WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

May 29, 2024 – 05:43 PM EDT

PDB ID	:	1HHJ
Title	:	THE ANTIGENIC IDENTITY OF PEPTIDE(SLASH)MHC COMPLEXES: A COMPARISON OF THE CONFORMATION OF FIVE PEPTIDES PRESENTED BY HLA-A2
Authors	:	Madden, D.R.; Garboczi, D.N.; Wiley, D.C.
Deposited on	:	1993-06-30
Resolution	:	2.50 Å(reported)

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

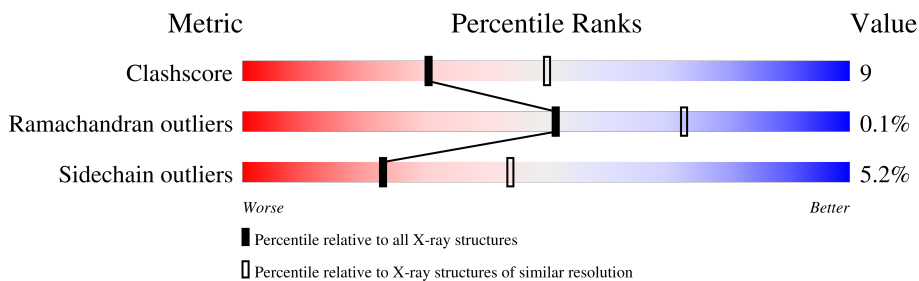|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	Percentile Ranks	Value
Clashscore		9
Ramachandran outliers		0.1%
Sidechain outliers		5.2%

Worse   *Better*

▊ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)

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	71% ... 25% ... •
1	D	275	70% ... 25% ... 5%
2	B	100	72% ... 26% ... •
2	E	100	77% ... 20% ... •
3	C	9	67% ... 33%
3	F	9	56% ... 44%

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 6308 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 CLASS I HISTOCOMPATIBILITY ANTIGEN (HLA-A*0201) (ALPHA CHAIN).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	275	Total 2247	C 1403	N 409	O 426	S 9	21	0	0
1	D	275	Total 2247	C 1403	N 409	O 426	S 9	17	0	0

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	100	Total 837	C 533	N 141	O 159	S 4	5	0	0
2	E	100	Total 837	C 533	N 141	O 159	S 4	10	0	0

- Molecule 3 is a protein called HIV-1 REVERSE TRANSCRIPTASE (RESIDUES 309-317).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	9	Total 70	C 46	N 12	O 12	0	0	0
3	F	9	Total 70	C 46	N 12	O 12	0	0	0

WORLDWIDE
wwPDB
PROTEIN DATA BANK
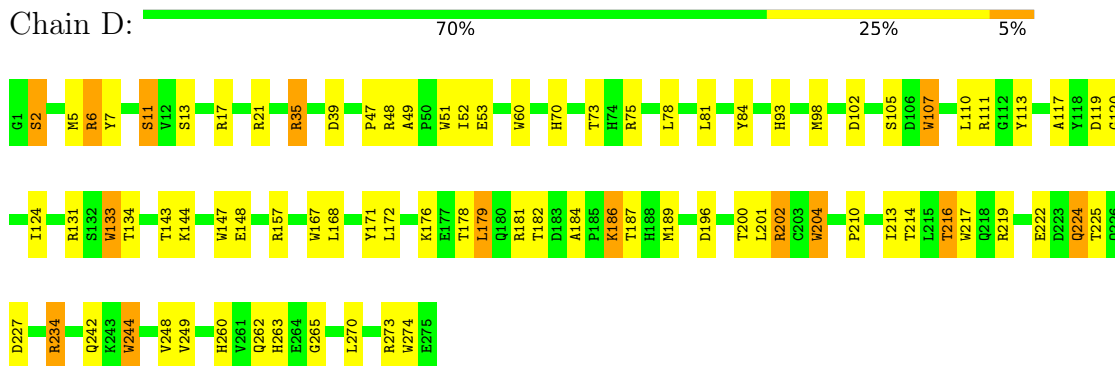
3 Residue-property plots ⓘ

