W O R L D W I D E

wwPDB

P R O T E I N   D A T A   B A N K

Full wwPDB X-ray Structure Validation Report ⓘ

Feb 15, 2017 – 02:44 am GMT

PDB ID : 4A8K
Title : Non-Catalytic Ions Direct the RNA-Dependent RNA Polymerase of Bacterial
dsRNA virus phi6 from De Novo Initiation to Elongation
Authors : Wright, S.; Poranen, M.M.; Bamford, D.H.; Stuart, D.I.; Grimes, J.M.
Deposited on : 2011-11-21
Resolution : 3.50 Å(reported)

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

MolProbity : 4.02b-467
Mogul : 1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix) : 1.9-1692
EDS : trunk28620
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)
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) : recalc28949

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 3.50 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	Percentile Ranks	Value
Rfree		0.219
Clashscore		3
Ramachandran outliers		0.5%
Sidechain outliers		3.1%
RSRZ outliers		0.7%

Worse — *Better*

▌ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution
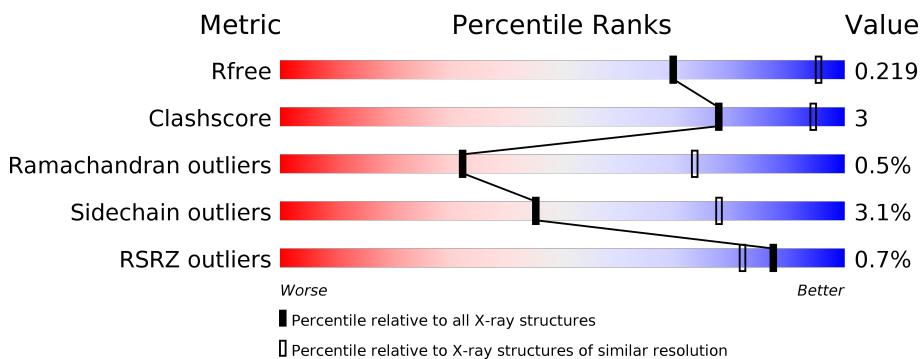
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	100719	1195 (3.60-3.40)
Clashscore	112137	1322 (3.60-3.40)
Ramachandran outliers	110173	1283 (3.60-3.40)
Sidechain outliers	110143	1284 (3.60-3.40)
RSRZ outliers	101464	1226 (3.60-3.40)

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. 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	665	92% — 8%
1	B	665	% — 89% — 10% ·
1	C	665	% — 90% — 9% ·
2	E	4	100% — 75% — 25%
3	F	2	50% — 50%
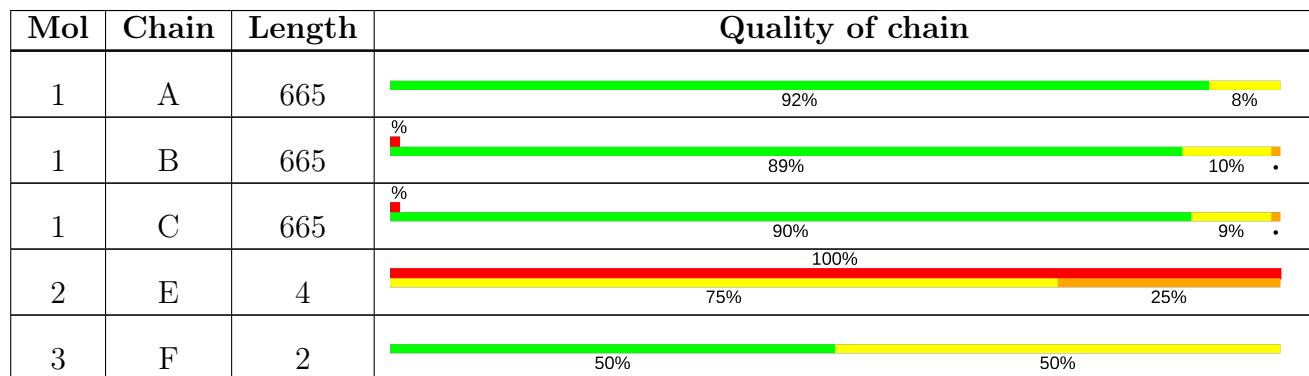
The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
5	GTP	A	1666	-	-	-	X
5	GTP	B	1666	-	-	-	X
5	GTP	C	1666	-	-	-	X

