wwPDB EM Validation Summary Report (i)

Nov 7, 2022 – 01:47 PM JST

PDB ID	:	5WVE
EMDB ID	:	EMD-6690
Title	:	Apaf-1-Caspase-9 holoenzyme
Authors	:	Li, Y.; Zhou, M.; Hu, Q.; Shi, Y.
Deposited on	:	2016-12-24
Resolution	:	4.40 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references (i)) were used in the production of this report:

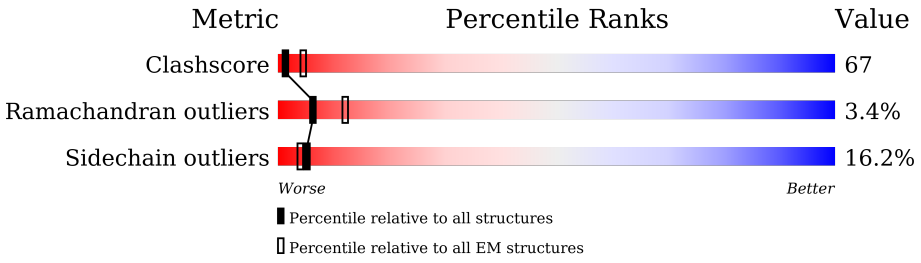
EMDB validation analysis	:	0.0.1.dev43
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (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 4.40 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
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	A	1248	33% 32% 46% 13% • 8%
1	C	1248	37% 32% 46% 13% • 8%
1	E	1248	43% 31% 46% 13% • 8%
1	G	1248	41% 31% 46% 14% • 8%
1	I	1248	39% 32% 46% 13% • 8%
1	K	1248	43% 32% 46% 13% • 8%
1	M	1248	43% 32% 46% 13% • 8%
2	B	105	49% 82% 15% ••

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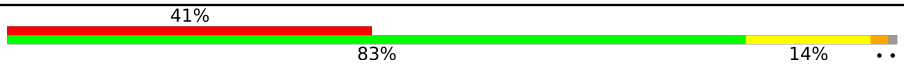
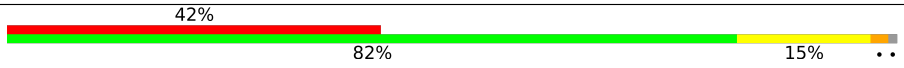
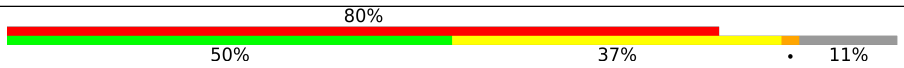
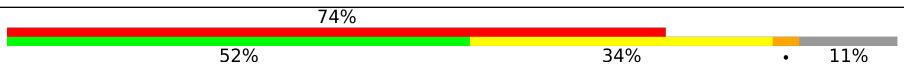
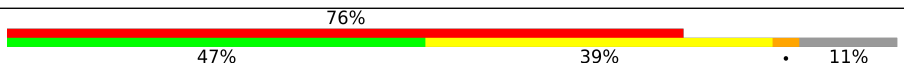
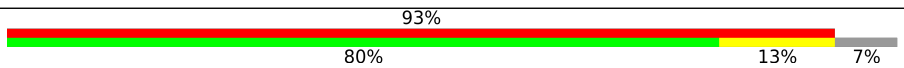
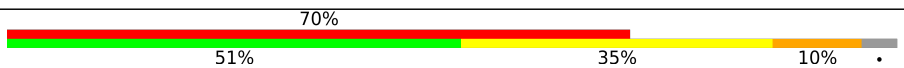
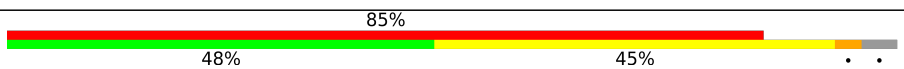
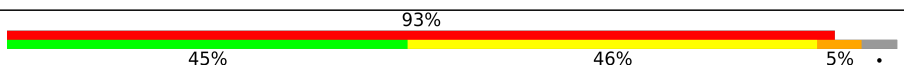
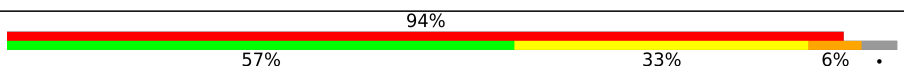
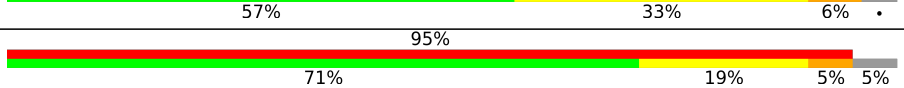
Mol	Chain	Length	Quality of chain
2	D	105	
2	F	105	
2	H	105	
2	J	105	
2	L	105	
2	N	105	
3	O	102	
3	P	102	
3	Q	102	
3	R	102	
3	W	102	
3	X	102	
4	S	100	
4	T	100	
4	U	100	
4	V	100	
4	Y	100	

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 78605 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 Apoptotic protease-activating factor 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1144	Total	C	N	O	S	0	0
			9139	5789	1569	1720	61		
1	C	1144	Total	C	N	O	S	0	0
			9139	5789	1569	1720	61		
1	E	1144	Total	C	N	O	S	0	0
			9139	5789	1569	1720	61		
1	G	1144	Total	C	N	O	S	0	0
			9139	5789	1569	1720	61		
1	I	1144	Total	C	N	O	S	0	0
			9139	5789	1569	1720	61		
1	K	1144	Total	C	N	O	S	0	0
			9139	5789	1569	1720	61		
1	M	1144	Total	C	N	O	S	0	0
			9139	5789	1569	1720	61		

- Molecule 2 is a protein called Cytochrome c.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	104	Total	C	N	O	S	0	0
			823	524	144	151	4		
2	D	104	Total	C	N	O	S	0	0
			823	524	144	151	4		
2	F	104	Total	C	N	O	S	0	0
			823	524	144	151	4		
2	H	104	Total	C	N	O	S	0	0
			823	524	144	151	4		
2	J	104	Total	C	N	O	S	0	0
			823	524	144	151	4		
2	L	104	Total	C	N	O	S	0	0
			823	524	144	151	4		
2	N	104	Total	C	N	O	S	0	0
			823	524	144	151	4		

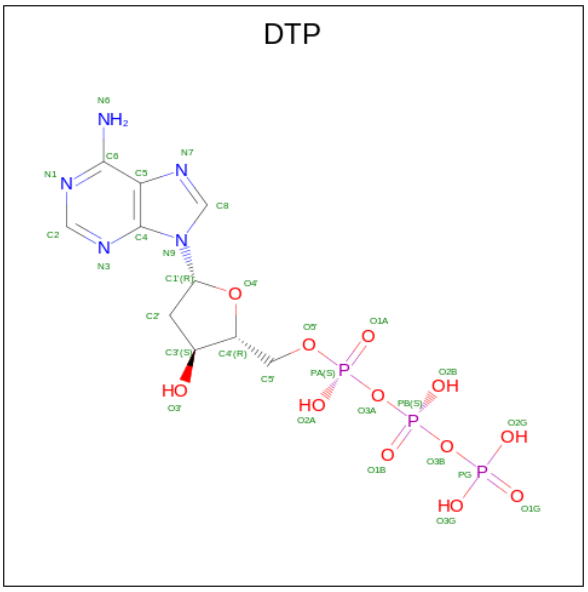
- Molecule 3 is a protein called Apoptotic protease-activating factor 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	O	91	Total	C	N	O	S	0	0
			735	461	127	141	6		
3	P	91	Total	C	N	O	S	0	0
			735	461	127	141	6		
3	Q	91	Total	C	N	O	S	0	0
			735	461	127	141	6		
3	R	91	Total	C	N	O	S	0	0
			735	461	127	141	6		
3	W	95	Total	C	N	O	S	0	0
			762	479	131	146	6		
3	X	92	Total	C	N	O	S	0	0
			742	466	128	142	6		

- Molecule 4 is a protein called Caspase.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	S	96	Total	C	N	O	S	0	0
			783	479	153	146	5		
4	T	96	Total	C	N	O	S	0	0
			783	479	153	146	5		
4	U	96	Total	C	N	O	S	0	0
			783	479	153	146	5		
4	V	96	Total	C	N	O	S	0	0
			783	479	153	146	5		
4	Y	95	Total	C	N	O	S	0	0
			777	475	152	145	5		

- Molecule 5 is 2'-DEOXYADENOSINE 5'-TRIPHOSPHATE (three-letter code: DTP) (formula: $C_{10}H_{16}N_5O_{12}P_3$).



Mol	Chain	Residues	Atoms					AltConf
5	A	1	Total	C	N	O	P	0
			30	10	5	12	3	
5	C	1	Total	C	N	O	P	0
			30	10	5	12	3	
5	E	1	Total	C	N	O	P	0
			30	10	5	12	3	
5	G	1	Total	C	N	O	P	0
			30	10	5	12	3	
5	I	1	Total	C	N	O	P	0
			30	10	5	12	3	
5	K	1	Total	C	N	O	P	0
			30	10	5	12	3	
5	M	1	Total	C	N	O	P	0
			30	10	5	12	3	

- Molecule 6 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
6	A	1	Total	Mg	0
			1	1	
6	C	1	Total	Mg	0
			1	1	
6	E	1	Total	Mg	0
			1	1	
6	G	1	Total	Mg	0
			1	1	
6	I	1	Total	Mg	0
			1	1	

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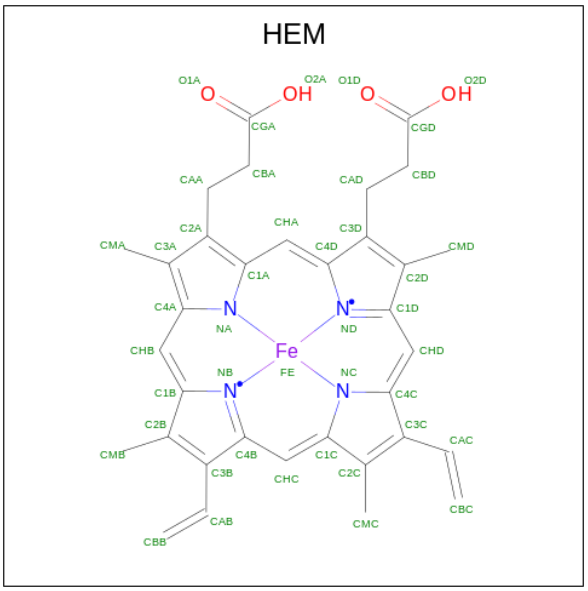
Mol	Chain	Residues	Atoms	AltConf
6	K	1	Total Mg 1 1	0
6	M	1	Total Mg 1 1	0

- Molecule 7 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



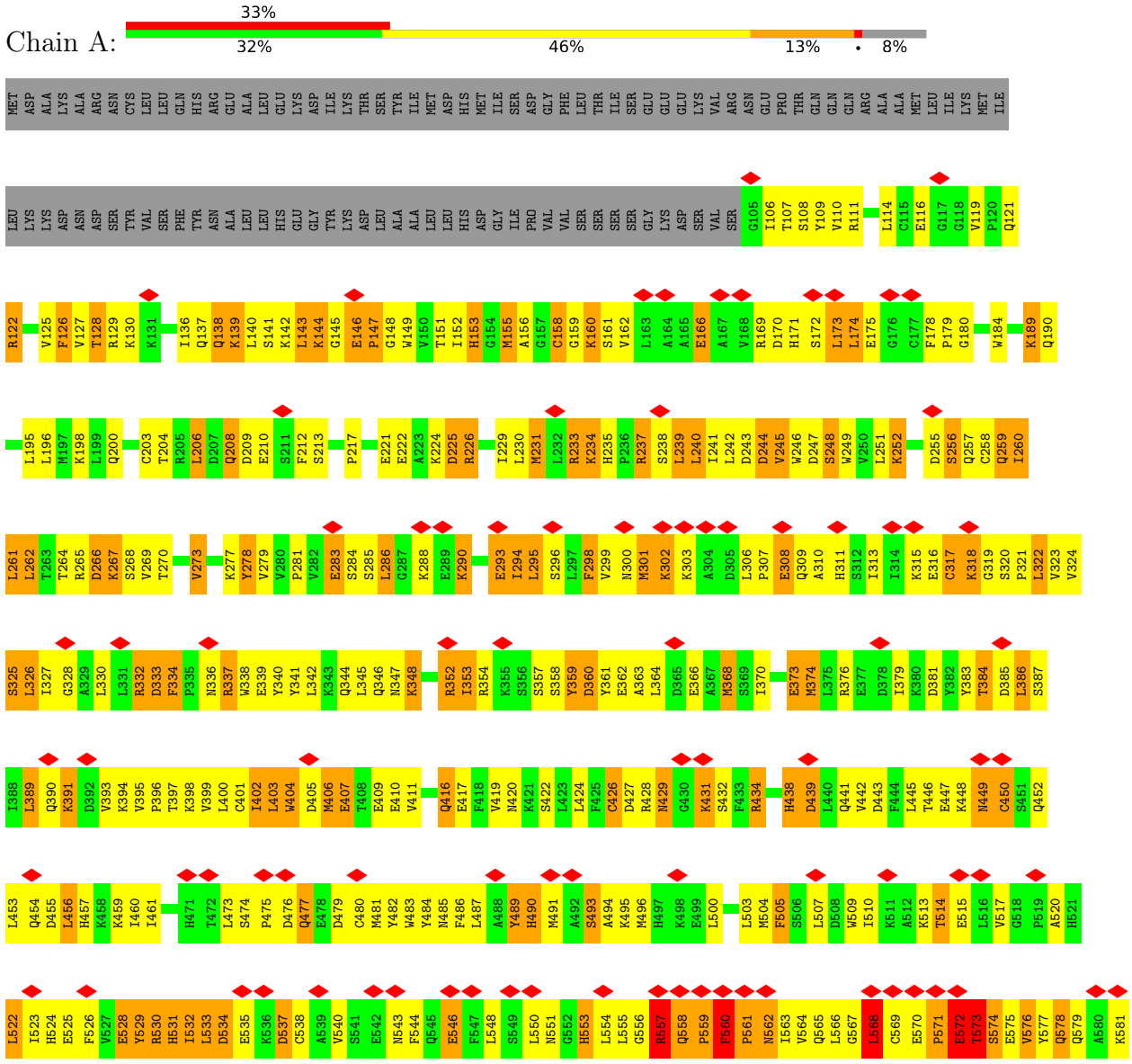
Mol	Chain	Residues	Atoms	AltConf
7	B	1	Total C Fe N O 43 34 1 4 4	0
7	D	1	Total C Fe N O 43 34 1 4 4	0
7	F	1	Total C Fe N O 43 34 1 4 4	0
7	H	1	Total C Fe N O 43 34 1 4 4	0
7	J	1	Total C Fe N O 43 34 1 4 4	0
7	L	1	Total C Fe N O 43 34 1 4 4	0
7	N	1	Total C Fe N O 43 34 1 4 4	0

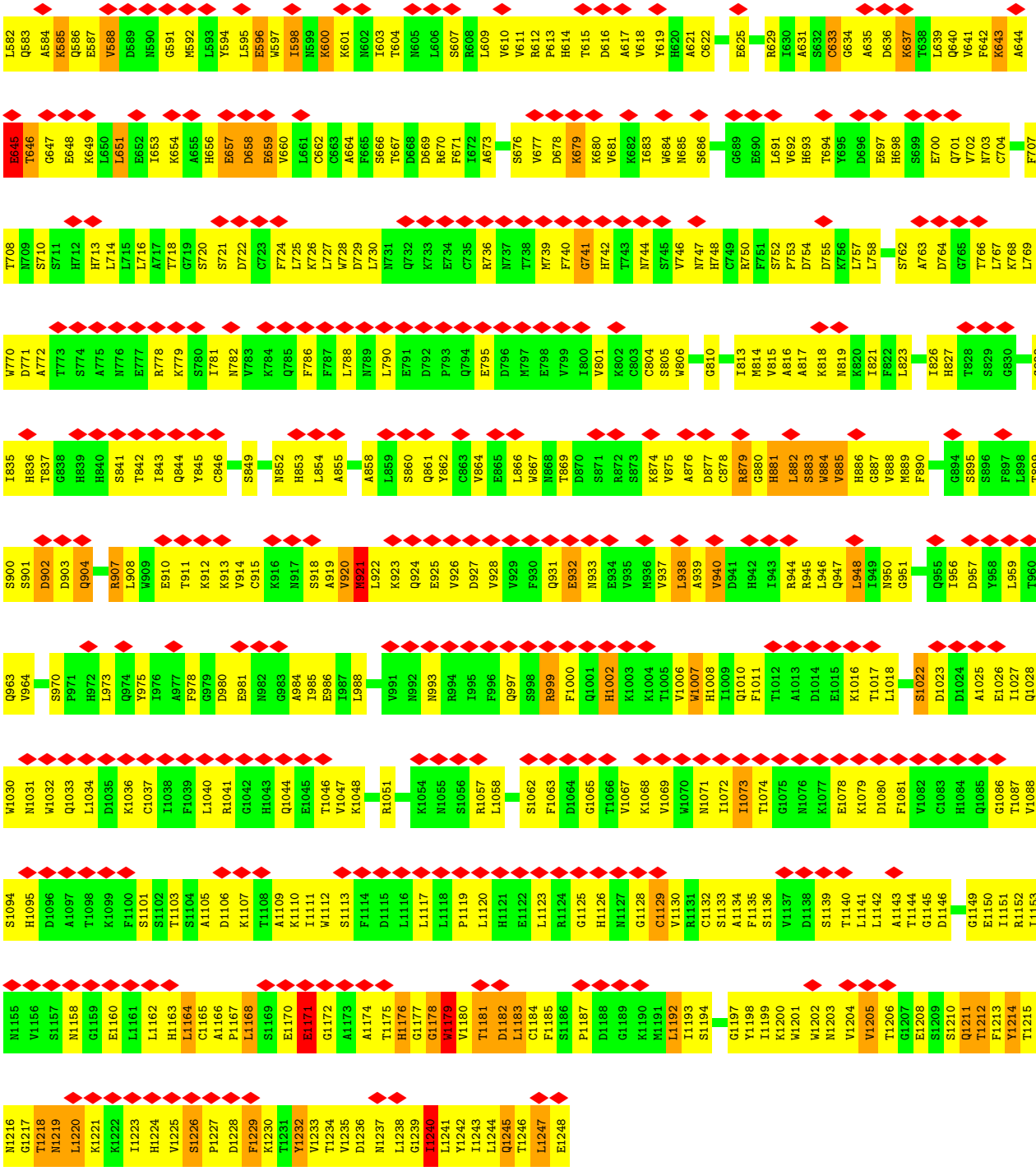
3 Residue-property plots (i)

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.

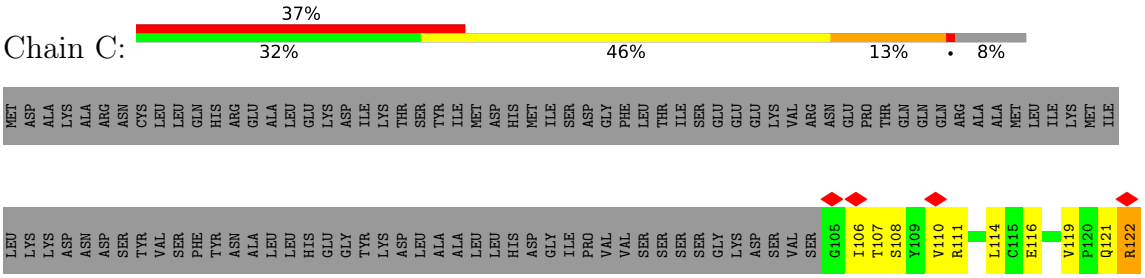
- Molecule 1: Apoptotic protease-activating factor 1

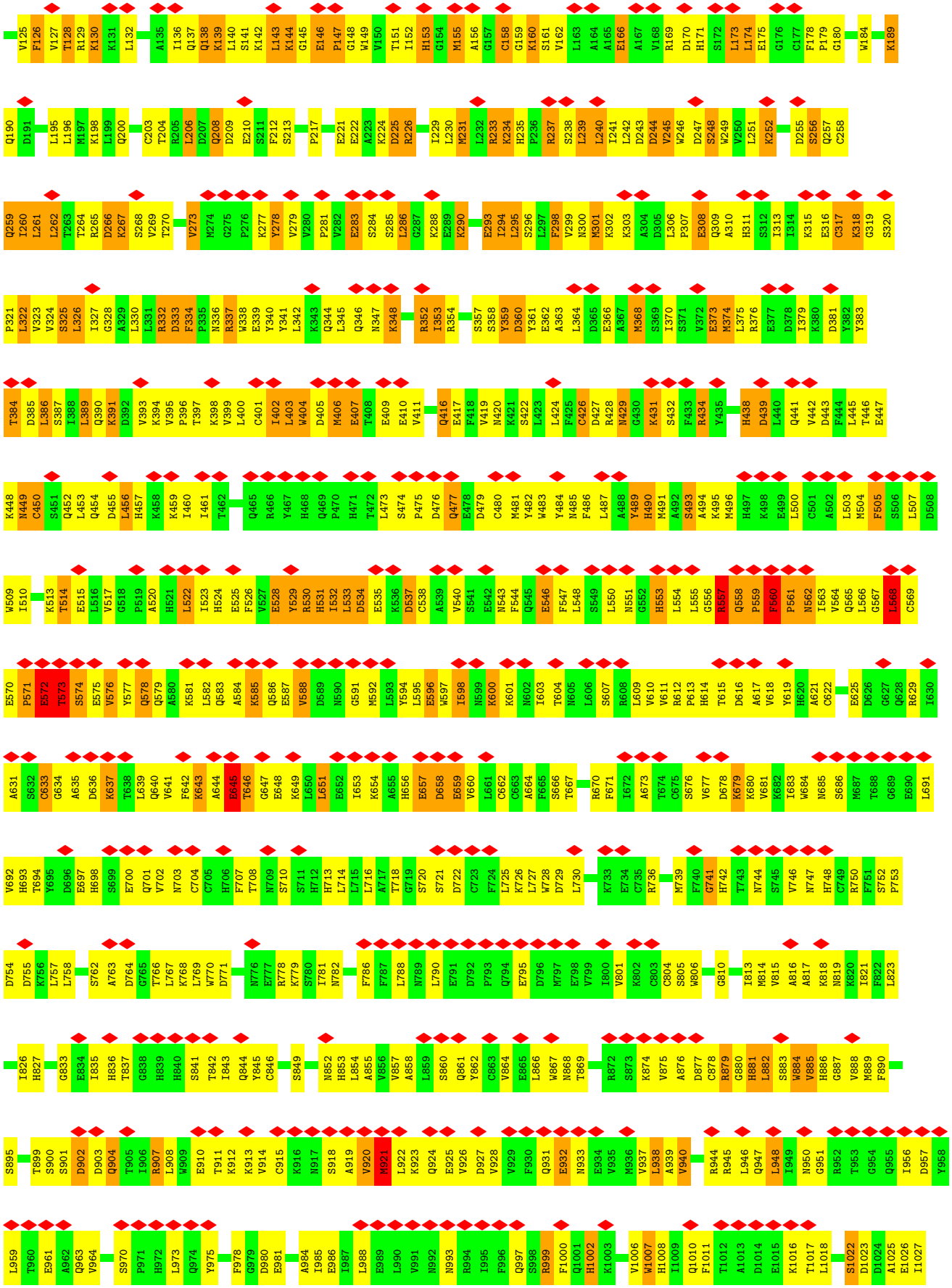
Chain A:

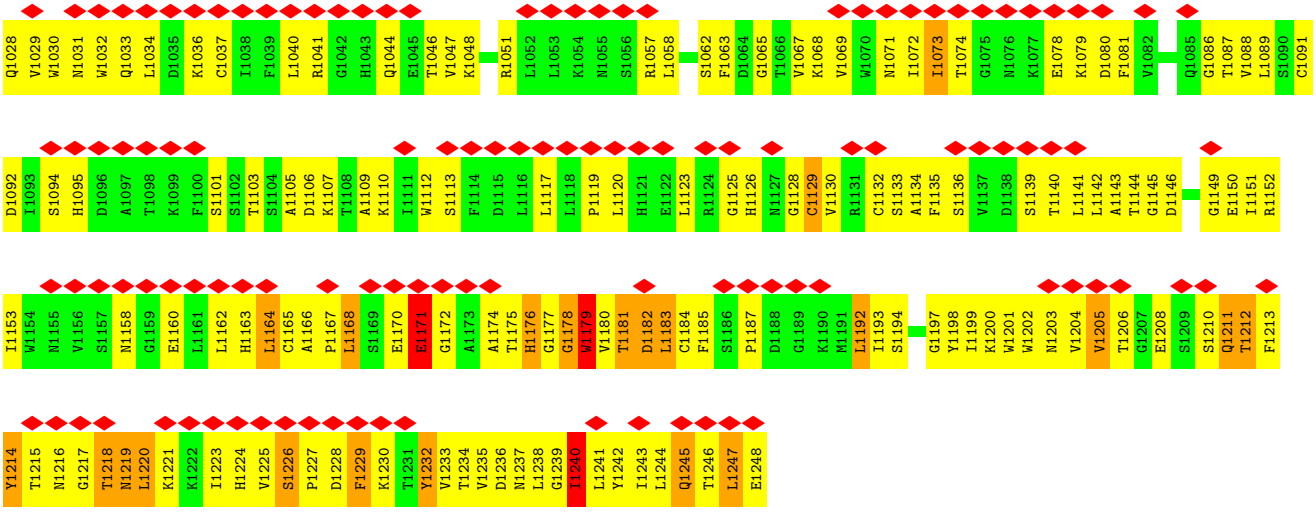




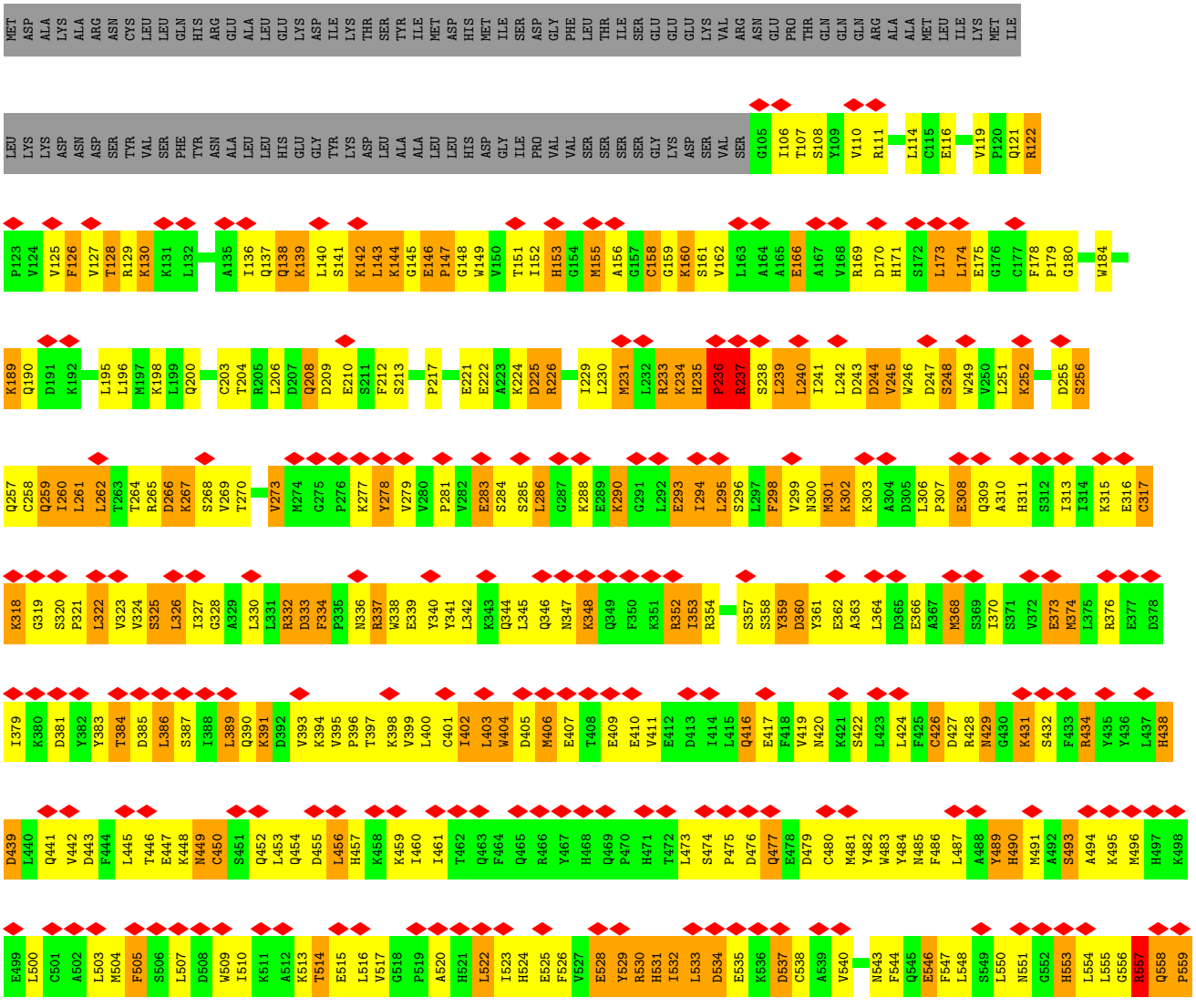
• Molecule 1: Apoptotic protease-activating factor 1

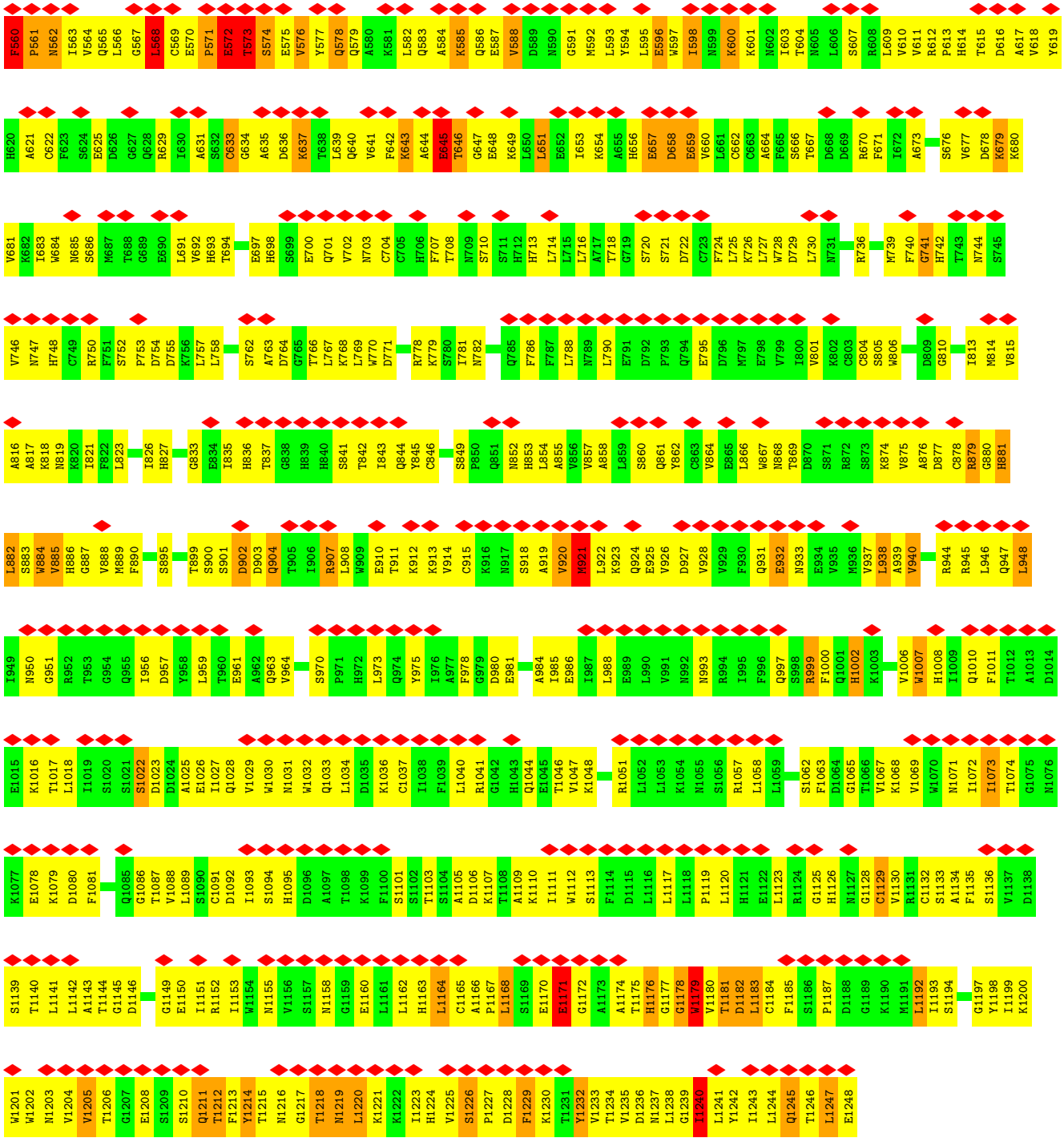



V125 F126 V127 T128 R129 K130 K131 L132 A135 I136 Q137 Q138 K139 L140 S141 K142 L143 K144 G145 E146 P147 G148 W149 V150 T151 I152 H153 G154 M155 A156 G157 C158 G159 K160 S161 V162 L163 A164 A165 E166 A167 V168 R169 D170 H171 S172 L173 L174 E175 G176 C177 F178 P179 G180 W184 K189
Q190 D191 L195 L196 M197 K198 L199 Q200 C203 T204 R205 L206 D207 Q208 D209 E210 S211 F212 S213 P217 E221 E222 A223 K224 D225 R226 I229 L230 W231 L232 R233 K234 H235 P236 R237 S238 L239 L240 I241 L242 D243 D244 V245 W246 D247 S248 W249 V250 L251 K252 D255 S256 Q257 C258
Q259 I260 L261 L262 T263 T264 R265 D266 K267 S268 V269 T270 V273 M274 G275 P276 K277 Y278 V279 V280 P281 V282 E283 S284 S285 L286 G287 K288 E289 K290 E293 I294 L295 S296 L297 F298 V299 N300 M301 K302 K303 A304 D305 L306 P307 E308 Q309 A310 H311 S312 I313 I314 K315 E316 C317 K318 G319 S320
P321 L322 V323 V324 S325 L326 I327 G328 A329 L330 L331 R332 D333 F334 P335 N336 R337 W338 E339 Y340 Y341 L342 K343 Q344 L345 Q346 N347 K348 R352 I353 R354 S357 S358 Y359 D360 Y361 E362 A363 L364 D365 E366 A367 M368 S369 I370 S371 V372 E373 M374 L375 R376 E377 D378 I379 K380 D381 Y382 Y383
T384 D385 L386 S387 I388 L389 Q390 K391 D392 V393 K394 V395 P396 T397 K398 V399 L400 C401 I402 L403 W404 D405 M406 E407 T408 E409 E410 V411 Q416 E417 F418 V419 N420 K421 S422 L423 L424 F425 C426 D427 R428 N429 G430 K431 S432 F433 R434 Y435 H438 D439 L440 Q441 V442 D443 F444 L445 T446 E447
K448 N449 C450 S451 Q452 L453 Q454 D455 L456 H457 K458 K459 I460 I461 T462 Q465 R466 Y467 H468 Q469 P470 H471 T472 L473 S474 P475 D476 Q477 E478 D479 C480 M481 Y482 W483 Y484 N485 F486 L487 A488 Y489 H490 M491 A492 S493 A494 K495 M496 H497 K498 E499 L500 C501 A502 L503 M504 F505 S506 L507 D508
W509 I510 K513 T514 E515 L516 V517 G518 P519 A520 H521 L522 I523 H524 E525 F526 V527 E528 Y529 R530 H531 I532 L533 D534 E535 K536 D537 C538 A539 V540 S541 E542 N543 F544 Q545 E546 F547 L548 S549 L550 N551 G552 H553 L554 L555 G556 R557 Q558 P559 F560 P561 N562 I563 V564 Q565 L566 G567 L568 C569
E570 P571 E572 T573 S574 E575 V576 Y577 Q578 Q579 A580 K581 L582 Q583 A584 K585 Q586 E587 V588 D589 N590 G591 M592 L593 Y594 L595 E596 W597 I598 N599 K600 K601 N602 I603 T604 N605 L606 S607 R608 L609 V610 V611 R612 P613 H614 T615 D616 A617 V618 Y619 H620 A621 C622 E625 D626 G627 G628 R629 I630
A631 S632 C633 G634 A635 D636 K637 T638 L639 Q640 V641 F642 K643 A644 E645 T646 G647 E648 K649 L650 L651 E652 I653 K654 A655 H656 E657 D658 E659 V660 L661 C662 C663 A664 F665 S666 T667 R670 F671 I672 A673 T674 C675 S676 V677 D678 K679 K680 V681 K682 I683 W684 N685 S686 M687 T688 G689 E690 L691
V692 H693 T694 Y695 D696 E697 H698 S699 E700 Q701 V702 N703 C704 C705 H706 F707 T708 N709 S710 S711 H712 H713 L714 L715 L716 A717 T718 G719 S720 S721 D722 C723 F724 L725 K726 L727 W728 D729 L730 K733 E734 C735 R736 M739 F740 G741 H742 T743 N744 S745 V746 N747 H748 C749 R750 F751 S752 P753
D754 D755 K756 L757 L758 S762 A763 D764 G765 T766 L767 K768 L769 W770 D771 N776 E777 R778 K779 S780 I781 N782 F786 F787 L788 N789 L790 E791 D792 P793 Q794 E795 D796 M797 E798 V799 I800 V801 K802 C803 C804 S805 W806 G810 I813 M814 V815 A816 A817 K818 N819 K820 I821 F822 L823
I826 H827 G833 E834 I835 H836 T837 G838 H839 H840 S841 T842 I843 Q844 Y845 C846 S849 N852 H853 L854 A855 V856 V857 A858 L859 S860 Q861 Y862 C863 V864 E865 L866 W867 N868 T869 R872 S873 K874 V875 A876 D877 C878 R879 G880 H881 L882 S883 W884 V885 H886 G887 V888 M889 F890
S895 T899 S900 S901 D902 D903 Q904 T905 I906 R907 L908 W909 E910 T911 K912 K913 V914 C915 K916 N917 S918 A919 V920 M921 L922 K923 Q924 E925 V926 D927 V928 V929 F930 Q931 E932 N933 E934 V935 M936 V937 L938 A939 V940 R944 R945 L946 Q947 L948 I949 N950 G951 R952 T953 G954 Q955 I956 D957 Y958
L959 T960 E961 A962 Q963 V964 S970 P971 H972 L973 Q974 Y975 F978 G979 D980 E981 A984 I985 E986 I987 L988 E989 L990 V991 N992 N993 R994 I995 F996 Q997 S998 R999 F1000 Q1001 H1002 K1003 V1006 W1007 H1008 I1009 Q1010 F1011 T1012 A1013 D1014 E1015 K1016 T1017 L1018 S1022 D1023 D1024 A1025 E1026 I1027



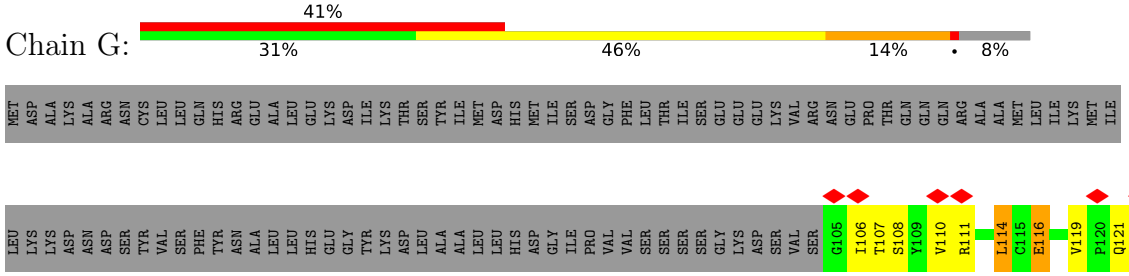
• Molecule 1: Apoptotic protease-activating factor 1

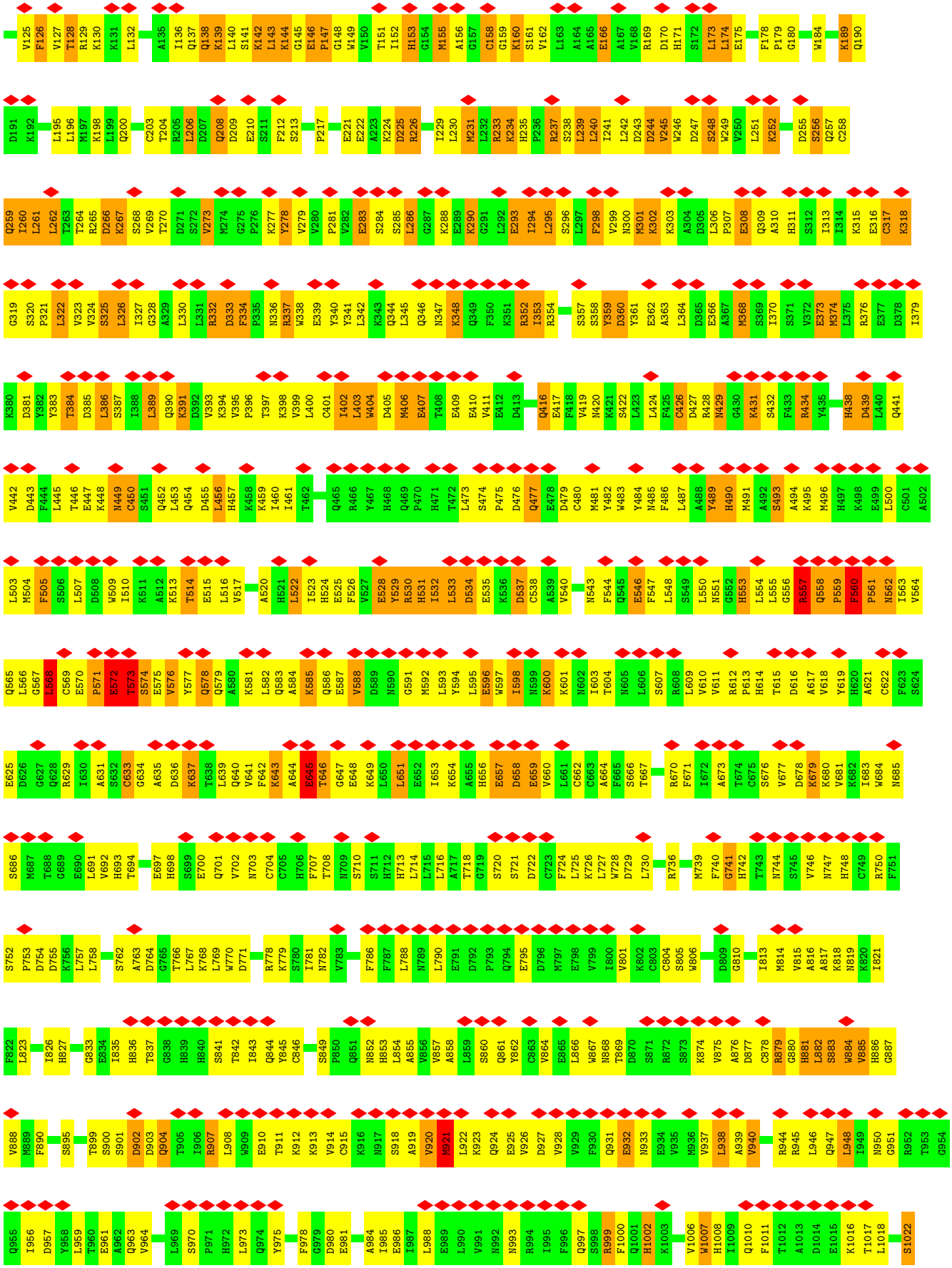




• Molecule 1: Apoptotic protease-activating factor 1

Chain G:




