



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 06:41 AM GMT

PDB ID : 2XXA  
Title : The Crystal Structure of the Signal Recognition Particle (SRP) in Complex with its Receptor(SR)  
Authors : Ataide, S.F.; Schmitz, N.; Shen, K.; Ke, A.; Shan, S.; Doudna, J.A.; Ban, N.  
Deposited on : 2010-11-09  
Resolution : 3.94 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  
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>  
with specific help available everywhere you see the ⓘ symbol.

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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 : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

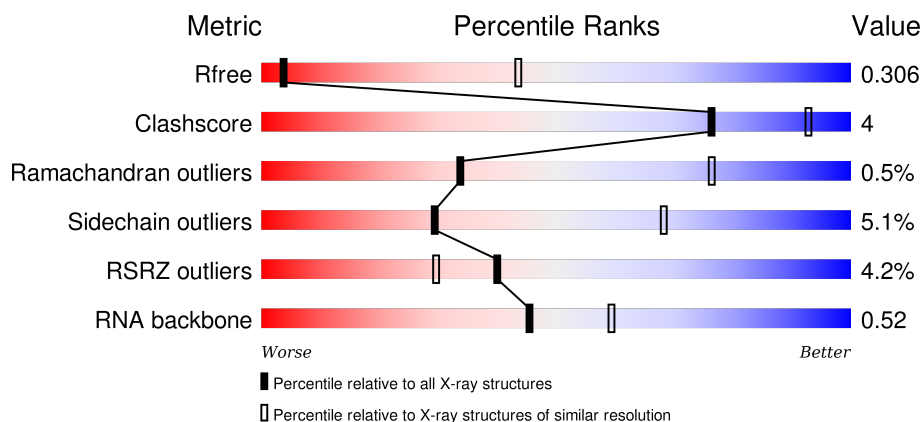
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 3.94 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))
$R_{free}$	91344	1007 (4.34-3.54)
Clashscore	102246	1042 (4.30-3.58)
Ramachandran outliers	100387	1000 (4.30-3.58)
Sidechain outliers	100360	1021 (4.32-3.56)
RSRZ outliers	91569	1011 (4.34-3.54)
RNA backbone	2183	1079 (5.04-2.80)

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  $\geq 3$ , 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  $\leq 5\%$ . 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	433	<div> <div>4%</div> <div>81%14% . .</div> </div>
1	C	433	<div> <div>4%</div> <div>85%9% . 5%</div> </div>
2	B	302	<div> <div>%</div> <div>78%14% . 6%</div> </div>
2	D	302	<div> <div>10%</div> <div>76%16% . 6%</div> </div>

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Mol	Chain	Length	Quality of chain
3	F	106	
3	G	106	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	GCP	A	600	-	-	-	X

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 15090 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 SIGNAL RECOGNITION PARTICLE PROTEIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	414	Total	C	N	O	S	0	0	1
			3134	1965	564	586	19			
1	C	410	Total	C	N	O	S	0	0	1
			3110	1950	559	582	19			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	406	SER	CYS	ENGINEERED MUTATION	UNP P0AGD7
C	406	SER	CYS	ENGINEERED MUTATION	UNP P0AGD7

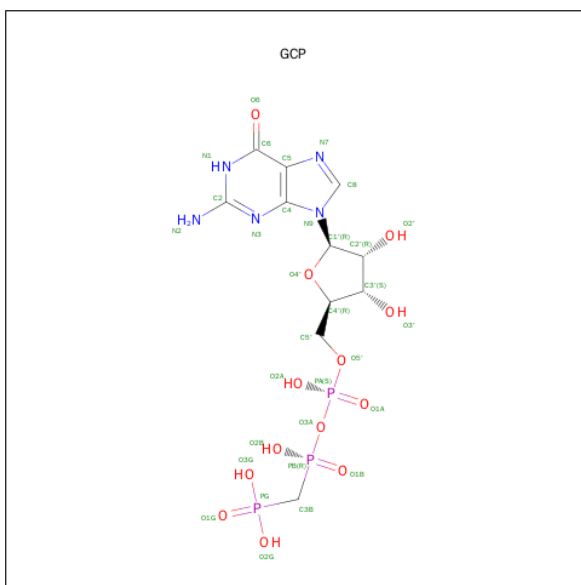
- Molecule 2 is a protein called SRP RECEPTOR FTSY.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	283	Total	C	N	O	S	0	0	0
			2163	1365	376	416	6			
2	D	283	Total	C	N	O	S	0	0	0
			2163	1365	376	416	6			

- Molecule 3 is a RNA chain called 4.5S RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	F	102	Total	C	N	O	P	0	0	0
			2188	973	399	714	102			
3	G	102	Total	C	N	O	P	0	0	0
			2188	973	399	714	102			

- Molecule 4 is PHOSPHOMETHYLPHOSPHONIC ACID GUANYLATE ESTER (three-letter code: GCP) (formula: C<sub>11</sub>H<sub>18</sub>N<sub>5</sub>O<sub>13</sub>P<sub>3</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total 32	C 11	N 5	O 13	P 3	0	0
4	B	1	Total 32	C 11	N 5	O 13	P 3	0	0
4	C	1	Total 32	C 11	N 5	O 13	P 3	0	0
4	D	1	Total 32	C 11	N 5	O 13	P 3	0	0

- Molecule 5 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total Mg 1 1	0	0
5	A	1	Total Mg 1 1	0	0
5	D	1	Total Mg 1 1	0	0
5	C	1	Total Mg 1 1	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	3	Total O 3 3	0	0

