WORLDWIDE wwPDB

PROTEIN DATA BANK

wwPDB EM Validation Summary Report (i)

Jul 24, 2025 – 08:12 PM JST

PDB ID	:	9LKT / pdb_00009lkt
EMDB ID	:	EMD-63186
Title	:	Human RNA Polymerase III de novo transcribing complex 10 (TC10)
Authors	:	Wang, Q.M.; Ren, Y.L.; Jin, Q.W.; Chen, X.Z.; Xu, Y.H.
Deposited on	:	2025-01-16
Resolution	:	3.50 Å(reported)

The following versions of software and data (see references (i)) were used in the production of this report:
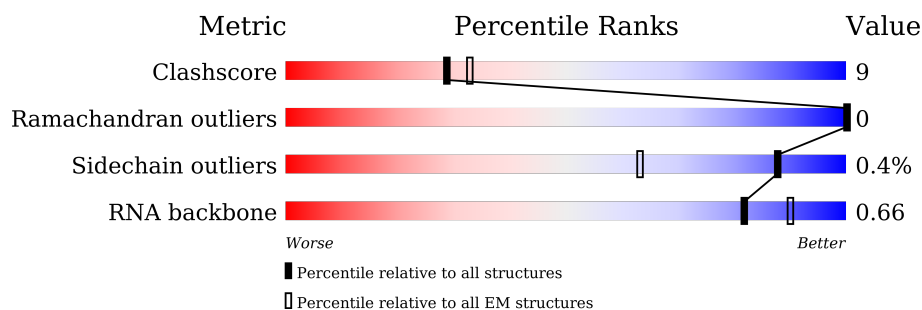
1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 3.50 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.
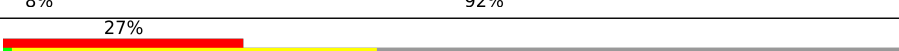
Metric	Percentile Ranks	Value
Clashscore		9
Ramachandran outliers		0
Sidechain outliers		0.4%
RNA backbone		0.66

Worse   *Better*

▌Percentile relative to all structures

▯Percentile relative to all EM structures
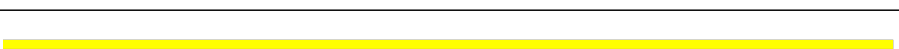
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

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	1390	83% 16%
2	B	1133	83% 14%
3	C	346	81% 18%
4	D	148	11% 66% 16% 18%
5	E	210	87% 13%
6	F	127	54% 6% 40%
7	G	204	6% 70% 12% 19%

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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	Length	Quality of chain
8	H	150	82% 17%
9	I	108	46% 50%
10	J	67	76% 21%
11	K	133	68% 9% 23%
12	L	58	5% 66% 14% 21%
13	M	708	33% 52% 8% 40%
14	N	398	8% 32% 63%
15	O	534	13% 81% 15%
16	P	316	55% 78% 18%
17	Q	223	8% 27% 11% 61%
18	V	419	8% 92%
19	X	123	27% 41% 59%
20	Y	123	19% 37% 59%
21	Z	9	100%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
25	SF4	P	401	-	-	X	-

2 Entry composition (i)

There are 26 unique types of molecules in this entry. The entry contains 44609 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 III subunit RPC1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1378	Total 10814	C 6850	N 1886	O 2005	S 73	0	0

- Molecule 2 is a protein called DNA-directed RNA polymerase III subunit RPC2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	1105	Total 8736	C 5535	N 1529	O 1603	S 69	0	0

- Molecule 3 is a protein called DNA-directed RNA polymerases I and III subunit RPAC1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	343	Total 2736	C 1723	N 488	O 514	S 11	0	0

- Molecule 4 is a protein called DNA-directed RNA polymerase III subunit RPC9.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	122	Total 985	C 614	N 172	O 196	S 3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	209	Total 1715	C 1083	N 300	O 324	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	76	Total 610	C 392	N 103	O 110	S 5	0	0

- Molecule 7 is a protein called DNA-directed RNA polymerase III subunit RPC8.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	166	Total	C	N	O	S	0	0
			1337	876	211	245	5		

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

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

- Molecule 9 is a protein called DNA-directed RNA polymerase III subunit RPC10.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	54	Total	C	N	O	S	0	0
			426	267	79	74	6		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	65	Total	C	N	O	S	0	0
			512	331	87	88	6		

- Molecule 11 is a protein called DNA-directed RNA polymerases I and III subunit RPAC2.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	103	Total	C	N	O	S	0	0
			822	513	145	157	7		

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

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

- Molecule 13 is a protein called DNA-directed RNA polymerase III subunit RPC5.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	M	422	Total	C	N	O	S	0	0
			3382	2138	588	636	20		

- Molecule 14 is a protein called DNA-directed RNA polymerase III subunit RPC4.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	N	146	Total 1128	C 710	N 191	O 221	S 6	0	0

- Molecule 15 is a protein called DNA-directed RNA polymerase III subunit RPC3.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	O	512	Total 4075	C 2565	N 712	O 774	S 24	0	0

- Molecule 16 is a protein called DNA-directed RNA polymerase III subunit RPC6.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	P	303	Total 2403	C 1516	N 411	O 460	S 16	0	0

- Molecule 17 is a protein called DNA-directed RNA polymerase III subunit RPC7.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	Q	87	Total 754	C 488	N 126	O 134	S 6	0	0

- Molecule 18 is a protein called Transcription factor IIIB 50 kDa subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	V	34	Total 246	C 144	N 41	O 56	S 5	0	0

- Molecule 19 is a DNA chain called DNA (123-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
19	X	51	Total 1050	C 499	N 203	O 297	P 51	0	0

- Molecule 20 is a DNA chain called DNA (123-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
20	Y	51	Total 1041	C 499	N 176	O 315	P 51	0	0

- Molecule 21 is a RNA chain called RNA (5'-R(P*UP*GP*CP*UP*CP*GP*CP*UP*U)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
21	Z	9	Total	C	N	O	P	0	0
			186	83	27	67	9		

- Molecule 22 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
22	A	2	Total	Zn	0
			2	2	
22	B	1	Total	Zn	0
			1	1	
22	I	1	Total	Zn	0
			1	1	
22	J	1	Total	Zn	0
			1	1	
22	L	1	Total	Zn	0
			1	1	

- Molecule 23 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
23	A	1	Total	Mg	0
			1	1	

- Molecule 24 is 3'-DEOXYADENOSINE-5'-TRIPHOSPHATE (CCD ID: 3AT) (formula: $C_{10}H_{16}N_5O_{12}P_3$).
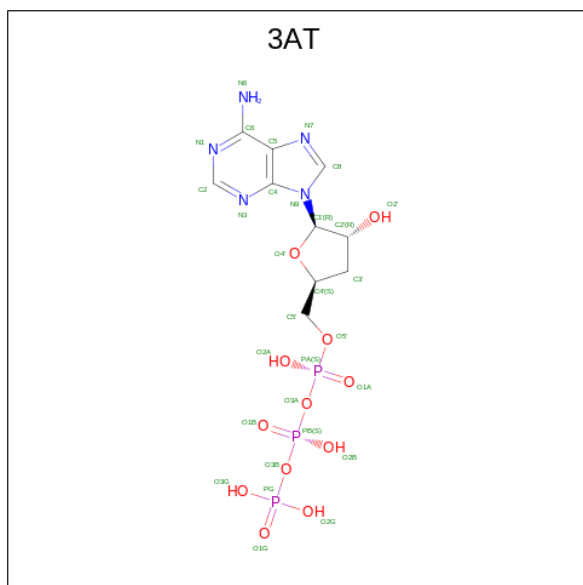
Mol	Chain	Residues	Atoms					AltConf
24	B	1	Total	C	N	O	P	0
			30	10	5	12	3	

- Molecule 25 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe_4S_4).

SF4
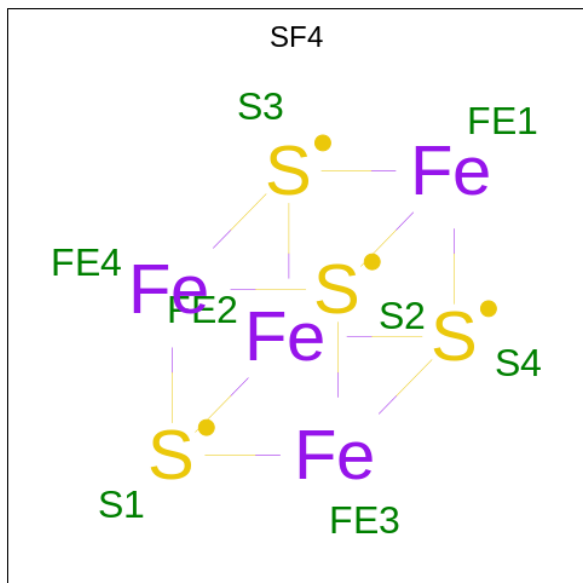
Mol	Chain	Residues	Atoms			AltConf
25	P	1	Total	Fe	S	0
			8	4	4	

- Molecule 26 is GUANOSINE-5'-TRIPHOSPHATE (CCD ID: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$).

GTP
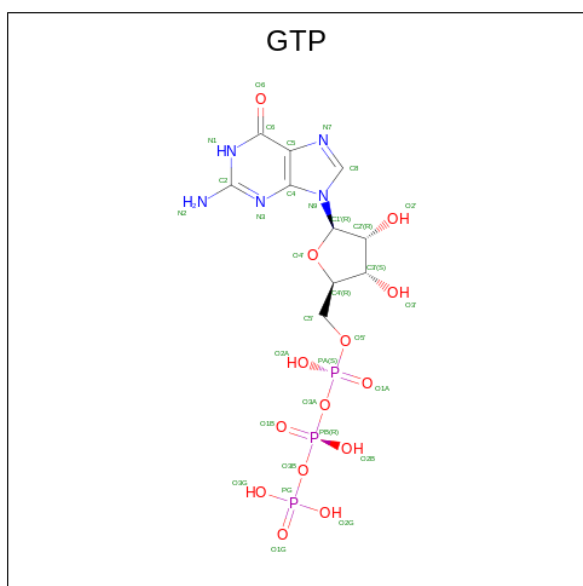
Mol	Chain	Residues	Atoms					AltConf
26	Z	1	Total	C	N	O	P	0
			32	10	5	14	3	

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.
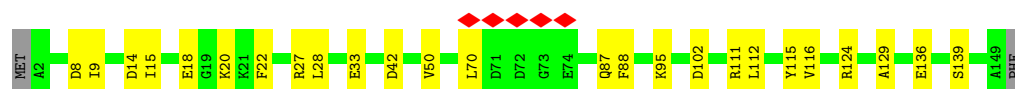
- Molecule 1: DNA-directed RNA polymerase III subunit RPC1