V125 F126 V127 T128 R129 K130 K131 L132 A135 I136 Q137 Q138 K139 L140 S141 K142 L143 K144 G145 E146 P147 G148 W149 V150 T151 I152 H153 G154 M155 A156 G157 C158 G159 K160 S161 V162 L163 A164 A165 E166 A167 V168 R169 D170 H171 S172 L173 L174 E175 F178 P179 G180 W184 K189 Q190
D191 K192 L195 L196 M197 K198 L199 Q200 C203 T204 R205 L206 D207 Q208 D209 E210 S211 F212 S213 P217 E221 E222 A223 K224 D225 R226 I229 L230 M231 L232 R233 K234 H235 F236 R237 S238 L239 L240 I241 L242 D243 D244 V245 W246 D247 S248 W249 V250 L251 K252 D255 S256 Q257 C258
Q259 I260 L261 L262 T263 T264 R265 D266 K267 S268 V269 T270 D271 S272 V273 M274 G275 P276 K277 Y278 V279 W280 P281 V282 E283 S284 S285 L286 G287 K288 E289 K290 G291 L292 E293 I294 L295 S296 L297 F298 V299 N300 M301 K302 K303 A304 D305 L306 P307 E308 Q309 A310 H311 S312 I313 I314 K315 E316 C317 K318
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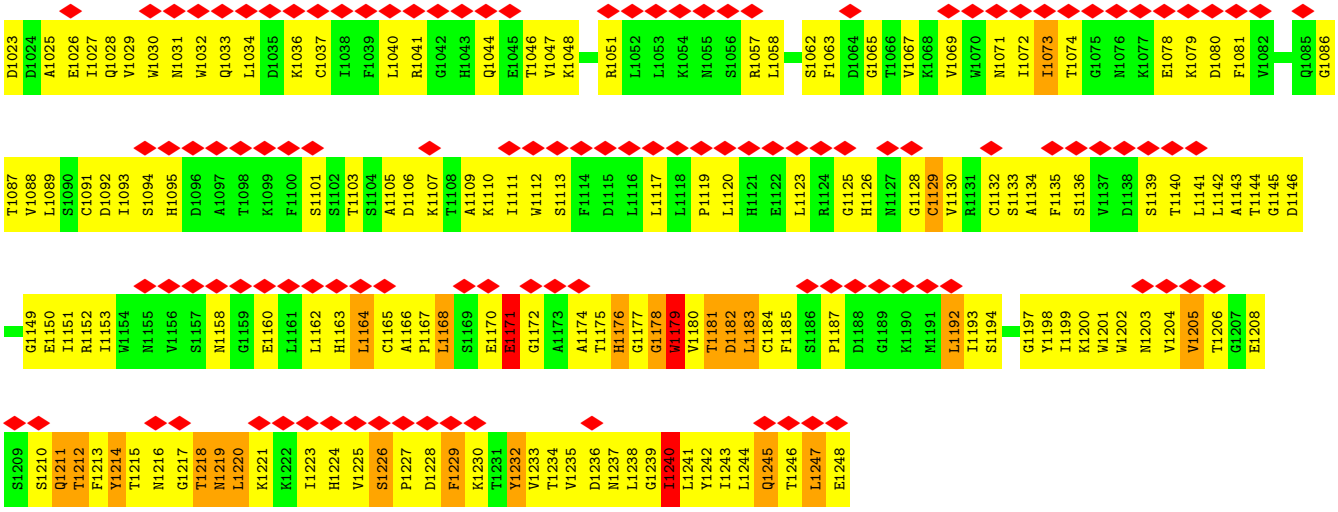
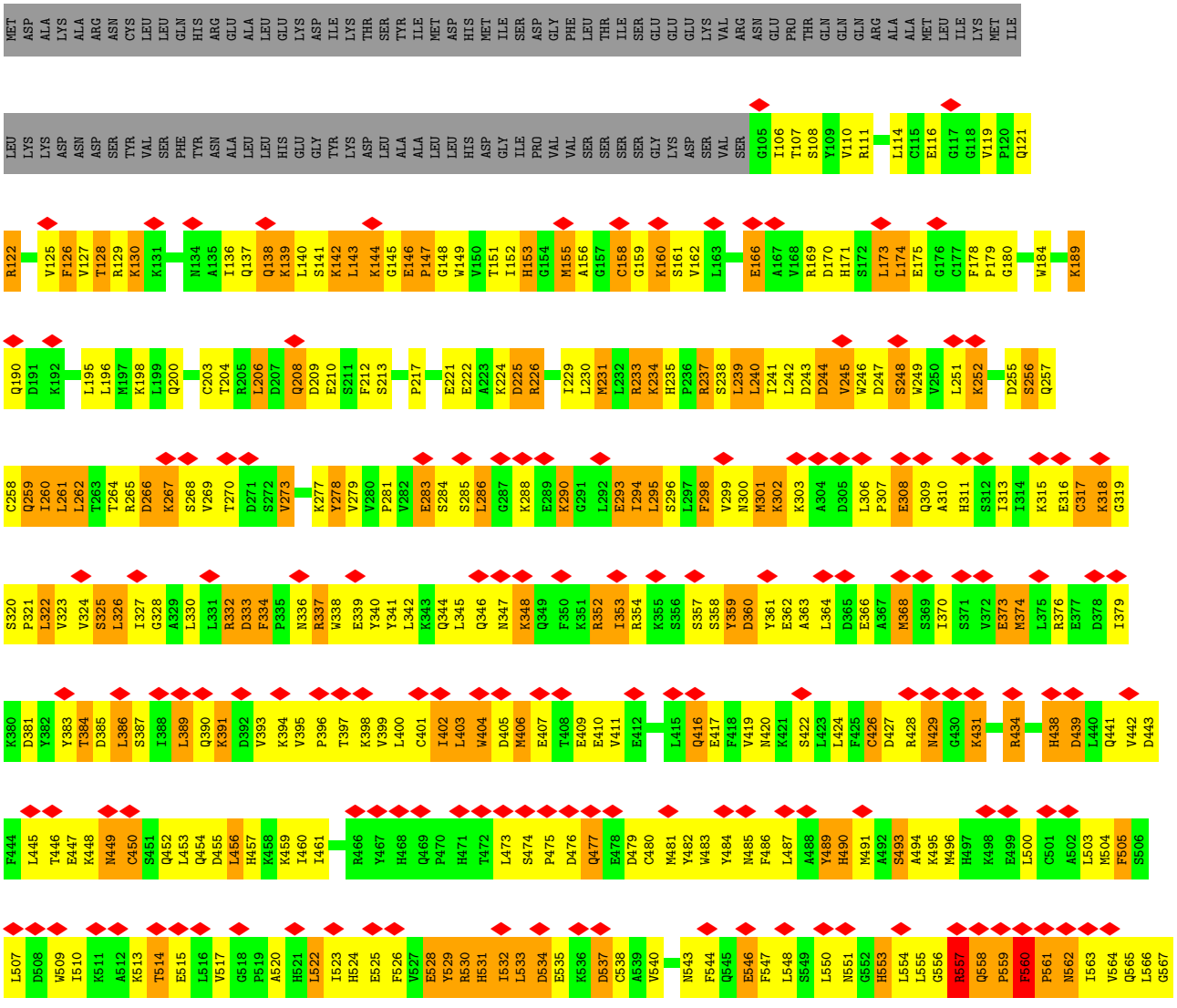
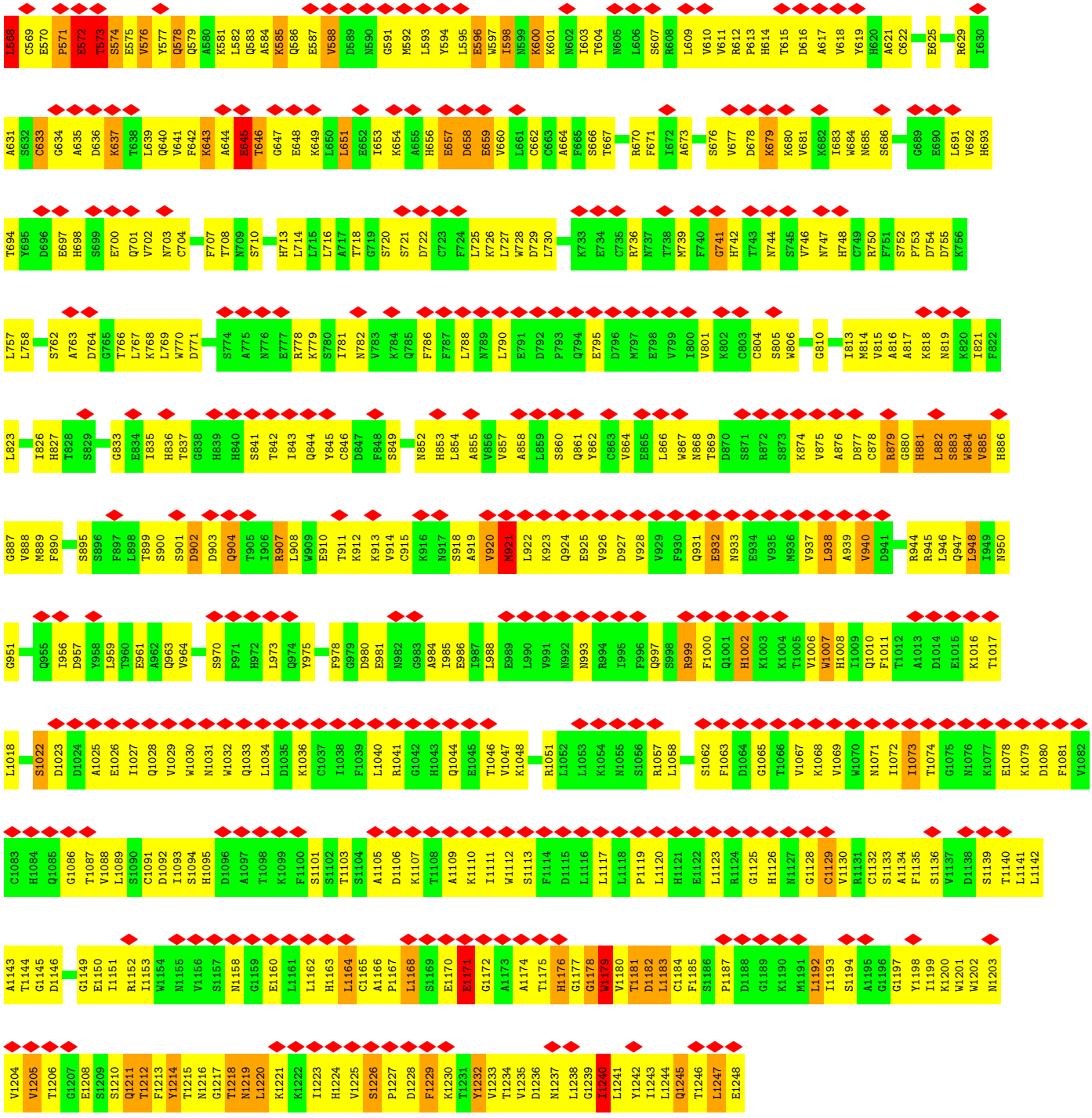
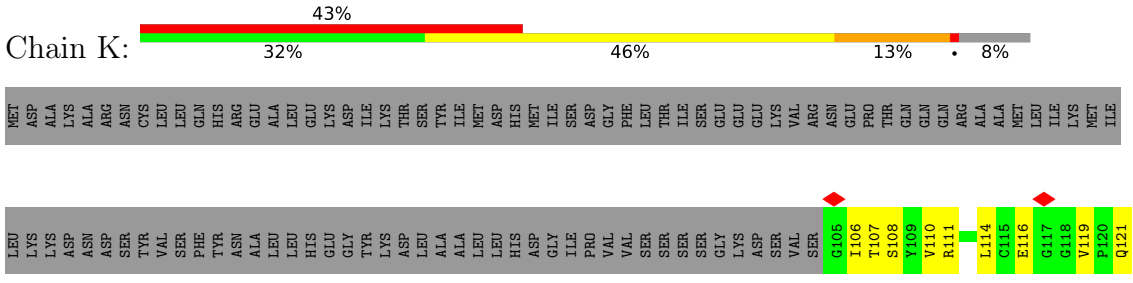


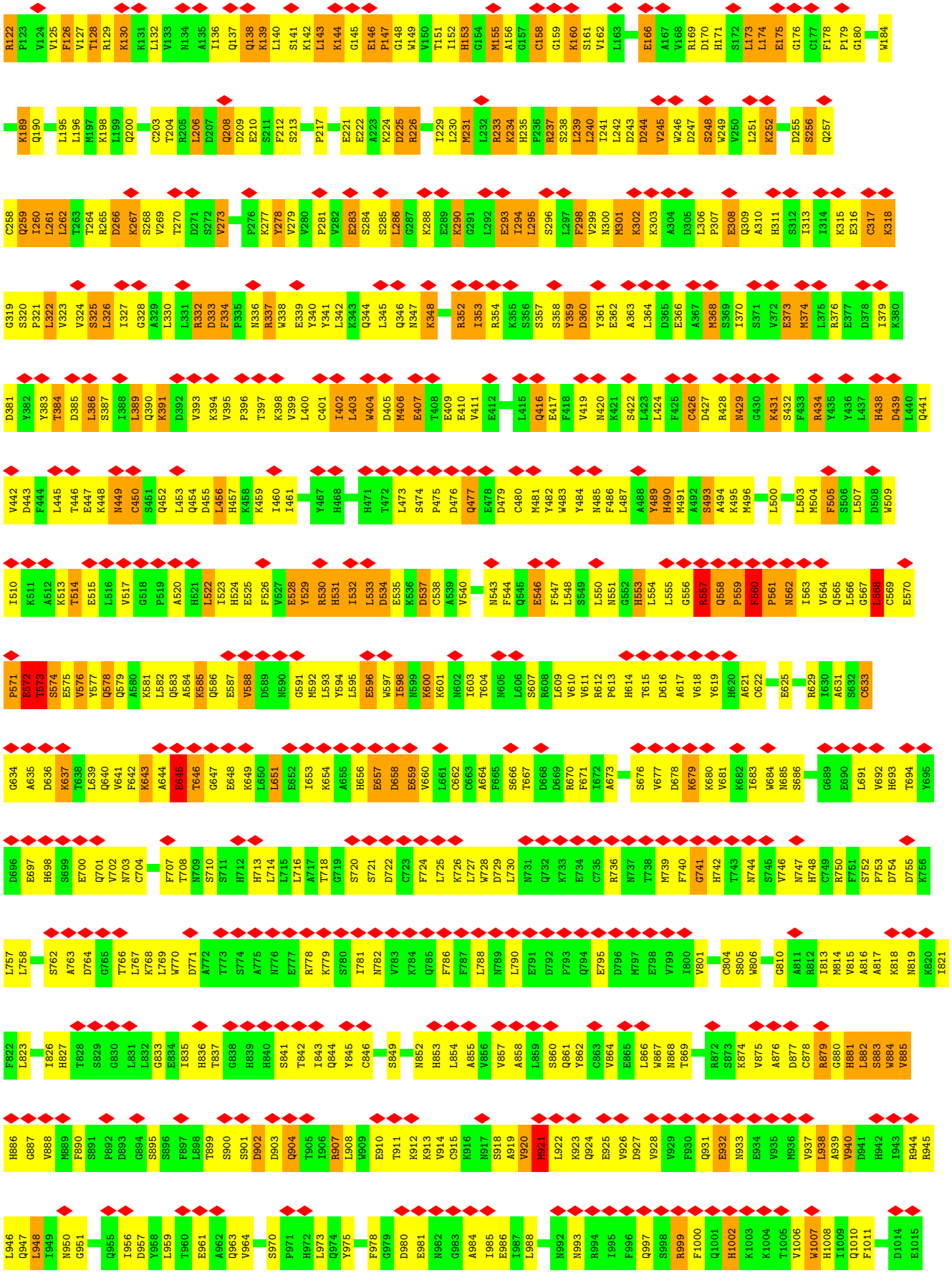
• Molecule 1: Apoptotic protease-activating factor 1





• Molecule 1: Apoptotic protease-activating factor 1

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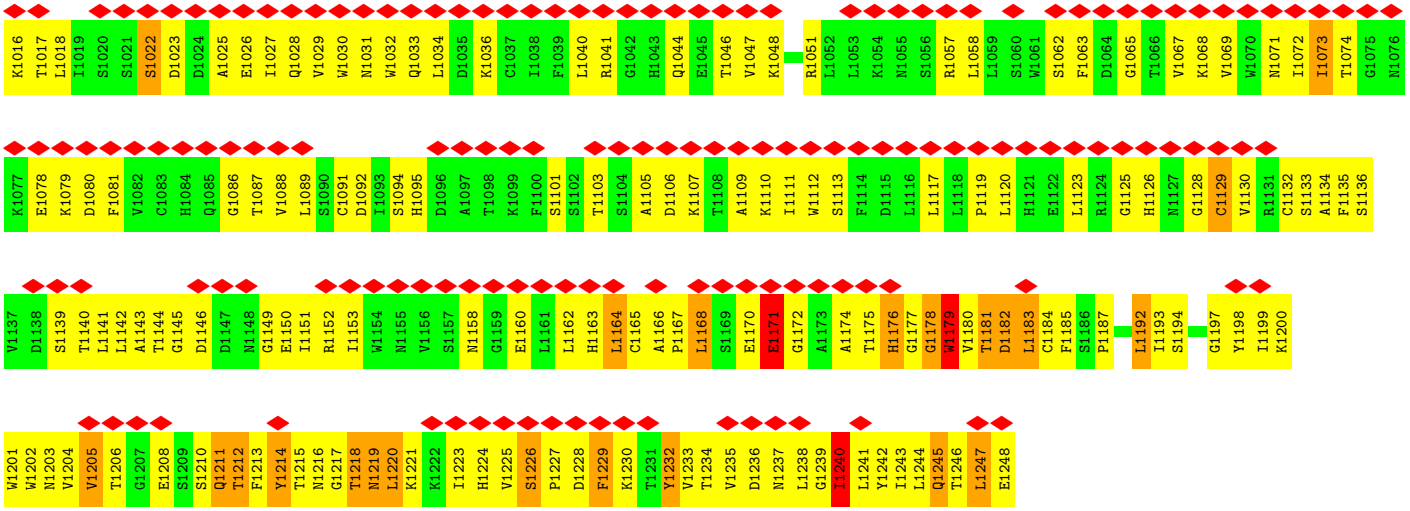
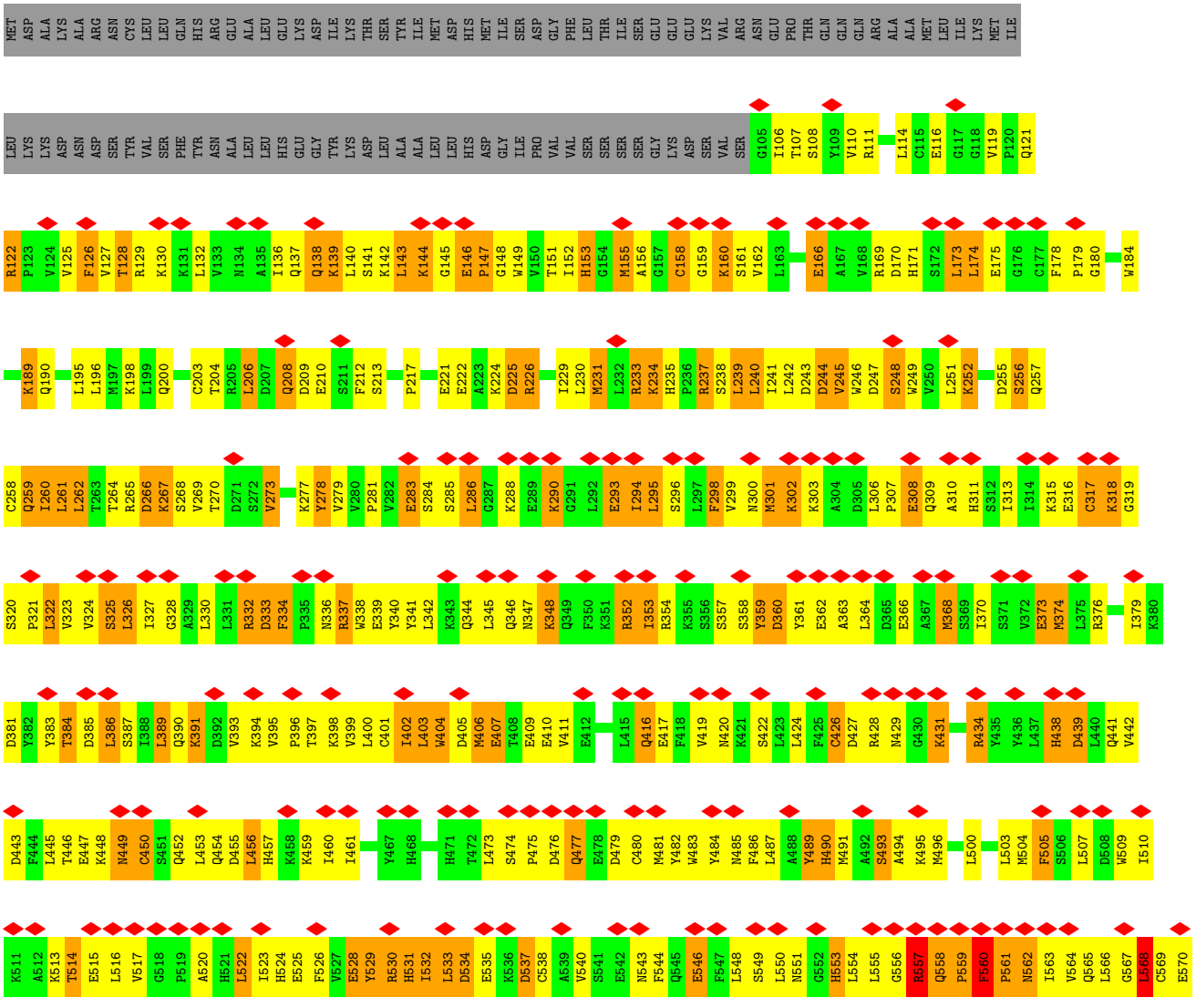
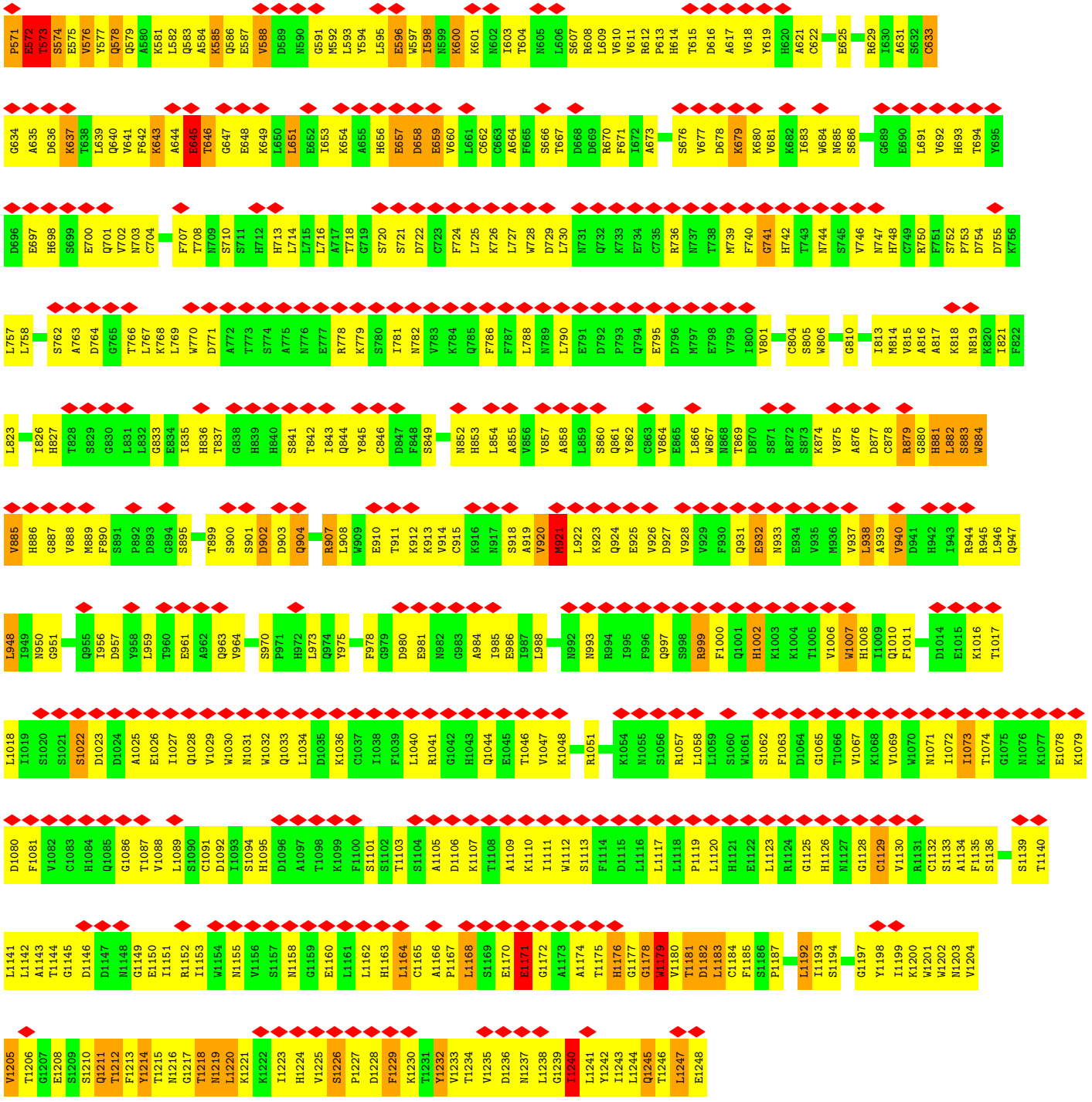


