



wwPDB EM Validation Summary Report ⓘ

Mar 4, 2026 – 11:40 PM UTC

PDB ID : 6U5K / pdb_00006u5k
EMDB ID : EMD-20648
Title : CryoEM Structure of Pyocin R2 - postcontracted - baseplate
Authors : Ge, P.; Avaylon, J.; Scholl, D.; Shneider, M.M.; Browning, C.; Buth, S.A.;
Plattner, M.; Ding, K.; Leiman, P.G.; Miller, J.F.; Zhou, Z.H.
Deposited on : 2019-08-27
Resolution : 3.50 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ 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:

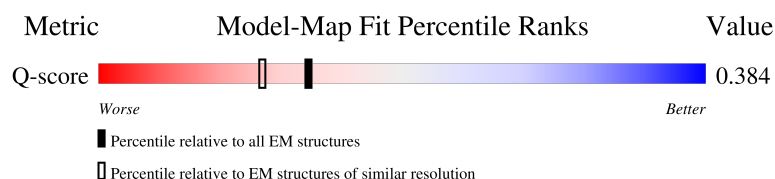
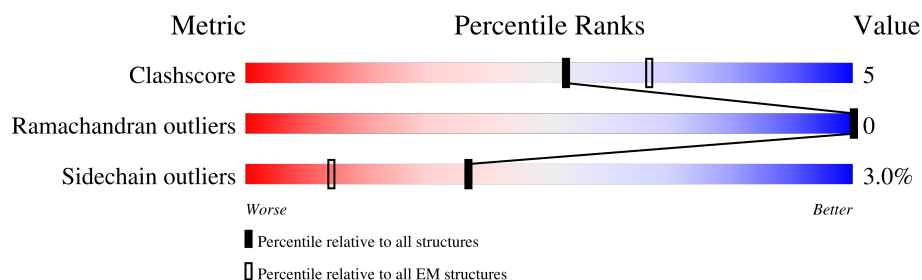
EMDB validation analysis : 0.0.1.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDb archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

1 Overall quality at a glance

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

The reported resolution of this entry is 3.50 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	13950 (3.00 - 4.00)

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

Mol	Chain	Length	Quality of chain
1	a	386	
1	b	386	
1	c	386	
1	d	386	

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Mol	Chain	Length	Quality of chain
1	e	386	22% 84% 14% ..
1	f	386	21% 84% 14% ..
1	g	386	9% 84% 14% ..
1	h	386	9% 85% 13% ..
1	i	386	8% 84% 14% ..
1	j	386	8% 86% 13% ..
1	k	386	9% 87% 12% ..
1	l	386	8% 86% 12% ..
1	m	386	6% 82% 16% ..
1	n	386	5% 81% 17% ..
1	o	386	5% 83% 15% ..
1	p	386	5% 82% 16% ..
1	q	386	5% 82% 16% ..
1	r	386	6% 82% 16% ..
1	s	386	5% 83% 14% ..
1	t	386	5% 84% 13% ..
1	u	386	5% 84% 13% ..
1	v	386	5% 83% 15% ..
1	w	386	5% 83% 14% ..
1	x	386	5% 83% 14% ..
2	G	68	81% 65% 16% 19%
2	H	68	81% 68% 13% 19%
2	I	68	81% 65% 16% 19%
2	J	68	81% 68% 13% 19%
2	K	68	81% 65% 16% 19%

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Mol	Chain	Length	Quality of chain
2	L	68	81% 65%16%19%
3	M	295	99% 89%9%
3	N	295	99% 90%8%
3	O	295	99% 89%9%
3	P	295	99% 90%8%
3	Q	295	99% 90%8%
3	R	295	99% 90%8%
3	S	295	99% 85%13%
3	T	295	99% 85%13%
3	U	295	99% 85%13%
3	V	295	99% 85%13%
3	W	295	99% 86%12%
3	X	295	99% 85%13%
4	0	177	85% 77%8%15%
4	1	177	85% 76%10%15%
4	2	177	85% 78%7%15%
4	3	177	85% 78%7%15%
4	4	177	85% 78%7%15%
4	5	177	85% 77%8%15%
5	A	108	69% 76%16%8%
5	B	108	65% 82%9%8%
5	C	108	69% 81%11%8%
5	D	108	64% 81%11%8%
5	E	108	65% 82%9%8%
5	F	108	64% 81%10%8%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 110106 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 Sheath PA0622.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	a	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	b	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	f	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	e	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	d	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	c	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	g	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	h	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	l	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	k	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	j	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	i	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	m	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	n	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	s	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	r	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	q	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		

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Mol	Chain	Residues	Atoms					AltConf	Trace
1	p	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	o	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	t	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	x	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	w	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	v	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		
1	u	383	Total	C	N	O	S	0	0
			2884	1817	504	555	8		

- Molecule 2 is a protein called Glue PA0627.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	G	55	Total	C	N	O	S	0	0
			413	258	68	82	5		
2	H	55	Total	C	N	O	S	0	0
			413	258	68	82	5		
2	L	55	Total	C	N	O	S	0	0
			413	258	68	82	5		
2	K	55	Total	C	N	O	S	0	0
			413	258	68	82	5		
2	J	55	Total	C	N	O	S	0	0
			413	258	68	82	5		
2	I	55	Total	C	N	O	S	0	0
			413	258	68	82	5		

- Molecule 3 is a protein called Tri1a PA0618.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	M	291	Total	C	N	O	S	0	0
			2218	1394	392	428	4		
3	N	291	Total	C	N	O	S	0	0
			2218	1394	392	428	4		
3	R	291	Total	C	N	O	S	0	0
			2218	1394	392	428	4		
3	Q	291	Total	C	N	O	S	0	0
			2218	1394	392	428	4		

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Mol	Chain	Residues	Atoms					AltConf	Trace
3	P	291	Total	C	N	O	S	0	0
			2218	1394	392	428	4		
3	O	291	Total	C	N	O	S	0	0
			2218	1394	392	428	4		
3	S	292	Total	C	N	O	S	0	0
			2223	1397	393	429	4		
3	T	292	Total	C	N	O	S	0	0
			2223	1397	393	429	4		
3	X	292	Total	C	N	O	S	0	0
			2223	1397	393	429	4		
3	W	292	Total	C	N	O	S	0	0
			2223	1397	393	429	4		
3	V	292	Total	C	N	O	S	0	0
			2223	1397	393	429	4		
3	U	292	Total	C	N	O	S	0	0
			2223	1397	393	429	4		

- Molecule 4 is a protein called Tri2 PA0619.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	0	151	Total	C	N	O	S	0	0
			1202	754	220	227	1		
4	1	151	Total	C	N	O	S	0	0
			1202	754	220	227	1		
4	5	151	Total	C	N	O	S	0	0
			1202	754	220	227	1		
4	4	151	Total	C	N	O	S	0	0
			1202	754	220	227	1		
4	3	151	Total	C	N	O	S	0	0
			1202	754	220	227	1		
4	2	151	Total	C	N	O	S	0	0
			1202	754	220	227	1		

- Molecule 5 is a protein called Sheath Initiator PA0617.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	B	99	Total	C	N	O	S	0	0
			759	474	144	136	5		
5	A	99	Total	C	N	O	S	0	0
			759	474	144	136	5		
5	F	99	Total	C	N	O	S	0	0
			759	474	144	136	5		

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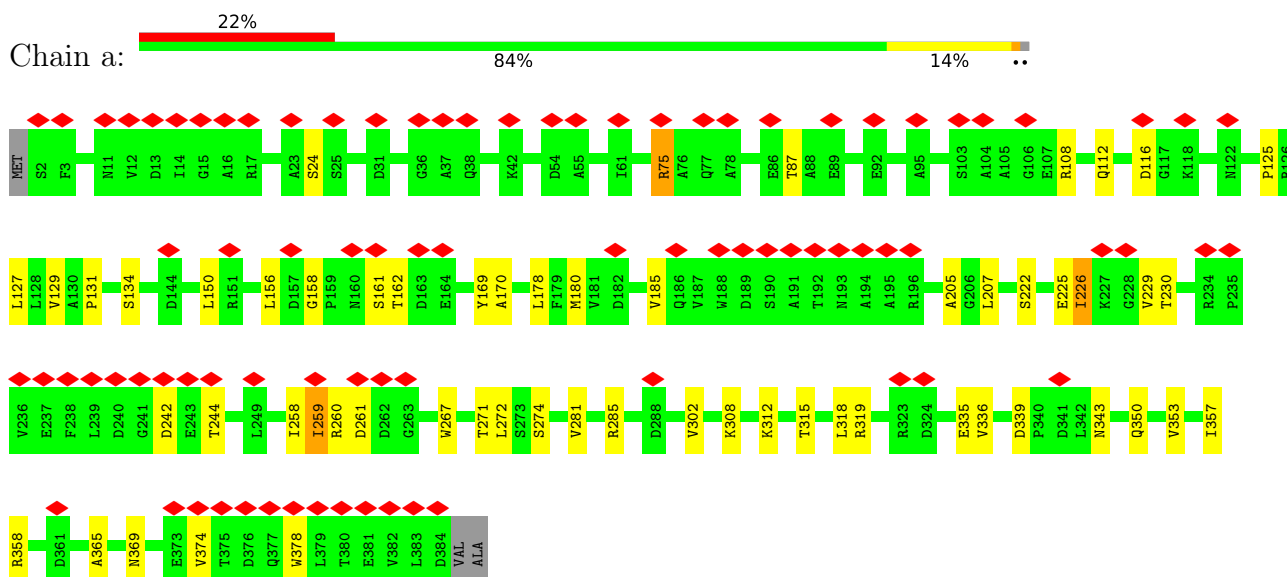
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Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	99	Total	C	N	O	S	0	0
			759	474	144	136	5		
5	D	99	Total	C	N	O	S	0	0
			759	474	144	136	5		
5	C	99	Total	C	N	O	S	0	0
			759	474	144	136	5		

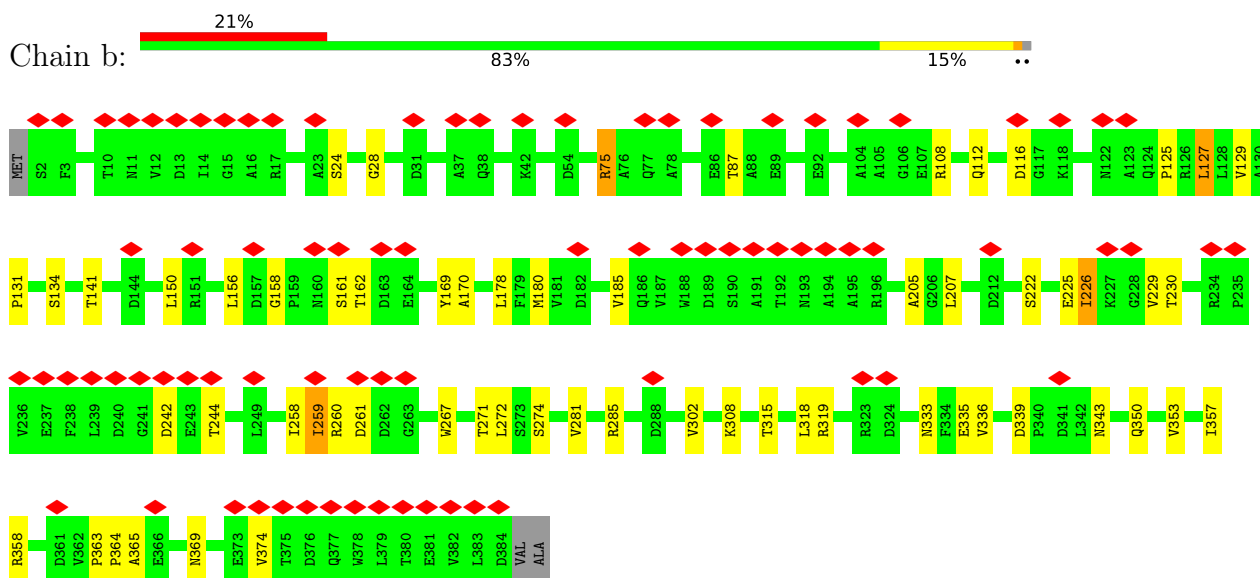
3 Residue-property plots

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.

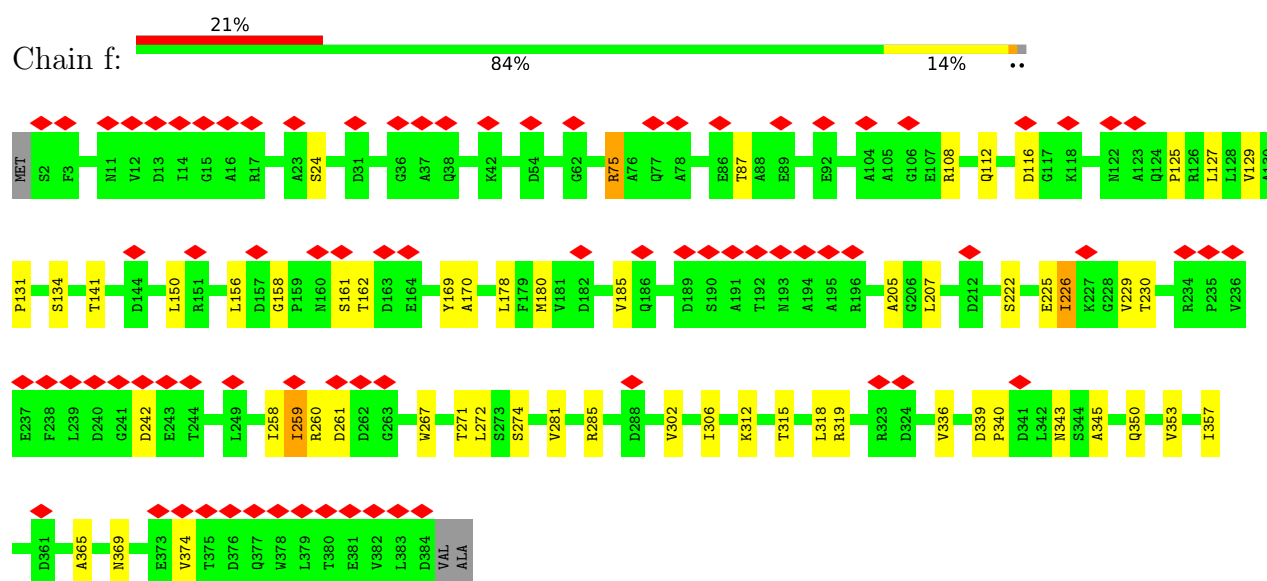
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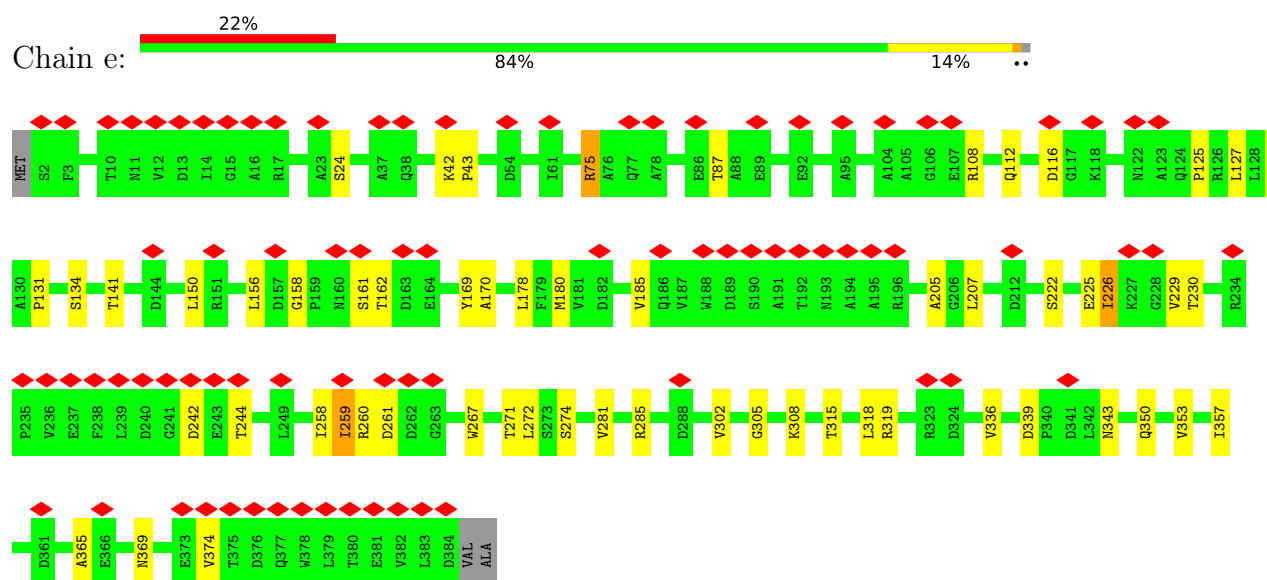
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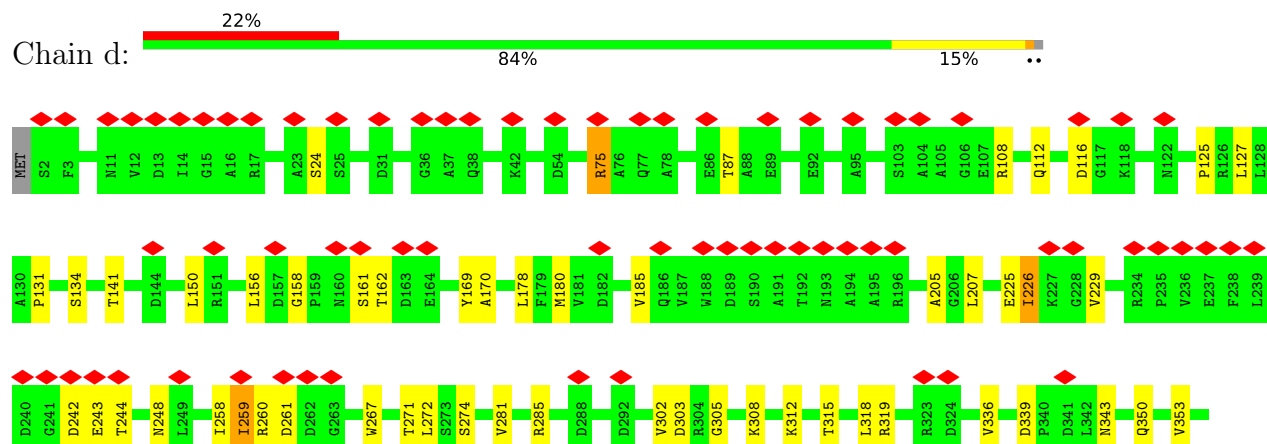
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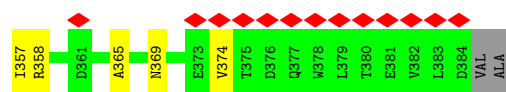


