



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 03:26 PM UTC

PDB ID : 5Q47 / pdb_00005q47
Title : PanDDA analysis group deposition – Crystal Structure of DCLRE1A after initial refinement with no ligand modelled (structure 72)
Authors : Newman, J.A.; Aitkenhead, H.; Lee, S.Y.; Kupinska, K.; Burgess-Brown, N.; Tallon, R.; Krojer, T.; von Delft, F.; Arrowsmith, C.H.; Edwards, A.; Bountra, C.; Gileadi, O.
Deposited on : 2017-05-25
Resolution : 1.38 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)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

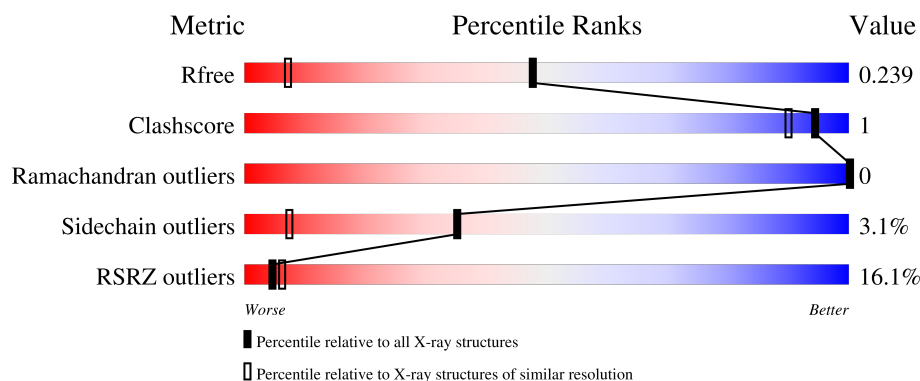
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.38 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}	180053	4403 (1.40-1.36)
Clashscore	190562	4528 (1.40-1.36)
Ramachandran outliers	187476	4459 (1.40-1.36)
Sidechain outliers	187428	4458 (1.40-1.36)
RSRZ outliers	180081	4399 (1.40-1.36)

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 $\leq 5\%$. 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	16% 77% 22% ..

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 (CCD ID: 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 (CCD ID: NI) (formula: Ni).

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

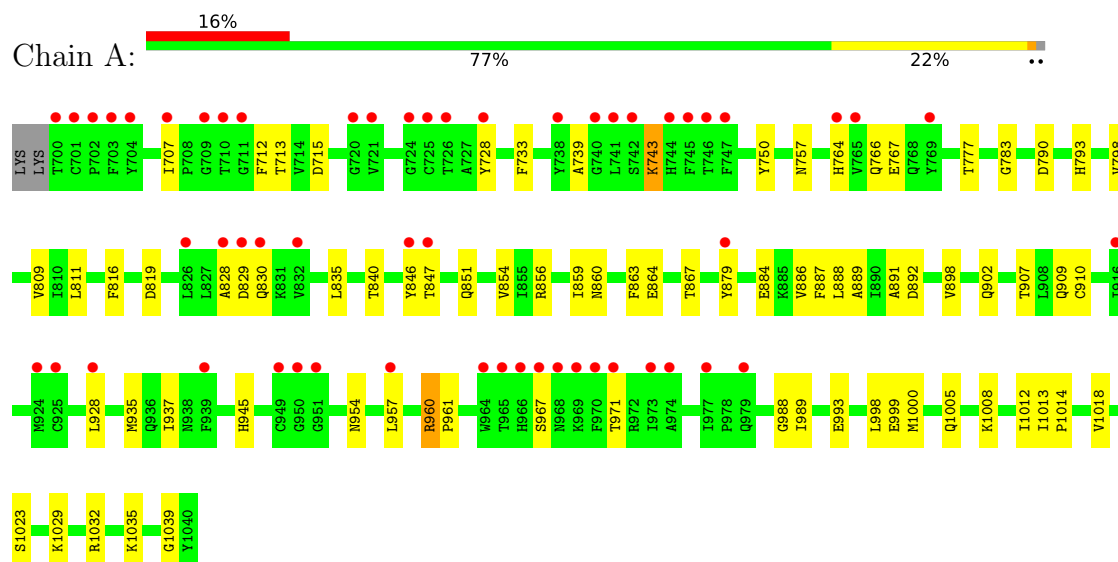
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
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, α , β , γ	52.28Å 57.61Å 115.57Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	28.89 – 1.38 28.89 – 1.38	Depositor EDS
% Data completeness (in resolution range)	99.8 (28.89-1.38) 99.8 (28.89-1.38)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.08 (at 1.38Å)	Xtriage
Refinement program	REFMAC 5.8.0155	Depositor
R, R_{free}	0.202 , 0.229 0.211 , 0.239	Depositor DCC
R_{free} test set	3510 reflections (4.85%)	wwPDB-VP
Wilson B-factor (Å ²)	19.3	Xtriage
Anisotropy	0.056	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 29.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	3044	wwPDB-VP
Average B, all atoms (Å ²)	29.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.74% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: MLI, NI

