wwPDB EM Validation Summary Report (i)

Nov 6, 2024 – 04:16 am GMT

PDB ID	:	9FD2
EMDB ID	:	EMD-50325
Title	:	Structure of Pol II-TC-NER-STK19 complex
Authors	:	Lee, S.-H.; Sixma, T.K.
Deposited on	:	2024-05-16
Resolution	:	3.40 Å(reported)

1   Overall quality at a glance   ⓘ

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.40 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.
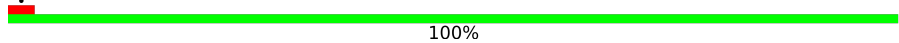
Metric	Percentile Ranks	Value
Ramachandran outliers		0
Sidechain outliers		2.3%
RNA backbone		0.69

Worse   *Better*

▮ Percentile relative to all structures

▯ Percentile relative to all EM structures
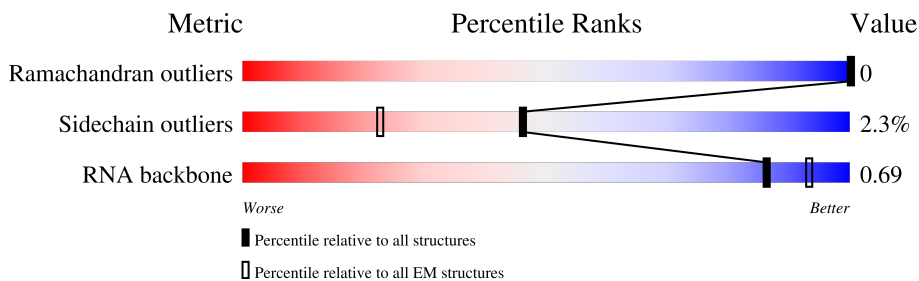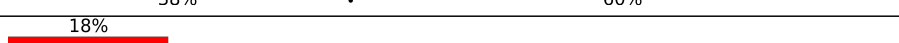
Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	1970	5% — 70% · 28%
2	B	1300	6% — 85% · 13%
3	C	275	· — 93% · 5%
4	D	142	80% — 89% · 10%
5	E	210	· — 97% ·
6	F	127	5% — 64% · 35%
7	G	172	62% — 99% ··
8	H	150	· — 96% ··

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Mol	Chain	Length	Quality of chain
9	I	125	16% · 90% · 6%
10	J	67	· 100%
11	K	117	· 97% · ·
12	L	58	9% · 76% · 21%
13	f	85	11% · 72% · 25%
14	N	60	8% · 67% · 33%
15	M	25	36% · 60%
16	T	60	8% · 90% · 10%
17	a	408	· 89% · 8%
18	b	1160	· 69% · 30%
19	c	152	7% · 24% · 76%
20	g	257	11% · 81% · 14%
21	e	1493	· 38% · 60%
22	d	729	18% · 34% · 66%

2 Entry composition ⓘ

There are 24 unique types of molecules in this entry. The entry contains 51949 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1409	Total 11161	C 7022	N 1998	O 2070	S 71	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	1130	Total 9048	C 5725	N 1591	O 1668	S 64	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	260	Total 2089	C 1309	N 359	O 415	S 6	0	0

- Molecule 4 is a protein called RNA polymerase II subunit D.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	128	Total 1050	C 656	N 178	O 212	S 4	0	0

- Molecule 5 is a protein called DNA-directed RNA polymerase II subunit E.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	209	Total 1720	C 1089	N 300	O 323	S 8	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	82	Total 657	C 418	N 113	O 121	S 5	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	G	171	1351	875	219	249	8	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	H	148	1186	750	194	237	5	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	I	117	949	587	169	182	11	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	J	67	533	345	90	92	6	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	K	115	920	593	152	173	2	0	0

- Molecule 12 is a protein called RNA polymerase II, I and III subunit K.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	L	46	388	241	75	66	6	0	0

- Molecule 13 is a protein called Transcription elongation factor 1 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	f	64	505	312	81	105	7	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
f	-1	GLY	-	expression tag	UNP P60002
f	0	ALA	-	expression tag	UNP P60002

- Molecule 14 is a DNA chain called Non-template DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	N	40	Total	C	N	O	P	0	0
			831	393	162	236	40		

- Molecule 15 is a RNA chain called RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	M	10	Total	C	N	O	P	0	0
			220	98	45	67	10		

- Molecule 16 is a DNA chain called Template DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	T	54	Total	C	N	O	P	0	0
			1091	521	187	329	54		

- Molecule 17 is a protein called DNA excision repair protein ERCC-8.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	a	377	Total	C	N	O	S	0	0
			2951	1842	520	570	19		

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
a	397	GLY	-	expression tag	UNP Q13216
a	398	THR	-	expression tag	UNP Q13216
a	399	SER	-	expression tag	UNP Q13216
a	400	ALA	-	expression tag	UNP Q13216
a	401	TRP	-	expression tag	UNP Q13216
a	402	SER	-	expression tag	UNP Q13216
a	403	HIS	-	expression tag	UNP Q13216
a	404	PRO	-	expression tag	UNP Q13216
a	405	GLN	-	expression tag	UNP Q13216
a	406	PHE	-	expression tag	UNP Q13216
a	407	GLU	-	expression tag	UNP Q13216
a	408	LYS	-	expression tag	UNP Q13216

- Molecule 18 is a protein called DNA damage-binding protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	b	814	Total 6405	C 4059	N 1079	O 1231	S 36	0	0

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
b	-19	MET	-	initiating methionine	UNP Q16531
b	-18	ALA	-	expression tag	UNP Q16531
b	-17	HIS	-	expression tag	UNP Q16531
b	-16	HIS	-	expression tag	UNP Q16531
b	-15	HIS	-	expression tag	UNP Q16531
b	-14	HIS	-	expression tag	UNP Q16531
b	-13	HIS	-	expression tag	UNP Q16531
b	-12	HIS	-	expression tag	UNP Q16531
b	-11	SER	-	expression tag	UNP Q16531
b	-10	ALA	-	expression tag	UNP Q16531
b	-9	ALA	-	expression tag	UNP Q16531
b	-8	LEU	-	expression tag	UNP Q16531
b	-7	GLU	-	expression tag	UNP Q16531
b	-6	VAL	-	expression tag	UNP Q16531
b	-5	LEU	-	expression tag	UNP Q16531
b	-4	PHE	-	expression tag	UNP Q16531
b	-3	GLN	-	expression tag	UNP Q16531
b	-2	GLY	-	expression tag	UNP Q16531
b	-1	PRO	-	expression tag	UNP Q16531
b	0	GLY	-	expression tag	UNP Q16531

- Molecule 19 is a protein called DET1- and DDB1-associated protein 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
19	c	36	Total 302	C 199	N 49	O 54	0	0

There are 50 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
c	103	ASP	-	expression tag	UNP Q9BW61
c	104	VAL	-	expression tag	UNP Q9BW61
c	105	LEU	-	expression tag	UNP Q9BW61
c	106	PHE	-	expression tag	UNP Q9BW61
c	107	GLN	-	expression tag	UNP Q9BW61

