Full wwPDB X-ray Structure Validation Report ⓘ

Sep 16, 2021 – 02:00 PM BST

PDB ID	:	6Z9W
Title	:	Human Class I Major Histocompatibility Complex, A02 allele, presenting LL-GWVFAQV
Authors	:	Rizkallah, P.J.; Man, S.; Redman, J.E.
Deposited on	:	2020-06-04
Resolution	:	2.70 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:

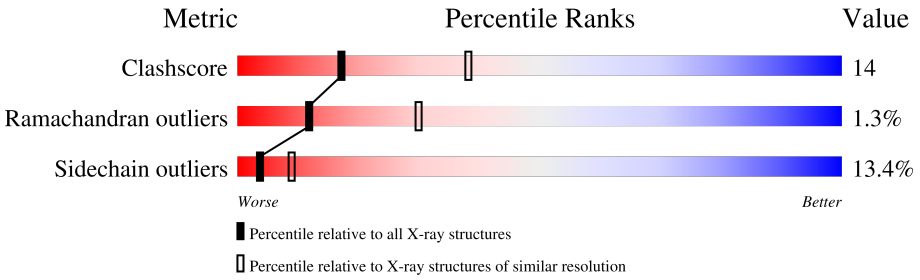
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.23.1

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 2.70 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))
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)

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 >=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 <=5%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	275	62% 33% .
1	D	275	65% 29% 6%
2	B	100	68% 28% . .
2	E	100	66% 31% . .
3	C	9	33% 67%
3	F	9	22% 44% 33%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 6408 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 MHC class I antigen.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	275	Total	C	N	O	S	0	0	0
			2247	1403	409	426	9			
1	D	275	Total	C	N	O	S	0	0	0
			2247	1403	409	426	9			

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	100	Total	C	N	O	S	0	0	0
			837	533	141	159	4			
2	E	100	Total	C	N	O	S	0	0	0
			837	533	141	159	4			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	0	MET	-	initiating methionine	UNP P61769
E	0	MET	-	initiating methionine	UNP P61769

- Molecule 3 is a protein called LEU-LEU-GLY-TRP-VAL-PHE-ALA-GLN-VAL.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	9	Total	C	N	O	0	0	0
			74	52	11	11			
3	F	9	Total	C	N	O	0	0	0
			74	52	11	11			

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	33	Total	O	0	0
			33	33		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	14	Total O 14 14	0	0
4	C	2	Total O 2 2	0	0
4	D	26	Total O 26 26	0	0
4	E	17	Total O 17 17	0	0

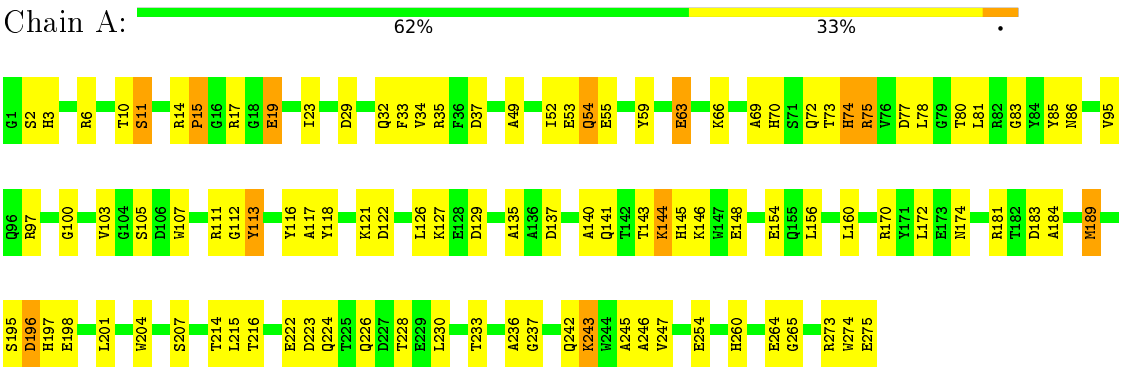
3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. 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. 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.

Note EDS was not executed.

