wwPDB X-ray Structure Validation Summary Report (i)

May 21, 2020 – 06:55 pm BST

PDB ID	:	4X6A
Title	:	Crystal structure of yeast RNA polymerase II encountering oxidative Cyclopurine DNA lesions
Authors	:	Wang, L.; Chong, J.; Wang, D.
Deposited on	:	2014-12-07
Resolution	:	3.96 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at *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 (i) symbol.

The following versions of software and data (see references (1)) were used in the production of this report:

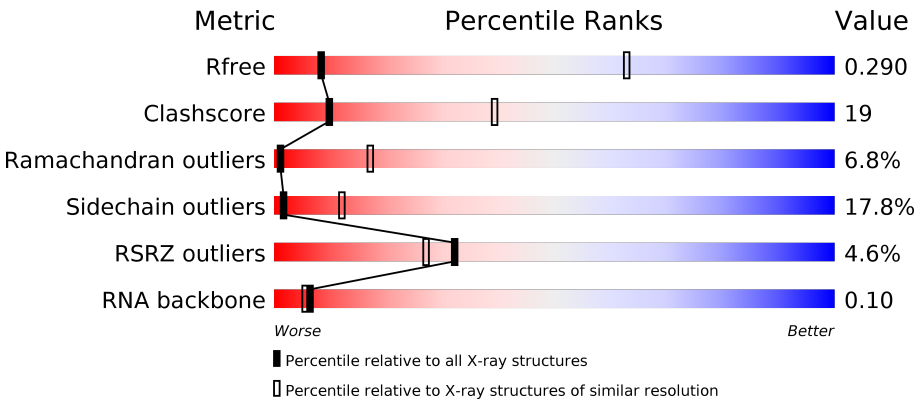
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 3.96 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	1025 (4.22-3.70)
Clashscore	141614	1085 (4.22-3.70)
Ramachandran outliers	138981	1047 (4.22-3.70)
Sidechain outliers	138945	1039 (4.22-3.70)
RSRZ outliers	127900	1013 (4.28-3.64)
RNA backbone	3102	1041 (4.84-3.00)

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 >=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 <=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	1733	5% 44% 27% 8% • 20%
2	B	1224	3% 49% 34% 6% • 10%
3	C	318	2% 45% 30% 8% • 16%
4	E	215	2% 55% 34% 10%

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Mol	Chain	Length	Quality of chain
5	F	155	2% 31% 19% • 46%
6	H	146	9% 47% 32% 10% • 9%
7	I	122	% 57% 30% 9% • •
8	J	70	41% 40% 10% • 7%
9	K	120	3% 55% 36% • • 5%
10	L	70	10% 31% 21% 11% • 34%
11	R	9	22% 56% 22%
12	T	29	3% 17% 21% 62%

2 Entry composition (i)

There are 13 unique types of molecules in this entry. The entry contains 28548 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 DNA-directed RNA polymerase II subunit RPB1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	1395	10969	6917	1923	2068	61	0	0	0

- Molecule 2 is a protein called DNA-directed RNA polymerase II subunit RPB2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	1104	8773	5555	1536	1627	55	0	0	0

- Molecule 3 is a protein called DNA-directed RNA polymerase II subunit RPB3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	266	2095	1317	348	417	13	0	0	0

- Molecule 4 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	E	214	1752	1111	309	321	11	0	0	0

- Molecule 5 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	F	84	679	434	115	127	3	0	0	0

- Molecule 6 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
6	H	133	1068	673	180	211	4	0	0	0

- Molecule 7 is a protein called DNA-directed RNA polymerase II subunit RPB9.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
7	I	119	971	596	179	186	10	0	0	0

- Molecule 8 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
8	J	65	532	339	93	94	6	0	0	0

- Molecule 9 is a protein called DNA-directed RNA polymerase II subunit RPB11.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
9	K	114	919	590	156	171	2	0	0	0

- Molecule 10 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
10	L	46	363	224	72	63	4	0	0	0

- Molecule 11 is a RNA chain called RNA_9 mer.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
11	R	9	195	87	37	62	9	0	0	0

- Molecule 12 is a DNA chain called Template DNA _29 mer.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
12	T	11	224	107	40	66	11	0	0	0

- Molecule 13 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Zn		
13	J	1	1	1	0	0
13	B	1	1	1	0	0

