Full wwPDB X-ray Structure Validation Report (i)

May 19, 2020 – 08:35 pm BST

PDB ID	:	1FFN
Title	:	CRYSTAL STRUCTURE OF MURINE CLASS I H-2DB COMPLEXED WITH PEPTIDE GP33(C9M)
Authors	:	Wang, B.; Sharma, A.; Maile, R.; Saad, M.; Collins, E.J.; Frelinger, J.A.
Deposited on	:	2000-07-25
Resolution	:	2.70 Å(reported)

The following versions of software and data (see references (i)) 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 2.70 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.
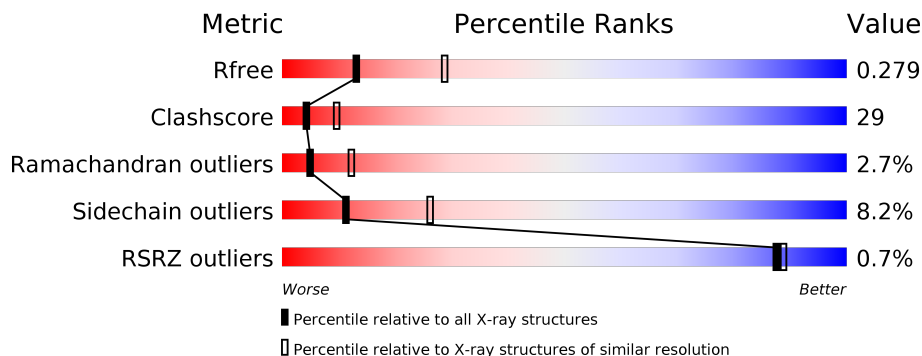
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

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 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 <=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	273	53% 40% 7%
1	D	273	53% 40% 7%
2	B	100	3% · 55% 38% 7%
2	E	100	2% · 54% 40% 6%
3	C	9	44% 44% 11%
3	F	9	67% 22% 11%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 6326 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	273	Total 2245	C 1418	N 397	O 421	S 9	0	0	0
1	D	273	Total 2245	C 1418	N 397	O 421	S 9	0	0	0

- Molecule 2 is a protein called BETA-2 MICROGLOBULIN, BETA CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	100	Total 829	C 529	N 139	O 153	S 8	0	0	0
2	E	100	Total 829	C 529	N 139	O 153	S 8	0	0	0

- Molecule 3 is a protein called SYNTHETIC PEPTIDE WITH SEQUENCE LYS-ALA-VAL-TYR-ASN-PHE-ALA-THR-MET.

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

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	10	Total 10	O 10	0	0
4	B	5	Total 5	O 5	0	0
4	D	11	Total 11	O 11	1	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	E	6	Total 6	O 6	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 le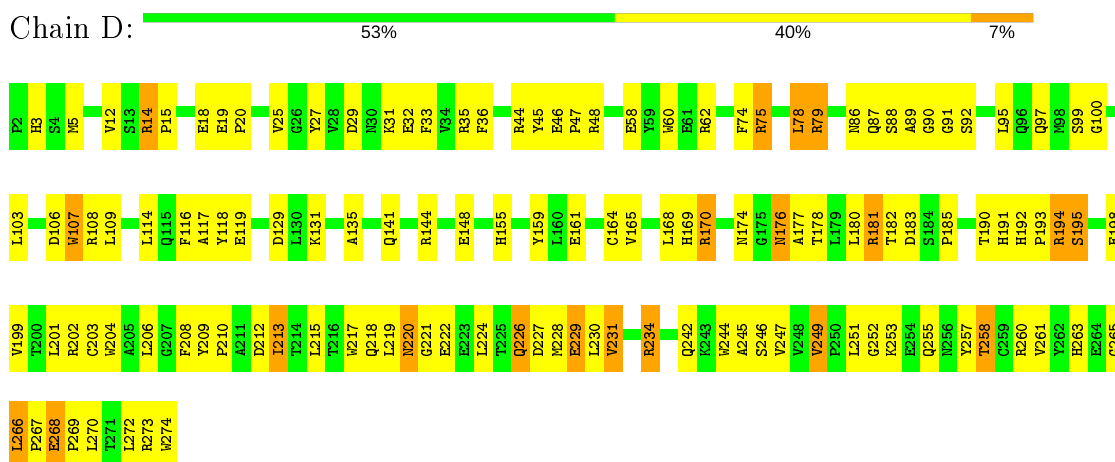ast one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: H-2 CLASS I HISTOCOMPATIBILITY ANTIGEN, D-B ALPHA CHAIN
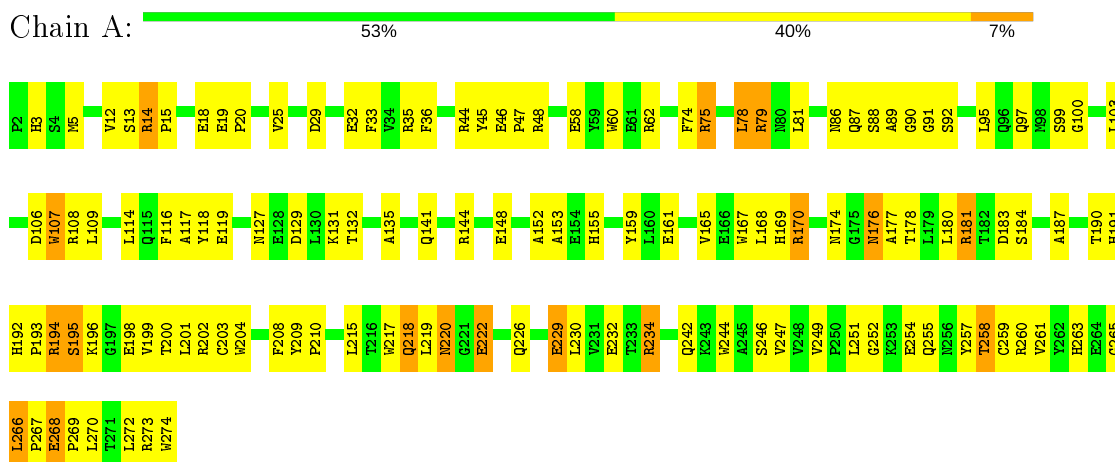
- Molecule 1: H-2 CLASS I HISTOCOMPATIBILITY ANTIGEN, D-B ALPHA CHAIN

