



# wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 19, 2023 – 02:20 AM EDT

PDB ID : 2QFY  
Title : Crystal structure of *Saccharomyces cerevesiae* mitochondrial NADP(+)-dependent isocitrate dehydrogenase in complex with  $\alpha$ -ketoglutarate  
Authors : Peng, Y.J.; Ding, J.P.  
Deposited on : 2007-06-28  
Resolution : 2.10 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

<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>.

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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 : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
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) : 2.36

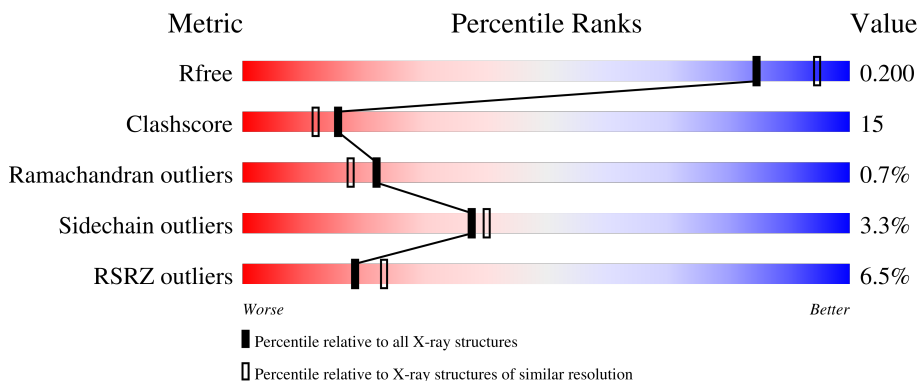
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.10 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.



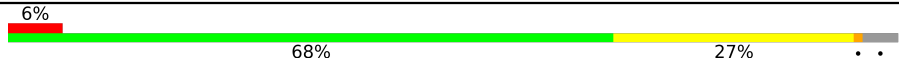
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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  $\geq 3$ , 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	427	 2% 76% 19% . .
1	B	427	 3% 75% 18% . .
1	C	427	 9% 65% 29% . .
1	D	427	 7% 67% 27% . .
1	E	427	 11% 68% 26% . .

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Mol	Chain	Length	Quality of chain
1	F	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	AKG	B	2002	-	-	-	X
2	AKG	C	2003	-	-	-	X
2	AKG	D	2004	-	-	-	X
2	AKG	E	2005	-	-	-	X
2	AKG	F	2006	-	-	-	X

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 20960 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 Isocitrate dehydrogenase [NADP].

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	411	3256	2076	551	617	12	0	0	0
1	B	411	3253	2073	551	617	12	0	0	0
1	C	411	3253	2073	551	617	12	0	0	0
1	D	411	3256	2076	551	617	12	0	0	0
1	E	411	3253	2073	551	617	12	0	0	0
1	F	411	3256	2076	551	617	12	0	0	0

There are 84 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-13	MET	-	expression tag	UNP P21954
A	-12	HIS	-	expression tag	UNP P21954
A	-11	HIS	-	expression tag	UNP P21954
A	-10	HIS	-	expression tag	UNP P21954
A	-9	HIS	-	expression tag	UNP P21954
A	-8	HIS	-	expression tag	UNP P21954
A	-7	HIS	-	expression tag	UNP P21954
A	-6	ALA	-	expression tag	UNP P21954
A	-5	MET	-	expression tag	UNP P21954
A	-4	GLY	-	expression tag	UNP P21954
A	-3	ILE	-	expression tag	UNP P21954
A	-2	PRO	-	expression tag	UNP P21954
A	-1	GLY	-	expression tag	UNP P21954
A	0	HIS	-	expression tag	UNP P21954
B	-13	MET	-	expression tag	UNP P21954
B	-12	HIS	-	expression tag	UNP P21954
B	-11	HIS	-	expression tag	UNP P21954

