



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 02:21 PM GMT

PDB ID : 3WVK  
Title : Time-Resolved Crystal Structure of HindIII with 230sec soaking  
Authors : Kawamura, T.; Kobayashi, T.; Watanabe, N.  
Deposited on : 2014-05-22  
Resolution : 2.00 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

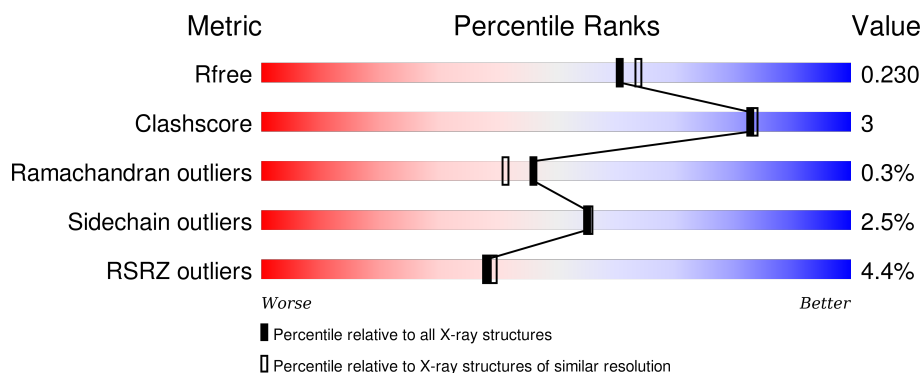
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	91344	6249 (2.00-2.00)
Clashscore	102246	7340 (2.00-2.00)
Ramachandran outliers	100387	7248 (2.00-2.00)
Sidechain outliers	100360	7247 (2.00-2.00)
RSRZ outliers	91569	6262 (2.00-2.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments 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	300	<div> <div>4%</div> <div>89%</div> <div>10%</div> <div>.</div> </div>
1	B	300	<div> <div>2%</div> <div>88%</div> <div>11%</div> <div>..</div> </div>
1	C	300	<div> <div>5%</div> <div>90%</div> <div>8%</div> <div>..</div> </div>
1	D	300	<div> <div>7%</div> <div>88%</div> <div>11%</div> <div>..</div> </div>
2	M	12	<div> <div>17%</div> <div>50%</div> <div>50%</div> </div>

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Mol	Chain	Length	Quality of chain
2	N	12	 75%25%
2	O	12	 67%33%
2	P	12	 75%25%
3	E	4	 75%25%
3	G	4	 100%
3	I	4	 100%
3	K	4	 100%
4	F	8	 63%25%13%
4	H	8	 25%63%13%
4	J	8	 50%38%13%
4	L	8	 63%25%13%

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	GOL	C	301	-	-	-	X

## 2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 12239 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 Type-2 restriction enzyme HindIII.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	298	Total	C	N	O	S	0	0	0
			2452	1580	405	464	3			
1	B	298	Total	C	N	O	S	0	0	0
			2452	1580	405	464	3			
1	C	298	Total	C	N	O	S	0	0	0
			2452	1580	405	464	3			
1	D	298	Total	C	N	O	S	0	0	0
			2452	1580	405	464	3			

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	M	12	Total	C	N	O	P	0	0	0
			243	116	46	70	11			
2	N	12	Total	C	N	O	P	0	0	0
			243	116	46	70	11			
2	O	12	Total	C	N	O	P	0	0	0
			243	116	46	70	11			
2	P	12	Total	C	N	O	P	0	0	0
			243	116	46	70	11			

