



# wwPDB X-ray Structure Validation Summary Report ⓘ

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PDB ID : 1SST  
Title : Serine Acetyltransferase- Complex with CoA  
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Deposited on : 2004-03-24  
Resolution : 2.00 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)  
A user guide is available at  
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>  
with specific help available everywhere you see the ⓘ symbol.

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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 : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

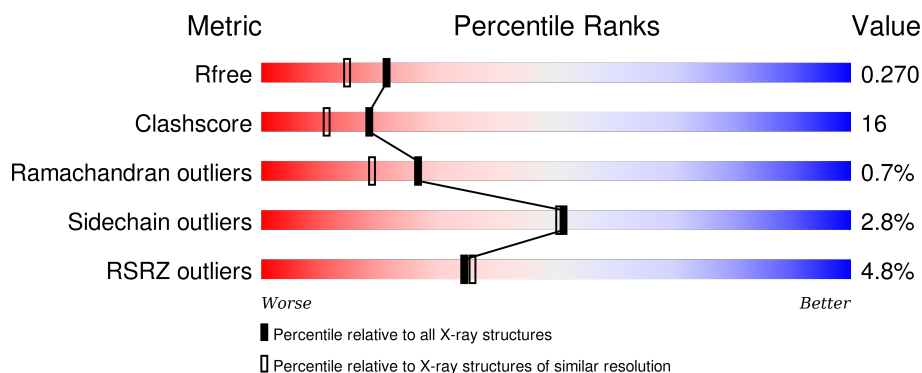
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 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))
$R_{free}$	91344	6249 (2.00-2.00)
Clashscore	102246	7340 (2.00-2.00)
Ramachandran outliers	100387	7248 (2.00-2.00)
Sidechain outliers	100360	7247 (2.00-2.00)
RSRZ outliers	91569	6262 (2.00-2.00)

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. 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	267	<div> <div>5%</div> <div> <div></div> <div>64%</div> <div>22%</div> <div>•</div> <div>13%</div> </div> </div>
1	B	267	<div> <div>3%</div> <div> <div></div> <div>56%</div> <div>30%</div> <div>•</div> <div>12%</div> </div> </div>
1	C	267	<div> <div>4%</div> <div> <div></div> <div>69%</div> <div>19%</div> <div></div> <div>12%</div> </div> </div>

## 2 Entry composition [i](#)

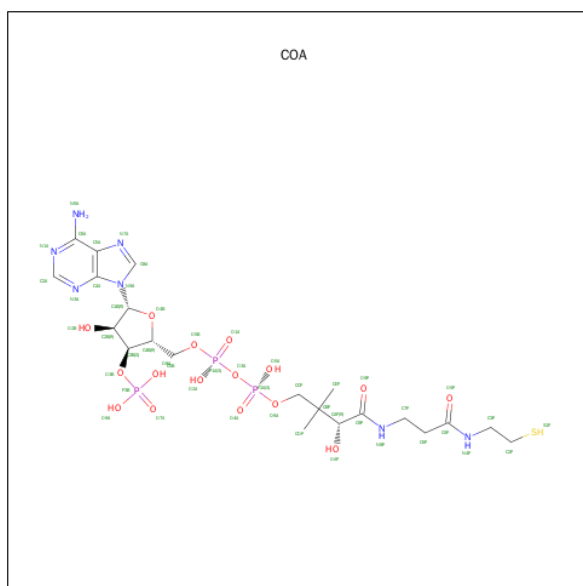
There are 3 unique types of molecules in this entry. The entry contains 5706 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Serine acetyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	233	Total	C	N	O	S	0	0	0
			1780	1138	309	326	7			
1	B	235	Total	C	N	O	S	0	0	0
			1811	1156	317	331	7			
1	C	236	Total	C	N	O	S	0	0	0
			1799	1148	315	330	6			

- 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	0	0
			48	21	7	16	3 1		
2	B	1	Total	C	N	O	P S	0	0
			48	21	7	16	3 1		
2	C	1	Total	C	N	O	P S	0	0
			48	21	7	16	3 1		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	58	Total 58	O 58	0	0
3	B	54	Total 54	O 54	0	0
3	C	60	Total 60	O 60	0	0



ASN
GLN
TYR
PHE
ILE
GLY
ILE
ASP
ASP
GLY
MET
ASN
LEU
ASN
ILE

## 4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	111.30Å 125.00Å 103.00Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	31.25 – 2.00 31.25 – 1.90	Depositor EDS
% Data completeness (in resolution range)	90.2 (31.25-2.00) 88.1 (31.25-1.90)	Depositor EDS
$R_{merge}$	0.03	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.48 (at 1.89Å)	Xtriage
Refinement program	CNS 1.0	Depositor
R, $R_{free}$	0.223 , 0.270 0.224 , 0.270	Depositor DCC
$R_{free}$ test set	2215 reflections (5.03%)	DCC
Wilson B-factor (Å <sup>2</sup> )	30.5	Xtriage
Anisotropy	0.295	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.38 , 45.2	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	0 of 50157 reflections	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	5706	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.12% of the height of the origin peak. No significant pseudotranslation is detected.*

