Full wwPDB EM Validation Report ⓘ

Nov 26, 2022 – 04:41 PM EST

PDB ID	:	5T0C
EMDB ID	:	EMD-8332
Title	:	Structural basis for dynamic regulation of the human 26S proteasome
Authors	:	Chen, S.; Wu, J.; Lu, Y.; Ma, Y.B.; Lee, B.H.; Yu, Z.; Ouyang, Q.; Finley, D.; Kirschner, M.W.; Mao, Y.
Deposited on	:	2016-08-15
Resolution	:	3.80 Å(reported)

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

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

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

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

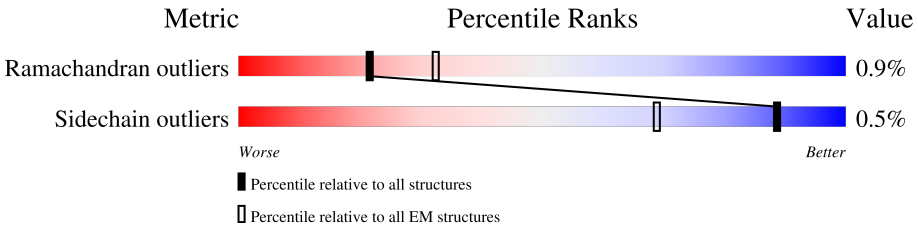
EMDB validation analysis	:	0.0.1.dev43
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.3

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.80 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	AU	953	82% 84% · 15%
1	BU	953	82% 84% · 15%
2	AV	533	89% 88% · 10%
2	BV	533	89% 88% · 10%
3	AW	456	99% 98% ·
3	BW	456	99% 98% ·
4	AX	422	90% 90% 10%
4	BX	422	89% 90% 10%
5	AY	389	92% 96% · ·

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Mol	Chain	Length	Quality of chain
5	BY	389	92% 96%
6	AZ	324	86% 87% 12%
6	BZ	324	86% 87% 12%
7	Aa	376	99% 97%
7	Ba	376	98% 97%
8	Ab	377	51% 50% 49%
8	Bb	377	51% 50% 49%
9	Ac	310	89% 90% 7%
9	Bc	310	89% 90% 7%
10	Ad	257	99% 98%
10	Bd	257	99% 98%
11	Ae	70	57% 56% 43%
11	Be	70	57% 56% 43%
12	Af	908	76% 75% 24%
12	Bf	908	76% 75% 24%
13	AA	433	27% 81% 17%
13	BA	433	27% 81% 17%
14	AB	440	35% 76% 22%
14	BB	440	35% 76% 22%
15	AD	418	58% 89% 9%
15	BD	418	58% 89% 9%
16	AE	389	43% 89% 9%
16	BE	389	43% 89% 9%
17	AF	439	33% 81% 17%
17	BF	439	33% 81% 17%

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Mol	Chain	Length	Quality of chain
18	AC	406	58% 92% • 5%
18	BC	406	57% 92% • 5%
19	AG	245	12% 97% ••
19	BG	245	12% 97% ••
20	AH	233	9% 99%
20	BH	233	9% 99%
21	AI	260	12% 96% •
21	BI	260	12% 96% •
22	AJ	247	13% 94% ••
22	BJ	247	13% 94% ••
23	AK	240	13% 94% • 5%
23	BK	240	13% 94% • 5%
24	AL	268	8% 89% 11%
24	BL	268	8% 89% 11%
25	AM	254	9% 93% • 6%
25	BM	254	9% 93% • 6%
26	AN	238	5% 80% 20%
26	BN	238	5% 80% 20%
27	AO	276	7% 80% 20%
27	BO	276	7% 80% 20%
28	AP	204	5% 100%
28	BP	204	5% 100%
29	AQ	201	12% 98% ••
29	BQ	201	12% 98% ••
30	AR	262	5% 77% 23%

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Mol	Chain	Length	Quality of chain
30	BR	262	5% 77% 23%
31	AS	240	89% 11%
31	BS	240	89% 11%
32	AT	263	5% 82% 18%
32	BT	263	5% 82% 18%

2 Entry composition

There are 35 unique types of molecules in this entry. The entry contains 155574 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 26S proteasome non-ATPase regulatory subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	AU	806	Total	C	N	O	S	0	0
			6287	3990	1075	1178	44		
1	BU	806	Total	C	N	O	S	0	0
			6287	3990	1075	1178	44		

- Molecule 2 is a protein called 26S proteasome non-ATPase regulatory subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	AV	480	Total	C	N	O	S	0	0
			3852	2444	684	710	14		
2	BV	480	Total	C	N	O	S	0	0
			3852	2444	684	710	14		

- Molecule 3 is a protein called 26S proteasome non-ATPase regulatory subunit 12.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	AW	456	Total	C	N	O	S	0	0
			3703	2339	635	704	25		
3	BW	456	Total	C	N	O	S	0	0
			3703	2339	635	704	25		

- Molecule 4 is a protein called 26S proteasome non-ATPase regulatory subunit 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	AX	380	Total	C	N	O	S	0	0
			3009	1918	509	570	12		
4	BX	380	Total	C	N	O	S	0	0
			3009	1918	509	570	12		

- Molecule 5 is a protein called 26S proteasome non-ATPase regulatory subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	AY	378	Total	C	N	O	S	0	0
			3115	1987	533	578	17		
5	BY	378	Total	C	N	O	S	0	0
			3115	1987	533	578	17		

- Molecule 6 is a protein called 26S proteasome non-ATPase regulatory subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	AZ	286	Total	C	N	O	S	0	0
			2281	1457	392	427	5		
6	BZ	286	Total	C	N	O	S	0	0
			2281	1457	392	427	5		

- Molecule 7 is a protein called 26S proteasome non-ATPase regulatory subunit 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	Aa	373	Total	C	N	O	S	0	0
			2995	1911	510	559	15		
7	Ba	373	Total	C	N	O	S	0	0
			2995	1911	510	559	15		

- Molecule 8 is a protein called 26S proteasome non-ATPase regulatory subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	Ab	191	Total	C	N	O	S	0	0
			1458	910	261	279	8		
8	Bb	191	Total	C	N	O	S	0	0
			1458	910	261	279	8		

- Molecule 9 is a protein called 26S proteasome non-ATPase regulatory subunit 14.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	Ac	287	Total	C	N	O	S	0	0
			2260	1430	389	422	19		
9	Bc	287	Total	C	N	O	S	0	0
			2260	1430	389	422	19		

- Molecule 10 is a protein called 26S proteasome non-ATPase regulatory subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	Ad	257	Total	C	N	O	S	0	0
			2116	1371	346	390	9		

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Mol	Chain	Residues	Atoms					AltConf	Trace
10	Bd	257	Total	C	N	O	S	0	0
			2116	1371	346	390	9		

- Molecule 11 is a protein called 26S proteasome complex subunit DSS1.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	Ae	40	Total	C	N	O	S	0	0
			334	200	55	77	2		
11	Be	40	Total	C	N	O	S	0	0
			334	200	55	77	2		

- Molecule 12 is a protein called 26S proteasome non-ATPase regulatory subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	Af	694	Total	C	N	O	S	0	0
			5331	3364	899	1027	41		
12	Bf	694	Total	C	N	O	S	0	0
			5331	3364	899	1027	41		

- Molecule 13 is a protein called 26S protease regulatory subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	AA	361	Total	C	N	O	S	0	0
			2835	1788	501	528	18		
13	BA	361	Total	C	N	O	S	0	0
			2835	1788	501	528	18		

- Molecule 14 is a protein called 26S protease regulatory subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	AB	341	Total	C	N	O	S	0	0
			2662	1671	453	526	12		
14	BB	341	Total	C	N	O	S	0	0
			2662	1671	453	526	12		

- Molecule 15 is a protein called 26S protease regulatory subunit 6B.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	AD	380	Total	C	N	O	S	0	0
			3040	1923	524	580	13		
15	BD	380	Total	C	N	O	S	0	0
			3040	1923	524	580	13		

- Molecule 16 is a protein called 26S protease regulatory subunit 10B.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	AE	353	Total	C	N	O	S	0	0
			2790	1755	494	525	16		
16	BE	353	Total	C	N	O	S	0	0
			2790	1755	494	525	16		

- Molecule 17 is a protein called 26S protease regulatory subunit 6A.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	AF	366	Total	C	N	O	S	0	0
			2863	1802	496	549	16		
17	BF	366	Total	C	N	O	S	0	0
			2863	1802	496	549	16		

- Molecule 18 is a protein called 26S protease regulatory subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	AC	384	Total	C	N	O	S	0	0
			3015	1894	540	564	17		
18	BC	384	Total	C	N	O	S	0	0
			3015	1894	540	564	17		

- Molecule 19 is a protein called Proteasome subunit alpha type-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	AG	240	Total	C	N	O	S	0	0
			1826	1160	305	348	13		
19	BG	240	Total	C	N	O	S	0	0
			1826	1160	305	348	13		

- Molecule 20 is a protein called Proteasome subunit alpha type-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	AH	232	Total	C	N	O	S	0	0
			1708	1081	289	333	5		
20	BH	232	Total	C	N	O	S	0	0
			1708	1081	289	333	5		

- Molecule 21 is a protein called Proteasome subunit alpha type-4.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	AI	250	Total	C	N	O	S	0	0
			1912	1204	329	371	8		
21	BI	250	Total	C	N	O	S	0	0
			1912	1204	329	371	8		

- Molecule 22 is a protein called Proteasome subunit alpha type-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	AJ	239	Total	C	N	O	S	0	0
			1704	1056	308	335	5		
22	BJ	239	Total	C	N	O	S	0	0
			1704	1056	308	335	5		

- Molecule 23 is a protein called Proteasome subunit alpha type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	AK	228	Total	C	N	O	S	0	0
			1722	1080	284	348	10		
23	BK	228	Total	C	N	O	S	0	0
			1722	1080	284	348	10		

- Molecule 24 is a protein called Proteasome subunit alpha type-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	AL	238	Total	C	N	O	S	0	0
			1850	1159	334	346	11		
24	BL	238	Total	C	N	O	S	0	0
			1850	1159	334	346	11		

- Molecule 25 is a protein called Proteasome subunit alpha type-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	AM	240	Total	C	N	O	S	0	0
			1856	1178	314	353	11		
25	BM	240	Total	C	N	O	S	0	0
			1856	1178	314	353	11		

- Molecule 26 is a protein called Proteasome subunit beta type-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	AN	191	Total	C	N	O	S	0	0
			1430	893	245	280	12		

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Mol	Chain	Residues	Atoms					AltConf	Trace
26	BN	191	Total	C	N	O	S	0	0
			1430	893	245	280	12		

- Molecule 27 is a protein called Proteasome subunit beta type-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	AO	220	Total	C	N	O	S	0	0
			1643	1033	280	318	12		
27	BO	220	Total	C	N	O	S	0	0
			1643	1033	280	318	12		

- Molecule 28 is a protein called Proteasome subunit beta type-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	AP	204	Total	C	N	O	S	0	0
			1585	1010	262	294	19		
28	BP	204	Total	C	N	O	S	0	0
			1585	1010	262	294	19		

- Molecule 29 is a protein called Proteasome subunit beta type-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	AQ	199	Total	C	N	O	S	0	0
			1570	1006	265	290	9		
29	BQ	199	Total	C	N	O	S	0	0
			1570	1006	265	290	9		

- Molecule 30 is a protein called Proteasome subunit beta type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	AR	201	Total	C	N	O	S	0	0
			1548	974	273	292	9		
30	BR	201	Total	C	N	O	S	0	0
			1548	974	273	292	9		

- Molecule 31 is a protein called Proteasome subunit beta type-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	AS	213	Total	C	N	O	S	0	0
			1641	1036	282	313	10		
31	BS	213	Total	C	N	O	S	0	0
			1641	1036	282	313	10		

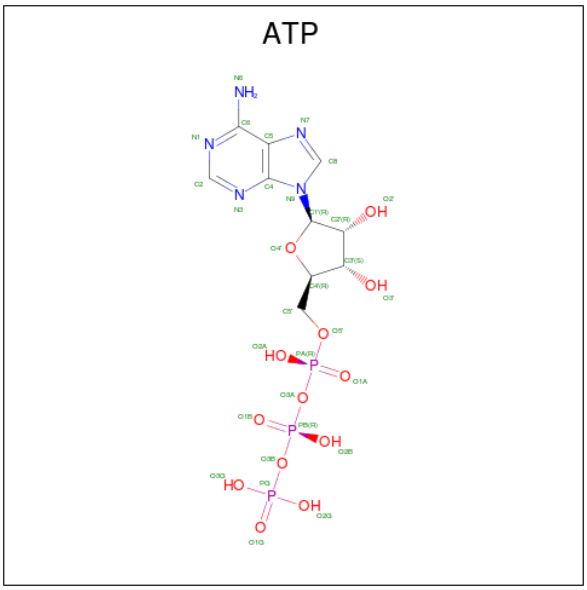
- Molecule 32 is a protein called Proteasome subunit beta type-4.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	AT	215	Total	C	N	O	S	0	0
			1667	1052	285	318	12		
32	BT	215	Total	C	N	O	S	0	0
			1667	1052	285	318	12		

- Molecule 33 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
33	Ac	1	Total	Zn	0
			1	1	
33	Bc	1	Total	Zn	0
			1	1	

- Molecule 34 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



Mol	Chain	Residues	Atoms					AltConf
34	AA	1	Total	C	N	O	P	0
			31	10	5	13	3	
34	AD	1	Total	C	N	O	P	0
			31	10	5	13	3	
34	AE	1	Total	C	N	O	P	0
			31	10	5	13	3	
34	AF	1	Total	C	N	O	P	0
			31	10	5	13	3	

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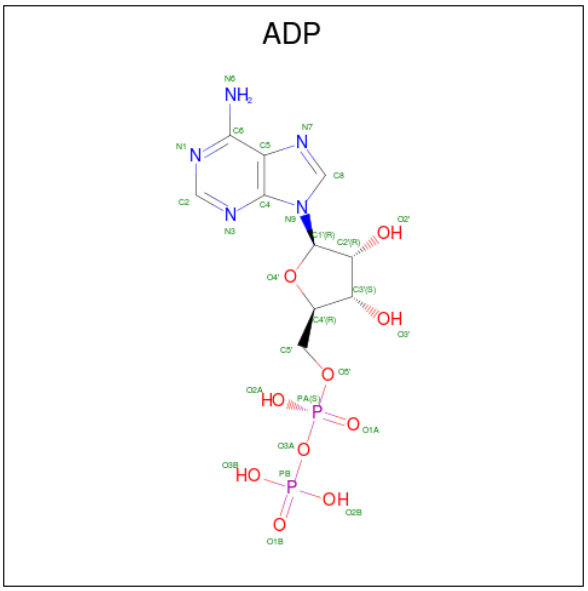
Mol	Chain	Residues	Atoms					AltConf
34	BA	1	Total	C	N	O	P	0
			31	10	5	13	3	
34	BD	1	Total	C	N	O	P	0
			31	10	5	13	3	
34	BE	1	Total	C	N	O	P	0
			31	10	5	13	3	
34	BF	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 35 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



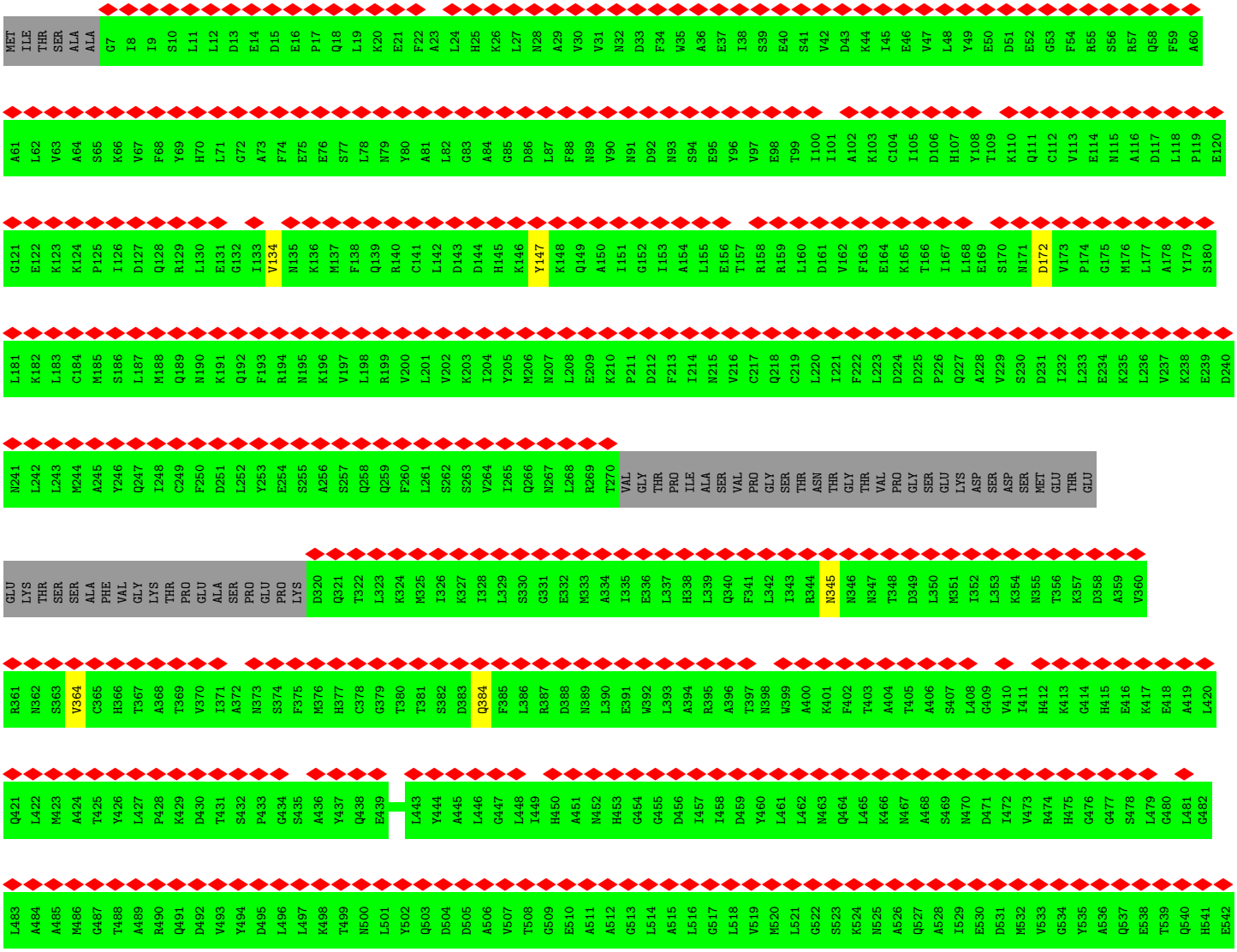
Mol	Chain	Residues	Atoms					AltConf
35	AB	1	Total	C	N	O	P	0
			27	10	5	10	2	
35	AC	1	Total	C	N	O	P	0
			27	10	5	10	2	
35	BB	1	Total	C	N	O	P	0
			27	10	5	10	2	
35	BC	1	Total	C	N	O	P	0
			27	10	5	10	2	

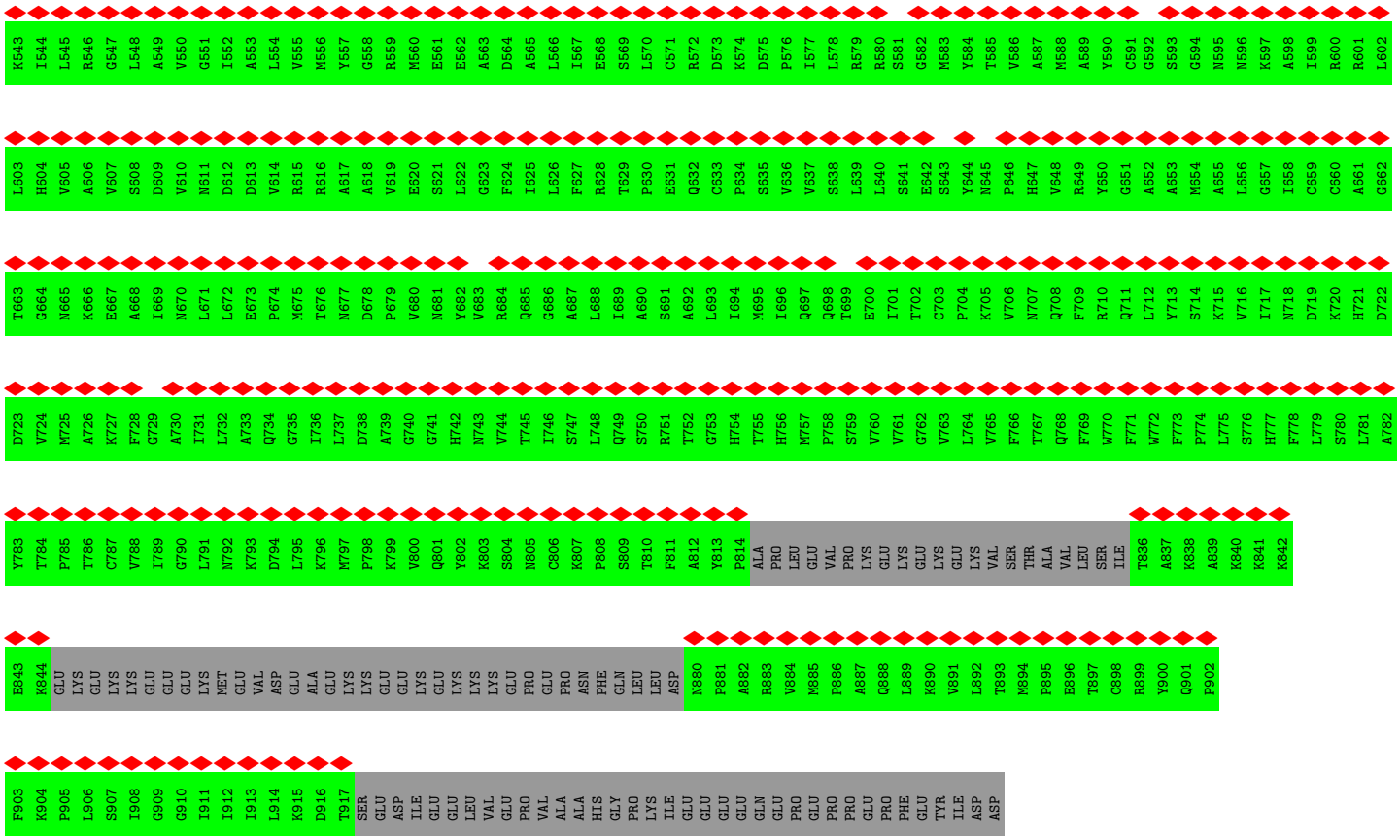
3 Residue-property plots (i)

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: 26S proteasome non-ATPase regulatory subunit 1

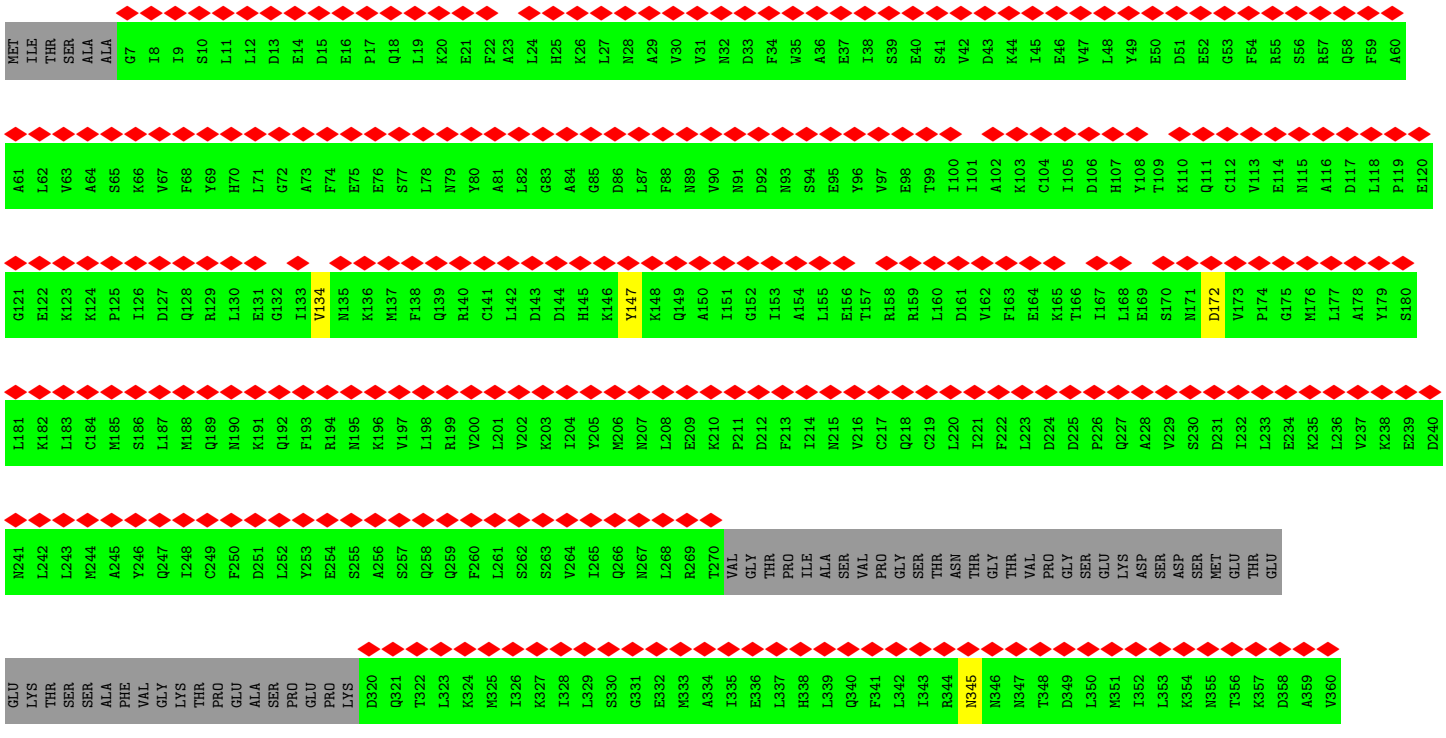
Chain AU:

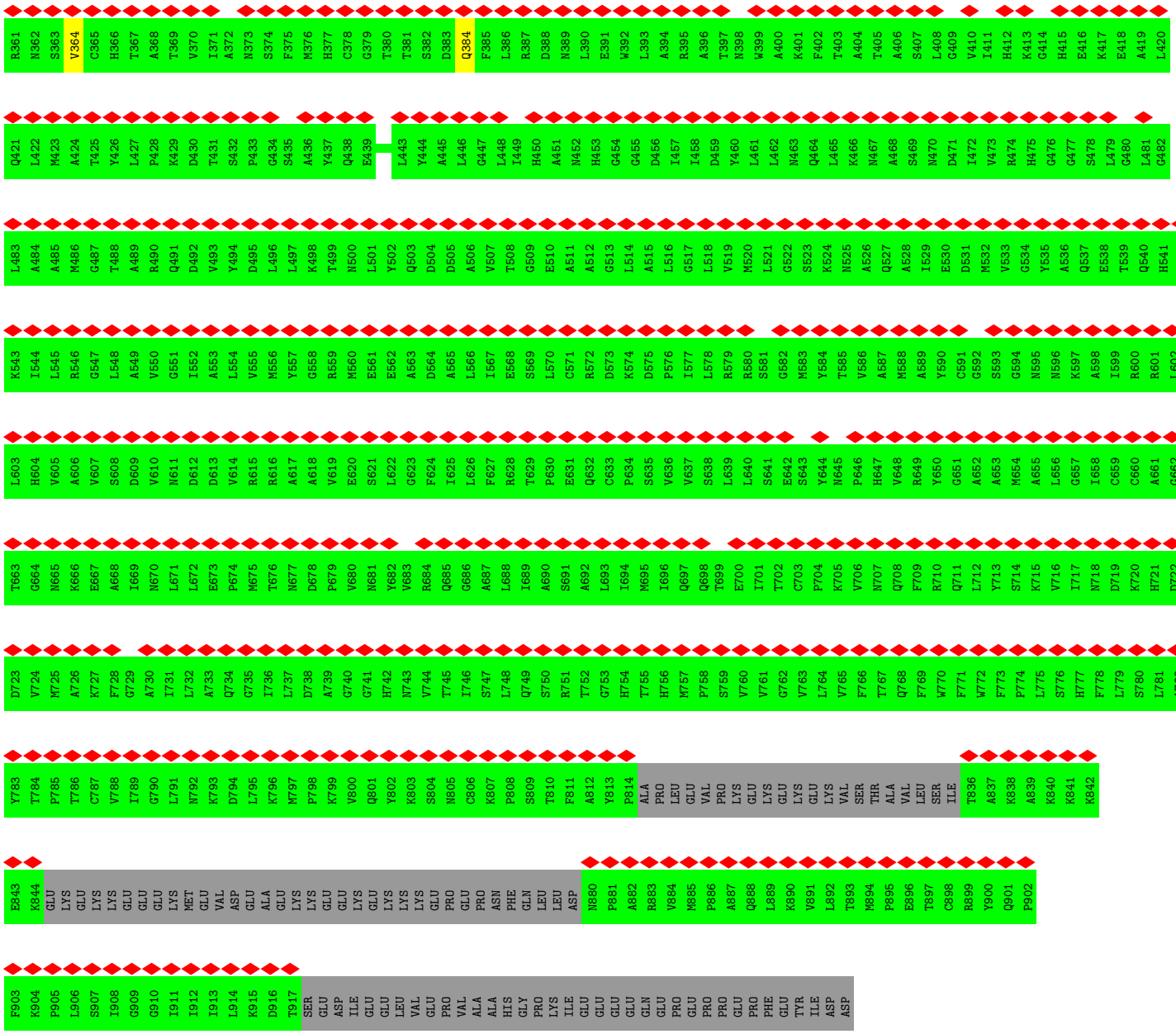




• Molecule 1: 26S proteasome non-ATPase regulatory subunit 1

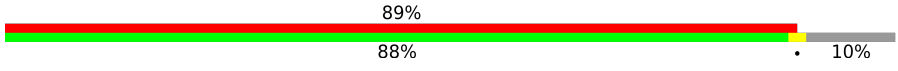
Chain BU:

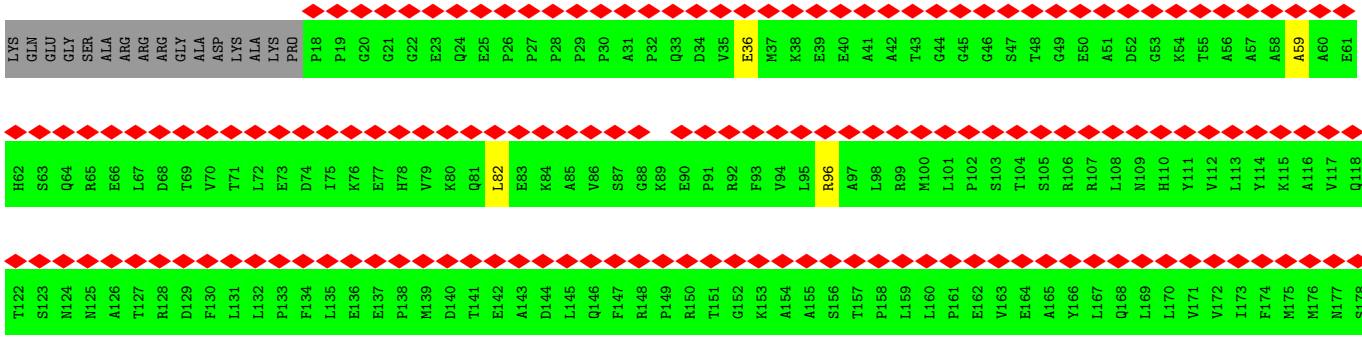


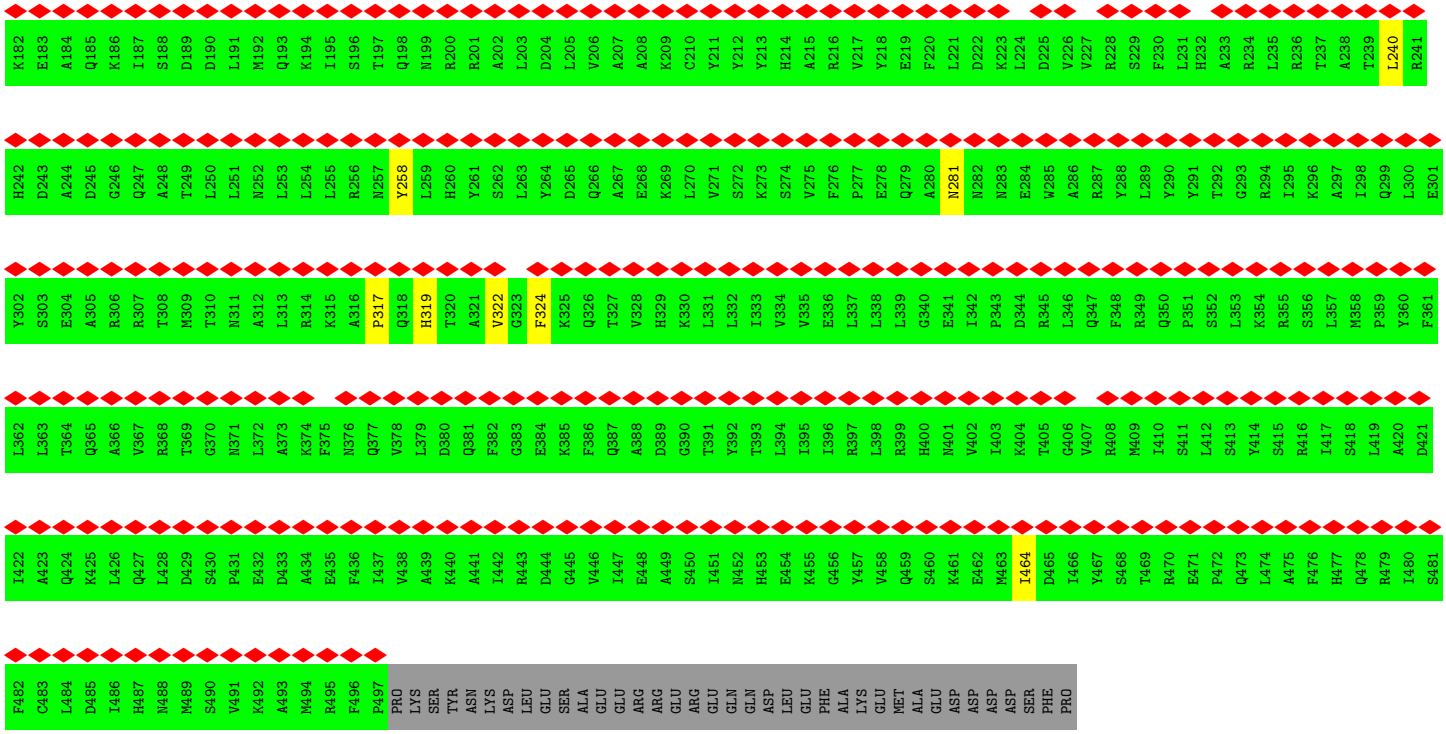


• Molecule 2: 26S proteasome non-ATPase regulatory subunit 3

Chain AV:

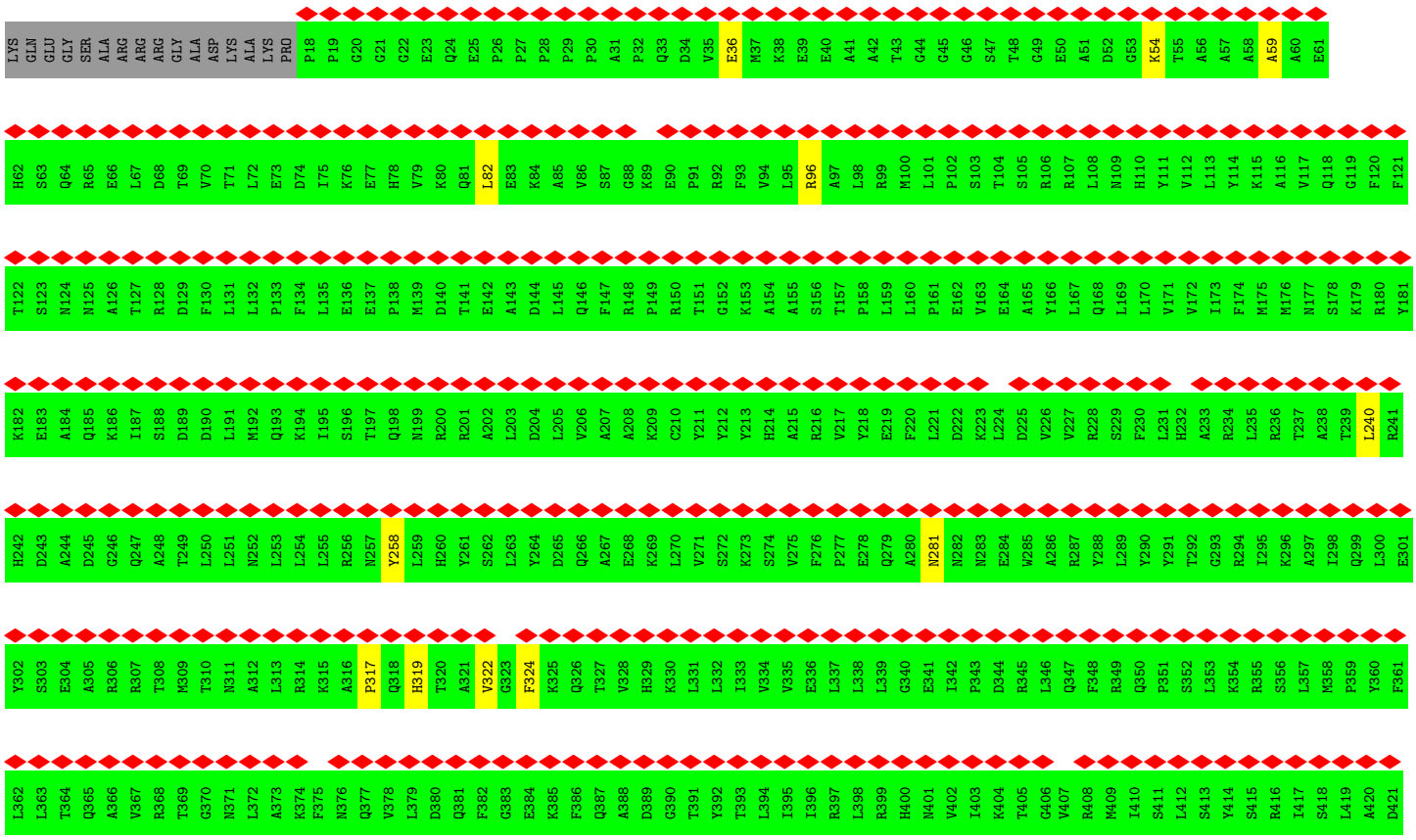






• Molecule 2: 26S proteasome non-ATPase regulatory subunit 3

Chain BV:



I422 A423 Q424 K425 L426 Q427 L428 D429 S430 P431 E432 D433 A434 E435 F436 I437 V438 A439 K440 A441 I442 R443 D444 G445 V446 I447 E448 A449 S450 I451 N452 H453 E454 K455 G456 Y457 V458 Q459 S460 K461 E462 M463 I464 D465 I466 Y467 S468 T469 R470 E471 P472 Q473 L474 A475 F476 H477 Q478 R479 I480 S481

F482 C483 L484 D485 I486 H487 N488 M489 S490 V491 K492 A493 M494 R495 F496 P497 PRO LYS SER TYR ASN LYS ASP LEU GLU SER ALA GLU GLU ARG ARG GLU ARG GLU GLN GLN ASP LEU GLU PHE ALA LYS GLU MET ALA GLU ASP ASP ASP ASP SER PHE PRO

• Molecule 3: 26S proteasome non-ATPase regulatory subunit 12

Chain AW: 99% 98%

M1 A2 D3 G4 G5 S6 E7 R8 A9 D10 G11 R12 I13 V14 K15 M16 E17 V18 D19 Y20 S21 A22 T23 V24 D25 Q26 R27 L28 P29 E30 C31 A32 K33 L34 A35 K36 E37 G38 R39 L40 Q41 E42 V43 I44 E45 T46 L47 L48 S49 L50 E51 K52 Q53 T54 R55 T56 A57 S58 D59 M60

V61 S62 T63 S64 R65 I66 L67 V68 A69 V70 V71 K72 M73 C74 Y75 E76 A77 K78 E79 W80 D81 L82 L83 N84 E85 N86 I87 M88 L89 L90 S91 K92 R93 R94 S95 Q96 L97 K98 Q99 A100 V101 A102 K103 M104 V105 Q106 Q107 C108 C109 T110 Y111 V112 E113 E114 I115 T116 D117 L118 P119 I120

K121 L122 R123 L124 I125 D126 T127 L128 R129 M130 V131 T132 E133 G134 K135 I136 Y137 V138 E139 I140 E141 R142 A143 R144 L145 T146 K147 T148 L149 A150 T151 I152 K153 E154 Q155 N156 G157 D158 V159 K160 E161 A162 A163 S164 I165 L166 Q167 E168 L169 Q170 V171 E172 T173 Y174 G175 S176 M177 E178 K179 K180

E181 R182 V183 E184 F185 I186 L187 E188 Q189 M190 R191 L192 C193 L194 A195 V196 K197 D198 Y199 I200 R201 T202 Q203 I204 I205 S206 K207 K208 I209 N210 T211 K212 F213 F214 Q215 E216 E217 N218 T219 E220 K221 L222 K223 L224 K225 Y226 Y227 N228 L229 M230 I231 Q232 L233 D234 Q235 H236 E237 G238 S239 Y240

L241 S242 I243 C244 K245 H246 Y247 R248 A249 I250 Y251 D252 T253 P254 C255 I256 Q257 A258 E259 S260 E261 K262 W263 Q264 Q265 A266 L267 K268 S269 V270 V271 L272 Y273 V274 I275 L276 A277 P278 F279 D280 N281 E282 Q283 S284 D285 L286 V287 H288 R289 I290 S291 G292 D293 K294 K295 L296 E297 E298 I299 P300

K301 Y302 K303 D304 L305 L306 K307 L308 F309 T310 T311 M312 E313 L314 M315 R316 W317 S318 T319 L320 V321 E322 D323 Y324 G325 M326 E327 L328 R329 K330 G331 S332 L333 E334 S335 P336 A337 T338 D339 V340 F341 G342 S343 T344 E345 E346 G347 E348 K349 R350 W351 K352 D353 L354 K355 N356 R357 V358 V359 E360

H361 N362 I363 R364 I365 M366 A367 K368 Y369 Y370 T371 R372 I373 T374 M375 K376 R377 M378 A379 Q380 L381 L382 D383 L384 S385 V386 D387 E388 S389 E390 A391 F392 L393 S394 N395 L396 V397 V398 N399 K400 T401 I402 F403 A404 K405 V406 D407 R408 L409 A410 G411 I412 I413 N414 F415 Q416 R417 P418 K419 D420

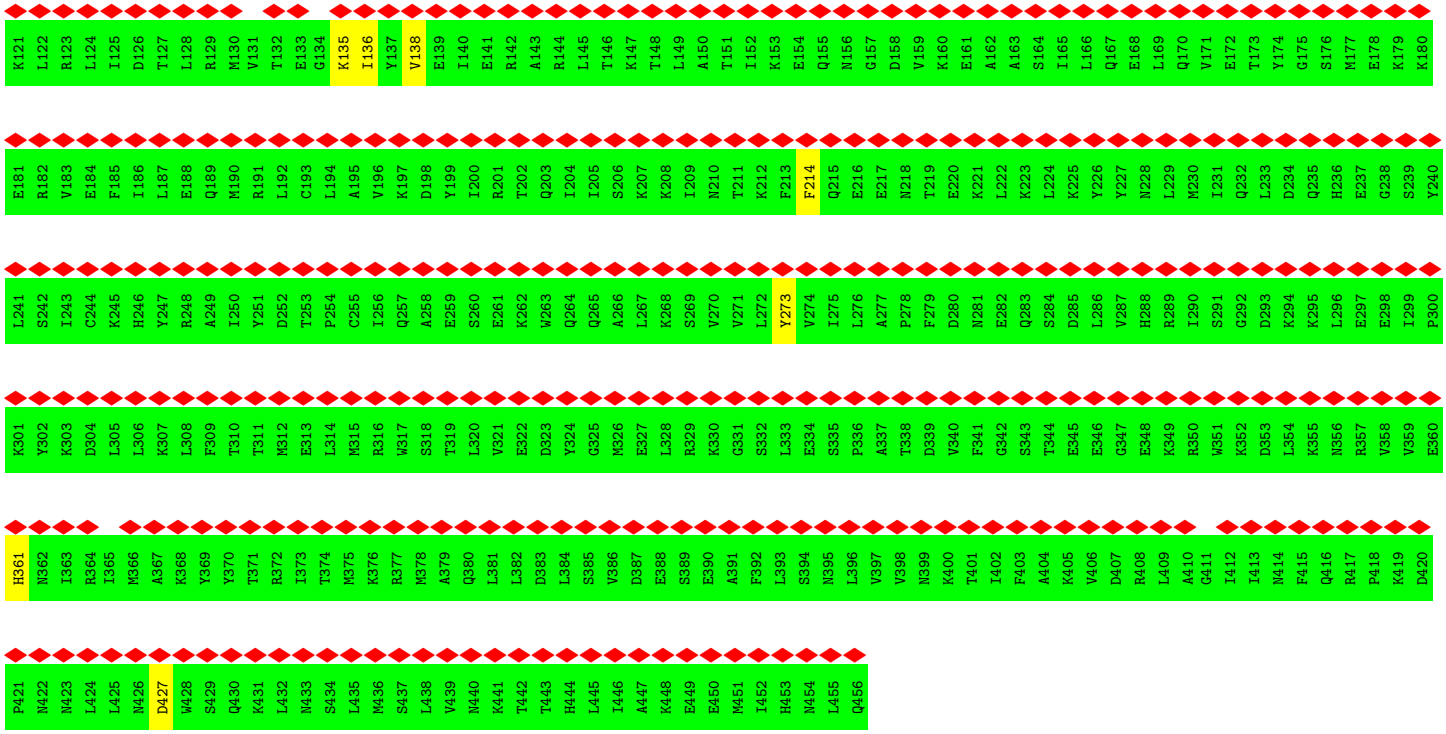
P421 N422 N423 L424 L425 N426 D427 W428 S429 Q430 K431 L432 N433 S434 L435 M436 S437 L438 V439 N440 K441 T442 T443 H444 L445 I446 A447 K448 E449 E450 M451 I452 H453 N454 L455 Q456

• Molecule 3: 26S proteasome non-ATPase regulatory subunit 12

Chain BW: 99% 98%

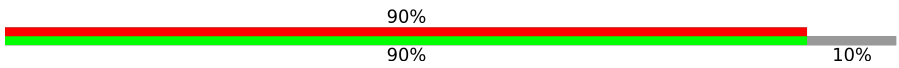
M1 A2 D3 G4 G5 S6 E7 R8 A9 D10 G11 R12 I13 V14 K15 M16 E17 V18 D19 Y20 S21 A22 T23 V24 D25 Q26 R27 L28 P29 E30 C31 A32 K33 L34 A35 K36 E37 G38 R39 L40 Q41 E42 V43 I44 E45 T46 L47 L48 S49 L50 E51 K52 Q53 T54 R55 T56 A57 S58 D59 M60

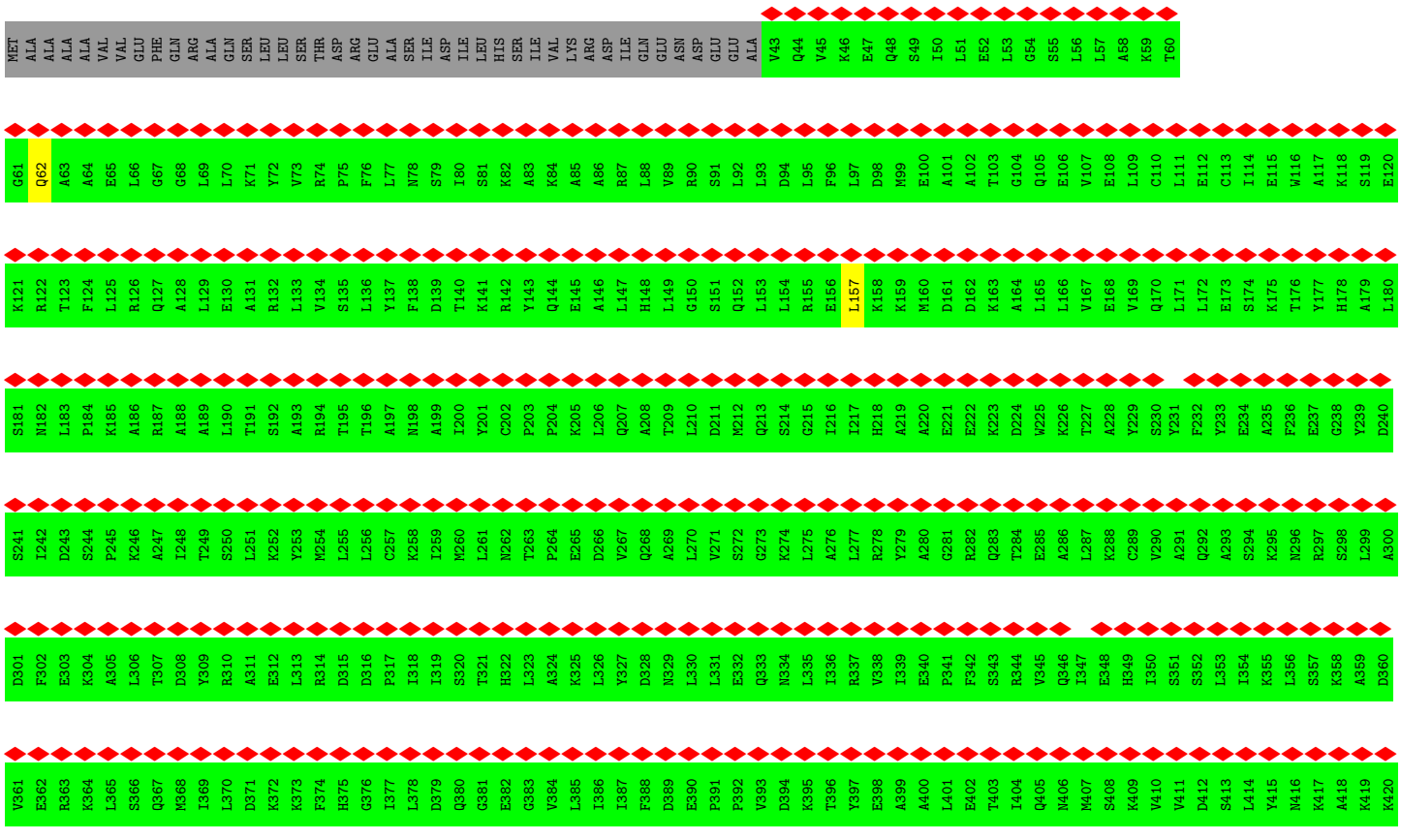
V61 S62 T63 S64 R65 I66 L67 V68 A69 V70 V71 K72 M73 C74 Y75 E76 A77 K78 E79 W80 D81 L82 L83 N84 E85 N86 I87 M88 L89 L90 S91 K92 R93 R94 S95 Q96 L97 K98 Q99 A100 V101 A102 K103 M104 V105 Q106 Q107 C108 C109 T110 Y111 V112 E113 E114 I115 T116 D117 L118 P119 I120



• Molecule 4: 26S proteasome non-ATPase regulatory subunit 11

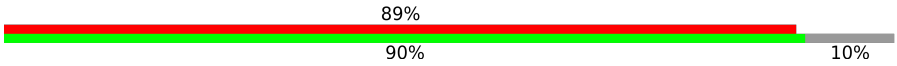
Chain AX:

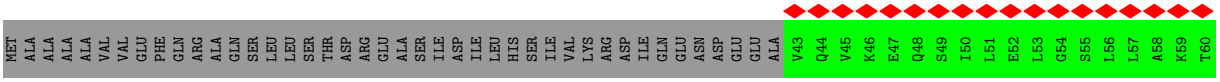


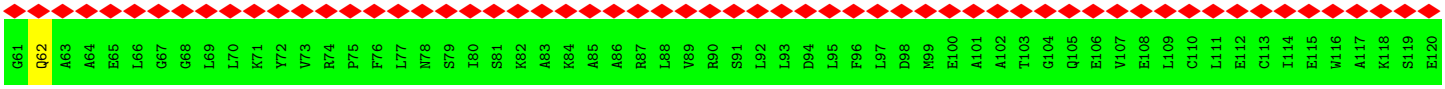


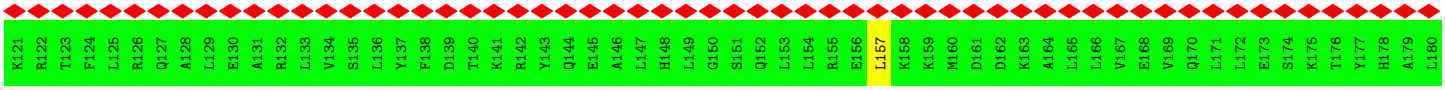
• Molecule 4: 26S proteasome non-ATPase regulatory subunit 11

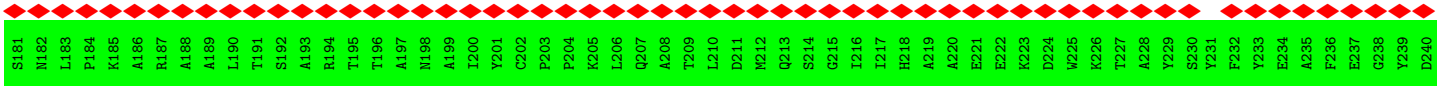
Chain BX:

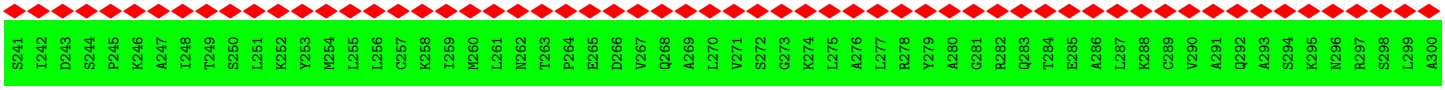


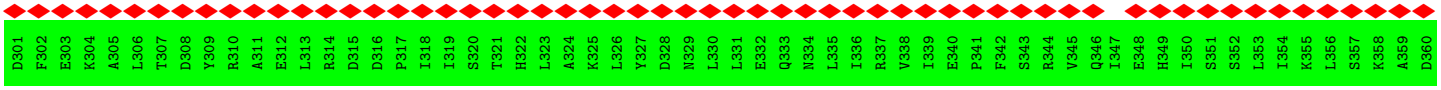


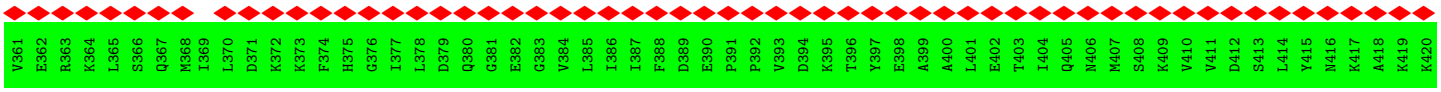






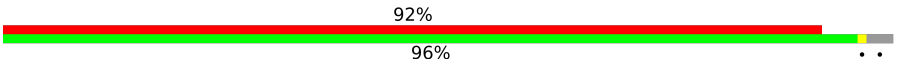


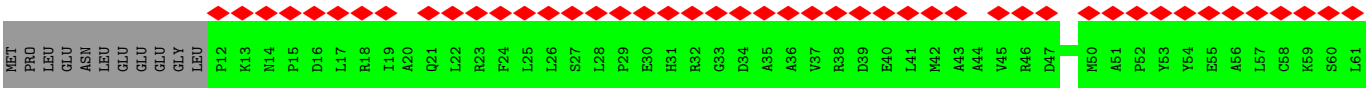


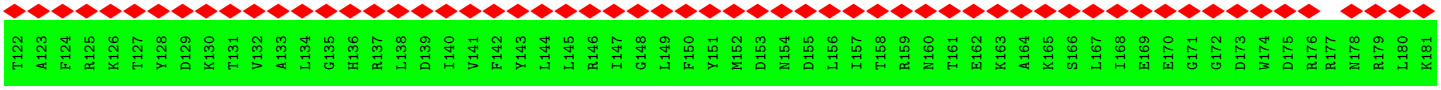


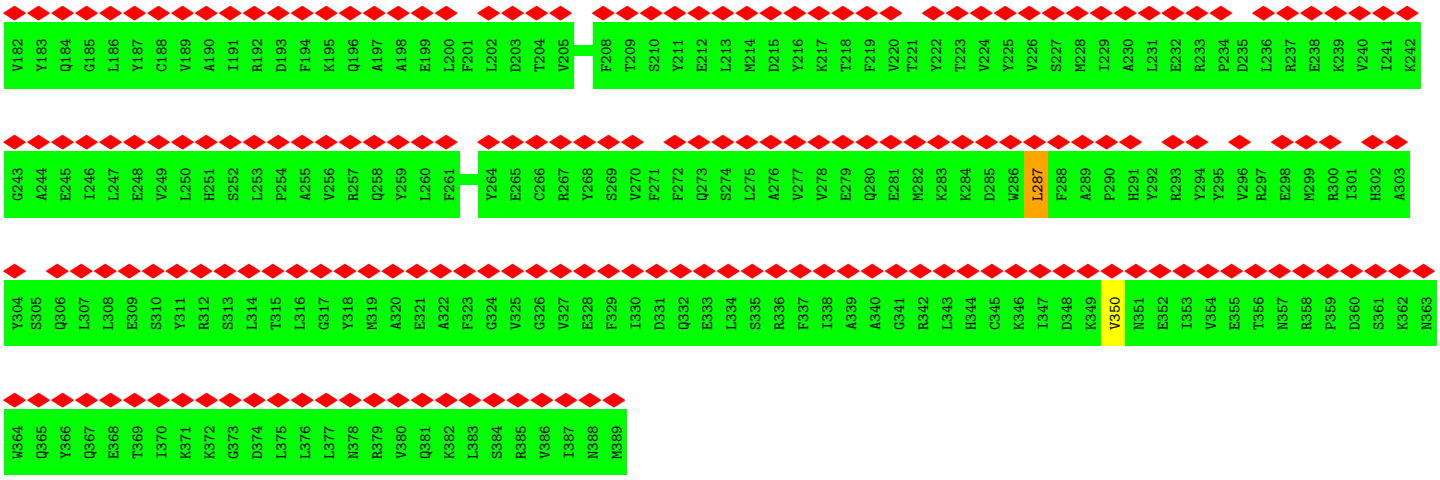
• Molecule 5: 26S proteasome non-ATPase regulatory subunit 6

Chain AY:



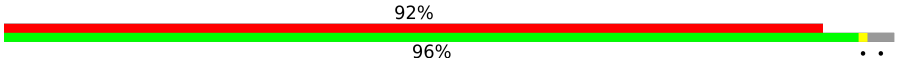


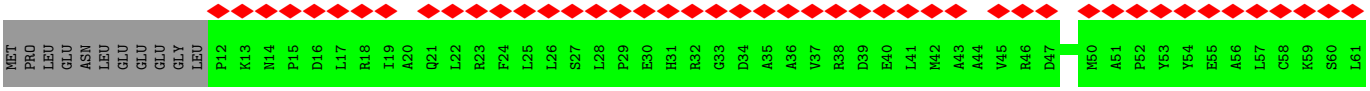


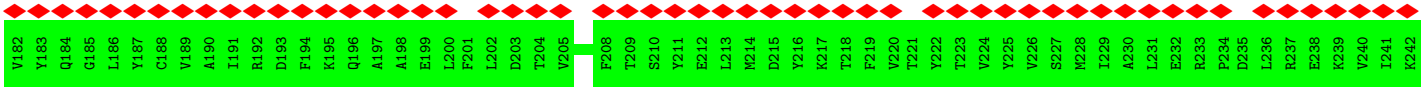


• Molecule 5: 26S proteasome non-ATPase regulatory subunit 6

Chain BY:

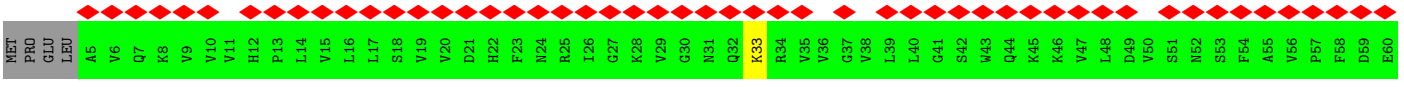


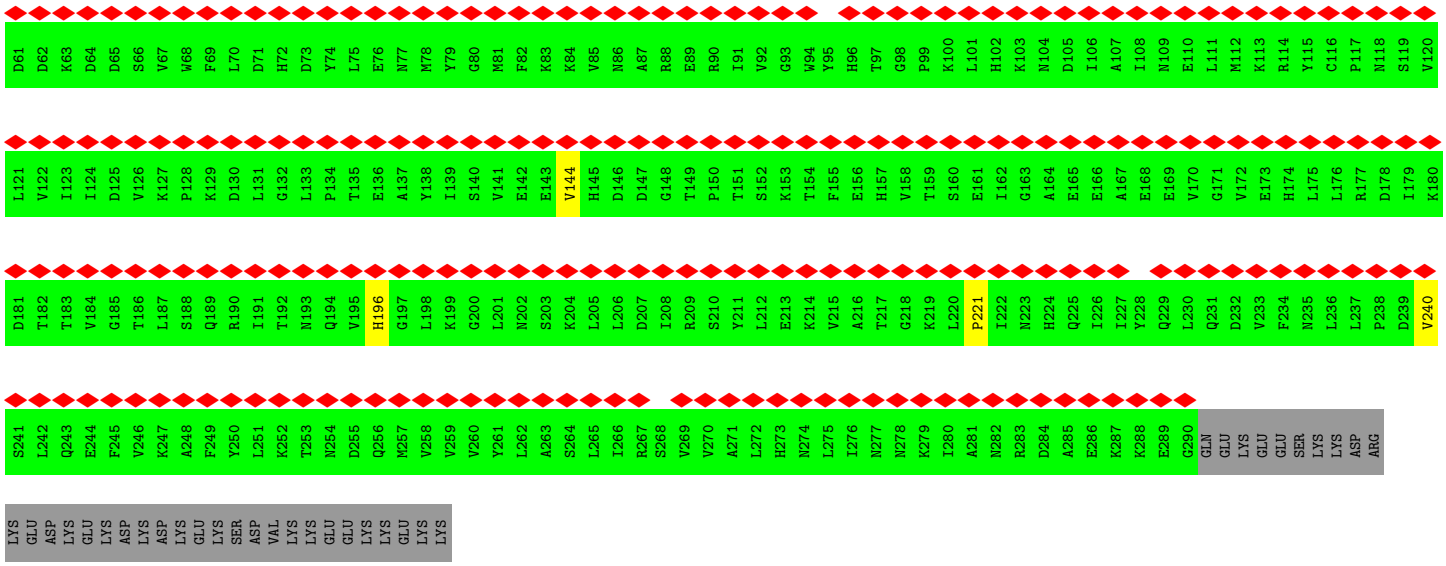




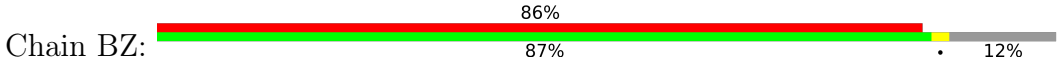
• Molecule 6: 26S proteasome non-ATPase regulatory subunit 7

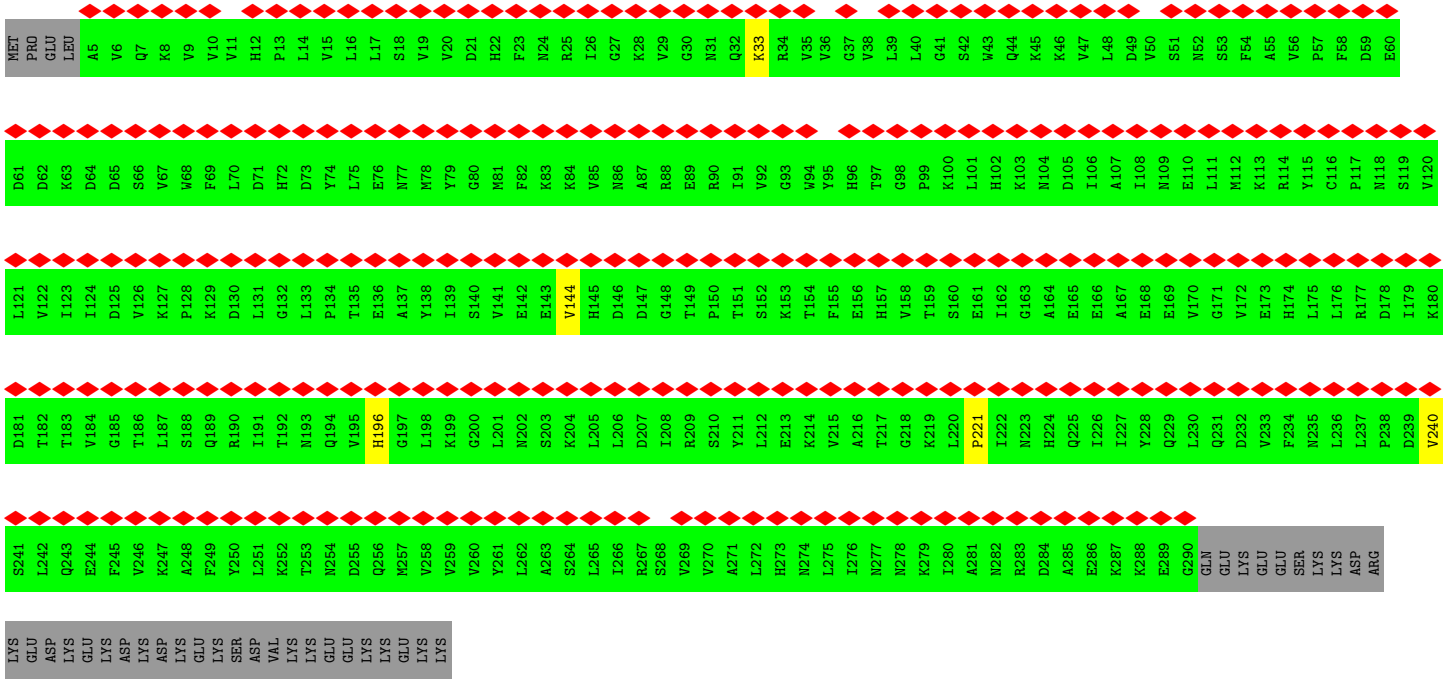
Chain AZ:



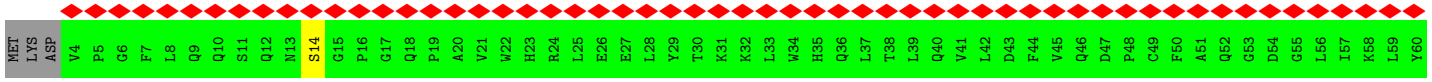


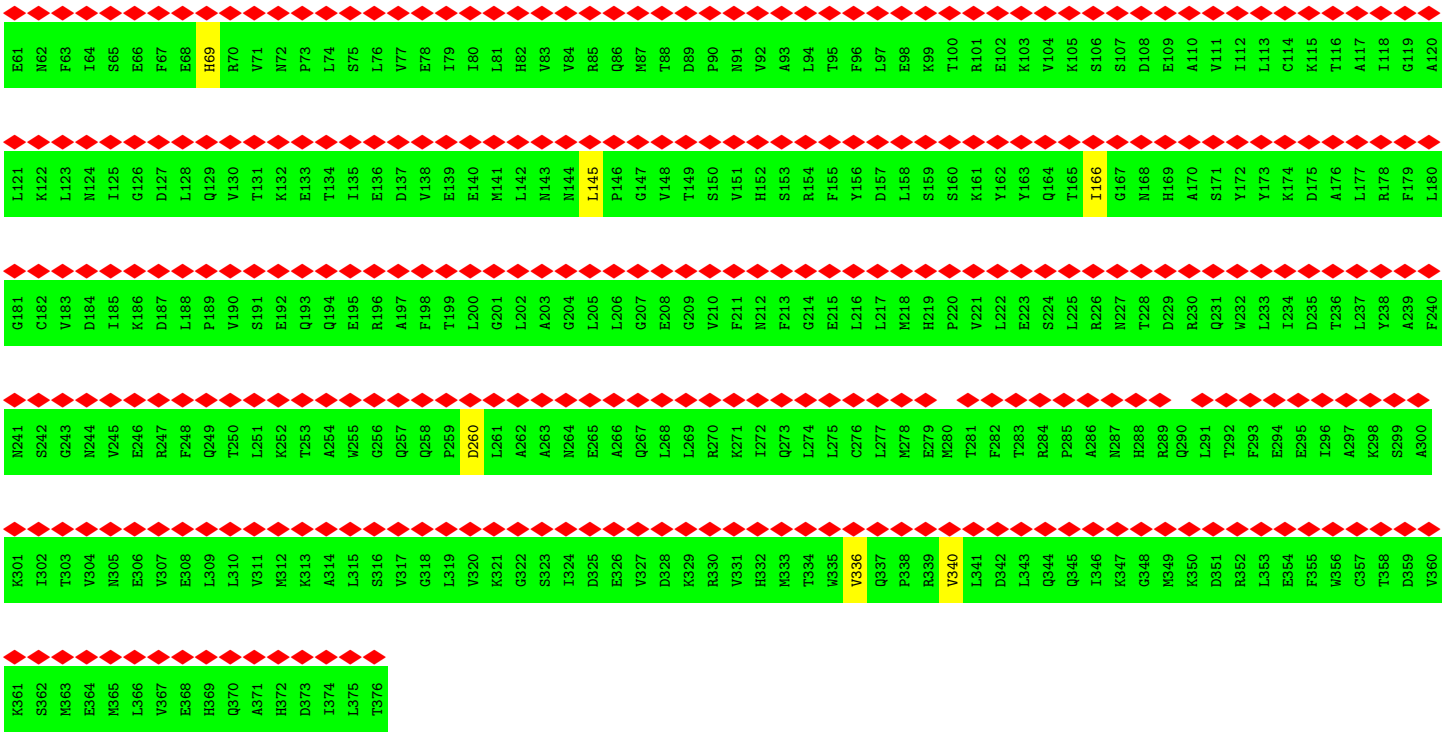
• Molecule 6: 26S proteasome non-ATPase regulatory subunit 7





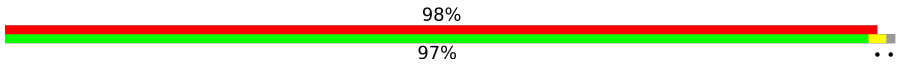
• Molecule 7: 26S proteasome non-ATPase regulatory subunit 13

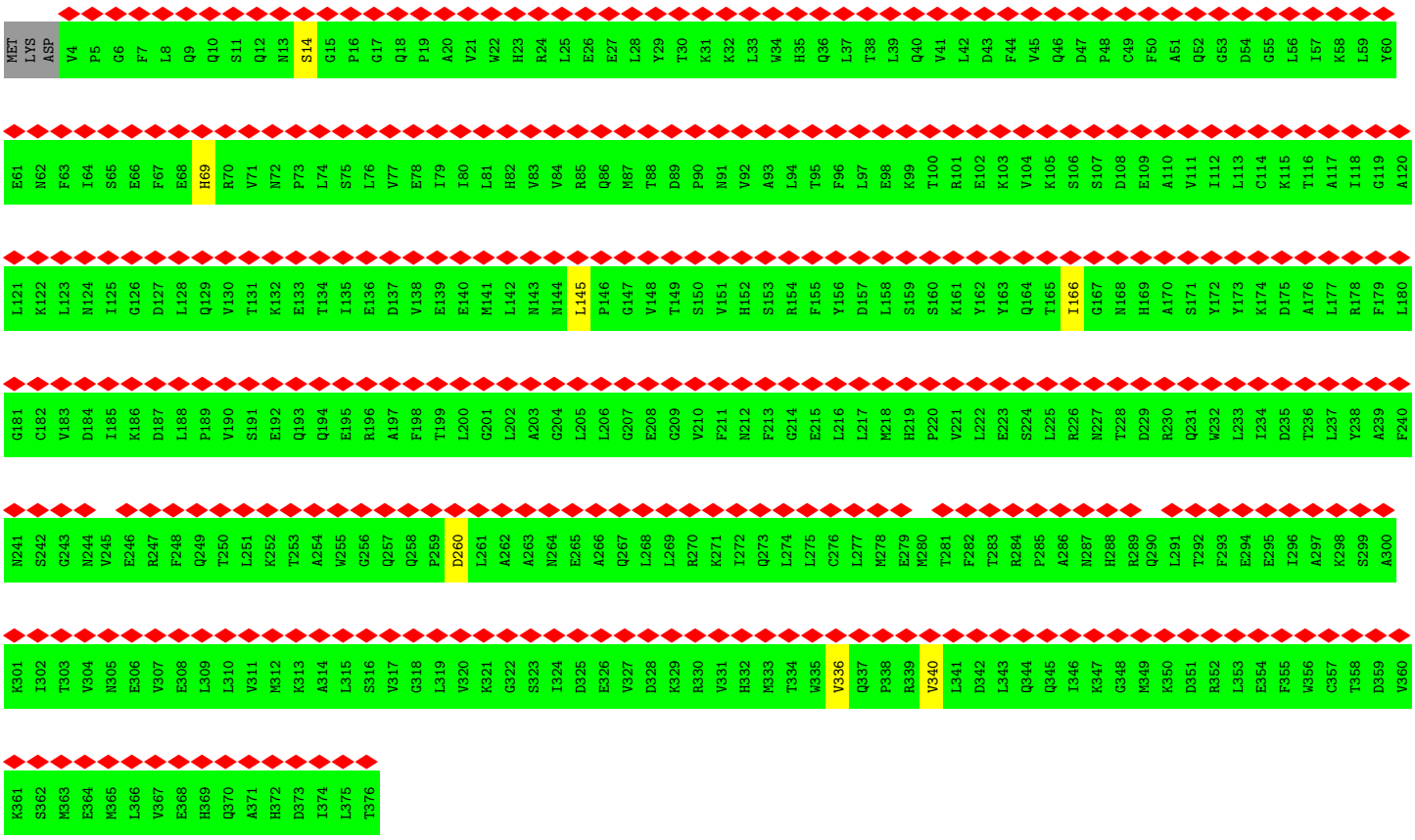




- Molecule 7: 26S proteasome non-ATPase regulatory subunit 13

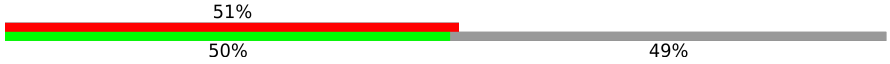
Chain Ba:

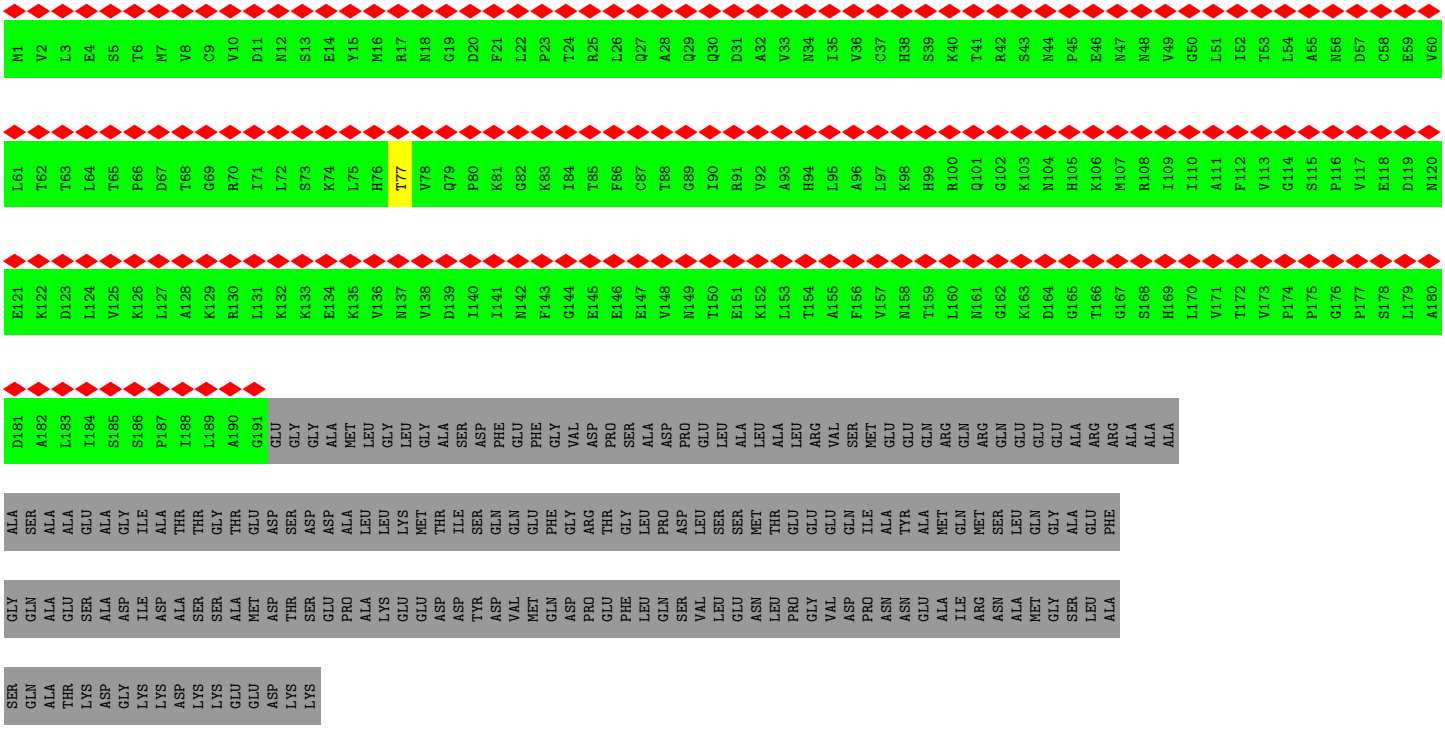




• Molecule 8: 26S proteasome non-ATPase regulatory subunit 4

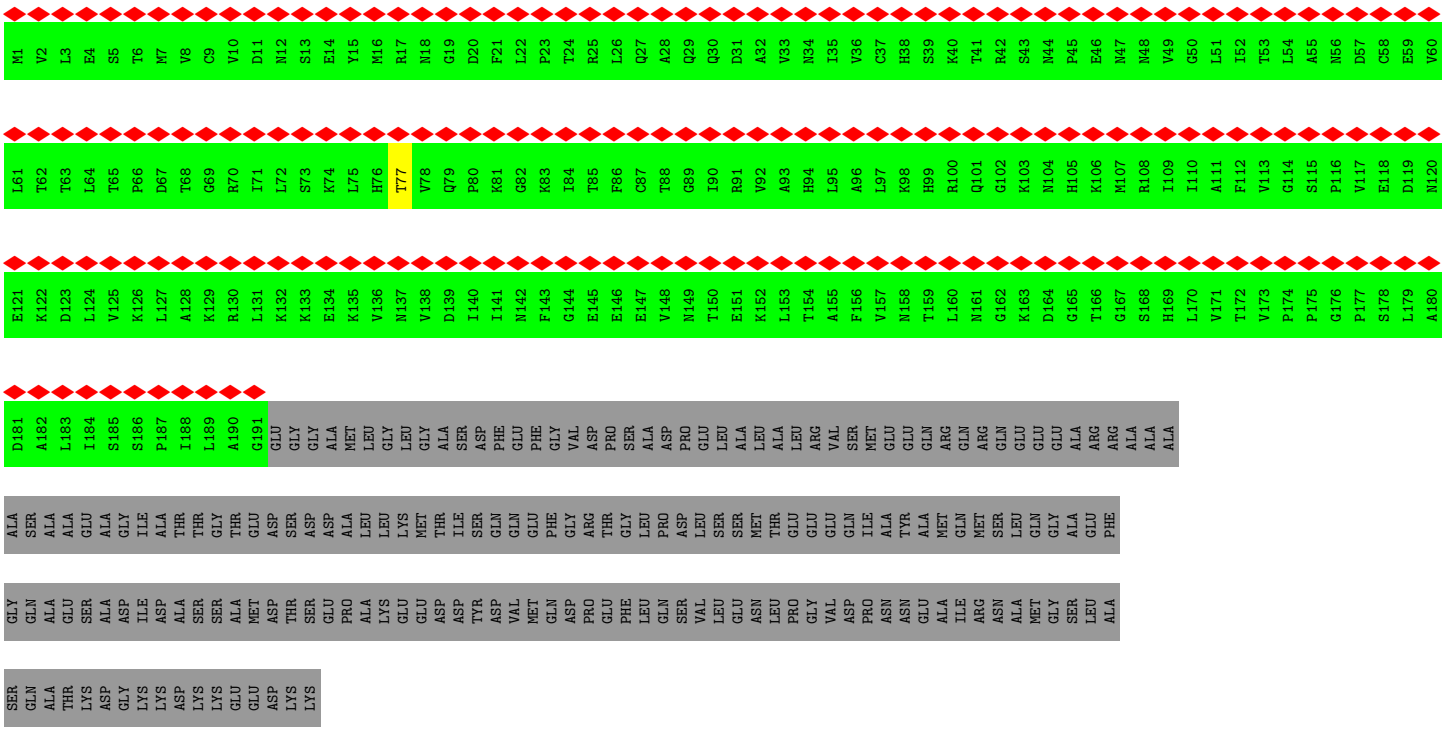
Chain Ab:





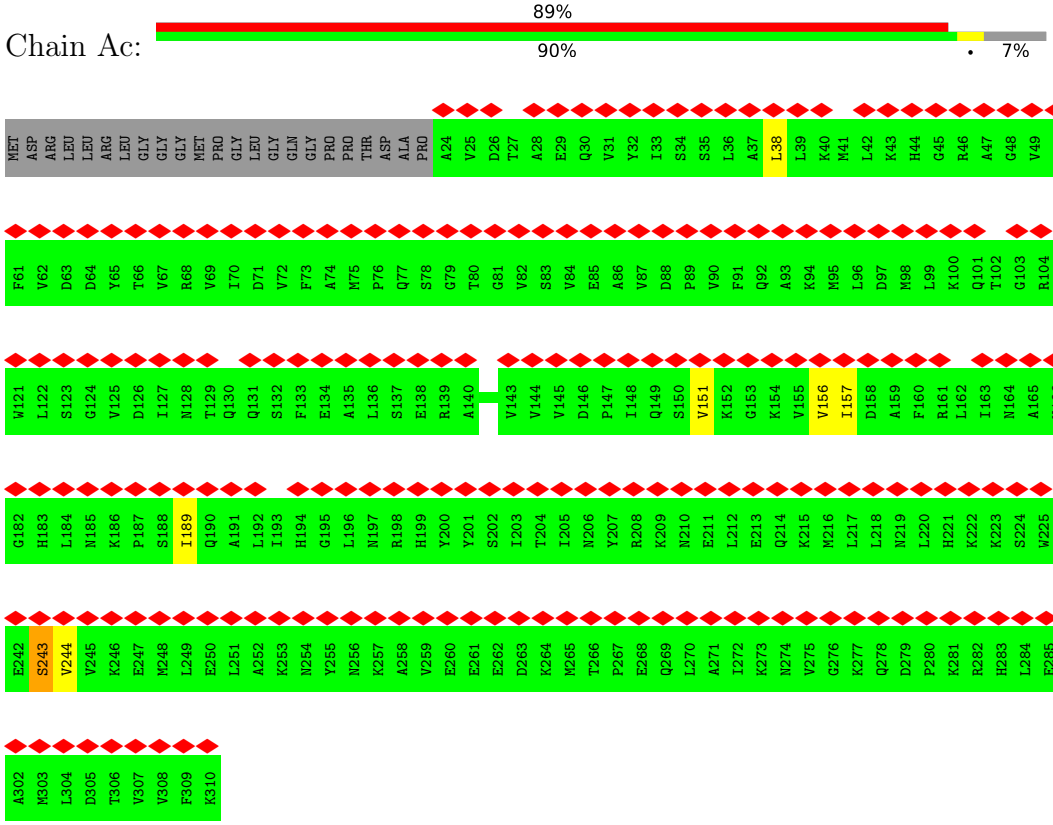
• Molecule 8: 26S proteasome non-ATPase regulatory subunit 4

Chain Bb:



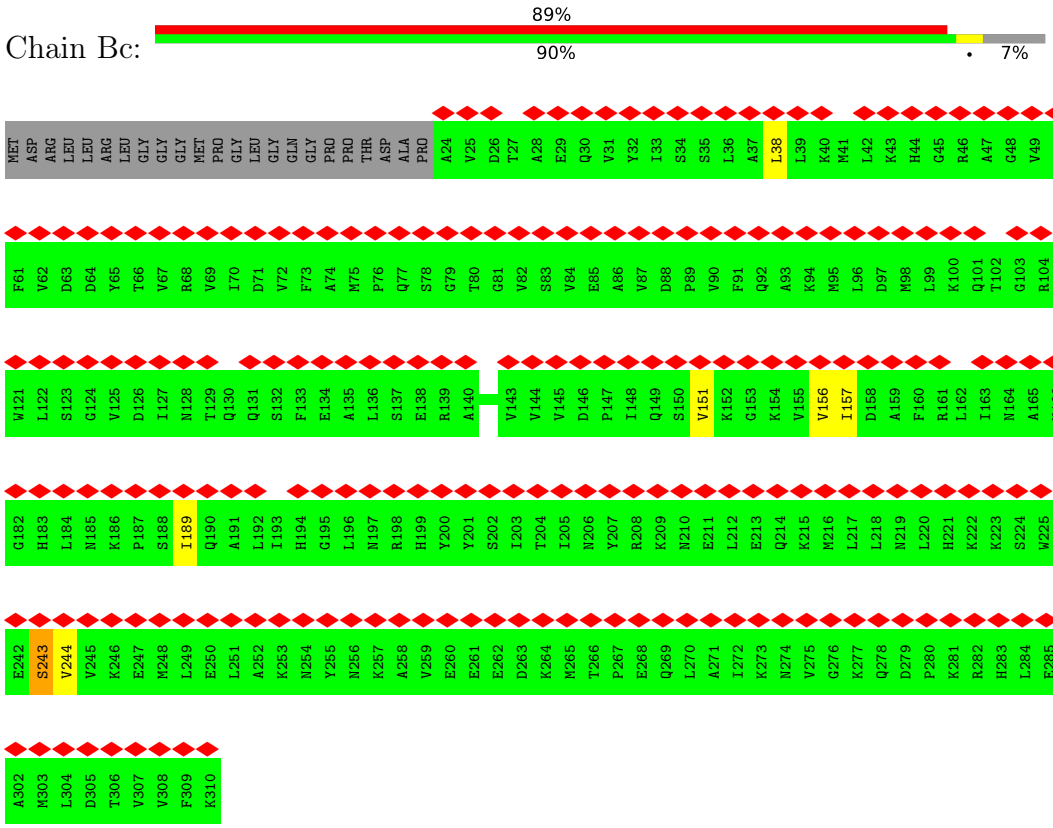
• Molecule 9: 26S proteasome non-ATPase regulatory subunit 14

Chain Ac:



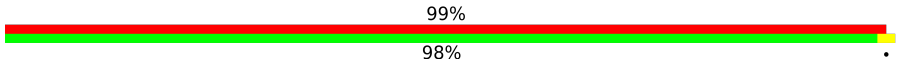
• Molecule 9: 26S proteasome non-ATPase regulatory subunit 14

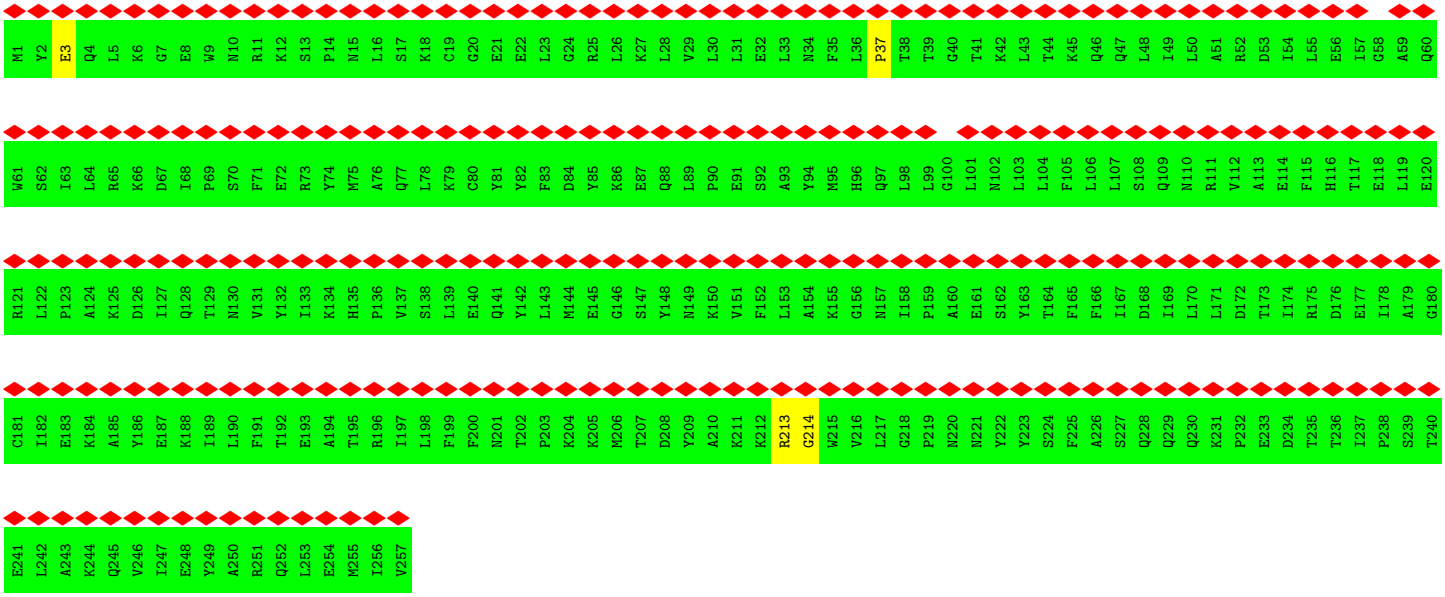
Chain Bc:



• Molecule 10: 26S proteasome non-ATPase regulatory subunit 8

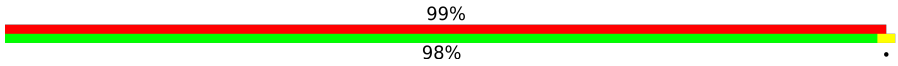
Chain Ad:

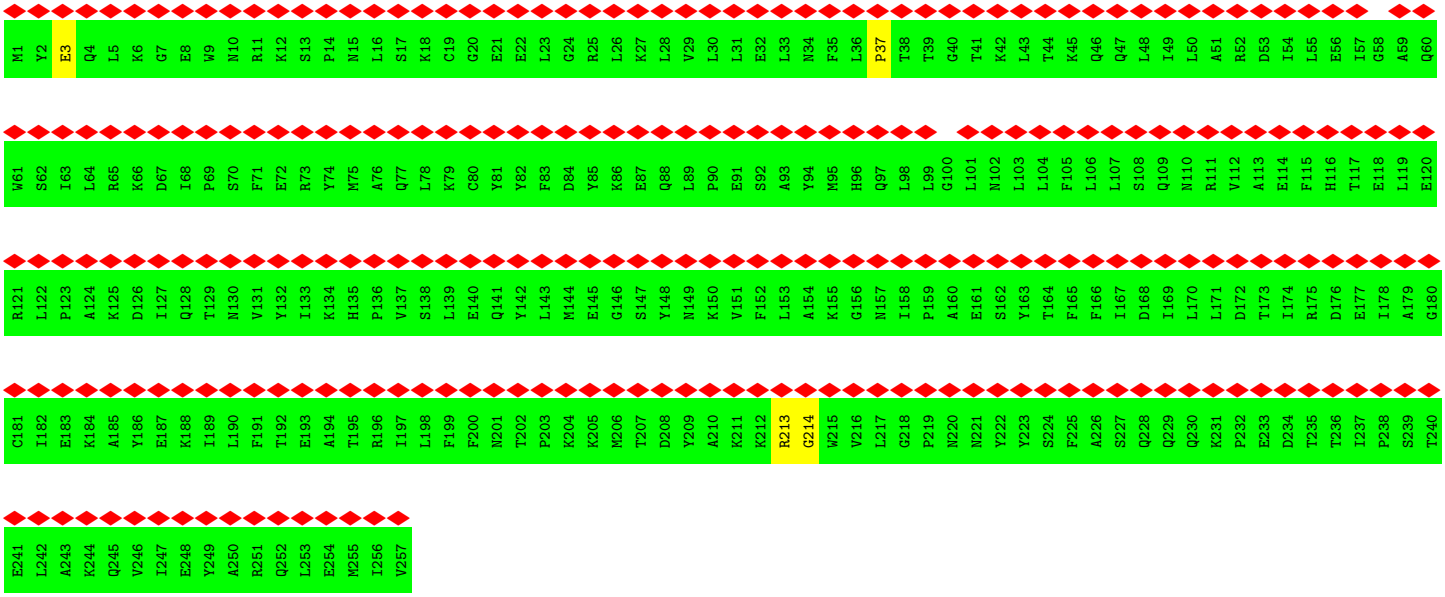




• Molecule 10: 26S proteasome non-ATPase regulatory subunit 8

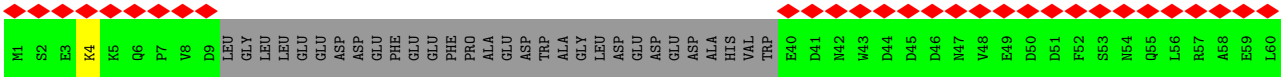
Chain Bd:

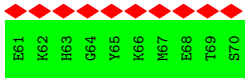




• Molecule 11: 26S proteasome complex subunit DSS1

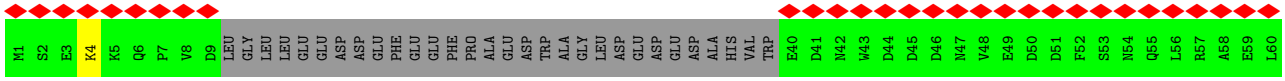
Chain Ae:

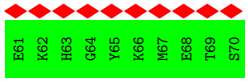




• Molecule 11: 26S proteasome complex subunit DSS1

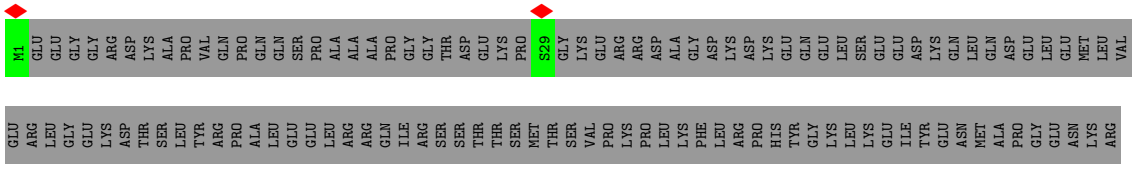
Chain Be:

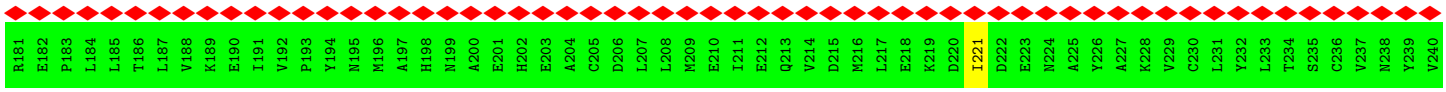


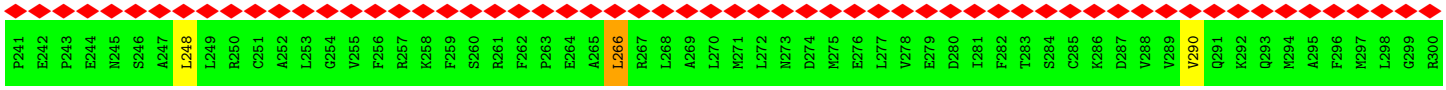


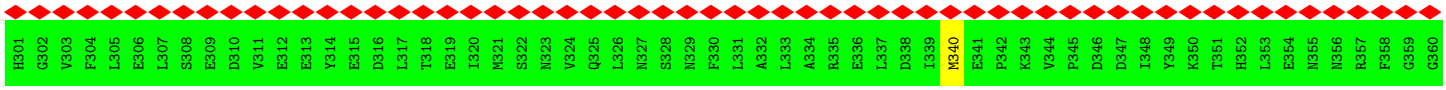
• Molecule 12: 26S proteasome non-ATPase regulatory subunit 2

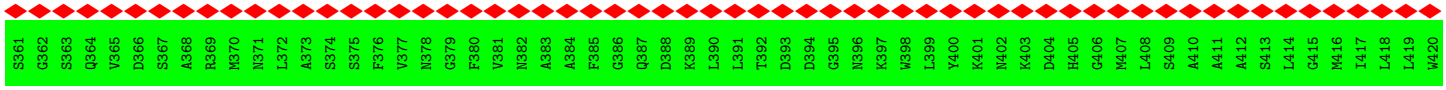
Chain Af:

