



# wwPDB X-ray Structure Validation Summary Report ⓘ

Dec 10, 2023 – 06:06 am GMT

PDB ID : 1UWE  
Title : MOLECULAR MECHANISM OF ENANTIOSELECTIVE PROTON  
TRANSFER TO CARBON IN CATALYTIC ANTIBODY 14D9  
Authors : Baumann, U.; Reymond, J.L.  
Deposited on : 2004-02-05  
Resolution : 2.67 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 : 4.02b-467  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

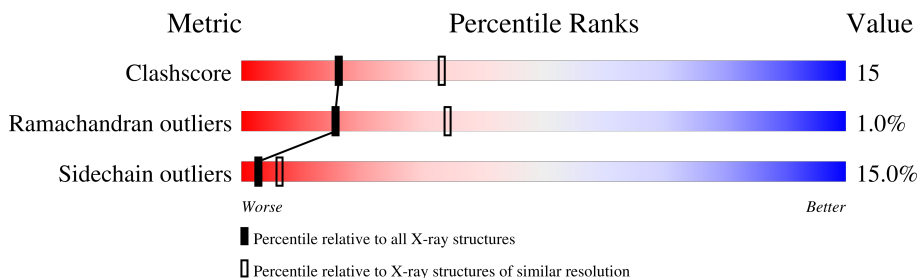
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.67 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	141614	4210 (2.70-2.66)
Ramachandran outliers	138981	4141 (2.70-2.66)
Sidechain outliers	138945	4141 (2.70-2.66)

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	H	218	
1	V	218	
1	Y	218	
2	L	213	
2	U	213	
2	X	213	

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 9703 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 ANTIBODY 14D9.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	H	218	1612	1023	260	324	5	0	0	0
1	V	218	1612	1023	260	324	5	0	0	0
1	Y	218	1612	1023	260	324	5	0	0	0

- Molecule 2 is a protein called ANTIBODY 14D9.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	L	213	1614	1007	268	333	6	0	0	0
2	U	213	1614	1007	268	333	6	0	0	0
2	X	213	1614	1007	268	333	6	0	0	0

- Molecule 3 is water.

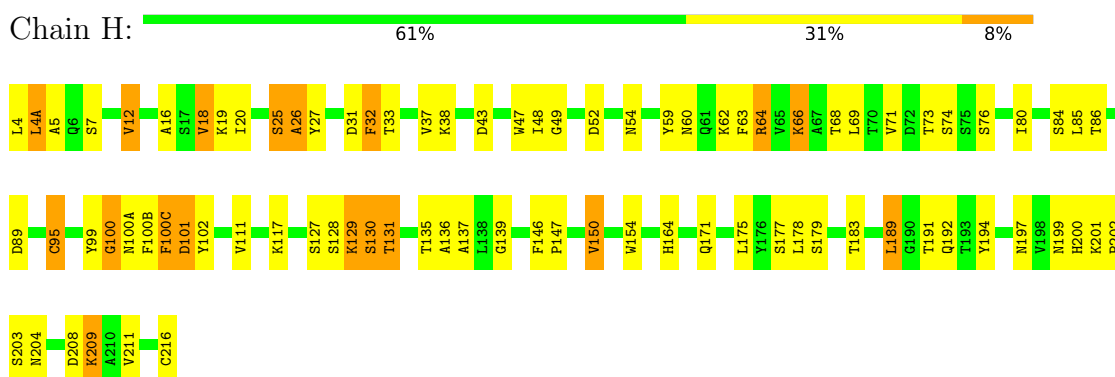
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	H	1	Total 1	O 1	0	0
3	L	6	Total 6	O 6	0	0
3	U	3	Total 3	O 3	0	0
3	V	9	Total 9	O 9	0	0
3	X	2	Total 2	O 2	0	0
3	Y	4	Total 4	O 4	0	0

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

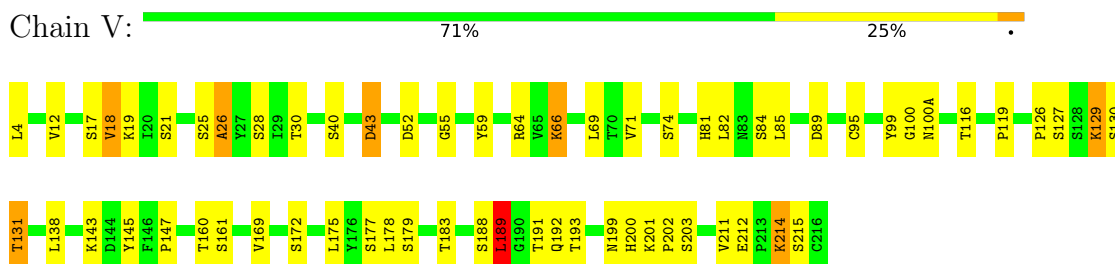
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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.

