



Full wwPDB X-ray Structure Validation Report ⓘ

May 29, 2024 – 01:26 PM EDT

PDB ID : 1HHG
Title : THE ANTIGENIC IDENTITY OF PEPTIDE(SLASH)MHC COMPLEXES:
A COMPARISON OF THE CONFORMATION OF FIVE PEPTIDES PRE-
SENTED BY HLA-A2
Authors : Madden, D.R.; Garboczi, D.N.; Wiley, D.C.
Deposited on : 1993-06-30
Resolution : 2.60 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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Xtrriage (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

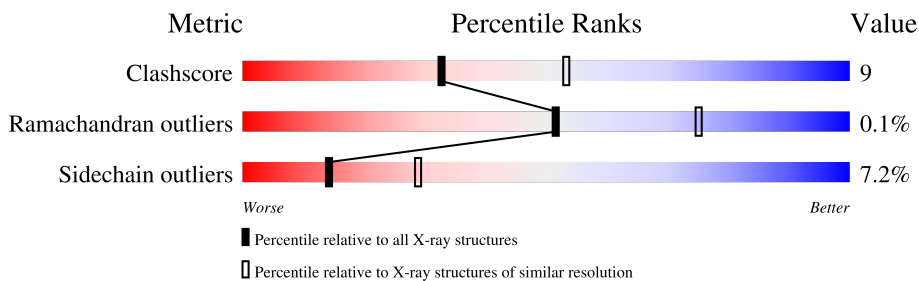
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)

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 $\leq 5\%$

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	275	
1	D	275	
2	B	100	
2	E	100	
3	C	9	
3	F	9	

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 6294 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	C	N	O	S	15	0	0
			2247	1403	409	426	9			
1	D	275	Total	C	N	O	S	24	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	5	0	0
			837	533	141	159	4			
2	E	100	Total	C	N	O	S	5	0	0
			837	533	141	159	4			

- Molecule 3 is a protein called HIV-1 GP120 ENVELOPE PROTEIN (RESIDUES 195-207).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	9	Total	C	N	O	S	0	0	0
			63	36	10	16	1			
3	F	9	Total	C	N	O	S	0	0	0
			63	36	10	16	1			

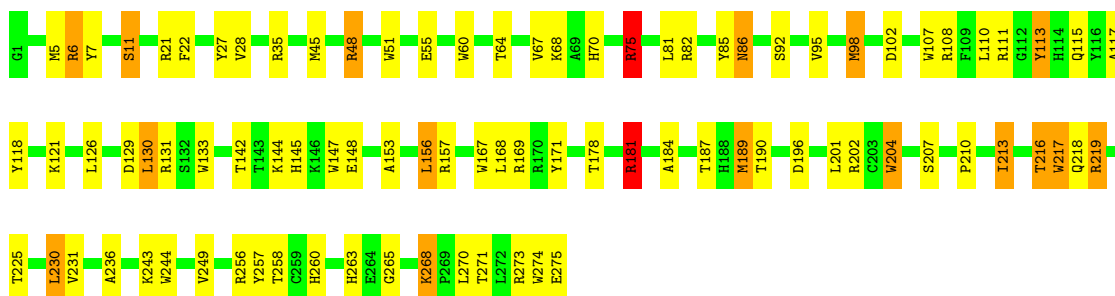
3 Residue-property plots

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.

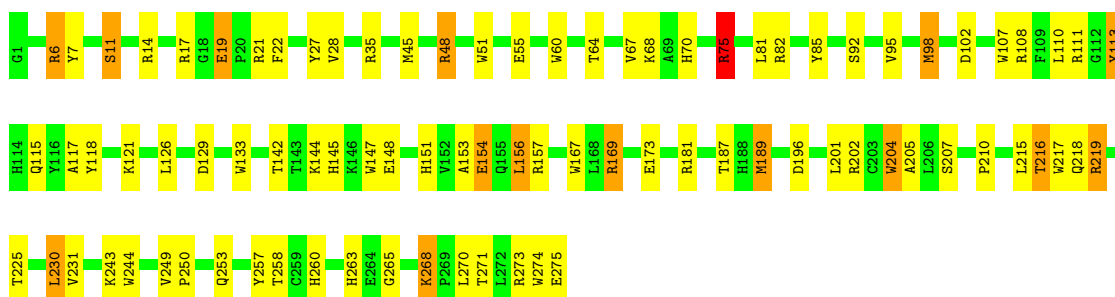
- Molecule 1: CLASS I HISTOCOMPATIBILITY ANTIGEN (HLA-A*0201) (ALPHA CHAIN)

