



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 14, 2017 – 03:41 am GMT

PDB ID : 3RGV  
Title : A single TCR bound to MHCI and MHC II reveals switchable TCR conformers  
Authors : Dai, S.; Huseby, E.; Scott-Browne, J.; Rubtsova, K.; Pinilla, C.; Crawford, F.;  
Marrack, P.; Yin, L.; Kappler, J.W.  
Deposited on : 2011-04-09  
Resolution : 2.90 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

<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  
Xtriage (Phenix) : 1.9-1692  
EDS : trunk28620  
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)  
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) : recalc28949

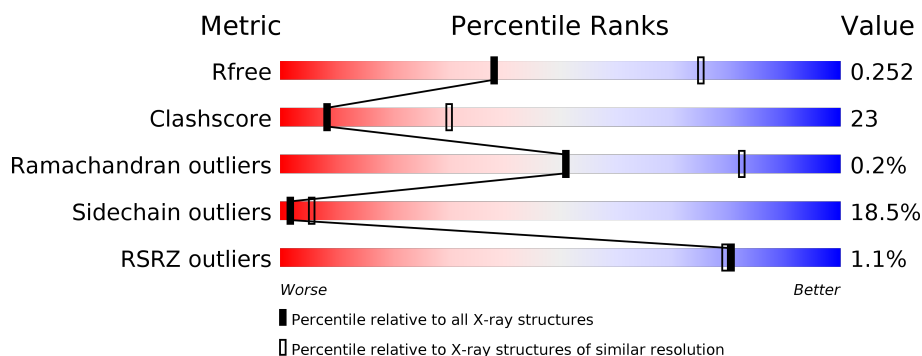
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.90 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))
$R_{free}$	100719	1586 (2.90-2.90)
Clashscore	112137	1807 (2.90-2.90)
Ramachandran outliers	110173	1768 (2.90-2.90)
Sidechain outliers	110143	1770 (2.90-2.90)
RSRZ outliers	101464	1596 (2.90-2.90)

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	200	<div> <div>2%</div> <div> <div></div> <div>53%</div> <div>39%</div> <div>9%</div> </div> </div>
2	B	236	<div> <div>%</div> <div> <div></div> <div>54%</div> <div>38%</div> <div>8%</div> </div> </div>
3	C	275	<div> <div>%</div> <div> <div></div> <div>58%</div> <div>36%</div> <div>7%</div> </div> </div>
4	D	100	<div> <div></div> <div> <div>52%</div> <div>36%</div> <div>12%</div> </div> </div>
5	E	13	<div> <div></div> <div> <div>46%</div> <div>46%</div> <div>8%</div> </div> </div>

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 6592 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 Yae62 TCR a chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	200	Total	C	N	O	S	12	0	0
			1560	976	253	323	8			

- Molecule 2 is a protein called Yae62 TCR b chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	236	Total	C	N	O	S	0	0	0
			1869	1177	325	361	6			

- Molecule 3 is a protein called H-2 class I histocompatibility antigen, K-B alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	275	Total	C	N	O	S	0	0	0
			2235	1407	394	425	9			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	84	CYS	TYR	ENGINEERED MUTATION	UNP P01901
C	121	SER	CYS	ENGINEERED MUTATION	UNP P01901

- Molecule 4 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	100	Total	C	N	O	S	3	0	0
			825	526	139	153	7			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	0	GLY	-	EXPRESSION TAG	UNP P01887

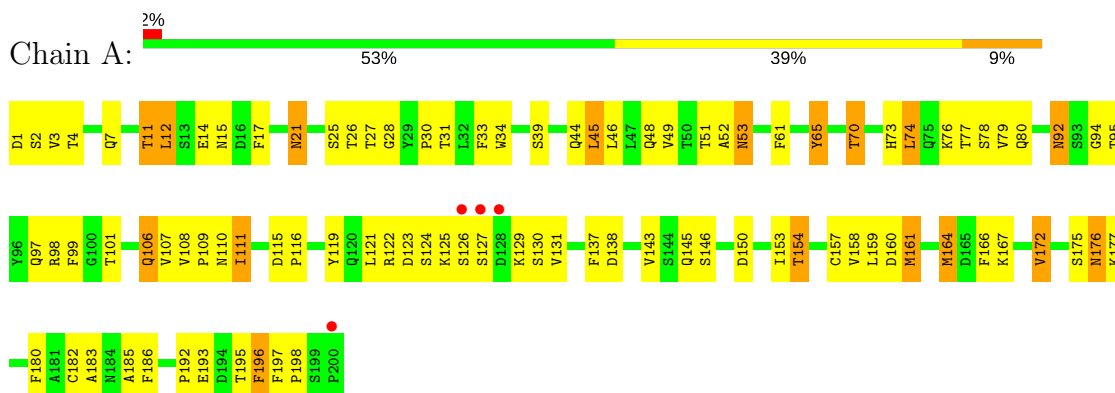
- Molecule 5 is a protein called peptide.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	E	13	Total	C	N	O	S	0	0	0
			103	68	17	16	2			

