



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 13, 2023 – 12:43 PM JST

PDB ID : 5X70  
Title : Crystal structure of Rice Dwarf Virus P5 in complex with a ssRNA oligomer  
Authors : Nakamichi, Y.; Higashiura, A.; Nakagawa, A.  
Deposited on : 2017-02-23  
Resolution : 3.30 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  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
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) : 2.36

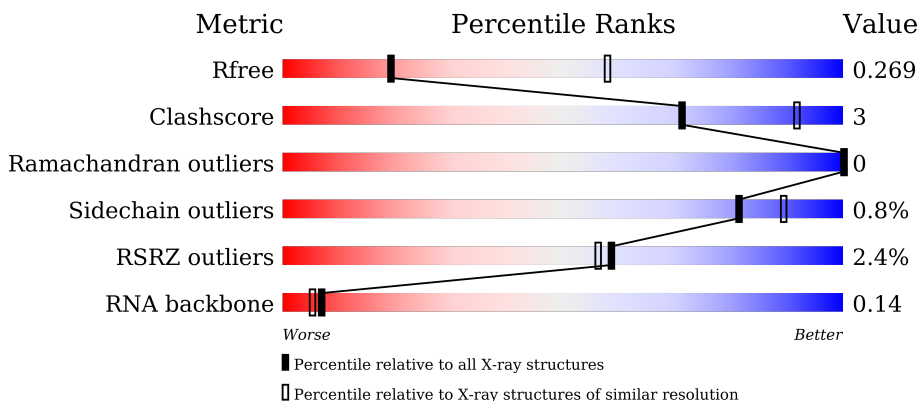
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.30 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	1149 (3.34-3.26)
Clashscore	141614	1205 (3.34-3.26)
Ramachandran outliers	138981	1183 (3.34-3.26)
Sidechain outliers	138945	1182 (3.34-3.26)
RSRZ outliers	127900	1115 (3.34-3.26)
RNA backbone	3102	1117 (3.70-2.90)

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	804	89% 8% .
1	B	804	88% 9% .
1	C	804	3% 84% 9% 6%
1	D	804	5% 80% 11% 9%

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Mol	Chain	Length	Quality of chain
2	E	6	 50% 50%
2	G	6	 17% 17% 67%

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 24258 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 mRNA capping enzyme P5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	779	Total 6193	C 3990	N 1026	O 1140	S 37	0	0	0
1	C	753	Total 5968	C 3847	N 987	O 1097	S 37	0	0	0
1	D	730	Total 5788	C 3729	N 955	O 1068	S 36	0	0	0
1	B	780	Total 6200	C 3995	N 1027	O 1141	S 37	0	0	0

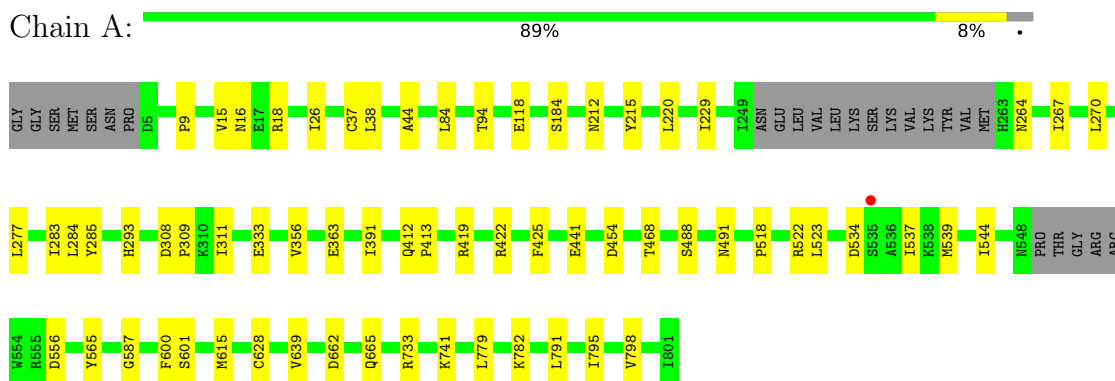
- Molecule 2 is a RNA chain called RNA (5'-R(P\*GP\*GP\*CP\*AP\*AP\*A)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	E	3	Total 66	C 29	N 13	O 21	P 3	0	0	0
2	G	2	Total 43	C 19	N 8	O 14	P 2	0	0	0

