WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Nov 3, 2023 – 08:50 AM EDT

PDB ID	:	3W39
Title	:	Crystal structure of HLA-B*5201 in complexed with HIV immunodominant epitope (TAFTIPSI)
Authors	:	Yagita, Y.; Kuse, N.; Kuroki, K.; Gatanaga, H.; Carlson, J.M.; Chikata, T.; Brumme, Z.L.; Murakoshi, H.; Akahoshi, T.; Pfeifer, N.; Mallal, S.; John, M.; Ose, T.; Matsubara, H.; Kanda, R.; Fukunaga, Y.; Honda, K.; Kawashima, Y.; Ariumi, Y.; Oka, S.; Maenaka, K.; Takiguchi, M.
Deposited on	:	2012-12-13
Resolution	:	3.10 Å(reported)

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	:	2.36
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)	:	2.36

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 3.10 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.
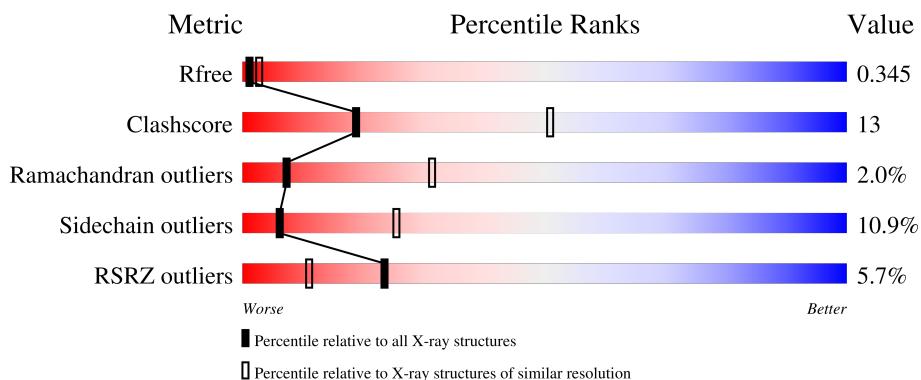
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1094 (3.10-3.10)
Clashscore	141614	1184 (3.10-3.10)
Ramachandran outliers	138981	1141 (3.10-3.10)
Sidechain outliers	138945	1141 (3.10-3.10)
RSRZ outliers	127900	1067 (3.10-3.10)

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% 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	277	6% — 68% 27% 6%
1	D	277	9% — 62% 34% ··
2	B	100	% — 66% 29% ··
2	E	100	% — 65% 31% ··

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	C	8	25% 38% 38%
3	F	8	25% 62% 12%

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 6312 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 HLA class I histocompatibility antigen, B-52 alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	277	Total	C	N	O	S	0	0	0
			2267	1412	412	435	8			
1	D	277	Total	C	N	O	S	0	0	0
			2267	1412	412	435	8			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	expression tag	UNP P30490
D	1	MET	-	expression tag	UNP P30490

- 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
			829	528	140	158	3			
2	E	99	Total	C	N	O	S	0	0	0
			829	528	140	158	3			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	0	MET	-	expression tag	UNP P61769
E	0	MET	-	expression tag	UNP P61769

- Molecule 3 is a protein called peptid from Gag-Pol polyprotein.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	8	Total	C	N	O	0	0	0
			60	40	8	12			
3	F	8	Total	C	N	O	0	0	0
			60	40	8	12			

