



wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 16, 2018 – 03:29 am GMT

PDB ID : 1NXE
Title : A Novel NADH Allosteric Regulator Site is Found on the Surface of the Hexameric Type II Phe383Ala Variant of Citrate Synthase
Authors : Maurus, R.; Nguyen, N.T.; Stokell, D.J.; Ayed, A.; Hultin, P.G.; Duckworth, H.W.; Brayer, G.D.
Deposited on : 2003-02-10
Resolution : 2.30 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
Mogul : 1.7.3 (157068), CSD as539be (2018)
Xtriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk30686

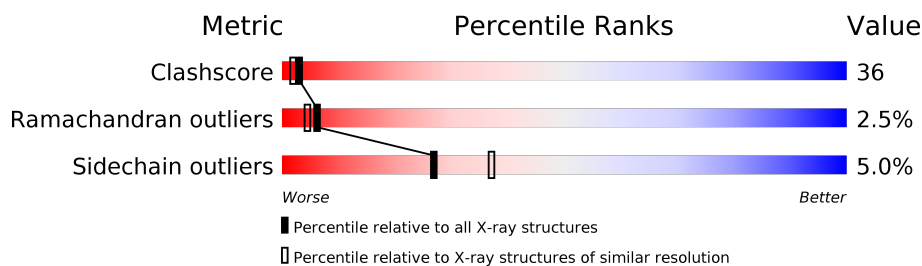
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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	122078	5071 (2.30-2.30)
Ramachandran outliers	120005	5021 (2.30-2.30)
Sidechain outliers	119972	5020 (2.30-2.30)

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. 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.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	427	
1	B	427	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	SO4	B	2001	-	X	X	-
2	SO4	B	2003	-	X	-	-

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 7475 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.

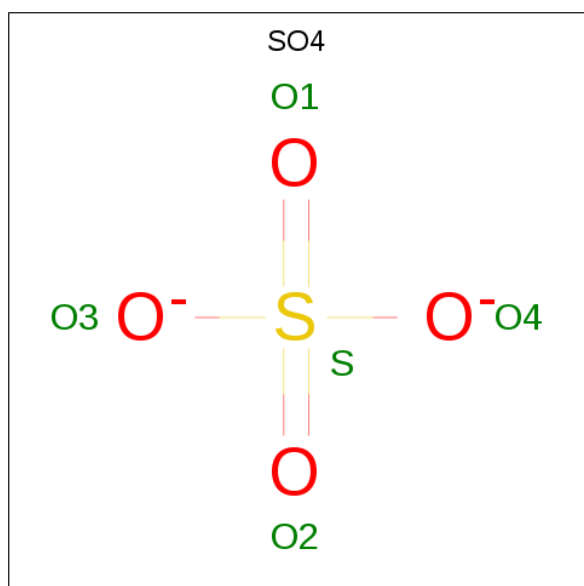
- Molecule 1 is a protein called Citrate synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	426	Total	C	N	O	S	0	0	0
			3359	2129	579	626	25			
1	B	426	Total	C	N	O	S	0	0	0
			3360	2129	579	627	25			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	383	ALA	PHE	ENGINEERED	UNP P0ABH7
B	1383	ALA	PHE	ENGINEERED	UNP P0ABH7

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		

- Molecule 3 is water.

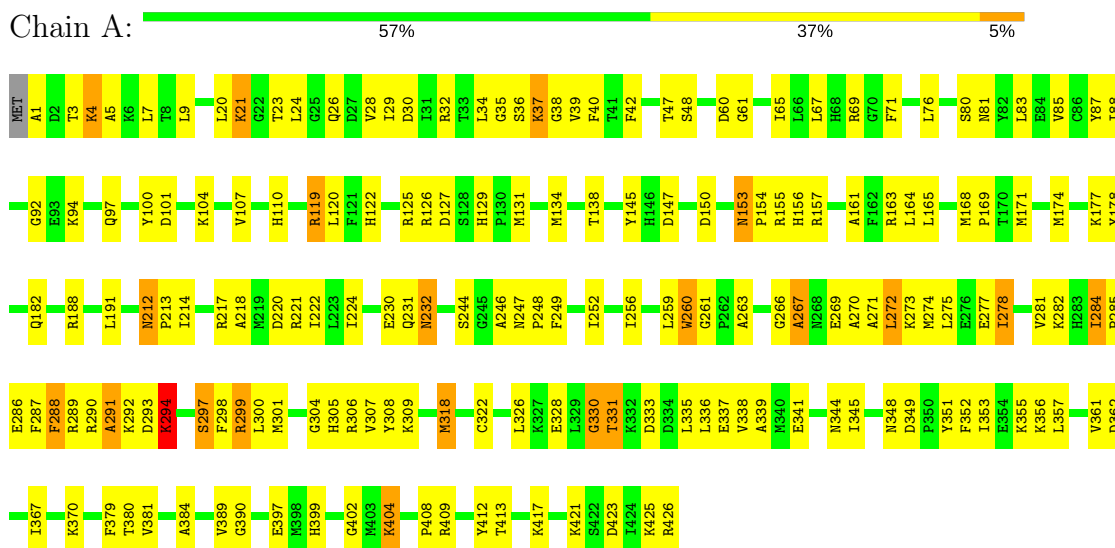
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	378	Total	O	0	0
			378	378		
3	B	348	Total	O	0	0
			348	348		