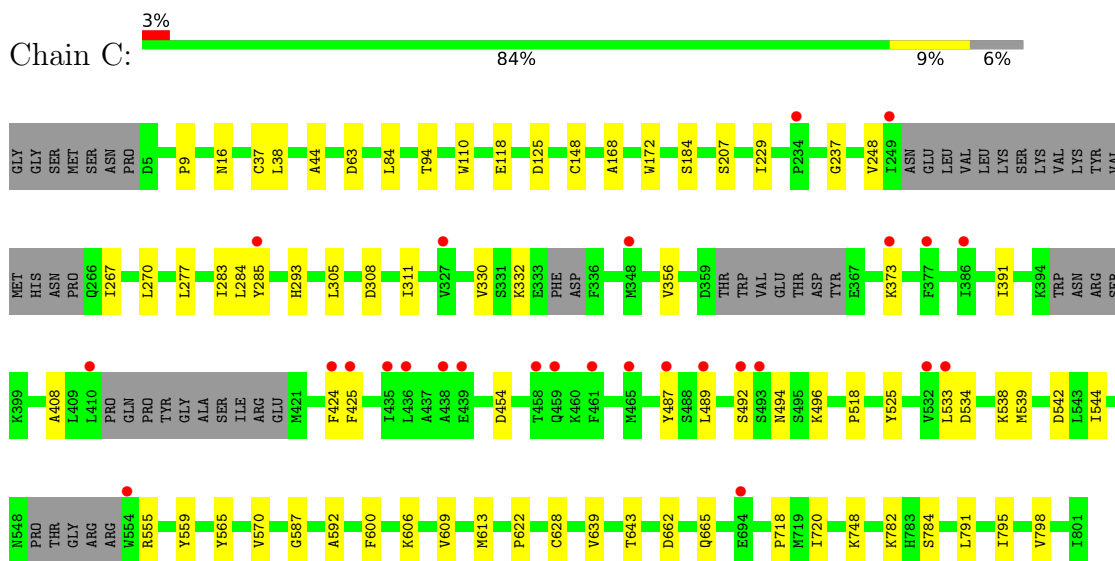
### 3 Residue-property plots

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 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.

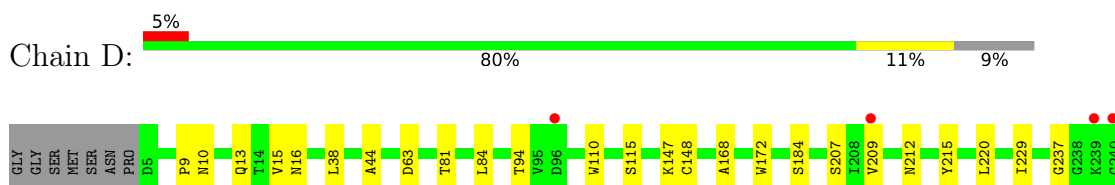
- Molecule 1: mRNA capping enzyme P5



- Molecule 1: mRNA capping enzyme P5



- Molecule 1: mRNA capping enzyme P5





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	80.75Å 80.66Å 145.73Å 104.74° 104.00° 95.29°	Depositor
Resolution (Å)	38.53 – 3.30 38.53 – 3.30	Depositor EDS
% Data completeness (in resolution range)	98.5 (38.53-3.30) 97.0 (38.53-3.30)	Depositor EDS
$R_{merge}$	0.08	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.61 (at 3.32Å)	Xtrriage
Refinement program	PHENIX (dev_2614: ???)	Depositor
R, $R_{free}$	0.220 , 0.269 0.220 , 0.269	Depositor DCC
$R_{free}$ test set	2669 reflections (5.29%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	72.5	Xtrriage
Anisotropy	0.158	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.31 , 20.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.400 for k,h,-h-k-l 0.013 for -k,-h,-l 0.009 for -h,-k,h+k+l	Xtrriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	24258	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	77.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.38% 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](#)

