WORLDWIDE wwPDB PROTEIN DATA BANK

wwPDB EM Validation Summary Report (i)

Nov 24, 2024 – 01:18 AM JST

PDB ID	:	8XNQ
EMDB ID	:	EMD-38511
Title	:	Respiratory complex Peripheral Arm of CI, open form A, focus-refined map of type IA, Wild type mouse under Cold Acclimation
Authors	:	Shin, Y.-C.; Liao, M.
Deposited on	:	2023-12-30
Resolution	:	3.70 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 (i) 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 (i)) were used in the production of this report:

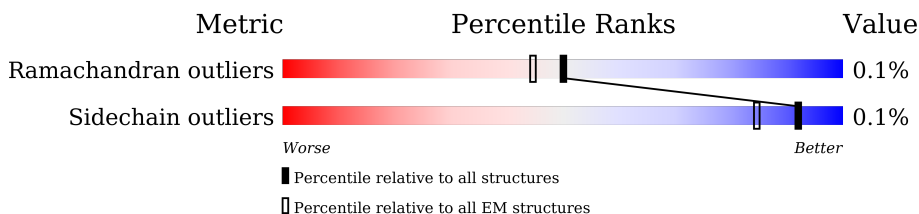|		
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

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 3.70 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		0.1%
Sidechain outliers		0.1%

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

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	115	47% / 80% 20%
2	B	224	12% / 67% · 30%
3	C	263	10% / 75% 25%
4	D	463	14% / 83% · 17%
5	E	248	73% / 83% · 15%
6	F	464	69% / 91% · 8%
7	G	727	28% / 92% · 6%
8	H	318	33% / 95% · ·
9	I	212	8% / 81% · 18%

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Mol	Chain	Length	Quality of chain
10	P	377	60% / 90% · 10%
11	Q	175	34% / 65% · 33%
12	R	116	53% / 72% 28%
13	S	99	34% / 82% · 16%
14	T	156	38% / 47% · 52%
15	V	116	15% / 93% · ·
16	W	131	37% / 87% 13%
17	X	172	40% / 81% · 17%
18	Z	144	44% / 97% ·
19	a	70	21% / 91% · 6%
20	b	84	45% / 95% 5%
21	q	145	79% / 80% · 17%
22	r	113	36% / 45% 55%
23	s	104	12% / 12% 88%

2 Entry composition ⓘ

There are 34 unique types of molecules in this entry. The entry contains 33919 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 NADH-ubiquinone oxidoreductase chain 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	92	754	523	107	119	5	0	0

- Molecule 2 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 7, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	157	1258	802	227	215	14	0	0

- Molecule 3 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 3, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	198	1641	1060	279	299	3	0	0

- Molecule 4 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	385	3088	1970	533	562	23	0	0

- Molecule 5 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	210	1635	1039	275	310	11	0	0

- Molecule 6 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	426	Total 3288	C 2073	N 588	O 605	S 22	0	0

- Molecule 7 is a protein called NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	687	Total 5287	C 3316	N 918	O 1012	S 41	0	0

- Molecule 8 is a protein called NADH-ubiquinone oxidoreductase chain 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	314	Total 2510	C 1687	N 380	O 421	S 22	0	0

- Molecule 9 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 8, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	174	Total 1398	C 880	N 240	O 266	S 12	0	0

- Molecule 10 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	P	340	Total 2730	C 1765	N 479	O 479	S 7	0	0

- Molecule 11 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 4, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	Q	118	Total 957	C 608	N 165	O 180	S 4	0	0

- Molecule 12 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 6, mitochondrial.

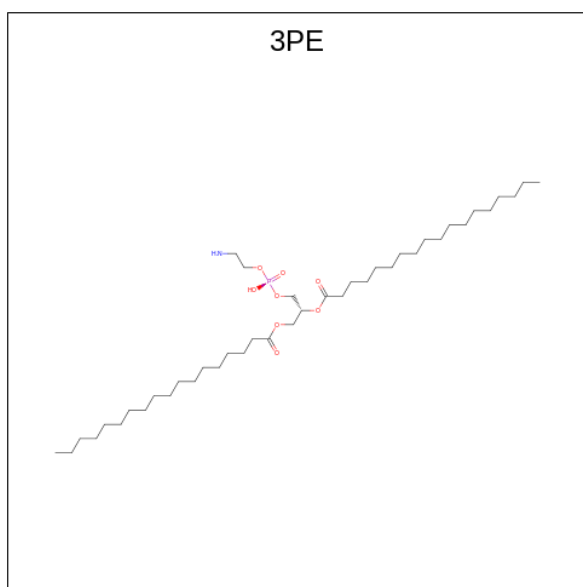| Mol	Chain	Residues	Atoms					AltConf	Trace
12	R	83	Total 660	C 411	N 120	O 126	S 3	0	0

- Molecule 13 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	S	83	Total	C	N	O	S	0	0
			667	419	126	119	3		

- Molecule 14 is a protein called Acyl carrier protein, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	T	75	Total	C	N	O	S	0	0
			604	388	89	122	5		

- Molecule 15 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	V	112	Total	C	N	O	S	0	0
			915	596	152	164	3		

- Molecule 16 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	W	114	Total	C	N	O	S	0	0
			970	619	180	165	6		

- Molecule 17 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	X	142	Total	C	N	O	S	0	0
			1164	736	209	209	10		

- Molecule 18 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	Z	139	Total	C	N	O	S	0	0
			1152	741	204	199	8		

- Molecule 19 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	a	66	Total 539	C 351	N 96	O 88	S 4	0	0

- Molecule 20 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	b	80	Total 628	C 414	N 99	O 111	S 4	0	0

- Molecule 21 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 12.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	q	120	Total 1004	C 645	N 178	O 177	S 4	0	0

- Molecule 22 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	r	51	Total 418	C 266	N 78	O 73	S 1	0	0

- Molecule 23 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 3, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
23	s	13	Total 107	C 69	N 15	O 23	0	0

- Molecule 24 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (three-letter code: 3PE) (formula: $C_{41}H_{82}NO_8P$) (labeled as "Ligand of Interest" by depositor).

3PE

Mol	Chain	Residues	Atoms					AltConf
24	A	1	Total	C	N	O	P	0
			46	36	1	8	1	
24	I	1	Total	C	N	O	P	0
			51	41	1	8	1	
24	b	1	Total	C	N	O	P	0
			46	36	1	8	1	

- Molecule 25 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe_4S_4).

SF4

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

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Mol	Chain	Residues	Atoms			AltConf
25	F	1	Total 8	Fe 4	S 4	0
25	G	1	Total 8	Fe 4	S 4	0
25	G	1	Total 8	Fe 4	S 4	0
25	I	1	Total 8	Fe 4	S 4	0
25	I	1	Total 8	Fe 4	S 4	0

- Molecule 26 is UBIQUINONE-1 (three-letter code: UQ1) (formula: $C_{14}H_{18}O_4$).
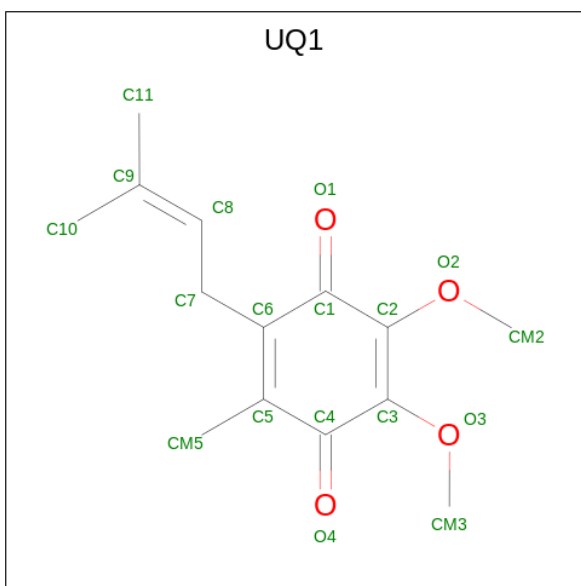
Mol	Chain	Residues	Atoms			AltConf
26	B	1	Total 18	C 14	O 4	0

- Molecule 27 is 1,2-DIACYL-SN-GLYCERO-3-PHOSPHOCHOLINE (three-letter code: PC1) (formula: $C_{44}H_{88}NO_8P$) (labeled as "Ligand of Interest" by depositor).
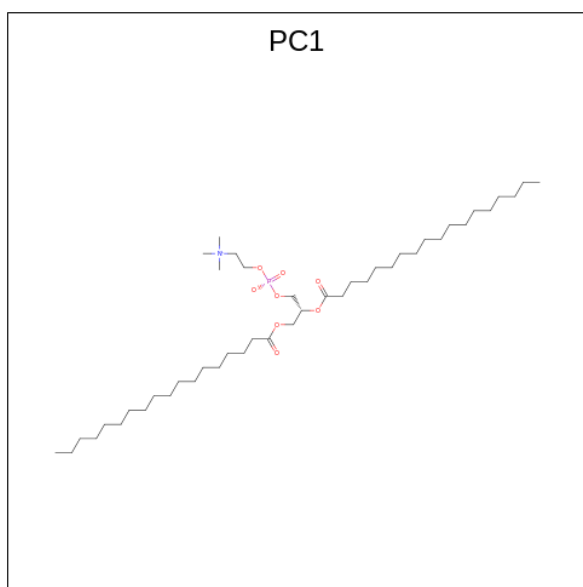
Mol	Chain	Residues	Atoms					AltConf
27	B	1	Total	C	N	O	P	0
			35	25	1	8	1	
27	H	1	Total	C	N	O	P	0
			42	32	1	8	1	
27	I	1	Total	C	N	O	P	0
			47	37	1	8	1	

- Molecule 28 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe_2S_2).
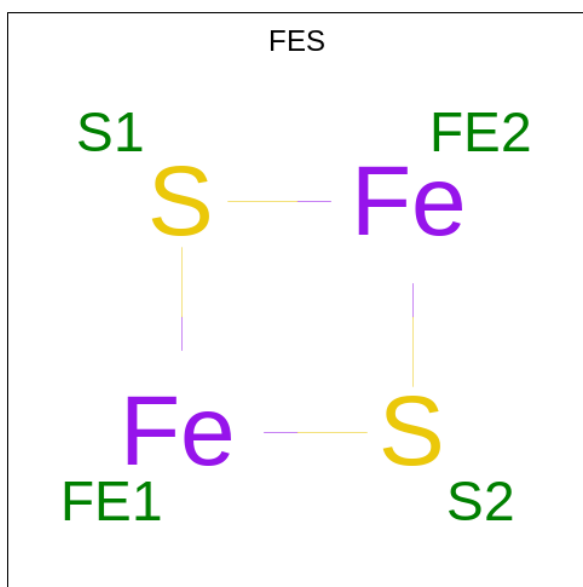
Mol	Chain	Residues	Atoms			AltConf
28	E	1	Total	Fe	S	0
			4	2	2	

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Mol	Chain	Residues	Atoms			AltConf
			Total	Fe	S	
28	G	1	4	2	2	0

- Molecule 29 is FLAVIN MONONUCLEOTIDE (three-letter code: FMN) (formula: $C_{17}H_{21}N_4O_9P$) (labeled as "Ligand of Interest" by depositor).

FMN
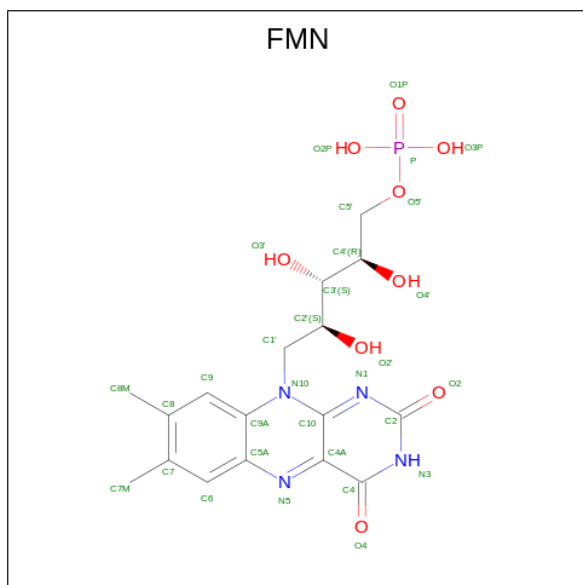
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
29	F	1	31	17	4	9	1	0

- Molecule 30 is Ubiquinone-9 (three-letter code: UQ9) (formula: $C_{54}H_{82}O_4$) (labeled as "Ligand of Interest" by depositor).

