2413	628	732	14	0	3	0
1	E	490	3781	2408	629	730	14	0	0	0
1	F	491	3794	2416	630	734	14	0	2	0
1	G	490	3781	2408	629	730	14	0	0	0
1	H	490	3787	2412	629	732	14	0	1	0
1	I	491	3788	2412	630	732	14	0	0	0
1	J	491	3788	2412	630	732	14	0	0	0
1	K	489	3773	2404	627	728	14	0	0	0
1	L	488	3764	2398	626	726	14	0	0	0

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	194	SER	GLU	ENGINEERED MUTATION	UNP C2N217
B	194	SER	GLU	ENGINEERED MUTATION	UNP C2N217
C	194	SER	GLU	ENGINEERED MUTATION	UNP C2N217
D	194	SER	GLU	ENGINEERED MUTATION	UNP C2N217
E	194	SER	GLU	ENGINEERED MUTATION	UNP C2N217

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Chain	Residue	Modelled	Actual	Comment	Reference
F	194	SER	GLU	ENGINEERED MUTATION	UNP C2N217
G	194	SER	GLU	ENGINEERED MUTATION	UNP C2N217
H	194	SER	GLU	ENGINEERED MUTATION	UNP C2N217
I	194	SER	GLU	ENGINEERED MUTATION	UNP C2N217
J	194	SER	GLU	ENGINEERED MUTATION	UNP C2N217
K	194	SER	GLU	ENGINEERED MUTATION	UNP C2N217
L	194	SER	GLU	ENGINEERED MUTATION	UNP C2N217

- Molecule 2 is SODIUM ION (three-letter code: NA) (formula: Na).

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

- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	255	Total O 255 255	0	0
3	B	123	Total O 123 123	0	0

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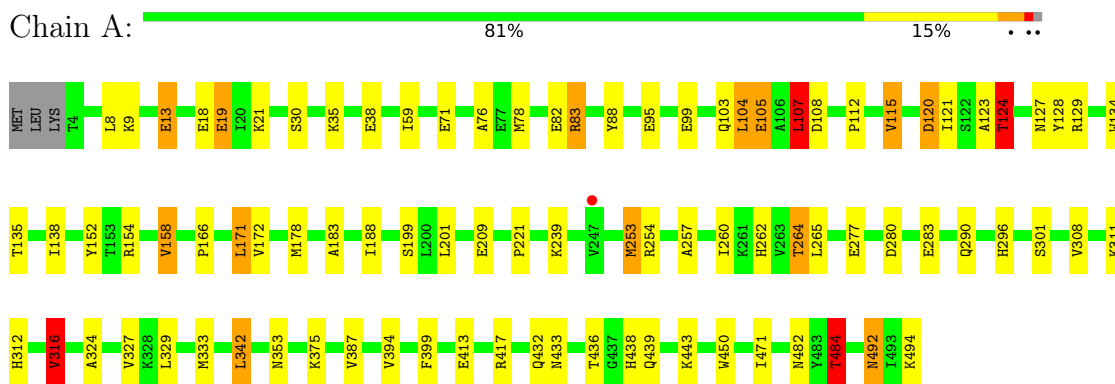
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	C	197	Total 197	O 197	0	0
3	D	216	Total 216	O 216	0	0
3	E	218	Total 218	O 218	0	0
3	F	124	Total 124	O 124	0	0
3	G	152	Total 152	O 152	0	0
3	H	143	Total 143	O 143	0	0
3	I	109	Total 109	O 109	0	0
3	J	74	Total 74	O 74	0	0
3	K	76	Total 76	O 76	0	0
3	L	62	Total 62	O 62	0	0

