Full wwPDB X-ray Structure Validation Report (i)

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PDB ID	:	6Y5N
Title	:	RING-DTC domain of Deltex1
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Deposited on	:	2020-02-25
Resolution	:	1.88 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 (i) symbol.

The following versions of software and data (see references (1)) were used in the production of this report:

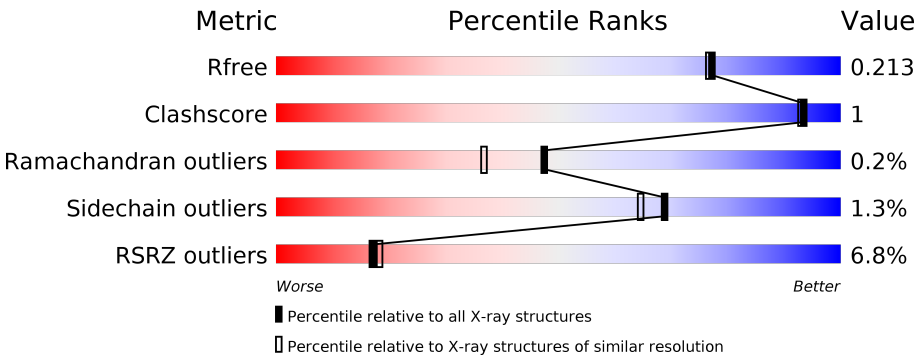
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.14.6
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.14.6

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.88 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	9470 (1.90-1.86)
Clashscore	141614	10282 (1.90-1.86)
Ramachandran outliers	138981	10152 (1.90-1.86)
Sidechain outliers	138945	10152 (1.90-1.86)
RSRZ outliers	127900	9303 (1.90-1.86)

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 >=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 <=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	% 93%
1	B	235	12% 94%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 7674 atoms, of which 3551 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 E3 ubiquitin-protein ligase DTX1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	228	3582	1132	1777	328	333	12	0	2	0
1	B	227	3546	1120	1762	321	331	12	0	2	0

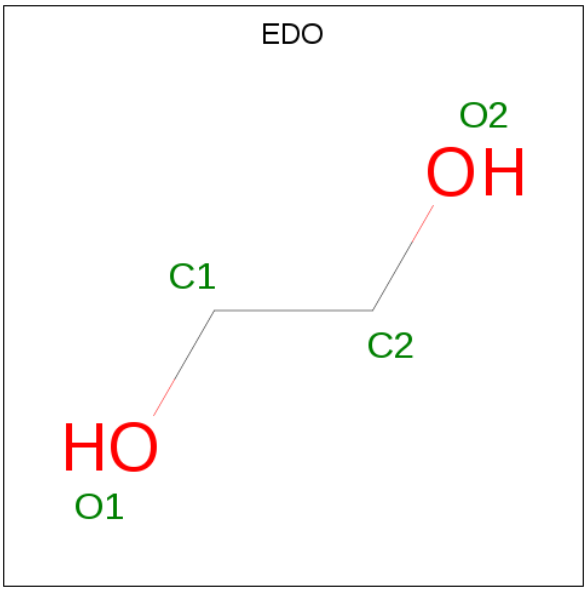
There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	386	GLY	-	expression tag	UNP Q86Y01
A	387	SER	-	expression tag	UNP Q86Y01
B	386	GLY	-	expression tag	UNP Q86Y01
B	387	SER	-	expression tag	UNP Q86Y01

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

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

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	H	O		
3	A	1	10	2	6	2	0	0
			Total	C	H	O		
3	A	1	10	2	6	2	0	0

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Cl		
4	B	1	1	1	0	0
			Total	Cl		
4	A	1	1	1	0	0

- Molecule 5 is water.

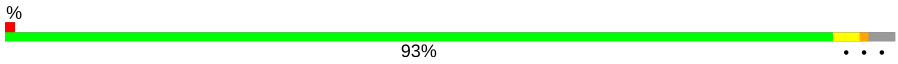
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
5	A	294	294	294	0	0
			Total	O		
5	B	226	226	226	0	0

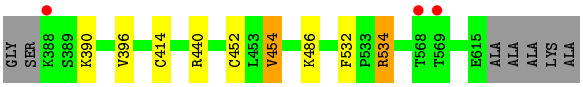
3 Residue-property plots (i)

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: E3 ubiquitin-protein ligase DTX1

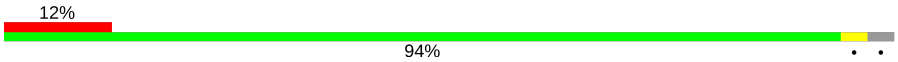
Chain A:

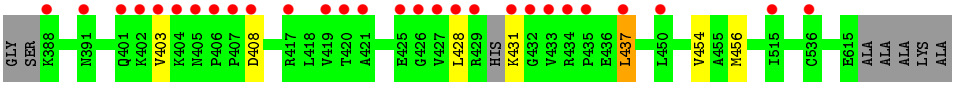




- Molecule 1: E3 ubiquitin-protein ligase DTX1

Chain B:





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	67.49Å 86.55Å 129.83Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	36.01 – 1.88 36.01 – 1.88	Depositor EDS
% Data completeness (in resolution range)	99.7 (36.01-1.88) 100.0 (36.01-1.88)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.57 (at 1.88Å)	Xtriage
Refinement program	PHENIX 1.12_2829	Depositor
R, R_{free}	0.187 , 0.210 0.188 , 0.213	Depositor DCC
R_{free} test set	3078 reflections (4.92%)	wwPDB-VP
Wilson B-factor (Å^2)	31.2	Xtriage
Anisotropy	0.359	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 47.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	7674	wwPDB-VP
Average B, all atoms (Å^2)	44.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.50% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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)

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, EDO, CL

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	0.53	0/1850	0.68	2/2506 (0.1%)
1	B	0.49	0/1840	0.62	0/2492
All	All	0.51	0/3690	0.65	2/4998 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	534	ARG	NE-CZ-NH1	6.74	123.67	120.30
1	A	534	ARG	NE-CZ-NH2	-5.65	117.47	120.30

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	1805	1777	1778	5	0
1	B	1784	1762	1750	5	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
3	A	8	12	12	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	294	0	0	2	1
5	B	226	0	0	4	1
All	All	4123	3551	3540	10	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 1.

All (10) 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:437:LEU:O	5:B:801:HOH:O	2.07	0.72
1:B:431:LYS:N	5:B:802:HOH:O	2.22	0.71
1:B:431:LYS:CA	5:B:802:HOH:O	2.49	0.59
1:B:431:LYS:HA	5:B:802:HOH:O	2.04	0.57
1:A:390:LYS:NZ	5:A:801:HOH:O	2.22	0.53
1:A:396:VAL:HG21	1:A:454:VAL:HA	1.96	0.46
1:A:414:CYS:HB3	1:A:452:CYS:SG	2.56	0.45
1:A:532:PHE:CE1	1:A:534:ARG:HD3	2.52	0.44
1:A:440[B]:ARG:NH2	5:A:805:HOH:O	2.32	0.44
1:B:428:LEU:HD13	1:B:454:VAL:HG12	2.02	0.41

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)
5:A:1044:HOH:O	5:B:977:HOH:O[4_465]	2.05	0.15

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	228/235 (97%)	225 (99%)	3 (1%)	0	100	100
1	B	225/235 (96%)	221 (98%)	3 (1%)	1 (0%)	34	22
All	All	453/470 (96%)	446 (98%)	6 (1%)	1 (0%)	47	37

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	408	ASP

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	199/199 (100%)	197 (99%)	2 (1%)	76	73
1	B	198/199 (100%)	195 (98%)	3 (2%)	65	59
All	All	397/398 (100%)	392 (99%)	5 (1%)	69	64

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	454	VAL
1	A	486	LYS
1	B	403	VAL
1	B	437	LEU
1	B	456	MET

Some 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)

Of 8 ligands modelled in this entry, 6 are monoatomic - leaving 2 for Mogul analysis.

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	$\#\|Z\| > 2$
3	EDO	A	703	-	3,3,3	0.49	0	2,2,2	0.79	0
3	EDO	A	704	-	3,3,3	0.39	0	2,2,2	0.19	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
3	EDO	A	703	-	-	1/1/1/1	-
3	EDO	A	704	-	-	1/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	704	EDO	O1-C1-C2-O2
3	A	703	EDO	O1-C1-C2-O2

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 (i)

6.1 Protein, DNA and RNA chains (i)

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	228/235 (97%)	-0.02	3 (1%) 77 79	25, 34, 50, 62	0
1	B	227/235 (96%)	0.53	28 (12%) 4 4	24, 39, 67, 77	0
All	All	455/470 (96%)	0.26	31 (6%) 17 18	24, 36, 64, 77	0

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	431	LYS	6.4
1	B	433	VAL	5.7
1	B	432	GLY	5.5
1	B	428	LEU	4.8
1	B	434	ARG	4.7
1	B	407	PRO	4.7
1	B	404	LYS	4.6
1	B	429	ARG	4.1
1	B	427	VAL	4.1
1	B	435	PRO	3.8
1	B	437	LEU	3.6
1	B	405	ASN	3.4
1	B	388	LYS	3.4
1	B	408	ASP	3.3
1	B	450	LEU	3.3
1	B	426	GLY	3.2
1	B	425	GLU	3.2
1	B	402	LYS	3.0
1	B	406	PRO	2.7
1	B	403	VAL	2.5
1	B	515	ILE	2.5
1	A	388	LYS	2.4
1	B	420	THR	2.4
1	B	417	ARG	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	391	ASN	2.3
1	B	421	ALA	2.2
1	A	569	THR	2.1
1	A	568	THR	2.1
1	B	419	VAL	2.1
1	B	536	CYS	2.1
1	B	401	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 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, 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	EDO	A	703	4/4	0.76	0.18	34,62,72,77	0
3	EDO	A	704	4/4	0.81	0.19	45,58,70,71	0
4	CL	A	705	1/1	0.94	0.52	91,91,91,91	0
2	ZN	B	702	1/1	0.96	0.26	80,80,80,80	0
4	CL	B	703	1/1	0.97	0.27	53,53,53,53	0
2	ZN	B	701	1/1	0.98	0.07	55,55,55,55	0
2	ZN	A	702	1/1	0.99	0.19	39,39,39,39	0
2	ZN	A	701	1/1	0.99	0.35	54,54,54,54	0

6.5 Other polymers (i)

There are no such residues in this entry.