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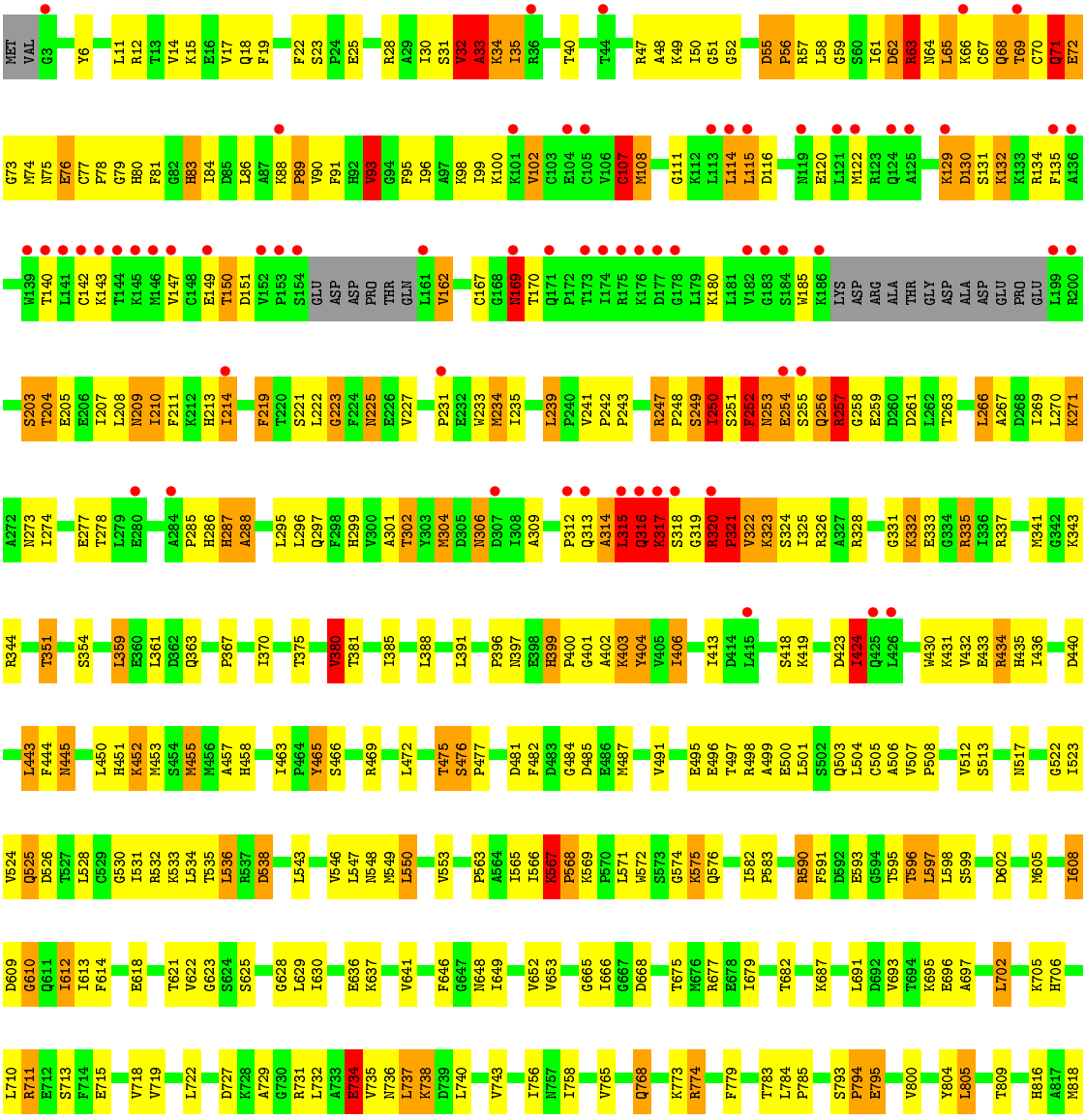
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Zn		
13	I	2	2	2	0	0
13	C	1	Total 1	Zn 1	0	0
13	A	2	Total 2	Zn 2	0	0
13	L	1	Total 1	Zn 1	0	0

