Full wwPDB EM Validation Report ⓘ

Nov 27, 2022 – 03:35 AM EST

PDB ID	:	6B8H
EMDB ID	:	EMD-7067
Title	:	Mosaic model of yeast mitochondrial ATP synthase monomer
Authors	:	Guo, H.; Bueler, S.A.; Rubinstein, J.L.
Deposited on	:	2017-10-07
Resolution	:	3.60 Å(reported)

This is a Full wwPDB EM Validation 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:

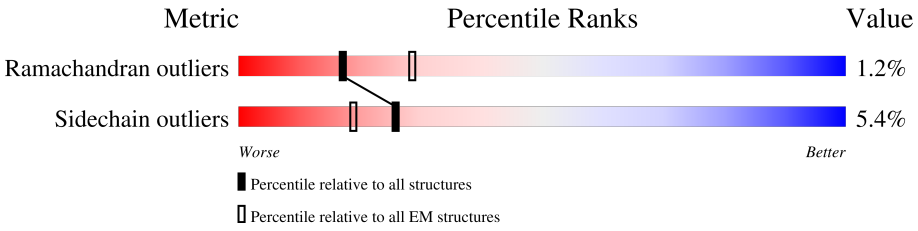
EMDB validation analysis	:	0.0.1.dev43
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.2

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.60 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)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	0	76	36% 99%
1	1	76	33% 99%
1	2	76	30% 97%
1	3	76	20% 96%
1	4	76	28% 99%
1	5	76	29% 97%
1	6	76	37% 97%
1	7	76	66% 96%
1	8	76	51% 99%

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Mol	Chain	Length	Quality of chain
1	9	76	47% 97%
1	J	76	99% 99%
1	L	76	99% 99%
1	M	76	99% 97%
1	N	76	97% 96%
1	P	76	99% 99%
1	Q	76	99% 97%
1	R	76	97% 97%
1	S	76	96% 96%
1	T	76	99% 99%
1	U	76	97% 97%
2	A	48	100% 96%
2	V	48	100% 96%
3	a	249	60% 100%
3	p	249	100% 100%
4	b	209	96% 93%
4	q	209	96% 93%
5	d	173	87% 88% 9%
5	r	173	91% 88% 9%
6	e	49	100% 100%
6	s	49	100% 100%
7	f	95	88% 85% 12%
7	t	95	88% 85% 12%
8	g	106	100% 99%
8	u	106	100% 99%

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Mol	Chain	Length	Quality of chain
9	i	59	100% 100%
9	w	59	100% 100%
10	k	68	16% 35% 65%
10	x	68	35% 35% 65%
11	B	510	96% 89% 7%
11	C	510	98% 92% 6%
11	K	510	98% 94% 5%
11	W	510	96% 89% 7%
11	X	510	98% 92% 6%
11	n	510	98% 94% 5%
12	D	478	98% 94%
12	E	478	98% 92% 6%
12	F	478	98% 92% 5%
12	Y	478	98% 94%
12	Z	478	98% 92% 6%
12	c	478	98% 92% 5%
13	G	278	54% 83% 12% 5%
13	j	278	95% 83% 12% 5%
14	H	138	17% 72% 14% 14%
14	l	138	86% 72% 14% 14%
15	I	61	28% 62% 13% 21%
15	m	61	79% 62% 13% 21%
16	O	195	83% 78% 17%
16	o	195	83% 78% 17%
17	h	21	100% 100%

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Mol	Chain	Length	Quality of chain
17	v	21	

2 Entry composition (i)

There are 19 unique types of molecules in this entry. The entry contains 75614 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 ATP synthase subunit 9, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	1	75	Total	C	N	O	S	0	0
			537	359	83	91	4		
1	2	75	Total	C	N	O	S	0	0
			537	359	83	91	4		
1	3	74	Total	C	N	O	S	0	0
			529	354	82	90	3		
1	4	75	Total	C	N	O	S	0	0
			537	359	83	91	4		
1	5	75	Total	C	N	O	S	0	0
			537	359	83	91	4		
1	6	74	Total	C	N	O	S	0	0
			529	354	82	90	3		
1	7	73	Total	C	N	O	S	0	0
			522	348	81	89	4		
1	8	75	Total	C	N	O	S	0	0
			537	359	83	91	4		
1	9	74	Total	C	N	O	S	0	0
			529	354	82	90	3		
1	0	75	Total	C	N	O	S	0	0
			537	359	83	91	4		
1	L	75	Total	C	N	O	S	0	0
			537	359	83	91	4		
1	M	75	Total	C	N	O	S	0	0
			537	359	83	91	4		
1	N	74	Total	C	N	O	S	0	0
			529	354	82	90	3		
1	P	75	Total	C	N	O	S	0	0
			537	359	83	91	4		
1	Q	75	Total	C	N	O	S	0	0
			537	359	83	91	4		
1	R	74	Total	C	N	O	S	0	0
			529	354	82	90	3		
1	S	73	Total	C	N	O	S	0	0
			522	348	81	89	4		

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Mol	Chain	Residues	Atoms					AltConf	Trace
1	T	75	Total	C	N	O	S	0	0
			537	359	83	91	4		
1	U	74	Total	C	N	O	S	0	0
			529	354	82	90	3		
1	J	75	Total	C	N	O	S	0	0
			537	359	83	91	4		

- Molecule 2 is a protein called ATP synthase protein 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	A	48	Total	C	N	O	S	0	0
			410	287	59	60	4		
2	V	48	Total	C	N	O	S	0	0
			410	287	59	60	4		

- Molecule 3 is a protein called ATP synthase subunit a.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	a	249	Total	C	N	O	S	0	0
			1971	1338	296	326	11		
3	p	249	Total	C	N	O	S	0	0
			1971	1338	296	326	11		

- Molecule 4 is a protein called ATP synthase subunit 4, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	b	200	Total	C	N	O	S	0	0
			1153	715	210	227	1		
4	q	200	Total	C	N	O	S	0	0
			1153	715	210	227	1		

- Molecule 5 is a protein called ATP synthase subunit d, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	d	157	Total	C	N	O	S	0	0
			930	573	173	182	2		
5	r	157	Total	C	N	O	S	0	0
			930	573	173	182	2		

- Molecule 6 is a protein called ATP synthase subunit e, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
6	e	49	Total 245	C 147	N 49	O 49	0	0
6	s	49	Total 245	C 147	N 49	O 49	0	0

- Molecule 7 is a protein called ATP synthase subunit f, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	f	84	Total 607	C 396	N 108	O 102	S 1	0	0
7	t	84	Total 607	C 396	N 108	O 102	S 1	0	0

- Molecule 8 is a protein called AATP synthase subunit g.

Mol	Chain	Residues	Atoms				AltConf	Trace
8	g	106	Total 530	C 318	N 106	O 106	0	0
8	u	106	Total 530	C 318	N 106	O 106	0	0

- Molecule 9 is a protein called ATP synthase subunit J, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	i	59	Total 473	C 313	N 78	O 80	S 2	0	0
9	w	59	Total 473	C 313	N 78	O 80	S 2	0	0

- Molecule 10 is a protein called ATP synthase subunit K, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	k	24	Total 180	C 122	N 30	O 27	S 1	0	0
10	x	24	Total 180	C 122	N 30	O 27	S 1	0	0

- Molecule 11 is a protein called ATP synthase subunit alpha, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	501	Total 3745	C 2363	N 665	O 714	S 3	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
11	B	492	Total	C	N	O	S	0	0
			3700	2336	656	705	3		
11	C	500	Total	C	N	O	S	0	0
			3739	2359	664	713	3		
11	n	501	Total	C	N	O	S	0	0
			3745	2363	665	714	3		
11	W	492	Total	C	N	O	S	0	0
			3700	2336	656	705	3		
11	X	500	Total	C	N	O	S	0	0
			3739	2359	664	713	3		

- Molecule 12 is a protein called ATP synthase subunit beta, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	D	470	Total	C	N	O	S	0	0
			3549	2250	604	689	6		
12	E	468	Total	C	N	O	S	0	0
			3536	2243	602	685	6		
12	F	469	Total	C	N	O	S	0	0
			3543	2247	603	687	6		
12	Y	470	Total	C	N	O	S	0	0
			3549	2250	604	689	6		
12	Z	468	Total	C	N	O	S	0	0
			3536	2243	602	685	6		
12	c	469	Total	C	N	O	S	0	0
			3543	2247	603	687	6		

- Molecule 13 is a protein called ATP synthase subunit gamma, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	G	265	Total	C	N	O	S	0	0
			2030	1277	355	388	10		
13	j	265	Total	C	N	O	S	0	0
			2030	1277	355	388	10		

- Molecule 14 is a protein called ATP synthase subunit delta, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	H	119	Total	C	N	O	S	0	0
			751	470	133	146	2		
14	l	119	Total	C	N	O	S	0	0
			751	470	133	146	2		

- Molecule 15 is a protein called ATP synthase catalytic sector F1 epsilon subunit.

Mol	Chain	Residues	Atoms				AltConf	Trace
15	I	48	Total	C	N	O	0	0
			324	201	56	67		
15	m	48	Total	C	N	O	0	0
			324	201	56	67		

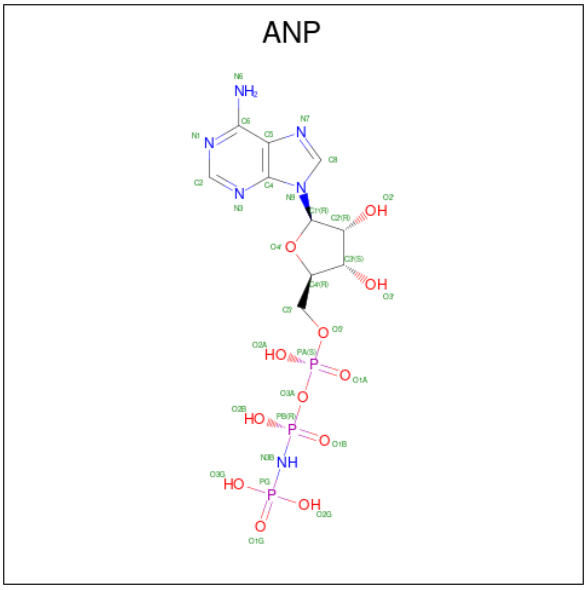
- Molecule 16 is a protein called ATP synthase subunit 5, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
16	O	161	Total	C	N	O	0	0
			795	473	161	161		
16	o	161	Total	C	N	O	0	0
			795	473	161	161		

- Molecule 17 is a protein called ATP synthase subunit h.

Mol	Chain	Residues	Atoms				AltConf	Trace
17	h	21	Total	C	N	O	0	0
			105	63	21	21		
17	v	21	Total	C	N	O	0	0
			105	63	21	21		

- Molecule 18 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (three-letter code: ANP) (formula: $C_{10}H_{17}N_6O_{12}P_3$).



Mol	Chain	Residues	Atoms					AltConf
18	K	1	Total	C	N	O	P	0
			31	10	6	12	3	
18	B	1	Total	C	N	O	P	0
			31	10	6	12	3	
18	C	1	Total	C	N	O	P	0
			31	10	6	12	3	
18	D	1	Total	C	N	O	P	0
			31	10	6	12	3	
18	F	1	Total	C	N	O	P	0
			31	10	6	12	3	
18	n	1	Total	C	N	O	P	0
			31	10	6	12	3	
18	W	1	Total	C	N	O	P	0
			31	10	6	12	3	
18	X	1	Total	C	N	O	P	0
			31	10	6	12	3	
18	Y	1	Total	C	N	O	P	0
			31	10	6	12	3	
18	c	1	Total	C	N	O	P	0
			31	10	6	12	3	

- Molecule 19 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

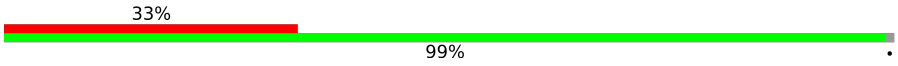
Mol	Chain	Residues	Atoms		AltConf
19	K	1	Total	Mg	0
			1	1	
19	B	1	Total	Mg	0
			1	1	
19	C	1	Total	Mg	0
			1	1	
19	D	1	Total	Mg	0
			1	1	
19	F	1	Total	Mg	0
			1	1	
19	n	1	Total	Mg	0
			1	1	
19	W	1	Total	Mg	0
			1	1	
19	X	1	Total	Mg	0
			1	1	
19	Y	1	Total	Mg	0
			1	1	
19	c	1	Total	Mg	0
			1	1	

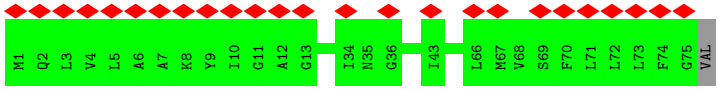
3 Residue-property plots (i)

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: ATP synthase subunit 9, mitochondrial

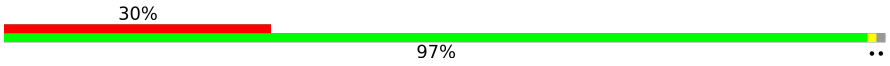
Chain 1:

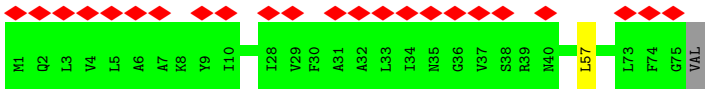




• Molecule 1: ATP synthase subunit 9, mitochondrial

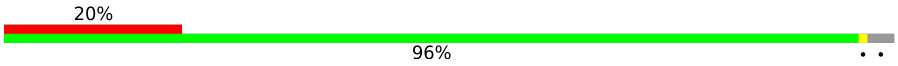
Chain 2:

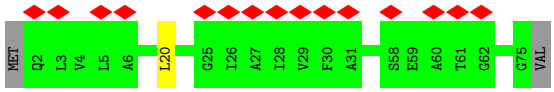




• Molecule 1: ATP synthase subunit 9, mitochondrial

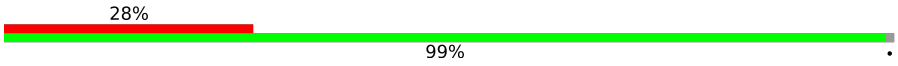
Chain 3:

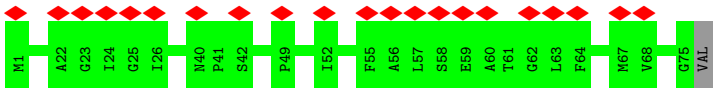




• Molecule 1: ATP synthase subunit 9, mitochondrial

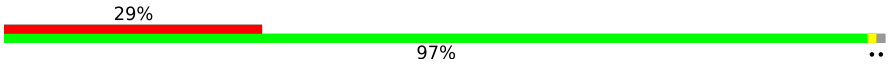
Chain 4:

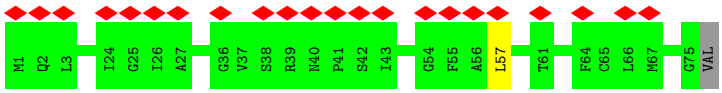




• Molecule 1: ATP synthase subunit 9, mitochondrial

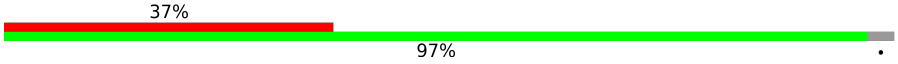
Chain 5:

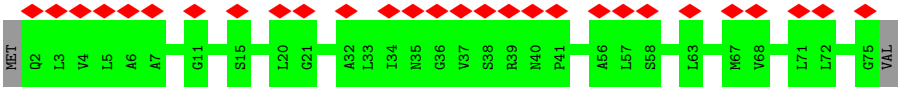




• Molecule 1: ATP synthase subunit 9, mitochondrial

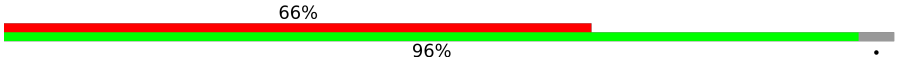
Chain 6:

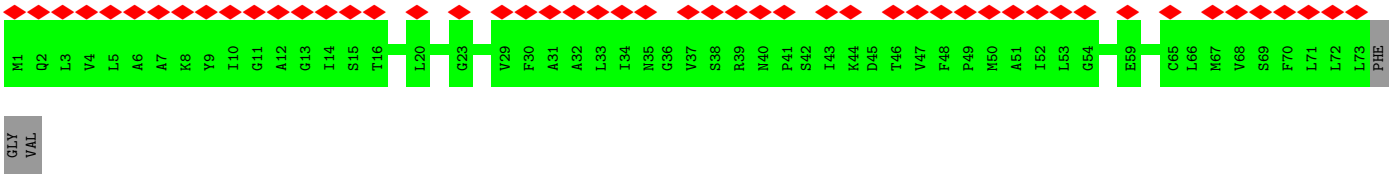




• Molecule 1: ATP synthase subunit 9, mitochondrial

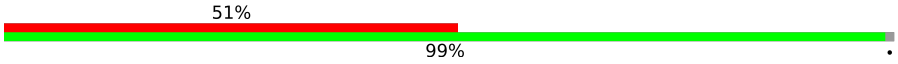
Chain 7:

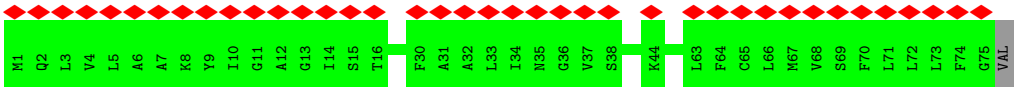




• Molecule 1: ATP synthase subunit 9, mitochondrial

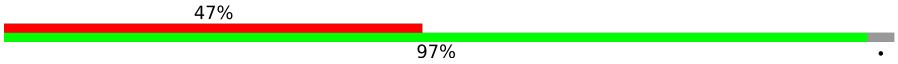
Chain 8:

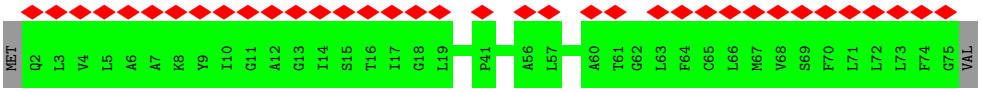




• Molecule 1: ATP synthase subunit 9, mitochondrial

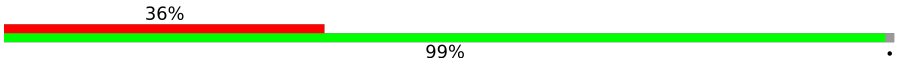
Chain 9:

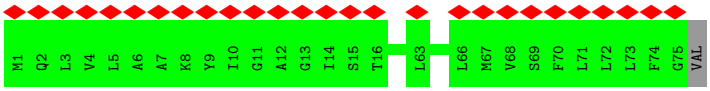




• Molecule 1: ATP synthase subunit 9, mitochondrial

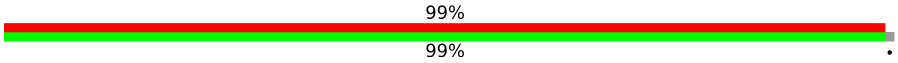
Chain 0:

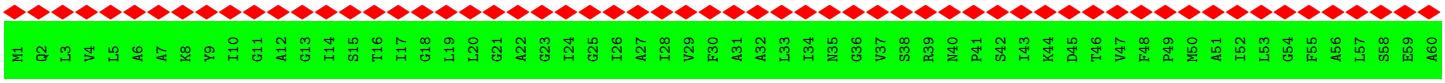


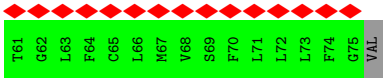


• Molecule 1: ATP synthase subunit 9, mitochondrial

Chain L:

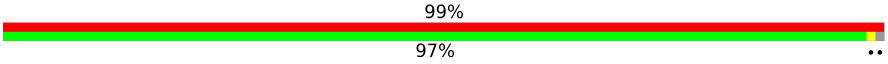


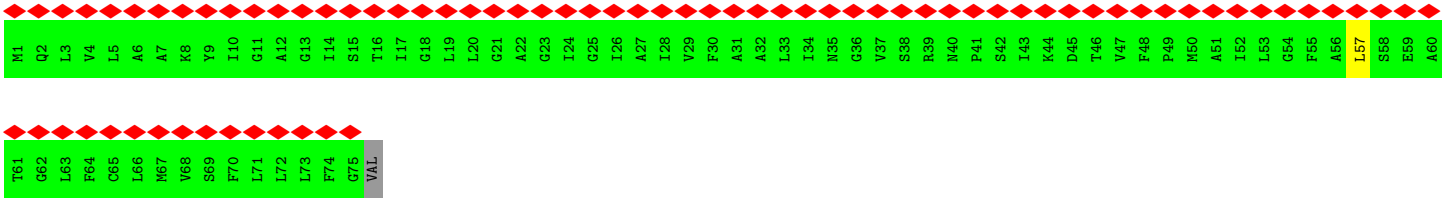




• Molecule 1: ATP synthase subunit 9, mitochondrial

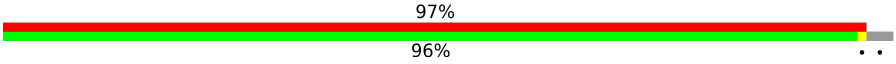
Chain M:

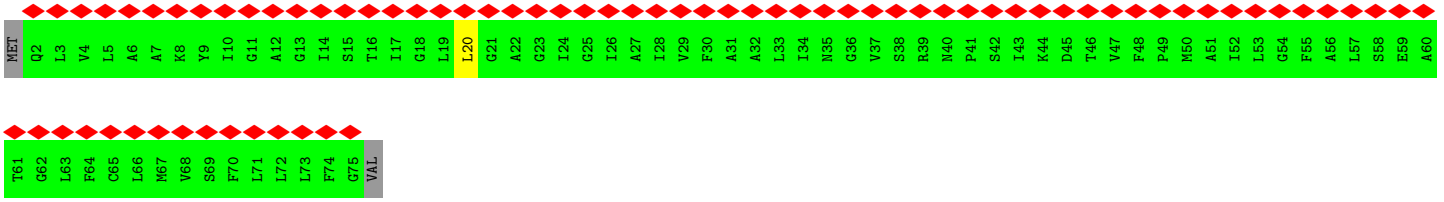




• Molecule 1: ATP synthase subunit 9, mitochondrial

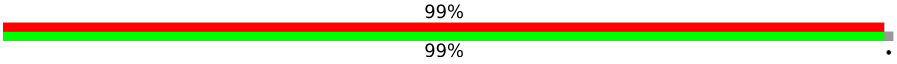
Chain N:

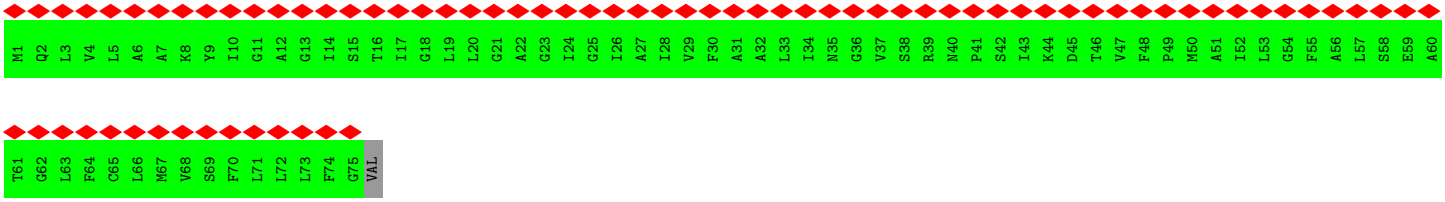




• Molecule 1: ATP synthase subunit 9, mitochondrial

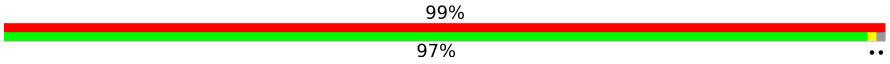
Chain P:

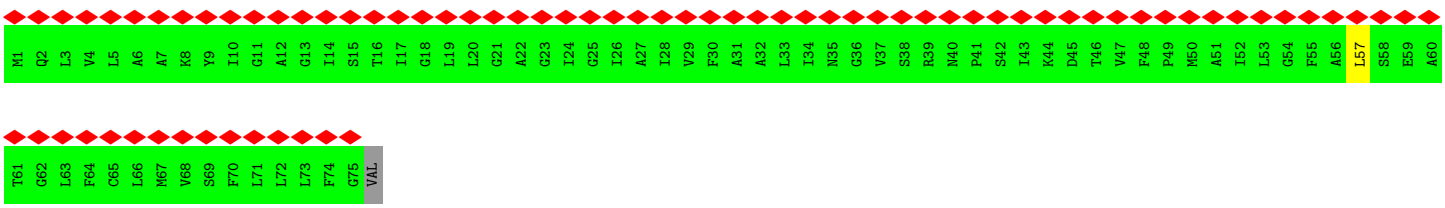




• Molecule 1: ATP synthase subunit 9, mitochondrial

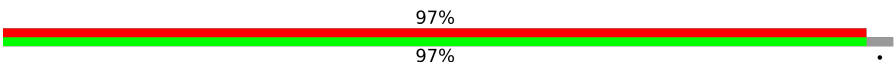
Chain Q:

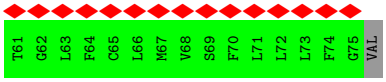




• Molecule 1: ATP synthase subunit 9, mitochondrial

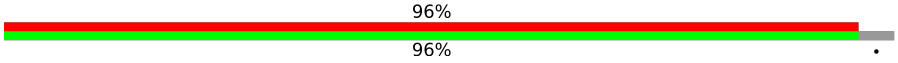
Chain R:

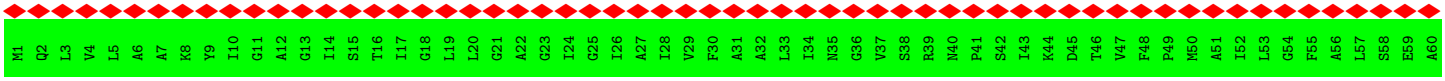


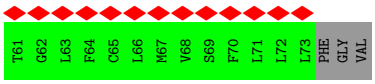


• Molecule 1: ATP synthase subunit 9, mitochondrial

Chain S:

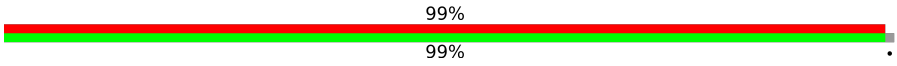


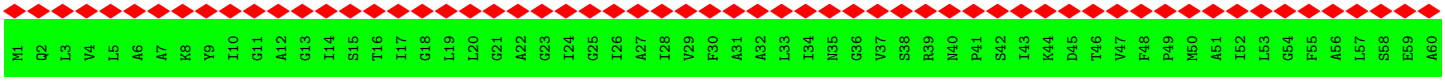


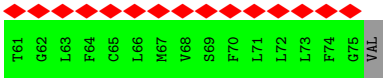


• Molecule 1: ATP synthase subunit 9, mitochondrial

Chain T:

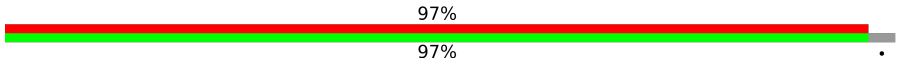


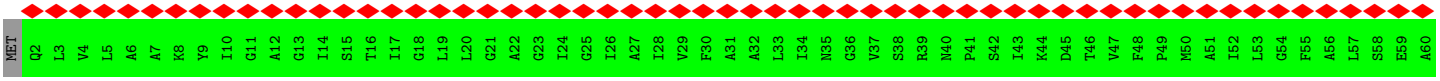


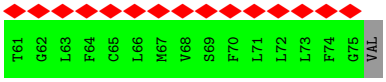


• Molecule 1: ATP synthase subunit 9, mitochondrial

Chain U:

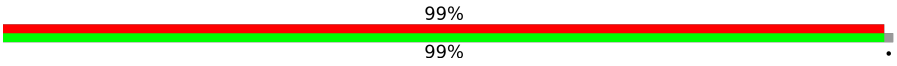


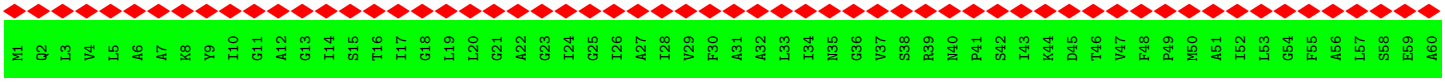


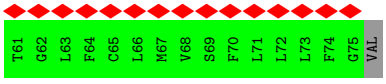


• Molecule 1: ATP synthase subunit 9, mitochondrial

Chain J:

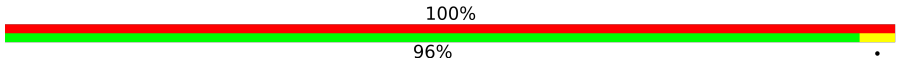


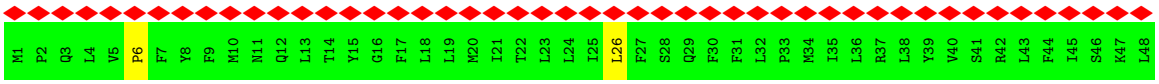




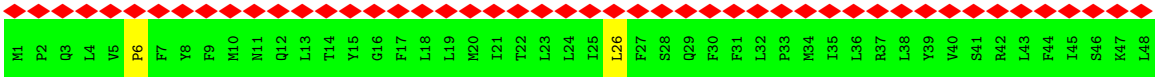
• Molecule 2: ATP synthase protein 8

Chain A:

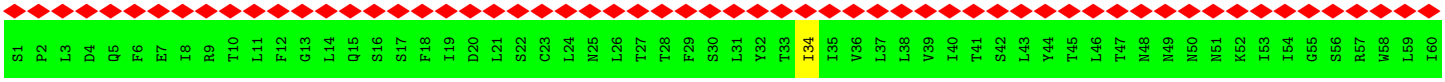


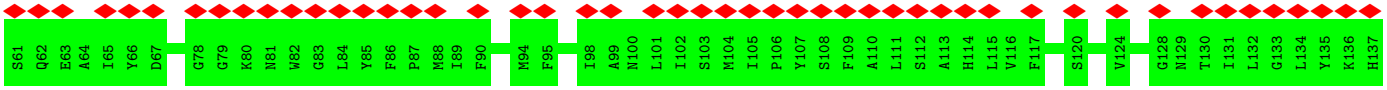


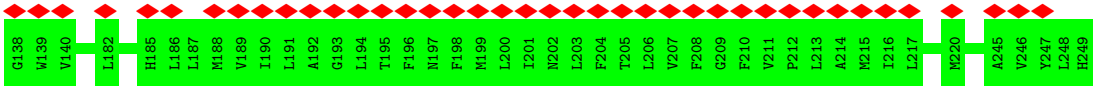
• Molecule 2: ATP synthase protein 8



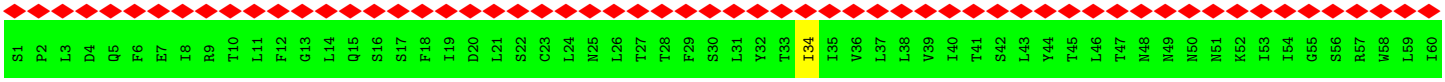
• Molecule 3: ATP synthase subunit a

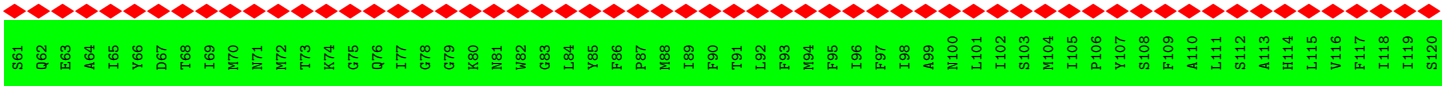


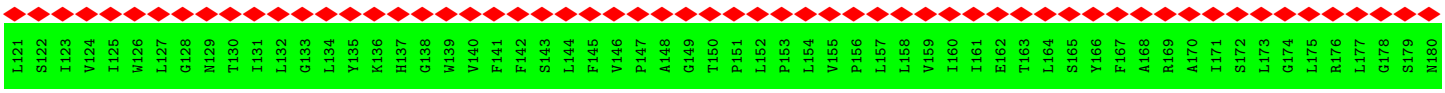


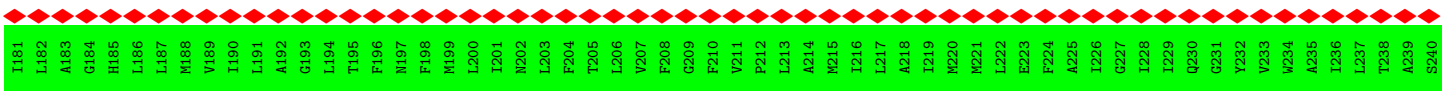


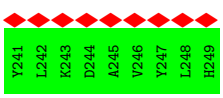
• Molecule 3: ATP synthase subunit a



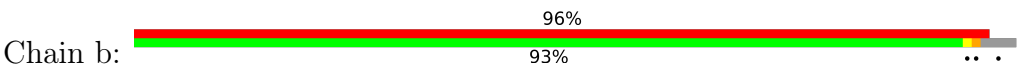


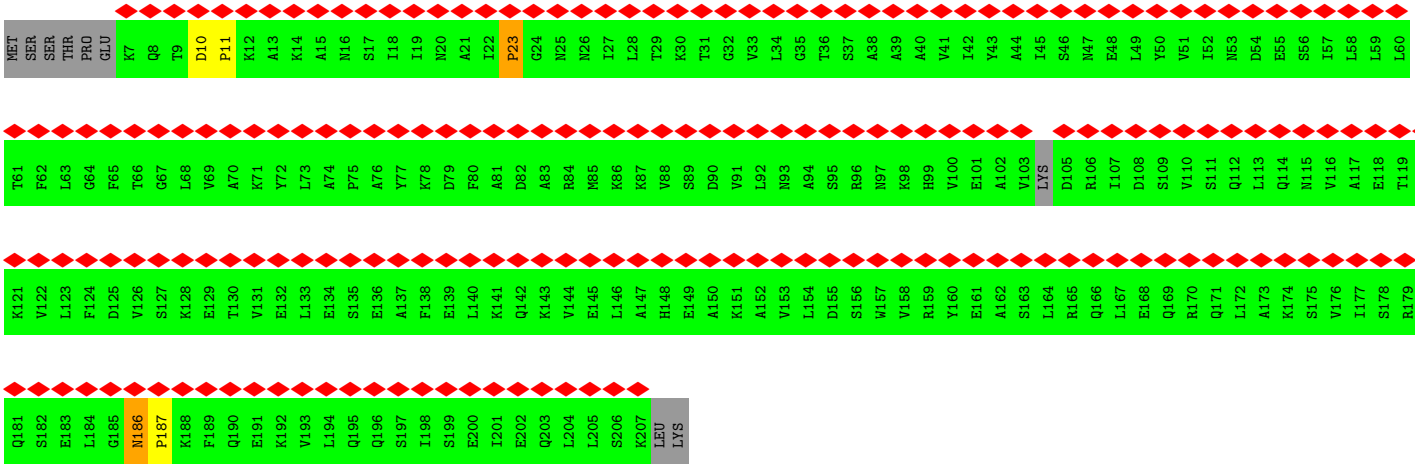




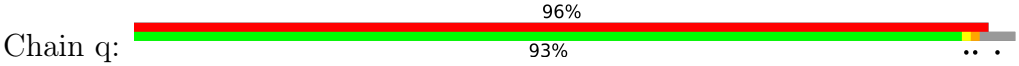


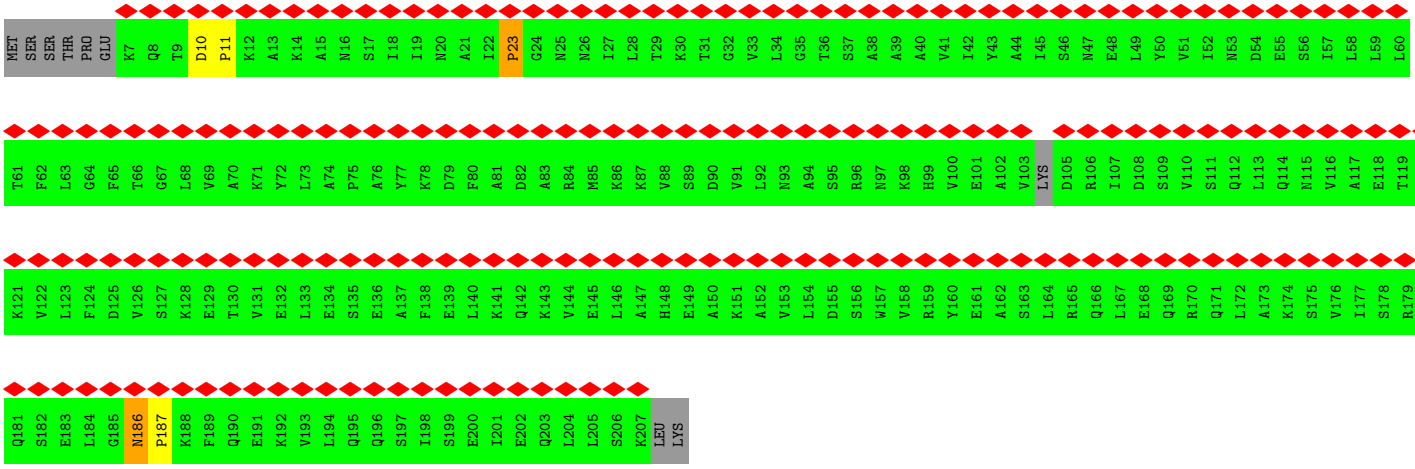
• Molecule 4: ATP synthase subunit 4, mitochondrial



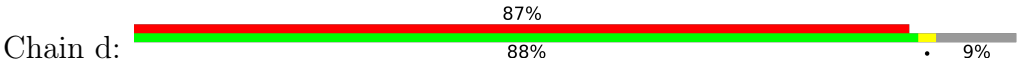


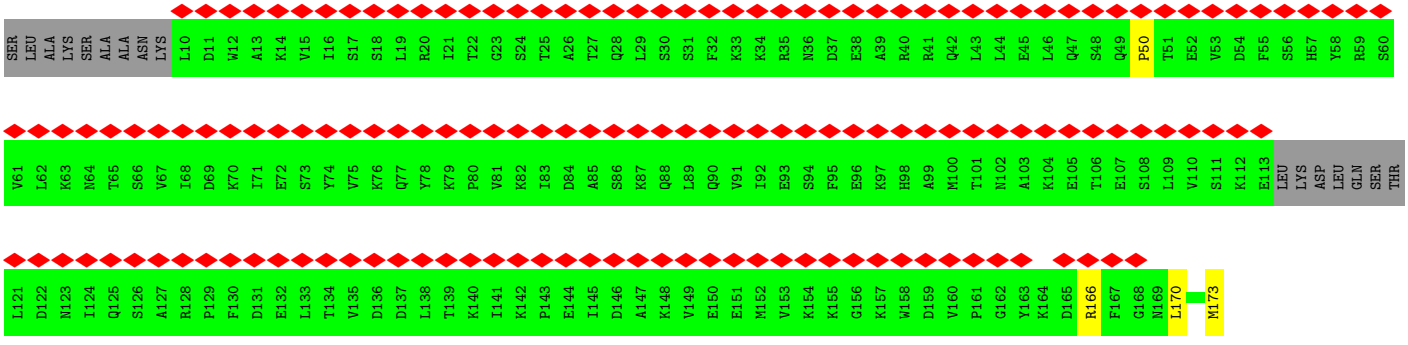
• Molecule 4: ATP synthase subunit 4, mitochondrial



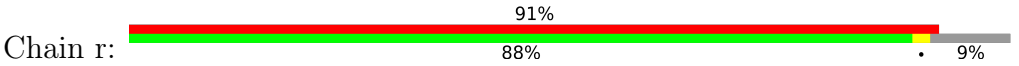


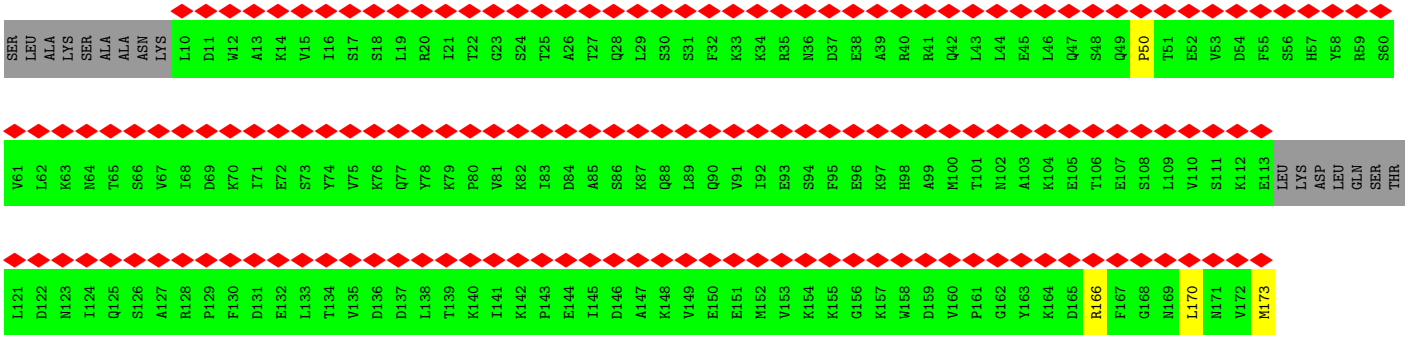
• Molecule 5: ATP synthase subunit d, mitochondrial





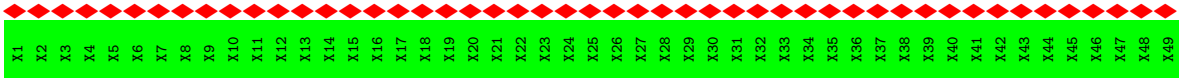
• Molecule 5: ATP synthase subunit d, mitochondrial





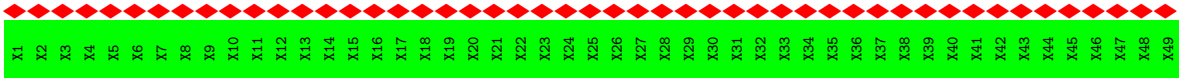
• Molecule 6: ATP synthase subunit e, mitochondrial

Chain e:



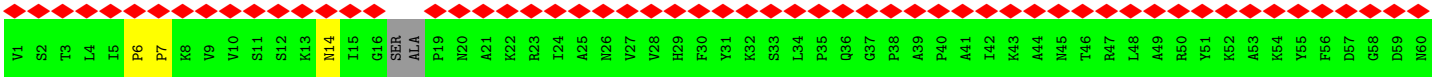
• Molecule 6: ATP synthase subunit e, mitochondrial

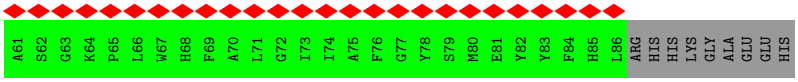
Chain s:



• Molecule 7: ATP synthase subunit f, mitochondrial

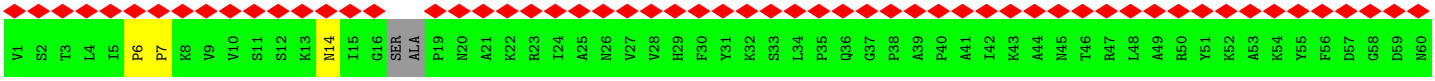
Chain f:

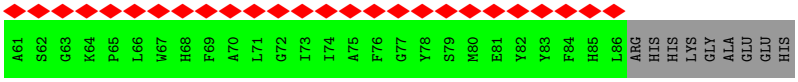




• Molecule 7: ATP synthase subunit f, mitochondrial

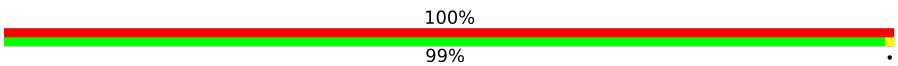
Chain t:





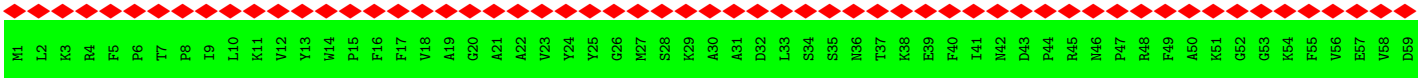
• Molecule 8: AATP synthase subunit g

Chain g:

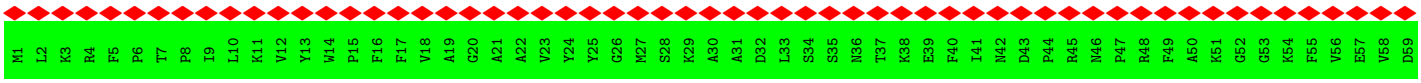


• Molecule 8: AATP synthase subunit g

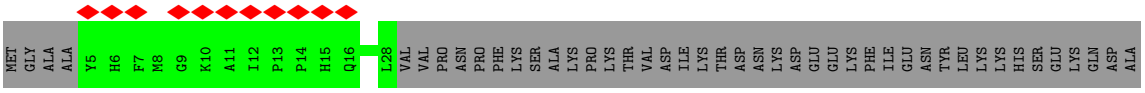
• Molecule 9: ATP synthase subunit J, mitochondrial



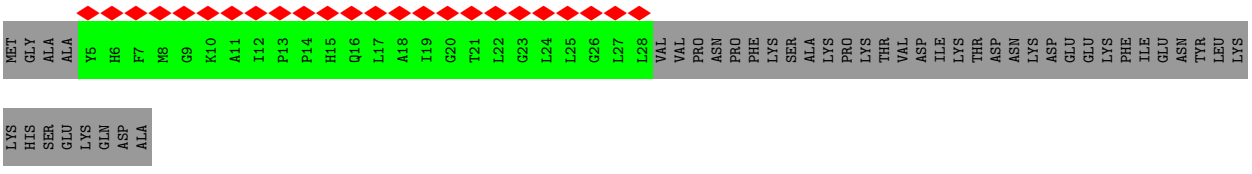
• Molecule 9: ATP synthase subunit J, mitochondrial



• Molecule 10: ATP synthase subunit K, mitochondrial

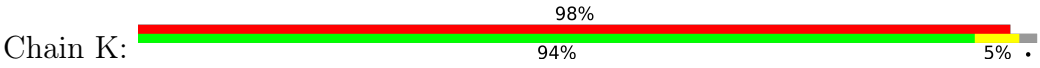


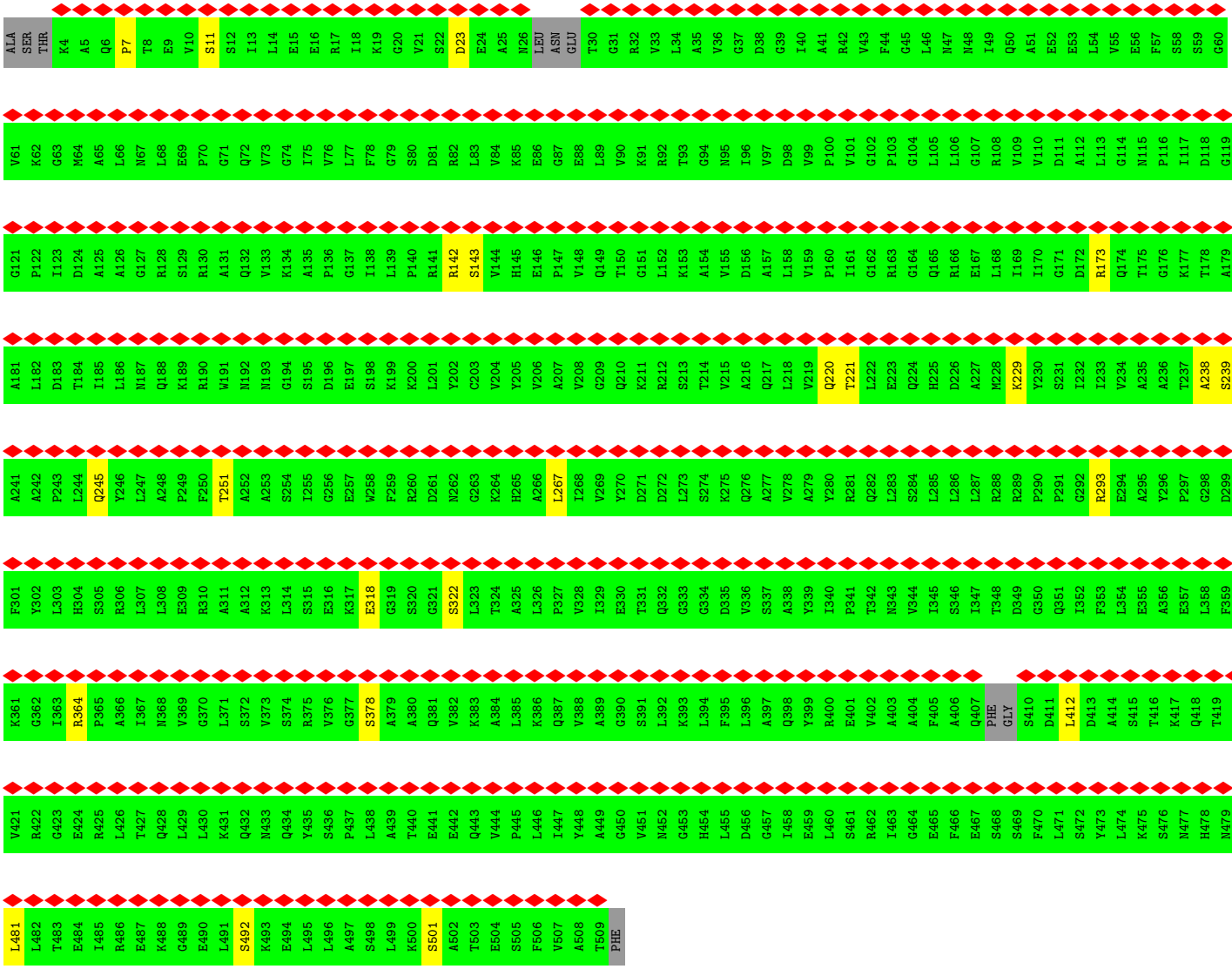
• Molecule 10: ATP synthase subunit K, mitochondrial



• Molecule 11: ATP synthase subunit alpha, mitochondrial

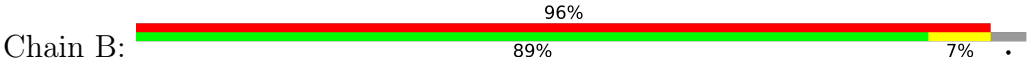
Chain K:

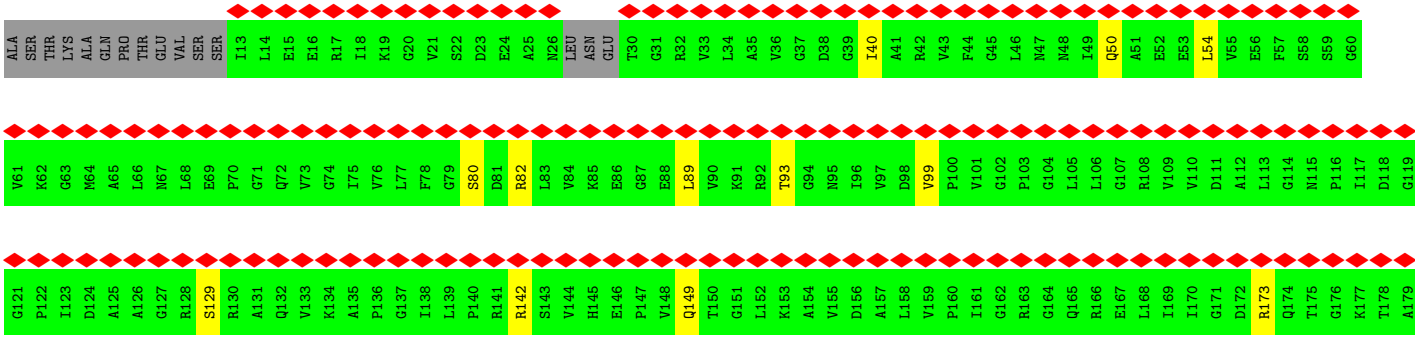


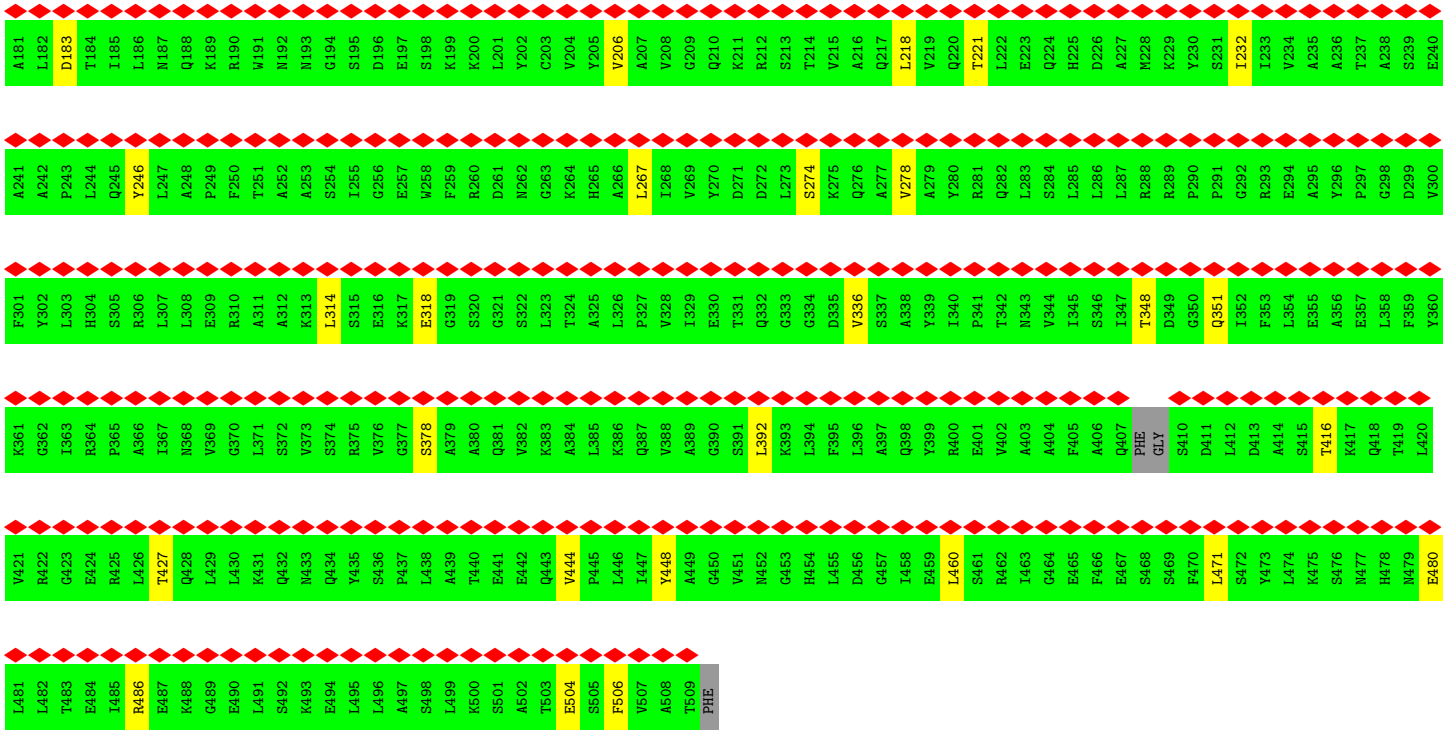


• Molecule 11: ATP synthase subunit alpha, mitochondrial

Chain B:

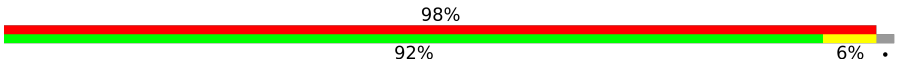


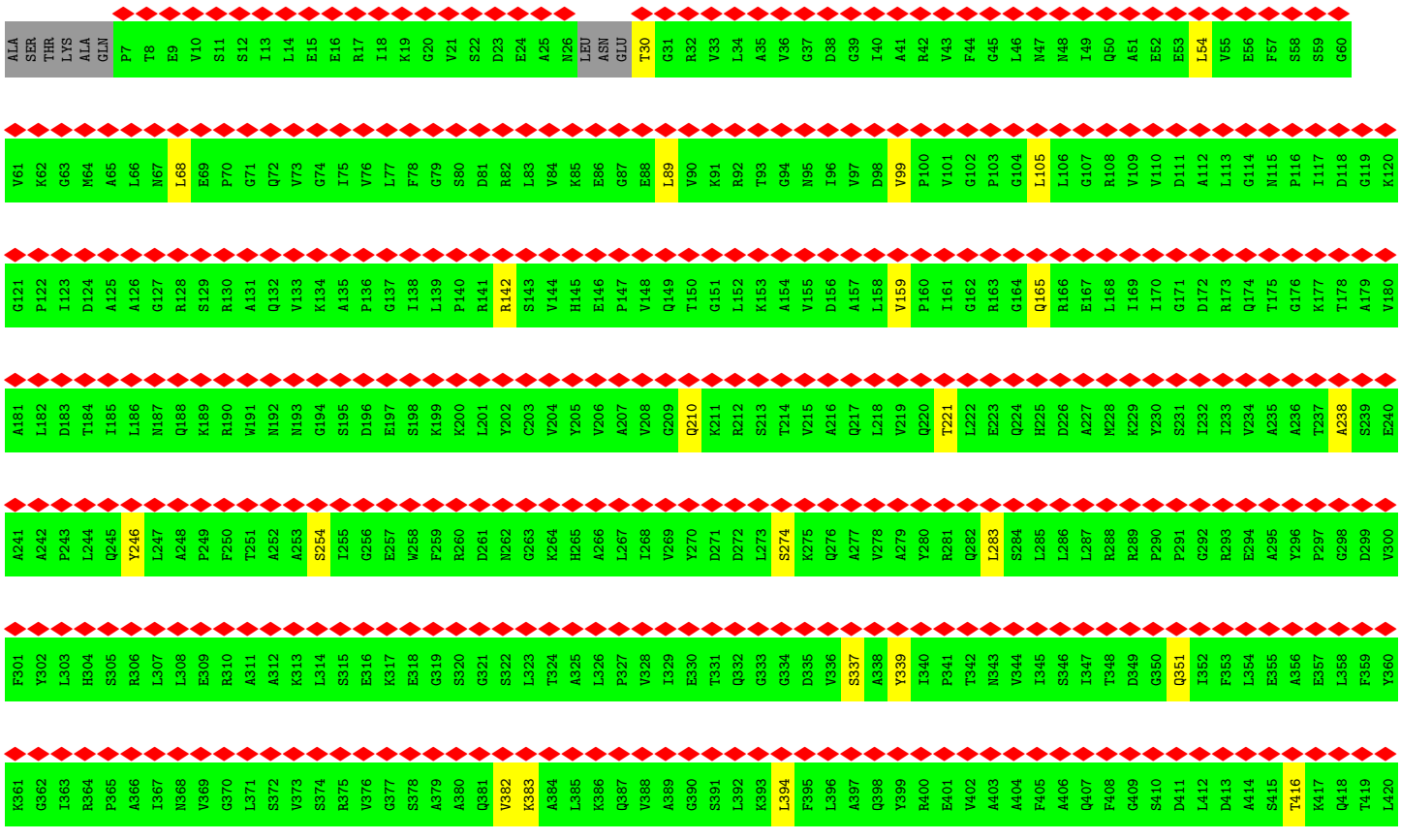




• Molecule 11: ATP synthase subunit alpha, mitochondrial

Chain C:



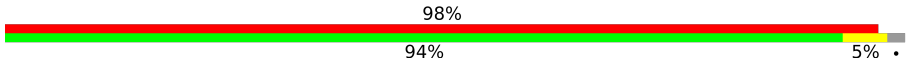


V421 R422 G423 E424 R425 L426 T427 Q428 L429 L430 K431 Q432 N433 Q434 Y435 S436 P437 L438 A439 T440 E441 E442 Q443 V444 P445 L446 I447 Y448 A449 G450 V451 N452 G453 H454 L455 D456 G457 I458 E459 L460 S461 R462 I463 G464 E465 F466 E467 S468 S469 F470 L471 S472 Y473 L474 K475 S476 N477 H478 N479 E480

L481 L482 T483 E484 I485 R486 E487 K488 G489 E490 L491 S492 K493 E494 L495 L496 A497 S498 L499 K500 S501 A502 T503 E504 S505 F506 V507 A508 T509 PHE

• Molecule 11: ATP synthase subunit alpha, mitochondrial

Chain n:



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V61 K62 G63 M64 A65 L66 N67 L68 E69 P70 G71 Q72 V73 G74 I75 V76 L77 F78 G79 S80 D81 R82 L83 V84 K85 E86 G87 E88 L89 V90 K91 R92 T93 G94 N95 I96 V97 D98 V99 P100 V101 G102 P103 G104 L105 L106 G107 R108 V109 V110 D111 A112 L113 G114 N115 P116 I117 D118 G119 K120

G121 P122 I123 D124 A125 A126 G127 R128 S129 R130 A131 Q132 V133 K134 A135 P136 G137 I138 L139 P140 R141 R142 S143 V144 H145 E146 P147 V148 Q149 T150 G151 L152 K153 A154 V155 D156 A157 L158 V159 P160 I161 G162 R163 G164 Q165 R166 E167 L168 I169 I170 G171 D172 R173 Q174 T175 G176 K177 T178 A179 V180

A181 L182 D183 T184 I185 L186 N187 Q188 K189 R190 W191 N192 N193 G194 S195 D196 E197 S198 K199 K200 L201 Y202 C203 V204 Y205 V206 A207 V208 G209 Q210 K211 R212 S213 T214 V215 A216 Q217 L218 V219 Q220 T221 L222 E223 Q224 H225 D226 A227 M228 K229 Y230 S231 I232 I233 V234 A235 A236 T237 A238 S239 E240

A241 A242 P243 L244 Q245 Y246 L247 A248 P249 F250 T251 A252 A253 S254 I255 G256 E257 W258 F259 R260 D261 N262 G263 K264 H265 A266 L267 I268 V269 Y270 D271 D272 L273 S274 K275 Q276 A277 V278 A279 Y280 R281 Q282 L283 S284 L285 L286 L287 R288 R289 P290 P291 G292 R293 E294 A295 Y296 P297 G298 D299 V300

F301 Y302 L303 H304 S305 R306 L307 L308 E309 R310 A311 A312 K313 L314 S315 E316 K317 E318 G319 S320 G321 S322 L323 T324 A325 L326 P327 V328 I329 E330 T331 Q332 G333 G334 D335 V336 S337 A338 Y339 I340 P341 T342 N343 V344 I345 S346 I347 T348 D349 G350 Q351 I352 F353 L354 E355 A356 E357 L358 F359 Y360

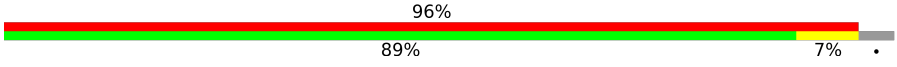
K361 G362 I363 R364 P365 A366 I367 N368 V369 G370 L371 S372 V373 S374 R375 V376 G377 S378 A379 A380 Q381 V382 K383 A384 L385 K386 Q387 V388 A389 G390 S391 L392 K393 L394 F395 L396 A397 Q398 Y399 R400 E401 V402 A403 A404 F405 A406 Q407 PHE GLY S410 D411 L412 D413 A414 S415 T416 K417 Q418 T419 L420

V421 R422 G423 E424 R425 L426 T427 Q428 L429 L430 K431 Q432 N433 Q434 Y435 S436 P437 L438 A439 T440 E441 E442 Q443 V444 P445 L446 I447 Y448 A449 G450 V451 N452 G453 H454 L455 D456 G457 I458 E459 L460 S461 R462 I463 G464 E465 F466 E467 S468 S469 F470 L471 S472 Y473 L474 K475 S476 N477 H478 N479 E480

L481 L482 T483 E484 I485 R486 E487 K488 G489 E490 L491 S492 K493 E494 L495 L496 A497 S498 L499 K500 S501 A502 T503 E504 S505 F506 V507 A508 T509 PHE

• Molecule 11: ATP synthase subunit alpha, mitochondrial

Chain W:



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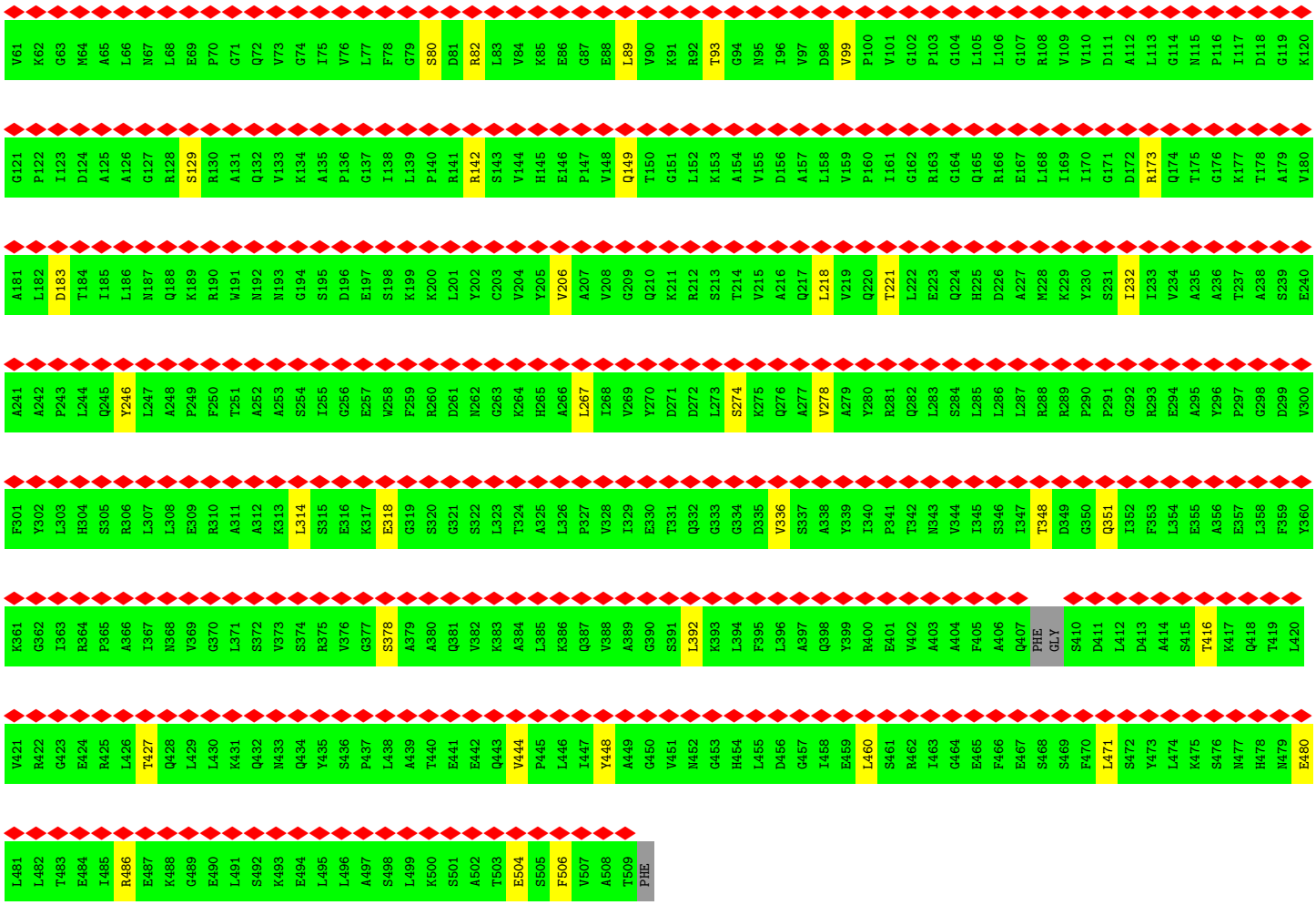
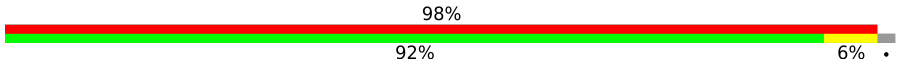
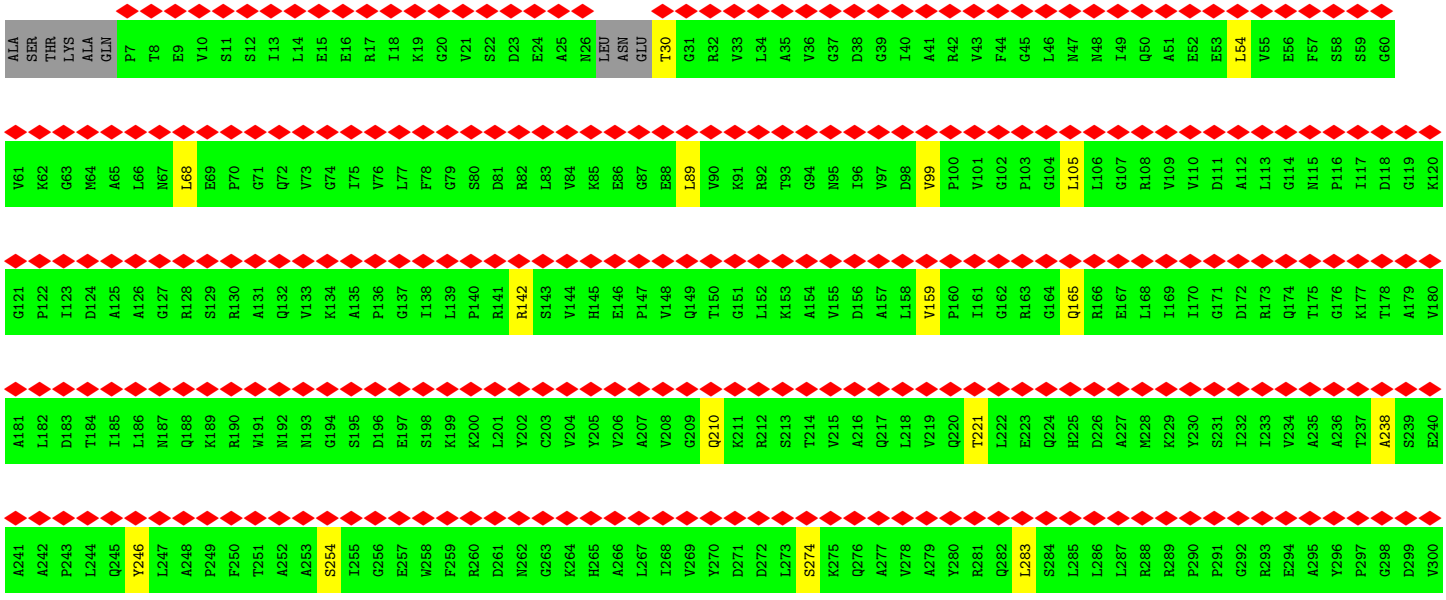


• Molecule 11: ATP synthase subunit alpha, mitochondrial

Chain X:





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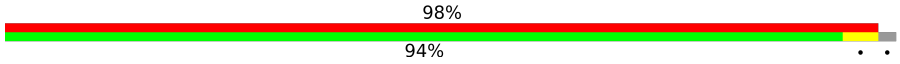
K361 G362 I363 R364 P365 A366 I367 N368 V369 G370 L371 S372 V373 S374 R375 V376 G377 S378 A379 A380 Q381 V382 K383 A384 L385 K386 Q387 V388 A389 G390 S391 L392 K393 L394 F395 L396 A397 Q398 Y399 R400 E401 V402 A403 A404 F405 A406 Q407 F408 G409 S410 D411 L412 D413 A414 S415 T416 K417 Q418 T419 L420

V421 R422 G423 E424 R425 L426 T427 Q428 L429 L430 K431 Q432 N433 Q434 Y435 S436 P437 L438 A439 T440 E441 E442 Q443 V444 P445 L446 T447 Y448 A449 G450 V451 N452 G453 H454 L455 D456 G457 I458 E459 L460 S461 R462 I463 G464 E465 F466 E467 S468 S469 F470 L471 S472 Y473 L474 K475 S476 N477 H478 N479 E480

L481 L482 T483 E484 I485 R486 E487 K488 G489 E490 L491 S492 K493 E494 L495 L496 A497 S498 L499 K500 S501 A502 T503 E504 S505 F506 V507 A508 T509 PHE

• Molecule 12: ATP synthase subunit beta, mitochondrial

Chain D:



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T61 I62 A63 M64 D65 G66 T67 E68 G69 L70 V71 R72 G73 E74 K75 V76 L77 D78 T79 G80 C81 P82 I83 S84 V85 P86 V87 G88 R89 E90 T91 L92 G93 R94 I95 I96 N97 V98 I99 G100 E101 P102 I103 D104 E105 R106 G107 P108 I109 K110 S111 K112 L113 R114 K115 P116 I117 H118 A119 D120

P121 P122 S123 F124 A125 E126 Q127 S128 T129 S130 A131 E132 I133 L134 E135 T136 G137 I138 K139 V140 V141 D142 L143 L144 A145 P146 Y147 A148 R149 G150 G151 K152 I153 G154 L155 F156 G157 G158 A159 G160 V161 G162 K163 T164 V165 F166 I167 Q168 E169 L170 I171 N172 N173 I174 A175 K176 A177 H178 G179 G180

F181 S182 V183 F184 T185 G186 V187 G188 E189 R190 T191 R192 E193 G194 N195 D196 L197 Y198 R199 E200 M201 K202 E203 T204 G205 V206 T207 N208 L209 E210 G211 E212 S213 K214 V215 A216 L217 V218 F219 G220 Q221 M222 N223 E224 P225 P226 G227 A228 R229 A230 R231 V232 A233 L234 T235 G236 L237 T238 I239 A240

E241 Y242 F243 R244 D245 E246 E247 G248 Q249 D250 V251 L252 L253 F254 I255 D256 N257 I258 F259 R260 F261 T262 Q263 A264 G265 S266 E267 V268 S269 A270 L271 L272 G273 R274 I275 P276 S277 A278 V279 G280 Y281 Q282 P283 T284 L285 A286 T287 D288 M289 G290 L291 L292 Q293 E294 R295 I296 T297 T298 T299 K300

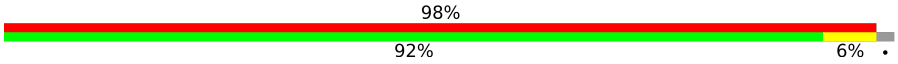
K301 G302 S303 V304 T305 S306 V307 Q308 A309 V310 Y311 V312 P313 A314 D315 D316 L317 T318 D319 P320 A321 P322 A323 T324 T325 F326 A327 H328 L329 D330 A331 T332 T333 V334 L335 S336 R337 G338 I339 S340 E341 L342 G343 I344 Y345 P346 A347 V348 D349 P350 L351 D352 S353 K354 S355 R356 L357 L358 D359 A360

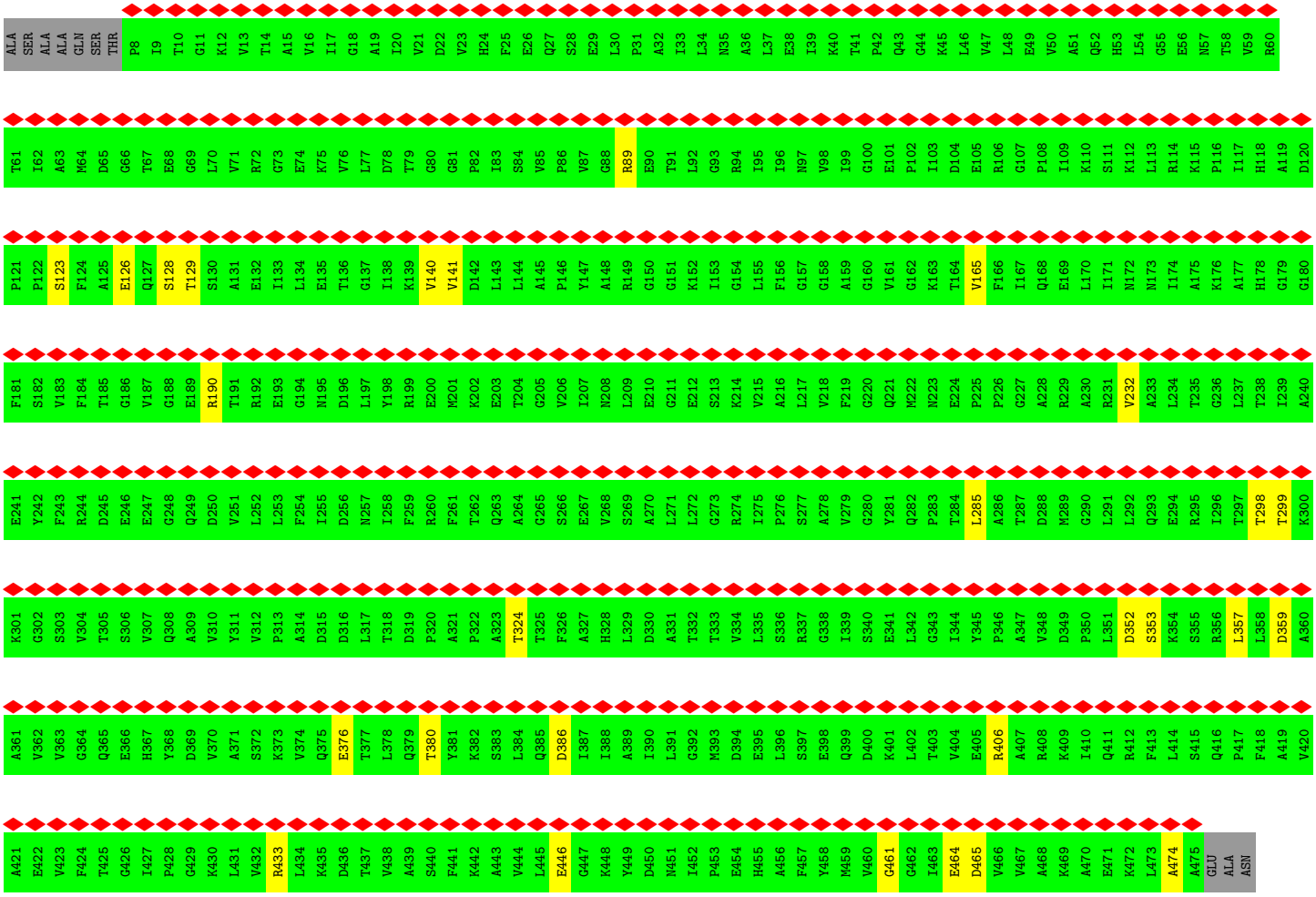
A361 V362 V363 G364 Q365 E366 H367 Y368 D369 V370 A371 S372 K373 V374 Q375 E376 T377 L378 Q379 T380 Y381 K382 S383 L384 Q385 D386 I387 I388 A389 I390 L391 G392 M393 D394 E395 L396 S397 E398 Q399 D400 K401 L402 T403 V404 E405 R406 A407 R408 K409 I410 Q411 R412 F413 L414 S415 Q416 P417 F418 A419 V420

A421 E422 V423 F424 T425 G426 I427 P428 G429 K430 L431 V432 R433 L434 K435 D436 T437 V438 A439 S440 F441 K442 A443 V444 L445 E446 G447 K448 Y449 D450 N451 I452 P453 E454 H455 A456 F457 Y458 M459 V460 G461 G462 I463 E464 D465 V466 V467 A468 K469 A470 E471 K472 L473 A474 A475 GLU ALA ASN

• Molecule 12: ATP synthase subunit beta, mitochondrial

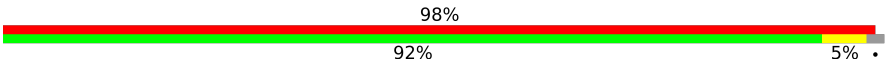
Chain E:

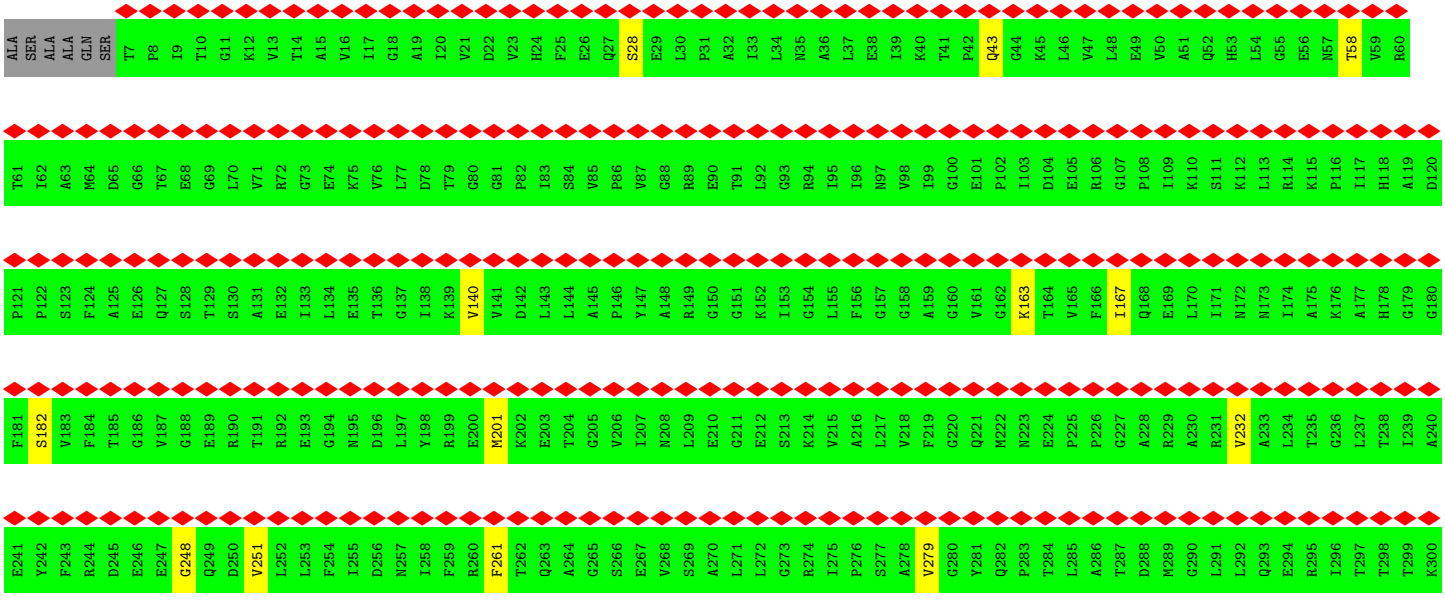


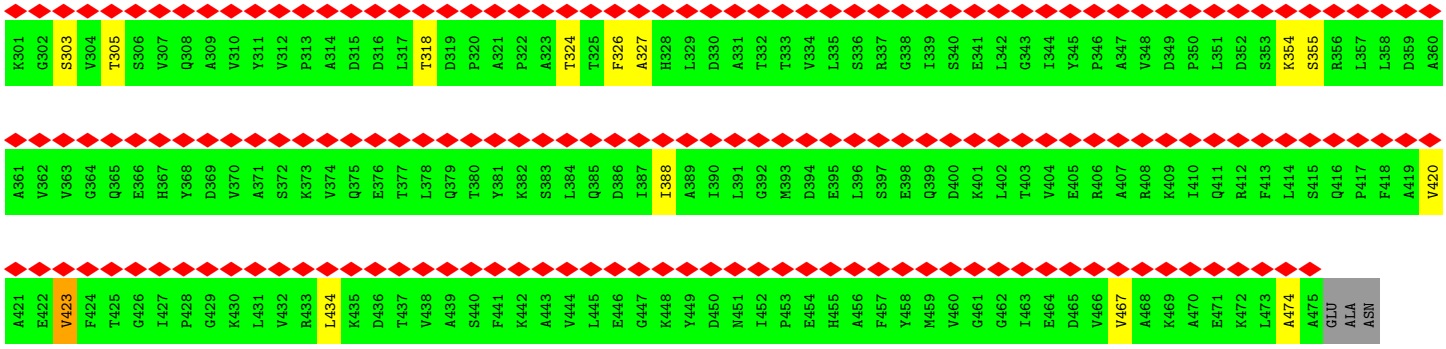


• Molecule 12: ATP synthase subunit beta, mitochondrial

Chain F:

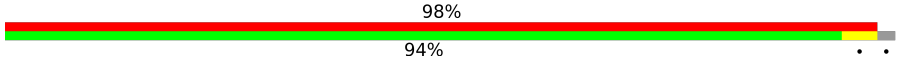


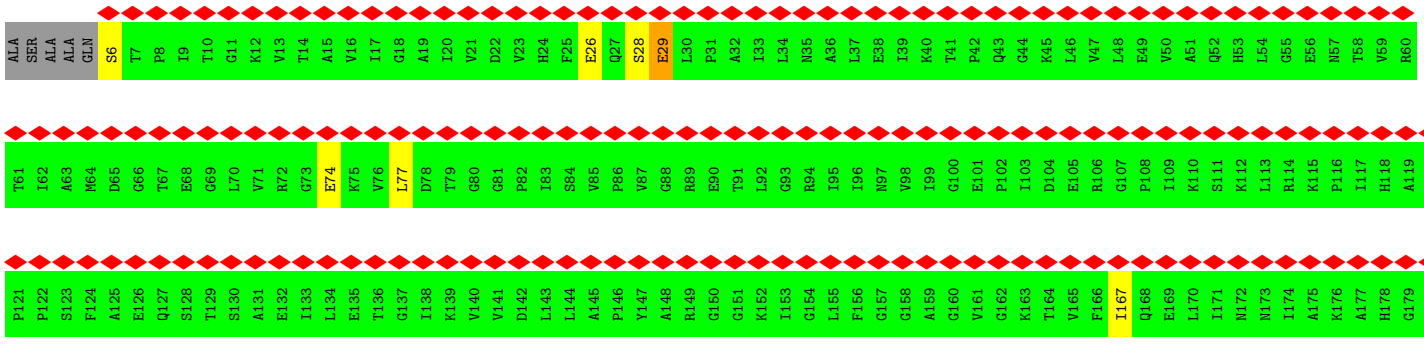




• Molecule 12: ATP synthase subunit beta, mitochondrial

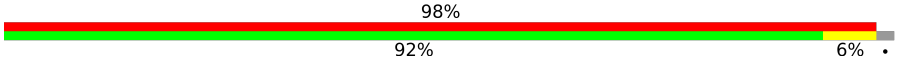
Chain Y:

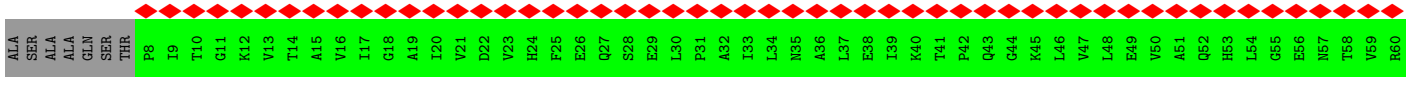


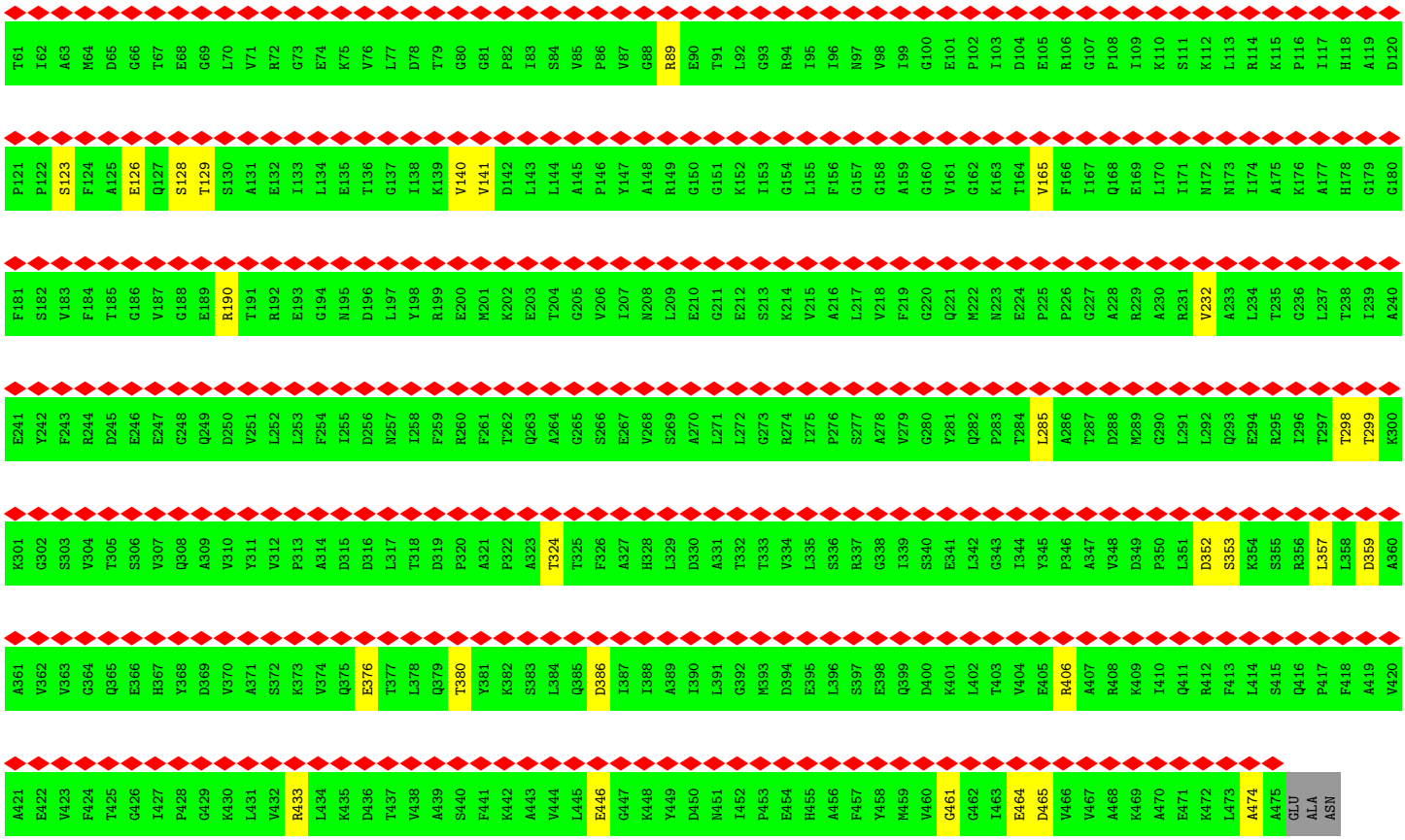


• Molecule 12: ATP synthase subunit beta, mitochondrial

Chain Z:

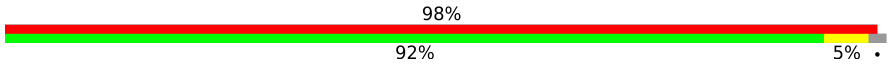


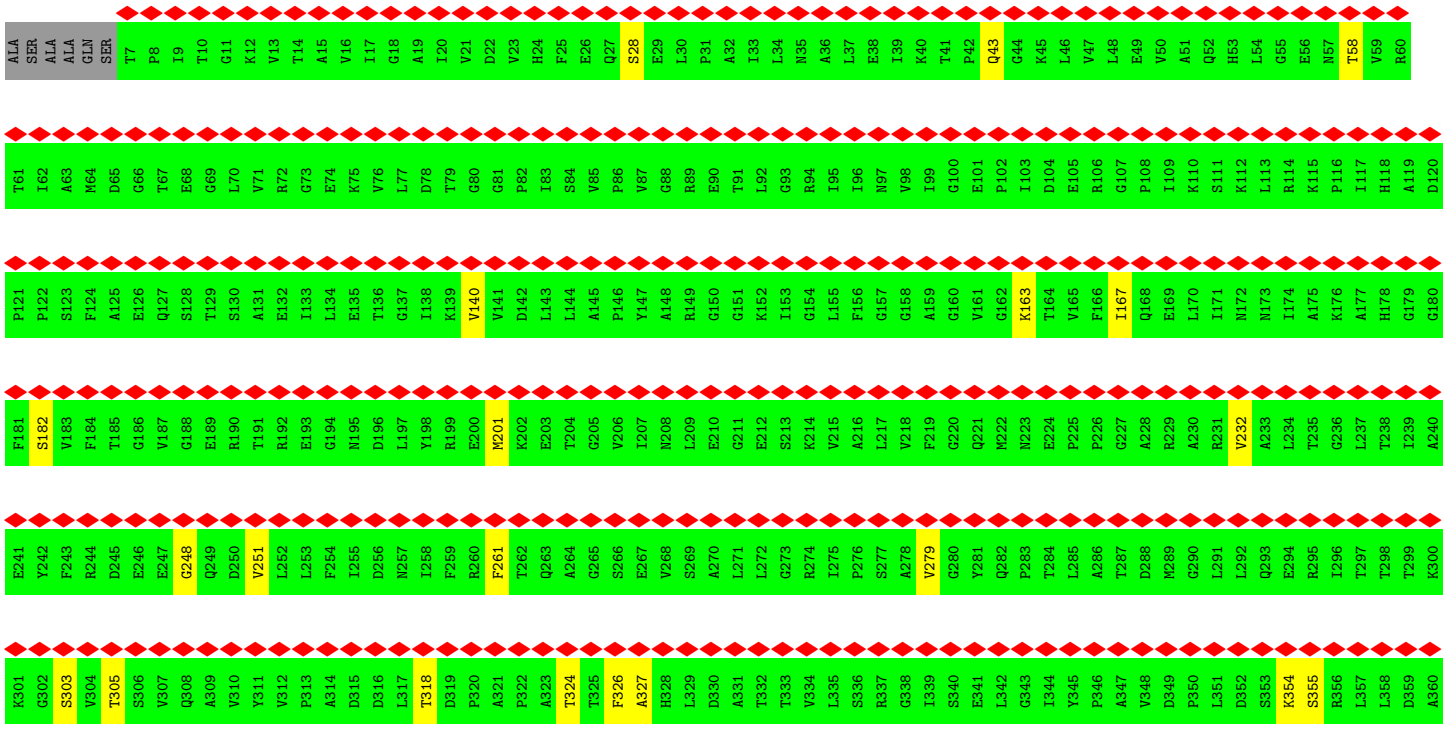


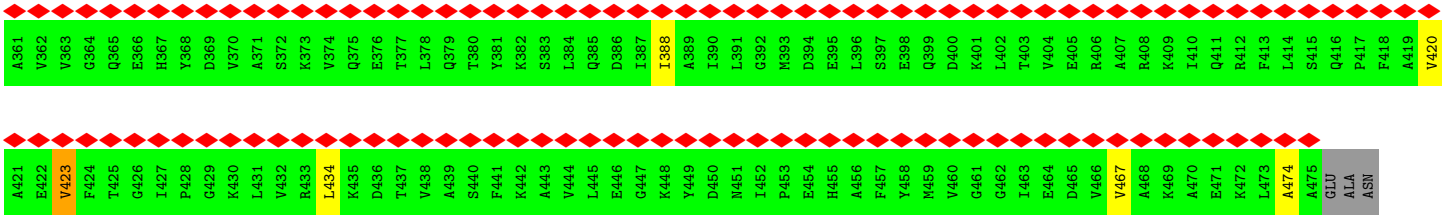


• Molecule 12: ATP synthase subunit beta, mitochondrial

Chain c:

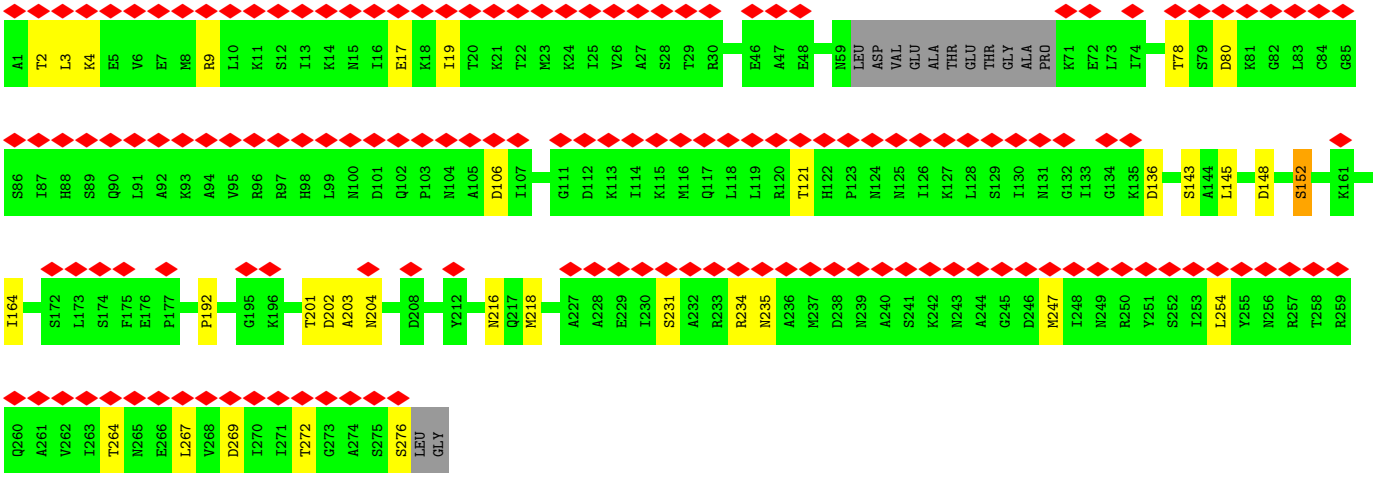






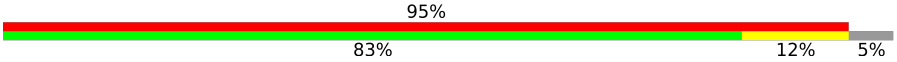
• Molecule 13: ATP synthase subunit gamma, mitochondrial

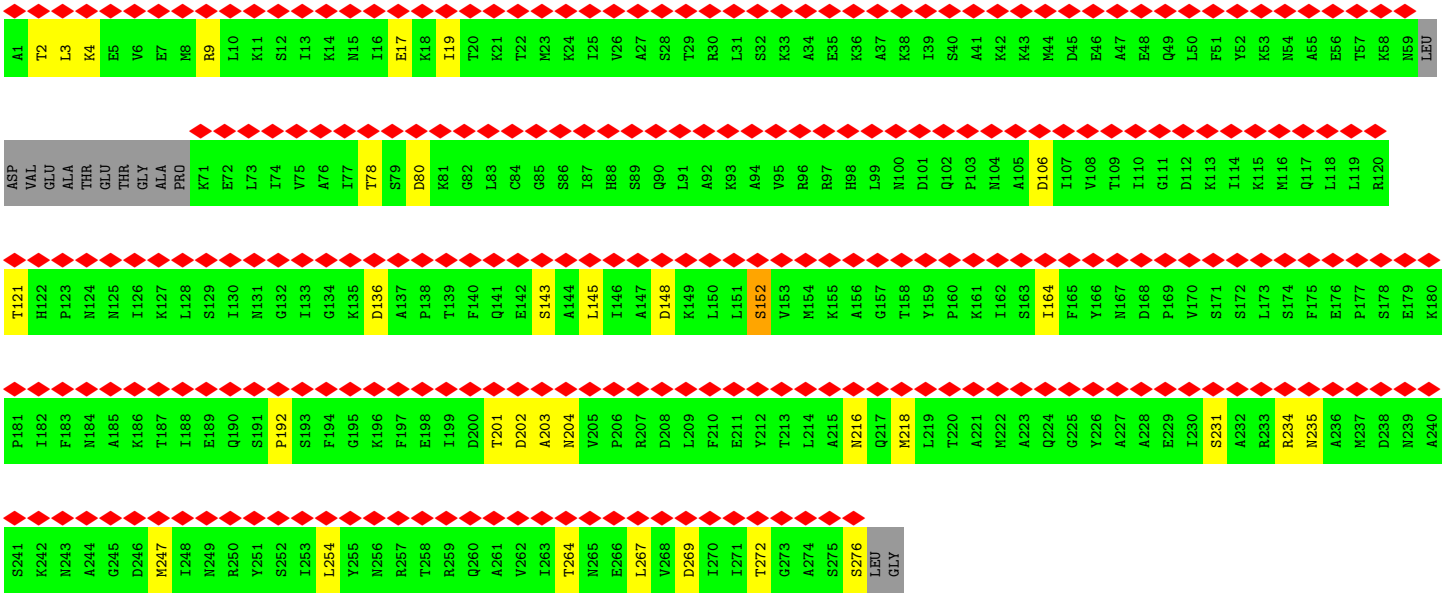
Chain G:



• Molecule 13: ATP synthase subunit gamma, mitochondrial

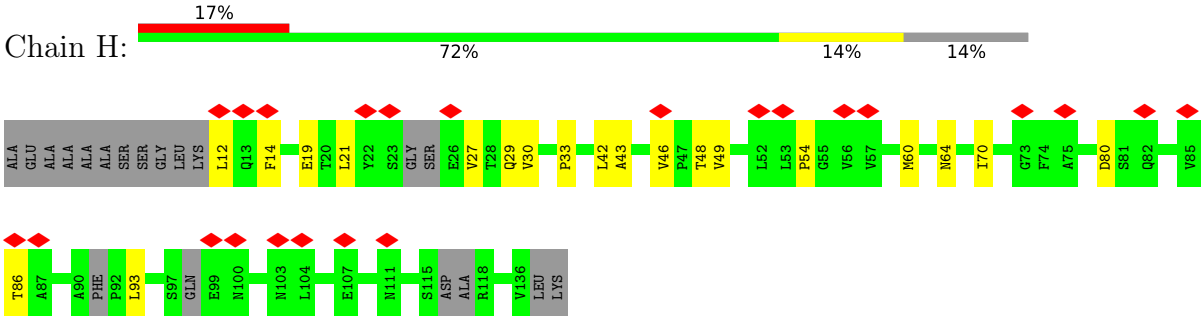
Chain j:





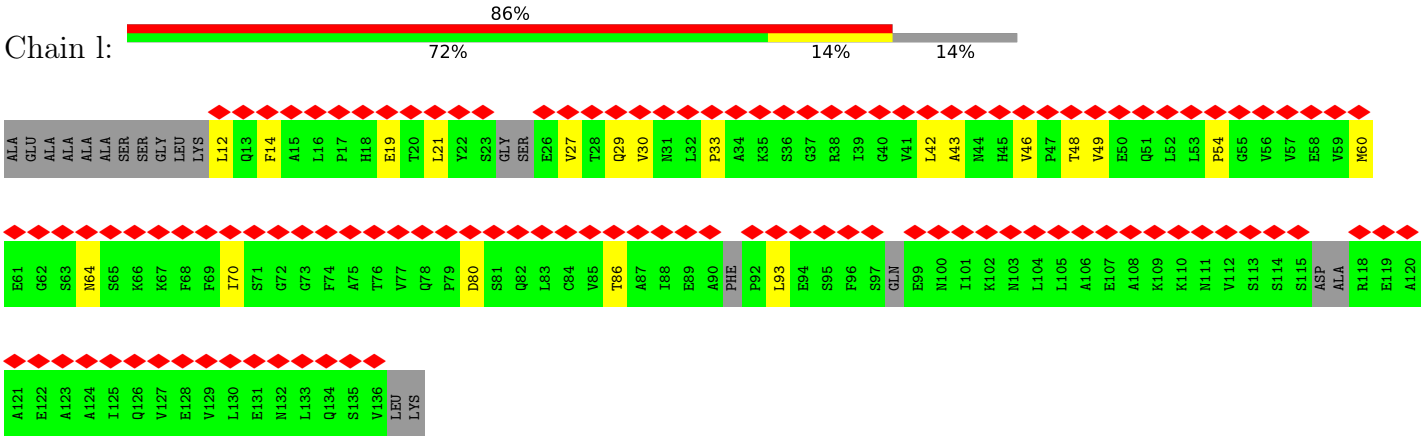
• Molecule 14: ATP synthase subunit delta, mitochondrial

Chain H:



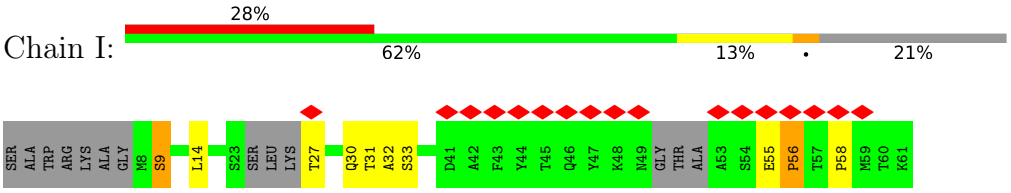
• Molecule 14: ATP synthase subunit delta, mitochondrial

Chain l:



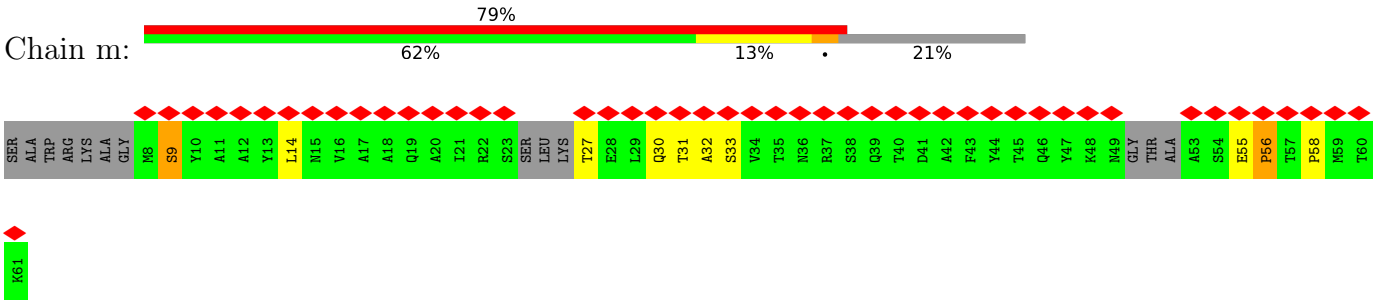
• Molecule 15: ATP synthase catalytic sector F1 epsilon subunit

Chain I:



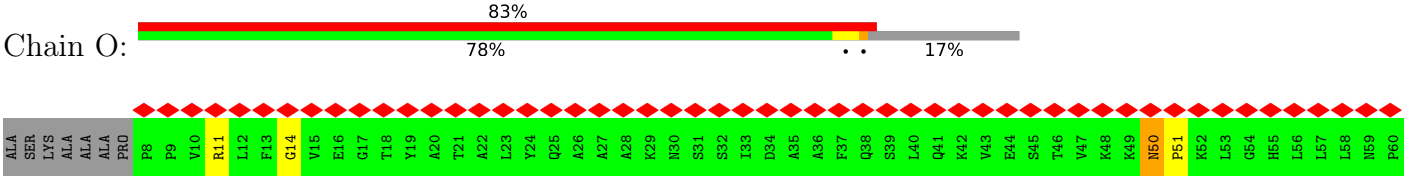
• Molecule 15: ATP synthase catalytic sector F1 epsilon subunit

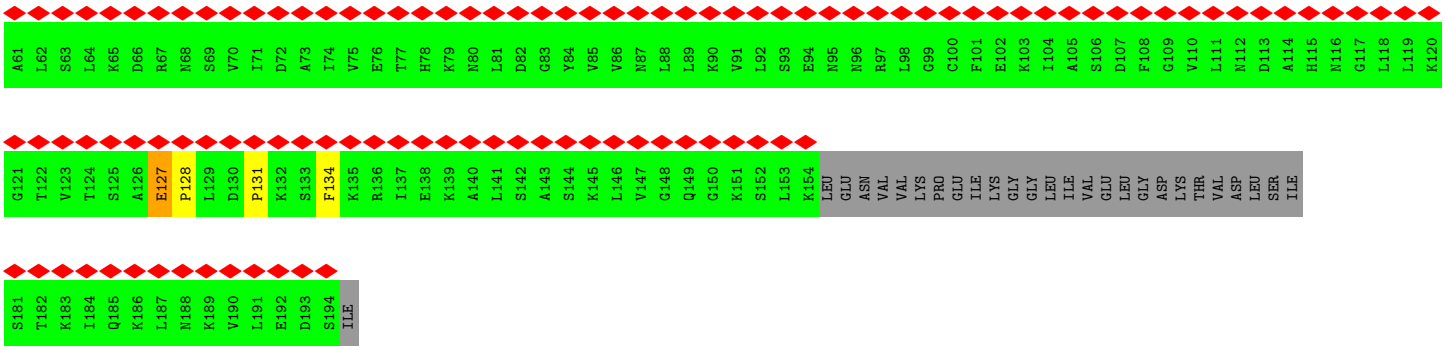
Chain m:



• Molecule 16: ATP synthase subunit 5, mitochondrial

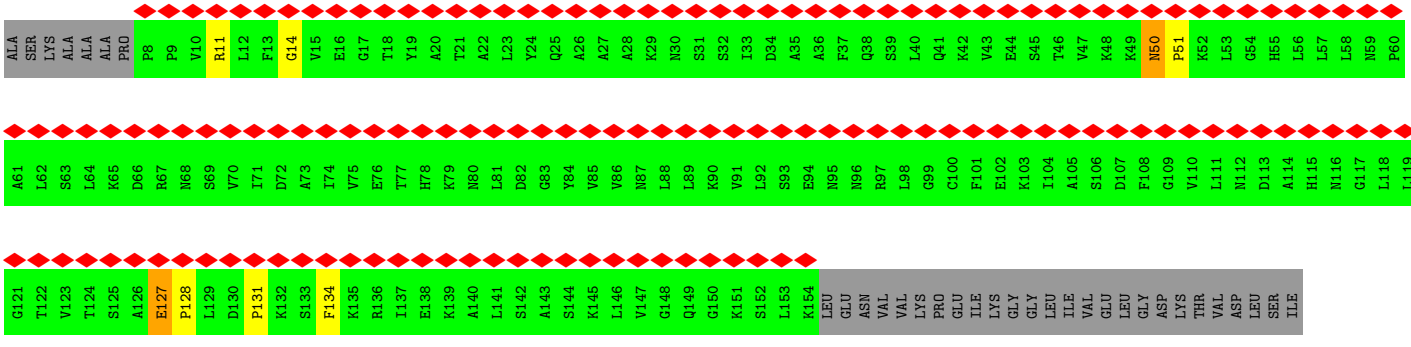
Chain O:





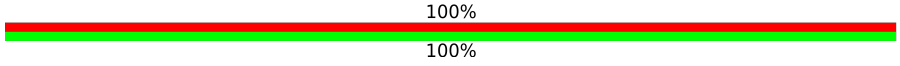
• Molecule 16: ATP synthase subunit 5, mitochondrial

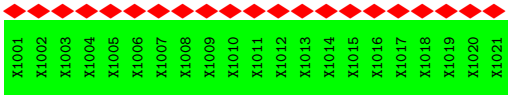
Chain o:



• Molecule 17: ATP synthase subunit h

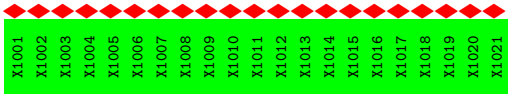
Chain h:





• Molecule 17: ATP synthase subunit h

Chain v:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	238848	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 ($e^-/Å^2$)	71	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	1.103	Depositor
Minimum map value	-0.374	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.000	Depositor
Recommended contour level	0.156	Depositor
Map size (Å)	464.0, 464.0, 464.0	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.45, 1.45, 1.45	Depositor

5 Model quality

5.1 Standard geometry

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

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	0	0.34	0/545	0.60	0/737
1	1	0.35	0/545	0.55	0/737
1	2	0.38	0/545	0.67	1/737 (0.1%)
1	3	0.37	0/537	0.61	1/727 (0.1%)
1	4	0.34	0/545	0.61	0/737
1	5	0.32	0/545	0.58	0/737
1	6	0.33	0/537	0.60	0/727
1	7	0.31	0/529	0.56	0/716
1	8	0.32	0/545	0.56	0/737
1	9	0.32	0/537	0.57	0/727
1	J	0.34	0/545	0.61	0/737
1	L	0.35	0/545	0.55	0/737
1	M	0.38	0/545	0.67	1/737 (0.1%)
1	N	0.37	0/537	0.61	1/727 (0.1%)
1	P	0.34	0/545	0.60	0/737
1	Q	0.32	0/545	0.58	0/737
1	R	0.34	0/537	0.59	0/727
1	S	0.31	0/529	0.56	0/716
1	T	0.32	0/545	0.56	0/737
1	U	0.32	0/537	0.57	0/727
2	A	0.50	0/422	0.77	1/570 (0.2%)
2	V	0.50	0/422	0.77	1/570 (0.2%)
3	a	0.45	0/2023	0.70	0/2758
3	p	0.45	0/2023	0.70	0/2758
4	b	0.46	0/1159	0.72	2/1599 (0.1%)
4	q	0.46	0/1159	0.72	2/1599 (0.1%)
5	d	0.56	0/936	0.81	1/1286 (0.1%)
5	r	0.56	0/936	0.81	1/1286 (0.1%)
7	f	0.40	0/624	0.64	2/845 (0.2%)
7	t	0.41	0/624	0.64	2/845 (0.2%)
9	i	0.42	0/488	0.60	0/659
9	w	0.42	0/488	0.60	0/659

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
10	k	0.28	0/185	0.68	0/250
10	x	0.28	0/185	0.68	0/250
11	B	0.46	0/3753	0.62	0/5080
11	C	0.56	0/3793	0.71	2/5137 (0.0%)
11	K	0.50	0/3798	0.65	0/5143
11	W	0.46	0/3753	0.62	0/5080
11	X	0.56	0/3793	0.71	2/5137 (0.0%)
11	n	0.50	0/3798	0.65	0/5143
12	D	0.55	0/3605	0.67	0/4889
12	E	0.44	0/3592	0.59	1/4870 (0.0%)
12	F	0.52	0/3599	0.69	0/4881
12	Y	0.55	0/3605	0.67	0/4889
12	Z	0.44	0/3592	0.59	1/4870 (0.0%)
12	c	0.52	0/3599	0.69	0/4881
13	G	0.44	0/2055	0.58	0/2766
13	j	0.44	0/2055	0.58	0/2766
14	H	0.46	0/759	0.59	0/1040
14	l	0.46	0/759	0.59	0/1040
15	I	0.48	0/326	0.80	2/445 (0.4%)
15	m	0.48	0/326	0.79	2/445 (0.4%)
16	O	0.61	0/793	0.99	2/1101 (0.2%)
16	o	0.62	0/793	0.99	2/1101 (0.2%)
All	All	0.48	0/74640	0.66	30/101276 (0.0%)

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
4	b	0	1
4	q	0	1
8	g	0	2
8	u	0	2
15	I	0	1
15	m	0	1
16	O	0	1
16	o	0	1
All	All	0	10

There are no bond length outliers.