• Molecule 1: Sheath PA0622

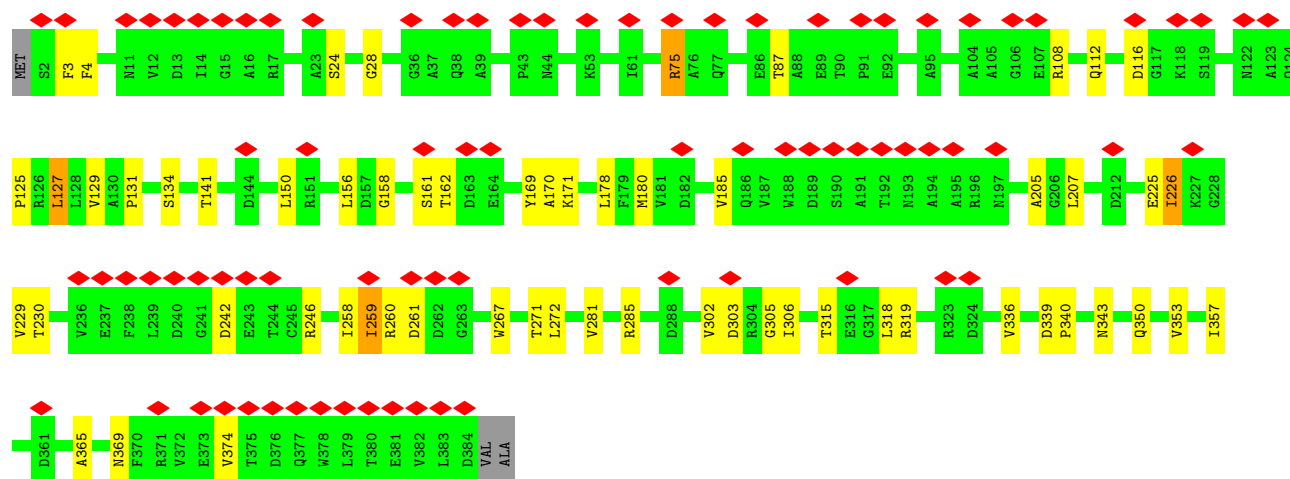
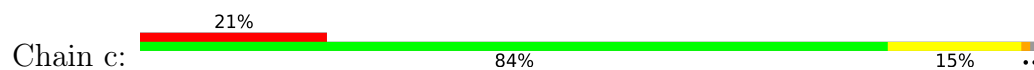


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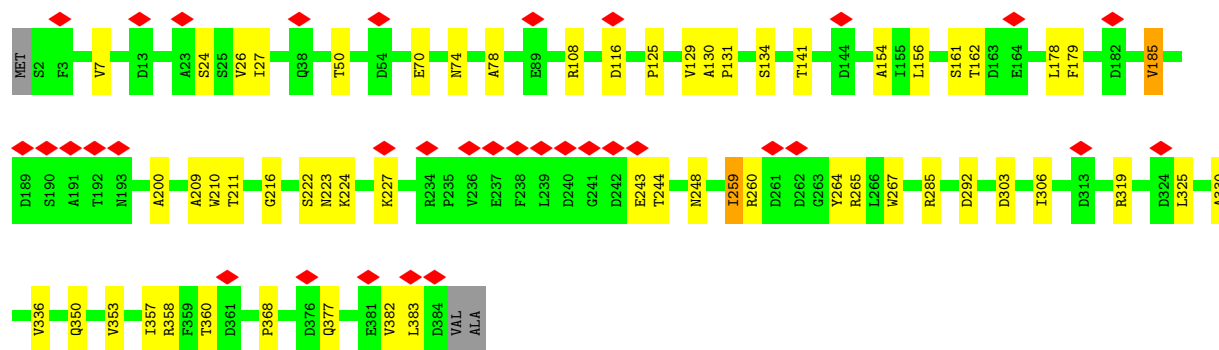
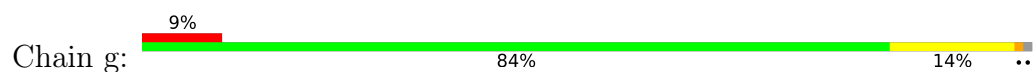




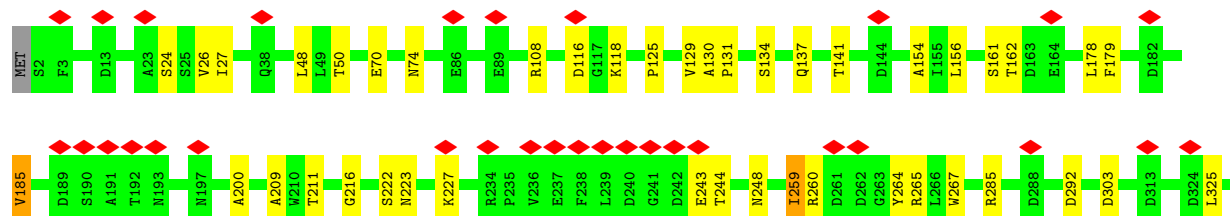
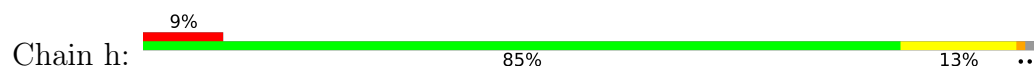
• Molecule 1: Sheath PA0622



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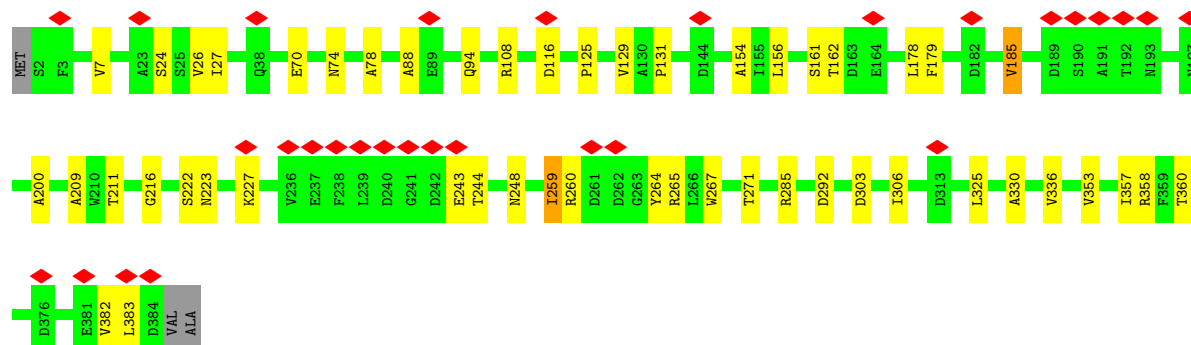
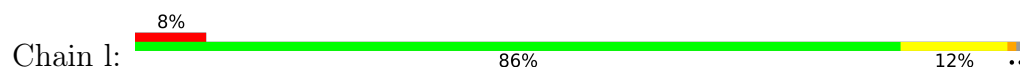


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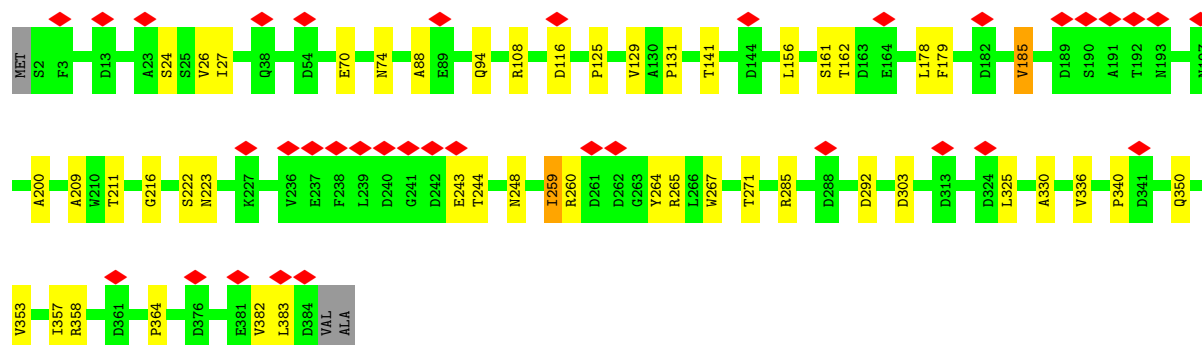
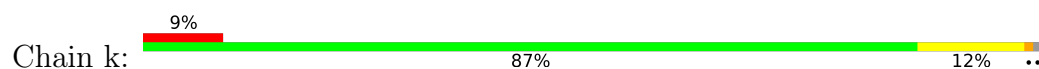




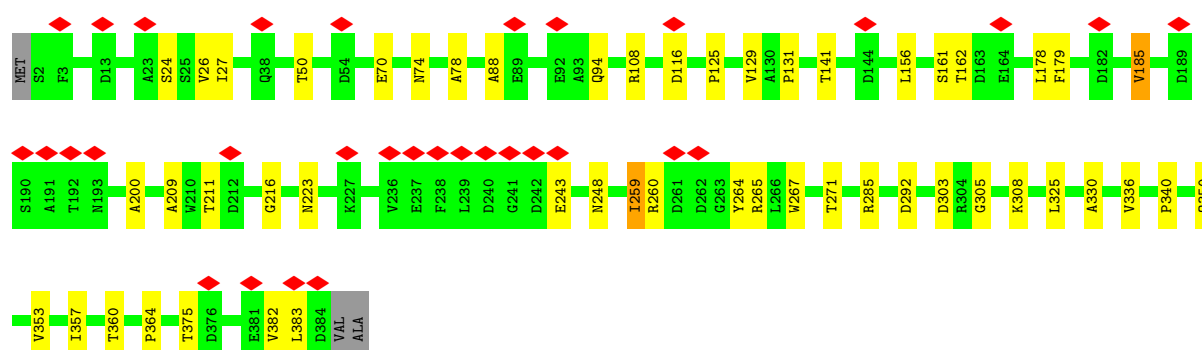
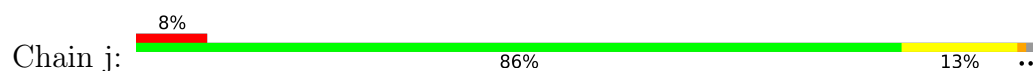
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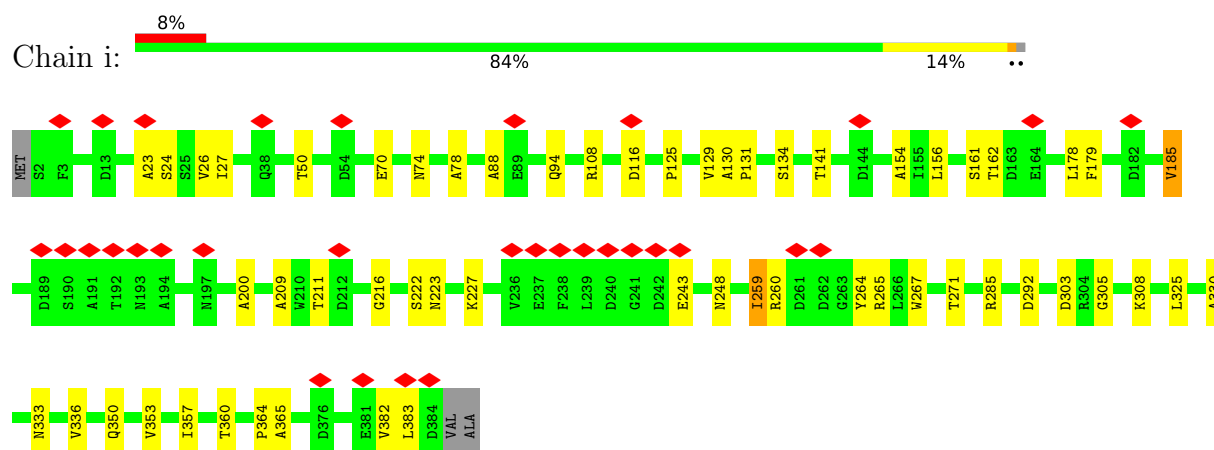
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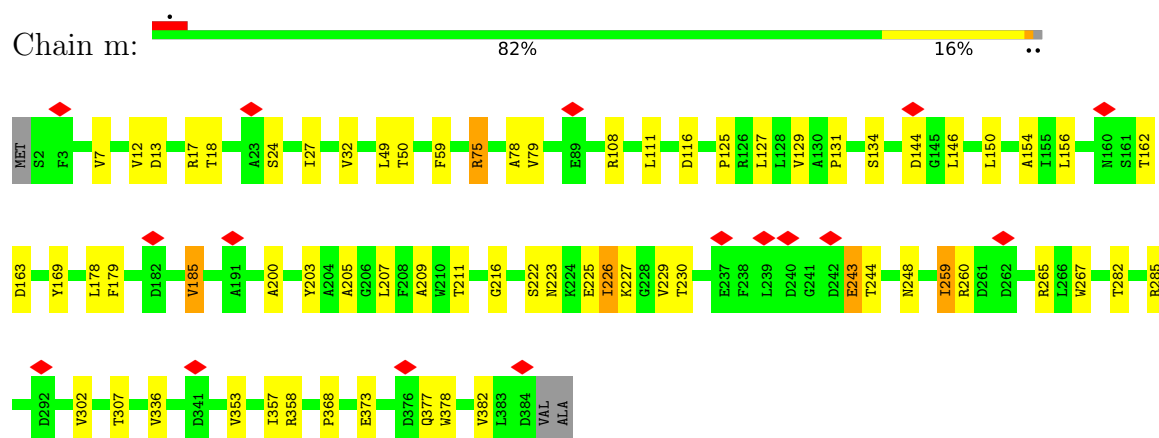
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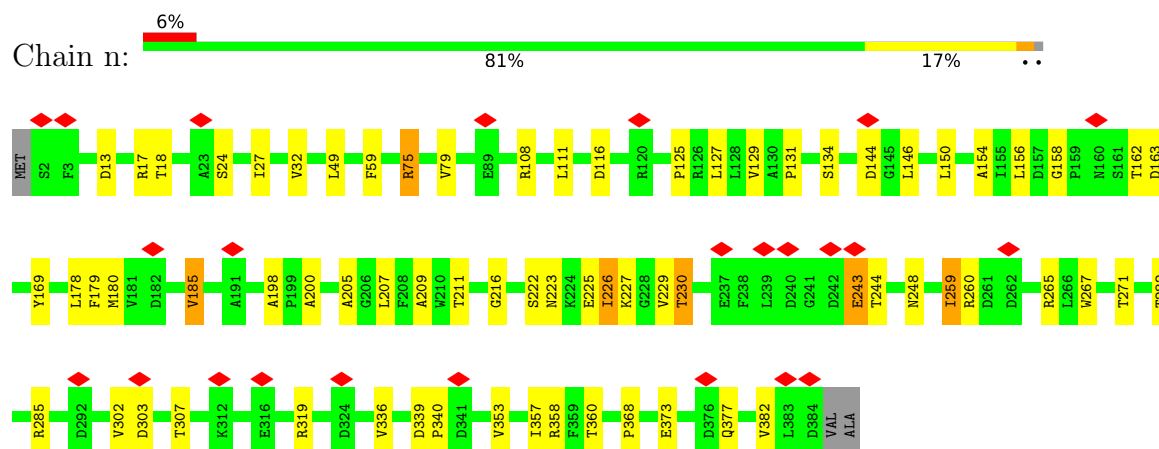
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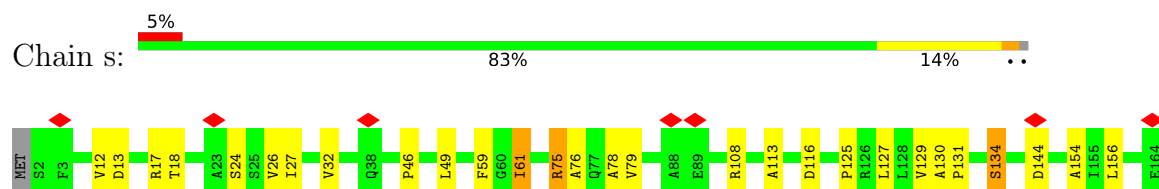
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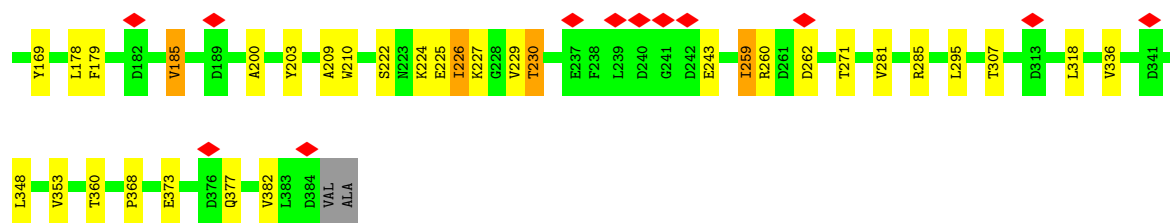


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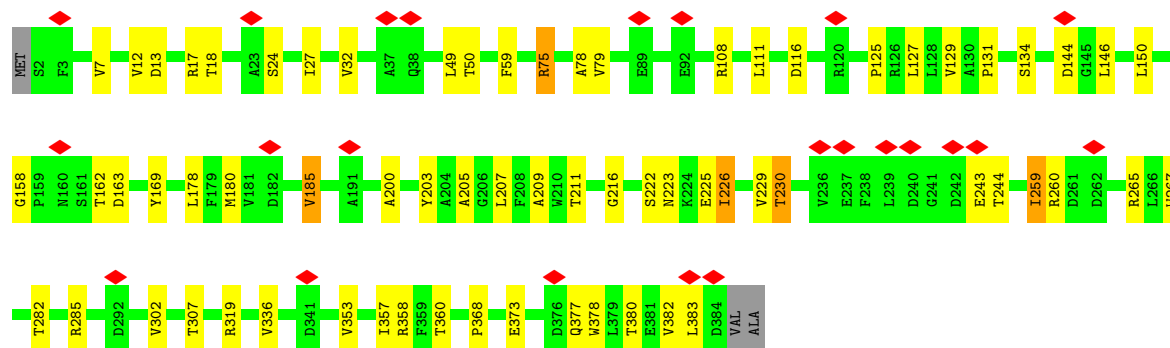
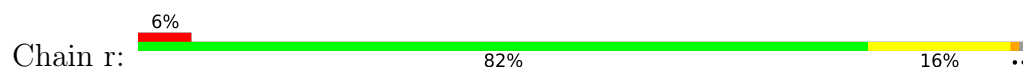


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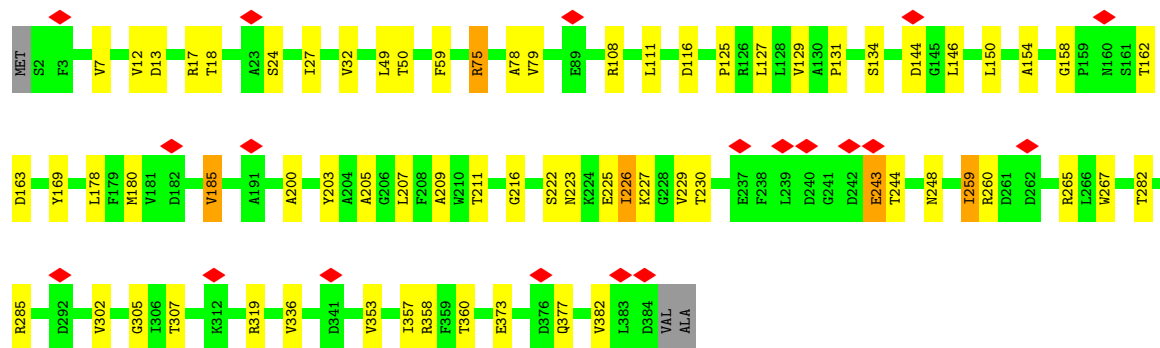
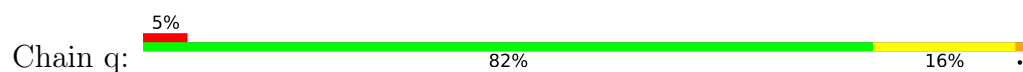