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 16008 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 RNA-DIRECTED RNA POLYMERASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	664	Total 5265	C 3342	N 914	O 977	S 32	0	0	0
1	B	664	Total 5265	C 3342	N 914	O 977	S 32	0	0	0
1	C	664	Total 5265	C 3342	N 914	O 977	S 32	0	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	456	MET	ILE	CONFLICT	UNP P11124
B	456	MET	ILE	CONFLICT	UNP P11124
C	456	MET	ILE	CONFLICT	UNP P11124

- Molecule 2 is a DNA chain called 5'-D(*AP*AP*TP*CP)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	E	4	Total 78	C 39	N 15	O 21	P 3	0	0	0

- Molecule 3 is a DNA chain called 5'-D(*TP*CP)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	F	2	Total 36	C 19	N 5	O 11	P 1	0	0	0

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	1	Total 1	Mg 1	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total 1	Mg 1	0	0
4	C	1	Total 1	Mg 1	0	0

- Molecule 5 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$).
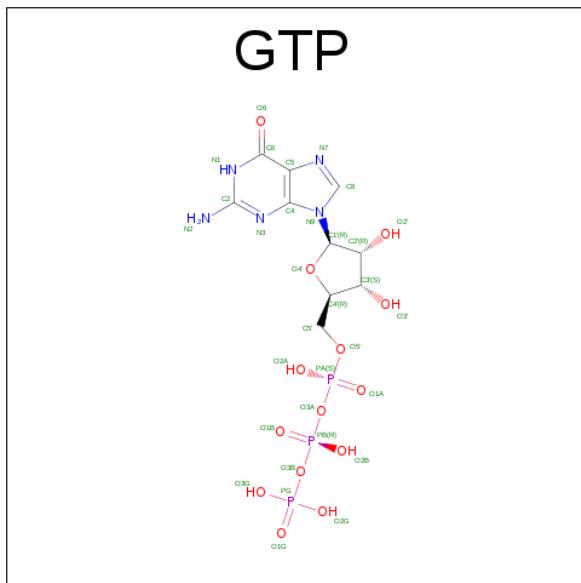
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	A	1	Total 32	C 10	N 5	O 14	P 3	0	0
5	B	1	Total 32	C 10	N 5	O 14	P 3	0	0
5	C	1	Total 32	C 10	N 5	O 14	P 3	0	0

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: RNA-DIRECTED RNA POLYMERASE
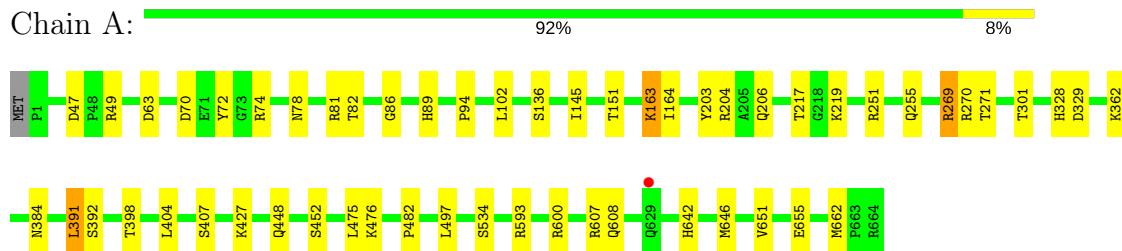
Chain A:

- Molecule 1: RNA-DIRECTED RNA POLYMERASE

Chain B:

- Molecule 1: RNA-DIRECTED RNA POLYMERASE

Chain C:
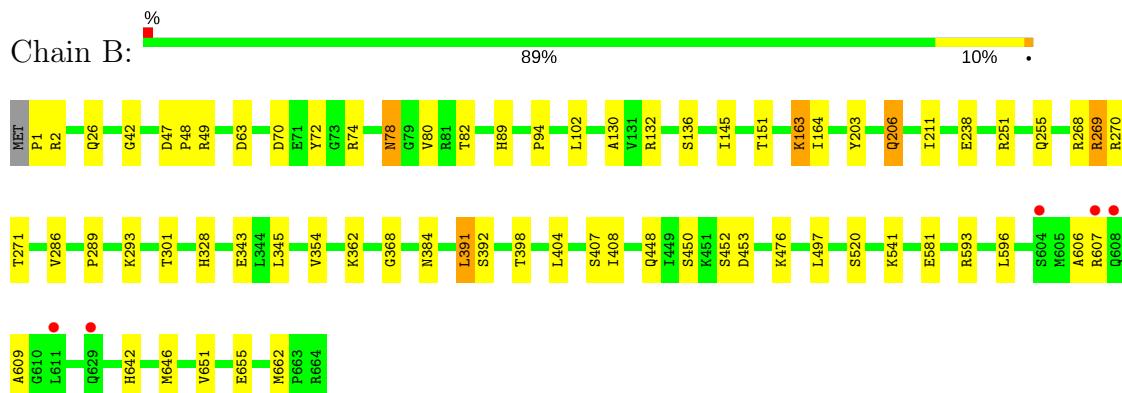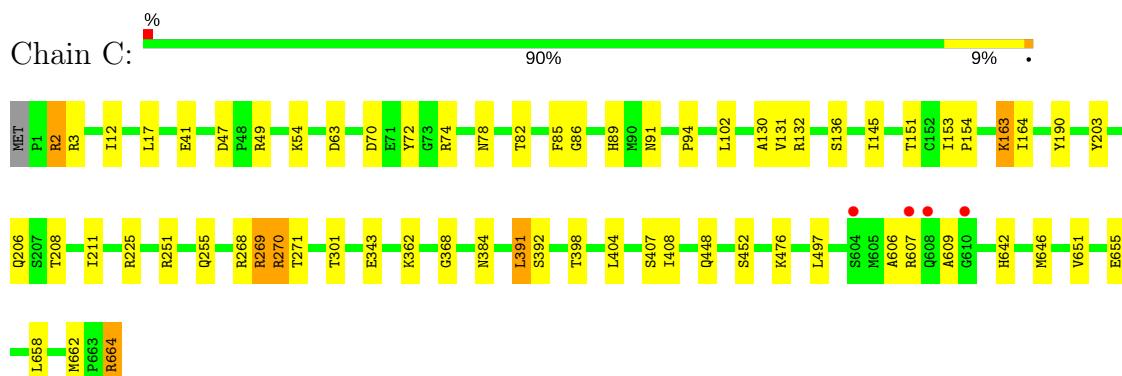
- Molecule 2: 5'-D(*AP*AP*TP*CP)-3'

Chain E:

A4 A5 T6 C7
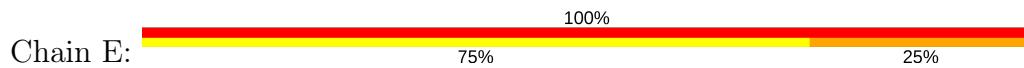
• Molecule 3: 5'-D(*TP*CP)-3'

Chain F:

T6 C7

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	106.53Å 93.03Å 140.86Å 90.00° 101.36° 90.00°	Depositor
Resolution (Å)	46.51 – 3.50 46.51 – 3.50	Depositor EDS
% Data completeness (in resolution range)	95.0 (46.51-3.50) 85.4 (46.51-3.50)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.51 (at 3.48Å)	Xtriage
Refinement program	BUSTER 2.9.2	Depositor
R, R_{free}	0.276 , 0.307 0.214 , 0.219	Depositor DCC
R_{free} test set	1721 reflections (6.23%)	DCC
Wilson B-factor (Å^2)	66.5	Xtriage
Anisotropy	0.931	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 39.3	EDS
L-test for twinning[2]	$< |L| > = 0.46, < L^2 > = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	16008	wwPDB-VP
Average B, all atoms (Å^2)	98.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.32% of the height of the origin peak. No significant pseudotranslation is detected.*