All (30) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	r	170	LEU	CA-CB-CG	7.82	133.28	115.30
5	d	170	LEU	CA-CB-CG	7.81	133.25	115.30
2	V	26	LEU	CA-CB-CG	7.74	133.09	115.30
2	A	26	LEU	CA-CB-CG	7.73	133.08	115.30
15	m	56	PRO	N-CA-CB	6.38	110.96	103.30
15	I	56	PRO	N-CA-CB	6.33	110.90	103.30
1	M	57	LEU	CA-CB-CG	5.82	128.69	115.30
4	b	11	PRO	N-CA-CB	5.82	110.28	103.30
15	I	58	PRO	N-CA-CB	5.80	110.27	103.30
1	2	57	LEU	CA-CB-CG	5.78	128.59	115.30
4	q	11	PRO	N-CA-CB	5.77	110.23	103.30
15	m	58	PRO	N-CA-CB	5.74	110.18	103.30
16	o	127	GLU	CB-CA-C	5.72	121.84	110.40
7	t	6	PRO	N-CA-CB	5.70	110.14	103.30
16	O	127	GLU	CB-CA-C	5.70	121.80	110.40
7	f	6	PRO	N-CA-CB	5.70	110.14	103.30
7	f	7	PRO	N-CA-CB	5.66	110.09	103.30
4	b	23	PRO	N-CA-CB	5.63	110.05	103.30
7	t	7	PRO	N-CA-CB	5.61	110.03	103.30
4	q	23	PRO	N-CA-CB	5.56	109.98	103.30
12	E	285	LEU	CA-CB-CG	5.31	127.52	115.30
12	Z	285	LEU	CA-CB-CG	5.31	127.51	115.30
16	o	134	PHE	CB-CA-C	-5.31	99.78	110.40
16	O	134	PHE	CB-CA-C	-5.28	99.85	110.40
11	C	283	LEU	CA-CB-CG	5.23	127.33	115.30
11	X	283	LEU	CA-CB-CG	5.21	127.28	115.30
11	C	68	LEU	CA-CB-CG	5.16	127.18	115.30
11	X	68	LEU	CA-CB-CG	5.15	127.15	115.30
1	N	20	LEU	CA-CB-CG	5.10	127.04	115.30
1	3	20	LEU	CA-CB-CG	5.08	126.99	115.30

There are no chirality outliers.

All (10) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
15	I	9	SER	Peptide
16	O	50	ASN	Peptide
4	b	186	ASN	Peptide
8	g	80	UNK	Peptide,Mainchain
15	m	9	SER	Peptide
16	o	50	ASN	Peptide
4	q	186	ASN	Peptide
8	u	80	UNK	Peptide,Mainchain

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	0	73/76 (96%)	73 (100%)	0	0	100	100
1	1	73/76 (96%)	71 (97%)	2 (3%)	0	100	100
1	2	73/76 (96%)	71 (97%)	2 (3%)	0	100	100
1	3	72/76 (95%)	72 (100%)	0	0	100	100
1	4	73/76 (96%)	73 (100%)	0	0	100	100
1	5	73/76 (96%)	72 (99%)	1 (1%)	0	100	100
1	6	72/76 (95%)	72 (100%)	0	0	100	100
1	7	71/76 (93%)	71 (100%)	0	0	100	100
1	8	73/76 (96%)	73 (100%)	0	0	100	100
1	9	72/76 (95%)	70 (97%)	2 (3%)	0	100	100
1	J	73/76 (96%)	73 (100%)	0	0	100	100
1	L	73/76 (96%)	71 (97%)	2 (3%)	0	100	100
1	M	73/76 (96%)	71 (97%)	2 (3%)	0	100	100
1	N	72/76 (95%)	72 (100%)	0	0	100	100
1	P	73/76 (96%)	73 (100%)	0	0	100	100
1	Q	73/76 (96%)	72 (99%)	1 (1%)	0	100	100
1	R	72/76 (95%)	72 (100%)	0	0	100	100
1	S	71/76 (93%)	71 (100%)	0	0	100	100
1	T	73/76 (96%)	73 (100%)	0	0	100	100
1	U	72/76 (95%)	70 (97%)	2 (3%)	0	100	100
2	A	46/48 (96%)	43 (94%)	2 (4%)	1 (2%)	6	39

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
2	V	46/48 (96%)	43 (94%)	2 (4%)	1 (2%)	6 39
3	a	247/249 (99%)	228 (92%)	19 (8%)	0	100 100
3	p	247/249 (99%)	228 (92%)	19 (8%)	0	100 100
4	b	196/209 (94%)	186 (95%)	6 (3%)	4 (2%)	7 41
4	q	196/209 (94%)	186 (95%)	6 (3%)	4 (2%)	7 41
5	d	153/173 (88%)	145 (95%)	7 (5%)	1 (1%)	22 61
5	r	153/173 (88%)	145 (95%)	7 (5%)	1 (1%)	22 61
7	f	80/95 (84%)	70 (88%)	9 (11%)	1 (1%)	12 50
7	t	80/95 (84%)	70 (88%)	9 (11%)	1 (1%)	12 50
9	i	57/59 (97%)	50 (88%)	7 (12%)	0	100 100
9	w	57/59 (97%)	50 (88%)	7 (12%)	0	100 100
10	k	22/68 (32%)	19 (86%)	3 (14%)	0	100 100
10	x	22/68 (32%)	19 (86%)	3 (14%)	0	100 100
11	B	486/510 (95%)	439 (90%)	45 (9%)	2 (0%)	34 71
11	C	496/510 (97%)	449 (90%)	44 (9%)	3 (1%)	25 64
11	K	495/510 (97%)	434 (88%)	56 (11%)	5 (1%)	15 55
11	W	486/510 (95%)	439 (90%)	45 (9%)	2 (0%)	34 71
11	X	496/510 (97%)	449 (90%)	44 (9%)	3 (1%)	25 64
11	n	495/510 (97%)	434 (88%)	56 (11%)	5 (1%)	15 55
12	D	468/478 (98%)	429 (92%)	37 (8%)	2 (0%)	34 71
12	E	466/478 (98%)	424 (91%)	36 (8%)	6 (1%)	12 50
12	F	467/478 (98%)	417 (89%)	42 (9%)	8 (2%)	9 45
12	Y	468/478 (98%)	429 (92%)	37 (8%)	2 (0%)	34 71
12	Z	466/478 (98%)	424 (91%)	36 (8%)	6 (1%)	12 50
12	c	467/478 (98%)	417 (89%)	42 (9%)	8 (2%)	9 45
13	G	261/278 (94%)	229 (88%)	25 (10%)	7 (3%)	5 35
13	j	261/278 (94%)	230 (88%)	24 (9%)	7 (3%)	5 35
14	H	109/138 (79%)	89 (82%)	15 (14%)	5 (5%)	2 23
14	l	109/138 (79%)	89 (82%)	15 (14%)	5 (5%)	2 23
15	I	42/61 (69%)	27 (64%)	9 (21%)	6 (14%)	0 4
15	m	42/61 (69%)	27 (64%)	9 (21%)	6 (14%)	0 4

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
16	O	157/195 (80%)	126 (80%)	24 (15%)	7 (4%)	2 23
16	o	157/195 (80%)	126 (80%)	24 (15%)	7 (4%)	2 23
All	All	9946/10594 (94%)	9045 (91%)	785 (8%)	116 (1%)	17 51

All (116) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	b	187	PRO
7	f	14	ASN
12	D	29	GLU
12	F	28	SER
13	G	152	SER
13	G	202	ASP
13	G	204	ASN
15	I	9	SER
15	I	33	SER
15	I	55	GLU
15	I	56	PRO
16	O	51	PRO
16	O	127	GLU
4	q	187	PRO
7	t	14	ASN
12	Y	29	GLU
12	Z	474	ALA
12	c	28	SER
13	j	152	SER
13	j	202	ASP
13	j	204	ASN
15	m	9	SER
15	m	33	SER
15	m	55	GLU
15	m	56	PRO
16	o	51	PRO
16	o	127	GLU
5	d	50	PRO
11	K	7	PRO
11	C	238	ALA
12	E	123	SER
12	E	474	ALA
12	F	43	GLN
12	F	423	VAL

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Mol	Chain	Res	Type
13	G	203	ALA
14	H	14	PHE
15	I	32	ALA
16	O	131	PRO
5	r	50	PRO
11	n	7	PRO
11	X	238	ALA
12	Z	123	SER
12	c	43	GLN
12	c	423	VAL
13	j	203	ALA
14	l	14	PHE
15	m	32	ALA
16	o	131	PRO
11	K	11	SER
11	K	23	ASP
11	B	392	LEU
12	D	28	SER
12	E	353	SER
14	H	43	ALA
14	H	93	LEU
16	O	14	GLY
11	n	11	SER
11	n	23	ASP
11	W	392	LEU
12	Y	28	SER
12	Z	353	SER
14	l	43	ALA
14	l	93	LEU
16	o	14	GLY
11	K	238	ALA
12	E	126	GLU
12	F	279	VAL
12	F	327	ALA
13	G	192	PRO
13	G	201	THR
16	O	11	ARG
16	O	128	PRO
11	n	229	LYS
11	n	238	ALA
12	Z	126	GLU
12	c	279	VAL

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Mol	Chain	Res	Type
12	c	327	ALA
13	j	192	PRO
13	j	201	THR
16	o	11	ARG
16	o	128	PRO
11	K	229	LYS
11	B	448	TYR
11	C	505	SER
12	F	474	ALA
13	G	78	THR
16	O	50	ASN
11	W	448	TYR
11	X	505	SER
12	c	326	PHE
12	c	474	ALA
13	j	78	THR
16	o	50	ASN
11	C	339	TYR
12	F	326	PHE
14	H	33	PRO
15	I	30	GLN
11	X	339	TYR
14	l	33	PRO
15	m	30	GLN
12	E	461	GLY
12	Z	461	GLY
4	b	186	ASN
4	q	186	ASN
4	b	10	ASP
4	q	10	ASP
2	A	6	PRO
4	b	23	PRO
12	E	141	VAL
12	F	248	GLY
14	H	54	PRO
2	V	6	PRO
4	q	23	PRO
12	Z	141	VAL
12	c	248	GLY
14	l	54	PRO

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	0	55/56 (98%)	55 (100%)	0	100	100
1	1	55/56 (98%)	55 (100%)	0	100	100
1	2	55/56 (98%)	55 (100%)	0	100	100
1	3	54/56 (96%)	54 (100%)	0	100	100
1	4	55/56 (98%)	55 (100%)	0	100	100
1	5	55/56 (98%)	54 (98%)	1 (2%)	59	81
1	6	54/56 (96%)	54 (100%)	0	100	100
1	7	54/56 (96%)	54 (100%)	0	100	100
1	8	55/56 (98%)	55 (100%)	0	100	100
1	9	54/56 (96%)	54 (100%)	0	100	100
1	J	55/56 (98%)	55 (100%)	0	100	100
1	L	55/56 (98%)	55 (100%)	0	100	100
1	M	55/56 (98%)	55 (100%)	0	100	100
1	N	54/56 (96%)	54 (100%)	0	100	100
1	P	55/56 (98%)	55 (100%)	0	100	100
1	Q	55/56 (98%)	54 (98%)	1 (2%)	59	81
1	R	54/56 (96%)	54 (100%)	0	100	100
1	S	54/56 (96%)	54 (100%)	0	100	100
1	T	55/56 (98%)	55 (100%)	0	100	100
1	U	54/56 (96%)	54 (100%)	0	100	100
2	A	47/47 (100%)	47 (100%)	0	100	100
2	V	47/47 (100%)	47 (100%)	0	100	100
3	a	217/217 (100%)	216 (100%)	1 (0%)	88	95
3	p	217/217 (100%)	216 (100%)	1 (0%)	88	95
4	b	48/182 (26%)	48 (100%)	0	100	100
4	q	48/182 (26%)	48 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
5	d	42/158 (27%)	40 (95%)	2 (5%)	25 60
5	r	42/158 (27%)	40 (95%)	2 (5%)	25 60
7	f	46/76 (60%)	46 (100%)	0	100 100
7	t	46/76 (60%)	46 (100%)	0	100 100
9	i	49/49 (100%)	49 (100%)	0	100 100
9	w	49/49 (100%)	49 (100%)	0	100 100
10	k	18/57 (32%)	18 (100%)	0	100 100
10	x	18/57 (32%)	18 (100%)	0	100 100
11	B	384/412 (93%)	348 (91%)	36 (9%)	8 38
11	C	384/412 (93%)	356 (93%)	28 (7%)	14 46
11	K	384/412 (93%)	365 (95%)	19 (5%)	25 59
11	W	384/412 (93%)	348 (91%)	36 (9%)	8 38
11	X	384/412 (93%)	356 (93%)	28 (7%)	14 46
11	n	384/412 (93%)	365 (95%)	19 (5%)	25 59
12	D	380/384 (99%)	360 (95%)	20 (5%)	22 58
12	E	378/384 (98%)	357 (94%)	21 (6%)	21 56
12	F	379/384 (99%)	359 (95%)	20 (5%)	22 58
12	Y	380/384 (99%)	360 (95%)	20 (5%)	22 58
12	Z	378/384 (98%)	357 (94%)	21 (6%)	21 56
12	c	379/384 (99%)	359 (95%)	20 (5%)	22 58
13	G	218/236 (92%)	191 (88%)	27 (12%)	4 26
13	j	218/236 (92%)	191 (88%)	27 (12%)	4 26
14	H	54/112 (48%)	39 (72%)	15 (28%)	0 3
14	l	54/112 (48%)	39 (72%)	15 (28%)	0 3
15	I	23/48 (48%)	20 (87%)	3 (13%)	4 24
15	m	23/48 (48%)	20 (87%)	3 (13%)	4 24
All	All	7194/8260 (87%)	6808 (95%)	386 (5%)	26 57

All (386) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	5	57	LEU
3	a	34	ILE

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Mol	Chain	Res	Type
5	d	166	ARG
5	d	173	MET
11	K	142	ARG
11	K	143	SER
11	K	173	ARG
11	K	220	GLN
11	K	221	THR
11	K	239	SER
11	K	245	GLN
11	K	251	THR
11	K	267	LEU
11	K	293	ARG
11	K	318	GLU
11	K	322	SER
11	K	364	ARG
11	K	378	SER
11	K	412	LEU
11	K	480	GLU
11	K	481	LEU
11	K	492	SER
11	K	501	SER
11	B	40	ILE
11	B	50	GLN
11	B	54	LEU
11	B	80	SER
11	B	82	ARG
11	B	89	LEU
11	B	93	THR
11	B	99	VAL
11	B	129	SER
11	B	142	ARG
11	B	149	GLN
11	B	173	ARG
11	B	183	ASP
11	B	206	VAL
11	B	218	LEU
11	B	221	THR
11	B	232	ILE
11	B	246	TYR
11	B	267	LEU
11	B	274	SER
11	B	278	VAL

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Mol	Chain	Res	Type
11	B	314	LEU
11	B	318	GLU
11	B	336	VAL
11	B	348	THR
11	B	351	GLN
11	B	378	SER
11	B	416	THR
11	B	427	THR
11	B	444	VAL
11	B	460	LEU
11	B	471	LEU
11	B	480	GLU
11	B	486	ARG
11	B	504	GLU
11	B	506	PHE
11	C	30	THR
11	C	54	LEU
11	C	89	LEU
11	C	99	VAL
11	C	105	LEU
11	C	142	ARG
11	C	159	VAL
11	C	165	GLN
11	C	210	GLN
11	C	221	THR
11	C	246	TYR
11	C	254	SER
11	C	274	SER
11	C	337	SER
11	C	351	GLN
11	C	382	VAL
11	C	383	LYS
11	C	394	LEU
11	C	416	THR
11	C	468	SER
11	C	476	SER
11	C	480	GLU
11	C	487	GLU
11	C	495	LEU
11	C	498	SER
11	C	501	SER
11	C	503	THR

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Mol	Chain	Res	Type
11	C	509	THR
12	D	6	SER
12	D	26	GLU
12	D	29	GLU
12	D	74	GLU
12	D	77	LEU
12	D	167	ILE
12	D	204	THR
12	D	206	VAL
12	D	214	LYS
12	D	249	GLN
12	D	251	VAL
12	D	255	ILE
12	D	268	VAL
12	D	332	THR
12	D	357	LEU
12	D	359	ASP
12	D	396	LEU
12	D	397	SER
12	D	423	VAL
12	D	464	GLU
12	E	89	ARG
12	E	128	SER
12	E	129	THR
12	E	140	VAL
12	E	165	VAL
12	E	190	ARG
12	E	232	VAL
12	E	298	THR
12	E	299	THR
12	E	324	THR
12	E	352	ASP
12	E	357	LEU
12	E	359	ASP
12	E	376	GLU
12	E	380	THR
12	E	386	ASP
12	E	406	ARG
12	E	433	ARG
12	E	446	GLU
12	E	464	GLU
12	E	465	ASP

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Mol	Chain	Res	Type
12	F	58	THR
12	F	140	VAL
12	F	163	LYS
12	F	167	ILE
12	F	182	SER
12	F	201	MET
12	F	232	VAL
12	F	251	VAL
12	F	261	PHE
12	F	303	SER
12	F	305	THR
12	F	318	THR
12	F	324	THR
12	F	354	LYS
12	F	355	SER
12	F	388	ILE
12	F	420	VAL
12	F	423	VAL
12	F	434	LEU
12	F	467	VAL
13	G	2	THR
13	G	3	LEU
13	G	4	LYS
13	G	9	ARG
13	G	17	GLU
13	G	19	ILE
13	G	80	ASP
13	G	106	ASP
13	G	121	THR
13	G	136	ASP
13	G	143	SER
13	G	145	LEU
13	G	148	ASP
13	G	152	SER
13	G	164	ILE
13	G	216	ASN
13	G	218	MET
13	G	231	SER
13	G	234	ARG
13	G	235	ASN
13	G	247	MET
13	G	254	LEU

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Mol	Chain	Res	Type
13	G	264	THR
13	G	267	LEU
13	G	269	ASP
13	G	272	THR
13	G	276	SER
14	H	12	LEU
14	H	19	GLU
14	H	21	LEU
14	H	27	VAL
14	H	29	GLN
14	H	30	VAL
14	H	42	LEU
14	H	46	VAL
14	H	48	THR
14	H	49	VAL
14	H	60	MET
14	H	64	ASN
14	H	70	ILE
14	H	80	ASP
14	H	86	THR
15	I	14	LEU
15	I	27	THR
15	I	31	THR
1	Q	57	LEU
3	p	34	ILE
5	r	166	ARG
5	r	173	MET
11	n	142	ARG
11	n	143	SER
11	n	173	ARG
11	n	220	GLN
11	n	221	THR
11	n	239	SER
11	n	245	GLN
11	n	251	THR
11	n	267	LEU
11	n	293	ARG
11	n	318	GLU
11	n	322	SER
11	n	364	ARG
11	n	378	SER
11	n	412	LEU

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Mol	Chain	Res	Type
11	n	480	GLU
11	n	481	LEU
11	n	492	SER
11	n	501	SER
11	W	40	ILE
11	W	50	GLN
11	W	54	LEU
11	W	80	SER
11	W	82	ARG
11	W	89	LEU
11	W	93	THR
11	W	99	VAL
11	W	129	SER
11	W	142	ARG
11	W	149	GLN
11	W	173	ARG
11	W	183	ASP
11	W	206	VAL
11	W	218	LEU
11	W	221	THR
11	W	232	ILE
11	W	246	TYR
11	W	267	LEU
11	W	274	SER
11	W	278	VAL
11	W	314	LEU
11	W	318	GLU
11	W	336	VAL
11	W	348	THR
11	W	351	GLN
11	W	378	SER
11	W	416	THR
11	W	427	THR
11	W	444	VAL
11	W	460	LEU
11	W	471	LEU
11	W	480	GLU
11	W	486	ARG
11	W	504	GLU
11	W	506	PHE
11	X	30	THR
11	X	54	LEU

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Mol	Chain	Res	Type
11	X	89	LEU
11	X	99	VAL
11	X	105	LEU
11	X	142	ARG
11	X	159	VAL
11	X	165	GLN
11	X	210	GLN
11	X	221	THR
11	X	246	TYR
11	X	254	SER
11	X	274	SER
11	X	337	SER
11	X	351	GLN
11	X	382	VAL
11	X	383	LYS
11	X	394	LEU
11	X	416	THR
11	X	468	SER
11	X	476	SER
11	X	480	GLU
11	X	487	GLU
11	X	495	LEU
11	X	498	SER
11	X	501	SER
11	X	503	THR
11	X	509	THR
12	Y	6	SER
12	Y	26	GLU
12	Y	29	GLU
12	Y	74	GLU
12	Y	77	LEU
12	Y	167	ILE
12	Y	204	THR
12	Y	206	VAL
12	Y	214	LYS
12	Y	249	GLN
12	Y	251	VAL
12	Y	255	ILE
12	Y	268	VAL
12	Y	332	THR
12	Y	357	LEU
12	Y	359	ASP

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Mol	Chain	Res	Type
12	Y	396	LEU
12	Y	397	SER
12	Y	423	VAL
12	Y	464	GLU
12	Z	89	ARG
12	Z	128	SER
12	Z	129	THR
12	Z	140	VAL
12	Z	165	VAL
12	Z	190	ARG
12	Z	232	VAL
12	Z	298	THR
12	Z	299	THR
12	Z	324	THR
12	Z	352	ASP
12	Z	357	LEU
12	Z	359	ASP
12	Z	376	GLU
12	Z	380	THR
12	Z	386	ASP
12	Z	406	ARG
12	Z	433	ARG
12	Z	446	GLU
12	Z	464	GLU
12	Z	465	ASP
12	c	58	THR
12	c	140	VAL
12	c	163	LYS
12	c	167	ILE
12	c	182	SER
12	c	201	MET
12	c	232	VAL
12	c	251	VAL
12	c	261	PHE
12	c	303	SER
12	c	305	THR
12	c	318	THR
12	c	324	THR
12	c	354	LYS
12	c	355	SER
12	c	388	ILE
12	c	420	VAL

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Mol	Chain	Res	Type
12	c	423	VAL
12	c	434	LEU
12	c	467	VAL
13	j	2	THR
13	j	3	LEU
13	j	4	LYS
13	j	9	ARG
13	j	17	GLU
13	j	19	ILE
13	j	80	ASP
13	j	106	ASP
13	j	121	THR
13	j	136	ASP
13	j	143	SER
13	j	145	LEU
13	j	148	ASP
13	j	152	SER
13	j	164	ILE
13	j	216	ASN
13	j	218	MET
13	j	231	SER
13	j	234	ARG
13	j	235	ASN
13	j	247	MET
13	j	254	LEU
13	j	264	THR
13	j	267	LEU
13	j	269	ASP
13	j	272	THR
13	j	276	SER
14	l	12	LEU
14	l	19	GLU
14	l	21	LEU
14	l	27	VAL
14	l	29	GLN
14	l	30	VAL
14	l	42	LEU
14	l	46	VAL
14	l	48	THR
14	l	49	VAL
14	l	60	MET
14	l	64	ASN

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Mol	Chain	Res	Type
14	l	70	ILE
14	l	80	ASP
14	l	86	THR
15	m	14	LEU
15	m	27	THR
15	m	31	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (60) such sidechains are listed below:

Mol	Chain	Res	Type
1	1	2	GLN
1	9	2	GLN
11	K	145	HIS
11	K	174	GLN
11	K	398	GLN
11	K	407	GLN
11	B	67	ASN
11	B	149	GLN
11	B	192	ASN
11	B	282	GLN
11	B	398	GLN
11	B	454	HIS
11	B	477	ASN
11	C	50	GLN
11	C	210	GLN
11	C	407	GLN
11	C	452	ASN
12	D	195	ASN
12	D	208	ASN
12	E	27	GLN
12	E	43	GLN
12	E	168	GLN
12	E	221	GLN
12	F	52	GLN
12	F	328	HIS
13	G	54	ASN
13	G	90	GLN
13	G	216	ASN
14	H	44	ASN
14	H	78	GLN
15	I	30	GLN
1	L	2	GLN

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Mol	Chain	Res	Type
11	n	145	HIS
11	n	174	GLN
11	n	398	GLN
11	n	407	GLN
11	W	149	GLN
11	W	192	ASN
11	W	282	GLN
11	W	398	GLN
11	W	454	HIS
11	W	477	ASN
11	X	50	GLN
11	X	210	GLN
11	X	407	GLN
11	X	452	ASN
12	Y	195	ASN
12	Y	208	ASN
12	Z	27	GLN
12	Z	43	GLN
12	Z	168	GLN
12	Z	221	GLN
12	c	52	GLN
12	c	328	HIS
13	j	54	ASN
13	j	90	GLN
13	j	216	ASN
14	l	44	ASN
14	l	78	GLN
15	m	30	GLN

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 monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 20 ligands modelled in this entry, 10 are monoatomic - leaving 10 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	$\#\|Z\| > 2$
18	ANP	Y	501	19	29,33,33	3.01	9 (31%)	31,52,52	2.10	10 (32%)
18	ANP	n	601	19	29,33,33	2.84	7 (24%)	31,52,52	1.76	9 (29%)
18	ANP	K	601	19	29,33,33	2.83	7 (24%)	31,52,52	1.76	9 (29%)
18	ANP	X	601	19	29,33,33	2.78	8 (27%)	31,52,52	2.02	10 (32%)
18	ANP	B	601	19	29,33,33	2.93	6 (20%)	31,52,52	1.78	8 (25%)
18	ANP	C	601	19	29,33,33	2.77	9 (31%)	31,52,52	2.03	10 (32%)
18	ANP	W	601	19	29,33,33	2.93	6 (20%)	31,52,52	1.78	8 (25%)
18	ANP	F	501	19	29,33,33	2.95	7 (24%)	31,52,52	2.17	10 (32%)
18	ANP	D	501	19	29,33,33	3.00	9 (31%)	31,52,52	2.11	10 (32%)
18	ANP	c	501	19	29,33,33	2.96	7 (24%)	31,52,52	2.17	10 (32%)

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
18	ANP	Y	501	19	-	3/14/38/38	0/3/3/3
18	ANP	n	601	19	-	1/14/38/38	0/3/3/3
18	ANP	K	601	19	-	1/14/38/38	0/3/3/3
18	ANP	X	601	19	-	2/14/38/38	0/3/3/3
18	ANP	B	601	19	-	3/14/38/38	0/3/3/3
18	ANP	C	601	19	-	2/14/38/38	0/3/3/3
18	ANP	W	601	19	-	3/14/38/38	0/3/3/3
18	ANP	F	501	19	-	1/14/38/38	0/3/3/3
18	ANP	D	501	19	-	3/14/38/38	0/3/3/3
18	ANP	c	501	19	-	1/14/38/38	0/3/3/3

All (75) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
18	n	601	ANP	PG-O1G	9.46	1.61	1.46
18	K	601	ANP	PG-O1G	9.41	1.61	1.46
18	Y	501	ANP	PG-O1G	8.83	1.60	1.46
18	D	501	ANP	PG-O1G	8.80	1.60	1.46
18	X	601	ANP	PG-O1G	8.76	1.60	1.46
18	C	601	ANP	PG-O1G	8.76	1.60	1.46
18	B	601	ANP	PG-O1G	8.66	1.59	1.46
18	W	601	ANP	PG-O1G	8.65	1.59	1.46
18	c	501	ANP	PG-O1G	8.64	1.59	1.46
18	F	501	ANP	PG-O1G	8.59	1.59	1.46
18	Y	501	ANP	PB-O1B	8.15	1.59	1.46
18	W	601	ANP	PB-O1B	8.14	1.59	1.46
18	B	601	ANP	PB-O1B	8.12	1.59	1.46
18	D	501	ANP	PB-O1B	8.10	1.59	1.46
18	n	601	ANP	PB-O1B	7.57	1.58	1.46
18	K	601	ANP	PB-O1B	7.55	1.58	1.46
18	c	501	ANP	PB-O1B	7.33	1.57	1.46
18	C	601	ANP	PB-O1B	7.33	1.57	1.46
18	X	601	ANP	PB-O1B	7.32	1.57	1.46
18	F	501	ANP	PB-O1B	7.31	1.57	1.46
18	F	501	ANP	C4-N3	7.13	1.45	1.35
18	c	501	ANP	C4-N3	7.12	1.45	1.35
18	D	501	ANP	C4-N3	7.02	1.45	1.35
18	Y	501	ANP	C4-N3	7.01	1.45	1.35
18	B	601	ANP	C4-N3	6.90	1.45	1.35
18	W	601	ANP	C4-N3	6.90	1.45	1.35
18	X	601	ANP	C4-N3	5.71	1.43	1.35
18	C	601	ANP	C4-N3	5.67	1.43	1.35
18	K	601	ANP	C4-N3	5.52	1.43	1.35
18	n	601	ANP	C4-N3	5.48	1.43	1.35
18	F	501	ANP	PB-N3B	4.30	1.74	1.63
18	c	501	ANP	PB-N3B	4.26	1.74	1.63
18	Y	501	ANP	PG-N3B	4.25	1.74	1.63
18	D	501	ANP	PG-N3B	4.21	1.74	1.63
18	c	501	ANP	PG-N3B	4.14	1.74	1.63
18	F	501	ANP	PG-N3B	4.11	1.74	1.63
18	B	601	ANP	PG-N3B	4.01	1.73	1.63
18	W	601	ANP	PG-N3B	4.01	1.73	1.63
18	B	601	ANP	PB-N3B	3.70	1.73	1.63
18	W	601	ANP	PB-N3B	3.69	1.73	1.63
18	X	601	ANP	PG-N3B	3.64	1.72	1.63
18	C	601	ANP	PG-N3B	3.62	1.72	1.63

