wwPDB EM Validation Summary Report

Nov 3, 2024 – 04:16 am GMT

PDB ID	:	6G0L
EMDB ID	:	EMD-4336
Title	:	Structure of two molecules of the chromatin remodelling enzyme Chd1 bound to a nucleosome
Authors	:	Sundaramoorthy, R.; Owen-hughes, T.; Norman, D.G.; Hughes, A.
Deposited on	:	2018-03-19
Resolution	:	10.00 Å(reported)

This is a wwPDB EM 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/EMValidationReportHelp
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:

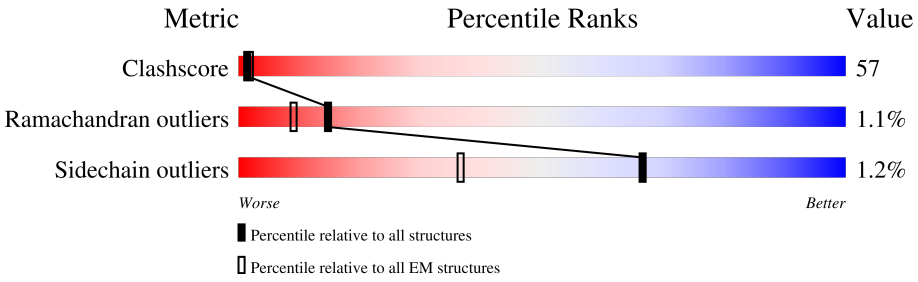
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 10.00 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	136	7% 19% 43% 5% • 29%
1	E	136	• 21% 45% 5% • 29%
2	B	103	• 16% 53% 9% • 19%
2	F	103	14% 30% 47% 10% • 11%
3	C	130	7% 28% 41% 9% • 21%
4	D	126	11% 30% 36% 9% • 25%
4	H	126	• 26% 44% • • 26%
5	G	130	18% 25% 48% 7% 19%

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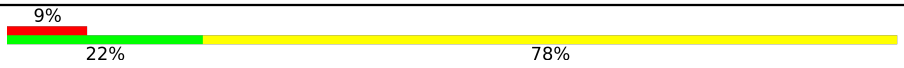
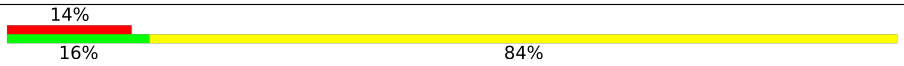
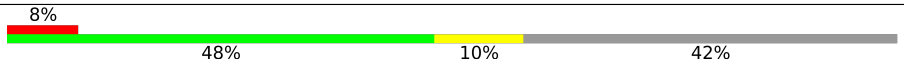
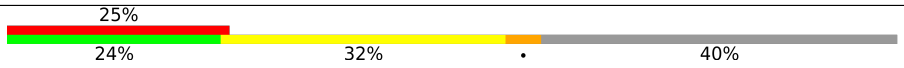
Mol	Chain	Length	Quality of chain
6	I	176	
7	J	177	
8	M	1468	
8	W	1468	

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
9	ADP	W	1502	-	-	X	-

2 Entry composition (i)

There are 10 unique types of molecules in this entry. The entry contains 27526 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 Histone H3.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	97	Total 800	C 504	N 155	O 138	S 3	0	0
1	E	97	Total 799	C 502	N 155	O 139	S 3	0	0

- Molecule 2 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	83	Total 662	C 418	N 129	O 114	S 1	0	0
2	F	92	Total 686	C 430	N 134	O 121	S 1	0	0

- Molecule 3 is a protein called Histone H2A type 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
3	C	103	Total 795	C 501	N 155	O 139	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	99	ARG	GLY	conflict	UNP P06897
C	106	ARG	GLY	conflict	UNP P06897

- Molecule 4 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	95	Total 745	C 469	N 134	O 140	S 2	0	0
4	H	93	Total 726	C 457	N 130	O 137	S 2	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	29	THR	SER	conflict	UNP A0A1L8G0X3
H	29	THR	SER	conflict	UNP A0A1L8G0X3

- Molecule 5 is a protein called Histone H2A type 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
5	G	105	Total	C	N	O	0	0
			809	510	158	141		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	99	ARG	GLY	conflict	UNP P06897

- Molecule 6 is a DNA chain called DNA (176-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
6	I	176	Total	C	N	O	P	0	0
			3590	1704	657	1053	176		

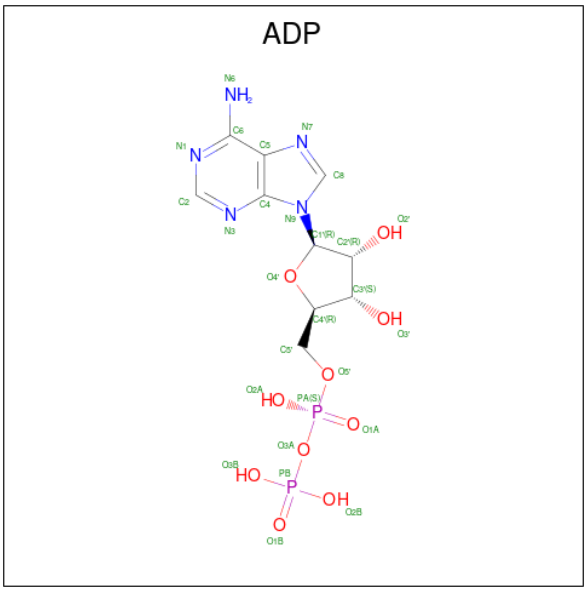
- Molecule 7 is a DNA chain called DNA (177-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
7	J	177	Total	C	N	O	P	0	0
			3646	1727	676	1066	177		

- Molecule 8 is a protein called Chromo domain-containing protein 1.

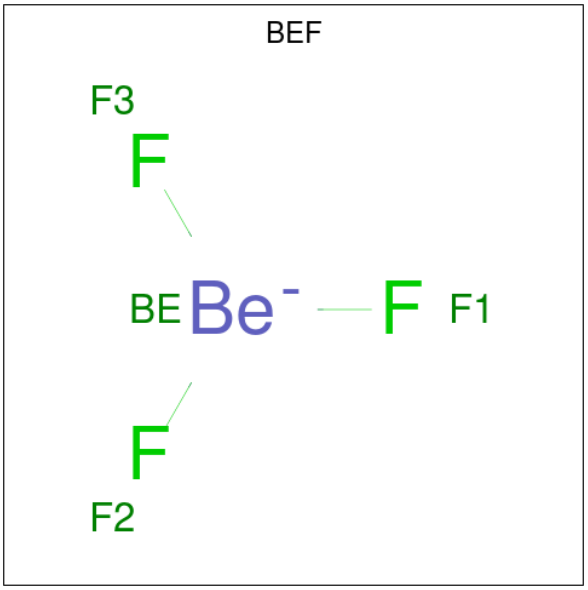
Mol	Chain	Residues	Atoms					AltConf	Trace
8	M	855	Total	C	N	O	S	0	0
			7017	4461	1221	1308	27		
8	W	878	Total	C	N	O	S	2	0
			7189	4568	1260	1334	27		

- Molecule 9 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



Mol	Chain	Residues	Atoms					AltConf
9	M	1	Total	C	N	O	P	0
			27	10	5	10	2	
9	W	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 10 is BERYLLIUM TRIFLUORIDE ION (three-letter code: BEF) (formula: BeF_3).

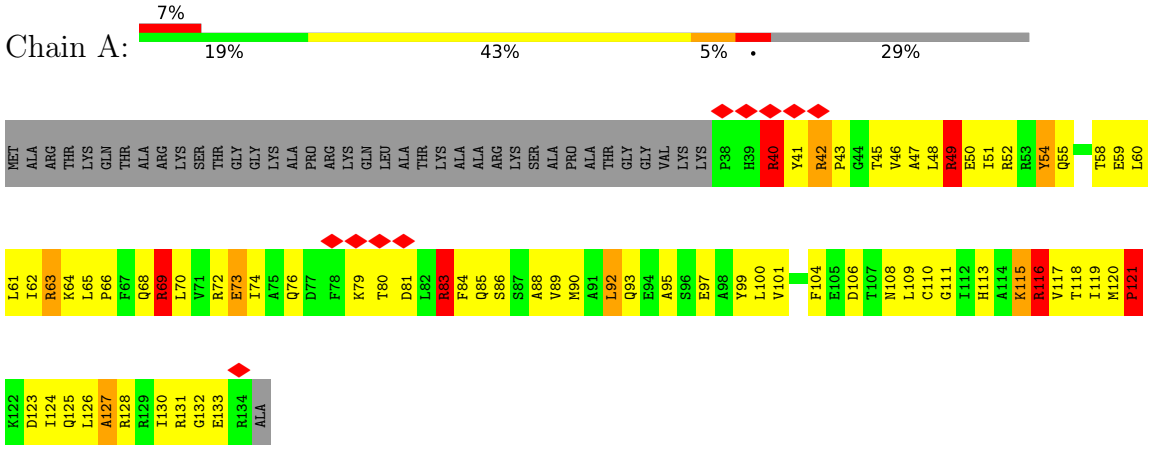


Mol	Chain	Residues	Atoms				AltConf
10	M	1	Total	Be	F		0
			4	1	3		
10	W	1	Total	Be	F		0
			4	1	3		

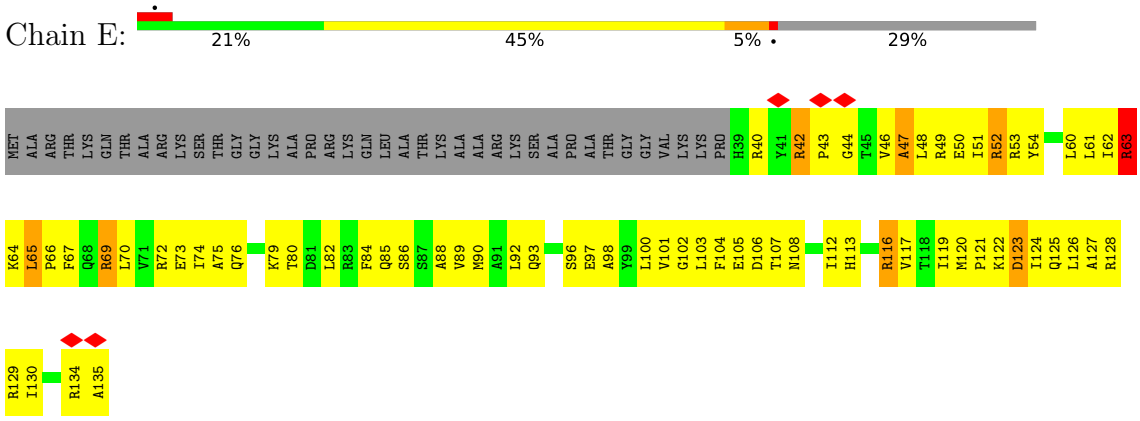
3 Residue-property plots (i)

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.