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Chain	Residue	Modelled	Actual	Comment	Reference
c	108	GLY	-	expression tag	UNP Q9BW61
c	109	PRO	-	expression tag	UNP Q9BW61
c	110	GLY	-	expression tag	UNP Q9BW61
c	111	ALA	-	expression tag	UNP Q9BW61
c	112	TRP	-	expression tag	UNP Q9BW61
c	113	SER	-	expression tag	UNP Q9BW61
c	114	HIS	-	expression tag	UNP Q9BW61
c	115	PRO	-	expression tag	UNP Q9BW61
c	116	GLN	-	expression tag	UNP Q9BW61
c	117	PHE	-	expression tag	UNP Q9BW61
c	118	GLU	-	expression tag	UNP Q9BW61
c	119	LYS	-	expression tag	UNP Q9BW61
c	120	GLY	-	expression tag	UNP Q9BW61
c	121	GLY	-	expression tag	UNP Q9BW61
c	122	GLY	-	expression tag	UNP Q9BW61
c	123	SER	-	expression tag	UNP Q9BW61
c	124	GLY	-	expression tag	UNP Q9BW61
c	125	GLY	-	expression tag	UNP Q9BW61
c	126	GLY	-	expression tag	UNP Q9BW61
c	127	SER	-	expression tag	UNP Q9BW61
c	128	GLY	-	expression tag	UNP Q9BW61
c	129	GLY	-	expression tag	UNP Q9BW61
c	130	GLY	-	expression tag	UNP Q9BW61
c	131	SER	-	expression tag	UNP Q9BW61
c	132	TRP	-	expression tag	UNP Q9BW61
c	133	SER	-	expression tag	UNP Q9BW61
c	134	HIS	-	expression tag	UNP Q9BW61
c	135	PRO	-	expression tag	UNP Q9BW61
c	136	GLN	-	expression tag	UNP Q9BW61
c	137	PHE	-	expression tag	UNP Q9BW61
c	138	GLU	-	expression tag	UNP Q9BW61
c	139	LYS	-	expression tag	UNP Q9BW61
c	140	GLY	-	expression tag	UNP Q9BW61
c	141	ALA	-	expression tag	UNP Q9BW61
c	142	SER	-	expression tag	UNP Q9BW61
c	143	GLY	-	expression tag	UNP Q9BW61
c	144	GLU	-	expression tag	UNP Q9BW61
c	145	ASP	-	expression tag	UNP Q9BW61
c	146	TYR	-	expression tag	UNP Q9BW61
c	147	LYS	-	expression tag	UNP Q9BW61
c	148	ASP	-	expression tag	UNP Q9BW61
c	149	ASP	-	expression tag	UNP Q9BW61

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Chain	Residue	Modelled	Actual	Comment	Reference
c	150	ASP	-	expression tag	UNP Q9BW61
c	151	ASP	-	expression tag	UNP Q9BW61
c	152	LYS	-	expression tag	UNP Q9BW61

- Molecule 20 is a protein called Inactive serine/threonine-protein kinase 19.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	g	220	Total	C	N	O	S	0	0
			1721	1098	308	309	6		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
g	-2	GLY	-	expression tag	UNP P49842
g	-1	PRO	-	expression tag	UNP P49842
g	0	GLY	-	expression tag	UNP P49842

- Molecule 21 is a protein called DNA excision repair protein ERCC-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	e	590	Total	C	N	O	S	0	0
			4820	3091	847	859	23		

- Molecule 22 is a protein called UV-stimulated scaffold protein A.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	d	249	Total	C	N	O	S	0	0
			2040	1274	397	361	8		

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
d	-19	MET	-	initiating methionine	UNP Q2YD98
d	-18	ALA	-	expression tag	UNP Q2YD98
d	-17	HIS	-	expression tag	UNP Q2YD98
d	-16	HIS	-	expression tag	UNP Q2YD98
d	-15	HIS	-	expression tag	UNP Q2YD98
d	-14	HIS	-	expression tag	UNP Q2YD98
d	-13	HIS	-	expression tag	UNP Q2YD98
d	-12	HIS	-	expression tag	UNP Q2YD98
d	-11	SER	-	expression tag	UNP Q2YD98

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Chain	Residue	Modelled	Actual	Comment	Reference
d	-10	ALA	-	expression tag	UNP Q2YD98
d	-9	ALA	-	expression tag	UNP Q2YD98
d	-8	LEU	-	expression tag	UNP Q2YD98
d	-7	GLU	-	expression tag	UNP Q2YD98
d	-6	VAL	-	expression tag	UNP Q2YD98
d	-5	LEU	-	expression tag	UNP Q2YD98
d	-4	PHE	-	expression tag	UNP Q2YD98
d	-3	GLN	-	expression tag	UNP Q2YD98
d	-2	GLY	-	expression tag	UNP Q2YD98
d	-1	PRO	-	expression tag	UNP Q2YD98
d	0	GLY	-	expression tag	UNP Q2YD98

- Molecule 23 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

| Mol	Chain	Residues	Atoms		AltConf
23	A	2	Total 2	Zn 2	0
23	B	1	Total 1	Zn 1	0
23	C	1	Total 1	Zn 1	0
23	I	2	Total 2	Zn 2	0
23	J	1	Total 1	Zn 1	0
23	L	1	Total 1	Zn 1	0
23	f	1	Total 1	Zn 1	0
23	d	1	Total 1	Zn 1	0

- Molecule 24 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

| Mol	Chain	Residues	Atoms		AltConf
24	A	1	Total 1	Mg 1	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 atom inclusion in map 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 diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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 subunit

LYS TYR SER PRO THR SER PRO THR TYR SER PRO THR THR PRO LYS TYR SER PRO THR SER PRO THR TYR SER PRO THR SER PRO VAL TYR THR PRO THR SER PRO LYS TYR SER PRO THR THR TYR SER PRO THR SER PRO LYS TYR SER PRO THR SER PRO THR TYR SER PRO

THR SER PRO LYS GLY SER THR TYR SER PRO THR SER PRO GLY TYR SER PRO THR SER PRO THR TYR SER LEU THR SER PRO ALA ILE SER PRO ASP SER ASP GLU GLU ASN

• Molecule 2: DNA-directed RNA polymerase subunit beta

Chain B:

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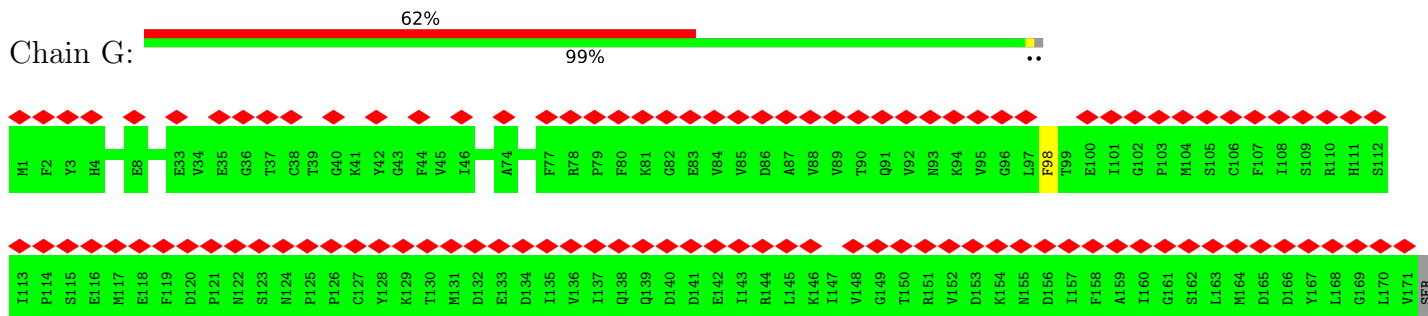
Chain C:

• Molecule 4: RNA polymerase II subunit D

Chain D:
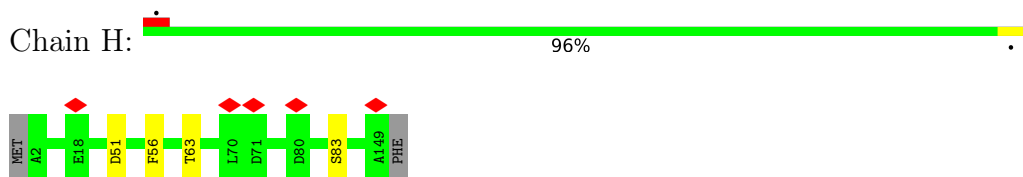
• Molecule 5: DNA-directed RNA polymerase II subunit E

