wwPDB EM Validation Summary Report (i)

Oct 29, 2026 – 12:37 pm GMT

PDB ID	:	9SR3 / pdb_00009sr3
EMDB ID	:	EMD-55128
Title	:	Structure of stacked allo-activated CBS conformer by allosteric SAM - by Helical approach
Authors	:	Inayathulla, M.; Tomas, M.
Deposited on	:	2025-09-23
Resolution	:	8.50 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:

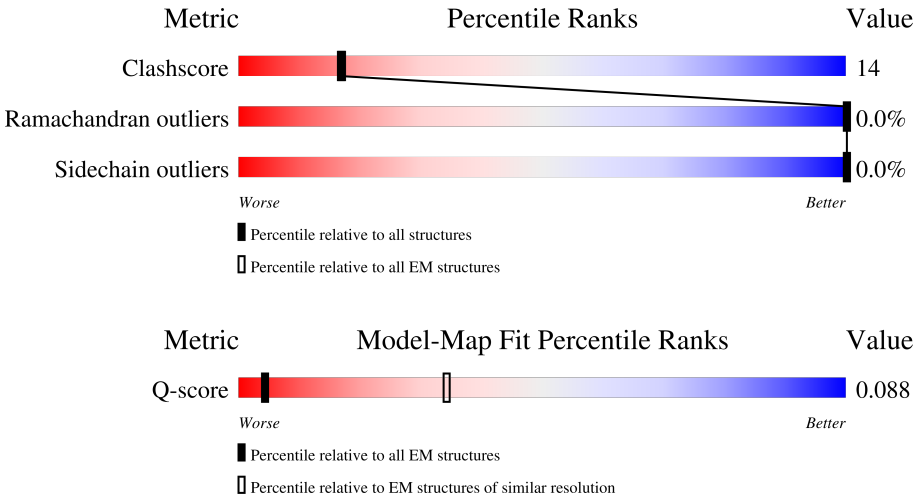
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.2
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

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 8.50 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	328 (8.00 - 9.00)

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	550	14% 11% 75%
1	B	550	12% 13% 75%
1	C	550	13% 12% 75%
1	D	550	14% 11% 75%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	E	550	13% 13% 75%
1	F	550	13% 12% 75%
1	G	550	12% 13% 75%
1	H	550	13% 12% 75%
1	I	550	11% 14% 75%
1	J	550	13% 12% 75%
1	K	550	11% 14% 75%
1	L	550	14% 11% 75%
1	a	550	14% 11% 75%
1	b	550	15% 10% 75%
1	c	550	13% 12% 75%
1	d	550	13% 12% 75%
1	e	550	12% 13% 75%
1	f	550	13% 13% 75%
1	g	550	14% 11% 75%
1	h	550	13% 12% 75%
1	i	550	13% 12% 75%
1	j	550	13% 12% 75%
1	k	550	13% 12% 75%
1	l	550	13% 13% 75%
2	M	550	45% 20% 35%
2	N	550	47% 18% 35%
2	O	550	46% 19% 35%
2	P	550	48% 17% 35%
2	Q	550	44% 21% 35%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	R	550	47% 18% 35%
2	S	550	45% 20% 35%
2	T	550	45% 20% 35%
2	U	550	47% 18% 35%
2	V	550	45% 20% 35%
2	W	550	46% 19% 35%
2	X	550	12% 53% 12% 35%
2	Y	550	15% 52% 13% 35%
2	Z	550	12% 54% 11% 35%
2	m	550	46% 19% 35%
2	n	550	15% 52% 13% 35%
2	o	550	12% 51% 14% 35%
2	p	550	15% 51% 14% 35%
2	q	550	12% 53% 12% 35%
2	r	550	15% 52% 13% 35%
2	s	550	11% 52% 13% 35%
2	t	550	14% 51% 14% 35%
2	u	550	11% 52% 13% 35%
2	v	550	15% 51% 14% 35%
2	w	550	11% 51% 14% 35%
2	x	550	14% 49% 16% 35%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 97686 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 Cystathionine beta-synthase.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	b	139	Total	C	N	O	S	0	0
			1062	677	186	194	5		
1	a	138	Total	C	N	O	S	0	0
			1053	672	184	192	5		
1	f	139	Total	C	N	O	S	0	0
			1062	677	186	194	5		
1	e	138	Total	C	N	O	S	0	0
			1053	672	184	192	5		
1	j	139	Total	C	N	O	S	0	0
			1062	677	186	194	5		
1	i	138	Total	C	N	O	S	0	0
			1053	672	184	192	5		
1	d	139	Total	C	N	O	S	0	0
			1062	677	186	194	5		
1	c	138	Total	C	N	O	S	0	0
			1053	672	184	192	5		
1	h	139	Total	C	N	O	S	0	0
			1062	677	186	194	5		
1	g	138	Total	C	N	O	S	0	0
			1053	672	184	192	5		
1	l	139	Total	C	N	O	S	0	0
			1062	677	186	194	5		
1	k	138	Total	C	N	O	S	0	0
			1053	672	184	192	5		
1	B	139	Total	C	N	O	S	0	0
			1062	677	186	194	5		
1	A	138	Total	C	N	O	S	0	0
			1053	672	184	192	5		
1	F	139	Total	C	N	O	S	0	0
			1062	677	186	194	5		
1	E	138	Total	C	N	O	S	0	0
			1053	672	184	192	5		
1	J	139	Total	C	N	O	S	0	0
			1062	677	186	194	5		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					AltConf	Trace
1	I	138	Total	C	N	O	S	0	0
			1053	672	184	192	5		
1	D	139	Total	C	N	O	S	0	0
			1062	677	186	194	5		
1	C	138	Total	C	N	O	S	0	0
			1053	672	184	192	5		
1	H	139	Total	C	N	O	S	0	0
			1062	677	186	194	5		
1	G	138	Total	C	N	O	S	0	0
			1053	672	184	192	5		
1	L	139	Total	C	N	O	S	0	0
			1062	677	186	194	5		
1	K	138	Total	C	N	O	S	0	0
			1053	672	184	192	5		

- Molecule 2 is a protein called Cystathionine beta-synthase.

Mol	Chain	Residues	Atoms						AltConf	Trace
2	M	358	Total	C	N	O	P	S	0	0
			2733	1718	478	519	1	17		
2	N	359	Total	C	N	O	P	S	0	0
			2743	1723	480	522	1	17		
2	O	358	Total	C	N	O	P	S	0	0
			2733	1718	478	519	1	17		
2	P	359	Total	C	N	O	P	S	0	0
			2743	1723	480	522	1	17		
2	Q	358	Total	C	N	O	P	S	0	0
			2733	1718	478	519	1	17		
2	R	359	Total	C	N	O	P	S	0	0
			2743	1723	480	522	1	17		
2	m	358	Total	C	N	O	P	S	0	0
			2733	1718	478	519	1	17		
2	S	359	Total	C	N	O	P	S	0	0
			2743	1723	480	522	1	17		
2	T	358	Total	C	N	O	P	S	0	0
			2733	1718	478	519	1	17		
2	U	359	Total	C	N	O	P	S	0	0
			2743	1723	480	522	1	17		
2	V	358	Total	C	N	O	P	S	0	0
			2733	1718	478	519	1	17		
2	W	359	Total	C	N	O	P	S	0	0
			2743	1723	480	522	1	17		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms						AltConf	Trace
2	X	358	Total	C	N	O	P	S	0	0
			2733	1718	478	519	1	17		
2	Y	359	Total	C	N	O	P	S	0	0
			2743	1723	480	522	1	17		
2	Z	358	Total	C	N	O	P	S	0	0
			2733	1718	478	519	1	17		
2	n	359	Total	C	N	O	P	S	0	0
			2743	1723	480	522	1	17		
2	o	358	Total	C	N	O	P	S	0	0
			2733	1718	478	519	1	17		
2	p	359	Total	C	N	O	P	S	0	0
			2743	1723	480	522	1	17		
2	q	358	Total	C	N	O	P	S	0	0
			2733	1718	478	519	1	17		
2	r	359	Total	C	N	O	P	S	0	0
			2743	1723	480	522	1	17		
2	s	358	Total	C	N	O	P	S	0	0
			2733	1718	478	519	1	17		
2	t	359	Total	C	N	O	P	S	0	0
			2743	1723	480	522	1	17		
2	u	358	Total	C	N	O	P	S	0	0
			2733	1718	478	519	1	17		
2	v	359	Total	C	N	O	P	S	0	0
			2743	1723	480	522	1	17		
2	w	358	Total	C	N	O	P	S	0	0
			2733	1718	478	519	1	17		
2	x	359	Total	C	N	O	P	S	0	0
			2743	1723	480	522	1	17		

There are 26 discrepancies between the modelled and reference sequences:

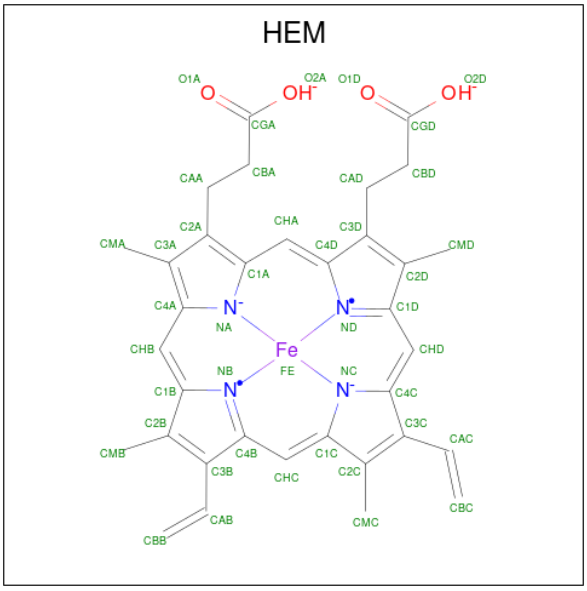
Chain	Residue	Modelled	Actual	Comment	Reference
M	201	SER	GLU	conflict	UNP P35520
N	201	SER	GLU	conflict	UNP P35520
O	201	SER	GLU	conflict	UNP P35520
P	201	SER	GLU	conflict	UNP P35520
Q	201	SER	GLU	conflict	UNP P35520
R	201	SER	GLU	conflict	UNP P35520
m	201	SER	GLU	conflict	UNP P35520
S	201	SER	GLU	conflict	UNP P35520
T	201	SER	GLU	conflict	UNP P35520
U	201	SER	GLU	conflict	UNP P35520
V	201	SER	GLU	conflict	UNP P35520

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
W	201	SER	GLU	conflict	UNP P35520
X	201	SER	GLU	conflict	UNP P35520
Y	201	SER	GLU	conflict	UNP P35520
Z	201	SER	GLU	conflict	UNP P35520
n	201	SER	GLU	conflict	UNP P35520
o	201	SER	GLU	conflict	UNP P35520
p	201	SER	GLU	conflict	UNP P35520
q	201	SER	GLU	conflict	UNP P35520
r	201	SER	GLU	conflict	UNP P35520
s	201	SER	GLU	conflict	UNP P35520
t	201	SER	GLU	conflict	UNP P35520
u	201	SER	GLU	conflict	UNP P35520
v	201	SER	GLU	conflict	UNP P35520
w	201	SER	GLU	conflict	UNP P35520
x	201	SER	GLU	conflict	UNP P35520

- Molecule 3 is PROTOPORPHYRIN IX CONTAINING FE (CCD ID: HEM) (formula: $C_{34}H_{32}FeN_4O_4$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
3	M	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	N	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	O	1	Total	C	Fe	N	O	0
			43	34	1	4	4	

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					AltConf
3	P	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	Q	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	R	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	m	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	S	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	T	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	U	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	V	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	W	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	X	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	Y	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	Z	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	n	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	o	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	p	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	q	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	r	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	s	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	t	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	u	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	v	1	Total	C	Fe	N	O	0
			43	34	1	4	4	

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					AltConf
3	w	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
3	x	1	Total	C	Fe	N	O	0
			43	34	1	4	4	

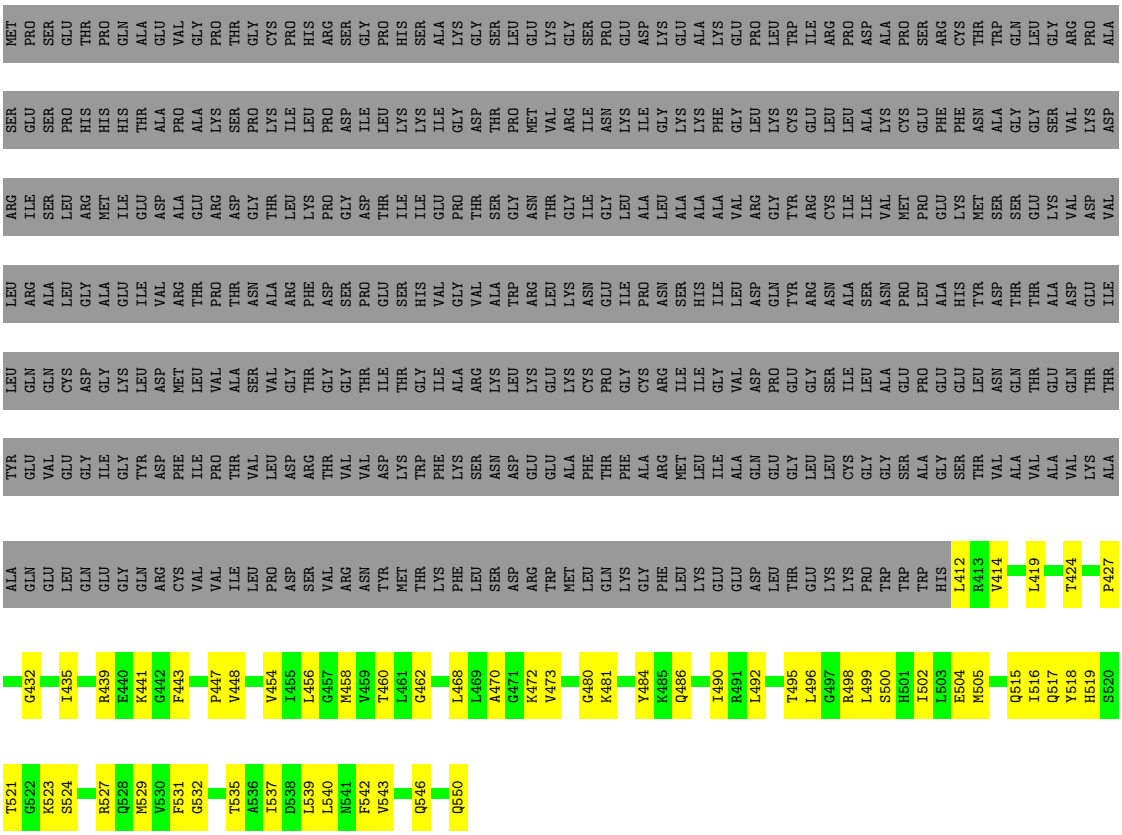
3 Residue-property plots (i)

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: Cystathionine beta-synthase

Chain b:

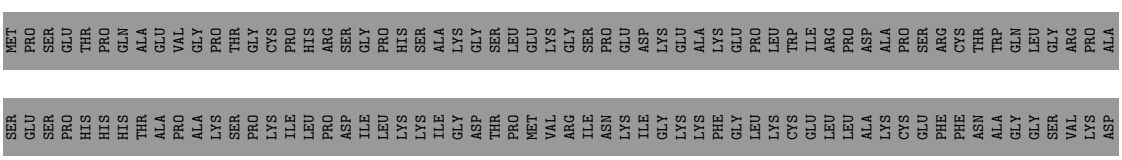


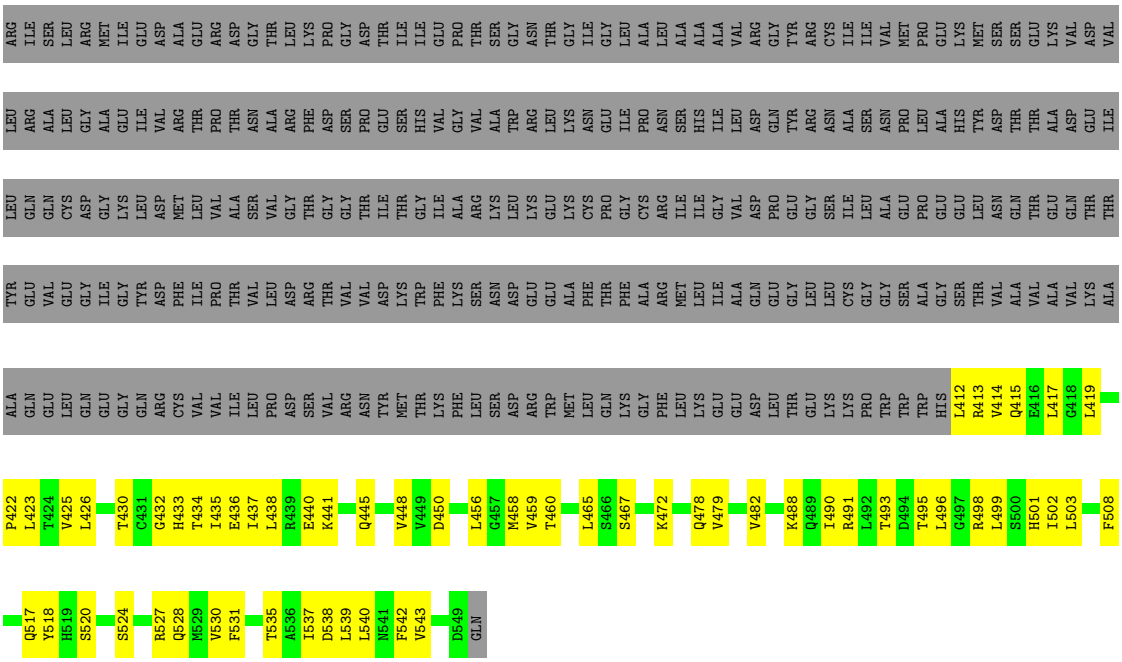


- Molecule 1: Cystathionine beta-synthase

Chain a:



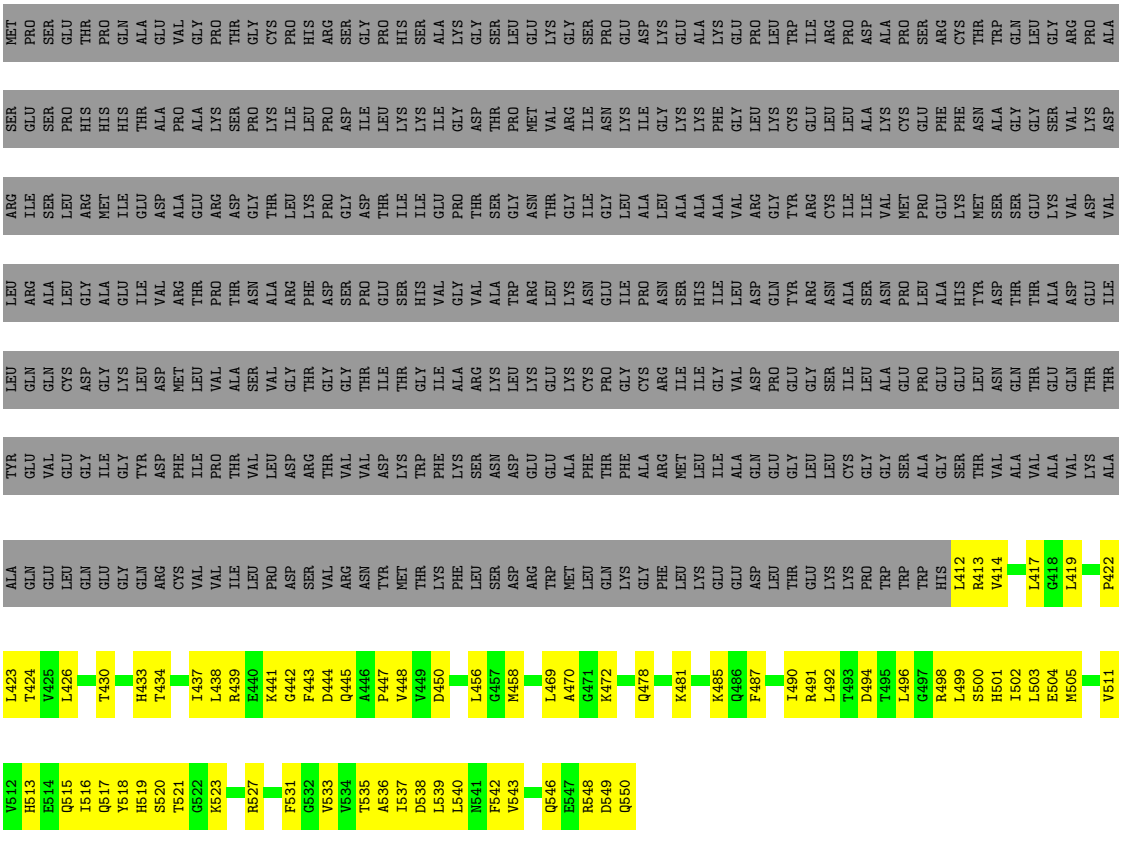




• Molecule 1: Cystathionine beta-synthase

Chain f:

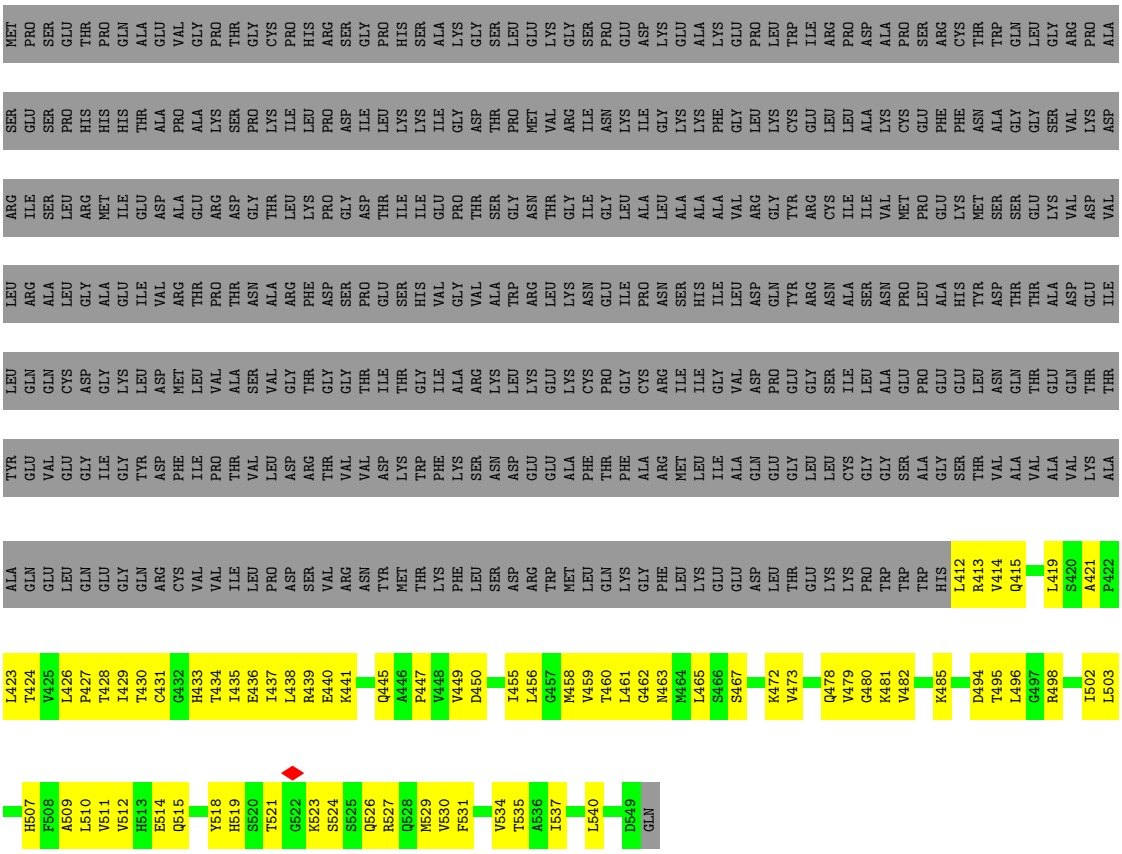




• Molecule 1: Cystathionine beta-synthase

Chain e:

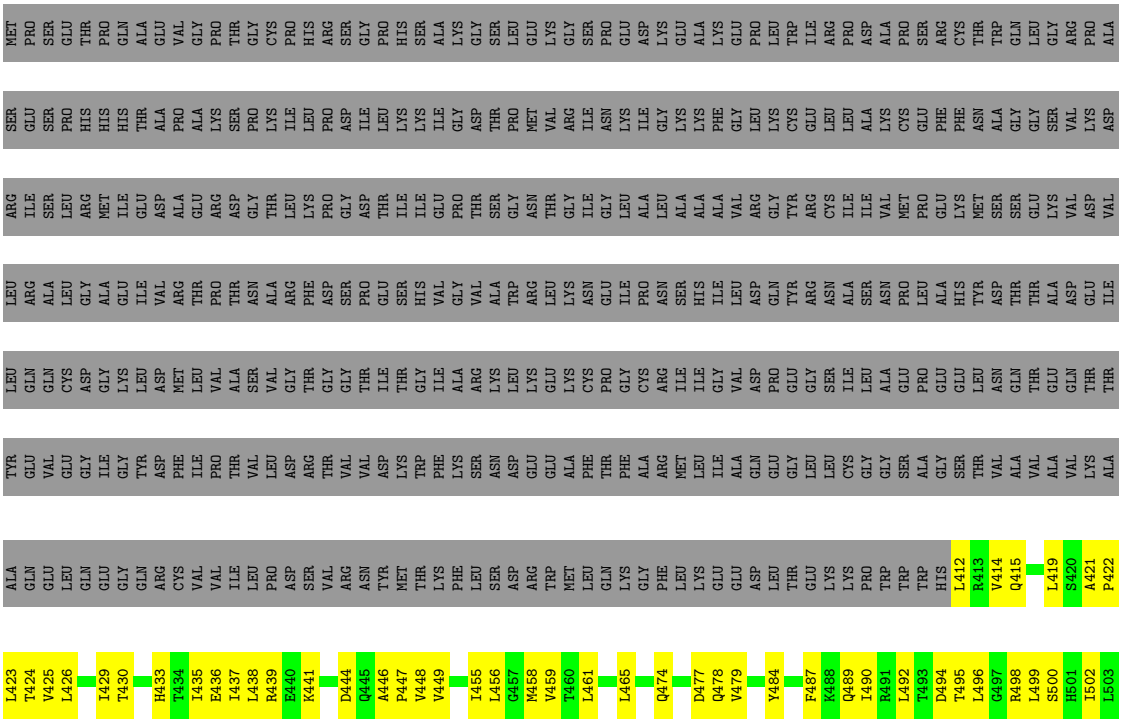


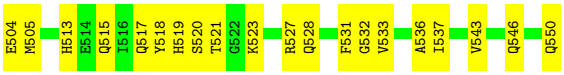


• Molecule 1: Cystathionine beta-synthase

Chain j:



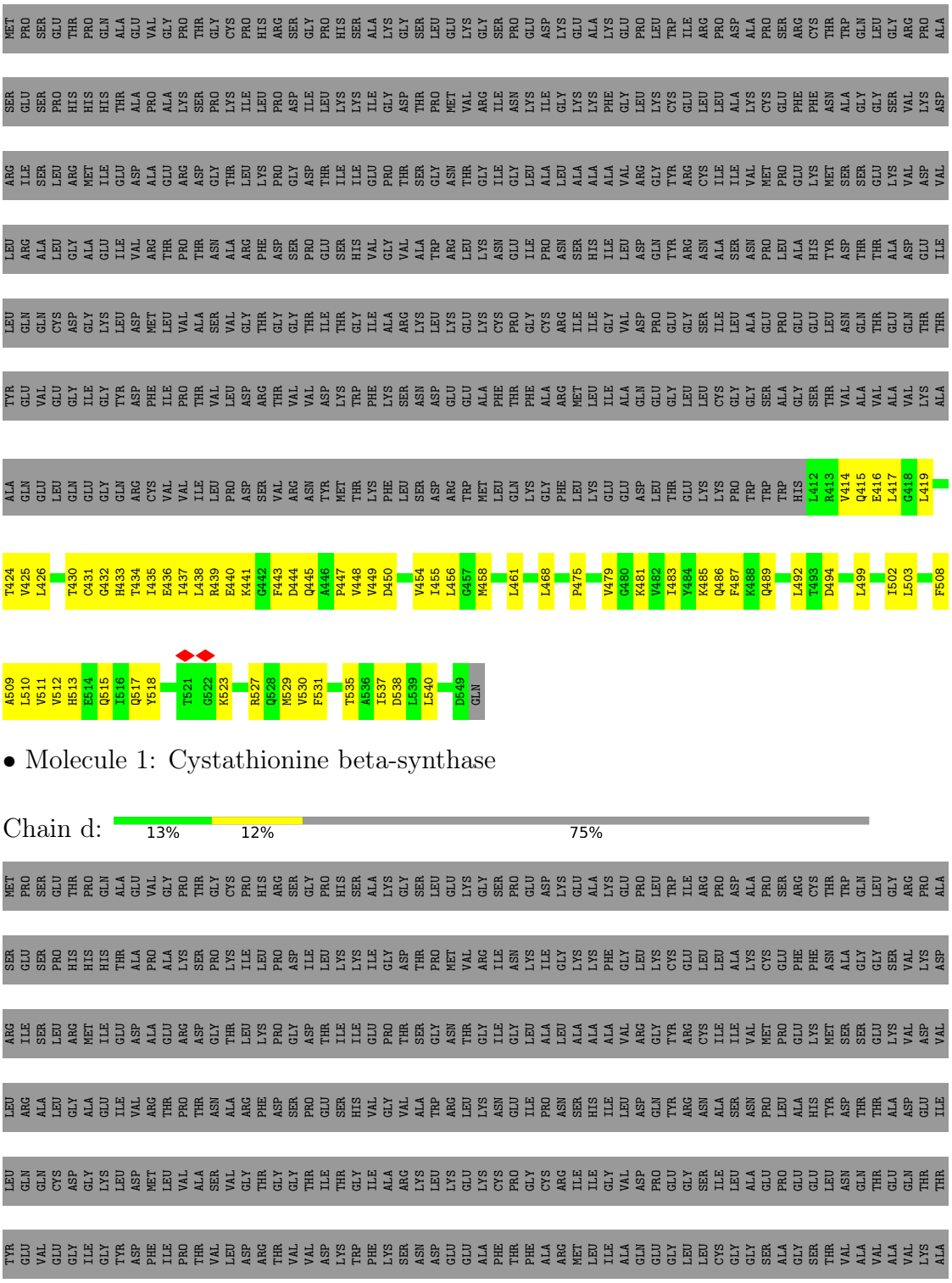




• Molecule 1: Cystathionine beta-synthase

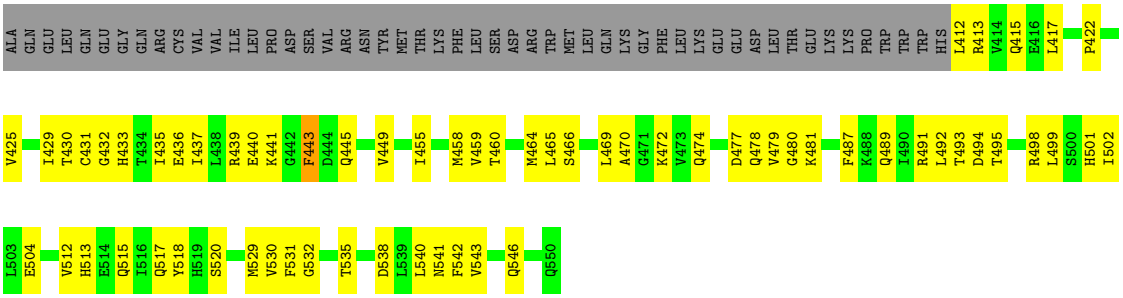
Chain i:





• Molecule 1: Cystathionine beta-synthase

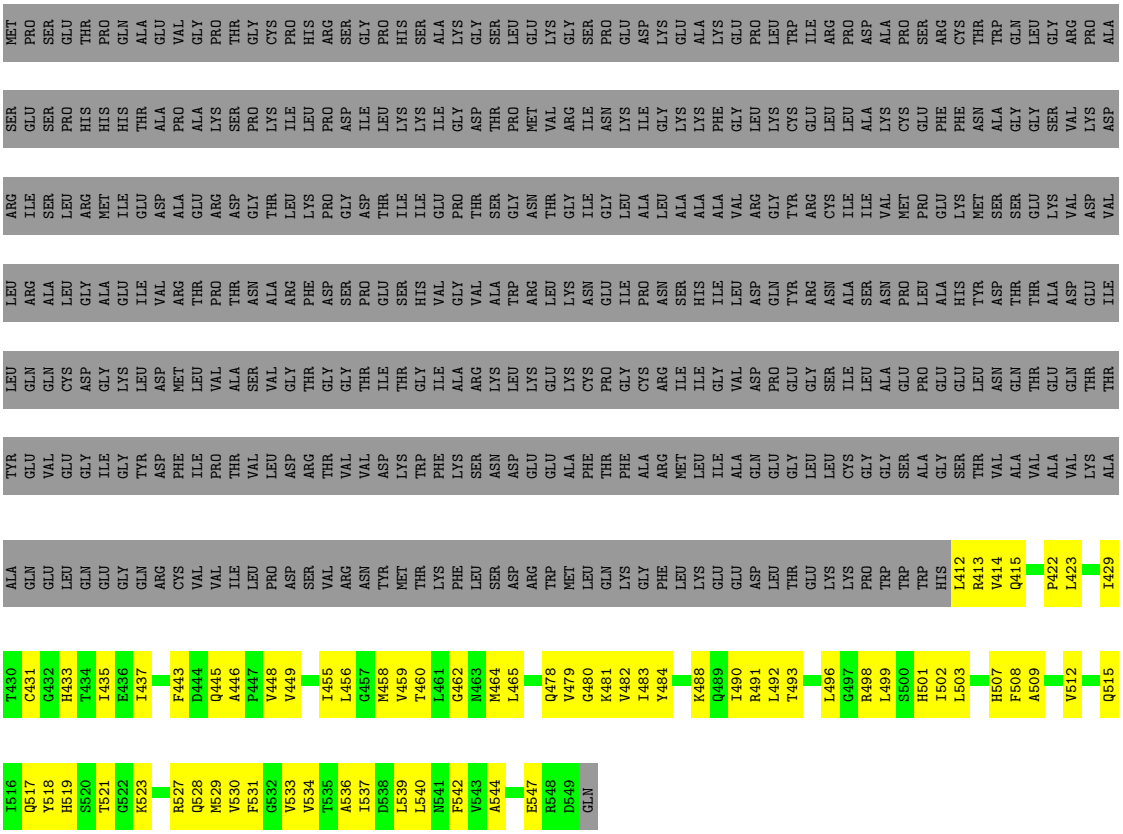
Chain d:



• Molecule 1: Cystathionine beta-synthase

Chain c:

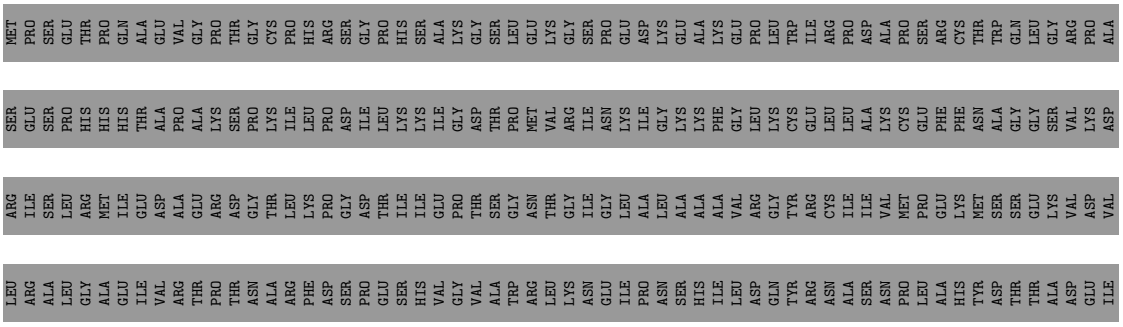


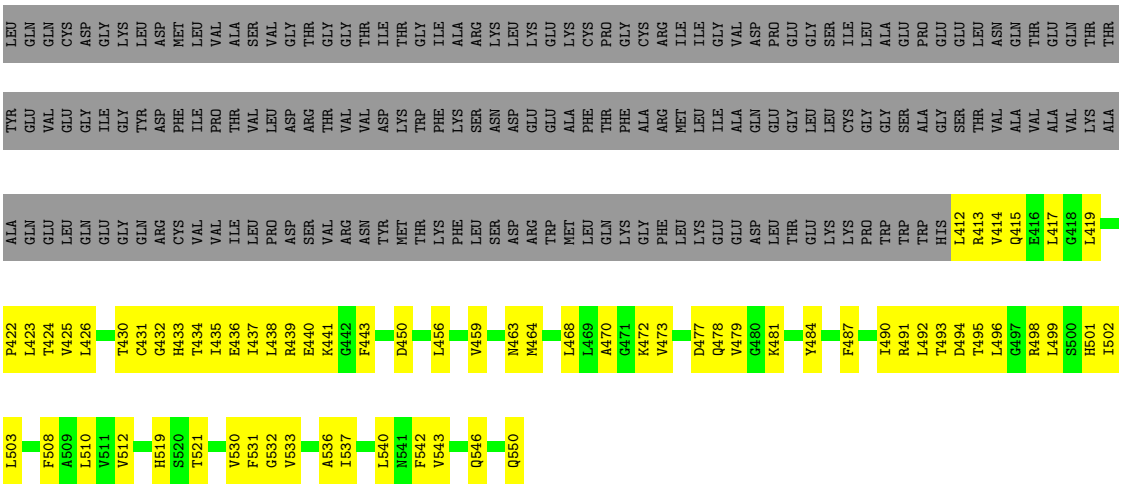


• Molecule 1: Cystathionine beta-synthase

Chain h:



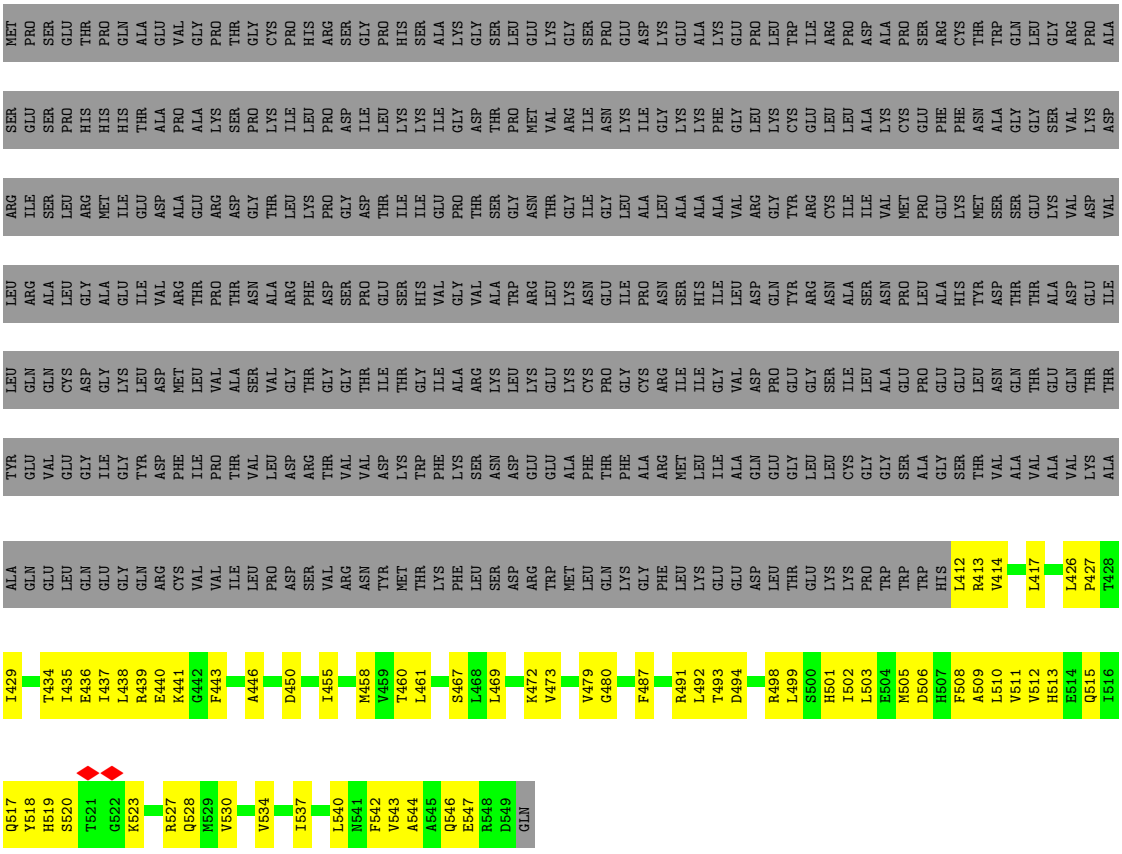




• Molecule 1: Cystathionine beta-synthase

Chain g:



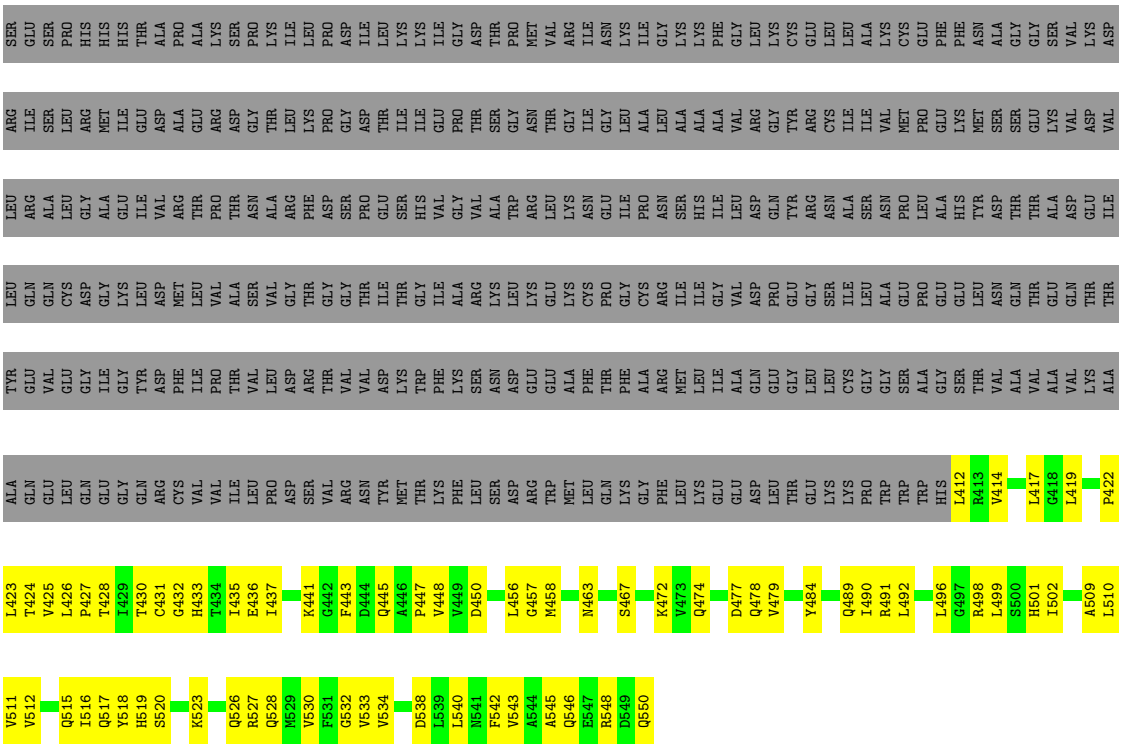


• Molecule 1: Cystathionine beta-synthase

Chain l:



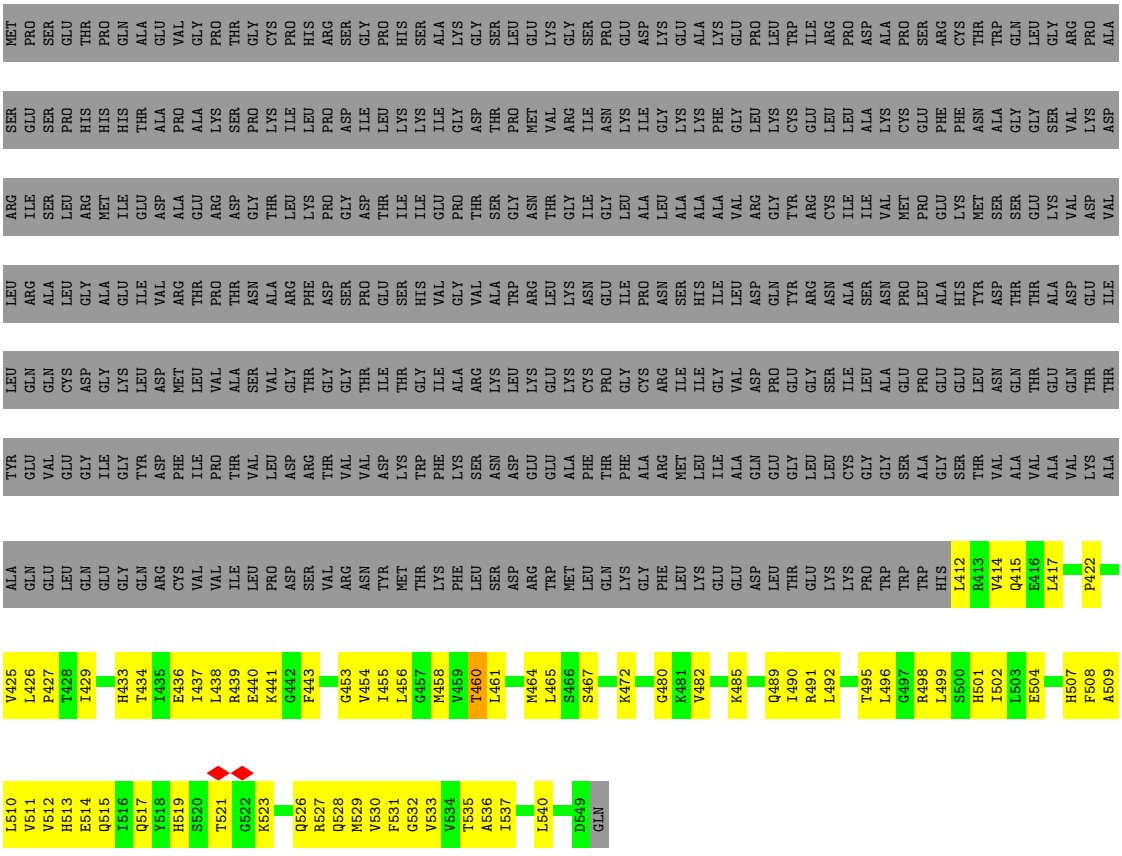




• Molecule 1: Cystathionine beta-synthase

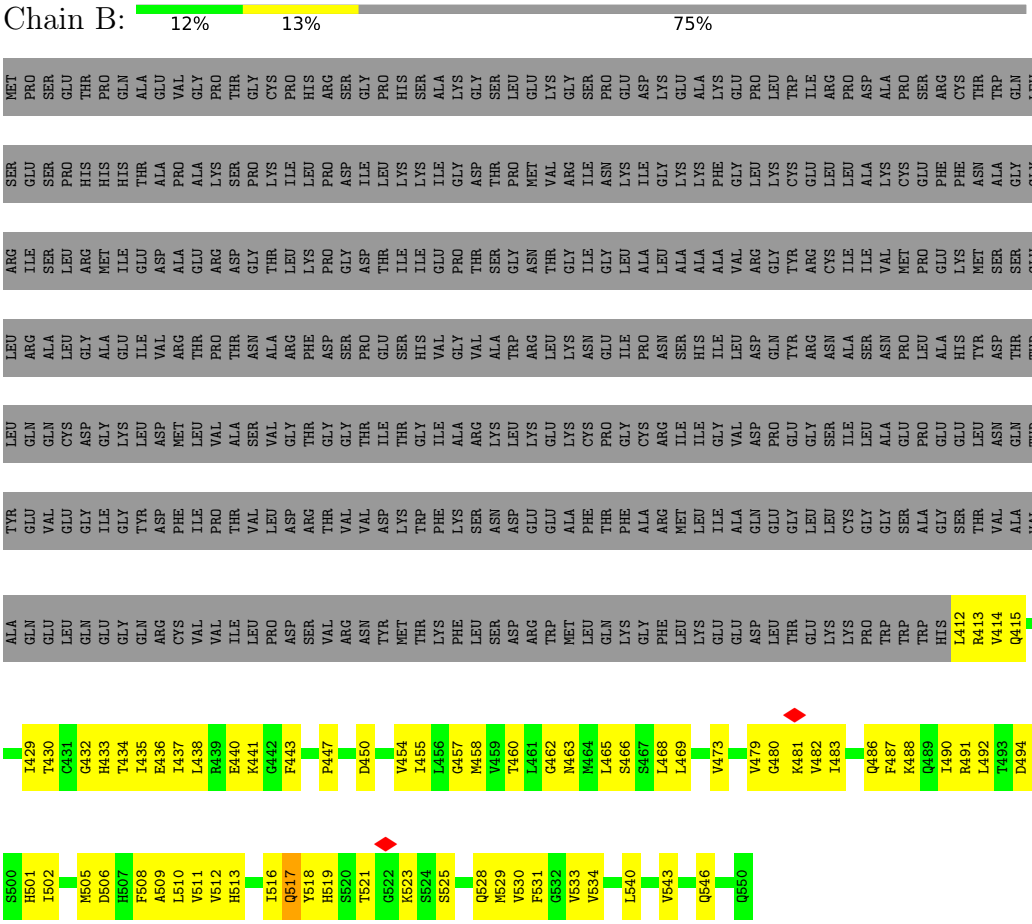
Chain k:





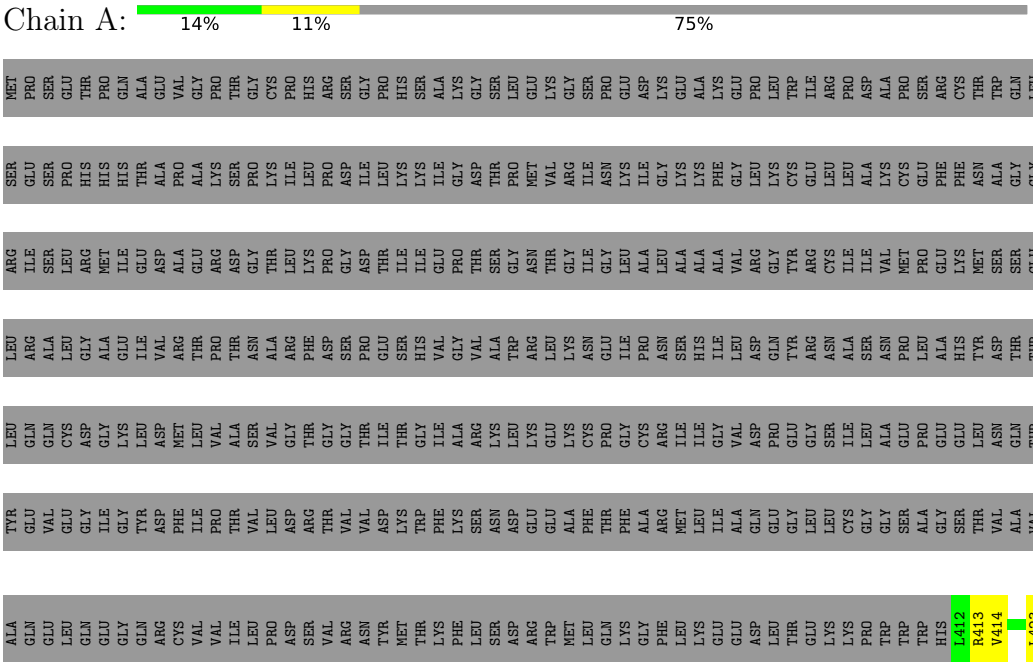
• Molecule 1: Cystathionine beta-synthase

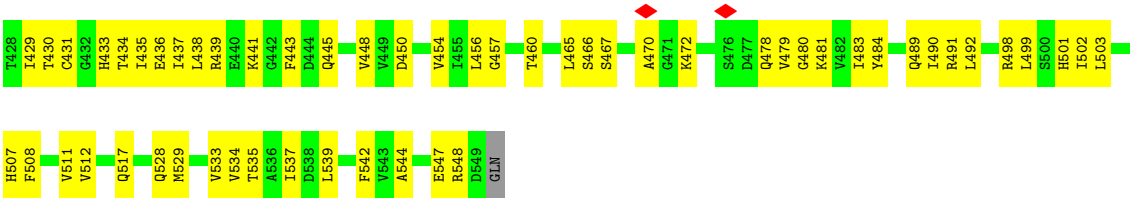
Chain B:



• Molecule 1: Cystathionine beta-synthase

Chain A:

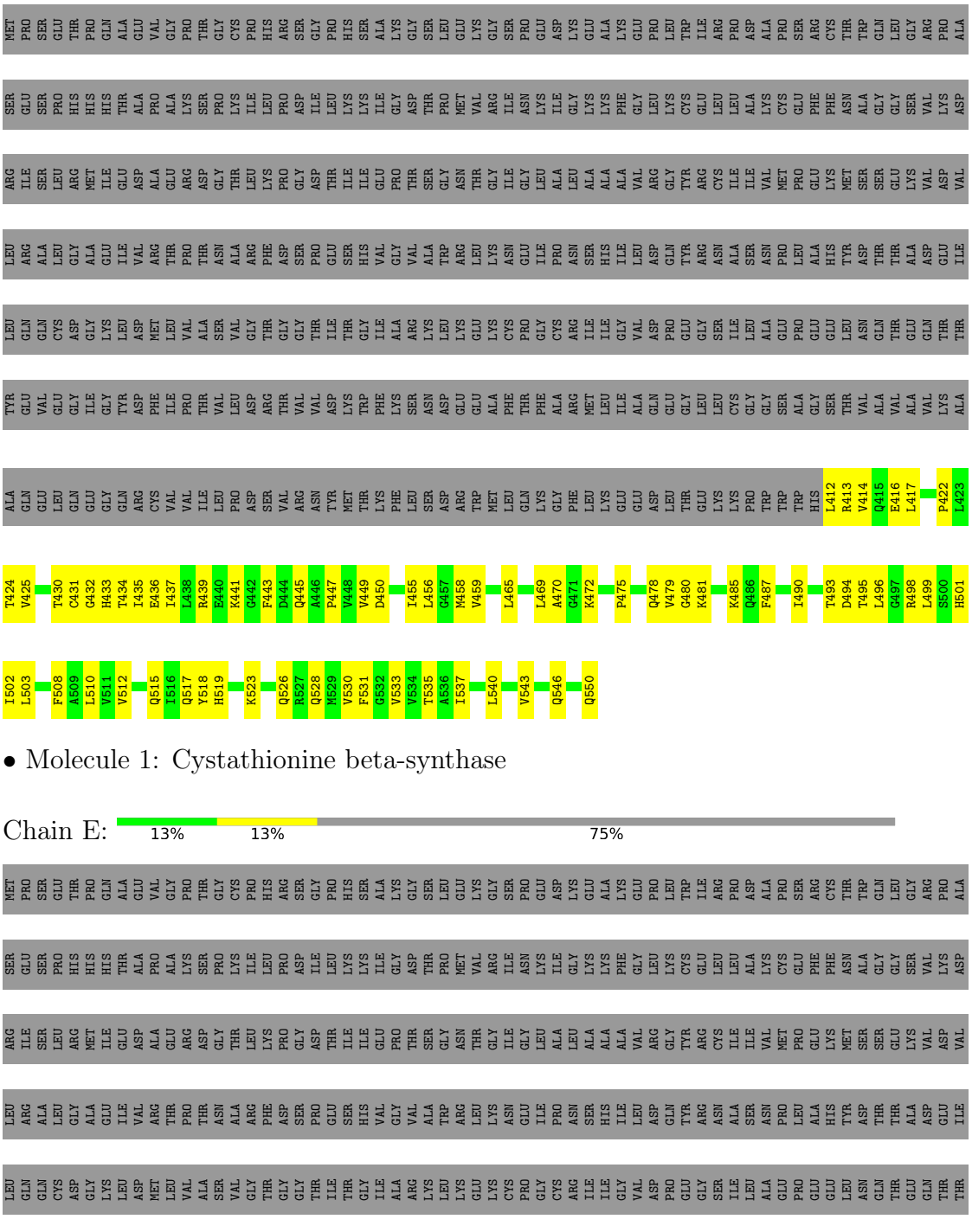




• Molecule 1: Cystathionine beta-synthase

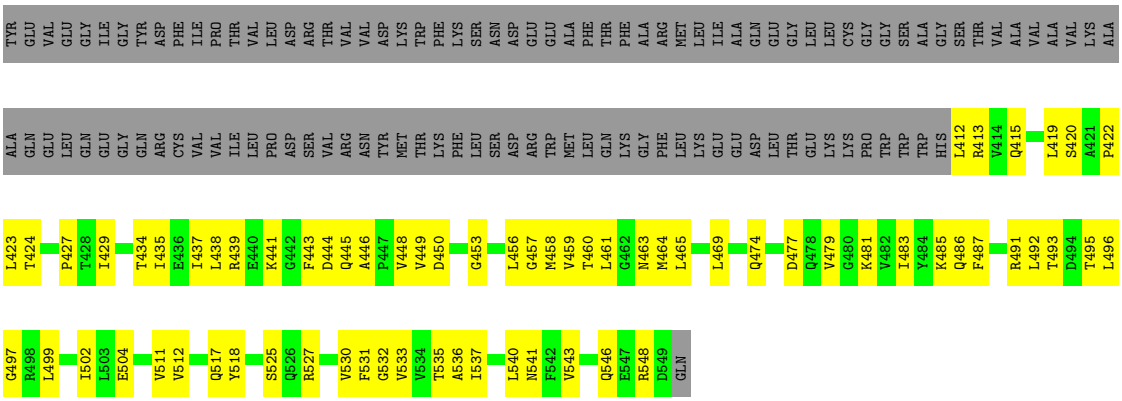
Chain F:





• Molecule 1: Cystathionine beta-synthase

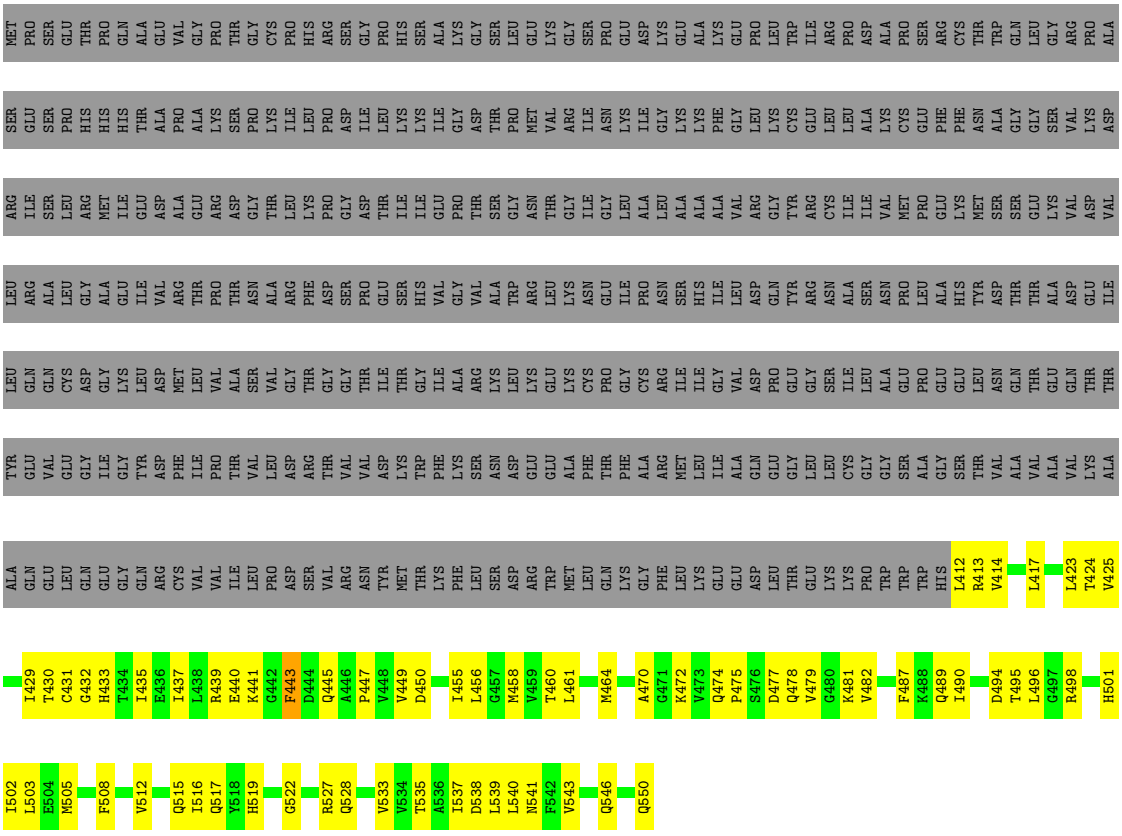
Chain E:



• Molecule 1: Cystathionine beta-synthase

Chain J:

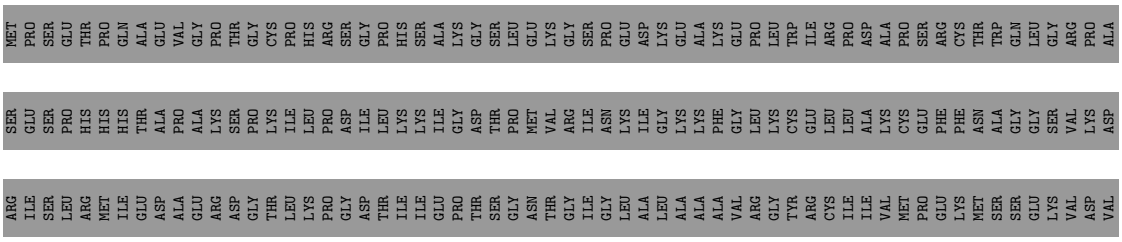


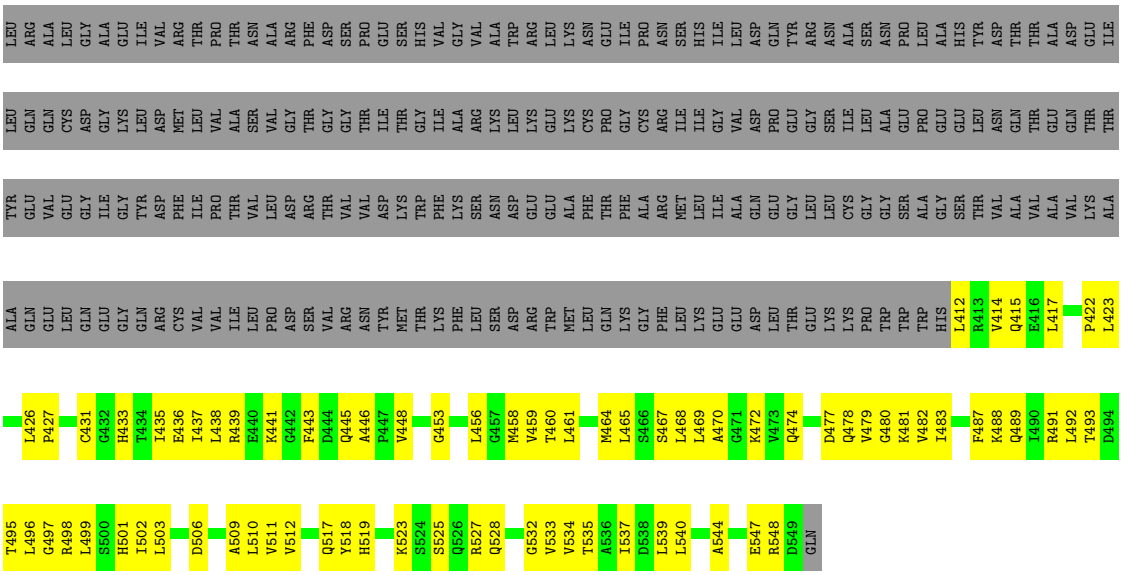


• Molecule 1: Cystathionine beta-synthase

Chain I:



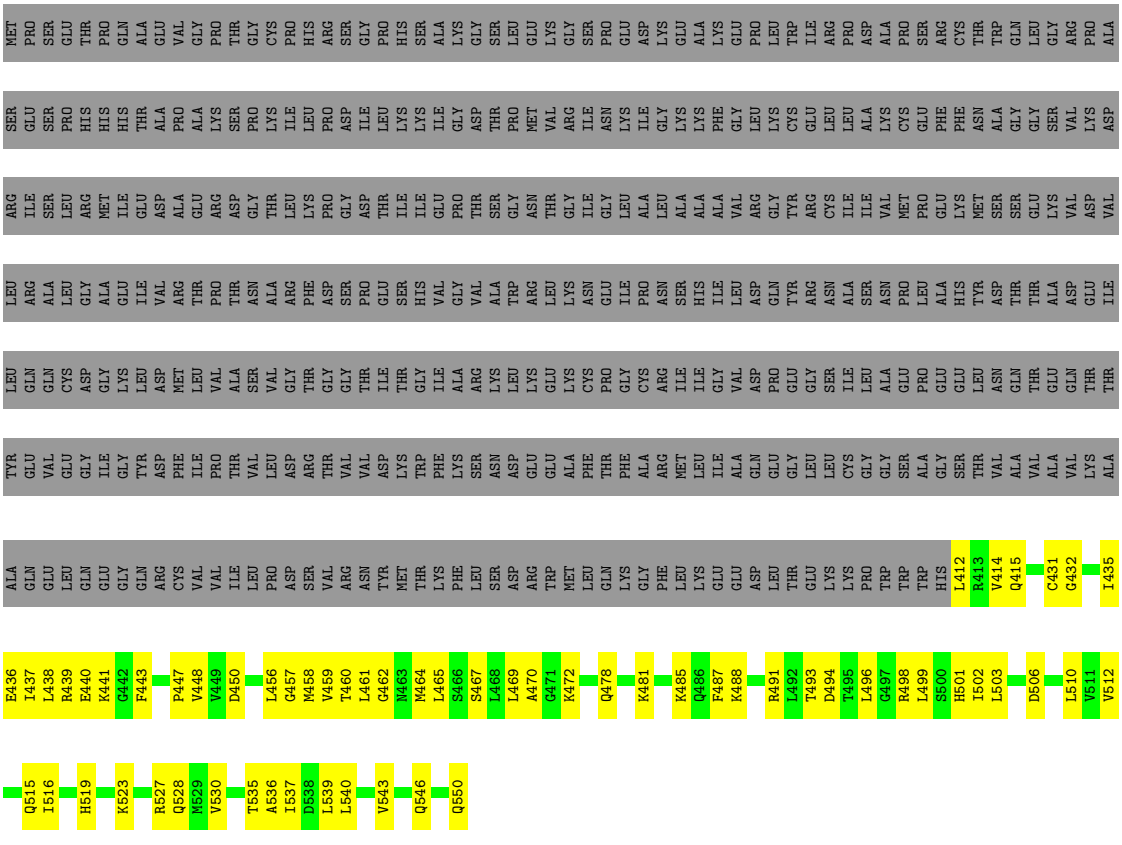




• Molecule 1: Cystathionine beta-synthase

Chain D:



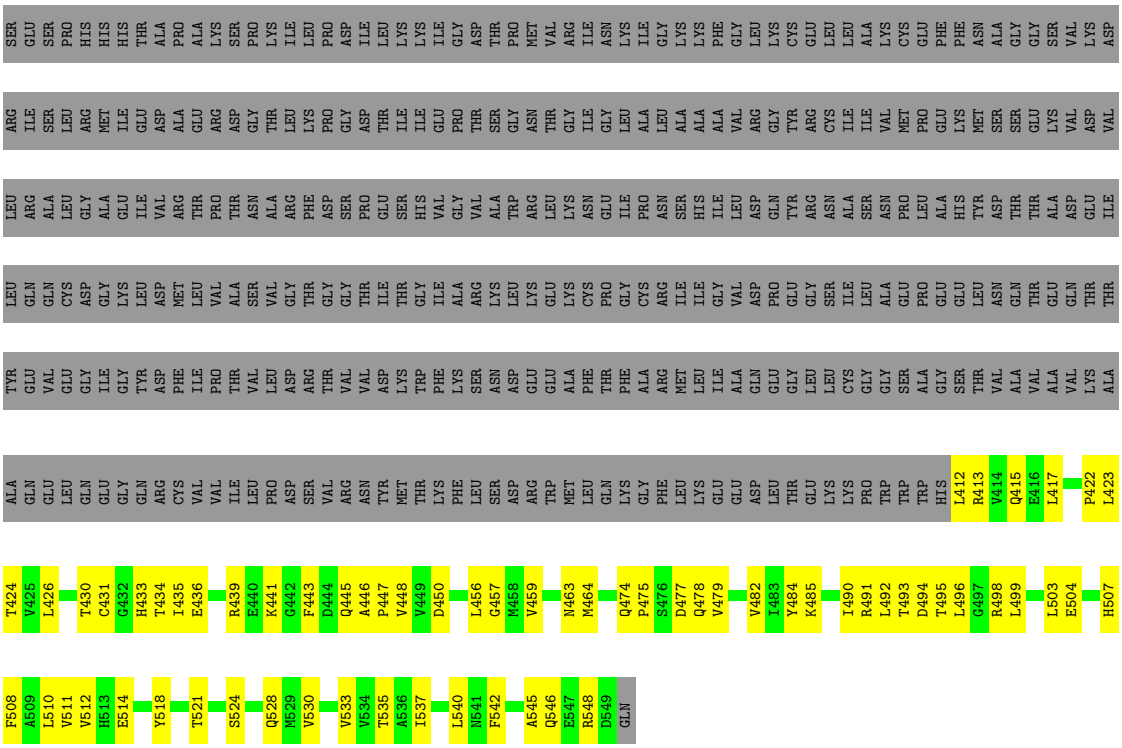


• Molecule 1: Cystathionine beta-synthase

Chain C:



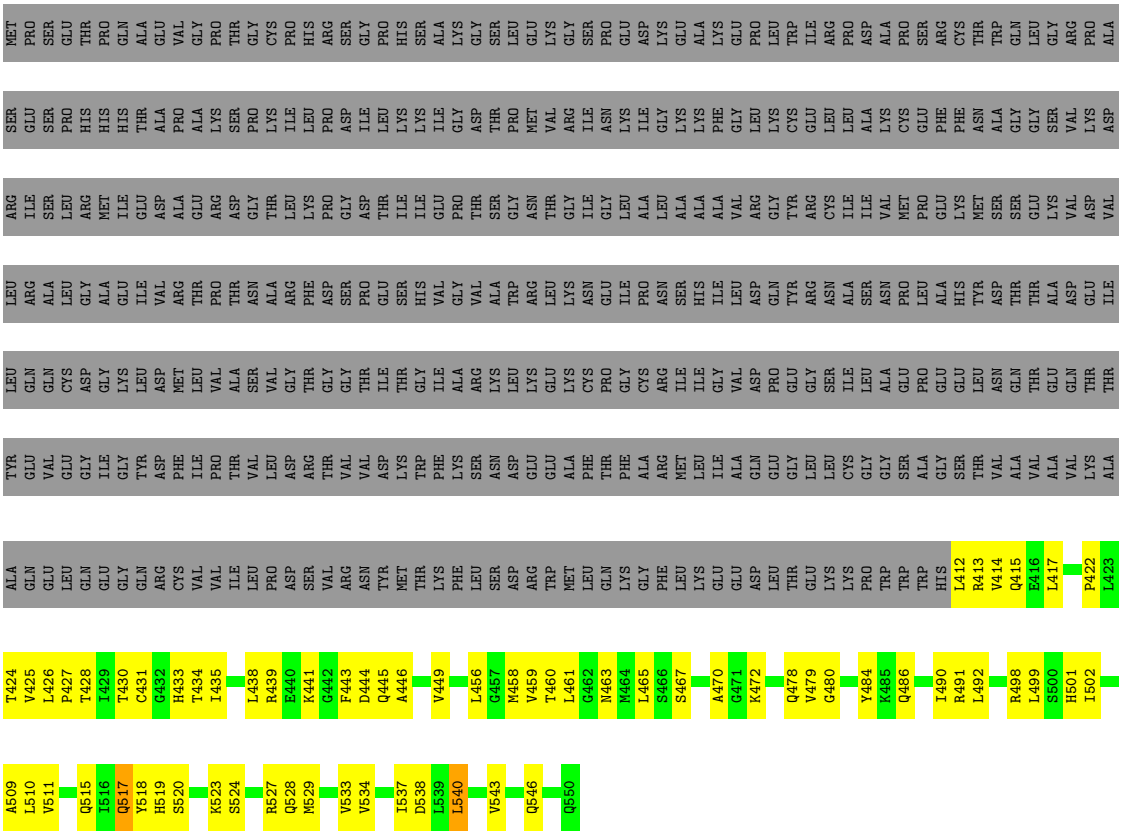




• Molecule 1: Cystathionine beta-synthase

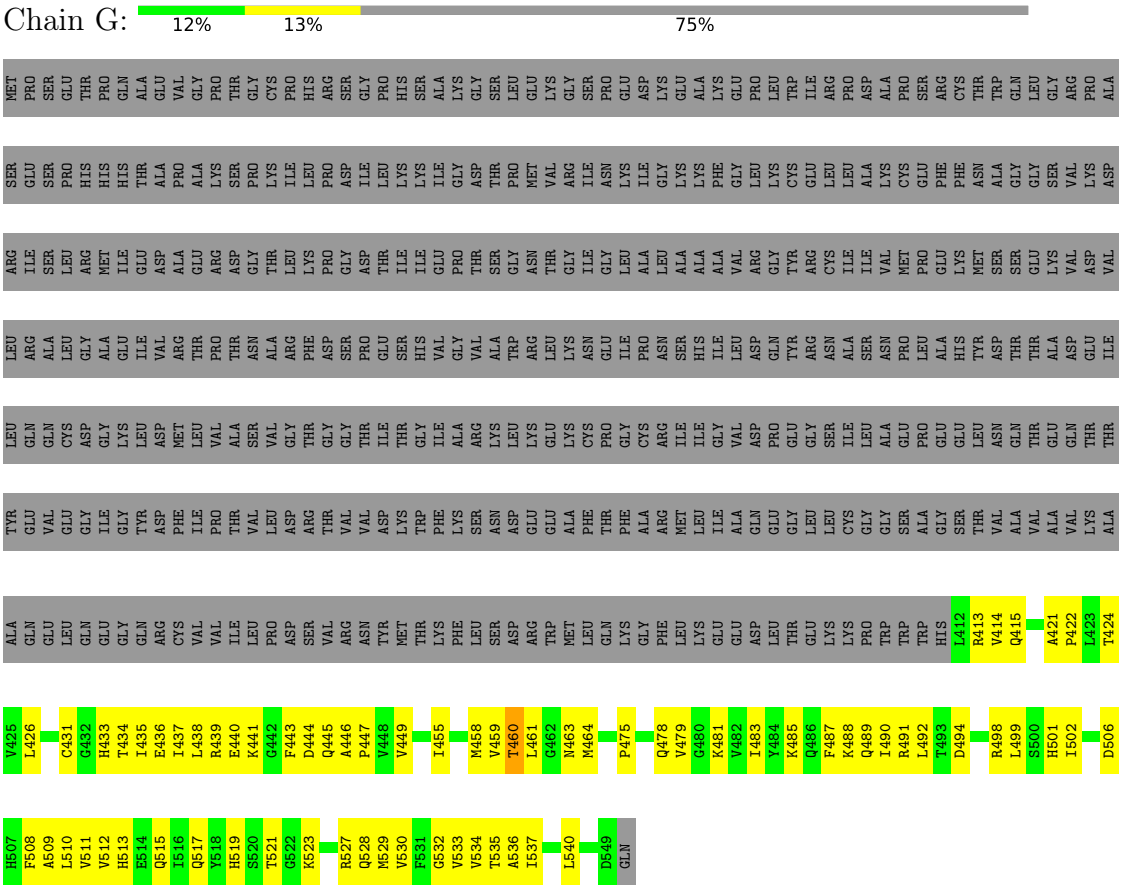
Chain H:





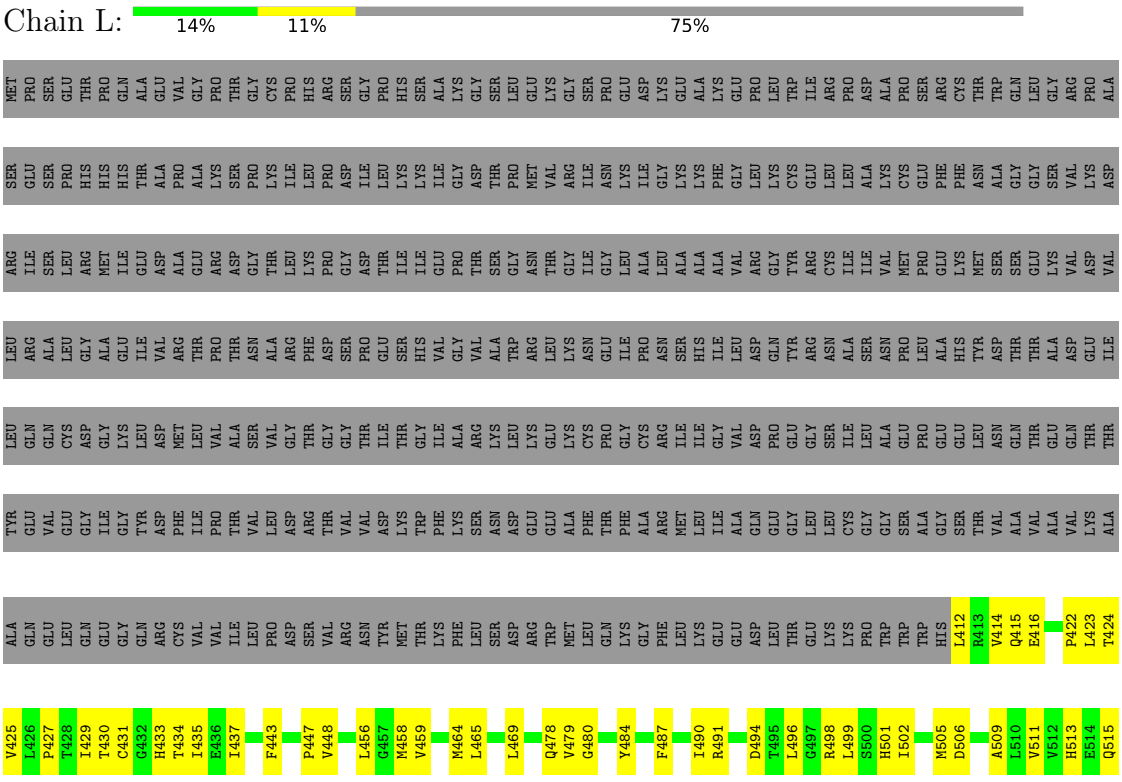
• Molecule 1: Cystathionine beta-synthase

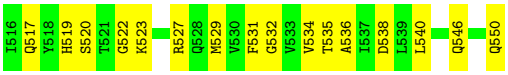
Chain G:



• Molecule 1: Cystathionine beta-synthase

Chain L:

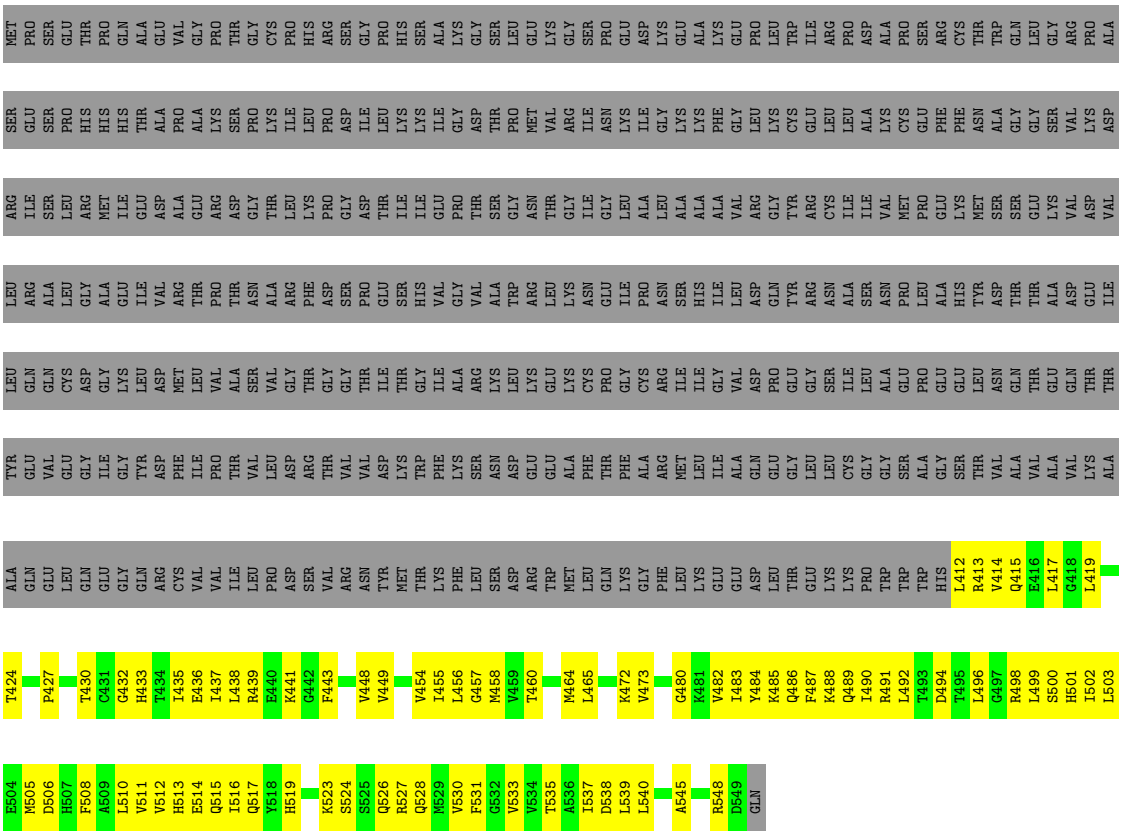




• Molecule 1: Cystathionine beta-synthase

Chain K:

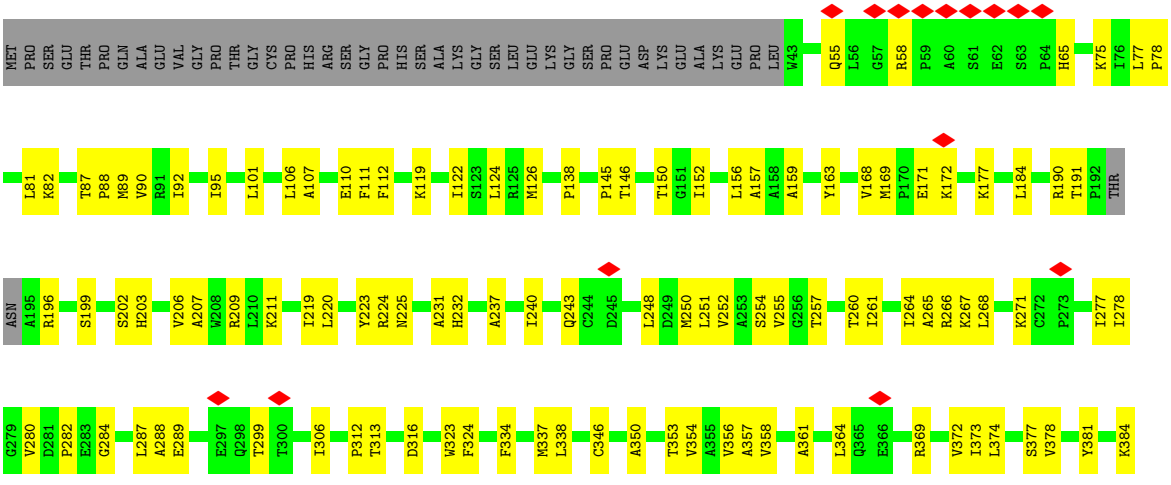


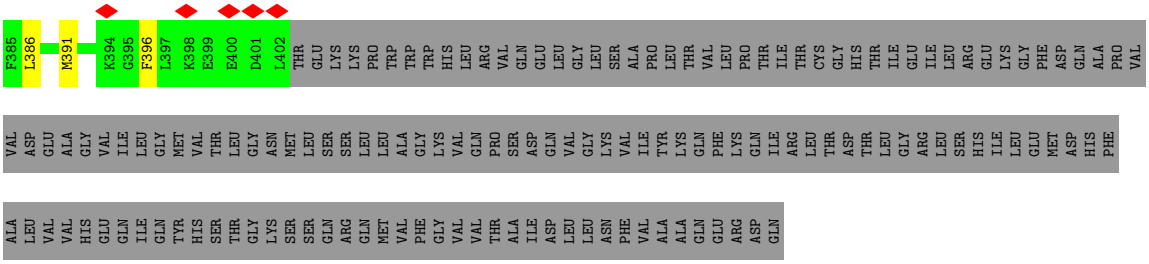


• Molecule 2: Cystathionine beta-synthase

Chain M:



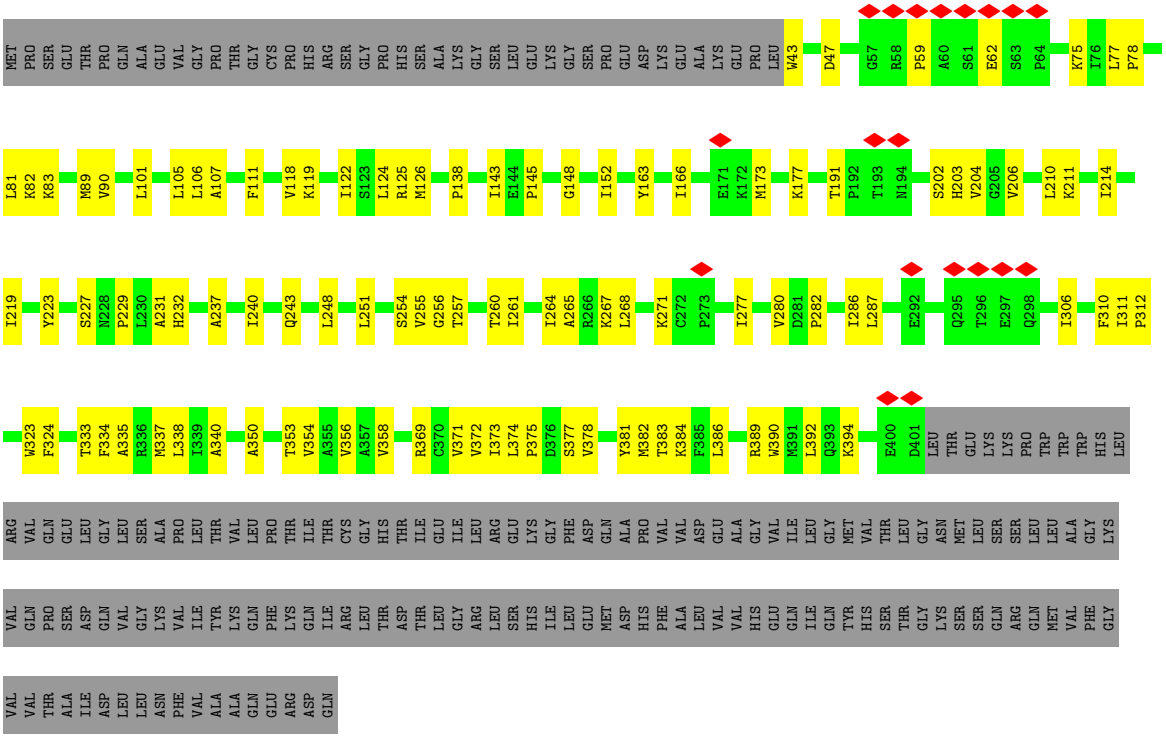




• Molecule 2: Cystathionine beta-synthase

Chain N:

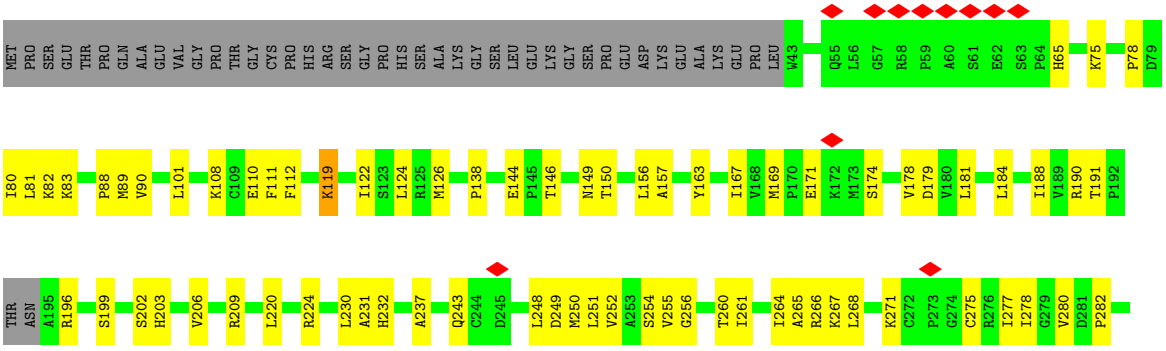


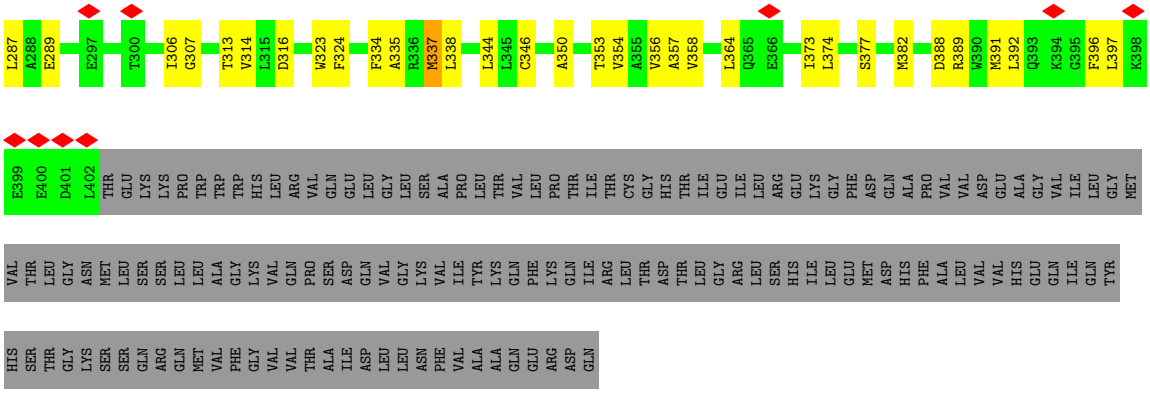


• Molecule 2: Cystathionine beta-synthase

Chain O:



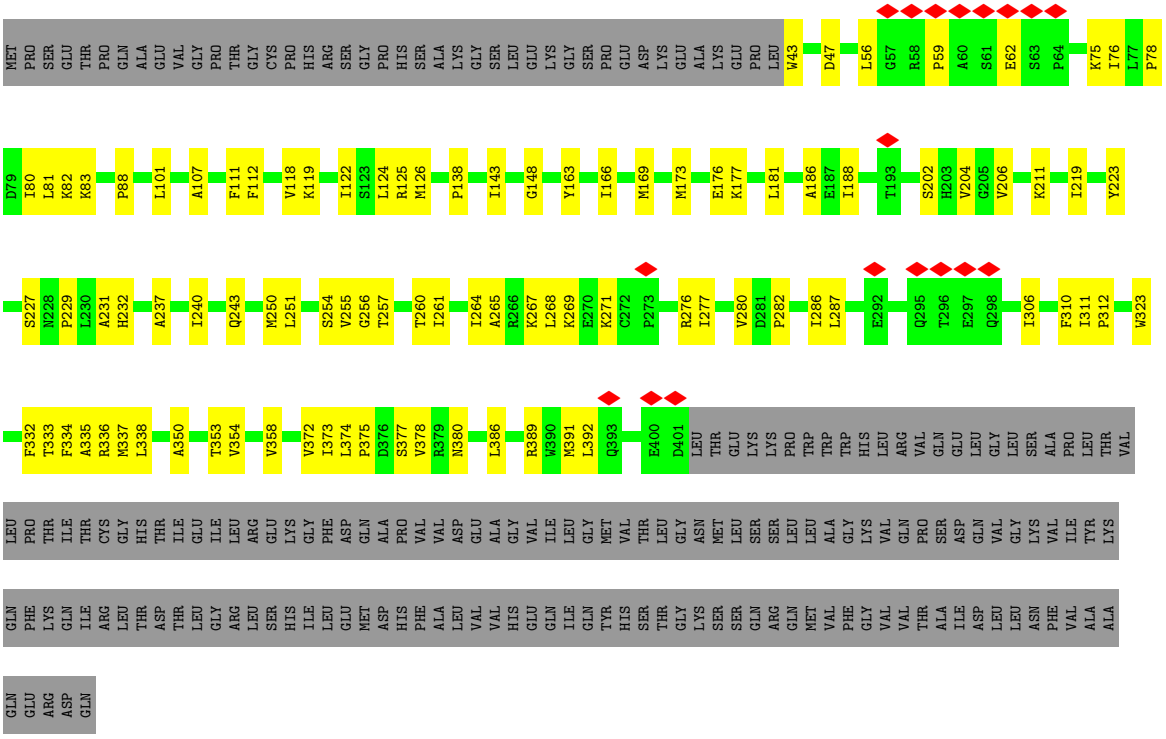




• Molecule 2: Cystathionine beta-synthase

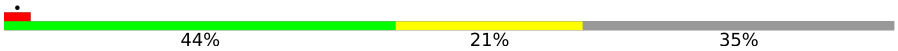
Chain P:

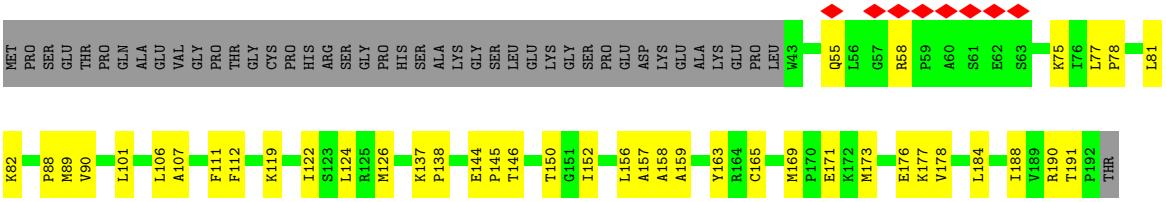


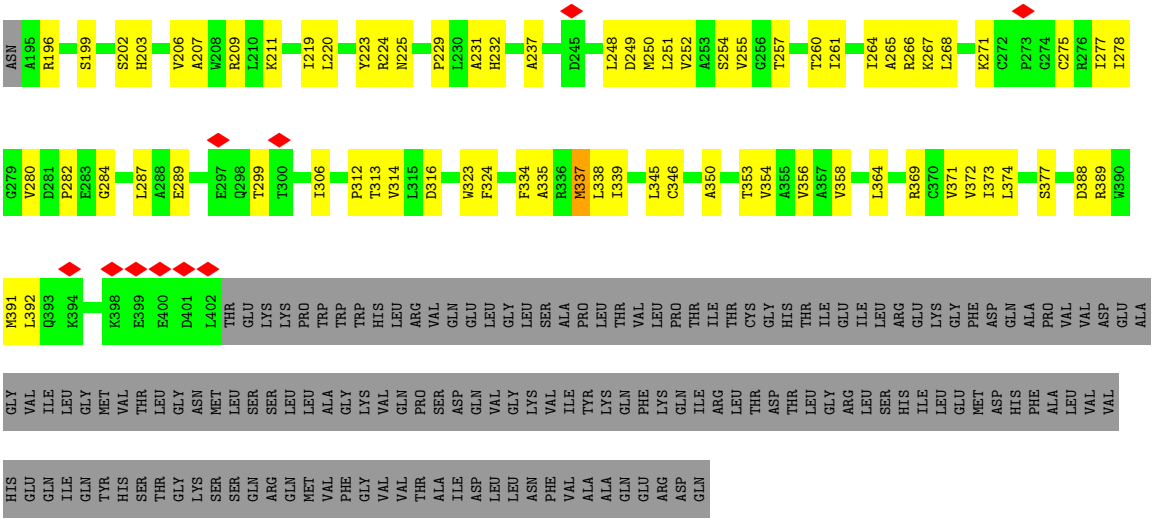


• Molecule 2: Cystathionine beta-synthase

Chain Q:



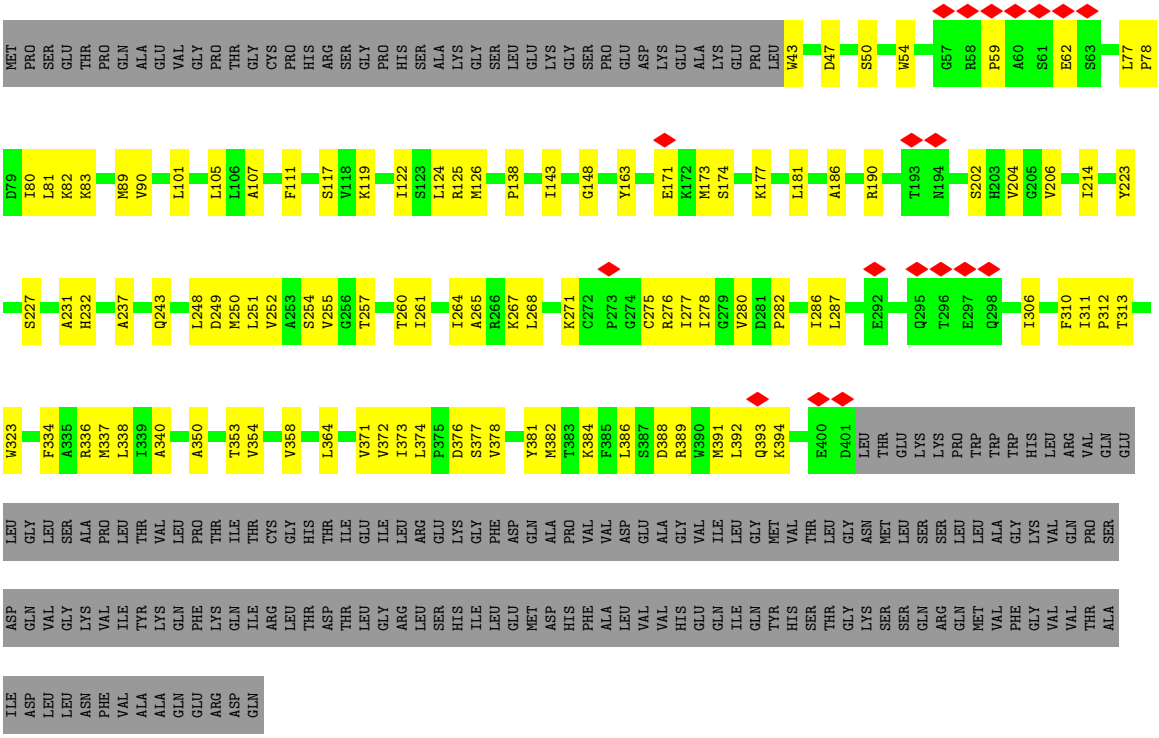




• Molecule 2: Cystathionine beta-synthase

Chain R:

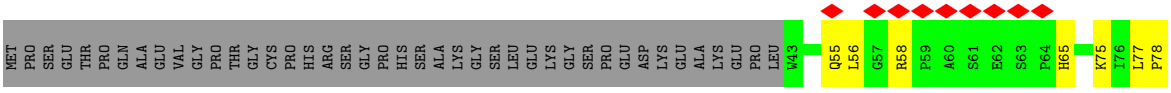


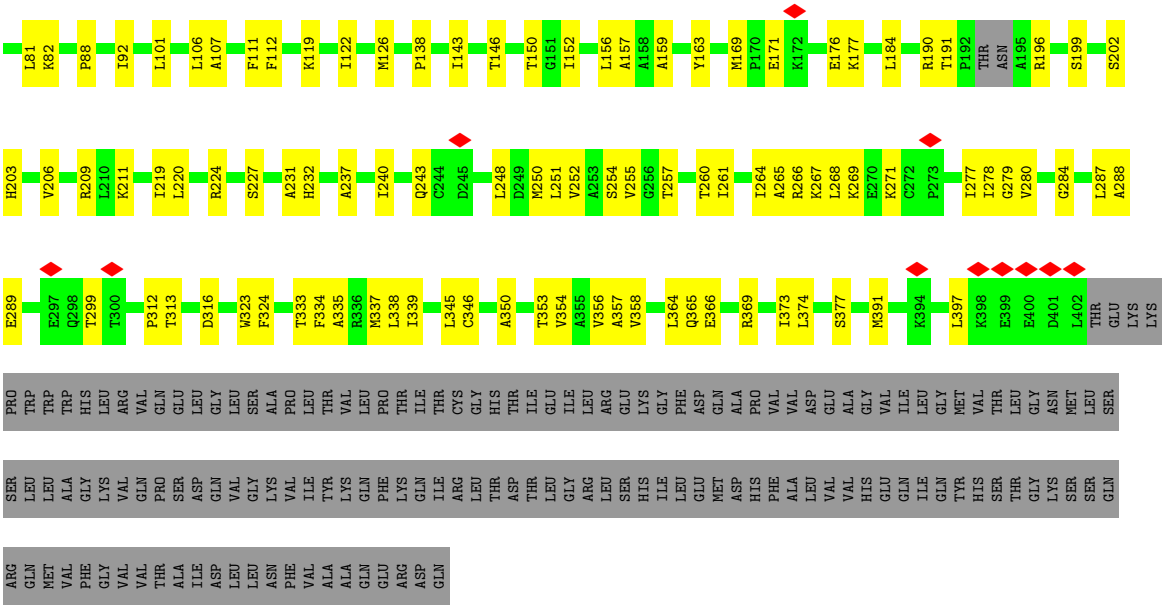


• Molecule 2: Cystathionine beta-synthase

Chain m:



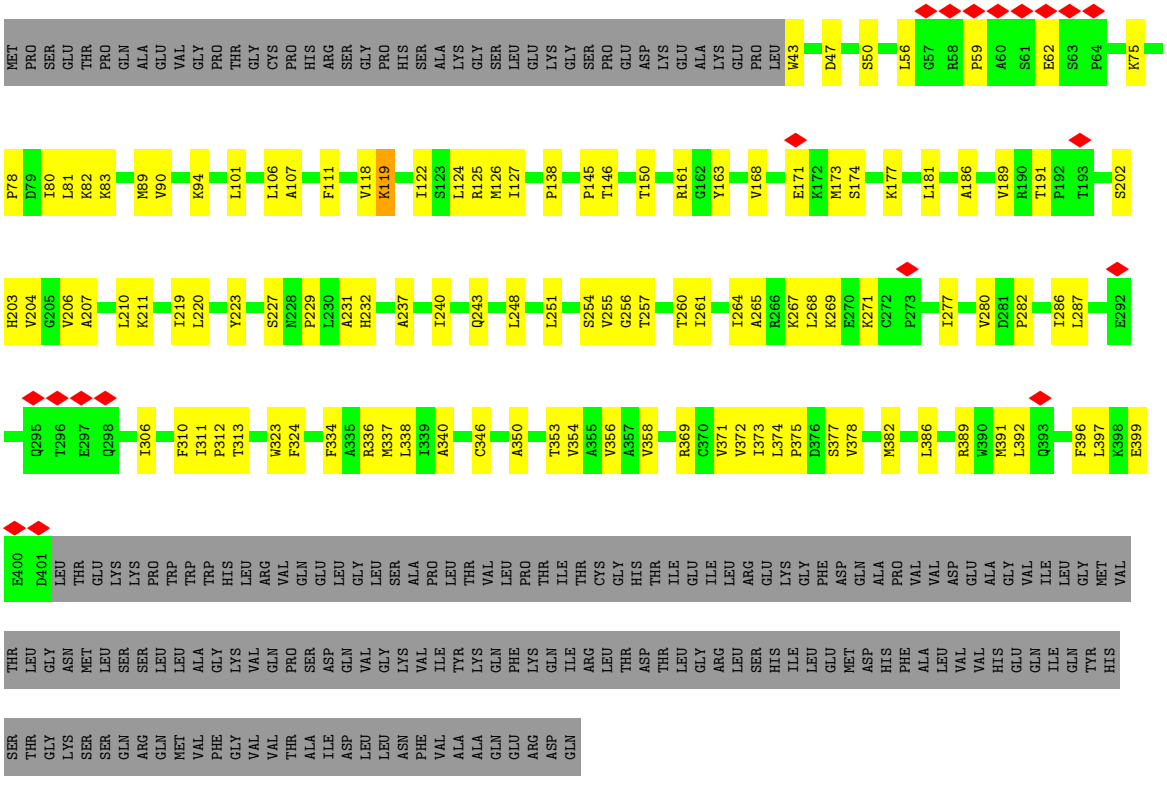




• Molecule 2: Cystathionine beta-synthase

Chain S:

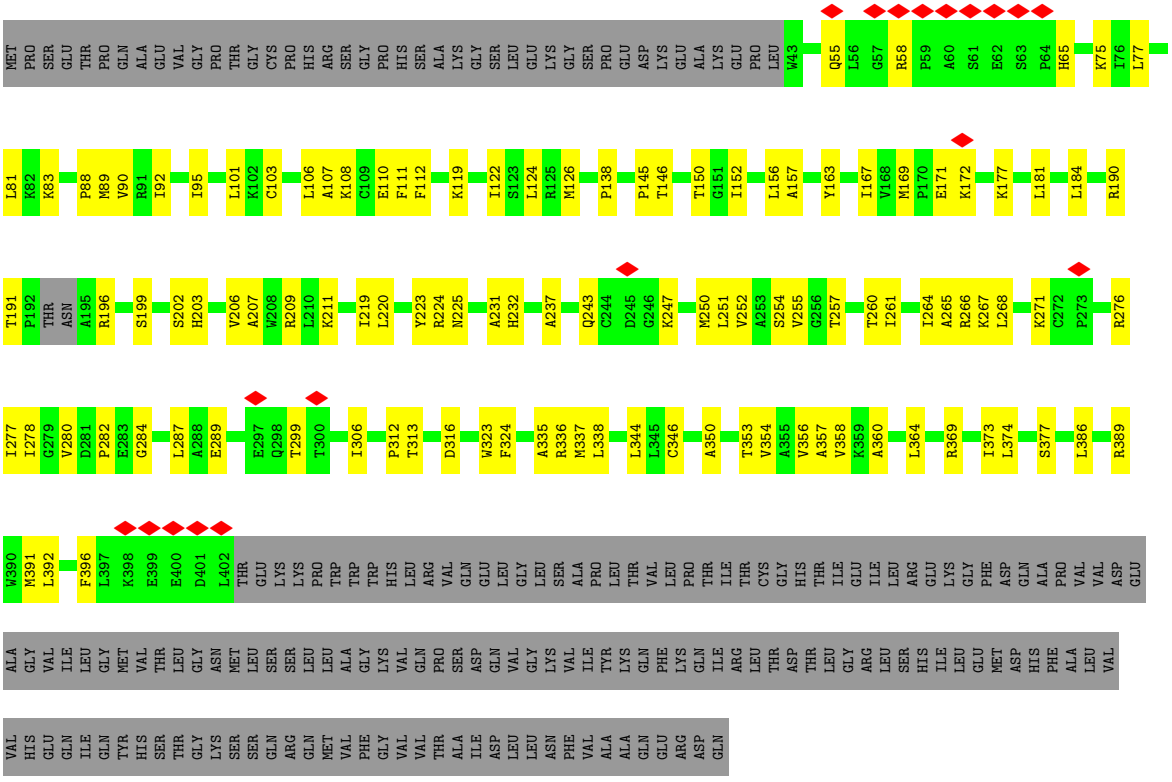




• Molecule 2: Cystathionine beta-synthase

Chain T:

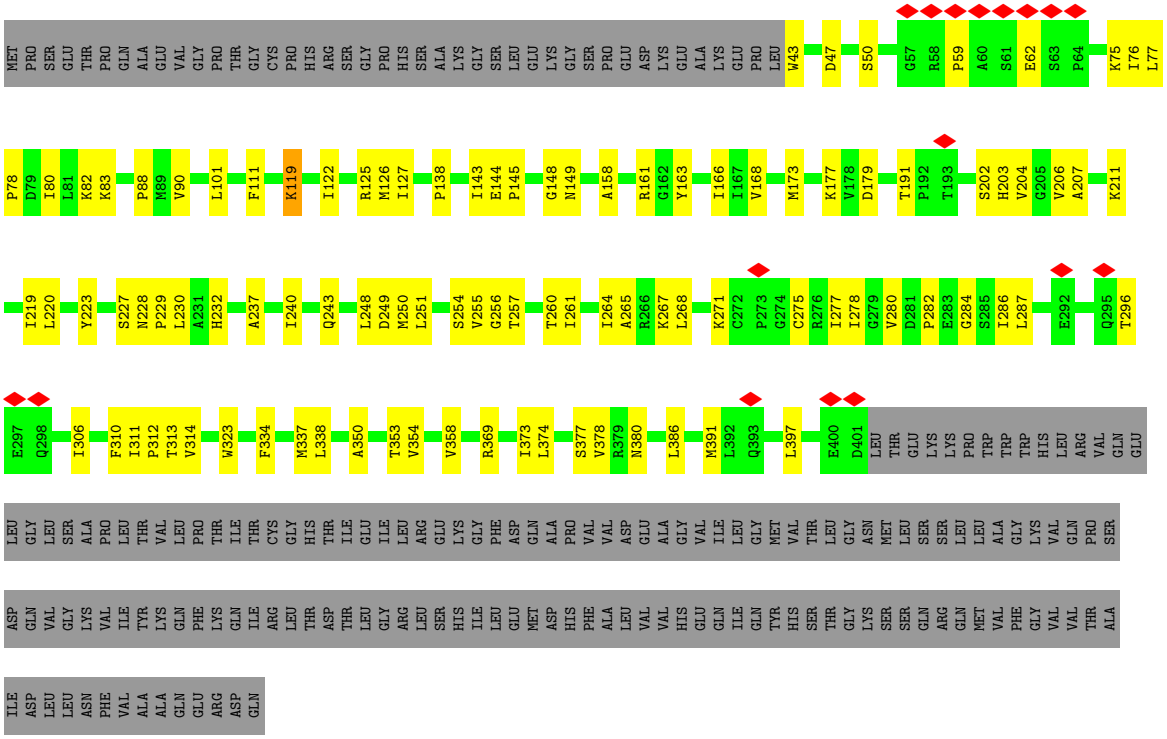




• Molecule 2: Cystathionine beta-synthase

Chain U:

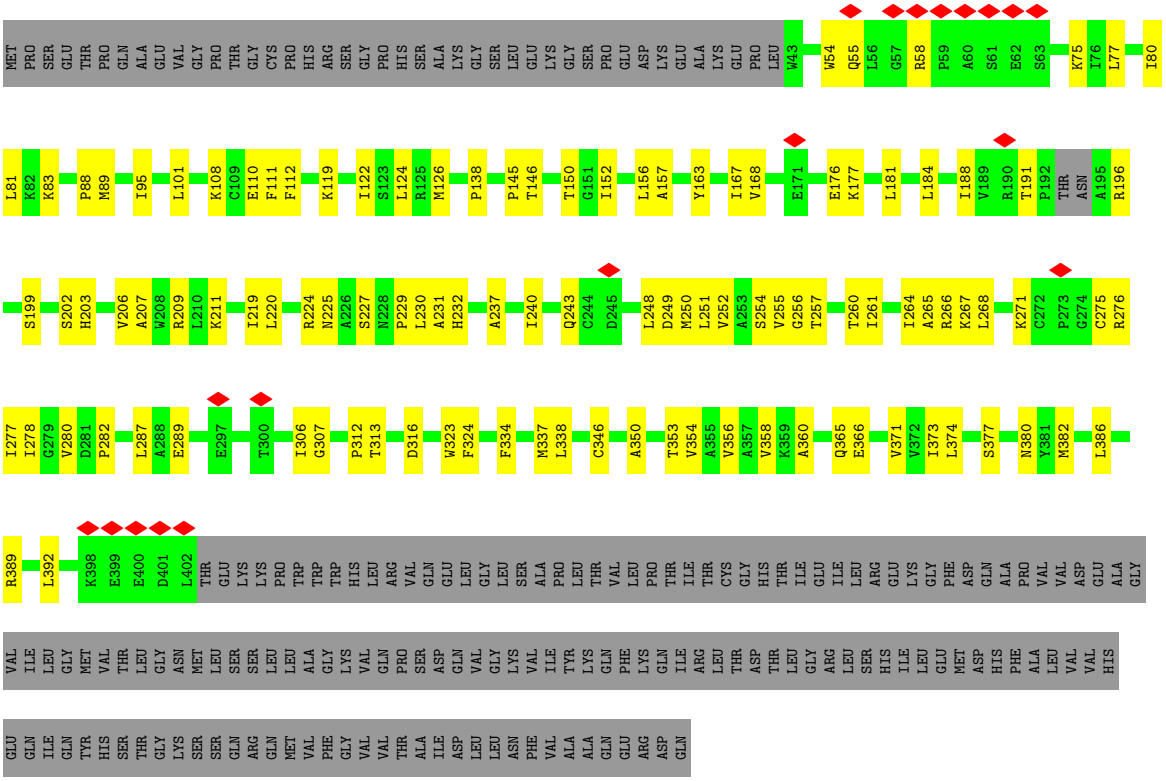




• Molecule 2: Cystathionine beta-synthase

Chain V:

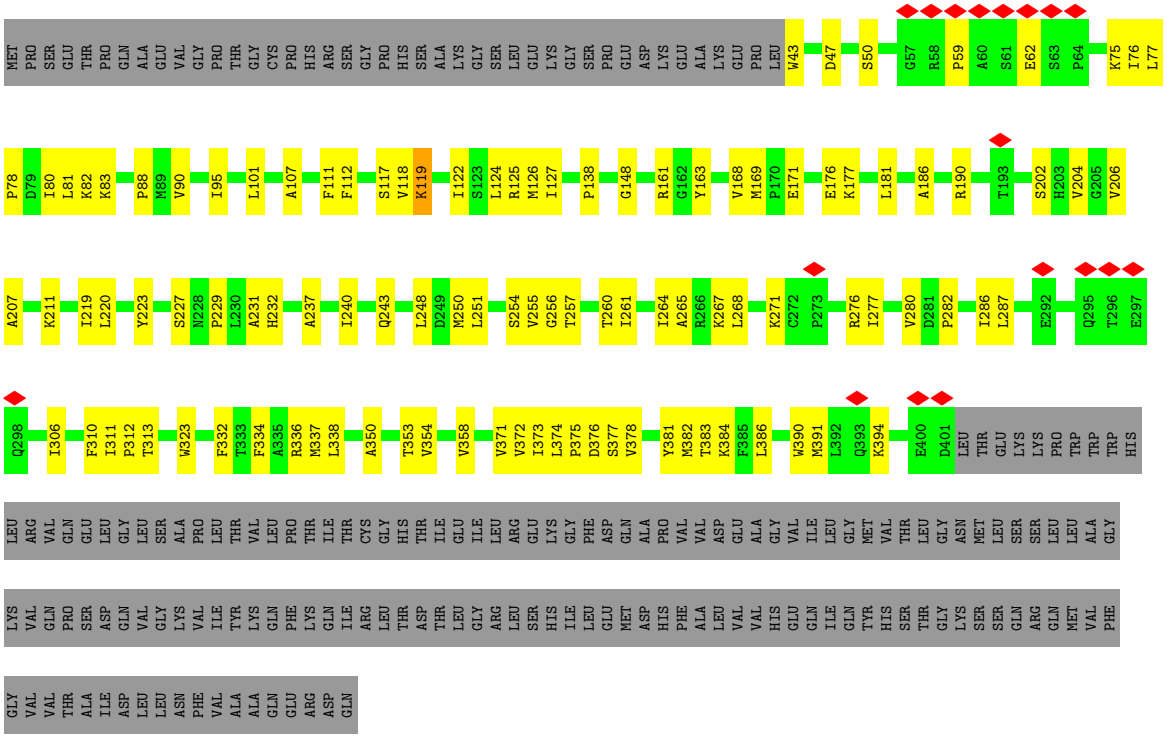




• Molecule 2: Cystathionine beta-synthase

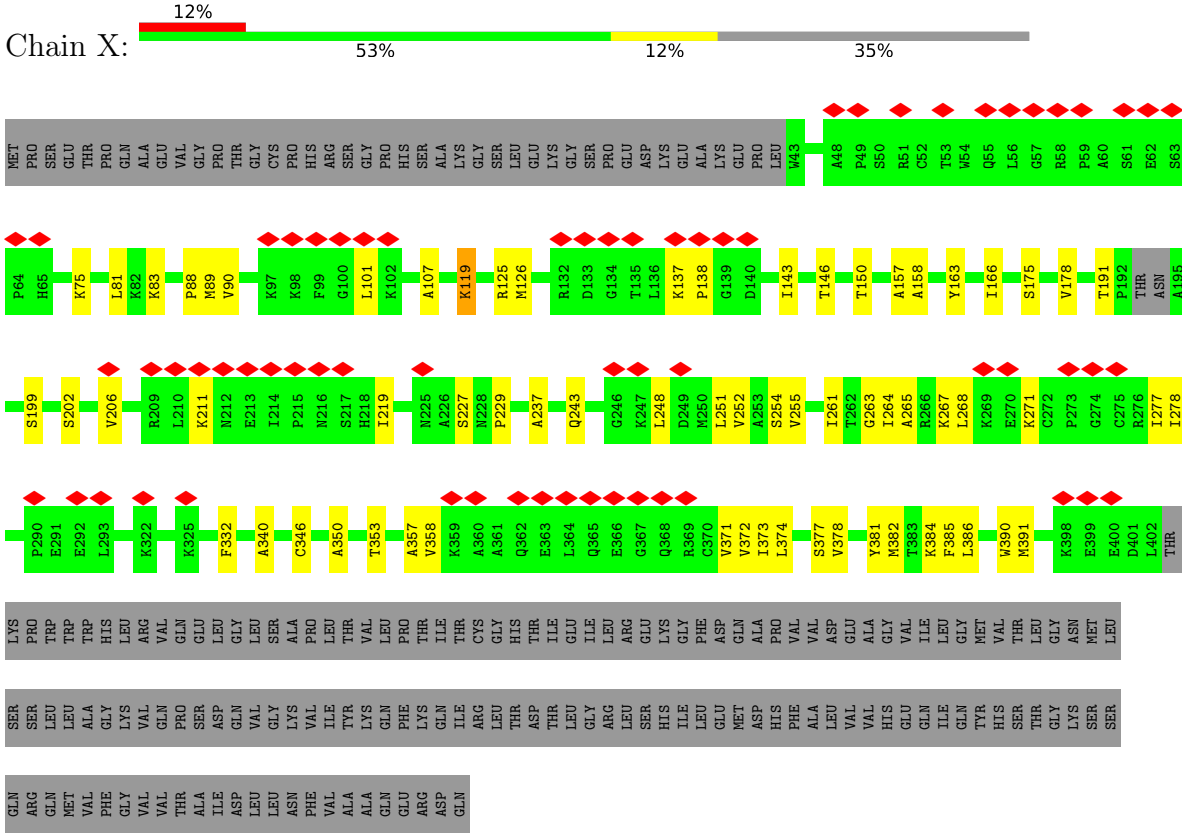
Chain W:





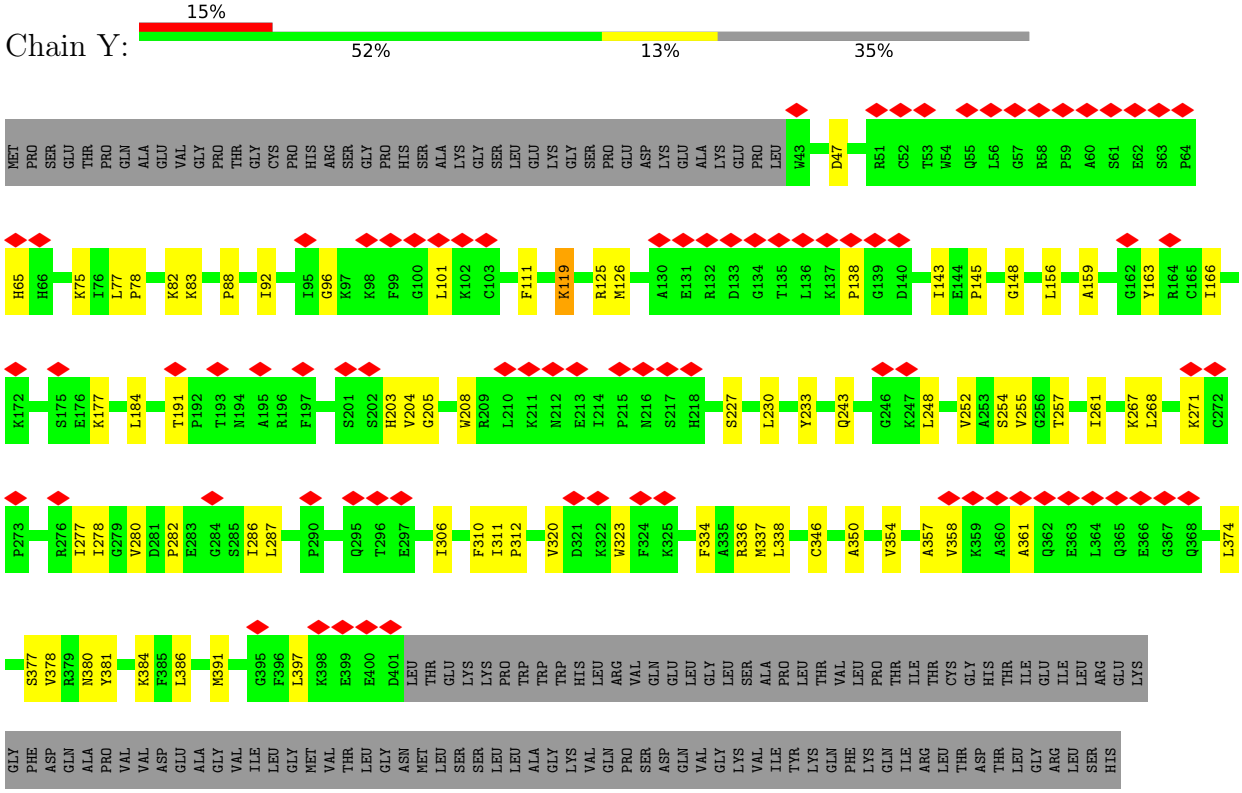
• Molecule 2: Cystathionine beta-synthase

Chain X:



• Molecule 2: Cystathionine beta-synthase

Chain Y:

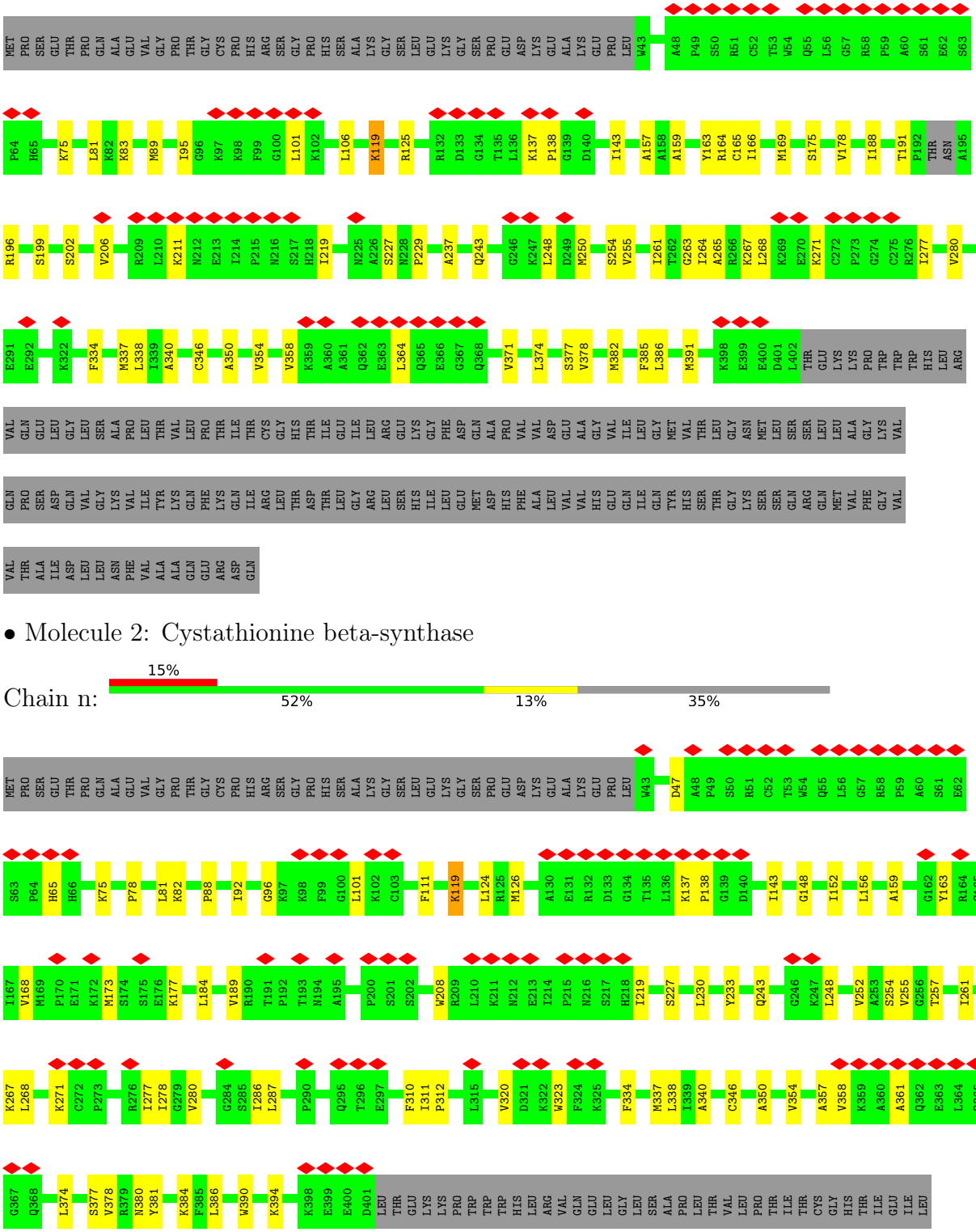




• Molecule 2: Cystathionine beta-synthase

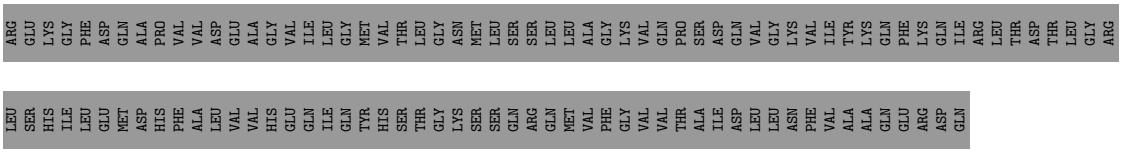
Chain Z:





• Molecule 2: Cystathionine beta-synthase

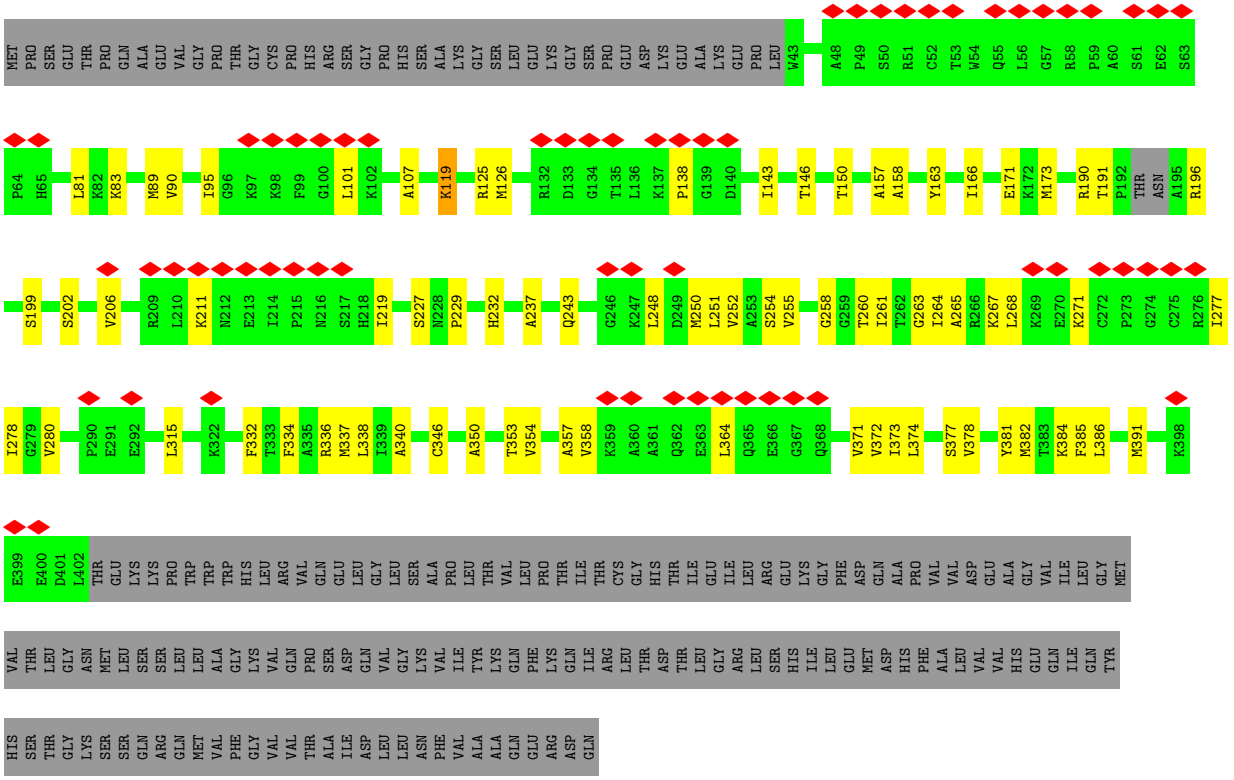
Chain n:



• Molecule 2: Cystathionine beta-synthase

Chain o:

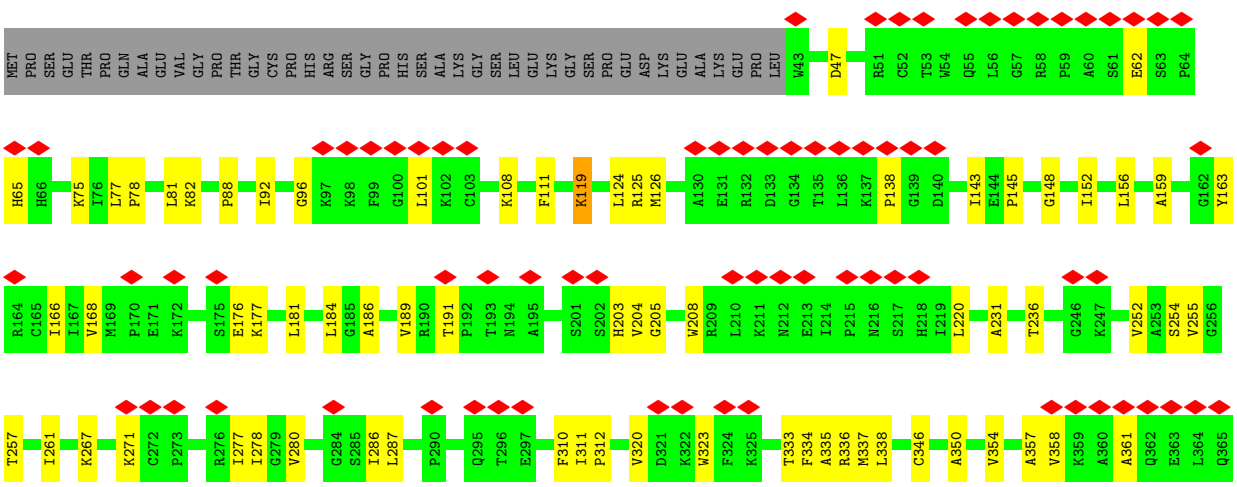


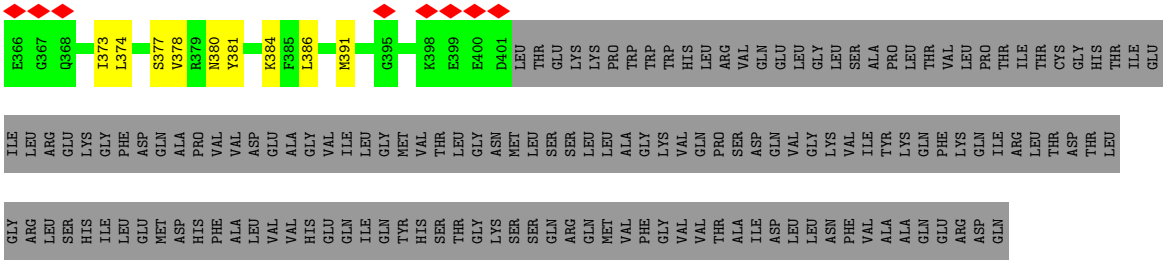


• Molecule 2: Cystathionine beta-synthase

Chain p:



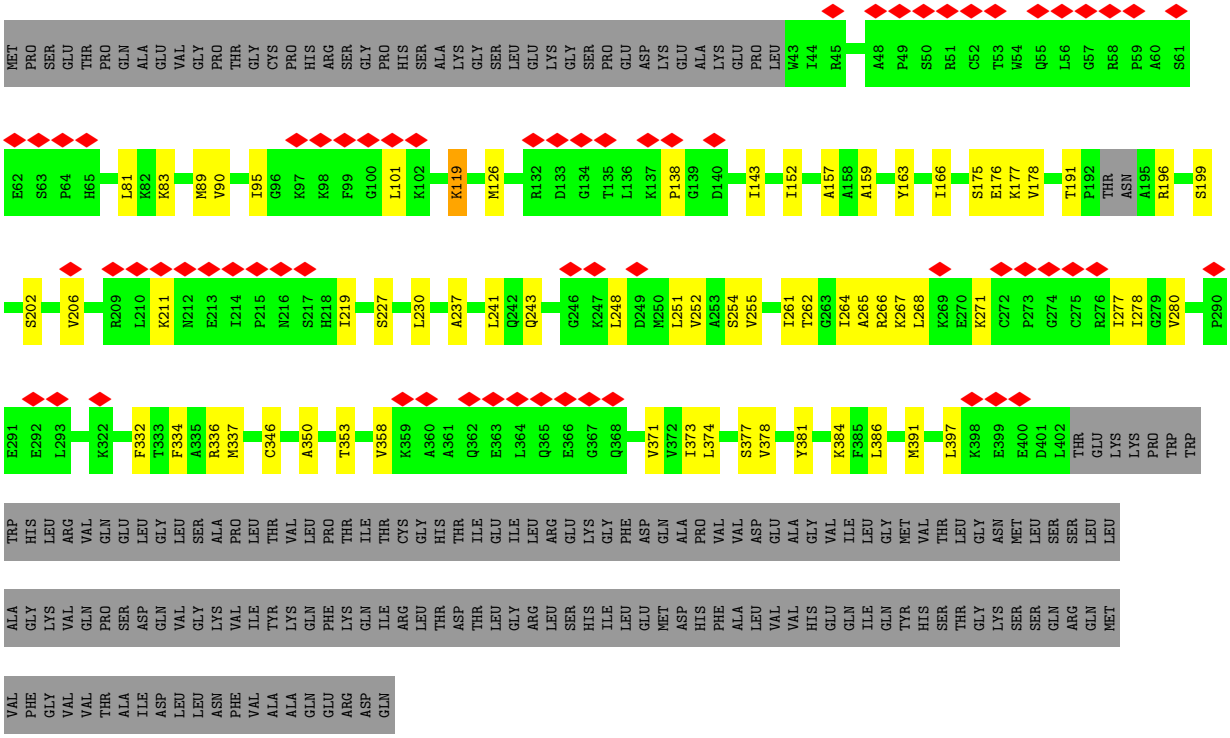




• Molecule 2: Cystathionine beta-synthase

Chain q:

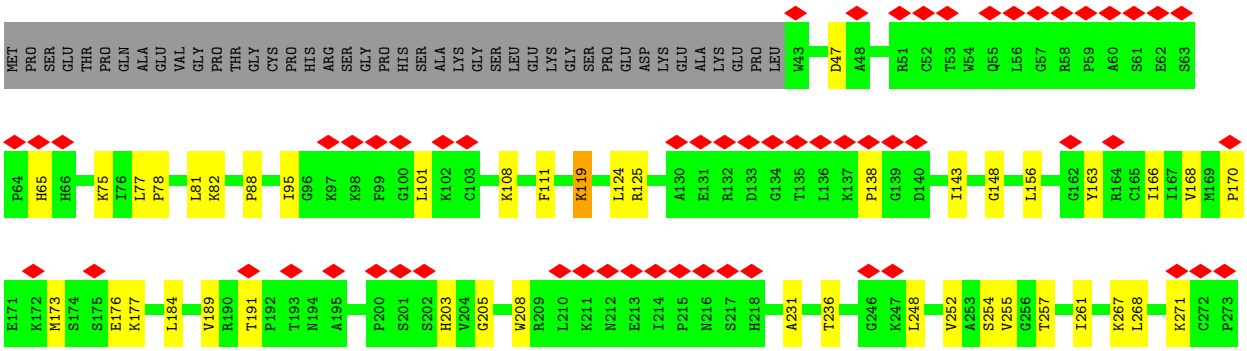


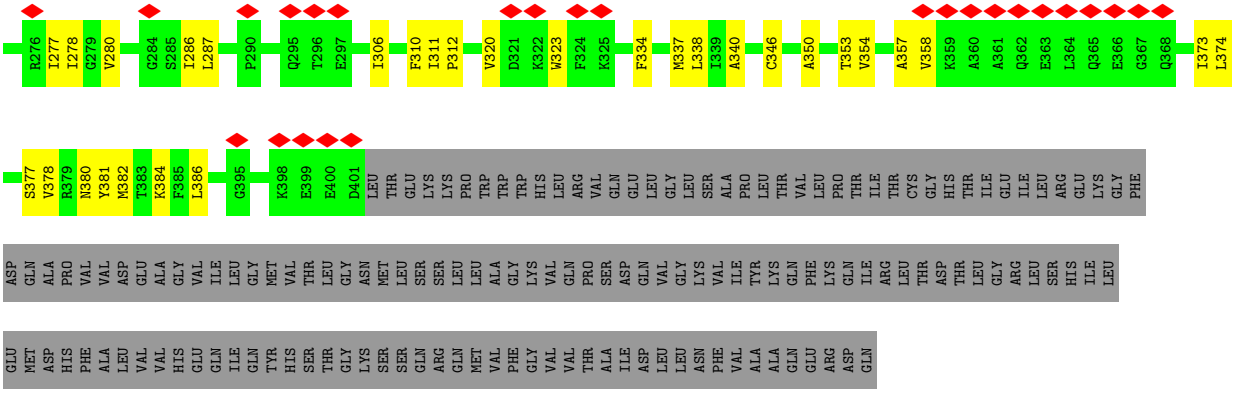


• Molecule 2: Cystathionine beta-synthase

Chain r:

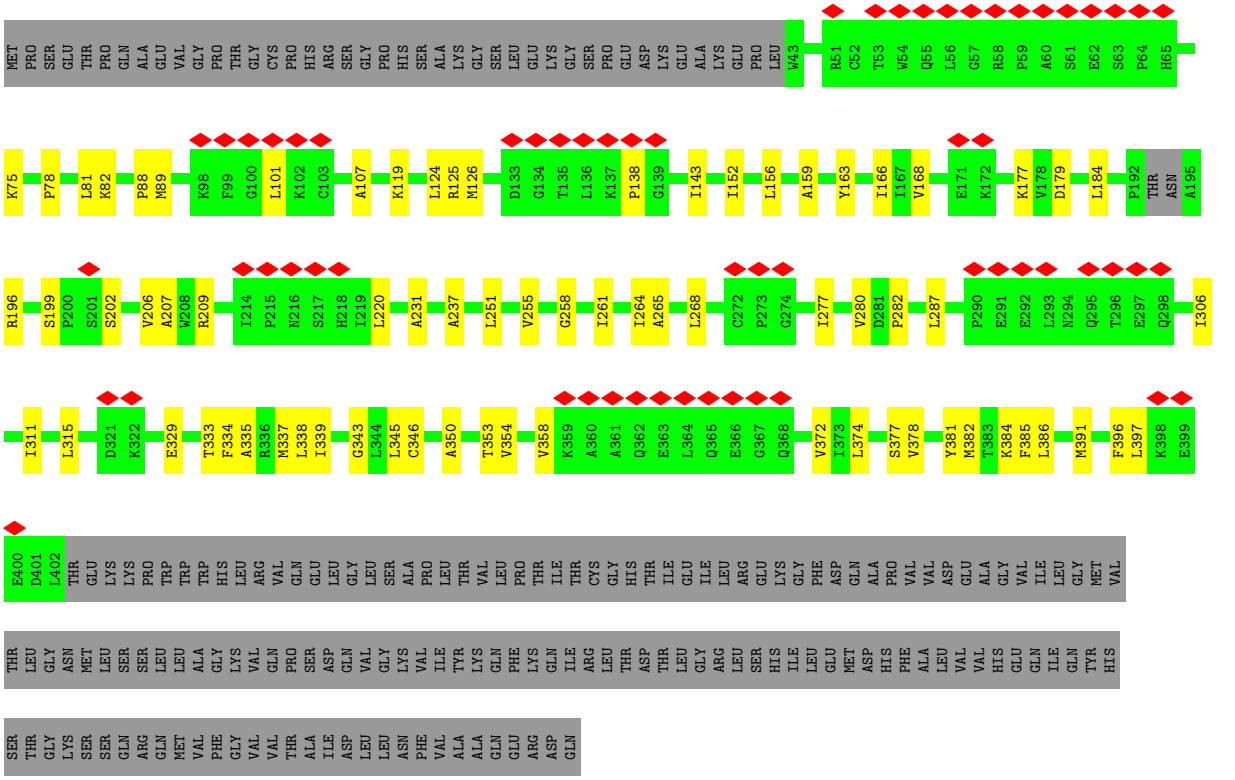






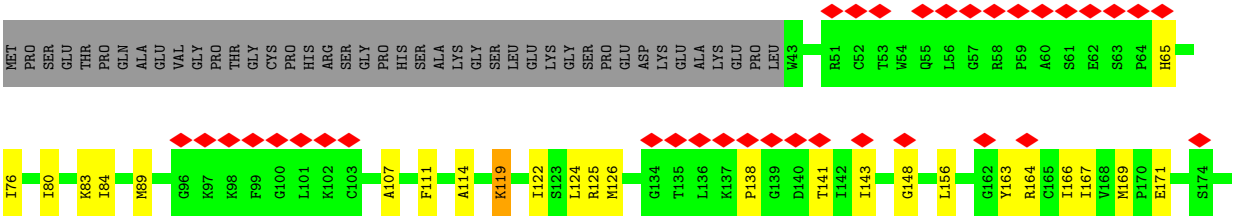
• Molecule 2: Cystathionine beta-synthase

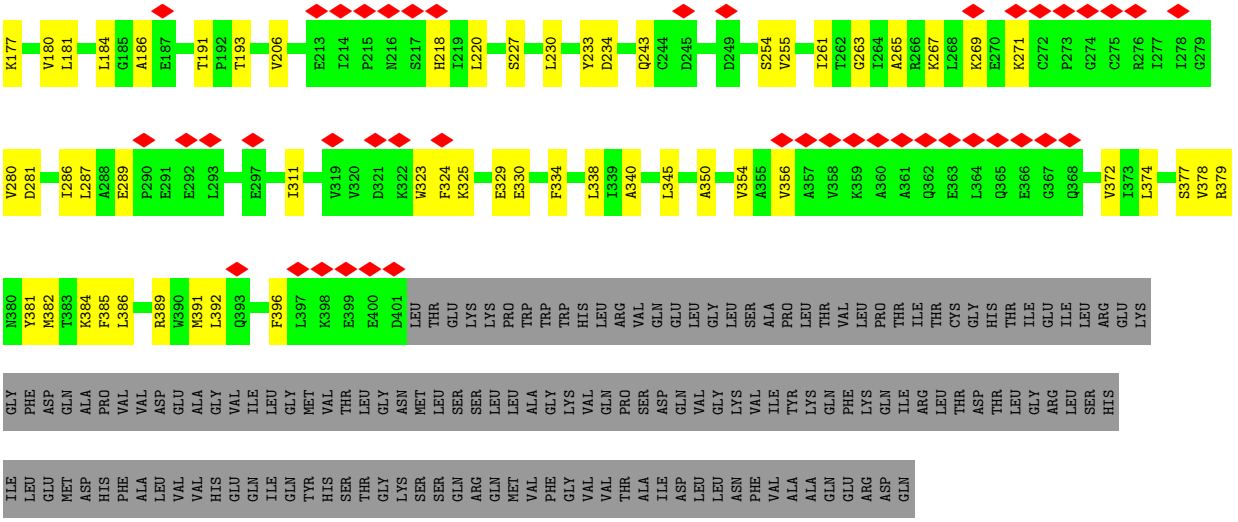




• Molecule 2: Cystathionine beta-synthase

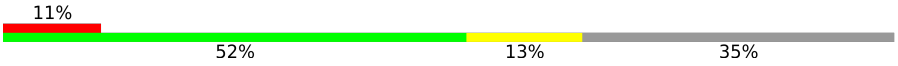


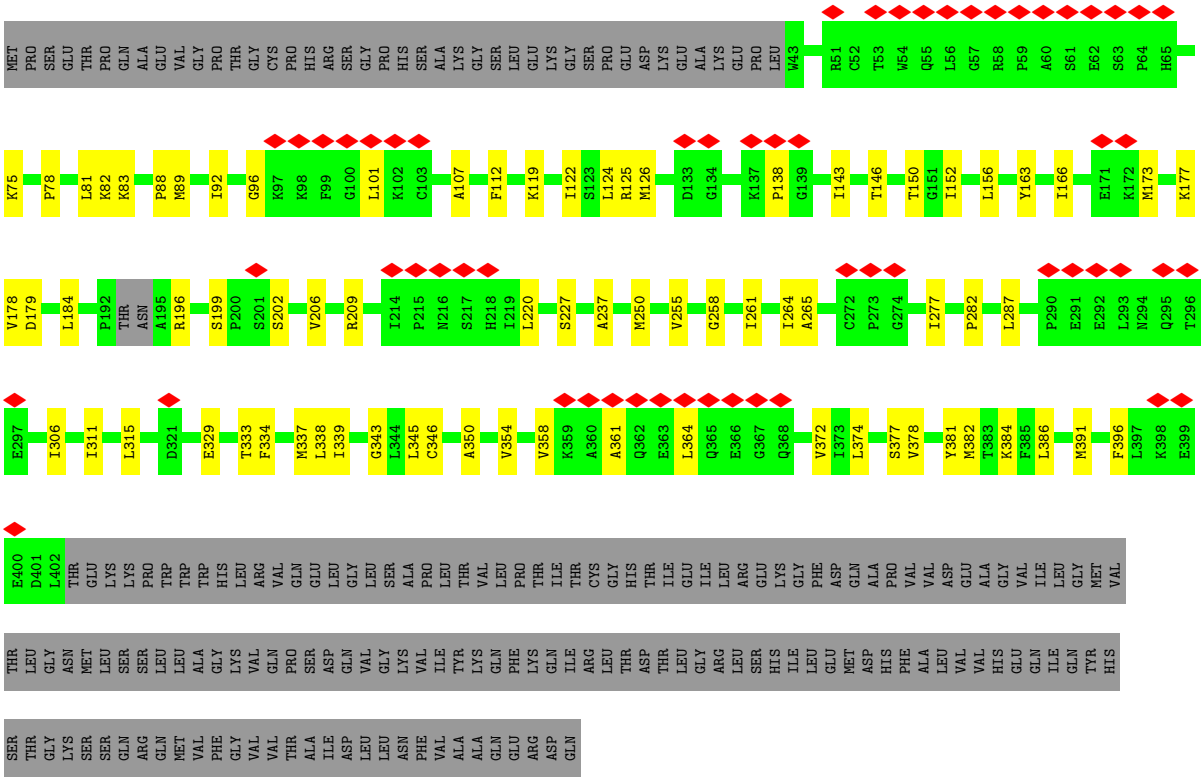




• Molecule 2: Cystathionine beta-synthase

Chain u:

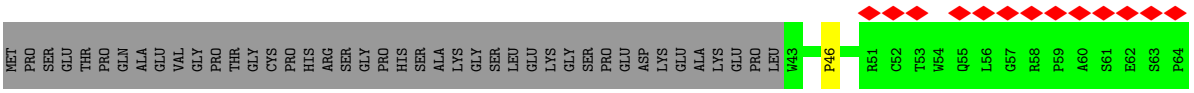


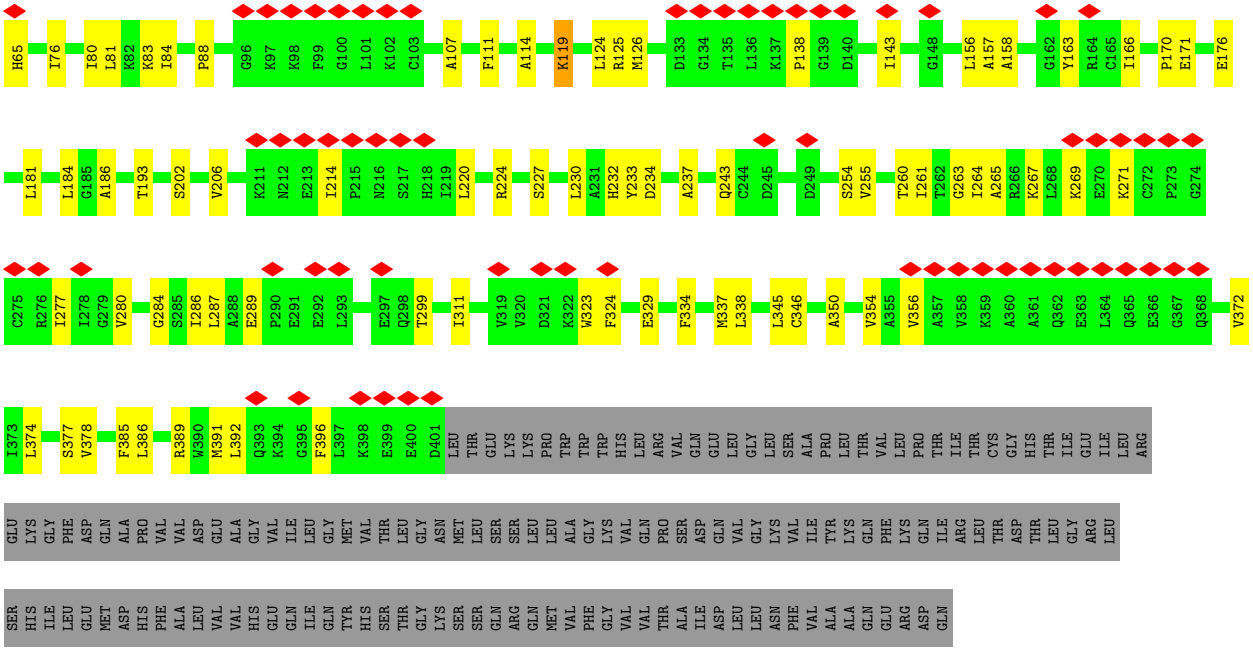


• Molecule 2: Cystathionine beta-synthase

Chain v:



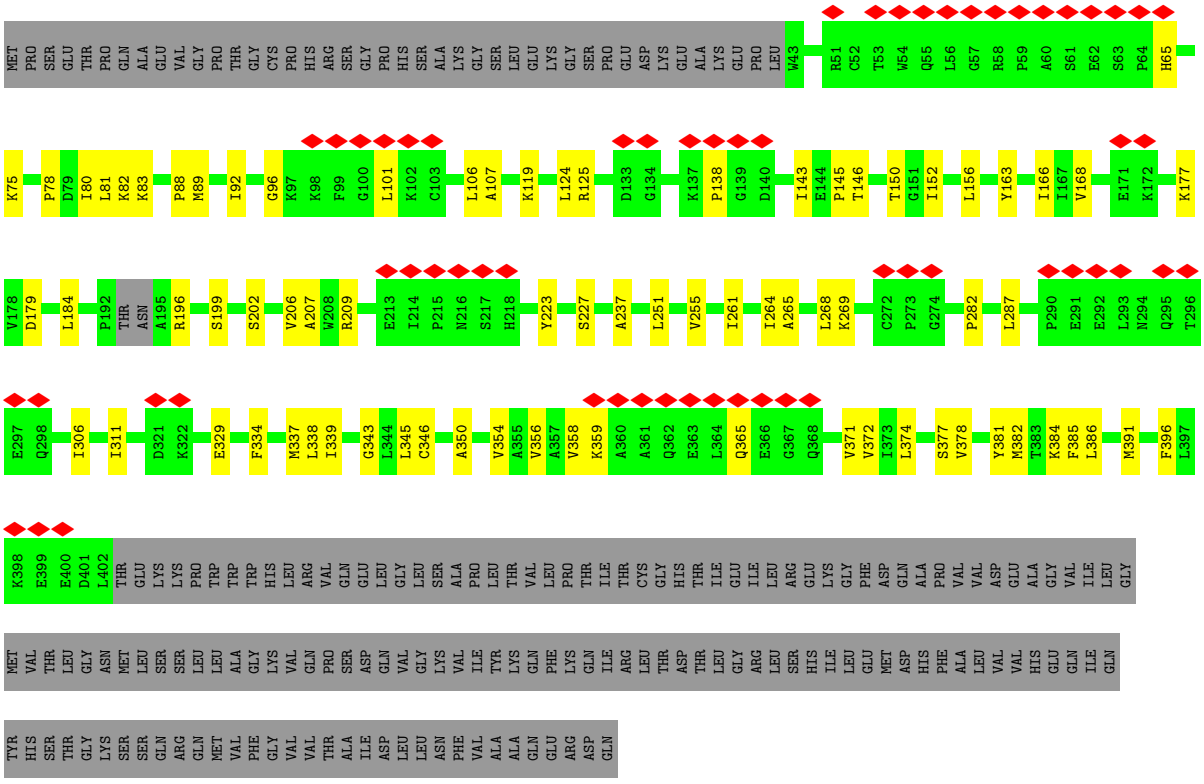




• Molecule 2: Cystathionine beta-synthase

Chain w:

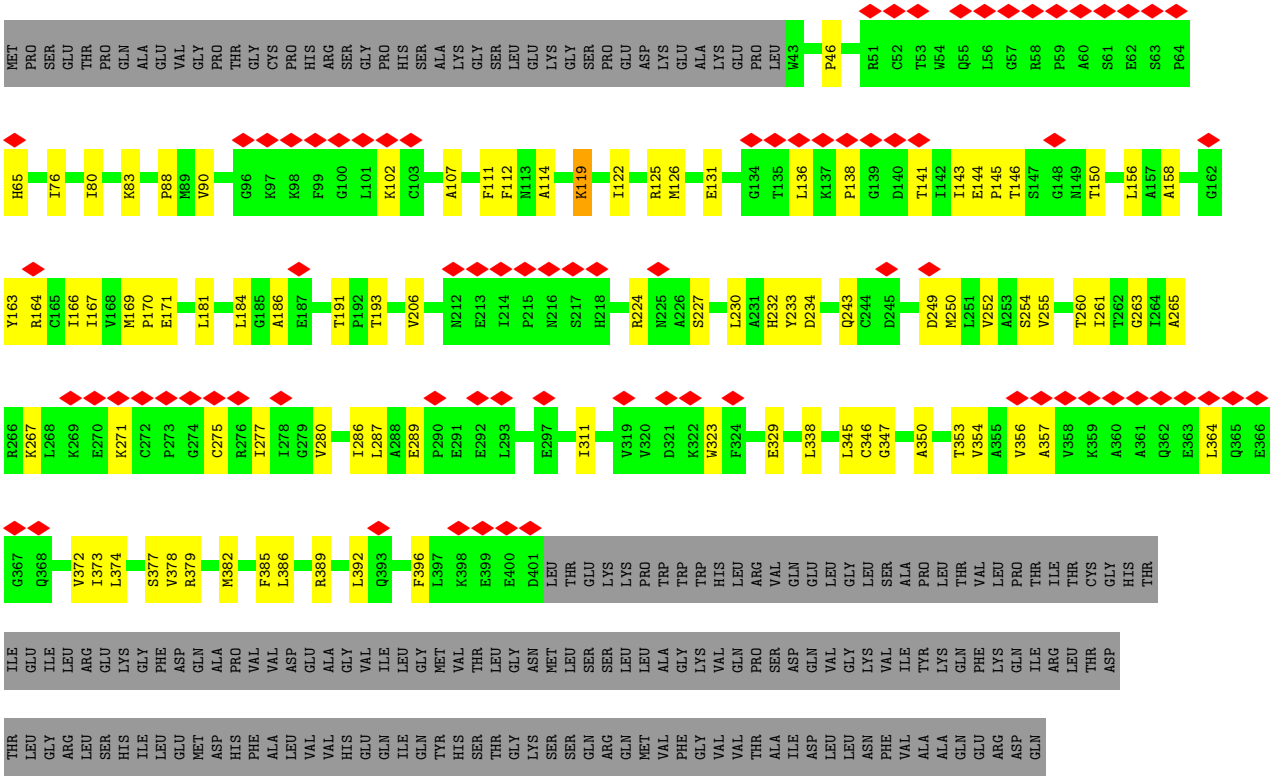




• Molecule 2: Cystathionine beta-synthase

Chain x:




MET PRO SER GLU THR PRO GLN ALA GLU VAL GLY PRO THR GLY CYS PRO HIS ARG SER GLY PRO HIS SER ALA LYS GLY SER LEU GLU LYS GLY SER PRO GLU ASP LYS GLU ALA LYS GLU PRO LEU W43 P46 R51 C52 T53 W54 Q55 L56 G57 R58 P59 A60 S61 E62 S63 P64
H65 I76 I80 K83 P88 M89 V90 G96 K97 K98 F99 G100 L101 K102 C103 A107 F111 F112 N113 A114 K119 I122 R125 M126 E131 G134 T135 L136 K137 P138 G139 D140 T141 I142 I143 E144 P145 T146 S147 G148 N149 T150 L156 A157 A158 G162
Y163 R164 C165 I166 I167 V168 M169 P170 E171 L181 L184 G185 A186 E187 T191 P192 T193 V206 N212 E213 I214 P215 N216 S217 H218 R224 N225 A226 S227 L230 A231 H232 Y233 D234 Q243 C244 D245 D249 M250 L251 V252 A253 S254 V255 T260 I261 T262 G263 Y264 A265
R266 K267 L268 K269 E270 K271 C272 P273 G274 C275 R276 I277 I278 G279 V280 I286 L287 A288 E289 P290 E291 E292 L293 E297 I311 V319 V320 D321 K322 W323 F324 E329 L338 L345 C346 G347 A350 T353 V354 A355 V356 A357 V358 K359 A360 A361 Q362 E363 L364 Q365 E366
G367 Q368 V372 I373 L374 S377 V378 R379 M382 F385 L386 R389 L392 Q393 F396 L397 K398 E399 E400 D401 LEU THR GLU LYS LYS PRO TRP TRP TRP HIS LEU ARG VAL GLN GLU LEU GLY LEU SER ALA PRO LEU THR VAL LEU PRO THR ILE THR CYS GLY HIS THR
ILE GLU ILE LEU ARG GLU LYS GLY PHE ASP GLN ALA PRO VAL VAL ASP GLU ALA GLY VAL ILE LEU GLY MET VAL THR LEU GLY ASN MET LEU SER SER LEU LEU ALA GLY LYS VAL GLN PRO SER ASP GLN VAL GLY LYS VAL ILE TYR LYS GLN PHE LYS GLN ILE ARG LEU THR ASP
THR LEU GLY ARG LEU SER HIS ILE LEU GLU MET ASP HIS PHE ALA LEU VAL VAL HIS GLU GLN ILE ASP LEU GLY TYR HIS SER THR GLY LYS SER SER GLN ARG GLN MET VAL PHE GLY VAL VAL THR ALA ILE ASP LEU LEU ASN PHE VAL ALA ALA GLN GLU ARG ASP GLN

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	HELICAL	Depositor
Imposed symmetry	HELICAL, twist=-176.08°, rise=48.28 Å, axial sym=C1	Depositor
Number of segments used	33700	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	42	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	3.515	Depositor
Minimum map value	-1.354	Depositor
Average map value	0.017	Depositor
Map value standard deviation	0.133	Depositor
Recommended contour level	0.4	Depositor
Map size (Å)	531.2, 531.2, 531.2	wwPDB
Map dimensions	160, 160, 160	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	3.3200002, 3.3200002, 3.3200002	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: LLP, HEM

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	0.27	0/1067	0.68	0/1442
1	B	0.27	0/1076	0.68	0/1454
1	C	0.27	0/1067	0.67	0/1442
1	D	0.25	0/1076	0.66	2/1454 (0.1%)
1	E	0.24	0/1067	0.61	0/1442
1	F	0.24	0/1076	0.64	0/1454
1	G	0.25	0/1067	0.70	0/1442
1	H	0.24	0/1076	0.61	0/1454
1	I	0.24	0/1067	0.63	0/1442
1	J	0.25	0/1076	0.63	0/1454
1	K	0.25	0/1067	0.68	0/1442
1	L	0.23	0/1076	0.66	0/1454
1	a	0.25	0/1067	0.59	0/1442
1	b	0.22	0/1076	0.58	0/1454
1	c	0.25	0/1067	0.65	0/1442
1	d	0.28	0/1076	0.71	0/1454
1	e	0.25	0/1067	0.64	1/1442 (0.1%)
1	f	0.25	0/1076	0.67	0/1454
1	g	0.29	0/1067	0.64	0/1442
1	h	0.26	0/1076	0.64	0/1454
1	i	0.26	0/1067	0.71	2/1442 (0.1%)
1	j	0.24	0/1076	0.61	0/1454
1	k	0.24	0/1067	0.60	0/1442
1	l	0.27	0/1076	0.66	0/1454
2	M	0.17	0/2758	0.46	0/3734
2	N	0.18	0/2769	0.48	0/3751
2	O	0.18	0/2758	0.51	1/3734 (0.0%)
2	P	0.17	0/2769	0.45	0/3751
2	Q	0.17	0/2758	0.48	1/3734 (0.0%)
2	R	0.17	0/2769	0.46	0/3751
2	S	0.17	0/2769	0.46	0/3751
2	T	0.17	0/2758	0.46	0/3734

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
2	U	0.17	0/2769	0.45	0/3751
2	V	0.17	0/2758	0.45	0/3734
2	W	0.17	0/2769	0.44	0/3751
2	X	0.15	0/2758	0.42	0/3734
2	Y	0.14	0/2769	0.40	0/3751
2	Z	0.15	0/2758	0.43	0/3734
2	m	0.17	0/2758	0.47	0/3734
2	n	0.14	0/2769	0.41	0/3751
2	o	0.15	0/2758	0.42	0/3734
2	p	0.15	0/2769	0.43	0/3751
2	q	0.16	0/2758	0.44	0/3734
2	r	0.14	0/2769	0.40	0/3751
2	s	0.16	0/2758	0.45	0/3734
2	t	0.15	0/2769	0.42	0/3751
2	u	0.15	0/2758	0.44	0/3734
2	v	0.16	0/2769	0.43	0/3751
2	w	0.15	0/2758	0.41	0/3734
2	x	0.16	0/2769	0.44	0/3751
All	All	0.19	0/97567	0.51	7/132057 (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
1	B	0	1
1	H	0	2
1	J	0	1
1	d	0	1
2	M	0	1
2	O	0	1
2	S	0	1
2	T	0	1
All	All	0	9

There are no bond length outliers.

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

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	485	LYS	CA-C-N	6.35	133.75	121.18
1	D	485	LYS	C-N-CA	6.35	133.75	121.18

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	O	337	MET	CB-CG-SD	5.31	128.63	112.70
2	Q	337	MET	CB-CG-SD	5.21	128.34	112.70
1	i	416	GLU	CA-C-N	-5.05	114.99	122.56

There are no chirality outliers.

