



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 03:19 PM UTC

PDB ID : 2W9E / pdb\_00002w9e  
Title : Structure of ICSM 18 (anti-Prp therapeutic antibody) Fab fragment complexed with human Prp fragment 119-231  
Authors : Antonyuk, S.V.; Trevitt, C.R.; Strange, R.W.; Jackson, G.S.; Sangar, D.; Batchelor, M.; Jones, S.; Georgiou, T.; Cooper, S.; Fraser, C.; Khalili-Shirazi, A.; Clarke, A.R.; Hasnain, S.S.; Collinge, J.  
Deposited on : 2009-01-23  
Resolution : 2.90 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.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	NOT EXECUTED
Xtriage (Phenix)	:	2.0
EDS	:	NOT EXECUTED
Buster-report	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

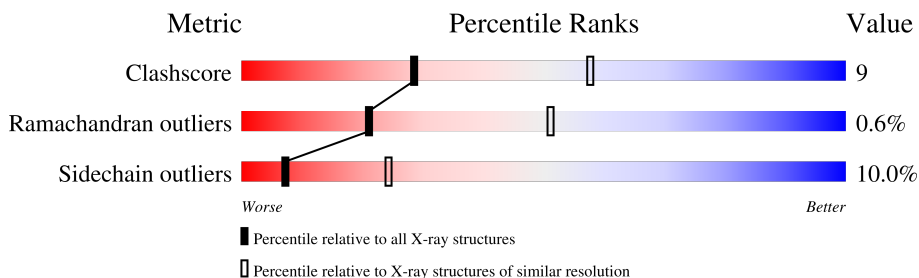
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.90 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))
Clashscore	190562	2690 (2.90-2.90)
Ramachandran outliers	187476	2623 (2.90-2.90)
Sidechain outliers	187428	2625 (2.90-2.90)

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  $\leq 5\%$ .

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	113	 67% 19% • 12%
2	H	215	 73% 23% •
3	L	212	 78% 20% •

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 4151 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 MAJOR PRION PROTEIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	99	Total	C	N	O	S	0	0	0
			828	512	144	163	9			

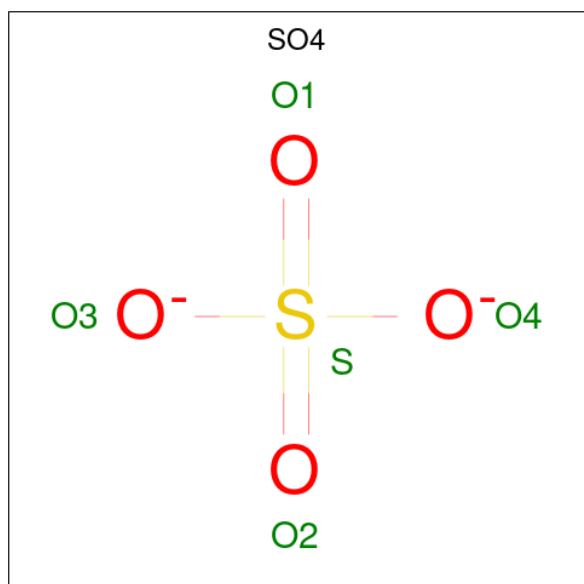
- Molecule 2 is a protein called ICSM 18-ANTI-PRP THERAPEUTIC FAB HEAVY CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	215	Total	C	N	O	S	0	2	0
			1623	1029	263	326	5			

- Molecule 3 is a protein called ICSM 18-ANTI-PRP THERAPEUTIC FAB LIGHT CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	L	212	Total	C	N	O	S	0	6	0
			1653	1030	276	338	9			

- Molecule 4 is SULFATE ION (CCD ID: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	O	S	0	0
			5	4	1		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	4	Total	O		0	0
			4	4			
5	H	16	Total	O		0	0
			16	16			
5	L	22	Total	O		0	0
			22	22			

### 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. 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. 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.

Note EDS was not executed.