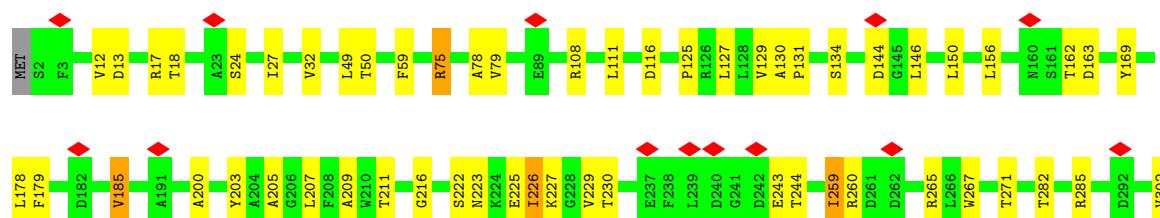
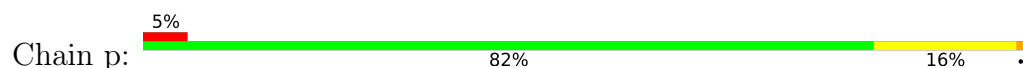
• Molecule 1: Sheath PA0622



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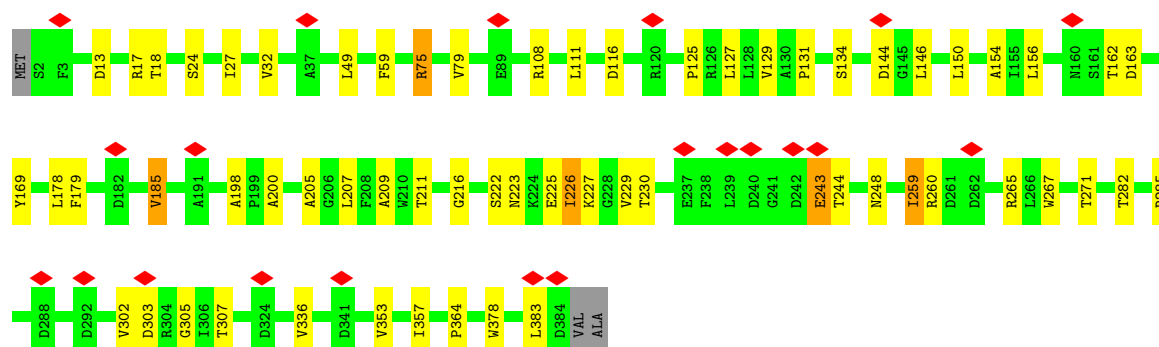
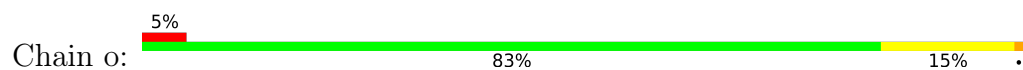


• Molecule 1: Sheath PA0622

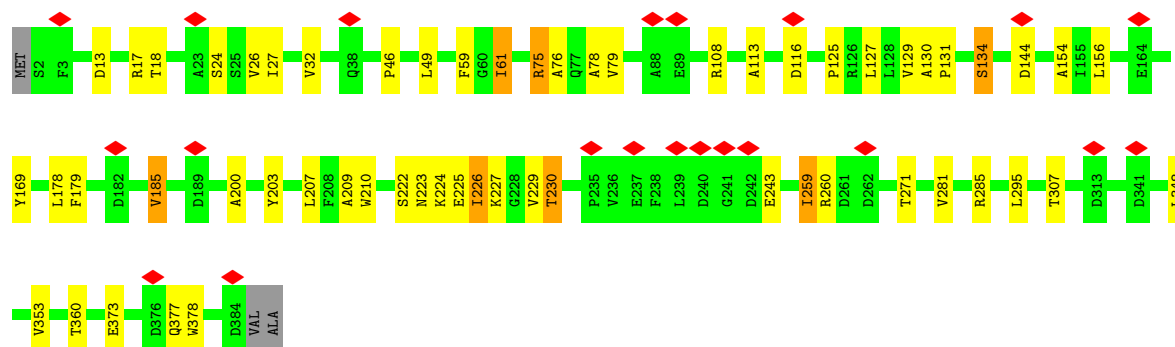
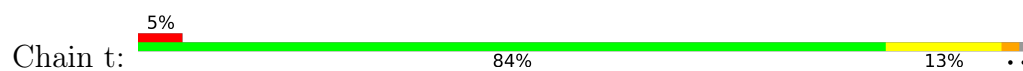




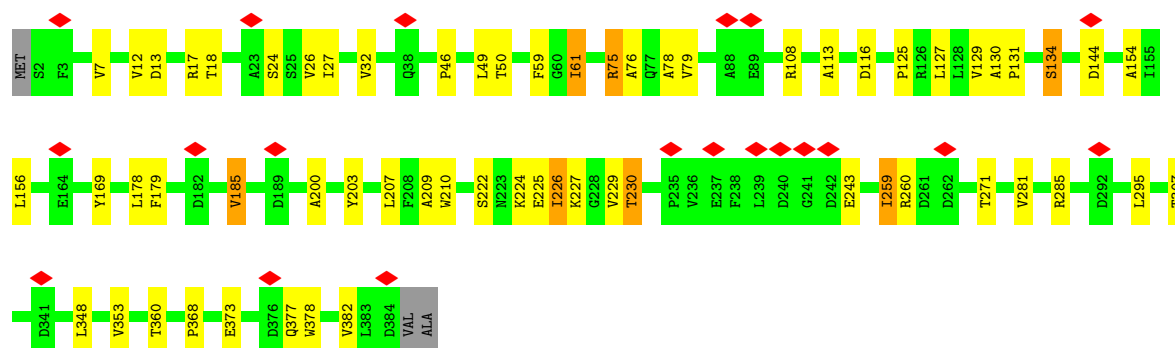
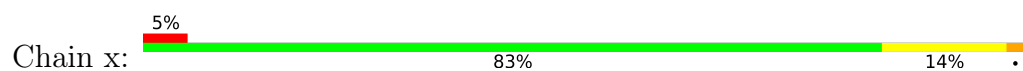
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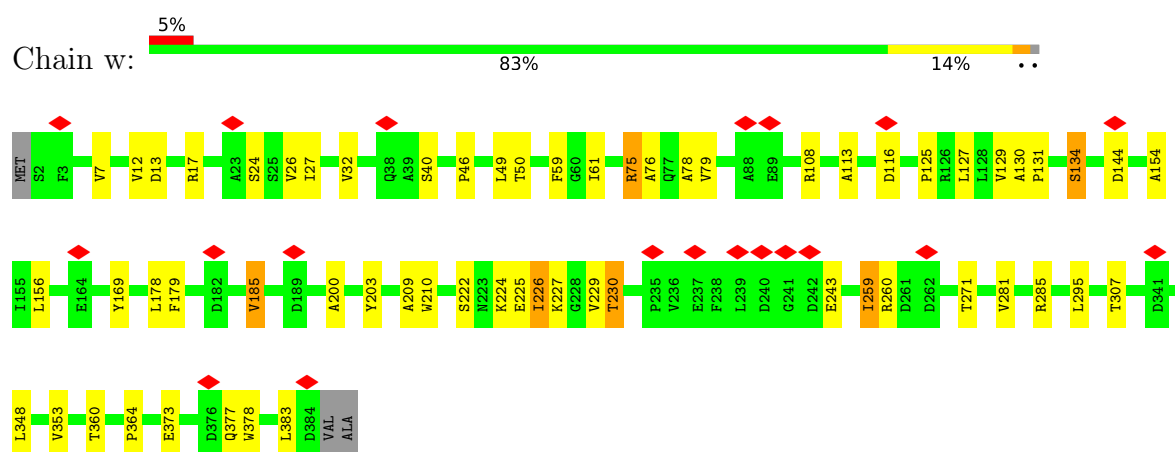
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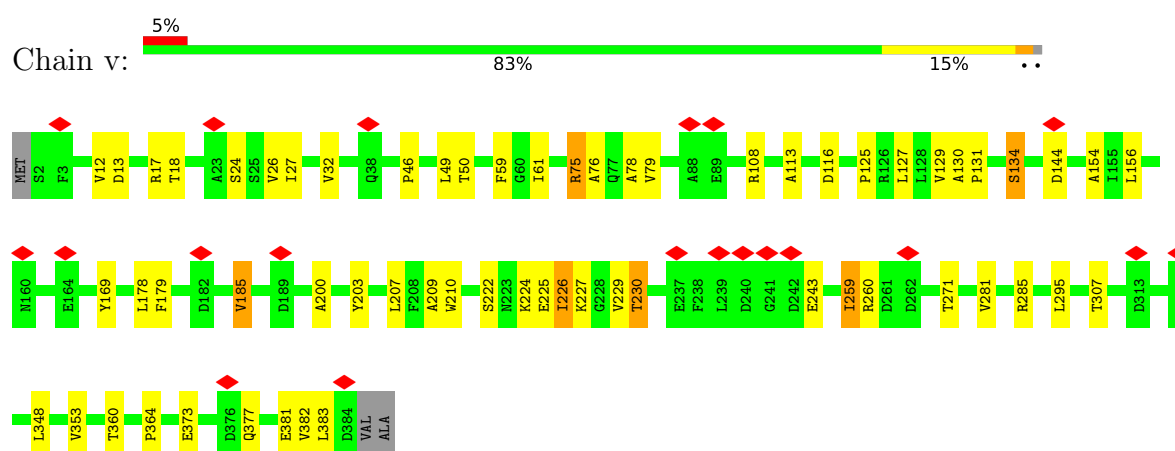
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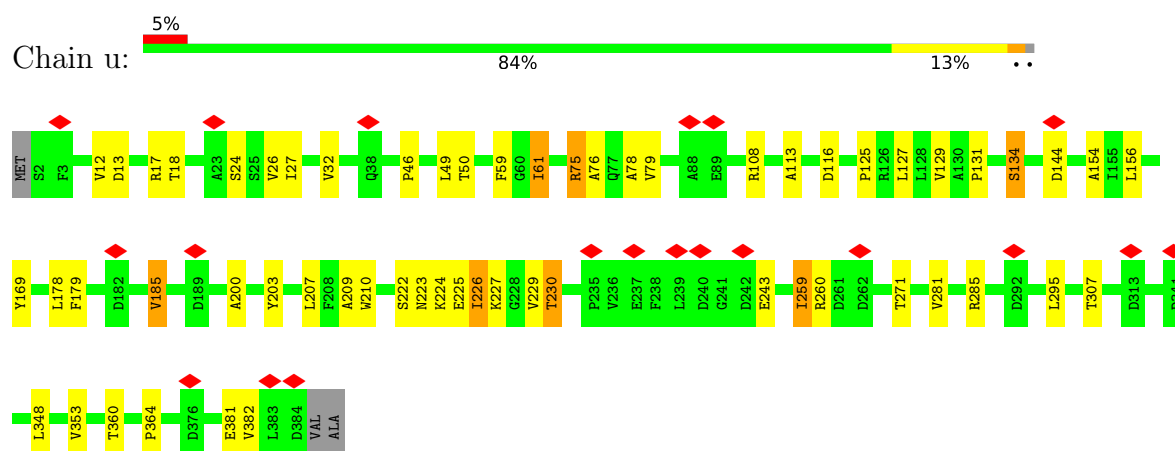
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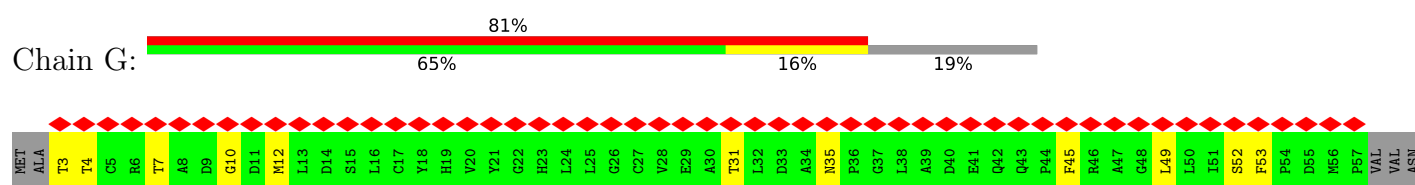
• Molecule 1: Sheath PA0622



• Molecule 1: Sheath PA0622

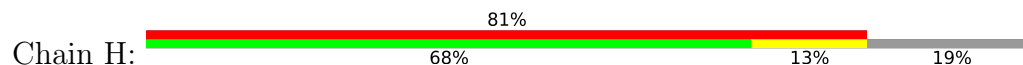


• Molecule 2: Glue PA0627



VAL
GLU
GLN
VAL
ARG
LEU
TRP
ASP

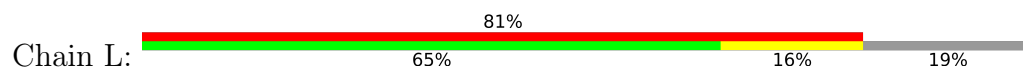
• Molecule 2: Glue PA0627



MET ALA T3 T4 C5 R6 T7 A8 A9 D9 G10 D11 M12 L13 L14 D14 S15 S16 L16 C17 C18 Y18 H19 H20 V20 Y21 Y22 G22 H23 H24 L24 L25 L26 G26 G27 C27 V28 E29 A30 T31 L32 D33 D34 A34 N35 P36 G37 L38 A39 D40 E41 Q42 Q43 P44 F45 R46 A47 G48 L49 L50 L51 I51 S52 F53 P54 D55 M56 P57 VAL VAL ASN

VAL
GLU
GLN
VAL
ARG
LEU
TRP
ASP

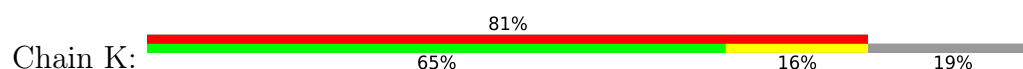
• Molecule 2: Glue PA0627



MET ALA T3 T4 C5 R6 T7 A8 A9 D9 G10 D11 M12 L13 L14 D14 S15 S16 L16 C17 C18 Y18 H19 H20 V20 Y21 Y22 G22 H23 H24 L24 L25 L26 G26 G27 C27 V28 E29 A30 T31 L32 D33 D34 A34 N35 P36 G37 L38 A39 D40 E41 Q42 Q43 P44 F45 R46 A47 G48 L49 L50 L51 I51 S52 F53 P54 D55 M56 P57 VAL VAL ASN

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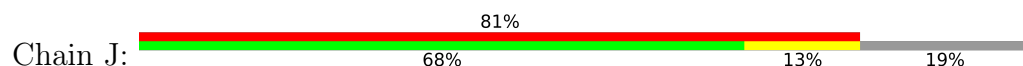
• Molecule 2: Glue PA0627



MET ALA T3 T4 C5 R6 T7 A8 A9 D9 G10 D11 M12 L13 L14 D14 S15 S16 L16 C17 C18 Y18 H19 H20 V20 Y21 Y22 G22 H23 H24 L24 L25 L26 G26 G27 C27 V28 E29 A30 T31 L32 D33 D34 A34 N35 P36 G37 L38 A39 D40 E41 Q42 Q43 P44 F45 R46 A47 G48 L49 L50 L51 I51 S52 F53 P54 D55 M56 P57 VAL VAL ASN

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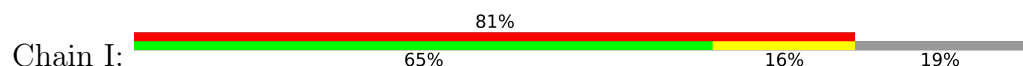
• Molecule 2: Glue PA0627



MET ALA T3 T4 C5 R6 T7 A8 A9 D9 G10 D11 M12 L13 L14 D14 S15 S16 L16 C17 C18 Y18 H19 H20 V20 Y21 Y22 G22 H23 H24 L24 L25 L26 G26 G27 C27 V28 E29 A30 T31 L32 D33 D34 A34 N35 P36 G37 L38 A39 D40 E41 Q42 Q43 P44 F45 R46 A47 G48 L49 L50 L51 I51 S52 F53 P54 D55 M56 P57 VAL VAL ASN

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• Molecule 2: Glue PA0627

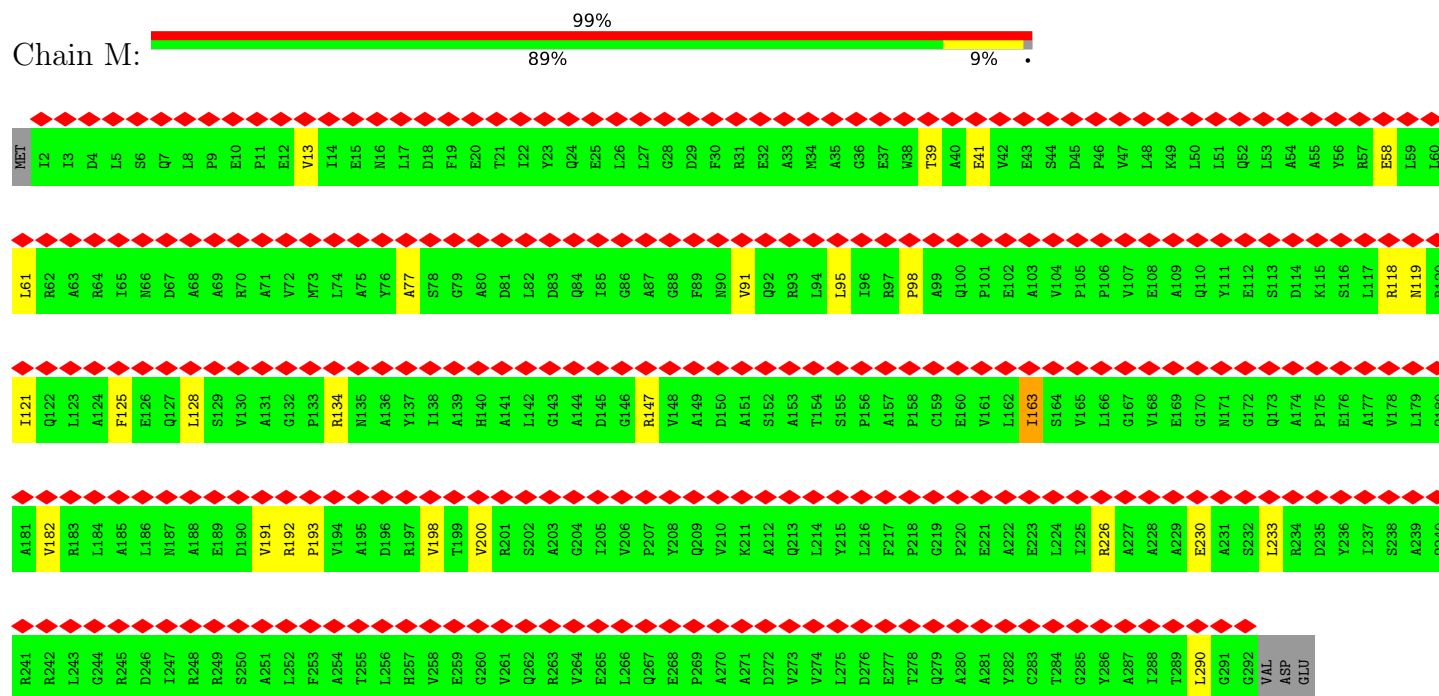


MET ALA T3 T4 C5 R6 T7 A8 A9 D9 G10 D11 M12 L13 L14 D14 S15 S16 L16 C17 C18 Y18 H19 H20 V20 Y21 Y22 G22 H23 H24 L24 L25 L26 G26 G27 C27 V28 E29 A30 T31 L32 D33 D34 A34 N35 P36 G37 L38 A39 D40 E41 Q42 Q43 P44 F45 R46 A47 G48 L49 L50 L51 I51 S52 F53 P54 D55 M56 P57 VAL VAL ASN

