



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 10:32 AM UTC

PDB ID : 5Q7X / pdb_00005q7x
Title : PanDDA analysis group deposition – Crystal Structure of DCLRE1A after initial refinement with no ligand modelled (structure 206)
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 : 1.69 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

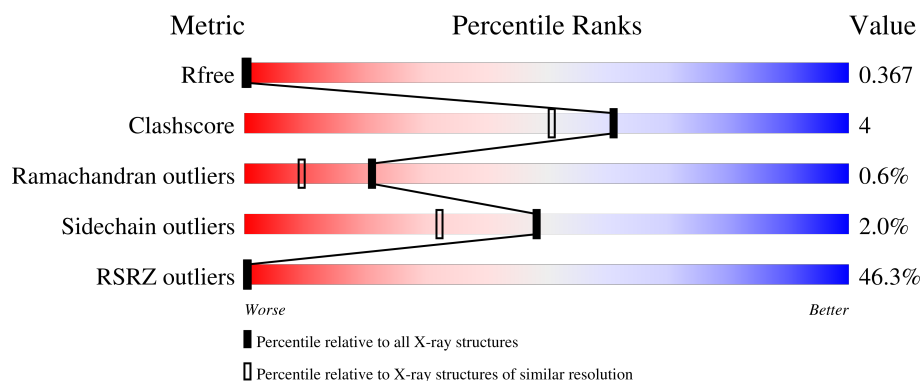
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.69 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	5551 (1.70-1.70)
Clashscore	190562	5924 (1.70-1.70)
Ramachandran outliers	187476	5846 (1.70-1.70)
Sidechain outliers	187428	5846 (1.70-1.70)
RSRZ outliers	180081	5554 (1.70-1.70)

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	46% 89% 10% ..

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		

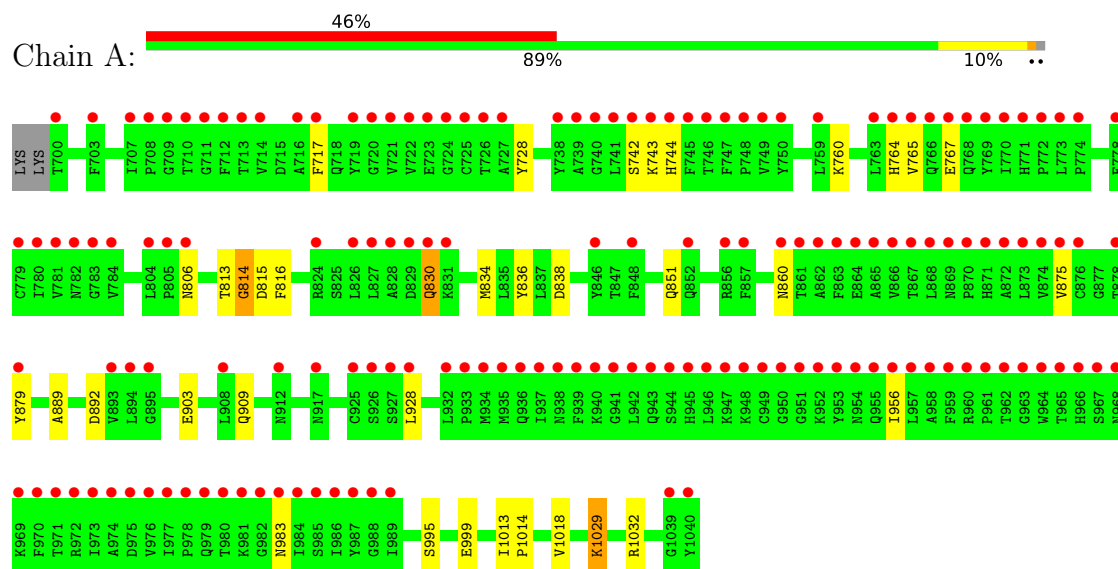
- Molecule 4 is water.

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	51.72Å 57.84Å 114.48Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	57.30 – 1.69 57.24 – 1.69	Depositor EDS
% Data completeness (in resolution range)	99.6 (57.30-1.69) 99.6 (57.24-1.69)	Depositor EDS
R_{merge}	0.21	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.50 (at 1.69Å)	Xtriage
Refinement program	REFMAC 5.8.0155	Depositor
R, R_{free}	0.305 , 0.351 0.320 , 0.367	Depositor DCC
R_{free} test set	1912 reflections (4.87%)	wwPDB-VP
Wilson B-factor (Å ²)	17.2	Xtriage
Anisotropy	0.523	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 46.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	3044	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.00% 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 [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	0.91	0/2802	1.01	3/3809 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	860	ASN	N-CA-C	5.79	117.26	111.07
1	A	830	GLN	N-CA-C	5.47	117.15	108.79
1	A	889	ALA	N-CA-C	5.01	116.74	111.28

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	813	THR	Peptide

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	23	0
2	A	7	0	2	0	0
3	A	1	0	0	0	0
4	A	310	0	0	11	2
All	All	3044	0	2678	23	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 4.