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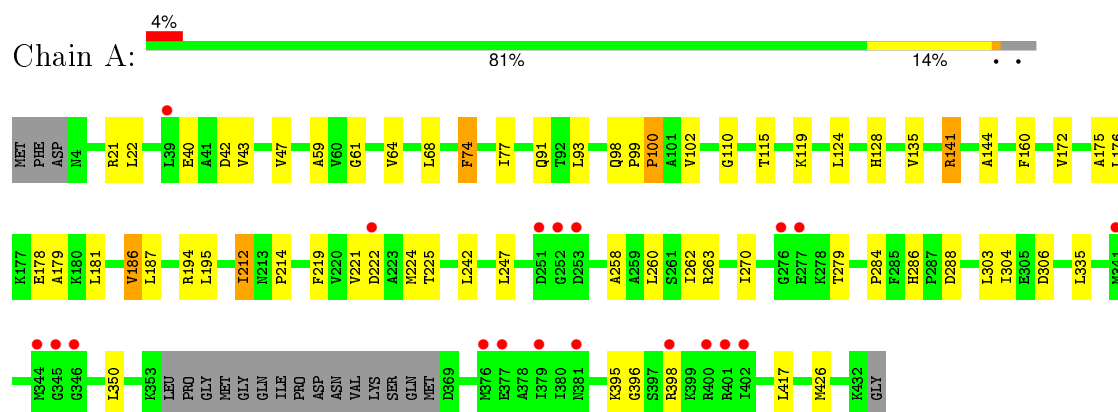
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	B	3	Total 3	O 3	0	0
6	C	3	Total 3	O 3	0	0
6	D	3	Total 3	O 3	0	0

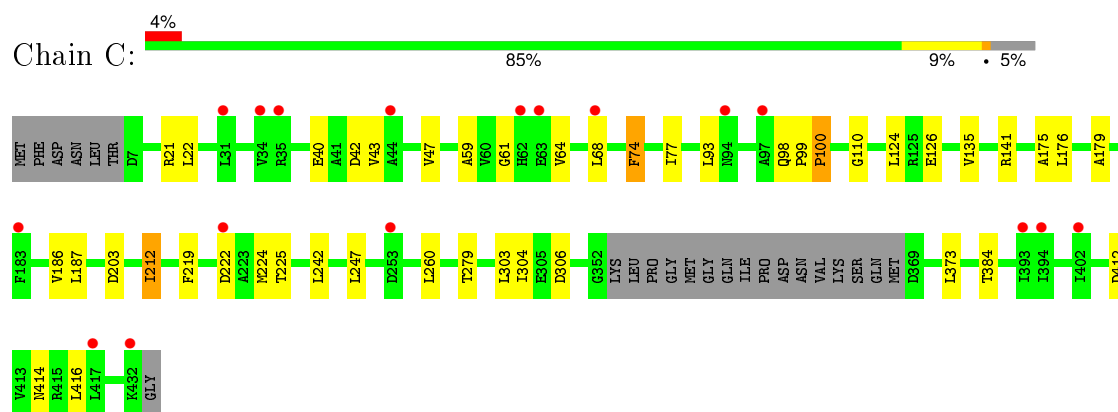
### 3 Residue-property plots [i](#)

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 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.

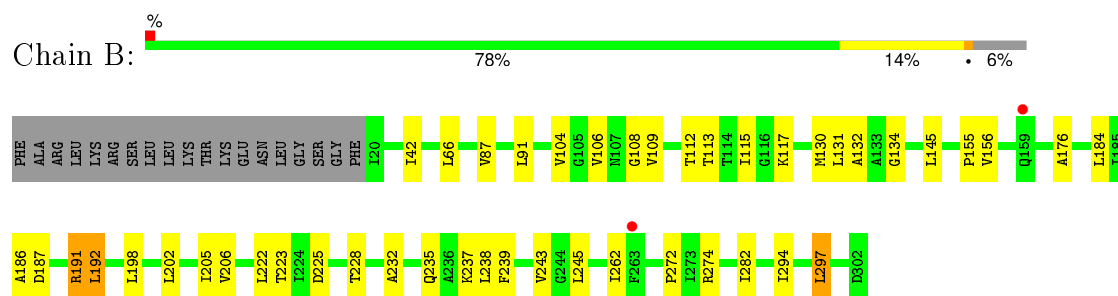
#### • Molecule 1: SIGNAL RECOGNITION PARTICLE PROTEIN



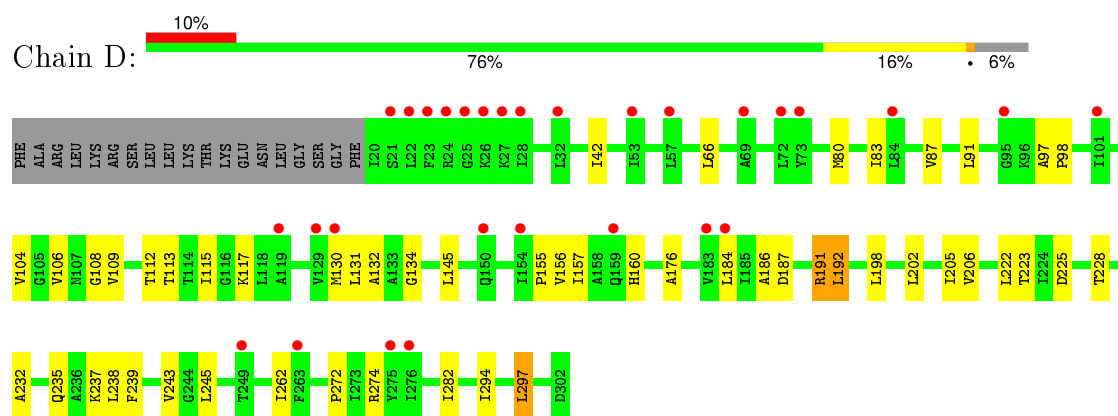
#### • Molecule 1: SIGNAL RECOGNITION PARTICLE PROTEIN