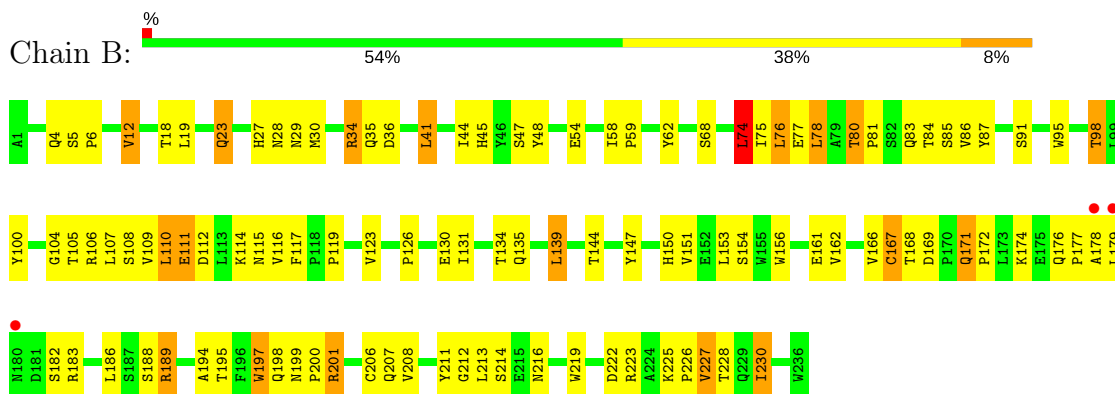
### 3 Residue-property plots [i](#)

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.

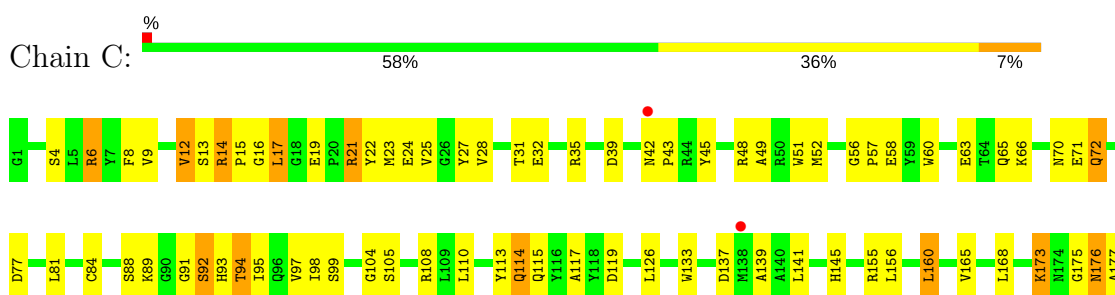
- Molecule 1: Yae62 TCR a chain

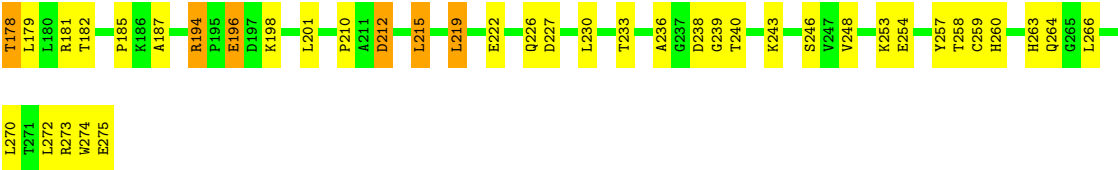


- Molecule 2: Yae62 TCR b chain

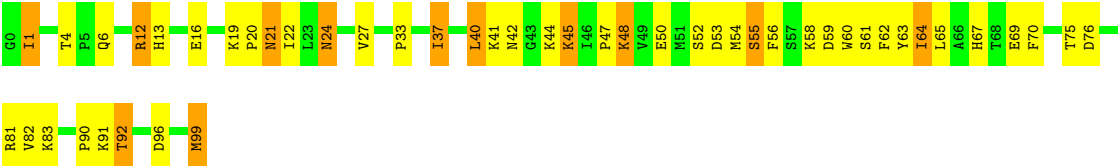


- Molecule 3: H-2 class I histocompatibility antigen, K-B alpha chain





• Molecule 4: Beta-2-microglobulin



• Molecule 5: peptide



## 4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	118.87Å 146.41Å 168.56Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.43 – 2.90 19.43 – 2.90	Depositor EDS
% Data completeness (in resolution range)	92.5 (19.43-2.90) 97.3 (19.43-2.90)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.58 (at 2.88Å)	Xtriage
Refinement program	PHENIX (phenix.refine)	Depositor
R, $R_{free}$	0.202 , 0.254 0.199 , 0.252	Depositor DCC
$R_{free}$ test set	1615 reflections (5.06%)	DCC
Wilson B-factor (Å <sup>2</sup> )	64.2	Xtriage
Anisotropy	0.415	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 33.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	6592	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	58.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.36% 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

### 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	0.52	0/1595	0.69	0/2169
2	B	0.48	0/1922	0.65	1/2620 (0.0%)
3	C	0.48	0/2295	0.66	0/3115
4	D	0.54	0/851	0.68	0/1153
5	E	0.61	0/107	0.84	0/144
All	All	0.50	0/6770	0.67	1/9201 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	74	LEU	CA-CB-CG	5.68	128.37	115.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	164	MET	Peptide

### 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	1560	0	1461	82	0
2	B	1869	0	1763	91	0
3	C	2235	0	2125	95	0
4	D	825	0	799	44	0
5	E	103	0	98	11	0
All	All	6592	0	6246	297	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 23.