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. 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: CLASS I HISTOCOMPATIBILITY ANTIGEN (HLA-A*0201) (ALPHA CHAIN)
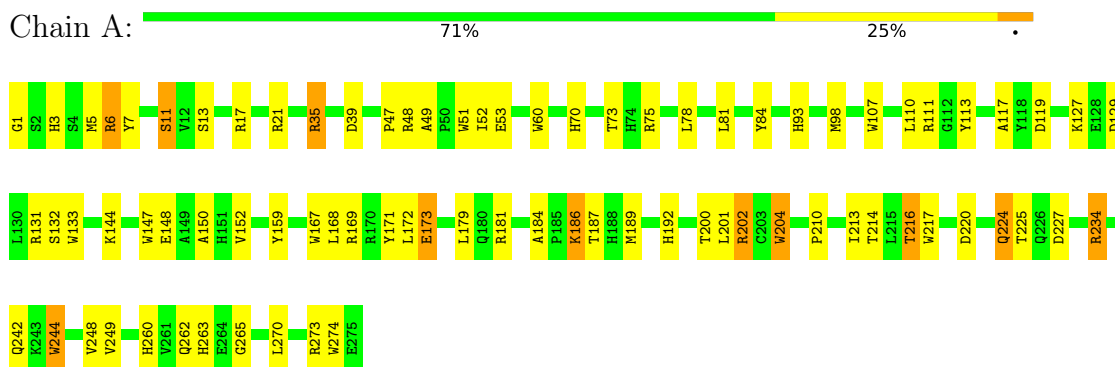
Chain A:

• Molecule 1: CLASS I HISTOCOMPATIBILITY ANTIGEN (HLA-A*0201) (ALPHA CHAIN)

Chain D:

• Molecule 2: BETA 2-MICROGLOBULIN

Chain B:

• Molecule 2: BETA 2-MICROGLOBULIN

Chain E:

M0 R3 T4 E16 K19 C25 F30 D34 V37 D38 L39 L40 W60 L64 F70 T73 E74 K75 Y78 A79 C80 R81 V82 N83 H84 V85 W95 M99

• Molecule 3: HIV-1 REVERSE TRANSCRIPTASE (RESIDUES 309-317)

Chain C:

67%   33%

I1 L2 K3 E4 P5 V6 V9

• Molecule 3: HIV-1 REVERSE TRANSCRIPTASE (RESIDUES 309-317)

Chain F:

56%   44%

I1 L2 K3 E4 P5 V6 V9
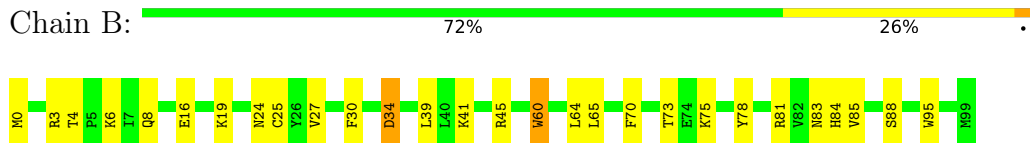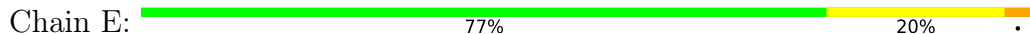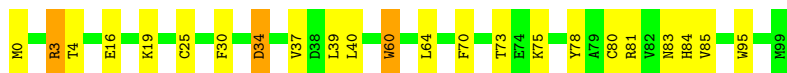
4 Data and refinement statistics (i)

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

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	50.37Å 63.60Å 74.75Å 81.53° 75.72° 77.48°	Depositor
Resolution (Å)	(Not available) – 2.50	Depositor
% Data completeness (in resolution range)	(Not available) ((Not available)-2.50)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, R_{free}	0.278 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	6308	wwPDB-VP
Average B, all atoms (Å^2)	15.0	wwPDB-VP

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	0.92	0/2312	1.57	37/3137 (1.2%)
1	D	0.92	0/2312	1.59	39/3137 (1.2%)
2	B	0.87	0/860	1.50	12/1162 (1.0%)
2	E	0.88	0/860	1.50	11/1162 (0.9%)
3	C	0.99	0/71	1.46	0/94
3	F	0.99	0/71	1.46	0/94
All	All	0.91	0/6486	1.56	99/8786 (1.1%)

There are no bond length outliers.

