



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 30, 2023 – 06:36 AM EDT

PDB ID : 3P4B  
Title : Alternatingly modified 2'Fluoro RNA octamer f/rA2U2-P3  
Authors : Pallan, P.S.; Greene, E.M.; Jicman, P.A.; Pandey, R.K.; Manoharan, M.;  
Rozners, E.; Egli, M.  
Deposited on : 2010-10-06  
Resolution : 1.45 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](mailto: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>.

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The following versions of software and data (see [references ⓘ](#)) 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 : 2.35  
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) : 2.35

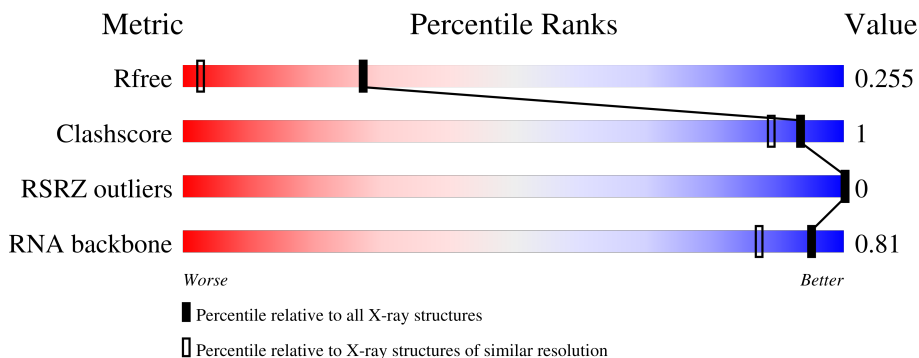
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.45 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	1156 (1.46-1.46)
Clashscore	141614	1202 (1.46-1.46)
RSRZ outliers	127900	1139 (1.46-1.46)
RNA backbone	3102	1000 (2.34-0.62)

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  $\geq 3$ , 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	8	38% 62%
1	B	8	100%
1	C	8	25% 75%
1	D	8	25% 75%
1	E	8	12% 75% 12%
1	F	8	12% 75% 12%

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 1145 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 5'-R\*(CFZ)P\*GP\*(AF2)P\*AP\*(UFT)P\*UP\*(CFZ)P\*G)-3'.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	F	N	O	P			
1	A	8	Total 167	C 76	F 4	N 30	O 50	P 7	0	0	0
1	B	8	Total 167	C 76	F 4	N 30	O 50	P 7	0	0	0
1	C	8	Total 167	C 76	F 4	N 30	O 50	P 7	0	0	0
1	D	8	Total 167	C 76	F 4	N 30	O 50	P 7	0	0	0
1	E	8	Total 167	C 76	F 4	N 30	O 50	P 7	7	0	0
1	F	8	Total 167	C 76	F 4	N 30	O 50	P 7	7	0	0

- Molecule 2 is BARIUM ION (three-letter code: BA) (formula: Ba).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total 1	Ba 1	0	0
2	D	1	Total 1	Ba 1	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	24	Total 24	O 24	0	0
3	B	27	Total 27	O 27	0	0
3	C	30	Total 30	O 30	0	0
3	D	20	Total 20	O 20	0	0

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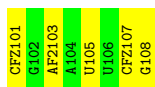
<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
3	E	21	Total	O	0	0
			21	21		
3	F	19	Total	O	0	0
			19	19		

### 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.

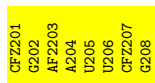
- Molecule 1: 5'-R(\*(CFZ)P\*GP\*(AF2)P\*AP\*(UFT)P\*UP\*(CFZ)P\*G)-3'

Chain A: 




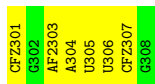
- Molecule 1: 5'-R(\*(CFZ)P\*GP\*(AF2)P\*AP\*(UFT)P\*UP\*(CFZ)P\*G)-3'

Chain B: 




- Molecule 1: 5'-R(\*(CFZ)P\*GP\*(AF2)P\*AP\*(UFT)P\*UP\*(CFZ)P\*G)-3'

Chain C: 



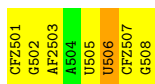
- Molecule 1: 5'-R(\*(CFZ)P\*GP\*(AF2)P\*AP\*(UFT)P\*UP\*(CFZ)P\*G)-3'

Chain D: 



