



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 17, 2024 – 04:45 AM EDT

PDB ID : 5Q2O  
Title : PanDDA analysis group deposition – Crystal Structure of DCLRE1A after initial refinement with no ligand modelled (structure 16)  
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Deposited on : 2017-05-25  
Resolution : 1.75 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  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtrriage (Phenix) : 1.13  
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

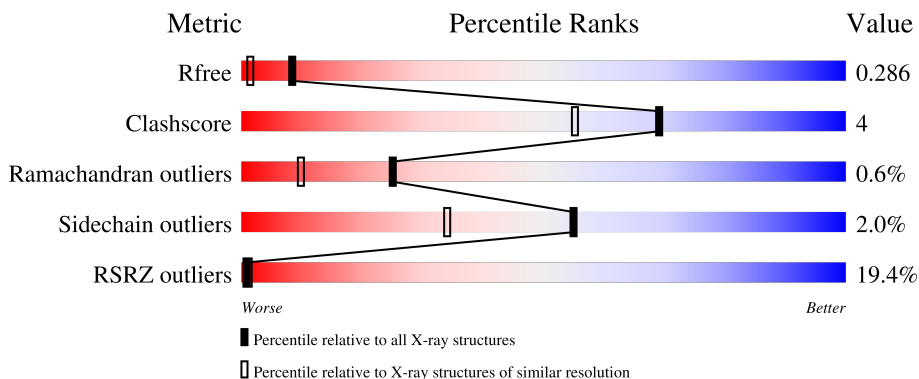
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.75 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	2340 (1.76-1.76)
Clashscore	141614	2466 (1.76-1.76)
Ramachandran outliers	138981	2437 (1.76-1.76)
Sidechain outliers	138945	2437 (1.76-1.76)
RSRZ outliers	127900	2298 (1.76-1.76)

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	343	

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 3044 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 DCLRE1A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	341	2726	1765	450	491	20	0	4	0

- Molecule 2 is MALONATE ION (three-letter code: MLI) (formula:  $C_3H_2O_4$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
2	A	1	7	3	4	0	0

- Molecule 3 is NICKEL (II) ION (three-letter code: NI) (formula: Ni).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Ni	0	0
			1	1		

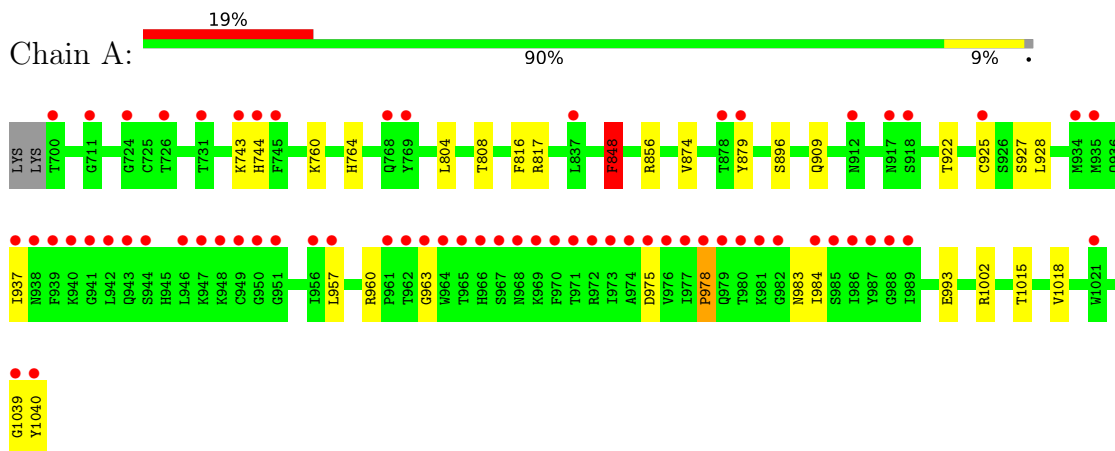
- Molecule 4 is water.

<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
4	A	310	Total 310	O 310	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: DCLRE1A



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	52.03Å 58.09Å 114.83Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.04 – 1.75 28.16 – 1.75	Depositor EDS
% Data completeness (in resolution range)	99.7 (29.04-1.75) 99.7 (28.16-1.75)	Depositor EDS
$R_{merge}$	0.04	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.76 (at 1.75Å)	Xtrriage
Refinement program	REFMAC 5.8.0155	Depositor
R, $R_{free}$	0.232 , 0.281 0.240 , 0.286	Depositor DCC
$R_{free}$ test set	1766 reflections (4.93%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	31.0	Xtrriage
Anisotropy	0.067	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 50.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	3044	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	49.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.02% 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](#)

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

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	0.96	1/2802 (0.0%)	0.94	6/3809 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	993	GLU	CD-OE2	5.76	1.31	1.25

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	817	ARG	NE-CZ-NH2	-6.27	117.17	120.30
1	A	817	ARG	NE-CZ-NH1	6.13	123.37	120.30
1	A	1002	ARG	NE-CZ-NH1	6.11	123.35	120.30
1	A	848	PHE	CB-CG-CD1	-5.97	116.62	120.80
1	A	848	PHE	CB-CG-CD2	5.04	124.33	120.80
1	A	848	PHE	CB-CA-C	5.02	120.45	110.40

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	2726	0	2676	20	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	7	0	2	0	0
3	A	1	0	0	0	0
4	A	310	0	0	15	0
All	All	3044	0	2678	20	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 4.