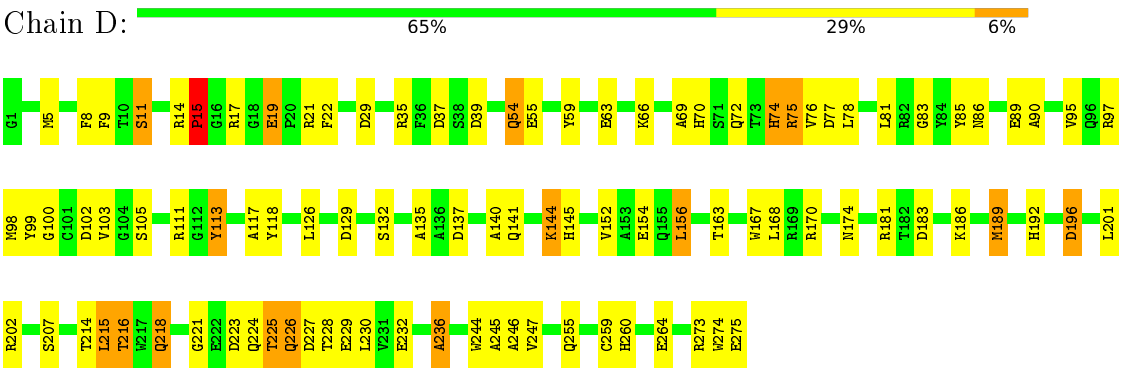
- Molecule 1: MHC class I antigen

Chain A:



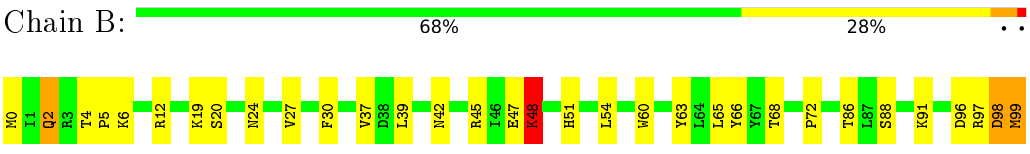
- Molecule 1: MHC class I antigen

Chain D:



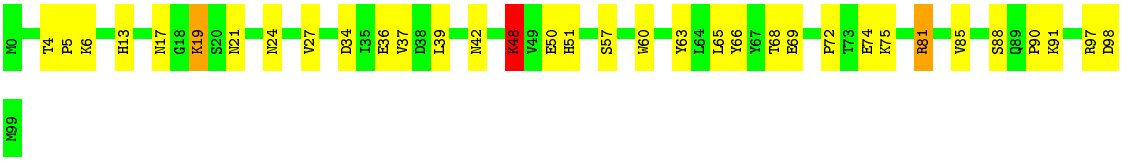
- Molecule 2: Beta-2-microglobulin

Chain B:



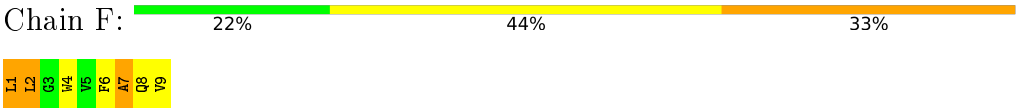
- Molecule 2: Beta-2-microglobulin

Chain E:



• Molecule 3: LEU-LEU-GLY-TRP-VAL-PHE-ALA-GLN-VAL

• Molecule 3: LEU-LEU-GLY-TRP-VAL-PHE-ALA-GLN-VAL



4 Data and refinement statistics (i)

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	59.73Å 69.21Å 88.62Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.94 – 2.70	Depositor
% Data completeness (in resolution range)	98.5 (29.94-2.70)	Depositor
R_{merge}	0.21	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	REFMAC 5.8.0258	Depositor
R, R_{free}	0.200 , 0.281	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Reported twinning fraction	0.649 for H, K, L 0.351 for -h,-k,l	Depositor
Outliers	(Not available)	Xtriage
Total number of atoms	6408	wwPDB-VP
Average B, all atoms ($Å^2$)	46.0	wwPDB-VP