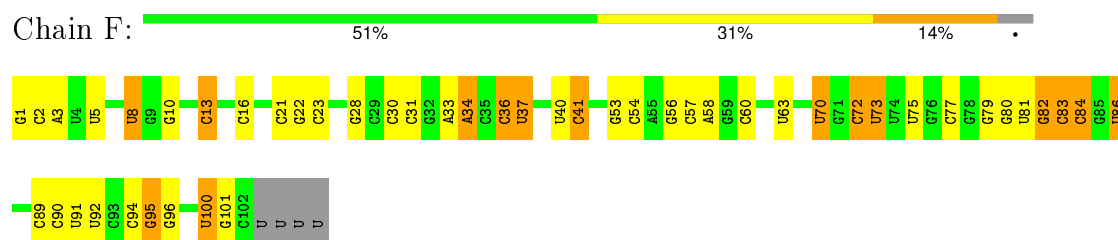
#### • Molecule 2: SRP RECEPTOR FTSY



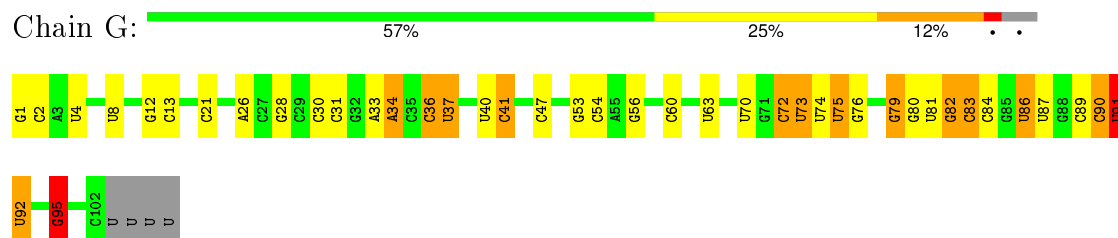
#### • Molecule 2: SRP RECEPTOR FTSY



• Molecule 3: 4.5S RNA



• Molecule 3: 4.5S RNA





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	84.10Å 131.04Å 266.04Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.30 – 3.94 49.30 – 3.94	Depositor EDS
% Data completeness (in resolution range)	(Not available) (49.30-3.94) 94.1 (49.30-3.94)	Depositor EDS
$R_{merge}$	0.04	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.08 (at 3.88Å)	Xtriage
Refinement program	BUSTER 2.8.0	Depositor
R, $R_{free}$	0.232 , 0.267 0.266 , 0.306	Depositor DCC
$R_{free}$ test set	1281 reflections (5.35%)	DCC
Wilson B-factor (Å <sup>2</sup> )	182.0	Xtriage
Anisotropy	0.239	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.26 , 148.2	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.28$	Xtriage
Outliers	1 of 25213 reflections (0.004%)	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	15090	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	230.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.81% 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, 0.375 respectively for untwinned datasets, and 0.333, 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: GCP, MG

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	0.41	0/3166	0.58	0/4250
1	C	0.42	0/3142	0.58	0/4218
2	B	0.39	0/2188	0.58	0/2948
2	D	0.39	0/2188	0.57	0/2948
3	F	0.93	1/2446 (0.0%)	1.49	35/3813 (0.9%)
3	G	0.92	1/2446 (0.0%)	1.50	32/3813 (0.8%)
All	All	0.62	2/15576 (0.0%)	1.00	67/21990 (0.3%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	1	G	OP3-P	-10.46	1.48	1.61
3	G	1	G	OP3-P	-10.21	1.48	1.61