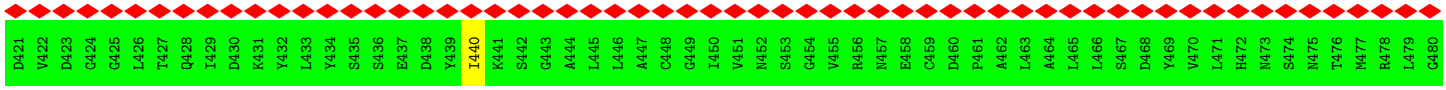


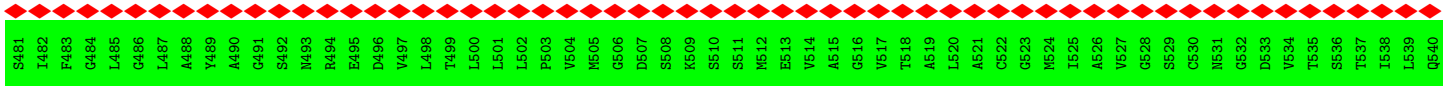


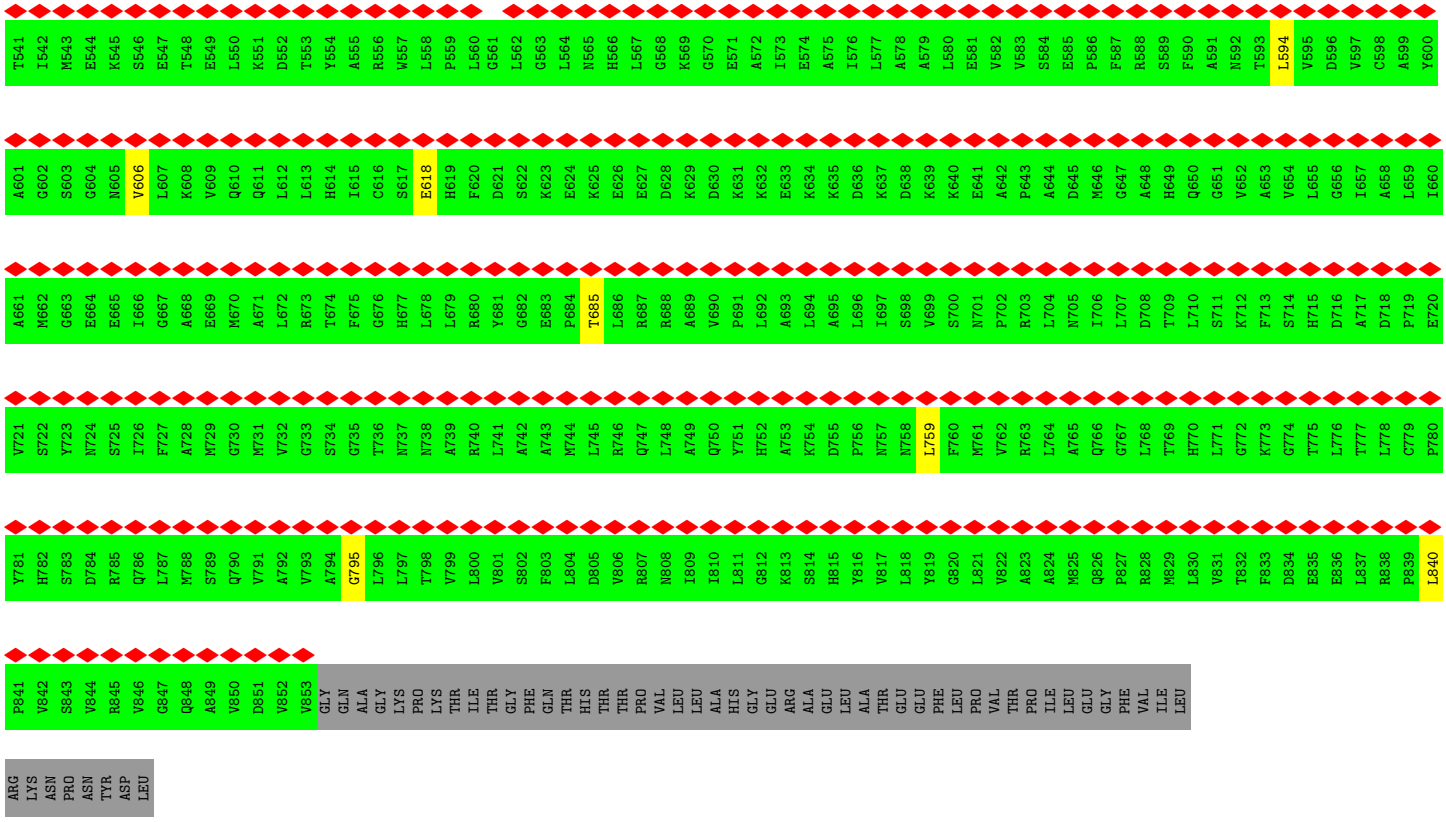






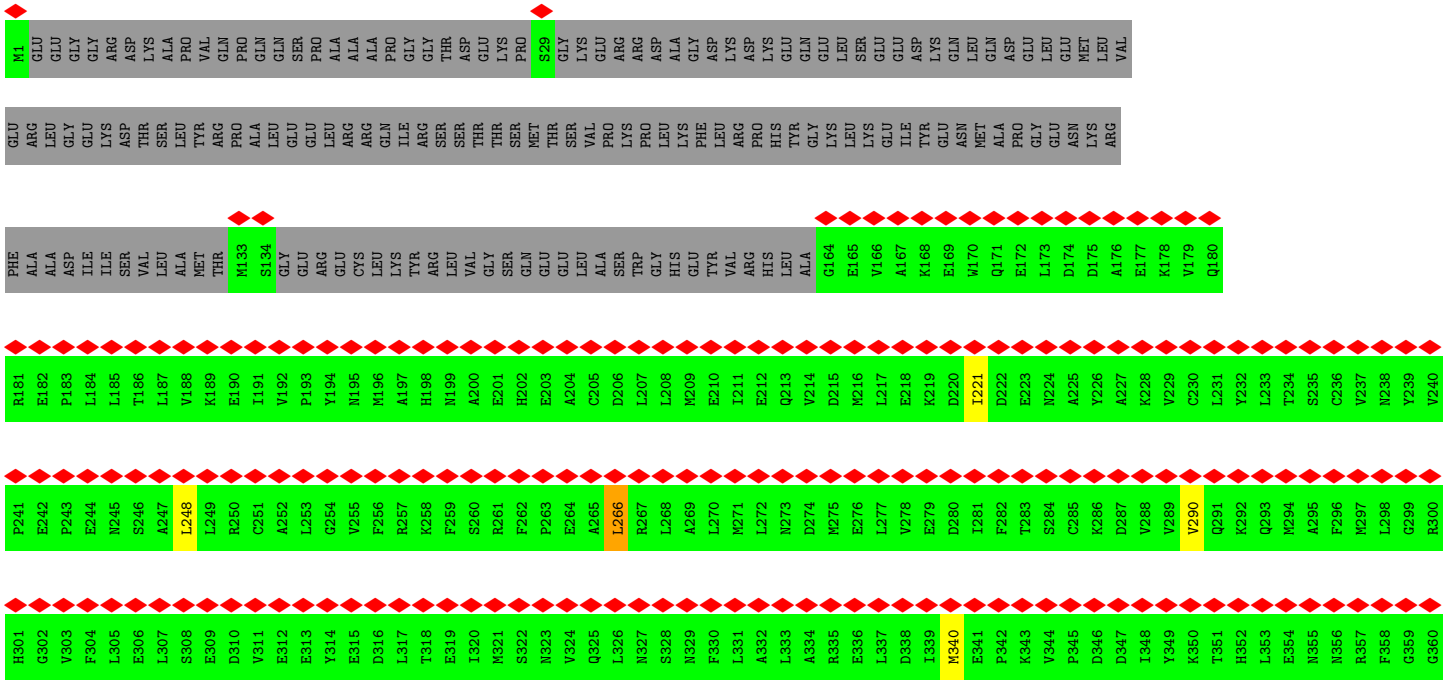


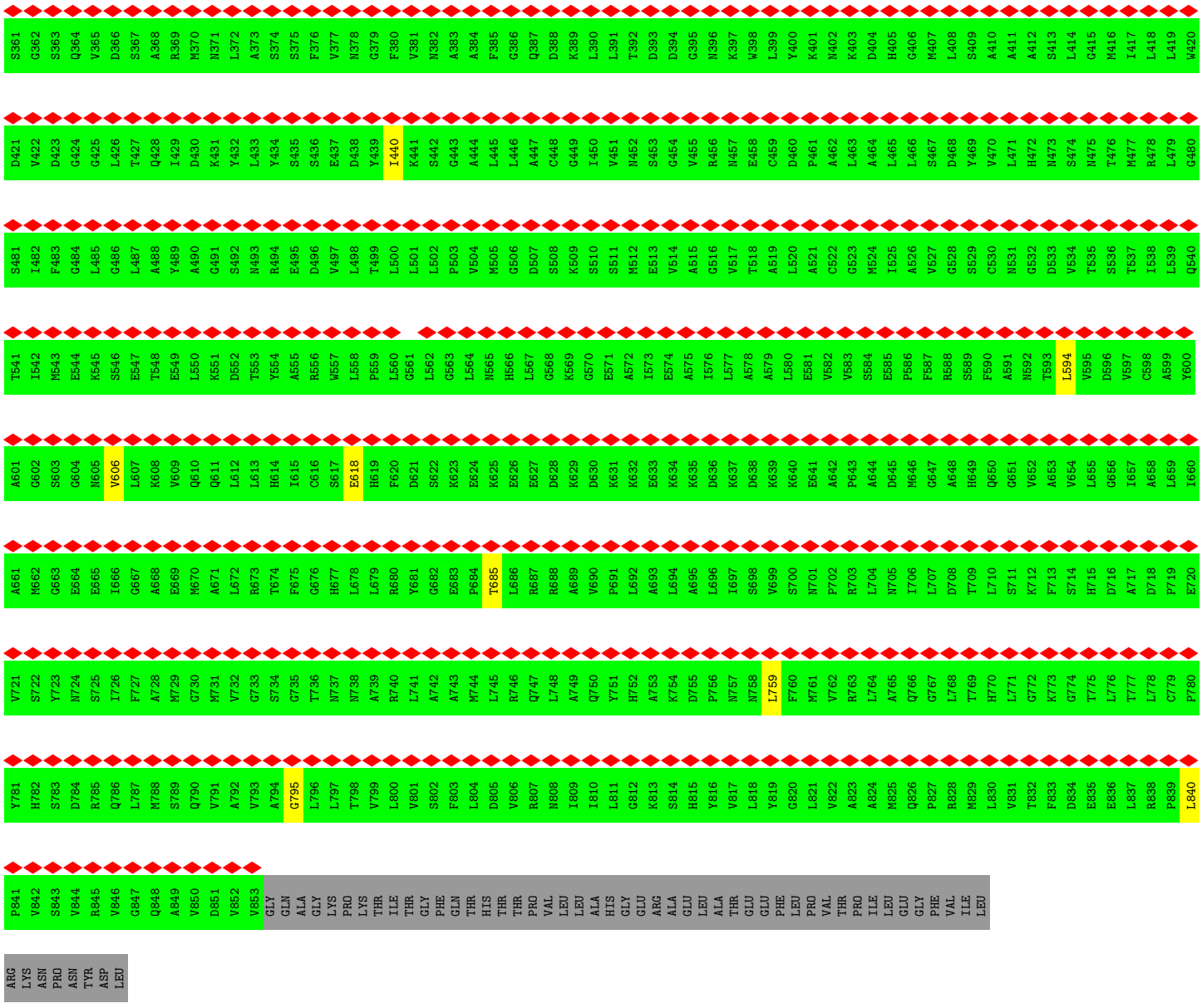




• Molecule 12: 26S proteasome non-ATPase regulatory subunit 2

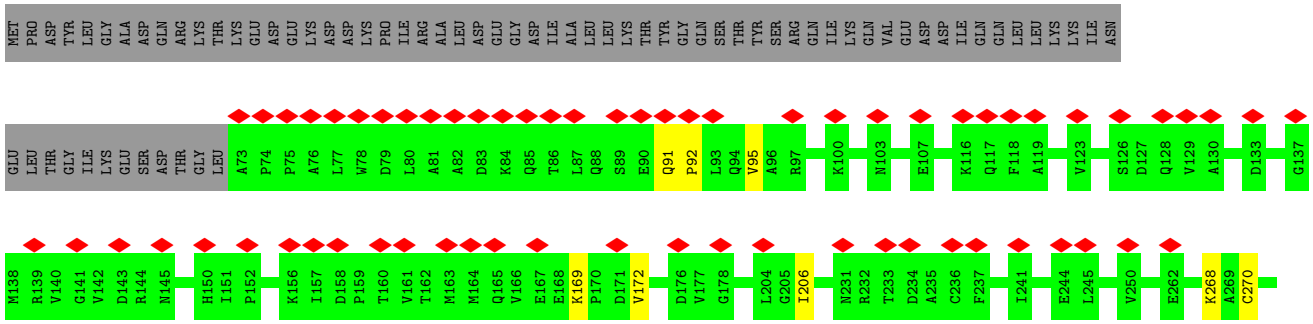
Chain Bf:

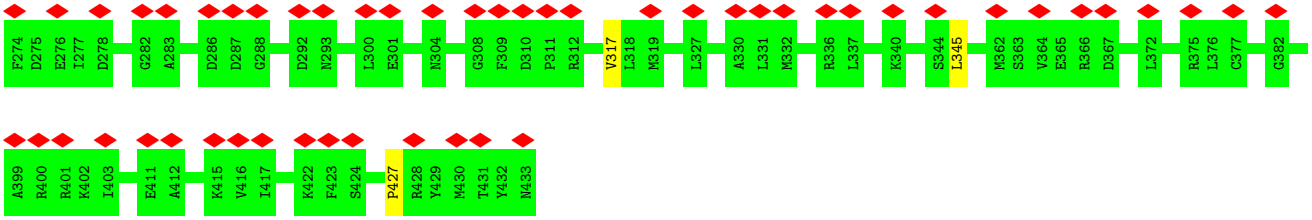




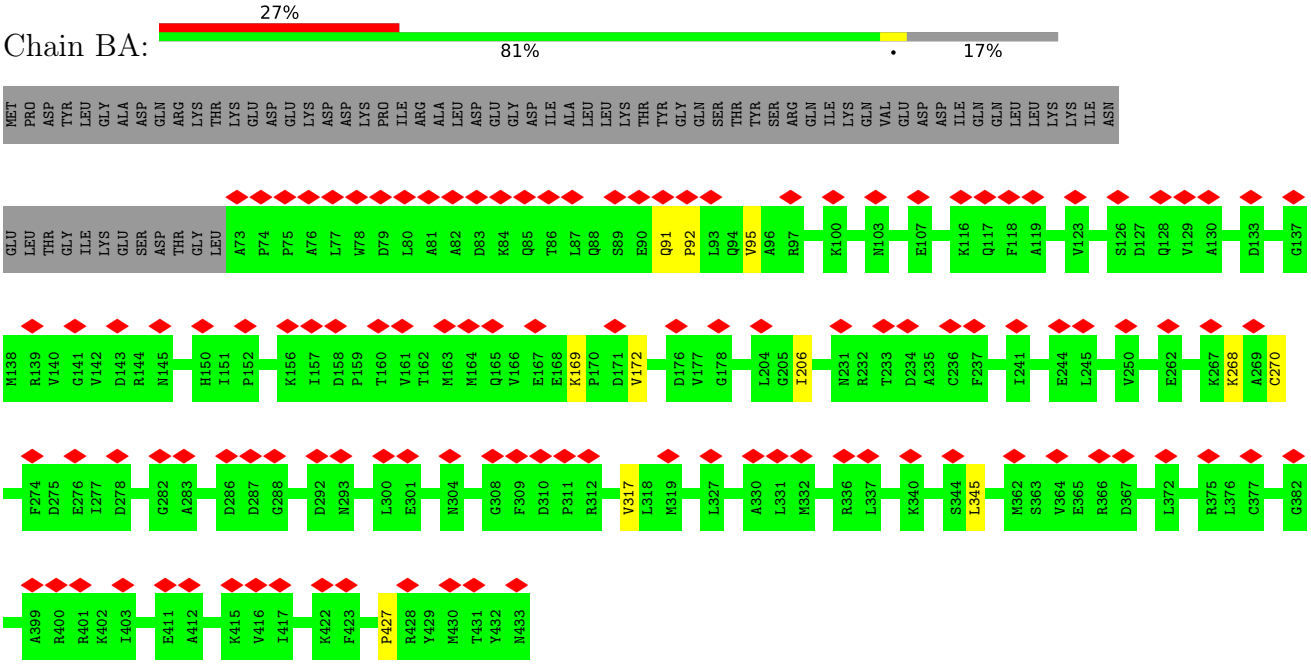
• Molecule 13: 26S protease regulatory subunit 7

Chain AA:

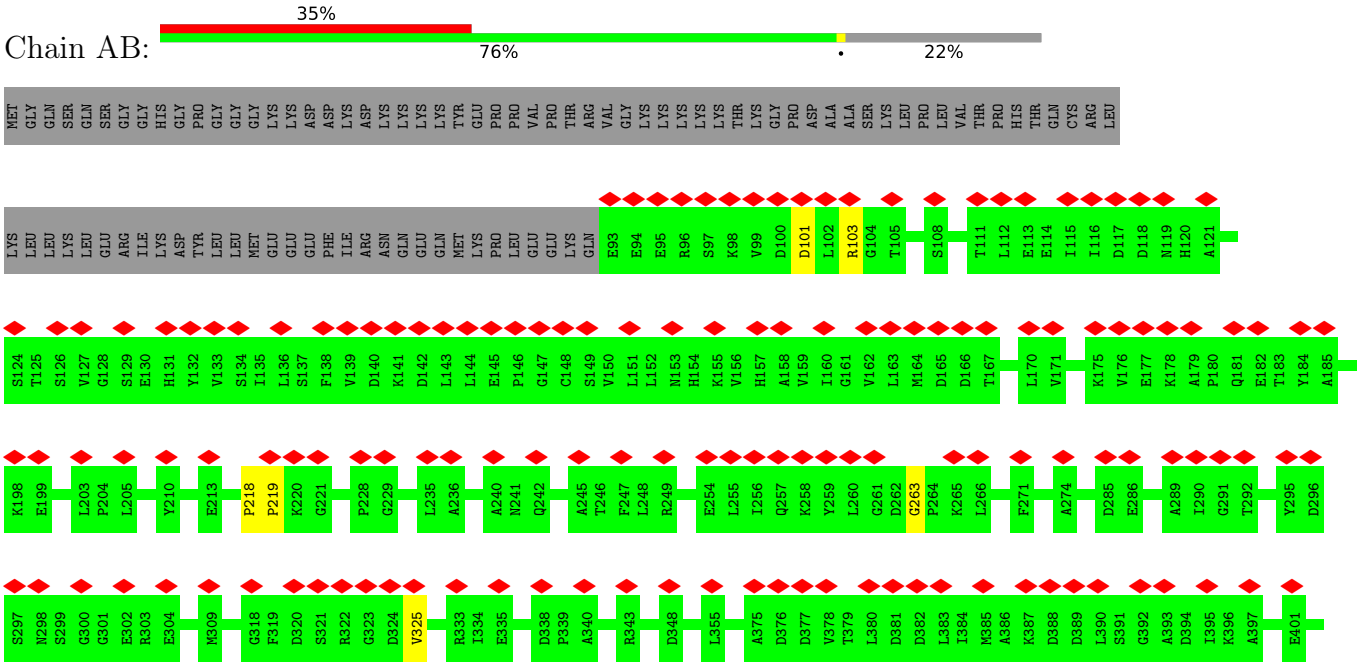


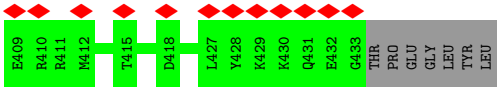


• Molecule 13: 26S protease regulatory subunit 7



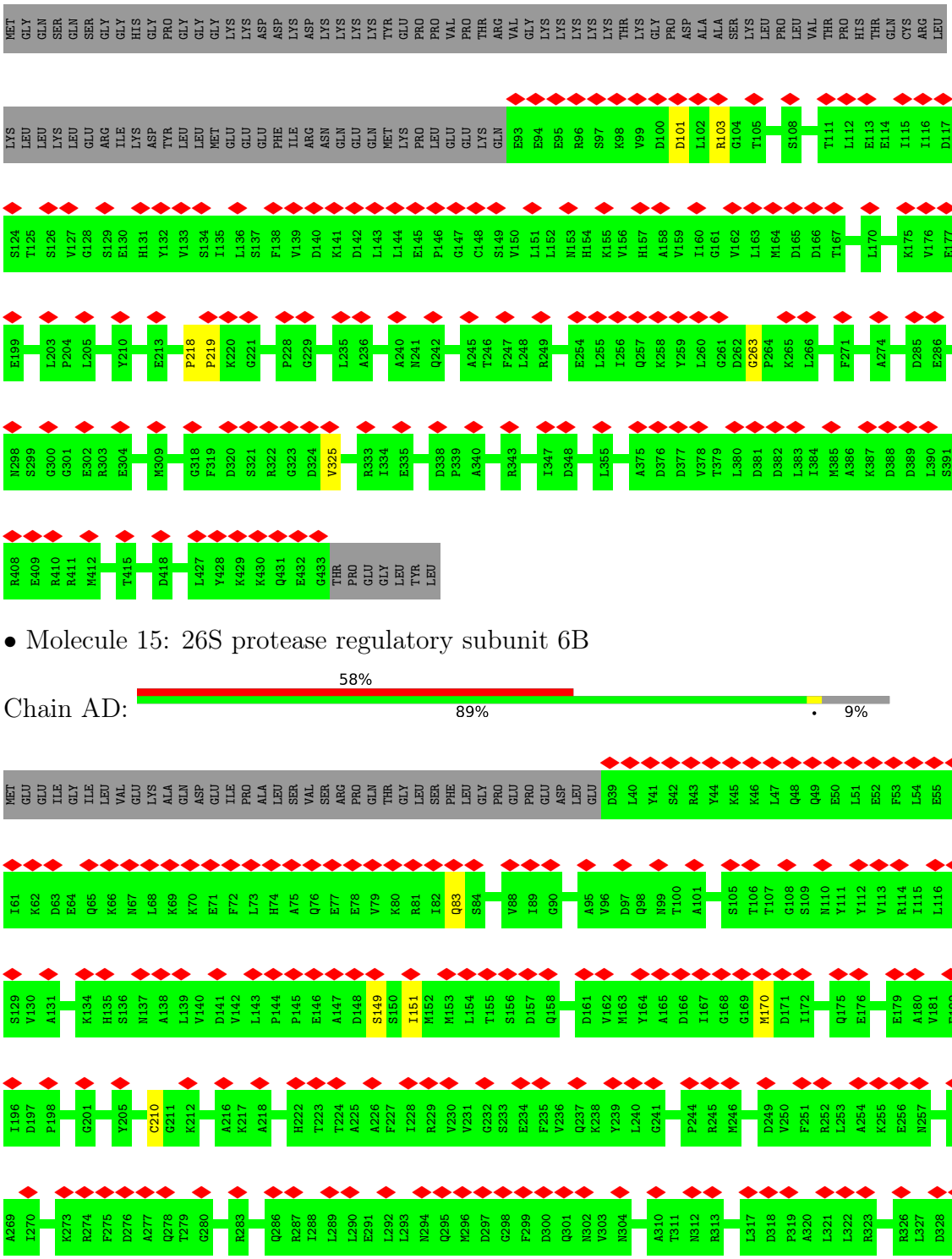
• Molecule 14: 26S protease regulatory subunit 4





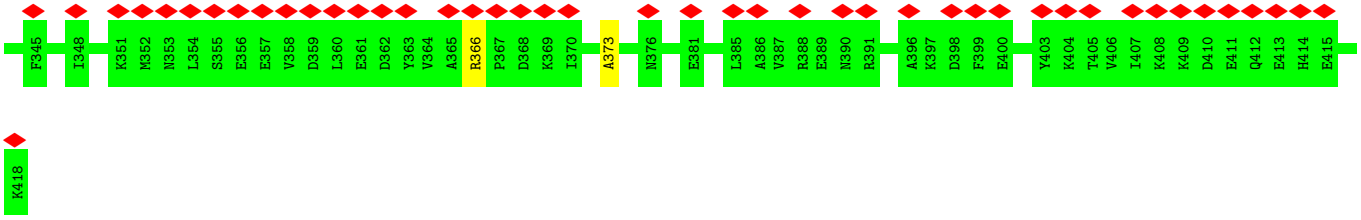
• Molecule 14: 26S protease regulatory subunit 4

Chain BB:



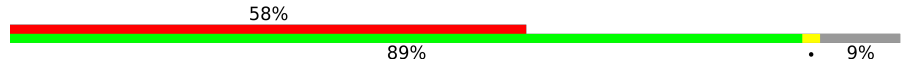
• Molecule 15: 26S protease regulatory subunit 6B

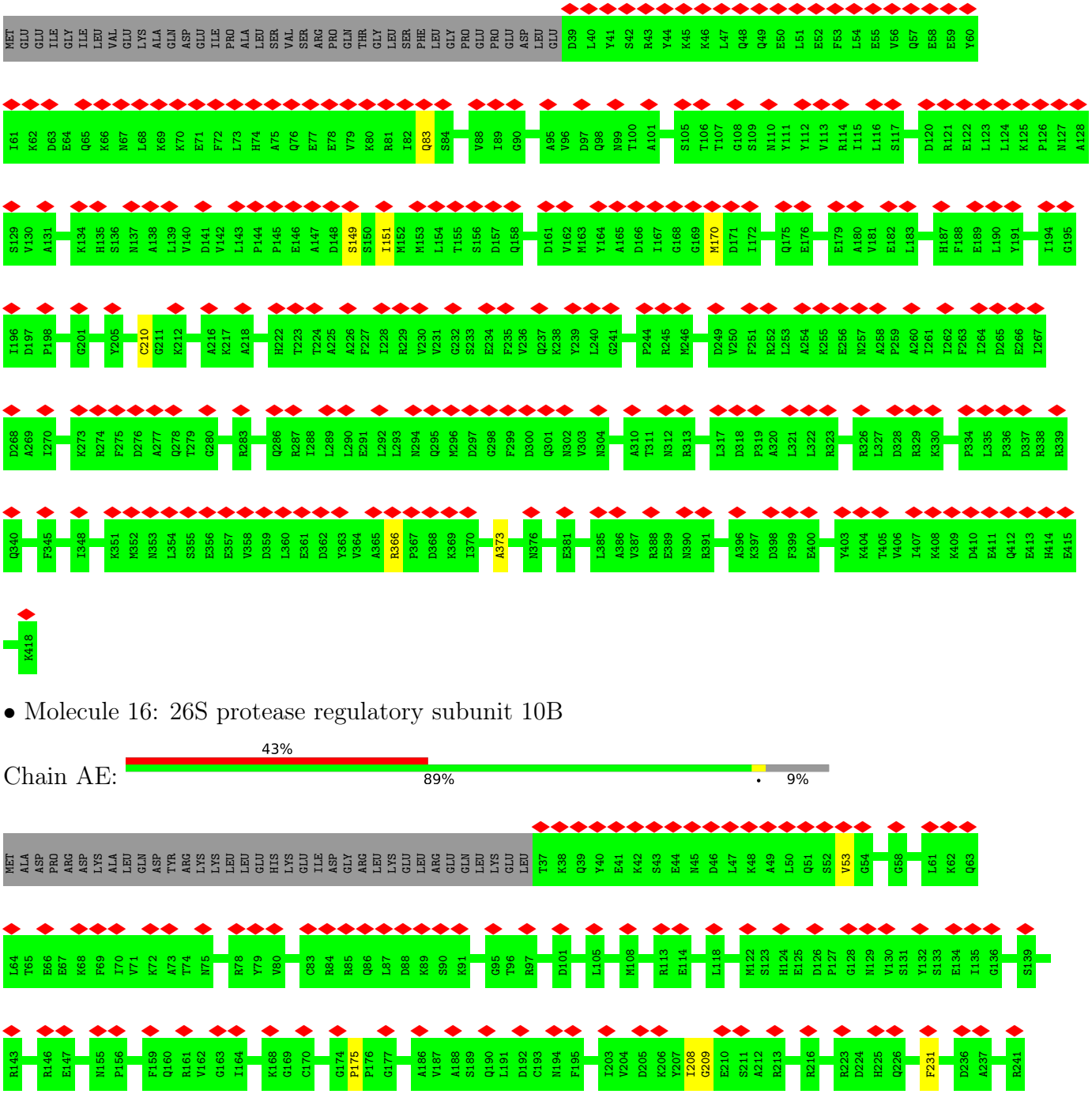
Chain AD:



• Molecule 15: 26S protease regulatory subunit 6B

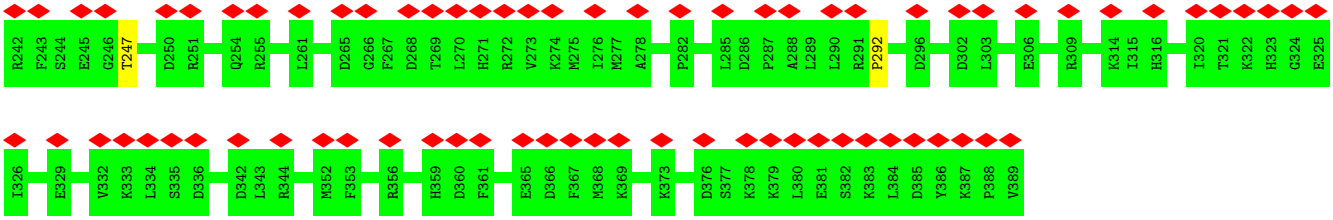
Chain BD:



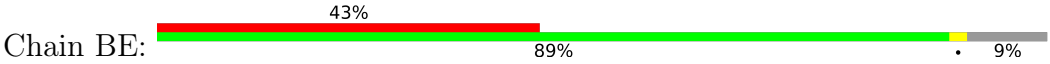


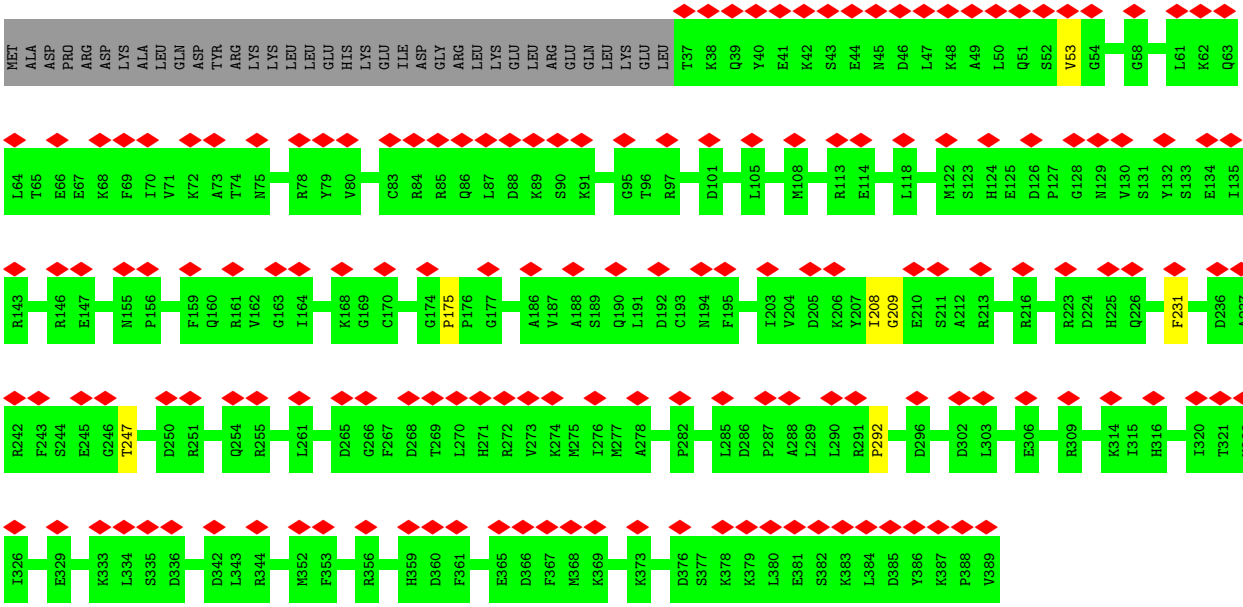
• Molecule 16: 26S protease regulatory subunit 10B

Chain AE:

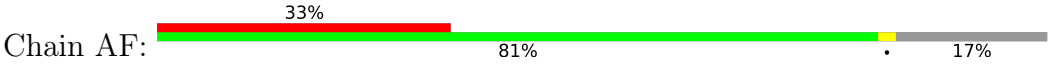


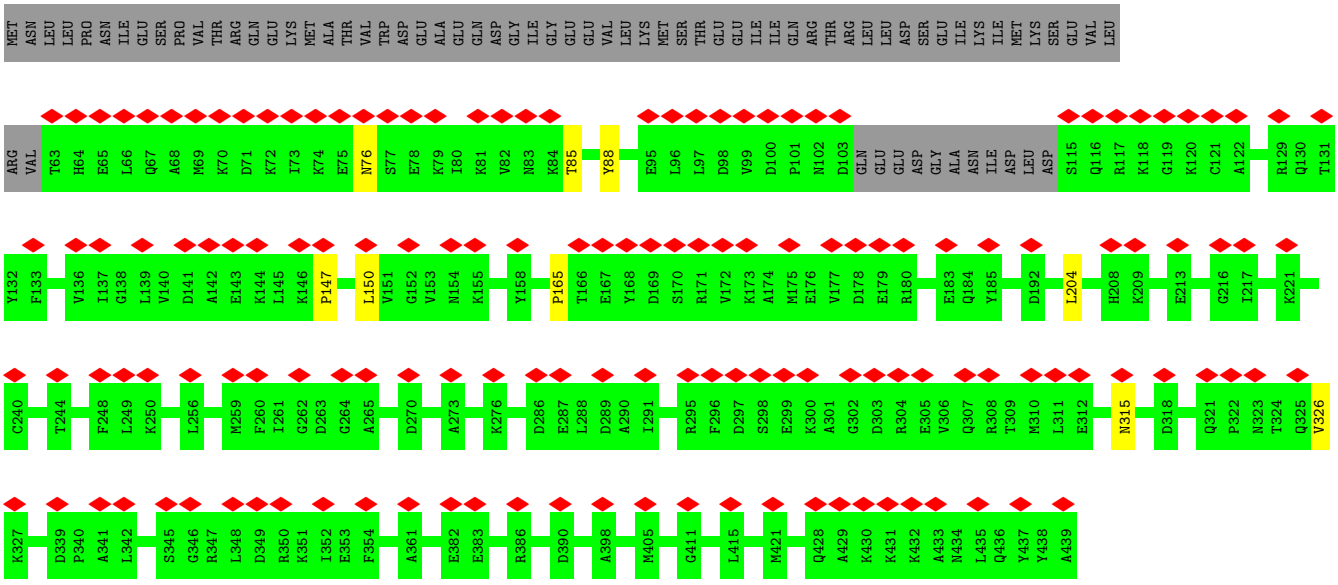
• Molecule 16: 26S protease regulatory subunit 10B





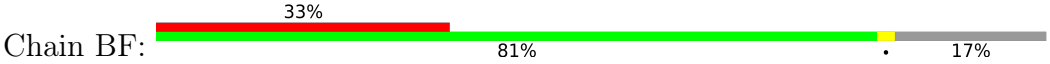
• Molecule 17: 26S protease regulatory subunit 6A

