



# Full wwPDB X-ray Structure Validation Report ⓘ

Jan 14, 2024 – 07:29 am GMT

PDB ID : 6I8G  
Title : Structure of the plant immune signaling node EDS1 (enhanced disease susceptibility 1) in complex with nanobody ENB73  
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Deposited on : 2018-11-20  
Resolution : 2.34 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

<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>.

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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) : 1.13  
EDS : 2.36  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

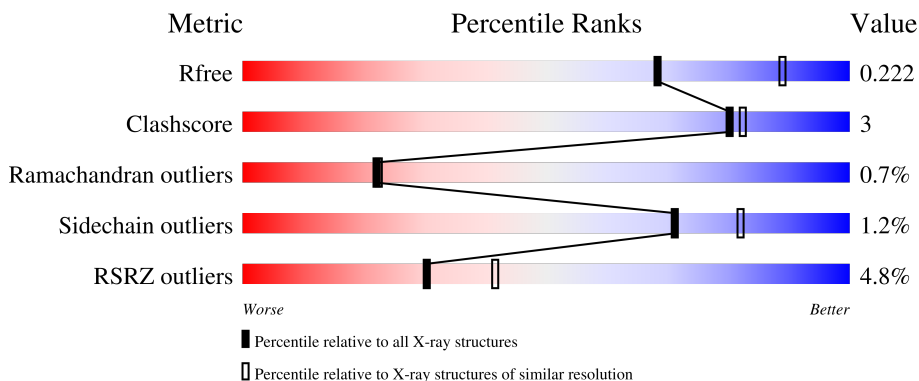
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.34 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))
$R_{free}$	130704	2096 (2.36-2.32)
Clashscore	141614	2193 (2.36-2.32)
Ramachandran outliers	138981	2159 (2.36-2.32)
Sidechain outliers	138945	2160 (2.36-2.32)
RSRZ outliers	127900	2067 (2.36-2.32)

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  $\geq 3$ , 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	631	
2	B	143	

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 6170 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 EDS1L.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	618	5029	3192	871	947	19	0	2	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	624	LEU	-	expression tag	UNP Q9XF23
A	625	GLU	-	expression tag	UNP Q9XF23
A	626	HIS	-	expression tag	UNP Q9XF23
A	627	HIS	-	expression tag	UNP Q9XF23
A	628	HIS	-	expression tag	UNP Q9XF23
A	629	HIS	-	expression tag	UNP Q9XF23
A	630	HIS	-	expression tag	UNP Q9XF23
A	631	HIS	-	expression tag	UNP Q9XF23

- Molecule 2 is a protein called EDS1-specific nanobody.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	126	972	607	170	191	4	0	0	0

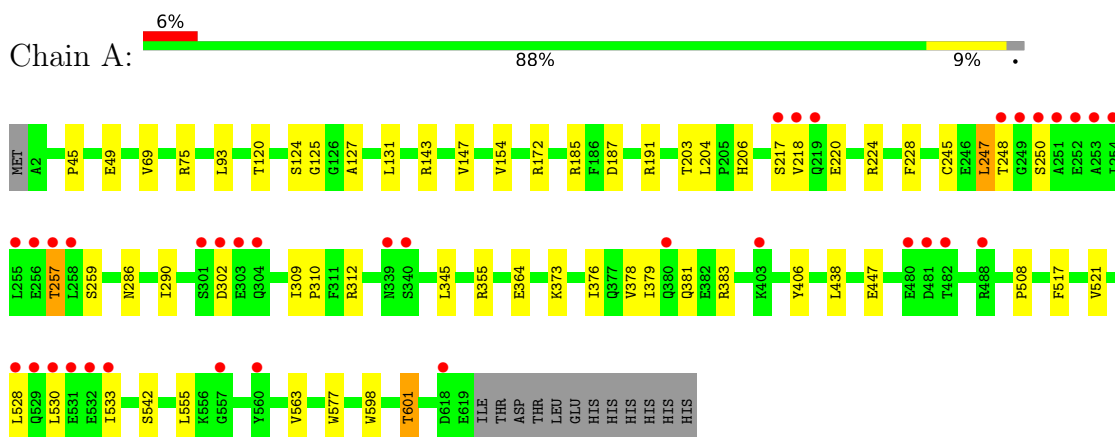
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	123	Total 123	O 123	0	0
3	B	46	Total 46	O 46	0	0

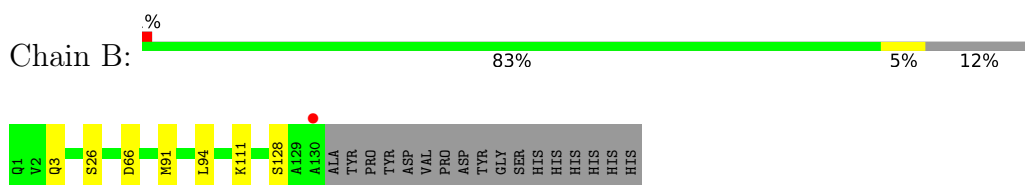
### 3 Residue-property plots [i](#)

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: Protein EDS1L



- Molecule 2: EDS1-specific nanobody



## 4 Data and refinement statistics i

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	177.50Å 68.23Å 105.27Å 90.00° 123.44° 90.00°	Depositor
Resolution (Å)	52.57 – 2.34 52.57 – 2.34	Depositor EDS
% Data completeness (in resolution range)	71.1 (52.57-2.34) 71.1 (52.57-2.34)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	0.12	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.14 (at 2.34Å)	Xtrriage
Refinement program	PHENIX (1.14_3260: ???)	Depositor
R, $R_{free}$	0.194 , 0.222 0.194 , 0.222	Depositor DCC
$R_{free}$ test set	1295 reflections (4.11%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	42.1	Xtrriage
Anisotropy	0.089	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 42.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.007 for -h-2*1,-k,l	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	6170	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	56.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.65% 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	0.25	0/5142	0.41	0/6944
2	B	0.25	0/993	0.46	0/1350
All	All	0.25	0/6135	0.42	0/8294

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	5029	0	4934	30	0
2	B	972	0	931	3	0
3	A	123	0	0	1	0
3	B	46	0	0	0	0
All	All	6170	0	5865	32	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 3.

