



## wwPDB EM Map/Model Validation Report ⓘ

Jun 16, 2016 – 06:16 PM EDT

PDB ID : 5G2Y  
EMDB ID: : EMD-3332  
Title : Structure a of Group II Intron Complexed with its Reverse Transcriptase  
Authors : Qu, G.; Kaushal, P.S.; Wang, J.; Shigematsu, H.; Piazza, C.L.; Agrawal, R.K.; Belfort, M.; Wang, H.W.  
Deposited on : 2016-04-16  
Resolution : 4.50 Å(reported)

This is a wwPDB EM Map/Model Validation Report for a publicly released PDB/EMDB entry.  
For rigid body fitted models, validation errors reported here could stem from errors in the original structure(s) used in the fitting.  
We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)  
A user guide is available at  
<http://wwpdb.org/validation/2016/EMValidationReportHelp>

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MolProbity : 4.02b-467  
Mogul : unknown  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20027790

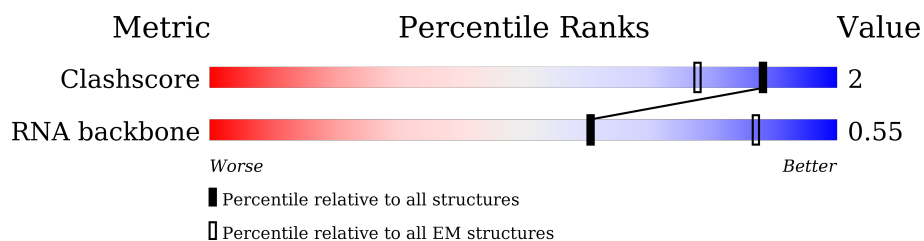
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*


The reported resolution of this entry is 4.50 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)	EM structures (#Entries)
Clashscore	114402	924
RNA backbone	3027	244

The table below summarises the geometric issues observed across the polymeric chains. The red, orange, yellow and green segments on the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	704	 63% 23% • 11%

## 2 Entry composition [i](#)

There is only 1 type of molecule in this entry. The entry contains 13494 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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.

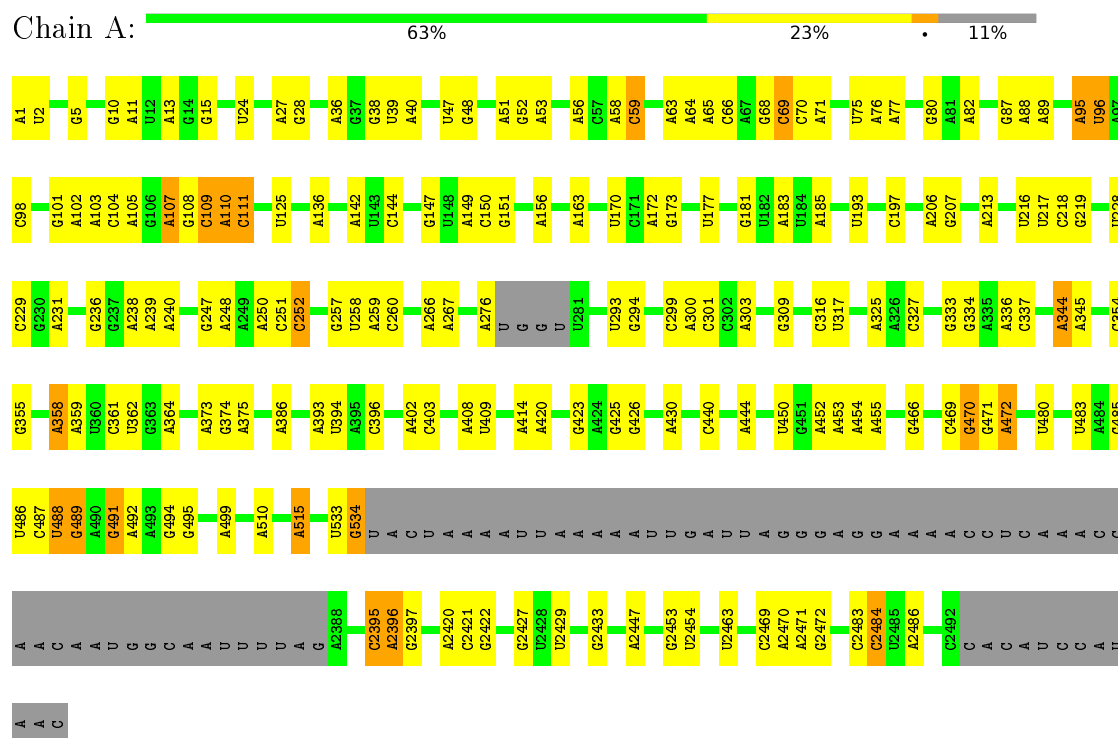
- Molecule 1 is a RNA chain called GROUP II INTRON.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	630	Total	C	N	O	P	0	0
			13494	6041	2489	4336	628		