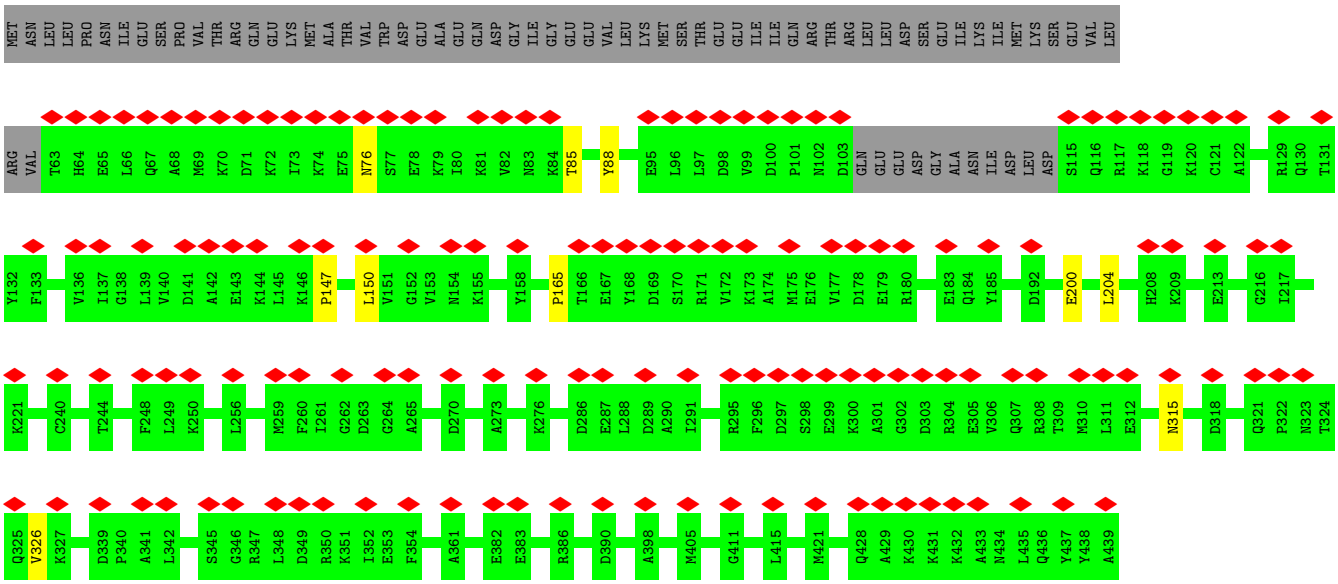




• Molecule 17: 26S protease regulatory subunit 6A

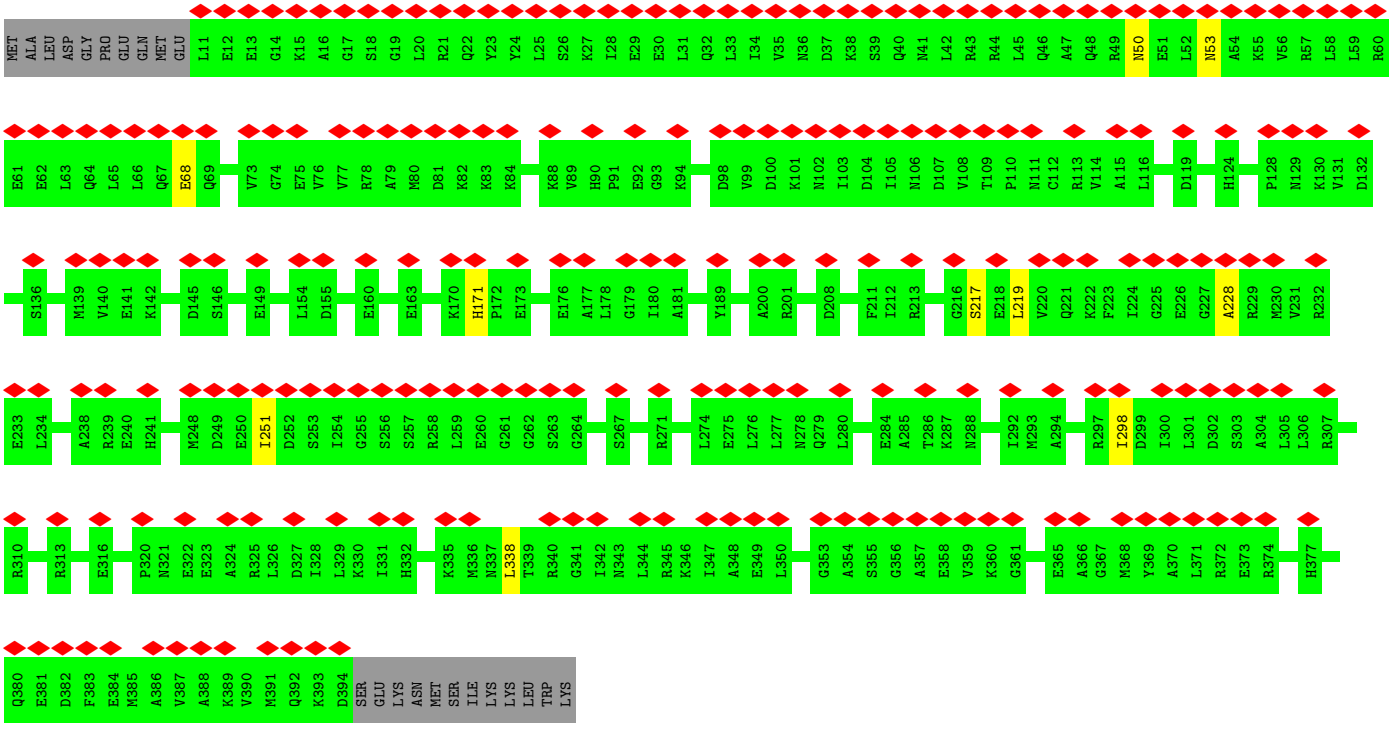
Chain BF:





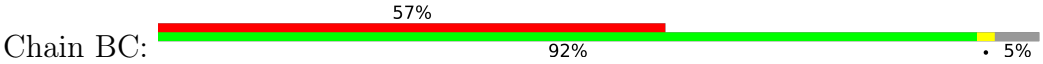
• Molecule 18: 26S protease regulatory subunit 8

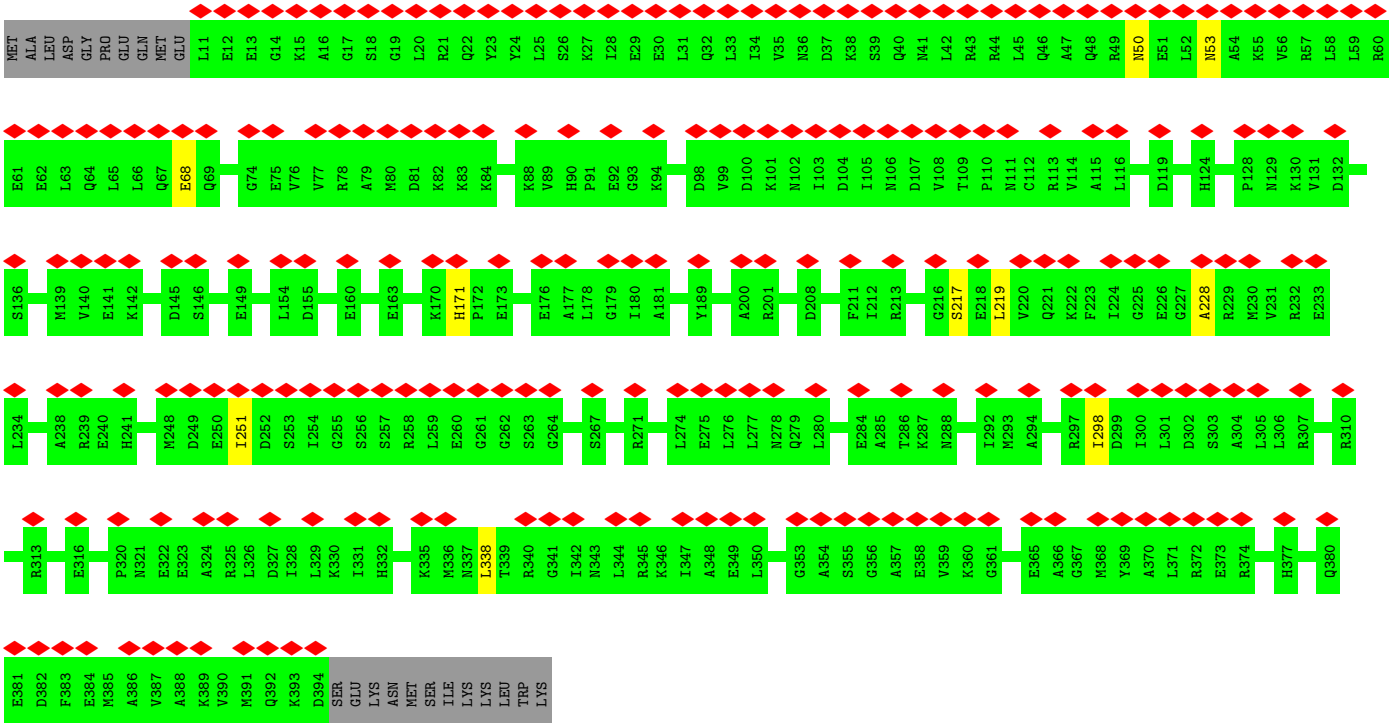
Chain AC:



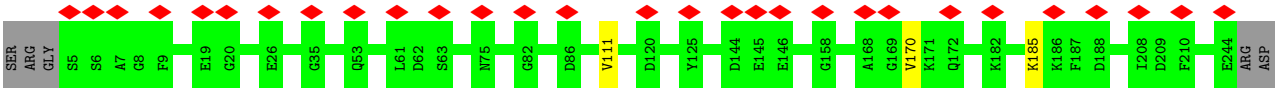
• Molecule 18: 26S protease regulatory subunit 8

Chain BC:

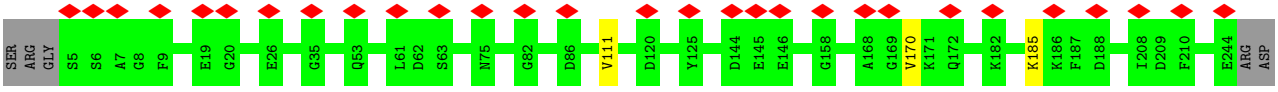




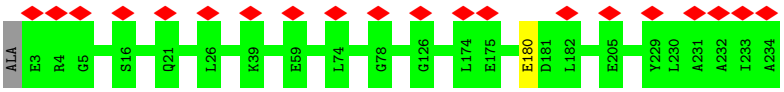
• Molecule 19: Proteasome subunit alpha type-6



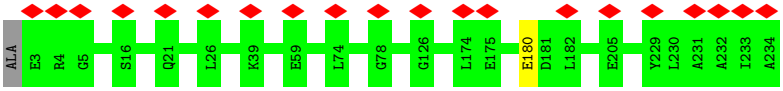
• Molecule 19: Proteasome subunit alpha type-6



• Molecule 20: Proteasome subunit alpha type-2

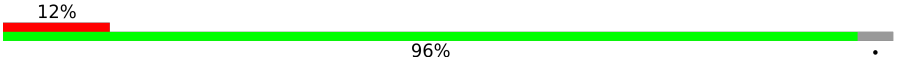


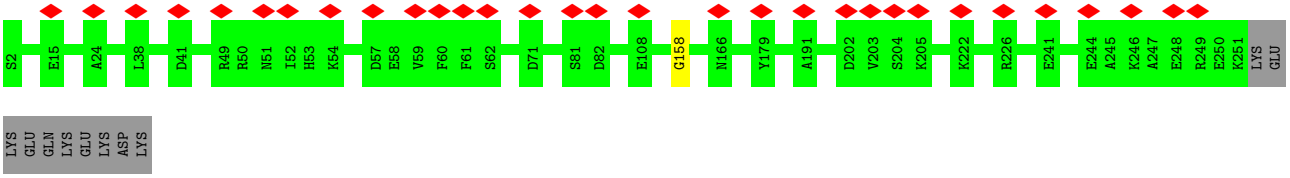
• Molecule 20: Proteasome subunit alpha type-2



• Molecule 21: Proteasome subunit alpha type-4

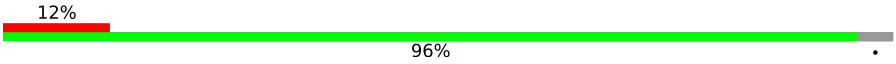
Chain AI:

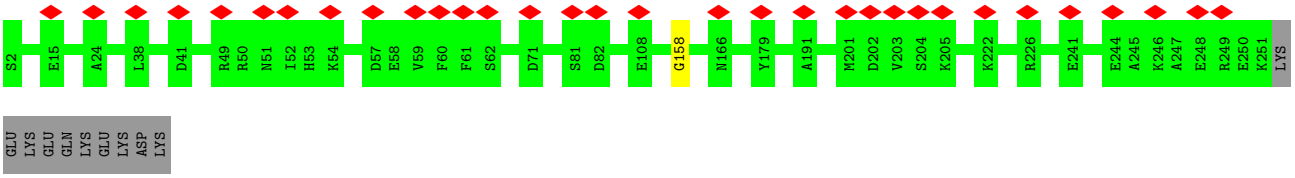




• Molecule 21: Proteasome subunit alpha type-4

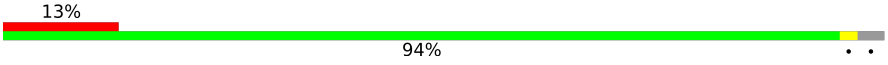
Chain BI:

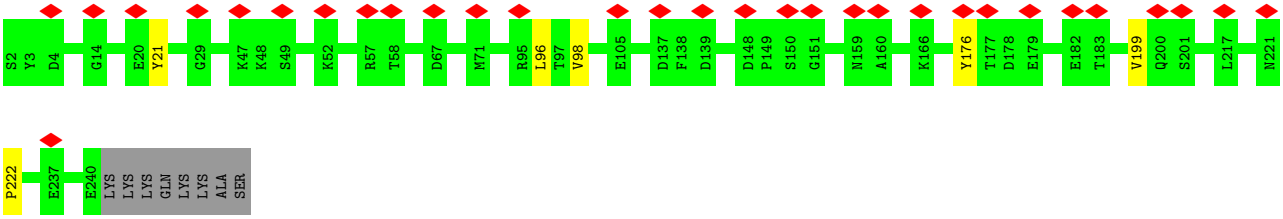




• Molecule 22: Proteasome subunit alpha type-7

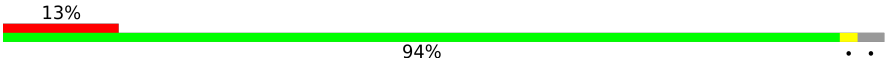
Chain AJ:

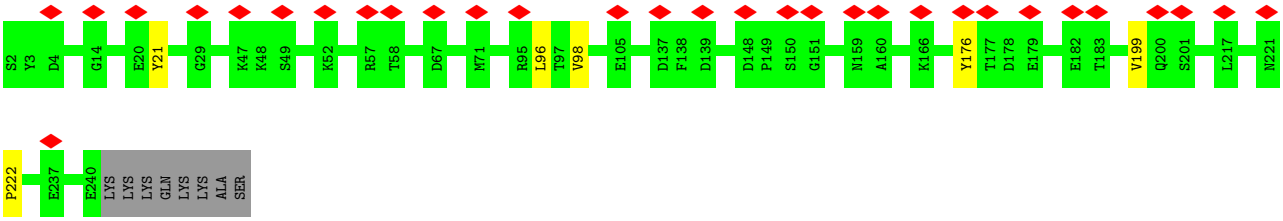




• Molecule 22: Proteasome subunit alpha type-7

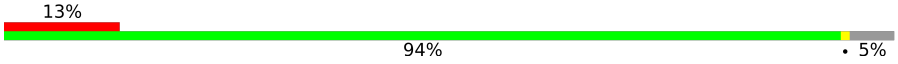
Chain BJ:

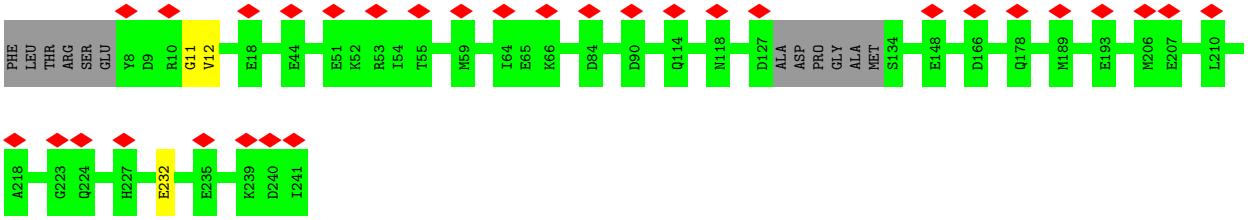




• Molecule 23: Proteasome subunit alpha type-5

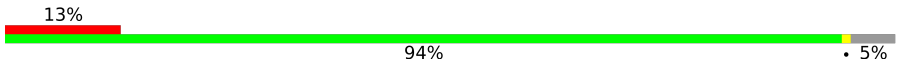
Chain AK:

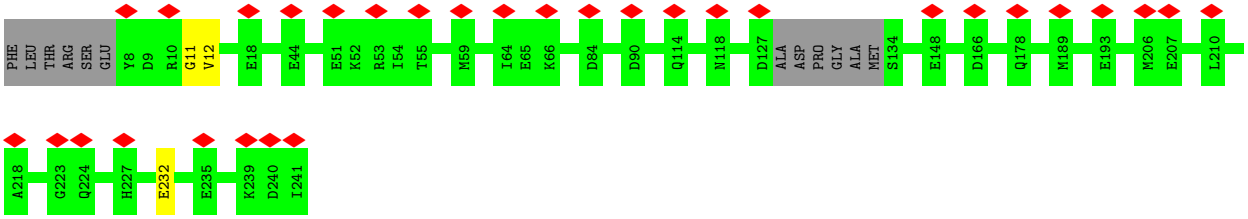




• Molecule 23: Proteasome subunit alpha type-5

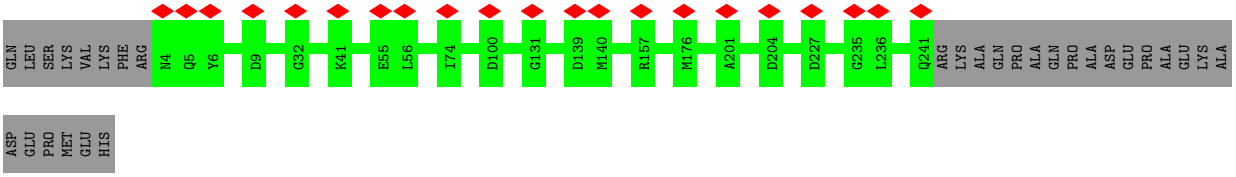
Chain BK:





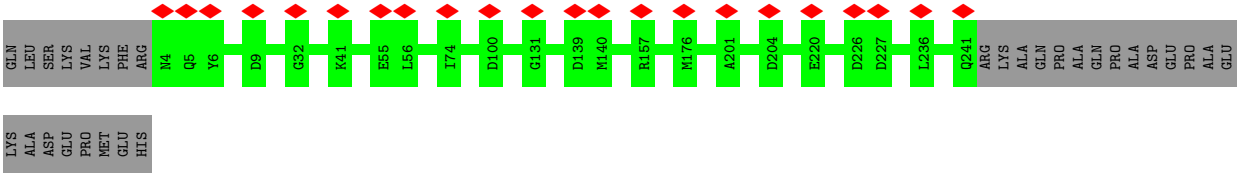
• Molecule 24: Proteasome subunit alpha type-1

Chain AL:



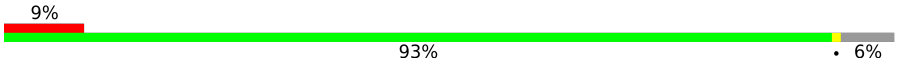
• Molecule 24: Proteasome subunit alpha type-1

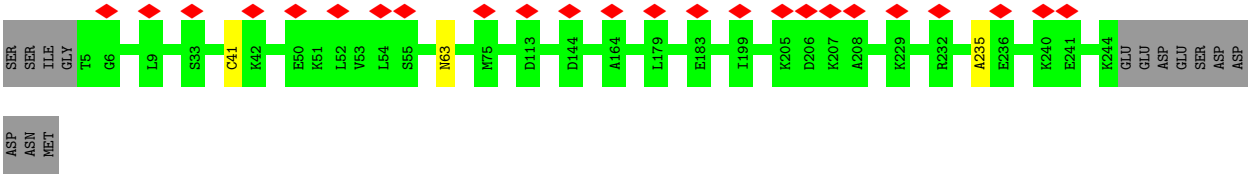
Chain BL:



• Molecule 25: Proteasome subunit alpha type-3

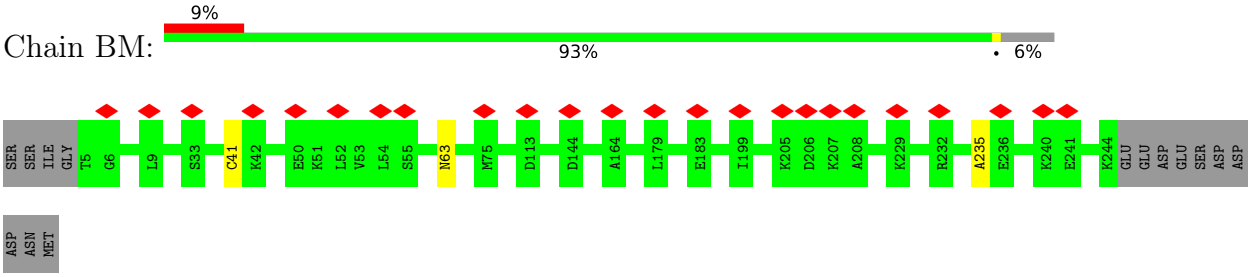
Chain AM:





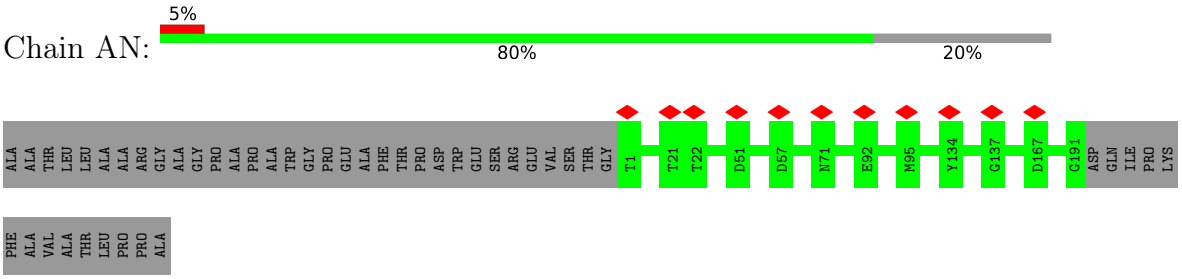
• Molecule 25: Proteasome subunit alpha type-3

Chain BM:



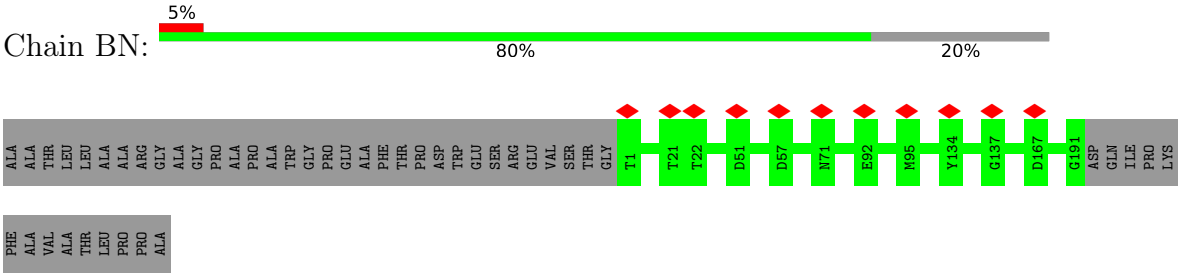
• Molecule 26: Proteasome subunit beta type-6

Chain AN:



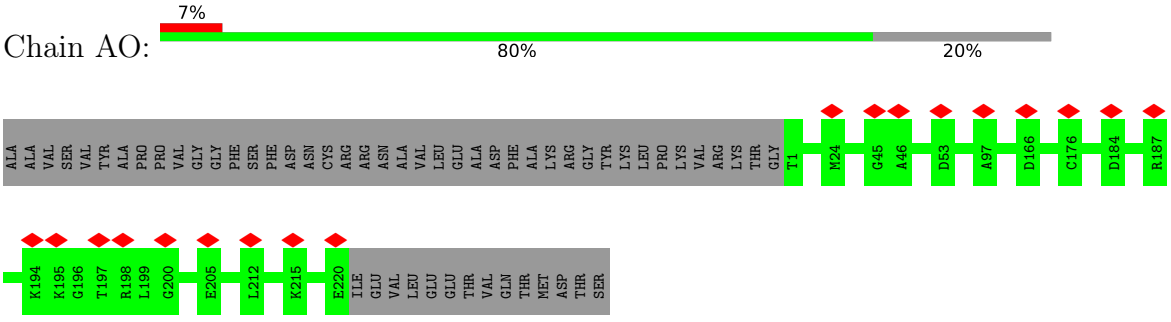
• Molecule 26: Proteasome subunit beta type-6

Chain BN:



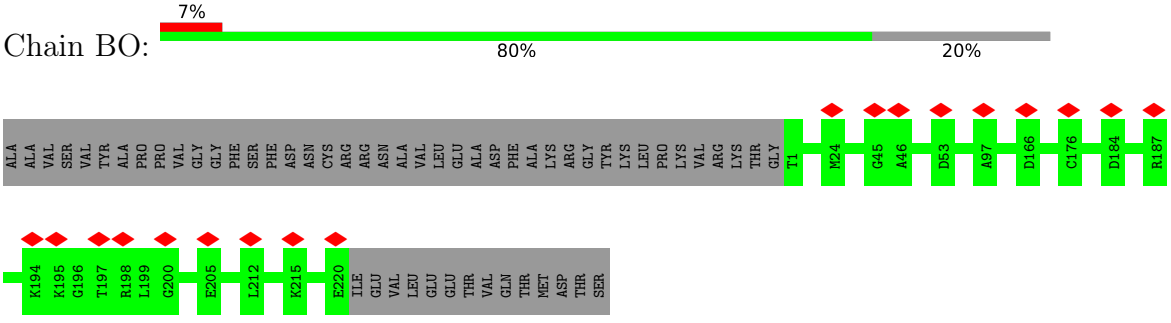
• Molecule 27: Proteasome subunit beta type-7

Chain AO:



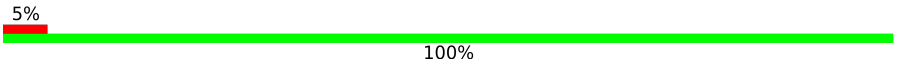
• Molecule 27: Proteasome subunit beta type-7

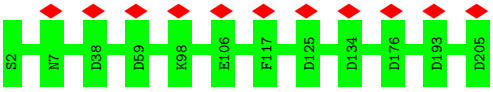
Chain BO:



• Molecule 28: Proteasome subunit beta type-3

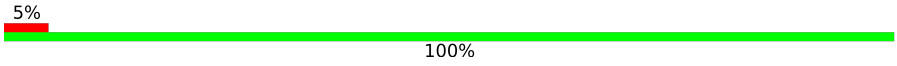
Chain AP:

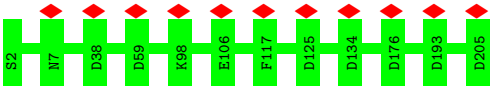




• Molecule 28: Proteasome subunit beta type-3

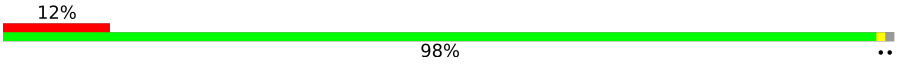
Chain BP:

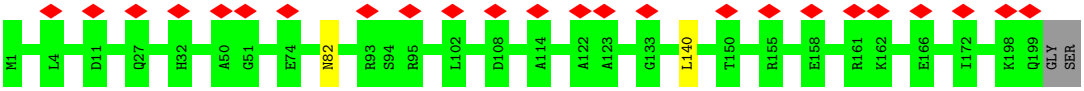




• Molecule 29: Proteasome subunit beta type-2

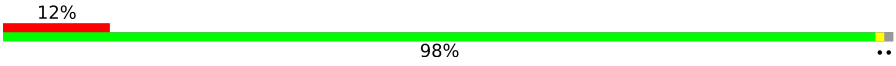
Chain AQ:

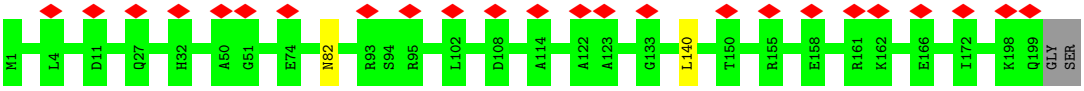




• Molecule 29: Proteasome subunit beta type-2

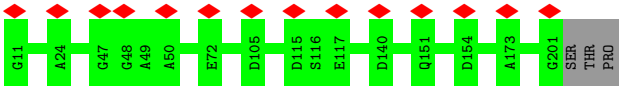
Chain BQ:





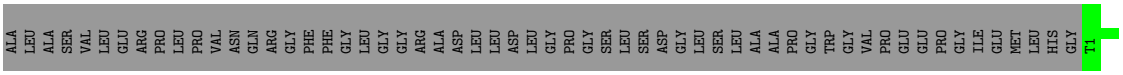
• Molecule 30: Proteasome subunit beta type-5

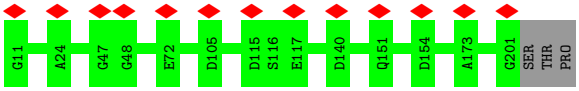
Chain AR:



• Molecule 30: Proteasome subunit beta type-5

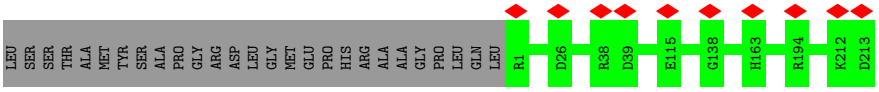
Chain BR:





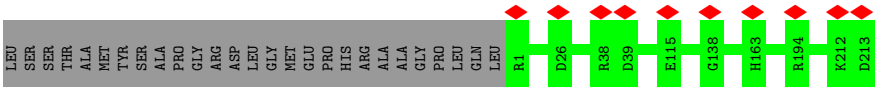
• Molecule 31: Proteasome subunit beta type-1

Chain AS:



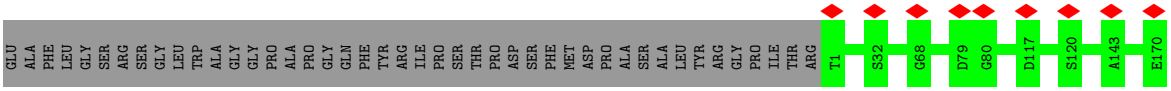
• Molecule 31: Proteasome subunit beta type-1

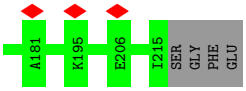
Chain BS:



• Molecule 32: Proteasome subunit beta type-4

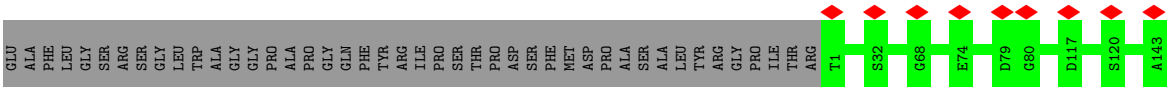
Chain AT:

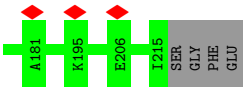




• Molecule 32: Proteasome subunit beta type-4

Chain BT:





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	86420	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TECNAI ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/Å^2$)	30	Depositor
Minimum defocus (nm)	-1000	Depositor
Maximum defocus (nm)	-3000	Depositor
Magnification	28736	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.017	Depositor
Minimum map value	-0.009	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.006	Depositor
Map size (Å)	550.4, 550.4, 550.4	wwPDB
Map dimensions	640, 640, 640	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.86, 0.86, 0.86	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, ATP, ADP

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	AU	0.29	0/6396	0.49	0/8646
1	BU	0.29	0/6396	0.49	0/8646
2	AV	0.31	0/3929	0.57	0/5309
2	BV	0.31	0/3929	0.57	0/5309
3	AW	0.29	0/3751	0.54	3/5042 (0.1%)
3	BW	0.29	0/3751	0.54	3/5042 (0.1%)
4	AX	0.27	0/3053	0.45	0/4115
4	BX	0.27	0/3053	0.45	0/4115
5	AY	0.30	0/3173	0.53	2/4273 (0.0%)
5	BY	0.30	0/3173	0.53	2/4273 (0.0%)
6	AZ	0.28	0/2324	0.55	0/3150
6	BZ	0.28	0/2324	0.55	0/3150
7	Aa	0.36	1/3053 (0.0%)	0.52	0/4133
7	Ba	0.36	1/3053 (0.0%)	0.52	0/4133
8	Ab	0.27	0/1478	0.48	0/2001
8	Bb	0.27	0/1478	0.48	0/2001
9	Ac	0.33	0/2302	0.60	1/3110 (0.0%)
9	Bc	0.33	0/2302	0.60	1/3110 (0.0%)
10	Ad	0.30	0/2162	0.57	0/2919
10	Bd	0.30	0/2162	0.57	0/2919
11	Ae	0.28	0/338	0.56	0/450
11	Be	0.28	0/338	0.56	0/450
12	Af	0.33	2/5413 (0.0%)	0.63	3/7317 (0.0%)
12	Bf	0.33	2/5413 (0.0%)	0.63	3/7317 (0.0%)
13	AA	0.31	0/2886	0.56	1/3899 (0.0%)
13	BA	0.31	0/2886	0.56	1/3899 (0.0%)
14	AB	0.29	0/2700	0.54	0/3645
14	BB	0.29	0/2700	0.54	0/3645
15	AD	0.29	0/3090	0.58	1/4168 (0.0%)
15	BD	0.29	0/3090	0.58	1/4168 (0.0%)
16	AE	0.29	0/2835	0.54	0/3821
16	BE	0.29	0/2835	0.54	0/3821

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
17	AF	0.32	0/2903	0.59	2/3912 (0.1%)
17	BF	0.32	0/2903	0.59	2/3912 (0.1%)
18	AC	0.29	0/3054	0.57	2/4107 (0.0%)
18	BC	0.29	0/3054	0.57	2/4107 (0.0%)
19	AG	0.30	0/1859	0.51	0/2523
19	BG	0.30	0/1859	0.51	0/2523
20	AH	0.30	0/1743	0.50	0/2372
20	BH	0.30	0/1743	0.50	0/2372
21	AI	0.31	0/1942	0.53	0/2628
21	BI	0.31	0/1942	0.53	0/2628
22	AJ	0.30	0/1728	0.48	0/2358
22	BJ	0.30	0/1728	0.48	0/2358
23	AK	0.30	0/1747	0.53	0/2364
23	BK	0.30	0/1747	0.53	0/2364
24	AL	0.28	0/1885	0.49	0/2552
24	BL	0.28	0/1885	0.49	0/2552
25	AM	0.31	0/1891	0.49	0/2552
25	BM	0.31	0/1891	0.49	0/2552
26	AN	0.29	0/1454	0.48	0/1967
26	BN	0.29	0/1454	0.48	0/1967
27	AO	0.28	0/1670	0.48	0/2265
27	BO	0.28	0/1670	0.48	0/2265
28	AP	0.31	0/1614	0.49	0/2177
28	BP	0.31	0/1614	0.49	0/2177
29	AQ	0.31	0/1603	0.51	1/2174 (0.0%)
29	BQ	0.31	0/1603	0.51	1/2174 (0.0%)
30	AR	0.30	0/1579	0.46	0/2134
30	BR	0.30	0/1579	0.46	0/2134
31	AS	0.29	0/1671	0.48	0/2253
31	BS	0.29	0/1671	0.48	0/2253
32	AT	0.30	0/1700	0.49	0/2305
32	BT	0.30	0/1700	0.49	0/2305
All	All	0.30	6/157852 (0.0%)	0.54	32/213282 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
9	Ac	0	1
9	Bc	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
16	AE	0	1
16	BE	0	1
18	AC	0	1
18	BC	0	1
23	AK	0	1
23	BK	0	1
All	All	0	8

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	Aa	145	LEU	C-N	11.88	1.56	1.34
7	Ba	145	LEU	C-N	11.88	1.56	1.34
12	Af	840	LEU	C-N	6.42	1.46	1.34
12	Bf	840	LEU	C-N	6.42	1.46	1.34
12	Af	340	MET	C-N	-5.33	1.21	1.34
12	Bf	340	MET	C-N	-5.33	1.21	1.34

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
17	BF	150	LEU	CB-CG-CD2	8.79	125.95	111.00
17	AF	150	LEU	CB-CG-CD2	8.76	125.90	111.00
17	BF	204	LEU	CA-CB-CG	6.02	129.15	115.30
17	AF	204	LEU	CA-CB-CG	6.02	129.15	115.30
12	Af	618	GLU	N-CA-C	6.00	127.21	111.00
12	Bf	618	GLU	N-CA-C	6.00	127.19	111.00
18	AC	217	SER	C-N-CA	5.96	136.61	121.70
18	BC	217	SER	C-N-CA	5.96	136.61	121.70
12	Af	266	LEU	CA-CB-CG	5.62	128.22	115.30
12	Bf	266	LEU	CA-CB-CG	5.61	128.21	115.30
3	BW	40	LEU	CA-CB-CG	5.53	128.01	115.30
3	AW	40	LEU	CA-CB-CG	5.52	127.99	115.30
5	AY	63	TRP	C-N-CA	5.52	135.50	121.70
5	BY	63	TRP	C-N-CA	5.52	135.50	121.70
3	BW	92	LYS	C-N-CA	5.46	135.35	121.70
3	AW	92	LYS	C-N-CA	5.44	135.31	121.70
12	Bf	795	GLY	N-CA-C	5.44	126.70	113.10
12	Af	795	GLY	N-CA-C	5.43	126.68	113.10
5	AY	287	LEU	CA-CB-CG	5.41	127.74	115.30
5	BY	287	LEU	CA-CB-CG	5.40	127.71	115.30
9	Ac	243	SER	C-N-CA	5.34	135.04	121.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	BW	135	LYS	C-N-CA	5.33	135.03	121.70
3	AW	135	LYS	C-N-CA	5.33	135.01	121.70
9	Bc	243	SER	C-N-CA	5.31	134.97	121.70
29	AQ	140	LEU	CA-CB-CG	5.18	127.21	115.30
29	BQ	140	LEU	CA-CB-CG	5.16	127.18	115.30
13	BA	91	GLN	C-N-CD	5.15	139.22	128.40
13	AA	91	GLN	C-N-CD	5.15	139.21	128.40
15	AD	373	ALA	C-N-CA	5.05	134.34	121.70
15	BD	373	ALA	C-N-CA	5.05	134.32	121.70
18	AC	338	LEU	CA-CB-CG	5.01	126.83	115.30
18	BC	338	LEU	CA-CB-CG	5.01	126.82	115.30

There are no chirality outliers.

