



Full wwPDB X-ray Structure Validation Report ⓘ

May 17, 2020 – 03:49 pm BST

PDB ID : 1S7U
Title : Crystal structures of the murine class I major histocompatibility complex H-2Db in complex with LCMV-derived gp33 index peptide and three of its escape variants
Authors : Velloso, L.M.; Michaelsson, J.; Ljunggren, H.G.; Schneider, G.; Achour, A.
Deposited on : 2004-01-30
Resolution : 2.20 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

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.11
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

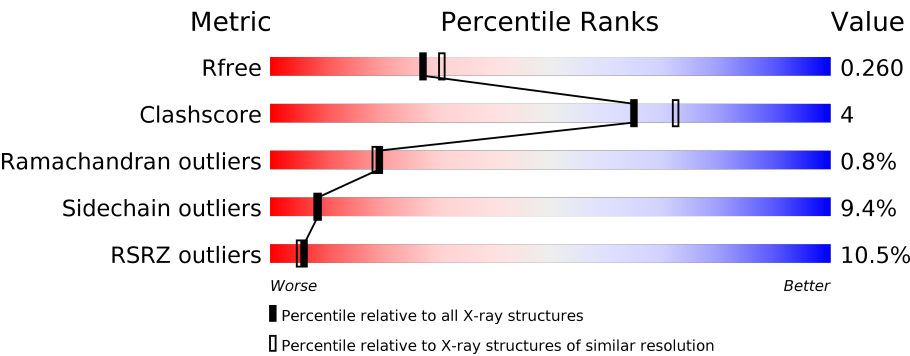
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 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	338	<div><div>8%</div><div><div>69%</div><div>10%</div><div>•</div><div>18%</div></div></div>
1	D	338	<div><div>11%</div><div><div>69%</div><div>9%</div><div>••</div><div>19%</div></div></div>
1	G	338	<div><div>16%</div><div><div>67%</div><div>13%</div><div>•</div><div>19%</div></div></div>
1	J	338	<div><div>10%</div><div><div>68%</div><div>11%</div><div>•</div><div>19%</div></div></div>
2	B	99	<div><div>2%</div><div><div>76%</div><div>23%</div><div>•</div></div></div>
2	E	99	<div><div>%</div><div><div>80%</div><div>18%</div><div>•</div></div></div>

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Mol	Chain	Length	Quality of chain
2	H	99	<div><div></div><div>4%</div><div>76%</div><div>22%</div><div></div></div>
2	K	99	<div><div></div><div>%</div><div>82%</div><div>15%</div><div></div></div>
3	C	9	<div><div></div><div>89%</div><div>11%</div><div></div></div>
3	F	9	<div><div></div><div>89%</div><div>11%</div><div></div></div>
3	I	9	<div><div></div><div>78%</div><div>11%</div><div>11%</div><div></div></div>
3	L	9	<div><div></div><div>78%</div><div>22%</div><div></div></div>

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 13593 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 H-2 class I histocompatibility antigen, D-B alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	276	Total	C	N	O	S	0	0	0
			2264	1430	400	425	9			
1	D	274	Total	C	N	O	S	0	0	0
			2248	1420	398	421	9			
1	G	274	Total	C	N	O	S	0	0	0
			2248	1420	398	421	9			
1	J	273	Total	C	N	O	S	0	0	0
			2244	1418	397	420	9			

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	99	Total	C	N	O	S	0	0	0
			818	523	138	151	6			
2	E	99	Total	C	N	O	S	0	0	0
			821	524	138	152	7			
2	H	99	Total	C	N	O	S	0	0	0
			821	524	138	152	7			
2	K	99	Total	C	N	O	S	0	0	0
			821	524	138	152	7			

- Molecule 3 is a protein called Glycoprotein 9-residue peptide.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	9	Total	C	N	O	S	0	0	0
			73	48	11	13	1			
3	F	9	Total	C	N	O	S	0	0	0
			73	48	11	13	1			
3	I	9	Total	C	N	O	S	0	0	0
			73	48	11	13	1			
3	L	9	Total	C	N	O	S	0	0	0
			73	48	11	13	1			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	9	MET	CYS	SEE REMARK 999	UNP P07399
F	9	MET	CYS	SEE REMARK 999	UNP P07399
I	9	MET	CYS	SEE REMARK 999	UNP P07399
L	9	MET	CYS	SEE REMARK 999	UNP P07399