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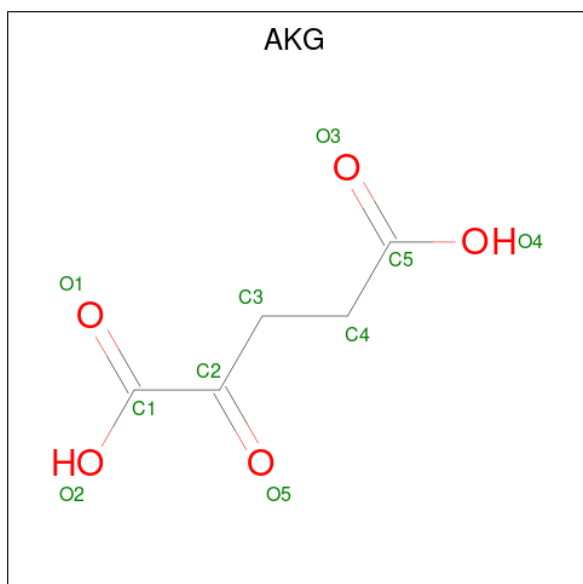
Chain	Residue	Modelled	Actual	Comment	Reference
B	-10	HIS	-	expression tag	UNP P21954
B	-9	HIS	-	expression tag	UNP P21954
B	-8	HIS	-	expression tag	UNP P21954
B	-7	HIS	-	expression tag	UNP P21954
B	-6	ALA	-	expression tag	UNP P21954
B	-5	MET	-	expression tag	UNP P21954
B	-4	GLY	-	expression tag	UNP P21954
B	-3	ILE	-	expression tag	UNP P21954
B	-2	PRO	-	expression tag	UNP P21954
B	-1	GLY	-	expression tag	UNP P21954
B	0	HIS	-	expression tag	UNP P21954
C	-13	MET	-	expression tag	UNP P21954
C	-12	HIS	-	expression tag	UNP P21954
C	-11	HIS	-	expression tag	UNP P21954
C	-10	HIS	-	expression tag	UNP P21954
C	-9	HIS	-	expression tag	UNP P21954
C	-8	HIS	-	expression tag	UNP P21954
C	-7	HIS	-	expression tag	UNP P21954
C	-6	ALA	-	expression tag	UNP P21954
C	-5	MET	-	expression tag	UNP P21954
C	-4	GLY	-	expression tag	UNP P21954
C	-3	ILE	-	expression tag	UNP P21954
C	-2	PRO	-	expression tag	UNP P21954
C	-1	GLY	-	expression tag	UNP P21954
C	0	HIS	-	expression tag	UNP P21954
D	-13	MET	-	expression tag	UNP P21954
D	-12	HIS	-	expression tag	UNP P21954
D	-11	HIS	-	expression tag	UNP P21954
D	-10	HIS	-	expression tag	UNP P21954
D	-9	HIS	-	expression tag	UNP P21954
D	-8	HIS	-	expression tag	UNP P21954
D	-7	HIS	-	expression tag	UNP P21954
D	-6	ALA	-	expression tag	UNP P21954
D	-5	MET	-	expression tag	UNP P21954
D	-4	GLY	-	expression tag	UNP P21954
D	-3	ILE	-	expression tag	UNP P21954
D	-2	PRO	-	expression tag	UNP P21954
D	-1	GLY	-	expression tag	UNP P21954
D	0	HIS	-	expression tag	UNP P21954
E	-13	MET	-	expression tag	UNP P21954
E	-12	HIS	-	expression tag	UNP P21954
E	-11	HIS	-	expression tag	UNP P21954

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Chain	Residue	Modelled	Actual	Comment	Reference
E	-10	HIS	-	expression tag	UNP P21954
E	-9	HIS	-	expression tag	UNP P21954
E	-8	HIS	-	expression tag	UNP P21954
E	-7	HIS	-	expression tag	UNP P21954
E	-6	ALA	-	expression tag	UNP P21954
E	-5	MET	-	expression tag	UNP P21954
E	-4	GLY	-	expression tag	UNP P21954
E	-3	ILE	-	expression tag	UNP P21954
E	-2	PRO	-	expression tag	UNP P21954
E	-1	GLY	-	expression tag	UNP P21954
E	0	HIS	-	expression tag	UNP P21954
F	-13	MET	-	expression tag	UNP P21954
F	-12	HIS	-	expression tag	UNP P21954
F	-11	HIS	-	expression tag	UNP P21954
F	-10	HIS	-	expression tag	UNP P21954
F	-9	HIS	-	expression tag	UNP P21954
F	-8	HIS	-	expression tag	UNP P21954
F	-7	HIS	-	expression tag	UNP P21954
F	-6	ALA	-	expression tag	UNP P21954
F	-5	MET	-	expression tag	UNP P21954
F	-4	GLY	-	expression tag	UNP P21954
F	-3	ILE	-	expression tag	UNP P21954
F	-2	PRO	-	expression tag	UNP P21954
F	-1	GLY	-	expression tag	UNP P21954
F	0	HIS	-	expression tag	UNP P21954

