



# wwPDB EM Validation Summary Report ⓘ

Aug 27, 2024 – 01:56 AM JST

PDB ID : 8WLN  
EMDB ID : EMD-37625  
Title : Cryo-EM structure of the MS ring with export apparatus and proximal rod within the motor-hook complex in the CCW state  
Authors : Tan, J.X.; Zhang, L.; Zhou, Y.; Zhu, Y.Q.  
Deposited on : 2023-09-30  
Resolution : 4.30 Å (reported)  
Based on initial models : ., ?

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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

EMDB validation analysis : 0.0.1.dev112  
MolProbity : 4.02b-467  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.38.2

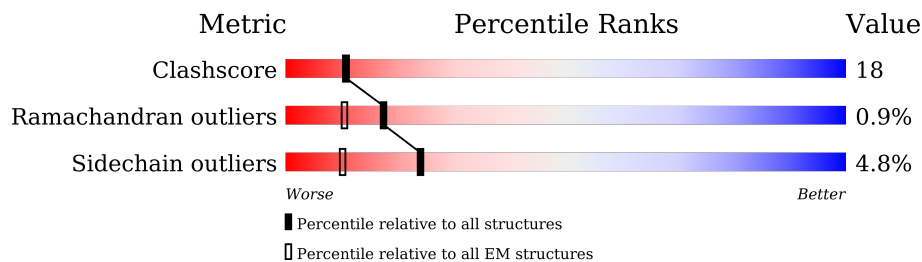
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 4.30 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)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	0	560	23% 6% 71%
1	1	560	22% 7% 71%
1	2	560	22% 7% 71%
1	3	560	23% 6% 71%
1	4	560	23% 6% 71%
1	5	560	23% 6% 71%
1	6	560	22% 7% 71%
1	7	560	22% 7% 71%

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Mol	Chain	Length	Quality of chain
1	8	560	23% 6% 71%
1	9	560	23% 6% 71%
1	AA	560	23% 6% 71%
1	AB	560	22% 6% 71%
1	AC	560	23% 6% 71%
1	AD	560	23% 6% 71%
1	AE	560	22% 7% 71%
1	AF	560	23% 6% 71%
1	AG	560	23% 6% 71%
1	AH	560	22% 7% 71%
1	AI	560	22% 6% 71%
1	AJ	560	23% 6% 71%
1	AK	560	23% 6% 71%
1	AL	560	23% 6% 71%
1	AM	560	23% 6% 71%
1	AN	560	23% 6% 71%
1	AO	560	23% 6% 71%
1	AP	560	22% 7% 71%
1	AQ	560	23% 6% 71%
1	UI	560	13% 17% 9% 72%
1	UJ	560	12% 17% 9% 72%
1	UK	560	16% 17% 9% 72%
1	UL	560	15% 17% 9% 72%
1	UM	560	20% 18% 8% 72%
1	UN	560	14% 17% 9% 72%

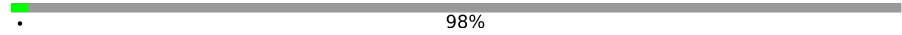
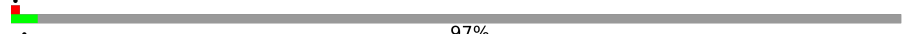

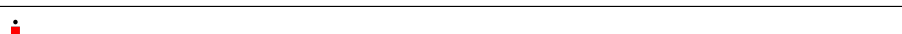
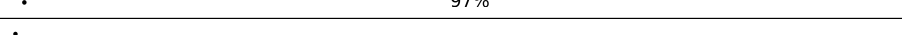
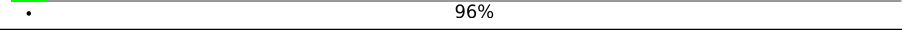
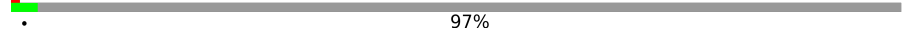
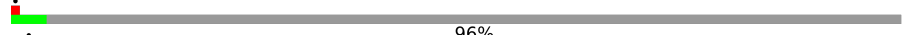

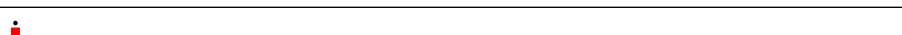
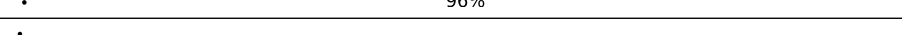
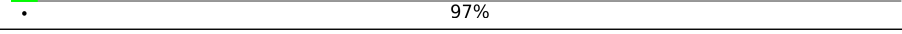
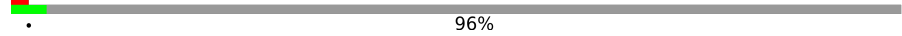


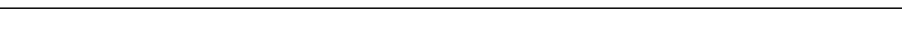






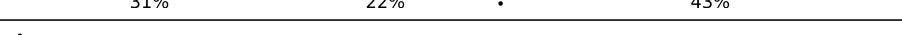


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Mol	Chain	Length	Quality of chain
1	UO	560	13% 18% 8% 72%
1	UP	560	12% 18% 8% 72%
1	WA	560	11% 8% 80%
1	WB	560	11% 8% 80%
1	WC	560	10% 8% 81%
1	WD	560	10% 8% 80%
1	WE	560	12% 7% 80%
1	WF	560	11% 8% 80%
1	WG	560	11% 9% 80%
1	WH	560	10% 6% 83%
1	WI	560	8% 8% 83%
1	WJ	560	10% 7% 82%
1	WK	560	9% 8% 82%
1	WL	560	9% 6% 85%
1	WM	560	9% 6% 85%
1	WN	560	9% 6% 85%
1	WO	560	11% 6% 83%
1	WP	560	10% 7% 82%
1	WQ	560	10% 9% 80%
1	WR	560	10% 8% 80%
1	WS	560	10% 9% 80%
1	WT	560	10% 8% 80%
1	WU	560	11% 8% 80%
1	WV	560	10% 8% 80%
1	WW	560	9% 9% 80%




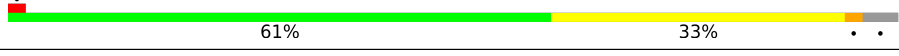





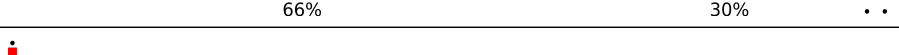
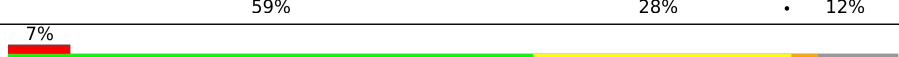
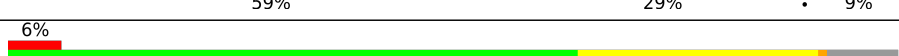

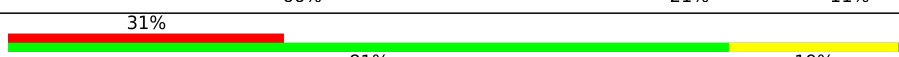
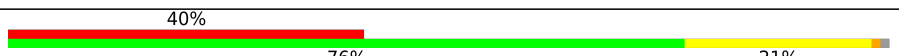



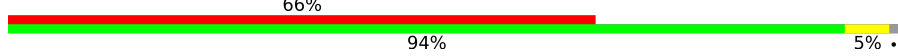

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Mol	Chain	Length	Quality of chain
1	b	560	 98%
1	c	560	 97%
1	d	560	 96%
1	e	560	 97%
1	f	560	 96%
1	g	560	 97%
1	h	560	 96%
1	i	560	 97%
1	j	560	 96%
1	k	560	 97%
1	l	560	 96%
1	t	560	 28% 71%
1	u	560	 28% 71%
1	v	560	 28% 71%
1	w	560	 28% 71%
1	x	560	 28% 71%
1	y	560	 28% 71%
1	z	560	 28% 71%
2	K	104	 31% 22% 43%
2	L	104	 68% 17% 12%
2	M	104	 62% 23% 11%
2	N	104	 63% 25% 11%
2	O	104	 5% 64% 23% 11%
2	P	104	 5% 62% 22% 5% 12%
3	A	89	 58% 36%

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Mol	Chain	Length	Quality of chain
3	B	89	 65% 34%
3	C	89	 63% 37%
3	D	89	 53% 47%
4	E	264	 61% 33%
5	F	245	 53% 30% 16%
5	G	245	 58% 25% 15%
5	H	245	 57% 26% 15%
5	I	245	 59% 23% 15%
5	J	245	 48% 34% 15%
6	Q	138	 66% 30%
6	R	138	 59% 28% 12%
6	S	138	 7% 59% 29% 9%
6	T	138	 6% 64% 27% 8%
6	U	138	 8% 66% 21% 11%
7	V	134	 31% 81% 19%
7	W	134	 40% 76% 21%
7	X	134	 49% 79% 19%
7	Y	134	 49% 75% 21%
7	Z	134	 59% 73% 24%
7	a	134	 66% 94% 5%

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 99060 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 Flagellar M-ring protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	0	164	1275	776	237	259	3	0	0
1	1	164	1275	776	237	259	3	0	0
1	2	164	1275	776	237	259	3	0	0
1	3	164	1275	776	237	259	3	0	0
1	4	164	1275	776	237	259	3	0	0
1	5	164	1275	776	237	259	3	0	0
1	6	164	1275	776	237	259	3	0	0
1	7	164	1275	776	237	259	3	0	0
1	8	164	1275	776	237	259	3	0	0
1	9	164	1275	776	237	259	3	0	0
1	AA	164	1275	776	237	259	3	0	0
1	AB	164	1275	776	237	259	3	0	0
1	AC	164	1275	776	237	259	3	0	0
1	AD	164	1275	776	237	259	3	0	0
1	AE	164	1275	776	237	259	3	0	0
1	AF	164	1275	776	237	259	3	0	0
1	AG	164	1275	776	237	259	3	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	AH	164	1275	776	237	259	3	0	0
1	AI	164	1275	776	237	259	3	0	0
1	AJ	164	1275	776	237	259	3	0	0
1	AK	164	1275	776	237	259	3	0	0
1	AL	164	1275	776	237	259	3	0	0
1	AM	164	1275	776	237	259	3	0	0
1	AN	164	1275	776	237	259	3	0	0
1	AO	164	1275	776	237	259	3	0	0
1	AP	164	1275	776	237	259	3	0	0
1	AQ	164	1275	776	237	259	3	0	0
1	UI	155	1172	733	211	226	2	0	0
1	UJ	155	1172	733	211	226	2	0	0
1	UK	155	1172	733	211	226	2	0	0
1	UL	155	1172	733	211	226	2	0	0
1	UM	155	1172	733	211	226	2	0	0
1	UN	155	1172	733	211	226	2	0	0
1	UO	155	1172	733	211	226	2	0	0
1	UP	155	1172	733	211	226	2	0	0
1	WA	113	849	534	148	166	1	0	0
1	WB	111	836	526	146	163	1	0	0
1	WC	108	812	510	142	159	1	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	WD	110	827	522	144	160	1	0	0
1	WE	112	843	531	147	164	1	0	0
1	WF	111	834	526	145	162	1	0	0
1	WG	112	843	531	147	164	1	0	0
1	WH	95	703	439	126	137	1	0	0
1	WI	95	703	439	126	137	1	0	0
1	WJ	99	737	462	131	143	1	0	0
1	WK	98	729	456	130	142	1	0	0
1	WL	85	622	389	110	122	1	0	0
1	WM	82	596	372	107	116	1	0	0
1	WN	84	611	380	109	121	1	0	0
1	WO	96	714	448	127	138	1	0	0
1	WP	100	741	464	132	144	1	0	0
1	WQ	111	834	526	145	162	1	0	0
1	WR	111	834	526	145	162	1	0	0
1	WS	111	834	526	145	162	1	0	0
1	WT	111	834	526	145	162	1	0	0
1	WU	112	843	531	147	164	1	0	0
1	WV	110	827	521	144	161	1	0	0
1	WW	111	834	526	145	162	1	0	0
1	t	164	1275	776	237	259	3	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
1	u	164	Total	C	N	O	S	0	0
			1275	776	237	259	3		
1	v	164	Total	C	N	O	S	0	0
			1275	776	237	259	3		
1	w	164	Total	C	N	O	S	0	0
			1275	776	237	259	3		
1	x	164	Total	C	N	O	S	0	0
			1275	776	237	259	3		
1	y	164	Total	C	N	O	S	0	0
			1275	776	237	259	3		
1	z	164	Total	C	N	O	S	0	0
			1275	776	237	259	3		
1	b	13	Total	C	N	O		0	0
			81	50	15	16			
1	c	16	Total	C	N	O		0	0
			103	64	19	20			
1	d	20	Total	C	N	O		0	0
			133	83	23	27			
1	e	16	Total	C	N	O		0	0
			103	64	19	20			
1	f	21	Total	C	N	O		0	0
			140	88	24	28			
1	g	16	Total	C	N	O		0	0
			103	64	19	20			
1	h	21	Total	C	N	O		0	0
			140	88	24	28			
1	i	16	Total	C	N	O		0	0
			103	64	19	20			
1	j	20	Total	C	N	O		0	0
			133	83	23	27			
1	k	16	Total	C	N	O		0	0
			103	64	19	20			
1	l	21	Total	C	N	O		0	0
			140	88	24	28			

- Molecule 2 is a protein called Flagellar hook-basal body complex protein FliE.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	K	59	Total	C	N	O	S	0	0
			429	265	74	83	7		
2	L	91	Total	C	N	O	S	0	0
			672	415	121	129	7		

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Mol	Chain	Residues	Atoms					AltConf	Trace
2	M	93	Total	C	N	O	S	0	0
			686	424	123	132	7		
2	N	93	Total	C	N	O	S	0	0
			686	424	123	132	7		
2	O	93	Total	C	N	O	S	0	0
			686	424	123	132	7		
2	P	92	Total	C	N	O	S	0	0
			679	420	122	130	7		

- Molecule 3 is a protein called Flagellar biosynthetic protein FliQ.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	A	89	Total	C	N	O	S	0	0
			670	449	100	114	7		
3	B	89	Total	C	N	O	S	0	0
			670	449	100	114	7		
3	C	89	Total	C	N	O	S	0	0
			670	449	100	114	7		
3	D	89	Total	C	N	O	S	0	0
			670	449	100	114	7		

- Molecule 4 is a protein called Flagellar biosynthetic protein FliR.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	E	253	Total	C	N	O	S	0	0
			1945	1305	307	318	15		

- Molecule 5 is a protein called Flagellar biosynthetic protein FliP.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	F	207	Total	C	N	O	S	0	0
			1605	1072	249	272	12		
5	G	209	Total	C	N	O	S	0	0
			1626	1086	252	276	12		
5	H	208	Total	C	N	O	S	0	0
			1614	1077	251	274	12		
5	I	208	Total	C	N	O	S	0	0
			1614	1077	251	274	12		
5	J	209	Total	C	N	O	S	0	0
			1623	1084	251	276	12		

- Molecule 6 is a protein called Flagellar basal body rod protein FlgB.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	Q	134	Total	C	N	O	S	0	0
			1030	633	189	203	5		
6	R	121	Total	C	N	O	S	0	0
			942	583	172	182	5		
6	S	125	Total	C	N	O	S	0	0
			967	598	177	187	5		
6	T	127	Total	C	N	O	S	0	0
			982	606	182	189	5		
6	U	123	Total	C	N	O	S	0	0
			950	588	172	185	5		

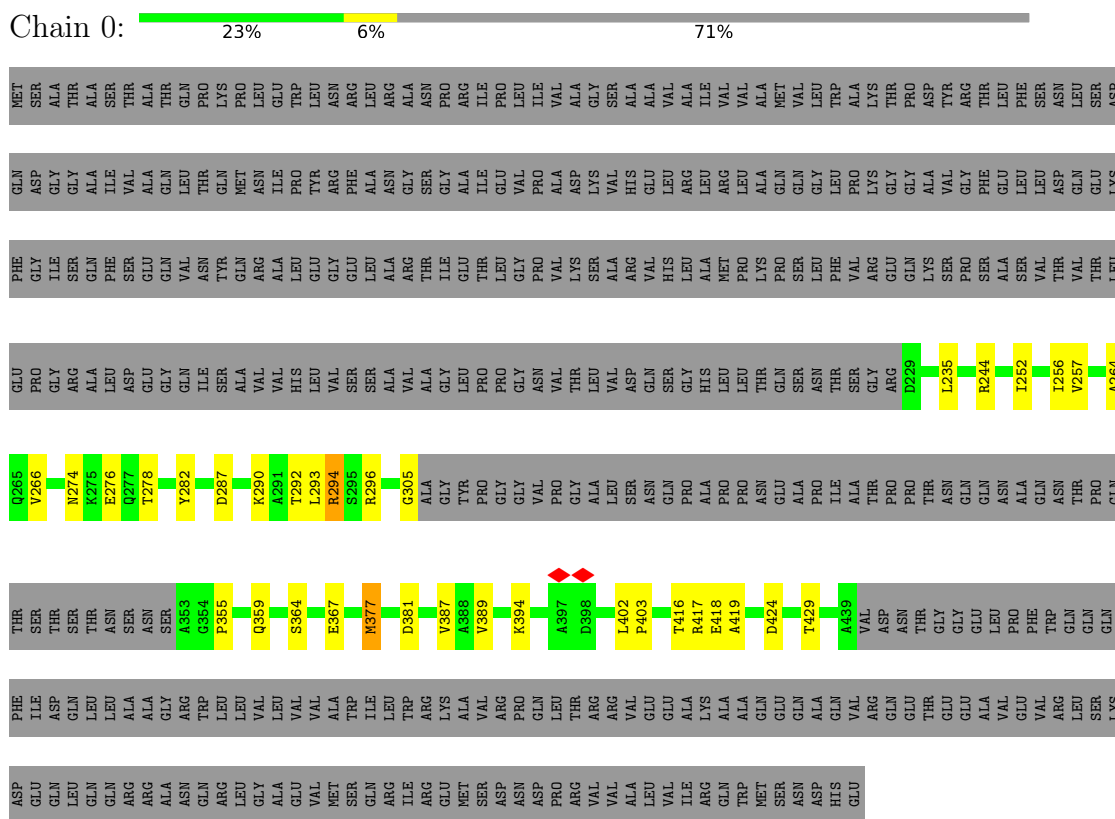
- Molecule 7 is a protein called Flagellar basal-body rod protein FlgC.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	V	133	Total	C	N	O	S	0	0
			969	604	167	193	5		
7	W	132	Total	C	N	O	S	0	0
			964	601	166	192	5		
7	X	133	Total	C	N	O	S	0	0
			969	604	167	193	5		
7	Y	133	Total	C	N	O	S	0	0
			969	604	167	193	5		
7	Z	131	Total	C	N	O	S	0	0
			956	595	165	191	5		
7	a	133	Total	C	N	O	S	0	0
			969	604	167	193	5		

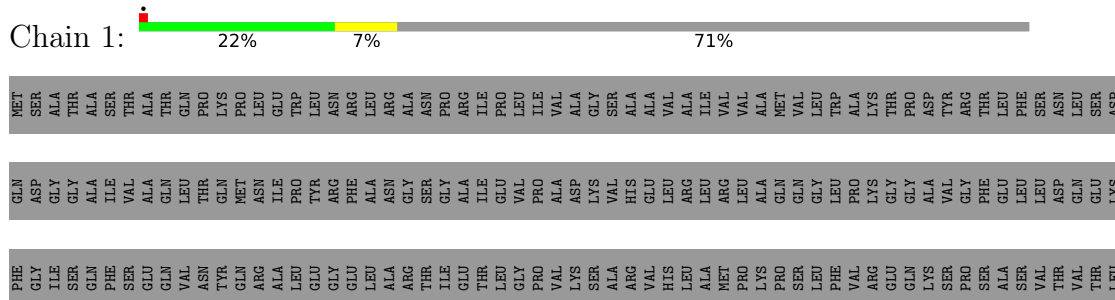
### 3 Residue-property plots [i](#)

