



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 02:21 PM UTC

PDB ID : 5AWU / pdb_00005awu
Title : Crystal structure of the SGIP1 mu homology domain in complex with an Eps15 fragment containing two DPF motifs (YDPFKGSDPFA)
Authors : Shimada, A.; Yamaguchi, A.; Kohda, D.
Deposited on : 2015-07-08
Resolution : 2.70 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

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4-5-2 with Phenix2.0
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

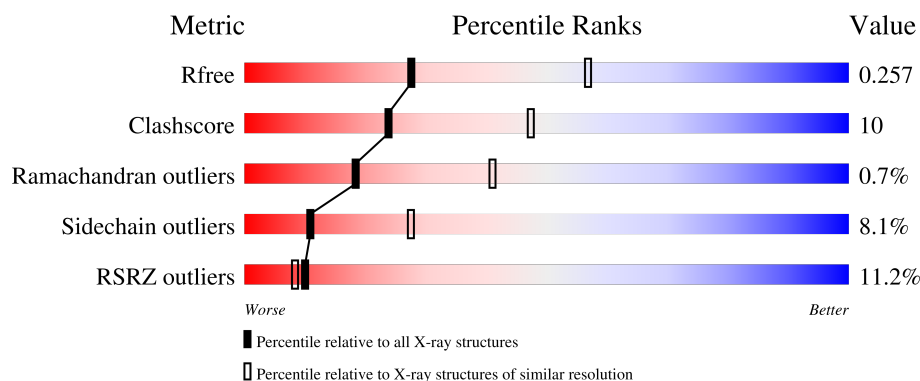
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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}	180053	3538 (2.70-2.70)
Clashscore	190562	3843 (2.70-2.70)
Ramachandran outliers	187476	3778 (2.70-2.70)
Sidechain outliers	187428	3778 (2.70-2.70)
RSRZ outliers	180081	3538 (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 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 $\leq 5\%$. 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	282	10% 69% 21% 6%
2	B	11	36% 55% 36% 9%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 2148 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 SH3-containing GRB2-like protein 3-interacting protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	265	Total	C	N	O	S	0	0	0
			2049	1310	348	381	10			

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	547	GLY	-	expression tag	UNP Q9BQI5
A	548	PRO	-	expression tag	UNP Q9BQI5
A	549	LEU	-	expression tag	UNP Q9BQI5
A	550	GLY	-	expression tag	UNP Q9BQI5
A	551	SER	-	expression tag	UNP Q9BQI5

- Molecule 2 is a protein called Epidermal growth factor receptor substrate 15.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	B	11	Total	C	N	O	0	0	0
			88	59	12	17			

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	4	Total	Zn	0	0
			4	4		

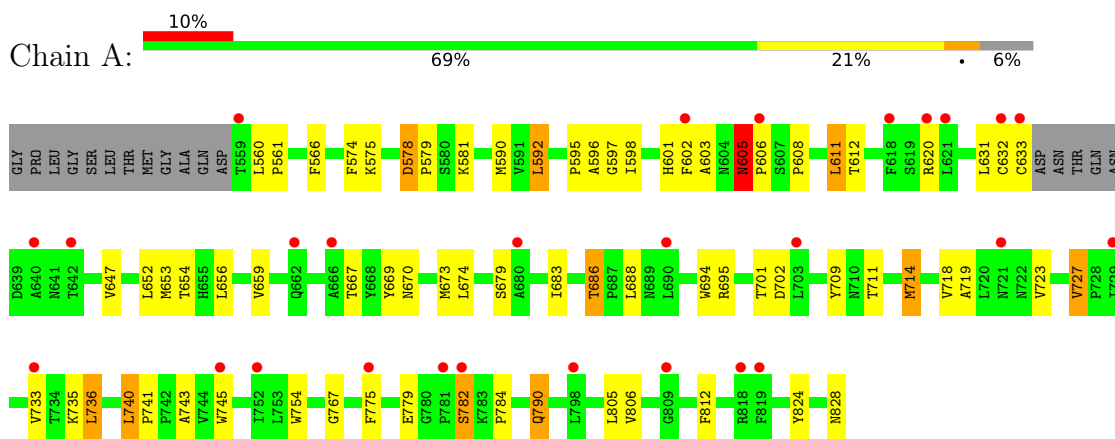
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	7	Total	O	0	0
			7	7		

