



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 6, 2026 – 04:31 PM UTC

PDB ID : 3PO3 / pdb_00003po3
Title : Arrested RNA Polymerase II reactivation intermediate
Authors : Cheung, A.C.M.; Cramer, P.
Deposited on : 2010-11-21
Resolution : 3.30 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 ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

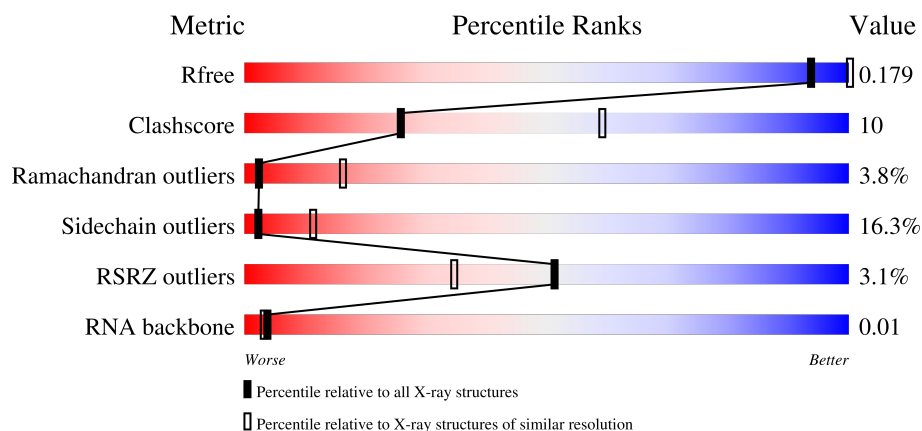
1 Overall quality at a glance

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.



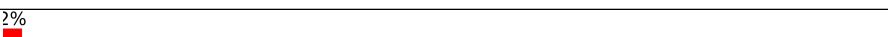
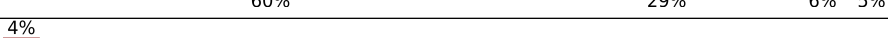
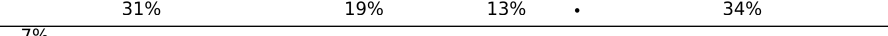
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	1169 (3.32-3.28)
Clashscore	190562	1209 (3.32-3.28)
Ramachandran outliers	187476	1188 (3.32-3.28)
Sidechain outliers	187428	1187 (3.32-3.28)
RSRZ outliers	180081	1169 (3.32-3.28)
RNA backbone	3983	1048 (3.60-3.00)

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 of 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 $\leq 5\%$. 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	1733	52% 22% 7% • 18%
2	B	1224	4% 61% 24% 5% • 9%
3	C	318	49% 28% 6% • 16%
4	D	221	5% 48% 24% 8% • 20%

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Mol	Chain	Length	Quality of chain
5	E	215	
6	F	155	
7	G	171	
8	H	146	
9	I	122	
10	J	70	
11	K	120	
12	L	70	
13	N	14	
14	P	5	
15	S	178	
16	T	27	

2 Entry composition [i](#)

There are 21 unique types of molecules in this entry. The entry contains 33008 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
1	A	1426	Total	C	N	O	S	0	0	0
			11214	7069	1959	2124	62			

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	1108	Total	C	N	O	S	0	0	0
			8810	5580	1541	1634	55			

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

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

- Molecule 4 is a protein called DNA-directed RNA polymerase II subunit RPB4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	177	Total	C	N	O	S	0	0	0
			1417	876	252	287	2			

- Molecule 5 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC1.

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

- Molecule 6 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC2.

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

- Molecule 7 is a protein called DNA-directed RNA polymerase II subunit RPB7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
7	G	171	Total	C	N	O	S	0	0	0
			1340	861	222	249	8			

- Molecule 8 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC3.

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

- Molecule 9 is a protein called DNA-directed RNA polymerase II subunit RPB9.

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

- Molecule 10 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC5.

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

- Molecule 11 is a protein called DNA-directed RNA polymerase II subunit RPB11.

