



wwPDB X-ray Structure Validation Summary Report ⓘ

Sep 27, 2023 – 08:19 PM EDT

PDB ID : 1H1K
Title : THE BLUETONGUE VIRUS (BTV) CORE BINDS DSRNA
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Deposited on : 2002-07-17
Resolution : 10.00 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 : 4.02b-467
Xtrriage (Phenix) : 1.13
EDS : **FAILED**
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35.1

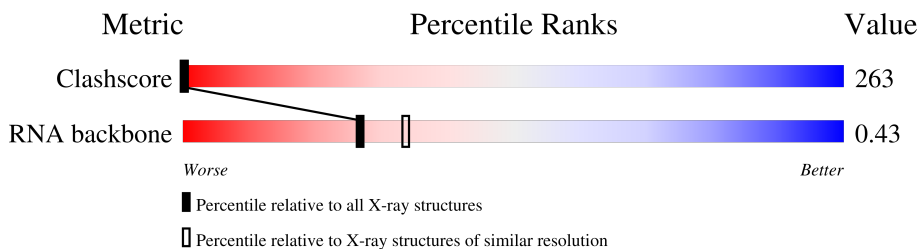
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 10.00 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))
Clashscore	141614	1071 (15.00-3.90)
RNA backbone	3102	1079 (11.50-3.00)

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 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 $\leq 5\%$

Note EDS failed to run properly.

Mol	Chain	Length	Quality of chain
1	I	412	78% 21%
2	J	276	72% 25%
3	K	265	77% 19%
4	L	412	79% 21%
5	M	276	73% 24%
6	N	265	82% 15%

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 40008 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 RNA chain called RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
1	I	412	9061	4120	2060	2470	411	0	0	0

- Molecule 2 is a RNA chain called RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	J	276	6069	2760	1380	1654	275	0	0	0

- Molecule 3 is a RNA chain called RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
3	K	265	5827	2650	1325	1588	264	0	0	0

- Molecule 4 is a RNA chain called RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
4	L	412	8237	3708	824	3294	411	0	0	0

- Molecule 5 is a RNA chain called RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
5	M	276	5517	2484	552	2206	275	0	0	0

- Molecule 6 is a RNA chain called RNA.

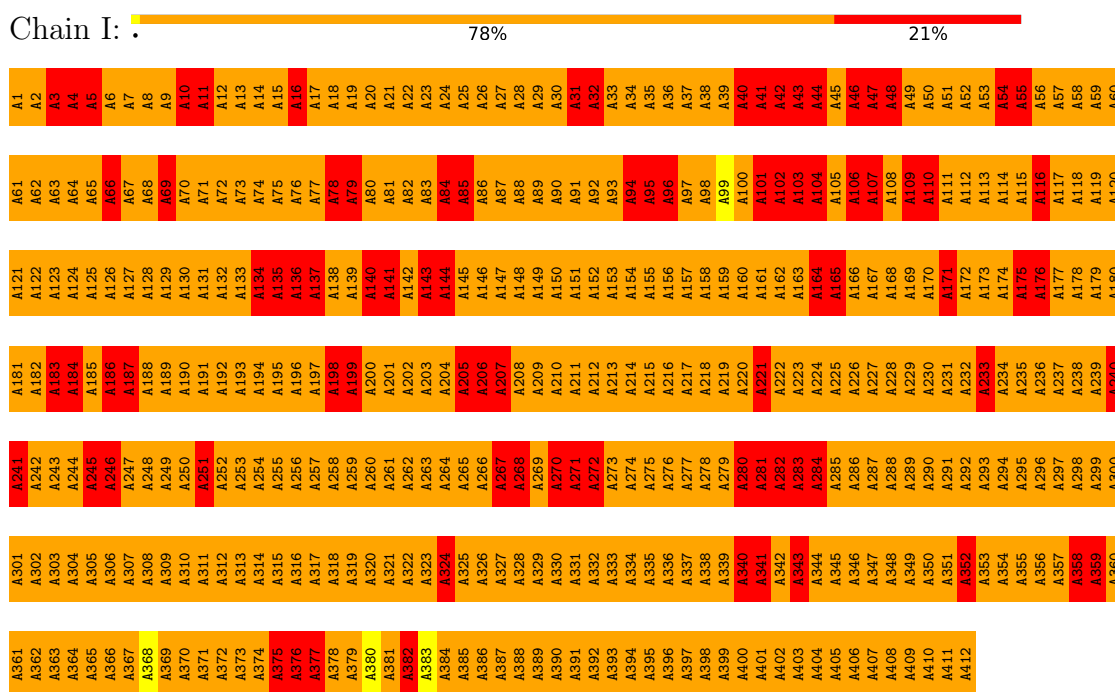
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
6	N	265	5297	2385	530	2118	264	0	0	0

