



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 6, 2026 – 03:52 PM UTC

PDB ID : 4J0E / pdb_00004j0e
Title : Crystal structure of 3-hydroxyacyl-CoA dehydrogenase from *Caenorhabditis elegans* in P1 space group
Authors : Xu, Y.; Sun, F.; Zhai, Y.
Deposited on : 2013-01-30
Resolution : 1.60 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

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	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

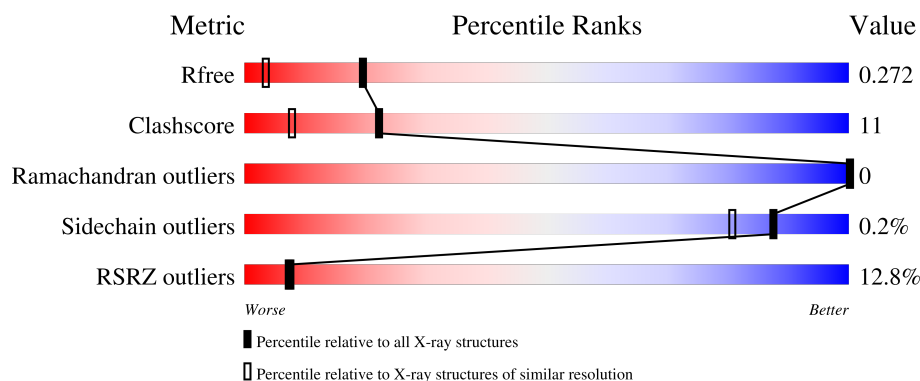
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.60 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}	180053	4673 (1.60-1.60)
Clashscore	190562	4931 (1.60-1.60)
Ramachandran outliers	187476	4831 (1.60-1.60)
Sidechain outliers	187428	4830 (1.60-1.60)
RSRZ outliers	180081	4672 (1.60-1.60)

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	320	10% 72% 18% • 8%
1	B	320	13% 64% 22% • 12%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 4692 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 Probable 3-hydroxyacyl-CoA dehydrogenase F54C8.1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	296	Total	C	N	O	S	41	0	0
			2257	1429	377	435	16			
1	B	283	Total	C	N	O	S	34	3	0
			2171	1380	359	416	16			

There are 44 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	MET	-	expression tag	UNP P34439
A	-1	GLY	-	expression tag	UNP P34439
A	0	SER	-	expression tag	UNP P34439
A	299	GLU	-	expression tag	UNP P34439
A	300	PHE	-	expression tag	UNP P34439
A	301	GLY	-	expression tag	UNP P34439
A	302	THR	-	expression tag	UNP P34439
A	303	SER	-	expression tag	UNP P34439
A	304	SER	-	expression tag	UNP P34439
A	305	THR	-	expression tag	UNP P34439
A	306	GLY	-	expression tag	UNP P34439
A	307	SER	-	expression tag	UNP P34439
A	308	SER	-	expression tag	UNP P34439
A	309	GLY	-	expression tag	UNP P34439
A	310	SER	-	expression tag	UNP P34439
A	311	SER	-	expression tag	UNP P34439
A	312	LEU	-	expression tag	UNP P34439
A	313	GLU	-	expression tag	UNP P34439
A	314	VAL	-	expression tag	UNP P34439
A	315	LEU	-	expression tag	UNP P34439
A	316	PHE	-	expression tag	UNP P34439
A	317	GLN	-	expression tag	UNP P34439
B	-2	MET	-	expression tag	UNP P34439
B	-1	GLY	-	expression tag	UNP P34439
B	0	SER	-	expression tag	UNP P34439