Chain A:
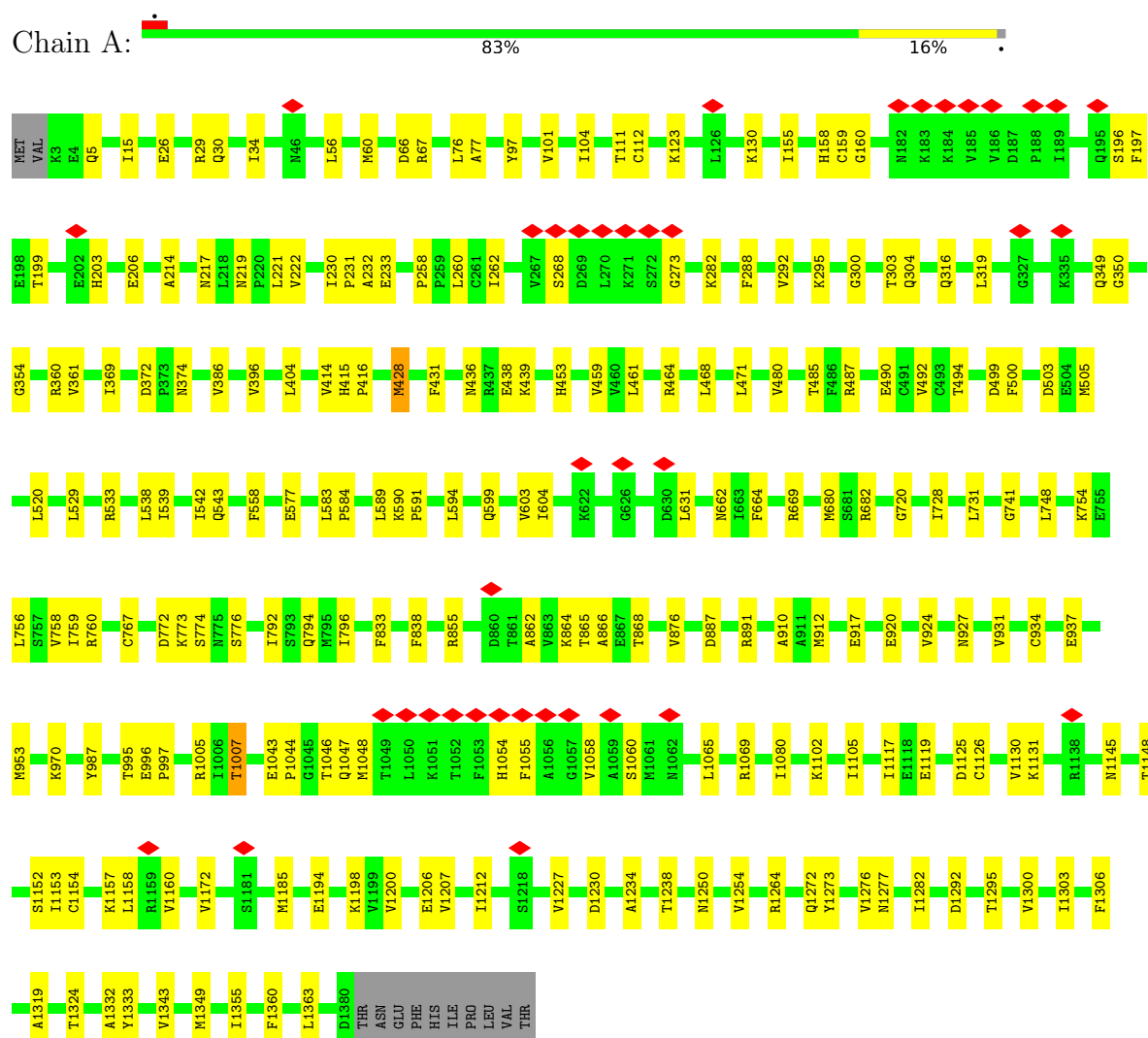
- Molecule 2: DNA-directed RNA polymerase III subunit RPC2
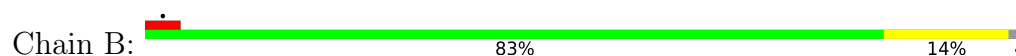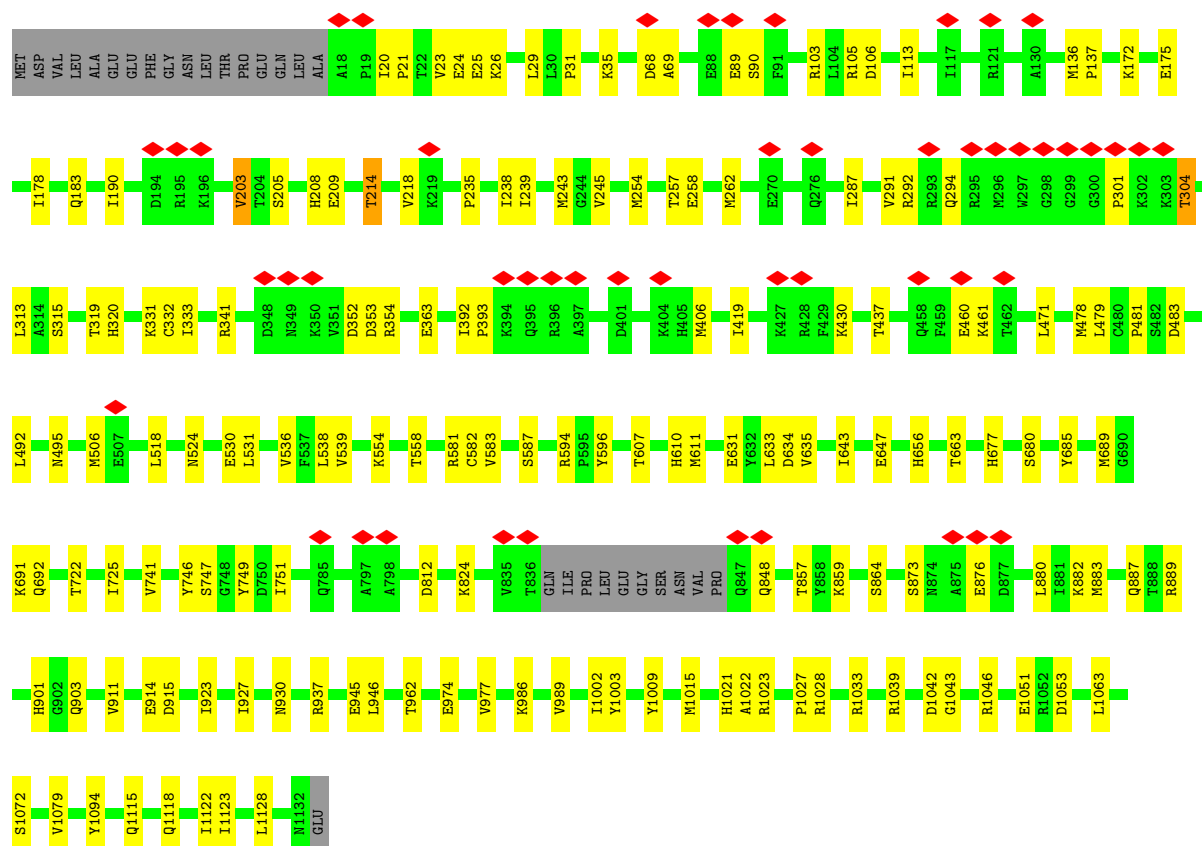
Chain B:
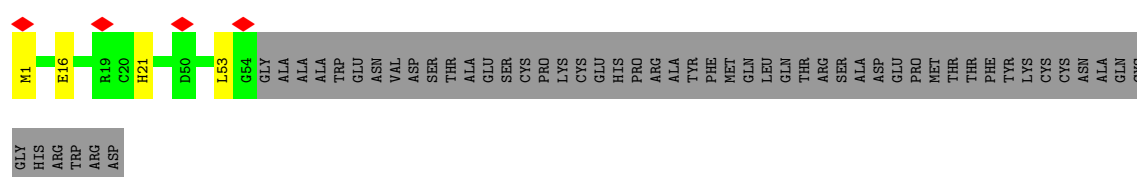
• Molecule 3: DNA-directed RNA polymerases I and III subunit RPAC1
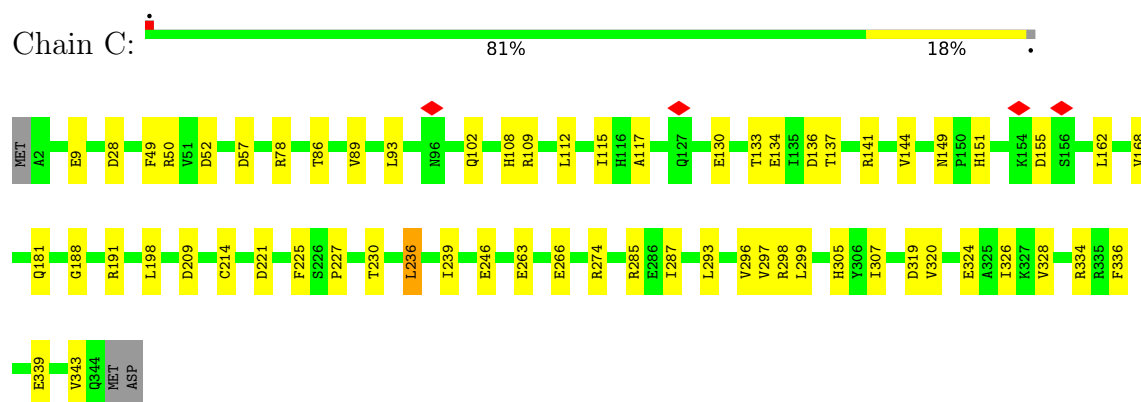
Chain C:

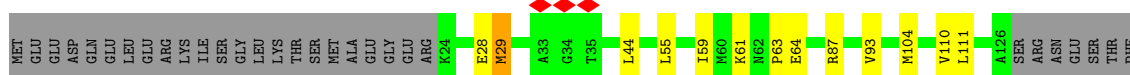• Molecule 4: DNA-directed RNA polymerase III subunit RPC9
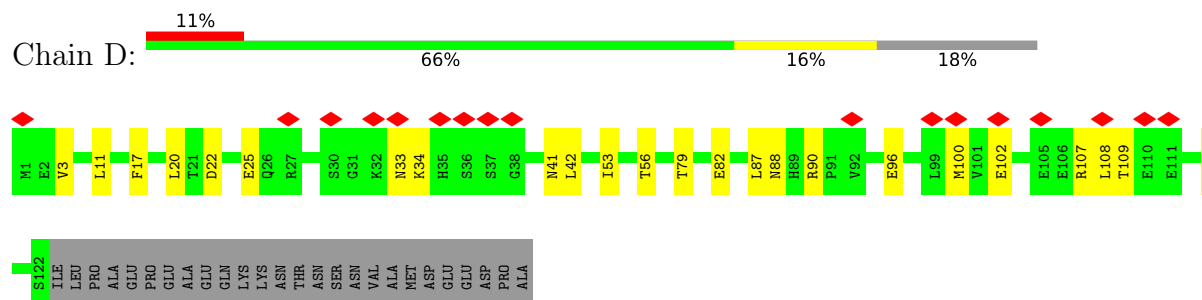
Chain D:

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

Chain E:
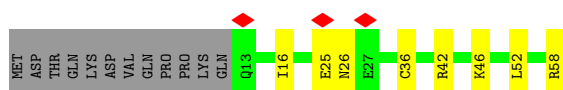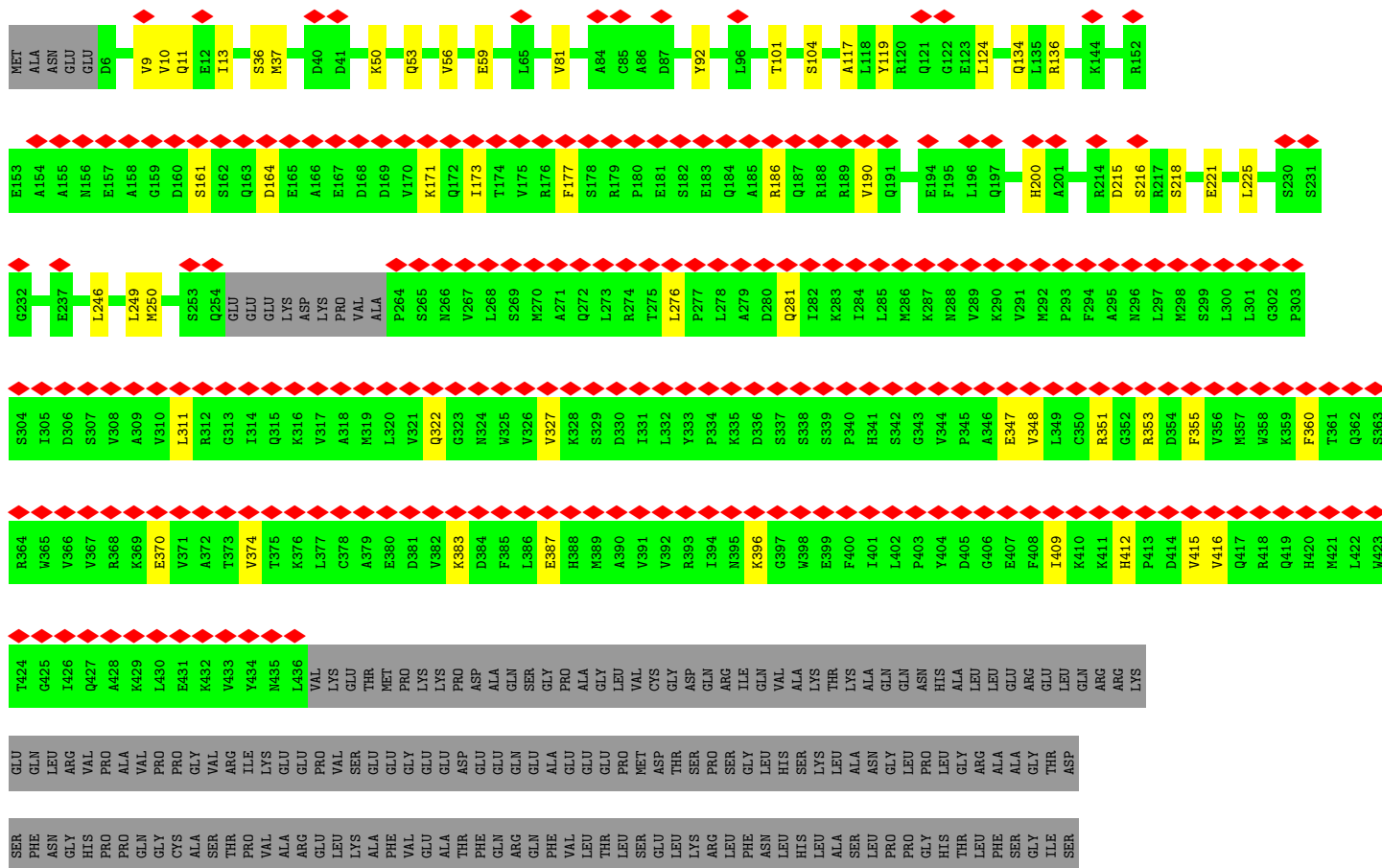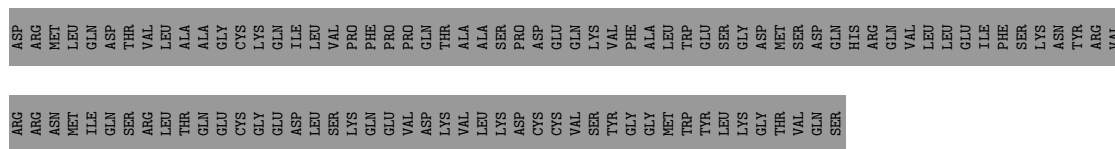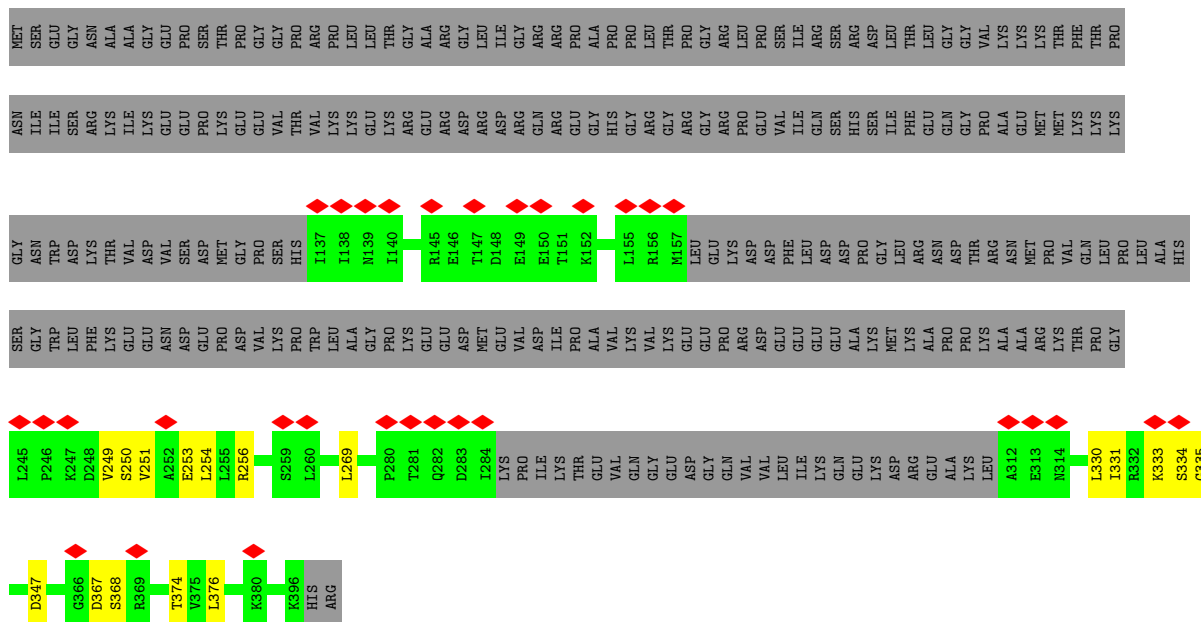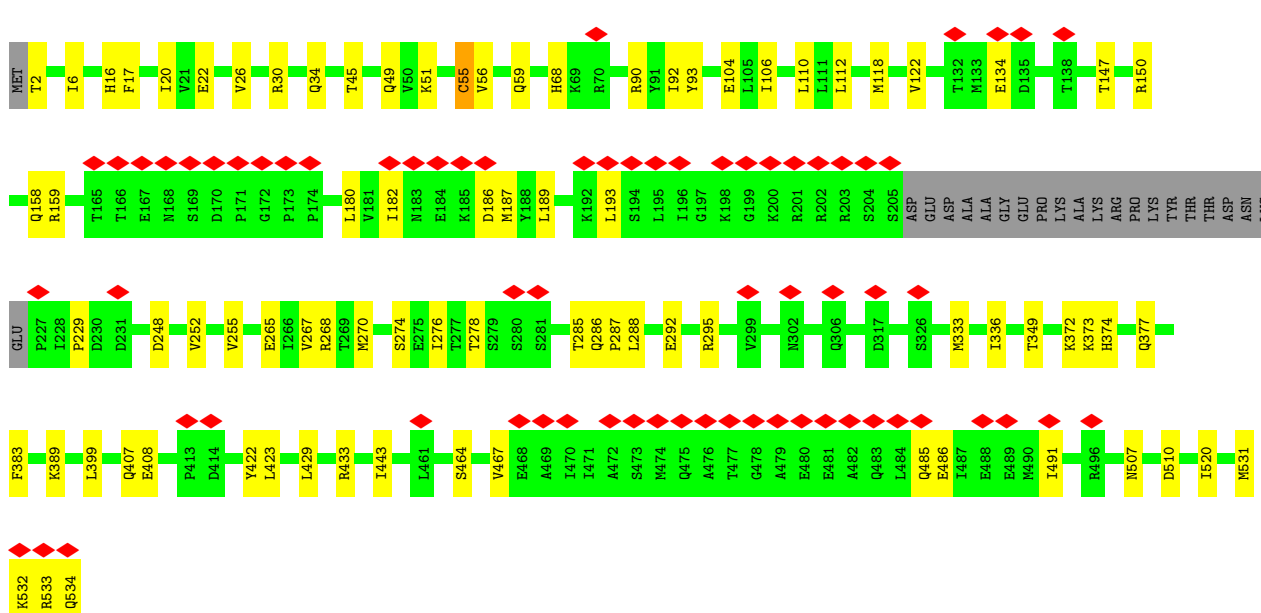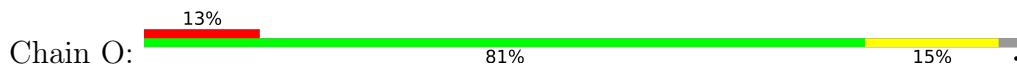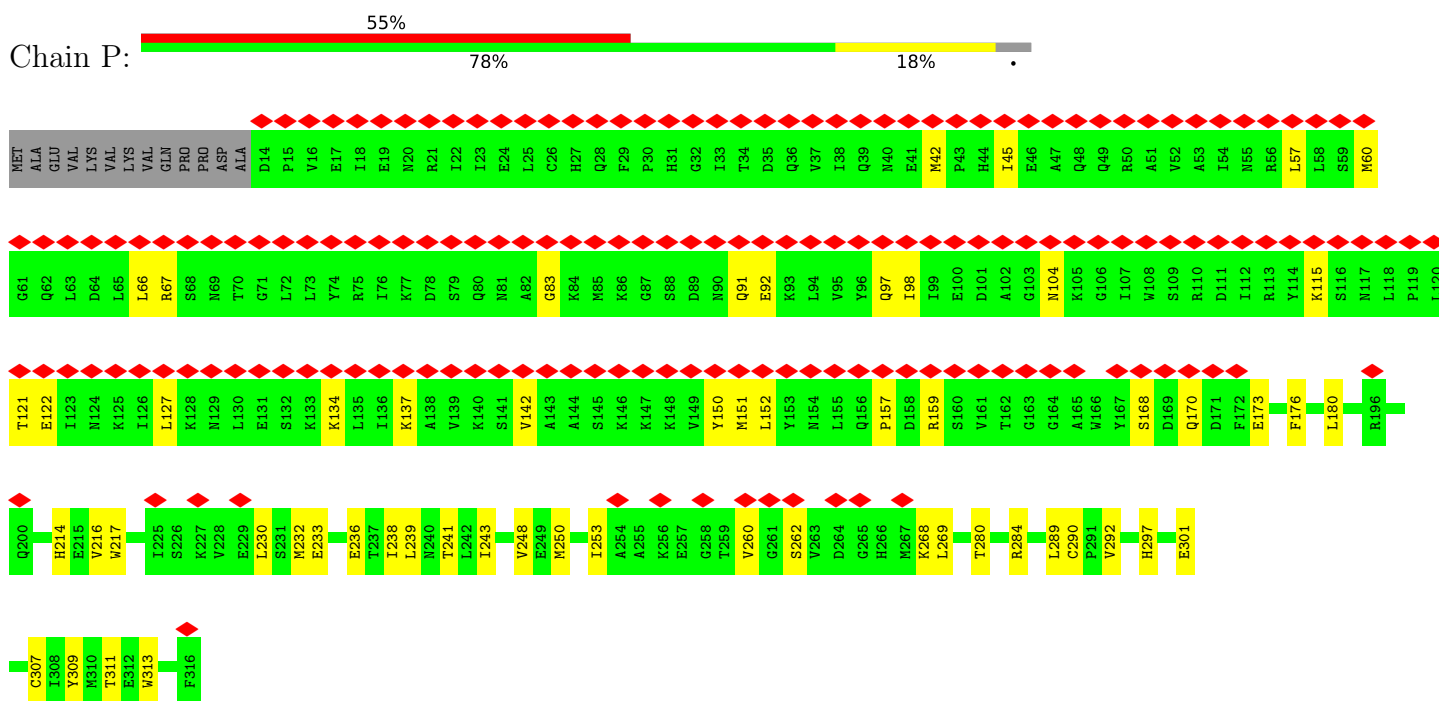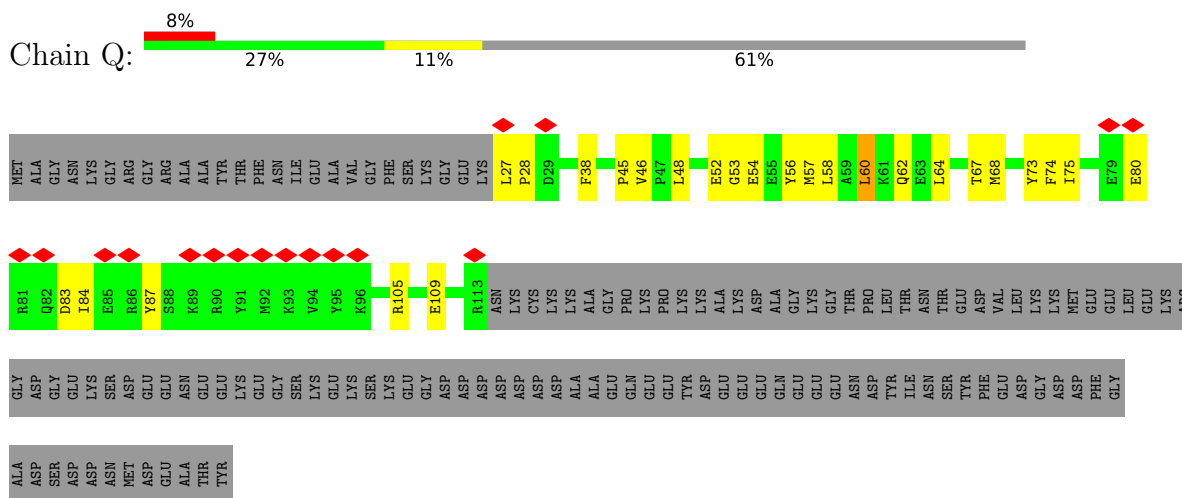
87%　　　13%

MET D2 D3 E4 E5 Q19 T29 E32 Q35 T36 E39 Q43 E50 R54 R55 T56 T59 V60 H64 N65 D66 Q71 F75 K85 V89 M94 Q95 A102 L103 K115 V119 D120 M121 K124 Y125 N138 E154 Q210

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

Chain F:

54%　　6%　　40%

MET SER ASP GLU ASP ASN PHE ASP ASP ASP PHE ASP ASP VAL GLU ASP GLU ASP GLY GLY LEU ASP ASP LEU GLU ASN ALA GLU GLU GLY GLN GLU ASN VAL GLU ILE LEU PRO SER GLY GLU ARG PRO GLN ALA ASN GLN LYS R51 R64 R69 E84 G85 E86

E96 R107 L110 S114 T126 ASP
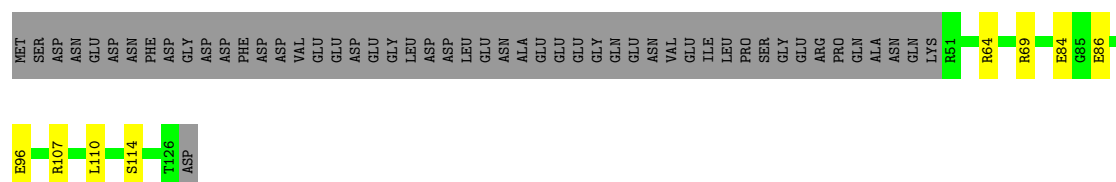
• Molecule 7: DNA-directed RNA polymerase III subunit RPC8