### 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 errors 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: GROUP II INTRON



## 4 Experimental information ⓘ

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	Depositor
Number of particles used	Not provided	Depositor
Resolution determination method	Not provided	Depositor
CTF correction method	INDIVIDUAL PARTICLES	Depositor
Microscope	OTHER	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	Not provided	Depositor
Minimum defocus (nm)	Not provided	Depositor
Maximum defocus (nm)	Not provided	Depositor
Magnification	Not provided	Depositor
Image detector	GATAN K2 SUMMIT (4K X 4K)	Depositor

## 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  >2	RMSZ	# Z  >2
1	A	0.11	0/15121	0.65	0/23567

There are no bond length outliers.

There are no bond angle outliers.

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	13494	0	6793	35	0
All	All	13494	0	6793	35	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 2.

All (35) 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:48:G:H1	1:A:59:C:H42	1.47	0.63
1:A:172:A:H61	1:A:362:U:H3	1.51	0.58
1:A:24:U:H3	1:A:375:A:H61	1.52	0.57
1:A:236:G:H1	1:A:252:C:H42	1.54	0.56
1:A:396:C:H42	1:A:466:G:H1	1.52	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:95:A:H5'	1:A:96:U:H5	1.72	0.55
1:A:27:A:N6	1:A:38:G:N7	2.55	0.54
1:A:472:A:N6	1:A:2395:C:O2	2.40	0.54
1:A:488:U:O2'	1:A:489:G:N2	2.39	0.53
1:A:2447:A:OP2	1:A:2469:C:N4	2.42	0.53
1:A:470:G:OP1	1:A:2420:A:N6	2.43	0.52
1:A:414:A:O2'	1:A:420:A:N6	2.43	0.51
1:A:172:A:OP2	1:A:358:A:N6	2.45	0.50
1:A:173:G:H1	1:A:361:C:H42	1.59	0.49
1:A:68:G:OP2	1:A:69:C:N4	2.45	0.49
1:A:110:A:O2'	1:A:111:C:OP1	2.27	0.49
1:A:1:A:H62	1:A:2396:A:H5''	1.78	0.48
1:A:533:U:H2'	1:A:534:G:H4'	1.96	0.47
1:A:15:G:H21	1:A:109:C:H42	1.62	0.47
1:A:260:C:H42	1:A:309:G:H1	1.64	0.46
1:A:499:A:H2	1:A:2427:G:H1'	1.81	0.46
1:A:107:A:O2'	1:A:108:G:N2	2.49	0.46
1:A:480:U:O4	1:A:515:A:O2'	2.35	0.45
1:A:102:A:OP2	1:A:111:C:N4	2.50	0.45
1:A:10:G:O2'	1:A:11:A:O4'	2.33	0.45
1:A:77:A:OP1	1:A:95:A:O2'	2.35	0.44
1:A:64:A:H2'	1:A:65:A:C8	2.52	0.44
1:A:47:U:H2'	1:A:48:G:H8	1.84	0.42
1:A:75:U:N3	1:A:101:G:N7	2.67	0.42
1:A:491:G:H5'	1:A:492:A:H8	1.85	0.42
1:A:70:C:H2'	1:A:71:A:C8	2.55	0.42
1:A:396:C:O2'	1:A:2484:C:O2	2.38	0.42
1:A:197:C:H41	1:A:344:A:H2	1.68	0.41
1:A:454:A:H2'	1:A:455:A:C2	2.56	0.41
1:A:354:C:N4	1:A:355:G:O6	2.55	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles ⓘ

