



wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 3, 2023 – 05:58 AM EDT

PDB ID : 1I1F
Title : Crystal structure of human class i mhc (hla-a2.1) complexed with beta 2-microglobulin and hiv-rt variant peptide ily
Authors : Kirksey, T.J.; Pogue-Caley, R.R.; Frelinger, J.A.; Collins, E.J.
Deposited on : 1999-04-16
Resolution : 2.80 Å (reported)

This is a wwPDB X-ray Structure Validation Summary 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
Xtriage (Phenix) : 1.13
EDS : 2.34
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) : 2.34

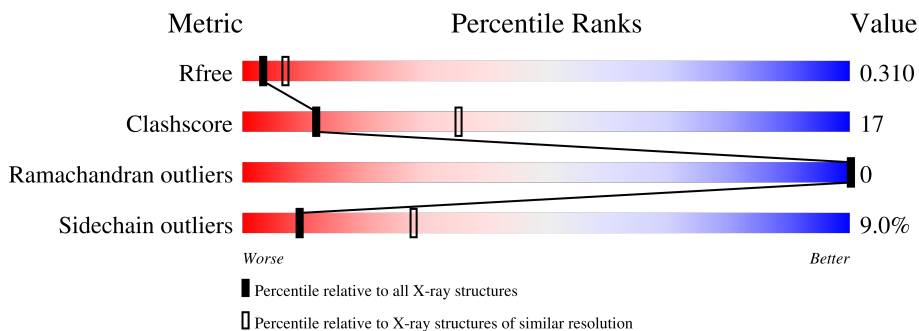
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)

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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	275	57% (green), 35% (yellow), 6% (orange), 2% (red), 0% (grey)
1	D	275	60% (green), 35% (yellow), 3% (orange), 2% (red), 0% (grey)
2	B	100	71% (green), 20% (yellow), 7% (orange), 2% (red), 0% (grey)
2	E	100	68% (green), 27% (yellow), 5% (orange), 0% (red), 0% (grey)
3	C	9	56% (green), 44% (yellow), 0% (orange), 0% (red), 0% (grey)
3	F	9	56% (green), 44% (yellow), 0% (orange), 0% (red), 0% (grey)

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 6311 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 PROTEIN (CLASS I HISTOCOMPATIBILITY ANTIGEN, GOGO-A0201 ALPHA CHAIN).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	275	Total 2247	C 1403	N 409	O 426	S 9	0	0	0
1	D	275	Total 2246	C 1403	N 409	O 425	S 9	0	0	0

- Molecule 2 is a protein called PROTEIN (BETA 2-MICROGLOBULIN).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	100	Total 836	C 533	N 141	O 158	S 4	0	0	0
2	E	100	Total 836	C 533	N 141	O 158	S 4	0	0	0

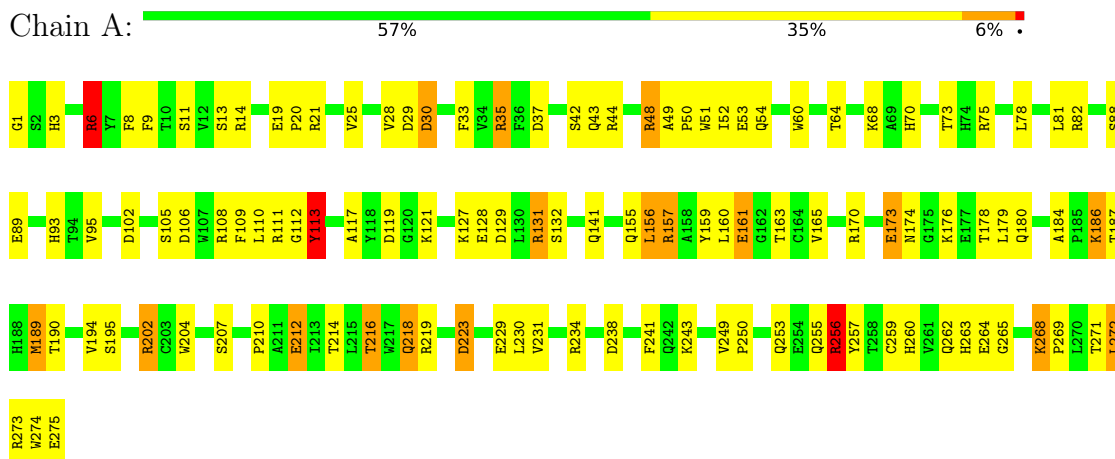
- Molecule 3 is a protein called PROTEIN (HIV-RT VARIANT PEPTIDE I1F (FLKEPVHGV)).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	C	9	Total 73	C 49	N 12	O 12	0	0	0
3	F	9	Total 73	C 49	N 12	O 12	0	0	0

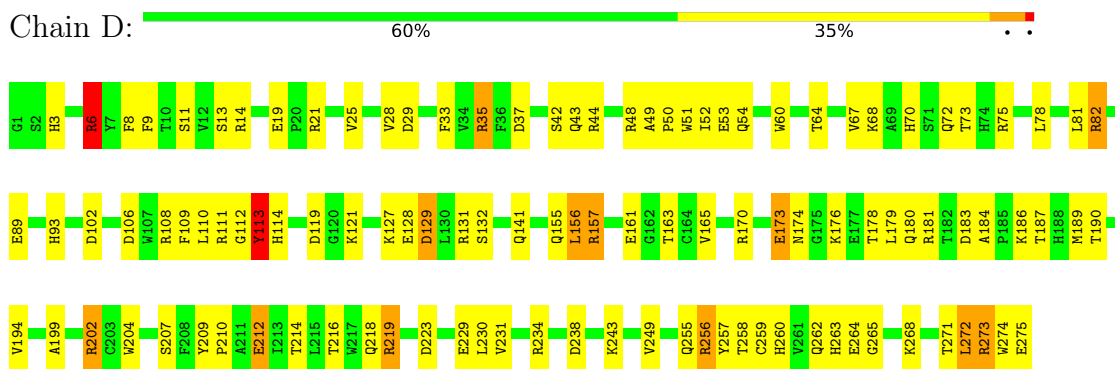
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

