



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 06:55 PM UTC

PDB ID : 1TXU / pdb_00001txu
Title : Crystal Structure of the Vps9 Domain of Rabex-5
Authors : Delprato, A.; Merithew, E.; Lambright, D.G.
Deposited on : 2004-07-06
Resolution : 2.35 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
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

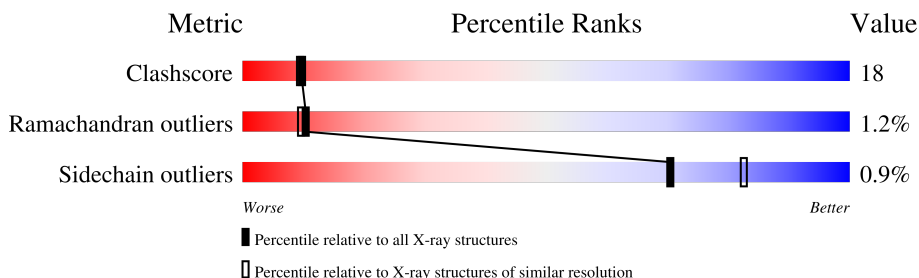
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.35 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))
Clashscore	190562	1663 (2.36-2.36)
Ramachandran outliers	187476	1646 (2.36-2.36)
Sidechain outliers	187428	1646 (2.36-2.36)

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 $\leq 5\%$

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	273	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 2163 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 Rab5 GDP/GTP exchange factor.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	254	Total	C	N	O	S	Se	108	0	0
			2080	1320	351	392	8	9			

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	122	MET	-	cloning artifact	UNP Q9UJ41
A	123	GLY	-	cloning artifact	UNP Q9UJ41
A	125	HIS	-	cloning artifact	UNP Q9UJ41
A	126	HIS	-	cloning artifact	UNP Q9UJ41
A	127	HIS	-	cloning artifact	UNP Q9UJ41
A	128	HIS	-	cloning artifact	UNP Q9UJ41
A	129	HIS	-	cloning artifact	UNP Q9UJ41
A	129	HIS	-	cloning artifact	UNP Q9UJ41
A	130	GLY	-	cloning artifact	UNP Q9UJ41
A	132	SER	-	cloning artifact	UNP Q9UJ41
A	132	SER	-	cloning artifact	UNP Q9UJ41
A	167	MSE	MET	modified residue	UNP Q9UJ41
A	193	MSE	MET	modified residue	UNP Q9UJ41
A	208	MSE	MET	modified residue	UNP Q9UJ41
A	216	MSE	MET	modified residue	UNP Q9UJ41
A	252	MSE	MET	modified residue	UNP Q9UJ41
A	267	MSE	MET	modified residue	UNP Q9UJ41
A	278	MSE	MET	modified residue	UNP Q9UJ41
A	348	MSE	MET	modified residue	UNP Q9UJ41
A	385	MSE	MET	modified residue	UNP Q9UJ41

- Molecule 2 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Mg	0	0
			1	1		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	82	Total	O	0	0
			82	82		

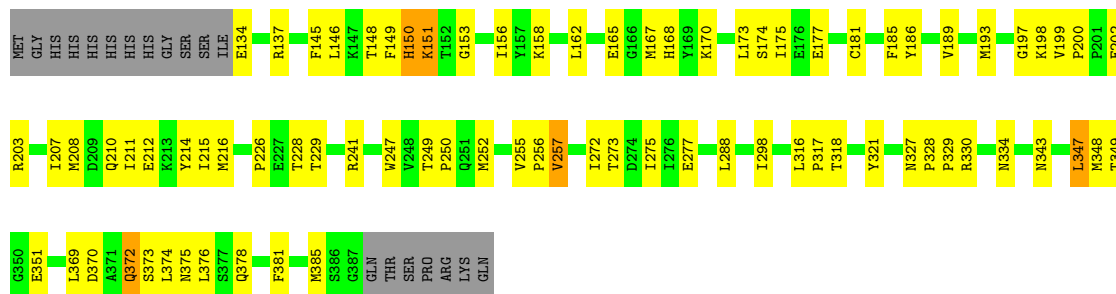
3 Residue-property plots

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. 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. 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.