- Molecule 2 is 2-OXOGLUTARIC ACID (three-letter code: AKG) (formula: C<sub>5</sub>H<sub>6</sub>O<sub>5</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			10	5	5		
2	B	1	Total	C	O	0	0
			10	5	5		
2	C	1	Total	C	O	0	0
			10	5	5		
2	D	1	Total	C	O	0	0
			10	5	5		
2	E	1	Total	C	O	0	0
			10	5	5		
2	F	1	Total	C	O	0	0
			10	5	5		

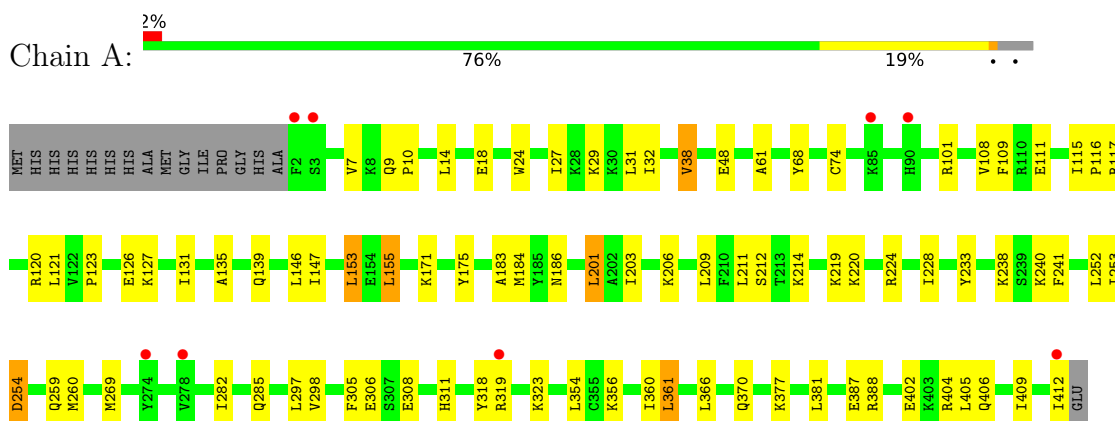
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	392	Total	O	0	0
			392	392		
3	B	328	Total	O	0	0
			328	328		
3	C	167	Total	O	0	0
			167	167		
3	D	151	Total	O	0	0
			151	151		
3	E	130	Total	O	0	0
			130	130		
3	F	205	Total	O	0	0
			205	205		

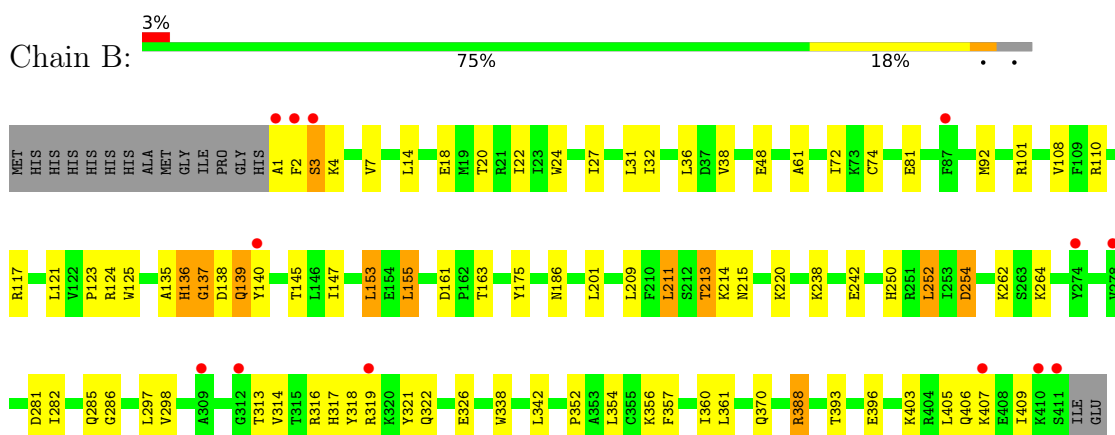
### 3 Residue-property plots [i](#)

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.

