WORLDWIDE wwPDB PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report (i)

Aug 24, 2023 – 10:08 AM JST

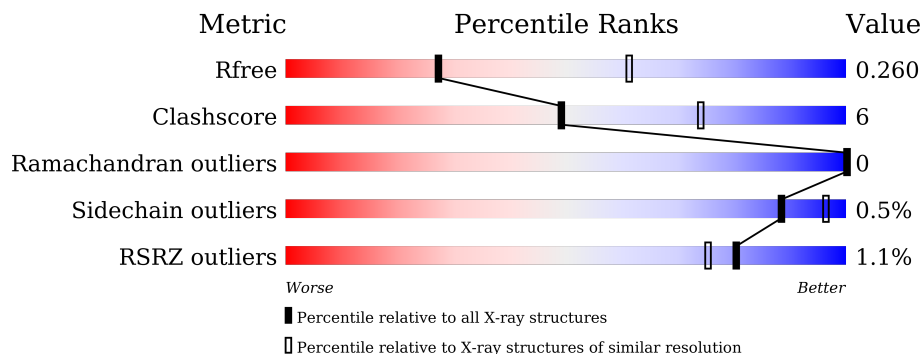|		
PDB ID	:	8GO5
Title	:	Fungal immunomodulatory protein FIP-nha WT
Authors	:	Liu, Y.; Bastiaan-Net, S.; Hoppenbrouwers, T.; Li, Z.
Deposited on	:	2022-08-24
Resolution	:	2.81 Å(reported)

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 2.81 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		0.260
Clashscore		6
Ramachandran outliers		0
Sidechain outliers		0.5%
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	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

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% 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	125	.% 74% 14% 12%
1	B	125	.% 83% 5% 12%
1	C	125	.% 74% 14% 11%
1	D	125	.% 67% 21% • 11%
1	E	125	2% 74% 14% 11%
1	F	125	77% 12% 11%

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Mol	Chain	Length	Quality of chain
1	G	125	73% 16% 11%
1	H	125	2% 76% 13% 11%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 7006 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 Fungal immunomodulatory proteins.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
1	D	111	Total	C	N	O	0	0	0
			861	547	145	169			
1	B	110	Total	C	N	O	0	0	0
			854	541	146	167			
1	A	110	Total	C	N	O	0	0	0
			880	560	151	169			
1	C	111	Total	C	N	O	0	0	0
			888	564	152	172			
1	E	111	Total	C	N	O	0	0	0
			878	558	148	172			
1	G	111	Total	C	N	O	0	0	0
			884	561	151	172			
1	H	111	Total	C	N	O	0	0	0
			877	559	151	167			
1	F	111	Total	C	N	O	0	0	0
			873	556	148	169			

There are 88 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	-4	GLY	-	expression tag	UNP C7ZE17
D	-3	PRO	-	expression tag	UNP C7ZE17
D	-2	LEU	-	expression tag	UNP C7ZE17
D	-1	GLY	-	expression tag	UNP C7ZE17
D	0	SER	-	expression tag	UNP C7ZE17
D	115	HIS	-	expression tag	UNP C7ZE17
D	116	HIS	-	expression tag	UNP C7ZE17
D	117	HIS	-	expression tag	UNP C7ZE17
D	118	HIS	-	expression tag	UNP C7ZE17
D	119	HIS	-	expression tag	UNP C7ZE17
D	120	HIS	-	expression tag	UNP C7ZE17
B	-4	GLY	-	expression tag	UNP C7ZE17
B	-3	PRO	-	expression tag	UNP C7ZE17

