



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 24, 2024 – 09:04 AM EDT

PDB ID : 6Y2X  
Title : RING-DTC domains of Deltex 2, Form 2  
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Deposited on : 2020-02-17  
Resolution : 1.77 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)	:	1.20.1
EDS	:	2.37.1
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)	:	2.37.1

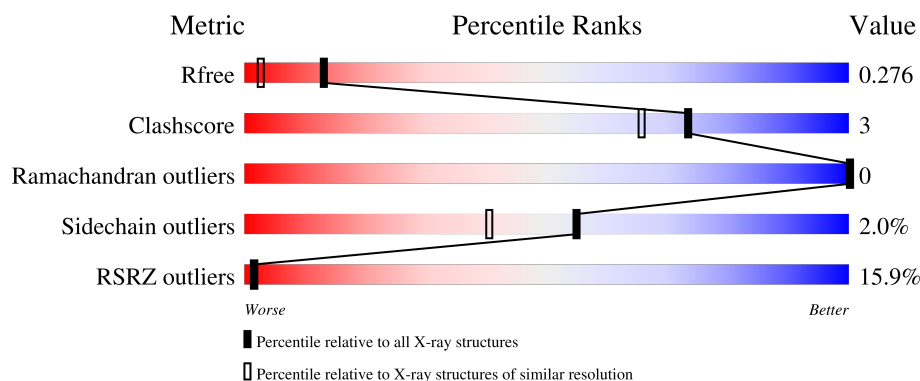
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.77 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	9185 (1.80-1.76)
Clashscore	141614	10184 (1.80-1.76)
Ramachandran outliers	138981	10051 (1.80-1.76)
Sidechain outliers	138945	10050 (1.80-1.76)
RSRZ outliers	127900	9032 (1.80-1.76)

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	235	
1	B	235	

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 3259 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 Probable E3 ubiquitin-protein ligase DTX2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	231	Total	C	N	O	S	0	3	0
			1755	1095	305	342	13			
1	B	177	Total	C	N	O	S	0	0	0
			1243	776	221	233	13			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	388	GLY	-	expression tag	UNP Q86UW9
A	389	SER	-	expression tag	UNP Q86UW9
B	388	GLY	-	expression tag	UNP Q86UW9
B	389	SER	-	expression tag	UNP Q86UW9

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

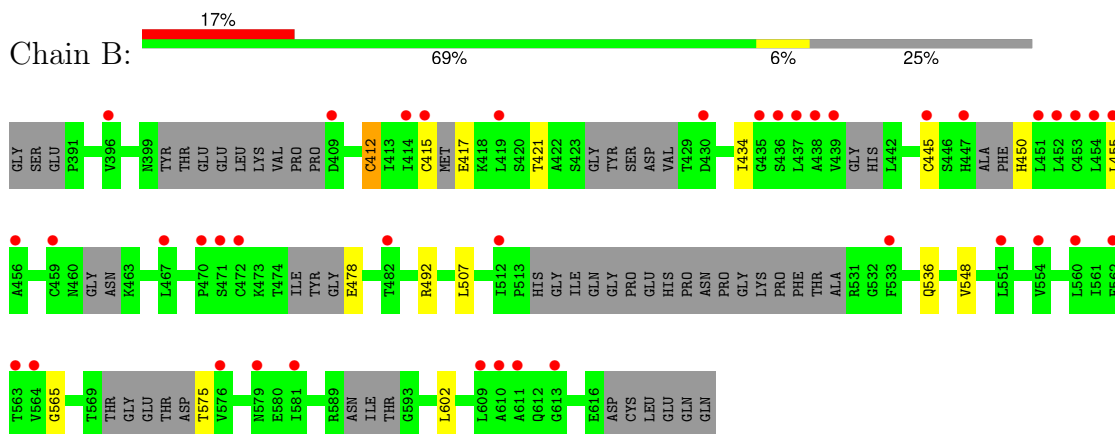
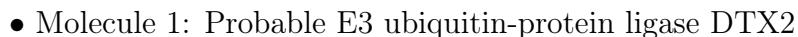
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total	Zn	0	0
			2	2		
2	B	2	Total	Zn	0	0
			2	2		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	209	Total	O	0	0
			209	209		
3	B	48	Total	O	0	0
			48	48		



- Molecule 1: Probable E3 ubiquitin-protein ligase DTX2



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	41.76Å 219.59Å 120.82Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	60.41 – 1.77 60.41 – 1.77	Depositor EDS
% Data completeness (in resolution range)	98.3 (60.41-1.77) 98.4 (60.41-1.77)	Depositor EDS
$R_{merge}$	0.05	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.90 (at 1.77Å)	Xtriage
Refinement program	PHENIX 1.10_2142	Depositor
R, $R_{free}$	0.242 , 0.274 0.244 , 0.276	Depositor DCC
$R_{free}$ test set	2708 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	28.7	Xtriage
Anisotropy	0.352	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 62.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	3259	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.17% 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: 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	0.38	0/1795	0.56	0/2444
1	B	0.29	0/1258	0.50	0/1700
All	All	0.35	0/3053	0.53	0/4144