All (297) 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:106:GLN:HE21	1:A:106:GLN:HA	1.22	1.01
3:C:238:ASP:HB2	3:C:240:THR:H	1.24	1.01
1:A:7:GLN:HE22	1:A:21:ASN:H	1.11	0.92
3:C:77:ASP:OD2	5:E:8:MET:HG3	1.76	0.86
3:C:173:LYS:HA	3:C:173:LYS:HE3	1.56	0.86
4:D:21:ASN:HD22	4:D:22:ILE:H	1.24	0.85
3:C:70:ASN:HD21	5:E:5:TYR:H	1.25	0.85
2:B:4:GLN:HE21	2:B:105:THR:HG23	1.40	0.84
2:B:84:THR:HG23	2:B:108:SER:HA	1.60	0.84
2:B:4:GLN:NE2	2:B:105:THR:HG23	1.92	0.83
3:C:238:ASP:N	3:C:239:GLY:HA2	1.92	0.83
3:C:13:SER:O	3:C:92:SER:HB2	1.77	0.82
1:A:106:GLN:NE2	1:A:106:GLN:HA	1.94	0.82
4:D:64:ILE:HD13	4:D:65:LEU:H	1.45	0.81
1:A:106:GLN:CA	1:A:106:GLN:HE21	1.94	0.81
4:D:83:LYS:HE2	4:D:90:PRO:HD3	1.62	0.81
4:D:24:ASN:HB3	4:D:67:HIS:HB3	1.63	0.81
2:B:81:PRO:HA	2:B:109:VAL:HG13	1.63	0.80
3:C:238:ASP:H	3:C:239:GLY:HA2	1.46	0.80
3:C:258:THR:HG22	3:C:273:ARG:HE	1.46	0.79
2:B:153:LEU:HD12	2:B:154:SER:N	1.99	0.77
1:A:192:PRO:O	1:A:195:THR:HG23	1.85	0.77
3:C:194:ARG:CG	3:C:194:ARG:HH11	1.98	0.76
2:B:174:LYS:HD3	2:B:177:PRO:HA	1.67	0.76
2:B:80:THR:O	2:B:109:VAL:HG11	1.88	0.73
3:C:93:HIS:HD2	3:C:119:ASP:OD2	1.70	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:92:ASN:ND2	1:A:94:GLY:H	1.87	0.72
3:C:9:VAL:HG22	3:C:24:GLU:HG2	1.70	0.72
2:B:201:ARG:HG2	2:B:201:ARG:HH11	1.53	0.72
3:C:99:SER:HB3	3:C:114:GLN:HG2	1.71	0.72
3:C:194:ARG:CB	3:C:194:ARG:HH11	2.02	0.71
2:B:111:GLU:CD	2:B:111:GLU:H	1.94	0.71
2:B:194:ALA:O	2:B:198:GLN:HG2	1.90	0.70
4:D:83:LYS:HG2	4:D:90:PRO:HB3	1.74	0.70
1:A:92:ASN:HD22	1:A:94:GLY:H	1.39	0.70
3:C:70:ASN:ND2	5:E:5:TYR:H	1.90	0.69
4:D:81:ARG:HG3	4:D:92:THR:HB	1.73	0.69
3:C:274:TRP:CD2	3:C:275:GLU:HA	2.28	0.69
2:B:18:THR:HG23	2:B:75:ILE:HG13	1.75	0.68
3:C:66:LYS:HE2	5:E:2:ILE:HG22	1.76	0.68
2:B:153:LEU:HD12	2:B:154:SER:H	1.60	0.67
1:A:146:SER:HB2	1:A:153:ILE:HD12	1.77	0.66
4:D:13:HIS:H	4:D:21:ASN:HD21	1.44	0.66
1:A:26:THR:HG21	1:A:30:PRO:HG3	1.78	0.66
2:B:62:TYR:CD2	2:B:76:LEU:HD22	2.31	0.66
3:C:215:LEU:H	3:C:215:LEU:HD22	1.61	0.65
3:C:219:LEU:HD23	3:C:219:LEU:O	1.97	0.65
2:B:116:VAL:O	2:B:223:ARG:NH2	2.30	0.64
3:C:196:GLU:HA	3:C:196:GLU:OE2	1.95	0.64
3:C:12:VAL:HG13	3:C:94:THR:HG23	1.79	0.64
4:D:42:ASN:HD21	4:D:76:ASP:HA	1.63	0.64
2:B:110:LEU:HD23	2:B:147:TYR:HE2	1.62	0.64
3:C:99:SER:HB3	3:C:114:GLN:CG	2.27	0.64
4:D:64:ILE:HD13	4:D:65:LEU:N	2.13	0.64
3:C:17:LEU:HD22	3:C:17:LEU:O	1.98	0.63
3:C:194:ARG:HG3	3:C:194:ARG:HH11	1.61	0.63
4:D:37:ILE:HG23	4:D:82:VAL:HG22	1.81	0.62
1:A:154:THR:CG2	1:A:172:VAL:HG22	2.30	0.62
2:B:112:ASP:HB3	2:B:115:ASN:ND2	2.15	0.61
1:A:45:LEU:HG	2:B:98:THR:CG2	2.29	0.61
1:A:196:PHE:CZ	1:A:198:PRO:HG3	2.35	0.61
1:A:1:ASP:CB	1:A:95:THR:HG21	2.30	0.61
1:A:154:THR:HG23	1:A:172:VAL:H	1.65	0.61
1:A:154:THR:HG23	1:A:172:VAL:O	2.01	0.61
1:A:49:VAL:HG21	1:A:65:TYR:HB2	1.83	0.60
3:C:13:SER:C	3:C:15:PRO:HD3	2.22	0.60
4:D:59:ASP:O	4:D:60:TRP:HB2	2.01	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:174:LYS:HG2	2:B:182:SER:HB3	1.84	0.60
2:B:117:PHE:CD1	2:B:183:ARG:HD3	2.37	0.59
1:A:129:LYS:HD3	1:A:130:SER:H	1.67	0.59
1:A:154:THR:HG21	1:A:172:VAL:HG22	1.84	0.59
1:A:12:LEU:O	1:A:108:VAL:HG12	2.02	0.59