All (67) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	G	82	G	P-O3'-C3'	10.59	132.40	119.70
3	F	91	U	P-O3'-C3'	10.40	132.18	119.70
3	F	82	G	P-O3'-C3'	10.39	132.17	119.70
3	G	83	C	P-O3'-C3'	10.35	132.12	119.70
3	G	79	G	P-O3'-C3'	8.89	130.37	119.70
3	F	83	C	P-O3'-C3'	8.81	130.28	119.70
3	G	70	U	O4'-C1'-N1	6.93	113.74	108.20
3	G	28	G	O4'-C1'-N9	6.88	113.71	108.20
3	F	70	U	O4'-C1'-N1	6.86	113.69	108.20
3	G	89	C	O4'-C1'-N1	6.84	113.67	108.20
3	G	72	C	P-O3'-C3'	6.79	127.85	119.70
3	G	91	U	O4'-C1'-N1	6.67	113.53	108.20
3	F	36	C	O4'-C1'-N1	6.35	113.28	108.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	G	90	C	O4'-C1'-N1	6.21	113.17	108.20
3	F	77	C	N1-C2-O2	6.17	122.60	118.90
3	F	92	U	O4'-C1'-N1	6.07	113.06	108.20
3	G	36	C	C1'-O4'-C4'	-6.06	105.05	109.90
3	F	1	G	P-O3'-C3'	6.01	126.91	119.70
3	G	36	C	O4'-C1'-N1	5.97	112.98	108.20
3	F	72	C	P-O3'-C3'	5.96	126.86	119.70
3	G	31	C	O4'-C1'-N1	5.92	112.94	108.20
3	F	56	G	P-O3'-C3'	5.90	126.78	119.70
3	F	31	C	O4'-C1'-N1	5.86	112.89	108.20
3	F	36	C	C1'-O4'-C4'	-5.83	105.24	109.90
3	G	92	U	O4'-C1'-N1	5.78	112.82	108.20
3	F	89	C	O4'-C1'-N1	5.72	112.78	108.20
3	G	56	G	P-O3'-C3'	5.68	126.51	119.70
3	G	28	G	C1'-O4'-C4'	-5.62	105.40	109.90
3	G	95	G	C8-N9-C4	-5.59	104.16	106.40
3	G	37	U	O4'-C1'-N1	5.58	112.67	108.20
3	F	28	G	O4'-C1'-N9	5.58	112.67	108.20
3	G	30	C	O4'-C1'-N1	5.57	112.66	108.20
3	G	41	C	P-O3'-C3'	5.55	126.37	119.70
3	F	30	C	O4'-C1'-N1	5.54	112.63	108.20
3	G	73	U	O4'-C1'-N1	5.52	112.62	108.20
3	F	75	U	O4'-C1'-N1	5.52	112.61	108.20
3	G	54	C	O4'-C1'-N1	5.50	112.60	108.20
3	F	40	U	O4'-C1'-N1	5.50	112.60	108.20
3	F	73	U	O4'-C1'-N1	5.50	112.60	108.20
3	G	74	U	O4'-C1'-N1	5.47	112.58	108.20
3	F	13	C	O4'-C1'-N1	5.45	112.56	108.20
3	G	75	U	O4'-C1'-N1	5.44	112.55	108.20
3	F	84	C	O4'-C1'-N1	5.41	112.53	108.20
3	G	86	U	O4'-C1'-N1	5.39	112.51	108.20
3	G	40	U	O4'-C1'-N1	5.39	112.51	108.20
3	F	34	A	P-O3'-C3'	5.37	126.15	119.70
3	G	2	C	O4'-C1'-N1	5.37	112.50	108.20
3	F	16	C	O4'-C1'-N1	5.36	112.48	108.20
3	G	21	C	O4'-C1'-N1	5.29	112.44	108.20
3	F	60	C	O4'-C1'-N1	5.29	112.43	108.20
3	F	90	C	O4'-C1'-N1	5.28	112.42	108.20
3	F	5	U	O4'-C1'-N1	5.25	112.40	108.20
3	F	94	C	N1-C2-O2	5.24	122.05	118.90
3	F	8	U	O4'-C1'-N1	5.21	112.37	108.20
3	F	100	U	O4'-C1'-N1	5.18	112.34	108.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	G	60	C	O4'-C1'-N1	5.17	112.34	108.20
3	F	63	U	O4'-C1'-N1	5.13	112.31	108.20
3	F	57	C	O4'-C1'-N1	5.12	112.30	108.20
3	F	41	C	P-O3'-C3'	5.12	125.85	119.70
3	F	86	U	O4'-C1'-N1	5.11	112.29	108.20
3	F	94	C	O4'-C1'-N1	5.10	112.28	108.20
3	G	63	U	P-O3'-C3'	5.08	125.79	119.70
3	G	4	U	O4'-C1'-N1	5.06	112.25	108.20
3	F	37	U	O4'-C1'-N1	5.05	112.24	108.20
3	G	47	C	O4'-C1'-N1	5.05	112.24	108.20
3	F	54	C	O4'-C1'-N1	5.03	112.22	108.20
3	G	34	A	P-O3'-C3'	5.02	125.73	119.70

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	3134	0	3234	30	0
1	C	3110	0	3215	17	0
2	B	2163	0	2205	23	0
2	D	2163	0	2205	28	0
3	F	2188	0	1106	8	0
3	G	2188	0	1106	6	0
4	A	32	0	14	3	0
4	B	32	0	14	1	0
4	C	32	0	14	1	0
4	D	32	0	14	1	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
6	A	3	0	0	0	0
6	B	3	0	0	0	0
6	C	3	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	D	3	0	0	0	0
All	All	15090	0	13127	106	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 4.

