Full wwPDB EM Validation Report ⓘ

Dec 18, 2022 – 06:20 pm GMT

PDB ID	:	7AR8
EMDB ID	:	EMD-11876
Title	:	Cryo-EM structure of Arabidopsis thaliana complex-I (closed conformation)
Authors	:	Klusch, N.; Kuelbrandt, W.; Yildiz, O.
Deposited on	:	2020-10-23
Resolution	:	3.53 Å(reported)

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

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

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

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

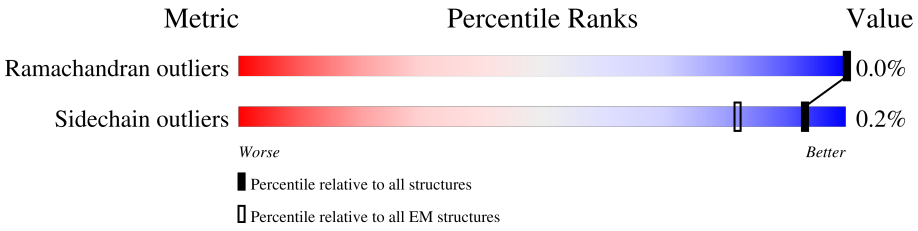
EMDB validation analysis	:	0.0.1.dev43
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.3

1 Overall quality at a glance

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

The reported resolution of this entry is 3.53 Å.

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



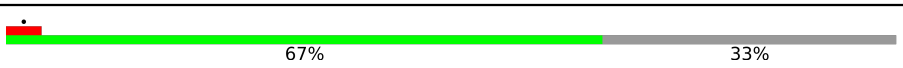
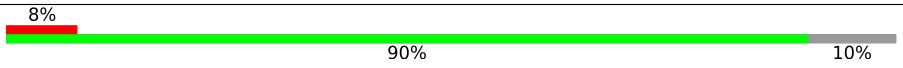
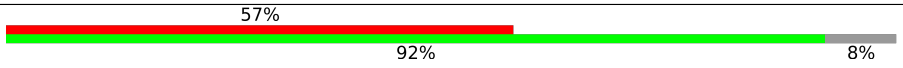
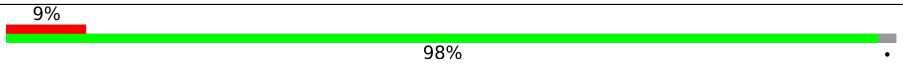
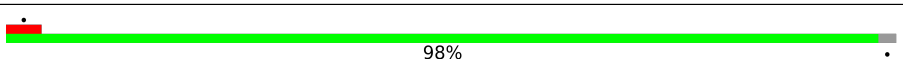
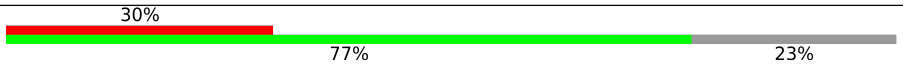
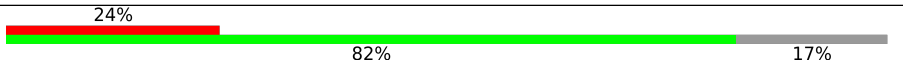
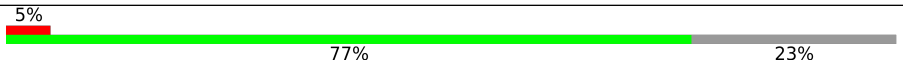
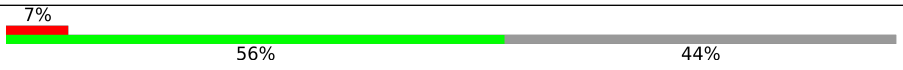
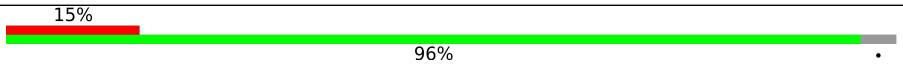
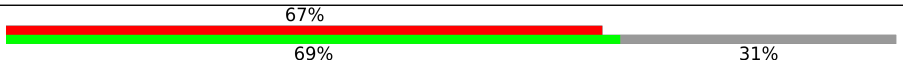
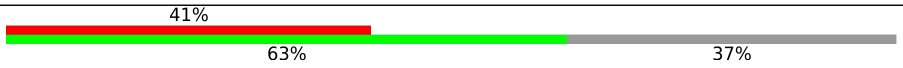
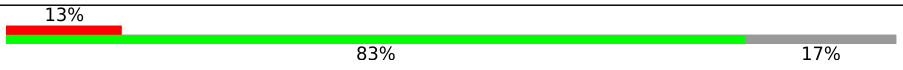
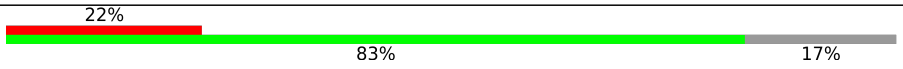
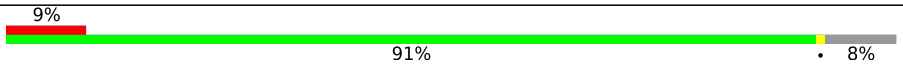
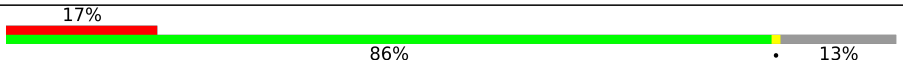
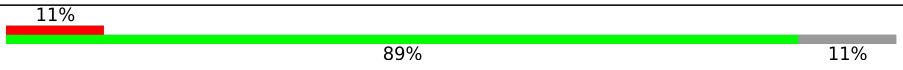
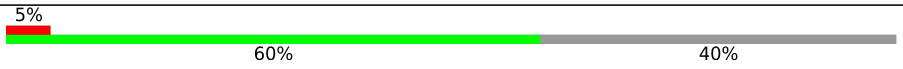
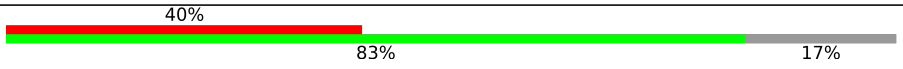
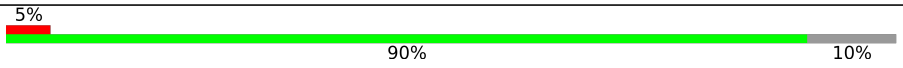
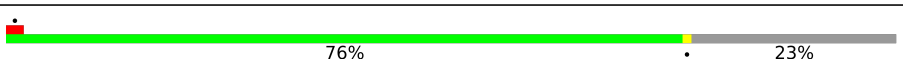
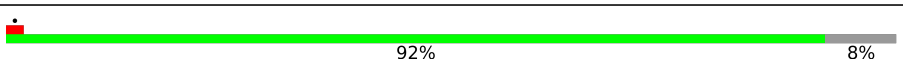
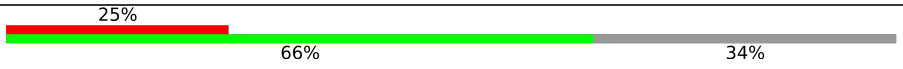
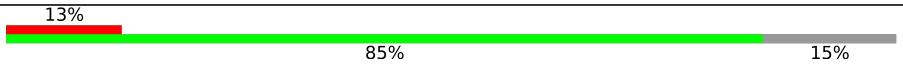
Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	119	8% 77% 23%
2	B	218	72% 28%
3	C	190	97%
4	D	394	98%
5	E	255	17% 75% 25%
6	F	486	17% 89% 11%
7	G	748	7% 92% 8%
8	H	325	10% 99%
9	I	222	76% 24%

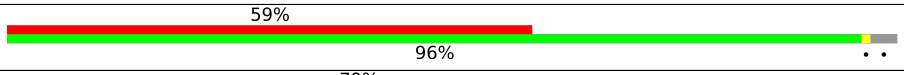
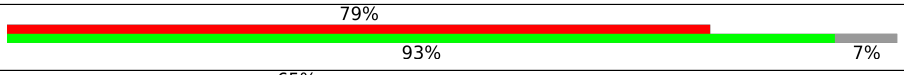
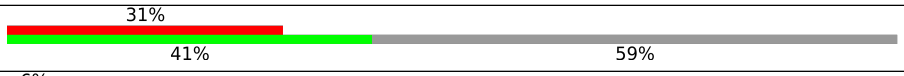
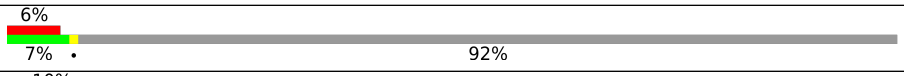
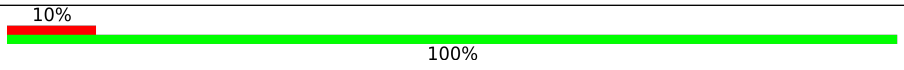
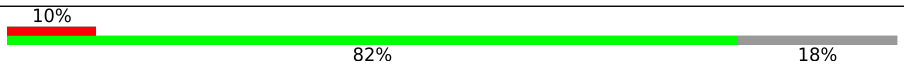
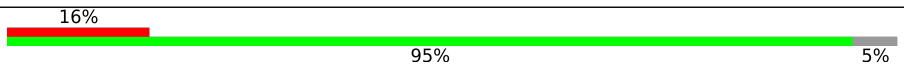
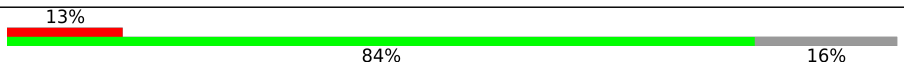
Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
10	J	205	
11	K	100	
12	L	669	
13	M	495	
14	N	499	
15	O	159	
16	P	402	
17	Q	154	
18	R	110	
19	S	97	
20	T	122	
21	U	126	
22	V	169	
23	W	133	
24	X	106	
25	Z	143	
26	a	65	
27	b	65	
28	c	88	
29	d	81	
30	e	83	
31	f	106	
32	g	114	
33	i	98	
34	j	69	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
35	k	72	
36	l	125	
37	m	71	
38	n	117	
39	o	103	
40	p	106	
41	q	159	
42	r	131	
43	u	30	
44	v	113	
45	x	256	
46	y	278	
47	z	275	

2 Entry composition

There are 61 unique types of molecules in this entry. The entry contains 61461 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called NADH-ubiquinone oxidoreductase chain 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	92	785	556	108	117	4	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	157	1244	797	218	215	14	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	185	1581	1021	271	283	6	0	0

- Molecule 4 is a protein called NADH dehydrogenase subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	385	3077	1954	542	557	24	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	363	SER	LEU	variant	UNP A0A2P2CLH2

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	192	1500	954	248	287	11	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	434	Total	C	N	O	S	0	0
			3368	2125	600	618	25		

- Molecule 7 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	688	Total	C	N	O	S	0	0
			5252	3291	921	1001	39		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	324	Total	C	N	O	S	0	0
			2536	1719	386	416	15		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	169	Total	C	N	O	S	0	0
			1381	869	234	268	10		

- Molecule 10 is a protein called NADH-ubiquinone oxidoreductase chain 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	138	Total	C	N	O	S	0	0
			1093	742	168	175	8		

- Molecule 11 is a protein called NADH dehydrogenase subunit 4L.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	90	Total	C	N	O	S	0	0
			707	476	109	115	7		

- Molecule 12 is a protein called NADH-ubiquinone oxidoreductase chain 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	L	615	Total	C	N	O	S	0	0
			4807	3191	748	832	36		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	91	PHE	SER	conflict	UNP B5TM94

- Molecule 13 is a protein called NADH-ubiquinone oxidoreductase chain 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	M	487	Total	C	N	O	S	0	0
			3887	2627	601	636	23		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
M	326	LEU	PRO	conflict	UNP B5TM93

- Molecule 14 is a protein called NADH-ubiquinone oxidoreductase chain 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	N	488	Total	C	N	O	S	0	0
			3820	2573	577	642	28		

- Molecule 15 is a protein called AT3G07480.1.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	O	122	Total	C	N	O	S	0	0
			956	598	169	185	4		

- Molecule 16 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	P	332	Total	C	N	O	S	0	0
			2560	1643	439	463	15		

- Molecule 17 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 4, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	Q	119	Total	C	N	O	S	0	0
			939	600	163	175	1		

- Molecule 18 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 6, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	R	62	Total	C	N	O	S	0	0
			482	304	84	89	5		

- Molecule 19 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	S	93	Total	C	N	O	S	0	0
			727	459	129	133	6		

- Molecule 20 is a protein called Acyl carrier protein 1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	T	84	Total	C	N	O	S	0	0
			667	421	105	138	3		

- Molecule 21 is a protein called Acyl carrier protein 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	U	79	Total	C	N	O	S	0	0
			616	387	98	130	1		

- Molecule 22 is a protein called Probable NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 5, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	V	140	Total	C	N	O	S	0	0
			1123	712	187	219	5		

- Molecule 23 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	W	110	Total	C	N	O	S	0	0
			893	571	159	160	3		

- Molecule 24 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8-B.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	X	97	Total	C	N	O	S	0	0
			767	480	132	143	12		

- Molecule 25 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	Z	124	Total	C	N	O	S	0	0
			990	635	174	176	5		

- Molecule 26 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	a	58	Total	C	N	O	S	0	0
			469	302	84	78	5		

- Molecule 27 is a protein called At2g46540/F11C10.23.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	b	39	Total	C	N	O	S	0	0
			288	190	47	48	3		

- Molecule 28 is a protein called Transmembrane protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	c	73	Total	C	N	O	S	0	0
			595	384	110	95	6		

- Molecule 29 is a protein called Excitatory amino acid transporter.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	d	73	Total	C	N	O	S	0	0
			574	368	104	97	5		

- Molecule 30 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 5-B.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	e	64	Total	C	N	O	S	0	0
			546	338	102	99	7		

- Molecule 31 is a protein called At4g16450.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	f	98	Total	C	N	O	S	0	0
			734	473	118	138	5		

- Molecule 32 is a protein called ESSS subunit of NADH:ubiquinone oxidoreductase (Complex I) protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	g	75	Total	C	N	O	S	0	0
			615	396	107	109	3		

- Molecule 33 is a protein called P1.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	i	83	Total	C	N	O	S	0	0
			721	458	132	126	5		

- Molecule 34 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	j	51	Total	C	N	O	S	0	0
			415	275	73	64	3		

- Molecule 35 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	k	47	Total	C	N	O	S	0	0
			374	238	71	62	3		

- Molecule 36 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
36	l	50	Total	C	N	O	0	0
			384	255	61	68		

- Molecule 37 is a protein called B15 – 1 beta subcomplex subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	m	69	Total	C	N	O	S	0	0
			569	364	106	97	2		

- Molecule 38 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	n	109	Total	C	N	O	S	0	0
			911	580	170	160	1		

- Molecule 39 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	o	77	Total	C	N	O	S	0	0
			631	398	109	114	10		

- Molecule 40 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10-B.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	p	93	Total	C	N	O	S	0	0
			778	493	144	137	4		

- Molecule 41 is a protein called Probable NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 12.

Mol	Chain	Residues	Atoms				AltConf	Trace
41	q	65	Total	C	N	O	0	0
			536	342	95	99		

- Molecule 42 is a protein called Furry.

Mol	Chain	Residues	Atoms				AltConf	Trace
42	r	10	Total	C	N	O	0	0
			88	57	17	14		

- Molecule 43 is a protein called unknown.

Mol	Chain	Residues	Atoms				AltConf	Trace
43	u	30	Total	C	N	O	0	0
			150	90	30	30		

- Molecule 44 is a protein called Uncharacterized protein At2g27730, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
44	v	30	Total	C	N	O	0	0
			226	147	39	40		

- Molecule 45 is a protein called Gamma carbonic anhydrase-like 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	x	211	Total	C	N	O	S	0	0
			1637	1049	281	302	5		

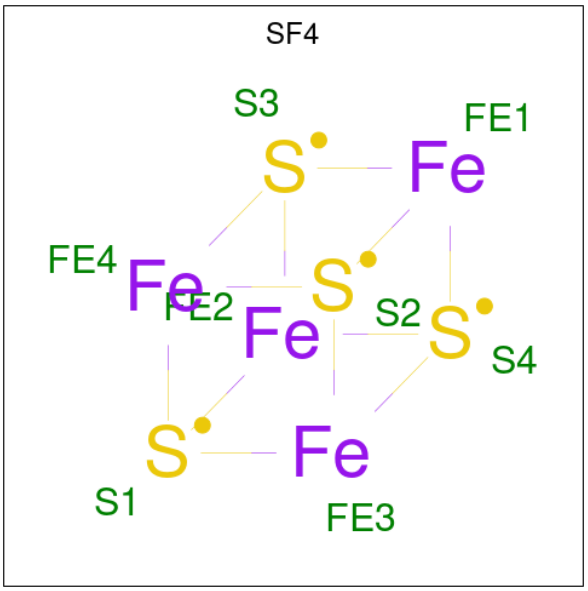
- Molecule 46 is a protein called Gamma carbonic anhydrase 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	y	263	Total	C	N	O	S	0	0
			2001	1251	357	386	7		

- Molecule 47 is a protein called Gamma carbonic anhydrase 1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	z	232	Total	C	N	O	S	0	0
			1763	1105	323	329	6		

- Molecule 48 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe_4S_4).



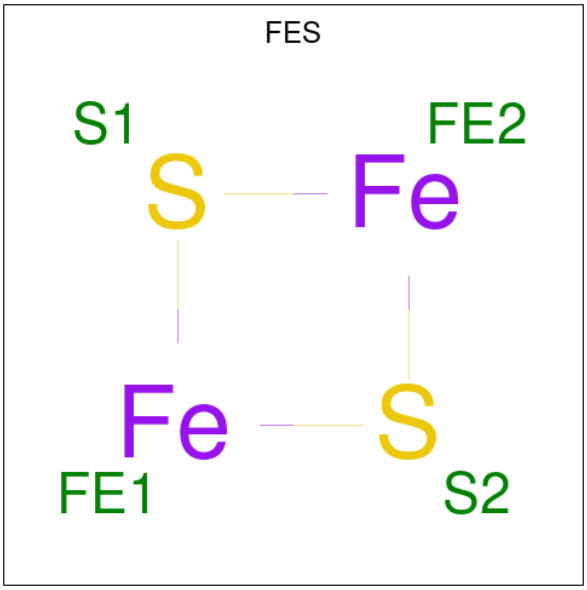
Mol	Chain	Residues	Atoms			AltConf
48	B	1	Total	Fe	S	0
			8	4	4	
48	F	1	Total	Fe	S	0
			8	4	4	
48	G	1	Total	Fe	S	0
			16	8	8	
48	G	1	Total	Fe	S	0
			16	8	8	

Continued on next page...

Continued from previous page...

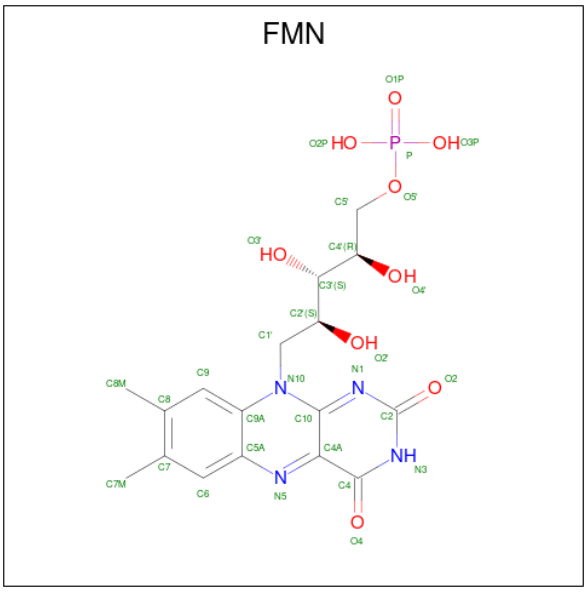
Mol	Chain	Residues	Atoms	AltConf
48	I	1	Total Fe S 16 8 8	0
48	I	1	Total Fe S 16 8 8	0

- Molecule 49 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe_2S_2).



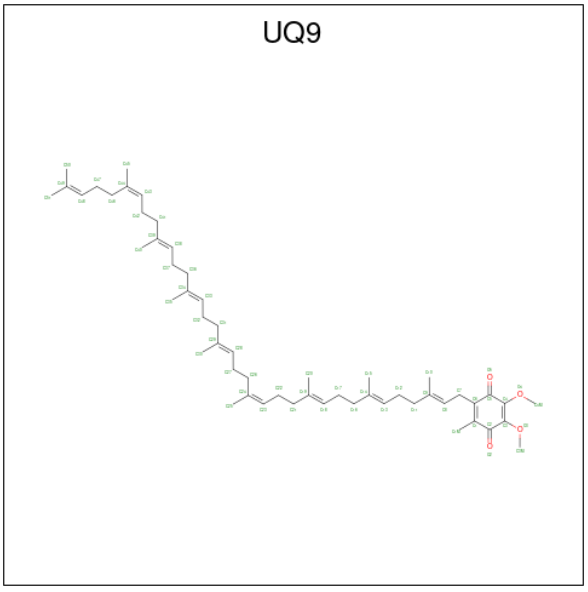
Mol	Chain	Residues	Atoms	AltConf
49	E	1	Total Fe S 4 2 2	0
49	G	1	Total Fe S 4 2 2	0

- Molecule 50 is FLAVIN MONONUCLEOTIDE (three-letter code: FMN) (formula: $C_{17}H_{21}N_4O_9P$).



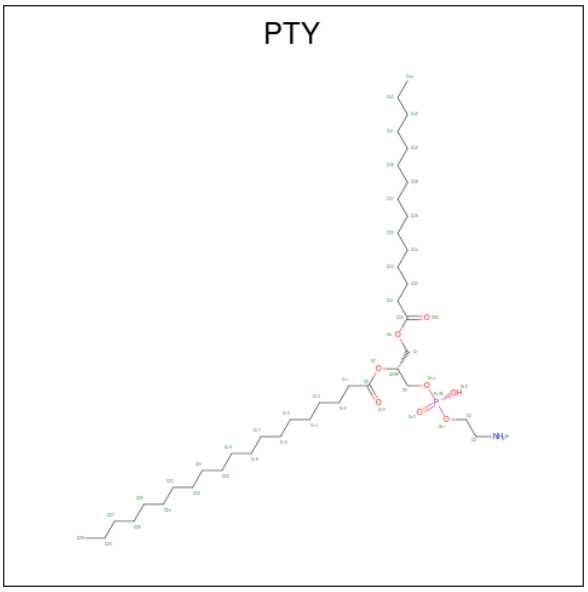
Mol	Chain	Residues	Atoms					AltConf
50	F	1	Total	C	N	O	P	0
			31	17	4	9	1	

- Molecule 51 is Ubiquinone-9 (three-letter code: UQ9) (formula: $C_{54}H_{82}O_4$).



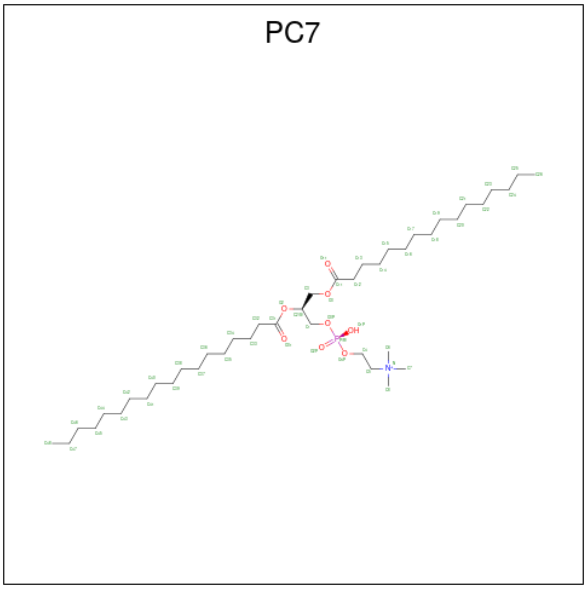
Mol	Chain	Residues	Atoms				AltConf
51	H	1	Total	C	O		0
			35	31	4		

- Molecule 52 is PHOSPHATIDYLETHANOLAMINE (three-letter code: PTY) (formula: $C_{40}H_{80}NO_8P$).