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: Flagellar M-ring protein

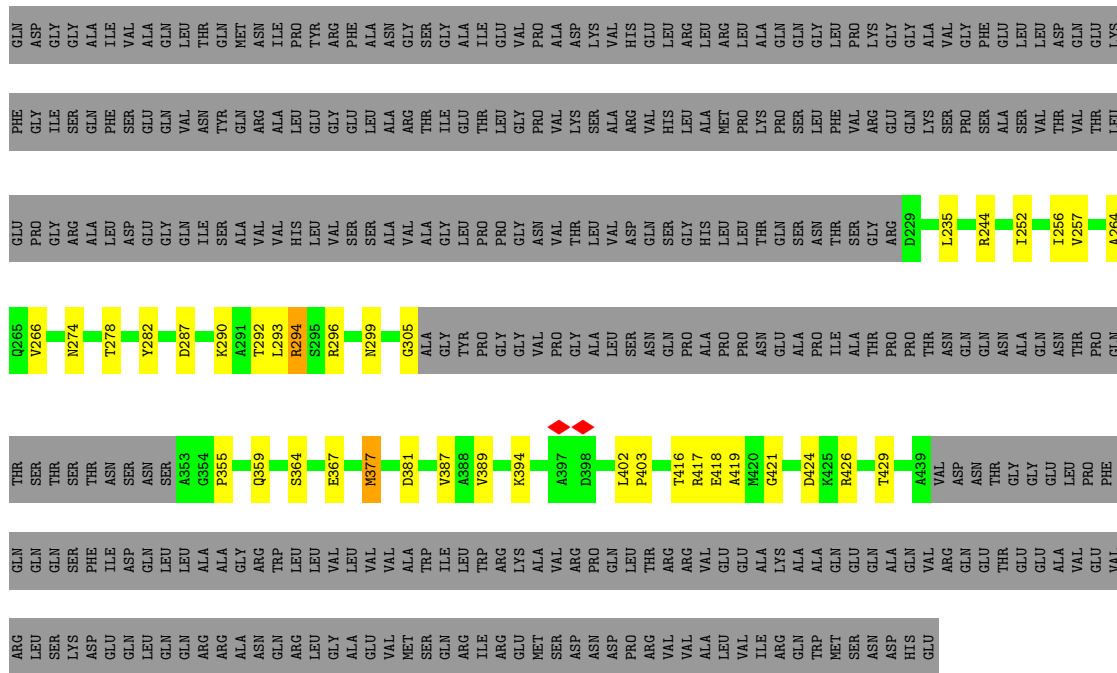


- Molecule 1: Flagellar M-ring protein

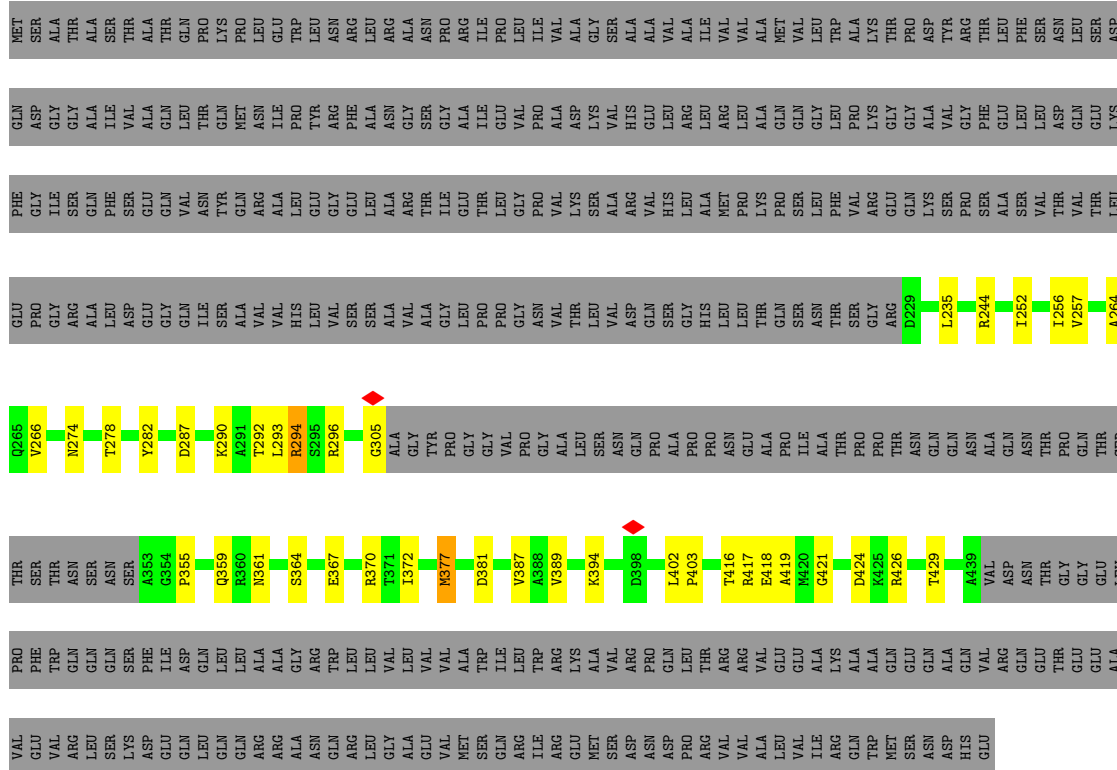








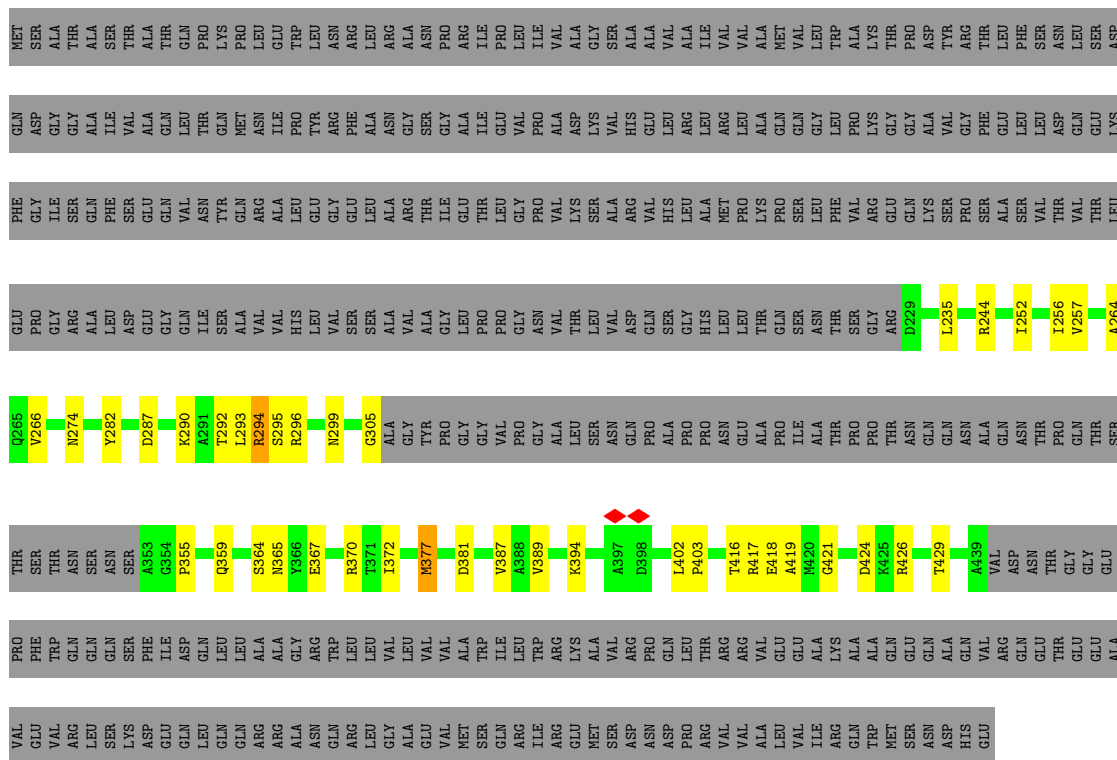
● Molecule 1: Flagellar M-ring protein



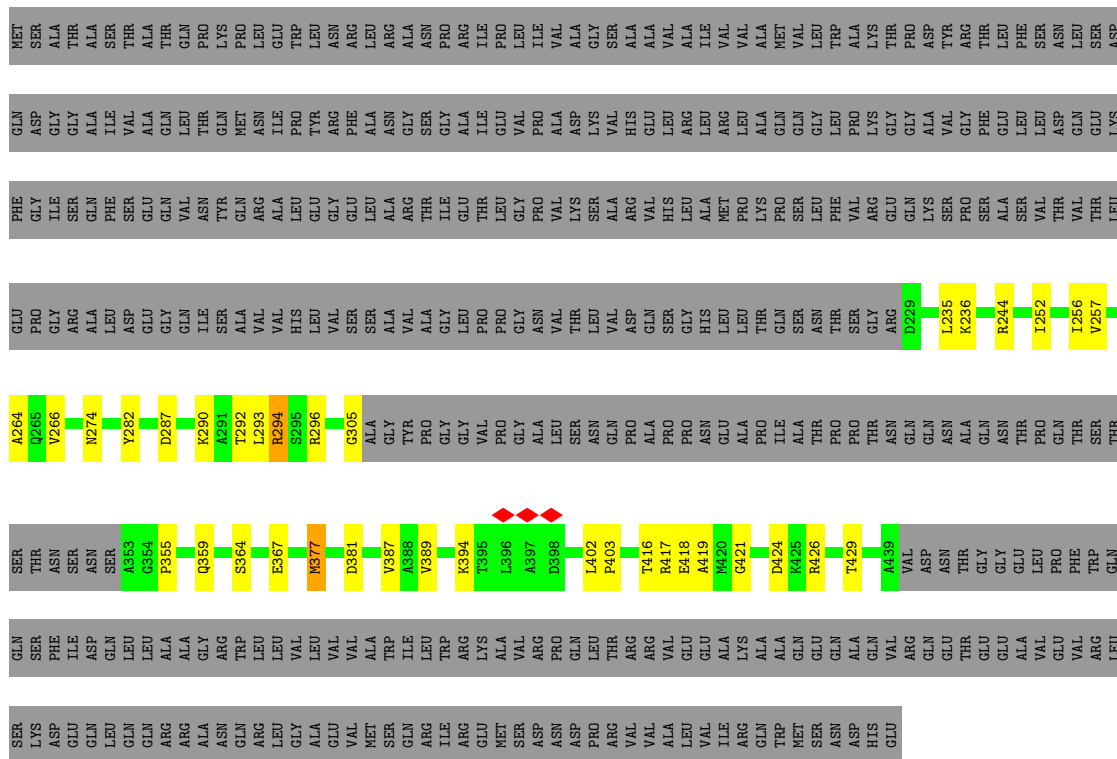
● Molecule 1: Flagellar M-ring protein







• Molecule 1: Flagellar M-ring protein



• Molecule 1: Flagellar M-ring protein







TRP GLN VAL ARG LEU LEU GLN SER ASP PHE ILE ASP TRP

VAL ARG LEU LEU GLN SER ASP PHE ILE ASP TRP

● Molecule 1: Flagellar M-ring protein



MET SER ALA THR ALA SER THR ASP THR ALA TRP

GLN ASP GLY GLY ASN ALA ILE VAL VAL MET ASN LEU

PHE GLY ILE ASN PHE SER GLU GLN VAL ASN TYR ARG ALA

GLU PRO GLY ARG ALA LEU ASP GLU GLN VAL HIS LEU VAL

G266 V266 M274 Y282 D287 K290 T292 L293 R294 S295 G305

THR ASN SER SER A353 G354 P355 Q359 S364 E367 M377 D381 V387 A388 V389 K394 A397 D398 L402 P403 T416 R417 E418 A419 M420 G421 D424 K425 R426 T429 A439

PHE ILE ASP GLN LEU LEU ALA GLY ALA TRP ILE ARG LEU VAL

ASP GLU GLN LEU GLN ARG ALA ASN TRP ARG LEU VAL MET SER

● Molecule 1: Flagellar M-ring protein



MET SER ALA THR ALA SER THR ASP THR ALA TRP

GLN ASP GLY GLY ASN ALA ILE VAL VAL MET ASN LEU

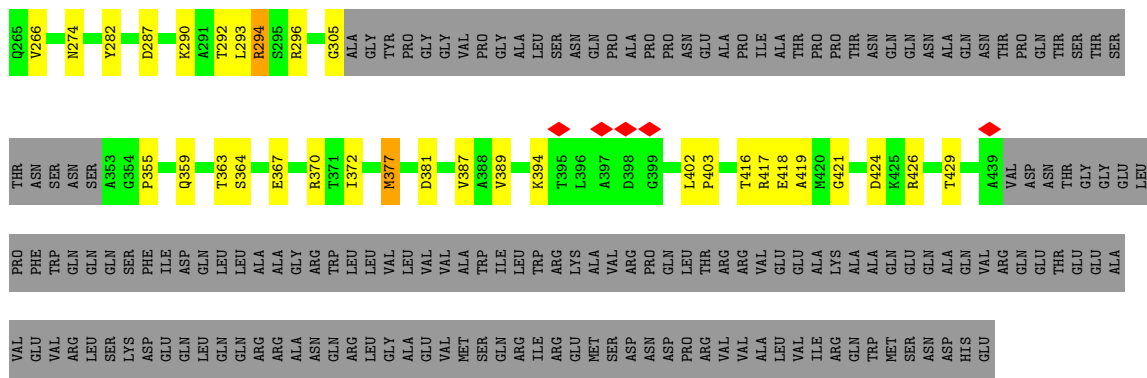
PHE GLY ILE SER GLN PHE SER GLU GLN VAL ASN TYR ARG ALA

GLU PRO GLY ARG ALA LEU ASP GLU GLN VAL HIS LEU VAL

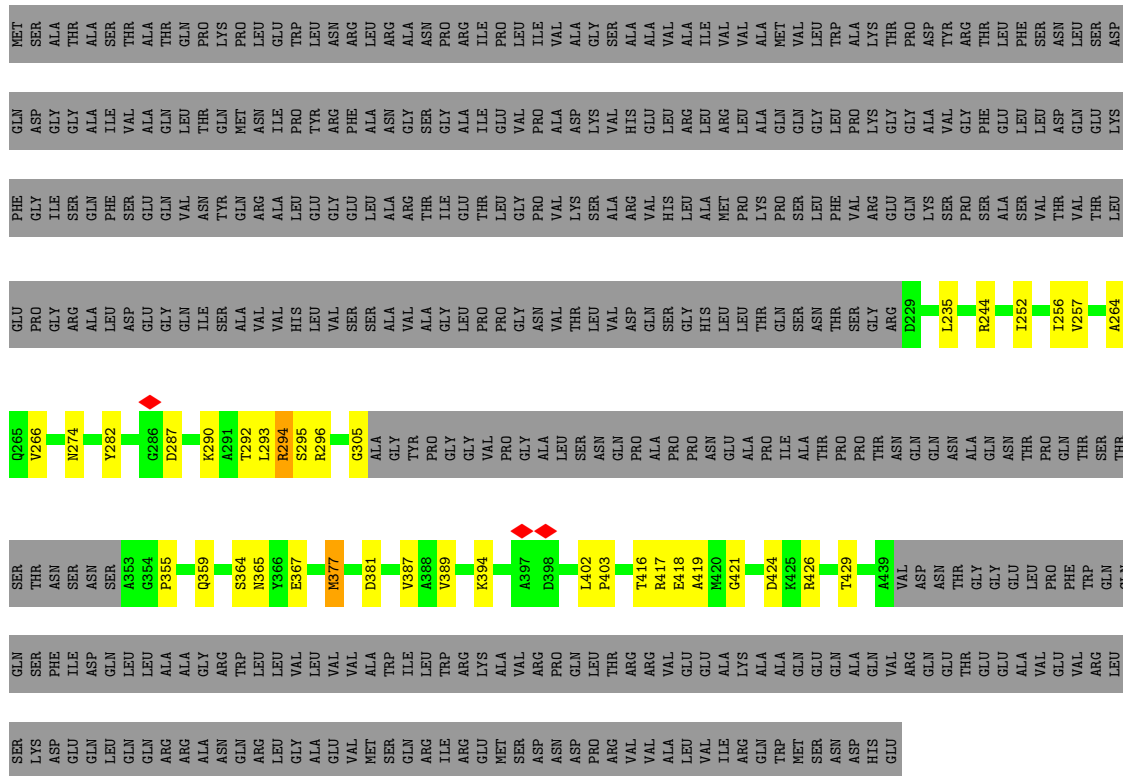
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ALA TYR PRO VAL VAL ALA THR SER PRO VAL LEU LEU VAL