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	0.24	0/6343	0.39	0/8608
1	B	0.24	0/6351	0.39	0/8619
1	C	0.24	0/6103	0.38	0/8270
1	D	0.25	0/5921	0.42	0/8028
2	E	0.15	0/73	0.68	0/112
2	G	0.44	0/47	1.02	0/71
All	All	0.24	0/24838	0.40	0/33708

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	6193	0	6185	36	0
1	B	6200	0	6193	39	0
1	C	5968	0	5988	44	0
1	D	5788	0	5773	51	0
2	E	66	0	34	0	0
2	G	43	0	23	1	0
All	All	24258	0	24196	167	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 (167) 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:388:VAL:O	1:D:389:ARG:HD2	1.74	0.86
1:C:391:ILE:HB	1:C:425:PHE:HB2	1.69	0.73
1:D:408:ALA:HB3	1:D:424:PHE:HB2	1.74	0.69
1:D:291:ALA:HB2	1:D:315:TRP:HE1	1.57	0.69
1:A:662:ASP:HB3	1:A:665:GLN:HG3	1.78	0.66
1:A:264:ASN:HB3	1:A:267:ILE:HB	1.79	0.64
1:A:391:ILE:HB	1:A:425:PHE:HB2	1.80	0.64
1:D:626:VAL:HG23	1:D:627:LYS:HG2	1.78	0.64
1:A:308:ASP:HB3	1:A:311:ILE:HG13	1.80	0.63
1:C:16:ASN:HA	1:C:782:LYS:HE3	1.81	0.63
1:D:291:ALA:HB2	1:D:315:TRP:NE1	2.15	0.62
1:B:308:ASP:HB3	1:B:311:ILE:HG13	1.81	0.61
1:C:489:LEU:O	1:C:494:ASN:ND2	2.24	0.61
1:D:279:THR:HG21	1:D:390:LEU:HD22	1.82	0.61
1:D:16:ASN:HA	1:D:782:LYS:HE3	1.84	0.59
1:D:286:ILE:HG23	1:D:358:ASP:HA	1.85	0.59
1:B:413:PRO:HD2	1:B:422:ARG:HH12	1.68	0.59
1:D:299:LEU:HB2	1:D:323:THR:HG23	1.86	0.58
1:B:264:ASN:HB3	1:B:267:ILE:HB	1.86	0.57
1:A:16:ASN:HA	1:A:782:LYS:HE3	1.87	0.56
1:D:378:GLU:N	1:D:378:GLU:OE1	2.39	0.56
1:B:391:ILE:HB	1:B:425:PHE:HB2	1.89	0.55
1:C:284:LEU:HB3	1:C:356:VAL:HG22	1.90	0.54
1:D:81:THR:HG22	1:D:627:LYS:HB3	1.89	0.54
1:D:662:ASP:HB3	1:D:665:GLN:HG3	1.88	0.54
1:A:9:PRO:HB3	1:A:639:VAL:HG22	1.89	0.54
1:C:662:ASP:HB3	1:C:665:GLN:HG3	1.89	0.54
1:B:662:ASP:HB3	1:B:665:GLN:HG3	1.90	0.54
1:C:492:SER:HB2	1:C:555:ARG:HB2	1.91	0.53
1:B:309:PRO:HG3	1:B:333:GLU:HG2	1.91	0.53
1:B:657:ARG:HE	1:B:663:PRO:HG3	1.73	0.53
1:B:16:ASN:HA	1:B:782:LYS:HE3	1.90	0.53
1:D:297:LEU:HB3	1:D:299:LEU:HD13	1.91	0.53
1:B:444:MET:O	1:B:448:THR:OG1	2.20	0.52
