W O R L D W I D E
wwPDB
PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

May 25, 2020 – 04:15 am BST

PDB ID	:	3T7I
Title	:	Crystal structure of Se-Met Rtt107p (residues 820-1070)
Authors	:	Li, X.; Li, F.; Wu, J.; Shi, Y.
Deposited on	:	2011-07-30
Resolution	:	2.30 Å(reported)

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

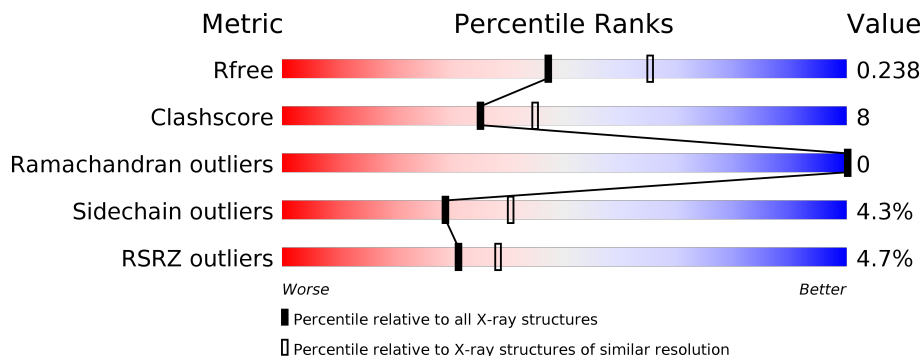|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

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 2.30 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	Percentile Ranks	Value
Rfree		0.238
Clashscore		8
Ramachandran outliers		0
Sidechain outliers		4.3%
RSRZ outliers		4.7%

Worse ← → *Better*

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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	256	4% / 75% 15% • 8%
1	B	256	4% / 75% 16% • 8%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 3947 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 Regulator of Ty1 transposition protein 107.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	236	Total 1917	C 1243	N 318	O 348	S 6	Se 2	11	0	0
1	B	236	Total 1917	C 1243	N 318	O 348	S 6	Se 2	12	0	0

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	815	GLY	-	EXPRESSION TAG	UNP P38850
A	816	SER	-	EXPRESSION TAG	UNP P38850
A	817	PRO	-	EXPRESSION TAG	UNP P38850
A	818	HIS	-	EXPRESSION TAG	UNP P38850
A	819	MSE	-	EXPRESSION TAG	UNP P38850
A	909	MSE	LEU	CONFLICT	UNP P38850
A	1028	MSE	LEU	CONFLICT	UNP P38850
B	815	GLY	-	EXPRESSION TAG	UNP P38850
B	816	SER	-	EXPRESSION TAG	UNP P38850
B	817	PRO	-	EXPRESSION TAG	UNP P38850
B	818	HIS	-	EXPRESSION TAG	UNP P38850
B	819	MSE	-	EXPRESSION TAG	UNP P38850
B	909	MSE	LEU	CONFLICT	UNP P38850
B	1028	MSE	LEU	CONFLICT	UNP P38850

- Molecule 2 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	52	Total 52	O 52	0	0
2	B	61	Total 61	O 61	0	0

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA and DNA 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: Regulator of Ty1 transposition protein 107
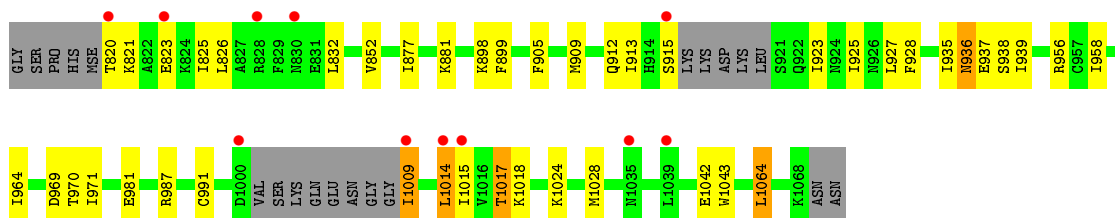
- Molecule 1: Regulator of Ty1 transposition protein 107
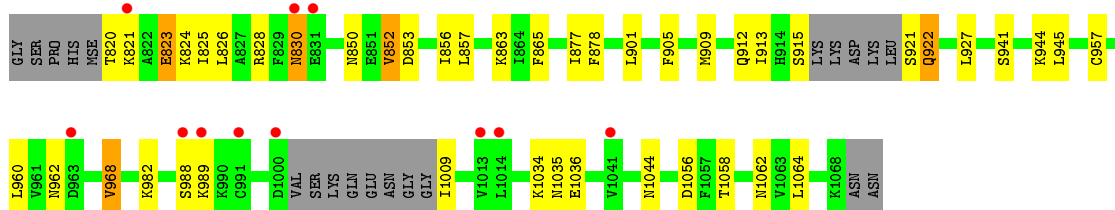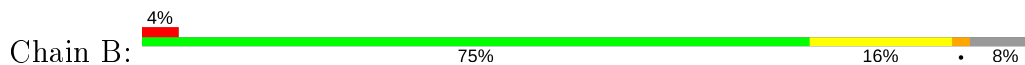
4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	59.24Å 74.64Å 129.08Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.99 – 2.30 19.99 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.7 (19.99-2.30) 99.1 (19.99-2.10)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	4.07 (at 2.11Å)	Xtriage
Refinement program	PHENIX 1.6.1_357	Depositor
R, R_{free}	0.203 , 0.248 0.207 , 0.238	Depositor DCC
R_{free} test set	1704 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å^2)	41.5	Xtriage
Anisotropy	0.090	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.29 , 44.8	EDS
L-test for twinning[2]	$<|L|> = 0.51, <L^2> = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	3947	wwPDB-VP
Average B, all atoms (Å^2)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 36.92 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 4.6402e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[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)