6%

Chain G:

70%　　12%　　19%

MET F2 M7 I26 N31 K32 K33 L34 A35 I46 D63 V70 V75 K90 S93 G96 V99 F103 L114 Q115 Q116 P117 A118 K119 A123 E124 Q125 V128 W129 E130 Y131 GLU THR GLU GLU GLY ALA HIS ASP LEU TYR MET ASP THR G145

E146 E147 I148 R151 V152 P162 THR GLY PRO SER SER ALA ASP ALA THR THR SER SER GLU GLU LEU PRO LYS LYS GLU ALA PRO Y184 T185 S189 I190 S191 E192 L198 W201 THR SER ASN
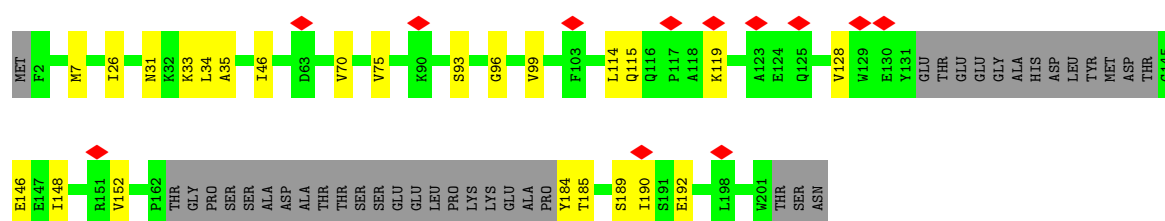
• Molecule 8: DNA-directed RNA polymerases I, II, and III subunit RPABC3

Chain H:

82%　　17%

MET A2 D8 I9 D14 I15 E18 G19 K20 K21 F22 R27 L28 E33 D42 V50 L70 D71 D72 G73 E74 Q87 F88 K95 D102 R111 L112 Y115 V116 R124 A129 E136 S139 A149 PHE

• Molecule 9: DNA-directed RNA polymerase III subunit RPC10

Chain I:

46%　　・　　50%

M1 E16 R19 C20 H21 D50 L53 G54 GLY ALA ALA ALA TRP GLU ASN VAL ASP SER THR ALA GLU SER CYS PRO LYS CYS GLU HIS PRO ARG ALA TYR PHE MET GLN LEU GLN THR ARG SER ALA ASP GLU PRO MET THR THR PHE TYR LYS CYS CYS ASN ALA GLN CYS

GLY HIS ARG TRP ARG ASP

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

Chain J:

76%　　21%　　・

M1 I2 I3 P4 F8 T9 C10 G11 E28 Y29 T30 D36 L40 K41 R42 R46 R47 M48 L49 L65 GLU LYS

• Molecule 11: DNA-directed RNA polymerases I and III subunit RPAC2

Chain K: 68%   9%   23%

MET GLU GLU ASP GLN GLU LEU GLU ARG LYS ILE SER GLY LEU LYS THR SER MET ALA GLU GLY GLU ARG K24 E28 M29 A33 G34 T35 L44 L55 I59 M60 K61 N62 P63 E64 R87 V93 M104 V110 L111 A126 SER ARG ASN GLU SER THR PHE

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

Chain L: 5%   66%   14%   21%

MET ASP THR GLN LYS ASP VAL GLN PRO PRO LYS GLN Q13 I16 E25 N26 E27 C36 R42 K46 L52 R58

• Molecule 13: DNA-directed RNA polymerase III subunit RPC5

Chain M: 33%   52%   8%   40%

MET ALA ASN GLU GLU D6 V9 V10 Q11 E12 I13 S36 M37 D40 D41 K50 Q53 V56 E59 L65 V81 A84 C85 A86 D87 Y92 L96 T101 S104 A117 L118 Y119 R120 Q121 G122 E123 L124 Q134 L135 R136 K144 R152

E153 A154 A155 N156 E157 A158 G159 D160 S161 S162 Q163 D164 E165 A166 E167 D168 D169 V170 K171 Q172 I173 T174 V175 R176 F177 S178 R179 P180 E181 S182 E183 A184 A185 R186 Q187 R188 R189 V190 Q191 E194 F195 L196 Q197 H200 A201 R214 D215 S216 R217 S218 E221 L225 S230 S231

G232 E237 L246 L249 M250 S253 Q254 GLU GLU LYS ASP LYS PRO VAL ALA P264 S265 N266 V267 L268 S269 M270 A271 Q272 L273 R274 T275 L276 P277 L278 A279 D280 Q281 I282 K283 I284 L285 M286 K287 N288 V289 K290 V291 M292 P293 F294 A295 N296 L297 M298 S299 L300 L301 G302 P303

S304 I305 D306 S307 V308 A309 V310 L311 R312 G313 I314 Q315 K316 V317 A318 M319 L320 V321 Q322 G323 N324 W325 V326 V327 K328 S329 D330 I331 L332 Y333 P334 K335 D336 S337 S338 S339 P340 H341 S342 G343 V344 A345 A346 E347 V348 L349 C350 R351 G352 R353 D354 F355 V356 M357 W358 K359 F360 T361 Q362 S363

R364 W365 V366 V367 R368 K369 E370 V371 A372 T373 V374 T375 K376 L377 C378 A379 E380 D381 V382 K383 D384 F385 L386 E387 H388 M389 A390 V391 V392 R393 I394 N395 G396 G397 W398 E399 F400 I401 L402 P403 Y404 D405 G406 E407 F408 I409 K410 K411 H412 P413 D414 V415 V416 Q417 R418 Q419 H420 M421 L422 W423

T424 G425 I426 Q427 A428 K429 L430 E431 K432 V433 Y434 N435 L436 VAL LYS GLU GLY THR MET PRO LYS PRO ASP VAL GLU GLU GLN GLU ALA GLN SER GLY PRO ALA GLU GLY LEU VAL CYS GLY ASP GLN ARG ILE GLN VAL ALA LYS THR ALA GLN GLN ASN HIS ALA LEU LEU LEU ARG GLU GLU LEU GLN ARG ARG LYS

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

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

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

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

• Molecule 14: DNA-directed RNA polymerase III subunit RPC4

Chain N:

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

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

GLY ASN TRP ASP LYS THR VAL ASP VAL SER ASP MET GLY PRO SER HIS **I137 I138 N139 I140** **R145 E146 T147 D148 E149 E150 T151 K152** **L155 R156 M157** LEU GLU LYS ASP ASP PHE LEU ASP ASP PRO GLY LEU ARG LEU ASN ASP THR ARG ASN MET PRO VAL GLN LEU PRO LEU ALA HIS

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

L245 P246 K247 D248 V249 S250 V251 **A252** E253 L254 L255 R256 **S259 I260** L269 **P280 T281 Q282 D283 I284** LYS PRO ILE LYS THR GLU VAL GLN GLY GLU GLY ASP GLY GLN VAL LEU VAL LEU ILE LYS GLN GLU GLY LYS ASP ARG GLU ALA LYS SER LEU **A312 E313 N314** L330 I331 **R332 K333 S334 G335**

D347 **G366 D367 S368 R369** **T374 V375 L376** **K380** K396 HIS ARG

• Molecule 15: DNA-directed RNA polymerase III subunit RPC3

Chain O:

MET T2 I6 H16 F17 I20 V21 E22 V26 R30 Q34 T45 Q49 V50 K51 **C55** V56 Q59 H68 K69 **R70** R90 Y91 I92 Y93 E104 L105 I106 L110 L111 L112 M118 V122 **T132 M133 E134 D135** T138 T147 R150

Q158 R159 **T165 T166 E167 N168 S169 D170 P171 G172 P173 P174** **L180 V181 I182 N183 E184 K185** D186 M187 Y188 L189 **K192 L193** S194 L195 I196 G197 K198 G199 K200 R201 R202 R203 S204 S205 ASP GLU ASP ALA ALA GLY GLU PRO LYS LYS ALA LYS ARG PRO LYS TYR THR THR ASP ASN LYS

GLU **P227 I228** P229 **D230 D231** D248 V252 V255 E265 I266 V267 R268 T269 M270 S274 E275 I276 T277 T278 S279 **S280 S281** T285 Q286 P287 L288 E292 R295 **V299** N302 **Q306** D317 **S326** M333 I336 T349 K372 K373 H374 Q377

F383 K389 L399 Q407 E408 **P413 D414** Y422 L423 L429 **R433** I443 **L461** S464 V467 **E468 A469** I470 I471 A472 S473 M474 Q475 A476 T477 Q478 A479 E480 E481 A482 Q483 L484 **Q485 E486** I487 **E488 E489** M490 **I491** R496 N507 D510 I520 M531

K532 R533 Q534

• Molecule 16: DNA-directed RNA polymerase III subunit RPC6

Chain P:

55%

78%

18%

• Molecule 17: DNA-directed RNA polymerase III subunit RPC7

Chain Q:

8%

27%

11%

61%

• Molecule 18: Transcription factor IIIB 50 kDa subunit

Chain V:

8%

92%

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

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

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

• Molecule 19: DNA (123-MER)

Chain X:

27%

41%

59%

DT DG DT DT DT DA DA DA DA DT DG DG DA DC DT DA DT DC DA DT DA DT DG DC DT DT DA DC DC DG DT DA DA DC DT DT DG DA DA DA DG DT DA DT DT DC DG DA DT DT DC DT DG DG DC DT

DT DT DA DT DA DT DT DC DT DG T-18 G-17 G-16 A-15 A-14 A-13 G-12 G-11 A-10 C-9 G-8 A-7 A-6 A-5 C-4 A-3 C-2 C-1 G0 T1 G2 C3 T4 C5 G6 C7 T8 T9 A10 A11 G12 C13 A14 G15 C16 A17 C18 A19 T20 A21 T22 A23 C24 T25 A26 A27 A28 A29

T30 T31 G32

• Molecule 20: DNA (123-MER)

Chain Y:

19%

37%

59%

C-32 A-31 A-30 T-29 T-28 T-27 T-26 A-25 G-24 T-23 A-22 T-21 A-20 T-19 G-18 T-17 G-16 C-15 T-14 G-13 T-10 A-9 A-8 G-7 C-6 G-5 A-4 G-3 C-2 A-1 C0 G1 G2 T3 G4 T5 T6 T7 C8 G9 T10 C11 C12 T13 T14 T15 C16 C17 A18 DC DA DG DA DT DA DT DA DT

DA DA DA DG DC DC DA DA DA DG DA DA DT DC DG DA DA DT DC DA DC DT DT DT DC DA DG DT DA DC DG DT DA DA DG DC DA DT DA DT DG DA DT DT DG DC DA DT DT DT DA DA DA

DC DA

• Molecule 21: RNA (5'-R(P*UP*GP*CP*UP*CP*GP*CP*UP*U)-3')

Chain Z:

100%

U2 G3 C4 U5 C6 G7 C8 U9 U10

4   Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	307000	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	50	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.281	Depositor
Minimum map value	-0.142	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.006	Depositor
Recommended contour level	0.02	Depositor
Map size (Å)	429.07724, 429.07724, 429.07724	wwPDB
Map dimensions	322, 322, 322	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.332538, 1.332538, 1.332538	Depositor

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: MG, 3AT, SF4, ZN, GTP

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	0.10	0/11008	0.24	0/14842
2	B	0.10	0/8905	0.25	0/12011
3	C	0.11	0/2790	0.25	0/3782
4	D	0.13	0/997	0.26	0/1343
5	E	0.11	0/1745	0.23	0/2358
6	F	0.12	0/620	0.23	0/839
7	G	0.13	0/1374	0.27	0/1868
8	H	0.11	0/1207	0.24	0/1628
9	I	0.13	0/434	0.25	0/584
10	J	0.12	0/521	0.24	0/703
11	K	0.12	0/837	0.29	1/1129 (0.1%)
12	L	0.15	0/394	0.28	0/524
13	M	0.10	0/3455	0.24	0/4673
14	N	0.11	0/1137	0.25	0/1530
15	O	0.11	0/4141	0.24	0/5592
16	P	0.11	0/2446	0.23	0/3301
17	Q	0.14	0/777	0.26	0/1050
18	V	0.13	0/248	0.21	0/336
19	X	0.18	0/1181	0.32	0/1820
20	Y	0.38	1/1163 (0.1%)	0.41	0/1793
21	Z	0.06	0/205	0.15	0/316
All	All	0.12	1/45585 (0.0%)	0.25	1/62022 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
20	Y	1	DG	O3'-P	-10.36	1.45	1.61

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	K	93	VAL	N-CA-C	-5.06	107.80	111.90

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	10814	0	11059	223	0
2	B	8736	0	8861	113	0
3	C	2736	0	2712	46	0
4	D	985	0	1006	17	0
5	E	1715	0	1733	18	0
6	F	610	0	642	6	0
7	G	1337	0	1306	19	0
8	H	1186	0	1147	18	0
9	I	426	0	428	3	0
10	J	512	0	525	9	0
11	K	822	0	810	12	0
12	L	388	0	393	6	0
13	M	3382	0	3376	63	0
14	N	1128	0	1181	15	0
15	O	4075	0	4149	139	0
16	P	2403	0	2408	65	0
17	Q	754	0	759	48	0
18	V	246	0	221	2	0
19	X	1050	0	572	98	0
20	Y	1041	0	581	100	0
21	Z	186	0	96	17	0
22	A	2	0	0	0	0
22	B	1	0	0	0	0
22	I	1	0	0	0	0
22	J	1	0	0	0	0
22	L	1	0	0	0	0
23	A	1	0	0	0	0
24	B	30	0	12	7	0
25	P	8	0	0	3	0

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

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
26	Z	32	0	11	2	0
All	All	44609	0	43988	816	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 9.