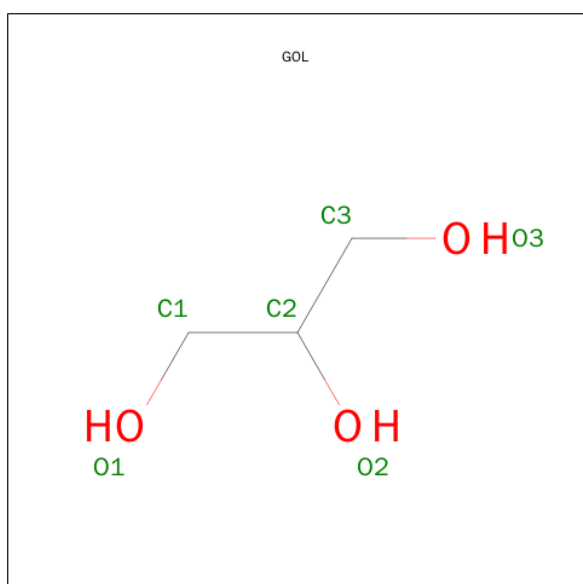
- Molecule 3 is a DNA chain called DNA (5'-D(\*GP\*CP\*CP\*A)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	4	Total	C	N	O	P	0	0	0
			78	38	16	21	3			
3	G	4	Total	C	N	O	P	0	0	0
			78	38	16	21	3			
3	I	4	Total	C	N	O	P	0	0	0
			78	38	16	21	3			
3	K	4	Total	C	N	O	P	0	0	0
			78	38	16	21	3			

- Molecule 4 is a DNA chain called DNA (5'-D(P\*AP\*GP\*CP\*TP\*TP\*GP\*GP\*C)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	F	8	Total 166	C 78	N 30	O 50	P 8	0	0	0
4	H	8	Total 166	C 78	N 30	O 50	P 8	0	0	0
4	J	8	Total 166	C 78	N 30	O 50	P 8	0	0	0
4	L	8	Total 166	C 78	N 30	O 50	P 8	0	0	0

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			6	3	3		
5	A	1	Total	C	O	0	0
			6	3	3		
5	C	1	Total	C	O	0	0
			6	3	3		
5	D	1	Total	C	O	0	0
			6	3	3		

- Molecule 6 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	B	2	Total	Mn	0	0
			2	2		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	2	Total 2	Mn 2	0	0
6	D	2	Total 2	Mn 2	0	0
6	C	2	Total 2	Mn 2	0	0

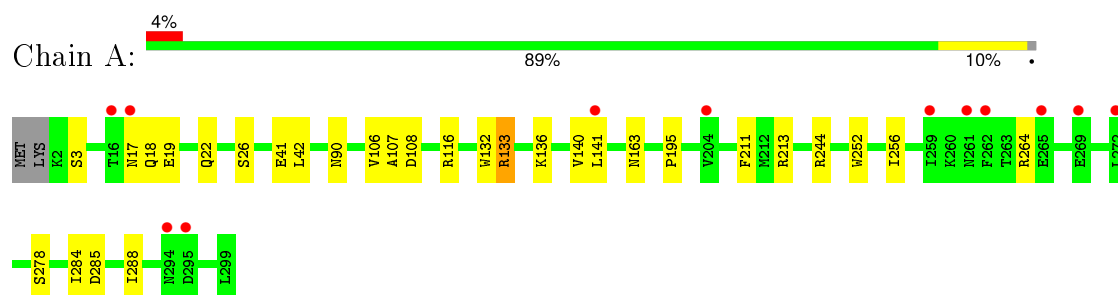
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	88	Total 88	O 88	0	0
7	B	99	Total 99	O 99	0	0
7	C	77	Total 77	O 77	0	0
7	D	93	Total 93	O 93	0	0
7	N	2	Total 2	O 2	0	0
7	O	1	Total 1	O 1	0	0
7	P	1	Total 1	O 1	0	0
7	E	8	Total 8	O 8	0	0
7	F	14	Total 14	O 14	0	0
7	G	15	Total 15	O 15	0	0
7	H	14	Total 14	O 14	0	0
7	I	8	Total 8	O 8	0	0
7	J	11	Total 11	O 11	0	0
7	K	9	Total 9	O 9	0	0
7	L	11	Total 11	O 11	0	0