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	0.87	1/2312 (0.0%)	0.86	0/3137
1	D	0.87	1/2312 (0.0%)	0.88	0/3137
2	B	0.87	0/860	0.89	0/1162
2	E	0.92	2/860 (0.2%)	0.91	0/1162
3	C	1.01	0/76	0.76	0/102
3	F	0.91	0/76	0.71	0/102
All	All	0.88	4/6496 (0.1%)	0.87	0/8802

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
2	B	0	2
2	E	0	1
3	C	0	1
3	F	0	1
All	All	0	5

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	36	GLU	CD-OE2	5.91	1.32	1.25
2	E	74	GLU	CD-OE2	5.82	1.32	1.25
1	A	6	ARG	C-O	5.28	1.33	1.23
1	D	236	ALA	C-O	5.06	1.32	1.23

There are no bond angle outliers.

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	5	PRO	Peptide
2	B	98	ASP	Peptide
3	C	7	ALA	Peptide
2	E	5	PRO	Peptide
3	F	7	ALA	Peptide

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2247	0	2096	66	1
1	D	2247	0	2096	73	0
2	B	837	0	803	23	0
2	E	837	0	803	20	0
3	C	74	0	77	10	0
3	F	74	0	77	14	0
4	A	33	0	0	2	0
4	B	14	0	0	1	0
4	C	2	0	0	0	0
4	D	26	0	0	2	0
4	E	17	0	0	1	0
All	All	6408	0	5952	170	1

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 14.