- Molecule 2: BETA-2 MICROGLOBULIN, BETA CHAIN
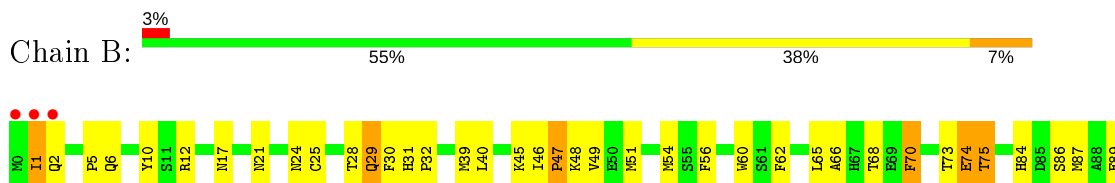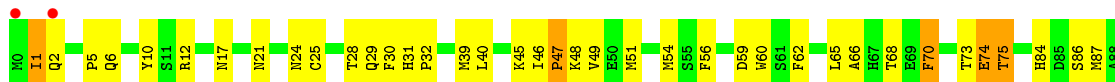
P90 K91 T92 V93 Y94 W95 D96 R97 D98 M99

● Molecule 2: BETA-2 MICROGLOBULIN, BETA CHAIN

Chain E:

2%

54% 40% 6%

M0 I1 Q2 P5 Q6 Y10 S11 R12 N17 N21 N24 C25 T28 Q29 F30 H31 P32 M39 L40 K45 I46 P47 K48 V49 E50 M51 M54 S55 F56 D59 W60 S61 F62 L65 A66 H67 T68 E69 F70 T73 E74 T75 H84 D85 S86 M87 A88

E89 P90 K91 T92 V93 Y94 W95 D96 R97 D98 M99

● Molecule 3: SYNTHETIC PEPTIDE WITH SEQUENCE LYS-ALA-VAL-TYR-ASN-PHE-ALA-THR-MET

Chain C:

44% 44% 11%

K1 A2 V3 Y4 N5 F6 M9

● Molecule 3: SYNTHETIC PEPTIDE WITH SEQUENCE LYS-ALA-VAL-TYR-ASN-PHE-ALA-THR-MET

Chain F:

67% 22% 11%

K1 A2 V3 Y4 N5 F6 M9

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	47.26Å 68.91Å 81.75Å 72.92° 73.24° 69.97°	Depositor
Resolution (Å)	50.00 – 2.70 31.83 – 2.70	Depositor EDS
% Data completeness (in resolution range)	89.7 (50.00-2.70) 89.6 (31.83-2.70)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.94 (at 2.68Å)	Xtriage
Refinement program	CNS 0.5	Depositor
R, R_{free}	0.240 , 0.286 0.235 , 0.279	Depositor DCC
R_{free} test set	1154 reflections (5.16%)	wwPDB-VP
Wilson B-factor (Å^2)	33.2	Xtriage
Anisotropy	0.314	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 12.9	EDS
L-test for twinning[2]	$< |L| > = 0.49, < L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.448 for h,h-k,h-l	Xtriage
F_o,F_c correlation	0.90	EDS
Total number of atoms	6326	wwPDB-VP
Average B, all atoms (Å^2)	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.14% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality (i)

5.1 Standard geometry (i)

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$|Z|$>5	RMSZ	#$|Z|$>5
1	A	0.42	0/2311	0.66	1/3136 (0.0%)
1	D	0.41	0/2311	0.64	0/3136
2	B	0.45	0/855	0.70	0/1158
2	E	0.46	0/855	0.69	0/1158
3	C	0.60	0/74	0.75	0/97
3	F	0.63	0/74	0.65	0/97
All	All	0.43	0/6480	0.66	1/8782 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	194	ARG	NE-CZ-NH2	6.16	123.38	120.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2245	0	2118	144	0
1	D	2245	0	2118	135	0
2	B	829	0	805	49	0
2	E	829	0	805	47	0
3	C	73	0	74	10	0
3	F	73	0	74	7	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	10	0	0	0	0
4	B	5	0	0	0	0
4	D	11	0	0	1	0
4	E	6	0	0	0	0
All	All	6326	0	5994	359	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 29.