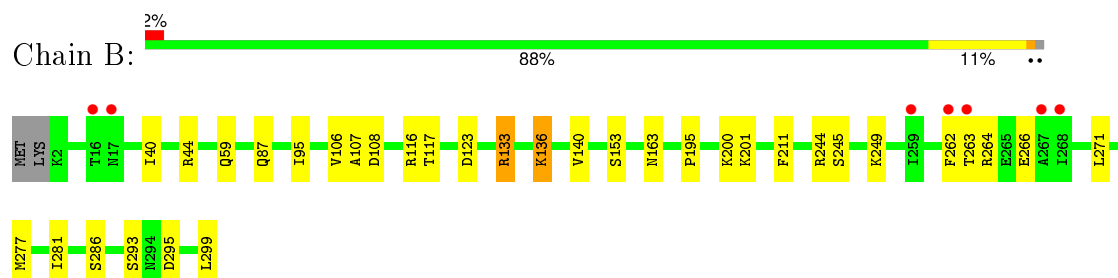
### 3 Residue-property plots [i](#)

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.

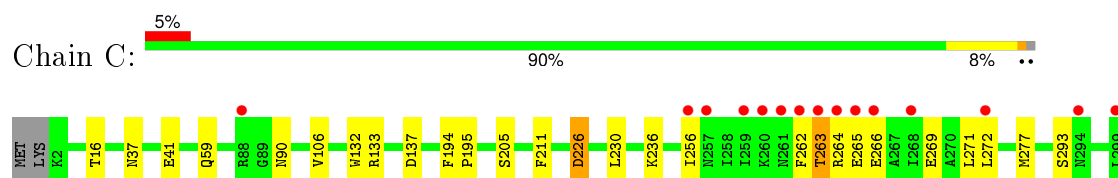
- Molecule 1: Type-2 restriction enzyme HindIII



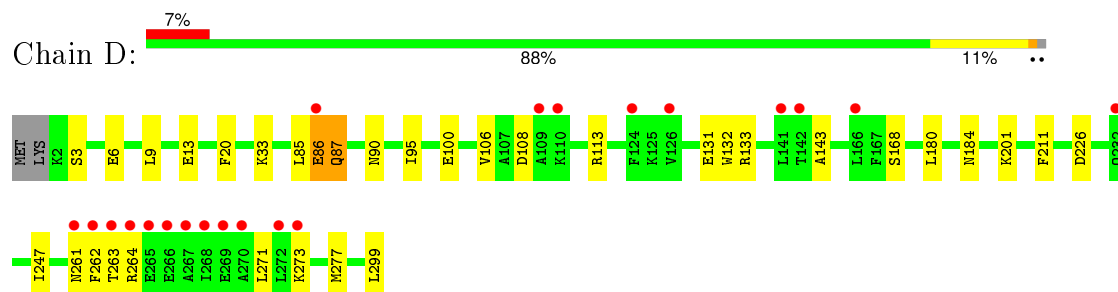
- Molecule 1: Type-2 restriction enzyme HindIII



- Molecule 1: Type-2 restriction enzyme HindIII



- Molecule 1: Type-2 restriction enzyme HindIII



- Molecule 2: DNA (5'-D(\*GP\*CP\*CP\*AP\*AP\*GP\*CP\*TP\*TP\*GP\*GP\*C)-3')



- Molecule 2: DNA (5'-D(\*GP\*CP\*CP\*AP\*AP\*GP\*CP\*TP\*TP\*GP\*GP\*C)-3')



- Molecule 2: DNA (5'-D(\*GP\*CP\*CP\*AP\*AP\*GP\*CP\*TP\*TP\*GP\*GP\*C)-3')



- Molecule 2: DNA (5'-D(\*GP\*CP\*CP\*AP\*AP\*GP\*CP\*TP\*TP\*GP\*GP\*C)-3')



- Molecule 3: DNA (5'-D(\*GP\*CP\*CP\*A)-3')



- Molecule 3: DNA (5'-D(\*GP\*CP\*CP\*A)-3')



There are no outlier residues recorded for this chain.

- Molecule 3: DNA (5'-D(\*GP\*CP\*CP\*A)-3')



There are no outlier residues recorded for this chain.

- Molecule 3: DNA (5'-D(\*GP\*CP\*CP\*A)-3')



There are no outlier residues recorded for this chain.



