



wwPDB X-ray Structure Validation Summary Report ⓘ

May 27, 2020 – 12:52 am BST

PDB ID : 3LRB
Title : Structure of E. coli AdiC
Authors : Gao, X.; Lu, F.; Zhou, L.; Shi, Y.
Deposited on : 2010-02-10
Resolution : 3.61 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.11
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) : 2.11

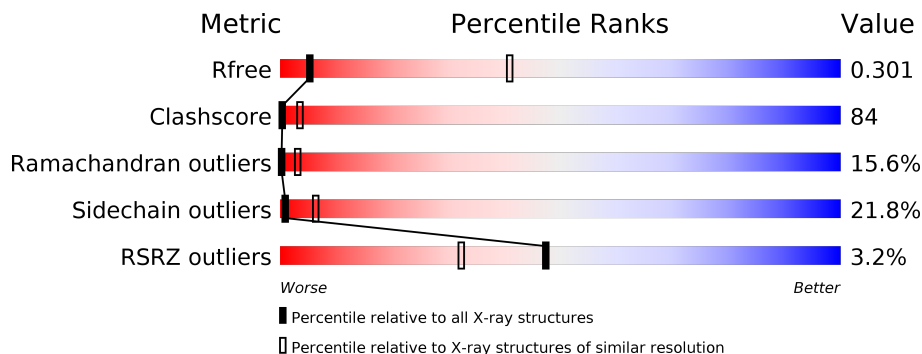
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.61 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	1290 (3.74-3.50)
Clashscore	141614	1387 (3.74-3.50)
Ramachandran outliers	138981	1339 (3.74-3.50)
Sidechain outliers	138945	1339 (3.74-3.50)
RSRZ outliers	127900	1191 (3.74-3.50)

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 ≥ 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	445	 3% (Poor fit), 18% (0 outliers), 51% (1 outlier), 20% (2 outliers), 8% (3+ outliers)
1	B	445	 2% (Poor fit), 18% (0 outliers), 50% (1 outlier), 20% (2 outliers), 8% (3+ outliers)

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 6072 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.

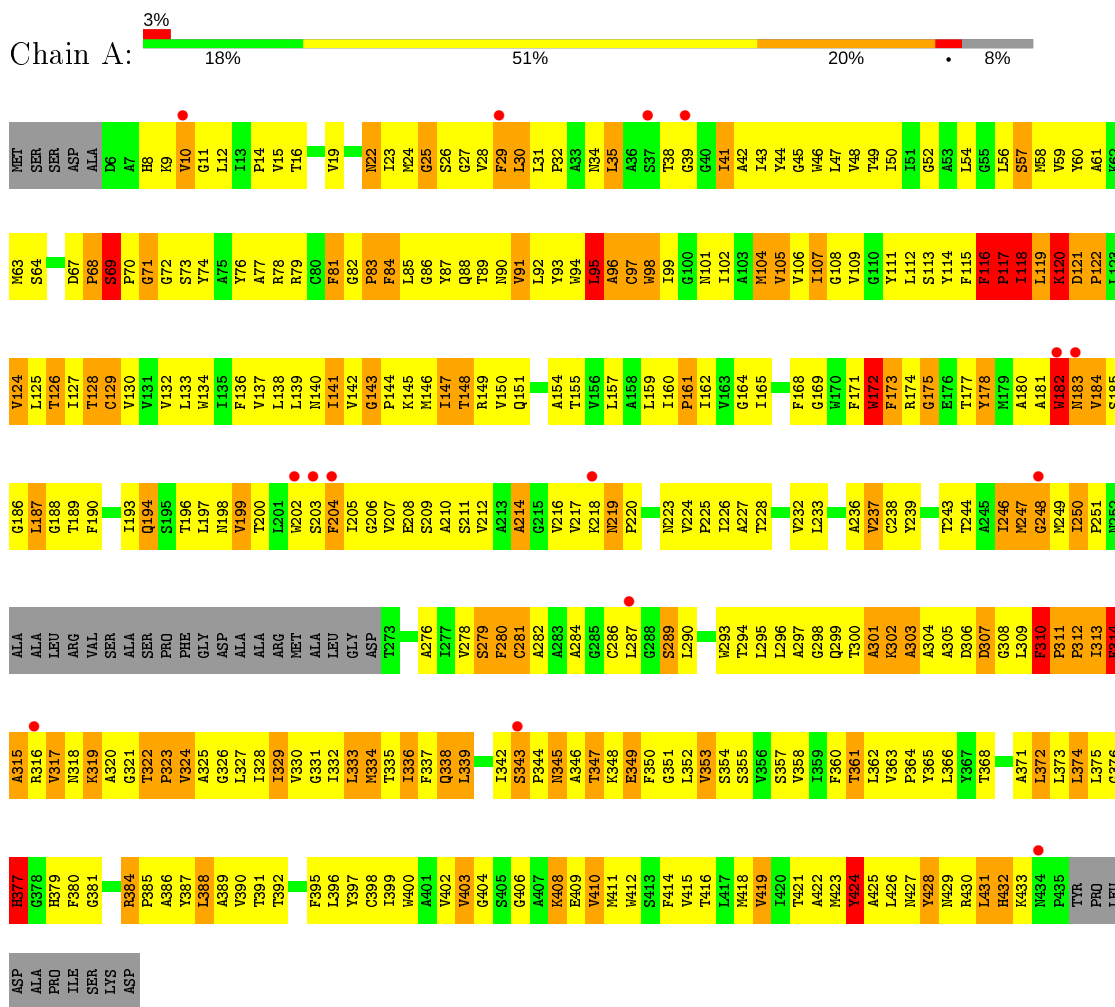
- Molecule 1 is a protein called Arginine/agmatine antiporter.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	410	Total 3036	C 2020	N 481	O 514	S 21	0	0	0
1	B	410	Total 3036	C 2020	N 481	O 514	S 21	0	0	0