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	0.48	0/1947	0.55	1/2616 (0.0%)
1	B	0.55	0/1947	0.54	0/2616
All	All	0.52	0/3894	0.54	1/5232 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	1014	LEU	CA-CB-CG	5.77	128.57	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	1917	0	1990	36	0
1	B	1917	0	1990	31	0
2	A	52	0	0	0	0
2	B	61	0	0	0	0
All	All	3947	0	3980	63	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 8.

All (63) 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:1017:THR:HG22	1:A:1018:LYS:HG3	1.46	0.96
1:A:898:LYS:HG3	1:B:944:LYS:HD2	1.50	0.93
1:B:957:CYS:SG	1:B:982:LYS:HE2	2.12	0.90
1:B:905:PHE:CZ	1:B:909:MSE:HE1	2.24	0.72
1:A:956:ARG:NH1	1:A:981:GLU:HG3	2.07	0.70
1:B:1056:ASP:OD1	1:B:1058:THR:HG22	1.93	0.68
1:B:1044:ASN:HD22	1:B:1062:ASN:HD21	1.42	0.67
1:A:928:PHE:HE2	1:B:945:LEU:HD11	1.61	0.65
1:A:1009:ILE:HG23	1:A:1009:ILE:O	1.97	0.65
1:A:905:PHE:CE1	1:A:927:LEU:HD13	2.33	0.64
1:B:820:THR:HG23	1:B:821:LYS:H	1.64	0.62
1:A:936:ASN:ND2	1:A:938:SER:H	1.98	0.61
1:A:987:ARG:O	1:A:991:CYS:HB2	2.05	0.56
1:A:1042:GLU:HG2	1:A:1064:LEU:CD2	2.37	0.55
1:A:936:ASN:HD22	1:A:938:SER:H	1.54	0.55
1:A:937:GLU:OE2	1:B:941:SER:HB3	2.07	0.54
1:B:850:ASN:OD1	1:B:852:VAL:HG13	2.07	0.54
1:A:898:LYS:HE3	1:A:899:PHE:CE2	2.43	0.53
1:B:1044:ASN:HD22	1:B:1062:ASN:ND2	2.04	0.53
1:A:821:LYS:O	1:A:825:ILE:HG13	2.09	0.52
1:A:964:ILE:HG12	1:A:971:ILE:HD12	1.93	0.51
1:B:820:THR:O	1:B:824:LYS:HG3	2.11	0.51
1:A:826:LEU:HD22	1:A:832:LEU:HD21	1.91	0.51
1:B:1036:GLU:OE1	1:B:1036:GLU:HA	2.10	0.51
1:B:821:LYS:O	1:B:825:ILE:HG13	2.11	0.51
1:A:1042:GLU:HG2	1:A:1064:LEU:HD21	1.93	0.50
1:A:956:ARG:HG3	1:A:981:GLU:CG	2.42	0.50
1:B:853:ASP:O	1:B:857:LEU:HG	2.11	0.49
1:A:936:ASN:C	1:A:936:ASN:HD22	2.16	0.49
1:B:820:THR:N	1:B:823:GLU:HG3	2.27	0.49
1:A:913:ILE:HD11	1:A:923:ILE:HD11	1.95	0.49
1:A:971:ILE:HG23	1:A:1043:TRP:CZ3	2.47	0.48
1:A:964:ILE:HG12	1:A:971:ILE:CD1	2.44	0.48
1:A:936:ASN:HB3	1:A:939:ILE:HD12	1.95	0.48
1:B:828:ARG:O	1:B:921:SER:N	2.47	0.48
1:B:913:ILE:C	1:B:915:SER:H	2.17	0.47
1:A:937:GLU:OE2	1:B:941:SER:CB	2.62	0.47
1:A:1009:ILE:CG2	1:A:1009:ILE:O	2.64	0.46
1:B:922:GLN:HB2	1:B:922:GLN:HE21	1.57	0.46
1:A:958:ILE:HD13	1:A:1015:ILE:HD12	1.98	0.45
1:B:988:SER:O	1:B:989:LYS:HB2	2.16	0.45
1:A:956:ARG:HG3	1:A:981:GLU:HG3	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1034:LYS:O	1:B:1035:ASN:HB3	2.17	0.45
1:B:823:GLU:HG3	1:B:823:GLU:H	1.64	0.45
1:A:909:MSE:HB2	1:A:925:ILE:HD13	1.98	0.45
1:A:936:ASN:HD22	1:A:937:GLU:N	2.15	0.45
1:B:960:LEU:HD23	1:B:968:VAL:HG22	1.98	0.45
1:A:820:THR:O	1:A:823:GLU:HB2	2.18	0.44
1:B:830:ASN:HA	1:B:830:ASN:HD22	1.57	0.44
1:B:905:PHE:CZ	1:B:909:MSE:CE	2.97	0.44
1:A:991:CYS:HB3	1:A:1024:LYS:NZ	2.32	0.44
1:B:927:LEU:C	1:B:927:LEU:HD23	2.37	0.44
1:A:912:GLN:O	1:A:915:SER:HA	2.18	0.43
1:A:905:PHE:CZ	1:A:927:LEU:HD13	2.54	0.43
1:B:820:THR:HG23	1:B:821:LYS:N	2.31	0.42
1:B:826:LEU:HD11	1:B:856:ILE:HA	2.01	0.42
1:B:863:LYS:HE3	1:B:865:PHE:CE1	2.55	0.42
1:A:898:LYS:HE3	1:A:899:PHE:HE2	1.84	0.42
1:A:969:ASP:OD1	1:A:970:THR:N	2.54	0.41
1:B:878:PHE:HA	1:B:901:LEU:O	2.21	0.41
1:B:863:LYS:HE3	1:B:865:PHE:CZ	2.55	0.41
1:A:1024:LYS:NZ	1:A:1028:MSE:HE1	2.36	0.41
1:A:1042:GLU:HG2	1:A:1064:LEU:HD22	2.03	0.40