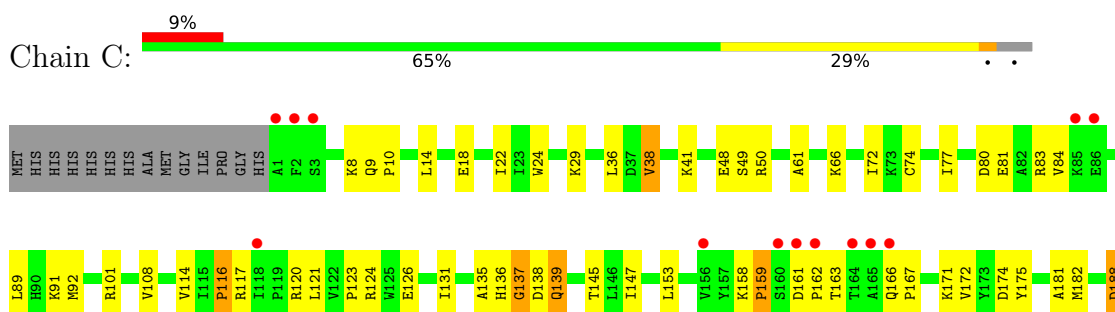
- Molecule 1: Isocitrate dehydrogenase [NADP]



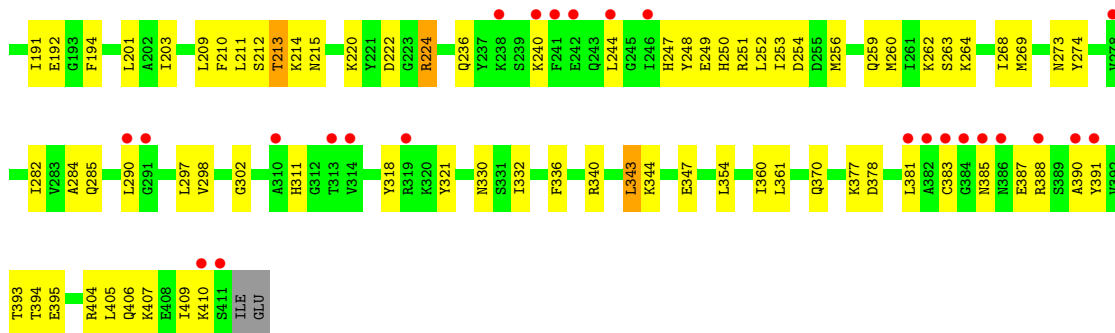
- Molecule 1: Isocitrate dehydrogenase [NADP]



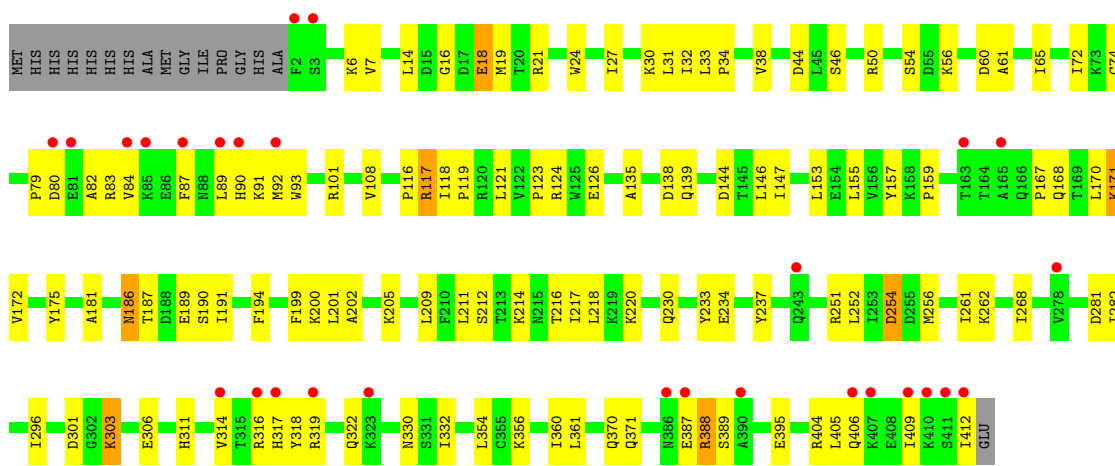
- Molecule 1: Isocitrate dehydrogenase [NADP]