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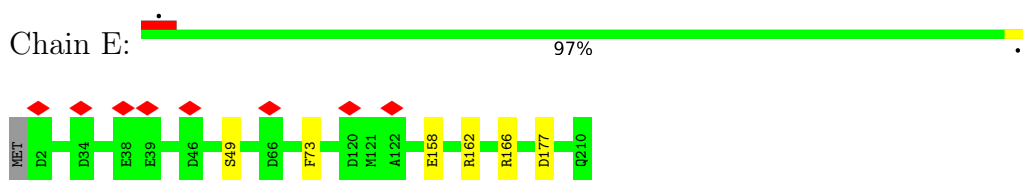
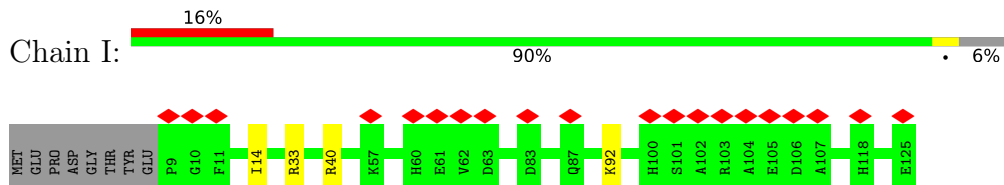• Molecule 6: DNA-directed RNA polymerases I, II, and III subunit RPABC2

Chain F:
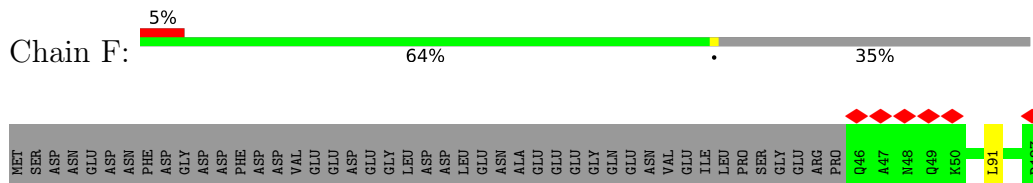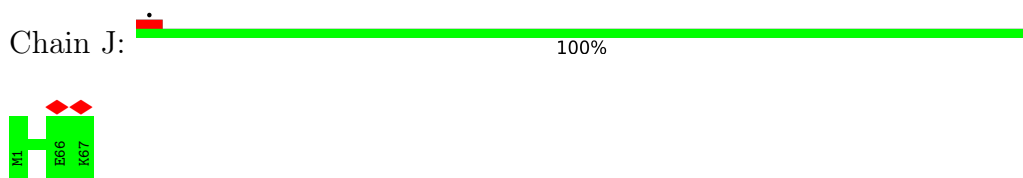
• Molecule 7: DNA-directed RNA polymerase subunit

Chain G:

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

Chain H:

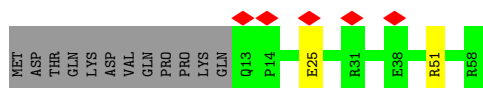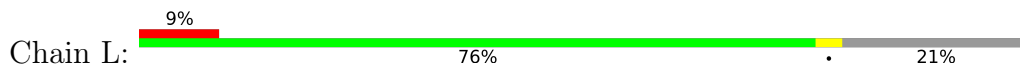• Molecule 9: DNA-directed RNA polymerase II subunit RPB9

Chain I:

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

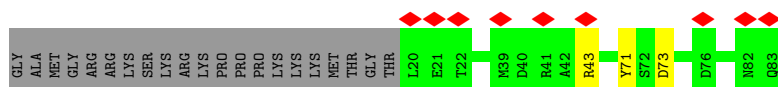Chain J:

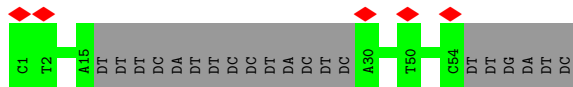• Molecule 11: DNA-directed RNA polymerase II subunit RPB11-a

Chain K:

97%

M1 N2 F13 F87 G115 ILE GLU

• Molecule 12: RNA polymerase II, I and III subunit K

9%

Chain L:

76%   21%

MET ASP THR GLN LYS ASP VAL GLN PRO PRO LYS GLN Q13 P14 E25 R31 E38 R51 R58

• Molecule 13: Transcription elongation factor 1 homolog

11%

Chain f:

72%   25%

GLY ALA MET GLY ARG ARG LYS SER LYS ARG LYS PRO PRO PRO LYS LYS LYS MET THR GLY THR L20 E21 T22 M39 D40 R41 A42 R43 Y71 S72 D73 D76 N82 Q83

• Molecule 14: Non-template DNA

8%

Chain N:

67%   33%

C1 T2 A15 DT DT DC DA DT DT DC DC DT DA DC DT DC A30 T50 C54 DT DT DG DA DT DC

• Molecule 15: RNA

Chain M:

36%   60%

G A A U A U A U A U C A A A A1 G8 G9 A10

• Molecule 16: Template DNA

8%

Chain T:

90%   10%

DG DA DT DC DA DA G7 G43 G44 C45 G60

• Molecule 17: DNA excision repair protein ERCC-8

Chain a:

89%   8%

M1 D14 E31 R78 D136 C157 H180 Q183 E188 D199 S206 K233 SER GLN ALA VAL E238 S239 N245 D256 D338 Y366 V369 P370 D371 ASP ASP GLU THR THR THR LYS SER GLN LEU N382 P383 A384 F385 E386 D387 A388 S391

SER ASP GLU GLU GLY THR SER ALA TRP SER HIS PRO GLN PHE GLU LYS

• Molecule 18: DNA damage-binding protein 1

Chain b:

69%   30%

MET ALA HIS HIS HIS HIS HIS SER ALA ALA LEU GLU VAL LEU PHE GLN GLY PRO GLY M1 S25 E96 C128 R147 D148 N149 K150 E151 C173 R198 Y245 K254 D265 E288 M291 D292 G293 T294 R369 R391 ASN GLY ILE GLY ILE HIS

GLU HIS ALA SER ILE ASP LEU PRO GLY ILE LYS GLY LEU TRP PRO LEU ARG SER ASP PRO ASN ARG GLU THR ASP ASP THR LEU VAL LEU SER PHE VAL GLY GLN THR ARG VAL LEU MET LEU ASN ALA GLY GLU GLU VAL GLU GLU THR GLU LEU MET GLY PHE VAL ASP GLN GLN GLN THR

PHE PHE CYS ASN VAL ALA HIS GLN GLN LEU ILE GLN LEU THR SER ALA SER ARG LEU VAL SER GLN GLU PRO LYS ALA LEU VAL SER GLU TRP LYS GLU PRO GLN ALA LYS ASN ILE SER VAL ALA SER CYS ASN SER SER GLN VAL VAL VAL ALA VAL GLY ARG ALA LEU TYR

TYR LEU GLN ILE PRO GLN GLU LEU ARG GLN ILE SER HIS THR GLU MET GLU HIS GLU VAL ALA CYS LEU ASP ILE THR PRO LEU GLY ASP ASN ALA GLY SER LEU SER PRO LEU CYS ALA ILE GLY LEU TRP THR ASP ILE SER ALA ARG ILE LEU LYS LEU PRO SER PHE GLU LEU LEU

HIS LYS GLU MET LEU GLY GLY GLU ILE ILE PRO ARG SER ILE LEU MET THR PHE GLU SER HIS SER THR PHE GLY LEU SER LEU TYR LEU GLU CYS ALA LEU GLY ASP SER GLY ALA LEU PHE TYR PHE GLY LEU ASN ILE GLU THR GLY LEU LEU SER ASP ARG LYS VAL THR LEU THR LYS THR GLN PRO THR VAL