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	1755	0	1627	12	0
1	B	1243	0	1097	7	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
3	A	209	0	0	2	0
3	B	48	0	0	0	0
All	All	3259	0	2724	19	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 (19) 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:412:CYS:SG	1:B:450:HIS:N	2.49	0.85
1:B:421:THR:O	1:B:450:HIS:NE2	2.31	0.64
1:A:411:ASP:HA	1:A:418:LYS:HA	1.83	0.60
1:B:434:ILE:HD12	1:B:455:LEU:HD22	1.89	0.54
1:A:514[A]:HIS:CD2	1:A:529:THR:HA	2.44	0.51
1:A:407:PRO:HB3	1:A:439:VAL:HG21	1.93	0.50
1:B:565:GLY:O	1:B:575:THR:N	2.46	0.48
1:A:546:ARG:NH1	3:A:810:HOH:O	2.46	0.47
1:A:450:HIS:HB2	1:A:453:CYS:SG	2.55	0.47
1:A:396:VAL:HA	1:A:399:ASN:HD22	1.80	0.47
1:B:548:VAL:HG21	1:B:602:LEU:HD22	1.97	0.47
1:A:533:PHE:CD1	1:A:535:ARG:HG3	2.51	0.45
1:B:415:CYS:O	1:B:417:GLU:N	2.50	0.45
1:A:514[B]:HIS:HD2	3:A:882:HOH:O	2.00	0.44
1:A:396:VAL:HA	1:A:399:ASN:ND2	2.33	0.43
1:A:493:PHE:CE1	1:A:505:THR:HB	2.54	0.42
1:B:507:LEU:HD11	1:B:536:GLN:HG2	2.01	0.42
1:A:442:LEU:HB3	1:A:476:TYR:CZ	2.55	0.41
1:A:434:ILE:HG22	1:A:452:LEU:HG	2.03	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	230/235 (98%)	225 (98%)	5 (2%)	0	100	100
1	B	155/235 (66%)	147 (95%)	8 (5%)	0	100	100
All	All	385/470 (82%)	372 (97%)	13 (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	184/203 (91%)	182 (99%)	2 (1%)	73	65
1	B	116/203 (57%)	112 (97%)	4 (3%)	37	20
All	All	300/406 (74%)	294 (98%)	6 (2%)	55	40

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	430	ASP
1	A	466	SER
1	B	412	CYS
1	B	445	CYS
1	B	478	GLU
1	B	492	ARG

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	395	GLN
1	A	399	ASN
1	A	500	HIS

### 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](#)

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, 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	231/235 (98%)	0.75	25 (10%) 5 5	19, 43, 91, 121	0
1	B	177/235 (75%)	1.19	40 (22%) 0 0	27, 76, 102, 118	0
All	All	408/470 (86%)	0.94	65 (15%) 1 1	19, 56, 99, 121	0

All (65) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	419	LEU	7.2
1	B	609	LEU	5.2
1	B	456	ALA	5.0
1	A	452	LEU	5.0
1	B	436	SER	4.8
1	B	563	THR	4.8
1	B	472	CYS	4.7
1	B	415	CYS	4.5
1	B	581	ILE	4.4
1	B	453	CYS	4.4
1	A	406	VAL	4.2
1	B	471	SER	4.1
1	B	459	CYS	4.1
1	B	576	VAL	4.0
1	B	470	PRO	4.0
1	A	426	SER	3.9
1	B	562	PHE	3.9
1	B	447	HIS	3.7
1	B	396	VAL	3.4
1	A	420	SER	3.4
1	A	457	MET	3.4
1	B	455	LEU	3.3
1	B	439	VAL	3.2
1	B	419	LEU	3.2

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Mol	Chain	Res	Type	RSRZ
1	B	611	ALA	3.1
1	B	533	PHE	3.1
1	A	437	LEU	3.1
1	B	560	LEU	3.1
1	B	438	ALA	3.1
1	B	610	ALA	3.0
1	A	423	SER	3.0
1	B	452	LEU	3.0
1	B	414	ILE	2.9
1	A	429	THR	2.9
1	A	439	VAL	2.8
1	B	445	CYS	2.8
1	B	579	ASN	2.7
1	B	454	LEU	2.7
1	A	393	PRO	2.7
1	A	427	ASP	2.6
1	A	415	CYS	2.6
1	B	564	VAL	2.6
1	A	456	ALA	2.6
1	B	613	GLY	2.5
1	B	551	LEU	2.5
1	B	512	ILE	2.5
1	A	413	ILE	2.4
1	B	482	THR	2.4
1	A	421	THR	2.4
1	A	455	LEU	2.3
1	B	467	LEU	2.2
1	B	435	GLY	2.2
1	B	437	LEU	2.2
1	A	436	SER	2.2
1	B	409	ASP	2.1
1	A	490	VAL	2.1
1	A	407	PRO	2.1
1	A	425	TYR	2.0
1	B	430	ASP	2.0
1	B	451	LEU	2.0
1	A	465	GLY	2.0
1	A	422	ALA	2.0
1	A	431	SER	2.0
1	A	394	GLU	2.0
1	B	554	VAL	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](#)

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, 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	B-factors( $\text{\AA}^2$ )	Q<0.9
2	ZN	B	702	1/1	0.89	0.07	94,94,94,94	0
2	ZN	A	701	1/1	0.92	0.07	66,66,66,66	0
2	ZN	A	702	1/1	0.97	0.12	46,46,46,46	0
2	ZN	B	701	1/1	0.98	0.06	86,86,86,86	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.