



# wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 9, 2026 – 10:46 PM UTC

PDB ID : 6UTA / pdb\_00006uta  
Title : Crystal structure of Z004 iGL Fab in complex with ZIKV EDIII  
Authors : Esswein, S.R.; Gristick, H.B.; Keeffe, J.R.; Bjorkman, P.J.  
Deposited on : 2019-10-29  
Resolution : 3.10 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](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>.

---

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

MolProbity : 4-5-2 with Phenix2.0  
Xtrriage (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

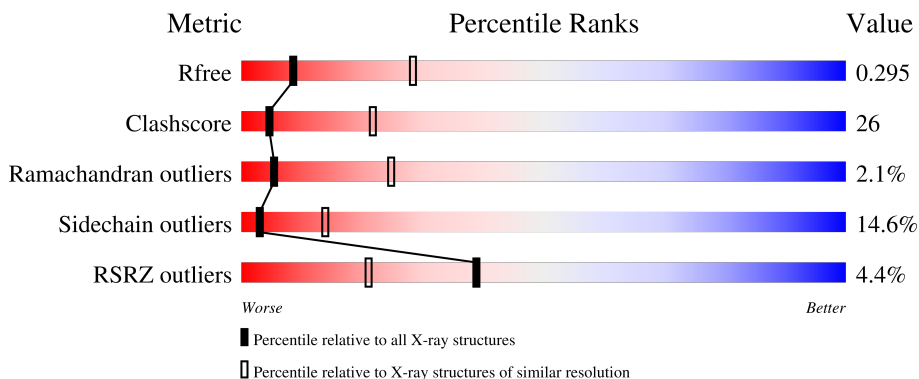
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.10 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.



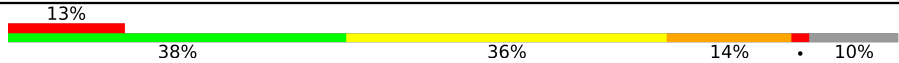
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	180053	1456 (3.10-3.10)
Clashscore	190562	1539 (3.10-3.10)
Ramachandran outliers	187476	1467 (3.10-3.10)
Sidechain outliers	187428	1467 (3.10-3.10)
RSRZ outliers	180081	1456 (3.10-3.10)

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	234	
1	H	234	
2	B	214	
2	L	214	
3	C	110	

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Length	Quality of chain
3	E	110	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into five segments: a red segment (13%), a green segment (38%), a yellow segment (36%), an orange segment (14%), and a grey segment (10%).</p>

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 8038 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 Z004 iGL Fab heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	H	221	Total 1636	C 1029	N 278	O 323	S 6	0	0	0
1	A	218	Total 1622	C 1022	N 275	O 319	S 6	0	0	0

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
H	221	HIS	-	expression tag	UNP S6C4S0
H	222	HIS	-	expression tag	UNP S6C4S0
H	223	HIS	-	expression tag	UNP S6C4S0
H	224	HIS	-	expression tag	UNP S6C4S0
H	225	HIS	-	expression tag	UNP S6C4S0
A	221	HIS	-	expression tag	UNP S6C4S0
A	222	HIS	-	expression tag	UNP S6C4S0
A	223	HIS	-	expression tag	UNP S6C4S0
A	224	HIS	-	expression tag	UNP S6C4S0
A	225	HIS	-	expression tag	UNP S6C4S0

- Molecule 2 is a protein called Z004 iGL Fab light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	L	212	Total 1638	C 1029	N 273	O 331	S 5	0	0	0
2	B	212	Total 1638	C 1029	N 273	O 331	S 5	0	0	0

- Molecule 3 is a protein called Env.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	E	99	Total 751	C 477	N 124	O 144	S 6	0	0	0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	99	753	479	124	144	6	0	0	0