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

- Molecule 12 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
12	L	46	Total	C	N	O	S	0	0	0
			364	224	72	64	4			

- Molecule 13 is a DNA chain called DNA non-template strand.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
13	N	7	Total	C	N	O	P	0	0	0
			144	69	30	39	6			

- Molecule 14 is a RNA chain called RNA product strand.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
14	P	5	Total	C	N	O	P	0	0	0
			100	45	15	35	5			

- Molecule 15 is a protein called Transcription elongation factor S-II.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
15	S	164	Total	C	N	O	S	0	0	0
			1294	809	230	247	8			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
S	290	ALA	ASP	engineered mutation	UNP P07273
S	291	ALA	GLU	engineered mutation	UNP P07273

- Molecule 16 is a DNA chain called DNA template strand.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
16	T	13	Total	Br	C	N	O	P	0	0	0
			266	1	126	44	82	13			

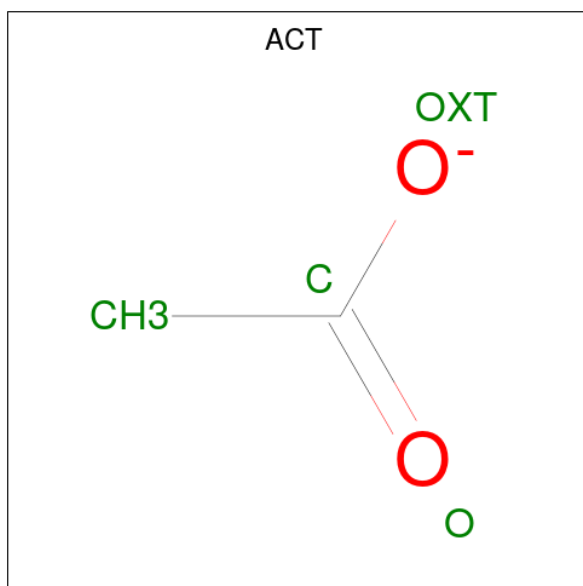
- Molecule 17 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
17	A	2	Total	Zn	0	0
			2	2		
17	B	1	Total	Zn	0	0
			1	1		
17	C	1	Total	Zn	0	0
			1	1		
17	I	2	Total	Zn	0	0
			2	2		
17	J	1	Total	Zn	0	0
			1	1		
17	L	1	Total	Zn	0	0
			1	1		
17	S	1	Total	Zn	0	0
			1	1		

- Molecule 18 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

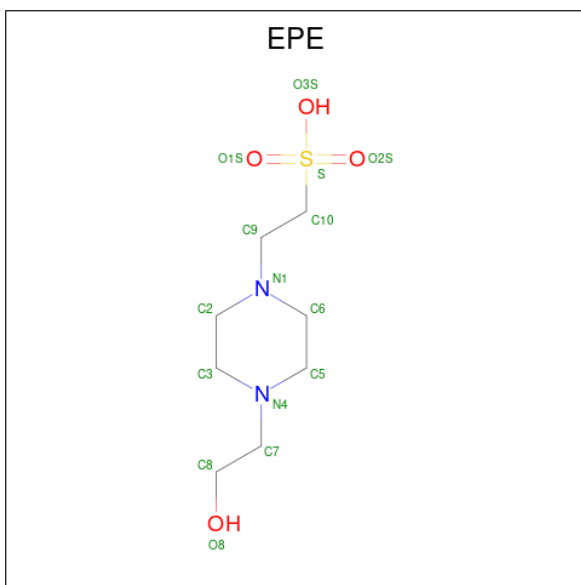
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
18	A	1	Total	Mg	0	0
			1	1		

- Molecule 19 is ACETATE ION (CCD ID: ACT) (formula: $C_2H_3O_2$).



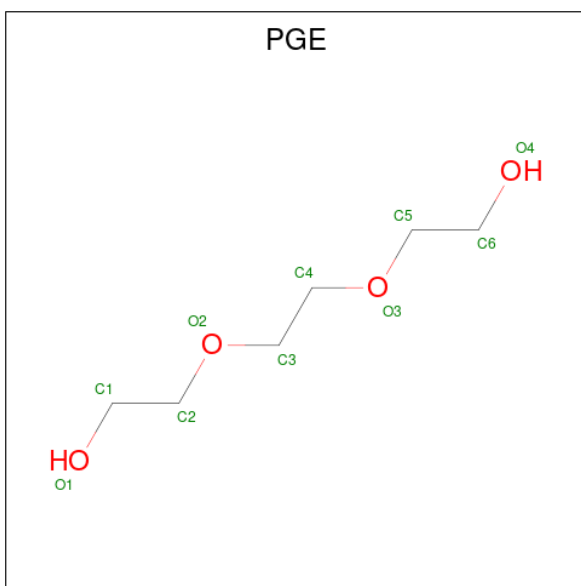
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
19	A	1	Total	C	O	0	0
			4	2	2		
19	B	1	Total	C	O	0	0
			4	2	2		

