



wwPDB X-ray Structure Validation Summary Report

Feb 28, 2014 – 06:42 PM GMT

PDB ID : 2WUC
Title : Crystal structure of HGFA in complex with the allosteric non- inhibitory antibody Fab40.deltaTrp and Ac-KQLR-chloromethylketone
Authors : Ganesan, R.; Eigenbrot, C.; Shia, S.; ,
Deposited on : 2009-10-01
Resolution : 2.70 Å(reported)

This is a wwPDB validation summary report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at <http://wwpdb.org/ValidationPDFNotes.html>

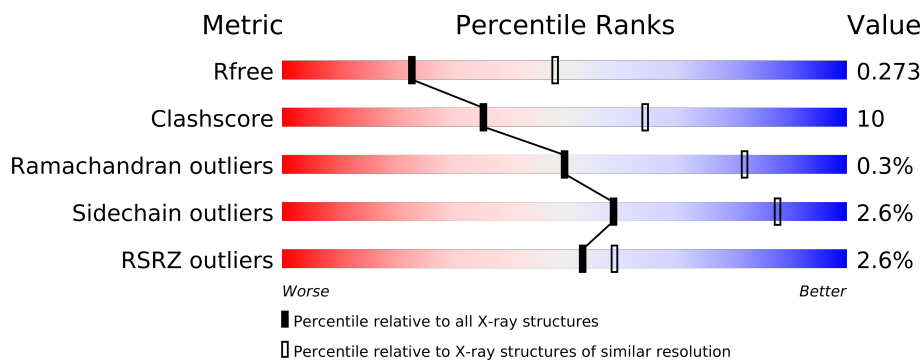
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity	:	4.02b-467
Mogul	:	1.15 2013
Xtriage (Phenix)	:	dev-1323
EDS	:	stable22639
Percentile statistics	:	21963
Refmac	:	5.8.0049
CCP4	:	6.3.0 (Settle)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP)	:	stable22683

1 Overall quality at a glance

The reported resolution of this entry is 2.70 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}	66092	1557 (2.70-2.70)
Clashscore	79885	1939 (2.70-2.70)
Ramachandran outliers	78287	1905 (2.70-2.70)
Sidechain outliers	78261	1905 (2.70-2.70)
RSRZ outliers	66119	1559 (2.70-2.70)

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. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	257	
2	B	35	
3	H	224	
4	I	6	
5	L	214	

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 5319 atoms, of which 0 are hydrogen and 0 are deuterium.

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 HEPATOCYTE GROWTH FACTOR ACTIVATOR LONG CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	240	Total	C	N	O	S	0	0	1
			1825	1156	317	339	13			

- Molecule 2 is a protein called HEPATOCYTE GROWTH FACTOR ACTIVATOR SHORT CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	7	Total	C	N	O	S	0	0	1
			48	26	15	6	1			

- Molecule 3 is a protein called FAB FRAGMENT FAB40.DELTATRP HEAVY CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	H	219	Total	C	N	O	S	0	0	1
			1613	1025	268	314	6			

- Molecule 4 is a protein called ACE-KQLR-CHLOROMETHYLKETONEINHIBITOR.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	I	6	Total	C	N	O	0	0	1
			41	26	9	6			

- Molecule 5 is a protein called FAB FRAGMENT FAB40.DELTATRP LIGHT CHAIN.

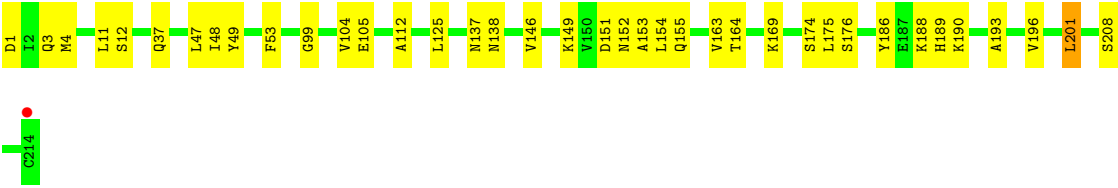
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	L	214	Total	C	N	O	S	0	0	0
			1633	1018	275	334	6			

- Molecule 6 is a polymer of unknown type called SUGAR (2-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	42	Total	O	0	0
			42	42		
7	B	1	Total	O	0	0
			1	1		
7	H	30	Total	O	0	0
			30	30		
7	I	2	Total	O	0	0
			2	2		
7	L	56	Total	O	0	0
			56	56		



4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	80.36Å 147.89Å 146.37Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.93 – 2.70 29.47 – 2.70	Depositor EDS
% Data completeness (in resolution range)	99.3 (19.93-2.70) 99.4 (29.47-2.70)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.00 (at 2.72Å)	Xtriage
Refinement program	CNS 1.2	Depositor
R, R_{free}	0.226 , 0.274 0.222 , 0.273	Depositor DCC
R_{free} test set	2388 reflections (10.99%)	DCC
Wilson B-factor (Å ²)	40.3	Xtriage
Anisotropy	0.293	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 10.9	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtriage
Outliers	0 of 24163 reflections	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	5319	wwPDB-VP
Average B, all atoms (Å ²)	38.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.95% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: AR7, 0QE, ACE, NAG

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	0.40	0/1879	0.62	0/2560
2	B	0.65	0/48	0.45	0/62
3	H	0.42	0/1656	0.62	0/2263
4	I	0.25	0/26	0.89	0/33
5	L	0.42	0/1667	0.63	0/2262
All	All	0.41	0/5276	0.62	0/7180

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
4	I	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
4	I	4	LEU	Mainchain

5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the

chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1825	0	1736	39	0
2	B	48	0	44	3	0
3	H	1613	0	1568	43	0
4	I	41	0	46	3	0
5	L	1633	0	1585	23	0
6	A	28	0	25	2	0
7	A	42	0	0	3	0
7	B	1	0	0	0	0
7	H	30	0	0	4	0
7	I	2	0	0	0	0
7	L	56	0	0	0	1
All	All	5319	0	5004	107	1

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 10.