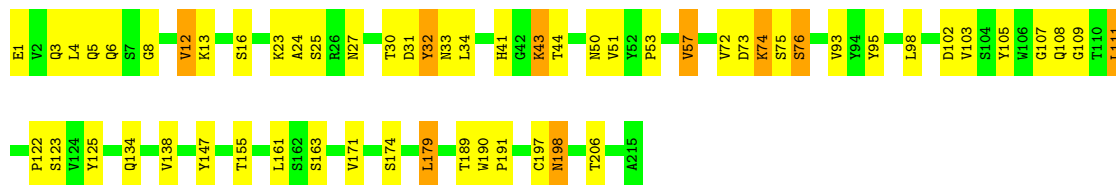
- Molecule 1: MAJOR PRION PROTEIN

Chain A: 




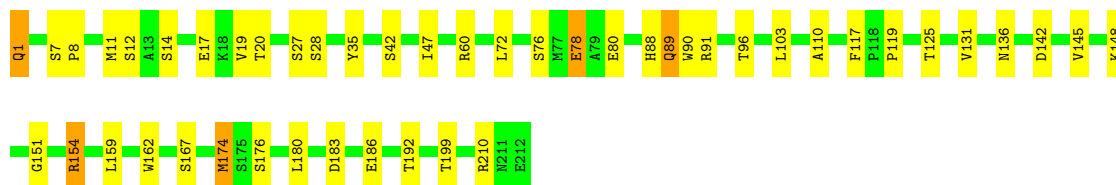
- Molecule 2: ICSM 18-ANTI-PRP THERAPEUTIC FAB HEAVY CHAIN

Chain H: 



- Molecule 3: ICSM 18-ANTI-PRP THERAPEUTIC FAB LIGHT CHAIN

Chain L: 



## 4 Data and refinement statistics

EDS was not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 63 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	126.15Å 126.15Å 134.13Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	50.00 – 2.90	Depositor
% Data completeness (in resolution range)	97.5 (50.00-2.90)	Depositor
$R_{merge}$	0.14	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.03 (at 2.90Å)	Xtriage
Refinement program	REFMAC 5.3.0037	Depositor
R, $R_{free}$	0.207 , 0.269	Depositor
Wilson B-factor (Å <sup>2</sup> )	55.2	Xtriage
Anisotropy	0.075	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	4151	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	40.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.34% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SO4

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	0.61	0/846	0.88	0/1141
2	H	0.59	0/1674	0.93	4/2296 (0.2%)
3	L	0.68	1/1712 (0.1%)	0.82	1/2323 (0.0%)
All	All	0.63	1/4232 (0.0%)	0.88	5/5760 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	L	151	GLY	C-N	13.94	1.53	1.33

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	23	LYS	N-CA-C	7.06	119.92	108.41
2	H	8	GLY	CA-C-N	5.57	125.75	119.90
2	H	8	GLY	C-N-CA	5.57	125.75	119.90
3	L	136	ASN	N-CA-C	5.56	118.47	109.40
2	H	57	VAL	N-CA-C	5.40	116.38	109.30

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	828	0	769	11	0
2	H	1623	0	1568	30	0
3	L	1653	0	1589	31	1
4	A	5	0	0	0	0
5	A	4	0	0	0	0
5	H	16	0	0	1	0
5	L	22	0	0	0	0
All	All	4151	0	3926	71	1

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 9.

