wwPDB X-ray Structure Validation Summary Report (i)

Aug 22, 2020 – 08:48 PM BST

PDB ID	:	6FGB
Title	:	Human FcRn extra-cellular domain complexed with Fab fragment of Rozano-lixizumab
Authors	:	Sarkar, K.; Ceska, T.; Meier, C.
Deposited on	:	2018-01-10
Resolution	:	2.90 Å(reported)

The following versions of software and data (see references (1)) were used in the production of this report:

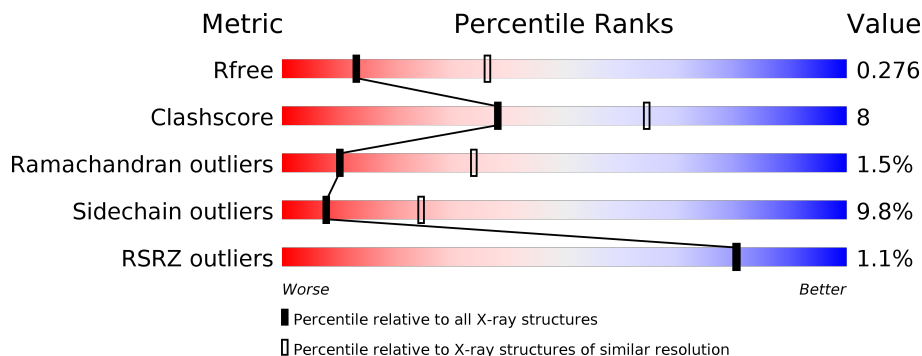|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.13.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.13.1

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 2.90 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
Rfree		0.276
Clashscore		8
Ramachandran outliers		1.5%
Sidechain outliers		9.8%
RSRZ outliers		1.1%

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))
R_{free}	130704	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (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 on 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% 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	342	60% · 16% · 23%
2	B	99	80% · 17% ·
3	L	219	74% · 22% ·
4	H	228	72% · 18% · 5% 5%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
6	NA	A	402	-	-	-	X

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 6141 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 IgG receptor FcRn large subunit p51.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	265	Total	C	N	O	S	0	0	0
			2015	1291	338	378	8			

- Molecule 2 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	99	Total	C	N	O	S	0	0	0
			811	517	137	154	3			

- Molecule 3 is a protein called 1519.g57- Light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	L	219	Total	C	N	O	S	0	0	0
			1672	1051	279	336	6			

- Molecule 4 is a protein called 1519.g57- Heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	H	217	Total	C	N	O	S	0	0	0
			1612	1023	269	314	6			

- Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Cl	0	0
			1	1		
5	L	1	Total	Cl	0	0
			1	1		

- Molecule 6 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	H	1	Total 1	Na 1	0	0
6	A	1	Total 1	Na 1	0	0

- Molecule 7 is water.

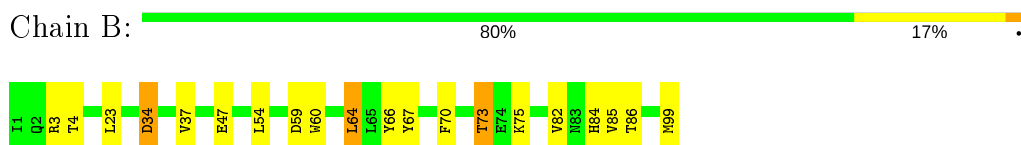| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	5	Total 5	O 5	0	0
7	B	9	Total 9	O 9	0	0
7	L	7	Total 7	O 7	0	0
7	H	6	Total 6	O 6	0	0