Chain A: 



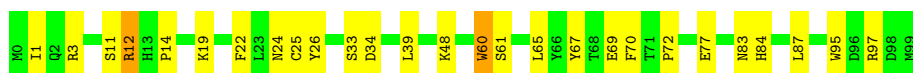
- Molecule 1: CLASS I HISTOCOMPATIBILITY ANTIGEN (HLA-A*0201) (ALPHA CHAIN)

Chain D: 



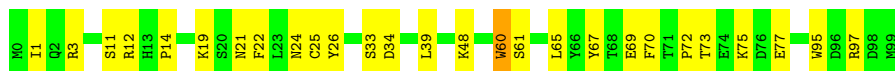
- Molecule 2: BETA 2-MICROGLOBULIN

Chain B: 



- Molecule 2: BETA 2-MICROGLOBULIN

Chain E: 



- Molecule 3: HIV-1 GP120 ENVELOPE PROTEIN (RESIDUES 195-207)

Chain C: 89% 11%



- Molecule 3: HIV-1 GP120 ENVELOPE PROTEIN (RESIDUES 195-207)

Chain F: 89% 11%



4 Data and refinement statistics

Xtrriage (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	62.70Å 87.00Å 79.40Å 90.00° 90.02° 90.00°	Depositor
Resolution (Å)	(Not available) – 2.60	Depositor
% Data completeness (in resolution range)	(Not available) ((Not available)-2.60)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, R_{free}	0.277 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	6294	wwPDB-VP
Average B, all atoms (Å ²)	24.0	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	0.94	0/2312	1.71	62/3137 (2.0%)
1	D	0.94	0/2312	1.70	60/3137 (1.9%)
2	B	0.88	0/860	1.53	10/1162 (0.9%)
2	E	0.89	0/860	1.53	10/1162 (0.9%)
3	C	0.74	0/62	1.42	0/83
3	F	0.74	0/62	1.42	0/83
All	All	0.92	0/6468	1.65	142/8764 (1.6%)

There are no bond length outliers.