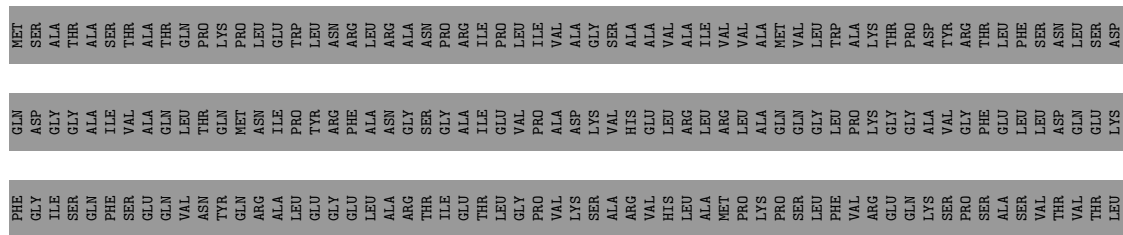


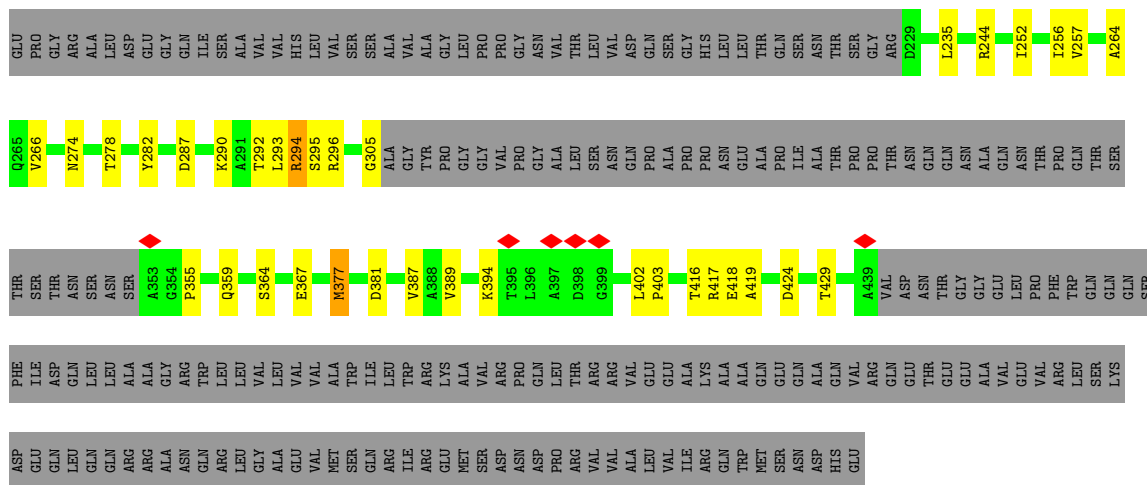


• Molecule 1: Flagellar M-ring protein

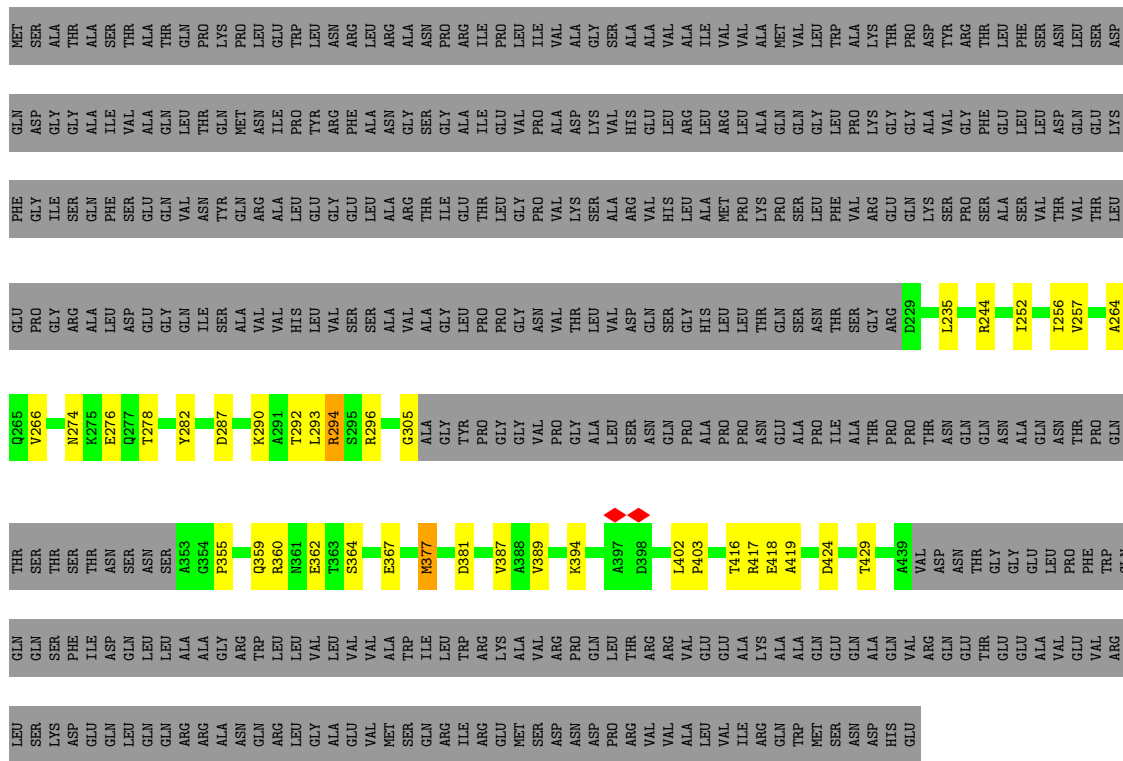


• Molecule 1: Flagellar M-ring protein

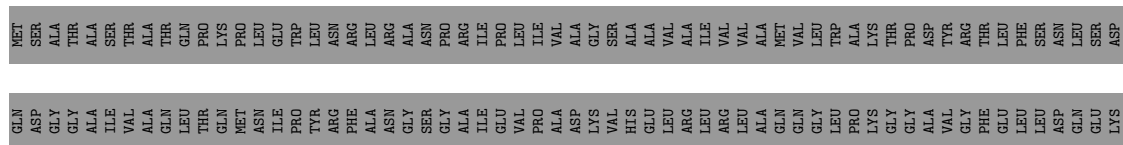




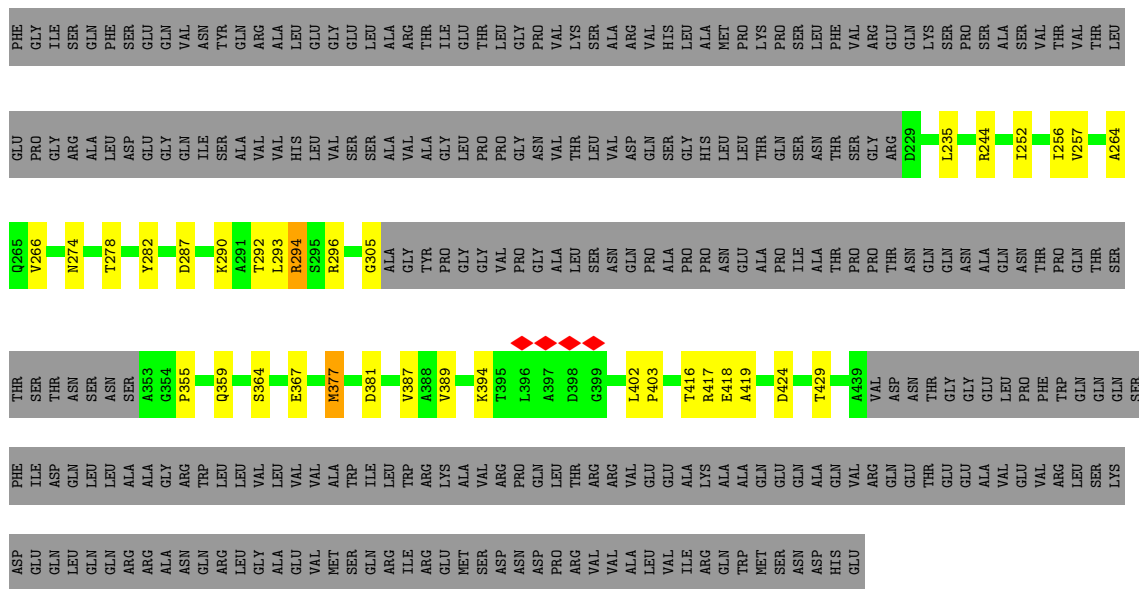
● Molecule 1: Flagellar M-ring protein



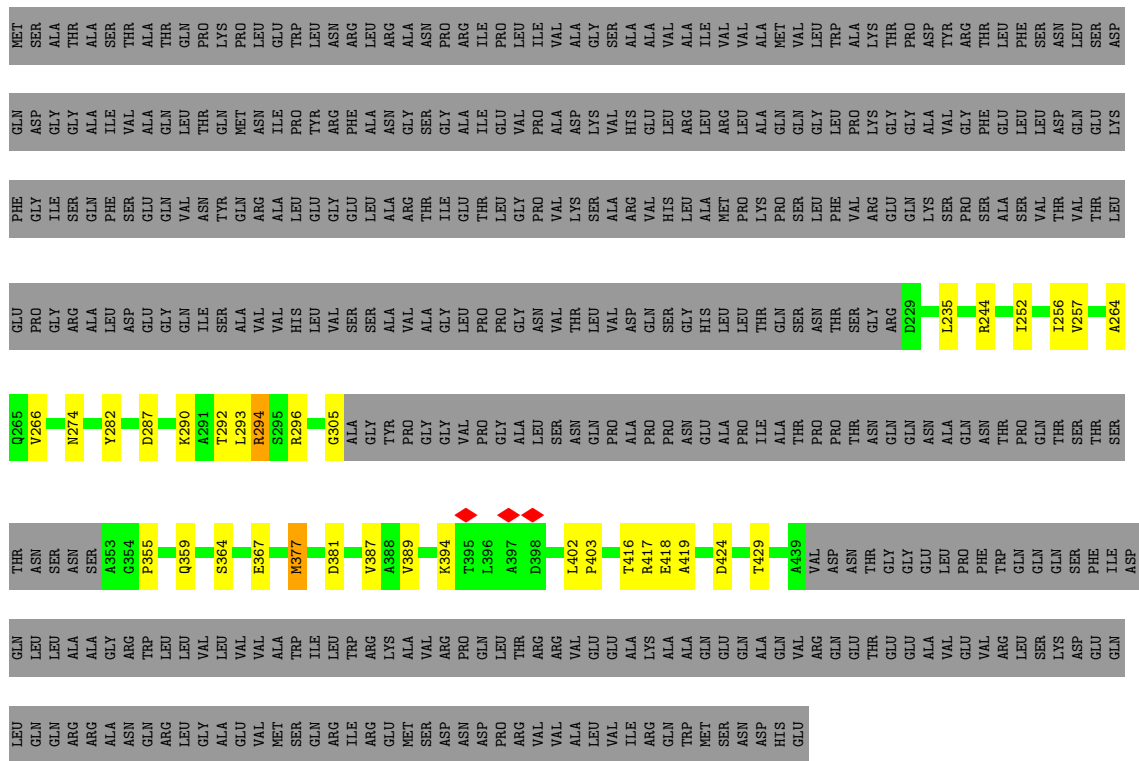
● Molecule 1: Flagellar M-ring protein



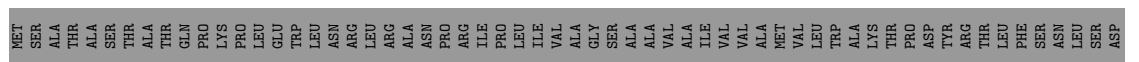


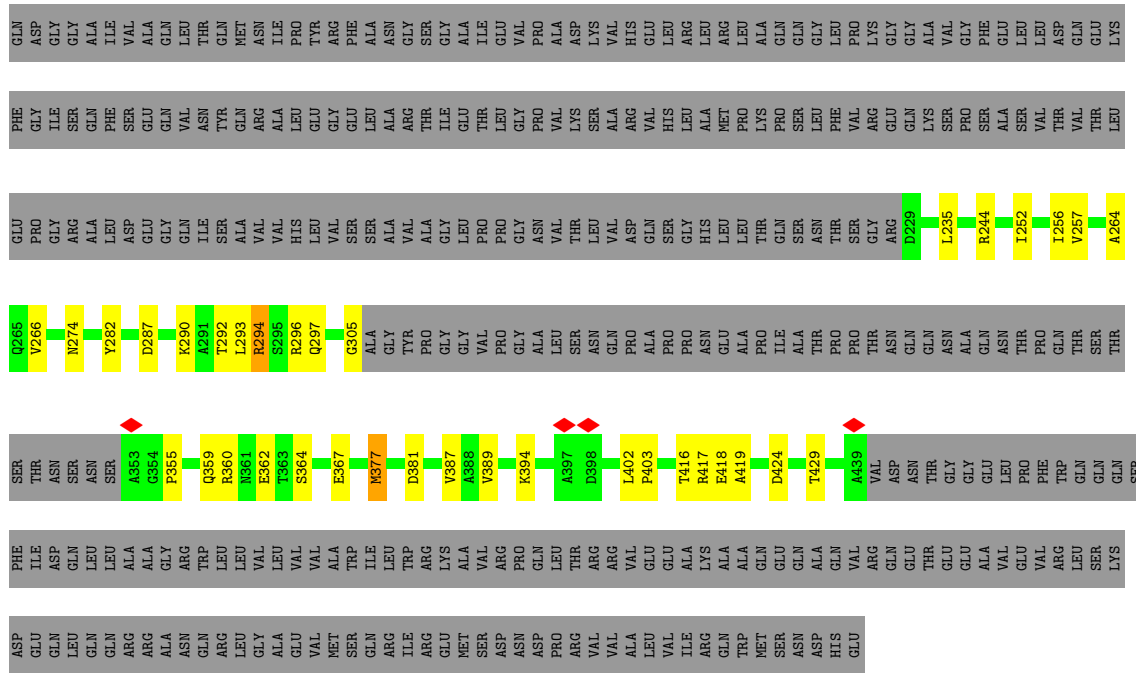


• Molecule 1: Flagellar M-ring protein

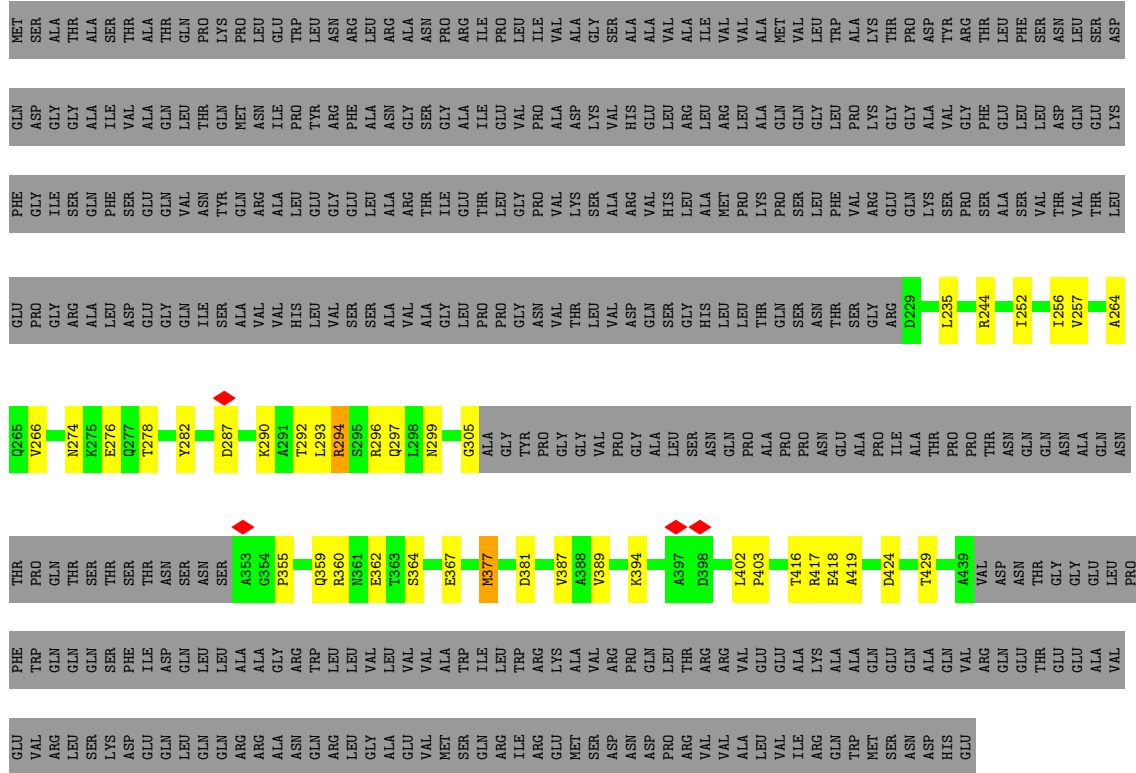


• Molecule 1: Flagellar M-ring protein



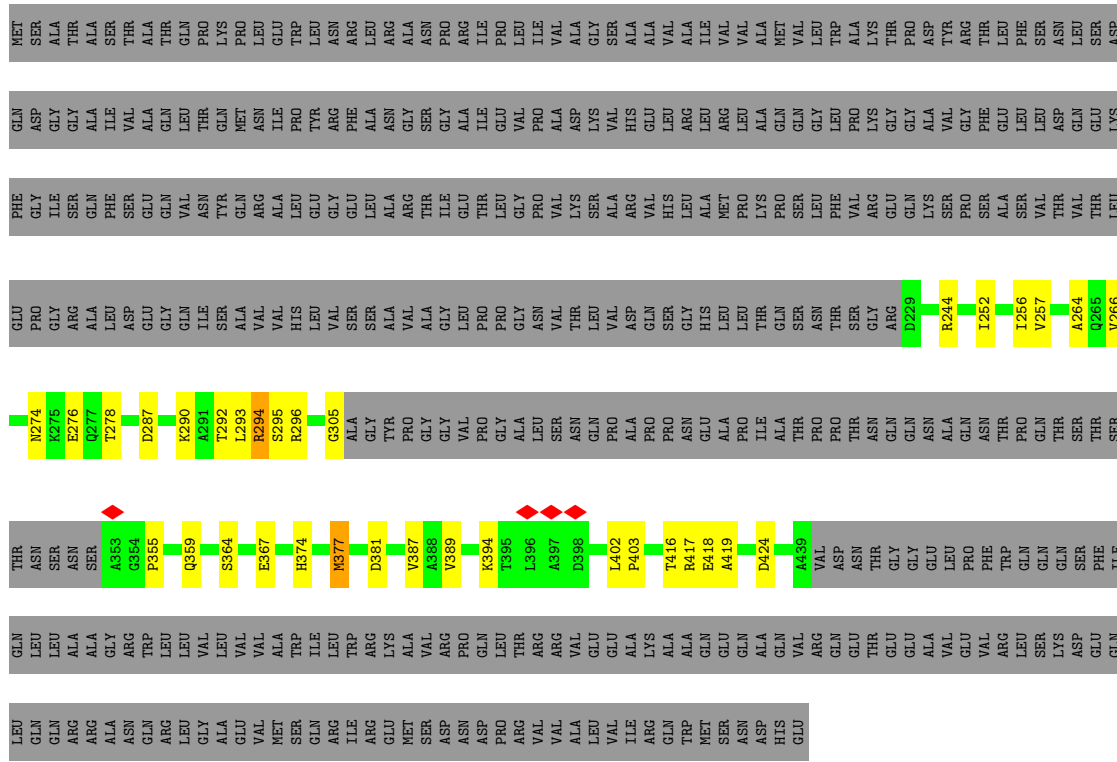


• Molecule 1: Flagellar M-ring protein

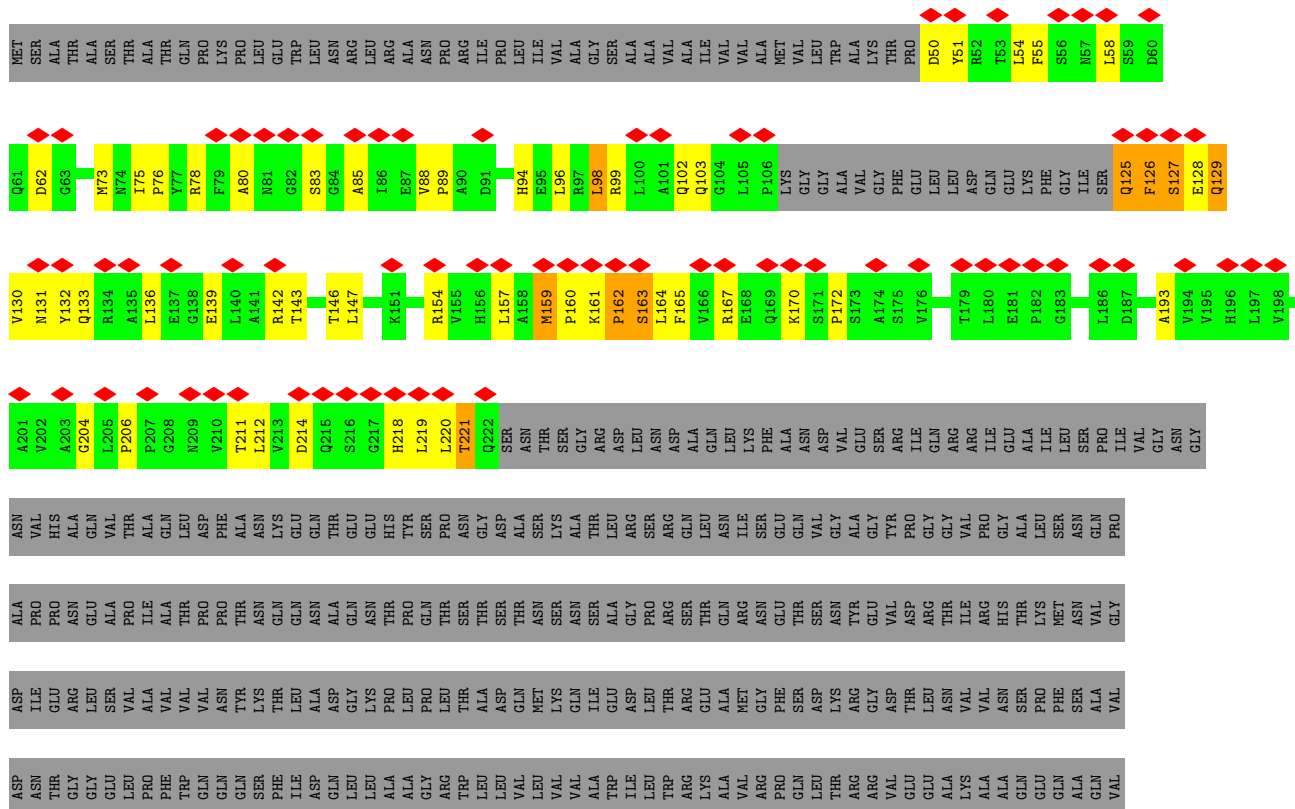


• Molecule 1: Flagellar M-ring protein

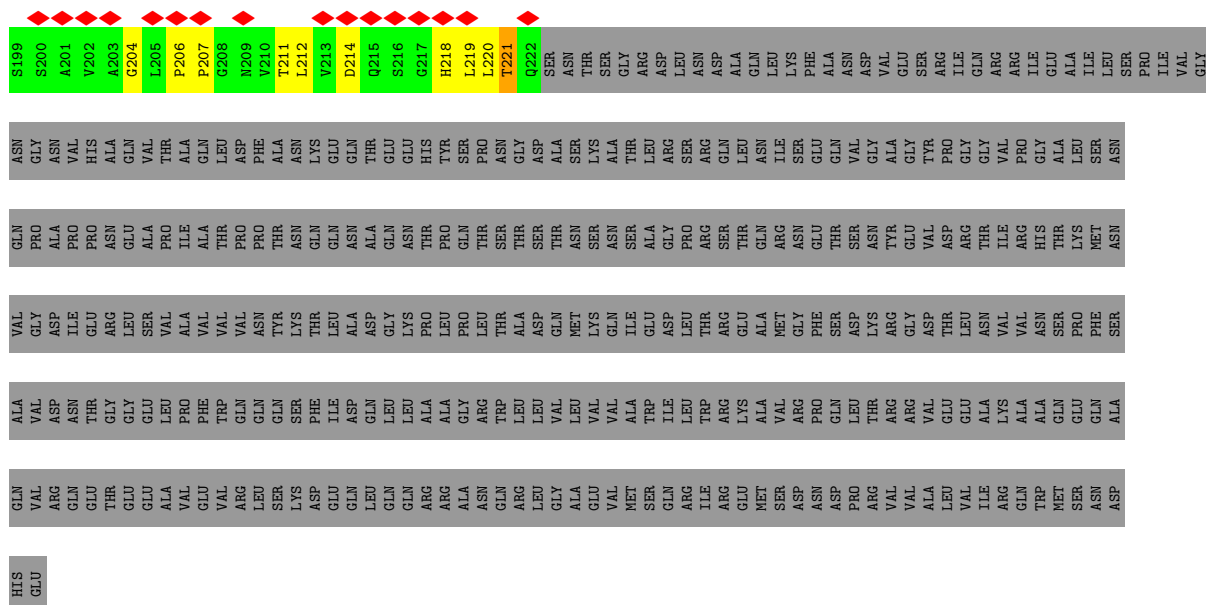




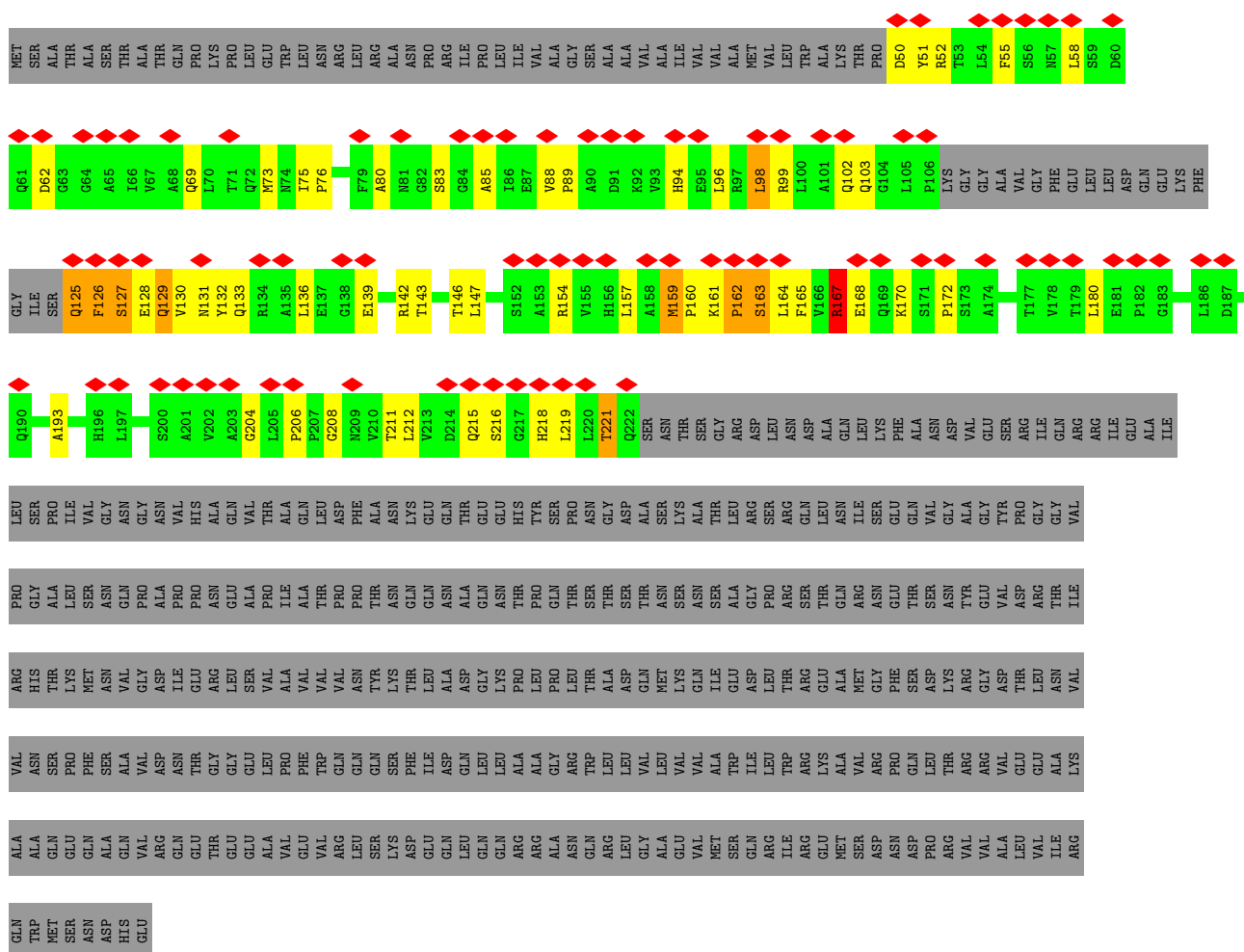
• Molecule 1: Flagellar M-ring protein





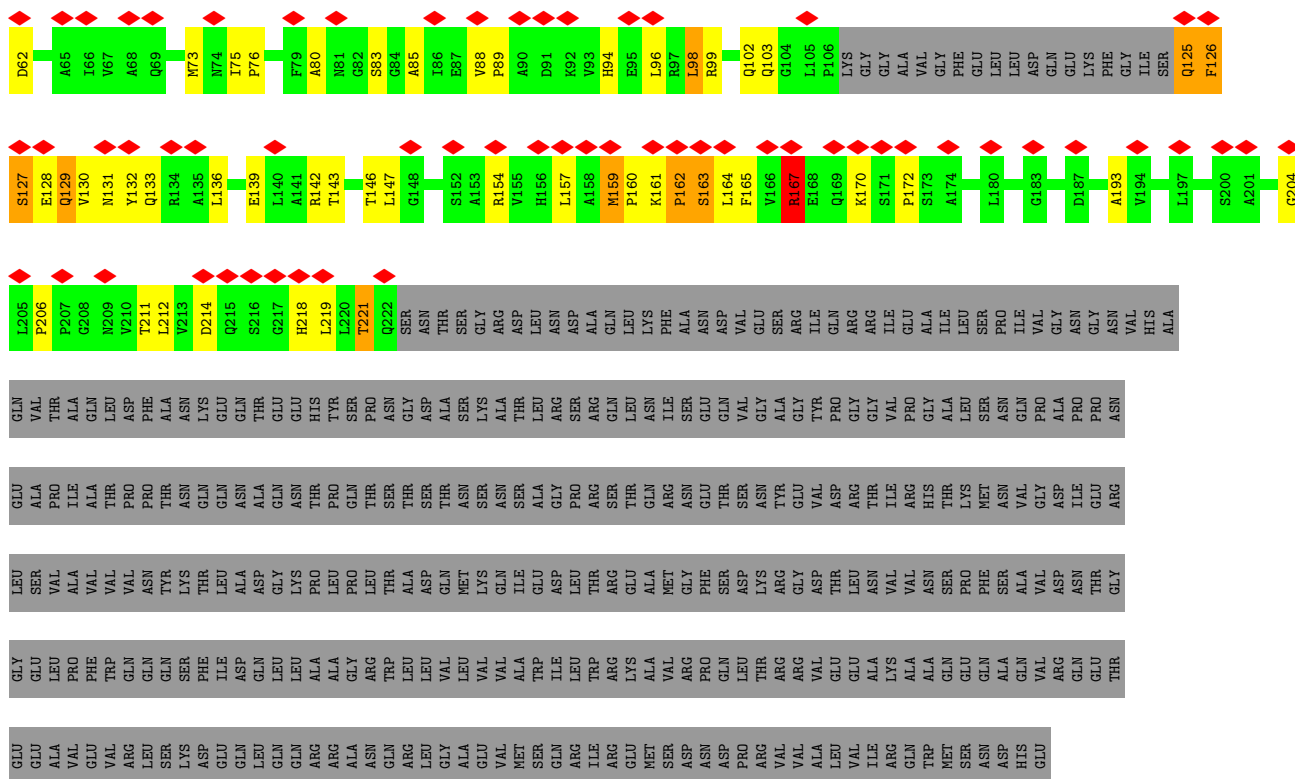


- Molecule 1: Flagellar M-ring protein

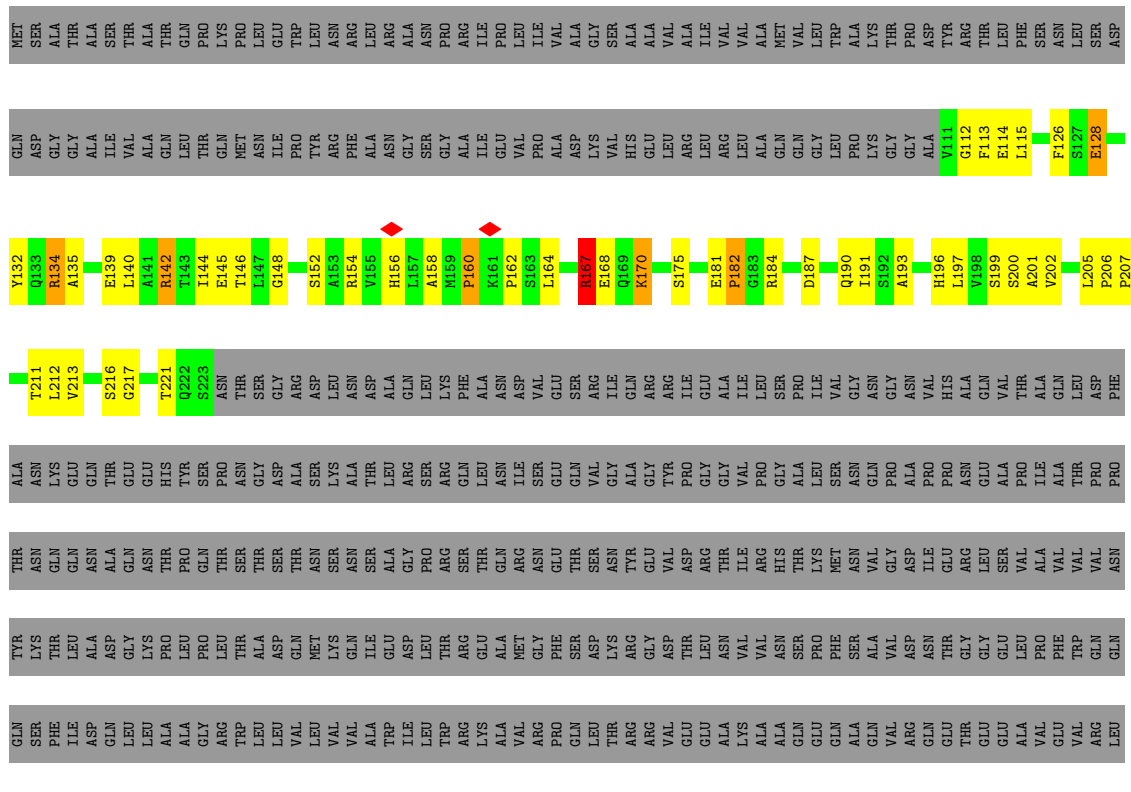








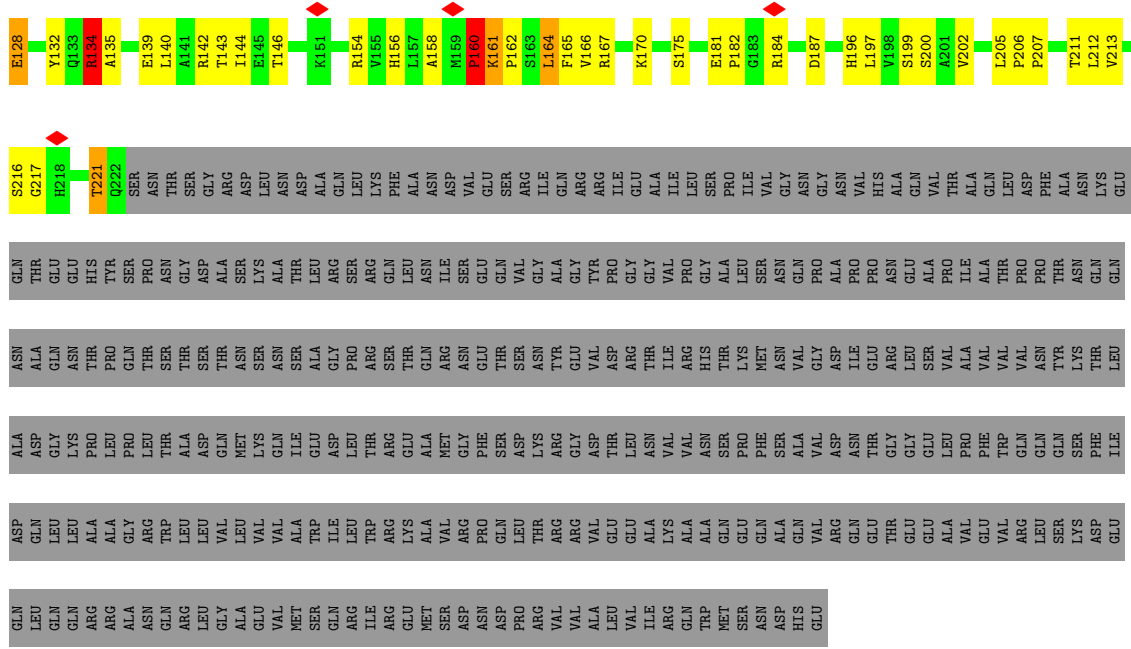
• Molecule 1: Flagellar M-ring protein



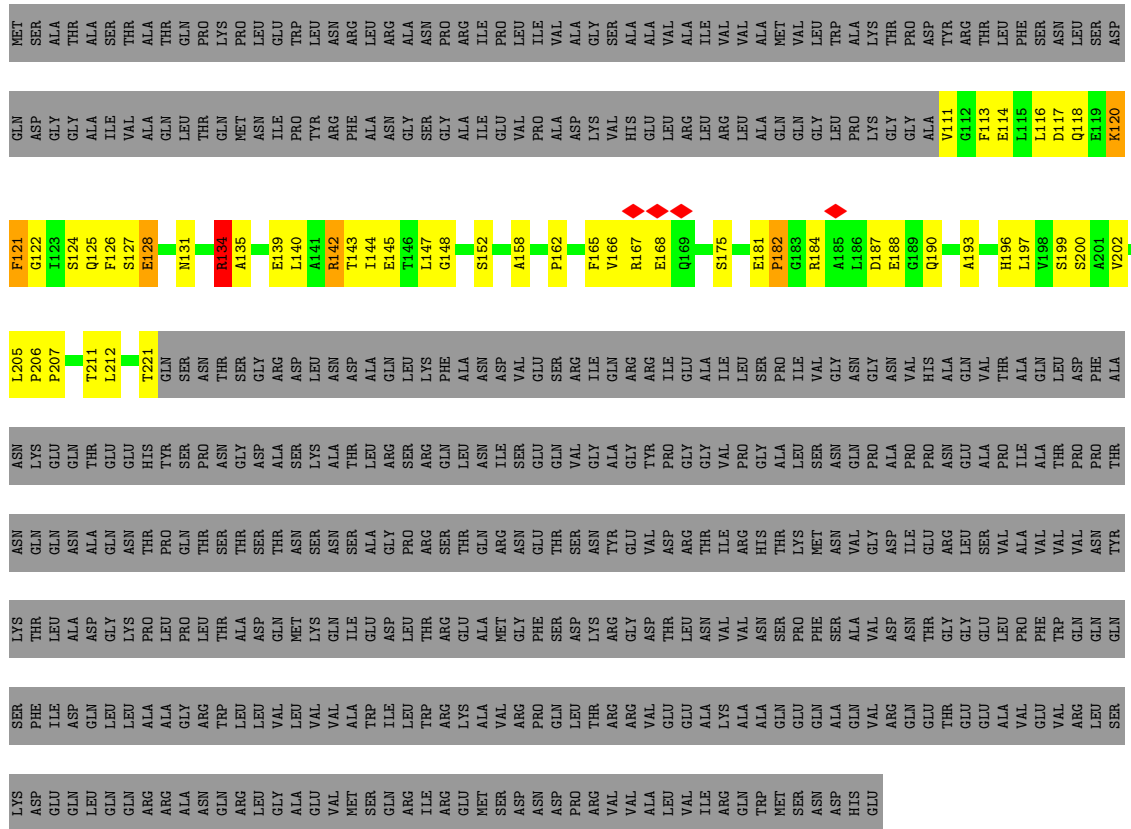








• Molecule 1: Flagellar M-ring protein

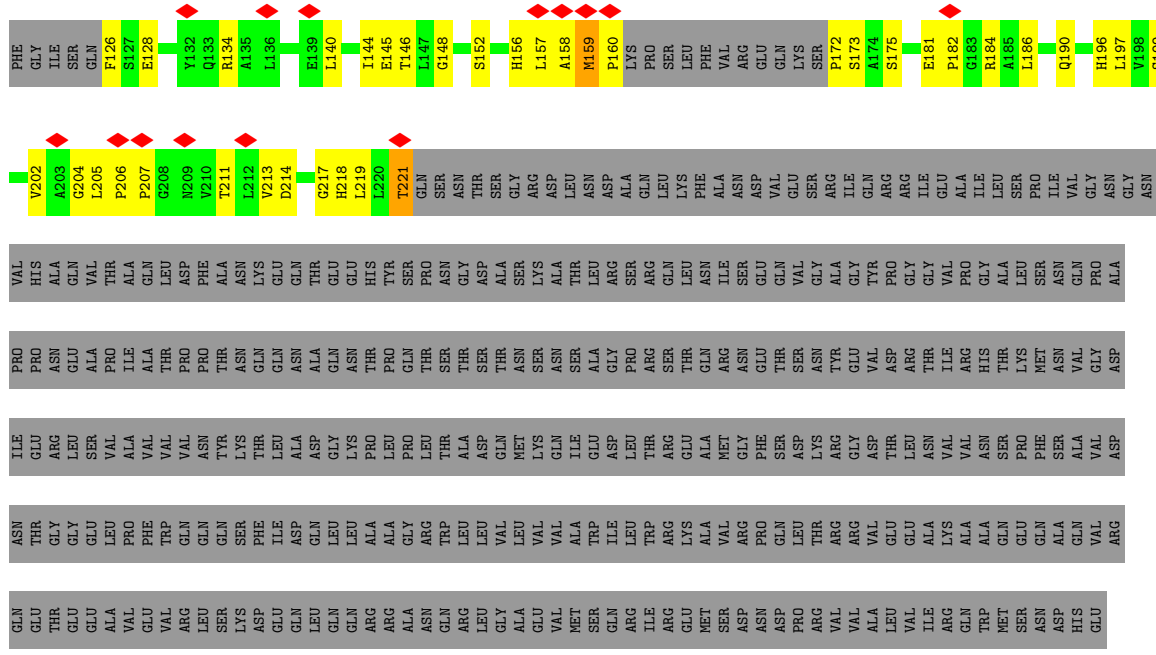


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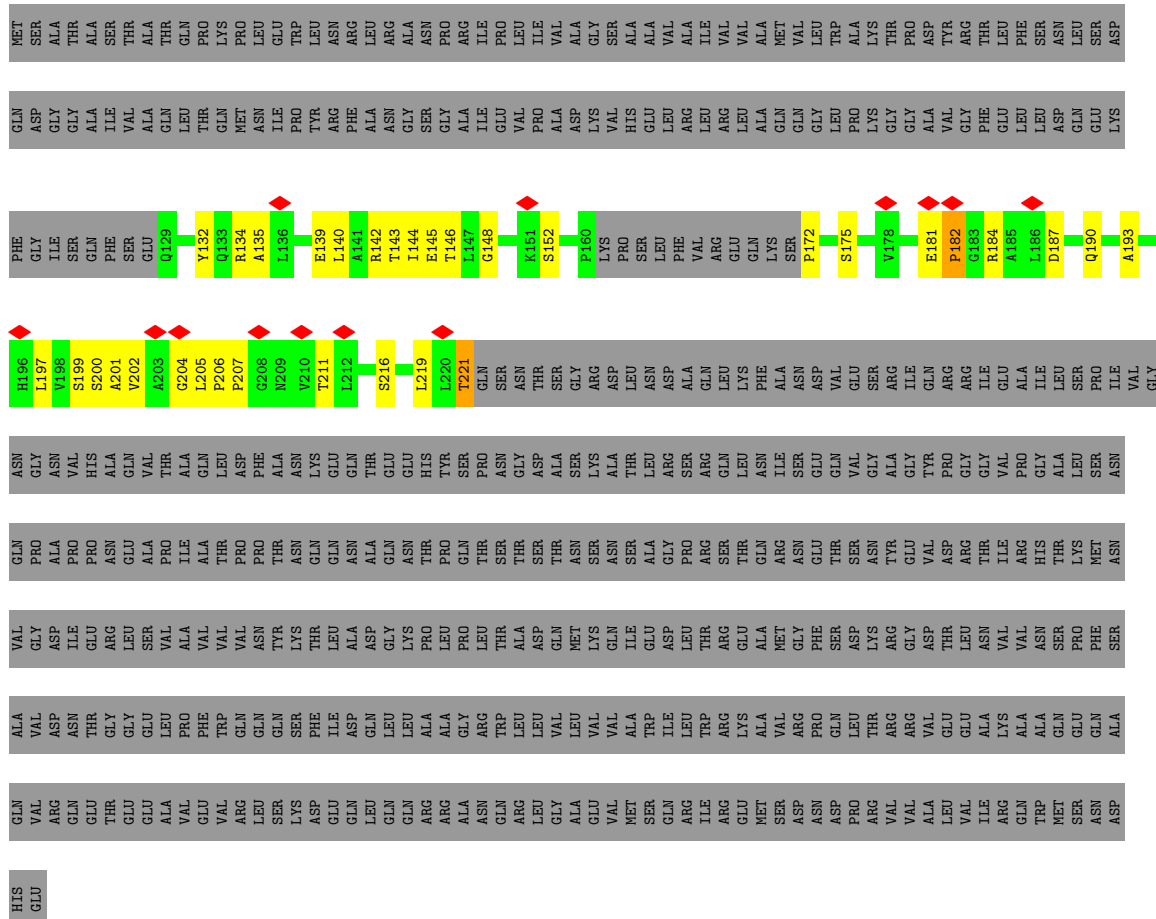








● Molecule 1: Flagellar M-ring protein

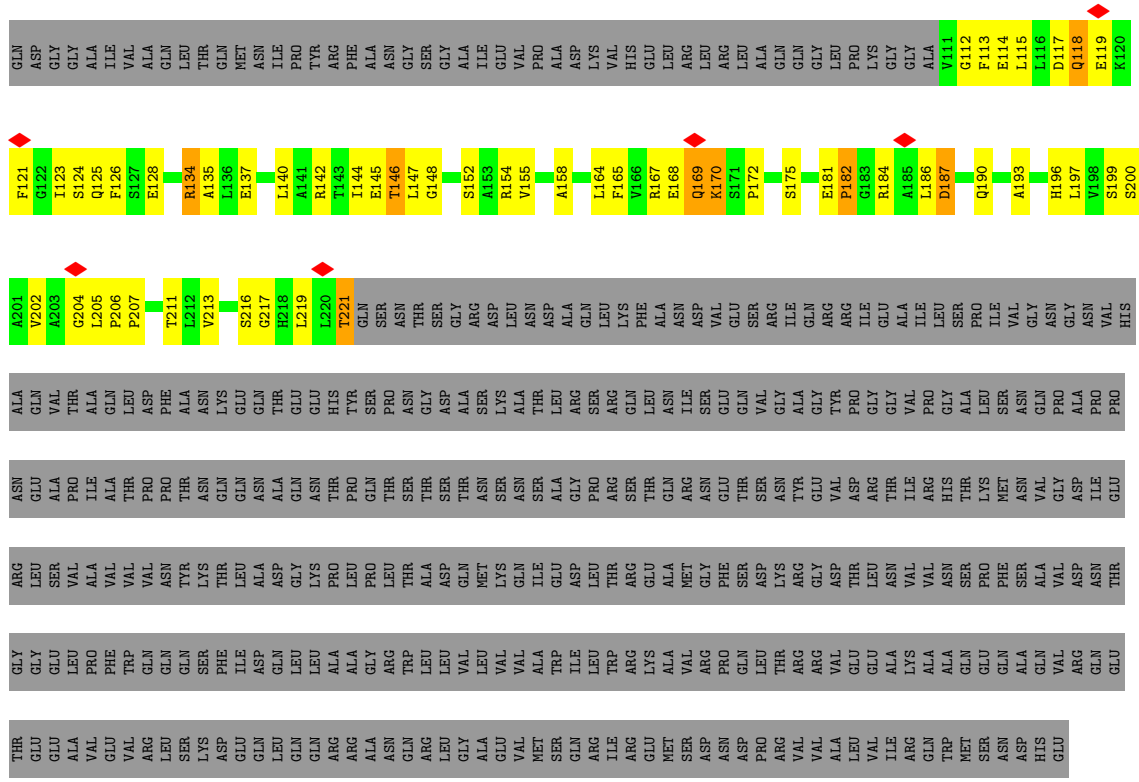




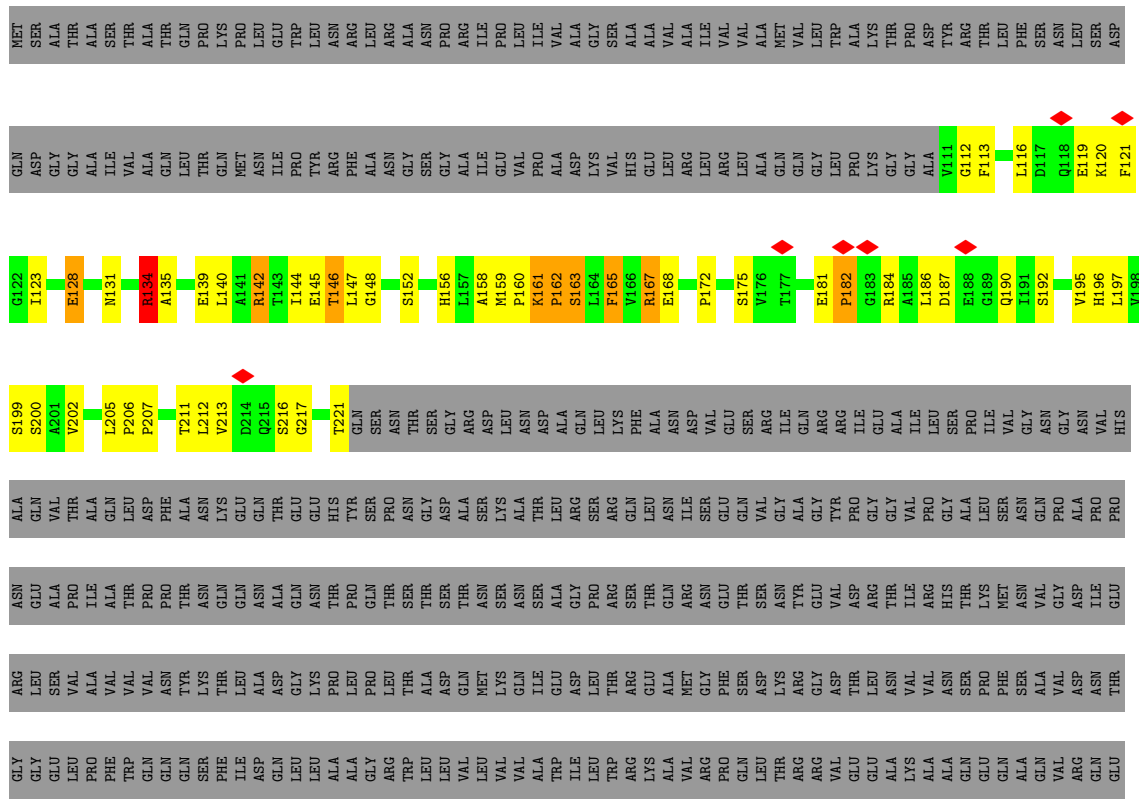








● Molecule 1: Flagellar M-ring protein

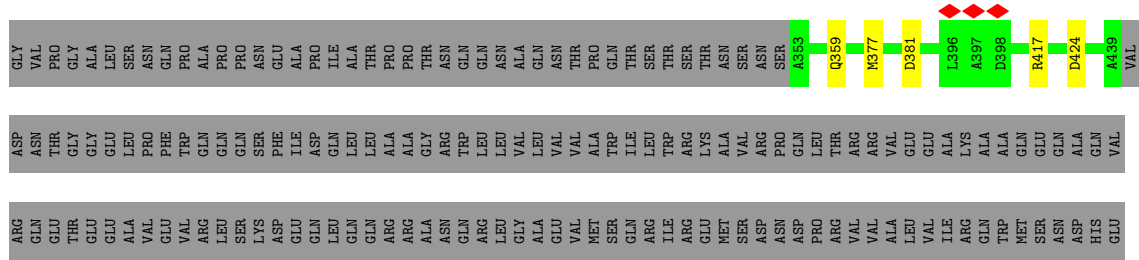




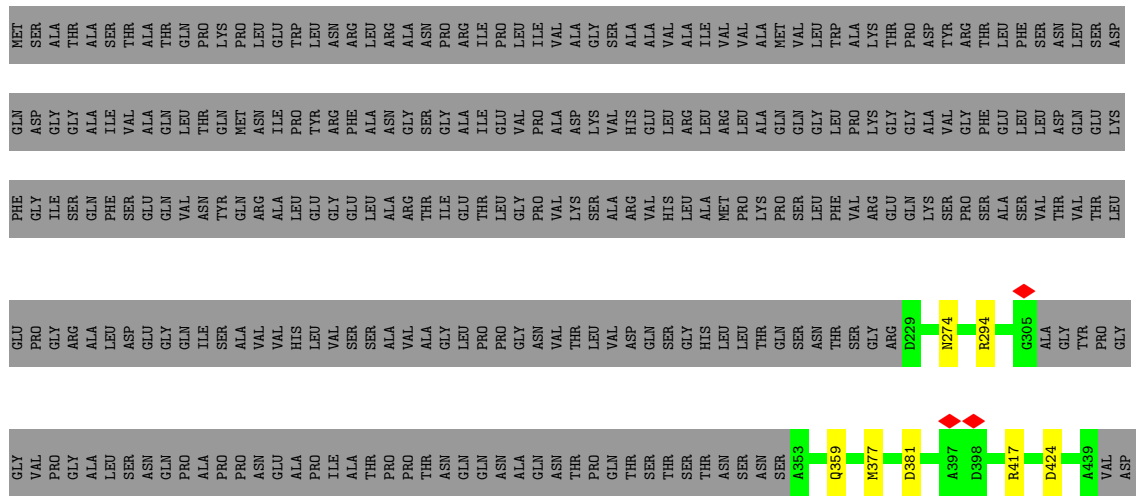




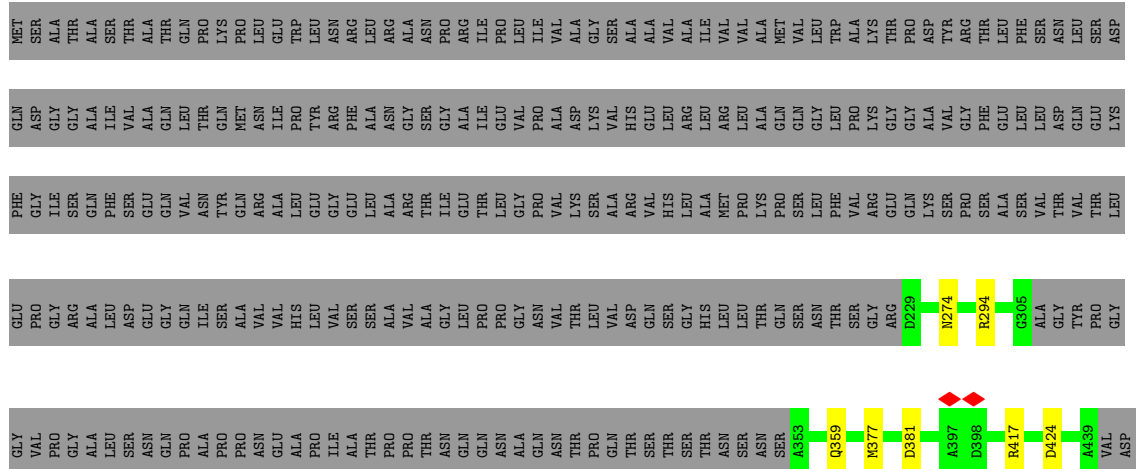