5 of 9 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	517	GLN	Peptide
1	H	517	GLN	Peptide
1	H	540	LEU	Peptide
1	J	443	PHE	Peptide
1	d	443	PHE	Peptide

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	1053	0	1088	48	0
1	B	1062	0	1096	58	0
1	C	1053	0	1088	60	0
1	D	1062	0	1096	54	0
1	E	1053	0	1088	57	0
1	F	1062	0	1096	63	0
1	G	1053	0	1088	66	0
1	H	1062	0	1096	48	0
1	I	1053	0	1088	77	0
1	J	1062	0	1096	59	0
1	K	1053	0	1088	73	0
1	L	1062	0	1096	49	0
1	a	1053	0	1088	50	0
1	b	1062	0	1096	44	0
1	c	1053	0	1088	57	0
1	d	1062	0	1096	73	0
1	e	1053	0	1088	67	0
1	f	1062	0	1096	65	0
1	g	1053	0	1088	66	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	h	1062	0	1096	59	0
1	i	1053	0	1088	54	0
1	j	1062	0	1096	63	0
1	k	1053	0	1088	61	0
1	l	1062	0	1096	62	0
2	M	2733	0	2723	73	0
2	N	2743	0	2732	66	0
2	O	2733	0	2723	74	0
2	P	2743	0	2733	62	0
2	Q	2733	0	2723	68	0
2	R	2743	0	2732	64	0
2	S	2743	0	2734	68	0
2	T	2733	0	2723	72	0
2	U	2743	0	2735	65	0
2	V	2733	0	2723	76	0
2	W	2743	0	2734	68	0
2	X	2733	0	2723	44	0
2	Y	2743	0	2734	47	0
2	Z	2733	0	2723	39	0
2	m	2733	0	2723	66	0
2	n	2743	0	2734	46	0
2	o	2733	0	2723	50	0
2	p	2743	0	2735	51	0
2	q	2733	0	2723	41	0
2	r	2743	0	2734	47	0
2	s	2733	0	2723	43	0
2	t	2743	0	2735	50	0
2	u	2733	0	2723	48	0
2	v	2743	0	2735	55	0
2	w	2733	0	2723	46	0
2	x	2743	0	2735	56	0
3	M	43	0	30	2	0
3	N	43	0	30	2	0
3	O	43	0	30	2	0
3	P	43	0	30	2	0
3	Q	43	0	30	3	0
3	R	43	0	30	4	0
3	S	43	0	30	2	0
3	T	43	0	30	2	0
3	U	43	0	30	2	0
3	V	43	0	30	3	0
3	W	43	0	30	1	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	X	43	0	30	4	0
3	Y	43	0	30	3	0
3	Z	43	0	30	4	0
3	m	43	0	30	3	0
3	n	43	0	30	3	0
3	o	43	0	30	4	0
3	p	43	0	30	4	0
3	q	43	0	30	3	0
3	r	43	0	30	3	0
3	s	43	0	30	2	0
3	t	43	0	30	4	0
3	u	43	0	30	2	0
3	v	43	0	30	4	0
3	w	43	0	30	3	0
3	x	43	0	30	4	0
All	All	97686	0	97929	2725	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 14.

The worst 5 of 2725 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:G:458:MET:HE3	1:G:459:VAL:H	1.36	0.90
2:r:65:HIS:HD2	3:r:601:HEM:NB	1.75	0.85
2:Y:65:HIS:HD2	3:Y:601:HEM:NB	1.75	0.84
1:a:491:ARG:HE	1:a:493:THR:HB	1.42	0.84
2:n:65:HIS:HD2	3:n:601:HEM:NB	1.75	0.83

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	134/550 (24%)	119 (89%)	14 (10%)	1 (1%)	18 56
1	B	135/550 (24%)	124 (92%)	11 (8%)	0	100 100
1	C	134/550 (24%)	119 (89%)	15 (11%)	0	100 100
1	D	135/550 (24%)	119 (88%)	16 (12%)	0	100 100
1	E	134/550 (24%)	119 (89%)	15 (11%)	0	100 100
1	F	135/550 (24%)	119 (88%)	16 (12%)	0	100 100
1	G	134/550 (24%)	120 (90%)	13 (10%)	1 (1%)	18 56
1	H	135/550 (24%)	126 (93%)	9 (7%)	0	100 100
1	I	134/550 (24%)	123 (92%)	11 (8%)	0	100 100
1	J	135/550 (24%)	122 (90%)	13 (10%)	0	100 100
1	K	134/550 (24%)	126 (94%)	8 (6%)	0	100 100
1	L	135/550 (24%)	126 (93%)	9 (7%)	0	100 100
1	a	134/550 (24%)	123 (92%)	11 (8%)	0	100 100
1	b	135/550 (24%)	123 (91%)	12 (9%)	0	100 100
1	c	134/550 (24%)	123 (92%)	11 (8%)	0	100 100
1	d	135/550 (24%)	117 (87%)	18 (13%)	0	100 100
1	e	134/550 (24%)	122 (91%)	11 (8%)	1 (1%)	18 56
1	f	135/550 (24%)	124 (92%)	11 (8%)	0	100 100
1	g	134/550 (24%)	118 (88%)	15 (11%)	1 (1%)	18 56
1	h	135/550 (24%)	121 (90%)	14 (10%)	0	100 100
1	i	134/550 (24%)	123 (92%)	11 (8%)	0	100 100
1	j	135/550 (24%)	124 (92%)	11 (8%)	0	100 100
1	k	134/550 (24%)	118 (88%)	15 (11%)	1 (1%)	18 56
1	l	135/550 (24%)	119 (88%)	16 (12%)	0	100 100
2	M	353/550 (64%)	338 (96%)	15 (4%)	0	100 100
2	N	356/550 (65%)	343 (96%)	13 (4%)	0	100 100
2	O	353/550 (64%)	338 (96%)	15 (4%)	0	100 100
2	P	356/550 (65%)	346 (97%)	10 (3%)	0	100 100
2	Q	353/550 (64%)	341 (97%)	12 (3%)	0	100 100
2	R	356/550 (65%)	343 (96%)	13 (4%)	0	100 100
2	S	356/550 (65%)	344 (97%)	12 (3%)	0	100 100
2	T	353/550 (64%)	338 (96%)	15 (4%)	0	100 100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	U	356/550 (65%)	341 (96%)	15 (4%)	0	100	100
2	V	353/550 (64%)	340 (96%)	13 (4%)	0	100	100
2	W	356/550 (65%)	343 (96%)	13 (4%)	0	100	100
2	X	353/550 (64%)	341 (97%)	12 (3%)	0	100	100
2	Y	356/550 (65%)	349 (98%)	7 (2%)	0	100	100
2	Z	353/550 (64%)	342 (97%)	11 (3%)	0	100	100
2	m	353/550 (64%)	337 (96%)	16 (4%)	0	100	100
2	n	356/550 (65%)	347 (98%)	9 (2%)	0	100	100
2	o	353/550 (64%)	339 (96%)	14 (4%)	0	100	100
2	p	356/550 (65%)	348 (98%)	8 (2%)	0	100	100
2	q	353/550 (64%)	342 (97%)	11 (3%)	0	100	100
2	r	356/550 (65%)	348 (98%)	8 (2%)	0	100	100
2	s	353/550 (64%)	340 (96%)	13 (4%)	0	100	100
2	t	356/550 (65%)	345 (97%)	11 (3%)	0	100	100
2	u	353/550 (64%)	342 (97%)	11 (3%)	0	100	100
2	v	356/550 (65%)	347 (98%)	9 (2%)	0	100	100
2	w	353/550 (64%)	343 (97%)	10 (3%)	0	100	100
2	x	356/550 (65%)	346 (97%)	10 (3%)	0	100	100
All	All	12445/27500 (45%)	11828 (95%)	612 (5%)	5 (0%)	100	100

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	G	460	THR
1	A	460	THR
1	g	460	THR
1	k	460	THR
1	e	460	THR

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	115/464 (25%)	115 (100%)	0	100	100
1	B	116/464 (25%)	116 (100%)	0	100	100
1	C	115/464 (25%)	115 (100%)	0	100	100
1	D	116/464 (25%)	116 (100%)	0	100	100
1	E	115/464 (25%)	115 (100%)	0	100	100
1	F	116/464 (25%)	116 (100%)	0	100	100
1	G	115/464 (25%)	115 (100%)	0	100	100
1	H	116/464 (25%)	116 (100%)	0	100	100
1	I	115/464 (25%)	115 (100%)	0	100	100
1	J	116/464 (25%)	116 (100%)	0	100	100
1	K	115/464 (25%)	115 (100%)	0	100	100
1	L	116/464 (25%)	116 (100%)	0	100	100
1	a	115/464 (25%)	115 (100%)	0	100	100
1	b	116/464 (25%)	116 (100%)	0	100	100
1	c	115/464 (25%)	115 (100%)	0	100	100
1	d	116/464 (25%)	116 (100%)	0	100	100
1	e	115/464 (25%)	115 (100%)	0	100	100
1	f	116/464 (25%)	116 (100%)	0	100	100
1	g	115/464 (25%)	115 (100%)	0	100	100
1	h	116/464 (25%)	116 (100%)	0	100	100
1	i	115/464 (25%)	115 (100%)	0	100	100
1	j	116/464 (25%)	116 (100%)	0	100	100
1	k	115/464 (25%)	115 (100%)	0	100	100
1	l	116/464 (25%)	116 (100%)	0	100	100
2	M	289/463 (62%)	289 (100%)	0	100	100
2	N	291/463 (63%)	291 (100%)	0	100	100
2	O	289/463 (62%)	289 (100%)	0	100	100
2	P	291/463 (63%)	291 (100%)	0	100	100
2	Q	289/463 (62%)	289 (100%)	0	100	100
2	R	291/463 (63%)	291 (100%)	0	100	100
2	S	291/463 (63%)	291 (100%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	T	289/463 (62%)	289 (100%)	0	100	100
2	U	291/463 (63%)	291 (100%)	0	100	100
2	V	289/463 (62%)	289 (100%)	0	100	100
2	W	291/463 (63%)	291 (100%)	0	100	100
2	X	289/463 (62%)	289 (100%)	0	100	100
2	Y	291/463 (63%)	291 (100%)	0	100	100
2	Z	289/463 (62%)	289 (100%)	0	100	100
2	m	289/463 (62%)	289 (100%)	0	100	100
2	n	291/463 (63%)	291 (100%)	0	100	100
2	o	289/463 (62%)	289 (100%)	0	100	100
2	p	291/463 (63%)	291 (100%)	0	100	100
2	q	289/463 (62%)	289 (100%)	0	100	100
2	r	291/463 (63%)	291 (100%)	0	100	100
2	s	289/463 (62%)	289 (100%)	0	100	100
2	t	291/463 (63%)	291 (100%)	0	100	100
2	u	289/463 (62%)	289 (100%)	0	100	100
2	v	291/463 (63%)	291 (100%)	0	100	100
2	w	289/463 (62%)	288 (100%)	1 (0%)	86	86
2	x	291/463 (63%)	291 (100%)	0	100	100
All	All	10312/23174 (44%)	10311 (100%)	1 (0%)	100	100

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	w	365	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 75 such sidechains are listed below:

Mol	Chain	Res	Type
2	S	149	ASN
2	u	380	ASN
2	T	218	HIS
2	o	67	HIS
1	A	515	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)

26 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	LLP	R	119	2	23,24,25	1.44	3 (13%)	25,32,34	3.73	4 (16%)
2	LLP	P	119	2	23,24,25	1.46	2 (8%)	25,32,34	3.98	5 (20%)
2	LLP	x	119	2	23,24,25	1.45	3 (13%)	25,32,34	1.26	3 (12%)
2	LLP	t	119	2	23,24,25	1.44	3 (13%)	25,32,34	1.22	2 (8%)
2	LLP	w	119	2	23,24,25	1.43	2 (8%)	25,32,34	1.54	3 (12%)
2	LLP	s	119	2	23,24,25	1.43	2 (8%)	25,32,34	1.46	3 (12%)
2	LLP	r	119	2	23,24,25	1.51	4 (17%)	25,32,34	1.25	2 (8%)
2	LLP	X	119	2	23,24,25	1.43	3 (13%)	25,32,34	1.69	4 (16%)
2	LLP	N	119	2	23,24,25	1.44	3 (13%)	25,32,34	3.74	4 (16%)
2	LLP	v	119	2	23,24,25	1.44	4 (17%)	25,32,34	1.27	2 (8%)
2	LLP	Q	119	2	23,24,25	1.45	3 (13%)	25,32,34	2.72	3 (12%)
2	LLP	n	119	2	23,24,25	1.49	3 (13%)	25,32,34	1.30	2 (8%)
2	LLP	q	119	2	23,24,25	1.43	3 (13%)	25,32,34	1.11	3 (12%)
2	LLP	U	119	2	23,24,25	1.47	3 (13%)	25,32,34	2.18	4 (16%)
2	LLP	o	119	2	23,24,25	1.43	3 (13%)	25,32,34	1.57	4 (16%)
2	LLP	M	119	2	23,24,25	1.45	3 (13%)	25,32,34	2.79	4 (16%)
2	LLP	p	119	2	23,24,25	1.48	4 (17%)	25,32,34	1.02	2 (8%)
2	LLP	m	119	2	23,24,25	1.45	3 (13%)	25,32,34	2.30	4 (16%)
2	LLP	W	119	2	23,24,25	1.46	2 (8%)	25,32,34	2.49	2 (8%)
2	LLP	Y	119	2	23,24,25	1.51	4 (17%)	25,32,34	1.12	2 (8%)
2	LLP	Z	119	2	23,24,25	1.43	3 (13%)	25,32,34	1.56	4 (16%)
2	LLP	V	119	2	23,24,25	1.45	3 (13%)	25,32,34	2.76	4 (16%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
2	LLP	O	119	2	23,24,25	1.47	3 (13%)	25,32,34	2.12	5 (20%)
2	LLP	S	119	2	23,24,25	1.44	2 (8%)	25,32,34	2.37	1 (4%)
2	LLP	T	119	2	23,24,25	1.45	3 (13%)	25,32,34	2.43	4 (16%)
2	LLP	u	119	2	23,24,25	1.42	2 (8%)	25,32,34	1.37	2 (8%)

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
2	LLP	R	119	2	-	6/16/17/19	0/1/1/1
2	LLP	P	119	2	-	7/16/17/19	0/1/1/1
2	LLP	x	119	2	-	9/16/17/19	0/1/1/1
2	LLP	t	119	2	-	9/16/17/19	0/1/1/1
2	LLP	w	119	2	-	5/16/17/19	0/1/1/1
2	LLP	s	119	2	-	5/16/17/19	0/1/1/1
2	LLP	r	119	2	-	8/16/17/19	0/1/1/1
2	LLP	X	119	2	-	7/16/17/19	0/1/1/1
2	LLP	N	119	2	-	6/16/17/19	0/1/1/1
2	LLP	v	119	2	-	9/16/17/19	0/1/1/1
2	LLP	Q	119	2	-	9/16/17/19	0/1/1/1
2	LLP	n	119	2	-	7/16/17/19	0/1/1/1
2	LLP	q	119	2	-	6/16/17/19	0/1/1/1
2	LLP	U	119	2	-	6/16/17/19	0/1/1/1
2	LLP	o	119	2	-	7/16/17/19	0/1/1/1
2	LLP	M	119	2	-	8/16/17/19	0/1/1/1
2	LLP	p	119	2	-	9/16/17/19	0/1/1/1
2	LLP	m	119	2	-	7/16/17/19	0/1/1/1
2	LLP	W	119	2	-	7/16/17/19	0/1/1/1
2	LLP	Y	119	2	-	7/16/17/19	0/1/1/1
2	LLP	Z	119	2	-	7/16/17/19	0/1/1/1
2	LLP	V	119	2	-	9/16/17/19	0/1/1/1
2	LLP	O	119	2	-	7/16/17/19	0/1/1/1
2	LLP	S	119	2	-	6/16/17/19	0/1/1/1
2	LLP	T	119	2	-	8/16/17/19	0/1/1/1

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	LLP	u	119	2	-	5/16/17/19	0/1/1/1

The worst 5 of 76 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	O	119	LLP	C4'-NZ	4.92	1.43	1.27
2	U	119	LLP	C4'-NZ	4.90	1.43	1.27
2	P	119	LLP	C4'-NZ	4.83	1.43	1.27
2	r	119	LLP	C4'-NZ	4.83	1.43	1.27
2	M	119	LLP	C4'-NZ	4.83	1.43	1.27

The worst 5 of 82 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	P	119	LLP	CE-NZ-C4'	-18.38	62.44	118.90
2	R	119	LLP	CE-NZ-C4'	-17.22	66.01	118.90
2	N	119	LLP	CE-NZ-C4'	-17.21	66.06	118.90
2	W	119	LLP	CE-NZ-C4'	-11.39	83.93	118.90
2	S	119	LLP	CE-NZ-C4'	-10.83	85.65	118.90

There are no chirality outliers.

5 of 186 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	M	119	LLP	C3-C4-C4'-NZ
2	M	119	LLP	C4-C4'-NZ-CE
2	M	119	LLP	C5'-OP4-P-OP1
2	M	119	LLP	C5'-OP4-P-OP2
2	M	119	LLP	C5'-OP4-P-OP3

There are no ring outliers.

15 monomers are involved in 16 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	x	119	LLP	1	0
2	t	119	LLP	1	0
2	r	119	LLP	1	0
2	X	119	LLP	1	0
2	v	119	LLP	1	0
2	n	119	LLP	1	0
2	q	119	LLP	1	0

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	U	119	LLP	2	0
2	o	119	LLP	1	0
2	p	119	LLP	1	0
2	W	119	LLP	1	0
2	Y	119	LLP	1	0
2	Z	119	LLP	1	0
2	O	119	LLP	1	0
2	S	119	LLP	1	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

26 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	HEM	n	601	2	50,50,50	1.50	9 (18%)	66,82,82	1.21	6 (9%)
3	HEM	o	601	2	50,50,50	1.55	8 (16%)	66,82,82	1.18	5 (7%)
3	HEM	s	601	2	50,50,50	1.42	8 (16%)	66,82,82	1.21	6 (9%)
3	HEM	q	601	2	50,50,50	1.65	8 (16%)	66,82,82	1.14	5 (7%)
3	HEM	T	601	2	50,50,50	1.37	7 (14%)	66,82,82	1.27	10 (15%)
3	HEM	U	601	2	50,50,50	1.48	8 (16%)	66,82,82	1.24	8 (12%)
3	HEM	Q	601	2	50,50,50	1.35	8 (16%)	66,82,82	1.28	10 (15%)
3	HEM	Y	601	2	50,50,50	1.49	9 (18%)	66,82,82	1.22	6 (9%)
3	HEM	P	601	2	50,50,50	1.51	7 (14%)	66,82,82	1.22	7 (10%)
3	HEM	x	601	2	50,50,50	1.46	8 (16%)	66,82,82	1.19	5 (7%)
3	HEM	t	601	2	50,50,50	1.51	7 (14%)	66,82,82	1.15	4 (6%)
3	HEM	m	601	2	50,50,50	1.47	7 (14%)	66,82,82	1.24	9 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	HEM	V	601	2	50,50,50	1.35	8 (16%)	66,82,82	1.29	10 (15%)
3	HEM	r	601	2	50,50,50	1.50	9 (18%)	66,82,82	1.21	6 (9%)
3	HEM	O	601	2	50,50,50	1.35	7 (14%)	66,82,82	1.27	10 (15%)
3	HEM	W	601	2	50,50,50	1.49	6 (12%)	66,82,82	1.22	7 (10%)
3	HEM	Z	601	2	50,50,50	1.49	8 (16%)	66,82,82	1.20	7 (10%)
3	HEM	N	601	2	50,50,50	1.50	6 (12%)	66,82,82	1.20	6 (9%)
3	HEM	v	601	2	50,50,50	1.48	7 (14%)	66,82,82	1.19	5 (7%)
3	HEM	X	601	2	50,50,50	1.56	8 (16%)	66,82,82	1.18	6 (9%)
3	HEM	R	601	2	50,50,50	1.45	6 (12%)	66,82,82	1.23	7 (10%)
3	HEM	w	601	2	50,50,50	1.42	7 (14%)	66,82,82	1.23	7 (10%)
3	HEM	S	601	2	50,50,50	1.49	8 (16%)	66,82,82	1.24	9 (13%)
3	HEM	u	601	2	50,50,50	1.41	8 (16%)	66,82,82	1.23	8 (12%)
3	HEM	M	601	2	50,50,50	1.42	8 (16%)	66,82,82	1.25	9 (13%)
3	HEM	p	601	2	50,50,50	1.48	8 (16%)	66,82,82	1.21	7 (10%)

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
3	HEM	n	601	2	-	0/14/54/54	-
3	HEM	o	601	2	-	0/14/54/54	-
3	HEM	s	601	2	-	0/14/54/54	-
3	HEM	q	601	2	-	0/14/54/54	-
3	HEM	T	601	2	-	1/14/54/54	-
3	HEM	U	601	2	-	3/14/54/54	-
3	HEM	Q	601	2	-	0/14/54/54	-
3	HEM	Y	601	2	-	0/14/54/54	-
3	HEM	P	601	2	-	3/14/54/54	-
3	HEM	x	601	2	-	0/14/54/54	-
3	HEM	t	601	2	-	0/14/54/54	-
3	HEM	m	601	2	-	0/14/54/54	-
3	HEM	V	601	2	-	0/14/54/54	-
3	HEM	r	601	2	-	0/14/54/54	-
3	HEM	O	601	2	-	2/14/54/54	-
3	HEM	W	601	2	-	3/14/54/54	-
3	HEM	Z	601	2	-	0/14/54/54	-

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	HEM	N	601	2	-	3/14/54/54	-
3	HEM	v	601	2	-	0/14/54/54	-
3	HEM	X	601	2	-	0/14/54/54	-
3	HEM	R	601	2	-	3/14/54/54	-
3	HEM	w	601	2	-	0/14/54/54	-
3	HEM	S	601	2	-	3/14/54/54	-
3	HEM	u	601	2	-	0/14/54/54	-
3	HEM	M	601	2	-	0/14/54/54	-
3	HEM	p	601	2	-	0/14/54/54	-

The worst 5 of 198 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	q	601	HEM	FE-NC	4.70	2.11	1.95
3	q	601	HEM	FE-ND	4.50	2.08	1.94
3	o	601	HEM	FE-ND	4.43	2.08	1.94
3	X	601	HEM	FE-ND	4.41	2.08	1.94
3	q	601	HEM	FE-NB	4.38	2.08	1.94

The worst 5 of 185 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	V	601	HEM	C4D-ND-C1D	3.27	108.45	105.07
3	Q	601	HEM	C4D-ND-C1D	3.25	108.43	105.07
3	O	601	HEM	C4D-ND-C1D	3.18	108.36	105.07
3	T	601	HEM	C4D-ND-C1D	3.16	108.34	105.07
3	m	601	HEM	C4D-ND-C1D	3.13	108.31	105.07

There are no chirality outliers.

5 of 21 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	S	601	HEM	C3D-CAD-CBD-CGD
3	U	601	HEM	C3D-CAD-CBD-CGD
3	P	601	HEM	C4D-C3D-CAD-CBD
3	S	601	HEM	C4D-C3D-CAD-CBD
3	U	601	HEM	C4D-C3D-CAD-CBD

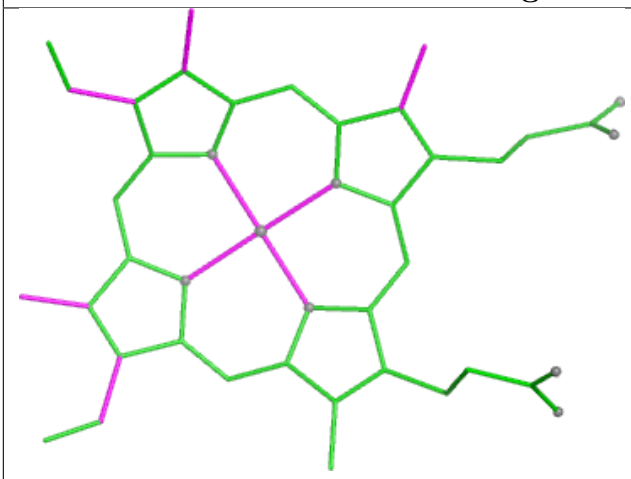
There are no ring outliers.

26 monomers are involved in 75 short contacts:

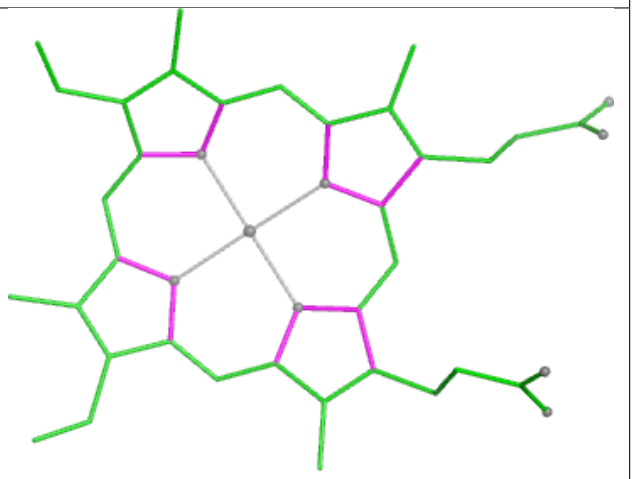
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	n	601	HEM	3	0
3	o	601	HEM	4	0
3	s	601	HEM	2	0
3	q	601	HEM	3	0
3	T	601	HEM	2	0
3	U	601	HEM	2	0
3	Q	601	HEM	3	0
3	Y	601	HEM	3	0
3	P	601	HEM	2	0
3	x	601	HEM	4	0
3	t	601	HEM	4	0
3	m	601	HEM	3	0
3	V	601	HEM	3	0
3	r	601	HEM	3	0
3	O	601	HEM	2	0
3	W	601	HEM	1	0
3	Z	601	HEM	4	0
3	N	601	HEM	2	0
3	v	601	HEM	4	0
3	X	601	HEM	4	0
3	R	601	HEM	4	0
3	w	601	HEM	3	0
3	S	601	HEM	2	0
3	u	601	HEM	2	0
3	M	601	HEM	2	0
3	p	601	HEM	4	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.