The worst 5 of 816 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:303:THR:OG1	15:O:377:GLN:NE2	1.62	1.31
13:M:177:PHE:CE2	16:P:98:ILE:HD12	1.76	1.20
1:A:159:CYS:HB2	15:O:531:MET:HG2	1.39	1.04
1:A:196:SER:HB2	15:O:373:LYS:CB	1.85	1.04
19:X:10:DA:H5'	19:X:11:DA:H5"	1.40	1.03

There are no symmetry-related clashes.

5.3　Torsion angles ⓘ

5.3.1　Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	1376/1390 (99%)	1346 (98%)	30 (2%)	0	100	100
2	B	1101/1133 (97%)	1069 (97%)	32 (3%)	0	100	100
3	C	341/346 (99%)	336 (98%)	5 (2%)	0	100	100
4	D	120/148 (81%)	118 (98%)	2 (2%)	0	100	100
5	E	207/210 (99%)	203 (98%)	4 (2%)	0	100	100
6	F	74/127 (58%)	71 (96%)	3 (4%)	0	100	100
7	G	160/204 (78%)	149 (93%)	11 (7%)	0	100	100
8	H	146/150 (97%)	145 (99%)	1 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
9	I	52/108 (48%)	52 (100%)	0	0	100	100
10	J	63/67 (94%)	61 (97%)	2 (3%)	0	100	100
11	K	101/133 (76%)	99 (98%)	2 (2%)	0	100	100
12	L	44/58 (76%)	41 (93%)	3 (7%)	0	100	100
13	M	418/708 (59%)	403 (96%)	15 (4%)	0	100	100
14	N	140/398 (35%)	140 (100%)	0	0	100	100
15	O	508/534 (95%)	498 (98%)	10 (2%)	0	100	100
16	P	301/316 (95%)	296 (98%)	5 (2%)	0	100	100
17	Q	85/223 (38%)	84 (99%)	1 (1%)	0	100	100
18	V	32/419 (8%)	31 (97%)	1 (3%)	0	100	100
All	All	5269/6672 (79%)	5142 (98%)	127 (2%)	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	1200/1212 (99%)	1194 (100%)	6 (0%)	86	93
2	B	963/988 (98%)	956 (99%)	7 (1%)	81	89
3	C	299/302 (99%)	297 (99%)	2 (1%)	81	89
4	D	114/136 (84%)	114 (100%)	0	100	100
5	E	191/192 (100%)	191 (100%)	0	100	100
6	F	66/111 (60%)	66 (100%)	0	100	100
7	G	149/181 (82%)	148 (99%)	1 (1%)	81	89
8	H	129/131 (98%)	129 (100%)	0	100	100
9	I	48/93 (52%)	48 (100%)	0	100	100
10	J	53/56 (95%)	52 (98%)	1 (2%)	52	73
11	K	92/119 (77%)	91 (99%)	1 (1%)	70	83

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
12	L	43/55 (78%)	43 (100%)	0	100	100
13	M	377/622 (61%)	377 (100%)	0	100	100
14	N	131/347 (38%)	131 (100%)	0	100	100
15	O	458/476 (96%)	457 (100%)	1 (0%)	92	97
16	P	269/280 (96%)	268 (100%)	1 (0%)	89	95
17	Q	84/195 (43%)	83 (99%)	1 (1%)	67	82
18	V	31/365 (8%)	31 (100%)	0	100	100
All	All	4697/5861 (80%)	4676 (100%)	21 (0%)	88	95

5 of 21 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	C	236	LEU
11	K	29	MET
17	Q	60	LEU
15	O	55	CYS
10	J	30	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 38 such sidechains are listed below:

Mol	Chain	Res	Type
15	O	34	GLN
15	O	497	GLN
15	O	68	HIS
15	O	377	GLN
16	P	297	HIS

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
21	Z	8/9 (88%)	0	0

There are no RNA backbone outliers to report.

There are no RNA pucker outliers to report.

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

There are no non-standard protein/DNA/RNA residues in this entry.

5.5   Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6   Ligand geometry ⓘ

Of 10 ligands modelled in this entry, 7 are monoatomic - leaving 3 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	$\#\|Z\| > 2$
26	GTP	Z	101	21	26,34,34	1.11	2 (7%)	32,54,54	1.59	7 (21%)
25	SF4	P	401	16	0,12,12	-	-	-		
24	3AT	B	1202	-	25,32,32	1.01	1 (4%)	28,50,50	1.62	5 (17%)

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
26	GTP	Z	101	21	-	7/18/38/38	0/3/3/3
25	SF4	P	401	16	-	-	0/6/5/5
24	3AT	B	1202	-	-	6/18/34/34	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
26	Z	101	GTP	C5-C6	-3.95	1.39	1.47
24	B	1202	3AT	C5-C4	2.52	1.47	1.40
26	Z	101	GTP	C2-N3	2.26	1.38	1.33

The worst 5 of 12 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
26	Z	101	GTP	PB-O3B-PG	-3.77	119.91	132.83
24	B	1202	3AT	PA-O3A-PB	-3.62	120.42	132.83
24	B	1202	3AT	PB-O3B-PG	-3.59	120.50	132.83
26	Z	101	GTP	C5-C6-N1	3.22	119.63	113.95
24	B	1202	3AT	N3-C2-N1	-3.16	123.75	128.68

There are no chirality outliers.

5 of 13 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
24	B	1202	3AT	C5'-O5'-PA-O3A
24	B	1202	3AT	O4'-C4'-C5'-O5'
24	B	1202	3AT	C3'-C4'-C5'-O5'
26	Z	101	GTP	C4'-C5'-O5'-PA
24	B	1202	3AT	C5'-O5'-PA-O2A

There are no ring outliers.

3 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
26	Z	101	GTP	2	0
25	P	401	SF4	3	0
24	B	1202	3AT	7	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand GTP Z 101

Bond lengths

Bond angles

Torsions

Rings

Ligand 3AT B 1202

Bond lengths

Bond angles

Torsions

Rings
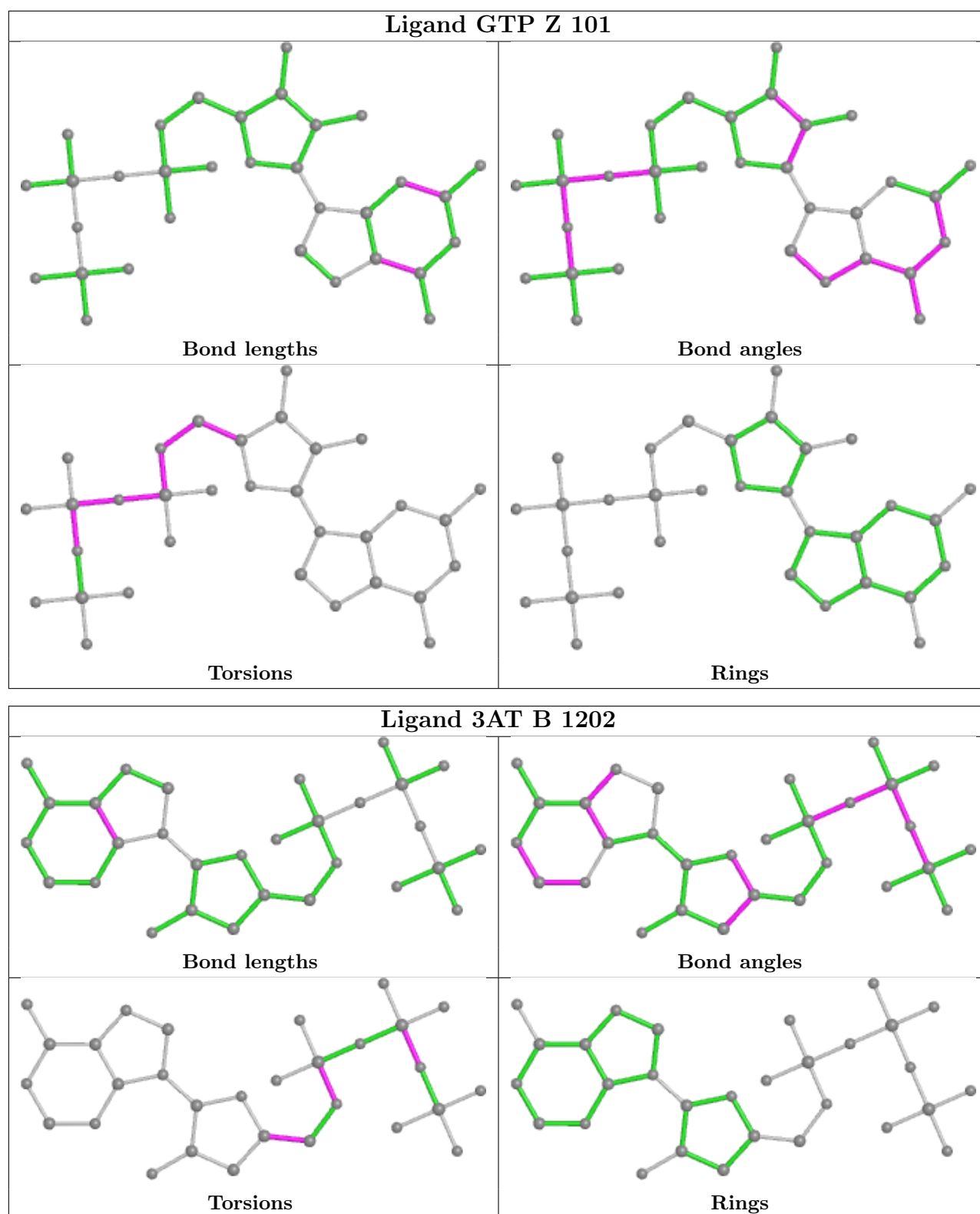
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6   Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-63186. These allow visual inspection of the internal detail of the map and identification of artifacts.

Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1   Orthogonal projections (i)

6.1.1   Primary map
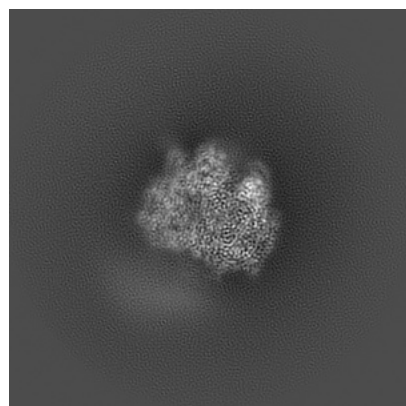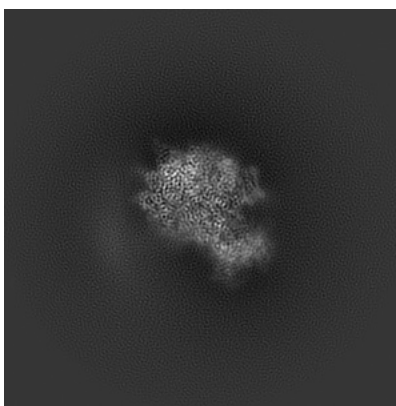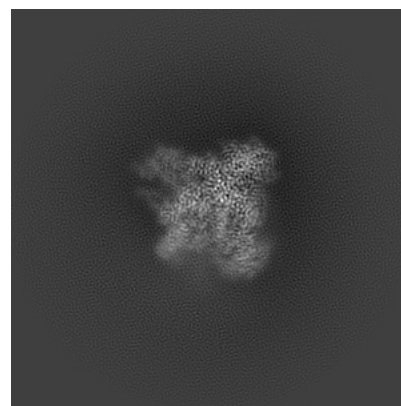
X   Y   Z