Note EDS was not executed.

- Molecule 1: Rab5 GDP/GTP exchange factor

Chain A: 



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	68.05Å 88.33Å 47.30Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 2.35	Depositor
% Data completeness (in resolution range)	93.7 (20.00-2.35)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	0.06	Depositor
Refinement program	CNS	Depositor
R, R_{free}	0.227 , 0.269	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2163	wwPDB-VP
Average B, all atoms (Å ²)	50.0	wwPDB-VP

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

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	0.44	0/2111	0.93	7/2830 (0.2%)

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	378	GLN	OE1-CD-NE2	-9.83	112.77	122.60
1	A	372	GLN	OE1-CD-NE2	-9.76	112.84	122.60
1	A	343	ASN	CB-CA-C	6.71	120.90	109.82
1	A	378	GLN	CG-CD-NE2	6.68	126.43	116.40
1	A	372	GLN	CG-CD-NE2	6.67	126.40	116.40
1	A	347	LEU	N-CA-C	5.48	120.24	113.50
1	A	214	TYR	N-CA-C	5.03	116.45	110.97

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	2080	0	2086	69	1
2	A	1	0	0	0	0
3	A	82	0	0	0	0
All	All	2163	0	2086	69	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 18.

All (69) 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:193:MSE:HE1	1:A:207:ILE:HD13	1.24	1.11
1:A:252:MSE:HE3	1:A:376:LEU:HD11	1.59	0.84
1:A:193:MSE:HE1	1:A:207:ILE:CD1	2.06	0.83
1:A:250:PRO:HG3	1:A:321:TYR:CZ	2.24	0.72
1:A:207:ILE:HG22	1:A:208:MSE:HE2	1.70	0.72
1:A:156:ILE:CD1	1:A:193:MSE:HE3	2.23	0.69
1:A:156:ILE:HD11	1:A:193:MSE:HE3	1.74	0.69
1:A:185:PHE:O	1:A:189:VAL:HG23	1.94	0.68
1:A:250:PRO:HG3	1:A:321:TYR:CE1	2.31	0.65
1:A:272:ILE:O	1:A:275:ILE:HG22	1.96	0.64
1:A:170:LYS:HB3	1:A:173:LEU:HD12	1.80	0.63
1:A:215:ILE:HD11	1:A:216:MSE:HE2	1.80	0.63
1:A:193:MSE:CE	1:A:207:ILE:HD13	2.16	0.59
1:A:198:LYS:N	1:A:198:LYS:HD2	2.20	0.56
1:A:185:PHE:CE1	1:A:189:VAL:HG21	2.41	0.55
1:A:247:TRP:HZ3	1:A:252:MSE:HE1	1.71	0.55
1:A:197:GLY:C	1:A:198:LYS:HD2	2.31	0.55
1:A:175:ILE:HD13	1:A:226:PRO:HG2	1.90	0.53
1:A:369:LEU:HD21	1:A:374:LEU:HD11	1.90	0.53
1:A:298:ILE:HG23	1:A:318:THR:HG21	1.91	0.53
1:A:185:PHE:CZ	1:A:189:VAL:HG21	2.44	0.53
1:A:186:TYR:OH	1:A:212:GLU:HG3	2.09	0.52
1:A:167:MSE:HE1	1:A:181:CYS:SG	2.50	0.52
1:A:203:ARG:HH11	1:A:203:ARG:HG2	1.76	0.51
1:A:215:ILE:CD1	1:A:216:MSE:HE2	2.40	0.51
1:A:273:THR:O	1:A:277:GLU:HG3	2.11	0.50
1:A:215:ILE:HG13	1:A:216:MSE:N	2.26	0.49
1:A:134:GLU:O	1:A:137:ARG:HB3	2.12	0.49
1:A:252:MSE:CE	1:A:374:LEU:HD13	2.43	0.49