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	1.84	52/2802 (1.9%)	1.44	19/3809 (0.5%)

All (52) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	989	ILE	CA-C	15.12	1.63	1.52
1	A	988	GLY	C-N	8.20	1.39	1.33
1	A	860	ASN	N-CA	8.07	1.56	1.46
1	A	891	ALA	C-O	7.68	1.33	1.24
1	A	840	THR	C-O	7.50	1.32	1.24
1	A	835	LEU	N-CA	7.32	1.54	1.46
1	A	846	TYR	C-O	6.97	1.32	1.23
1	A	743	LYS	N-CA	6.90	1.55	1.46
1	A	961	PRO	N-CA	-6.77	1.39	1.47
1	A	954	ASN	N-CA	6.73	1.54	1.46
1	A	864	GLU	C-O	6.71	1.31	1.24
1	A	715	ASP	CA-C	6.51	1.61	1.53
1	A	809	VAL	CA-C	6.08	1.60	1.52
1	A	1005	GLN	N-CA	5.94	1.53	1.46
1	A	886	VAL	C-O	5.88	1.30	1.24
1	A	888	LEU	C-O	5.88	1.31	1.24
1	A	798	VAL	N-CA	5.87	1.52	1.46
1	A	1032	ARG	N-CA	5.82	1.53	1.46
1	A	910	CYS	N-CA	5.80	1.53	1.46
1	A	847	THR	CA-C	5.79	1.59	1.52
1	A	739	ALA	N-CA	5.74	1.53	1.46
1	A	828	ALA	CA-C	5.73	1.60	1.52
1	A	713	THR	CA-C	5.71	1.59	1.52
1	A	907	THR	N-CA	5.62	1.53	1.46
1	A	1008	LYS	N-CA	5.59	1.51	1.46
1	A	728	TYR	CA-C	5.55	1.59	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	811	LEU	CA-CB	-5.53	1.45	1.53
1	A	819	ASP	C-N	5.51	1.41	1.33
1	A	750	TYR	CA-C	5.50	1.59	1.52
1	A	793	HIS	N-CA	5.48	1.49	1.46
1	A	707	ILE	CA-C	5.44	1.57	1.53
1	A	1023	SER	N-CA	5.42	1.52	1.46
1	A	1013	ILE	CA-C	5.42	1.58	1.52
1	A	945	HIS	CA-C	5.40	1.59	1.52
1	A	863	PHE	C-O	5.39	1.30	1.24
1	A	777	THR	N-CA	5.39	1.52	1.46
1	A	892	ASP	C-O	5.39	1.30	1.24
1	A	884	GLU	N-CA	5.36	1.53	1.46
1	A	712	PHE	N-CA	5.35	1.52	1.45
1	A	999	GLU	N-CA	5.35	1.52	1.46
1	A	790	ASP	CG-OD2	-5.34	1.15	1.25
1	A	859	ILE	C-O	5.34	1.30	1.24
1	A	957	LEU	CA-C	5.25	1.59	1.52
1	A	854	VAL	CA-CB	5.20	1.60	1.54
1	A	1039	GLY	N-CA	5.19	1.53	1.45
1	A	1035	LYS	CA-CB	-5.18	1.45	1.53
1	A	733	PHE	C-O	5.14	1.31	1.23
1	A	1014	PRO	CA-C	-5.12	1.45	1.52
1	A	993	GLU	CA-C	5.09	1.59	1.52
1	A	1012	ILE	N-CA	5.07	1.52	1.46
1	A	851	GLN	CA-C	5.07	1.59	1.52
1	A	889	ALA	C-O	5.02	1.30	1.24

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	829	ASP	N-CA-C	7.76	122.00	112.54
1	A	713	THR	O-C-N	7.16	132.46	123.15
1	A	1008	LYS	CA-C-O	6.86	125.20	120.47
1	A	743	LYS	N-CA-C	6.15	120.25	112.87
1	A	887	PHE	N-CA-C	-5.94	104.38	111.69
1	A	1000	MET	O-C-N	5.81	128.05	122.07
1	A	864	GLU	O-C-N	-5.65	116.25	122.07
1	A	867	THR	N-CA-C	-5.36	105.51	111.36
1	A	898	VAL	CA-C-N	5.35	126.76	121.57
1	A	898	VAL	C-N-CA	5.35	126.76	121.57
1	A	846	TYR	CA-C-O	5.32	126.45	120.92
1	A	902	GLN	O-C-N	5.32	127.75	122.12