- Molecule 1: 5'-R(\*(CFZ)P\*GP\*(AF2)P\*AP\*(UFT)P\*UP\*(CFZ)P\*G)-3'

Chain E: 



- Molecule 1: 5'-R(\*(CFZ)P\*GP\*(AF2)P\*AP\*(UFT)P\*UP\*(CFZ)P\*G)-3'

Chain F: 

CFZ601  
G602  
AFZ603  
A604  
U605  
U606  
CFZ607  
G608

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 3	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	43.38Å 43.38Å 60.99Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	21.69 – 1.45 20.44 – 1.45	Depositor EDS
% Data completeness (in resolution range)	100.0 (21.69-1.45) 98.5 (20.44-1.45)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.71 (at 1.45Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, $R_{free}$	0.197 , 0.251 0.216 , 0.255	Depositor DCC
$R_{free}$ test set	1141 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	20.7	Xtriage
Anisotropy	0.427	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.28 , 22.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.53$ , $\langle L^2 \rangle = 0.37$	Xtriage
Estimated twinning fraction	0.016 for -h,-k,l 0.468 for h,-h-k,-l 0.018 for -k,-h,-l	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	1145	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	19.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 18.33% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: AF2, UFT, BA, CFZ

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	1.74	0/96	1.44	0/143
1	B	2.24	6/96 (6.2%)	1.21	0/143
1	C	2.30	4/96 (4.2%)	1.31	0/143
1	D	1.92	1/96 (1.0%)	1.37	0/143
1	E	2.17	5/96 (5.2%)	1.81	3/143 (2.1%)
1	F	3.09	4/96 (4.2%)	1.64	2/143 (1.4%)
All	All	2.28	20/576 (3.5%)	1.48	5/858 (0.6%)

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	E	0	1
1	F	0	1
All	All	0	2

All (20) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	606	U	O5'-C5'	-20.49	1.10	1.42
1	F	606	U	C3'-O3'	10.31	1.56	1.42
1	C	304	A	C8-N7	9.49	1.38	1.31
1	F	608	G	C8-N7	9.26	1.36	1.30
1	B	204	A	C8-N7	7.95	1.37	1.31
1	C	304	A	C2-N3	7.86	1.40	1.33
1	E	506	U	O5'-C5'	-7.17	1.31	1.42
1	B	208	G	C8-N7	6.93	1.35	1.30
1	C	306	U	C2'-C1'	-6.87	1.45	1.53
1	E	502	G	C6-O6	-6.69	1.18	1.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	402	G	C6-N1	6.50	1.44	1.39
1	B	206	U	C2'-C1'	-6.44	1.46	1.53
1	E	508	G	C8-N7	6.32	1.34	1.30
1	B	204	A	C2-N3	6.04	1.39	1.33
1	E	506	U	C3'-O3'	-5.97	1.33	1.42
1	E	502	G	C8-N7	-5.72	1.27	1.30
1	B	206	U	C4-C5	5.71	1.48	1.43
1	B	202	G	C6-N1	5.60	1.43	1.39
1	F	602	G	C6-O6	-5.26	1.19	1.24
1	C	304	A	N9-C4	5.24	1.41	1.37

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	506	U	P-O5'-C5'	7.50	132.90	120.90
1	F	606	U	P-O5'-C5'	6.95	132.02	120.90
1	E	506	U	O4'-C1'-N1	6.26	113.21	108.20
1	F	606	U	C2-N1-C1'	-6.11	110.37	117.70
1	E	506	U	C4'-C3'-C2'	-5.38	97.22	102.60

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	E	506	U	Sidechain
1	F	606	U	Sidechain

## 5.2 Too-close contacts

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	167	0	83	1	0
1	B	167	0	83	0	0
1	C	167	0	83	0	0
1	D	167	0	83	1	0
1	E	167	0	83	0	0
1	F	167	0	83	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	1	0	0	0	0
2	D	1	0	0	0	0
3	A	24	0	0	1	0
3	B	27	0	0	0	0
3	C	30	0	0	0	0
3	D	20	0	0	1	0
3	E	21	0	0	0	0
3	F	19	0	0	0	0
All	All	1145	0	498	2	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 1.