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
18	AC	171	HIS	Peptide
16	AE	175	PRO	Peptide
23	AK	232	GLU	Peptide
9	Ac	243	SER	Peptide
18	BC	171	HIS	Peptide
16	BE	175	PRO	Peptide
23	BK	232	GLU	Peptide
9	Bc	243	SER	Peptide

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	AU	798/953 (84%)	762 (96%)	34 (4%)	2 (0%)	41	74
1	BU	798/953 (84%)	762 (96%)	34 (4%)	2 (0%)	41	74
2	AV	478/533 (90%)	431 (90%)	40 (8%)	7 (2%)	10	46
2	BV	478/533 (90%)	431 (90%)	39 (8%)	8 (2%)	9	43
3	AW	454/456 (100%)	412 (91%)	38 (8%)	4 (1%)	17	54
3	BW	454/456 (100%)	412 (91%)	38 (8%)	4 (1%)	17	54
4	AX	378/422 (90%)	363 (96%)	15 (4%)	0	100	100
4	BX	378/422 (90%)	363 (96%)	15 (4%)	0	100	100
5	AY	376/389 (97%)	342 (91%)	30 (8%)	4 (1%)	14	51
5	BY	376/389 (97%)	342 (91%)	30 (8%)	4 (1%)	14	51
6	AZ	284/324 (88%)	257 (90%)	23 (8%)	4 (1%)	11	46
6	BZ	284/324 (88%)	257 (90%)	23 (8%)	4 (1%)	11	46
7	Aa	371/376 (99%)	343 (92%)	23 (6%)	5 (1%)	12	48
7	Ba	371/376 (99%)	343 (92%)	23 (6%)	5 (1%)	12	48
8	Ab	189/377 (50%)	180 (95%)	8 (4%)	1 (0%)	29	66
8	Bb	189/377 (50%)	180 (95%)	8 (4%)	1 (0%)	29	66
9	Ac	285/310 (92%)	252 (88%)	27 (10%)	6 (2%)	7	40
9	Bc	285/310 (92%)	252 (88%)	27 (10%)	6 (2%)	7	40
10	Ad	255/257 (99%)	227 (89%)	25 (10%)	3 (1%)	13	50
10	Bd	255/257 (99%)	227 (89%)	25 (10%)	3 (1%)	13	50
11	Ae	36/70 (51%)	32 (89%)	3 (8%)	1 (3%)	5	35
11	Be	36/70 (51%)	32 (89%)	3 (8%)	1 (3%)	5	35
12	Af	686/908 (76%)	571 (83%)	110 (16%)	5 (1%)	22	60
12	Bf	686/908 (76%)	571 (83%)	110 (16%)	5 (1%)	22	60
13	AA	359/433 (83%)	317 (88%)	33 (9%)	9 (2%)	5	36
13	BA	359/433 (83%)	317 (88%)	33 (9%)	9 (2%)	5	36
14	AB	339/440 (77%)	303 (89%)	32 (9%)	4 (1%)	13	50
14	BB	339/440 (77%)	303 (89%)	32 (9%)	4 (1%)	13	50
15	AD	378/418 (90%)	330 (87%)	44 (12%)	4 (1%)	14	51
15	BD	378/418 (90%)	330 (87%)	44 (12%)	4 (1%)	14	51
16	AE	351/389 (90%)	307 (88%)	40 (11%)	4 (1%)	14	51
16	BE	351/389 (90%)	307 (88%)	40 (11%)	4 (1%)	14	51

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
17	AF	362/439 (82%)	326 (90%)	32 (9%)	4 (1%)	14	51
17	BF	362/439 (82%)	326 (90%)	31 (9%)	5 (1%)	11	46
18	AC	382/406 (94%)	341 (89%)	37 (10%)	4 (1%)	15	52
18	BC	382/406 (94%)	341 (89%)	37 (10%)	4 (1%)	15	52
19	AG	238/245 (97%)	221 (93%)	14 (6%)	3 (1%)	12	48
19	BG	238/245 (97%)	221 (93%)	14 (6%)	3 (1%)	12	48
20	AH	230/233 (99%)	216 (94%)	14 (6%)	0	100	100
20	BH	230/233 (99%)	216 (94%)	14 (6%)	0	100	100
21	AI	248/260 (95%)	226 (91%)	21 (8%)	1 (0%)	34	70
21	BI	248/260 (95%)	226 (91%)	21 (8%)	1 (0%)	34	70
22	AJ	237/247 (96%)	226 (95%)	7 (3%)	4 (2%)	9	43
22	BJ	237/247 (96%)	226 (95%)	7 (3%)	4 (2%)	9	43
23	AK	224/240 (93%)	201 (90%)	21 (9%)	2 (1%)	17	54
23	BK	224/240 (93%)	202 (90%)	20 (9%)	2 (1%)	17	54
24	AL	236/268 (88%)	214 (91%)	22 (9%)	0	100	100
24	BL	236/268 (88%)	214 (91%)	22 (9%)	0	100	100
25	AM	238/254 (94%)	219 (92%)	17 (7%)	2 (1%)	19	57
25	BM	238/254 (94%)	219 (92%)	17 (7%)	2 (1%)	19	57
26	AN	189/238 (79%)	184 (97%)	5 (3%)	0	100	100
26	BN	189/238 (79%)	184 (97%)	5 (3%)	0	100	100
27	AO	218/276 (79%)	211 (97%)	7 (3%)	0	100	100
27	BO	218/276 (79%)	211 (97%)	7 (3%)	0	100	100
28	AP	202/204 (99%)	181 (90%)	21 (10%)	0	100	100
28	BP	202/204 (99%)	181 (90%)	21 (10%)	0	100	100
29	AQ	197/201 (98%)	181 (92%)	16 (8%)	0	100	100
29	BQ	197/201 (98%)	181 (92%)	16 (8%)	0	100	100
30	AR	199/262 (76%)	192 (96%)	7 (4%)	0	100	100
30	BR	199/262 (76%)	192 (96%)	7 (4%)	0	100	100
31	AS	211/240 (88%)	201 (95%)	10 (5%)	0	100	100
31	BS	211/240 (88%)	201 (95%)	10 (5%)	0	100	100
32	AT	213/263 (81%)	204 (96%)	9 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
32	BT	213/263 (81%)	204 (96%)	9 (4%)	0	100 100
All	All	19682/22662 (87%)	17947 (91%)	1567 (8%)	168 (1%)	21 54

All (168) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	AU	364	VAL
3	AW	136	ILE
5	AY	350	VAL
9	Ac	157	ILE
9	Ac	244	VAL
12	Af	221	ILE
12	Af	606	VAL
13	AA	206	ILE
19	AG	111	VAL
23	AK	12	VAL
1	BU	364	VAL
3	BW	136	ILE
5	BY	350	VAL
9	Bc	157	ILE
9	Bc	244	VAL
12	Bf	221	ILE
12	Bf	606	VAL
13	BA	206	ILE
19	BG	111	VAL
23	BK	12	VAL
2	AV	82	LEU
7	Aa	340	VAL
12	Af	290	VAL
13	AA	95	VAL
13	AA	268	LYS
13	AA	427	PRO
14	AB	218	PRO
14	AB	263	GLY
14	AB	325	VAL
15	AD	149	SER
15	AD	151	ILE
17	AF	88	TYR
18	AC	298	ILE
21	AI	158	GLY
22	AJ	199	VAL
23	AK	11	GLY

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Mol	Chain	Res	Type
25	AM	63	ASN
2	BV	82	LEU
7	Ba	336	VAL
7	Ba	340	VAL
12	Bf	290	VAL
13	BA	95	VAL
13	BA	268	LYS
13	BA	427	PRO
14	BB	218	PRO
14	BB	263	GLY
14	BB	325	VAL
15	BD	149	SER
15	BD	151	ILE
17	BF	88	TYR
18	BC	298	ILE
21	BI	158	GLY
22	BJ	199	VAL
23	BK	11	GLY
25	BM	63	ASN
2	AV	59	ALA
2	AV	96	ARG
5	AY	287	LEU
6	AZ	144	VAL
7	Aa	336	VAL
12	Af	440	ILE
15	AD	170	MET
16	AE	209	GLY
16	AE	247	THR
18	AC	219	LEU
19	AG	185	LYS
22	AJ	96	LEU
2	BV	59	ALA
2	BV	96	ARG
5	BY	287	LEU
6	BZ	144	VAL
12	Bf	440	ILE
15	BD	170	MET
16	BE	209	GLY
16	BE	247	THR
18	BC	219	LEU
19	BG	185	LYS
22	BJ	96	LEU

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Mol	Chain	Res	Type
3	AW	40	LEU
3	AW	138	VAL
5	AY	64	GLN
5	AY	67	VAL
6	AZ	33	LYS
8	Ab	77	THR
9	Ac	156	VAL
10	Ad	213	ARG
12	Af	594	LEU
16	AE	208	ILE
18	AC	228	ALA
3	BW	40	LEU
3	BW	138	VAL
5	BY	64	GLN
5	BY	67	VAL
6	BZ	33	LYS
8	Bb	77	THR
9	Bc	156	VAL
10	Bd	213	ARG
12	Bf	594	LEU
16	BE	208	ILE
18	BC	228	ALA
3	AW	427	ASP
7	Aa	69	HIS
7	Aa	260	ASP
11	Ae	4	LYS
3	BW	427	ASP
7	Ba	69	HIS
7	Ba	260	ASP
11	Be	4	LYS
2	AV	319	HIS
10	Ad	214	GLY
15	AD	210	CYS
17	AF	165	PRO
25	AM	235	ALA
2	BV	54	LYS
2	BV	319	HIS
10	Bd	214	GLY
14	BB	219	PRO
15	BD	210	CYS
17	BF	165	PRO
17	BF	200	GLU

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Mol	Chain	Res	Type
25	BM	235	ALA
9	Ac	105	PRO
13	AA	317	VAL
14	AB	219	PRO
17	AF	326	VAL
19	AG	170	VAL
22	AJ	98	VAL
9	Bc	105	PRO
13	BA	317	VAL
17	BF	326	VAL
19	BG	170	VAL
22	BJ	98	VAL
2	AV	464	ILE
6	AZ	240	VAL
13	AA	92	PRO
13	AA	169	LYS
13	AA	172	VAL
16	AE	292	PRO
18	AC	251	ILE
2	BV	464	ILE
6	BZ	240	VAL
13	BA	92	PRO
13	BA	169	LYS
13	BA	172	VAL
16	BE	292	PRO
18	BC	251	ILE
1	AU	134	VAL
2	AV	322	VAL
7	Aa	166	ILE
9	Ac	151	VAL
1	BU	134	VAL
2	BV	322	VAL
7	Ba	166	ILE
9	Bc	151	VAL
2	AV	317	PRO
13	AA	345	LEU
17	AF	147	PRO
22	AJ	222	PRO
2	BV	317	PRO
13	BA	345	LEU
17	BF	147	PRO
22	BJ	222	PRO

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Mol	Chain	Res	Type
9	Ac	189	ILE
9	Bc	189	ILE
6	AZ	221	PRO
6	BZ	221	PRO
10	Ad	37	PRO
10	Bd	37	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	AU	685/816 (84%)	681 (99%)	4 (1%)	86 92
1	BU	685/816 (84%)	681 (99%)	4 (1%)	86 92
2	AV	414/459 (90%)	409 (99%)	5 (1%)	71 84
2	BV	414/459 (90%)	409 (99%)	5 (1%)	71 84
3	AW	416/416 (100%)	413 (99%)	3 (1%)	84 91
3	BW	416/416 (100%)	413 (99%)	3 (1%)	84 91
4	AX	327/362 (90%)	325 (99%)	2 (1%)	86 92
4	BX	327/362 (90%)	325 (99%)	2 (1%)	86 92
5	AY	334/344 (97%)	334 (100%)	0	100 100
5	BY	334/344 (97%)	334 (100%)	0	100 100
6	AZ	257/295 (87%)	256 (100%)	1 (0%)	91 95
6	BZ	257/295 (87%)	256 (100%)	1 (0%)	91 95
7	Aa	333/336 (99%)	332 (100%)	1 (0%)	92 96
7	Ba	333/336 (99%)	332 (100%)	1 (0%)	92 96
8	Ab	167/312 (54%)	167 (100%)	0	100 100
8	Bb	167/312 (54%)	167 (100%)	0	100 100
9	Ac	252/268 (94%)	250 (99%)	2 (1%)	81 89
9	Bc	252/268 (94%)	250 (99%)	2 (1%)	81 89
10	Ad	231/231 (100%)	230 (100%)	1 (0%)	91 95

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
10	Bd	231/231 (100%)	230 (100%)	1 (0%)	91 95
11	Ae	38/63 (60%)	38 (100%)	0	100 100
11	Be	38/63 (60%)	38 (100%)	0	100 100
12	Af	582/763 (76%)	578 (99%)	4 (1%)	84 91
12	Bf	582/763 (76%)	578 (99%)	4 (1%)	84 91
13	AA	308/372 (83%)	307 (100%)	1 (0%)	92 96
13	BA	308/372 (83%)	307 (100%)	1 (0%)	92 96
14	AB	298/385 (77%)	296 (99%)	2 (1%)	84 91
14	BB	298/385 (77%)	296 (99%)	2 (1%)	84 91
15	AD	333/366 (91%)	331 (99%)	2 (1%)	86 92
15	BD	333/366 (91%)	331 (99%)	2 (1%)	86 92
16	AE	308/341 (90%)	306 (99%)	2 (1%)	86 92
16	BE	308/341 (90%)	306 (99%)	2 (1%)	86 92
17	AF	312/379 (82%)	309 (99%)	3 (1%)	76 86
17	BF	312/379 (82%)	309 (99%)	3 (1%)	76 86
18	AC	332/352 (94%)	329 (99%)	3 (1%)	78 88
18	BC	332/352 (94%)	329 (99%)	3 (1%)	78 88
19	AG	193/209 (92%)	193 (100%)	0	100 100
19	BG	193/209 (92%)	193 (100%)	0	100 100
20	AH	164/190 (86%)	163 (99%)	1 (1%)	86 92
20	BH	164/190 (86%)	163 (99%)	1 (1%)	86 92
21	AI	193/220 (88%)	193 (100%)	0	100 100
21	BI	193/220 (88%)	193 (100%)	0	100 100
22	AJ	152/210 (72%)	150 (99%)	2 (1%)	69 82
22	BJ	152/210 (72%)	150 (99%)	2 (1%)	69 82
23	AK	186/202 (92%)	186 (100%)	0	100 100
23	BK	186/202 (92%)	186 (100%)	0	100 100
24	AL	198/229 (86%)	198 (100%)	0	100 100
24	BL	198/229 (86%)	198 (100%)	0	100 100
25	AM	192/211 (91%)	191 (100%)	1 (0%)	88 94
25	BM	192/211 (91%)	191 (100%)	1 (0%)	88 94

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
26	AN	148/180 (82%)	148 (100%)	0	100 100
26	BN	148/180 (82%)	148 (100%)	0	100 100
27	AO	177/227 (78%)	177 (100%)	0	100 100
27	BO	177/227 (78%)	177 (100%)	0	100 100
28	AP	172/173 (99%)	172 (100%)	0	100 100
28	BP	172/173 (99%)	172 (100%)	0	100 100
29	AQ	164/171 (96%)	163 (99%)	1 (1%)	86 92
29	BQ	164/171 (96%)	163 (99%)	1 (1%)	86 92
30	AR	153/201 (76%)	153 (100%)	0	100 100
30	BR	153/201 (76%)	153 (100%)	0	100 100
31	AS	174/198 (88%)	174 (100%)	0	100 100
31	BS	174/198 (88%)	174 (100%)	0	100 100
32	AT	175/214 (82%)	175 (100%)	0	100 100
32	BT	175/214 (82%)	175 (100%)	0	100 100
All	All	16736/19390 (86%)	16654 (100%)	82 (0%)	89 94

All (82) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	AU	147	TYR
1	AU	172	ASP
1	AU	345	ASN
1	AU	384	GLN
2	AV	36	GLU
2	AV	240	LEU
2	AV	258	TYR
2	AV	281	ASN
2	AV	324	PHE
3	AW	214	PHE
3	AW	273	TYR
3	AW	361	HIS
4	AX	62	GLN
4	AX	157	LEU
6	AZ	196	HIS
7	Aa	14	SER
9	Ac	38	LEU
9	Ac	234	TYR

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Mol	Chain	Res	Type
10	Ad	3	GLU
12	Af	248	LEU
12	Af	266	LEU
12	Af	685	THR
12	Af	759	LEU
13	AA	270	CYS
14	AB	101	ASP
14	AB	103	ARG
15	AD	83	GLN
15	AD	366	ARG
16	AE	53	VAL
16	AE	231	PHE
17	AF	76	ASN
17	AF	85	THR
17	AF	315	ASN
18	AC	50	ASN
18	AC	53	ASN
18	AC	68	GLU
20	AH	180	GLU
22	AJ	21	TYR
22	AJ	176	TYR
25	AM	41	CYS
29	AQ	82	ASN
1	BU	147	TYR
1	BU	172	ASP
1	BU	345	ASN
1	BU	384	GLN
2	BV	36	GLU
2	BV	240	LEU
2	BV	258	TYR
2	BV	281	ASN
2	BV	324	PHE
3	BW	214	PHE
3	BW	273	TYR
3	BW	361	HIS
4	BX	62	GLN
4	BX	157	LEU
6	BZ	196	HIS
7	Ba	14	SER
9	Bc	38	LEU
9	Bc	234	TYR
10	Bd	3	GLU

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Mol	Chain	Res	Type
12	Bf	248	LEU
12	Bf	266	LEU
12	Bf	685	THR
12	Bf	759	LEU
13	BA	270	CYS
14	BB	101	ASP
14	BB	103	ARG
15	BD	83	GLN
15	BD	366	ARG
16	BE	53	VAL
16	BE	231	PHE
17	BF	76	ASN
17	BF	85	THR
17	BF	315	ASN
18	BC	50	ASN
18	BC	53	ASN
18	BC	68	GLU
20	BH	180	GLU
22	BJ	21	TYR
22	BJ	176	TYR
25	BM	41	CYS
29	BQ	82	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (105) such sidechains are listed below:

Mol	Chain	Res	Type
1	AU	18	GLN
1	AU	338	HIS
2	AV	33	GLN
3	AW	257	GLN
3	AW	414	ASN
7	Aa	18	GLN
7	Aa	35	HIS
7	Aa	244	ASN
9	Ac	172	HIS
9	Ac	298	GLN
11	Ae	6	GLN
12	Af	198	HIS
12	Af	199	ASN
12	Af	371	ASN
12	Af	387	GLN
12	Af	396	ASN

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Mol	Chain	Res	Type
12	Af	428	GLN
12	Af	452	ASN
12	Af	475	ASN
12	Af	531	ASN
12	Af	565	ASN
12	Af	650	GLN
12	Af	724	ASN
12	Af	737	ASN
12	Af	747	GLN
13	AA	94	GLN
13	AA	304	ASN
13	AA	414	ASN
14	AB	153	ASN
14	AB	193	GLN
14	AB	315	GLN
15	AD	286	GLN
15	AD	304	ASN
16	AE	75	ASN
16	AE	262	ASN
16	AE	345	ASN
17	AF	194	GLN
17	AF	369	HIS
19	AG	127	GLN
19	AG	150	GLN
21	AI	95	GLN
21	AI	119	GLN
22	AJ	120	GLN
26	AN	123	GLN
27	AO	193	ASN
28	AP	169	GLN
28	AP	173	ASN
31	AS	146	GLN
31	AS	151	ASN
31	AS	157	ASN
31	AS	159	GLN
1	BU	18	GLN
1	BU	338	HIS
2	BV	33	GLN
3	BW	257	GLN
3	BW	414	ASN
7	Ba	18	GLN
7	Ba	244	ASN

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Mol	Chain	Res	Type
9	Bc	172	HIS
9	Bc	298	GLN
11	Be	6	GLN
12	Bf	198	HIS
12	Bf	199	ASN
12	Bf	371	ASN
12	Bf	387	GLN
12	Bf	396	ASN
12	Bf	428	GLN
12	Bf	452	ASN
12	Bf	475	ASN
12	Bf	531	ASN
12	Bf	565	ASN
12	Bf	650	GLN
12	Bf	724	ASN
12	Bf	737	ASN
12	Bf	747	GLN
13	BA	94	GLN
13	BA	304	ASN
13	BA	414	ASN
14	BB	153	ASN
14	BB	193	GLN
14	BB	314	ASN
14	BB	315	GLN
15	BD	286	GLN
15	BD	304	ASN
16	BE	75	ASN
16	BE	262	ASN
16	BE	345	ASN
17	BF	194	GLN
17	BF	369	HIS
19	BG	127	GLN
19	BG	150	GLN
20	BH	166	ASN
20	BH	169	ASN
21	BI	95	GLN
21	BI	119	GLN
22	BJ	120	GLN
25	BM	147	GLN
26	BN	123	GLN
27	BO	193	ASN
28	BP	169	GLN

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Mol	Chain	Res	Type
28	BP	173	ASN
31	BS	146	GLN
31	BS	151	ASN
31	BS	157	ASN
31	BS	159	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

Of 14 ligands modelled in this entry, 2 are monoatomic - leaving 12 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	$\#\|Z\| > 2$
34	ATP	AA	501	-	26,33,33	0.89	1 (3%)	31,52,52	1.75	5 (16%)
35	ADP	BC	501	-	24,29,29	0.98	1 (4%)	29,45,45	1.37	4 (13%)
34	ATP	BF	501	-	26,33,33	0.93	1 (3%)	31,52,52	1.62	5 (16%)
35	ADP	AC	501	-	24,29,29	0.97	1 (4%)	29,45,45	1.36	4 (13%)
34	ATP	AE	401	-	26,33,33	0.92	1 (3%)	31,52,52	1.69	5 (16%)
35	ADP	AB	501	-	24,29,29	0.94	1 (4%)	29,45,45	1.36	5 (17%)
34	ATP	BE	401	-	26,33,33	0.92	1 (3%)	31,52,52	1.69	5 (16%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
34	ATP	BA	501	-	26,33,33	0.89	1 (3%)	31,52,52	1.75	5 (16%)
34	ATP	AF	501	-	26,33,33	0.93	1 (3%)	31,52,52	1.62	5 (16%)
34	ATP	AD	501	-	26,33,33	0.88	1 (3%)	31,52,52	1.42	5 (16%)
34	ATP	BD	501	-	26,33,33	0.89	1 (3%)	31,52,52	1.42	5 (16%)
35	ADP	BB	501	-	24,29,29	0.94	1 (4%)	29,45,45	1.36	5 (17%)

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
34	ATP	AA	501	-	-	4/18/38/38	0/3/3/3
35	ADP	BC	501	-	-	5/12/32/32	0/3/3/3
34	ATP	BF	501	-	-	1/18/38/38	0/3/3/3
35	ADP	AC	501	-	-	5/12/32/32	0/3/3/3
34	ATP	AE	401	-	-	3/18/38/38	0/3/3/3
35	ADP	AB	501	-	-	6/12/32/32	0/3/3/3
34	ATP	BE	401	-	-	3/18/38/38	0/3/3/3
34	ATP	BA	501	-	-	4/18/38/38	0/3/3/3
34	ATP	AF	501	-	-	1/18/38/38	0/3/3/3
34	ATP	AD	501	-	-	2/18/38/38	0/3/3/3
34	ATP	BD	501	-	-	2/18/38/38	0/3/3/3
35	ADP	BB	501	-	-	6/12/32/32	0/3/3/3

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
35	BC	501	ADP	C5-C4	2.58	1.47	1.40
35	AC	501	ADP	C5-C4	2.55	1.47	1.40
34	AE	401	ATP	C5-C4	2.53	1.47	1.40
34	BE	401	ATP	C5-C4	2.52	1.47	1.40
34	AF	501	ATP	C5-C4	2.47	1.47	1.40
34	BF	501	ATP	C5-C4	2.47	1.47	1.40
35	AB	501	ADP	C5-C4	2.43	1.47	1.40
35	BB	501	ADP	C5-C4	2.43	1.47	1.40
34	AD	501	ATP	C5-C4	2.40	1.47	1.40
34	BD	501	ATP	C5-C4	2.40	1.47	1.40
34	BA	501	ATP	C5-C4	2.32	1.47	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
34	AA	501	ATP	C5-C4	2.32	1.47	1.40

All (58) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
34	BA	501	ATP	PA-O3A-PB	-4.97	115.77	132.83
34	AA	501	ATP	PA-O3A-PB	-4.96	115.80	132.83
34	BF	501	ATP	PB-O3B-PG	-4.57	117.15	132.83
34	AF	501	ATP	PB-O3B-PG	-4.57	117.16	132.83
34	AA	501	ATP	PB-O3B-PG	-4.27	118.18	132.83
34	BA	501	ATP	PB-O3B-PG	-4.26	118.22	132.83
34	BF	501	ATP	PA-O3A-PB	-3.92	119.36	132.83
34	AF	501	ATP	PA-O3A-PB	-3.92	119.36	132.83
34	AE	401	ATP	PB-O3B-PG	-3.82	119.70	132.83
34	BE	401	ATP	PB-O3B-PG	-3.82	119.70	132.83
34	BE	401	ATP	C3'-C2'-C1'	3.81	106.72	100.98
34	AE	401	ATP	C3'-C2'-C1'	3.80	106.70	100.98
34	AE	401	ATP	PA-O3A-PB	-3.74	119.98	132.83
34	BE	401	ATP	PA-O3A-PB	-3.73	120.01	132.83
35	BB	501	ADP	C3'-C2'-C1'	3.55	106.33	100.98
35	AB	501	ADP	C3'-C2'-C1'	3.53	106.29	100.98
34	BA	501	ATP	C3'-C2'-C1'	3.41	106.11	100.98
34	AA	501	ATP	C3'-C2'-C1'	3.40	106.09	100.98
34	AD	501	ATP	N3-C2-N1	-3.28	123.55	128.68
34	BD	501	ATP	N3-C2-N1	-3.27	123.57	128.68
34	AD	501	ATP	PA-O3A-PB	-3.27	121.61	132.83
34	BD	501	ATP	PA-O3A-PB	-3.27	121.62	132.83
35	AC	501	ADP	C3'-C2'-C1'	3.18	105.77	100.98
35	BC	501	ADP	C3'-C2'-C1'	3.18	105.77	100.98
35	AC	501	ADP	C4-C5-N7	-3.04	106.23	109.40
35	BC	501	ADP	C4-C5-N7	-3.04	106.23	109.40
34	BA	501	ATP	N3-C2-N1	-3.04	123.92	128.68
34	AA	501	ATP	N3-C2-N1	-3.03	123.94	128.68
34	AE	401	ATP	C4-C5-N7	-2.96	106.31	109.40
34	BE	401	ATP	C4-C5-N7	-2.96	106.31	109.40
34	AD	501	ATP	C3'-C2'-C1'	2.94	105.40	100.98
34	BD	501	ATP	C3'-C2'-C1'	2.94	105.40	100.98
35	BC	501	ADP	N3-C2-N1	-2.77	124.34	128.68
35	AC	501	ADP	N3-C2-N1	-2.75	124.38	128.68
34	AF	501	ATP	N3-C2-N1	-2.67	124.51	128.68
34	BF	501	ATP	N3-C2-N1	-2.65	124.53	128.68
34	AF	501	ATP	C4-C5-N7	-2.61	106.68	109.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
35	BB	501	ADP	N3-C2-N1	-2.60	124.61	128.68
35	AB	501	ADP	N3-C2-N1	-2.60	124.62	128.68
34	BF	501	ATP	C4-C5-N7	-2.59	106.70	109.40
34	AF	501	ATP	C3'-C2'-C1'	2.53	104.79	100.98
34	BF	501	ATP	C3'-C2'-C1'	2.51	104.75	100.98
35	BC	501	ADP	PA-O3A-PB	-2.41	124.55	132.83
35	AC	501	ADP	PA-O3A-PB	-2.41	124.57	132.83
34	AD	501	ATP	C4-C5-N7	-2.36	106.94	109.40
34	BD	501	ATP	C4-C5-N7	-2.36	106.94	109.40
35	AB	501	ADP	PA-O3A-PB	-2.34	124.78	132.83
35	BB	501	ADP	PA-O3A-PB	-2.34	124.80	132.83
34	AE	401	ATP	N3-C2-N1	-2.31	125.06	128.68
34	AD	501	ATP	PB-O3B-PG	-2.31	124.89	132.83
34	BD	501	ATP	PB-O3B-PG	-2.31	124.90	132.83
34	BE	401	ATP	N3-C2-N1	-2.28	125.11	128.68
35	BB	501	ADP	C4-C5-N7	-2.27	107.04	109.40
34	BA	501	ATP	C4-C5-N7	-2.25	107.05	109.40
35	AB	501	ADP	C4-C5-N7	-2.24	107.07	109.40
34	AA	501	ATP	C4-C5-N7	-2.21	107.09	109.40
35	AB	501	ADP	C2'-C3'-C4'	2.16	106.84	102.64
35	BB	501	ADP	C2'-C3'-C4'	2.14	106.80	102.64

There are no chirality outliers.

