Full wwPDB EM Validation Report ⓘ

Sep 28, 2024 – 07:50 pm BST

PDB ID	:	6GCS
EMDB ID	:	EMD-4384
Title	:	Cryo-EM structure of respiratory complex I from Yarrowia lipolytica
Authors	:	Parey, K.; Vonck, J.
Deposited on	:	2018-04-19
Resolution	:	4.32 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:

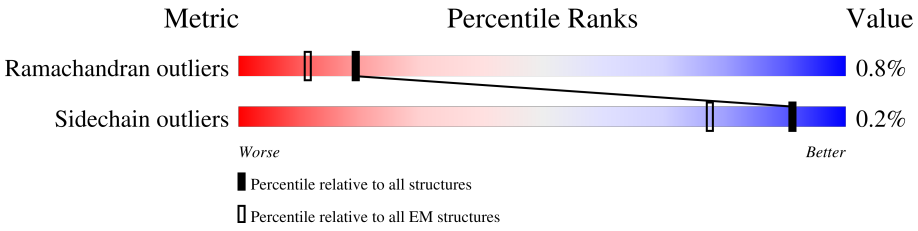
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 4.32 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	207382	16835
Sidechain outliers	206894	16415

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

Mol	Chain	Length	Quality of chain
1	A	728	34% 94% • 5%
2	B	488	39% 90% • 9%
3	C	466	33% 87% • 11%
4	D	87	39% 91% • 8%
5	E	375	37% 83% • 15%
6	F	144	26% 81% •• 17%
7	G	281	14% 78% • • 17%
8	H	243	30% 74% • 24%
9	I	229	18% 77% •• 21%

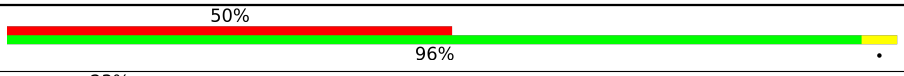
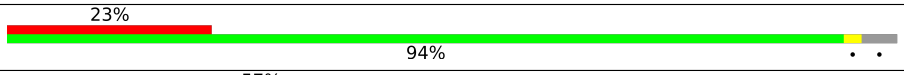
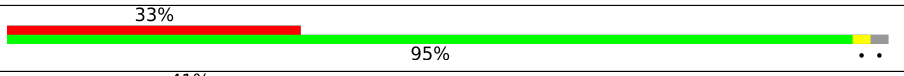
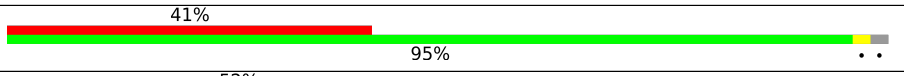
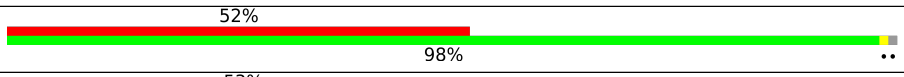
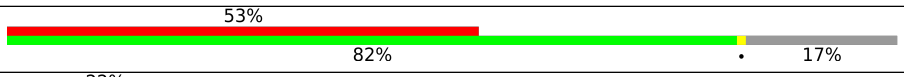
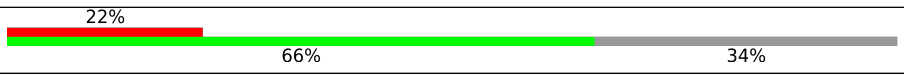
Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
10	J	198	43% 70% 29%
11	K	210	21% 79% 20%
12	L	86	43% 98%
13	M	136	17% 74% 23%
14	O	109	61% 69% 29%
15	P	124	39% 94% 6%
16	Q	132	48% 64% 36%
17	R	109	39% 94% 6%
18	S	159	30% 100%
19	U	172	38% 88% 8%
20	W	123	45% 93%
21	X	169	11% 63% 31%
22	Y	161	19% 71% 29%
23	Z	137	12% 100%
24	a	100	13% 99%
25	b	64	19% 100%
26	c	60	35% 70% 30%
27	d	92	35% 97%
28	e	45	22% 100%
29	f	87	52% 91% 8%
30	g	63	51% 92% 5%
31	h	138	28% 90% 6%
32	i	53	25% 100%
33	j	93	18% 74% 22%
34	n	93	12% 99%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
35	1	341	
36	2	469	
37	3	128	
38	4	486	
39	5	655	
40	6	185	
41	8	99	
42	9	89	

2 Entry composition

There are 50 unique types of molecules in this entry. The entry contains 55137 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 75-KDA PROTEIN (NUAM).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	689	5236	3251	921	1035	29	0	0

- Molecule 2 is a protein called 51-KDA PROTEIN (NUBM).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	443	3380	2132	595	630	23	0	0

- Molecule 3 is a protein called 49-KDA PROTEIN (NUCM).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	416	3190	2032	548	589	21	0	0

- Molecule 4 is a protein called NIMM SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	80	559	352	103	101	3	0	0

- Molecule 5 is a protein called NUEM SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	318	2546	1621	445	471	9	0	0

- Molecule 6 is a protein called NUFM SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F	119	915	578	155	181	1	0	0

- Molecule 7 is a protein called 30-KDA PROTEIN (NUGM).

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	232	Total	C	N	O	S	0	0
			1680	1069	294	313	4		

- Molecule 8 is a protein called 24-KDA SUBUNIT (NUHM).

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	185	Total	C	N	O	S	0	0
			1385	870	232	266	17		

- Molecule 9 is a protein called TYKY SUBUNIT (NUIM).

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	180	Total	C	N	O	S	0	0
			1441	915	240	276	10		

- Molecule 10 is a protein called NUJM SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	140	Total	C	N	O	S	0	0
			961	612	174	170	5		

- Molecule 11 is a protein called PSST SUBUNIT (NUKM).

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	169	Total	C	N	O	S	0	0
			1339	852	235	238	14		

- Molecule 12 is a protein called ND4L SUBUNIT (NULM).

Mol	Chain	Residues	Atoms					AltConf	Trace
12	L	86	Total	C	N	O	S	0	0
			668	447	106	112	3		

- Molecule 13 is a protein called NUMM SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	M	105	Total	C	N	O	S	0	0
			726	449	136	136	5		

- Molecule 14 is a protein called ACPM1 SUBUNIT.

Mol	Chain	Residues	Atoms				AltConf	Trace
14	O	77	Total 591	C 373	N 93	O 125	0	0

- Molecule 15 is a protein called NB4M SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	P	116	Total 982	C 633	N 170	O 177	S 2	0	0

- Molecule 16 is a protein called ACPM2 SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	Q	85	Total 648	C 405	N 103	O 138	S 2	0	0

- Molecule 17 is a protein called NI2M SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	R	102	Total 820	C 517	N 159	O 142	S 2	0	0

- Molecule 18 is a protein called NESM SUBUNIT.

Mol	Chain	Residues	Atoms				AltConf	Trace
18	S	159	Total 796	C 477	N 159	O 160	0	0

- Molecule 19 is a protein called NUPM SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	U	158	Total 1141	C 707	N 205	O 219	S 10	0	0

- Molecule 20 is a protein called NB6M SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	W	118	Total 929	C 590	N 174	O 160	S 5	0	0

- Molecule 21 is a protein called NUXM SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	X	117	Total 638	C 392	N 124	O 121	S 1	0	0

- Molecule 22 is a protein called NUYM SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	Y	115	Total 957	C 610	N 173	O 172	S 2	0	0

- Molecule 23 is a protein called NUZM SUBUNIT.

Mol	Chain	Residues	Atoms				AltConf	Trace
23	Z	137	Total 686	C 411	N 137	O 138	0	0

- Molecule 24 is a protein called NIAM SUBUNIT.

Mol	Chain	Residues	Atoms				AltConf	Trace
24	a	100	Total 501	C 300	N 100	O 101	0	0

- Molecule 25 is a protein called NEBM SUBUNIT.

Mol	Chain	Residues	Atoms				AltConf	Trace
25	b	64	Total 321	C 192	N 64	O 65	0	0

- Molecule 26 is a protein called NB2M SUBUNIT.

Mol	Chain	Residues	Atoms				AltConf	Trace
26	c	42	Total 251	C 163	N 43	O 45	0	0

- Molecule 27 is a protein called NIDM SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	d	89	Total 752	C 467	N 136	O 146	S 3	0	0

- Molecule 28 is a protein called NUUM SUBUNIT.

Mol	Chain	Residues	Atoms				AltConf	Trace
28	e	45	Total 226	C 135	N 45	O 46	0	0

- Molecule 29 is a protein called NI8M SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	f	80	Total 629	C 394	N 119	O 115	S 1	0	0

- Molecule 30 is a protein called NI9M SUBUNIT.

Mol	Chain	Residues	Atoms				AltConf	Trace
30	g	60	Total 492	C 328	N 88	O 76	0	0

- Molecule 31 is a protein called N7BM SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	h	130	Total 1081	C 697	N 184	O 198	S 2	0	0

- Molecule 32 is a protein called UNKNOWN SUBUNIT.

Mol	Chain	Residues	Atoms				AltConf	Trace
32	i	53	Total 266	C 159	N 53	O 54	0	0

- Molecule 33 is a protein called NB5M SUBUNIT.

Mol	Chain	Residues	Atoms				AltConf	Trace
33	j	73	Total 436	C 266	N 87	O 83	0	0

- Molecule 34 is a protein called NUNM SUBUNIT.

Mol	Chain	Residues	Atoms				AltConf	Trace
34	n	93	Total 466	C 279	N 93	O 94	0	0

- Molecule 35 is a protein called ND1 SUBUNIT (NU1M).

Mol	Chain	Residues	Atoms					AltConf	Trace
35	1	340	Total	C	N	O	S	0	0
			2608	1766	390	445	7		

- Molecule 36 is a protein called ND2 SUBUNIT (NU2M).

Mol	Chain	Residues	Atoms					AltConf	Trace
36	2	452	Total	C	N	O	S	0	0
			3376	2263	511	590	12		

- Molecule 37 is a protein called ND3 SUBUNIT (NU3M).

Mol	Chain	Residues	Atoms					AltConf	Trace
37	3	110	Total	C	N	O	S	0	0
			871	600	129	140	2		

- Molecule 38 is a protein called ND4 SUBUNIT (NU4M).

Mol	Chain	Residues	Atoms					AltConf	Trace
38	4	475	Total	C	N	O	S	0	0
			3312	2188	533	581	10		

- Molecule 39 is a protein called ND5 SUBUNIT (NU5M).

Mol	Chain	Residues	Atoms					AltConf	Trace
39	5	639	Total	C	N	O	S	0	0
			4599	3032	723	817	27		

- Molecule 40 is a protein called ND6 SUBUNIT (NU6M).

Mol	Chain	Residues	Atoms					AltConf	Trace
40	6	183	Total	C	N	O	S	0	0
			1211	812	189	203	7		

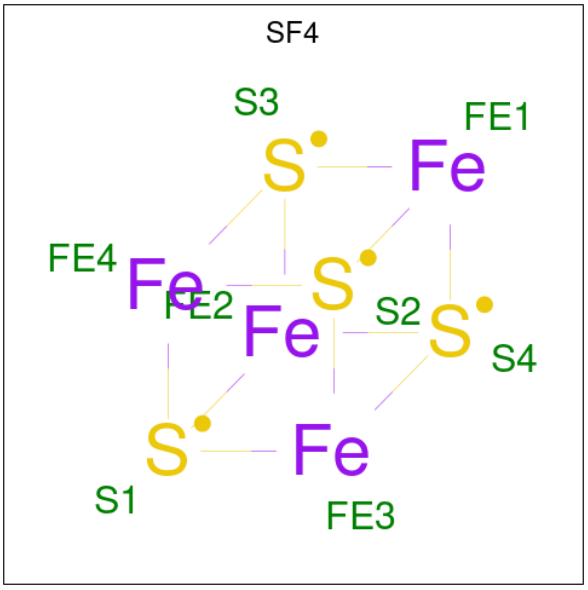
- Molecule 41 is a protein called NB8M SUBUNIT.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	8	82	Total	C	N	O	S	0	0
			672	426	122	116	8		

- Molecule 42 is a protein called NIPM SUBUNIT.

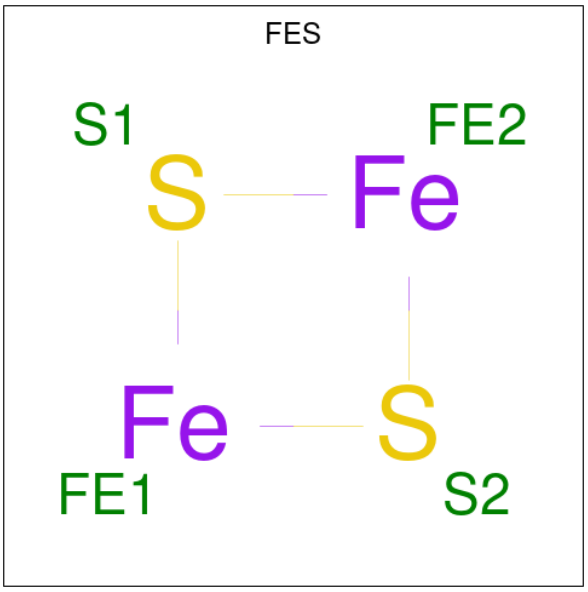
Mol	Chain	Residues	Atoms					AltConf	Trace
42	9	59	Total	C	N	O	S	0	0
			468	290	85	87	6		

- Molecule 43 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe_4S_4).



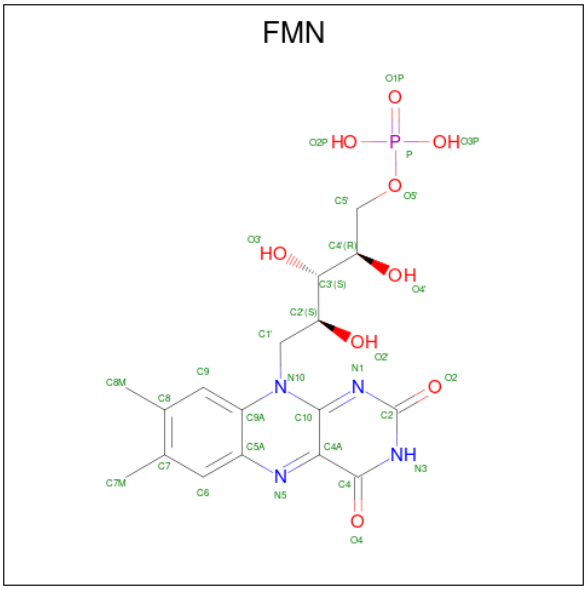
Mol	Chain	Residues	Atoms			AltConf
43	A	1	Total	Fe	S	0
			8	4	4	
43	A	1	Total	Fe	S	0
			8	4	4	
43	B	1	Total	Fe	S	0
			8	4	4	
43	I	1	Total	Fe	S	0
			8	4	4	
43	I	1	Total	Fe	S	0
			8	4	4	
43	K	1	Total	Fe	S	0
			8	4	4	

- Molecule 44 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe_2S_2).



Mol	Chain	Residues	Atoms			AltConf
44	A	1	Total	Fe	S	0
			4	2	2	
44	H	1	Total	Fe	S	0
			4	2	2	

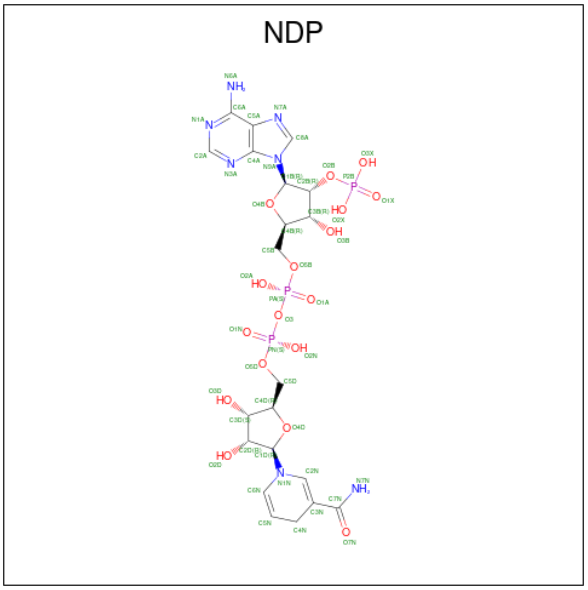
- Molecule 45 is FLAVIN MONONUCLEOTIDE (three-letter code: FMN) (formula: $C_{17}H_{21}N_4O_9P$).



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

- Molecule 46 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
46	E	1	Total	C	N	O	P	0
			48	21	7	17	3	

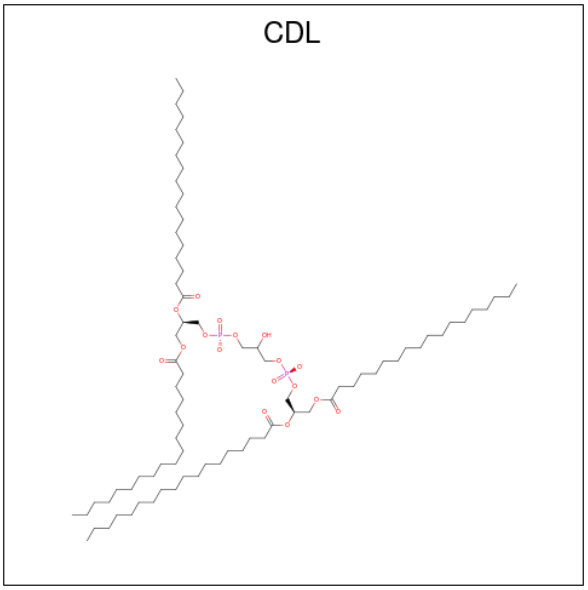
- Molecule 47 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
47	M	1	Total	Zn	0
			1	1	

- Molecule 48 is S-[2-({N-[(2S)-2-hydroxy-3,3-dimethyl-4-(phosphonooxy)butanoyl]-beta-alanyl}amino)ethyl] tetradecanethioate (three-letter code: ZMP) (formula: $C_{25}H_{49}N_2O_8PS$).

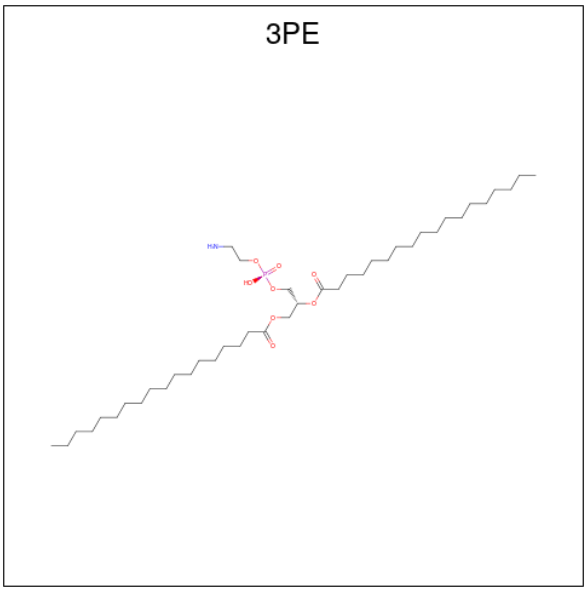
Mol	Chain	Residues	Atoms						AltConf
48	O	1	Total	C	N	O	P	S	0
			29	18	2	7	1	1	

- Molecule 49 is CARDIOLIPIN (three-letter code: CDL) (formula: $C_{81}H_{156}O_{17}P_2$).



Mol	Chain	Residues	Atoms				AltConf
49	g	1	Total	C	O	P	0
			83	64	17	2	

- Molecule 50 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (three-letter code: 3PE) (formula: $C_{41}H_{82}NO_8P$).



