



# wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 1, 2016 – 09:25 AM GMT

PDB ID : 3IBB  
Title : Propionyl-CoA Carboxylase Beta Subunit, D422A  
Authors : Diacovich, L.; Arabolaza, A.; Shillito, E.M.; Lin, T.-W.; Mitchell, D.L.; Pham, H.; Melgar, M.M.  
Deposited on : 2009-07-15  
Resolution : 3.50 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](mailto: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.

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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 : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

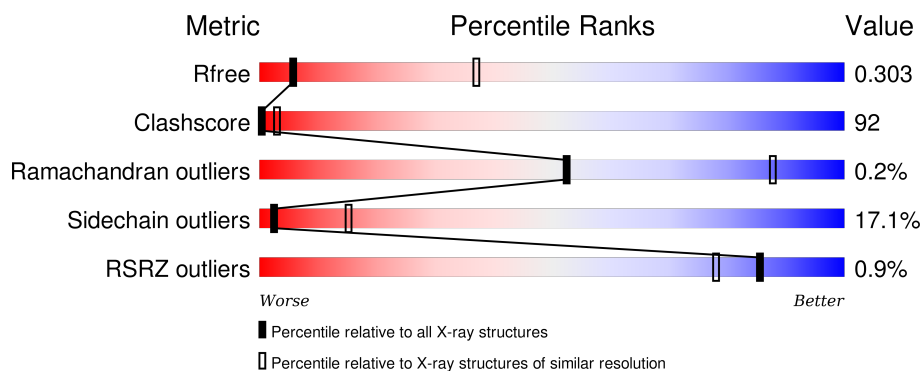
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 3.50 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))
$R_{free}$	91344	1051 (3.60-3.40)
Clashscore	102246	1157 (3.60-3.40)
Ramachandran outliers	100387	1120 (3.60-3.40)
Sidechain outliers	100360	1121 (3.60-3.40)
RSRZ outliers	91569	1058 (3.60-3.40)

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  $\geq 3$ , 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.

Mol	Chain	Length	Quality of chain
1	A	530	<div> <div>22%</div> <div>66%</div> <div>10%</div> <div>•</div> </div>
1	B	530	<div> <div>25%</div> <div>61%</div> <div>12%</div> <div>•</div> </div>
1	C	530	<div> <div>27%</div> <div>62%</div> <div>9%</div> <div>•</div> </div>
1	D	530	<div> <div>23%</div> <div>63%</div> <div>12%</div> <div>•</div> </div>
1	E	530	<div> <div>24%</div> <div>64%</div> <div>11%</div> <div>•</div> </div>

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Mol	Chain	Length	Quality of chain
1	F	530	<p>25% 59% 13%</p>

## 2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 23700 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 Propionyl-CoA carboxylase complex B subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	521	Total	C	N	O	S	0	0	0
			3950	2480	698	759	13			
1	B	521	Total	C	N	O	S	0	0	0
			3950	2480	698	759	13			
1	C	521	Total	C	N	O	S	0	0	0
			3950	2480	698	759	13			
1	D	521	Total	C	N	O	S	0	0	0
			3950	2480	698	759	13			
1	E	521	Total	C	N	O	S	0	0	0
			3950	2480	698	759	13			
1	F	521	Total	C	N	O	S	0	0	0
			3950	2480	698	759	13			