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
18	K	601	ANP	PB-N3B	3.56	1.72	1.63
18	n	601	ANP	PB-N3B	3.53	1.72	1.63
18	X	601	ANP	PB-N3B	3.51	1.72	1.63
18	C	601	ANP	PB-N3B	3.50	1.72	1.63
18	n	601	ANP	PG-N3B	3.41	1.72	1.63
18	K	601	ANP	PG-N3B	3.41	1.72	1.63
18	D	501	ANP	PB-N3B	3.14	1.71	1.63
18	Y	501	ANP	PB-N3B	3.12	1.71	1.63
18	F	501	ANP	PA-O1A	2.43	1.59	1.50
18	c	501	ANP	PA-O1A	2.41	1.59	1.50
18	K	601	ANP	PA-O1A	2.39	1.59	1.50
18	n	601	ANP	PA-O1A	2.39	1.59	1.50
18	D	501	ANP	PA-O1A	2.37	1.59	1.50
18	Y	501	ANP	PA-O1A	2.37	1.59	1.50
18	X	601	ANP	PA-O1A	2.35	1.59	1.50
18	C	601	ANP	PA-O1A	2.33	1.59	1.50
18	n	601	ANP	C8-N7	2.33	1.38	1.34
18	B	601	ANP	PA-O1A	2.32	1.59	1.50
18	W	601	ANP	PA-O1A	2.32	1.59	1.50
18	K	601	ANP	C8-N7	2.32	1.38	1.34
18	c	501	ANP	PG-O3G	2.30	1.63	1.56
18	F	501	ANP	PG-O3G	2.29	1.62	1.56
18	C	601	ANP	PB-O3A	2.18	1.61	1.59
18	Y	501	ANP	C8-N7	2.17	1.38	1.34
18	X	601	ANP	C8-N7	2.16	1.38	1.34
18	D	501	ANP	C8-N7	2.16	1.38	1.34
18	X	601	ANP	PB-O3A	2.15	1.61	1.59
18	D	501	ANP	C2'-C1'	-2.15	1.50	1.53
18	Y	501	ANP	C2'-C1'	-2.11	1.50	1.53
18	C	601	ANP	C8-N7	2.08	1.38	1.34
18	D	501	ANP	PG-O2G	2.02	1.62	1.56
18	C	601	ANP	C2'-C1'	-2.01	1.50	1.53
18	Y	501	ANP	PG-O2G	2.00	1.62	1.56

All (94) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
18	c	501	ANP	O1B-PB-N3B	-5.49	103.68	111.77
18	F	501	ANP	O1B-PB-N3B	-5.47	103.71	111.77
18	C	601	ANP	O1G-PG-N3B	-5.20	104.11	111.77
18	X	601	ANP	O1G-PG-N3B	-5.19	104.12	111.77
18	W	601	ANP	PB-O3A-PA	-4.70	116.07	132.62

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
18	B	601	ANP	PB-O3A-PA	-4.70	116.08	132.62
18	Y	501	ANP	PB-O3A-PA	-4.61	116.38	132.62
18	D	501	ANP	PB-O3A-PA	-4.61	116.40	132.62
18	n	601	ANP	PB-O3A-PA	-4.17	117.92	132.62
18	K	601	ANP	PB-O3A-PA	-4.16	117.96	132.62
18	D	501	ANP	C4-C5-N7	-4.13	105.10	109.40
18	Y	501	ANP	C4-C5-N7	-4.09	105.14	109.40
18	B	601	ANP	N3-C2-N1	-3.90	122.58	128.68
18	C	601	ANP	PB-O3A-PA	-3.90	118.89	132.62
18	W	601	ANP	N3-C2-N1	-3.90	122.59	128.68
18	X	601	ANP	PB-O3A-PA	-3.89	118.90	132.62
18	F	501	ANP	N3-C2-N1	-3.82	122.71	128.68
18	c	501	ANP	N3-C2-N1	-3.80	122.74	128.68
18	n	601	ANP	C4-C5-N7	-3.75	105.49	109.40
18	K	601	ANP	C4-C5-N7	-3.74	105.50	109.40
18	C	601	ANP	N3-C2-N1	-3.67	122.94	128.68
18	B	601	ANP	C4-C5-N7	-3.66	105.58	109.40
18	X	601	ANP	N3-C2-N1	-3.64	122.99	128.68
18	W	601	ANP	C4-C5-N7	-3.63	105.62	109.40
18	c	501	ANP	O4'-C1'-C2'	3.63	112.23	106.93
18	F	501	ANP	O4'-C1'-C2'	3.61	112.21	106.93
18	D	501	ANP	C3'-C2'-C1'	3.53	106.30	100.98
18	D	501	ANP	O1G-PG-N3B	-3.51	106.61	111.77
18	Y	501	ANP	O1G-PG-N3B	-3.50	106.61	111.77
18	Y	501	ANP	C3'-C2'-C1'	3.48	106.22	100.98
18	D	501	ANP	O2'-C2'-C1'	-3.48	98.00	110.85
18	Y	501	ANP	O2'-C2'-C1'	-3.48	98.02	110.85
18	F	501	ANP	O3G-PG-O1G	-3.40	104.89	113.45
18	c	501	ANP	O3G-PG-O1G	-3.40	104.89	113.45
18	C	601	ANP	C4-C5-N7	-3.37	105.89	109.40
18	B	601	ANP	C3'-C2'-C1'	3.32	105.98	100.98
18	X	601	ANP	C4-C5-N7	-3.30	105.96	109.40
18	W	601	ANP	C3'-C2'-C1'	3.28	105.92	100.98
18	D	501	ANP	N3-C2-N1	-3.26	123.58	128.68
18	n	601	ANP	N3-C2-N1	-3.22	123.65	128.68
18	K	601	ANP	N3-C2-N1	-3.19	123.69	128.68
18	Y	501	ANP	N3-C2-N1	-3.18	123.70	128.68
18	c	501	ANP	C5-C6-N6	-3.14	115.58	120.35
18	F	501	ANP	C5-C6-N6	-3.13	115.59	120.35
18	Y	501	ANP	O2G-PG-O3G	3.05	115.75	107.64
18	F	501	ANP	O2B-PB-O1B	3.03	116.27	109.92
18	c	501	ANP	O2B-PB-O1B	3.02	116.26	109.92

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
18	D	501	ANP	O2G-PG-O3G	3.02	115.69	107.64
18	K	601	ANP	O1G-PG-N3B	-3.01	107.34	111.77
18	n	601	ANP	O1G-PG-N3B	-3.01	107.34	111.77
18	Y	501	ANP	O2B-PB-O3A	2.94	114.45	104.64
18	D	501	ANP	O2B-PB-O3A	2.92	114.40	104.64
18	c	501	ANP	O2G-PG-O3G	2.90	115.37	107.64
18	F	501	ANP	O2G-PG-O3G	2.89	115.34	107.64
18	n	601	ANP	C3'-C2'-C1'	2.88	105.32	100.98
18	K	601	ANP	C3'-C2'-C1'	2.88	105.31	100.98
18	D	501	ANP	C2-N1-C6	2.83	123.60	118.75
18	C	601	ANP	C1'-N9-C4	-2.76	121.79	126.64
18	Y	501	ANP	C2-N1-C6	2.75	123.45	118.75
18	C	601	ANP	C2-N1-C6	2.74	123.43	118.75
18	X	601	ANP	C2-N1-C6	2.73	123.43	118.75
18	X	601	ANP	C1'-N9-C4	-2.73	121.84	126.64
18	B	601	ANP	C2-N1-C6	2.68	123.34	118.75
18	W	601	ANP	C2-N1-C6	2.67	123.32	118.75
18	X	601	ANP	C3'-C2'-C1'	2.64	104.95	100.98
18	C	601	ANP	C3'-C2'-C1'	2.64	104.95	100.98
18	W	601	ANP	O1G-PG-N3B	-2.63	107.90	111.77
18	B	601	ANP	O1G-PG-N3B	-2.62	107.91	111.77
18	F	501	ANP	N6-C6-N1	2.61	123.99	118.57
18	c	501	ANP	N6-C6-N1	2.57	123.91	118.57
18	F	501	ANP	C2-N1-C6	2.46	122.96	118.75
18	c	501	ANP	C2-N1-C6	2.40	122.85	118.75
18	K	601	ANP	O3'-C3'-C4'	-2.39	104.14	111.05
18	n	601	ANP	O3'-C3'-C4'	-2.37	104.19	111.05
18	n	601	ANP	O2B-PB-O3A	2.24	112.13	104.64
18	K	601	ANP	O2B-PB-O3A	2.23	112.10	104.64
18	C	601	ANP	O4'-C1'-C2'	2.22	110.18	106.93
18	D	501	ANP	O3G-PG-O1G	-2.22	107.87	113.45
18	Y	501	ANP	O3G-PG-O1G	-2.21	107.89	113.45
18	c	501	ANP	C3'-C2'-C1'	2.21	104.31	100.98
18	X	601	ANP	C2'-C3'-C4'	2.21	106.94	102.64
18	F	501	ANP	C3'-C2'-C1'	2.21	104.30	100.98
18	X	601	ANP	O4'-C1'-C2'	2.20	110.14	106.93
18	C	601	ANP	C2'-C3'-C4'	2.18	106.88	102.64
18	X	601	ANP	O1B-PB-N3B	-2.12	108.64	111.77
18	n	601	ANP	C2'-C3'-C4'	2.12	106.76	102.64
18	C	601	ANP	O1B-PB-N3B	-2.10	108.67	111.77
18	K	601	ANP	C2'-C3'-C4'	2.10	106.72	102.64
18	W	601	ANP	C2'-C3'-C4'	2.08	106.68	102.64

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
18	B	601	ANP	C2'-C3'-C4'	2.06	106.64	102.64
18	K	601	ANP	O3A-PB-N3B	-2.03	100.95	106.59
18	n	601	ANP	O3A-PB-N3B	-2.02	100.99	106.59
18	B	601	ANP	C5'-C4'-C3'	-2.02	107.63	115.18
18	W	601	ANP	C5'-C4'-C3'	-2.01	107.63	115.18

There are no chirality outliers.

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
18	K	601	ANP	PG-N3B-PB-O1B
18	B	601	ANP	PG-N3B-PB-O1B
18	C	601	ANP	PB-N3B-PG-O1G
18	C	601	ANP	PG-N3B-PB-O1B
18	D	501	ANP	PB-N3B-PG-O1G
18	D	501	ANP	PG-N3B-PB-O1B
18	D	501	ANP	PG-N3B-PB-O3A
18	F	501	ANP	PG-N3B-PB-O1B
18	n	601	ANP	PG-N3B-PB-O1B
18	W	601	ANP	PG-N3B-PB-O1B
18	X	601	ANP	PB-N3B-PG-O1G
18	X	601	ANP	PG-N3B-PB-O1B
18	Y	501	ANP	PB-N3B-PG-O1G
18	Y	501	ANP	PG-N3B-PB-O1B
18	Y	501	ANP	PG-N3B-PB-O3A
18	c	501	ANP	PG-N3B-PB-O1B
18	W	601	ANP	C3'-C4'-C5'-O5'
18	B	601	ANP	O4'-C4'-C5'-O5'
18	B	601	ANP	C3'-C4'-C5'-O5'
18	W	601	ANP	O4'-C4'-C5'-O5'

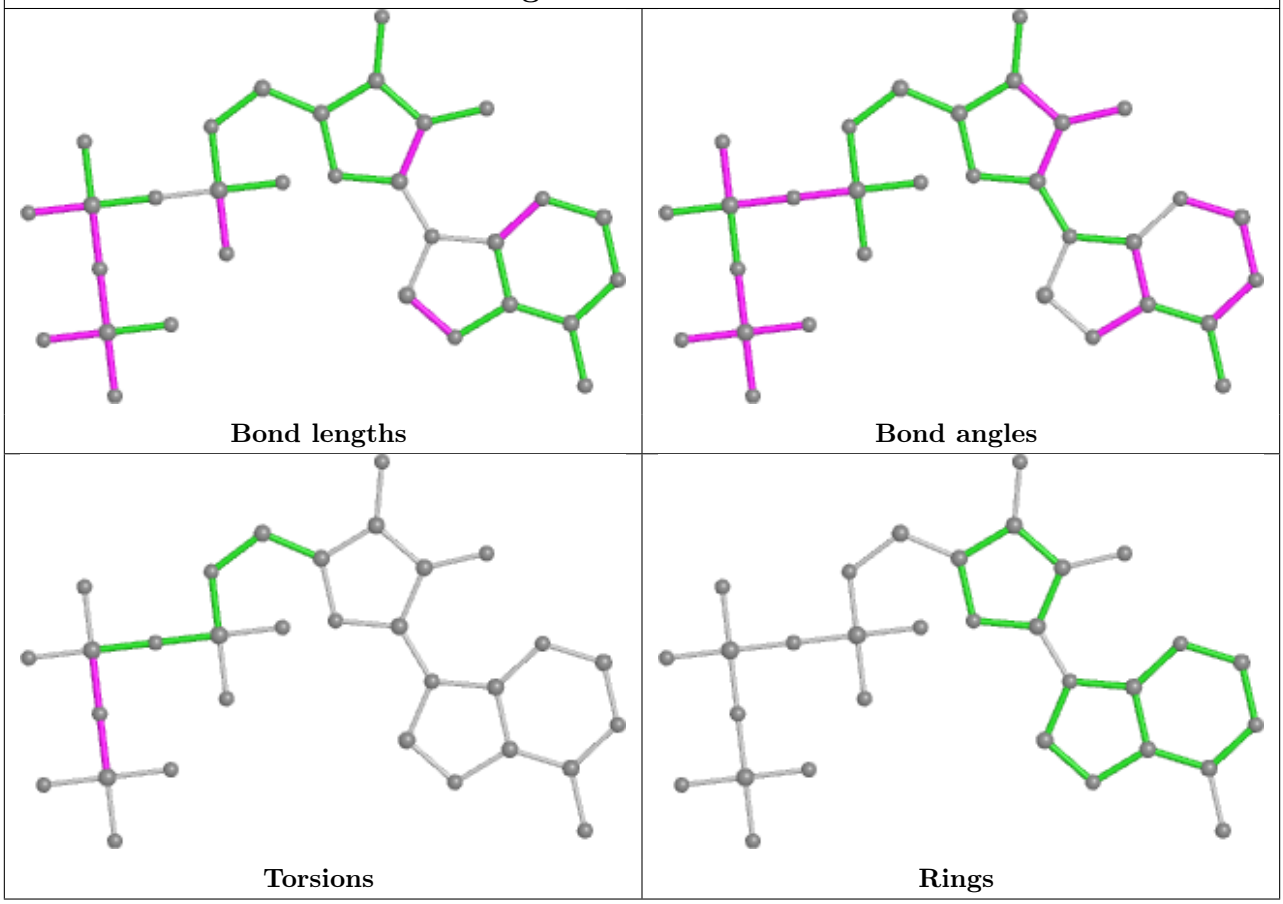
There are no ring outliers.

No monomer is involved in short contacts.

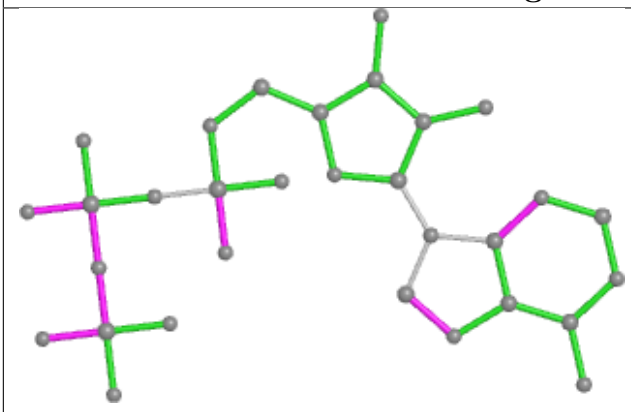
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

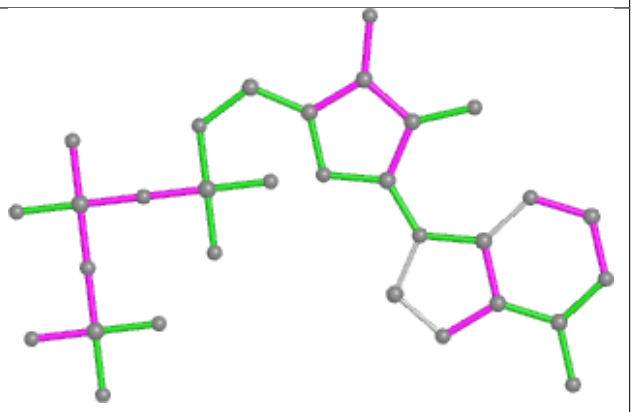
Ligand ANP Y 501



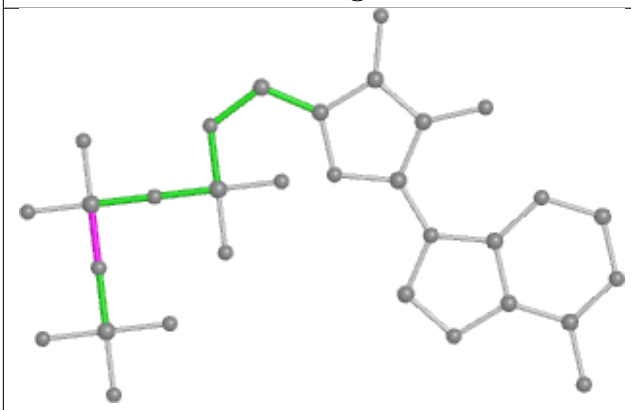
Ligand ANP n 601



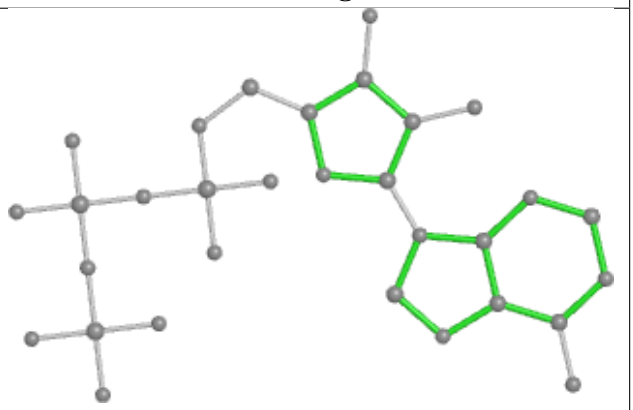
Bond lengths



Bond angles

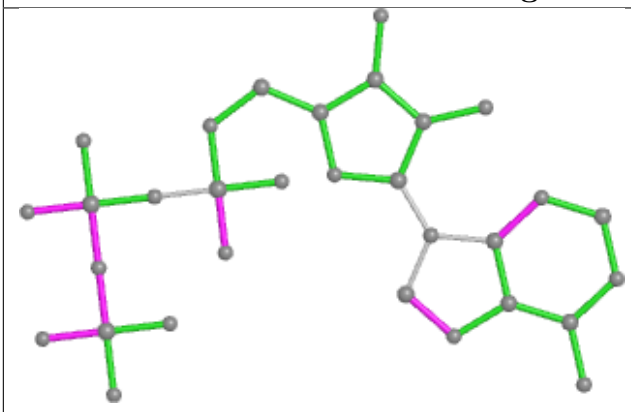


Torsions

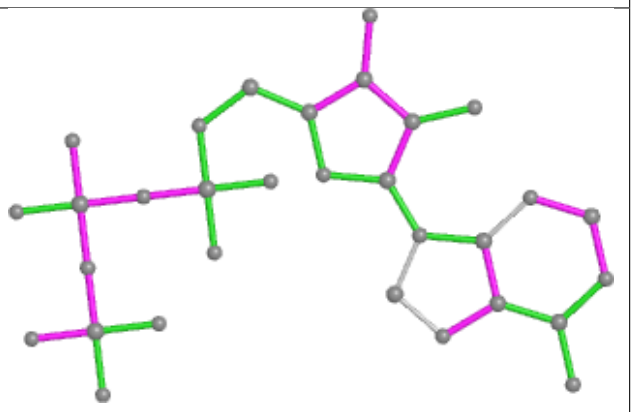


Rings

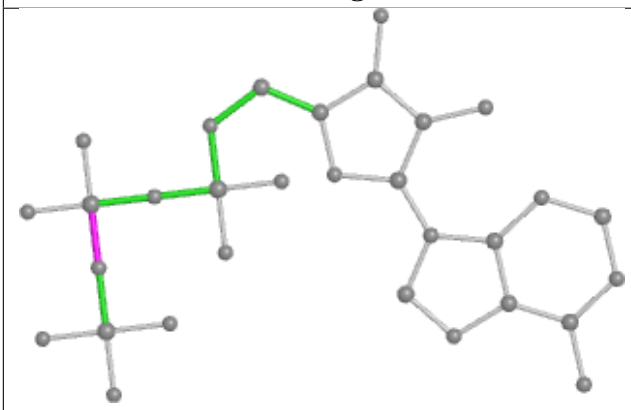
Ligand ANP K 601



Bond lengths



Bond angles



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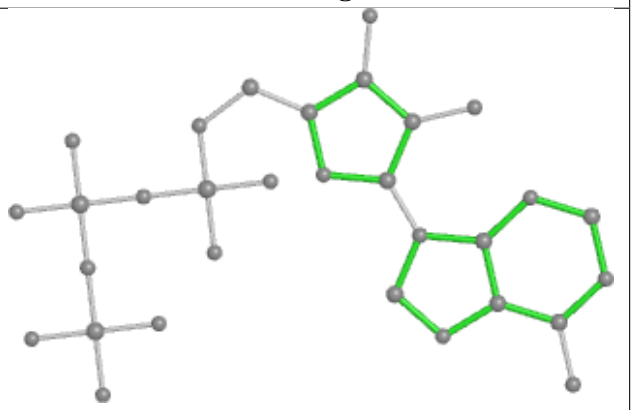
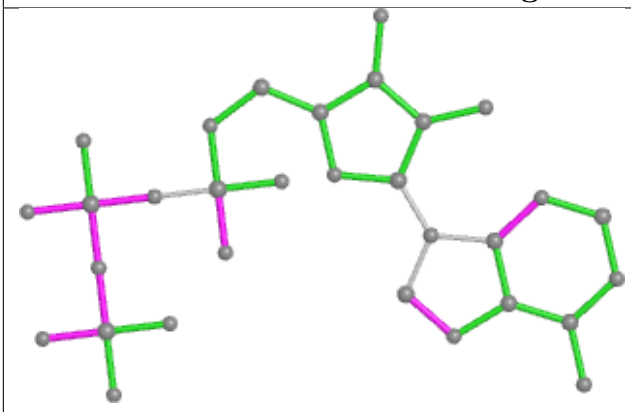


Rings

Ligand ANP X 601



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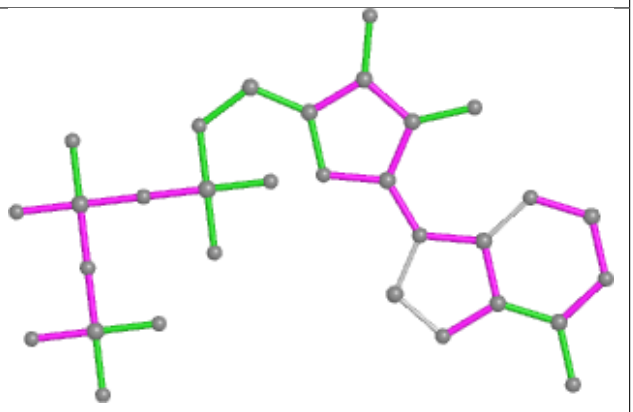
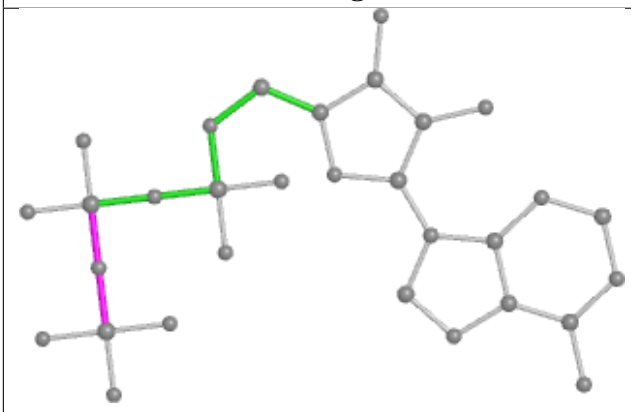
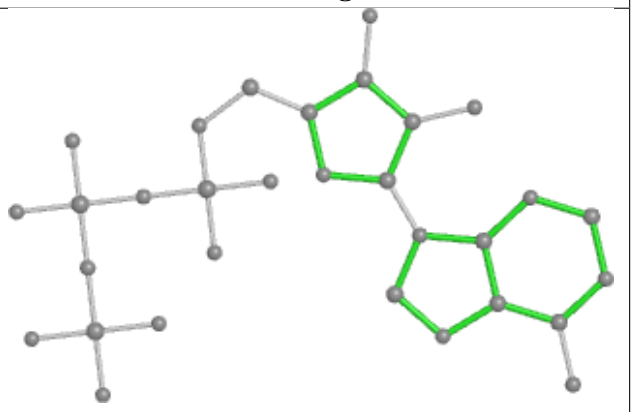