All (99) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	204	TRP	CD1-CG-CD2	9.74	114.09	106.30
1	D	204	TRP	CD1-CG-CD2	9.74	114.09	106.30
1	D	274	TRP	CD1-CG-CD2	8.43	113.05	106.30
2	B	60	TRP	CD1-CG-CD2	8.42	113.03	106.30
1	A	274	TRP	CD1-CG-CD2	8.38	113.00	106.30
1	A	204	TRP	CE2-CD2-CG	-8.37	100.60	107.30
1	D	204	TRP	CE2-CD2-CG	-8.35	100.62	107.30
1	D	51	TRP	CD1-CG-CD2	8.34	112.97	106.30
1	A	133	TRP	CD1-CG-CD2	8.34	112.97	106.30
2	E	60	TRP	CD1-CG-CD2	8.34	112.97	106.30
1	A	51	TRP	CD1-CG-CD2	8.29	112.93	106.30
2	E	95	TRP	CD1-CG-CD2	8.29	112.93	106.30
2	B	95	TRP	CD1-CG-CD2	8.27	112.92	106.30
1	D	131	ARG	NE-CZ-NH1	8.27	124.43	120.30
1	D	167	TRP	CD1-CG-CD2	8.27	112.91	106.30
1	D	274	TRP	CE2-CD2-CG	-8.26	100.69	107.30
1	D	133	TRP	CD1-CG-CD2	8.25	112.90	106.30
1	A	244	TRP	CD1-CG-CD2	8.24	112.90	106.30
1	A	167	TRP	CD1-CG-CD2	8.24	112.89	106.30
1	A	274	TRP	CE2-CD2-CG	-8.23	100.72	107.30
1	D	244	TRP	CD1-CG-CD2	8.13	112.80	106.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	244	TRP	CE2-CD2-CG	-8.10	100.82	107.30
1	D	244	TRP	CE2-CD2-CG	-8.07	100.84	107.30
1	A	107	TRP	CD1-CG-CD2	7.94	112.65	106.30
2	B	60	TRP	CE2-CD2-CG	-7.92	100.97	107.30
2	E	60	TRP	CE2-CD2-CG	-7.82	101.05	107.30
2	E	95	TRP	CE2-CD2-CG	-7.73	101.11	107.30
2	B	95	TRP	CE2-CD2-CG	-7.68	101.15	107.30
1	D	51	TRP	CE2-CD2-CG	-7.66	101.17	107.30
1	A	51	TRP	CE2-CD2-CG	-7.63	101.19	107.30
1	D	107	TRP	CE2-CD2-CG	-7.51	101.29	107.30
1	D	167	TRP	CE2-CD2-CG	-7.48	101.32	107.30
1	D	147	TRP	CE2-CD2-CG	-7.47	101.32	107.30
1	A	167	TRP	CE2-CD2-CG	-7.47	101.33	107.30
1	A	133	TRP	CE2-CD2-CG	-7.41	101.37	107.30
1	D	133	TRP	CE2-CD2-CG	-7.35	101.42	107.30
1	A	202	ARG	NE-CZ-NH2	-7.15	116.73	120.30
1	D	217	TRP	CD1-CG-CD2	7.11	111.99	106.30
1	A	217	TRP	CD1-CG-CD2	7.09	111.97	106.30
1	D	60	TRP	CD1-CG-CD2	7.06	111.95	106.30
1	A	60	TRP	CD1-CG-CD2	7.03	111.92	106.30
1	D	107	TRP	CD1-CG-CD2	6.99	111.89	106.30
1	D	202	ARG	NE-CZ-NH2	-6.99	116.81	120.30
1	A	159	TYR	CB-CG-CD2	-6.94	116.83	121.00
1	D	147	TRP	CD1-CG-CD2	6.92	111.83	106.30
1	A	107	TRP	CE2-CD2-CG	-6.91	101.77	107.30
1	A	181	ARG	NE-CZ-NH1	6.87	123.73	120.30
1	A	147	TRP	CE2-CD2-CG	-6.83	101.84	107.30