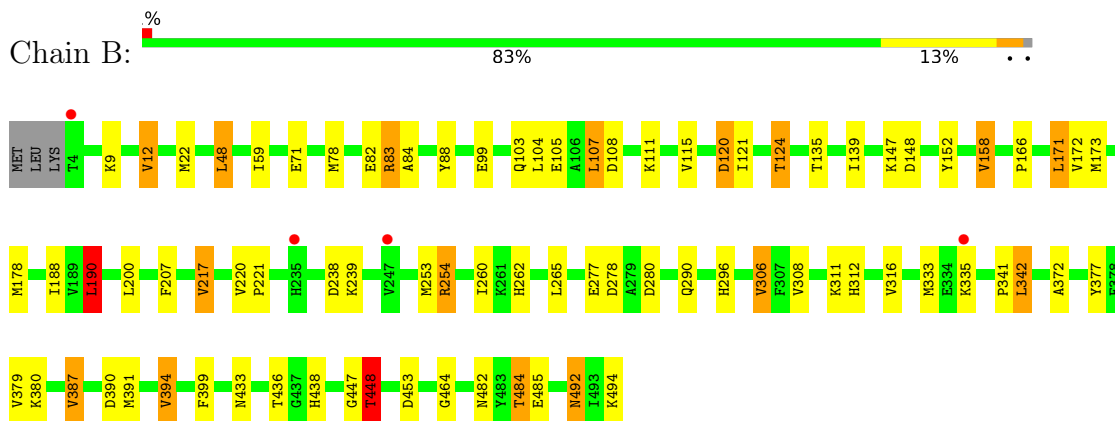
### 3 Residue-property plots [i](#)

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.

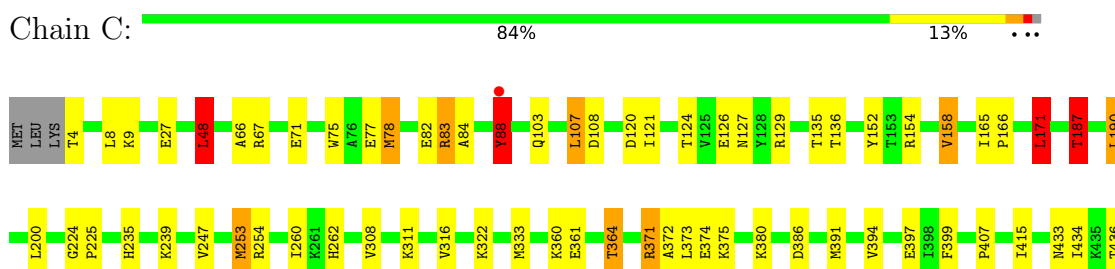
- Molecule 1: Aldehyde dehydrogenase



- Molecule 1: Aldehyde dehydrogenase



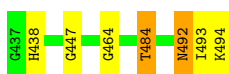
- Molecule 1: Aldehyde dehydrogenase





- Molecule 1: Aldehyde dehydrogenase

Chain D: 85% 12% ..



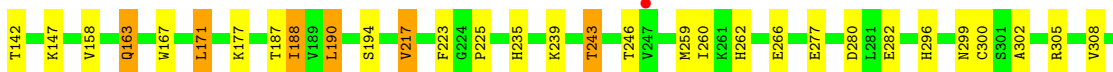
- Molecule 1: Aldehyde dehydrogenase

Chain E: 85% 12% ..



- Molecule 1: Aldehyde dehydrogenase

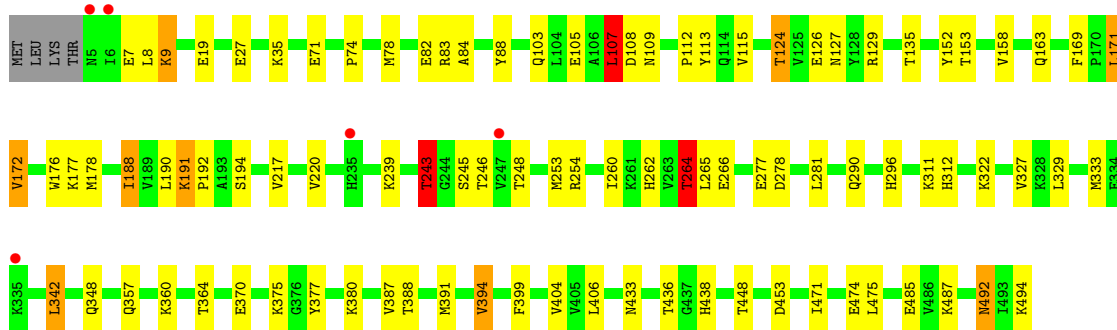
Chain F: 80% 17% ..