● Molecule 1: Flagellar M-ring protein



● Molecule 1: Flagellar M-ring protein











TRP  
MET  
SER  
ASN  
ASP  
HIS  
GLU

● Molecule 1: Flagellar M-ring protein

Chain g:  97%

MET SER ALA THR THR GLN PRO LYS PRO LEU  
GLN ASP GLY THR THR GLN TRP LEU LEU ARG LEU  
SER ALA ASP THR THR GLN TRP LEU LEU ARG LEU

GLN ASP GLY THR THR GLN TRP LEU LEU ARG LEU  
SER ALA ASP THR THR GLN TRP LEU LEU ARG LEU

PHE GLY ILE SER GLN PHE SER GLU GLN THR THR  
GLU GLN VAL ASN TYR GLN MET ASN LEU LEU  
ARG ALA ILE LEU ARG VAL THR THR THR THR

GLU PRO GLY SER ALA ASP GLU GLN ILE LEU  
VAL HIS LEU VAL VAL VAL VAL VAL VAL VAL  
SER THR THR THR THR THR THR THR THR THR

VAL GLU SER ILE ILE GLU ALA ILE SER VAL  
ARG ARG ALA ALA ALA ALA ALA ALA ALA ALA  
THR THR THR THR THR THR THR THR THR THR

SER GLU VAL VAL VAL VAL VAL VAL VAL VAL  
GLN VAL VAL VAL VAL VAL VAL VAL VAL VAL  
THR THR THR THR THR THR THR THR THR THR

SER GLU VAL VAL VAL VAL VAL VAL VAL VAL  
GLN VAL VAL VAL VAL VAL VAL VAL VAL VAL  
THR THR THR THR THR THR THR THR THR THR

TYR GLU VAL ASP THR THR THR THR THR THR  
LEU LEU LEU LEU LEU LEU LEU LEU LEU LEU  
SER SER SER SER SER SER SER SER SER SER

ARG GLY THR THR THR THR THR THR THR THR  
ASP ASP ASP ASP ASP ASP ASP ASP ASP ASP  
SER SER SER SER SER SER SER SER SER SER

ARG VAL VAL VAL VAL VAL VAL VAL VAL VAL  
GLN VAL VAL VAL VAL VAL VAL VAL VAL VAL  
THR THR THR THR THR THR THR THR THR THR

VAL VAL ALA VAL VAL VAL VAL VAL VAL  
GLN TRP MET SER ASN ASP HIS  
GLU GLU

● Molecule 1: Flagellar M-ring protein

Chain h:  96%

MET SER ALA THR THR GLN PRO LYS PRO LEU  
GLN ASP GLY THR THR GLN TRP LEU LEU ARG LEU  
SER ALA ASP THR THR GLN TRP LEU LEU ARG LEU