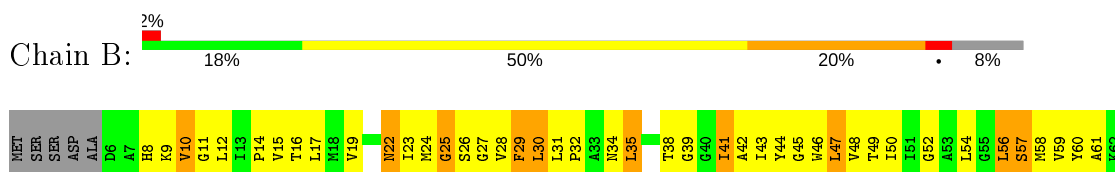
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: Arginine/agmatine antiporter



- Molecule 1: Arginine/agmatine antiporter



PRO	L375	L313	W252	S185	V124	M63
LEU	G376	F314	ALA	G186	L125	S64
ASP	H377	A315	ALA	L187	T126	D67
ALA	R316	L316	LEU	G188	I127	P68
PRO	H379	V317	ARG	T189	T128	S69
ILE	F380	N318	VAL	F190	C129	P70
SER	G381	K319	SER		V130	G71
LYS	R384	A320	ALA	I193	V131	G72
ASP	P385	G321	SER	Q194	V132	S73
	A386	T322	PRO	S195	L133	Y74
	L387	P323	PHE	T196	W134	A75
	L388	V324	GLY	L197	I135	Y76
	A389	A325	ASP	M198	F136	A77
	V390	G326	ALA	V199	V137	R78
	T391	L327	ALA	T200	L138	R79
	T392	I328	ARG	L201	L139	F80
	F395	V330	MET	W202	N140	G81
	L396	G331	LEU	S203	I141	G82
	Y397	I332	GLY	F204	V142	P83
	C398	L333	ASP	L205	G143	F84
	I399	M334	ASP	G206	P144	L85
	W400	T335		V207	K145	G86
	V401	I336	A276	E208	M146	Y87
	V402	F337	T277	S209	I147	Q88
	V403	Q338	V278	S210	T148	T89
	G404	L339	S279	S211	R149	N90
	S405	I342	F280	V212	V150	V91
	A406	S343	C281	A213	Q151	L92
	A407	P344	A282	A214	A154	Y93
	K408	N345	A283	G215	T155	W94
	E409	A346	A284	V216	V156	L95
	V410	A347	G285	V217	L157	C97
	M411	K348	C286	K218	A158	W98
	W412	E349	L287	M219	L159	I99
	F414	F350	G288	P220	I160	G100
	V415	G351	S289	N223	P161	N101
	T416	L352	L290	V224	I162	I102
	M418	V353	G291	P225	V163	A103
	V419	S354	G292	I226	G164	M104
	I420	S355	W293	A227	I165	V105
	T421	V357	T294	T228	A166	V106
	A422	V358	L295	V232	V167	I107
	Y423	I359	L296	L233	F168	G108
	L424	F360	A297	L236	G169	V109
	L426	T361	G298	A236	W170	G110
	N427	L362	Q299	V237	F171	Y111
	Y428	T363	T300	T244	W172	L112
	N429	V363	A301	T245	F173	L113
	R430	P364	K302	I246	R174	Y114
	L431	F366	A303	A245	G175	F115
	H432	T368	D306	T247	E176	F116
	K433	A371	D307	W247	T177	P117
	N434	L372	G308	L309	Y178	P118
	P435	L373	L309	F310	M179	I118
	TYR	L374	L311	I250	A180	L119
			P312	P251	A181	K120
					W182	D121
					M183	P122
					V184	L123