1:A:375:ASN:O	1:A:376:LEU:HD23	2.13	0.49
1:A:349:THR:O	1:A:349:THR:HG22	2.13	0.49
1:A:174:SER:OG	1:A:177:GLU:HG3	2.13	0.48
1:A:200:PRO:C	1:A:202:GLU:H	2.23	0.47
1:A:252:MSE:HE2	1:A:374:LEU:HB3	1.96	0.47
1:A:189:VAL:O	1:A:193:MSE:HG3	2.15	0.47
1:A:193:MSE:SE	1:A:208:MSE:HE3	2.65	0.47
1:A:167:MSE:HE1	1:A:181:CYS:CB	2.44	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:381:PHE:CZ	1:A:385:MSE:HE2	2.49	0.47
1:A:145:PHE:O	1:A:148:THR:HB	2.14	0.47
1:A:203:ARG:HG2	1:A:203:ARG:NH1	2.30	0.46
1:A:249:THR:OG1	1:A:252:MSE:HG3	2.16	0.46
1:A:370:ASP:O	1:A:373:SER:HB3	2.16	0.46
1:A:149:PHE:O	1:A:151:LYS:N	2.48	0.46
1:A:316:LEU:HB3	1:A:317:PRO:HD3	1.99	0.45
1:A:149:PHE:O	1:A:150:HIS:C	2.59	0.45
1:A:156:ILE:HD13	1:A:193:MSE:HE3	2.00	0.44
1:A:255:VAL:HA	1:A:256:PRO:HD3	1.76	0.44
1:A:369:LEU:HD23	1:A:369:LEU:C	2.43	0.44
1:A:134:GLU:HG3	1:A:137:ARG:HH21	1.83	0.43
1:A:199:VAL:HA	1:A:200:PRO:HD3	1.88	0.43
1:A:165:GLU:O	1:A:168:HIS:HB3	2.19	0.43
1:A:200:PRO:C	1:A:202:GLU:N	2.77	0.43
1:A:208:MSE:CE	1:A:211:ILE:HD12	2.48	0.43
1:A:241:ARG:NH2	1:A:369:LEU:O	2.51	0.43
1:A:255:VAL:HG12	1:A:257:VAL:HB	2.00	0.43
1:A:252:MSE:CE	1:A:376:LEU:HD11	2.37	0.43
1:A:374:LEU:O	1:A:375:ASN:HB3	2.19	0.42
1:A:145:PHE:CD2	1:A:210:GLN:HG3	2.55	0.42
1:A:247:TRP:CZ3	1:A:252:MSE:HE1	2.53	0.42
1:A:146:LEU:O	1:A:153:GLY:HA3	2.19	0.42
1:A:330:ARG:O	1:A:334:ASN:ND2	2.51	0.41
1:A:327:ASN:N	1:A:328:PRO:HD3	2.35	0.41
1:A:288:LEU:HD11	1:A:347:LEU:HD21	2.02	0.41
1:A:328:PRO:HA	1:A:329:PRO:HD3	1.91	0.41
1:A:252:MSE:HE1	1:A:374:LEU:HD13	2.02	0.40
1:A:158:LYS:O	1:A:162:LEU:HG	2.21	0.40
1:A:226:PRO:HB2	1:A:228:THR:HG22	2.03	0.40
1:A:329:PRO:O	1:A:330:ARG:C	2.64	0.40
1:A:175:ILE:HG21	1:A:229:THR:HG21	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:202:GLU:OE2	1:A:372:GLN:CB[2_554]	1.89	0.31

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	252/273 (92%)	233 (92%)	16 (6%)	3 (1%)	10 9

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	150	HIS
1	A	351	GLU
1	A	151	LYS

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	235/243 (97%)	233 (99%)	2 (1%)	70 82

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	257	VAL
1	A	348	MSE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	159	GLN

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Mol	Chain	Res	Type
1	A	258	ASN
1	A	336	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 1 ligands modelled in this entry, 1 is 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

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.