All (170) 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:D:226:GLN:HE21	1:D:226:GLN:HA	1.36	0.89
1:D:192:HIS:NE2	2:E:98:ASP:OD2	2.07	0.87
1:A:126:LEU:HD22	1:A:156:LEU:HD23	1.60	0.83
1:D:135:ALA:HB3	1:D:141:GLN:HE21	1.47	0.79
1:A:10:THR:HG21	2:B:54:LEU:HD23	1.67	0.77
1:A:233:THR:OG1	1:A:243:LYS:HD2	1.84	0.76
2:B:97:ARG:HG2	2:B:99:MET:HG3	1.67	0.75
1:D:230:LEU:HD12	1:D:245:ALA:HB2	1.69	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:85:TYR:OH	1:D:137:ASP:OD2	2.06	0.72
2:E:17:ASN:OD1	2:E:97:ARG:NH1	2.23	0.71
1:A:80:THR:HG21	3:C:9:VAL:OXT	1.90	0.71
1:D:22:PHE:HB2	4:D:317:HOH:O	1.89	0.71
1:D:70:HIS:CE1	3:F:6:PHE:HE1	2.07	0.71
2:B:97:ARG:CG	2:B:99:MET:HG3	2.20	0.71
1:A:85:TYR:OH	1:A:137:ASP:OD2	2.09	0.70
1:D:232:GLU:OE1	2:E:6:LYS:NZ	2.24	0.69
1:A:228:THR:HG22	1:A:247:VAL:HG12	1.75	0.68
1:A:53:GLU:OE1	4:A:301:HOH:O	2.09	0.68
1:D:81:LEU:HD13	1:D:118:TYR:CD1	2.28	0.68
1:A:81:LEU:HD13	1:A:118:TYR:CD1	2.31	0.66
1:A:74:HIS:HE1	1:A:97:ARG:HE	1.44	0.66
1:A:135:ALA:CB	1:A:141:GLN:HE21	2.10	0.65
1:A:148:GLU:OE1	4:A:302:HOH:O	2.15	0.64
1:A:156:LEU:CD1	3:C:5:VAL:HG11	2.28	0.64
2:E:27:VAL:HG23	2:E:27:VAL:O	1.97	0.64
1:D:135:ALA:HB3	1:D:141:GLN:NE2	2.13	0.63
1:D:15:PRO:HG2	1:D:90:ALA:O	1.99	0.62
1:D:54:GLN:OE1	1:D:174:ASN:HB3	1.98	0.62
1:D:70:HIS:CE1	3:F:2:LEU:HD22	2.35	0.62
1:D:59:TYR:O	1:D:63:GLU:HG2	2.00	0.61
1:A:59:TYR:O	1:A:63:GLU:HG2	2.00	0.61
1:A:54:GLN:OE1	1:A:174:ASN:HB3	2.01	0.61
1:D:181:ARG:NE	1:D:183:ASP:OD2	2.33	0.61
1:D:273:ARG:HG2	1:D:274:TRP:N	2.16	0.60
1:D:103:VAL:HG13	1:D:168:LEU:HD23	1.83	0.60
1:D:135:ALA:CB	1:D:141:GLN:HE21	2.14	0.59
1:D:99:TYR:OH	3:F:2:LEU:HD23	2.02	0.59
1:D:111:ARG:NE	4:D:302:HOH:O	2.27	0.59
1:D:230:LEU:CD1	1:D:245:ALA:HB2	2.32	0.59
1:A:117:ALA:HB2	2:B:60:TRP:CE2	2.37	0.59
1:A:66:LYS:O	1:A:69:ALA:HB3	2.03	0.58
1:A:77:ASP:OD1	3:C:9:VAL:HG22	2.03	0.58
2:E:39:LEU:HD13	2:E:68:THR:HG22	1.86	0.58
1:D:196:ASP:OD1	1:D:196:ASP:C	2.42	0.58
1:D:273:ARG:HD2	1:D:275:GLU:HG2	1.86	0.57
1:A:66:LYS:HZ1	3:C:1:LEU:HG	1.69	0.57
1:D:74:HIS:HE1	1:D:97:ARG:HE	1.50	0.57
1:A:113:TYR:CD1	1:A:113:TYR:N	2.73	0.57
1:A:196:ASP:OD1	1:A:196:ASP:C	2.42	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:66:LYS:O	1:D:69:ALA:HB3	2.05	0.56
1:D:102:ASP:OD1	1:D:113:TYR:OH	2.22	0.56
2:B:19:LYS:O	2:B:72:PRO:HD2	2.06	0.56
1:D:78:LEU:CD2	1:D:95:VAL:HG13	2.36	0.56
1:A:11:SER:HB2	1:A:74:HIS:HD2	1.70	0.56
1:A:100:GLY:O	1:A:160:LEU:HD22	2.06	0.55