- Molecule 20 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (CCD ID: EPE) (formula: $C_8H_{18}N_2O_4S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
20	A	1	Total	C	N	O	S	0	0
			15	8	2	4	1		

- Molecule 21 is TRIETHYLENE GLYCOL (CCD ID: PGE) (formula: $C_6H_{14}O_4$).

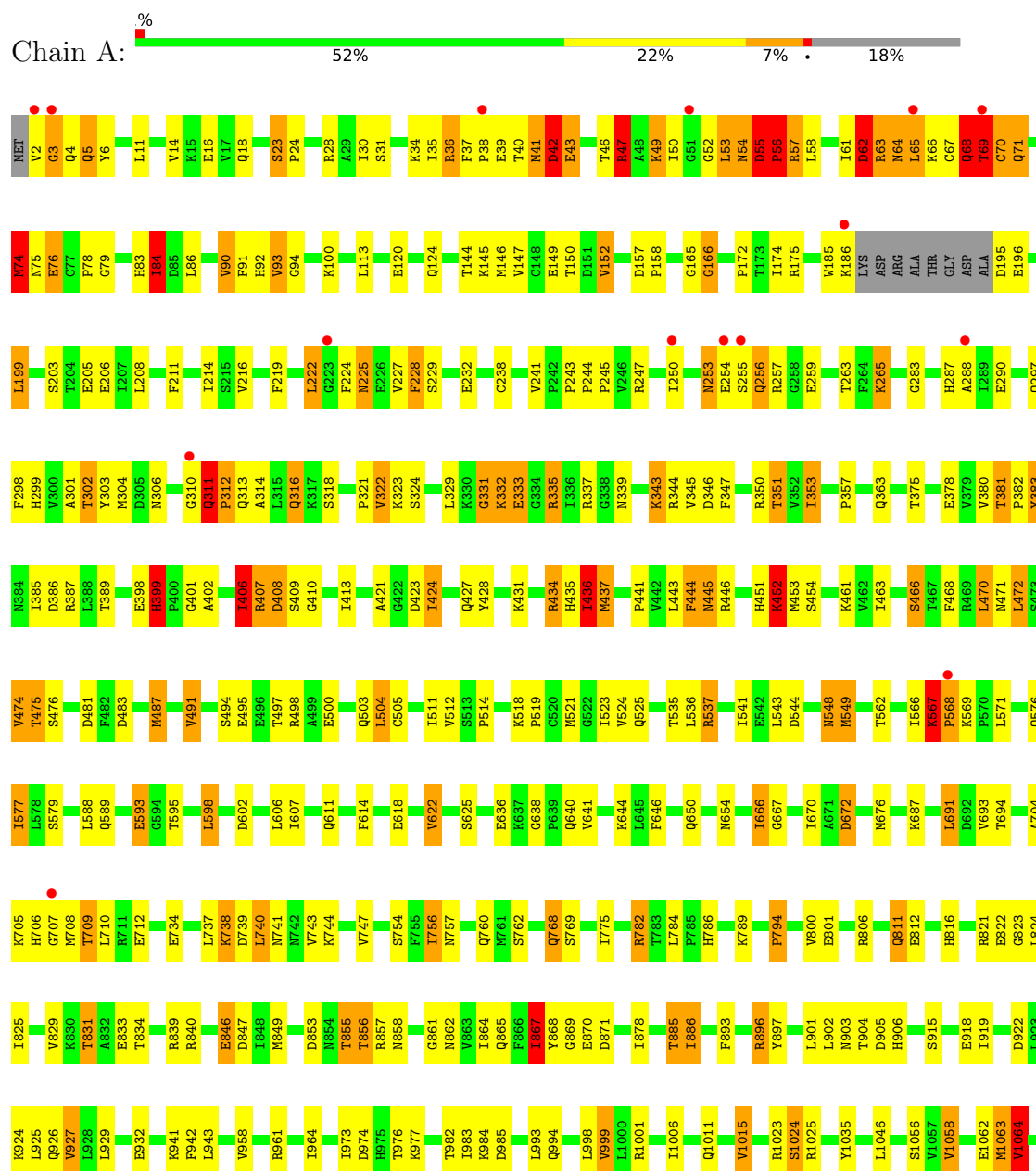


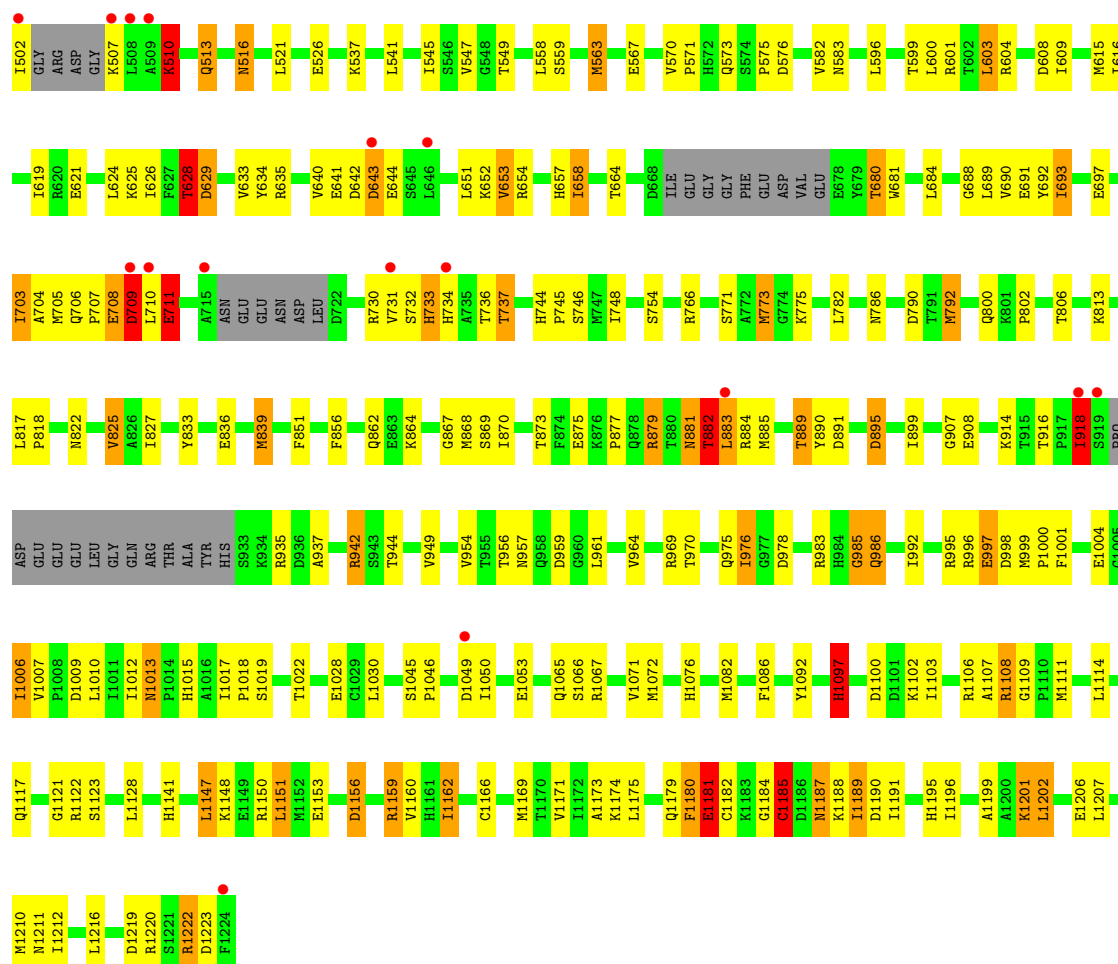
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
21	L	1	Total	C	O	0	0
			10	6	4		

