



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 17, 2026 – 11:14 PM UTC

PDB ID : 6VME / pdb\_00006vme  
Title : Human ESCRT-I heterotetramer headpiece  
Authors : Flower, T.G.; Hurley, J.H.; Tjahjono, N.  
Deposited on : 2020-01-27  
Resolution : 2.19 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.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

---

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4-5-2 with Phenix2.0  
Xtrriage (Phenix) : 2.0  
EDS : 3.0  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
CCP4 : 9.0.010 (Gargrove)  
Density-Fitness : 1.0.12  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.49

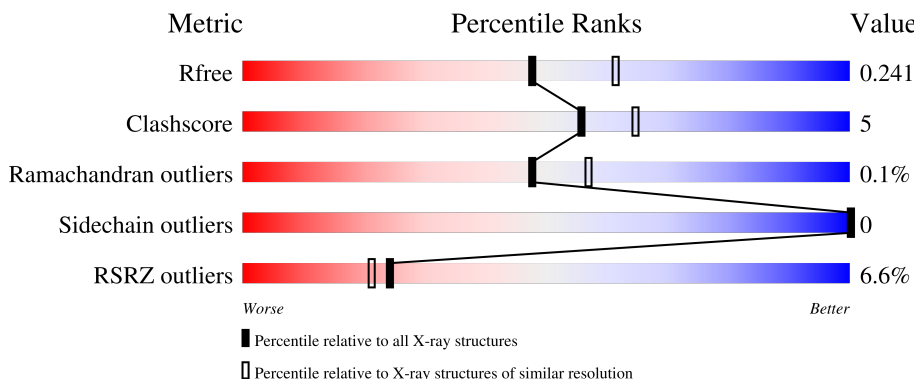
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.19 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))
$R_{free}$	180053	6164 (2.20-2.20)
Clashscore	190562	6851 (2.20-2.20)
Ramachandran outliers	187476	6768 (2.20-2.20)
Sidechain outliers	187428	6769 (2.20-2.20)
RSRZ outliers	180081	6166 (2.20-2.20)

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	B	81	
1	F	81	
1	G	81	
1	H	81	
1	I	81	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	J	81	
2	C	71	
2	K	71	
2	L	71	
2	M	71	
2	N	71	
2	O	71	
3	A	25	
3	D	25	
3	P	25	
3	Q	25	
3	R	25	
3	T	25	
4	E	122	
4	U	122	
4	V	122	
4	W	122	
4	X	122	
4	Y	122	

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 12786 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 Tumor susceptibility gene 101 protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	B	76	Total 607	C 391	N 107	O 108	S 1	0	0	0
1	F	77	Total 615	C 397	N 108	O 109	S 1	0	0	0
1	G	75	Total 603	C 389	N 106	O 107	S 1	0	0	0
1	H	76	Total 607	C 392	N 106	O 108	S 1	0	0	0
1	I	75	Total 602	C 390	N 106	O 105	S 1	0	0	0
1	J	76	Total 604	C 390	N 107	O 106	S 1	0	0	0

- Molecule 2 is a protein called Vacuolar protein sorting-associated protein 37B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	C	67	Total 527	C 331	N 88	O 105	S 3	0	0	0
2	K	65	Total 521	C 330	N 87	O 101	S 3	0	0	0
2	L	65	Total 517	C 328	N 87	O 99	S 3	0	0	0
2	M	65	Total 514	C 326	N 86	O 99	S 3	0	0	0
2	N	67	Total 530	C 334	N 88	O 105	S 3	0	0	0
2	O	62	Total 488	C 310	N 82	O 93	S 3	0	0	0

- Molecule 3 is a protein called Multivesicular body subunit 12A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	D	19	Total	C	N	O	S	0	0	0
			135	87	21	26	1			
3	P	20	Total	C	N	O	S	0	0	0
			137	89	20	27	1			
3	Q	18	Total	C	N	O	S	0	0	0
			118	75	18	24	1			
3	R	21	Total	C	N	O	S	0	0	0
			143	92	21	29	1			
3	A	20	Total	C	N	O	S	0	0	0
			135	87	20	27	1			
3	T	18	Total	C	N	O	S	0	0	0
			125	81	18	25	1			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	204	SER	-	expression tag	UNP Q96EY5
D	205	ASN	-	expression tag	UNP Q96EY5
P	204	SER	-	expression tag	UNP Q96EY5
P	205	ASN	-	expression tag	UNP Q96EY5
Q	204	SER	-	expression tag	UNP Q96EY5
Q	205	ASN	-	expression tag	UNP Q96EY5
R	204	SER	-	expression tag	UNP Q96EY5
R	205	ASN	-	expression tag	UNP Q96EY5
A	204	SER	-	expression tag	UNP Q96EY5
A	205	ASN	-	expression tag	UNP Q96EY5
T	204	SER	-	expression tag	UNP Q96EY5
T	205	ASN	-	expression tag	UNP Q96EY5

- Molecule 4 is a protein called Vacuolar protein sorting-associated protein 28 homolog.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	E	102	Total	C	N	O	S	0	0	0
			822	520	138	157	7			
4	U	102	Total	C	N	O	S	0	0	0
			827	524	141	155	7			
4	V	104	Total	C	N	O	S	0	0	0
			826	523	139	157	7			
4	W	105	Total	C	N	O	S	0	0	0
			840	530	143	160	7			
4	X	101	Total	C	N	O	S	0	0	0
			820	520	137	156	7			
4	Y	100	Total	C	N	O	S	0	0	0
			815	515	138	155	7			