All (359) 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)
2:E:2:GLN:HB2	2:E:86:SER:HB3	1.49	0.94
2:B:2:GLN:HB2	2:B:86:SER:HB3	1.50	0.94
1:A:19:GLU:HG3	1:A:75:ARG:HH21	1.31	0.93
1:D:19:GLU:HG3	1:D:75:ARG:HH21	1.31	0.93
1:D:194:ARG:NH2	1:D:202:ARG:HH21	1.66	0.92
1:D:170:ARG:HE	1:D:174:ASN:HD21	1.18	0.92
1:A:170:ARG:HE	1:A:174:ASN:HD21	1.20	0.90
1:A:194:ARG:NH2	1:A:202:ARG:HH21	1.69	0.89
1:D:176:ASN:HD22	1:D:177:ALA:H	1.18	0.88
1:A:176:ASN:HD22	1:A:177:ALA:H	1.19	0.88
1:D:19:GLU:HG2	1:D:20:PRO:HD2	1.57	0.87
1:A:14:ARG:HH21	1:A:20:PRO:HA	1.38	0.86
1:A:19:GLU:HG2	1:A:20:PRO:HD2	1.57	0.86
1:D:178:THR:O	1:D:181:ARG:HD2	1.75	0.86
1:D:14:ARG:HH21	1:D:20:PRO:HA	1.40	0.86
1:A:178:THR:O	1:A:181:ARG:HD2	1.76	0.85
1:D:5:MET:HB2	1:D:168:LEU:HD13	1.58	0.85
1:D:108:ARG:HH11	1:D:108:ARG:HG3	1.45	0.82
1:A:5:MET:HB2	1:A:168:LEU:HD13	1.62	0.82
1:D:159:TYR:CE2	3:F:3:VAL:HG22	2.15	0.81
1:A:263:HIS:HB3	1:A:266:LEU:HD22	1.63	0.81
1:A:108:ARG:HH11	1:A:108:ARG:HG3	1.47	0.80
1:D:109:LEU:HD22	1:D:161:GLU:HA	1.64	0.80
2:E:2:GLN:HA	2:E:31:HIS:O	1.82	0.79
1:A:109:LEU:HD22	1:A:161:GLU:HA	1.65	0.79
2:B:2:GLN:HA	2:B:31:HIS:O	1.82	0.79
1:A:19:GLU:HG3	1:A:75:ARG:NH2	1.98	0.79
1:D:19:GLU:HG3	1:D:75:ARG:NH2	1.99	0.78
1:D:194:ARG:CZ	1:D:202:ARG:HH21	1.96	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:103:LEU:HD21	1:A:165:VAL:HG13	1.67	0.75
1:D:103:LEU:HD21	1:D:165:VAL:HG13	1.68	0.75
1:A:263:HIS:CD2	1:A:265:GLY:H	2.06	0.73
1:D:185:PRO:HD2	1:D:266:LEU:HD11	1.71	0.72
1:A:159:TYR:CE2	3:C:3:VAL:HG22	2.24	0.72
2:B:5:PRO:HB3	2:B:30:PHE:HB3	1.70	0.72
1:A:79:ARG:HH11	1:A:79:ARG:HG2	1.54	0.71
2:B:17:ASN:HD22	2:B:74:GLU:H	1.39	0.71
2:E:5:PRO:HB3	2:E:30:PHE:HB3	1.73	0.69
2:E:84:HIS:HD2	2:E:86:SER:OG	1.74	0.69
1:D:79:ARG:HH11	1:D:79:ARG:HG2	1.57	0.69
2:E:17:ASN:HD22	2:E:74:GLU:H	1.41	0.69
1:A:260:ARG:NH2	1:A:269:PRO:HG2	2.07	0.69
1:D:46:GLU:HG3	1:D:47:PRO:HD2	1.75	0.69
2:E:39:MET:CE	2:E:68:THR:HG22	2.22	0.68
2:B:39:MET:CE	2:B:68:THR:HG22	2.22	0.68
1:A:155:HIS:HB3	3:C:6:PHE:CZ	2.29	0.68
1:A:202:ARG:NH1	1:A:246:SER:HB3	2.08	0.68
1:D:117:ALA:HB2	2:E:60:TRP:CE2	2.27	0.68
1:A:46:GLU:HG3	1:A:47:PRO:HD2	1.76	0.67
1:A:194:ARG:HH22	1:A:202:ARG:HH21	1.42	0.67
2:B:84:HIS:HD2	2:B:86:SER:OG	1.76	0.67
1:D:155:HIS:HB3	3:F:6:PHE:CZ	2.30	0.67
1:A:155:HIS:HB3	3:C:6:PHE:CE1	2.29	0.67
1:A:258:THR:HA	1:A:273:ARG:HG2	1.77	0.67
2:B:17:ASN:HD22	2:B:74:GLU:N	1.94	0.66
1:A:108:ARG:HG3	1:A:108:ARG:NH1	2.09	0.66
1:D:176:ASN:HD22	1:D:177:ALA:N	1.90	0.66
1:A:176:ASN:HD22	1:A:177:ALA:N	1.91	0.66
2:E:17:ASN:HD22	2:E:74:GLU:N	1.94	0.66
1:A:117:ALA:HB2	2:B:60:TRP:CE2	2.30	0.65
1:D:170:ARG:NE	1:D:174:ASN:HD21	1.93	0.65
1:D:258:THR:HB	1:D:273:ARG:HG2	1.77	0.65
1:A:194:ARG:CZ	1:A:202:ARG:HH21	2.08	0.65
1:D:219:LEU:O	1:D:221:GLY:N	2.30	0.65
1:A:47:PRO:HG3	1:A:60:TRP:CZ2	2.32	0.65
2:B:73:THR:O	2:B:75:THR:N	2.30	0.65
1:D:206:LEU:HD23	1:D:242:GLN:HB3	1.79	0.65
1:D:108:ARG:HG3	1:D:108:ARG:NH1	2.08	0.64
2:E:1:ILE:HG22	2:E:1:ILE:O	1.97	0.64
1:D:155:HIS:HB3	3:F:6:PHE:CE1	2.33	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:17:ASN:ND2	2:B:74:GLU:N	2.46	0.64
1:D:47:PRO:HG3	1:D:60:TRP:CZ2	2.32	0.64
1:A:194:ARG:NH1	1:A:202:ARG:NH2	2.45	0.64
1:A:170:ARG:NE	1:A:174:ASN:HD21	1.95	0.64
1:D:194:ARG:HH22	1:D:202:ARG:HH21	1.46	0.64
2:E:17:ASN:ND2	2:E:74:GLU:N	2.46	0.64
2:B:1:ILE:HG22	2:B:1:ILE:O	1.97	0.64
1:D:267:PRO:C	1:D:268:GLU:HG3	2.18	0.64
1:D:194:ARG:NH1	1:D:202:ARG:NH2	2.45	0.63
1:D:255:GLN:HG2	1:D:274:TRP:O	1.98	0.63
1:D:185:PRO:HD2	1:D:266:LEU:CD1	2.27	0.63
1:A:267:PRO:C	1:A:268:GLU:HG3	2.18	0.62
1:D:33:PHE:C	1:D:48:ARG:HB2	2.19	0.62
2:B:39:MET:HE3	2:B:68:THR:HG22	1.81	0.62
1:D:107:TRP:HE1	1:D:169:HIS:CE1	2.17	0.62
2:E:73:THR:O	2:E:75:THR:N	2.32	0.62
1:A:35:ARG:NH2	2:B:54:MET:O	2.32	0.62
1:A:194:ARG:O	1:A:195:SER:CB	2.48	0.62
1:A:263:HIS:HB3	1:A:266:LEU:CD2	2.30	0.62
2:E:39:MET:HE3	2:E:68:THR:HG22	1.82	0.62