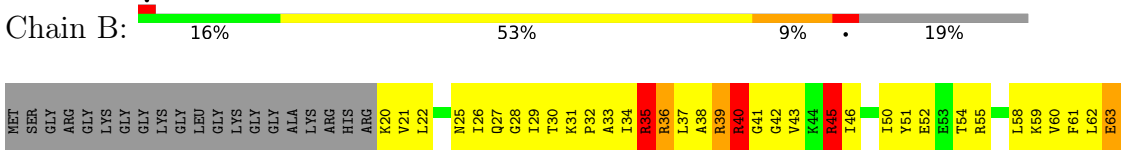
• Molecule 1: Histone H3

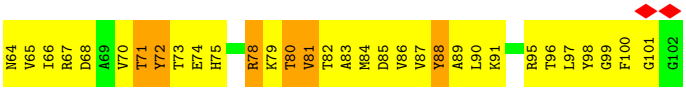


• Molecule 1: Histone H3



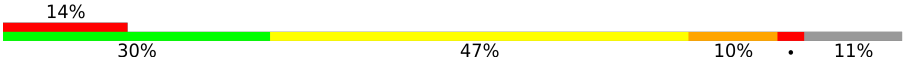
• Molecule 2: Histone H4

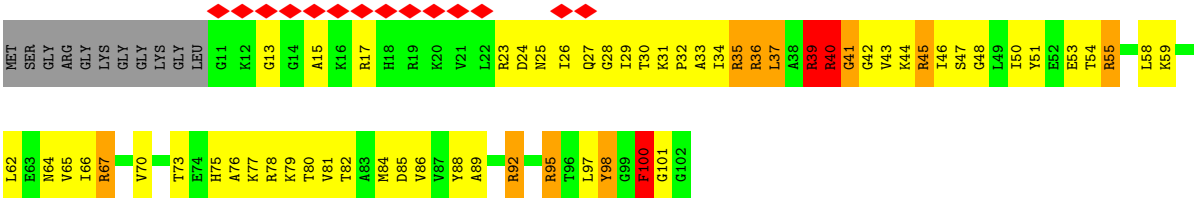




• Molecule 2: Histone H4

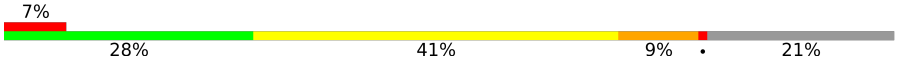
Chain F:

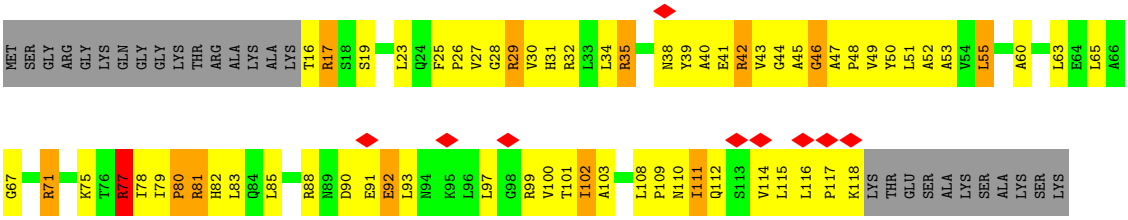




• Molecule 3: Histone H2A type 1

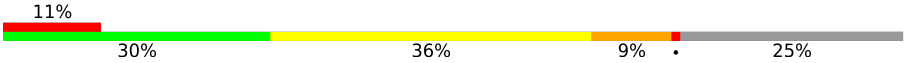
Chain C:

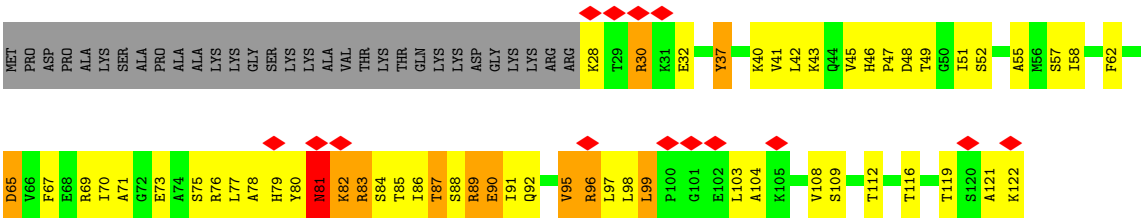




• Molecule 4: Histone H4

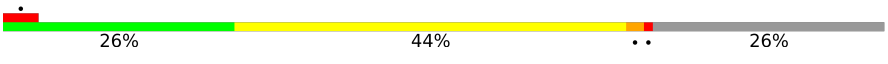
Chain D:

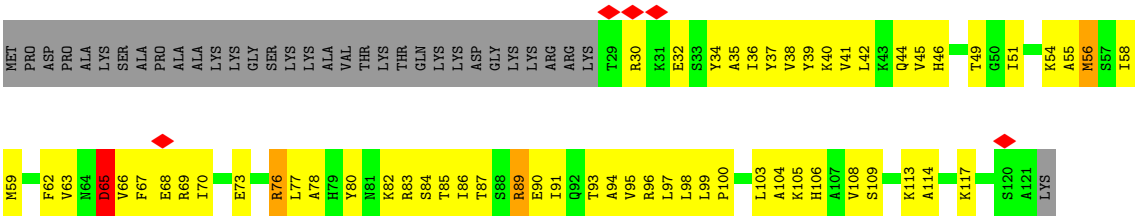




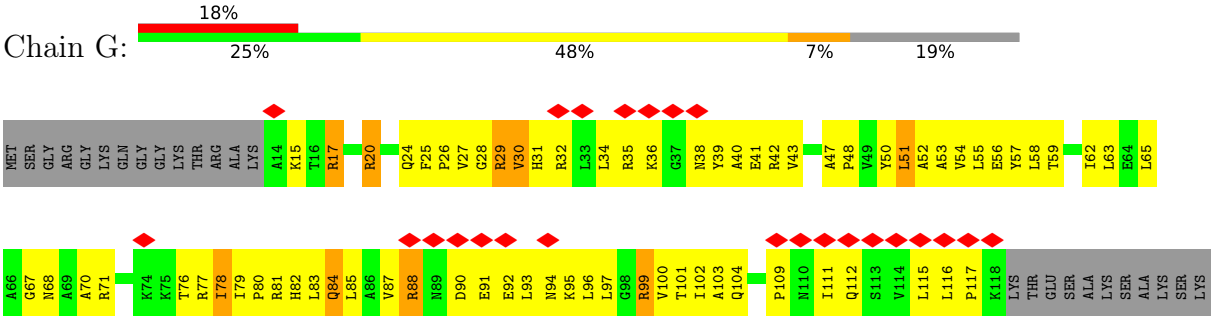
• Molecule 4: Histone H4

Chain H:

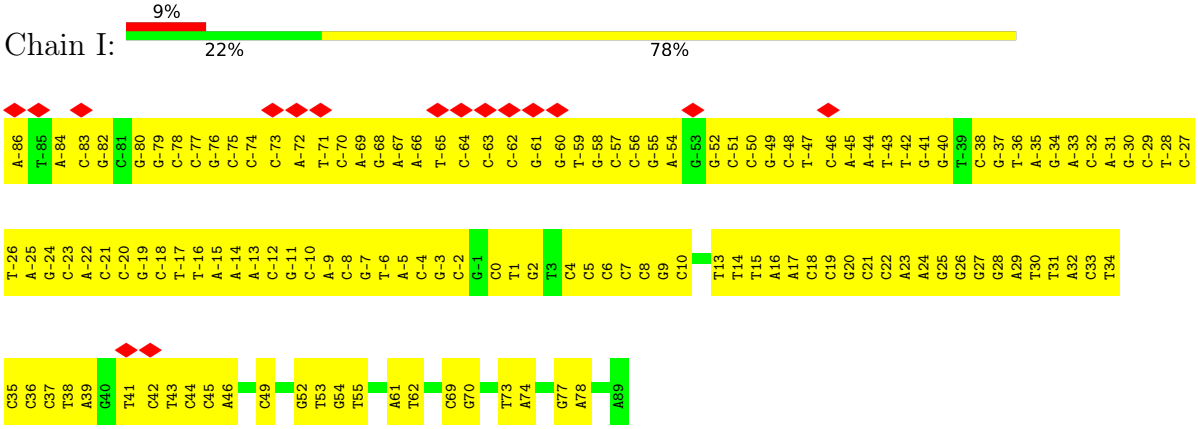




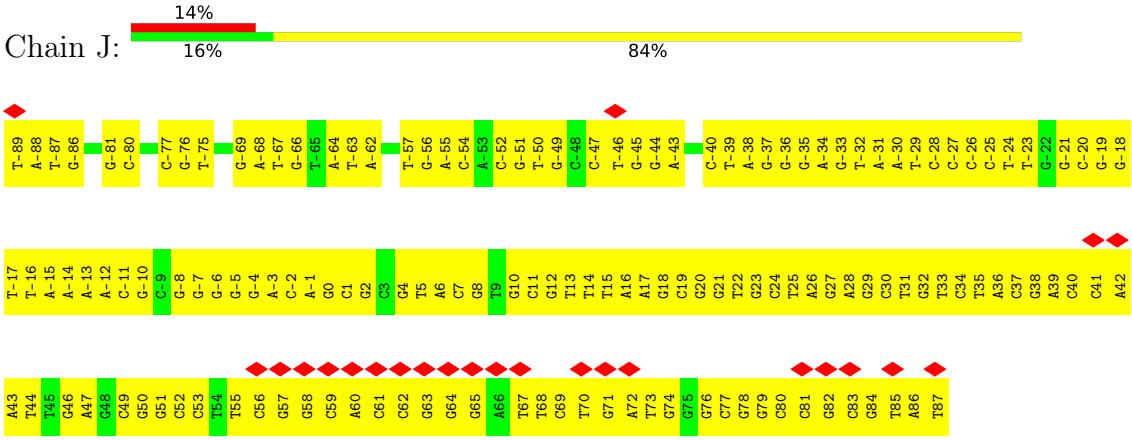
• Molecule 5: Histone H2A type 1



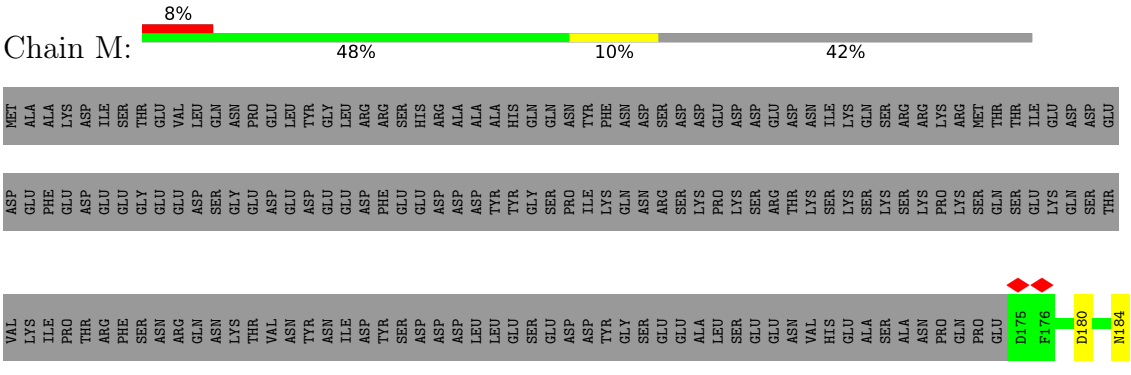
• Molecule 6: DNA (176-MER)