Bond angles

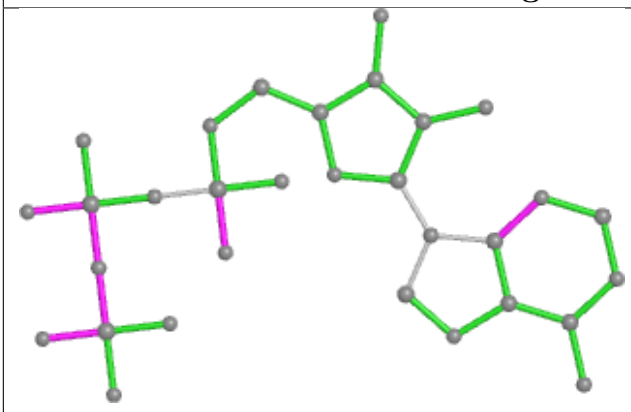


Torsions

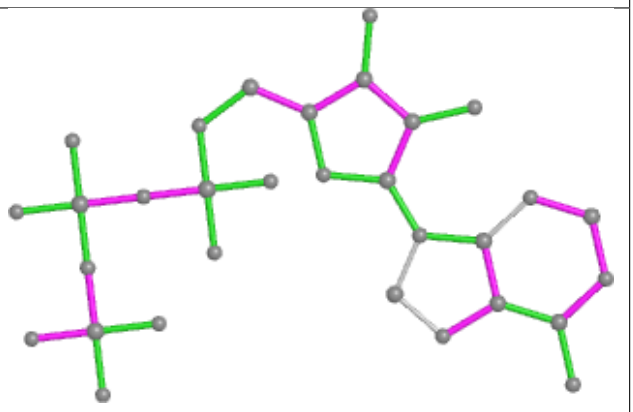


Rings

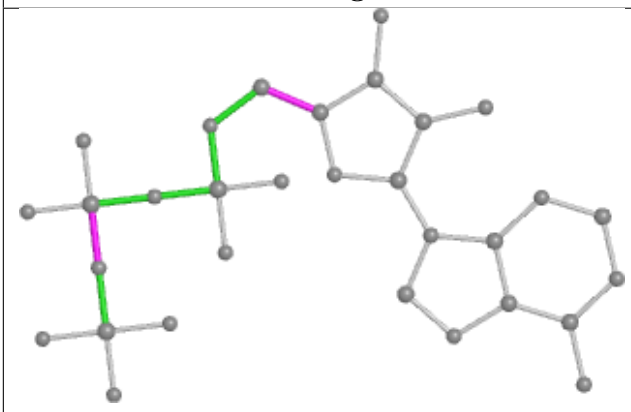
Ligand ANP B 601



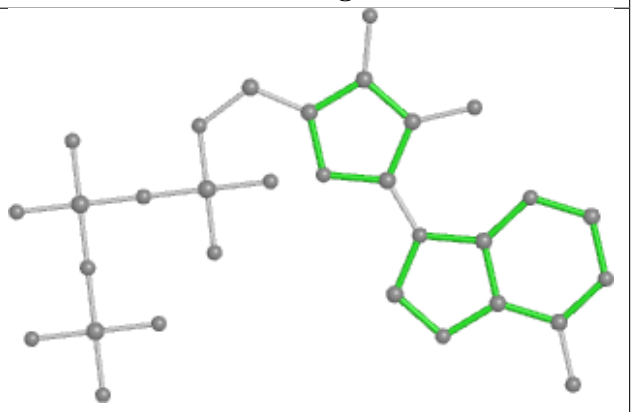
Bond lengths



Bond angles

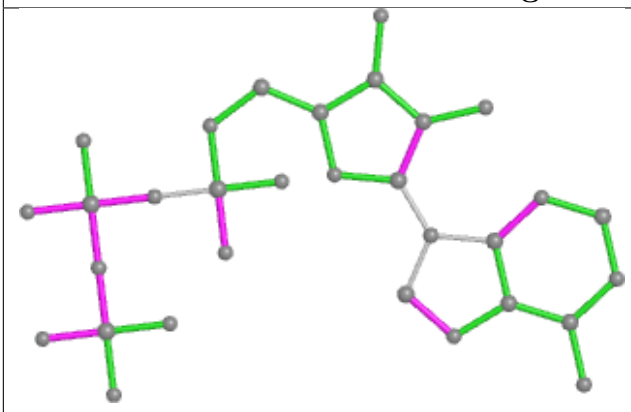


Torsions

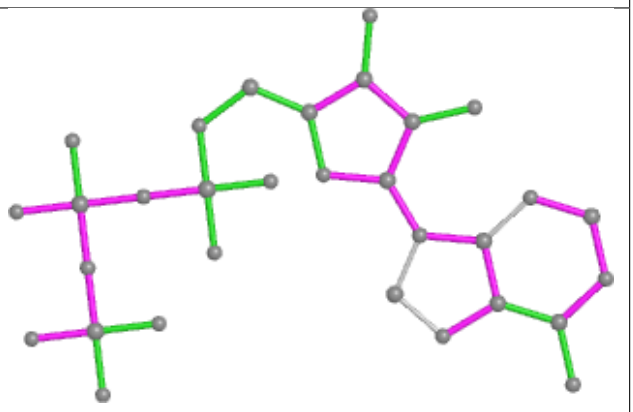


Rings

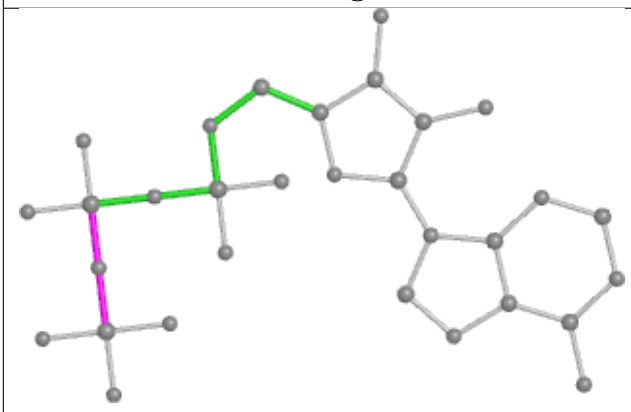
Ligand ANP C 601



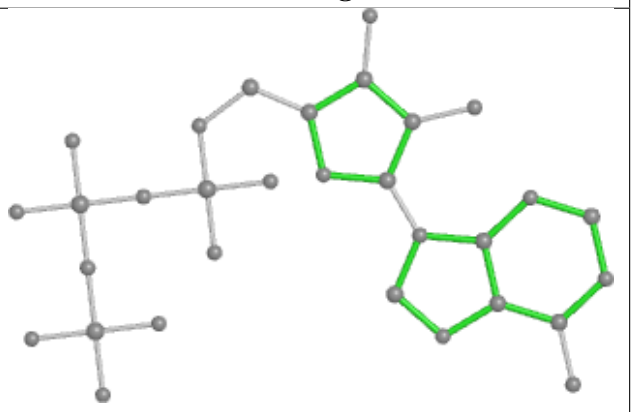
Bond lengths



Bond angles

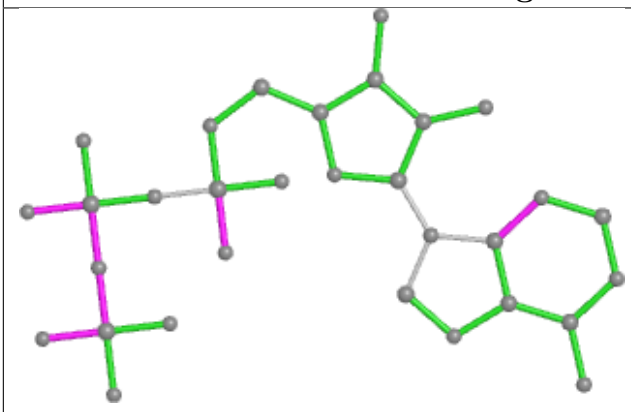


Torsions

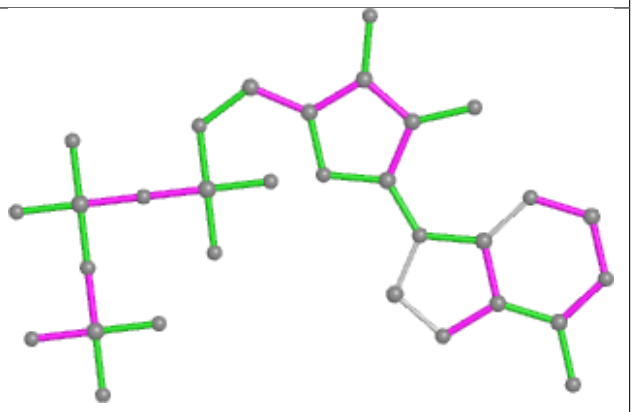


Rings

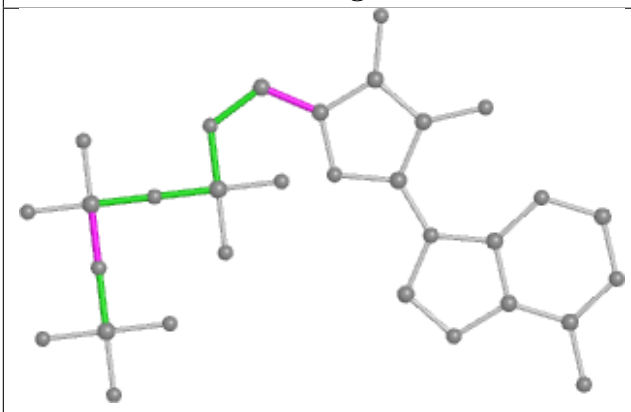
Ligand ANP W 601



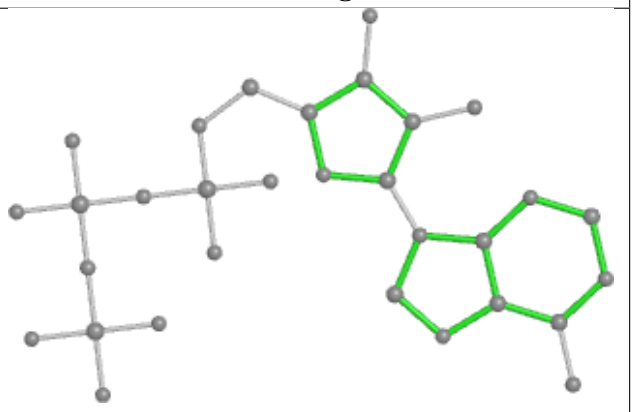
Bond lengths



Bond angles

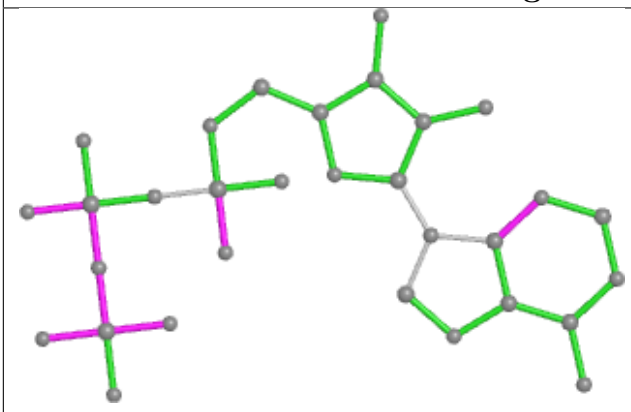


Torsions

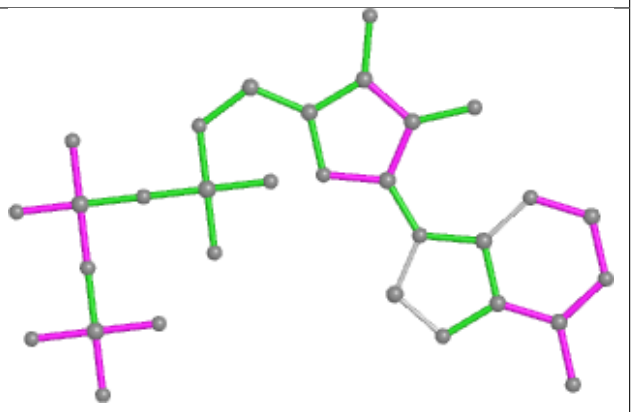


Rings

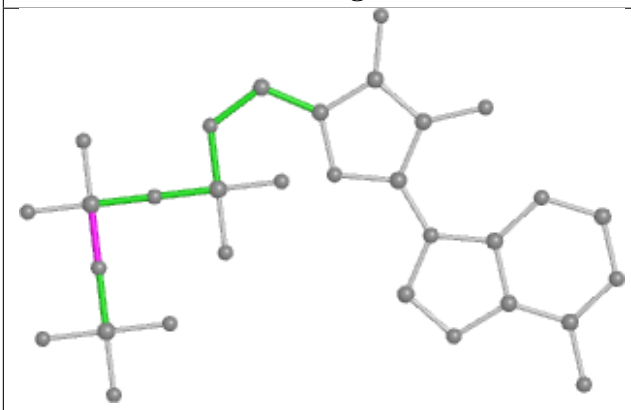
Ligand ANP F 501



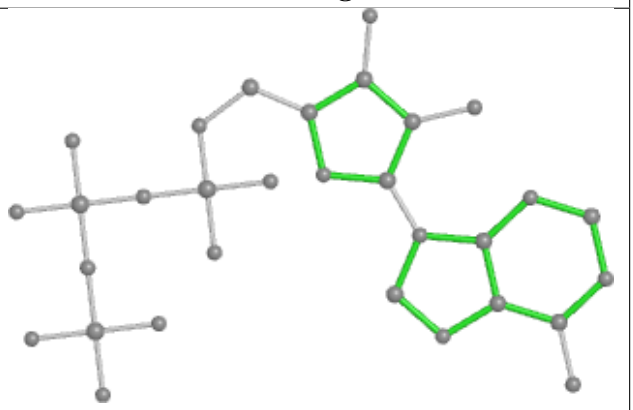
Bond lengths



Bond angles

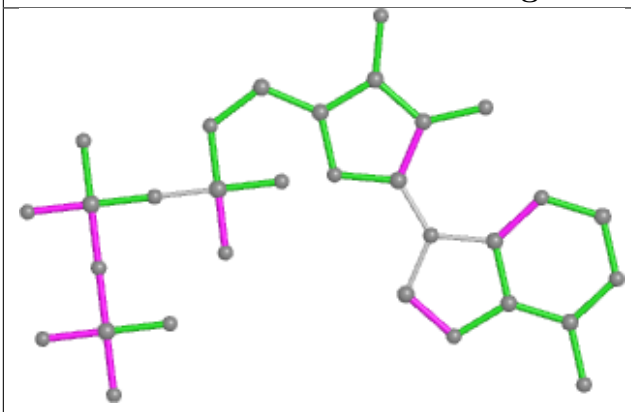


Torsions



Rings

Ligand ANP D 501



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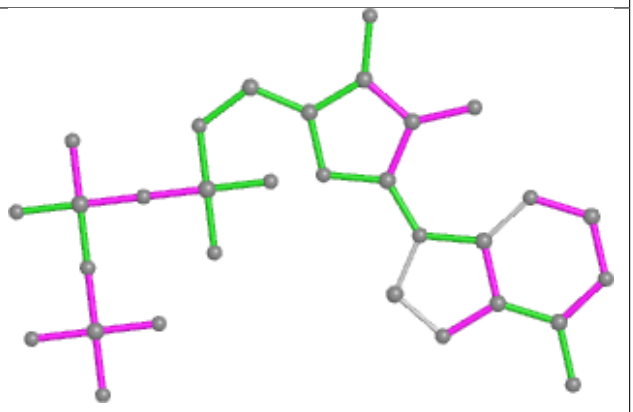
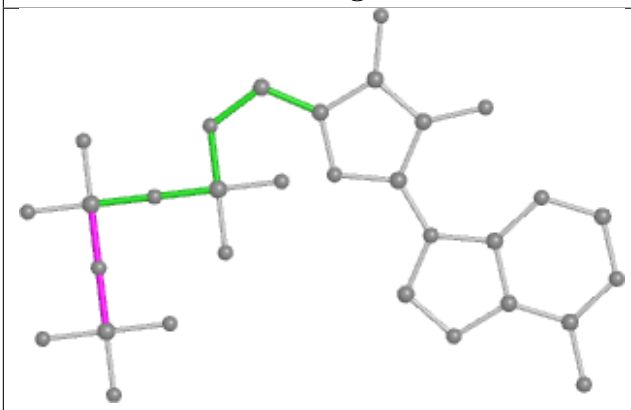
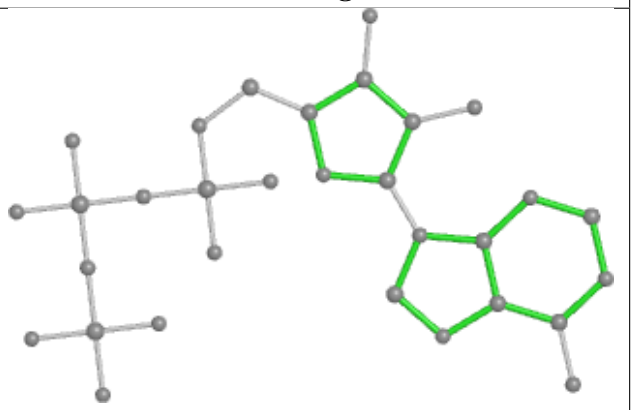


Bond angles

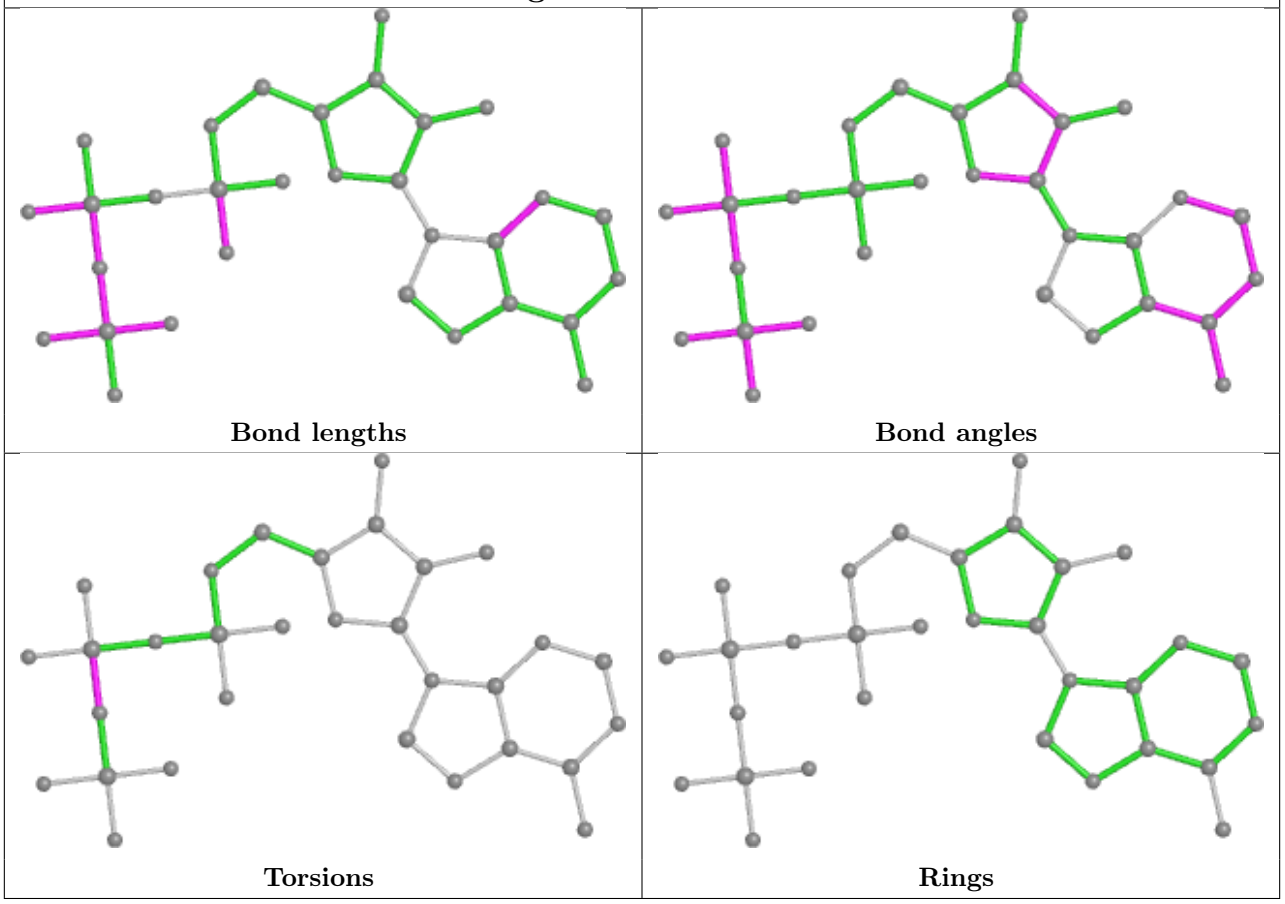


Torsions



Rings

Ligand ANP c 501



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

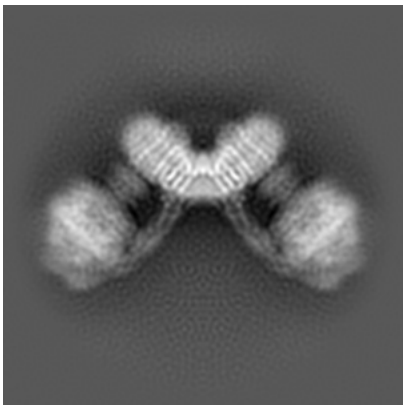
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-7067. These allow visual inspection of the internal detail of the map and identification of artifacts.

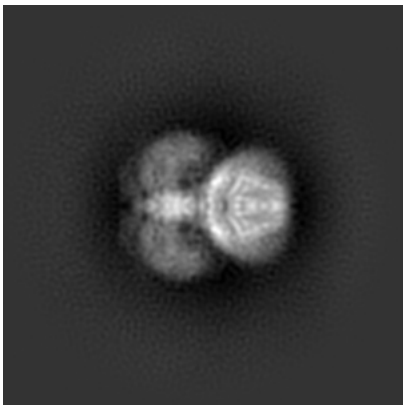
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

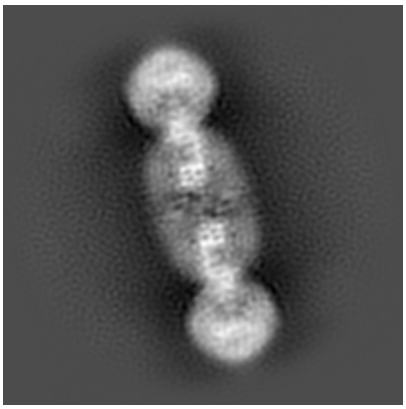
6.1.1 Primary map



X

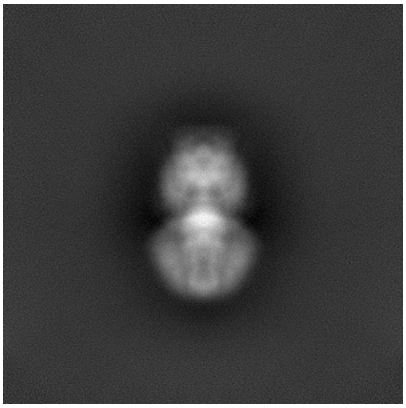


Y

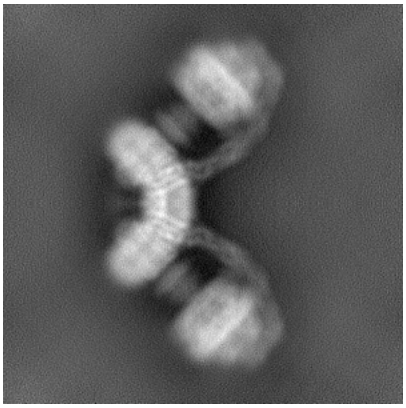


Z

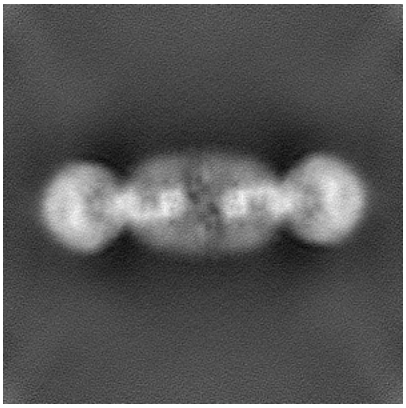
6.1.2 Raw map



X



Y

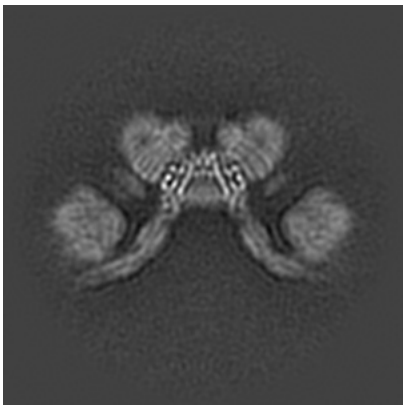


Z

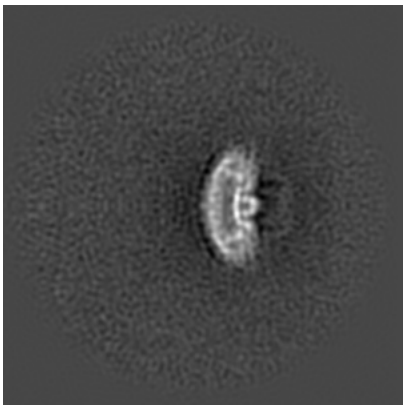
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

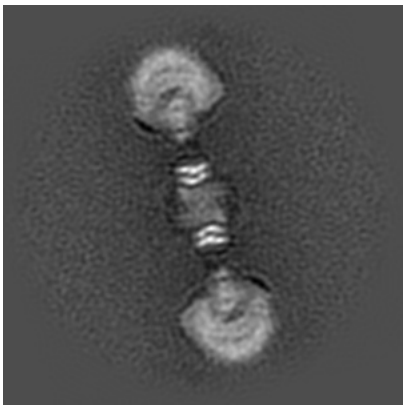
6.2.1 Primary map



X Index: 160

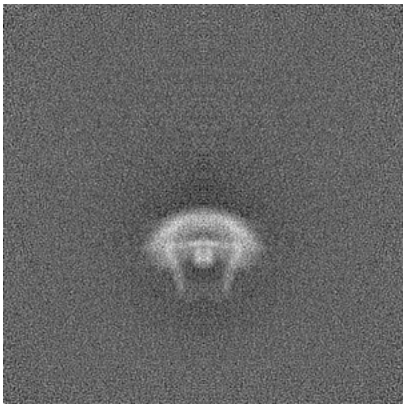


Y Index: 160

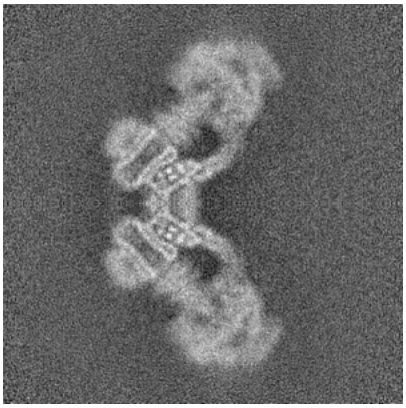


Z Index: 160

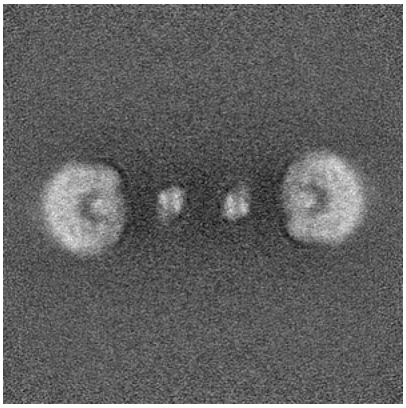
6.2.2 Raw map



X Index: 160



Y Index: 160

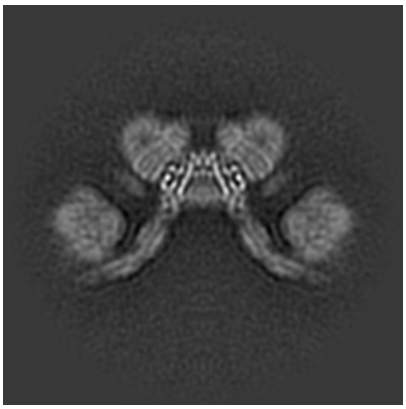


Z Index: 160

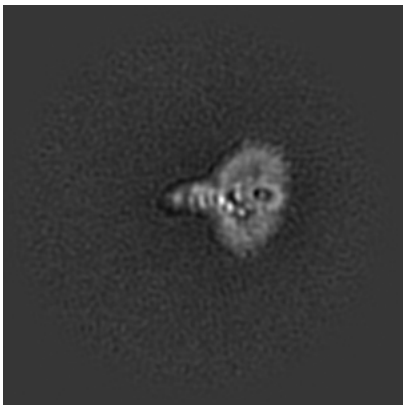
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

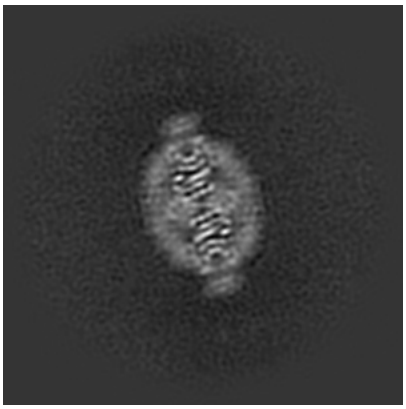
6.3.1 Primary map



X Index: 159

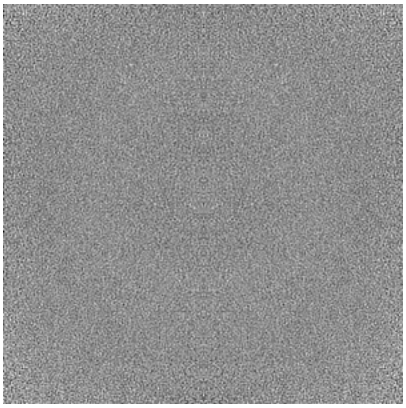


Y Index: 130

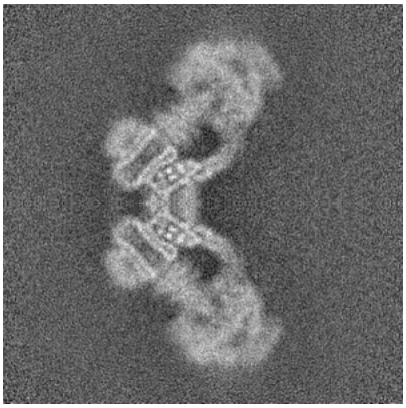


Z Index: 188

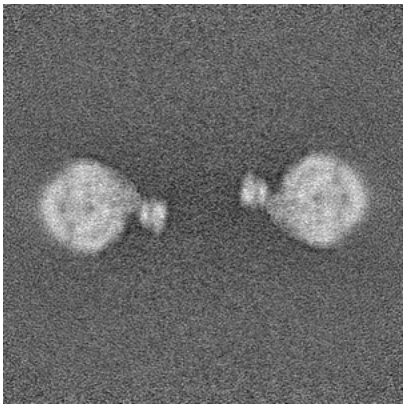
6.3.2 Raw map



X Index: 0



Y Index: 160

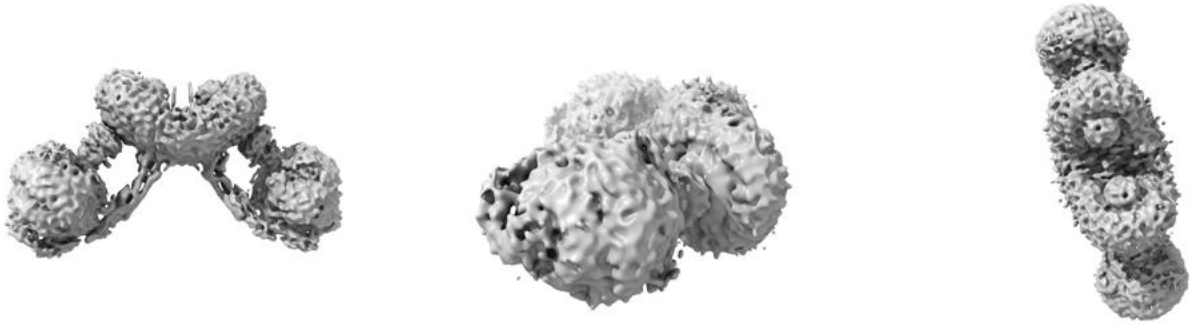


Z Index: 181

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

6.4 Orthogonal surface views (i)

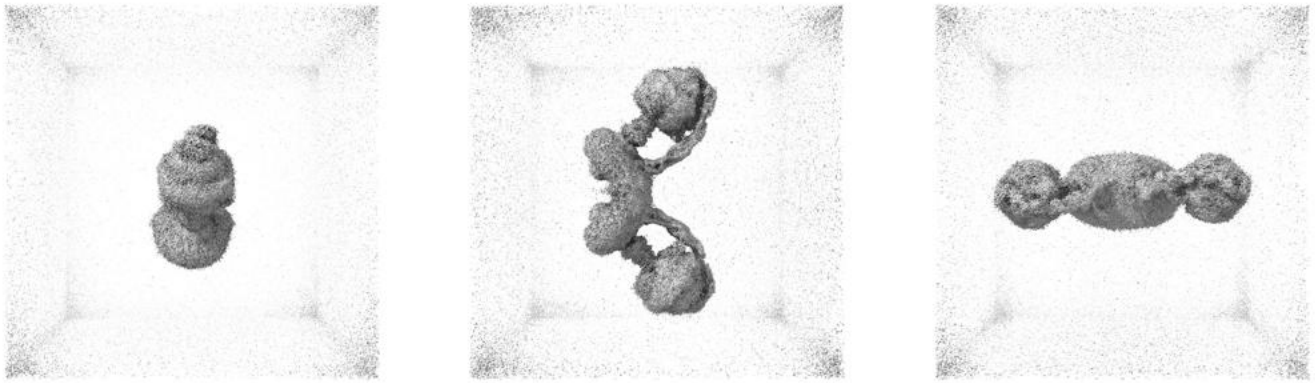
6.4.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.156. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.4.2 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.

