



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 08:15 PM UTC

PDB ID : 4OJF / pdb_00004ojf
Title : Humanised 3D6 Fab complexed to amyloid beta 1-8
Authors : Miles, L.A.; Crespi, G.A.N.; Parker, M.W.
Deposited on : 2014-01-21
Resolution : 2.00 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

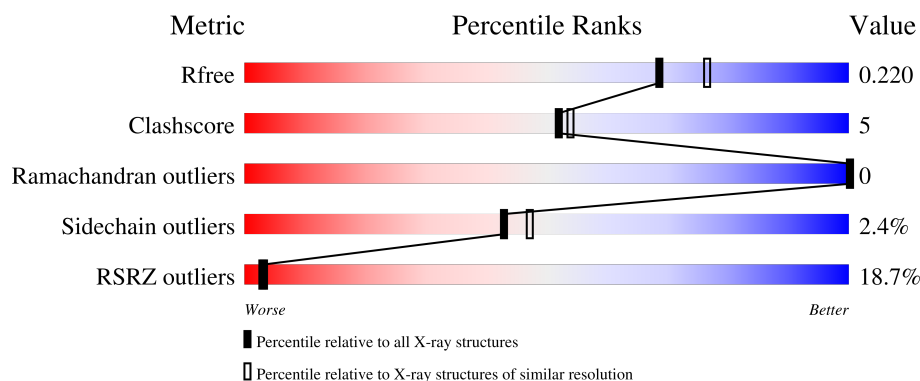
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (2.00-2.00)

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	H	227	16% 89% 7% • •
2	L	219	21% 85% 14% •
3	A	8	12% 75% 25%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 6984 atoms, of which 3304 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 Humanised 3D6 Fab Heavy Chain.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	H	219	Total	C	H	N	O	S	0	0	0
			3234	1027	1599	281	321	6			

- Molecule 2 is a protein called Humanised 3D6 Fab Light Chain.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	L	219	Total	C	H	N	O	S	0	0	0
			3347	1062	1658	283	338	6			

- Molecule 3 is a protein called Amyloid beta A4 protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	A	6	Total	C	H	N	O	0	0	0
			101	33	47	11	10			

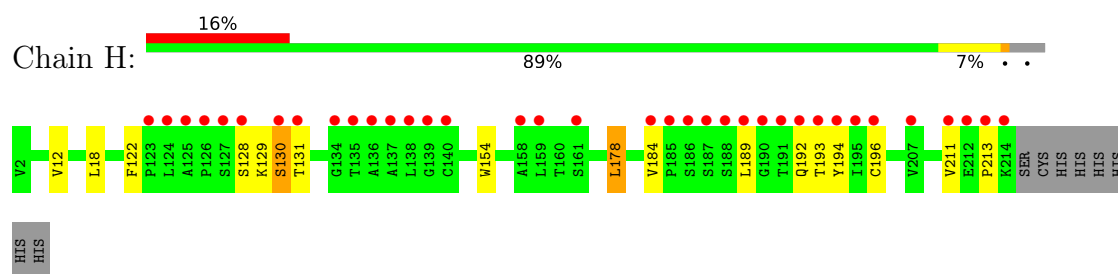
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	H	158	Total	O	0	0
			158	158		
4	L	141	Total	O	0	0
			141	141		
4	A	3	Total	O	0	0
			3	3		

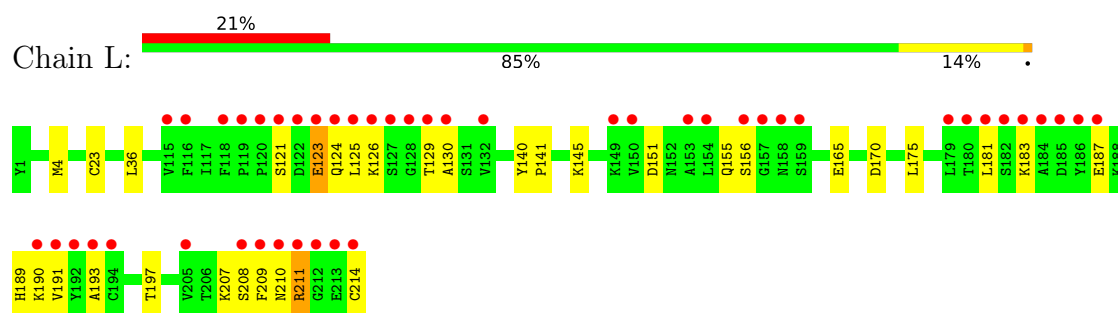
3 Residue-property plots [i](#)

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.

