



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 17, 2020 – 06:36 AM EST

PDB ID : 6V4R  
Title : Crystal structure of a chimeric MR78-like antibody chimera-1 Fab  
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Deposited on : 2019-11-28  
Resolution : 3.48 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.

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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)	:	1.13
EDS	:	2.14.6
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)	:	2.14.6

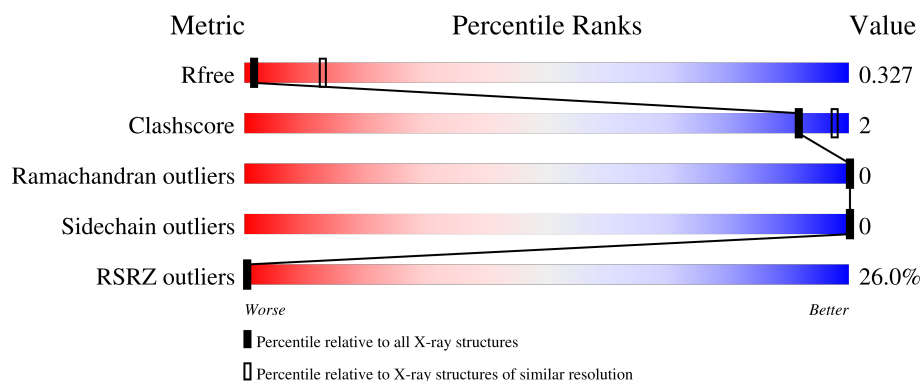
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.48 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	1379 (3.56-3.40)
Clashscore	141614	1461 (3.56-3.40)
Ramachandran outliers	138981	1424 (3.56-3.40)
Sidechain outliers	138945	1425 (3.56-3.40)
RSRZ outliers	127900	1289 (3.56-3.40)

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  $\geq 3$ , 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	H	228	<div> <div>29%</div> <div>91%</div> <div>5%</div> </div>
2	L	214	<div> <div>22%</div> <div>94%</div> </div>

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 3259 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 Chimera-1 Fab heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	H	220	Total	C	N	O	S	0	0	0
			1637	1044	261	327	5			

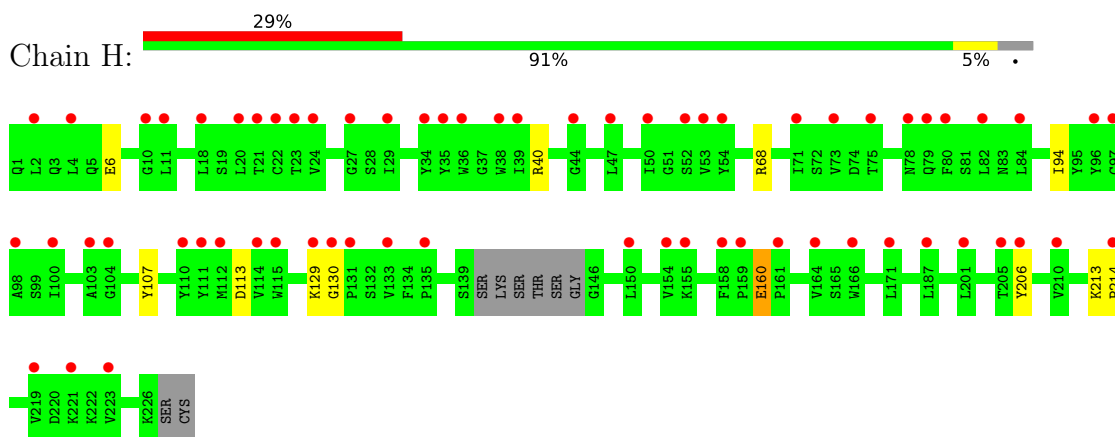
- Molecule 2 is a protein called Chimera-1 Fab light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	L	210	Total	C	N	O	S	0	0	0
			1622	1017	270	330	5			