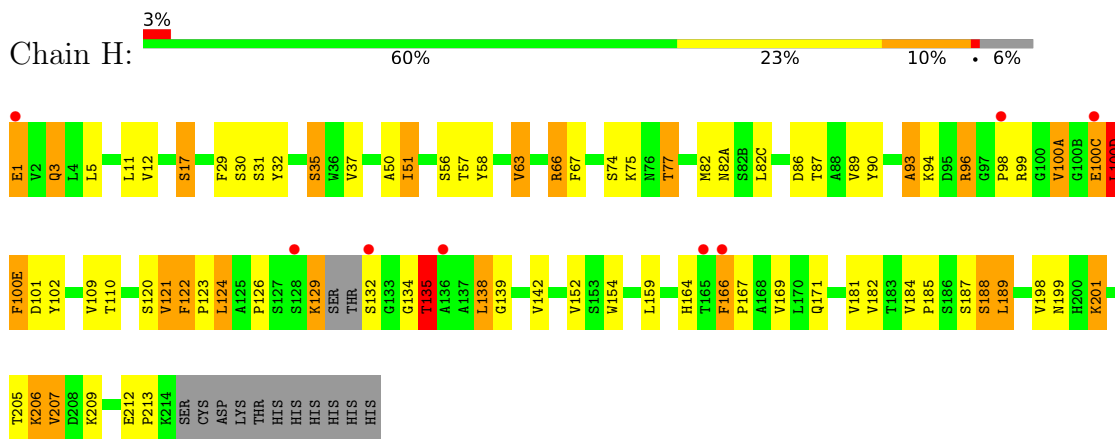
There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	298	MET	-	initiating methionine	UNP A0A1X9PPI0
C	298	MET	-	initiating methionine	UNP A0A1X9PPI0

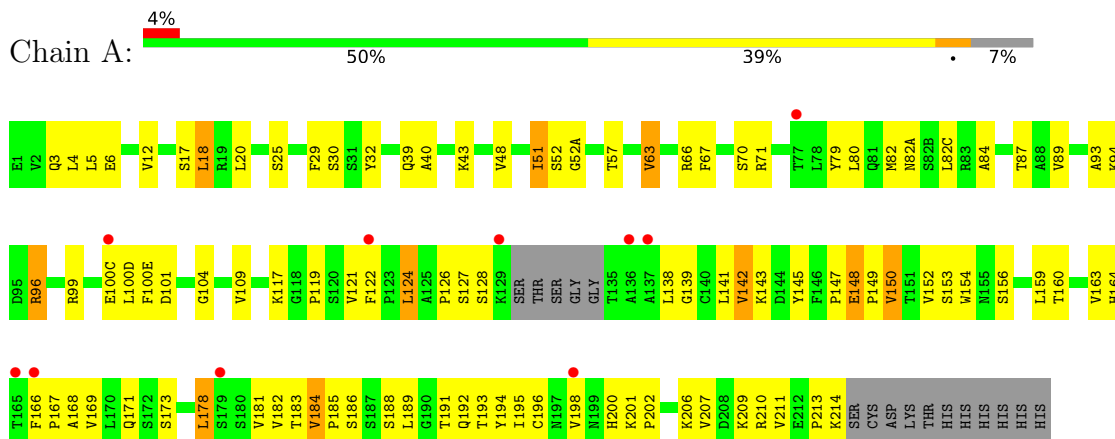
### 3 Residue-property plots [i](#)

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.