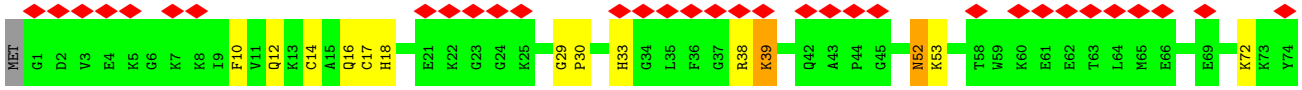
• Molecule 1: Apoptotic protease-activating factor 1

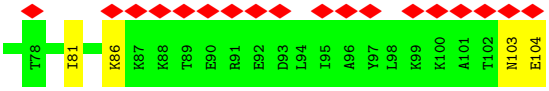




• Molecule 2: Cytochrome c

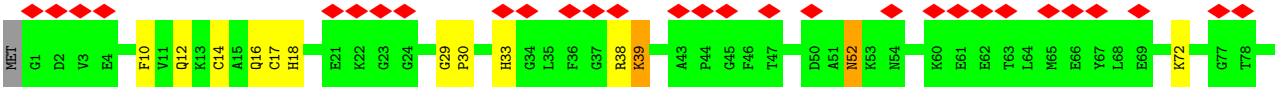
Chain B:

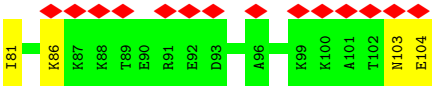




• Molecule 2: Cytochrome c

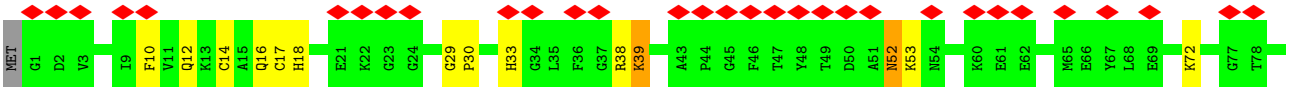
Chain D:

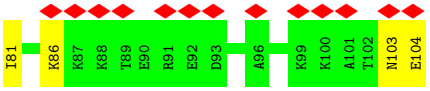




• Molecule 2: Cytochrome c

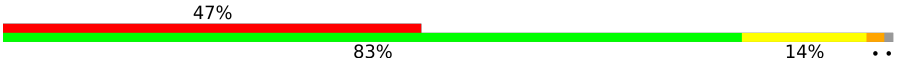
Chain F:

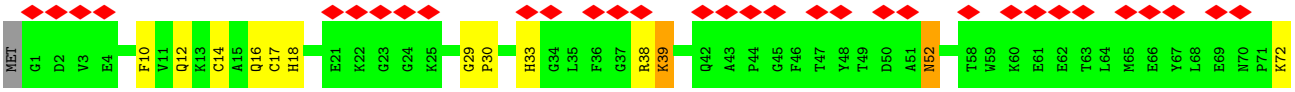


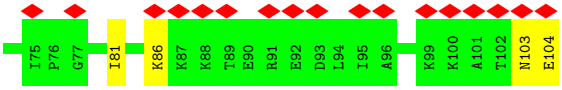


• Molecule 2: Cytochrome c

Chain H:

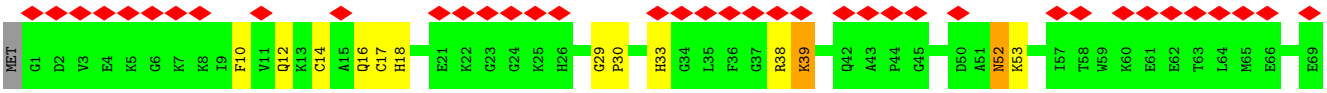


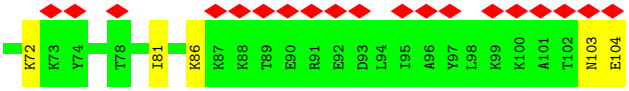




• Molecule 2: Cytochrome c

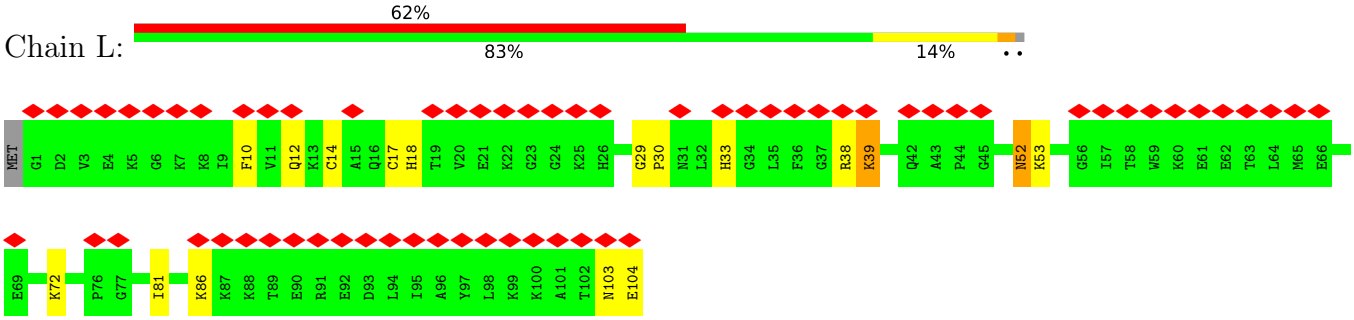
Chain J:





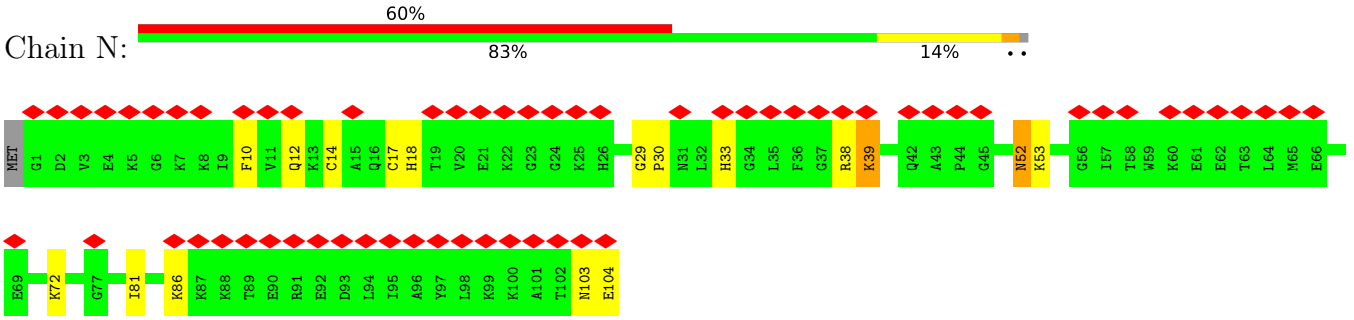
• Molecule 2: Cytochrome c

Chain L:



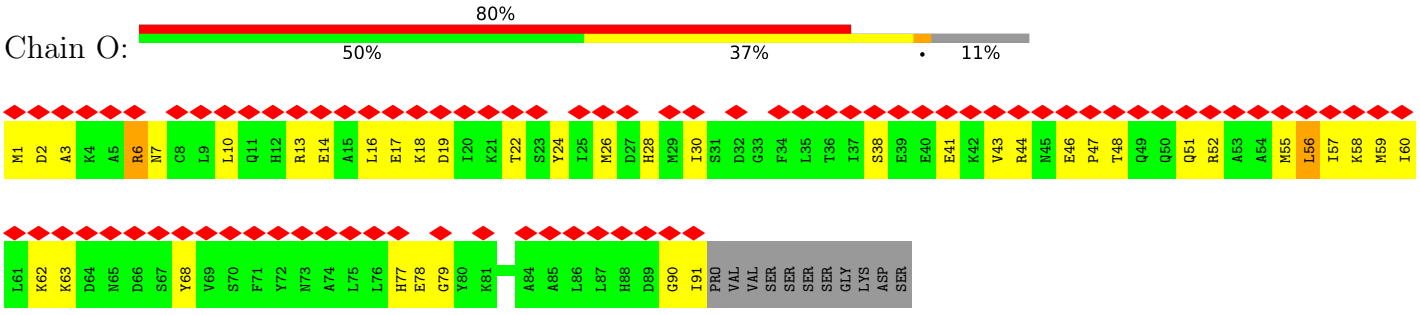
• Molecule 2: Cytochrome c

Chain N:



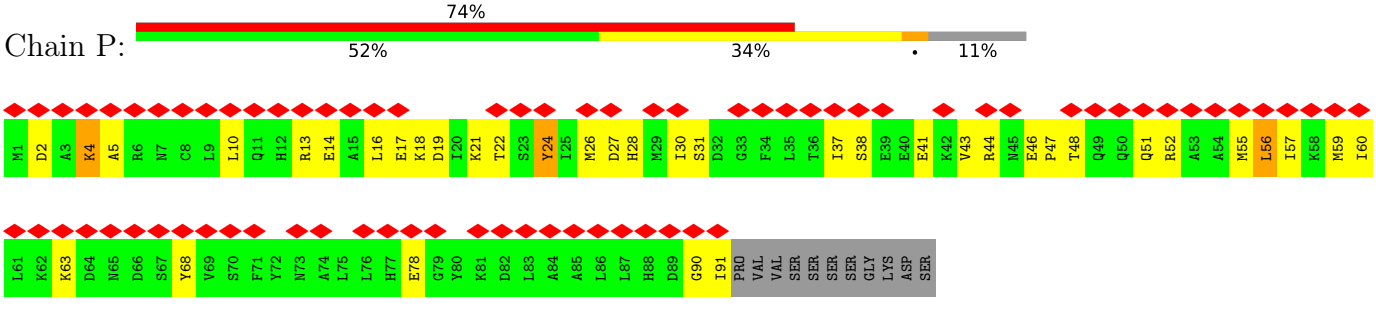
• Molecule 3: Apoptotic protease-activating factor 1

Chain O:



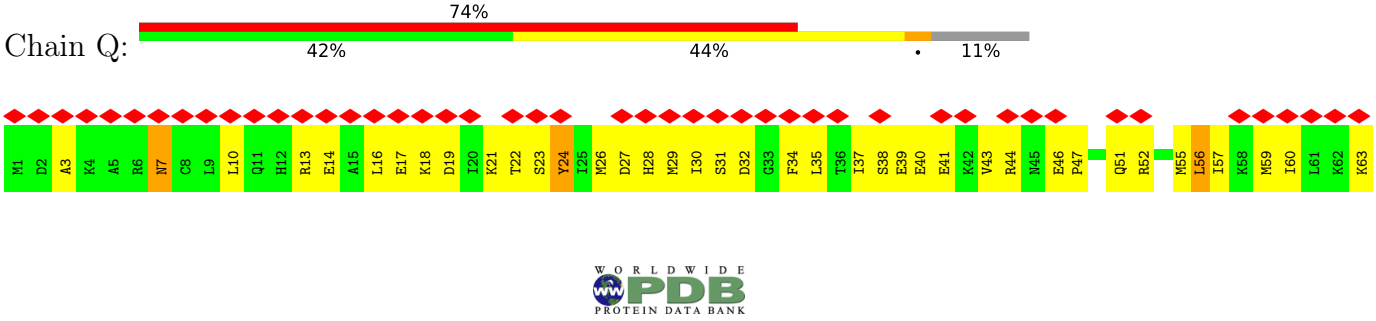
• Molecule 3: Apoptotic protease-activating factor 1

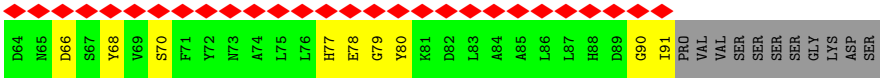
Chain P:



• Molecule 3: Apoptotic protease-activating factor 1

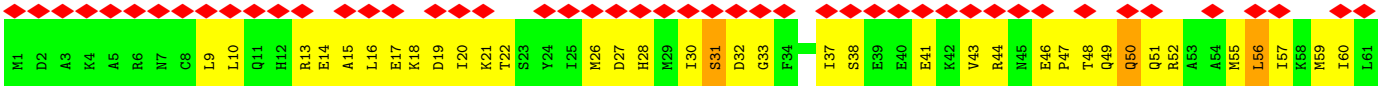
Chain Q:

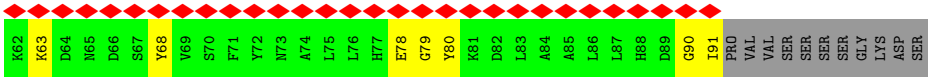




• Molecule 3: Apoptotic protease-activating factor 1

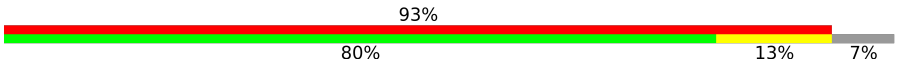
Chain R:

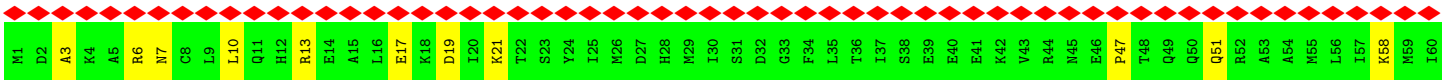


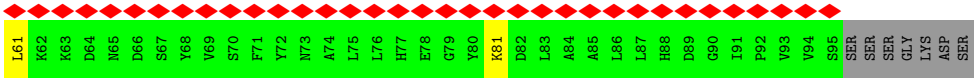


• Molecule 3: Apoptotic protease-activating factor 1

Chain W:

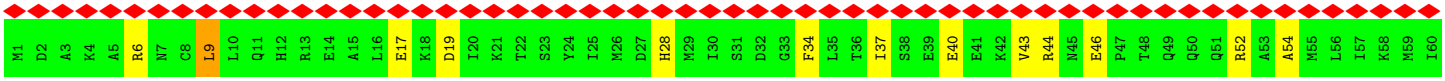


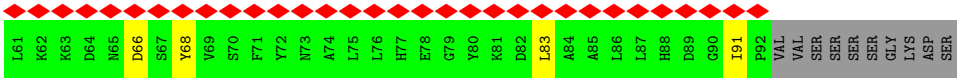




• Molecule 3: Apoptotic protease-activating factor 1

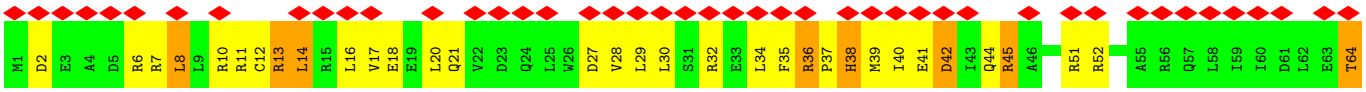
Chain X:

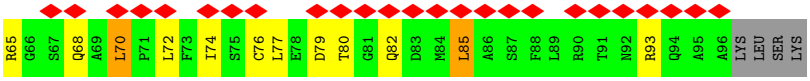




• Molecule 4: Caspase

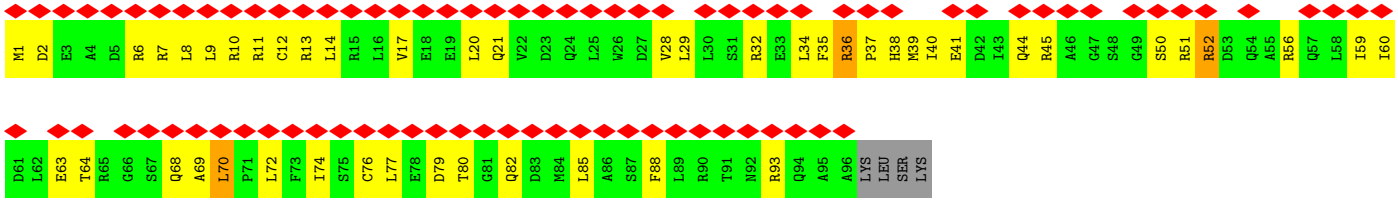
Chain S:





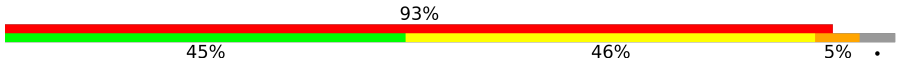
• Molecule 4: Caspase

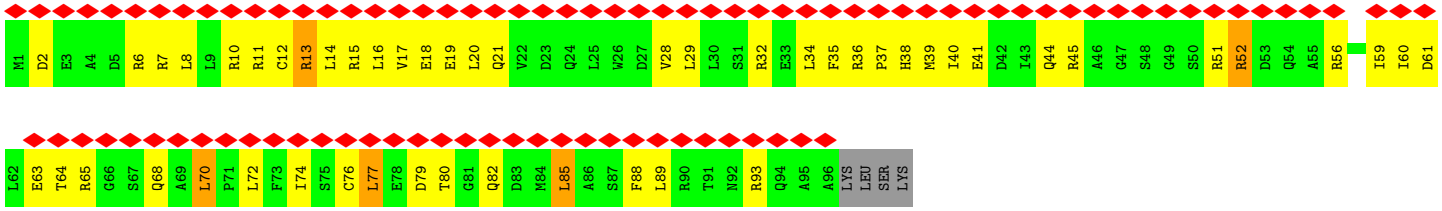
Chain T:



• Molecule 4: Caspase

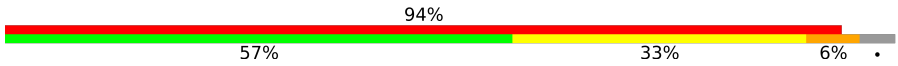
Chain U:





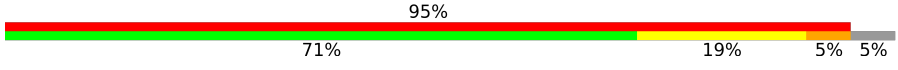
• Molecule 4: Caspase

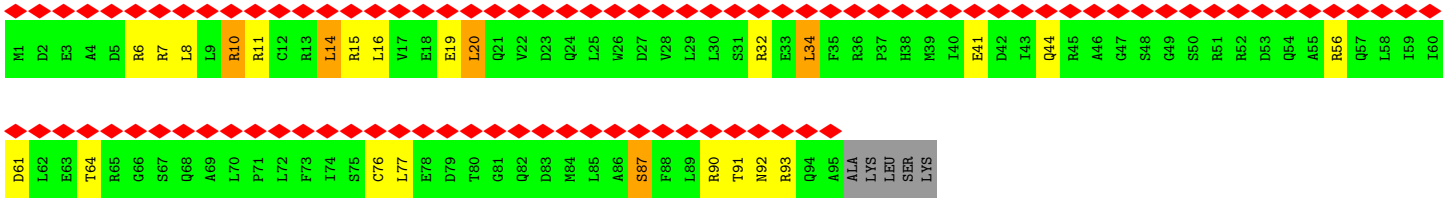
Chain V:



• Molecule 4: Caspase

Chain Y:





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	240130	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI POLARA 300	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	32	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON II (4k x 4k)	Depositor
Maximum map value	0.325	Depositor
Minimum map value	-0.097	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.011	Depositor
Recommended contour level	0.06	Depositor
Map size (Å)	428.80002, 428.80002, 428.80002	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.34, 1.34, 1.34	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

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

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|>5$	RMSZ	#$\|Z\|>5$
1	A	0.31	0/9337	0.52	2/12636 (0.0%)
1	C	0.30	0/9337	0.52	2/12636 (0.0%)
1	E	0.31	1/9337 (0.0%)	0.53	3/12636 (0.0%)
1	G	0.31	0/9337	0.52	2/12636 (0.0%)
1	I	0.31	0/9337	0.52	2/12636 (0.0%)
1	K	0.31	1/9337 (0.0%)	0.52	2/12636 (0.0%)
1	M	0.31	0/9337	0.52	2/12636 (0.0%)
2	B	0.65	0/839	0.73	0/1118
2	D	0.65	0/839	0.73	0/1118
2	F	0.65	0/839	0.73	0/1118
2	H	0.65	0/839	0.73	0/1118
2	J	0.65	0/839	0.73	0/1118
2	L	0.65	0/839	0.73	0/1118
2	N	0.65	0/839	0.73	0/1118
3	O	0.41	0/745	0.64	0/998
3	P	0.42	0/745	0.64	0/998
3	Q	0.40	0/745	0.62	0/998
3	R	0.41	0/745	0.64	0/998
3	W	0.66	0/773	0.58	0/1038
3	X	0.74	0/753	0.61	0/1010
4	S	0.42	0/790	0.66	0/1059
4	T	0.42	0/790	0.64	0/1059
4	U	0.40	0/790	0.62	0/1059
4	V	0.43	0/790	0.67	0/1059
4	Y	0.60	0/784	0.61	0/1051
All	All	0.37	2/79682 (0.0%)	0.55	15/107605 (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	T	0	1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	K	1179	TRP	C-N	-6.36	1.19	1.34
1	E	236	PRO	N-CD	5.21	1.55	1.47

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	M	560	PHE	C-N-CD	-6.44	106.43	120.60
1	K	560	PHE	C-N-CD	-6.43	106.45	120.60
1	A	560	PHE	C-N-CD	-6.42	106.48	120.60
1	C	560	PHE	C-N-CD	-6.39	106.54	120.60
1	E	560	PHE	C-N-CD	-6.39	106.54	120.60

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
4	T	52	ARG	Sidechain

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	9139	0	9004	1450	0
1	C	9139	0	9005	1398	0
1	E	9139	0	9005	1439	0
1	G	9139	0	9005	1410	0
1	I	9139	0	9005	1405	0
1	K	9139	0	9005	1410	0
1	M	9139	0	9005	1400	0
2	B	823	0	849	33	0
2	D	823	0	849	33	0
2	F	823	0	849	32	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	H	823	0	849	31	0
2	J	823	0	849	33	0
2	L	823	0	849	33	0
2	N	823	0	849	35	0
3	O	735	0	738	82	0
3	P	735	0	738	98	0
3	Q	735	0	738	124	0
3	R	735	0	738	101	0
3	W	762	0	768	36	0
3	X	742	0	745	17	0
4	S	783	0	792	109	0
4	T	783	0	792	115	0
4	U	783	0	792	119	0
4	V	783	0	792	67	0
4	Y	777	0	784	26	0
5	A	30	0	12	6	0
5	C	30	0	12	6	0
5	E	30	0	12	6	0
5	G	30	0	12	6	0
5	I	30	0	12	6	0
5	K	30	0	12	6	0
5	M	30	0	12	6	0
6	A	1	0	0	0	0
6	C	1	0	0	0	0
6	E	1	0	0	0	0
6	G	1	0	0	0	0
6	I	1	0	0	0	0
6	K	1	0	0	0	0
6	M	1	0	0	0	0
7	B	43	0	30	15	0
7	D	43	0	30	18	0
7	F	43	0	30	14	0
7	H	43	0	30	14	0
7	J	43	0	30	15	0
7	L	43	0	30	14	0
7	N	43	0	30	16	0
All	All	78605	0	77688	10505	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 67.