UQ9
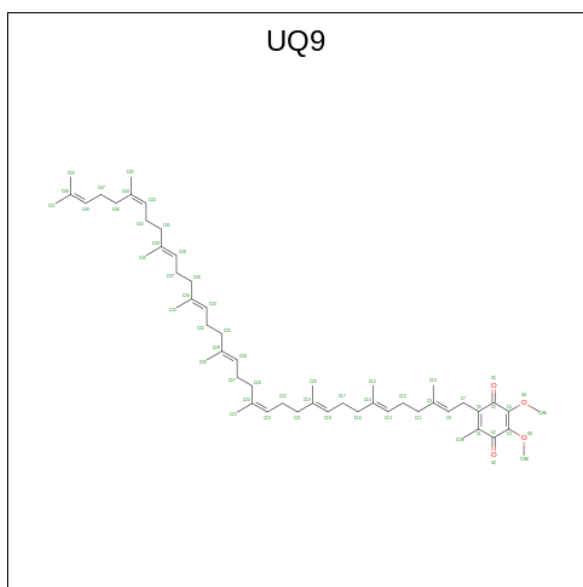
Mol	Chain	Residues	Atoms			AltConf
30	H	1	Total	C	O	0
			35	31	4	

- Molecule 31 is NADPH DIHYDRO-NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NDP) (formula: $C_{21}H_{30}N_7O_{17}P_3$) (labeled as "Ligand of Interest" by depositor).

NDP
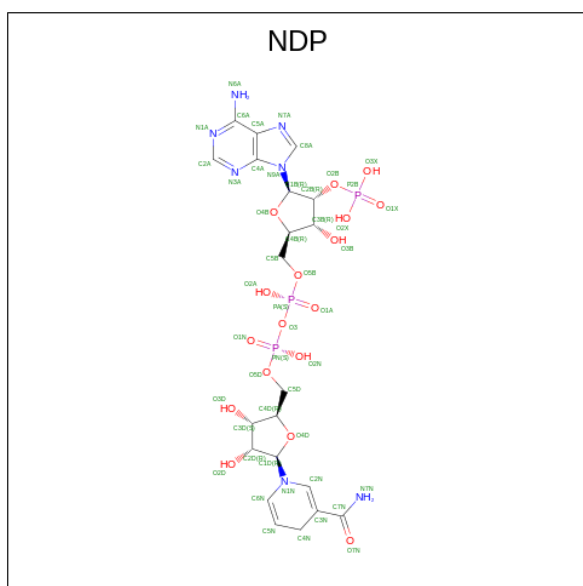
Mol	Chain	Residues	Atoms					AltConf
31	P	1	Total	C	N	O	P	0
			48	21	7	17	3	

- Molecule 32 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
32	R	1	Total 1	Zn 1	0

- Molecule 33 is {S}-[2-[3-[[(2 {R})-3,3-dimethyl-2-oxidanyl-4-phosphonooxy-butanoyl]ami no]propanoylamino]ethyl] (3 {S})-3-oxidanyltetradecanethioate (three-letter code: EHZ) (formula: $C_{25}H_{49}N_2O_9PS$) (labeled as "Ligand of Interest" by depositor).
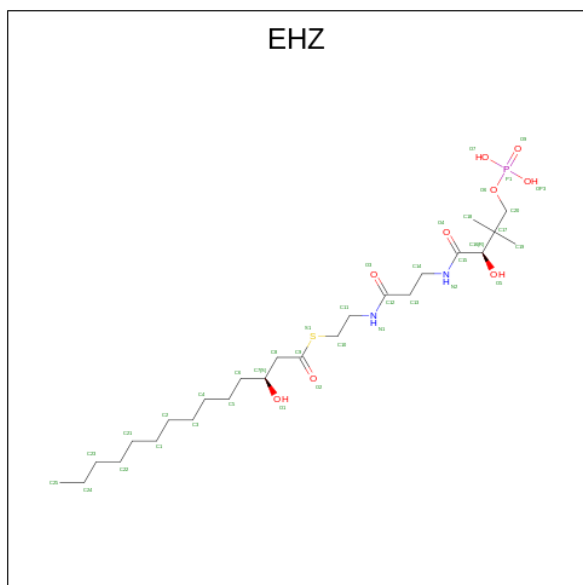
Mol	Chain	Residues	Atoms						AltConf
			Total	C	N	O	P	S	
33	W	1	32	19	2	9	1	1	0

- Molecule 34 is CARDIOLIPIN (three-letter code: CDL) (formula: $C_{81}H_{156}O_{17}P_2$) (labeled as "Ligand of Interest" by depositor).

CDL

Mol	Chain	Residues	Atoms				AltConf
34	q	1	Total	C	O	P	0
			57	38	17	2	

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: NADH-ubiquinone oxidoreductase chain 3

• Molecule 2: NADH dehydrogenase [ubiquinone] iron-sulfur protein 7, mitochondrial

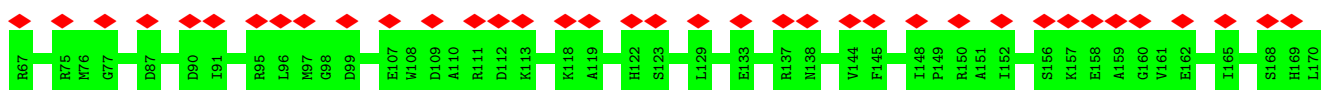

• Molecule 3: NADH dehydrogenase [ubiquinone] iron-sulfur protein 3, mitochondrial
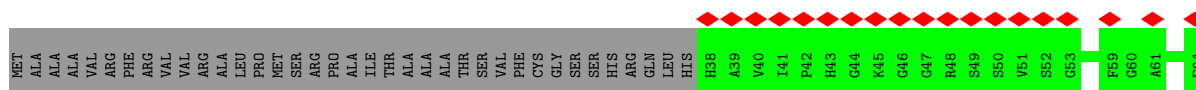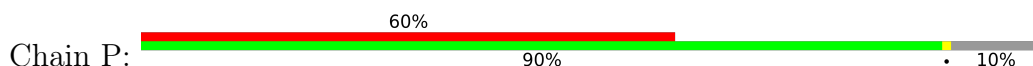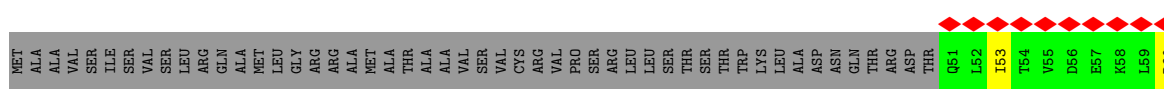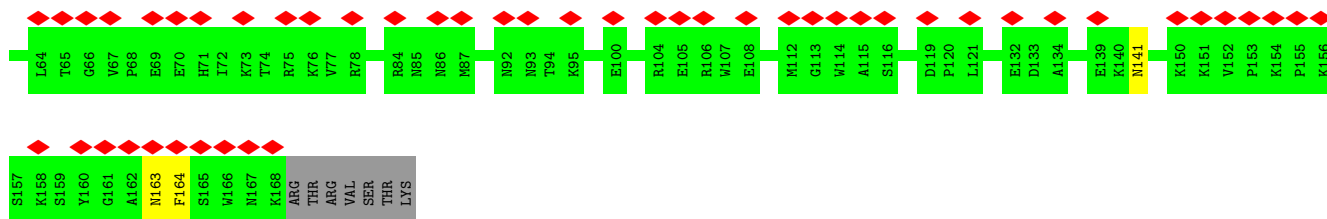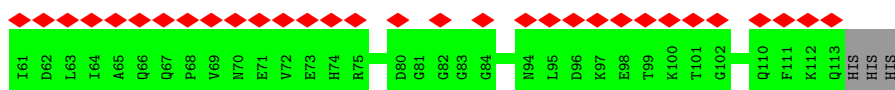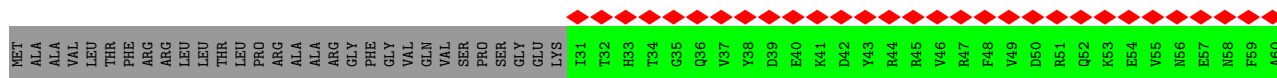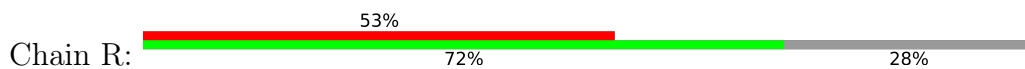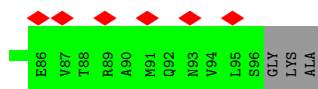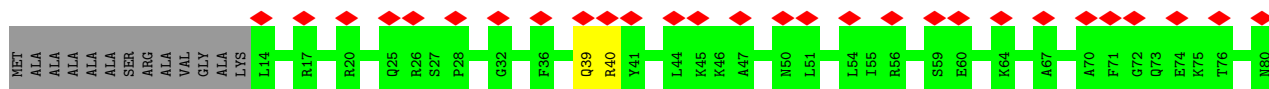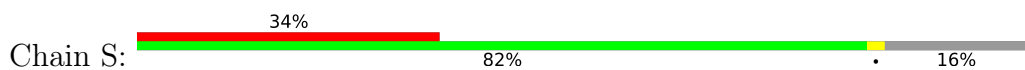

• Molecule 4: NADH dehydrogenase [ubiquinone] iron-sulfur protein 2, mitochondrial

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

TRP LYS PRO PRO TRP ASN ASP VAL ASP ILE LEU LYS GLU LYS ALA VAL THR N79 M80 T81 L82 N83 F84 G85 P86 Q87 H88 P89 A90 A91 H92 G93 V94 L95 R96 L99 E100 L101 S102 G103 E104 M105 V106 R107 K108 G114 E121 D140 M144 M185 D193 I194

G195 A196 M197 E205 E260 E266 R266 N270 R271 D274 D282 D309 D325 E370 A426 P427 G428 L435 M438 S439 K440 G441 H442 M443 L444 A445 D446 A449 I450 I451 Q454 D455 I456 E460 I461 D462 R463

• Molecule 5: NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial

Chain E:

73%

83%　　　　　15%

MET PHE SER LEU ALA LEU ALA LEU ARG ALA ARG THR GLY LEU ALA ALA GLN TRP GLY ARG HIS ALA ARG ASN LEU HIS LYS THR ALA VAL HIS ASN GLY ALA GLY GLY ALA LEU F38 V39 H40 R41 D42 T43 P44 E45 N46 N47 P48 D49 T50 P51 F52 D53 F54 T55 P56 E57 N58 Y59 K60

R61 I62 E63 A64 I65 V66 K67 N68 Y69 P70 E71 G72 H73 Q74 A75 A76 A77 V78 L79 P80 V81 L82 D83 L84 A85 Q86 R87 Q88 N89 G90 W91 L92 P93 I94 S95 A96 M97 N98 K99 V100 A101 E102 V103 L104 Q105 M109 R110 E113 V114 A115 Y118 T119 M120 Y121 N122 R123 K124

P125 V126 G127 K128 Y129 H130 I131 Q132 L141 R142 D143 S144 D145 S146 I147 L148 E149 T150 L151 Q152 R153 K154 L155 G156 I157 K158 V159 G160 E161 T162 T163 P164 D165 K166 L167 F168 T169 L170 I171 E172 V173 E174 C175 L176 G177 A178 C179 V180 N181 A182 V185 Q186 I187 N188 D189 N190 Y191 Y192

E193 D194 L195 T196 P197 K198 D199 I200 E201 E202 I203 I204 D205 E206 L207 K208 A209 G210 K211 V212 P213 K214 P215 G216 P217 R218 S219 G220 R221 F222 C223 C224 E225 P226 A227 G228 G229 L230 T231 S232 L233 T234 E235 P236 P237 K238 G239 P240 G241 F242 G243 V244 Q245 A246 G247 LEU

• Molecule 6: NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial

Chain F:

69%

91%　　　　　8%

MET LEU ALA ALA ARG HIS PHE LEU GLY GLY LEU VAL PRO VAL ARG VAL SER VAL ARG PHE SER SER GLY THR THR ALA PRO LYS LYS THR SER F32 G33 S34 L35 K36 D37 E38 D39 R40 I41 F42 T43 N44 L45 Y46 G47 R48 H49 D50 W51 R52 L53 K54 G55 A56 L57 R58 R59 G60