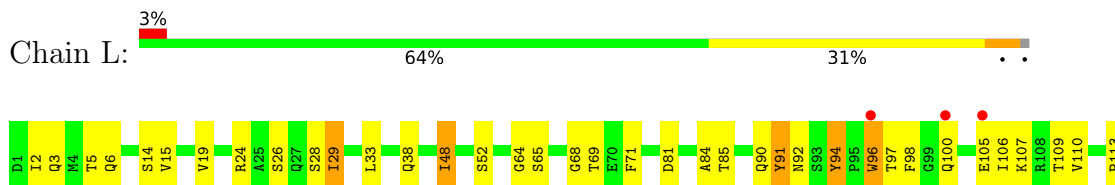
- Molecule 1: Z004 iGL Fab heavy chain

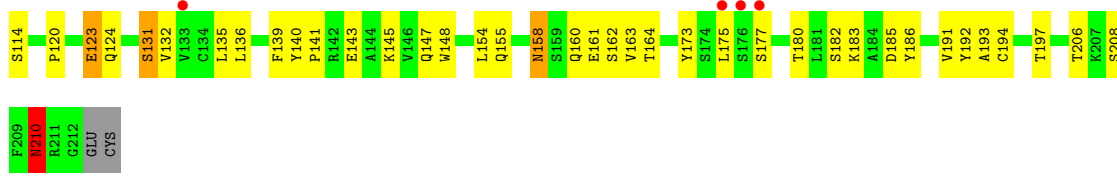


- Molecule 1: Z004 iGL Fab heavy chain

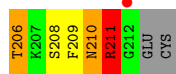
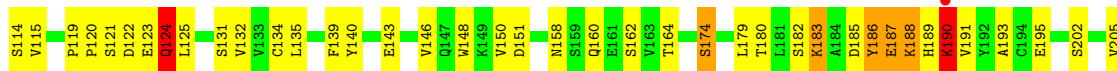
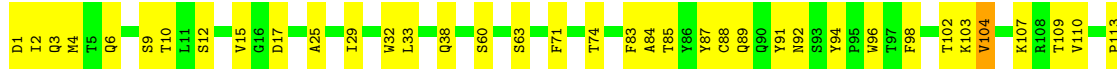


- Molecule 2: Z004 iGL Fab light chain

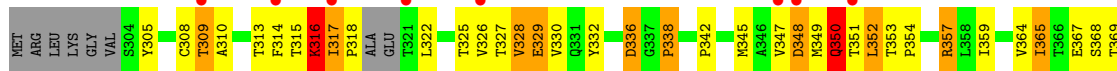




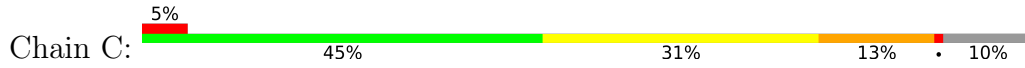
• Molecule 2: Z004 iGL Fab light chain



• Molecule 3: Env



• Molecule 3: Env



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	85.91Å 85.91Å 327.46Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	38.42 – 3.10 38.42 – 3.10	Depositor EDS
% Data completeness (in resolution range)	93.7 (38.42-3.10) 93.6 (38.42-3.10)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.56 (at 3.12Å)	Xtrriage
Refinement program	PHENIX 1.16_3549	Depositor
R, $R_{free}$	0.274 , 0.291 0.277 , 0.295	Depositor DCC
$R_{free}$ test set	1085 reflections (4.65%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	67.7	Xtrriage
Anisotropy	0.167	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.31 , 24.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.85	EDS
Total number of atoms	8038	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	62.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.90% 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	0.91	1/1659 (0.1%)	1.05	5/2255 (0.2%)
1	H	1.00	5/1673 (0.3%)	1.09	11/2273 (0.5%)
2	B	0.79	1/1676 (0.1%)	0.93	6/2277 (0.3%)
2	L	0.90	3/1676 (0.2%)	0.95	5/2277 (0.2%)
3	C	0.91	1/770 (0.1%)	1.21	5/1049 (0.5%)
3	E	1.10	1/768 (0.1%)	1.31	7/1046 (0.7%)
All	All	0.92	12/8222 (0.1%)	1.06	39/11177 (0.3%)

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	380	PRO	C-O	-9.77	1.16	1.24
2	L	48	ILE	C-O	-8.61	1.15	1.23
3	E	380	PRO	C-O	-8.25	1.15	1.24
1	H	123	PRO	C-O	-7.34	1.15	1.23
2	L	91	TYR	C-O	-5.63	1.15	1.23

