



# Full wwPDB X-ray Structure Validation Report ⓘ

Jan 16, 2018 – 06:36 AM EST

PDB ID : 5NVL  
Title : Crystal structure of the human 4EHP-GIGYF2 complex  
Authors : Peter, D.; Valkov, E.  
Deposited on : 2017-05-04  
Resolution : 2.30 Å(reported)

This is a Full wwPDB X-ray Structure Validation 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

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20030736  
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20030736

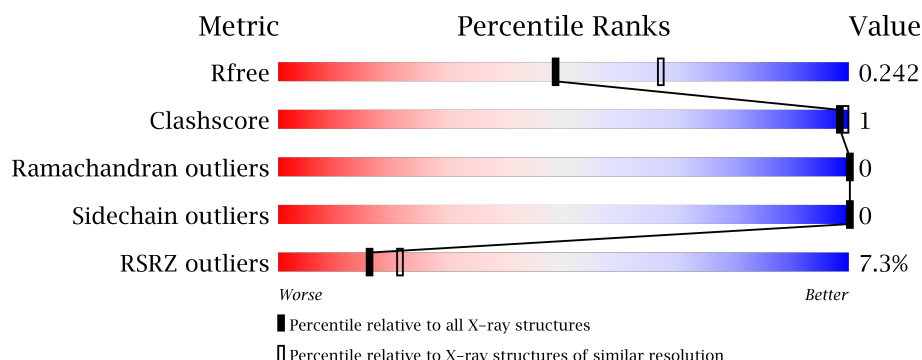
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.30 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))
$R_{free}$	100719	4130 (2.30-2.30)
Clashscore	112137	4751 (2.30-2.30)
Ramachandran outliers	110173	4705 (2.30-2.30)
Sidechain outliers	110143	4704 (2.30-2.30)
RSRZ outliers	101464	4156 (2.30-2.30)

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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  $\leq 5\%$ . 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	189	<div> <div>10%</div> <div> <div></div> <div>84%</div> <div>•</div> <div>14%</div> </div> </div>
1	C	189	<div> <div>4%</div> <div> <div></div> <div>81%</div> <div>•</div> <div>17%</div> </div> </div>
2	B	75	<div> <div>3%</div> <div> <div></div> <div>92%</div> <div></div> <div>8%</div> </div> </div>
2	D	75	<div> <div>7%</div> <div> <div></div> <div>88%</div> <div>•</div> <div>11%</div> </div> </div>

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 7508 atoms, of which 3697 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 Eukaryotic translation initiation factor 4E type 2.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	163	Total	C	H	N	O	S	0	0	0
			2662	859	1315	240	240	8			
1	C	156	Total	C	H	N	O	S	0	0	0
			2549	822	1260	230	230	7			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	46	GLY	-	expression tag	UNP O60573
A	47	PRO	-	expression tag	UNP O60573
A	48	HIS	-	expression tag	UNP O60573
A	49	MET	-	expression tag	UNP O60573
A	50	LEU	-	expression tag	UNP O60573
A	51	GLU	-	expression tag	UNP O60573
C	46	GLY	-	expression tag	UNP O60573
C	47	PRO	-	expression tag	UNP O60573
C	48	HIS	-	expression tag	UNP O60573
C	49	MET	-	expression tag	UNP O60573
C	50	LEU	-	expression tag	UNP O60573
C	51	GLU	-	expression tag	UNP O60573

- Molecule 2 is a protein called GRB10-interacting GYF protein 2.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	B	69	Total	C	H	N	O	S	0	0	0
			1130	362	570	90	106	2			
2	D	67	Total	C	H	N	O	S	0	0	0
			1097	352	552	88	103	2			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	31	GLY	-	expression tag	UNP Q6Y7W6
B	32	PRO	-	expression tag	UNP Q6Y7W6
B	33	HIS	-	expression tag	UNP Q6Y7W6
B	34	MET	-	expression tag	UNP Q6Y7W6
D	31	GLY	-	expression tag	UNP Q6Y7W6
D	32	PRO	-	expression tag	UNP Q6Y7W6
D	33	HIS	-	expression tag	UNP Q6Y7W6
D	34	MET	-	expression tag	UNP Q6Y7W6