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	766	GLN	CA-C-N	5.30	127.69	120.54
1	A	766	GLN	C-N-CA	5.30	127.69	120.54
1	A	945	HIS	N-CA-C	5.29	117.04	111.28
1	A	783	GLY	N-CA-C	5.25	122.85	115.30
1	A	757	ASN	O-C-N	-5.20	116.61	122.12
1	A	935	MET	N-CA-C	5.09	118.59	112.38
1	A	998	LEU	N-CA-C	5.01	116.75	111.28

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	2726	0	2676	7	0
2	A	7	0	2	0	0
3	A	1	0	0	0	0
4	A	310	0	0	2	2
All	All	3044	0	2678	7	2

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 (7) 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:909:GLN:NE2	4:A:1201:HOH:O	2.11	0.82
1:A:1018:VAL:HG22	4:A:1420:HOH:O	1.98	0.64
1:A:743:LYS:CB	1:A:764[B]:HIS:O	2.58	0.51
1:A:743:LYS:HB3	1:A:764[B]:HIS:HB2	1.97	0.45
1:A:743:LYS:HB3	1:A:764[B]:HIS:O	2.16	0.44
1:A:937:ILE:HG21	1:A:960:ARG:CG	2.47	0.44
1:A:856:ARG:HE	1:A:856:ARG:HA	1.84	0.43

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the sym-

metry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:1415:HOH:O	4:A:1443:HOH:O[1_455]	1.91	0.29
4:A:1423:HOH:O	4:A:1442:HOH:O[1_655]	2.06	0.14

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%)	335 (98%)	8 (2%)	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	299/305 (98%)	290 (97%)	9 (3%)	36 8

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	767	GLU
1	A	816	PHE
1	A	830	GLN
1	A	879	TYR
1	A	928	LEU

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Mol	Chain	Res	Type
1	A	960	ARG
1	A	967	SER
1	A	971	THR
1	A	1029	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	766	GLN
1	A	851	GLN
1	A	869	ASN
1	A	966	HIS
1	A	968	ASN
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 oligosaccharides 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	1.12	0	7,7,7	2.00	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	-3.48	114.38	123.33
2	A	1101	MLI	O9-C3-O8	-2.85	116.01	123.33

There are no chirality outliers.

All (4) torsion outliers are listed below:

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

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, 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	341/343 (99%)	0.93	55 (16%) 4 6	10, 25, 48, 112	4 (1%)

All (55) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	970	PHE	7.2
1	A	703	PHE	5.6
1	A	964	TRP	4.3
1	A	968	ASN	4.2
1	A	965	THR	4.2
1	A	700	THR	4.1
1	A	879	TYR	3.8
1	A	721	VAL	3.6
1	A	966	HIS	3.6
1	A	971	THR	3.5
1	A	724	GLY	3.5
1	A	745	PHE	3.5
1	A	769	TYR	3.3
1	A	847	THR	3.3
1	A	746	THR	3.2
1	A	747	PHE	3.1
1	A	740	GLY	3.1
1	A	977	ILE	2.9
1	A	925	CYS	2.9
1	A	701	CYS	2.8
1	A	720	GLY	2.7
1	A	709	GLY	2.7
1	A	973	ILE	2.7
1	A	738	TYR	2.7
1	A	764[A]	HIS	2.6
1	A	765	VAL	2.6
1	A	969	LYS	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	704	TYR	2.5
1	A	741	LEU	2.5
1	A	979	GLN	2.5
1	A	951	GLY	2.5
1	A	828	ALA	2.5
1	A	702	PRO	2.5
1	A	950	GLY	2.5
1	A	826	LEU	2.4
1	A	710	THR	2.4
1	A	726	THR	2.4
1	A	742	SER	2.4
1	A	728	TYR	2.3
1	A	832	VAL	2.3
1	A	830	GLN	2.3
1	A	725	CYS	2.3
1	A	949	CYS	2.3
1	A	928	LEU	2.3
1	A	744	HIS	2.2
1	A	924	MET	2.2
1	A	711	GLY	2.2
1	A	829	ASP	2.1
1	A	846	TYR	2.1
1	A	967	SER	2.1
1	A	957	LEU	2.1
1	A	707	ILE	2.1
1	A	916	ILE	2.1
1	A	974	ALA	2.0
1	A	939	PHE	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 oligosaccharides 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($\text{\AA}^2$)	Q<0.9
2	MLI	A	1101	7/7	0.96	0.06	17,20,26,28	0
3	NI	A	1102	1/1	0.99	0.04	15,15,15,15	0

6.5 Other polymers [i](#)

There are no such residues in this entry.