D61 W62 Y63 K64 T65 K66 E67 I68 L69 L70 K71 G72 P73 D74 W75 I76 L77 G78 E79 M80 K81 T82 S83 G84 L85 R86 G87 R88 G89 G90 A91 G92 F93 P94 T95 G96 L97 K98 F101 M102 N103 K104 P105 S106 D107 G108 R109 P110 K111 Y112 L113 V114 V115 D118 E119 G120 E121 P122

G123 T124 C125 K126 D127 R128 E129 I130 M131 R132 H333 D134 P135 H136 K137 L138 V139 E140 G141 C142 L143 V144 G145 G146 R147 A148 M149 G150 A151 R152 A153 A154 Y155 I156 Y157 I158 R159 G160 E161 F162 Y163 N164 E165 A166 S167 N168 L169 Q170 V171 A172 I173 R174 E175 A176 Y177 E178 A179 G180 L181 I182

G183 K184 N185 A186 C187 G188 S189 D190 Y191 D192 F193 D194 V195 F196 V197 V198 R199 G200 A201 G202 E209 L212 I213 E214 S215 I216 E217 G218 K219 Q220 G221 K222 P228 D232 V233 G234 V235 F236 G237 A243 N244 V245 E246 T247 V248 A249 V250 S251 P252 T253 I254 C255 R256 R257 G258

G259 T260 W261 F262 A263 G264 F265 G266 R267 E268 R269 N270 S271 G272 T273 K274 L275 F276 N277 I278 S279 G280 H281 V282 N283 H284 P285 C286 T287 V288 E289 E290 E291 M292 S293 L296 K297 E298 L299 I300 E301 K302 H303 A304 G305 G306 V307 T308 G309 G310 W311 D312 N313 L314 L315 A316 V317 I318 P319

G320 G321 S322 S323 L326 I327 P328 K329 S330 V331 C332 E333 T334 V335 L336 M337 D338 F339 D340 A341 L342 V343 Q344 A345 Q346 T347 G348 L349 G350 T351 A352 A353 V354 I355 V356 M357 D358 R359 S360 T361 D362 I363 A366 L370 F373 H376 R386 E387 D390 K394 V395 M396

A397 R398 F399 V400 K401 G402 D403 A404 R405 E408 I409 D410 K417 Q418 G428 D429 H441 F442 R443 P444 E445 L446 E447 D448 R449 M450 Q451 R452 F453 A454 Q455 Q456 H457 ARG ALA TRP GLN ALA SER

• Molecule 7: NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial

Chain G:

28%

92%	6%

MET LEU ARG ILE PRO ILE LYS ARG ALA LEU ILE GLY LEU SER ASN SER PRO LYS GLY TYR VAL ARG THR THR GLY THR ALA ALA S29 N30 L31 I32 E33 D37 G38 Q39 E44 E54 M58 Q59 E67 R68 M77 E81 K84 M94 K98 G99 W100

N105 E114 M117 L126 Q133 E136 C137 D138 D149 R150 E155 E161 D162 K163 N164 I165 T174 D193 D194 L195 G199 R200 G201 N202 D203 M204 Y209 I210 E211 K212 D224 A237 R246 E249 S250 I251 D252 V253 M254 D255 A256 R266

E279 N282 D288 F292 D295 Q300 M306 V307 R308 N309 E310 K311 D321 R325 M329 L330 Q331 N332 F333 E334 A337 G344 D347 D356 N359 K360 V361 D362 S363 D364 E375 G376 A377 D380 L381 R382 S383 N384 Y385 L386 L387 N388 T389

A392 E395 E396 A397 D398 L402 R408 F409 E410 L431 S434 D437 R441 Y442 D443 H444 L445 G446 D447 S448 P449 K450 I451 D454 I455 A456 S457 G458 R459 H460 S461 F462 C463 E464 V465 L466 K467 D468 A469 K470 M473 A480 R483 D484 R501 V502 T503 T504

G505 A508 E509 W510 K511 V512 M513 A525 L526 D527 L528 I537 R538 K539 K543 F546 L547 L548 G549 A550 D551 S552 G553 C554 I555 T556 R557 Q558 D559 K562 D563 Q569 D574 A580 D581 G586 A587 T599 E600 G601 R602 K607 G614 E618 D619

I629 L634 D637 D640 R643 N644 R645 S650 P651 N652 L653 V654 R655 Y656 D657 D658 I659 E660 E661 T662 N663 Y664 F665 Q666 Q667 A668 S669 E670 L671 A672 K673 N676 Q677 E678 V679 L680 A681 D682 P683 L684 L689 T690 I691 K692 D693 F694 Y695 M696 R702 K712

T715 GLU GLY ALA GLN ALA VAL GLU GLU PRO SER ILE CYS

• Molecule 8: NADH-ubiquinone oxidoreductase chain 1

Chain H:

33%

95%

M1 F2 F3 L9 L10 L14 I15 A16 M17 A18 F19 L20 R25 M31 I39 V40 G41 D51 A52 M53 K54 E59 P60 M61 R62 P63 L64 THR T66 S67 M68 S69 L70 F71 I72 L77 S78 L79 T80 L81 A82 L83 S84 L85 L89 P92 I96 N97 L98

N99 L100 L103 L106 S110 V113 I116 L117 G120 W121 A122 S123 N124 S125 K126 Y127 S128 L129 F130 G131 A132 L133 R134 A135 Q138 T139 I140 M146 A147 I148 L151 L154 Y160 S161 L162 E192 A196 D199 L200 T201 E202 G203 E204 S205 E206 LEU

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

VAL SER G210 F211 N212 V213 E214 Y215 A216 A217 F220 A221 L222 F223 F224 M225 I241 L246 Y247 Y248 I249 N250 L251 P252 E253 M261 E262 R279 F280 R281 L285 L289 N292 L298 A299 M302 I305 S306 L307 T311 A312 G313 Y317 M318

• Molecule 9: NADH dehydrogenase [ubiquinone] iron-sulfur protein 8, mitochondrial

Chain I: 8%   81%   18%

MET TYR ARG LEU SER SER SER MET LEU PRO ARG ALA LEU ALA GLN ALA MET ARG THR GLY HIS LEU LEU ASN GLY SER GLN SER LEU HIS SER ALA VAL ALA ALA T35 K42 GLU GLN GLU SER E47 V48 D49 M50 K51 D55 R59 I60 L61 M62 W63 L66 L74 R135

A136 D137 D146 Y154 E160 E169 R212

• Molecule 10: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial

Chain P: 60%   90%   10%

MET ALA ALA VAL ARG PHE ARG VAL VAL ARG ALA LEU PRO MET SER ARG PRO ALA ILE THR ALA ALA THR SER VAL PHE CYS GLY SER SER HIS ARG GLN LEU HIS H38 A39 V40 I41 P42 H43 G44 K45 G46 G47 R48 S49 S50 V51 S52 G53 F59 G60 A61 F64

R67 R75 M76 G77 D87 D90 I91 R95 L96 M97 G98 D99 E107 W108 D109 A110 R111 D112 K113 K118 A119 H122 S123 L129 E133 R137 N138 V144 F145 I148 P149 R150 A151 I152 S156 K157 E158 A159 G160 V161 E162 I165 S168 H169 L170

N171 A172 S173 M174 K175 S176 S177 S178 K179 S180 L181 K184 A185 E188 K189 E190 V191 R192 S193 V194 F195 A198 I199 I200 I201 R202 P203 S204 D205 I206 F207 G208 R209 E210 D211 R212 F213 L214 N215 H216 F217 A218 N219 Y220 R221 W222 F223 L224 A225 V226 P227 L228 V229 S230 L231 G232 F233

K234 T235 V236 K237 Q238 P239 V240 Y241 V242 A243 D244 V245 S246 N251 K254 D255 P256 D257 A258 V259 G260 K261 T262 F263 A264 F265 T266 G267 P268 N269 R270 Y271 L272 L273 F274 H275 L276 V277 K278 Y279 I280 F281 S282 M283 T284 H285 R286 T287 F288 L289 P290 Y291 P292 L293 P294 L295 F296 V297

Y298 S299 W300 I301 G302 K303 L304 F305 G306 L307 S308 P309 F310 E311 P312 W313 T314 T315 K316 D317 E320 R321 I322 H323 I324 S325 D326 V327 M328 P329 T330 D331 L332 P333 G334 L335 E336 D337 L338 G339 V340 Q341 P342 T343 P344 L345 E346 L347 K348 S349 I350 E351 V352 L353 R354 R355 H356 R357 T358

Y359 R360 W361 L362 S363 S364 E365 I366 E367 E368 T369 K370 P371 A372 K373 T374 V375 N376 Y377

• Molecule 11: NADH dehydrogenase [ubiquinone] iron-sulfur protein 4, mitochondrial

Chain Q: 34%   65%   33%

MET ALA ALA VAL SER ILE SER VAL SER LEU ARG GLN ALA MET LEU GLY ARG ARG ALA MET ALA THR ALA ALA VAL SER VAL CYS ARG VAL PRO SER ARG LEU LEU SER THR SER THR TRP LYS LEU ALA ASP GLN THR ARG ASP THR Q51 L52 I53 T54 V55 D56 E57 K58 L59 D60

• Molecule 12: NADH dehydrogenase [ubiquinone] iron-sulfur protein 6, mitochondrial

Chain R:

• Molecule 13: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2

Chain S:

• Molecule 14: Acyl carrier protein, mitochondrial

Chain T:
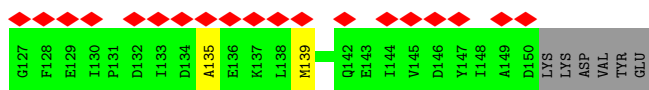
• Molecule 15: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 5

Chain V:
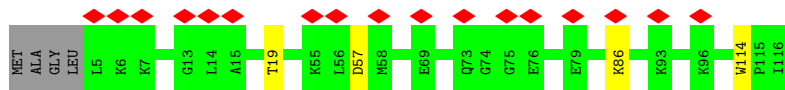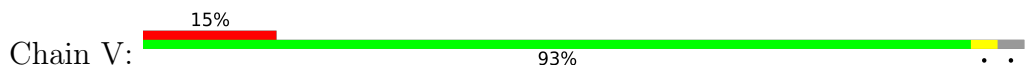
- Molecule 16: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 6

Chain W:
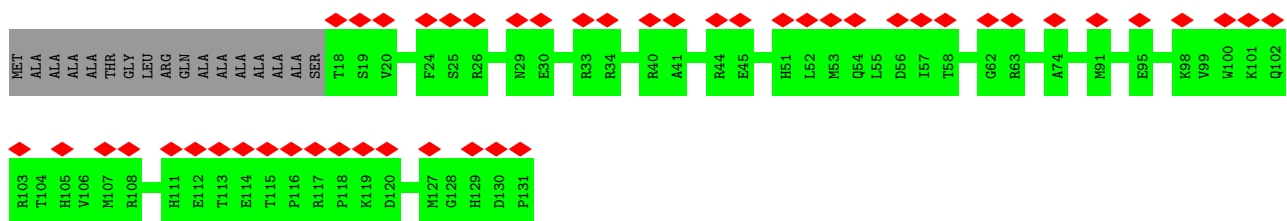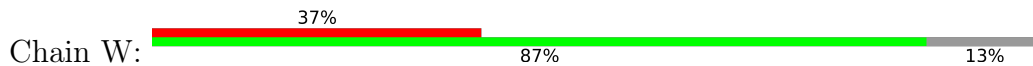
- Molecule 17: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8

