wwPDB EM Validation Summary Report (i)

Jun 18, 2025 – 02:58 PM JST

PDB ID	:	9JYZ / pdb_00009jyz
EMDB ID	:	EMD-61910
Title	:	portal-tail complex of mature T7
Authors	:	Liu, H.R.; Chen, W.Y.
Deposited on	:	2024-10-13
Resolution	:	2.70 Å(reported)

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

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

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

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

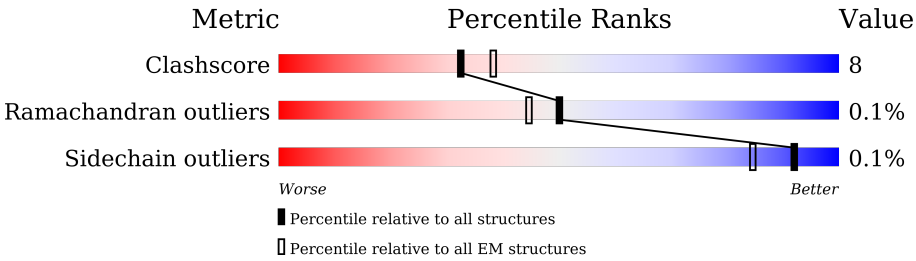
EMDB validation analysis	:	FAILED
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

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 2.70 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 >=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%

Mol	Chain	Length	Quality of chain
1	0	88	5% 8% • 84%
1	3	88	8% • 5% 84%
1	4	88	• 10% • 84%
1	5	88	7% 6% • 84%
1	6	88	7% 5% 5% 84%
1	7	88	6% 9% • 84%
1	8	88	5% 7% • • 84%
1	9	88	6% 9% • 84%
1	AA	88	5% 8% • • 84%

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Mol	Chain	Length	Quality of chain
1	AB	88	7% 5% 5% 84%
1	AC	88	• 11% • • 84%
1	AD	88	6% 7% • • 84%
2	1	99	12% • 85%
2	2	99	11% • 85%
2	v	99	12% • 85%
2	w	99	11% • 85%
2	y	99	11% • 85%
2	z	99	12% • 85%
3	A	553	20% 5% 75%
3	B	553	21% 5% 75%
3	C	553	21% 5% 75%
3	D	553	20% 5% 75%
3	E	553	20% 6% 75%
3	F	553	19% 5% 76%
3	G	553	19% 5% 76%
3	H	553	20% 5% 76%
3	I	553	19% 5% 76%
3	J	553	19% 5% 76%
3	K	553	18% 7% 75%
3	L	553	18% 7% 75%
3	M	553	17% 7% 75%
3	N	553	18% 7% 75%
3	O	553	19% 5% 75%
3	a	553	21% 5% 75%

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Mol	Chain	Length	Quality of chain
3	b	553	20% 5% 76%
3	c	553	19% 6% 75%
4	P	794	79% 21%
4	Q	794	77% 22%
4	R	794	79% 21%
4	S	794	79% 21%
4	T	794	80% 20%
4	x	794	78% 22%
5	U	196	86% 14%
5	V	196	82% 18%
5	W	196	85% 15%
5	X	196	86% 14%
5	Y	196	88% 12%
5	Z	196	80% 19% •
5	d	196	81% 19% •
5	e	196	81% 19% •
5	f	196	80% 19% •
5	g	196	79% 20% •
5	h	196	85% 15%
5	i	196	80% 20% •
6	j	536	77% 21% •
6	k	536	79% 20% •
6	l	536	77% 21% •
6	m	536	77% 21% •
6	n	536	76% 22% •

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Mol	Chain	Length	Quality of chain
6	o	536	77% 21% •
6	p	536	77% 21% •
6	q	536	79% 19% •
6	r	536	78% 20% •
6	s	536	76% 22% •
6	t	536	77% 21% •
6	u	536	76% 22% •

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 126948 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 Protein 6.7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	0	14	110	70	18	20	2	0	0
1	3	14	110	70	18	20	2	0	0
1	4	14	110	70	18	20	2	0	0
1	5	14	110	70	18	20	2	0	0
1	6	14	110	70	18	20	2	0	0
1	7	14	110	70	18	20	2	0	0
1	8	14	110	70	18	20	2	0	0
1	9	14	110	70	18	20	2	0	0
1	AA	14	110	70	18	20	2	0	0
1	AB	14	110	70	18	20	2	0	0
1	AC	14	110	70	18	20	2	0	0
1	AD	14	110	70	18	20	2	0	0

- Molecule 2 is a protein called Protein 7.3.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	1	15	101	60	21	20	0	0
2	2	15	101	60	21	20	0	0
2	v	15	101	60	21	20	0	0