LEU ARG THR PHE ARG SER LEU SER THR THR ASN VAL PHE ALA CYS SER ASP ARG PRO THR VAL ILE TYR SER SER ASN HIS LYS LEU VAL PHE SER ASN VAL ASN LEU LYS GLU VAL ASN TYR MET CYS PRO LEU ASN ASP SER GLY TYR PRO ASP SER LEU ALA LEU ALA ASN ASN SER

THR LEU THR ILE THR ILE ASP GLU ILE Q708 R722 S737 D744 T745 S746 G747 G748 R753 K769 S772 SER SER THR ALA PRO HIS GLU THR S781 F782 G783 E784 N826 E842 R847 R889 R928 S981 A982 N1016 L1017 GLY GLU T1020 S1021

W1047 R1080 E1107 Q1113 Y1114 D1115 D1116 G1117 S1118 G1119 M1120 K1121 R1122 H1140

• Molecule 19: DET1- and DDB1-associated protein 1

7%

Chain c:

24%   76%

MET ALA ASP F4 H20 ALA ASP SER VAL CYS LYS ALA SER ASN ARG ARG P32 S33 T38 R39 E40 Y41 P42 S43 E44 T49 E50 LYS THR ASN ILE LEU LEU ARG TYR LEU HIS GLN GLN TRP ASP LYS LYS ASN ALA ALA LYS LYS ARG ASP GLN GLU GLN VAL GLU LEU GLU

GLY GLU SER SER ALA PRO PRO ARG LYS VAL ALA ARG THR ASP SER PRO ASP MET HIS GLU ASP THR ASP VAL LEU PHE GLN GLY PRO GLY ALA TRP SER HIS PRO GLN PHE GLU LYS LYS GLY GLY SER GLY SER GLY SER GLY SER GLY TRP SER HIS PRO GLN PHE GLU LYS GLY

ALA SER GLY GLU ASP TYR LYS ASP ASP ASP LYS

• Molecule 20: Inactive serine/threonine-protein kinase 19

11%

Chain g:

81%   14%

GLY PRO GLY MET SER TRP LYS ARG HIS HIS LEU ILE PRO GLU THR PHE GLY VAL LYS ARG ARG LYS ARG GLY PRO VAL GLU LEU SER ASP PRO LEU ARG GLY GLU PRO G34 R37 R49 D54 D71 R72 Q83 D96 L97 D98 K114 D117 G118 M146

• Molecule 21: DNA excision repair protein ERCC-6

Chain e:

PRO SER SER THR SER PRO THR THR GLU LYS CYS GLN ASP ILE MET LYS LYS GLU GLY LYS ASP ASN VAL PRO GLU HIS PHE SER GLY ARG ALA GLU ASP ALA ASP SER SER GLY **P1383** GLU **S1387** LEU **L1399** ILE LEU PRO GLU LEU GLU SER GLU GLY HIS LEU GLN GLU ALA

SER ALA LEU LEU PRO THR THR GLU HIS ASP LEU LEU VAL GLU MET ASN PHE ILE ALA PHE GLN ALA HIS THR ASP GLY GLN ALA SER THR ARG GLU ILE LEU GLN GLU PHE GLU SER LYS LEU SER ALA SER GLN CYS VAL PHE ARG GLU LEU LEU ARG ASN LEU CYS THR

PHE HIS ARG THR GLY GLU GLY GLU ILE LYS LEU LYS PRO GLU TYR CYS

• Molecule 22: UV-stimulated scaffold protein A

18%

Chain d: 34% · 66%

MET ALA HIS HIS HIS HIS HIS HIS SER ALA ALA LEU GLU VAL LEU PHE GLN GLY PRO GLY MET **D2** **L5** **T14** **S15** **G16** **E17** **P18** **R19** **L20** **N21** **K24** **E27** **K30** **I31** **S34** **R41** **R44** **I47** **Q52** **E53** **H54** **A55** **E56** **I57** **F69** **V70** **R71**

F75 **L89** **T90** **L91** **G92** **T93** **D94** **P98** **L99** **P100** **P101** **P102** **R103** **E104** **A105** **R108** **R115** **E118** **E122** **R139** **H140** **N141** **K142** **K143** VAL ASP PHE GLN ASP ASN ALA ARG LEU ALA GLU ARG LYS GLU GLU LYS GLN LYS HIS LEU ASP LYS ILE TYR GLN

GLU ARG ALA SER GLN ALA GLU ARG GLU MET GLN GLU MET SER GLY GLU ILE GLU SER CYS LEU THR GLU VAL GLU SER CYS PHE ARG LEU LEU VAL PRO PHE ASP ASP PRO ASN PRO GLU THR GLU SER LEU GLY MET ALA SER GLY MET SER ASP ALA LEU ARG SER SER CYS ALA

GLY GLN VAL GLY PRO CYS ARG SER GLY HIS LYS TYR THR PRO ASP PRO ARG ASP GLY GLU GLN GLN PRO CYS CYS SER GLU GLY LEU LYS VAL LEU VAL GLN GLU LEU PRO ALA SER ALA GLY HIS PRO ARG ALA GLY ALA GLY LEU GLY ALA GLN PRO SER GLN THR ALA THR GLY ASP PRO ASP GLU GLU ASP SER GLU LEU GLU GLU SER ASP LEU GLU ARG SER CYS GLU GLU PHE

VAL ARG SER HIS GLY LEU GLY SER HIS LYS TYR THR LEU ASP VAL GLU LEU CYS SER GLU GLU VAL LEU LYS VAL GLU LEU PRO GLU ASN ILE ASP ASN LEU ALA LEU ILE GLU PRO GLY GLY ALA ARG ASP ARG THR LEU LYS LEU ILE LEU GLU ASN LYS PHE PRO ALA VAL CYS SER TRP ILE GLN ARG PHE THR

ARG VAL GLY THR HIS GLY CYS LEU ARG ALA ILE ASP LEU LYS ALA GLU LYS TYR LYS LEU ASP LEU VAL ARG CYS LEU ARG THR THR ARG MET ASP GLU GLU VAL SER ASP PRO THR ALA GLY LYS ILE VAL LYS SER ASP GLN HIS ARG PHE TRP LYS

GLU LYS GLU GLY TYR GLU PRO HIS ILE PRO ASP HIS LEU ARG PRO GLU TYR GLY LEU GLU ALA PRO GLU ARG ALA ARG ALA PRO VAL PRO VAL ARG CYS LEU ARG THR ARG THR MET ASP GLU GLU VAL SER ASP PRO THR ALA GLY LYS ILE VAL LYS SER ASP GLN HIS ARG PHE TRP LYS

PRO PRO SER SER ALA SER PRO SER ARG ALA LEU PRO GLU GLU PRO GLN GLU ALA GLN LYS LEU LEU ALA GLU ARG ALA ARG ALA PRO VAL VAL PRO TYR GLY VAL ASP LEU HIS TYR GLN GLY LEU LEU PRO THR ALA GLY ILE VAL LYS SER ASP GLN GLN HIS ARG PHE TRP LYS

PRO SER GLU VAL GLU GLU VAL VAL ASN ALA ASP ILE SER GLU MET LEU ARG SER ARG HIS ILE **T555** **F556** **A557** **G558** **K559** **F560** **E561** **P562** **V563** **Q564** **H565** **W566** **C567** **R568** **A569** **P570** **R571** **P572** **D573** **G574** **R575** **L576** **C577** **E578** **R579** **Q580** **D581** **R582** **L583** **K584** **C585** **P586** **F587** **H588** **G589** **K590** **I591** **V592**