Chain X:
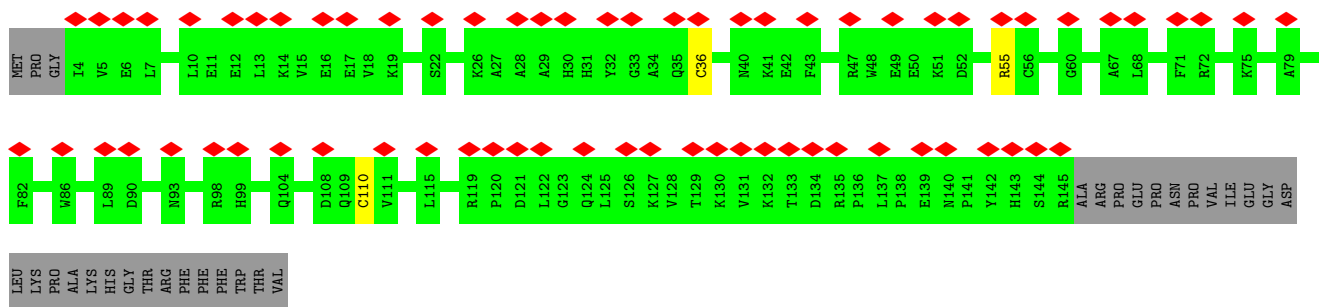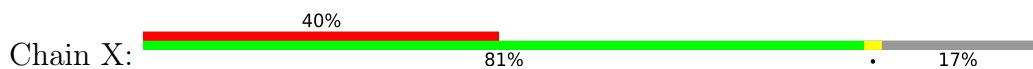
- Molecule 18: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13

Chain Z:
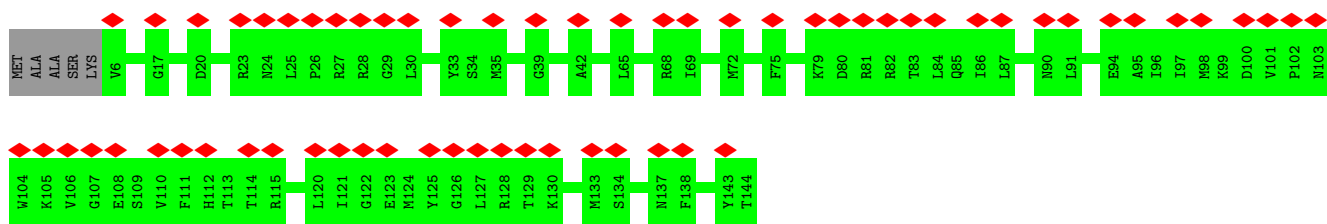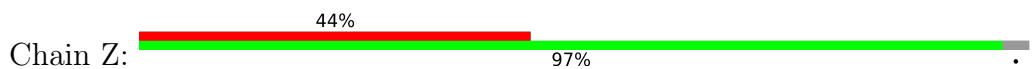
- Molecule 19: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 1

Chain a:
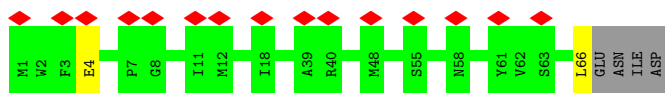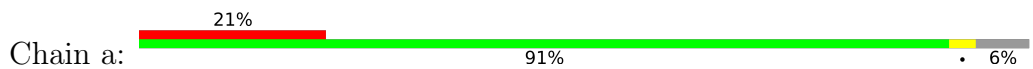
- Molecule 20: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 3

Chain b:
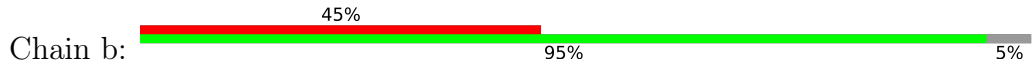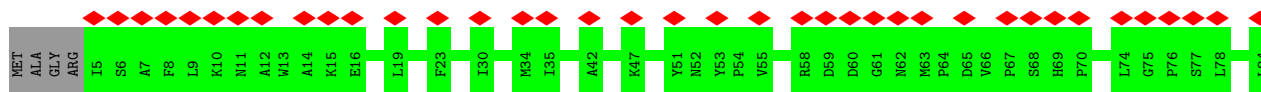
• Molecule 21: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 12

Chain q:

79%

80%   •   17%
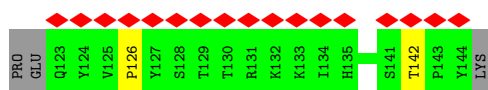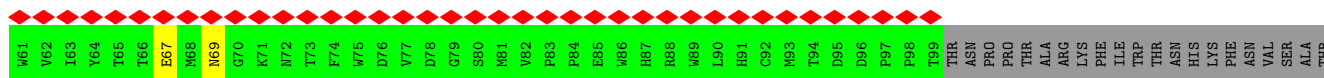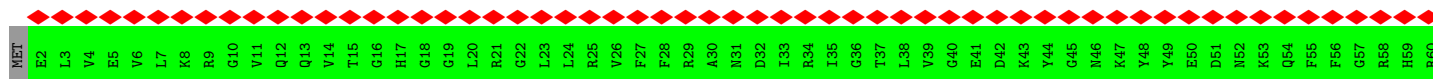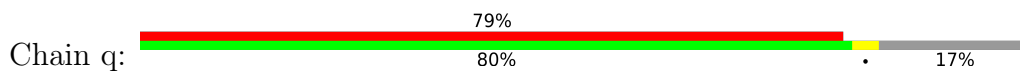
• Molecule 22: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 7

Chain r:

36%

45%   55%
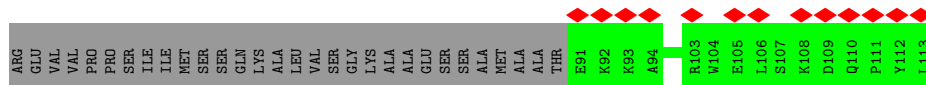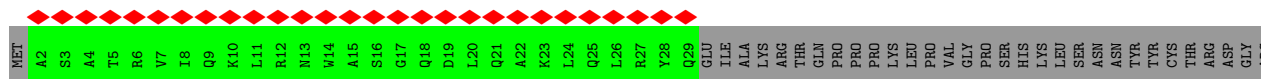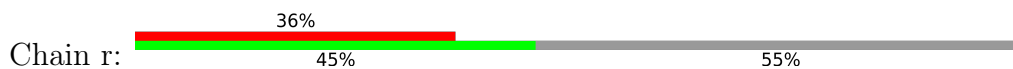
• Molecule 23: NADH dehydrogenase [ubiquinone] flavoprotein 3, mitochondrial

Chain s:

12%

12%   88%
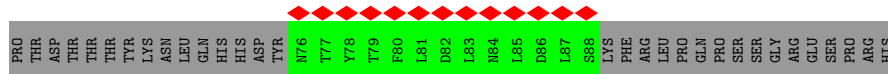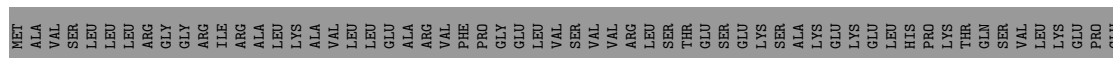
4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	31517	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose $(e^-/\text{Å}^2)$	46.1, 45.9	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k), GATAN K3 (6k x 4k)	Depositor
Maximum map value	4.506	Depositor
Minimum map value	-1.026	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.071	Depositor
Recommended contour level	0.55	Depositor
Map size (Å)	422.40002, 422.40002, 422.40002	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.1, 1.1, 1.1	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: SF4, FES, EHZ, UQ9, CDL, 3PE, NDP, ZN, UQ1, PC1, FMN

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	0.53	0/774	0.78	0/1056
2	B	0.62	0/1289	0.87	4/1744 (0.2%)
3	C	0.55	0/1687	0.81	1/2297 (0.0%)
4	D	0.61	0/3162	0.83	3/4276 (0.1%)
5	E	0.54	2/1675 (0.1%)	0.74	2/2282 (0.1%)
6	F	0.58	1/3363 (0.0%)	0.83	4/4543 (0.1%)
7	G	0.59	1/5374 (0.0%)	0.98	17/7281 (0.2%)
8	H	0.62	1/2585 (0.0%)	0.89	9/3529 (0.3%)
9	I	0.59	0/1427	0.89	2/1927 (0.1%)
10	P	0.52	0/2804	0.74	2/3802 (0.1%)
11	Q	0.58	1/980 (0.1%)	0.80	4/1324 (0.3%)
12	R	0.42	0/671	0.70	0/903
13	S	0.62	0/678	0.96	2/915 (0.2%)
14	T	0.59	0/613	0.84	2/826 (0.2%)
15	V	0.57	0/937	0.85	4/1270 (0.3%)
16	W	0.53	0/993	0.72	0/1335
17	X	0.54	0/1191	0.89	5/1605 (0.3%)
18	Z	0.50	0/1183	0.63	0/1597
19	a	0.54	0/552	0.74	1/743 (0.1%)
20	b	0.47	0/651	0.53	0/895
21	q	0.65	1/1037 (0.1%)	0.91	3/1408 (0.2%)
22	r	0.64	0/426	0.96	0/573
23	s	0.50	0/108	0.61	0/147
All	All	0.57	7/34160 (0.0%)	0.84	65/46278 (0.1%)

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	E	93	PRO	N-CD	-6.00	1.39	1.47
6	F	235	VAL	N-CA	-5.85	1.34	1.46
8	H	60	PRO	N-CD	5.71	1.55	1.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	E	80	PRO	N-CD	5.61	1.55	1.47
7	G	683	PRO	N-CD	-5.50	1.40	1.47

The worst 5 of 65 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	G	174	THR	N-CA-C	-8.11	89.11	111.00
11	Q	60	ASP	N-CA-C	-7.66	90.32	111.00
17	X	55	ARG	N-CA-CB	-7.46	97.18	110.60
7	G	204	MET	N-CA-C	-7.26	91.40	111.00
17	X	55	ARG	N-CA-C	7.03	129.97	111.00

There are no chirality outliers.

There are no planarity outliers.

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	88/115 (76%)	79 (90%)	9 (10%)	0	100	100
2	B	155/224 (69%)	144 (93%)	10 (6%)	1 (1%)	22	54
3	C	196/263 (74%)	184 (94%)	12 (6%)	0	100	100
4	D	383/463 (83%)	355 (93%)	27 (7%)	1 (0%)	37	67
5	E	208/248 (84%)	188 (90%)	20 (10%)	0	100	100
6	F	424/464 (91%)	404 (95%)	20 (5%)	0	100	100
7	G	685/727 (94%)	627 (92%)	58 (8%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
8	H	308/318 (97%)	286 (93%)	21 (7%)	1 (0%)	37	67
9	I	170/212 (80%)	169 (99%)	1 (1%)	0	100	100
10	P	338/377 (90%)	315 (93%)	23 (7%)	0	100	100
11	Q	116/175 (66%)	114 (98%)	2 (2%)	0	100	100
12	R	81/116 (70%)	76 (94%)	5 (6%)	0	100	100
13	S	81/99 (82%)	78 (96%)	3 (4%)	0	100	100
14	T	73/156 (47%)	72 (99%)	1 (1%)	0	100	100
15	V	110/116 (95%)	107 (97%)	3 (3%)	0	100	100
16	W	112/131 (86%)	106 (95%)	6 (5%)	0	100	100
17	X	140/172 (81%)	129 (92%)	11 (8%)	0	100	100
18	Z	137/144 (95%)	129 (94%)	8 (6%)	0	100	100
19	a	64/70 (91%)	60 (94%)	4 (6%)	0	100	100
20	b	78/84 (93%)	68 (87%)	10 (13%)	0	100	100
21	q	116/145 (80%)	114 (98%)	2 (2%)	0	100	100
22	r	47/113 (42%)	43 (92%)	4 (8%)	0	100	100
23	s	11/104 (11%)	11 (100%)	0	0	100	100
All	All	4121/5036 (82%)	3858 (94%)	260 (6%)	3 (0%)	50	78

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
8	H	92	PRO
4	D	93	GLY
2	B	195	PRO

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	84/104 (81%)	84 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	B	133/185 (72%)	131 (98%)	2 (2%)	60	75
3	C	180/227 (79%)	180 (100%)	0	100	100
4	D	332/395 (84%)	332 (100%)	0	100	100
5	E	182/206 (88%)	182 (100%)	0	100	100
6	F	341/370 (92%)	341 (100%)	0	100	100
7	G	579/610 (95%)	579 (100%)	0	100	100
8	H	276/280 (99%)	276 (100%)	0	100	100
9	I	148/178 (83%)	148 (100%)	0	100	100
10	P	297/325 (91%)	297 (100%)	0	100	100
11	Q	105/153 (69%)	105 (100%)	0	100	100
12	R	70/96 (73%)	70 (100%)	0	100	100
13	S	74/80 (92%)	74 (100%)	0	100	100
14	T	69/135 (51%)	69 (100%)	0	100	100
15	V	100/102 (98%)	100 (100%)	0	100	100
16	W	108/114 (95%)	108 (100%)	0	100	100
17	X	129/154 (84%)	129 (100%)	0	100	100
18	Z	120/123 (98%)	120 (100%)	0	100	100
19	a	56/60 (93%)	55 (98%)	1 (2%)	54	71
20	b	71/73 (97%)	71 (100%)	0	100	100
21	q	108/131 (82%)	108 (100%)	0	100	100
22	r	44/96 (46%)	44 (100%)	0	100	100
23	s	13/95 (14%)	13 (100%)	0	100	100
All	All	3619/4292 (84%)	3616 (100%)	3 (0%)	92	96

