



wwPDB X-ray Structure Validation Summary Report ⓘ

Jan 31, 2016 – 06:41 PM GMT

PDB ID : 1BVU
Title : GLUTAMATE DEHYDROGENASE FROM THERMOCOCCUS LITORALIS
Authors : Baker, P.J.; Britton, K.L.; Yip, K.S.; Stillman, T.J.; Rice, D.W.
Deposited on : 1999-07-20
Resolution : 2.50 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
<http://wwpdb.org/validation/2016/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 (RC4), CSD as536be (2015)
Xtriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

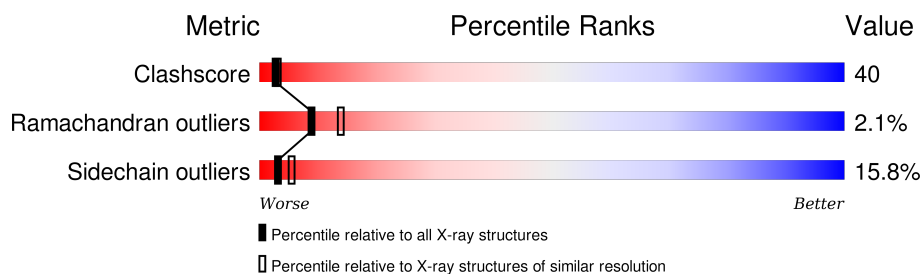
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	102246	4242 (2.50-2.50)
Ramachandran outliers	100387	4156 (2.50-2.50)
Sidechain outliers	100360	4158 (2.50-2.50)

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. 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	418	 37% 50% 12%
1	B	418	 45% 46% 7%
1	C	418	 45% 43% 11%
1	D	418	 39% 49% 11%
1	E	418	 43% 49% 6% .
1	F	418	 44% 47% 9%

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 19566 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 PROTEIN (GLUTAMATE DEHYDROGENASE).

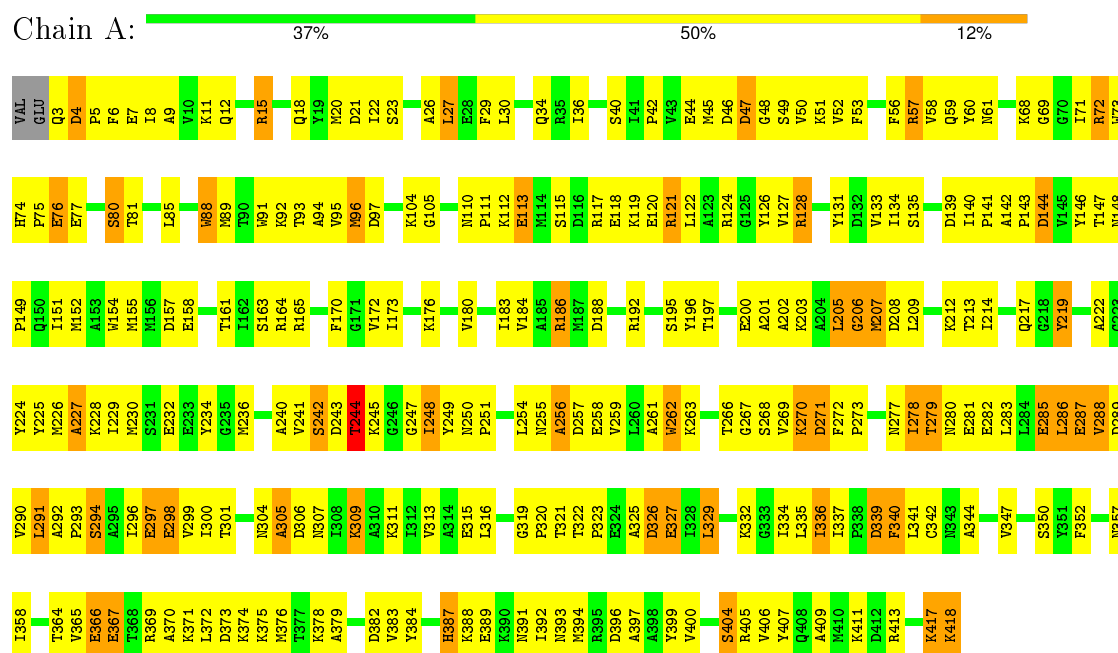
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	416	Total	C	N	O	S	0	0	0
			3261	2076	547	620	18			
1	B	416	Total	C	N	O	S	0	0	0
			3261	2076	547	620	18			
1	C	416	Total	C	N	O	S	0	0	0
			3261	2076	547	620	18			
1	D	416	Total	C	N	O	S	0	0	0
			3261	2076	547	620	18			
1	E	416	Total	C	N	O	S	0	0	0
			3261	2076	547	620	18			
1	F	416	Total	C	N	O	S	0	0	0
			3261	2076	547	620	18			

