



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 26, 2023 – 02:36 AM EDT

PDB ID : 6AZX
Title : Crystal structure of the neutralizing anti-circumsporozoite protein 663 antibody
Authors : Scally, S.W.; Bosch, A.; Triller, G.; Wardemann, H.; Julien, J.P.
Deposited on : 2017-09-13
Resolution : 2.10 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 : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.35.1
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) : 2.35.1

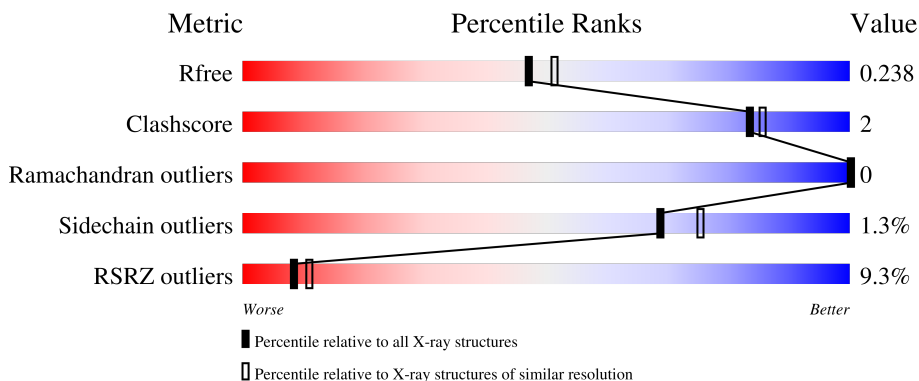
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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}	130704	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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 ≥ 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	223	 10% 82% 7% 10%
1	C	223	 7% 89% 5% 6%
2	B	218	 12% 91% 6% 6%
2	D	218	 6% 91% 7% 6%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 6853 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 663 antibody, heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	C	210	1591	1012	265	308	6	0	0	0
1	A	201	1518	963	253	296	6	0	1	0

- Molecule 2 is a protein called 663 antibody, light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	D	215	1636	1030	270	331	5	0	0	0
2	B	211	1563	985	262	311	5	0	0	0

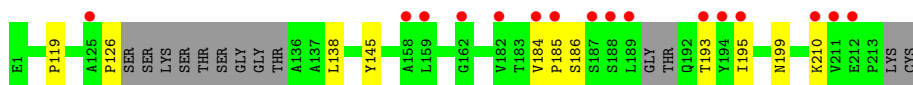
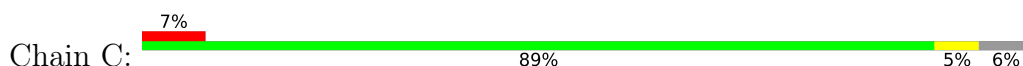
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	C	175	Total 175	O 175	0	0
3	D	100	Total 100	O 100	0	0
3	A	175	Total 175	O 175	0	0
3	B	95	Total 95	O 95	0	0

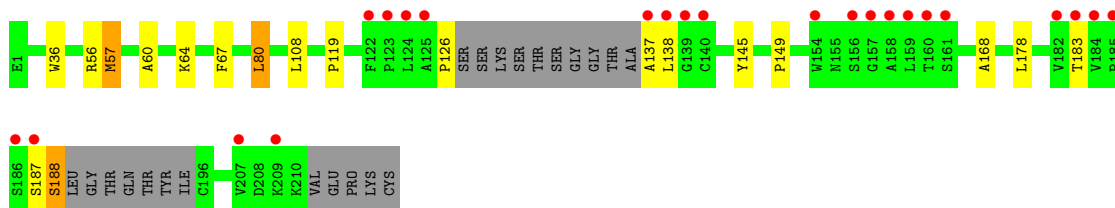
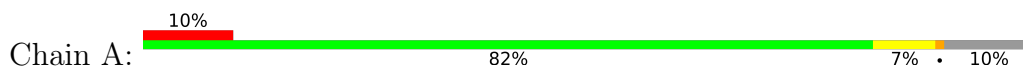
3 Residue-property plots [i](#)

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.

