



wwPDB X-ray Structure Validation Summary Report ⓘ

Sep 24, 2023 – 05:29 AM EDT

PDB ID : 5TRC
Title : Crystal structure of phosphorylated AC3-AC5 domains of yeast acetyl-CoA carboxylase
Authors : Wei, J.; Tong, L.
Deposited on : 2016-10-26
Resolution : 2.90 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

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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
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

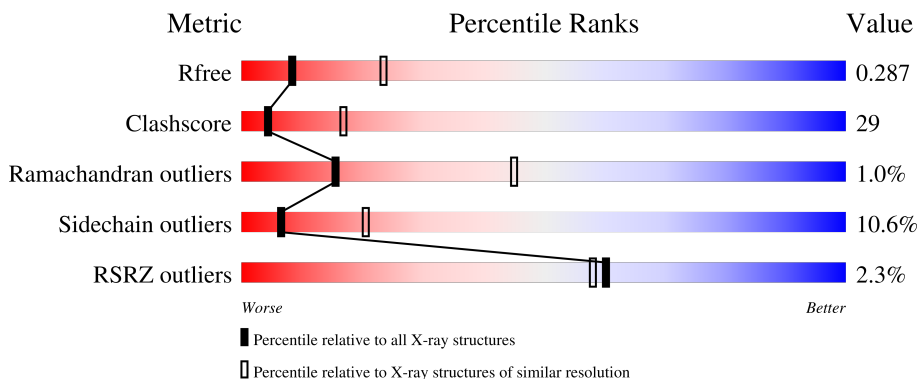
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.90 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	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (2.90-2.90)

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 ≥ 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	474	
1	B	474	

2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 6628 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 Acetyl-CoA carboxylase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	P	S			
1	A	426	3414	2178	581	648	1	6	0	0	0
1	B	398	3212	2051	549	605	1	6	0	0	0

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1504	HIS	-	expression tag	UNP Q00955
A	1505	HIS	-	expression tag	UNP Q00955
A	1506	HIS	-	expression tag	UNP Q00955
A	1507	HIS	-	expression tag	UNP Q00955
A	1508	HIS	-	expression tag	UNP Q00955
A	1509	HIS	-	expression tag	UNP Q00955
B	1504	HIS	-	expression tag	UNP Q00955
B	1505	HIS	-	expression tag	UNP Q00955
B	1506	HIS	-	expression tag	UNP Q00955
B	1507	HIS	-	expression tag	UNP Q00955
B	1508	HIS	-	expression tag	UNP Q00955
B	1509	HIS	-	expression tag	UNP Q00955

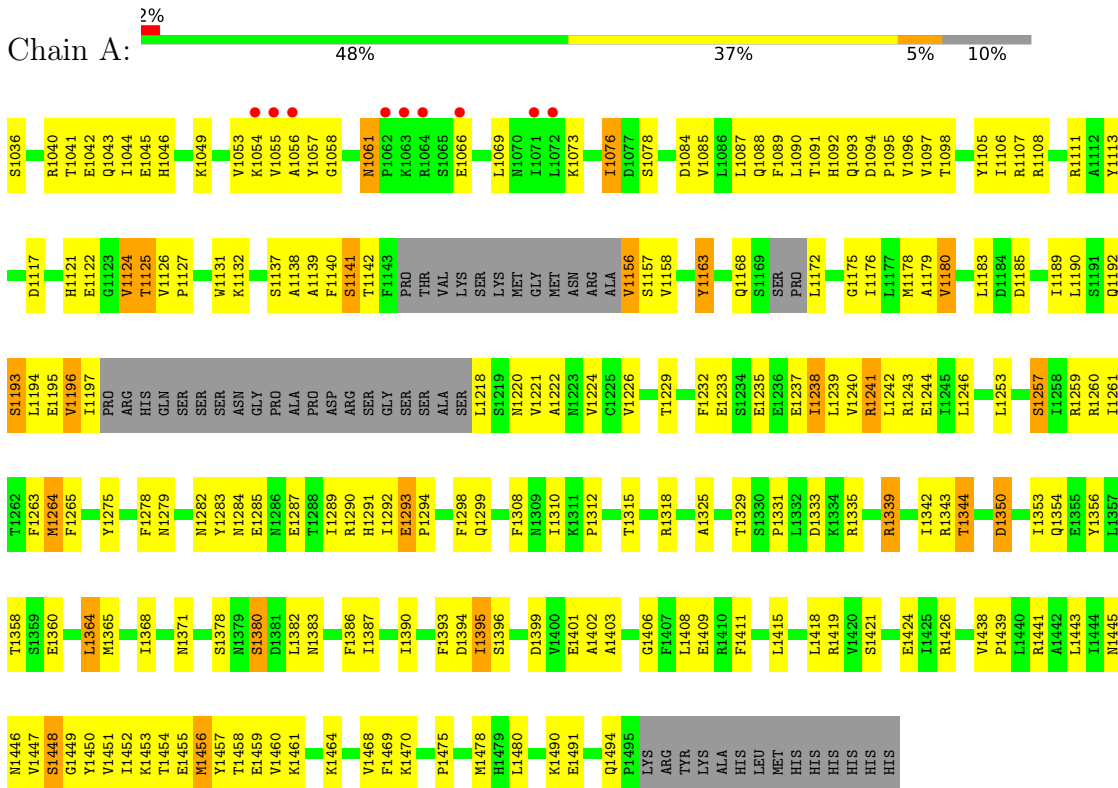
- Molecule 2 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Cl	0	0
			1	1		
2	B	1	Total	Cl	0	0
			1	1		