3 Residue-property plots

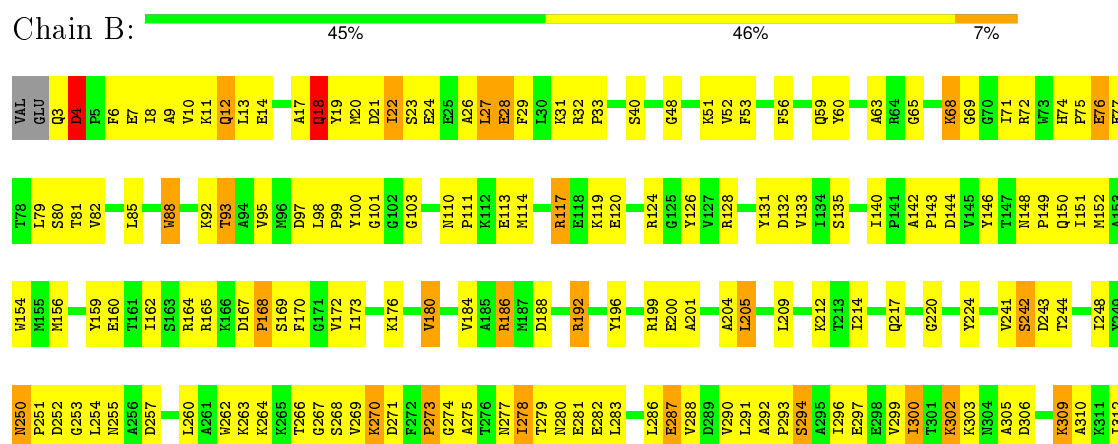
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according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

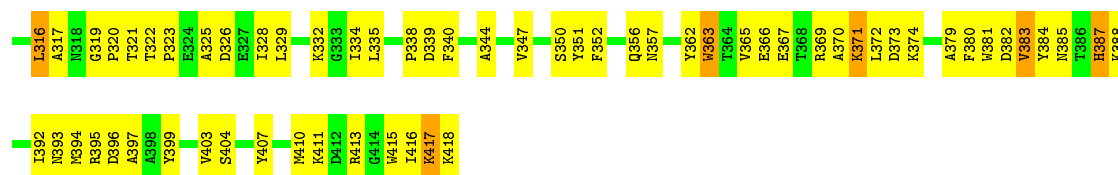
Note EDS was not executed.

• Molecule 1: PROTEIN (GLUTAMATE DEHYDROGENASE)