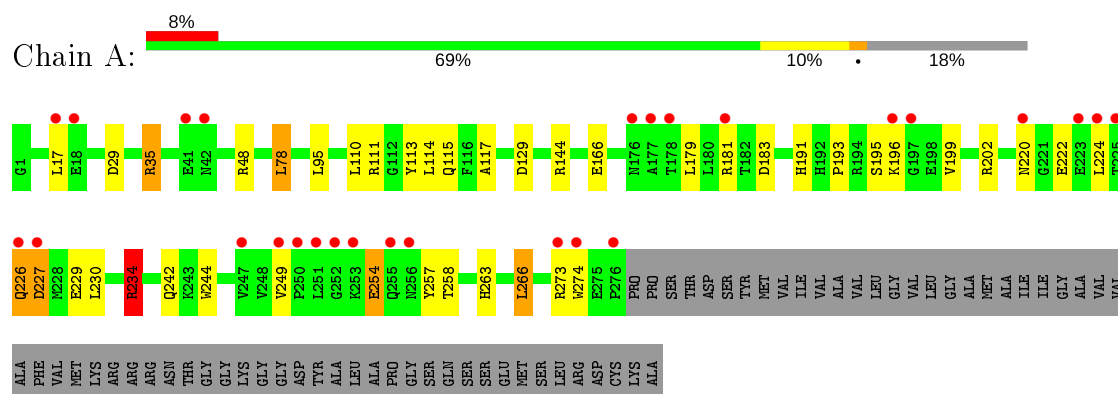
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	168	Total 168	O 168	0	0
4	B	118	Total 118	O 118	0	0
4	C	4	Total 4	O 4	0	0
4	D	163	Total 163	O 163	0	0
4	E	83	Total 83	O 83	0	0
4	F	6	Total 6	O 6	0	0
4	G	140	Total 140	O 140	0	0
4	H	79	Total 79	O 79	0	0
4	I	5	Total 5	O 5	0	0
4	J	152	Total 152	O 152	0	0
4	K	95	Total 95	O 95	0	0
4	L	3	Total 3	O 3	0	0

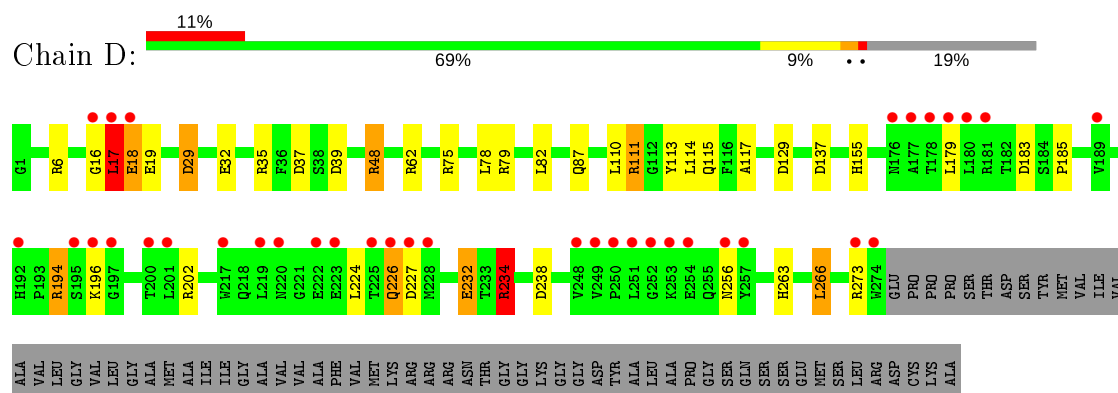
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of 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.

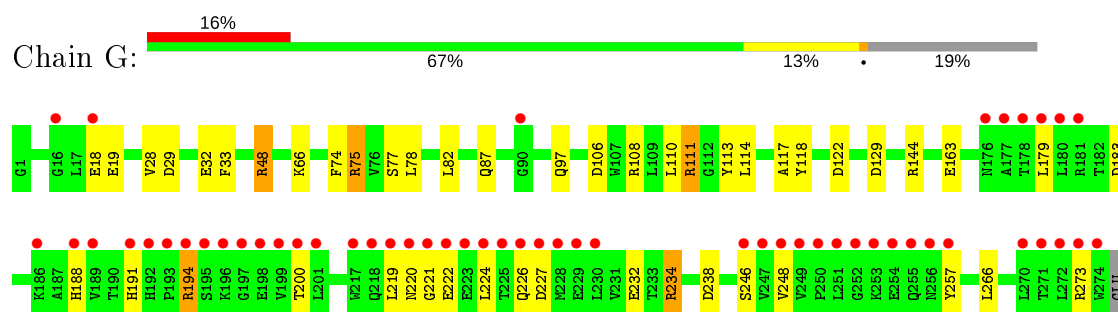
- Molecule 1: H-2 class I histocompatibility antigen, D-B alpha chain



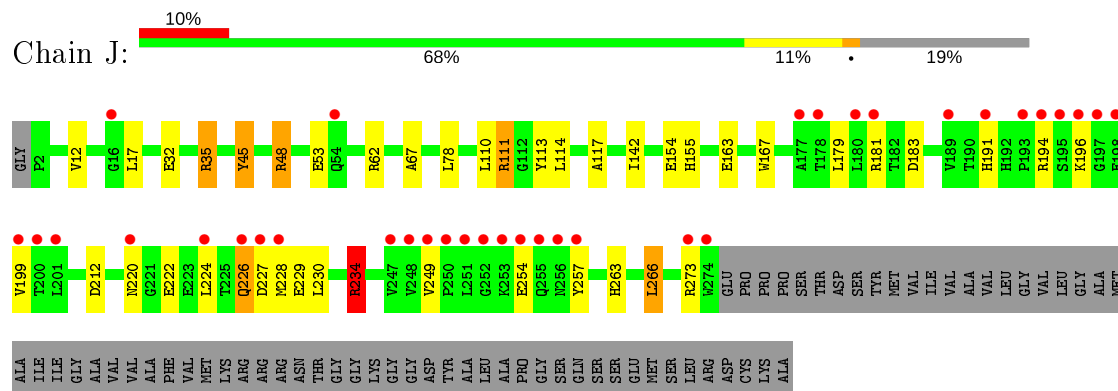
- Molecule 1: H-2 class I histocompatibility antigen, D-B alpha chain



