



# Full wwPDB X-ray Structure Validation Report

Feb 27, 2014 – 02:22 AM GMT

PDB ID : 2Q2B  
Title : Crystal structure of the C-terminal domain of mouse acyl-CoA thioesterase 7  
Authors : Guncar, G.; Forwood, J.K.; Kobe, B.  
Deposited on : 2007-05-27  
Resolution : 2.50 Å(reported)

This is a full wwPDB 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/ValidationPDFNotes.html>

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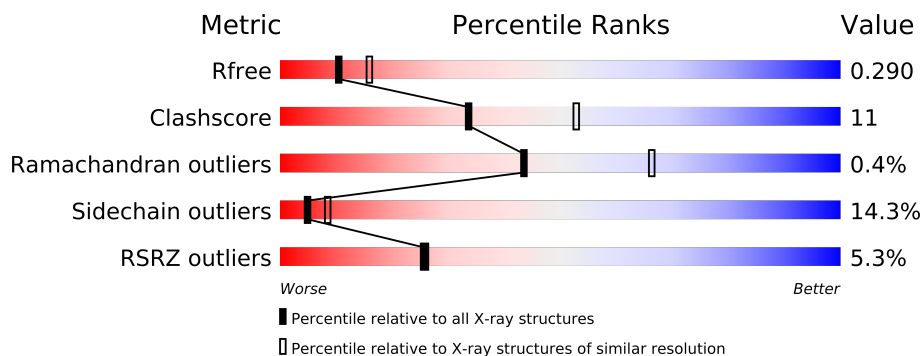
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.15 2013  
Xtriage (Phenix) : dev-1323  
EDS : stable22639  
Percentile statistics : 21963  
Refmac : 5.8.0049  
CCP4 : 6.3.0 (Settle)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)  
Validation Pipeline (wwPDB-VP) : stable22683

# 1 Overall quality at a glance

The reported resolution of this entry is 2.50 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))
$R_{free}$	66092	2784 (2.50-2.50)
Clashscore	79885	3562 (2.50-2.50)
Ramachandran outliers	78287	3480 (2.50-2.50)
Sidechain outliers	78261	3482 (2.50-2.50)
RSRZ outliers	66119	2785 (2.50-2.50)

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. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	179	
1	B	179	

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2242 atoms, of which 0 are hydrogen and 0 are deuterium.

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 Cytosolic acyl coenzyme A thioester hydrolase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	141	Total	C	N	O	S	0	0	0
			1095	689	191	207	8			
1	B	141	Total	C	N	O	S	38	0	0
			1092	688	189	207	8			

- Molecule 2 is water.

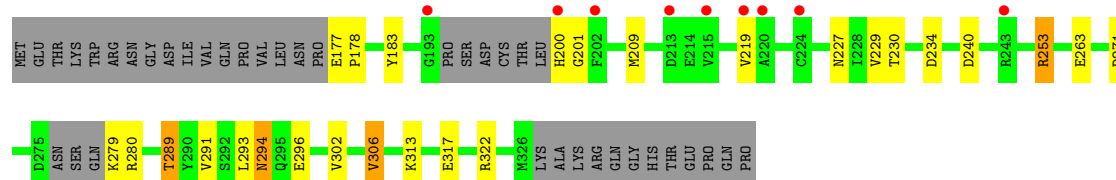
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	31	Total	O	0	0
			31	31		
2	B	24	Total	O	0	0
			24	24		

### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

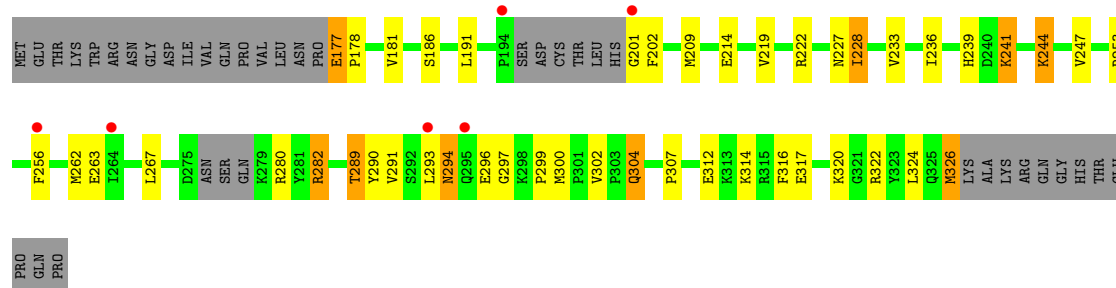
- Molecule 1: Cytosolic acyl coenzyme A thioester hydrolase