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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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: GTP, 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	0/5396	0.63	1/7297 (0.0%)
1	B	0.42	0/5396	0.65	1/7297 (0.0%)
1	C	0.41	0/5396	0.65	1/7297 (0.0%)
2	E	1.02	0/87	1.95	3/132 (2.3%)
3	F	1.29	0/39	2.56	2/58 (3.4%)
All	All	0.42	0/16314	0.67	8/22081 (0.0%)

There are no bond length outliers.

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	E	5	DA	P-O3'-C3'	10.49	132.28	119.70
3	F	6	DT	P-O3'-C3'	9.83	131.50	119.70
3	F	6	DT	O4'-C1'-N1	8.74	114.11	108.00
2	E	7	DC	O4'-C1'-N1	6.09	112.27	108.00
2	E	6	DT	O4'-C1'-N1	5.51	111.86	108.00
1	B	206	GLN	N-CA-C	-5.35	96.56	111.00
1	A	206	GLN	N-CA-C	-5.15	97.10	111.00
1	C	206	GLN	N-CA-C	-5.15	97.10	111.00

There are no chirality outliers.

There are no planarity outliers.

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	5265	0	5165	33	0
1	B	5265	0	5164	42	0
1	C	5265	0	5165	37	0
2	E	78	0	47	2	0
3	F	36	0	25	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
5	A	32	0	12	2	0
5	B	32	0	11	3	0
5	C	32	0	12	4	0
All	All	16008	0	15601	107	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 3.