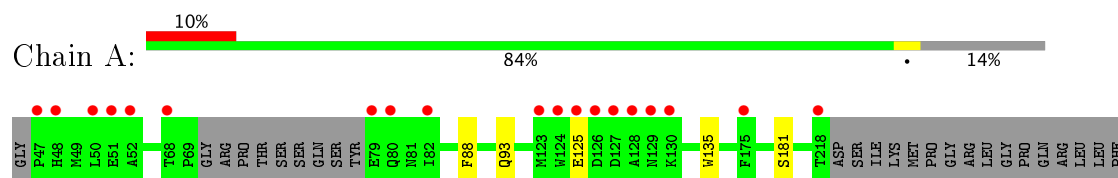
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	26	Total	O	0	0
			26	26		
3	B	7	Total	O	0	0
			7	7		
3	C	29	Total	O	0	0
			29	29		
3	D	8	Total	O	0	0
			8	8		

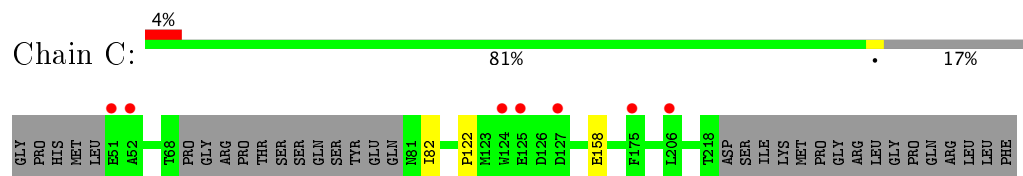
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

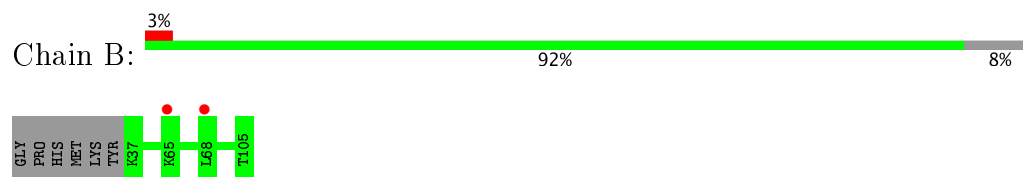
- Molecule 1: Eukaryotic translation initiation factor 4E type 2



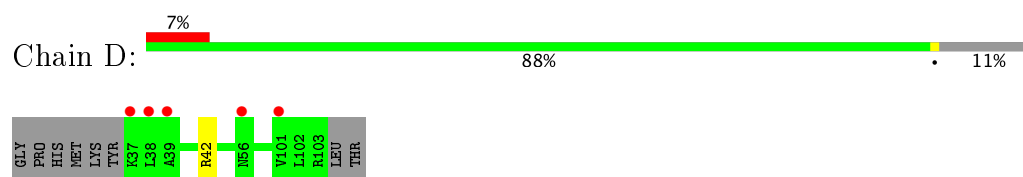
- Molecule 1: Eukaryotic translation initiation factor 4E type 2



- Molecule 2: GRB10-interacting GYF protein 2



- Molecule 2: GRB10-interacting GYF protein 2



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	82.55Å 82.55Å 148.49Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	45.89 – 2.30 45.89 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.8 (45.89-2.30) 99.8 (45.89-2.30)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.12	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.14 (at 2.29Å)	Xtriage
Refinement program	PHENIX (1.10.1 _2155: ???)	Depositor
R, $R_{free}$	0.205 , 0.242 0.204 , 0.242	Depositor DCC
$R_{free}$ test set	1167 reflections (4.97%)	DCC
Wilson B-factor (Å <sup>2</sup> )	45.8	Xtriage
Anisotropy	0.457	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.38 , 44.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.43$ , $\langle L^2 \rangle = 0.25$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	7508	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	68.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.70% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  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	0.28	0/1383	0.44	0/1869
1	C	0.28	0/1322	0.45	0/1786
2	B	0.27	0/571	0.43	0/773
2	D	0.28	0/556	0.42	0/752
All	All	0.28	0/3832	0.44	0/5180