3 Residue-property plots ⓘ

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: HLA class I histocompatibility antigen, B-52 alpha chain
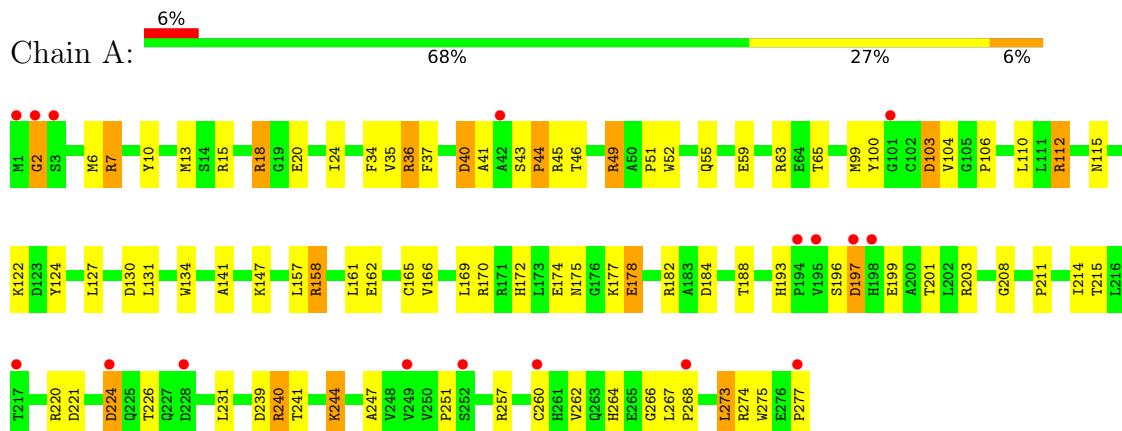
• Molecule 1: HLA class I histocompatibility antigen, B-52 alpha chain
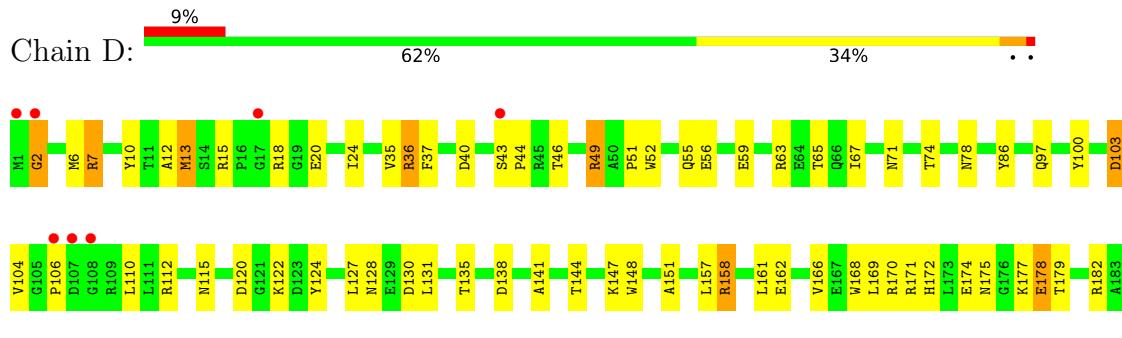
• Molecule 2: Beta-2-microglobulin

MET I1 Q2 K6 I7 P14 N17 G18 N21 F22 L23 N24 V27 S33 D34 L39 R45 I46 E47 K48 S52 D53 L54 L65 T68 E69 F70 E74 K75 V82 N83 H84 V85 T86 L87 S88 K91 R97 D98 M99

• Molecule 2: Beta-2-microglobulin

Chain E:

%

65% 31%

MET I1 Q2 K6 I7 Y10 P14 A15 E16 S20 N21 F22 L23 N24 V27 S33 D34 L39 R45 I46 E47 K48 H51 S52 D53 L54 W60 S61 F62 L65 T68 E69 F70 E74 K75 V82 N83 H84 V85 T86 L87 D98 M99

• Molecule 3: peptid from Gag-Pol polyprotein

Chain C:

25% 38% 38%

T1 A2 F3 T4 I5 P6 S7 I8

• Molecule 3: peptid from Gag-Pol polyprotein

Chain F:

25% 62% 12%

T1 A2 F3 T4 I5 P6 S7 I8
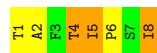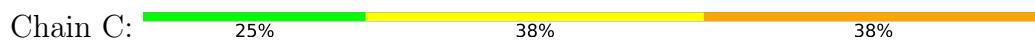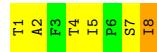
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	69.05Å 83.25Å 170.35Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	38.80 – 3.10 46.91 – 3.10	Depositor EDS
% Data completeness (in resolution range)	96.0 (38.80-3.10) 94.4 (46.91-3.10)	Depositor EDS
R_{merge}	0.24	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.27 (at 3.12Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8_1069)	Depositor
R, R_{free}	0.295 , 0.347 0.297 , 0.345	Depositor DCC
R_{free} test set	947 reflections (5.15%)	wwPDB-VP
Wilson B-factor (Å^2)	23.1	Xtriage
Anisotropy	1.428	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 21.6	EDS
L-test for twinning[2]	$< |L| > = 0.48, < L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.83	EDS
Total number of atoms	6312	wwPDB-VP
Average B, all atoms (Å^2)	14.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 29.12 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.6379e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