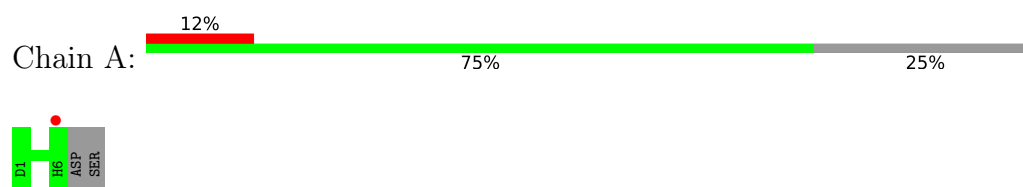
• Molecule 1: Humanised 3D6 Fab Heavy Chain



• Molecule 2: Humanised 3D6 Fab Light Chain



• Molecule 3: Amyloid beta A4 protein



4 Data and refinement statistics

Property	Value	Source
Space group	P 2 ₁ 2 ₁ 2 ₁	Depositor
Cell constants a, b, c, α , β , γ	60.16Å 83.43Å 88.25Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	42.70 – 2.00 42.70 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.8 (42.70-2.00) 98.4 (42.70-2.00)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	5.28 (at 2.00Å)	Xtriage
Refinement program	REFMAC, PHENIX 1.8_1069	Depositor
R, R_{free}	0.172 , 0.215 0.176 , 0.220	Depositor DCC
R_{free} test set	1546 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	17.0	Xtriage
Anisotropy	0.343	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.39 , 44.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6984	wwPDB-VP
Average B, all atoms (Å ²)	30.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.10% 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	H	0.49	0/1674	0.79	0/2276
2	L	0.49	0/1727	0.79	1/2345 (0.0%)
3	A	0.52	0/55	0.66	0/72
All	All	0.49	0/3456	0.79	1/4693 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	H	0	1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	L	211	ARG	N-CA-C	5.65	121.20	113.97

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	H	130	SER	Peptide

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	1635	1599	1596	11	0
2	L	1689	1658	1655	24	0
3	A	54	47	46	0	0
4	A	3	0	0	0	0
4	H	158	0	0	1	0
4	L	141	0	0	1	0
All	All	3680	3304	3297	34	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 5.

All (34) 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:129:LYS:N	1:H:130:SER:OG	2.04	0.91
2:L:187:GLU:OE2	2:L:211:ARG:NH2	2.12	0.81
2:L:190:LYS:HA	2:L:211:ARG:HD3	1.64	0.77
2:L:189:HIS:O	2:L:211:ARG:NH1	2.22	0.73
2:L:189:HIS:O	2:L:211:ARG:HD2	1.89	0.73
2:L:189:HIS:O	2:L:211:ARG:CD	2.42	0.68
2:L:190:LYS:HA	2:L:211:ARG:CD	2.29	0.62
2:L:121:SER:O	2:L:125:LEU:HB2	2.04	0.58
2:L:151:ASP:HA	2:L:191:VAL:HB	1.86	0.58
1:H:192:GLN:OE1	1:H:193:THR:N	2.31	0.56
2:L:190:LYS:O	2:L:210:ASN:HA	2.05	0.56
1:H:192:GLN:HG3	1:H:194:TYR:CE1	2.42	0.55
2:L:187:GLU:HA	2:L:211:ARG:NH2	2.22	0.53
2:L:36:LEU:C	2:L:36:LEU:HD12	2.34	0.53
2:L:126:LYS:NZ	4:L:440:HOH:O	2.42	0.52
1:H:128:SER:C	1:H:130:SER:OG	2.54	0.50
2:L:208:SER:O	2:L:209:PHE:CD1	2.65	0.50
1:H:211:VAL:O	4:H:440:HOH:O	2.20	0.47
2:L:140:TYR:CG	2:L:141:PRO:HA	2.50	0.46
1:H:178:LEU:C	1:H:178:LEU:HD12	2.41	0.46
1:H:128:SER:HA	1:H:129:LYS:HA	1.65	0.45
2:L:145:LYS:HB2	2:L:197:THR:HB	1.98	0.45
2:L:175:LEU:C	2:L:175:LEU:HD23	2.42	0.45
2:L:155:GLN:O	2:L:156:SER:OG	2.30	0.44
2:L:193:ALA:HA	2:L:208:SER:OG	2.18	0.43
2:L:193:ALA:CB	2:L:208:SER:OG	2.66	0.43
2:L:123:GLU:O	2:L:126:LYS:HG2	2.18	0.43
2:L:170:ASP:OD1	2:L:170:ASP:C	2.60	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:122:PHE:CE2	2:L:124:GLN:HG3	2.54	0.42
2:L:130:ALA:N	2:L:181:LEU:O	2.42	0.42
2:L:4:MET:HE3	2:L:23:CYS:SG	2.58	0.42
1:H:12:VAL:CG2	1:H:18:LEU:HD13	2.48	0.42
1:H:189:LEU:HD11	1:H:213:PRO:HG2	2.01	0.41
1:H:154:TRP:CH2	1:H:196:CYS:HB3	2.55	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	H	217/227 (96%)	206 (95%)	11 (5%)	0	100	100
2	L	217/219 (99%)	211 (97%)	6 (3%)	0	100	100
3	A	4/8 (50%)	4 (100%)	0	0	100	100
All	All	438/454 (96%)	421 (96%)	17 (4%)	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	182/190 (96%)	179 (98%)	3 (2%)	55	62