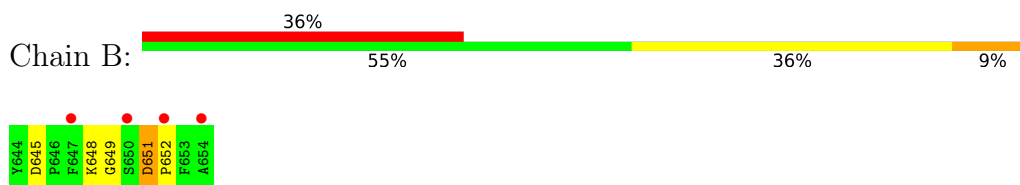
3 Residue-property plots [i](#)

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: SH3-containing GRB2-like protein 3-interacting protein 1



- Molecule 2: Epidermal growth factor receptor substrate 15



4 Data and refinement statistics

Property	Value	Source
Space group	P 4 21 2	Depositor
Cell constants a, b, c, α , β , γ	109.56Å 109.56Å 80.09Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	37.61 – 2.70 37.61 – 2.70	Depositor EDS
% Data completeness (in resolution range)	98.9 (37.61-2.70) 99.8 (37.61-2.70)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.06 (at 2.69Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8.2_1309)	Depositor
R, R_{free}	0.209 , 0.245 0.215 , 0.257	Depositor DCC
R_{free} test set	712 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	69.9	Xtriage
Anisotropy	0.641	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 66.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	2148	wwPDB-VP
Average B, all atoms (Å ²)	95.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.51% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: ZN

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	0.55	0/2096	0.92	8/2853 (0.3%)
2	B	0.31	0/92	0.99	2/124 (1.6%)
All	All	0.54	0/2188	0.92	10/2977 (0.3%)

There are no bond length outliers.

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	631	LEU	N-CA-C	7.85	121.00	109.07
2	B	651	ASP	CA-C-N	6.13	125.69	119.19
2	B	651	ASP	C-N-CA	6.13	125.69	119.19
1	A	578	ASP	CA-C-N	5.79	126.19	119.47
1	A	578	ASP	C-N-CA	5.79	126.19	119.47
1	A	727	VAL	CA-C-N	5.57	125.75	119.90
1	A	727	VAL	C-N-CA	5.57	125.75	119.90
1	A	605	ASN	N-CA-C	5.51	121.98	109.81
1	A	632	CYS	N-CA-C	5.17	118.96	111.56
1	A	603	ALA	N-CA-C	-5.08	107.21	113.41

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	2049	0	2058	39	1
2	B	88	0	74	5	0
3	A	4	0	0	0	0
4	A	7	0	0	0	0
All	All	2148	0	2132	43	1

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 10.

All (43) 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:620:ARG:NH1	1:A:679:SER:O	2.16	0.78
1:A:606:PRO:HB3	1:A:653:MET:HE1	1.78	0.64
1:A:740:LEU:HD23	1:A:741:PRO:HA	1.82	0.61
1:A:560:LEU:HD12	1:A:561:PRO:HD2	1.83	0.61
1:A:574:PHE:HZ	1:A:686:THR:HG21	1.67	0.60
1:A:590:MET:HE3	1:A:592:LEU:HD13	1.85	0.59
1:A:602:PHE:HB3	1:A:653:MET:HE2	1.85	0.58
1:A:590:MET:HE2	1:A:673:MET:HB2	1.87	0.57
1:A:601:HIS:O	1:A:605:ASN:ND2	2.20	0.57
1:A:686:THR:HG23	1:A:824:TYR:OH	2.06	0.55
1:A:592:LEU:HD22	1:A:673:MET:HG3	1.89	0.55
1:A:611:LEU:HD13	1:A:647:VAL:HG21	1.89	0.54
1:A:566:PHE:CE2	1:A:590:MET:HG3	2.42	0.53
1:A:606:PRO:HA	1:A:608:PRO:HD3	1.91	0.53
1:A:695:ARG:HB3	1:A:702:ASP:HB2	1.90	0.52
1:A:736:LEU:HD22	1:A:775:PHE:CD1	2.45	0.52
1:A:560:LEU:HD21	1:A:598:ILE:HG22	1.93	0.50
1:A:670:ASN:ND2	2:B:645:ASP:OD2	2.42	0.50
1:A:736:LEU:HD22	1:A:775:PHE:HD1	1.78	0.48
2:B:645:ASP:HB3	2:B:648:LYS:HB2	1.97	0.47
1:A:743:ALA:HB2	1:A:754:TRP:CD1	2.51	0.46
1:A:574:PHE:O	1:A:575:LYS:HD3	2.15	0.46
1:A:608:PRO:HG3	1:A:653:MET:HE3	1.97	0.45
2:B:651:ASP:HA	2:B:652:PRO:HD3	1.78	0.45
1:A:718:VAL:HG22	1:A:719:ALA:H	1.82	0.45
1:A:714:MET:CE	1:A:718:VAL:H	2.30	0.44
1:A:612:THR:OG1	1:A:806:VAL:O	2.34	0.44
1:A:694:TRP:CD1	1:A:828:ASN:HB2	2.52	0.44
2:B:648:LYS:HD2	2:B:649:GLY:HA2	1.99	0.44
2:B:648:LYS:HA	2:B:649:GLY:HA2	1.67	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:578:ASP:HA	1:A:579:PRO:HD3	1.77	0.44
1:A:596:ALA:HA	1:A:669:TYR:HE2	1.84	0.43
1:A:733:VAL:HG21	1:A:745:TRP:CH2	2.55	0.42
1:A:723:VAL:HA	1:A:790:GLN:O	2.19	0.42
1:A:656:LEU:HA	1:A:659:VAL:HG22	2.01	0.42
1:A:694:TRP:CZ3	1:A:784:PRO:HA	2.55	0.42
1:A:805:LEU:HG	1:A:812:PHE:CE2	2.55	0.41
1:A:592:LEU:HA	1:A:592:LEU:HD12	1.73	0.41
1:A:709:TYR:HB3	1:A:767:GLY:HA3	2.03	0.41
1:A:714:MET:HE1	1:A:718:VAL:HG12	2.01	0.41
1:A:701:THR:OG1	1:A:782:SER:OG	2.34	0.41
1:A:598:ILE:HA	1:A:601:HIS:HB3	2.03	0.40
1:A:561:PRO:HG2	1:A:595:PRO:HG3	2.03	0.40