1:A:196:LYS:HG2	1:A:196:LYS:O	1.98	0.62
2:B:17:ASN:ND2	2:B:74:GLU:H	1.97	0.61
1:A:95:LEU:HD21	3:C:9:MET:HE1	1.81	0.61
1:D:191:HIS:NE2	1:D:199:VAL:HG11	2.16	0.61
2:B:47:PRO:O	2:B:49:VAL:N	2.33	0.61
1:A:107:TRP:HE1	1:A:169:HIS:CE1	2.18	0.61
2:E:47:PRO:O	2:E:49:VAL:N	2.33	0.61
1:D:15:PRO:HD3	1:D:92:SER:HB3	1.83	0.60
1:D:144:ARG:O	1:D:148:GLU:HG3	2.01	0.60
1:D:35:ARG:HD3	1:D:48:ARG:HH21	1.66	0.60
1:A:144:ARG:O	1:A:148:GLU:HG3	2.01	0.60
1:D:119:GLU:HG3	4:D:277:HOH:O	2.01	0.60
1:A:192:HIS:NE2	2:B:98:ASP:HB3	2.15	0.60
1:D:234:ARG:HD3	2:E:10:TYR:CE2	2.37	0.60
1:A:15:PRO:HD3	1:A:92:SER:HB3	1.84	0.60
2:E:17:ASN:ND2	2:E:74:GLU:H	1.99	0.60
1:A:33:PHE:C	1:A:48:ARG:HB2	2.22	0.60
1:D:176:ASN:ND2	1:D:177:ALA:H	1.96	0.59
1:A:35:ARG:HD3	1:A:48:ARG:HH21	1.67	0.59
1:D:249:VAL:HG22	1:D:257:TYR:CZ	2.37	0.59
1:A:215:LEU:CD2	1:A:261:VAL:HG13	2.33	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:249:VAL:HG22	1:D:257:TYR:CE1	2.38	0.59
1:A:176:ASN:ND2	1:A:177:ALA:H	1.97	0.59
2:B:32:PRO:O	2:B:84:HIS:HE1	1.86	0.59
1:A:255:GLN:HG2	1:A:274:TRP:O	2.01	0.59
1:A:194:ARG:O	1:A:195:SER:HB2	2.02	0.58
1:A:258:THR:HB	1:A:273:ARG:HG2	1.84	0.58
1:D:194:ARG:O	1:D:195:SER:HB2	2.03	0.58
1:A:167:TRP:CE2	3:C:1:LYS:HD3	2.38	0.58
1:A:180:LEU:HD12	1:A:180:LEU:O	2.03	0.58
1:A:258:THR:HB	1:A:273:ARG:CG	2.34	0.58
1:D:103:LEU:HG	1:D:168:LEU:HD23	1.83	0.58
2:B:6:GLN:HB2	2:B:28:THR:HG23	1.86	0.58
1:A:14:ARG:NH2	1:A:20:PRO:HA	2.15	0.57
1:A:267:PRO:O	1:A:268:GLU:HG3	2.05	0.57
1:D:202:ARG:NH1	1:D:244:TRP:CZ3	2.72	0.57
1:D:35:ARG:NH2	2:E:54:MET:O	2.36	0.57
1:D:180:LEU:O	1:D:180:LEU:HD12	2.03	0.57
1:D:194:ARG:CZ	1:D:202:ARG:NH2	2.66	0.57
1:A:144:ARG:HD3	1:A:148:GLU:OE2	2.03	0.57
1:D:228:MET:HG3	1:D:246:SER:O	2.03	0.57
2:E:6:GLN:HB2	2:E:28:THR:HG23	1.87	0.57
1:A:78:LEU:CD1	1:A:95:LEU:HB2	2.35	0.57
1:D:144:ARG:HD3	1:D:148:GLU:OE2	2.04	0.56
1:D:263:HIS:HB3	1:D:266:LEU:HD22	1.87	0.56
1:D:78:LEU:CD1	1:D:95:LEU:HB2	2.35	0.56
1:A:103:LEU:HG	1:A:168:LEU:HD23	1.86	0.56
1:D:107:TRP:NE1	1:D:169:HIS:CE1	2.74	0.56
1:A:202:ARG:HH11	1:A:202:ARG:HG3	1.71	0.55
2:B:21:ASN:HB3	2:B:70:PHE:CE1	2.40	0.55
1:D:14:ARG:NH2	1:D:20:PRO:HA	2.18	0.55
2:E:39:MET:HE2	2:E:68:THR:HG22	1.87	0.55
1:D:170:ARG:HE	1:D:174:ASN:ND2	1.98	0.55
2:E:32:PRO:O	2:E:84:HIS:HE1	1.90	0.55
1:A:107:TRP:NE1	1:A:169:HIS:CE1	2.74	0.55
1:D:119:GLU:HB3	2:E:1:ILE:HG23	1.89	0.55
1:A:203:CYS:HB2	1:A:217:TRP:CZ2	2.42	0.54
1:A:176:ASN:ND2	1:A:176:ASN:N	2.55	0.54
1:A:191:HIS:HB2	1:A:274:TRP:CZ2	2.42	0.54
2:E:2:GLN:HG3	2:E:86:SER:HA	1.89	0.54
1:A:249:VAL:HG22	1:A:257:TYR:CZ	2.43	0.54
1:A:119:GLU:HB3	2:B:1:ILE:HG23	1.90	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:183:ASP:O	1:A:208:PHE:HA	2.07	0.54
2:B:39:MET:HE2	2:B:68:THR:HG22	1.89	0.54
1:A:261:VAL:HB	1:A:270:LEU:HB2	1.90	0.54
1:D:176:ASN:N	1:D:176:ASN:ND2	2.56	0.54
1:D:203:CYS:HB2	1:D:217:TRP:CZ2	2.43	0.54
1:A:234:ARG:NH2	2:B:99:MET:O	2.41	0.53
1:A:266:LEU:HB3	1:A:268:GLU:O	2.07	0.53
1:A:74:PHE:O	1:A:78:LEU:HB2	2.08	0.53
2:E:21:ASN:HB3	2:E:70:PHE:CE1	2.42	0.53
2:B:95:TRP:CG	2:B:96:ASP:N	2.77	0.53
2:E:2:GLN:HB2	2:E:86:SER:CB	2.31	0.53
1:A:194:ARG:CZ	1:A:202:ARG:NH2	2.72	0.53
3:C:3:VAL:HG12	3:C:4:TYR:N	2.24	0.53
2:E:95:TRP:CG	2:E:96:ASP:N	2.77	0.53
1:A:187:ALA:HA	1:A:204:TRP:O	2.09	0.53
2:B:2:GLN:HG3	2:B:86:SER:HA	1.91	0.52
1:D:74:PHE:O	1:D:78:LEU:HB2	2.09	0.52
1:A:170:ARG:HE	1:A:174:ASN:ND2	2.00	0.52
1:A:79:ARG:CG	1:A:79:ARG:HH11	2.22	0.52
1:A:249:VAL:HG22	1:A:257:TYR:CE1	2.45	0.52
2:E:2:GLN:CB	2:E:86:SER:HB3	2.33	0.52
1:A:202:ARG:NH1	1:A:244:TRP:CZ3	2.78	0.51
1:D:183:ASP:O	1:D:208:PHE:HA	2.10	0.51
2:B:2:GLN:CB	2:B:86:SER:HB3	2.34	0.51
1:D:212:ASP:O	1:D:213:ILE:HB	2.09	0.51
1:D:107:TRP:HE3	1:D:107:TRP:H	1.59	0.51
3:F:3:VAL:HG12	3:F:4:TYR:N	2.26	0.51
1:A:194:ARG:HH12	1:A:202:ARG:NH2	2.08	0.51
1:A:229:GLU:C	1:A:230:LEU:HD12	2.31	0.50
2:E:87:MET:CE	2:E:91:LYS:HB2	2.41	0.50
1:D:190:THR:OG1	1:D:202:ARG:HB3	2.11	0.50