All (23) 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	2.10	0.84
1:A:806:ASN:N	4:A:1202:HOH:O	2.11	0.69
1:A:815:ASP:OD1	4:A:1203:HOH:O	2.16	0.62
1:A:834:MET:HE2	1:A:1013:ILE:HD11	1.85	0.58
1:A:1032:ARG:NE	4:A:1210:HOH:O	2.39	0.54
1:A:903:GLU:CB	4:A:1393:HOH:O	2.57	0.52
1:A:743:LYS:HG3	1:A:744:HIS:CE1	2.44	0.52
1:A:999:GLU:OE2	4:A:1204:HOH:O	2.19	0.50
1:A:851:GLN:NE2	4:A:1216:HOH:O	2.46	0.49
1:A:760:LYS:O	1:A:764[A]:HIS:HA	2.12	0.49
1:A:1032:ARG:NH2	4:A:1219:HOH:O	2.46	0.48
1:A:892:ASP:HB3	4:A:1206:HOH:O	2.13	0.47
1:A:983:ASN:ND2	4:A:1218:HOH:O	2.46	0.47
1:A:834:MET:CE	1:A:1013:ILE:HD11	2.45	0.46
1:A:717:PHE:CE1	1:A:728:TYR:HB3	2.54	0.43
1:A:814:GLY:O	1:A:838:ASP:HB2	2.18	0.43
1:A:760:LYS:O	1:A:764[B]:HIS:HA	2.19	0.43
1:A:836:TYR:CZ	1:A:1013:ILE:HD12	2.54	0.43
1:A:742:SER:O	1:A:765:VAL:HG22	2.18	0.42
1:A:1029:LYS:NZ	4:A:1234:HOH:O	2.51	0.42
1:A:1014:PRO:HB2	1:A:1018:VAL:HG12	2.02	0.41
1:A:875:VAL:HG23	1:A:956:ILE:HG23	2.02	0.41
1:A:743:LYS:CG	1:A:744:HIS:CE1	3.05	0.40

All (2) 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)
4:A:1328:HOH:O	4:A:1406:HOH:O[3_545]	2.11	0.09
4:A:1481:HOH:O	4:A:1488:HOH:O[2_555]	2.18	0.02

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%)	324 (94%)	17 (5%)	2 (1%)	21 9

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	814	GLY
1	A	767	GLU

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%)	48 32

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

Mol	Chain	Res	Type
1	A	816	PHE
1	A	830	GLN
1	A	879	TYR

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Mol	Chain	Res	Type
1	A	928	LEU
1	A	995	SER
1	A	1029	LYS

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	909	GLN
1	A	943	GLN
1	A	966	HIS
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	0.78	0	7,7,7	1.65	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-C1	2.78	123.11	114.51
2	A	1101	MLI	O6-C2-C1	-2.54	114.87	122.11

There are no chirality outliers.

All (4) torsion outliers are listed below:

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

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%)	2.51	158 (46%) 0 0	8, 30, 86, 149	4 (1%)

All (158) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	942	LEU	11.1
1	A	745	PHE	10.2
1	A	956	ILE	9.8
1	A	939	PHE	9.2
1	A	937	ILE	9.2
1	A	970	PHE	9.1
1	A	984	ILE	9.1
1	A	977	ILE	8.8
1	A	973	ILE	8.8
1	A	765	VAL	8.7
1	A	987	TYR	8.5
1	A	986	ILE	8.5
1	A	769	TYR	8.5
1	A	982	GLY	8.5
1	A	978	PRO	7.5
1	A	971	THR	7.5
1	A	974	ALA	7.3
1	A	780	ILE	7.3
1	A	966	HIS	7.3
1	A	744	HIS	7.2
1	A	976	VAL	7.1
1	A	946	LEU	7.0
1	A	928	LEU	6.9
1	A	957	LEU	6.8
1	A	968	ASN	6.5
1	A	747	PHE	6.4
1	A	950	GLY	6.4