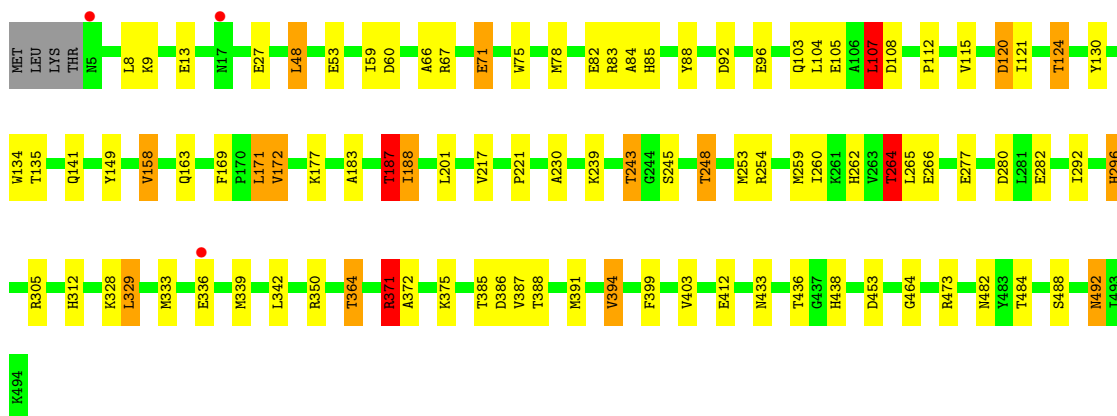
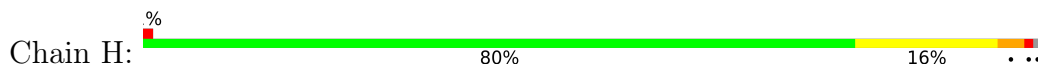
- Molecule 1: Aldehyde dehydrogenase

Chain G: 80% 17% ..

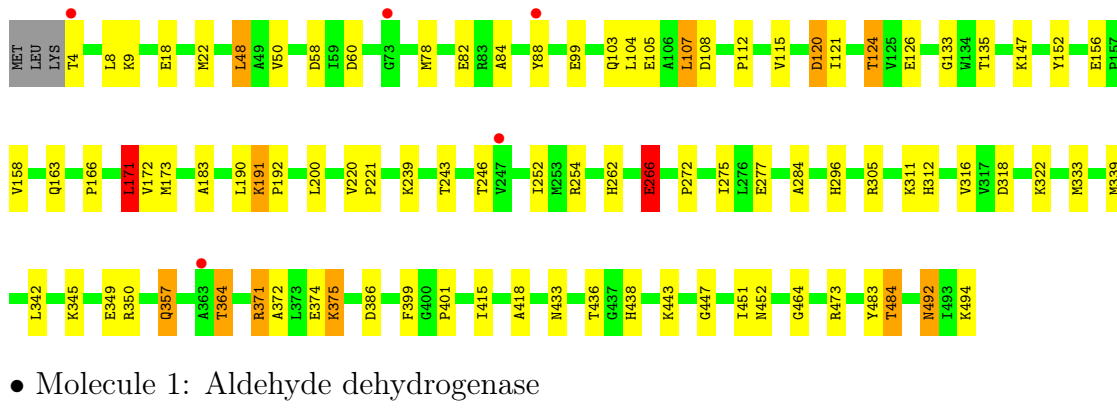
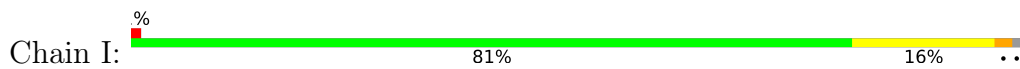