All (2) 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:D:408:G:O3'	3:D:780:HOH:O	2.15	0.62
1:A:108:G:O3'	3:A:826:HOH:O	2.14	0.58

There are no symmetry-related clashes.

## 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	A	3/8 (37%)	0	0
1	B	3/8 (37%)	0	0
1	C	3/8 (37%)	0	0
1	D	3/8 (37%)	0	0

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Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	E	3/8 (37%)	0	0
1	F	3/8 (37%)	1 (33%)	0
All	All	18/48 (37%)	1 (5%)	0

All (1) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	F	606	U

There are no RNA pucker outliers to report.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

24 non-standard protein/DNA/RNA residues are modelled in this entry.

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
1	UFT	B	205	1	18,21,22	1.58	4 (22%)	26,30,33	1.73	4 (15%)
1	AF2	A	103	1	18,24,25	1.76	3 (16%)	18,35,38	1.71	2 (11%)
1	AF2	E	503	1	18,24,25	0.99	0	18,35,38	1.71	4 (22%)
1	AF2	C	303	1	18,24,25	0.92	1 (5%)	18,35,38	1.63	2 (11%)
1	CFZ	A	101	1	18,18,22	0.99	1 (5%)	26,26,33	0.95	2 (7%)
1	UFT	F	605	1	18,21,22	1.95	4 (22%)	26,30,33	1.82	6 (23%)
1	CFZ	D	401	1	18,18,22	0.78	0	26,26,33	1.07	2 (7%)
1	CFZ	E	501	1	18,18,22	1.25	1 (5%)	26,26,33	0.83	1 (3%)
1	CFZ	A	107	1	18,21,22	0.95	0	26,30,33	1.21	3 (11%)
1	AF2	F	603	1	18,24,25	1.04	0	18,35,38	1.73	4 (22%)
1	CFZ	D	407	1	18,21,22	0.80	0	26,30,33	1.08	2 (7%)
1	CFZ	B	207	1	18,21,22	1.30	2 (11%)	26,30,33	0.93	1 (3%)
1	UFT	E	505	1	18,21,22	1.91	4 (22%)	26,30,33	1.82	5 (19%)
1	AF2	D	403	1	18,24,25	1.68	3 (16%)	18,35,38	1.58	3 (16%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
1	UFT	C	305	1	18,21,22	1.73	4 (22%)	26,30,33	1.81	4 (15%)
1	CFZ	F	601	1	18,18,22	1.13	1 (5%)	26,26,33	0.95	1 (3%)
1	UFT	D	405	1,2	18,21,22	1.22	1 (5%)	26,30,33	1.61	6 (23%)
1	UFT	A	105	1,2	18,21,22	1.43	2 (11%)	26,30,33	1.82	6 (23%)
1	CFZ	F	607	1	18,21,22	1.19	3 (16%)	26,30,33	0.87	2 (7%)
1	CFZ	E	507	1	18,21,22	1.66	4 (22%)	26,30,33	1.01	1 (3%)
1	CFZ	C	307	1	18,21,22	1.18	1 (5%)	26,30,33	1.04	2 (7%)
1	CFZ	C	301	1	18,18,22	0.99	1 (5%)	26,26,33	0.83	0
1	AF2	B	203	1	18,24,25	1.07	1 (5%)	18,35,38	1.61	2 (11%)
1	CFZ	B	201	1	18,18,22	0.97	2 (11%)	26,26,33	0.73	0

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
1	UFT	B	205	1	-	0/7/25/26	0/2/2/2
1	AF2	A	103	1	-	0/3/25/26	0/3/3/3
1	AF2	E	503	1	-	0/3/25/26	0/3/3/3
1	AF2	C	303	1	-	0/3/25/26	0/3/3/3
1	CFZ	A	101	1	-	0/6/22/26	0/2/2/2
1	UFT	F	605	1	-	0/7/25/26	0/2/2/2
1	CFZ	D	401	1	-	0/6/22/26	0/2/2/2
1	CFZ	E	501	1	-	0/6/22/26	0/2/2/2
1	CFZ	A	107	1	-	0/7/25/26	0/2/2/2
1	AF2	F	603	1	-	0/3/25/26	0/3/3/3
1	CFZ	D	407	1	-	0/7/25/26	0/2/2/2
1	CFZ	B	207	1	-	0/7/25/26	0/2/2/2
1	UFT	E	505	1	-	0/7/25/26	0/2/2/2
1	AF2	D	403	1	-	0/3/25/26	0/3/3/3
1	UFT	C	305	1	-	0/7/25/26	0/2/2/2
1	CFZ	F	601	1	-	0/6/22/26	0/2/2/2
1	UFT	D	405	1,2	-	0/7/25/26	0/2/2/2
1	UFT	A	105	1,2	-	0/7/25/26	0/2/2/2
1	CFZ	F	607	1	-	0/7/25/26	0/2/2/2
1	CFZ	E	507	1	-	0/7/25/26	0/2/2/2
1	CFZ	C	307	1	-	0/7/25/26	0/2/2/2
1	CFZ	C	301	1	-	0/6/22/26	0/2/2/2
1	AF2	B	203	1	-	0/3/25/26	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	CFZ	B	201	1	-	2/6/22/26	0/2/2/2