1:D:201:LEU:O	1:D:246:SER:HA	2.11	0.50
1:D:35:ARG:CD	1:D:48:ARG:HH21	2.25	0.50
1:A:95:LEU:HD21	3:C:9:MET:CE	2.42	0.50
1:D:78:LEU:HD13	1:D:95:LEU:HB2	1.93	0.50
2:E:49:VAL:HG12	2:E:51:MET:HE2	1.93	0.50
1:A:234:ARG:HD3	2:B:10:TYR:CE2	2.46	0.50
1:A:78:LEU:HD13	1:A:95:LEU:HB2	1.93	0.50
1:A:201:LEU:O	1:A:246:SER:HA	2.11	0.50
1:D:261:VAL:HB	1:D:270:LEU:HB2	1.92	0.49
1:A:107:TRP:HE3	1:A:107:TRP:H	1.60	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:218:GLN:HE22	1:A:260:ARG:HG3	1.76	0.49
1:D:79:ARG:CG	1:D:79:ARG:HH11	2.25	0.49
2:B:56:PHE:HB3	2:B:62:PHE:CD2	2.47	0.49
1:D:97:GLN:HG3	1:D:116:PHE:CD2	2.47	0.49
1:D:258:THR:HA	1:D:273:ARG:HG2	1.94	0.49
1:D:234:ARG:NH2	2:E:99:MET:O	2.39	0.49
1:A:176:ASN:O	1:A:180:LEU:HB3	2.13	0.49
1:D:88:SER:O	1:D:90:GLY:N	2.41	0.49
1:A:184:SER:HB3	1:A:266:LEU:HD13	1.94	0.49
2:B:46:ILE:HG23	2:B:47:PRO:HD2	1.94	0.49
1:D:135:ALA:HB3	1:D:141:GLN:NE2	2.28	0.48
2:B:2:GLN:HB2	2:B:86:SER:CB	2.32	0.48
2:B:87:MET:CE	2:B:91:LYS:HB2	2.44	0.48
1:D:219:LEU:C	1:D:221:GLY:H	2.16	0.48
2:B:49:VAL:HG12	2:B:51:MET:HE2	1.96	0.48
1:A:167:TRP:CD2	3:C:1:LYS:HD3	2.49	0.48
1:A:159:TYR:CD2	3:C:3:VAL:HG22	2.48	0.48
1:D:258:THR:HB	1:D:273:ARG:CG	2.42	0.48
2:E:25:CYS:HB3	2:E:66:ALA:HB3	1.95	0.48
1:A:88:SER:O	1:A:90:GLY:N	2.42	0.48
2:E:2:GLN:CA	2:E:31:HIS:O	2.59	0.48
2:E:40:LEU:HD23	2:E:45:LYS:HA	1.96	0.48
2:B:2:GLN:CA	2:B:31:HIS:O	2.59	0.48
1:D:263:HIS:CD2	1:D:265:GLY:H	2.31	0.48
1:D:176:ASN:O	1:D:180:LEU:HB3	2.14	0.48
2:E:56:PHE:HB3	2:E:62:PHE:CD2	2.49	0.48
1:A:217:TRP:CZ3	1:A:259:CYS:HB2	2.49	0.48
1:D:3:HIS:HA	1:D:29:ASP:OD1	2.14	0.48
1:D:46:GLU:HG3	1:D:47:PRO:CD	2.44	0.47
1:A:135:ALA:HB3	1:A:141:GLN:NE2	2.30	0.47
2:E:46:ILE:HG23	2:E:47:PRO:HD2	1.96	0.47
2:E:17:ASN:HD22	2:E:73:THR:HA	1.80	0.47
1:A:191:HIS:HE1	1:A:254:GLU:OE2	1.97	0.47
1:A:35:ARG:CD	1:A:48:ARG:HH21	2.28	0.47
1:D:260:ARG:HH21	1:D:269:PRO:HG2	1.78	0.47
2:E:17:ASN:ND2	2:E:97:ARG:HH22	2.12	0.47
2:E:87:MET:HE1	2:E:91:LYS:HB2	1.96	0.47
1:A:215:LEU:HD22	1:A:261:VAL:HG22	1.97	0.47
1:A:3:HIS:HA	1:A:29:ASP:OD1	2.15	0.47
1:D:194:ARG:O	1:D:195:SER:CB	2.63	0.47
1:A:176:ASN:ND2	1:A:176:ASN:H	2.11	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:191:HIS:HB2	1:A:274:TRP:CH2	2.50	0.47
1:A:258:THR:CA	1:A:273:ARG:HG2	2.42	0.47
1:A:260:ARG:HA	1:A:270:LEU:O	2.15	0.47
1:D:129:ASP:OD2	1:D:131:LYS:N	2.39	0.47
1:D:192:HIS:CE1	2:E:98:ASP:HB3	2.49	0.47
1:A:129:ASP:OD2	1:A:131:LYS:N	2.39	0.47
2:B:25:CYS:HB3	2:B:66:ALA:HB3	1.96	0.47
1:A:46:GLU:HG3	1:A:47:PRO:CD	2.44	0.46
1:D:274:TRP:O	1:D:274:TRP:CD1	2.68	0.46
2:B:40:LEU:HD23	2:B:45:LYS:HA	1.98	0.46
1:A:194:ARG:HD2	1:A:200:THR:OG1	2.16	0.46
1:A:222:GLU:CD	1:A:222:GLU:H	2.19	0.46
1:A:97:GLN:HG3	1:A:116:PHE:CD2	2.51	0.46
2:B:17:ASN:HD22	2:B:73:THR:HA	1.81	0.46
1:D:176:ASN:H	1:D:176:ASN:ND2	2.12	0.46
1:A:106:ASP:OD1	1:A:106:ASP:N	2.42	0.46
1:A:209:TYR:CD1	1:A:210:PRO:HA	2.51	0.46
1:A:244:TRP:CZ2	2:B:99:MET:HG2	2.51	0.46
1:D:195:SER:HB3	1:D:198:GLU:O	2.15	0.46
1:D:44:ARG:HG2	1:D:45:TYR:O	2.16	0.46
2:B:17:ASN:ND2	2:B:97:ARG:HH22	2.14	0.46
1:D:159:TYR:CZ	3:F:3:VAL:HG22	2.50	0.46
1:A:190:THR:OG1	1:A:192:HIS:HE1	1.98	0.46
1:A:194:ARG:NH1	1:A:202:ARG:HH22	2.13	0.46
1:D:194:ARG:HH12	1:D:202:ARG:NH2	2.11	0.46
1:A:99:SER:OG	3:C:3:VAL:HG21	2.16	0.46
1:D:106:ASP:N	1:D:106:ASP:OD1	2.42	0.46
1:D:182:THR:HG22	1:D:210:PRO:CD	2.46	0.46
1:D:229:GLU:O	1:D:245:ALA:HA	2.16	0.46
1:D:135:ALA:HB3	1:D:141:GLN:HE22	1.80	0.45
1:A:191:HIS:CE1	1:A:199:VAL:HG11	2.51	0.45
1:D:99:SER:OG	3:F:3:VAL:HG21	2.16	0.45
1:D:78:LEU:HA	1:D:78:LEU:HD12	1.73	0.45
1:A:135:ALA:HB3	1:A:141:GLN:HE22	1.81	0.45
1:A:78:LEU:HA	1:A:78:LEU:HD12	1.72	0.45
1:D:231:VAL:CG1	1:D:244:TRP:CZ2	3.00	0.45
1:A:36:PHE:CD1	1:A:36:PHE:C	2.90	0.45
1:A:176:ASN:N	1:A:176:ASN:HD22	2.15	0.45
1:A:260:ARG:NH2	1:A:269:PRO:CG	2.78	0.45
1:A:215:LEU:HD21	1:A:261:VAL:HG13	1.99	0.45