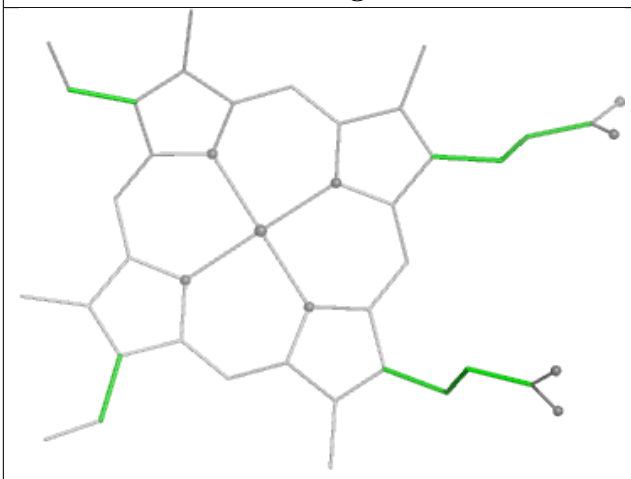
Ligand HEM n 601



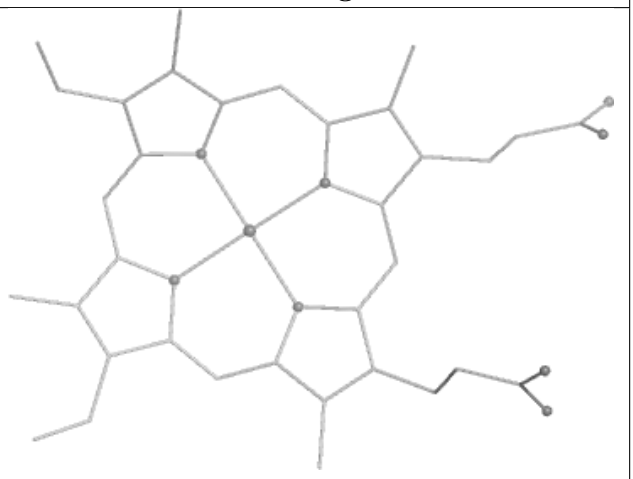
Bond lengths



Bond angles

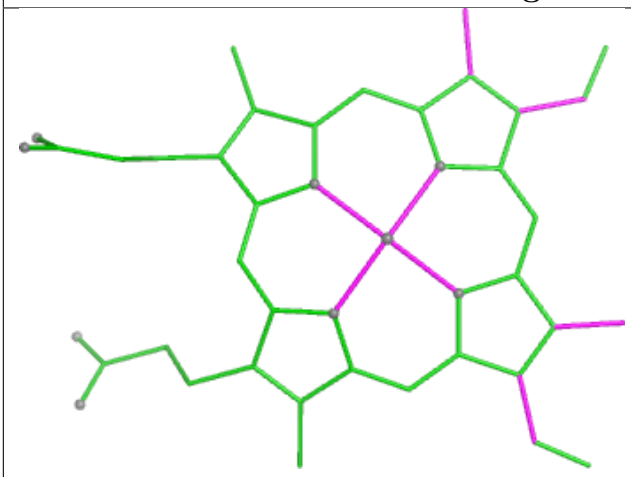


Torsions

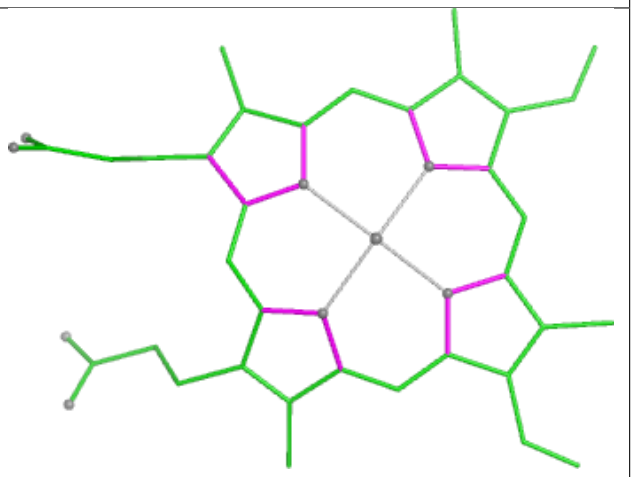


Rings

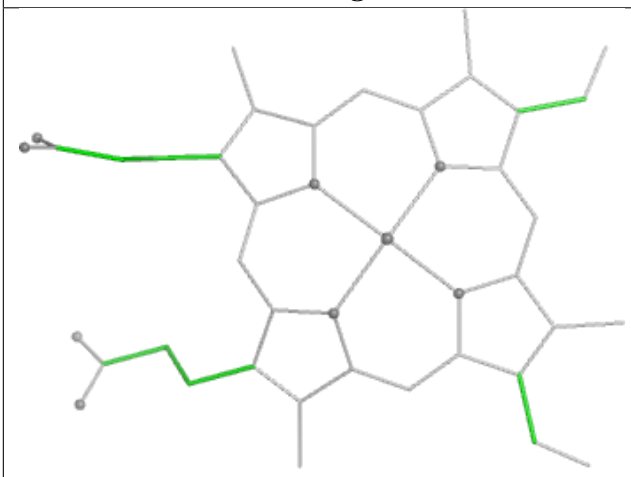
Ligand HEM o 601



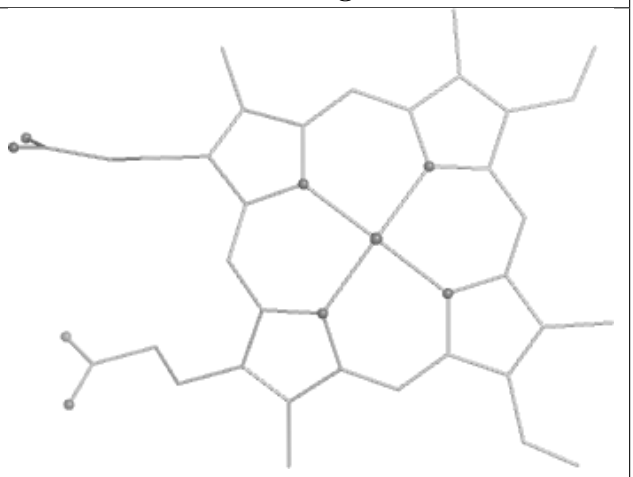
Bond lengths



Bond angles

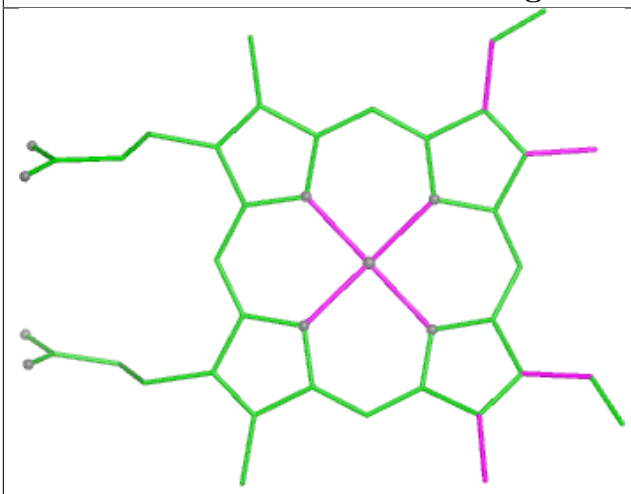


Torsions

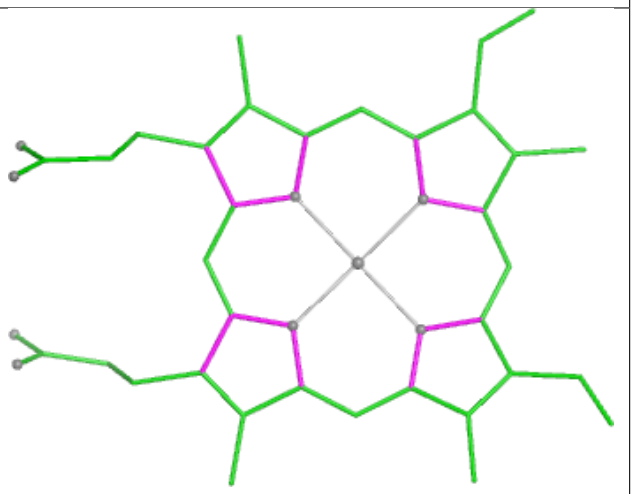


Rings

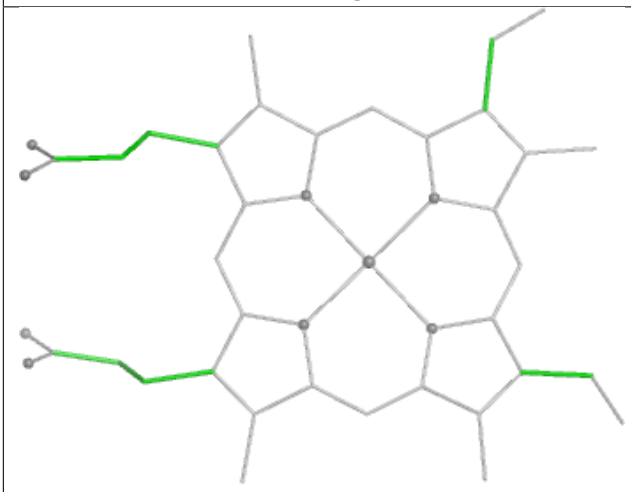
Ligand HEM s 601



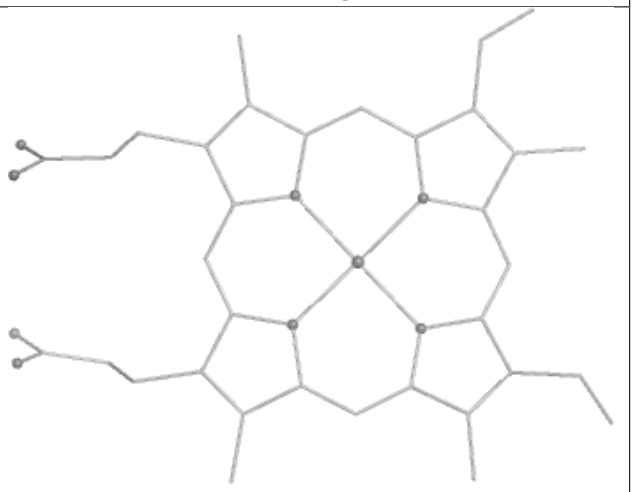
Bond lengths



Bond angles

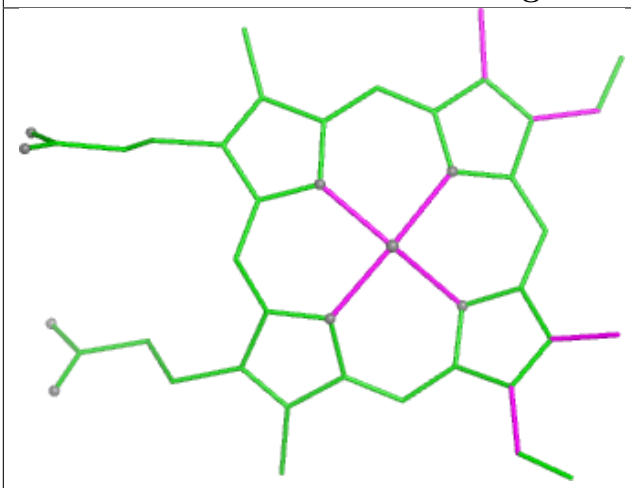


Torsions

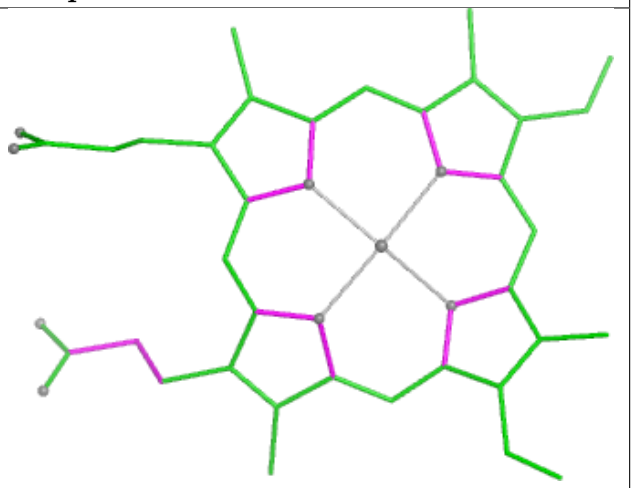


Rings

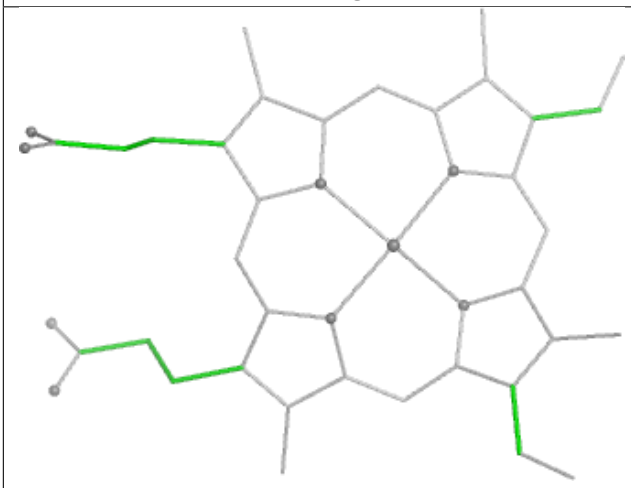
Ligand HEM q 601



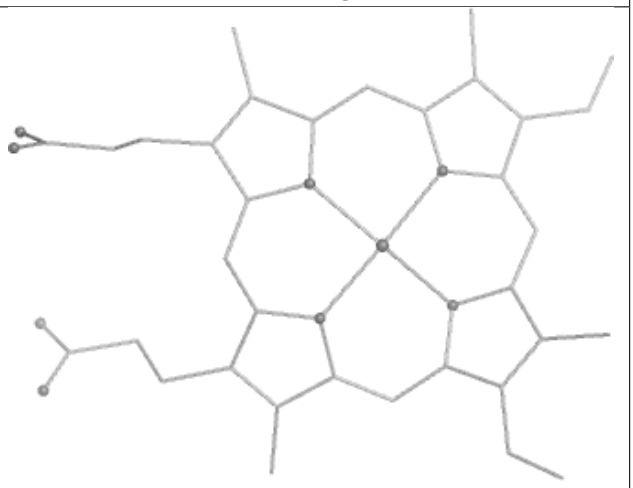
Bond lengths



Bond angles

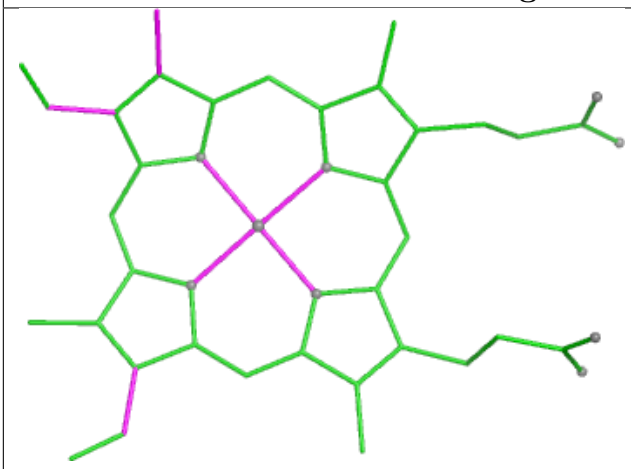


Torsions

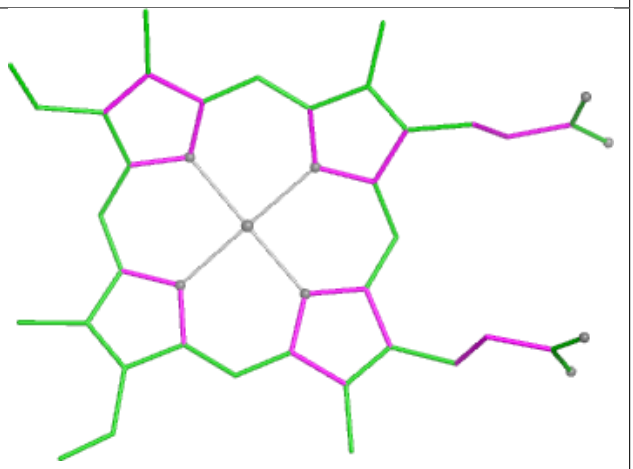


Rings

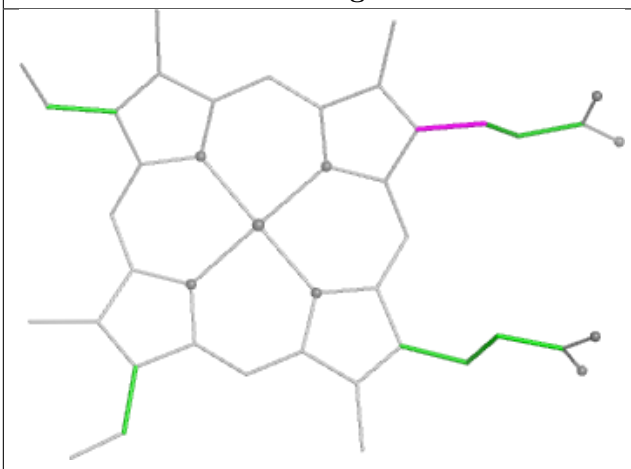
Ligand HEM T 601



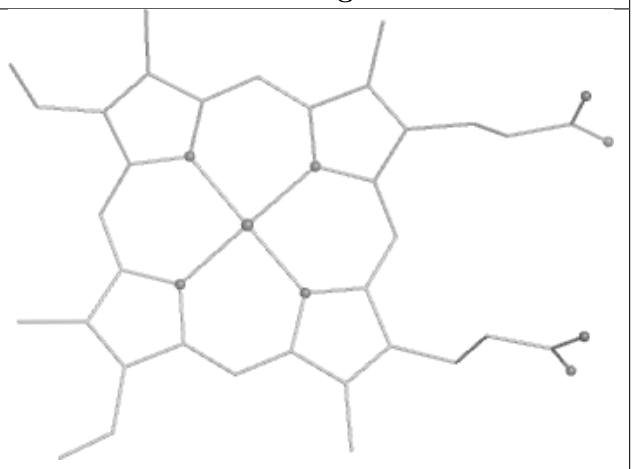
Bond lengths



Bond angles

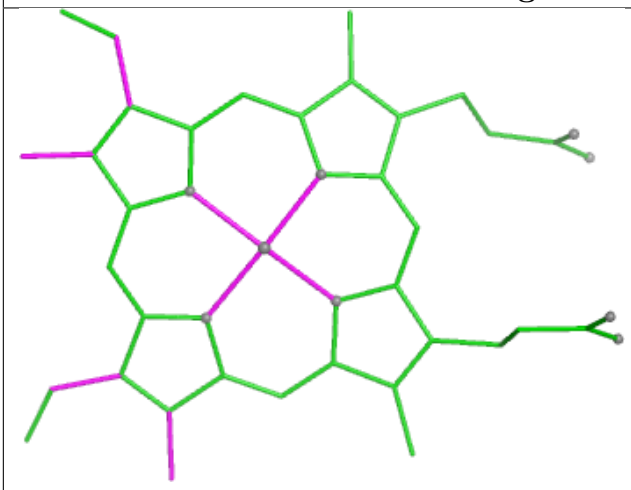


Torsions

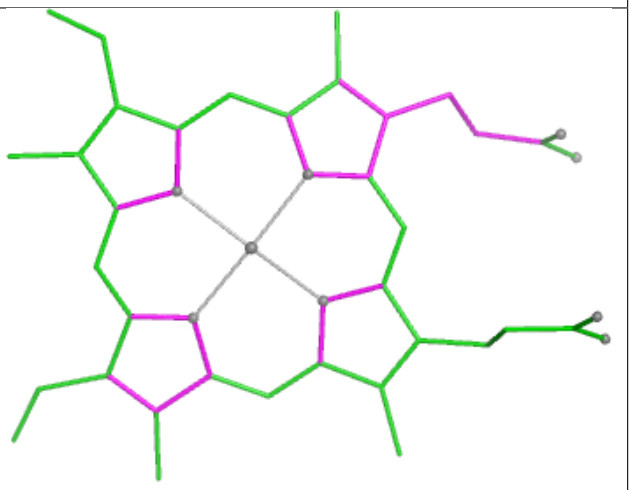


Rings

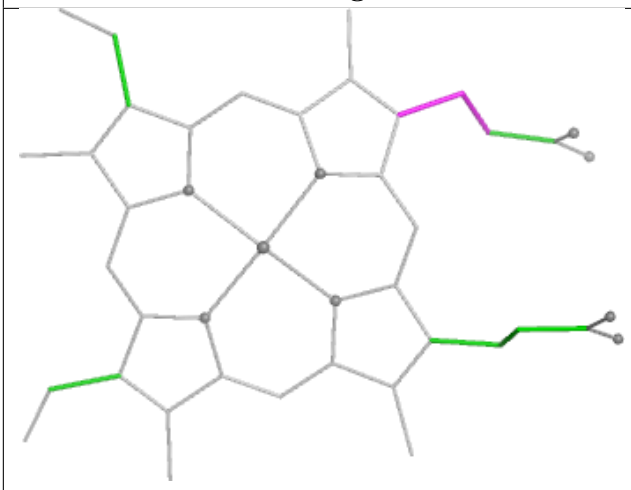
Ligand HEM U 601



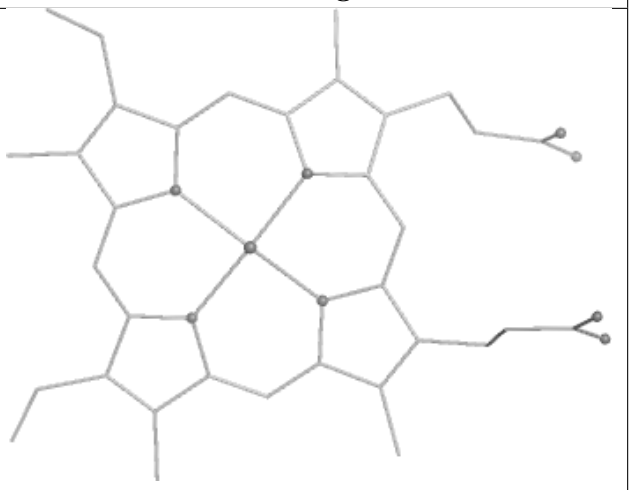
Bond lengths



Bond angles

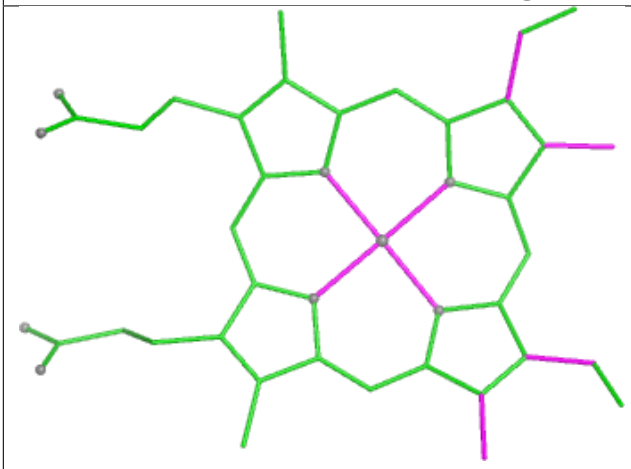


Torsions

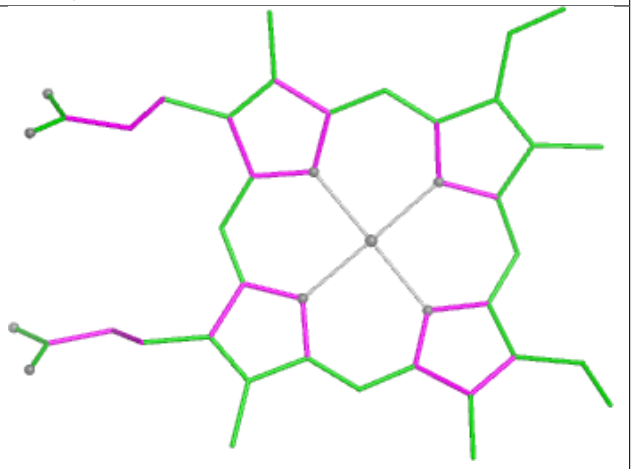


Rings

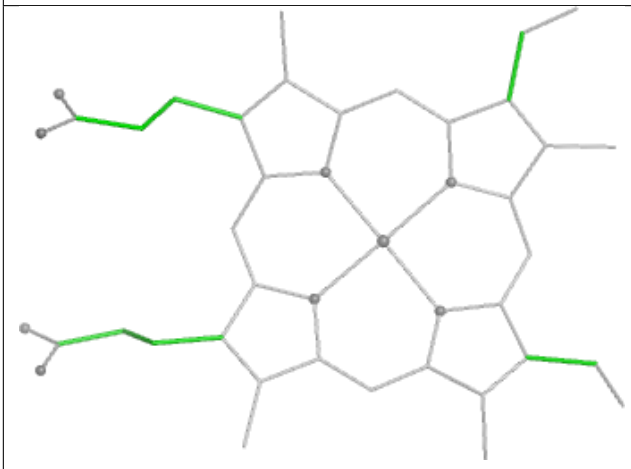
Ligand HEM Q 601



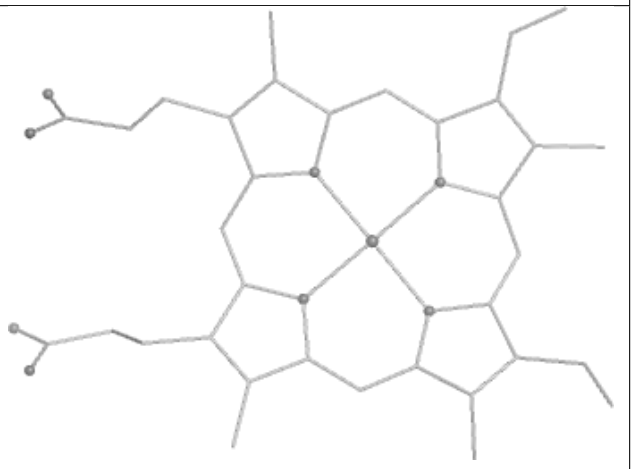
Bond lengths



Bond angles

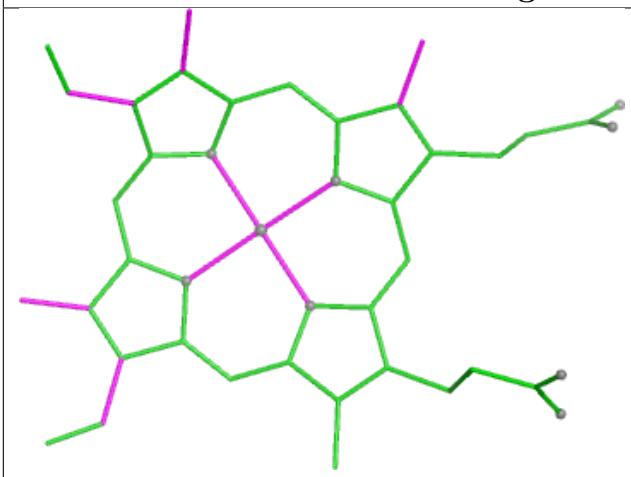


Torsions

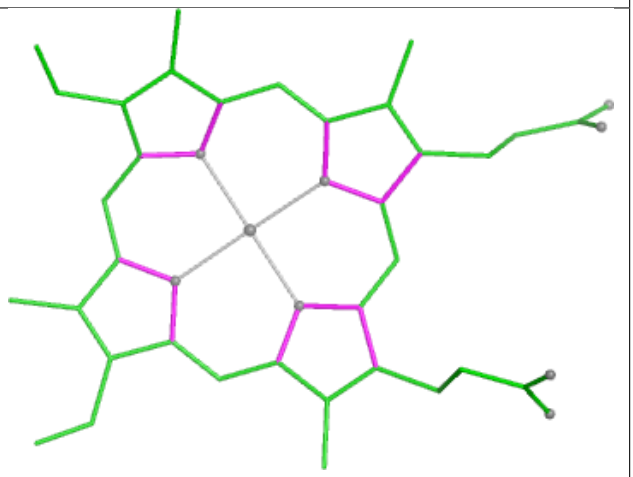


Rings

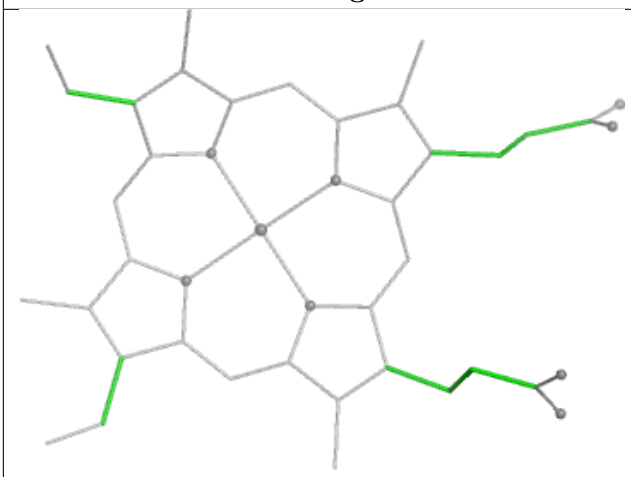
Ligand HEM Y 601



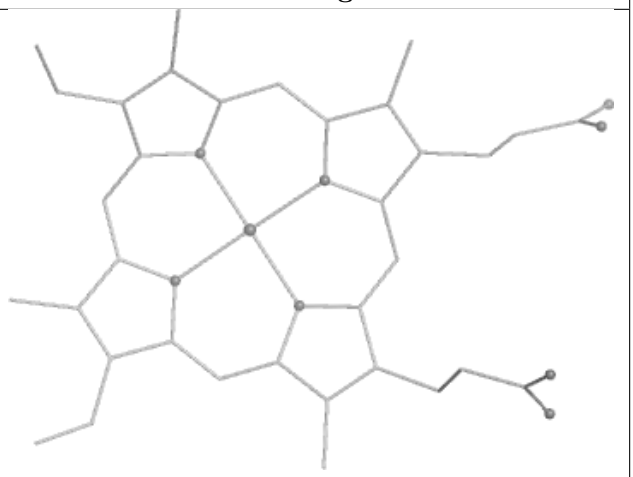
Bond lengths



Bond angles

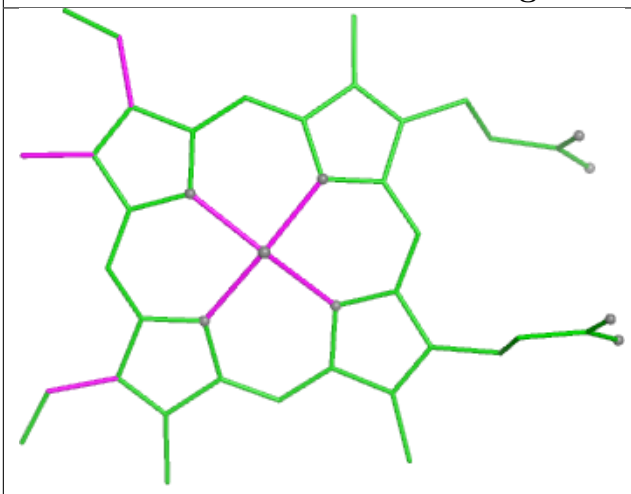


Torsions

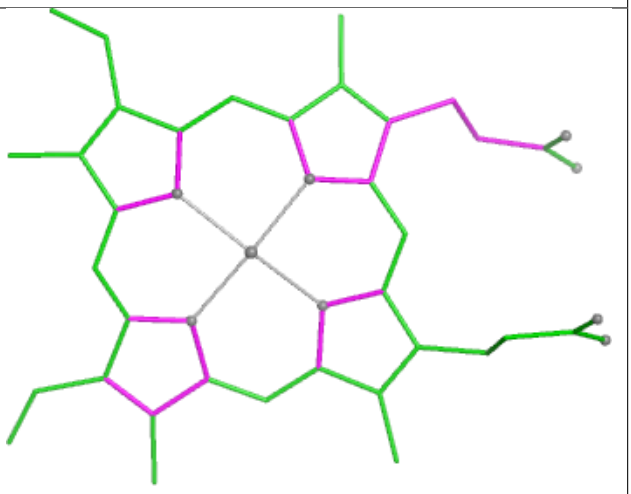


Rings

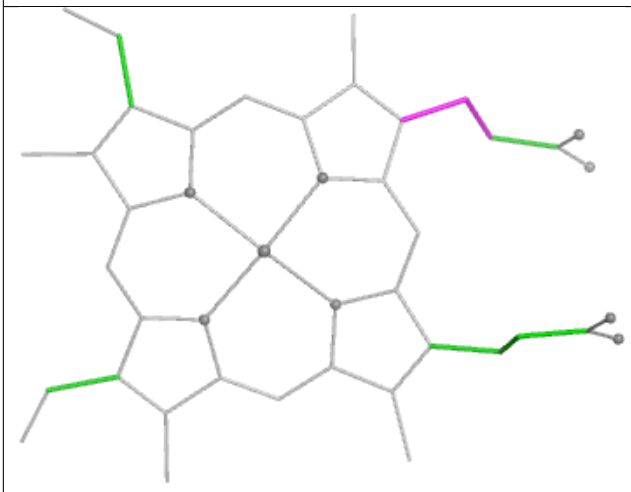
Ligand HEM P 601



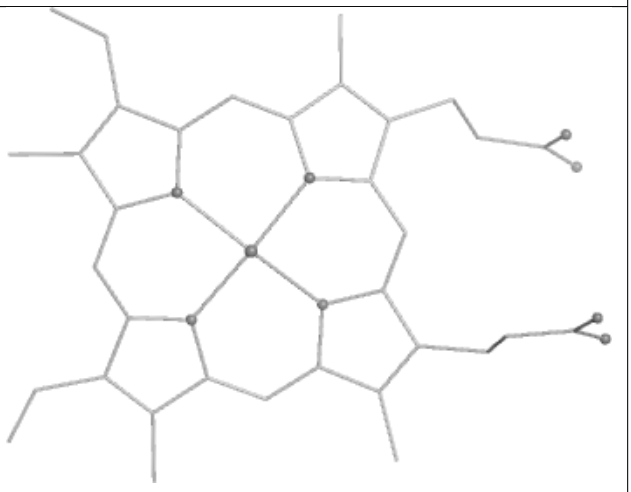
Bond lengths



Bond angles

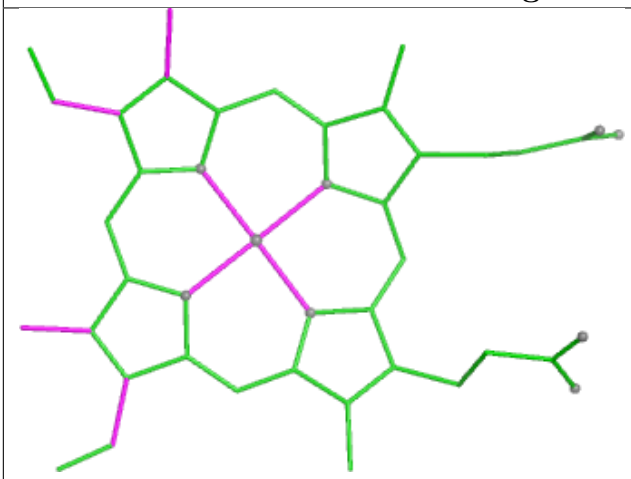


Torsions

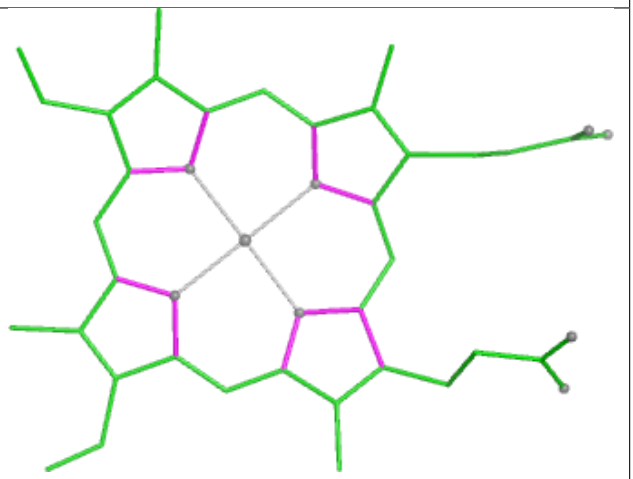


Rings

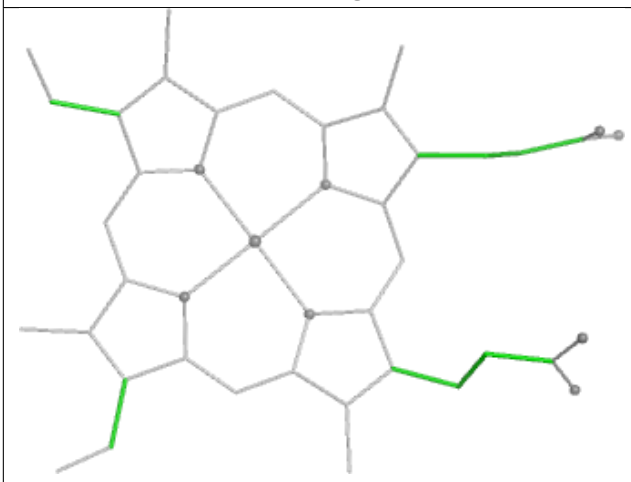
Ligand HEM x 601



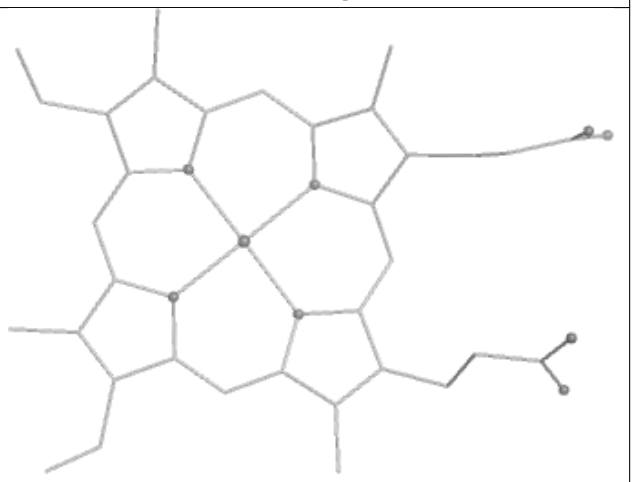
Bond lengths



Bond angles

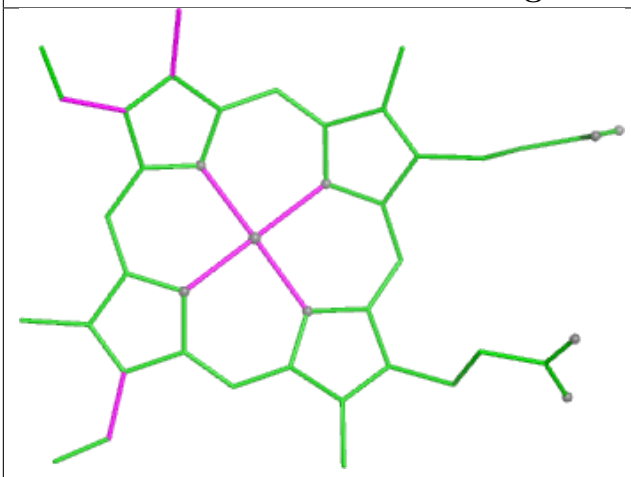


Torsions

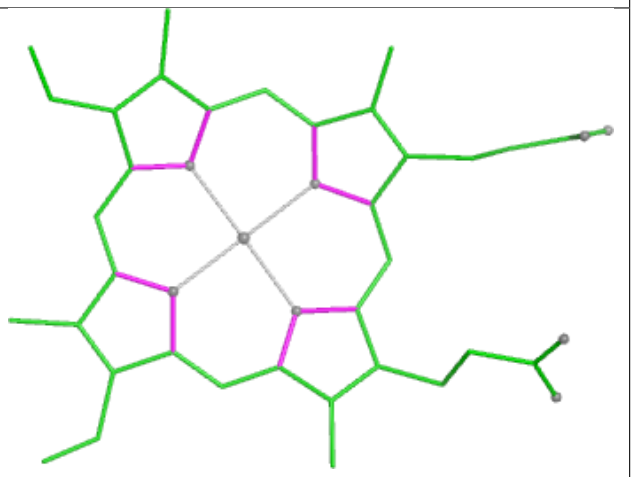


Rings

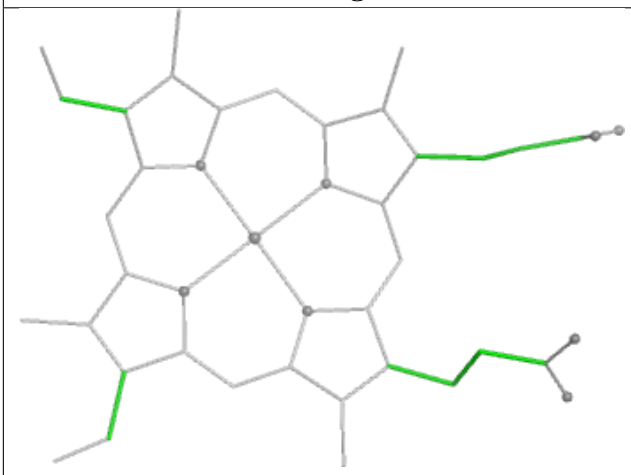
Ligand HEM t 601



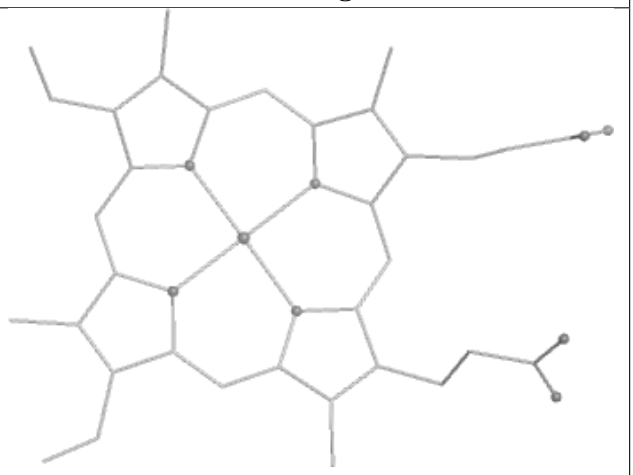
Bond lengths



Bond angles

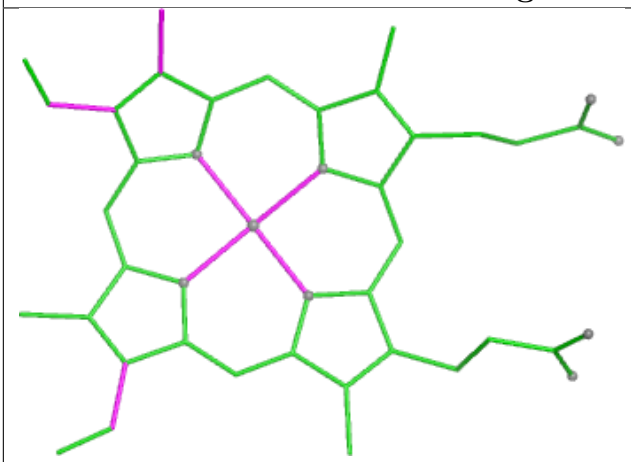


Torsions

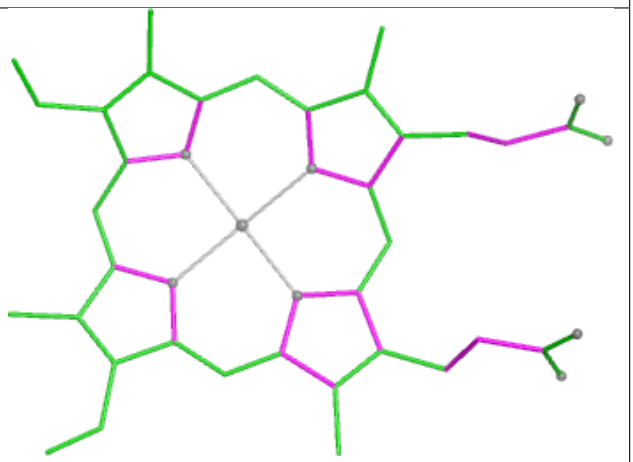


Rings

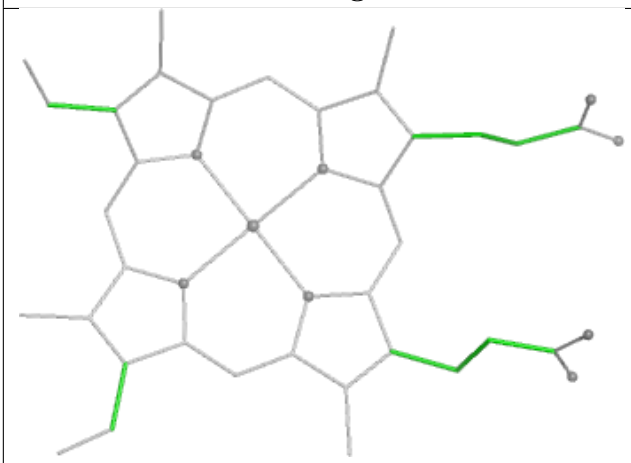
Ligand HEM m 601



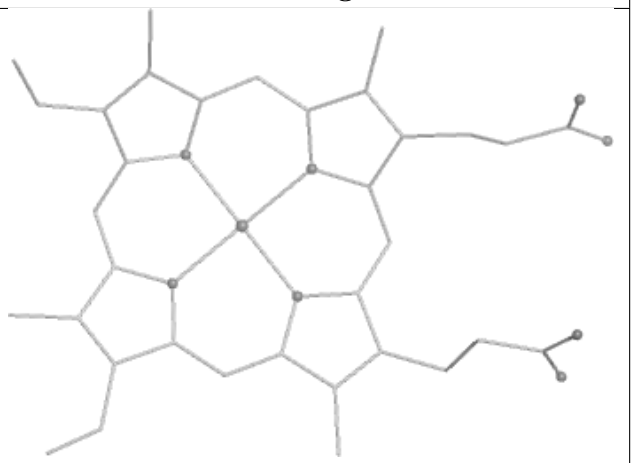
Bond lengths



Bond angles

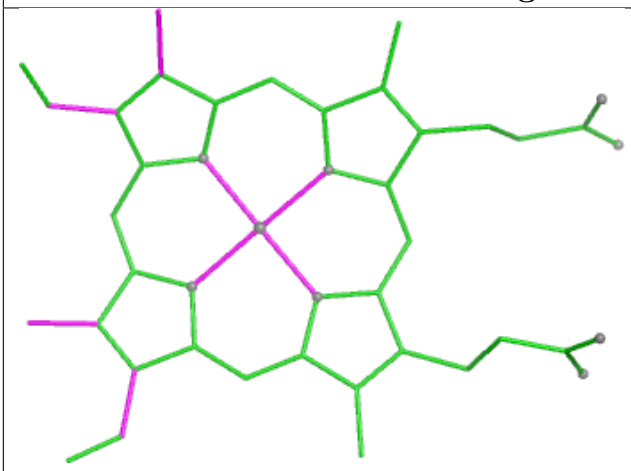


Torsions

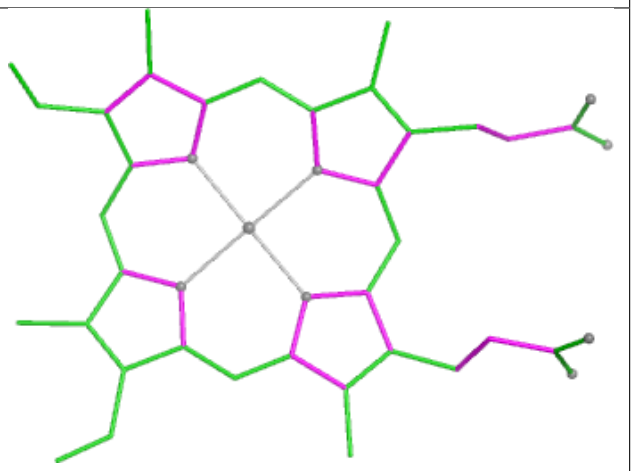


Rings

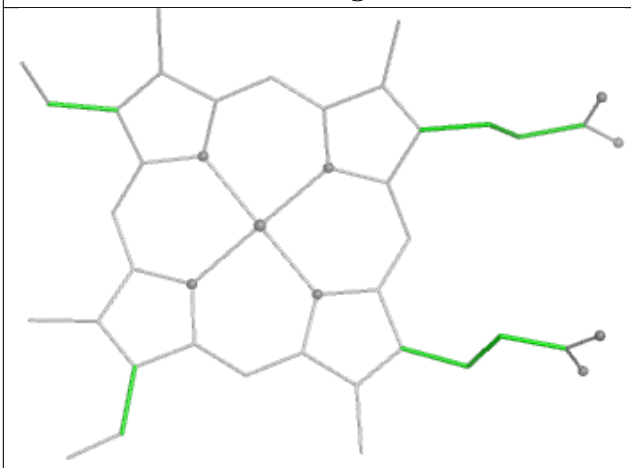
Ligand HEM V 601



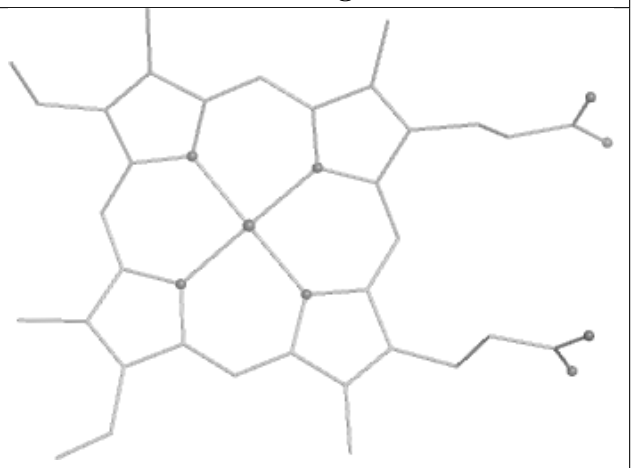
Bond lengths



Bond angles

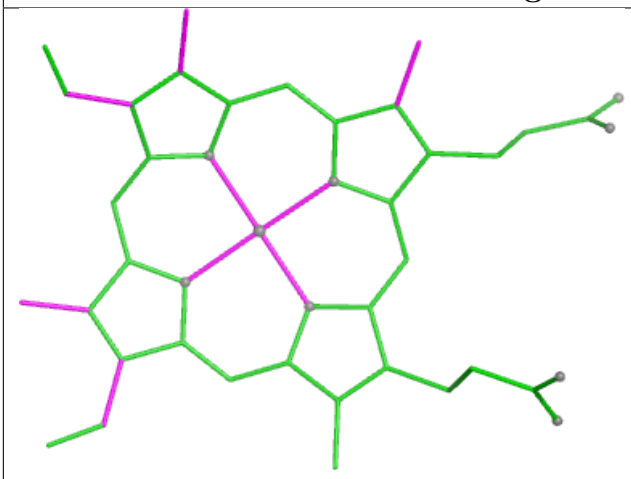


Torsions

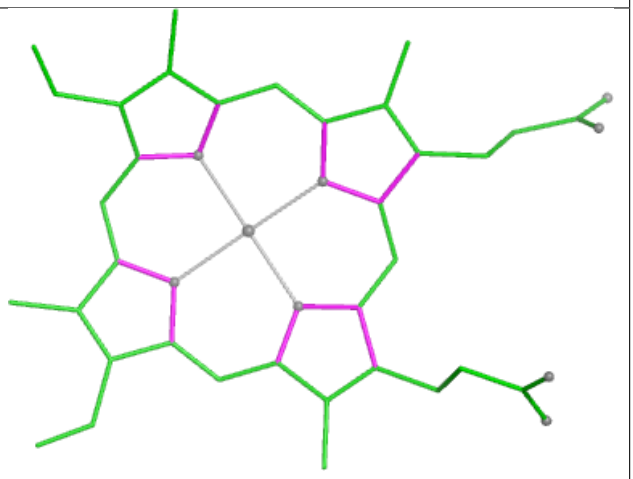