All (32) 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:185:ARG:HH22	1:A:302:ASP:HB3	1.61	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:91:MET:HE2	2:B:94:LEU:HD21	1.78	0.64
1:A:49:GLU:HG3	1:A:204:LEU:HD23	1.82	0.61
1:A:93:LEU:HD22	1:A:131:LEU:HB3	1.83	0.59
1:A:245:CYS:O	1:A:250:SER:N	2.29	0.57
1:A:373:LYS:O	1:A:376:ILE:HG13	2.04	0.57
1:A:247:LEU:HD21	1:A:364:GLU:HG3	1.90	0.53
1:A:309:ILE:HG23	1:A:310:PRO:HD3	1.91	0.51
1:A:528:LEU:HB2	1:A:533:ILE:HD11	1.93	0.49
1:A:598:TRP:O	1:A:601:THR:HG22	2.13	0.49
1:A:45:PRO:HB3	1:A:125:GLY:H	1.78	0.48
1:A:124:SER:O	1:A:127:ALA:HB3	2.13	0.48
1:A:187:ASP:O	1:A:191:ARG:NH1	2.43	0.48
1:A:206[A]:HIS:CD2	1:A:224:ARG:HH21	2.32	0.48
1:A:185:ARG:HH12	1:A:302:ASP:HB3	1.80	0.47
1:A:120:THR:HA	1:A:154:VAL:O	2.15	0.46
1:A:75:ARG:NH1	3:A:707:HOH:O	2.49	0.46
1:A:530:LEU:H	1:A:530:LEU:HD12	1.80	0.46
1:A:286:ASN:O	1:A:290:ILE:HG13	2.17	0.45
1:A:257:THR:C	1:A:259:SER:H	2.20	0.45
1:A:172:ARG:HA	1:A:447:GLU:HA	1.99	0.44
1:A:143:ARG:HD2	1:A:508:PRO:O	2.17	0.44
1:A:376:ILE:HA	1:A:379:ILE:HG12	2.00	0.44
1:A:555:LEU:HD22	1:A:563:VAL:HB	2.00	0.43
1:A:438:LEU:HD23	1:A:438:LEU:HA	1.90	0.43
1:A:217:SER:OG	2:B:111:LYS:NZ	2.51	0.43
1:A:542:SER:HA	1:A:577:TRP:HH2	1.83	0.43
1:A:378:VAL:O	1:A:381:GLN:HG2	2.19	0.42
1:A:345:LEU:HD12	1:A:355[B]:ARG:HG2	2.02	0.42
1:A:203:THR:HG23	1:A:228:PHE:HD1	1.86	0.41
2:B:3:GLN:HB2	2:B:26:SER:HB3	2.02	0.41
1:A:517:PHE:O	1:A:521:VAL:HG13	2.20	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	618/631 (98%)	590 (96%)	24 (4%)	4 (1%)	25	26
2	B	124/143 (87%)	120 (97%)	3 (2%)	1 (1%)	19	20
All	All	742/774 (96%)	710 (96%)	27 (4%)	5 (1%)	22	22

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	128	SER
1	A	220	GLU
1	A	248	THR
1	A	257	THR
1	A	218	VAL

### 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	545/556 (98%)	538 (99%)	7 (1%)	69	79
2	B	102/117 (87%)	101 (99%)	1 (1%)	76	85
All	All	647/673 (96%)	639 (99%)	8 (1%)	71	82

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	69	VAL
1	A	147	VAL
1	A	247	LEU
1	A	312	ARG
1	A	383	ARG
1	A	406	TYR
1	A	601	THR
2	B	66	ASP



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 monosaccharides 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	618/631 (97%)	0.11	35 (5%) 23 33	23, 51, 115, 222	0
2	B	126/143 (88%)	-0.39	1 (0%) 86 90	32, 43, 65, 88	0
All	All	744/774 (96%)	0.02	36 (4%) 30 41	23, 48, 107, 222	0

All (36) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	258	LEU	8.8
1	A	252	GLU	8.1
1	A	253	ALA	8.0
1	A	251	ALA	7.7
1	A	255	LEU	7.5
1	A	250	SER	7.0
1	A	254	ILE	6.5
1	A	528	LEU	5.4
1	A	302	ASP	5.2
1	A	248	THR	4.8
1	A	301	SER	4.8
1	A	218	VAL	4.5
1	A	249	GLY	4.2
1	A	533	ILE	4.2
1	A	256	GLU	3.8
1	A	531	GLU	3.8
1	A	529	GLN	3.6
1	A	482	THR	3.5
1	A	339	ASN	3.4
1	A	530	LEU	3.4
1	A	557	GLY	2.9
1	A	340	SER	2.8
1	A	532	GLU	2.7
1	A	618	ASP	2.6

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Mol	Chain	Res	Type	RSRZ
2	B	130	ALA	2.5
1	A	488	ARG	2.5
1	A	380	GLN	2.5
1	A	257	THR	2.2
1	A	219	GLN	2.2
1	A	481	ASP	2.2
1	A	303	GLU	2.2
1	A	480	GLU	2.2
1	A	304	GLN	2.1
1	A	403	LYS	2.1
1	A	560	TYR	2.1
1	A	217	SER	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 monosaccharides 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.