1:A:234:ARG:NH1	2:B:10:TYR:CD2	2.85	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:193:PRO:O	1:D:195:SER:N	2.50	0.45
1:D:231:VAL:HG13	1:D:244:TRP:CZ2	2.52	0.45
1:D:86:ASN:OD1	1:D:86:ASN:O	2.35	0.44
1:D:209:TYR:CD1	1:D:210:PRO:HA	2.53	0.44
1:D:219:LEU:C	1:D:221:GLY:N	2.70	0.44
1:A:218:GLN:HG2	1:A:258:THR:HG23	1.99	0.44
1:A:32:GLU:OE2	1:A:35:ARG:NH1	2.50	0.44
2:B:24:ASN:HB3	2:B:65:LEU:HD11	1.98	0.44
1:D:229:GLU:C	1:D:230:LEU:HD12	2.38	0.44
1:D:5:MET:O	1:D:100:GLY:HA3	2.17	0.44
1:D:252:GLY:O	1:D:253:LYS:HD3	2.18	0.44
2:B:46:ILE:CG2	2:B:47:PRO:HD2	2.48	0.44
1:D:185:PRO:HB3	1:D:208:PHE:HB3	1.99	0.44
1:D:202:ARG:HD2	1:D:204:TRP:CZ2	2.52	0.44
1:A:202:ARG:HD2	1:A:204:TRP:CZ2	2.53	0.43
1:D:14:ARG:NH2	1:D:19:GLU:O	2.52	0.43
1:A:242:GLN:NE2	2:B:12:ARG:O	2.51	0.43
1:D:215:LEU:CD2	1:D:261:VAL:HG13	2.48	0.43
1:D:222:GLU:OE1	1:D:222:GLU:N	2.51	0.43
1:D:226:GLN:HE22	1:D:227:ASP:CG	2.21	0.43
1:A:86:ASN:OD1	1:A:86:ASN:O	2.35	0.43
1:D:176:ASN:HD22	1:D:176:ASN:N	2.16	0.43
2:E:46:ILE:CG2	2:E:47:PRO:HD2	2.49	0.43
1:A:258:THR:CB	1:A:273:ARG:HG2	2.47	0.43
1:D:242:GLN:NE2	2:E:12:ARG:O	2.51	0.43
1:D:32:GLU:OE2	1:D:35:ARG:NH1	2.51	0.43
1:D:36:PHE:C	1:D:36:PHE:CD1	2.92	0.43
1:D:58:GLU:O	1:D:62:ARG:HG3	2.18	0.43
1:D:234:ARG:HD3	2:E:10:TYR:CZ	2.53	0.43
1:A:14:ARG:NH2	1:A:19:GLU:O	2.52	0.43
1:D:202:ARG:NH1	1:D:244:TRP:CH2	2.87	0.43
1:D:191:HIS:O	1:D:192:HIS:CD2	2.72	0.43
1:A:25:VAL:HG22	1:A:35:ARG:HG3	2.00	0.43
2:E:24:ASN:HB3	2:E:65:LEU:HD11	1.99	0.43
2:E:49:VAL:HG12	2:E:51:MET:CE	2.47	0.43
1:A:5:MET:O	1:A:100:GLY:HA3	2.18	0.43
1:D:170:ARG:C	1:D:170:ARG:HD3	2.39	0.43
1:D:224:LEU:N	1:D:224:LEU:HD22	2.34	0.43
1:A:244:TRP:HZ2	2:B:99:MET:HG2	1.84	0.43
1:A:44:ARG:HG2	1:A:45:TYR:O	2.19	0.43
1:D:25:VAL:HG22	1:D:35:ARG:HG3	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:170:ARG:C	1:A:170:ARG:HD3	2.39	0.42
1:D:15:PRO:HG3	1:D:91:GLY:CA	2.48	0.42
1:A:15:PRO:HG3	1:A:91:GLY:CA	2.48	0.42
1:A:79:ARG:NH1	1:A:79:ARG:CG	2.82	0.42
2:E:59:ASP:C	2:E:59:ASP:OD1	2.58	0.42
1:D:107:TRP:N	1:D:107:TRP:HE3	2.17	0.42
1:D:159:TYR:CE2	1:D:164:CYS:HB2	2.54	0.42
1:A:234:ARG:HB2	2:B:10:TYR:OH	2.19	0.42
1:D:251:LEU:HG	1:D:252:GLY:N	2.35	0.42
1:D:15:PRO:HG3	1:D:91:GLY:HA2	2.02	0.42
1:A:15:PRO:HG3	1:A:91:GLY:HA2	2.02	0.42
1:A:107:TRP:N	1:A:107:TRP:HE3	2.17	0.42
2:B:32:PRO:O	2:B:84:HIS:CE1	2.71	0.42
2:B:87:MET:HE2	2:B:91:LYS:HB2	2.01	0.41
1:A:81:LEU:HD13	1:A:118:TYR:CD1	2.55	0.41
2:E:1:ILE:CG2	2:E:1:ILE:O	2.68	0.41
1:A:202:ARG:NH1	1:A:246:SER:CB	2.79	0.41
1:A:195:SER:HB3	1:A:198:GLU:O	2.20	0.41
1:D:15:PRO:HG3	1:D:91:GLY:C	2.41	0.41
2:E:84:HIS:HD2	2:E:86:SER:CB	2.33	0.41
1:A:13:SER:HA	1:A:20:PRO:HB3	2.03	0.41
1:D:251:LEU:O	1:D:253:LYS:HG2	2.21	0.41
2:B:1:ILE:O	2:B:1:ILE:CG2	2.68	0.41
1:D:87:GLN:NE2	1:D:118:TYR:OH	2.48	0.41
1:A:152:ALA:O	1:A:153:ALA:C	2.59	0.41
1:A:184:SER:HB3	1:A:266:LEU:CD1	2.51	0.41
1:A:58:GLU:O	1:A:62:ARG:HG3	2.21	0.41
1:A:127:ASN:HD22	1:A:132:THR:C	2.24	0.41
1:A:219:LEU:O	1:A:220:ASN:C	2.59	0.41
2:B:28:THR:O	2:B:29:GLN:CB	2.68	0.41
1:D:219:LEU:O	1:D:220:ASN:OD1	2.39	0.41
3:F:3:VAL:HG12	3:F:4:TYR:H	1.86	0.41
1:A:87:GLN:NE2	1:A:118:TYR:OH	2.48	0.41
1:A:15:PRO:HG3	1:A:91:GLY:C	2.42	0.41
2:B:84:HIS:HD2	2:B:86:SER:CB	2.34	0.40
1:D:97:GLN:HG3	1:D:116:PHE:CE2	2.56	0.40
1:D:79:ARG:CG	1:D:79:ARG:NH1	2.84	0.40
2:E:17:ASN:OD1	2:E:97:ARG:NH2	2.54	0.40
1:D:258:THR:CB	1:D:273:ARG:HG2	2.48	0.40
1:A:251:LEU:HG	1:A:252:GLY:N	2.36	0.40
2:B:6:GLN:HB2	2:B:28:THR:CG2	2.51	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:27:TYR:HA	1:D:31:LYS:O	2.20	0.40
2:E:17:ASN:CG	2:E:97:ARG:HH22	2.25	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	271/273 (99%)	244 (90%)	22 (8%)	5 (2%)	8	21
1	D	271/273 (99%)	251 (93%)	15 (6%)	5 (2%)	8	21
2	B	98/100 (98%)	82 (84%)	11 (11%)	5 (5%)	2	3
2	E	98/100 (98%)	82 (84%)	11 (11%)	5 (5%)	2	3
3	C	7/9 (78%)	5 (71%)	2 (29%)	0	100	100
3	F	7/9 (78%)	6 (86%)	1 (14%)	0	100	100
All	All	752/764 (98%)	670 (89%)	62 (8%)	20 (3%)	5	12