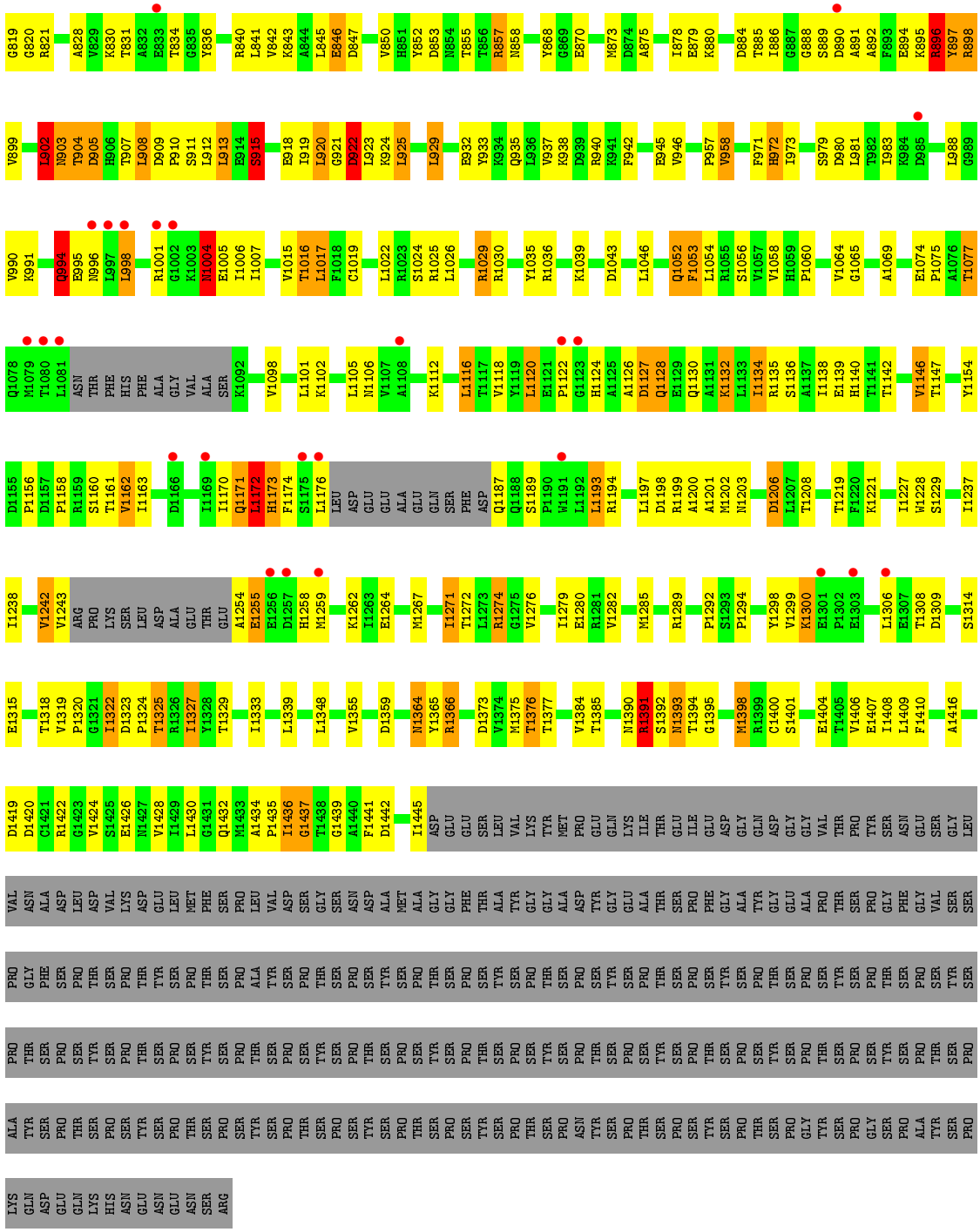
3 Residue-property plots (i)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of 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: DNA-directed RNA polymerase II subunit RPB1