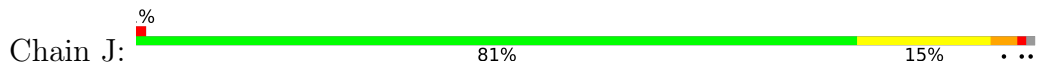
• Molecule 1: Aldehyde dehydrogenase

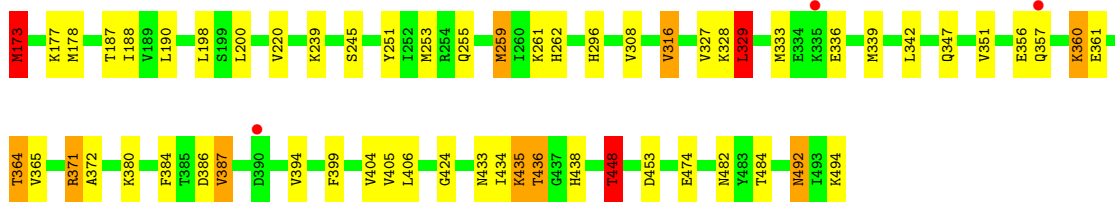


• Molecule 1: Aldehyde dehydrogenase

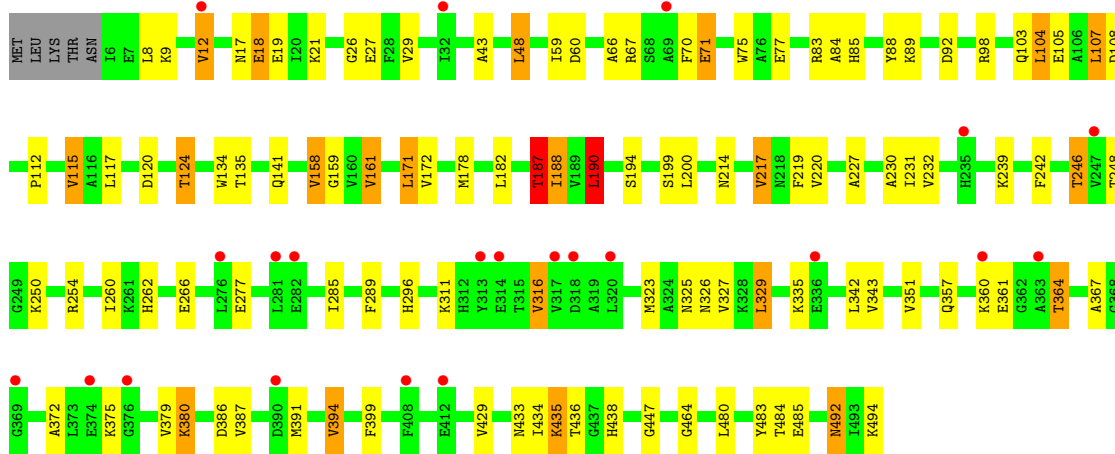
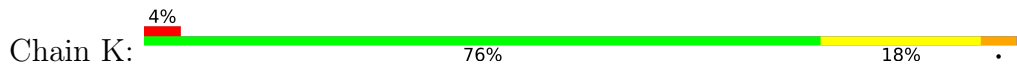