- Molecule 4: DNA (5'-D(P\*AP\*GP\*CP\*TP\*TP\*GP\*GP\*C)-3')

Chain F:  63% 25% 13%



- Molecule 4: DNA (5'-D(P\*AP\*GP\*CP\*TP\*TP\*GP\*GP\*C)-3')

Chain H:  25% 63% 13%



- Molecule 4: DNA (5'-D(P\*AP\*GP\*CP\*TP\*TP\*GP\*GP\*C)-3')

Chain J:  50% 38% 13%



- Molecule 4: DNA (5'-D(P\*AP\*GP\*CP\*TP\*TP\*GP\*GP\*C)-3')

Chain L:  63% 25% 13%



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	80.25Å 141.16Å 96.58Å 90.00° 111.96° 90.00°	Depositor
Resolution (Å)	39.77 – 2.00 39.77 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.7 (39.77-2.00) 99.7 (39.77-2.00)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.09 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.8.0069	Depositor
R, $R_{free}$	0.179 , 0.226 0.187 , 0.230	Depositor DCC
$R_{free}$ test set	6688 reflections (5.30%)	DCC
Wilson B-factor (Å <sup>2</sup> )	29.2	Xtriage
Anisotropy	0.063	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.39 , 49.0	EDS
Estimated twinning fraction	0.046 for h,-k,-h-l	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	3 of 132966 reflections (0.002%)	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	12239	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.76% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, MN

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	0.98	0/2494	0.96	4/3351 (0.1%)
1	B	0.99	2/2494 (0.1%)	0.96	6/3351 (0.2%)
1	C	0.95	0/2494	0.92	2/3351 (0.1%)
1	D	0.93	0/2494	0.93	2/3351 (0.1%)
2	M	0.69	0/272	1.10	1/418 (0.2%)
2	N	0.86	1/272 (0.4%)	1.10	1/418 (0.2%)
2	O	0.83	0/272	1.15	2/418 (0.5%)
2	P	0.70	0/272	1.10	2/418 (0.5%)
3	E	1.14	0/87	1.03	0/132
3	G	0.75	0/87	1.03	0/132
3	I	1.18	0/87	0.99	0/132
3	K	1.15	0/87	1.06	0/132
4	F	1.26	1/185 (0.5%)	1.11	1/282 (0.4%)
4	H	1.09	1/185 (0.5%)	1.17	2/282 (0.7%)
4	J	1.16	1/185 (0.5%)	1.23	2/282 (0.7%)
4	L	1.12	1/185 (0.5%)	1.14	2/282 (0.7%)
All	All	0.96	7/12152 (0.1%)	0.98	27/16732 (0.2%)

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
3	E	0	1

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	F	1	DA	OP3-P	-12.08	1.46	1.61
4	H	1	DA	OP3-P	-9.57	1.49	1.61

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	J	1	DA	OP3-P	-9.38	1.49	1.61
4	L	1	DA	OP3-P	-7.76	1.51	1.61
2	N	1	DG	O3'-P	-6.32	1.53	1.61
1	B	153	SER	CB-OG	5.34	1.49	1.42
1	B	286	SER	CB-OG	-5.13	1.35	1.42