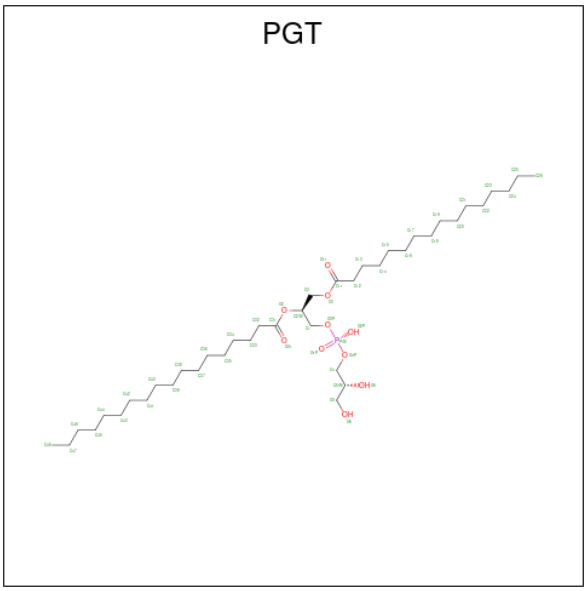
Mol	Chain	Residues	Atoms					AltConf
52	H	1	Total	C	N	O	P	0
			50	40	1	8	1	
52	M	1	Total	C	N	O	P	0
			50	40	1	8	1	
52	N	1	Total	C	N	O	P	0
			50	40	1	8	1	

- Molecule 53 is (7S)-4-HYDROXY-N,N,N-TRIMETHYL-9-OXO-7-[(PALMITOYLOXY)METHYL]-3,5,8-TRIOXA-4-PHOSPHAHEXACOSAN-1-AMINIUM 4-OXIDE (three-letter code: PC7) (formula: $C_{42}H_{85}NO_8P$).



Mol	Chain	Residues	Atoms					AltConf
53	M	1	Total	C	N	O	P	0
			52	42	1	8	1	
53	v	1	Total	C	N	O	P	0
			52	42	1	8	1	

- Molecule 54 is (1S)-2-{[{[(2R)-2,3-DIHYDROXYPROPYL]OXY}(HYDROXY)PHOSPHORYL]OXY}-1-[(PALMITOYLOXY)METHYL]ETHYL STEARATE (three-letter code: PGT) (formula: $C_{40}H_{79}O_{10}P$).

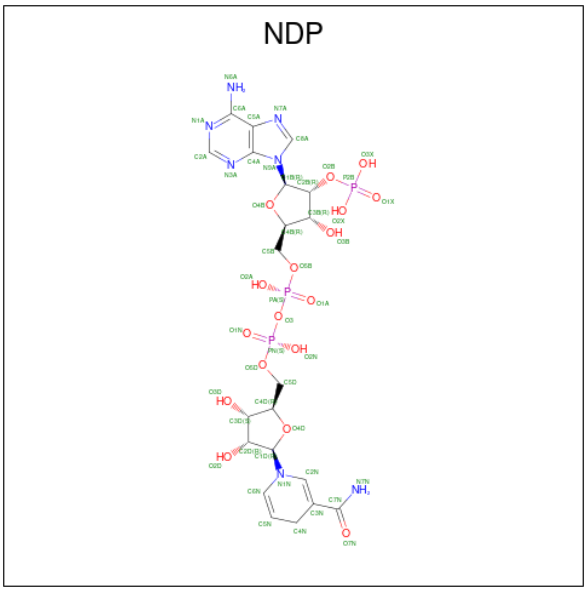


Mol	Chain	Residues	Atoms				AltConf
54	N	1	Total	C	O	P	0
			41	30	10	1	

- Molecule 55 is FE (III) ION (three-letter code: FE) (formula: Fe).

Mol	Chain	Residues	Atoms		AltConf
55	O	1	Total	Fe	0
			1	1	

- Molecule 56 is NADPH DIHYDRO-NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NDP) (formula: $C_{21}H_{30}N_7O_{17}P_3$).

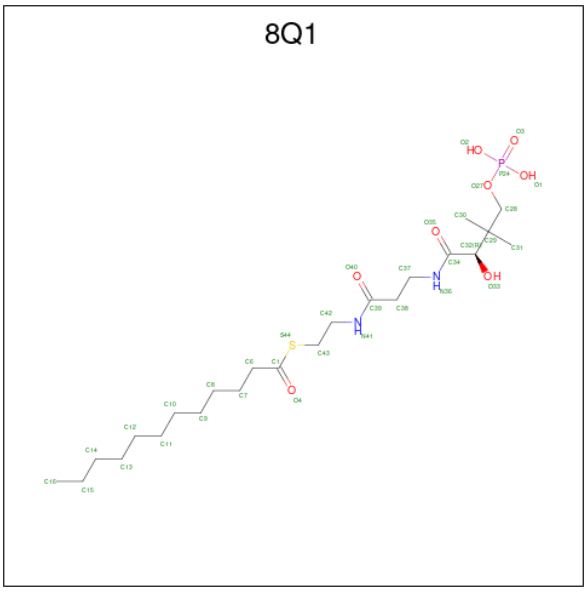


Mol	Chain	Residues	Atoms					AltConf
56	P	1	Total	C	N	O	P	0
			48	21	7	17	3	

- Molecule 57 is ZINC ION (three-letter code: ZN) (formula: Zn).

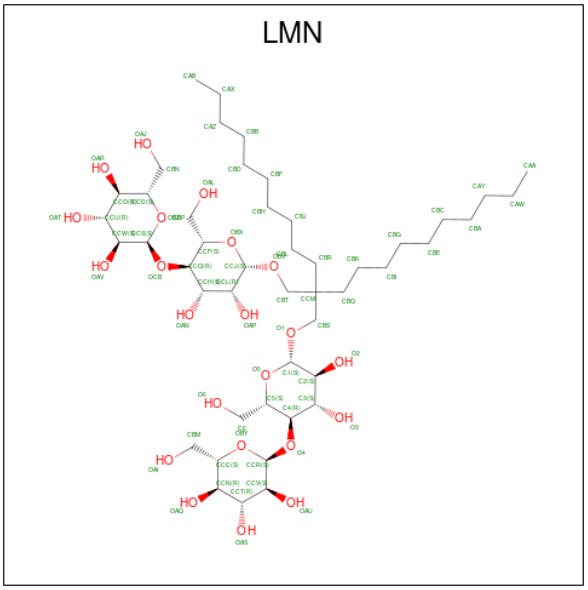
Mol	Chain	Residues	Atoms		AltConf
57	R	1	Total	Zn	0
			1	1	
57	y	1	Total	Zn	0
			1	1	

- Molecule 58 is S-[2-({N-[(2R)-2-hydroxy-3,3-dimethyl-4-(phosphonooxy)butanoyl]-beta-alanyl}amino)ethyl] dodecanethioate (three-letter code: 8Q1) (formula: $C_{23}H_{45}N_2O_8PS$).



Mol	Chain	Residues	Atoms						AltConf
58	W	1	Total	C	N	O	P	S	0
			35	23	2	8	1	1	
58	n	1	Total	C	N	O	P	S	0
			35	23	2	8	1	1	

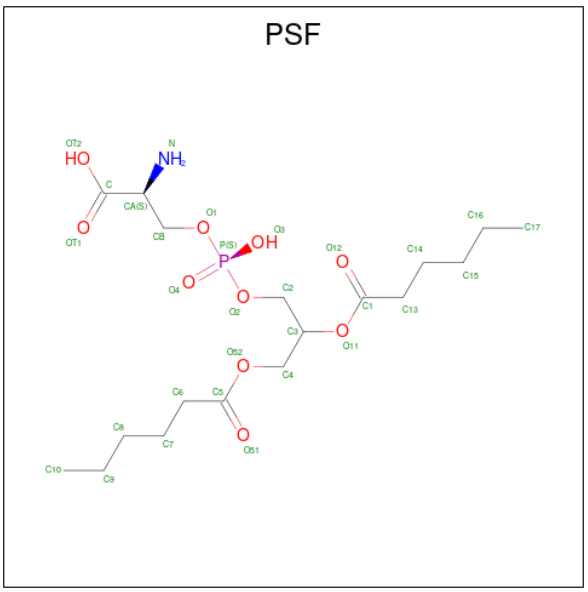
- Molecule 59 is Lauryl Maltose Neopentyl Glycol (three-letter code: LMN) (formula: $C_{47}H_{88}O_{22}$).



Mol	Chain	Residues	Atoms			AltConf
59	d	1	Total	C	O	0
			69	47	22	

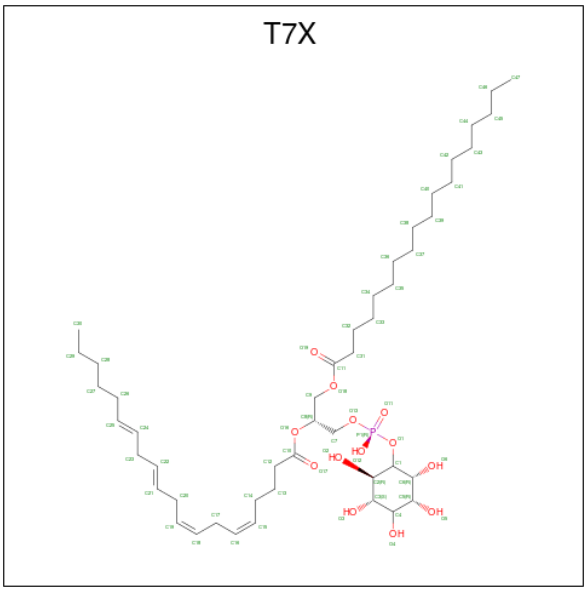
- Molecule 60 is 1,2-DICAPROYL-SN-PHOSPHATIDYL-L-SERINE (three-letter code: PSF)

(formula: $C_{18}H_{34}NO_{10}P$).



Mol	Chain	Residues	Atoms					AltConf
60	z	1	Total	C	N	O	P	0
			30	18	1	10	1	

- Molecule 61 is Phosphatidylinositol (three-letter code: T7X) (formula: $C_{47}H_{83}O_{13}P$).



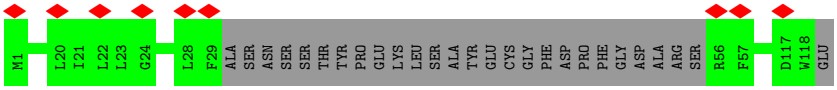
Mol	Chain	Residues	Atoms				AltConf
61	z	1	Total	C	O	P	0
			61	47	13	1	

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

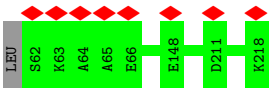
• Molecule 1: NADH-ubiquinone oxidoreductase chain 3

Chain A:



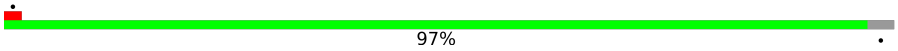
• Molecule 2: NADH dehydrogenase [ubiquinone] iron-sulfur protein 7, mitochondrial

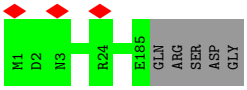
Chain B:



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

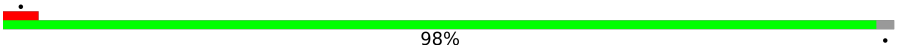
Chain C:

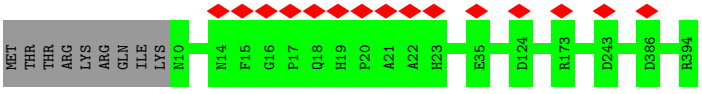




• Molecule 4: NADH dehydrogenase subunit 7

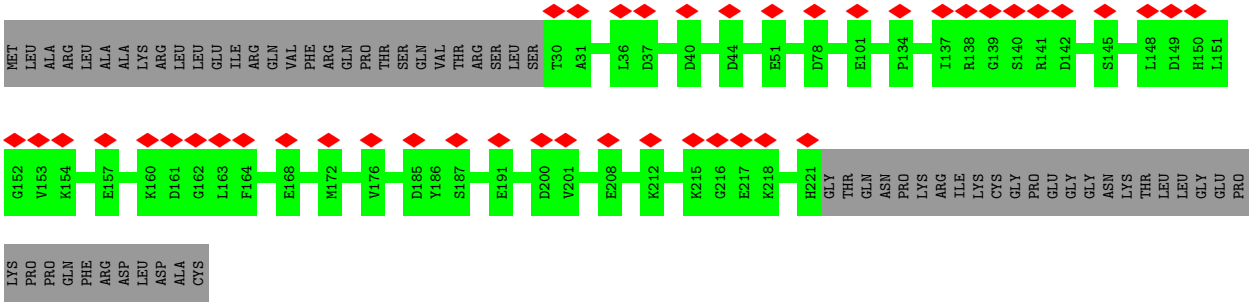
Chain D:



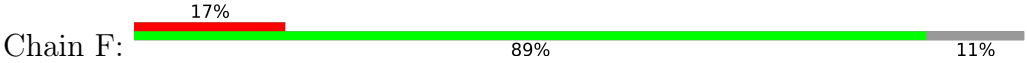


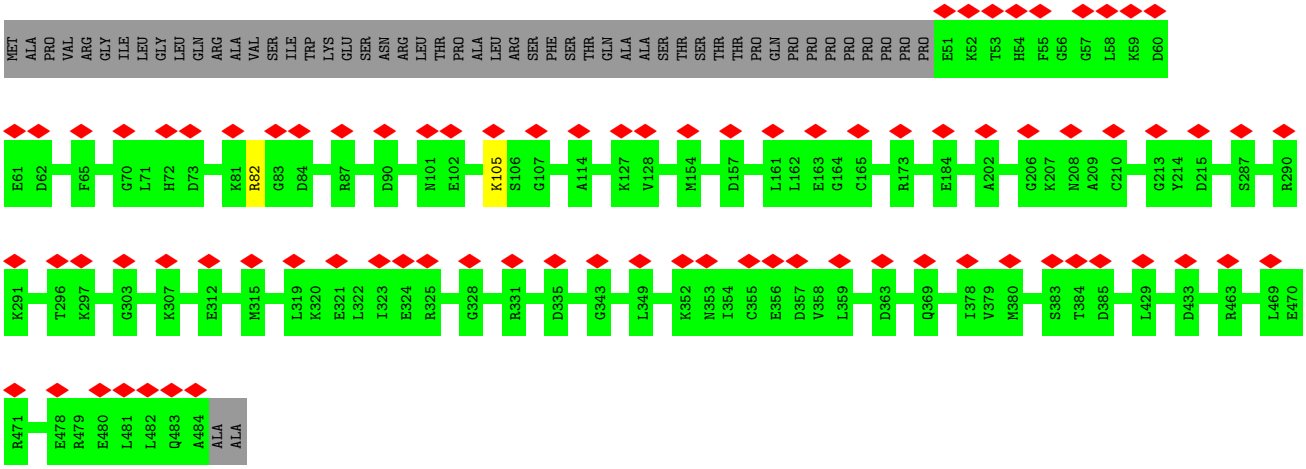
• Molecule 5: NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial

Chain E:

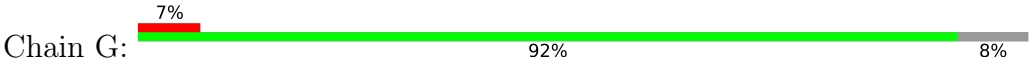


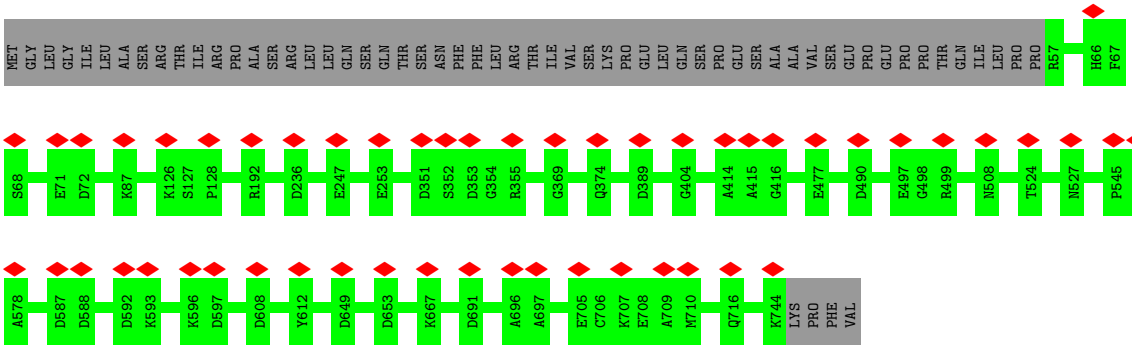
• Molecule 6: NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial



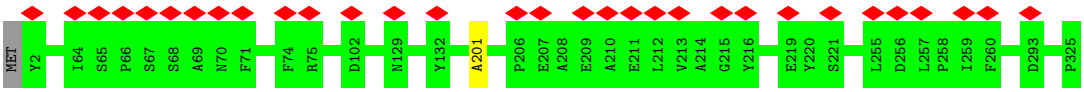


• Molecule 7: NADH dehydrogenase [ubiquinone] iron-sulfur protein 1, mitochondrial



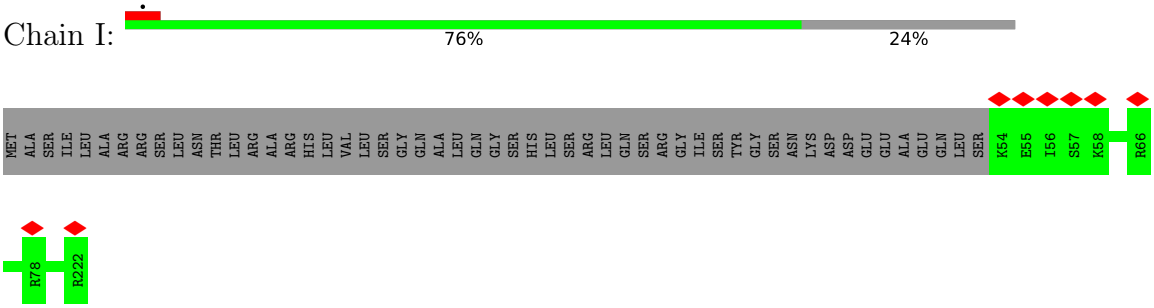


• Molecule 8: NADH-ubiquinone oxidoreductase chain 1



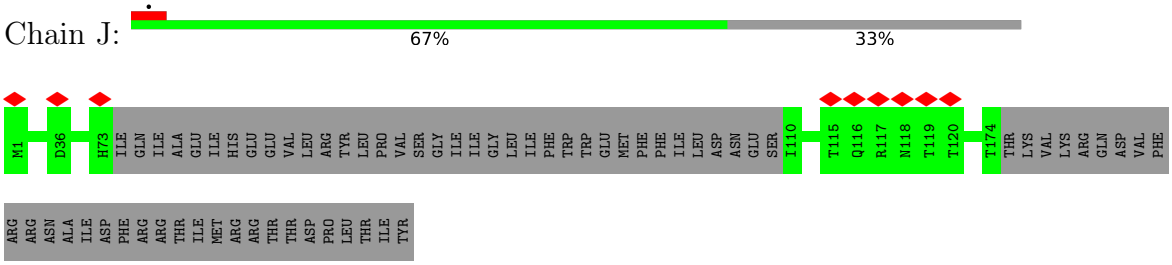
• Molecule 9: NADH dehydrogenase [ubiquinone] iron-sulfur protein 8-A, mitochondrial

Chain I:



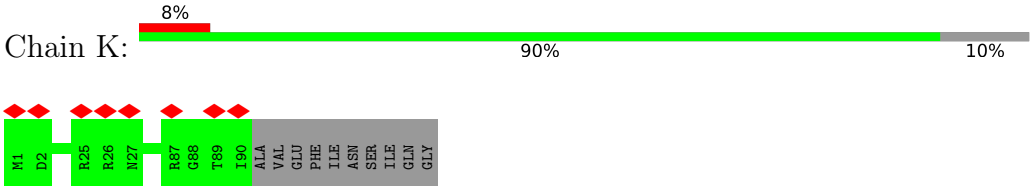
• Molecule 10: NADH-ubiquinone oxidoreductase chain 6

Chain J:



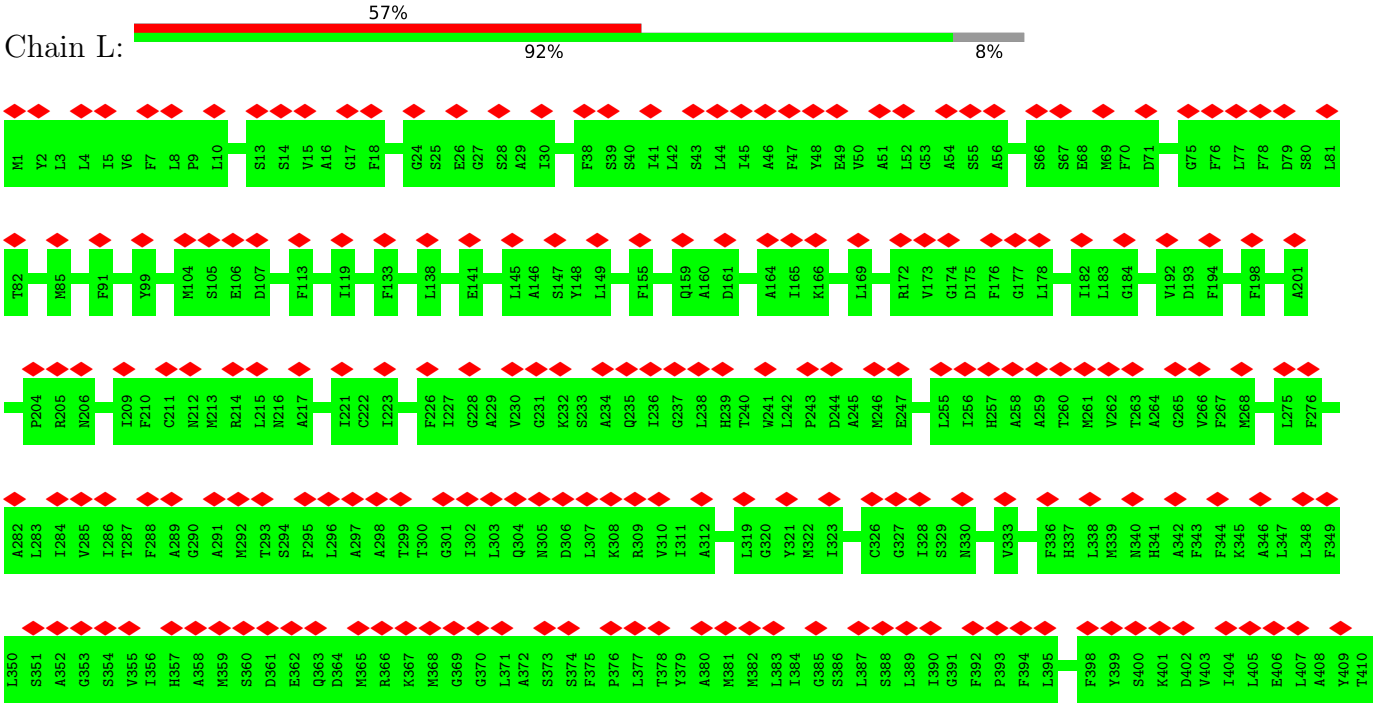
• Molecule 11: NADH dehydrogenase subunit 4L