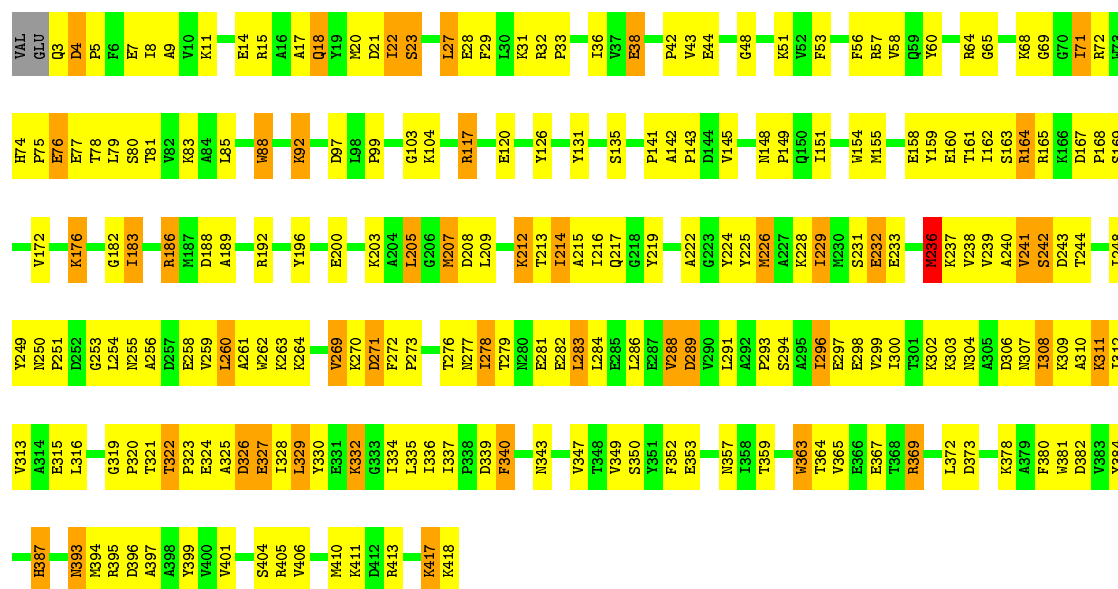
• Molecule 1: PROTEIN (GLUTAMATE DEHYDROGENASE)





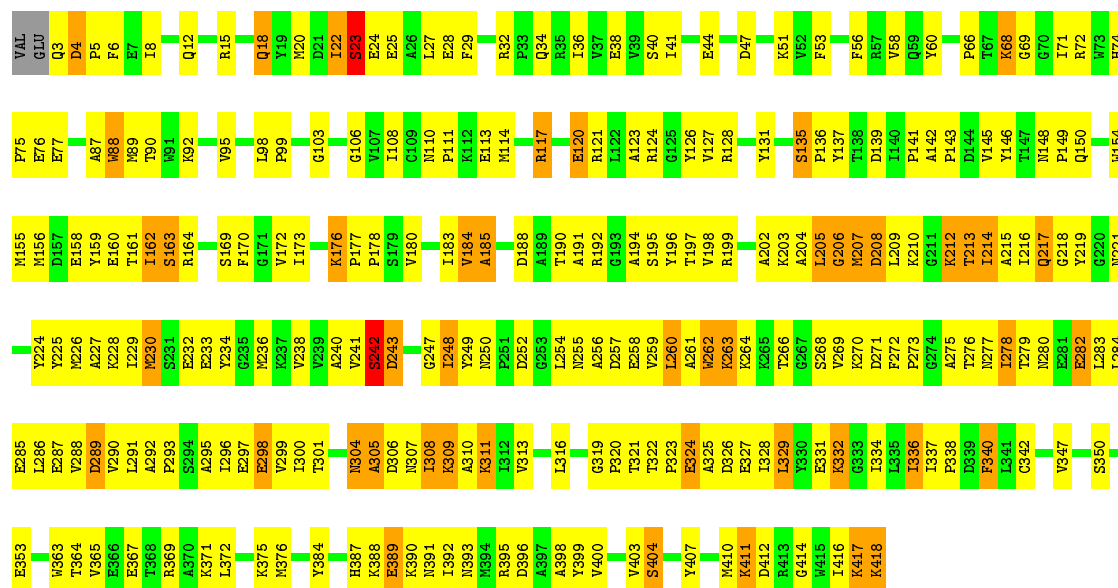
• Molecule 1: PROTEIN (GLUTAMATE DEHYDROGENASE)