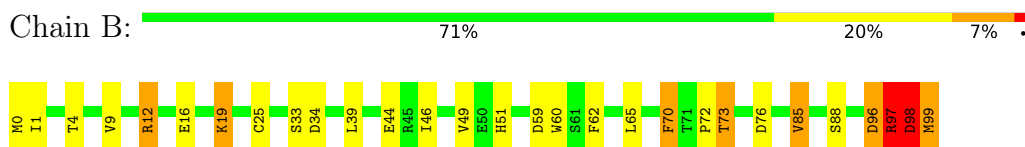
- Molecule 1: PROTEIN (CLASS I HISTOCOMPATIBILITY ANTIGEN, GOGO-A0201 ALPHA CHAIN)



- Molecule 1: PROTEIN (CLASS I HISTOCOMPATIBILITY ANTIGEN, GOGO-A0201 ALPHA CHAIN)



- Molecule 2: PROTEIN (BETA 2-MICROGLOBULIN)



- Molecule 2: PROTEIN (BETA 2-MICROGLOBULIN)

Chain E:  68% 27% 5%




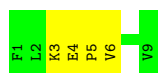
- Molecule 3: PROTEIN (HIV-RT VARIANT PEPTIDE I1F (FLKEPVHGV))

Chain C:  56% 44%



- Molecule 3: PROTEIN (HIV-RT VARIANT PEPTIDE I1F (FLKEPVHGV))

Chain F:  56% 44%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	49.57Å 62.97Å 74.56Å 82.09° 76.47° 77.78°	Depositor
Resolution (Å)	15.00 – 2.80 29.19 – 2.15	Depositor EDS
% Data completeness (in resolution range)	99.0 (15.00-2.80) 95.4 (29.19-2.15)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.11 (at 2.16Å)	Xtrriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.260 , 0.315 0.302 , 0.310	Depositor DCC
R_{free} test set	3615 reflections (8.20%)	wwPDB-VP
Wilson B-factor (Å ²)	18.7	Xtrriage
Anisotropy	0.364	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 39.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.80	EDS
Total number of atoms	6311	wwPDB-VP
Average B, all atoms (Å ²)	43.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.44% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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	0.52	0/2312	1.55	28/3137 (0.9%)
1	D	0.52	0/2311	1.49	29/3137 (0.9%)
2	B	0.57	0/859	1.59	12/1162 (1.0%)
2	E	0.53	0/859	1.50	8/1162 (0.7%)
3	C	0.82	0/75	1.15	0/99
3	F	0.84	0/75	1.11	0/99
All	All	0.54	0/6491	1.52	77/8796 (0.9%)

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
1	A	0	2
1	D	0	1
2	B	1	0
All	All	1	3

There are no bond length outliers.

The worst 5 of 77 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	44	GLU	OE1-CD-OE2	-22.86	95.86	123.30
1	A	256	ARG	NE-CZ-NH2	22.85	131.72	120.30
2	E	44	GLU	OE1-CD-OE2	-21.72	97.23	123.30
1	D	256	ARG	NE-CZ-NH2	21.25	130.92	120.30
1	D	6	ARG	NE-CZ-NH1	-14.03	113.29	120.30

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	B	1	ILE	CB

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	112	GLY	Mainchain
1	A	218	GLN	Mainchain
1	D	112	GLY	Mainchain

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	88	0
1	D	2246	0	2096	90	0
2	B	836	0	803	20	0
2	E	836	0	803	26	0
3	C	73	0	76	9	0
3	F	73	0	76	14	0
All	All	6311	0	5950	210	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 17.

The worst 5 of 210 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:93:HIS:CD2	2:E:0:MET:HE1	1.69	1.28
1:A:93:HIS:CD2	2:B:0:MET:HE1	1.85	1.10
1:D:93:HIS:CD2	2:E:0:MET:CE	2.46	0.97
1:D:6:ARG:HH12	1:D:113:TYR:HE1	1.15	0.94
1:D:35:ARG:HH12	1:D:48:ARG:NH1	1.67	0.93

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%)	11 (4%)	0	100	100
1	D	273/275 (99%)	261 (96%)	12 (4%)	0	100	100
2	B	98/100 (98%)	95 (97%)	3 (3%)	0	100	100
2	E	98/100 (98%)	95 (97%)	3 (3%)	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%)	29 (4%)	0	100	100

There are no Ramachandran outliers to report.

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%)	208 (90%)	23 (10%)	7	22
1	D	231/231 (100%)	210 (91%)	21 (9%)	9	27
2	B	95/95 (100%)	86 (90%)	9 (10%)	8	25
2	E	95/95 (100%)	88 (93%)	7 (7%)	13	37
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%)	608 (91%)	60 (9%)	9	28

5 of 60 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	85	VAL
2	E	21	ASN
1	D	81	LEU
2	E	19	LYS
2	E	88	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 17 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	218	GLN
2	E	89	GLN
2	B	2	GLN
2	B	89	GLN
1	D	54	GLN

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 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

6.1 Protein, DNA and RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.