1:A:419:ARG:HH21	1:A:441:GLU:HG3	1.74	0.52
1:C:533:LEU:HD23	1:C:533:LEU:H	1.74	0.52
1:B:522:ARG:NH2	1:B:601:SER:OG	2.43	0.52
1:A:309:PRO:HG3	1:A:333:GLU:HG2	1.92	0.52
1:D:272:LEU:HD22	1:D:422:ARG:HE	1.74	0.52
1:C:539:MET:HG3	1:C:544:ILE:HG12	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:413:PRO:HD2	1:A:422:ARG:HH12	1.75	0.51
1:A:488:SER:O	1:A:491:ASN:ND2	2.38	0.51
1:A:184:SER:OG	1:A:587:GLY:HA3	2.11	0.51
1:B:419:ARG:HH21	1:B:441:GLU:HG2	1.76	0.50
1:C:570:VAL:HG13	1:C:720:ILE:HG12	1.92	0.50
1:B:9:PRO:HB3	1:B:639:VAL:HG22	1.94	0.50
1:A:539:MET:HG3	1:A:544:ILE:HG12	1.94	0.50
1:C:308:ASP:HB3	1:C:311:ILE:HG13	1.94	0.50
1:D:286:ILE:HD12	1:D:334:PHE:CG	2.47	0.49
1:D:622:PRO:HB3	1:D:718:PRO:HG2	1.93	0.49
1:A:84:LEU:HG	1:A:628:CYS:HB2	1.94	0.49
1:B:184:SER:OG	1:B:587:GLY:HA3	2.12	0.49
1:C:184:SER:OG	1:C:587:GLY:HA3	2.12	0.49
1:B:539:MET:HG3	1:B:544:ILE:HG12	1.94	0.49
1:D:209:VAL:HB	1:D:485:ALA:HA	1.95	0.48
1:B:615:MET:HE3	1:B:733:ARG:HB2	1.95	0.48
1:A:284:LEU:HB3	1:A:356:VAL:HG12	1.95	0.48
1:D:694:GLU:O	1:D:697:THR:OG1	2.29	0.48
1:D:791:LEU:O	1:D:795:ILE:HG12	2.13	0.48
1:C:9:PRO:HB3	1:C:639:VAL:HG22	1.95	0.48
1:A:356:VAL:HG22	1:A:391:ILE:HG12	1.96	0.47
1:D:184:SER:OG	1:D:587:GLY:HA3	2.14	0.47
1:A:615:MET:HE3	1:A:733:ARG:HB2	1.97	0.47
1:A:491:ASN:HA	1:A:556:ASP:HA	1.95	0.47
1:D:274:THR:HA	1:D:277:LEU:HD12	1.96	0.47
1:C:622:PRO:HB3	1:C:718:PRO:HG2	1.96	0.47
1:D:525:TYR:CD1	1:D:784:SER:HB2	2.50	0.47
1:D:353:LYS:HA	1:D:387:ASP:HB3	1.97	0.47
1:C:267:ILE:HD12	1:C:270:LEU:HB2	1.97	0.47
1:C:791:LEU:O	1:C:795:ILE:HG12	2.14	0.47
1:D:565:TYR:CZ	1:D:798:VAL:HG22	2.50	0.46
1:C:330:VAL:HG12	1:C:332:LYS:H	1.80	0.46
1:D:9:PRO:HB3	1:D:639:VAL:HG22	1.96	0.46
1:C:270:LEU:HG	1:C:293:HIS:HB2	1.98	0.46
1:D:110:TRP:CD1	1:D:148:CYS:HA	2.51	0.46
1:A:522:ARG:NH2	1:A:601:SER:OG	2.49	0.46
1:C:542:ASP:OD1	1:C:542:ASP:N	2.49	0.46
1:C:408:ALA:HB3	1:C:424:PHE:HB2	1.98	0.46
1:A:518:PRO:HG3	1:A:600:PHE:CE2	2.50	0.45
1:C:565:TYR:CD1	1:C:720:ILE:HD11	2.51	0.45