All (20) 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:1040:TYR:OH	4:A:1201:HOH:O	1.72	1.07
1:A:848:PHE:O	4:A:1202:HOH:O	2.17	0.58
1:A:909:GLN:NE2	4:A:1212:HOH:O	2.38	0.56
1:A:1015:THR:O	4:A:1203:HOH:O	2.18	0.56
1:A:804:LEU:HD22	1:A:808:THR:HB	1.87	0.55
1:A:856:ARG:HG2	4:A:1494:HOH:O	2.07	0.55
1:A:1018:VAL:HG22	4:A:1358:HOH:O	2.10	0.51
1:A:984:ILE:HD12	4:A:1335:HOH:O	2.15	0.46
1:A:1039:GLY:CA	4:A:1284:HOH:O	2.64	0.46
1:A:760:LYS:O	1:A:764[A]:HIS:HA	2.16	0.45
1:A:874:VAL:HA	1:A:957:LEU:O	2.16	0.45
1:A:922:THR:OG1	4:A:1204:HOH:O	2.21	0.44
1:A:978:PRO:HD3	4:A:1419:HOH:O	2.15	0.44
1:A:743:LYS:HG3	1:A:744:HIS:CE1	2.52	0.44
1:A:983:ASN:C	4:A:1263:HOH:O	2.57	0.43
1:A:896:SER:O	4:A:1205:HOH:O	2.21	0.43
1:A:1039:GLY:HA2	4:A:1284:HOH:O	2.19	0.43
1:A:925:CYS:HA	4:A:1297:HOH:O	2.19	0.42
1:A:983:ASN:ND2	4:A:1228:HOH:O	2.51	0.41
1:A:937:ILE:HG21	1:A:960:ARG:HG2	2.02	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	343/343 (100%)	326 (95%)	15 (4%)	2 (1%)	25 10

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	963	GLY
1	A	978	PRO

### 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	299/305 (98%)	293 (98%)	6 (2%)	55 34

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

Mol	Chain	Res	Type
1	A	816	PHE
1	A	848	PHE
1	A	879	TYR
1	A	927	SER
1	A	928	LEU
1	A	975	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	851	GLN
1	A	869	ASN
1	A	909	GLN
1	A	943	GLN
1	A	979	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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 2 ligands modelled in this entry, 1 is monoatomic - leaving 1 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
2	MLI	A	1101	3	6,6,6	0.98	0	7,7,7	1.84	2 (28%)

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
2	MLI	A	1101	3	-	4/4/4/4	-

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1101	MLI	O7-C2-O6	3.13	131.10	123.30
2	A	1101	MLI	O6-C2-C1	-2.97	113.41	122.08

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1101	MLI	C3-C1-C2-O6
2	A	1101	MLI	C2-C1-C3-O8
2	A	1101	MLI	C3-C1-C2-O7
2	A	1101	MLI	C2-C1-C3-O9

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	341/343 (99%)	1.14	66 (19%) <b>1</b> <b>1</b>	19, 43, 103, 179	0

All (66) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	970	PHE	17.1
1	A	969	LYS	14.6
1	A	968	ASN	9.6
1	A	935	MET	9.5
1	A	967	SER	8.4
1	A	976	VAL	8.3
1	A	973	ILE	8.0
1	A	966	HIS	7.5
1	A	964	TRP	7.1
1	A	940	LYS	6.8
1	A	979	GLN	6.0
1	A	972	ARG	5.8
1	A	977	ILE	5.0
1	A	917	ASN	4.9
1	A	951	GLY	4.6
1	A	938	ASN	4.6
1	A	768	GLN	4.6
1	A	986	ILE	4.6
1	A	984	ILE	4.5
1	A	941	GLY	4.3
1	A	980	THR	4.3
1	A	943	GLN	4.2
1	A	982	GLY	4.2
1	A	956	ILE	4.2
1	A	1039	GLY	4.2
1	A	912	ASN	4.1
1	A	981	LYS	4.1

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	950	GLY	4.0
1	A	724	GLY	3.9
1	A	744	HIS	3.8
1	A	985	SER	3.7
1	A	975	ASP	3.6
1	A	961	PRO	3.4
1	A	925	CYS	3.2
1	A	937	ILE	3.2
1	A	939	PHE	3.2
1	A	942	LEU	3.1
1	A	965	THR	3.1
1	A	1040	TYR	3.1
1	A	700	THR	3.0
1	A	974	ALA	3.0
1	A	971	THR	2.9
1	A	879	TYR	2.9
1	A	944	SER	2.8
1	A	989	ILE	2.8
1	A	948	LYS	2.7
1	A	987	TYR	2.7
1	A	963	GLY	2.7
1	A	947	LYS	2.7
1	A	988	GLY	2.6
1	A	918	SER	2.6
1	A	711	GLY	2.6
1	A	962	THR	2.5
1	A	934	MET	2.5
1	A	949	CYS	2.4
1	A	946	LEU	2.4
1	A	731	THR	2.4
1	A	1021	TRP	2.3
1	A	978	PRO	2.3
1	A	769	TYR	2.3
1	A	743	LYS	2.2
1	A	745	PHE	2.1
1	A	726	THR	2.1
1	A	878	THR	2.1
1	A	957	LEU	2.0
1	A	837	LEU	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	MLI	A	1101	7/7	0.96	0.09	25,29,36,38	0
3	NI	A	1102	1/1	0.99	0.06	24,24,24,24	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.