• Molecule 1: Aldehyde dehydrogenase

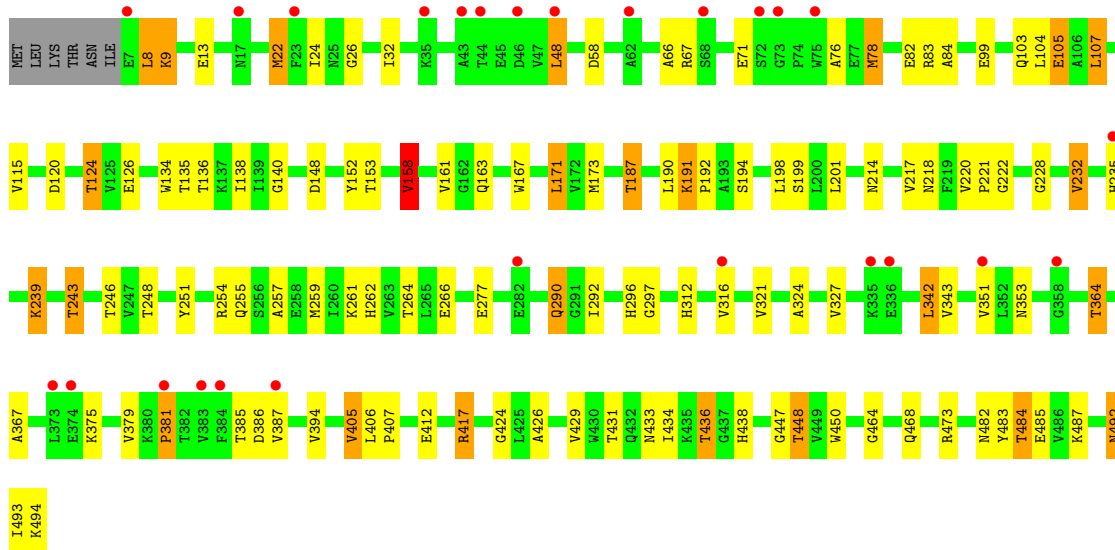
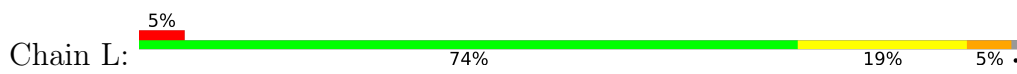




• Molecule 1: Aldehyde dehydrogenase



• Molecule 1: Aldehyde dehydrogenase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	145.56Å 93.66Å 247.85Å 90.00° 95.55° 90.00°	Depositor
Resolution (Å)	43.56 – 1.90 43.56 – 1.90	Depositor EDS
% Data completeness (in resolution range)	84.9 (43.56-1.90) 84.9 (43.56-1.90)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	7.47 (at 1.89Å)	Xtrriage
Refinement program	REFMAC 5.7.0032	Depositor
R, $R_{free}$	0.204 , 0.252 0.211 , 0.255	Depositor DCC
$R_{free}$ test set	22144 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	16.6	Xtrriage
Anisotropy	0.226	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.39 , 43.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	47191	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	17.0	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 27.04 % 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 2.3627e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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: NA

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	1.18	11/3873 (0.3%)	1.11	22/5254 (0.4%)
1	B	1.03	1/3873 (0.0%)	1.07	11/5254 (0.2%)
1	C	1.08	3/3875 (0.1%)	1.08	14/5257 (0.3%)
1	D	1.07	5/3875 (0.1%)	1.07	19/5256 (0.4%)
1	E	1.13	6/3860 (0.2%)	1.08	17/5236 (0.3%)
1	F	1.06	2/3879 (0.1%)	1.07	14/5262 (0.3%)
1	G	1.05	4/3860 (0.1%)	1.01	7/5236 (0.1%)
1	H	1.02	4/3869 (0.1%)	1.04	12/5248 (0.2%)
1	I	0.98	2/3867 (0.1%)	0.98	8/5246 (0.2%)
1	J	0.94	1/3867 (0.0%)	0.98	4/5246 (0.1%)
1	K	1.02	1/3852 (0.0%)	1.00	7/5225 (0.1%)
1	L	1.01	1/3843 (0.0%)	1.00	3/5214 (0.1%)
All	All	1.05	41/46393 (0.1%)	1.04	138/62934 (0.2%)

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	D	0	1

The worst 5 of 41 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	19	GLU	CD-OE1	8.67	1.35	1.25
1	G	264	THR	CB-CG2	8.24	1.79	1.52
1	D	88	TYR	CE1-CZ	7.98	1.49	1.38
1	C	88	TYR	CE1-CZ	7.86	1.48	1.38
1	H	264	THR	CB-CG2	7.09	1.75	1.52