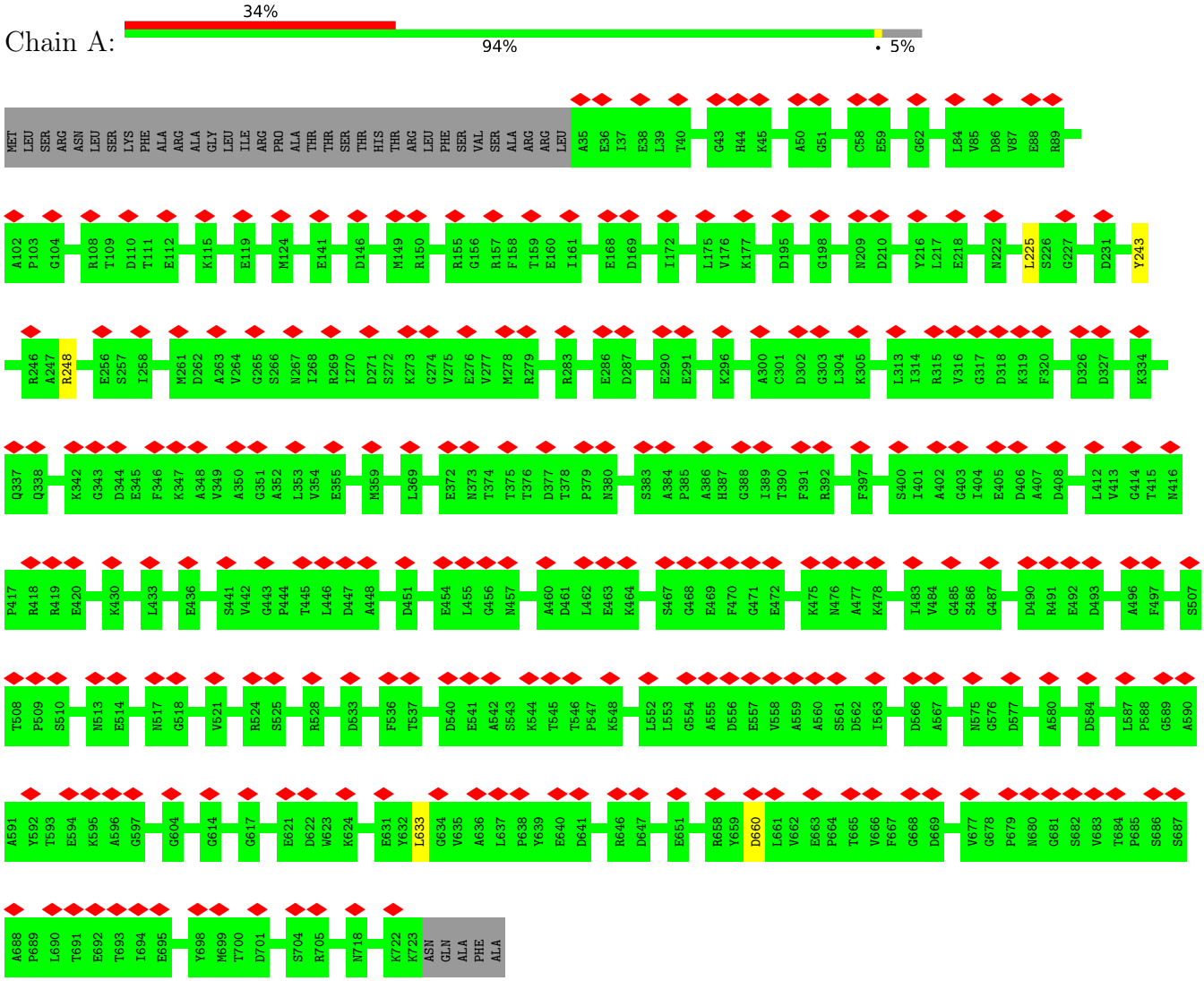
Mol	Chain	Residues	Atoms					AltConf
50	g	1	Total	C	N	O	P	0
			43	33	1	8	1	
50	1	1	Total	C	N	O	P	0
			51	41	1	8	1	
50	4	1	Total	C	N	O	P	0
			43	33	1	8	1	

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.

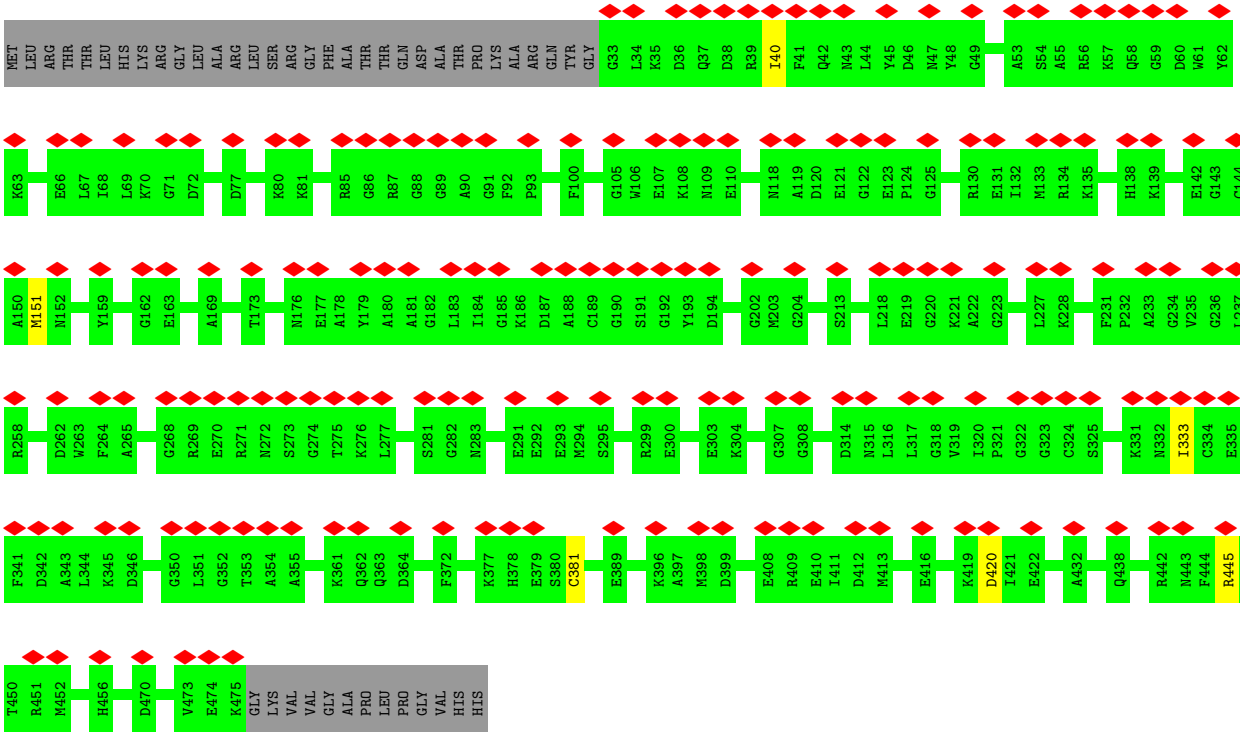
• Molecule 1: 75-KDA PROTEIN (NUAM)

Chain A:

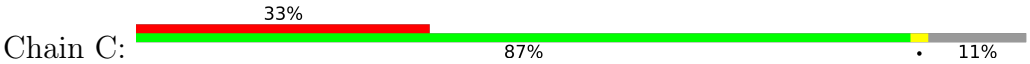


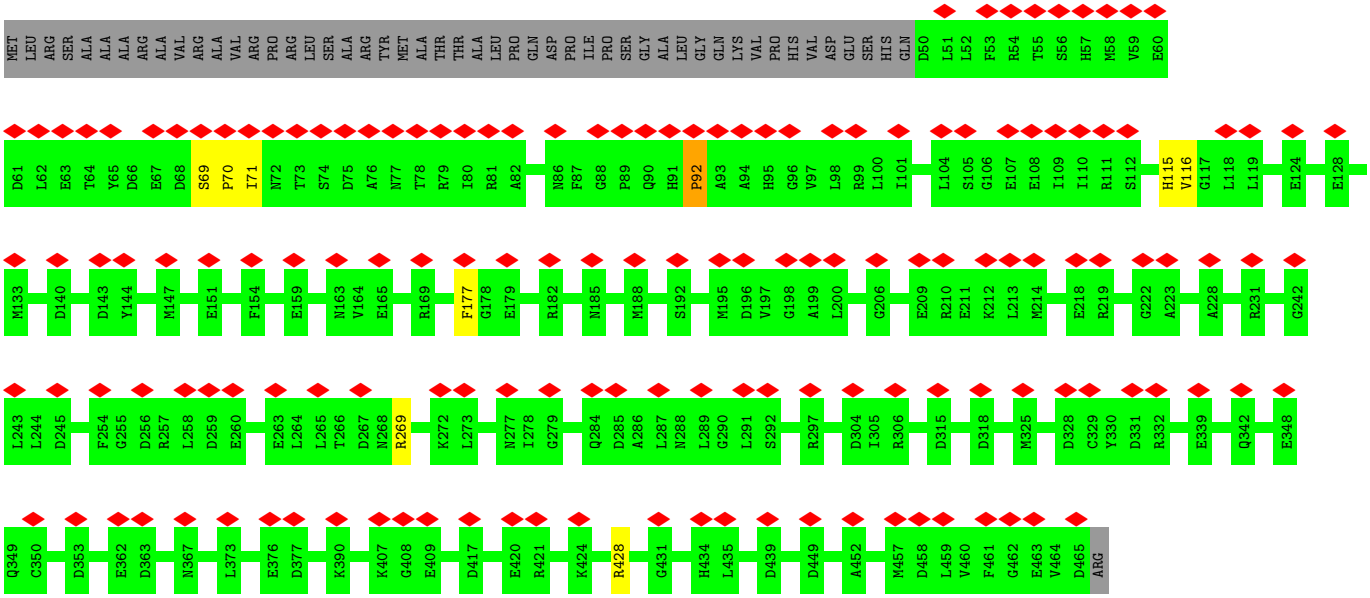
• Molecule 2: 51-KDA PROTEIN (NUBM)

Chain B:

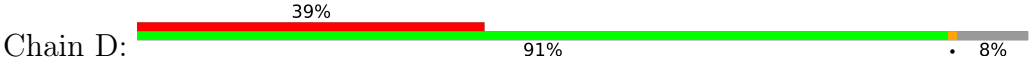


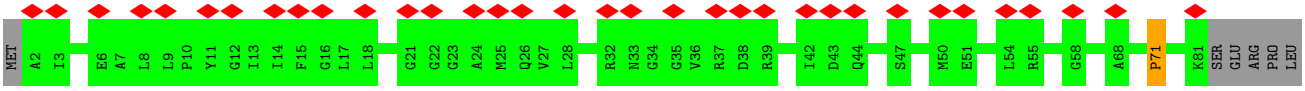
• Molecule 3: 49-KDA PROTEIN (NUCM)





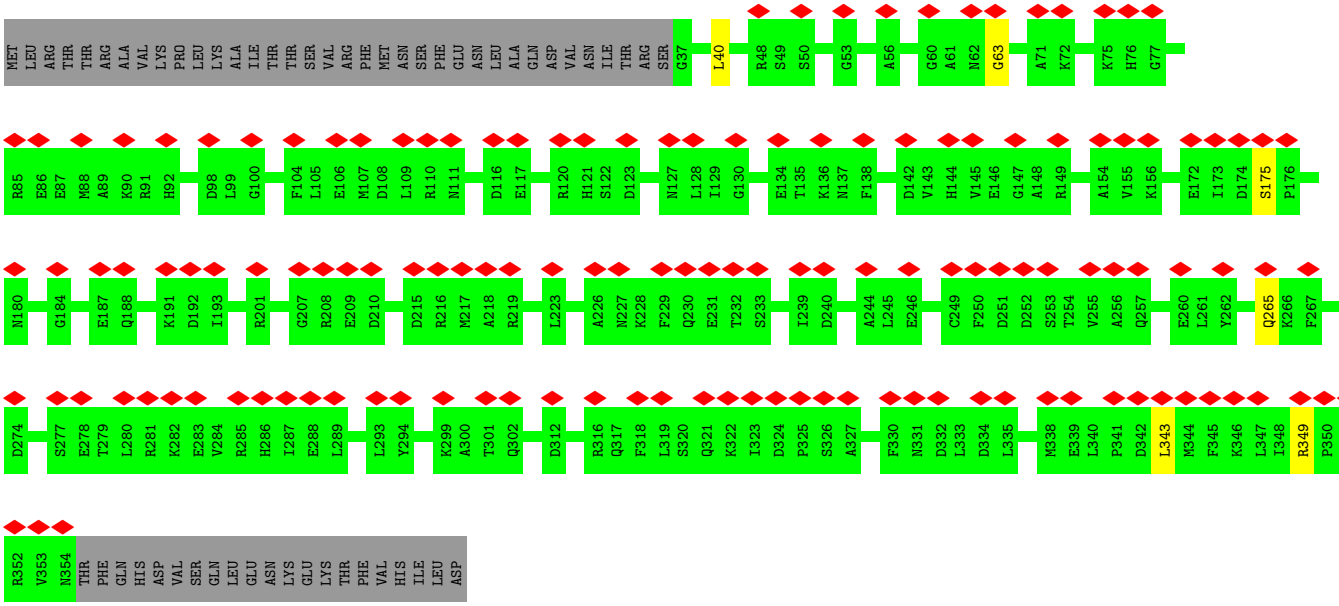
• Molecule 4: NIMM SUBUNIT





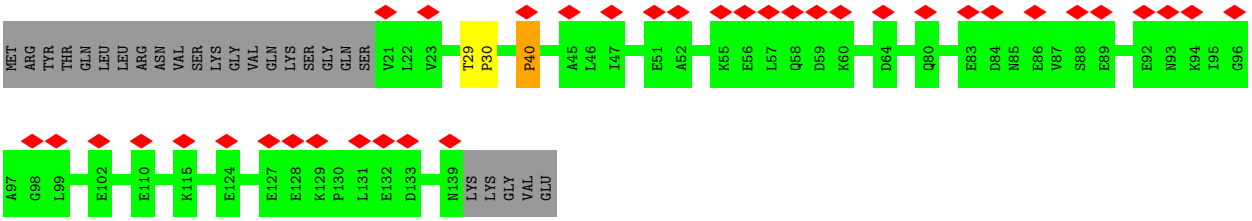
• Molecule 5: NUEM SUBUNIT

Chain E:



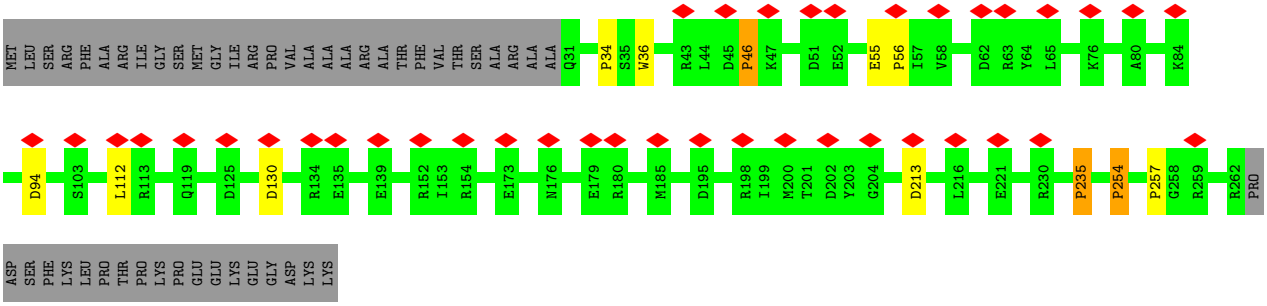
• Molecule 6: NUFM SUBUNIT

Chain F:



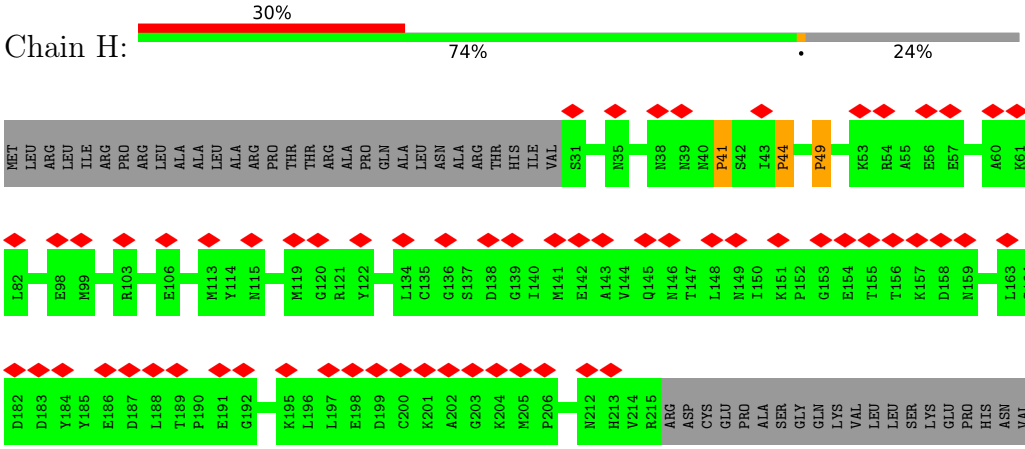
• Molecule 7: 30-KDA PROTEIN (NUGM)

Chain G:



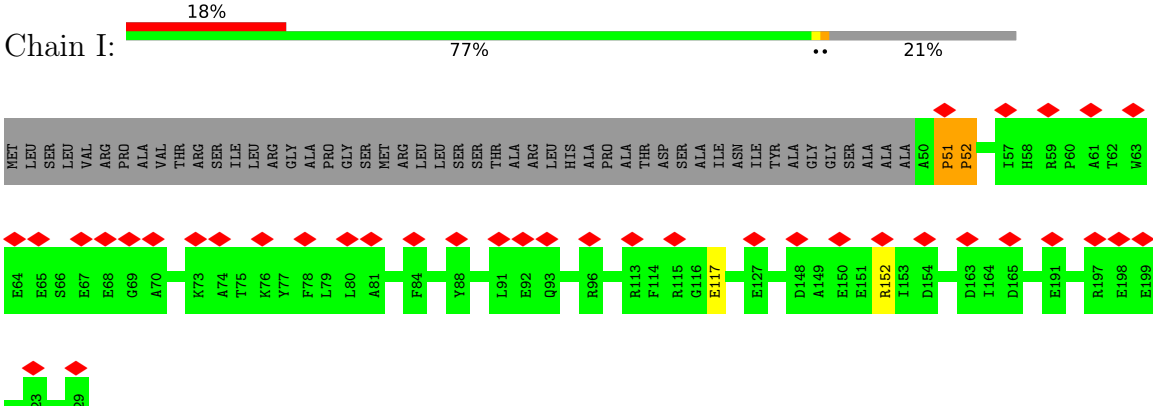
• Molecule 8: 24-KDA SUBUNIT (NUHM)

Chain H:



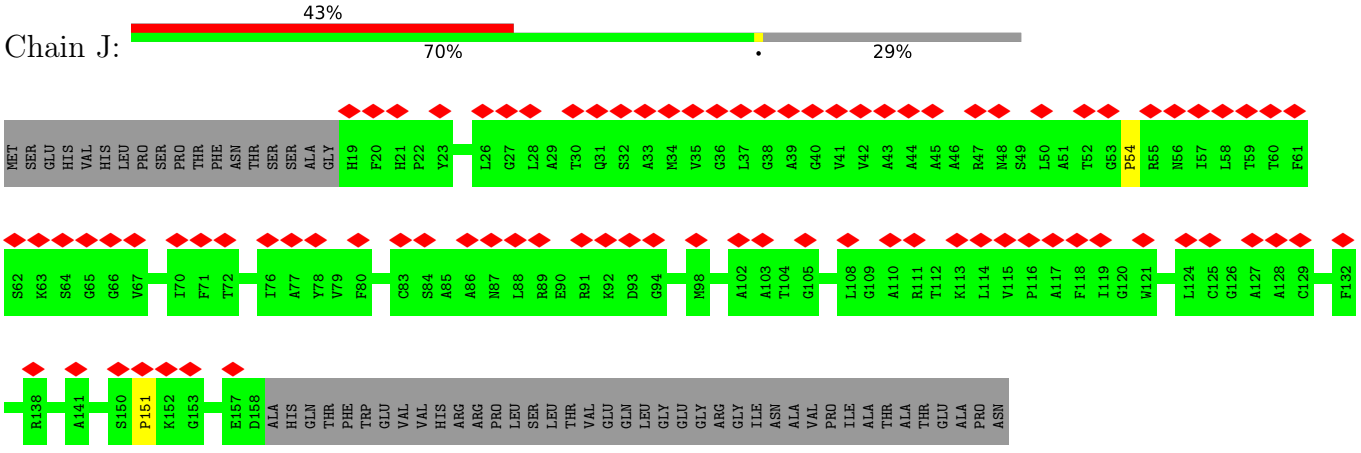
• Molecule 9: TYKY SUBUNIT (NUIM)

Chain I:



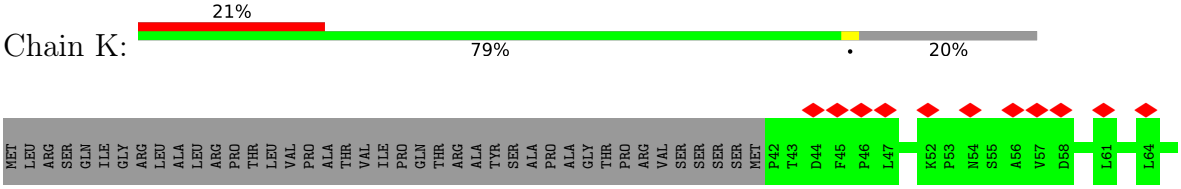
• Molecule 10: NUJM SUBUNIT

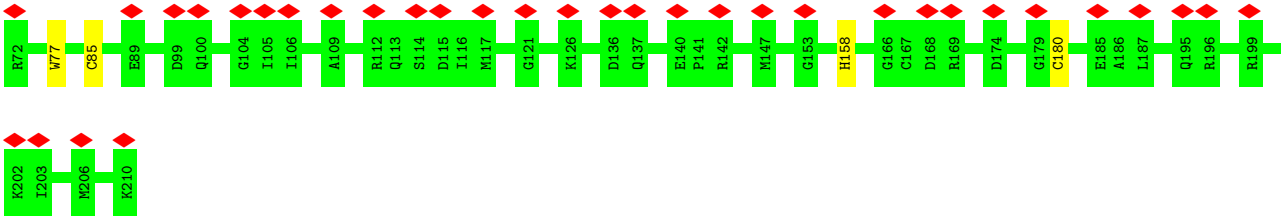
Chain J:



• Molecule 11: PSST SUBUNIT (NUKM)

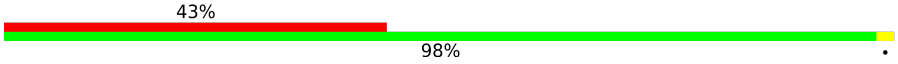
Chain K:

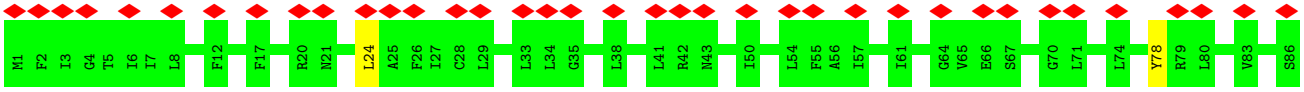




• Molecule 12: ND4L SUBUNIT (NULM)

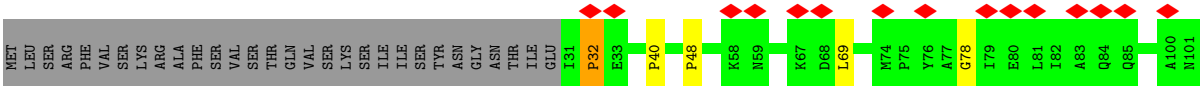
Chain L:

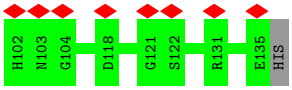




• Molecule 13: NUMM SUBUNIT

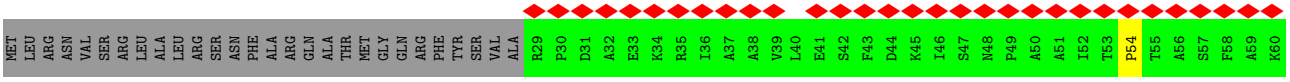
Chain M:

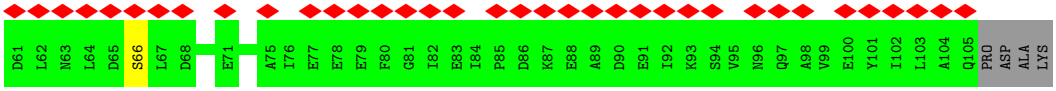




• Molecule 14: ACPM1 SUBUNIT

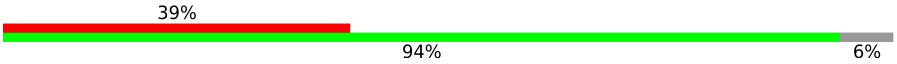
Chain O:

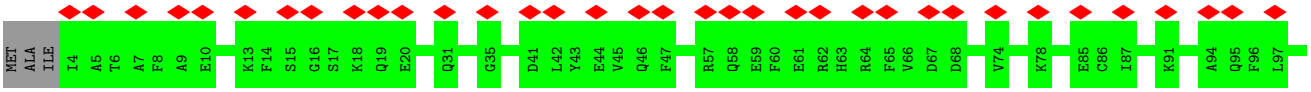


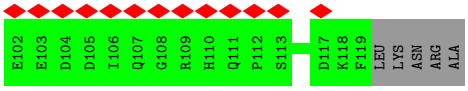


• Molecule 15: NB4M SUBUNIT

Chain P:

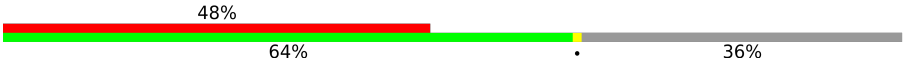


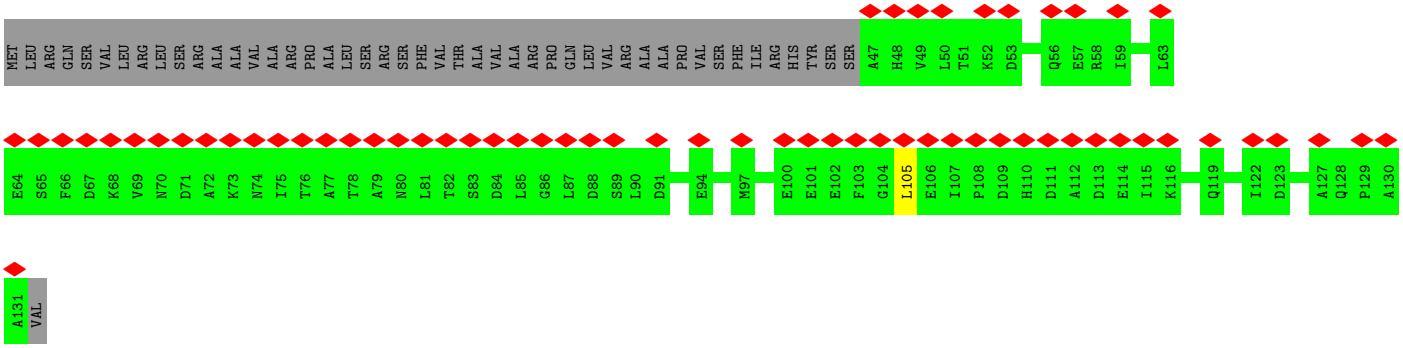




• Molecule 16: ACPM2 SUBUNIT

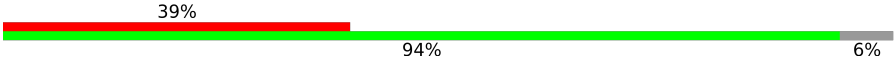
Chain Q:

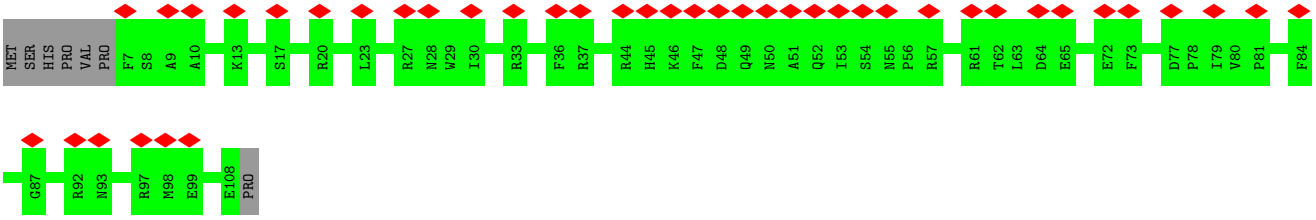




• Molecule 17: NI2M SUBUNIT

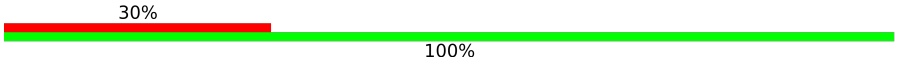
Chain R:

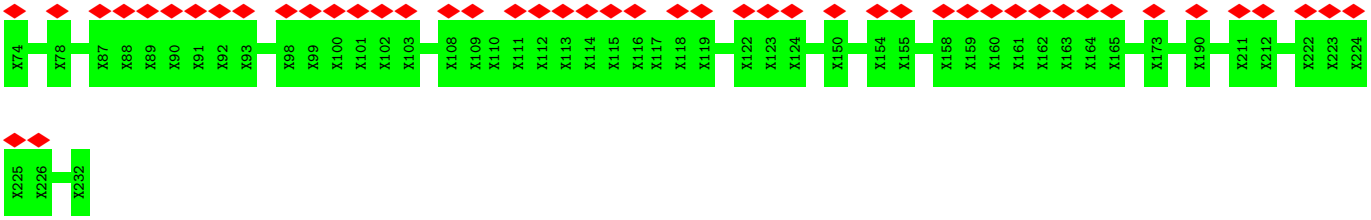




• Molecule 18: NESM SUBUNIT

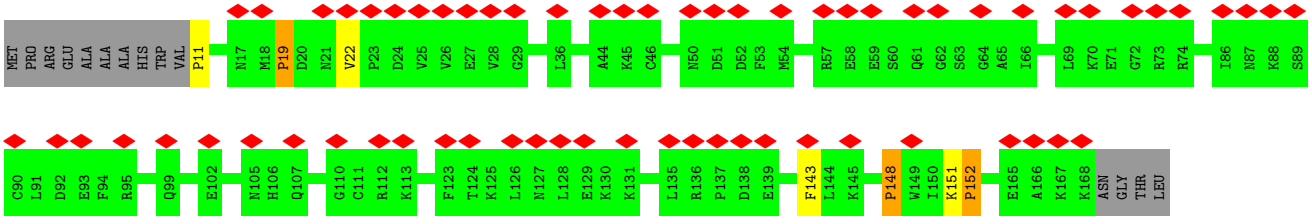
Chain S:





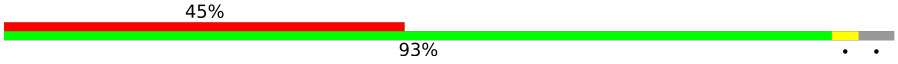
• Molecule 19: NUPM SUBUNIT

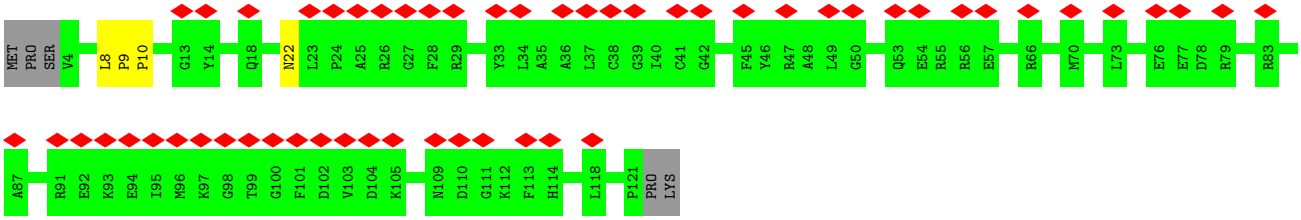
Chain U:



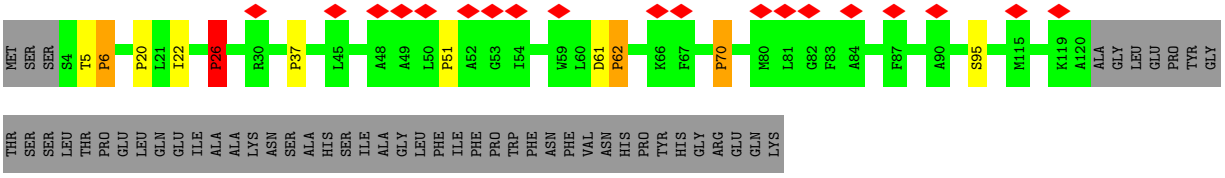
• Molecule 20: NB6M SUBUNIT

Chain W:

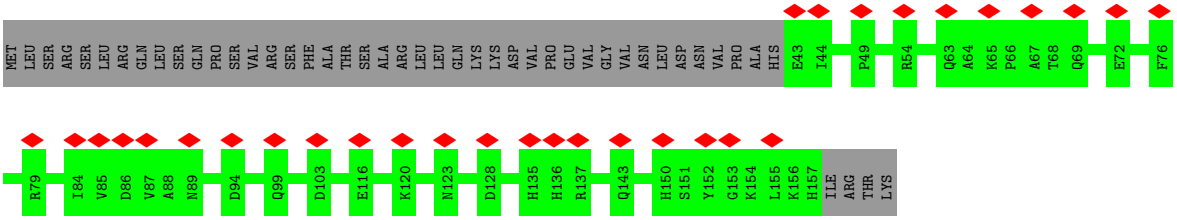




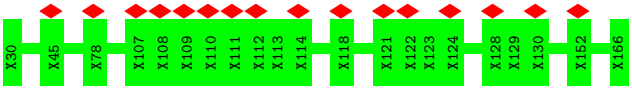
• Molecule 21: NUXM SUBUNIT



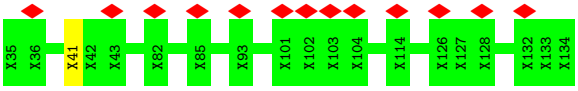
• Molecule 22: NUYM SUBUNIT



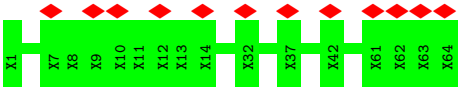
• Molecule 23: NUZM SUBUNIT



• Molecule 24: NIAM SUBUNIT

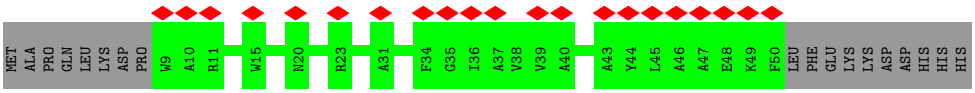


• Molecule 25: NEBM SUBUNIT



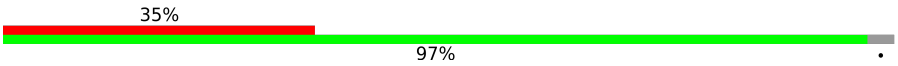
• Molecule 26: NB2M SUBUNIT

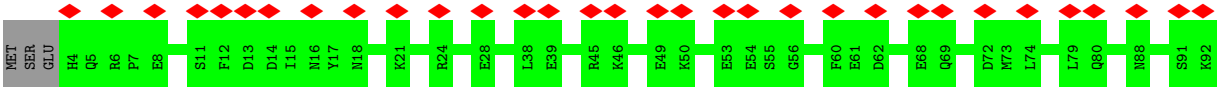
Chain c:



• Molecule 27: NIDM SUBUNIT

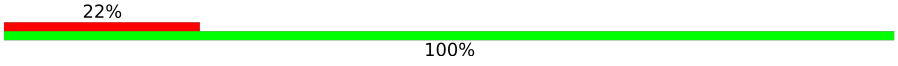
Chain d:

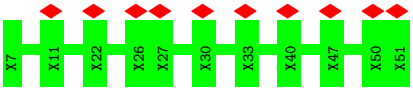




• Molecule 28: NUUM SUBUNIT

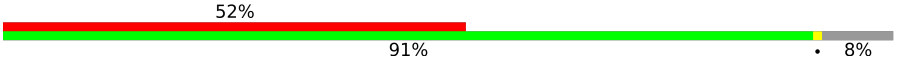
Chain e:

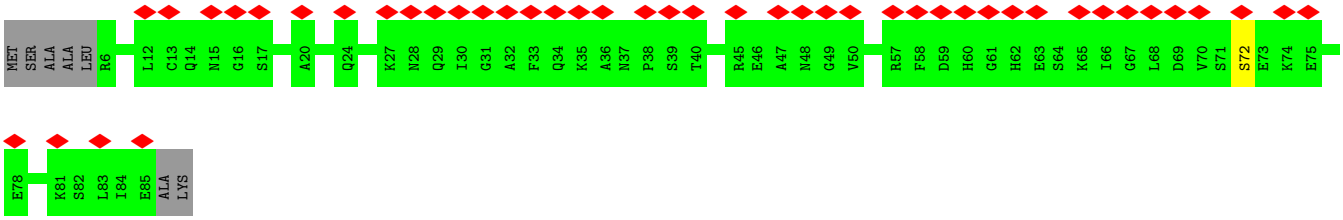




• Molecule 29: NI8M SUBUNIT

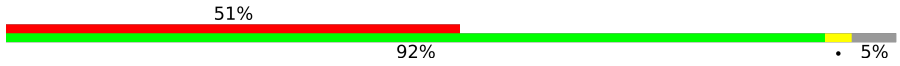
Chain f:

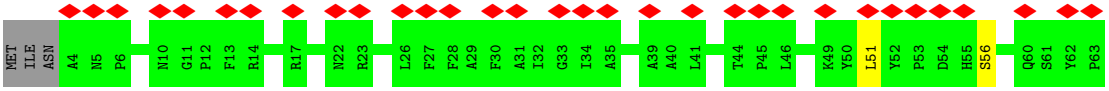




• Molecule 30: NI9M SUBUNIT

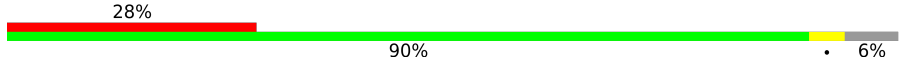
Chain g:

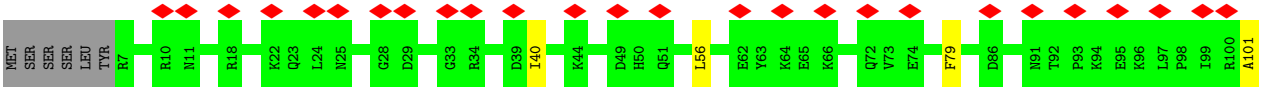


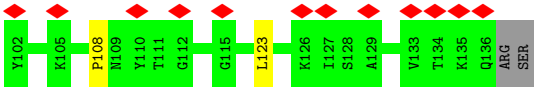


• Molecule 31: N7BM SUBUNIT

Chain h:

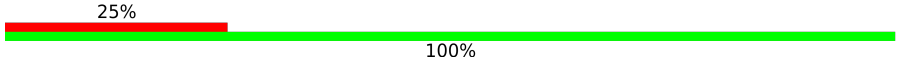


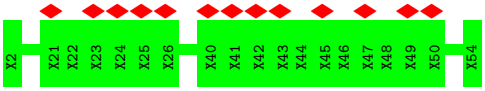




• Molecule 32: UNKNOWN SUBUNIT

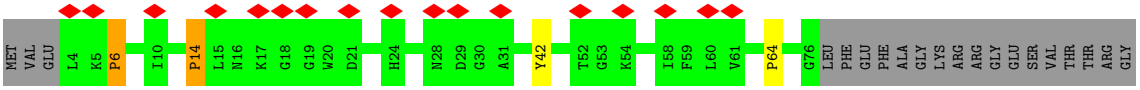
Chain i:





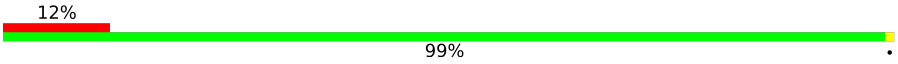
• Molecule 33: NB5M SUBUNIT

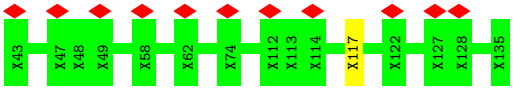
Chain j:



• Molecule 34: NUNM SUBUNIT

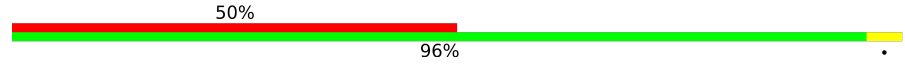
Chain n:

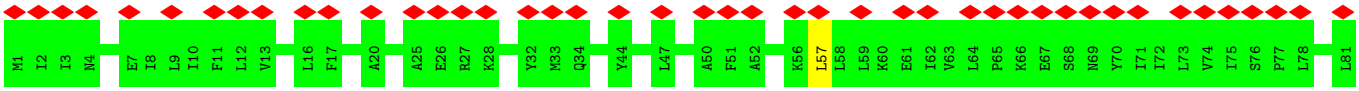


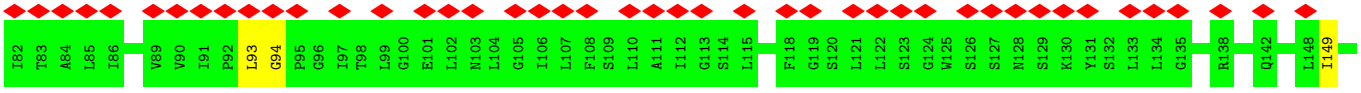


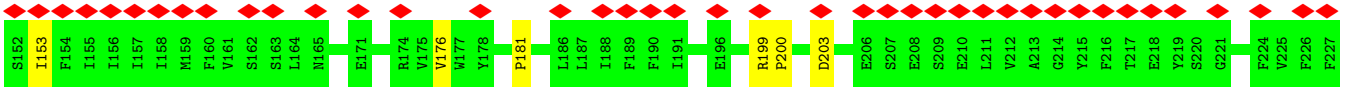
• Molecule 35: ND1 SUBUNIT (NU1M)

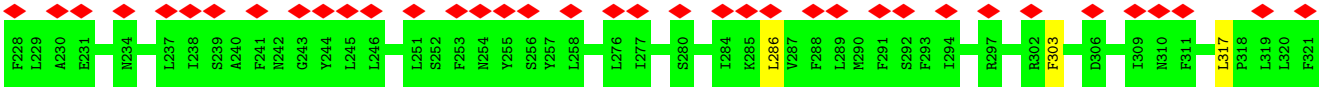
Chain 1:

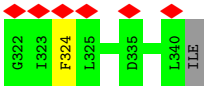






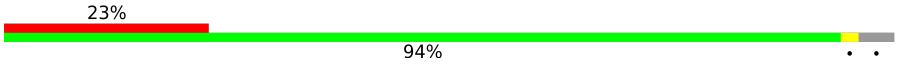


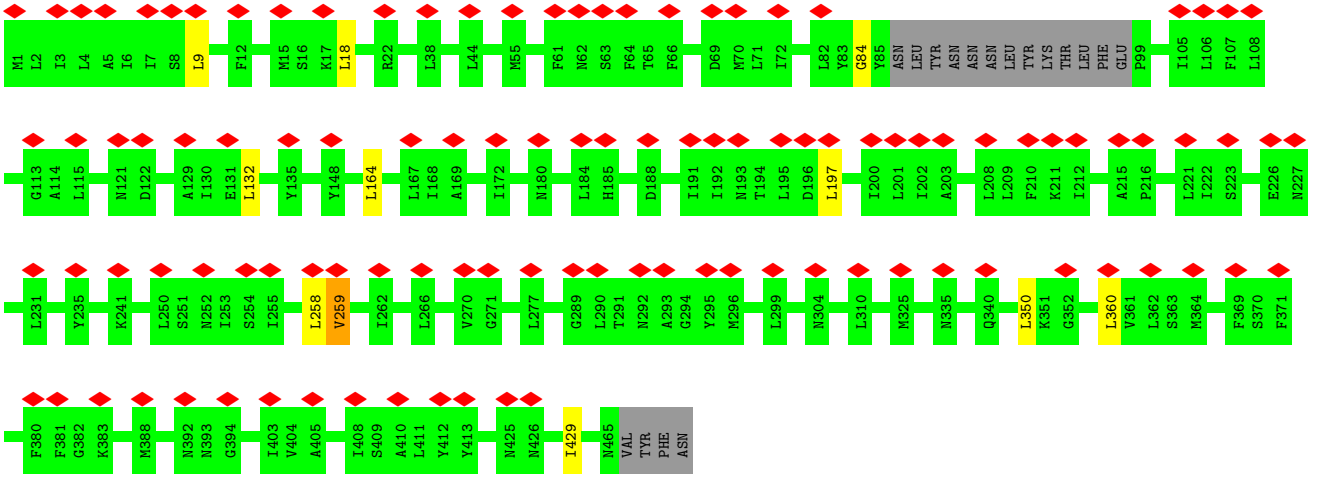




• Molecule 36: ND2 SUBUNIT (NU2M)

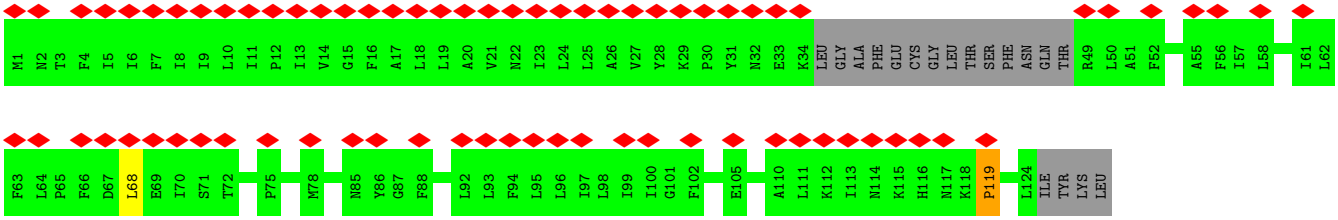
Chain 2:





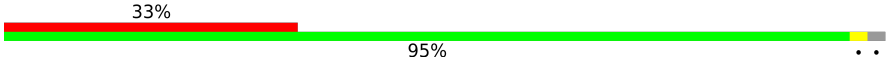
• Molecule 37: ND3 SUBUNIT (NU3M)

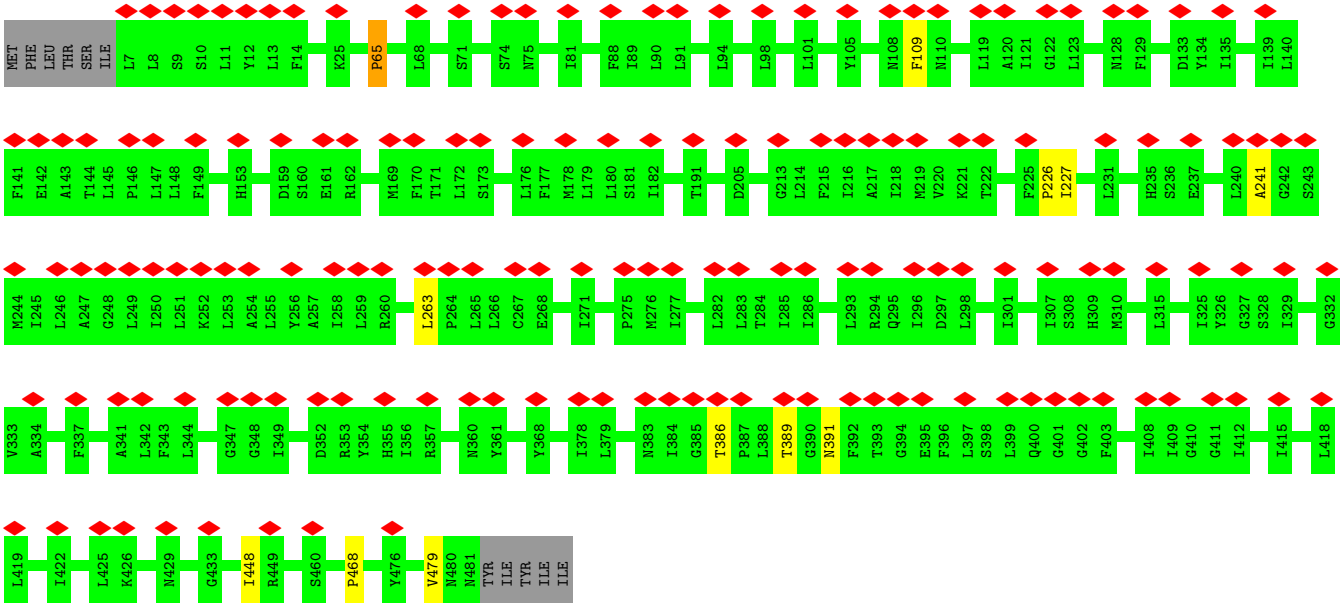
Chain 3:



• Molecule 38: ND4 SUBUNIT (NU4M)

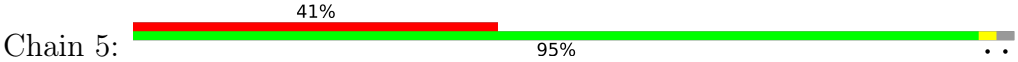
Chain 4:

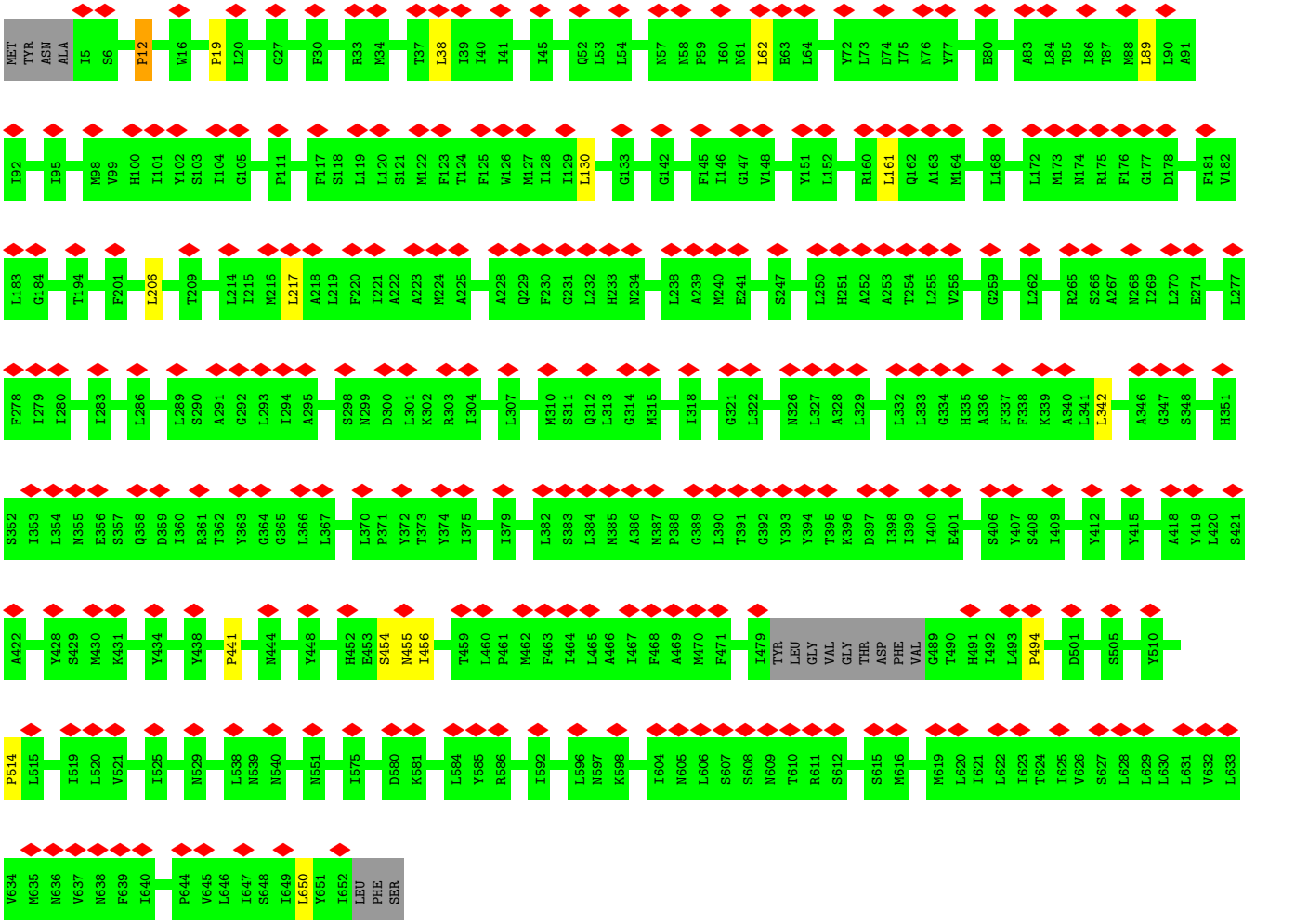




• Molecule 39: ND5 SUBUNIT (NU5M)

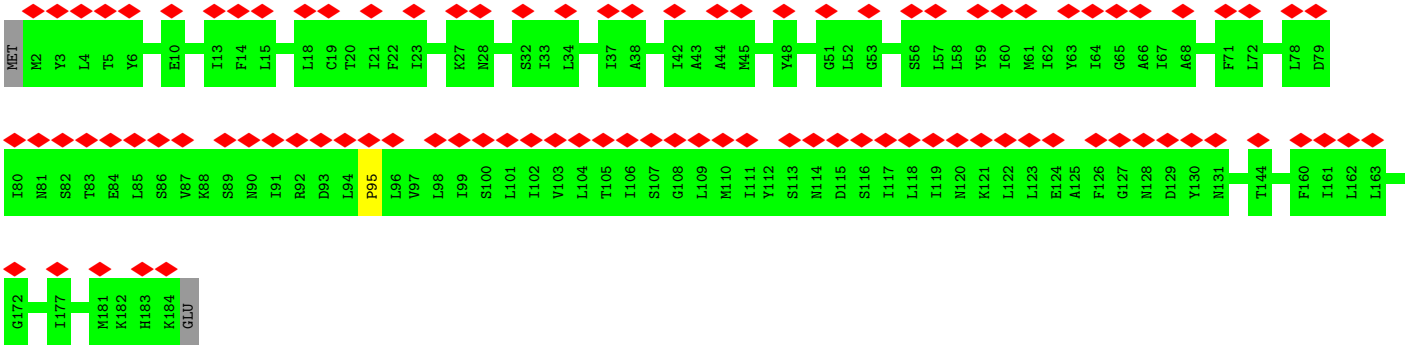
Chain 5:





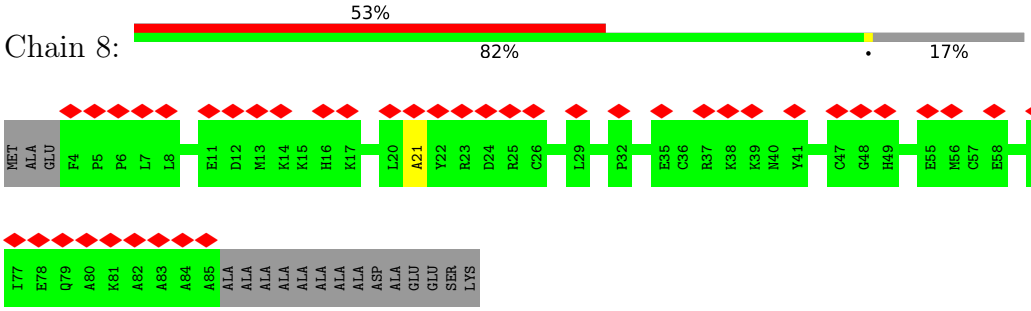
• Molecule 40: ND6 SUBUNIT (NU6M)

Chain 6:



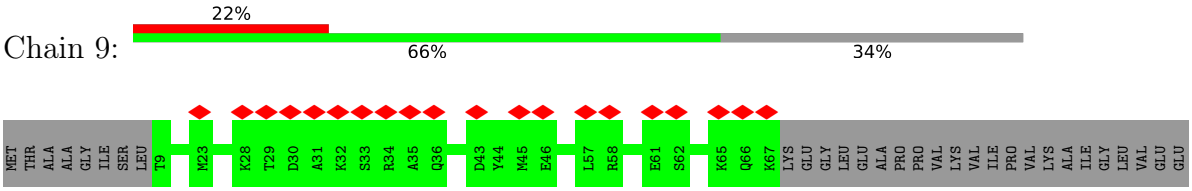
• Molecule 41: NB8M SUBUNIT

Chain 8:



• Molecule 42: NIPM SUBUNIT

Chain 9:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	124626	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI POLARA 300	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	60.5	Depositor
Minimum defocus (nm)	-1.5	Depositor
Maximum defocus (nm)	-3.0	Depositor
Magnification	45872	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.256	Depositor
Minimum map value	-0.057	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.045	Depositor
Map size (Å)	497.04, 497.04, 497.04	wwPDB
Map dimensions	456, 456, 456	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.09, 1.09, 1.09	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

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

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	0.46	0/5329	0.65	2/7232 (0.0%)
2	B	0.42	0/3451	0.66	2/4660 (0.0%)
3	C	0.54	0/3260	0.71	3/4421 (0.1%)
4	D	0.43	0/568	0.71	1/770 (0.1%)
5	E	0.44	0/2604	0.68	1/3529 (0.0%)
6	F	0.40	0/932	0.67	2/1265 (0.2%)
7	G	0.57	0/1721	0.81	8/2356 (0.3%)
8	H	0.43	0/1411	0.69	3/1919 (0.2%)
9	I	0.60	0/1475	0.76	2/1998 (0.1%)
10	J	0.36	0/983	0.67	1/1343 (0.1%)
11	K	0.59	0/1377	0.70	0/1872
12	L	0.49	0/676	0.80	1/913 (0.1%)
13	M	0.44	0/741	0.73	4/1009 (0.4%)
14	O	0.37	0/598	0.58	0/813
15	P	0.47	0/1007	0.63	0/1355
16	Q	0.33	0/654	0.64	1/890 (0.1%)
17	R	0.34	0/840	0.53	0/1136
19	U	0.37	0/1157	0.77	4/1568 (0.3%)
20	W	0.41	0/948	0.68	2/1275 (0.2%)
21	X	0.35	0/641	0.81	7/881 (0.8%)
22	Y	0.52	0/985	0.63	0/1330
26	c	0.30	0/255	0.53	0/349
27	d	0.41	0/768	0.66	0/1031
29	f	0.43	0/639	0.68	0/856
30	g	0.43	0/516	0.67	1/707 (0.1%)
31	h	0.49	0/1118	0.74	3/1522 (0.2%)
33	j	0.37	0/444	0.71	3/611 (0.5%)
35	1	0.50	0/2674	0.81	4/3656 (0.1%)
36	2	0.54	0/3440	0.78	8/4696 (0.2%)
37	3	0.46	0/890	0.88	3/1213 (0.2%)
38	4	0.49	0/3373	0.75	3/4630 (0.1%)
39	5	0.43	0/4692	0.73	14/6430 (0.2%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
40	6	0.43	0/1229	0.69	1/1686 (0.1%)
41	8	0.38	0/686	0.58	0/918
42	9	0.38	0/477	0.57	0/637
All	All	0.47	0/52559	0.71	84/71477 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	3
2	B	0	2
5	E	0	5
7	G	0	2
9	I	0	1
10	J	0	1
11	K	0	1
12	L	0	1
19	U	0	2
20	W	0	1
21	X	0	2
24	a	0	1
29	f	0	1
30	g	0	1
31	h	0	1
33	j	0	1
34	n	0	1
35	1	0	9
36	2	0	2
38	4	0	3
39	5	0	1
41	8	0	1
All	All	0	43

There are no bond length outliers.

All (84) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	G	94	ASP	CB-CG-OD1	10.06	127.36	118.30
37	3	68	LEU	CA-CB-CG	9.54	137.24	115.30
31	h	56	LEU	CA-CB-CG	8.15	134.04	115.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
19	U	19	PRO	N-CA-CB	7.71	112.55	103.30
39	5	206	LEU	CB-CG-CD1	-7.49	98.27	111.00
38	4	263	LEU	CA-CB-CG	7.46	132.45	115.30
8	H	41	PRO	N-CA-CB	7.23	111.98	103.30
37	3	119	PRO	N-CA-CB	7.19	111.93	103.30
36	2	164	LEU	CA-CB-CG	-7.15	98.86	115.30
7	G	46	PRO	N-CA-CB	7.08	111.80	103.30
4	D	71	PRO	N-CA-CB	7.04	111.75	103.30
7	G	254	PRO	N-CA-CB	7.03	111.73	103.30
16	Q	105	LEU	CA-CB-CG	6.95	131.28	115.30
21	X	26	PRO	N-CA-CB	6.83	111.50	103.30
7	G	112	LEU	CA-CB-CG	6.80	130.94	115.30
35	1	286	LEU	CA-CB-CG	6.79	130.91	115.30
21	X	70	PRO	N-CA-CB	6.71	111.36	103.30
35	1	317	LEU	CB-CG-CD2	-6.69	99.62	111.00
31	h	123	LEU	CA-CB-CG	6.54	130.34	115.30
33	j	14	PRO	N-CA-CB	6.54	111.14	103.30
19	U	152	PRO	N-CA-CB	6.53	111.14	103.30
21	X	62	PRO	N-CA-CB	6.52	111.12	103.30
37	3	68	LEU	CB-CG-CD1	-6.50	99.96	111.00
7	G	257	PRO	N-CA-CB	6.47	111.07	103.30
6	F	30	PRO	N-CA-CB	6.43	111.02	103.30
9	I	52	PRO	N-CA-CB	6.41	110.99	103.30
13	M	32	PRO	N-CA-CB	6.39	110.97	103.30
38	4	65	PRO	N-CA-CB	6.38	110.96	103.30
36	2	350	LEU	CA-CB-CG	6.35	129.90	115.30
3	C	115	HIS	N-CA-C	6.32	128.07	111.00
1	A	225	LEU	CA-CB-CG	6.32	129.82	115.30
39	5	342	LEU	CA-CB-CG	6.28	129.74	115.30
31	h	40	ILE	CG1-CB-CG2	-6.21	97.74	111.40
33	j	6	PRO	N-CA-CB	6.21	110.75	103.30
8	H	44	PRO	N-CA-CB	6.21	110.75	103.30
13	M	69	LEU	CA-CB-CG	6.20	129.56	115.30
7	G	56	PRO	N-CA-CB	6.15	110.68	103.30
39	5	217	LEU	CA-CB-CG	6.13	129.40	115.30
38	4	468	PRO	N-CA-CB	6.12	110.65	103.30
21	X	51	PRO	N-CA-CB	6.11	110.64	103.30
7	G	235	PRO	N-CA-CB	6.08	110.60	103.30
3	C	70	PRO	N-CA-CB	6.06	110.57	103.30
21	X	6	PRO	N-CA-CB	6.03	110.54	103.30
39	5	494	PRO	N-CA-CB	6.01	110.51	103.30
33	j	64	PRO	N-CA-CB	6.00	110.50	103.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
39	5	19	PRO	N-CA-CB	5.99	110.49	103.30
39	5	514	PRO	N-CA-CB	5.99	110.48	103.30
19	U	11	PRO	N-CA-CB	5.96	110.45	103.30
39	5	441	PRO	N-CA-CB	5.93	110.42	103.30
2	B	420	ASP	CB-CG-OD1	5.90	123.61	118.30
9	I	51	PRO	N-CA-CB	5.89	110.37	103.30
20	W	9	PRO	N-CA-CB	5.87	110.34	103.30
36	2	360	LEU	CA-CB-CG	5.87	128.79	115.30
21	X	37	PRO	N-CA-CB	5.80	110.25	103.30
13	M	40	PRO	N-CA-CB	5.72	110.17	103.30
12	L	24	LEU	CA-CB-CG	5.71	128.44	115.30
10	J	151	PRO	N-CA-CB	5.71	110.15	103.30
35	1	181	PRO	N-CA-CB	5.70	110.14	103.30
39	5	89	LEU	CA-CB-CG	5.66	128.31	115.30
7	G	213	ASP	C-N-CA	-5.66	107.56	121.70
13	M	48	PRO	N-CA-CB	5.64	110.07	103.30
6	F	40	PRO	N-CA-CB	5.63	110.05	103.30
5	E	343	LEU	CB-CG-CD2	-5.61	101.46	111.00
19	U	148	PRO	N-CA-CB	5.58	109.99	103.30
3	C	92	PRO	N-CA-CB	5.57	109.98	103.30
20	W	10	PRO	N-CA-CB	5.51	109.92	103.30
39	5	161	LEU	CA-CB-CG	5.48	127.90	115.30
36	2	132	LEU	CA-CB-CG	5.47	127.89	115.30
39	5	650	LEU	CA-CB-CG	5.45	127.83	115.30
39	5	12	PRO	N-CA-CB	5.38	109.76	103.30
40	6	95	PRO	N-CA-CB	5.38	109.75	103.30
39	5	38	LEU	CA-CB-CG	5.29	127.47	115.30
35	1	153	ILE	CG1-CB-CG2	-5.27	99.80	111.40
8	H	49	PRO	N-CA-CB	5.27	109.62	103.30
21	X	20	PRO	N-CA-CB	5.26	109.62	103.30
2	B	333	ILE	CG1-CB-CG2	-5.25	99.86	111.40
36	2	9	LEU	CA-CB-CG	5.24	127.36	115.30
36	2	197	LEU	CA-CB-CG	5.24	127.35	115.30
39	5	130	LEU	CA-CB-CG	5.24	127.35	115.30
36	2	18	LEU	CA-CB-CG	5.13	127.09	115.30
30	g	51	LEU	CA-CB-CG	5.10	127.03	115.30
39	5	62	LEU	CA-CB-CG	5.10	127.04	115.30
1	A	660	ASP	CB-CG-OD1	5.05	122.85	118.30
36	2	259	VAL	CA-CB-CG2	5.01	118.42	110.90

There are no chirality outliers.