VAL
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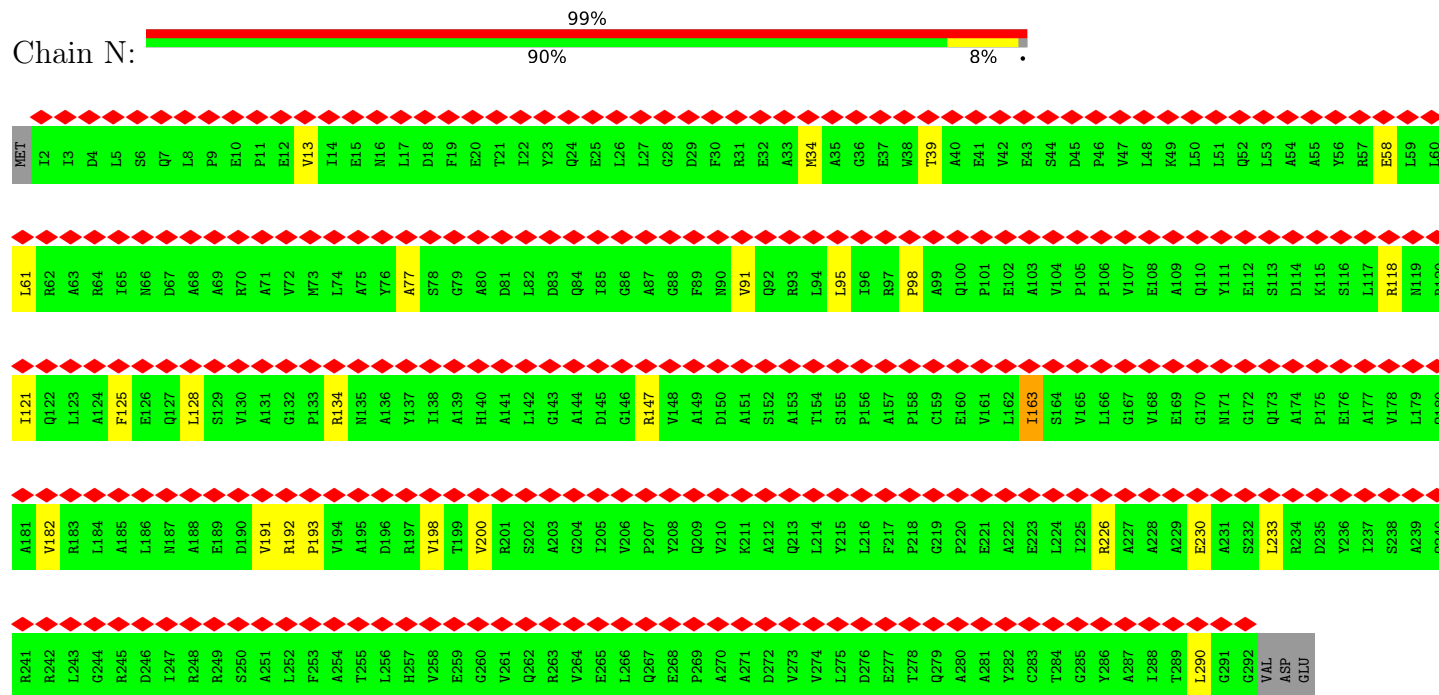
• Molecule 3: Tri1a PA0618

Chain M:



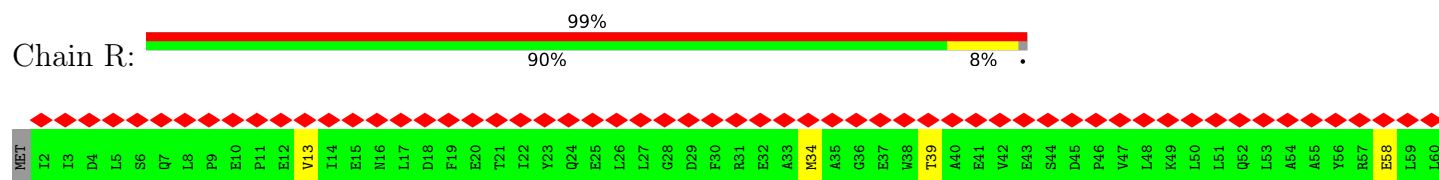
• Molecule 3: Tri1a PA0618

Chain N:

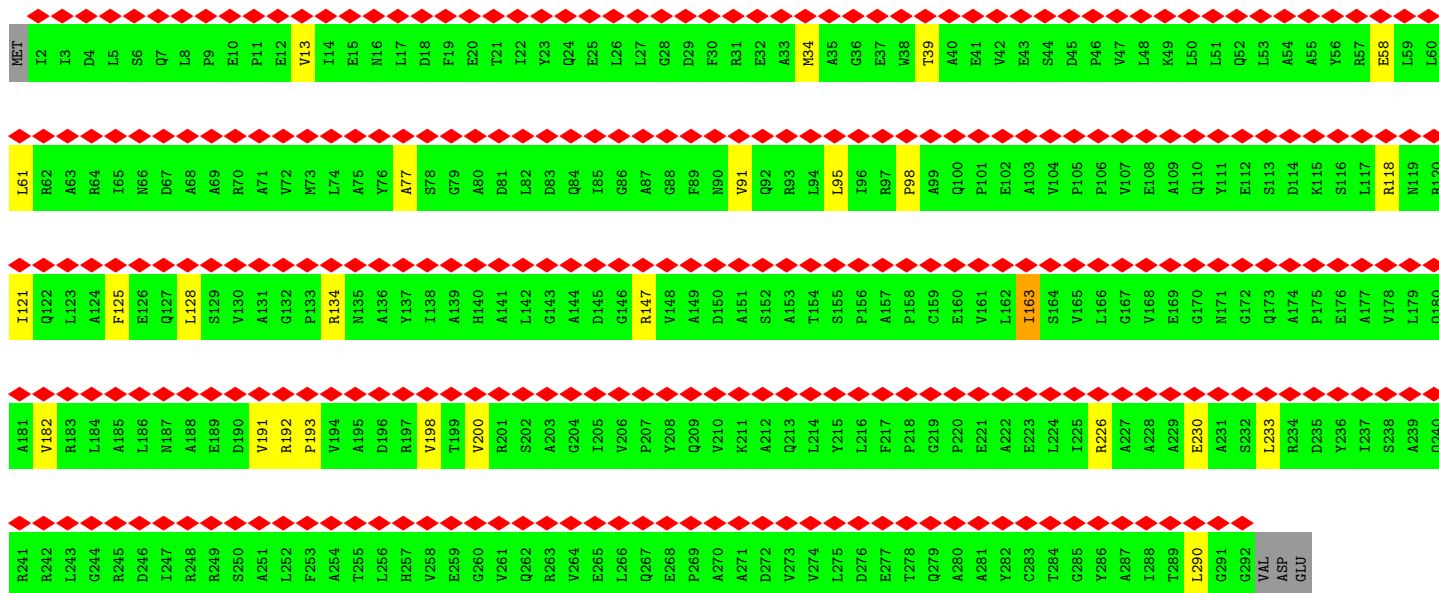
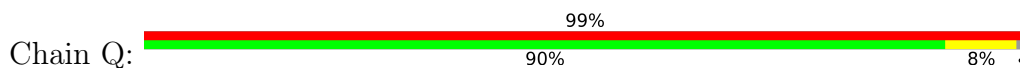


• Molecule 3: Tri1a PA0618

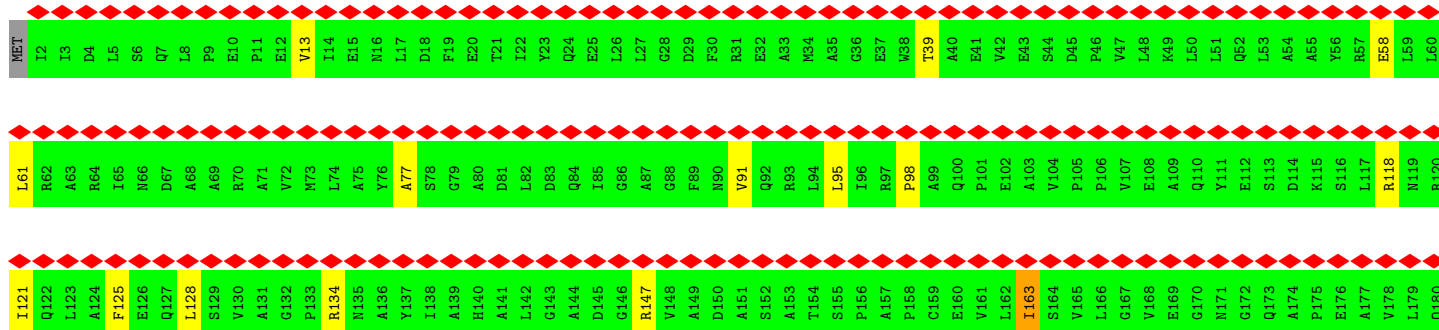
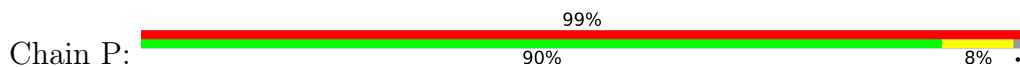
Chain R:

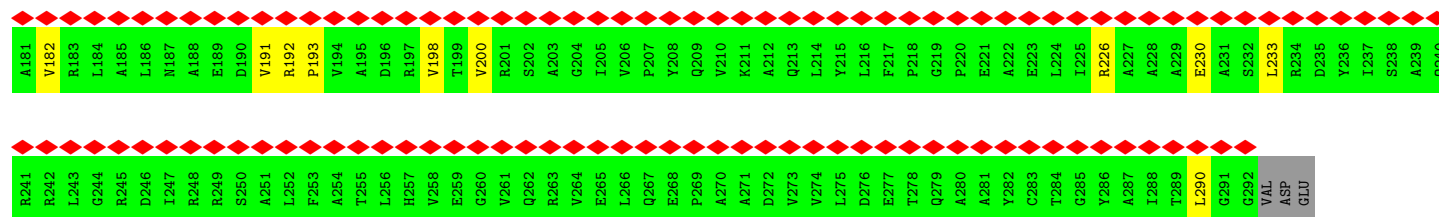


- Molecule 3: Tri1a PA0618

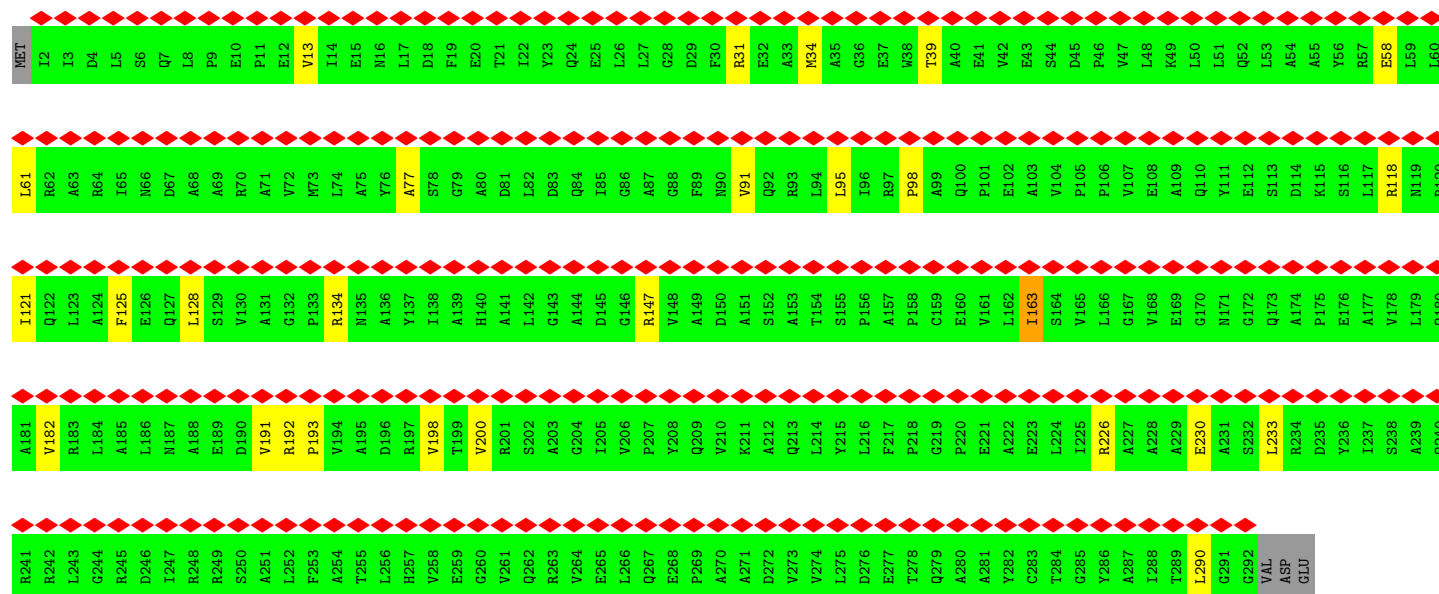
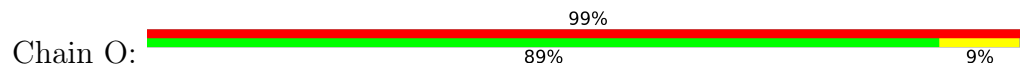


- Molecule 3: Tri1a PA0618

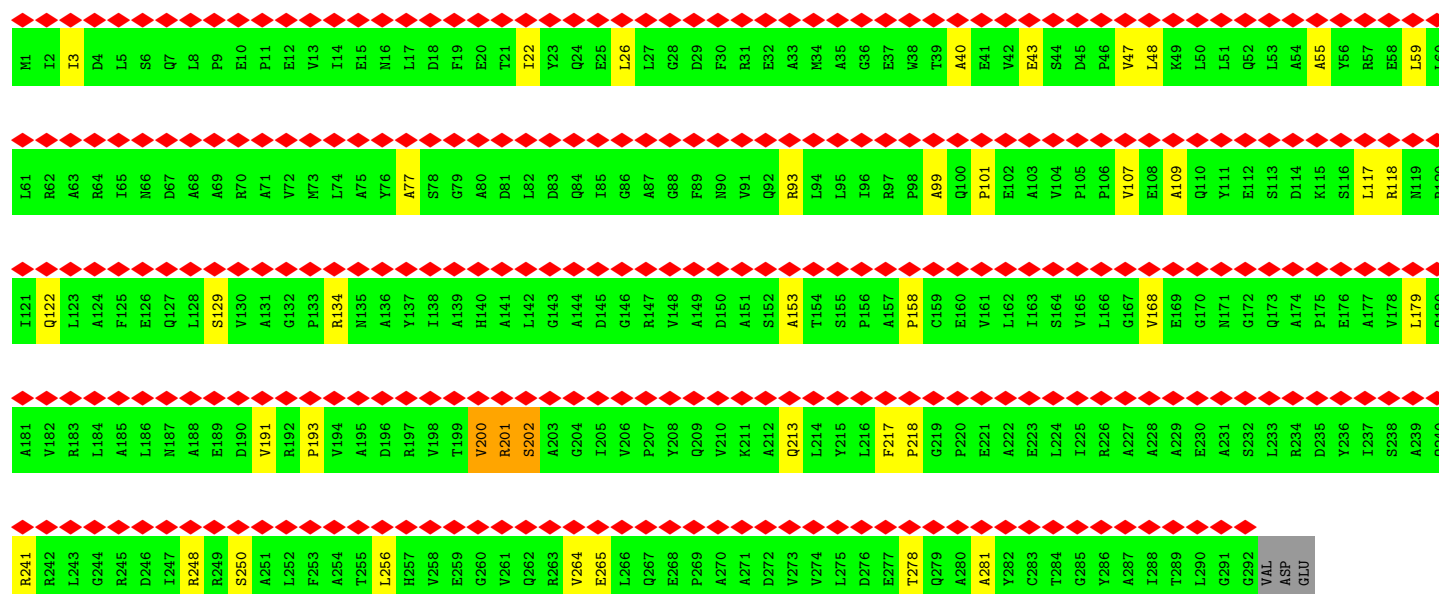
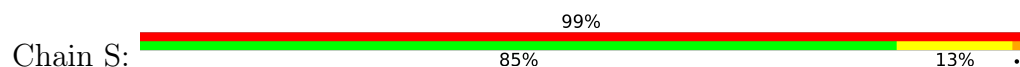