1	A	217	TRP	CE2-CD2-CG	-6.82	101.84	107.30
1	D	217	TRP	CE2-CD2-CG	-6.80	101.86	107.30
1	D	60	TRP	CE2-CD2-CG	-6.78	101.88	107.30
1	A	60	TRP	CE2-CD2-CG	-6.71	101.93	107.30
2	B	81	ARG	NE-CZ-NH2	-6.42	117.09	120.30
1	A	274	TRP	CG-CD2-CE3	6.39	139.65	133.90
2	E	81	ARG	NE-CZ-NH2	-6.38	117.11	120.30
1	D	274	TRP	CG-CD2-CE3	6.36	139.63	133.90
1	A	244	TRP	CG-CD2-CE3	6.33	139.59	133.90
2	E	3	ARG	NE-CZ-NH1	6.32	123.46	120.30
2	B	45	ARG	NE-CZ-NH2	-6.30	117.15	120.30
1	D	244	TRP	CG-CD2-CE3	6.22	139.50	133.90
2	B	3	ARG	NE-CZ-NH1	6.17	123.38	120.30
2	E	95	TRP	CG-CD2-CE3	6.04	139.34	133.90
1	D	273	ARG	NE-CZ-NH2	-6.01	117.30	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	95	TRP	CG-CD2-CE3	6.00	139.30	133.90
1	A	273	ARG	NE-CZ-NH2	-5.95	117.33	120.30
1	A	244	TRP	CB-CG-CD1	-5.94	119.27	127.00
1	D	244	TRP	CB-CG-CD1	-5.90	119.33	127.00
1	A	147	TRP	CD1-CG-CD2	5.84	110.97	106.30
1	A	220	ASP	CB-CG-OD1	5.76	123.48	118.30
1	D	204	TRP	CG-CD1-NE1	-5.69	104.41	110.10
2	B	60	TRP	CG-CD2-CE3	5.68	139.01	133.90
1	A	204	TRP	CG-CD1-NE1	-5.65	104.45	110.10
2	E	60	TRP	CG-CD2-CE3	5.65	138.98	133.90
1	D	167	TRP	CG-CD2-CE3	5.59	138.93	133.90
2	B	0	MET	CA-CB-CG	5.56	122.75	113.30
1	A	167	TRP	CG-CD2-CE3	5.55	138.90	133.90
1	D	274	TRP	CB-CG-CD1	-5.53	119.81	127.00
1	D	196	ASP	CB-CA-C	-5.52	99.36	110.40
2	E	0	MET	CA-CB-CG	5.50	122.66	113.30
1	A	274	TRP	CB-CG-CD1	-5.50	119.85	127.00
1	D	39	ASP	CB-CG-OD1	5.42	123.17	118.30
1	A	202	ARG	NE-CZ-NH1	5.39	122.99	120.30
1	D	6	ARG	NE-CZ-NH2	-5.38	117.61	120.30
1	A	6	ARG	NE-CZ-NH2	-5.36	117.62	120.30
1	A	39	ASP	CB-CG-OD1	5.32	123.09	118.30
1	A	133	TRP	CG-CD1-NE1	-5.27	104.83	110.10
1	D	147	TRP	CG-CD2-CE3	5.24	138.62	133.90
2	E	60	TRP	CB-CG-CD1	-5.23	120.20	127.00
2	B	60	TRP	CB-CG-CD1	-5.21	120.23	127.00
1	D	157	ARG	NE-CZ-NH2	-5.21	117.70	120.30
1	D	133	TRP	CG-CD1-NE1	-5.20	104.90	110.10
1	D	274	TRP	CG-CD1-NE1	-5.17	104.93	110.10
1	A	6	ARG	NE-CZ-NH1	5.16	122.88	120.30
1	D	202	ARG	NE-CZ-NH1	5.15	122.88	120.30
1	D	6	ARG	NE-CZ-NH1	5.13	122.86	120.30
1	A	274	TRP	CG-CD1-NE1	-5.09	105.01	110.10
1	D	107	TRP	CG-CD2-CE3	5.04	138.44	133.90
2	E	60	TRP	CG-CD1-NE1	-5.01	105.08	110.10
2	B	60	TRP	CG-CD1-NE1	-5.01	105.09	110.10