GLN ASP GLY THR THR GLN TRP LEU LEU ARG LEU  
SER ALA ASP THR THR GLN TRP LEU LEU ARG LEU

PHE GLY ILE SER GLN PHE SER GLU GLN THR THR  
GLU GLN VAL ASN TYR GLN MET ASN LEU LEU  
ARG ALA ILE LEU ARG VAL THR THR THR THR

GLU PRO GLY SER ALA ASP GLU GLN ILE LEU  
VAL HIS LEU VAL VAL VAL VAL VAL VAL VAL  
SER THR THR THR THR THR THR THR THR THR

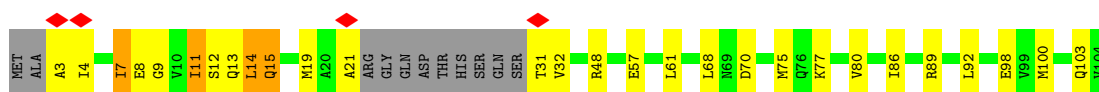
VAL GLU SER ILE ILE GLU ALA ILE SER VAL  
ARG ARG ALA ALA ALA ALA ALA ALA ALA ALA  
THR THR THR THR THR THR THR THR THR THR



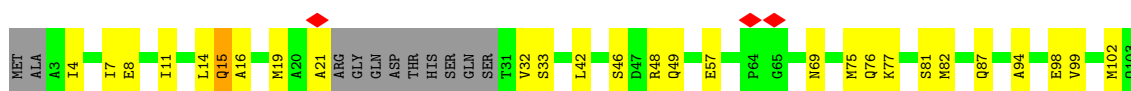




• Molecule 2: Flagellar hook-basal body complex protein FliE



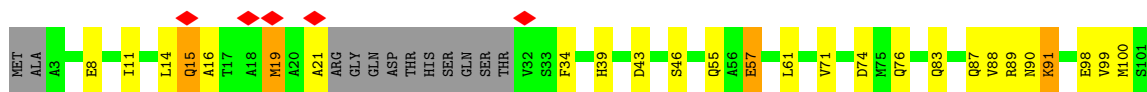
• Molecule 2: Flagellar hook-basal body complex protein FliE



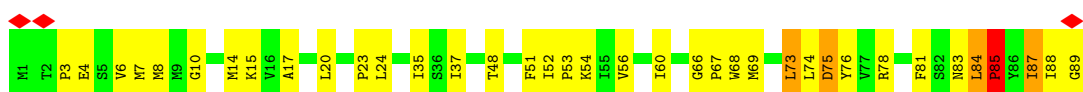
• Molecule 2: Flagellar hook-basal body complex protein FliE



• Molecule 2: Flagellar hook-basal body complex protein FliE



• Molecule 3: Flagellar biosynthetic protein FliQ



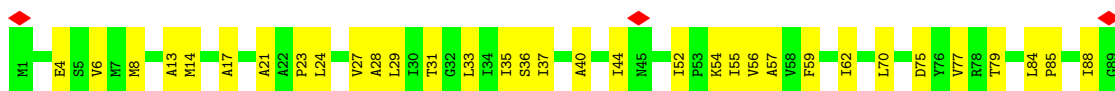
• Molecule 3: Flagellar biosynthetic protein FliQ



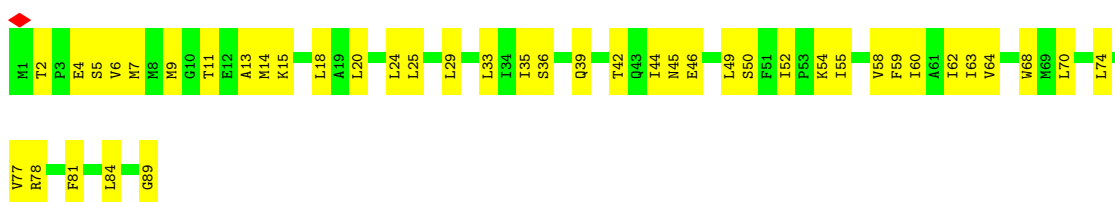




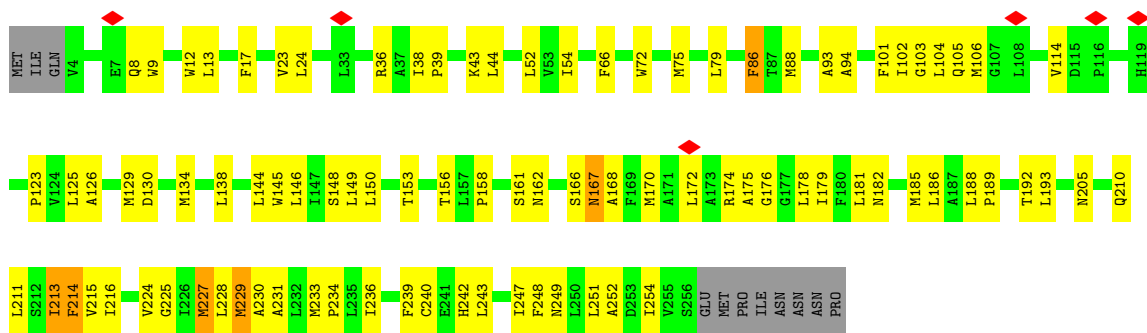
• Molecule 3: Flagellar biosynthetic protein FliQ



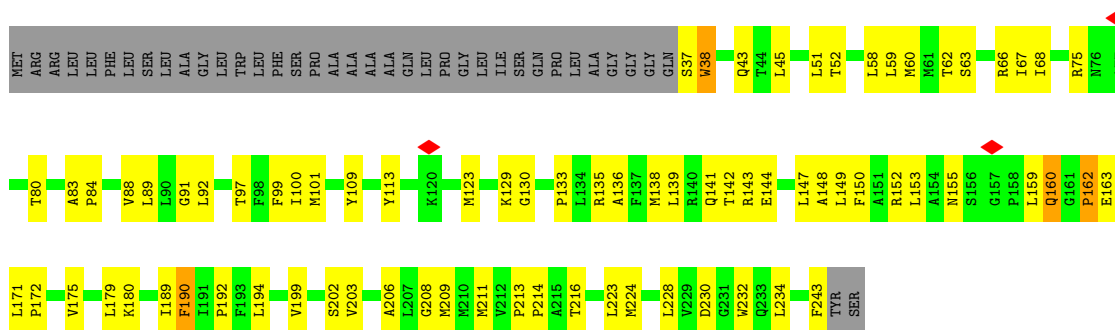
• Molecule 3: Flagellar biosynthetic protein FliQ



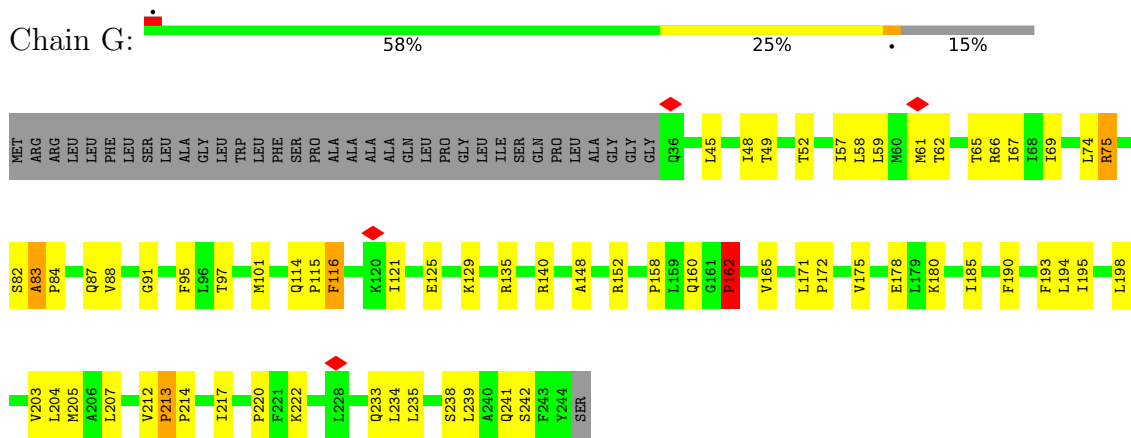
• Molecule 4: Flagellar biosynthetic protein FliR



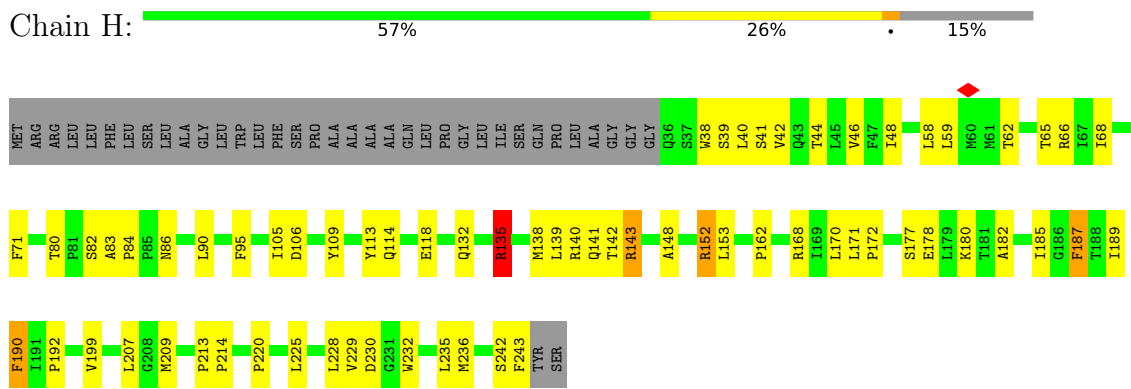
• Molecule 5: Flagellar biosynthetic protein FliP



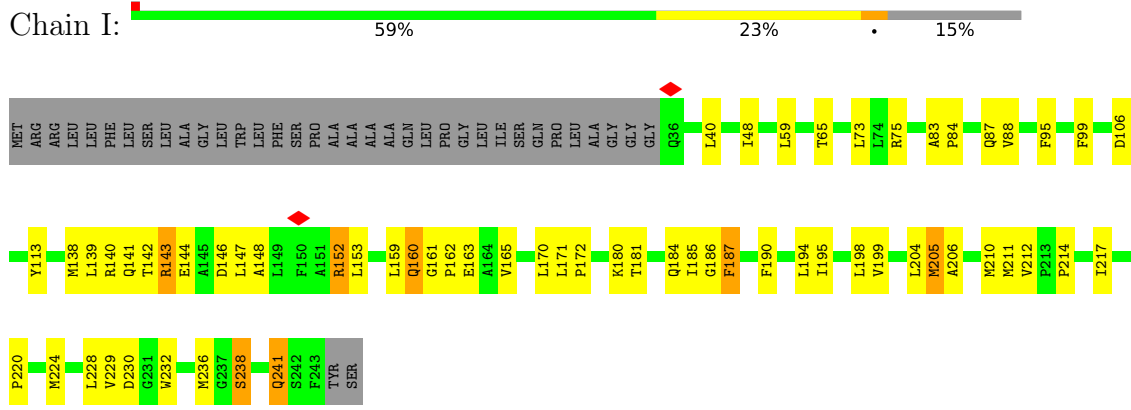
• Molecule 5: Flagellar biosynthetic protein FlIP



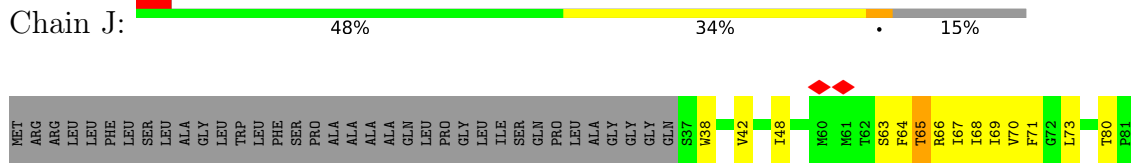
• Molecule 5: Flagellar biosynthetic protein FlIP

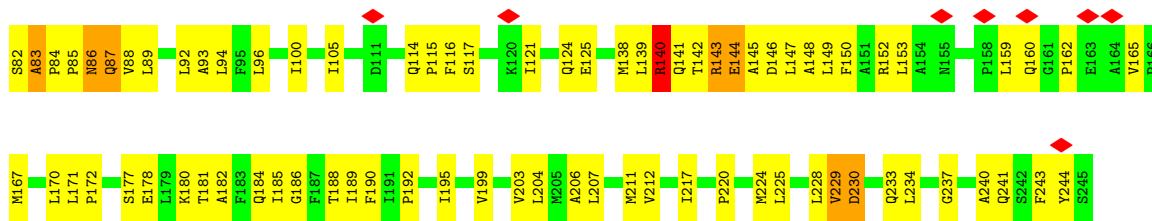


• Molecule 5: Flagellar biosynthetic protein FlIP

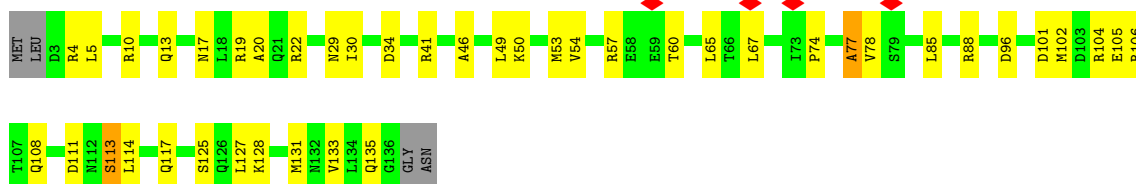


• Molecule 5: Flagellar biosynthetic protein FlIP

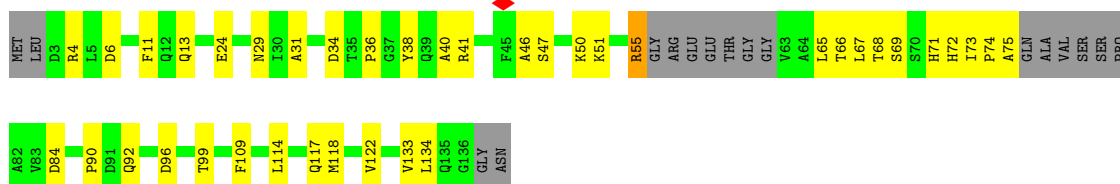




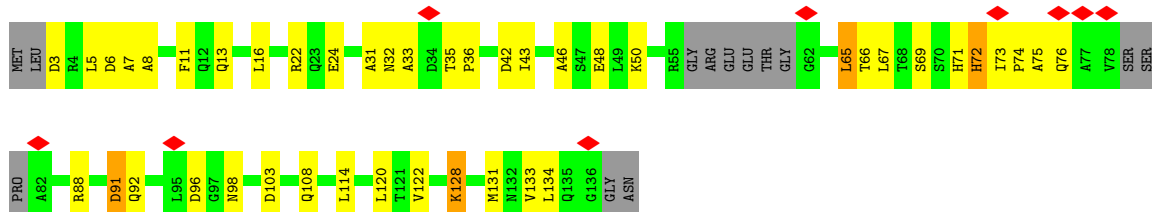
• Molecule 6: Flagellar basal body rod protein FlgB



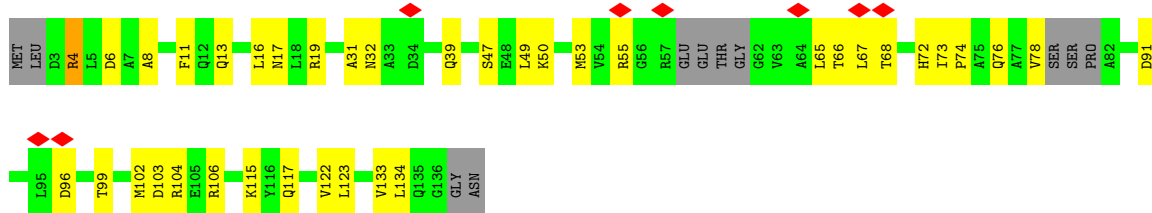
• Molecule 6: Flagellar basal body rod protein FlgB



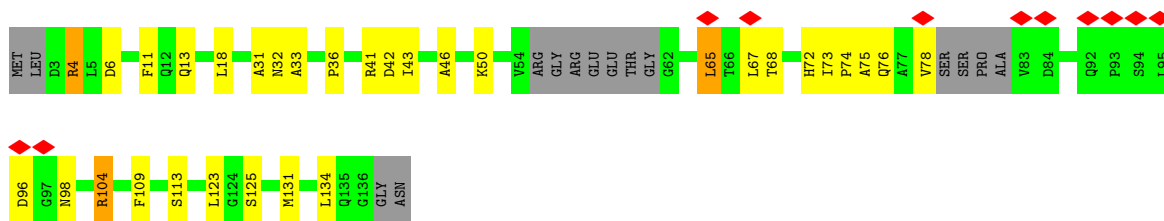
• Molecule 6: Flagellar basal body rod protein FlgB



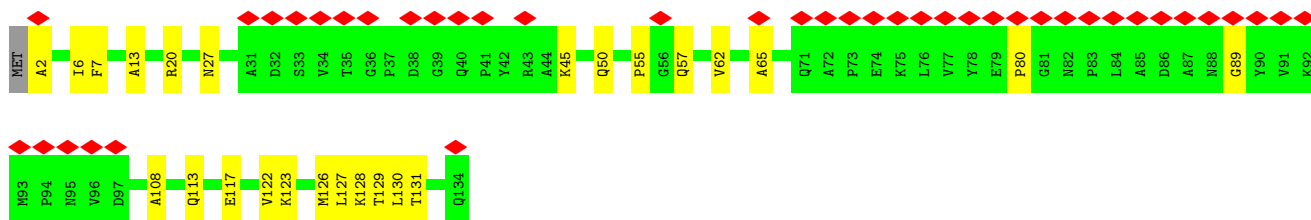
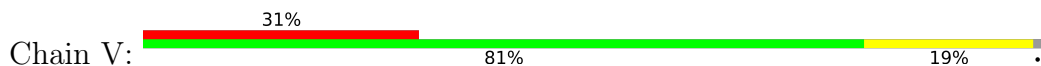
• Molecule 6: Flagellar basal body rod protein FlgB



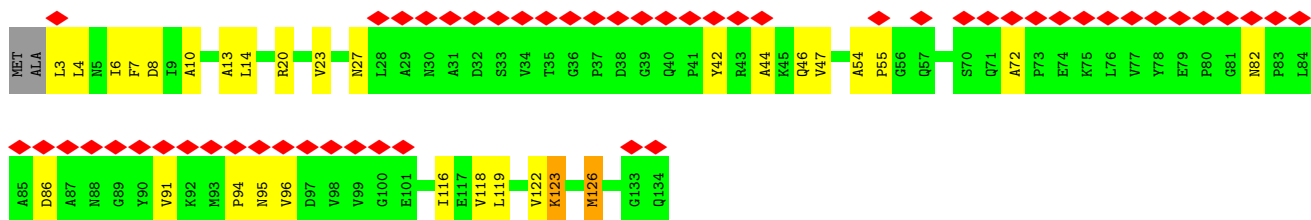
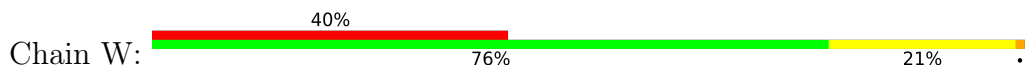
• Molecule 6: Flagellar basal body rod protein FlgB



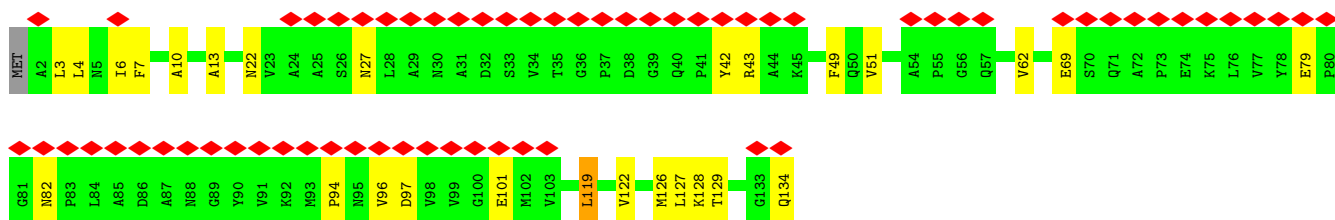
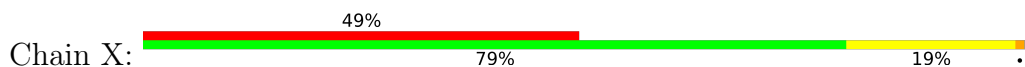
• Molecule 7: Flagellar basal-body rod protein FlgC



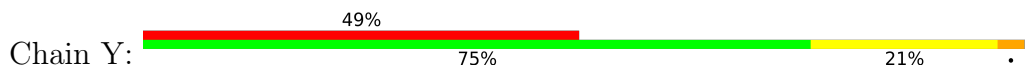
• Molecule 7: Flagellar basal-body rod protein FlgC

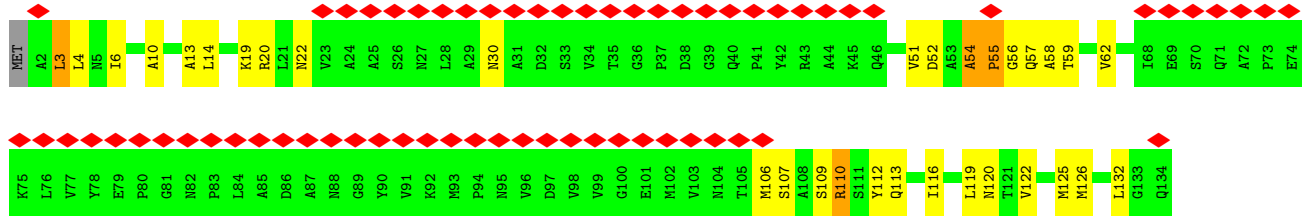


• Molecule 7: Flagellar basal-body rod protein FlgC

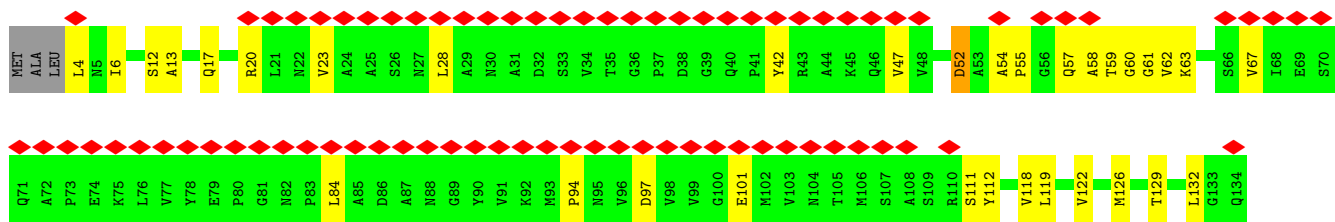
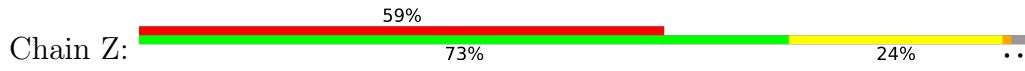


• Molecule 7: Flagellar basal-body rod protein FlgC

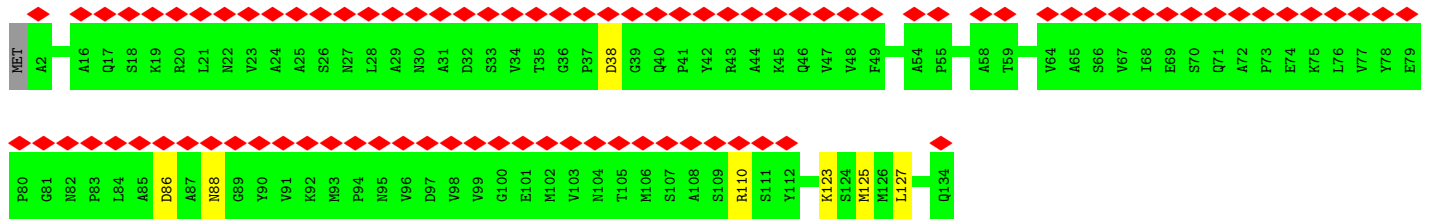
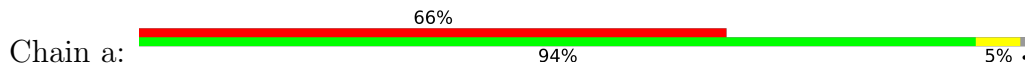




