



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 17, 2024 – 03:42 AM EDT

PDB ID : 3P30  
Title : crystal structure of the cluster II Fab 1281 in complex with HIV-1 gp41 ectodomain  
Authors : Frey, G.; Chen, J.; Rits-Volloch, S.; Freeman, M.M.; Zolla-Pazner, S.; Chen, B.  
Deposited on : 2010-10-04  
Resolution : 3.30 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](mailto: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>.

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

MolProbity : 4.02b-467  
Xtriage (Phenix) : 1.20.1  
EDS : 2.37.1  
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) : 2.37.1

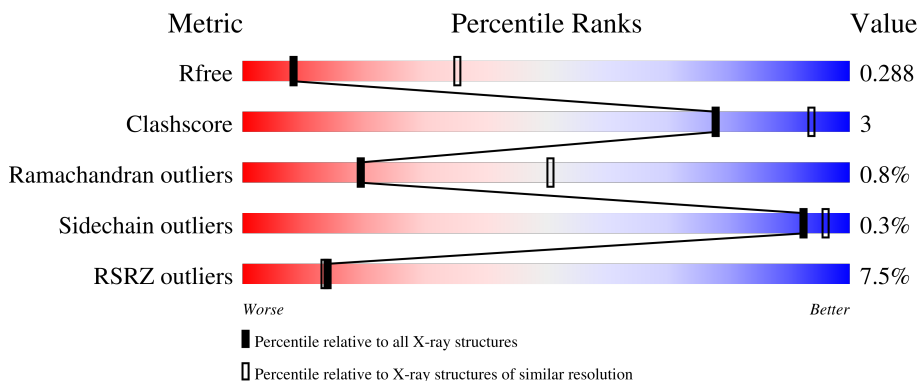
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.30 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	1149 (3.34-3.26)
Clashscore	141614	1205 (3.34-3.26)
Ramachandran outliers	138981	1183 (3.34-3.26)
Sidechain outliers	138945	1182 (3.34-3.26)
RSRZ outliers	127900	1115 (3.34-3.26)

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  $\geq 3$ , 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	A	96	 86% <span style="float: right;">12%</span>
2	L	213	 88% <span style="float: right;">11%</span>
3	H	226	 92% <span style="float: right;">7%</span>

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 3770 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 HIV-1 gp41.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
1	A	84	659	422	111	126	0	0	0

- Molecule 2 is a protein called 1281 Fab light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	L	211	1495	942	242	307	4	0	0	0

- Molecule 3 is a protein called 1281 Fab heavy chain.

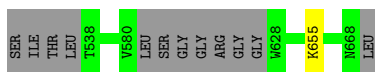
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	H	226	1616	1015	273	323	5	0	0	0

### 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 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.

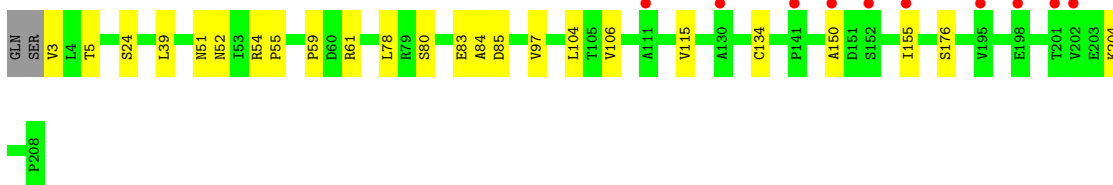
- Molecule 1: HIV-1 gp41

Chain A:  86% 12%

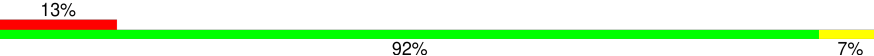


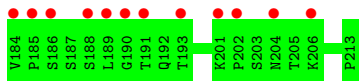
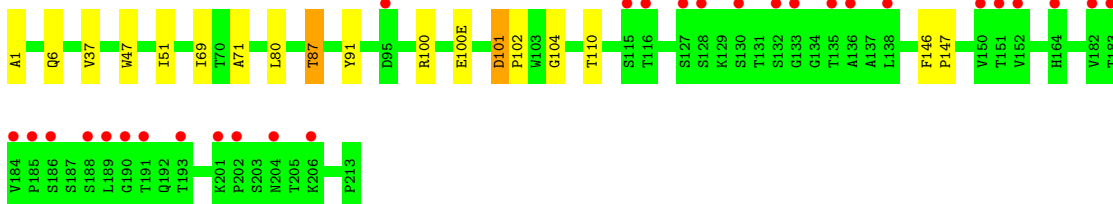
- Molecule 2: 1281 Fab light chain

Chain L:  5% 88% 11%



- Molecule 3: 1281 Fab heavy chain

Chain H:  13% 92% 7%



## 4 Data and refinement statistics

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	115.83Å 115.83Å 119.54Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	33.44 – 3.30 32.83 – 2.80	Depositor EDS
% Data completeness (in resolution range)	99.5 (33.44-3.30) 86.5 (32.83-2.80)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.05 (at 2.81Å)	Xtrriage
Refinement program	REFMAC 5.5.0109	Depositor
R, $R_{free}$	0.261 , 0.289 0.257 , 0.288	Depositor DCC
$R_{free}$ test set	652 reflections (5.14%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	90.5	Xtrriage
Anisotropy	0.015	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.25 , 51.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.035 for h,-h-k,-l	Xtrriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	3770	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	130.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.25% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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	0.26	0/669	0.38	0/912
2	L	0.29	0/1535	0.43	0/2114
3	H	0.30	0/1656	0.45	0/2273
All	All	0.29	0/3860	0.43	0/5299

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	A	659	0	619	1	0
2	L	1495	0	1379	12	0
3	H	1616	0	1516	9	0
All	All	3770	0	3514	21	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 3.