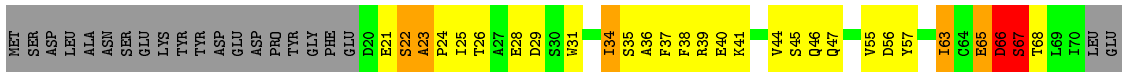
Chain A: 5% 44% 27% 8% • 20%

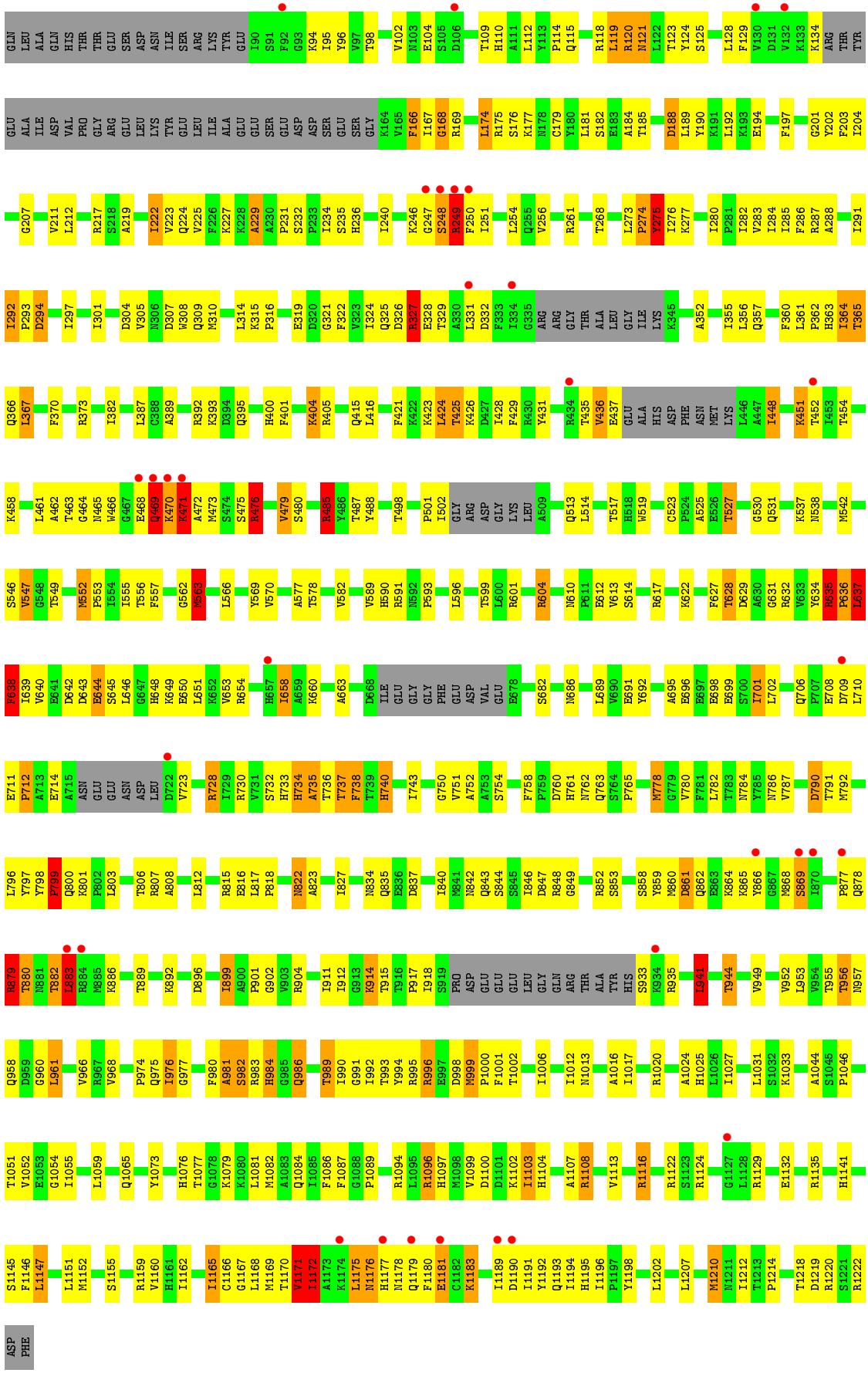




- Molecule 2: DNA-directed RNA polymerase II subunit RPB2

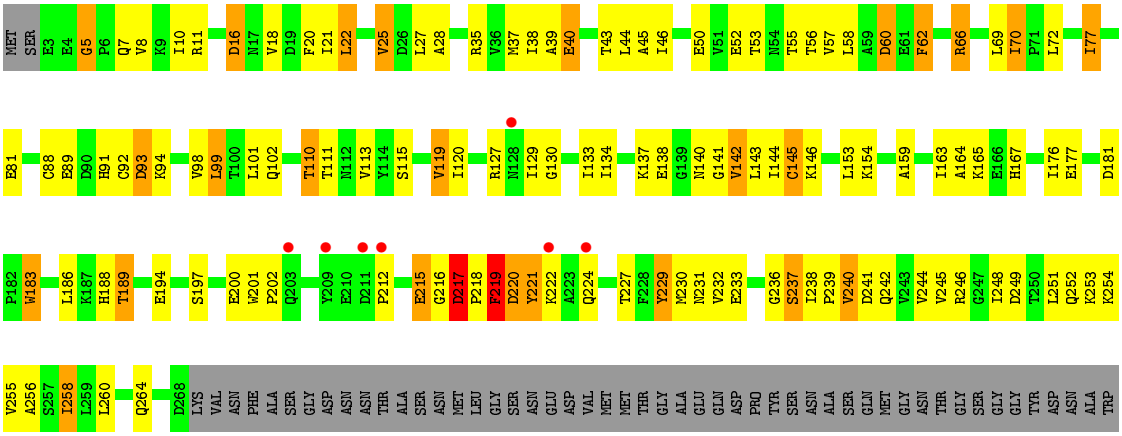
Chain B:




GLN LEU ALA GLN HIS THR THR GLU SER ASP ASN ILE SER ARG LYS TYR GLU I90 S91 F92 G93 K94 I95 Y96 V97 T98 V102 N103 E104 S105 D106 T109 H110 A111 L112 Y113 P114 Q115 R118 L119 R120 N121 L122 T123 Y124 S125 L128 F129 V130 D131 V132 K133 K134 ARG THR TYR
GLU ALA ILE ASP VAL PRO GLY ARG GLU LEU LYS TYR GLU LEU ILE ALA GLU GLU GLU SER GLU ASP ASP SER GLU SER GLY K164 V165 F166 I167 G168 R169 L174 R175 S176 K177 N178 C179 Y180 L181 S182 E183 A184 T185 D188 L189 Y190 K191 L192 K193 E194 F197 G201 Y202 F203 I204
G207 V211 L212 R217 S218 A219 I222 V223 Q224 V225 F226 K227 K228 A229 A230 P231 S232 P233 I234 S235 H236 I240 K246 G247 S248 R249 F250 I251 L254 Q255 V256 R261 T268 L273 P274 Y275 I276 K277 I280 P281 I282 V283 I284 I285 F286 R287 A288 I291
I292 P293 D294 I297 I301 D304 V305 N306 D307 W308 Q309 M310 L314 K315 P316 E319 D320 G321 F322 V323 I324 Q325 D326 R327 E328 T329 A330 L331 D332 F333 I334 G335 ARG ARG GLY THR ALA LEU GLY ILE LYS K345 A352 I355 L356 Q357 F360 L361 P362 H363 I364 T365
Q366 L367 F370 R373 I382 L387 G388 A389 R392 K393 D394 Q395 H400 F401 K404 R405 Q415 L416 F421 K422 K423 L424 T425 K426 D427 I428 F429 R430 Y431 R434 T435 V436 E437 GLU ALA HIS ASP PHE ASN MET LYS L446 A447 I448 K451 T452 I453 T454
K458 L461 A462 T463 G464 N465 W466 G467 E468 Q469 K470 K471 A472 M473 S474 S475 R476 V479 S480 R485 Y486 T487 Y488 T498 P501 I502 GLY ARG ASP GLY LYS LEU A509 Q513 L514 T517 H518 W519 C523 P524 A525 E526 T527 G530 Q531 K537 N538 N542
S546 V547 G548 T549 M552 P553 I554 I555 T556 F557 G562 M563 L566 Y569 V570 A577 T578 V582 V589 H590 R591 N592 P593 L596 T599 L600 R601 R604 N610 P611 E612 V613 S614 R617 K622 F627 T628 D629 A630 G631 R632 V633 Y634 R635 P636 L637
F638 I639 V640 E641 D642 D643 E644 S645 L646 G647 H648 K649 E650 L651 K652 V653 R654 H657 I658 A659 K660 A663 D668 ILE GLU GLY GLY PHE GLU ASP VAL GLU E678 S682 N686 L689 V690 E691 V692 A695 E696 E697 E698 E699 S700 I701 L702 Q706 F707 E708 D709 L710
E711 P712 A713 E714 A715 ASN GLU GLU ASN ASP LEU D722 V723 R728 I729 R730 V731 S732 H733 H734 A735 T736 T737 F738 T739 H740 I743 G750 V751 A752 A753 S754 F758 P759 D760 H761 N762 Q763 S764 P765 M778 G779 V780 F781 L782 T783 N784 Y785 N786 V787 D790 T791 M792
L796 Y797 Y798 P799 Q800 K801 P802 L803 T806 R807 A808 L812 R815 E816 L817 P818 N822 A823 I827 N834 Q835 E836 D837 I840 M841 N842 Q843 S844 S845 I846 D847 R848 G849 R852 S853 S858 Y859 M860 D861 Q862 E863 K864 K865 Y866 G867 M868 S869 I870 P877 Q878
R879 T880 N881 T882 L883 R884 M885 K886 T889 K892 D896 I899 A900 P901 G902 V903 R904 I911 I912 G913 K914 T915 T916 P917 I918 S919 PRO ASP GLU GLU GLU LEU GLY GLN ARG THR ALA TYR HIS S933 K934 R935 I941 T944 V949 V952 L953 V954 T955 T956 N957
Q958 D959 G960 L961 V966 R967 V968 P974 Q975 I976 G977 F980 A981 S982 R983 H984 G985 Q986 T989 I990 G991 I992 T993 Y994 R995 R996 E997 D998 M999 P1000 F1001 T1002 I1006 I1012 N1013 A1016 I1017 R1020 A1024 H1025 L1026 I1027 L1031 S1032 K1033 A1044 S1045 P1046
T1051 V1052 E1053 G1054 I1055 L1059 Q1065 Y1073 H1076 T1077 G1078 K1079 K1080 L1081 M1082 A1083 Q1084 I1085 F1086 F1087 G1088 P1089 R1094 L1095 R1096 H1097 M1098 V1099 D1100 D1101 K1102 I1103 H1104 A1107 R1108 V1113 R1116 R1122 S1123 R1124 G1127 L1128 R1129 E1132 R1135 H1141
S1145 F1146 L1147 L1151 M1152 S1155 R1159 V1160 H1161 I1162 I1165 C1166 G1167 L1168 M1169 T1170 V1171 I1172 A1173 K1174 L1175 N1176 H1177 N1178 Q1179 F1180 E1181 C1182 K1183 I1189 D1190 I1191 Y1192 Q1193 I1194 H1195 I1196 P1197 Y1198 L1202 L1207 M1210 N1211 I1212 T1213 P1214 T1218 D1219 R1220 S1221 R1222
ASP PHE

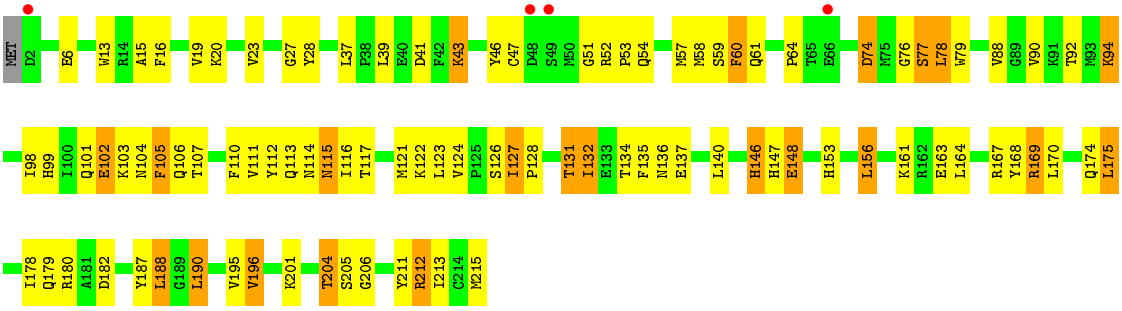
- Molecule 3: DNA-directed RNA polymerase II subunit RPB3