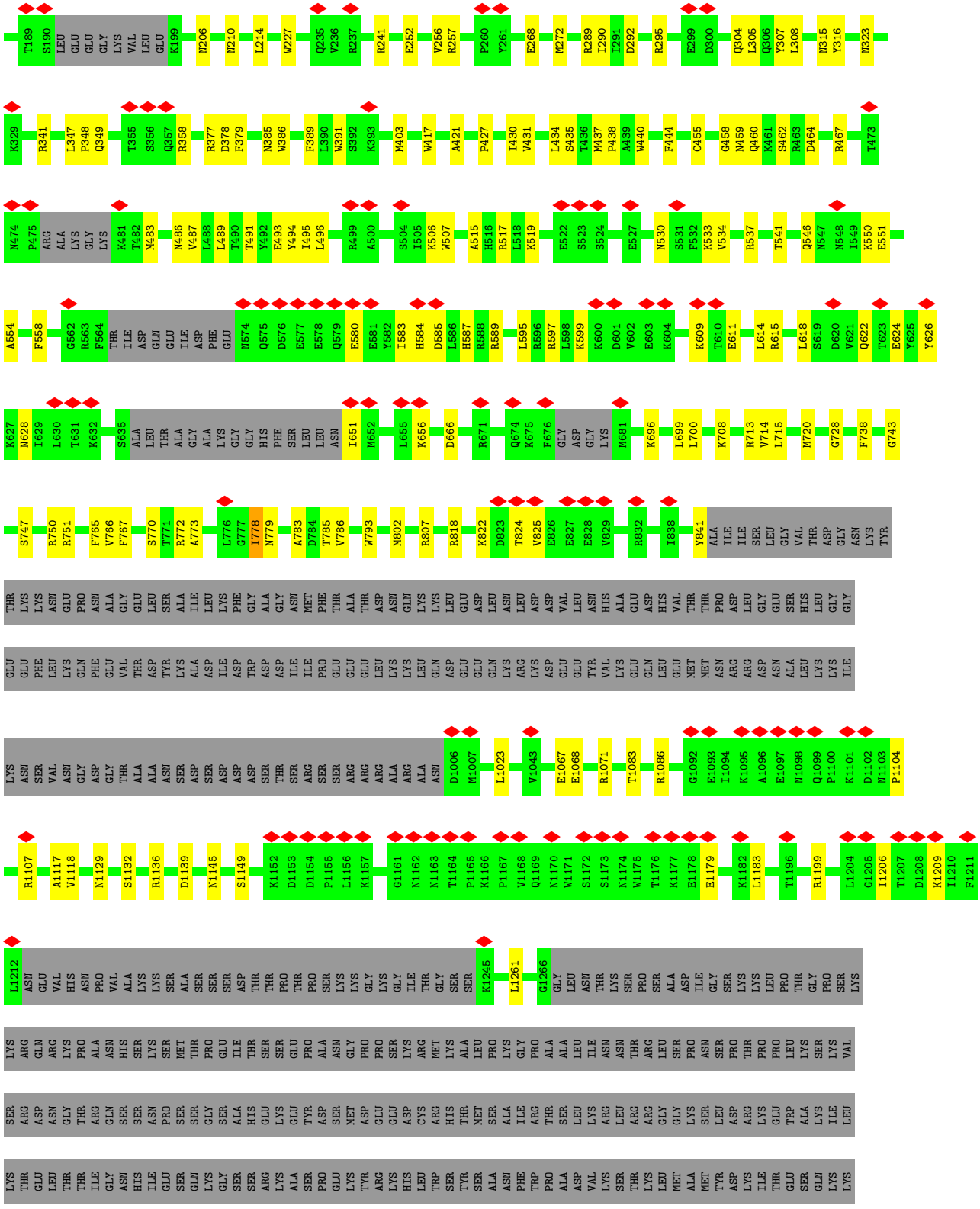


• Molecule 7: DNA (177-MER)



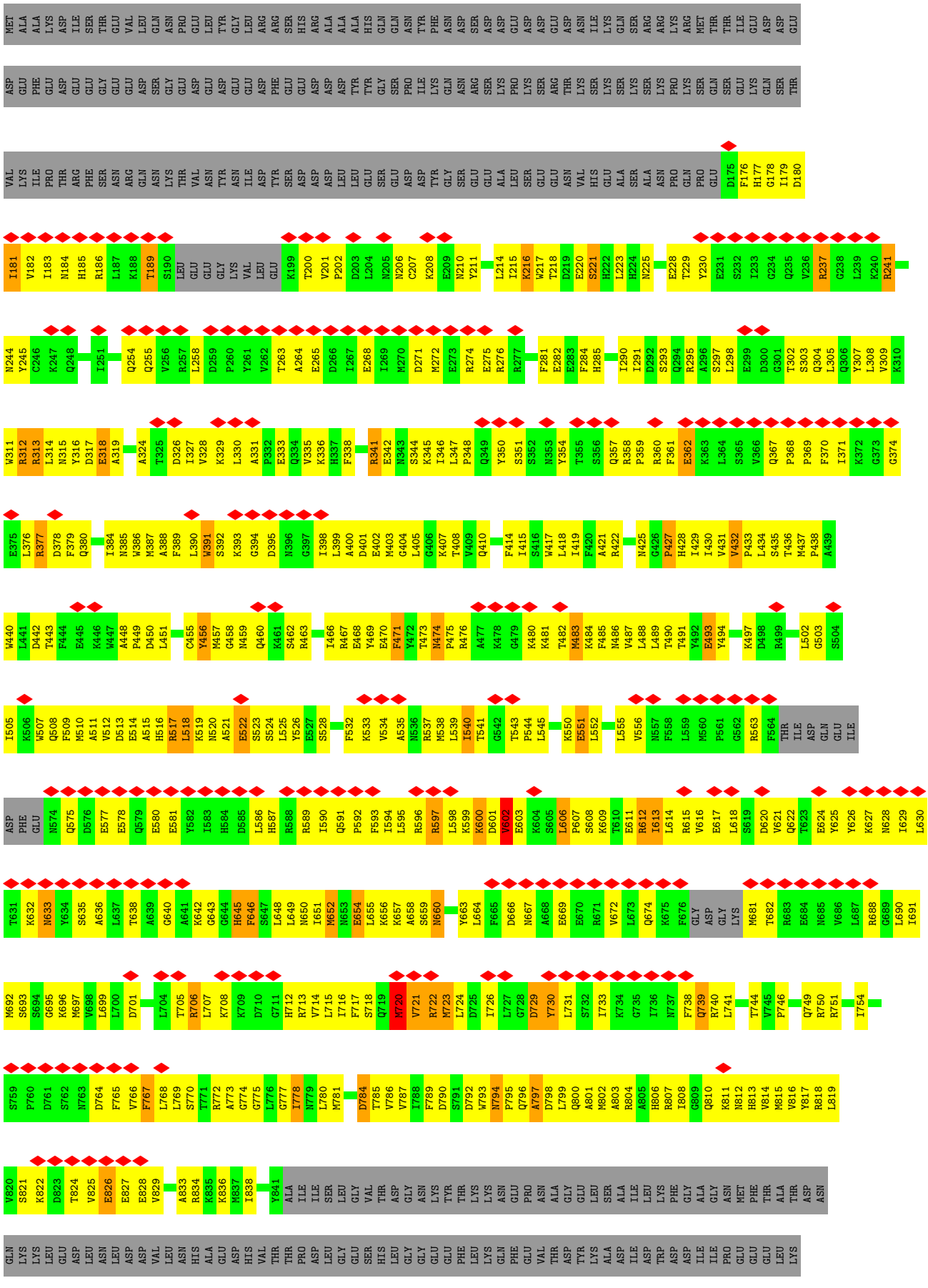
• Molecule 8: Chromo domain-containing protein 1