---

[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 ⓘ

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	0.71	1/2332 (0.0%)	0.76	0/3173
1	D	0.72	0/2332	0.76	1/3173 (0.0%)
2	B	0.70	0/852	0.70	0/1152
2	E	0.71	0/852	0.72	0/1152
3	C	0.80	0/61	1.20	0/82
3	F	0.91	0/61	1.18	0/82
All	All	0.72	1/6490 (0.0%)	0.76	1/8814 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
3	C	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	165	CYS	CB-SG	7.17	1.94	1.82

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	120	ASP	CB-CG-OD2	5.11	122.90	118.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	C	4	THR	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	2267	0	2118	59	0
1	D	2267	0	2118	73	0
2	B	829	0	794	18	0
2	E	829	0	794	21	0
3	C	60	0	64	3	0
3	F	60	0	64	15	0
All	All	6312	0	5952	160	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 13.

All (160) 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:71:ASN:ND2	3:F:5:ILE:H	1.69	0.90
1:D:71:ASN:HD21	3:F:5:ILE:H	1.26	0.81
1:A:37:PHE:HB2	1:A:46:THR:HG22	1.60	0.81
1:D:221:ASP:OD2	1:D:257:ARG:NH1	2.17	0.77
1:A:221:ASP:OD2	1:A:257:ARG:NH1	2.18	0.77
1:D:37:PHE:HB2	1:D:46:THR:HG22	1.67	0.74
2:E:7:ILE:HG12	2:E:82:VAL:HG21	1.68	0.74
1:D:144:THR:OG1	3:F:8:ILE:OXT	2.04	0.73
2:E:33:SER:HB2	2:E:54:LEU:HD21	1.72	0.70
1:A:224:ASP:OD1	1:A:224:ASP:N	2.22	0.69
2:B:7:ILE:HG12	2:B:82:VAL:HG21	1.74	0.68
2:E:1:ILE:HG23	2:E:2:GLN:HG3	1.76	0.66
1:D:71:ASN:HD21	3:F:5:ILE:N	1.94	0.65
1:D:103:ASP:OD1	1:D:103:ASP:N	2.30	0.65
1:A:55:GLN:OE1	1:A:175:ASN:HB3	1.97	0.64
1:A:174:GLU:O	1:A:177:LYS:HG3	1.98	0.63
1:D:97:GLN:NE2	2:E:60:TRP:O	2.31	0.63
1:D:235:ARG:HD2	2:E:10:TYR:CE1	2.32	0.63
1:A:208:GLY:HA2	1:A:241:THR:HB	1.82	0.61
1:D:46:THR:HG23	1:D:65:THR:HA	1.83	0.61
3:F:1:THR:OG1	3:F:2:ALA:N	2.33	0.61