All (107) 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:C:270:ARG:HH22	5:C:1666:GTP:H5"	1.45	0.80
1:A:608:GLN:HE22	1:B:593:ARG:NH1	1.84	0.75
1:A:600:ARG:HH12	1:B:581:GLU:HG3	1.53	0.71
1:B:206:GLN:HG2	1:B:268:ARG:HD3	1.77	0.66
1:A:251:ARG:HH11	1:A:255:GLN:HE22	1.45	0.65
1:B:251:ARG:HH11	1:B:255:GLN:HE22	1.46	0.62
1:C:251:ARG:HH11	1:C:255:GLN:HE22	1.47	0.61
1:A:593:ARG:HG2	1:B:42:GLY:HA2	1.84	0.60
1:A:600:ARG:NH1	1:B:581:GLU:HG3	2.18	0.59
1:A:608:GLN:HE22	1:B:593:ARG:CZ	2.16	0.58
1:A:427:LYS:HE3	1:C:12:ILE:HG21	1.86	0.58
1:A:151:THR:HG22	1:A:163:LYS:HG3	1.85	0.58
1:C:651:VAL:O	1:C:655:GLU:HB2	2.04	0.58
1:B:651:VAL:O	1:B:655:GLU:HB2	2.05	0.57
1:B:151:THR:HG22	1:B:163:LYS:HG3	1.87	0.56
1:B:203:TYR:HE1	1:B:271:THR:HG22	1.71	0.55
1:C:203:TYR:HE1	1:C:271:THR:HG22	1.70	0.55
1:A:651:VAL:O	1:A:655:GLU:HB2	2.06	0.55
1:C:151:THR:HG22	1:C:163:LYS:HG3	1.87	0.54
1:C:203:TYR:CE1	1:C:271:THR:HG22	2.41	0.54
1:B:541:LYS:NZ	2:E:4:DA:H2"	2.23	0.54
1:B:203:TYR:CE1	1:B:271:THR:HG22	2.42	0.54
1:A:203:TYR:HE1	1:A:271:THR:HG22	1.72	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:203:TYR:CE1	1:A:271:THR:HG22	2.44	0.51
1:A:534:SER:O	1:B:48:PRO:HG2	2.11	0.51
1:B:1:PRO:HG3	1:B:238:GLU:HG3	1.93	0.50
1:B:26:GLN:HB3	2:E:6:DT:C2	2.46	0.50
1:B:328:HIS:C	1:B:328:HIS:CD2	2.84	0.50
1:B:328:HIS:ND1	1:B:453:ASP:HB3	2.27	0.50
1:C:392:SER:O	1:C:398:THR:HG21	2.12	0.50
1:A:392:SER:O	1:A:398:THR:HG21	2.11	0.50
1:C:343:GLU:HA	1:C:343:GLU:OE1	2.12	0.49
1:A:407:SER:HA	1:A:448:GLN:HE22	1.77	0.49
1:B:392:SER:O	1:B:398:THR:HG21	2.12	0.49
5:B:1666:GTP:O2G	5:B:1666:GTP:O2B	2.30	0.49
1:A:47:ASP:OD1	1:A:49:ARG:HD3	2.13	0.49
1:A:94:PRO:HB3	1:A:269:ARG:HG3	1.95	0.49
1:B:130:ALA:HB2	1:B:408:ILE:HD11	1.95	0.49
1:B:270:ARG:NH1	5:B:1666:GTP:O2'	2.37	0.48
1:C:94:PRO:HB3	1:C:269:ARG:HG3	1.96	0.48
1:C:407:SER:HA	1:C:448:GLN:HE22	1.79	0.48
1:A:70:ASP:OD2	1:A:74:ARG:HD2	2.14	0.47
1:B:136:SER:OG	1:B:293:LYS:NZ	2.48	0.47
1:A:270:ARG:HH22	5:A:1666:GTP:C5'	2.26	0.47
1:B:70:ASP:OD2	1:B:74:ARG:HD2	2.14	0.47
1:C:70:ASP:OD2	1:C:74:ARG:HD2	2.14	0.47
1:B:606:ALA:HB3	1:B:609:ALA:HB2	1.96	0.47
1:B:145:ILE:HD12	1:B:164:ILE:HD13	1.97	0.47
1:C:225:ARG:HG3	1:C:268:ARG:HG3	1.97	0.47
1:A:145:ILE:HD12	1:A:164:ILE:HD13	1.97	0.46
1:B:345:LEU:HG	1:B:354:VAL:HG11	1.97	0.46
1:B:407:SER:HA	1:B:448:GLN:HE22	1.81	0.46
1:C:270:ARG:NH2	5:C:1666:GTP:H5''	2.24	0.46