All (142) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	204	TRP	CD1-CG-CD2	10.30	114.54	106.30
1	D	204	TRP	CD1-CG-CD2	10.26	114.51	106.30
1	D	274	TRP	CD1-CG-CD2	9.44	113.85	106.30
1	A	274	TRP	CD1-CG-CD2	9.43	113.84	106.30
1	D	167	TRP	CD1-CG-CD2	9.00	113.50	106.30
1	A	167	TRP	CD1-CG-CD2	8.98	113.48	106.30
1	A	75	ARG	NE-CZ-NH1	8.94	124.77	120.30
1	A	244	TRP	CD1-CG-CD2	8.85	113.38	106.30
1	D	244	TRP	CD1-CG-CD2	8.83	113.36	106.30
1	D	75	ARG	NE-CZ-NH1	8.81	124.70	120.30
2	B	60	TRP	CD1-CG-CD2	8.72	113.28	106.30
1	D	51	TRP	CD1-CG-CD2	8.69	113.25	106.30
1	A	51	TRP	CD1-CG-CD2	8.66	113.23	106.30
1	D	217	TRP	CD1-CG-CD2	8.64	113.21	106.30
2	E	60	TRP	CD1-CG-CD2	8.64	113.21	106.30
1	A	217	TRP	CD1-CG-CD2	8.63	113.20	106.30
1	A	133	TRP	CD1-CG-CD2	8.60	113.18	106.30
1	D	133	TRP	CD1-CG-CD2	8.55	113.14	106.30
1	A	244	TRP	CE2-CD2-CG	-8.39	100.59	107.30
1	D	244	TRP	CE2-CD2-CG	-8.34	100.63	107.30
1	A	181	ARG	NE-CZ-NH2	-8.29	116.16	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	204	TRP	CE2-CD2-CG	-8.15	100.78	107.30
1	A	274	TRP	CE2-CD2-CG	-8.12	100.80	107.30
1	D	204	TRP	CE2-CD2-CG	-8.08	100.84	107.30
1	D	274	TRP	CE2-CD2-CG	-8.06	100.85	107.30
2	E	95	TRP	CD1-CG-CD2	8.04	112.73	106.30
1	D	51	TRP	CE2-CD2-CG	-7.90	100.98	107.30
1	D	219	ARG	NE-CZ-NH2	-7.90	116.35	120.30
2	B	60	TRP	CE2-CD2-CG	-7.88	101.00	107.30
2	B	95	TRP	CD1-CG-CD2	7.87	112.59	106.30
1	A	51	TRP	CE2-CD2-CG	-7.85	101.02	107.30
1	A	219	ARG	NE-CZ-NH2	-7.83	116.39	120.30
2	E	60	TRP	CE2-CD2-CG	-7.79	101.07	107.30
1	A	133	TRP	CE2-CD2-CG	-7.72	101.13	107.30
1	D	133	TRP	CE2-CD2-CG	-7.68	101.15	107.30
2	E	95	TRP	CE2-CD2-CG	-7.64	101.19	107.30
1	A	167	TRP	CE2-CD2-CG	-7.53	101.28	107.30
1	D	167	TRP	CE2-CD2-CG	-7.51	101.29	107.30
1	D	107	TRP	CE2-CD2-CG	-7.48	101.31	107.30
2	B	95	TRP	CE2-CD2-CG	-7.48	101.32	107.30
1	A	217	TRP	CE2-CD2-CG	-7.45	101.34	107.30
1	A	256	ARG	NE-CZ-NH1	7.42	124.01	120.30
1	D	217	TRP	CE2-CD2-CG	-7.41	101.37	107.30
1	A	75	ARG	NE-CZ-NH2	-7.41	116.60	120.30
1	D	75	ARG	NE-CZ-NH2	-7.22	116.69	120.30
1	A	204	TRP	CG-CD1-NE1	-7.22	102.88	110.10
1	D	204	TRP	CG-CD1-NE1	-7.18	102.92	110.10
1	D	6	ARG	NE-CZ-NH1	7.06	123.83	120.30
1	A	169	ARG	NE-CZ-NH2	-7.06	116.77	120.30
1	D	169	ARG	NE-CZ-NH2	-6.99	116.80	120.30
1	A	6	ARG	NE-CZ-NH1	6.97	123.78	120.30
1	A	107	TRP	CD1-CG-CD2	6.89	111.81	106.30
1	D	60	TRP	CE2-CD2-CG	-6.85	101.82	107.30
1	D	27	TYR	CB-CG-CD2	-6.84	116.89	121.00
1	A	60	TRP	CE2-CD2-CG	-6.84	101.83	107.30
1	D	107	TRP	CD1-CG-CD2	6.84	111.77	106.30
1	A	107	TRP	CE2-CD2-CG	-6.83	101.84	107.30
1	A	147	TRP	CD1-CG-CD2	6.79	111.73	106.30
1	D	147	TRP	CD1-CG-CD2	6.77	111.72	106.30
1	A	27	TYR	CB-CG-CD2	-6.77	116.94	121.00
1	D	181	ARG	NE-CZ-NH2	-6.54	117.03	120.30
1	A	108	ARG	NE-CZ-NH2	-6.45	117.07	120.30
2	B	12	ARG	NE-CZ-NH2	-6.45	117.08	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	12	ARG	NE-CZ-NH2	-6.44	117.08	120.30
1	D	60	TRP	CD1-CG-CD2	6.42	111.44	106.30
1	D	108	ARG	NE-CZ-NH2	-6.37	117.12	120.30
1	A	60	TRP	CD1-CG-CD2	6.36	111.39	106.30
1	A	48	ARG	NE-CZ-NH2	-6.31	117.14	120.30
1	A	55	GLU	CA-C-N	6.31	128.82	116.20