Chain C: 45% 43% 11%



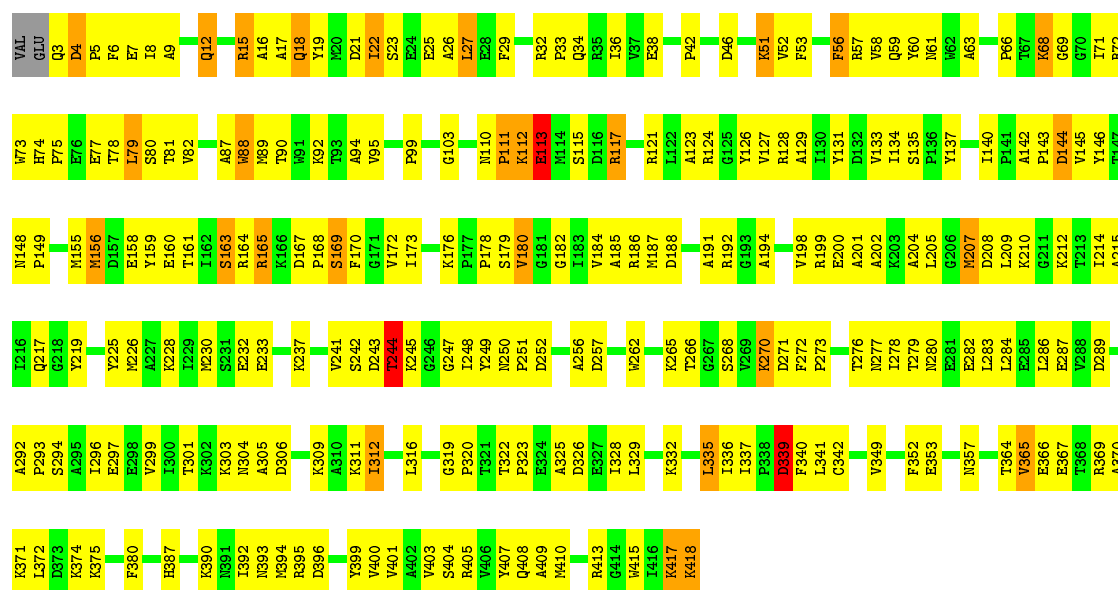
• Molecule 1: PROTEIN (GLUTAMATE DEHYDROGENASE)

Chain D: 39% 49% 11%



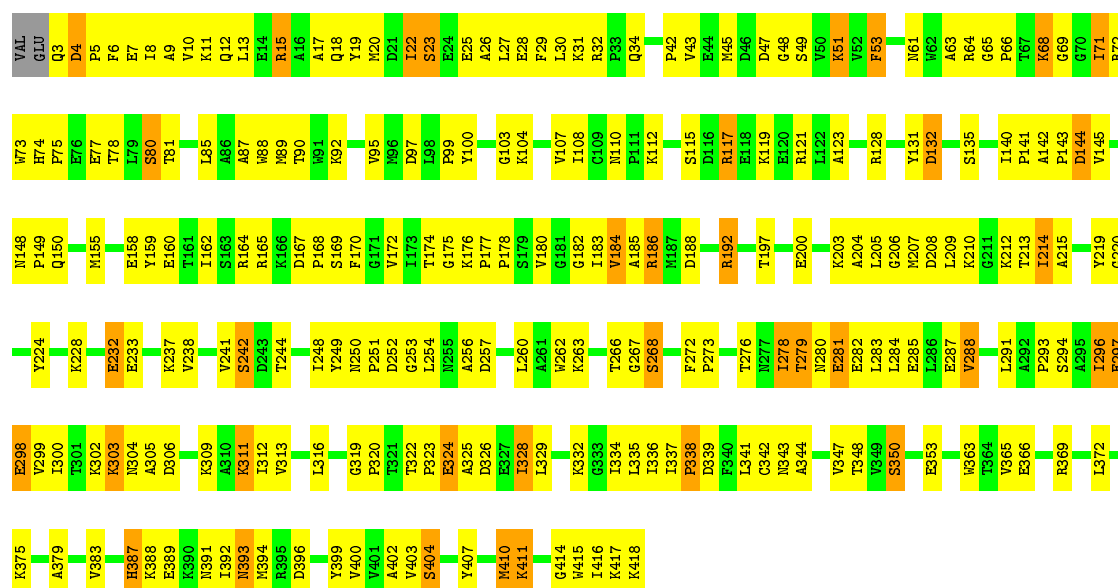
• Molecule 1: PROTEIN (GLUTAMATE DEHYDROGENASE)

Chain E:  43% 49% 6%



• Molecule 1: PROTEIN (GLUTAMATE DEHYDROGENASE)