1:C:47:ASP:OD1	1:C:49:ARG:HD3	2.16	0.46
1:C:270:ARG:HH12	5:C:1666:GTP:H3'	1.81	0.46
1:C:606:ALA:HB3	1:C:609:ALA:HB2	1.98	0.46
1:B:206:GLN:HB2	1:B:270:ARG:HD2	1.98	0.46
1:B:94:PRO:HB3	1:B:269:ARG:HG3	1.98	0.45
1:C:642:HIS:CE1	1:C:646:MET:HG3	2.51	0.45
1:C:86:GLY:O	1:C:208:THR:HG22	2.16	0.45
1:A:72:TYR:CE2	1:A:476:LYS:HD3	2.52	0.45
1:B:301:THR:HG23	1:B:448:GLN:HG3	1.99	0.45
1:A:642:HIS:CE1	1:A:646:MET:HG3	2.52	0.45
1:A:475:LEU:HD21	1:A:482:PRO:HG3	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:151:THR:CG2	1:C:163:LYS:HG3	2.48	0.44
1:C:391:LEU:HD22	1:C:398:THR:HG22	1.99	0.44
1:B:391:LEU:HD22	1:B:398:THR:HG22	1.98	0.44
1:C:251:ARG:HB2	1:C:255:GLN:HE21	1.83	0.44
1:C:301:THR:HG23	1:C:448:GLN:HG3	1.98	0.44
1:A:328:HIS:HD2	1:A:329:ASP:OD1	2.01	0.44
1:B:47:ASP:OD1	1:B:49:ARG:HD3	2.17	0.44
1:B:286:VAL:O	1:B:289:PRO:HD2	2.18	0.44
1:A:301:THR:HG23	1:A:448:GLN:HG3	2.00	0.43
1:C:17:LEU:HA	1:C:190:TYR:OH	2.18	0.43
1:C:270:ARG:NH1	5:C:1666:GTP:H3'	2.33	0.43
1:B:89:HIS:CE1	1:B:211:ILE:HD11	2.54	0.43
1:C:145:ILE:HD12	1:C:164:ILE:HD13	1.99	0.43
1:A:392:SER:O	1:A:398:THR:CG2	2.66	0.43
1:B:251:ARG:HB2	1:B:255:GLN:HE21	1.82	0.43
1:B:392:SER:O	1:B:398:THR:CG2	2.67	0.43
1:C:54:LYS:NZ	1:C:91:ASN:HD21	2.17	0.43
1:C:163:LYS:HB2	1:C:163:LYS:HE3	1.81	0.43
1:C:130:ALA:HB2	1:C:408:ILE:HD11	2.01	0.43
1:A:270:ARG:HH22	5:A:1666:GTP:H5'	1.84	0.43
1:B:163:LYS:HE3	1:B:163:LYS:HB2	1.81	0.43
1:A:94:PRO:CB	1:A:269:ARG:HG3	2.49	0.43
1:C:94:PRO:CB	1:C:269:ARG:HG3	2.49	0.43
1:B:151:THR:CG2	1:B:163:LYS:HG3	2.49	0.42
1:A:391:LEU:HD22	1:A:398:THR:HG22	2.01	0.42
1:B:642:HIS:CE1	1:B:646:MET:HG3	2.54	0.42
1:A:151:THR:CG2	1:A:163:LYS:HG3	2.48	0.42
1:B:94:PRO:CB	1:B:269:ARG:HG3	2.50	0.42
1:C:392:SER:O	1:C:398:THR:CG2	2.67	0.42
1:C:85:PHE:O	1:C:211:ILE:HD12	2.19	0.42
1:B:132:ARG:NH1	1:B:343:GLU:OE2	2.53	0.42
1:A:251:ARG:HB2	1:A:255:GLN:HE21	1.85	0.42
1:A:251:ARG:HH11	1:A:255:GLN:NE2	2.16	0.41
1:C:72:TYR:CE2	1:C:476:LYS:HD3	2.54	0.41
1:A:217:THR:HG23	1:A:219:LYS:H	1.84	0.41
5:B:1666:GTP:O1B	5:B:1666:GTP:O1A	2.38	0.41
1:B:72:TYR:CE2	1:B:476:LYS:HD3	2.55	0.41
1:C:89:HIS:CE1	1:C:211:ILE:HD11	2.55	0.41
1:C:131:VAL:HG11	1:C:343:GLU:HB3	2.03	0.41
1:A:86:GLY:O	1:A:89:HIS:HD2	2.04	0.41
1:C:664:ARG:H	1:C:664:ARG:HD3	1.86	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:78:ASN:ND2	1:B:80:VAL:H	2.19	0.41
1:C:153:ILE:HA	1:C:154:PRO:HA	1.84	0.41