1	D	55	GLU	CA-C-N	6.31	128.82	116.20
1	D	48	ARG	NE-CZ-NH2	-6.29	117.15	120.30
1	A	147	TRP	CE2-CD2-CG	-6.26	102.30	107.30
1	D	147	TRP	CE2-CD2-CG	-6.25	102.30	107.30
1	D	107	TRP	CG-CD2-CE3	6.13	139.42	133.90
1	D	268	LYS	CA-CB-CG	6.09	126.81	113.40
1	A	268	LYS	CA-CB-CG	6.09	126.80	113.40
1	D	275	GLU	CA-CB-CG	6.05	126.71	113.40
1	A	275	GLU	CA-CB-CG	6.04	126.68	113.40
1	D	207	SER	CA-CB-OG	5.91	127.17	111.20
1	A	102	ASP	CB-CG-OD1	5.89	123.60	118.30
1	A	207	SER	CA-CB-OG	5.88	127.09	111.20
1	A	107	TRP	CG-CD2-CE3	5.84	139.16	133.90
1	D	102	ASP	CB-CG-OD1	5.79	123.51	118.30
1	A	108	ARG	CA-CB-CG	-5.77	100.70	113.40
1	D	108	ARG	CA-CB-CG	-5.74	100.77	113.40
1	D	98	MET	CG-SD-CE	-5.65	91.17	100.20
1	A	98	MET	CG-SD-CE	-5.64	91.17	100.20
1	D	154	GLU	CA-CB-CG	5.59	125.71	113.40
1	A	244	TRP	CB-CG-CD1	-5.59	119.73	127.00
1	D	244	TRP	CB-CG-CD1	-5.59	119.74	127.00
1	D	189	MET	CA-CB-CG	5.59	122.80	113.30
1	D	244	TRP	CG-CD2-CE3	5.58	138.92	133.90
1	A	244	TRP	CG-CD2-CE3	5.57	138.91	133.90
1	A	274	TRP	CG-CD2-CE3	5.55	138.90	133.90
1	D	274	TRP	CG-CD2-CE3	5.54	138.89	133.90
1	A	274	TRP	CG-CD1-NE1	-5.54	104.56	110.10
1	D	274	TRP	CG-CD1-NE1	-5.53	104.57	110.10
2	B	97	ARG	NE-CZ-NH2	-5.51	117.54	120.30
1	A	217	TRP	CG-CD1-NE1	-5.48	104.62	110.10
1	D	217	TRP	CG-CD1-NE1	-5.47	104.63	110.10
1	A	219	ARG	NE-CZ-NH1	5.44	123.02	120.30
1	A	189	MET	CG-SD-CE	5.41	108.86	100.20
2	E	97	ARG	NE-CZ-NH2	-5.39	117.61	120.30
1	A	133	TRP	CB-CG-CD1	-5.39	120.00	127.00
1	D	167	TRP	CG-CD1-NE1	-5.39	104.71	110.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	219	ARG	NE-CZ-NH1	5.38	122.99	120.30
1	A	130	LEU	CA-CB-CG	5.38	127.67	115.30
1	D	133	TRP	CB-CG-CD1	-5.38	120.01	127.00
1	D	217	TRP	CB-CG-CD1	-5.37	120.02	127.00
1	A	167	TRP	CG-CD1-NE1	-5.36	104.74	110.10
1	A	113	TYR	CB-CG-CD2	-5.35	117.79	121.00
1	A	217	TRP	CB-CG-CD1	-5.34	120.05	127.00
2	E	95	TRP	CG-CD2-CE3	5.32	138.69	133.90
1	D	113	TYR	CB-CG-CD2	-5.31	117.81	121.00
2	E	26	TYR	CB-CG-CD2	-5.29	117.82	121.00
1	D	217	TRP	CG-CD2-CE3	5.29	138.66	133.90
1	A	217	TRP	CG-CD2-CE3	5.29	138.66	133.90
2	B	26	TYR	CB-CG-CD2	-5.27	117.83	121.00
1	A	133	TRP	CG-CD2-CE3	5.26	138.64	133.90
1	D	274	TRP	CB-CG-CD1	-5.26	120.16	127.00
1	D	133	TRP	CG-CD2-CE3	5.25	138.62	133.90
2	B	95	TRP	CG-CD2-CE3	5.23	138.61	133.90
1	A	274	TRP	CB-CG-CD1	-5.22	120.21	127.00
1	D	169	ARG	CB-CG-CD	-5.21	98.06	111.60
1	A	244	TRP	CG-CD1-NE1	-5.20	104.90	110.10
1	A	169	ARG	CB-CG-CD	-5.19	98.12	111.60
1	D	244	TRP	CG-CD1-NE1	-5.18	104.92	110.10
2	B	67	TYR	CB-CG-CD2	-5.15	117.91	121.00
1	A	231	VAL	CA-CB-CG1	-5.15	103.18	110.90
1	A	28	VAL	N-CA-C	-5.14	97.13	111.00
1	D	231	VAL	CA-CB-CG1	-5.13	103.20	110.90
1	A	216	THR	N-CA-CB	-5.12	100.57	110.30
1	D	28	VAL	N-CA-C	-5.12	97.17	111.00
1	D	82	ARG	NE-CZ-NH1	5.11	122.86	120.30
2	E	67	TYR	CB-CG-CD2	-5.10	117.94	121.00
1	D	216	THR	N-CA-CB	-5.10	100.62	110.30
1	A	82	ARG	NE-CZ-NH1	5.06	122.83	120.30
1	A	204	TRP	CG-CD2-CE3	5.04	138.44	133.90
2	B	60	TRP	CG-CD2-CE3	5.03	138.43	133.90
1	D	204	TRP	CG-CD2-CE3	5.02	138.42	133.90
1	A	133	TRP	CG-CD1-NE1	-5.01	105.09	110.10
2	E	60	TRP	CG-CD2-CE3	5.00	138.40	133.90