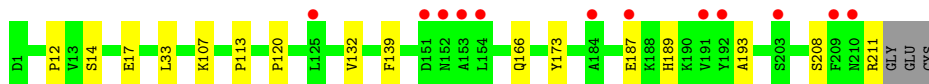
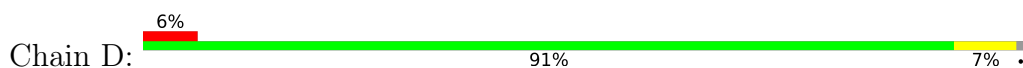
- Molecule 1: 663 antibody, heavy chain



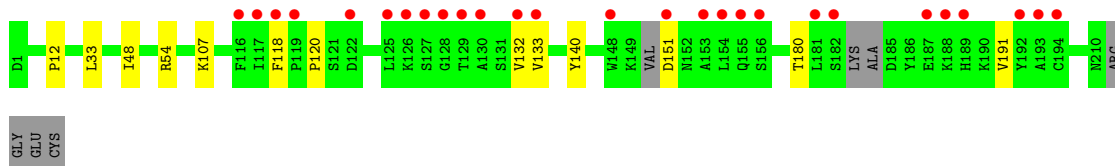
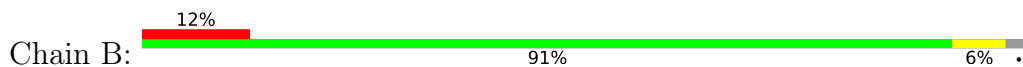
- Molecule 1: 663 antibody, heavy chain



- Molecule 2: 663 antibody, light chain



- Molecule 2: 663 antibody, light chain



4 Data and refinement statistics i

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	80.28Å 138.09Å 206.67Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.93 – 2.10 39.93 – 2.10	Depositor EDS
% Data completeness (in resolution range)	100.0 (39.93-2.10) 95.2 (39.93-2.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.57 (at 2.10Å)	Xtrriage
Refinement program	PHENIX (1.12_2829: ???)	Depositor
R, R_{free}	0.206 , 0.238 0.206 , 0.238	Depositor DCC
R_{free} test set	1999 reflections (2.97%)	wwPDB-VP
Wilson B-factor (Å ²)	28.9	Xtrriage
Anisotropy	0.100	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 59.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.025 for 1/2*h-1/2*k,-3/2*h-1/2*k,-l 0.036 for 1/2*h+1/2*k,3/2*h-1/2*k,-l	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	6853	wwPDB-VP
Average B, all atoms (Å ²)	50.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.08% 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

5.1 Standard geometry

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	0/1553	0.51	0/2116
1	C	0.25	0/1628	0.47	0/2218
2	B	0.24	0/1598	0.45	0/2181
2	D	0.25	0/1675	0.45	0/2286
All	All	0.25	0/6454	0.47	0/8801

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

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	1518	0	1462	11	0
1	C	1591	0	1545	5	0
2	B	1563	0	1460	6	0
2	D	1636	0	1542	8	0
3	A	175	0	0	0	0
3	B	95	0	0	0	0
3	C	175	0	0	0	0
3	D	100	0	0	0	0
All	All	6853	0	6009	30	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 (30) 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:60:ALA:HA	1:A:64:LYS:HB2	1.59	0.85
1:A:126:PRO:HD3	1:A:138:LEU:HB3	1.78	0.64
2:B:118:PHE:HB2	2:B:133:VAL:HG22	1.82	0.62
1:C:193:THR:HG23	1:C:210:LYS:HE3	1.85	0.59
2:D:187:GLU:O	2:D:211:ARG:NH1	2.36	0.58
2:B:12:PRO:HB2	2:B:107:LYS:HD2	1.85	0.57
1:A:119:PRO:HB3	1:A:145:TYR:HB3	1.88	0.56
1:C:126:PRO:HD3	1:C:138:LEU:HB3	1.89	0.54
1:C:119:PRO:HB3	1:C:145:TYR:HB3	1.90	0.54
2:B:151:ASP:N	2:B:191:VAL:O	2.40	0.54
2:B:120:PRO:HD3	2:B:132:VAL:HG22	1.89	0.53
1:A:188:SER:O	1:A:188:SER:OG	2.19	0.53
2:D:189:HIS:O	2:D:211:ARG:NE	2.41	0.52
2:D:166:GLN:HG3	2:D:173:TYR:CZ	2.45	0.51
2:D:120:PRO:HD3	2:D:132:VAL:HG22	1.93	0.49
1:A:67:PHE:HB3	1:A:80:LEU:HD21	1.94	0.48
2:D:14:SER:O	2:D:17:GLU:HG2	2.14	0.48
1:A:108:LEU:HD23	1:A:149:PRO:HD3	1.97	0.47
1:C:195:ILE:HG12	1:C:210:LYS:HA	1.96	0.46
2:D:12:PRO:HB2	2:D:107:LYS:HD2	1.96	0.46
1:A:36:TRP:NE1	1:A:80:LEU:HB2	2.32	0.44
2:D:193:ALA:HB2	2:D:208:SER:HB3	2.00	0.43
1:C:184:VAL:HB	1:C:185:PRO:HD2	2.00	0.42
1:A:168:ALA:HA	1:A:178:LEU:HB3	2.01	0.42
1:A:36:TRP:CE2	1:A:80:LEU:HB2	2.55	0.42
2:B:107:LYS:HA	2:B:140:TYR:OH	2.19	0.42
2:B:48:ILE:HD13	2:B:54:ARG:HA	2.03	0.41
1:A:137:ALA:HA	1:A:183:THR:HA	2.02	0.41
2:D:113:PRO:HB3	2:D:139:PHE:HB3	2.03	0.40
1:A:56:ARG:C	1:A:57:MET:HG2	2.42	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	A	196/223 (88%)	190 (97%)	6 (3%)	0	100	100
1	C	204/223 (92%)	198 (97%)	6 (3%)	0	100	100
2	B	205/218 (94%)	199 (97%)	6 (3%)	0	100	100
2	D	213/218 (98%)	207 (97%)	6 (3%)	0	100	100
All	All	818/882 (93%)	794 (97%)	24 (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	A	169/190 (89%)	165 (98%)	4 (2%)	49	53
1	C	177/190 (93%)	175 (99%)	2 (1%)	73	79
2	B	169/193 (88%)	167 (99%)	2 (1%)	71	77
2	D	182/193 (94%)	181 (100%)	1 (0%)	88	92
All	All	697/766 (91%)	688 (99%)	9 (1%)	69	75