• Molecule 7: Flagellar basal-body rod protein FlgC



• Molecule 7: Flagellar basal-body rod protein FlgC



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	11858	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 ( $e^-/\text{\AA}^2$ )	45	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	105000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	1.689	Depositor
Minimum map value	-0.642	Depositor
Average map value	-0.003	Depositor
Map value standard deviation	0.078	Depositor
Recommended contour level	0.35	Depositor
Map size ( $\text{\AA}$ )	681.984, 681.984, 681.984	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.332, 1.332, 1.332	Depositor

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

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	0	0.27	0/1289	0.53	0/1741
1	1	0.26	0/1289	0.53	0/1741
1	2	0.27	0/1289	0.53	0/1741
1	3	0.27	0/1289	0.53	0/1741
1	4	0.27	0/1289	0.53	0/1741
1	5	0.27	0/1289	0.53	0/1741
1	6	0.27	0/1289	0.53	0/1741
1	7	0.27	0/1289	0.53	0/1741
1	8	0.27	0/1289	0.53	0/1741
1	9	0.27	0/1289	0.53	0/1741
1	AA	0.27	0/1289	0.53	0/1741
1	AB	0.27	0/1289	0.53	0/1741
1	AC	0.27	0/1289	0.53	0/1741
1	AD	0.27	0/1289	0.53	0/1741
1	AE	0.27	0/1289	0.53	0/1741
1	AF	0.27	0/1289	0.53	0/1741
1	AG	0.27	0/1289	0.53	0/1741
1	AH	0.27	0/1289	0.53	0/1741
1	AI	0.26	0/1289	0.53	0/1741
1	AJ	0.27	0/1289	0.53	0/1741
1	AK	0.27	0/1289	0.53	0/1741
1	AL	0.27	0/1289	0.53	0/1741
1	AM	0.27	0/1289	0.53	0/1741
1	AN	0.27	0/1289	0.53	0/1741
1	AO	0.27	0/1289	0.53	0/1741
1	AP	0.27	0/1289	0.53	0/1741
1	AQ	0.26	0/1289	0.53	0/1741
1	UI	0.83	2/1191 (0.2%)	0.82	4/1618 (0.2%)
1	UJ	0.84	2/1191 (0.2%)	0.82	4/1618 (0.2%)
1	UK	0.83	2/1191 (0.2%)	0.82	4/1618 (0.2%)
1	UL	0.82	2/1191 (0.2%)	0.82	4/1618 (0.2%)
1	UM	0.84	2/1191 (0.2%)	0.82	4/1618 (0.2%)
1	UN	0.84	2/1191 (0.2%)	0.82	4/1618 (0.2%)
1	UO	0.83	2/1191 (0.2%)	0.82	4/1618 (0.2%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	UP	0.84	2/1191 (0.2%)	0.82	4/1618 (0.2%)
1	WA	0.60	0/863	0.72	1/1172 (0.1%)
1	WB	0.59	0/850	0.70	0/1154
1	WC	0.59	0/825	0.68	0/1121
1	WD	0.61	0/841	0.68	0/1142
1	WE	0.60	0/857	0.71	0/1164
1	WF	0.60	0/848	0.69	0/1152
1	WG	0.60	0/857	0.68	0/1164
1	WH	0.60	0/714	0.69	0/973
1	WI	0.59	0/714	0.74	0/973
1	WJ	0.61	0/749	0.72	1/1020 (0.1%)
1	WK	0.60	0/741	0.69	0/1009
1	WL	0.60	0/631	0.70	0/860
1	WM	0.59	0/604	0.70	0/824
1	WN	0.60	0/619	0.70	0/844
1	WO	0.60	0/726	0.72	1/989 (0.1%)
1	WP	0.60	0/753	0.69	0/1025
1	WQ	0.60	0/848	0.69	0/1152
1	WR	0.60	0/848	0.69	0/1152
1	WS	0.61	0/848	0.69	0/1152
1	WT	0.60	0/848	0.70	0/1152
1	WU	0.60	0/857	0.67	0/1164
1	WV	0.61	0/841	0.69	0/1142
1	WW	0.60	0/848	0.70	0/1152
1	b	0.46	0/83	0.87	1/114 (0.9%)
1	c	0.27	0/107	0.38	0/148
1	d	0.31	0/137	0.49	0/191
1	e	0.28	0/107	0.57	0/148
1	f	0.40	0/145	0.55	0/203
1	g	0.33	0/107	0.51	0/148
1	h	0.26	0/145	0.43	0/203
1	i	0.30	0/107	0.38	0/148
1	j	0.33	0/137	0.70	0/191
1	k	0.30	0/107	0.37	0/148
1	l	0.29	0/145	0.45	0/203
1	t	0.26	0/1289	0.53	0/1741
1	u	0.27	0/1289	0.53	0/1741
1	v	0.27	0/1289	0.53	0/1741
1	w	0.27	0/1289	0.53	0/1741
1	x	0.27	0/1289	0.53	0/1741
1	y	0.26	0/1289	0.53	0/1741
1	z	0.27	0/1289	0.53	0/1741
2	K	0.43	0/428	0.57	0/572



Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
2	L	0.36	0/675	0.49	0/905
2	M	0.36	0/689	0.52	0/925
2	N	0.36	0/689	0.50	0/925
2	O	0.37	0/689	0.53	0/925
2	P	0.40	0/682	0.52	0/915
3	A	0.45	0/681	0.67	1/930 (0.1%)
3	B	0.33	0/681	0.52	0/930
3	C	0.28	0/681	0.50	0/930
3	D	0.26	0/681	0.48	0/930
4	E	0.31	0/1994	0.52	0/2724
5	F	0.36	0/1643	0.62	2/2237 (0.1%)
5	G	0.30	0/1665	0.49	1/2267 (0.0%)
5	H	0.29	0/1652	0.50	0/2249
5	I	0.29	0/1652	0.47	0/2249
5	J	0.33	0/1662	0.52	0/2263
6	Q	0.37	0/1042	0.56	0/1408
6	R	0.33	0/951	0.50	0/1282
6	S	0.35	0/976	0.56	0/1316
6	T	0.35	0/991	0.54	0/1335
6	U	0.34	0/959	0.50	0/1293
7	V	0.30	0/981	0.47	0/1334
7	W	0.29	0/976	0.50	0/1327
7	X	0.34	0/981	0.50	0/1334
7	Y	0.33	0/981	0.62	0/1334
7	Z	0.29	0/968	0.48	0/1316
7	a	0.36	0/981	0.52	0/1334
All	All	0.44	16/100442 (0.0%)	0.59	40/136124 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	UI	0	2
1	UJ	0	2
1	UK	0	3
1	UL	0	3
1	UM	0	2
1	UN	0	2
1	UO	0	2
1	UP	0	3

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Mol	Chain	#Chirality outliers	#Planarity outliers
1	WA	0	3
1	WB	0	4
1	WC	0	3
1	WD	0	1
1	WE	0	2
1	WF	0	3
1	WG	0	3
1	WI	0	1
1	WJ	0	3
1	WK	0	2
1	WL	0	2
1	WM	0	1
1	WN	0	1
1	WO	0	1
1	WP	0	3
1	WQ	0	2
1	WR	0	3
1	WS	0	1
1	WT	0	2
1	WU	0	2
1	WV	0	3
1	WW	0	2
5	H	0	2
5	J	0	2
6	Q	0	1
6	R	0	1
6	T	0	1
6	U	0	1
7	Y	0	1
7	a	0	1
All	All	0	77

The worst 5 of 16 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	UM	172	PRO	N-CD	-9.56	1.34	1.47
1	UL	172	PRO	N-CD	-9.52	1.34	1.47
1	UO	172	PRO	N-CD	-9.48	1.34	1.47
1	UP	172	PRO	N-CD	-9.48	1.34	1.47
1	UJ	172	PRO	N-CD	-9.47	1.34	1.47

The worst 5 of 40 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	F	162	PRO	CA-N-CD	-12.01	94.69	111.50
1	UK	126	PHE	O-C-N	8.82	136.82	122.70
1	UN	126	PHE	O-C-N	8.81	136.79	122.70
1	UO	126	PHE	O-C-N	8.80	136.78	122.70
1	UL	126	PHE	O-C-N	8.80	136.78	122.70

There are no chirality outliers.

5 of 77 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	UI	221	THR	Mainchain
1	UI	50	ASP	Mainchain
1	UJ	270	THR	Mainchain
1	UJ	50	ASP	Mainchain
1	UK	50	ASP	Mainchain

## 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	0	1275	0	1254	29	0
1	1	1275	0	1254	50	0
1	2	1275	0	1254	38	0
1	3	1275	0	1254	25	0
1	4	1275	0	1254	32	0
1	5	1275	0	1254	35	0
1	6	1275	0	1254	45	0
1	7	1275	0	1254	50	0
1	8	1275	0	1254	30	0
1	9	1275	0	1254	25	0
1	AA	1275	0	1254	27	0
1	AB	1275	0	1254	40	0
1	AC	1275	0	1254	42	0
1	AD	1275	0	1254	43	0
1	AE	1275	0	1254	41	0
1	AF	1275	0	1254	26	0
1	AG	1275	0	1254	28	0
1	AH	1275	0	1254	51	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	AI	1275	0	1254	45	0
1	AJ	1275	0	1254	40	0
1	AK	1275	0	1254	35	0
1	AL	1275	0	1254	35	0
1	AM	1275	0	1254	31	0
1	AN	1275	0	1254	24	0
1	AO	1275	0	1254	27	0
1	AP	1275	0	1254	35	0
1	AQ	1275	0	1254	24	0
1	UI	1172	0	1181	64	0
1	UJ	1172	0	1181	79	0
1	UK	1172	0	1181	77	0
1	UL	1172	0	1181	66	0
1	UM	1172	0	1181	67	0
1	UN	1172	0	1181	70	0
1	UO	1172	0	1181	66	0
1	UP	1172	0	1181	66	0
1	WA	849	0	860	78	0
1	WB	836	0	846	79	0
1	WC	812	0	826	61	0
1	WD	827	0	840	101	0
1	WE	843	0	855	95	0
1	WF	834	0	847	62	0
1	WG	843	0	855	73	0
1	WH	703	0	722	64	0
1	WI	703	0	722	75	0
1	WJ	737	0	755	91	0
1	WK	729	0	744	84	0
1	WL	622	0	632	58	0
1	WM	596	0	612	46	0
1	WN	611	0	623	54	0
1	WO	714	0	731	46	0
1	WP	741	0	758	67	0
1	WQ	834	0	847	68	0
1	WR	834	0	847	63	0
1	WS	834	0	847	85	0
1	WT	834	0	847	69	0
1	WU	843	0	855	67	0
1	WV	827	0	838	65	0
1	WW	834	0	847	94	0
1	b	81	0	78	0	0
1	c	103	0	99	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	d	133	0	129	0	0
1	e	103	0	99	0	0
1	f	140	0	136	0	0
1	g	103	0	99	0	0
1	h	140	0	136	0	0
1	i	103	0	99	0	0
1	j	133	0	129	0	0
1	k	103	0	99	0	0
1	l	140	0	136	0	0
1	t	1275	0	1254	0	0
1	u	1275	0	1254	0	0
1	v	1275	0	1254	0	0
1	w	1275	0	1254	0	0
1	x	1275	0	1254	0	0
1	y	1275	0	1254	0	0
1	z	1275	0	1254	0	0
2	K	429	0	445	58	0
2	L	672	0	684	60	0
2	M	686	0	700	70	0
2	N	686	0	700	52	0
2	O	686	0	700	32	0
2	P	679	0	693	43	0
3	A	670	0	739	69	0
3	B	670	0	739	50	0
3	C	670	0	739	47	0
3	D	670	0	739	87	0
4	E	1945	0	2063	136	0
5	F	1605	0	1701	85	0
5	G	1626	0	1718	83	0
5	H	1614	0	1709	82	0
5	I	1614	0	1709	115	0
5	J	1623	0	1715	142	0
6	Q	1030	0	1025	39	0
6	R	942	0	943	82	0
6	S	967	0	968	80	0
6	T	982	0	984	62	0
6	U	950	0	946	60	0
7	V	969	0	981	19	0
7	W	964	0	976	30	0
7	X	969	0	981	30	0
7	Y	969	0	981	31	0
7	Z	956	0	965	24	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	a	969	0	981	0	0
All	All	99060	0	99703	3347	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 18.

The worst 5 of 3347 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)
6:R:51:LYS:HB3	6:R:55:ARG:NH2	1.13	1.43
1:WJ:164:LEU:HD22	4:E:145:TRP:CD1	1.54	1.41
1:WW:165:PHE:CE1	3:B:89:GLY:HA2	1.57	1.38
1:WD:168:GLU:CD	1:WD:170:LYS:HE3	1.41	1.36
1:1:365:ASN:HB3	6:U:72:HIS:CD2	1.64	1.33

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	0	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	1	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	2	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	3	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	4	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	5	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	6	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	7	160/560 (29%)	158 (99%)	2 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	8	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	9	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AA	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AB	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AC	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AD	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AE	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AF	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AG	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AH	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AI	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AJ	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AK	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AL	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AM	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AN	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AO	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AP	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	AQ	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	UI	151/560 (27%)	146 (97%)	3 (2%)	2 (1%)	10	42
1	UJ	151/560 (27%)	146 (97%)	3 (2%)	2 (1%)	10	42
1	UK	151/560 (27%)	146 (97%)	3 (2%)	2 (1%)	10	42
1	UL	151/560 (27%)	142 (94%)	7 (5%)	2 (1%)	10	42
1	UM	151/560 (27%)	146 (97%)	3 (2%)	2 (1%)	10	42
1	UN	151/560 (27%)	146 (97%)	3 (2%)	2 (1%)	10	42
1	UO	151/560 (27%)	146 (97%)	3 (2%)	2 (1%)	10	42
1	UP	151/560 (27%)	146 (97%)	3 (2%)	2 (1%)	10	42
1	WA	111/560 (20%)	99 (89%)	9 (8%)	3 (3%)	4	26
1	WB	109/560 (20%)	94 (86%)	10 (9%)	5 (5%)	2	18
1	WC	106/560 (19%)	96 (91%)	9 (8%)	1 (1%)	14	50
1	WD	108/560 (19%)	99 (92%)	4 (4%)	5 (5%)	2	18

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	WE	110/560 (20%)	98 (89%)	8 (7%)	4 (4%)	3	21
1	WF	109/560 (20%)	98 (90%)	8 (7%)	3 (3%)	4	25
1	WG	110/560 (20%)	98 (89%)	10 (9%)	2 (2%)	7	34
1	WH	93/560 (17%)	86 (92%)	5 (5%)	2 (2%)	5	30
1	WI	93/560 (17%)	82 (88%)	5 (5%)	6 (6%)	1	13
1	WJ	97/560 (17%)	89 (92%)	7 (7%)	1 (1%)	13	48
1	WK	96/560 (17%)	84 (88%)	9 (9%)	3 (3%)	3	23
1	WL	81/560 (14%)	75 (93%)	4 (5%)	2 (2%)	4	27
1	WM	78/560 (14%)	72 (92%)	4 (5%)	2 (3%)	4	26
1	WN	80/560 (14%)	75 (94%)	2 (2%)	3 (4%)	2	20
1	WO	94/560 (17%)	85 (90%)	7 (7%)	2 (2%)	5	31
1	WP	98/560 (18%)	87 (89%)	6 (6%)	5 (5%)	1	16
1	WQ	109/560 (20%)	100 (92%)	5 (5%)	4 (4%)	2	21
1	WR	109/560 (20%)	94 (86%)	8 (7%)	7 (6%)	1	13
1	WS	109/560 (20%)	96 (88%)	7 (6%)	6 (6%)	1	15
1	WT	109/560 (20%)	97 (89%)	5 (5%)	7 (6%)	1	13
1	WU	110/560 (20%)	101 (92%)	8 (7%)	1 (1%)	14	50
1	WV	108/560 (19%)	97 (90%)	9 (8%)	2 (2%)	6	33
1	WW	109/560 (20%)	95 (87%)	9 (8%)	5 (5%)	2	18
1	b	11/560 (2%)	9 (82%)	2 (18%)	0	100	100
1	c	14/560 (2%)	12 (86%)	2 (14%)	0	100	100
1	d	18/560 (3%)	18 (100%)	0	0	100	100
1	e	14/560 (2%)	14 (100%)	0	0	100	100
1	f	19/560 (3%)	17 (90%)	2 (10%)	0	100	100
1	g	14/560 (2%)	13 (93%)	1 (7%)	0	100	100
1	h	19/560 (3%)	19 (100%)	0	0	100	100
1	i	14/560 (2%)	14 (100%)	0	0	100	100
1	j	18/560 (3%)	18 (100%)	0	0	100	100
1	k	14/560 (2%)	14 (100%)	0	0	100	100
1	l	19/560 (3%)	19 (100%)	0	0	100	100
1	t	160/560 (29%)	158 (99%)	2 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	u	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	v	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	w	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	x	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	y	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
1	z	160/560 (29%)	158 (99%)	2 (1%)	0	100	100
2	K	55/104 (53%)	52 (94%)	3 (6%)	0	100	100
2	L	87/104 (84%)	87 (100%)	0	0	100	100
2	M	89/104 (86%)	87 (98%)	2 (2%)	0	100	100
2	N	89/104 (86%)	89 (100%)	0	0	100	100
2	O	89/104 (86%)	89 (100%)	0	0	100	100
2	P	88/104 (85%)	88 (100%)	0	0	100	100
3	A	87/89 (98%)	81 (93%)	4 (5%)	2 (2%)	5	29
3	B	87/89 (98%)	86 (99%)	1 (1%)	0	100	100
3	C	87/89 (98%)	86 (99%)	1 (1%)	0	100	100
3	D	87/89 (98%)	85 (98%)	2 (2%)	0	100	100
4	E	251/264 (95%)	233 (93%)	16 (6%)	2 (1%)	16	53
5	F	205/245 (84%)	197 (96%)	8 (4%)	0	100	100
5	G	207/245 (84%)	199 (96%)	6 (3%)	2 (1%)	13	48
5	H	206/245 (84%)	201 (98%)	5 (2%)	0	100	100
5	I	206/245 (84%)	199 (97%)	6 (3%)	1 (0%)	25	63
5	J	207/245 (84%)	192 (93%)	10 (5%)	5 (2%)	5	28
6	Q	132/138 (96%)	127 (96%)	4 (3%)	1 (1%)	16	53
6	R	115/138 (83%)	114 (99%)	1 (1%)	0	100	100
6	S	119/138 (86%)	116 (98%)	3 (2%)	0	100	100
6	T	121/138 (88%)	119 (98%)	2 (2%)	0	100	100
6	U	117/138 (85%)	115 (98%)	2 (2%)	0	100	100
7	V	131/134 (98%)	122 (93%)	9 (7%)	0	100	100
7	W	130/134 (97%)	123 (95%)	7 (5%)	0	100	100
7	X	131/134 (98%)	124 (95%)	7 (5%)	0	100	100
7	Y	131/134 (98%)	121 (92%)	7 (5%)	3 (2%)	5	29

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
7	Z	129/134 (96%)	123 (95%)	5 (4%)	1 (1%)	16	53
7	a	131/134 (98%)	124 (95%)	7 (5%)	0	100	100
All	All	12672/46523 (27%)	12179 (96%)	379 (3%)	114 (1%)	17	50

5 of 114 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	WO	168	GLU
1	WR	123	ILE
1	WR	165	PHE
1	WR	166	VAL
1	WS	187	ASP

### 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	0	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	1	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	2	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	3	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	4	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	5	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	6	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	7	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	8	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	9	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AA	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AB	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AC	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AD	141/467 (30%)	134 (95%)	7 (5%)	20	43

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	AE	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AF	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AG	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AH	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AI	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AJ	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AK	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AL	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AM	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AN	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AO	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AP	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	AQ	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	UI	128/467 (27%)	123 (96%)	5 (4%)	27	50
1	UJ	128/467 (27%)	123 (96%)	5 (4%)	27	50
1	UK	128/467 (27%)	123 (96%)	5 (4%)	27	50
1	UL	128/467 (27%)	122 (95%)	6 (5%)	22	45
1	UM	128/467 (27%)	123 (96%)	5 (4%)	27	50
1	UN	128/467 (27%)	123 (96%)	5 (4%)	27	50
1	UO	128/467 (27%)	123 (96%)	5 (4%)	27	50
1	UP	128/467 (27%)	122 (95%)	6 (5%)	22	45
1	WA	95/467 (20%)	91 (96%)	4 (4%)	25	48
1	WB	93/467 (20%)	87 (94%)	6 (6%)	14	36
1	WC	91/467 (20%)	83 (91%)	8 (9%)	8	26
1	WD	92/467 (20%)	88 (96%)	4 (4%)	25	48
1	WE	94/467 (20%)	87 (93%)	7 (7%)	11	31
1	WF	93/467 (20%)	86 (92%)	7 (8%)	11	31
1	WG	94/467 (20%)	87 (93%)	7 (7%)	11	31
1	WH	79/467 (17%)	75 (95%)	4 (5%)	20	43
1	WI	79/467 (17%)	73 (92%)	6 (8%)	11	31
1	WJ	83/467 (18%)	79 (95%)	4 (5%)	21	44

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	WK	82/467 (18%)	77 (94%)	5 (6%)	15	38
1	WL	69/467 (15%)	66 (96%)	3 (4%)	25	48
1	WM	66/467 (14%)	65 (98%)	1 (2%)	60	75
1	WN	68/467 (15%)	66 (97%)	2 (3%)	37	58
1	WO	80/467 (17%)	76 (95%)	4 (5%)	20	43
1	WP	83/467 (18%)	77 (93%)	6 (7%)	12	32
1	WQ	93/467 (20%)	91 (98%)	2 (2%)	47	66
1	WR	93/467 (20%)	86 (92%)	7 (8%)	11	31
1	WS	93/467 (20%)	87 (94%)	6 (6%)	14	36
1	WT	93/467 (20%)	86 (92%)	7 (8%)	11	31
1	WU	94/467 (20%)	90 (96%)	4 (4%)	25	48
1	WV	92/467 (20%)	83 (90%)	9 (10%)	6	22
1	WW	93/467 (20%)	85 (91%)	8 (9%)	8	27
1	b	8/467 (2%)	6 (75%)	2 (25%)	0	3
1	c	11/467 (2%)	10 (91%)	1 (9%)	7	25
1	d	14/467 (3%)	12 (86%)	2 (14%)	2	14
1	e	11/467 (2%)	11 (100%)	0	100	100
1	f	15/467 (3%)	15 (100%)	0	100	100
1	g	11/467 (2%)	11 (100%)	0	100	100
1	h	15/467 (3%)	15 (100%)	0	100	100
1	i	11/467 (2%)	11 (100%)	0	100	100
1	j	14/467 (3%)	13 (93%)	1 (7%)	12	33
1	k	11/467 (2%)	11 (100%)	0	100	100
1	l	15/467 (3%)	14 (93%)	1 (7%)	13	35
1	t	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	u	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	v	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	w	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	x	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	y	141/467 (30%)	134 (95%)	7 (5%)	20	43
1	z	141/467 (30%)	134 (95%)	7 (5%)	20	43

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	K	45/79 (57%)	39 (87%)	6 (13%)	3	15
2	L	68/79 (86%)	64 (94%)	4 (6%)	16	39
2	M	70/79 (89%)	65 (93%)	5 (7%)	12	33
2	N	70/79 (89%)	66 (94%)	4 (6%)	17	40
2	O	70/79 (89%)	66 (94%)	4 (6%)	17	40
2	P	69/79 (87%)	64 (93%)	5 (7%)	12	32
3	A	74/74 (100%)	68 (92%)	6 (8%)	9	29
3	B	74/74 (100%)	72 (97%)	2 (3%)	40	60
3	C	74/74 (100%)	74 (100%)	0	100	100
3	D	74/74 (100%)	74 (100%)	0	100	100
4	E	210/221 (95%)	205 (98%)	5 (2%)	44	64
5	F	177/204 (87%)	171 (97%)	6 (3%)	32	54
5	G	179/204 (88%)	173 (97%)	6 (3%)	32	54
5	H	178/204 (87%)	173 (97%)	5 (3%)	38	59
5	I	178/204 (87%)	171 (96%)	7 (4%)	27	50
5	J	179/204 (88%)	172 (96%)	7 (4%)	27	50
6	Q	110/113 (97%)	106 (96%)	4 (4%)	30	52
6	R	101/113 (89%)	100 (99%)	1 (1%)	73	82
6	S	103/113 (91%)	96 (93%)	7 (7%)	13	34
6	T	104/113 (92%)	102 (98%)	2 (2%)	52	70
6	U	102/113 (90%)	96 (94%)	6 (6%)	16	39
7	V	104/105 (99%)	104 (100%)	0	100	100
7	W	104/105 (99%)	101 (97%)	3 (3%)	37	58
7	X	104/105 (99%)	102 (98%)	2 (2%)	52	70
7	Y	104/105 (99%)	100 (96%)	4 (4%)	28	50
7	Z	103/105 (98%)	100 (97%)	3 (3%)	37	58
7	a	104/105 (99%)	98 (94%)	6 (6%)	17	39
All	All	10878/38698 (28%)	10360 (95%)	518 (5%)	24	44

5 of 518 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
5	I	205	MET

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Mol	Chain	Res	Type
6	Q	125	SER
5	I	187	PHE
2	K	101	SER
2	K	15	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 169 such sidechains are listed below:

Mol	Chain	Res	Type
1	y	303	GLN
6	S	92	GLN
1	z	374	HIS
5	I	160	GLN
6	U	72	HIS

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates [i](#)

There are no 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.

