



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 4, 2026 – 09:45 PM UTC

PDB ID : 6UCE / pdb_00006uce
Title : N123-VRC34_pI3 HIV neutralizing antibody in complex with HIV fusion peptide residue 512-519
Authors : Xu, K.; Kwong, P.D.
Deposited on : 2019-09-16
Resolution : 1.38 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 : 4-5-2 with Phenix2.0
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

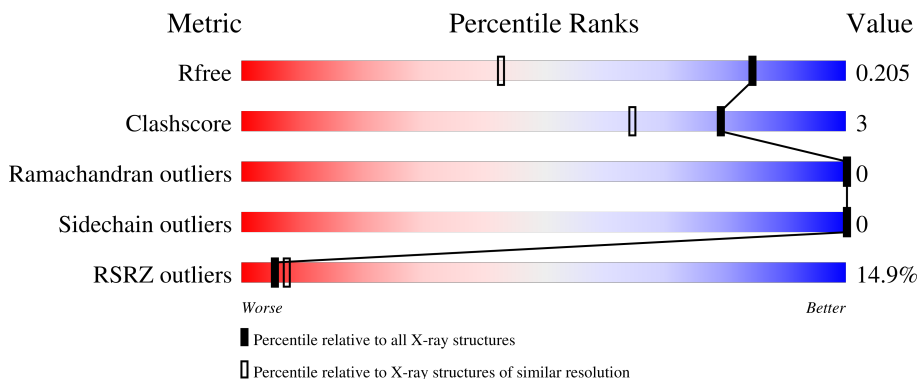
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.38 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}	180053	4403 (1.40-1.36)
Clashscore	190562	4528 (1.40-1.36)
Ramachandran outliers	187476	4459 (1.40-1.36)
Sidechain outliers	187428	4458 (1.40-1.36)
RSRZ outliers	180081	4399 (1.40-1.36)

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 $\leq 5\%$. 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	L	214	
2	H	233	
3	C	8	

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 4147 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 N123-VRC34_pI3 light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	L	214	1641	1030	275	330	6	0	0	0

- Molecule 2 is a protein called N123-VRC34_pI3 heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	H	228	1720	1087	288	336	9	0	0	0

- Molecule 3 is a protein called HIV fusion peptide.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	C	8	51	35	8	8	0	0	0

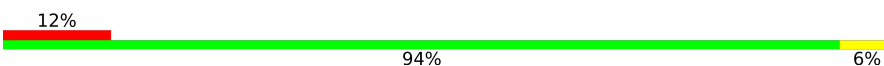
- Molecule 4 is water.

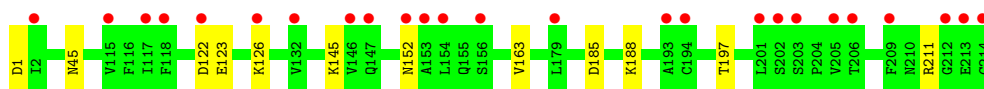
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	L	367	Total 367	O 367	0	0
4	H	357	Total 357	O 357	0	0
4	C	11	Total 11	O 11	0	0

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 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.

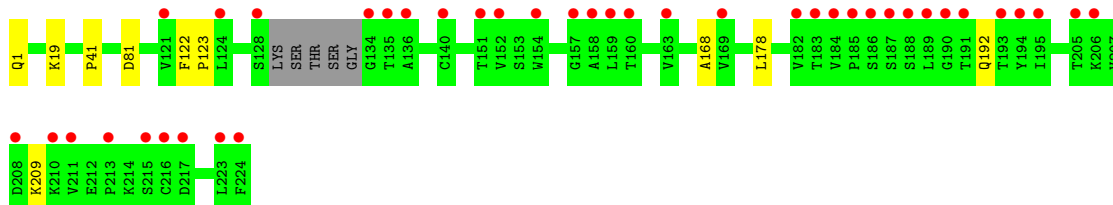
- Molecule 1: N123-VRC34_pI3 light chain

Chain L: 



- Molecule 2: N123-VRC34_pI3 heavy chain

Chain H: 



- Molecule 3: HIV fusion peptide

Chain C: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	42.81Å 80.73Å 69.82Å 90.00° 102.31° 90.00°	Depositor
Resolution (Å)	31.42 – 1.38 31.42 – 1.38	Depositor EDS
% Data completeness (in resolution range)	94.6 (31.42-1.38) 94.5 (31.42-1.38)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.85 (at 1.38Å)	Xtrriage
Refinement program	PHENIX 1.13_2998	Depositor
R, R_{free}	0.180 , 0.204 0.181 , 0.205	Depositor DCC
R_{free} test set	4485 reflections (4.74%)	wwPDB-VP
Wilson B-factor (Å ²)	15.1	Xtrriage
Anisotropy	0.338	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 38.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	4147	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.74% 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	L	0.21	0/1678	0.45	0/2279
2	H	0.17	0/1762	0.41	0/2400
3	C	0.21	0/51	0.46	0/68
All	All	0.19	0/3491	0.43	0/4747

There are no bond length outliers.

There are no bond angle outliers.

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	L	1641	0	1592	10	0
2	H	1720	0	1681	10	0
3	C	51	0	53	0	0
4	C	11	0	0	0	0
4	H	357	0	0	4	5
4	L	367	0	0	5	5
All	All	4147	0	3326	18	6

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 3.

