



wwPDB X-ray Structure Validation Summary Report ⓘ

May 29, 2020 – 11:34 am BST

PDB ID : 6VBP
Title : Crystal structure of anti-HIV-1 antibody DH815 bound to gp120 V2 peptide
Authors : Janus, B.M.; Ofek, G.
Deposited on : 2019-12-19
Resolution : 2.30 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 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 : 2.11
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) : 2.11

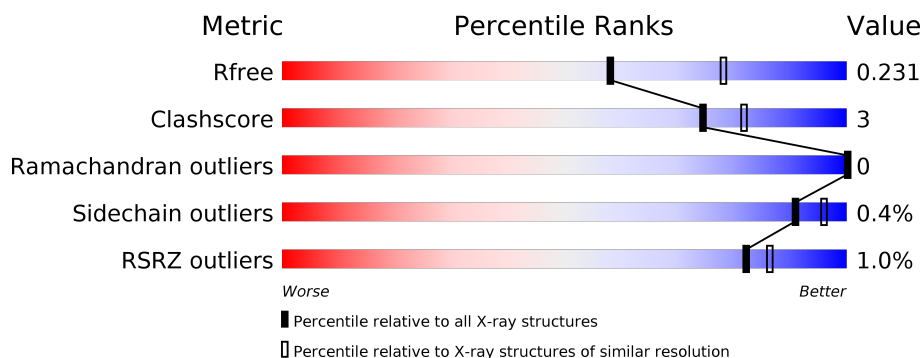
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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 on 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	B	220	<div> <div style="width: 95%;"></div> <div style="width: 5%;"></div> </div>
1	D	220	<div> <div style="width: 95%;"></div> <div style="width: 5%;"></div> </div>
1	I	220	<div> <div style="width: 93%;"></div> <div style="width: 6%;"></div> </div>
1	L	220	<div> <div style="width: 91%;"></div> <div style="width: 8%;"></div> </div>
2	A	223	<div> <div style="width: 89%;"></div> <div style="width: 6%;"></div> </div>
2	C	223	<div> <div style="width: 94%;"></div> <div style="width: 5%;"></div> </div>

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Mol	Chain	Length	Quality of chain
2	H	223	<div><div></div><div>89%</div><div>6%</div><div></div></div>
2	J	223	<div><div>3%</div><div></div><div>91%</div><div>5%</div><div></div></div>
3	E	22	<div><div>9%</div><div></div><div>59%</div><div></div><div>41%</div></div>
3	F	22	<div><div></div><div>59%</div><div>5%</div><div></div><div>36%</div></div>
3	G	22	<div><div></div><div>45%</div><div>18%</div><div></div><div>36%</div></div>
3	K	22	<div><div>9%</div><div></div><div>55%</div><div></div><div>45%</div></div>

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 27397 atoms, of which 13232 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 DH815 light chain.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	L	218	Total	C	H	N	O	S	0	0	0
			3298	1047	1623	284	339	5			
1	B	219	Total	C	H	N	O	S	0	0	0
			3313	1051	1631	285	341	5			
1	D	219	Total	C	H	N	O	S	0	0	0
			3320	1053	1634	285	343	5			
1	I	219	Total	C	H	N	O	S	0	0	0
			3320	1053	1634	285	343	5			

- Molecule 2 is a protein called DH815 heavy chain.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	H	214	Total	C	H	N	O	S	0	0	0
			3177	1024	1564	271	313	5			
2	A	213	Total	C	H	N	O	S	0	0	0
			3176	1023	1567	270	311	5			
2	C	221	Total	C	H	N	O	S	0	0	0
			3296	1055	1630	280	325	6			
2	J	214	Total	C	H	N	O	S	0	0	0
			3149	1021	1541	270	312	5			

- Molecule 3 is a protein called Envelope glycoprotein gp160.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	F	14	Total	C	H	N	O	0	0	0
			231	79	118	17	17			
3	E	13	Total	C	H	N	O	0	0	0
			190	68	90	16	16			
3	G	14	Total	C	H	N	O	0	0	0
			230	79	117	17	17			
3	K	12	Total	C	H	N	O	0	0	0
			173	62	83	13	15			

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	C	1	Total Cl 1 1	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	L	75	Total O 75 75	0	0
5	H	56	Total O 56 56	0	0
5	B	63	Total O 63 63	0	0
5	A	54	Total O 54 54	0	0
5	D	88	Total O 88 88	0	0
5	C	70	Total O 70 70	0	0
5	F	3	Total O 3 3	0	0
5	E	4	Total O 4 4	0	0
5	I	82	Total O 82 82	0	0
5	J	28	Total O 28 28	0	0

3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: DH815 light chain

Chain L: 