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:84:HIS:H	2:B:87:LEU:HD12	1.67	0.60
2:B:18:GLY:CA	1:D:179:THR:HG22	2.31	0.60
2:B:33:SER:HB2	2:B:54:LEU:HD21	1.84	0.60
1:D:55:GLN:OE1	1:D:175:ASN:HB3	2.02	0.60
1:A:147:LYS:HD2	3:C:8:ILE:OXT	2.02	0.59
1:A:275:TRP:CH2	1:A:277:PRO:HB3	2.37	0.59
1:A:193:HIS:HB2	1:A:201:THR:HB	1.85	0.58
2:B:1:ILE:HG23	2:B:2:GLN:HG3	1.85	0.58
2:E:84:HIS:H	2:E:87:LEU:HD12	1.68	0.58
1:A:196:SER:HB3	1:A:199:GLU:H	1.68	0.57
1:A:103:ASP:N	1:A:103:ASP:OD1	2.36	0.57
1:A:46:THR:HG23	1:A:65:THR:HA	1.86	0.57
1:D:208:GLY:HA2	1:D:241:THR:HB	1.86	0.57
1:A:36:ARG:HH11	1:A:36:ARG:HB3	1.69	0.57
1:A:52:TRP:HZ3	1:A:172:HIS:ND1	2.03	0.57
1:D:10:TYR:HH	1:D:100:TYR:HH	1.52	0.56
1:D:203:ARG:HG3	1:D:247:ALA:HB2	1.87	0.56
1:A:182:ARG:NH2	1:A:184:ASP:OD2	2.39	0.56
1:A:203:ARG:HG3	1:A:247:ALA:HB2	1.89	0.55
1:D:6:MET:HB2	1:D:169:LEU:HD13	1.89	0.55
1:D:157:LEU:O	1:D:161:LEU:HG	2.06	0.55
2:B:18:GLY:HA2	1:D:179:THR:HG22	1.88	0.55
1:D:7:ARG:NH1	1:D:103:ASP:OD1	2.39	0.55
1:D:182:ARG:NH2	1:D:184:ASP:OD2	2.40	0.55
1:A:188:THR:HG21	1:A:262:VAL:HG21	1.89	0.54
1:A:178:GLU:HG2	2:E:74:GLU:HB3	1.90	0.54
1:D:220:ARG:HD2	1:D:257:ARG:NH2	2.22	0.54
1:D:196:SER:HB3	1:D:199:GLU:H	1.72	0.54
2:B:84:HIS:CE1	2:B:86:THR:HG23	2.42	0.54
1:D:71:ASN:HD21	3:F:4:THR:HA	1.73	0.54
1:D:188:THR:HG21	1:D:262:VAL:HG21	1.89	0.54
1:A:110:LEU:HD22	1:A:162:GLU:HG2	1.91	0.52
1:A:178:GLU:O	1:A:182:ARG:NH1	2.39	0.52
1:D:110:LEU:HD22	1:D:162:GLU:HG2	1.92	0.52
1:D:179:THR:O	1:D:240:ARG:NH1	2.43	0.52
1:D:124:TYR:CZ	1:D:141:ALA:HA	2.45	0.52
1:D:12:ALA:C	1:D:13:MET:HG3	2.30	0.52
1:A:6:MET:HB2	1:A:169:LEU:HD13	1.92	0.51
1:A:131:LEU:HB2	1:A:158:ARG:HG3	1.92	0.51
1:D:168:TRP:CD1	3:F:1:THR:N	2.79	0.51
2:E:33:SER:HB3	2:E:62:PHE:CE1	2.46	0.51