3 Residue-property plots

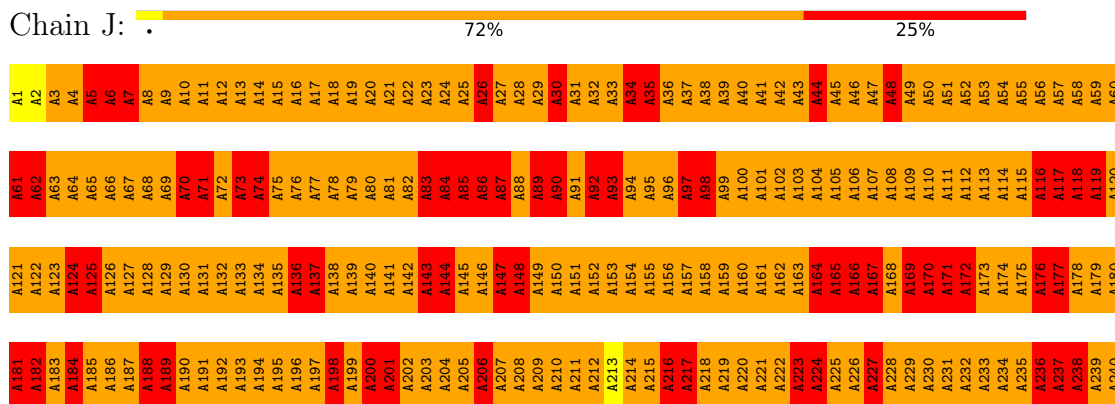
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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.

Note EDS failed to run properly.

- Molecule 1: RNA



- Molecule 2: RNA



A241
A242
A243
A244
A245
A246
A247
A248
A249
A250
A251
A252
A253
A254
A255
A256
A257
A258
A259
A260
A261
A262
A263
A264
A265
A266
A267
A268
A269
A270
A271
A272
A273
A274
A275
A276

• Molecule 3: RNA

Chain K: . 77% 19%

A1	A61	A121	A181	A241
A2	A62	A122	A182	A242
A3	A63	A123	A183	A243
A4	A64	A124	A184	A244
A5	A65	A125	A185	A245
A6	A66	A126	A186	A246
A7	A67	A127	A187	A247
A8	A68	A128	A188	A248
A9	A69	A129	A189	A249
A10	A70	A130	A190	A250
A11	A71	A131	A191	A251
A12	A72	A132	A192	A252
A13	A73	A133	A193	A253
A14	A74	A134	A194	A254
A15	A75	A135	A195	A255
A16	A76	A136	A196	A256
A17	A77	A137	A197	A257
A18	A78	A138	A198	A258
A19	A79	A139	A199	A259
A20	A80	A140	A200	A260
A21	A81	A141	A201	A261
A22	A82	A142	A202	A262
A23	A83	A143	A203	A263
A24	A84	A144	A204	A264
A25	A85	A145	A205	A265
A26	A86	A146	A206	A266
A27	A87	A147	A207	A267
A28	A88	A148	A208	A268
A29	A89	A149	A209	A269
A30	A90	A150	A210	A270
A31	A91	A151	A211	A271
A32	A92	A152	A212	A272
A33	A93	A153	A213	A273
A34	A94	A154	A214	A274
A35	A95	A155	A215	A275
A36	A96	A156	A216	A276
A37	A97	A157	A217	
A38	A98	A158	A218	
A39	A99	A159	A219	
A40	A100	A160	A220	
A41	A101	A161	A221	
A42	A102	A162	A222	
A43	A103	A163	A223	
A44	A104	A164	A224	
A45	A105	A165	A225	
A46	A106	A166	A226	
A47	A107	A167	A227	
A48	A108	A168	A228	
A49	A109	A169	A229	
A50	A110	A170	A230	
A51	A111	A171	A231	
A52	A112	A172	A232	
A53	A113	A173	A233	
A54	A114	A174	A234	
A55	A115	A175	A235	
A56	A116	A176	A236	
A57	A117	A177	A237	
A58	A118	A178	A238	
A59	A119	A179	A239	
A60	A120	A180	A240	