Chain C:



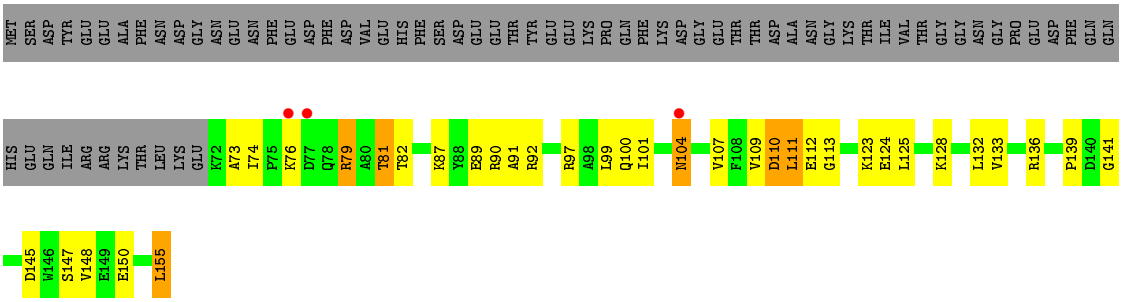
- Molecule 4: DNA-directed RNA polymerases I, II, and III subunit RPABC1

Chain E:



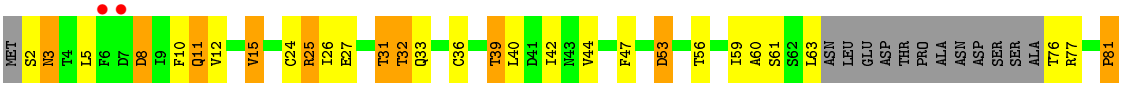
- Molecule 5: DNA-directed RNA polymerases I, II, and III subunit RPABC2

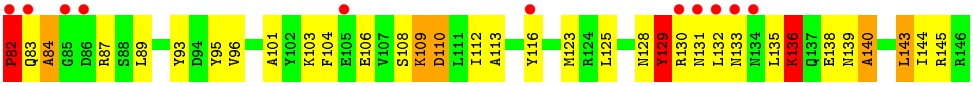
Chain F:



- Molecule 6: DNA-directed RNA polymerases I, II, and III subunit RPABC3

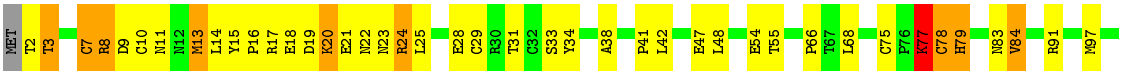
Chain H:





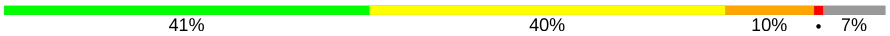
- Molecule 7: DNA-directed RNA polymerase II subunit RPB9

Chain I:



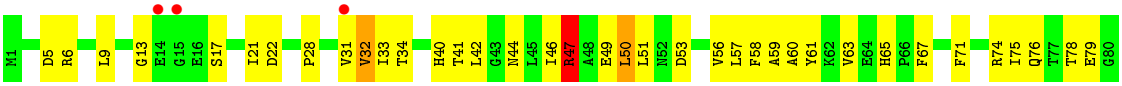
- Molecule 8: DNA-directed RNA polymerases I, II, and III subunit RPABC5

Chain J:



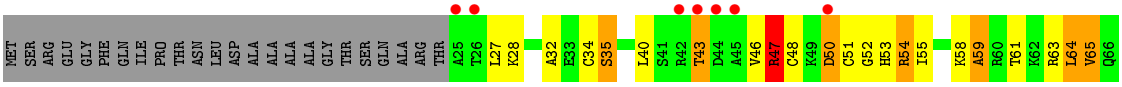
- Molecule 9: DNA-directed RNA polymerase II subunit RPB11

Chain K:



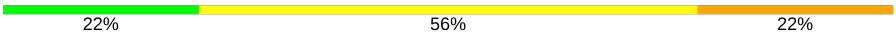
- Molecule 10: DNA-directed RNA polymerases I, II, and III subunit RPABC4

Chain L:



- Molecule 11: RNA_9 mer

Chain R:



- Molecule 12: Template DNA _29 mer

Chain T:

3%
17%
21%
62%

DC
DT
DA
DC
DC
DG
DA
DT
DA
DA
DG
DC
DA
DG
DA
DG
DG
DC
A19
?20
C21
T22
C23
G26
G29

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	156.55Å 220.33Å 191.56Å 90.00° 97.00° 90.00°	Depositor
Resolution (Å)	50.00 – 3.96 47.66 – 3.96	Depositor EDS
% Data completeness (in resolution range)	89.0 (50.00-3.96) 89.0 (47.66-3.96)	Depositor EDS
R_{merge}	0.26	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.48 (at 4.00Å)	Xtriage
Refinement program	REFMAC, PHENIX	Depositor
R, R_{free}	0.249 , 0.296 0.243 , 0.290	Depositor DCC
R_{free} test set	2560 reflections (5.12%)	wwPDB-VP
Wilson B-factor (Å^2)	83.4	Xtriage
Anisotropy	1.330	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 87.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.43$, $< L^2 > = 0.26$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	28548	wwPDB-VP
Average B, all atoms (Å^2)	149.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.74% of the height of the origin peak. No significant pseudotranslation is detected.*

[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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, 02I

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	0.42	0/11163	0.76	4/15091 (0.0%)
2	B	0.42	0/8943	0.74	5/12059 (0.0%)
3	C	0.40	0/2133	0.70	0/2891
4	E	0.40	0/1788	0.71	0/2406
5	F	0.41	0/691	0.71	0/933
6	H	0.43	0/1086	0.79	0/1470
7	I	0.44	0/989	0.75	1/1331 (0.1%)
8	J	0.42	0/541	0.75	0/727
9	K	0.40	0/937	0.71	1/1265 (0.1%)
10	L	0.48	0/365	0.93	0/485
11	R	0.31	0/218	0.60	0/338
12	T	0.32	0/225	0.56	0/342
All	All	0.42	0/29079	0.74	11/39338 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	13
2	B	0	6
4	E	0	1
6	H	0	5
7	I	0	1
10	L	0	1
All	All	0	27

There are no bond length outliers.

The worst 5 of 11 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	637	LEU	CA-CB-CG	9.57	137.31	115.30
7	I	77	LYS	CB-CA-C	-7.66	95.08	110.40
2	B	485	ARG	NE-CZ-NH1	6.82	123.71	120.30
9	K	47	ARG	NE-CZ-NH1	6.45	123.53	120.30
1	A	315	LEU	CA-CB-CG	6.06	129.24	115.30

There are no chirality outliers.

5 of 27 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	107	CYS	Peptide
1	A	169	ASN	Peptide
1	A	203	SER	Peptide
1	A	209	ASN	Peptide
1	A	33	ALA	Peptide

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	10969	0	11069	432	0
2	B	8773	0	8811	387	0
3	C	2095	0	2051	104	0
4	E	1752	0	1776	64	0
5	F	679	0	701	20	0
6	H	1068	0	1040	46	0
7	I	971	0	927	43	0
8	J	532	0	542	35	0
9	K	919	0	929	44	0
10	L	363	0	387	20	0
11	R	195	0	98	6	0
12	T	224	0	123	15	0
13	A	2	0	0	0	0
13	B	1	0	0	0	0
13	C	1	0	0	0	0
13	I	2	0	0	0	0
13	J	1	0	0	0	0
13	L	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	28548	0	28454	1095	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 19.

The worst 5 of 1095 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)
3:C:38:ILE:HD11	3:C:176:ILE:CD1	1.39	1.51
3:C:38:ILE:CD1	3:C:176:ILE:HD11	1.72	1.19
7:I:7:CYS:HB3	7:I:14:LEU:HD21	1.23	1.14
3:C:38:ILE:CD1	3:C:176:ILE:CD1	2.27	1.10
1:A:567:LYS:HB2	1:A:568:PRO:HD2	1.37	1.07

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	1383/1733 (80%)	1057 (76%)	217 (16%)	109 (8%)	1 14
2	B	1086/1224 (89%)	858 (79%)	162 (15%)	66 (6%)	1 18
3	C	264/318 (83%)	206 (78%)	45 (17%)	13 (5%)	2 22
4	E	212/215 (99%)	174 (82%)	29 (14%)	9 (4%)	3 25
5	F	82/155 (53%)	62 (76%)	15 (18%)	5 (6%)	1 18
6	H	129/146 (88%)	97 (75%)	23 (18%)	9 (7%)	1 16
7	I	117/122 (96%)	85 (73%)	20 (17%)	12 (10%)	0 9
8	J	63/70 (90%)	48 (76%)	11 (18%)	4 (6%)	1 18
9	K	112/120 (93%)	95 (85%)	14 (12%)	3 (3%)	5 34

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
10	L	44/70 (63%)	26 (59%)	10 (23%)	8 (18%)	0 2
All	All	3492/4173 (84%)	2708 (78%)	546 (16%)	238 (7%)	1 17

5 of 238 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	32	VAL
1	A	55	ASP
1	A	62	ASP
1	A	63	ARG
1	A	68	GLN