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:45:ARG:HA	1:A:65:THR:HG23	1.93	0.51
2:B:46:ILE:HD12	2:B:68:THR:HG21	1.92	0.50
1:A:264:HIS:CD2	1:A:266:GLY:H	2.29	0.50
1:D:174:GLU:O	1:D:177:LYS:HG3	2.11	0.50
1:D:36:ARG:HG3	2:E:53:ASP:CG	2.31	0.50
1:D:115:ASN:CB	1:D:157:LEU:HD21	2.42	0.50
1:D:15:ARG:NH2	1:D:20:GLU:O	2.42	0.49
1:A:214:ILE:CG2	1:A:244:LYS:HD2	2.43	0.49
1:D:220:ARG:HB2	1:D:258:TYR:CE1	2.48	0.49
1:D:275:TRP:CH2	1:D:277:PRO:HB3	2.46	0.49
1:D:231:LEU:HD22	1:D:244:LYS:HE3	1.94	0.48
2:B:34:ASP:O	2:B:84:HIS:HD2	1.96	0.48
2:E:21:ASN:OD1	2:E:22:PHE:N	2.40	0.48
2:E:84:HIS:CD2	2:E:85:VAL:H	2.31	0.48
1:A:2:GLY:HA3	1:A:106:PRO:HA	1.96	0.48
2:B:6:LYS:O	2:B:27:VAL:HA	2.14	0.48
1:A:239:ASP:C	1:A:241:THR:H	2.18	0.47
1:D:264:HIS:CD2	1:D:266:GLY:H	2.32	0.47
1:D:127:LEU:HD22	1:D:157:LEU:HD23	1.97	0.47
2:B:17:ASN:OD1	2:B:97:ARG:NH2	2.47	0.47
1:D:260:CYS:HB3	1:D:273:LEU:HD12	1.97	0.47
1:D:131:LEU:HB2	1:D:158:ARG:HG3	1.97	0.47
1:A:41:ALA:O	1:A:44:PRO:HD3	2.15	0.47
1:A:147:LYS:HD2	3:C:8:ILE:C	2.35	0.47
1:D:2:GLY:HA3	1:D:106:PRO:HA	1.97	0.47
1:A:7:ARG:NH1	1:A:103:ASP:OD1	2.44	0.46
1:A:124:TYR:CZ	1:A:141:ALA:HA	2.50	0.46
1:A:166:VAL:HG12	1:A:170:ARG:NH1	2.30	0.46
1:D:193:HIS:CE1	2:E:98:ASP:HB3	2.49	0.46
1:D:78:ASN:HA	3:F:8:ILE:CG2	2.46	0.46
1:A:127:LEU:HD22	1:A:157:LEU:HD23	1.97	0.46
1:A:15:ARG:NH1	1:A:40:ASP:OD2	2.24	0.46
1:D:235:ARG:HD2	2:E:10:TYR:CD1	2.51	0.46
1:A:178:GLU:HG2	2:E:74:GLU:CB	2.46	0.46
1:D:86:TYR:OH	1:D:138:ASP:OD2	2.25	0.46
2:E:33:SER:HB3	2:E:62:PHE:CZ	2.51	0.46
1:A:197:ASP:OD1	1:A:197:ASP:N	2.41	0.46
1:D:36:ARG:NH1	1:D:49:ARG:HE	2.14	0.45
1:D:237:ALA:O	2:E:24:ASN:ND2	2.48	0.45
1:A:131:LEU:CB	1:A:158:ARG:HG3	2.47	0.45
1:D:67:ILE:HG21	3:F:2:ALA:HB3	1.97	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:127:LEU:HB2	1:A:134:TRP:CZ3	2.51	0.45
1:D:239:ASP:C	1:D:241:THR:H	2.19	0.45
3:C:5:ILE:HG12	3:C:6:PRO:HD2	1.99	0.45
1:D:207:LEU:HD23	1:D:243:GLN:HG2	1.98	0.45
1:A:157:LEU:O	1:A:161:LEU:HG	2.17	0.45
1:A:260:CYS:HB3	1:A:273:LEU:HD12	1.98	0.44
1:D:128:ASN:OD1	1:D:135:THR:OG1	2.35	0.44
1:A:15:ARG:NH2	1:A:20:GLU:O	2.41	0.44
1:A:220:ARG:HD2	1:A:257:ARG:NH2	2.33	0.44
1:A:36:ARG:NH1	1:A:49:ARG:HE	2.16	0.44
1:A:127:LEU:HD22	1:A:157:LEU:CD2	2.47	0.44
1:D:78:ASN:OD1	3:F:7:SER:HA	2.17	0.44