• Molecule 4: RNA

Chain L: 79% 21%

U413	U473	U533	U593	U653	U713	U773
U414	U474	U534	U594	U654	U714	U774
U415	U475	U535	U595	U655	U715	U775
U416	U476	U536	U596	U656	U716	U776
U417	U477	U537	U597	U657	U717	U777
U418	U478	U538	U598	U658	U718	U778
U419	U479	U539	U599	U659	U719	U779
U420	U480	U540	U600	U660	U720	U780
U421	U481	U541	U601	U661	U721	U781
U422	U482	U542	U602	U662	U722	U782
U423	U483	U543	U603	U663	U723	U783
U424	U484	U544	U604	U664	U724	U784
U425	U485	U545	U605	U665	U725	U785
U426	U486	U546	U606	U666	U726	U786
U427	U487	U547	U607	U667	U727	U787
U428	U488	U548	U608	U668	U728	U788
U429	U489	U549	U609	U669	U729	U789
U430	U490	U550	U610	U670	U730	U790
U431	U491	U551	U611	U671	U731	U791
U432	U492	U552	U612	U672	U732	U792
U433	U493	U553	U613	U673	U733	U793
U434	U494	U554	U614	U674	U734	U794
U435	U495	U555	U615	U675	U735	U795
U436	U496	U556	U616	U676	U736	U796
U437	U497	U557	U617	U677	U737	U797
U438	U498	U558	U618	U678	U738	U798
U439	U499	U559	U619	U679	U739	U799
U440	U500	U560	U620	U680	U740	U800
U441	U501	U561	U621	U681	U741	U801
U442	U502	U562	U622	U682	U742	U802
U443	U503	U563	U623	U683	U743	U803
U444	U504	U564	U624	U684	U744	U804
U445	U505	U565	U625	U685	U745	U805
U446	U506	U566	U626	U686	U746	U806
U447	U507	U567	U627	U687	U747	U807
U448	U508	U568	U628	U688	U748	U808
U449	U509	U569	U629	U689	U749	U809
U450	U510	U570	U630	U690	U750	U810
U451	U511	U571	U631	U691	U751	U811
U452	U512	U572	U632	U692	U752	U812
U453	U513	U573	U633	U693	U753	U813
U454	U514	U574	U634	U694	U754	U814
U455	U515	U575	U635	U695	U755	U815
U456	U516	U576	U636	U696	U756	U816
U457	U517	U577	U637	U697	U757	U817
U458	U518	U578	U638	U698	U758	U818
U459	U519	U579	U639	U699	U759	U819
U460	U520	U580	U640	U700	U760	U820
U461	U521	U581	U641	U701	U761	U821
U462	U522	U582	U642	U702	U762	U822
U463	U523	U583	U643	U703	U763	U823
U464	U524	U584	U644	U704	U764	U824
U465	U525	U585	U645	U705	U765	
U466	U526	U586	U646	U706	U766	
U467	U527	U587	U647	U707	U767	
U468	U528	U588	U648	U708	U768	
U469	U529	U589	U649	U709	U769	
U470	U530	U590	U650	U710	U770	
U471	U531	U591	U651	U711	U771	
U472	U532	U592	U652	U712	U772	

• Molecule 5: RNA

Chain M: . 73% 24%


U277	U337	U397
U278	U338	U398
U279	U339	U399
U280	U340	U400
U281	U341	U401
U282	U342	U402
U283	U343	U403
U284	U344	U404
U285	U345	U405
U286	U346	U406
U287	U347	U407
U288	U348	U408
U289	U349	U409
U290	U350	U410
U291	U351	U411
U292	U352	U412
U293	U353	U413
U294	U354	U414
U295	U355	U415
U296	U356	U416
U297	U357	U417
U298	U358	U418
U299	U359	U419
U300	U360	U420
U301	U361	U421
U302	U362	U422
U303	U363	U423
U304	U364	U424
U305	U365	U425
U306	U366	U426
U307	U367	U427
U308	U368	U428
U309	U369	U429
U310	U370	U430
U311	U371	U431
U312	U372	U432
U313	U373	U433
U314	U374	U434
U315	U375	U435
U316	U376	U436
U317	U377	U437
U318	U378	U438
U319	U379	U439
U320	U380	U440
U321	U381	U441
U322	U382	U442
U323	U383	U443
U324	U384	U444
U325	U385	U445
U326	U386	U446
U327	U387	U447
U328	U388	U448
U329	U389	U449
U330	U390	U450
U331	U391	U451
U332	U392	U452
U333	U393	U453
U334	U394	U454
U335	U395	U455
U336	U396	U456