All (43) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
35	1	149	ILE	Peptide
35	1	176	VAL	Peptide
35	1	199	ARG	Peptide
35	1	203	ASP	Peptide
35	1	303	PHE	Peptide
35	1	324	PHE	Peptide
35	1	57	LEU	Peptide
35	1	93	LEU	Peptide
35	1	94	GLY	Peptide
36	2	258	LEU	Peptide
36	2	84	GLY	Peptide
38	4	226	PRO	Peptide
38	4	389	THR	Peptide
38	4	391	ASN	Peptide
39	5	454	SER	Peptide
41	8	21	ALA	Peptide
1	A	243	TYR	Peptide
1	A	248	ARG	Peptide
1	A	633	LEU	Peptide
2	B	151	MET	Peptide
2	B	445	ARG	Peptide
5	E	175	SER	Peptide
5	E	265	GLN	Peptide
5	E	349	ARG	Peptide
5	E	40	LEU	Peptide
5	E	63	GLY	Peptide
7	G	130	ASP	Peptide
7	G	36	TRP	Peptide
9	I	117	GLU	Peptide
10	J	54	PRO	Peptide
11	K	180	CYS	Peptide
12	L	78	TYR	Peptide
19	U	143	PHE	Peptide
19	U	22	VAL	Peptide
20	W	22	ASN	Peptide
21	X	26	PRO	Peptide
21	X	95	SER	Peptide
24	a	41	UNK	Peptide
29	f	72	SER	Peptide
30	g	56	SER	Peptide
31	h	101	ALA	Peptide
33	j	42	TYR	Peptide
34	n	117	UNK	Peptide

5.2 Too-close contacts

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

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	687/728 (94%)	604 (88%)	83 (12%)	0	100	100
2	B	441/488 (90%)	391 (89%)	49 (11%)	1 (0%)	44	78
3	C	414/466 (89%)	371 (90%)	39 (9%)	4 (1%)	13	48
4	D	78/87 (90%)	66 (85%)	11 (14%)	1 (1%)	10	41
5	E	316/375 (84%)	261 (83%)	55 (17%)	0	100	100
6	F	117/144 (81%)	101 (86%)	14 (12%)	2 (2%)	7	36
7	G	230/281 (82%)	180 (78%)	45 (20%)	5 (2%)	5	30
8	H	183/243 (75%)	151 (82%)	29 (16%)	3 (2%)	8	37
9	I	178/229 (78%)	148 (83%)	28 (16%)	2 (1%)	12	46
10	J	138/198 (70%)	123 (89%)	15 (11%)	0	100	100
11	K	167/210 (80%)	143 (86%)	23 (14%)	1 (1%)	22	59
12	L	84/86 (98%)	69 (82%)	15 (18%)	0	100	100
13	M	103/136 (76%)	84 (82%)	17 (16%)	2 (2%)	6	33
14	O	75/109 (69%)	68 (91%)	6 (8%)	1 (1%)	10	41
15	P	114/124 (92%)	103 (90%)	11 (10%)	0	100	100
16	Q	83/132 (63%)	70 (84%)	13 (16%)	0	100	100
17	R	100/109 (92%)	90 (90%)	10 (10%)	0	100	100
19	U	156/172 (91%)	128 (82%)	24 (15%)	4 (3%)	4	26
20	W	116/123 (94%)	104 (90%)	11 (10%)	1 (1%)	14	50
21	X	115/169 (68%)	81 (70%)	27 (24%)	7 (6%)	1	13
22	Y	113/161 (70%)	95 (84%)	18 (16%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
26	c	40/60 (67%)	35 (88%)	5 (12%)	0	100	100
27	d	87/92 (95%)	78 (90%)	9 (10%)	0	100	100
29	f	78/87 (90%)	66 (85%)	12 (15%)	0	100	100
30	g	58/63 (92%)	42 (72%)	16 (28%)	0	100	100
31	h	128/138 (93%)	103 (80%)	24 (19%)	1 (1%)	16	53
33	j	71/93 (76%)	62 (87%)	7 (10%)	2 (3%)	4	25
35	1	338/341 (99%)	291 (86%)	46 (14%)	1 (0%)	37	72
36	2	448/469 (96%)	400 (89%)	46 (10%)	2 (0%)	30	67
37	3	106/128 (83%)	87 (82%)	18 (17%)	1 (1%)	14	50
38	4	473/486 (97%)	394 (83%)	72 (15%)	7 (2%)	8	39
39	5	635/655 (97%)	554 (87%)	78 (12%)	3 (0%)	25	63
40	6	181/185 (98%)	162 (90%)	19 (10%)	0	100	100
41	8	80/99 (81%)	71 (89%)	9 (11%)	0	100	100
42	9	57/89 (64%)	52 (91%)	5 (9%)	0	100	100
All	All	6788/7755 (88%)	5828 (86%)	909 (13%)	51 (1%)	19	53

All (51) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	C	116	VAL
4	D	71	PRO
6	F	29	THR
7	G	34	PRO
7	G	46	PRO
7	G	55	GLU
7	G	235	PRO
7	G	254	PRO
8	H	41	PRO
8	H	44	PRO
9	I	52	PRO
13	M	32	PRO
19	U	19	PRO
19	U	148	PRO
21	X	5	THR
21	X	6	PRO
21	X	26	PRO
21	X	70	PRO

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
33	j	6	PRO
36	2	259	VAL
37	3	119	PRO
38	4	448	ILE
39	5	12	PRO
2	B	40	ILE
20	W	8	LEU
38	4	65	PRO
38	4	241	ALA
39	5	455	ASN
39	5	456	ILE
21	X	61	ASP
38	4	386	THR
11	K	158	HIS
33	j	14	PRO
3	C	92	PRO
9	I	51	PRO
19	U	151	LYS
21	X	22	ILE
21	X	62	PRO
36	2	429	ILE
3	C	69	SER
13	M	78	GLY
38	4	109	PHE
19	U	152	PRO
6	F	40	PRO
8	H	49	PRO
14	O	54	PRO
31	h	108	PRO
38	4	227	ILE
38	4	479	VAL
3	C	71	ILE
35	1	200	PRO

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	563/595 (95%)	563 (100%)	0	100	100
2	B	340/389 (87%)	339 (100%)	1 (0%)	91	92
3	C	320/394 (81%)	317 (99%)	3 (1%)	75	83
4	D	44/69 (64%)	44 (100%)	0	100	100
5	E	275/329 (84%)	275 (100%)	0	100	100
6	F	89/129 (69%)	89 (100%)	0	100	100
7	G	143/245 (58%)	143 (100%)	0	100	100
8	H	144/212 (68%)	143 (99%)	1 (1%)	81	87
9	I	148/187 (79%)	147 (99%)	1 (1%)	81	87
10	J	80/147 (54%)	80 (100%)	0	100	100
11	K	146/180 (81%)	144 (99%)	2 (1%)	62	76
12	L	75/75 (100%)	75 (100%)	0	100	100
13	M	60/115 (52%)	60 (100%)	0	100	100
14	O	65/91 (71%)	64 (98%)	1 (2%)	60	75
15	P	104/110 (94%)	104 (100%)	0	100	100
16	Q	72/111 (65%)	72 (100%)	0	100	100
17	R	84/100 (84%)	84 (100%)	0	100	100
19	U	110/148 (74%)	110 (100%)	0	100	100
20	W	89/102 (87%)	89 (100%)	0	100	100
21	X	17/133 (13%)	17 (100%)	0	100	100
22	Y	98/140 (70%)	98 (100%)	0	100	100
26	c	11/45 (24%)	11 (100%)	0	100	100
27	d	82/85 (96%)	82 (100%)	0	100	100
29	f	69/73 (94%)	69 (100%)	0	100	100
30	g	49/52 (94%)	49 (100%)	0	100	100
31	h	115/123 (94%)	114 (99%)	1 (1%)	75	83
33	j	17/73 (23%)	17 (100%)	0	100	100
35	1	272/302 (90%)	272 (100%)	0	100	100
36	2	340/433 (78%)	340 (100%)	0	100	100
37	3	93/114 (82%)	93 (100%)	0	100	100
38	4	295/434 (68%)	295 (100%)	0	100	100
39	5	426/580 (73%)	426 (100%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
40	6	88/167 (53%)	88 (100%)	0	100 100
41	8	69/76 (91%)	69 (100%)	0	100 100
42	9	49/76 (64%)	49 (100%)	0	100 100
All	All	5041/6634 (76%)	5031 (100%)	10 (0%)	91 94

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

Mol	Chain	Res	Type
2	B	381	CYS
3	C	177	PHE
3	C	269	ARG
3	C	428	ARG
8	H	172	CYS
9	I	152	ARG
11	K	77	TRP
11	K	85	CYS
14	O	66	SER
31	h	79	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (29) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	120	ASN
1	A	127	GLN
1	A	194	ASN
1	A	459	HIS
1	A	575	ASN
3	C	120	HIS
3	C	185	ASN
3	C	226	HIS
3	C	288	ASN
5	E	62	ASN
5	E	76	HIS
5	E	170	ASN
11	K	100	GLN
11	K	193	GLN
13	M	103	ASN
15	P	63	HIS
15	P	95	GLN
19	U	50	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
19	U	105	ASN
27	d	20	HIS
29	f	28	ASN
30	g	21	HIS
31	h	78	HIS
36	2	357	ASN
38	4	103	ASN
38	4	207	GLN
38	4	400	GLN
39	5	233	HIS
39	5	312	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 16 ligands modelled in this entry, 1 is monoatomic - leaving 15 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	$\#\|Z\| > 2$
43	SF4	A	802	1	0,12,12	-	-	-		
43	SF4	A	801	1	0,12,12	-	-	-		
43	SF4	I	301	9	0,12,12	-	-	-		

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
43	SF4	I	302	9	0,12,12	-	-	-		
50	3PE	g	202	-	42,42,50	0.93	4 (9%)	45,47,55	1.11	2 (4%)
44	FES	H	301	8	0,4,4	-	-	-		
48	ZMP	O	201	14	22,28,36	2.01	6 (27%)	27,35,45	2.13	9 (33%)
45	FMN	B	502	-	33,33,33	2.57	10 (30%)	48,50,50	1.55	9 (18%)
50	3PE	1	401	-	50,50,50	0.85	3 (6%)	53,55,55	1.15	2 (3%)
49	CDL	g	201	-	82,82,99	0.95	7 (8%)	88,94,111	1.16	5 (5%)
46	NDP	E	401	-	45,52,52	4.06	20 (44%)	53,80,80	2.25	11 (20%)
43	SF4	K	301	11	0,12,12	-	-	-		
50	3PE	4	501	-	42,42,50	0.95	4 (9%)	45,47,55	1.13	3 (6%)
44	FES	A	803	1	0,4,4	-	-	-		
43	SF4	B	501	2	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
43	SF4	A	802	1	-	-	0/6/5/5
50	3PE	g	202	-	-	24/46/46/54	-
43	SF4	A	801	1	-	-	0/6/5/5
43	SF4	B	501	2	-	-	0/6/5/5
43	SF4	I	301	9	-	-	0/6/5/5
43	SF4	I	302	9	-	-	0/6/5/5
48	ZMP	O	201	14	-	5/33/35/43	-
45	FMN	B	502	-	-	12/18/18/18	0/3/3/3
50	3PE	1	401	-	-	28/54/54/54	-
44	FES	H	301	8	-	-	0/1/1/1
49	CDL	g	201	-	-	43/93/93/110	-
43	SF4	K	301	11	-	-	0/6/5/5
50	3PE	4	501	-	-	22/46/46/54	-
44	FES	A	803	1	-	-	0/1/1/1
46	NDP	E	401	-	-	5/30/77/77	0/5/5/5

All (54) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
46	E	401	NDP	O4B-C1B	14.81	1.61	1.41

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
46	E	401	NDP	C6N-C5N	12.17	1.55	1.33
46	E	401	NDP	O4D-C1D	8.02	1.61	1.42
46	E	401	NDP	C2D-C1D	-7.37	1.29	1.53
46	E	401	NDP	O4D-C4D	-6.95	1.29	1.45
45	B	502	FMN	C4A-N5	6.69	1.43	1.30
46	E	401	NDP	O4B-C4B	-6.20	1.31	1.45
45	B	502	FMN	C10-N1	5.98	1.45	1.33
48	O	201	ZMP	C13-N1	5.43	1.45	1.33
46	E	401	NDP	C2N-C3N	5.43	1.50	1.34
48	O	201	ZMP	C16-N2	5.17	1.44	1.33
45	B	502	FMN	C2-N1	4.76	1.48	1.36
46	E	401	NDP	C7N-N7N	4.75	1.46	1.33
45	B	502	FMN	C5A-N5	4.38	1.47	1.39
45	B	502	FMN	C2-N3	4.22	1.48	1.39
45	B	502	FMN	C9A-N10	3.71	1.47	1.41
46	E	401	NDP	C6A-N6A	3.66	1.47	1.34
45	B	502	FMN	O2-C2	-3.46	1.17	1.24
45	B	502	FMN	C4-N3	3.39	1.45	1.38
46	E	401	NDP	C4N-C5N	3.33	1.57	1.48
45	B	502	FMN	C10-N10	3.07	1.44	1.37
46	E	401	NDP	O3D-C3D	-3.04	1.35	1.43
46	E	401	NDP	O2D-C2D	2.92	1.49	1.43
46	E	401	NDP	O3B-C3B	-2.90	1.36	1.43
46	E	401	NDP	C7N-C3N	2.84	1.54	1.48
45	B	502	FMN	O4-C4	-2.76	1.18	1.23
49	g	201	CDL	OB6-CB4	-2.68	1.39	1.46
49	g	201	CDL	OA6-CA4	-2.68	1.39	1.46
46	E	401	NDP	C5A-C4A	-2.59	1.34	1.40
48	O	201	ZMP	O3-C16	-2.51	1.18	1.23
48	O	201	ZMP	C10-S1	2.50	1.82	1.76
50	g	202	3PE	O21-C2	-2.46	1.40	1.46
50	1	401	3PE	O31-C31	2.45	1.40	1.33
46	E	401	NDP	P2B-O2B	2.43	1.63	1.59
50	4	501	3PE	O31-C31	2.41	1.40	1.33
46	E	401	NDP	O7N-C7N	-2.41	1.18	1.24
46	E	401	NDP	C6N-N1N	2.38	1.43	1.37
49	g	201	CDL	OA8-CA7	2.36	1.40	1.33
50	g	202	3PE	O31-C31	2.36	1.40	1.33
50	4	501	3PE	O21-C21	2.33	1.40	1.34
46	E	401	NDP	C4N-C3N	2.30	1.54	1.49
50	1	401	3PE	O21-C21	2.29	1.40	1.34
48	O	201	ZMP	O2-C13	-2.29	1.18	1.23

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
49	g	201	CDL	OB8-CB7	2.27	1.40	1.33
50	4	501	3PE	O21-C2	-2.27	1.40	1.46
48	O	201	ZMP	C9-C10	2.26	1.53	1.50
50	1	401	3PE	O31-C3	-2.24	1.40	1.45
50	g	202	3PE	O31-C3	-2.22	1.40	1.45
50	g	202	3PE	O21-C21	2.20	1.40	1.34
50	4	501	3PE	O31-C3	-2.20	1.40	1.45
49	g	201	CDL	OB8-CB6	-2.18	1.40	1.45
49	g	201	CDL	OA8-CA6	-2.13	1.40	1.45
46	E	401	NDP	C2A-N3A	2.06	1.35	1.32
49	g	201	CDL	OA6-CA5	2.05	1.40	1.34

All (41) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
46	E	401	NDP	C5A-C6A-N6A	9.75	135.16	120.35
46	E	401	NDP	N6A-C6A-N1A	-7.33	103.35	118.57
48	O	201	ZMP	C9-C10-S1	6.68	121.24	113.46
46	E	401	NDP	N3A-C2A-N1A	-6.19	119.01	128.68
50	1	401	3PE	O21-C21-C22	4.67	121.56	111.50
50	4	501	3PE	O21-C21-C22	4.25	120.66	111.50
49	g	201	CDL	OB6-CB5-C51	4.15	120.44	111.50
46	E	401	NDP	PN-O3-PA	-4.05	118.92	132.83
50	g	202	3PE	O21-C21-C22	4.04	120.21	111.50
48	O	201	ZMP	O1-C10-C9	-4.01	119.25	123.99
49	g	201	CDL	OA6-CA5-C11	3.98	120.08	111.50
45	B	502	FMN	C4-N3-C2	-3.78	118.66	125.64
45	B	502	FMN	C7M-C7-C6	-3.39	113.23	119.49
48	O	201	ZMP	C14-C15-N2	-2.97	105.91	111.90
45	B	502	FMN	O4-C4-C4A	-2.94	118.80	126.60
50	g	202	3PE	O31-C31-C32	2.80	120.68	111.91
46	E	401	NDP	C1B-N9A-C4A	-2.79	121.74	126.64
48	O	201	ZMP	C20-C18-C17	2.79	113.66	108.82
48	O	201	ZMP	C11-S1-C10	2.76	110.48	101.87
45	B	502	FMN	C4-C4A-C10	2.72	121.36	116.79
50	4	501	3PE	O31-C31-C32	2.67	120.29	111.91
49	g	201	CDL	OA8-CA7-C31	2.62	120.14	111.91
46	E	401	NDP	C3D-C2D-C1D	2.58	106.34	101.43
49	g	201	CDL	OB8-CB7-C71	2.54	119.87	111.91
45	B	502	FMN	C4A-C4-N3	2.48	119.48	113.19
50	1	401	3PE	O31-C31-C32	2.44	119.56	111.91
49	g	201	CDL	CB4-OB6-CB5	-2.44	111.79	117.79

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
48	O	201	ZMP	C14-C13-N1	2.40	120.46	116.42
48	O	201	ZMP	O1-C10-S1	-2.39	119.51	122.61
45	B	502	FMN	C7M-C7-C8	2.37	125.60	120.74
46	E	401	NDP	C3N-C7N-N7N	2.32	121.79	117.67
46	E	401	NDP	O4B-C1B-C2B	-2.27	102.65	106.59
48	O	201	ZMP	O3-C16-N2	-2.24	118.18	122.99
46	E	401	NDP	C5B-C4B-C3B	-2.22	106.85	115.18
46	E	401	NDP	C3N-C2N-N1N	-2.20	119.95	123.10
45	B	502	FMN	C5A-C9A-N10	2.15	120.18	117.95
48	O	201	ZMP	C15-C14-C13	-2.12	108.82	112.36
45	B	502	FMN	C4A-C10-N10	2.06	119.50	116.48
50	4	501	3PE	C3-C2-C1	-2.06	106.92	111.79
45	B	502	FMN	C4A-C10-N1	-2.05	119.97	124.73
46	E	401	NDP	C4D-O4D-C1D	-2.01	105.03	109.47

There are no chirality outliers.