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	Interatomic distance (Å)	Clash overlap (Å)
1:A:633:CYS:SG	1:A:633:CYS:SG[3_545]	1.73	0.47

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	261/282 (93%)	248 (95%)	11 (4%)	2 (1%)	16	37
2	B	9/11 (82%)	8 (89%)	1 (11%)	0	100	100
All	All	270/293 (92%)	256 (95%)	12 (4%)	2 (1%)	18	41

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	597	GLY
1	A	605	ASN

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	226/239 (95%)	207 (92%)	19 (8%)	10	26
2	B	9/9 (100%)	9 (100%)	0	100	100
All	All	235/248 (95%)	216 (92%)	19 (8%)	11	27

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	581	LYS
1	A	592	LEU
1	A	611	LEU
1	A	652	LEU
1	A	654	THR
1	A	667	THR
1	A	674	LEU
1	A	683	ILE
1	A	686	THR
1	A	688	LEU
1	A	711	THR
1	A	714	MET
1	A	727	VAL
1	A	735	LYS
1	A	736	LEU
1	A	740	LEU
1	A	779	GLU
1	A	782	SER
1	A	790	GLN

Sometimes 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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

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 [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, 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	265/282 (93%)	0.84	27 (10%)	12 10	62, 91, 135, 152	0
2	B	11/11 (100%)	1.56	4 (36%)	1 0	96, 118, 155, 161	0
All	All	276/293 (94%)	0.87	31 (11%)	10 8	62, 91, 140, 161	0

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	775	PHE	5.7
1	A	633	CYS	3.9
1	A	680	ALA	3.7
1	A	559	THR	3.7
1	A	606	PRO	3.2
1	A	782	SER	3.1
1	A	632	CYS	3.0
1	A	729	ILE	2.9
1	A	798	LEU	2.9
1	A	818	ARG	2.8
1	A	690	LEU	2.8
2	B	654	ALA	2.8
1	A	618	PHE	2.7
1	A	733	VAL	2.6
1	A	662	GLN	2.6
1	A	666	ALA	2.6
1	A	819	PHE	2.4
2	B	650	SER	2.4
1	A	809	GLY	2.3
1	A	640	ALA	2.3
1	A	703	LEU	2.3
1	A	602	PHE	2.3
1	A	745	TRP	2.3
1	A	621	LEU	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	781	PRO	2.2
1	A	642	THR	2.1
2	B	652	PRO	2.1
2	B	647	PHE	2.1
1	A	620	ARG	2.1
1	A	752	ILE	2.1
1	A	721	ASN	2.1

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 oligosaccharides 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. 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
3	ZN	A	902	1/1	0.83	0.18	170,170,170,170	0
3	ZN	A	904	1/1	0.86	0.07	153,153,153,153	0
3	ZN	A	901	1/1	0.92	0.18	125,125,125,125	0
3	ZN	A	903	1/1	0.96	0.06	106,106,106,106	0

6.5 Other polymers [i](#)

There are no such residues in this entry.