U397 U398 U399 U400 U401 U402 U403 U404 U405 U406 U407 U408 U409 U410 U411 U412 U413 U414 U415 U416 U417 U418 U419 U420 U421 U422 U423 U424 U425 U426 U427 U428 U429 U430 U431 U432 U433 U434 U435 U436 U437 U438 U439 U440 U441 U442 U443 U444 U445 U446 U447 U448 U449 U450 U451 U452 U453 U454 U455 U456

U457 U458 U459 U460 U461 U462 U463 U464 U465 U466 U467 U468 U469 U470 U471 U472 U473 U474 U475 U476 U477 U478 U479 U480 U481 U482 U483 U484 U485 U486 U487 U488 U489 U490 U491 U492 U493 U494 U495 U496 U497 U498 U499 U500 U501 U502 U503 U504 U505 U506 U507 U508 U509 U510 U511 U512 U513 U514 U515 U516

U517 U518 U519 U520 U521 U522 U523 U524 U525 U526 U527 U528 U529 U530 U531 U532 U533 U534 U535 U536 U537 U538 U539 U540 U541 U542 U543 U544 U545 U546 U547 U548 U549 U550 U551 U552

• Molecule 6: RNA

Chain N:  82% 15%

U266 U267 U268 U269 U270 U271 U272 U273 U274 U275 U276 U277 U278 U279 U280 U281 U282 U283 U284 U285 U286 U287 U288 U289 U290 U291 U292 U293 U294 U295 U296 U297 U298 U299 U300 U301 U302 U303 U304 U305 U306 U307 U308 U309 U310 U311 U312 U313 U314 U315 U316 U317 U318 U319 U320 U321 U322 U323 U324 U325

U326 U327 U328 U329 U330 U331 U332 U333 U334 U335 U336 U337 U338 U339 U340 U341 U342 U343 U344 U345 U346 U347 U348 U349 U350 U351 U352 U353 U354 U355 U356 U357 U358 U359 U360 U361 U362 U363 U364 U365 U366 U367 U368 U369 U370 U371 U372 U373 U374 U375 U376 U377 U378 U379 U380 U381 U382 U383 U384 U385

U386 U387 U388 U389 U390 U391 U392 U393 U394 U395 U396 U397 U398 U399 U400 U401 U402 U403 U404 U405 U406 U407 U408 U409 U410 U411 U412 U413 U414 U415 U416 U417 U418 U419 U420 U421 U422 U423 U424 U425 U426 U427 U428 U429 U430 U431 U432 U433 U434 U435 U436 U437 U438 U439 U440 U441 U442 U443 U444 U445

U446 U447 U448 U449 U450 U451 U452 U453 U454 U455 U456 U457 U458 U459 U460 U461 U462 U463 U464 U465 U466 U467 U468 U469 U470 U471 U472 U473 U474 U475 U476 U477 U478 U479 U480 U481 U482 U483 U484 U485 U486 U487 U488 U489 U490 U491 U492 U493 U494 U495 U496 U497 U498 U499 U500 U501 U502 U503 U504 U505

U506 U507 U508 U509 U510 U511 U512 U513 U514 U515 U516 U517 U518 U519 U520 U521 U522 U523 U524 U525 U526 U527 U528 U529 U530

4 Data and refinement statistics

EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	795.60Å 821.80Å 753.30Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	(Not available) – 10.00	Depositor
% Data completeness (in resolution range)	(Not available) ((Not available)-10.00)	Depositor
R_{merge}	0.23	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.83 (at 3.49Å)	Xtrriage
Refinement program	CNS	Depositor
R, R_{free}	(Not available) , (Not available)	Depositor
Wilson B-factor (Å ²)	48.5	Xtrriage
Anisotropy	0.015	Xtrriage
L-test for twinning ²	$\langle L \rangle = 0.38$, $\langle L^2 \rangle = 0.21$	Xtrriage
Estimated twinning fraction	0.078 for k,h,-l	Xtrriage
Total number of atoms	40008	wwPDB-VP
Average B, all atoms (Å ²)	50.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.12% 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](#)