All (139) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
45	B	502	FMN	N10-C1'-C2'-O2'
45	B	502	FMN	N10-C1'-C2'-C3'
45	B	502	FMN	C1'-C2'-C3'-O3'
45	B	502	FMN	C1'-C2'-C3'-C4'
45	B	502	FMN	O2'-C2'-C3'-C4'
45	B	502	FMN	C3'-C4'-C5'-O5'
45	B	502	FMN	O4'-C4'-C5'-O5'
45	B	502	FMN	C5'-O5'-P-O2P
45	B	502	FMN	C5'-O5'-P-O3P
46	E	401	NDP	C1B-C2B-O2B-P2B
48	O	201	ZMP	S1-C11-C12-N1
48	O	201	ZMP	C7-C8-C9-C10
49	g	201	CDL	CA2-OA2-PA1-OA3
49	g	201	CDL	CB2-OB2-PB2-OB3
49	g	201	CDL	CB2-OB2-PB2-OB4
49	g	201	CDL	CB2-OB2-PB2-OB5
49	g	201	CDL	CB3-OB5-PB2-OB4
50	g	202	3PE	O22-C21-O21-C2
50	g	202	3PE	C22-C21-O21-C2
50	1	401	3PE	C22-C21-O21-C2
50	4	501	3PE	C1-O11-P-O12
50	4	501	3PE	C1-O11-P-O13
50	4	501	3PE	C1-O11-P-O14

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
50	4	501	3PE	O13-C11-C12-N
49	g	201	CDL	OB9-CB7-OB8-CB6
50	1	401	3PE	O22-C21-O21-C2
49	g	201	CDL	C71-CB7-OB8-CB6
50	g	202	3PE	C36-C37-C38-C39
45	B	502	FMN	O2'-C2'-C3'-O3'
46	E	401	NDP	O4B-C4B-C5B-O5B
49	g	201	CDL	CA7-C31-C32-C33
50	4	501	3PE	C31-C32-C33-C34
49	g	201	CDL	CA5-C11-C12-C13
49	g	201	CDL	CB7-C71-C72-C73
49	g	201	CDL	CA2-OA2-PA1-OA5
49	g	201	CDL	CB3-OB5-PB2-OB2
50	g	202	3PE	C11-O13-P-O11
50	1	401	3PE	C1-O11-P-O13
50	g	202	3PE	C23-C24-C25-C26
50	1	401	3PE	C29-C2A-C2B-C2C
50	1	401	3PE	C2B-C2C-C2D-C2E
49	g	201	CDL	C40-C41-C42-C43
50	g	202	3PE	C2E-C2F-C2G-C2H
50	1	401	3PE	C37-C38-C39-C3A
49	g	201	CDL	C15-C16-C17-C18
49	g	201	CDL	C13-C14-C15-C16
50	g	202	3PE	C35-C36-C37-C38
50	g	202	3PE	C27-C28-C29-C2A
50	1	401	3PE	C36-C37-C38-C39
50	4	501	3PE	C33-C34-C35-C36
50	1	401	3PE	C2A-C2B-C2C-C2D
50	1	401	3PE	C21-C22-C23-C24
49	g	201	CDL	C73-C74-C75-C76
50	g	202	3PE	C34-C35-C36-C37
50	1	401	3PE	C32-C33-C34-C35
49	g	201	CDL	C76-C77-C78-C79
50	g	202	3PE	C2B-C2C-C2D-C2E
50	1	401	3PE	C28-C29-C2A-C2B
50	1	401	3PE	C2E-C2F-C2G-C2H
50	g	202	3PE	O13-C11-C12-N
50	g	202	3PE	C31-C32-C33-C34
50	4	501	3PE	C2D-C2E-C2F-C2G
49	g	201	CDL	C36-C37-C38-C39
50	1	401	3PE	C39-C3A-C3B-C3C
49	g	201	CDL	C11-CA5-OA6-CA4

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
49	g	201	CDL	C51-CB5-OB6-CB4
48	O	201	ZMP	C6-C7-C8-C9
50	g	202	3PE	C28-C29-C2A-C2B
49	g	201	CDL	OA7-CA5-OA6-CA4
49	g	201	CDL	OB7-CB5-OB6-CB4
50	4	501	3PE	C21-C22-C23-C24
49	g	201	CDL	C33-C34-C35-C36
48	O	201	ZMP	C5-C6-C7-C8
49	g	201	CDL	C12-C13-C14-C15
50	4	501	3PE	O21-C2-C3-O31
50	4	501	3PE	C24-C25-C26-C27
50	g	202	3PE	C33-C34-C35-C36
49	g	201	CDL	C75-C76-C77-C78
49	g	201	CDL	C11-C12-C13-C14
49	g	201	CDL	C39-C40-C41-C42
50	g	202	3PE	C1-C2-C3-O31
50	g	202	3PE	C29-C2A-C2B-C2C
49	g	201	CDL	C35-C36-C37-C38
46	E	401	NDP	C3B-C4B-C5B-O5B
50	1	401	3PE	C1-C2-O21-C21
50	g	202	3PE	C37-C38-C39-C3A
50	4	501	3PE	C28-C29-C2A-C2B
45	B	502	FMN	C5'-O5'-P-O1P
50	4	501	3PE	C22-C23-C24-C25
49	g	201	CDL	C37-C38-C39-C40
50	4	501	3PE	C2B-C2C-C2D-C2E
49	g	201	CDL	CB5-C51-C52-C53
50	4	501	3PE	C1-C2-C3-O31
50	g	202	3PE	O21-C2-C3-O31
50	1	401	3PE	C1-C2-C3-O31
50	4	501	3PE	C34-C35-C36-C37
50	1	401	3PE	C26-C27-C28-C29
49	g	201	CDL	C38-C39-C40-C41
46	E	401	NDP	O4D-C1D-N1N-C6N
49	g	201	CDL	CA2-OA2-PA1-OA4
50	g	202	3PE	C11-O13-P-O14
50	1	401	3PE	C1-O11-P-O12
50	1	401	3PE	C1-O11-P-O14
49	g	201	CDL	OB6-CB4-CB6-OB8
49	g	201	CDL	C31-CA7-OA8-CA6
50	1	401	3PE	C3B-C3C-C3D-C3E
49	g	201	CDL	OA9-CA7-OA8-CA6

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
49	g	201	CDL	C16-C17-C18-C19
50	1	401	3PE	C3C-C3D-C3E-C3F
50	g	202	3PE	C1-O11-P-O13
50	1	401	3PE	C11-O13-P-O11
50	4	501	3PE	C23-C24-C25-C26
49	g	201	CDL	CB3-CB4-CB6-OB8
50	g	202	3PE	C32-C33-C34-C35
49	g	201	CDL	CA4-CA3-OA5-PA1
50	1	401	3PE	C2-C1-O11-P
45	B	502	FMN	C2'-C3'-C4'-O4'
48	O	201	ZMP	C12-C11-S1-C10
49	g	201	CDL	C31-C32-C33-C34
49	g	201	CDL	C52-C53-C54-C55
50	1	401	3PE	C2C-C2D-C2E-C2F
49	g	201	CDL	C19-C20-C21-C22
50	4	501	3PE	C2A-C2B-C2C-C2D
50	1	401	3PE	C33-C34-C35-C36
50	1	401	3PE	C3D-C3E-C3F-C3G
49	g	201	CDL	CB4-CB3-OB5-PB2
50	4	501	3PE	C25-C26-C27-C28
46	E	401	NDP	C5D-O5D-PN-O1N
50	4	501	3PE	C11-O13-P-O14
50	1	401	3PE	C22-C23-C24-C25
50	g	202	3PE	O21-C21-C22-C23
50	1	401	3PE	O21-C21-C22-C23
50	1	401	3PE	C24-C25-C26-C27
50	g	202	3PE	C12-C11-O13-P
50	4	501	3PE	C12-C11-O13-P
50	4	501	3PE	O21-C21-C22-C23
49	g	201	CDL	C17-C18-C19-C20
50	g	202	3PE	O22-C21-C22-C23
50	4	501	3PE	O22-C21-C22-C23

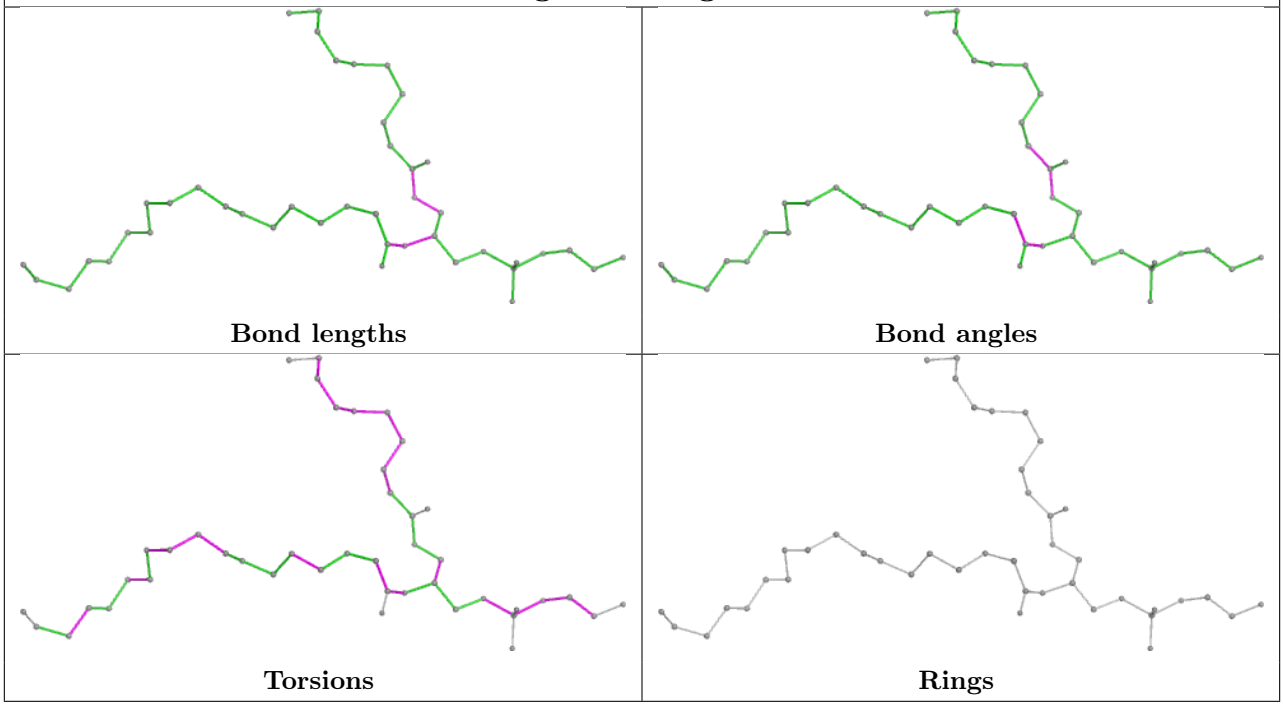
There are no ring outliers.

No monomer is involved in short contacts.

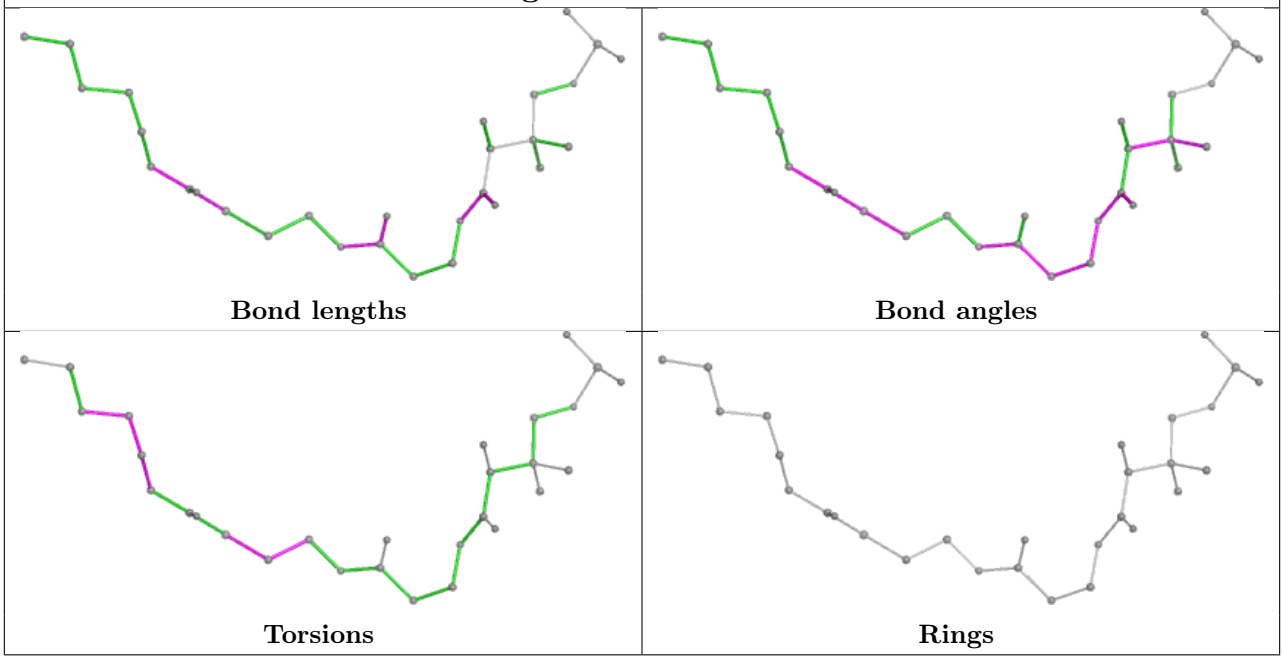
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