All (71) 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)
3:L:1:GLN:OE1	3:L:1:GLN:N	1.98	0.96
2:H:33:ASN:HD21	2:H:50:ASN:HD22	1.09	0.92
1:A:166:MET:HE1	1:A:218:TYR:CD1	2.07	0.90
2:H:122:PRO:HB3	2:H:147:TYR:HB3	1.58	0.86
2:H:6:GLN:NE2	2:H:109:GLY:H	1.82	0.77
2:H:33:ASN:ND2	2:H:50:ASN:HD22	1.83	0.76
3:L:148:LYS:HB2	3:L:192:THR:HB	1.68	0.75
1:A:166:MET:HE1	1:A:218:TYR:HD1	1.53	0.73
2:H:5:GLN:HG3	2:H:108:GLN:HE22	1.54	0.72
3:L:89:GLN:NE2	3:L:91:ARG:H	1.90	0.70
3:L:11:MET:CE	3:L:19:VAL:HG13	2.24	0.68
2:H:6:GLN:HE21	2:H:107:GLY:HA3	1.59	0.67
3:L:154:ARG:HG2	3:L:154:ARG:HH11	1.60	0.66
3:L:88:HIS:CE1	3:L:90:TRP:HE1	2.15	0.64
2:H:95:TYR:CE2	3:L:42:SER:HB2	2.33	0.64
3:L:162:TRP:HE1	3:L:174:MET:HE3	1.62	0.63
2:H:33:ASN:HD21	2:H:50:ASN:ND2	1.91	0.63
3:L:11:MET:HE3	3:L:19:VAL:HG13	1.81	0.60
3:L:11:MET:HE2	3:L:103:LEU:HD13	1.85	0.59
2:H:198:ASN:HD22	2:H:198:ASN:N	1.98	0.59
3:L:8:PRO:HG2	3:L:11:MET:HB2	1.85	0.59
2:H:43:LYS:HG3	2:H:44:THR:HG23	1.86	0.58
3:L:154:ARG:HG2	3:L:154:ARG:NH1	2.20	0.56
2:H:53:PRO:HB3	2:H:72:VAL:HG21	1.86	0.56
2:H:197:CYS:C	2:H:198:ASN:HD22	2.15	0.55
3:L:47:ILE:HD12	3:L:72[A]:LEU:HD13	1.89	0.54
2:H:122:PRO:CB	2:H:147:TYR:HB3	2.34	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:L:119:PRO:HD3	3:L:131:VAL:HG22	1.90	0.54
2:H:93:VAL:HG22	2:H:111:LEU:HD12	1.90	0.53
3:L:11:MET:HE1	3:L:19:VAL:HG13	1.90	0.53
2:H:134:GLN:HG3	2:H:134:GLN:O	2.09	0.51
3:L:162:TRP:CD1	3:L:174:MET:HG3	2.46	0.51
3:L:88:HIS:HD2	3:L:96:THR:O	1.94	0.50
1:A:172:GLN:O	1:A:176:VAL:HG23	2.12	0.50
3:L:162:TRP:NE1	3:L:174:MET:HE3	2.27	0.49
2:H:179:LEU:C	2:H:179:LEU:HD12	2.38	0.49
2:H:190:TRP:CD1	2:H:191:PRO:HA	2.48	0.49
1:A:139:ILE:HG21	1:A:208:ARG:HG2	1.95	0.48
2:H:31:ASP:O	2:H:32:TYR:HB3	2.14	0.48
3:L:159:LEU:O	3:L:176:SER:HA	2.14	0.47
3:L:1:GLN:N	3:L:1:GLN:CD	2.64	0.47
3:L:154:ARG:HH12	3:L:180:LEU:CD2	2.28	0.47
2:H:12:VAL:HG12	2:H:16:SER:HB2	1.95	0.46
3:L:60:ARG:HD2	3:L:76:SER:O	2.15	0.46
2:H:6:GLN:HE21	2:H:107:GLY:CA	2.27	0.46
2:H:123:SER:HB3	2:H:125:TYR:CZ	2.51	0.46
3:L:110:ALA:C	3:L:199:THR:HG21	2.40	0.46
2:H:74:LYS:C	2:H:76:SER:H	2.23	0.46
2:H:190:TRP:CG	2:H:191:PRO:HA	2.51	0.45
1:A:164:ARG:NH1	1:A:168:GLU:OE1	2.50	0.45
2:H:198:ASN:N	2:H:198:ASN:ND2	2.64	0.45
3:L:11:MET:CE	3:L:19:VAL:CG1	2.93	0.45
2:H:24:ALA:HB1	2:H:27:ASN:HB2	1.99	0.45
3:L:14:SER:O	3:L:17:GLU:HB2	2.16	0.45
3:L:11:MET:HE1	3:L:19:VAL:CG1	2.47	0.44
1:A:196:GLU:HG3	1:A:197:ASN:N	2.33	0.44
2:H:41:HIS:CD2	2:H:43:LYS:HG2	2.53	0.43
3:L:7:SER:HA	3:L:8:PRO:C	2.43	0.43
1:A:154:MET:HA	1:A:157:TYR:CD1	2.53	0.43
2:H:73:ASP:OD2	2:H:75:SER:HB2	2.19	0.42
1:A:134:MET:HE2	1:A:220:ARG:NH1	2.34	0.42
2:H:32:TYR:CZ	2:H:53:PRO:HG2	2.54	0.42
3:L:35:TYR:N	3:L:35:TYR:CD1	2.88	0.42
1:A:139:ILE:HG22	1:A:141:PHE:CZ	2.55	0.42
3:L:117:PHE:O	3:L:131:VAL:HG13	2.20	0.41
3:L:186:GLU:HA	3:L:210:ARG:NH2	2.35	0.41
1:A:128:TYR:CE2	1:A:182:ILE:HD13	2.55	0.41
2:H:1:GLU:N	2:H:105:TYR:OH	2.50	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:138:ILE:HD13	1:A:154:MET:HE1	2.02	0.41
2:H:111:LEU:HD23	5:H:2008:HOH:O	2.20	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:L:78:GLU:OE1	3:L:78:GLU:OE1[8_555]	1.94	0.26