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	10	Total O 10 10	0	0
5	C	8	Total O 8 8	0	0
5	D	3	Total O 3 3	0	0
5	E	31	Total O 31 31	0	0
5	F	18	Total O 18 18	0	0
5	G	16	Total O 16 16	0	0
5	H	5	Total O 5 5	0	0
5	I	10	Total O 10 10	0	0
5	J	5	Total O 5 5	0	0
5	K	12	Total O 12 12	0	0
5	L	3	Total O 3 3	0	0
5	M	6	Total O 6 6	0	0
5	N	15	Total O 15 15	0	0
5	O	1	Total O 1 1	0	0
5	P	7	Total O 7 7	0	0
5	Q	2	Total O 2 2	0	0
5	R	2	Total O 2 2	0	0
5	A	10	Total O 10 10	0	0
5	U	34	Total O 34 34	0	0
5	V	37	Total O 37 37	0	0
5	W	22	Total O 22 22	0	0

*Continued on next page...*

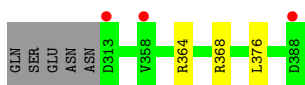
*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
5	X	25	Total	O	0	0
			25	25		
5	Y	26	Total	O	0	0
			26	26		

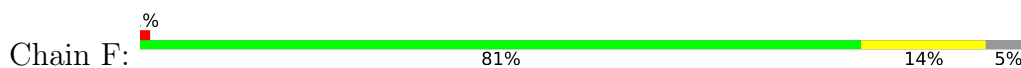
### 3 Residue-property plots [i](#)

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.

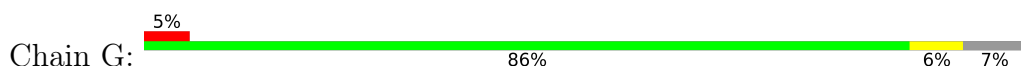
- Molecule 1: Tumor susceptibility gene 101 protein



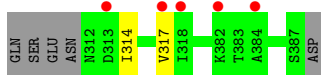
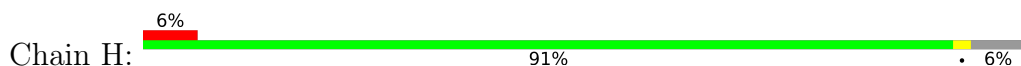
- Molecule 1: Tumor susceptibility gene 101 protein



- Molecule 1: Tumor susceptibility gene 101 protein



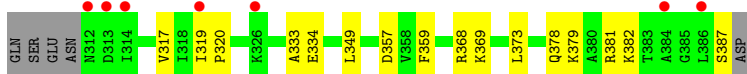
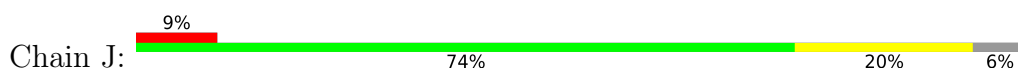
- Molecule 1: Tumor susceptibility gene 101 protein



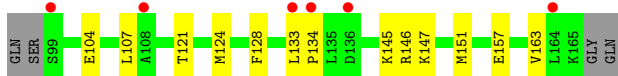
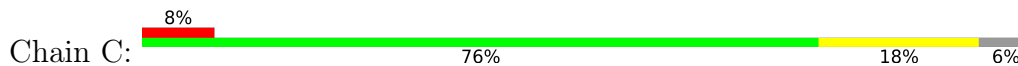
- Molecule 1: Tumor susceptibility gene 101 protein



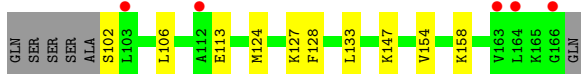
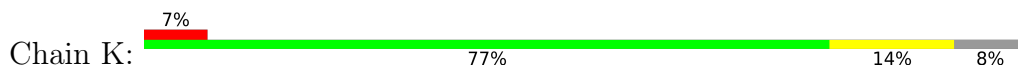
- Molecule 1: Tumor susceptibility gene 101 protein



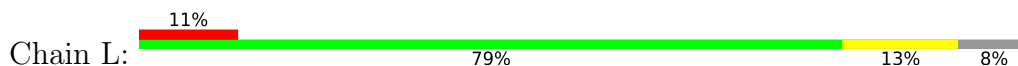
- Molecule 2: Vacuolar protein sorting-associated protein 37B



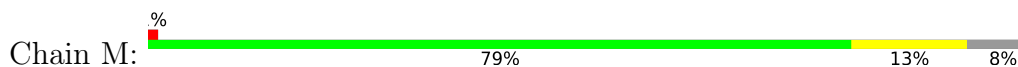
- Molecule 2: Vacuolar protein sorting-associated protein 37B



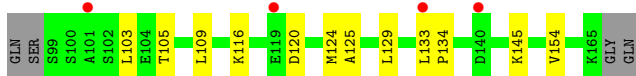
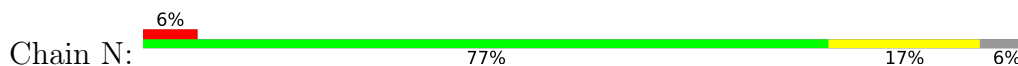
- Molecule 2: Vacuolar protein sorting-associated protein 37B