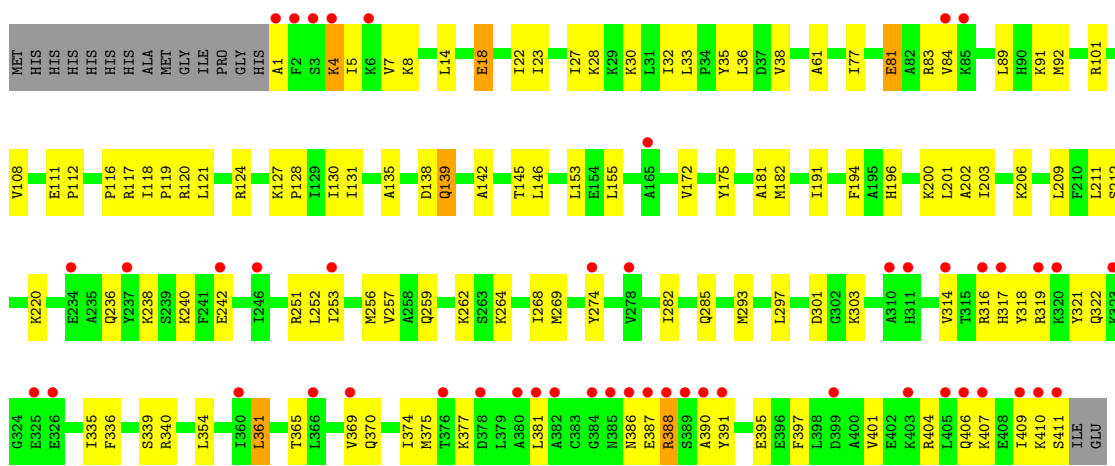




• Molecule 1: Isocitrate dehydrogenase [NADP]

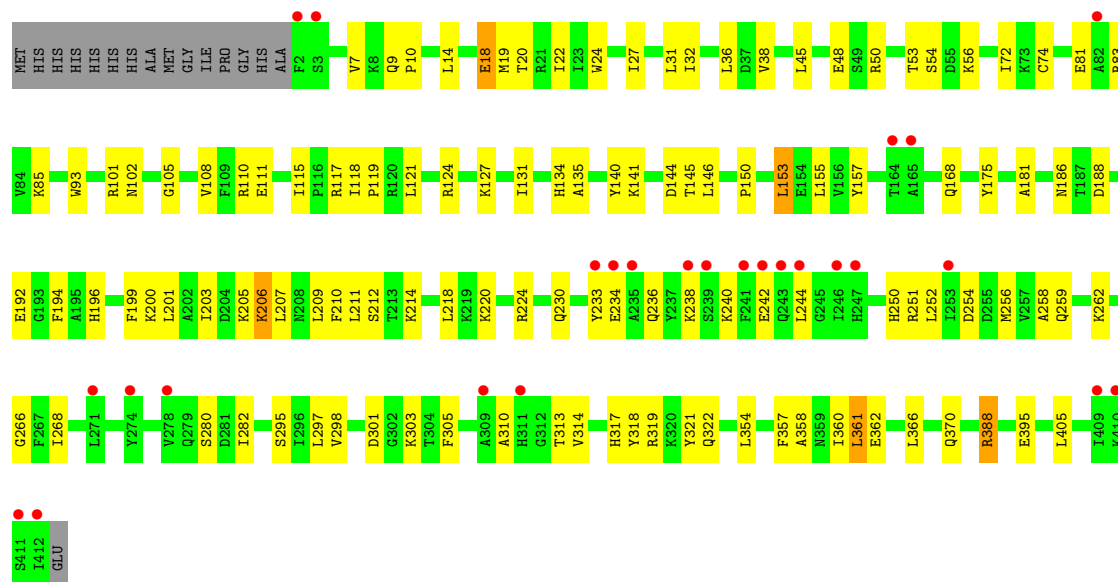


• Molecule 1: Isocitrate dehydrogenase [NADP]