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.
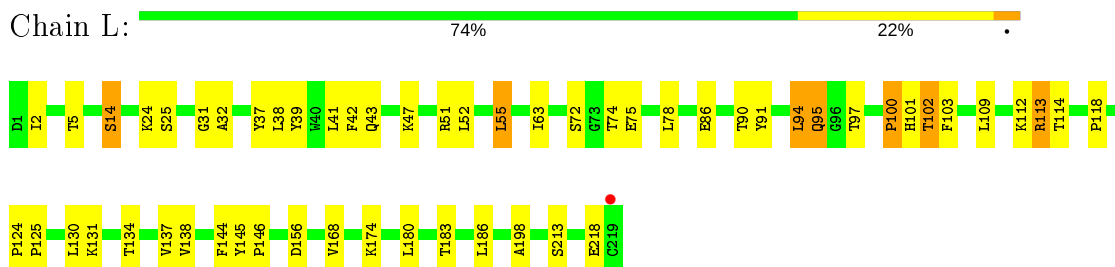
- Molecule 1: IgG receptor FcRn large subunit p51
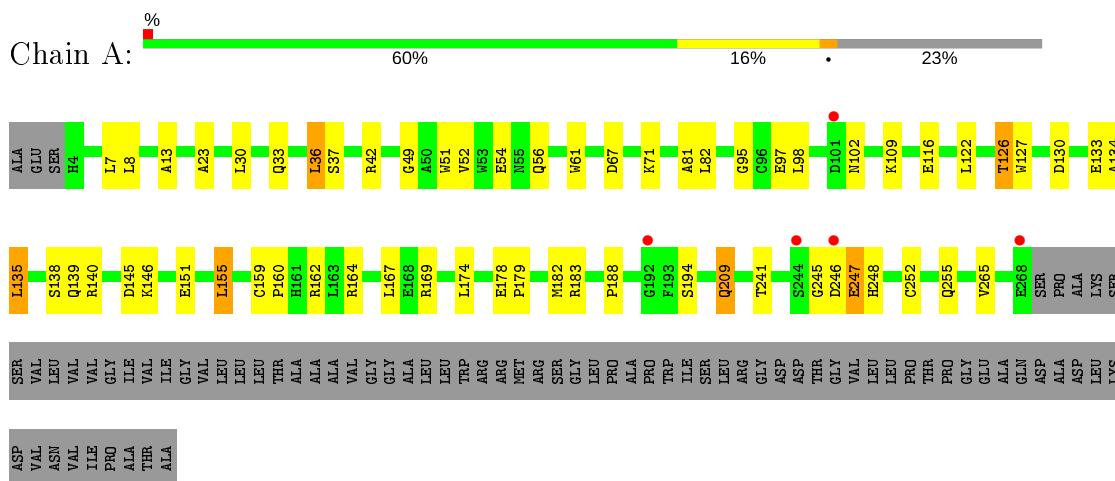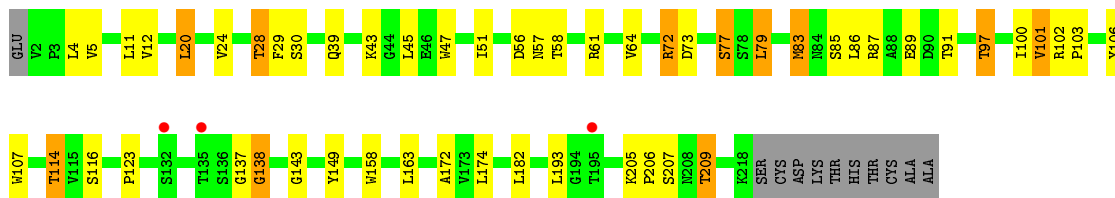
Chain A:

- Molecule 2: Beta-2-microglobulin

Chain B:

- Molecule 3: 1519.g57- Light chain

Chain L:

- Molecule 4: 1519.g57- Heavy chain

Chain H:

GLU V2 P3 L4 V5 L11 V12 L20 V24 T28 F29 S30 Q39 K43 G44 L45 E46 W47 I51 D56 N57 T58 R61 V64 R72 D73 S77 S78 L79 M83 N84 S85 L86 R87 A88 E89 D90 T91 T97 I100 V101 R102 P103 Y106

W107 T114 V115 S116 P123 S132 T135 S136 G137 G138 G143 Y149 W158 L163 A172 V173 L174 L182 L193 G194 T195 K205 P206 S207 N208 T209 K218 SER CYS ASP LYS THR HIS THR CYS ALA ALA

4   Data and refinement statistics (i)

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α, β, γ	150.10Å 150.10Å 89.15Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	30.00 – 2.90 29.82 – 2.90	Depositor EDS
% Data completeness (in resolution range)	99.9 (30.00-2.90) 99.9 (29.82-2.90)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	4.03 (at 2.90Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.232 , 0.284 0.228 , 0.276	Depositor DCC
R_{free} test set	1320 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å^2)	56.7	Xtriage
Anisotropy	0.061	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.29 , 23.7	EDS
L-test for twinning[2]	$<|L|> = 0.49, <L^2> = 0.32$	Xtriage
Estimated twinning fraction	0.032 for -h,-k,l	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	6141	wwPDB-VP
Average B, all atoms (Å^2)	50.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.01% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $<|L|>$, $<L^2>$ 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: NA, CL