6.1.2   Raw map

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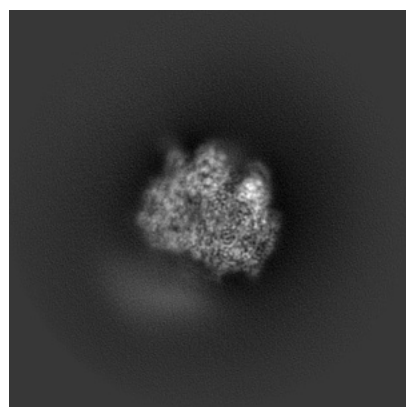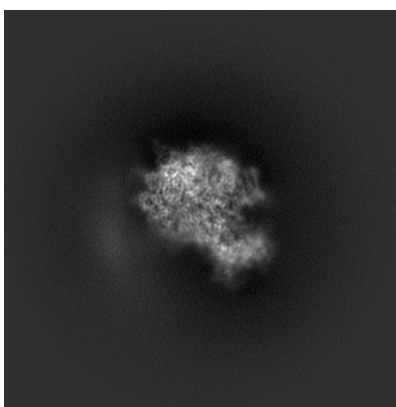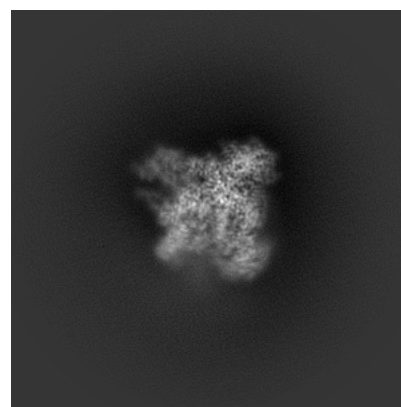
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
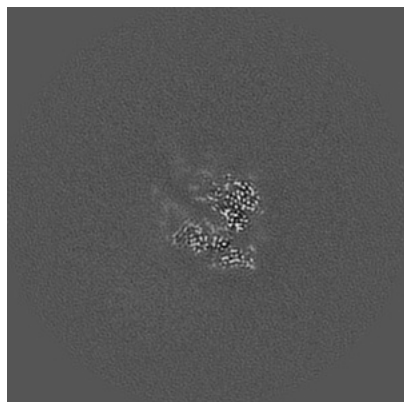
6.2.1 Primary map
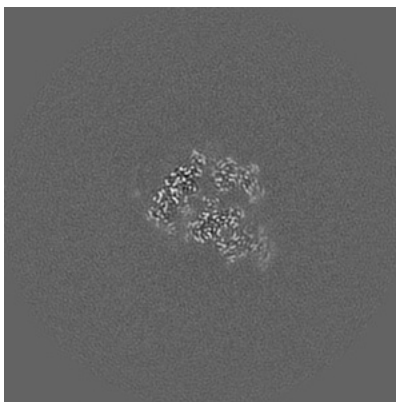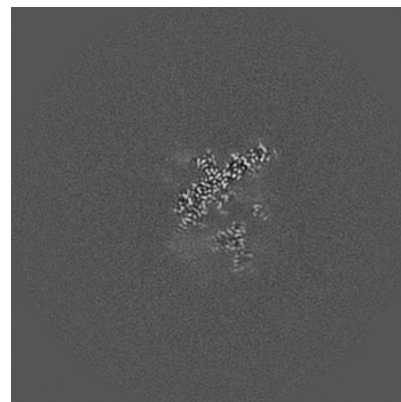
| X Index: 161 | Y Index: 161 | Z Index: 161 |

6.2.2 Raw map
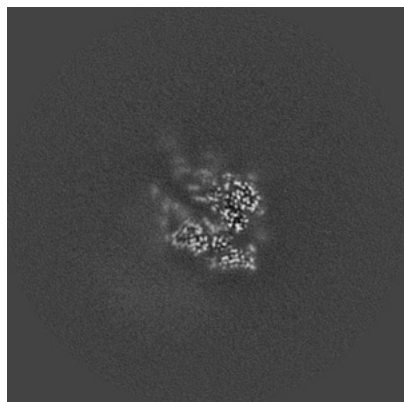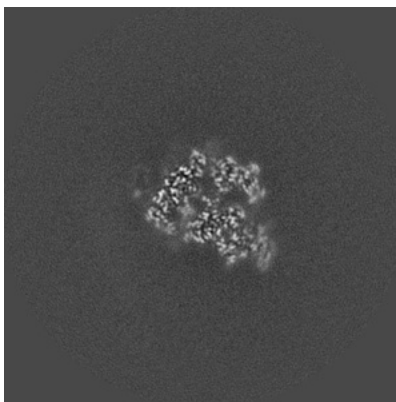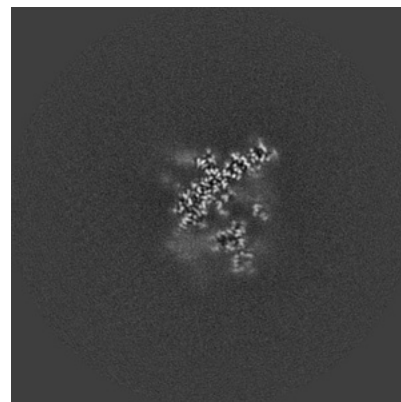
| X Index: 161 | Y Index: 161 | Z Index: 161 |

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

6.3 Largest variance slices ⓘ

6.3.1 Primary map
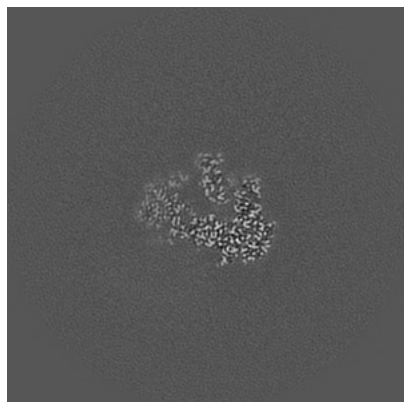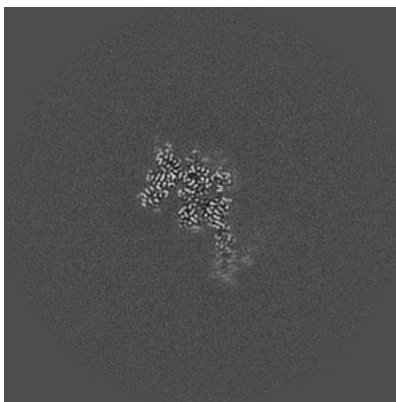
| X Index: 182 | Y Index: 192 | Z Index: 146 |
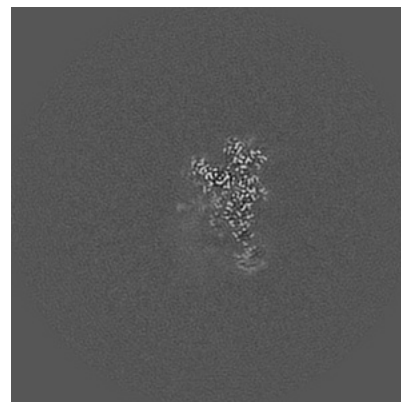
6.3.2 Raw map
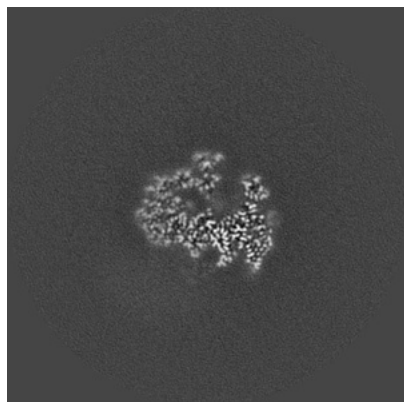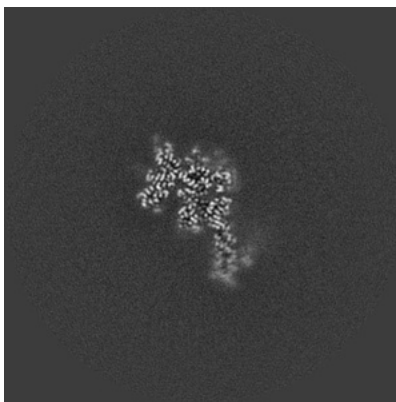
| X Index: 188 | Y Index: 192 | Z Index: 173 |
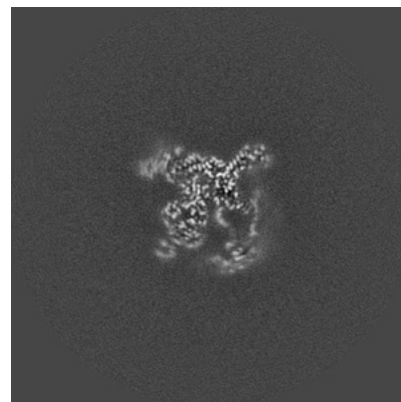
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map
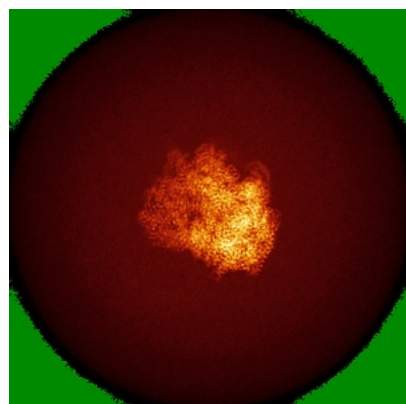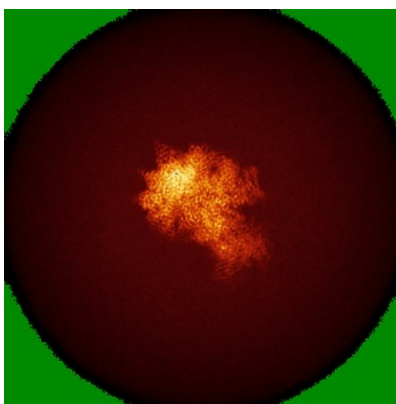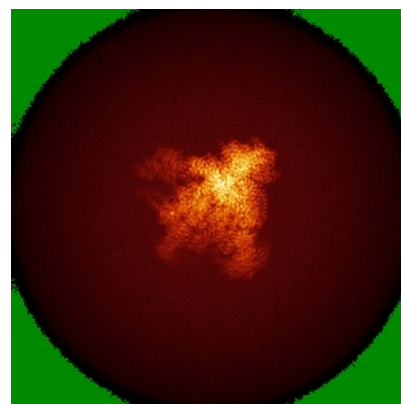
X   Y   Z

6.4.2 Raw map

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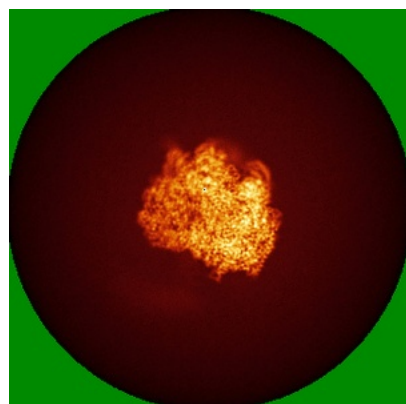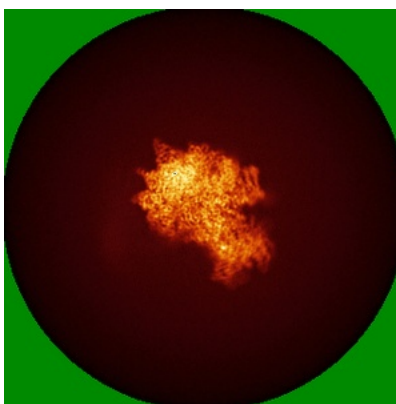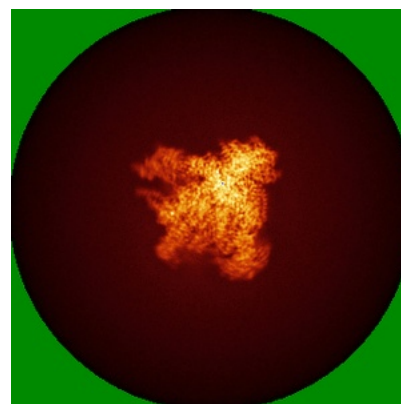
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

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 0.02. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map
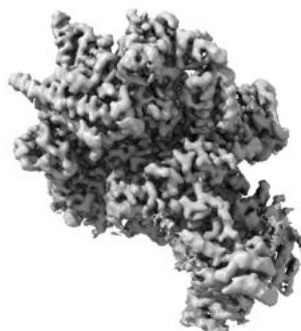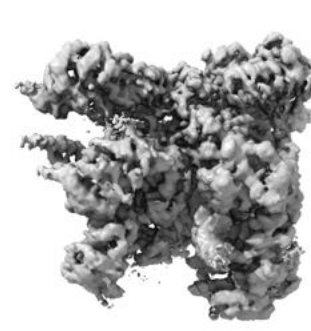
X   Y   Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