Rings

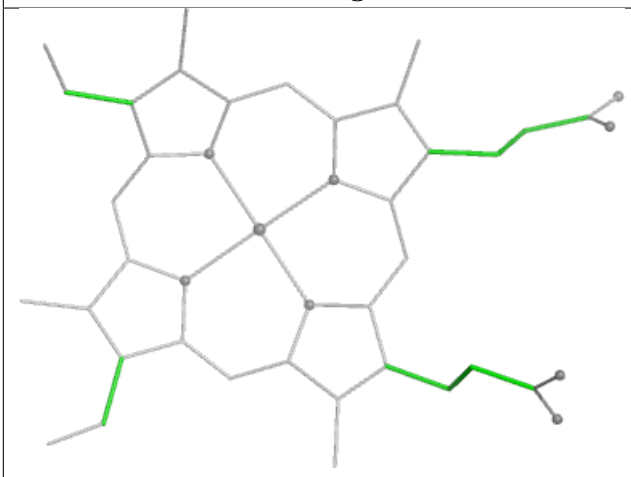
Ligand HEM r 601



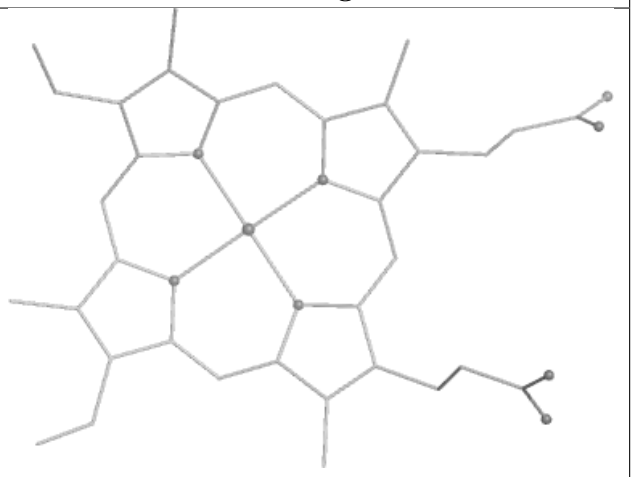
Bond lengths



Bond angles

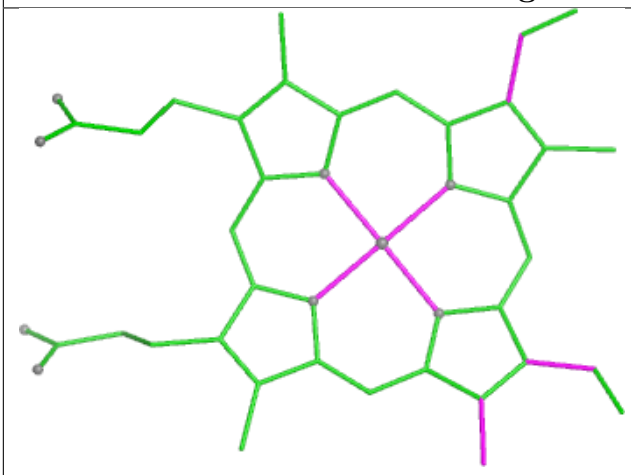


Torsions

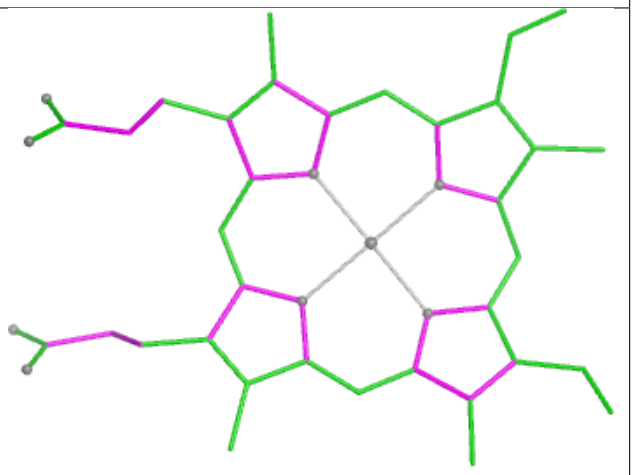


Rings

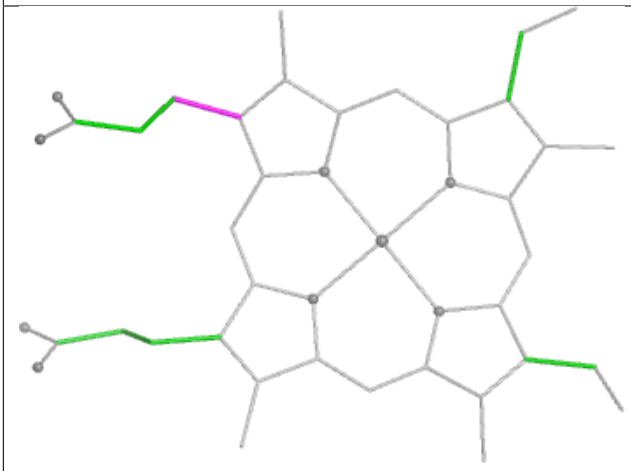
Ligand HEM O 601



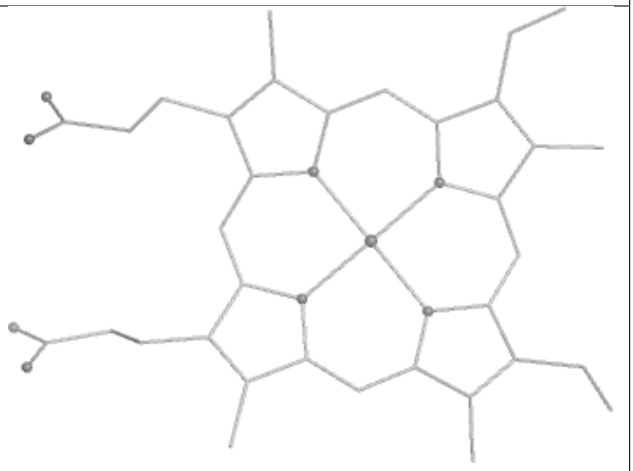
Bond lengths



Bond angles

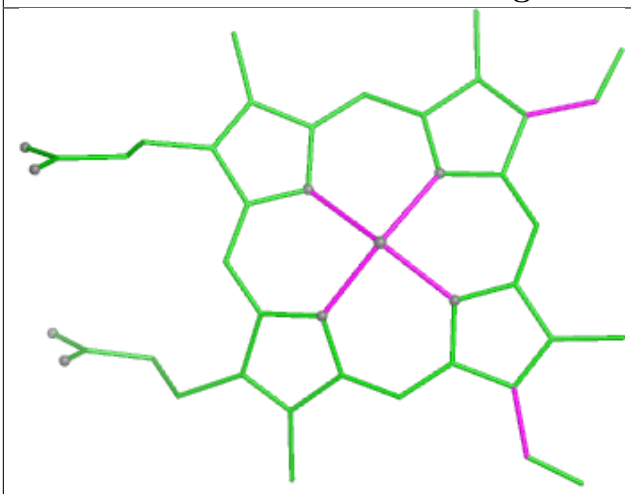


Torsions

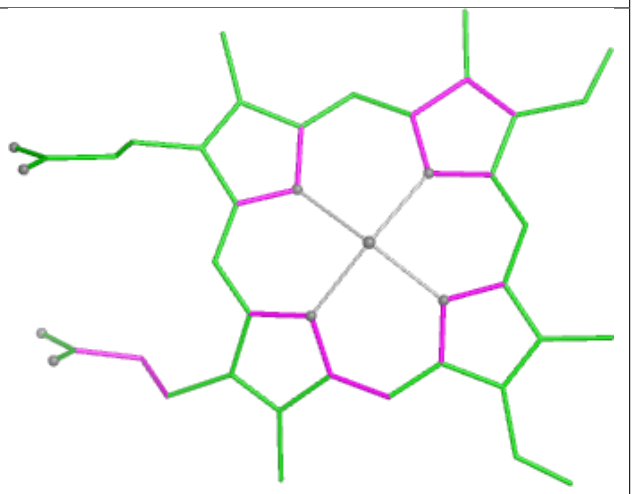


Rings

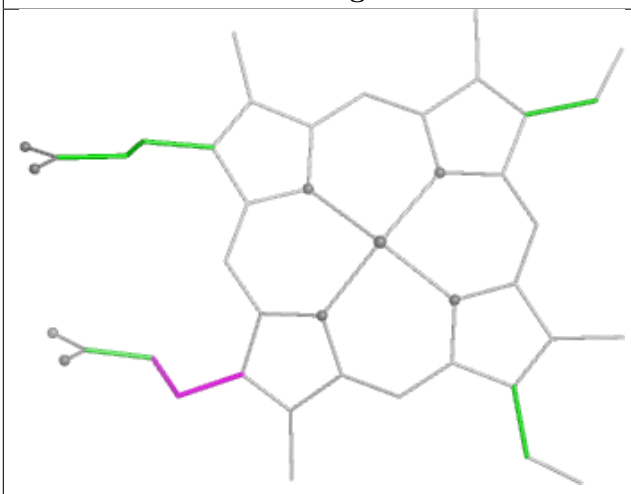
Ligand HEM W 601



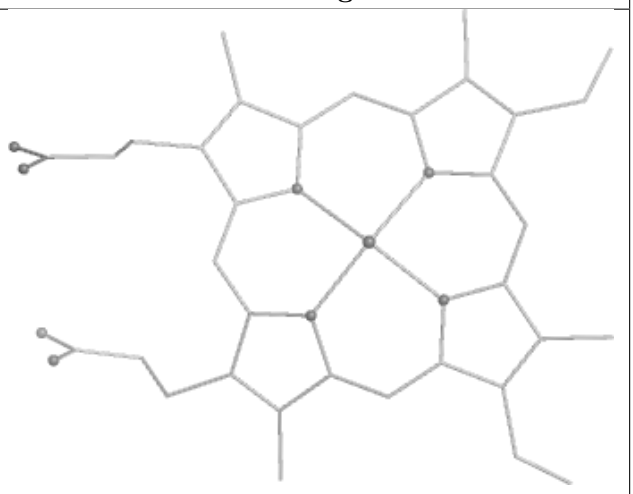
Bond lengths



Bond angles

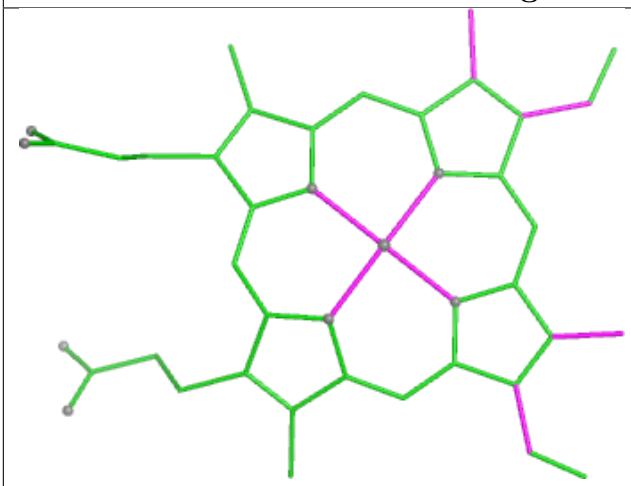


Torsions

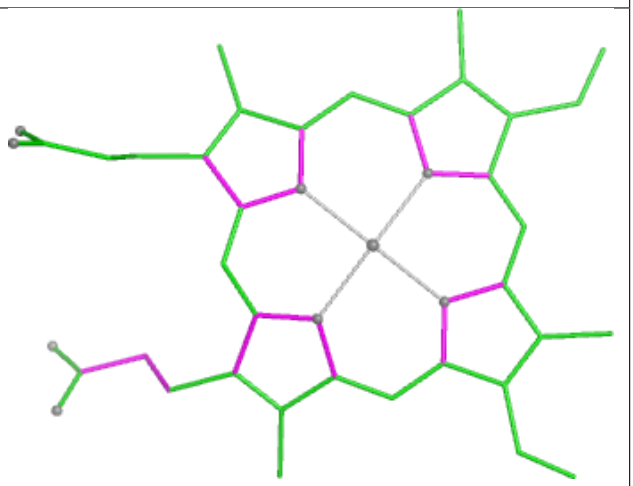


Rings

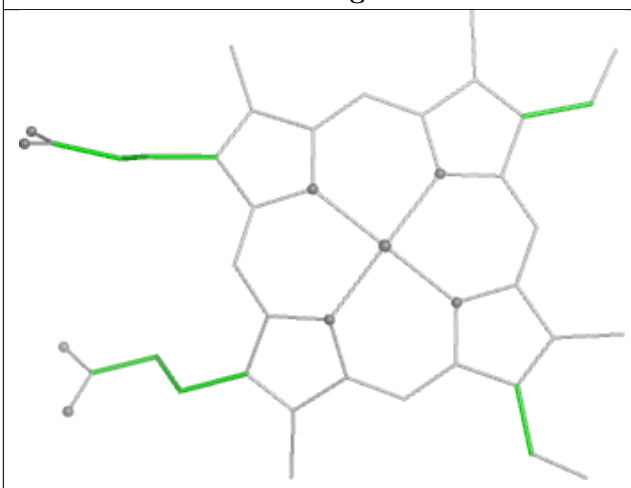
Ligand HEM Z 601



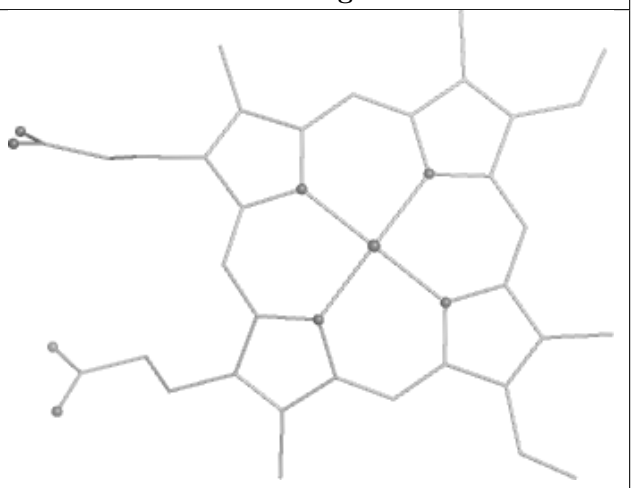
Bond lengths



Bond angles

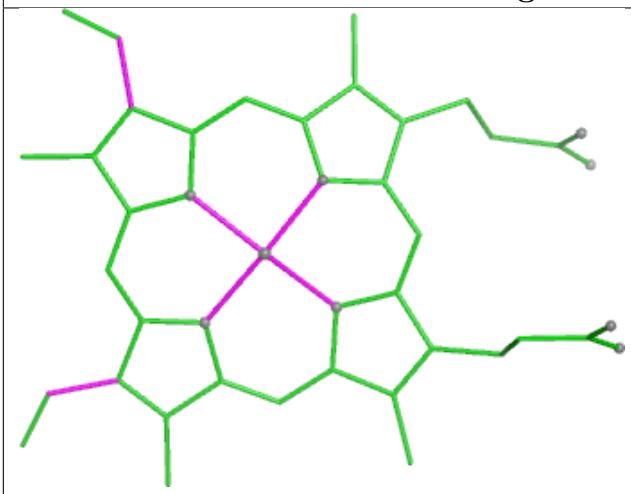


Torsions

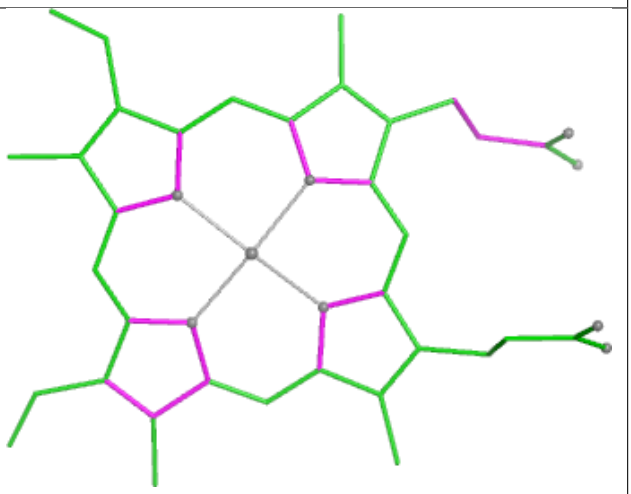


Rings

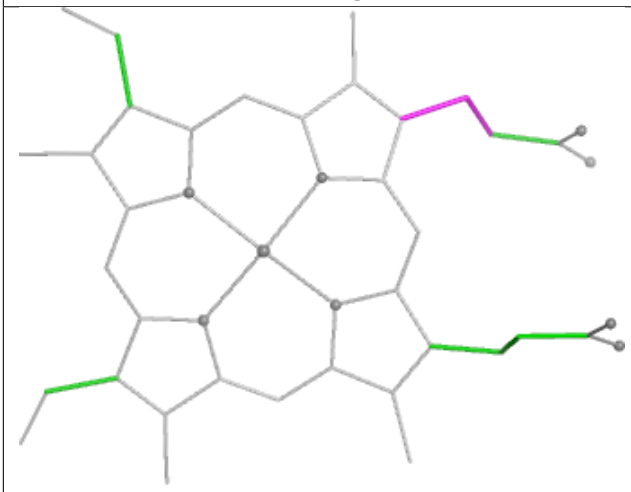
Ligand HEM N 601



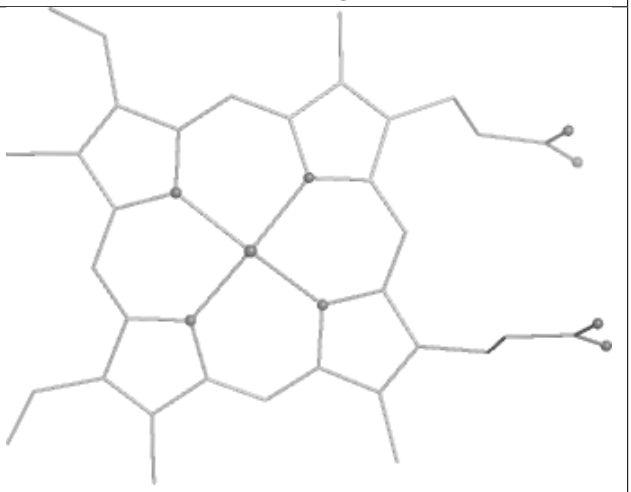
Bond lengths



Bond angles

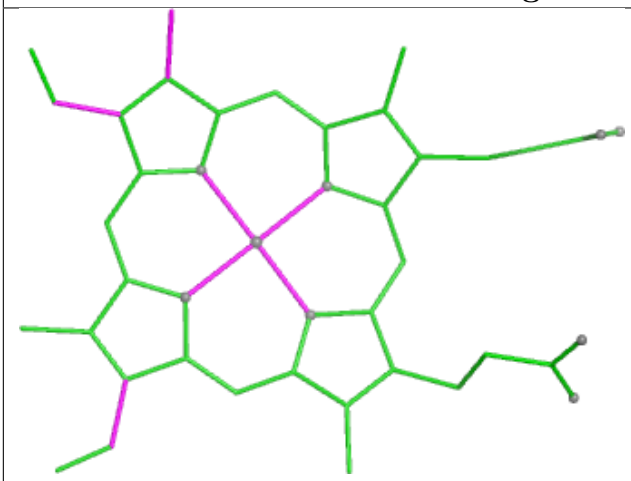


Torsions

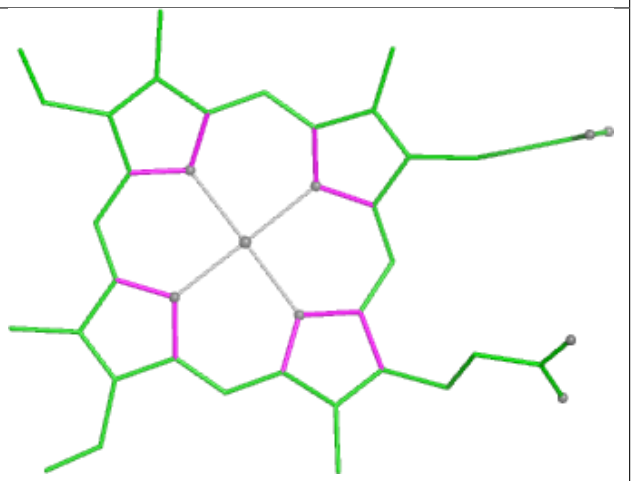


Rings

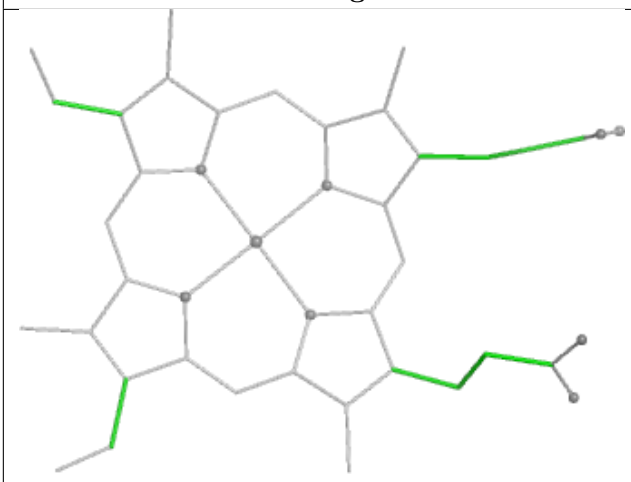
Ligand HEM v 601



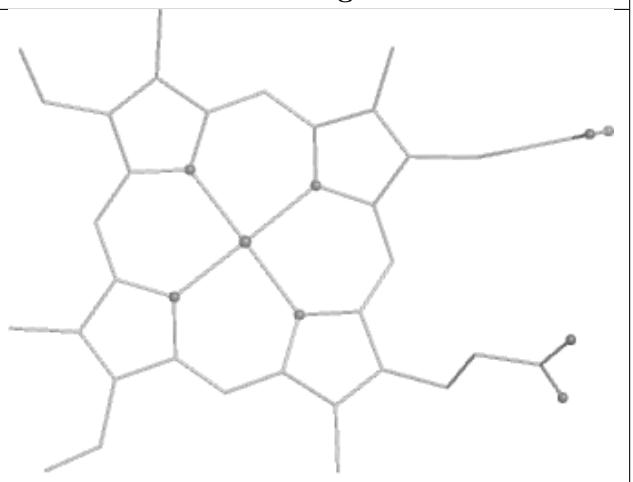
Bond lengths



Bond angles

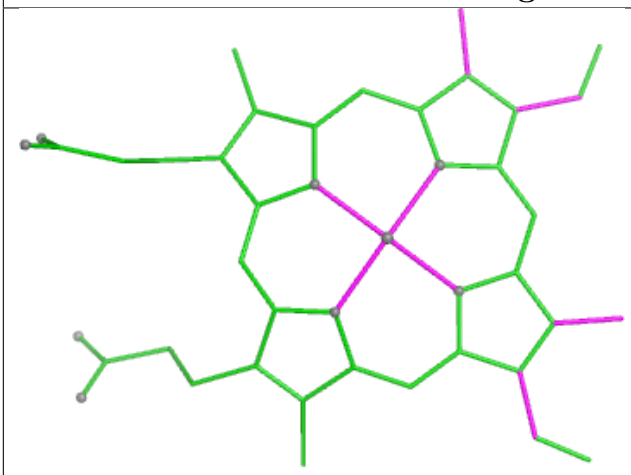


Torsions

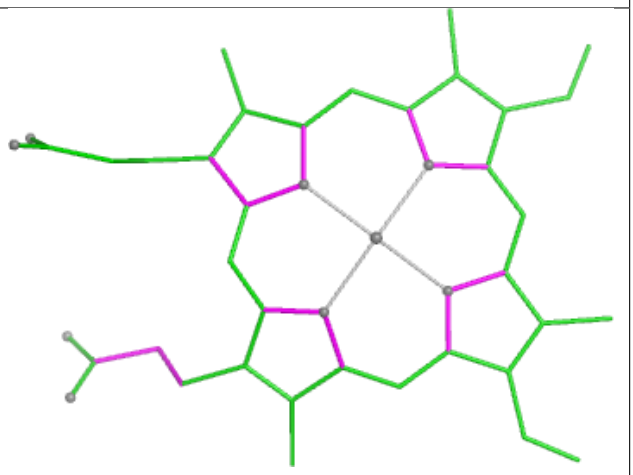


Rings

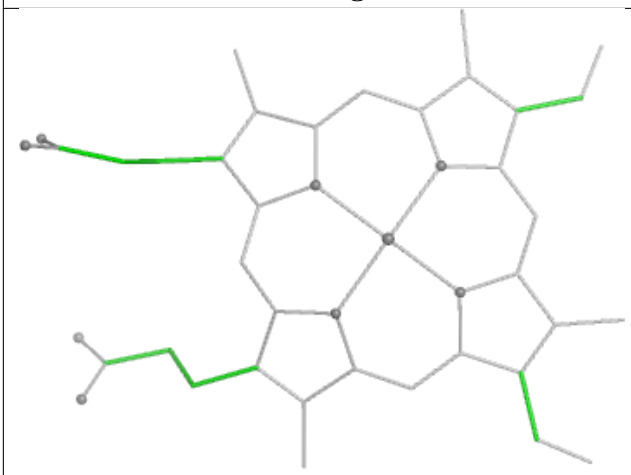
Ligand HEM X 601



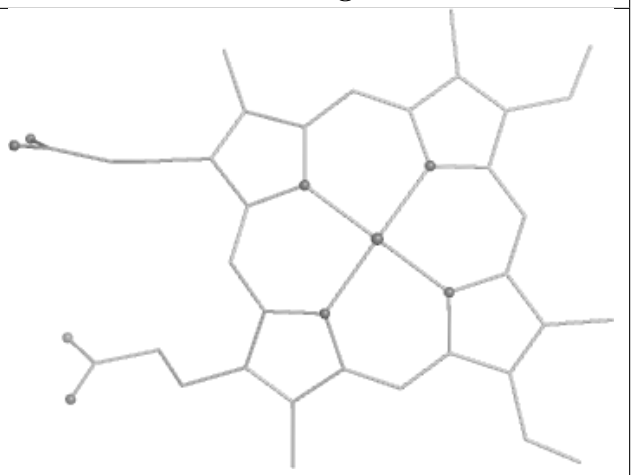
Bond lengths



Bond angles

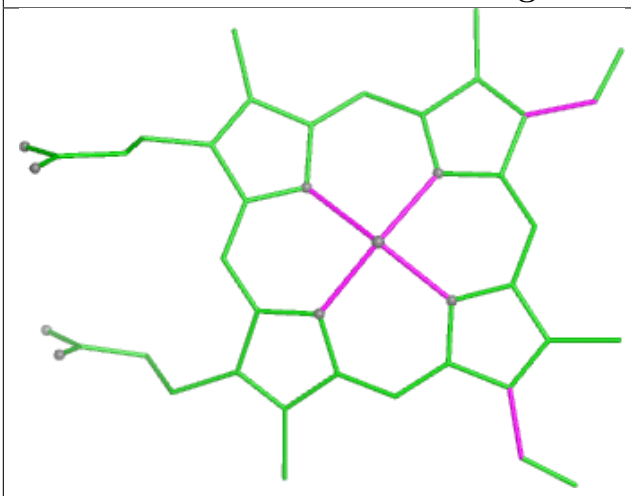


Torsions

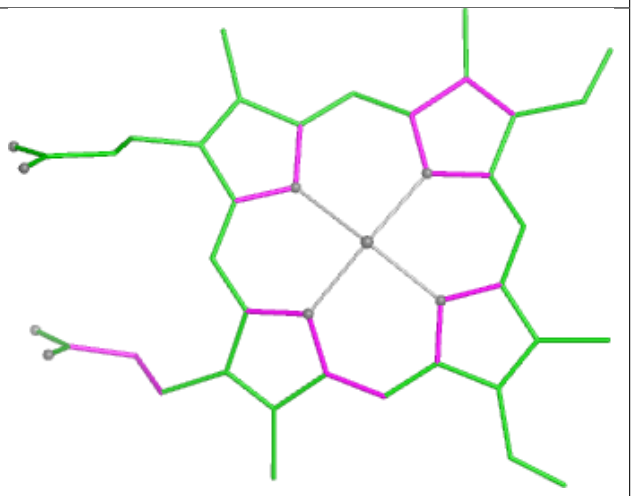


Rings

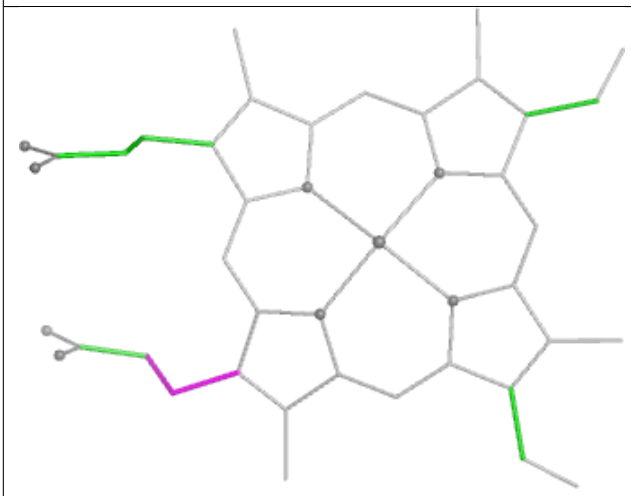
Ligand HEM R 601



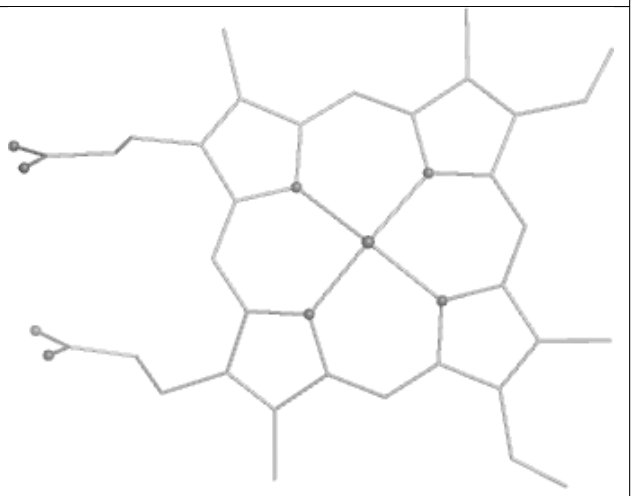
Bond lengths



Bond angles

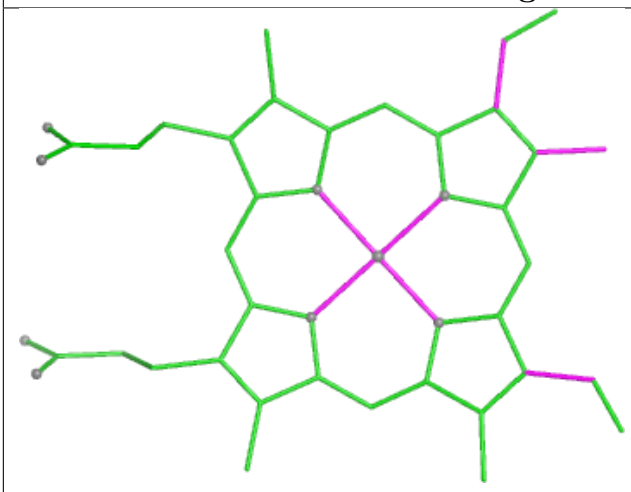


Torsions

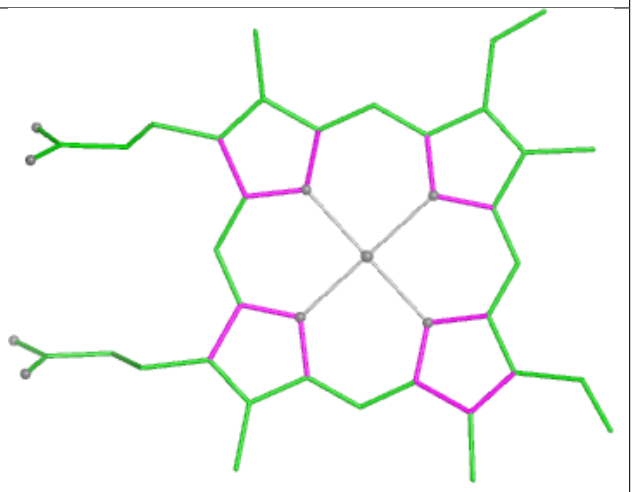


Rings

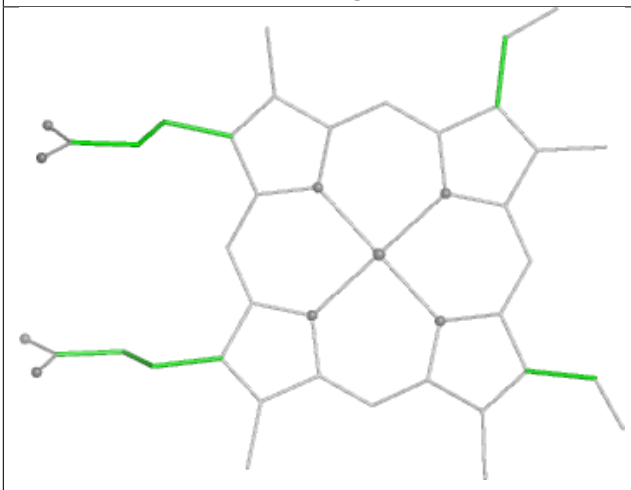
Ligand HEM w 601



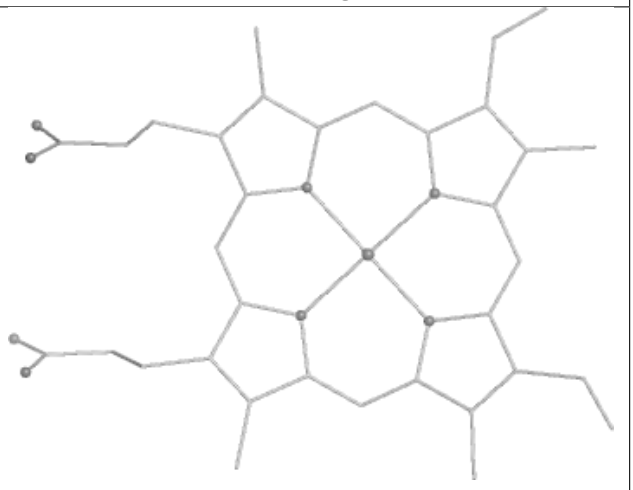
Bond lengths



Bond angles

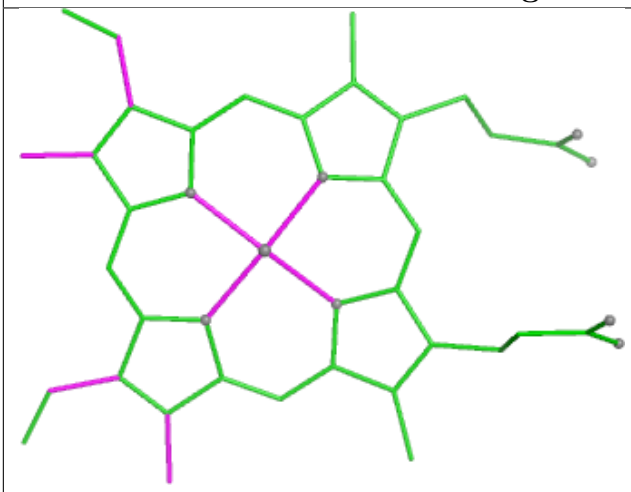


Torsions

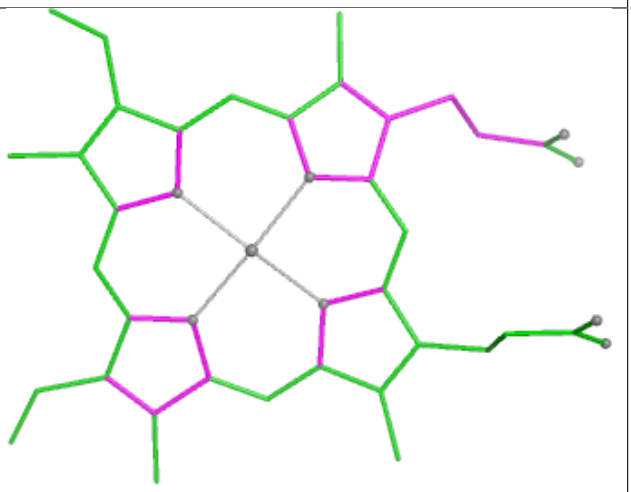


Rings

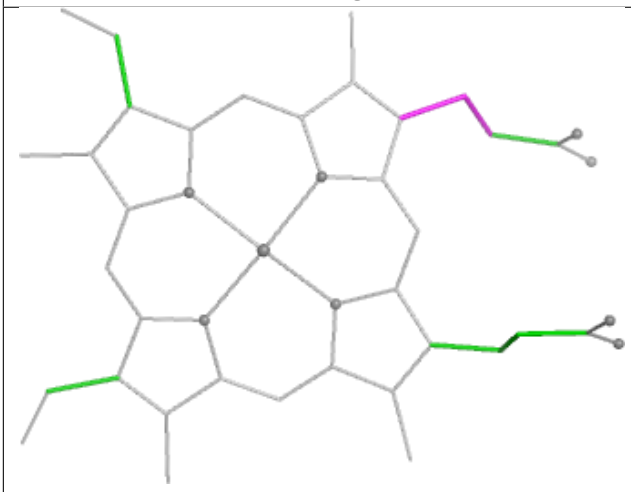
Ligand HEM S 601



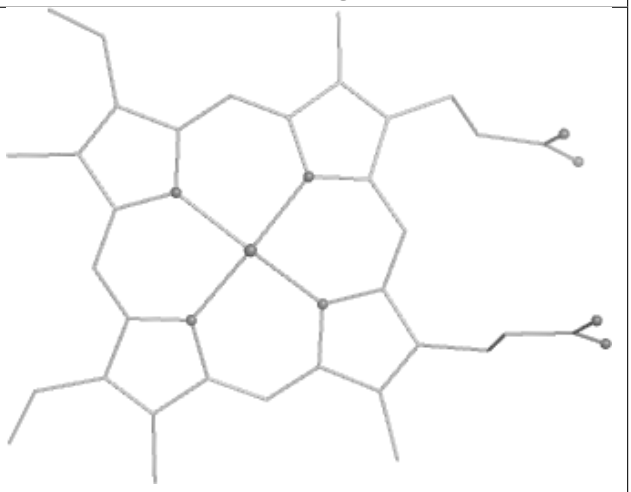
Bond lengths



Bond angles

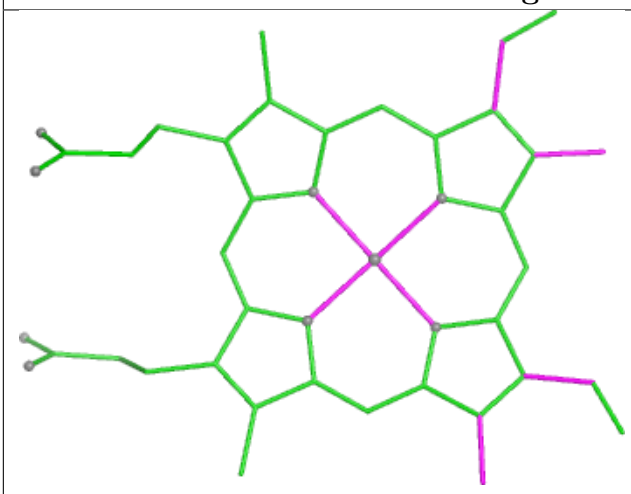


Torsions

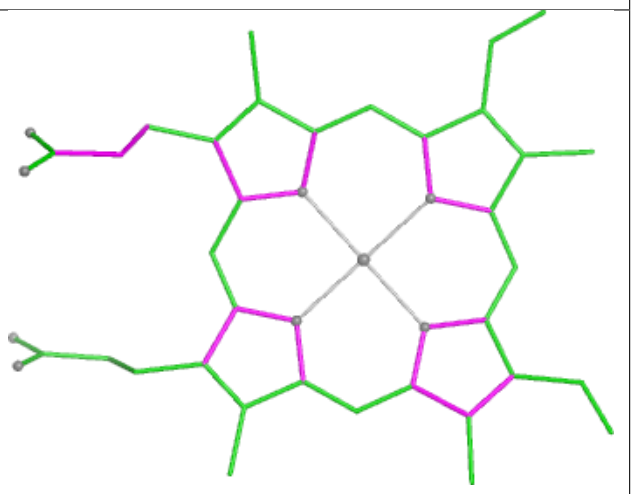


Rings

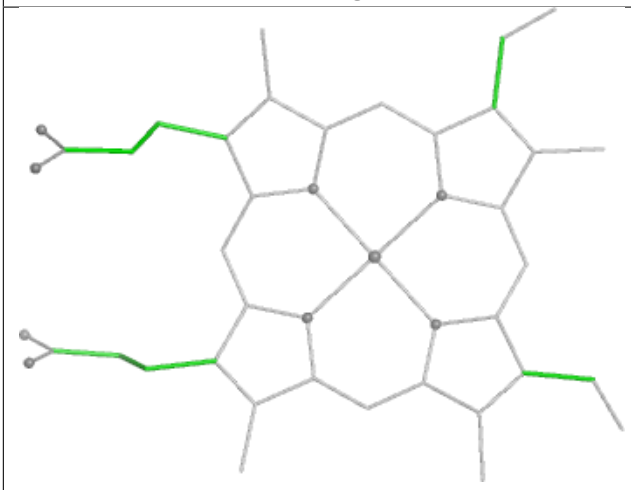
Ligand HEM u 601



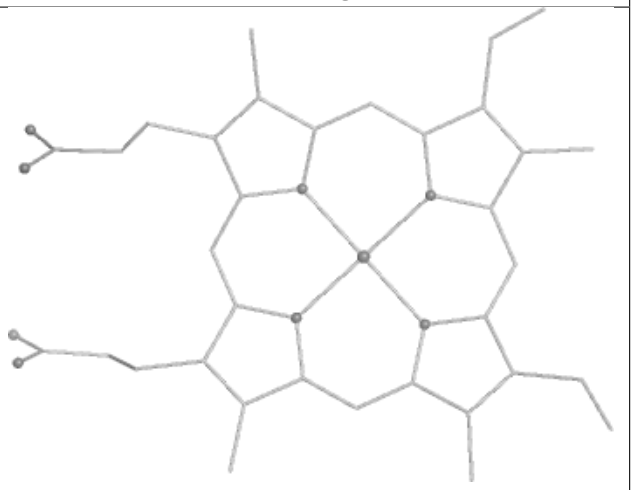
Bond lengths



Bond angles

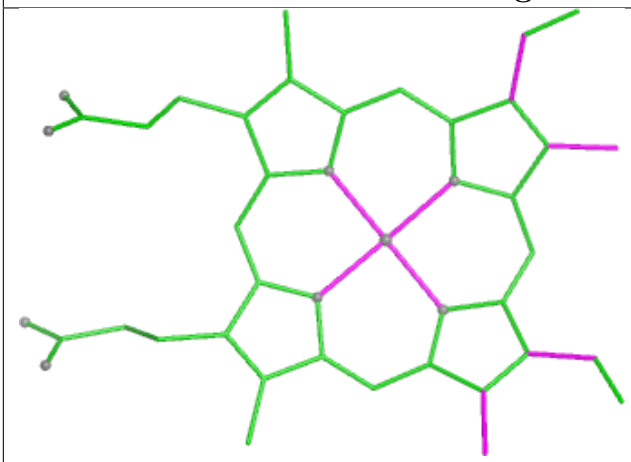


Torsions

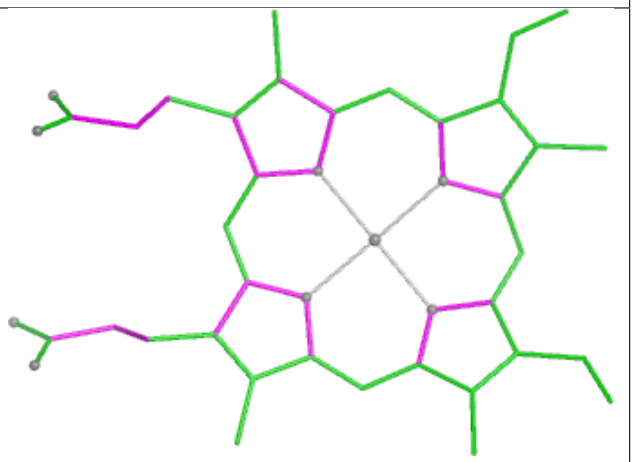


Rings

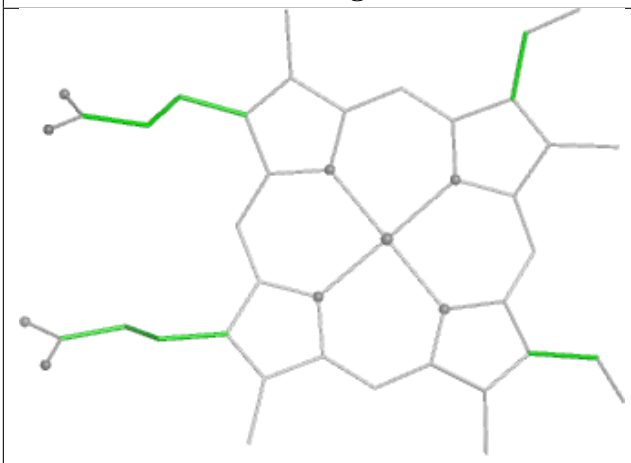
Ligand HEM M 601



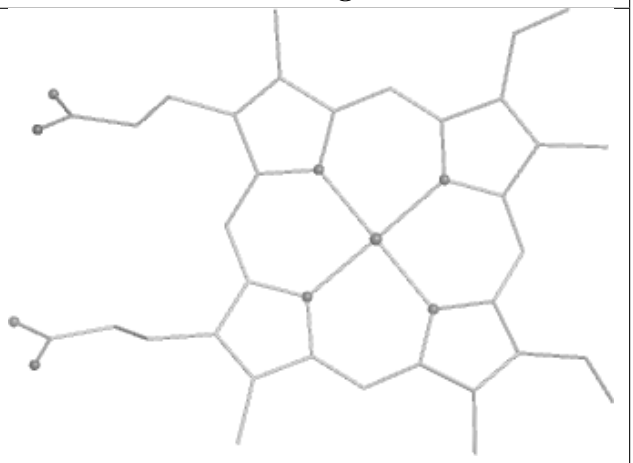
Bond lengths



Bond angles

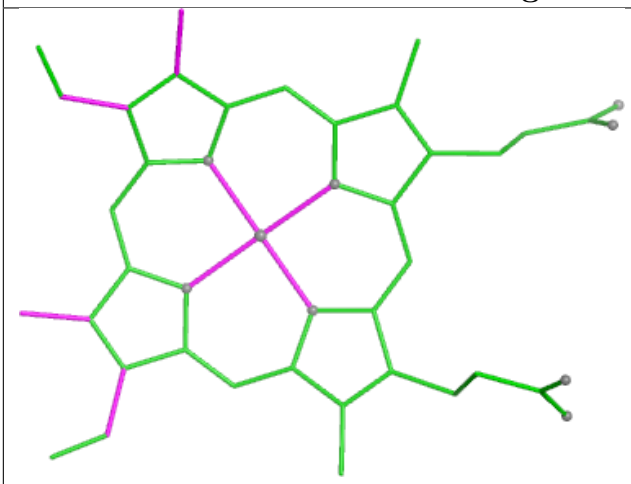


Torsions

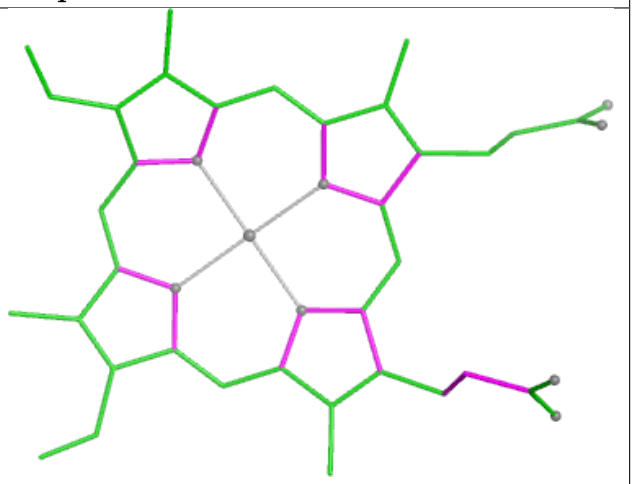


Rings

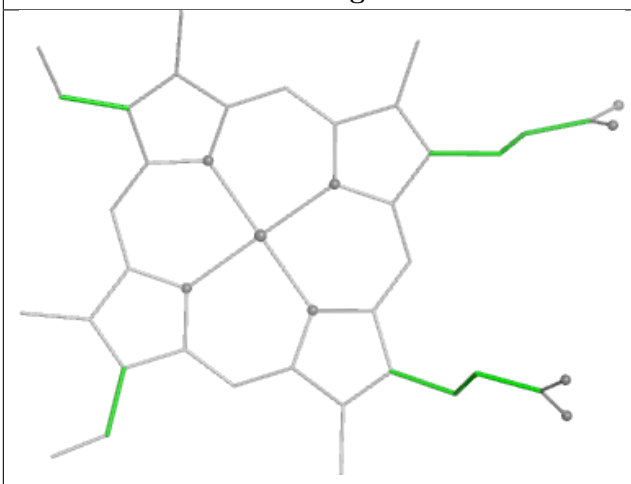
Ligand HEM p 601



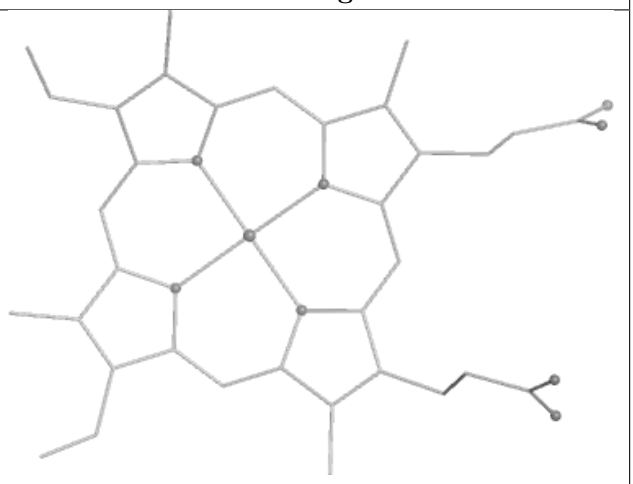
Bond lengths



Bond angles



Torsions



Rings

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.