The worst 5 of 10505 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:862:TYR:CD1	1:C:885:VAL:HG12	1.35	1.62
1:M:862:TYR:CD1	1:M:885:VAL:HG12	1.35	1.60
1:K:862:TYR:CD1	1:K:885:VAL:HG12	1.35	1.60
1:C:862:TYR:CZ	1:C:881:HIS:HB2	1.06	1.59
1:I:862:TYR:CD1	1:I:885:VAL:HG12	1.35	1.59

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	1142/1248 (92%)	1002 (88%)	93 (8%)	47 (4%)	3	25
1	C	1142/1248 (92%)	1002 (88%)	94 (8%)	46 (4%)	3	26
1	E	1142/1248 (92%)	999 (88%)	95 (8%)	48 (4%)	3	25
1	G	1142/1248 (92%)	1002 (88%)	93 (8%)	47 (4%)	3	25
1	I	1142/1248 (92%)	1002 (88%)	93 (8%)	47 (4%)	3	25
1	K	1142/1248 (92%)	1002 (88%)	93 (8%)	47 (4%)	3	25
1	M	1142/1248 (92%)	1002 (88%)	93 (8%)	47 (4%)	3	25
2	B	102/105 (97%)	100 (98%)	2 (2%)	0	100	100
2	D	102/105 (97%)	100 (98%)	2 (2%)	0	100	100
2	F	102/105 (97%)	100 (98%)	2 (2%)	0	100	100
2	H	102/105 (97%)	100 (98%)	2 (2%)	0	100	100
2	J	102/105 (97%)	100 (98%)	2 (2%)	0	100	100
2	L	102/105 (97%)	100 (98%)	2 (2%)	0	100	100
2	N	102/105 (97%)	100 (98%)	2 (2%)	0	100	100
3	O	89/102 (87%)	86 (97%)	3 (3%)	0	100	100
3	P	89/102 (87%)	87 (98%)	2 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	Q	89/102 (87%)	86 (97%)	3 (3%)	0	100	100
3	R	89/102 (87%)	87 (98%)	2 (2%)	0	100	100
3	W	93/102 (91%)	93 (100%)	0	0	100	100
3	X	90/102 (88%)	90 (100%)	0	0	100	100
4	S	94/100 (94%)	92 (98%)	2 (2%)	0	100	100
4	T	94/100 (94%)	91 (97%)	3 (3%)	0	100	100
4	U	94/100 (94%)	88 (94%)	6 (6%)	0	100	100
4	V	94/100 (94%)	92 (98%)	2 (2%)	0	100	100
4	Y	93/100 (93%)	92 (99%)	1 (1%)	0	100	100
All	All	9716/10583 (92%)	8695 (90%)	692 (7%)	329 (3%)	6	29

5 of 329 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	147	PRO
1	A	557	ARG
1	A	560	PHE
1	A	562	ASN
1	A	574	SER

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	1027/1119 (92%)	840 (82%)	187 (18%)	1	11
1	C	1027/1119 (92%)	840 (82%)	187 (18%)	1	11
1	E	1027/1119 (92%)	840 (82%)	187 (18%)	1	11
1	G	1027/1119 (92%)	840 (82%)	187 (18%)	1	11
1	I	1027/1119 (92%)	840 (82%)	187 (18%)	1	11
1	K	1027/1119 (92%)	839 (82%)	188 (18%)	1	11
1	M	1027/1119 (92%)	840 (82%)	187 (18%)	1	11

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	B	86/87 (99%)	80 (93%)	6 (7%)	15 41
2	D	86/87 (99%)	81 (94%)	5 (6%)	20 47
2	F	86/87 (99%)	80 (93%)	6 (7%)	15 41
2	H	86/87 (99%)	81 (94%)	5 (6%)	20 47
2	J	86/87 (99%)	80 (93%)	6 (7%)	15 41
2	L	86/87 (99%)	80 (93%)	6 (7%)	15 41
2	N	86/87 (99%)	80 (93%)	6 (7%)	15 41
3	O	80/90 (89%)	77 (96%)	3 (4%)	33 58
3	P	80/90 (89%)	76 (95%)	4 (5%)	24 51
3	Q	80/90 (89%)	76 (95%)	4 (5%)	24 51
3	R	80/90 (89%)	76 (95%)	4 (5%)	24 51
3	W	84/90 (93%)	82 (98%)	2 (2%)	49 69
3	X	81/90 (90%)	79 (98%)	2 (2%)	47 68
4	S	85/89 (96%)	73 (86%)	12 (14%)	3 19
4	T	85/89 (96%)	80 (94%)	5 (6%)	19 47
4	U	85/89 (96%)	79 (93%)	6 (7%)	14 41
4	V	85/89 (96%)	77 (91%)	8 (9%)	8 30
4	Y	84/89 (94%)	77 (92%)	7 (8%)	11 37
All	All	8700/9427 (92%)	7293 (84%)	1407 (16%)	5 15

5 of 1407 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	I	882	LEU
1	K	1229	PHE
1	I	1232	TYR
1	I	881	HIS
1	K	360	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 242 such sidechains are listed below:

Mol	Chain	Res	Type
1	G	1211	GLN
3	R	28	HIS
1	I	1126	HIS

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Mol	Chain	Res	Type
3	Q	51	GLN
3	W	51	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 21 ligands modelled in this entry, 7 are monoatomic - leaving 14 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	$\#\|Z\| > 2$
5	DTP	A	1301	6	26,32,32	0.87	1 (3%)	30,50,50	1.56	4 (13%)
7	HEM	B	201	2	41,50,50	1.31	6 (14%)	45,82,82	1.74	6 (13%)
7	HEM	N	201	2	41,50,50	1.31	5 (12%)	45,82,82	1.73	6 (13%)
5	DTP	I	1301	6	26,32,32	0.86	1 (3%)	30,50,50	1.55	4 (13%)
5	DTP	E	1301	6	26,32,32	0.87	1 (3%)	30,50,50	1.57	4 (13%)
7	HEM	F	201	2	41,50,50	1.32	5 (12%)	45,82,82	1.73	6 (13%)
5	DTP	G	1301	6	26,32,32	0.86	1 (3%)	30,50,50	1.55	5 (16%)
5	DTP	K	1301	6	26,32,32	0.85	1 (3%)	30,50,50	1.56	4 (13%)
5	DTP	M	1301	6	26,32,32	0.86	1 (3%)	30,50,50	1.56	4 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
7	HEM	H	201	2	41,50,50	1.31	6 (14%)	45,82,82	1.73	6 (13%)
7	HEM	J	201	2	41,50,50	1.32	6 (14%)	45,82,82	1.73	6 (13%)
7	HEM	L	201	2	41,50,50	1.31	6 (14%)	45,82,82	1.72	6 (13%)
7	HEM	D	201	2	41,50,50	1.32	5 (12%)	45,82,82	1.74	6 (13%)
5	DTP	C	1301	6	26,32,32	0.85	1 (3%)	30,50,50	1.56	4 (13%)

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
5	DTP	A	1301	6	-	5/18/34/34	0/3/3/3
7	HEM	B	201	2	-	7/12/54/54	-
7	HEM	N	201	2	-	7/12/54/54	-
5	DTP	I	1301	6	-	5/18/34/34	0/3/3/3
5	DTP	E	1301	6	-	5/18/34/34	0/3/3/3
7	HEM	F	201	2	-	7/12/54/54	-
5	DTP	G	1301	6	-	5/18/34/34	0/3/3/3
5	DTP	K	1301	6	-	5/18/34/34	0/3/3/3
5	DTP	M	1301	6	-	5/18/34/34	0/3/3/3
7	HEM	H	201	2	-	7/12/54/54	-
7	HEM	J	201	2	-	7/12/54/54	-
7	HEM	L	201	2	-	7/12/54/54	-
7	HEM	D	201	2	-	7/12/54/54	-
5	DTP	C	1301	6	-	5/18/34/34	0/3/3/3

The worst 5 of 46 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	J	201	HEM	C1B-NB	-3.47	1.34	1.40
7	N	201	HEM	C1B-NB	-3.43	1.34	1.40
7	B	201	HEM	C1B-NB	-3.39	1.34	1.40
7	H	201	HEM	C1B-NB	-3.37	1.34	1.40
7	F	201	HEM	C1B-NB	-3.37	1.34	1.40

The worst 5 of 71 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	D	201	HEM	C1B-NB-C4B	4.70	109.93	105.07
7	D	201	HEM	CHC-C4B-NB	4.70	129.54	124.43
7	B	201	HEM	C1B-NB-C4B	4.70	109.93	105.07
7	J	201	HEM	CHC-C4B-NB	4.70	129.53	124.43
7	H	201	HEM	CHC-C4B-NB	4.68	129.52	124.43

There are no chirality outliers.

5 of 84 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1301	DTP	C5'-O5'-PA-O2A
5	A	1301	DTP	C5'-O5'-PA-O3A
5	C	1301	DTP	C5'-O5'-PA-O2A
5	C	1301	DTP	C5'-O5'-PA-O3A
5	E	1301	DTP	C5'-O5'-PA-O2A

There are no ring outliers.

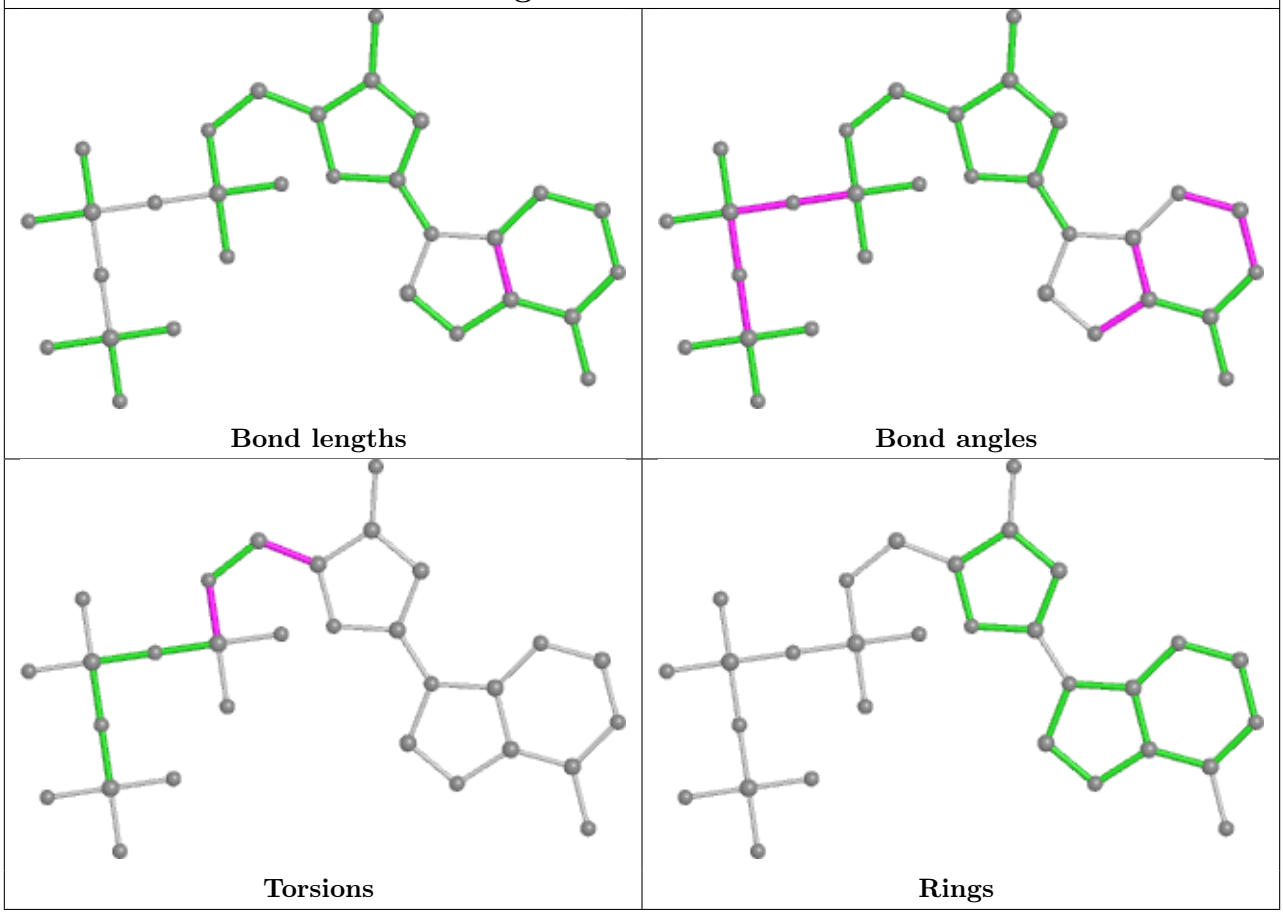
14 monomers are involved in 148 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	1301	DTP	6	0
7	B	201	HEM	15	0
7	N	201	HEM	16	0
5	I	1301	DTP	6	0
5	E	1301	DTP	6	0
7	F	201	HEM	14	0
5	G	1301	DTP	6	0
5	K	1301	DTP	6	0
5	M	1301	DTP	6	0
7	H	201	HEM	14	0
7	J	201	HEM	15	0
7	L	201	HEM	14	0
7	D	201	HEM	18	0
5	C	1301	DTP	6	0

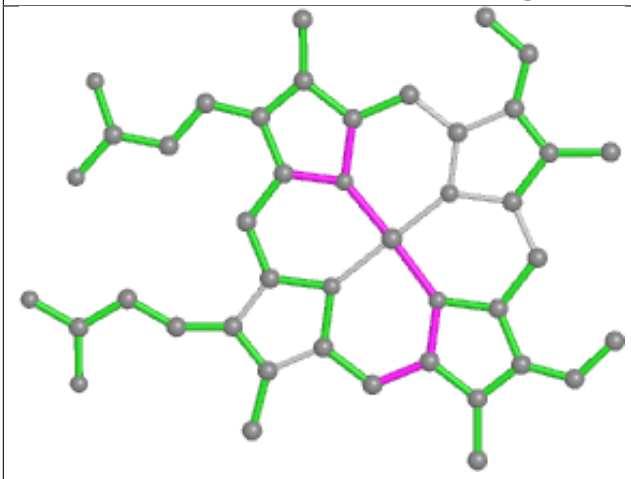
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the

average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

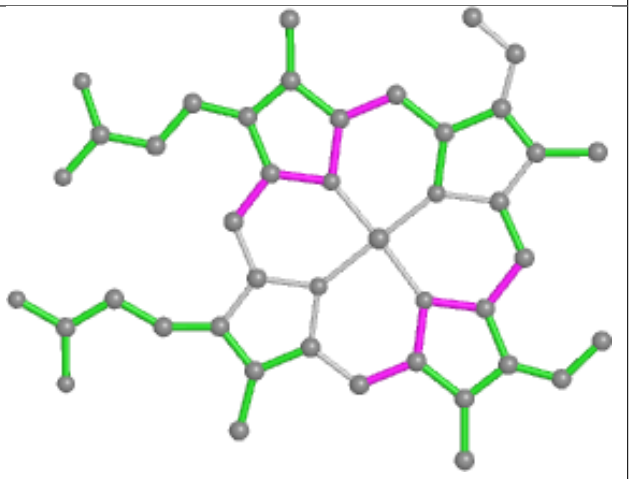
Ligand DTP A 1301



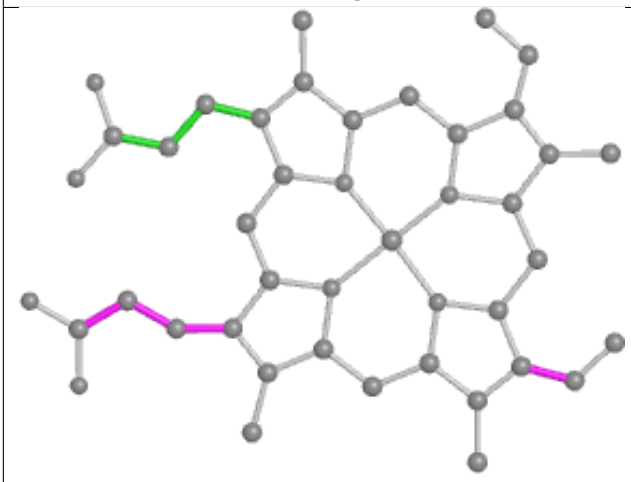
Ligand HEM B 201



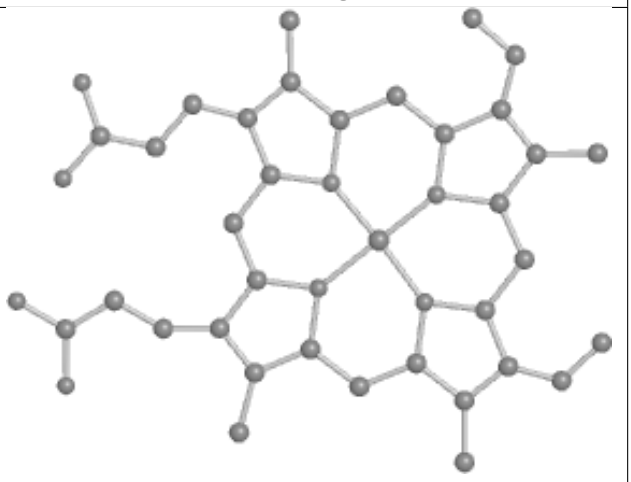
Bond lengths



Bond angles

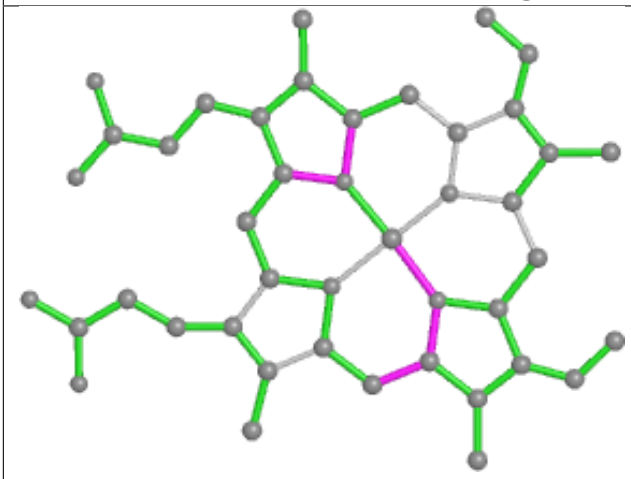


Torsions



Rings

Ligand HEM N 201



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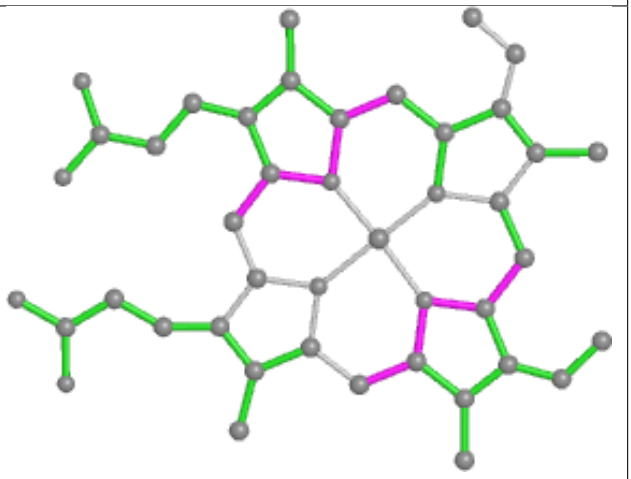
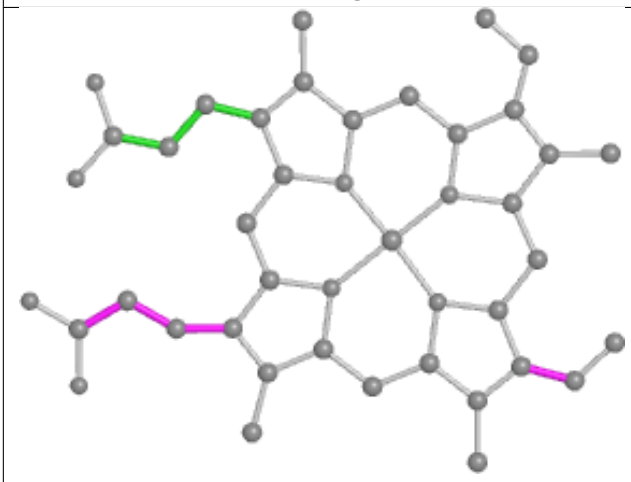
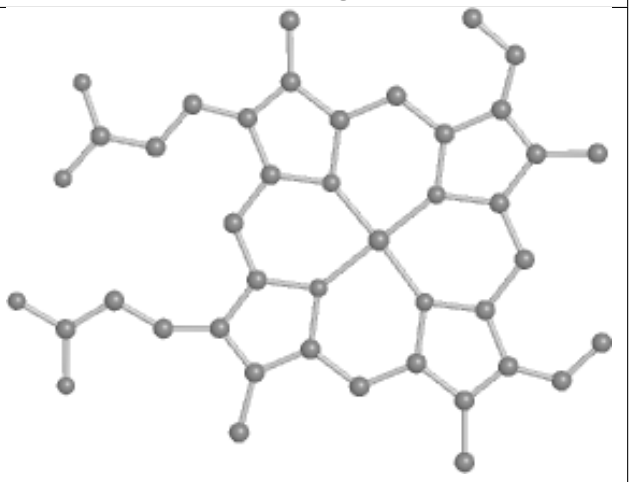