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

Mol	Chain	Res	Type
1	C	186	SER
1	C	199	ASN
2	D	33	LEU
1	A	57	MET
1	A	80	LEU
1	A	187	SER
1	A	188	SER
2	B	33	LEU
2	B	180	THR

Sometimes 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 [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	201/223 (90%)	0.37	23 (11%) 5 6	17, 40, 96, 127	0
1	C	210/223 (94%)	0.21	16 (7%) 13 18	19, 37, 96, 127	0
2	B	211/218 (96%)	0.51	27 (12%) 3 4	21, 52, 116, 135	0
2	D	215/218 (98%)	0.41	12 (5%) 24 29	20, 57, 95, 112	0
All	All	837/882 (94%)	0.38	78 (9%) 8 11	17, 46, 102, 135	0

All (78) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	125	LEU	6.0
1	C	194	TYR	5.0
2	B	154	LEU	4.9
1	A	124	LEU	4.8
2	B	181	LEU	4.3
2	B	188	LYS	4.3
1	A	137	ALA	4.1
1	A	157	GLY	3.9
1	C	193	THR	3.9
1	C	125	ALA	3.9
1	A	187	SER	3.8
2	D	191	VAL	3.7
1	A	125	ALA	3.6
1	C	187	SER	3.6
1	C	188	SER	3.6
2	D	210	ASN	3.6
1	A	185	PRO	3.5
2	D	125	LEU	3.5
2	B	132	VAL	3.5
2	D	203	SER	3.4
1	C	185	PRO	3.4

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Mol	Chain	Res	Type	RSRZ
2	B	151	ASP	3.4
2	D	209	PHE	3.3
1	A	138	LEU	3.3
2	D	187	GLU	3.2
2	B	194	CYS	3.2
1	A	186	SER	3.1
2	B	156	SER	3.1
2	B	122	ASP	3.1
2	B	118	PHE	3.0
1	A	156	SER	3.0
1	C	189	LEU	3.0
1	A	182	VAL	3.0
2	D	153	ALA	3.0
2	D	151	ASP	3.0
2	D	192	TYR	2.9
1	A	123	PRO	2.9
2	B	182	SER	2.9
1	A	184	VAL	2.9
2	B	155	GLN	2.9
2	D	154	LEU	2.9
1	A	160	THR	2.8
2	B	189	HIS	2.8
1	C	158	ALA	2.8
1	C	159	LEU	2.8
1	A	159	LEU	2.8
1	C	212	GLU	2.8
2	D	152	ASN	2.7
2	B	119	PRO	2.7
2	B	130	ALA	2.7
2	B	133	VAL	2.6
2	B	126	LYS	2.6
1	A	158	ALA	2.6
1	C	195	ILE	2.6
1	C	210	LYS	2.5
1	C	182	VAL	2.5
1	A	209	LYS	2.5
2	B	148	TRP	2.4
2	B	117	ILE	2.4
2	B	153	ALA	2.4
1	A	122	PHE	2.4
1	C	162	GLY	2.4
1	A	139	GLY	2.4

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Mol	Chain	Res	Type	RSRZ
2	D	184	ALA	2.4
1	A	154	TRP	2.4
2	B	128	GLY	2.3
2	B	192	TYR	2.3
1	A	140	CYS	2.3
2	B	187	GLU	2.2
1	A	207	VAL	2.2
2	B	116	PHE	2.2
2	B	193	ALA	2.2
1	C	184	VAL	2.2
1	C	211	VAL	2.1
2	B	127	SER	2.1
2	B	129	THR	2.1
1	A	183	THR	2.1
1	A	161	SER	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.