All (106) 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:D:87:VAL:HG13	2:D:272:PRO:HA	1.53	0.90
2:B:87:VAL:HG13	2:B:272:PRO:HA	1.54	0.90
1:A:141:ARG:HH12	4:A:600:GCP:H3B2	1.44	0.81
1:A:110:GLY:HA2	4:A:600:GCP:H3B1	1.64	0.79
1:C:110:GLY:HA2	4:C:600:GCP:H3B1	1.64	0.78
1:A:141:ARG:NH1	4:A:600:GCP:H3B2	2.10	0.67
3:G:8:U:H3	3:G:95:G:H1	1.47	0.60
2:B:108:GLY:HA2	4:B:600:GCP:H3B1	1.85	0.59
2:D:108:GLY:HA2	4:D:600:GCP:H3B1	1.85	0.59
2:D:131:LEU:HB2	2:D:156:VAL:HG22	1.86	0.58
2:B:131:LEU:HB2	2:B:156:VAL:HG22	1.85	0.57
1:C:224:MET:HG3	2:D:228:THR:HG22	1.87	0.55
3:G:12:G:N2	3:G:90:C:N3	2.54	0.55
1:C:74:PHE:HA	1:C:77:ILE:HD12	1.89	0.55
3:G:91:U:H2'	3:G:92:U:O4'	2.07	0.54
1:A:224:MET:HG3	2:B:228:THR:HG22	1.89	0.54
2:B:113:THR:HG22	2:B:117:LYS:HE3	1.90	0.54
1:A:74:PHE:HA	1:A:77:ILE:HD12	1.90	0.54
2:B:225:ASP:HB3	2:B:228:THR:HG23	1.90	0.53
2:D:225:ASP:HB3	2:D:228:THR:HG23	1.91	0.53
2:D:113:THR:HG22	2:D:117:LYS:HE3	1.90	0.53
1:A:176:LEU:HD22	1:A:212:ILE:HG22	1.92	0.52
2:D:109:VAL:HG12	2:D:225:ASP:HB2	1.92	0.52
1:A:263:ARG:HB2	1:A:270:ILE:HD11	1.92	0.51
2:B:130:MET:HG3	2:B:155:PRO:HG2	1.92	0.51
2:D:91:LEU:HB2	2:D:274:ARG:HD2	1.91	0.51
2:B:176:ALA:HB2	2:B:184:LEU:HD13	1.92	0.51
2:B:91:LEU:HB2	2:B:274:ARG:HD2	1.92	0.51
3:G:86:U:H2'	3:G:87:U:C6	2.46	0.50
1:C:176:LEU:HD22	1:C:212:ILE:HG22	1.93	0.50
2:B:109:VAL:HG12	2:B:225:ASP:HB2	1.94	0.50
1:A:135:VAL:HG21	1:A:175:ALA:HB1	1.94	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:222:LEU:HB2	2:B:245:LEU:HD22	1.93	0.49
2:B:294:ILE:HA	2:B:297:LEU:HD12	1.94	0.49
2:D:222:LEU:HB2	2:D:245:LEU:HD22	1.94	0.49
2:D:104:VAL:HG12	2:D:202:LEU:HD11	1.94	0.49
2:D:130:MET:HG3	2:D:155:PRO:HG2	1.93	0.49
2:B:112:THR:HG23	2:B:145:LEU:HD12	1.95	0.49
2:D:176:ALA:HB2	2:D:184:LEU:HD13	1.94	0.48
1:A:59:ALA:HA	1:A:77:ILE:HD13	1.96	0.48
3:F:8:U:H3	3:F:95:G:H1	1.62	0.48
1:C:21:ARG:HD3	1:C:64:VAL:HG21	1.96	0.48
1:C:59:ALA:HA	1:C:77:ILE:HD13	1.96	0.48
1:C:135:VAL:HG21	1:C:175:ALA:HB1	1.94	0.48
2:B:104:VAL:HG12	2:B:202:LEU:HD11	1.95	0.48
2:D:232:ALA:HA	2:D:235:GLN:HB2	1.96	0.48
1:A:68:LEU:HD21	1:A:304:ILE:HG12	1.96	0.47
1:A:286:HIS:NE2	1:A:288:ASP:HB2	2.28	0.47
2:B:232:ALA:HA	2:B:235:GLN:HB2	1.96	0.47
1:C:68:LEU:HD21	1:C:304:ILE:HG12	1.94	0.47
2:D:294:ILE:HA	2:D:297:LEU:HD12	1.95	0.47
3:F:21:C:H2'	3:F:22:G:C8	2.49	0.47
2:D:106:VAL:HG12	2:D:192:LEU:HA	1.96	0.47
1:C:384:THR:HG22	3:F:58:A:H5''	1.97	0.47
2:D:202:LEU:HA	2:D:205:ILE:HD12	1.96	0.47
1:A:124:LEU:HD13	1:A:186:VAL:HG21	1.97	0.47
1:A:21:ARG:HD3	1:A:64:VAL:HG21	1.97	0.46
3:G:75:U:H2'	3:G:76:G:H8	1.80	0.46
2:B:106:VAL:HG12	2:B:192:LEU:HA	1.97	0.46
1:A:395:LYS:H	1:A:398:ARG:HB2	1.80	0.46
2:B:202:LEU:HA	2:B:205:ILE:HD12	1.96	0.46
1:A:141:ARG:HB3	1:A:144:ALA:HB2	1.96	0.46
2:D:191:ARG:HD2	2:D:202:LEU:HD22	1.98	0.46
1:C:99:PRO:O	1:C:100:PRO:C	2.53	0.46
2:B:132:ALA:HB3	2:B:186:ALA:HA	1.97	0.46
2:D:112:THR:HG23	2:D:145:LEU:HD12	1.97	0.45
2:D:112:THR:HA	2:D:115:ILE:HD12	1.98	0.45
2:B:191:ARG:HD2	2:B:202:LEU:HD22	1.98	0.45
1:A:179:ALA:HB2	1:A:187:LEU:HD13	1.99	0.45
1:A:22:LEU:H	1:A:64:VAL:HG22	1.82	0.45
2:B:112:THR:HA	2:B:115:ILE:HD12	1.98	0.44
1:A:99:PRO:O	1:A:100:PRO:C	2.56	0.44
2:B:134:GLY:HA3	2:B:187:ASP:O	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:134:GLY:HA3	2:D:187:ASP:O	2.17	0.44
1:A:258:ALA:O	1:A:262:ILE:HG12	2.17	0.44
1:A:98:GLN:HB3	1:A:99:PRO:HD2	1.98	0.44
1:C:179:ALA:HB2	1:C:187:LEU:HD13	1.99	0.44
1:A:135:VAL:HG13	1:A:160:PHE:HB3	1.99	0.43
2:D:239:PHE:HB3	2:D:245:LEU:HD21	1.99	0.43
1:C:22:LEU:H	1:C:64:VAL:HG22	1.83	0.43
1:A:43:VAL:HG11	1:A:260:LEU:HD23	1.99	0.43
1:C:43:VAL:HG11	1:C:260:LEU:HD23	2.00	0.43
1:A:115:THR:HG22	1:A:119:LYS:HE2	2.00	0.43
2:B:239:PHE:HB3	2:B:245:LEU:HD21	1.99	0.43
2:D:132:ALA:HB3	2:D:186:ALA:HA	1.99	0.43
2:B:206:VAL:HG21	2:B:243:VAL:HG13	1.99	0.43
1:A:124:LEU:HA	1:A:128:HIS:HB2	2.01	0.42
1:A:219:PHE:HB2	1:A:242:LEU:HD22	2.01	0.42
1:C:222:ASP:HB3	1:C:225:THR:HG23	2.01	0.42
3:F:2:C:H2'	3:F:3:A:C8	2.54	0.42
1:C:124:LEU:HD13	1:C:186:VAL:HG21	2.01	0.42
3:G:75:U:H2'	3:G:76:G:C8	2.54	0.42
1:C:219:PHE:HB2	1:C:242:LEU:HD22	2.02	0.42
3:F:100:U:H2'	3:F:101:G:C8	2.55	0.42
1:A:221:VAL:HG11	1:A:262:ILE:HG13	2.02	0.41
1:A:222:ASP:HB3	1:A:225:THR:HG23	2.01	0.41
2:D:206:VAL:HG21	2:D:243:VAL:HG13	2.02	0.41
2:D:160:HIS:HE1	3:F:10:G:H21	1.67	0.41
2:D:160:HIS:HE1	3:F:10:G:N2	2.18	0.41
2:D:157:ILE:HD12	3:F:96:G:H5''	2.03	0.41
1:C:98:GLN:HB3	1:C:99:PRO:HD2	2.02	0.41
1:A:172:VAL:HB	1:A:212:ILE:HG12	2.03	0.41
1:A:102:VAL:HB	1:A:214:PRO:HA	2.03	0.40
2:D:80:MET:HA	2:D:83:ILE:HD12	2.03	0.40
1:A:91:GLN:HG2	1:A:284:PRO:HB2	2.02	0.40
2:D:97:ALA:HA	2:D:98:PRO:HA	1.96	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	410/433 (95%)	380 (93%)	26 (6%)	4 (1%)	19	65
1	C	406/433 (94%)	375 (92%)	28 (7%)	3 (1%)	26	71
2	B	281/302 (93%)	267 (95%)	14 (5%)	0	100	100
2	D	281/302 (93%)	267 (95%)	14 (5%)	0	100	100
All	All	1378/1470 (94%)	1289 (94%)	82 (6%)	7 (0%)	34	76