The worst 5 of 138 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	278	ASP	CB-CG-OD1	11.71	128.84	118.30
1	G	108	ASP	CB-CG-OD2	-10.16	109.16	118.30
1	I	108	ASP	CB-CG-OD2	-9.77	109.51	118.30
1	C	254	ARG	NE-CZ-NH1	9.27	124.94	120.30
1	D	158	VAL	CB-CA-C	-9.20	93.92	111.40

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	D	493	ILE	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	3791	0	3743	61	0
1	B	3791	0	3743	57	0
1	C	3793	0	3742	53	0
1	D	3787	0	3742	54	0
1	E	3781	0	3731	53	0
1	F	3794	0	3748	75	0
1	G	3781	0	3731	73	0
1	H	3787	0	3737	74	0
1	I	3788	0	3738	66	0
1	J	3788	0	3738	65	0
1	K	3773	0	3725	83	0
1	L	3764	0	3714	89	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
2	E	2	0	0	0	0
2	F	2	0	0	0	0
2	G	2	0	0	0	0
2	H	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	I	2	0	0	0	0
2	J	2	0	0	0	0
2	K	2	0	0	0	0
2	L	2	0	0	0	0
3	A	255	0	0	11	0
3	B	123	0	0	3	0
3	C	197	0	0	3	0
3	D	216	0	0	5	0
3	E	218	0	0	1	0
3	F	124	0	0	2	0
3	G	152	0	0	4	0
3	H	143	0	0	3	0
3	I	109	0	0	1	0
3	J	74	0	0	4	0
3	K	76	0	0	3	0
3	L	62	0	0	4	0
All	All	47191	0	44832	720	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 8.

The worst 5 of 720 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:H:264:THR:CG2	1:H:264:THR:CB	1.75	1.63
1:G:264:THR:CB	1:G:264:THR:CG2	1.79	1.58
1:L:448:THR:HG23	3:L:627:HOH:O	1.60	1.02
1:D:88:TYR:CE2	3:D:689:HOH:O	2.12	1.01
1:I:173:MET:HE1	1:I:243:THR:HG21	1.48	0.92

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	490/494 (99%)	478 (98%)	12 (2%)	0	100	100
1	B	490/494 (99%)	471 (96%)	19 (4%)	0	100	100
1	C	490/494 (99%)	476 (97%)	13 (3%)	1 (0%)	47	38
1	D	490/494 (99%)	476 (97%)	14 (3%)	0	100	100
1	E	488/494 (99%)	474 (97%)	14 (3%)	0	100	100
1	F	491/494 (99%)	475 (97%)	16 (3%)	0	100	100
1	G	488/494 (99%)	473 (97%)	15 (3%)	0	100	100
1	H	489/494 (99%)	473 (97%)	16 (3%)	0	100	100
1	I	489/494 (99%)	471 (96%)	18 (4%)	0	100	100
1	J	489/494 (99%)	471 (96%)	17 (4%)	1 (0%)	47	38
1	K	487/494 (99%)	470 (96%)	17 (4%)	0	100	100
1	L	486/494 (98%)	466 (96%)	18 (4%)	2 (0%)	34	24
All	All	5867/5928 (99%)	5674 (97%)	189 (3%)	4 (0%)	51	42

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	L	78	MET
1	C	373	LEU
1	L	424	GLY
1	J	424	GLY

### 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	399/401 (100%)	375 (94%)	24 (6%)	19	9
1	B	399/401 (100%)	369 (92%)	30 (8%)	13	5
1	C	399/401 (100%)	376 (94%)	23 (6%)	20	10

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	D	399/401 (100%)	374 (94%)	25 (6%)	18	8
1	E	397/401 (99%)	373 (94%)	24 (6%)	19	9
1	F	400/401 (100%)	372 (93%)	28 (7%)	15	7
1	G	397/401 (99%)	367 (92%)	30 (8%)	13	5
1	H	398/401 (99%)	364 (92%)	34 (8%)	10	4
1	I	398/401 (99%)	370 (93%)	28 (7%)	15	7
1	J	398/401 (99%)	360 (90%)	38 (10%)	8	3
1	K	396/401 (99%)	361 (91%)	35 (9%)	10	4
1	L	395/401 (98%)	355 (90%)	40 (10%)	7	2
All	All	4775/4812 (99%)	4416 (92%)	359 (8%)	13	5