Chain A: 



- Molecule 1: Cytosolic acyl coenzyme A thioester hydrolase

Chain B: 



## 4 Data and refinement statistics

Property	Value	Source
Space group	H 3 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	136.74Å 136.74Å 99.83Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	28.39 – 2.50 28.38 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.9 (28.39-2.50) 99.9 (28.38-2.50)	Depositor EDS
$R_{merge}$	0.05	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.38 (at 2.51Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, $R_{free}$	0.222 , 0.288 0.225 , 0.290	Depositor DCC
$R_{free}$ test set	629 reflections (5.29%)	DCC
Wilson B-factor (Å <sup>2</sup> )	65.4	Xtriage
Anisotropy	0.045	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 58.1	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtriage
Outliers	0 of 12525 reflections	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	2242	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	38.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.85% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

## 5 Model quality

### 5.1 Standard geometry

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	0.51	0/1113	0.63	0/1498
1	B	0.58	0/1110	0.63	0/1495
All	All	0.55	0/2223	0.63	0/2993

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	B	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	239	HIS	Peptide

### 5.2 Close contacts

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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1095	0	1096	15	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1092	0	1096	33	0
2	A	31	0	0	3	0
2	B	24	0	0	3	0
All	All	2242	0	2192	47	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 11.

All (47) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:B:201:GLY:O	1:B:202:PHE:HD1	1.52	0.91
1:B:201:GLY:O	1:B:202:PHE:CD1	2.30	0.84
1:B:201:GLY:HA3	1:B:244:LYS:HD2	1.66	0.76
1:B:177:GLU:N	2:B:40:HOH:O	2.22	0.72
1:A:294:ASN:C	1:A:294:ASN:HD22	1.95	0.70
1:B:256:PHE:HD2	1:B:316:PHE:CE1	2.13	0.67
1:A:253:ARG:HG2	2:A:11:HOH:O	1.98	0.63
1:B:263:GLU:OE1	1:B:322:ARG:NH1	2.35	0.60
1:B:294:ASN:HD22	1:B:296:GLU:H	1.49	0.59
1:B:201:GLY:N	1:B:244:LYS:HZ3	2.00	0.59
1:B:201:GLY:HA3	1:B:244:LYS:CD	2.33	0.56
1:B:256:PHE:CD2	1:B:316:PHE:CE1	2.94	0.55
1:A:289:THR:HG22	2:A:4:HOH:O	2.04	0.55
1:B:177:GLU:N	1:B:178:PRO:CD	2.69	0.55
1:A:279:LYS:CD	1:A:280:ARG:H	2.21	0.54
1:B:201:GLY:C	1:B:202:PHE:CD1	2.82	0.53
1:A:279:LYS:HD3	1:A:280:ARG:H	1.72	0.53
1:B:289:THR:HG22	2:B:3:HOH:O	2.08	0.52
1:A:227:ASN:ND2	1:A:293:LEU:O	2.35	0.51
1:B:324:LEU:O	1:B:326:MET:HG3	2.12	0.50
1:B:228:ILE:HD12	1:B:290:TYR:HD2	1.78	0.49
1:B:241:LYS:HD3	1:B:241:LYS:H	1.77	0.49
1:B:291:VAL:HG13	1:B:299:PRO:HB3	1.94	0.49
1:A:177:GLU:N	1:A:178:PRO:CD	2.76	0.49
1:A:294:ASN:ND2	1:A:296:GLU:H	2.12	0.48
1:B:293:LEU:HD22	1:B:297:GLY:O	2.14	0.47
1:B:304:GLN:HA	1:B:304:GLN:OE1	2.15	0.47
1:B:267:LEU:HD13	1:B:282:ARG:NH1	2.31	0.46
1:B:262:MET:O	1:B:289:THR:HA	2.17	0.45
1:A:263:GLU:OE1	1:A:322:ARG:NH1	2.49	0.45
1:B:181:VAL:HG21	1:B:312:GLU:HG2	1.98	0.45
1:B:186:SER:OG	1:B:222:ARG:NH1	2.51	0.44