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	I	3.74	703/10296 (6.8%)	3.73	1049/16060 (6.5%)
2	J	3.72	457/6896 (6.6%)	3.57	672/10756 (6.2%)
3	K	4.26	459/6621 (6.9%)	3.39	627/10327 (6.1%)
4	L	4.08	734/9060 (8.1%)	3.87	1040/14000 (7.4%)
5	M	3.97	464/6068 (7.6%)	3.99	683/9376 (7.3%)
6	N	4.42	459/5824 (7.9%)	3.40	573/8994 (6.4%)
All	All	4.01	3276/44765 (7.3%)	3.68	4644/69513 (6.7%)

The worst 5 of 3276 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	M	313	U	O3'-P	48.59	2.19	1.61
3	K	12	A	O3'-P	48.05	2.18	1.61
1	I	149	A	O3'-P	47.30	2.17	1.61
3	K	11	A	O3'-P	47.12	2.17	1.61
3	K	75	A	O3'-P	46.95	2.17	1.61

The worst 5 of 4644 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	L	722	U	OP2-P-O3'	-44.48	7.35	105.20
3	K	120	A	P-O3'-C3'	-44.33	66.50	119.70
1	I	101	A	OP2-P-O3'	-41.80	13.24	105.20
2	J	223	A	P-O3'-C3'	-41.00	70.50	119.70
2	J	92	A	OP2-P-O3'	-40.81	15.42	105.20

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	I	9061	0	4518	4048	715
2	J	6069	0	3032	2589	1135
3	K	5827	0	2926	1867	622
4	L	8237	0	4114	3497	802
5	M	5517	0	2762	2245	1030
6	N	5297	0	2665	1656	473
All	All	40008	0	20017	15802	2447

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 263.

The worst 5 of 15802 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)
2:J:47:A:C2'	2:J:48:A:H5'	1.27	1.65
5:M:319:U:C2'	5:M:320:U:H5'	1.25	1.57
4:L:477:U:C2'	4:L:478:U:H5'	1.35	1.56
3:K:168:A:C2'	3:K:169:A:H5'	1.34	1.54
1:I:65:A:C2'	1:I:66:A:C5'	1.85	1.53

The worst 5 of 2447 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)
1:I:150:A:OP2	4:L:465:U:C3'[3_556]	0.12	2.08
4:L:752:U:OP2	5:M:500:U:P[3_556]	0.21	1.99
4:L:758:U:C5'	5:M:510:U:N3[3_556]	0.23	1.97
2:J:48:A:C1'	4:L:754:U:O3'[3_546]	0.25	1.95
2:J:43:A:C1'	4:L:759:U:C2'[3_546]	0.28	1.92

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

There are no protein molecules in this entry.

5.3.2 Protein sidechains [i](#)

There are no protein molecules in this entry.

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	I	411/412 (99%)	57 (13%)	40 (9%)
2	J	275/276 (99%)	46 (16%)	29 (10%)
3	K	264/265 (99%)	32 (12%)	20 (7%)
4	L	411/412 (99%)	55 (13%)	39 (9%)
5	M	275/276 (99%)	47 (17%)	27 (9%)
6	N	262/265 (98%)	25 (9%)	19 (7%)
All	All	1898/1906 (99%)	262 (13%)	174 (9%)

5 of 262 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	I	4	A
1	I	5	A
1	I	11	A
1	I	16	A
1	I	32	A

5 of 174 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
4	L	736	U
5	M	474	U
4	L	746	U
5	M	338	U
5	M	518	U

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 [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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
4	L	134
1	I	113
6	N	112
3	K	104
5	M	68
2	J	64

The worst 5 of 595 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	N	517:U	O3'	518:U	P	2.23
1	N	456:U	O3'	457:U	P	2.20
1	M	313:U	O3'	314:U	P	2.19
1	K	12:A	O3'	13:A	P	2.18
1	I	149:A	O3'	150:A	P	2.17

6 Fit of model and data

6.1 Protein, DNA and RNA chains

EDS failed to run properly - this section is therefore empty.

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

EDS failed to run properly - this section is therefore empty.

6.3 Carbohydrates

EDS failed to run properly - this section is therefore empty.

6.4 Ligands

EDS failed to run properly - this section is therefore empty.

6.5 Other polymers

EDS failed to run properly - this section is therefore empty.