



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 02:51 AM UTC

PDB ID : 6WIO / pdb_00006wio
Title : Fab antigen complex
Authors : Antonysamy, S.
Deposited on : 2020-04-10
Resolution : 2.17 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

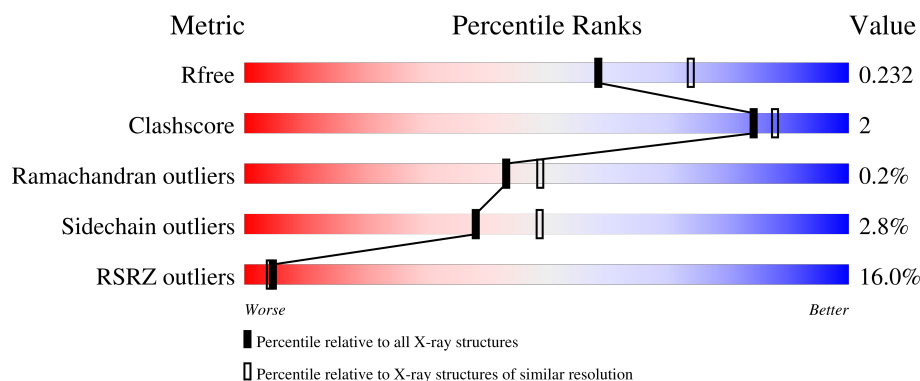
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.17 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	8975 (2.20-2.16)
Clashscore	190562	9786 (2.20-2.16)
Ramachandran outliers	187476	9664 (2.20-2.16)
Sidechain outliers	187428	9664 (2.20-2.16)
RSRZ outliers	180081	8979 (2.20-2.16)

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	A	230	10% 94% 6%
2	B	213	2% 93% 6%
3	C	161	37% 50% 12% 37%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 4348 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 Fab Heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	230	Total	C	N	O	S	0	0	0
			1732	1106	287	332	7			

- Molecule 2 is a protein called Fab Light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	213	Total	C	N	O	S	0	0	0
			1625	1011	276	332	6			

- Molecule 3 is a protein called Interleukin-17A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	102	Total	C	N	O	S	0	0	0
			828	516	160	146	6			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	156	HIS	-	expression tag	UNP Q16552
C	157	HIS	-	expression tag	UNP Q16552
C	158	HIS	-	expression tag	UNP Q16552
C	159	HIS	-	expression tag	UNP Q16552
C	160	HIS	-	expression tag	UNP Q16552
C	161	HIS	-	expression tag	UNP Q16552

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	67	Total	O	0	0
			67	67		
4	B	82	Total	O	0	0
			82	82		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	C	14	Total	O	0	0
			14	14		

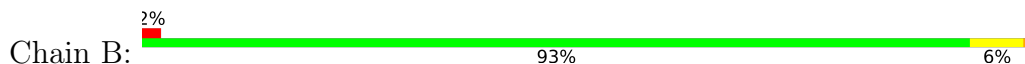
3 Residue-property plots [i](#)

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.