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Chain	Residue	Modelled	Actual	Comment	Reference
B	299	GLU	-	expression tag	UNP P34439
B	300	PHE	-	expression tag	UNP P34439
B	301	GLY	-	expression tag	UNP P34439
B	302	THR	-	expression tag	UNP P34439
B	303	SER	-	expression tag	UNP P34439
B	304	SER	-	expression tag	UNP P34439
B	305	THR	-	expression tag	UNP P34439
B	306	GLY	-	expression tag	UNP P34439
B	307	SER	-	expression tag	UNP P34439
B	308	SER	-	expression tag	UNP P34439
B	309	GLY	-	expression tag	UNP P34439
B	310	SER	-	expression tag	UNP P34439
B	311	SER	-	expression tag	UNP P34439
B	312	LEU	-	expression tag	UNP P34439
B	313	GLU	-	expression tag	UNP P34439
B	314	VAL	-	expression tag	UNP P34439
B	315	LEU	-	expression tag	UNP P34439
B	316	PHE	-	expression tag	UNP P34439
B	317	GLN	-	expression tag	UNP P34439

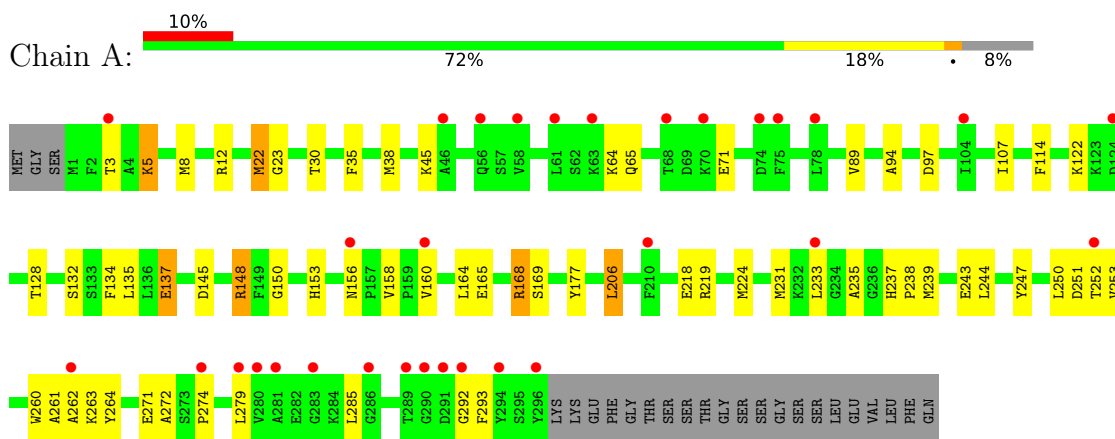
- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	153	Total O 153 153	0	0
2	B	111	Total O 111 111	0	0

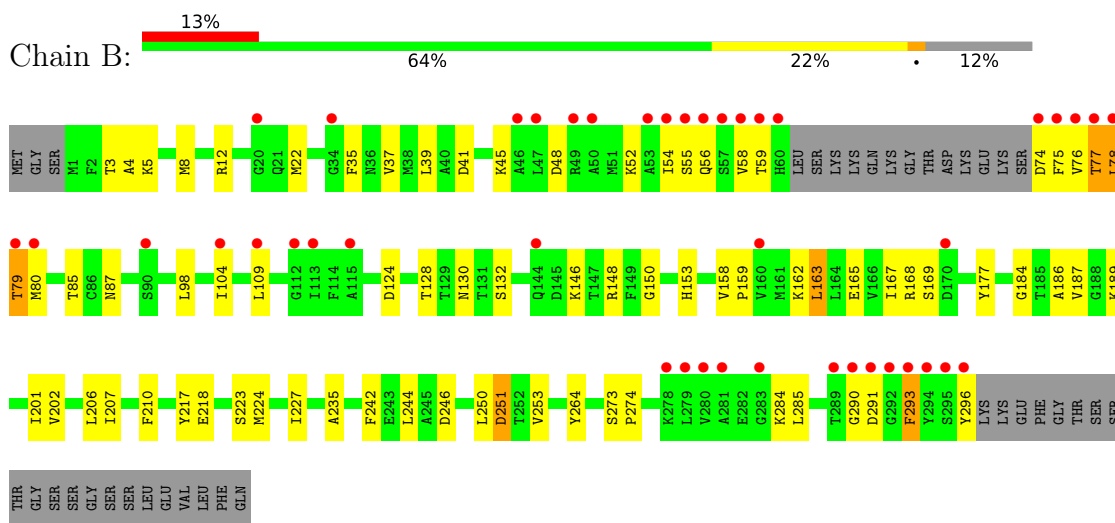
3 Residue-property plots [i](#)