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	133	ARG	NE-CZ-NH2	-7.97	116.31	120.30
4	J	3	DC	O5'-P-OP2	-7.95	98.55	105.70
4	H	6	DG	O5'-P-OP2	-7.32	99.11	105.70
1	A	116	ARG	NE-CZ-NH1	7.28	123.94	120.30
2	O	12	DC	O4'-C4'-C3'	-6.64	101.84	104.50
2	P	12	DC	O4'-C4'-C3'	-6.61	101.86	104.50
1	B	108	ASP	CB-CG-OD1	-6.55	112.40	118.30
2	N	1	DG	C5'-C4'-O4'	6.27	121.22	109.30
1	B	123	ASP	CB-CG-OD1	6.22	123.90	118.30
4	H	7	DG	O5'-P-OP2	-6.19	100.13	105.70
4	J	3	DC	O5'-P-OP1	6.09	118.00	110.70
1	D	108	ASP	CB-CG-OD1	-6.04	112.86	118.30
1	A	244	ARG	NE-CZ-NH1	5.93	123.27	120.30
2	M	12	DC	O4'-C4'-C3'	-5.89	102.14	104.50
2	O	9	DT	O5'-P-OP1	-5.85	100.44	105.70
4	L	6	DG	OP1-P-OP2	5.61	128.01	119.60
1	B	133	ARG	NE-CZ-NH2	-5.58	117.51	120.30
1	C	226	ASP	CB-CG-OD1	5.51	123.26	118.30
1	B	244	ARG	NE-CZ-NH1	5.48	123.04	120.30
1	A	108	ASP	CB-CG-OD1	-5.43	113.41	118.30
4	L	6	DG	O5'-P-OP2	-5.41	100.83	105.70
1	B	116	ARG	NE-CZ-NH2	-5.27	117.67	120.30
1	B	133	ARG	NE-CZ-NH1	5.25	122.93	120.30
2	P	8	DT	O5'-P-OP2	5.15	116.89	110.70
1	D	113	ARG	NE-CZ-NH2	5.15	122.87	120.30
1	C	137	ASP	CB-CG-OD2	-5.07	113.74	118.30
4	F	8	DC	O5'-P-OP2	-5.06	101.14	105.70