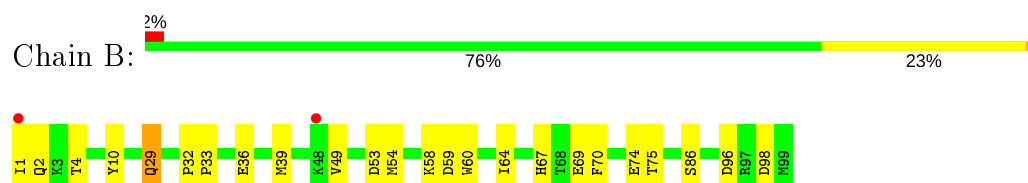
- Molecule 1: H-2 class I histocompatibility antigen, D-B alpha chain



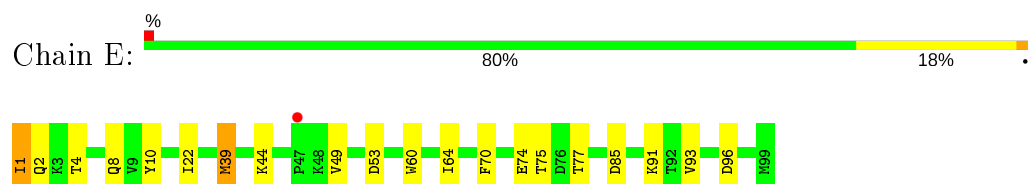
- Molecule 1: H-2 class I histocompatibility antigen, D-B alpha chain



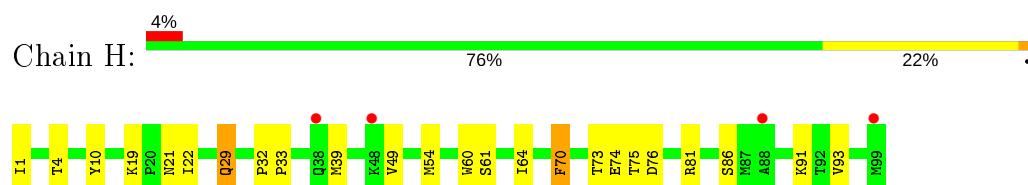
- Molecule 2: Beta-2-microglobulin



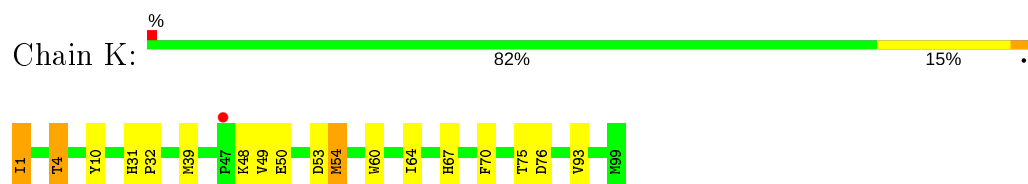
- Molecule 2: Beta-2-microglobulin




- Molecule 2: Beta-2-microglobulin



- Molecule 2: Beta-2-microglobulin



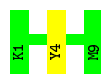
- Molecule 3: Glycoprotein 9-residue peptide

Chain C:  89% 11%




- Molecule 3: Glycoprotein 9-residue peptide

Chain F:  89% 11%




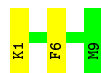
- Molecule 3: Glycoprotein 9-residue peptide

Chain I:  78% 11% 11%



- Molecule 3: Glycoprotein 9-residue peptide

Chain L:  78% 22%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	92.39 Å 123.34 Å 99.39 Å 90.00° 103.17° 90.00°	Depositor
Resolution (Å)	72.70 – 2.20 72.68 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.0 (72.70-2.20) 99.0 (72.68-2.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.84 (at 2.20 Å)	Xtriage
Refinement program	REFMAC 5.1.24	Depositor
R, R_{free}	0.213 , 0.262 0.213 , 0.260	Depositor DCC
R_{free} test set	5426 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å ²)	42.5	Xtriage
Anisotropy	0.070	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 56.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	13593	wwPDB-VP
Average B, all atoms (Å ²)	29.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 12.83% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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	0.44	0/2331	0.74	7/3166 (0.2%)
1	D	0.45	0/2314	0.77	9/3142 (0.3%)
1	G	0.44	0/2314	0.74	7/3142 (0.2%)
1	J	0.45	0/2310	0.76	6/3136 (0.2%)
2	B	0.55	0/844	0.80	3/1146 (0.3%)
2	E	0.53	1/847 (0.1%)	0.77	3/1148 (0.3%)
2	H	0.47	0/847	0.73	0/1148
2	K	0.54	0/847	0.76	2/1148 (0.2%)
3	C	0.70	0/74	0.67	0/97
3	F	0.60	0/74	0.71	0/97
3	I	0.65	0/74	0.73	0/97
3	L	0.87	0/74	1.06	0/97
All	All	0.47	1/12950 (0.0%)	0.76	37/17564 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	39	MET	SD-CE	-5.33	1.48	1.77