All (21) 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)
3:H:101:ASP:HB3	3:H:102:PRO:HD3	1.72	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:L:78:LEU:HD11	2:L:104:LEU:HD21	1.79	0.64
2:L:80:SER:HA	2:L:106:VAL:HG21	1.85	0.57
1:A:655:LYS:HG3	3:H:1:ALA:HB2	1.86	0.57
3:H:69:ILE:HG22	3:H:80:LEU:HA	1.90	0.54
3:H:6:GLN:HE22	3:H:91:TYR:HA	1.72	0.53
2:L:59:PRO:HB2	2:L:61:ARG:HG2	1.94	0.50
3:H:87:THR:HG23	3:H:110:THR:HA	1.94	0.50
3:H:6:GLN:HE21	3:H:104:GLY:HA3	1.78	0.49
2:L:115:VAL:HB	2:L:204:LYS:HD3	1.94	0.49
2:L:5:THR:HB	2:L:24:SER:HB2	1.95	0.48
2:L:39:LEU:HD23	2:L:84:ALA:HB2	2.00	0.44
2:L:83:GLU:HB2	2:L:106:VAL:HG23	1.99	0.44
2:L:51:ASN:O	2:L:52:ASN:HB3	2.19	0.43
2:L:54:ARG:HA	2:L:55:PRO:HD3	1.92	0.43
2:L:134:CYS:HB3	2:L:176:SER:HB3	2.00	0.43
3:H:51:ILE:HD12	3:H:71:ALA:HB2	2.02	0.42
2:L:150:ALA:HB2	2:L:155:ILE:HD11	2.02	0.42
3:H:146:PHE:HA	3:H:147:PRO:HA	1.83	0.41
3:H:37:VAL:HG22	3:H:47:TRP:HA	2.03	0.41
2:L:3:VAL:HB	2:L:97:VAL:HG11	2.03	0.41

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	80/96 (83%)	79 (99%)	1 (1%)	0	100	100
2	L	209/213 (98%)	193 (92%)	16 (8%)	0	100	100
3	H	224/226 (99%)	205 (92%)	15 (7%)	4 (2%)	8	35
All	All	513/535 (96%)	477 (93%)	32 (6%)	4 (1%)	19	51

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	H	100	ARG
3	H	100(E)	GLU
3	H	87	THR
3	H	101	ASP

### 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	66/86 (77%)	66 (100%)	0	100	100
2	L	158/179 (88%)	157 (99%)	1 (1%)	86	91
3	H	171/188 (91%)	171 (100%)	0	100	100
All	All	395/453 (87%)	394 (100%)	1 (0%)	92	96

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	L	85	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
2	L	52	ASN
3	H	6	GLN
3	H	164	HIS

### 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

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	84/96 (87%)	-0.30	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	55, 75, 123, 138	0
2	L	211/213 (99%)	-0.08	10 (4%) <span style="border: 1px solid red; padding: 2px;">31</span> <span style="border: 1px solid red; padding: 2px;">29</span>	61, 122, 227, 268	0
3	H	226/226 (100%)	0.43	29 (12%) <span style="border: 1px solid red; padding: 2px;">3</span> <span style="border: 1px solid red; padding: 2px;">3</span>	63, 139, 286, 354	0
All	All	521/535 (97%)	0.11	39 (7%) <span style="border: 1px solid red; padding: 2px;">14</span> <span style="border: 1px solid red; padding: 2px;">13</span>	55, 113, 254, 354	0

All (39) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	H	184	VAL	7.4
3	H	127	SER	6.9
3	H	202	PRO	6.8
3	H	132	SER	6.3
3	H	204	ASN	5.0
3	H	185	PRO	4.7
2	L	198	GLU	4.1
3	H	190	GLY	3.6
2	L	152	SER	3.5
3	H	133	GLY	3.4
3	H	191	THR	3.3
2	L	111	ALA	3.2
2	L	195	VAL	3.2
3	H	115	SER	3.1
3	H	206	LYS	2.9
2	L	202	VAL	2.9
3	H	130	SER	2.9
3	H	193	THR	2.9
3	H	150	VAL	2.8
3	H	183	THR	2.8
3	H	116	THR	2.7
3	H	188	SER	2.7
3	H	182	VAL	2.7

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Mol	Chain	Res	Type	RSRZ
3	H	189	LEU	2.6
3	H	135	THR	2.5
2	L	141	PRO	2.5
3	H	201	LYS	2.4
3	H	128	SER	2.4
2	L	155	ILE	2.3
2	L	130	ALA	2.2
3	H	151	THR	2.2
3	H	186	SER	2.2
3	H	95	ASP	2.2
3	H	152	VAL	2.2
2	L	150	ALA	2.1
3	H	138	LEU	2.1
2	L	201	THR	2.1
3	H	164	HIS	2.0
3	H	136	ALA	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 monosaccharides 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.