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	E	4	DA	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	2452	0	2502	21	0
1	B	2452	0	2502	19	0
1	C	2452	0	2502	16	0
1	D	2452	0	2502	16	0
2	M	243	0	136	6	0
2	N	243	0	136	1	0
2	O	243	0	136	1	0
2	P	243	0	136	1	0
3	E	78	0	45	0	0
3	G	78	0	45	0	0
3	I	78	0	45	0	0
3	K	78	0	45	0	0
4	F	166	0	91	1	0
4	H	166	0	91	2	0
4	J	166	0	91	2	0
4	L	166	0	91	1	0
5	A	12	0	16	0	0
5	C	6	0	8	0	0
5	D	6	0	8	0	0
6	A	2	0	0	0	0
6	B	2	0	0	0	0
6	C	2	0	0	0	0
6	D	2	0	0	0	0
7	A	88	0	0	0	0
7	B	99	0	0	2	0
7	C	77	0	0	0	0
7	D	93	0	0	0	0
7	E	8	0	0	0	0
7	F	14	0	0	0	0
7	G	15	0	0	0	0
7	H	14	0	0	0	0
7	I	8	0	0	0	0
7	J	11	0	0	0	0
7	K	9	0	0	0	0
7	L	11	0	0	0	0
7	N	2	0	0	0	0
7	O	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	P	1	0	0	0	0
All	All	12239	0	11128	72	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 (72) 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:A:264:ARG:NH1	1:B:262:PHE:O	1.77	1.17
1:A:213:ARG:NH1	1:B:299:LEU:OXT	2.01	0.93
2:M:5:DA:H2''	2:M:6:DG:OP2	1.76	0.83
1:A:285:ASP:OD1	1:B:249:LYS:HE3	1.87	0.74
1:C:271:LEU:HG	1:D:271:LEU:HD13	1.73	0.69
1:B:263:THR:OG1	1:B:266:GLU:HG3	1.92	0.69
1:C:262:PHE:O	1:D:264:ARG:NH1	2.30	0.64
1:D:9:LEU:O	1:D:13:GLU:HG2	2.03	0.59
2:N:5:DA:H2''	2:N:6:DG:OP2	2.03	0.59
1:A:285:ASP:OD1	1:B:249:LYS:CE	2.51	0.58
1:B:95:ILE:HD12	1:B:136:LYS:HE3	1.85	0.57
1:D:85:LEU:HD11	1:D:95:ILE:HG23	1.87	0.57
1:A:18:GLN:NE2	1:A:22:GLN:OE1	2.38	0.56
1:A:252:TRP:HB2	1:B:281:ILE:HD11	1.88	0.55
1:A:17:ASN:ND2	1:A:18:GLN:OE1	2.40	0.55
1:C:264:ARG:HB3	1:C:264:ARG:NH2	2.23	0.54
1:A:288:ILE:HD11	1:B:245:SER:CB	2.39	0.53
2:M:5:DA:C2'	2:M:6:DG:OP2	2.51	0.51
1:B:200:LYS:HE2	7:B:495:HOH:O	2.11	0.50
2:M:7:DC:H1'	2:M:8:DT:H5'	1.94	0.50
1:C:230:LEU:HD23	1:D:299:LEU:HD21	1.94	0.50
2:O:4:DA:H2''	2:O:5:DA:OP2	2.12	0.49
2:P:4:DA:OP2	2:P:4:DA:H2'	2.13	0.49
1:C:264:ARG:HG3	1:D:264:ARG:HG2	1.94	0.49
1:A:252:TRP:CB	1:B:281:ILE:HD11	2.44	0.48
2:M:5:DA:H2'	2:M:5:DA:OP2	2.13	0.48
1:A:90:ASN:HB3	1:A:132:TRP:CD1	2.48	0.48
1:C:16:THR:OG1	1:C:59:GLN:HG3	2.14	0.47
1:C:37:ASN:O	1:C:41:GLU:HG3	2.14	0.47
1:C:90:ASN:HB3	1:C:132:TRP:CD1	2.49	0.47
2:M:4:DA:H1'	2:M:5:DA:C8	2.50	0.47
1:C:106:VAL:HG11	1:C:133:ARG:HA	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:252:TRP:O	1:A:256:ILE:HG23	2.16	0.46
1:B:293:SER:OG	1:B:295:ASP:OD1	2.33	0.46
1:C:263:THR:HG23	1:C:266:GLU:HG3	1.98	0.46
1:A:264:ARG:HA	1:B:264:ARG:HG3	1.99	0.45
4:J:1:DA:H2'	4:J:2:DG:O4'	2.17	0.45
1:B:271:LEU:HD23	1:B:271:LEU:HA	1.79	0.45
1:D:247:ILE:H	1:D:247:ILE:HD12	1.81	0.45
1:D:90:ASN:HB3	1:D:132:TRP:CD1	2.52	0.45
1:B:59:GLN:HG3	7:B:464:HOH:O	2.16	0.45
1:D:86:GLU:O	1:D:87:GLN:HB2	2.17	0.44
1:A:3:SER:HB2	1:A:41:GLU:OE2	2.17	0.44
1:A:141:LEU:C	1:A:141:LEU:HD23	2.37	0.44
1:A:285:ASP:OD1	1:B:249:LYS:NZ	2.50	0.44
4:H:1:DA:H2'	4:H:2:DG:O4'	2.18	0.44
1:A:42:LEU:HA	1:A:42:LEU:HD23	1.84	0.44
1:B:163:ASN:HA	1:B:195:PRO:HB2	1.99	0.43
1:D:106:VAL:HG11	1:D:133:ARG:HA	2.00	0.43
1:B:107:ALA:HA	1:B:140:VAL:O	2.19	0.43
1:A:107:ALA:HA	1:A:140:VAL:O	2.17	0.43
1:D:20:PHE:CD1	4:J:7:DG:H5''	2.54	0.43
1:C:194:PHE:N	1:C:195:PRO:CD	2.81	0.43
4:H:3:DC:H2''	4:H:4:DT:H5'	2.01	0.43
4:F:1:DA:H2'	4:F:2:DG:O4'	2.19	0.43
1:C:264:ARG:HB3	1:C:264:ARG:CZ	2.49	0.42
1:B:40:ILE:O	1:B:44:ARG:HG2	2.18	0.42
2:M:6:DG:H2'	2:M:6:DG:OP2	2.18	0.42
1:C:264:ARG:CB	1:C:264:ARG:CZ	2.97	0.42
1:D:143:ALA:O	1:D:168:SER:HA	2.20	0.42
1:A:284:ILE:O	1:A:288:ILE:HD12	2.20	0.42
1:D:180:LEU:HA	1:D:180:LEU:HD23	1.86	0.41
1:B:106:VAL:HG11	1:B:133:ARG:HA	2.03	0.41
1:C:236:LYS:HE3	1:C:236:LYS:HB2	1.67	0.41
1:D:100:GLU:OE1	1:D:184:ASN:HB3	2.19	0.41
1:D:3:SER:N	1:D:6:GLU:OE2	2.44	0.41
1:A:163:ASN:HA	1:A:195:PRO:HB2	2.03	0.41
1:C:256:ILE:HA	1:D:277:MET:HE1	2.03	0.41
4:L:1:DA:H2'	4:L:2:DG:O4'	2.21	0.41
1:C:263:THR:OG1	1:C:264:ARG:N	2.53	0.40
1:A:17:ASN:OD1	1:A:17:ASN:N	2.52	0.40
1:A:106:VAL:HG11	1:A:133:ARG:HA	2.02	0.40