• Molecule 8: Chromo domain-containing protein 1

Chain W: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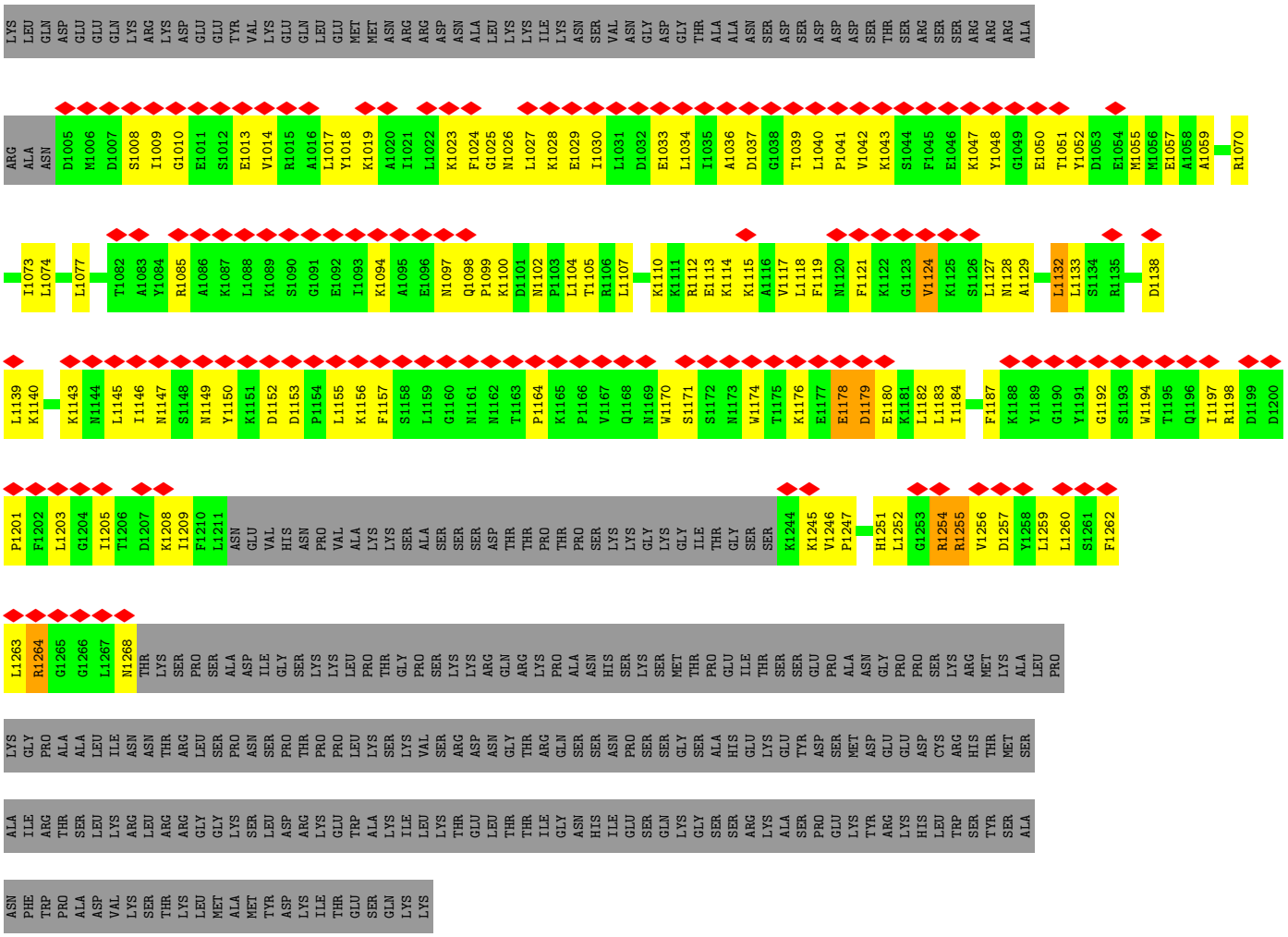
ASP GLU PHE GLU ASP GLU GLU GLY GLU GLU ASP SER GLY GLU ASP PHE GLU ASP GLU ASP GLU GLU ASP PHE GLU GLU ASP ASP TYR TYR GLY SER PRO ILE LYS GLN ASN ARG SER LYS PRO LYS SER SER ARG THR LYS SER LYS SER LYS PRO LYS SER GLN SER GLU LYS GLN SER THR
VAL LYS ILE PRO THR ARG PHE SER ASN ARG GLN ASN LYS THR VAL ASN TYR ASN ILE ASP TYR SER ASP ASP LEU LEU GLU SER GLU ASP ASP GLU ALA LEU SER GLU GLU ASN VAL HIS GLU ALA SER ALA ASN PRO GLN PRO GLU D175 F176 H177 G178 I179 D180
I181 V182 I183 N184 H185 R186 L187 K188 T189 S190 LEU GLU GLU GLY LYS VAL LEU GLU K199 T200 V201 P202 D203 L204 N205 N206 C207 K208 E209 N210 Y211 L214 I215 K216 W217 T218 D219 E220 S221 H222 L223 H224 N225 E228 T229 Y230 E231 S232 I233 G234 Q235 V236 R237 G238 L239 K240 R241
N244 Y245 C246 K247 Q248 I251 Q254 Q255 V256 R257 L258 D259 P260 Y261 V262 T263 A264 E265 D266 I267 E268 I269 M270 D271 M272 E273 R274 E275 R276 R277 F281 E282 E283 F284 H285 I290 I291 D292 S293 Q294 R295 A296 S297 L298 E299 D300 G301 T302 S303 Q304 L305 Q306 Y307 L308 V309 K310
W311 R312 R313 L314 N315 Y316 D317 E318 A319 A324 T325 D326 I327 V328 K329 L330 A331 P332 E333 Q334 V335 K336 H337 F338 R341 E342 N343 S344 K345 I346 L347 P348 Q349 Y350 S351 S352 N353 Y354 T355 S356 Q357 R358 P359 R360 F361 E362 K363 L364 S365 V366 Q367 P368 P369 F370 I371 K372 G373 G374
E375 L376 R377 D378 F379 Q380 I384 N385 W386 M387 A388 F389 L390 W391 S392 K393 G394 D395 N396 G397 I398 L399 A400 D401 E402 M403 G404 L405 G406 K407 T408 V409 Q410 F414 I415 S416 W417 L418 I419 F420 A421 R422 N425 G426 P427 H428 I429 I430 V431 V432 P433 L434 S435 T436 M437 P438 A439
W440 L441 D442 T443 F444 E445 K446 W447 A448 P449 D450 L451 C455 Y456 M457 G458 N459 Q460 K461 S462 R463 I466 R467 E468 Y469 E470 F471 Y472 T473 N474 P475 R476 A477 K478 G479 K480 K481 T482 M483 K484 F485 N486 V487 L488 L489 T490 T491 Y492 E493 Y494 K497 D498 R499 L502 G503 S504
I505 K506 W507 Q508 F509 M510 A511 V512 D513 E514 A515 H516 R517 L518 K519 N520 A521 E522 S523 S524 L525 Y526 E527 S528 F532 K533 V534 A535 N536 R537 M538 L539 I540 T541 G542 T543 P544 L545 K550 E551 L552 L555 V556 N557 F558 L559 M560 P561 G562 R563 F564 THR ILE ASP GLN GLU ILE
ASP PHE GLU N574 Q575 D576 E577 E578 Q579 E580 E581 Y582 I583 H584 D585 L586 H587 R588 R589 I590 Q591 P592 F593 I594 L595 R596 R597 L598 K599 K600 D601 W602 E603 K604 S605 L606 P607 S608 K609 T610 E611 R612 I613 L614 R615 V616 E617 L618 S619 D620 V621 Q622 T623 E624 Y625 Y626 K627 N628 I629 L630
T631 K632 N633 Y634 S635 A636 L637 T638 A639 G640 A641 K642 G643 G644 H645 F646 S647 L648 L649 N650 I651 M652 N653 E654 L655 K656 K657 A658 S659 N660 Y663 L664 F665 D666 N667 A668 E669 E670 R671 V672 L673 Q674 K675 F676 GLY ASP GLY LYS M681 T682 R683 E684 N685 V686 L687 R688 G689 L690 I691
M692 S693 S694 G695 K696 M697 V698 L699 L700 D701 L704 T705 R706 L707 K708 K709 D710 G711 H712 R713 V714 L715 I716 F717 S718 Q719 M720 V721 R722 M723 L724 D725 I726 L727 G728 D729 Y730 L731 S732 I733 K734 G735 I736 N737 F738 Q739 R740 L741 T744 V745 F746 Q749 R750 R751 I754
S759 P760 D761 S762 N763 D764 F765 V766 F767 L768 L769 S770 T771 R772 A773 G774 G775 L776 G777 T778 N779 L780 M781 D784 T785 V786 V787 I788 F789 D790 S791 D792 W793 N794 P795 Q796 A797 D798 L799 Q800 A801 M802 A803 R804 A805 H806 R807 I808 G809 Q810 K811 N812 H813 V814 M815 V816 Y817 R818 L819
V820 S821 K822 D823 T824 V825 E826 E827 E828 V829 A833 R834 K835 K836 M837 I838 Y841 ALA ILE ILE SER LEU GLY VAL THR ASP GLY ASN LYS TYR THR LYS LYS ASN GLU PRO ASN ALA GLY GLU LEU SER ALA ILE LEU LEU LYS PHE GLY ALA GLY ASN MET PHE THR ALA THR ASP ASN
GLN LYS LYS LEU GLU ASP VAL LEU ASN HIS ALA GLU ASP HIS VAL THR THR PRO ASP LEU GLY GLU SER HIS LEU GLY GLY GLU GLU PHE LEU LYS GLN PHE GLU VAL THR ASP TYR LYS ALA SER ILE ASP TRP ASP ASP ILE ILE PRO GLU GLU GLU LEU LYS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ARG ALA ASN D1005 M1006 D1007 S1008 I1009 G1010 E1011 S1012 E1013 V1014 R1015 A1016 L1017 Y1018 K1019 A1020 I1021 L1022 K1023 F1024 G1025 N1026 L1027 K1028 E1029 I1030 L1031 D1032 E1033 L1034 I1035 A1036 D1037 G1038 T1039 L1040 P1041 V1042 K1043 S1044 F1045 E1046 K1047 Y1048 G1049 E1050 T1051 Y1052 D1053 E1054 M1055 M1056 E1057 A1058 A1059 R1070
I1073 L1074 L1077 T1082 A1083 Y1084 R1085 A1086 K1087 L1088 K1089 S1090 G1091 E1092 I1093 K1094 A1095 E1096 N1097 Q1098 P1099 K1100 D1101 N1102 P1103 L1104 T1105 R1106 L1107 K1110 K1111 R1112 E1113 K1114 K1115 A1116 V1117 L1118 F1119 N1120 F1121 K1122 G1123 V1124 K1125 S1126 L1127 N1128 A1129 L1132 L1133 S1134 R1135 D1138
L1139 K1140 K1143 N1144 L1145 T1146 N1147 S1148 N1149 Y1150 K1151 D1152 D1153 P1154 L1155 K1156 F1157 S1158 L1159 G1160 N1161 N1162 T1163 P1164 K1165 P1166 V1167 Q1168 N1169 W1170 S1171 S1172 N1173 W1174 T1175 K1176 E1177 E1178 D1179 E1180 K1181 L1182 L1183 I1184 F1187 K1188 Y1189 G1190 Y1191 G1192 S1193 W1194 T1195 Q1196 I1197 R1198 D1199 D1200
P1201 F1202 L1203 G1204 I1205 T1206 D1207 K1208 I1209 F1210 L1211 ASN GLU VAL HIS ASN PRO VAL ALA LYS LYS SER ALA SER SER SER ASP THR THR PRO THR PRO SER LYS LYS GLY LYS GLY ILE THR GLY SER SER K1244 K1245 V1246 P1247 H1251 L1252 G1253 R1254 R1255 V1256 D1257 Y1258 L1259 L1260 S1261 F1262
L1263 R1264 G1265 G1266 L1267 N1268 THR LYS SER PRO SER ALA ASP ILE GLY SER LYS LYS LEU PRO THR GLY PRO SER LYS LYS ARG GLN ARG LYS PRO ALA ASN HIS SER LYS SER MET THR PRO GLU ILE THR SER SER GLU PRO ALA ASN GLY PRO PRO SER LYS ARG MET LYS ALA LEU PRO
LYS GLY PRO ALA ALA LEU ILE ASN ASN THR ARG LEU SER PRO ASN SER PRO THR PRO PRO LEU LYS SER VAL SER ARG ASP ASN GLY THR ARG GLN SER SER ASN PRO SER SER GLY SER ALA HIS GLU LYS GLU TYR ASP SER MET ASP GLU GLU ASP CYS ARG HIS THR MET SER
ALA ILE ARG THR SER LEU LYS ARG ARG LEU ARG ARG GLY GLY LYS SER LEU ASP ARG LYS GLU TRP ALA LYS ILE LEU LYS THR GLU LEU THR THR ILE GLY ASN HIS ILE GLU SER GLN LYS GLY SER SER ARG LYS ALA SER PRO GLU LYS TYR ARG LYS HIS LEU TRP SER TYR SER ALA
ASN PHE TRP PRO ALA ASP VAL LYS SER THR LYS LEU MET ALA MET TYR ASP LYS ILE THR GLU SER GLN LYS LYS

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	68000	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	1.56	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	98591	Depositor
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.162	Depositor
Minimum map value	-0.047	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.008	Depositor
Recommended contour level	0.044	Depositor
Map size (Å)	369.19998, 369.19998, 369.19998	wwPDB
Map dimensions	260, 260, 260	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.42, 1.42, 1.42	Depositor

5 Model quality

5.1 Standard geometry

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

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	1.13	6/812 (0.7%)	1.47	10/1088 (0.9%)
1	E	1.03	4/810 (0.5%)	1.36	3/1084 (0.3%)
2	B	1.15	7/669 (1.0%)	1.69	10/894 (1.1%)
2	F	1.20	5/693 (0.7%)	1.57	12/929 (1.3%)
3	C	1.31	8/805 (1.0%)	1.54	5/1088 (0.5%)
4	D	1.20	6/756 (0.8%)	1.36	5/1015 (0.5%)
4	H	1.10	2/737 (0.3%)	1.40	5/993 (0.5%)
5	G	1.16	3/819 (0.4%)	1.37	5/1106 (0.5%)
6	I	0.32	0/4023	0.71	0/6199
7	J	0.33	0/4091	0.72	0/6315
8	M	0.23	0/7152	0.38	0/9632
8	W	1.03	22/7334 (0.3%)	1.14	20/9875 (0.2%)
All	All	0.77	63/28701 (0.2%)	0.97	75/40218 (0.2%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	7
1	E	0	6
2	B	0	5
2	F	0	7
3	C	0	7
4	D	0	3
4	H	0	4
5	G	0	4
8	W	0	19
All	All	0	62

The worst 5 of 63 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	W	669	GLU	CD-OE2	-10.85	1.13	1.25
4	D	73	GLU	CD-OE2	10.82	1.37	1.25
8	W	826	GLU	CD-OE2	-10.39	1.14	1.25
8	W	493	GLU	CD-OE2	9.68	1.36	1.25
4	D	90	GLU	CD-OE2	-9.00	1.15	1.25

The worst 5 of 75 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	40	ARG	NE-CZ-NH1	-15.85	112.38	120.30
3	C	50	TYR	CB-CG-CD1	-14.59	112.25	121.00
3	C	50	TYR	CB-CG-CD2	12.81	128.69	121.00
1	E	52	ARG	NE-CZ-NH1	-10.88	114.86	120.30
8	W	597	ARG	NE-CZ-NH2	-10.08	115.26	120.30

There are no chirality outliers.