1:A:12:LEU:HD12	1:A:79:VAL:HG11	1.83	0.59
3:C:194:ARG:NH1	3:C:194:ARG:HG3	2.17	0.59
4:D:21:ASN:HD22	4:D:22:ILE:N	1.97	0.59
2:B:58:ILE:N	2:B:59:PRO:HD3	2.18	0.58
1:A:121:LEU:HD12	1:A:121:LEU:N	2.18	0.58
3:C:194:ARG:HB3	3:C:194:ARG:HH11	1.68	0.58
3:C:52:MET:HE2	3:C:52:MET:HA	1.86	0.58
2:B:219:TRP:HB2	2:B:225:LYS:HG3	1.84	0.58
3:C:81:LEU:HD23	5:E:10:CYS:SG	2.44	0.58
2:B:156:TRP:CZ3	2:B:161:GLU:HB2	2.39	0.58
2:B:223:ARG:HH21	2:B:226:PRO:HG3	1.69	0.57
3:C:238:ASP:HB2	3:C:240:THR:N	2.08	0.57
1:A:172:VAL:HG13	2:B:189:ARG:HH21	1.69	0.57
2:B:212:GLY:H	2:B:228:THR:HG22	1.69	0.57
2:B:23:GLN:NE2	2:B:30:MET:SD	2.78	0.56
2:B:139:LEU:N	2:B:139:LEU:HD23	2.20	0.56
1:A:61:PHE:HB3	1:A:74:LEU:HD21	1.87	0.56
1:A:11:THR:O	1:A:12:LEU:HD23	2.06	0.56
2:B:116:VAL:HG12	2:B:226:PRO:HB2	1.88	0.56
3:C:70:ASN:HD21	5:E:5:TYR:N	2.01	0.56
1:A:185:ALA:O	1:A:186:PHE:HB2	2.06	0.55
1:A:34:TRP:CE2	1:A:74:LEU:HB2	2.41	0.55
2:B:62:TYR:CE2	2:B:76:LEU:HD22	2.41	0.55
1:A:116:PRO:CB	1:A:195:THR:HG22	2.36	0.55
2:B:201:ARG:CG	2:B:201:ARG:HH11	2.20	0.55
2:B:112:ASP:HB3	2:B:115:ASN:HD21	1.71	0.55
2:B:212:GLY:N	2:B:228:THR:HG22	2.21	0.55
3:C:266:LEU:HD12	3:C:266:LEU:O	2.05	0.55
3:C:19:GLU:HA	3:C:19:GLU:OE1	2.07	0.54
3:C:274:TRP:CE3	3:C:275:GLU:HA	2.42	0.54
3:C:178:THR:O	3:C:181:ARG:HG2	2.07	0.54
4:D:40:LEU:HD12	4:D:45:LYS:HA	1.88	0.54
3:C:4:SER:OG	3:C:6:ARG:NH2	2.40	0.54
1:A:143:VAL:O	1:A:143:VAL:HG13	2.08	0.54
1:A:121:LEU:HB2	1:A:131:VAL:HG12	1.89	0.54
3:C:194:ARG:CG	3:C:194:ARG:NH1	2.65	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:45:LYS:H	4:D:45:LYS:HD2	1.73	0.53
2:B:23:GLN:OE1	2:B:27:HIS:HB2	2.09	0.53
3:C:42:ASN:N	3:C:43:PRO:HD3	2.24	0.53
2:B:62:TYR:HD2	2:B:76:LEU:HD22	1.74	0.53
2:B:150:HIS:HB3	2:B:211:TYR:HB2	1.90	0.53
1:A:26:THR:HG21	1:A:30:PRO:HD3	1.90	0.52
3:C:14:ARG:O	3:C:17:LEU:HD13	2.09	0.52
3:C:15:PRO:HG2	3:C:91:GLY:O	2.09	0.52
3:C:25:VAL:HG12	3:C:27:TYR:CE1	2.45	0.52
1:A:21:ASN:ND2	1:A:73:HIS:HE1	2.07	0.52
3:C:215:LEU:HA	3:C:260:HIS:O	2.09	0.52
4:D:16:GLU:HB3	4:D:19:LYS:HE3	1.90	0.52
4:D:59:ASP:HB3	4:D:61:SER:H	1.75	0.52
2:B:219:TRP:CB	2:B:225:LYS:HG3	2.39	0.52
4:D:24:ASN:HB2	4:D:65:LEU:HD11	1.92	0.52
1:A:26:THR:HG21	1:A:30:PRO:CD	2.40	0.52
3:C:35:ARG:HB3	3:C:48:ARG:HD2	1.92	0.52
3:C:126:LEU:HD13	3:C:133:TRP:CZ3	2.45	0.51
3:C:274:TRP:CG	3:C:275:GLU:HA	2.45	0.51
3:C:32:GLU:OE2	3:C:48:ARG:HD3	2.10	0.51
3:C:15:PRO:CB	3:C:16:GLY:HA2	2.40	0.51
1:A:161:MET:HG3	1:A:166:PHE:HD2	1.75	0.51
2:B:48:TYR:O	3:C:72:GLN:HG2	2.11	0.51
1:A:1:ASP:HB3	1:A:95:THR:HG21	1.93	0.50
2:B:19:LEU:HD12	2:B:74:LEU:HD11	1.93	0.50
2:B:119:PRO:HG2	2:B:208:VAL:CG2	2.42	0.50
1:A:116:PRO:HB2	1:A:195:THR:HG22	1.93	0.50
2:B:12:VAL:HA	2:B:110:LEU:O	2.11	0.50
2:B:213:LEU:HD12	2:B:226:PRO:HD2	1.94	0.50
4:D:33:PRO:HB3	4:D:62:PHE:CE2	2.47	0.50
4:D:54:MET:HG3	4:D:55:SER:N	2.26	0.49
1:A:108:VAL:HG22	1:A:109:PRO:CD	2.42	0.49
2:B:27:HIS:ND1	2:B:91:SER:OG	2.39	0.49
1:A:28:GLY:O	1:A:30:PRO:HD3	2.12	0.49
3:C:99:SER:CB	3:C:114:GLN:HG3	2.42	0.49
5:E:2:ILE:HD13	5:E:3:TYR:H	1.77	0.49
3:C:266:LEU:HD22	3:C:270:LEU:HG	1.95	0.49
2:B:116:VAL:CG1	2:B:226:PRO:HB2	2.43	0.49
2:B:23:GLN:O	2:B:23:GLN:HG2	2.10	0.49
2:B:28:ASN:HB3	2:B:48:TYR:O	2.13	0.49