All (43) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	505	UFT	O4-C4	5.61	1.35	1.24
1	F	605	UFT	O4-C4	5.41	1.35	1.24
1	C	305	UFT	C2'-C1'	-4.54	1.47	1.53
1	D	403	AF2	O4'-C1'	4.41	1.47	1.41
1	A	105	UFT	O4-C4	4.05	1.32	1.24
1	C	307	CFZ	O3'-C3'	3.96	1.52	1.43
1	A	103	AF2	O4'-C1'	3.91	1.46	1.41
1	B	207	CFZ	O3'-C3'	3.87	1.52	1.43
1	A	103	AF2	C2-N3	3.86	1.38	1.32
1	B	205	UFT	C2'-C1'	-3.74	1.48	1.53
1	E	507	CFZ	O3'-C3'	3.69	1.51	1.43
1	E	507	CFZ	O5'-C5'	-3.68	1.35	1.44
1	A	103	AF2	C2'-C1'	-3.60	1.48	1.53
1	E	501	CFZ	C2'-C1'	-3.58	1.48	1.53
1	D	403	AF2	C2-N3	3.39	1.37	1.32
1	F	605	UFT	C2'-C3'	-3.29	1.48	1.52
1	B	205	UFT	O4-C4	3.28	1.30	1.24
1	F	605	UFT	C2-N3	-3.26	1.32	1.38
1	C	305	UFT	O4-C4	3.13	1.30	1.24
1	F	601	CFZ	C2'-C1'	-3.00	1.49	1.53
1	D	405	UFT	O4-C4	2.90	1.30	1.24
1	D	403	AF2	C2'-C1'	-2.88	1.49	1.53
1	B	203	AF2	C2-N3	2.80	1.36	1.32
1	E	505	UFT	O2-C2	2.79	1.28	1.23
1	E	505	UFT	C2'-C3'	-2.76	1.48	1.52
1	E	505	UFT	C2-N3	-2.68	1.33	1.38
1	F	605	UFT	C4-N3	-2.68	1.33	1.38
1	F	607	CFZ	C2'-C1'	-2.61	1.49	1.53
1	F	607	CFZ	O5'-C5'	-2.53	1.38	1.44
1	B	207	CFZ	O2-C2	2.52	1.28	1.23
1	B	205	UFT	C2'-C3'	-2.47	1.49	1.52
1	B	205	UFT	C6-C5	2.33	1.40	1.35
1	C	303	AF2	C2-N3	2.22	1.35	1.32
1	A	105	UFT	C6-C5	2.21	1.40	1.35
1	F	607	CFZ	O3'-C3'	2.20	1.48	1.43
1	E	507	CFZ	C2'-C1'	-2.19	1.50	1.53
1	C	305	UFT	C2'-C3'	-2.17	1.49	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	301	CFZ	C1'-N1	2.15	1.53	1.47
1	B	201	CFZ	C1'-N1	2.13	1.53	1.47
1	E	507	CFZ	C5-C4	2.09	1.47	1.42
1	C	305	UFT	C6-C5	2.09	1.39	1.35
1	A	101	CFZ	C2-N1	2.07	1.44	1.40
1	B	201	CFZ	C2-N1	2.03	1.44	1.40