1:D:70:HIS:CE1	3:F:6:PHE:CE1	2.93	0.55
1:D:135:ALA:HB1	1:D:140:ALA:HB3	1.89	0.55
1:A:201:LEU:O	1:A:246:ALA:HA	2.08	0.53
1:D:76:VAL:HG11	3:F:8:GLN:HE22	1.72	0.53
1:A:230:LEU:CD1	1:A:245:ALA:HB2	2.38	0.53
2:E:19:LYS:O	2:E:72:PRO:HD2	2.09	0.53
1:A:181:ARG:NE	1:A:183:ASP:OD2	2.31	0.52
1:D:11:SER:HB2	1:D:74:HIS:HD2	1.75	0.52
1:A:189:MET:SD	1:A:201:LEU:HD13	2.48	0.52
1:A:3:HIS:HA	1:A:29:ASP:OD1	2.10	0.52
1:D:21:ARG:NH2	1:D:37:ASP:OD2	2.41	0.52
1:D:167:TRP:CD2	3:F:1:LEU:HD13	2.45	0.52
1:D:167:TRP:CE2	3:F:1:LEU:HD13	2.45	0.51
1:A:11:SER:HB2	1:A:74:HIS:CD2	2.45	0.51
2:B:24:ASN:HB3	2:B:65:LEU:HD11	1.93	0.51
1:A:197:HIS:ND1	1:A:198:GLU:HG3	2.26	0.51
1:A:23:ILE:HG12	1:A:37:ASP:OD2	2.11	0.50
1:A:10:THR:HG21	2:B:54:LEU:CD2	2.41	0.50
1:A:66:LYS:NZ	3:C:1:LEU:HG	2.26	0.50
1:A:73:THR:HG23	3:C:8:GLN:HG2	1.93	0.50
1:A:242:GLN:O	1:A:243:LYS:HB2	2.10	0.50
1:D:218:GLN:HG3	1:D:260:HIS:CD2	2.47	0.50
1:D:11:SER:HB2	1:D:74:HIS:CD2	2.47	0.49
1:D:77:ASP:OD1	3:F:9:VAL:HG22	2.12	0.49
1:D:5:MET:O	1:D:100:GLY:HA3	2.13	0.49
2:B:39:LEU:CD1	2:B:68:THR:HG22	2.42	0.49
1:D:9:PHE:CZ	3:F:2:LEU:HD21	2.47	0.49
1:A:135:ALA:HB1	1:A:140:ALA:HB3	1.95	0.49
1:D:273:ARG:HD2	1:D:275:GLU:CG	2.42	0.49
2:B:39:LEU:HD13	2:B:68:THR:HG22	1.95	0.49
1:D:152:VAL:HG12	1:D:156:LEU:HD23	1.94	0.49
1:A:33:PHE:CD2	1:A:34:VAL:HG13	2.48	0.49
1:A:72:GLN:OE1	1:A:75:ARG:HD3	2.12	0.49
1:D:163:THR:OG1	3:F:4:TRP:HH2	1.96	0.48
1:D:216:THR:HB	1:D:260:HIS:HB2	1.94	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:236:ALA:HB1	2:B:12:ARG:HG3	1.95	0.48
1:D:70:HIS:ND1	3:F:6:PHE:HE1	2.11	0.48
1:D:201:LEU:O	1:D:246:ALA:HA	2.13	0.48
1:A:204:TRP:HZ2	2:B:98:ASP:CB	2.26	0.48
2:E:48:LYS:HE2	2:E:68:THR:OG1	2.14	0.48
1:D:55:GLU:OE1	1:D:170:ARG:NH2	2.43	0.47
1:A:49:ALA:O	1:A:52:ILE:HG22	2.15	0.47
1:A:75:ARG:HH21	1:A:75:ARG:CG	2.28	0.47
1:D:229:GLU:OE2	1:D:244:TRP:HH2	1.97	0.47
1:A:237:GLY:HA3	2:B:12:ARG:HH21	1.77	0.47
1:A:69:ALA:HB3	3:C:6:PHE:CZ	2.50	0.47
1:A:112:GLY:C	1:A:113:TYR:CD1	2.88	0.47
1:A:156:LEU:HD13	3:C:5:VAL:HG11	1.95	0.47
2:E:39:LEU:CD1	2:E:68:THR:HG22	2.44	0.47
1:D:78:LEU:HD21	1:D:95:VAL:HG13	1.97	0.47
1:A:19:GLU:HG3	1:A:75:ARG:NH2	2.30	0.46
2:B:51:HIS:HA	2:B:65:LEU:O	2.15	0.46
1:D:19:GLU:HG3	1:D:75:ARG:NH2	2.29	0.46
2:B:2:GLN:HB3	2:B:86:THR:HG22	1.97	0.46
1:A:228:THR:HG22	1:A:247:VAL:CG1	2.45	0.46
1:D:189:MET:SD	1:D:201:LEU:HD13	2.55	0.46
2:B:27:VAL:HG23	2:B:30:PHE:HE2	1.80	0.46