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	100	PRO
1	C	100	PRO
1	A	42	ASP
1	A	61	GLY
1	C	42	ASP
1	C	61	GLY
1	A	396	GLY

### 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	329/359 (92%)	310 (94%)	19 (6%)	25	64
1	C	328/359 (91%)	312 (95%)	16 (5%)	31	69
2	B	225/244 (92%)	214 (95%)	11 (5%)	31	69

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	D	225/244 (92%)	214 (95%)	11 (5%)	31	69
All	All	1107/1206 (92%)	1050 (95%)	57 (5%)	29	68

All (57) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	40	GLU
1	A	47	VAL
1	A	74	PHE
1	A	93	LEU
1	A	141	ARG
1	A	178	GLU
1	A	181	LEU
1	A	186	VAL
1	A	194	ARG
1	A	195	LEU
1	A	212	ILE
1	A	247	LEU
1	A	279	THR
1	A	303	LEU
1	A	306	ASP
1	A	335	LEU
1	A	350	LEU
1	A	417	LEU
1	A	426	MET
2	B	42	ILE
2	B	66	LEU
2	B	191	ARG
2	B	192	LEU
2	B	198	LEU
2	B	223	THR
2	B	237	LYS
2	B	238	LEU
2	B	262	ILE
2	B	282	ILE
2	B	297	LEU
1	C	40	GLU
1	C	47	VAL
1	C	74	PHE
1	C	93	LEU
1	C	126	GLU
1	C	141	ARG

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Mol	Chain	Res	Type
1	C	203	ASP
1	C	212	ILE
1	C	247	LEU
1	C	279	THR
1	C	303	LEU
1	C	306	ASP
1	C	373	LEU
1	C	412	ASP
1	C	414	ASN
1	C	416	LEU
2	D	42	ILE
2	D	66	LEU
2	D	191	ARG
2	D	192	LEU
2	D	198	LEU
2	D	223	THR
2	D	237	LYS
2	D	238	LEU
2	D	262	ILE
2	D	282	ILE
2	D	297	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	337	GLN
2	B	159	GLN
2	B	235	GLN
2	D	121	GLN
2	D	159	GLN
2	D	160	HIS
2	D	235	GLN

### 5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
3	F	101/106 (95%)	18 (17%)	5 (4%)
3	G	101/106 (95%)	17 (16%)	6 (5%)
All	All	202/212 (95%)	35 (17%)	11 (5%)