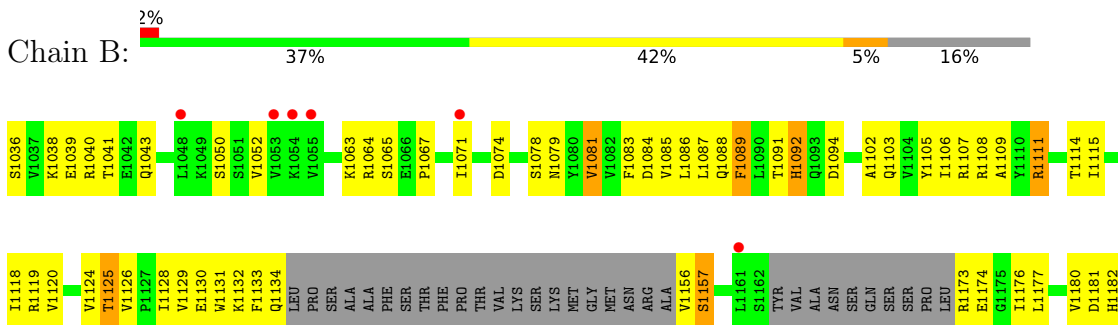
3 Residue-property plots i

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: Acetyl-CoA carboxylase



- Molecule 1: Acetyl-CoA carboxylase



GLY	I1395	WE319	D1247	L1183
GLU	S1396	I1320	L1248	D1184
V1467	D1399	Y1323	N1249	V1186
F1468	V1400	E1324	K1250	V1186
F1469	E1401	A1325	Q1251	I1189
K1470	F1404	V1326	L1252	L1190
S1471	G1405	S1327	L1253	S1191
L1472	G1406	K1328	I1258	Q1192
P1475	F1407	T1329	R1259	S1193
H1479	L1408	S1330	R1260	L1194
L1480	E1409	P1331	I1261	E1195
R1481	R1410	L1332	T1262	V1196
P1482	R1414	D1333	F1263	I1E
T1485	L1418	K1334	M1264	PRO
P1486	R1419	R1335	F1265	ARG
V1489	E1424	F1336	ARG	HIS
K1490	I1425	F1337	G1266	HIS
E1491	R1426	T1337	F1267	GLN
Q1494	I1427	T1338	K1268	GLN
P1495	I1428	I1341	Y1272	SER
LYS	I1429	I1342	Y1273	SER
ARG	K1430	I1343	P1274	ASN
TYR	D1431	R1343	K1274	GLY
LYS	P1432	T1344	Y1275	PRO
ALA	GLN	R1348	Y1276	ALA
ALA	THR	D1349	T1277	PRO
HIS	GLY	D1350	F1278	ASP
LEU	ALA	I1351	N1279	ASP
LEU	GLY	S1352	E1285	ARG
HIS	ALA	I1353	N1286	ARG
HIS	ALA	Q1354	E1287	SER
HIS	ALA	E1355	T1288	GLY
HIS	P1437	Y1356	I1289	SER
HIS	V1438	L1357	R1290	ALA
HIS	P1439	E1360	H1291	SER
HIS	L1440	D1367	I1292	L1218
HIS	R1441	I1368	E1293	S1219
HIS	L1442	I1369	P1294	N1220
HIS	L1443	L1370	A1295	V1221
HIS	I1444	E1373	L1296	C1225
	V1447	D1376	A1297	V1226
	SER	E1377	F1298	A1227
	G1449	T1377	Q1299	S1228
	V1450	S1378	L1300	T1229
	I1451	N1379	E1301	GLU
	I1452	S1380	L1302	G1231
	T1454	D1381	L1305	S1234
	E1455	L1382	S1306	E1235
	M1456	N1383	M1307	E1236
	Y1457	I1389	F1308	E1237
	T1458	A1391	I1309	I1238
	E1459	V1392	I1310	L1239
	V1460	F1393	K1311	L1240
	K1461	ALA	P1312	V1240
	N1462	LYS	I1313	R1241
	ALA		M1317	L1242
	LYS		R1318	R1243
				E1244
				I1245
				L1246