- Molecule 2: Vacuolar protein sorting-associated protein 37B



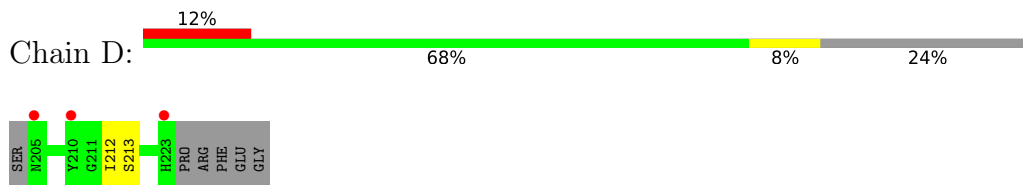
- Molecule 2: Vacuolar protein sorting-associated protein 37B



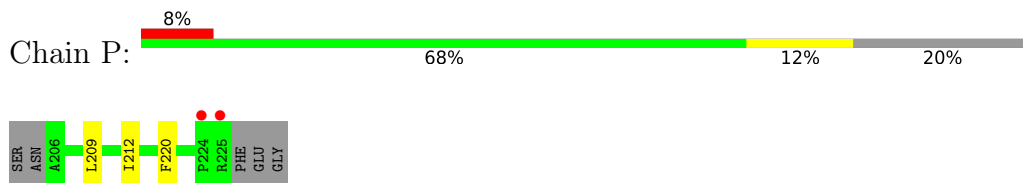
- Molecule 2: Vacuolar protein sorting-associated protein 37B



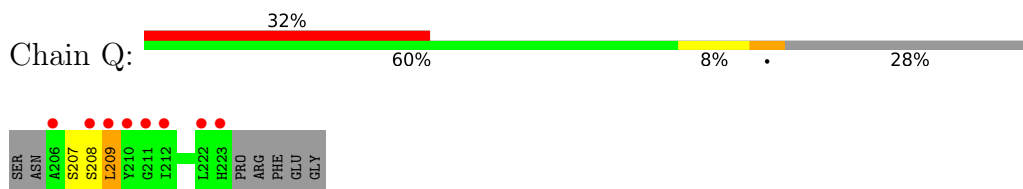
- Molecule 3: Multivesicular body subunit 12A



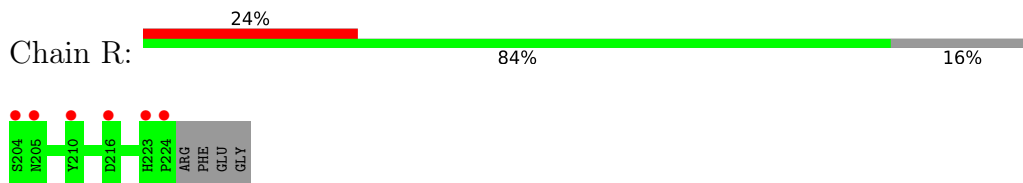
- Molecule 3: Multivesicular body subunit 12A



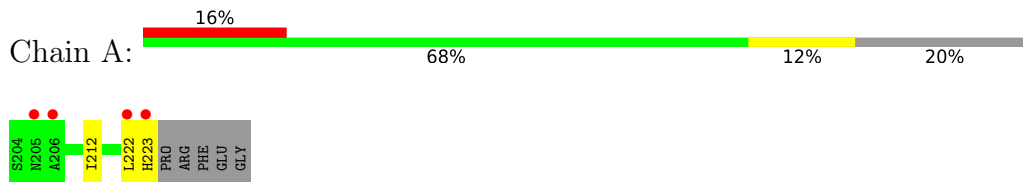
- Molecule 3: Multivesicular body subunit 12A



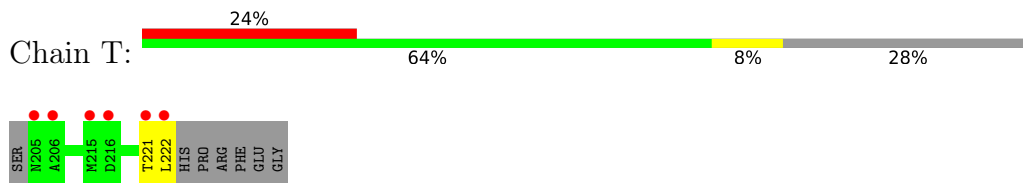
- Molecule 3: Multivesicular body subunit 12A



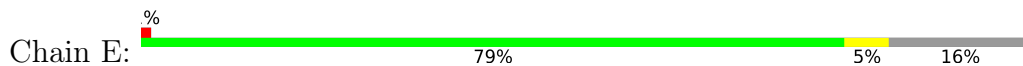
- Molecule 3: Multivesicular body subunit 12A

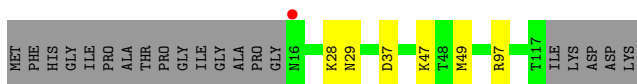


- Molecule 3: Multivesicular body subunit 12A

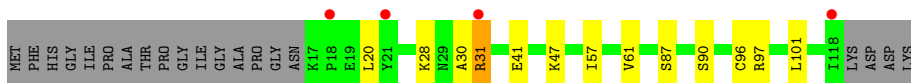
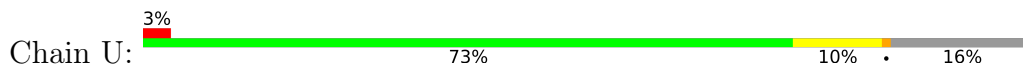