3 Residue-property plots

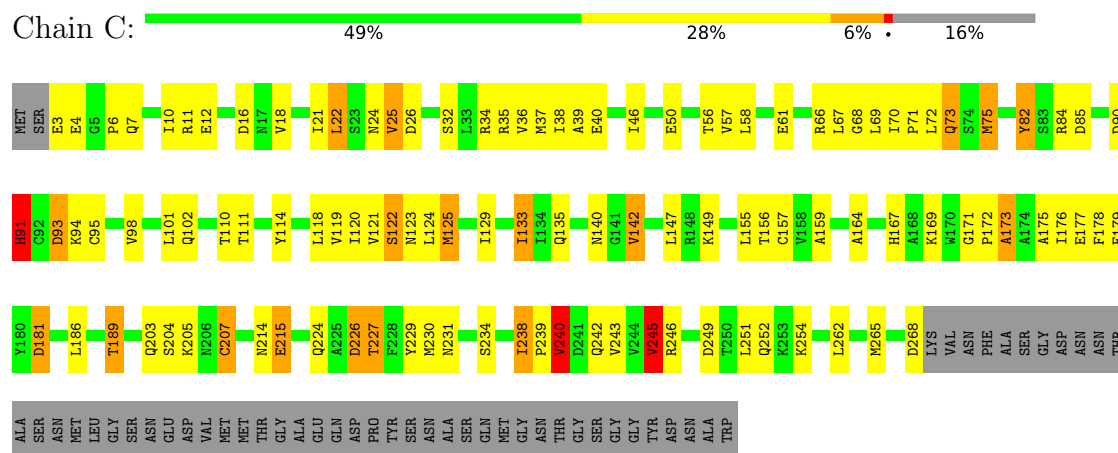
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: DNA-directed RNA polymerase II subunit RPB1





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



• Molecule 4: DNA-directed RNA polymerase II subunit RPB4



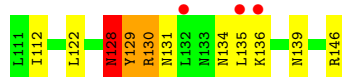
- Molecule 5: DNA-directed RNA polymerases I, II, and III subunit RPABC1

- Molecule 6: DNA-directed RNA polymerases I, II, and III subunit RPABC2

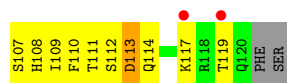
- Molecule 7: DNA-directed RNA polymerase II subunit RPB7

- Molecule 8: DNA-directed RNA polymerases I, II, and III subunit RPABC3

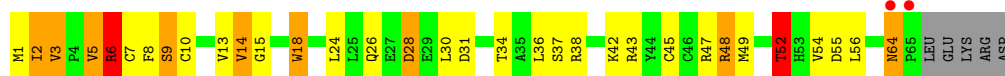




- Molecule 9: DNA-directed RNA polymerase II subunit RPB9



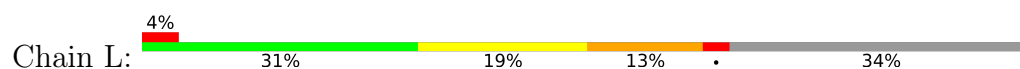
- Molecule 10: DNA-directed RNA polymerases I, II, and III subunit RPABC5



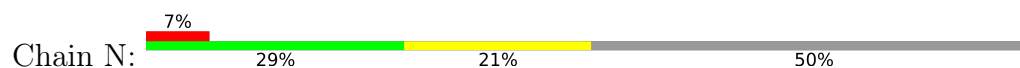
- Molecule 11: DNA-directed RNA polymerase II subunit RPB11