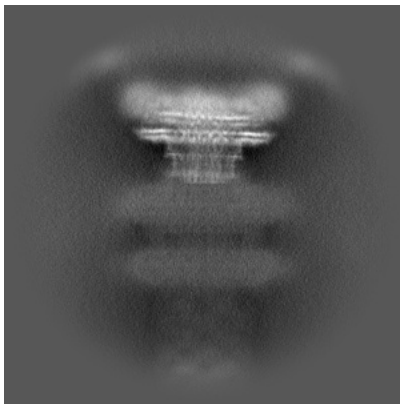
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-37625. These allow visual inspection of the internal detail of the map and identification of artifacts.

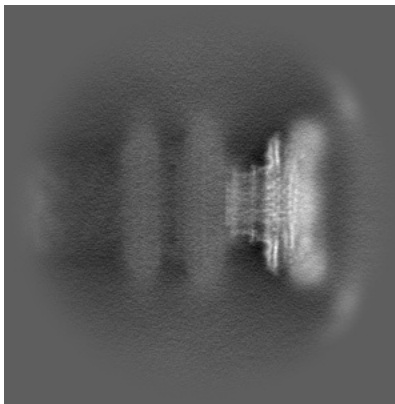
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

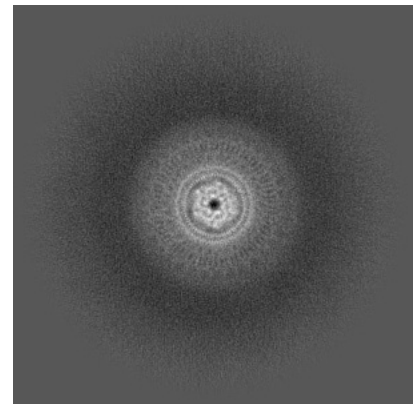
#### 6.1.1 Primary map



X

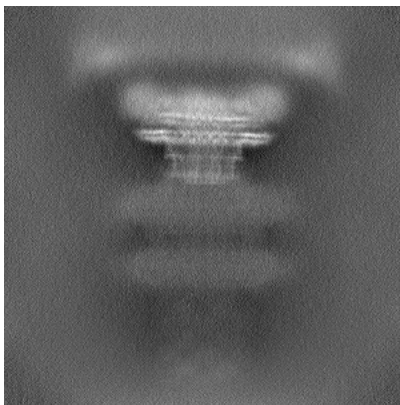


Y

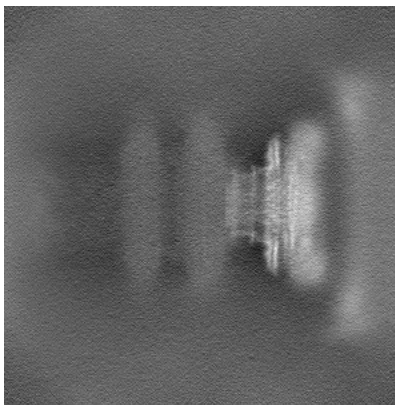


Z

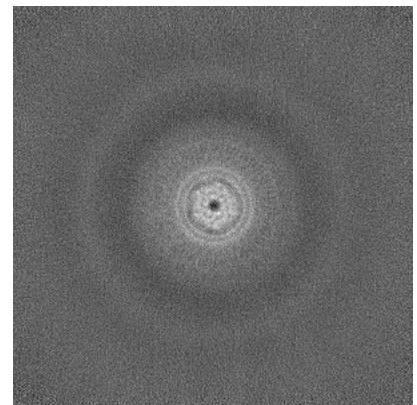
#### 6.1.2 Raw map



X



Y



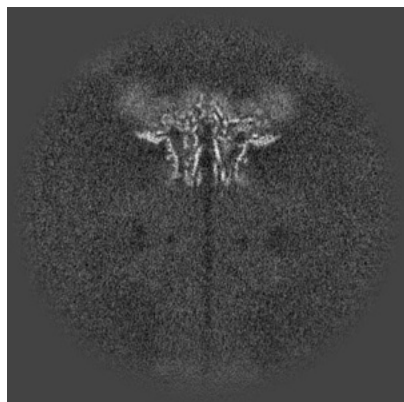
Z

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

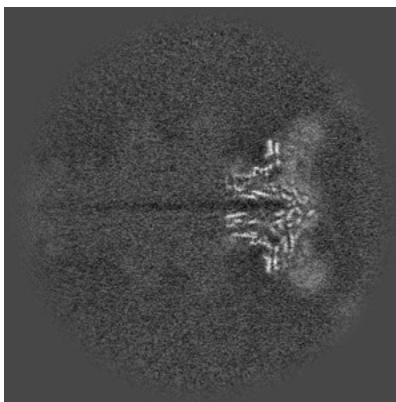


## 6.2 Central slices [i](#)

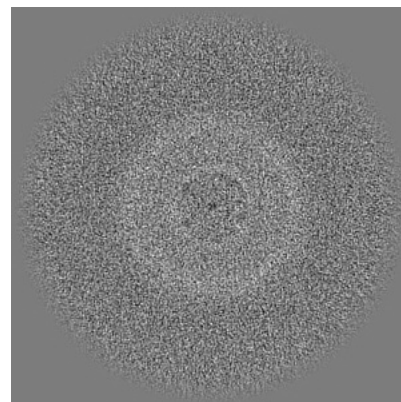
### 6.2.1 Primary map



X Index: 256

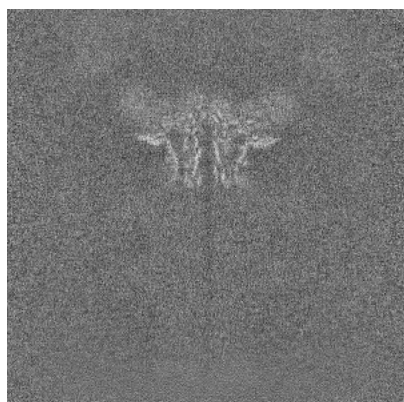


Y Index: 256

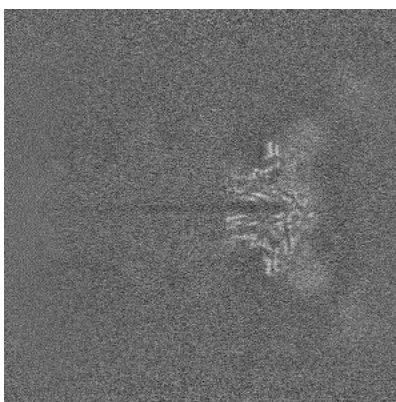


Z Index: 256

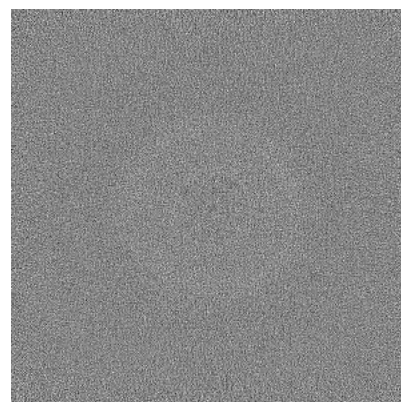
### 6.2.2 Raw map



X Index: 256



Y Index: 256



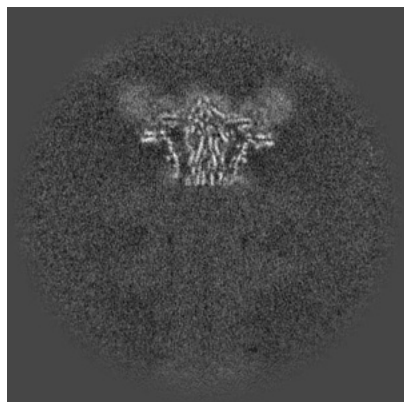
Z Index: 256

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

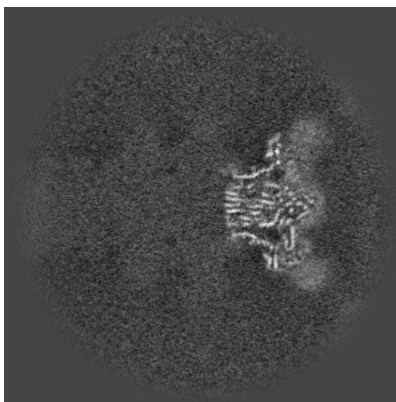


## 6.3 Largest variance slices [i](#)

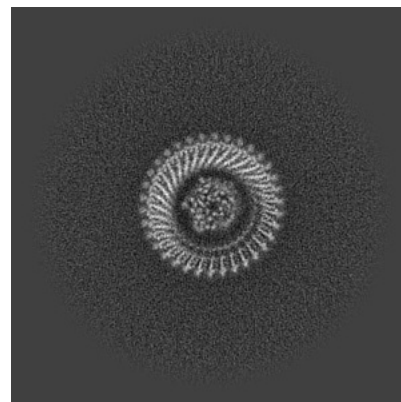
### 6.3.1 Primary map



X Index: 249

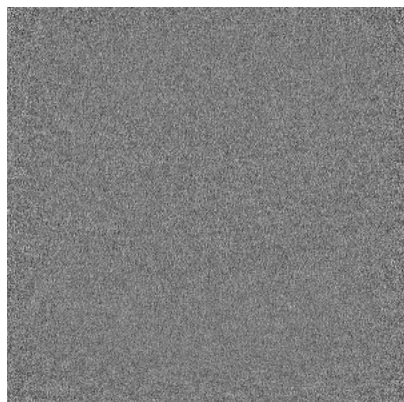


Y Index: 244

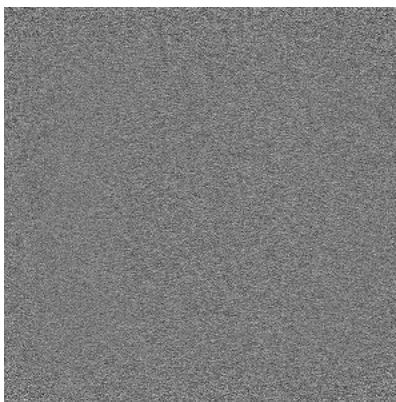


Z Index: 347

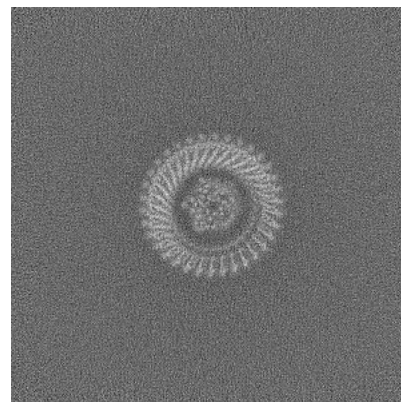
### 6.3.2 Raw map



X Index: 0



Y Index: 0

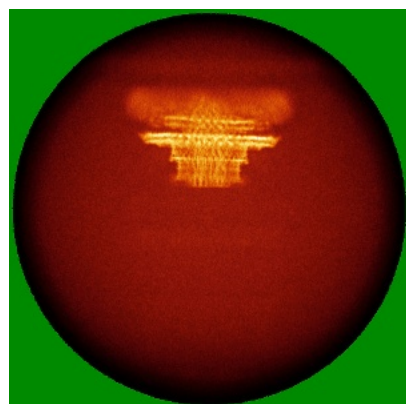


Z Index: 347

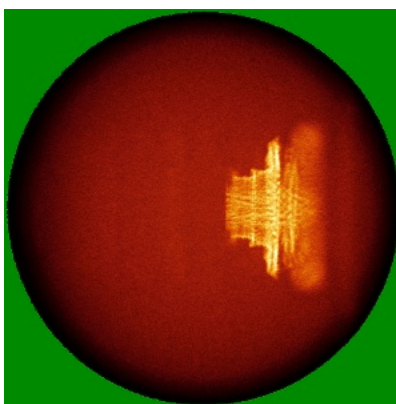
The images above show the largest variance slices of the map in three orthogonal directions.

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

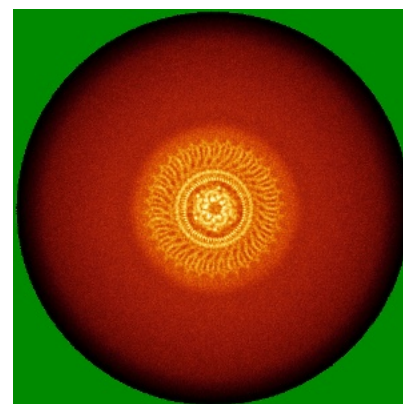
### 6.4.1 Primary map



X

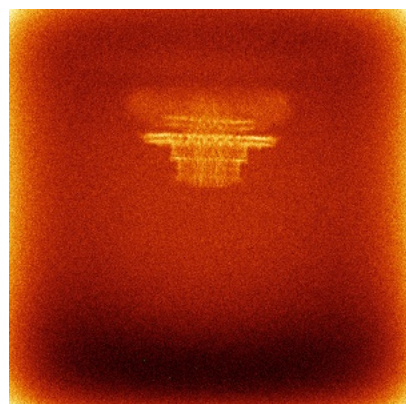


Y

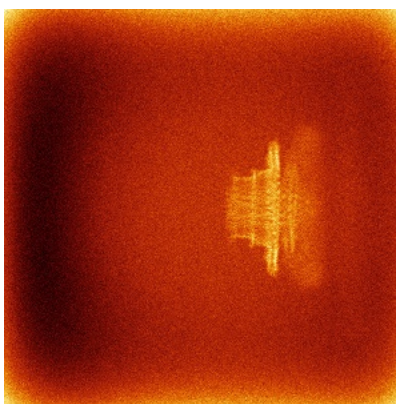


Z

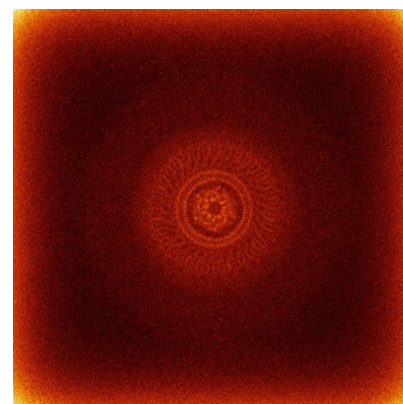
### 6.4.2 Raw map



X



Y

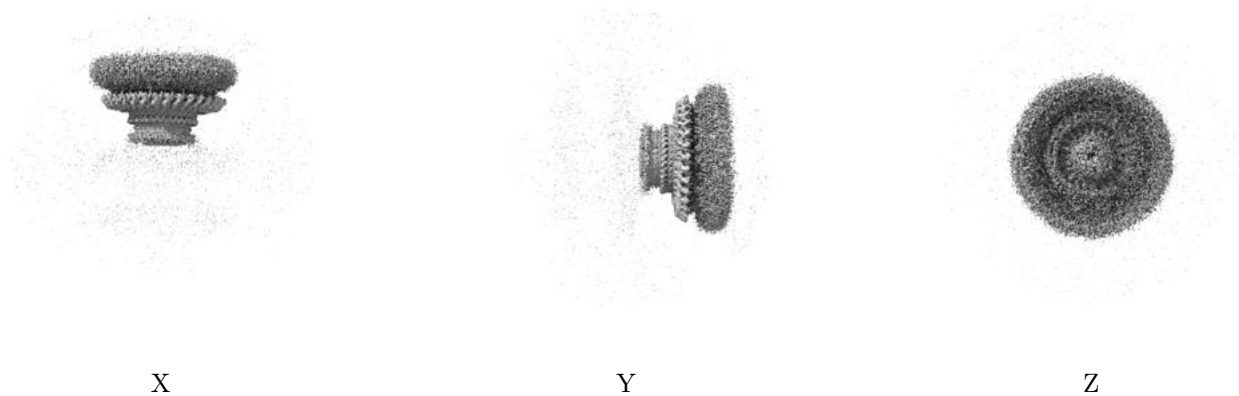


Z

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

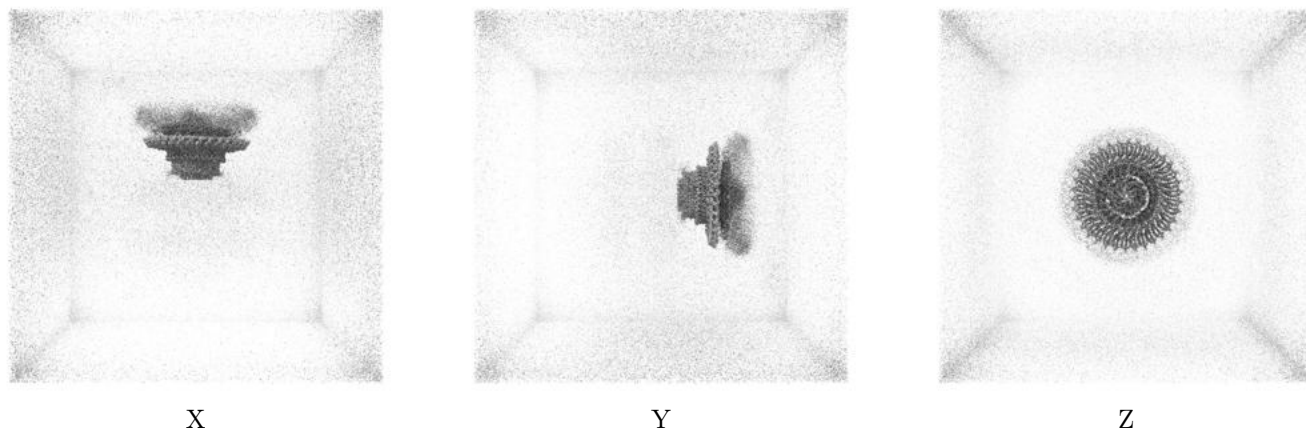
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.35. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



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

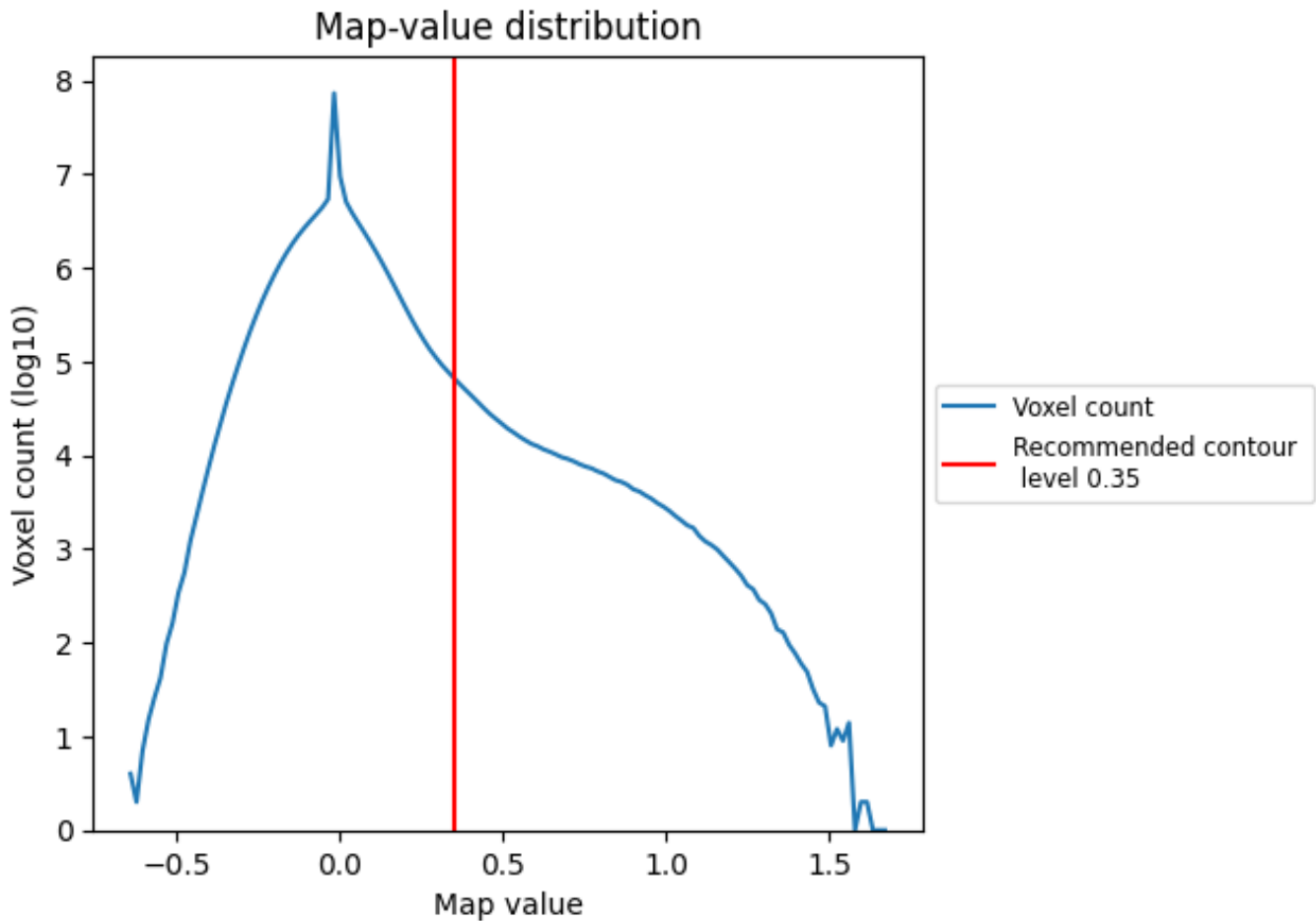
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

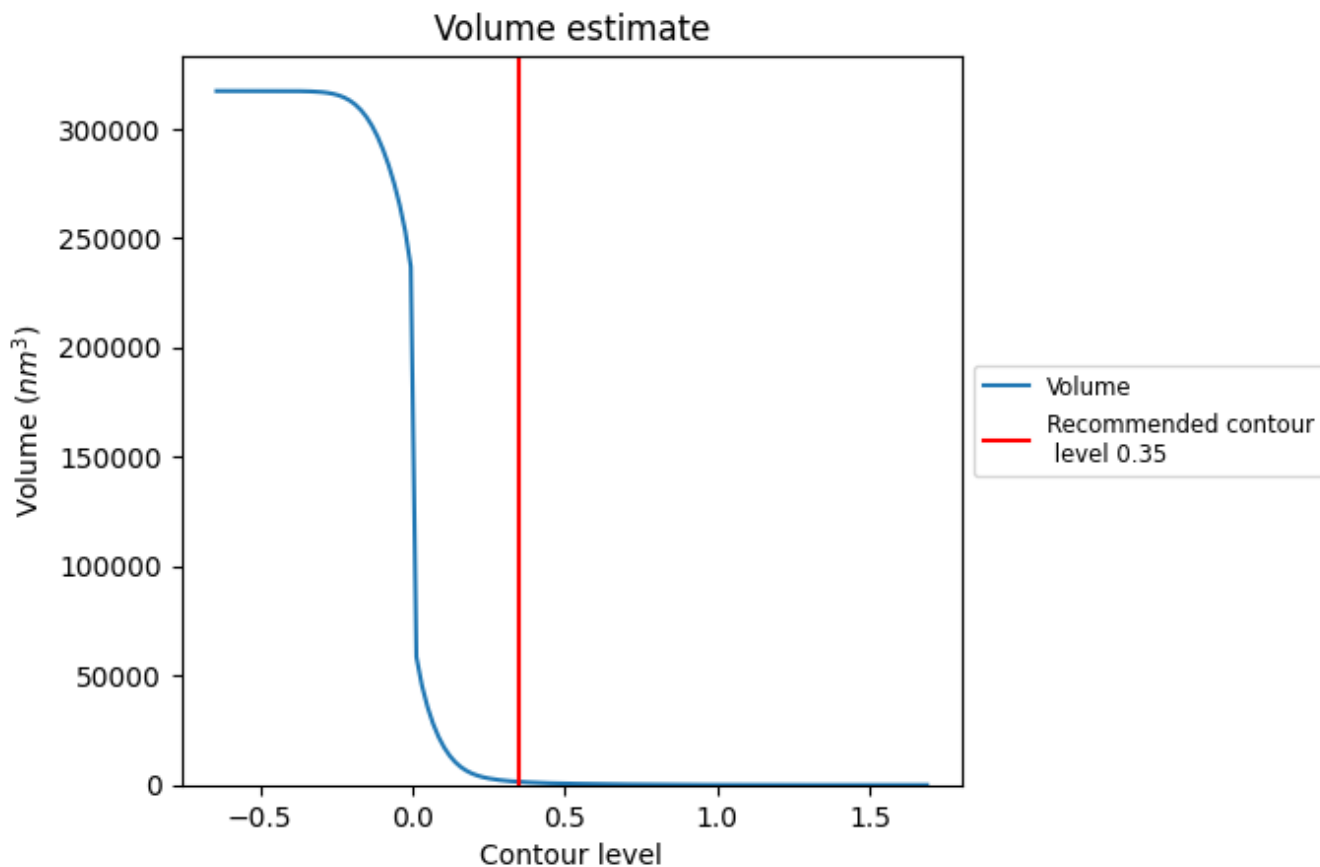
This section contains the results of statistical analysis of the map.