Bond angles

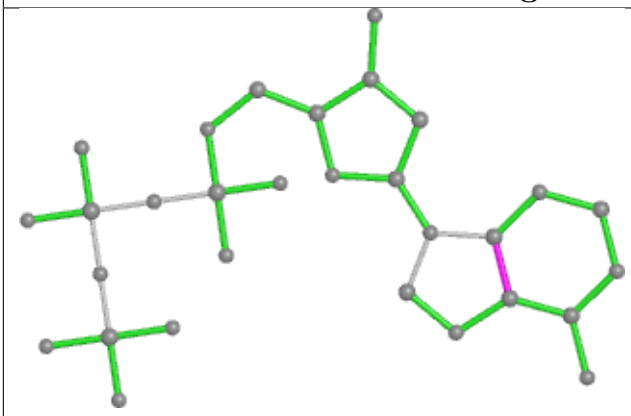


Torsions

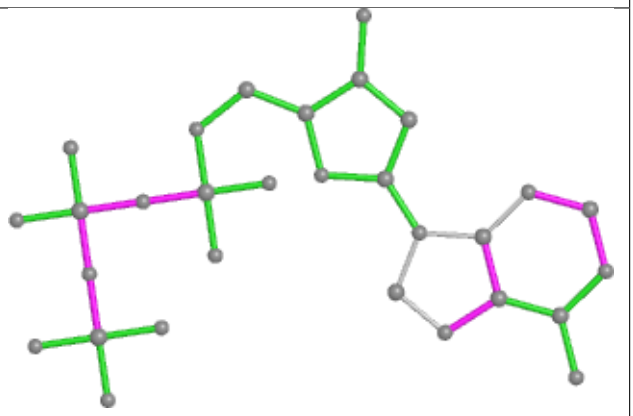


Rings

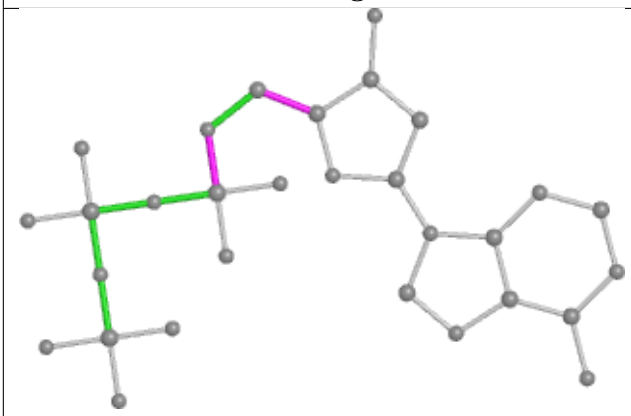
Ligand DTP I 1301



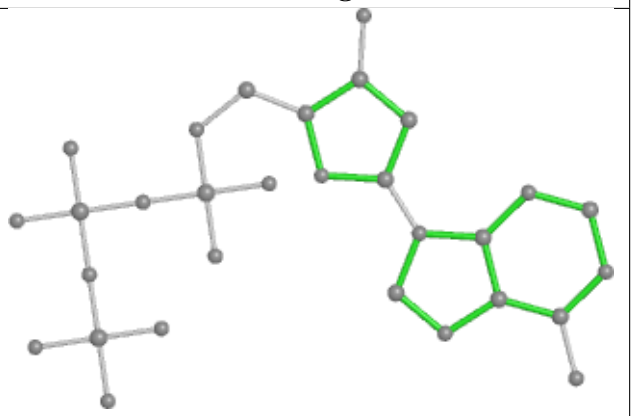
Bond lengths



Bond angles

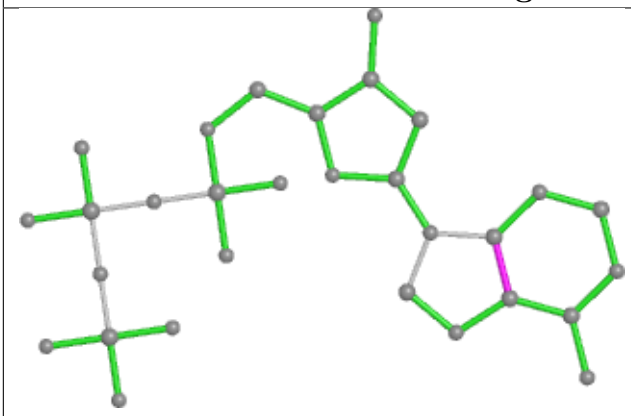


Torsions

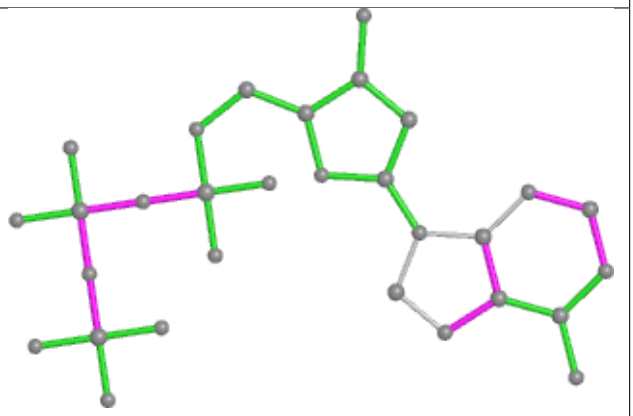


Rings

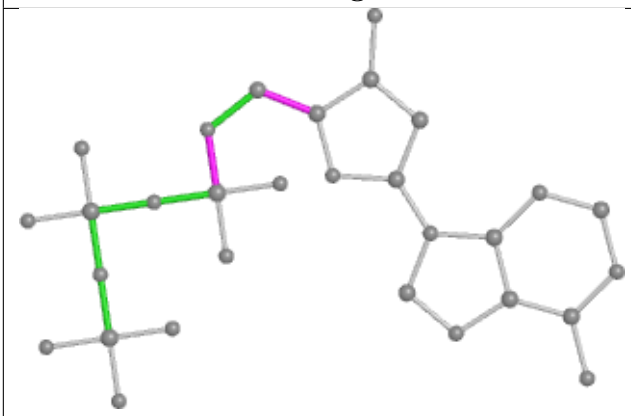
Ligand DTP E 1301



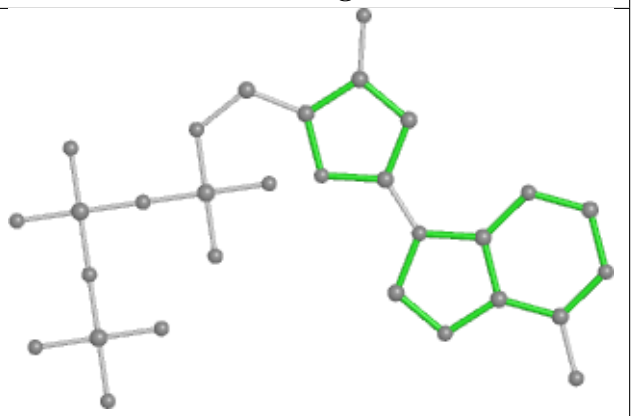
Bond lengths



Bond angles

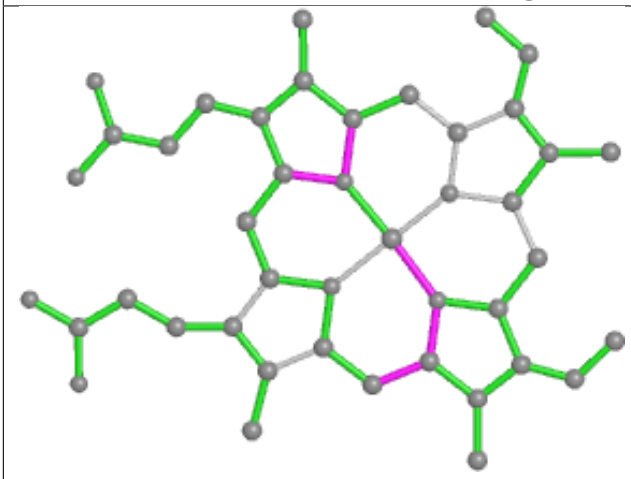


Torsions

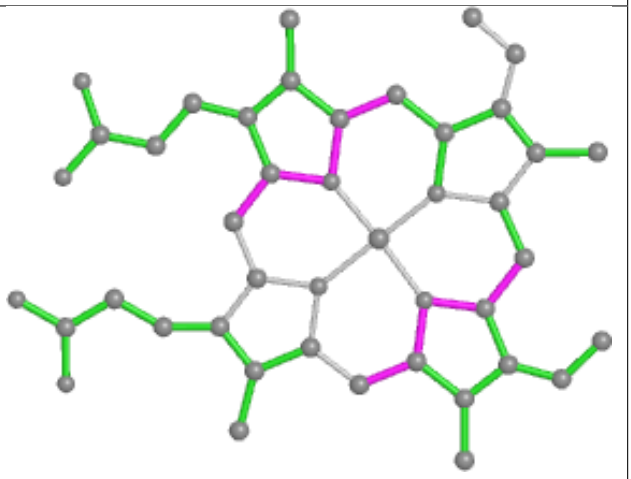


Rings

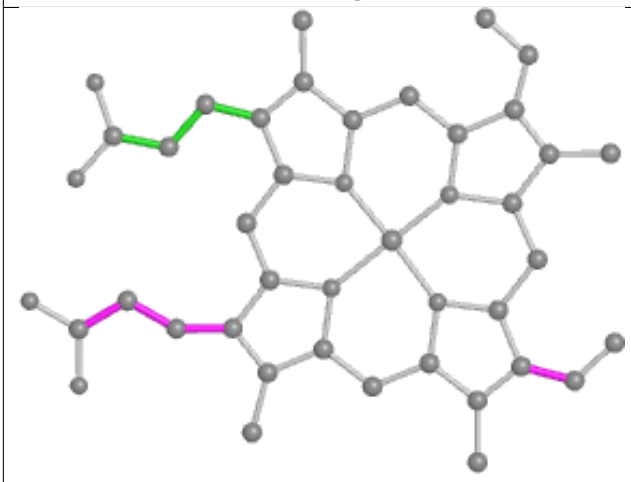
Ligand HEM F 201



Bond lengths



Bond angles



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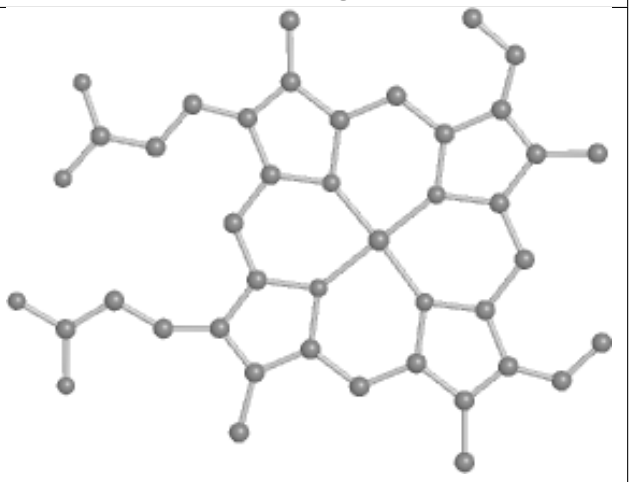
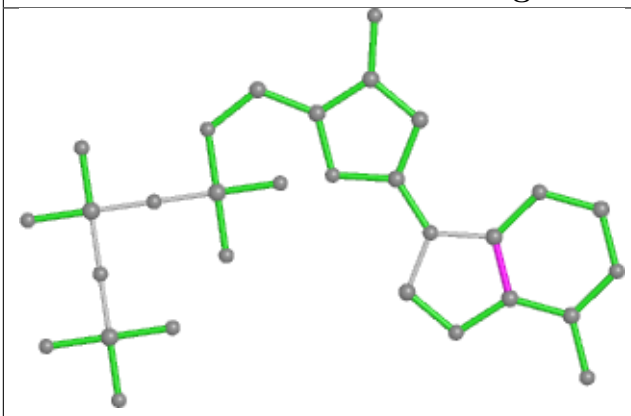
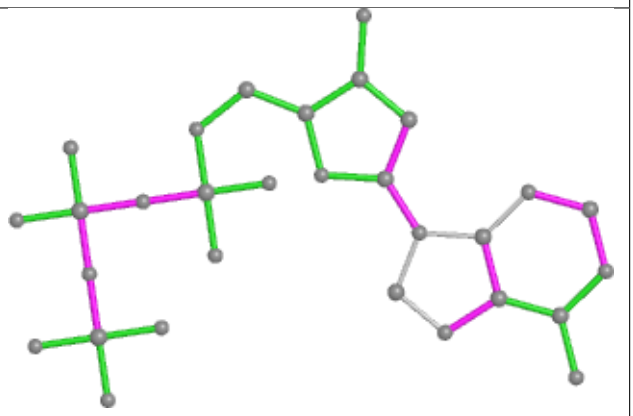


