Full wwPDB EM Validation Report ⓘ

Jul 3, 2024 – 02:39 am BST

PDB ID	:	7O3T
EMDB ID	:	EMD-12708
Title	:	I-layer structure (TrwF/VirB9NTD, TrwE/VirB10NTD) of the outer membrane core complex from the fully-assembled R388 type IV secretion system determined by cryo-EM.
Authors	:	Mace, K.; Vadakkepat, A.K.; Lukoyanova, N.; Waksman, G.
Deposited on	:	2021-04-03
Resolution	:	3.10 Å(reported)

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

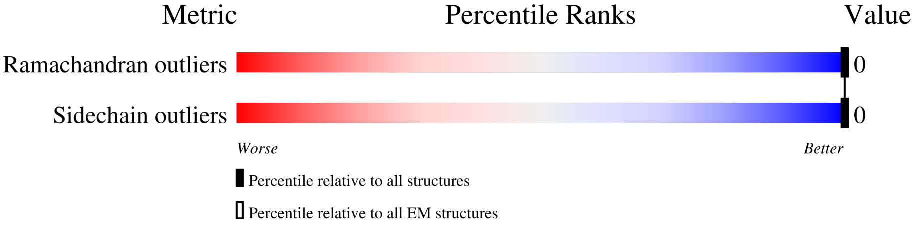
EMDB validation analysis	:	0.0.1.dev92
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

1 Overall quality at a glance

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

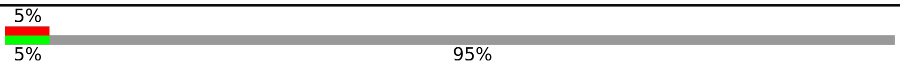
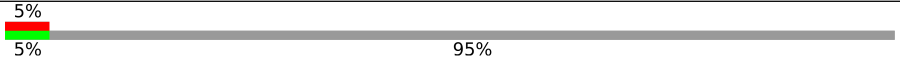
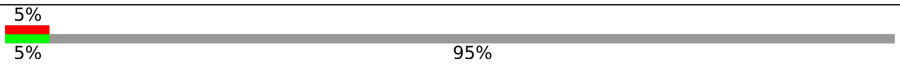
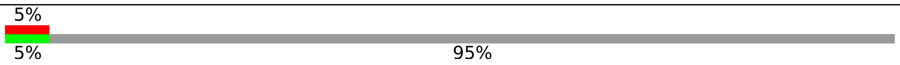
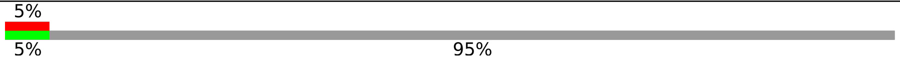
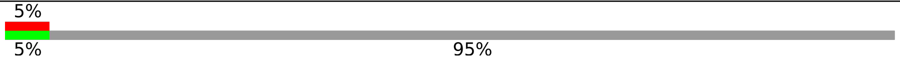
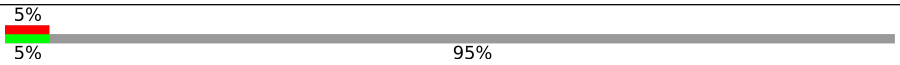
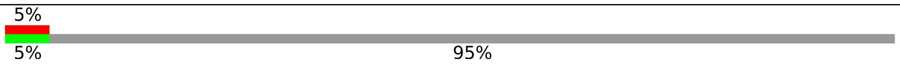
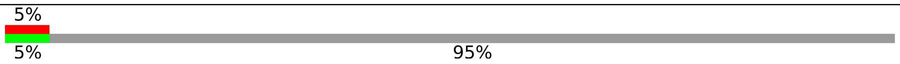
The reported resolution of this entry is 3.10 Å.

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



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

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

Mol	Chain	Length	Quality of chain
1	A	395	
1	D	395	
1	G	395	
1	J	395	
1	M	395	
1	P	395	
1	S	395	
1	V	395	
1	Y	395	

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Mol	Chain	Length	Quality of chain
1	b	395	5% 5% 95%
1	e	395	5% 5% 95%
1	h	395	5% 5% 95%
1	k	395	5% 5% 95%
1	n	395	5% 5% 95%
1	u	395	5% 5% 95%
1	y	395	• 5% 95%
2	B	266	18% 43% 57%
2	E	266	18% 43% 57%
2	H	266	20% 43% 57%
2	K	266	19% 43% 57%
2	N	266	18% 43% 57%
2	Q	266	20% 43% 57%
2	T	266	18% 43% 57%
2	W	266	19% 43% 57%
2	Z	266	17% 43% 57%
2	c	266	18% 43% 57%
2	f	266	21% 43% 57%
2	i	266	18% 43% 57%
2	l	266	17% 43% 57%
2	o	266	18% 43% 57%
2	v	266	20% 43% 57%
2	z	266	20% 43% 57%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 17456 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 TrwE protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	19	149	92	29	27	1	0	0
1	D	19	149	92	29	27	1	0	0
1	G	19	149	92	29	27	1	0	0
1	J	19	149	92	29	27	1	0	0
1	M	19	149	92	29	27	1	0	0
1	P	19	149	92	29	27	1	0	0
1	S	19	149	92	29	27	1	0	0
1	u	19	149	92	29	27	1	0	0
1	V	19	149	92	29	27	1	0	0
1	Y	19	149	92	29	27	1	0	0
1	b	19	149	92	29	27	1	0	0
1	e	19	149	92	29	27	1	0	0
1	h	19	149	92	29	27	1	0	0
1	k	19	149	92	29	27	1	0	0
1	n	19	149	92	29	27	1	0	0
1	y	19	149	92	29	27	1	0	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	335	ASP	ASN	conflict	UNP O50337
D	335	ASP	ASN	conflict	UNP O50337
G	335	ASP	ASN	conflict	UNP O50337
J	335	ASP	ASN	conflict	UNP O50337
M	335	ASP	ASN	conflict	UNP O50337
P	335	ASP	ASN	conflict	UNP O50337
S	335	ASP	ASN	conflict	UNP O50337
u	335	ASP	ASN	conflict	UNP O50337
V	335	ASP	ASN	conflict	UNP O50337
Y	335	ASP	ASN	conflict	UNP O50337
b	335	ASP	ASN	conflict	UNP O50337
e	335	ASP	ASN	conflict	UNP O50337
h	335	ASP	ASN	conflict	UNP O50337
k	335	ASP	ASN	conflict	UNP O50337
n	335	ASP	ASN	conflict	UNP O50337
y	335	ASP	ASN	conflict	UNP O50337

- Molecule 2 is a protein called TrwF protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	E	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	H	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	K	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	N	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	Q	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	T	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	v	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	W	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	Z	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	c	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	f	115	Total 942	C 591	N 173	O 175	S 3	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
2	i	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	l	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	o	115	Total 942	C 591	N 173	O 175	S 3	0	0
2	z	115	Total 942	C 591	N 173	O 175	S 3	0	0

There are 304 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	71	ASP	ILE	conflict	UNP O50336
B	72	SER	PRO	conflict	UNP O50336
B	73	GLU	LYS	conflict	UNP O50336
B	74	ALA	PRO	conflict	UNP O50336
B	75	TYR	MET	conflict	UNP O50336
B	76	ALA	PRO	conflict	UNP O50336
B	77	PHE	LEU	conflict	UNP O50336
B	78	ALA	PRO	conflict	UNP O50336
B	79	ARG	GLY	conflict	UNP O50336
B	80	LYS	ARG	conflict	UNP O50336
B	81	GLY	ALA	conflict	UNP O50336
B	82	ARG	GLY	conflict	UNP O50336
B	83	HIS	ILE	conflict	UNP O50336
B	84	ILE	PHE	conflict	UNP O50336
B	85	PHE	LEU	conflict	UNP O50336
B	86	ILE	SER	conflict	UNP O50336
B	87	LYS	SER	conflict	UNP O50336
B	88	PRO	ARG	conflict	UNP O50336
B	89	GLN	THR	conflict	UNP O50336
E	71	ASP	ILE	conflict	UNP O50336
E	72	SER	PRO	conflict	UNP O50336
E	73	GLU	LYS	conflict	UNP O50336
E	74	ALA	PRO	conflict	UNP O50336
E	75	TYR	MET	conflict	UNP O50336
E	76	ALA	PRO	conflict	UNP O50336
E	77	PHE	LEU	conflict	UNP O50336
E	78	ALA	PRO	conflict	UNP O50336
E	79	ARG	GLY	conflict	UNP O50336
E	80	LYS	ARG	conflict	UNP O50336
E	81	GLY	ALA	conflict	UNP O50336
E	82	ARG	GLY	conflict	UNP O50336

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Chain	Residue	Modelled	Actual	Comment	Reference
E	83	HIS	ILE	conflict	UNP O50336
E	84	ILE	PHE	conflict	UNP O50336
E	85	PHE	LEU	conflict	UNP O50336
E	86	ILE	SER	conflict	UNP O50336
E	87	LYS	SER	conflict	UNP O50336
E	88	PRO	ARG	conflict	UNP O50336
E	89	GLN	THR	conflict	UNP O50336
H	71	ASP	ILE	conflict	UNP O50336
H	72	SER	PRO	conflict	UNP O50336
H	73	GLU	LYS	conflict	UNP O50336
H	74	ALA	PRO	conflict	UNP O50336
H	75	TYR	MET	conflict	UNP O50336
H	76	ALA	PRO	conflict	UNP O50336
H	77	PHE	LEU	conflict	UNP O50336
H	78	ALA	PRO	conflict	UNP O50336
H	79	ARG	GLY	conflict	UNP O50336
H	80	LYS	ARG	conflict	UNP O50336
H	81	GLY	ALA	conflict	UNP O50336
H	82	ARG	GLY	conflict	UNP O50336
H	83	HIS	ILE	conflict	UNP O50336
H	84	ILE	PHE	conflict	UNP O50336
H	85	PHE	LEU	conflict	UNP O50336
H	86	ILE	SER	conflict	UNP O50336
H	87	LYS	SER	conflict	UNP O50336
H	88	PRO	ARG	conflict	UNP O50336
H	89	GLN	THR	conflict	UNP O50336
K	71	ASP	ILE	conflict	UNP O50336
K	72	SER	PRO	conflict	UNP O50336
K	73	GLU	LYS	conflict	UNP O50336
K	74	ALA	PRO	conflict	UNP O50336
K	75	TYR	MET	conflict	UNP O50336
K	76	ALA	PRO	conflict	UNP O50336
K	77	PHE	LEU	conflict	UNP O50336
K	78	ALA	PRO	conflict	UNP O50336
K	79	ARG	GLY	conflict	UNP O50336
K	80	LYS	ARG	conflict	UNP O50336
K	81	GLY	ALA	conflict	UNP O50336
K	82	ARG	GLY	conflict	UNP O50336
K	83	HIS	ILE	conflict	UNP O50336
K	84	ILE	PHE	conflict	UNP O50336
K	85	PHE	LEU	conflict	UNP O50336
K	86	ILE	SER	conflict	UNP O50336

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Chain	Residue	Modelled	Actual	Comment	Reference
K	87	LYS	SER	conflict	UNP O50336
K	88	PRO	ARG	conflict	UNP O50336
K	89	GLN	THR	conflict	UNP O50336
N	71	ASP	ILE	conflict	UNP O50336
N	72	SER	PRO	conflict	UNP O50336
N	73	GLU	LYS	conflict	UNP O50336
N	74	ALA	PRO	conflict	UNP O50336
N	75	TYR	MET	conflict	UNP O50336
N	76	ALA	PRO	conflict	UNP O50336
N	77	PHE	LEU	conflict	UNP O50336
N	78	ALA	PRO	conflict	UNP O50336
N	79	ARG	GLY	conflict	UNP O50336
N	80	LYS	ARG	conflict	UNP O50336
N	81	GLY	ALA	conflict	UNP O50336
N	82	ARG	GLY	conflict	UNP O50336
N	83	HIS	ILE	conflict	UNP O50336
N	84	ILE	PHE	conflict	UNP O50336
N	85	PHE	LEU	conflict	UNP O50336
N	86	ILE	SER	conflict	UNP O50336
N	87	LYS	SER	conflict	UNP O50336
N	88	PRO	ARG	conflict	UNP O50336
N	89	GLN	THR	conflict	UNP O50336
Q	71	ASP	ILE	conflict	UNP O50336
Q	72	SER	PRO	conflict	UNP O50336
Q	73	GLU	LYS	conflict	UNP O50336
Q	74	ALA	PRO	conflict	UNP O50336
Q	75	TYR	MET	conflict	UNP O50336
Q	76	ALA	PRO	conflict	UNP O50336
Q	77	PHE	LEU	conflict	UNP O50336
Q	78	ALA	PRO	conflict	UNP O50336
Q	79	ARG	GLY	conflict	UNP O50336
Q	80	LYS	ARG	conflict	UNP O50336
Q	81	GLY	ALA	conflict	UNP O50336
Q	82	ARG	GLY	conflict	UNP O50336
Q	83	HIS	ILE	conflict	UNP O50336
Q	84	ILE	PHE	conflict	UNP O50336
Q	85	PHE	LEU	conflict	UNP O50336
Q	86	ILE	SER	conflict	UNP O50336
Q	87	LYS	SER	conflict	UNP O50336
Q	88	PRO	ARG	conflict	UNP O50336
Q	89	GLN	THR	conflict	UNP O50336
T	71	ASP	ILE	conflict	UNP O50336

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Chain	Residue	Modelled	Actual	Comment	Reference
T	72	SER	PRO	conflict	UNP O50336
T	73	GLU	LYS	conflict	UNP O50336
T	74	ALA	PRO	conflict	UNP O50336
T	75	TYR	MET	conflict	UNP O50336
T	76	ALA	PRO	conflict	UNP O50336
T	77	PHE	LEU	conflict	UNP O50336
T	78	ALA	PRO	conflict	UNP O50336
T	79	ARG	GLY	conflict	UNP O50336
T	80	LYS	ARG	conflict	UNP O50336
T	81	GLY	ALA	conflict	UNP O50336
T	82	ARG	GLY	conflict	UNP O50336
T	83	HIS	ILE	conflict	UNP O50336
T	84	ILE	PHE	conflict	UNP O50336
T	85	PHE	LEU	conflict	UNP O50336
T	86	ILE	SER	conflict	UNP O50336
T	87	LYS	SER	conflict	UNP O50336
T	88	PRO	ARG	conflict	UNP O50336
T	89	GLN	THR	conflict	UNP O50336
v	71	ASP	ILE	conflict	UNP O50336
v	72	SER	PRO	conflict	UNP O50336
v	73	GLU	LYS	conflict	UNP O50336
v	74	ALA	PRO	conflict	UNP O50336
v	75	TYR	MET	conflict	UNP O50336
v	76	ALA	PRO	conflict	UNP O50336
v	77	PHE	LEU	conflict	UNP O50336
v	78	ALA	PRO	conflict	UNP O50336
v	79	ARG	GLY	conflict	UNP O50336
v	80	LYS	ARG	conflict	UNP O50336
v	81	GLY	ALA	conflict	UNP O50336
v	82	ARG	GLY	conflict	UNP O50336
v	83	HIS	ILE	conflict	UNP O50336
v	84	ILE	PHE	conflict	UNP O50336
v	85	PHE	LEU	conflict	UNP O50336
v	86	ILE	SER	conflict	UNP O50336
v	87	LYS	SER	conflict	UNP O50336
v	88	PRO	ARG	conflict	UNP O50336
v	89	GLN	THR	conflict	UNP O50336
W	71	ASP	ILE	conflict	UNP O50336
W	72	SER	PRO	conflict	UNP O50336
W	73	GLU	LYS	conflict	UNP O50336
W	74	ALA	PRO	conflict	UNP O50336
W	75	TYR	MET	conflict	UNP O50336

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Chain	Residue	Modelled	Actual	Comment	Reference
W	76	ALA	PRO	conflict	UNP O50336
W	77	PHE	LEU	conflict	UNP O50336
W	78	ALA	PRO	conflict	UNP O50336
W	79	ARG	GLY	conflict	UNP O50336
W	80	LYS	ARG	conflict	UNP O50336
W	81	GLY	ALA	conflict	UNP O50336
W	82	ARG	GLY	conflict	UNP O50336
W	83	HIS	ILE	conflict	UNP O50336
W	84	ILE	PHE	conflict	UNP O50336
W	85	PHE	LEU	conflict	UNP O50336
W	86	ILE	SER	conflict	UNP O50336
W	87	LYS	SER	conflict	UNP O50336
W	88	PRO	ARG	conflict	UNP O50336
W	89	GLN	THR	conflict	UNP O50336
Z	71	ASP	ILE	conflict	UNP O50336
Z	72	SER	PRO	conflict	UNP O50336
Z	73	GLU	LYS	conflict	UNP O50336
Z	74	ALA	PRO	conflict	UNP O50336
Z	75	TYR	MET	conflict	UNP O50336
Z	76	ALA	PRO	conflict	UNP O50336
Z	77	PHE	LEU	conflict	UNP O50336
Z	78	ALA	PRO	conflict	UNP O50336
Z	79	ARG	GLY	conflict	UNP O50336
Z	80	LYS	ARG	conflict	UNP O50336
Z	81	GLY	ALA	conflict	UNP O50336
Z	82	ARG	GLY	conflict	UNP O50336
Z	83	HIS	ILE	conflict	UNP O50336
Z	84	ILE	PHE	conflict	UNP O50336
Z	85	PHE	LEU	conflict	UNP O50336
Z	86	ILE	SER	conflict	UNP O50336
Z	87	LYS	SER	conflict	UNP O50336
Z	88	PRO	ARG	conflict	UNP O50336
Z	89	GLN	THR	conflict	UNP O50336
c	71	ASP	ILE	conflict	UNP O50336
c	72	SER	PRO	conflict	UNP O50336
c	73	GLU	LYS	conflict	UNP O50336
c	74	ALA	PRO	conflict	UNP O50336
c	75	TYR	MET	conflict	UNP O50336
c	76	ALA	PRO	conflict	UNP O50336
c	77	PHE	LEU	conflict	UNP O50336
c	78	ALA	PRO	conflict	UNP O50336
c	79	ARG	GLY	conflict	UNP O50336

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Chain	Residue	Modelled	Actual	Comment	Reference
c	80	LYS	ARG	conflict	UNP O50336
c	81	GLY	ALA	conflict	UNP O50336
c	82	ARG	GLY	conflict	UNP O50336
c	83	HIS	ILE	conflict	UNP O50336
c	84	ILE	PHE	conflict	UNP O50336
c	85	PHE	LEU	conflict	UNP O50336
c	86	ILE	SER	conflict	UNP O50336
c	87	LYS	SER	conflict	UNP O50336
c	88	PRO	ARG	conflict	UNP O50336
c	89	GLN	THR	conflict	UNP O50336
f	71	ASP	ILE	conflict	UNP O50336
f	72	SER	PRO	conflict	UNP O50336
f	73	GLU	LYS	conflict	UNP O50336
f	74	ALA	PRO	conflict	UNP O50336
f	75	TYR	MET	conflict	UNP O50336
f	76	ALA	PRO	conflict	UNP O50336
f	77	PHE	LEU	conflict	UNP O50336
f	78	ALA	PRO	conflict	UNP O50336
f	79	ARG	GLY	conflict	UNP O50336
f	80	LYS	ARG	conflict	UNP O50336
f	81	GLY	ALA	conflict	UNP O50336
f	82	ARG	GLY	conflict	UNP O50336
f	83	HIS	ILE	conflict	UNP O50336
f	84	ILE	PHE	conflict	UNP O50336
f	85	PHE	LEU	conflict	UNP O50336
f	86	ILE	SER	conflict	UNP O50336
f	87	LYS	SER	conflict	UNP O50336
f	88	PRO	ARG	conflict	UNP O50336
f	89	GLN	THR	conflict	UNP O50336
i	71	ASP	ILE	conflict	UNP O50336
i	72	SER	PRO	conflict	UNP O50336
i	73	GLU	LYS	conflict	UNP O50336
i	74	ALA	PRO	conflict	UNP O50336
i	75	TYR	MET	conflict	UNP O50336
i	76	ALA	PRO	conflict	UNP O50336
i	77	PHE	LEU	conflict	UNP O50336
i	78	ALA	PRO	conflict	UNP O50336
i	79	ARG	GLY	conflict	UNP O50336
i	80	LYS	ARG	conflict	UNP O50336
i	81	GLY	ALA	conflict	UNP O50336
i	82	ARG	GLY	conflict	UNP O50336
i	83	HIS	ILE	conflict	UNP O50336

Continued on next page...