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2247	0	2096	49	0
1	D	2247	0	2096	40	0
2	B	837	0	803	11	0
2	E	837	0	803	10	0
3	C	63	0	64	0	0
3	F	63	0	64	0	0
All	All	6294	0	5926	105	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 (105) 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:190:THR:CG2	1:A:202:ARG:HB3	1.78	1.13
1:A:190:THR:HG22	1:A:202:ARG:HB3	1.43	0.97
1:D:75:ARG:HH11	1:D:75:ARG:HB2	1.42	0.82
1:A:75:ARG:HB2	1:A:75:ARG:HH11	1.42	0.82
1:A:190:THR:HG21	1:A:202:ARG:HB3	1.70	0.71
1:D:14:ARG:HB3	1:D:17:ARG:HB2	1.71	0.71
1:A:189:MET:SD	1:A:217:TRP:HH2	2.14	0.71
1:D:6:ARG:HH11	1:D:6:ARG:HG3	1.60	0.66
1:A:6:ARG:HH11	1:A:6:ARG:HG3	1.60	0.66
1:A:111:ARG:HD2	1:A:113:TYR:OH	2.00	0.61
1:D:111:ARG:HD2	1:D:113:TYR:OH	2.00	0.61
1:A:210:PRO:O	1:A:263:HIS:HE1	1.84	0.61
1:A:201:LEU:HD22	1:A:249:VAL:HG21	1.81	0.60
1:D:201:LEU:HD22	1:D:249:VAL:HG21	1.81	0.60
1:A:117:ALA:HB2	2:B:60:TRP:CE2	2.38	0.59
1:D:117:ALA:HB2	2:E:60:TRP:CE2	2.40	0.57
1:A:153:ALA:HA	1:A:156:LEU:HB2	1.86	0.57
1:D:210:PRO:O	1:D:263:HIS:HE1	1.88	0.56
1:A:190:THR:HG22	1:A:202:ARG:CB	2.28	0.56
2:B:25:CYS:HB2	2:B:39:LEU:HD21	1.88	0.56
2:E:25:CYS:HB2	2:E:39:LEU:HD21	1.88	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:3:ARG:NH1	2:B:61:SER:HB3	2.22	0.54
2:E:3:ARG:NH1	2:E:61:SER:HB3	2.22	0.54
1:A:189:MET:SD	1:A:217:TRP:CH2	3.00	0.54
1:D:153:ALA:HA	1:D:156:LEU:HB2	1.89	0.54
1:A:11:SER:HA	1:A:21:ARG:O	2.08	0.54
1:D:11:SER:HA	1:D:21:ARG:O	2.08	0.54
1:D:81:LEU:HD13	1:D:118:TYR:CD1	2.42	0.54
1:D:121:LYS:HG3	2:E:1:ILE:HD12	1.90	0.54
1:A:81:LEU:HD13	1:A:118:TYR:CD1	2.42	0.53
1:A:144:LYS:O	1:A:148:GLU:HG3	2.09	0.53
1:D:144:LYS:O	1:D:148:GLU:HG3	2.09	0.53
1:D:169:ARG:O	1:D:173:GLU:HG3	2.10	0.52
2:B:83:ASN:HA	2:B:87:LEU:HD12	1.92	0.51
1:A:230:LEU:HD22	1:A:243:LYS:HE3	1.94	0.50
1:A:189:MET:HA	1:A:202:ARG:O	2.12	0.50
1:D:230:LEU:HD22	1:D:243:LYS:HE3	1.94	0.49
1:D:189:MET:HA	1:D:202:ARG:O	2.12	0.49
1:A:187:THR:HA	1:A:204:TRP:O	2.12	0.49
1:D:187:THR:HA	1:D:204:TRP:O	2.12	0.49
1:A:129:ASP:O	1:A:157:ARG:NH1	2.46	0.48
1:A:213:ILE:HD12	1:A:263:HIS:HB2	1.94	0.48
2:B:19:LYS:O	2:B:72:PRO:HD2	2.14	0.48
2:E:19:LYS:O	2:E:72:PRO:HD2	2.14	0.48
1:D:19:GLU:H	1:D:19:GLU:CD	2.17	0.48
1:A:230:LEU:CD2	1:A:243:LYS:HE3	2.44	0.47
1:D:230:LEU:CD2	1:D:243:LYS:HE3	2.44	0.47
1:A:218:GLN:O	1:A:257:TYR:HA	2.14	0.47
1:D:218:GLN:O	1:D:257:TYR:HA	2.14	0.47
1:A:6:ARG:HD2	1:A:98:MET:CE	2.44	0.46
1:D:6:ARG:HD2	1:D:98:MET:CE	2.44	0.46
1:D:126:LEU:HD22	1:D:156:LEU:HD23	1.97	0.46