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	L	195/195 (100%)	189 (97%)	6 (3%)	35	37
3	A	5/7 (71%)	5 (100%)	0	100	100
All	All	382/392 (97%)	373 (98%)	9 (2%)	43	47

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	H	131	THR
1	H	178	LEU
1	H	184	VAL
2	L	123	GLU
2	L	129	THR
2	L	165	GLU
2	L	183	LYS
2	L	207	LYS
2	L	214	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	H	105	GLN
2	L	45	GLN
2	L	160	GLN
3	A	6	HIS

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 oligosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

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 ⓘ

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	H	219/227 (96%)	0.32	36 (16%) 4 4	6, 21, 77, 94	0
2	L	219/219 (100%)	0.51	46 (21%) 2 2	9, 24, 73, 99	0
3	A	6/8 (75%)	-0.18	1 (16%) 4 4	9, 10, 20, 43	0
All	All	444/454 (97%)	0.40	83 (18%) 3 3	6, 23, 74, 99	0

All (83) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	L	210	ASN	6.4
2	L	125	LEU	5.6
2	L	209	PHE	5.4
2	L	214	CYS	5.0
2	L	181	LEU	4.8
1	H	195	ILE	4.8
1	H	189	LEU	4.6
1	H	138	LEU	4.4
1	H	185	PRO	4.2
1	H	135	THR	4.1
2	L	154	LEU	4.1
1	H	191	THR	4.0
1	H	213	PRO	4.0
3	A	6	HIS	3.8
1	H	128	SER	3.8
1	H	190	GLY	3.7
2	L	130	ALA	3.7
2	L	153	ALA	3.5
2	L	183	LYS	3.5
1	H	186	SER	3.5
1	H	187	SER	3.4
2	L	129	THR	3.4
2	L	186	TYR	3.3

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	H	211	VAL	3.3
1	H	130	SER	3.3
2	L	119	PRO	3.2
2	L	184	ALA	3.2
2	L	179	LEU	3.2
2	L	157	GLY	3.1
2	L	150	VAL	3.1
1	H	159	LEU	3.1
1	H	194	TYR	3.1
2	L	194	CYS	3.1
2	L	182	SER	3.1
2	L	122	ASP	3.0
1	H	184	VAL	3.0
1	H	192	GLN	3.0
2	L	192	TYR	3.0
2	L	156	SER	3.0
2	L	191	VAL	2.9
2	L	115	VAL	2.9
2	L	132	VAL	2.9
1	H	127	SER	2.9
2	L	126	LYS	2.8
2	L	180	THR	2.8
2	L	116	PHE	2.8
1	H	193	THR	2.8
2	L	193	ALA	2.7
1	H	126	PRO	2.7
1	H	140	CYS	2.7
1	H	139	GLY	2.6
2	L	212	GLY	2.6
2	L	211	ARG	2.6
1	H	214	LYS	2.6
2	L	121	SER	2.6
2	L	118	PHE	2.6
1	H	125	ALA	2.6
1	H	188	SER	2.6
1	H	207	VAL	2.5
1	H	212	GLU	2.5
1	H	137	ALA	2.5
1	H	131	THR	2.5
2	L	208	SER	2.4
1	H	136	ALA	2.4
2	L	128	GLY	2.4

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	H	124	LEU	2.4
1	H	134	GLY	2.4
1	H	196	CYS	2.4
2	L	120	PRO	2.3
2	L	149	LYS	2.2
2	L	187	GLU	2.2
2	L	127	SER	2.2
2	L	185	ASP	2.2
1	H	158	ALA	2.2
2	L	190	LYS	2.2
1	H	123	PRO	2.1
2	L	213	GLU	2.1
2	L	205	VAL	2.1
2	L	123	GLU	2.1
2	L	159	SER	2.1
1	H	161	SER	2.0
2	L	124	GLN	2.0
2	L	158	ASN	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.