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	122	ARG
2	B	170	TYR
19	a	66	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 77 such sidechains are listed below:

Mol	Chain	Res	Type
10	P	275	HIS
21	q	54	GLN
11	Q	51	GLN
17	X	143	HIS
22	r	110	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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 21 ligands modelled in this entry, 1 is monoatomic - leaving 20 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	$\#|Z| > 2$
25	SF4	G	801	7	0,12,12	-	-	-		
31	NDP	P	401	-	45,52,52	0.95	2 (4%)	53,80,80	1.21	4 (7%)
25	SF4	F	502	6	0,12,12	-	-	-		
28	FES	E	301	5	0,4,4	-	-	-		
30	UQ9	H	401	-	35,35,58	0.81	2 (5%)	42,45,73	0.50	0
34	CDL	q	201	-	56,56,99	1.19	4 (7%)	62,68,111	1.29	6 (9%)
25	SF4	B	301	2	0,12,12	-	-	-		
24	3PE	I	301	-	50,50,50	0.90	2 (4%)	53,55,55	1.03	3 (5%)
33	EHZ	W	201	-	27,31,37	1.89	7 (25%)	37,41,47	1.86	11 (29%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
25	SF4	I	303	9	0,12,12	-	-	-		
27	PC1	I	302	-	46,46,53	1.00	2 (4%)	52,54,61	1.07	3 (5%)
24	3PE	b	201	-	45,45,50	0.95	2 (4%)	48,50,55	1.09	3 (6%)
25	SF4	G	802	7	0,12,12	-	-	-	-	-
27	PC1	H	402	-	41,41,53	1.05	2 (4%)	47,49,61	1.06	4 (8%)
29	FMN	F	501	-	33,33,33	1.40	5 (15%)	48,50,50	1.21	6 (12%)
25	SF4	I	304	9	0,12,12	-	-	-	-	-
27	PC1	B	303	-	34,34,53	1.15	2 (5%)	40,42,61	1.15	3 (7%)
24	3PE	A	401	-	45,45,50	0.93	2 (4%)	48,50,55	1.01	2 (4%)
28	FES	G	803	7	0,4,4	-	-	-	-	-
26	UQ1	B	302	-	18,18,18	2.04	2 (11%)	22,25,25	1.75	5 (22%)

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
25	SF4	G	801	7	-	-	0/6/5/5
31	NDP	P	401	-	-	6/30/77/77	0/5/5/5
25	SF4	F	502	6	-	-	0/6/5/5
28	FES	E	301	5	-	-	0/1/1/1
34	CDL	q	201	-	-	14/67/67/110	-
30	UQ9	H	401	-	-	13/30/54/81	0/1/1/1
25	SF4	B	301	2	-	-	0/6/5/5
24	3PE	I	301	-	-	17/54/54/54	-
33	EHZ	W	201	-	-	22/39/39/45	-
25	SF4	I	303	9	-	-	0/6/5/5
27	PC1	I	302	-	-	13/50/50/57	-
24	3PE	b	201	-	-	8/49/49/54	-
25	SF4	G	802	7	-	-	0/6/5/5
27	PC1	H	402	-	-	15/45/45/57	-
29	FMN	F	501	-	-	4/18/18/18	0/3/3/3
25	SF4	I	304	9	-	-	0/6/5/5
27	PC1	B	303	-	-	11/38/38/57	-
24	3PE	A	401	-	-	14/49/49/54	-
28	FES	G	803	7	-	-	0/1/1/1
26	UQ1	B	302	-	-	0/9/33/33	0/1/1/1

The worst 5 of 34 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
26	B	302	UQ1	C6-C5	7.56	1.49	1.35
33	W	201	EHZ	C15-N2	5.40	1.45	1.33
33	W	201	EHZ	C12-N1	5.14	1.45	1.33
29	F	501	FMN	C9A-C5A	4.76	1.49	1.41
27	I	302	PC1	O31-C31	4.20	1.45	1.33

The worst 5 of 50 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
33	W	201	EHZ	C8-C9-S1	6.26	121.38	113.63
26	B	302	UQ1	CM2-O2-C2	5.28	135.19	116.47
34	q	201	CDL	OA6-CA5-C11	4.36	120.89	111.50
27	I	302	PC1	O21-C21-C22	4.24	120.63	111.50
34	q	201	CDL	OB6-CB5-C51	4.12	120.38	111.50

There are no chirality outliers.

5 of 137 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
24	A	401	3PE	C12-C11-O13-P
24	A	401	3PE	O32-C31-O31-C3
24	A	401	3PE	C32-C31-O31-C3
24	I	301	3PE	C11-O13-P-O12
24	b	201	3PE	O22-C21-O21-C2

There are no ring outliers.

No monomer is involved in short contacts.

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 NDP P 401

Bond lengths

Bond angles

Torsions

Rings

Ligand UQ9 H 401

Bond lengths

Bond angles

Torsions

Rings

Ligand CDL q 201

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE I 301

Bond lengths

Bond angles

Torsions

Rings

Ligand EHZ W 201

Bond lengths	Bond angles
Torsions	Rings

Ligand PC1 I 302

Bond lengths	Bond angles
Torsions	Rings

Ligand 3PE b 201

Bond lengths	Bond angles
Torsions	Rings

Ligand PC1 H 402

Bond lengths

Bond angles

Torsions

Rings

Ligand FMN F 501

Bond lengths

Bond angles

Torsions

Rings

Ligand PC1 B 303

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE A 401

Bond lengths

Bond angles

Torsions

Rings

Ligand UQ1 B 302

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

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-38511. 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 ⓘ
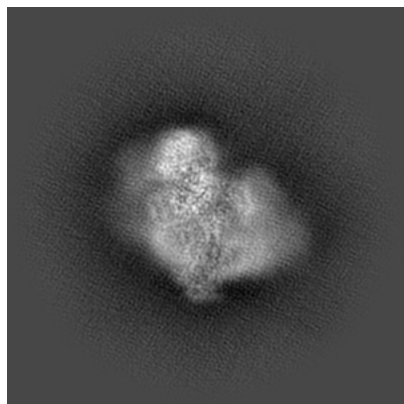
6.1.1　Primary map

X
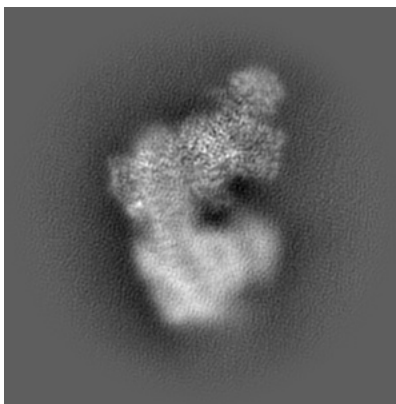
Y
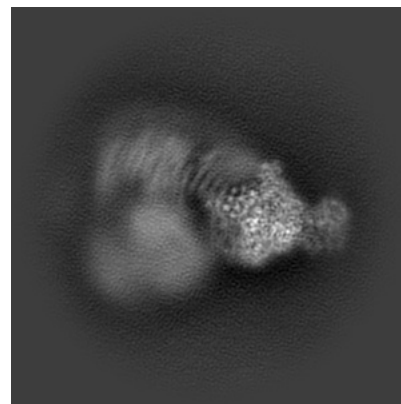
Z

6.1.2　Raw map

X

Y

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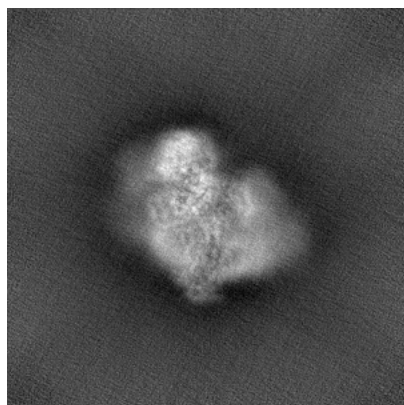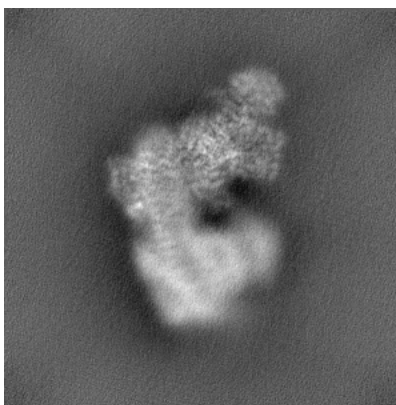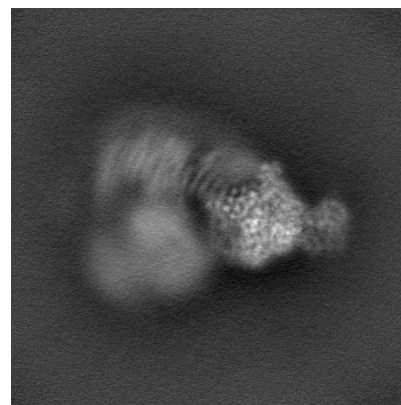
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
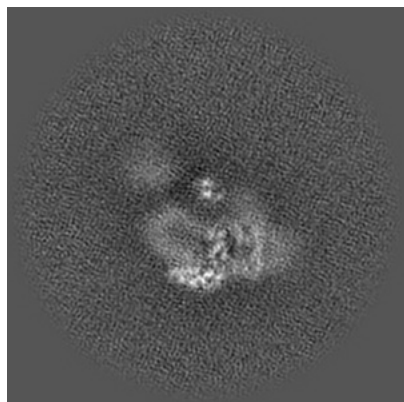
6.2.1 Primary map
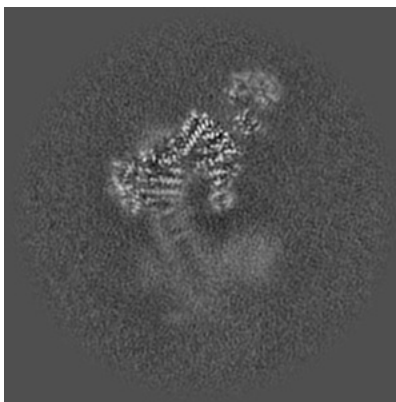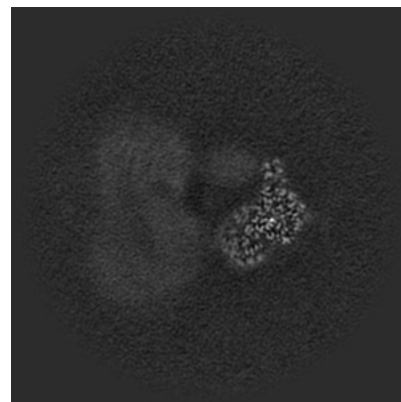
X Index: 192   Y Index: 192   Z Index: 192

6.2.2 Raw map
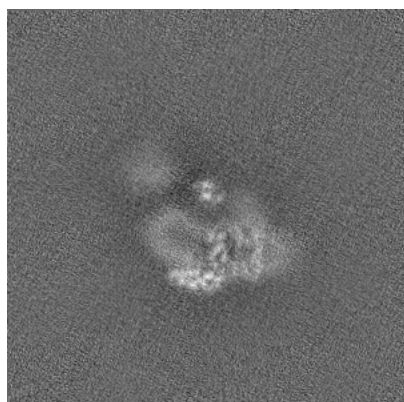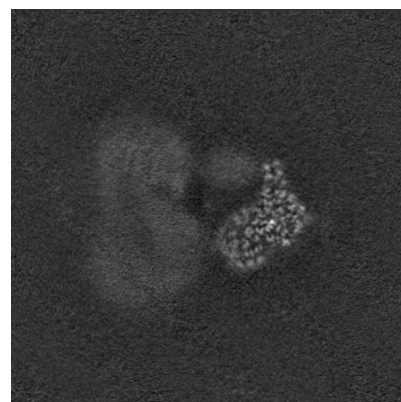
X Index: 192   Y Index: 192   Z Index: 192