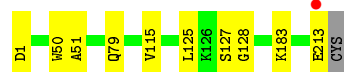
- Molecule 1: DH815 light chain

Chain B: 

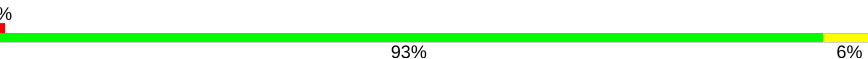


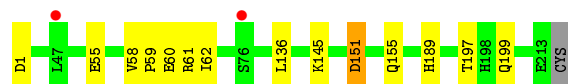
- Molecule 1: DH815 light chain

Chain D: 



- Molecule 1: DH815 light chain

Chain I: 

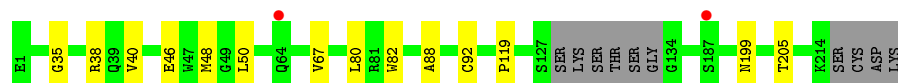
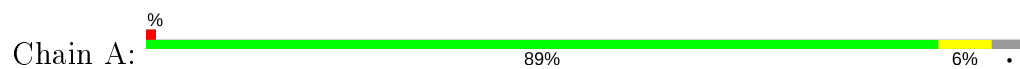


- Molecule 2: DH815 heavy chain

Chain H: 



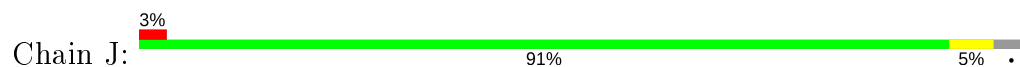
- Molecule 2: DH815 heavy chain



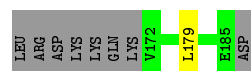
- Molecule 2: DH815 heavy chain



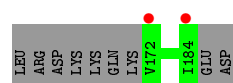
- Molecule 2: DH815 heavy chain



- Molecule 3: Envelope glycoprotein gp160



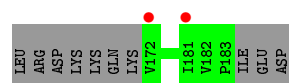
- Molecule 3: Envelope glycoprotein gp160



- Molecule 3: Envelope glycoprotein gp160



- Molecule 3: Envelope glycoprotein gp160



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	69.90Å 158.53Å 92.65Å 90.00° 110.27° 90.00°	Depositor
Resolution (Å)	45.15 – 2.30 45.15 – 2.30	Depositor EDS
% Data completeness (in resolution range)	96.0 (45.15-2.30) 91.9 (45.15-2.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.37 (at 2.29Å)	Xtriage
Refinement program	PHENIX 1.14_3228	Depositor
R, R_{free}	0.180 , 0.229 0.183 , 0.231	Depositor DCC
R_{free} test set	1984 reflections (2.46%)	wwPDB-VP
Wilson B-factor (Å ²)	37.5	Xtriage
Anisotropy	0.118	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 40.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	0.033 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	27397	wwPDB-VP
Average B, all atoms (Å ²)	54.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.41% 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](#)

Bond lengths and bond angles in the following residue types are not validated in this section:
CL

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	B	0.28	0/1718	0.47	0/2333
1	D	0.29	0/1722	0.49	0/2338
1	I	0.32	0/1722	0.52	1/2338 (0.0%)
1	L	0.29	0/1711	0.48	0/2323
2	A	0.30	0/1653	0.51	0/2258
2	C	0.30	0/1711	0.51	0/2336
2	H	0.39	0/1657	0.58	0/2264
2	J	0.28	0/1652	0.49	0/2259
3	E	0.33	0/103	0.46	0/140
3	F	0.37	0/116	0.62	0/158
3	G	0.65	0/116	0.86	0/158
3	K	0.46	0/92	0.81	0/125
All	All	0.31	0/13973	0.51	1/19030 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	I	151	ASP	CB-CG-OD2	5.19	122.97	118.30

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	B	1682	1631	1630	13	2
1	D	1686	1634	1634	7	1
1	I	1686	1634	1634	10	2
1	L	1675	1623	1623	14	0
2	A	1609	1567	1566	8	0
2	C	1666	1630	1630	10	0
2	H	1613	1564	1564	13	1
2	J	1608	1541	1547	6	0
3	E	100	90	90	0	0
3	F	113	118	117	1	0
3	G	113	117	117	4	0
3	K	90	83	83	0	0
4	C	1	0	0	1	0
5	A	54	0	0	0	0
5	B	63	0	0	3	2
5	C	70	0	0	8	0
5	D	88	0	0	6	0
5	E	4	0	0	0	0
5	F	3	0	0	0	0
5	H	56	0	0	6	0
5	I	82	0	0	4	1
5	J	28	0	0	0	0
5	L	75	0	0	7	1
All	All	14165	13232	13235	85	5

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.