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	2247	0	2096	44	0
1	D	2247	0	2096	48	0
2	B	837	0	803	12	0
2	E	837	0	803	10	0
3	C	70	0	78	4	0
3	F	70	0	78	5	0
All	All	6308	0	5954	112	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 9.

All (112) 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:A:35:ARG:HG2	1:A:48:ARG:HD3	1.66	0.78
1:D:35:ARG:HG2	1:D:48:ARG:HD3	1.66	0.77
2:E:25:CYS:HB2	2:E:39:LEU:HD21	1.80	0.64
1:D:49:ALA:O	1:D:52:ILE:HG22	1.98	0.63
2:B:25:CYS:HB2	2:B:39:LEU:HD21	1.80	0.63
1:A:49:ALA:O	1:A:52:ILE:HG22	1.98	0.62
1:D:178:THR:O	1:D:181:ARG:HG2	1.99	0.61
1:A:1:GLY:O	1:A:3:HIS:CD2	2.54	0.59
2:B:73:THR:HG22	2:B:75:LYS:H	1.68	0.59
1:A:110:LEU:HG	1:A:111:ARG:NH1	2.19	0.57
1:A:17:ARG:HG2	1:A:17:ARG:HH11	1.70	0.57
1:D:17:ARG:HG2	1:D:17:ARG:HH11	1.70	0.57
1:A:11:SER:HA	1:A:21:ARG:O	2.05	0.57
1:A:150:ALA:HB3	1:A:152:VAL:HG23	1.87	0.56
1:D:11:SER:HA	1:D:21:ARG:O	2.05	0.56
1:A:70:HIS:CE1	3:C:6:VAL:HG21	2.41	0.56
1:D:35:ARG:NH1	1:D:48:ARG:NH1	2.54	0.56
1:A:35:ARG:NH1	1:A:48:ARG:NH1	2.54	0.55
1:D:70:HIS:CE1	3:F:6:VAL:HG21	2.41	0.55
1:A:70:HIS:HE1	3:C:3:LYS:O	1.92	0.53
2:E:73:THR:HG22	2:E:75:LYS:H	1.74	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:110:LEU:HG	1:A:111:ARG:HH12	1.73	0.53
1:A:224:GLN:HG3	1:A:227:ASP:HB2	1.91	0.52
1:D:70:HIS:HE1	3:F:3:LYS:O	1.92	0.52
1:D:81:LEU:HD23	1:D:84:TYR:HD2	1.75	0.52
1:A:214:THR:HB	1:A:262:GLN:HB2	1.91	0.52
1:D:6:ARG:NH2	1:D:102:ASP:OD1	2.43	0.51
1:D:214:THR:HB	1:D:262:GLN:HB2	1.91	0.51
1:D:224:GLN:HG3	1:D:227:ASP:HB2	1.93	0.51
1:D:47:PRO:HB2	1:D:53:GLU:HG2	1.92	0.51
1:A:47:PRO:HB2	1:A:53:GLU:HG2	1.93	0.50
1:A:202:ARG:HD2	1:A:244:TRP:CD2	2.45	0.50
1:D:5:MET:SD	1:D:171:TYR:HE2	2.34	0.50
1:D:202:ARG:HD2	1:D:244:TRP:CD2	2.45	0.50
2:B:41:LYS:HE3	2:B:78:TYR:OH	2.11	0.50
1:A:81:LEU:HD23	1:A:84:TYR:HD2	1.75	0.50
1:D:172:LEU:HA	1:D:179:LEU:CD1	2.41	0.50
2:B:30:PHE:HZ	2:B:64:LEU:HD12	1.77	0.50
1:A:5:MET:HB2	1:A:168:LEU:HD13	1.94	0.49
1:D:172:LEU:HA	1:D:179:LEU:HD11	1.95	0.49
1:A:144:LYS:O	1:A:148:GLU:HG3	2.12	0.49
2:E:30:PHE:HZ	2:E:64:LEU:HD12	1.77	0.49
1:D:5:MET:HB2	1:D:168:LEU:HD13	1.94	0.48
1:D:187:THR:HA	1:D:204:TRP:O	2.13	0.48
1:D:201:LEU:HD22	1:D:249:VAL:HG21	1.96	0.48
1:D:117:ALA:HB2	2:E:60:TRP:CE2	2.48	0.48
1:A:127:LYS:HD2	1:A:132:SER:OG	2.14	0.48
1:A:187:THR:HA	1:A:204:TRP:O	2.13	0.48
1:D:182:THR:CG2	1:D:265:GLY:CA	2.91	0.48
1:A:201:LEU:HD22	1:A:249:VAL:HG21	1.95	0.47
1:A:213:ILE:HG13	1:A:262:GLN:O	2.14	0.47
1:D:110:LEU:HG	1:D:111:ARG:HH12	1.78	0.47
1:A:73:THR:HG21	3:C:6:VAL:HG12	1.96	0.47
1:D:73:THR:HG21	3:F:6:VAL:HG12	1.96	0.47
2:E:34:ASP:O	2:E:84:HIS:HD2	1.97	0.47
1:A:6:ARG:NH2	1:A:113:TYR:CE1	2.83	0.47
2:B:34:ASP:O	2:B:84:HIS:HD2	1.97	0.47