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	230/256 (90%)	226 (98%)	4 (2%)	0	100	100
1	B	230/256 (90%)	224 (97%)	6 (3%)	0	100	100
All	All	460/512 (90%)	450 (98%)	10 (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	220/234 (94%)	211 (96%)	9 (4%)	30	43
1	B	220/234 (94%)	210 (96%)	10 (4%)	27	39
All	All	440/468 (94%)	421 (96%)	19 (4%)	29	40

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	852	VAL
1	A	877	ILE
1	A	881	LYS
1	A	935	ILE
1	A	936	ASN
1	A	1009	ILE
1	A	1014	LEU
1	A	1017	THR
1	A	1064	LEU
1	B	823	GLU
1	B	830	ASN
1	B	852	VAL
1	B	877	ILE
1	B	912	GLN
1	B	922	GLN
1	B	962	ASN
1	B	968	VAL
1	B	1009	ILE
1	B	1064	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	859	GLN

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Mol	Chain	Res	Type
1	A	922	GLN
1	A	936	ASN
1	A	1066	GLN
1	B	830	ASN
1	B	922	GLN
1	B	962	ASN
1	B	1062	ASN
1	B	1066	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 carbohydrates in this entry.

5.6   Ligand geometry (i)

There are no ligands in this entry.

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	234/256 (91%)	-0.19	11 (4%)	31	38	27, 39, 66, 82	44 (18%)
1	B	234/256 (91%)	-0.11	11 (4%)	31	38	24, 41, 65, 76	46 (19%)
All	All	468/512 (91%)	-0.15	22 (4%)	31	38	24, 40, 66, 82	90 (19%)

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	988	SER	4.0
1	A	915	SER	3.1
1	B	830	ASN	3.0
1	B	1000	ASP	2.9
1	A	820	THR	2.8
1	A	830	ASN	2.7
1	A	1000	ASP	2.7
1	B	989	LYS	2.7
1	B	1014	LEU	2.6
1	A	1035	ASN	2.6
1	A	1014	LEU	2.5
1	B	821	LYS	2.4
1	A	1009	ILE	2.4
1	A	1015	ILE	2.4
1	B	1013	VAL	2.3
1	B	991	CYS	2.2
1	A	823	GLU	2.2
1	A	828	ARG	2.1
1	B	1041	VAL	2.1
1	B	831	GLU	2.0
1	B	963	ASP	2.0
1	A	1039	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 carbohydrates in this entry.

6.4 Ligands (i)

There are no ligands in this entry.

6.5 Other polymers (i)

There are no such residues in this entry.