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-2	LEU	-	expression tag	UNP C7ZE17
B	-1	GLY	-	expression tag	UNP C7ZE17
B	0	SER	-	expression tag	UNP C7ZE17
B	115	HIS	-	expression tag	UNP C7ZE17
B	116	HIS	-	expression tag	UNP C7ZE17
B	117	HIS	-	expression tag	UNP C7ZE17
B	118	HIS	-	expression tag	UNP C7ZE17
B	119	HIS	-	expression tag	UNP C7ZE17
B	120	HIS	-	expression tag	UNP C7ZE17
A	-4	GLY	-	expression tag	UNP C7ZE17
A	-3	PRO	-	expression tag	UNP C7ZE17
A	-2	LEU	-	expression tag	UNP C7ZE17
A	-1	GLY	-	expression tag	UNP C7ZE17
A	0	SER	-	expression tag	UNP C7ZE17
A	115	HIS	-	expression tag	UNP C7ZE17
A	116	HIS	-	expression tag	UNP C7ZE17
A	117	HIS	-	expression tag	UNP C7ZE17
A	118	HIS	-	expression tag	UNP C7ZE17
A	119	HIS	-	expression tag	UNP C7ZE17
A	120	HIS	-	expression tag	UNP C7ZE17
C	-4	GLY	-	expression tag	UNP C7ZE17
C	-3	PRO	-	expression tag	UNP C7ZE17
C	-2	LEU	-	expression tag	UNP C7ZE17
C	-1	GLY	-	expression tag	UNP C7ZE17
C	0	SER	-	expression tag	UNP C7ZE17
C	115	HIS	-	expression tag	UNP C7ZE17
C	116	HIS	-	expression tag	UNP C7ZE17
C	117	HIS	-	expression tag	UNP C7ZE17
C	118	HIS	-	expression tag	UNP C7ZE17
C	119	HIS	-	expression tag	UNP C7ZE17
C	120	HIS	-	expression tag	UNP C7ZE17
E	-4	GLY	-	expression tag	UNP C7ZE17
E	-3	PRO	-	expression tag	UNP C7ZE17
E	-2	LEU	-	expression tag	UNP C7ZE17
E	-1	GLY	-	expression tag	UNP C7ZE17
E	0	SER	-	expression tag	UNP C7ZE17
E	115	HIS	-	expression tag	UNP C7ZE17
E	116	HIS	-	expression tag	UNP C7ZE17
E	117	HIS	-	expression tag	UNP C7ZE17
E	118	HIS	-	expression tag	UNP C7ZE17
E	119	HIS	-	expression tag	UNP C7ZE17
E	120	HIS	-	expression tag	UNP C7ZE17

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Chain	Residue	Modelled	Actual	Comment	Reference
G	-4	GLY	-	expression tag	UNP C7ZE17
G	-3	PRO	-	expression tag	UNP C7ZE17
G	-2	LEU	-	expression tag	UNP C7ZE17
G	-1	GLY	-	expression tag	UNP C7ZE17
G	0	SER	-	expression tag	UNP C7ZE17
G	115	HIS	-	expression tag	UNP C7ZE17
G	116	HIS	-	expression tag	UNP C7ZE17
G	117	HIS	-	expression tag	UNP C7ZE17
G	118	HIS	-	expression tag	UNP C7ZE17
G	119	HIS	-	expression tag	UNP C7ZE17
G	120	HIS	-	expression tag	UNP C7ZE17
H	-4	GLY	-	expression tag	UNP C7ZE17
H	-3	PRO	-	expression tag	UNP C7ZE17
H	-2	LEU	-	expression tag	UNP C7ZE17
H	-1	GLY	-	expression tag	UNP C7ZE17
H	0	SER	-	expression tag	UNP C7ZE17
H	115	HIS	-	expression tag	UNP C7ZE17
H	116	HIS	-	expression tag	UNP C7ZE17
H	117	HIS	-	expression tag	UNP C7ZE17
H	118	HIS	-	expression tag	UNP C7ZE17
H	119	HIS	-	expression tag	UNP C7ZE17
H	120	HIS	-	expression tag	UNP C7ZE17
F	-4	GLY	-	expression tag	UNP C7ZE17
F	-3	PRO	-	expression tag	UNP C7ZE17
F	-2	LEU	-	expression tag	UNP C7ZE17
F	-1	GLY	-	expression tag	UNP C7ZE17
F	0	SER	-	expression tag	UNP C7ZE17
F	115	HIS	-	expression tag	UNP C7ZE17
F	116	HIS	-	expression tag	UNP C7ZE17
F	117	HIS	-	expression tag	UNP C7ZE17
F	118	HIS	-	expression tag	UNP C7ZE17
F	119	HIS	-	expression tag	UNP C7ZE17
F	120	HIS	-	expression tag	UNP C7ZE17

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	D	2	Total 2	O 2	0	0
2	B	2	Total 2	O 2	0	0
2	A	2	Total 2	O 2	0	0

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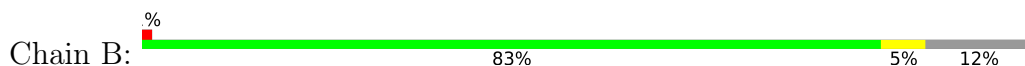| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	C	2	Total 2	O 2	0	0
2	E	1	Total 1	O 1	0	0
2	G	2	Total 2	O 2	0	0