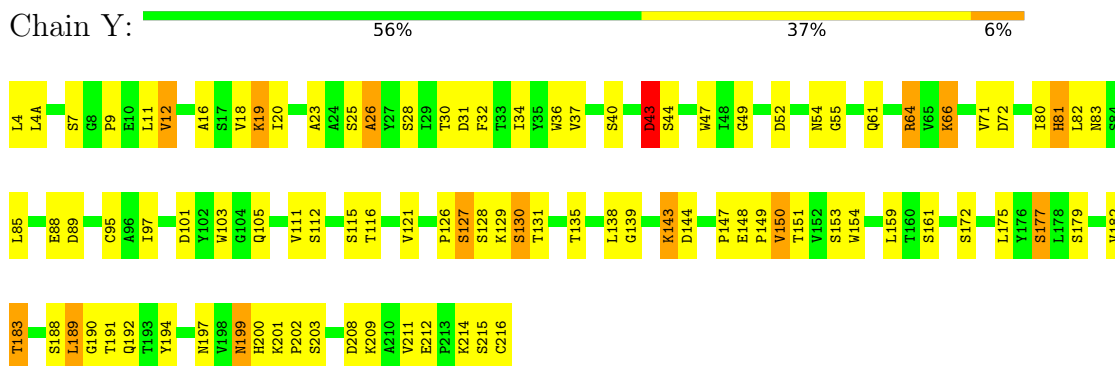
- Molecule 1: ANTIBODY 14D9



- Molecule 1: ANTIBODY 14D9

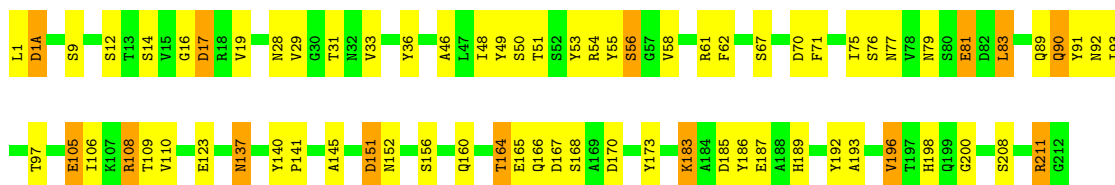


- Molecule 1: ANTIBODY 14D9



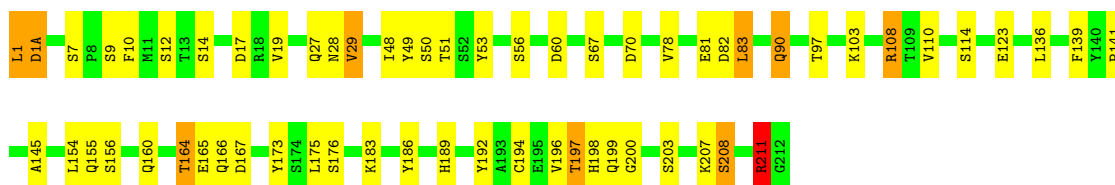
- Molecule 2: ANTIBODY 14D9

Chain L:  66% 28% 7%



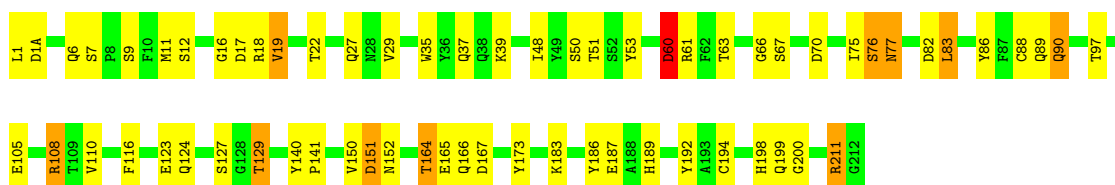
• Molecule 2: ANTIBODY 14D9

Chain U:  71% 24% 5%



• Molecule 2: ANTIBODY 14D9

Chain X:  69% 25% 5%



## 4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	110.10Å 142.79Å 125.46Å 90.00° 104.85° 90.00°	Depositor
Resolution (Å)	20.00 – 2.67	Depositor
% Data completeness (in resolution range)	100.0 (20.00-2.67)	Depositor
$R_{merge}$	0.04	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	REFMAC 5.1.24	Depositor
R, $R_{free}$	0.218 , 0.271	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	9703	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	9.0	wwPDB-VP