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	35	ARG	NE-CZ-NH1	6.91	123.75	120.30
2	E	53	ASP	CB-CG-OD2	6.88	124.49	118.30
1	D	234	ARG	NE-CZ-NH2	-6.73	116.94	120.30
1	A	183	ASP	CB-CG-OD2	6.60	124.24	118.30
1	A	29	ASP	CB-CG-OD2	6.44	124.10	118.30
1	A	35	ARG	NE-CZ-NH2	-6.34	117.13	120.30
1	D	238	ASP	CB-CG-OD2	6.07	123.76	118.30
1	G	122	ASP	CB-CG-OD2	6.01	123.71	118.30
1	D	234	ARG	NE-CZ-NH1	5.95	123.28	120.30
1	G	29	ASP	CB-CG-OD2	5.93	123.64	118.30
1	D	137	ASP	CB-CG-OD2	5.91	123.62	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	J	183	ASP	CB-CG-OD2	5.87	123.58	118.30
2	B	96	ASP	CB-CG-OD2	5.83	123.54	118.30
1	J	35	ARG	NE-CZ-NH1	5.79	123.20	120.30
1	J	35	ARG	NE-CZ-NH2	-5.73	117.44	120.30
2	K	53	ASP	CB-CG-OD2	5.66	123.39	118.30
1	D	183	ASP	CB-CG-OD2	5.62	123.36	118.30
1	D	129	ASP	CB-CG-OD2	5.60	123.34	118.30
1	G	129	ASP	CB-CG-OD2	5.53	123.28	118.30
1	G	183	ASP	CB-CG-OD2	5.53	123.27	118.30
1	D	35	ARG	NE-CZ-NH2	-5.52	117.54	120.30
1	A	129	ASP	CB-CG-OD2	5.44	123.20	118.30
2	E	85	ASP	CB-CG-OD2	5.40	123.16	118.30
1	A	227	ASP	CB-CG-OD2	5.30	123.07	118.30
1	J	234	ARG	NE-CZ-NH1	5.29	122.94	120.30
1	D	37	ASP	CB-CG-OD2	5.27	123.04	118.30
2	K	76	ASP	CB-CG-OD2	5.25	123.03	118.30
1	G	106	ASP	CB-CG-OD2	5.24	123.02	118.30
1	G	238	ASP	CB-CG-OD2	5.24	123.02	118.30
1	J	227	ASP	CB-CG-OD2	5.24	123.02	118.30
1	A	234	ARG	NE-CZ-NH2	-5.21	117.70	120.30
1	G	227	ASP	CB-CG-OD2	5.19	122.97	118.30
2	B	53	ASP	CB-CG-OD2	5.16	122.94	118.30
1	D	227	ASP	CB-CG-OD2	5.10	122.89	118.30
1	J	212	ASP	CB-CG-OD2	5.09	122.88	118.30
2	B	98	ASP	CB-CG-OD2	5.09	122.88	118.30
2	E	96	ASP	CB-CG-OD2	5.05	122.85	118.30

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	2264	0	2136	16	0
1	D	2248	0	2123	17	0
1	G	2248	0	2123	24	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	J	2244	0	2118	17	0
2	B	818	0	791	11	0
2	E	821	0	796	8	0
2	H	821	0	796	10	0
2	K	821	0	796	10	0
3	C	73	0	74	0	0
3	F	73	0	74	1	0
3	I	73	0	74	5	0
3	L	73	0	74	2	0
4	A	168	0	0	2	0
4	B	118	0	0	1	0
4	C	4	0	0	0	0
4	D	163	0	0	2	0
4	E	83	0	0	1	0
4	F	6	0	0	0	0
4	G	140	0	0	5	0
4	H	79	0	0	0	0
4	I	5	0	0	0	0
4	J	152	0	0	5	0
4	K	95	0	0	2	0
4	L	3	0	0	0	0
All	All	13593	0	11975	100	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 4.