Rings

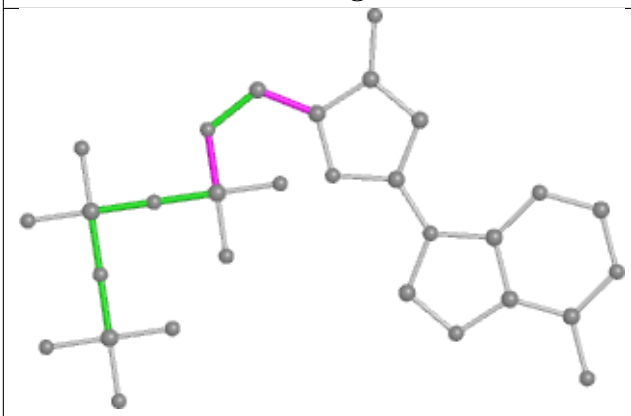
Ligand DTP G 1301



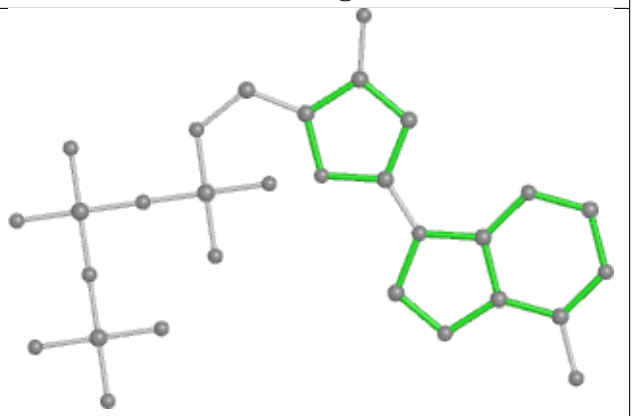
Bond lengths



Bond angles

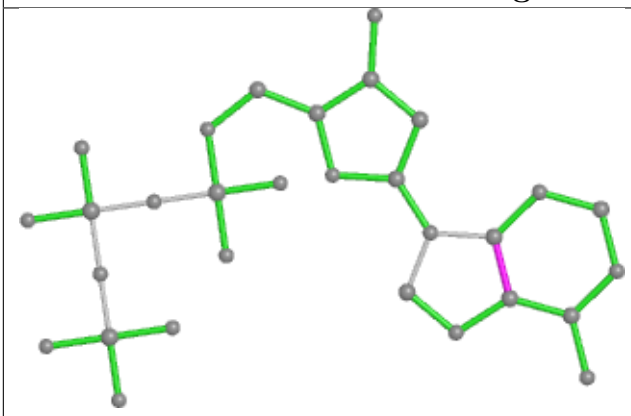


Torsions

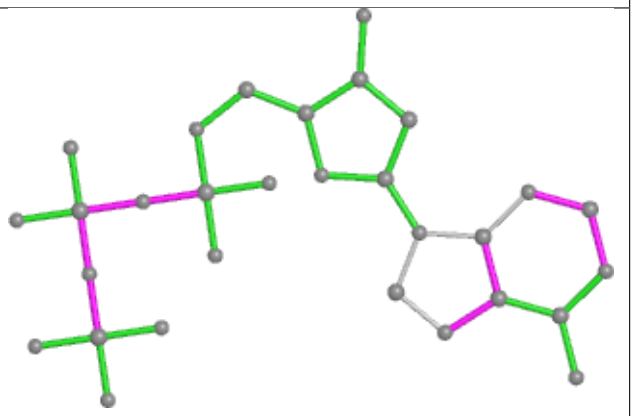


Rings

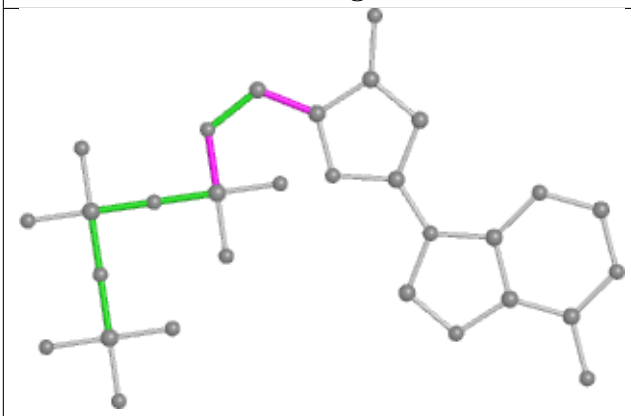
Ligand DTP K 1301



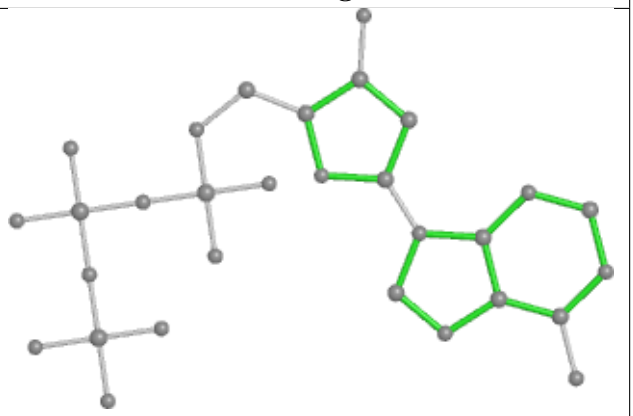
Bond lengths



Bond angles

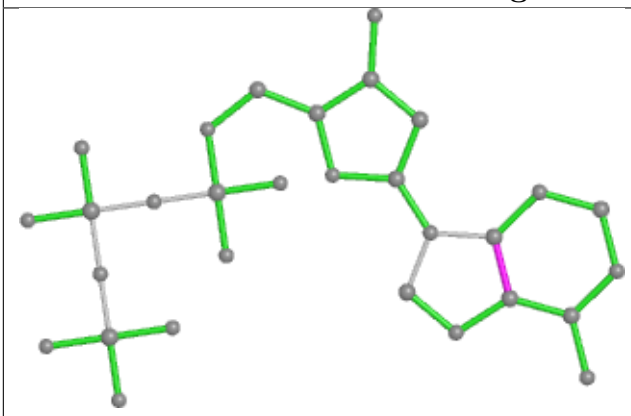


Torsions

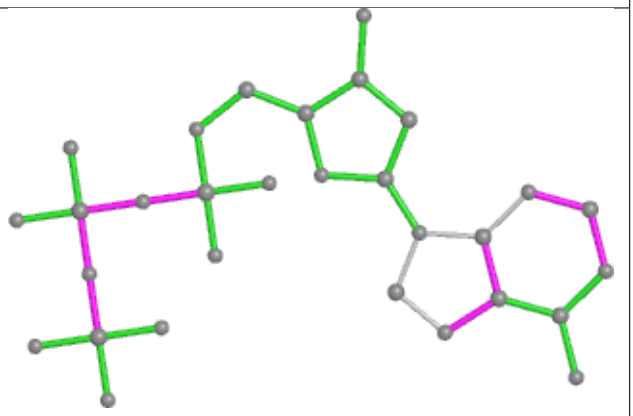


Rings

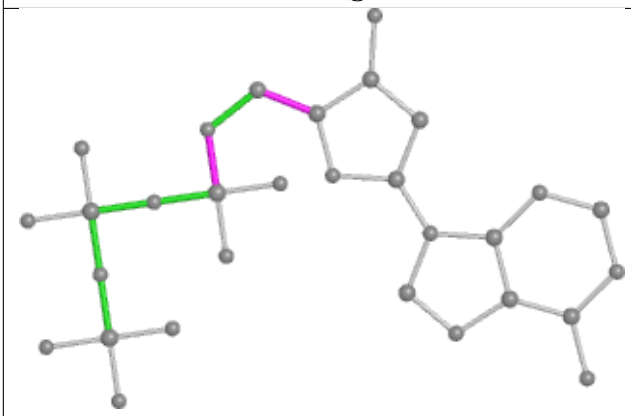
Ligand DTP M 1301



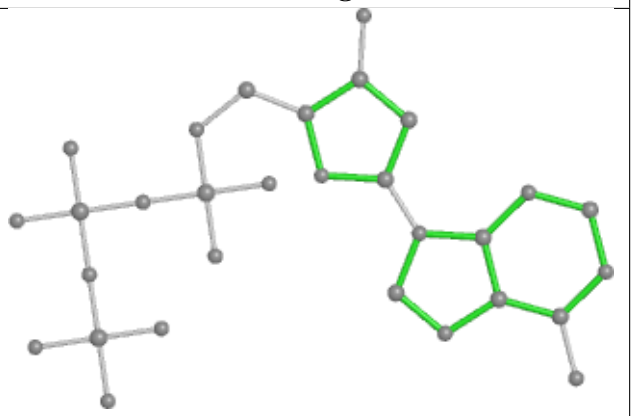
Bond lengths



Bond angles

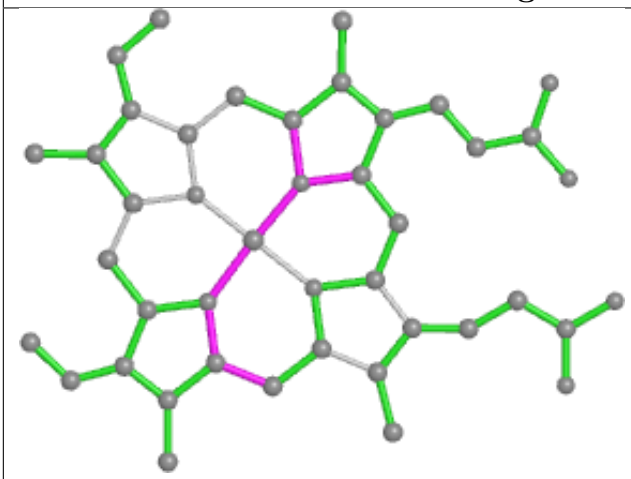


Torsions

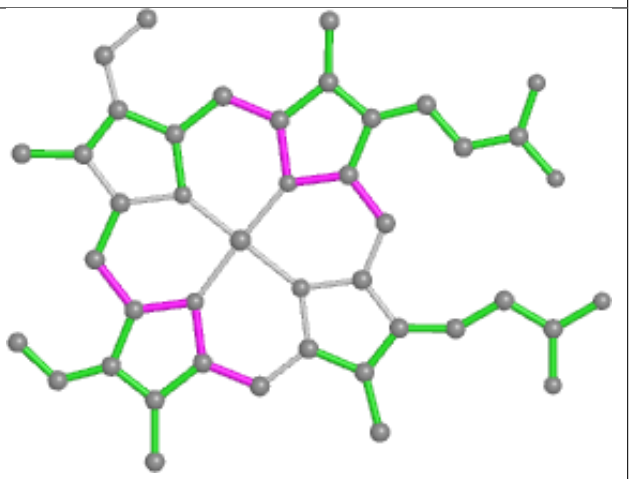


Rings

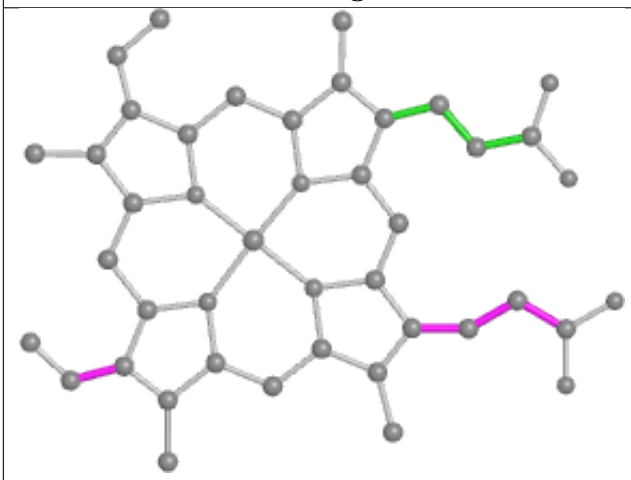
Ligand HEM H 201



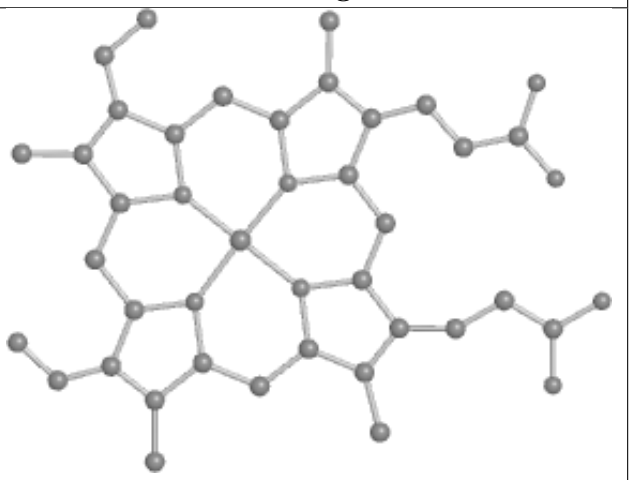
Bond lengths



Bond angles

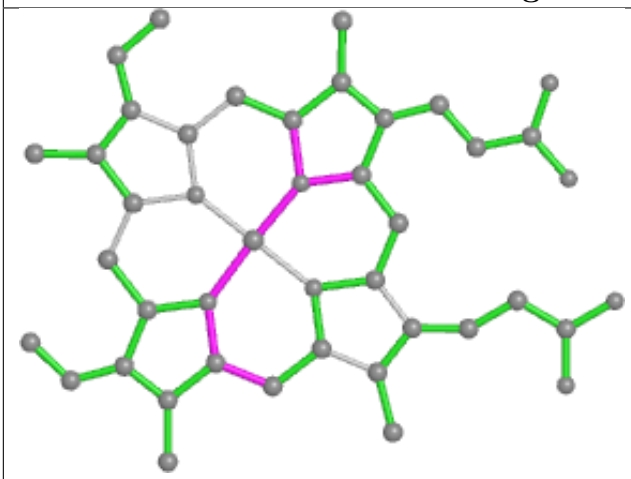


Torsions

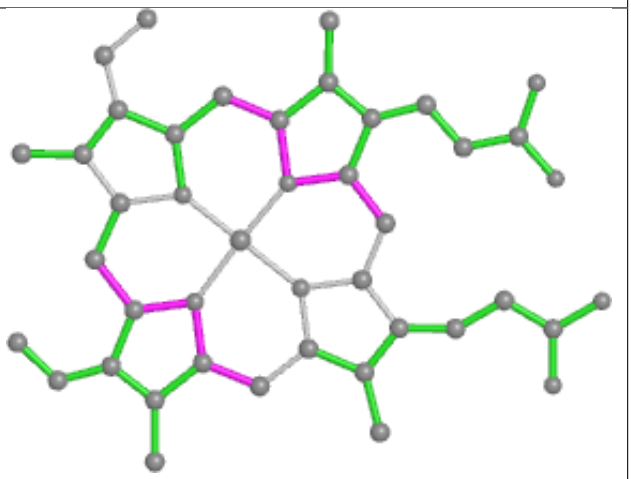


Rings

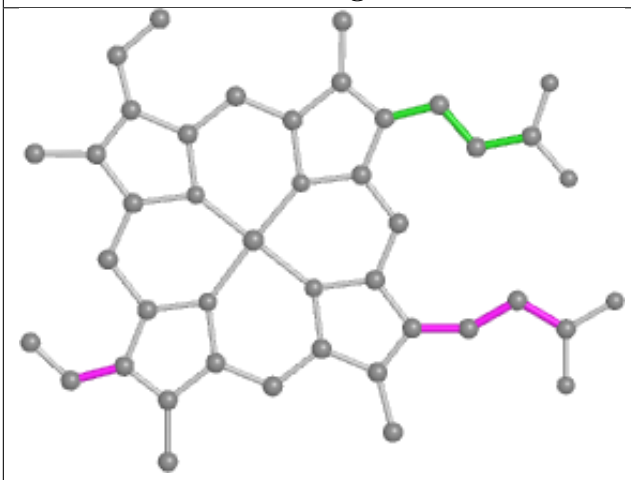
Ligand HEM J 201



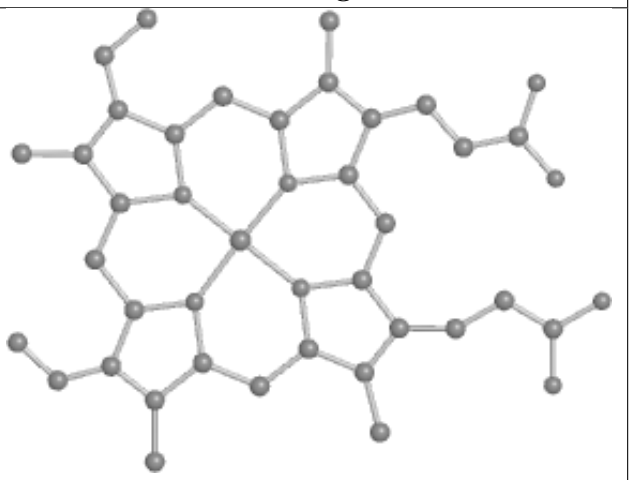
Bond lengths



Bond angles

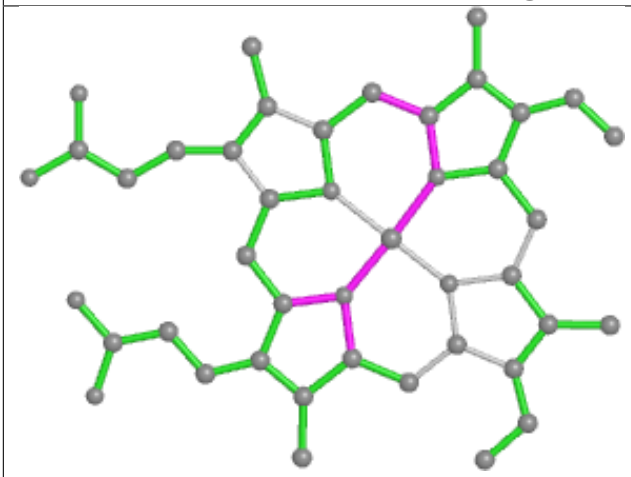


Torsions

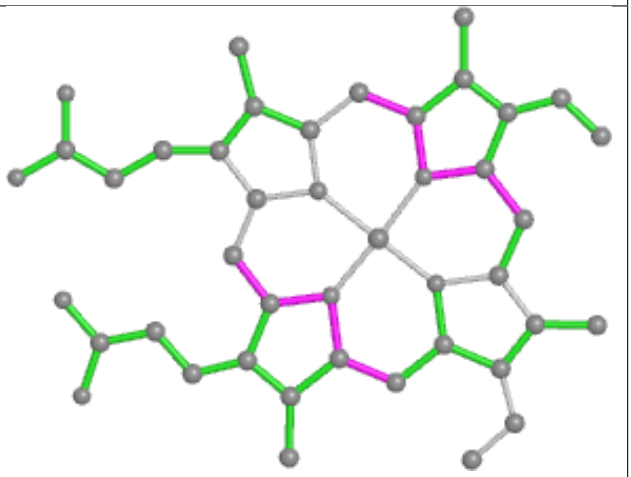


Rings

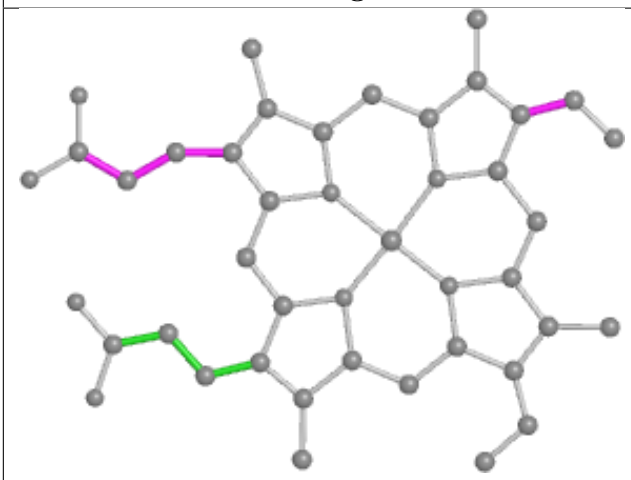
Ligand HEM L 201



Bond lengths



Bond angles



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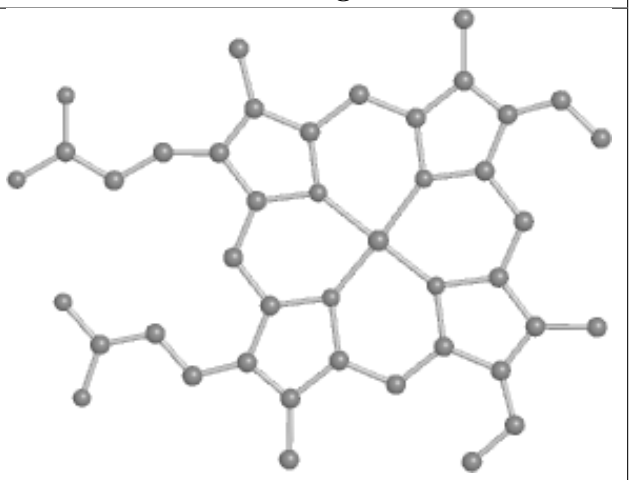
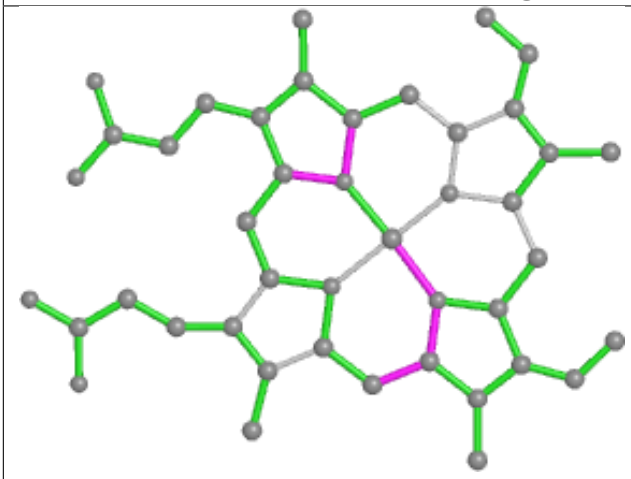
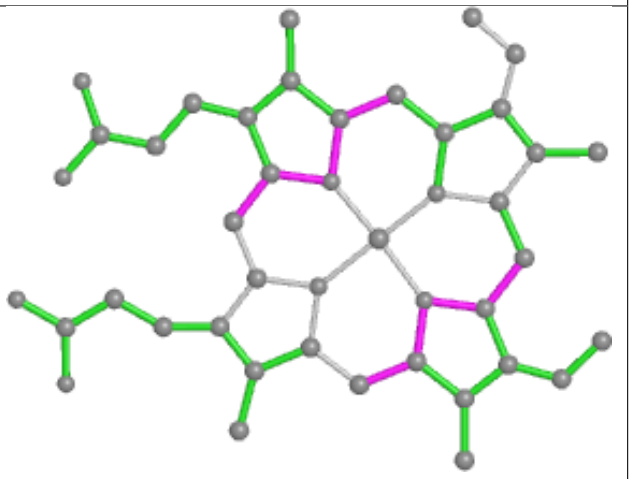


Rings

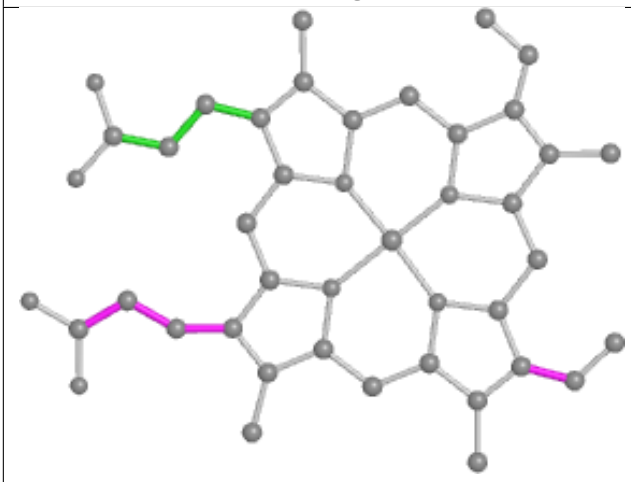
Ligand HEM D 201



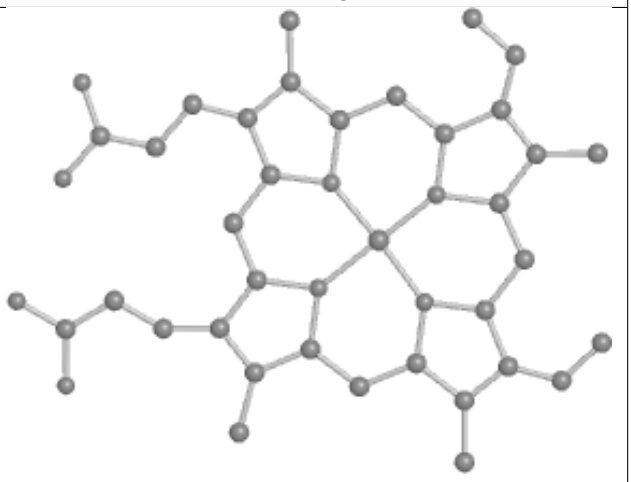
Bond lengths



Bond angles

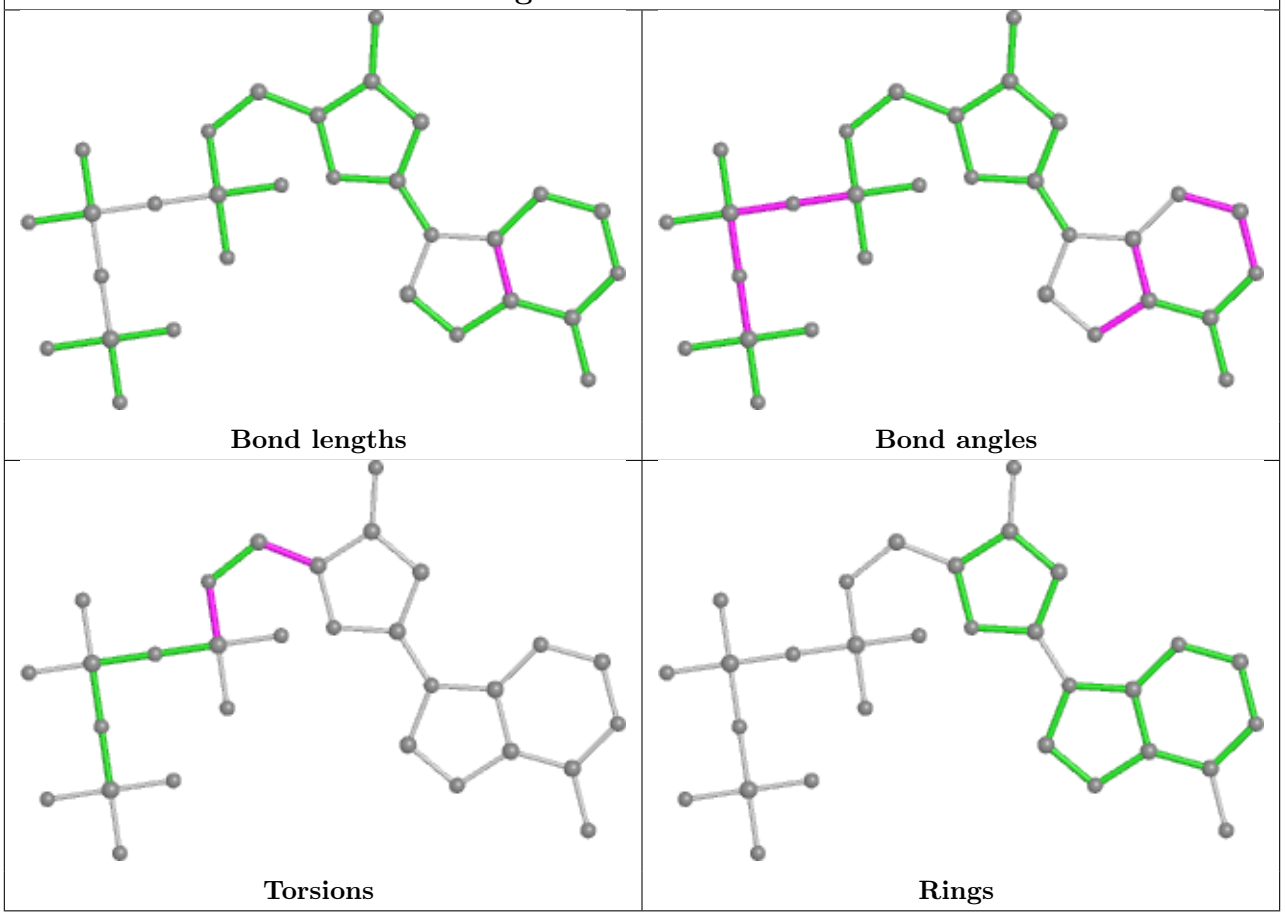


Torsions



Rings

Ligand DTP C 1301



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	K	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	K	1179:TRP	C	1180:VAL	N	1.19

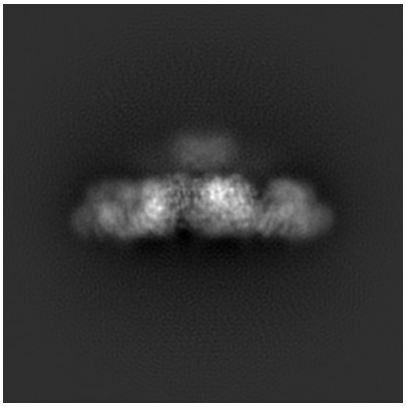
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-6690. These allow visual inspection of the internal detail of the map and identification of artifacts.

