



# Full wwPDB X-ray Structure Validation Report ⓘ

Apr 25, 2022 – 01:08 pm BST

PDB ID : 7QS4  
Title : Crystal structure of B30.2 PRYSPRY domain of TRIM36  
Authors : Chaikuad, A.; Zhubi, R.; Knapp, S.; Structural Genomics Consortium (SGC)  
Deposited on : 2022-01-12  
Resolution : 2.25 Å(reported)

This is a Full wwPDB X-ray Structure Validation 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.

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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  
Xtriage (Phenix) : 1.13  
EDS : 2.28  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0267  
CCP4 : 7.1.010 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.28

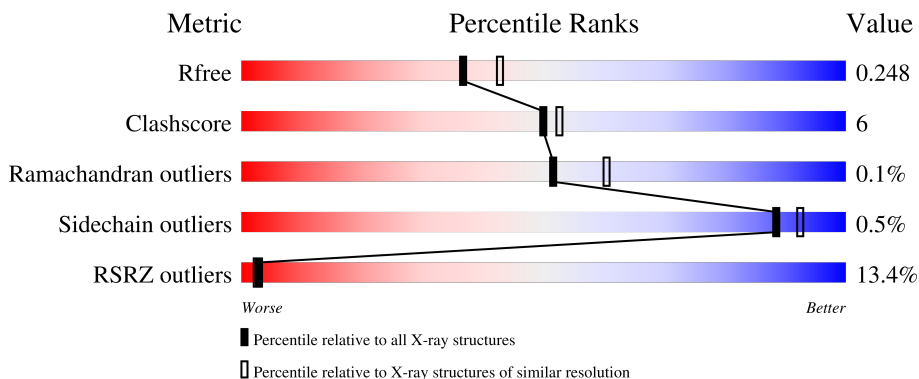
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.25 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	1377 (2.26-2.26)
Clashscore	141614	1487 (2.26-2.26)
Ramachandran outliers	138981	1449 (2.26-2.26)
Sidechain outliers	138945	1450 (2.26-2.26)
RSRZ outliers	127900	1356 (2.26-2.26)

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	230	
1	B	230	
1	C	230	
1	D	230	

## 2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 6215 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 HAPRIN-a2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	206	1661	1070	268	313	10	0	1	0
1	B	195	1562	1010	256	287	9	0	1	0
1	C	182	1470	957	238	266	9	0	1	0
1	D	177	1425	924	236	256	9	0	1	0

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	506	MET	-	initiating methionine	UNP Q4R1Q4
A	729	ALA	-	expression tag	UNP Q4R1Q4
A	730	GLU	-	expression tag	UNP Q4R1Q4
A	731	ASN	-	expression tag	UNP Q4R1Q4
A	732	LEU	-	expression tag	UNP Q4R1Q4
A	733	TYR	-	expression tag	UNP Q4R1Q4
A	734	PHE	-	expression tag	UNP Q4R1Q4
A	735	GLN	-	expression tag	UNP Q4R1Q4
B	506	MET	-	initiating methionine	UNP Q4R1Q4
B	729	ALA	-	expression tag	UNP Q4R1Q4
B	730	GLU	-	expression tag	UNP Q4R1Q4
B	731	ASN	-	expression tag	UNP Q4R1Q4
B	732	LEU	-	expression tag	UNP Q4R1Q4
B	733	TYR	-	expression tag	UNP Q4R1Q4
B	734	PHE	-	expression tag	UNP Q4R1Q4
B	735	GLN	-	expression tag	UNP Q4R1Q4
C	506	MET	-	initiating methionine	UNP Q4R1Q4
C	729	ALA	-	expression tag	UNP Q4R1Q4
C	730	GLU	-	expression tag	UNP Q4R1Q4
C	731	ASN	-	expression tag	UNP Q4R1Q4
C	732	LEU	-	expression tag	UNP Q4R1Q4

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Chain	Residue	Modelled	Actual	Comment	Reference
C	733	TYR	-	expression tag	UNP Q4R1Q4
C	734	PHE	-	expression tag	UNP Q4R1Q4
C	735	GLN	-	expression tag	UNP Q4R1Q4
D	506	MET	-	initiating methionine	UNP Q4R1Q4
D	729	ALA	-	expression tag	UNP Q4R1Q4
D	730	GLU	-	expression tag	UNP Q4R1Q4
D	731	ASN	-	expression tag	UNP Q4R1Q4
D	732	LEU	-	expression tag	UNP Q4R1Q4
D	733	TYR	-	expression tag	UNP Q4R1Q4
D	734	PHE	-	expression tag	UNP Q4R1Q4
D	735	GLN	-	expression tag	UNP Q4R1Q4