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Chain	Residue	Modelled	Actual	Comment	Reference
i	84	ILE	PHE	conflict	UNP O50336
i	85	PHE	LEU	conflict	UNP O50336
i	86	ILE	SER	conflict	UNP O50336
i	87	LYS	SER	conflict	UNP O50336
i	88	PRO	ARG	conflict	UNP O50336
i	89	GLN	THR	conflict	UNP O50336
l	71	ASP	ILE	conflict	UNP O50336
l	72	SER	PRO	conflict	UNP O50336
l	73	GLU	LYS	conflict	UNP O50336
l	74	ALA	PRO	conflict	UNP O50336
l	75	TYR	MET	conflict	UNP O50336
l	76	ALA	PRO	conflict	UNP O50336
l	77	PHE	LEU	conflict	UNP O50336
l	78	ALA	PRO	conflict	UNP O50336
l	79	ARG	GLY	conflict	UNP O50336
l	80	LYS	ARG	conflict	UNP O50336
l	81	GLY	ALA	conflict	UNP O50336
l	82	ARG	GLY	conflict	UNP O50336
l	83	HIS	ILE	conflict	UNP O50336
l	84	ILE	PHE	conflict	UNP O50336
l	85	PHE	LEU	conflict	UNP O50336
l	86	ILE	SER	conflict	UNP O50336
l	87	LYS	SER	conflict	UNP O50336
l	88	PRO	ARG	conflict	UNP O50336
l	89	GLN	THR	conflict	UNP O50336
o	71	ASP	ILE	conflict	UNP O50336
o	72	SER	PRO	conflict	UNP O50336
o	73	GLU	LYS	conflict	UNP O50336
o	74	ALA	PRO	conflict	UNP O50336
o	75	TYR	MET	conflict	UNP O50336
o	76	ALA	PRO	conflict	UNP O50336
o	77	PHE	LEU	conflict	UNP O50336
o	78	ALA	PRO	conflict	UNP O50336
o	79	ARG	GLY	conflict	UNP O50336
o	80	LYS	ARG	conflict	UNP O50336
o	81	GLY	ALA	conflict	UNP O50336
o	82	ARG	GLY	conflict	UNP O50336
o	83	HIS	ILE	conflict	UNP O50336
o	84	ILE	PHE	conflict	UNP O50336
o	85	PHE	LEU	conflict	UNP O50336
o	86	ILE	SER	conflict	UNP O50336
o	87	LYS	SER	conflict	UNP O50336

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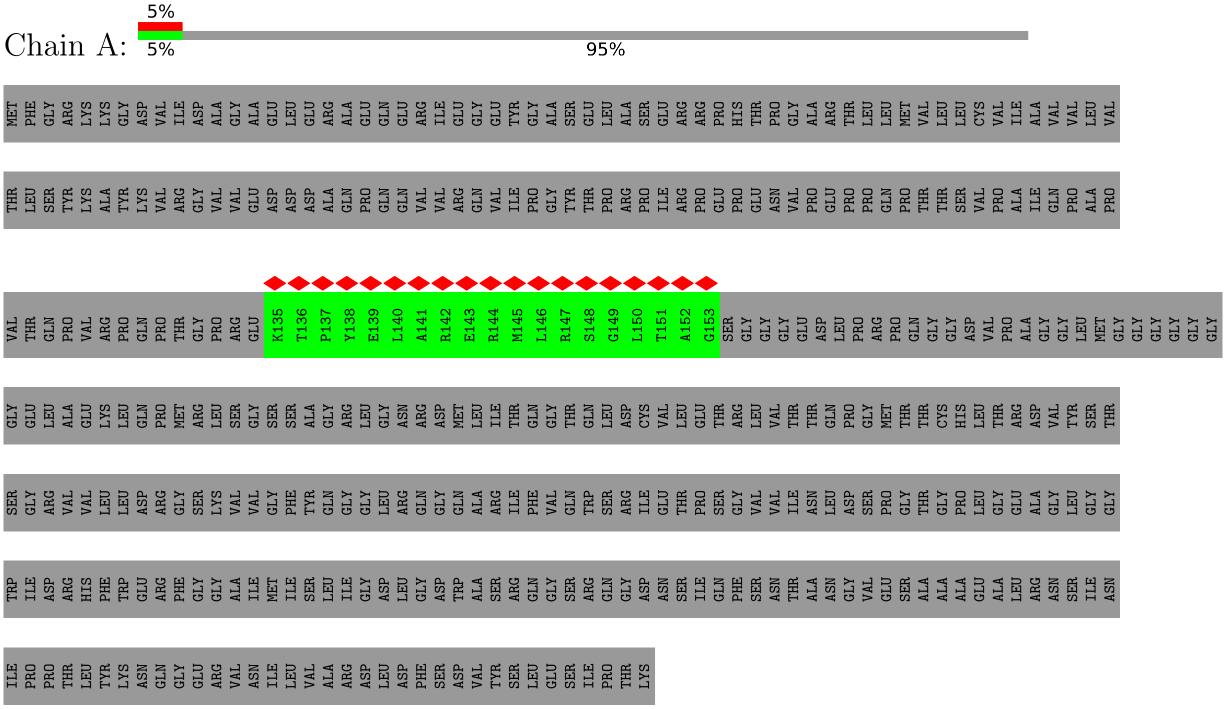
Chain	Residue	Modelled	Actual	Comment	Reference
o	88	PRO	ARG	conflict	UNP O50336
o	89	GLN	THR	conflict	UNP O50336
z	71	ASP	ILE	conflict	UNP O50336
z	72	SER	PRO	conflict	UNP O50336
z	73	GLU	LYS	conflict	UNP O50336
z	74	ALA	PRO	conflict	UNP O50336
z	75	TYR	MET	conflict	UNP O50336
z	76	ALA	PRO	conflict	UNP O50336
z	77	PHE	LEU	conflict	UNP O50336
z	78	ALA	PRO	conflict	UNP O50336
z	79	ARG	GLY	conflict	UNP O50336
z	80	LYS	ARG	conflict	UNP O50336
z	81	GLY	ALA	conflict	UNP O50336
z	82	ARG	GLY	conflict	UNP O50336
z	83	HIS	ILE	conflict	UNP O50336
z	84	ILE	PHE	conflict	UNP O50336
z	85	PHE	LEU	conflict	UNP O50336
z	86	ILE	SER	conflict	UNP O50336
z	87	LYS	SER	conflict	UNP O50336
z	88	PRO	ARG	conflict	UNP O50336
z	89	GLN	THR	conflict	UNP O50336

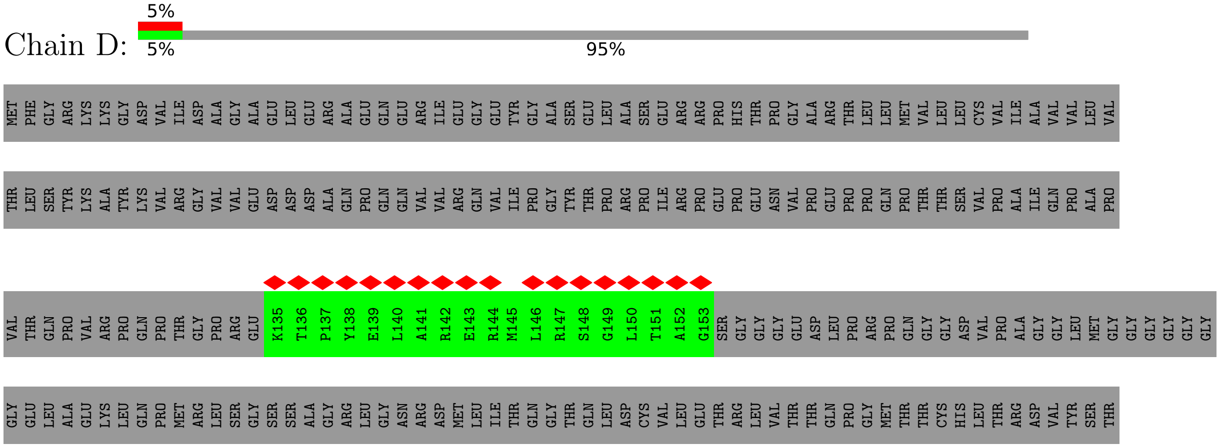
3 Residue-property plots ⓘ

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.

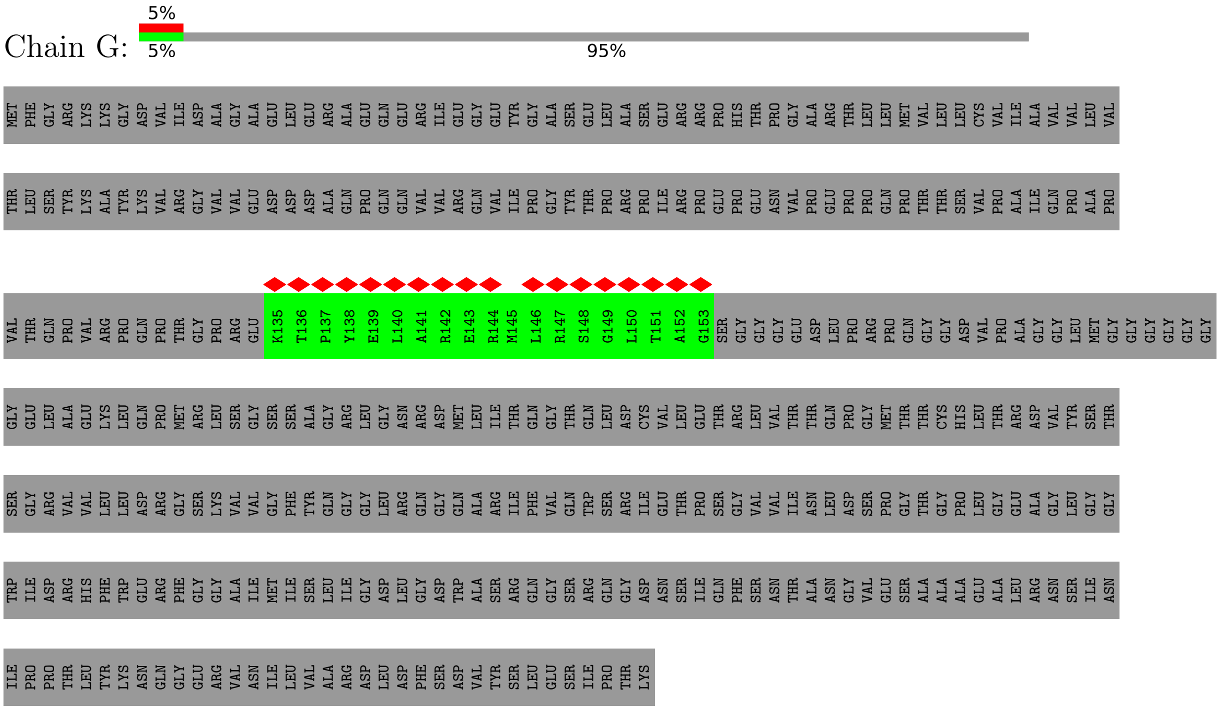
- Molecule 1: TrwE protein



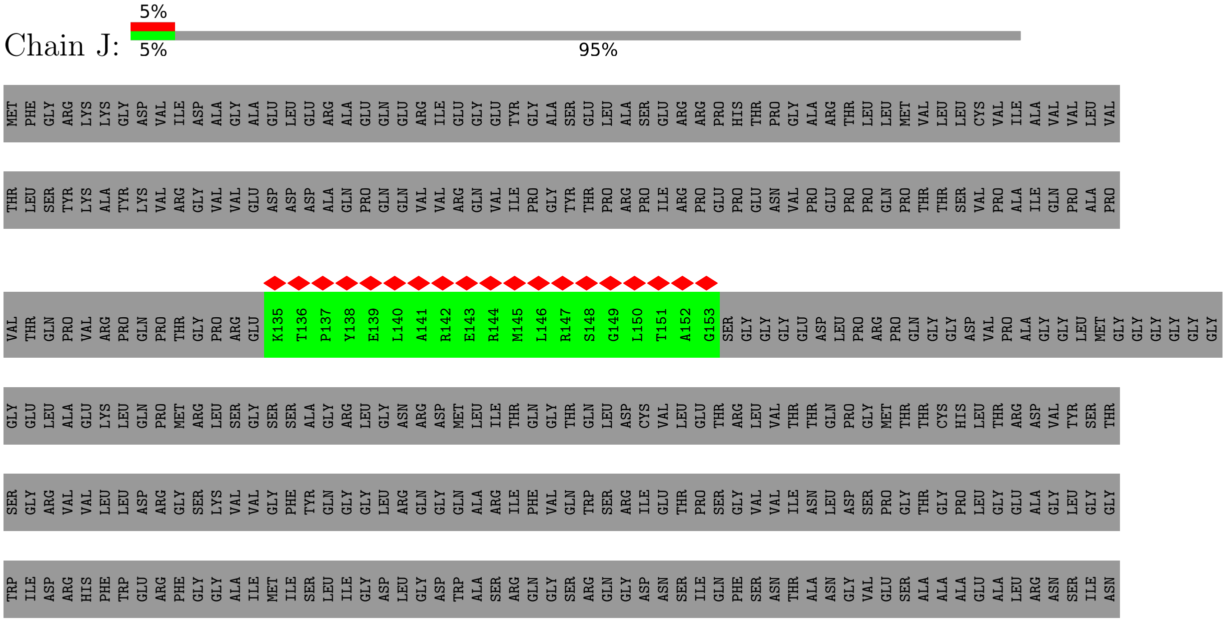
- Molecule 1: TrwE protein



- Molecule 1: TrwE protein



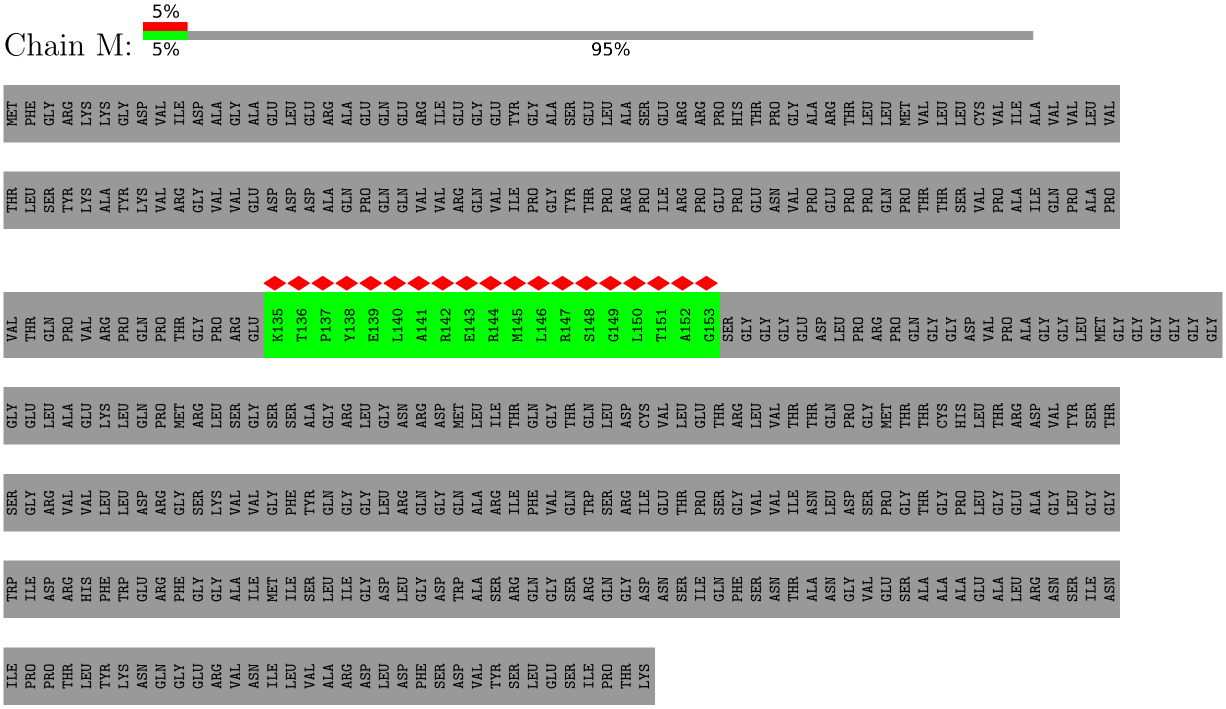
- Molecule 1: TrwE protein




ILE PRO PRO THR LEU TYR LYS ASN GLN GLY GLU ARG VAL ASN ILE LEU VAL ALA ARG ASP LEU ASP PHE SER ASP VAL TYR SER LEU GLU SER ILE PRO THR LYS

- Molecule 1: TrwE protein

Chain M:



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THR LEU SER TYR LYS ALA TYR LYS VAL ARG GLY VAL VAL GLU ASP ASP ALA GLN PRO GLN GLN VAL VAL ARG GLN VAL ILE PRO GLY TYR THR PRO ARG PRO ILE ARG PRO GLU PRO GLU ASN VAL PRO GLU PRO PRO GLN PRO THR THR SER VAL PRO ALA ILE GLN PRO ALA PRO

VAL THR GLN PRO VAL ARG PRO GLN PRO THR GLY PRO ARG GLU K135 T136 P137 Y138 E139 L140 A141 R142 E143 R144 M145 L146 R147 S148 G149 L150 T151 A152 G153 SER GLY GLY GLU ASP LEU PRO ARG PRO GLN GLY GLY ASP VAL PRO ALA GLY LEU MET GLY GLY GLY GLY GLY

GLY GLU LEU ALA GLU LYS LEU GLN PRO MET ARG LEU SER GLY SER SER ALA GLY ARG LEU GLY ASN ARG ASP MET LEU ILE THR GLN GLY THR GLN LEU ASP CYS VAL LEU GLU THR ARG LEU VAL THR THR GLN PRO GLY MET THR THR CYS HIS LEU THR ARG ASP VAL TYR SER THR

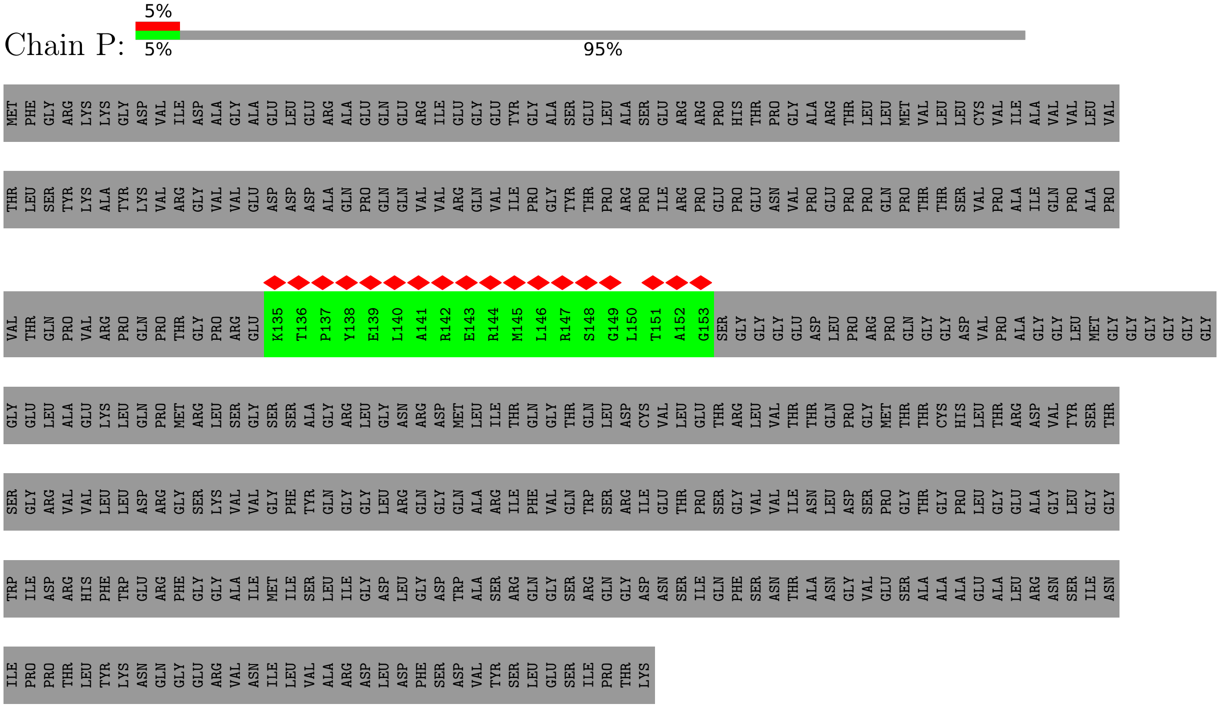
SER GLY ARG VAL VAL LEU LEU ASP ARG GLY SER LYS VAL VAL GLY PHE TYR GLN GLY GLY LEU ARG GLN GLY GLN ALA ARG ILE PHE VAL GLN TRP SER ARG ILE GLU THR PRO SER GLY VAL VAL ILE ASN LEU ASP SER PRO GLY THR GLY PRO LEU GLY GLU ALA GLY LEU GLY GLY

TRP ILE ASP ARG HIS PHE TRP GLU ARG PHE GLY GLY ALA ILE MET ILE SER LEU ILE GLY ASP LEU GLY ASP TRP ALA SER ARG GLN GLY SER ARG GLN GLY ASP ASN SER ILE GLN PHE SER ASN THR ALA ASN GLY VAL GLU SER ALA ALA ALA GLU ALA LEU ARG ASN SER ILE ASN

ILE PRO PRO THR LEU TYR LYS ASN GLN GLY GLU ARG VAL ASN ILE LEU VAL ALA ARG ASP LEU ASP PHE SER ASP VAL TYR SER LEU GLU SER ILE PRO THR LYS

- Molecule 1: TrwE protein

Chain P:



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THR LEU SER TYR LYS ALA TYR LYS VAL ARG GLY VAL VAL GLU ASP ASP ALA GLN PRO GLN GLN VAL VAL ARG GLN VAL ILE PRO GLY TYR THR PRO ARG PRO ILE ARG PRO GLU PRO GLU ASN VAL PRO GLU PRO PRO GLN PRO THR THR SER VAL PRO ALA ILE GLN PRO ALA PRO

VAL THR GLN PRO VAL ARG PRO GLN PRO THR GLY PRO ARG GLU K135 T136 P137 Y138 E139 L140 A141 R142 E143 R144 M145 L146 R147 S148 G149 L150 T151 A152 G153 SER GLY GLY GLU ASP LEU PRO ARG PRO GLN GLY GLY ASP VAL PRO ALA GLY LEU MET GLY GLY GLY GLY GLY

GLY GLU LEU ALA GLU LYS LEU GLN PRO MET ARG LEU SER GLY SER SER ALA GLY ARG LEU GLY ASN ARG ASP MET LEU ILE THR GLN GLY THR GLN LEU ASP CYS VAL LEU GLU THR ARG LEU VAL THR THR GLN PRO GLY MET THR THR CYS HIS LEU THR ARG ASP VAL TYR SER THR

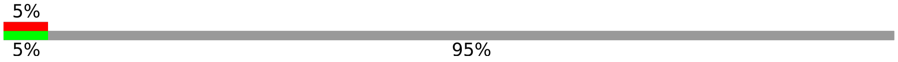
SER GLY ARG VAL VAL LEU LEU ASP ARG GLY SER LYS VAL VAL GLY PHE TYR GLN GLY GLY LEU ARG GLN GLY GLN ALA ARG ILE PHE VAL GLN TRP SER ARG ILE GLU THR PRO SER GLY VAL VAL ILE ASN LEU ASP SER PRO GLY THR GLY PRO LEU GLY GLU ALA GLY LEU GLY GLY

TRP ILE ASP ARG HIS PHE TRP GLU ARG PHE GLY GLY ALA ILE MET ILE SER LEU ILE GLY ASP LEU GLY ASP TRP ALA SER ARG GLN GLY SER ARG GLN GLY ASP ASN SER ILE GLN PHE SER ASN THR ALA ASN GLY VAL GLU SER ALA ALA ALA GLU ALA LEU ARG ASN SER ILE ASN

ILE PRO PRO THR LEU TYR LYS ASN GLN GLY GLU ARG VAL ASN ILE LEU VAL ALA ARG ASP LEU ASP PHE SER ASP VAL TYR SER LEU GLU SER ILE PRO THR LYS

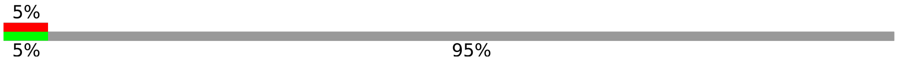
- Molecule 1: TrwE protein

Chain S:



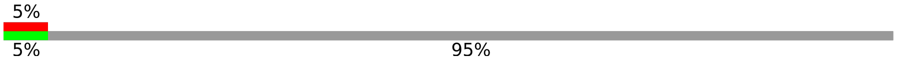
- Molecule 1: TrwE protein

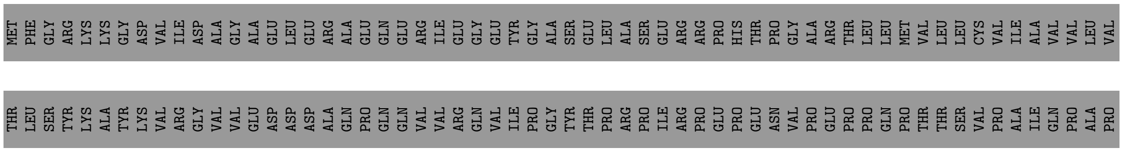
Chain u:

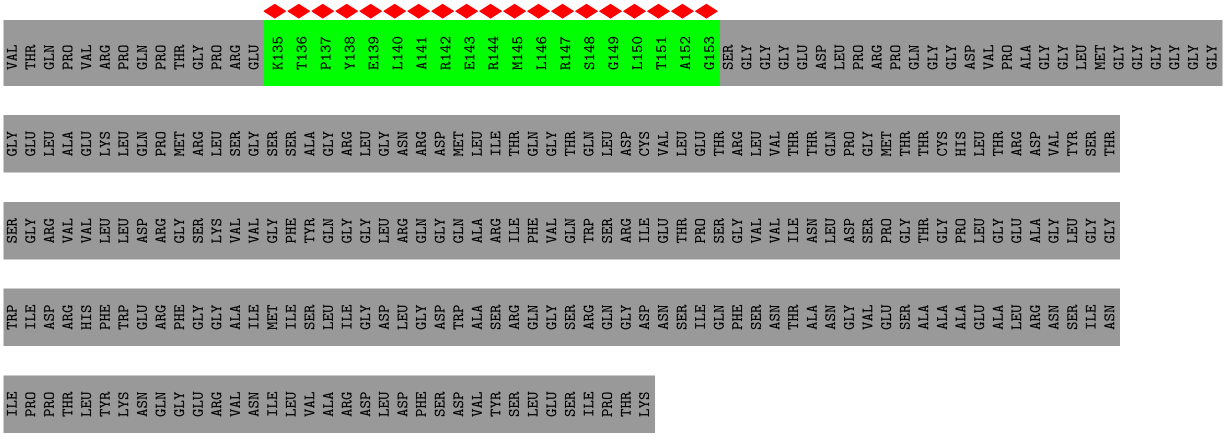


- Molecule 1: TrwE protein

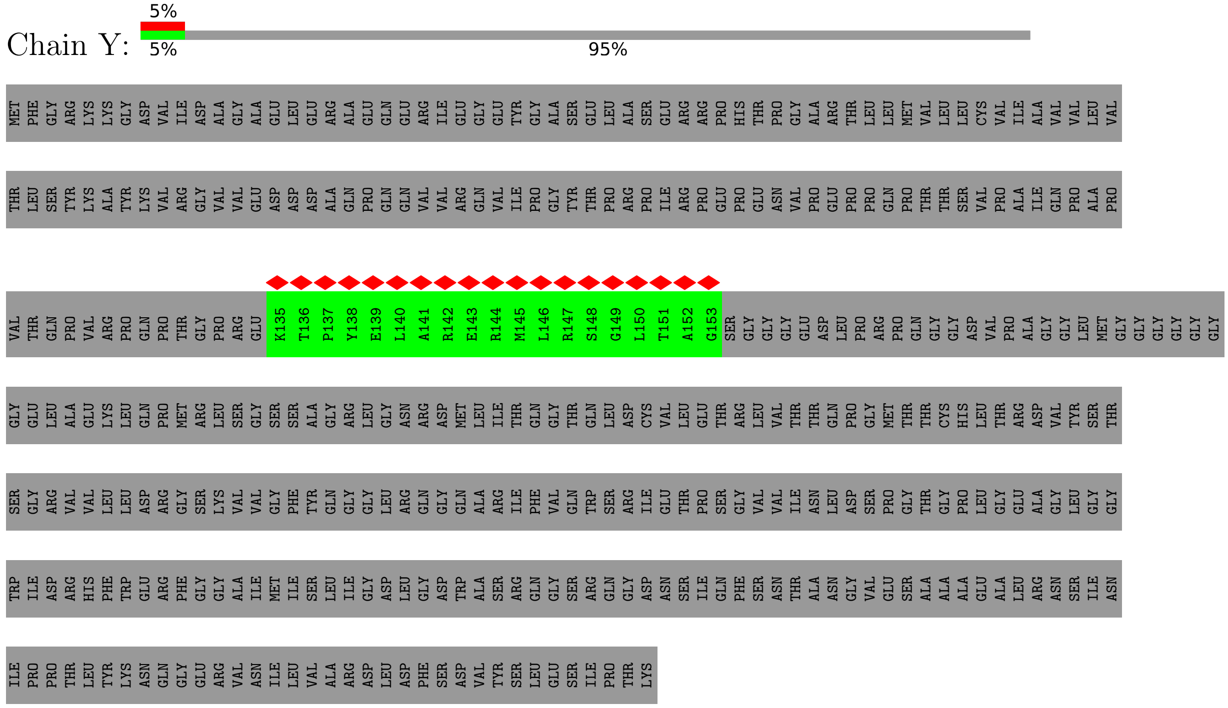
Chain V:



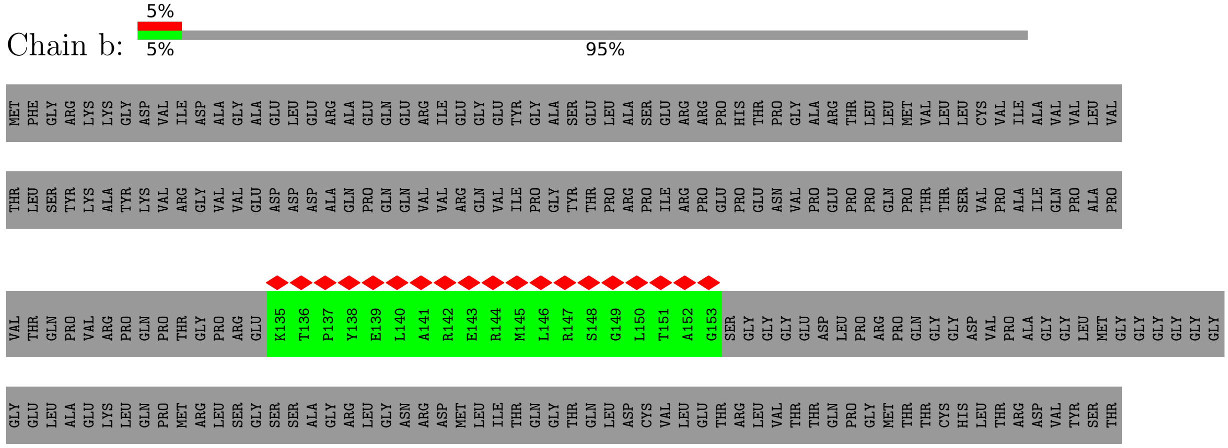




- Molecule 1: TrwE protein



- Molecule 1: TrwE protein



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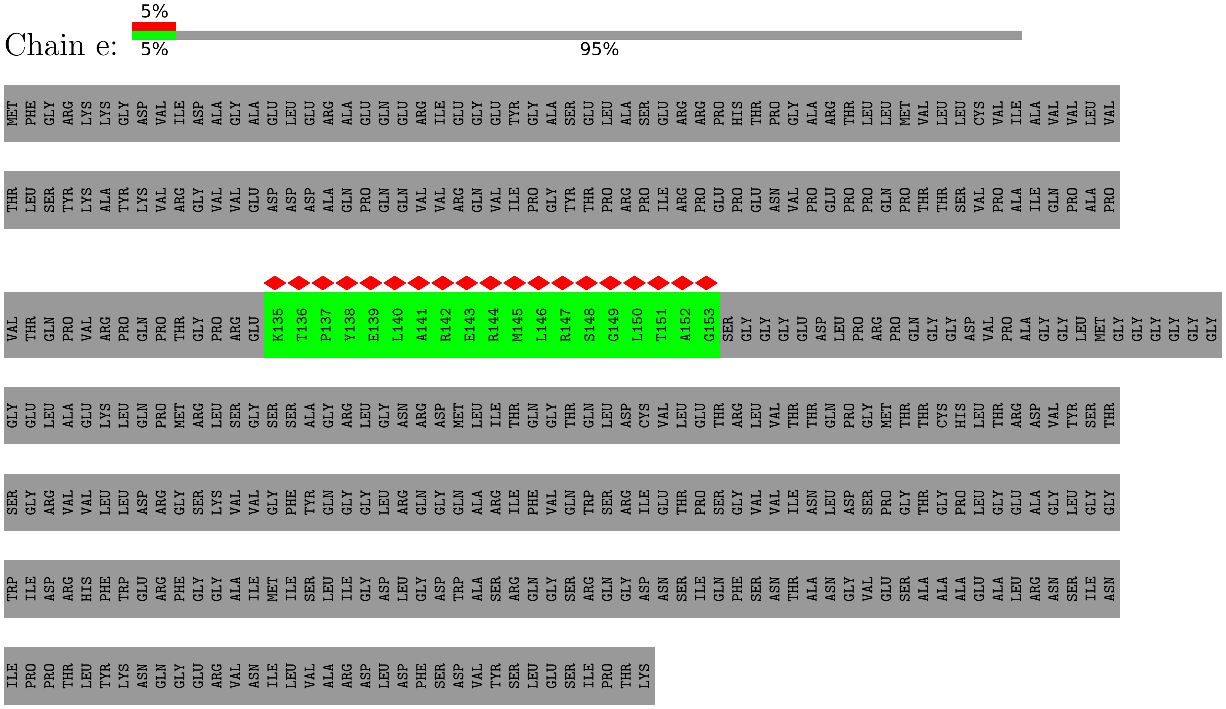
TRP ILE ASP ARG HIS PHE TRP GLU ARG PHE GLY GLY ALA ILE MET ILE SER LEU ILE GLY ASP LEU GLY ASP TRP ALA SER ARG GLN GLY SER ARG GLN GLY ASP ASN SER ILE GLN PHE SER ASN THR ALA ASN GLY VAL GLU SER ALA ALA GLU ALA LEU ARG ASN SER ILE ASN

ILE PRO PRO THR LEU TYR LYS ASN GLN GLY GLU ARG VAL ASN ILE LEU VAL ALA ARG ASP LEU ASP PHE SER ASP VAL TYR SER LEU GLU SER ILE PRO THR LYS

- Molecule 1: TrwE protein



Chain e:

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THR LEU SER TYR LYS ALA TYR LYS VAL ARG GLY VAL VAL GLU ASP ASP ASP ALA GLN PRO GLN GLN VAL VAL ARG GLN VAL ILE PRO GLY TYR THR PRO ARG PRO ILE ARG PRO GLU PRO GLU ASN VAL PRO GLU PRO PRO GLN PRO THR THR SER VAL PRO ALA ILE GLN PRO ALA PRO

VAL THR GLN PRO VAL ARG PRO GLN PRO THR GLY PRO ARG GLU K135 T136 P137 Y138 E139 L140 A141 R142 E143 R144 M145 L146 R147 S148 G149 L150 T151 A152 G153 SER GLY GLY GLY GLU ASP LEU PRO ARG PRO GLN GLY GLY ASP VAL PRO ALA GLY GLY LEU MET GLY GLY GLY GLY GLY GLY

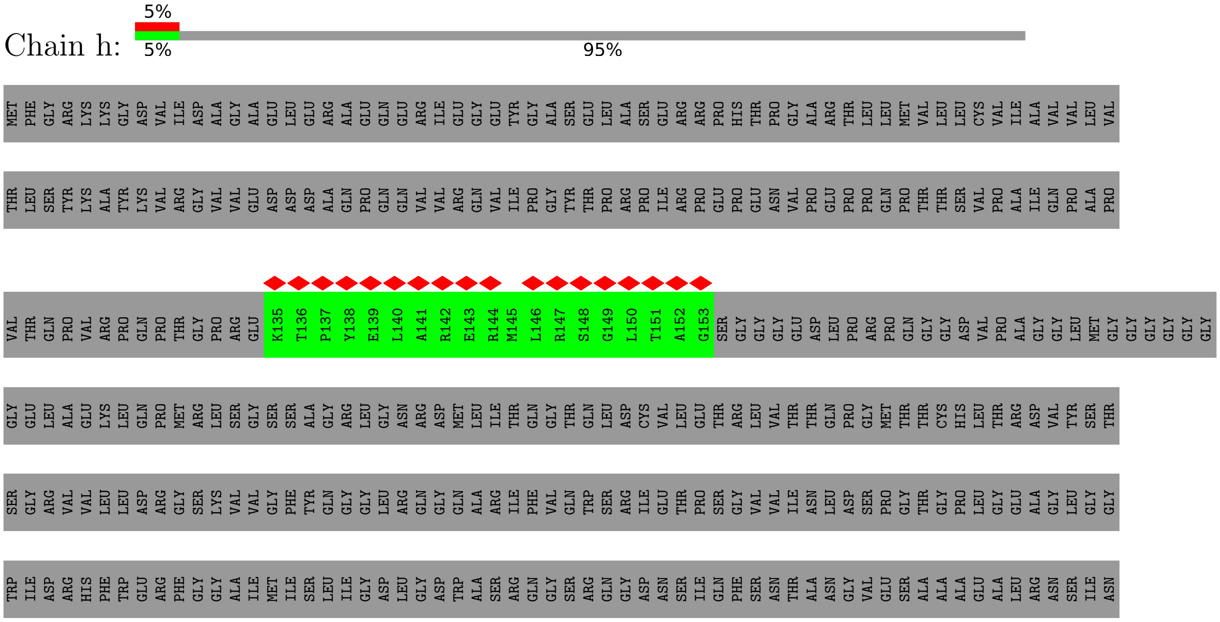
GLY GLU LEU ALA GLU LYS LEU GLN PRO MET ARG LEU SER GLY SER SER ALA GLY ARG LEU GLY ASN ARG ASP MET LEU ILE THR GLN GLY THR GLN LEU ASP CYS VAL LEU GLU THR ARG LEU VAL THR THR GLN PRO GLY MET THR THR CYS HIS LEU THR ARG ASP VAL TYR SER THR

SER GLY ARG VAL VAL LEU LEU ASP ARG GLY SER LYS VAL VAL GLY PHE TYR GLN GLY GLY LEU ARG GLN GLY GLN ALA ARG ILE PHE VAL GLN TRP SER ARG ILE GLU THR PRO SER GLY VAL VAL ILE ASN LEU ASP SER PRO GLY THR GLY PRO LEU GLY GLU ALA GLY LEU GLY GLY

TRP ILE ASP ARG HIS PHE TRP GLU ARG PHE GLY GLY ALA ILE MET ILE SER LEU ILE GLY ASP LEU GLY ASP TRP ALA SER ARG GLN GLY SER ARG GLN GLY ASP ASN SER ILE GLN PHE SER ASN THR ALA ASN GLY VAL GLU SER ALA ALA GLU ALA LEU ARG ASN SER ILE ASN

ILE PRO PRO THR LEU TYR LYS ASN GLN GLY GLU ARG VAL ASN ILE LEU VAL ALA ARG ASP LEU ASP PHE SER ASP VAL TYR SER LEU GLU SER ILE PRO THR LYS

- Molecule 1: TrwE protein



Chain h:

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THR LEU SER TYR LYS ALA TYR LYS VAL ARG GLY VAL VAL GLU ASP ASP ASP ALA GLN PRO GLN GLN VAL VAL ARG GLN VAL ILE PRO GLY TYR THR PRO ARG PRO ILE ARG PRO GLU PRO GLU ASN VAL PRO GLU PRO PRO GLN PRO THR THR SER VAL PRO ALA ILE GLN PRO ALA PRO

VAL THR GLN PRO VAL ARG PRO GLN PRO THR GLY PRO ARG GLU K135 T136 P137 Y138 E139 L140 A141 R142 E143 R144 M145 L146 R147 S148 G149 L150 T151 A152 G153 SER GLY GLY GLY GLU ASP LEU PRO ARG PRO GLN GLY GLY ASP VAL PRO ALA GLY GLY LEU MET GLY GLY GLY GLY GLY GLY

GLY GLU LEU ALA GLU LYS LEU GLN PRO MET ARG LEU SER GLY SER SER ALA GLY ARG LEU GLY ASN ARG ASP MET LEU ILE THR GLN GLY THR GLN LEU ASP CYS VAL LEU GLU THR ARG LEU VAL THR THR GLN PRO GLY MET THR THR CYS HIS LEU THR ARG ASP VAL TYR SER THR

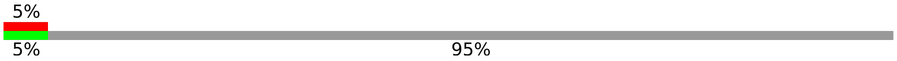
SER GLY ARG VAL VAL LEU LEU ASP ARG GLY SER LYS VAL VAL GLY PHE TYR GLN GLY GLY LEU ARG GLN GLY GLN ALA ARG ILE PHE VAL GLN TRP SER ARG ILE GLU THR PRO SER GLY VAL VAL ILE ASN LEU ASP SER PRO GLY THR GLY PRO LEU GLY GLU ALA GLY LEU GLY GLY

TRP ILE ASP ARG HIS PHE TRP GLU ARG PHE GLY GLY ALA ILE MET ILE SER LEU ILE GLY ASP LEU GLY ASP TRP ALA SER ARG GLN GLY SER ARG GLN GLY ASP ASN SER ILE GLN PHE SER ASN THR ALA ASN GLY VAL GLU SER ALA ALA GLU ALA LEU ARG ASN SER ILE ASN

ILE PRO PRO THR LEU TYR LYS ASN GLN GLY GLU ARG VAL ASN ILE LEU VAL ALA ARG ASP LEU ASP PHE SER ASP VAL TYR SER LEU GLU SER ILE PRO THR LYS

- Molecule 1: TrwE protein

Chain k:



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THR LEU SER TYR LYS ALA TYR LYS VAL ARG GLY VAL VAL GLU ASP ASP ALA GLN PRO GLN GLN VAL VAL ARG GLN VAL ILE PRO GLY TYR THR PRO ARG PRO ILE ARG PRO GLU PRO GLU ASN VAL PRO GLU PRO PRO GLN PRO THR THR SER VAL PRO ALA ILE GLN PRO ALA PRO

VAL THR GLN PRO VAL ARG PRO GLN PRO THR GLY PRO ARG GLU K135 T136 P137 Y138 E139 L140 A141 R142 E143 R144 M145 L146 R147 S148 G149 L150 T151 A152 G153 SER GLY GLY GLU ASP LEU PRO ARG PRO GLN GLY GLY ASP VAL PRO ALA GLY LEU MET GLY GLY GLY GLY GLY

GLY GLU LEU ALA GLU LYS LEU GLN PRO MET ARG LEU SER GLY SER SER ALA GLY ARG LEU GLY ASN ARG ASP MET LEU ILE THR GLN GLY THR GLN LEU ASP CYS VAL LEU GLU THR ARG LEU VAL THR THR GLN PRO GLY MET THR THR CYS HIS LEU THR ARG ASP VAL TYR SER THR

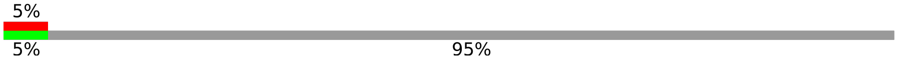
SER GLY ARG VAL VAL LEU LEU ASP ARG GLY SER LYS VAL VAL GLY PHE TYR GLN GLY LEU ARG GLN GLY GLN ALA ARG ILE PHE VAL GLN TRP SER ARG ILE GLU THR PRO SER GLY VAL VAL ILE ASN LEU ASP SER PRO GLY THR GLY PRO LEU GLY GLU ALA GLY LEU GLY

TRP ILE ASP ARG HIS PHE TRP GLU ARG PHE GLY GLY ALA ILE MET ILE SER LEU ILE GLY ASP LEU GLY ASP TRP ALA SER ARG GLN GLY SER ARG GLN GLY ASP ASN SER ILE GLN PHE SER ASN THR ALA ASN GLY VAL GLU SER ALA ALA ALA GLU ALA LEU ARG ASN SER ILE ASN

ILE PRO PRO THR LEU TYR LYS ASN GLN GLY GLU ARG VAL ASN ILE LEU VAL ALA ARG ASP LEU ASP PHE SER ASP VAL TYR SER LEU GLU SER ILE PRO THR LYS

- Molecule 1: TrwE protein

Chain n:



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THR LEU SER TYR LYS ALA TYR LYS VAL ARG GLY VAL VAL GLU ASP ASP ALA GLN PRO GLN GLN VAL VAL ARG GLN VAL ILE PRO GLY TYR THR PRO ARG PRO ILE ARG PRO GLU PRO GLU ASN VAL PRO GLU PRO PRO GLN PRO THR THR SER VAL PRO ALA ILE GLN PRO ALA PRO

VAL THR GLN PRO VAL ARG PRO GLN PRO THR GLY PRO ARG GLU K135 T136 P137 Y138 E139 L140 A141 R142 E143 R144 M145 L146 R147 S148 G149 L150 T151 A152 G153 SER GLY GLY GLU ASP LEU PRO ARG PRO GLN GLY GLY ASP VAL PRO ALA GLY LEU MET GLY GLY GLY GLY GLY

GLY GLU LEU ALA GLU LYS LEU GLN PRO MET ARG LEU SER GLY SER SER ALA GLY ARG LEU GLY ASN ARG ASP MET LEU ILE THR GLN GLY THR GLN LEU ASP CYS VAL LEU GLU THR ARG LEU VAL THR THR GLN PRO GLY MET THR THR CYS HIS LEU THR ARG ASP VAL TYR SER THR

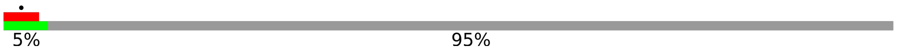
SER GLY ARG VAL VAL LEU LEU ASP ARG GLY SER LYS VAL VAL GLY PHE TYR GLN GLY LEU ARG GLN GLY GLN ALA ARG ILE PHE VAL GLN TRP SER ARG ILE GLU THR PRO SER GLY VAL VAL ILE ASN LEU ASP SER PRO GLY THR GLY PRO LEU GLY GLU ALA GLY LEU GLY

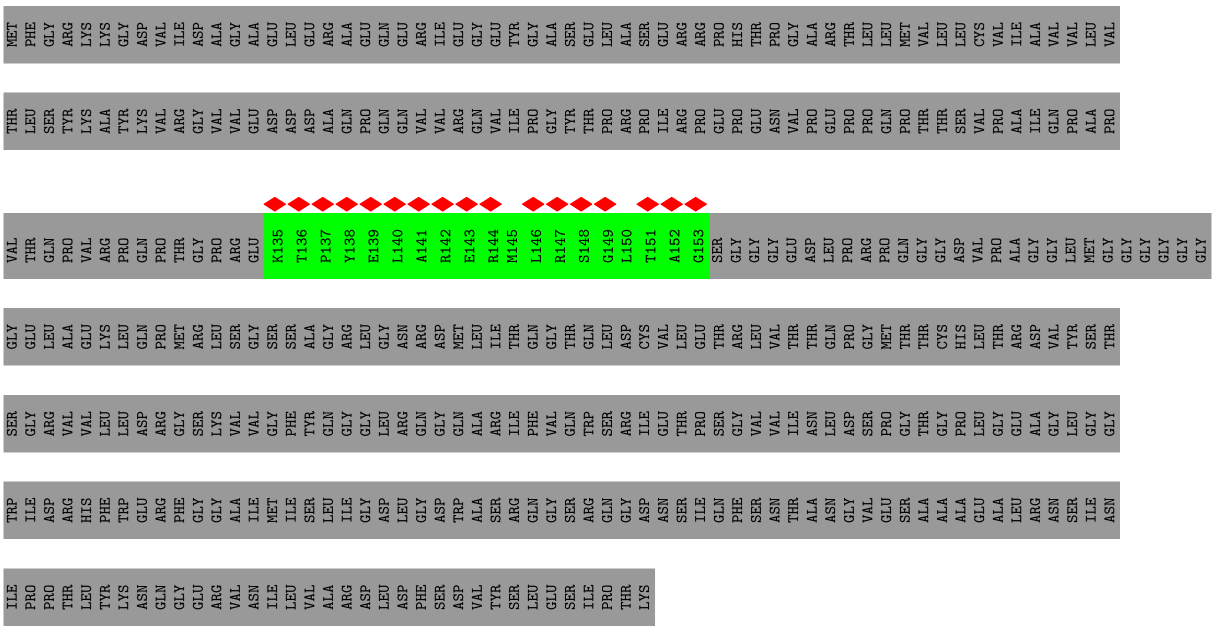
TRP ILE ASP ARG HIS PHE TRP GLU ARG PHE GLY GLY ALA ILE MET ILE SER LEU ILE GLY ASP LEU GLY ASP TRP ALA SER ARG GLN GLY SER ARG GLN GLY ASP ASN SER ILE GLN PHE SER ASN THR ALA ASN GLY VAL GLU SER ALA ALA ALA GLU ALA LEU ARG ASN SER ILE ASN

ILE PRO PRO THR LEU TYR LYS ASN GLN GLY GLU ARG VAL ASN ILE LEU VAL ALA ARG ASP LEU ASP PHE SER ASP VAL TYR SER LEU GLU SER ILE PRO THR LYS

- Molecule 1: TrwE protein

Chain y:





MET PHE GLY ARG LYS LYS GLY ASP VAL ILE ASP ALA GLY ALA GLU LEU GLU ARG ALA GLU GLN GLU ARG ILE GLU GLY GLU TYR GLY ALA SER GLU LEU ALA SER GLU ARG ARG PRO HIS THR PRO GLY ALA ARG THR LEU LEU MET VAL LEU LEU CYS VAL ILE ALA VAL VAL LEU VAL

THR LEU SER TYR LYS ALA TYR LYS VAL ARG GLY VAL VAL GLU ASP ASP ASP ALA GLN PRO GLN GLN VAL VAL ARG GLN VAL ILE PRO GLY TYR THR PRO ARG PRO ILE ARG PRO GLU PRO GLU ASN VAL PRO GLU PRO PRO GLN PRO THR THR SER VAL PRO ALA ILE GLN PRO ALA PRO

VAL THR GLN PRO VAL ARG PRO GLN PRO THR GLY PRO ARG GLU K135 T136 P137 Y138 E139 L140 A141 R142 E143 R144 M145 L146 R147 S148 G149 L150 T151 A152 G153 SER GLY GLY GLY GLU ASP LEU PRO ARG PRO GLN GLY GLY ASP VAL PRO ALA GLY GLY LEU MET GLY GLY GLY GLY GLY

GLY GLU LEU ALA GLU LYS LEU GLN PRO MET ARG LEU SER GLY SER SER ALA GLY ARG LEU GLY ASN ARG ASP MET LEU ILE THR GLN GLY THR GLN LEU ASP CYS VAL LEU GLU THR ARG LEU VAL THR THR GLN PRO GLY MET THR THR CYS HIS LEU THR ARG ASP VAL TYR SER THR

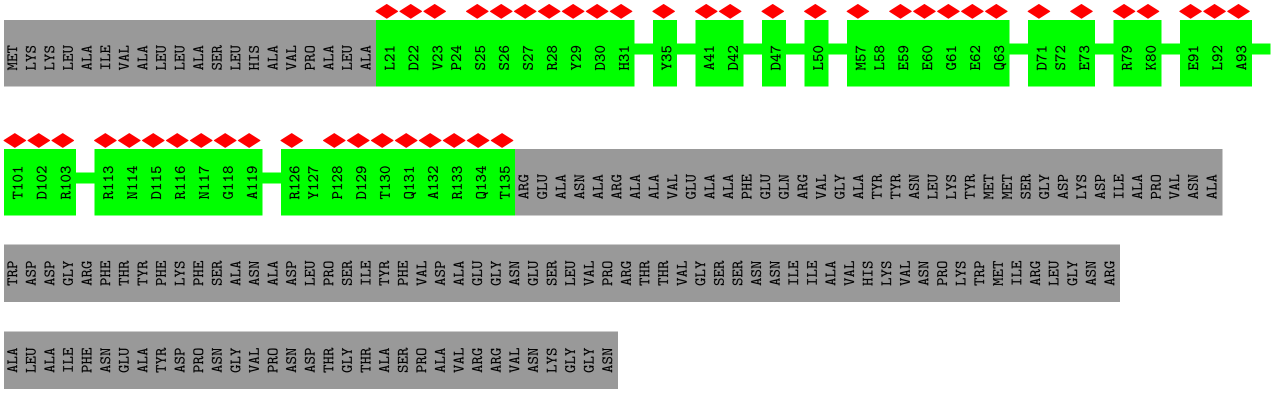
SER GLY ARG VAL VAL LEU LEU ASP ARG GLY SER LYS VAL VAL GLY PHE TYR GLN GLY GLY LEU ARG GLN GLY GLN ALA ARG ILE PHE VAL GLN TRP SER ARG ILE GLU THR PRO SER GLY VAL VAL ILE ASN LEU ASP SER PRO GLY THR GLY PRO LEU GLY GLU ALA GLY LEU GLY GLY

