



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 29, 2020 – 01:59 PM BST

PDB ID : 2R36
Title : Crystal structure of ni human ARG-insulin
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Deposited on : 2007-08-29
Resolution : 2.00 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.13
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) : 2.13

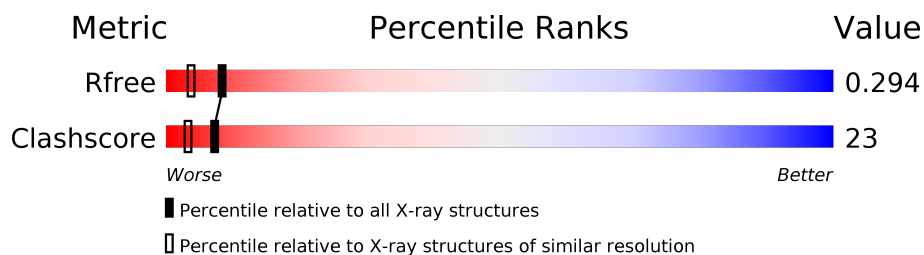
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION





The reported resolution of this entry is 2.00 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	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)

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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	22	
1	C	22	
2	B	30	
2	D	30	

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 881 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 Insulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	22	Total	C	N	O	S	0	0	0
			174	105	29	36	4			
1	C	22	Total	C	N	O	S	0	0	0
			174	105	29	36	4			

- Molecule 2 is a protein called Insulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	30	Total	C	N	O	S	0	1	0
			243	158	40	43	2			
2	D	30	Total	C	N	O	S	0	1	0
			249	165	40	42	2			

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

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	2	Total	Ni	0	0
			2	2		
3	D	2	Total	Ni	0	0
			2	2		

- Molecule 4 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	D	1	Total	Na	0	0
			1	1		

- Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	D	1	Total	Cl	0	1
			1	1		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	6	Total 6	O 6	0	0
6	B	16	Total 16	O 16	0	0
6	C	2	Total 2	O 2	0	0
6	D	11	Total 11	O 11	0	1

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. 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. 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: Insulin

Chain A:  68% 32%



• Molecule 1: Insulin

Chain C:  77% 18% 5%



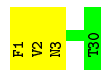
• Molecule 2: Insulin

Chain B:  73% 27%



• Molecule 2: Insulin

Chain D:  90% 10%



4 Data and refinement statistics

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, α , β , γ	83.95Å 83.95Å 40.22Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	35.20 – 2.00 35.20 – 2.00	Depositor EDS
% Data completeness (in resolution range)	95.0 (35.20-2.00) 95.0 (35.20-2.00)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.27 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.221 , 0.255 0.244 , 0.294	Depositor DCC
R_{free} test set	680 reflections (10.01%)	wwPDB-VP
Wilson B-factor (Å ²)	34.9	Xtriage
Anisotropy	0.009	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 59.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.023 for h,-h-k,-l	Xtriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	881	wwPDB-VP
Average B, all atoms (Å ²)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.60% 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, CL, NA

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	0.34	0/175	0.39	0/234
1	C	0.46	0/175	0.70	1/234 (0.4%)
2	B	0.35	0/255	0.48	0/343
2	D	0.42	0/261	0.52	0/351
All	All	0.39	0/866	0.53	1/1162 (0.1%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	16	LEU	CA-CB-CG	5.16	127.17	115.30

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	174	0	162	11	0
1	C	174	0	162	15	0
2	B	243	0	233	12	0
2	D	249	0	235	17	0
3	B	2	0	0	0	0
3	D	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	D	1	0	0	0	0
5	D	1	0	0	0	0
6	A	6	0	0	1	0
6	B	16	0	0	5	0
6	C	2	0	0	1	0
6	D	11	0	0	0	0
All	All	881	0	792	37	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 23.

All (37) 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:C:13:LEU:HB2	2:D:1[B]:PHE:CE2	1.54	1.40
1:C:13:LEU:HD12	2:D:1[B]:PHE:CZ	1.88	1.08
1:C:13:LEU:CB	2:D:1[B]:PHE:HE2	1.72	1.01
1:C:13:LEU:HB2	2:D:1[B]:PHE:HE2	0.92	0.95
1:C:13:LEU:CB	2:D:1[B]:PHE:CE2	2.47	0.94
2:B:4:GLN:HB2	6:B:53:HOH:O	1.70	0.90
1:C:10:ILE:HD13	2:D:3:ASN:HB2	1.62	0.81
1:C:13:LEU:CD1	2:D:1[B]:PHE:CZ	2.70	0.73
2:B:2:VAL:O	2:B:3:ASN:CG	2.30	0.69
1:C:13:LEU:CD1	2:D:1[B]:PHE:CE2	2.75	0.69
1:C:13:LEU:HD12	2:D:1[B]:PHE:CE2	2.26	0.69
1:C:0:ARG:HD2	6:C:24:HOH:O	1.96	0.66
1:C:13:LEU:HB2	2:D:1[B]:PHE:CD2	2.28	0.61
1:A:2:ILE:HG22	6:A:27:HOH:O	2.01	0.59
1:A:12:SER:HB3	2:B:3:ASN:HD21	1.68	0.59
2:B:8:GLY:HA3	6:B:52:HOH:O	2.02	0.58
1:A:0:ARG:CG	1:A:0:ARG:HH21	2.17	0.57
2:D:2:VAL:HG12	2:D:3:ASN:OD1	2.07	0.55
1:A:0:ARG:H2	2:B:29:LYS:HE2	1.71	0.54
1:C:10:ILE:CD1	2:D:3:ASN:HB2	2.36	0.54
1:A:0:ARG:HA	1:A:4:GLU:HG3	1.90	0.54
1:C:13:LEU:HD12	2:D:1[B]:PHE:HZ	1.67	0.51
1:A:5:GLN:HE21	1:A:15:GLN:HE21	1.59	0.50
1:A:13:LEU:HB2	2:B:1:PHE:CE2	2.47	0.50
2:D:2:VAL:HG12	2:D:3:ASN:N	2.26	0.49
2:B:4:GLN:CB	6:B:53:HOH:O	2.45	0.49
1:C:13:LEU:CA	2:D:1[B]:PHE:HE2	2.25	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:0:ARG:CG	1:A:0:ARG:NH2	2.74	0.45
2:B:30:THR:OG1	2:B:30:THR:O	2.30	0.45
1:A:2:ILE:HG12	2:B:11:LEU:HD21	1.99	0.44
2:B:4:GLN:HG2	6:B:55:HOH:O	2.18	0.44
2:D:2:VAL:CG1	2:D:3:ASN:N	2.82	0.42
1:A:0:ARG:HG2	1:A:0:ARG:NH2	2.35	0.42
2:B:1:PHE:HD1	6:B:55:HOH:O	2.01	0.41
1:A:0:ARG:N	2:B:29:LYS:HE2	2.36	0.41
1:C:12:SER:O	1:C:16:LEU:HB2	2.20	0.41

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

There are no protein backbone outliers to report in this entry.

5.3.2 Protein sidechains [i](#)

There are no protein residues with a non-rotameric sidechain to report in this entry.

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

Of 6 ligands modelled in this entry, 6 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

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

Unable to reproduce the depositors R factor - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

Unable to reproduce the depositors R factor - this section is therefore empty.

6.3 Carbohydrates ⓘ

Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands ⓘ

Unable to reproduce the depositors R factor - this section is therefore empty.

6.5 Other polymers ⓘ

Unable to reproduce the depositors R factor - this section is therefore empty.