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Mol	Chain	Res	Type	RSRZ
1	A	954	ASN	6.3
1	A	941	GLY	6.3
1	A	980	THR	6.2
1	A	866	VAL	6.1
1	A	964	TRP	6.0
1	A	746	THR	5.9
1	A	983	ASN	5.8
1	A	781	VAL	5.8
1	A	711	GLY	5.7
1	A	722	VAL	5.7
1	A	972	ARG	5.7
1	A	967	SER	5.5
1	A	768	GLN	5.5
1	A	742	SER	5.5
1	A	862	ALA	5.4
1	A	938	ASN	5.4
1	A	953	TYR	5.4
1	A	770	ILE	5.3
1	A	936	GLN	5.2
1	A	988	GLY	5.2
1	A	868	LEU	5.2
1	A	951	GLY	5.1
1	A	961	PRO	5.1
1	A	779	CYS	5.0
1	A	940	LYS	5.0
1	A	965	THR	5.0
1	A	721	VAL	5.0
1	A	741	LEU	5.0
1	A	764[A]	HIS	5.0
1	A	963	GLY	4.9
1	A	985	SER	4.9
1	A	955	GLN	4.8
1	A	870	PRO	4.8
1	A	863	PHE	4.7
1	A	981	LYS	4.7
1	A	784	VAL	4.7
1	A	927	SER	4.6
1	A	700	THR	4.6
1	A	743	LYS	4.6
1	A	969	LYS	4.6
1	A	867	THR	4.5
1	A	943	GLN	4.5

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Mol	Chain	Res	Type	RSRZ
1	A	962	THR	4.4
1	A	979	GLN	4.4
1	A	871	HIS	4.3
1	A	865	ALA	4.3
1	A	763	LEU	4.3
1	A	726	THR	4.3
1	A	989	ILE	4.3
1	A	724	GLY	4.2
1	A	879	TYR	4.2
1	A	750	TYR	4.2
1	A	872	ALA	4.2
1	A	975	ASP	4.2
1	A	948	LYS	4.1
1	A	748	PRO	4.1
1	A	935	MET	4.1
1	A	782	ASN	4.0
1	A	945	HIS	4.0
1	A	710	THR	4.0
1	A	766	GLN	4.0
1	A	767	GLU	3.9
1	A	960	ARG	3.9
1	A	856	ARG	3.8
1	A	725	CYS	3.8
1	A	709	GLY	3.7
1	A	739	ALA	3.7
1	A	952	LYS	3.6
1	A	959	PHE	3.6
1	A	828	ALA	3.5
1	A	932	LEU	3.5
1	A	944	SER	3.5
1	A	826	LEU	3.5
1	A	869	ASN	3.5
1	A	857	PHE	3.4
1	A	749	VAL	3.4
1	A	949	CYS	3.4
1	A	727	ALA	3.4
1	A	874	VAL	3.4
1	A	771	HIS	3.4
1	A	712	PHE	3.4
1	A	864	GLU	3.3
1	A	723	GLU	3.2
1	A	873	LEU	3.2

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Mol	Chain	Res	Type	RSRZ
1	A	772	PRO	3.2
1	A	759	LEU	3.1
1	A	876[A]	CYS	3.1
1	A	861	THR	3.1
1	A	947	LYS	3.1
1	A	738	TYR	3.1
1	A	740	GLY	3.1
1	A	934	MET	3.0
1	A	773	LEU	3.0
1	A	933	PRO	3.0
1	A	926	SER	2.9
1	A	716	ALA	2.9
1	A	805	PRO	2.9
1	A	893	VAL	2.9
1	A	783	GLY	2.8
1	A	894	LEU	2.8
1	A	925	CYS	2.8
1	A	703	PHE	2.8
1	A	719	TYR	2.8
1	A	804	LEU	2.8
1	A	827	LEU	2.8
1	A	720	GLY	2.7
1	A	895	GLY	2.7
1	A	829	ASP	2.7
1	A	830	GLN	2.6
1	A	1040	TYR	2.6
1	A	1039	GLY	2.5
1	A	778	GLU	2.5
1	A	860	ASN	2.4
1	A	707	ILE	2.4
1	A	875	VAL	2.4
1	A	878	THR	2.4
1	A	717	PHE	2.4
1	A	713	THR	2.4
1	A	806	ASN	2.3
1	A	852	GLN	2.3
1	A	848	PHE	2.3
1	A	708	PRO	2.2
1	A	824	ARG	2.2
1	A	831	LYS	2.2
1	A	958	ALA	2.1
1	A	912	ASN	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	846	TYR	2.1
1	A	908	LEU	2.1
1	A	774	PRO	2.1
1	A	714	VAL	2.0
1	A	917	ASN	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	0.91	0.11	12,17,20,23	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.