TRP ILE ASP ARG HIS PHE TRP GLU ARG PHE GLY GLY ALA ILE MET ILE SER LEU ILE GLY ASP LEU GLY ASP TRP ALA SER ARG GLN GLY SER ARG GLN GLY ASP ASN SER ILE GLN PHE SER ASN THR ALA ASN GLY VAL GLU SER ALA ALA ALA GLU ALA LEU ARG ASN SER ILE ASN

ILE PRO PRO THR LEU TYR LYS ASN GLN GLY GLU ARG VAL ASN ILE LEU VAL ALA ARG ASP LEU ASP PHE SER ASP VAL TYR SER LEU GLU SER ILE PRO THR LYS

- Molecule 2: TrwF protein

Chain B:



MET LYS LYS LEU ALA ILE VAL ALA LEU LEU ALA SER LEU HIS ALA VAL PRO ALA LEU ALA L21 D22 V23 P24 S25 S26 S27 R28 Y29 D30 H31 Y35 A41 D42 D47 L50 M57 L58 E59 E60 G61 E62 Q63 D71 S72 E73 R79 K80 E91 L92 A93

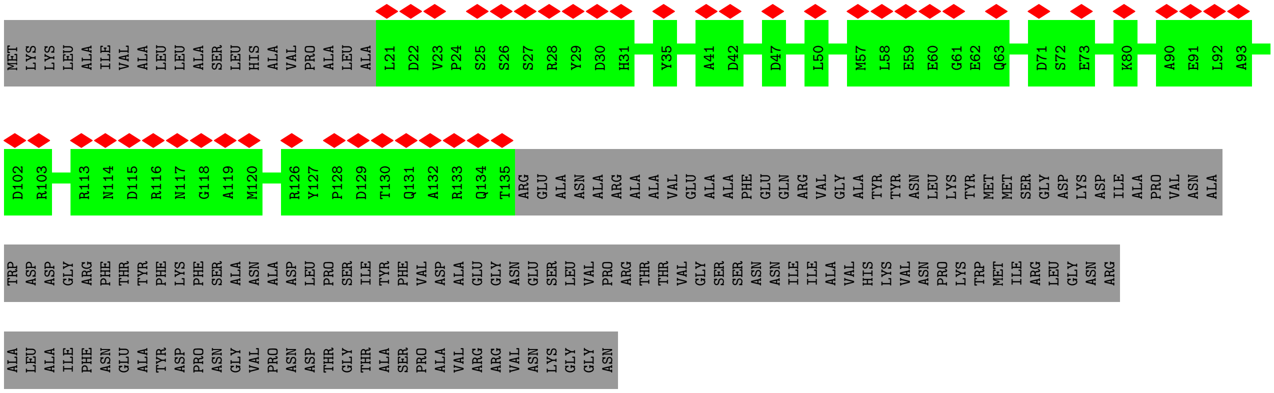
T101 D102 R103 R113 N114 D115 R116 N117 G118 A119 R126 Y127 P128 D129 T130 Q131 A132 R133 Q134 T135 ARG GLU ALA ASN ALA ARG ALA ALA VAL GLU ALA ALA PHE GLU GLN ARG VAL GLY ALA TYR TYR ASN LEU LYS TYR MET MET SER GLY ASP LYS ASP ILE ALA PRO VAL ASN ALA

TRP ASP ASP GLY ARG PHE THR TYR PHE LYS PHE SER ALA ASN ALA ASP LEU PRO SER ILE TYR PHE VAL ASP ALA GLU GLY ASN GLU SER LEU VAL PRO ARG THR THR VAL GLY SER SER ASN ASN ILE ILE ALA VAL HIS LYS VAL ASN PRO LYS TRP MET ILE ARG LEU GLY ASN ARG

ALA LEU ALA ILE PHE ASN GLU ALA TYR ASP PRO ASN GLY VAL PRO ASN ASP THR GLY THR ALA SER PRO ALA VAL ARG ARG VAL ASN LYS GLY GLY ASN

- Molecule 2: TrwF protein

Chain E:



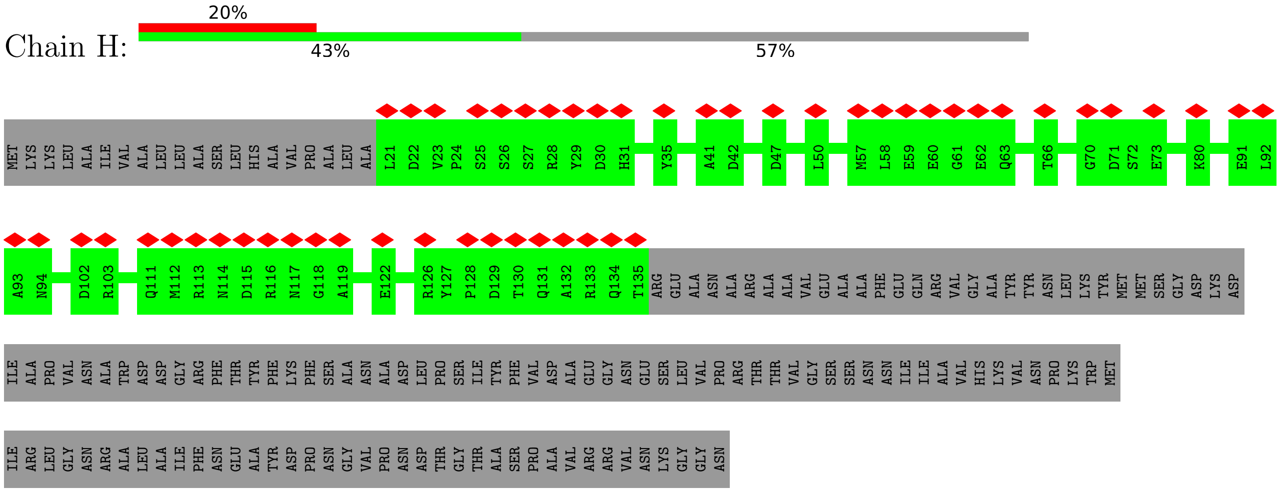
MET LYS LYS LEU ALA ILE VAL ALA LEU LEU ALA SER LEU HIS ALA VAL PRO ALA LEU ALA L21 D22 V23 P24 S25 S26 S27 R28 Y29 D30 H31 Y35 A41 D42 D47 L50 M57 L58 E59 E60 G61 E62 Q63 D71 S72 E73 K80 A90 E91 L92 A93

D102 R103 R113 N114 D115 R116 N117 G118 A119 M120 R126 Y127 P128 D129 T130 Q131 A132 R133 Q134 T135 ARG GLU ALA ASN ALA ARG ALA ALA VAL GLU ALA ALA PHE GLU GLN ARG VAL GLY ALA TYR TYR ASN LEU LYS TYR MET MET SER GLY ASP LYS ASP ILE ALA PRO VAL ASN ALA

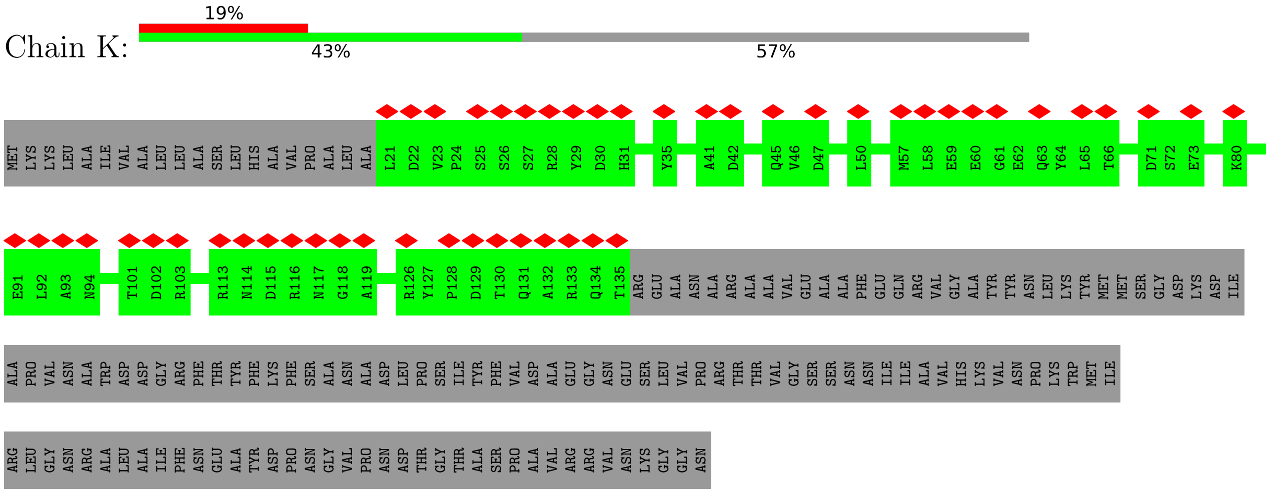
TRP ASP ASP GLY ARG PHE THR TYR PHE LYS PHE SER ALA ASN ALA ASP LEU PRO SER ILE TYR PHE VAL ASP ALA GLU GLY ASN GLU SER LEU VAL PRO ARG THR THR VAL GLY SER SER ASN ASN ILE ILE ALA VAL HIS LYS VAL ASN PRO LYS TRP MET ILE ARG LEU GLY ASN ARG

ALA LEU ALA ILE PHE ASN GLU ALA TYR ASP PRO ASN GLY VAL PRO ASN ASP THR GLY THR ALA SER PRO ALA VAL ARG ARG VAL ASN LYS GLY GLY ASN