1:A:160:ASP:OD2	1:A:167:LYS:HE3	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:26:THR:HG21	1:A:30:PRO:CG	2.41	0.48
3:C:194:ARG:HB2	3:C:198:LYS:HB2	1.94	0.48
4:D:55:SER:HB2	4:D:63:TYR:CE2	2.48	0.48
1:A:14:GLU:HG3	1:A:110:ASN:ND2	2.29	0.48
1:A:45:LEU:HG	2:B:98:THR:HG23	1.94	0.48
2:B:169:ASP:HB2	2:B:186:LEU:HD12	1.95	0.48
2:B:76:LEU:HD23	2:B:76:LEU:N	2.29	0.48
1:A:196:PHE:CD2	1:A:196:PHE:C	2.86	0.48
4:D:1:ILE:HD13	4:D:1:ILE:H	1.77	0.48
4:D:21:ASN:C	4:D:22:ILE:HD12	2.34	0.48
2:B:34:ARG:HH22	2:B:83:GLN:HA	1.77	0.48
4:D:55:SER:HB2	4:D:63:TYR:CZ	2.49	0.48
3:C:212:ASP:OD2	3:C:212:ASP:N	2.46	0.47
3:C:233:THR:OG1	3:C:243:LYS:HD2	2.14	0.47
4:D:27:VAL:HG21	4:D:37:ILE:HD13	1.94	0.47
4:D:69:GLU:CD	4:D:69:GLU:H	2.17	0.47
3:C:104:GLY:HA2	3:C:110:LEU:HD12	1.96	0.47
3:C:236:ALA:O	4:D:12:ARG:HD3	2.14	0.47
3:C:155:ARG:NH1	5:E:4:VAL:O	2.44	0.47
1:A:76:LYS:HD3	1:A:79:VAL:HA	1.95	0.47
3:C:215:LEU:H	3:C:215:LEU:CD2	2.26	0.47
4:D:96:ASP:HB3	4:D:99:MET:HG3	1.96	0.47
2:B:156:TRP:CH2	2:B:161:GLU:HB2	2.50	0.47
2:B:153:LEU:HD21	2:B:188:SER:HB3	1.96	0.47
3:C:187:ALA:CB	3:C:272:LEU:HD11	2.44	0.47
3:C:49:ALA:HB1	3:C:51:TRP:NE1	2.29	0.47
4:D:41:LYS:O	4:D:42:ASN:C	2.53	0.47
1:A:92:ASN:HB2	1:A:97:GLN:HE22	1.80	0.47
3:C:12:VAL:HG23	3:C:21:ARG:HB3	1.96	0.47
1:A:150:ASP:O	1:A:175:SER:HB2	2.15	0.46
2:B:116:VAL:HG12	2:B:226:PRO:CB	2.45	0.46
2:B:35:GLN:HB2	2:B:41:LEU:CD1	2.45	0.46
2:B:95:TRP:HZ2	3:C:65:GLN:NE2	2.13	0.46
2:B:126:PRO:HD2	2:B:197:TRP:CZ2	2.51	0.46
4:D:12:ARG:HG2	4:D:13:HIS:CE1	2.50	0.46
2:B:29:ASN:HA	2:B:47:SER:O	2.16	0.46
3:C:99:SER:HB2	3:C:114:GLN:HG3	1.98	0.46
3:C:56:GLY:O	3:C:60:TRP:CD1	2.67	0.46
1:A:53:ASN:HB3	1:A:65:TYR:O	2.16	0.46
3:C:259:CYS:HB3	3:C:272:LEU:HB2	1.96	0.46
2:B:116:VAL:O	2:B:117:PHE:CG	2.69	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:62:TYR:HD2	2:B:76:LEU:CD2	2.28	0.46
3:C:95:ILE:HG21	5:E:8:MET:HE1	1.97	0.46
1:A:52:ALA:HA	1:A:53:ASN:HA	1.65	0.46
2:B:41:LEU:HA	2:B:41:LEU:HD12	1.79	0.46
3:C:185:PRO:HD3	3:C:263:HIS:ND1	2.30	0.46
2:B:189:ARG:N	2:B:189:ARG:HD2	2.31	0.45
3:C:156:LEU:HG	3:C:160:LEU:HD22	1.99	0.45
3:C:238:ASP:CB	3:C:240:THR:H	2.12	0.45
3:C:139:ALA:HA	5:E:11:GLY:O	2.17	0.45
1:A:79:VAL:HG22	1:A:107:VAL:HG21	1.99	0.45
1:A:119:TYR:CE1	2:B:130:GLU:HA	2.52	0.45
4:D:45:LYS:CD	4:D:45:LYS:H	2.29	0.45
3:C:84:CYS:SG	5:E:11:GLY:HA2	2.57	0.45
2:B:110:LEU:HD23	2:B:147:TYR:CE2	2.48	0.45
2:B:225:LYS:HA	2:B:226:PRO:HD3	1.83	0.45
1:A:45:LEU:HD21	1:A:48:GLN:CG	2.47	0.45
3:C:99:SER:CB	3:C:114:GLN:CG	2.95	0.45
2:B:171:GLN:HA	2:B:172:PRO:HD3	1.73	0.44
2:B:134:THR:C	2:B:135:GLN:HG2	2.38	0.44
2:B:34:ARG:NH2	2:B:83:GLN:HA	2.32	0.44
1:A:183:ALA:HA	1:A:197:PHE:CE1	2.51	0.44
2:B:85:SER:OG	2:B:86:VAL:N	2.50	0.44
3:C:210:PRO:HG2	3:C:264:GLN:OE1	2.17	0.44
3:C:12:VAL:HG11	4:D:33:PRO:HG2	2.00	0.44
2:B:131:ILE:HG23	2:B:194:ALA:HB1	1.99	0.44
1:A:49:VAL:CG2	1:A:65:TYR:HB2	2.47	0.43
2:B:116:VAL:CG1	2:B:117:PHE:N	2.81	0.43
2:B:211:TYR:HA	2:B:228:THR:HG22	2.00	0.43
4:D:47:PRO:HD2	4:D:48:LYS:HG2	1.99	0.43
2:B:34:ARG:NH1	2:B:85:SER:HB2	2.33	0.43
3:C:57:PRO:HD2	3:C:58:GLU:H	1.83	0.43
2:B:176:GLN:HA	2:B:177:PRO:HD3	1.72	0.43