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

6.3 Largest variance slices (i)

6.3.1 Primary map
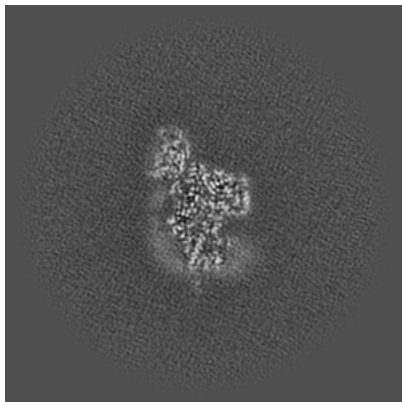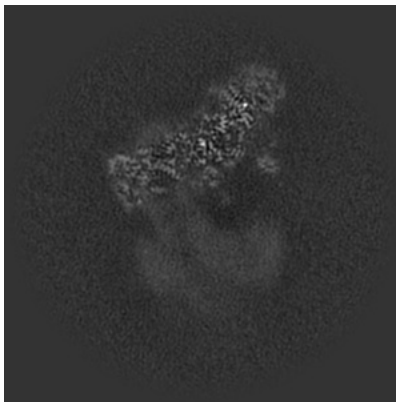
| X Index: 244 | Y Index: 178 | Z Index: 204 |
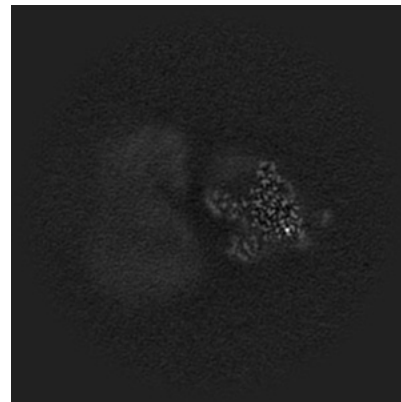
6.3.2 Raw map
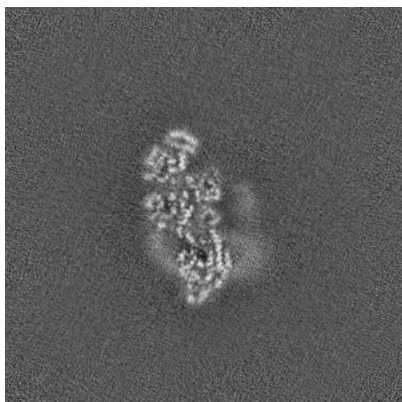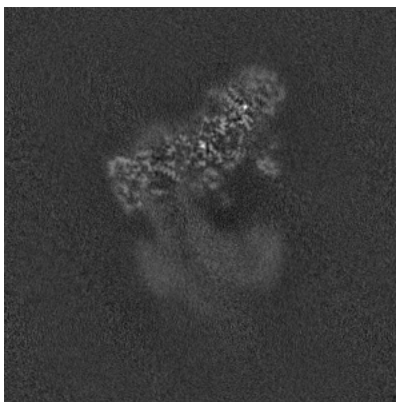
| X Index: 232 | Y Index: 178 | Z Index: 199 |
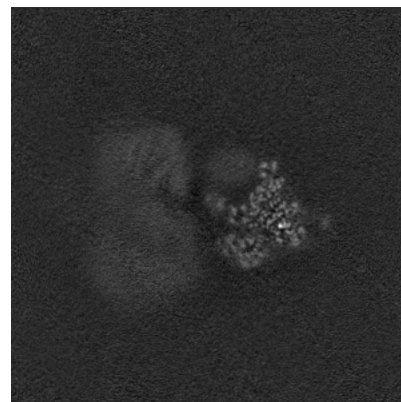
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map

X   Y   Z

6.4.2 Raw map

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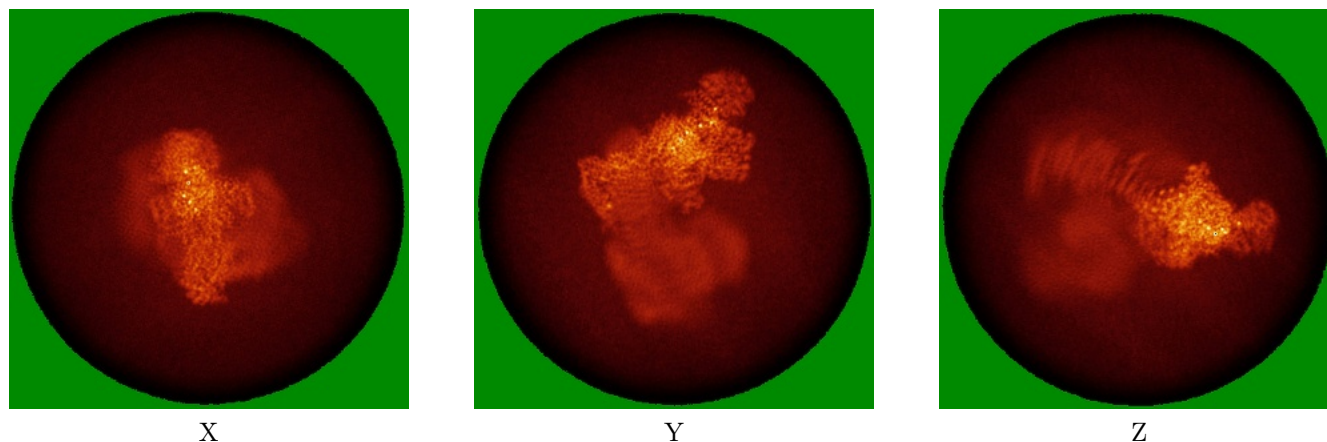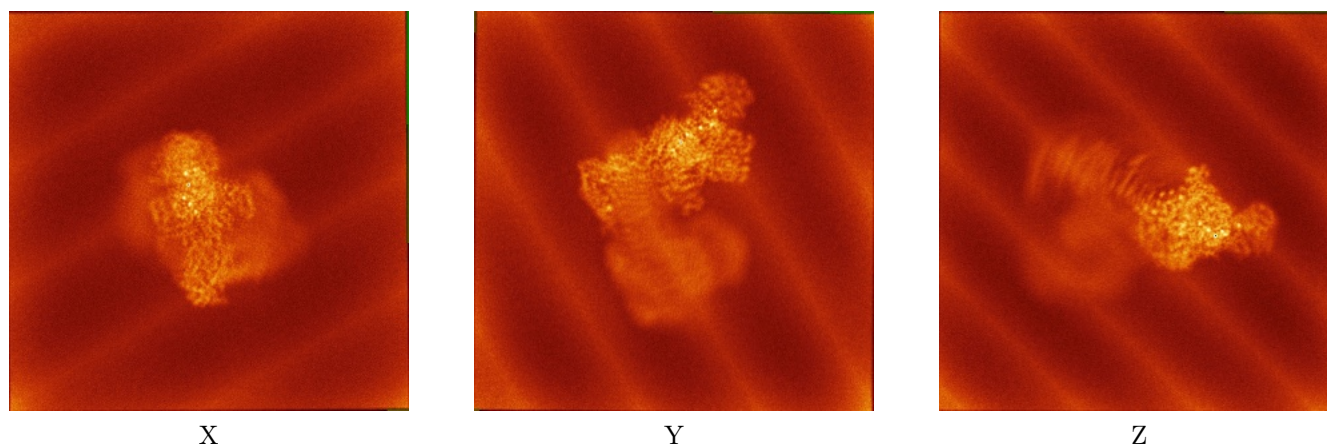
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views ⓘ

6.5.1 Primary map

X   Y   Z
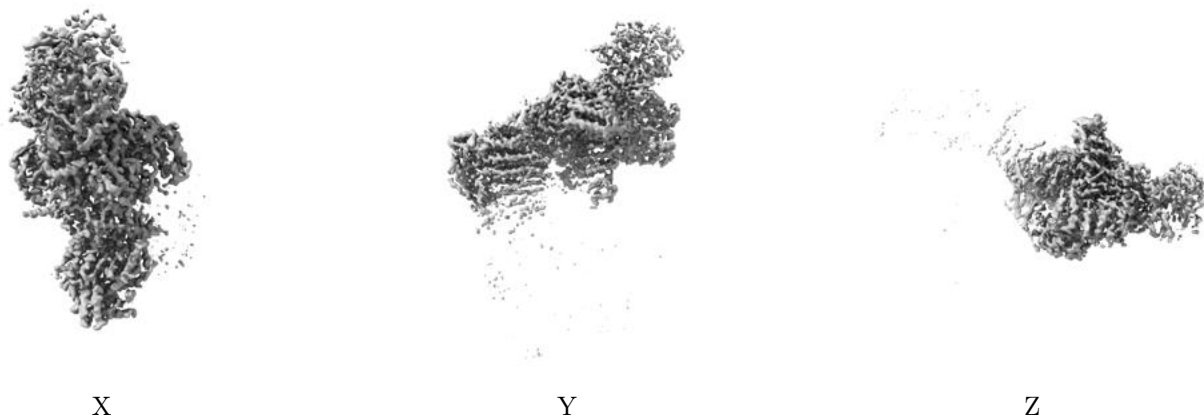
The images above show the 3D surface view of the map at the recommended contour level 0.55. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

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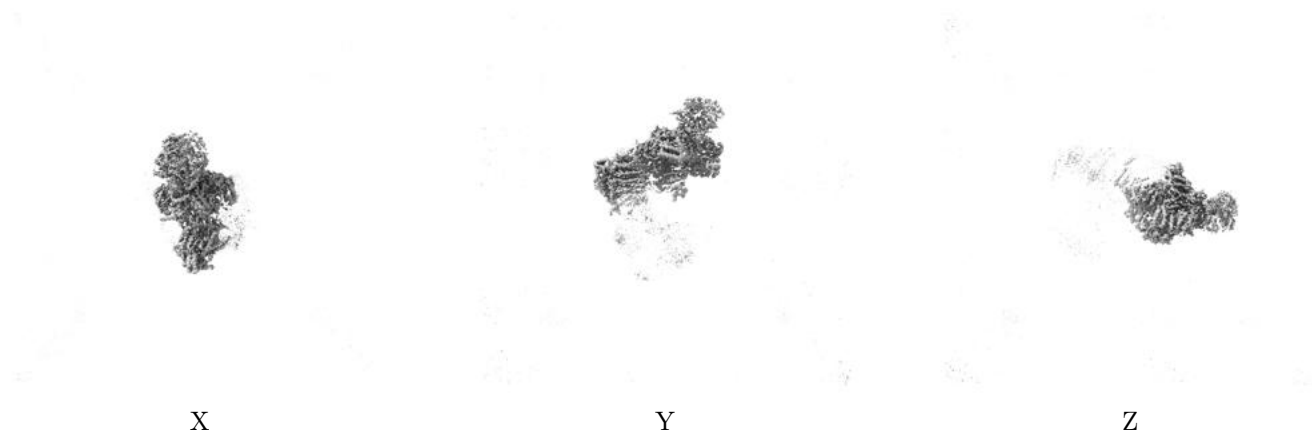
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