There are no symmetry-related clashes.

5.3   Torsion angles ⓘ

5.3.1   Protein backbone ⓘ

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	662/665 (100%)	640 (97%)	20 (3%)	2 (0%)	44	80
1	B	662/665 (100%)	637 (96%)	22 (3%)	3 (0%)	32	73
1	C	662/665 (100%)	635 (96%)	23 (4%)	4 (1%)	28	70
All	All	1986/1995 (100%)	1912 (96%)	65 (3%)	9 (0%)	32	73

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	607	ARG
1	B	2	ARG
1	B	607	ARG
1	C	607	ARG
1	C	136	SER
1	A	136	SER
1	C	2	ARG
1	C	368	GLY
1	B	368	GLY

5.3.2   Protein sidechains ⓘ

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	557/558 (100%)	542 (97%)	15 (3%)	50	80
1	B	557/558 (100%)	541 (97%)	16 (3%)	48	78
1	C	557/558 (100%)	537 (96%)	20 (4%)	40	74
All	All	1671/1674 (100%)	1620 (97%)	51 (3%)	45	78

All (51) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	63	ASP
1	A	78	ASN
1	A	81	ARG
1	A	82	THR
1	A	102	LEU
1	A	163	LYS
1	A	204	ARG
1	A	269	ARG
1	A	362	LYS
1	A	384	ASN
1	A	391	LEU
1	A	404	LEU
1	A	452	SER
1	A	497	LEU
1	A	662	MET
1	B	63	ASP
1	B	78	ASN
1	B	82	THR
1	B	102	LEU
1	B	163	LYS
1	B	269	ARG
1	B	362	LYS
1	B	384	ASN
1	B	391	LEU
1	B	404	LEU
1	B	450	SER
1	B	452	SER
1	B	497	LEU
1	B	520	SER
1	B	596	LEU

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Mol	Chain	Res	Type
1	B	662	MET
1	C	2	ARG
1	C	3	ARG
1	C	41	GLU
1	C	63	ASP
1	C	78	ASN
1	C	82	THR
1	C	102	LEU
1	C	132	ARG
1	C	163	LYS
1	C	269	ARG
1	C	270	ARG
1	C	362	LYS
1	C	384	ASN
1	C	391	LEU
1	C	404	LEU
1	C	452	SER
1	C	497	LEU
1	C	658	LEU
1	C	662	MET
1	C	664	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (28) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	15	GLN
1	A	26	GLN
1	A	78	ASN
1	A	89	HIS
1	A	91	ASN
1	A	255	GLN
1	A	309	ASN
1	A	328	HIS
1	A	448	GLN
1	A	525	GLN
1	A	608	GLN
1	A	626	ASN
1	B	15	GLN
1	B	26	GLN
1	B	78	ASN
1	B	89	HIS
1	B	255	GLN

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Mol	Chain	Res	Type
1	B	309	ASN
1	B	448	GLN
1	B	525	GLN
1	B	626	ASN
1	C	26	GLN
1	C	78	ASN
1	C	91	ASN
1	C	255	GLN
1	C	309	ASN
1	C	448	GLN
1	C	525	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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 ⓘ

There are no carbohydrates in this entry.

5.6 Ligand geometry ⓘ

Of 6 ligands modelled in this entry, 3 are monoatomic - leaving 3 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	$\#|Z| > 2$
5	GTP	A	1666	-	27,34,34	1.90	10 (37%)	27,54,54	2.12	8 (29%)
5	GTP	B	1666	-	27,34,34	1.22	3 (11%)	27,54,54	2.17	7 (25%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
5	GTP	C	1666	-	27,34,34	1.68	5 (18%)	27,54,54	1.94	7 (25%)

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
5	GTP	A	1666	-	-	0/18/38/38	0/3/3/3
5	GTP	B	1666	-	-	0/18/38/38	0/3/3/3
5	GTP	C	1666	-	-	0/18/38/38	0/3/3/3

All (18) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	C	1666	GTP	C8-N7	-2.54	1.29	1.34
5	A	1666	GTP	C8-N7	-2.37	1.30	1.34
5	A	1666	GTP	C5-C4	2.04	1.45	1.40
5	C	1666	GTP	PG-O2G	2.09	1.63	1.54
5	A	1666	GTP	C2-N2	2.09	1.38	1.34
5	B	1666	GTP	O4'-C1'	2.09	1.44	1.41
5	A	1666	GTP	C4-N3	2.20	1.39	1.35
5	A	1666	GTP	C2-N1	2.22	1.39	1.35
5	A	1666	GTP	C2'-C3'	2.30	1.59	1.53
5	C	1666	GTP	C2-N1	2.31	1.39	1.35
5	A	1666	GTP	C6-C5	2.47	1.46	1.41
5	A	1666	GTP	PG-O3B	2.49	1.64	1.60
5	B	1666	GTP	C5-C4	3.02	1.47	1.40
5	A	1666	GTP	C6-N1	3.21	1.38	1.33
5	C	1666	GTP	C6-N1	3.23	1.38	1.33
5	B	1666	GTP	C6-C5	4.14	1.49	1.41
5	C	1666	GTP	O4'-C1'	4.26	1.47	1.41
5	A	1666	GTP	O4'-C1'	5.29	1.48	1.41