1:D:260:HIS:HA	1:D:270:LEU:O	2.14	0.47
1:A:5:MET:SD	1:A:171:TYR:HE2	2.38	0.47
1:A:260:HIS:HA	1:A:270:LEU:O	2.14	0.46
1:D:6:ARG:NH2	1:D:113:TYR:CE1	2.83	0.46
1:D:213:ILE:HG13	1:D:262:GLN:O	2.14	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:172:LEU:HA	1:A:179:LEU:HD11	1.98	0.46
1:D:182:THR:HG21	1:D:265:GLY:CA	2.46	0.46
1:D:2:SER:H	1:D:105:SER:HA	1.81	0.45
1:D:7:TYR:O	1:D:98:MET:HA	2.17	0.45
3:F:3:LYS:HG2	3:F:4:GLU:N	2.31	0.45
2:E:40:LEU:O	2:E:78:TYR:HA	2.17	0.45
1:A:169:ARG:O	1:A:173:GLU:HG2	2.17	0.45
1:A:7:TYR:O	1:A:98:MET:HA	2.17	0.45
1:D:35:ARG:NH1	1:D:48:ARG:HH11	2.15	0.44
1:A:35:ARG:NH1	1:A:48:ARG:HH11	2.15	0.44
3:C:3:LYS:HG2	3:C:4:GLU:N	2.31	0.44
1:D:234:ARG:HD3	1:D:242:GLN:HB2	2.00	0.44
1:D:133:TRP:HB2	1:D:144:LYS:HG3	1.98	0.44
1:A:234:ARG:HD3	1:A:242:GLN:HB2	2.00	0.43
2:B:73:THR:HG22	2:B:75:LYS:HB3	1.99	0.43
1:A:172:LEU:HA	1:A:179:LEU:CD1	2.48	0.43
1:A:189:MET:HA	1:A:202:ARG:O	2.19	0.43
1:A:93:HIS:HD2	1:A:119:ASP:OD2	2.02	0.43
1:D:120:GLY:O	2:E:3:ARG:NH2	2.52	0.43
1:D:189:MET:HA	1:D:202:ARG:O	2.19	0.43
1:A:210:PRO:O	1:A:263:HIS:HE1	2.01	0.42
1:D:210:PRO:O	1:D:263:HIS:HE1	2.01	0.42
1:D:93:HIS:HD2	1:D:119:ASP:OD2	2.01	0.42
1:D:143:THR:HG23	3:F:9:VAL:HA	2.00	0.42
1:D:144:LYS:HE2	1:D:148:GLU:OE2	2.19	0.42
1:A:234:ARG:NH1	2:B:8:GLN:OE1	2.52	0.42
1:D:5:MET:SD	1:D:171:TYR:CE2	3.12	0.42
2:E:37:VAL:HG13	2:E:80:CYS:SG	2.60	0.42
1:A:216:THR:HG22	1:A:260:HIS:HB2	2.02	0.42
1:D:182:THR:HG21	1:D:265:GLY:HA2	2.00	0.42
1:A:184:ALA:O	1:A:186:LYS:NZ	2.49	0.41
1:A:129:ASP:O	1:A:131:ARG:HG3	2.21	0.41
1:A:263:HIS:CD2	1:A:265:GLY:H	2.38	0.41
1:D:263:HIS:CD2	1:D:265:GLY:H	2.38	0.41
1:D:107:TRP:CE2	1:D:172:LEU:HD13	2.55	0.41
2:E:34:ASP:O	2:E:84:HIS:CD2	2.73	0.41
1:D:124:ILE:HA	1:D:134:THR:O	2.21	0.41
2:B:6:LYS:O	2:B:27:VAL:HA	2.22	0.40
2:B:16:GLU:HB2	2:B:19:LYS:HD2	2.03	0.40
1:D:13:SER:HB3	1:D:78:LEU:HD13	2.04	0.40
1:D:184:ALA:O	1:D:186:LYS:NZ	2.51	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:219:ARG:O	1:D:222:GLU:HG2	2.21	0.40
1:A:117:ALA:HB2	2:B:60:TRP:CE2	2.56	0.40
2:B:24:ASN:HB3	2:B:65:LEU:HD11	2.03	0.40
1:D:216:THR:HG22	1:D:260:HIS:HB2	2.02	0.40
2:B:34:ASP:O	2:B:84:HIS:CD2	2.73	0.40
2:E:16:GLU:HB2	2:E:19:LYS:HD2	2.03	0.40
1:A:13:SER:HB3	1:A:78:LEU:HD13	2.03	0.40
1:A:169:ARG:HH11	1:A:169:ARG:HD3	1.70	0.40
1:A:179:LEU:H	1:A:179:LEU:HG	1.70	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	273/275 (99%)	262 (96%)	11 (4%)	0	100	100
1	D	273/275 (99%)	259 (95%)	13 (5%)	1 (0%)	34	54
2	B	98/100 (98%)	96 (98%)	2 (2%)	0	100	100
2	E	98/100 (98%)	96 (98%)	2 (2%)	0	100	100
3	C	7/9 (78%)	7 (100%)	0	0	100	100
3	F	7/9 (78%)	7 (100%)	0	0	100	100
All	All	756/768 (98%)	727 (96%)	28 (4%)	1 (0%)	51	73