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: Probable 3-hydroxyacyl-CoA dehydrogenase F54C8.1



- Molecule 1: Probable 3-hydroxyacyl-CoA dehydrogenase F54C8.1



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	55.71Å 55.22Å 56.07Å 80.45° 75.58° 72.42°	Depositor
Resolution (Å)	54.04 – 1.60 54.04 – 1.60	Depositor EDS
% Data completeness (in resolution range)	95.2 (54.04-1.60) 95.2 (54.04-1.60)	Depositor EDS
R_{merge}	0.03	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.88 (at 1.60Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.223 , 0.270 0.225 , 0.272	Depositor DCC
R_{free} test set	4056 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	27.7	Xtriage
Anisotropy	0.035	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.41 , 41.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.009 for -h,-l,-k	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	4692	wwPDB-VP
Average B, all atoms (Å ²)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.45% 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](#)

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	1.57	15/2292 (0.7%)	1.46	22/3087 (0.7%)
1	B	1.52	18/2215 (0.8%)	1.43	13/2987 (0.4%)
All	All	1.55	33/4507 (0.7%)	1.44	35/6074 (0.6%)

The worst 5 of 33 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	45	LYS	CA-CB	-6.91	1.42	1.53
1	B	207	ILE	CA-C	6.85	1.59	1.52
1	B	186	ALA	N-CA	6.84	1.54	1.46
1	A	5	LYS	C-O	6.77	1.31	1.24
1	B	187	VAL	CA-C	6.73	1.61	1.52

The worst 5 of 35 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	65	GLN	CG-CD-NE2	-7.63	104.95	116.40
1	B	158	VAL	CA-C-N	-7.57	111.92	119.56
1	B	158	VAL	C-N-CA	-7.57	111.92	119.56
1	A	65	GLN	CB-CG-CD	-7.29	100.21	112.60
1	A	237	HIS	CA-C-N	-6.77	112.80	119.64

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	2257	0	2284	39	0
1	B	2171	0	2189	62	0
2	A	153	0	0	2	0
2	B	111	0	0	1	0
All	All	4692	0	4473	92	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 11.

The worst 5 of 92 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:224:MET:HE1	1:B:293:PHE:HB3	1.24	1.19
1:B:210[B]:PHE:HE1	1:B:244:LEU:HD23	1.19	1.06
1:A:271:GLU:HB2	2:A:428:HOH:O	1.59	1.01
1:A:231:MET:HE3	1:B:201:ILE:HG22	1.49	0.94
1:A:231:MET:HE1	1:B:202:VAL:HA	1.50	0.93

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	294/320 (92%)	287 (98%)	7 (2%)	0	100	100
1	B	282/320 (88%)	278 (99%)	4 (1%)	0	100	100
All	All	576/640 (90%)	565 (98%)	11 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	244/264 (92%)	244 (100%)	0	100	100
1	B	235/264 (89%)	234 (100%)	1 (0%)	84	75
All	All	479/528 (91%)	478 (100%)	1 (0%)	87	81

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	159	PRO

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

Mol	Chain	Res	Type
1	A	153	HIS
1	B	21	GLN
1	B	116	GLN
1	B	153	HIS

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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, 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	296/320 (92%)	0.69	31 (10%)	11 11	16, 31, 48, 64	16 (5%)
1	B	283/320 (88%)	0.92	43 (15%)	5 5	13, 33, 50, 66	14 (4%)
All	All	579/640 (90%)	0.80	74 (12%)	7 7	13, 32, 50, 66	30 (5%)

The worst 5 of 74 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	77	THR	5.1
1	B	58	VAL	5.0
1	B	170	ASP	4.3
1	B	59	THR	4.2
1	B	75	PHE	4.1

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 oligosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.