3 Residue-property plots

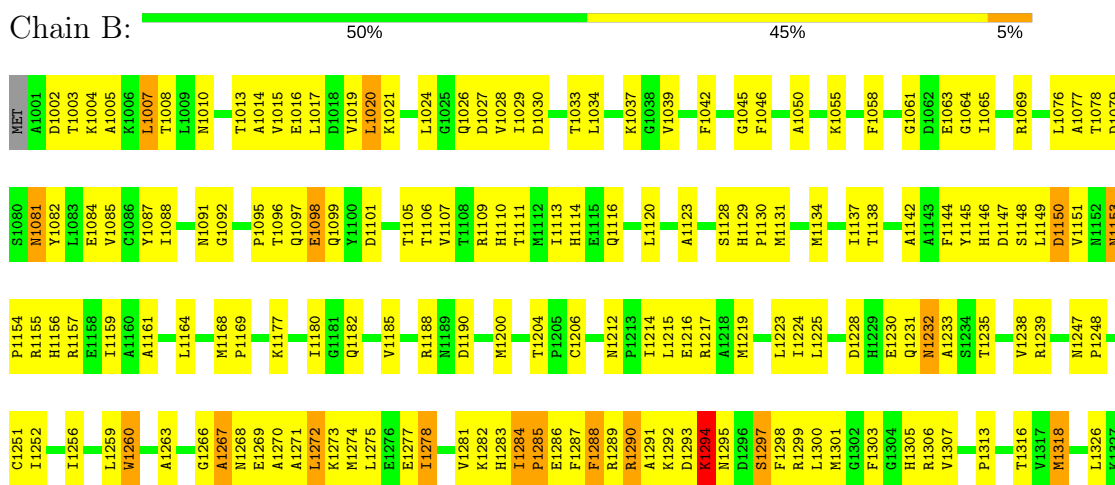
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are 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.

Note EDS was not executed.

• Molecule 1: Citrate synthase



• Molecule 1: Citrate synthase



D1419	E1328	+	M1340	+	D1349	G1366	+	T1380	+	R1387	+	I1392	+	W1395	+	M1398	+	H1399	+	K1403	+	K1404	+	I1405	+	A1406	+	R1407	+	P1408	+	R1409	+	E1416	+	K1417	+	E1419	
F1420	L1329		E1341		L1342	F1350		I1367		L1368		R1387		I1392		W1395		M1398		H1399		K1403		K1404		I1405		A1406		R1407		P1408		R1409		E1416		K1417	E1419
K1421	S1330		E1343		M1344	F1352		L1369		K1370		L1380		I1392		W1395		M1398		H1399		K1403		K1404		I1405		A1406		R1407		P1408		R1409		E1416		K1417	E1419
S1422	T1331		E1343		M1344	F1352		L1369		K1370		L1380		I1392		W1395		M1398		H1399		K1403		K1404		I1405		A1406		R1407		P1408		R1409		E1416		K1417	E1419
D1423	K1332		E1343		M1344	F1352		L1369		K1370		L1380		I1392		W1395		M1398		H1399		K1403		K1404		I1405		A1406		R1407		P1408		R1409		E1416		K1417	E1419
I1424	L1333	+	E1337	+	D1349	G1366	+	T1380	+	R1387	+	I1392	+	W1395	+	M1398	+	H1399	+	K1403	+	K1404	+	I1405	+	A1406	+	R1407	+	P1408	+	R1409	+	E1416	+	K1417	+	E1419	
K1425	D1334		E1341		L1342	F1350		I1367		L1368		R1387		I1392		W1395		M1398		H1399		K1403		K1404		I1405		A1406		R1407		P1408		R1409		E1416		K1417	E1419
R1426	L1335		E1343		M1344	F1352		L1369		K1370		L1380		I1392		W1395		M1398		H1399		K1403		K1404		I1405		A1406		R1407		P1408		R1409		E1416		K1417	E1419
	L1336		E1343		M1344	F1352		L1369		K1370		L1380		I1392		W1395		M1398		H1399		K1403		K1404		I1405		A1406		R1407		P1408		R1409		E1416		K1417	E1419
	E1337		E1343		M1344	F1352		L1369		K1370		L1380		I1392		W1395		M1398		H1399		K1403		K1404		I1405		A1406		R1407		P1408		R1409		E1416		K1417	E1419