All (20) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	195	SER
2	B	47	PRO
2	B	48	LYS
2	B	74	GLU
1	D	194	ARG
1	D	195	SER
1	D	220	ASN
2	E	47	PRO
2	E	48	LYS
2	E	74	GLU

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Mol	Chain	Res	Type
1	A	220	ASN
1	A	89	ALA
1	A	222	GLU
2	B	97	ARG
1	D	89	ALA
2	E	97	ARG
1	A	193	PRO
1	D	213	ILE
2	E	1	ILE
2	B	1	ILE

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	232/232 (100%)	211 (91%)	21 (9%)	9	21
1	D	232/232 (100%)	210 (90%)	22 (10%)	8	20
2	B	95/95 (100%)	90 (95%)	5 (5%)	22	48
2	E	95/95 (100%)	90 (95%)	5 (5%)	22	48
3	C	7/7 (100%)	6 (86%)	1 (14%)	3	8
3	F	7/7 (100%)	6 (86%)	1 (14%)	3	8
All	All	668/668 (100%)	613 (92%)	55 (8%)	11	26

All (55) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	12	VAL
1	A	14	ARG
1	A	18	GLU
1	A	75	ARG
1	A	78	LEU
1	A	79	ARG
1	A	107	TRP
1	A	114	LEU