The worst 5 of 107 close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
5:L:112:ALA:HB1	5:L:201:LEU:HD13	1.68	0.75
4:I:2:LYS:HE3	4:I:2:LYS:HA	1.73	0.71
3:H:119:PRO:HB3	3:H:145:TYR:HB3	1.75	0.69
1:A:167:LYS:O	1:A:171:VAL:HG21	1.95	0.67
1:A:45:SER:OG	1:A:198:PRO:HB3	1.94	0.67

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	Distance(Å)	Clash(Å)
7:L:2002:HOH:O	7:L:2002:HOH:O[4_545]	2.14	0.06

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	A	238/257 (93%)	218 (92%)	19 (8%)	1 (0%)	43	76
2	B	5/35 (14%)	3 (60%)	2 (40%)	0	100	100
3	H	215/224 (96%)	198 (92%)	17 (8%)	0	100	100
4	I	3/6 (50%)	2 (67%)	1 (33%)	0	100	100
5	L	212/214 (99%)	200 (94%)	11 (5%)	1 (0%)	38	70
All	All	673/736 (91%)	621 (92%)	50 (7%)	2 (0%)	50	82

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	L	138	ASN
1	A	171	VAL

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	A	199/213 (93%)	195 (98%)	4 (2%)	68	92
2	B	4/30 (13%)	3 (75%)	1 (25%)	1	2
3	H	175/181 (97%)	170 (97%)	5 (3%)	55	85
4	I	3/3 (100%)	3 (100%)	0	100	100
5	L	186/186 (100%)	181 (97%)	5 (3%)	57	87
All	All	567/613 (92%)	552 (97%)	15 (3%)	59	88

5 of 15 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	H	101	ASP
3	H	147	PRO
5	L	169	LYS
3	H	33	TYR
5	L	3	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 15 such sidechains are listed below:

Mol	Chain	Res	Type
3	H	3	GLN
3	H	30	ASN
3	H	204	ASN
1	A	239	ASN
3	H	199	ASN

5.3.3 RNA ⓘ

There are no RNA chains 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	$\# Z > 2$
4	AR7	I	5	1,4	7,8,11	1.52	2 (28%)	6,8,13	0.34	0

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
4	AR7	I	5	1,4	-	0/5/6/11	0/0/0/0

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	I	5	AR7	CA-CB	2.75	1.56	1.53
4	I	5	AR7	CZ-NH2	-2.17	1.29	1.32

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5.5 Carbohydrates ⓘ

2 carbohydrates are 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	$\# Z > 2$
6	NAG	A	1244	1,6	12,14,15	1.07	1 (8%)	15,19,21	0.64	0
6	NAG	A	1245	6	12,14,15	0.65	0	15,19,21	1.66	5 (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
6	NAG	A	1244	1,6	-	0/6/23/26	0/1/1/1
6	NAG	A	1245	6	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	1244	NAG	O5-C5	3.40	1.51	1.45

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	1245	NAG	C4-C3-C2	-3.68	102.30	111.32
6	A	1245	NAG	C2-N2-C7	-2.45	118.98	123.09
6	A	1245	NAG	O4-C4-C5	2.33	115.42	109.28
6	A	1245	NAG	O5-C5-C4	-2.25	107.80	110.65
6	A	1245	NAG	O4-C4-C3	2.01	114.86	110.35

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

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

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	240/257 (93%)	0.21	9 (3%) 38 43	20, 39, 72, 83	1 (0%)
2	B	7/35 (20%)	1.10	0 100 100	54, 65, 90, 91	0
3	H	219/224 (97%)	0.01	7 (3%) 45 50	18, 35, 57, 97	1 (0%)
4	I	6/6 (100%)	0.73	0 100 100	43, 57, 76, 79	0
5	L	214/214 (100%)	-0.32	1 (0%) 88 92	18, 31, 55, 87	0
All	All	686/736 (93%)	-0.01	17 (2%) 53 61	18, 35, 65, 97	2 (0%)

The worst 5 of 17 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	H	217	ASP	14.5
3	H	216	CYS	5.8
3	H	215	SER	5.1
1	A	148	VAL	5.0
1	A	244	PRO	4.8

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

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	RSR	LLDF	B-factors(Å ²)	Q<0.9
4	AR7	I	5	11/12	0.21	-	36,41,49,50	0

6.3 Carbohydrates [i](#)

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	RSR	LLDF	B-factors(Å ²)	Q<0.9
6	NAG	A	1244	14/15	0.30	-	53,63,68,68	0
6	NAG	A	1245	14/15	0.62	-	70,75,83,83	0

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.