- Molecule 4: Vacuolar protein sorting-associated protein 28 homolog

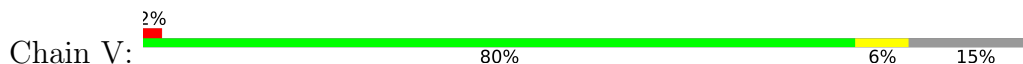




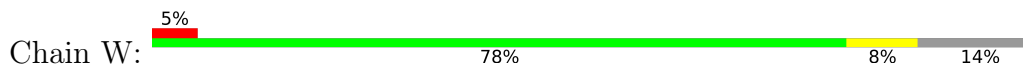
- Molecule 4: Vacuolar protein sorting-associated protein 28 homolog



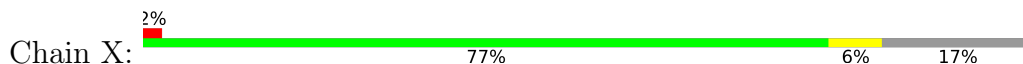
- Molecule 4: Vacuolar protein sorting-associated protein 28 homolog



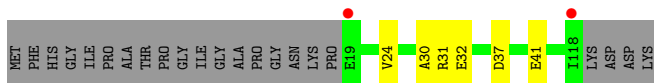
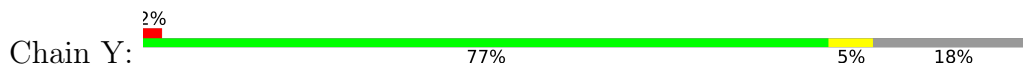
- Molecule 4: Vacuolar protein sorting-associated protein 28 homolog



- Molecule 4: Vacuolar protein sorting-associated protein 28 homolog



- Molecule 4: Vacuolar protein sorting-associated protein 28 homolog



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 61	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	162.58Å 162.58Å 139.72Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	99.18 – 2.19 99.18 – 2.19	Depositor EDS
% Data completeness (in resolution range)	99.2 (99.18-2.19) 90.4 (99.18-2.19)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.07 (at 2.18Å)	Xtrriage
Refinement program	PHENIX 1.17_3644	Depositor
R, $R_{free}$	0.193 , 0.240 0.195 , 0.241	Depositor DCC
$R_{free}$ test set	1998 reflections (1.85%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	41.7	Xtrriage
Anisotropy	0.146	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 54.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.41$ , $\langle L^2 \rangle = 0.23$	Xtrriage
Estimated twinning fraction	0.088 for h,-h-k,-l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	12786	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	61.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.29% 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	B	0.34	0/615	0.48	0/829
1	F	0.41	0/623	0.60	0/840
1	G	0.39	0/611	0.56	0/823
1	H	0.34	0/615	0.46	0/830
1	I	0.40	0/610	0.60	0/822
1	J	0.35	0/612	0.51	0/825
2	C	0.31	0/531	0.53	0/710
2	K	0.34	0/525	0.52	0/700
2	L	0.31	0/521	0.52	0/695
2	M	0.26	0/518	0.42	0/693
2	N	0.34	0/534	0.51	0/714
2	O	0.28	0/492	0.48	0/659
3	A	0.41	0/137	0.69	0/186
3	D	0.38	0/138	0.52	0/187
3	P	0.33	0/140	0.57	0/191
3	Q	0.73	1/119 (0.8%)	0.91	0/161
3	R	0.28	0/146	0.45	0/199
3	T	0.27	0/127	0.45	0/172
4	E	0.34	0/835	0.50	0/1122
4	U	0.42	0/840	0.60	1/1128 (0.1%)
4	V	0.37	0/839	0.59	0/1129
4	W	0.33	0/854	0.49	0/1148
4	X	0.35	0/833	0.50	0/1118
4	Y	0.35	0/827	0.50	0/1110
All	All	0.36	1/12642 (0.0%)	0.53	1/16991 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	Q	209	LEU	CA-CB	6.29	1.62	1.53

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	U	31	ARG	CG-CD-NE	7.09	127.61	112.00

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	B	607	0	629	2	1
1	F	615	0	640	11	0
1	G	603	0	629	4	0
1	H	607	0	629	2	0
1	I	602	0	634	9	0
1	J	604	0	627	13	0
2	C	527	0	533	11	0
2	K	521	0	541	9	0
2	L	517	0	537	5	0
2	M	514	0	528	6	0
2	N	530	0	542	7	0
2	O	488	0	494	10	0
3	A	135	0	123	2	0
3	D	135	0	126	5	0
3	P	137	0	128	4	0
3	Q	118	0	112	3	2
3	R	143	0	133	0	0
3	T	125	0	119	4	0
4	E	822	0	815	5	0
4	U	827	0	831	14	2
4	V	826	0	814	9	0
4	W	840	0	828	7	1
4	X	820	0	823	7	0
4	Y	815	0	815	5	0
5	A	10	0	0	0	0
5	B	10	0	0	0	0
5	C	8	0	0	0	0
5	D	3	0	0	0	0
5	E	31	0	0	1	0

*Continued on next page...*

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	F	18	0	0	0	0
5	G	16	0	0	0	0
5	H	5	0	0	0	0
5	I	10	0	0	0	0
5	J	5	0	0	0	0
5	K	12	0	0	0	0
5	L	3	0	0	0	0
5	M	6	0	0	0	0
5	N	15	0	0	0	0
5	O	1	0	0	0	0
5	P	7	0	0	0	0
5	Q	2	0	0	0	0
5	R	2	0	0	0	0
5	U	34	0	0	2	0
5	V	37	0	0	2	0
5	W	22	0	0	1	0
5	X	25	0	0	1	0
5	Y	26	0	0	0	0
All	All	12786	0	12630	119	3

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 5.