2:B:22:PHE:CZ	2:B:69:GLU:HG2	2.51	0.46
2:E:22:PHE:CZ	2:E:69:GLU:HG2	2.51	0.46
1:D:250:PRO:O	1:D:253:GLN:HB2	2.16	0.46
1:A:126:LEU:HD22	1:A:156:LEU:HD23	1.98	0.46
2:B:24:ASN:HB3	2:B:65:LEU:HD11	1.97	0.46
2:E:24:ASN:HB3	2:E:65:LEU:HD11	1.98	0.46
2:B:84:HIS:H	2:B:87:LEU:HD12	1.81	0.46
1:D:263:HIS:HD2	1:D:265:GLY:H	1.64	0.45
1:A:263:HIS:HD2	1:A:265:GLY:H	1.64	0.45
1:D:260:HIS:HA	1:D:270:LEU:O	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:260:HIS:HA	1:A:270:LEU:O	2.17	0.45
1:D:126:LEU:HD22	1:D:156:LEU:CD2	2.46	0.45
1:A:184:ALA:HB2	1:A:265:GLY:O	2.17	0.45
1:A:121:LYS:HG3	2:B:1:ILE:HD12	1.99	0.44
1:A:236:ALA:O	2:B:12:ARG:HG3	2.16	0.44
1:D:258:THR:HG22	1:D:273:ARG:HE	1.82	0.44
1:A:258:THR:HG22	1:A:273:ARG:HE	1.83	0.44
1:A:5:MET:SD	1:A:171:TYR:HE2	2.40	0.44
1:A:219:ARG:HD3	1:A:257:TYR:CZ	2.53	0.44
2:B:11:SER:HA	2:B:22:PHE:O	2.17	0.44
2:E:11:SER:HA	2:E:22:PHE:O	2.17	0.44
1:D:219:ARG:HD3	1:D:257:TYR:CZ	2.53	0.43
1:A:168:LEU:O	1:A:171:TYR:HB2	2.19	0.43
1:D:129:ASP:O	1:D:157:ARG:NH1	2.52	0.42
1:A:75:ARG:HB2	1:A:75:ARG:NH1	2.22	0.42
1:A:126:LEU:HD21	1:A:130:LEU:HA	2.01	0.42
1:D:81:LEU:O	1:D:85:TYR:HD2	2.01	0.42
1:A:81:LEU:O	1:A:85:TYR:HD2	2.02	0.42
1:D:7:TYR:O	1:D:98:MET:HA	2.20	0.42
1:A:7:TYR:O	1:A:98:MET:HA	2.20	0.42
1:A:178:THR:O	1:A:181:ARG:HD3	2.20	0.42
1:D:151:HIS:O	1:D:154:GLU:HB3	2.20	0.42
1:A:98:MET:SD	1:A:98:MET:C	2.99	0.41
1:D:64:THR:O	1:D:68:LYS:HD3	2.20	0.41
1:D:75:ARG:HB2	1:D:75:ARG:NH1	2.22	0.41
1:D:98:MET:C	1:D:98:MET:SD	2.99	0.41
1:A:64:THR:O	1:A:68:LYS:HD3	2.20	0.41
1:A:142:THR:O	1:A:145:HIS:HB2	2.20	0.41
1:D:48:ARG:HA	1:D:48:ARG:HD2	1.86	0.41
1:D:142:THR:O	1:D:145:HIS:HB2	2.20	0.41
1:A:130:LEU:HB3	1:A:157:ARG:HG2	2.03	0.41
1:A:126:LEU:HD22	1:A:156:LEU:CD2	2.50	0.41
1:A:131:ARG:HA	1:A:153:ALA:HB1	2.04	0.40
1:A:260:HIS:CE1	1:A:271:THR:HG23	2.56	0.40
1:D:205:ALA:HB2	1:D:215:LEU:HD11	2.03	0.40
1:A:48:ARG:HA	1:A:48:ARG:HD2	1.86	0.40
1:D:260:HIS:CE1	1:D:271:THR:HG23	2.55	0.40
1:A:22:PHE:HE2	1:A:67:VAL:HG22	1.86	0.40
1:D:22:PHE:HE2	1:D:67:VAL:HG22	1.86	0.40
2:E:11:SER:HB2	2:E:21:ASN:ND2	2.37	0.40
1:A:6:ARG:HD2	1:A:98:MET:HE1	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:6:ARG:HD2	1:D:98:MET:HE1	2.03	0.40
2:E:73:THR:HG22	2:E:75:LYS:H	1.86	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	273/275 (99%)	262 (96%)	10 (4%)	1 (0%)	34	57
1	D	273/275 (99%)	263 (96%)	10 (4%)	0	100	100
2	B	98/100 (98%)	95 (97%)	3 (3%)	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%)	730 (97%)	25 (3%)	1 (0%)	51	75