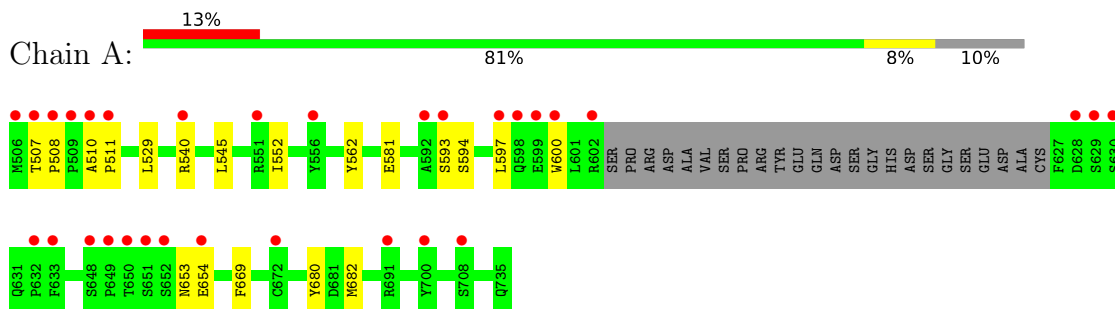
- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	20	Total O 20 20	0	0
2	B	38	Total O 38 38	0	0
2	C	17	Total O 17 17	0	0
2	D	22	Total O 22 22	0	0

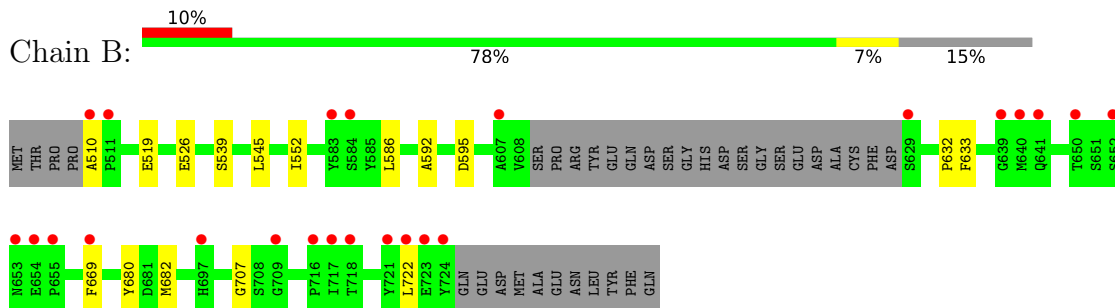
### 3 Residue-property plots [i](#)

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.