1:D:218:GLN:HE22	1:D:221:GLY:HA2	1.80	0.46
1:A:274:TRP:O	1:A:275:GLU:HB2	2.16	0.46
1:A:122:ASP:OD1	2:B:60:TRP:NE1	2.44	0.45
1:D:215:LEU:HD23	1:D:245:ALA:N	2.31	0.45
1:A:143:THR:HG23	3:C:9:VAL:HA	1.99	0.45
2:E:81:ARG:CG	2:E:90:PRO:HB3	2.46	0.45
1:A:103:VAL:HB	1:A:107:TRP:HA	1.99	0.45
1:A:107:TRP:CZ2	1:A:172:LEU:HD13	2.52	0.45
1:D:8:PHE:CD1	1:D:98:MET:HG2	2.52	0.45
1:A:11:SER:HB3	1:A:95:VAL:HG22	1.99	0.45
2:E:24:ASN:HB3	2:E:65:LEU:HD11	1.99	0.45
1:D:228:THR:HG22	1:D:247:VAL:HG12	1.99	0.44
1:A:83:GLY:O	1:A:86:ASN:N	2.45	0.44
1:A:78:LEU:CD2	1:A:95:VAL:HG13	2.48	0.44
1:D:78:LEU:HD23	1:D:95:VAL:HG13	2.00	0.44
1:A:107:TRP:CH2	1:A:172:LEU:HB3	2.53	0.44
2:E:81:ARG:HG2	2:E:90:PRO:HB3	1.99	0.44
1:D:202:ARG:NH1	2:E:98:ASP:O	2.51	0.43
1:A:237:GLY:C	2:B:12:ARG:NH2	2.71	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:37:VAL:HG11	2:B:66:TYR:CD1	2.53	0.43
1:D:83:GLY:O	1:D:86:ASN:N	2.46	0.43
1:A:103:VAL:HB	1:A:107:TRP:C	2.38	0.43
1:D:274:TRP:O	1:D:275:GLU:C	2.57	0.43
1:D:152:VAL:HG12	1:D:156:LEU:CD2	2.49	0.43
1:D:168:LEU:HD12	1:D:168:LEU:O	2.18	0.43
1:A:135:ALA:HB3	1:A:141:GLN:HE21	1.82	0.43
2:B:45:ARG:NH1	4:B:108:HOH:O	2.52	0.43
2:E:27:VAL:O	2:E:27:VAL:CG2	2.65	0.43
2:B:27:VAL:HG23	2:B:30:PHE:CE2	2.53	0.42
2:E:37:VAL:HG11	2:E:66:TYR:CD1	2.54	0.42
1:D:72:GLN:O	1:D:76:VAL:HG23	2.18	0.42
1:D:218:GLN:NE2	1:D:221:GLY:HA2	2.34	0.42
1:D:117:ALA:HB2	2:E:60:TRP:CE2	2.54	0.42
1:D:236:ALA:O	2:E:24:ASN:ND2	2.51	0.42
2:B:48:LYS:HE2	2:B:68:THR:OG1	2.19	0.42
1:A:216:THR:O	1:A:260:HIS:N	2.48	0.42
2:E:51:HIS:HA	2:E:65:LEU:O	2.19	0.42
1:A:144:LYS:HG2	1:A:145:HIS:CD2	2.55	0.41
1:D:99:TYR:CD1	1:D:99:TYR:C	2.93	0.41
1:A:184:ALA:HB2	1:A:265:GLY:O	2.21	0.41
2:B:97:ARG:HG3	2:B:99:MET:HG3	2.00	0.41
1:D:168:LEU:HD12	1:D:168:LEU:C	2.40	0.41
1:D:225:THR:O	1:D:226:GLN:C	2.59	0.41
2:E:63:TYR:CD1	2:E:63:TYR:C	2.93	0.41
1:A:55:GLU:OE1	1:A:170:ARG:NH2	2.42	0.41
1:D:126:LEU:HD12	1:D:126:LEU:HA	1.92	0.41
1:D:255:GLN:NE2	1:D:275:GLU:OE1	2.53	0.41
2:E:85:VAL:HG12	4:E:109:HOH:O	2.19	0.41
2:B:63:TYR:C	2:B:63:TYR:CD1	2.94	0.41
1:D:226:GLN:HA	1:D:226:GLN:NE2	2.17	0.41
1:D:144:LYS:HG2	1:D:145:HIS:CD2	2.56	0.41
1:D:76:VAL:HG11	3:F:8:GLN:NE2	2.36	0.40
3:F:4:TRP:HA	3:F:6:PHE:CZ	2.56	0.40
1:A:63:GLU:OE2	1:A:66:LYS:NZ	2.53	0.40
2:E:13:HIS:HB2	2:E:21:ASN:ND2	2.36	0.40
1:D:9:PHE:HZ	3:F:2:LEU:HD21	1.84	0.40
1:A:70:HIS:CE1	3:C:6:PHE:HE1	2.39	0.40
1:A:274:TRP:O	1:A:275:GLU:CB	2.69	0.40