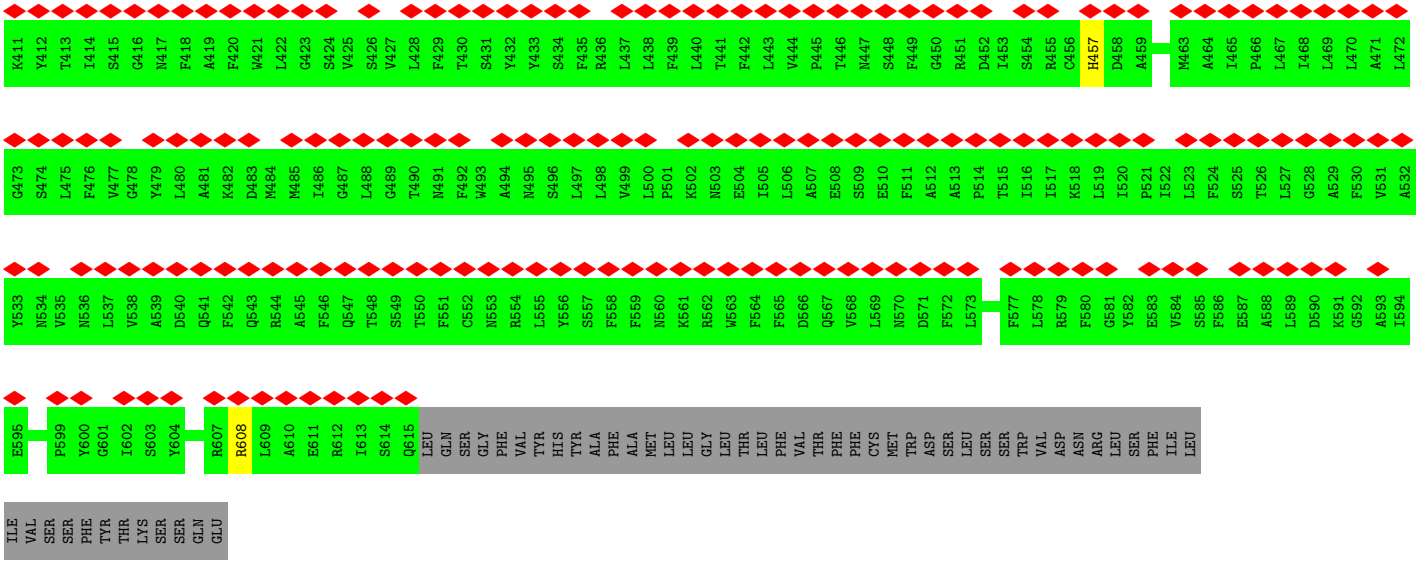
Chain K:



• Molecule 12: NADH-ubiquinone oxidoreductase chain 5

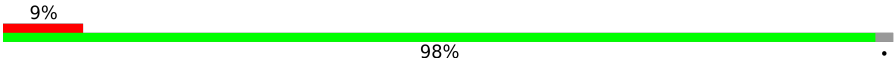
Chain L:

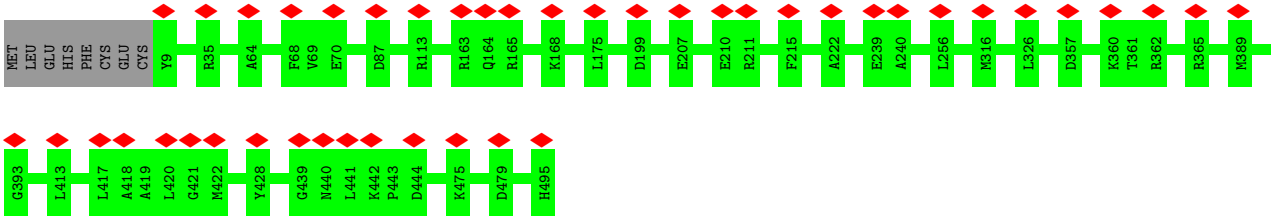




• Molecule 13: NADH-ubiquinone oxidoreductase chain 4

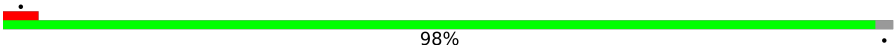
Chain M:

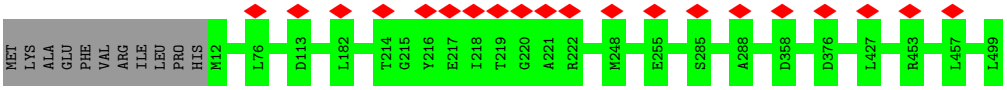




• Molecule 14: NADH-ubiquinone oxidoreductase chain 2

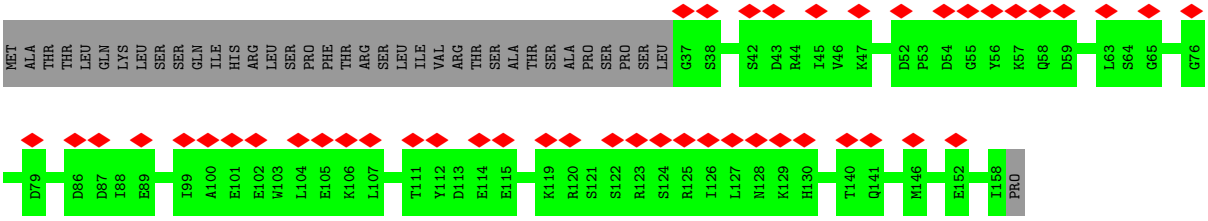
Chain N:





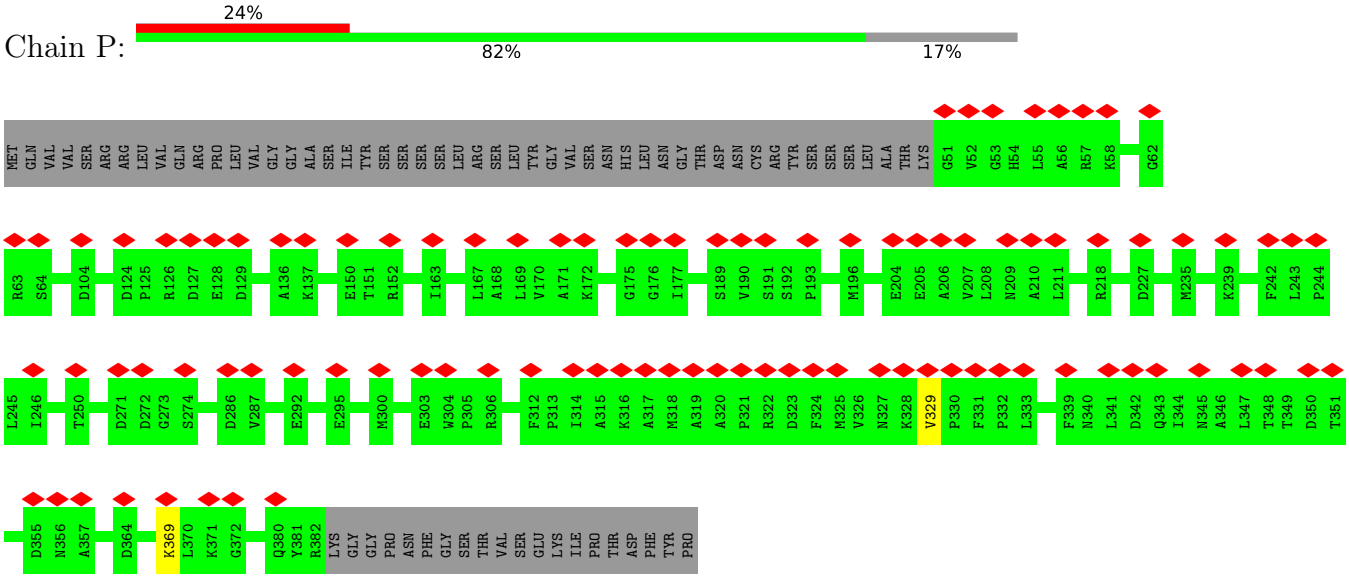
• Molecule 15: AT3G07480.1

Chain O:



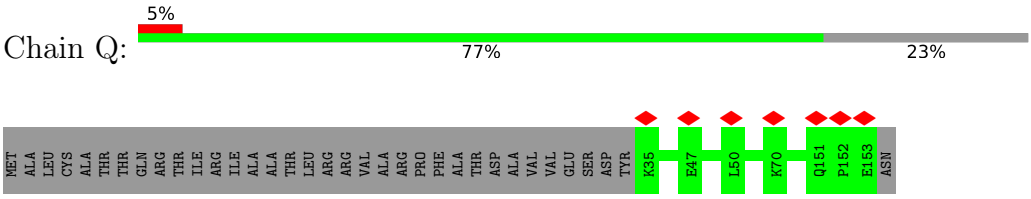
• Molecule 16: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial

Chain P:



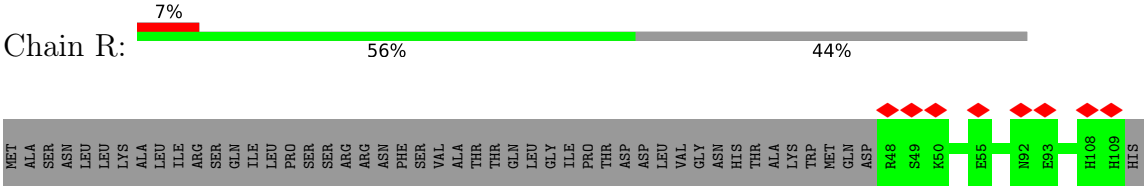
• Molecule 17: NADH dehydrogenase [ubiquinone] iron-sulfur protein 4, mitochondrial

Chain Q:



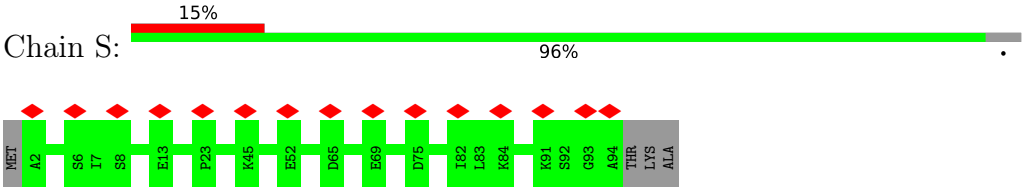
• Molecule 18: NADH dehydrogenase [ubiquinone] iron-sulfur protein 6, mitochondrial

Chain R:



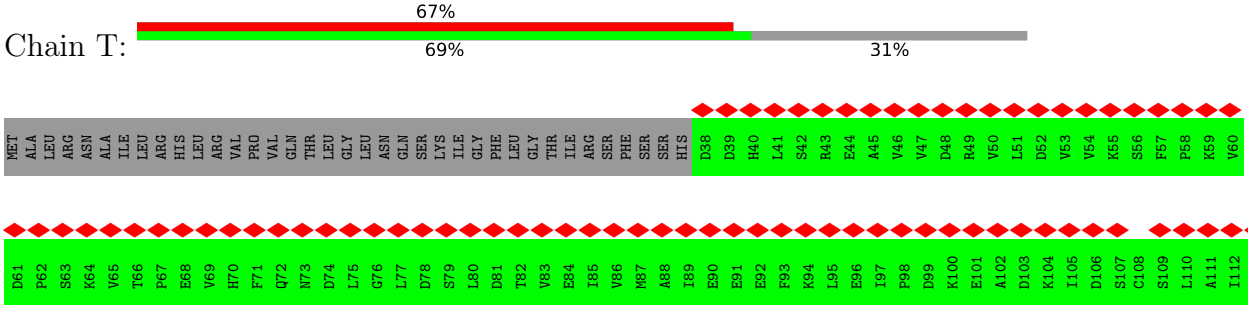
• Molecule 19: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2

Chain S:



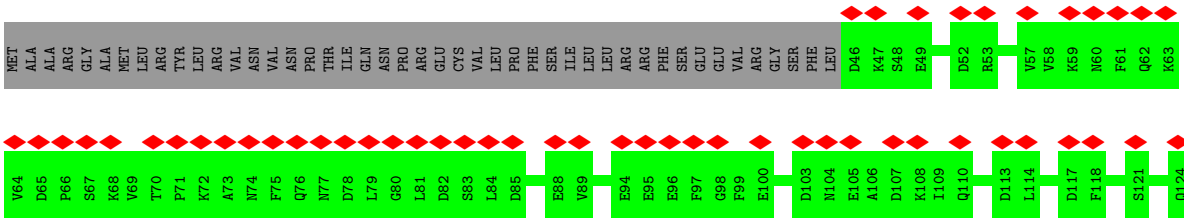
• Molecule 20: Acyl carrier protein 1, mitochondrial

Chain T:



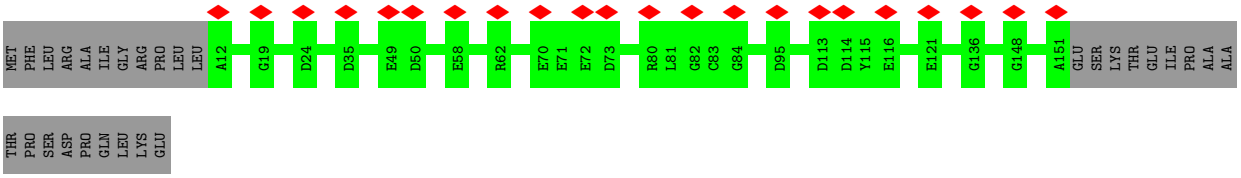
• Molecule 21: Acyl carrier protein 2, mitochondrial

Chain U:



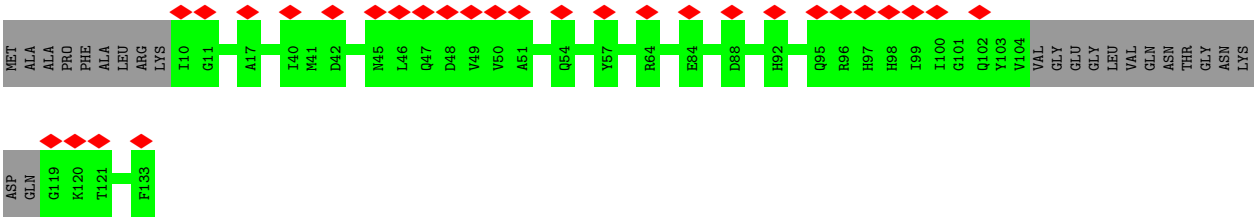
• Molecule 22: Probable NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 5, mitochondrial

Chain V:



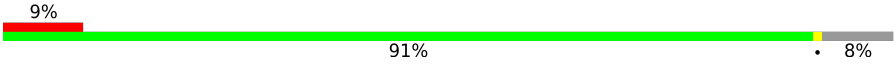
• Molecule 23: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 6

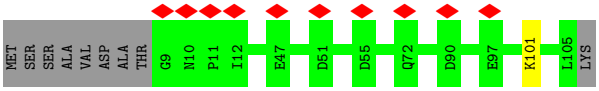
Chain W:



• Molecule 24: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8-B

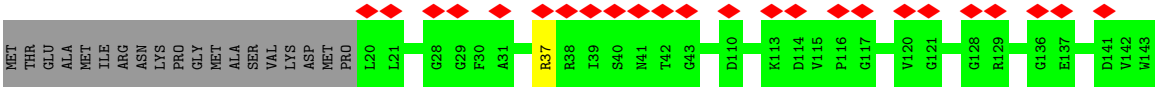
Chain X:



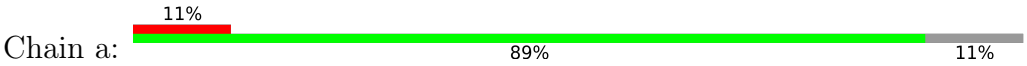


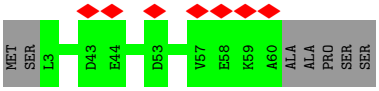
• Molecule 25: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13-A

Chain Z:

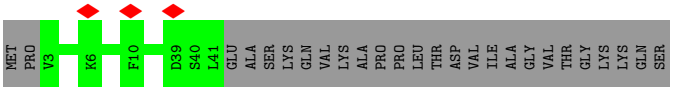


• Molecule 26: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 1

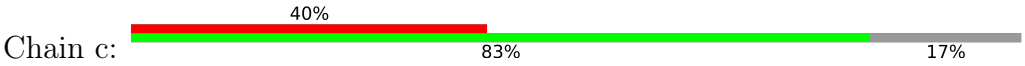




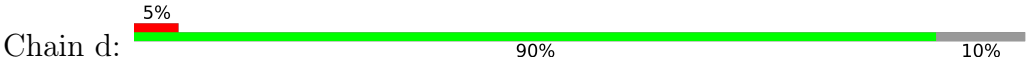
• Molecule 27: At2g46540/F11C10.23

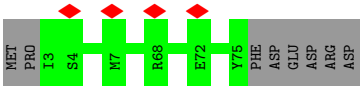


• Molecule 28: Transmembrane protein

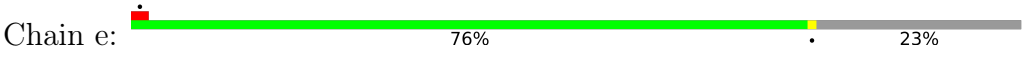


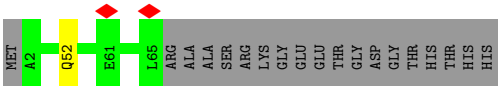
• Molecule 29: Excitatory amino acid transporter



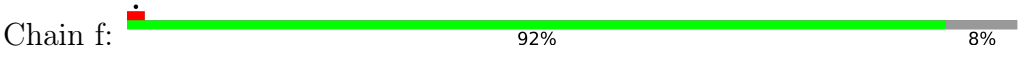


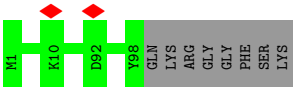
• Molecule 30: NADH dehydrogenase [ubiquinone] iron-sulfur protein 5-B





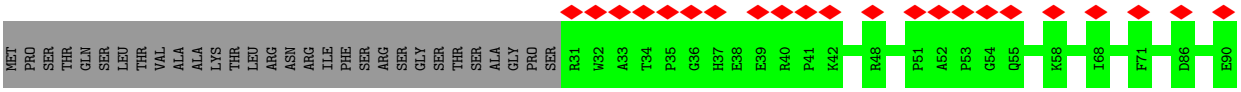
• Molecule 31: At4g16450

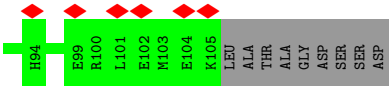




• Molecule 32: ESSS subunit of NADH:ubiquinone oxidoreductase (Complex I) protein

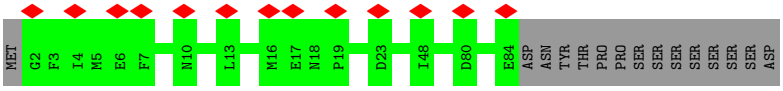
Chain g:





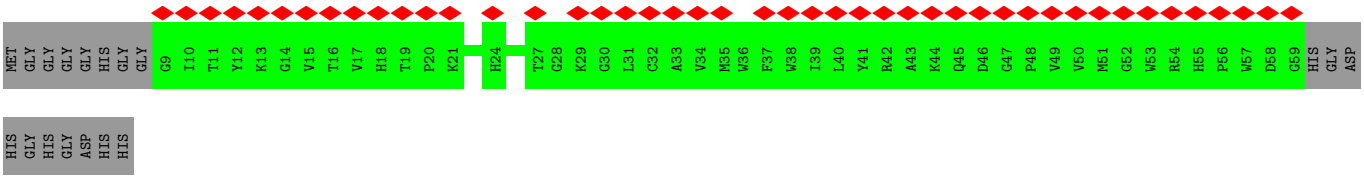
• Molecule 33: P1

Chain i:



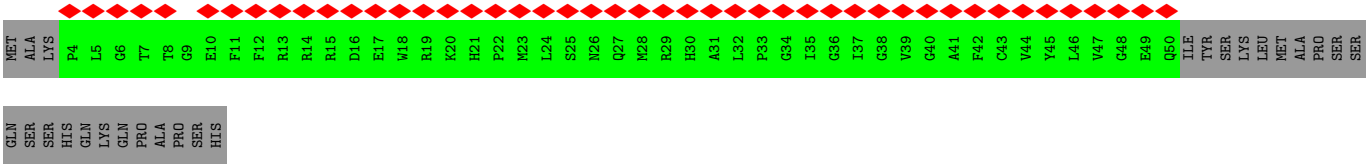
• Molecule 34: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2

Chain j:



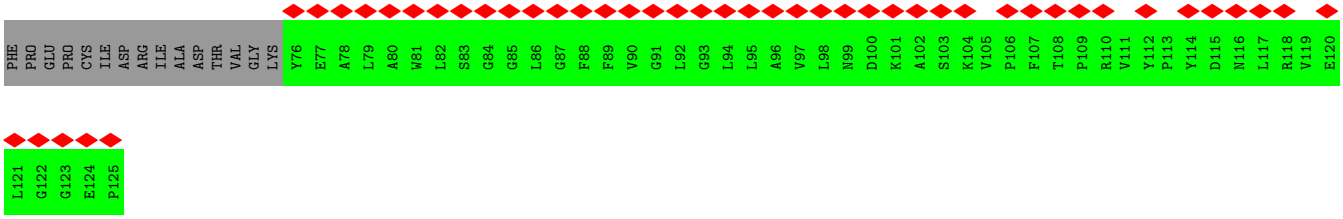
• Molecule 35: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3-A

Chain k:

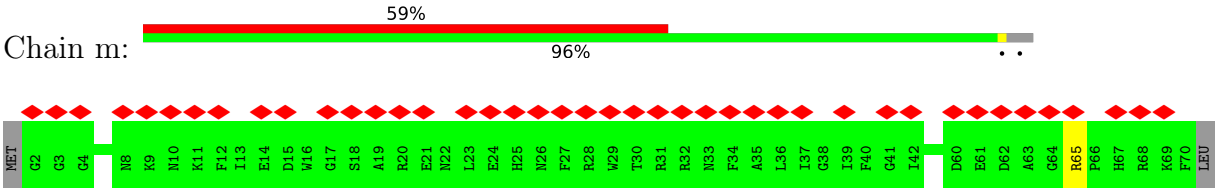


• Molecule 36: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial

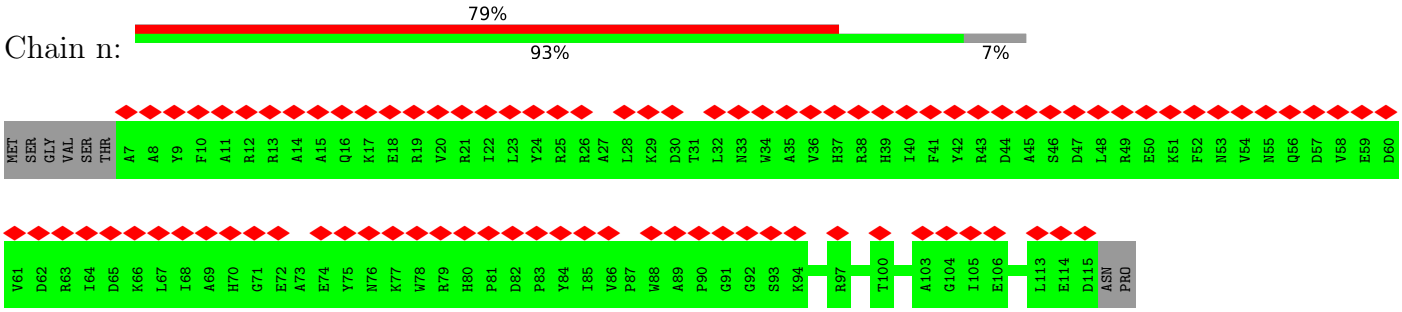
Chain l:



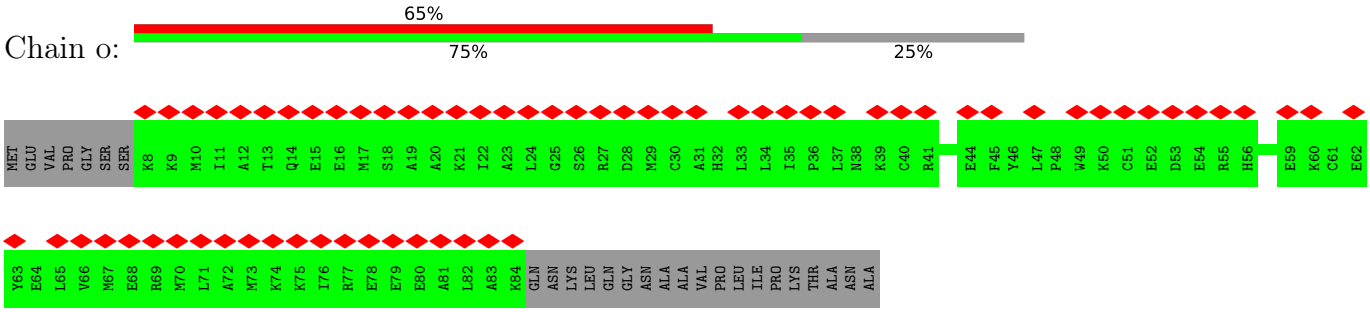
• Molecule 37: B15 – 1 beta subcomplex subunit 4