### 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: Chimera-1 Fab heavy chain



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	133.78Å 133.78Å 91.91Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	57.93 – 3.48 57.93 – 3.48	Depositor EDS
% Data completeness (in resolution range)	99.0 (57.93-3.48) 99.0 (57.93-3.48)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.82 (at 3.49Å)	Xtriage
Refinement program	REFMAC 5.8.0238, PHENIX Rosetta-Phenix	Depositor
R, $R_{free}$	0.295 , 0.327 0.306 , 0.327	Depositor DCC
$R_{free}$ test set	524 reflections (4.23%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	159.9	Xtriage
Anisotropy	0.093	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 175.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.43$ , $\langle L^2 \rangle = 0.25$	Xtriage
Estimated twinning fraction	0.094 for -h,-k,l	Xtriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	3259	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	189.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.39% 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	H	0.79	2/1681 (0.1%)	0.91	5/2297 (0.2%)
2	L	0.88	2/1657 (0.1%)	0.85	1/2251 (0.0%)
All	All	0.84	4/3338 (0.1%)	0.88	6/4548 (0.1%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	H	107	TYR	CB-CG	-5.50	1.43	1.51
2	L	88	CYS	CB-SG	-5.08	1.73	1.81
2	L	92	GLU	CG-CD	5.08	1.59	1.51
1	H	6	GLU	CD-OE1	-5.00	1.20	1.25

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	H	68	ARG	NE-CZ-NH2	-8.76	115.92	120.30
1	H	68	ARG	NE-CZ-NH1	6.80	123.70	120.30
1	H	206	TYR	CB-CG-CD1	-6.19	117.29	121.00
2	L	211	ARG	NE-CZ-NH2	-5.55	117.53	120.30
1	H	40	ARG	NE-CZ-NH2	-5.49	117.55	120.30
1	H	160	GLU	N-CA-C	5.24	125.14	111.00

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	H	1637	0	1595	8	0
2	L	1622	0	1574	3	0
All	All	3259	0	3169	10	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 2.

All (10) 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:H:160:GLU:O	1:H:160:GLU:HG3	1.61	0.96
1:H:160:GLU:O	1:H:160:GLU:CG	2.14	0.95
1:H:160:GLU:O	1:H:160:GLU:OE2	2.18	0.60
2:L:39:LYS:NZ	2:L:81:GLU:O	2.40	0.55
1:H:160:GLU:O	1:H:160:GLU:CD	2.46	0.53
1:H:213:LYS:HB3	1:H:214:PRO:HD3	1.94	0.48
1:H:94:ILE:HD12	1:H:94:ILE:N	2.33	0.43
1:H:113:ASP:OD1	2:L:55:LYS:NZ	2.48	0.42
2:L:186:TYR:O	2:L:192:TYR:OH	2.37	0.41
1:H:129:LYS:NZ	1:H:130:GLY:O	2.46	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	H	216/228 (95%)	210 (97%)	6 (3%)	0	100	100
2	L	208/214 (97%)	203 (98%)	5 (2%)	0	100	100
All	All	424/442 (96%)	413 (97%)	11 (3%)	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	H	185/192 (96%)	185 (100%)	0	100	100
2	L	187/191 (98%)	187 (100%)	0	100	100
All	All	372/383 (97%)	372 (100%)	0	100	100

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

Some 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 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 ⓘ

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	H	220/228 (96%)	1.44	65 (29%) <b>0</b> <b>0</b>	137, 194, 234, 243	0
2	L	210/214 (98%)	1.17	47 (22%) <b>0</b> <b>0</b>	138, 183, 213, 227	0
All	All	430/442 (97%)	1.30	112 (26%) <b>0</b> <b>0</b>	137, 188, 224, 243	0