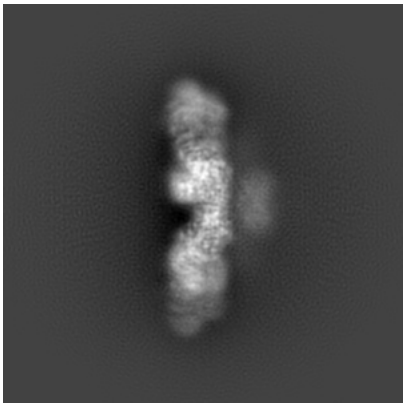
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

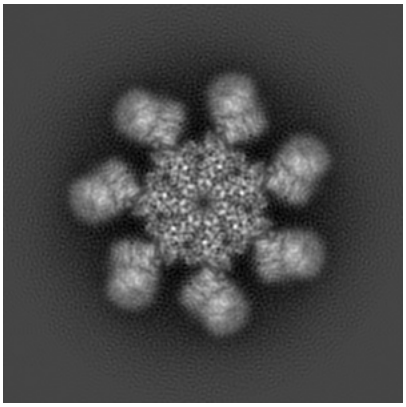
6.1.1 Primary map



X



Y

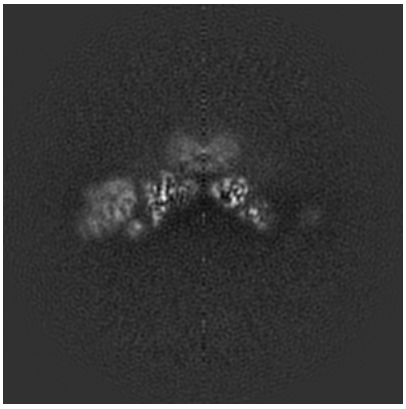


Z

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

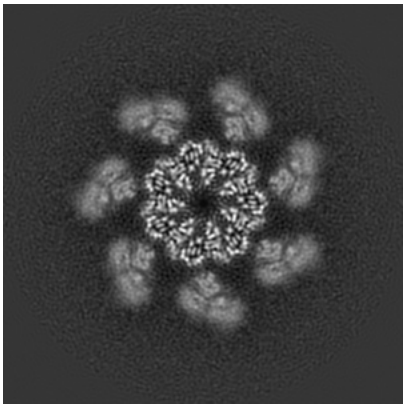
6.2 Central slices

6.2.1 Primary map



X Index: 160

Y Index: 160



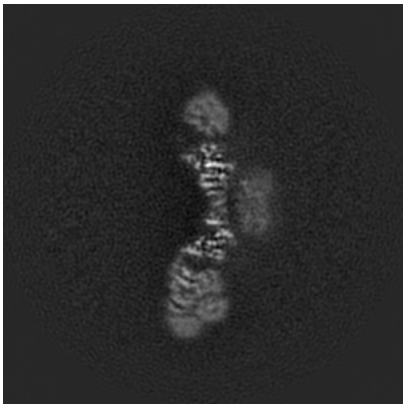
Z Index: 160

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

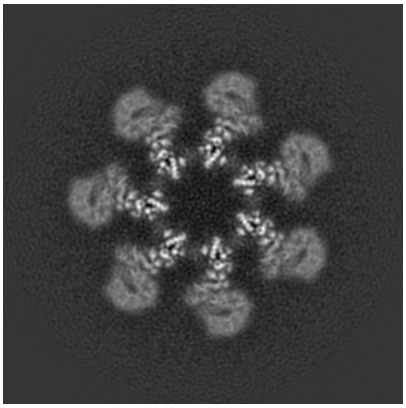
6.3 Largest variance slices (i)

6.3.1 Primary map

X Index: 174



Y Index: 168



Z Index: 149

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

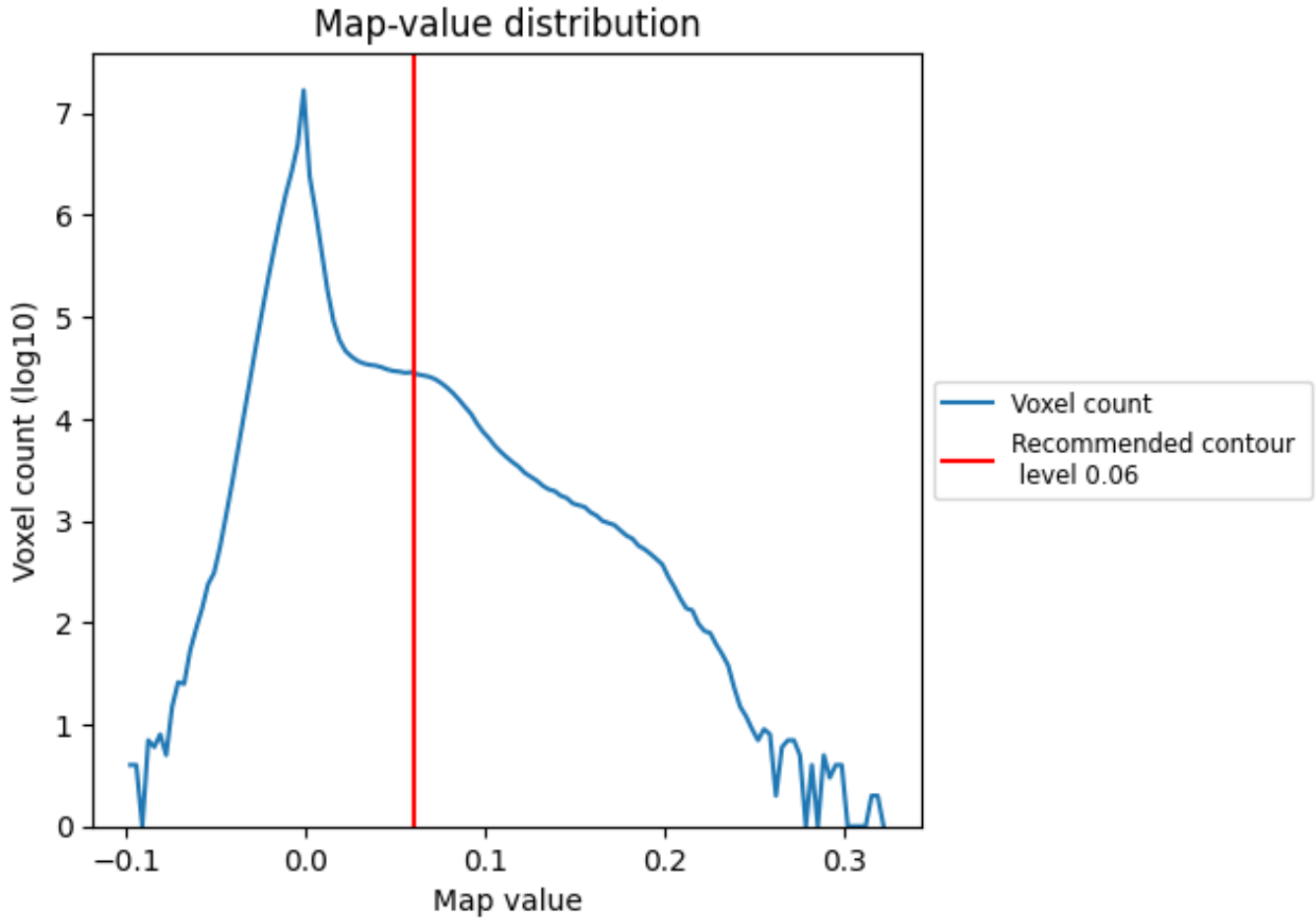
6.5 Mask visualisation (i)

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

7 Map analysis

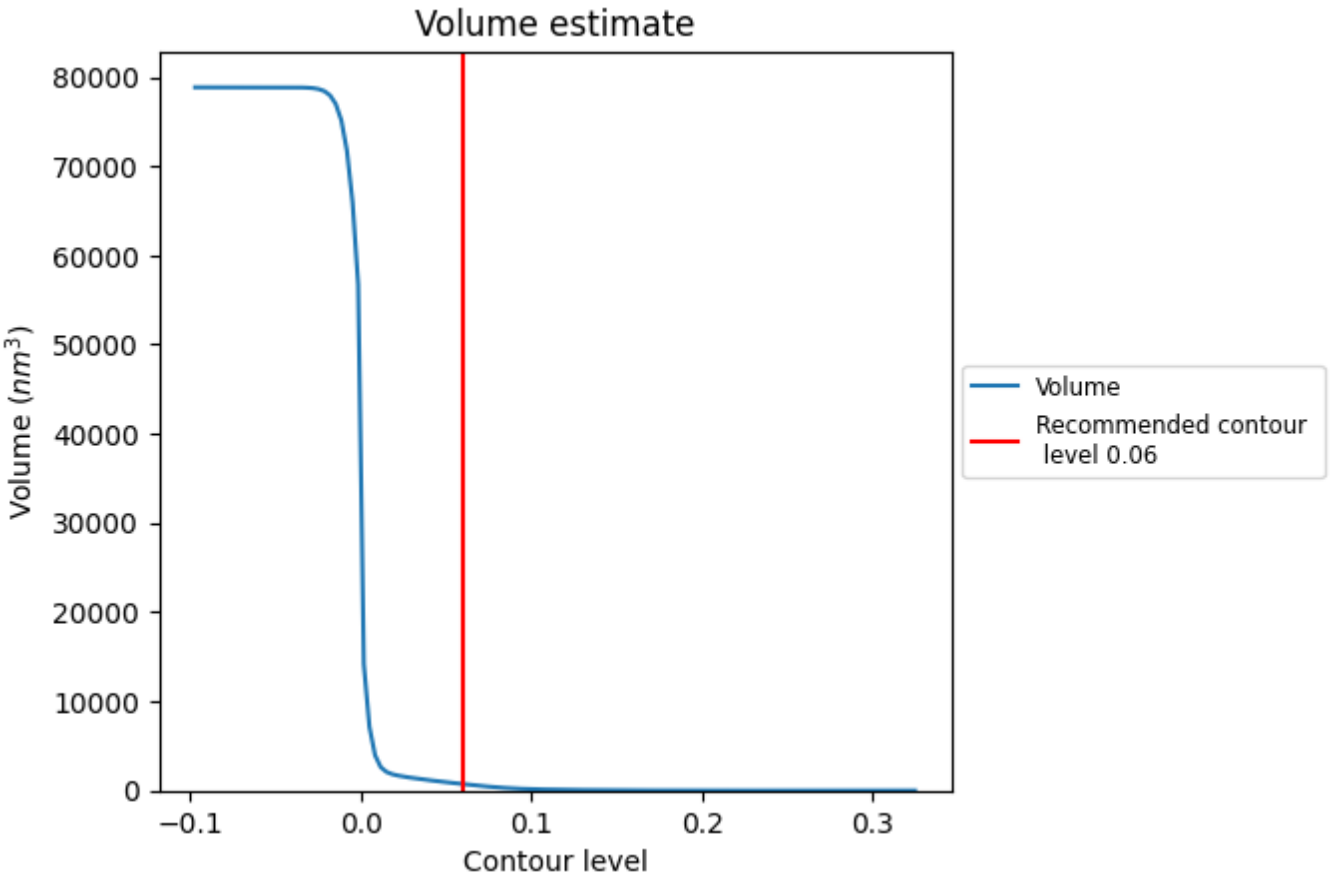
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

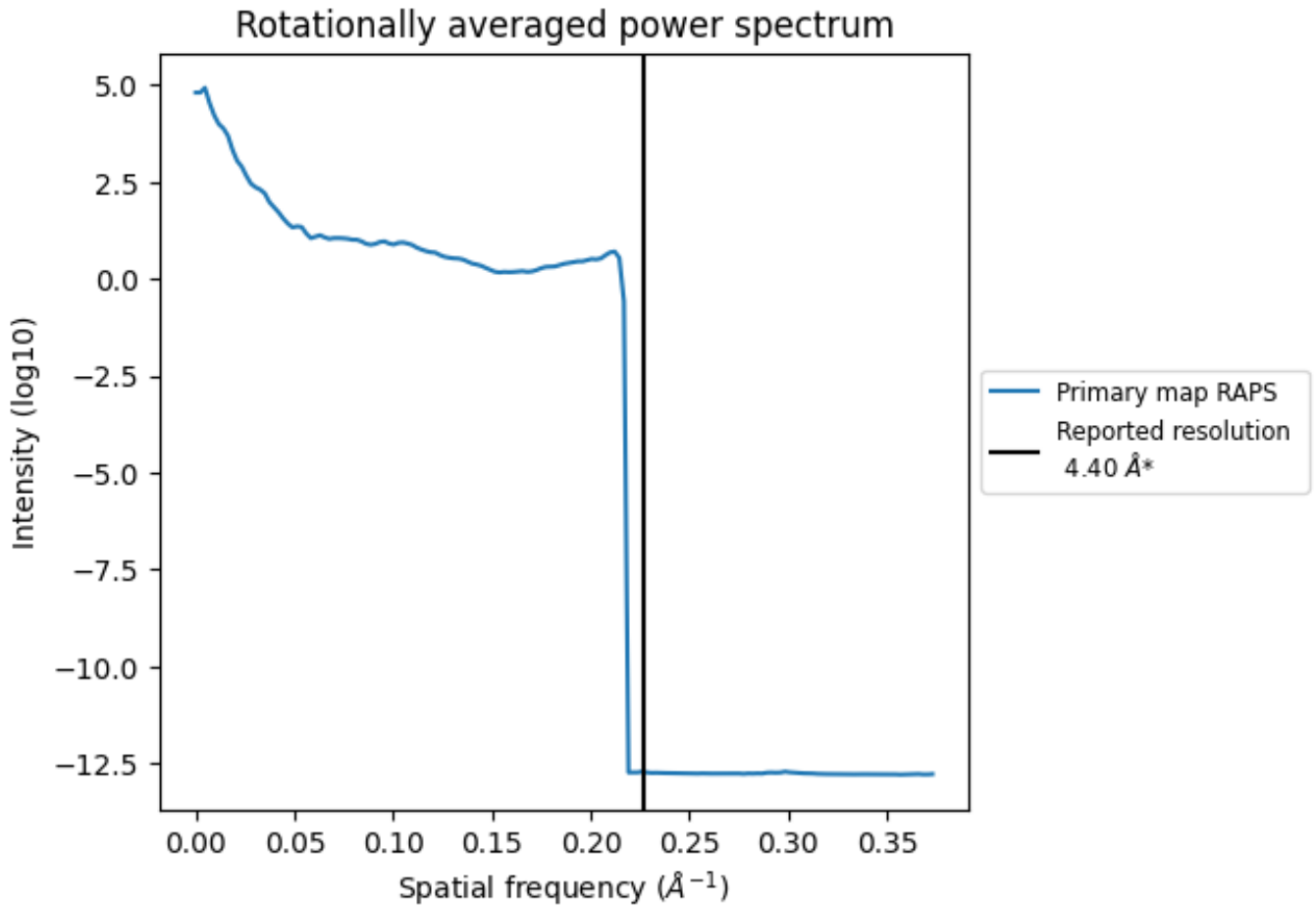
7.2 Volume estimate (i)



The volume at the recommended contour level is 726 nm^3; this corresponds to an approximate mass of 656 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 0.227 Å^{-1}

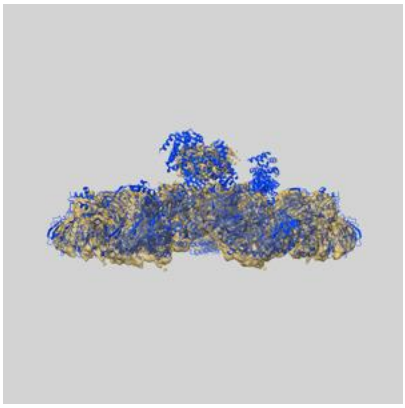
8 Fourier-Shell correlation (i)

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

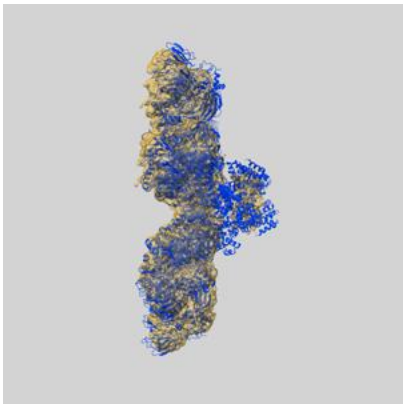
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-6690 and PDB model 5WVE. Per-residue inclusion information can be found in section 3 on page 8.

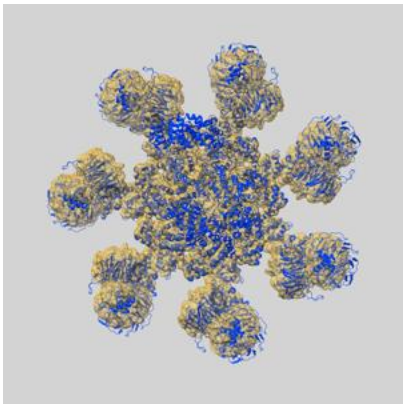
9.1 Map-model overlay



X



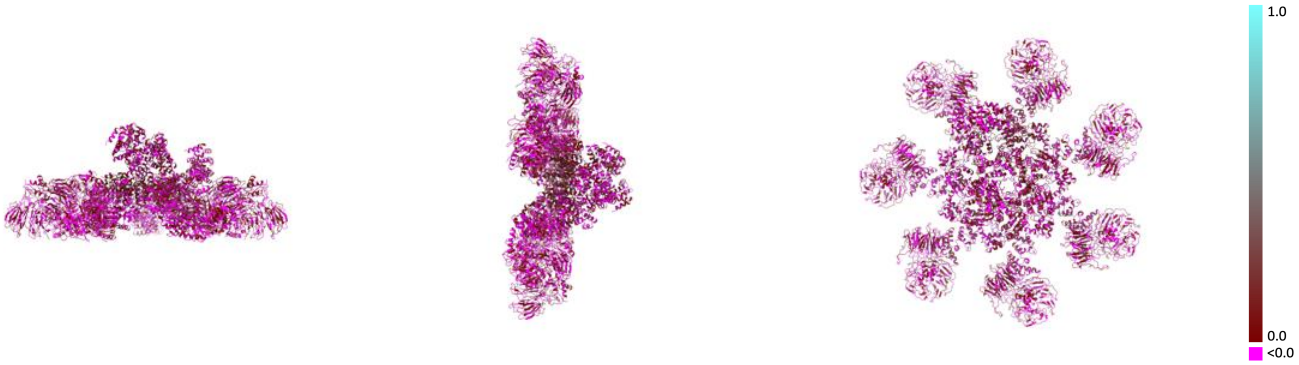
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.06 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

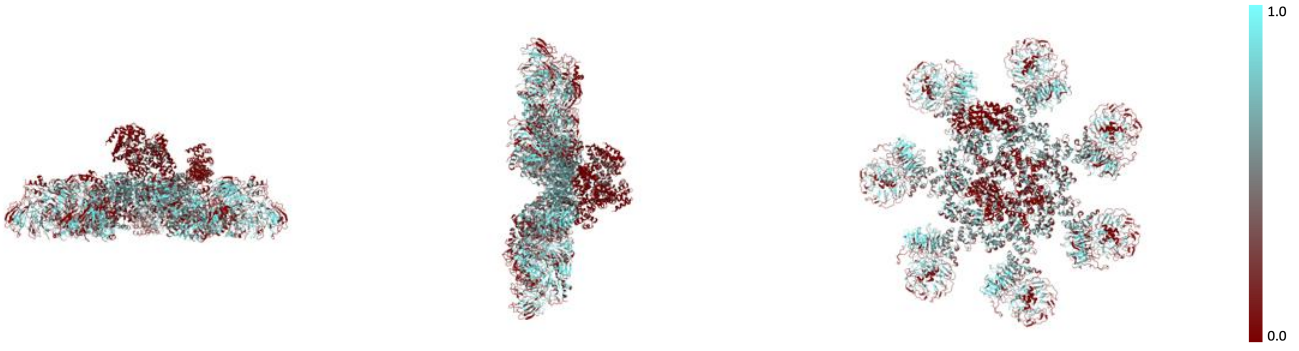
9.2 Q-score mapped to coordinate model



X Y Z

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

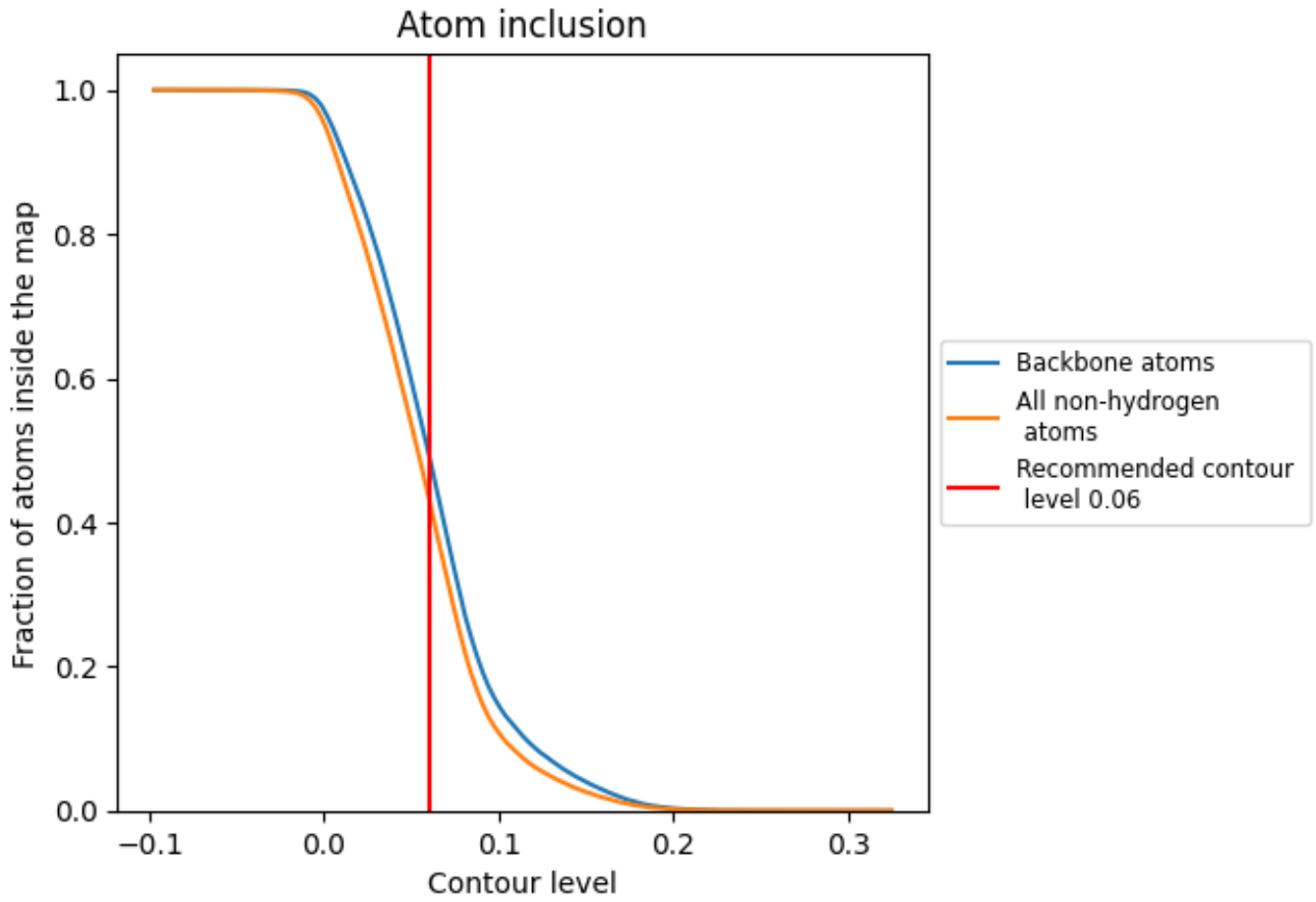
9.3 Atom inclusion mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.06).

9.4 Atom inclusion (i)



At the recommended contour level, 49% of all backbone atoms, 43% 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 (0.06) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4333	0.0380
A	0.5306	0.0810
B	0.4408	0.0420
C	0.5082	0.0470
D	0.5299	0.0170
E	0.4464	0.0150
F	0.5275	0.0380
G	0.4648	0.0260
H	0.4853	-0.0000
I	0.4883	0.0440
J	0.4138	0.0310
K	0.4473	0.0360
L	0.3329	0.0170
M	0.4551	0.0380
N	0.3341	0.0140
O	0.0802	0.0250
P	0.1383	0.0500
Q	0.1452	0.0310
R	0.1286	0.0130
S	0.2819	0.0140
T	0.1303	0.0600
U	0.0359	0.0300
V	0.0279	0.0440
W	0.0000	0.0410
X	0.0000	-0.0170
Y	0.0000	-0.0060