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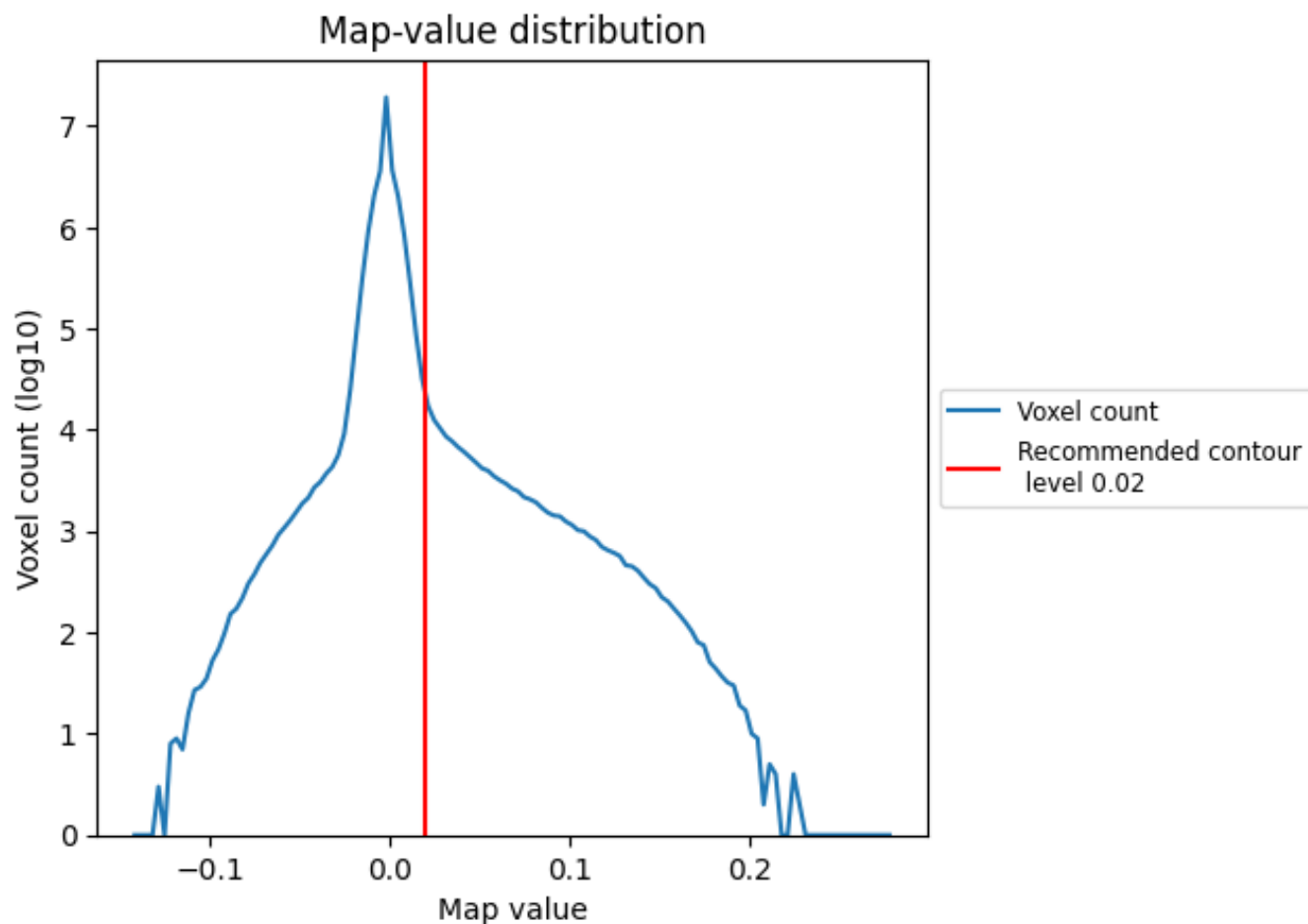
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2 Volume estimate ⓘ
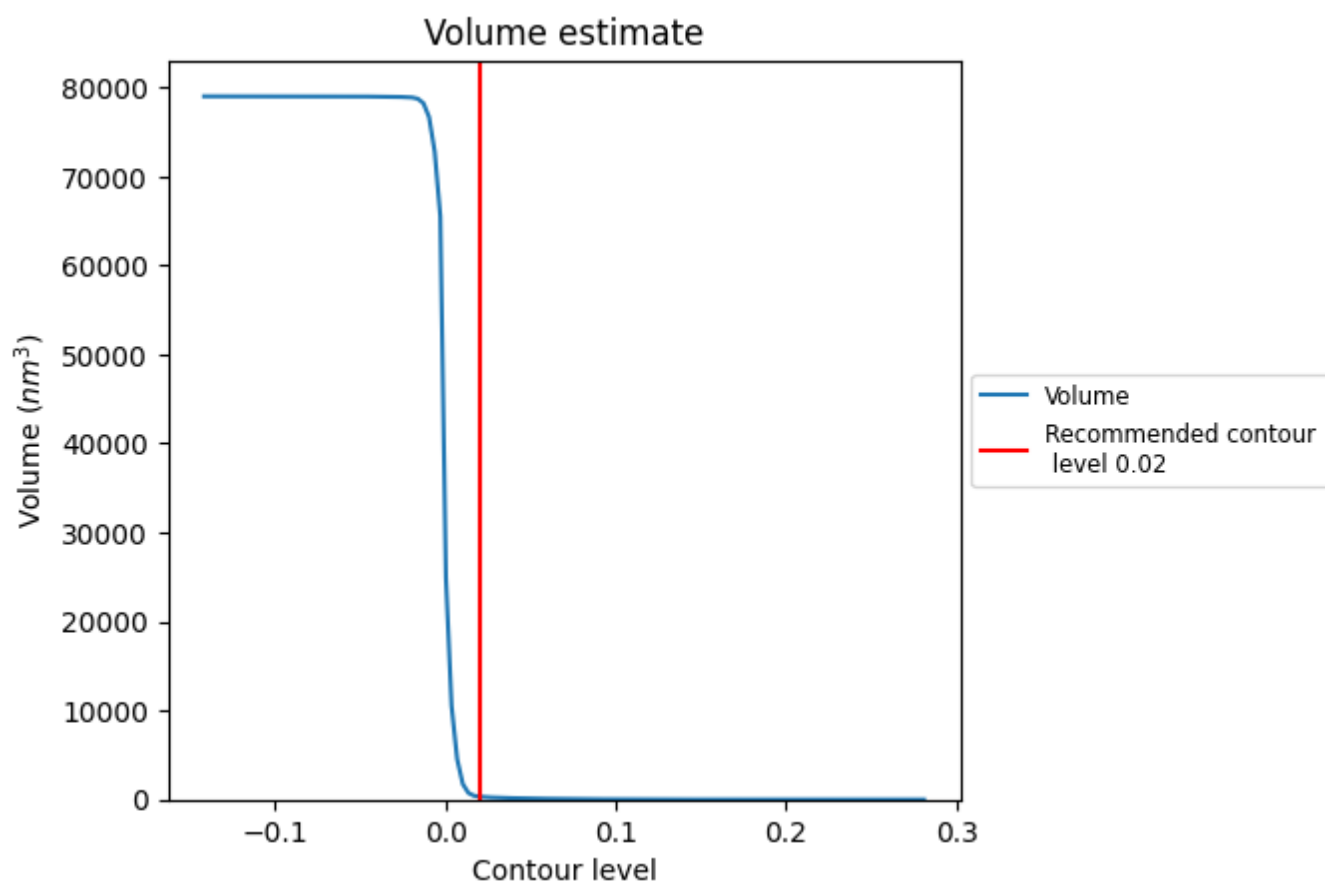
The volume at the recommended contour level is 325 nm^3; this corresponds to an approximate mass of 293 kDa.

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 ⓘ
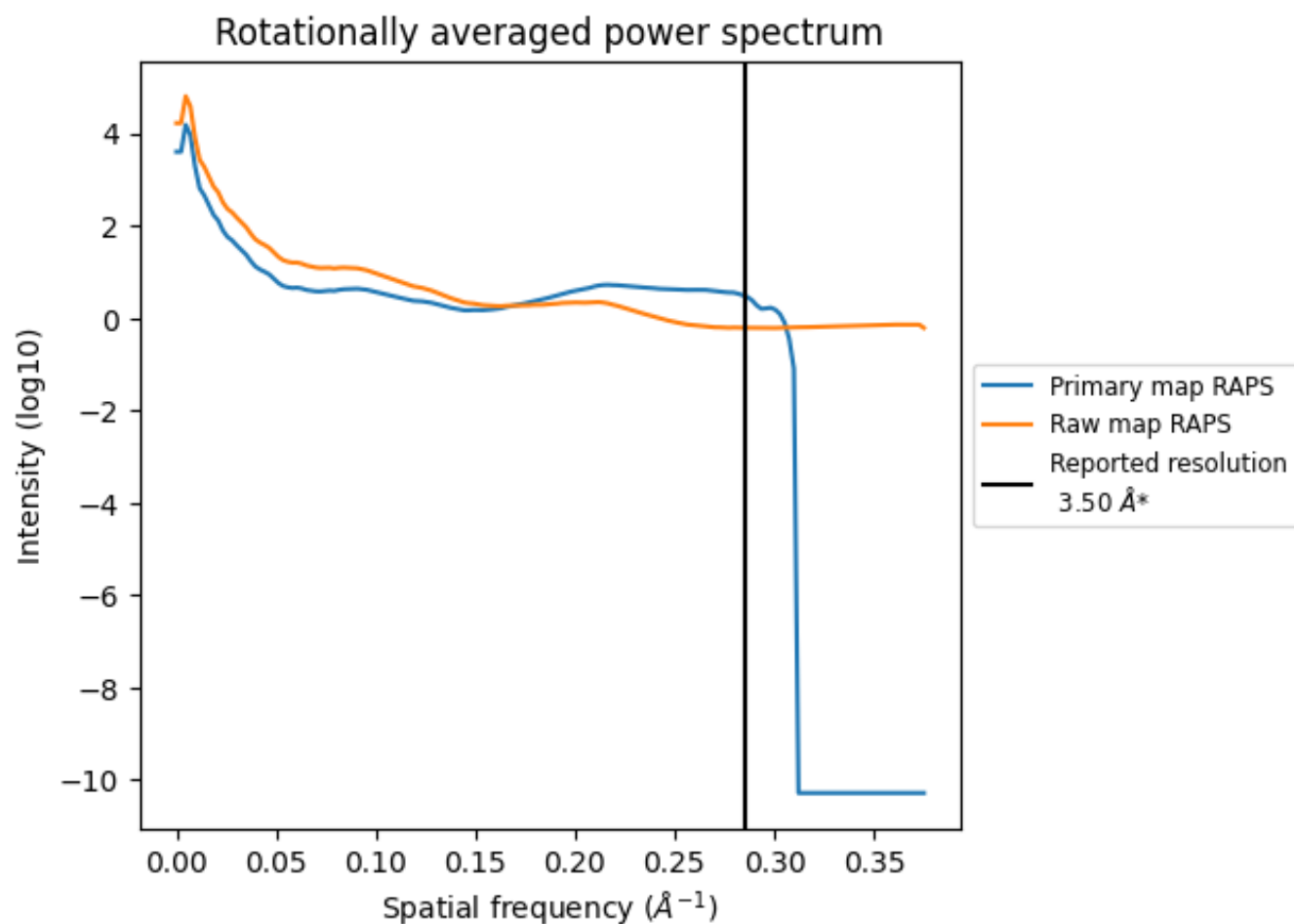
*Reported resolution corresponds to spatial frequency of 0.286 Å^{-1}