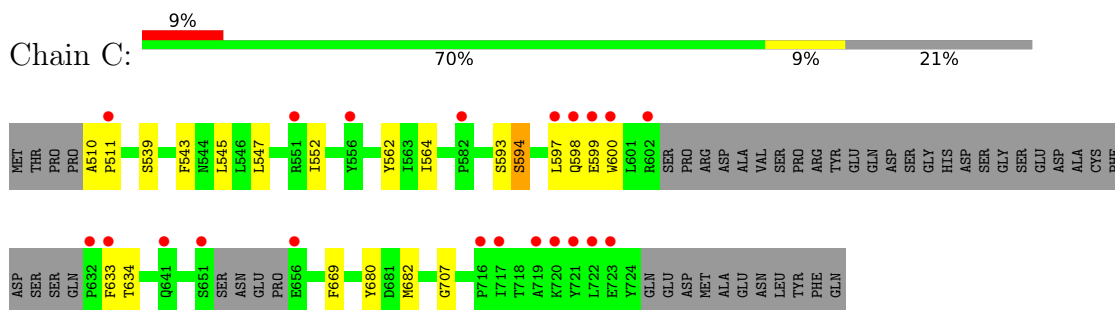
- Molecule 1: HAPRIN-a2



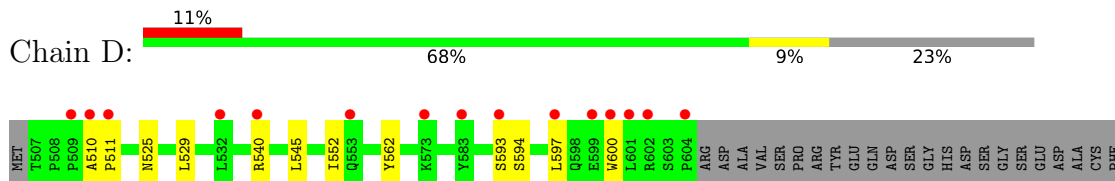
- Molecule 1: HAPRIN-a2

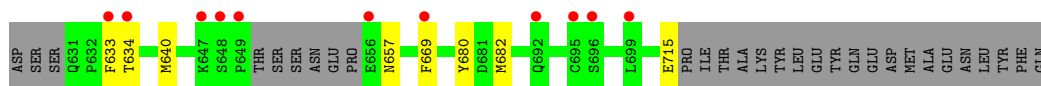


- Molecule 1: HAPRIN-a2



- Molecule 1: HAPRIN-a2





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	91.74Å 93.06Å 103.85Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.53 – 2.25 46.53 – 2.25	Depositor EDS
% Data completeness (in resolution range)	99.9 (46.53-2.25) 100.0 (46.53-2.25)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.41 (at 2.24Å)	Xtrriage
Refinement program	REFMAC 5.8.0267	Depositor
R, $R_{free}$	0.203 , 0.245 0.212 , 0.248	Depositor DCC
$R_{free}$ test set	2169 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	56.6	Xtrriage
Anisotropy	0.311	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	(Not available) , (Not available)	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.019 for k,h,-l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	6215	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	74.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.04% 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](#)

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	0.78	1/1703 (0.1%)	0.72	0/2304
1	B	0.78	1/1604 (0.1%)	0.73	0/2170
1	C	0.73	0/1509	0.72	0/2037
1	D	0.75	0/1461	0.72	0/1974
All	All	0.76	2/6277 (0.0%)	0.73	0/8485

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	581	GLU	CD-OE1	-5.79	1.19	1.25
1	B	519	GLU	CD-OE1	5.52	1.31	1.25

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	1661	0	1608	20	0
1	B	1562	0	1537	15	0
1	C	1470	0	1454	20	0
1	D	1425	0	1407	18	0
2	A	20	0	0	0	0
2	B	38	0	0	1	0
2	C	17	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	22	0	0	0	0
All	All	6215	0	6006	70	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 6.