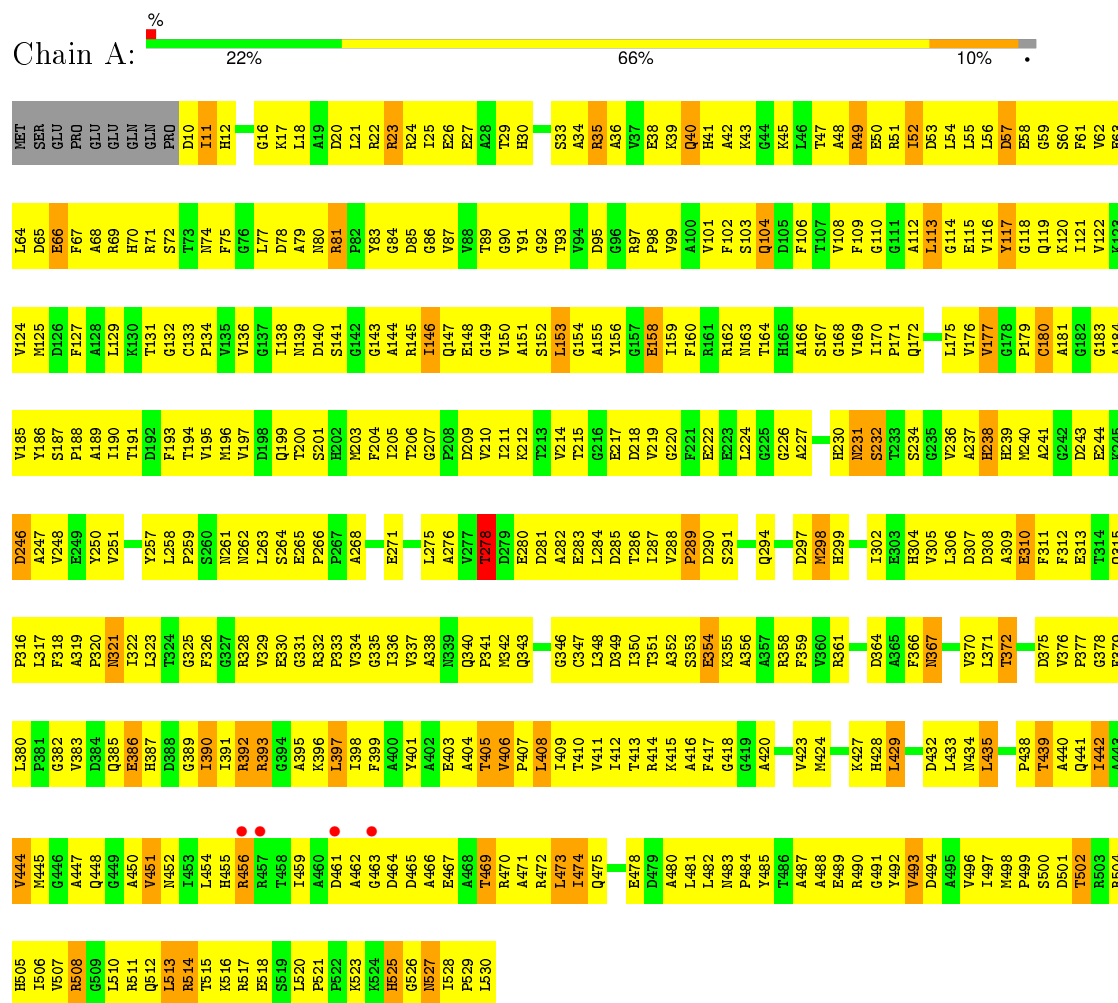
There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	422	ALA	ASP	ENGINEERED	UNP Q9X4K7
B	422	ALA	ASP	ENGINEERED	UNP Q9X4K7
C	422	ALA	ASP	ENGINEERED	UNP Q9X4K7
D	422	ALA	ASP	ENGINEERED	UNP Q9X4K7
E	422	ALA	ASP	ENGINEERED	UNP Q9X4K7
F	422	ALA	ASP	ENGINEERED	UNP Q9X4K7