P593 **R594** **D595** **D596** **E597** **G598** **R599** **P600** **L601** **D602** **P603** **E604** **D605** **R606** **A607** **R608** **E609** **Q610** **R611** **R612** **Q613** **L614** **Q615** **K616** **Q617** **E618** **R619** PRO GLU TRP GLN ASP PRO GLU LEU MET ARG ASP VAL GLU ALA ALA THR GLY GLN ASP LEU GLY SER SER ARG TYR SER GLY LYS GLY ARG GLY LYS LYS

ARG ARG TYR **P656** **S657** **L658** **T659** **N660** **L661** **K662** **A663** **Q664** **A665** **D666** **R671** **R674** **K679** **A680** **A681** **V682** **R683** **R684** **A687** **A688** **M689** **N690** **R691** **M692** **D693** **Q694** **K695** **K696** **H697** GLU LYS PHE SER ASN GLN PHE ASN TYR ALA LEU ASN

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	257539	Depositor
Resolution determination method	OTHER	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	81000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	114.502	Depositor
Minimum map value	-1.609	Depositor
Average map value	0.029	Depositor
Map value standard deviation	1.373	Depositor
Recommended contour level	4.4	Depositor
Map size (Å)	423.99997, 423.99997, 423.99997	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.06, 1.06, 1.06	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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

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	0.25	0/11364	0.50	0/15342
2	B	0.26	0/9229	0.50	0/12458
3	C	0.26	0/2132	0.48	0/2896
4	D	0.24	0/1064	0.44	0/1428
5	E	0.26	0/1751	0.52	0/2366
6	F	0.26	0/667	0.50	0/901
7	G	0.25	0/1382	0.48	0/1874
8	H	0.26	0/1207	0.51	0/1628
9	I	0.24	0/972	0.48	0/1316
10	J	0.27	0/542	0.48	0/730
11	K	0.26	0/939	0.43	0/1271
12	L	0.26	0/394	0.58	0/524
13	f	0.24	0/515	0.46	0/700
14	N	0.54	0/934	0.89	0/1439
15	M	0.29	0/247	0.77	0/384
16	T	0.53	0/1218	0.96	0/1874
17	a	0.28	0/3015	0.53	0/4086
18	b	0.28	0/6518	0.51	0/8810
19	c	0.25	0/311	0.45	0/420
20	g	0.24	0/1753	0.55	0/2374
21	e	0.25	0/4929	0.50	0/6642
22	d	0.24	0/2077	0.51	0/2783
All	All	0.28	0/53160	0.53	0/72246

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	3

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W O R L D W I D E
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PROTEIN DATA BANK

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Mol	Chain	#Chirality outliers	#Planarity outliers
2	B	0	1
5	E	0	2
9	I	0	1
12	L	0	1
13	f	0	1
17	a	0	1
18	b	0	3
20	g	0	3
21	e	0	4
22	d	0	1
All	All	0	21

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 21 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1160	ARG	Sidechain
1	A	20	ARG	Sidechain
1	A	532	ARG	Sidechain
2	B	975	ARG	Sidechain
5	E	162	ARG	Sidechain

5.2 Too-close contacts ⓘ

Due to software issues we are unable to calculate clashes - this section is therefore empty.

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 PDB entries followed by that with respect to all EM entries.

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	1399/1970 (71%)	1349 (96%)	50 (4%)	0	100	100
2	B	1122/1300 (86%)	1078 (96%)	44 (4%)	0	100	100
3	C	256/275 (93%)	250 (98%)	6 (2%)	0	100	100
4	D	126/142 (89%)	123 (98%)	3 (2%)	0	100	100
5	E	207/210 (99%)	203 (98%)	4 (2%)	0	100	100
6	F	80/127 (63%)	77 (96%)	3 (4%)	0	100	100
7	G	169/172 (98%)	161 (95%)	8 (5%)	0	100	100
8	H	146/150 (97%)	144 (99%)	2 (1%)	0	100	100
9	I	115/125 (92%)	104 (90%)	11 (10%)	0	100	100
10	J	65/67 (97%)	64 (98%)	1 (2%)	0	100	100
11	K	113/117 (97%)	112 (99%)	1 (1%)	0	100	100
12	L	44/58 (76%)	42 (96%)	2 (4%)	0	100	100
13	f	62/85 (73%)	60 (97%)	2 (3%)	0	100	100
17	a	371/408 (91%)	345 (93%)	26 (7%)	0	100	100
18	b	806/1160 (70%)	766 (95%)	40 (5%)	0	100	100
19	c	32/152 (21%)	32 (100%)	0	0	100	100
20	g	218/257 (85%)	210 (96%)	8 (4%)	0	100	100
21	e	574/1493 (38%)	546 (95%)	28 (5%)	0	100	100
22	d	243/729 (33%)	234 (96%)	9 (4%)	0	100	100
All	All	6148/8997 (68%)	5900 (96%)	248 (4%)	0	100	100

There are no Ramachandran outliers to report.

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 PDB entries followed by that with respect to all EM entries.

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	1241/1749 (71%)	1211 (98%)	30 (2%)	44	66
2	B	992/1127 (88%)	974 (98%)	18 (2%)	54	73

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	C	237/252 (94%)	232 (98%)	5 (2%)	48	69
4	D	118/126 (94%)	116 (98%)	2 (2%)	56	74
5	E	191/192 (100%)	187 (98%)	4 (2%)	48	69
6	F	71/111 (64%)	70 (99%)	1 (1%)	62	77
7	G	152/153 (99%)	151 (99%)	1 (1%)	81	88
8	H	129/131 (98%)	125 (97%)	4 (3%)	35	60
9	I	105/112 (94%)	102 (97%)	3 (3%)	37	61
10	J	56/56 (100%)	56 (100%)	0	100	100
11	K	104/106 (98%)	102 (98%)	2 (2%)	52	71
12	L	43/55 (78%)	42 (98%)	1 (2%)	45	67
13	f	59/76 (78%)	57 (97%)	2 (3%)	32	57
17	a	331/358 (92%)	319 (96%)	12 (4%)	30	56
18	b	712/1014 (70%)	700 (98%)	12 (2%)	56	74
19	c	35/128 (27%)	35 (100%)	0	100	100
20	g	183/215 (85%)	175 (96%)	8 (4%)	24	50
21	e	527/1297 (41%)	509 (97%)	18 (3%)	32	57
22	d	216/623 (35%)	213 (99%)	3 (1%)	62	77
All	All	5502/7881 (70%)	5376 (98%)	126 (2%)	46	67

5 of 126 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
5	E	158	GLU
21	e	689	PHE
13	f	71	TYR
21	e	642	TYR
21	e	1001	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 24 such sidechains are listed below:

Mol	Chain	Res	Type
17	a	228	GLN
21	e	772	GLN
21	e	641	HIS
21	e	773	HIS

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Mol	Chain	Res	Type
2	B	968	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
15	M	9/25 (36%)	1 (11%)	0

All (1) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
15	M	8	G

There are no RNA pucker outliers to report.