1:B:84:LEU:HG	1:B:628:CYS:HB2	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:277:LEU:HD23	1:C:283:ILE:HG13	1.97	0.45
1:B:491:ASN:HA	1:B:556:ASP:HA	1.98	0.45
1:C:110:TRP:CD1	1:C:148:CYS:HA	2.52	0.45
1:C:565:TYR:CZ	1:C:798:VAL:HG22	2.52	0.45
1:B:38:LEU:HD21	1:B:44:ALA:HB2	1.98	0.45
1:C:38:LEU:O	1:C:94:THR:HA	2.17	0.45
1:D:378:GLU:HG2	1:D:378:GLU:O	2.16	0.45
1:B:791:LEU:O	1:B:795:ILE:HG12	2.17	0.45
1:B:212:ASN:HB3	1:B:215:TYR:HD2	1.83	0.44
1:C:525:TYR:CD1	1:C:784:SER:HB2	2.52	0.44
1:C:748:LYS:HE2	1:C:748:LYS:HB3	1.83	0.44
1:D:491:ASN:HA	1:D:556:ASP:HA	1.99	0.44
1:B:518:PRO:HG3	1:B:600:PHE:CE2	2.52	0.44
1:C:496:LYS:HA	1:C:559:TYR:OH	2.17	0.44
1:D:304:ILE:HB	1:D:327:VAL:HG13	1.99	0.44
1:A:38:LEU:HD21	1:A:44:ALA:HB2	1.99	0.44
1:D:38:LEU:HD21	1:D:44:ALA:HB2	1.99	0.44
1:A:270:LEU:HG	1:A:293:HIS:HB2	2.00	0.44
1:C:38:LEU:HD21	1:C:44:ALA:HB2	2.00	0.44
1:D:518:PRO:HG3	1:D:600:PHE:CE2	2.53	0.44
1:D:748:LYS:HE2	1:D:748:LYS:HB3	1.81	0.44
1:A:26:ILE:HG22	1:A:84:LEU:HD22	2.00	0.43
1:C:518:PRO:HG3	1:C:600:PHE:CE2	2.53	0.43
1:C:168:ALA:HB1	1:D:643:THR:HG23	1.99	0.43
1:C:207:SER:HB3	1:C:229:ILE:HD12	2.00	0.43
1:D:312:THR:OG1	1:D:313:SER:N	2.51	0.43
1:B:37:CYS:HB2	1:B:118:GLU:HA	2.01	0.43
1:C:565:TYR:CE1	1:C:606:LYS:HD2	2.54	0.43
1:B:216:VAL:HA	1:B:226:PRO:HG3	2.00	0.43
1:D:84:LEU:HG	1:D:628:CYS:HB2	2.01	0.43
1:B:73:TYR:OH	2:G:3:C:OP1	2.28	0.43
1:A:791:LEU:O	1:A:795:ILE:HG12	2.18	0.43
1:D:207:SER:HB3	1:D:229:ILE:HD12	2.01	0.43
1:C:172:TRP:HZ2	1:C:592:ALA:HB2	1.84	0.42
1:D:38:LEU:O	1:D:94:THR:HA	2.18	0.42
1:A:277:LEU:HD23	1:A:283:ILE:HG13	2.01	0.42
1:A:412:GLN:HG2	1:A:422:ARG:HG3	2.00	0.42
1:C:284:LEU:HD13	1:C:305:LEU:HD23	2.01	0.42
1:D:63:ASP:HA	1:D:94:THR:OG1	2.20	0.42
1:D:237:GLY:HA3	1:D:248:VAL:HG23	2.01	0.42
1:B:412:GLN:HG2	1:B:422:ARG:HG3	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:212:ASN:HB3	1:D:215:TYR:HD2	1.84	0.42
1:C:237:GLY:HA3	1:C:248:VAL:HG23	2.01	0.42
1:D:172:TRP:HZ2	1:D:592:ALA:HB2	1.83	0.42
1:C:570:VAL:HB	1:C:609:VAL:HG21	2.02	0.42
1:D:295:LEU:HA	1:D:295:LEU:HD12	1.81	0.42