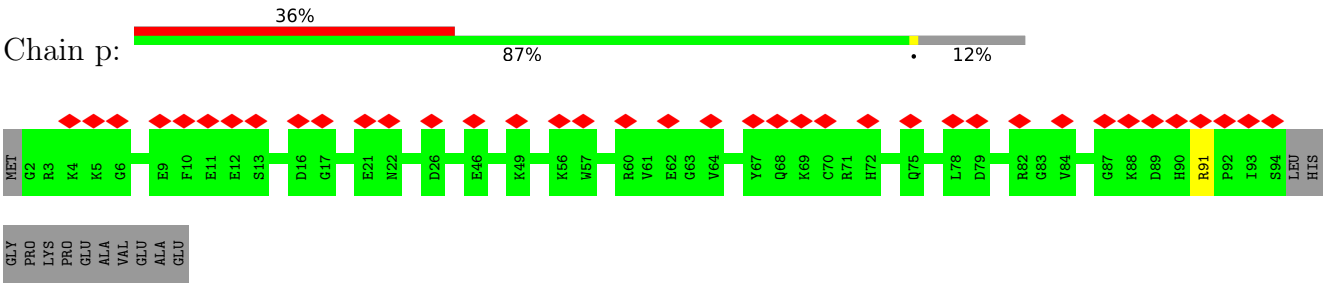
• Molecule 38: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9



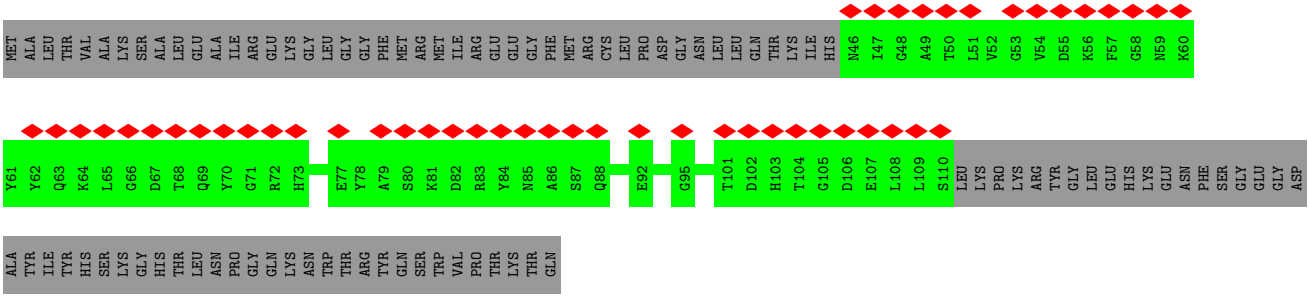
• Molecule 39: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7



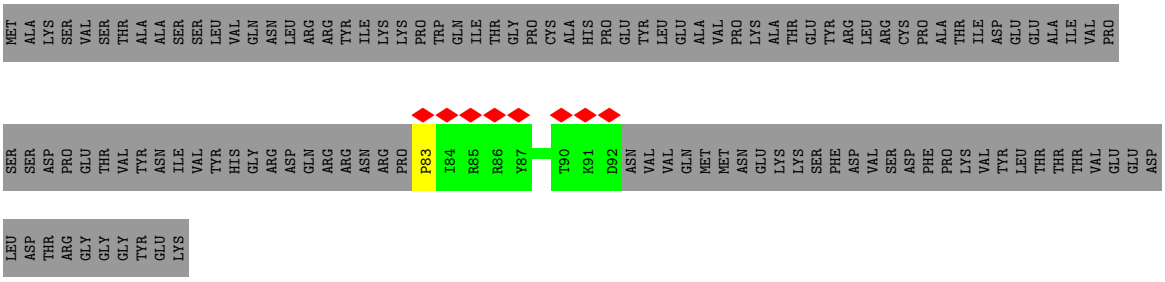
• Molecule 40: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10-B



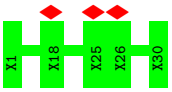
• Molecule 41: Probable NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 12



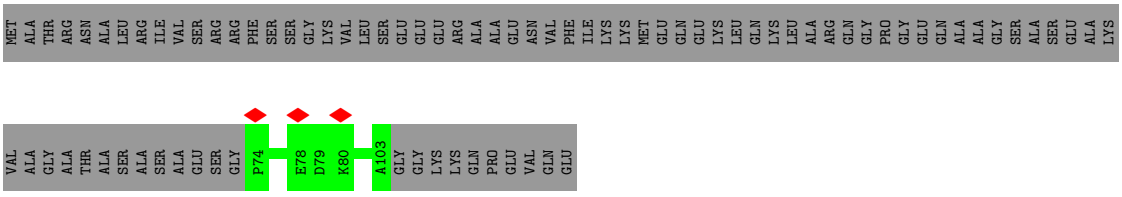
• Molecule 42: Furry



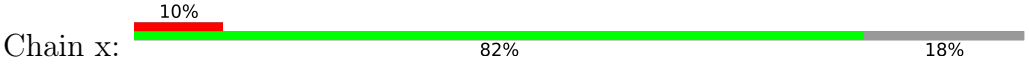
• Molecule 43: unknown

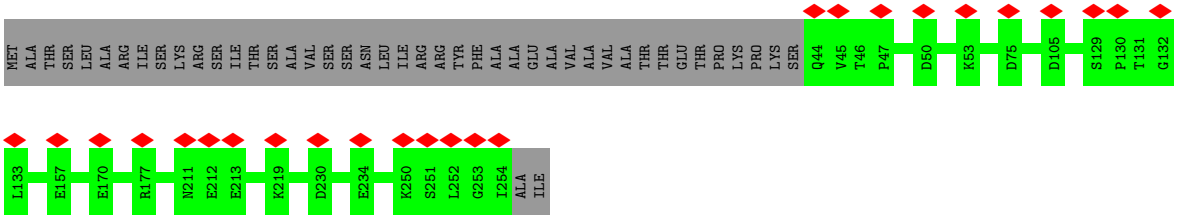


• Molecule 44: Uncharacterized protein At2g27730, mitochondrial



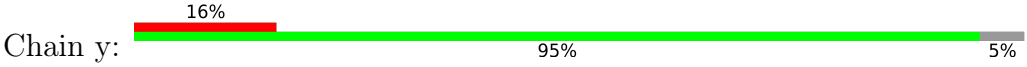
• Molecule 45: Gamma carbonic anhydrase-like 2, mitochondrial

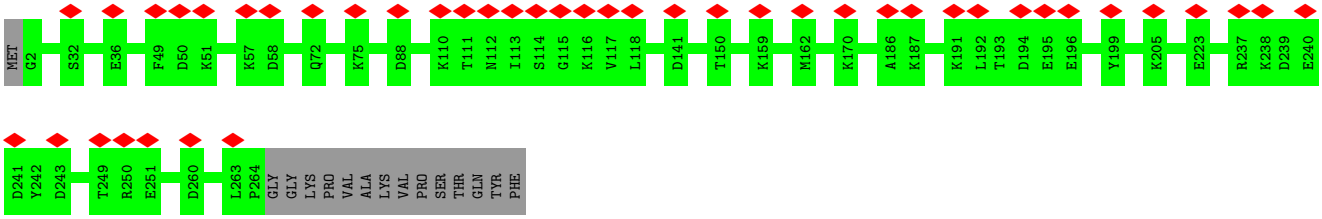




• Molecule 46: Gamma carbonic anhydrase 2, mitochondrial

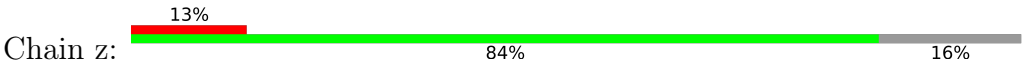
Chain y:

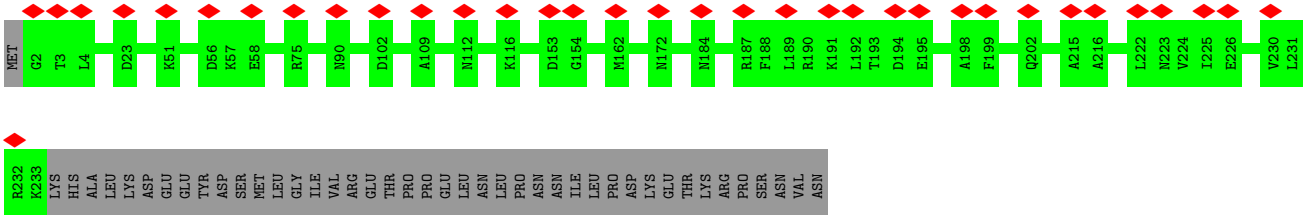




• Molecule 47: Gamma carbonic anhydrase 1, mitochondrial

Chain z:





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	42096	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	43	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.119	Depositor
Minimum map value	-0.038	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.011	Depositor
Map size (Å)	502.2, 502.2, 502.2	wwPDB
Map dimensions	600, 600, 600	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.837, 0.837, 0.837	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: T7X, FES, SF4, FMN, UQ9, PGT, ZN, PTY, FE, NDP, LMN, PSF, 8Q1, PC7

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	0.30	0/813	0.49	0/1103
2	B	0.31	0/1279	0.52	0/1734
3	C	0.29	0/1629	0.54	0/2207
4	D	0.29	0/3147	0.52	0/4256
5	E	0.27	0/1535	0.49	0/2084
6	F	0.26	0/3441	0.52	0/4641
7	G	0.27	0/5347	0.51	0/7242
8	H	0.30	0/2609	0.51	0/3553
9	I	0.29	0/1410	0.51	0/1904
10	J	0.28	0/1118	0.48	0/1523
11	K	0.28	0/717	0.52	0/969
12	L	0.27	0/4938	0.50	0/6706
13	M	0.27	0/3996	0.46	0/5431
14	N	0.29	0/3924	0.48	0/5327
15	O	0.24	0/971	0.50	0/1314
16	P	0.26	0/2617	0.49	0/3544
17	Q	0.28	0/966	0.47	0/1305
18	R	0.27	0/493	0.49	0/668
19	S	0.25	0/739	0.53	0/996
20	T	0.25	0/679	0.42	0/922
21	U	0.24	0/625	0.41	0/847
22	V	0.26	0/1146	0.48	0/1555
23	W	0.26	0/912	0.55	0/1234
24	X	0.25	0/781	0.48	0/1049
25	Z	0.28	0/1019	0.53	0/1381
26	a	0.24	0/481	0.54	0/646
27	b	0.26	0/292	0.45	0/396
28	c	0.24	0/614	0.53	0/829
29	d	0.27	0/585	0.52	0/788
30	e	0.27	0/559	0.51	0/745
31	f	0.28	0/750	0.50	0/1015
32	g	0.25	0/635	0.53	0/863

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
33	i	0.26	0/741	0.55	0/997
34	j	0.24	0/433	0.48	0/592
35	k	0.24	0/384	0.52	0/515
36	l	0.25	0/395	0.49	0/538
37	m	0.25	0/584	0.47	0/782
38	n	0.25	0/938	0.51	0/1273
39	o	0.25	0/640	0.52	0/852
40	p	0.25	0/799	0.51	0/1074
41	q	0.24	0/553	0.47	0/750
42	r	0.92	1/89 (1.1%)	1.92	4/118 (3.4%)
44	v	0.25	0/230	0.49	0/311
45	x	0.28	0/1677	0.52	0/2290
46	y	0.26	0/2034	0.51	0/2757
47	z	0.27	0/1795	0.52	0/2430
All	All	0.27	1/62059 (0.0%)	0.51	4/84056 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
42	r	83	PRO	C-N	7.66	1.51	1.34

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
42	r	83	PRO	C-N-CA	-12.29	90.97	121.70
42	r	83	PRO	O-C-N	9.68	138.18	122.70
42	r	83	PRO	CA-C-N	-8.62	98.25	117.20
42	r	83	PRO	CA-N-CD	-8.56	99.51	111.50

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

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	88/119 (74%)	86 (98%)	2 (2%)	0	100	100
2	B	155/218 (71%)	136 (88%)	19 (12%)	0	100	100
3	C	183/190 (96%)	164 (90%)	19 (10%)	0	100	100
4	D	383/394 (97%)	354 (92%)	29 (8%)	0	100	100
5	E	190/255 (74%)	172 (90%)	18 (10%)	0	100	100
6	F	432/486 (89%)	399 (92%)	33 (8%)	0	100	100
7	G	686/748 (92%)	618 (90%)	68 (10%)	0	100	100
8	H	322/325 (99%)	290 (90%)	31 (10%)	1 (0%)	41	75
9	I	167/222 (75%)	164 (98%)	3 (2%)	0	100	100
10	J	134/205 (65%)	129 (96%)	5 (4%)	0	100	100
11	K	88/100 (88%)	85 (97%)	3 (3%)	0	100	100
12	L	613/669 (92%)	569 (93%)	44 (7%)	0	100	100
13	M	485/495 (98%)	466 (96%)	19 (4%)	0	100	100
14	N	486/499 (97%)	469 (96%)	17 (4%)	0	100	100
15	O	120/159 (76%)	113 (94%)	7 (6%)	0	100	100
16	P	330/402 (82%)	299 (91%)	30 (9%)	1 (0%)	41	75
17	Q	117/154 (76%)	111 (95%)	6 (5%)	0	100	100
18	R	60/110 (54%)	60 (100%)	0	0	100	100
19	S	91/97 (94%)	82 (90%)	9 (10%)	0	100	100
20	T	82/122 (67%)	78 (95%)	4 (5%)	0	100	100
21	U	77/126 (61%)	72 (94%)	5 (6%)	0	100	100
22	V	138/169 (82%)	133 (96%)	5 (4%)	0	100	100
23	W	106/133 (80%)	102 (96%)	4 (4%)	0	100	100
24	X	95/106 (90%)	90 (95%)	5 (5%)	0	100	100
25	Z	122/143 (85%)	113 (93%)	9 (7%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
26	a	56/65 (86%)	54 (96%)	2 (4%)	0	100	100
27	b	37/65 (57%)	37 (100%)	0	0	100	100
28	c	71/88 (81%)	62 (87%)	9 (13%)	0	100	100
29	d	71/81 (88%)	68 (96%)	3 (4%)	0	100	100
30	e	62/83 (75%)	58 (94%)	4 (6%)	0	100	100
31	f	96/106 (91%)	86 (90%)	10 (10%)	0	100	100
32	g	73/114 (64%)	67 (92%)	6 (8%)	0	100	100
33	i	81/98 (83%)	75 (93%)	6 (7%)	0	100	100
34	j	49/69 (71%)	40 (82%)	9 (18%)	0	100	100
35	k	45/72 (62%)	38 (84%)	7 (16%)	0	100	100
36	l	48/125 (38%)	47 (98%)	1 (2%)	0	100	100
37	m	67/71 (94%)	63 (94%)	4 (6%)	0	100	100
38	n	107/117 (92%)	97 (91%)	10 (9%)	0	100	100
39	o	75/103 (73%)	69 (92%)	6 (8%)	0	100	100
40	p	91/106 (86%)	81 (89%)	10 (11%)	0	100	100
41	q	63/159 (40%)	55 (87%)	8 (13%)	0	100	100
42	r	8/131 (6%)	8 (100%)	0	0	100	100
44	v	28/113 (25%)	27 (96%)	1 (4%)	0	100	100
45	x	209/256 (82%)	190 (91%)	19 (9%)	0	100	100
46	y	261/278 (94%)	239 (92%)	22 (8%)	0	100	100
47	z	230/275 (84%)	211 (92%)	19 (8%)	0	100	100
All	All	7578/9221 (82%)	7026 (93%)	550 (7%)	2 (0%)	100	100

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
8	H	201	ALA
16	P	329	VAL

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	84/106 (79%)	84 (100%)	0	100 100
2	B	132/184 (72%)	132 (100%)	0	100 100
3	C	175/179 (98%)	175 (100%)	0	100 100
4	D	331/340 (97%)	331 (100%)	0	100 100
5	E	166/220 (76%)	166 (100%)	0	100 100
6	F	353/396 (89%)	351 (99%)	2 (1%)	86 94
7	G	571/625 (91%)	571 (100%)	0	100 100
8	H	271/272 (100%)	271 (100%)	0	100 100
9	I	151/195 (77%)	151 (100%)	0	100 100
10	J	123/186 (66%)	123 (100%)	0	100 100
11	K	78/86 (91%)	78 (100%)	0	100 100
12	L	518/568 (91%)	516 (100%)	2 (0%)	91 97
13	M	426/434 (98%)	426 (100%)	0	100 100
14	N	406/416 (98%)	406 (100%)	0	100 100
15	O	107/141 (76%)	107 (100%)	0	100 100
16	P	273/334 (82%)	272 (100%)	1 (0%)	91 97
17	Q	100/128 (78%)	100 (100%)	0	100 100
18	R	55/97 (57%)	55 (100%)	0	100 100
19	S	82/85 (96%)	82 (100%)	0	100 100
20	T	79/112 (70%)	79 (100%)	0	100 100
21	U	72/113 (64%)	72 (100%)	0	100 100
22	V	123/148 (83%)	123 (100%)	0	100 100
23	W	97/114 (85%)	97 (100%)	0	100 100
24	X	87/94 (93%)	86 (99%)	1 (1%)	73 88
25	Z	99/115 (86%)	98 (99%)	1 (1%)	76 89
26	a	48/53 (91%)	48 (100%)	0	100 100
27	b	32/53 (60%)	32 (100%)	0	100 100
28	c	64/71 (90%)	64 (100%)	0	100 100
29	d	58/66 (88%)	58 (100%)	0	100 100
30	e	59/73 (81%)	58 (98%)	1 (2%)	60 83

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
31	f	78/84 (93%)	78 (100%)	0	100 100
32	g	65/96 (68%)	65 (100%)	0	100 100
33	i	75/90 (83%)	75 (100%)	0	100 100
34	j	42/51 (82%)	42 (100%)	0	100 100
35	k	38/60 (63%)	38 (100%)	0	100 100
36	l	39/97 (40%)	39 (100%)	0	100 100
37	m	57/59 (97%)	56 (98%)	1 (2%)	59 81
38	n	92/99 (93%)	92 (100%)	0	100 100
39	o	67/87 (77%)	67 (100%)	0	100 100
40	p	83/93 (89%)	82 (99%)	1 (1%)	71 87
41	q	54/133 (41%)	54 (100%)	0	100 100
42	r	10/118 (8%)	10 (100%)	0	100 100
44	v	23/84 (27%)	23 (100%)	0	100 100
45	x	180/216 (83%)	180 (100%)	0	100 100
46	y	220/232 (95%)	220 (100%)	0	100 100
47	z	187/228 (82%)	187 (100%)	0	100 100
All	All	6530/7831 (83%)	6520 (100%)	10 (0%)	93 98

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
6	F	82	ARG
6	F	105	LYS
12	L	457	HIS
12	L	608	ARG
16	P	369	LYS
24	X	101	LYS
25	Z	37	ARG
30	e	52	GLN
37	m	65	ARG
40	p	91	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
3	C	4	GLN
5	E	177	ASN
5	E	196	ASN
7	G	320	ASN
7	G	686	ASN
12	L	235	GLN
13	M	329	GLN
13	M	409	GLN
13	M	490	GLN
19	S	43	ASN
21	U	74	ASN
21	U	77	ASN
29	d	21	ASN
32	g	95	GLN
41	q	88	GLN
46	y	160	HIS

5.3.3 RNA (i)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains (i)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 25 ligands modelled in this entry, 3 are monoatomic - leaving 22 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
50	FMN	F	500	-	33,33,33	1.09	2 (6%)	48,50,50	1.21	8 (16%)
48	SF4	I	501	9	0,12,12	-	-	-		
52	PTY	M	502	13	49,49,49	0.87	4 (8%)	52,54,54	1.11	2 (3%)
53	PC7	v	201	-	51,51,51	0.96	4 (7%)	57,59,59	1.05	2 (3%)
48	SF4	B	500	2	0,12,12	-	-	-		
60	PSF	z	301	47	28,29,29	1.18	4 (14%)	32,36,36	1.19	2 (6%)
53	PC7	M	501	-	51,51,51	0.97	4 (7%)	57,59,59	1.09	2 (3%)
49	FES	E	500	5	0,4,4	-	-	-		
54	PGT	N	501	-	40,40,50	1.16	3 (7%)	43,46,56	1.10	2 (4%)
52	PTY	H	402	-	49,49,49	0.87	4 (8%)	52,54,54	1.11	2 (3%)
58	8Q1	n	200	38	31,34,34	1.69	6 (19%)	40,43,43	1.47	4 (10%)
56	NDP	P	500	16	45,52,52	2.22	5 (11%)	53,80,80	1.73	12 (22%)
48	SF4	F	501	6	0,12,12	-	-	-		
48	SF4	I	500	9	0,12,12	-	-	-		
49	FES	G	801	7	0,4,4	-	-	-		
51	UQ9	H	401	8	35,35,58	2.61	13 (37%)	42,45,73	1.66	10 (23%)
52	PTY	N	502	-	49,49,49	0.87	4 (8%)	52,54,54	1.07	2 (3%)
58	8Q1	W	200	-	31,34,34	1.69	6 (19%)	40,43,43	1.49	4 (10%)
59	LMN	d	101	-	72,72,72	1.67	14 (19%)	96,98,98	1.13	5 (5%)
61	T7X	z	302	-	61,61,61	0.84	4 (6%)	71,73,73	1.07	3 (4%)
48	SF4	G	802	7	0,12,12	-	-	-		
48	SF4	G	803	7	0,12,12	-	-	-		

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
50	FMN	F	500	-	-	4/18/18/18	0/3/3/3
48	SF4	I	501	9	-	-	0/6/5/5
52	PTY	M	502	13	-	24/53/53/53	-
53	PC7	v	201	-	-	28/55/55/55	-
48	SF4	B	500	2	-	-	0/6/5/5
60	PSF	z	301	47	-	15/35/35/35	-
53	PC7	M	501	-	-	19/55/55/55	-
49	FES	E	500	5	-	-	0/1/1/1
54	PGT	N	501	-	-	29/45/45/55	-

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
52	PTY	H	402	-	-	17/53/53/53	-
58	8Q1	n	200	38	-	11/41/41/41	-
56	NDP	P	500	16	-	6/30/77/77	0/5/5/5
48	SF4	F	501	6	-	-	0/6/5/5
48	SF4	I	500	9	-	-	0/6/5/5
49	FES	G	801	7	-	-	0/1/1/1
51	UQ9	H	401	8	-	9/30/54/81	0/1/1/1
52	PTY	N	502	-	-	21/53/53/53	-
58	8Q1	W	200	-	-	20/41/41/41	-
59	LMN	d	101	-	-	28/50/130/130	0/4/4/4
61	T7X	z	302	-	-	32/56/80/80	0/1/1/1
48	SF4	G	802	7	-	-	0/6/5/5
48	SF4	G	803	7	-	-	0/6/5/5

All (77) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
56	P	500	NDP	P2B-O2B	12.23	1.82	1.59
51	H	401	UQ9	C6-C1	10.53	1.54	1.35
58	W	200	8Q1	C34-N36	5.50	1.45	1.33
58	n	200	8Q1	C34-N36	5.48	1.45	1.33
58	W	200	8Q1	C39-N41	5.39	1.45	1.33
58	n	200	8Q1	C39-N41	5.30	1.45	1.33
59	d	101	LMN	O5-C1	4.74	1.53	1.41
59	d	101	LMN	CBS-CCM	4.40	1.63	1.53
51	H	401	UQ9	C7-C8	4.38	1.57	1.50
51	H	401	UQ9	C4-C3	4.30	1.53	1.36
59	d	101	LMN	CBT-CCM	4.19	1.63	1.53
56	P	500	NDP	PN-O5D	4.00	1.75	1.59
50	F	500	FMN	C4A-N5	3.77	1.38	1.30
59	d	101	LMN	CBR-CCM	3.65	1.61	1.54
59	d	101	LMN	O1-C1	-3.44	1.34	1.40
56	P	500	NDP	O2B-C2B	-3.07	1.32	1.44
54	N	501	PGT	O3-C11	3.02	1.42	1.33
54	N	501	PGT	O2-C31	2.97	1.42	1.34
59	d	101	LMN	OBY-CCR	2.89	1.49	1.41
51	H	401	UQ9	C7-C6	2.89	1.56	1.51
59	d	101	LMN	OBZ-CCS	2.82	1.49	1.41
59	d	101	LMN	OBX-CCF	2.77	1.51	1.44
59	d	101	LMN	O4-C4	2.68	1.50	1.43

