



# Full wwPDB X-ray Structure Validation Report i

Feb 28, 2014 – 07:53 AM GMT

PDB ID : 1HNH  
Title : CRYSTAL STRUCTURE OF BETA-KETOACYL-ACP SYNTHASE III +  
DEGRADED FORM OF ACETYL-COA  
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Deposited on : 2000-12-07  
Resolution : 1.90 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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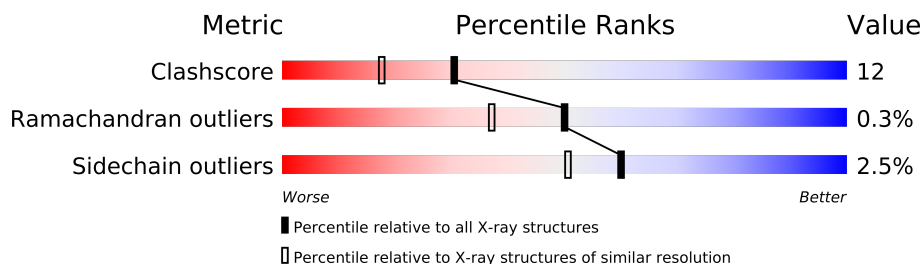
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity	:	4.02b-467
Mogul	:	1.15 2013
Xtrriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	21963
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 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))
Clashscore	79885	4465 (1.90-1.90)
Ramachandran outliers	78287	4413 (1.90-1.90)
Sidechain outliers	78261	4414 (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 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.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	317	

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 2618 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.

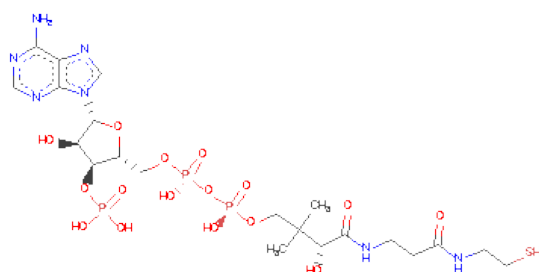
- Molecule 1 is a protein called BETA-KETOACYL-ACYL CARRIER PROTEIN SYNTHASE III.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	317	Total	C	N	O	S	Se	0	0	0
			2334	1460	401	460	5	8			

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MSE	MET	MODIFIED RESIDUE	UNP P0A6R0
A	25	MSE	MET	MODIFIED RESIDUE	UNP P0A6R0
A	54	MSE	MET	MODIFIED RESIDUE	UNP P0A6R0
A	65	MSE	MET	MODIFIED RESIDUE	UNP P0A6R0
A	97	MSE	MET	MODIFIED RESIDUE	UNP P0A6R0
A	112	SCY	CYS	MODIFIED RESIDUE	UNP P0A6R0
A	207	MSE	MET	MODIFIED RESIDUE	UNP P0A6R0
A	260	MSE	MET	MODIFIED RESIDUE	UNP P0A6R0
A	262	MSE	MET	MODIFIED RESIDUE	UNP P0A6R0

- Molecule 2 is COENZYME A (three-letter code: COA) (formula:  $C_{21}H_{36}N_7O_{16}P_3S$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	S	
			48	21	7	16	3	1	
									0
									0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	236	Total	O		
			236	236	0	0



## 4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section will therefore be incomplete.

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	72.45Å 72.45Å 102.80Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 1.90	Depositor
% Data completeness (in resolution range)	(Not available) (20.00-1.90)	Depositor
$R_{merge}$	0.08	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	CNS	Depositor
R, $R_{free}$	0.221 , 0.274	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2618	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	23.0	wwPDB-VP

## 5 Model quality

### 5.1 Standard geometry

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

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	0.65	0/2356	0.78	2/3197 (0.1%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	273	GLY	N-CA-C	-5.44	99.51	113.10
1	A	157	PHE	N-CA-C	5.04	124.62	111.00

There are no chirality outliers.

There are no planarity outliers.

### 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	2334	0	2294	56	0
2	A	48	0	32	3	0
3	A	236	0	0	6	1
All	All	2618	0	2326	56	1

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 12.