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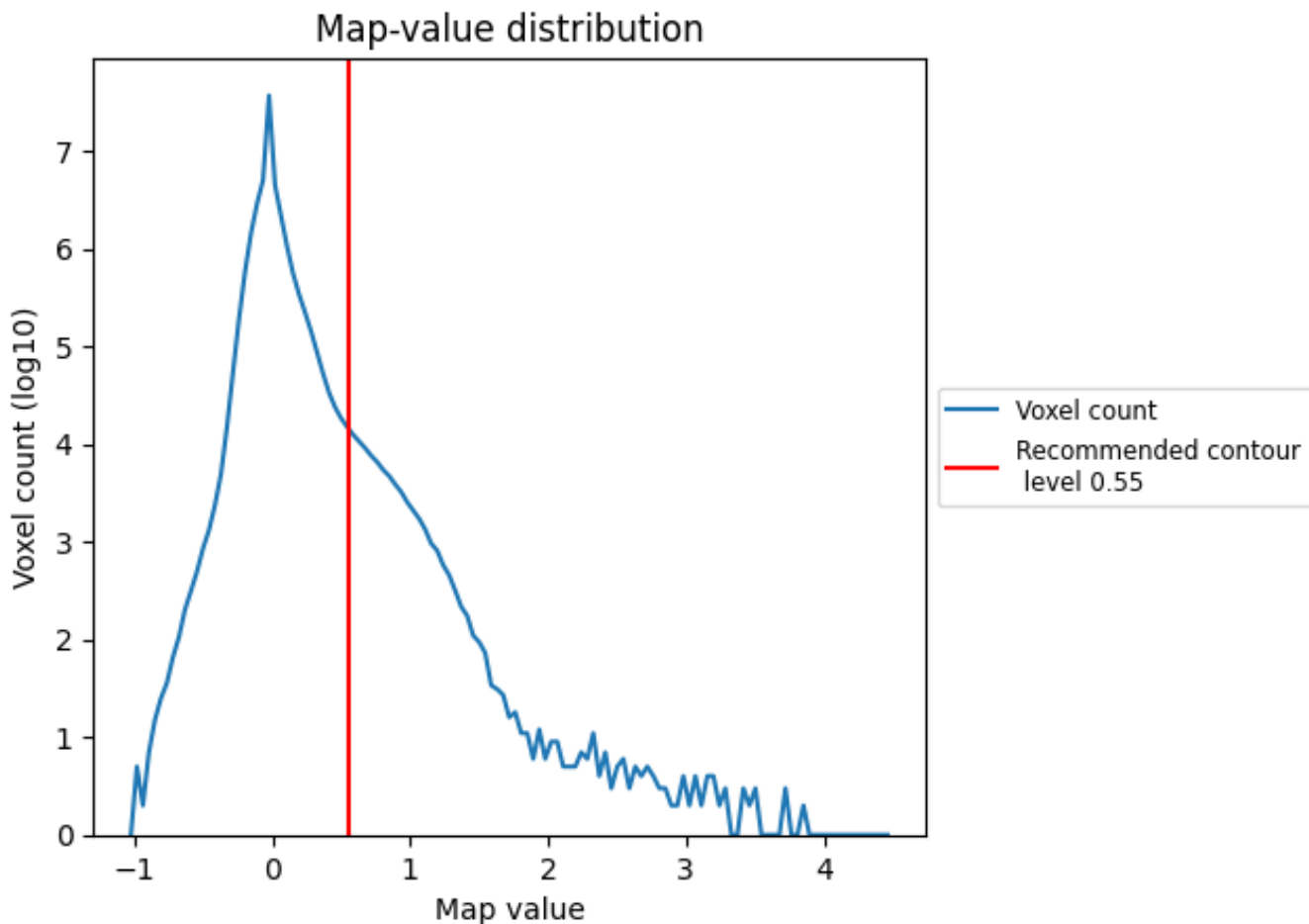
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2   Volume estimate ⓘ
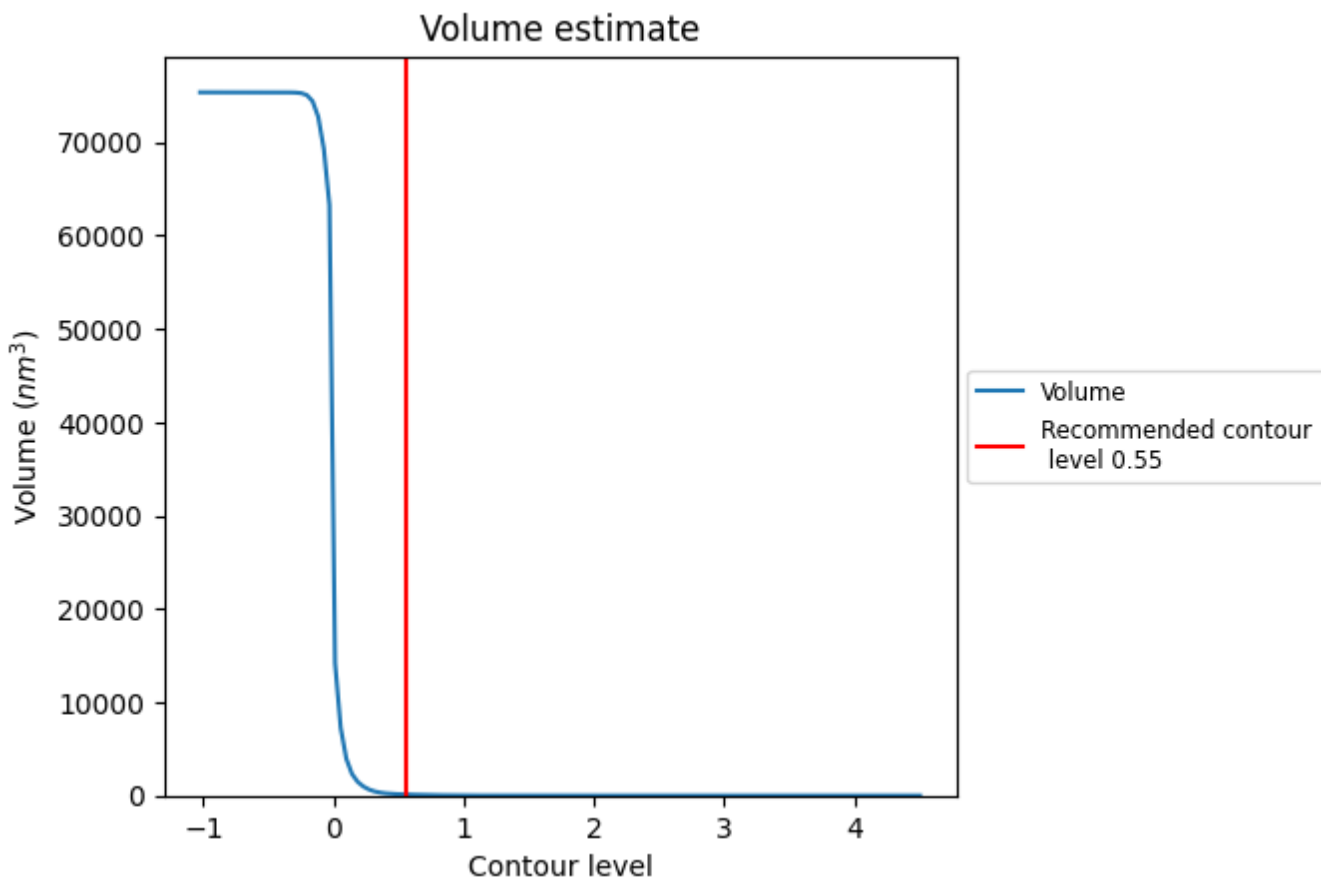
The volume at the recommended contour level is 117 nm^3; this corresponds to an approximate mass of 106 kDa.

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 ⓘ
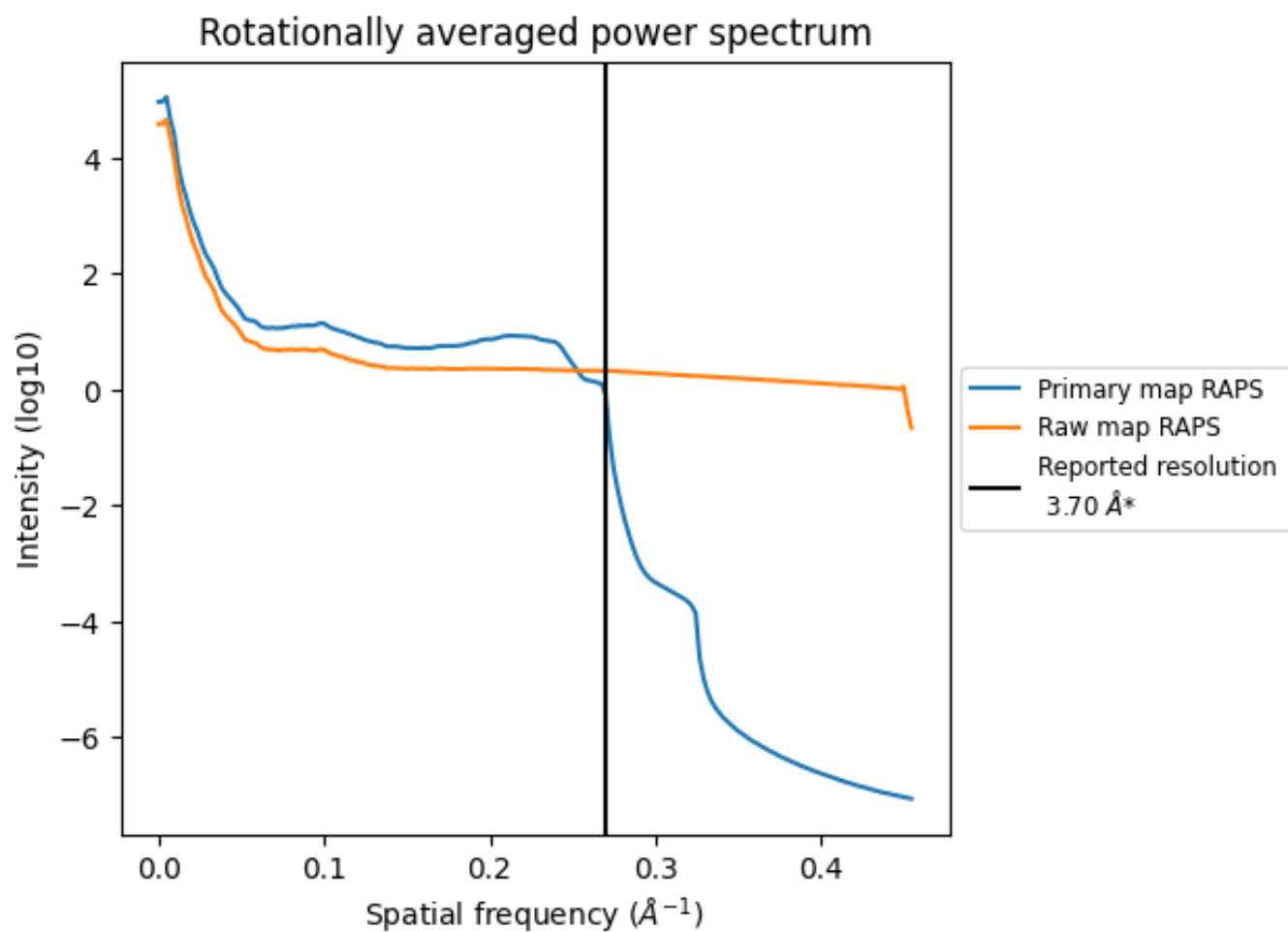
*Reported resolution corresponds to spatial frequency of 0.270 Å^{-1}