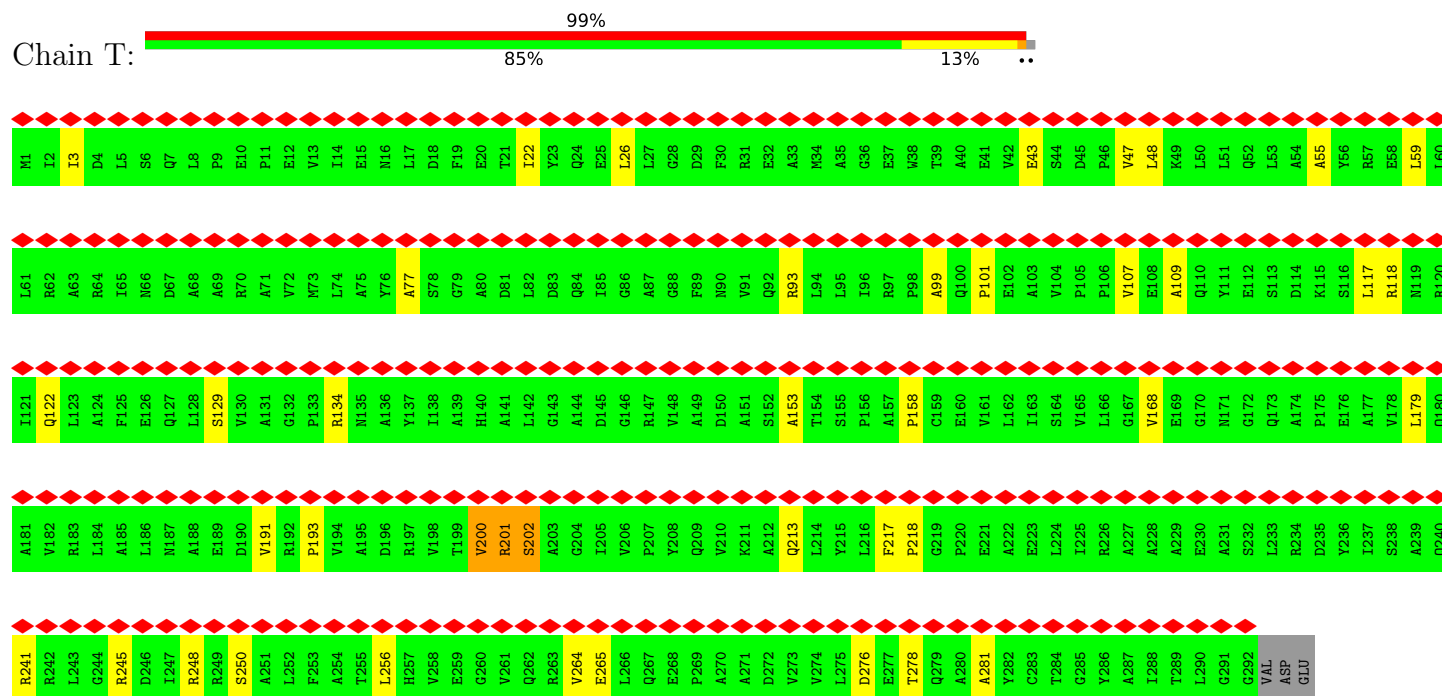
• Molecule 3: Tri1a PA0618



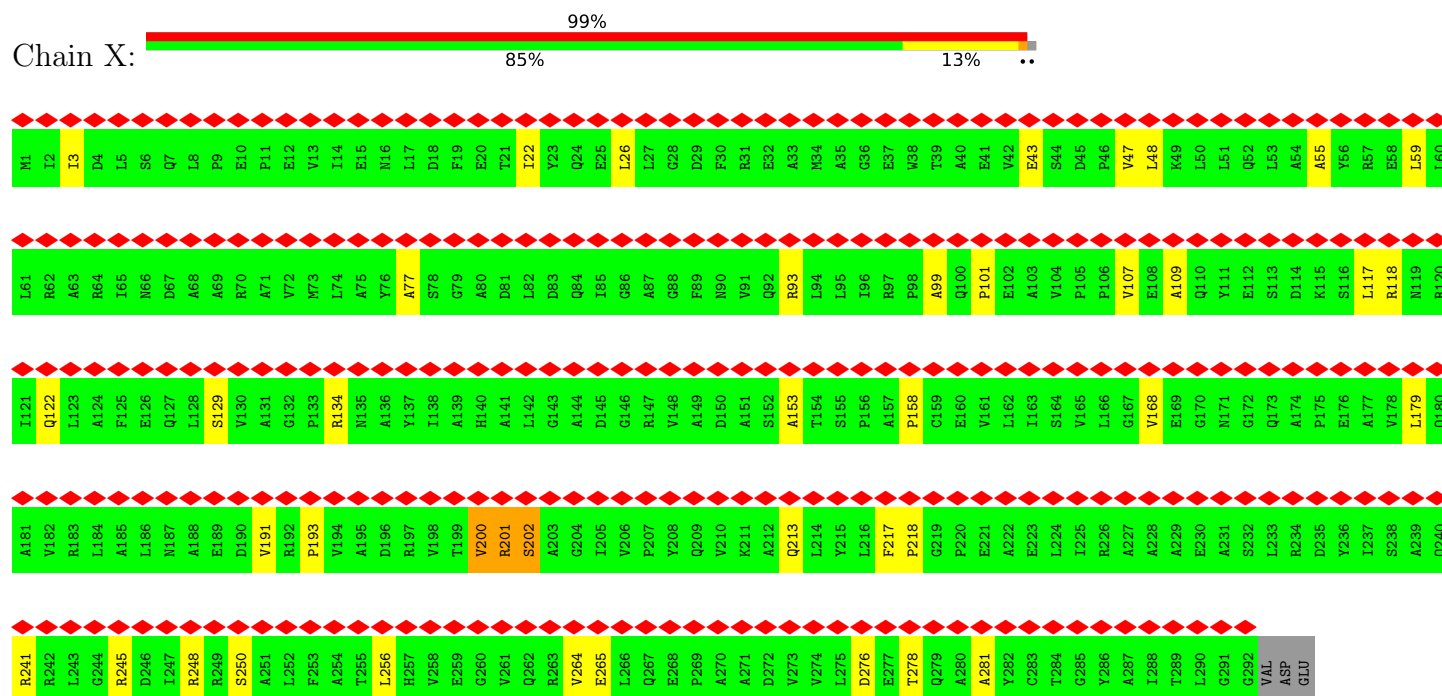
• Molecule 3: Tri1a PA0618



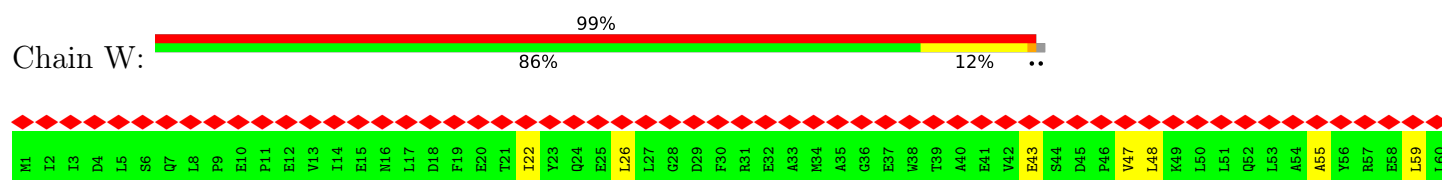
● Molecule 3: Tri1a PA0618

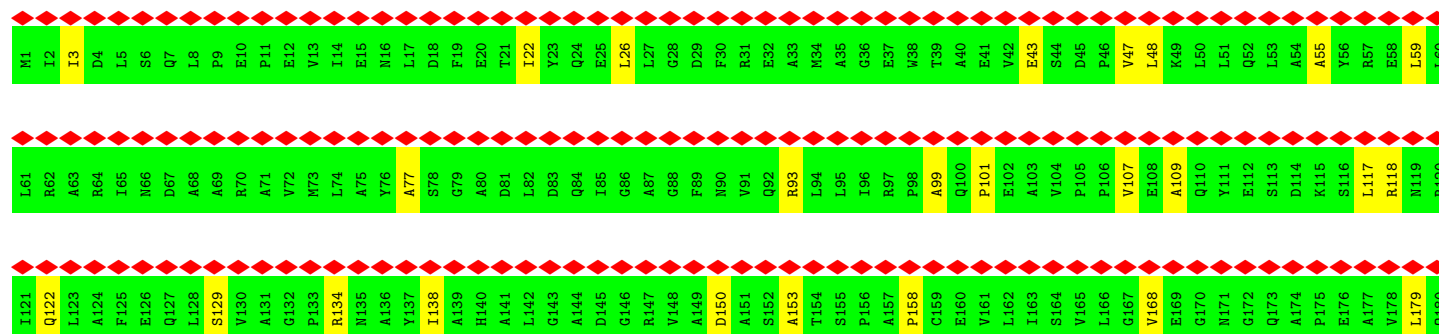


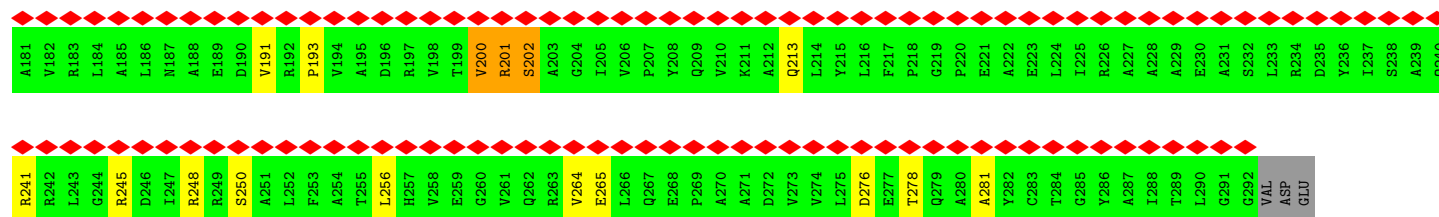
● Molecule 3: Tri1a PA0618



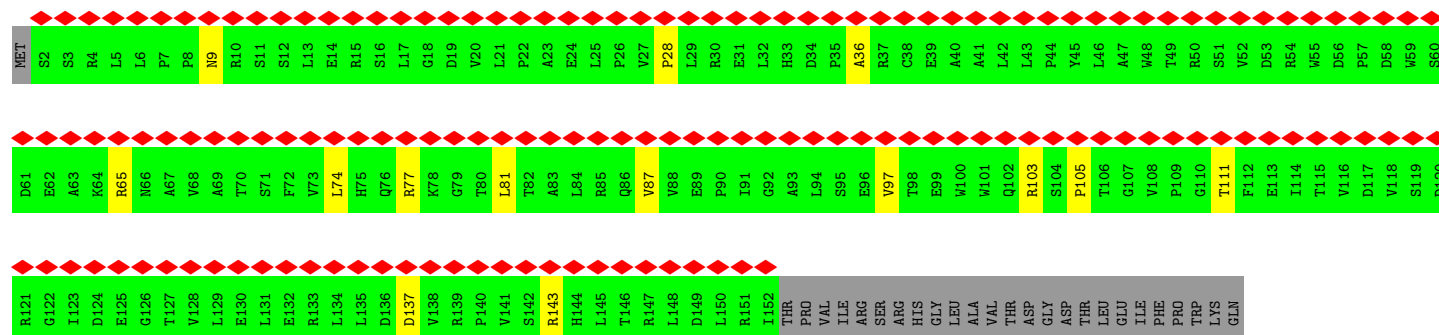
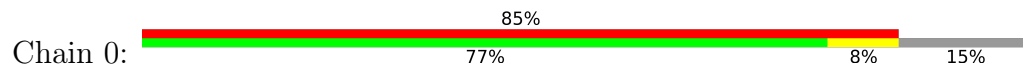
● Molecule 3: Tri1a PA0618



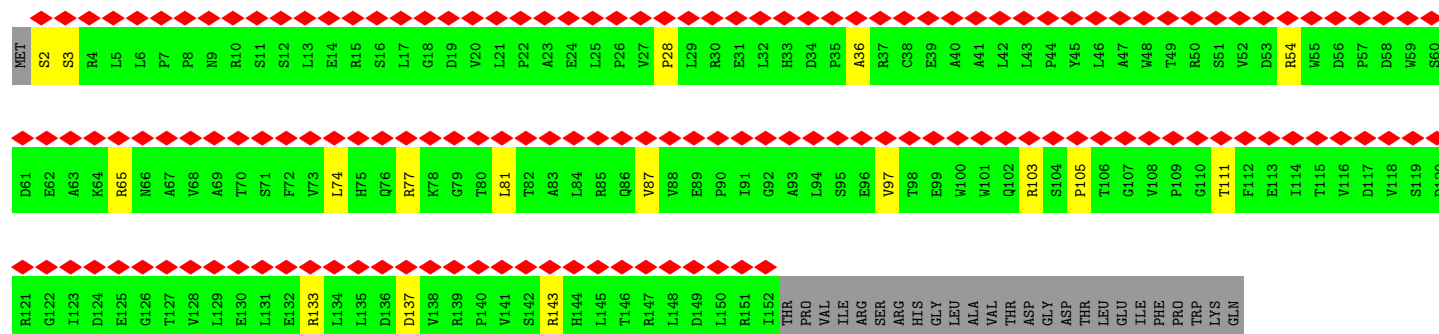
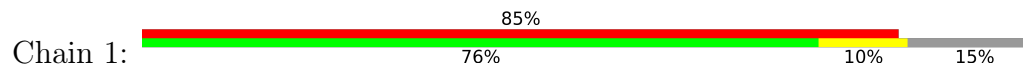




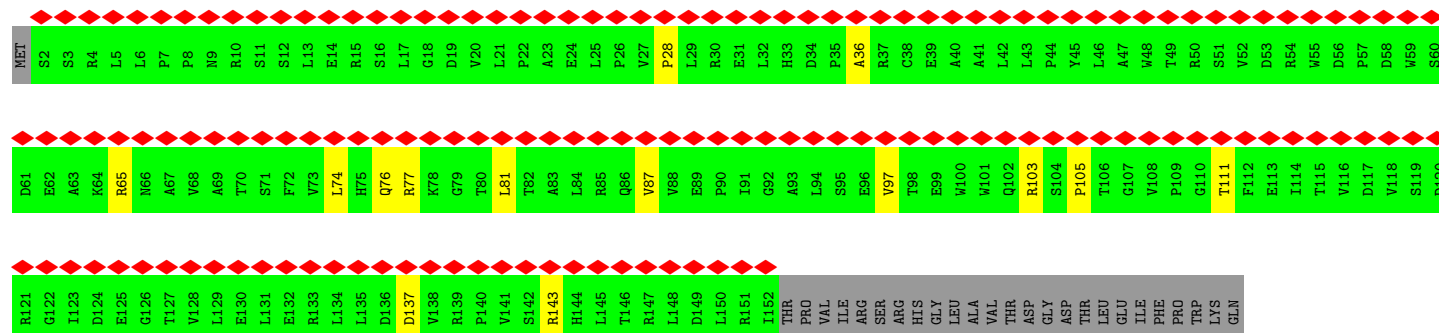
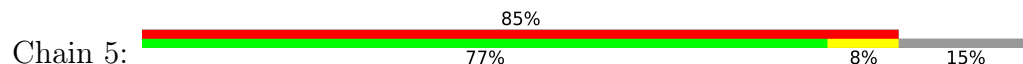
• Molecule 4: Tri2 PA0619