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	1218/1520 (80%)	984 (81%)	234 (19%)	1 9
2	B	958/1061 (90%)	802 (84%)	156 (16%)	2 15
3	C	234/274 (85%)	194 (83%)	40 (17%)	2 13
4	E	196/197 (100%)	162 (83%)	34 (17%)	2 13
5	F	74/137 (54%)	61 (82%)	13 (18%)	2 12
6	H	117/128 (91%)	98 (84%)	19 (16%)	2 15
7	I	113/116 (97%)	95 (84%)	18 (16%)	2 16
8	J	60/65 (92%)	44 (73%)	16 (27%)	0 3
9	K	99/102 (97%)	86 (87%)	13 (13%)	4 22
10	L	40/57 (70%)	31 (78%)	9 (22%)	1 6
All	All	3109/3657 (85%)	2557 (82%)	552 (18%)	2 12

5 of 552 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	134	LYS

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Mol	Chain	Res	Type
2	B	622	LYS
7	I	107	SER
2	B	217	ARG
2	B	415	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 54 such sidechains are listed below:

Mol	Chain	Res	Type
2	B	325	GLN
2	B	686	ASN
7	I	11	ASN
2	B	465	ASN
2	B	516	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
11	R	8/9 (88%)	4 (50%)	0

All (4) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
11	R	2	U
11	R	3	C
11	R	4	G
11	R	9	U

There are no RNA pucker outliers to report.

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

1 non-standard protein/DNA/RNA residue is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
12	02I	T	20	12	16,24,25	3.37	7 (43%)	15,37,40	4.12	6 (40%)

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
12	02I	T	20	12	-	0/0/28/29	0/3/4/4

The worst 5 of 7 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	T	20	02I	O4'-C1'	-7.64	1.25	1.42
12	T	20	02I	O4'-C4'	-7.32	1.33	1.44
12	T	20	02I	C2-N3	3.94	1.38	1.32
12	T	20	02I	C4'-C5'	-3.73	1.45	1.52
12	T	20	02I	O3'-C3'	-3.72	1.35	1.43

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
12	T	20	02I	C5-C6-N6	11.29	137.50	120.35
12	T	20	02I	N6-C6-N1	-7.77	102.44	118.57
12	T	20	02I	N3-C2-N1	-5.50	120.08	128.68
12	T	20	02I	O4'-C1'-C2'	-4.43	97.89	106.25
12	T	20	02I	C2'-C1'-N9	-2.49	105.65	109.56

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	T	20	02I	5	0

5.5 Carbohydrates (i)

There are no carbohydrates in this entry.

5.6 Ligand geometry (i)

Of 8 ligands modelled in this entry, 8 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	1395/1733 (80%)	0.18	90 (6%)	18	15	84, 144, 236, 306	0
2	B	1104/1224 (90%)	0.03	33 (2%)	50	39	76, 131, 209, 281	0
3	C	266/318 (83%)	-0.04	7 (2%)	56	46	89, 133, 192, 229	0
4	E	214/215 (99%)	-0.15	4 (1%)	66	58	99, 166, 231, 267	0
5	F	84/155 (54%)	-0.10	3 (3%)	42	34	102, 142, 185, 209	0
6	H	133/146 (91%)	0.60	13 (9%)	7	7	119, 168, 238, 262	0
7	I	119/122 (97%)	-0.07	1 (0%)	86	79	96, 151, 190, 216	0
8	J	65/70 (92%)	-0.06	0	100	100	98, 128, 168, 192	0
9	K	114/120 (95%)	0.12	3 (2%)	56	46	94, 137, 177, 200	0
10	L	46/70 (65%)	0.36	7 (15%)	2	2	119, 180, 250, 264	0
11	R	9/9 (100%)	-0.30	0	100	100	102, 124, 217, 261	0
12	T	10/29 (34%)	-0.27	1 (10%)	7	7	108, 136, 243, 256	0
All	All	3559/4211 (84%)	0.09	162 (4%)	32	27	76, 141, 224, 306	0

The worst 5 of 162 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	144	THR	7.9
1	A	316	GLN	7.5
1	A	121	LEU	6.5
6	H	83	GLN	5.8
1	A	173	THR	5.5

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

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

median, 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	B-factors(Å^2)	Q<0.9
12	02I	T	20	21/22	0.75	0.30	204,227,305,321	0

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. 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	B-factors(Å^2)	Q<0.9
13	ZN	A	1801	1/1	0.60	0.08	244,244,244,244	0
13	ZN	L	101	1/1	0.96	0.05	175,175,175,175	0
13	ZN	I	202	1/1	0.97	0.08	128,128,128,128	0
13	ZN	I	201	1/1	0.97	0.08	161,161,161,161	0
13	ZN	J	101	1/1	0.98	0.20	124,124,124,124	0
13	ZN	B	1301	1/1	0.98	0.06	202,202,202,202	0
13	ZN	C	401	1/1	0.99	0.08	135,135,135,135	0
13	ZN	A	1802	1/1	0.99	0.05	170,170,170,170	0

6.5 Other polymers (i)

There are no such residues in this entry.