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wwPDB X-ray Structure Validation Summary Report (i)

Jun 12, 2024 – 07:42 PM EDT

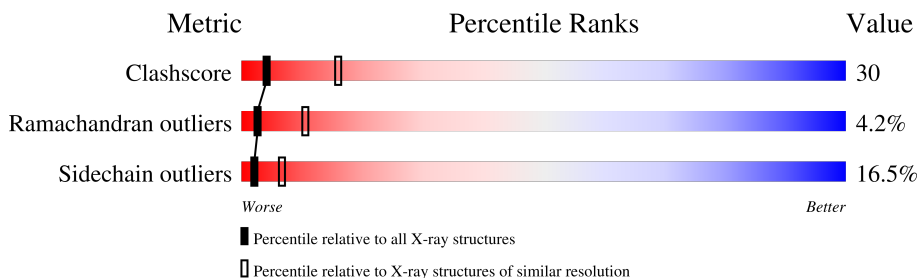|		
PDB ID	:	1B4J
Title	:	COMPARISON OF THE THREE-DIMENSIONAL STRUCTURES OF A HUMANIZED AND A CHIMERIC FAB OF AN ANTI-GAMMA-INTER FERON ANTIBODY
Authors	:	Fan, Z.; Shan, L.; Goldsteen, B.Z.; Guddat, L.W.; Thakur, A.; Landolfi, N.F.; Co, M.S.; Vasques, M.; Queen, C.; Ramsland, P.A.; Edmundson, A.B.
Deposited on	:	1998-12-22
Resolution	:	2.90 Å(reported)

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	Percentile Ranks	Value
Clashscore		30
Ramachandran outliers		4.2%
Sidechain outliers		16.5%

Worse *Better*

▌Percentile relative to all X-ray structures

▯Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (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 >=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 <=5%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	L	214	48% 43% 9%
2	H	220	42% 43% 13% .

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2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 3313 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.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	L	214	1660	1038	275	340	7	0	0	0

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	9	LYS	SER	conflict	EMBL X95750
L	11	MET	LEU	conflict	EMBL X95750
L	12	TYR	SER	conflict	EMBL X95750
L	13	VAL	ALA	conflict	EMBL X95750
L	14	SER	PHE	conflict	EMBL X95750
L	15	ILE	VAL	conflict	EMBL X95750
L	17	GLU	ASP	conflict	EMBL X95750
L	21	LEU	ILE	conflict	EMBL X95750
L	22	SER	THR	conflict	EMBL X95750
L	24	LYS	ARG	conflict	EMBL X95750
L	27	GLU	GLN	conflict	EMBL X95750
L	28	ASN	SER	conflict	EMBL X95750
L	29	VAL	ILE	conflict	EMBL X95750
L	30	ASP	SER	conflict	EMBL X95750
L	31	THR	SER	conflict	EMBL X95750
L	33	VAL	LEU	conflict	EMBL X95750
L	34	SER	ASN	conflict	EMBL X95750
L	41	GLU	GLY	conflict	EMBL X95750
L	42	GLN	LYS	conflict	EMBL X95750
L	43	SER	ALA	conflict	EMBL X95750
L	50	GLY	ALA	conflict	EMBL X95750
L	53	ASN	SER	conflict	EMBL X95750
L	54	ARG	LEU	conflict	EMBL X95750
L	55	TYR	GLN	conflict	EMBL X95750
L	56	THR	SER	conflict	EMBL X95750
L	60	ASP	SER	conflict	EMBL X95750
L	63	THR	SER	conflict	EMBL X95750

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Chain	Residue	Modelled	Actual	Comment	Reference
L	68	ALA	GLY	conflict	EMBL X95750
L	78	VAL	LEU	conflict	EMBL X95750
L	80	ALA	PRO	conflict	EMBL X95750
L	83	LEU	PHE	conflict	EMBL X95750
L	85	ASP	THR	conflict	EMBL X95750
L	87	HIS	TYR	conflict	EMBL X95750
L	89	GLY	GLN	conflict	EMBL X95750
L	92	TYR	HIS	conflict	EMBL X95750
L	93	ASN	SER	conflict	EMBL X95750
L	94	TYR	THR	conflict	EMBL X95750
L	96	PHE	TYR	conflict	EMBL X95750
L	100	SER	GLN	conflict	EMBL X95750
L	103	LYS	ASN	conflict	EMBL X95750

- Molecule 2 is a protein called ANTIBODY.

| Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	H	220	1653	1050	273	324	6	0	0	0

3 Residue-property plots ⓘ

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.
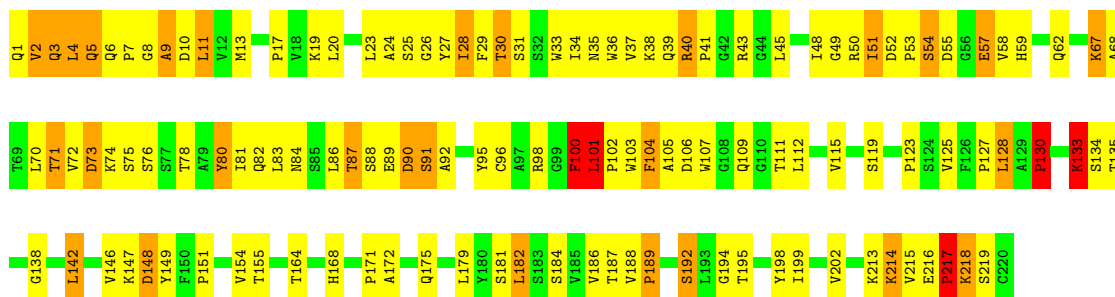
Note EDS was not executed.

