



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 13, 2017 – 05:01 pm GMT

PDB ID : 2YOP  
Title : Long wavelength S-SAD structure of FAM3B PANDER  
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Deposited on : 2012-10-26  
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  
Mogul : 1.7.2 (RC1), CSD as538be (2017)  
Xtriage (Phenix) : 1.9-1692  
EDS : trunk28620  
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) : recalc28949

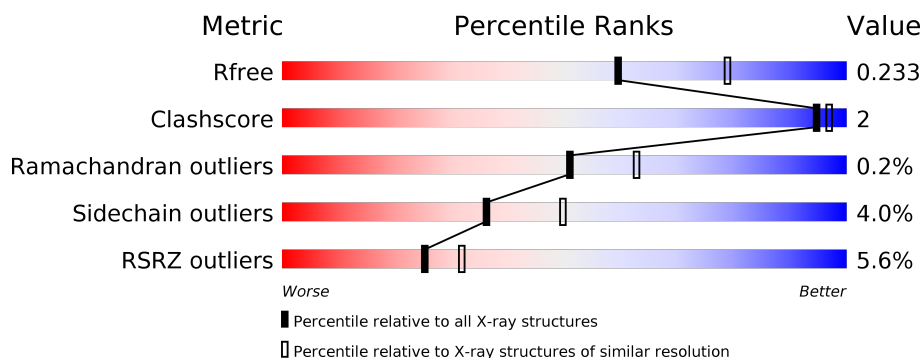
# 1 Overall quality at a glance ⓘ

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	198	<div> <div>8%</div> <div> <div></div> <div>80%</div> <div>10%</div> <div>11%</div> </div> </div>
1	B	198	<div> <div>6%</div> <div> <div></div> <div>86%</div> <div>5%</div> <div>9%</div> </div> </div>
1	C	198	<div> <div>2%</div> <div> <div></div> <div>84%</div> <div>7%</div> <div>9%</div> </div> </div>

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 4577 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 PROTEIN FAM3B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	177	Total	C	N	O	S	0	0	0
			1391	877	242	264	8			
1	B	180	Total	C	N	O	S	0	0	0
			1420	896	246	270	8			
1	C	181	Total	C	N	O	S	0	0	0
			1428	903	248	269	8			

There are 24 discrepancies between the modelled and reference sequences:

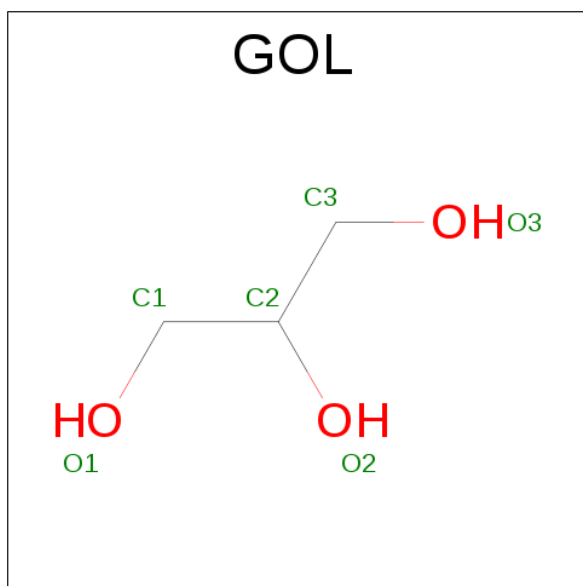
Chain	Residue	Modelled	Actual	Comment	Reference
A	236	ASP	-	EXPRESSION TAG	UNP Q9D309
A	237	TYR	-	EXPRESSION TAG	UNP Q9D309
A	238	LYS	-	EXPRESSION TAG	UNP Q9D309
A	239	ASP	-	EXPRESSION TAG	UNP Q9D309
A	240	ASP	-	EXPRESSION TAG	UNP Q9D309
A	241	ASP	-	EXPRESSION TAG	UNP Q9D309
A	242	ASP	-	EXPRESSION TAG	UNP Q9D309
A	243	LYS	-	EXPRESSION TAG	UNP Q9D309
B	236	ASP	-	EXPRESSION TAG	UNP Q9D309
B	237	TYR	-	EXPRESSION TAG	UNP Q9D309
B	238	LYS	-	EXPRESSION TAG	UNP Q9D309
B	239	ASP	-	EXPRESSION TAG	UNP Q9D309
B	240	ASP	-	EXPRESSION TAG	UNP Q9D309
B	241	ASP	-	EXPRESSION TAG	UNP Q9D309
B	242	ASP	-	EXPRESSION TAG	UNP Q9D309
B	243	LYS	-	EXPRESSION TAG	UNP Q9D309
C	236	ASP	-	EXPRESSION TAG	UNP Q9D309
C	237	TYR	-	EXPRESSION TAG	UNP Q9D309
C	238	LYS	-	EXPRESSION TAG	UNP Q9D309
C	239	ASP	-	EXPRESSION TAG	UNP Q9D309
C	240	ASP	-	EXPRESSION TAG	UNP Q9D309
C	241	ASP	-	EXPRESSION TAG	UNP Q9D309
C	242	ASP	-	EXPRESSION TAG	UNP Q9D309