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 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.
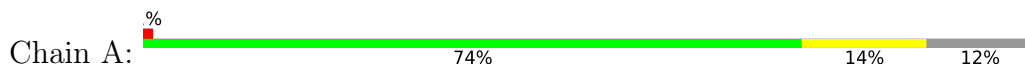
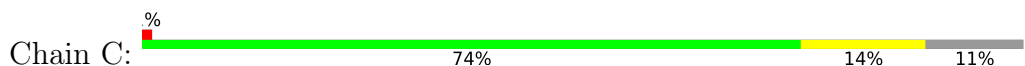- Molecule 1: Fungal immunomodulatory proteins
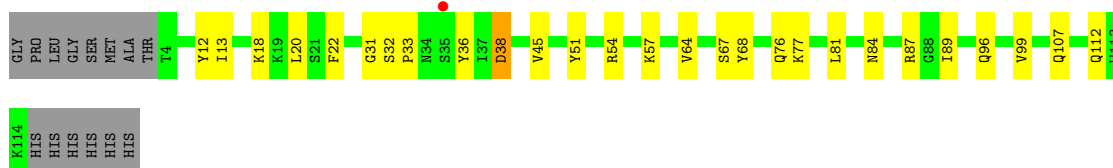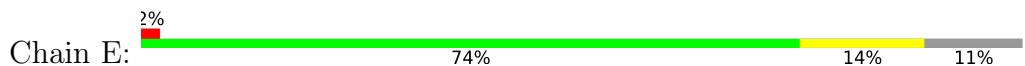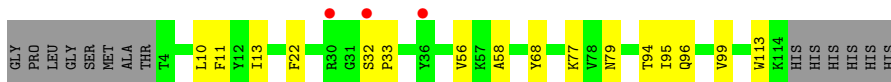
Chain D:

- Molecule 1: Fungal immunomodulatory proteins

Chain B:

- Molecule 1: Fungal immunomodulatory proteins

Chain A:

- Molecule 1: Fungal immunomodulatory proteins

Chain C:

- Molecule 1: Fungal immunomodulatory proteins

Chain E:

GLY PRO LEU GLY SER MET ALA THR T4 F11 G29 R30 G31 S32 P33 N34 S35 Y36 N39 R44 Y51 R54 V55 V56 K77 D91 T92 I95 Q96 V99 V100 Q107 Q112 W113 K114 HIS HIS HIS HIS HIS

• Molecule 1: Fungal immunomodulatory proteins

Chain G:

73%   16%   11%

GLY PRO LEU GLY SER MET ALA THR T4 F11 Y12 I13 V14 L20 S32 P33 L40 T41 F42 K52 Y53 R54 K57 A58 S67 I89 Q93 T94 I95 V99 Q107 W113 K114 HIS HIS HIS HIS HIS

• Molecule 1: Fungal immunomodulatory proteins

Chain H:

2%

76%   13%   11%

GLY PRO LEU GLY SER MET ALA THR T4 L10 F11 Y12 I13 F22 R30 G31 S32 P33 Y36 V56 K57 A58 Y68 K77 V78 N79 T94 I95 Q96 V99 W113 K114 HIS HIS HIS HIS HIS

• Molecule 1: Fungal immunomodulatory proteins

Chain F:

77%   12%   11%
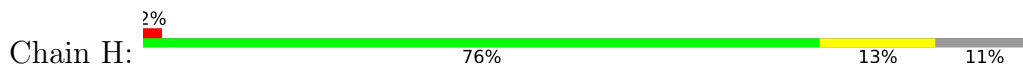
GLY PRO LEU GLY SER MET ALA THR T4 R30 G31 S32 P33 K49 P50 Y51 R54 V55 V56 D61 L62 G63 D73 T94 I95 Q96 V99 D103 Q107 K114 HIS HIS HIS HIS HIS HIS
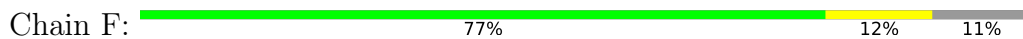
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	66.58Å 74.47Å 87.47Å 99.33° 112.15° 108.59°	Depositor
Resolution (Å)	25.69 – 2.81 25.69 – 2.81	Depositor EDS
% Data completeness (in resolution range)	96.9 (25.69-2.81) 96.9 (25.69-2.81)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	2.25 (at 2.80Å)	Xtriage
Refinement program	REFMAC 5.8.0123	Depositor
R, R_{free}	0.219 , 0.255 0.222 , 0.260	Depositor DCC
R_{free} test set	1640 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å^2)	56.9	Xtriage
Anisotropy	0.997	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 41.0	EDS
L-test for twinning[2]	$<|L|> = 0.49$, $<L^2> = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	7006	wwPDB-VP
Average B, all atoms (Å^2)	67.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 13.30% 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 (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	A	0.45	0/901	0.64	0/1226
1	B	0.46	0/874	0.62	0/1193
1	C	0.49	0/909	0.63	0/1237
1	D	0.47	0/881	0.66	0/1203
1	E	0.47	0/899	0.62	0/1226
1	F	0.52	0/894	0.71	0/1220
1	G	0.50	0/905	0.67	0/1233
1	H	0.46	0/898	0.63	0/1224
All	All	0.48	0/7161	0.65	0/9762