1:A:15:VAL:HG11	1:A:779:LEU:HA	2.02	0.42
1:A:523:LEU:HD21	1:A:537:ILE:HG21	2.00	0.42
1:D:15:VAL:HG11	1:D:779:LEU:HA	2.00	0.42
1:B:523:LEU:HD21	1:B:537:ILE:HG21	2.02	0.42
1:A:37:CYS:HB2	1:A:118:GLU:HA	2.01	0.42
1:A:212:ASN:HB3	1:A:215:TYR:HD2	1.84	0.42
1:B:172:TRP:HZ2	1:B:592:ALA:HB2	1.85	0.42
1:A:18:ARG:HD3	1:B:18:ARG:NH2	2.35	0.42
1:B:277:LEU:HD23	1:B:283:ILE:HG13	2.01	0.41
1:A:38:LEU:O	1:A:94:THR:HA	2.20	0.41
1:B:519:ASN:OD1	1:B:522:ARG:HB2	2.20	0.41
1:B:17:GLU:OE2	1:B:782:LYS:NZ	2.44	0.41
1:C:84:LEU:HG	1:C:628:CYS:HB2	2.03	0.41
1:C:643:THR:HG23	1:D:168:ALA:HB1	2.02	0.41
1:C:538:LYS:HD2	1:C:538:LYS:HA	1.80	0.41
1:D:115:SER:OG	1:D:147:LYS:HG3	2.21	0.41
1:B:525:TYR:CD1	1:B:784:SER:HB2	2.55	0.41
1:A:267:ILE:HD12	1:A:270:LEU:HB2	2.02	0.41
1:C:356:VAL:HB	1:C:391:ILE:HD13	2.02	0.41
1:D:386:ILE:HG23	1:D:388:VAL:HG23	2.02	0.41
1:B:229:ILE:HA	1:B:468:THR:O	2.20	0.41
1:D:10:ASN:HD21	1:D:13:GLN:HG2	1.85	0.41
1:B:185:VAL:HG11	1:B:574:ILE:HG23	2.03	0.41
1:A:220:LEU:HD13	1:A:220:LEU:HA	1.96	0.41
1:A:741:LYS:H	1:A:741:LYS:HG2	1.63	0.41
1:C:63:ASP:HA	1:C:94:THR:OG1	2.20	0.41
1:C:373:LYS:HB2	1:C:373:LYS:HE3	1.86	0.41
1:C:609:VAL:HA	1:C:613:MET:HB2	2.03	0.41
1:D:538:LYS:HD2	1:D:538:LYS:HA	1.81	0.41
1:B:610:HIS:HA	1:B:614:LEU:HG	2.03	0.41
1:A:565:TYR:CZ	1:A:798:VAL:HG22	2.56	0.41
1:B:419:ARG:HH22	1:B:445:ASP:CG	2.23	0.40
1:A:229:ILE:HA	1:A:468:THR:O	2.22	0.40
1:C:37:CYS:HB2	1:C:118:GLU:HA	2.02	0.40
1:B:237:GLY:HA3	1:B:248:VAL:HG23	2.03	0.40
1:B:739:LEU:HD23	1:B:739:LEU:HA	1.89	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:220:LEU:HD13	1:D:220:LEU:HA	1.89	0.40
1:D:354:LEU:HD13	1:D:355:SER:N	2.37	0.40
1:B:38:LEU:O	1:B:94:THR:HA	2.21	0.40
1:D:376:TYR:O	1:D:376:TYR:HD1	2.05	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	773/804 (96%)	743 (96%)	30 (4%)	0	100	100
1	B	774/804 (96%)	742 (96%)	32 (4%)	0	100	100
1	C	739/804 (92%)	704 (95%)	35 (5%)	0	100	100
1	D	714/804 (89%)	673 (94%)	41 (6%)	0	100	100
All	All	3000/3216 (93%)	2862 (95%)	138 (5%)	0	100	100