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	1666	GTP	N3-C2-N1	-4.40	121.03	127.46
5	B	1666	GTP	C6-C5-C4	-4.25	116.62	120.84
5	A	1666	GTP	C5-C6-N1	-4.06	117.70	123.48
5	B	1666	GTP	C5-C6-N1	-4.05	117.72	123.48
5	A	1666	GTP	N3-C2-N1	-3.88	121.80	127.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	C	1666	GTP	C5-C6-N1	-3.65	118.29	123.48
5	B	1666	GTP	N3-C2-N1	-3.47	122.39	127.46
5	B	1666	GTP	C4-C5-N7	-3.29	106.23	109.41
5	C	1666	GTP	C6-C5-C4	-2.69	118.17	120.84
5	A	1666	GTP	C4-C5-N7	-2.39	107.10	109.41
5	B	1666	GTP	C1'-N9-C4	-2.27	122.71	126.64
5	C	1666	GTP	C4-C5-N7	-2.27	107.22	109.41
5	C	1666	GTP	N2-C2-N1	2.04	120.50	117.24
5	A	1666	GTP	O2'-C2'-C3'	2.49	119.81	111.83
5	A	1666	GTP	O5'-C5'-C4'	2.52	117.94	109.00
5	C	1666	GTP	C6-N1-C2	3.30	120.81	116.06
5	A	1666	GTP	C6-N1-C2	3.35	120.88	116.06
5	A	1666	GTP	C1'-N9-C4	3.44	132.58	126.64
5	B	1666	GTP	C6-N1-C2	4.70	122.82	116.06
5	B	1666	GTP	C2-N3-C4	4.77	120.73	115.16
5	C	1666	GTP	C2-N3-C4	5.39	121.45	115.16
5	A	1666	GTP	C2-N3-C4	5.79	121.92	115.16

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	1666	GTP	2	0
5	B	1666	GTP	3	0
5	C	1666	GTP	4	0

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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, 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	664/665 (99%)	-0.26	1 (0%)	94	93	71, 94, 120, 146	0
1	B	664/665 (99%)	-0.25	5 (0%)	86	79	69, 92, 117, 174	0
1	C	664/665 (99%)	-0.21	4 (0%)	89	84	67, 98, 130, 201	0
2	E	4/4 (100%)	2.88	4 (100%)	0	0	225, 226, 228, 229	0
3	F	2/2 (100%)	-0.03	0	100	100	181, 181, 181, 182	0
All	All	1998/2001 (99%)	-0.23	14 (0%)	87	82	67, 94, 124, 229	0

All (14) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	608	GLN	6.3
1	C	607	ARG	5.0
2	E	7	DC	4.8
1	B	608	GLN	4.2
1	B	607	ARG	3.8
1	B	629	GLN	2.7
1	B	604	SER	2.7
2	E	5	DA	2.4
1	B	611	LEU	2.3
1	C	610	GLY	2.3
1	C	604	SER	2.2
2	E	6	DT	2.2
2	E	4	DA	2.2
1	A	629	GLN	2.0

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

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates ⓘ

There are no carbohydrates in this entry.

6.4 Ligands ⓘ

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, 95th 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($Å^2$)	Q<0.9
5	GTP	A	1666	32/32	0.85	0.69	8.29	183,186,189,191	0
5	GTP	C	1666	32/32	0.75	0.62	6.02	184,187,189,191	0
5	GTP	B	1666	32/32	0.61	0.67	4.51	170,174,176,178	0
4	MG	C	1665	1/1	0.88	0.27	1.77	68,68,68,68	0
4	MG	B	1665	1/1	0.97	0.27	0.77	63,63,63,63	0
4	MG	A	1665	1/1	0.92	0.25	-0.15	63,63,63,63	0

6.5 Other polymers ⓘ

There are no such residues in this entry.

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