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	296/300 (99%)	289 (98%)	7 (2%)	0	100	100
1	B	296/300 (99%)	287 (97%)	7 (2%)	2 (1%)	26	19
1	C	296/300 (99%)	284 (96%)	12 (4%)	0	100	100
1	D	296/300 (99%)	285 (96%)	9 (3%)	2 (1%)	26	19
All	All	1184/1200 (99%)	1145 (97%)	35 (3%)	4 (0%)	46	41

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	263	THR
1	B	87	GLN
1	D	87	GLN
1	B	117	THR

### 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	274/276 (99%)	269 (98%)	5 (2%)	66	69
1	B	274/276 (99%)	270 (98%)	4 (2%)	72	75
1	C	274/276 (99%)	265 (97%)	9 (3%)	45	43
1	D	274/276 (99%)	265 (97%)	9 (3%)	45	43
All	All	1096/1104 (99%)	1069 (98%)	27 (2%)	55	55



All (27) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	19	GLU
1	A	26	SER
1	A	136	LYS
1	A	211	PHE
1	A	278	SER
1	B	136	LYS
1	B	201	LYS
1	B	211	PHE
1	B	277	MET
1	C	205	SER
1	C	211	PHE
1	C	226	ASP
1	C	263	THR
1	C	265	GLU
1	C	269	GLU
1	C	272	LEU
1	C	277	MET
1	C	293	SER
1	D	33	LYS
1	D	86	GLU
1	D	131	GLU
1	D	201	LYS
1	D	211	PHE
1	D	226	ASP
1	D	261	ASN
1	D	262	PHE
1	D	273	LYS

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

Mol	Chain	Res	Type
1	C	177	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 12 ligands modelled in this entry, 8 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	$\# Z  > 2$
5	GOL	A	301	-	5,5,5	0.80	0	5,5,5	0.62	0
5	GOL	A	302	-	5,5,5	0.60	0	5,5,5	0.52	0
5	GOL	C	301	-	5,5,5	0.54	0	5,5,5	0.61	0
5	GOL	D	301	-	5,5,5	0.63	0	5,5,5	0.77	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
5	GOL	A	301	-	-	0/4/4/4	0/0/0/0
5	GOL	A	302	-	-	0/4/4/4	0/0/0/0
5	GOL	C	301	-	-	0/4/4/4	0/0/0/0
5	GOL	D	301	-	-	0/4/4/4	0/0/0/0