### 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](#)

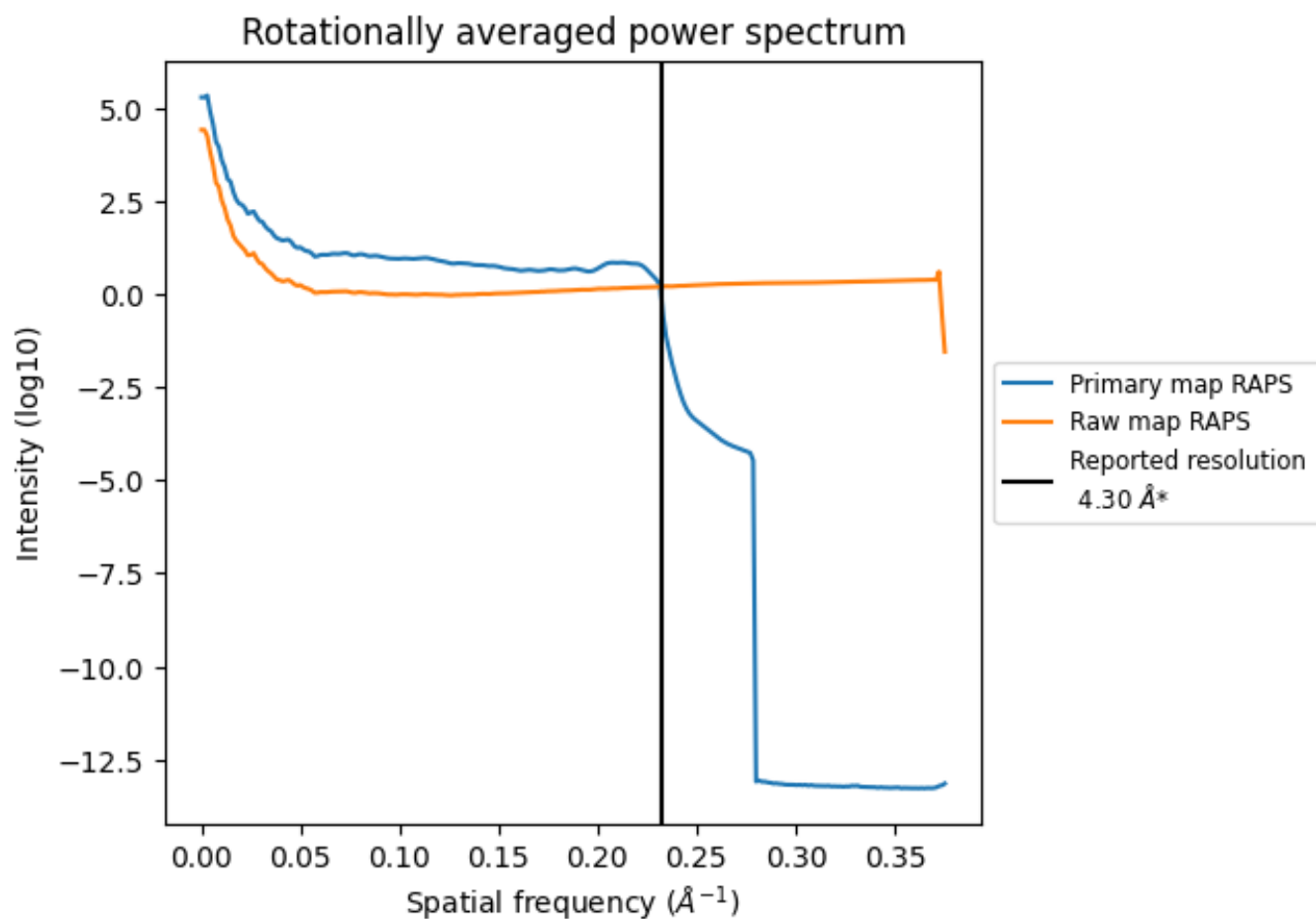


The volume at the recommended contour level is 1439  $\text{nm}^3$ ; this corresponds to an approximate mass of 1300 kDa.

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](#)

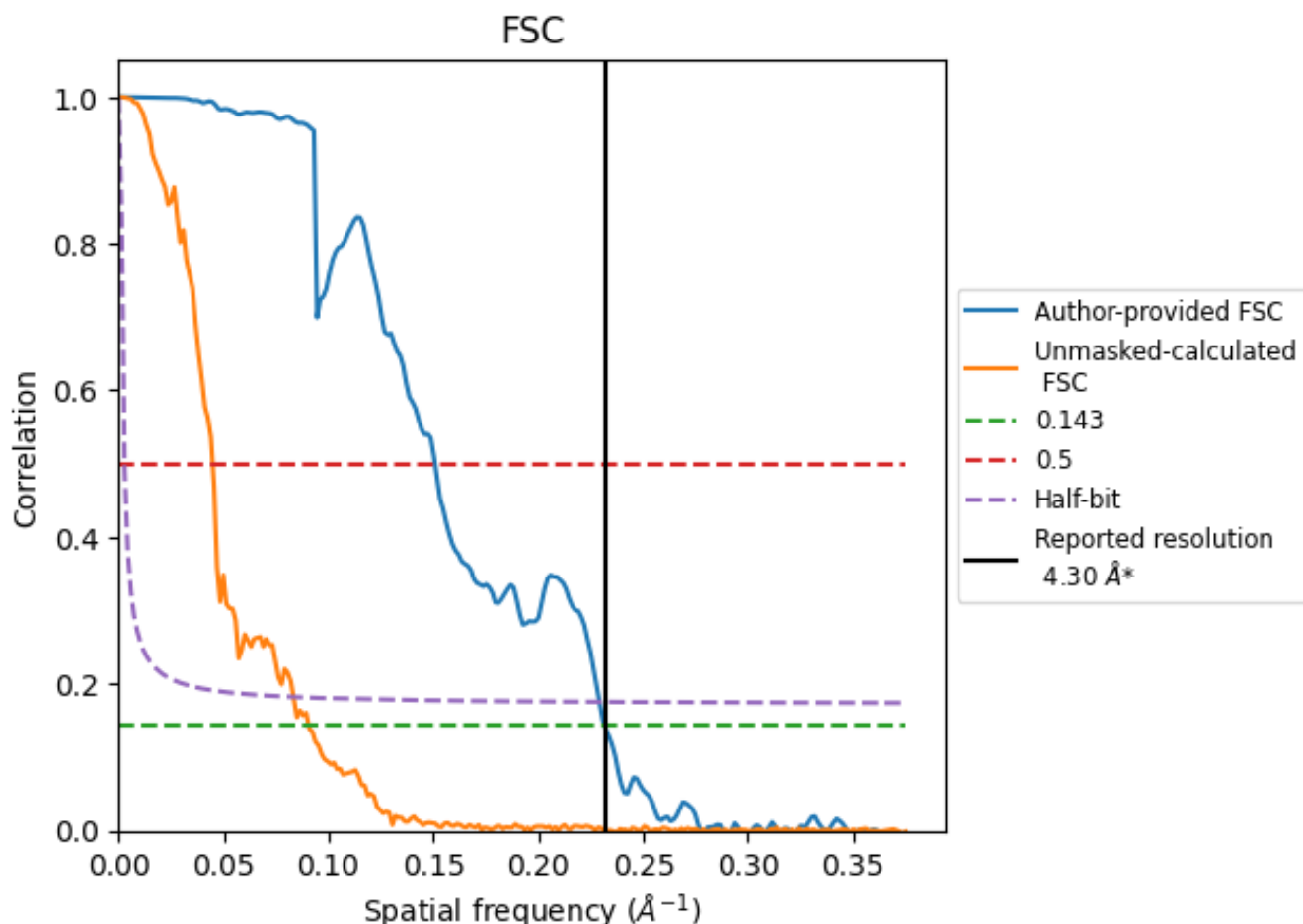


\*Reported resolution corresponds to spatial frequency of 0.233 Å<sup>-1</sup>

## 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 0.233 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.30	-	-
Author-provided FSC curve	4.31	6.63	4.36
Unmasked-calculated*	11.04	22.32	11.99

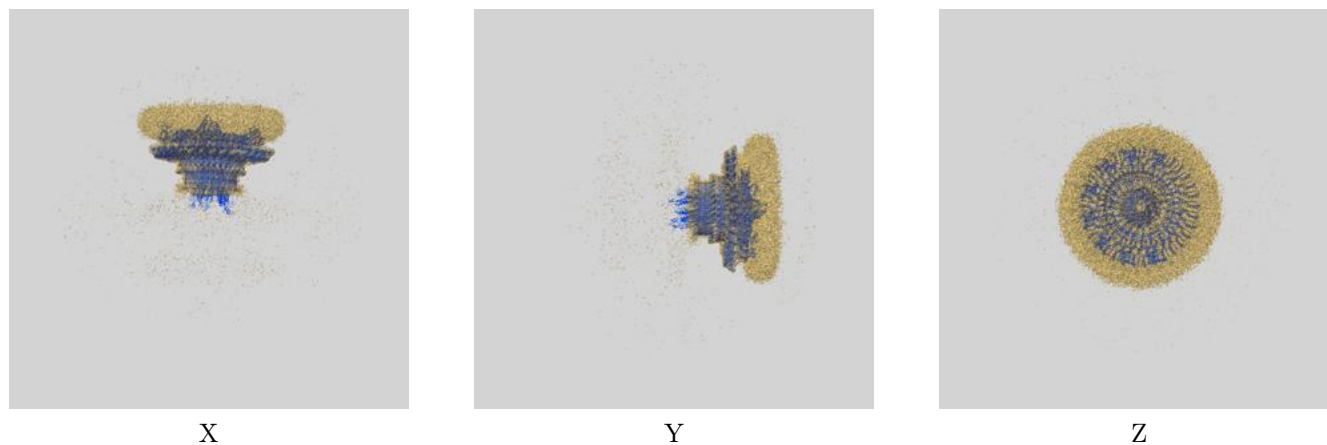
\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 11.04 differs from the reported value 4.3 by more than 10 %



## 9 Map-model fit [i](#)

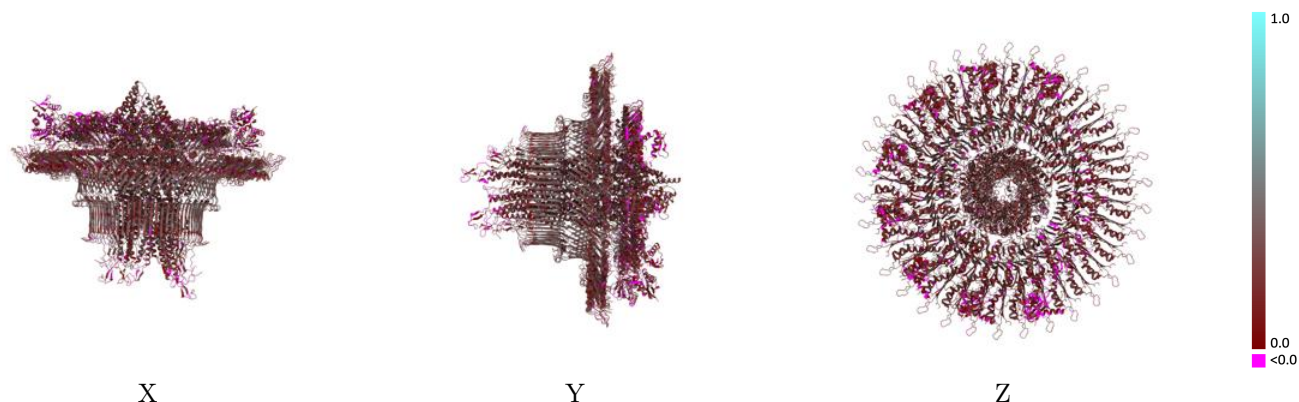
This section contains information regarding the fit between EMDB map EMD-37625 and PDB model 8WLN. Per-residue inclusion information can be found in section [3](#) on page [13](#).

### 9.1 Map-model overlay [i](#)



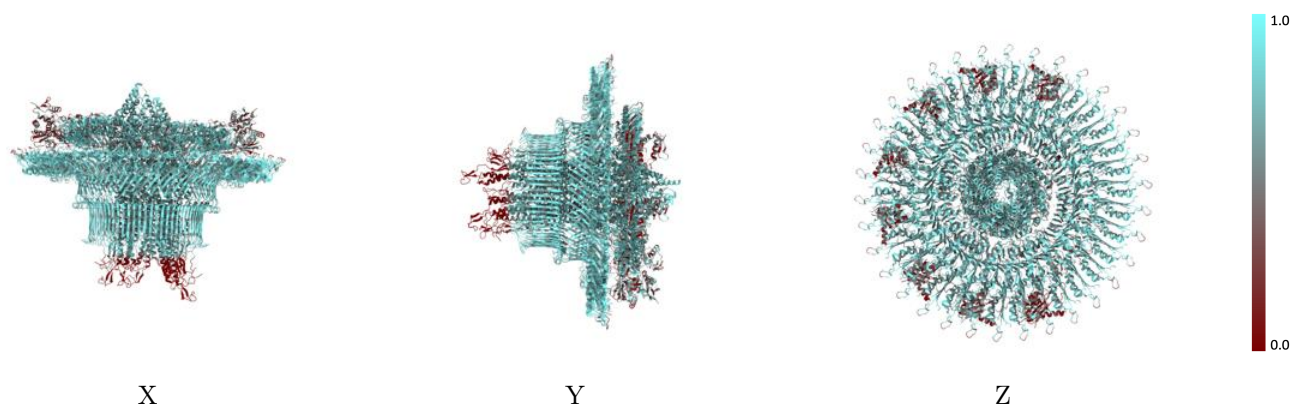
The images above show the 3D surface view of the map at the recommended contour level 0.35 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



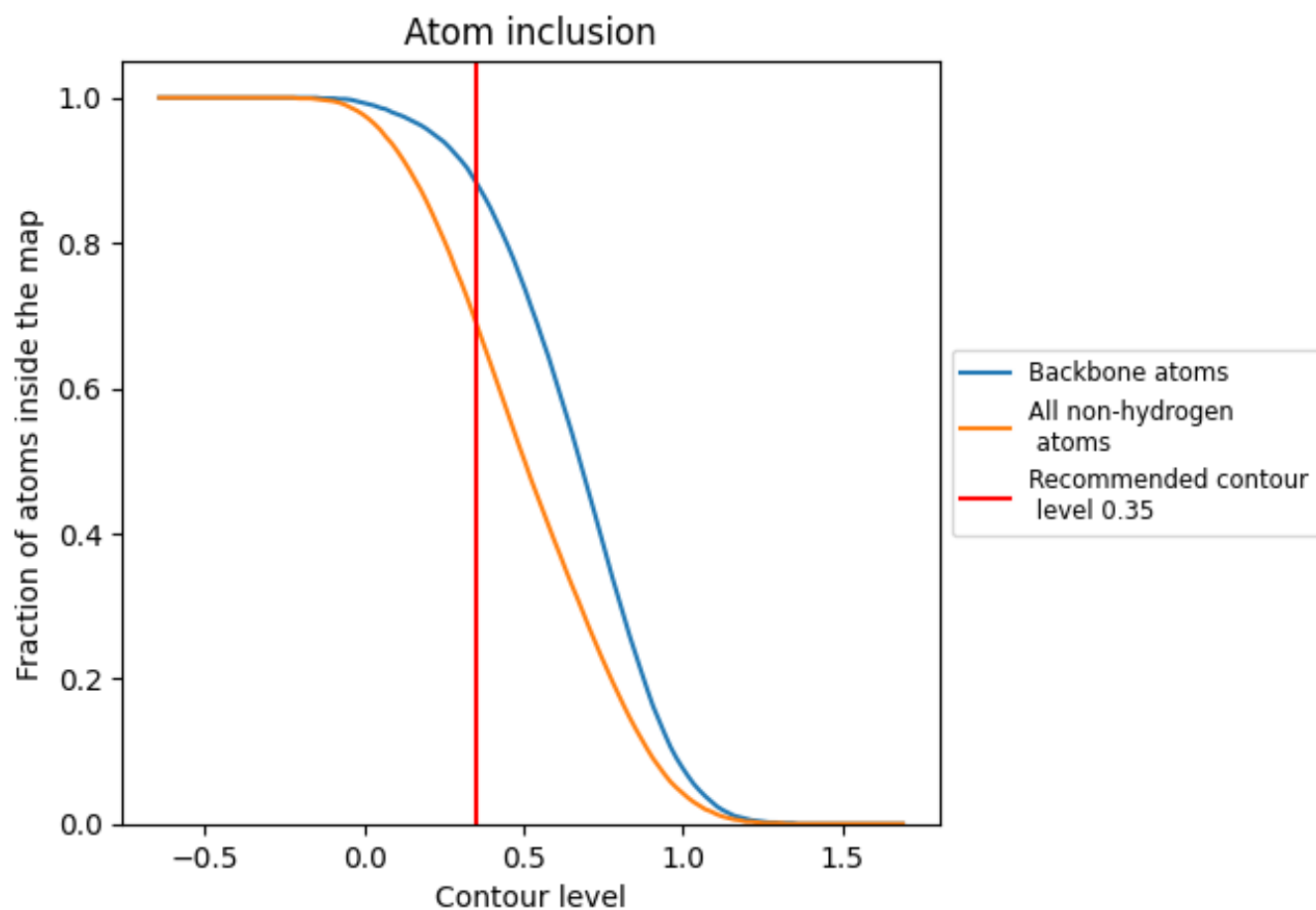
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.35).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 88% of all backbone atoms, 69% 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 (0.35) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6910	 0.2300
0	 0.7850	 0.2680
1	 0.7820	 0.2640
2	 0.8010	 0.2690
3	 0.7770	 0.2700
4	 0.7880	 0.2600
5	 0.7960	 0.2700
6	 0.7780	 0.2560
7	 0.8000	 0.2690
8	 0.7920	 0.2740
9	 0.7870	 0.2720
A	 0.7280	 0.2250
AA	 0.7840	 0.2710
AB	 0.7820	 0.2730
AC	 0.7740	 0.2520
AD	 0.7940	 0.2550
AE	 0.7990	 0.2640
AF	 0.7860	 0.2490
AG	 0.7920	 0.2470
AH	 0.7780	 0.2470
AI	 0.7610	 0.2430
AJ	 0.7780	 0.2430
AK	 0.7750	 0.2530
AL	 0.7720	 0.2590
AM	 0.7690	 0.2500
AN	 0.7790	 0.2600
AO	 0.7880	 0.2670
AP	 0.7760	 0.2600
AQ	 0.7840	 0.2720
B	 0.7460	 0.2500
C	 0.7440	 0.2360
D	 0.7350	 0.2270
E	 0.7390	 0.2560
F	 0.7450	 0.2530
G	 0.7270	 0.2590

























































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Chain	Atom inclusion	Q-score
H	 0.7260	 0.2540
I	 0.7120	 0.2400
J	 0.7190	 0.2570
K	 0.6740	 0.2340
L	 0.7040	 0.2490
M	 0.7150	 0.2610
N	 0.7030	 0.2420
O	 0.6790	 0.2380
P	 0.6840	 0.2430
Q	 0.7010	 0.2740
R	 0.7160	 0.2590
S	 0.6970	 0.2530
T	 0.6920	 0.2440
U	 0.6370	 0.2460
UI	 0.4250	 0.1280
UJ	 0.4330	 0.1430
UK	 0.3790	 0.1290
UL	 0.3740	 0.1060
UM	 0.2750	 0.0510
UN	 0.4210	 0.1180
UO	 0.4140	 0.1210
UP	 0.4600	 0.1050
V	 0.5170	 0.2300
W	 0.4370	 0.2280
WA	 0.7290	 0.2050
WB	 0.7350	 0.2200
WC	 0.7660	 0.2330
WD	 0.7600	 0.2270
WE	 0.7380	 0.2270
WF	 0.7410	 0.2360
WG	 0.7160	 0.2290
WH	 0.6860	 0.2070
WI	 0.6880	 0.1910
WJ	 0.7290	 0.2140
WK	 0.6090	 0.1490
WL	 0.6490	 0.1350
WM	 0.6900	 0.1310
WN	 0.6530	 0.1150
WO	 0.6440	 0.1230
WP	 0.7210	 0.1890
WQ	 0.6840	 0.1910
WR	 0.6950	 0.1920

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Chain	Atom inclusion	Q-score
WS	 0.7280	 0.2010
WT	 0.7170	 0.2000
WU	 0.7080	 0.2140
WV	 0.7340	 0.2110
WW	 0.7400	 0.2270
X	 0.3970	 0.2070
Y	 0.3460	 0.1830
Z	 0.2900	 0.1570
a	 0.2470	 0.1730
b	 0.6420	 0.2240
c	 0.5920	 0.2860
d	 0.5040	 0.2360
e	 0.4950	 0.2290
f	 0.5430	 0.2330
g	 0.3590	 0.1800
h	 0.4860	 0.2200
i	 0.1650	 0.1660
j	 0.5040	 0.2610
k	 0.0780	 0.1140
l	 0.3430	 0.2040
t	 0.7880	 0.2830
u	 0.7920	 0.2790
v	 0.7980	 0.2840
w	 0.8070	 0.2830
x	 0.7960	 0.2770
y	 0.7940	 0.2850
z	 0.7860	 0.2800