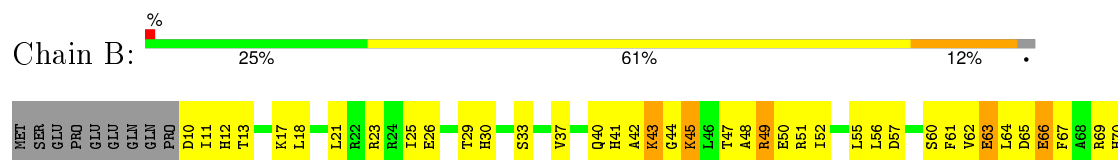
### 3 Residue-property plots

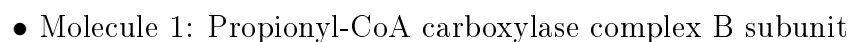
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according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

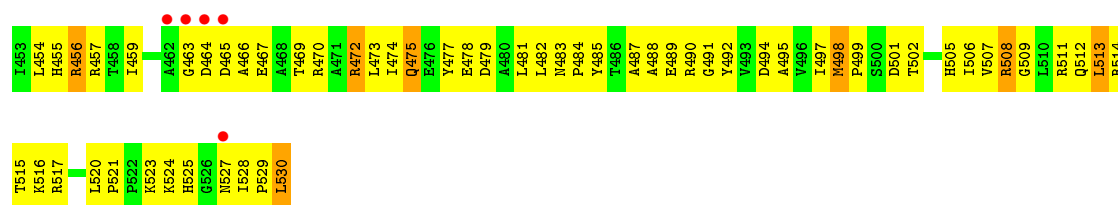
- Molecule 1: Propionyl-CoA carboxylase complex B subunit