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

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, 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	298/300 (99%)	0.09	12 (4%) 42 44	17, 33, 62, 89	0
1	B	298/300 (99%)	-0.12	7 (2%) 64 64	18, 32, 56, 75	0
1	C	298/300 (99%)	-0.19	15 (5%) 32 34	19, 33, 66, 91	0
1	D	298/300 (99%)	0.12	21 (7%) 19 21	20, 33, 67, 97	0
2	M	12/12 (100%)	0.53	2 (16%) 2 3	33, 53, 68, 69	0
2	N	12/12 (100%)	0.38	0 100 100	29, 52, 63, 69	0
2	O	12/12 (100%)	0.27	0 100 100	31, 50, 58, 60	0
2	P	12/12 (100%)	0.25	0 100 100	29, 45, 62, 65	0
3	E	4/4 (100%)	-0.38	0 100 100	23, 23, 23, 34	0
3	G	4/4 (100%)	-0.80	0 100 100	19, 19, 21, 26	0
3	I	4/4 (100%)	-0.71	0 100 100	21, 22, 23, 28	0
3	K	4/4 (100%)	-0.58	0 100 100	19, 22, 23, 27	0
4	F	8/8 (100%)	-0.32	0 100 100	22, 23, 26, 29	0
4	H	8/8 (100%)	-0.35	0 100 100	20, 26, 30, 36	0
4	J	8/8 (100%)	-0.62	0 100 100	22, 24, 26, 30	0
4	L	8/8 (100%)	-0.45	0 100 100	23, 24, 26, 30	0
All	All	1288/1296 (99%)	-0.03	57 (4%) 38 39	17, 33, 63, 97	0

All (57) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	17	ASN	5.6
1	C	263	THR	5.4
1	D	265	GLU	5.1
1	D	263	THR	4.5
1	C	262	PHE	4.2

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Mol	Chain	Res	Type	RSRZ
1	D	262	PHE	4.0
1	D	264	ARG	4.0
1	D	273	LYS	3.9
1	C	265	GLU	3.7
1	D	261	ASN	3.6
1	B	17	ASN	3.5
1	C	256	ILE	3.5
1	A	269	GLU	3.4
1	C	259	ILE	3.4
1	A	259	ILE	3.2
1	A	262	PHE	3.1
1	A	16	THR	3.1
1	B	262	PHE	3.1
1	B	267	ALA	3.0
1	B	268	ILE	2.9
1	C	261	ASN	2.9
1	D	141	LEU	2.9
1	D	268	ILE	2.9
1	D	269	GLU	2.9
1	C	264	ARG	2.9
1	D	272	LEU	2.8
1	C	260	LYS	2.8
1	D	109	ALA	2.8
1	D	166	LEU	2.7
1	B	263	THR	2.7
1	A	204	VAL	2.7
1	C	299	LEU	2.6
1	C	268	ILE	2.6
1	A	141	LEU	2.5
1	A	261	ASN	2.3
1	B	16	THR	2.3
1	D	142	THR	2.3
1	D	266	GLU	2.3
1	D	124	PHE	2.2
1	C	294	ASN	2.2
1	A	272	LEU	2.2
1	C	266	GLU	2.2
1	D	126	VAL	2.2
2	M	6	DG	2.2
1	A	295	ASP	2.2
1	A	265	GLU	2.2
1	D	86	GLU	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	257	ASN	2.2
1	D	232	GLN	2.1
1	D	267	ALA	2.1
1	C	272	LEU	2.1
2	M	5	DA	2.1
1	A	294	ASN	2.1
1	B	259	ILE	2.1
1	C	88	ARG	2.1
1	D	110	LYS	2.1
1	D	270	ALA	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	GOL	C	301	6/6	0.94	0.14	2.65	35,43,45,53	0
5	GOL	A	301	6/6	0.96	0.14	1.87	30,38,40,40	0
5	GOL	A	302	6/6	0.96	0.12	0.53	32,39,43,48	0
6	MN	C	302	1/1	1.00	0.11	0.32	26,26,26,26	0
6	MN	A	304	1/1	1.00	0.11	-0.23	28,28,28,28	0
6	MN	B	301	1/1	1.00	0.12	-0.26	24,24,24,24	0
6	MN	A	303	1/1	1.00	0.15	-0.34	26,26,26,26	0
5	GOL	D	301	6/6	0.95	0.11	-0.48	42,45,48,48	0
6	MN	D	303	1/1	0.99	0.11	-0.78	29,29,29,29	0
6	MN	B	302	1/1	1.00	0.07	-1.02	24,24,24,24	0
6	MN	D	302	1/1	1.00	0.14	-1.02	25,25,25,25	0
6	MN	C	303	1/1	0.99	0.07	-1.08	28,28,28,28	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.