- Molecule 12: DNA-directed RNA polymerases I, II, and III subunit RPABC4



- Molecule 13: DNA non-template strand

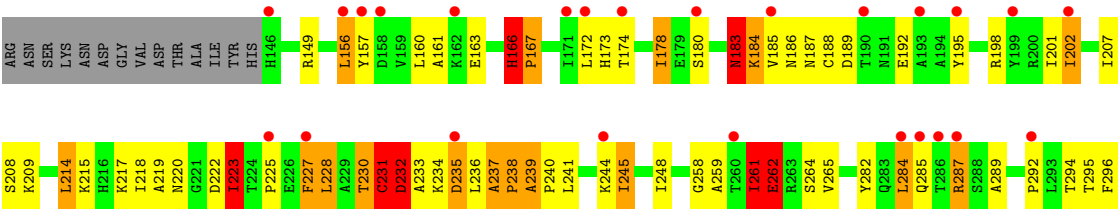


- Molecule 14: RNA product strand





● Molecule 15: Transcription elongation factor S-II



● Molecule 16: DNA template strand



4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	220.02Å 395.07Å 280.43Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.97 – 3.30 49.97 – 3.30	Depositor EDS
% Data completeness (in resolution range)	(Not available) (49.97-3.30) 99.6 (49.97-3.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.00 (at 3.33Å)	Xtriage
Refinement program	BUSTER 2.9.2	Depositor
R, R_{free}	0.161 , 0.189 0.181 , 0.179	Depositor DCC
R_{free} test set	3598 reflections (1.97%)	wwPDB-VP
Wilson B-factor (Å ²)	111.5	Xtriage
Anisotropy	0.234	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 131.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	0.018 for 1/2*h-1/2*k,-3/2*h-1/2*k,-l 0.026 for 1/2*h+1/2*k,3/2*h-1/2*k,-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	33008	wwPDB-VP
Average B, all atoms (Å ²)	127.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.93% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: ACT, MG, ZN, EPE, BRU, PGE

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	0.92	12/11417 (0.1%)	1.55	139/15442 (0.9%)
2	B	0.87	3/8981 (0.0%)	1.46	87/12108 (0.7%)
3	C	0.87	0/2133	1.42	16/2891 (0.6%)
4	D	0.88	0/1427	1.64	30/1914 (1.6%)
5	E	0.76	0/1788	1.44	9/2406 (0.4%)
6	F	0.90	0/691	1.32	1/933 (0.1%)
7	G	0.93	2/1368 (0.1%)	1.39	6/1844 (0.3%)
8	H	0.79	0/1086	1.35	8/1470 (0.5%)
9	I	0.82	0/989	1.42	12/1331 (0.9%)
10	J	0.89	0/541	1.65	12/727 (1.7%)
11	K	0.85	1/937 (0.1%)	1.35	6/1265 (0.5%)
12	L	0.91	0/366	1.62	8/485 (1.6%)
13	N	0.38	0/162	1.13	0/249
14	P	1.05	0/109	1.78	3/166 (1.8%)
15	S	0.89	0/1317	1.58	15/1778 (0.8%)
16	T	0.46	0/274	1.12	0/421
All	All	0.88	18/33586 (0.1%)	1.49	352/45430 (0.8%)

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	1

The worst 5 of 18 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	867	ILE	CG1-CD1	10.18	1.91	1.51
1	A	56	PRO	C-N	9.19	1.46	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	55	ASP	CA-C	-8.54	1.42	1.52
7	G	1	MET	C-N	8.23	1.45	1.33
1	A	69	THR	C-N	7.86	1.44	1.33

The worst 5 of 352 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
10	J	5	VAL	N-CA-C	-11.52	94.90	109.30
14	P	8	C	P-O3'-C3'	10.64	136.16	120.20
4	D	26	THR	N-CA-C	-10.54	96.62	112.54
1	A	56	PRO	CA-C-N	10.46	140.53	121.70
1	A	56	PRO	C-N-CA	10.46	140.53	121.70

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	55	ASP	Mainchain

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	11214	0	11281	268	0
2	B	8810	0	8847	145	0
3	C	2095	0	2051	60	0
4	D	1417	0	1429	26	0
5	E	1752	0	1776	32	0
6	F	679	0	701	17	0
7	G	1340	0	1357	40	0
8	H	1068	0	1040	19	0
9	I	971	0	927	17	0
10	J	532	0	542	20	0
11	K	919	0	929	24	0
12	L	364	0	386	9	0
13	N	144	0	80	2	0
14	P	100	0	56	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
15	S	1294	0	1295	37	0
16	T	266	0	146	0	0
17	A	2	0	0	0	0
17	B	1	0	0	0	0
17	C	1	0	0	0	0
17	I	2	0	0	0	0
17	J	1	0	0	0	0
17	L	1	0	0	0	0
17	S	1	0	0	0	0
18	A	1	0	0	0	0
19	A	4	0	3	1	0
19	B	4	0	3	1	0
20	A	15	0	17	2	0
21	L	10	0	14	0	0
All	All	33008	0	32880	628	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 10.