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	92.81Å 108.30Å 138.11Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.32 – 3.61 49.32 – 3.61	Depositor EDS
% Data completeness (in resolution range)	99.6 (49.32-3.61) 99.8 (49.32-3.61)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.50 (at 3.57Å)	Xtrriage
Refinement program	PHENIX (phenix.refine)	Depositor
R, R_{free}	0.295 , 0.318 0.275 , 0.301	Depositor DCC
R_{free} test set	876 reflections (5.29%)	wwPDB-VP
Wilson B-factor (Å ²)	152.4	Xtrriage
Anisotropy	0.452	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.25 , 132.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	6072	wwPDB-VP
Average B, all atoms (Å ²)	188.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.85% 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	0.48	0/3115	0.74	2/4264 (0.0%)
1	B	0.48	0/3115	0.74	2/4264 (0.0%)
All	All	0.48	0/6230	0.74	4/8528 (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	3
1	B	0	3
All	All	0	6

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	311	PRO	C-N-CD	-6.25	106.85	120.60
1	B	311	PRO	C-N-CD	-5.78	107.89	120.60
1	A	432	HIS	N-CA-C	5.72	126.45	111.00
1	B	432	HIS	N-CA-C	5.38	125.52	111.00

There are no chirality outliers.

5 of 6 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	116	PHE	Peptide
1	A	377	HIS	Peptide
1	A	424	TYR	Peptide
1	B	116	PHE	Peptide
1	B	377	HIS	Peptide

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	3036	0	3141	537	0
1	B	3036	0	3141	538	0
All	All	6072	0	6282	1040	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 84.

The worst 5 of 1040 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:315:ALA:HB1	1:A:316:ARG:HA	1.19	1.16
1:A:430:ARG:HG2	1:B:374:LEU:HD23	1.28	1.15
1:B:38:THR:HB	1:B:39:GLY:HA3	1.18	1.14
1:B:315:ALA:HB1	1:B:316:ARG:HA	1.15	1.14
1:A:38:THR:HB	1:A:39:GLY:HA3	1.19	1.12

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	406/445 (91%)	261 (64%)	82 (20%)	63 (16%)	0 3
1	B	406/445 (91%)	262 (64%)	80 (20%)	64 (16%)	0 3
All	All	812/890 (91%)	523 (64%)	162 (20%)	127 (16%)	0 3

5 of 127 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	10	VAL
1	A	68	PRO
1	A	83	PRO
1	A	116	PHE
1	A	117	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	314/343 (92%)	246 (78%)	68 (22%)	1 6
1	B	314/343 (92%)	245 (78%)	69 (22%)	1 6
All	All	628/686 (92%)	491 (78%)	137 (22%)	1 6

5 of 137 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	390	VAL
1	B	81	PHE
1	B	362	LEU
1	A	403	VAL
1	B	26	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 9 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	379	HIS
1	B	379	HIS
1	B	151	GLN
1	A	223	ASN
1	B	22	ASN

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](#)

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	410/445 (92%)	-0.08	15 (3%) 41 27	109, 173, 311, 406	0
1	B	410/445 (92%)	-0.20	11 (2%) 54 39	108, 172, 311, 406	0
All	All	820/890 (92%)	-0.14	26 (3%) 47 32	108, 172, 313, 406	0

The worst 5 of 26 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	166	ALA	7.2
1	A	248	GLY	4.1
1	A	37	SER	4.0
1	B	170	TRP	3.8
1	A	287	LEU	3.4

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](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.