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:294:ASN:HD22	1:A:296:GLU:H	1.65	0.44
1:A:294:ASN:ND2	1:A:294:ASN:C	2.68	0.44
1:B:263:GLU:CD	1:B:322:ARG:NH1	2.71	0.44
1:B:326:MET:SD	2:B:7:HOH:O	2.61	0.44
1:B:307:PRO:HB3	1:B:312:GLU:HB3	2.00	0.44
1:B:241:LYS:CD	1:B:241:LYS:H	2.31	0.43
1:A:306:VAL:O	1:A:306:VAL:CG1	2.67	0.43
1:B:233:VAL:HG11	1:B:236:ILE:HD11	2.01	0.43
1:B:201:GLY:N	1:B:244:LYS:NZ	2.68	0.42
1:A:200:HIS:HB3	2:A:23:HOH:O	2.19	0.41
1:B:177:GLU:N	1:B:178:PRO:HD3	2.35	0.41
1:B:228:ILE:HD13	1:B:291:VAL:O	2.21	0.41
1:A:177:GLU:O	1:A:183:TYR:HB2	2.21	0.41
1:B:267:LEU:HD22	1:B:282:ARG:HH11	1.86	0.40
1:A:209:MET:HE2	1:B:209:MET:HB3	2.03	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution. The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	135/179 (75%)	132 (98%)	2 (2%)	1 (1%)	30	50
1	B	135/179 (75%)	127 (94%)	8 (6%)	0	100	100
All	All	270/358 (75%)	259 (96%)	10 (4%)	1 (0%)	43	66

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	201	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	122/157 (78%)	108 (88%)	14 (12%)	8	15
1	B	122/157 (78%)	101 (83%)	21 (17%)	3	5
All	All	244/314 (78%)	209 (86%)	35 (14%)	5	8

All (35) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	219	VAL
1	A	229	VAL
1	A	230	THR
1	A	234	ASP
1	A	240	ASP
1	A	253	ARG
1	A	271	ASP
1	A	289	THR
1	A	291	VAL
1	A	294	ASN
1	A	302	VAL
1	A	306	VAL
1	A	313	LYS
1	A	317	GLU
1	B	177	GLU
1	B	191	LEU
1	B	214	GLU
1	B	219	VAL
1	B	227	ASN
1	B	228	ILE
1	B	241	LYS
1	B	244	LYS
1	B	247	VAL
1	B	253	ARG
1	B	280	ARG
1	B	282	ARG
1	B	289	THR
1	B	294	ASN
1	B	300	MET

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Mol	Chain	Res	Type
1	B	302	VAL
1	B	304	GLN
1	B	314	LYS
1	B	317	GLU
1	B	320	LYS
1	B	326	MET

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	239	HIS
1	A	294	ASN
1	A	304	GLN
1	B	239	HIS
1	B	294	ASN

### 5.3.3 RNA ⓘ

There are no RNA chains in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

## 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 5.6 Ligand geometry ⓘ

There are no ligands in this entry.

## 5.7 Other polymers ⓘ

There are no such residues in this entry.

## 5.8 Polymer linkage issues

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	141/179 (78%)	0.40	9 (6%) 19 19	29, 38, 43, 47	1 (0%)
1	B	141/179 (78%)	0.47	6 (4%) 34 35	32, 38, 43, 48	9 (6%)
All	All	282/358 (78%)	0.44	15 (5%) 25 26	29, 38, 43, 48	10 (3%)

All (15) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	194	PRO	5.5
1	A	243	ARG	4.0
1	A	200	HIS	3.5
1	A	202	PHE	2.9
1	B	295	GLN	2.7
1	A	224	CYS	2.6
1	B	201	GLY	2.6
1	B	264	ILE	2.6
1	B	293	LEU	2.5
1	A	219	VAL	2.3
1	A	213	ASP	2.2
1	A	193	GLY	2.2
1	A	220	ALA	2.1
1	A	215	VAL	2.1
1	B	256	PHE	2.1

### 6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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

### 6.3 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 6.4 Ligands

There are no ligands in this entry.

## 6.5 Other polymers

There are no such residues in this entry.