5 of 359 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	I	191	LYS
1	K	18	GLU
1	I	342	LEU
1	J	120	ASP
1	K	190	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 155 such sidechains are listed below:

Mol	Chain	Res	Type
1	I	492	ASN
1	L	114	GLN
1	J	290	GLN
1	K	214	ASN
1	L	433	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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 24 ligands modelled in this entry, 24 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 [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	491/494 (99%)	-0.14	1 (0%) 95 95	5, 10, 21, 35	0
1	B	491/494 (99%)	0.02	4 (0%) 86 87	10, 17, 30, 45	0
1	C	491/494 (99%)	-0.12	1 (0%) 95 95	5, 12, 25, 43	0
1	D	489/494 (98%)	-0.07	2 (0%) 92 93	5, 12, 25, 37	0
1	E	490/494 (99%)	-0.12	1 (0%) 95 95	5, 11, 23, 43	0
1	F	491/494 (99%)	0.07	2 (0%) 92 93	9, 17, 31, 43	0
1	G	490/494 (99%)	0.02	5 (1%) 82 84	10, 16, 29, 52	0
1	H	490/494 (99%)	0.03	3 (0%) 89 90	10, 16, 29, 58	0
1	I	491/494 (99%)	0.02	5 (1%) 82 84	11, 18, 30, 46	0
1	J	491/494 (99%)	0.15	7 (1%) 75 77	10, 21, 34, 53	0
1	K	489/494 (98%)	0.46	22 (4%) 33 36	13, 21, 34, 50	0
1	L	488/494 (98%)	0.56	26 (5%) 26 29	13, 22, 35, 57	0
All	All	5882/5928 (99%)	0.07	79 (1%) 77 79	5, 17, 30, 58	0

The worst 5 of 79 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	L	43	ALA	5.5
1	H	5	ASN	4.6
1	J	33	GLY	4.3
1	E	5	ASN	3.9
1	K	390	ASP	3.4

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

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

### 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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	B-factors(Å <sup>2</sup> )	Q<0.9
2	NA	F	501	1/1	0.93	0.10	16,16,16,16	0
2	NA	B	501	1/1	0.94	0.09	17,17,17,17	0
2	NA	J	502	1/1	0.94	0.10	21,21,21,21	0
2	NA	K	502	1/1	0.94	0.14	23,23,23,23	0
2	NA	L	501	1/1	0.94	0.21	21,21,21,21	0
2	NA	K	501	1/1	0.95	0.17	20,20,20,20	0
2	NA	B	502	1/1	0.96	0.07	14,14,14,14	0
2	NA	H	501	1/1	0.97	0.07	15,15,15,15	0
2	NA	J	501	1/1	0.97	0.26	20,20,20,20	0
2	NA	I	502	1/1	0.98	0.09	15,15,15,15	0
2	NA	C	501	1/1	0.98	0.09	12,12,12,12	0
2	NA	F	502	1/1	0.98	0.06	13,13,13,13	0
2	NA	D	502	1/1	0.98	0.07	12,12,12,12	0
2	NA	H	502	1/1	0.98	0.06	16,16,16,16	0
2	NA	I	501	1/1	0.98	0.10	19,19,19,19	0
2	NA	L	502	1/1	0.98	0.07	23,23,23,23	0
2	NA	A	501	1/1	0.99	0.10	10,10,10,10	0
2	NA	C	502	1/1	0.99	0.08	9,9,9,9	0
2	NA	G	501	1/1	0.99	0.09	14,14,14,14	0
2	NA	G	502	1/1	0.99	0.05	15,15,15,15	0
2	NA	D	501	1/1	0.99	0.11	11,11,11,11	0
2	NA	A	502	1/1	0.99	0.06	10,10,10,10	0
2	NA	E	501	1/1	0.99	0.13	10,10,10,10	0
2	NA	E	502	1/1	1.00	0.06	12,12,12,12	0

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

There are no such residues in this entry.