All (119) 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)
4:U:31:ARG:H	4:U:31:ARG:HD2	1.22	1.01
2:M:124:MET:HE1	2:M:145:LYS:HD2	1.55	0.89
4:U:31:ARG:HD2	4:U:31:ARG:N	2.00	0.75
4:X:114:ARG:NH1	5:X:201:HOH:O	2.22	0.72
2:C:124:MET:HE1	2:C:145:LYS:HD2	1.71	0.72
2:L:102:SER:OG	2:L:103:LEU:N	2.24	0.71
4:U:31:ARG:H	4:U:31:ARG:CD	2.04	0.70
2:C:128:PHE:HB2	2:C:133:LEU:HD23	1.79	0.65
1:I:356:LEU:HD22	4:X:61:VAL:HG21	1.79	0.65
2:C:104:GLU:OE2	2:C:163:VAL:HG11	1.97	0.64
4:U:28:LYS:NZ	5:U:201:HOH:O	2.30	0.64
2:C:157:GLU:OE1	3:D:212:ILE:HD13	1.98	0.64
2:N:124:MET:HE1	2:N:145:LYS:HD2	1.79	0.63
1:B:368:ARG:NH2	4:E:37:ASP:OD1	2.24	0.62
1:F:324:LEU:HD23	4:U:20:LEU:HD13	1.81	0.62

Continued on next page...

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:314:ILE:HD12	1:H:317:VAL:HG11	1.80	0.61
3:T:221:THR:HG22	3:T:222:LEU:H	1.66	0.61
2:C:133:LEU:HD12	2:C:134:PRO:HD2	1.82	0.60
4:U:30:ALA:HB3	4:U:31:ARG:NH1	2.16	0.60
4:U:90:SER:OG	4:W:97:ARG:NE	2.23	0.59
1:F:314:ILE:HG21	2:K:113:GLU:HG3	1.87	0.57
4:W:47:LYS:NZ	5:W:201:HOH:O	2.38	0.56
1:J:357:ASP:OD1	1:J:357:ASP:N	2.34	0.56
1:I:371:PHE:HB2	4:X:43:PHE:CD1	2.41	0.55
2:C:121:THR:HA	2:C:124:MET:HE3	1.88	0.55
4:Y:31:ARG:NH1	4:Y:32:GLU:HG3	2.22	0.55
4:W:16:ASN:C	4:W:17:LYS:HD2	2.32	0.55
3:D:212:ILE:HD12	3:D:212:ILE:C	2.32	0.54
4:E:97:ARG:NH1	4:V:90:SER:OG	2.37	0.54
4:V:100:ARG:NH2	5:V:203:HOH:O	2.41	0.53
3:D:212:ILE:HD12	3:D:213:SER:N	2.25	0.51
2:O:139:ILE:O	2:O:143:GLN:HB2	2.10	0.51
1:J:368:ARG:NH2	4:Y:37:ASP:OD1	2.30	0.51
4:W:66:TYR:CE2	4:W:116:ILE:HG22	2.46	0.51
2:K:154:VAL:HA	3:P:212:ILE:HD11	1.93	0.50
1:I:323:PRO:HD2	4:X:21:TYR:HA	1.93	0.50
2:L:124:MET:HE1	2:L:141:VAL:HB	1.93	0.50
2:N:125:ALA:O	2:N:129:LEU:HG	2.11	0.50
4:W:35:LYS:O	4:W:39:MET:HG3	2.12	0.50
1:G:356:LEU:HD13	4:V:61:VAL:HG11	1.94	0.49
1:G:379:LYS:HD2	1:G:382:LYS:HE3	1.95	0.49
1:J:381:ARG:NH2	1:J:387:SER:O	2.43	0.49
1:J:378:GLN:O	1:J:382:LYS:HG2	2.13	0.49
4:X:112:GLU:O	4:X:114:ARG:HG3	2.12	0.49
2:L:127:LYS:HG2	2:L:132:GLU:HB2	1.95	0.48
3:Q:207:SER:HB3	4:V:100:ARG:HD2	1.94	0.48
1:F:356:LEU:HD13	4:U:61:VAL:HG11	1.95	0.48
2:C:157:GLU:CD	3:D:212:ILE:HD13	2.38	0.48
1:I:376:LEU:HD22	4:X:24:VAL:HG23	1.95	0.48
1:J:319:ILE:HG12	1:J:320:PRO:HD2	1.95	0.48
4:V:61:VAL:HB	4:V:65:GLU:HG3	1.94	0.48
1:F:361:LYS:HA	1:F:361:LYS:HD2	1.63	0.48
2:N:154:VAL:HA	3:A:212:ILE:HD11	1.95	0.47
2:O:123:ASN:O	2:O:127:LYS:HG2	2.14	0.47
2:O:114:GLY:O	2:O:118:GLU:HG2	2.15	0.47
2:C:147:LYS:O	2:C:151:MET:HG2	2.15	0.47