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
51	H	401	UQ9	C11-C9	2.65	1.56	1.51
52	M	502	PTY	O7-C6	-2.60	1.40	1.46
52	H	402	PTY	O7-C6	-2.59	1.40	1.46
53	v	201	PC7	O2-C2	-2.55	1.40	1.46
60	z	301	PSF	O11-C3	-2.54	1.40	1.46
53	M	501	PC7	O2-C2	-2.50	1.40	1.46
59	d	101	LMN	OBX-CCJ	2.46	1.48	1.41
51	H	401	UQ9	C26-C24	2.45	1.56	1.51
50	F	500	FMN	C10-N1	2.44	1.38	1.33
51	H	401	UQ9	C16-C14	2.43	1.56	1.51
53	v	201	PC7	O3-C11	2.43	1.40	1.33
51	H	401	UQ9	C21-C19	2.42	1.56	1.51
58	n	200	8Q1	C1-S44	2.41	1.82	1.76
58	W	200	8Q1	C1-S44	2.40	1.81	1.76
60	z	301	PSF	O52-C5	2.38	1.40	1.33
53	M	501	PC7	O3-C11	2.36	1.40	1.33
52	N	502	PTY	O4-C30	2.36	1.40	1.33
52	H	402	PTY	O4-C30	2.36	1.40	1.33
52	M	502	PTY	O4-C30	2.35	1.40	1.33
61	z	302	T7X	O18-C11	2.34	1.40	1.33
59	d	101	LMN	C3-C4	-2.34	1.46	1.52
52	N	502	PTY	O7-C6	-2.32	1.40	1.46
61	z	302	T7X	O16-C10	2.31	1.40	1.34
56	P	500	NDP	C7N-N7N	2.28	1.39	1.33
52	M	502	PTY	O4-C1	-2.27	1.40	1.45
53	M	501	PC7	O3-C3	-2.27	1.40	1.45
59	d	101	LMN	CBQ-CCM	2.27	1.58	1.54
51	H	401	UQ9	O4-C4M	-2.27	1.40	1.45
61	z	302	T7X	O18-C9	-2.25	1.40	1.45
58	n	200	8Q1	C6-C1	2.23	1.53	1.50
61	z	302	T7X	O16-C8	-2.22	1.41	1.46
52	N	502	PTY	O7-C8	2.22	1.40	1.34
53	v	201	PC7	O3-C3	-2.21	1.40	1.45
52	H	402	PTY	O4-C1	-2.21	1.40	1.45
58	n	200	8Q1	O35-C34	-2.21	1.19	1.23
58	W	200	8Q1	O35-C34	-2.20	1.19	1.23
54	N	501	PGT	P-O3P	2.19	1.68	1.59
52	N	502	PTY	O4-C1	-2.16	1.40	1.45
56	P	500	NDP	C2A-N1A	2.15	1.37	1.33
60	z	301	PSF	O52-C4	-2.15	1.40	1.45
51	H	401	UQ9	C6-C5	2.15	1.52	1.46
58	n	200	8Q1	O40-C39	-2.15	1.18	1.23

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
58	W	200	8Q1	O40-C39	-2.14	1.18	1.23
53	M	501	PC7	O2-C31	2.12	1.40	1.34
53	v	201	PC7	O2-C31	2.12	1.40	1.34
52	H	402	PTY	O7-C8	2.12	1.40	1.34
60	z	301	PSF	O11-C1	2.12	1.40	1.34
59	d	101	LMN	O5-C5	2.09	1.49	1.44
51	H	401	UQ9	O5-C5	-2.07	1.18	1.23
58	W	200	8Q1	C6-C1	2.07	1.53	1.50
52	M	502	PTY	O7-C8	2.07	1.40	1.34
51	H	401	UQ9	C17-C18	2.05	1.57	1.50
59	d	101	LMN	CBQ-CBK	2.04	1.59	1.52
51	H	401	UQ9	O3-C3M	-2.01	1.40	1.45

All (60) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
56	P	500	NDP	PN-O3-PA	-7.00	108.80	132.83
58	n	200	8Q1	C6-C1-S44	5.39	119.73	113.46
58	W	200	8Q1	C6-C1-S44	5.30	119.63	113.46
51	H	401	UQ9	C7-C8-C9	-4.64	119.07	126.79
61	z	302	T7X	O16-C10-C12	4.28	120.72	111.50
53	M	501	PC7	O2-C31-C32	4.21	120.58	111.50
53	v	201	PC7	O2-C31-C32	4.04	120.20	111.50
52	H	402	PTY	O7-C8-C11	3.99	120.09	111.50
60	z	301	PSF	O11-C1-C13	3.90	119.90	111.50
52	M	502	PTY	O7-C8-C11	3.89	119.89	111.50
54	N	501	PGT	O2-C31-C32	3.89	119.88	111.50
59	d	101	LMN	CCR-O4-C4	-3.87	108.39	117.96
52	N	502	PTY	O7-C8-C11	3.85	119.79	111.50
56	P	500	NDP	O2B-P2B-O1X	-3.39	96.31	109.39
58	W	200	8Q1	O4-C1-C6	-3.34	120.04	123.99
51	H	401	UQ9	C12-C13-C14	-3.30	119.71	127.66
56	P	500	NDP	PA-O5B-C5B	-3.16	103.13	121.68
58	n	200	8Q1	O4-C1-C6	-3.15	120.27	123.99
50	F	500	FMN	C4-N3-C2	-3.13	119.85	125.64
59	d	101	LMN	CCS-OCB-CCQ	-3.13	110.21	117.96
51	H	401	UQ9	C25-C24-C26	3.03	120.37	115.27
51	H	401	UQ9	C17-C18-C19	-3.02	120.39	127.66
56	P	500	NDP	PN-O5D-C5D	-3.01	104.04	121.68
59	d	101	LMN	OBX-CCF-CCQ	2.83	115.72	109.75
50	F	500	FMN	C4A-C4-N3	2.70	120.04	113.19
52	M	502	PTY	O4-C30-C31	2.69	120.36	111.91

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
51	H	401	UQ9	C20-C19-C21	2.67	119.77	115.27
53	M	501	PC7	O3-C11-C12	2.65	120.24	111.91
52	N	502	PTY	O4-C30-C31	2.62	120.12	111.91
51	H	401	UQ9	C22-C23-C24	-2.61	121.36	127.66
50	F	500	FMN	O4-C4-C4A	-2.59	119.73	126.60
52	H	402	PTY	O4-C30-C31	2.57	119.98	111.91
60	z	301	PSF	O52-C5-C6	2.57	119.97	111.91
51	H	401	UQ9	C15-C14-C16	2.56	119.58	115.27
59	d	101	LMN	CCJ-OBX-CCF	2.56	118.71	113.69
56	P	500	NDP	O3X-P2B-O2X	2.56	117.42	107.64
58	W	200	8Q1	C43-S44-C1	2.55	109.80	101.87
61	z	302	T7X	O18-C11-C31	2.54	119.87	111.91
51	H	401	UQ9	C27-C26-C24	-2.52	110.49	114.62
53	v	201	PC7	O3-C11-C12	2.46	119.61	111.91
54	N	501	PGT	O3-C11-C12	2.38	119.37	111.91
50	F	500	FMN	C4A-C10-N10	2.38	119.95	116.48
56	P	500	NDP	O5D-PN-O1N	-2.37	99.81	109.07
56	P	500	NDP	C5B-C4B-C3B	-2.36	106.32	115.18
56	P	500	NDP	C2A-N1A-C6A	-2.35	114.73	118.75
51	H	401	UQ9	C10-C9-C11	2.35	119.22	115.27
56	P	500	NDP	O2N-PN-O1N	2.32	123.73	112.24
56	P	500	NDP	O4B-C4B-C3B	2.25	109.57	105.11
58	W	200	8Q1	C38-C39-N41	2.25	120.20	116.42
51	H	401	UQ9	C8-C7-C6	2.23	118.05	112.05
50	F	500	FMN	C9A-C5A-N5	-2.22	120.02	122.43
59	d	101	LMN	OBX-CCJ-CCL	2.21	115.02	110.35
50	F	500	FMN	C5A-C9A-N10	2.21	120.23	117.95
50	F	500	FMN	C4A-C10-N1	-2.16	119.71	124.73
58	n	200	8Q1	C43-S44-C1	2.16	108.59	101.87
50	F	500	FMN	C10-C4A-N5	-2.13	120.34	124.86
61	z	302	T7X	C12-C13-C14	-2.09	109.50	113.23
58	n	200	8Q1	O4-C1-S44	-2.01	120.00	122.61
56	P	500	NDP	C5D-C4D-C3D	-2.01	107.65	115.18
56	P	500	NDP	O2A-PA-O1A	2.00	122.14	112.24

There are no chirality outliers.

All (263) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
50	F	500	FMN	N10-C1'-C2'-O2'
50	F	500	FMN	N10-C1'-C2'-C3'
50	F	500	FMN	C5'-O5'-P-O1P

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
51	H	401	UQ9	C25-C24-C26-C27
51	H	401	UQ9	C23-C24-C26-C27
51	H	401	UQ9	C12-C11-C9-C10
51	H	401	UQ9	C12-C11-C9-C8
52	H	402	PTY	C2-C3-O11-P1
52	H	402	PTY	C5-O14-P1-O12
52	M	502	PTY	N1-C2-C3-O11
52	M	502	PTY	C11-C8-O7-C6
52	M	502	PTY	C3-O11-P1-O12
52	M	502	PTY	C3-O11-P1-O13
52	M	502	PTY	C5-O14-P1-O13
52	N	502	PTY	O10-C8-O7-C6
53	v	201	PC7	C32-C31-O2-C2
53	v	201	PC7	C1-O3P-P-O4P
53	v	201	PC7	C4-O4P-P-O3P
53	v	201	PC7	C4-O4P-P-O1P
53	v	201	PC7	C4-O4P-P-O2P
53	v	201	PC7	O4P-C4-C5-N
54	N	501	PGT	C32-C31-O2-C2
54	N	501	PGT	C1-O3P-P-O1P
54	N	501	PGT	C1-O3P-P-O2P
54	N	501	PGT	C4-O4P-P-O1P
56	P	500	NDP	C5D-O5D-PN-O1N
58	W	200	8Q1	O4-C1-C6-C7
58	W	200	8Q1	S44-C1-C6-C7
58	W	200	8Q1	O4-C1-S44-C43
58	W	200	8Q1	C6-C1-S44-C43
58	W	200	8Q1	O27-C28-C29-C31
58	W	200	8Q1	O27-C28-C29-C32
58	W	200	8Q1	C28-C29-C32-C34
58	W	200	8Q1	C28-C29-C32-O33
58	W	200	8Q1	C30-C29-C32-C34
58	W	200	8Q1	C30-C29-C32-O33
58	W	200	8Q1	C31-C29-C32-C34
58	W	200	8Q1	C31-C29-C32-O33
58	W	200	8Q1	O33-C32-C34-N36
58	W	200	8Q1	N41-C42-C43-S44
58	n	200	8Q1	O4-C1-S44-C43
58	n	200	8Q1	C6-C1-S44-C43
58	n	200	8Q1	O27-C28-C29-C31
58	n	200	8Q1	O27-C28-C29-C32
58	n	200	8Q1	C42-C43-S44-C1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
58	n	200	8Q1	C28-O27-P24-O3
58	n	200	8Q1	C28-O27-P24-O2
58	n	200	8Q1	C28-O27-P24-O1
59	d	101	LMN	C2-C1-O1-CBS
59	d	101	LMN	O5-C1-O1-CBS
59	d	101	LMN	CBK-CBQ-CCM-CBR
59	d	101	LMN	CBK-CBQ-CCM-CBS
59	d	101	LMN	CBK-CBQ-CCM-CBT
59	d	101	LMN	OBV-CBT-CCM-CBQ
59	d	101	LMN	OBV-CBT-CCM-CBR
59	d	101	LMN	OBX-CCJ-OBV-CBT
59	d	101	LMN	CCL-CCJ-OBV-CBT
60	z	301	PSF	CB-O1-P-O2
60	z	301	PSF	CB-O1-P-O4
60	z	301	PSF	CB-O1-P-O3
60	z	301	PSF	N-CA-CB-O1
60	z	301	PSF	C-CA-CB-O1
61	z	302	T7X	C12-C10-O16-C8
52	M	502	PTY	C31-C30-O4-C1
53	M	501	PC7	C12-C11-O3-C3
52	M	502	PTY	O30-C30-O4-C1
53	M	501	PC7	O11-C11-O3-C3
59	d	101	LMN	OBZ-CCS-OCB-CCQ
52	M	502	PTY	O10-C8-O7-C6
53	v	201	PC7	O31-C31-O2-C2
54	N	501	PGT	O31-C31-O2-C2
61	z	302	T7X	O17-C10-O16-C8
59	d	101	LMN	CCW-CCS-OCB-CCQ
52	N	502	PTY	C11-C8-O7-C6
56	P	500	NDP	O4D-C1D-N1N-C6N
59	d	101	LMN	OAJ-CBN-CCD-OBZ
56	P	500	NDP	O4B-C4B-C5B-O5B
51	H	401	UQ9	C9-C11-C12-C13
59	d	101	LMN	OAJ-CBN-CCD-CCO
59	d	101	LMN	CBI-CBK-CBQ-CCM
60	z	301	PSF	C13-C1-O11-C3
59	d	101	LMN	OBV-CBT-CCM-CBS
61	z	302	T7X	C11-C31-C32-C33
59	d	101	LMN	O5-C5-C6-O6
53	v	201	PC7	C11-C12-C13-C14
51	H	401	UQ9	C19-C21-C22-C23
52	H	402	PTY	C5-O14-P1-O11

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
52	M	502	PTY	C3-O11-P1-O14
54	N	501	PGT	C1-O3P-P-O4P
54	N	501	PGT	C4-O4P-P-O3P
59	d	101	LMN	CBJ-CBL-CBR-CCM
60	z	301	PSF	O12-C1-O11-C3
54	N	501	PGT	C31-C32-C33-C34
52	H	402	PTY	C33-C34-C35-C36
53	v	201	PC7	C18-C19-C20-C21
53	v	201	PC7	C20-C21-C22-C23
58	W	200	8Q1	O27-C28-C29-C30
58	n	200	8Q1	O27-C28-C29-C30
52	M	502	PTY	C22-C23-C24-C25
53	M	501	PC7	C43-C44-C45-C46
54	N	501	PGT	C17-C18-C19-C20
51	H	401	UQ9	C24-C26-C27-C28
52	M	502	PTY	C19-C20-C21-C22
53	M	501	PC7	C18-C19-C20-C21
53	M	501	PC7	C13-C14-C15-C16
53	v	201	PC7	C34-C35-C36-C37
61	z	302	T7X	O13-C7-C8-C9
52	M	502	PTY	C24-C25-C26-C27
53	v	201	PC7	C33-C34-C35-C36
59	d	101	LMN	CBG-CBI-CBK-CBQ
52	H	402	PTY	N1-C2-C3-O11
52	N	502	PTY	C25-C26-C27-C28
54	N	501	PGT	C15-C16-C17-C18
61	z	302	T7X	C31-C11-O18-C9
61	z	302	T7X	C36-C37-C38-C39
52	H	402	PTY	C23-C24-C25-C26
59	d	101	LMN	CBD-CBF-CBH-CBJ
53	v	201	PC7	C19-C20-C21-C22
52	N	502	PTY	C32-C33-C34-C35
54	N	501	PGT	C13-C14-C15-C16
52	H	402	PTY	C11-C12-C13-C14
61	z	302	T7X	O19-C11-O18-C9
61	z	302	T7X	C12-C13-C14-C15
58	W	200	8Q1	C6-C7-C8-C9
58	n	200	8Q1	C12-C13-C14-C15
53	M	501	PC7	C41-C42-C43-C44
58	W	200	8Q1	N36-C37-C38-C39
61	z	302	T7X	C39-C40-C41-C42
52	M	502	PTY	O14-C5-C6-O7

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
58	W	200	8Q1	C11-C10-C9-C8
59	d	101	LMN	CBC-CBE-CBG-CBI
53	v	201	PC7	O2-C2-C3-O3
61	z	302	T7X	C33-C34-C35-C36
60	z	301	PSF	OT1-C-CA-CB
61	z	302	T7X	C32-C33-C34-C35
52	H	402	PTY	C11-C8-O7-C6
52	M	502	PTY	C5-O14-P1-O11
52	N	502	PTY	C3-O11-P1-O14
52	M	502	PTY	O14-C5-C6-C1
53	v	201	PC7	C14-C15-C16-C17
53	v	201	PC7	C17-C18-C19-C20
59	d	101	LMN	OAI-CBM-CCC-OBY
52	N	502	PTY	O4-C1-C6-C5
54	N	501	PGT	C1-C2-C3-O3
60	z	301	PSF	C2-C3-C4-O52
51	H	401	UQ9	C1-C6-C7-C8
52	N	502	PTY	C37-C38-C39-C40
58	W	200	8Q1	O33-C32-C34-O35
56	P	500	NDP	C3B-C4B-C5B-O5B
51	H	401	UQ9	C5-C6-C7-C8
52	N	502	PTY	C1-C6-O7-C8
53	M	501	PC7	C35-C36-C37-C38
53	M	501	PC7	O3P-C1-C2-O2
53	v	201	PC7	O3P-C1-C2-O2
60	z	301	PSF	O11-C3-C4-O52
53	v	201	PC7	C12-C13-C14-C15
53	M	501	PC7	C42-C43-C44-C45
54	N	501	PGT	O4P-C4-C5-C6
53	M	501	PC7	C15-C16-C17-C18
61	z	302	T7X	C41-C42-C43-C44
52	H	402	PTY	O10-C8-O7-C6
53	v	201	PC7	C1-C2-C3-O3
52	N	502	PTY	C11-C12-C13-C14
53	M	501	PC7	C16-C17-C18-C19
61	z	302	T7X	C15-C16-C17-C18
61	z	302	T7X	C19-C20-C21-C22
61	z	302	T7X	C22-C23-C24-C25
53	M	501	PC7	C32-C33-C34-C35
54	N	501	PGT	O4P-C4-C5-O5
52	N	502	PTY	C33-C34-C35-C36
54	N	501	PGT	C16-C17-C18-C19

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
53	M	501	PC7	C20-C21-C22-C23
52	H	402	PTY	C14-C15-C16-C17
61	z	302	T7X	C40-C41-C42-C43
54	N	501	PGT	O3P-C1-C2-C3
60	z	301	PSF	O2-C2-C3-C4
61	z	302	T7X	C1-O1-P1-O13
61	z	302	T7X	C9-C8-O16-C10
54	N	501	PGT	C5-C4-O4P-P
52	N	502	PTY	O14-C5-C6-O7
60	z	301	PSF	O2-C2-C3-O11
61	z	302	T7X	O13-C7-C8-O16
54	N	501	PGT	C12-C13-C14-C15
54	N	501	PGT	O2-C2-C3-O3
56	P	500	NDP	C5D-O5D-PN-O3
59	d	101	LMN	O1-CBS-CCM-CBQ
59	d	101	LMN	O1-CBS-CCM-CBR
53	v	201	PC7	C38-C39-C40-C41
60	z	301	PSF	OT2-C-CA-CB
52	M	502	PTY	C11-C12-C13-C14
52	N	502	PTY	C3-O11-P1-O12
53	v	201	PC7	C1-O3P-P-O1P
52	H	402	PTY	C35-C36-C37-C38
53	v	201	PC7	O3P-C1-C2-C3
52	H	402	PTY	C12-C13-C14-C15
52	N	502	PTY	C2-C3-O11-P1
53	v	201	PC7	C5-C4-O4P-P
52	H	402	PTY	C13-C14-C15-C16
52	M	502	PTY	C33-C34-C35-C36
53	M	501	PC7	O4P-C4-C5-N
59	d	101	LMN	CCM-CBT-OBV-CCJ
52	N	502	PTY	O4-C1-C6-O7
54	N	501	PGT	C35-C36-C37-C38
53	v	201	PC7	C15-C16-C17-C18
53	v	201	PC7	O3-C11-C12-C13
52	N	502	PTY	O14-C5-C6-C1
53	M	501	PC7	O3P-C1-C2-C3
61	z	302	T7X	C38-C39-C40-C41
53	M	501	PC7	C19-C20-C21-C22
54	N	501	PGT	O3P-C1-C2-O2
61	z	302	T7X	O18-C11-C31-C32
52	N	502	PTY	C39-C40-C41-C42
61	z	302	T7X	C7-C8-C9-O18

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
53	v	201	PC7	C41-C42-C43-C44
54	N	501	PGT	O3-C11-C12-C13
52	M	502	PTY	C8-C11-C12-C13
52	M	502	PTY	C37-C38-C39-C40
59	d	101	LMN	CAW-CAY-CBA-CBC
61	z	302	T7X	C25-C26-C27-C28
52	H	402	PTY	C37-C38-C39-C40
53	M	501	PC7	C21-C22-C23-C24
61	z	302	T7X	C13-C14-C15-C16
61	z	302	T7X	C31-C32-C33-C34
53	v	201	PC7	C39-C40-C41-C42
52	M	502	PTY	C25-C26-C27-C28
53	M	501	PC7	C14-C15-C16-C17
52	M	502	PTY	C15-C16-C17-C18
52	N	502	PTY	C31-C30-O4-C1
59	d	101	LMN	CAZ-CBB-CBD-CBF
52	H	402	PTY	C18-C19-C20-C21
59	d	101	LMN	CBB-CBD-CBF-CBH
52	N	502	PTY	O30-C30-O4-C1
54	N	501	PGT	C37-C38-C39-C40
61	z	302	T7X	C16-C17-C18-C19
61	z	302	T7X	C18-C19-C20-C21
61	z	302	T7X	C21-C22-C23-C24
56	P	500	NDP	C4B-C5B-O5B-PA
54	N	501	PGT	O11-C11-O3-C3
58	n	200	8Q1	C13-C14-C15-C16
54	N	501	PGT	C4-C5-C6-O6
54	N	501	PGT	C12-C11-O3-C3
54	N	501	PGT	O5-C5-C6-O6
52	N	502	PTY	C14-C15-C16-C17
52	M	502	PTY	C35-C36-C37-C38
50	F	500	FMN	C5'-O5'-P-O2P
61	z	302	T7X	O16-C10-C12-C13
61	z	302	T7X	C24-C25-C26-C27
52	N	502	PTY	C30-C31-C32-C33
52	M	502	PTY	C12-C11-C8-O7
60	z	301	PSF	O11-C1-C13-C14
54	N	501	PGT	O2-C31-C32-C33
61	z	302	T7X	O17-C10-C12-C13
53	v	201	PC7	C16-C17-C18-C19
59	d	101	LMN	CAY-CBA-CBC-CBE
52	N	502	PTY	C36-C37-C38-C39

Continued on next page...

Continued from previous page...

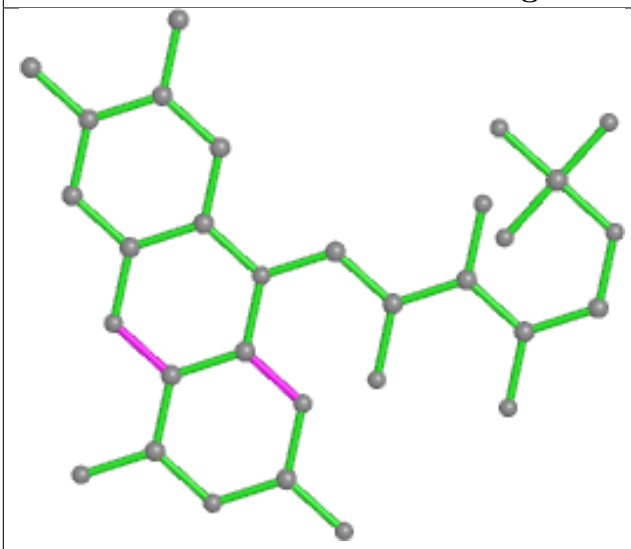
Mol	Chain	Res	Type	Atoms
61	z	302	T7X	C34-C35-C36-C37
52	H	402	PTY	C15-C16-C17-C18
52	M	502	PTY	C12-C11-C8-O10
52	H	402	PTY	C3-O11-P1-O12
53	M	501	PC7	C1-O3P-P-O2P
54	N	501	PGT	O31-C31-C32-C33
60	z	301	PSF	O12-C1-C13-C14
58	W	200	8Q1	C29-C32-C34-O35

There are no ring outliers.