The worst 5 of 628 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:867:ILE:CG1	1:A:867:ILE:CD1	1.91	1.49
6:F:93:ILE:HD11	6:F:134:ILE:HD11	1.41	1.02
1:A:855:THR:HG21	1:A:857:ARG:HE	1.26	0.98
1:A:869:GLY:O	5:E:204:THR:HG21	1.69	0.93
7:G:1:MET:SD	7:G:2:PHE:N	2.44	0.90

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	1418/1733 (82%)	1255 (88%)	105 (7%)	58 (4%)	2	15
2	B	1090/1224 (89%)	963 (88%)	92 (8%)	35 (3%)	3	19
3	C	264/318 (83%)	238 (90%)	17 (6%)	9 (3%)	3	18
4	D	173/221 (78%)	153 (88%)	14 (8%)	6 (4%)	3	18
5	E	212/215 (99%)	202 (95%)	8 (4%)	2 (1%)	14	43
6	F	82/155 (53%)	77 (94%)	4 (5%)	1 (1%)	10	37
7	G	169/171 (99%)	154 (91%)	12 (7%)	3 (2%)	6	29
8	H	129/146 (88%)	101 (78%)	18 (14%)	10 (8%)	1	5
9	I	117/122 (96%)	98 (84%)	16 (14%)	3 (3%)	4	23
10	J	63/70 (90%)	54 (86%)	6 (10%)	3 (5%)	2	12
11	K	112/120 (93%)	107 (96%)	5 (4%)	0	100	100
12	L	44/70 (63%)	27 (61%)	8 (18%)	9 (20%)	0	0
15	S	162/178 (91%)	129 (80%)	20 (12%)	13 (8%)	1	5
All	All	4035/4743 (85%)	3558 (88%)	325 (8%)	152 (4%)	2	16

5 of 152 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	4	GLN
1	A	42	ASP
1	A	65	LEU
1	A	66	LYS
1	A	68	GLN

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	1246/1520 (82%)	1045 (84%)	201 (16%)	2	12
2	B	962/1061 (91%)	814 (85%)	148 (15%)	2	12
3	C	234/274 (85%)	193 (82%)	41 (18%)	2	9

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	D	157/200 (78%)	120 (76%)	37 (24%)	1	4
5	E	196/197 (100%)	176 (90%)	20 (10%)	7	26
6	F	74/137 (54%)	67 (90%)	7 (10%)	8	29
7	G	152/152 (100%)	122 (80%)	30 (20%)	1	6
8	H	117/128 (91%)	103 (88%)	14 (12%)	5	20
9	I	113/116 (97%)	89 (79%)	24 (21%)	1	5
10	J	60/65 (92%)	49 (82%)	11 (18%)	2	7
11	K	99/102 (97%)	83 (84%)	16 (16%)	2	11
12	L	40/57 (70%)	29 (72%)	11 (28%)	0	2
15	S	141/153 (92%)	117 (83%)	24 (17%)	2	10
All	All	3591/4162 (86%)	3007 (84%)	584 (16%)	2	11

5 of 584 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
7	G	61	ILE
15	S	228	LEU
7	G	143	ILE
7	G	49	LEU
9	I	117	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 125 such sidechains are listed below:

Mol	Chain	Res	Type
2	B	383	ASN
7	G	122	ASN
2	B	975	GLN
7	G	96	GLN
15	S	173	HIS

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
14	P	5/5 (100%)	3 (60%)	2 (40%)

All (3) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
14	P	8	C
14	P	9	C
14	P	10	C

All (2) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
14	P	7	C
14	P	8	C

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	$\# Z > 2$
16	BRU	T	22	14,16	18,21,22	0.70	0	25,30,33	2.18	9 (36%)

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
16	BRU	T	22	14,16	-	2/7/21/22	0/2/2/2

There are no bond length outliers.

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
16	T	22	BRU	C5-C4-N3	4.86	118.93	113.34
16	T	22	BRU	N3-C2-N1	4.69	120.99	114.89
16	T	22	BRU	C4-N3-C2	-4.63	121.27	127.34
16	T	22	BRU	O4-C4-C5	-3.46	121.39	125.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
16	T	22	BRU	O4'-C1'-N1	3.18	113.51	107.86

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
16	T	22	BRU	O4'-C4'-C5'-O5'
16	T	22	BRU	C3'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 14 ligands modelled in this entry, 10 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	$\# Z > 2$
21	PGE	L	71	-	9,9,9	0.48	0	8,8,8	0.32	0
20	EPE	A	1735	-	15,15,15	0.59	0	19,20,20	2.04	6 (31%)
19	ACT	A	1734	-	3,3,3	0.74	0	3,3,3	1.20	0
19	ACT	B	1225	-	3,3,3	0.94	0	3,3,3	1.79	1 (33%)

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
21	PGE	L	71	-	-	3/7/7/7	-
20	EPE	A	1735	-	-	3/9/19/19	0/1/1/1

There are no bond length outliers.