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Chain	Residue	Modelled	Actual	Comment	Reference
C	243	LYS	-	EXPRESSION TAG	UNP Q9D309

- Molecule 2 is GLYCEROL (three-letter code: GOL) (formula:  $C_3H_8O_3$ ).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 6 3 3	0	0
2	C	1	Total C O 6 3 3	0	0
2	C	1	Total C O 6 3 3	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	89	Total O 89 89	0	0
3	B	95	Total O 95 95	0	0
3	C	136	Total O 136 136	0	0



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	42.93Å 90.44Å 185.28Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.76 – 2.30 29.76 – 2.30	Depositor EDS
% Data completeness (in resolution range)	97.0 (29.76-2.30) 97.1 (29.76-2.30)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.10 (at 2.31Å)	Xtriage
Refinement program	BUSTER 2.11.1	Depositor
R, $R_{free}$	0.185 , 0.229 0.188 , 0.233	Depositor DCC
$R_{free}$ test set	1619 reflections (5.32%)	DCC
Wilson B-factor (Å <sup>2</sup> )	38.0	Xtriage
Anisotropy	0.590	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.31 , 47.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	4577	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	46.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.43% 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

### 5.1 Standard geometry

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

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	0.47	0/1421	0.74	0/1911
1	B	0.50	0/1451	0.72	0/1951
1	C	0.51	0/1460	0.71	0/1962
All	All	0.49	0/4332	0.73	0/5824

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	A	1391	0	1367	8	0
1	B	1420	0	1393	2	0
1	C	1428	0	1410	4	0
2	A	6	0	8	2	0
2	C	12	0	16	0	0
3	A	89	0	0	1	0
3	B	95	0	0	0	0
3	C	136	0	0	0	0
All	All	4577	0	4194	13	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 2.

All (13) 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:B:154:VAL:HG12	1:B:189:VAL:HG12	1.81	0.63
1:A:157:ASP:OD1	2:A:1192:GOL:H11	2.01	0.58
1:C:154:VAL:HG12	1:C:189:VAL:HG12	1.90	0.54
1:A:168:LYS:HB3	1:A:180:LYS:HD3	1.90	0.54
1:A:79:LEU:HD22	1:C:237:TYR:HB3	1.90	0.52
1:A:185:ARG:HH21	2:A:1192:GOL:H12	1.78	0.49
1:C:179:ILE:HD12	1:C:182:MET:HG3	1.95	0.49
1:A:154:VAL:HG12	1:A:189:VAL:HG12	1.95	0.46
1:A:202:ILE:HG22	3:A:2087:HOH:O	2.18	0.44
1:A:137:PRO:HA	1:A:140:LYS:HG2	2.00	0.43
1:B:78:LEU:O	1:B:225:GLN:HA	2.19	0.43
1:A:145:THR:HG21	1:A:151:LEU:HD21	2.01	0.42
1:C:78:LEU:HD11	1:C:152:PHE:CD1	2.56	0.40