• Molecule 1: Isocitrate dehydrogenase [NADP]





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	74.90Å 98.48Å 190.60Å 90.00° 98.40° 90.00°	Depositor
Resolution (Å)	43.65 – 2.10 43.65 – 2.08	Depositor EDS
% Data completeness (in resolution range)	99.2 (43.65-2.10) 98.3 (43.65-2.08)	Depositor EDS
$R_{merge}$	0.08	Depositor
$R_{sym}$	0.07	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.72 (at 2.08Å)	Xtrriage
Refinement program	CNS	Depositor
R, $R_{free}$	0.206 , 0.247 0.203 , 0.200	Depositor DCC
$R_{free}$ test set	8055 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	38.4	Xtrriage
Anisotropy	0.262	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 55.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.013 for h,-k,-h-l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	20960	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	49.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.93% 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, 0.333 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: AKG

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	0/3319	0.64	0/4477
1	B	0.34	0/3316	0.71	3/4473 (0.1%)
1	C	0.30	0/3316	0.58	0/4473
1	D	0.30	0/3319	0.57	0/4477
1	E	0.29	0/3316	0.56	0/4473
1	F	0.31	0/3319	0.58	0/4477
All	All	0.32	0/19905	0.61	3/26850 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	3	SER	N-CA-C	-15.61	68.87	111.00
1	B	3	SER	CB-CA-C	11.18	131.33	110.10
1	B	4	LYS	N-CA-CB	-6.81	98.34	110.60

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	3256	0	3302	71	0
1	B	3253	0	3299	92	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	3253	0	3299	126	0
1	D	3256	0	3302	118	0
1	E	3253	0	3299	113	0
1	F	3256	0	3302	101	0
2	A	10	0	4	1	0
2	B	10	0	4	3	0
2	C	10	0	4	1	0
2	D	10	0	4	3	0
2	E	10	0	4	1	0
2	F	10	0	4	2	0
3	A	392	0	0	13	0
3	B	328	0	0	10	0
3	C	167	0	0	9	0
3	D	151	0	0	4	0
3	E	130	0	0	1	0
3	F	205	0	0	8	0
All	All	20960	0	19827	581	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 15.

The worst 5 of 581 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:D:117:ARG:H	1:D:370:GLN:HE22	1.00	0.98
1:A:7:VAL:HG21	1:A:38:VAL:HG13	1.46	0.96
1:D:79:PRO:HG3	1:D:93:TRP:HB2	1.51	0.92
1:C:117:ARG:HD2	1:C:370:GLN:HG2	1.51	0.92
1:F:206:LYS:HG3	1:F:244:LEU:HD23	1.52	0.90

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	409/427 (96%)	395 (97%)	14 (3%)	0	100	100
1	B	409/427 (96%)	392 (96%)	15 (4%)	2 (0%)	29	26
1	C	409/427 (96%)	378 (92%)	25 (6%)	6 (2%)	10	5
1	D	409/427 (96%)	384 (94%)	23 (6%)	2 (0%)	29	26
1	E	409/427 (96%)	382 (93%)	23 (6%)	4 (1%)	15	11
1	F	409/427 (96%)	394 (96%)	13 (3%)	2 (0%)	29	26
All	All	2454/2562 (96%)	2325 (95%)	113 (5%)	16 (1%)	22	18

5 of 16 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	137	GLY
1	E	4	LYS
1	C	311	HIS
1	D	18	GLU
1	D	311	HIS

### 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	355/367 (97%)	341 (96%)	14 (4%)	32	33
1	B	354/367 (96%)	339 (96%)	15 (4%)	30	30
1	C	354/367 (96%)	343 (97%)	11 (3%)	40	43
1	D	355/367 (97%)	344 (97%)	11 (3%)	40	43
1	E	354/367 (96%)	344 (97%)	10 (3%)	43	47
1	F	355/367 (97%)	345 (97%)	10 (3%)	43	47
All	All	2127/2202 (97%)	2056 (97%)	71 (3%)	38	40