4:D:22:ILE:HD12	4:D:22:ILE:N	2.33	0.43
4:D:59:ASP:O	4:D:60:TRP:CB	2.65	0.43
1:A:185:ALA:O	1:A:186:PHE:CB	2.65	0.43
1:A:33:PHE:CD1	1:A:48:GLN:HG2	2.54	0.43
1:A:123:ASP:OD2	1:A:124:SER:N	2.51	0.43
1:A:176:ASN:O	1:A:177:LYS:HG2	2.19	0.43
1:A:70:THR:O	1:A:70:THR:OG1	2.33	0.43
1:A:15:ASN:HA	1:A:78:SER:OG	2.18	0.43
1:A:129:LYS:HD3	1:A:130:SER:N	2.33	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:238:ASP:OD1	4:D:12:ARG:HD2	2.18	0.43
1:A:154:THR:CG2	1:A:172:VAL:H	2.32	0.43
1:A:196:PHE:CE2	1:A:198:PRO:HG3	2.54	0.43
1:A:7:GLN:HE22	1:A:21:ASN:N	1.95	0.43
3:C:215:LEU:N	3:C:215:LEU:HD22	2.30	0.43
3:C:253:LYS:HE3	3:C:253:LYS:HB3	1.80	0.43
3:C:35:ARG:CB	3:C:48:ARG:HD2	2.49	0.43
2:B:6:PRO:O	2:B:105:THR:CG2	2.67	0.42
3:C:126:LEU:HD12	3:C:126:LEU:HA	1.65	0.42
3:C:210:PRO:HD2	3:C:263:HIS:NE2	2.34	0.42
4:D:19:LYS:HA	4:D:20:PRO:HD3	1.92	0.42
1:A:106:GLN:NE2	1:A:106:GLN:CA	2.67	0.42
1:A:116:PRO:HB3	1:A:195:THR:HG22	2.01	0.42
2:B:207:GLN:O	2:B:207:GLN:HG2	2.19	0.42
1:A:180:PHE:CZ	1:A:185:ALA:HB2	2.54	0.42
1:A:99:PHE:HB2	2:B:41:LEU:HB2	2.01	0.42
1:A:45:LEU:HG	2:B:98:THR:HG21	2.00	0.42
4:D:41:LYS:O	4:D:44:LYS:HG2	2.20	0.42
1:A:115:ASP:N	1:A:116:PRO:HD3	2.34	0.42
1:A:126:SER:O	1:A:127:SER:HB2	2.20	0.42
1:A:33:PHE:HD1	1:A:48:GLN:HG2	1.84	0.42
2:B:166:VAL:CG1	2:B:167:CYS:N	2.82	0.42
3:C:23:MET:CE	3:C:35:ARG:NH1	2.83	0.42
1:A:80:GLN:NE2	1:A:80:GLN:HA	2.32	0.42
4:D:6:GLN:O	4:D:27:VAL:HA	2.20	0.42
1:A:52:ALA:HA	1:A:65:TYR:HB3	2.02	0.42
2:B:199:ASN:HA	2:B:200:PRO:HD3	1.88	0.42
2:B:230:ILE:HG22	2:B:230:ILE:O	2.20	0.42
3:C:117:ALA:HB2	4:D:60:TRP:CE2	2.55	0.42
2:B:227:VAL:HG23	2:B:228:THR:O	2.20	0.41
4:D:58:LYS:H	4:D:58:LYS:HG3	1.59	0.41
3:C:182:THR:HG23	3:C:182:THR:O	2.20	0.41
1:A:45:LEU:HD21	1:A:48:GLN:HG3	2.02	0.41
2:B:100:TYR:CD2	2:B:100:TYR:N	2.89	0.41
2:B:110:LEU:HD12	2:B:110:LEU:H	1.86	0.41
2:B:44:ILE:HG22	2:B:45:HIS:CD2	2.56	0.41
3:C:257:TYR:O	3:C:273:ARG:HD3	2.21	0.41
1:A:182:CYS:O	1:A:183:ALA:C	2.58	0.41
4:D:64:ILE:CD1	4:D:65:LEU:N	2.83	0.41
1:A:111:ILE:HD12	1:A:137:PHE:O	2.20	0.41
1:A:159:LEU:HD12	1:A:159:LEU:C	2.41	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:87:TYR:O	2:B:104:GLY:HA2	2.21	0.41
1:A:159:LEU:HB3	2:B:167:CYS:HB3	2.02	0.41
3:C:201:LEU:O	3:C:246:SER:HA	2.21	0.41
3:C:8:PHE:HD2	4:D:56:PHE:CZ	2.39	0.41
2:B:119:PRO:HG2	2:B:208:VAL:HG21	2.02	0.41
4:D:16:GLU:OE2	4:D:19:LYS:HE2	2.21	0.41
1:A:121:LEU:HB2	1:A:131:VAL:CG1	2.50	0.41
2:B:23:GLN:HE21	2:B:23:GLN:HB3	1.39	0.41
1:A:160:ASP:C	1:A:160:ASP:OD1	2.59	0.41
2:B:78:LEU:HD12	2:B:78:LEU:H	1.85	0.41
3:C:22:TYR:HB2	3:C:71:GLU:HG3	2.03	0.41
3:C:9:VAL:HB	3:C:97:VAL:HB	2.03	0.41
1:A:176:ASN:N	1:A:176:ASN:OD1	2.54	0.41
3:C:117:ALA:HB2	4:D:60:TRP:CZ2	2.55	0.41
1:A:108:VAL:HG22	1:A:109:PRO:HD2	2.03	0.40
3:C:175:GLY:O	3:C:176:ASN:C	2.60	0.40
3:C:98:ILE:HG22	3:C:113:TYR:HE1	1.86	0.40
1:A:79:VAL:O	1:A:79:VAL:HG13	2.22	0.40
3:C:137:ASP:C	3:C:137:ASP:OD2	2.59	0.40
3:C:160:LEU:HD12	3:C:160:LEU:HA	1.86	0.40
3:C:179:LEU:HD23	3:C:179:LEU:HA	1.86	0.40
2:B:95:TRP:CZ2	3:C:65:GLN:NE2	2.90	0.40
2:B:169:ASP:HB2	2:B:186:LEU:CD1	2.50	0.40
2:B:216:ASN:OD1	2:B:216:ASN:N	2.49	0.40
3:C:6:ARG:NE	3:C:113:TYR:OH	2.53	0.40