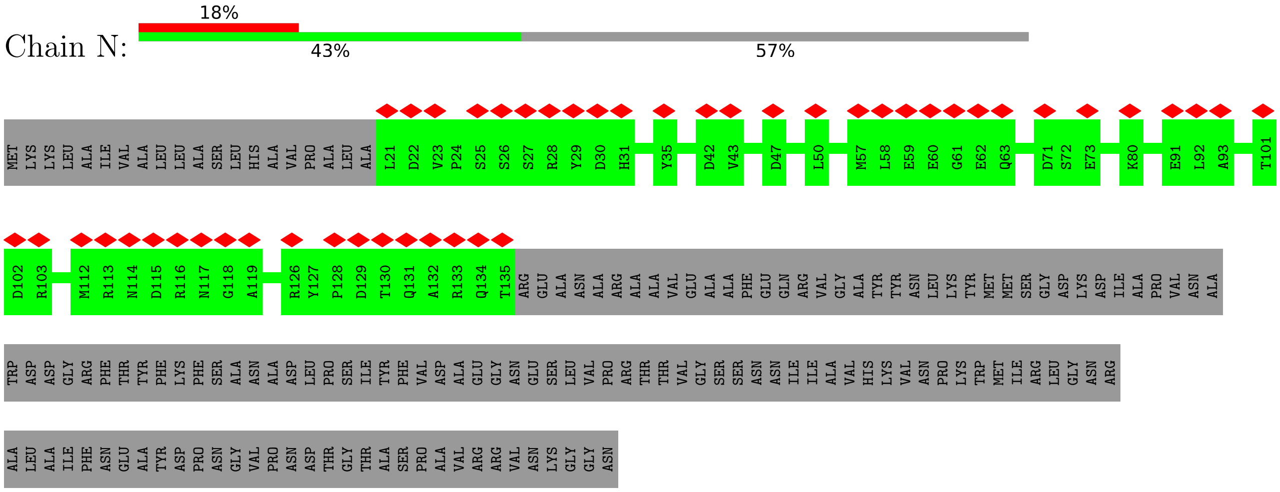
- Molecule 2: TrwF protein



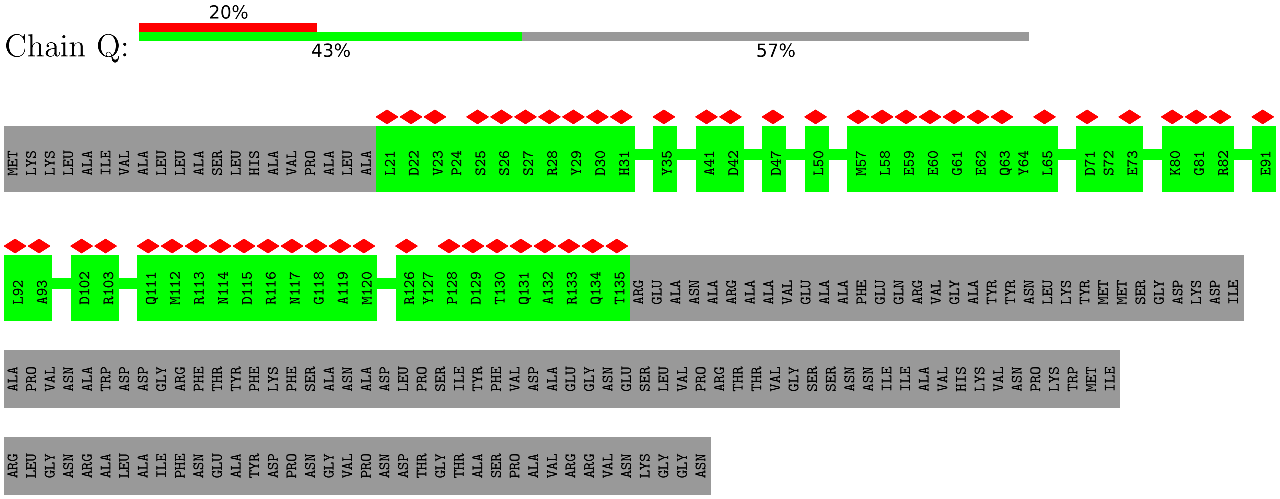
- Molecule 2: TrwF protein



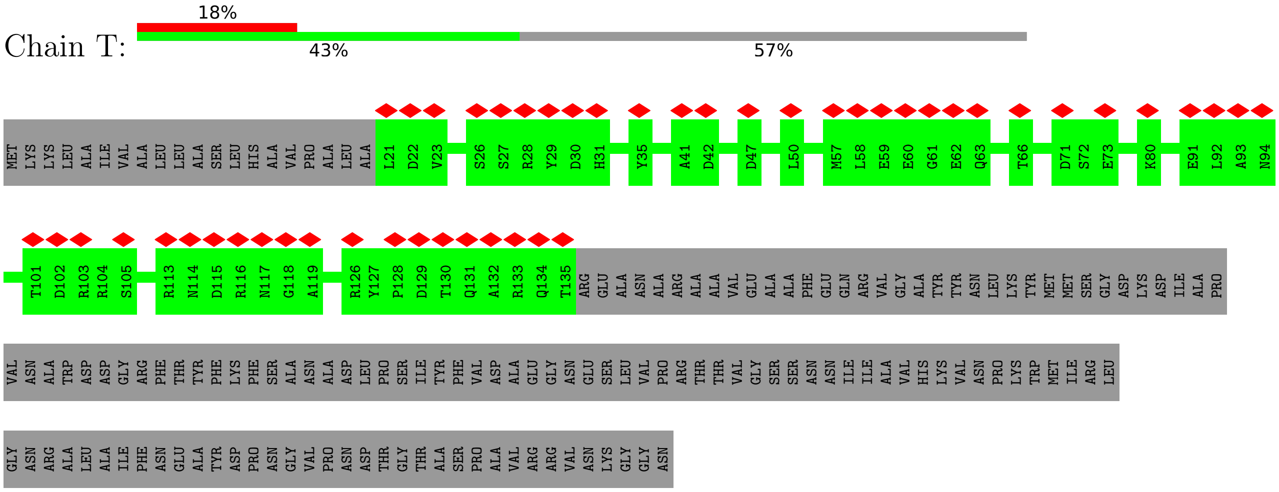
- Molecule 2: TrwF protein



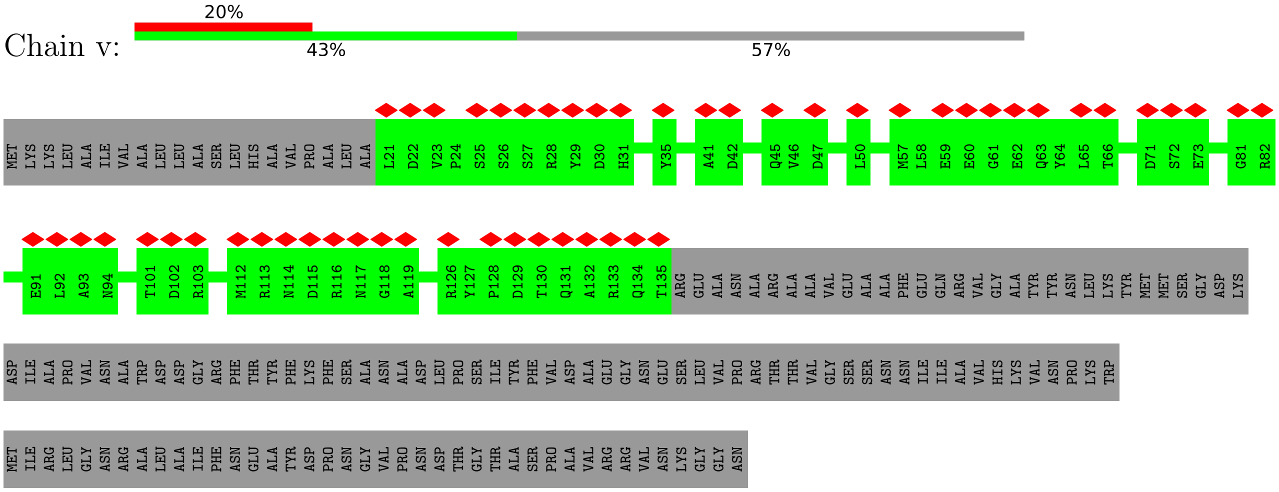
- Molecule 2: TrwF protein



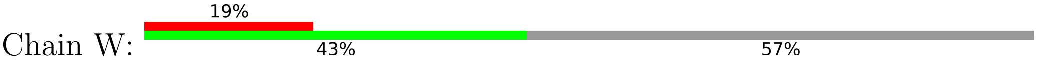
- Molecule 2: TrwF protein

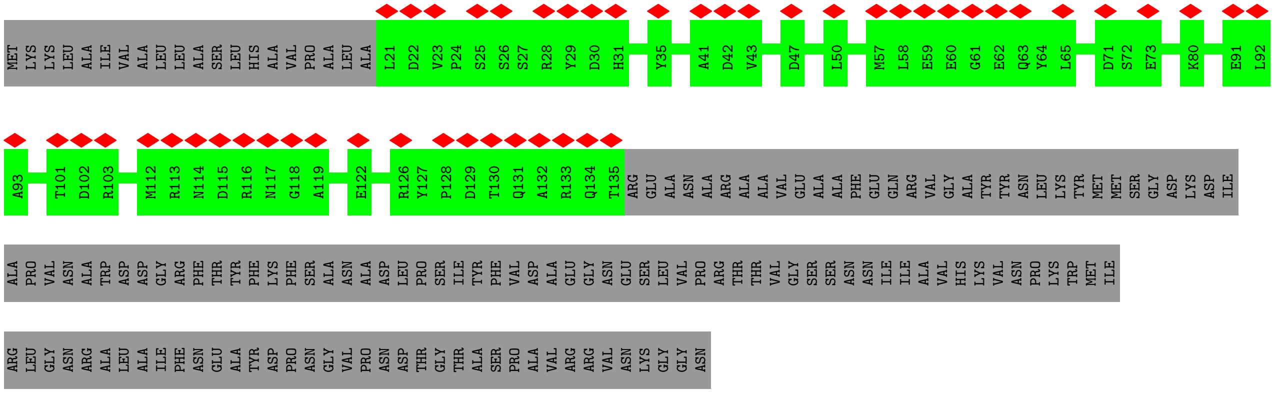


- Molecule 2: TrwF protein



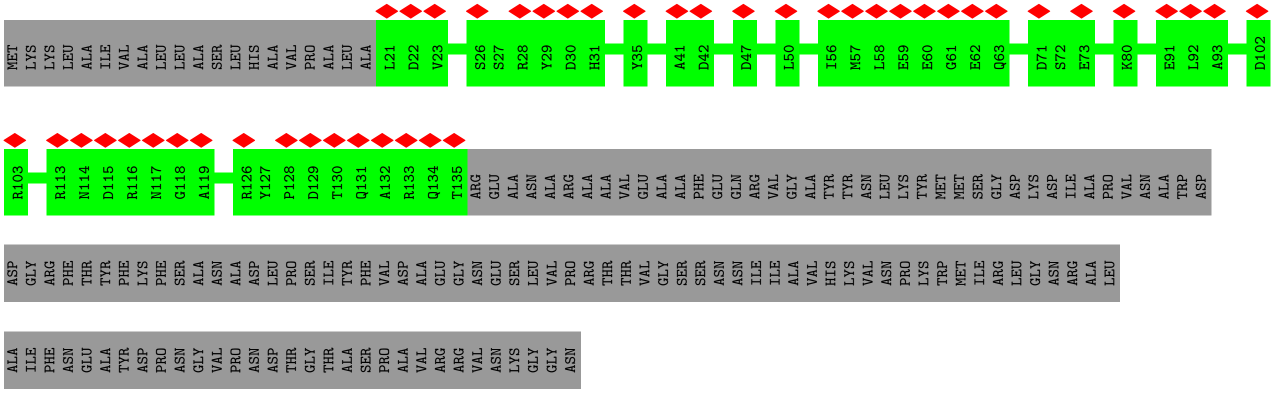
- Molecule 2: TrwF protein





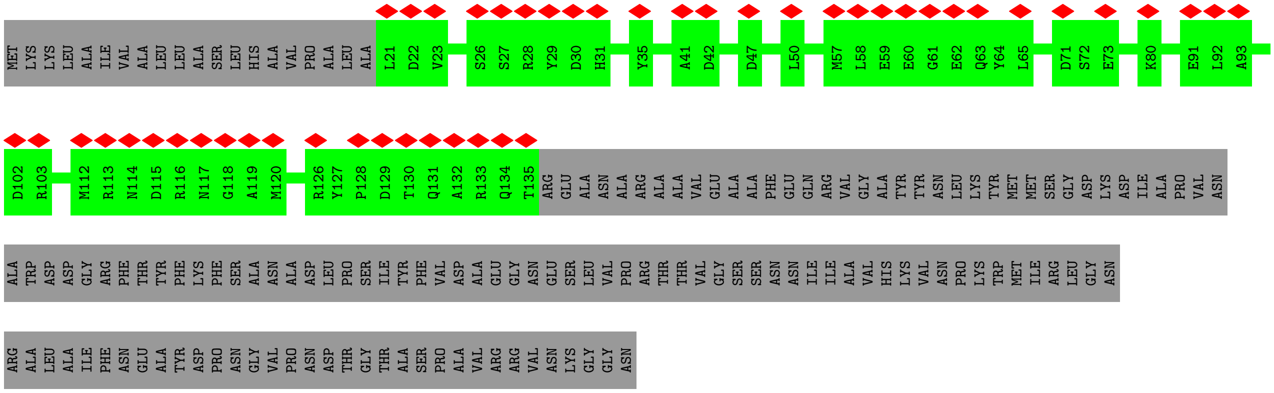
- Molecule 2: TrwF protein

Chain Z:



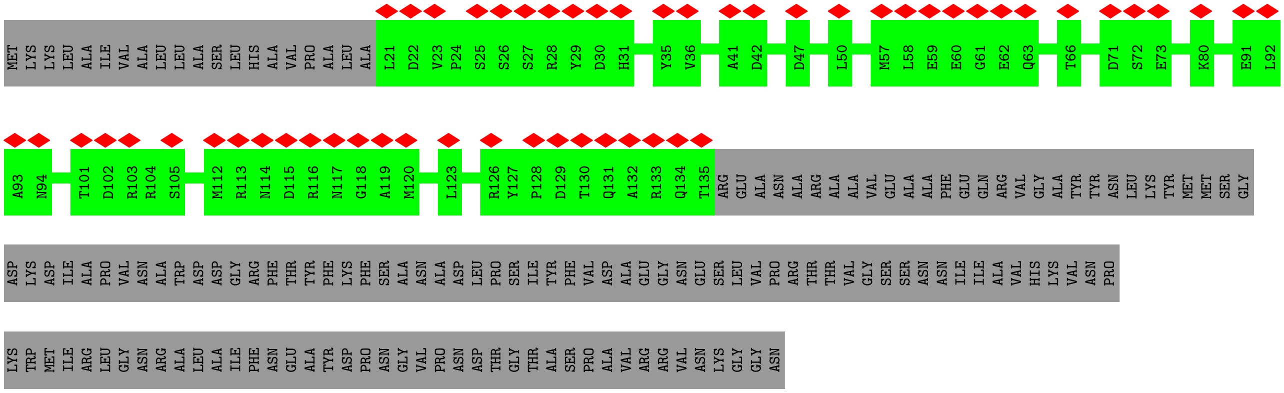
- Molecule 2: TrwF protein

Chain c:



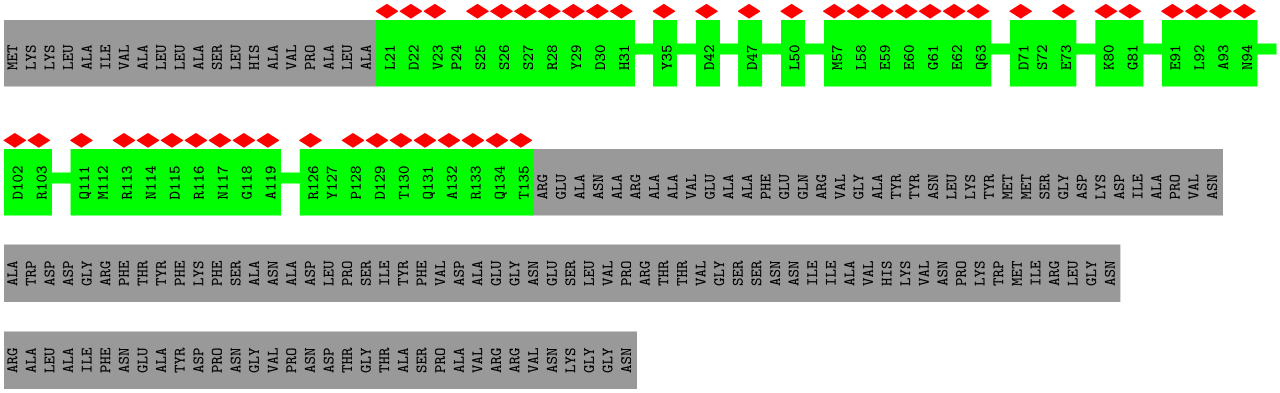
- Molecule 2: TrwF protein

Chain f:



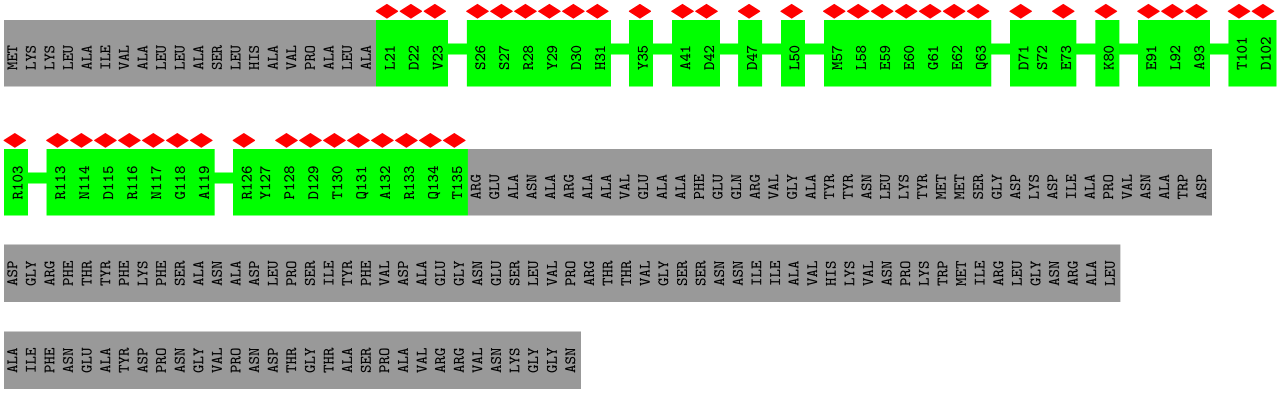
- Molecule 2: TrwF protein

Chain i:



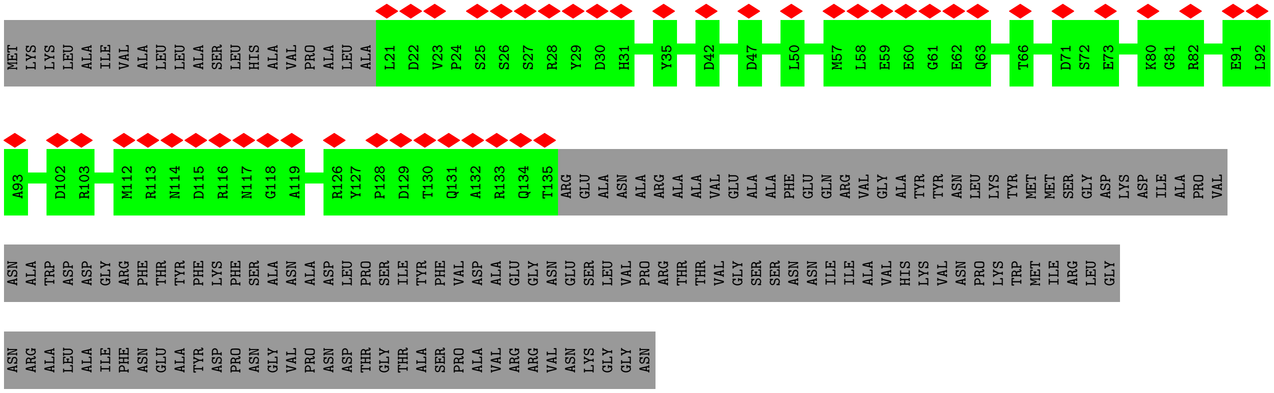
- Molecule 2: TrwF protein

Chain l:

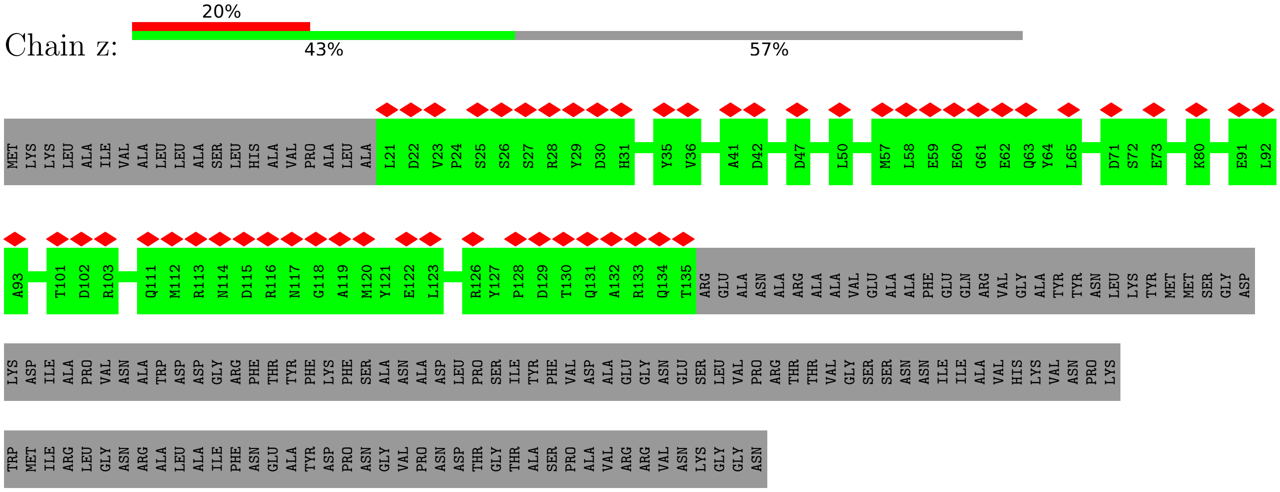


- Molecule 2: TrwF protein

Chain o:



- Molecule 2: TrwF protein



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C16	Depositor
Number of particles used	1280606	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 ($e^-/\mathring{A}^2$)	57.5	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	30.829	Depositor
Minimum map value	-27.674	Depositor
Average map value	0.018	Depositor
Map value standard deviation	1.623	Depositor
Recommended contour level	10.0	Depositor
Map size (Å)	258.21402, 257.147, 85.36	wwPDB
Map dimensions	242, 241, 80	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.067, 1.067, 1.067	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	0.35	0/150	0.55	0/199
1	D	0.35	0/150	0.55	0/199
1	G	0.34	0/150	0.55	0/199
1	J	0.34	0/150	0.55	0/199
1	M	0.35	0/150	0.55	0/199
1	P	0.35	0/150	0.55	0/199
1	S	0.34	0/150	0.55	0/199
1	V	0.35	0/150	0.55	0/199
1	Y	0.35	0/150	0.55	0/199
1	b	0.35	0/150	0.55	0/199
1	e	0.35	0/150	0.55	0/199
1	h	0.35	0/150	0.55	0/199
1	k	0.35	0/150	0.55	0/199
1	n	0.35	0/150	0.55	0/199
1	u	0.35	0/150	0.54	0/199
1	y	0.34	0/150	0.55	0/199
2	B	0.60	0/962	0.52	0/1302
2	E	0.60	0/962	0.52	0/1302
2	H	0.60	0/962	0.52	0/1302
2	K	0.60	0/962	0.52	0/1302
2	N	0.60	0/962	0.52	0/1302
2	Q	0.60	0/962	0.52	0/1302
2	T	0.60	0/962	0.52	0/1302
2	W	0.60	0/962	0.52	0/1302
2	Z	0.60	0/962	0.52	0/1302
2	c	0.60	0/962	0.52	0/1302
2	f	0.60	0/962	0.53	0/1302
2	i	0.60	0/962	0.52	0/1302
2	l	0.60	0/962	0.52	0/1302
2	o	0.60	0/962	0.53	0/1302
2	v	0.60	0/962	0.52	0/1302
2	z	0.60	0/962	0.53	0/1302
All	All	0.58	0/17792	0.53	0/24016

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	17/395 (4%)	17 (100%)	0	0	100	100
1	D	17/395 (4%)	17 (100%)	0	0	100	100
1	G	17/395 (4%)	17 (100%)	0	0	100	100
1	J	17/395 (4%)	17 (100%)	0	0	100	100
1	M	17/395 (4%)	17 (100%)	0	0	100	100
1	P	17/395 (4%)	17 (100%)	0	0	100	100
1	S	17/395 (4%)	17 (100%)	0	0	100	100
1	V	17/395 (4%)	17 (100%)	0	0	100	100
1	Y	17/395 (4%)	17 (100%)	0	0	100	100
1	b	17/395 (4%)	17 (100%)	0	0	100	100
1	e	17/395 (4%)	17 (100%)	0	0	100	100
1	h	17/395 (4%)	17 (100%)	0	0	100	100
1	k	17/395 (4%)	17 (100%)	0	0	100	100
1	n	17/395 (4%)	17 (100%)	0	0	100	100
1	u	17/395 (4%)	17 (100%)	0	0	100	100
1	y	17/395 (4%)	17 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	E	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	H	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	K	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	N	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	Q	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	T	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	W	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	Z	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	c	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	f	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	i	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	l	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	o	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	v	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
2	z	113/266 (42%)	110 (97%)	3 (3%)	0	100	100
All	All	2080/10576 (20%)	2032 (98%)	48 (2%)	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	15/318 (5%)	15 (100%)	0	100	100
1	D	15/318 (5%)	15 (100%)	0	100	100
1	G	15/318 (5%)	15 (100%)	0	100	100
1	J	15/318 (5%)	15 (100%)	0	100	100
1	M	15/318 (5%)	15 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	P	15/318 (5%)	15 (100%)	0	100	100
1	S	15/318 (5%)	15 (100%)	0	100	100
1	V	15/318 (5%)	15 (100%)	0	100	100
1	Y	15/318 (5%)	15 (100%)	0	100	100
1	b	15/318 (5%)	15 (100%)	0	100	100
1	e	15/318 (5%)	15 (100%)	0	100	100
1	h	15/318 (5%)	15 (100%)	0	100	100
1	k	15/318 (5%)	15 (100%)	0	100	100
1	n	15/318 (5%)	15 (100%)	0	100	100
1	u	15/318 (5%)	15 (100%)	0	100	100
1	y	15/318 (5%)	15 (100%)	0	100	100
2	B	99/216 (46%)	99 (100%)	0	100	100
2	E	99/216 (46%)	99 (100%)	0	100	100
2	H	99/216 (46%)	99 (100%)	0	100	100
2	K	99/216 (46%)	99 (100%)	0	100	100
2	N	99/216 (46%)	99 (100%)	0	100	100
2	Q	99/216 (46%)	99 (100%)	0	100	100
2	T	99/216 (46%)	99 (100%)	0	100	100
2	W	99/216 (46%)	99 (100%)	0	100	100
2	Z	99/216 (46%)	99 (100%)	0	100	100
2	c	99/216 (46%)	99 (100%)	0	100	100
2	f	99/216 (46%)	99 (100%)	0	100	100
2	i	99/216 (46%)	99 (100%)	0	100	100
2	l	99/216 (46%)	99 (100%)	0	100	100
2	o	99/216 (46%)	99 (100%)	0	100	100
2	v	99/216 (46%)	99 (100%)	0	100	100
2	z	99/216 (46%)	99 (100%)	0	100	100
All	All	1824/8544 (21%)	1824 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

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

Mol	Chain	Res	Type
2	B	89	GLN
2	E	89	GLN
2	H	89	GLN
2	K	89	GLN
2	N	89	GLN
2	Q	89	GLN
2	T	89	GLN
2	v	89	GLN
2	W	89	GLN
2	Z	89	GLN
2	c	89	GLN
2	f	89	GLN
2	i	89	GLN
2	l	89	GLN
2	o	89	GLN
2	z	89	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

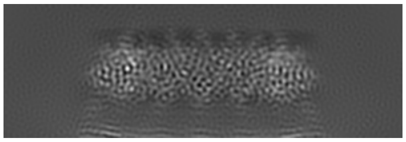
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-12708. These allow visual inspection of the internal detail of the map and identification of artifacts.