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
20	A	1735	EPE	C5-N4-C3	4.97	119.54	108.84
20	A	1735	EPE	C7-N4-C3	3.53	120.64	111.24
20	A	1735	EPE	C7-N4-C5	3.17	119.68	111.24
20	A	1735	EPE	C9-N1-C2	-2.72	103.99	111.24
19	B	1225	ACT	OXT-C-CH3	2.35	124.90	115.05

There are no chirality outliers.

5 of 6 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
21	L	71	PGE	O2-C3-C4-O3
21	L	71	PGE	O3-C5-C6-O4
21	L	71	PGE	O1-C1-C2-O2
20	A	1735	EPE	C10-C9-N1-C2
20	A	1735	EPE	C10-C9-N1-C6

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
20	A	1735	EPE	2	0
19	A	1734	ACT	1	0
19	B	1225	ACT	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	1426/1733 (82%)	-0.25	21 (1%) 72 53	67, 109, 163, 215	0
2	B	1108/1224 (90%)	-0.04	44 (3%) 42 28	69, 126, 191, 217	0
3	C	266/318 (83%)	-0.40	0 100 100	86, 116, 160, 193	0
4	D	177/221 (80%)	-0.02	11 (6%) 26 18	81, 118, 183, 202	0
5	E	214/215 (99%)	-0.30	1 (0%) 87 76	88, 141, 188, 203	0
6	F	84/155 (54%)	-0.56	2 (2%) 59 40	70, 90, 122, 136	0
7	G	171/171 (100%)	-0.30	1 (0%) 85 73	82, 105, 148, 171	0
8	H	133/146 (91%)	0.15	6 (4%) 38 25	121, 158, 197, 205	0
9	I	119/122 (97%)	0.02	5 (4%) 40 26	123, 156, 197, 216	0
10	J	65/70 (92%)	-0.36	2 (3%) 51 35	95, 117, 159, 177	0
11	K	114/120 (95%)	-0.42	2 (1%) 67 49	85, 112, 157, 173	0
12	L	46/70 (65%)	0.43	3 (6%) 25 17	93, 158, 183, 202	0
13	N	7/14 (50%)	0.83	1 (14%) 6 5	217, 222, 231, 234	0
14	P	5/5 (100%)	1.36	1 (20%) 3 2	238, 239, 244, 247	0
15	S	164/178 (92%)	0.83	26 (15%) 5 4	116, 181, 240, 254	0
16	T	12/27 (44%)	0.25	0 100 100	162, 195, 247, 252	0
All	All	4111/4789 (85%)	-0.13	126 (3%) 51 35	67, 119, 191, 254	0

The worst 5 of 126 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	69	THR	8.0
2	B	509	ALA	7.0
2	B	70	ILE	6.8
12	L	27	LEU	6.8
2	B	335	GLY	6.1

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
16	BRU	T	22	20/21	0.71	0.16	138,213,293,294	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides 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
21	PGE	L	71	10/10	0.87	0.22	116,149,279,292	0
19	ACT	B	1225	4/4	0.95	0.16	46,51,87,298	0
19	ACT	A	1734	4/4	0.97	0.11	72,95,126,151	0
20	EPE	A	1735	15/15	0.98	0.08	25,77,245,245	0
17	ZN	L	1071	1/1	0.99	0.02	158,158,158,158	0
17	ZN	S	999	1/1	0.99	0.02	215,215,215,215	0
17	ZN	I	1122	1/1	0.99	0.03	186,186,186,186	0
17	ZN	A	2457	1/1	1.00	0.03	87,87,87,87	0
17	ZN	B	2225	1/1	1.00	0.03	94,94,94,94	0
18	MG	A	2458	1/1	1.00	0.02	83,83,83,83	0
17	ZN	C	1269	1/1	1.00	0.01	94,94,94,94	0
17	ZN	I	1121	1/1	1.00	0.01	130,130,130,130	0
17	ZN	A	2456	1/1	1.00	0.02	145,145,145,145	0
17	ZN	J	1066	1/1	1.00	0.02	103,103,103,103	0

6.5 Other polymers [i](#)

There are no such residues in this entry.