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	0.50	0/2079	0.64	0/2837
2	B	0.44	0/834	0.61	0/1132
3	L	0.44	0/1709	0.67	1/2319 (0.0%)
4	H	0.46	0/1652	0.67	1/2257 (0.0%)
All	All	0.47	0/6274	0.65	2/8545 (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
3	L	0	1

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	H	79	LEU	CA-CB-CG	6.17	129.49	115.30
3	L	55	LEU	CA-CB-CG	-5.07	103.64	115.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	L	100	PRO	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	A	2015	0	1843	32	0
2	B	811	0	757	10	0
3	L	1672	0	1625	26	0
4	H	1612	0	1566	25	0
5	A	1	0	0	0	0
5	L	1	0	0	0	0
6	A	1	0	0	0	0
6	H	1	0	0	0	0
7	A	5	0	0	0	0
7	B	9	0	0	2	0
7	H	6	0	0	0	0
7	L	7	0	0	2	0
All	All	6141	0	5791	90	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 8.

The worst 5 of 90 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:24:LYS:HE2	3:L:74:THR:HG22	1.31	1.07
1:A:246:ASP:N	1:A:247:GLU:HB2	1.73	1.01
4:H:97:THR:HG22	4:H:106:TYR:O	1.66	0.95
3:L:37:TYR:HB2	3:L:97:THR:HG22	1.59	0.83
2:B:4:THR:HG22	2:B:86:THR:HB	1.60	0.82

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	263/342 (77%)	249 (95%)	13 (5%)	1 (0%)	34	66
2	B	97/99 (98%)	92 (95%)	3 (3%)	2 (2%)	7	26
3	L	217/219 (99%)	193 (89%)	19 (9%)	5 (2%)	6	23
4	H	215/228 (94%)	192 (89%)	19 (9%)	4 (2%)	8	28
All	All	792/888 (89%)	726 (92%)	54 (7%)	12 (2%)	10	34

5 of 12 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	H	138	GLY
4	H	64	VAL
4	H	77	SER
1	A	247	GLU
2	B	47	GLU

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	199/277 (72%)	182 (92%)	17 (8%)	10	31
2	B	89/94 (95%)	83 (93%)	6 (7%)	16	43
3	L	190/193 (98%)	175 (92%)	15 (8%)	12	34
4	H	178/192 (93%)	152 (85%)	26 (15%)	3	9
All	All	656/756 (87%)	592 (90%)	64 (10%)	8	24

5 of 64 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	L	94	LEU
3	L	137	VAL
4	H	114	THR

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Mol	Chain	Res	Type
3	L	95	GLN
3	L	113	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	209	GLN
1	A	248	HIS
4	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 ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 4 ligands modelled in this entry, 4 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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 ⓘ

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(Å²)	Q<0.9
1	A	265/342 (77%)	-0.18	5 (1%)	66	65	26, 44, 70, 79	1 (0%)
2	B	99/99 (100%)	-0.54	0	100	100	25, 39, 49, 53	0
3	L	219/219 (100%)	-0.07	1 (0%)	91	91	36, 54, 88, 96	0
4	H	217/228 (95%)	-0.12	3 (1%)	75	75	35, 54, 69, 75	0
All	All	800/888 (90%)	-0.18	9 (1%)	80	80	25, 49, 77, 96	1 (0%)

The worst 5 of 9 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	L	219	CYS	3.4
1	A	246	ASP	3.3
1	A	244	SER	2.8
1	A	192	GLY	2.8
4	H	195	THR	2.7

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

There are no non-standard protein/DNA/RNA residues in this entry.

6.3   Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4   Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	NA	A	402	1/1	0.78	0.41	46,46,46,46	0
5	CL	A	401	1/1	0.85	0.14	68,68,68,68	0
6	NA	H	301	1/1	0.87	0.39	58,58,58,58	0
5	CL	L	301	1/1	0.91	0.15	67,67,67,67	0

6.5 Other polymers (i)

There are no such residues in this entry.