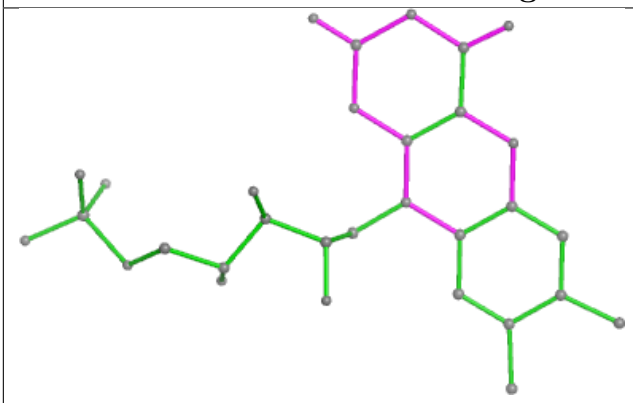
Ligand 3PE g 202



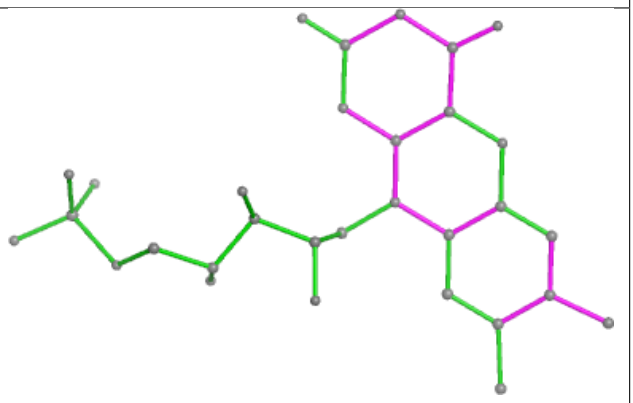
Ligand ZMP O 201



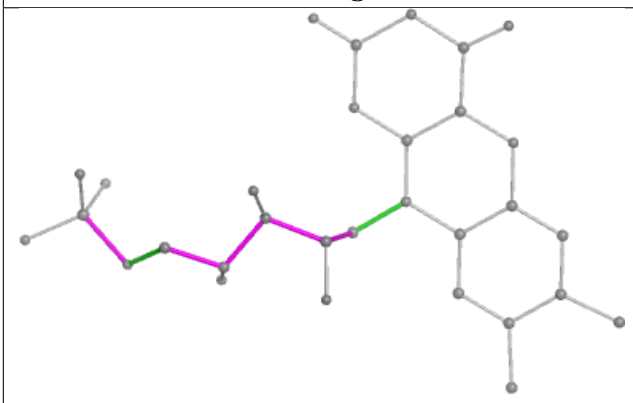
Ligand FMN B 502



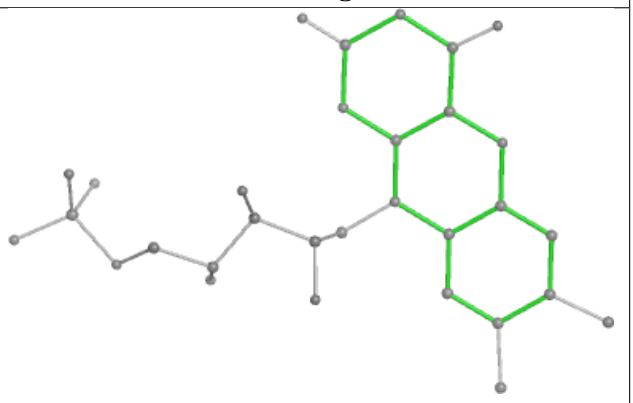
Bond lengths



Bond angles

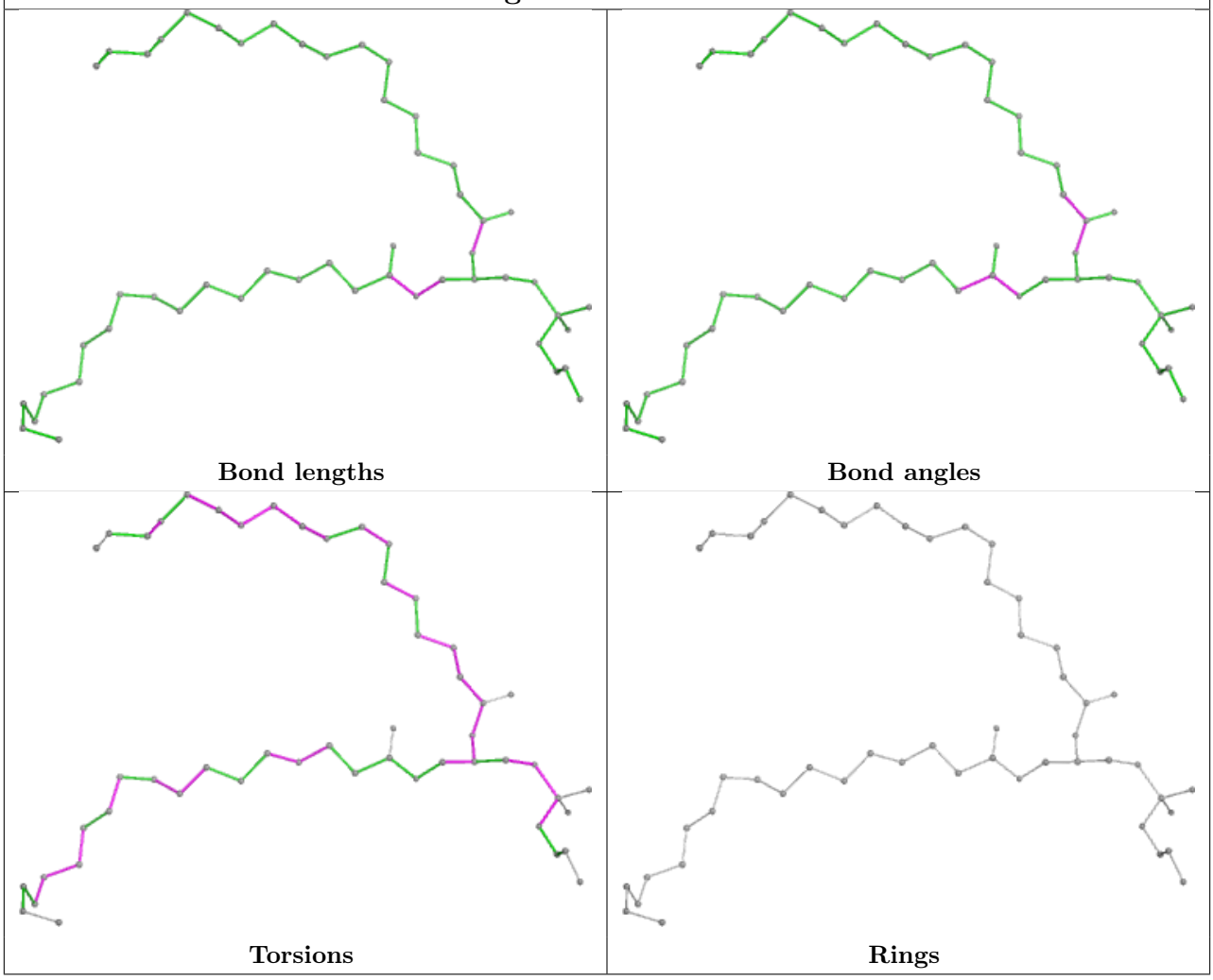


Torsions

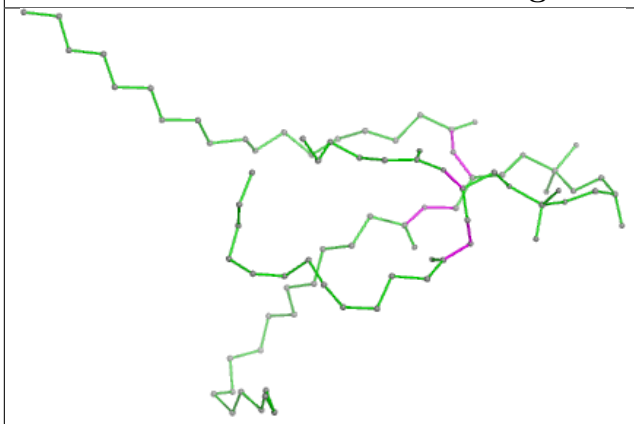


Rings

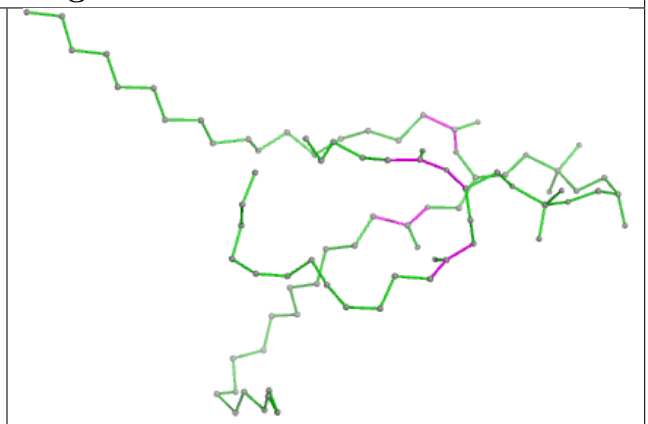
Ligand 3PE 1 401



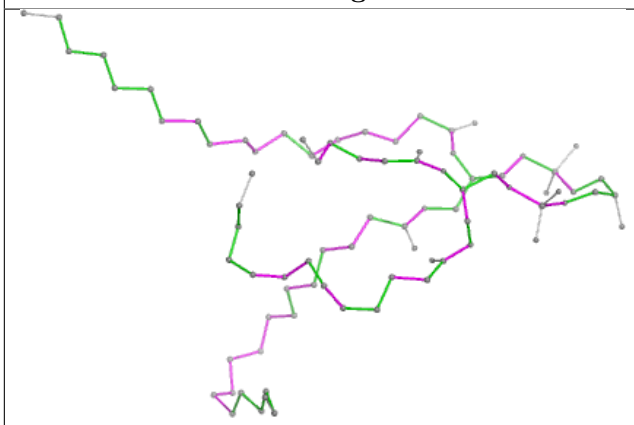
Ligand CDL g 201



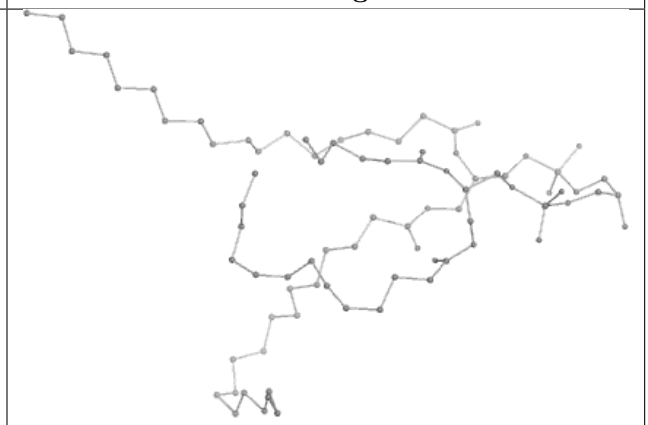
Bond lengths



Bond angles

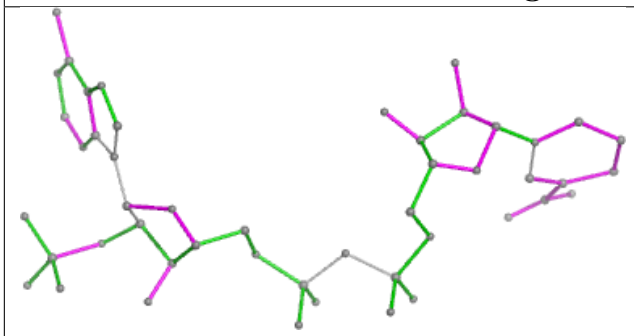


Torsions

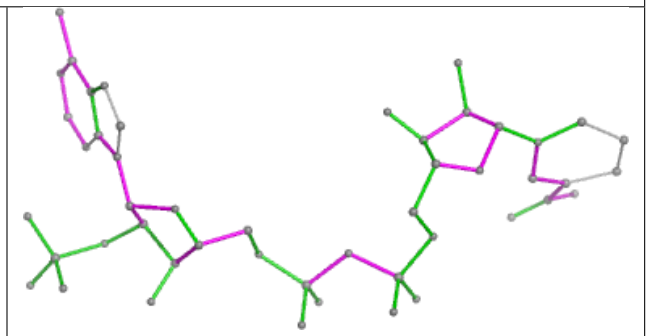


Rings

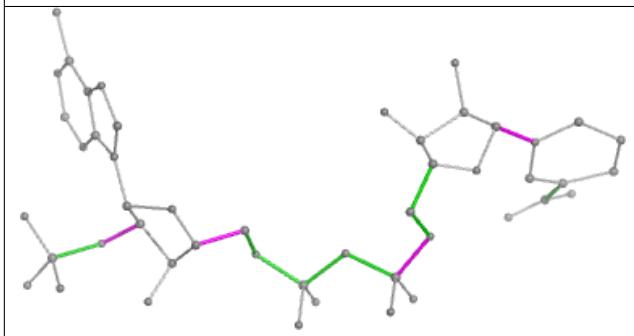
Ligand NDP E 401



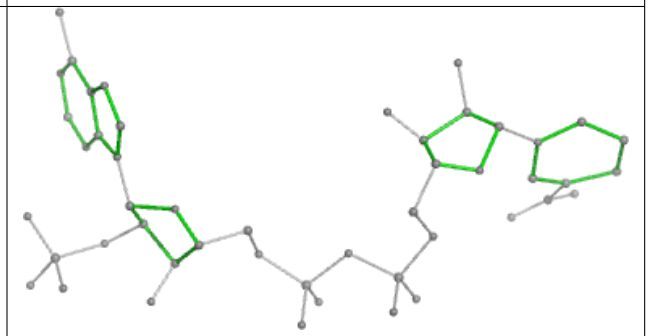
Bond lengths



Bond angles

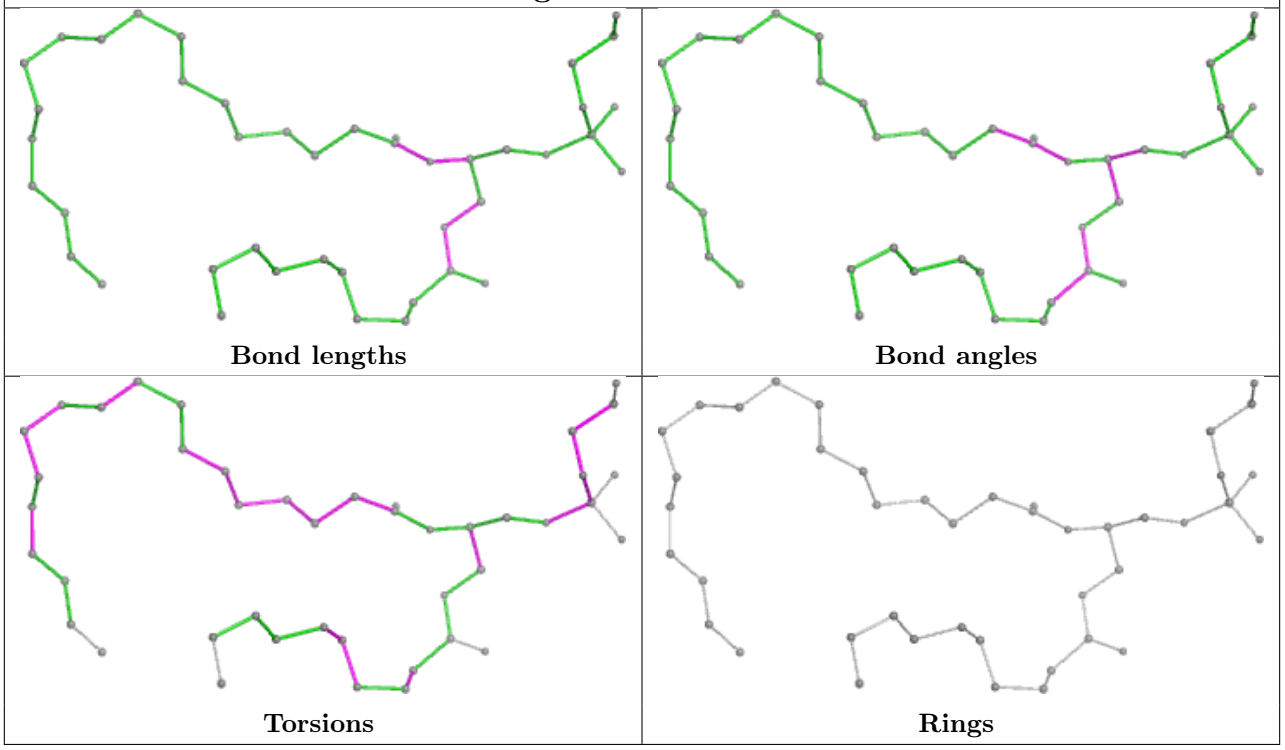


Torsions



Rings

Ligand 3PE 4 501



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

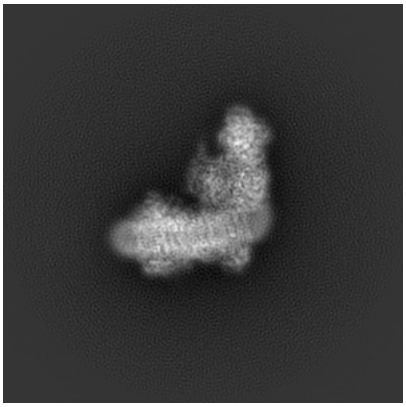
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-4384. These allow visual inspection of the internal detail of the map and identification of artifacts.

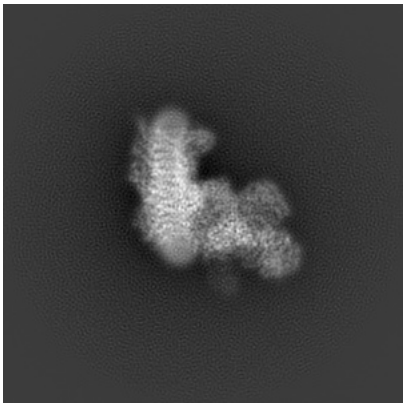
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

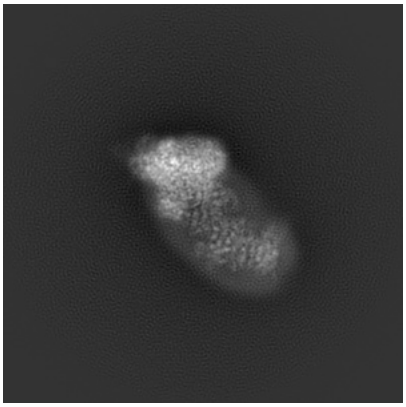
6.1.1 Primary map



X



Y

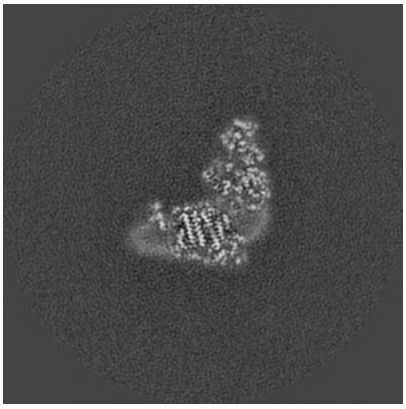


Z

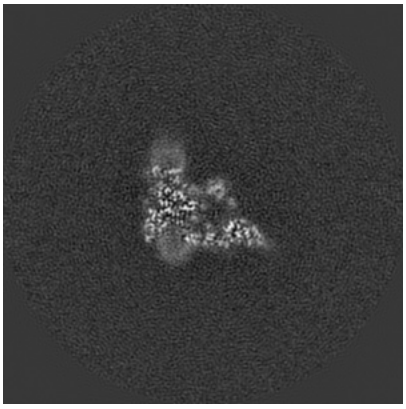
The images above show the map projected in three orthogonal directions.

6.2 Central slices

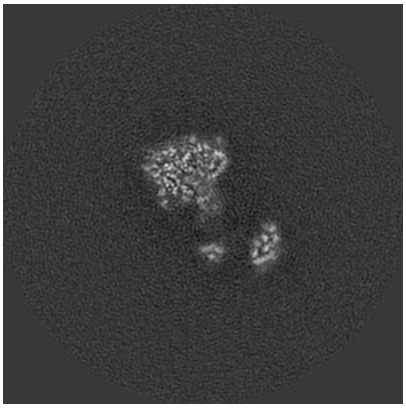
6.2.1 Primary map



X Index: 228



Y Index: 228

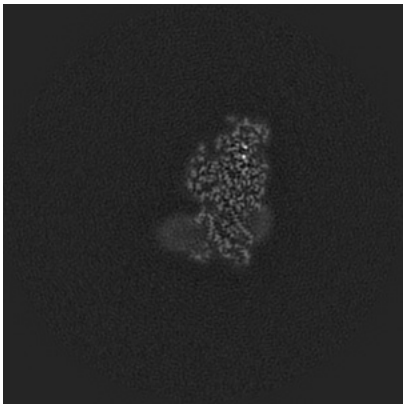


Z Index: 228

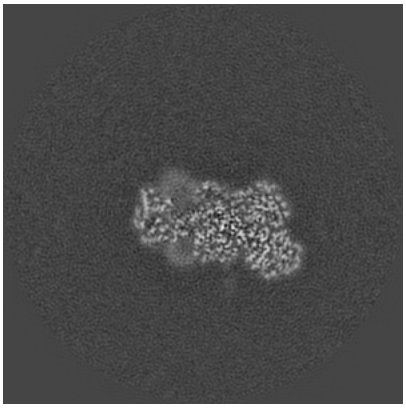
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

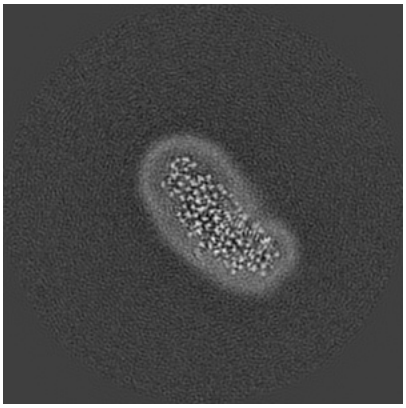
6.3.1 Primary map



X Index: 192



Y Index: 268

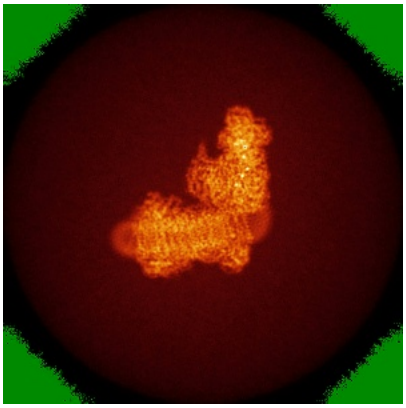


Z Index: 201

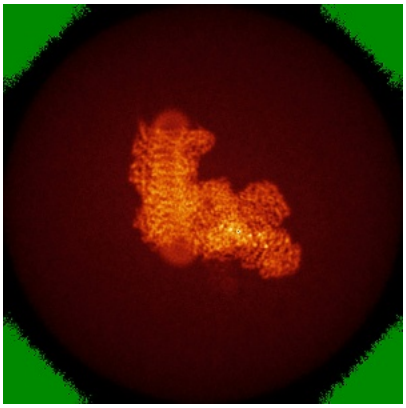
The images above show the largest variance slices of the map in three orthogonal directions.

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

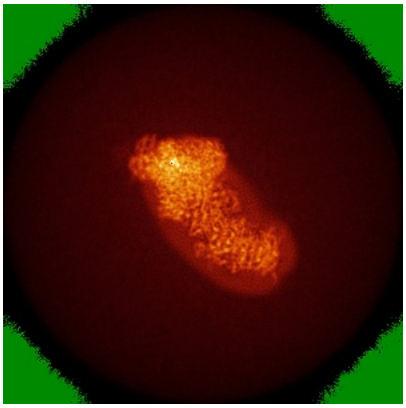
6.4.1 Primary map



X



Y



Z

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

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.045. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

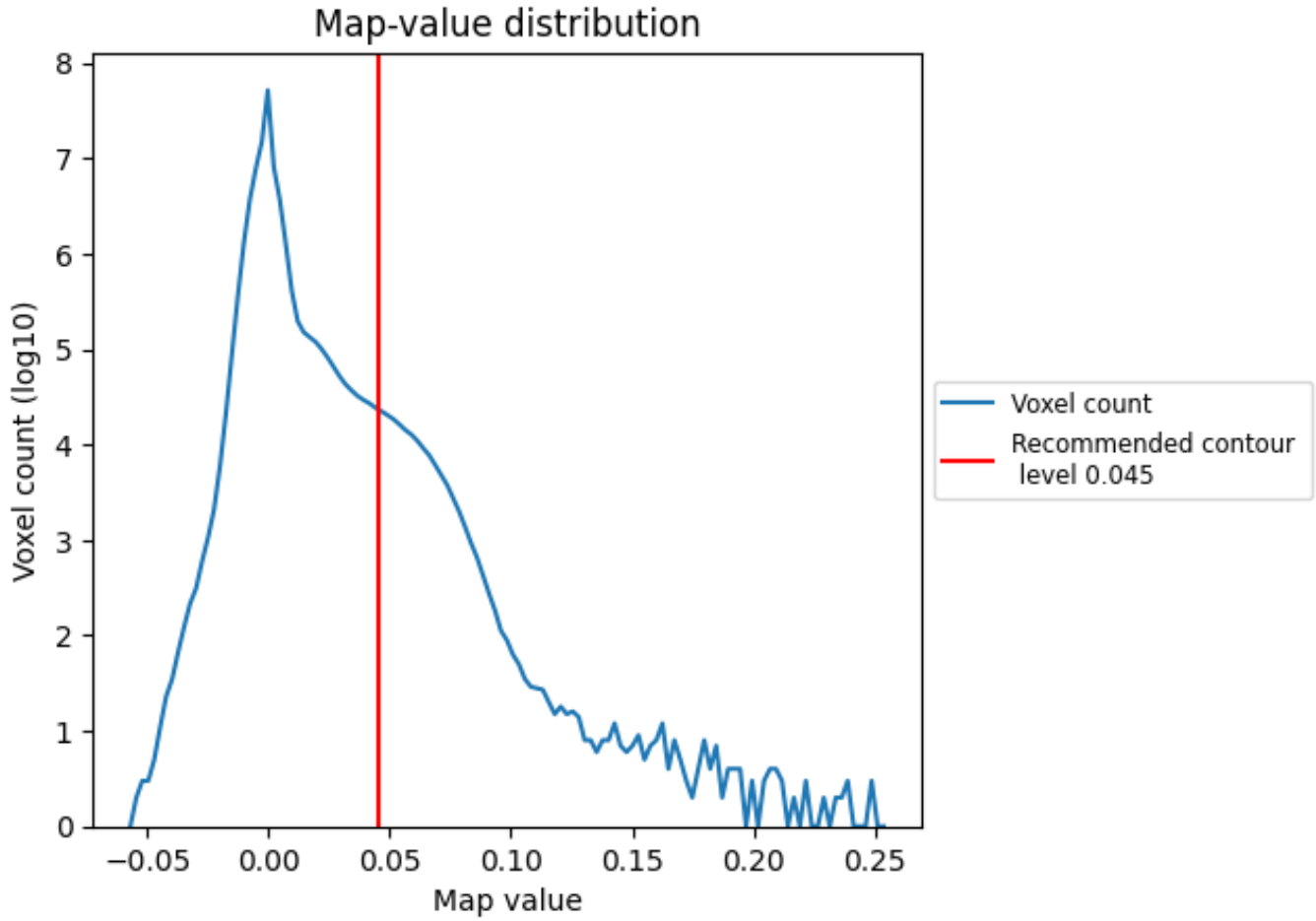
6.6 Mask visualisation (i)

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

7 Map analysis

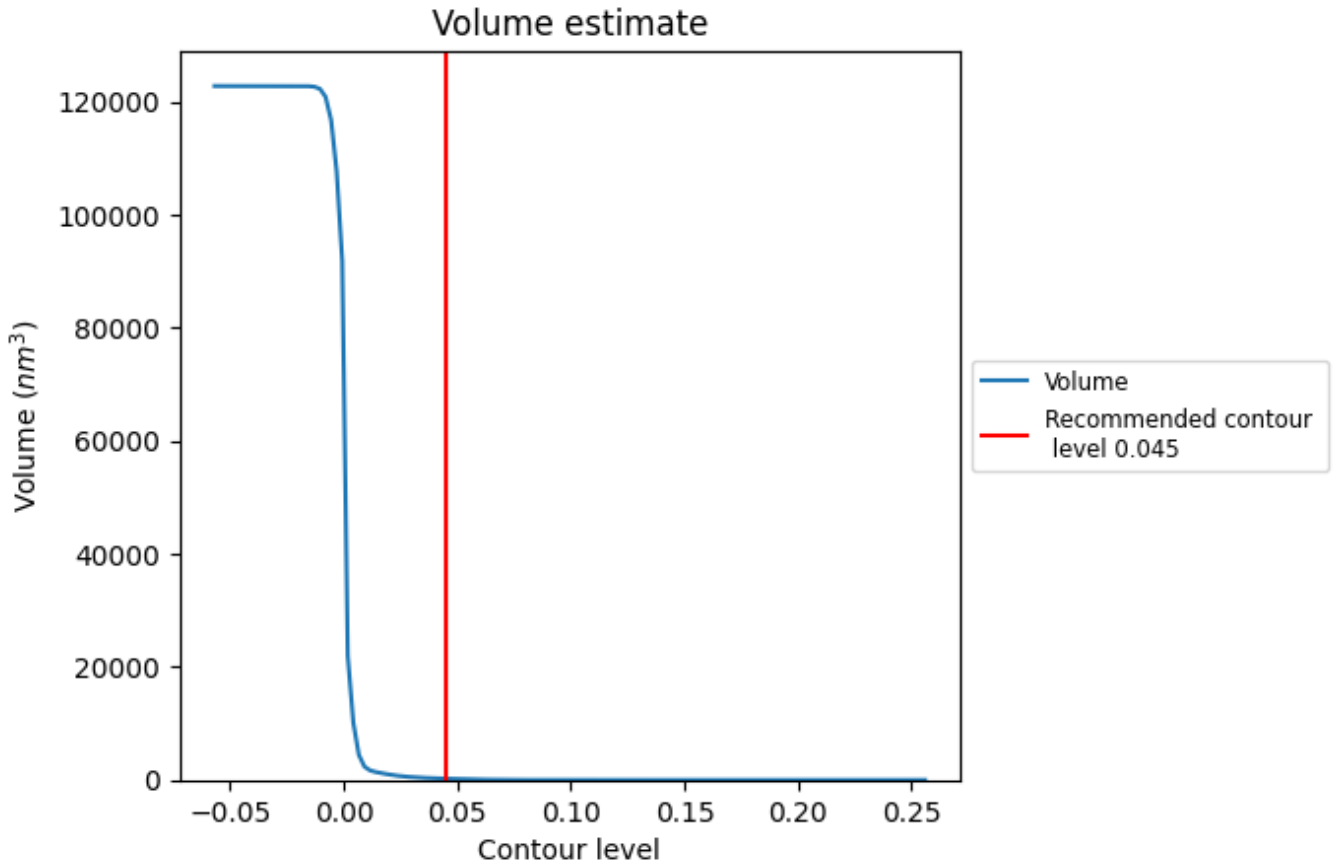
This section contains the results of statistical analysis of the map.