• Molecule 1: ANTIBODY

Chain L:
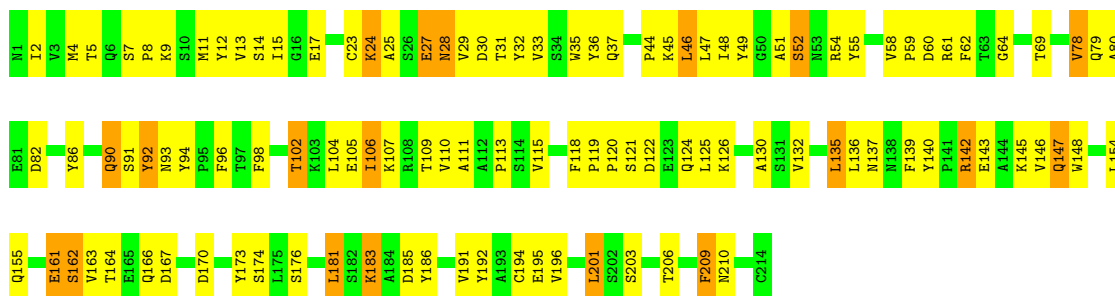
• Molecule 2: ANTIBODY

Chain H:

4 Data and refinement statistics (i)

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

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	67.10Å 75.80Å 111.20Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	8.00 – 2.90	Depositor
% Data completeness (in resolution range)	73.2 (8.00-2.90)	Depositor
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR 3.8	Depositor
R, R_{free}	0.193 , 0.330	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3313	wwPDB-VP
Average B, all atoms (Å^2)	26.0	wwPDB-VP

5   Model quality ⓘ

5.1   Standard geometry ⓘ

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

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	L	0.47	0/1696	0.72	0/2301
2	H	0.50	0/1690	0.81	0/2310
All	All	0.49	0/3386	0.77	0/4611

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	L	1660	0	1598	83	0
2	H	1653	0	1617	118	0
All	All	3313	0	3215	193	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 30.

The worst 5 of 193 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:4:LEU:HD21	2:H:98:ARG:HB2	1.39	1.01
2:H:101:LEU:HD13	2:H:102:PRO:HD2	1.49	0.93
2:H:192:SER:HA	2:H:195:THR:HB	1.56	0.87
2:H:218:LYS:HZ2	2:H:219:SER:H	1.21	0.87
2:H:6:GLN:HE22	2:H:95:TYR:HA	1.41	0.85

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	L	212/214 (99%)	181 (85%)	28 (13%)	3 (1%)	11	36
2	H	218/220 (99%)	161 (74%)	42 (19%)	15 (7%)	1	3
All	All	430/434 (99%)	342 (80%)	70 (16%)	18 (4%)	3	10

5 of 18 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	H	28	ILE
2	H	133	LYS
2	H	101	LEU
1	L	30	ASP
1	L	143	GLU

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	L	190/190 (100%)	165 (87%)	25 (13%)	4	12
2	H	186/186 (100%)	149 (80%)	37 (20%)	1	4
All	All	376/376 (100%)	314 (84%)	62 (16%)	2	7

5 of 62 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	H	11	LEU
2	H	142	LEU
2	H	57	GLU
2	H	134	SER
2	H	214	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 13 such sidechains are listed below:

Mol	Chain	Res	Type
1	L	160	GLN
1	L	189	HIS
2	H	203	ASN
2	H	82	GLN
2	H	175	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

1 non-standard protein/DNA/RNA residue is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z| > 2$	Counts	RMSZ	#$|Z| > 2$
2	PCA	H	1	2	7,8,9	2.75	4 (57%)	9,10,12	2.83	3 (33%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	PCA	H	1	2	-	0/0/11/13	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	1	PCA	CB-CG	-5.68	1.40	1.53
2	H	1	PCA	OE-CD	2.72	1.28	1.23
2	H	1	PCA	CG-CD	-2.42	1.44	1.50
2	H	1	PCA	CD-N	2.35	1.40	1.34

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	1	PCA	CB-CG-CD	7.35	116.25	104.40
2	H	1	PCA	OE-CD-CG	3.32	132.55	126.76
2	H	1	PCA	CG-CD-N	-2.29	102.45	108.39

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates ⓘ

There are no monosaccharides 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 (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.