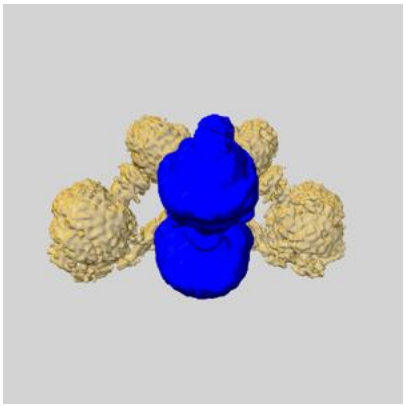
6.5 Mask visualisation (i)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

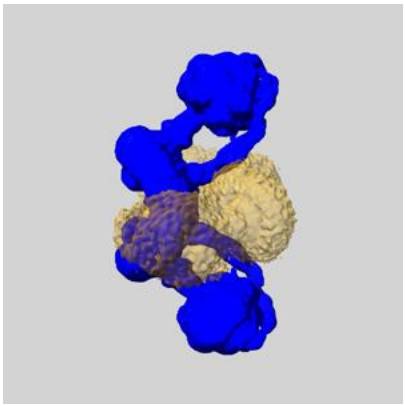
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

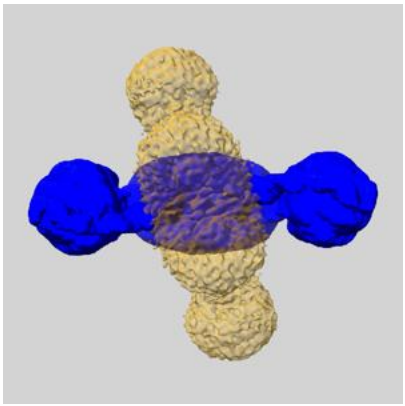
6.5.1 emd_7067_msk_1.map (i)



X



Y

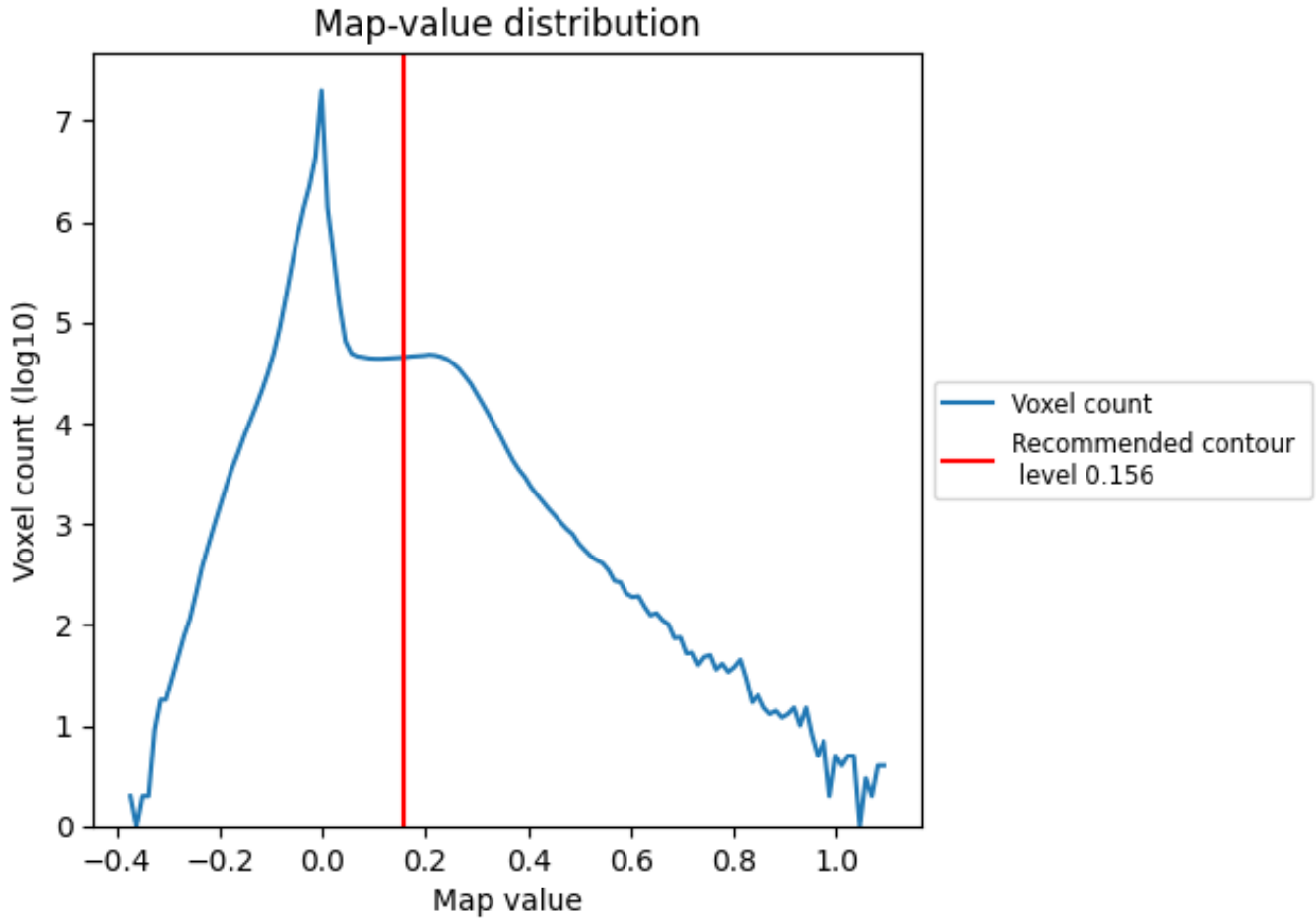


Z

7 Map analysis

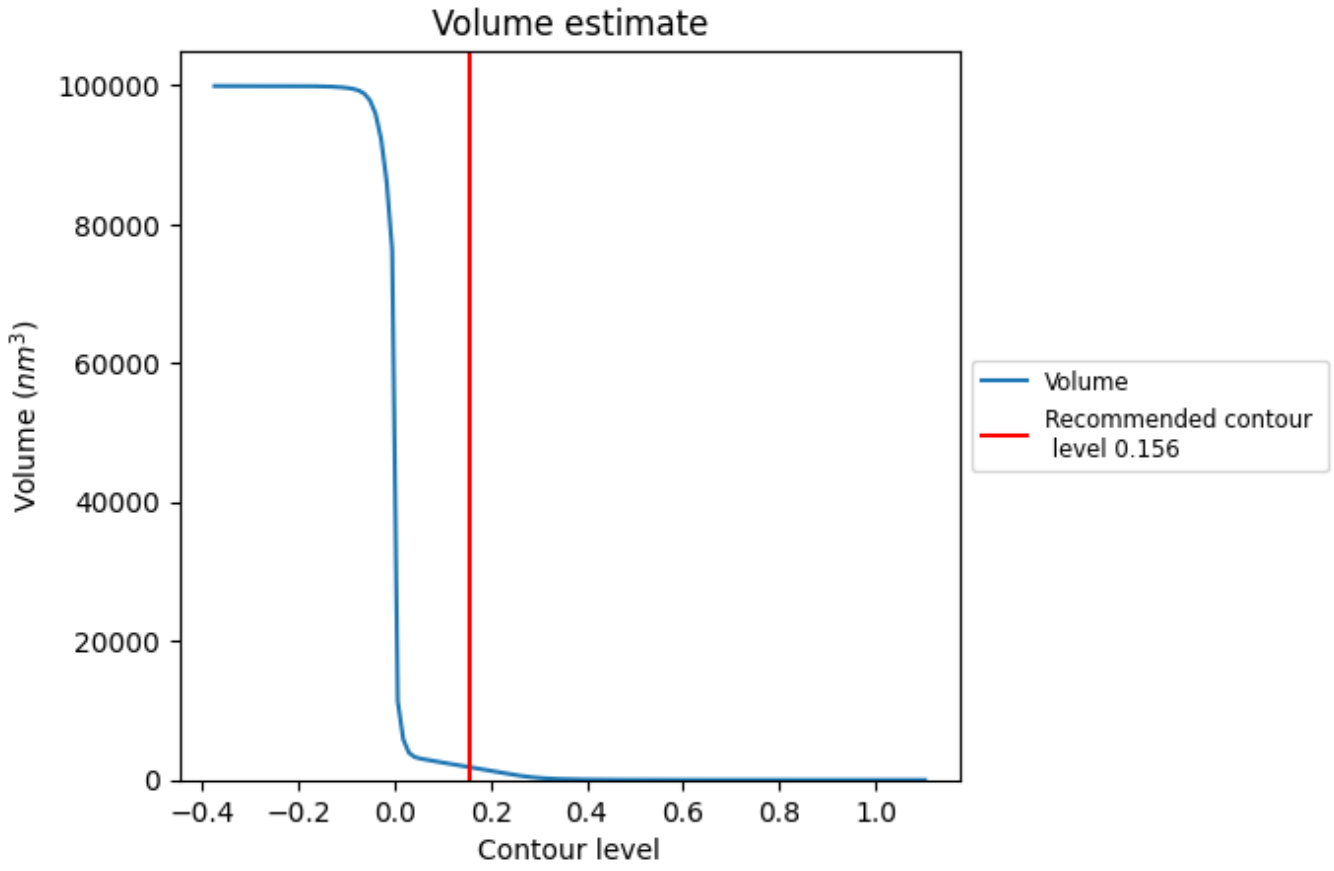
This section contains the results of statistical analysis of the map.

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.

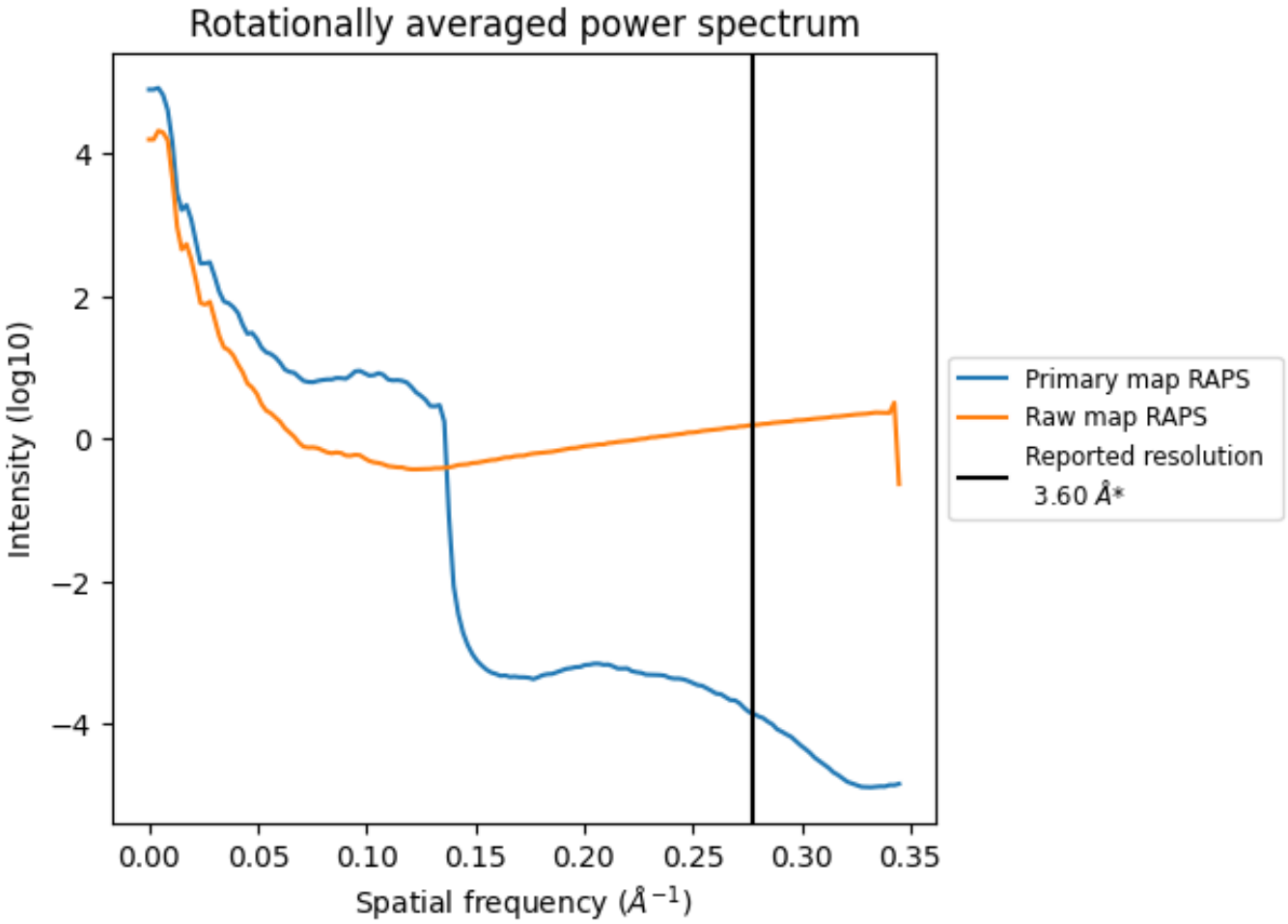
7.2 Volume estimate



The volume at the recommended contour level is 1866 nm^3; this corresponds to an approximate mass of 1686 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)

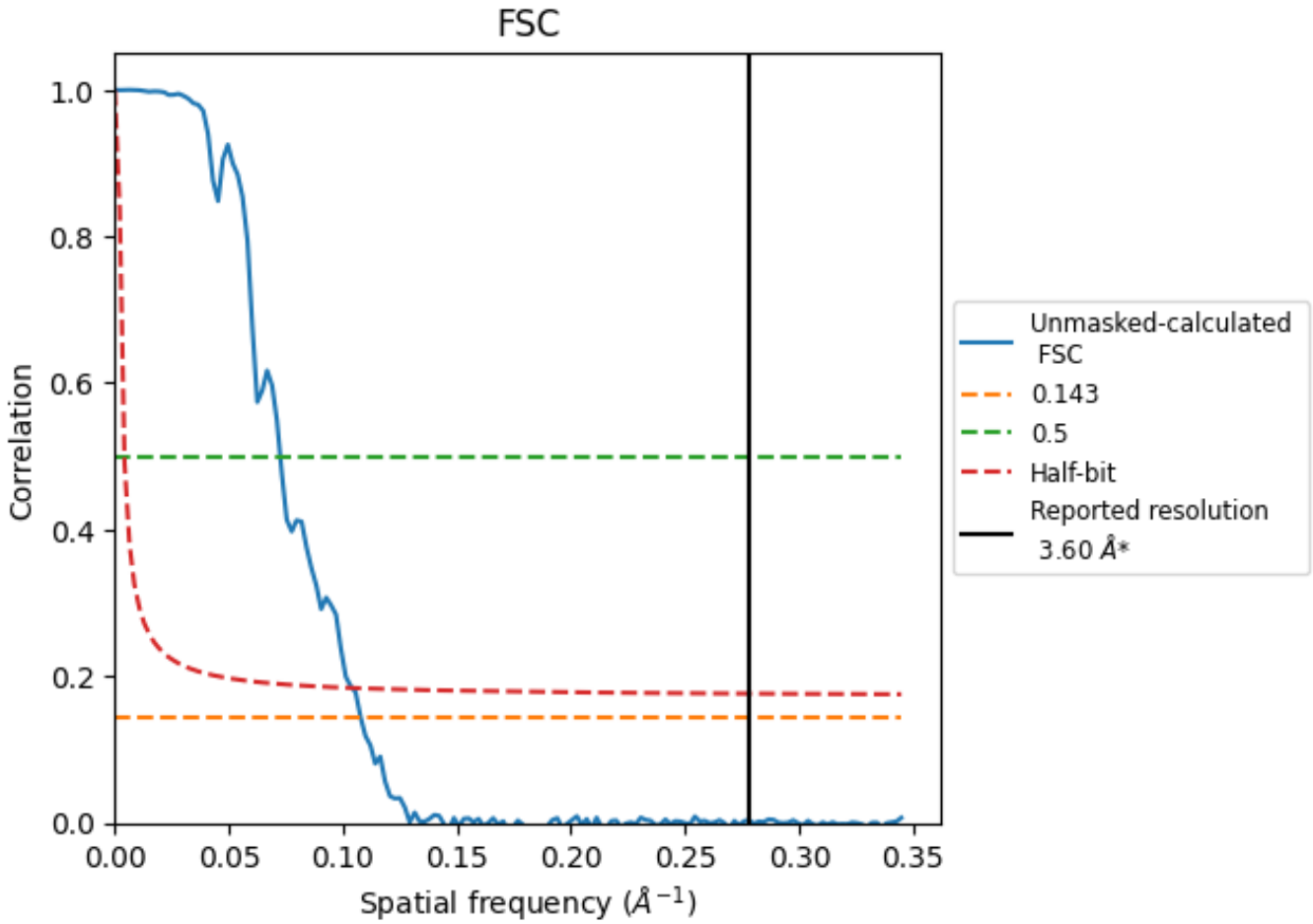


*Reported resolution corresponds to spatial frequency of 0.278 Å^{-1}

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 0.278 Å^{-1}

8.2 Resolution estimates (i)

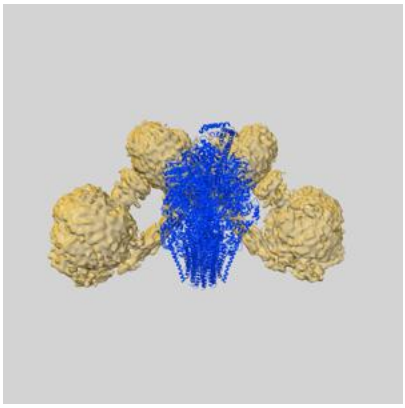
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.60	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	9.28	13.77	9.61

*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 9.28 differs from the reported value 3.6 by more than 10 %

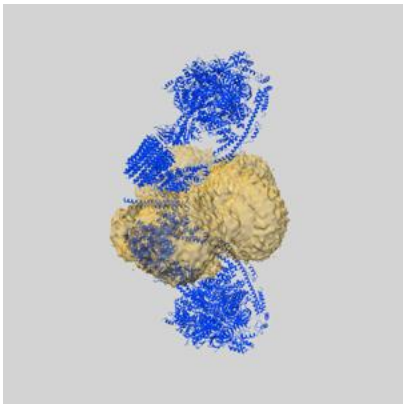
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-7067 and PDB model 6B8H. Per-residue inclusion information can be found in section 3 on page 12.

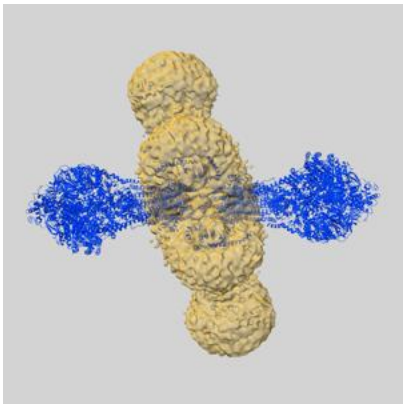
9.1 Map-model overlay



X



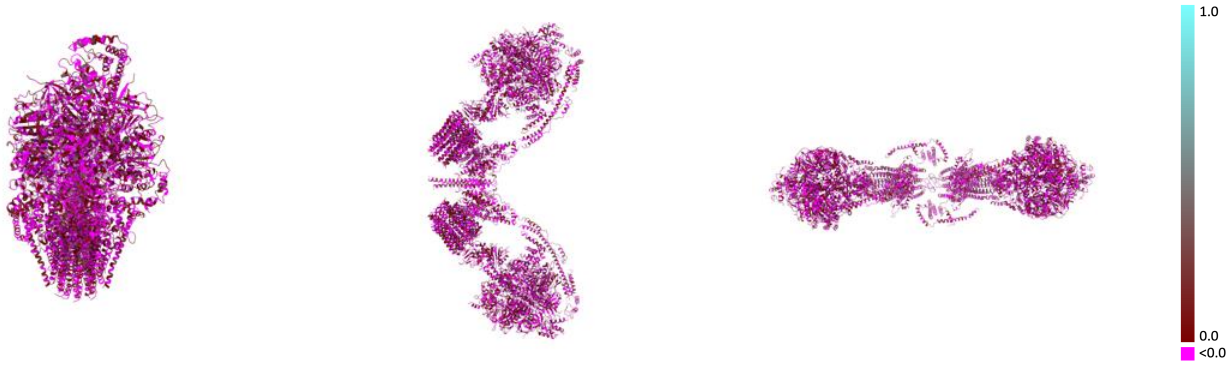
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.156 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.

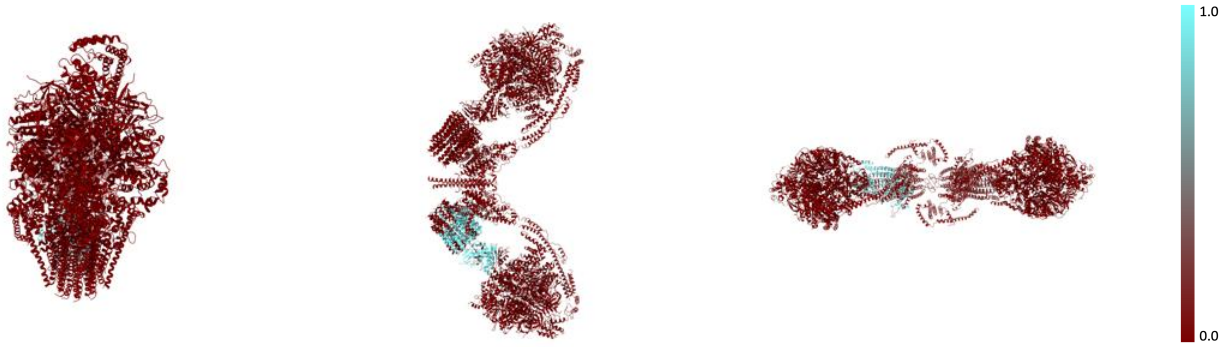
9.2 Q-score mapped to coordinate model (i)



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.

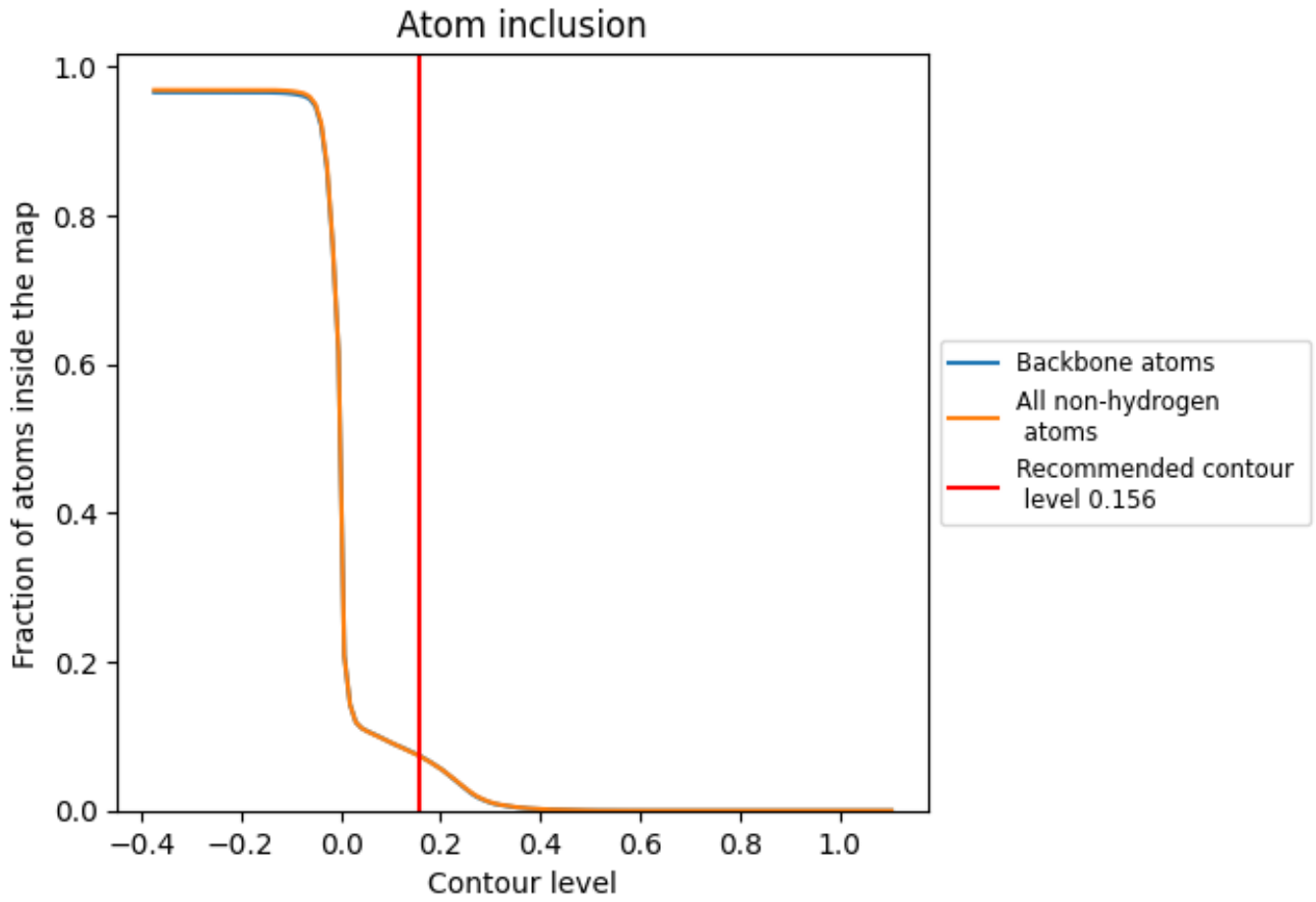
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.156).

9.4 Atom inclusion (i)



At the recommended contour level, 7% of all backbone atoms, 7% 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 (0.156) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.0740	0.0010
0	0.5749	-0.0100
1	0.6348	0.0120
2	0.6704	0.0120
3	0.7662	-0.0290
4	0.6779	-0.0130
5	0.6536	-0.0530
6	0.5627	0.0120
7	0.3083	-0.0080
8	0.4195	0.0180
9	0.4905	-0.0090
A	0.0099	0.0150
B	0.0000	0.0050
C	0.0000	-0.0040
D	0.0000	-0.0040
E	0.0011	0.0140
F	0.0000	0.0020
G	0.4168	0.0020
H	0.7955	0.0290
I	0.5912	0.0070
J	0.0000	-0.0160
K	0.0000	-0.0030
L	0.0000	0.0190
M	0.0000	0.0340
N	0.0000	-0.0280
O	0.0000	0.0050
P	0.0000	0.0020
Q	0.0000	0.0060
R	0.0000	-0.0160
S	0.0000	0.0000
T	0.0000	0.0250
U	0.0000	-0.0190
V	0.0000	0.0110
W	0.0000	-0.0040
X	0.0000	-0.0050

Continued on next page...

Continued from previous page...

Chain	Atom inclusion	Q-score
Y	0.0000	0.0060
Z	0.0000	0.0020
a	0.3593	-0.0080
b	0.0052	0.0120
c	0.0000	0.0050
d	0.0444	0.0250
e	0.0000	0.0130
f	0.0000	0.0010
g	0.0000	-0.0100
h	0.0000	0.0980
i	0.0000	-0.0340
j	0.0000	0.0040
k	0.4860	0.0580
l	0.0000	0.0020
m	0.0000	-0.0070
n	0.0000	-0.0040
o	0.0000	0.0180
p	0.0000	-0.0150
q	0.0000	0.0040
r	0.0000	-0.0180
s	0.0041	0.0420
t	0.0000	-0.0100
u	0.0000	-0.0330
v	0.0000	0.0890
w	0.0000	0.0140
x	0.0000	-0.0200