5 of 62 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	40	ARG	Sidechain
1	A	42	ARG	Sidechain
1	A	49	ARG	Sidechain
1	A	63	ARG	Sidechain
1	A	69	ARG	Sidechain

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	800	0	837	194	0
1	E	799	0	834	154	0
2	B	662	0	709	172	0
2	F	686	0	693	186	0
3	C	795	0	844	177	0
4	D	745	0	773	133	0
4	H	726	0	746	112	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	G	809	0	864	174	0
6	I	3590	0	1969	643	0
7	J	3646	0	1989	703	0
8	M	7017	0	7011	171	0
8	W	7189	0	7206	938	0
9	M	27	0	12	1	0
9	W	27	0	12	13	0
10	M	4	0	0	1	0
10	W	4	0	0	0	0
All	All	27526	0	24499	2959	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 57.

The worst 5 of 2959 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)
7:J:26:DA:H2"	7:J:27:DG:C8	1.33	1.59
6:I:30:DT:C6	6:I:31:DT:H72	1.40	1.52
1:A:63:ARG:CZ	7:J:17:DA:H5'	1.40	1.50
6:I:22:DC:P	8:W:520:ASN:HB3	1.52	1.50
6:I:-84:DA:H2	7:J:86:DA:C2	1.30	1.48

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 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	95/136 (70%)	87 (92%)	7 (7%)	1 (1%)	12 47
1	E	95/136 (70%)	86 (90%)	5 (5%)	4 (4%)	2 17

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
2	B	81/103 (79%)	69 (85%)	10 (12%)	2 (2%)	4 26
2	F	90/103 (87%)	85 (94%)	5 (6%)	0	100 100
3	C	101/130 (78%)	83 (82%)	14 (14%)	4 (4%)	2 18
4	D	93/126 (74%)	85 (91%)	7 (8%)	1 (1%)	12 47
4	H	91/126 (72%)	81 (89%)	9 (10%)	1 (1%)	12 47
5	G	103/130 (79%)	93 (90%)	10 (10%)	0	100 100
8	M	839/1468 (57%)	749 (89%)	89 (11%)	1 (0%)	48 83
8	W	868/1468 (59%)	784 (90%)	70 (8%)	14 (2%)	8 38
All	All	2456/3926 (63%)	2202 (90%)	226 (9%)	28 (1%)	15 47

5 of 28 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	D	82	LYS
1	E	42	ARG
8	M	778	ILE
8	W	474	ASN
8	W	600	LYS

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	85/111 (77%)	85 (100%)	0	100 100
1	E	84/111 (76%)	83 (99%)	1 (1%)	67 78
2	B	68/79 (86%)	68 (100%)	0	100 100
2	F	63/79 (80%)	63 (100%)	0	100 100
3	C	82/102 (80%)	82 (100%)	0	100 100
4	D	81/105 (77%)	80 (99%)	1 (1%)	67 78
4	H	79/105 (75%)	78 (99%)	1 (1%)	65 77
5	G	83/101 (82%)	82 (99%)	1 (1%)	67 78

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
8	M	772/1313 (59%)	772 (100%)	0	100 100
8	W	787/1313 (60%)	764 (97%)	23 (3%)	37 56
All	All	2184/3419 (64%)	2157 (99%)	27 (1%)	66 78

5 of 27 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
8	W	635	SER
8	W	660	ASN
8	W	1132	LEU
8	W	652	MET
8	W	720	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 12 such sidechains are listed below:

Mol	Chain	Res	Type
5	G	84	GLN
5	G	112	GLN
8	W	667	ASN
8	M	653	ASN
1	E	108	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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)

4 ligands are 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	$\#\|Z\| > 2$
10	BEF	W	1501	9	0,3,3	-	-	-		
9	ADP	M	1501	10	24,29,29	0.97	1 (4%)	29,45,45	1.49	4 (13%)
9	ADP	W	1502	10	24,29,29	1.46	4 (16%)	29,45,45	1.89	7 (24%)
10	BEF	M	1502	9	0,3,3	-	-	-		

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
9	ADP	M	1501	10	-	5/12/32/32	0/3/3/3
9	ADP	W	1502	10	-	3/12/32/32	0/3/3/3

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	W	1502	ADP	C5-C4	3.08	1.49	1.40
9	M	1501	ADP	C5-C4	2.50	1.47	1.40
9	W	1502	ADP	PB-O1B	2.35	1.58	1.50
9	W	1502	ADP	PB-O2B	-2.23	1.46	1.54
9	W	1502	ADP	C2-N3	2.23	1.35	1.32

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

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
9	W	1502	ADP	C3'-C2'-C1'	4.96	108.45	100.98
9	M	1501	ADP	PA-O3A-PB	-3.63	120.37	132.83
9	W	1502	ADP	N3-C2-N1	-3.49	123.23	128.68
9	M	1501	ADP	C3'-C2'-C1'	3.45	106.17	100.98
9	W	1502	ADP	PA-O3A-PB	-3.39	121.21	132.83

There are no chirality outliers.

5 of 8 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	M	1501	ADP	C5'-O5'-PA-O2A
9	M	1501	ADP	C5'-O5'-PA-O3A
9	W	1502	ADP	PA-O3A-PB-O2B
9	M	1501	ADP	PA-O3A-PB-O1B
9	W	1502	ADP	O4'-C4'-C5'-O5'

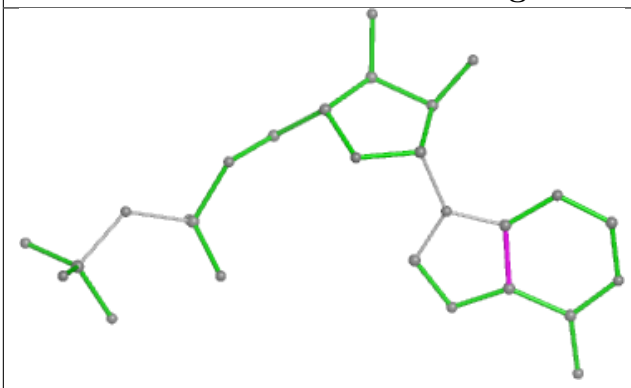
There are no ring outliers.

3 monomers are involved in 15 short contacts:

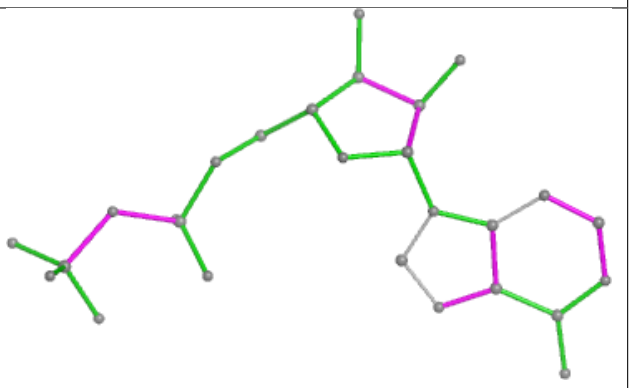
Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	M	1501	ADP	1	0
9	W	1502	ADP	13	0
10	M	1502	BEF	1	0

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.