All (42) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
34	AA	501	ATP	C5'-O5'-PA-O2A
34	AA	501	ATP	C5'-O5'-PA-O3A
34	AD	501	ATP	PB-O3B-PG-O2G
34	AE	401	ATP	C5'-O5'-PA-O3A
34	BA	501	ATP	C5'-O5'-PA-O2A
34	BA	501	ATP	C5'-O5'-PA-O3A
34	BD	501	ATP	PB-O3B-PG-O2G
34	BE	401	ATP	C5'-O5'-PA-O3A
35	AB	501	ADP	C5'-O5'-PA-O1A
35	AB	501	ADP	C5'-O5'-PA-O2A
35	AB	501	ADP	C5'-O5'-PA-O3A
35	AC	501	ADP	C5'-O5'-PA-O1A
35	AC	501	ADP	C5'-O5'-PA-O2A
35	AC	501	ADP	O4'-C4'-C5'-O5'
35	BB	501	ADP	C5'-O5'-PA-O1A
35	BB	501	ADP	C5'-O5'-PA-O2A

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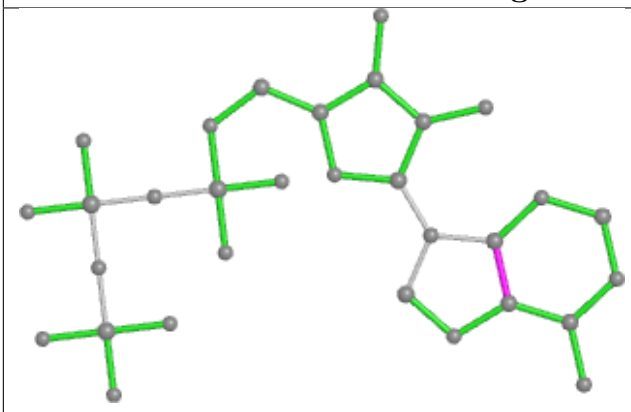
Mol	Chain	Res	Type	Atoms
35	BB	501	ADP	C5'-O5'-PA-O3A
35	BC	501	ADP	C5'-O5'-PA-O1A
35	BC	501	ADP	C5'-O5'-PA-O2A
35	BC	501	ADP	O4'-C4'-C5'-O5'
35	AC	501	ADP	C3'-C4'-C5'-O5'
35	BC	501	ADP	C3'-C4'-C5'-O5'
35	AC	501	ADP	C5'-O5'-PA-O3A
35	BC	501	ADP	C5'-O5'-PA-O3A
34	AA	501	ATP	C5'-O5'-PA-O1A
34	AE	401	ATP	C5'-O5'-PA-O1A
34	BA	501	ATP	C5'-O5'-PA-O1A
34	BE	401	ATP	C5'-O5'-PA-O1A
35	AB	501	ADP	PB-O3A-PA-O2A
35	BB	501	ADP	PB-O3A-PA-O2A
35	AB	501	ADP	O4'-C4'-C5'-O5'
35	BB	501	ADP	O4'-C4'-C5'-O5'
35	AB	501	ADP	PB-O3A-PA-O1A
35	BB	501	ADP	PB-O3A-PA-O1A
34	AD	501	ATP	C5'-O5'-PA-O3A
34	AF	501	ATP	C5'-O5'-PA-O3A
34	BD	501	ATP	C5'-O5'-PA-O3A
34	BF	501	ATP	C5'-O5'-PA-O3A
34	AE	401	ATP	PA-O3A-PB-O2B
34	BE	401	ATP	PA-O3A-PB-O2B
34	AA	501	ATP	C4'-C5'-O5'-PA
34	BA	501	ATP	C4'-C5'-O5'-PA

There are no ring outliers.

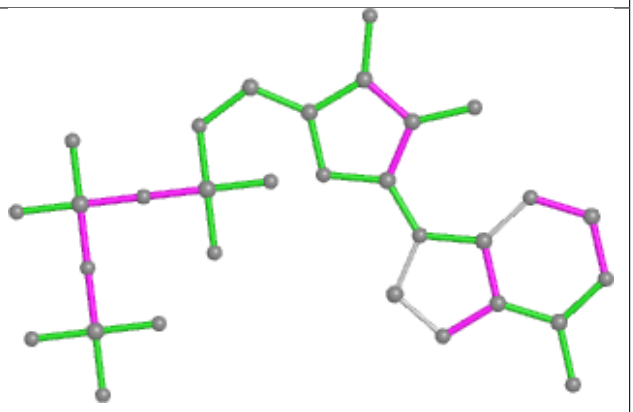
No monomer is involved in short contacts.

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.

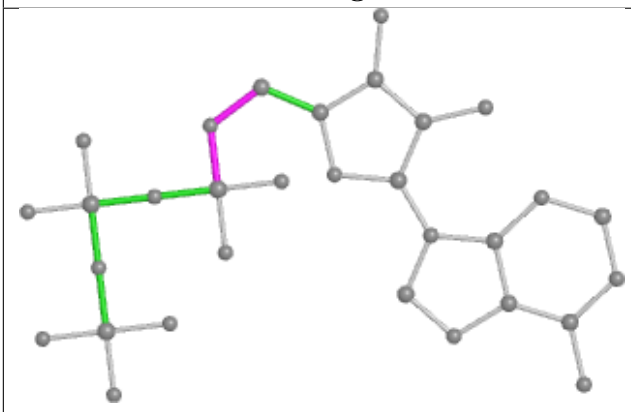
Ligand ATP AA 501



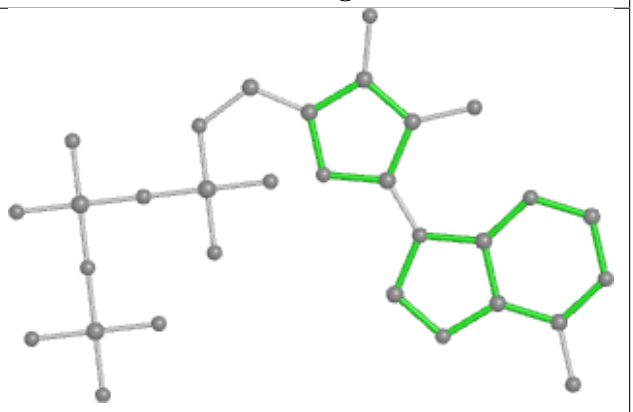
Bond lengths



Bond angles

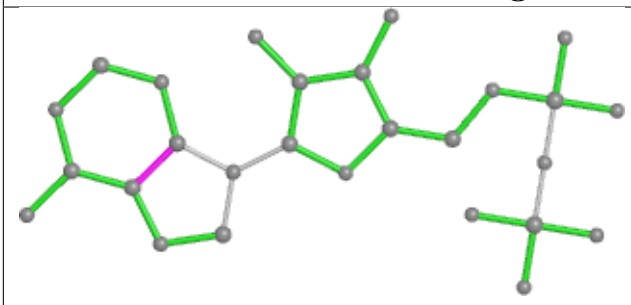


Torsions

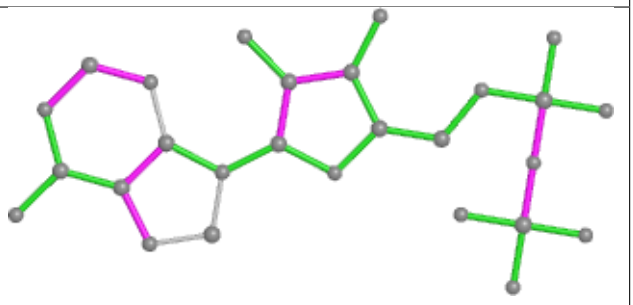


Rings

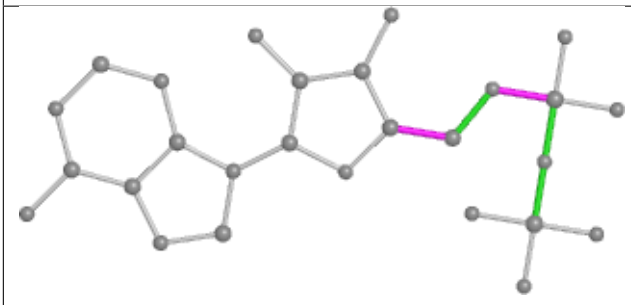
Ligand ADP BC 501



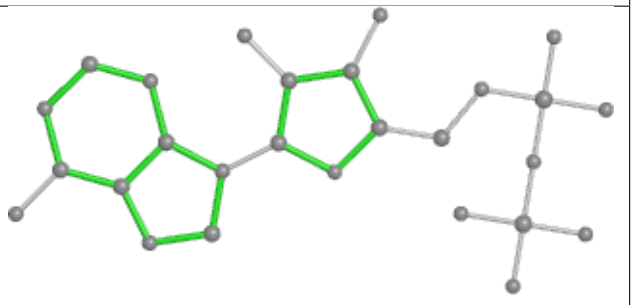
Bond lengths



Bond angles

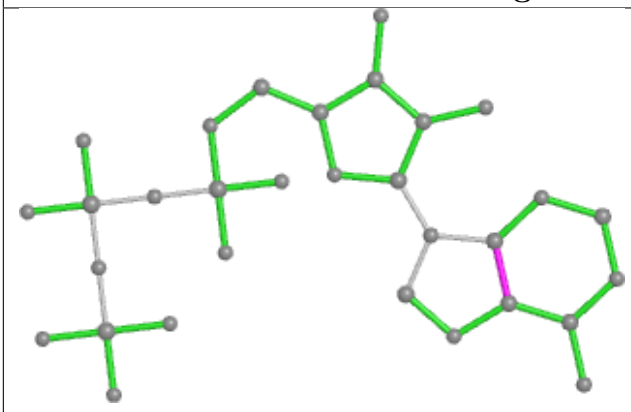


Torsions

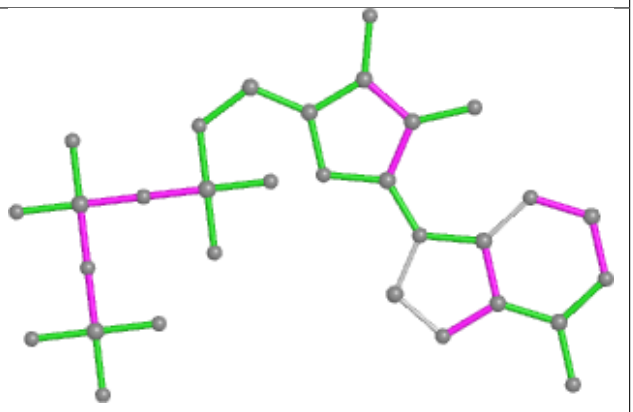


Rings

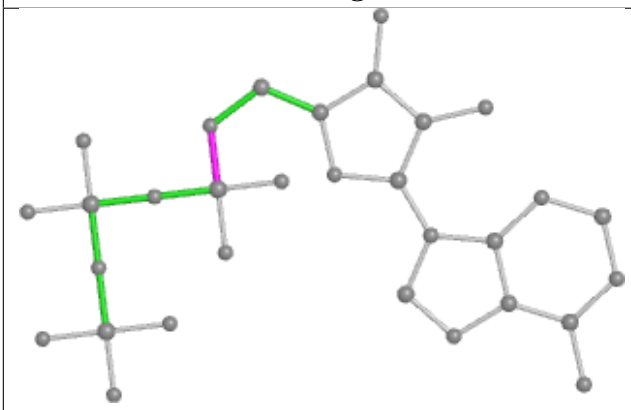
Ligand ATP BF 501



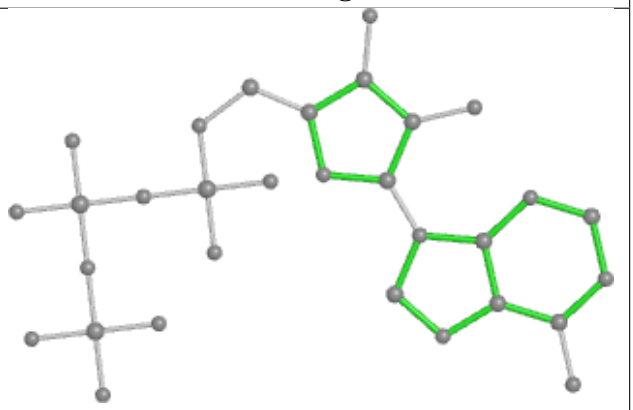
Bond lengths



Bond angles

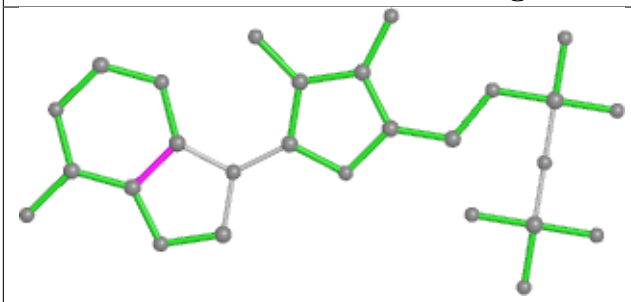


Torsions

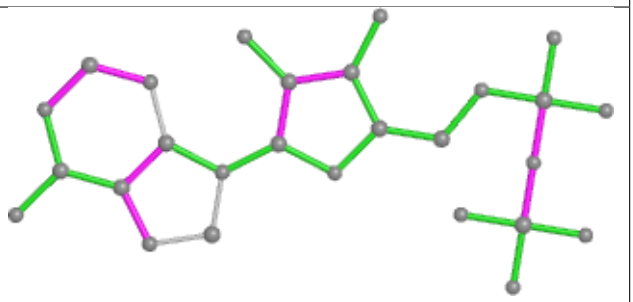


Rings

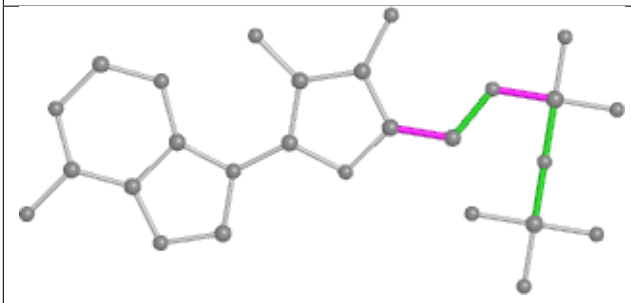
Ligand ADP AC 501



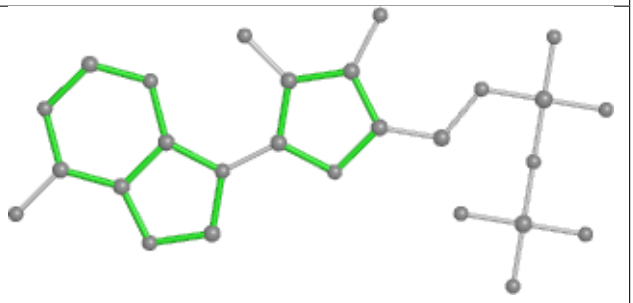
Bond lengths



Bond angles

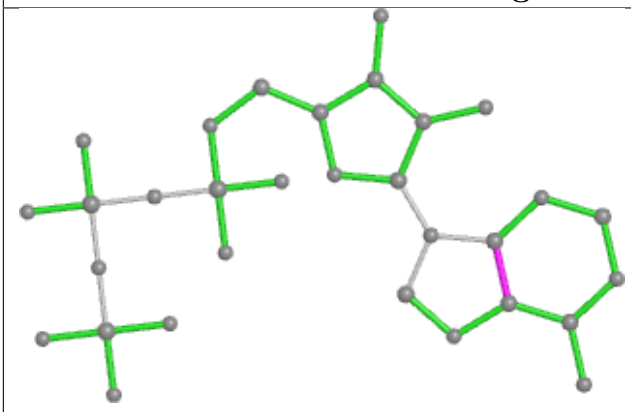


Torsions

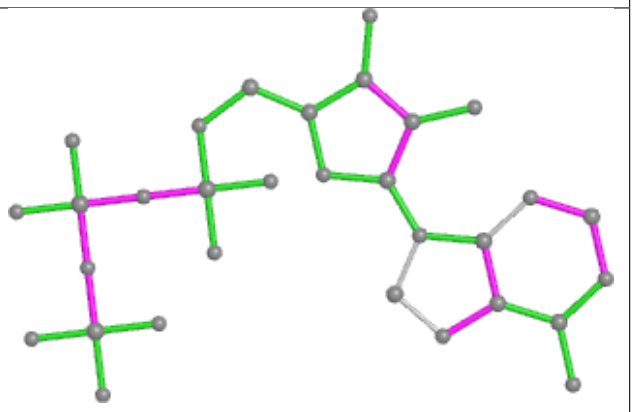


Rings

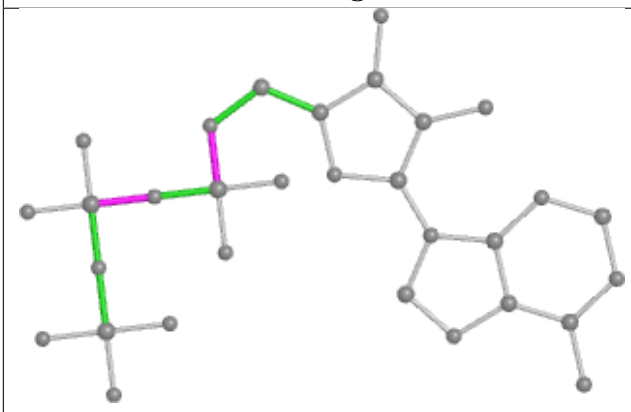
Ligand ATP AE 401



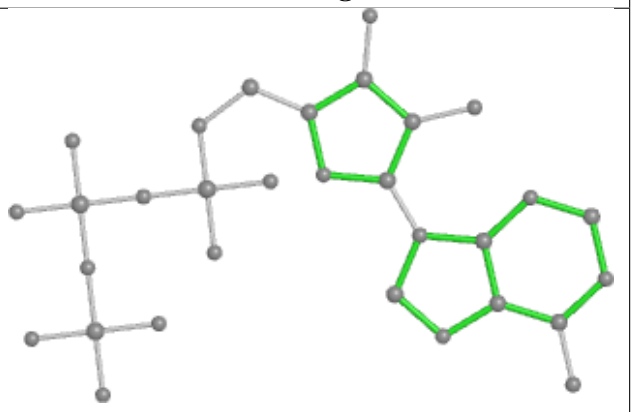
Bond lengths



Bond angles

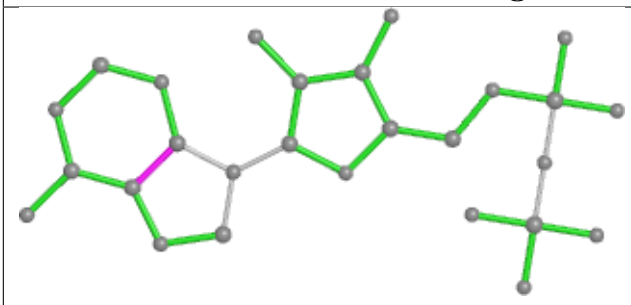


Torsions



Rings

Ligand ADP AB 501



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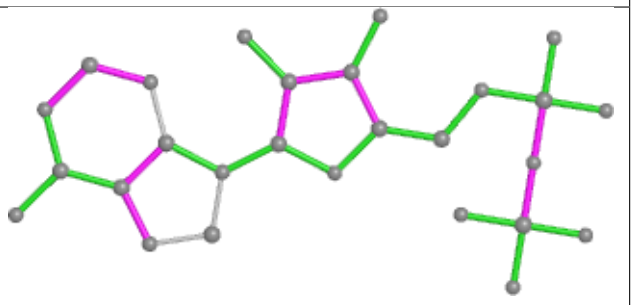
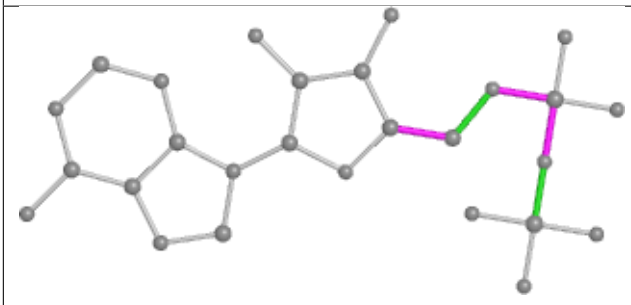


Bond angles



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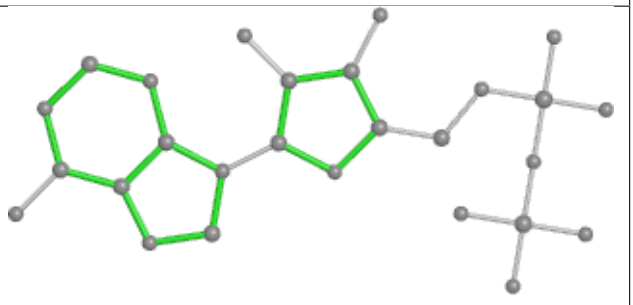
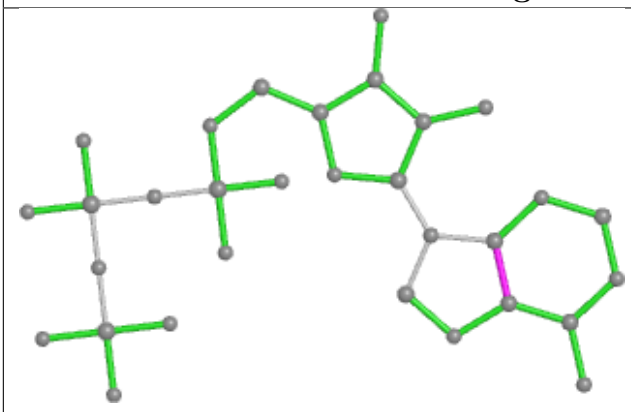


Rings

Ligand ATP BE 401



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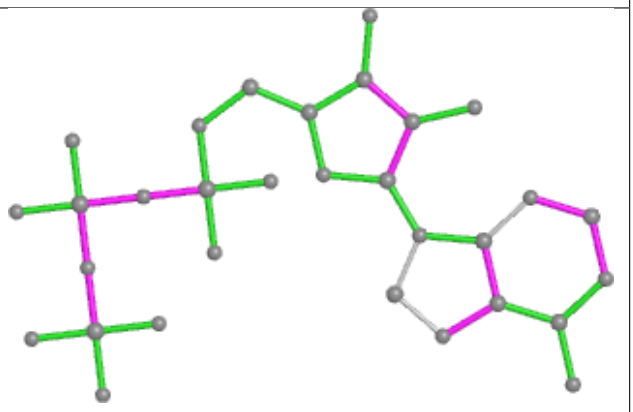
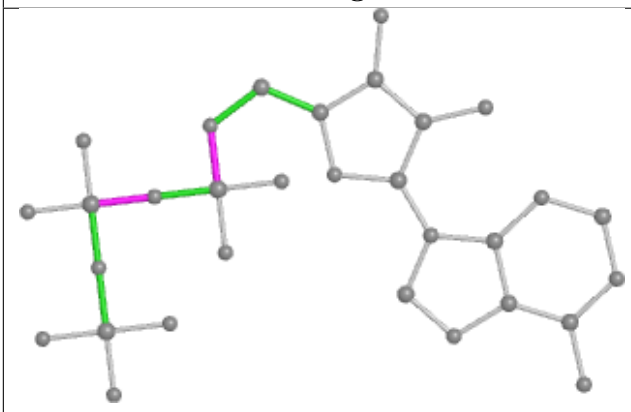


Bond angles



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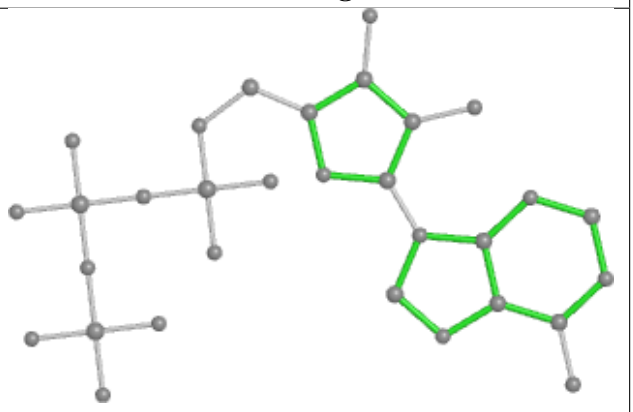
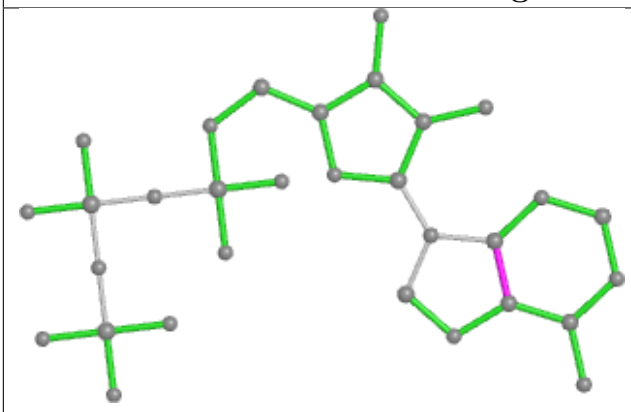


Rings

Ligand ATP BA 501



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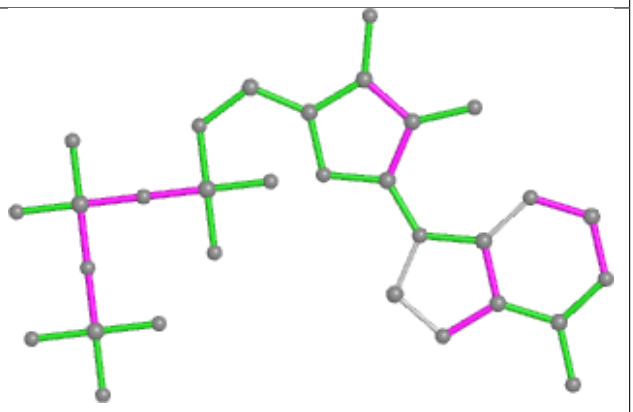
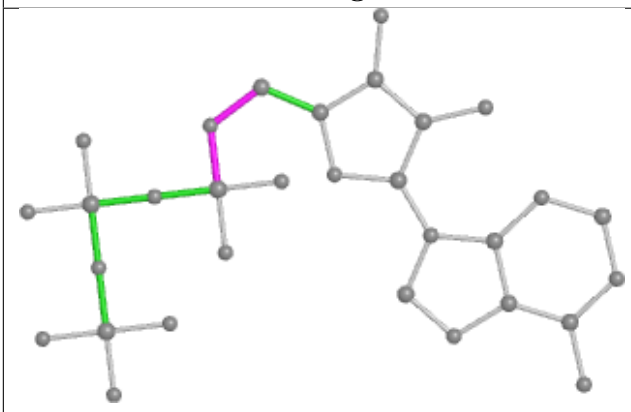
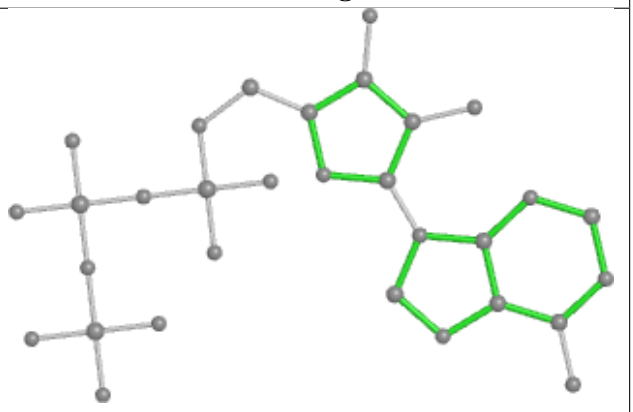


Bond angles

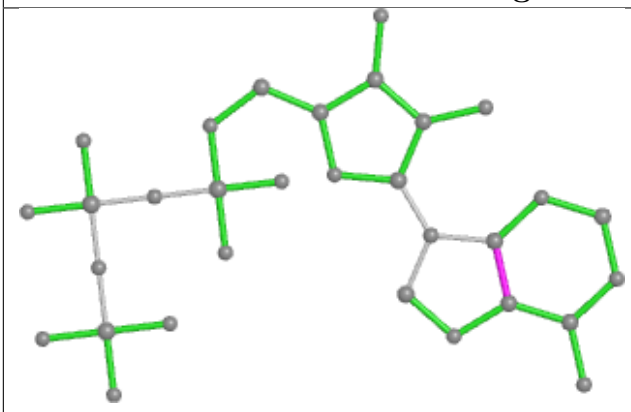


Torsions

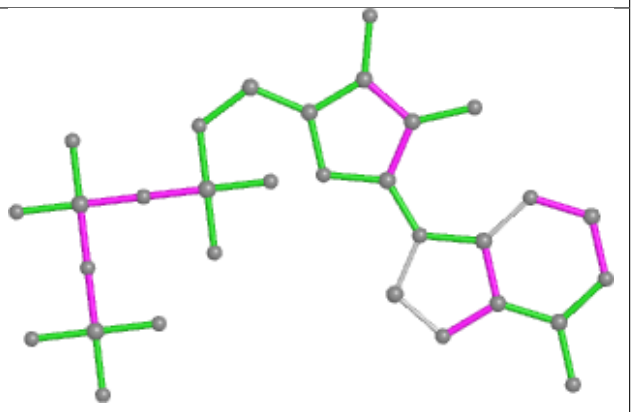


Rings

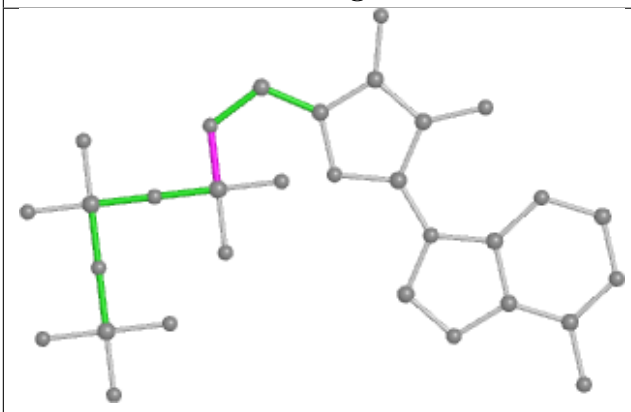
Ligand ATP AF 501



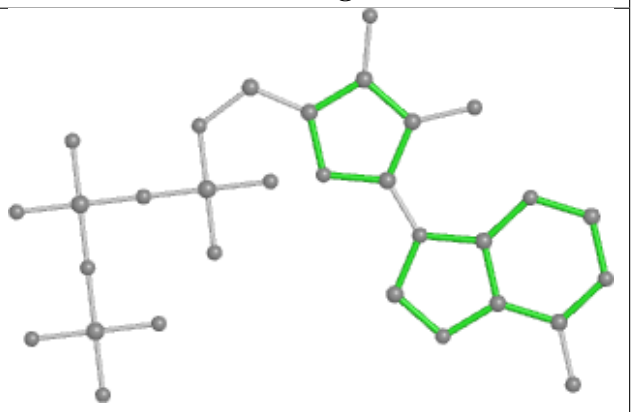
Bond lengths



Bond angles

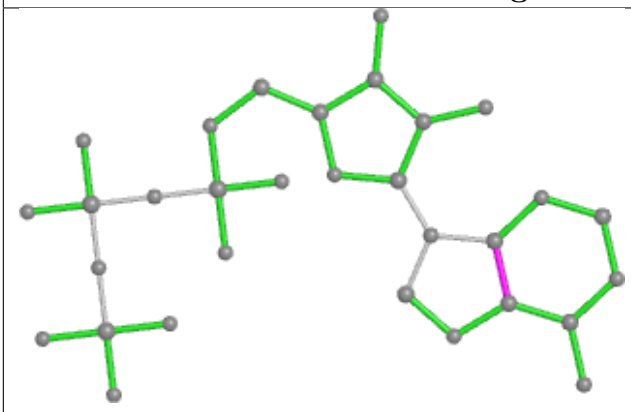


Torsions

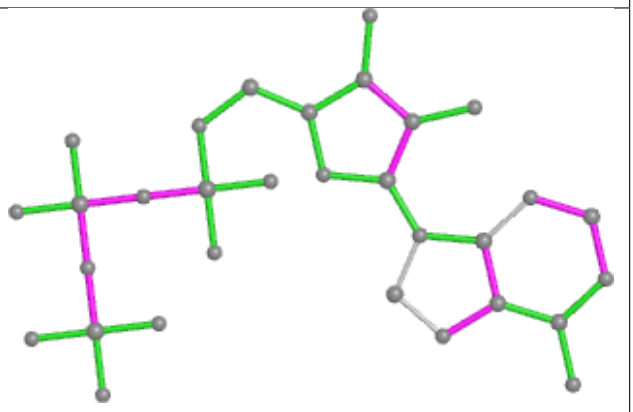


Rings

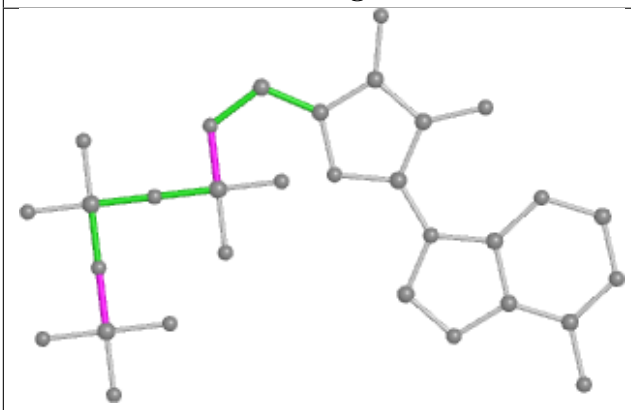
Ligand ATP AD 501



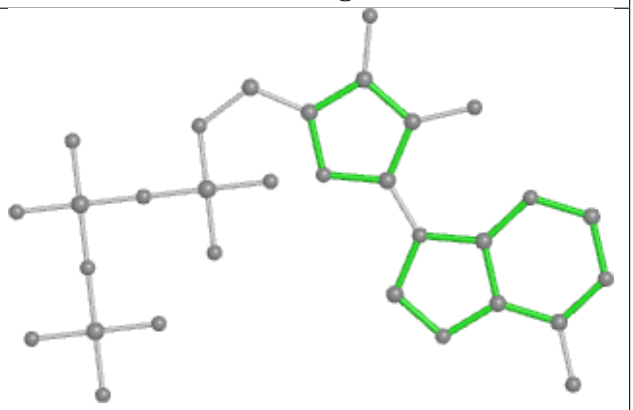
Bond lengths



Bond angles

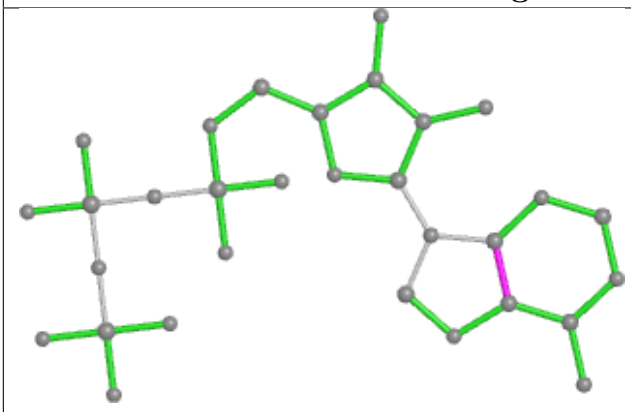


Torsions

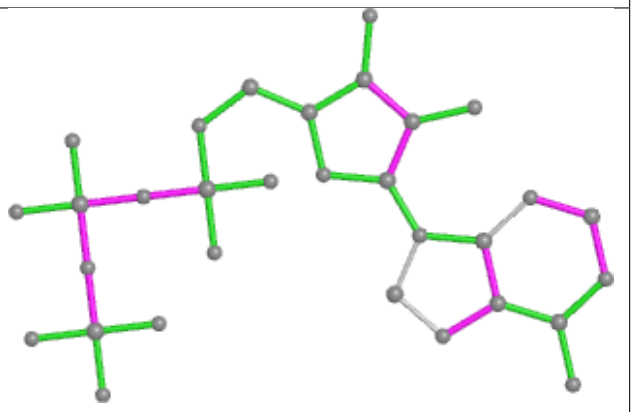


Rings

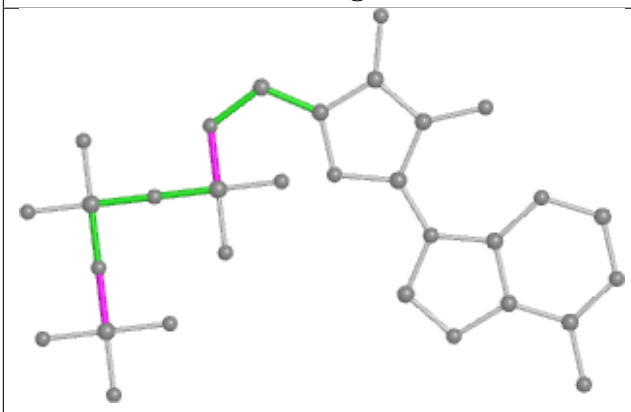
Ligand ATP BD 501



Bond lengths



Bond angles



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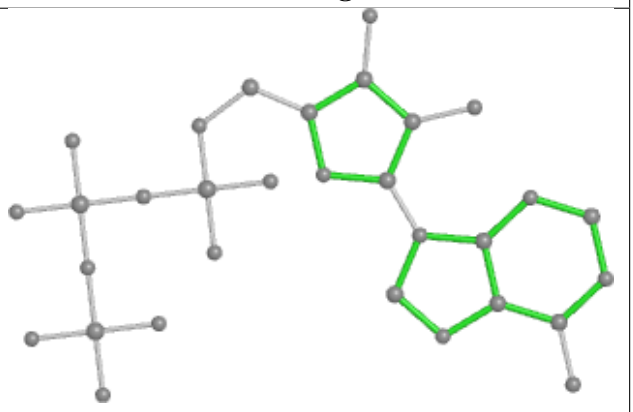
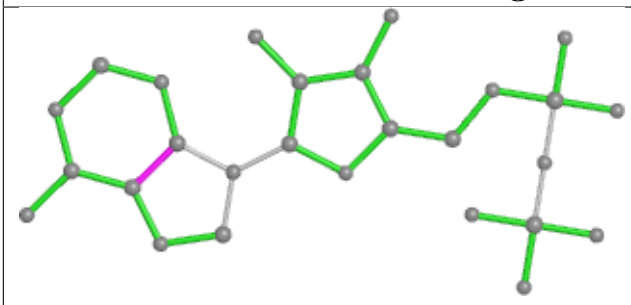
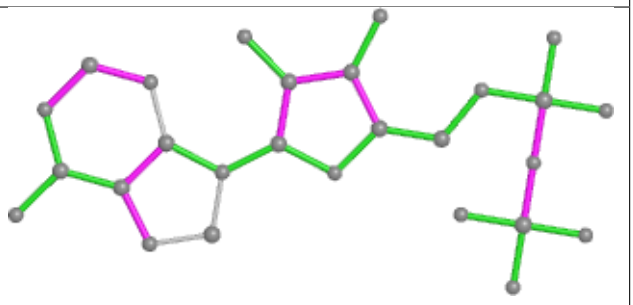