## 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	0.97	5/1655 (0.3%)	0.77	8/2263 (0.4%)
1	V	0.37	0/1655	0.67	1/2263 (0.0%)
1	Y	0.35	0/1655	0.69	6/2263 (0.3%)
2	L	0.72	7/1650 (0.4%)	0.72	8/2250 (0.4%)
2	U	0.40	0/1650	0.70	5/2250 (0.2%)
2	X	0.33	0/1650	0.65	6/2250 (0.3%)
All	All	0.58	12/9915 (0.1%)	0.70	34/13539 (0.3%)

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	H	32	PHE	CG-CD1	19.64	1.68	1.38
1	H	32	PHE	CG-CD2	19.61	1.68	1.38
1	H	32	PHE	CE1-CZ	16.36	1.68	1.37
1	H	32	PHE	CE2-CZ	16.12	1.68	1.37
2	L	55	TYR	CE2-CZ	12.04	1.54	1.38

The worst 5 of 34 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	H	32	PHE	CD1-CG-CD2	8.22	128.99	118.30
1	H	32	PHE	CB-CG-CD1	-7.81	115.33	120.80
1	H	32	PHE	CB-CG-CD2	-7.32	115.68	120.80
1	H	101	ASP	CB-CG-OD2	7.16	124.75	118.30
1	Y	89	ASP	CB-CG-OD2	6.25	123.93	118.30

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	H	1612	0	1554	57	3
1	V	1612	0	1554	36	0
1	Y	1612	0	1552	62	3
2	L	1614	0	1535	54	0
2	U	1614	0	1535	36	0
2	X	1614	0	1535	40	0
3	H	1	0	0	0	0
3	L	6	0	0	0	0
3	U	3	0	0	0	0
3	V	9	0	0	0	0
3	X	2	0	0	1	0
3	Y	4	0	0	1	0
All	All	9703	0	9265	275	3

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 15.

The worst 5 of 275 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:4:LEU:O	1:H:4(A):LEU:C	1.86	1.12
2:U:189:HIS:O	2:U:211:ARG:HD3	1.50	1.11
1:H:100(B):PHE:O	1:H:100(C):PHE:O	1.73	1.07
2:L:108:ARG:HH11	2:L:108:ARG:HG3	0.93	1.05
1:Y:4:LEU:HD23	1:Y:4(A):LEU:H	1.21	1.01

All (3) 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)
1:H:54:ASN:OD1	1:Y:23:ALA:CB[2_656]	1.68	0.52
1:H:100:GLY:N	1:Y:26:ALA:O[2_656]	2.05	0.15
1:H:100:GLY:CA	1:Y:26:ALA:O[2_656]	2.18	0.02



## 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	216/218 (99%)	199 (92%)	12 (6%)	5 (2%)	6	14
1	V	216/218 (99%)	205 (95%)	9 (4%)	2 (1%)	17	37
1	Y	216/218 (99%)	201 (93%)	12 (6%)	3 (1%)	11	25
2	L	211/213 (99%)	200 (95%)	10 (5%)	1 (0%)	29	52
2	U	211/213 (99%)	202 (96%)	8 (4%)	1 (0%)	29	52
2	X	211/213 (99%)	201 (95%)	9 (4%)	1 (0%)	29	52
All	All	1281/1293 (99%)	1208 (94%)	60 (5%)	13 (1%)	15	34

5 of 13 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	H	26	ALA
1	H	100(C)	PHE
1	V	26	ALA
1	Y	26	ALA
1	H	4(A)	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	H	181/181 (100%)	149 (82%)	32 (18%)	2	4
1	V	181/181 (100%)	152 (84%)	29 (16%)	2	5
1	Y	181/181 (100%)	151 (83%)	30 (17%)	2	5

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	L	181/181 (100%)	159 (88%)	22 (12%)	5	10
2	U	181/181 (100%)	153 (84%)	28 (16%)	2	6
2	X	181/181 (100%)	159 (88%)	22 (12%)	5	10
All	All	1086/1086 (100%)	923 (85%)	163 (15%)	3	6

5 of 163 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	X	18	ARG
1	Y	88	GLU
2	X	60	ASP
2	X	164	THR
1	Y	161	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 30 such sidechains are listed below:

Mol	Chain	Res	Type
2	U	90	GLN
1	Y	192	GLN
2	U	160	GLN
1	Y	200	HIS
2	X	198	HIS

### 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

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.