- Molecule 1: Propionyl-CoA carboxylase complex B subunit

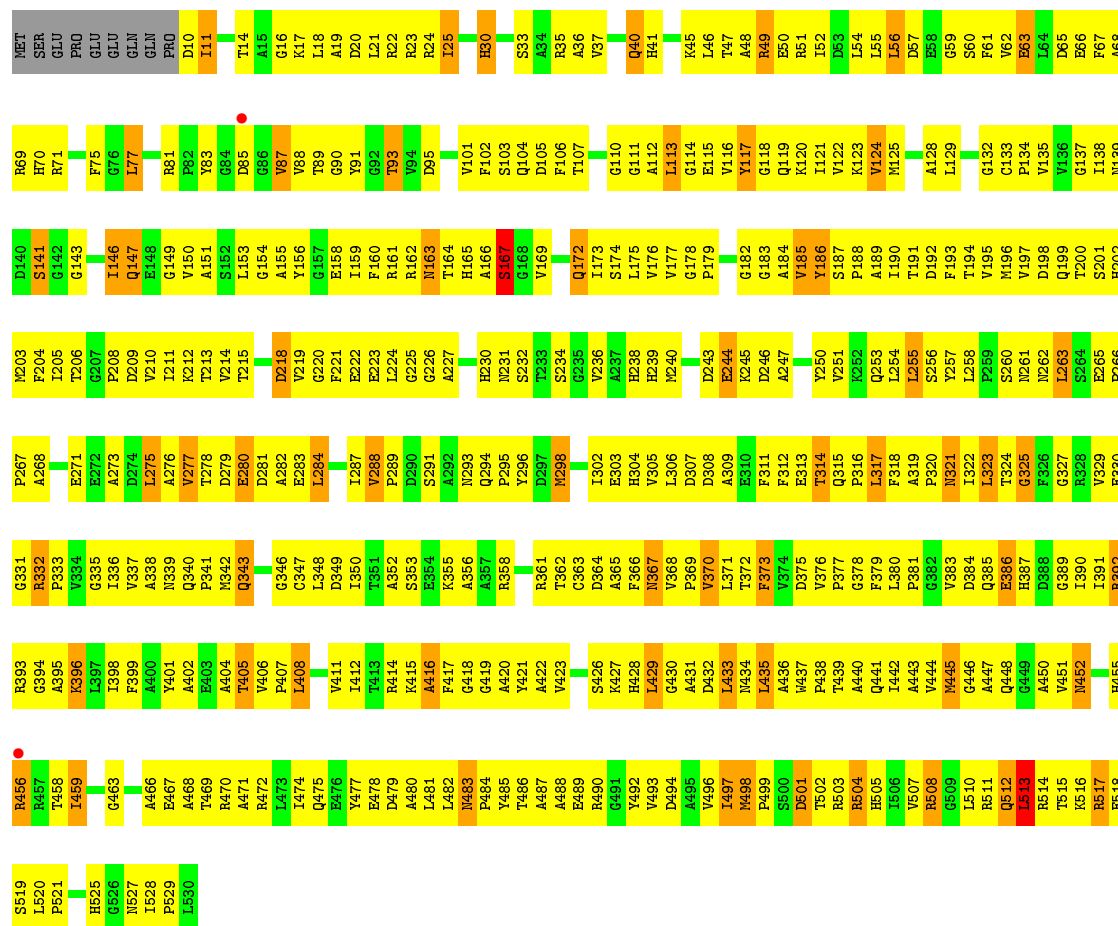






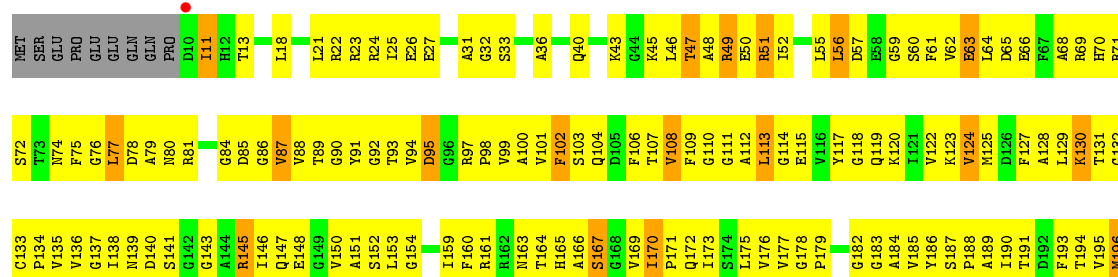
• Molecule 1: Propionyl-CoA carboxylase complex B subunit