All (35) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
3	F	13	C
3	F	23	C
3	F	33	A
3	F	34	A
3	F	36	C
3	F	37	U
3	F	41	C
3	F	53	G
3	F	70	U
3	F	72	C
3	F	73	U
3	F	80	G
3	F	81	U
3	F	82	G
3	F	83	C
3	F	84	C
3	F	86	U
3	F	95	G
3	G	13	C
3	G	26	A
3	G	33	A
3	G	34	A
3	G	36	C
3	G	37	U
3	G	41	C
3	G	53	G
3	G	72	C
3	G	73	U
3	G	79	G
3	G	80	G
3	G	81	U
3	G	82	G
3	G	83	C
3	G	84	C
3	G	95	G

All (11) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
3	F	33	A
3	F	72	C
3	F	79	G

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Mol	Chain	Res	Type
3	F	82	G
3	F	83	C
3	G	33	A
3	G	72	C
3	G	79	G
3	G	82	G
3	G	83	C
3	G	91	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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 for Mogul analysis.

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$
4	GCP	A	600	5	26,34,34	1.67	4 (15%)	34,54,54	2.21	11 (32%)
4	GCP	B	600	5	26,34,34	1.81	6 (23%)	34,54,54	2.32	13 (38%)
4	GCP	C	600	5	26,34,34	1.70	4 (15%)	34,54,54	2.19	11 (32%)
4	GCP	D	600	5	26,34,34	1.79	5 (19%)	34,54,54	2.30	13 (38%)

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
4	GCP	A	600	5	-	0/15/38/38	0/3/3/3
4	GCP	B	600	5	-	0/15/38/38	0/3/3/3
4	GCP	C	600	5	-	0/15/38/38	0/3/3/3
4	GCP	D	600	5	-	0/15/38/38	0/3/3/3

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	600	GCP	PB-O2B	-3.50	1.47	1.56
4	C	600	GCP	PB-O2B	-3.45	1.47	1.56
4	D	600	GCP	PB-O2B	-2.98	1.49	1.56
4	B	600	GCP	PB-O2B	-2.95	1.49	1.56
4	A	600	GCP	PG-O3G	-2.10	1.49	1.54
4	D	600	GCP	PG-O2G	-2.03	1.50	1.54
4	B	600	GCP	PG-O2G	-2.03	1.50	1.54
4	C	600	GCP	PG-O2G	-2.02	1.50	1.54
4	B	600	GCP	O4'-C1'	2.05	1.43	1.41
4	D	600	GCP	PB-O3A	2.38	1.61	1.58
4	B	600	GCP	PB-O3A	2.51	1.61	1.58
4	A	600	GCP	C6-C5	3.09	1.47	1.41
4	C	600	GCP	C6-C5	3.18	1.47	1.41
4	D	600	GCP	C6-C5	3.38	1.48	1.41
4	B	600	GCP	C6-C5	3.41	1.48	1.41
4	A	600	GCP	C4-N3	5.30	1.44	1.35
4	C	600	GCP	C4-N3	5.50	1.44	1.35
4	D	600	GCP	C4-N3	5.79	1.44	1.35
4	B	600	GCP	C4-N3	5.90	1.45	1.35

All (48) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	600	GCP	C6-C5-C4	-5.88	113.86	120.90
4	B	600	GCP	C6-C5-C4	-5.87	113.88	120.90
4	A	600	GCP	C6-C5-C4	-5.07	114.84	120.90
4	C	600	GCP	C6-C5-C4	-5.05	114.86	120.90
4	A	600	GCP	C4-C5-N7	-4.00	105.80	109.48
4	C	600	GCP	C4-C5-N7	-3.83	105.95	109.48
4	D	600	GCP	C4-C5-N7	-3.60	106.17	109.48
4	B	600	GCP	C4-C5-N7	-3.60	106.17	109.48
4	B	600	GCP	N3-C2-N1	-3.41	122.25	127.44
4	A	600	GCP	O3'-C3'-C4'	-3.40	100.84	111.05
4	A	600	GCP	N3-C2-N1	-3.40	122.27	127.44
4	D	600	GCP	N3-C2-N1	-3.37	122.31	127.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	600	GCP	O3'-C3'-C4'	-3.37	100.94	111.05
4	C	600	GCP	N3-C2-N1	-3.31	122.40	127.44
4	C	600	GCP	C1'-N9-C4	-3.05	122.34	126.94
4	A	600	GCP	C1'-N9-C4	-3.00	122.41	126.94
4	B	600	GCP	C5-C6-N1	-2.93	119.58	123.59
4	D	600	GCP	C5-C6-N1	-2.92	119.60	123.59
4	D	600	GCP	C1'-N9-C4	-2.87	122.61	126.94
4	B	600	GCP	C1'-N9-C4	-2.80	122.72	126.94
4	B	600	GCP	O3'-C3'-C4'	-2.80	102.66	111.05
4	D	600	GCP	O3'-C3'-C4'	-2.79	102.69	111.05
4	C	600	GCP	C5-C6-N1	-2.46	120.22	123.59
4	A	600	GCP	C5-C6-N1	-2.42	120.28	123.59
4	D	600	GCP	O3'-C3'-C2'	-2.38	104.08	111.83
4	B	600	GCP	O3'-C3'-C2'	-2.38	104.08	111.83
4	D	600	GCP	O2'-C2'-C3'	2.27	119.22	111.83
4	C	600	GCP	C2'-C3'-C4'	2.32	107.39	102.61
4	B	600	GCP	O2'-C2'-C3'	2.33	119.39	111.83
4	A	600	GCP	C2'-C3'-C4'	2.35	107.44	102.61
4	C	600	GCP	O2B-PB-O1B	2.43	117.78	110.12
4	A	600	GCP	O2B-PB-O1B	2.45	117.83	110.12
4	D	600	GCP	O4'-C1'-N9	2.53	113.39	108.10
4	B	600	GCP	O4'-C1'-N9	2.54	113.42	108.10
4	C	600	GCP	O2'-C2'-C3'	2.54	120.10	111.83
4	A	600	GCP	O2'-C2'-C3'	2.58	120.23	111.83
4	D	600	GCP	O2B-PB-O1B	2.71	118.64	110.12
4	B	600	GCP	O2B-PB-O1B	2.76	118.81	110.12
4	D	600	GCP	C2'-C3'-C4'	2.98	108.73	102.61
4	D	600	GCP	C2'-C1'-N9	3.03	118.92	114.29
4	B	600	GCP	C2'-C1'-N9	3.07	118.98	114.29
4	B	600	GCP	C2'-C3'-C4'	3.07	108.93	102.61
4	C	600	GCP	C2'-C1'-N9	4.44	121.08	114.29
4	A	600	GCP	C2'-C1'-N9	4.45	121.09	114.29
4	A	600	GCP	C6-N1-C2	5.08	122.99	115.94
4	C	600	GCP	C6-N1-C2	5.11	123.03	115.94
4	D	600	GCP	C6-N1-C2	5.83	124.04	115.94
4	B	600	GCP	C6-N1-C2	5.90	124.13	115.94