All (70) 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:B:680:TYR:HB2	1:B:682:MET:CE	2.23	0.69
1:B:510:ALA:HB2	1:B:669:PHE:HE1	1.58	0.68
1:A:507:THR:HB	1:A:508:PRO:HD3	1.74	0.68
1:A:510:ALA:HB2	1:A:669:PHE:HE1	1.59	0.67
1:C:680:TYR:HB2	1:C:682:MET:CE	2.25	0.67
1:C:599:GLU:OE1	1:C:600:TRP:CD1	2.49	0.66
1:A:510:ALA:HB2	1:A:669:PHE:CE1	2.29	0.66
1:A:529:LEU:HB2	1:A:540[A]:ARG:HE	1.62	0.64
1:C:680:TYR:CB	1:C:682:MET:CE	2.76	0.64
1:B:680:TYR:CB	1:B:682:MET:CE	2.76	0.64
1:B:545:LEU:HD11	1:B:552:ILE:HD11	1.80	0.63
1:C:510:ALA:HB2	1:C:669:PHE:HE1	1.62	0.63
1:D:510:ALA:HB2	1:D:669:PHE:CE1	2.36	0.61
1:D:680:TYR:HB3	1:D:682:MET:CE	2.30	0.61
1:A:680:TYR:HB2	1:A:682:MET:CE	2.31	0.60
1:D:510:ALA:HB1	1:D:511:PRO:HD2	1.84	0.59
1:D:510:ALA:HB2	1:D:669:PHE:HE1	1.66	0.59
1:B:510:ALA:HB2	1:B:669:PHE:CE1	2.37	0.58
1:B:526:GLU:HG2	2:B:835:HOH:O	2.04	0.58
1:D:545:LEU:HD11	1:D:552:ILE:HD11	1.86	0.57
1:C:545:LEU:HD11	1:C:552:ILE:HD11	1.85	0.57
1:D:680:TYR:CB	1:D:682:MET:CE	2.82	0.57
1:A:680:TYR:HB2	1:A:682:MET:HE3	1.86	0.56
1:A:680:TYR:CB	1:A:682:MET:CE	2.82	0.56
1:C:593:SER:O	1:C:597:LEU:HG	2.07	0.54
1:A:507:THR:CB	1:A:508:PRO:HD3	2.37	0.54
1:B:545:LEU:CD1	1:B:552:ILE:HD11	2.38	0.54
1:A:545:LEU:HD11	1:A:552:ILE:HD11	1.91	0.53
1:D:545:LEU:CD1	1:D:552:ILE:HD11	2.38	0.53
1:D:593:SER:O	1:D:597:LEU:HG	2.08	0.53
1:A:593:SER:O	1:A:597:LEU:HG	2.09	0.53
1:B:680:TYR:HB3	1:B:682:MET:HE1	1.91	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:680:TYR:HB3	1:C:682:MET:CE	2.40	0.52
1:A:510:ALA:HB1	1:A:511:PRO:HD2	1.91	0.51
1:C:510:ALA:HB2	1:C:669:PHE:CE1	2.44	0.51
1:C:598:GLN:HA	1:C:598:GLN:OE1	2.09	0.51
1:B:680:TYR:HB3	1:B:682:MET:CE	2.41	0.50
1:B:592:ALA:HA	1:B:632:PRO:O	2.12	0.50
1:B:680:TYR:HB2	1:B:682:MET:HE2	1.93	0.50
1:C:510:ALA:HB1	1:C:511:PRO:HD2	1.95	0.49
1:D:562:TYR:CD1	1:D:600:TRP:HB3	2.48	0.49
1:C:547:LEU:HD23	1:D:657:ASN:HB2	1.94	0.48
1:A:540[B]:ARG:HH21	1:A:540[B]:ARG:HG2	1.79	0.48
1:C:545:LEU:CD1	1:C:552:ILE:HD11	2.43	0.48
1:C:680:TYR:HB2	1:C:682:MET:HE2	1.94	0.48
1:C:680:TYR:HB3	1:C:682:MET:HE1	1.95	0.48
1:A:545:LEU:CD1	1:A:552:ILE:HD11	2.45	0.47
1:C:539:SER:OG	1:C:707:GLY:O	2.29	0.46
1:A:507:THR:HB	1:A:508:PRO:CD	2.44	0.46
1:A:680:TYR:HB3	1:A:682:MET:CE	2.45	0.46
1:D:680:TYR:HB3	1:D:682:MET:HE1	1.97	0.46
1:D:594:SER:HA	1:D:597:LEU:HD12	1.98	0.46
1:D:529:LEU:HB2	1:D:540[A]:ARG:HE	1.82	0.45
1:A:562:TYR:CD1	1:A:600:TRP:HB3	2.52	0.45
1:C:562:TYR:CD1	1:C:600:TRP:HB3	2.52	0.45
1:D:680:TYR:HB2	1:D:682:MET:CE	2.47	0.44
1:B:539:SER:OG	1:B:707:GLY:O	2.25	0.44
1:B:592:ALA:HB2	1:B:633:PHE:CD1	2.53	0.44
1:A:680:TYR:CB	1:A:682:MET:HE3	2.47	0.43
1:D:633:PHE:O	1:D:634:THR:OG1	2.33	0.43
1:A:529:LEU:HD22	1:A:540[B]:ARG:HE	1.82	0.43
1:A:529:LEU:HB2	1:A:540[A]:ARG:NE	2.32	0.43
1:C:564:ILE:HG21	1:C:597:LEU:HD22	2.01	0.43
1:B:722:LEU:HD12	1:D:525:ASN:HD21	1.84	0.42
1:C:543:PHE:CE2	1:D:640:MET:HE3	2.55	0.41
1:C:594:SER:HA	1:C:597:LEU:HD12	2.04	0.40
1:D:680:TYR:CB	1:D:682:MET:HE2	2.50	0.40
1:A:653:ASN:OD1	1:A:654:GLU:N	2.54	0.40
1:B:586:LEU:HD23	1:B:586:LEU:C	2.42	0.40
1:C:633:PHE:O	1:C:634:THR:OG1	2.36	0.40

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	203/230 (88%)	196 (97%)	7 (3%)	0	100	100
1	B	192/230 (84%)	187 (97%)	4 (2%)	1 (0%)	29	29
1	C	177/230 (77%)	172 (97%)	5 (3%)	0	100	100
1	D	172/230 (75%)	167 (97%)	5 (3%)	0	100	100
All	All	744/920 (81%)	722 (97%)	21 (3%)	1 (0%)	51	60