All (1) 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)
1:A:146:LYS:NZ	1:A:222:GLU:OE2[2_546]	2.06	0.14

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	273/275 (99%)	252 (92%)	19 (7%)	2 (1%)	22 46
1	D	273/275 (99%)	251 (92%)	20 (7%)	2 (1%)	22 46
2	B	98/100 (98%)	89 (91%)	7 (7%)	2 (2%)	7 19
2	E	98/100 (98%)	90 (92%)	5 (5%)	3 (3%)	4 9
3	C	7/9 (78%)	6 (86%)	1 (14%)	0	100 100
3	F	7/9 (78%)	4 (57%)	2 (29%)	1 (14%)	0 0
All	All	756/768 (98%)	692 (92%)	54 (7%)	10 (1%)	12 30

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	243	LYS
2	E	42	ASN
2	E	48	LYS
1	A	15	PRO
1	D	15	PRO
2	E	34	ASP
3	F	7	ALA
2	B	42	ASN
2	B	48	LYS
1	D	29	ASP

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	231/231 (100%)	198 (86%)	33 (14%)	3 8
1	D	231/231 (100%)	198 (86%)	33 (14%)	3 8
2	B	95/95 (100%)	84 (88%)	11 (12%)	5 12
2	E	95/95 (100%)	85 (90%)	10 (10%)	7 16
3	C	7/7 (100%)	7 (100%)	0	100 100
3	F	7/7 (100%)	5 (71%)	2 (29%)	0 1
All	All	666/666 (100%)	577 (87%)	89 (13%)	4 9

All (89) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2	SER
1	A	11	SER
1	A	14	ARG
1	A	15	PRO
1	A	17	ARG
1	A	19	GLU
1	A	32	GLN
1	A	35	ARG
1	A	54	GLN
1	A	63	GLU
1	A	74	HIS
1	A	75	ARG
1	A	105	SER
1	A	111	ARG
1	A	113	TYR
1	A	116	TYR
1	A	121	LYS
1	A	127	LYS
1	A	129	ASP
1	A	144	LYS
1	A	154	GLU
1	A	189	MET

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Mol	Chain	Res	Type
1	A	195	SER
1	A	196	ASP
1	A	207	SER
1	A	214	THR
1	A	215	LEU
1	A	223	ASP
1	A	224	GLN
1	A	226	GLN
1	A	254	GLU
1	A	264	GLU
1	A	273	ARG
2	B	0	MET
2	B	2	GLN
2	B	4	THR
2	B	6	LYS
2	B	20	SER
2	B	47	GLU
2	B	48	LYS
2	B	88	SER
2	B	91	LYS
2	B	96	ASP
2	B	99	MET
1	D	11	SER
1	D	14	ARG
1	D	15	PRO
1	D	17	ARG
1	D	19	GLU
1	D	35	ARG
1	D	39	ASP
1	D	54	GLN
1	D	74	HIS
1	D	75	ARG
1	D	89	GLU
1	D	105	SER
1	D	113	TYR
1	D	129	ASP
1	D	132	SER
1	D	144	LYS
1	D	154	GLU
1	D	156	LEU
1	D	186	LYS
1	D	189	MET

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Mol	Chain	Res	Type
1	D	196	ASP
1	D	207	SER
1	D	214	THR
1	D	215	LEU
1	D	216	THR
1	D	218	GLN
1	D	223	ASP
1	D	224	GLN
1	D	225	THR
1	D	226	GLN
1	D	227	ASP
1	D	259	CYS
1	D	264	GLU
2	E	4	THR
2	E	19	LYS
2	E	48	LYS
2	E	50	GLU
2	E	57	SER
2	E	69	GLU
2	E	75	LYS
2	E	81	ARG
2	E	88	SER
2	E	91	LYS
3	F	1	LEU
3	F	2	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	74	HIS
1	A	96	GLN
1	A	141	GLN
1	A	145	HIS
1	A	192	HIS
1	D	74	HIS
1	D	86	ASN
1	D	141	GLN
1	D	145	HIS
1	D	218	GLN
1	D	226	GLN
1	D	260	HIS
3	F	8	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

5.7 Other polymers

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

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.