4 Data and refinement statistics

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

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, α , β , γ	165.24Å 165.24Å 157.56Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	10.00 – 2.30	Depositor
% Data completeness (in resolution range)	77.0 (10.00-2.30)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	CNS	Depositor
R, R_{free}	0.170 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	7475	wwPDB-VP
Average B, all atoms (Å ²)	38.0	wwPDB-VP

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: SO4

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	0.36	0/3436	0.64	0/4645
1	B	0.36	0/3437	0.61	0/4645
All	All	0.36	0/6873	0.62	0/9290

There are no bond length outliers.

There are no bond angle outliers.

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	3359	0	3309	243	0
1	B	3360	0	3306	273	0
2	A	15	0	0	0	0
2	B	15	0	0	2	0
3	A	378	0	0	31	0
3	B	348	0	0	37	0
All	All	7475	0	6615	485	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 36.

The worst 5 of 485 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:21:LYS:HE2	1:A:21:LYS:H	1.05	1.13
1:B:1295:ASN:HB3	3:B:443:HOH:O	1.51	1.08
1:A:269:GLU:HA	1:A:272:LEU:HB2	1.38	1.05
1:B:1287:PHE:HA	1:B:1291:ALA:HB3	1.41	1.03
1:B:1020:LEU:HD21	1:B:1030:ASP:HB2	1.39	1.00

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	424/427 (99%)	369 (87%)	44 (10%)	11 (3%)	6	4
1	B	424/427 (99%)	374 (88%)	40 (9%)	10 (2%)	6	5
All	All	848/854 (99%)	743 (88%)	84 (10%)	21 (2%)	6	4

5 of 21 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	297	SER
1	B	1297	SER
1	A	246	ALA
1	A	267	ALA
1	A	294	LYS

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	360/361 (100%)	344 (96%)	16 (4%)	31	43
1	B	360/361 (100%)	340 (94%)	20 (6%)	23	32
All	All	720/722 (100%)	684 (95%)	36 (5%)	27	37

5 of 36 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	1007	LEU
1	B	1150	ASP
1	B	1354	GLU
1	B	1081	ASN
1	B	1153	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 19 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	305	HIS
1	B	1081	ASN
1	B	1153	ASN
1	A	232	ASN
1	B	1231	GLN

5.3.3 RNA ⓘ

There are no RNA molecules 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

6 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	SO4	A	2004	-	4,4,4	0.77	0	6,6,6	0.31	0
2	SO4	A	2005	-	4,4,4	0.78	0	6,6,6	0.38	0
2	SO4	A	2006	-	4,4,4	0.76	0	6,6,6	0.44	0
2	SO4	B	2001	-	4,4,4	0.69	0	6,6,6	3.71	4 (66%)
2	SO4	B	2002	-	4,4,4	0.82	0	6,6,6	0.25	0
2	SO4	B	2003	-	4,4,4	0.69	0	6,6,6	3.73	4 (66%)

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	SO4	A	2004	-	-	0/0/0/0	0/0/0/0
2	SO4	A	2005	-	-	0/0/0/0	0/0/0/0
2	SO4	A	2006	-	-	0/0/0/0	0/0/0/0
2	SO4	B	2001	-	-	0/0/0/0	0/0/0/0
2	SO4	B	2002	-	-	0/0/0/0	0/0/0/0
2	SO4	B	2003	-	-	0/0/0/0	0/0/0/0

There are no bond length outliers.

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	2003	SO4	O4-S-O1	-5.59	79.01	109.24
2	B	2001	SO4	O4-S-O1	-5.52	79.40	109.24
2	B	2003	SO4	O4-S-O3	-4.98	86.68	108.83
2	B	2001	SO4	O4-S-O3	-4.84	87.32	108.83
2	B	2001	SO4	O4-S-O2	-4.54	84.72	109.24

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	2001	SO4	2	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](#)

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.