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 (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	880	0	847	11	0
1	B	854	0	799	5	0
1	C	888	0	857	11	0
1	D	861	0	813	16	0
1	E	878	0	835	10	0
1	F	873	0	828	10	0
1	G	884	0	846	18	0
1	H	877	0	833	13	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	2	0	0	1	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
2	E	1	0	0	0	0
2	G	2	0	0	0	0
All	All	7006	0	6658	81	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 6.

The worst 5 of 81 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:G:95:ILE:HG22	1:G:113:TRP:HB3	1.44	0.99
1:A:44:ARG:HD2	2:A:201:HOH:O	1.86	0.76
1:E:100:VAL:HG12	1:E:107:GLN:HG2	1.67	0.75
1:E:56:VAL:HG22	1:E:96:GLN:HB2	1.72	0.72
1:H:58:ALA:N	1:H:94:THR:O	2.26	0.67

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	A	108/125 (86%)	106 (98%)	2 (2%)	0	100	100
1	B	108/125 (86%)	107 (99%)	1 (1%)	0	100	100
1	C	109/125 (87%)	108 (99%)	1 (1%)	0	100	100
1	D	109/125 (87%)	108 (99%)	1 (1%)	0	100	100
1	E	109/125 (87%)	108 (99%)	1 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	F	109/125 (87%)	108 (99%)	1 (1%)	0	100	100
1	G	109/125 (87%)	107 (98%)	2 (2%)	0	100	100
1	H	109/125 (87%)	108 (99%)	1 (1%)	0	100	100
All	All	870/1000 (87%)	860 (99%)	10 (1%)	0	100	100

There are no Ramachandran outliers to report.

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	95/108 (88%)	95 (100%)	0	100	100
1	B	90/108 (83%)	90 (100%)	0	100	100
1	C	97/108 (90%)	97 (100%)	0	100	100
1	D	92/108 (85%)	91 (99%)	1 (1%)	73	92
1	E	95/108 (88%)	94 (99%)	1 (1%)	73	92
1	F	93/108 (86%)	91 (98%)	2 (2%)	52	83
1	G	96/108 (89%)	96 (100%)	0	100	100
1	H	92/108 (85%)	92 (100%)	0	100	100
All	All	750/864 (87%)	746 (100%)	4 (0%)	88	96

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	38	ASP
1	E	44	ARG
1	F	30	ARG
1	F	94	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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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 ⓘ

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	110/125 (88%)	-0.55	1 (0%)	84	80	45, 61, 94, 110	0
1	B	110/125 (88%)	-0.33	1 (0%)	84	80	42, 68, 102, 111	0
1	C	111/125 (88%)	-0.57	1 (0%)	84	80	41, 58, 88, 117	0
1	D	111/125 (88%)	-0.51	1 (0%)	84	80	46, 63, 94, 118	0
1	E	111/125 (88%)	-0.31	3 (2%)	54	44	48, 70, 116, 133	0
1	F	111/125 (88%)	-0.62	0	100	100	43, 59, 91, 110	0
1	G	111/125 (88%)	-0.45	0	100	100	44, 63, 88, 101	0
1	H	111/125 (88%)	-0.21	3 (2%)	54	44	46, 75, 101, 123	0
All	All	886/1000 (88%)	-0.44	10 (1%)	80	75	41, 64, 99, 133	0

The worst 5 of 10 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	92	THR	3.6
1	A	32	SER	3.4
1	B	92	THR	3.3
1	C	32	SER	3.2
1	H	32	SER	3.1

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.

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6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.