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	198/200 (99%)	181 (91%)	17 (9%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	234/236 (99%)	220 (94%)	13 (6%)	1 (0%)	38	72
3	C	273/275 (99%)	250 (92%)	22 (8%)	1 (0%)	38	72
4	D	98/100 (98%)	89 (91%)	9 (9%)	0	100	100
5	E	11/13 (85%)	10 (91%)	1 (9%)	0	100	100
All	All	814/824 (99%)	750 (92%)	62 (8%)	2 (0%)	51	82

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	C	177	ALA
2	B	178	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	179/179 (100%)	141 (79%)	38 (21%)	1	4
2	B	203/203 (100%)	166 (82%)	37 (18%)	2	6
3	C	233/233 (100%)	195 (84%)	38 (16%)	3	8
4	D	94/94 (100%)	75 (80%)	19 (20%)	1	4
5	E	10/10 (100%)	9 (90%)	1 (10%)	9	27
All	All	719/719 (100%)	586 (82%)	133 (18%)	2	5

All (133) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2	SER
1	A	3	VAL
1	A	4	THR
1	A	11	THR
1	A	12	LEU
1	A	17	PHE

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Mol	Chain	Res	Type
1	A	21	ASN
1	A	25	SER
1	A	27	THR
1	A	31	THR
1	A	39	SER
1	A	44	GLN
1	A	45	LEU
1	A	46	LEU
1	A	51	THR
1	A	53	ASN
1	A	65	TYR
1	A	70	THR
1	A	74	LEU
1	A	77	THR
1	A	92	ASN
1	A	98	ARG
1	A	101	THR
1	A	106	GLN
1	A	111	ILE
1	A	122	ARG
1	A	125	LYS
1	A	138	ASP
1	A	145	GLN
1	A	154	THR
1	A	157	CYS
1	A	158	VAL
1	A	161	MET
1	A	164	MET
1	A	172	VAL
1	A	176	ASN
1	A	193	GLU
1	A	196	PHE
2	B	5	SER
2	B	12	VAL
2	B	23	GLN
2	B	34	ARG
2	B	36	ASP
2	B	41	LEU
2	B	54	GLU
2	B	68	SER
2	B	74	LEU
2	B	76	LEU