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	176	LYS

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	231/231 (100%)	219 (95%)	12 (5%)	23	44
1	D	231/231 (100%)	219 (95%)	12 (5%)	23	44
2	B	95/95 (100%)	89 (94%)	6 (6%)	18	34
2	E	95/95 (100%)	90 (95%)	5 (5%)	22	43
3	C	8/8 (100%)	8 (100%)	0	100	100
3	F	8/8 (100%)	8 (100%)	0	100	100
All	All	668/668 (100%)	633 (95%)	35 (5%)	23	44

All (35) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	SER
1	A	35	ARG
1	A	75	ARG
1	A	173	GLU
1	A	186	LYS
1	A	192	HIS
1	A	200	THR
1	A	216	THR
1	A	224	GLN
1	A	225	THR
1	A	234	ARG
1	A	248	VAL
2	B	4	THR
2	B	34	ASP
2	B	70	PHE
2	B	83	ASN
2	B	85	VAL
2	B	88	SER
1	D	2	SER
1	D	11	SER
1	D	35	ARG
1	D	75	ARG

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Mol	Chain	Res	Type
1	D	179	LEU
1	D	186	LYS
1	D	200	THR
1	D	216	THR
1	D	224	GLN
1	D	225	THR
1	D	234	ARG
1	D	248	VAL
2	E	4	THR
2	E	34	ASP
2	E	70	PHE
2	E	83	ASN
2	E	85	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	93	HIS
1	A	155	GLN
1	A	174	ASN
1	D	93	HIS
1	D	155	GLN
1	D	174	ASN

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.