4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	56.43Å 93.19Å 110.94Å 90.00° 99.57° 90.00°	Depositor
Resolution (Å)	46.57 – 2.90 46.57 – 2.88	Depositor EDS
% Data completeness (in resolution range)	97.5 (46.57-2.90) 97.5 (46.57-2.88)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.90 (at 2.91Å)	Xtrriage
Refinement program	PHENIX 1.9_1692	Depositor
R, R_{free}	0.223 , 0.287 0.227 , 0.287	Depositor DCC
R_{free} test set	1272 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å ²)	82.6	Xtrriage
Anisotropy	0.145	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 61.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	6628	wwPDB-VP
Average B, all atoms (Å ²)	86.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.32% 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](#)

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

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	0.61	0/3470	0.71	1/4703 (0.0%)
1	B	0.53	0/3260	0.69	0/4410
All	All	0.57	0/6730	0.70	1/9113 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1293	GLU	C-N-CD	5.04	138.98	128.40

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	3414	0	3409	166	0
1	B	3212	0	3213	221	0
2	A	1	0	0	1	0
2	B	1	0	0	1	0
All	All	6628	0	6622	383	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 29.

The worst 5 of 383 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:1275:TYR:O	1:A:1290:ARG:O	1.66	1.14
1:B:1221:VAL:HG11	1:B:1260:ARG:NH1	1.70	1.07
1:A:1445:ASN:OD1	1:A:1447:VAL:HG22	1.59	1.01
1:B:1221:VAL:HG13	1:B:1260:ARG:CG	1.97	0.94
1:A:1189:ILE:O	1:A:1193:SER:OG	1.85	0.94

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	417/474 (88%)	371 (89%)	40 (10%)	6 (1%)	11	36
1	B	381/474 (80%)	350 (92%)	29 (8%)	2 (0%)	29	61
All	All	798/948 (84%)	721 (90%)	69 (9%)	8 (1%)	15	45

5 of 8 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1449	GLY
1	B	1195	GLU
1	B	1475	PRO
1	A	1378	SER
1	A	1331	PRO

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	380/421 (90%)	340 (90%)	40 (10%)	7	21
1	B	359/421 (85%)	321 (89%)	38 (11%)	6	20
All	All	739/842 (88%)	661 (89%)	78 (11%)	6	20

5 of 78 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	1251	GLN
1	B	1410	ARG
1	B	1290	ARG
1	B	1353	ILE
1	B	1456	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 8 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	1286	ASN
1	B	1220	ASN
1	A	1371	ASN
1	A	1192	GLN
1	B	1134	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

2 non-standard protein/DNA/RNA residues 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
1	SEP	A	1157	1	8,9,10	1.29	1 (12%)	8,12,14	1.06	0
1	SEP	B	1157	1	8,9,10	1.49	2 (25%)	8,12,14	1.06	0

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	SEP	A	1157	1	-	2/5/8/10	-
1	SEP	B	1157	1	-	1/5/8/10	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1157	SEP	P-O1P	3.04	1.60	1.50
1	B	1157	SEP	P-O1P	2.74	1.59	1.50
1	B	1157	SEP	P-O3P	2.15	1.63	1.54

There are no bond angle outliers.

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	1157	SEP	N-CA-CB-OG
1	A	1157	SEP	CB-OG-P-O2P
1	B	1157	SEP	N-CA-CB-OG

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	B	1157	SEP	1	0

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 2 ligands modelled in this entry, 2 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, 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	425/474 (89%)	0.16	9 (2%) 63 61	39, 77, 116, 143	0
1	B	397/474 (83%)	0.25	10 (2%) 57 55	59, 95, 126, 148	0
All	All	822/948 (86%)	0.21	19 (2%) 60 58	39, 86, 122, 148	0

The worst 5 of 19 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1054	LYS	5.0
1	A	1055	VAL	3.3
1	A	1072	LEU	3.2
1	B	1053	VAL	3.2
1	B	1054	LYS	3.0

6.2 Non-standard residues in protein, DNA, RNA chains [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, 95th 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 ²)	Q<0.9
1	SEP	B	1157	10/11	0.93	0.18	83,100,104,105	0
1	SEP	A	1157	10/11	0.97	0.21	55,65,71,75	0

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, 95th 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(\AA^2)	Q<0.9
2	CL	A	1601	1/1	0.94	0.09	71,71,71,71	0
2	CL	B	1601	1/1	0.98	0.12	76,76,76,76	0

6.5 Other polymers [i](#)

There are no such residues in this entry.