8 Fourier-Shell correlation ⓘ

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC ⓘ
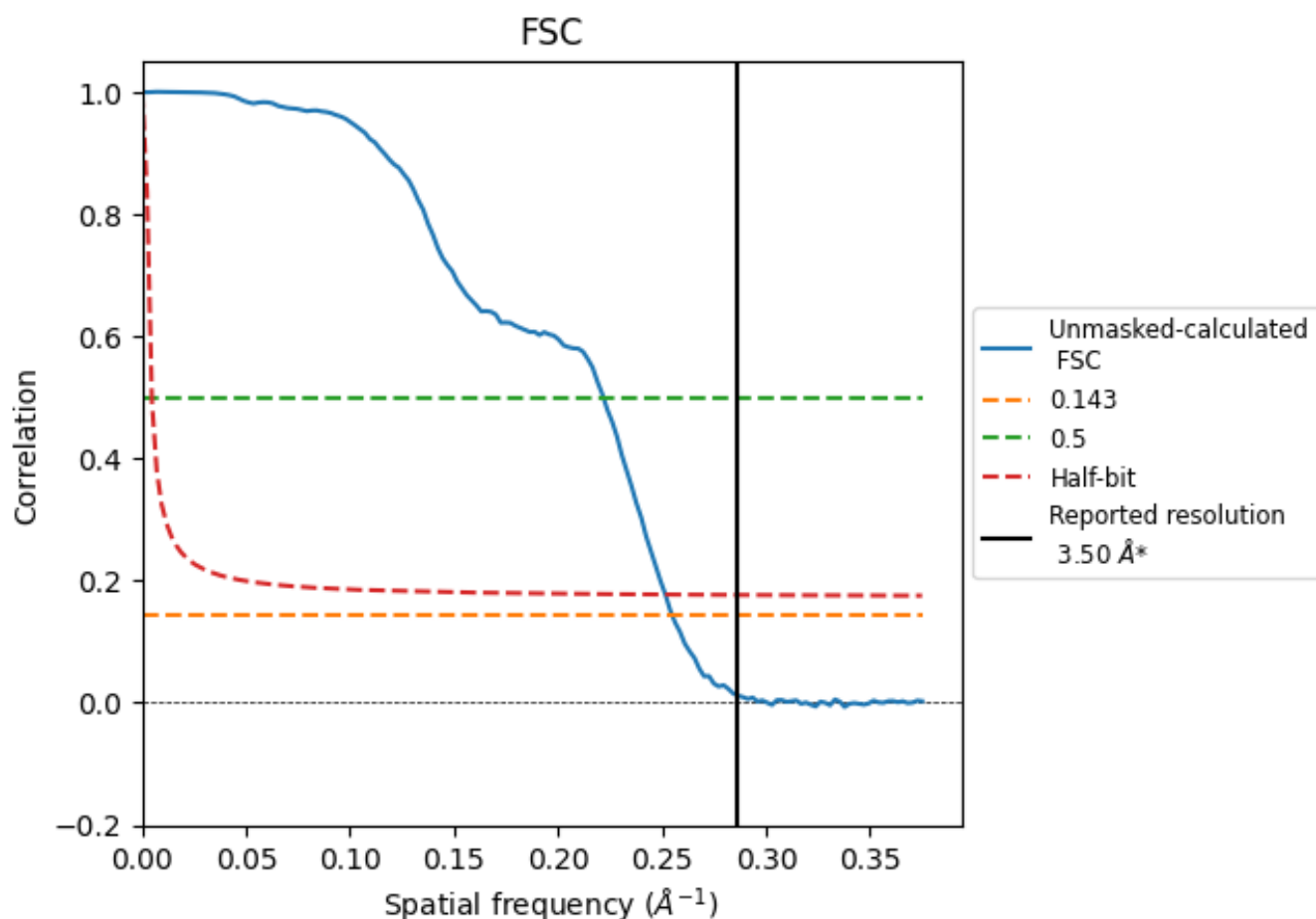
*Reported resolution corresponds to spatial frequency of 0.286 Å^{-1}

8.2　Resolution estimates　ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.50	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.92	4.51	3.97

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.92 differs from the reported value 3.5 by more than 10 %

9　Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-63186 and PDB model 9LKT. Per-residue inclusion information can be found in section 3 on page 10.

9.1　Map-model overlay ⓘ

X	Y	Z
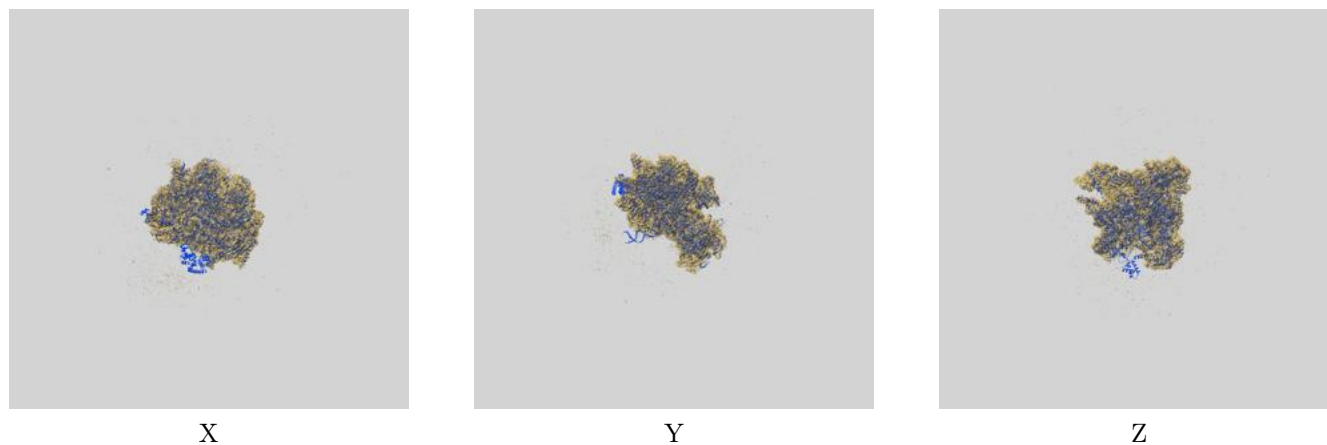
The images above show the 3D surface view of the map at the recommended contour level 0.02 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model   ⓘ
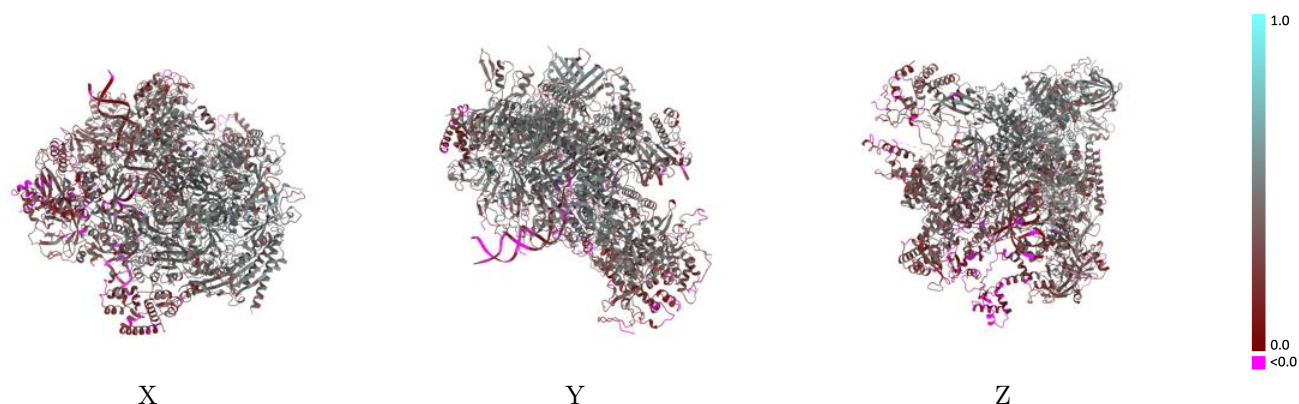
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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   ⓘ
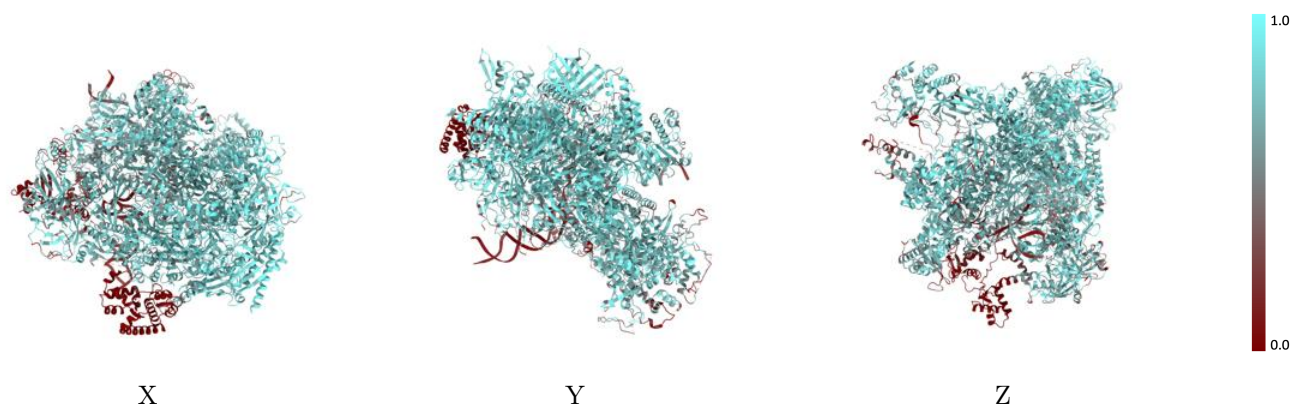
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.02).

9.4   Atom inclusion ⓘ
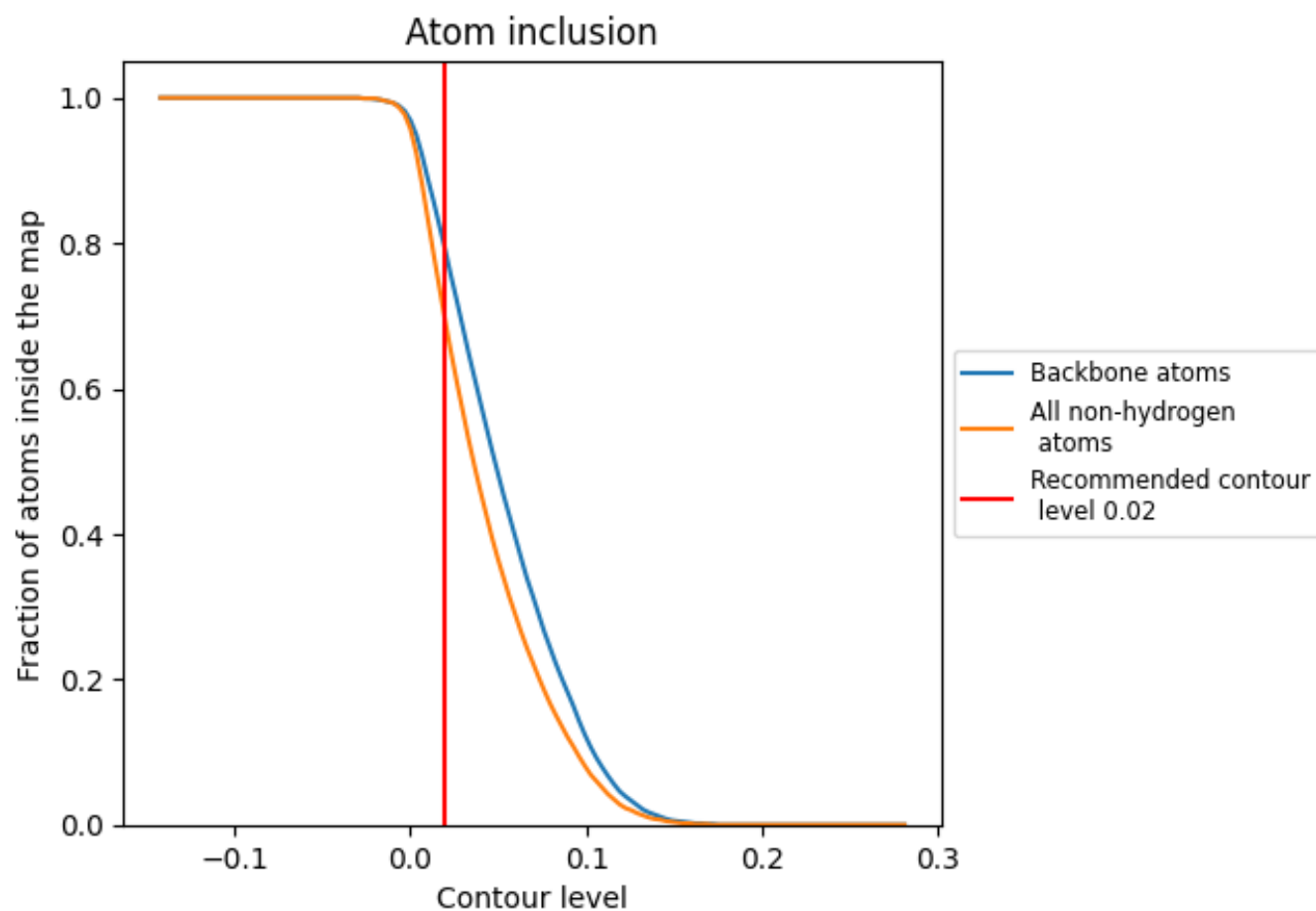
At the recommended contour level, 79% of all backbone atoms, 69% of all non-hydrogen atoms, are inside the map.

9.5   Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.02) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6930	0.3650
A	0.7870	0.4300
B	0.7880	0.4230
C	0.8250	0.4410
D	0.6640	0.2560
E	0.7680	0.3730
F	0.8710	0.4860
G	0.7470	0.3350
H	0.8000	0.4450
I	0.7510	0.3570
J	0.8300	0.4310
K	0.8330	0.4430
L	0.7710	0.3610
M	0.3610	0.2490
N	0.6040	0.2630
O	0.6910	0.3520
P	0.3330	0.1730
Q	0.6110	0.3090
V	0.4770	0.3690
X	0.3080	0.0810
Y	0.4800	0.2010
Z	0.7020	0.3290

1.0

0.0
<0.0