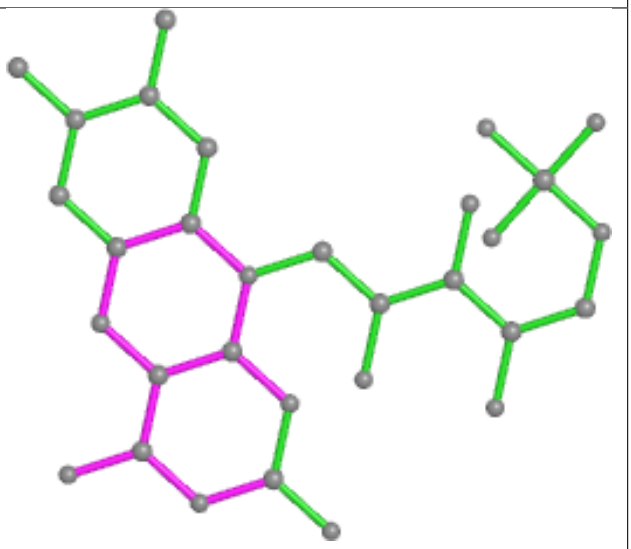
No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

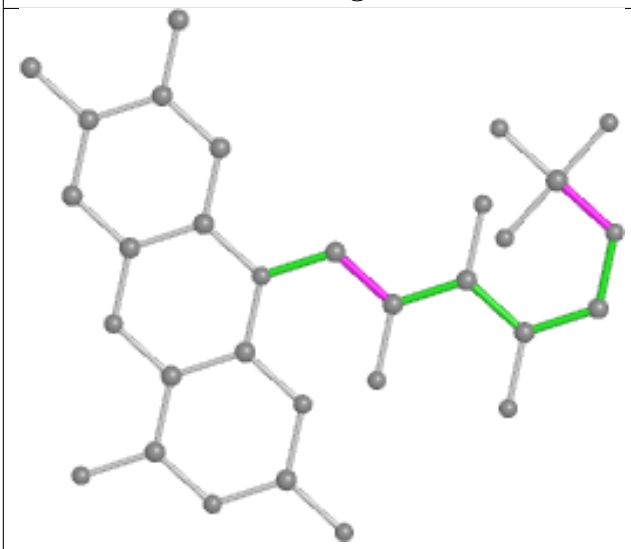
Ligand FMN F 500



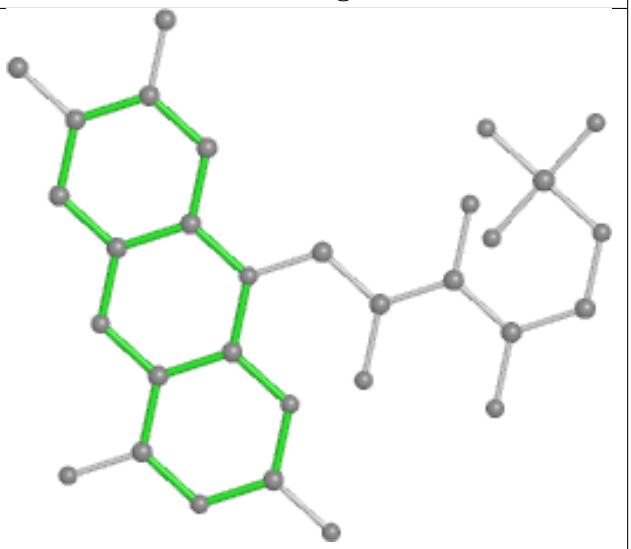
Bond lengths



Bond angles

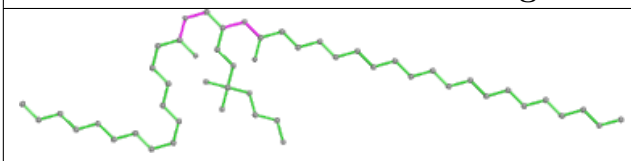


Torsions

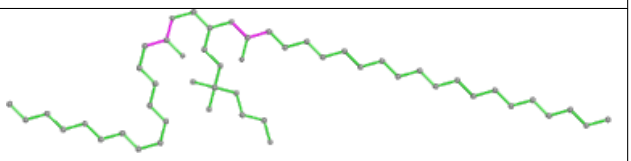


Rings

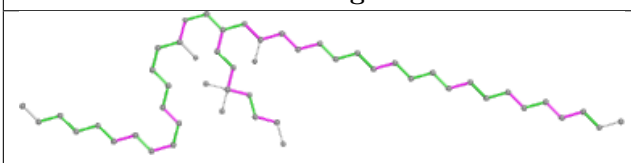
Ligand PTY M 502



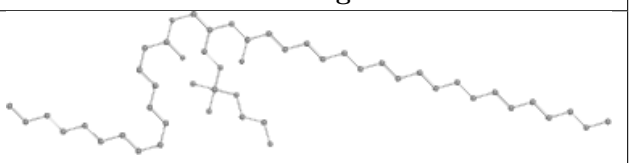
Bond lengths



Bond angles

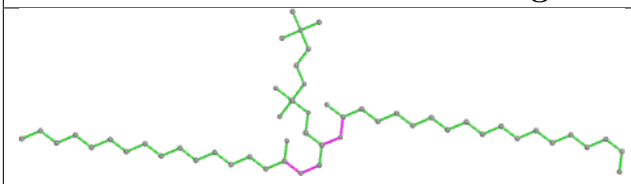


Torsions

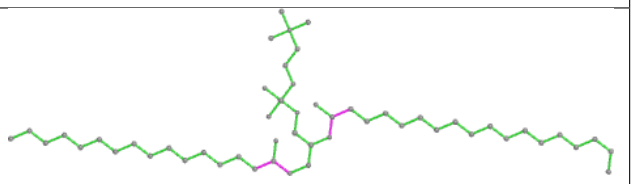


Rings

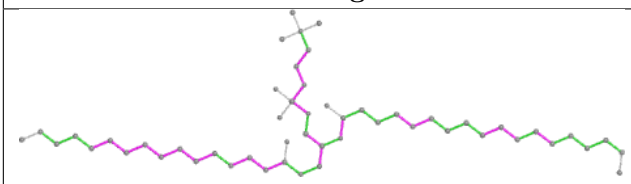
Ligand PC7 v 201



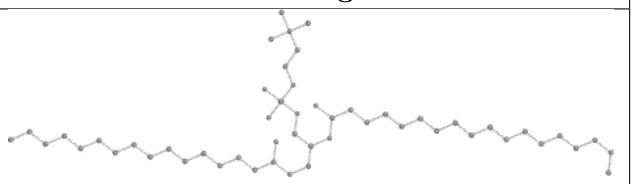
Bond lengths



Bond angles

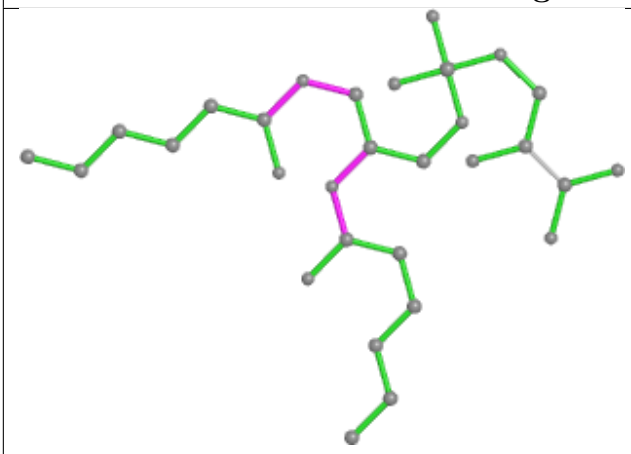


Torsions

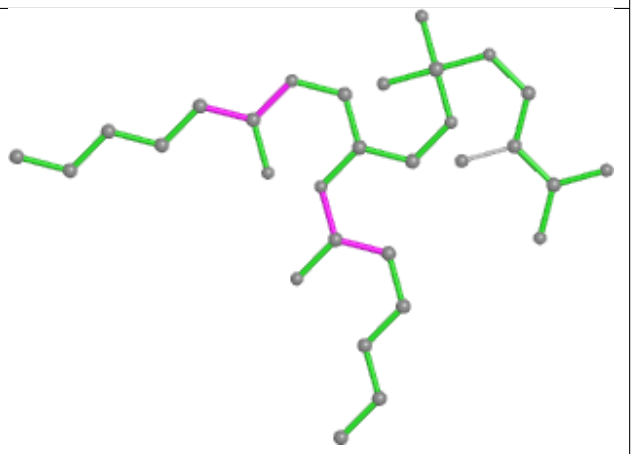


Rings

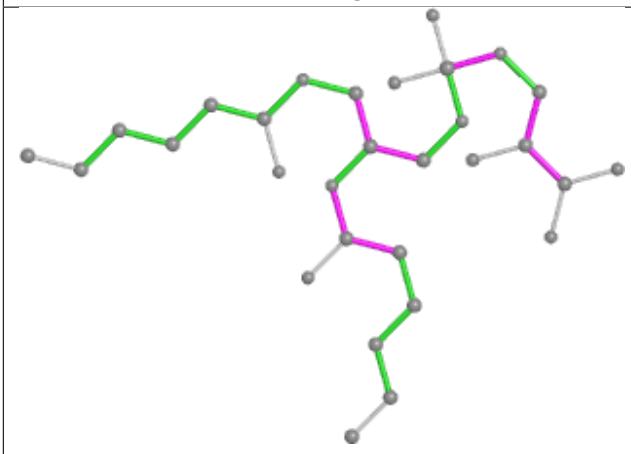
Ligand PSF z 301



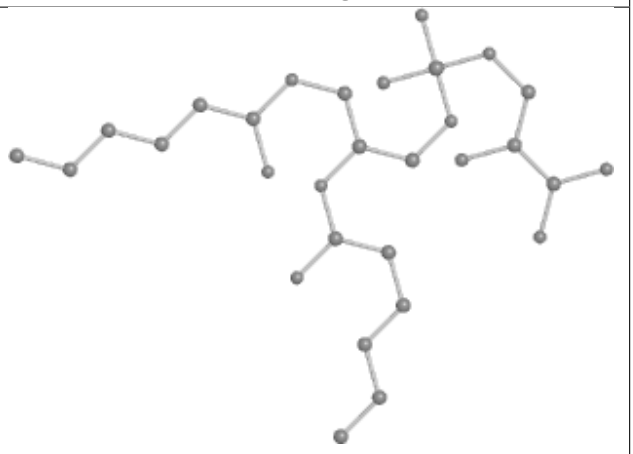
Bond lengths



Bond angles

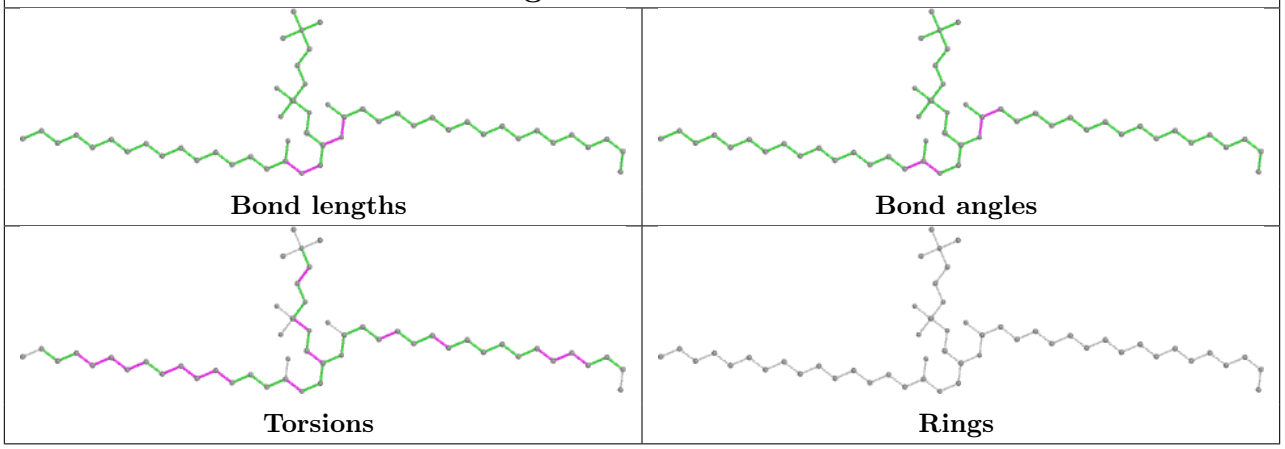


Torsions

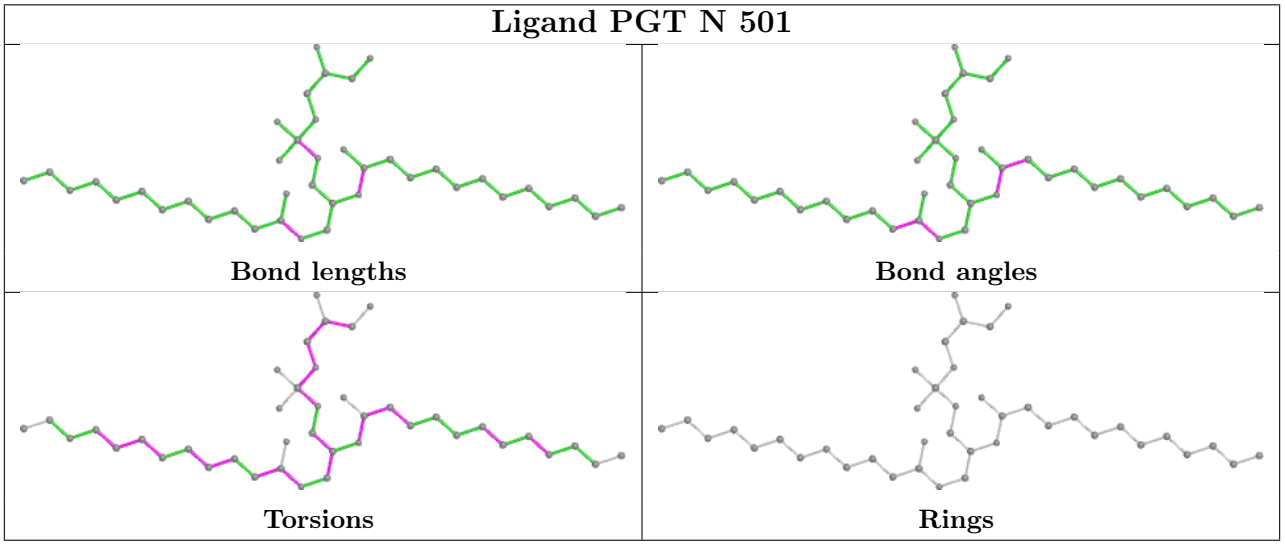


Rings

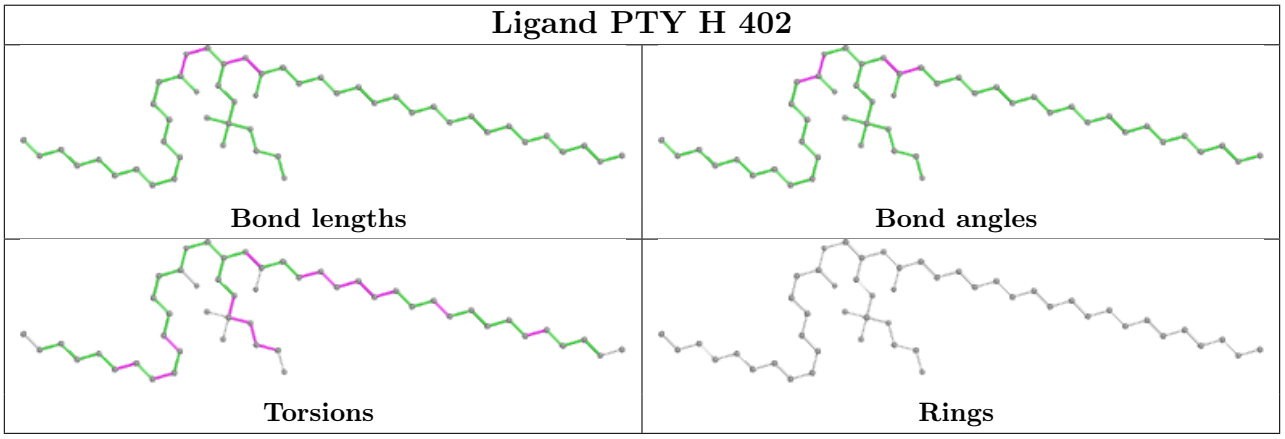
Ligand PC7 M 501



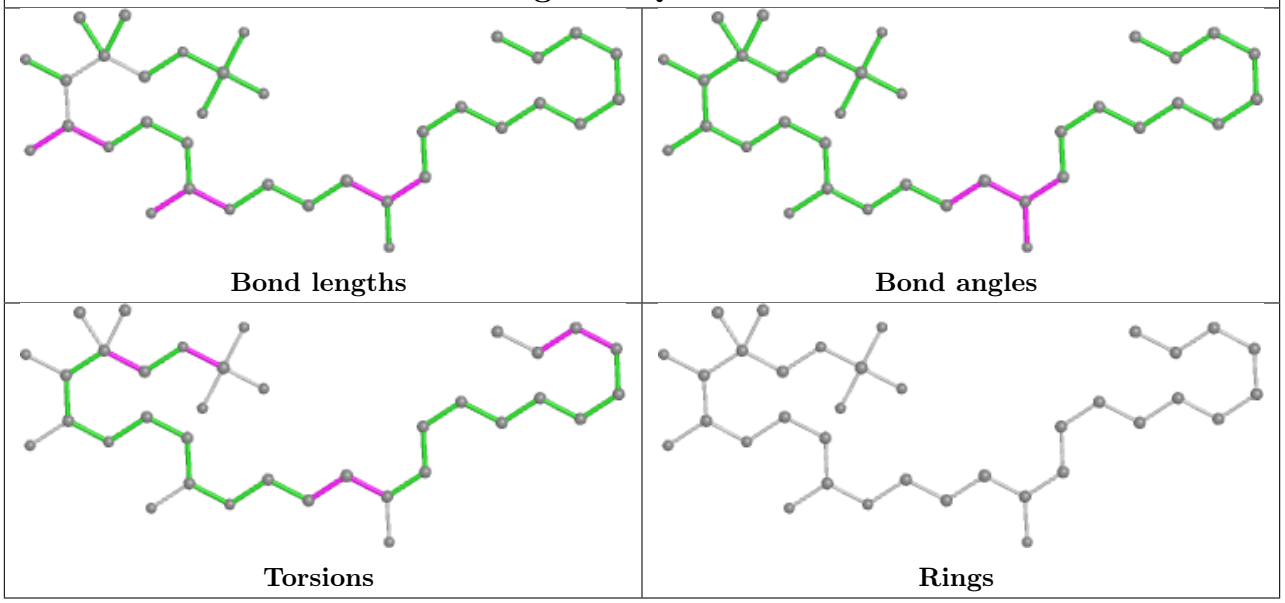
Ligand PGT N 501



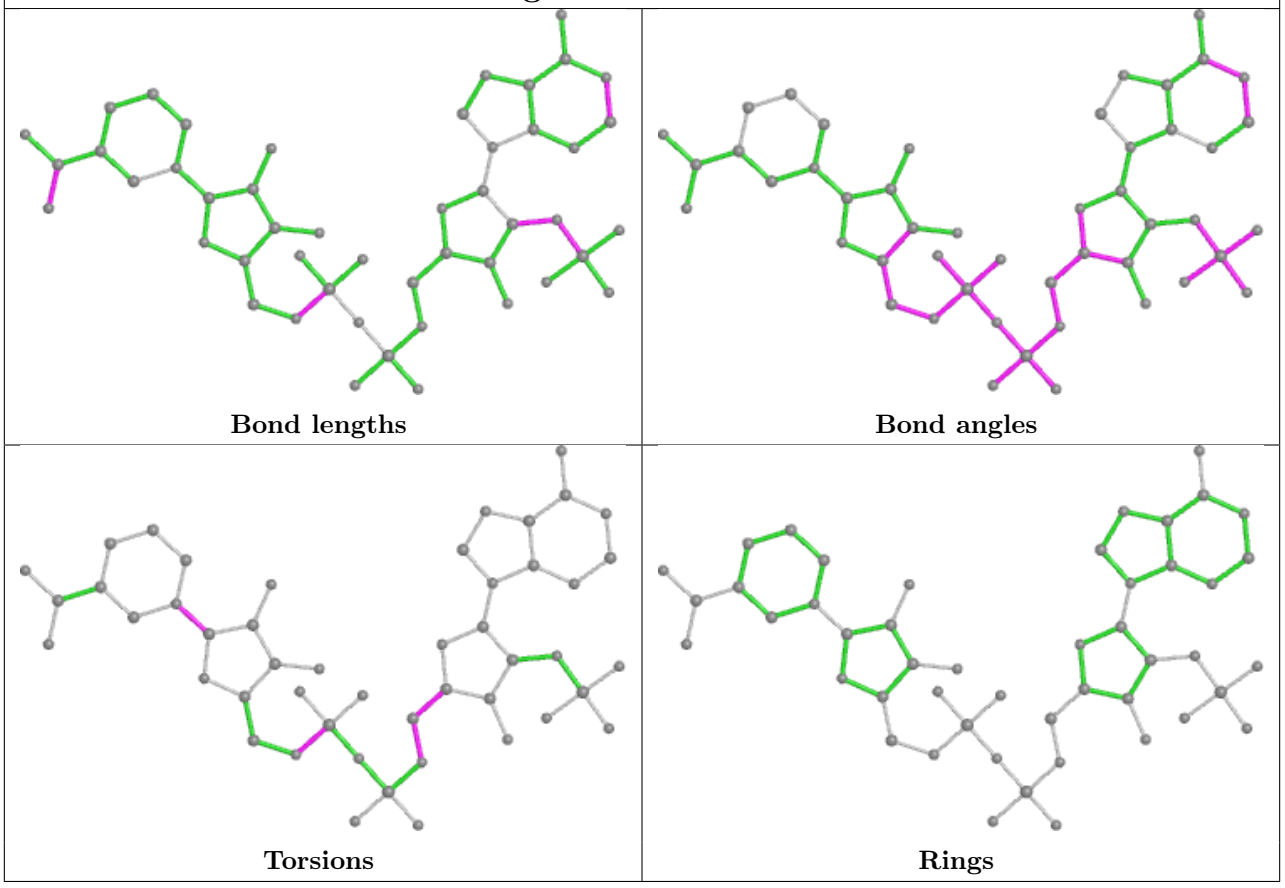
Ligand PTY H 402



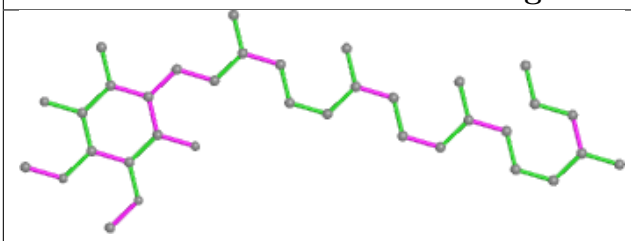
Ligand 8Q1 n 200

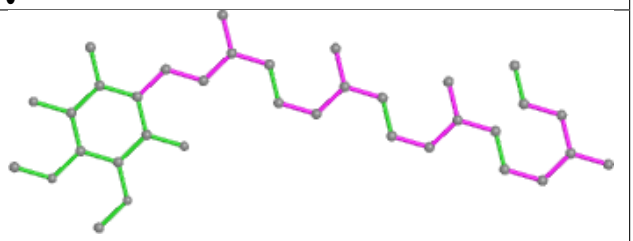


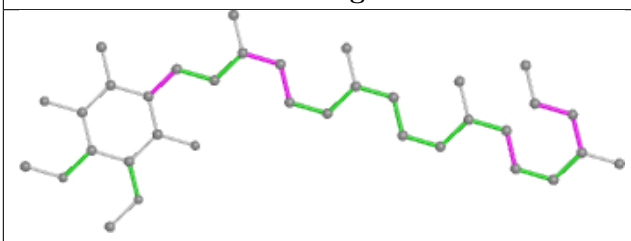
Ligand NDP P 500

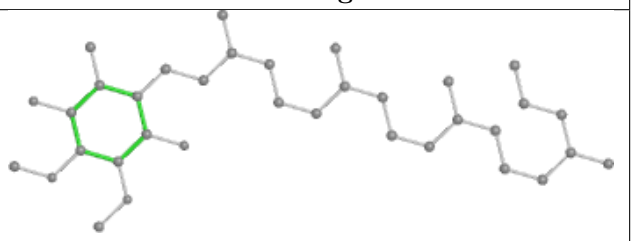


Ligand UQ9 H 401

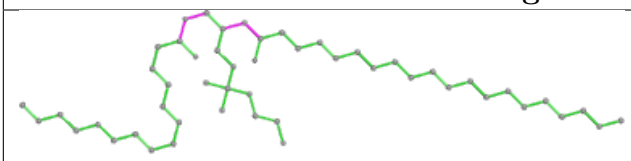

Bond lengths

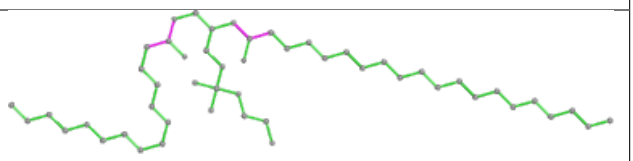

Bond angles

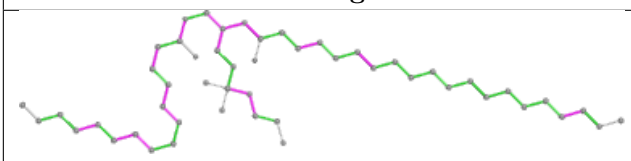

Torsions

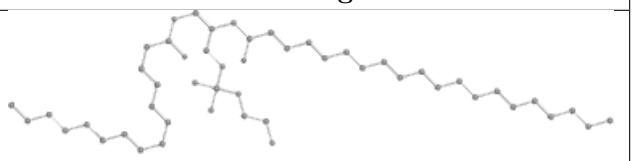

Rings

Ligand PTY N 502

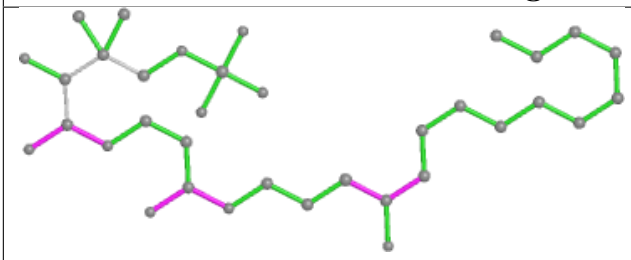

Bond lengths

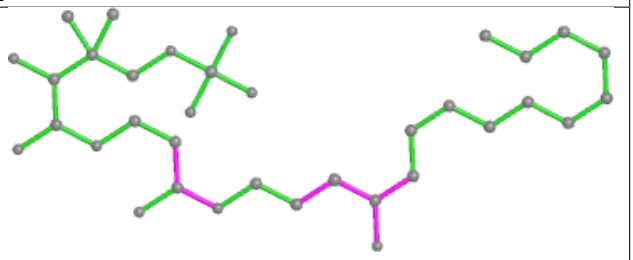

Bond angles

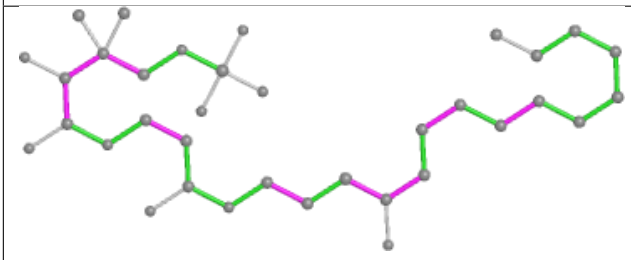

Torsions

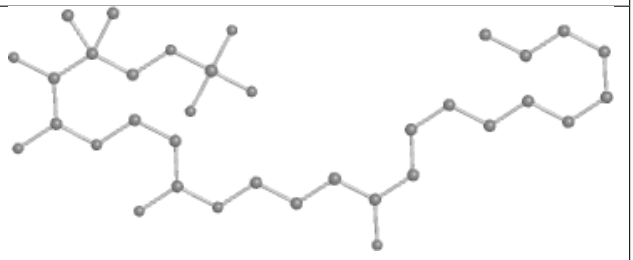

Rings

Ligand 8Q1 W 200