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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 11 ligands modelled in this entry, 11 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 ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-50325. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections ⓘ

6.1.1 Primary map

| X | Y | Z |
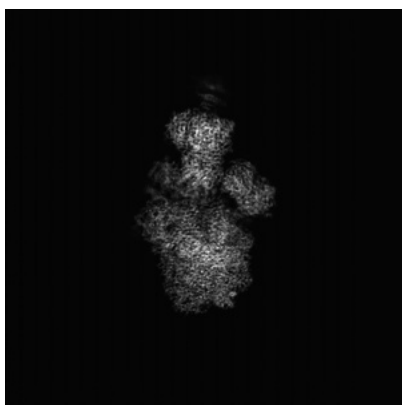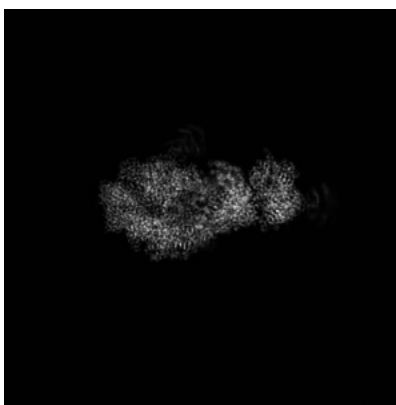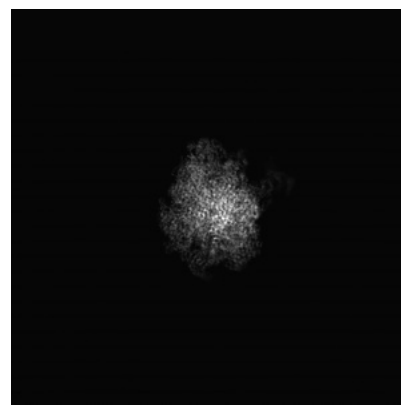
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ

6.2.1 Primary map

| X Index: 200 | Y Index: 200 | Z Index: 200 |

The images above show central slices of the map in three orthogonal directions.

6.3　Largest variance slices ⓘ

6.3.1　Primary map

| X Index: 214 | Y Index: 191 | Z Index: 160 |
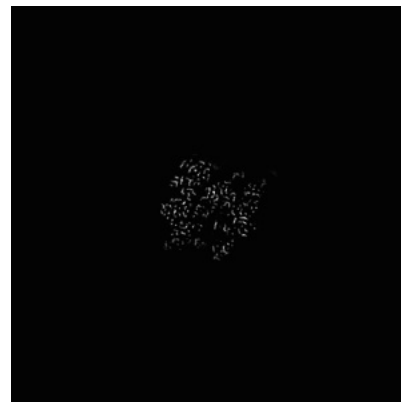
The images above show the largest variance slices of the map in three orthogonal directions.

6.4　Orthogonal standard-deviation projections (False-color) ⓘ

6.4.1　Primary map

| X | Y | Z |
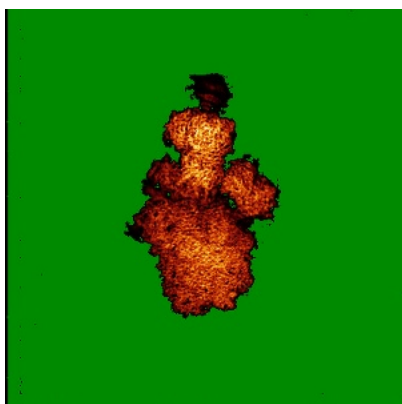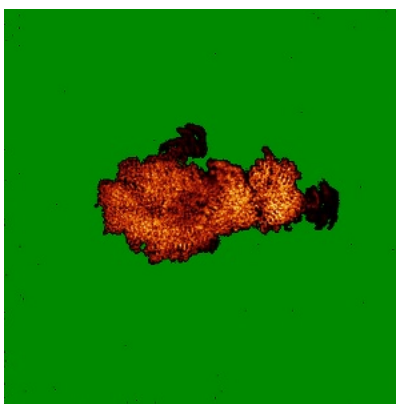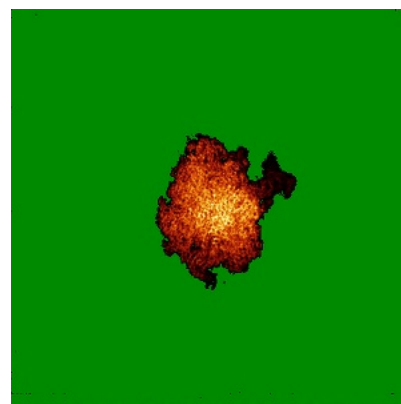
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5   Orthogonal surface views   ⓘ

6.5.1   Primary map

X   Y   Z
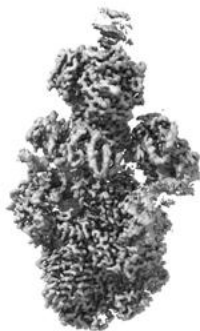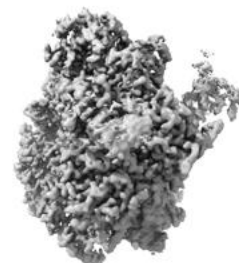
The images above show the 3D surface view of the map at the recommended contour level 4.4. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.6   Mask visualisation   ⓘ

This section was not generated. No masks/segmentation were deposited.

7   Map analysis ⓘ

This section contains the results of statistical analysis of the map.