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	175/198 (88%)	168 (96%)	6 (3%)	1 (1%)	28	34
1	B	178/198 (90%)	173 (97%)	5 (3%)	0	100	100
1	C	179/198 (90%)	174 (97%)	5 (3%)	0	100	100
All	All	532/594 (90%)	515 (97%)	16 (3%)	1 (0%)	51	63

All (1) Ramachandran outliers are listed below:



Mol	Chain	Res	Type
1	A	71	PRO

### 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	148/166 (89%)	142 (96%)	6 (4%)	35	48
1	B	151/166 (91%)	146 (97%)	5 (3%)	43	59
1	C	152/166 (92%)	145 (95%)	7 (5%)	31	42
All	All	451/498 (91%)	433 (96%)	18 (4%)	36	50

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	60	ARG
1	A	62	LYS
1	A	135	SER
1	A	147	SER
1	A	162	LYS
1	A	201	GLU
1	B	84	ARG
1	B	135	SER
1	B	147	SER
1	B	162	LYS
1	B	212	GLN
1	C	59	LYS
1	C	122	ILE
1	C	135	SER
1	C	147	SER
1	C	162	LYS
1	C	197	GLU
1	C	203	GLU

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	166	GLN
1	B	166	GLN
1	C	166	GLN

### 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](#)

3 ligands 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	$\# Z  > 2$
2	GOL	A	1192	-	5,5,5	0.83	0	5,5,5	1.37	1 (20%)
2	GOL	C	1194	-	5,5,5	0.93	0	5,5,5	0.78	0
2	GOL	C	1195	-	5,5,5	0.25	0	5,5,5	0.87	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
2	GOL	A	1192	-	-	0/4/4/4	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GOL	C	1194	-	-	0/4/4/4	0/0/0/0
2	GOL	C	1195	-	-	0/4/4/4	0/0/0/0

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1192	GOL	C3-C2-C1	-2.40	101.98	111.52

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1192	GOL	2	0

## 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	177/198 (89%)	0.17	15 (8%) 11 16	27, 49, 83, 107	0
1	B	180/198 (90%)	0.08	11 (6%) 22 28	25, 46, 79, 99	0
1	C	181/198 (91%)	-0.04	4 (2%) 62 69	23, 35, 62, 87	0
All	All	538/594 (90%)	0.07	30 (5%) 25 32	23, 42, 78, 107	0

All (30) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	58	PRO	5.4
1	B	130	TYR	4.4
1	C	59	LYS	4.3
1	B	213	SER	4.1
1	B	218	ALA	3.9
1	A	235	ARG	3.5
1	B	212	GLN	3.3
1	A	68	PRO	3.3
1	A	69	CYS	3.3
1	A	70	PRO	3.3
1	C	154	VAL	3.2
1	A	67	SER	3.1
1	A	71	PRO	2.9
1	B	131	GLU	2.8
1	B	216	ARG	2.8
1	A	200	SER	2.7
1	A	102	THR	2.5
1	B	102	THR	2.4
1	C	189	VAL	2.4
1	A	133	ASP	2.4
1	B	132	GLY	2.3
1	A	101	LYS	2.3
1	A	66	TRP	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	236	ASP	2.2
1	B	106	ALA	2.1
1	B	133	ASP	2.1
1	A	234	LEU	2.1
1	B	217	TYR	2.1
1	A	72	ASP	2.0
1	A	61	GLN	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](#)

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, 95<sup>th</sup> 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	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
2	GOL	C	1195	6/6	0.83	0.17	1.18	82,82,82,83	0
2	GOL	A	1192	6/6	0.96	0.14	0.99	44,46,46,47	0
2	GOL	C	1194	6/6	0.94	0.08	-1.68	29,32,34,34	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.