There are no Ramachandran outliers to report.

### 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	689/711 (97%)	685 (99%)	4 (1%)	86	91
1	B	690/711 (97%)	685 (99%)	5 (1%)	84	90

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	665/711 (94%)	660 (99%)	5 (1%)	81	89
1	D	645/711 (91%)	637 (99%)	8 (1%)	71	83
All	All	2689/2844 (94%)	2667 (99%)	22 (1%)	81	89

All (22) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	285	TYR
1	A	363	GLU
1	A	454	ASP
1	A	534	ASP
1	C	125	ASP
1	C	285	TYR
1	C	454	ASP
1	C	487	TYR
1	C	534	ASP
1	D	285	TYR
1	D	300	ASN
1	D	353	LYS
1	D	376	TYR
1	D	383	ARG
1	D	446	ASP
1	D	447	PHE
1	D	534	ASP
1	B	285	TYR
1	B	366	TYR
1	B	454	ASP
1	B	534	ASP
1	B	748	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	374	GLN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	E	3/6 (50%)	2 (66%)	1 (33%)

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Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	G	1/6 (16%)	0	0
All	All	4/12 (33%)	2 (50%)	1 (25%)

All (2) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	E	2	G
2	E	3	C

All (1) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
2	E	1	G

#### 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](#)

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	779/804 (96%)	-0.11	1 (0%) 95 97	42, 66, 97, 115	0
1	B	780/804 (97%)	-0.10	3 (0%) 92 93	43, 66, 98, 118	0
1	C	753/804 (93%)	0.17	27 (3%) 42 40	47, 81, 136, 160	0
1	D	730/804 (90%)	0.26	43 (5%) 22 22	46, 80, 133, 160	0
2	E	3/6 (50%)	0.87	0 100 100	90, 90, 102, 120	0
2	G	2/6 (33%)	0.24	0 100 100	89, 89, 89, 101	0
All	All	3047/3228 (94%)	0.05	74 (2%) 59 56	42, 71, 126, 160	0

All (74) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	458	THR	5.6
1	D	410	LEU	5.5
1	C	234	PRO	5.0
1	D	390	LEU	4.9
1	D	304	ILE	4.8
1	D	424	PHE	4.4
1	D	461	PHE	4.4
1	D	294	LEU	4.2
1	C	435	ILE	4.1
1	C	377	PHE	4.0
1	C	465	MET	3.9
1	C	327	VAL	3.8
1	D	327	VAL	3.6
1	D	334	PHE	3.5
1	C	532	VAL	3.5
1	D	279	THR	3.5
1	D	283	ILE	3.3
1	C	439	GLU	3.2
1	D	285	TYR	3.2

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	D	453	SER	3.1
1	D	483	VAL	3.1
1	D	555	ARG	3.1
1	C	533	LEU	3.0
1	D	271	CYS	3.0
1	D	393	MET	2.9
1	D	556	ASP	2.9
1	C	410	LEU	2.9
1	C	458	THR	2.8
1	D	554	TRP	2.8
1	C	492	SER	2.8
1	D	240	GLY	2.7
1	B	738	ASN	2.7
1	D	388	VAL	2.7
1	D	309	PRO	2.7
1	D	544	ILE	2.6
1	D	272	LEU	2.6
1	D	308	ASP	2.6
1	C	461	PHE	2.6
1	D	358	ASP	2.5
1	D	487	TYR	2.5
1	D	439	GLU	2.5
1	D	459	GLN	2.5
1	B	533	LEU	2.5
1	C	425	PHE	2.4
1	C	487	TYR	2.4
1	D	426	HIS	2.4
1	D	239	LYS	2.4
1	D	315	TRP	2.4
1	C	438	ALA	2.4
1	C	554	TRP	2.3
1	C	424	PHE	2.3
1	D	539	MET	2.3
1	C	285	TYR	2.3
1	D	241	PRO	2.3
1	C	373	LYS	2.3
1	D	242	PHE	2.3
1	C	386	ILE	2.3
1	D	284	LEU	2.3
1	D	400	ASP	2.3
1	C	249	ILE	2.2
1	C	348	MET	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	558	GLY	2.2
1	D	534	ASP	2.2
1	C	489	LEU	2.2
1	C	694	GLU	2.1
1	D	209	VAL	2.1
1	A	535	SER	2.1
1	C	493	SER	2.1
1	D	96	ASP	2.1
1	C	459	GLN	2.0
1	D	441	GLU	2.0
1	B	676	PHE	2.0
1	C	436	LEU	2.0
1	D	599	LEU	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 monosaccharides in this entry.

## 6.4 Ligands [i](#)

There are no ligands in this entry.

## 6.5 Other polymers [i](#)

There are no such residues in this entry.