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.

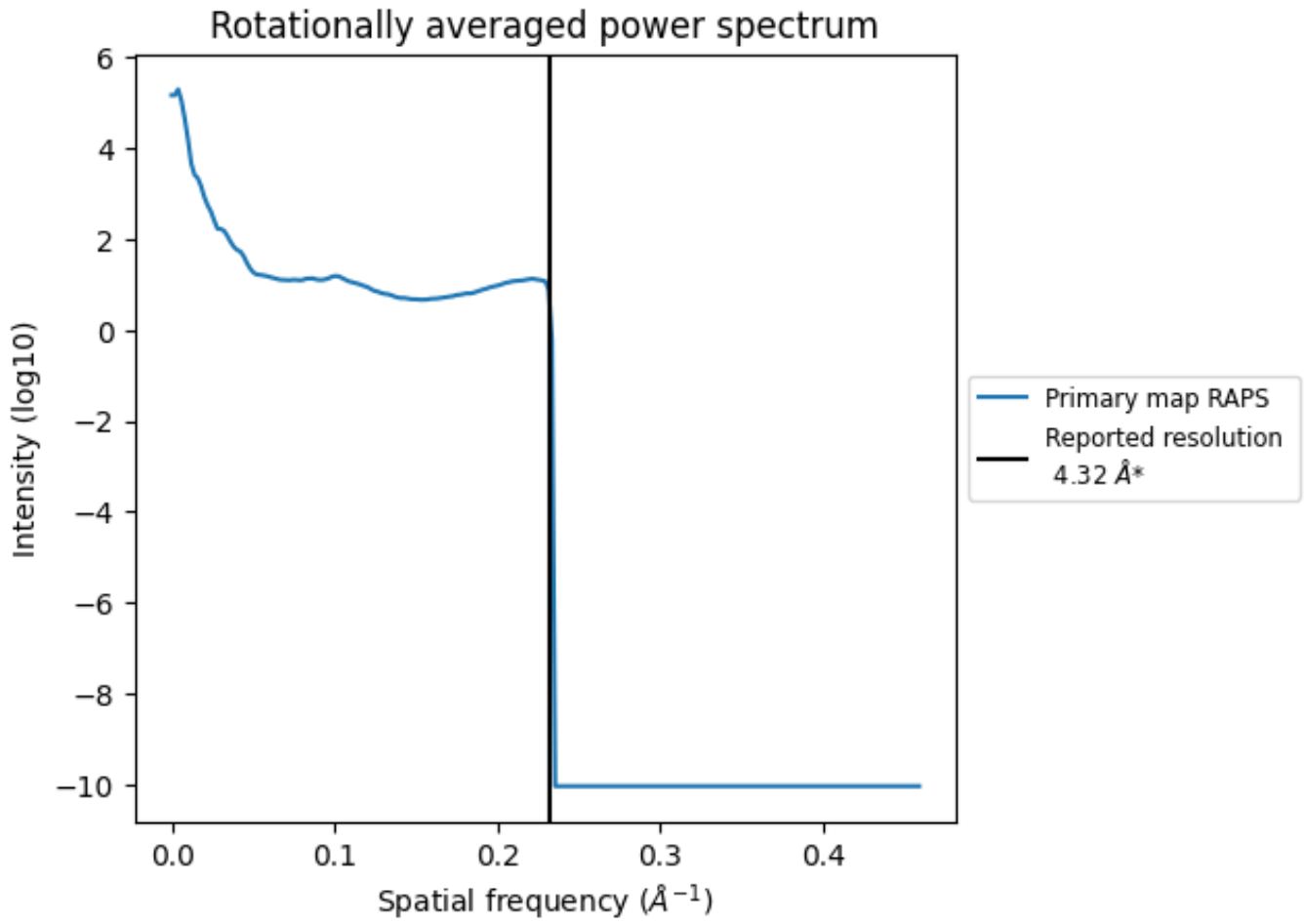
7.2 Volume estimate



The volume at the recommended contour level is 223 nm^3; this corresponds to an approximate mass of 202 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)

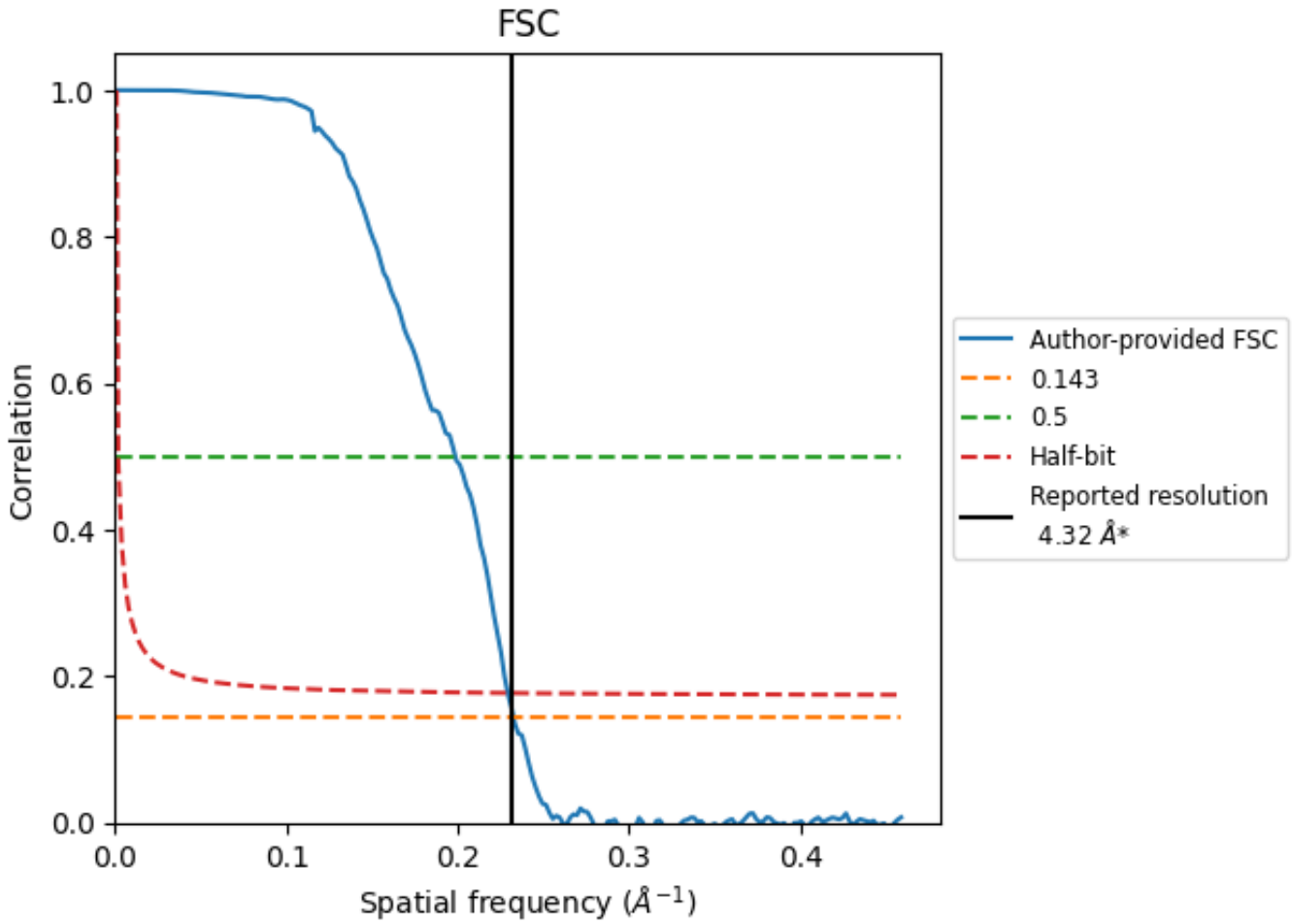


*Reported resolution corresponds to spatial frequency of 0.231 Å^{-1}

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 0.231 Å^{-1}

8.2 Resolution estimates (i)

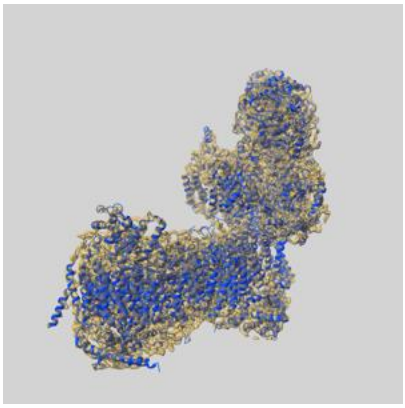
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.32	-	-
Author-provided FSC curve	4.30	5.04	4.36
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

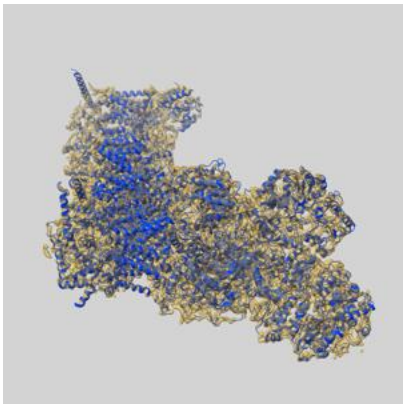
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-4384 and PDB model 6GCS. Per-residue inclusion information can be found in section 3 on page 16.

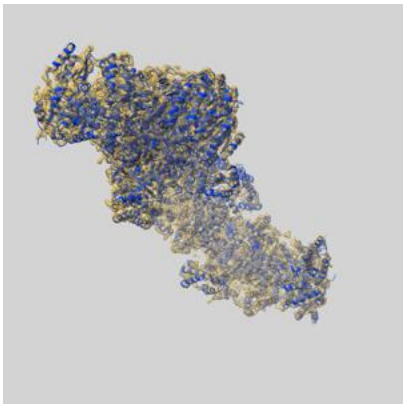
9.1 Map-model overlay



X



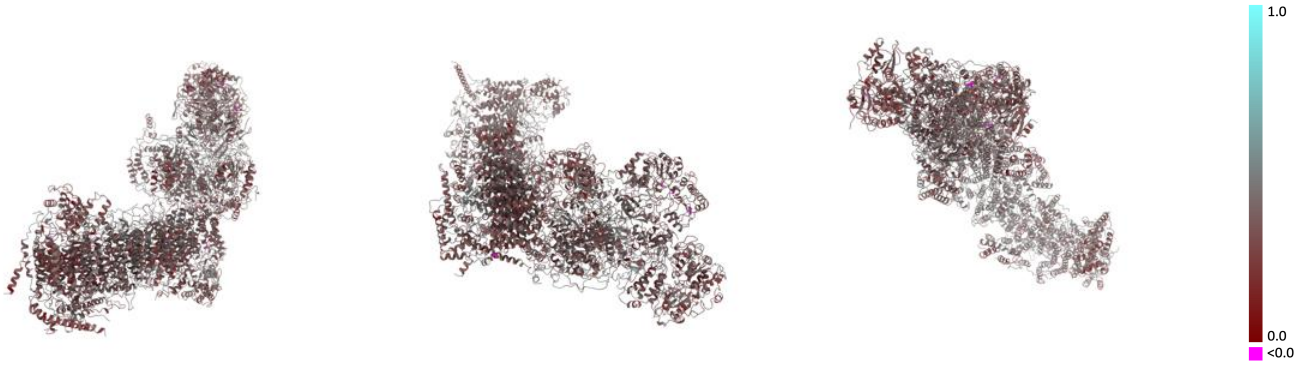
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.045 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

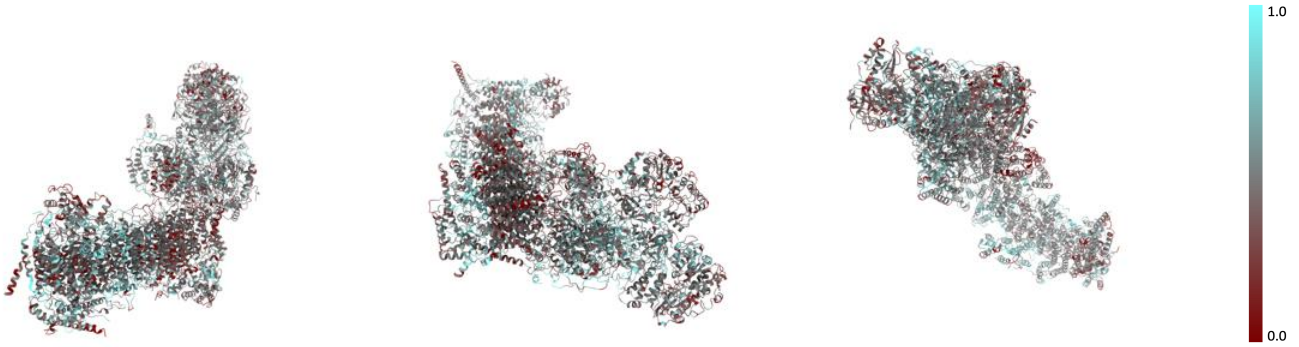
9.2 Q-score mapped to coordinate model



X Y Z

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

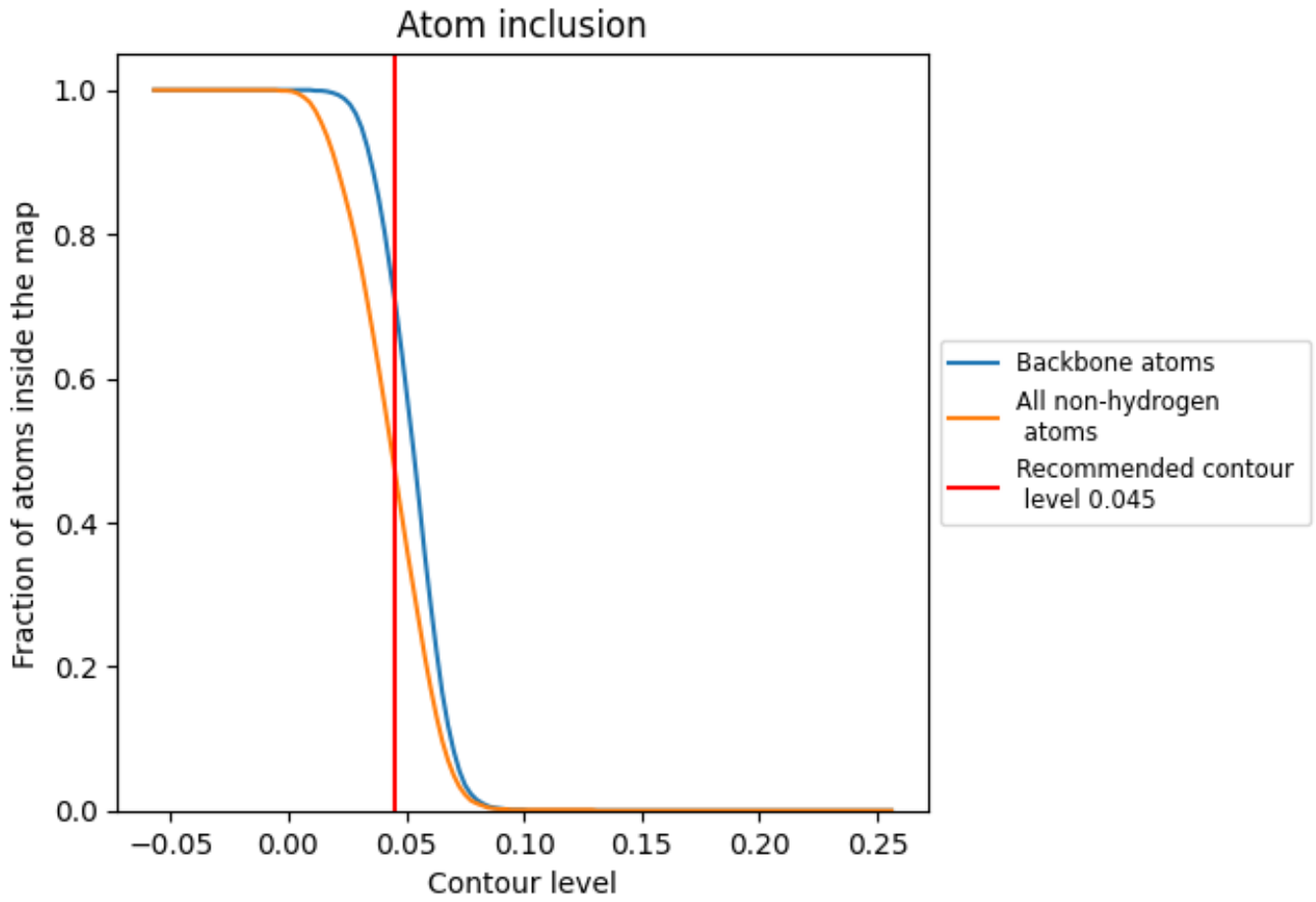
9.3 Atom inclusion mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.045).

9.4 Atom inclusion (i)



At the recommended contour level, 71% of all backbone atoms, 48% 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 (0.045) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4760	0.3710
1	0.4040	0.3510
2	0.5170	0.3900
3	0.3210	0.3650
4	0.4920	0.3770
5	0.4510	0.3460
6	0.3990	0.3890
8	0.3540	0.3110
9	0.4630	0.3350
A	0.4730	0.3650
B	0.4500	0.3440
C	0.4780	0.3900
D	0.4820	0.3780
E	0.4480	0.3640
F	0.4970	0.3730
G	0.5750	0.4070
H	0.4820	0.3450
I	0.5320	0.3770
J	0.3470	0.3500
K	0.5320	0.3860
L	0.4240	0.3750
M	0.5720	0.4050
O	0.2150	0.3280
P	0.4490	0.3790
Q	0.2880	0.3160
R	0.4530	0.3550
S	0.6020	0.3880
U	0.4660	0.3660
W	0.4460	0.3610
X	0.6380	0.4220
Y	0.4960	0.3990
Z	0.7390	0.4500
a	0.6890	0.4510
b	0.6510	0.3740
c	0.4160	0.3580

Continued on next page...

Continued from previous page...

Chain	Atom inclusion	Q-score
d	0.4810	0.3480
e	0.6280	0.4130
f	0.3840	0.3520
g	0.3760	0.3870
h	0.5030	0.3900
i	0.6350	0.3870
j	0.5920	0.4240
n	0.7100	0.4180