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	595	ASP

### 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	181/203 (89%)	180 (99%)	1 (1%)	86	91
1	B	170/203 (84%)	170 (100%)	0	100	100
1	C	159/203 (78%)	158 (99%)	1 (1%)	86	91
1	D	155/203 (76%)	154 (99%)	1 (1%)	86	91
All	All	665/812 (82%)	662 (100%)	3 (0%)	88	92

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	594	SER
1	C	594	SER
1	D	715	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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](#)

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	206/230 (89%)	0.86	31 (15%) 2 2	44, 67, 138, 198	0
1	B	195/230 (84%)	0.76	24 (12%) 4 3	45, 63, 127, 208	0
1	C	182/230 (79%)	0.65	21 (11%) 4 4	48, 66, 129, 151	0
1	D	177/230 (76%)	0.82	26 (14%) 2 2	43, 67, 118, 168	0
All	All	760/920 (82%)	0.77	102 (13%) 3 2	43, 66, 132, 208	0

All (102) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	653	ASN	15.2
1	D	597	LEU	10.4
1	A	602	ARG	9.7
1	B	650	THR	8.4
1	A	650	THR	7.8
1	A	632	PRO	7.5
1	A	649	PRO	7.1
1	C	651	SER	6.4
1	B	722	LEU	6.4
1	A	507	THR	6.3
1	B	655	PRO	6.1
1	A	628	ASP	6.1
1	C	721	TYR	6.0
1	B	654	GLU	6.0
1	D	649	PRO	5.9
1	D	600	TRP	5.3
1	D	648	SER	5.2
1	C	720	LYS	4.9
1	D	604	PRO	4.8
1	A	511	PRO	4.7
1	C	600	TRP	4.6

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Mol	Chain	Res	Type	RSRZ
1	A	629	SER	4.4
1	B	607	ALA	4.4
1	A	506	MET	4.4
1	B	718	THR	4.2
1	A	630	SER	4.1
1	C	633	PHE	4.0
1	A	597	LEU	4.0
1	D	602	ARG	3.9
1	D	509	PRO	3.9
1	D	573	LYS	3.9
1	D	599	GLU	3.8
1	C	602	ARG	3.8
1	D	692	GLN	3.8
1	B	641[A]	GLN	3.8
1	A	540[A]	ARG	3.7
1	A	508	PRO	3.6
1	A	510	ALA	3.6
1	C	722	LEU	3.4
1	A	633	PHE	3.4
1	B	652	SER	3.4
1	A	593	SER	3.3
1	B	629	SER	3.3
1	B	511	PRO	3.3
1	C	511	PRO	3.3
1	C	717	ILE	3.2
1	C	632	PRO	3.2
1	B	717	ILE	3.1
1	C	723	GLU	3.1
1	D	669	PHE	3.1
1	A	652	SER	3.0
1	D	510	ALA	2.9
1	D	593	SER	2.9
1	B	640	MET	2.9
1	D	540[A]	ARG	2.9
1	C	716	PRO	2.9
1	A	600	TRP	2.9
1	D	532	LEU	2.9
1	C	599	GLU	2.8
1	B	510	ALA	2.8
1	D	601	LEU	2.8
1	B	716	PRO	2.8
1	A	651	SER	2.7

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	D	633	PHE	2.7
1	D	553	GLN	2.7
1	D	695	CYS	2.6
1	A	509	PRO	2.6
1	C	598	GLN	2.5
1	C	719	ALA	2.5
1	A	551	ARG	2.4
1	B	669	PHE	2.4
1	A	592	ALA	2.4
1	B	583	TYR	2.4
1	C	597	LEU	2.3
1	B	723	GLU	2.3
1	A	598	GLN	2.3
1	D	647	LYS	2.3
1	C	641	GLN	2.3
1	A	672	CYS	2.3
1	D	634	THR	2.3
1	D	699	LEU	2.3
1	B	697	HIS	2.3
1	D	696	SER	2.3
1	B	709	GLY	2.2
1	A	654	GLU	2.2
1	B	639	GLY	2.2
1	C	656	GLU	2.2
1	B	724	TYR	2.2
1	A	708	SER	2.2
1	A	556	TYR	2.2
1	C	551	ARG	2.2
1	D	511	PRO	2.1
1	A	599	GLU	2.1
1	A	700	TYR	2.1
1	B	584	SER	2.1
1	D	583	TYR	2.1
1	D	656	GLU	2.1
1	B	721	TYR	2.1
1	C	582	PRO	2.1
1	C	556	TYR	2.0
1	A	648	SER	2.0
1	A	691	ARG	2.0

## 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 monosaccharides 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.