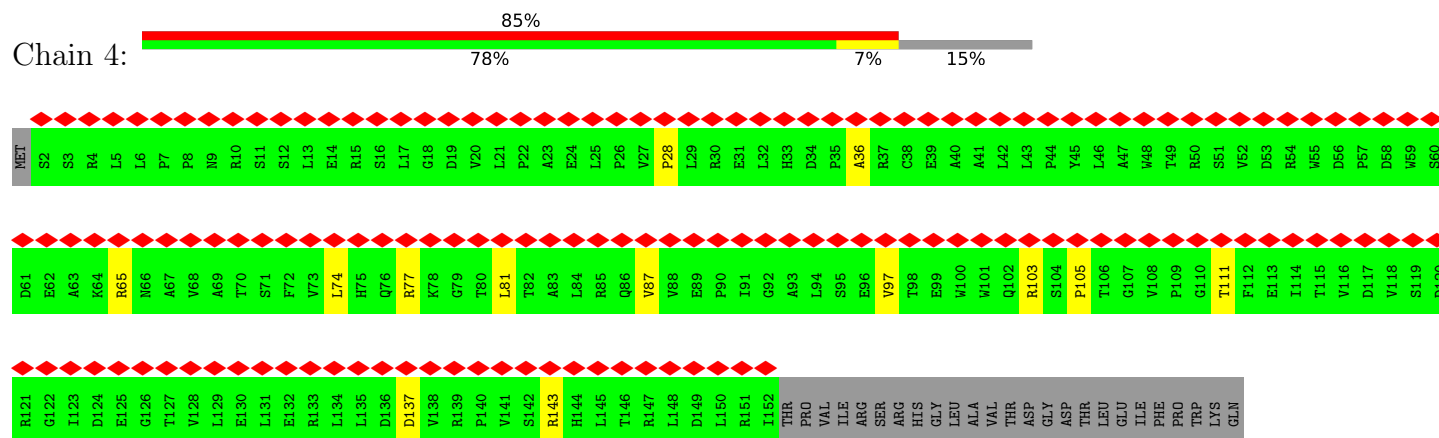
• Molecule 4: Tri2 PA0619



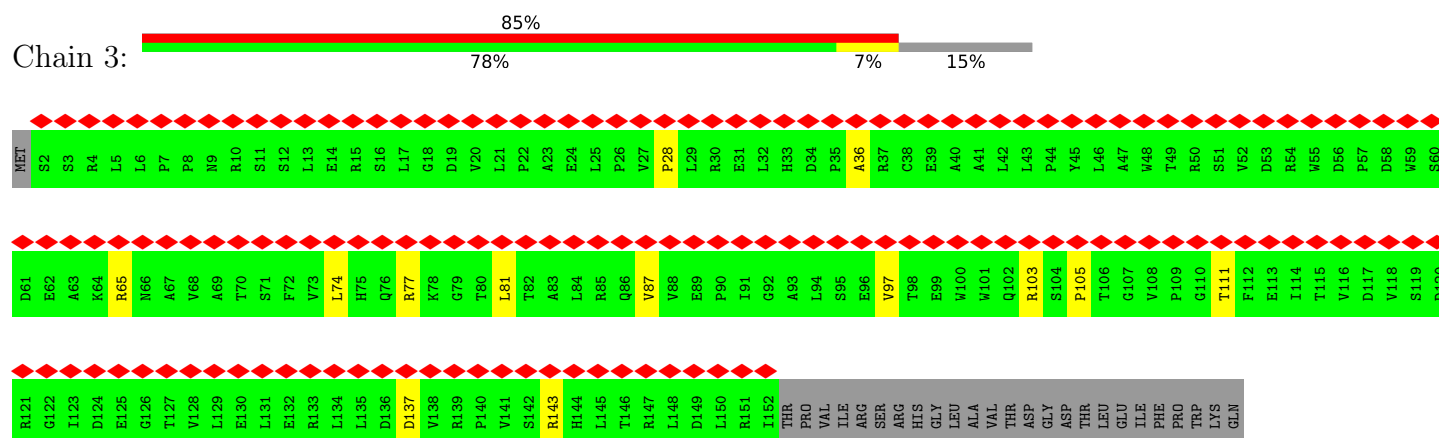
• Molecule 4: Tri2 PA0619



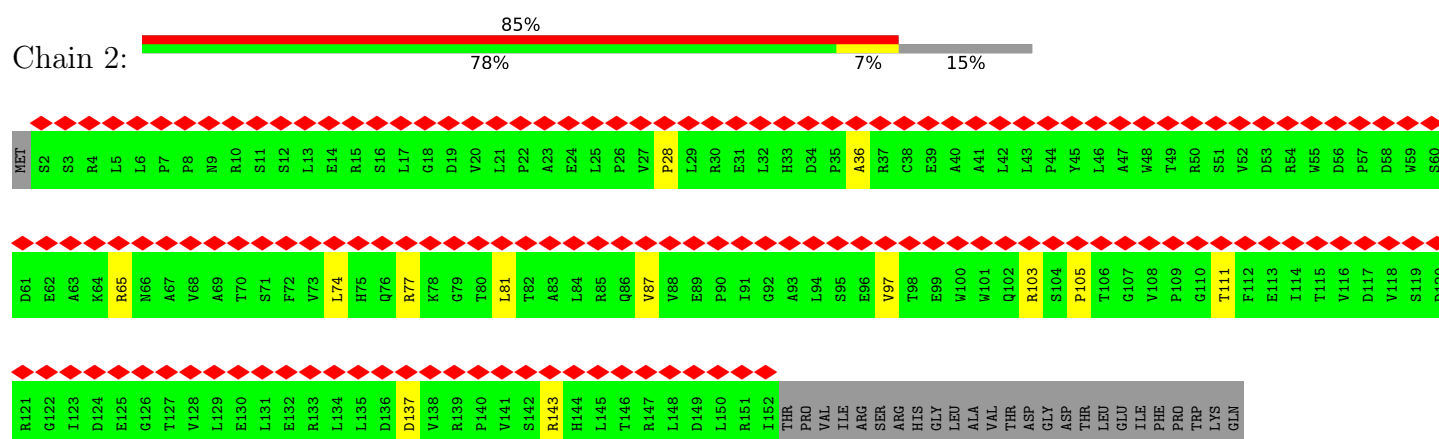
- Molecule 4: Tri2 PA0619



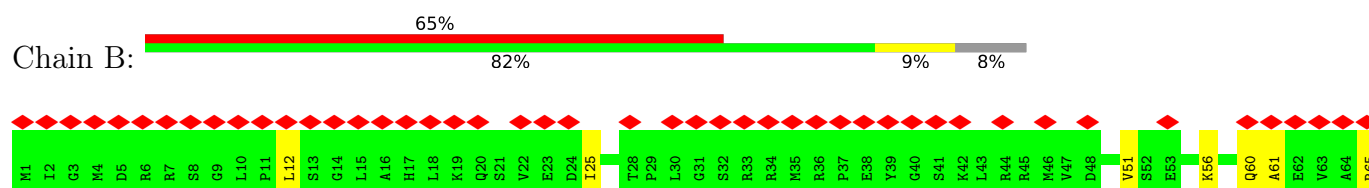
- Molecule 4: Tri2 PA0619

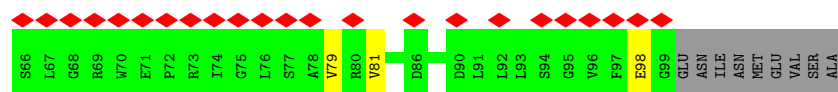


- Molecule 4: Tri2 PA0619

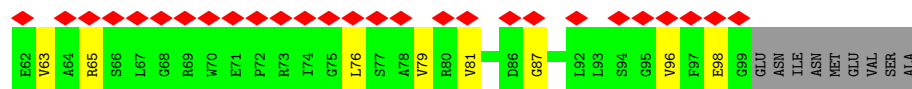
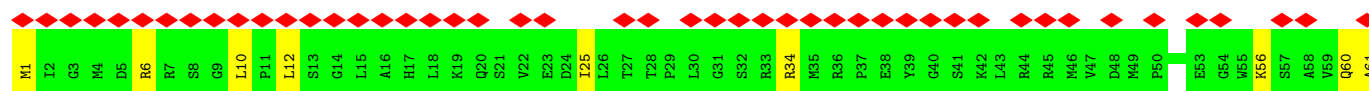
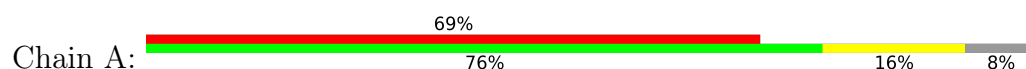


- Molecule 5: Sheath Initiator PA0617

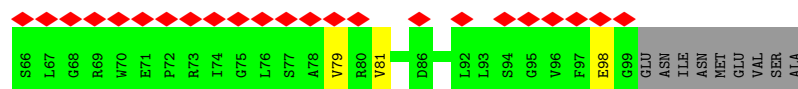
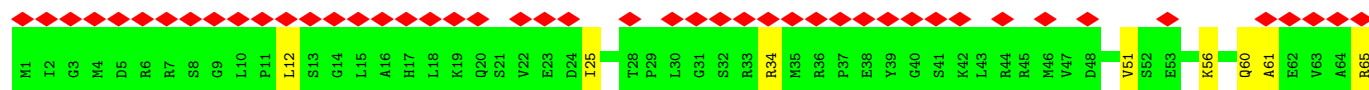
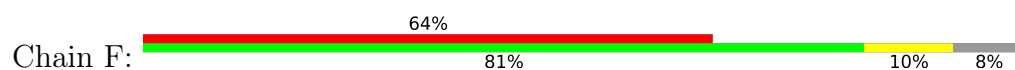




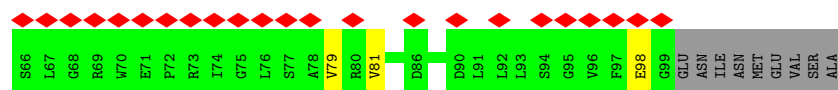
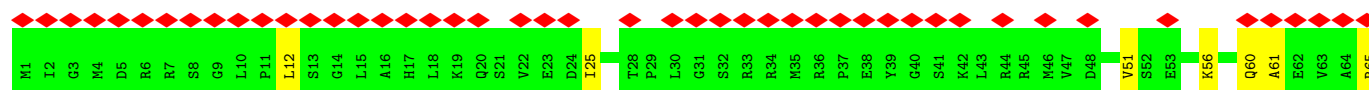
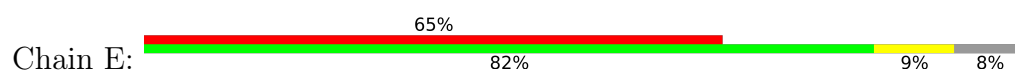
• Molecule 5: Sheath Initiator PA0617



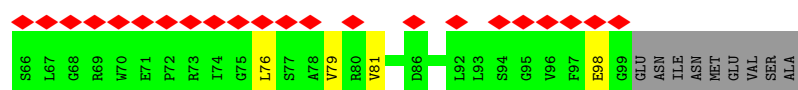
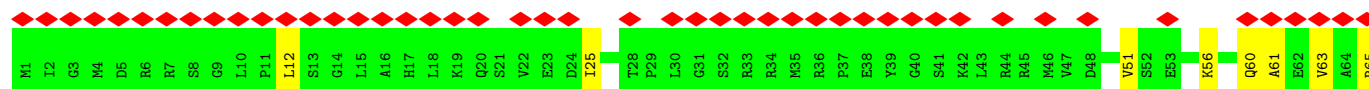
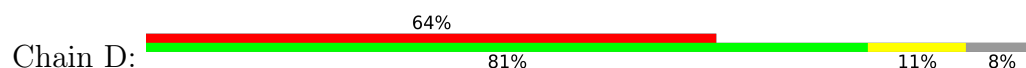
• Molecule 5: Sheath Initiator PA0617



• Molecule 5: Sheath Initiator PA0617



• Molecule 5: Sheath Initiator PA0617



• Molecule 5: Sheath Initiator PA0617

[illegible]

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C6	Depositor
Number of particles used	15581	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	80	Depositor
Minimum defocus (nm)	1100	Depositor
Maximum defocus (nm)	3400	Depositor
Magnification	130000	Depositor
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	0.189	Depositor
Minimum map value	-0.107	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.010	Depositor
Recommended contour level	0.03	Depositor
Map size (Å)	437.22, 437.22, 437.22	wwPDB
Map dimensions	420, 420, 420	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.041, 1.041, 1.041	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z > 5$	RMSZ	# $ Z > 5$
1	a	0.21	0/2942	0.40	0/4010
1	b	0.21	0/2942	0.40	0/4010
1	c	0.21	0/2942	0.40	0/4010
1	d	0.21	0/2942	0.40	0/4010
1	e	0.21	0/2942	0.40	0/4010
1	f	0.21	0/2942	0.40	0/4010
1	g	0.24	0/2942	0.41	0/4010
1	h	0.24	0/2942	0.41	0/4010
1	i	0.24	0/2942	0.41	0/4010
1	j	0.24	0/2942	0.41	0/4010
1	k	0.24	0/2942	0.41	0/4010
1	l	0.24	0/2942	0.41	0/4010
1	m	0.25	0/2942	0.42	0/4010
1	n	0.25	0/2942	0.42	0/4010
1	o	0.25	0/2942	0.42	0/4010
1	p	0.25	0/2942	0.42	0/4010
1	q	0.25	0/2942	0.42	0/4010
1	r	0.25	0/2942	0.42	0/4010
1	s	0.27	0/2942	0.43	0/4010
1	t	0.27	0/2942	0.43	0/4010
1	u	0.27	0/2942	0.43	0/4010
1	v	0.27	0/2942	0.43	0/4010
1	w	0.27	0/2942	0.43	0/4010
1	x	0.27	0/2942	0.43	0/4010
2	G	0.18	0/422	0.53	0/575
2	H	0.19	0/422	0.53	0/575
2	I	0.19	0/422	0.53	0/575
2	J	0.19	0/422	0.53	0/575
2	K	0.19	0/422	0.53	0/575
2	L	0.19	0/422	0.53	0/575
3	M	0.22	0/2253	0.53	0/3069
3	N	0.22	0/2253	0.52	0/3069
3	O	0.22	0/2253	0.53	0/3069
3	P	0.22	0/2253	0.53	0/3069

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
3	Q	0.22	0/2253	0.52	0/3069
3	R	0.22	0/2253	0.53	0/3069
3	S	0.19	0/2258	0.55	3/3076 (0.1%)
3	T	0.19	0/2258	0.55	3/3076 (0.1%)
3	U	0.19	0/2258	0.55	3/3076 (0.1%)
3	V	0.19	0/2258	0.55	3/3076 (0.1%)
3	W	0.19	0/2258	0.55	3/3076 (0.1%)
3	X	0.19	0/2258	0.55	3/3076 (0.1%)
4	0	0.24	0/1229	0.58	0/1680
4	1	0.24	0/1229	0.59	0/1680
4	2	0.24	0/1229	0.59	0/1680
4	3	0.24	0/1229	0.58	0/1680
4	4	0.24	0/1229	0.58	0/1680
4	5	0.24	0/1229	0.58	0/1680
5	A	0.18	0/770	0.42	0/1036
5	B	0.18	0/770	0.42	0/1036
5	C	0.18	0/770	0.42	0/1036
5	D	0.18	0/770	0.42	0/1036
5	E	0.18	0/770	0.42	0/1036
5	F	0.18	0/770	0.42	0/1036
All	All	0.23	0/112200	0.46	18/152856 (0.0%)

There are no bond length outliers.

The worst 5 of 18 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	U	200	VAL	N-CA-C	8.06	118.15	110.42
3	W	200	VAL	N-CA-C	8.04	118.14	110.42
3	V	200	VAL	N-CA-C	8.03	118.13	110.42
3	T	200	VAL	N-CA-C	8.02	118.12	110.42
3	S	200	VAL	N-CA-C	8.00	118.10	110.42

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	a	2884	0	2841	32	0
1	b	2884	0	2841	34	0
1	c	2884	0	2841	36	0
1	d	2884	0	2841	34	0
1	e	2884	0	2841	32	0
1	f	2884	0	2841	32	0
1	g	2884	0	2841	34	0
1	h	2884	0	2841	31	0
1	i	2884	0	2841	35	0
1	j	2884	0	2841	30	0
1	k	2884	0	2841	26	0
1	l	2884	0	2841	28	0
1	m	2884	0	2841	42	0
1	n	2884	0	2841	42	0
1	o	2884	0	2841	39	0
1	p	2884	0	2841	41	0
1	q	2884	0	2841	44	0
1	r	2884	0	2841	44	0
1	s	2884	0	2841	36	0
1	t	2884	0	2841	34	0
1	u	2884	0	2841	34	0
1	v	2884	0	2841	38	0
1	w	2884	0	2841	36	0
1	x	2884	0	2841	38	0
2	G	413	0	389	13	0
2	H	413	0	389	12	0
2	I	413	0	389	13	0
2	J	413	0	389	12	0
2	K	413	0	389	13	0
2	L	413	0	389	14	0
3	M	2218	0	2222	17	0
3	N	2218	0	2222	16	0
3	O	2218	0	2222	18	0
3	P	2218	0	2222	15	0
3	Q	2218	0	2222	16	0
3	R	2218	0	2222	16	0
3	S	2223	0	2227	32	0
3	T	2223	0	2227	32	0
3	U	2223	0	2227	32	0
3	V	2223	0	2227	32	0
3	W	2223	0	2227	31	0
3	X	2223	0	2227	33	0
4	O	1202	0	1202	12	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	1	1202	0	1202	12	0
4	2	1202	0	1202	10	0
4	3	1202	0	1202	10	0
4	4	1202	0	1202	10	0
4	5	1202	0	1202	11	0
5	A	759	0	794	11	0
5	B	759	0	794	4	0
5	C	759	0	794	5	0
5	D	759	0	794	5	0
5	E	759	0	794	4	0
5	F	759	0	794	5	0
All	All	110106	0	109188	1129	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

The worst 5 of 1129 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:S:179:LEU:HD21	3:S:200:VAL:CG1	1.70	1.22
3:X:179:LEU:HD21	3:X:200:VAL:CG1	1.70	1.21
3:V:179:LEU:HD21	3:V:200:VAL:CG1	1.70	1.21
3:T:179:LEU:HD21	3:T:200:VAL:CG1	1.70	1.21
3:U:179:LEU:HD21	3:U:200:VAL:CG1	1.70	1.21

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	a	381/386 (99%)	354 (93%)	27 (7%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	b	381/386 (99%)	354 (93%)	27 (7%)	0	100	100
1	c	381/386 (99%)	354 (93%)	27 (7%)	0	100	100
1	d	381/386 (99%)	354 (93%)	27 (7%)	0	100	100
1	e	381/386 (99%)	354 (93%)	27 (7%)	0	100	100
1	f	381/386 (99%)	354 (93%)	27 (7%)	0	100	100
1	g	381/386 (99%)	359 (94%)	22 (6%)	0	100	100
1	h	381/386 (99%)	358 (94%)	23 (6%)	0	100	100
1	i	381/386 (99%)	358 (94%)	23 (6%)	0	100	100
1	j	381/386 (99%)	358 (94%)	23 (6%)	0	100	100
1	k	381/386 (99%)	358 (94%)	23 (6%)	0	100	100
1	l	381/386 (99%)	358 (94%)	23 (6%)	0	100	100
1	m	381/386 (99%)	352 (92%)	29 (8%)	0	100	100
1	n	381/386 (99%)	352 (92%)	29 (8%)	0	100	100
1	o	381/386 (99%)	352 (92%)	29 (8%)	0	100	100
1	p	381/386 (99%)	352 (92%)	29 (8%)	0	100	100
1	q	381/386 (99%)	352 (92%)	29 (8%)	0	100	100
1	r	381/386 (99%)	352 (92%)	29 (8%)	0	100	100
1	s	381/386 (99%)	359 (94%)	22 (6%)	0	100	100
1	t	381/386 (99%)	359 (94%)	22 (6%)	0	100	100
1	u	381/386 (99%)	359 (94%)	22 (6%)	0	100	100
1	v	381/386 (99%)	359 (94%)	22 (6%)	0	100	100
1	w	381/386 (99%)	359 (94%)	22 (6%)	0	100	100
1	x	381/386 (99%)	359 (94%)	22 (6%)	0	100	100
2	G	53/68 (78%)	50 (94%)	3 (6%)	0	100	100
2	H	53/68 (78%)	50 (94%)	3 (6%)	0	100	100
2	I	53/68 (78%)	50 (94%)	3 (6%)	0	100	100
2	J	53/68 (78%)	50 (94%)	3 (6%)	0	100	100
2	K	53/68 (78%)	50 (94%)	3 (6%)	0	100	100
2	L	53/68 (78%)	50 (94%)	3 (6%)	0	100	100
3	M	289/295 (98%)	266 (92%)	23 (8%)	0	100	100
3	N	289/295 (98%)	266 (92%)	23 (8%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	O	289/295 (98%)	266 (92%)	23 (8%)	0	100	100
3	P	289/295 (98%)	266 (92%)	23 (8%)	0	100	100
3	Q	289/295 (98%)	266 (92%)	23 (8%)	0	100	100
3	R	289/295 (98%)	266 (92%)	23 (8%)	0	100	100
3	S	290/295 (98%)	272 (94%)	18 (6%)	0	100	100
3	T	290/295 (98%)	272 (94%)	18 (6%)	0	100	100
3	U	290/295 (98%)	272 (94%)	18 (6%)	0	100	100
3	V	290/295 (98%)	272 (94%)	18 (6%)	0	100	100
3	W	290/295 (98%)	272 (94%)	18 (6%)	0	100	100
3	X	290/295 (98%)	272 (94%)	18 (6%)	0	100	100
4	0	149/177 (84%)	134 (90%)	15 (10%)	0	100	100
4	1	149/177 (84%)	134 (90%)	15 (10%)	0	100	100
4	2	149/177 (84%)	134 (90%)	15 (10%)	0	100	100
4	3	149/177 (84%)	134 (90%)	15 (10%)	0	100	100
4	4	149/177 (84%)	134 (90%)	15 (10%)	0	100	100
4	5	149/177 (84%)	134 (90%)	15 (10%)	0	100	100
5	A	97/108 (90%)	88 (91%)	9 (9%)	0	100	100
5	B	97/108 (90%)	88 (91%)	9 (9%)	0	100	100
5	C	97/108 (90%)	88 (91%)	9 (9%)	0	100	100
5	D	97/108 (90%)	88 (91%)	9 (9%)	0	100	100
5	E	97/108 (90%)	88 (91%)	9 (9%)	0	100	100
5	F	97/108 (90%)	88 (91%)	9 (9%)	0	100	100
All	All	14412/14922 (97%)	13399 (93%)	1013 (7%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	a	296/298 (99%)	282 (95%)	14 (5%)	23	49
1	b	296/298 (99%)	282 (95%)	14 (5%)	23	49
1	c	296/298 (99%)	282 (95%)	14 (5%)	23	49
1	d	296/298 (99%)	282 (95%)	14 (5%)	23	49
1	e	296/298 (99%)	282 (95%)	14 (5%)	23	49
1	f	296/298 (99%)	282 (95%)	14 (5%)	23	49
1	g	296/298 (99%)	289 (98%)	7 (2%)	43	64
1	h	296/298 (99%)	289 (98%)	7 (2%)	43	64
1	i	296/298 (99%)	289 (98%)	7 (2%)	43	64
1	j	296/298 (99%)	289 (98%)	7 (2%)	43	64
1	k	296/298 (99%)	289 (98%)	7 (2%)	43	64
1	l	296/298 (99%)	289 (98%)	7 (2%)	43	64
1	m	296/298 (99%)	283 (96%)	13 (4%)	25	51
1	n	296/298 (99%)	283 (96%)	13 (4%)	25	51
1	o	296/298 (99%)	283 (96%)	13 (4%)	25	51
1	p	296/298 (99%)	283 (96%)	13 (4%)	25	51
1	q	296/298 (99%)	283 (96%)	13 (4%)	25	51
1	r	296/298 (99%)	283 (96%)	13 (4%)	25	51
1	s	296/298 (99%)	280 (95%)	16 (5%)	20	46
1	t	296/298 (99%)	280 (95%)	16 (5%)	20	46
1	u	296/298 (99%)	280 (95%)	16 (5%)	20	46
1	v	296/298 (99%)	280 (95%)	16 (5%)	20	46
1	w	296/298 (99%)	280 (95%)	16 (5%)	20	46
1	x	296/298 (99%)	280 (95%)	16 (5%)	20	46
2	G	45/57 (79%)	45 (100%)	0	100	100
2	H	45/57 (79%)	45 (100%)	0	100	100
2	I	45/57 (79%)	45 (100%)	0	100	100
2	J	45/57 (79%)	45 (100%)	0	100	100
2	K	45/57 (79%)	45 (100%)	0	100	100
2	L	45/57 (79%)	45 (100%)	0	100	100
3	M	226/230 (98%)	223 (99%)	3 (1%)	61	72
3	N	226/230 (98%)	223 (99%)	3 (1%)	61	72