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	86	ASN

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%)	213 (92%)	18 (8%)	12	25
1	D	231/231 (100%)	215 (93%)	16 (7%)	15	31
2	B	95/95 (100%)	89 (94%)	6 (6%)	18	36
2	E	95/95 (100%)	89 (94%)	6 (6%)	18	36
3	C	9/9 (100%)	8 (89%)	1 (11%)	6	11
3	F	9/9 (100%)	8 (89%)	1 (11%)	6	11
All	All	670/670 (100%)	622 (93%)	48 (7%)	14	29

All (48) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	SER
1	A	35	ARG
1	A	45	MET
1	A	70	HIS
1	A	75	ARG
1	A	86	ASN
1	A	92	SER
1	A	95	VAL
1	A	110	LEU
1	A	115	GLN
1	A	156	LEU
1	A	181	ARG
1	A	196	ASP
1	A	213	ILE
1	A	216	THR
1	A	225	THR
1	A	230	LEU
1	A	268	LYS
2	B	14	PRO
2	B	33	SER
2	B	34	ASP
2	B	48	LYS
2	B	70	PHE
2	B	77	GLU
3	C	4	SER
1	D	11	SER
1	D	19	GLU
1	D	35	ARG
1	D	45	MET
1	D	70	HIS

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Mol	Chain	Res	Type
1	D	75	ARG
1	D	92	SER
1	D	95	VAL
1	D	110	LEU
1	D	115	GLN
1	D	156	LEU
1	D	196	ASP
1	D	216	THR
1	D	225	THR
1	D	230	LEU
1	D	268	LYS
2	E	14	PRO
2	E	33	SER
2	E	34	ASP
2	E	48	LYS
2	E	70	PHE
2	E	77	GLU
3	F	4	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	70	HIS
1	A	93	HIS
1	A	114	HIS
1	A	151	HIS
1	A	192	HIS
1	A	253	GLN
1	A	263	HIS
2	B	8	GLN
1	D	70	HIS
1	D	93	HIS
1	D	114	HIS
1	D	192	HIS
1	D	253	GLN
1	D	263	HIS
2	E	8	GLN

5.3.3 RNA

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 monosaccharides 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](#)

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.