### 5.3.1 Protein backbone ⓘ

There are no protein molecules in this entry.

### 5.3.2 Protein sidechains ⓘ

There are no protein molecules in this entry.

### 5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	626 / 704 (88%)	139 (22%)	8 (1%)

All (139) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	2	U
1	A	5	G
1	A	13	A
1	A	28	G
1	A	36	A
1	A	39	U
1	A	40	A
1	A	51	A
1	A	52	G
1	A	53	A
1	A	56	A
1	A	58	A
1	A	59	C
1	A	63	A
1	A	66	C
1	A	69	C
1	A	76	A
1	A	80	G
1	A	82	A
1	A	87	G
1	A	88	A
1	A	89	A
1	A	95	A
1	A	96	U
1	A	98	C
1	A	103	A
1	A	104	C
1	A	105	A
1	A	107	A
1	A	109	C
1	A	110	A

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Mol	Chain	Res	Type
1	A	111	C
1	A	125	U
1	A	136	A
1	A	142	A
1	A	144	C
1	A	147	G
1	A	149	A
1	A	150	C
1	A	151	G
1	A	156	A
1	A	163	A
1	A	170	U
1	A	177	U
1	A	181	G
1	A	183	A
1	A	185	A
1	A	193	U
1	A	206	A
1	A	207	G
1	A	213	A
1	A	216	U
1	A	217	U
1	A	218	C
1	A	219	G
1	A	229	C
1	A	231	A
1	A	238	A
1	A	239	A
1	A	240	A
1	A	247	G
1	A	248	A
1	A	250	A
1	A	251	C
1	A	252	C
1	A	257	G
1	A	258	U
1	A	259	A
1	A	266	A
1	A	267	A
1	A	276	A
1	A	293	U
1	A	294	G

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Mol	Chain	Res	Type
1	A	299	C
1	A	300	A
1	A	301	C
1	A	303	A
1	A	316	C
1	A	317	U
1	A	325	A
1	A	327	C
1	A	333	G
1	A	334	G
1	A	336	A
1	A	337	C
1	A	344	A
1	A	345	A
1	A	358	A
1	A	359	A
1	A	364	A
1	A	373	A
1	A	374	G
1	A	386	A
1	A	393	A
1	A	394	U
1	A	402	A
1	A	403	C
1	A	408	A
1	A	409	U
1	A	423	G
1	A	425	G
1	A	426	G
1	A	430	A
1	A	440	C
1	A	444	A
1	A	450	U
1	A	452	A
1	A	453	A
1	A	469	C
1	A	470	G
1	A	471	G
1	A	472	A
1	A	483	U
1	A	485	G
1	A	486	U

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Mol	Chain	Res	Type
1	A	487	C
1	A	488	U
1	A	489	G
1	A	491	G
1	A	494	G
1	A	495	G
1	A	510	A
1	A	515	A
1	A	534	G
1	A	2396	A
1	A	2397	G
1	A	2421	C
1	A	2422	G
1	A	2429	U
1	A	2433	G
1	A	2453	G
1	A	2454	U
1	A	2463	U
1	A	2470	A
1	A	2471	A
1	A	2472	G
1	A	2483	C
1	A	2484	C
1	A	2486	A

All (8) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	39	U
1	A	110	A
1	A	228	U
1	A	300	A
1	A	316	C
1	A	373	A
1	A	402	A
1	A	2395	C

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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.