All (65) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	603	AF2	N3-C2-N1	-5.52	120.05	128.68
1	E	503	AF2	N3-C2-N1	-5.51	120.06	128.68
1	A	103	AF2	N3-C2-N1	-5.36	120.30	128.68
1	B	203	AF2	N3-C2-N1	-5.32	120.36	128.68
1	C	303	AF2	N3-C2-N1	-5.02	120.83	128.68
1	D	403	AF2	N3-C2-N1	-4.72	121.30	128.68
1	C	305	UFT	C4-N3-C2	-4.62	120.49	126.58
1	A	105	UFT	N3-C2-N1	4.56	120.95	114.89
1	B	205	UFT	C4-N3-C2	-4.54	120.59	126.58
1	C	305	UFT	N3-C2-N1	4.53	120.91	114.89
1	E	505	UFT	C4-N3-C2	-4.36	120.83	126.58
1	B	205	UFT	N3-C2-N1	4.24	120.52	114.89
1	F	605	UFT	N3-C2-N1	4.12	120.36	114.89
1	C	305	UFT	C5-C4-N3	4.10	120.97	114.84
1	B	205	UFT	C5-C4-N3	4.04	120.89	114.84
1	F	605	UFT	C5-C4-N3	4.03	120.87	114.84
1	F	605	UFT	C4-N3-C2	-4.02	121.28	126.58
1	A	105	UFT	C4-N3-C2	-4.00	121.30	126.58
1	E	505	UFT	N3-C2-N1	3.87	120.03	114.89
1	D	405	UFT	N3-C2-N1	3.84	119.98	114.89
1	E	505	UFT	C5-C4-N3	3.82	120.56	114.84
1	D	405	UFT	C4-N3-C2	-3.73	121.66	126.58
1	A	105	UFT	C2'-C1'-N1	-3.58	108.73	114.20
1	A	107	CFZ	C2'-C1'-N1	-3.55	108.77	114.20
1	E	505	UFT	O4-C4-C5	-3.49	119.03	125.16
1	E	505	UFT	C2'-C1'-N1	-3.48	108.88	114.20
1	F	605	UFT	O4-C4-C5	-3.40	119.18	125.16
1	A	105	UFT	O2-C2-N1	-3.32	118.38	122.79
1	E	507	CFZ	C2'-C3'-C4'	-3.31	98.13	102.40
1	D	401	CFZ	C3'-C2'-C1'	-3.20	99.26	103.13
1	A	105	UFT	C5-C4-N3	3.15	119.55	114.84
1	D	405	UFT	C2'-C1'-N1	-3.08	109.50	114.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	405	UFT	C5-C4-N3	2.99	119.32	114.84
1	F	605	UFT	C2'-C1'-N1	-2.96	109.67	114.20
1	D	407	CFZ	C2'-C1'-N1	-2.94	109.71	114.20
1	D	401	CFZ	C2'-C3'-C4'	-2.89	98.67	102.40
1	C	303	AF2	C2'-C3'-C4'	-2.85	98.73	102.40
1	A	107	CFZ	C3'-C2'-C1'	-2.83	99.70	103.13
1	D	407	CFZ	C3'-C2'-C1'	-2.83	99.71	103.13
1	A	105	UFT	O4-C4-C5	-2.82	120.19	125.16
1	B	207	CFZ	C2'-C3'-C4'	-2.78	98.81	102.40
1	B	203	AF2	C2'-C3'-C4'	-2.72	98.89	102.40
1	D	405	UFT	O2-C2-N1	-2.69	119.21	122.79
1	F	601	CFZ	C3'-C2'-C1'	-2.66	99.90	103.13
1	F	607	CFZ	C2'-C3'-C4'	-2.66	98.97	102.40
1	C	305	UFT	O4-C4-C5	-2.63	120.53	125.16
1	A	101	CFZ	C3'-C2'-C1'	-2.60	99.98	103.13
1	D	405	UFT	O4-C4-C5	-2.57	120.64	125.16
1	B	205	UFT	O4-C4-C5	-2.54	120.69	125.16
1	C	307	CFZ	C3'-C2'-C1'	-2.48	100.13	103.13
1	A	101	CFZ	C2'-C3'-C4'	-2.36	99.35	102.40
1	E	503	AF2	C1'-N9-C4	-2.34	122.52	126.64
1	E	501	CFZ	C3'-C2'-C1'	-2.33	100.31	103.13
1	D	403	AF2	C2-N1-C6	2.33	122.73	118.75
1	F	603	AF2	C4-C5-N7	-2.23	107.08	109.40
1	F	605	UFT	C2'-C3'-C4'	-2.22	99.53	102.40
1	F	603	AF2	C2-N1-C6	2.22	122.55	118.75
1	A	107	CFZ	C2'-C3'-C4'	-2.22	99.54	102.40
1	D	403	AF2	C3'-C2'-C1'	-2.21	100.45	103.13
1	C	307	CFZ	C2'-C3'-C4'	-2.17	99.60	102.40
1	A	103	AF2	C2-N1-C6	2.17	122.47	118.75
1	F	603	AF2	C1'-N9-C4	-2.14	122.88	126.64
1	E	503	AF2	C4-C5-N7	-2.12	107.19	109.40
1	E	503	AF2	C2-N1-C6	2.07	122.29	118.75
1	F	607	CFZ	F2'-C2'-C1'	-2.03	104.84	109.08