Chain F:  44% 47% 9%



4 Data and refinement statistics

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

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	141.90Å 197.50Å 125.70Å 90.00° 113.60° 90.00°	Depositor
Resolution (Å)	10.00 – 2.50	Depositor
% Data completeness (in resolution range)	87.0 (10.00-2.50)	Depositor
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	TNT	Depositor
R, R_{free}	(Not available) , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	19566	wwPDB-VP
Average B, all atoms (Å ²)	50.0	wwPDB-VP

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	0.68	0/3331	0.89	4/4511 (0.1%)
1	B	0.70	0/3331	0.91	4/4511 (0.1%)
1	C	0.70	0/3331	0.90	3/4511 (0.1%)
1	D	0.70	0/3331	0.89	1/4511 (0.0%)
1	E	0.72	0/3331	0.94	3/4511 (0.1%)
1	F	0.70	0/3331	0.90	0/4511
All	All	0.70	0/19986	0.90	15/27066 (0.1%)

There are no bond length outliers.

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	164	ARG	NE-CZ-NH2	7.26	123.93	120.30
1	C	164	ARG	NE-CZ-NH1	-6.32	117.14	120.30
1	A	128	ARG	NE-CZ-NH1	6.13	123.36	120.30
1	B	250	ASN	C-N-CD	-6.09	107.20	120.60
1	B	316	LEU	CB-CG-CD2	-6.05	100.71	111.00

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	3261	0	3254	331	0
1	B	3261	0	3254	229	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	3261	0	3254	260	0
1	D	3261	0	3254	300	0
1	E	3261	0	3254	262	0
1	F	3261	0	3254	241	0
All	All	19566	0	19524	1572	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 40.

The worst 5 of 1572 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:329:LEU:HD23	1:A:334:ILE:CD1	1.54	1.36
1:E:29:PHE:CD1	1:E:410:MET:HE1	1.64	1.32
1:D:255:ASN:O	1:D:259:VAL:HG23	1.25	1.30
1:A:329:LEU:CD2	1:A:334:ILE:HD12	1.63	1.27
1:A:279:THR:HG22	1:A:282:GLU:OE2	1.28	1.27

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	414/418 (99%)	355 (86%)	48 (12%)	11 (3%)	6	9
1	B	414/418 (99%)	370 (89%)	39 (9%)	5 (1%)	16	29
1	C	414/418 (99%)	355 (86%)	53 (13%)	6 (1%)	14	24
1	D	414/418 (99%)	356 (86%)	49 (12%)	9 (2%)	8	13
1	E	414/418 (99%)	366 (88%)	38 (9%)	10 (2%)	7	11
1	F	414/418 (99%)	359 (87%)	45 (11%)	10 (2%)	7	11

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	2484/2508 (99%)	2161 (87%)	272 (11%)	51 (2%)	9	14

5 of 51 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	4	ASP
1	B	4	ASP
1	C	4	ASP
1	D	4	ASP
1	D	305	ALA

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	342/344 (99%)	284 (83%)	58 (17%)	2	4
1	B	342/344 (99%)	296 (86%)	46 (14%)	5	9
1	C	342/344 (99%)	277 (81%)	65 (19%)	2	3
1	D	342/344 (99%)	279 (82%)	63 (18%)	2	3
1	E	342/344 (99%)	299 (87%)	43 (13%)	5	10
1	F	342/344 (99%)	292 (85%)	50 (15%)	4	7
All	All	2052/2064 (99%)	1727 (84%)	325 (16%)	3	5

5 of 325 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	302	LYS
1	D	89	MET
1	F	244	THR
1	C	311	LYS
1	C	399	TYR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 40 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	408	GLN
1	C	280	ASN
1	F	3	GLN
1	C	217	GLN
1	C	307	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 ⓘ

6.1 Protein, DNA and RNA chains ⓘ

EDS was not executed - this section will therefore be empty.

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

EDS was not executed - this section will therefore be empty.

6.3 Carbohydrates ⓘ

EDS was not executed - this section will therefore be empty.

6.4 Ligands ⓘ

EDS was not executed - this section will therefore be empty.

6.5 Other polymers ⓘ

EDS was not executed - this section will therefore be empty.