All (100) 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:G:77:SER:HB3	4:G:475:HOH:O	1.25	1.25
1:G:77:SER:CB	4:G:475:HOH:O	1.84	1.14
1:J:142:ILE:HG13	4:J:478:HOH:O	1.81	0.79
1:D:32:GLU:OE2	1:D:48:ARG:HD2	1.87	0.74
1:G:163:GLU:OE2	3:I:1:LYS:NZ	2.22	0.73
1:D:232:GLU:CD	2:E:8:GLN:HE21	1.93	0.72
2:B:29:GLN:NE2	2:B:59:ASP:OD2	2.27	0.68
1:G:66:LYS:HZ3	3:I:1:LYS:HZ3	1.47	0.63
2:B:39:MET:HE2	2:B:49:VAL:HG13	1.79	0.63
1:A:111:ARG:CZ	4:A:418:HOH:O	2.47	0.62
1:A:234:ARG:HD3	2:B:10:TYR:CE2	2.35	0.61
2:K:1:ILE:N	4:K:189:HOH:O	2.34	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:234:ARG:HD3	2:H:10:TYR:CE2	2.38	0.58
1:D:234:ARG:HD3	2:E:10:TYR:CE2	2.39	0.58
1:J:32:GLU:OE2	1:J:48:ARG:HD2	2.04	0.57
1:G:188:HIS:ND1	4:G:452:HOH:O	2.32	0.57
2:K:50:GLU:HB2	2:K:67:HIS:CE1	2.40	0.57
1:A:263:HIS:HB3	1:A:266:LEU:HD22	1.87	0.56
2:E:39:MET:CE	2:E:49:VAL:HG13	2.35	0.56
1:J:142:ILE:CD1	4:J:478:HOH:O	2.52	0.56
2:K:31:HIS:CD2	2:K:32:PRO:HA	2.41	0.55
1:A:191:HIS:CE1	1:A:199:VAL:HG21	2.42	0.55
2:B:39:MET:CE	2:B:49:VAL:HG13	2.36	0.55
1:D:17:LEU:HB3	4:D:385:HOH:O	2.07	0.54
1:J:234:ARG:HD3	2:K:10:TYR:CE2	2.43	0.54
2:H:39:MET:CE	2:H:49:VAL:HG13	2.37	0.53
1:D:16:GLY:O	1:D:17:LEU:O	2.27	0.53
1:A:111:ARG:HD3	1:A:113:TYR:CZ	2.43	0.53
1:J:111:ARG:HD2	1:J:113:TYR:CZ	2.43	0.53
1:A:193:PRO:HA	1:A:199:VAL:HG12	1.92	0.52
1:J:117:ALA:HB2	2:K:60:TRP:CE2	2.44	0.52
1:D:232:GLU:CD	2:E:8:GLN:NE2	2.62	0.52
2:H:73:THR:OG1	2:H:76:ASP:OD2	2.27	0.52
1:D:111:ARG:HD2	1:D:113:TYR:CZ	2.45	0.52
1:J:12:VAL:HG21	4:J:436:HOH:O	2.08	0.52
1:G:66:LYS:HZ3	3:I:1:LYS:NZ	2.07	0.52
1:A:234:ARG:HD2	1:A:242:GLN:HB2	1.92	0.52
1:A:254:GLU:HG3	1:A:274:TRP:HD1	1.75	0.52
1:J:142:ILE:CG1	4:J:478:HOH:O	2.49	0.52
1:J:263:HIS:HB3	1:J:266:LEU:HD22	1.92	0.51
2:K:39:MET:HE2	2:K:49:VAL:HG13	1.92	0.51
2:E:39:MET:HE3	2:E:49:VAL:HG13	1.92	0.50
1:G:108:ARG:HG2	4:G:384:HOH:O	2.12	0.49
1:A:230:LEU:C	1:A:230:LEU:HD12	2.33	0.49
2:H:4:THR:HG22	2:H:86:SER:HB2	1.93	0.49
1:J:32:GLU:OE2	1:J:48:ARG:CD	2.61	0.49
1:A:117:ALA:HB2	2:B:60:TRP:CE2	2.48	0.48
2:H:39:MET:HE2	2:H:49:VAL:HG13	1.95	0.48
2:K:39:MET:HE1	2:K:67:HIS:C	2.34	0.47
1:A:249:VAL:HG22	1:A:257:TYR:CZ	2.50	0.47
2:B:36:GLU:OE1	4:B:214:HOH:O	2.20	0.47
1:D:117:ALA:HB2	2:E:60:TRP:CE2	2.49	0.47
1:D:82:LEU:HA	1:D:87:GLN:HE21	1.79	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:144:ARG:HD3	4:G:434:HOH:O	2.14	0.47
1:J:45:TYR:CE2	1:J:67:ALA:HB2	2.50	0.47
1:G:87:GLN:NE2	1:G:118:TYR:OH	2.39	0.47