All (56) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:45:ALA:HB2	1:A:54:MSE:HE1	1.33	1.06
1:A:258:LEU:HB3	1:A:260:MSE:HE2	1.56	0.87
1:A:198:ASN:HD22	1:A:198:ASN:N	1.80	0.78
1:A:45:ALA:CB	1:A:54:MSE:HE1	2.12	0.78
1:A:258:LEU:CB	1:A:260:MSE:HE2	2.14	0.77
1:A:7:GLY:HA2	1:A:65:MSE:HE2	1.72	0.71
1:A:245:GLN:HB3	1:A:269:LEU:HB3	1.73	0.70
1:A:11:TYR:CD2	1:A:54:MSE:HG2	2.33	0.64
1:A:198:ASN:N	1:A:198:ASN:ND2	2.46	0.63
1:A:274:ASN:ND2	2:A:350:COA:S1P	2.72	0.62
1:A:110:ALA:HB3	1:A:114:GLY:HA2	1.83	0.60
1:A:87:PHE:HA	1:A:88:PRO:C	2.21	0.59
1:A:65:MSE:HG3	3:A:583:HOH:O	2.04	0.57
1:A:45:ALA:HB2	1:A:54:MSE:CE	2.22	0.57
1:A:11:TYR:HD2	1:A:54:MSE:HG2	1.70	0.56
1:A:2:TYR:CD2	1:A:172:PRO:HD3	2.40	0.56
1:A:293:ILE:HD13	1:A:293:ILE:N	2.23	0.54
1:A:258:LEU:CB	1:A:260:MSE:CE	2.86	0.54
1:A:132:LYS:HE2	1:A:133:TYR:CZ	2.43	0.53
1:A:93:GLN:O	1:A:97:MSE:HG3	2.10	0.52
1:A:212:VAL:HB	2:A:350:COA:H62	1.92	0.52
1:A:45:ALA:CB	1:A:54:MSE:CE	2.84	0.52
1:A:307:GLY:N	1:A:308:PHE:HA	2.25	0.51
1:A:197:VAL:C	1:A:198:ASN:HD22	2.13	0.51
1:A:195:ASP:HB3	1:A:198:ASN:O	2.11	0.51
1:A:176:SER:OG	1:A:178:HIS:HE1	1.94	0.50
1:A:197:VAL:C	1:A:198:ASN:ND2	2.66	0.49
1:A:284:LEU:O	1:A:288:VAL:HG23	2.11	0.49
1:A:129:GLY:HA2	3:A:487:HOH:O	2.12	0.49
1:A:224:VAL:HG11	1:A:258:LEU:HG	1.95	0.48
1:A:212:VAL:CG1	2:A:350:COA:H62	2.43	0.47
1:A:262:MSE:HG2	3:A:578:HOH:O	2.14	0.47
1:A:2:TYR:CE2	1:A:172:PRO:HD3	2.50	0.47
1:A:235:ARG:HG3	3:A:461:HOH:O	2.15	0.46
1:A:54:MSE:HB3	1:A:161:ALA:HB2	1.97	0.46
1:A:32:TRP:CE2	1:A:36:ARG:HG3	2.50	0.46
1:A:304:PHE:HZ	1:A:308:PHE:CD2	2.34	0.46
1:A:261:SER:C	1:A:263:ASP:N	2.68	0.44
1:A:301:LEU:O	1:A:312:SER:HA	2.17	0.44
1:A:224:VAL:O	1:A:228:LEU:HG	2.17	0.44
1:A:8:THR:O	1:A:62:ALA:HA	2.18	0.44
1:A:12:LEU:HD11	1:A:272:HIS:NE2	2.32	0.44

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:213:PHE:O	1:A:217:VAL:HG23	2.17	0.44
1:A:32:TRP:CD2	1:A:36:ARG:HG3	2.53	0.43
1:A:240:TRP:CD1	1:A:293:ILE:HD12	2.54	0.43
1:A:219:GLU:OE1	1:A:219:GLU:HA	2.18	0.43
1:A:31:GLU:HB2	3:A:549:HOH:O	2.18	0.42
1:A:258:LEU:HB2	1:A:260:MSE:CE	2.50	0.42
1:A:146:CYS:O	1:A:148:PRO:HD3	2.20	0.41
1:A:93:GLN:NE2	3:A:412:HOH:O	2.53	0.41
1:A:26:VAL:HB	1:A:151:ARG:HB3	2.02	0.41
1:A:175:ILE:CG2	1:A:231:ASN:ND2	2.84	0.41
1:A:298:LEU:HD12	1:A:316:ARG:HD3	2.02	0.41
1:A:258:LEU:HD23	1:A:260:MSE:HE1	2.03	0.40
1:A:13:PRO:HG3	1:A:54:MSE:HE2	2.03	0.40
1:A:10:SER:OG	1:A:282:CYS:HA	2.21	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
3:A:628:HOH:O	3:A:628:HOH:O[8_665]	2.07	0.13

## 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	314/317 (99%)	301 (96%)	12 (4%)	1 (0%)	50 37

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	209	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	241/238 (101%)	235 (98%)	6 (2%)	60 50

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	31	GLU
1	A	42	ARG
1	A	71	ASP
1	A	142	LEU
1	A	198	ASN
1	A	258	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	85	HIS
1	A	93	GLN
1	A	124	GLN
1	A	178	HIS
1	A	193	ASN
1	A	198	ASN
1	A	210	ASN
1	A	231	ASN

### 5.3.3 RNA ⓘ

There are no RNA chains in this entry.