7.1   Map-value distribution ⓘ

The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2 Volume estimate ⓘ
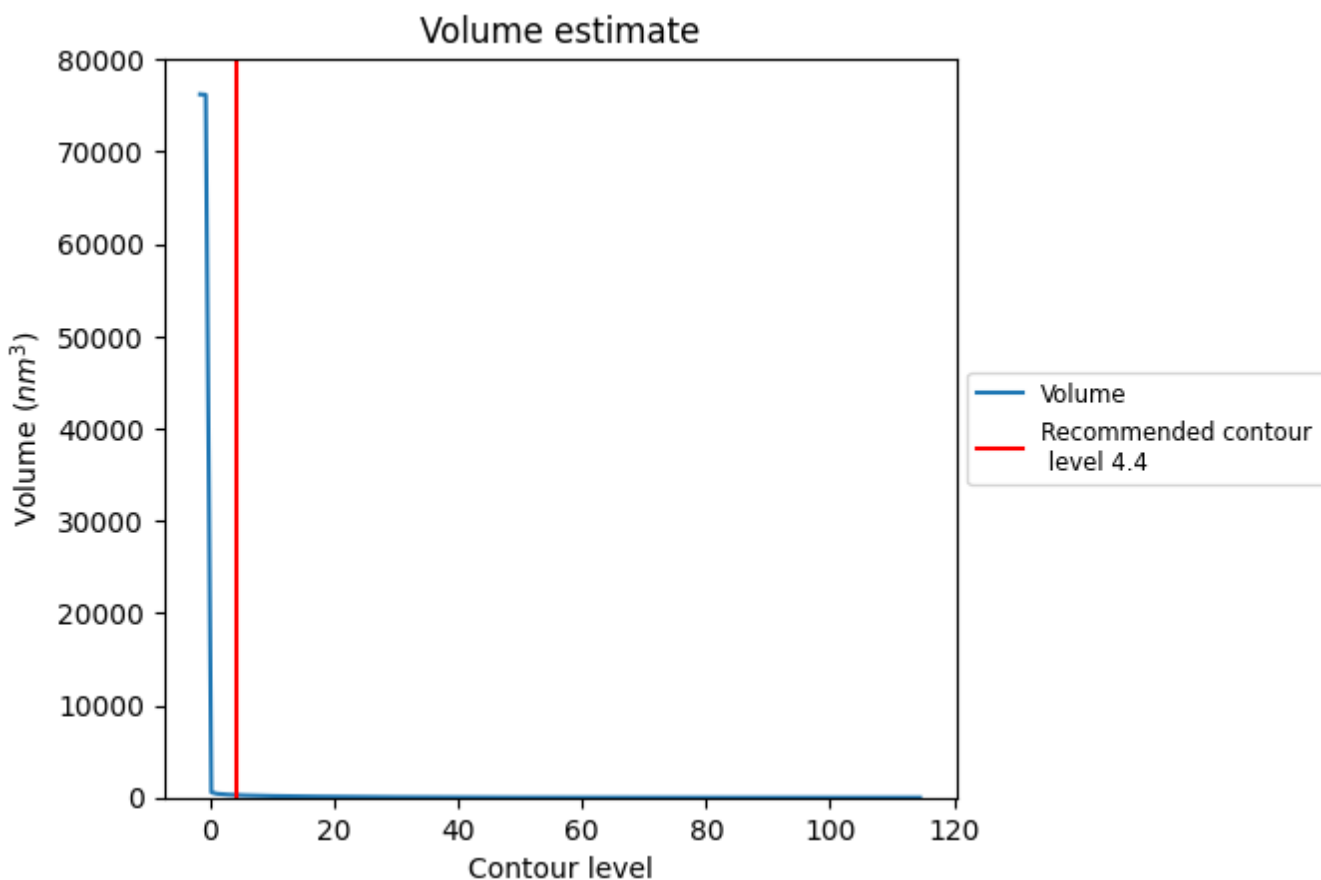
The volume at the recommended contour level is 269 nm^3; this corresponds to an approximate mass of 243 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3　Rotationally averaged power spectrum (i)
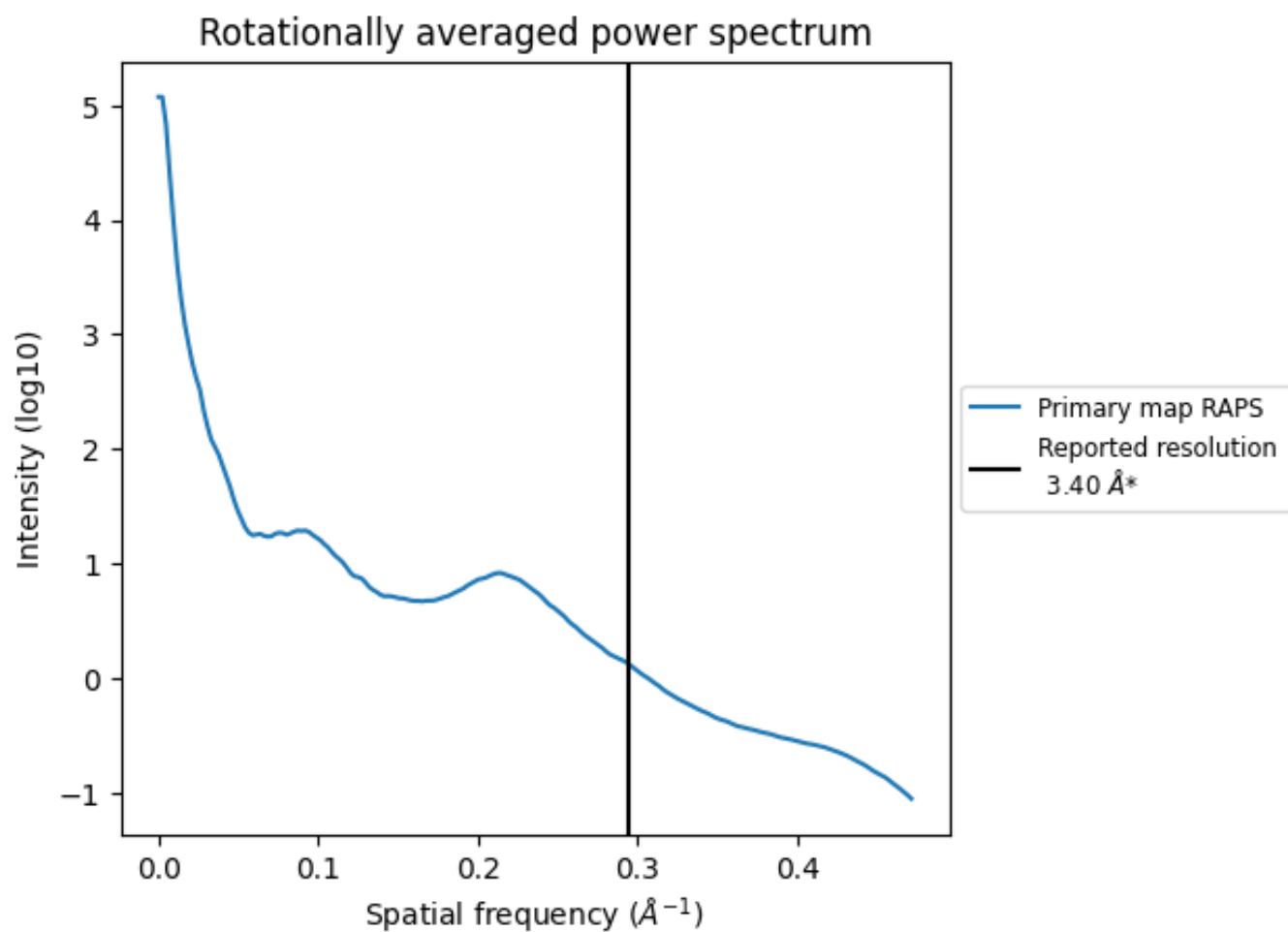
*Reported resolution corresponds to spatial frequency of 0.294 Å^{-1}

8 Fourier-Shell correlation ⓘ

This section was not generated. No FSC curve or half-maps provided.

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-50325 and PDB model 9FD2. Per-residue inclusion information can be found in section 3 on page 11.

9.1 Map-model overlay ⓘ

| X | Y | Z |
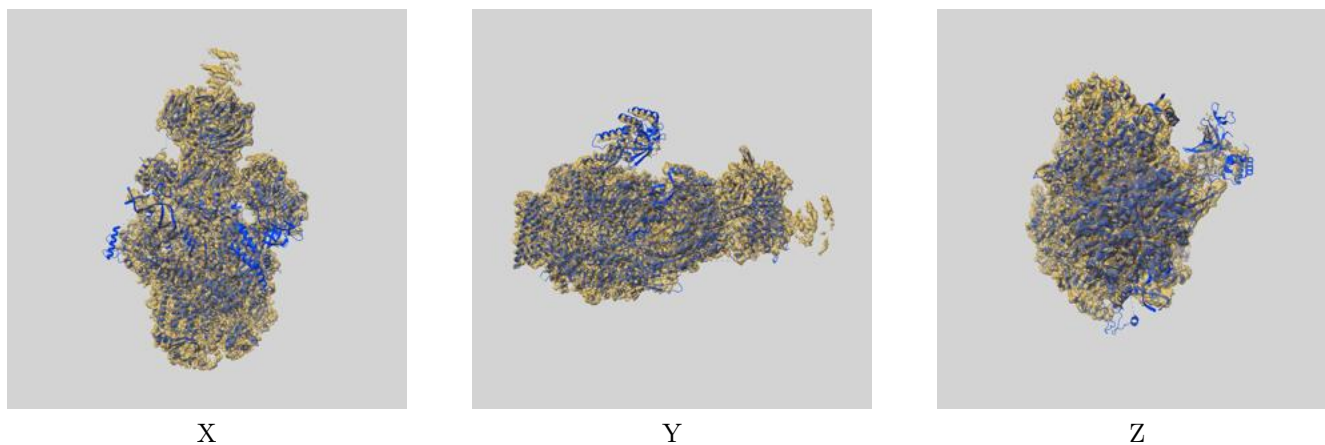
The images above show the 3D surface view of the map at the recommended contour level 4.4 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model ⓘ