1:D:224:ASP:OD1	1:D:224:ASP:N	2.33	0.44
2:E:46:ILE:HD12	2:E:68:THR:HG21	2.00	0.44
1:D:43:SER:HA	1:D:44:PRO:HD2	1.70	0.43
2:B:91:LYS:HE3	2:B:91:LYS:HB2	1.84	0.43
1:D:237:ALA:HB3	1:D:239:ASP:OD1	2.17	0.43
1:A:158:ARG:O	1:A:162:GLU:HG3	2.18	0.43
2:B:84:HIS:CD2	2:B:85:VAL:H	2.36	0.43
1:D:74:THR:HG21	3:F:5:ILE:HG22	1.99	0.43
1:A:18:ARG:H	1:A:18:ARG:HG3	1.71	0.43
2:B:21:ASN:OD1	2:B:22:PHE:N	2.37	0.43
2:E:51:HIS:HA	2:E:65:LEU:O	2.18	0.43
1:D:221:ASP:OD2	1:D:257:ARG:HD2	2.18	0.43
1:D:147:LYS:HD3	1:D:148:TRP:CD1	2.54	0.42
2:E:6:LYS:O	2:E:27:VAL:HA	2.19	0.42
2:B:24:ASN:HB3	2:B:65:LEU:HD11	2.02	0.42
1:D:78:ASN:HA	3:F:8:ILE:HG21	2.02	0.41
1:D:168:TRP:CG	3:F:1:THR:N	2.88	0.41
1:A:193:HIS:CE1	2:B:98:ASP:HB3	2.56	0.41
1:A:239:ASP:CB	2:E:20:SER:HB3	2.50	0.41
2:B:34:ASP:O	2:B:84:HIS:CD2	2.72	0.41
1:D:158:ARG:O	1:D:162:GLU:HG3	2.20	0.41
1:A:211:PRO:O	1:A:264:HIS:HE1	2.04	0.41
1:A:52:TRP:CZ3	1:A:172:HIS:ND1	2.86	0.41
1:D:188:THR:HA	1:D:205:TRP:O	2.21	0.41
1:D:74:THR:HG21	3:F:5:ILE:O	2.20	0.41
1:A:112:ARG:HE	1:A:112:ARG:HB3	1.68	0.41
1:D:228:ASP:O	1:D:248:VAL:HG23	2.21	0.41
2:E:39:LEU:HD23	2:E:68:THR:HG22	2.02	0.41
1:A:43:SER:HA	1:A:44:PRO:HD2	1.69	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:166:VAL:HG12	1:D:170:ARG:NH1	2.35	0.41
1:A:34:PHE:CD2	1:A:35:VAL:HG13	2.55	0.41
1:A:239:ASP:O	1:A:241:THR:N	2.53	0.41
1:A:267:LEU:HA	1:A:268:PRO:HD3	1.91	0.41
1:D:131:LEU:CB	1:D:158:ARG:HG3	2.51	0.41
1:D:197:ASP:OD1	1:D:197:ASP:N	2.42	0.41
2:B:74:GLU:HB2	1:D:178:GLU:HG2	2.03	0.41
1:A:231:LEU:HD22	1:A:244:LYS:HE3	2.03	0.40
1:D:56:GLU:OE1	1:D:171:ARG:NH2	2.53	0.40
1:D:127:LEU:HD22	1:D:157:LEU:CD2	2.51	0.40
1:D:71:ASN:HD21	3:F:4:THR:CA	2.34	0.40
1:A:10:TYR:OH	1:A:100:TYR:OH	2.33	0.40
1:A:208:GLY:HA2	1:A:241:THR:CB	2.48	0.40
1:D:52:TRP:HZ3	1:D:172:HIS:ND1	2.20	0.40
1:A:115:ASN:CB	1:A:157:LEU:HD21	2.51	0.40
1:D:178:GLU:O	1:D:182:ARG:HB2	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	275/277 (99%)	246 (90%)	23 (8%)	6 (2%)	6	29
1	D	275/277 (99%)	246 (90%)	23 (8%)	6 (2%)	6	29
2	B	97/100 (97%)	92 (95%)	4 (4%)	1 (1%)	15	49
2	E	97/100 (97%)	92 (95%)	4 (4%)	1 (1%)	15	49
3	C	6/8 (75%)	4 (67%)	1 (17%)	1 (17%)	0	0
3	F	6/8 (75%)	6 (100%)	0	0	100	100
All	All	756/770 (98%)	686 (91%)	55 (7%)	15 (2%)	7	31