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	600	GCP	3	0
4	B	600	GCP	1	0
4	C	600	GCP	1	0
4	D	600	GCP	1	0

## 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 ⓘ

### 6.1 Protein, DNA and RNA chains ⓘ

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	414/433 (95%)	0.10	19 (4%) 36 26	120, 202, 286, 322	2 (0%)
1	C	410/433 (94%)	0.25	17 (4%) 41 30	167, 255, 317, 392	2 (0%)
2	B	283/302 (93%)	0.18	2 (0%) 89 84	127, 174, 262, 295	0
2	D	283/302 (93%)	0.58	29 (10%) 9 7	174, 228, 321, 376	0
3	F	102/106 (96%)	-0.37	0 100 100	210, 244, 304, 361	0
3	G	102/106 (96%)	-0.24	0 100 100	169, 263, 339, 412	0
All	All	1594/1682 (94%)	0.19	67 (4%) 40 29	120, 228, 305, 412	4 (0%)

All (67) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	345	GLY	9.2
2	D	26	LYS	6.6
2	D	25	GLY	6.0
1	A	377	GLU	5.5
2	D	129	VAL	4.5
2	D	183	VAL	4.5
1	A	376	MET	4.4
1	A	402	ILE	4.1
1	A	346	GLY	4.0
1	C	62	HIS	4.0
2	D	72	LEU	3.8
1	C	44	ALA	3.8
2	D	28	ILE	3.6
2	D	23	PHE	3.4
1	C	34	VAL	3.4
2	D	84	LEU	3.3
1	A	381	ASN	3.1
2	D	27	LYS	3.1
1	C	97	ALA	3.1

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Mol	Chain	Res	Type	RSRZ
2	D	32	LEU	2.8
1	A	344	MET	2.7
1	A	401	ARG	2.7
2	D	150	GLN	2.7
1	A	341	MET	2.6
2	D	21	SER	2.6
2	D	22	LEU	2.5
1	A	379	ILE	2.5
2	D	184	LEU	2.5
1	A	253	ASP	2.5
2	D	69	ALA	2.5
1	A	222	ASP	2.5
1	C	94	ASN	2.4
2	D	263	PHE	2.4
1	A	251	ASP	2.4
2	D	154	ILE	2.4
2	D	275	TYR	2.3
2	D	249	THR	2.3
1	C	35	ARG	2.3
1	C	31	LEU	2.3
2	D	24	ARG	2.3
1	A	252	GLY	2.3
1	C	63	GLU	2.3
2	B	263	PHE	2.3
1	C	394	ILE	2.2
1	C	222	ASP	2.2
1	C	402	ILE	2.2
2	D	73	TYR	2.2
2	D	53	ILE	2.2
1	C	417	LEU	2.2
1	C	393	ILE	2.2
1	A	276	GLY	2.2
2	D	119	ALA	2.1
2	D	95	GLY	2.1
1	C	68	LEU	2.1
2	D	101	ILE	2.1
1	A	400	ARG	2.1
2	D	57	LEU	2.1
1	C	183	PHE	2.1
1	C	253	ASP	2.1
2	D	276	ILE	2.1
2	D	130	MET	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	398	ARG	2.1
2	B	159	GLN	2.0
1	A	39	LEU	2.0
2	D	159	GLN	2.0
1	A	277	GLU	2.0
1	C	432	LYS	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](#)

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
5	MG	A	601	1/1	0.97	0.33	0.69	113,113,113,113	0
4	GCP	A	600	32/32	0.97	0.41	0.55	136,136,136,136	0
4	GCP	D	600	32/32	0.85	0.37	0.49	219,219,219,219	0
4	GCP	C	600	32/32	0.94	0.35	0.25	252,252,252,252	0
4	GCP	B	600	32/32	0.96	0.32	-0.14	137,137,137,137	0
5	MG	D	601	1/1	0.98	0.32	-0.23	235,235,235,235	0
5	MG	C	601	1/1	0.97	0.26	-0.73	256,256,256,256	0
5	MG	B	601	1/1	0.98	0.29	-0.76	212,212,212,212	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.