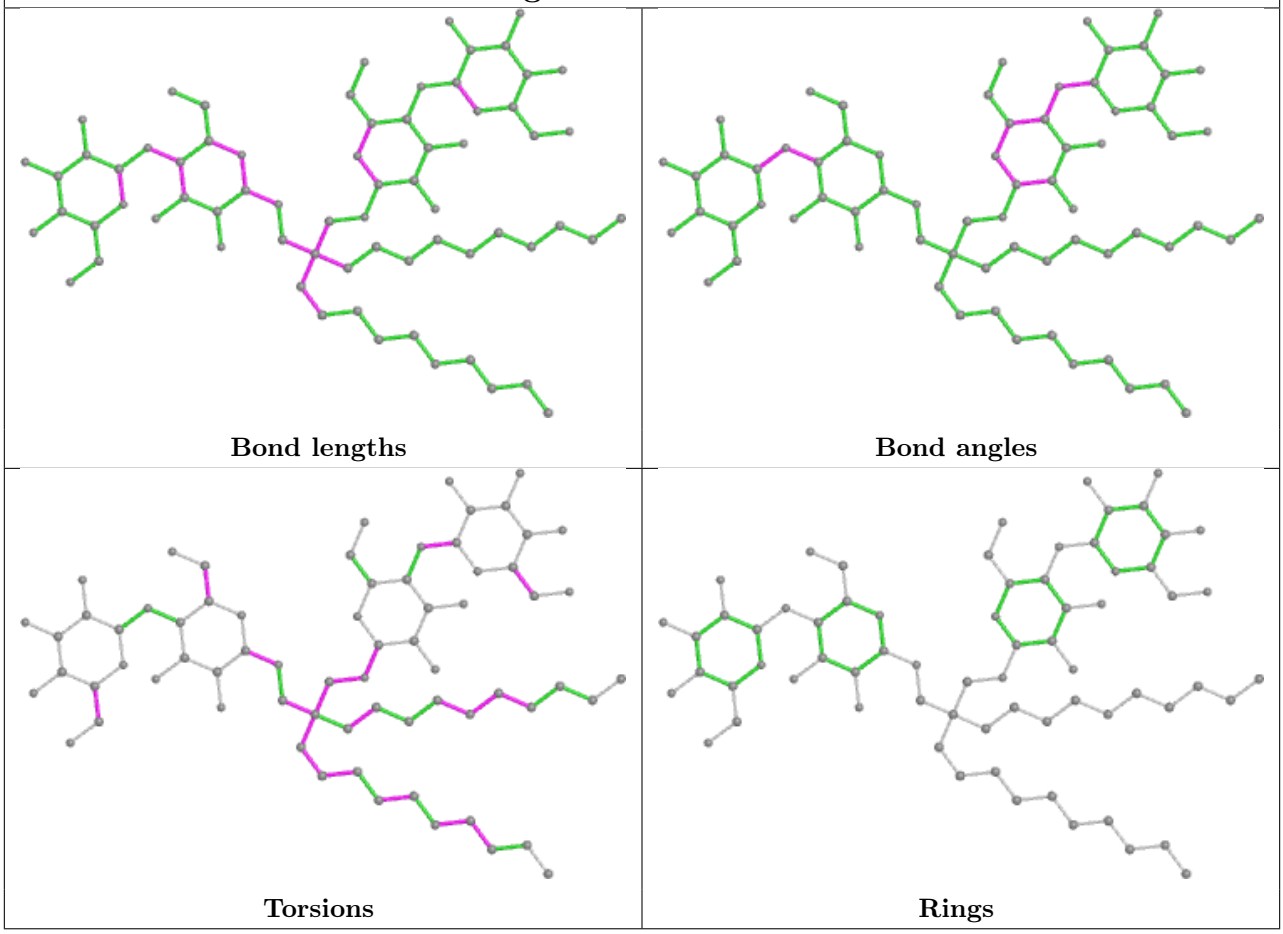

Bond lengths


Bond angles

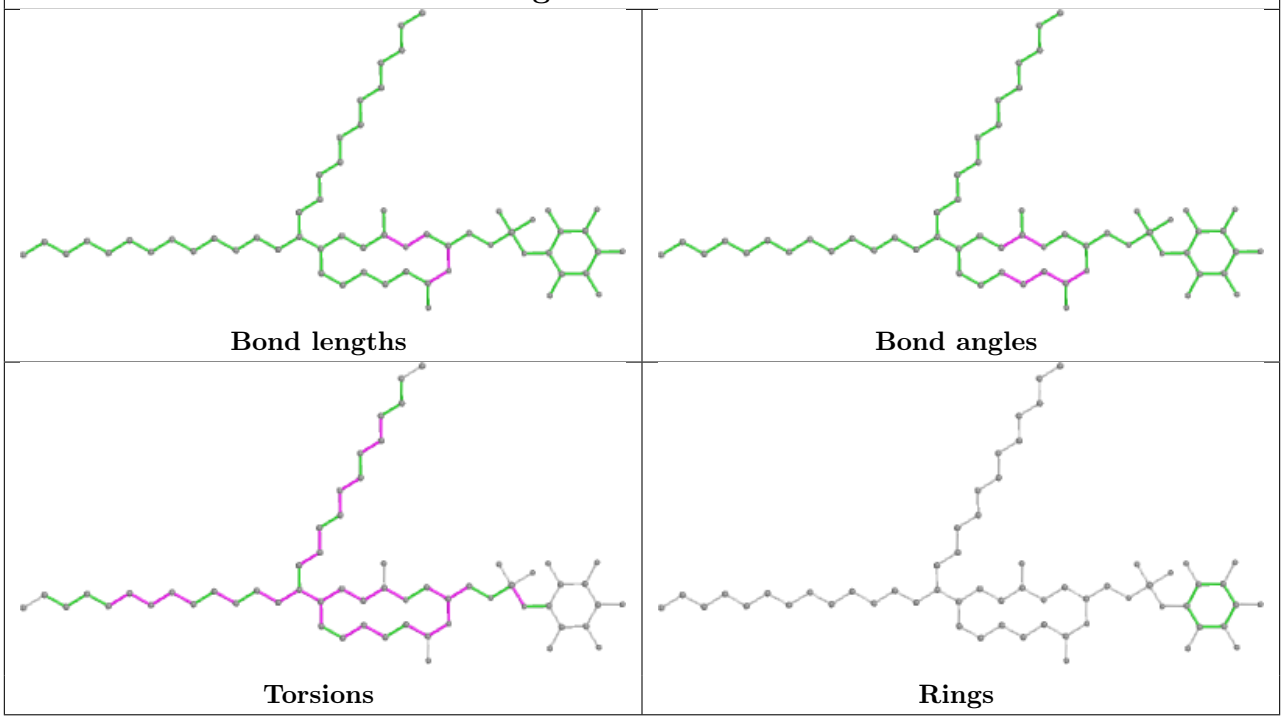

Torsions


Rings

Ligand LMN d 101



Ligand T7X z 302



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.

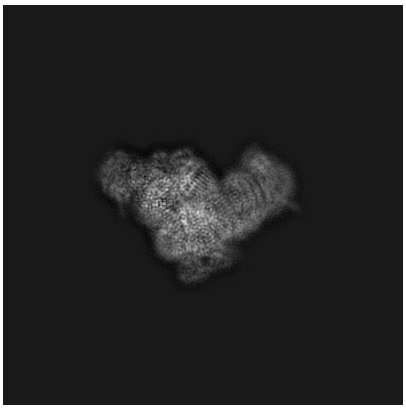
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-11876. These allow visual inspection of the internal detail of the map and identification of artifacts.

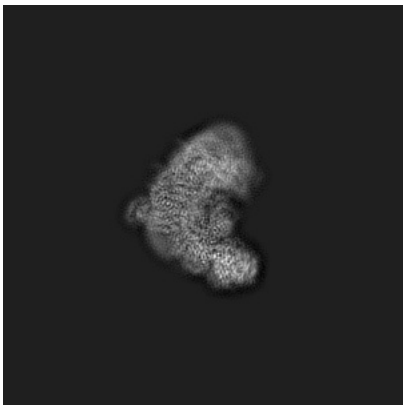
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

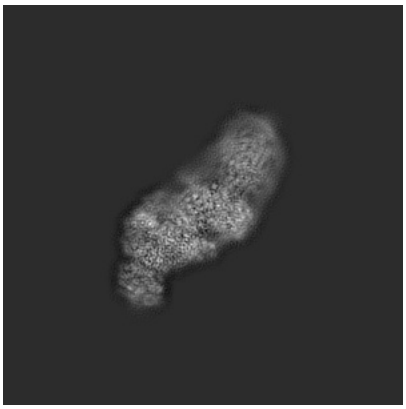
6.1.1 Primary map



X

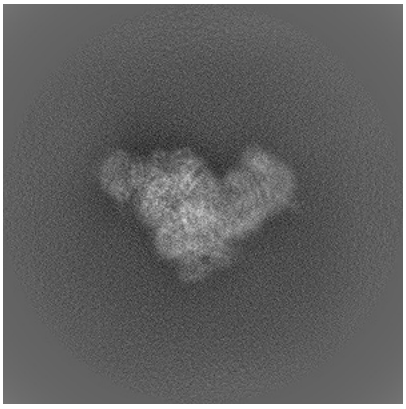


Y

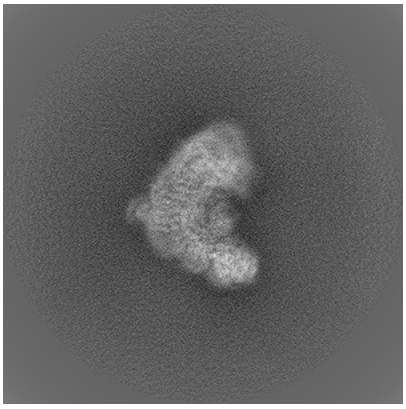


Z

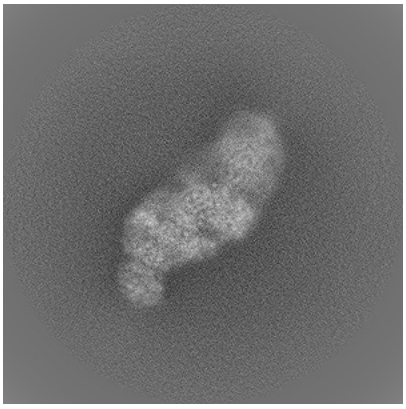
6.1.2 Raw map



X



Y

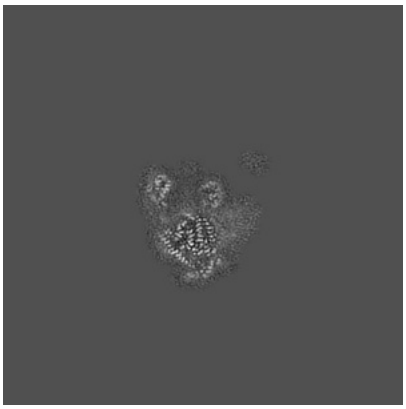


Z

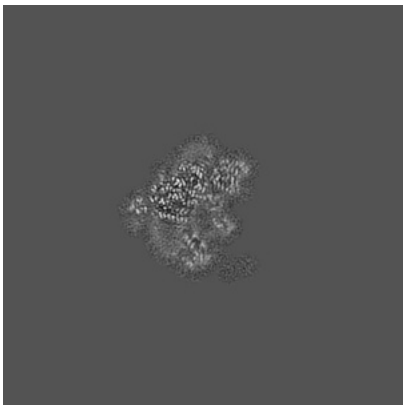
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

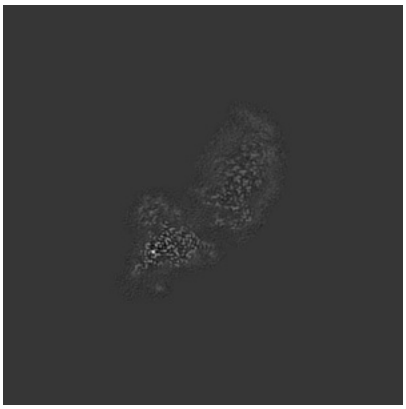
6.2.1 Primary map



X Index: 300

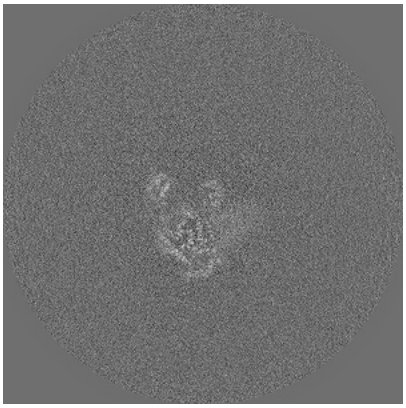


Y Index: 300

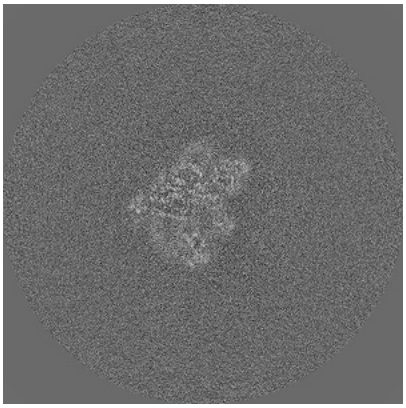


Z Index: 300

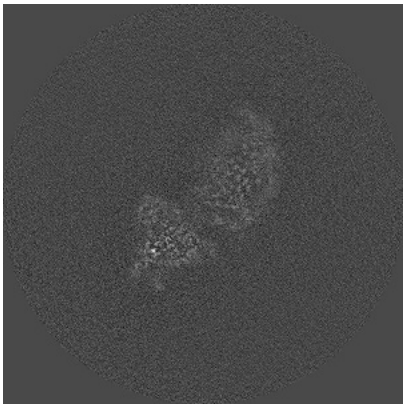
6.2.2 Raw map



X Index: 300



Y Index: 300



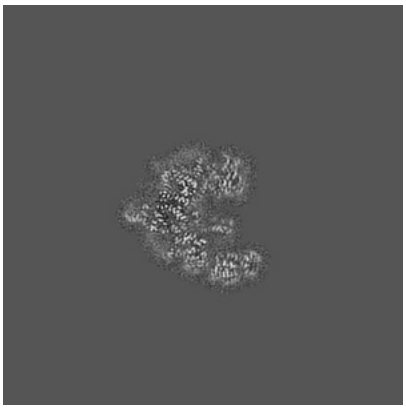
Z Index: 300

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

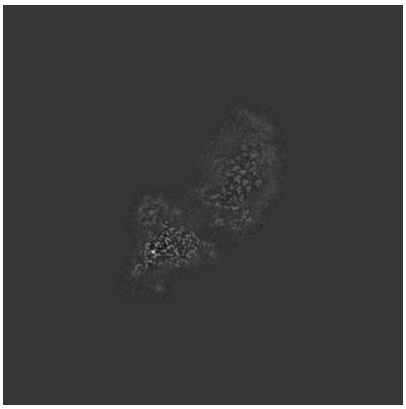
6.3 Largest variance slices (i)

6.3.1 Primary map

X Index: 222

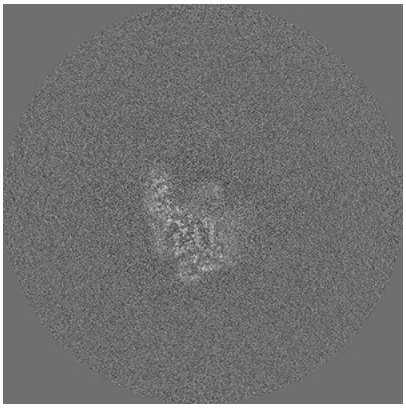


Y Index: 273

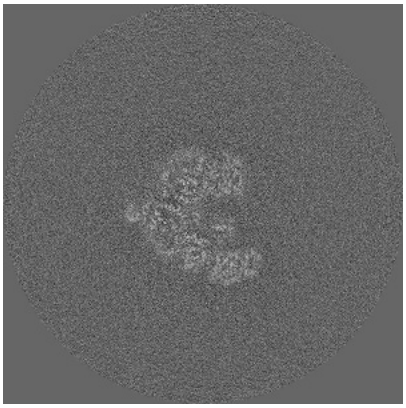


Z Index: 300

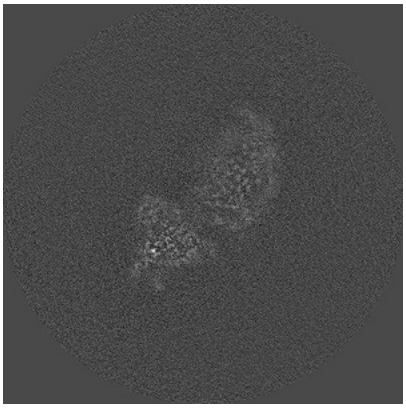
6.3.2 Raw map



X Index: 289



Y Index: 272

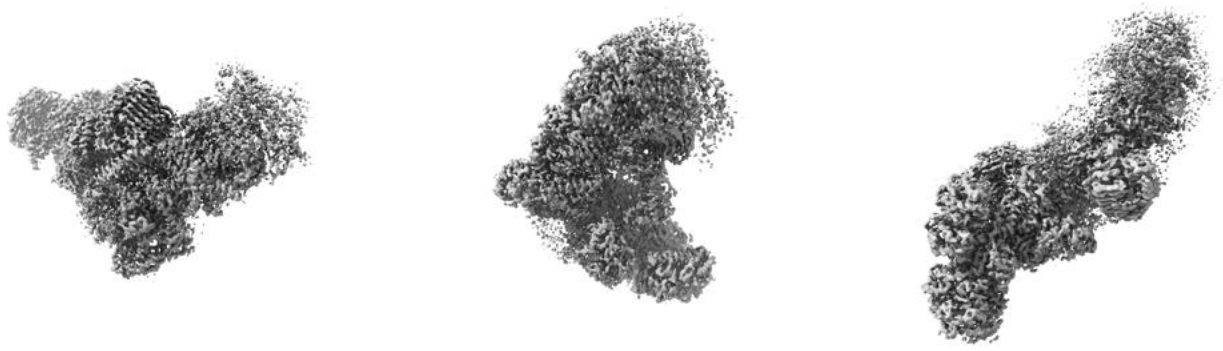


Z Index: 300

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

6.4 Orthogonal surface views (i)

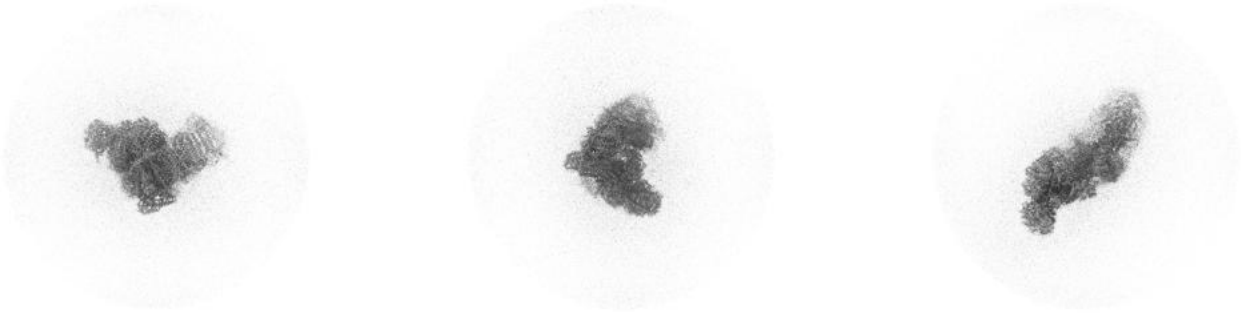
6.4.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.011. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.4.2 Raw map