All (15) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	240	ARG
1	A	251	PRO
1	A	244	LYS
1	D	224	ASP
1	D	251	PRO
1	D	240	ARG
2	B	14	PRO
1	D	51	PRO
1	D	151	ALA
3	C	2	ALA
1	D	2	GLY
1	A	2	GLY
1	A	51	PRO
2	E	14	PRO
1	A	44	PRO

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	235/235 (100%)	211 (90%)	24 (10%)	7	27
1	D	235/235 (100%)	212 (90%)	23 (10%)	8	29
2	B	94/95 (99%)	83 (88%)	11 (12%)	5	22
2	E	94/95 (99%)	84 (89%)	10 (11%)	6	26
3	C	7/7 (100%)	3 (43%)	4 (57%)	0	0
3	F	7/7 (100%)	6 (86%)	1 (14%)	3	14
All	All	672/674 (100%)	599 (89%)	73 (11%)	6	25

All (73) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	7	ARG
1	A	13	MET

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	18	ARG
1	A	24	ILE
1	A	36	ARG
1	A	40	ASP
1	A	49	ARG
1	A	59	GLU
1	A	63	ARG
1	A	99	MET
1	A	103	ASP
1	A	104	VAL
1	A	112	ARG
1	A	122	LYS
1	A	130	ASP
1	A	158	ARG
1	A	178	GLU
1	A	197	ASP
1	A	215	THR
1	A	224	ASP
1	A	226	THR
1	A	240	ARG
1	A	273	LEU
1	A	274	ARG
2	B	1	ILE
2	B	27	VAL
2	B	34	ASP
2	B	39	LEU
2	B	45	ARG
2	B	48	LYS
2	B	52	SER
2	B	69	GLU
2	B	70	PHE
2	B	74	GLU
2	B	75	LYS
3	C	1	THR
3	C	4	THR
3	C	5	ILE
3	C	8	ILE
1	D	7	ARG
1	D	13	MET
1	D	18	ARG
1	D	24	ILE
1	D	35	VAL

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	D	36	ARG
1	D	40	ASP
1	D	49	ARG
1	D	59	GLU
1	D	63	ARG
1	D	103	ASP
1	D	104	VAL
1	D	112	ARG
1	D	122	LYS
1	D	130	ASP
1	D	158	ARG
1	D	178	GLU
1	D	215	THR
1	D	224	ASP
1	D	226	THR
1	D	240	ARG
1	D	273	LEU
1	D	274	ARG
2	E	1	ILE
2	E	27	VAL
2	E	34	ASP
2	E	45	ARG
2	E	48	LYS
2	E	52	SER
2	E	69	GLU
2	E	70	PHE
2	E	74	GLU
2	E	75	LYS
3	F	8	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	71	ASN
1	A	73	GLN
1	A	128	ASN
1	A	145	GLN
1	A	156	GLN
1	A	263	GLN
1	A	264	HIS
2	B	83	ASN
2	B	84	HIS

Continued from previous page...

Mol	Chain	Res	Type
1	D	71	ASN
1	D	73	GLN
1	D	128	ASN
1	D	156	GLN
1	D	175	ASN
1	D	263	GLN
1	D	264	HIS
2	E	83	ASN
2	E	84	HIS

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 ⓘ

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(Å²)	Q<0.9
1	A	277/277 (100%)	0.60	17 (6%)	21	9	5, 12, 41, 53	0
1	D	277/277 (100%)	0.56	25 (9%)	9	3	5, 11, 42, 51	0
2	B	99/100 (99%)	0.15	1 (1%)	82	67	6, 8, 15, 20	0
2	E	99/100 (99%)	0.13	1 (1%)	82	67	5, 8, 15, 21	0
3	C	8/8 (100%)	-0.05	0	100	100	6, 7, 9, 10	0
3	F	8/8 (100%)	0.17	0	100	100	6, 7, 8, 8	0
All	All	768/770 (99%)	0.45	44 (5%)	23	11	5, 10, 41, 53	0

All (44) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1	MET	9.9
1	A	197	ASP	5.2
1	A	198	HIS	4.8
1	D	1	MET	4.4
1	A	2	GLY	3.9
1	D	224	ASP	3.8
1	A	42	ALA	3.6
1	A	277	PRO	3.5
1	D	197	ASP	3.5
1	D	253	GLY	3.3
1	D	272	THR	3.0
1	A	268	PRO	2.9
1	D	223	GLU	2.9
2	B	88	SER	2.7
1	A	217	THR	2.7
1	D	255	GLU	2.7
1	A	224	ASP	2.6
1	D	196	SER	2.6
1	A	228	ASP	2.6

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	D	107	ASP	2.6
1	D	217	THR	2.5
1	D	256	GLN	2.5
1	A	260	CYS	2.5
1	D	226	THR	2.5
1	A	195	VAL	2.4
1	A	3	SER	2.4
1	A	252	SER	2.3
1	D	276	GLU	2.3
1	D	2	GLY	2.3
1	D	106	PRO	2.3
1	D	204	CYS	2.3
1	D	43	SER	2.2
1	A	101	GLY	2.2
1	D	277	PRO	2.2
1	D	17	GLY	2.2
2	E	16	GLU	2.1
1	A	194	PRO	2.1
1	D	108	GLY	2.1
1	D	259	THR	2.1
1	D	221	ASP	2.1
1	D	274	ARG	2.1
1	A	249	VAL	2.0
1	D	219	GLN	2.0
1	D	254	GLU	2.0

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.