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	O	226/230 (98%)	223 (99%)	3 (1%)	61	72
3	P	226/230 (98%)	223 (99%)	3 (1%)	61	72
3	Q	226/230 (98%)	223 (99%)	3 (1%)	61	72
3	R	226/230 (98%)	223 (99%)	3 (1%)	61	72
3	S	226/230 (98%)	225 (100%)	1 (0%)	84	81
3	T	226/230 (98%)	225 (100%)	1 (0%)	84	81
3	U	226/230 (98%)	225 (100%)	1 (0%)	84	81
3	V	226/230 (98%)	225 (100%)	1 (0%)	84	81
3	W	226/230 (98%)	225 (100%)	1 (0%)	84	81
3	X	226/230 (98%)	225 (100%)	1 (0%)	84	81
4	0	134/157 (85%)	134 (100%)	0	100	100
4	1	134/157 (85%)	134 (100%)	0	100	100
4	2	134/157 (85%)	134 (100%)	0	100	100
4	3	134/157 (85%)	134 (100%)	0	100	100
4	4	134/157 (85%)	134 (100%)	0	100	100
4	5	134/157 (85%)	134 (100%)	0	100	100
5	A	82/90 (91%)	79 (96%)	3 (4%)	30	56
5	B	82/90 (91%)	79 (96%)	3 (4%)	30	56
5	C	82/90 (91%)	79 (96%)	3 (4%)	30	56
5	D	82/90 (91%)	79 (96%)	3 (4%)	30	56
5	E	82/90 (91%)	79 (96%)	3 (4%)	30	56
5	F	82/90 (91%)	79 (96%)	3 (4%)	30	56
All	All	11382/11736 (97%)	11040 (97%)	342 (3%)	37	60

5 of 342 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	q	259	ILE
1	x	230	THR
1	p	79	VAL
1	o	307	THR
1	w	185	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 137 such sidechains are listed below:

Mol	Chain	Res	Type
3	V	262	GLN
3	U	257	HIS
1	t	11	ASN
3	R	122	GLN
3	R	110	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

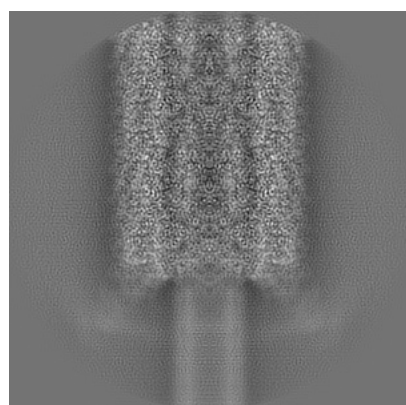
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-20648. These allow visual inspection of the internal detail of the map and identification of artifacts.

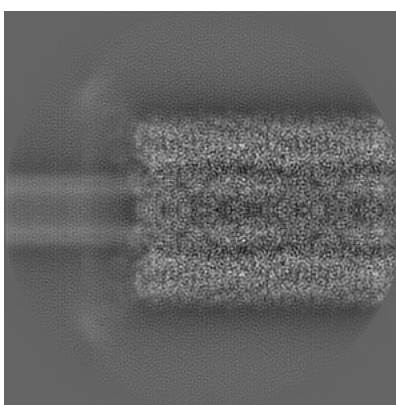
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

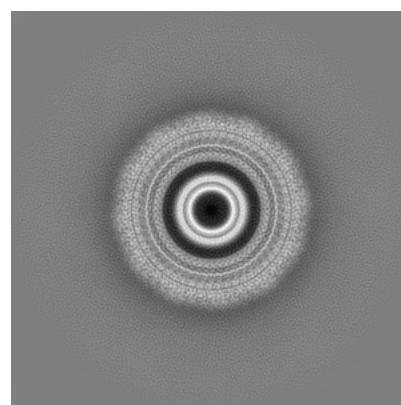
6.1.1 Primary map



X



Y

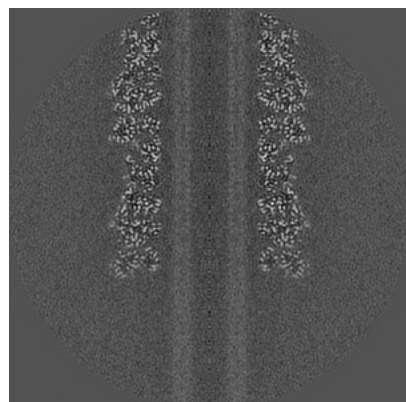


Z

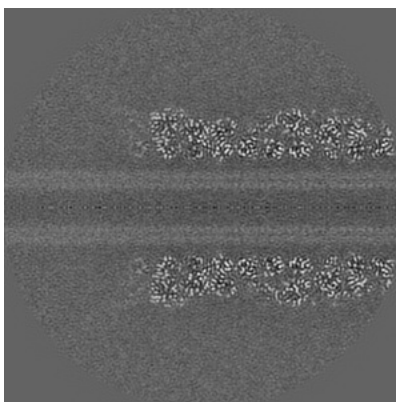
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

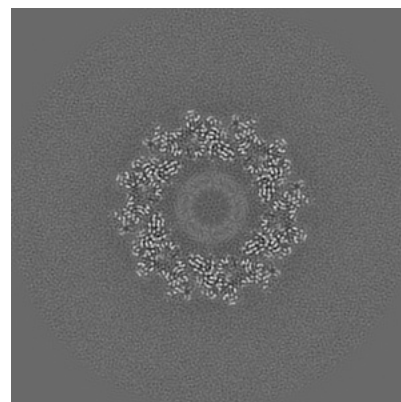
6.2.1 Primary map



X Index: 210



Y Index: 210

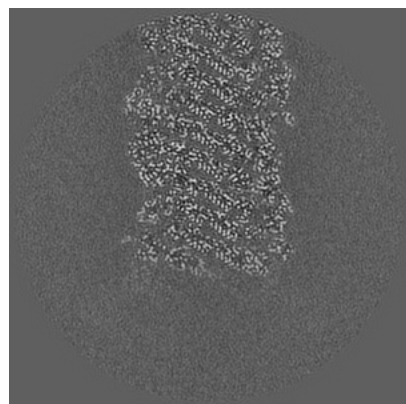


Z Index: 210

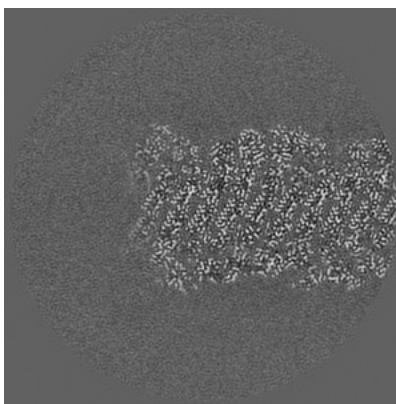
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

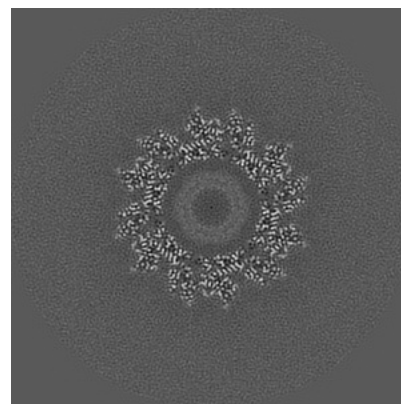
6.3.1 Primary map



X Index: 155



Y Index: 153

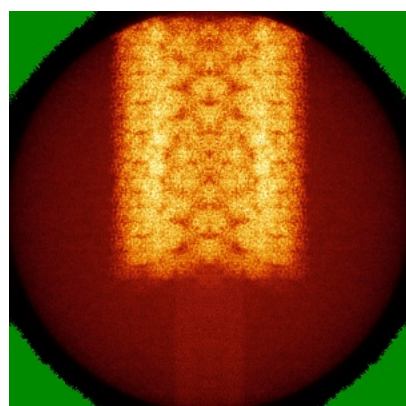


Z Index: 220

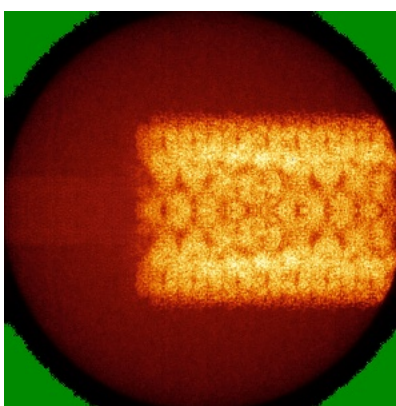
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

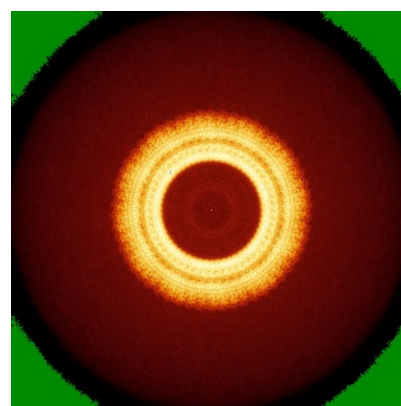
6.4.1 Primary map



X



Y

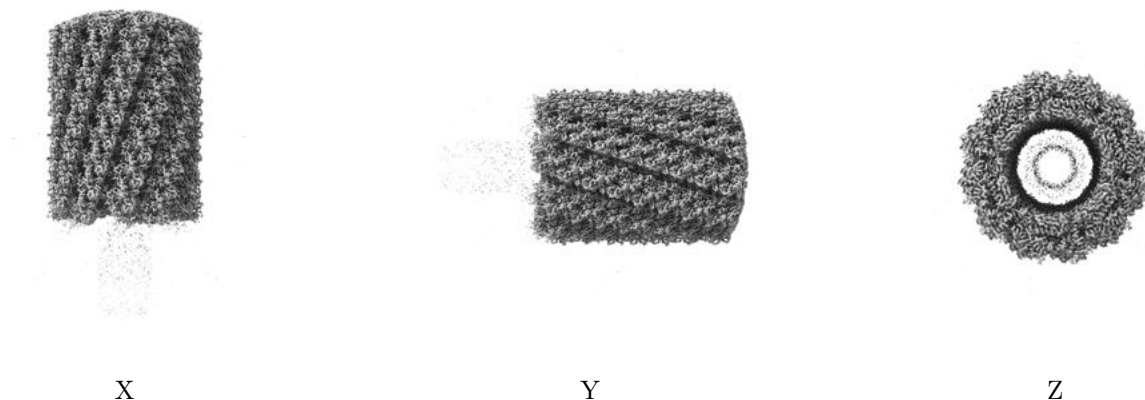


Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.03. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

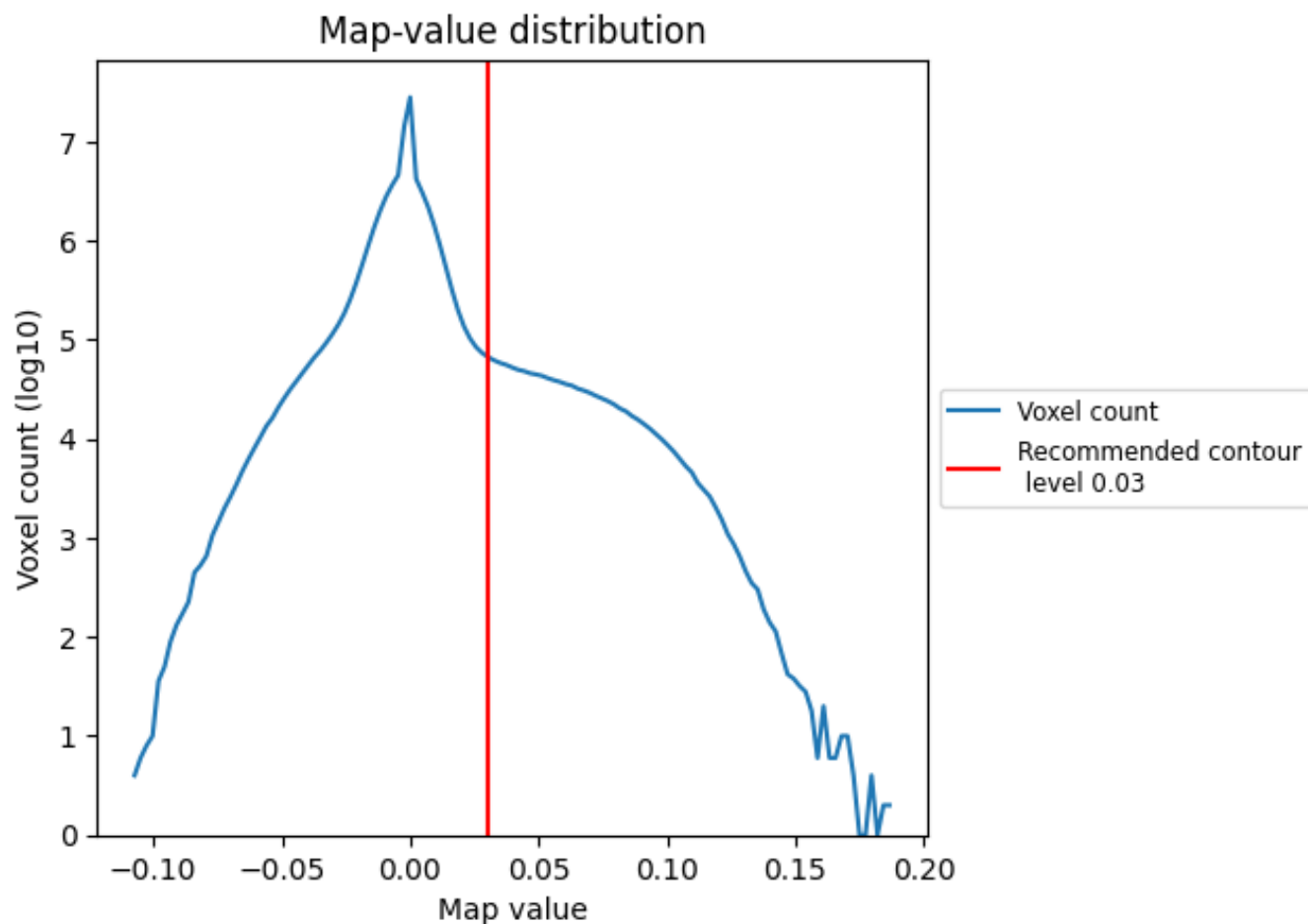
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

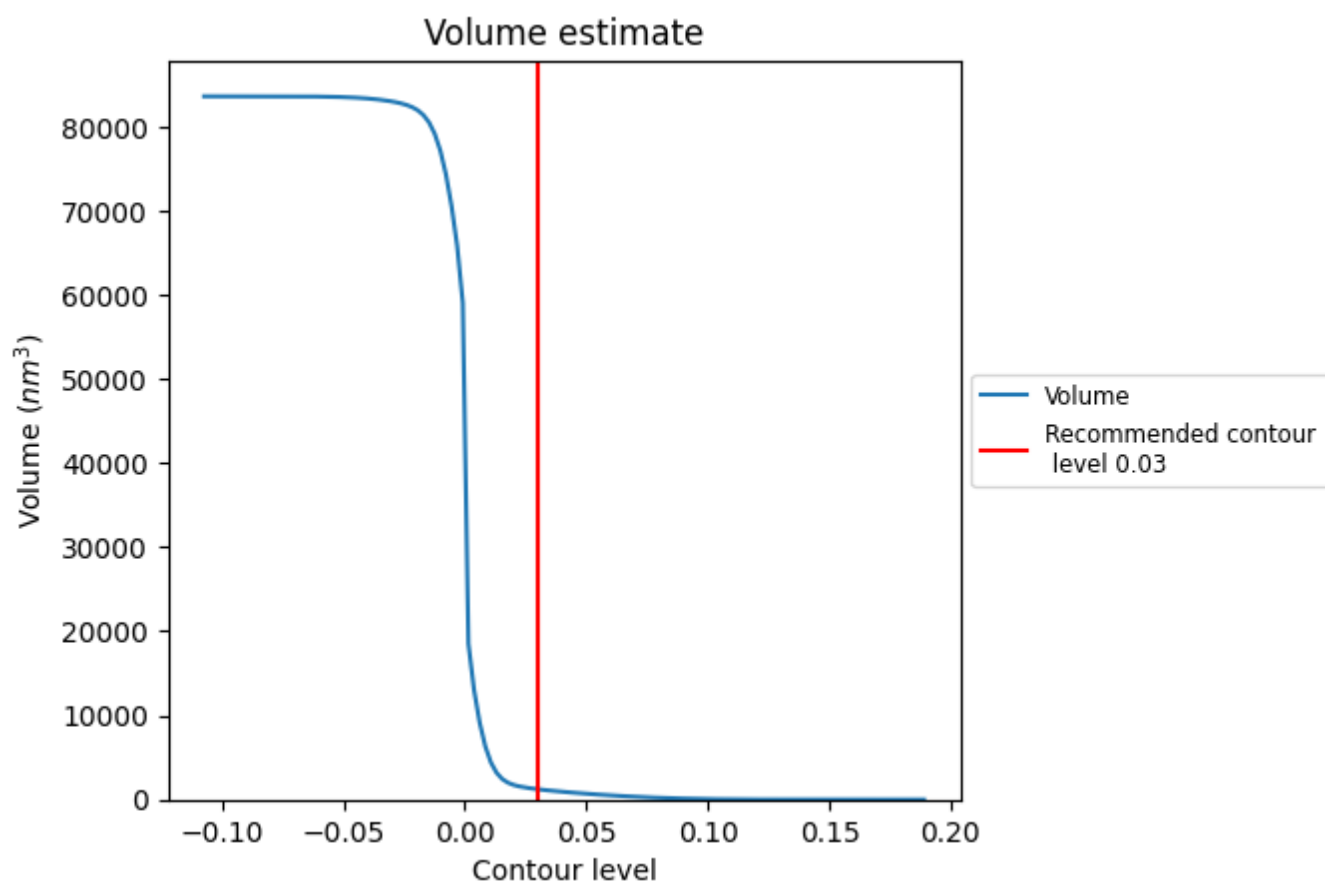
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