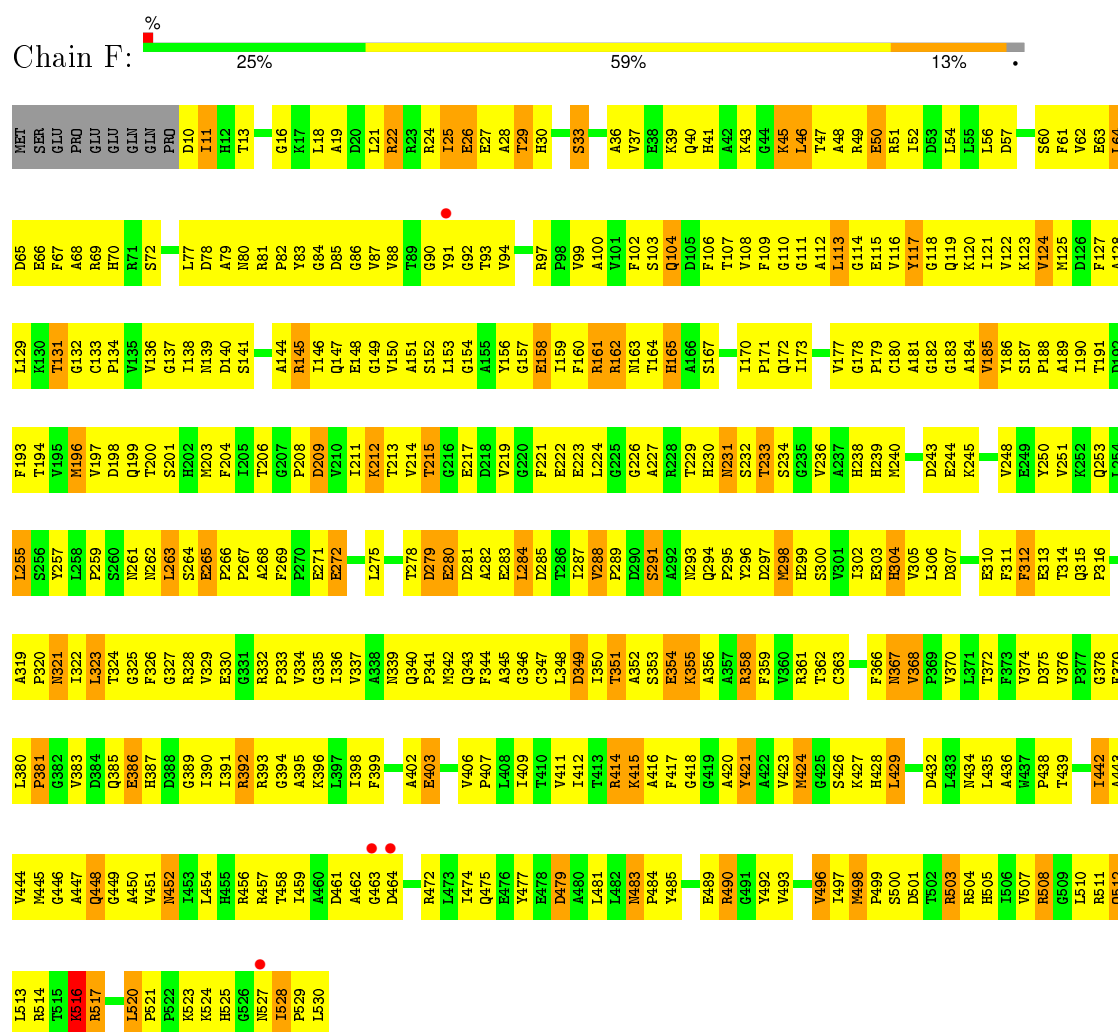
Chain D: 23% 63% 12%



• Molecule 1: Propionyl-CoA carboxylase complex B subunit

Chain E: 24% 64% 11%







## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	87.06Å 183.33Å 228.71Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 3.50 45.83 – 3.46	Depositor EDS
% Data completeness (in resolution range)	94.4 (50.00-3.50) 94.5 (45.83-3.46)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	5.04 (at 3.48Å)	Xtriage
Refinement program	REFMAC	Depositor
R, $R_{free}$	0.190 , 0.269 0.286 , 0.303	Depositor DCC
$R_{free}$ test set	2238 reflections (5.00%)	DCC
Wilson B-factor (Å <sup>2</sup> )	65.3	Xtriage
Anisotropy	0.084	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.28 , -4.2	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	1 of 46011 reflections (0.002%)	Xtriage
$F_o, F_c$ correlation	0.81	EDS
Total number of atoms	23700	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	2.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.47% 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, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

## 5 Model quality

### 5.1 Standard geometry

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	0.45	1/4030 (0.0%)	0.82	5/5474 (0.1%)
1	B	0.39	1/4030 (0.0%)	0.77	2/5474 (0.0%)
1	C	0.37	1/4030 (0.0%)	0.78	2/5474 (0.0%)
1	D	0.41	1/4030 (0.0%)	0.79	5/5474 (0.1%)
1	E	0.39	1/4030 (0.0%)	0.78	5/5474 (0.1%)
1	F	0.37	0/4030	0.74	3/5474 (0.1%)
All	All	0.40	5/24180 (0.0%)	0.78	22/32844 (0.1%)

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	530	LEU	C-OXT	5.86	1.34	1.23
1	A	238	HIS	C-N	-5.53	1.21	1.34
1	E	414	ARG	C-N	5.39	1.46	1.34
1	D	363	CYS	C-N	5.35	1.46	1.34
1	B	476	GLU	C-N	-5.09	1.22	1.34