## 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	97/113 (86%)	91 (94%)	5 (5%)	1 (1%)	12	39
2	H	215/215 (100%)	197 (92%)	16 (7%)	2 (1%)	14	41
3	L	216/212 (102%)	205 (95%)	11 (5%)	0	100	100
All	All	528/540 (98%)	493 (93%)	32 (6%)	3 (1%)	21	51

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	H	32	TYR
2	H	76	SER
1	A	195	GLY

### 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	93/101 (92%)	87 (94%)	6 (6%)	15	44
2	H	186/186 (100%)	160 (86%)	26 (14%)	3	11
3	L	191/185 (103%)	175 (92%)	16 (8%)	10	31
All	All	470/472 (100%)	422 (90%)	48 (10%)	7	23

All (48) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	125	LEU
1	A	172	GLN
1	A	184	ILE
1	A	201	THR
1	A	204	LYS
1	A	208	ARG
2	H	3	GLN
2	H	4	LEU
2	H	12	VAL
2	H	13	LYS
2	H	25	SER
2	H	30	THR
2	H	34	LEU
2	H	43	LYS
2	H	51	VAL
2	H	57	VAL
2	H	74	LYS
2	H	98[A]	LEU
2	H	98[B]	LEU
2	H	102	ASP
2	H	103	VAL
2	H	111	LEU
2	H	138	VAL
2	H	155	THR
2	H	161	LEU
2	H	163	SER
2	H	171	VAL
2	H	174	SER
2	H	179	LEU
2	H	189	THR
2	H	198	ASN

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Mol	Chain	Res	Type
2	H	206	THR
3	L	1	GLN
3	L	12	SER
3	L	20	THR
3	L	27	SER
3	L	28[A]	SER
3	L	28[B]	SER
3	L	78	GLU
3	L	80	GLU
3	L	89	GLN
3	L	125	THR
3	L	142	ASP
3	L	145	VAL
3	L	154	ARG
3	L	167	SER
3	L	174	MET
3	L	183	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	155	HIS
1	A	174	ASN
1	A	186	GLN
2	H	3	GLN
2	H	5	GLN
2	H	6	GLN
2	H	33	ASN
2	H	157	ASN
2	H	193	GLN
2	H	198	ASN
3	L	88	HIS
3	L	89	GLN
3	L	160	ASN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

Mogul was not executed - this section is therefore empty.

## 5.5 Carbohydrates [i](#)

Mogul was not executed - this section is therefore empty.

## 5.6 Ligand geometry [i](#)

Mogul was not executed - this section is therefore empty.

## 5.7 Other polymers [i](#)

Mogul was not executed - this section is therefore empty.

## 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

EDS was not executed - this section is therefore empty.

### 6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

### 6.4 Ligands

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers

EDS was not executed - this section is therefore empty.