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	B	201	CFZ	O4'-C4'-C5'-O5'
1	B	201	CFZ	C3'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 2 ligands modelled in this entry, 2 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 [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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	4/8 (50%)	0.35	0 100 100	15, 16, 18, 20	0
1	B	4/8 (50%)	0.69	0 100 100	13, 15, 17, 20	0
1	C	4/8 (50%)	0.57	0 100 100	13, 15, 17, 19	0
1	D	4/8 (50%)	0.55	0 100 100	15, 15, 17, 20	0
1	E	4/8 (50%)	0.83	0 100 100	17, 18, 23, 26	1 (25%)
1	F	4/8 (50%)	0.95	0 100 100	17, 17, 23, 27	1 (25%)
All	All	24/48 (50%)	0.66	0 100 100	13, 17, 23, 27	2 (8%)

There are no RSRZ outliers to report.

### 6.2 Non-standard residues in protein, DNA, RNA chains [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, 95<sup>th</sup> 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(Å <sup>2</sup> )	Q<0.9
1	CFZ	E	507	20/21	0.83	0.15	16,21,32,34	0
1	CFZ	C	301	17/21	0.87	0.12	15,20,25,29	0
1	CFZ	F	601	17/21	0.87	0.14	14,16,19,20	0
1	CFZ	E	501	17/21	0.88	0.13	14,17,19,21	0
1	AF2	E	503	22/23	0.88	0.13	17,19,26,29	0
1	CFZ	B	201	17/21	0.89	0.12	15,20,27,30	0
1	CFZ	A	101	17/21	0.89	0.11	12,17,21,23	0
1	UFT	A	105	20/21	0.89	0.13	12,18,20,20	0
1	CFZ	F	607	20/21	0.89	0.11	15,20,32,36	0
1	AF2	D	403	22/23	0.90	0.13	13,15,19,20	0
1	AF2	F	603	22/23	0.90	0.12	17,20,26,28	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
1	UFT	F	605	20/21	0.90	0.13	15,21,27,27	0
1	AF2	B	203	22/23	0.90	0.11	13,17,20,24	0
1	UFT	D	405	20/21	0.92	0.11	12,18,20,20	0
1	CFZ	D	401	17/21	0.92	0.10	13,17,22,22	0
1	CFZ	D	407	20/21	0.93	0.10	13,16,19,20	0
1	CFZ	B	207	20/21	0.93	0.12	12,13,21,23	0
1	CFZ	A	107	20/21	0.93	0.09	13,16,19,19	0
1	AF2	C	303	22/23	0.93	0.11	13,17,21,23	0
1	AF2	A	103	22/23	0.94	0.09	12,16,19,21	0
1	UFT	E	505	20/21	0.95	0.11	15,21,27,27	0
1	CFZ	C	307	20/21	0.95	0.10	11,14,20,24	0
1	UFT	C	305	20/21	0.96	0.12	11,13,16,16	0
1	UFT	B	205	20/21	0.96	0.10	11,13,16,16	0

### 6.3 Carbohydrates [i](#)

There are no monosaccharides 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, 95<sup>th</sup> 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	BA	D	702	1/1	0.95	0.34	45,45,45,45	0
2	BA	A	701	1/1	0.99	0.28	46,46,46,46	0

### 6.5 Other polymers [i](#)

There are no such residues in this entry.