The worst 5 of 22 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	108	VAL	CB-CA-C	-5.97	100.06	111.40
1	B	150	VAL	CB-CA-C	-5.94	100.12	111.40
1	D	277	VAL	N-CA-C	-5.83	95.27	111.00
1	D	513	LEU	CB-CA-C	-5.78	99.22	110.20
1	A	278	THR	CB-CA-C	5.72	127.04	111.60

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts ⓘ

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	3950	0	3880	836	0
1	B	3950	0	3880	780	0
1	C	3950	0	3880	784	0
1	D	3950	0	3881	807	0
1	E	3950	0	3881	772	0
1	F	3950	0	3881	786	0
All	All	23700	0	23283	4332	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 92.

The worst 5 of 4332 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:F:497:ILE:HD13	1:F:505:HIS:CD2	1.40	1.54
1:C:379:PHE:CE2	1:D:205:ILE:HD11	1.38	1.54
1:A:318:PHE:CZ	1:A:351:THR:HB	1.42	1.53
1:F:311:PHE:CE1	1:F:325:GLY:HA3	1.45	1.49
1:F:215:THR:CG2	1:F:217:GLU:HG2	1.43	1.47

There are no symmetry-related clashes.

## 5.3 Torsion angles ⓘ

### 5.3.1 Protein backbone ⓘ

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	519/530 (98%)	503 (97%)	14 (3%)	2 (0%)	39 81

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	519/530 (98%)	501 (96%)	18 (4%)	0	100	100
1	C	519/530 (98%)	501 (96%)	17 (3%)	1 (0%)	52	88
1	D	519/530 (98%)	501 (96%)	17 (3%)	1 (0%)	52	88
1	E	519/530 (98%)	505 (97%)	14 (3%)	0	100	100
1	F	519/530 (98%)	503 (97%)	13 (2%)	3 (1%)	30	75
All	All	3114/3180 (98%)	3014 (97%)	93 (3%)	7 (0%)	52	88

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	416	ALA
1	F	145	ARG
1	F	516	LYS
1	A	389	GLY
1	F	381	PRO

### 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	411/420 (98%)	349 (85%)	62 (15%)	3	21
1	B	411/420 (98%)	339 (82%)	72 (18%)	2	14
1	C	411/420 (98%)	353 (86%)	58 (14%)	4	24
1	D	411/420 (98%)	337 (82%)	74 (18%)	2	12
1	E	411/420 (98%)	342 (83%)	69 (17%)	2	15
1	F	411/420 (98%)	325 (79%)	86 (21%)	1	8
All	All	2466/2520 (98%)	2045 (83%)	421 (17%)	2	15

5 of 421 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	513	LEU

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Mol	Chain	Res	Type
1	D	343	GLN
1	F	358	ARG
1	D	40	GLN
1	D	167	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 92 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	172	GLN
1	E	70	HIS
1	F	452	ASN
1	D	231	ASN
1	D	452	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, 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	521/530 (98%)	-0.05	4 (0%) 87 80	2, 2, 2, 2	0
1	B	521/530 (98%)	0.06	6 (1%) 81 72	2, 2, 2, 16	0
1	C	521/530 (98%)	-0.01	6 (1%) 81 72	2, 2, 2, 14	0
1	D	521/530 (98%)	0.05	2 (0%) 93 90	2, 2, 2, 2	0
1	E	521/530 (98%)	0.05	7 (1%) 79 70	2, 2, 2, 2	0
1	F	521/530 (98%)	-0.01	4 (0%) 87 80	2, 2, 2, 13	0
All	All	3126/3180 (98%)	0.01	29 (0%) 85 78	2, 2, 2, 16	0

The worst 5 of 29 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	464	ASP	3.7
1	A	456	ARG	3.3
1	C	463	GLY	3.3
1	C	465	ASP	3.3
1	A	461	ASP	3.0

### 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.