The worst 5 of 85 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)
4:C:301:CL:CL	5:C:420:HOH:O	1.97	1.16
2:H:92:CYS:SG	5:H:350:HOH:O	2.09	1.10
1:B:27(D):HIS:NE2	1:B:92:TYR:CE1	2.21	1.08
1:L:1:ASP:N	5:L:301:HOH:O	1.89	0.99
1:B:27(D):HIS:CE1	1:B:92:TYR:CD1	2.54	0.95

All (5) 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)
5:L:369:HOH:O	5:B:363:HOH:O[2_454]	1.99	0.21
1:B:27(F):SER:HA	1:I:60:GLU:OE2[2_344]	1.47	0.13
5:B:362:HOH:O	5:I:381:HOH:O[2_444]	2.08	0.12
2:H:82(A):SER:OG	1:D:127:SER:O[1_554]	2.10	0.10
1:B:27(F):SER:CA	1:I:60:GLU:OE2[2_344]	2.15	0.05

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	B	217/220 (99%)	210 (97%)	7 (3%)	0	100	100
1	D	217/220 (99%)	213 (98%)	4 (2%)	0	100	100
1	I	217/220 (99%)	209 (96%)	8 (4%)	0	100	100
1	L	216/220 (98%)	211 (98%)	5 (2%)	0	100	100
2	A	209/223 (94%)	206 (99%)	3 (1%)	0	100	100
2	C	219/223 (98%)	217 (99%)	2 (1%)	0	100	100
2	H	210/223 (94%)	207 (99%)	3 (1%)	0	100	100
2	J	210/223 (94%)	206 (98%)	4 (2%)	0	100	100
3	E	11/22 (50%)	11 (100%)	0	0	100	100
3	F	12/22 (54%)	12 (100%)	0	0	100	100
3	G	12/22 (54%)	10 (83%)	2 (17%)	0	100	100
3	K	10/22 (46%)	9 (90%)	1 (10%)	0	100	100
All	All	1760/1860 (95%)	1721 (98%)	39 (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	B	191/193 (99%)	191 (100%)	0	100	100
1	D	192/193 (100%)	191 (100%)	1 (0%)	88	95
1	I	192/193 (100%)	191 (100%)	1 (0%)	88	95
1	L	190/193 (98%)	189 (100%)	1 (0%)	88	95
2	A	179/191 (94%)	178 (99%)	1 (1%)	86	94
2	C	188/191 (98%)	188 (100%)	0	100	100
2	H	179/191 (94%)	177 (99%)	2 (1%)	73	86
2	J	177/191 (93%)	177 (100%)	0	100	100
3	E	9/21 (43%)	9 (100%)	0	100	100
3	F	12/21 (57%)	12 (100%)	0	100	100
3	G	12/21 (57%)	12 (100%)	0	100	100
3	K	8/21 (38%)	8 (100%)	0	100	100
All	All	1529/1620 (94%)	1523 (100%)	6 (0%)	91	96

5 of 6 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	H	105	ARG
1	I	1	ASP
2	A	199	ASN
2	H	22	CYS
1	D	1	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	I	199	GLN

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 carbohydrates in this entry.

5.6 Ligand geometry ⓘ

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	B	219/220 (99%)	-0.05	2 (0%) 84 88	28, 43, 75, 118	0
1	D	219/220 (99%)	-0.06	1 (0%) 91 94	25, 39, 69, 102	0
1	I	219/220 (99%)	-0.05	2 (0%) 84 88	26, 43, 72, 97	0
1	L	218/220 (99%)	-0.06	0 100 100	26, 44, 75, 82	0
2	A	213/223 (95%)	0.08	2 (0%) 84 88	30, 48, 81, 103	0
2	C	221/223 (99%)	-0.02	1 (0%) 91 94	28, 44, 71, 104	0
2	H	214/223 (95%)	0.01	0 100 100	29, 48, 73, 97	0
2	J	214/223 (95%)	0.18	6 (2%) 53 60	34, 58, 87, 110	0
3	E	13/22 (59%)	0.59	2 (15%) 2 3	35, 47, 73, 76	0
3	F	14/22 (63%)	0.24	0 100 100	43, 54, 89, 89	0
3	G	14/22 (63%)	0.22	0 100 100	37, 53, 81, 86	0
3	K	12/22 (54%)	1.07	2 (16%) 1 2	53, 72, 92, 95	0
All	All	1790/1860 (96%)	0.02	18 (1%) 82 86	25, 47, 79, 118	0

The worst 5 of 18 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	J	128	SER	3.4
3	E	184	ILE	3.2
2	A	64	GLN	2.8
1	I	47	LEU	2.8
1	B	27(D)	HIS	2.7

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 carbohydrates in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	CL	C	301	1/1	0.98	0.12	59,59,59,59	0

6.5 Other polymers [i](#)

There are no such residues in this entry.