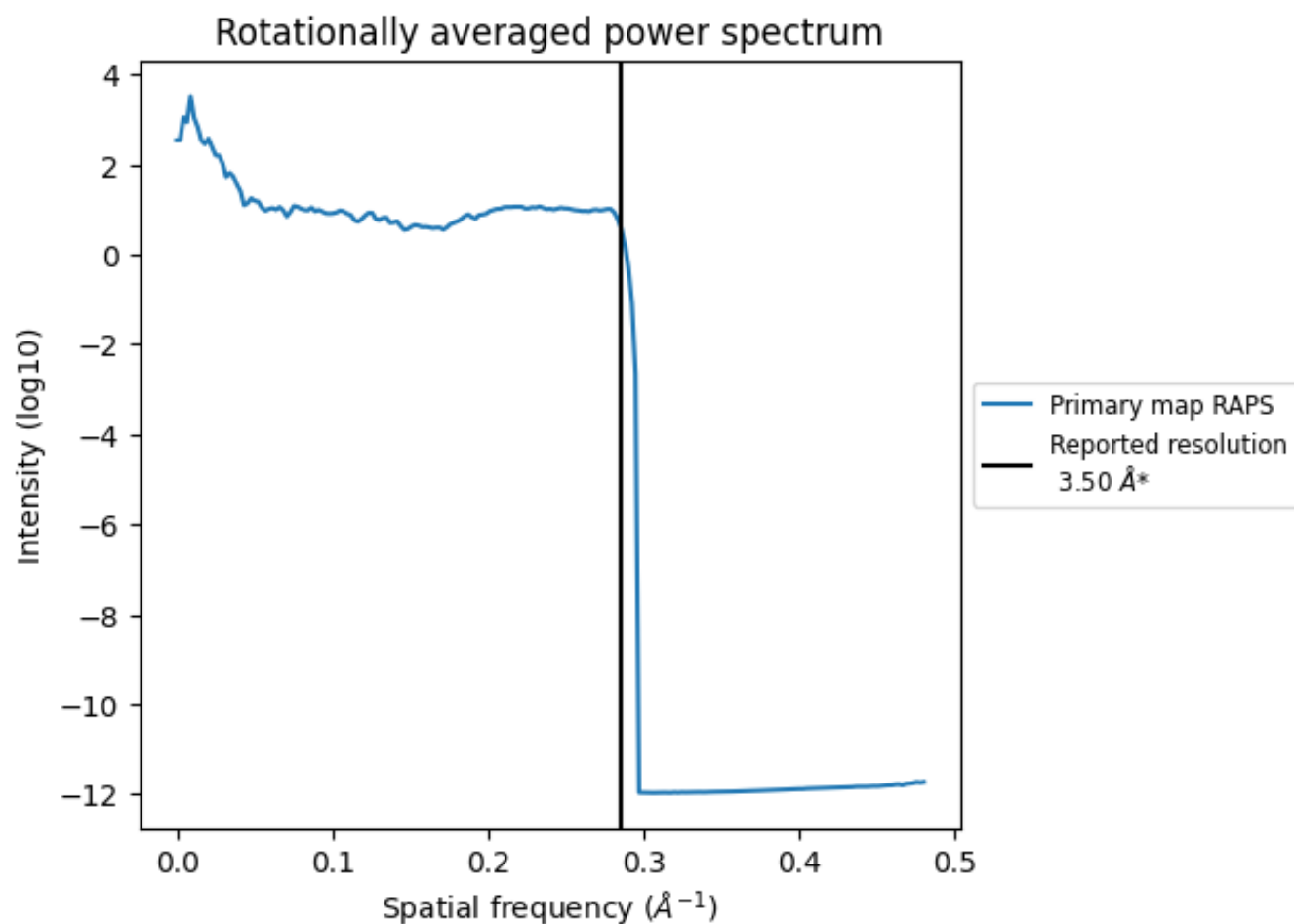
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1227 nm³; this corresponds to an approximate mass of 1108 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 ⓘ

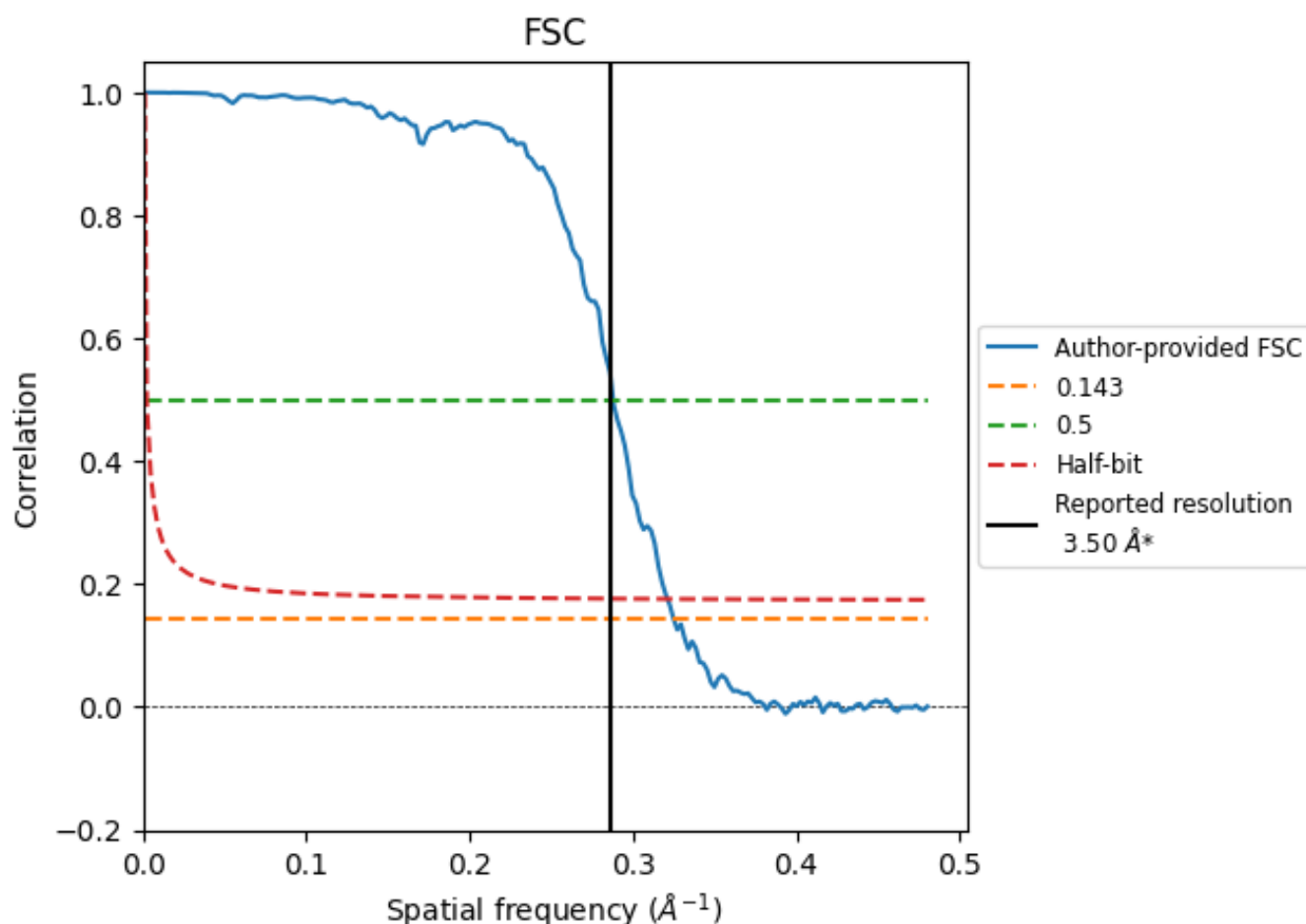


*Reported resolution corresponds to spatial frequency of 0.286 $\text{\AA}^{-1}$

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.286 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

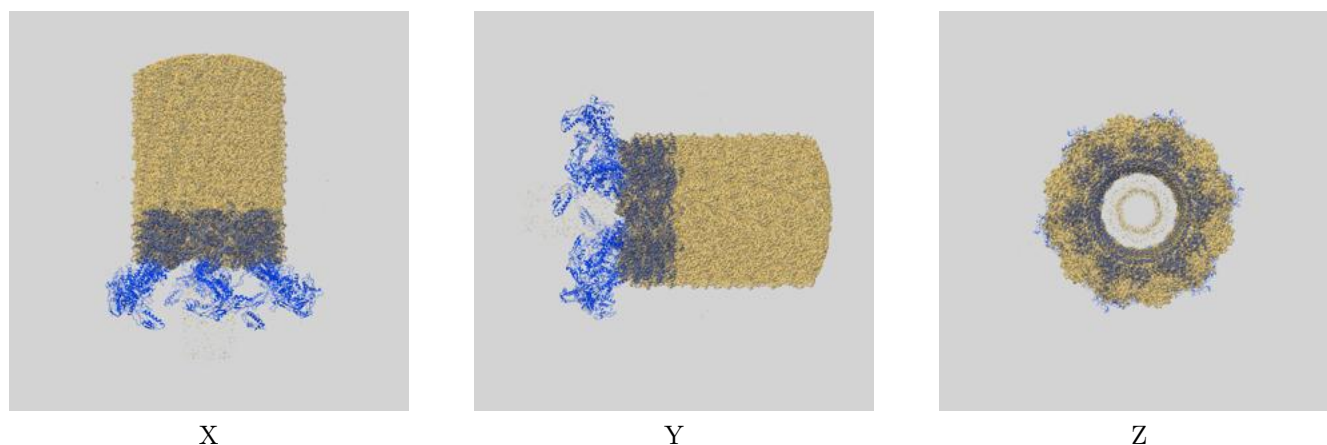
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.50	-	-
Author-provided FSC curve	3.08	3.47	3.11
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from author-provided FSC intersecting FSC 0.143 CUT-OFF 3.08 differs from the reported value 3.5 by more than 10 %

9 Map-model fit [i](#)

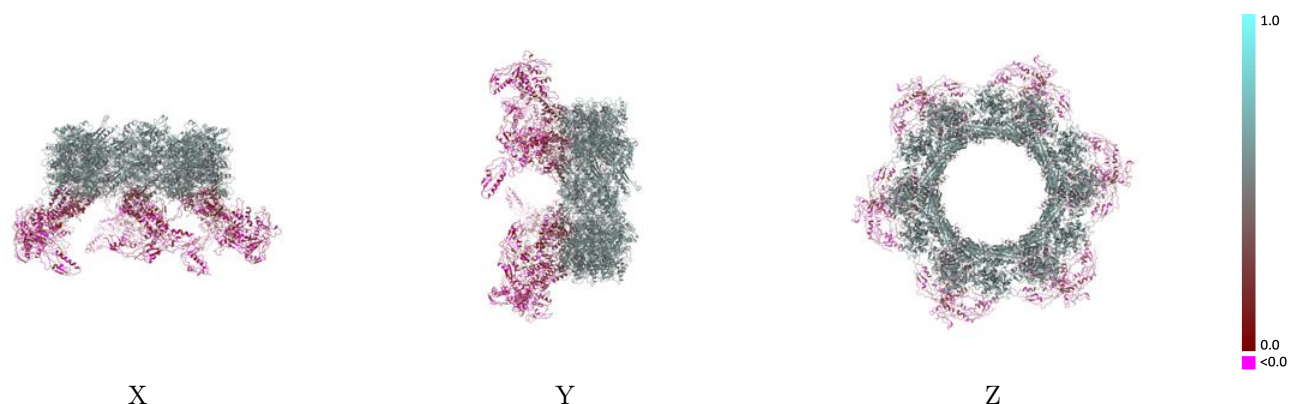
This section contains information regarding the fit between EMDB map EMD-20648 and PDB model 6U5K. Per-residue inclusion information can be found in section [3](#) on page [9](#).

9.1 Map-model overlay [i](#)



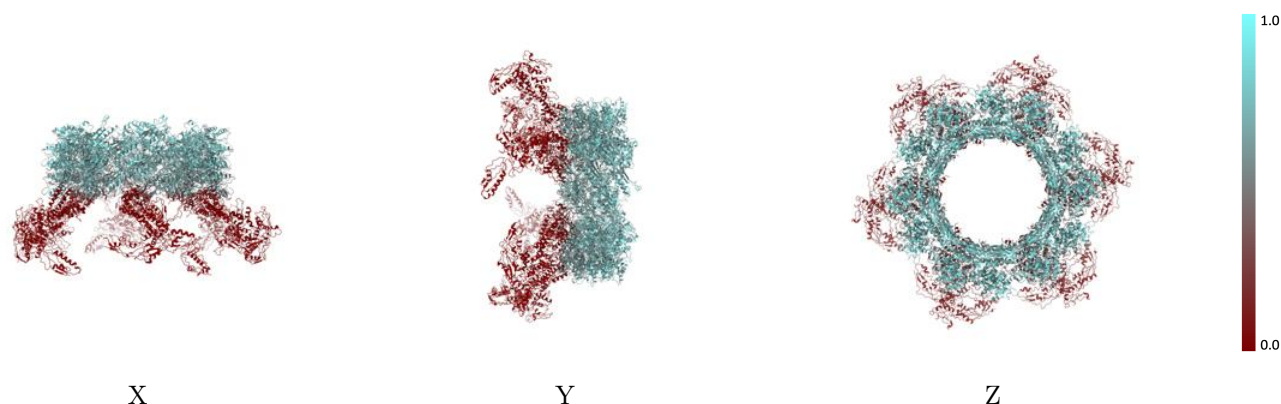
The images above show the 3D surface view of the map at the recommended contour level 0.03 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



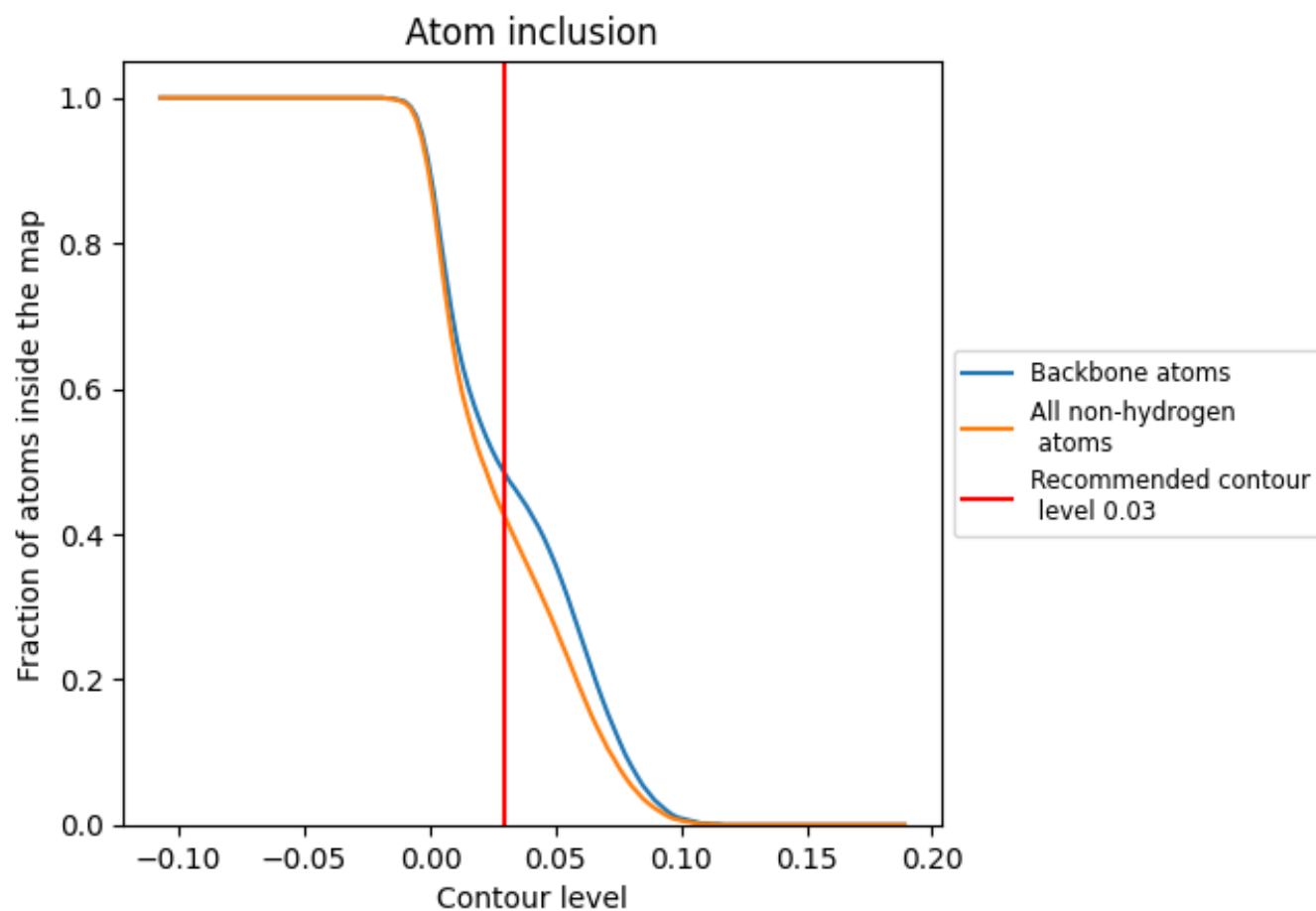
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

9.3 Atom inclusion mapped to coordinate model [i](#)



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 (0.03).

9.4 Atom inclusion [i](#)



At the recommended contour level, 48% of all backbone atoms, 42% 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 (0.03) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.4220	 0.3840
0	 0.0030	 0.1260
1	 0.0030	 0.1250
2	 0.0010	 0.1090
3	 0.0030	 0.1230
4	 0.0030	 0.1240
5	 0.0030	 0.1240
A	 0.2160	 0.3380
B	 0.2540	 0.3680
C	 0.2240	 0.3450
D	 0.2530	 0.3710
E	 0.2560	 0.3690
F	 0.2530	 0.3680
G	 0.0000	 0.1870
H	 0.0000	 0.1830
I	 0.0000	 0.1970
J	 0.0000	 0.1910
K	 0.0000	 0.1910
L	 0.0000	 0.1910
M	 0.0010	 0.1080
N	 0.0010	 0.1080
O	 0.0010	 0.1030
P	 0.0010	 0.1090
Q	 0.0010	 0.1110
R	 0.0010	 0.1070
S	 0.0010	 0.1150
T	 0.0020	 0.1180
U	 0.0010	 0.0910
V	 0.0010	 0.1150
W	 0.0020	 0.1170
X	 0.0020	 0.1170
a	 0.5640	 0.5040
b	 0.5610	 0.5030
c	 0.5600	 0.4900
d	 0.5620	 0.5020



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Chain	Atom inclusion	Q-score
e	 0.5640	 0.5030
f	 0.5650	 0.5050
g	 0.6590	 0.5290
h	 0.6560	 0.5280
i	 0.6650	 0.5260
j	 0.6620	 0.5260
k	 0.6570	 0.5290
l	 0.6640	 0.5290
m	 0.6910	 0.5360
n	 0.6890	 0.5350
o	 0.6910	 0.5350
p	 0.6890	 0.5370
q	 0.6890	 0.5380
r	 0.6880	 0.5360
s	 0.6970	 0.5390
t	 0.6950	 0.5380
u	 0.6960	 0.5370
v	 0.6980	 0.5390
w	 0.6960	 0.5410
x	 0.6990	 0.5390