5 of 71 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	293	MET
1	E	361	LEU
1	F	209	LEU
1	B	254	ASP
1	B	252	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 38 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	370	GLN
1	F	370	GLN
1	F	88	ASN
1	F	259	GLN
1	F	406	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](#)

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

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	AKG	E	2005	-	9,9,9	1.21	0	11,11,11	1.43	2 (18%)
2	AKG	D	2004	-	9,9,9	1.22	1 (11%)	11,11,11	1.42	2 (18%)
2	AKG	C	2003	-	9,9,9	1.23	1 (11%)	11,11,11	1.40	2 (18%)
2	AKG	F	2006	-	9,9,9	1.22	1 (11%)	11,11,11	1.44	1 (9%)
2	AKG	B	2002	-	9,9,9	1.23	1 (11%)	11,11,11	1.42	2 (18%)
2	AKG	A	2001	-	9,9,9	1.24	1 (11%)	11,11,11	1.42	2 (18%)

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	AKG	E	2005	-	-	1/9/9/9	-
2	AKG	D	2004	-	-	1/9/9/9	-
2	AKG	C	2003	-	-	1/9/9/9	-
2	AKG	F	2006	-	-	3/9/9/9	-
2	AKG	B	2002	-	-	4/9/9/9	-
2	AKG	A	2001	-	-	3/9/9/9	-

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	2001	AKG	C3-C2	2.12	1.53	1.51
2	C	2003	AKG	C3-C2	2.09	1.53	1.51
2	D	2004	AKG	C3-C2	2.03	1.53	1.51
2	B	2002	AKG	C3-C2	2.02	1.53	1.51
2	F	2006	AKG	C3-C2	2.01	1.53	1.51

The worst 5 of 11 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	2006	AKG	O1-C1-C2	-2.80	117.98	121.72
2	D	2004	AKG	O1-C1-C2	-2.78	118.01	121.72
2	A	2001	AKG	O1-C1-C2	-2.76	118.03	121.72
2	C	2003	AKG	O1-C1-C2	-2.76	118.03	121.72
2	E	2005	AKG	O1-C1-C2	-2.75	118.05	121.72

There are no chirality outliers.

5 of 13 torsion outliers are listed below:



Mol	Chain	Res	Type	Atoms
2	A	2001	AKG	C1-C2-C3-C4
2	B	2002	AKG	C1-C2-C3-C4
2	C	2003	AKG	C1-C2-C3-C4
2	D	2004	AKG	C1-C2-C3-C4
2	E	2005	AKG	C1-C2-C3-C4

There are no ring outliers.

6 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	2005	AKG	1	0
2	D	2004	AKG	3	0
2	C	2003	AKG	1	0
2	F	2006	AKG	2	0
2	B	2002	AKG	3	0
2	A	2001	AKG	1	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	411/427 (96%)	0.21	8 (1%) 66 71	23, 34, 55, 89	0
1	B	411/427 (96%)	0.27	13 (3%) 47 54	21, 36, 65, 103	0
1	C	411/427 (96%)	0.63	37 (9%) 9 12	31, 48, 86, 103	0
1	D	411/427 (96%)	0.49	28 (6%) 17 21	34, 49, 89, 103	0
1	E	411/427 (96%)	0.73	49 (11%) 4 5	36, 53, 101, 128	0
1	F	411/427 (96%)	0.46	26 (6%) 20 24	31, 46, 73, 108	0
All	All	2466/2562 (96%)	0.46	161 (6%) 18 23	21, 45, 83, 128	0

The worst 5 of 161 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	1	ALA	19.1
1	E	2	PHE	10.1
1	C	2	PHE	9.9
1	A	2	PHE	8.0
1	F	412	ILE	7.9

### 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 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, 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	B-factors(Å <sup>2</sup> )	Q<0.9
2	AKG	E	2005	10/10	0.43	0.69	83,84,87,87	10
2	AKG	C	2003	10/10	0.58	0.74	75,77,80,80	10
2	AKG	F	2006	10/10	0.58	0.82	80,82,85,87	9
2	AKG	B	2002	10/10	0.60	0.68	76,77,80,80	10
2	AKG	D	2004	10/10	0.66	0.40	87,88,91,91	0
2	AKG	A	2001	10/10	0.72	0.37	72,74,76,77	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.