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Mol	Chain	Res	Type
1	A	170	ARG
1	A	176	ASN
1	A	181	ARG
1	A	218	GLN
1	A	226	GLN
1	A	229	GLU
1	A	232	GLU
1	A	234	ARG
1	A	247	VAL
1	A	258	THR
1	A	266	LEU
1	A	268	GLU
1	A	272	LEU
2	B	29	GLN
2	B	70	PHE
2	B	75	THR
2	B	89	GLU
2	B	93	VAL
3	C	4	TYR
1	D	12	VAL
1	D	14	ARG
1	D	18	GLU
1	D	75	ARG
1	D	78	LEU
1	D	79	ARG
1	D	107	TRP
1	D	114	LEU
1	D	170	ARG
1	D	176	ASN
1	D	181	ARG
1	D	218	GLN
1	D	226	GLN
1	D	229	GLU
1	D	231	VAL
1	D	234	ARG
1	D	247	VAL
1	D	249	VAL
1	D	258	THR
1	D	266	LEU
1	D	268	GLU
1	D	272	LEU
2	E	29	GLN

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Mol	Chain	Res	Type
2	E	70	PHE
2	E	75	THR
2	E	89	GLU
2	E	93	VAL
3	F	4	TYR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	86	ASN
1	A	127	ASN
1	A	174	ASN
1	A	176	ASN
1	A	188	HIS
1	A	191	HIS
1	A	192	HIS
1	A	220	ASN
1	A	226	GLN
1	A	263	HIS
2	B	8	GLN
2	B	17	ASN
2	B	38	GLN
2	B	84	HIS
1	D	86	ASN
1	D	127	ASN
1	D	174	ASN
1	D	176	ASN
1	D	192	HIS
1	D	226	GLN
1	D	263	HIS
2	E	8	GLN
2	E	17	ASN
2	E	38	GLN
2	E	84	HIS

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 (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, 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	273/273 (100%)	-0.42	0 100	100	12, 25, 42, 51	0
1	D	273/273 (100%)	-0.45	0 100	100	12, 25, 42, 51	0
2	B	100/100 (100%)	-0.42	3 (3%) 50	51	10, 27, 39, 65	0
2	E	100/100 (100%)	-0.34	2 (2%) 65	67	10, 27, 39, 65	0
3	C	9/9 (100%)	-0.48	0 100	100	13, 24, 27, 37	0
3	F	9/9 (100%)	-0.58	0 100	100	13, 24, 27, 37	0
All	All	764/764 (100%)	-0.42	5 (0%) 87	89	10, 26, 42, 65	0

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	E	2	GLN	4.6
2	B	2	GLN	4.2
2	B	0	MET	2.6
2	E	0	MET	2.2
2	B	1	ILE	2.1

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.