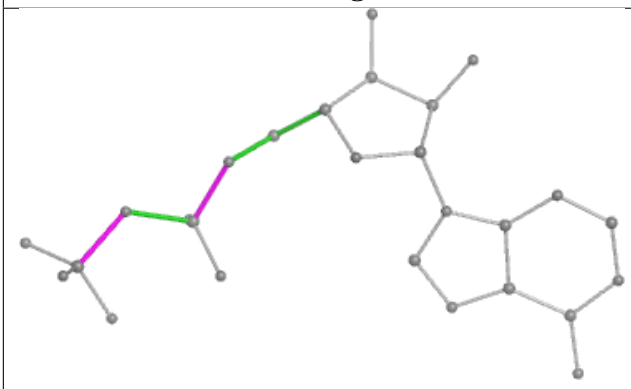
Ligand ADP M 1501



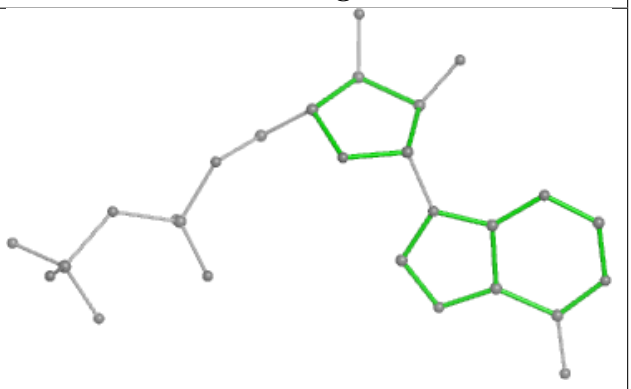
Bond lengths



Bond angles

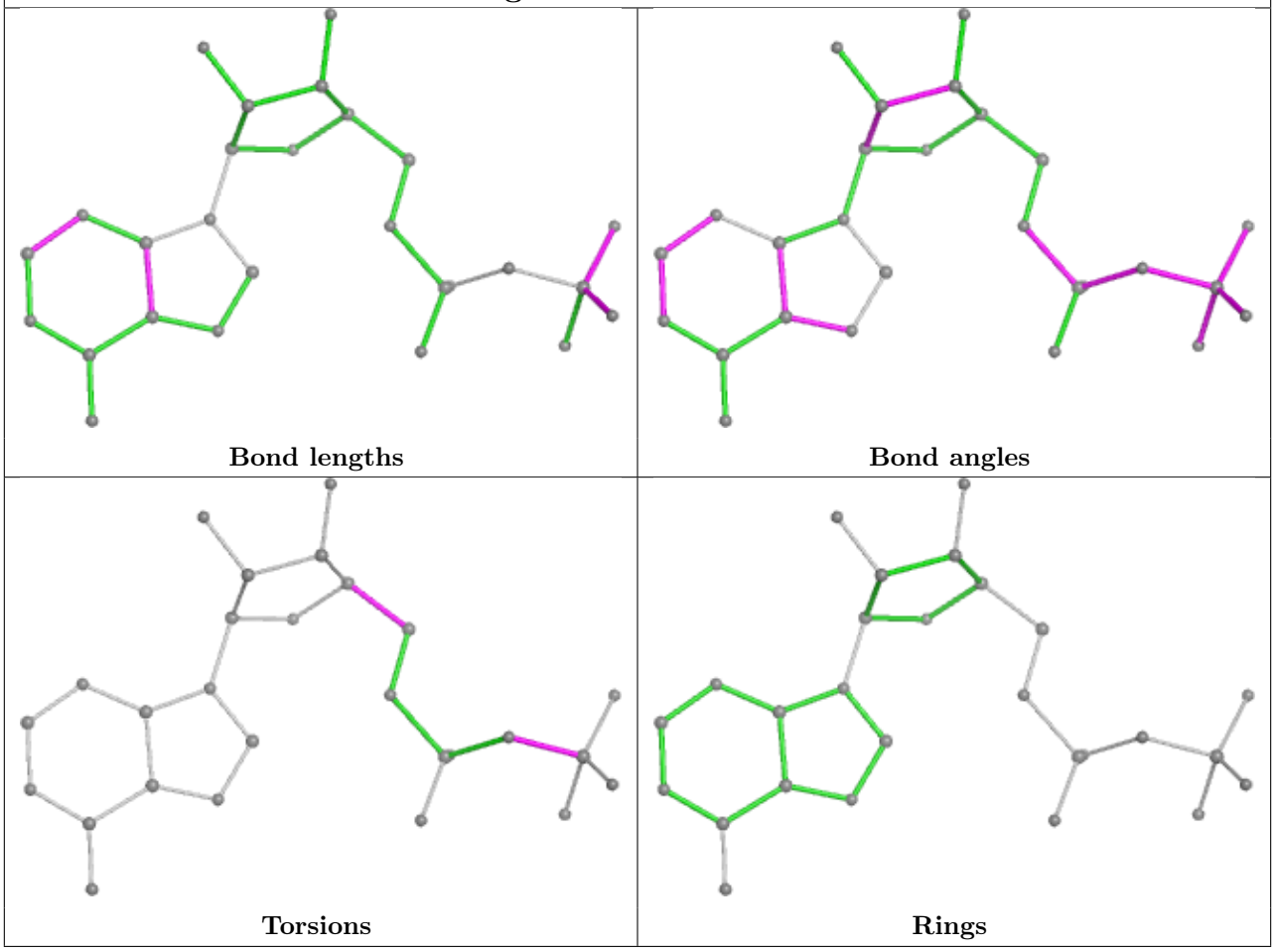


Torsions



Rings

Ligand ADP W 1502



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
7	J	1
6	I	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	J	-46:DT	O3'	-45:DG	P	3.92
1	I	45:DC	O3'	46:DA	P	3.25

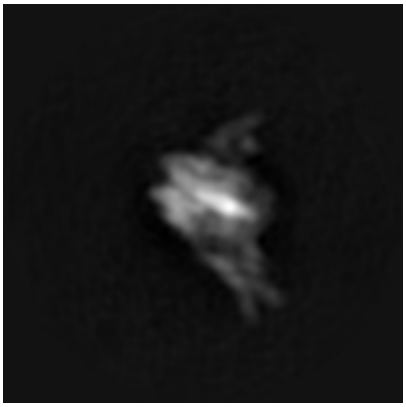
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-4336. These allow visual inspection of the internal detail of the map and identification of artifacts.

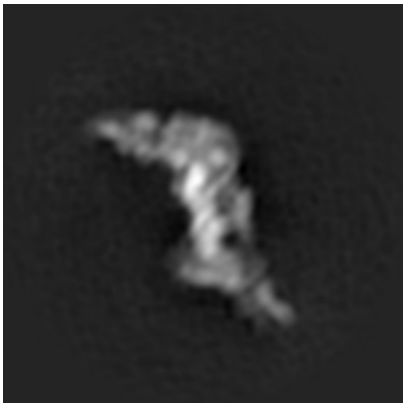
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

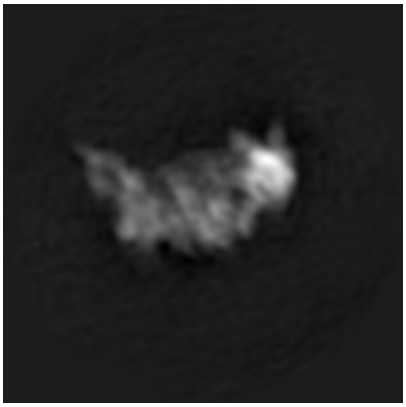
6.1.1 Primary map



X



Y



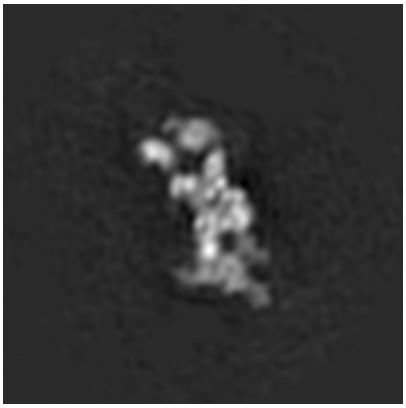
Z

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

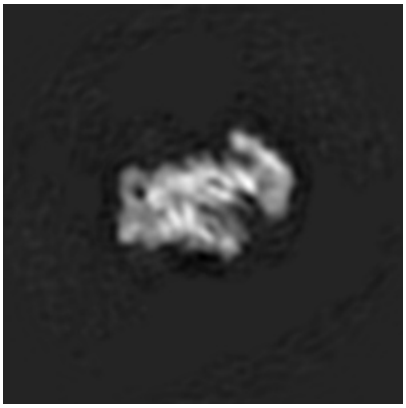
6.2 Central slices

6.2.1 Primary map

X Index: 130



Y Index: 130

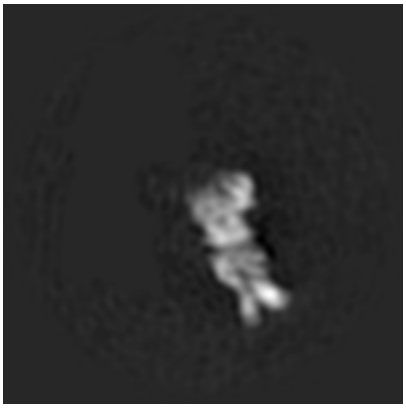


Z Index: 130

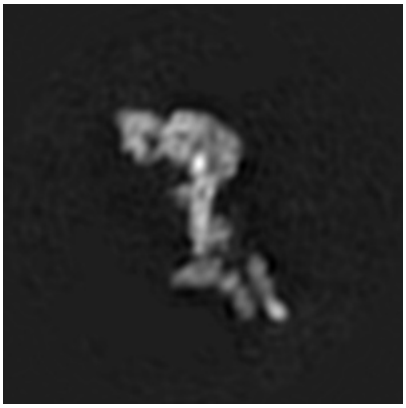
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

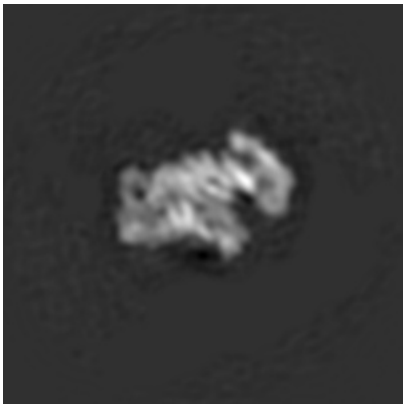
6.3.1 Primary map



X Index: 177



Y Index: 146

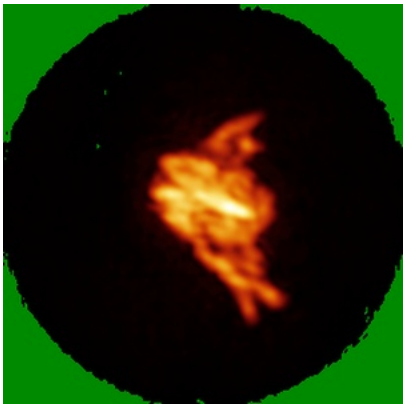


Z Index: 128

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

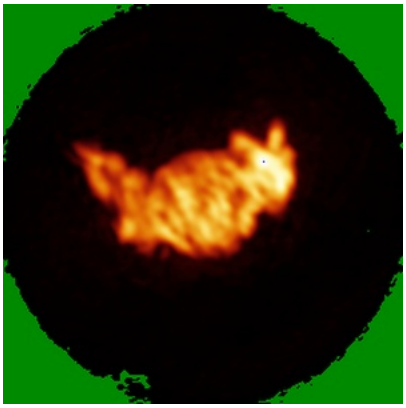
6.4 Orthogonal standard-deviation projections (False-color) (i)

6.4.1 Primary map



X

Y

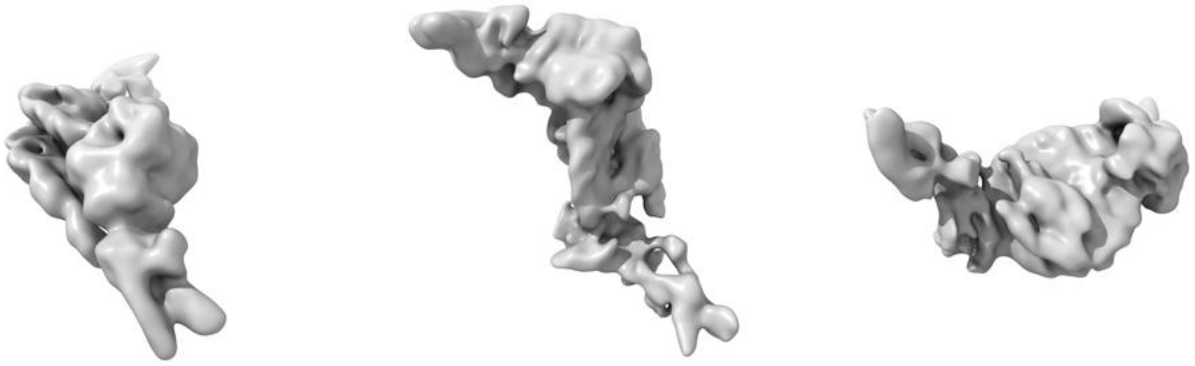


Z

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 (i)

6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.044. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

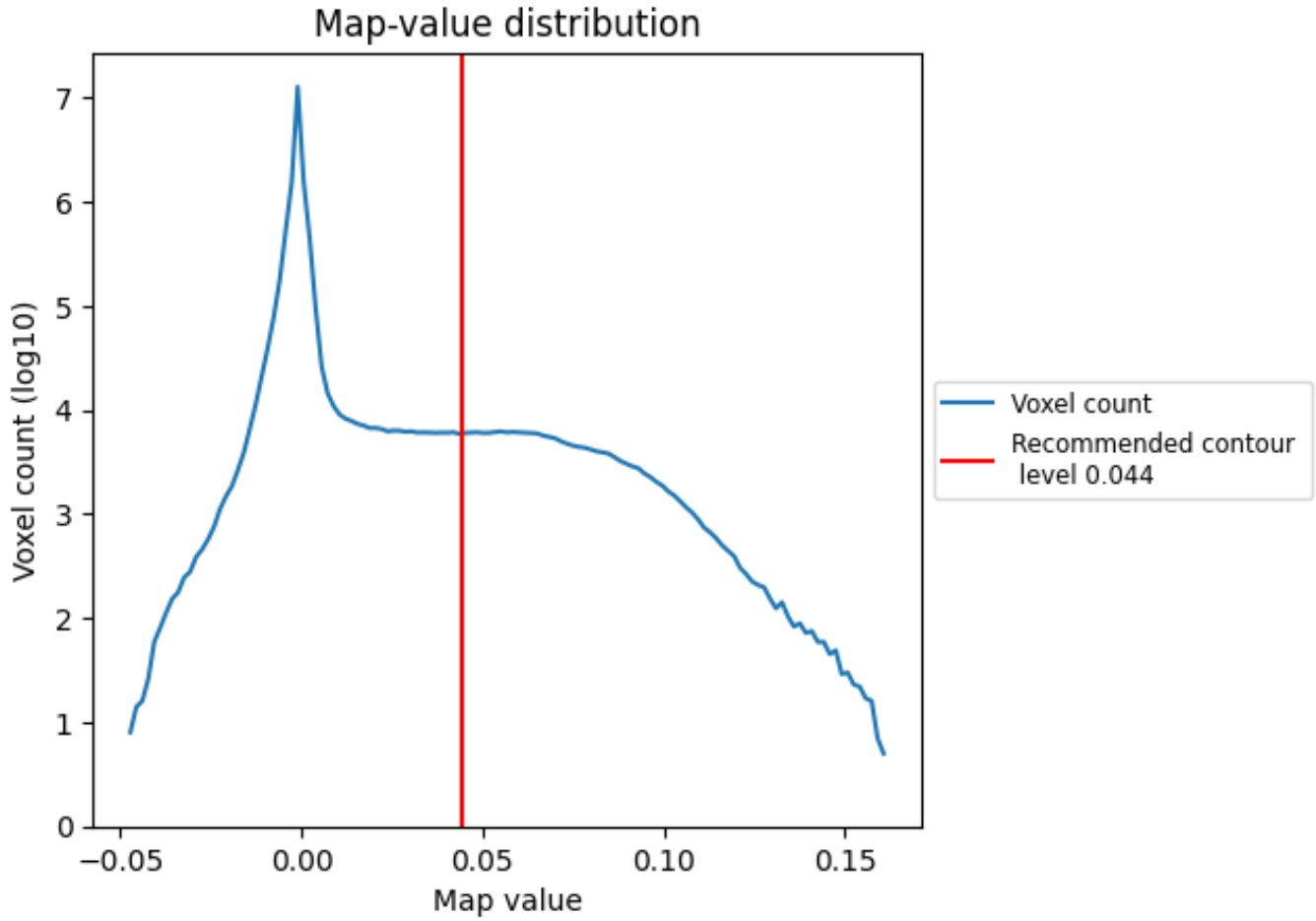
6.6 Mask visualisation (i)