X   Y   Z
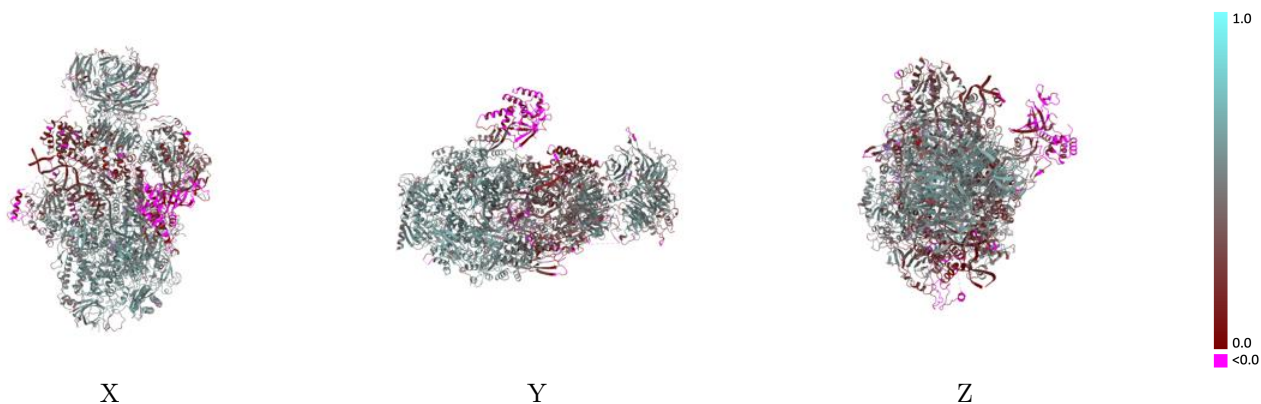
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3   Atom inclusion mapped to coordinate model ⓘ

X   Y   Z
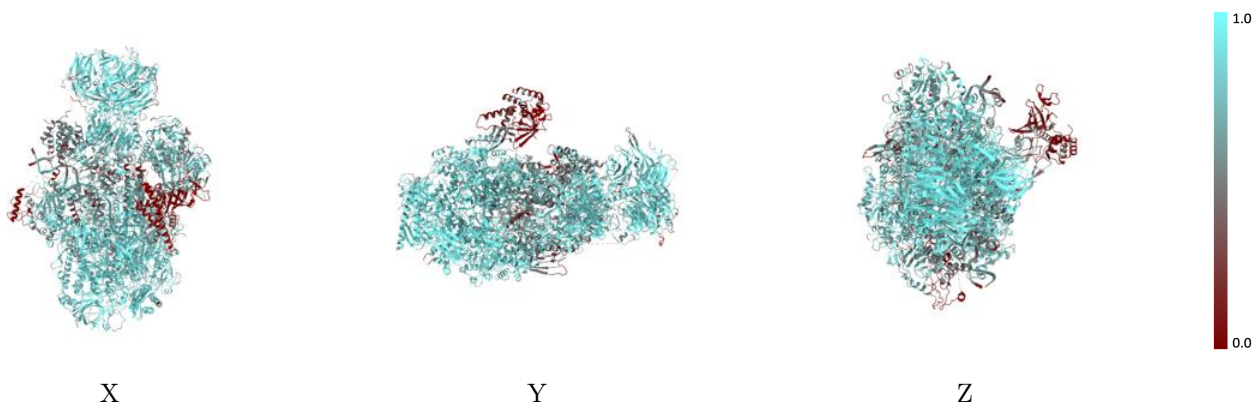
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (4.4).

9.4 Atom inclusion ⓘ
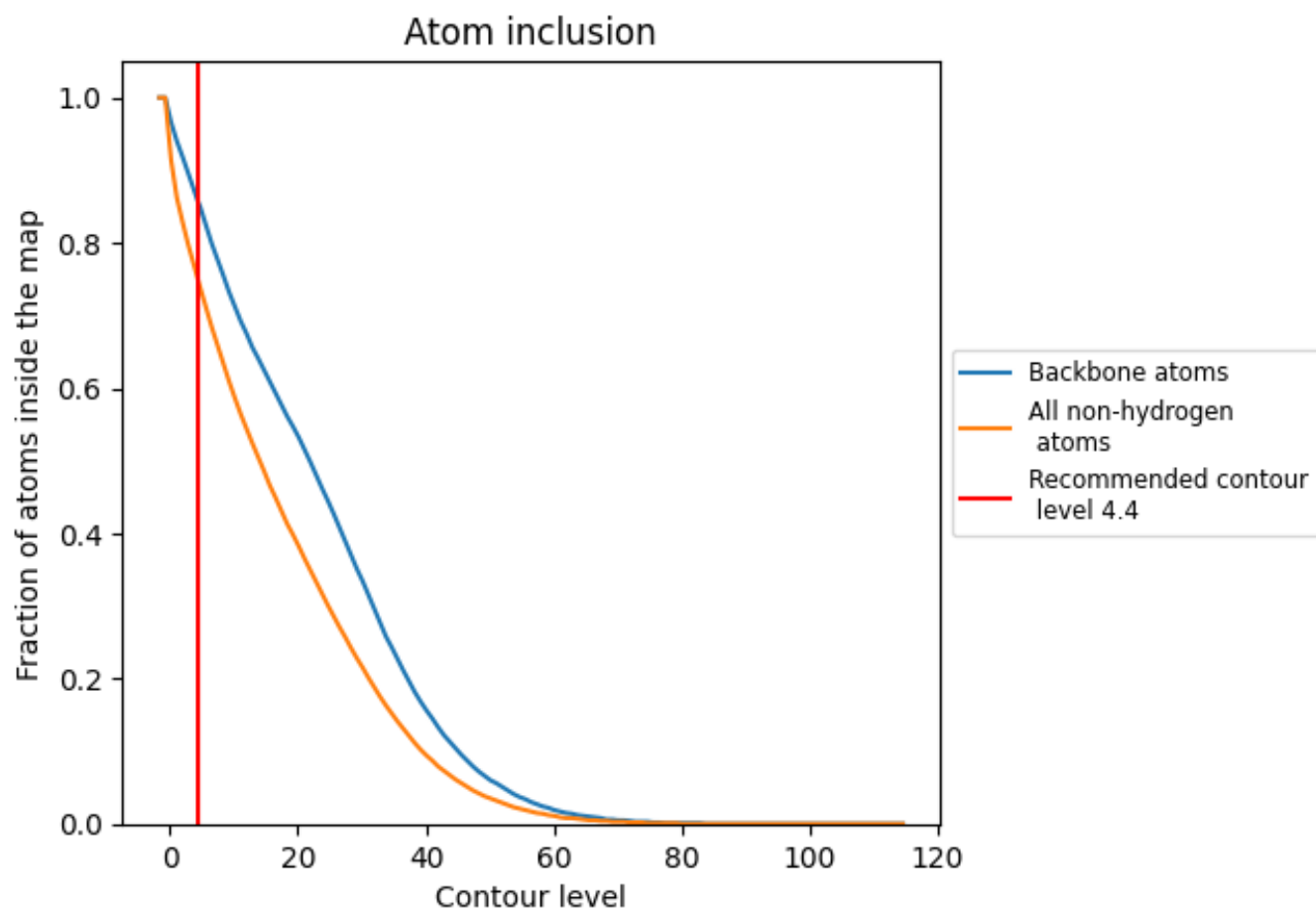
At the recommended contour level, 86% of all backbone atoms, 75% of all non-hydrogen atoms, are inside the map.

9.5　Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (4.4) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7490	0.4360
A	0.7920	0.4980
B	0.8130	0.5090
C	0.8510	0.5400
D	0.1360	-0.0040
E	0.7950	0.4840
F	0.8290	0.5120
G	0.3060	0.1540
H	0.8190	0.5180
I	0.6570	0.3880
J	0.8870	0.5680
K	0.8580	0.5480
L	0.7290	0.4390
M	0.8910	0.4930
N	0.6400	0.2460
T	0.7120	0.3270
a	0.8710	0.5110
b	0.8450	0.4820
c	0.5360	0.3050
d	0.3510	0.1260
e	0.7330	0.3740
f	0.6370	0.3180
g	0.6310	0.2400

1.0

0.0
<0.0