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 ⓘ
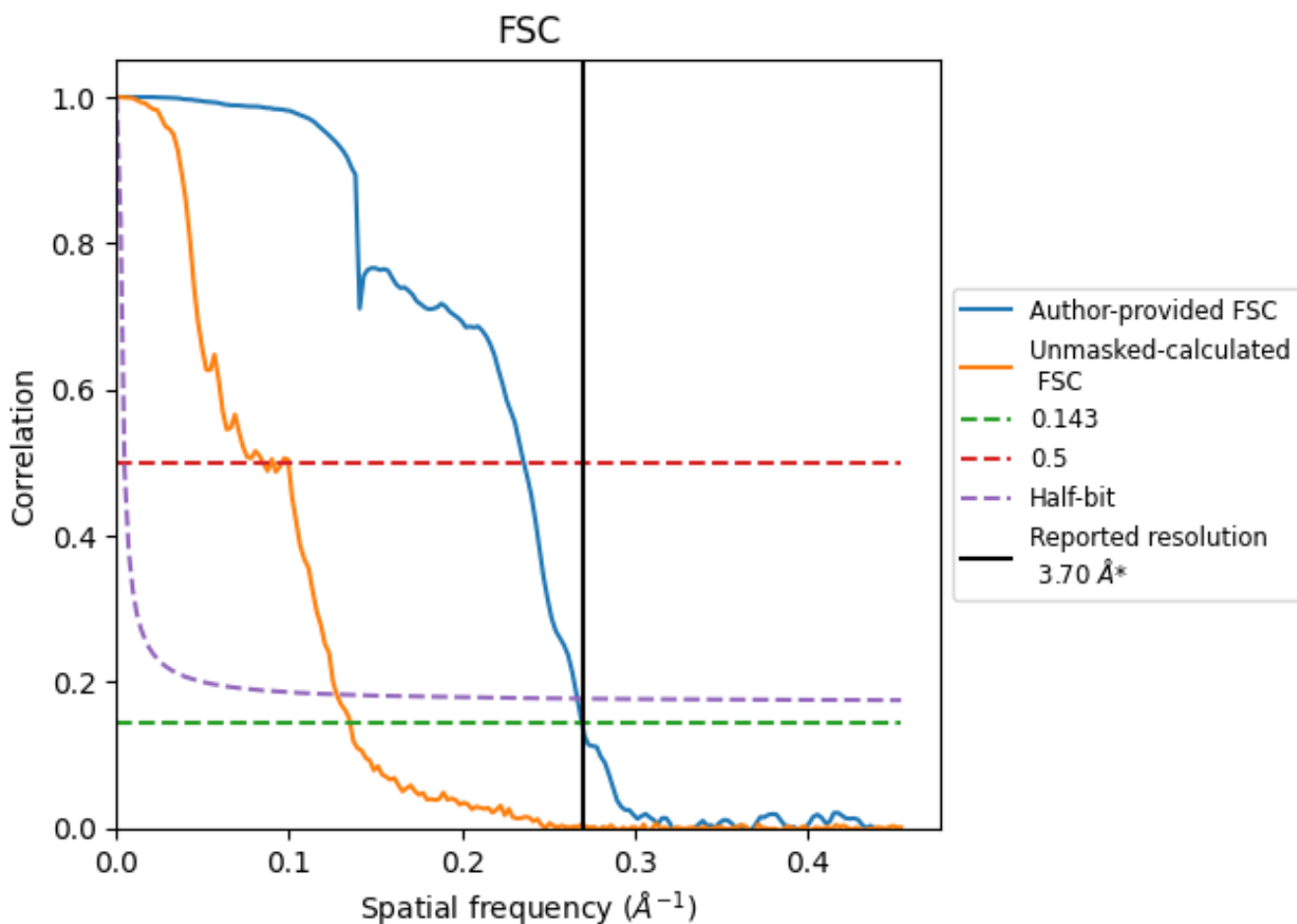
*Reported resolution corresponds to spatial frequency of 0.270 Å^{-1}

8.2   Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.70	-	-
Author-provided FSC curve	3.71	4.24	3.75
Unmasked-calculated*	7.39	11.79	7.84

*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 7.39 differs from the reported value 3.7 by more than 10 %

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-38511 and PDB model 8XNQ. Per-residue inclusion information can be found in section 3 on page 15.

## 9.1 Map-model overlay ⓘ

| X | Y | Z |
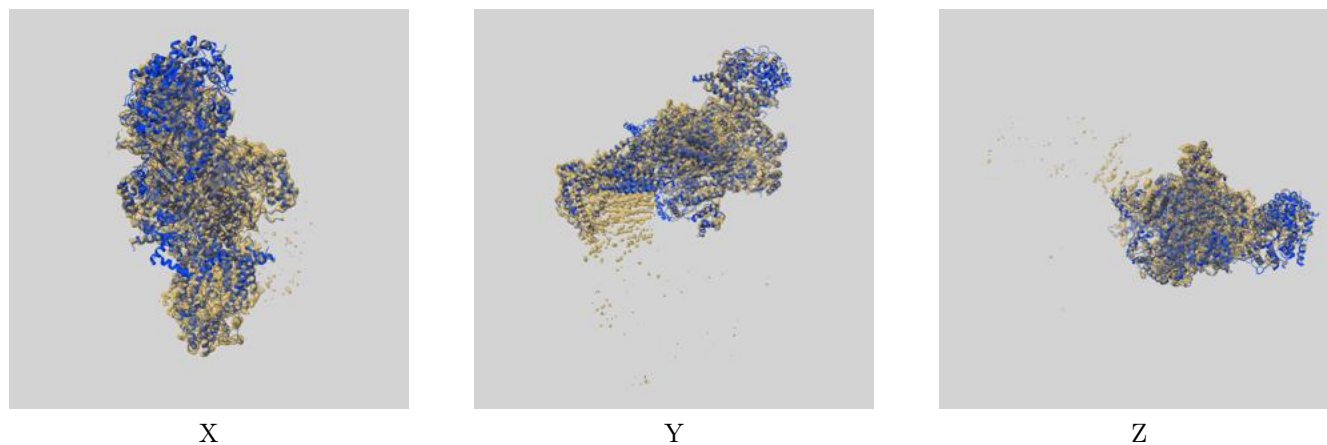
The images above show the 3D surface view of the map at the recommended contour level 0.55 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model ⓘ

X   Y   Z
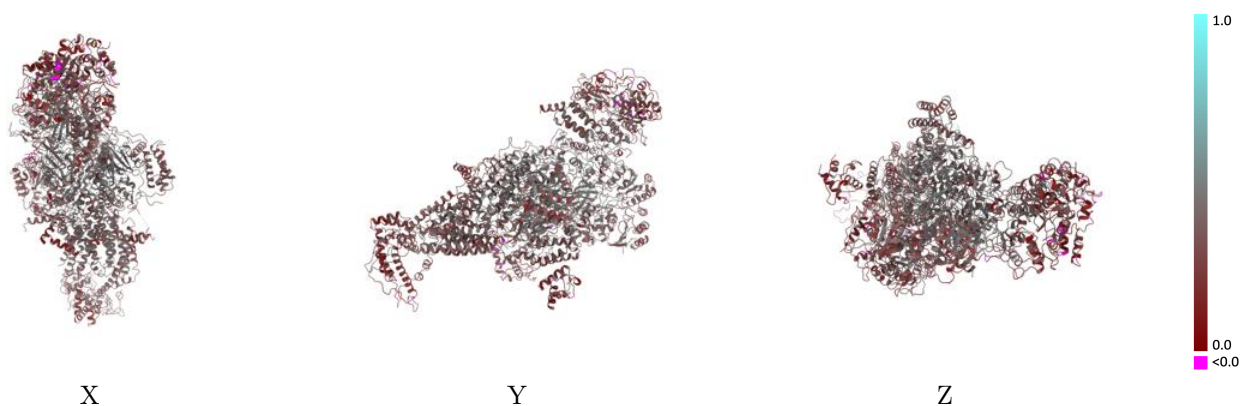
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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
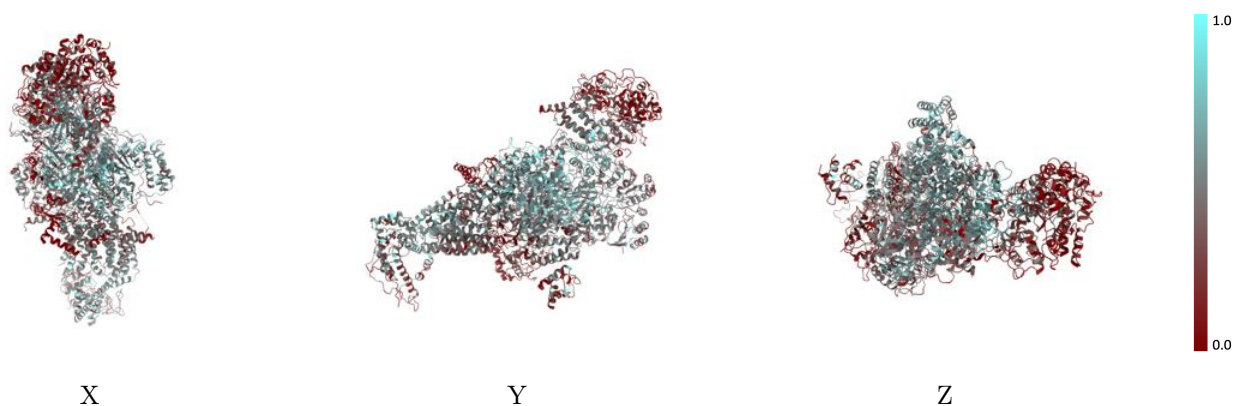
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.55).

9.4   Atom inclusion (i)
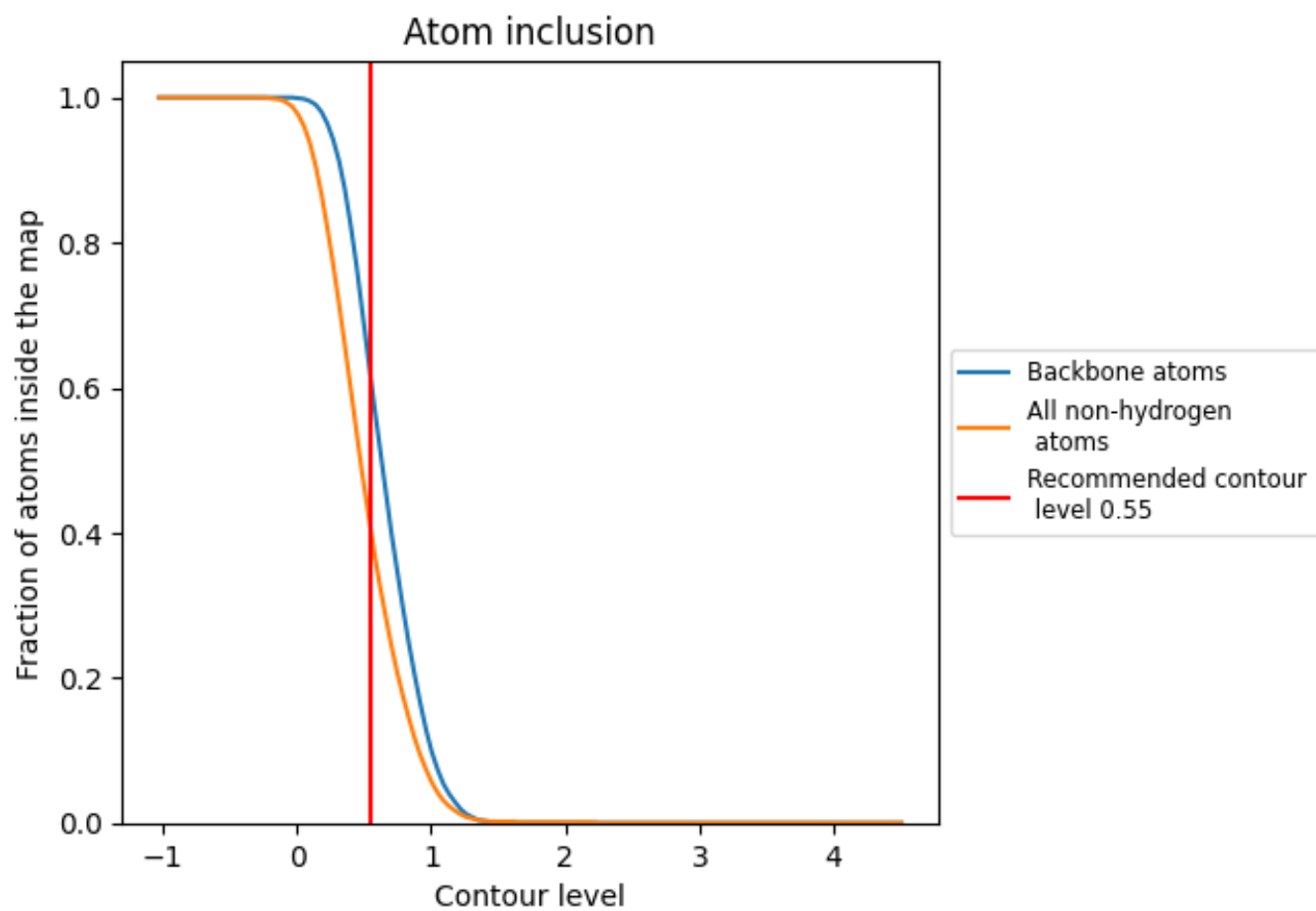
At the recommended contour level, 61% of all backbone atoms, 40% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.55) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4040	0.3450
A	0.3300	0.3340
B	0.5340	0.4150
C	0.5760	0.4210
D	0.5680	0.4250
E	0.1700	0.2710
F	0.2510	0.2970
G	0.5050	0.3790
H	0.4440	0.3780
I	0.5700	0.4170
P	0.2900	0.2930
Q	0.3650	0.3800
R	0.1870	0.2610
S	0.4290	0.3140
T	0.2490	0.2230
V	0.5470	0.3520
W	0.3800	0.3520
X	0.4080	0.2550
Z	0.4250	0.2830
a	0.5420	0.3630
b	0.3870	0.3080
q	0.0470	0.2820
r	0.1770	0.3070
s	0.0090	0.1520

1.0

0.0
<0.0