1:A:220:ASN:ND2	4:A:489:HOH:O	2.48	0.46
1:A:35:ARG:NH2	2:B:54:MET:O	2.40	0.46
2:H:32:PRO:HB2	2:H:33:PRO:HD2	1.98	0.46
1:A:234:ARG:HD3	2:B:10:TYR:CD2	2.51	0.46
1:D:115:GLN:NE2	4:D:500:HOH:O	2.48	0.46
1:J:249:VAL:HG22	1:J:257:TYR:CZ	2.52	0.45
2:B:39:MET:HE1	2:B:67:HIS:C	2.37	0.45
1:G:74:PHE:HZ	1:G:97:GLN:HE21	1.65	0.45
2:H:29:GLN:HA	2:H:61:SER:HB2	1.98	0.45
1:J:191:HIS:NE2	1:J:199:VAL:HG21	2.32	0.45
1:G:19:GLU:OE1	1:G:75:ARG:NE	2.49	0.44
1:D:263:HIS:HB3	1:D:266:LEU:HD22	1.98	0.44
1:A:202:ARG:HD2	1:A:244:TRP:CD2	2.52	0.44
1:G:194:ARG:NH1	1:G:248:VAL:HG12	2.33	0.44
1:G:219:LEU:HD13	1:G:257:TYR:CE1	2.52	0.44
1:D:185:PRO:HD2	1:D:266:LEU:HD13	1.99	0.44
2:B:32:PRO:HB2	2:B:33:PRO:HD2	2.00	0.43
1:D:155:HIS:HE1	3:F:4:TYR:O	2.01	0.43
1:G:66:LYS:NZ	3:I:1:LYS:NZ	2.66	0.43
2:K:4:THR:HG22	4:K:180:HOH:O	2.19	0.43
1:J:155:HIS:HB3	3:L:6:PHE:CZ	2.54	0.43
1:G:28:VAL:HG23	1:G:33:PHE:CE1	2.53	0.43
1:D:6:ARG:NH2	1:D:113:TYR:CE1	2.87	0.43
1:G:200:THR:HG23	1:G:246:SER:HB2	2.00	0.42
2:H:21:ASN:HB3	2:H:70:PHE:CE1	2.54	0.42
1:G:19:GLU:OE1	1:G:75:ARG:CZ	2.67	0.42
1:J:32:GLU:OE2	1:J:35:ARG:HD2	2.19	0.42
4:J:436:HOH:O	2:K:54:MET:HE1	2.19	0.42
1:D:234:ARG:HD3	2:E:10:TYR:CZ	2.55	0.42
1:G:32:GLU:OE2	1:G:48:ARG:HD2	2.20	0.42
2:H:39:MET:HE3	2:H:49:VAL:HG13	2.01	0.42
1:J:230:LEU:HD12	1:J:230:LEU:C	2.40	0.41
1:J:167:TRP:CE2	3:L:1:LYS:HD2	2.56	0.41
1:G:77:SER:HB2	3:I:9:MET:HG2	2.02	0.41
2:B:4:THR:HG22	2:B:86:SER:HB2	2.03	0.41
1:A:78:LEU:HD13	1:A:95:LEU:HB2	2.02	0.41
1:D:18:GLU:HG2	1:D:19:GLU:N	2.36	0.41
1:G:111:ARG:HD2	1:G:113:TYR:CZ	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:117:ALA:HB2	2:H:60:TRP:CE2	2.56	0.40
2:K:39:MET:CE	2:K:49:VAL:HG13	2.50	0.40
1:D:194:ARG:HE	1:D:194:ARG:HB3	1.75	0.40
1:G:32:GLU:OE2	1:G:48:ARG:CD	2.70	0.40
1:G:82:LEU:HA	1:G:87:GLN:HE21	1.86	0.40
2:E:1:ILE:N	4:E:163:HOH:O	2.55	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	274/338 (81%)	263 (96%)	8 (3%)	3 (1%)	14	12
1	D	272/338 (80%)	256 (94%)	13 (5%)	3 (1%)	14	12
1	G	272/338 (80%)	257 (94%)	12 (4%)	3 (1%)	14	12
1	J	271/338 (80%)	256 (94%)	12 (4%)	3 (1%)	14	12
2	B	97/99 (98%)	95 (98%)	2 (2%)	0	100	100
2	E	97/99 (98%)	94 (97%)	3 (3%)	0	100	100
2	H	97/99 (98%)	95 (98%)	2 (2%)	0	100	100
2	K	97/99 (98%)	95 (98%)	2 (2%)	0	100	100
3	C	7/9 (78%)	6 (86%)	1 (14%)	0	100	100
3	F	7/9 (78%)	6 (86%)	1 (14%)	0	100	100
3	I	7/9 (78%)	6 (86%)	1 (14%)	0	100	100
3	L	7/9 (78%)	6 (86%)	1 (14%)	0	100	100
All	All	1505/1784 (84%)	1435 (95%)	58 (4%)	12 (1%)	19	19