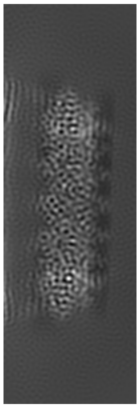
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

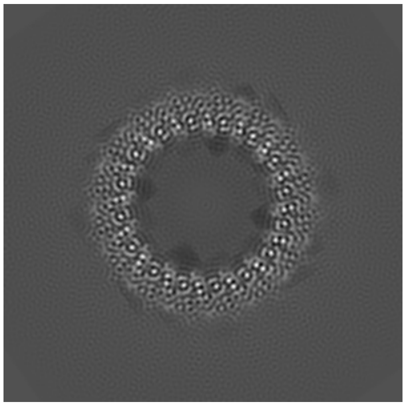
6.1.1 Primary map



X

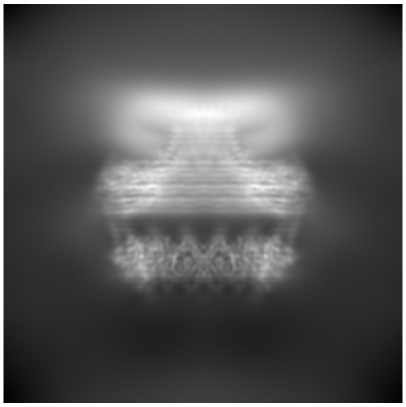


Y

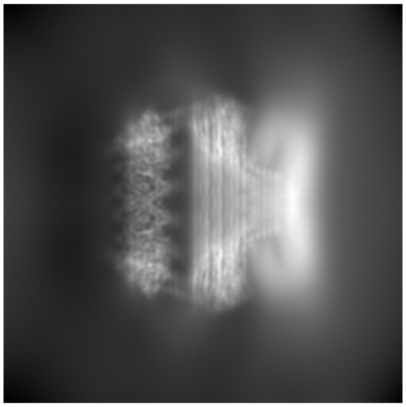


Z

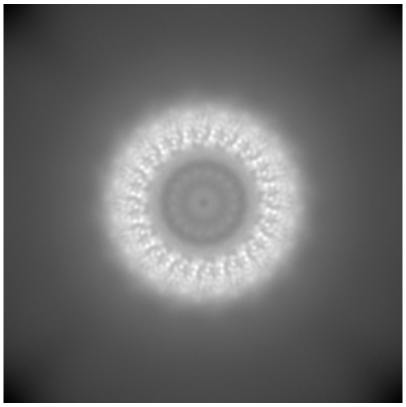
6.1.2 Raw map



X



Y

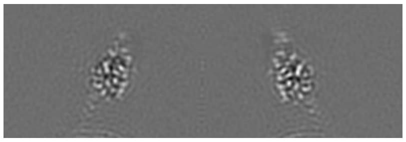


Z

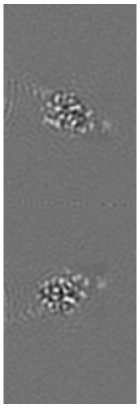
The images above show the map projected in three orthogonal directions.

6.2 Central slices

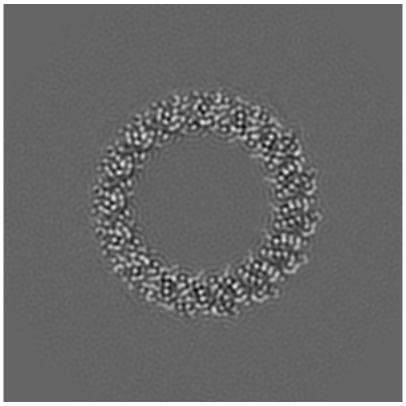
6.2.1 Primary map



X Index: 121

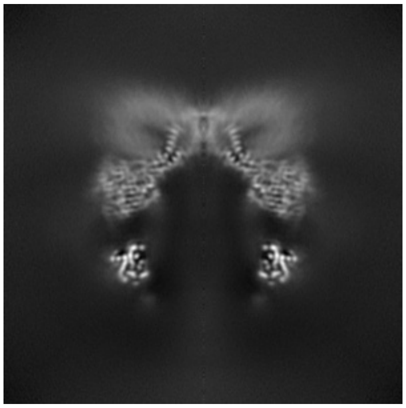


Y Index: 120

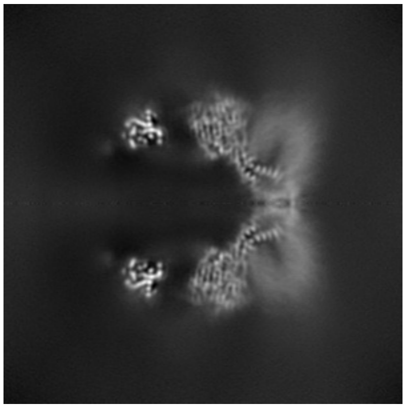


Z Index: 40

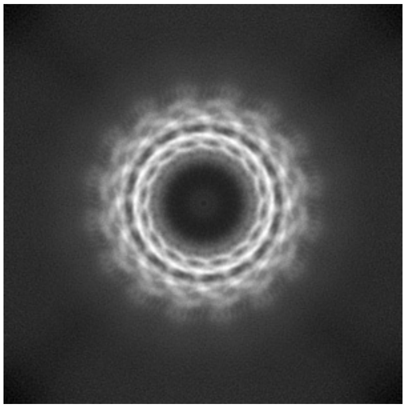
6.2.2 Raw map



X Index: 150



Y Index: 150

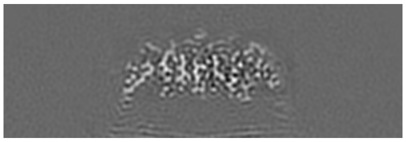


Z Index: 150

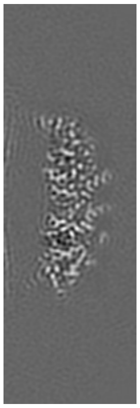
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices

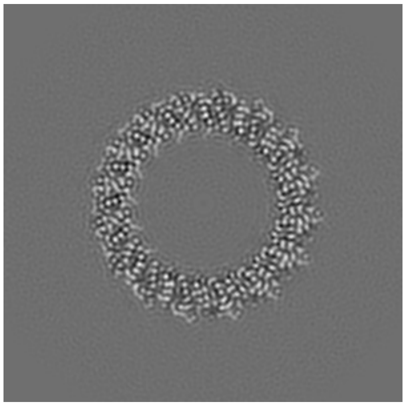
6.3.1 Primary map



X Index: 170

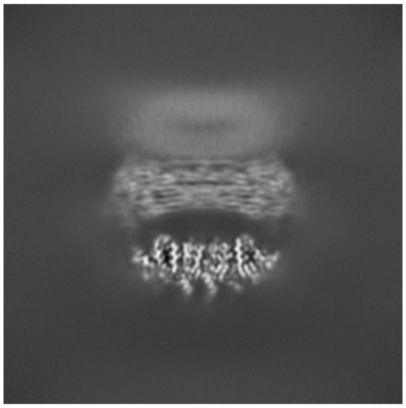


Y Index: 74

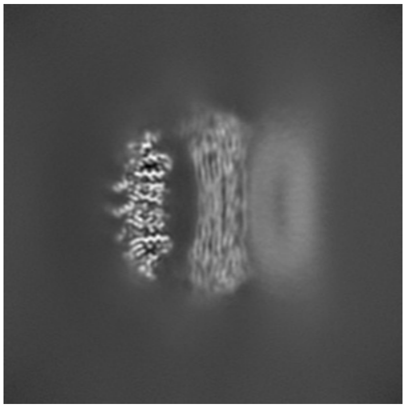


Z Index: 38

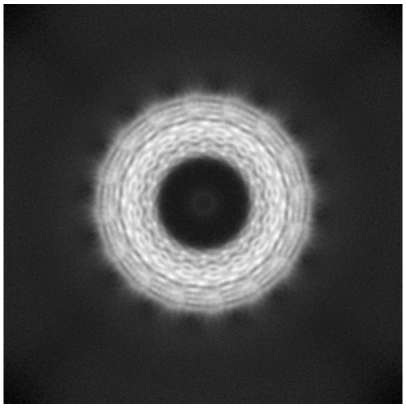
6.3.2 Raw map



X Index: 104



Y Index: 104

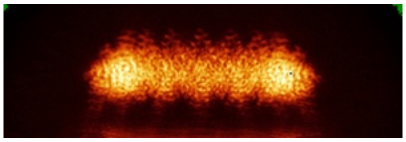


Z Index: 162

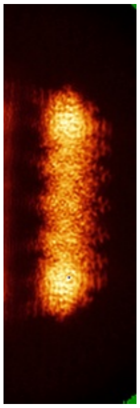
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color)

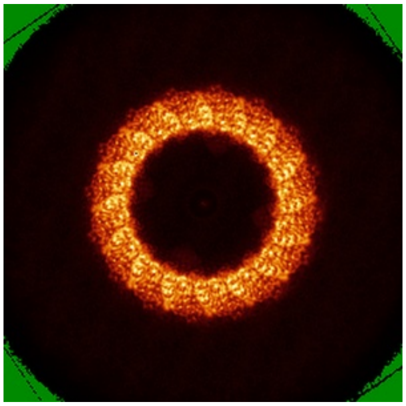
6.4.1 Primary map



X

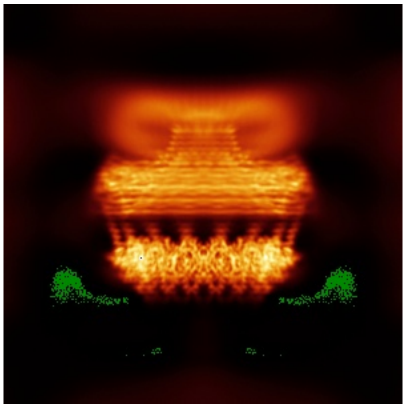


Y

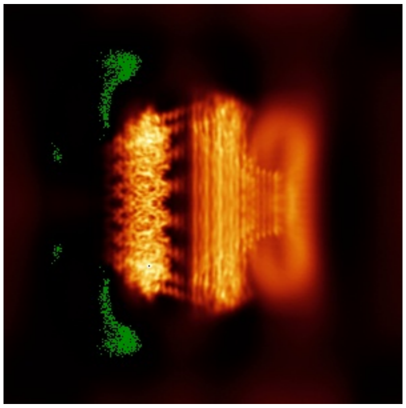


Z

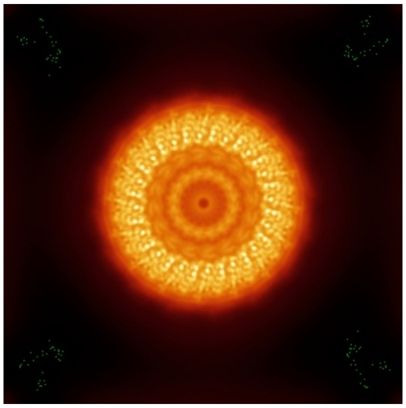
6.4.2 Raw map



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

6.5.1 Primary map

X

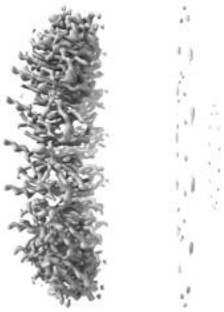
Y

Z

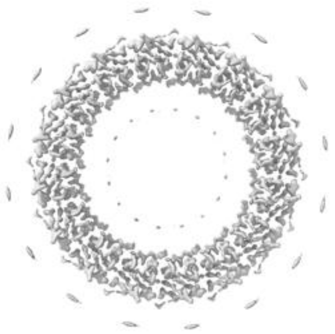
The images above show the 3D surface view of the map at the recommended contour level 10.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

X



Y



Z

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

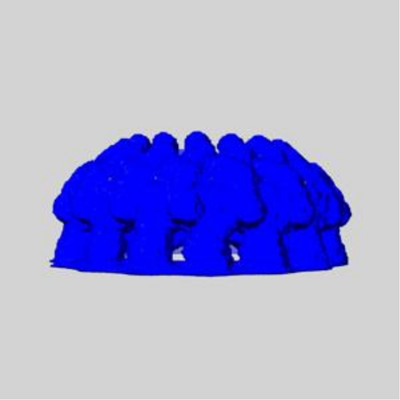
6.6 Mask visualisation ⓘ

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

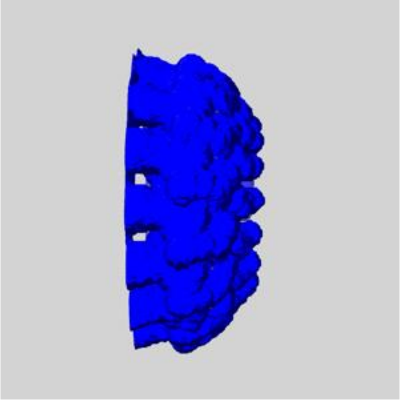
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