Rings

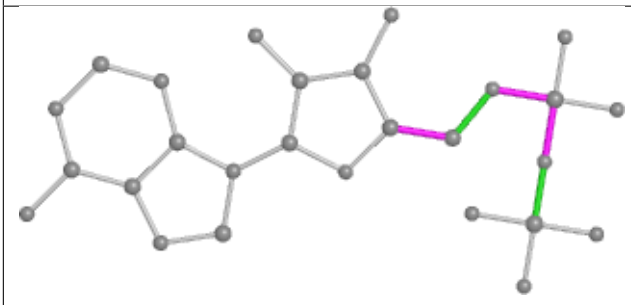
Ligand ADP BB 501



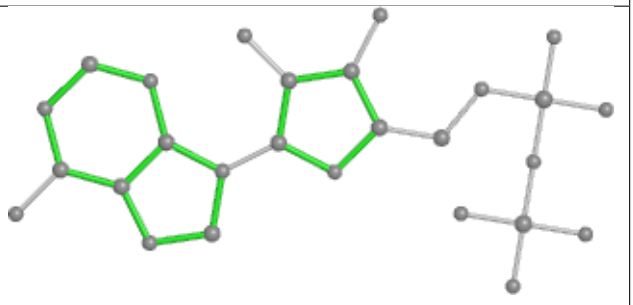
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
12	Bf	3
12	Af	3

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	Bf	269:ALA	C	270:LEU	N	9.72
1	Af	269:ALA	C	270:LEU	N	9.71
1	Af	238:ASN	C	239:TYR	N	7.22
1	Bf	238:ASN	C	239:TYR	N	7.22
1	Af	507:ASP	C	508:SER	N	5.88
1	Bf	507:ASP	C	508:SER	N	5.88

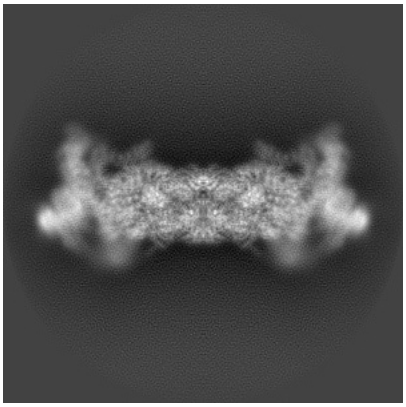
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-8332. These allow visual inspection of the internal detail of the map and identification of artifacts.

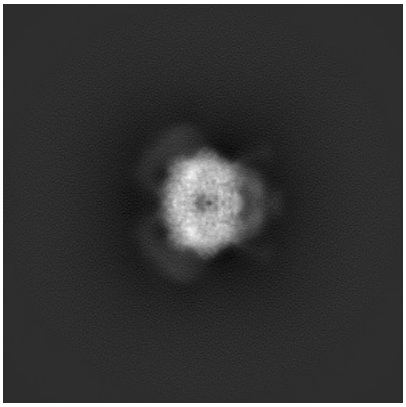
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

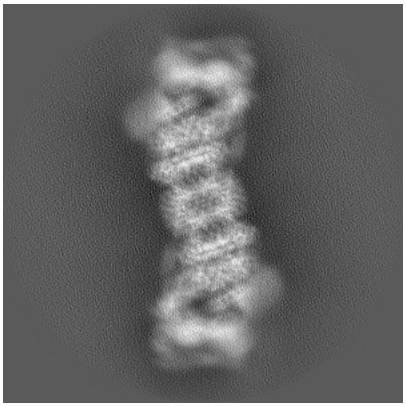
6.1.1 Primary map



X



Y

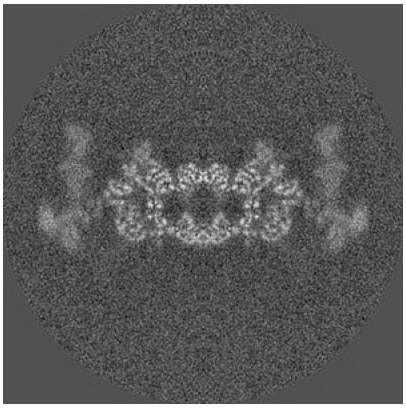


Z

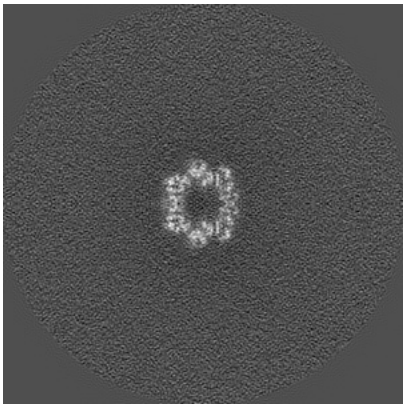
The images above show the map projected in three orthogonal directions.

6.2 Central slices

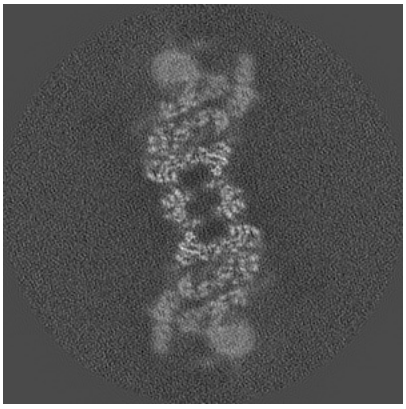
6.2.1 Primary map



X Index: 320



Y Index: 320

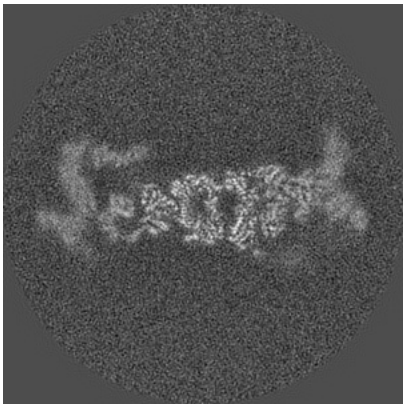


Z Index: 320

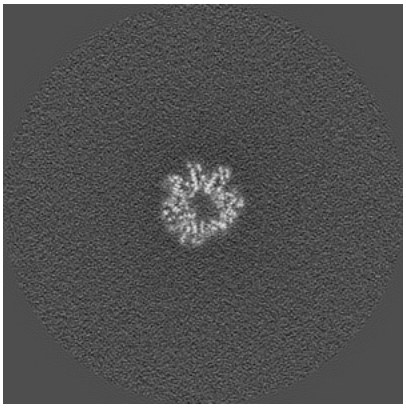
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

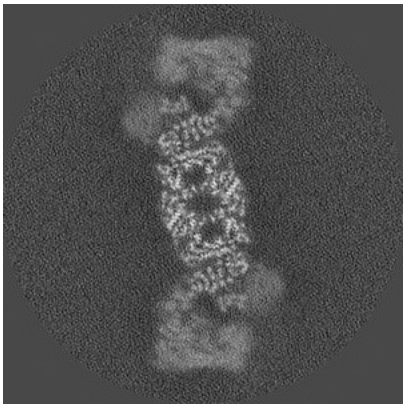
6.3.1 Primary map



X Index: 294



Y Index: 302



Z Index: 297

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

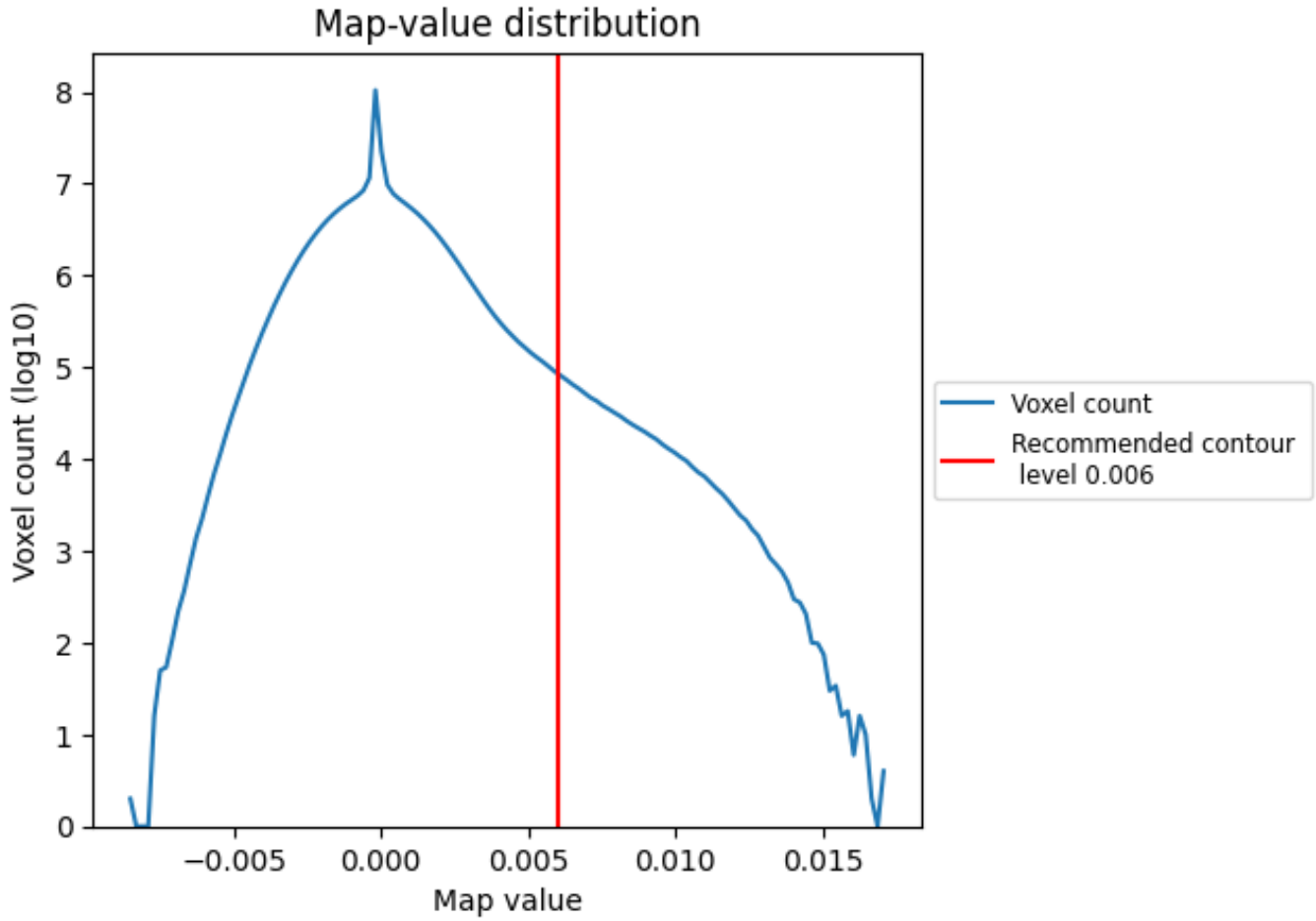
6.5 Mask visualisation (i)

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

7 Map analysis

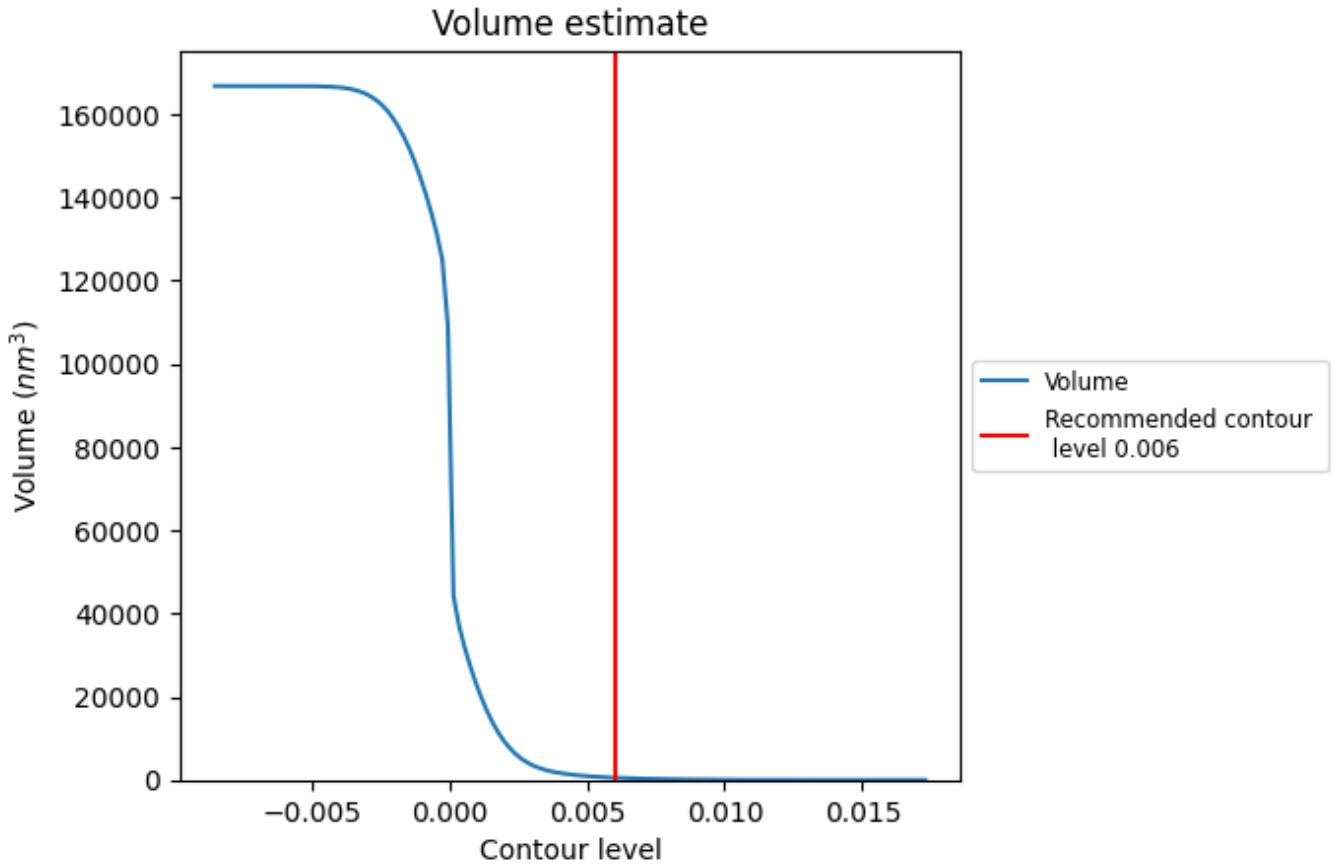
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

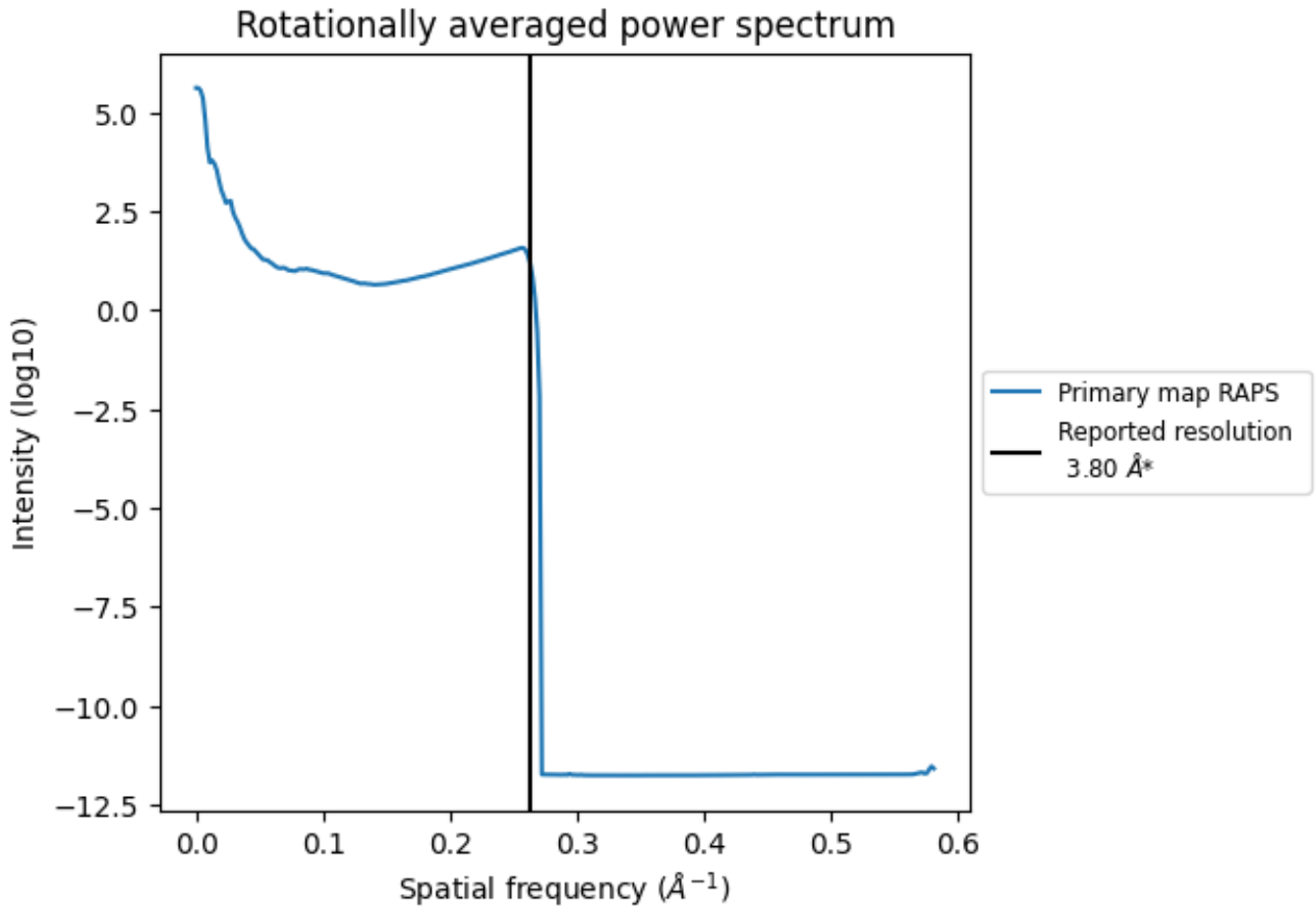
7.2 Volume estimate



The volume at the recommended contour level is 538 nm^3; this corresponds to an approximate mass of 486 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 0.263 $Å^{-1}$

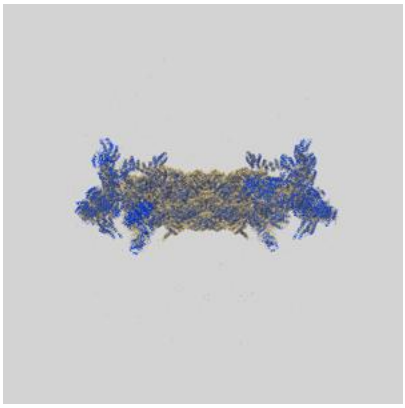
8 Fourier-Shell correlation

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

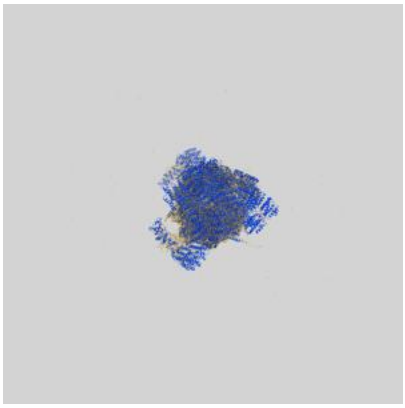
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-8332 and PDB model 5T0C. Per-residue inclusion information can be found in section 3 on page 14.

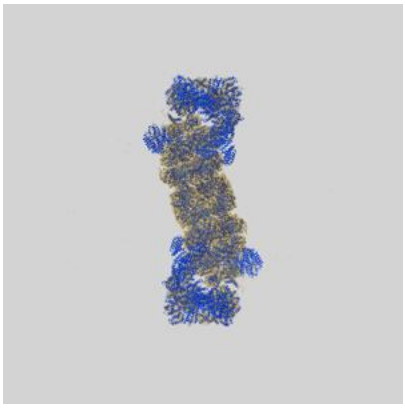
9.1 Map-model overlay



X



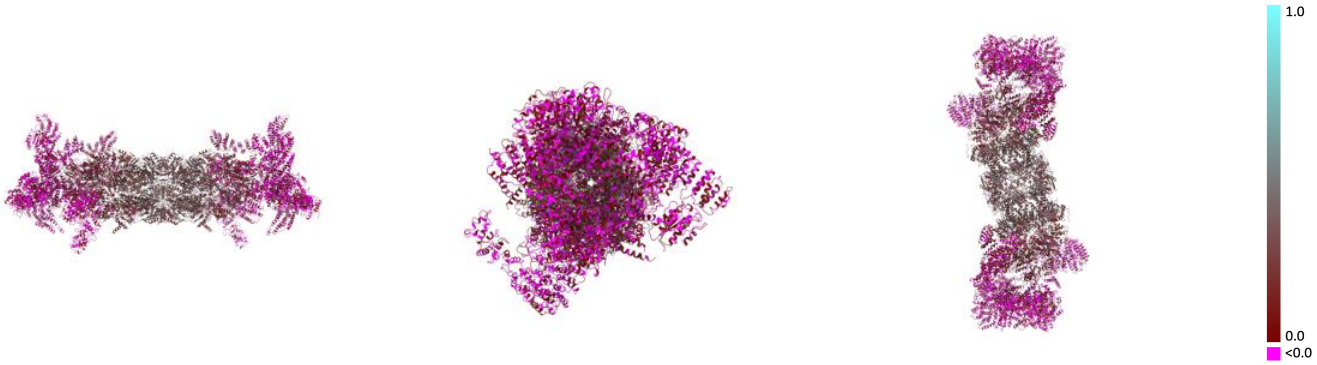
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.006 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.

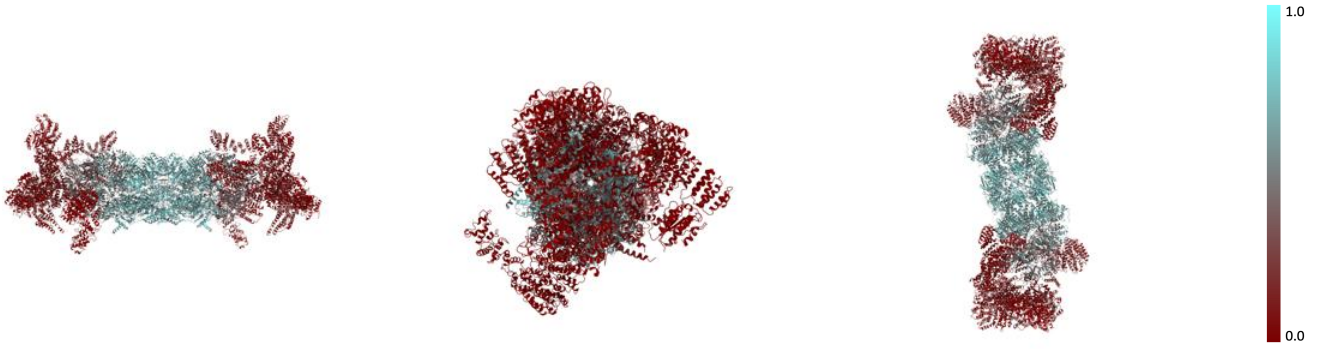
9.2 Q-score mapped to coordinate model



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.

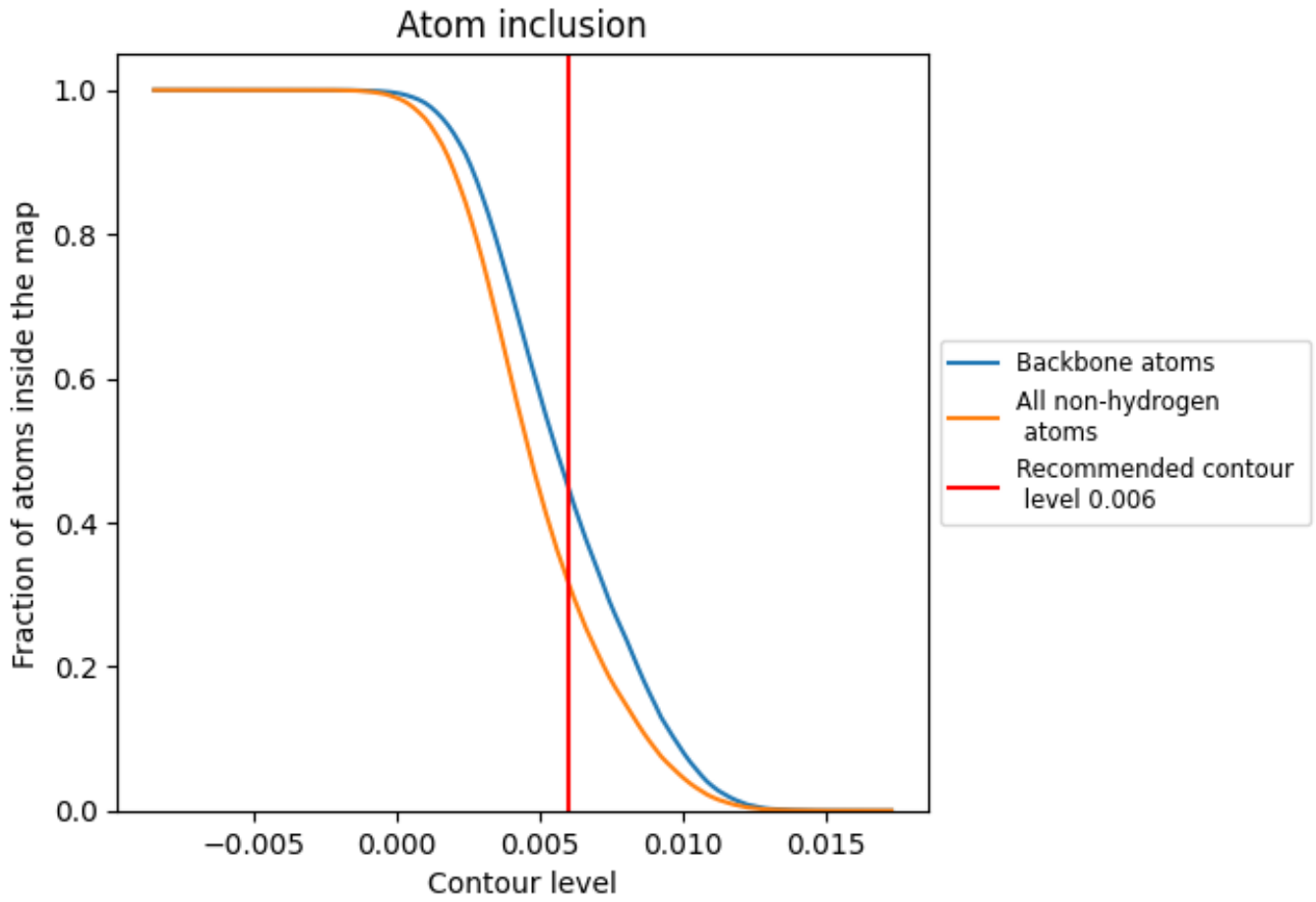
9.3 Atom inclusion mapped to coordinate model



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 (0.006).

9.4 Atom inclusion (i)



At the recommended contour level, 45% of all backbone atoms, 31% 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 (0.006) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.3144	0.1560
AA	0.4868	0.2160
AB	0.4117	0.2020
AC	0.3345	0.1930
AD	0.3420	0.1850
AE	0.4168	0.2020
AF	0.4547	0.2150
AG	0.6041	0.3040
AH	0.6406	0.3170
AI	0.6142	0.2940
AJ	0.6441	0.2840
AK	0.5932	0.2860
AL	0.6419	0.3090
AM	0.6197	0.3060
AN	0.6667	0.3370
AO	0.6654	0.3340
AP	0.6836	0.3460
AQ	0.6450	0.3060
AR	0.6996	0.3400
AS	0.6542	0.3350
AT	0.6969	0.3370
AU	0.0778	0.0220
AV	0.0572	0.0280
AW	0.0573	0.0460
AX	0.0504	0.0730
AY	0.1303	0.0580
AZ	0.0551	0.0370
Aa	0.0492	0.0150
Ab	0.0187	0.0250
Ac	0.0923	0.0470
Ad	0.0279	0.0240
Ae	0.0364	0.0240
Af	0.0147	0.0040
BA	0.4857	0.2190
BB	0.4121	0.2050

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Chain	Atom inclusion	Q-score
BC	0.3358	0.1920
BD	0.3413	0.1850
BE	0.4168	0.2030
BF	0.4550	0.2140
BG	0.6024	0.3020
BH	0.6395	0.3200
BI	0.6142	0.2940
BJ	0.6453	0.2830
BK	0.5914	0.2870
BL	0.6414	0.3090
BM	0.6203	0.3050
BN	0.6688	0.3370
BO	0.6654	0.3360
BP	0.6842	0.3430
BQ	0.6436	0.3060
BR	0.7003	0.3400
BS	0.6548	0.3330
BT	0.6987	0.3370
BU	0.0783	0.0220
BV	0.0564	0.0290
BW	0.0556	0.0450
BX	0.0514	0.0730
BY	0.1313	0.0590
BZ	0.0542	0.0340
Ba	0.0512	0.0170
Bb	0.0187	0.0270
Bc	0.0914	0.0470
Bd	0.0275	0.0250
Be	0.0364	0.0180
Bf	0.0150	0.0040