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

7 Map analysis

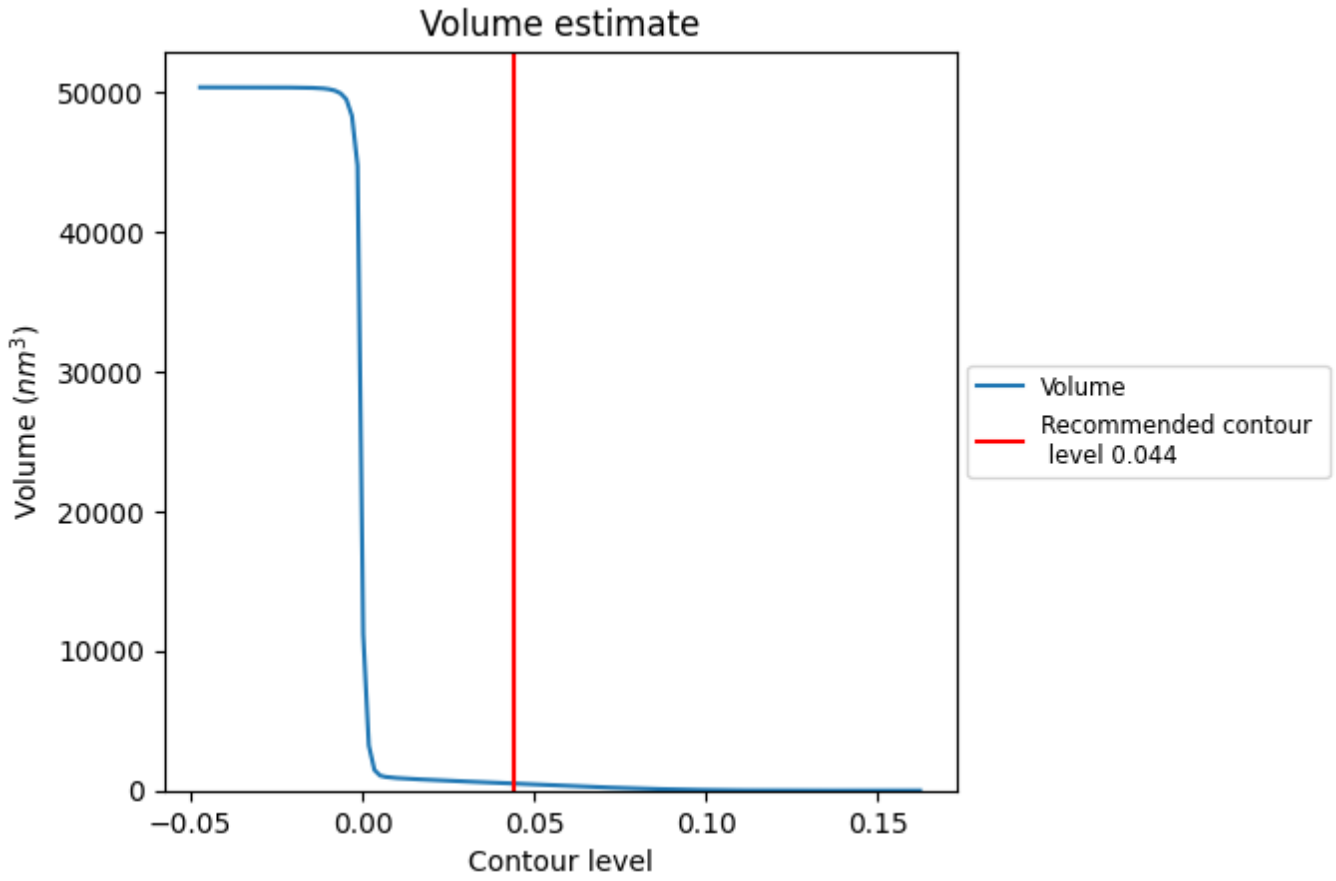
This section contains the results of statistical analysis of the map.

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.

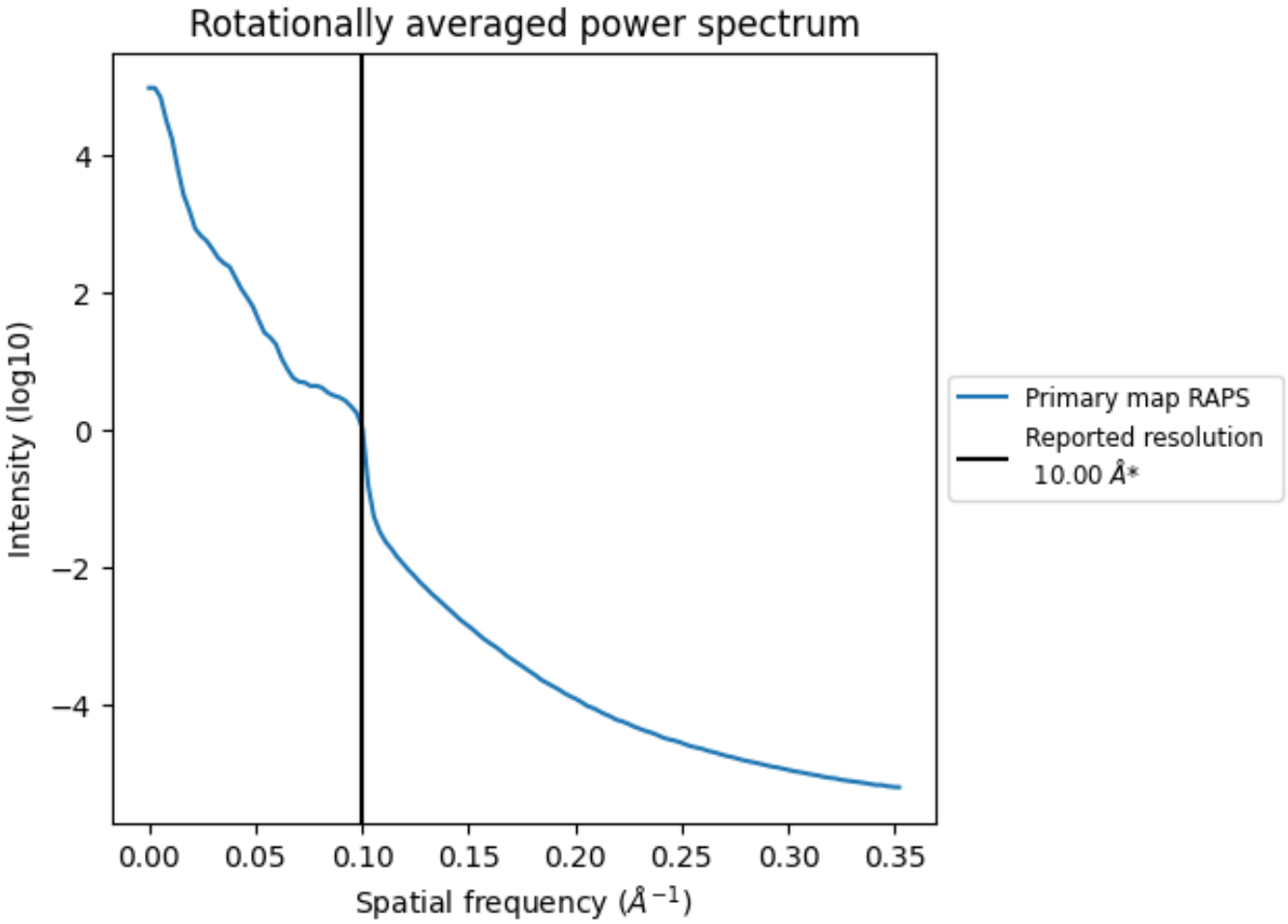
7.2 Volume estimate (i)



The volume at the recommended contour level is 503 nm^3; this corresponds to an approximate mass of 454 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)