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

1 non-standard protein/DNA/RNA residue is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the chemical component dictionary. The Link

column lists molecule types, if any, to which the group is linked. 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  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
1	SCY	A	112	1	8,8,9	6.86	3 (37%)	7,9,11	2.50	1 (14%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the chemical component dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	SCY	A	112	1	-	0/5/7/9	0/0/0/0

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	112	SCY	O-C	18.67	1.24	1.11
1	A	112	SCY	CA-C	3.69	1.55	1.48
1	A	112	SCY	CB-SG	2.61	1.84	1.81

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	112	SCY	CB-SG-CD	-6.29	96.51	100.97

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

## 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 5.6 Ligand geometry ⓘ

1 ligand is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the chemical component dictionary. The Link column lists molecule types, if any, to which the group is linked. 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  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
2	COA	A	350	-	50,50,50	2.42	17 (34%)	75,75,75	2.19	24 (32%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the chemical component dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	COA	A	350	-	-	0/48/64/64	0/1/3/3

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	350	COA	CBP-CAP	8.40	1.64	1.55
2	A	350	COA	C4A-N9A	-6.02	1.29	1.37
2	A	350	COA	C2A-N3A	4.17	1.40	1.32
2	A	350	COA	O4B-C1B	3.99	1.47	1.41
2	A	350	COA	C8A-N7A	3.83	1.42	1.34
2	A	350	COA	C3P-N4P	3.71	1.55	1.46
2	A	350	COA	O9P-C9P	3.61	1.30	1.23
2	A	350	COA	C8A-N9A	3.54	1.41	1.36
2	A	350	COA	P2A-O3A	3.36	1.65	1.59
2	A	350	COA	P1A-O3A	3.03	1.65	1.59
2	A	350	COA	CCP-CBP	2.92	1.57	1.52
2	A	350	COA	C5A-N7A	-2.91	1.29	1.40
2	A	350	COA	P3B-O7A	2.90	1.60	1.51
2	A	350	COA	C5A-C4A	2.48	1.46	1.40
2	A	350	COA	C2B-C3B	-2.12	1.48	1.53
2	A	350	COA	P3B-O3B	2.11	1.66	1.59
2	A	350	COA	P3B-O9A	2.05	1.62	1.54

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	350	COA	N3A-C2A-N1A	-8.02	122.00	128.71
2	A	350	COA	O4B-C1B-C2B	-6.01	97.56	106.77
2	A	350	COA	C1B-N9A-C4A	-5.43	117.25	126.64
2	A	350	COA	C3P-N4P-C5P	4.86	132.74	122.84
2	A	350	COA	C8A-N9A-C4A	4.35	110.22	106.90
2	A	350	COA	C7P-N8P-C9P	3.89	130.56	122.57
2	A	350	COA	N3A-C4A-N9A	3.77	132.24	125.43
2	A	350	COA	N7A-C8A-N9A	-3.31	105.01	114.36
2	A	350	COA	C4B-O4B-C1B	3.28	113.31	109.75
2	A	350	COA	CDP-CBP-CAP	3.27	114.50	108.82
2	A	350	COA	C8A-N9A-C1B	3.12	132.53	126.38
2	A	350	COA	C7P-C6P-C5P	-2.93	107.27	112.25
2	A	350	COA	O2B-C2B-C3B	2.68	119.09	111.20
2	A	350	COA	N6A-C6A-N1A	2.61	124.48	119.36
2	A	350	COA	CBP-CAP-C9P	2.44	115.10	112.73
2	A	350	COA	C2A-N1A-C6A	2.41	123.13	118.77
2	A	350	COA	C5A-C4A-N3A	-2.36	120.57	125.70
2	A	350	COA	C6P-C5P-N4P	2.16	120.42	116.50
2	A	350	COA	O9P-C9P-N8P	2.14	127.39	123.05
2	A	350	COA	O4B-C1B-N9A	-2.07	106.51	108.44
2	A	350	COA	CEP-CBP-CCP	-2.06	105.79	108.76
2	A	350	COA	O5P-C5P-N4P	-2.04	118.90	122.94
2	A	350	COA	C6P-C7P-N8P	2.03	116.24	111.87
2	A	350	COA	P2A-O3A-P1A	-2.02	125.75	131.68

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

## 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 ⓘ

EDS was not executed - this section will therefore be empty.

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

EDS was not executed - this section will therefore be empty.

### 6.3 Carbohydrates ⓘ

EDS was not executed - this section will therefore be empty.

### 6.4 Ligands ⓘ

EDS was not executed - this section will therefore be empty.

### 6.5 Other polymers ⓘ

EDS was not executed - this section will therefore be empty.