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	196	LYS
1	D	17	LEU
1	J	196	LYS
1	J	220	ASN
1	J	226	GLN
1	A	195	SER
1	D	29	ASP
1	G	220	ASN
1	D	226	GLN
1	A	226	GLN
1	G	194	ARG
1	G	221	GLY

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	234/280 (84%)	214 (92%)	20 (8%)	10	10
1	D	232/280 (83%)	209 (90%)	23 (10%)	8	7
1	G	232/280 (83%)	216 (93%)	16 (7%)	15	16
1	J	232/280 (83%)	209 (90%)	23 (10%)	8	7
2	B	93/94 (99%)	84 (90%)	9 (10%)	8	7
2	E	94/94 (100%)	82 (87%)	12 (13%)	4	3
2	H	94/94 (100%)	82 (87%)	12 (13%)	4	3
2	K	94/94 (100%)	86 (92%)	8 (8%)	10	10
3	C	7/7 (100%)	6 (86%)	1 (14%)	3	2
3	F	7/7 (100%)	7 (100%)	0	100	100
3	I	7/7 (100%)	6 (86%)	1 (14%)	3	2
3	L	7/7 (100%)	7 (100%)	0	100	100
All	All	1333/1524 (88%)	1208 (91%)	125 (9%)	8	8

All (125) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	17	LEU
1	A	48	ARG
1	A	78	LEU
1	A	110	LEU
1	A	114	LEU
1	A	115	GLN
1	A	144	ARG
1	A	166	GLU
1	A	179	LEU
1	A	181	ARG
1	A	222	GLU
1	A	224	LEU
1	A	226	GLN
1	A	227	ASP
1	A	229	GLU
1	A	234	ARG
1	A	254	GLU
1	A	258	THR
1	A	266	LEU
1	A	273	ARG
2	B	1	ILE
2	B	2	GLN
2	B	29	GLN
2	B	58	LYS
2	B	64	ILE
2	B	69	GLU
2	B	70	PHE
2	B	74	GLU
2	B	75	THR
3	C	1	LYS
1	D	17	LEU
1	D	18	GLU
1	D	29	ASP
1	D	39	ASP
1	D	48	ARG
1	D	62	ARG
1	D	75	ARG
1	D	78	LEU
1	D	79	ARG
1	D	110	LEU
1	D	111	ARG
1	D	114	LEU
1	D	179	LEU

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Mol	Chain	Res	Type
1	D	194	ARG
1	D	196	LYS
1	D	202	ARG
1	D	224	LEU
1	D	226	GLN
1	D	232	GLU
1	D	234	ARG
1	D	256	ASN
1	D	266	LEU
1	D	273	ARG
2	E	1	ILE
2	E	2	GLN
2	E	4	THR
2	E	22	ILE
2	E	44	LYS
2	E	64	ILE
2	E	70	PHE
2	E	74	GLU
2	E	75	THR
2	E	77	THR
2	E	91	LYS
2	E	93	VAL
1	G	18	GLU
1	G	48	ARG
1	G	75	ARG
1	G	78	LEU
1	G	110	LEU
1	G	111	ARG
1	G	114	LEU
1	G	179	LEU
1	G	191	HIS
1	G	222	GLU
1	G	224	LEU
1	G	226	GLN
1	G	232	GLU
1	G	234	ARG
1	G	266	LEU
1	G	273	ARG
2	H	1	ILE
2	H	19	LYS
2	H	22	ILE
2	H	29	GLN

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Mol	Chain	Res	Type
2	H	54	MET
2	H	64	ILE
2	H	70	PHE
2	H	74	GLU
2	H	75	THR
2	H	81	ARG
2	H	91	LYS
2	H	93	VAL
3	I	1	LYS
1	J	17	LEU
1	J	45	TYR
1	J	48	ARG
1	J	53	GLU
1	J	62	ARG
1	J	78	LEU
1	J	110	LEU
1	J	111	ARG
1	J	114	LEU
1	J	154	GLU
1	J	163	GLU
1	J	179	LEU
1	J	181	ARG
1	J	194	ARG
1	J	222	GLU
1	J	224	LEU
1	J	226	GLN
1	J	228	MET
1	J	229	GLU
1	J	234	ARG
1	J	254	GLU
1	J	266	LEU
1	J	273	ARG
2	K	1	ILE
2	K	4	THR
2	K	48	LYS
2	K	54	MET
2	K	64	ILE
2	K	70	PHE
2	K	75	THR
2	K	93	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	42	ASN
1	A	97	GLN
2	B	38	GLN
3	C	5	ASN
1	D	87	GLN
1	D	97	GLN
1	D	155	HIS
1	D	192	HIS
2	E	8	GLN
2	E	38	GLN
3	F	5	ASN
1	G	87	GLN
1	G	97	GLN
1	G	256	ASN
3	I	5	ASN
1	J	97	GLN
1	J	255	GLN
2	K	67	HIS
3	L	5	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 ⓘ

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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, 95th 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 ²)	Q<0.9
1	A	276/338 (81%)	0.51	27 (9%) 7 6	12, 25, 56, 64	0
1	D	274/338 (81%)	0.73	36 (13%) 3 3	12, 25, 53, 64	0
1	G	274/338 (81%)	1.27	54 (19%) 1 1	12, 25, 53, 64	0
1	J	273/338 (80%)	0.73	35 (12%) 3 3	12, 25, 53, 64	0
2	B	99/99 (100%)	0.06	2 (2%) 65 63	14, 23, 29, 33	0
2	E	99/99 (100%)	0.15	1 (1%) 82 81	14, 23, 30, 33	0
2	H	99/99 (100%)	0.37	4 (4%) 38 36	13, 23, 30, 36	0
2	K	99/99 (100%)	0.05	1 (1%) 82 81	14, 23, 30, 33	0
3	C	9/9 (100%)	-0.06	0 100 100	15, 17, 21, 22	0
3	F	9/9 (100%)	0.25	0 100 100	14, 17, 21, 22	0
3	I	9/9 (100%)	0.32	0 100 100	14, 17, 21, 23	0
3	L	9/9 (100%)	0.75	0 100 100	15, 17, 21, 23	0
All	All	1529/1784 (85%)	0.63	160 (10%) 6 5	12, 24, 52, 64	0

All (160) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	251	LEU	14.0
1	G	178	THR	11.2
1	G	249	VAL	10.5
1	J	177	ALA	10.1
1	G	195	SER	9.8
1	G	177	ALA	9.6
1	G	224	LEU	9.2
1	J	197	GLY	9.0
1	G	199	VAL	8.5
1	G	248	VAL	8.0
1	A	177	ALA	8.0