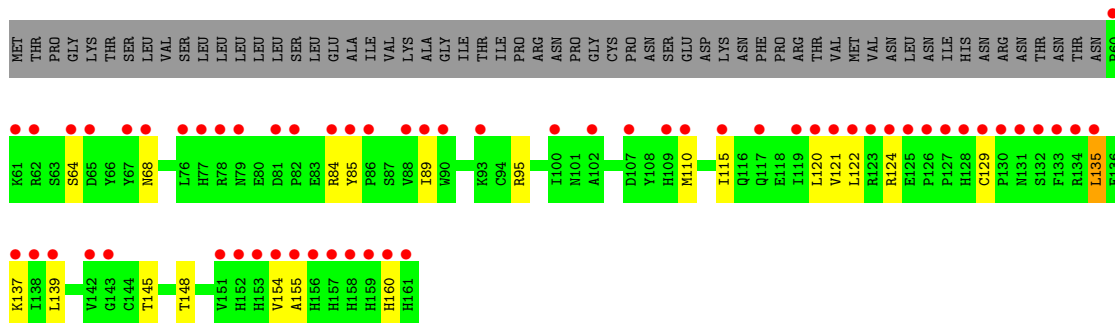
- Molecule 1: Fab Heavy chain



- Molecule 2: Fab Light chain



- Molecule 3: Interleukin-17A



4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α , β , γ	73.26Å 73.26Å 316.38Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	79.10 – 2.17 79.10 – 2.17	Depositor EDS
% Data completeness (in resolution range)	100.0 (79.10-2.17) 100.0 (79.10-2.17)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.13 (at 2.16Å)	Xtriage
Refinement program	BUSTER 2.11.7	Depositor
R, R_{free}	0.208 , 0.227 0.209 , 0.232	Depositor DCC
R_{free} test set	2362 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	52.2	Xtriage
Anisotropy	0.020	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 55.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	4348	wwPDB-VP
Average B, all atoms (Å ²)	69.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.21% 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	A	0.71	0/1778	1.07	3/2430 (0.1%)
2	B	0.73	0/1658	1.05	0/2250
3	C	0.77	0/855	1.24	4/1166 (0.3%)
All	All	0.73	0/4291	1.10	7/5846 (0.1%)

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	35	ASN	CA-CB-CG	6.08	118.67	112.60
3	C	154	VAL	CA-C-N	5.25	128.54	120.82
3	C	154	VAL	C-N-CA	5.25	128.54	120.82
1	A	68	PHE	CA-CB-CG	5.23	119.03	113.80
1	A	33	TRP	N-CA-C	-5.16	102.84	110.48
3	C	155	ALA	CA-C-N	5.08	127.60	120.28
3	C	155	ALA	C-N-CA	5.08	127.60	120.28

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	1732	0	1654	6	0
2	B	1625	0	1572	7	0
3	C	828	0	783	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	67	0	0	0	0
4	B	82	0	0	0	0
4	C	14	0	0	0	0
All	All	4348	0	4009	19	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 (19) 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:A:83:MET:HE2	1:A:86:LEU:HD21	1.64	0.79
1:A:39:GLN:HE22	2:B:39:GLN:HE22	1.35	0.73
2:B:106:GLU:HG3	2:B:174:TYR:OH	1.91	0.69
2:B:114:PRO:HB3	2:B:140:PHE:HB3	1.82	0.62
1:A:58:LYS:HE3	1:A:70:ILE:O	2.02	0.59
3:C:110:MET:HE2	3:C:148:THR:HG21	1.84	0.58
3:C:84:ARG:HG2	3:C:89:ILE:HD11	1.85	0.58
3:C:110:MET:HE2	3:C:148:THR:CG2	2.37	0.55
3:C:124:ARG:HD2	3:C:129:CYS:H	1.78	0.48
1:A:12:VAL:HG11	1:A:86:LEU:HD13	1.95	0.47
2:B:79:LEU:HD21	2:B:105:LEU:HD21	1.97	0.46
1:A:117:TRP:CE3	2:B:45:PRO:HD2	2.51	0.46
3:C:115:ILE:HD11	3:C:145:THR:HB	1.98	0.45
3:C:85:TYR:HB2	3:C:122:LEU:HB2	1.98	0.45
2:B:160:SER:HA	2:B:179:THR:O	2.18	0.43
2:B:109:ARG:HH21	2:B:110:THR:HG22	1.83	0.42
3:C:135:LEU:H	3:C:135:LEU:HG	1.66	0.42
1:A:207:THR:HG23	1:A:224:LYS:HE3	2.01	0.42
3:C:120:LEU:HD23	3:C:135:LEU:HD13	2.01	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	228/230 (99%)	225 (99%)	3 (1%)	0	100	100
2	B	211/213 (99%)	207 (98%)	4 (2%)	0	100	100
3	C	100/161 (62%)	93 (93%)	6 (6%)	1 (1%)	12	10
All	All	539/604 (89%)	525 (97%)	13 (2%)	1 (0%)	43	49

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	C	160	HIS

5.3.2 Protein sidechains ⓘ

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	186/196 (95%)	184 (99%)	2 (1%)	65	77
2	B	183/184 (100%)	179 (98%)	4 (2%)	45	58
3	C	94/150 (63%)	87 (93%)	7 (7%)	13	13
All	All	463/530 (87%)	450 (97%)	13 (3%)	38	49