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Mol	Chain	Res	Type
2	B	77	GLU
2	B	78	LEU
2	B	80	THR
2	B	98	THR
2	B	106	ARG
2	B	107	LEU
2	B	110	LEU
2	B	111	GLU
2	B	114	LYS
2	B	123	VAL
2	B	139	LEU
2	B	144	THR
2	B	151	VAL
2	B	162	VAL
2	B	167	CYS
2	B	168	THR
2	B	171	GLN
2	B	179	LEU
2	B	189	ARG
2	B	195	THR
2	B	197	TRP
2	B	201	ARG
2	B	206	CYS
2	B	214	SER
2	B	222	ASP
2	B	227	VAL
2	B	230	ILE
3	C	6	ARG
3	C	12	VAL
3	C	14	ARG
3	C	17	LEU
3	C	21	ARG
3	C	28	VAL
3	C	31	THR
3	C	39	ASP
3	C	45	TYR
3	C	63	GLU
3	C	72	GLN
3	C	88	SER
3	C	89	LYS
3	C	92	SER
3	C	94	THR

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Mol	Chain	Res	Type
3	C	105	SER
3	C	108	ARG
3	C	114	GLN
3	C	115	GLN
3	C	141	LEU
3	C	145	HIS
3	C	160	LEU
3	C	165	VAL
3	C	168	LEU
3	C	173	LYS
3	C	176	ASN
3	C	178	THR
3	C	194	ARG
3	C	196	GLU
3	C	212	ASP
3	C	215	LEU
3	C	219	LEU
3	C	222	GLU
3	C	226	GLN
3	C	227	ASP
3	C	230	LEU
3	C	248	VAL
3	C	254	GLU
4	D	1	ILE
4	D	4	THR
4	D	12	ARG
4	D	21	ASN
4	D	24	ASN
4	D	37	ILE
4	D	40	LEU
4	D	45	LYS
4	D	48	LYS
4	D	50	GLU
4	D	52	SER
4	D	53	ASP
4	D	55	SER
4	D	64	ILE
4	D	70	PHE
4	D	75	THR
4	D	91	LYS
4	D	92	THR
4	D	99	MET

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Mol	Chain	Res	Type
5	E	2	ILE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (28) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	7	GLN
1	A	15	ASN
1	A	21	ASN
1	A	80	GLN
1	A	92	ASN
1	A	97	GLN
1	A	106	GLN
1	A	120	GLN
1	A	145	GLN
1	A	187	ASN
2	B	23	GLN
2	B	28	ASN
2	B	29	ASN
2	B	115	ASN
2	B	133	HIS
2	B	198	GLN
3	C	65	GLN
3	C	70	ASN
3	C	87	GLN
3	C	93	HIS
3	C	96	GLN
3	C	115	GLN
3	C	191	HIS
3	C	192	HIS
3	C	260	HIS
4	D	21	ASN
4	D	38	GLN
4	D	42	ASN

### 5.3.3 RNA ⓘ

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	200/200 (100%)	-0.23	4 (2%) 65 62	30, 53, 95, 110	3 (1%)
2	B	236/236 (100%)	-0.24	3 (1%) 77 76	33, 54, 94, 122	0
3	C	275/275 (100%)	-0.21	2 (0%) 87 86	33, 61, 91, 102	0
4	D	100/100 (100%)	-0.25	0 100 100	32, 53, 77, 85	1 (1%)
5	E	13/13 (100%)	-0.18	0 100 100	37, 47, 84, 85	0
All	All	824/824 (100%)	-0.22	9 (1%) 80 79	30, 56, 91, 122	4 (0%)

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	127	SER	4.6
2	B	179	LEU	3.7
1	A	200	PRO	3.7
1	A	128	ASP	3.6
2	B	180	ASN	3.5
2	B	178	ALA	2.8
3	C	42	ASN	2.6
1	A	126	SER	2.3
3	C	138	MET	2.3

### 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.