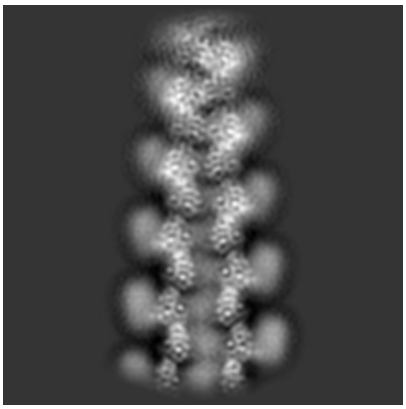
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-55128. 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

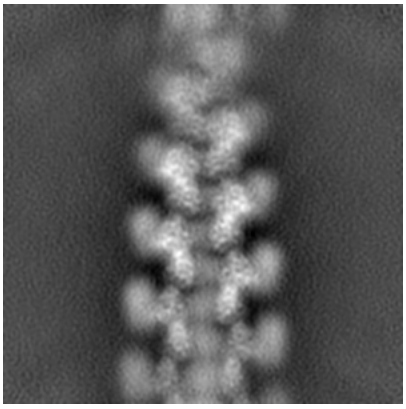


Y

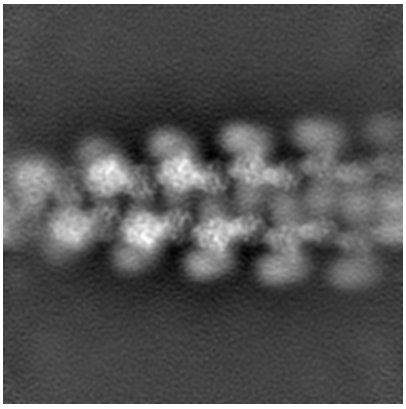


Z

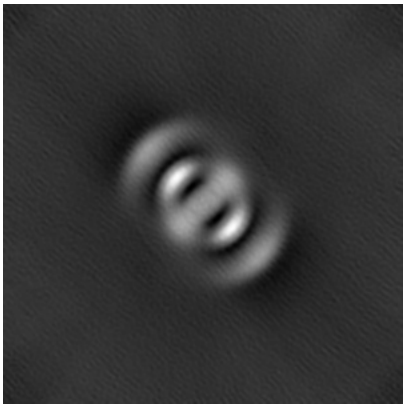
6.1.2 Raw map



X



Y



Z

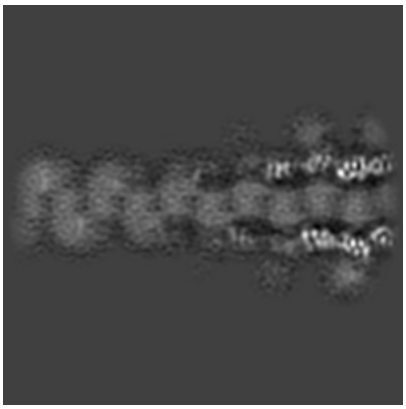
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

6.2.1 Primary map



X Index: 80



Y Index: 80

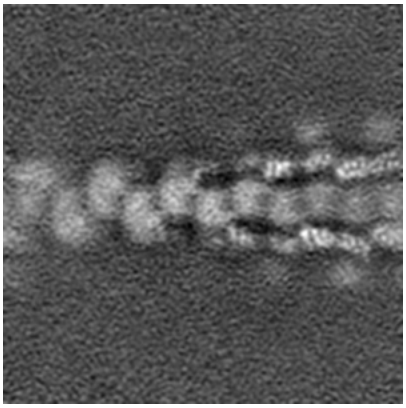


Z Index: 80

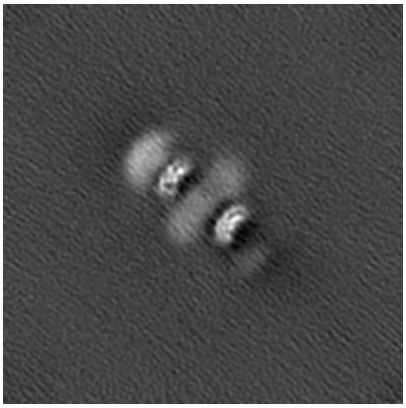
6.2.2 Raw map



X Index: 80



Y Index: 80



Z Index: 80

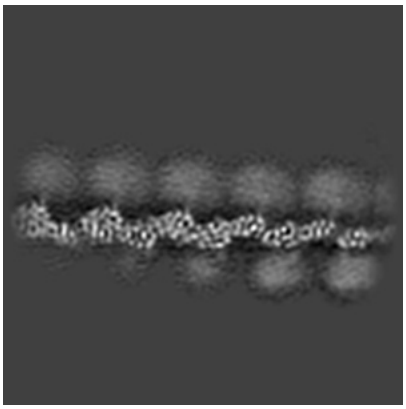
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

6.3.1 Primary map



X Index: 68

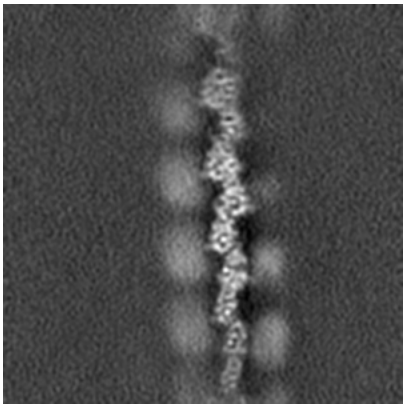


Y Index: 90

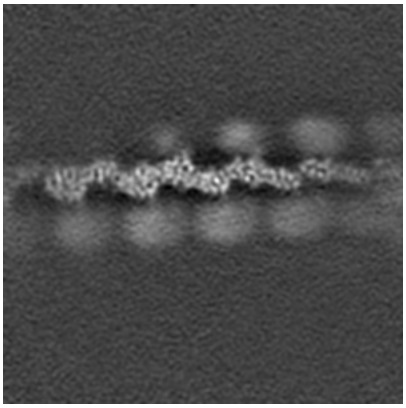


Z Index: 68

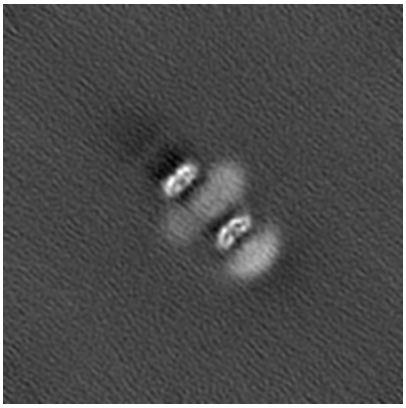
6.3.2 Raw map



X Index: 69



Y Index: 70

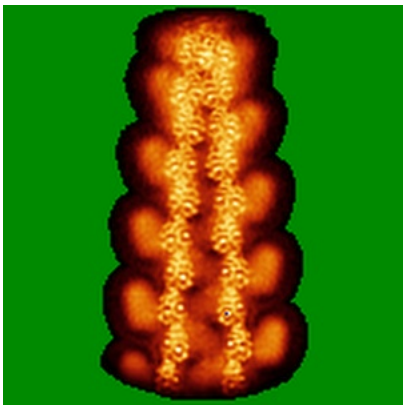


Z Index: 68

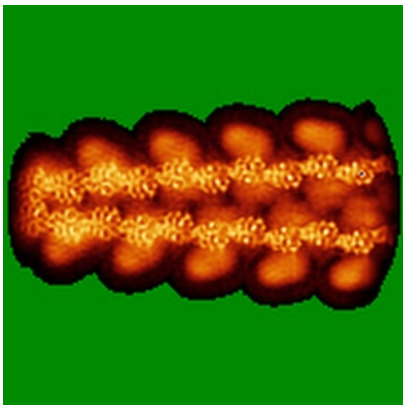
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



X

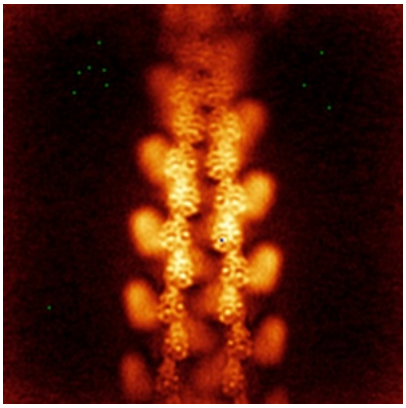


Y

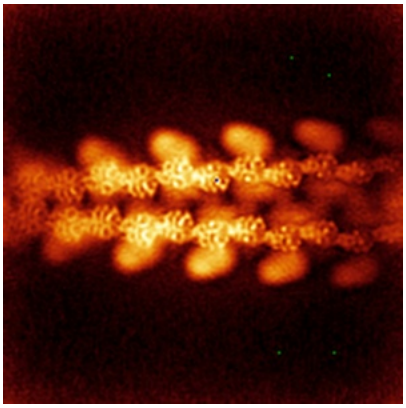


Z

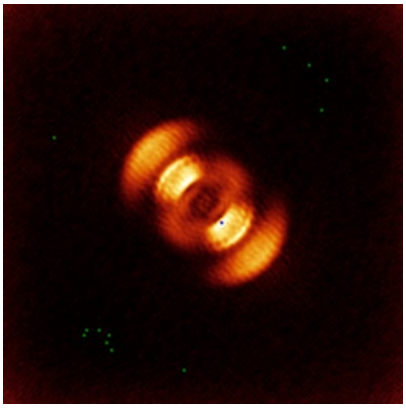
6.4.2 Raw map



X



Y



Z

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

6.5 Orthogonal surface views (i)

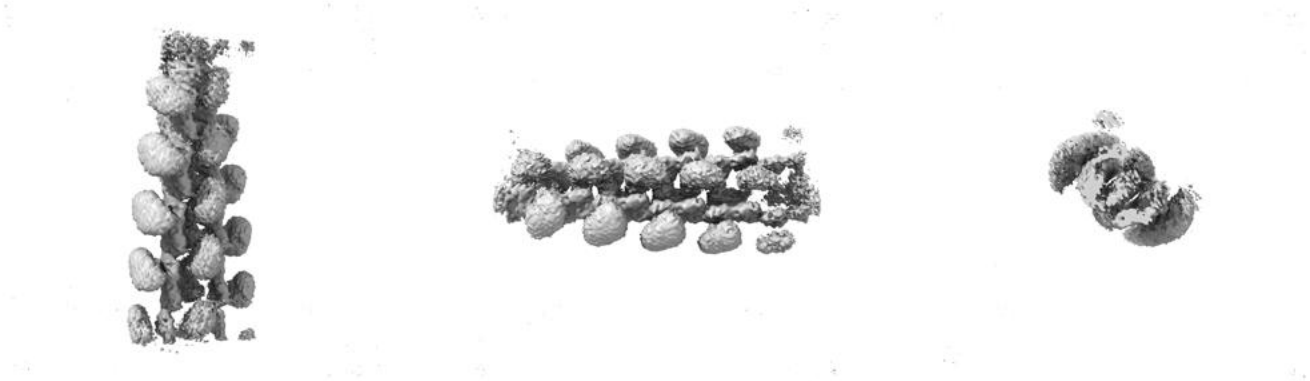
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.4. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

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

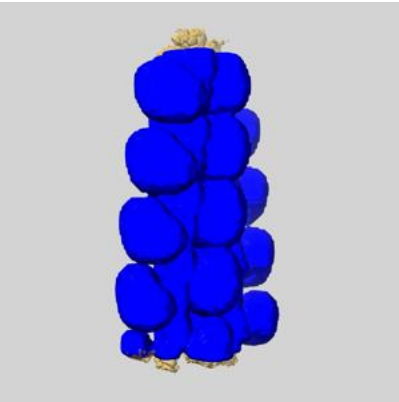
6.6 Mask visualisation (i)

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

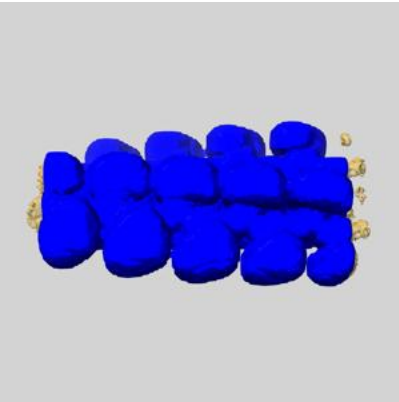
A mask typically either:

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

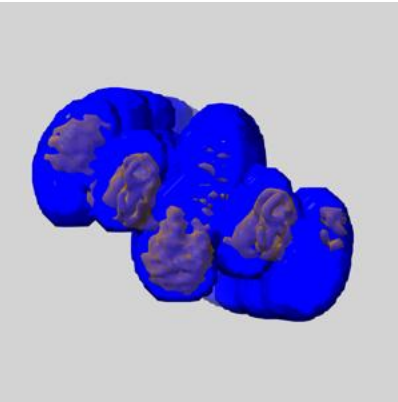
6.6.1 emd_55128_msk_1.map (i)



X



Y

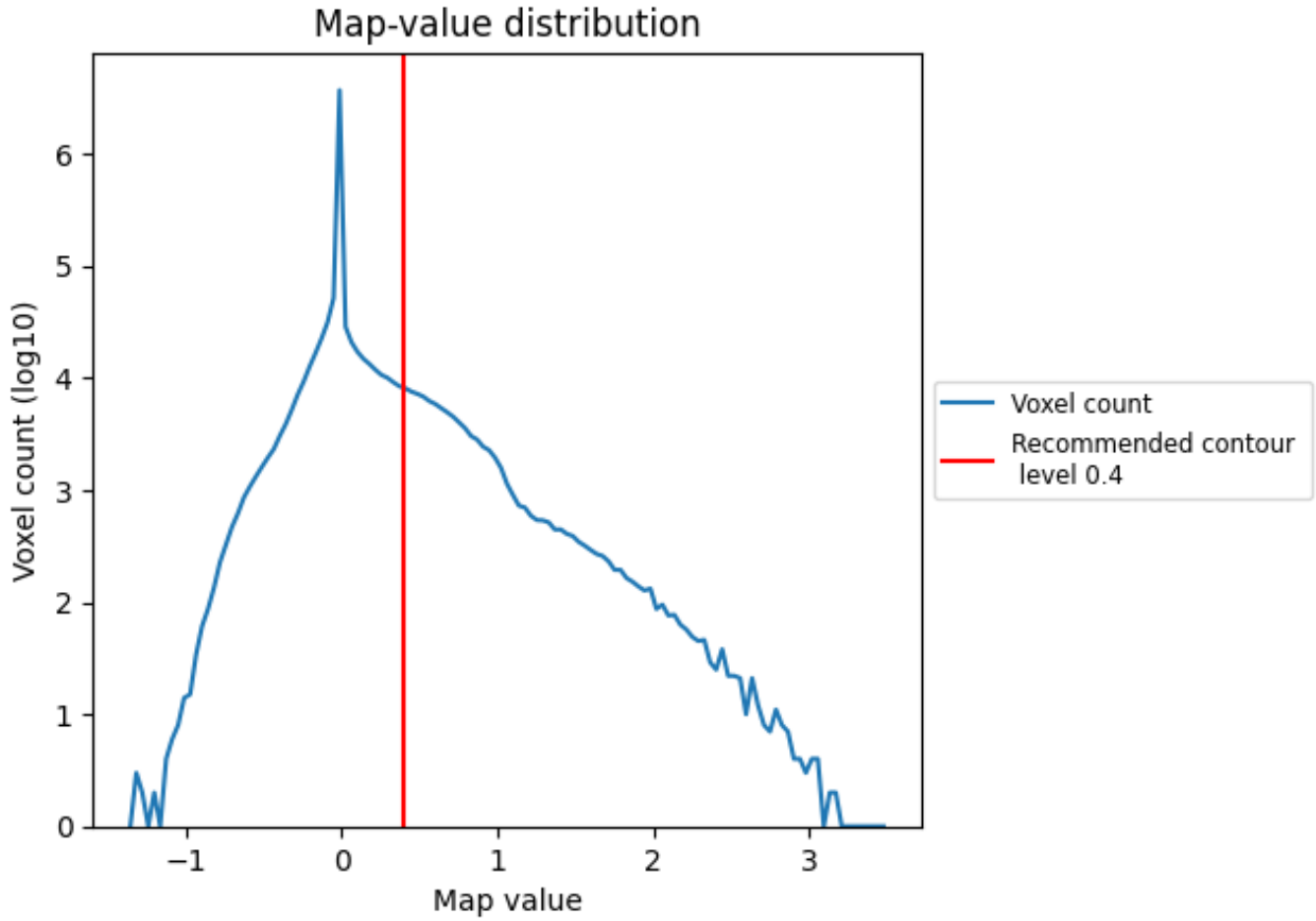


Z

7 Map analysis

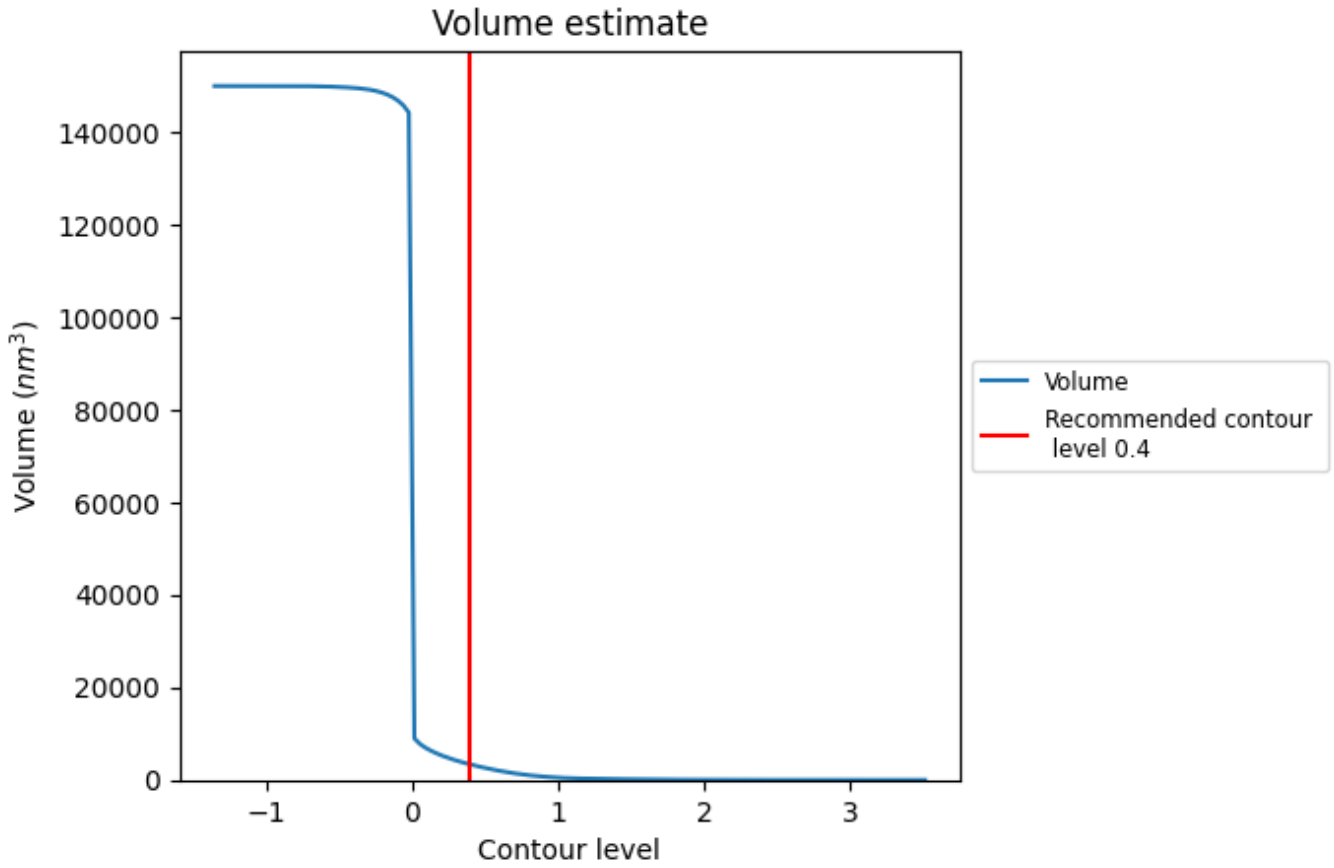
This section contains the results of statistical analysis of the map.

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.

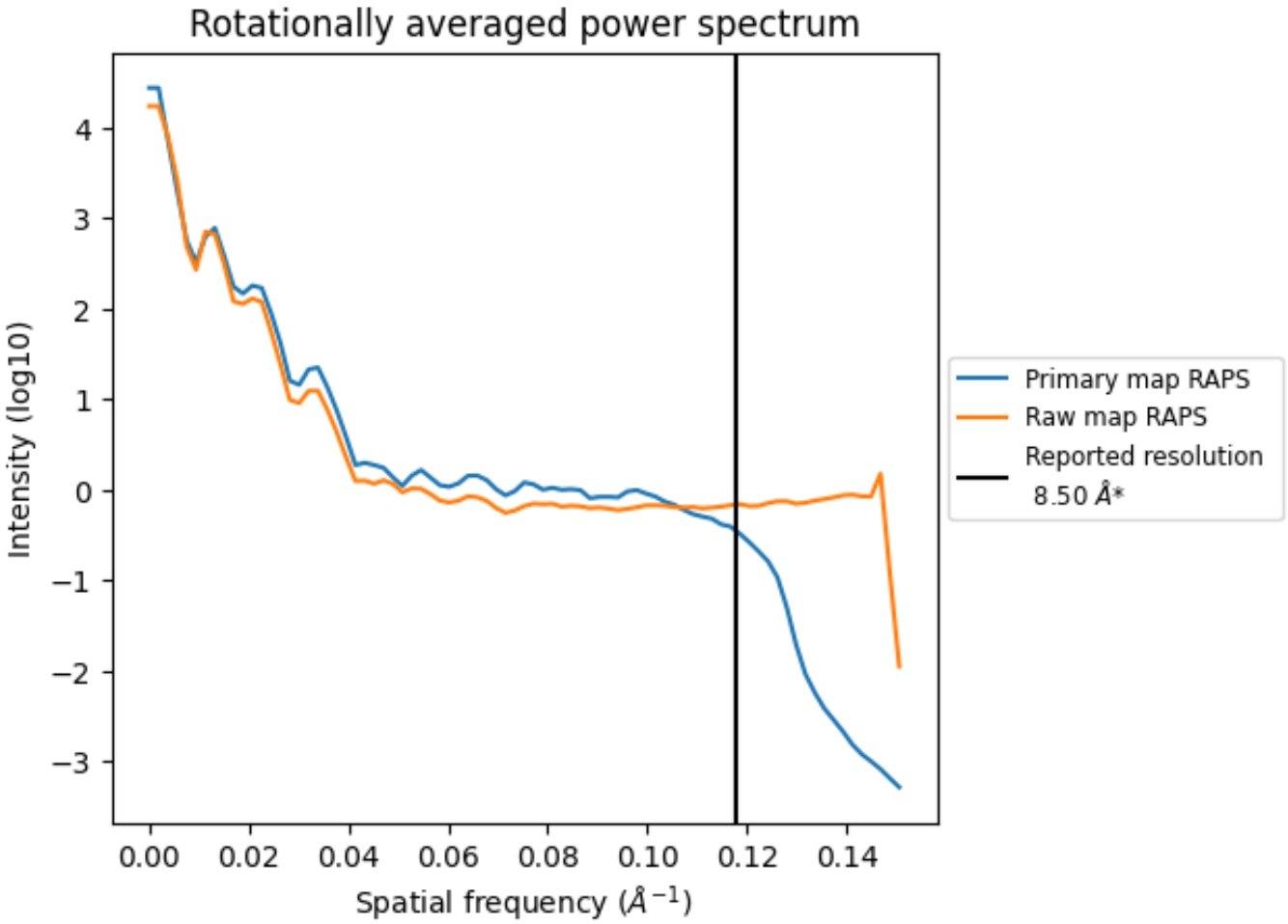
7.2 Volume estimate (i)



The volume at the recommended contour level is 3342 nm^3; this corresponds to an approximate mass of 3019 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)

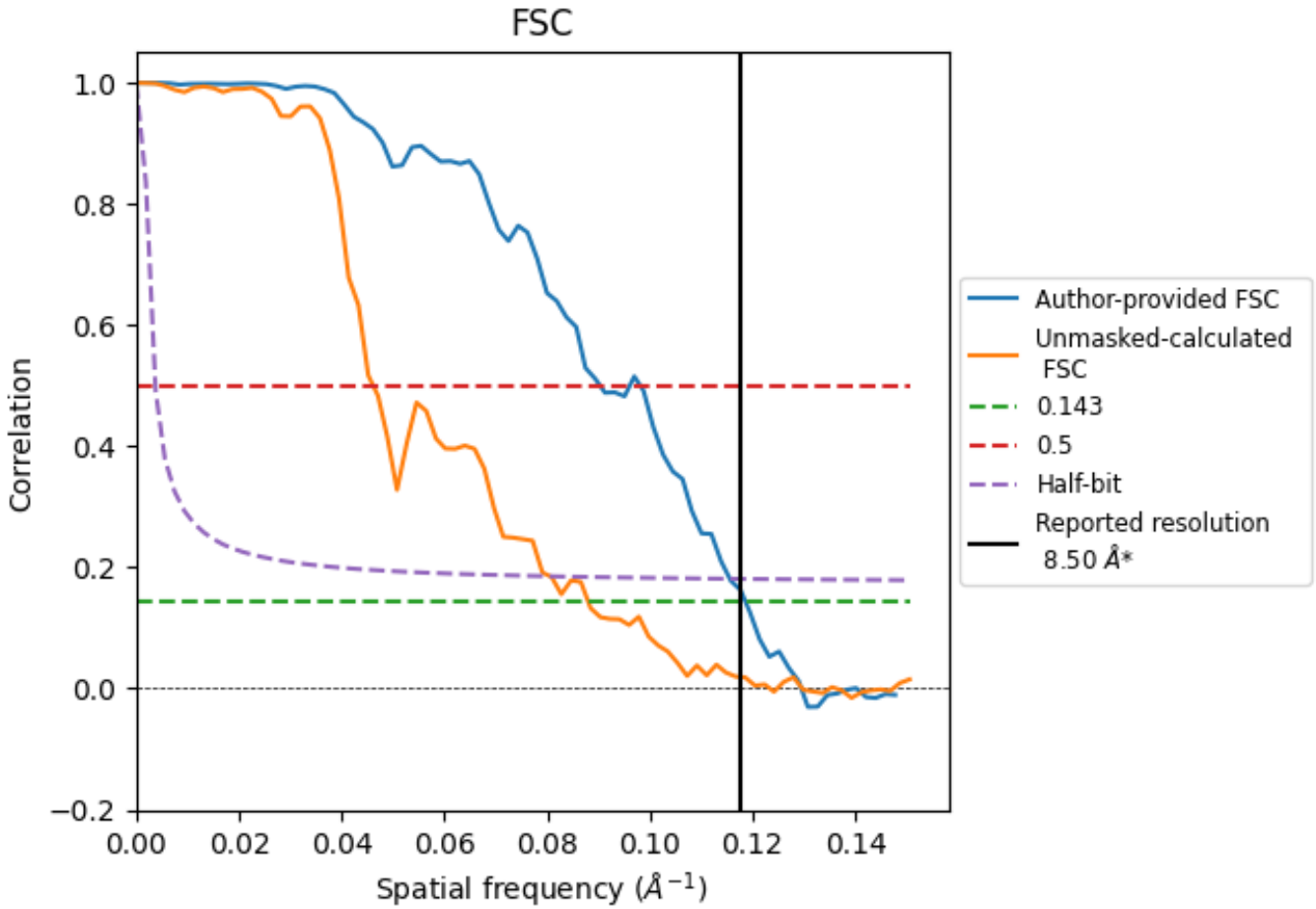


*Reported resolution corresponds to spatial frequency of 0.118 Å^{-1}

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 0.118 Å^{-1}

8.2 Resolution estimates (i)

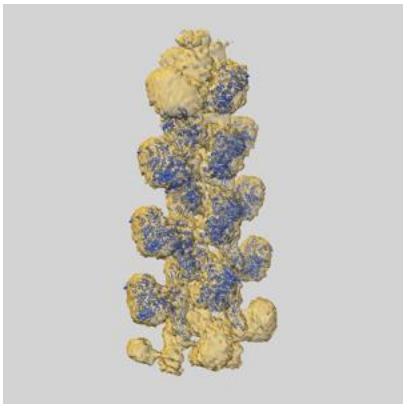
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	8.50	-	-
Author-provided FSC curve	8.42	11.07	8.65
Unmasked-calculated*	11.36	21.69	12.41

*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 11.36 differs from the reported value 8.5 by more than 10 %

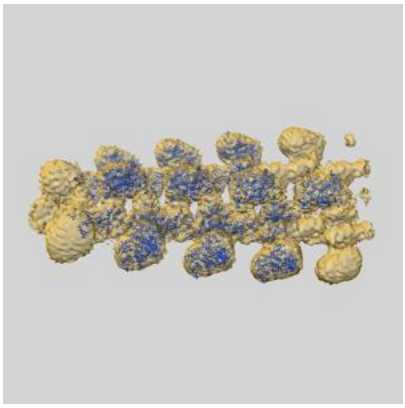
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-55128 and PDB model 9SR3. Per-residue inclusion information can be found in section 3 on page 11.

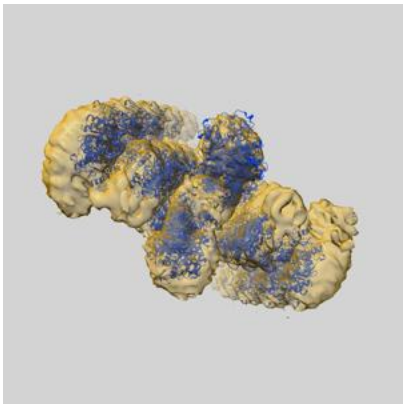
9.1 Map-model overlay



X



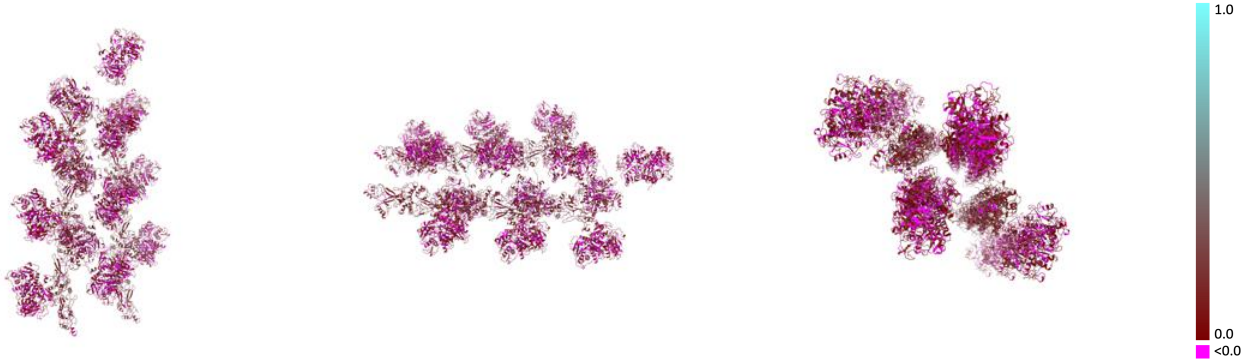
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.4 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.

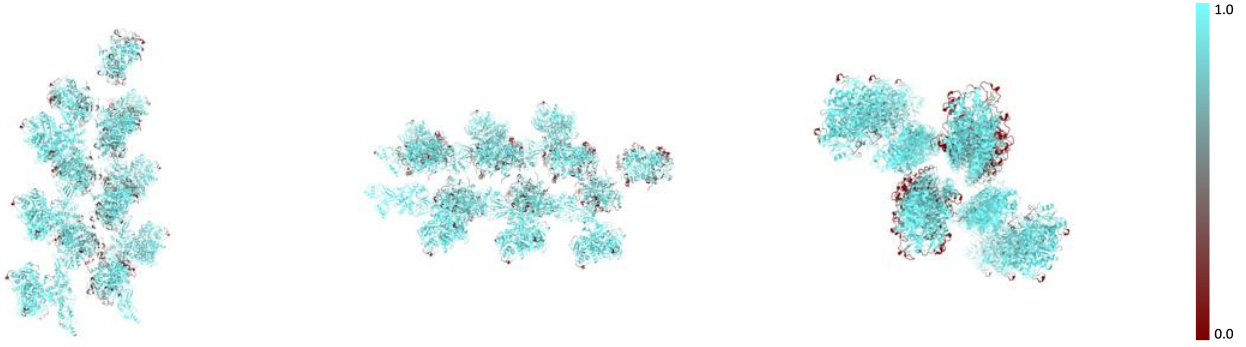
9.2 Q-score mapped to coordinate model



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.

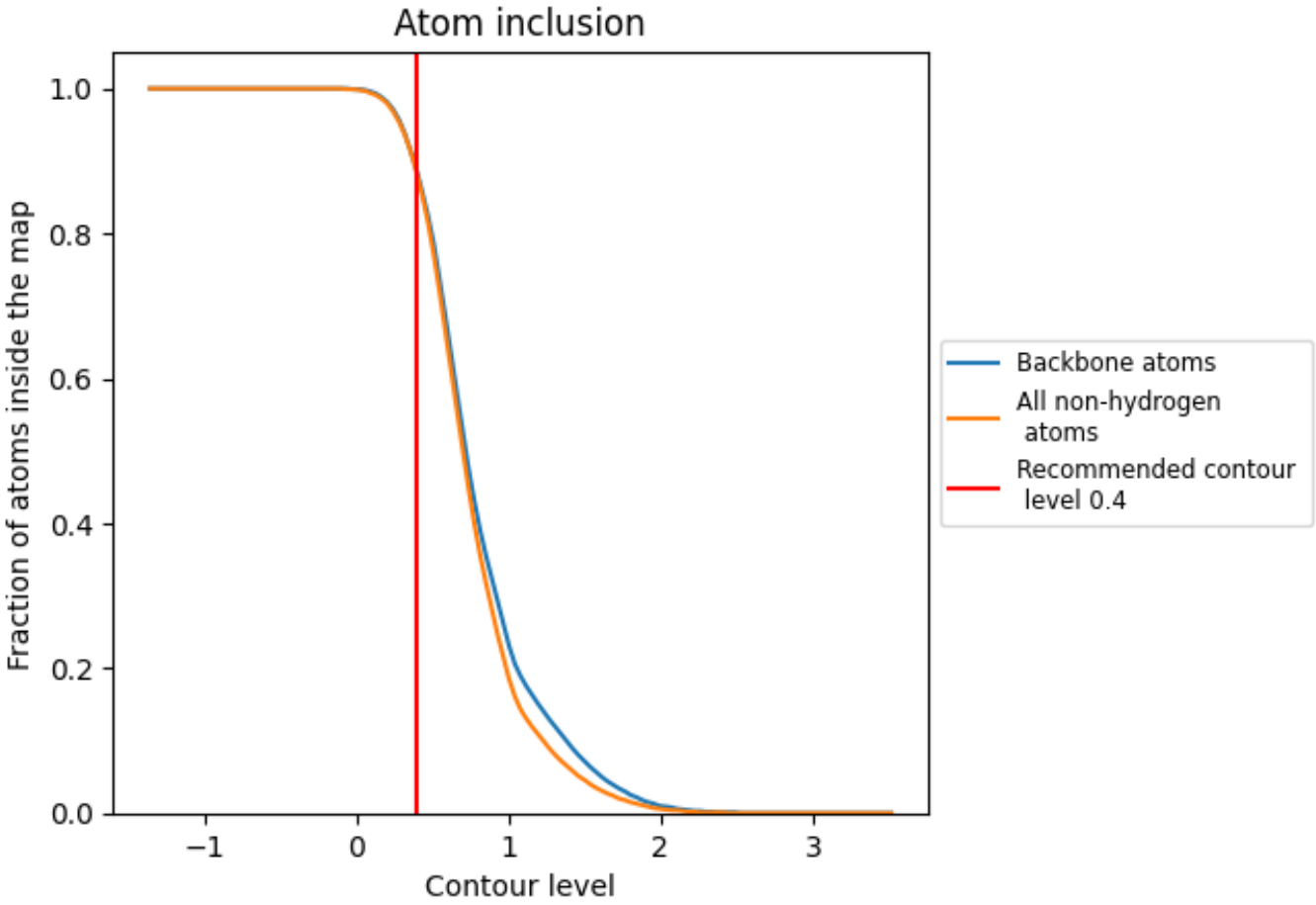
9.3 Atom inclusion mapped to coordinate model



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 (0.4).

9.4 Atom inclusion (i)



At the recommended contour level, 88% of all backbone atoms, 88% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.4) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8820	0.0880
A	0.9740	0.1520
B	0.9630	0.1780
C	0.9870	0.1820
D	0.9840	0.1740
E	0.9930	0.1860
F	0.9870	0.1820
G	0.9910	0.1900
H	0.9860	0.1710
I	0.9860	0.1910
J	0.9930	0.1940
K	0.9890	0.1880
L	0.9920	0.1710
M	0.9350	0.0670
N	0.9390	0.0530
O	0.9380	0.0660
P	0.9360	0.0540
Q	0.9380	0.0680
R	0.9350	0.0490
S	0.9360	0.0540
T	0.9380	0.0690
U	0.9390	0.0560
V	0.9370	0.0630
W	0.9400	0.0540
X	0.7870	0.0510
Y	0.7340	0.0440
Z	0.7900	0.0480
a	0.9910	0.1770
b	0.9930	0.1740
c	0.9830	0.1920
d	0.9900	0.1820
e	0.9860	0.1710
f	0.9940	0.1760
g	0.9730	0.1780
h	0.9890	0.1850



Continued on next page...

Continued from previous page...

Chain	Atom inclusion	Q-score
i	0.9650	0.1720
j	0.9900	0.1580
k	0.9640	0.1560
l	0.9860	0.1560
m	0.9370	0.0700
n	0.7310	0.0460
o	0.7890	0.0540
p	0.7280	0.0420
q	0.7880	0.0540
r	0.7340	0.0450
s	0.8090	0.0610
t	0.7470	0.0630
u	0.8140	0.0590
v	0.7420	0.0640
w	0.8110	0.0630
x	0.7420	0.0520