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	104	LEU
1	A	193	SER
2	B	106	GLU
2	B	110	THR
2	B	115	SER
2	B	170	LYS
3	C	64	SER
3	C	68	ASN
3	C	95	ARG

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Mol	Chain	Res	Type
3	C	121	VAL
3	C	135	LEU
3	C	137	LYS
3	C	139	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	3	GLN
1	A	31	ASN
1	A	77	ASN
1	A	82	GLN
1	A	84	ASN
1	A	206	GLN
2	B	39	GLN
2	B	138	ASN
2	B	161	GLN
2	B	190	HIS
3	C	68	ASN
3	C	75	ASN

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	A	230/230 (100%)	0.61	22 (9%)	13 12	44, 57, 80, 140	0
2	B	213/213 (100%)	0.41	5 (2%)	61 60	43, 56, 77, 141	0
3	C	102/161 (63%)	2.68	60 (58%)	0 0	51, 100, 205, 213	0
All	All	545/604 (90%)	0.92	87 (15%)	5 4	43, 59, 141, 213	0

All (87) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	C	135	LEU	7.4
3	C	120	LEU	7.2
3	C	119	ILE	6.1
3	C	156	HIS	5.8
3	C	161	HIS	5.7
3	C	130	PRO	5.7
3	C	60	PRO	5.6
3	C	157	HIS	5.4
3	C	158	HIS	5.4
3	C	85	TYR	5.3
3	C	155	ALA	5.2
3	C	138	ILE	5.2
3	C	90	TRP	5.0
3	C	160	HIS	5.0
1	A	106	ASP	4.9
3	C	122	LEU	4.9
1	A	230	CYS	4.9
1	A	104	LEU	4.7
2	B	213	CYS	4.6
3	C	82	PRO	4.6
3	C	133	PHE	4.6
3	C	126	PRO	4.5
1	A	229	SER	4.4

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Mol	Chain	Res	Type	RSRZ
3	C	159	HIS	4.4
3	C	86	PRO	4.4
3	C	154	VAL	4.2
1	A	107	TYR	4.1
3	C	127	PRO	4.1
1	A	105	THR	4.0
3	C	134	ARG	4.0
3	C	89	ILE	3.8
3	C	115	ILE	3.7
3	C	128	HIS	3.7
3	C	121	VAL	3.7
3	C	68	ASN	3.6
3	C	139	LEU	3.5
1	A	141	SER	3.4
2	B	24	ARG	3.4
3	C	109	HIS	3.4
1	A	103	ILE	3.4
3	C	67	TYR	3.3
3	C	142	VAL	3.2
3	C	102	ALA	3.2
1	A	27	PHE	3.2
3	C	65	ASP	3.2
3	C	153	HIS	3.2
1	A	143	LYS	3.1
3	C	61	LYS	3.1
3	C	129	CYS	3.1
1	A	1	GLU	3.1
1	A	77	ASN	3.1
3	C	137	LYS	3.0
3	C	152	HIS	3.0
3	C	151	VAL	3.0
1	A	24	ALA	2.9
1	A	65	LYS	2.9
3	C	131	ASN	2.9
3	C	125	GLU	2.8
2	B	201	THR	2.8
3	C	62	ARG	2.8
3	C	79	ASN	2.7
3	C	78	ARG	2.7
3	C	88	VAL	2.7
2	B	170	LYS	2.7
3	C	132	SER	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	25	SER	2.6
3	C	81	ASP	2.6
3	C	76	LEU	2.6
3	C	64	SER	2.6
3	C	107	ASP	2.6
3	C	123	ARG	2.5
1	A	142	SER	2.4
3	C	77	HIS	2.4
3	C	110	MET	2.4
3	C	143	GLY	2.4
1	A	145	THR	2.4
2	B	189	LYS	2.3
1	A	28	THR	2.3
3	C	100	ILE	2.3
1	A	29	PHE	2.2
1	A	228	LYS	2.2
1	A	112	TRP	2.2
1	A	147	GLY	2.1
3	C	84	ARG	2.1
3	C	93	LYS	2.1
3	C	117	GLN	2.0
3	C	124	ARG	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.