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:J:349:LEU:HD22	1:J:359:PHE:CD2	2.49	0.47
2:N:133:LEU:HD12	2:N:134:PRO:HD2	1.96	0.47
4:U:96:CYS:HB3	4:U:101:LEU:O	2.15	0.47
2:C:157:GLU:OE1	3:D:212:ILE:CD1	2.64	0.46
1:F:334:GLU:HG2	2:K:147:LYS:HD2	1.96	0.46
2:M:127:LYS:HB3	2:M:127:LYS:HE2	1.66	0.46
1:F:320:PRO:HA	3:P:220:PHE:HA	1.99	0.45
2:M:137:SER:O	2:M:141:VAL:HG22	2.17	0.45
1:F:364:ARG:HD3	4:U:41:GLU:OE1	2.17	0.45
4:E:28:LYS:HG3	4:E:29:ASN:ND2	2.31	0.45
1:I:381:ARG:HH21	1:I:387:SER:HA	1.81	0.45
2:O:103:LEU:HD12	2:O:104:GLU:HG2	1.99	0.45
2:K:102:SER:O	2:K:106:LEU:HG	2.17	0.44
1:F:338:ILE:HD11	1:F:369:LYS:HE2	1.99	0.44
1:B:376:LEU:HD23	1:B:376:LEU:HA	1.82	0.44
3:T:221:THR:HG22	3:T:222:LEU:N	2.30	0.44
2:C:104:GLU:OE1	2:C:107:LEU:HD23	2.17	0.44
2:O:107:LEU:O	2:O:111:GLN:HG3	2.17	0.44
2:O:151:MET:HE3	2:O:151:MET:HB2	1.87	0.44
4:E:47:LYS:NZ	5:E:204:HOH:O	2.41	0.44
2:N:105:THR:O	2:N:109:LEU:HG	2.18	0.44
4:U:87:SER:O	4:W:97:ARG:NH1	2.51	0.44
2:C:146:ARG:HA	2:C:146:ARG:HD2	1.77	0.43
1:F:314:ILE:HG21	2:K:113:GLU:CG	2.49	0.43
2:O:117:ILE:HD11	2:O:145:LYS:HB3	2.00	0.43
1:H:314:ILE:HA	1:H:317:VAL:HG13	2.01	0.43
2:M:116:LYS:HD2	2:M:116:LYS:HA	1.74	0.43
3:Q:209:LEU:HB2	5:V:227:HOH:O	2.18	0.43
4:E:49:MET:HE3	4:E:49:MET:HB2	1.89	0.43
1:I:382:LYS:N	1:I:382:LYS:HD3	2.34	0.43
1:I:364:ARG:HH11	1:I:364:ARG:HD3	1.65	0.42
1:G:368:ARG:NH2	4:V:37:ASP:OD1	2.43	0.42
1:J:333:ALA:HB2	2:O:151:MET:HG3	2.02	0.42
2:K:127:LYS:HB3	2:K:133:LEU:HD12	2.02	0.42
2:L:103:LEU:HD23	2:L:163:VAL:HG12	2.01	0.42
3:Q:207:SER:C	3:Q:209:LEU:N	2.76	0.42
1:F:348:ALA:HB2	2:K:128:PHE:CE2	2.55	0.41
1:J:317:VAL:O	3:T:222:LEU:HD23	2.20	0.41
2:M:107:LEU:HA	2:M:159:LEU:HD23	2.02	0.41
4:U:47:LYS:NZ	5:U:202:HOH:O	2.53	0.41
2:K:124:MET:HB2	2:K:124:MET:HE3	1.70	0.41

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:V:100:ARG:HE	4:V:100:ARG:HB2	1.60	0.41
1:I:339:GLU:HG2	4:Y:30:ALA:HB1	2.02	0.41
1:J:381:ARG:HH21	1:J:387:SER:C	2.28	0.41
2:N:103:LEU:HD23	2:N:103:LEU:HA	1.85	0.41
4:V:26:LEU:HD12	4:V:26:LEU:HA	1.89	0.41
1:I:324:LEU:CD2	1:I:384:ALA:HB2	2.51	0.41
1:J:319:ILE:HG23	1:J:320:PRO:O	2.21	0.41
4:V:62:SER:OG	4:V:65:GLU:HG2	2.21	0.41
4:X:58:LYS:HG2	4:Y:41:GLU:CD	2.46	0.41
1:F:335:GLU:HG2	3:P:209:LEU:HD21	2.03	0.41
1:G:364:ARG:NH1	4:U:57:ILE:O	2.54	0.41
2:K:158:LYS:HG3	3:P:220:PHE:CD1	2.55	0.41
4:U:97:ARG:NH2	4:W:90:SER:OG	2.54	0.41
2:M:159:LEU:O	2:M:163:VAL:HG13	2.21	0.41
2:N:116:LYS:O	2:N:120:ASP:HB2	2.21	0.40
3:A:222:LEU:HD22	3:A:223:HIS:H	1.86	0.40
1:J:369:LYS:HE3	1:J:373:LEU:HD21	2.03	0.40
1:J:379:LYS:HB3	4:Y:24:VAL:HG11	2.03	0.40
2:L:146:ARG:HD2	2:L:146:ARG:HA	1.92	0.40
2:O:125:ALA:O	2:O:129:LEU:HG	2.21	0.40
2:O:162:MET:HE3	3:T:222:LEU:HD11	2.03	0.40
1:J:334:GLU:HB3	1:J:373:LEU:HD13	2.03	0.40