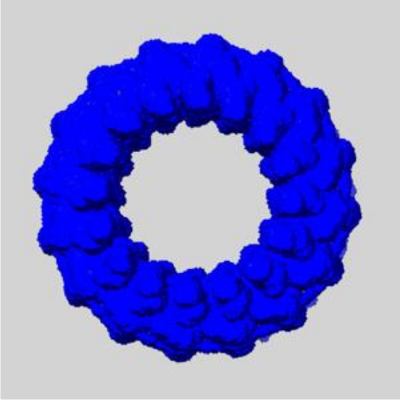
6.6.1 emd_12708_msk_1.map ⓘ



X



Y

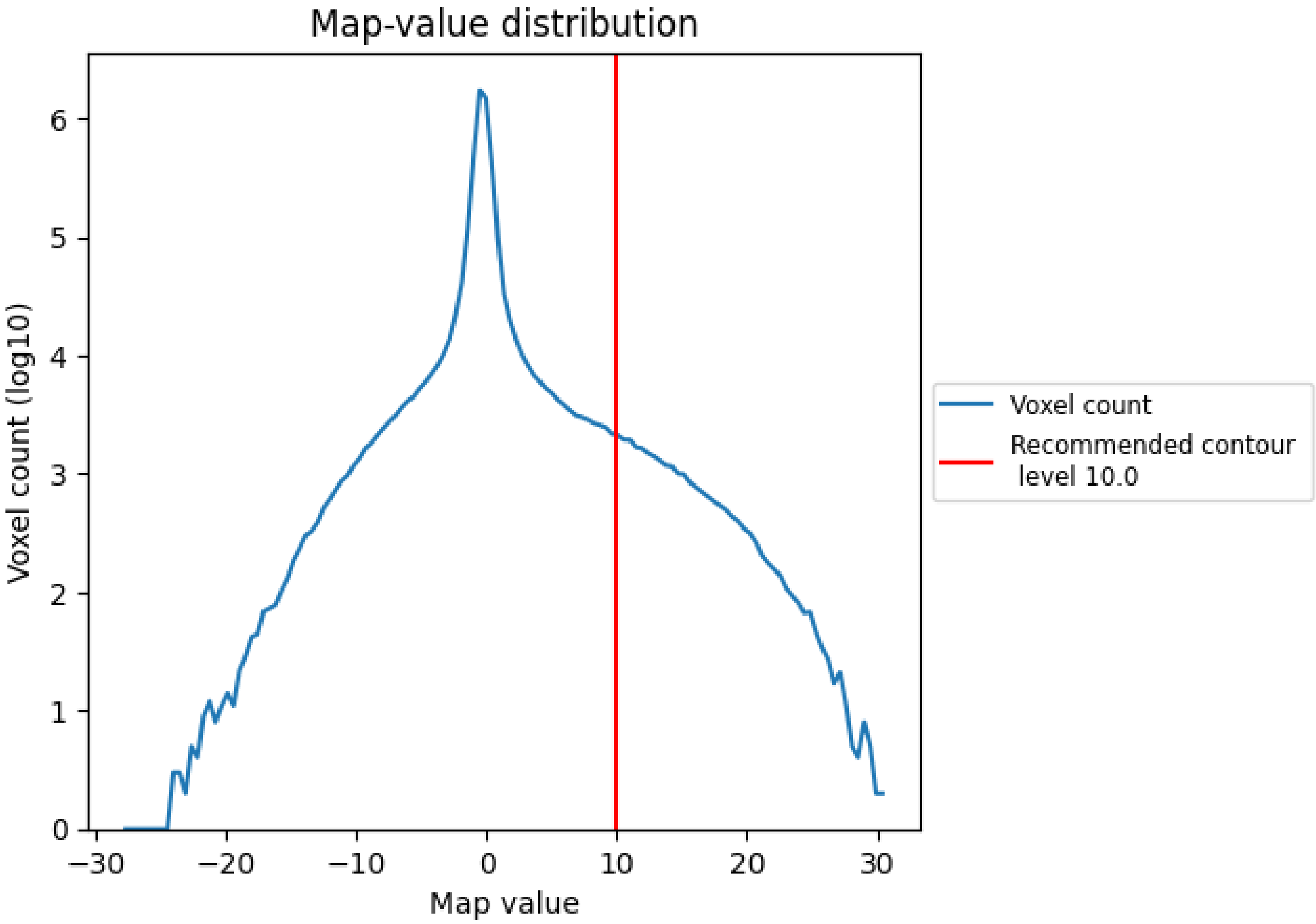


Z

7 Map analysis ⓘ

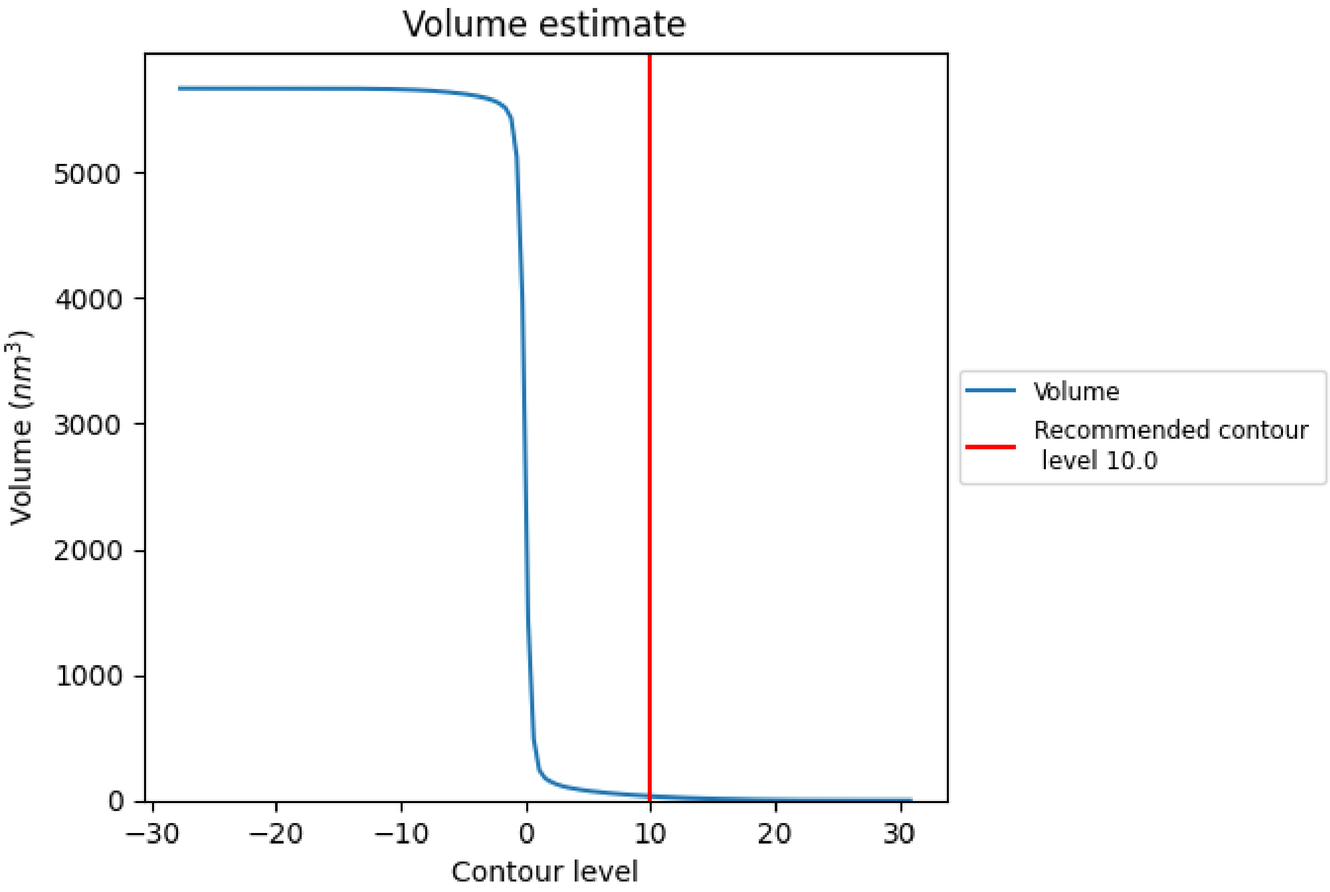
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution ⓘ



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

7.2 Volume estimate ⓘ



The volume at the recommended contour level is 31 nm^3; this corresponds to an approximate mass of 28 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.

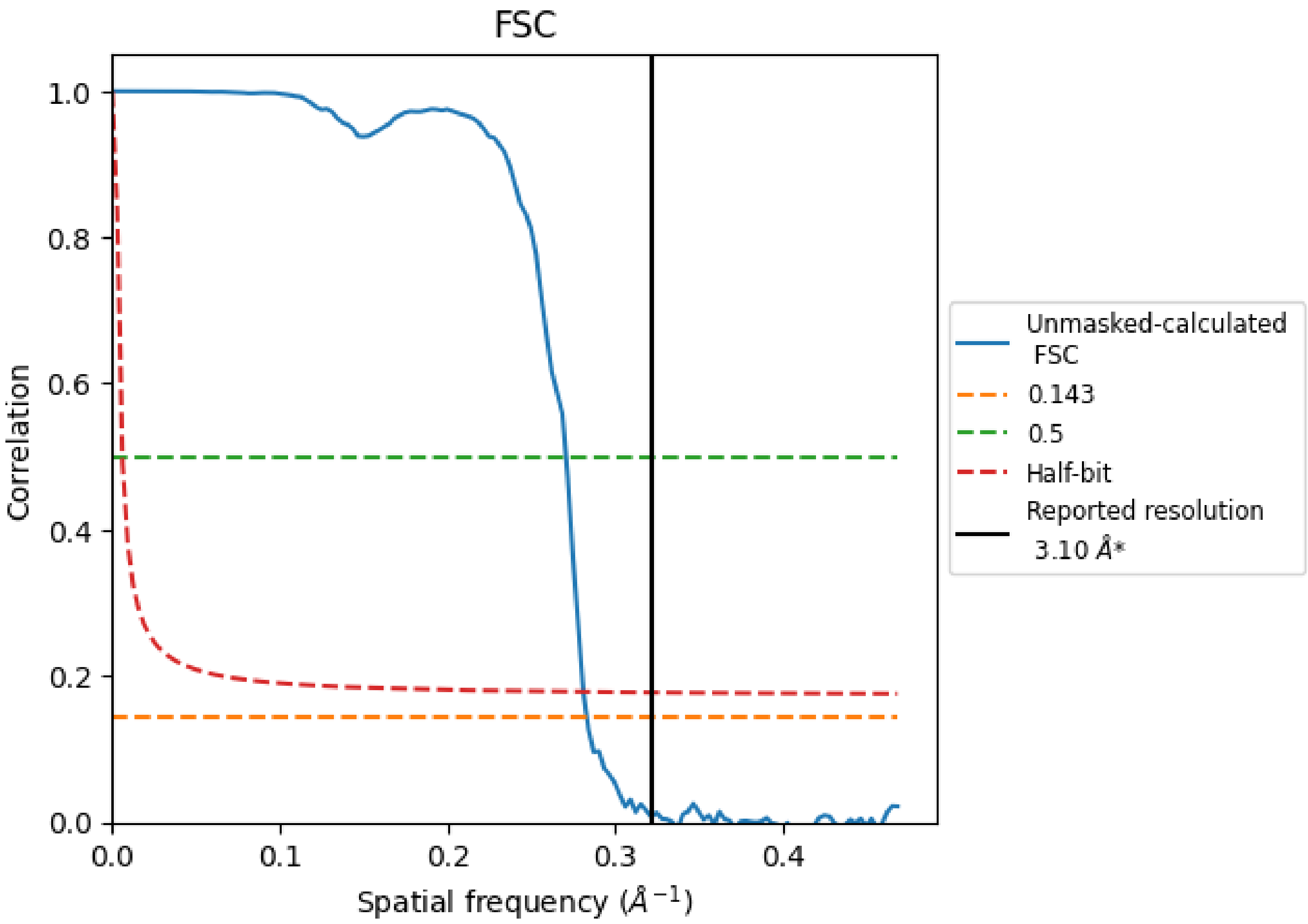
7.3 Rotationally averaged power spectrum ⓘ

This section was not generated. The rotationally averaged power spectrum is only generated for cubic maps.

8 Fourier-Shell correlation ⓘ

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

8.1 FSC ⓘ



*Reported resolution corresponds to spatial frequency of 0.323 Å^{-1}

8.2 Resolution estimates ⓘ

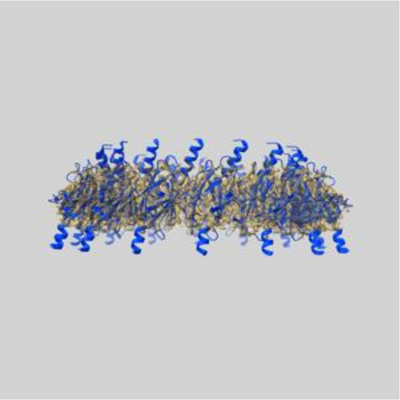
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.10	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.53	3.69	3.56

*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 3.53 differs from the reported value 3.1 by more than 10 %

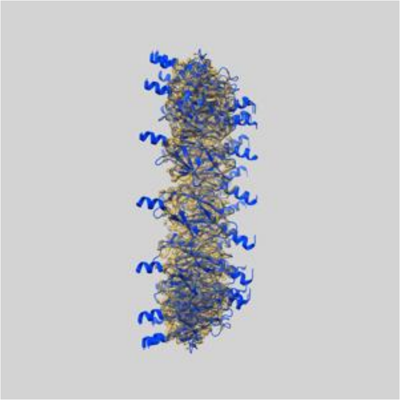
9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-12708 and PDB model 7O3T. Per-residue inclusion information can be found in section 3 on page 14.

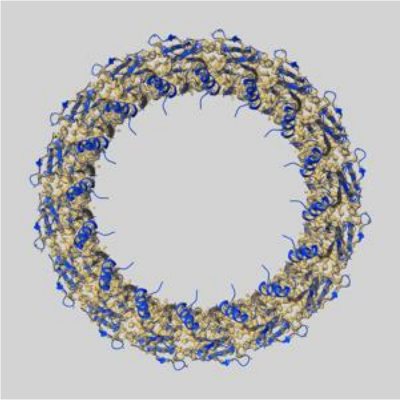
9.1 Map-model overlay (i)



X



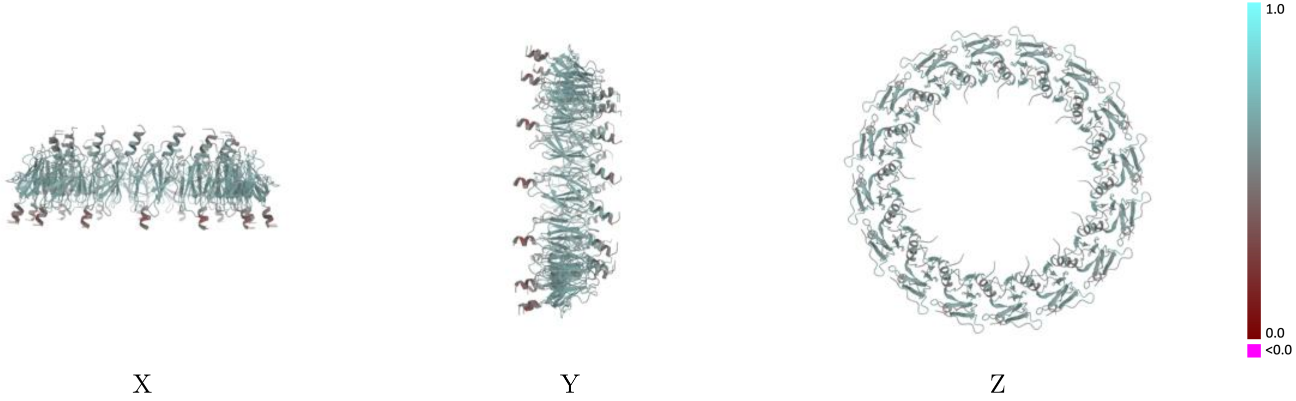
Y



Z

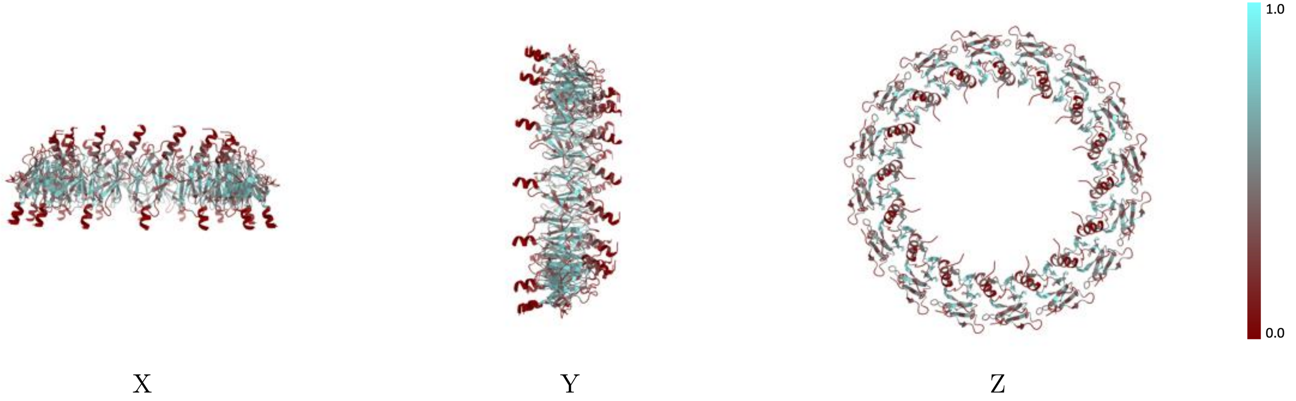
The images above show the 3D surface view of the map at the recommended contour level 10.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model ⓘ



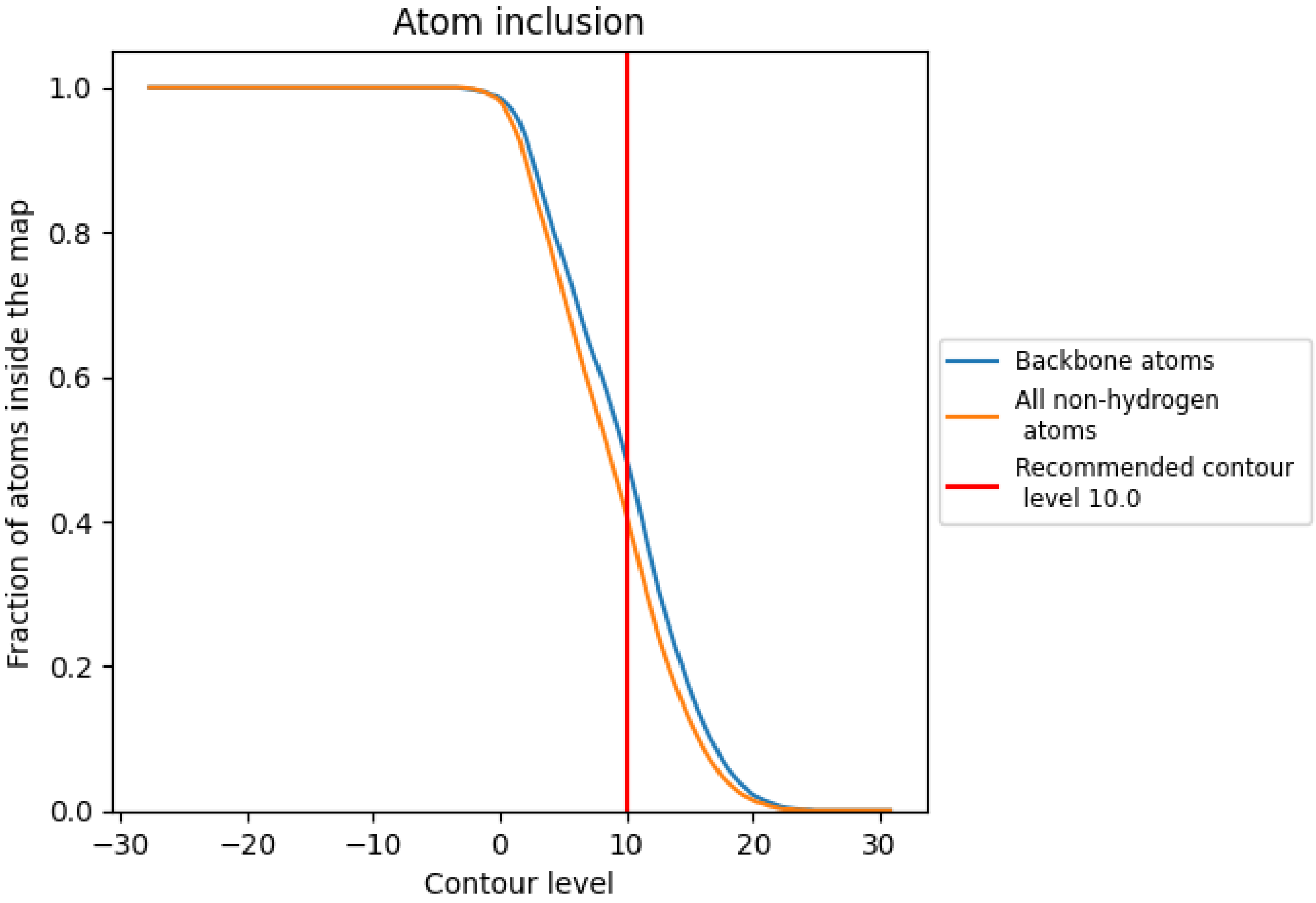
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

9.3 Atom inclusion mapped to coordinate model ⓘ



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 (10.0).

9.4 Atom inclusion ⓘ



At the recommended contour level, 49% of all backbone atoms, 41% 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 (10.0) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	■ 0.4100	■ 0.5640
A	■ 0.1410	■ 0.5480
B	■ 0.4520	■ 0.5700
D	■ 0.1760	■ 0.5250
E	■ 0.4590	■ 0.5680
G	■ 0.1060	■ 0.5450
H	■ 0.4370	■ 0.5710
J	■ 0.1830	■ 0.5230
K	■ 0.4480	■ 0.5720
M	■ 0.1340	■ 0.5380
N	■ 0.4430	■ 0.5680
P	■ 0.2110	■ 0.5250
Q	■ 0.4500	■ 0.5660
S	■ 0.1270	■ 0.5240
T	■ 0.4570	■ 0.5690
V	■ 0.1480	■ 0.5290
W	■ 0.4570	■ 0.5700
Y	■ 0.1760	■ 0.5270
Z	■ 0.4630	■ 0.5630
b	■ 0.1200	■ 0.5420
c	■ 0.4620	■ 0.5680
e	■ 0.1550	■ 0.5330
f	■ 0.4120	■ 0.5700
h	■ 0.1690	■ 0.5390
i	■ 0.4500	■ 0.5690
k	■ 0.1690	■ 0.5260
l	■ 0.4770	■ 0.5700
n	■ 0.1200	■ 0.5390
o	■ 0.4440	■ 0.5690
u	■ 0.1550	■ 0.5260
v	■ 0.4350	■ 0.5690
y	■ 0.2110	■ 0.5310
z	■ 0.4400	■ 0.5710