X Y Z

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

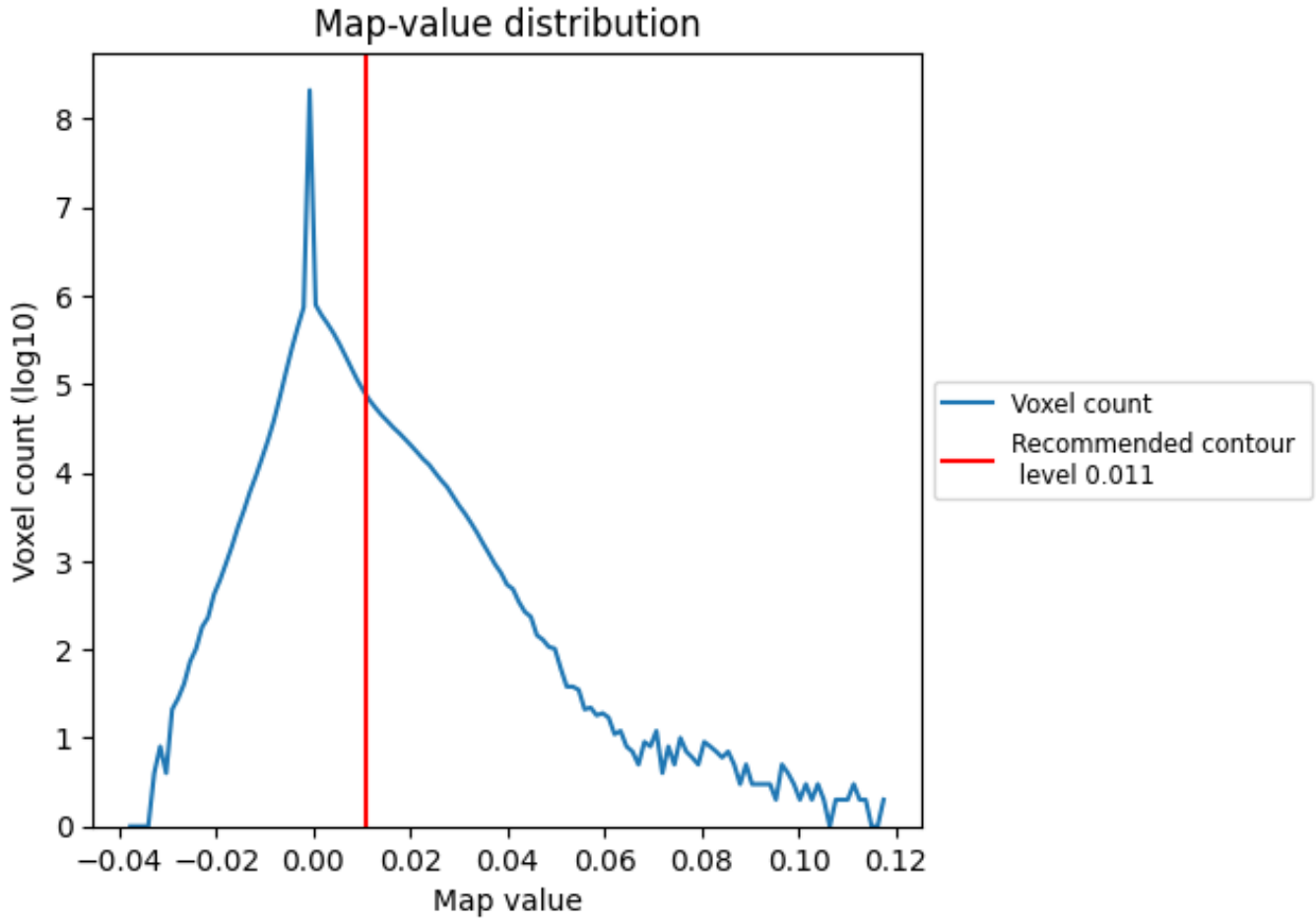
6.5 Mask visualisation (i)

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

7 Map analysis

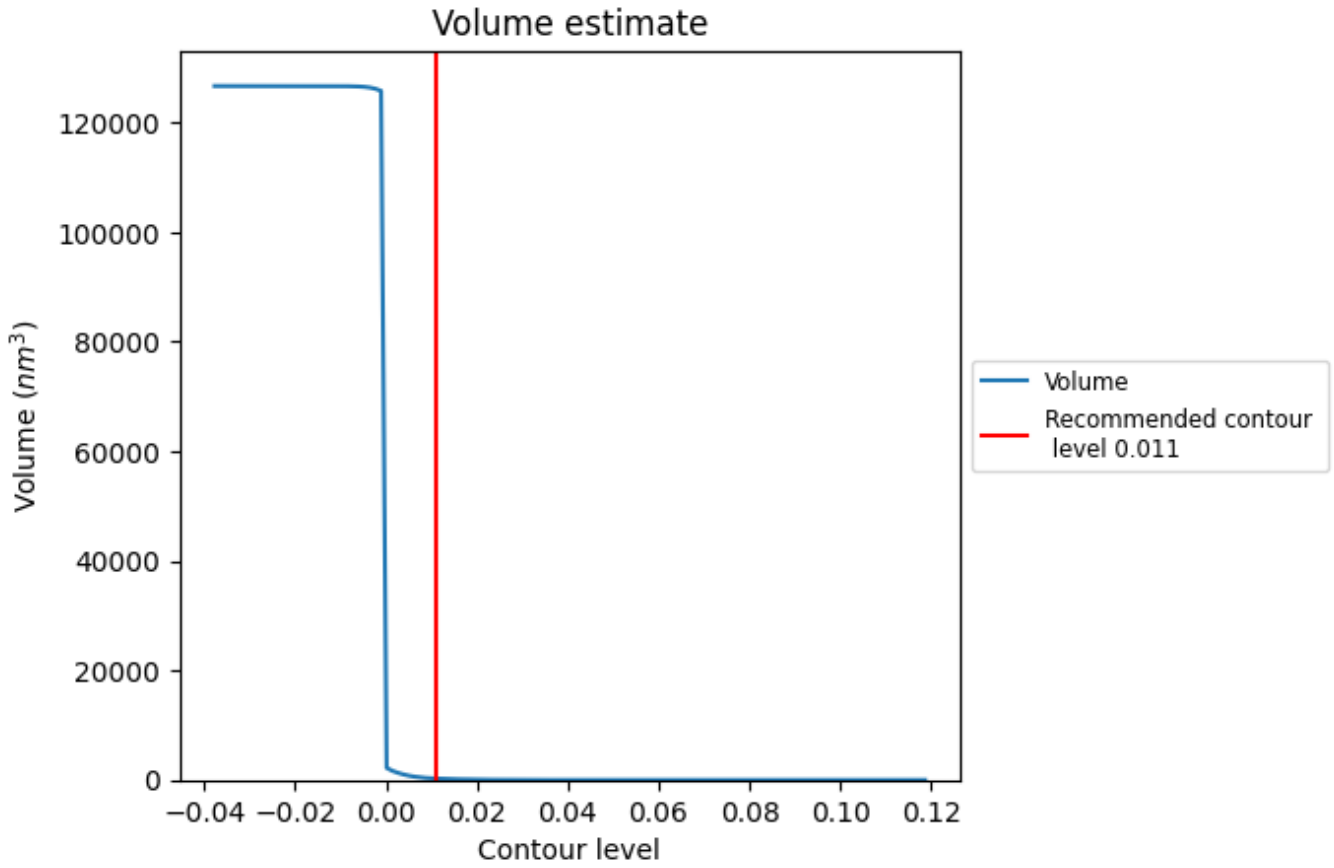
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

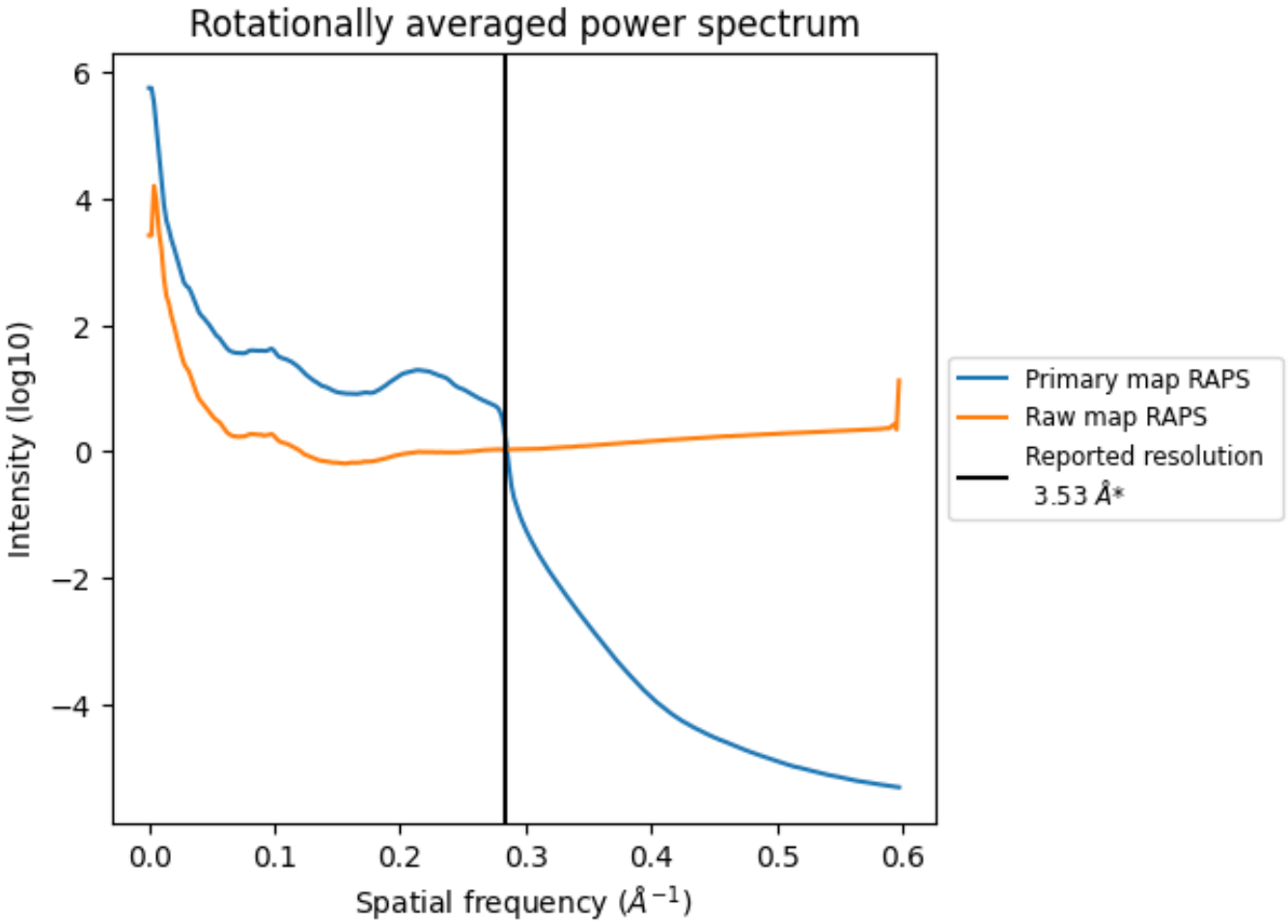
7.2 Volume estimate



The volume at the recommended contour level is 255 nm^3; this corresponds to an approximate mass of 230 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)

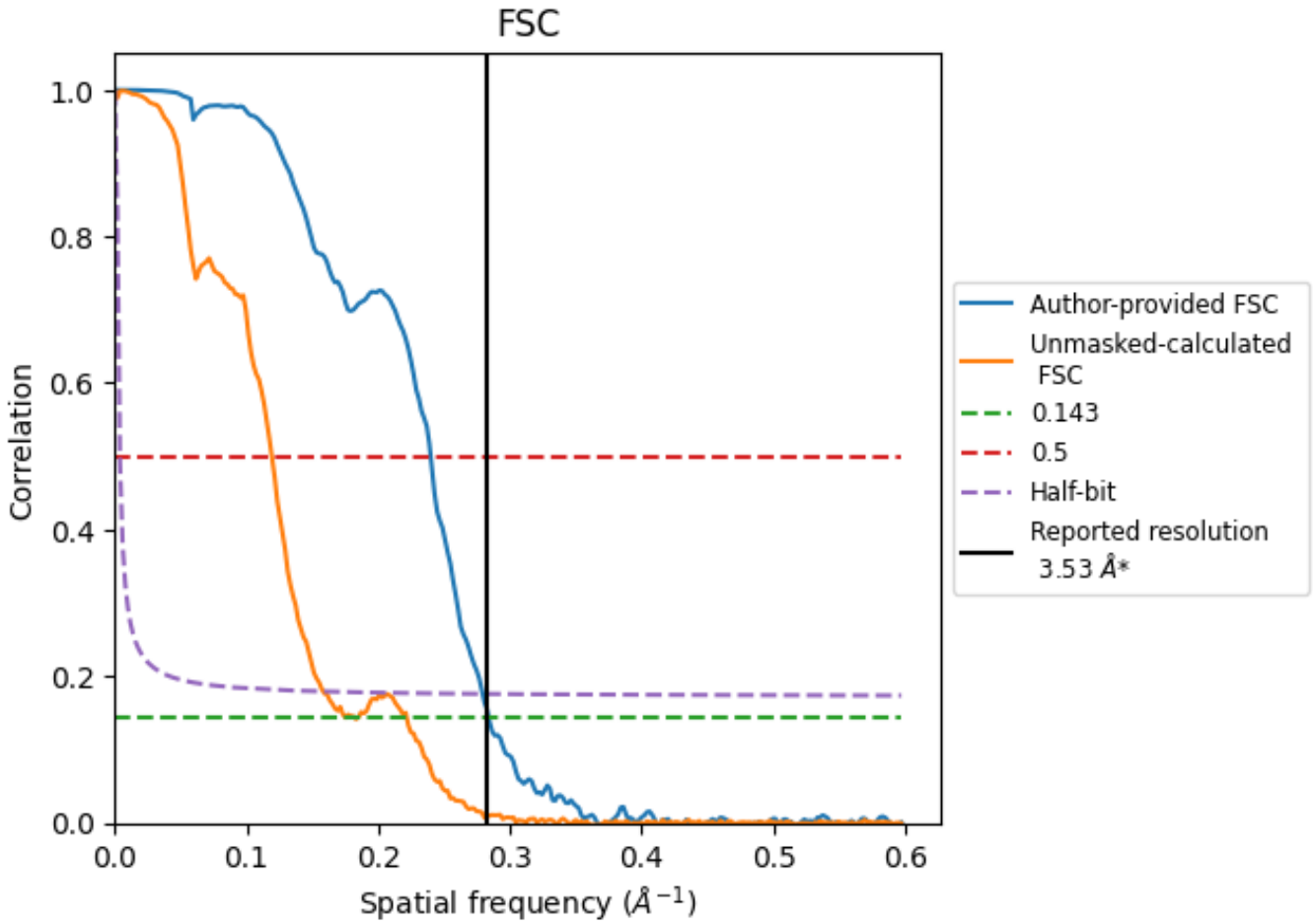


*Reported resolution corresponds to spatial frequency of 0.283 Å^{-1}

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 0.283 Å^{-1}

8.2 Resolution estimates (i)

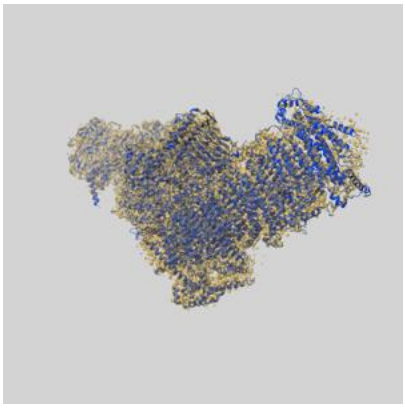
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.53	-	-
Author-provided FSC curve	3.52	4.17	3.58
Unmasked-calculated*	5.48	8.38	6.31

*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 5.48 differs from the reported value 3.53 by more than 10 %

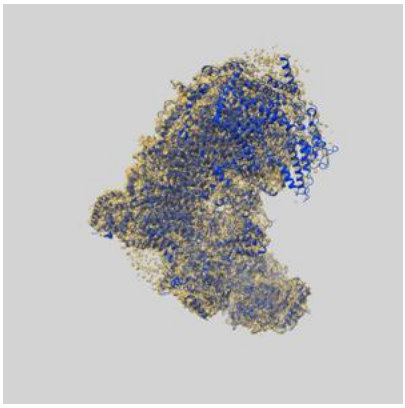
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-11876 and PDB model 7AR8. Per-residue inclusion information can be found in section 3 on page 20.

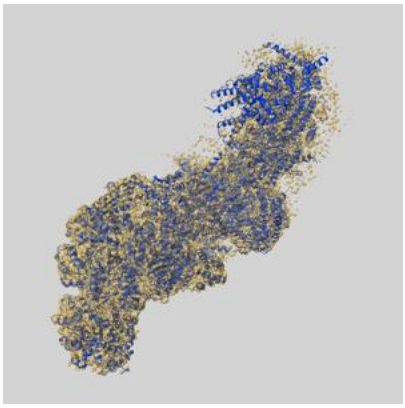
9.1 Map-model overlay



X



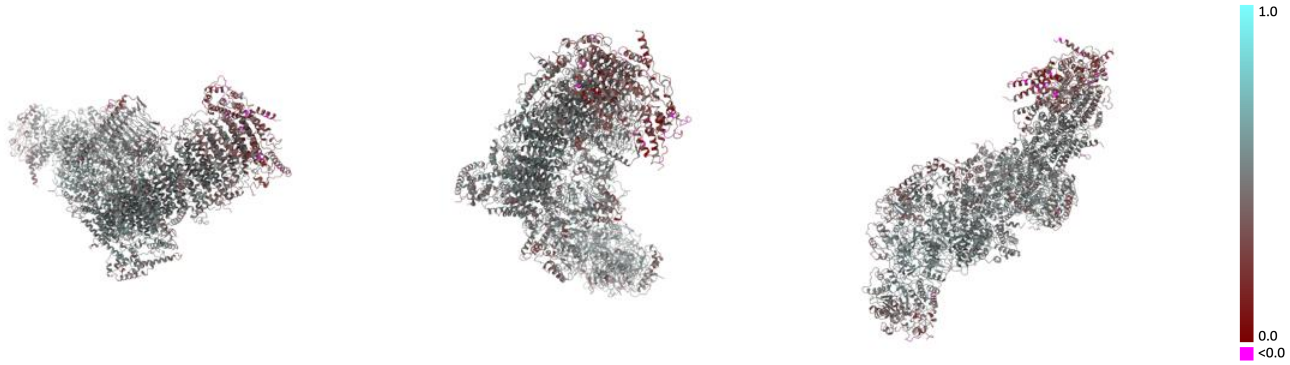
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.011 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

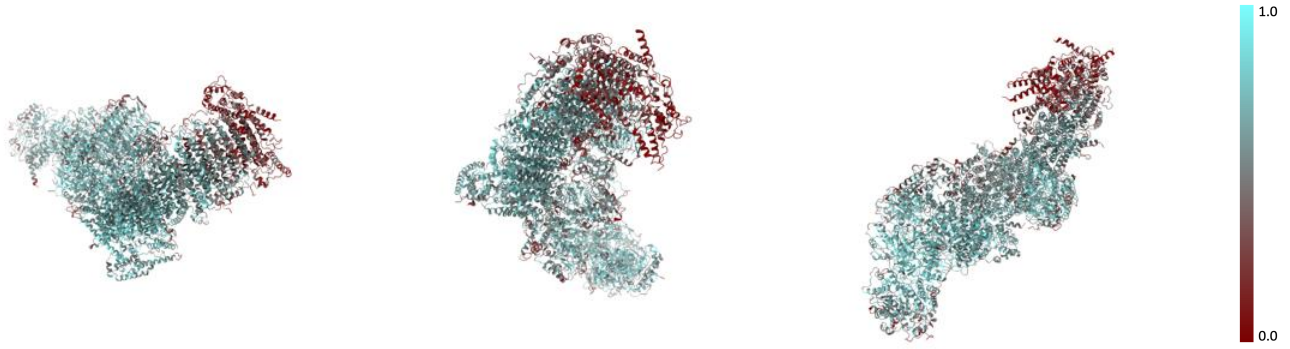
9.2 Q-score mapped to coordinate model (i)



X Y Z

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

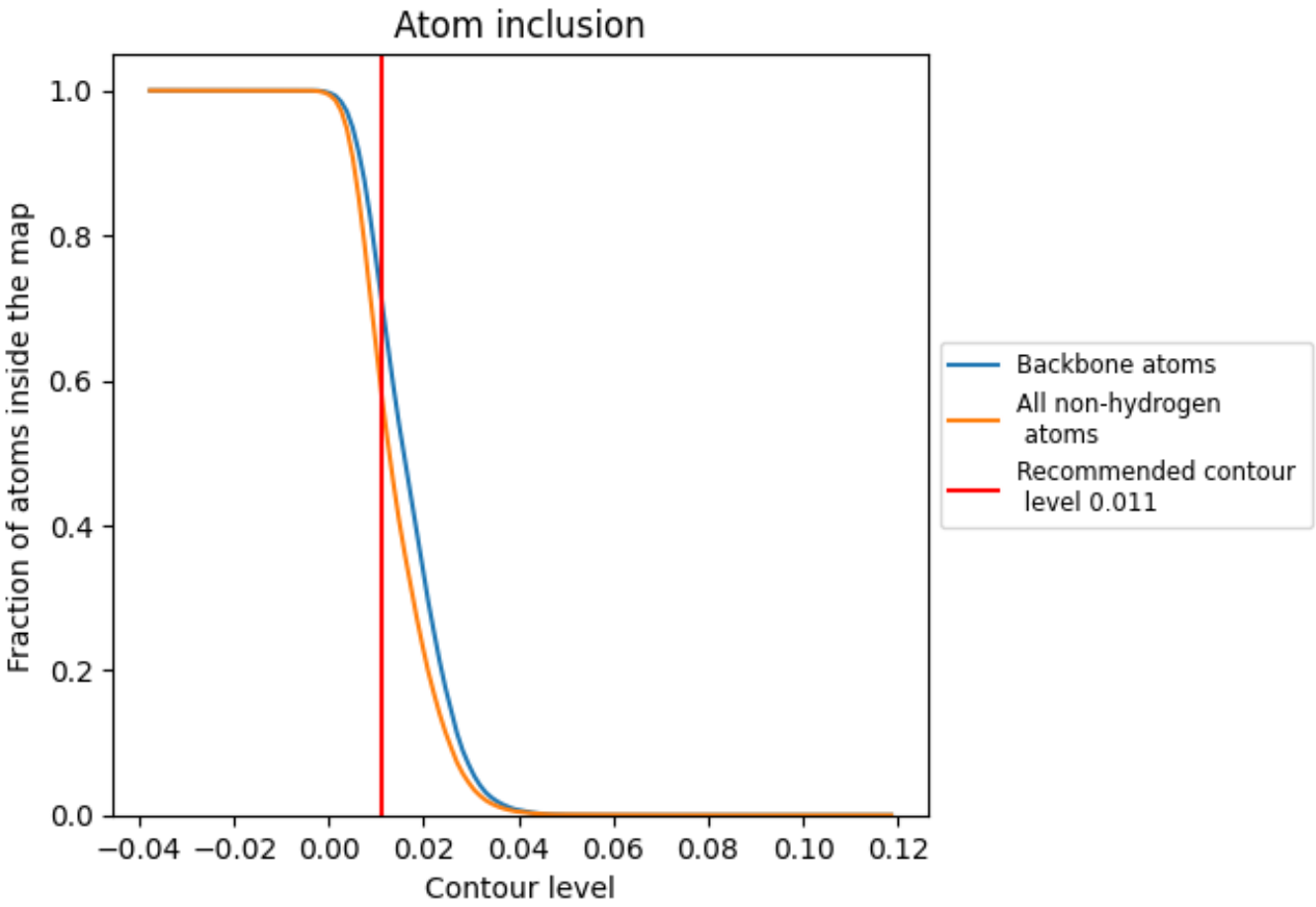
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.011).

9.4 Atom inclusion (i)



At the recommended contour level, 72% of all backbone atoms, 59% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.011) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5872	0.4640
A	0.6697	0.5110
B	0.7650	0.5270
C	0.7616	0.5250
D	0.7496	0.5250
E	0.5855	0.4300
F	0.5987	0.4480
G	0.7114	0.5020
H	0.6773	0.5050
I	0.7684	0.5280
J	0.6763	0.5080
K	0.6241	0.4950
L	0.3423	0.3860
M	0.6235	0.4920
N	0.6948	0.5120
O	0.4658	0.4690
P	0.5332	0.4380
Q	0.6833	0.5180
R	0.6968	0.5130
S	0.6245	0.4400
T	0.0590	0.2200
U	0.3632	0.3910
V	0.6279	0.4660
W	0.5369	0.4540
X	0.6331	0.4640
Z	0.6403	0.4780
a	0.6572	0.4830
b	0.6303	0.4860
c	0.4266	0.4000
d	0.6565	0.4880
e	0.7324	0.4950
f	0.7368	0.5050
g	0.4708	0.4420
i	0.6288	0.4670
j	0.1906	0.3270

Continued on next page...

Continued from previous page...

Chain	Atom inclusion	Q-score
k	0.1022	0.2430
l	0.1516	0.2900
m	0.3430	0.4120
n	0.1853	0.2900
o	0.2334	0.3210
p	0.4755	0.4170
q	0.1935	0.4040
r	0.1928	0.3340
u	0.6667	0.4100
v	0.5641	0.4920
x	0.6512	0.4940
y	0.6024	0.4610
z	0.6097	0.4680