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:Q:208:SER:O	4:U:31:ARG:NH2[5_554]	1.56	0.64
3:Q:209:LEU:CA	4:U:31:ARG:NH2[5_554]	2.12	0.08
1:B:364:ARG:NH2	4:W:57:ILE:O[5_554]	2.19	0.01

## 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	B	74/81 (91%)	74 (100%)	0	0	100	100
1	F	75/81 (93%)	75 (100%)	0	0	100	100
1	G	73/81 (90%)	73 (100%)	0	0	100	100
1	H	74/81 (91%)	74 (100%)	0	0	100	100
1	I	73/81 (90%)	72 (99%)	1 (1%)	0	100	100
1	J	74/81 (91%)	74 (100%)	0	0	100	100
2	C	65/71 (92%)	62 (95%)	3 (5%)	0	100	100
2	K	63/71 (89%)	61 (97%)	2 (3%)	0	100	100
2	L	63/71 (89%)	61 (97%)	1 (2%)	1 (2%)	7	6
2	M	63/71 (89%)	63 (100%)	0	0	100	100
2	N	65/71 (92%)	65 (100%)	0	0	100	100
2	O	60/71 (84%)	59 (98%)	1 (2%)	0	100	100
3	A	18/25 (72%)	17 (94%)	1 (6%)	0	100	100
3	D	17/25 (68%)	17 (100%)	0	0	100	100
3	P	18/25 (72%)	18 (100%)	0	0	100	100
3	Q	16/25 (64%)	14 (88%)	2 (12%)	0	100	100
3	R	19/25 (76%)	18 (95%)	1 (5%)	0	100	100
3	T	16/25 (64%)	16 (100%)	0	0	100	100
4	E	100/122 (82%)	99 (99%)	1 (1%)	0	100	100
4	U	100/122 (82%)	99 (99%)	1 (1%)	0	100	100
4	V	102/122 (84%)	102 (100%)	0	0	100	100
4	W	103/122 (84%)	100 (97%)	3 (3%)	0	100	100
4	X	99/122 (81%)	99 (100%)	0	0	100	100
4	Y	98/122 (80%)	98 (100%)	0	0	100	100
All	All	1528/1794 (85%)	1510 (99%)	17 (1%)	1 (0%)	48	57

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	L	165	LYS

### 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	B	63/71 (89%)	63 (100%)	0	100	100
1	F	64/71 (90%)	64 (100%)	0	100	100
1	G	63/71 (89%)	63 (100%)	0	100	100
1	H	63/71 (89%)	63 (100%)	0	100	100
1	I	63/71 (89%)	63 (100%)	0	100	100
1	J	62/71 (87%)	62 (100%)	0	100	100
2	C	57/62 (92%)	57 (100%)	0	100	100
2	K	57/62 (92%)	57 (100%)	0	100	100
2	L	56/62 (90%)	56 (100%)	0	100	100
2	M	55/62 (89%)	55 (100%)	0	100	100
2	N	58/62 (94%)	58 (100%)	0	100	100
2	O	51/62 (82%)	51 (100%)	0	100	100
3	A	13/20 (65%)	13 (100%)	0	100	100
3	D	14/20 (70%)	14 (100%)	0	100	100
3	P	14/20 (70%)	14 (100%)	0	100	100
3	Q	12/20 (60%)	12 (100%)	0	100	100
3	R	15/20 (75%)	15 (100%)	0	100	100
3	T	13/20 (65%)	13 (100%)	0	100	100
4	E	88/105 (84%)	88 (100%)	0	100	100
4	U	89/105 (85%)	89 (100%)	0	100	100
4	V	87/105 (83%)	87 (100%)	0	100	100
4	W	89/105 (85%)	89 (100%)	0	100	100
4	X	89/105 (85%)	89 (100%)	0	100	100
4	Y	88/105 (84%)	88 (100%)	0	100	100
All	All	1323/1548 (86%)	1323 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
4	E	38	ASN
2	K	160	GLN
2	N	160	GLN
4	U	38	ASN
4	U	83	GLN
4	X	38	ASN
4	X	83	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 oligosaccharides 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	B	76/81 (93%)	0.37	3 (3%) 43 40	39, 54, 80, 98	0
1	F	77/81 (95%)	0.21	1 (1%) 75 73	36, 48, 76, 117	0
1	G	75/81 (92%)	0.24	4 (5%) 32 29	39, 48, 91, 122	0
1	H	76/81 (93%)	0.69	5 (6%) 24 21	43, 57, 94, 109	0
1	I	75/81 (92%)	0.27	5 (6%) 24 21	39, 49, 74, 100	0
1	J	76/81 (93%)	0.62	7 (9%) 14 12	43, 62, 104, 142	0
2	C	67/71 (94%)	0.62	6 (8%) 15 12	42, 61, 90, 119	0
2	K	65/71 (91%)	0.41	5 (7%) 19 17	42, 56, 91, 122	0
2	L	65/71 (91%)	0.65	8 (12%) 8 6	44, 62, 115, 137	0
2	M	65/71 (91%)	0.56	1 (1%) 72 69	53, 73, 90, 107	0
2	N	67/71 (94%)	0.49	4 (5%) 27 24	43, 59, 84, 146	0
2	O	62/71 (87%)	1.21	9 (14%) 6 4	58, 84, 111, 122	0
3	A	20/25 (80%)	1.05	4 (20%) 3 2	47, 58, 102, 107	0
3	D	19/25 (76%)	0.65	3 (15%) 5 3	45, 59, 83, 112	0
3	P	20/25 (80%)	0.72	2 (10%) 12 10	41, 55, 131, 134	0
3	Q	18/25 (72%)	2.48	8 (44%) 0 0	57, 73, 119, 127	0
3	R	21/25 (84%)	1.35	6 (28%) 1 1	47, 72, 115, 125	0
3	T	18/25 (72%)	1.56	6 (33%) 1 0	51, 84, 108, 112	0
4	E	102/122 (83%)	0.30	1 (0%) 79 77	36, 54, 85, 99	0
4	U	102/122 (83%)	0.20	4 (3%) 43 40	37, 50, 74, 140	0
4	V	104/122 (85%)	0.15	2 (1%) 66 63	36, 50, 75, 145	0
4	W	105/122 (86%)	0.45	6 (5%) 29 26	40, 56, 95, 139	0
4	X	101/122 (82%)	0.19	2 (1%) 65 62	40, 54, 79, 90	0
4	Y	100/122 (81%)	0.27	2 (2%) 65 62	41, 55, 89, 114	0