All (112) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	206	TYR	7.9
1	H	29	ILE	7.6
1	H	36	TRP	5.7
1	H	201	LEU	5.4
1	H	223	VAL	5.3
2	L	35	TRP	5.1
1	H	214	PRO	5.1
1	H	24	VAL	5.1
2	L	209	PHE	4.8
1	H	20	LEU	4.5
2	L	90	GLN	4.5
1	H	80	PHE	4.4
1	H	75	THR	4.3
1	H	38	TRP	4.2
1	H	79	GLN	4.2
1	H	131	PRO	4.2
1	H	158	PHE	4.1
1	H	166	TRP	4.1
2	L	4	MET	4.1
1	H	22	CYS	4.1
1	H	82	LEU	4.1
1	H	11	LEU	4.1
1	H	219	VAL	4.0
1	H	115	TRP	4.0

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Mol	Chain	Res	Type	RSRZ
1	H	53	VAL	3.9
1	H	103	ALA	3.9
1	H	27	GLY	3.9
2	L	200	GLY	3.8
1	H	4	LEU	3.7
2	L	196	VAL	3.7
1	H	97	CYS	3.6
2	L	46	LEU	3.6
2	L	62	PHE	3.6
2	L	96	PHE	3.6
1	H	150	LEU	3.5
2	L	186	TYR	3.5
2	L	149	LYS	3.5
2	L	23	CYS	3.5
1	H	54	TYR	3.5
2	L	47	LEU	3.4
2	L	192	TYR	3.4
1	H	47	LEU	3.4
2	L	87	TYR	3.4
2	L	73	PHE	3.3
1	H	133	VAL	3.3
1	H	104	GLY	3.3
2	L	36	TYR	3.2
2	L	69	THR	3.2
1	H	35	TYR	3.2
2	L	98	PHE	3.1
2	L	135	LEU	3.1
2	L	144	ALA	3.1
1	H	44	GLY	3.1
1	H	210	VAL	3.1
1	H	2	LEU	3.1
2	L	33	LEU	3.0
2	L	71	PHE	3.0
1	H	112	MET	3.0
2	L	111	ALA	3.0
1	H	98	ALA	3.0
1	H	10	GLY	3.0
1	H	221	LYS	3.0
1	H	130	GLY	3.0
1	H	18	LEU	3.0
2	L	110	VAL	2.9
1	H	73	VAL	2.9

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Mol	Chain	Res	Type	RSRZ
2	L	120	PRO	2.9
1	H	111	TYR	2.8
2	L	115	VAL	2.8
2	L	48	ILE	2.8
2	L	106	ILE	2.8
1	H	78	ASN	2.8
1	H	110	TYR	2.7
1	H	187	LEU	2.7
2	L	132	VAL	2.7
1	H	71	ILE	2.7
2	L	118	PHE	2.7
1	H	114	VAL	2.7
2	L	104	VAL	2.6
2	L	194	CYS	2.6
1	H	164	VAL	2.5
2	L	146	VAL	2.5
2	L	91	TYR	2.5
1	H	205	THR	2.4
2	L	193	ALA	2.4
1	H	84	LEU	2.4
1	H	50	ILE	2.4
1	H	129	LYS	2.3
2	L	11	LEU	2.3
2	L	108	ARG	2.3
1	H	34	TYR	2.3
1	H	52	SER	2.3
2	L	44	PRO	2.3
1	H	39	ILE	2.2
2	L	181	LEU	2.2
1	H	23	THR	2.2
1	H	100	ILE	2.2
1	H	135	PRO	2.2
2	L	21	ILE	2.2
2	L	133	VAL	2.1
1	H	96	TYR	2.1
2	L	94	LEU	2.1
1	H	155	LYS	2.1
1	H	21	THR	2.1
2	L	119	PRO	2.1
1	H	171	LEU	2.1
1	H	159	PRO	2.0
1	H	154	VAL	2.0

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Mol	Chain	Res	Type	RSRZ
2	L	29	ILE	2.0
2	L	72	THR	2.0
1	H	161	PRO	2.0
2	L	51	THR	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.