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	1347	1315	1314	3	0
1	C	1289	1260	1258	2	0
2	B	560	570	569	0	0
2	D	545	552	551	1	0
3	A	26	0	0	0	0
3	B	7	0	0	0	0
3	C	29	0	0	0	0
3	D	8	0	0	0	0
All	All	3811	3697	3692	5	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 1.

All (5) 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:A:125:GLU:N	1:A:125:GLU:OE1	2.23	0.71
1:C:158:GLU:O	2:D:42:ARG:NH1	2.44	0.50
1:C:82:ILE:HD13	1:C:122:PRO:HG2	1.94	0.49
1:A:88:PHE:HB2	1:A:93:GLN:HB3	1.99	0.43
1:A:135:TRP:O	1:A:181:SER:HA	2.19	0.41

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	159/189 (84%)	156 (98%)	3 (2%)	0	100	100
1	C	152/189 (80%)	146 (96%)	6 (4%)	0	100	100
2	B	67/75 (89%)	65 (97%)	2 (3%)	0	100	100
2	D	65/75 (87%)	64 (98%)	1 (2%)	0	100	100
All	All	443/528 (84%)	431 (97%)	12 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 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	144/166 (87%)	144 (100%)	0	100	100
1	C	137/166 (82%)	137 (100%)	0	100	100
2	B	63/68 (93%)	63 (100%)	0	100	100
2	D	61/68 (90%)	61 (100%)	0	100	100
All	All	405/468 (86%)	405 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

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

### 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 carbohydrates 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 ⓘ

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	163/189 (86%)	0.52	19 (11%) 5 7	34, 52, 119, 233	0
1	C	156/189 (82%)	0.37	7 (4%) 34 41	34, 54, 95, 131	0
2	B	69/75 (92%)	0.22	2 (2%) 52 59	38, 55, 86, 107	0
2	D	67/75 (89%)	0.63	5 (7%) 15 20	38, 61, 94, 113	0
All	All	455/528 (86%)	0.44	33 (7%) 16 21	34, 56, 103, 233	0

All (33) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	80	GLN	6.6
1	A	127	ASP	6.4
1	A	124	TRP	6.2
2	D	37	LYS	6.2
1	A	48	HIS	5.3
1	A	128	ALA	5.2
1	C	51	GLU	4.7
2	D	101	VAL	4.6
1	A	47	PRO	4.6
1	A	130	LYS	4.3
1	C	124	TRP	4.2
1	A	125	GLU	4.2
1	C	125	GLU	3.5
1	A	68	THR	3.4
2	B	68	LEU	3.4
1	A	52	ALA	3.2
2	D	38	LEU	3.2
1	C	175	PHE	3.1
1	A	129	ASN	3.1
1	A	126	ASP	3.0
1	A	218	THR	3.0

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Mol	Chain	Res	Type	RSRZ
1	A	79	GLU	2.7
1	C	52	ALA	2.6
1	A	51	GLU	2.6
2	D	56	ASN	2.6
1	A	50	LEU	2.5
1	A	82	ILE	2.5
2	D	39	ALA	2.5
2	B	65	LYS	2.4
1	A	123	MET	2.2
1	A	175	PHE	2.2
1	C	206	LEU	2.1
1	C	127	ASP	2.0

## 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

## 6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 6.4 Ligands [i](#)

There are no ligands in this entry.

## 6.5 Other polymers [i](#)

There are no such residues in this entry.