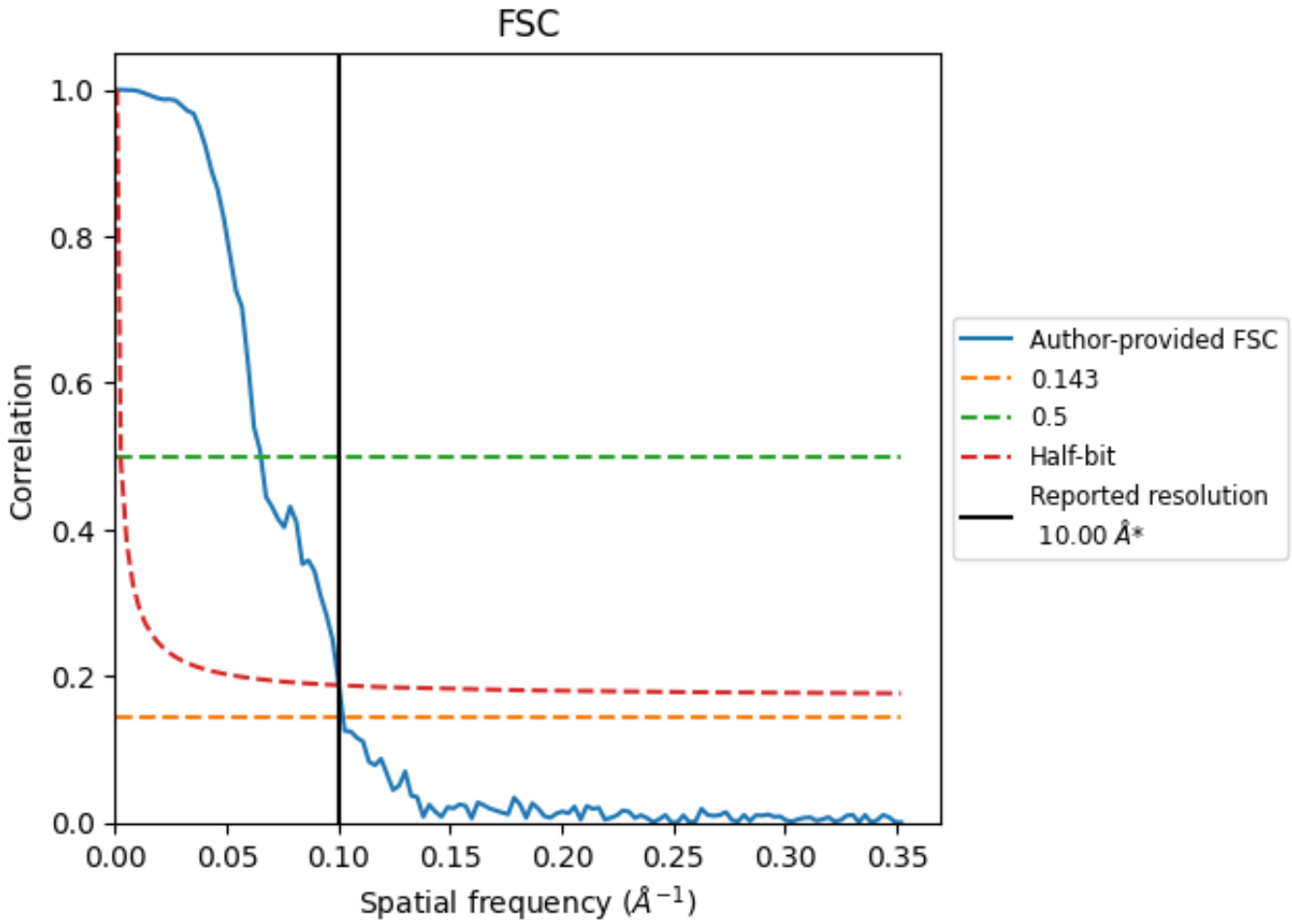


*Reported resolution corresponds to spatial frequency of 0.100 Å^{-1}

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 0.100 Å^{-1}

8.2 Resolution estimates (i)

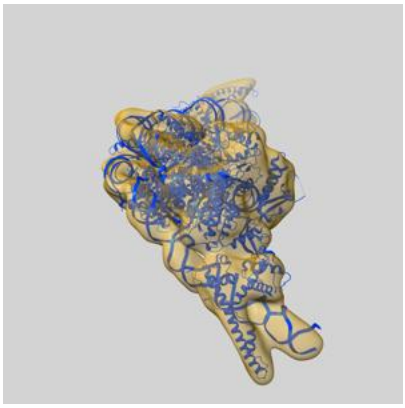
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	10.00	-	-
Author-provided FSC curve	9.78	15.31	9.96
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

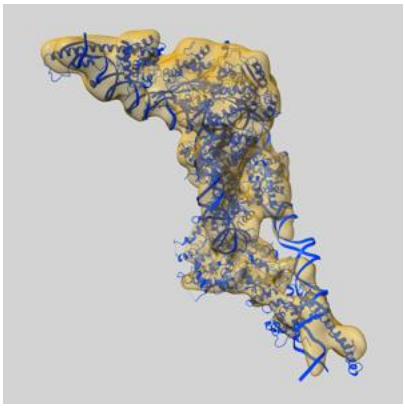
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-4336 and PDB model 6G0L. Per-residue inclusion information can be found in section 3 on page 7.

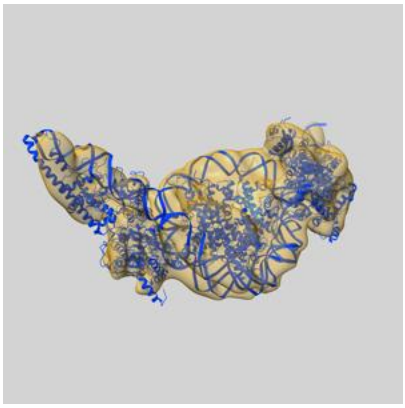
9.1 Map-model overlay



X



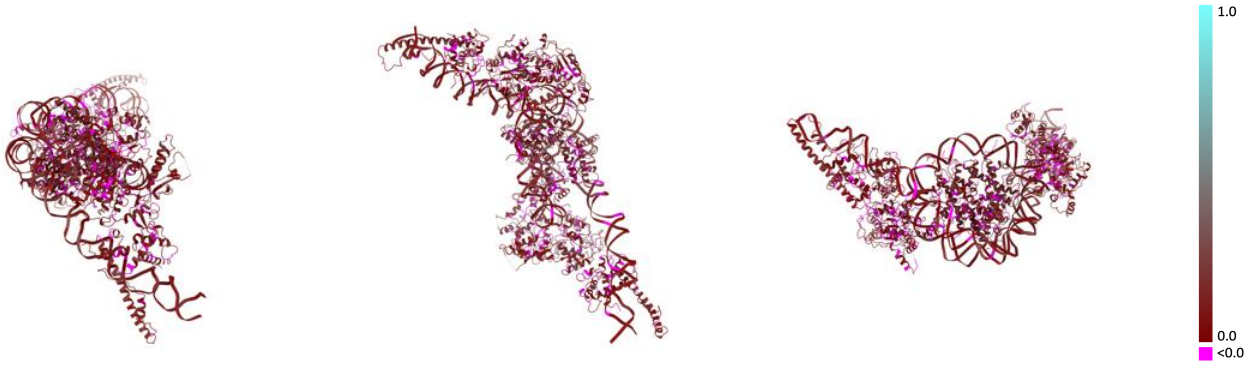
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.044 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.

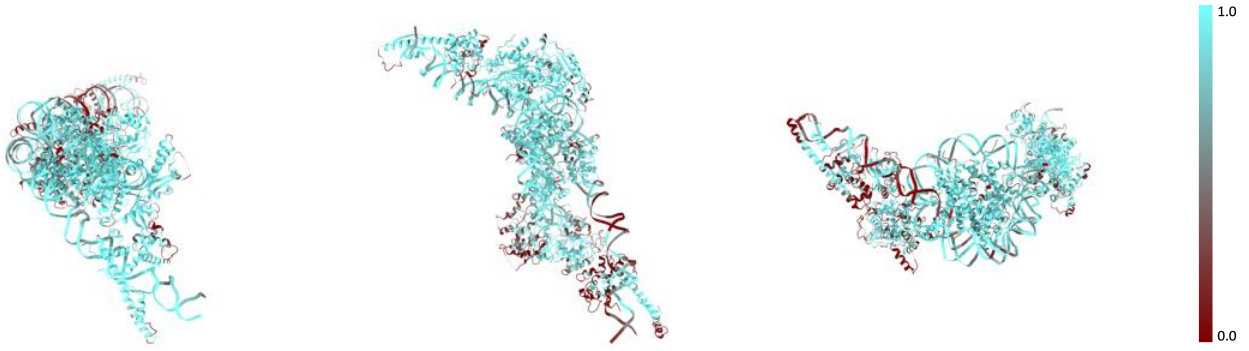
9.2 Q-score mapped to coordinate model



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.

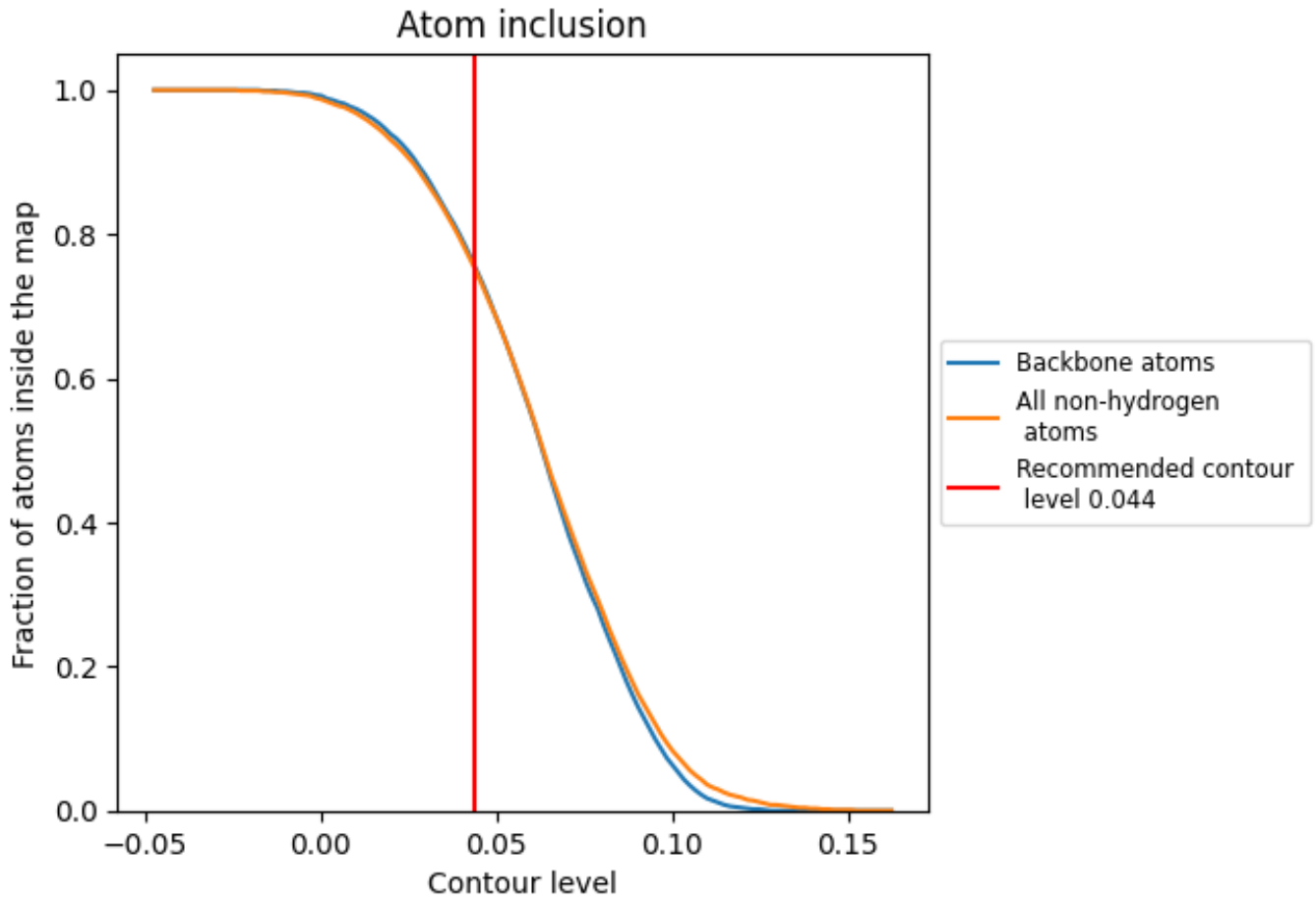
9.3 Atom inclusion mapped to coordinate model



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 (0.044).

9.4 Atom inclusion (i)



At the recommended contour level, 75% 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 (0.044) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7510	0.0950
A	0.8440	0.1140
B	0.9500	0.1000
C	0.8830	0.0650
D	0.8120	0.1020
E	0.9270	0.1220
F	0.8510	0.0640
G	0.7410	0.0690
H	0.8980	0.1310
I	0.7910	0.1190
J	0.7580	0.1190
M	0.8330	0.0930
W	0.5540	0.0730