<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, 0.375 respectively for untwinned datasets, and 0.333, 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: COA

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	0.58	0/1817	0.78	0/2472
1	B	0.58	0/1849	0.77	1/2514 (0.0%)
1	C	0.56	0/1837	0.78	1/2500 (0.0%)
All	All	0.57	0/5503	0.78	2/7486 (0.0%)

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	A	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	B	100	TYR	N-CA-C	5.42	125.65	111.00
1	C	100	TYR	N-CA-C	5.00	124.52	111.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	127	TYR	Sidechain



## 5.2 Too-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 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	1780	0	1792	68	0
1	B	1811	0	1829	67	0
1	C	1799	0	1801	40	0
2	A	48	0	32	3	0
2	B	48	0	32	3	0
2	C	48	0	32	4	0
3	A	58	0	0	9	0
3	B	54	0	0	6	0
3	C	60	0	0	2	0
All	All	5706	0	5518	172	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 16.

The worst 5 of 172 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:A:197:MET:SD	1:A:198:ILE:N	2.10	1.22
1:A:196:VAL:HG12	1:A:197:MET:H	0.94	1.10
1:A:193:ARG:O	1:A:196:VAL:HG23	1.58	1.03
1:A:196:VAL:HG12	1:A:197:MET:N	1.76	0.96
1:C:163:THR:H	1:C:189:HIS:HD2	1.15	0.93

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	229/267 (86%)	214 (93%)	13 (6%)	2 (1%)	21	13
1	B	231/267 (86%)	221 (96%)	7 (3%)	3 (1%)	15	7
1	C	232/267 (87%)	225 (97%)	7 (3%)	0	100	100
All	All	692/801 (86%)	660 (95%)	27 (4%)	5 (1%)	26	19

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	196	VAL
1	B	89	PRO
1	A	229	TYR
1	B	87	ARG
1	B	229	TYR

### 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	187/217 (86%)	183 (98%)	4 (2%)	61	63
1	B	192/217 (88%)	182 (95%)	10 (5%)	29	23
1	C	188/217 (87%)	186 (99%)	2 (1%)	80	83
All	All	567/651 (87%)	551 (97%)	16 (3%)	51	50

5 of 16 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	65	GLU
1	B	68	GLN
1	B	187	ASP
1	B	7	GLN
1	B	224	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 23 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	82	GLN
1	B	119	GLN
1	C	189	HIS
1	B	108	GLN
1	B	141	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 carbohydrates in this entry.

### 5.6 Ligand geometry [i](#)

3 ligands are 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	300	-	40,50,50	1.14	2 (5%)	50,75,75	1.54	8 (16%)
2	COA	B	400	-	40,50,50	0.81	1 (2%)	50,75,75	1.66	7 (14%)
2	COA	C	500	-	40,50,50	1.01	1 (2%)	50,75,75	1.38	6 (12%)

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	300	-	-	0/44/64/64	0/3/3/3
2	COA	B	400	-	-	0/44/64/64	0/3/3/3
2	COA	C	500	-	-	0/44/64/64	0/3/3/3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	300	COA	C6P-C5P	-2.63	1.46	1.51
2	C	500	COA	C6P-C5P	-2.26	1.46	1.51
2	B	400	COA	C2A-N3A	2.16	1.36	1.32
2	A	300	COA	C2A-N3A	2.88	1.37	1.32

The worst 5 of 21 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	400	COA	P2A-O3A-P1A	-7.89	110.57	132.73
2	C	500	COA	P2A-O3A-P1A	-5.87	116.25	132.73
2	A	300	COA	P2A-O3A-P1A	-5.69	116.75	132.73
2	C	500	COA	N3A-C2A-N1A	-2.67	126.85	128.89
2	A	300	COA	O4B-C1B-N9A	-2.64	102.57	108.10

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	300	COA	3	0
2	B	400	COA	3	0
2	C	500	COA	4	0

## 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	233/267 (87%)	0.18	14 (6%) 25 27	23, 31, 46, 59	0
1	B	235/267 (88%)	0.28	9 (3%) 44 45	24, 35, 48, 55	0
1	C	236/267 (88%)	0.09	11 (4%) 35 37	23, 32, 46, 53	0
All	All	704/801 (87%)	0.19	34 (4%) 34 36	23, 33, 47, 59	0

The worst 5 of 34 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	89	PRO	7.2
1	A	197	MET	5.7
1	C	181	THR	5.0
1	A	198	ILE	4.6
1	A	2	THR	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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
2	COA	B	400	48/48	0.86	0.19	0.94	37,46,57,59	0
2	COA	A	300	48/48	0.90	0.16	0.08	39,46,52,53	0
2	COA	C	500	48/48	0.95	0.11	-0.51	28,38,49,53	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.