Continued on next page...

*Continued from previous page...*

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
All	All	1576/1794 (87%)	0.47	104 (6%) 24 21	36, 57, 98, 146	0

All (104) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	Q	211	GLY	7.7
3	Q	209	LEU	7.6
2	O	103	LEU	6.7
1	F	388	ASP	6.6
3	T	222	LEU	5.7
2	O	164	LEU	5.3
3	R	224	PRO	5.2
1	J	384	ALA	5.2
3	Q	223	HIS	5.1
1	G	388	ASP	5.1
4	W	118	ILE	4.9
4	W	16	ASN	4.9
2	K	166	GLY	4.8
3	Q	210	TYR	4.5
2	C	108	ALA	4.5
3	A	223	HIS	4.5
1	J	313	ASP	4.3
4	E	16	ASN	4.1
3	Q	206	ALA	4.1
1	G	314	ILE	4.1
4	W	20	LEU	4.0
2	K	163	VAL	4.0
2	L	163	VAL	4.0
2	N	101	ALA	3.9
2	C	136	ASP	3.8
3	P	224	PRO	3.8
3	D	210	TYR	3.7
1	H	313	ASP	3.7
3	Q	208	SER	3.7
2	M	101	ALA	3.7
2	K	164	LEU	3.6
4	V	15	GLY	3.6
1	J	312	ASN	3.6
2	O	163	VAL	3.5
3	T	205	ASN	3.5
1	J	314	ILE	3.5
3	R	223	HIS	3.5

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	I	387	SER	3.3
4	U	18	PRO	3.3
3	T	221	THR	3.2
4	Y	19	GLU	3.2
4	W	14	PRO	3.2
1	B	313	ASP	3.1
3	A	222	LEU	3.1
4	U	21	TYR	3.1
2	O	105	THR	3.1
3	T	206	ALA	3.0
3	D	223	HIS	3.0
3	P	225	ARG	3.0
1	H	318	ILE	3.0
3	R	210	TYR	3.0
1	J	326	LYS	3.0
2	C	99	SER	3.0
4	V	16	ASN	2.9
4	Y	118	ILE	2.8
2	C	134	PRO	2.8
2	L	106	LEU	2.7
3	A	205	ASN	2.7
2	N	140	ASP	2.7
2	L	109	LEU	2.7
2	L	164	LEU	2.7
4	U	31	ARG	2.7
1	G	386	LEU	2.7
3	Q	212	ILE	2.6
4	X	18	PRO	2.6
1	I	313	ASP	2.6
2	O	141	VAL	2.5
2	N	133	LEU	2.5
1	H	384	ALA	2.5
3	R	205	ASN	2.5
1	H	317	VAL	2.4
1	J	386	LEU	2.4
2	N	119	GLU	2.4
1	G	317	VAL	2.4
2	O	133	LEU	2.4
3	Q	222	LEU	2.4
1	I	385	GLY	2.4
1	B	358	VAL	2.4
1	H	382	LYS	2.4

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
2	K	112	ALA	2.3
2	K	103	LEU	2.3
2	L	162	MET	2.3
2	O	136	ASP	2.3
3	R	204	SER	2.3
3	A	206	ALA	2.3
2	L	103	LEU	2.3
2	L	102	SER	2.2
2	L	166	GLY	2.2
3	T	216	ASP	2.2
1	J	319	ILE	2.2
3	R	216	ASP	2.2
2	C	164	LEU	2.2
1	I	382	LYS	2.2
3	D	205	ASN	2.1
4	W	15	GLY	2.1
2	C	133	LEU	2.1
4	U	118	ILE	2.1
2	O	112	ALA	2.1
4	W	60	CYS	2.1
2	O	127	LYS	2.1
1	I	386	LEU	2.0
3	T	215	MET	2.0
1	B	388	ASP	2.0
4	X	59	ASP	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 oligosaccharides 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.