All (18) 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:L:211:ARG:O	4:L:301:HOH:O	1.98	0.80
1:L:1:ASP:OD1	4:L:302:HOH:O	2.00	0.79
2:H:192:GLN:O	4:H:301:HOH:O	2.03	0.76
1:L:152:ASN:O	4:L:303:HOH:O	2.05	0.74
2:H:19:LYS:NZ	4:H:303:HOH:O	2.11	0.73
2:H:81:ASP:OD1	4:H:302:HOH:O	2.09	0.69
1:L:163:VAL:HG21	4:L:647:HOH:O	2.00	0.61
1:L:45:ASN:ND2	4:L:308:HOH:O	2.33	0.61
1:L:123:GLU:OE2	2:H:209:LYS:NZ	2.34	0.58
2:H:123:PRO:HD3	2:H:209:LYS:HE2	1.89	0.54
2:H:1:GLN:OE1	2:H:1:GLN:N	2.41	0.50
2:H:41:PRO:HG2	4:H:582:HOH:O	2.13	0.47
1:L:185:ASP:HA	1:L:188:LYS:HD3	1.97	0.46
2:H:168:ALA:HA	2:H:178:LEU:HB3	2.01	0.43
1:L:123:GLU:HG2	2:H:122:PHE:CE1	2.55	0.41
1:L:145:LYS:HB3	1:L:197:THR:HB	2.03	0.41
1:L:122:ASP:O	1:L:126:LYS:HG2	2.21	0.40
2:H:1:GLN:H1	2:H:1:GLN:CD	2.24	0.40

All (6) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:L:508:HOH:O	4:H:362:HOH:O[1_556]	1.85	0.35
4:H:405:HOH:O	4:H:531:HOH:O[1_454]	1.97	0.23
4:L:642:HOH:O	4:L:657:HOH:O[1_556]	2.01	0.19
4:L:640:HOH:O	4:H:604:HOH:O[1_554]	2.02	0.18
4:L:332:HOH:O	4:H:478:HOH:O[1_655]	2.05	0.15
4:L:365:HOH:O	4:H:536:HOH:O[2_645]	2.16	0.04

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	L	212/214 (99%)	206 (97%)	6 (3%)	0	100	100
2	H	224/233 (96%)	222 (99%)	2 (1%)	0	100	100
3	C	6/8 (75%)	4 (67%)	2 (33%)	0	100	100
All	All	442/455 (97%)	432 (98%)	10 (2%)	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	L	187/187 (100%)	187 (100%)	0	100	100
2	H	192/196 (98%)	192 (100%)	0	100	100
3	C	4/4 (100%)	4 (100%)	0	100	100
All	All	383/387 (99%)	383 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 oligosaccharides 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

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	L	214/214 (100%)	0.80	25 (11%) 9 11	10, 21, 37, 74	0
2	H	228/233 (97%)	0.83	40 (17%) 4 5	10, 21, 52, 63	0
3	C	8/8 (100%)	1.06	2 (25%) 2 2	14, 16, 24, 43	0
All	All	450/455 (98%)	0.82	67 (14%) 5 7	10, 21, 47, 74	0

All (67) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	H	216	CYS	4.1
2	H	224	PHE	4.0
3	C	519	PHE	3.9
2	H	189	LEU	3.9
2	H	205	THR	3.7
2	H	217	ASP	3.7
2	H	191	THR	3.6
1	L	202	SER	3.5
1	L	214	CYS	3.5
2	H	157	GLY	3.5
2	H	160	THR	3.4
1	L	154	LEU	3.4
2	H	195	ILE	3.4
2	H	185	PRO	3.4
1	L	212	GLY	3.3
2	H	159	LEU	3.2
1	L	194	CYS	3.1
2	H	134	GLY	3.0
2	H	193	THR	3.0
1	L	132	VAL	3.0
2	H	208	ASP	2.9
2	H	183	THR	2.9
2	H	223	LEU	2.9

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Mol	Chain	Res	Type	RSRZ
1	L	2	ILE	2.9
2	H	188	SER	2.8
2	H	194	TYR	2.8
2	H	186	SER	2.8
2	H	152	VAL	2.7
1	L	117	ILE	2.7
2	H	190	GLY	2.7
1	L	205	VAL	2.7
2	H	128	SER	2.7
2	H	215	SER	2.7
2	H	158	ALA	2.6
2	H	211	VAL	2.6
2	H	182	VAL	2.5
3	C	512	ALA	2.5
1	L	118	PHE	2.5
2	H	163	VAL	2.5
2	H	206	LYS	2.4
2	H	213	PRO	2.4
1	L	146	VAL	2.4
2	H	135	THR	2.4
2	H	187	SER	2.3
2	H	121	VAL	2.3
1	L	193	ALA	2.3
1	L	179	LEU	2.3
2	H	124	LEU	2.2
2	H	210	LYS	2.2
1	L	153	ALA	2.2
1	L	115	VAL	2.2
2	H	184	VAL	2.2
1	L	122	ASP	2.1
1	L	213	GLU	2.1
1	L	203	SER	2.1
1	L	152	ASN	2.1
1	L	206	THR	2.1
2	H	169	VAL	2.1
1	L	126	LYS	2.1
1	L	201	LEU	2.1
2	H	151	THR	2.1
1	L	147	GLN	2.1
1	L	209	PHE	2.1
2	H	136	ALA	2.1
1	L	156	SER	2.0

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Mol	Chain	Res	Type	RSRZ
2	H	140	CYS	2.0
2	H	154	TRP	2.0

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 oligosaccharides 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.