The worst 5 of 39 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	H	123	PRO	CB-CA-C	-7.03	101.74	110.95
2	L	186	TYR	N-CA-C	6.73	118.62	111.28
3	E	348	ASP	CA-C-N	6.37	133.70	121.54
3	E	348	ASP	C-N-CA	6.37	133.70	121.54
1	H	185	PRO	CB-CA-C	-6.34	103.11	111.23

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	1622	0	1593	103	0
1	H	1636	0	1604	72	0
2	B	1638	0	1591	97	0
2	L	1638	0	1591	65	0
3	C	753	0	748	62	0
3	E	751	0	744	62	0
All	All	8038	0	7871	413	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 26.

The worst 5 of 413 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:90:TYR:HE2	1:H:109:VAL:CG2	1.38	1.36
1:H:90:TYR:CE2	1:H:109:VAL:HG21	1.64	1.31
2:B:185:ASP:CA	2:B:188:LYS:HD2	1.58	1.30
1:A:122:PHE:CZ	2:B:124:GLN:HG3	1.66	1.28
2:B:150:VAL:HG12	2:B:189:HIS:CD2	1.72	1.25

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	214/234 (92%)	196 (92%)	17 (8%)	1 (0%)	24 57

*Continued on next page...*

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	H	217/234 (93%)	193 (89%)	20 (9%)	4 (2%)	6	28
2	B	210/214 (98%)	195 (93%)	11 (5%)	4 (2%)	6	27
2	L	210/214 (98%)	200 (95%)	8 (4%)	2 (1%)	12	41
3	C	95/110 (86%)	81 (85%)	10 (10%)	4 (4%)	2	13
3	E	95/110 (86%)	79 (83%)	9 (10%)	7 (7%)	1	5
All	All	1041/1116 (93%)	944 (91%)	75 (7%)	22 (2%)	5	25

5 of 22 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	H	30	SER
1	H	135	THR
1	H	188	SER
3	E	349	MET
3	E	352	LEU

### 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	180/194 (93%)	153 (85%)	27 (15%)	3	13
1	H	181/194 (93%)	151 (83%)	30 (17%)	2	10
2	B	187/189 (99%)	163 (87%)	24 (13%)	4	18
2	L	187/189 (99%)	167 (89%)	20 (11%)	6	25
3	C	85/94 (90%)	71 (84%)	14 (16%)	2	11
3	E	85/94 (90%)	68 (80%)	17 (20%)	1	6
All	All	905/954 (95%)	773 (85%)	132 (15%)	3	14

5 of 132 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	202	SER

Continued on next page...

*Continued from previous page...*

Mol	Chain	Res	Type
3	C	327	THR
3	C	402	ARG
2	L	206	THR
2	L	183	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 16 such sidechains are listed below:

Mol	Chain	Res	Type
2	B	160	GLN
2	B	137	ASN
1	A	105	GLN
2	B	38	GLN
1	A	39	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 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 [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, 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	218/234 (93%)	0.63	10 (4%) 37 20	45, 58, 90, 101	0
1	H	221/234 (94%)	0.65	8 (3%) 46 26	47, 56, 70, 93	0
2	B	212/214 (99%)	0.60	2 (0%) 81 63	46, 63, 81, 86	0
2	L	212/214 (99%)	0.52	7 (3%) 49 29	45, 61, 73, 77	0
3	C	99/110 (90%)	0.79	6 (6%) 27 15	50, 61, 85, 93	0
3	E	99/110 (90%)	0.97	14 (14%) 6 3	52, 68, 86, 103	0
All	All	1061/1116 (95%)	0.65	47 (4%) 39 21	45, 60, 83, 103	0

The worst 5 of 47 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	C	347	VAL	3.9
3	C	350	GLN	3.7
3	E	393	GLU	3.5
3	E	321	THR	3.1
1	H	166	PHE	3.1

### 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.