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Mol	Chain	Res	Type	RSRZ
1	G	217	TRP	7.6
1	A	227	ASP	7.5
1	D	252	GLY	7.5
1	G	252	GLY	7.4
1	G	254	GLU	7.3
1	D	177	ALA	7.0
1	G	191	HIS	6.4
1	J	226	GLN	6.4
1	G	257	TYR	6.3
1	D	178	THR	6.2
1	G	179	LEU	6.2
1	D	195	SER	6.2
1	G	219	LEU	6.1
1	G	201	LEU	6.0
1	G	198	GLU	5.9
1	G	196	LYS	5.9
1	D	249	VAL	5.8
1	A	197	GLY	5.7
1	J	220	ASN	5.7
1	D	17	LEU	5.6
1	D	220	ASN	5.6
1	D	250	PRO	5.6
1	D	197	GLY	5.5
1	G	200	THR	5.4
1	A	196	LYS	5.1
1	D	227	ASP	5.1
1	G	189	VAL	5.0
1	G	192	HIS	5.0
1	D	196	LYS	5.0
1	D	248	VAL	4.9
1	G	227	ASP	4.9
1	D	16	GLY	4.8
1	J	199	VAL	4.8
1	A	226	GLN	4.7
1	J	178	THR	4.7
1	J	228	MET	4.6
1	D	201	LEU	4.6
1	D	251	LEU	4.6
1	J	252	GLY	4.6
1	G	218	GLN	4.6
1	G	221	GLY	4.6
1	J	180	LEU	4.4

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Mol	Chain	Res	Type	RSRZ
1	G	253	LYS	4.4
1	G	193	PRO	4.4
1	J	227	ASP	4.3
1	G	197	GLY	4.3
1	J	196	LYS	4.3
1	G	250	PRO	4.2
1	A	220	ASN	4.1
1	J	198	GLU	4.1
1	G	256	ASN	4.1
1	A	18	GLU	4.1
1	G	180	LEU	4.1
1	A	42	ASN	4.0
1	G	220	ASN	4.0
1	G	176	ASN	4.0
1	G	270	LEU	3.9
1	D	179	LEU	3.9
1	G	272	LEU	3.9
1	D	217	TRP	3.9
1	J	251	LEU	3.9
1	A	181	ARG	3.8
1	A	225	THR	3.8
1	J	250	PRO	3.8
1	A	251	LEU	3.7
1	J	16	GLY	3.7
1	G	247	VAL	3.7
1	D	18	GLU	3.6
1	J	248	VAL	3.6
1	D	181	ARG	3.6
1	G	273	ARG	3.6
1	G	16	GLY	3.6
1	J	247	VAL	3.6
1	D	253	LYS	3.6
1	A	249	VAL	3.5
1	D	180	LEU	3.5
1	D	226	GLN	3.5
1	G	194	ARG	3.5
1	D	256	ASN	3.4
1	G	274	TRP	3.3
1	D	274	TRP	3.3
1	D	225	THR	3.3
1	J	256	ASN	3.3
1	G	246	SER	3.3

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Mol	Chain	Res	Type	RSRZ
1	G	223	GLU	3.3
1	G	255	GLN	3.2
1	J	201	LEU	3.2
1	A	252	GLY	3.1
1	G	90	GLY	3.1
2	H	99	MET	3.1
1	D	223	GLU	3.1
1	D	254	GLU	3.1
1	J	200	THR	3.1
1	G	181	ARG	3.1
1	G	228	MET	3.0
1	G	222	GLU	3.0
1	D	273	ARG	3.0
1	G	226	GLN	3.0
1	J	194	ARG	2.9
1	A	41	GLU	2.9
1	J	274	TRP	2.9
1	A	253	LYS	2.8
1	J	249	VAL	2.8
1	J	54	GLN	2.8
1	D	228	MET	2.8
1	J	255	GLN	2.8
1	A	17	LEU	2.7
1	A	256	ASN	2.7
1	J	257	TYR	2.7
1	A	178	THR	2.7
1	D	222	GLU	2.7
1	A	273	ARG	2.7
1	J	224	LEU	2.7
1	A	250	PRO	2.7
1	J	181	ARG	2.6
1	G	229	GLU	2.6
1	A	247	VAL	2.6
1	G	230	LEU	2.6
1	D	176	ASN	2.6
2	B	48	LYS	2.6
2	H	88	ALA	2.6
1	D	219	LEU	2.5
1	G	186	LYS	2.4
1	G	271	THR	2.4
2	E	47	PRO	2.4
1	D	189	VAL	2.4

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Mol	Chain	Res	Type	RSRZ
1	J	193	PRO	2.4
1	J	254	GLU	2.4
1	A	223	GLU	2.4
1	G	225	THR	2.3
1	A	255	GLN	2.3
1	A	276	PRO	2.3
1	J	253	LYS	2.3
1	D	257	TYR	2.2
1	J	191	HIS	2.2
2	B	1	ILE	2.2
1	A	224	LEU	2.2
1	D	200	THR	2.2
2	K	47	PRO	2.2
1	J	189	VAL	2.2
1	G	18	GLU	2.2
1	D	192	HIS	2.1
1	A	274	TRP	2.1
2	H	38	GLN	2.1
1	A	176	ASN	2.1
1	J	195	SER	2.0
1	J	273	ARG	2.0
1	G	188	HIS	2.0
2	H	48	LYS	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 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.