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Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	w	15	101	60	21	20	0	0
			Total	C	N	O		
2	y	15	101	60	21	20	0	0
			Total	C	N	O		
2	z	15	101	60	21	20	0	0

- Molecule 3 is a protein called Tail fiber protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	A	141	1115	698	201	215	1	0	0
			Total	C	N	O	S		
3	B	141	1115	698	201	215	1	0	0
			Total	C	N	O	S		
3	C	141	1115	698	201	215	1	0	0
			Total	C	N	O	S		
3	D	141	1115	698	201	215	1	0	0
			Total	C	N	O	S		
3	E	141	1115	698	201	215	1	0	0
			Total	C	N	O	S		
3	F	134	1067	668	192	206	1	0	0
			Total	C	N	O	S		
3	G	134	1067	668	192	206	1	0	0
			Total	C	N	O	S		
3	H	134	1067	668	192	206	1	0	0
			Total	C	N	O	S		
3	I	134	1067	668	192	206	1	0	0
			Total	C	N	O	S		
3	J	134	1067	668	192	206	1	0	0
			Total	C	N	O	S		
3	K	136	1080	675	195	209	1	0	0
			Total	C	N	O	S		
3	L	136	1080	675	195	209	1	0	0
			Total	C	N	O	S		
3	M	136	1080	675	195	209	1	0	0
			Total	C	N	O	S		
3	N	136	1080	675	195	209	1	0	0
			Total	C	N	O	S		
3	O	136	1080	675	195	209	1	0	0
			Total	C	N	O	S		
3	a	141	1115	698	201	215	1	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	b	134	1067	668	192	206	1	0	0
			Total	C	N	O	S		
3	c	136	1080	675	195	209	1	0	0

- Molecule 4 is a protein called Tail tubular protein gp12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	P	793	6313	4003	1087	1208	15	0	0
			Total	C	N	O	S		
4	Q	793	6313	4003	1087	1208	15	0	0
			Total	C	N	O	S		
4	R	793	6313	4003	1087	1208	15	0	0
			Total	C	N	O	S		
4	S	793	6313	4003	1087	1208	15	0	0
			Total	C	N	O	S		
4	T	793	6313	4003	1087	1208	15	0	0
			Total	C	N	O	S		
4	x	793	6313	4003	1087	1208	15	0	0

- Molecule 5 is a protein called Tail tubular protein gp11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	U	196	1565	971	267	318	9	0	0
			Total	C	N	O	S		
5	V	196	1565	971	267	318	9	0	0
			Total	C	N	O	S		
5	W	196	1565	971	267	318	9	0	0
			Total	C	N	O	S		
5	X	196	1565	971	267	318	9	0	0
			Total	C	N	O	S		
5	Y	196	1565	971	267	318	9	0	0
			Total	C	N	O	S		
5	Z	195	1557	966	266	317	8	0	0
			Total	C	N	O	S		
5	d	195	1557	966	266	317	8	0	0
			Total	C	N	O	S		
5	e	195	1557	966	266	317	8	0	0
			Total	C	N	O	S		
5	f	195	1557	966	266	317	8	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
5	g	195	Total 1557	C 966	N 266	O 317	S 8	0	0
5	h	196	Total 1565	C 971	N 267	O 318	S 9	0	0
5	i	195	Total 1557	C 966	N 266	O 317	S 8	0	0

- Molecule 6 is a protein called Portal protein.

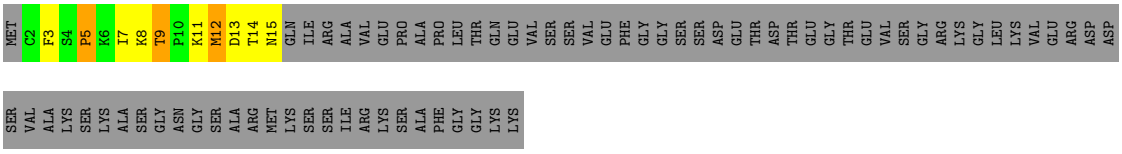
Mol	Chain	Residues	Atoms					AltConf	Trace
6	j	526	Total 4070	C 2549	N 692	O 806	S 23	0	0
6	k	526	Total 4070	C 2549	N 692	O 806	S 23	0	0
6	l	526	Total 4070	C 2549	N 692	O 806	S 23	0	0
6	m	526	Total 4070	C 2549	N 692	O 806	S 23	0	0
6	n	526	Total 4070	C 2549	N 692	O 806	S 23	0	0
6	o	526	Total 4070	C 2549	N 692	O 806	S 23	0	0
6	p	526	Total 4070	C 2549	N 692	O 806	S 23	0	0
6	q	526	Total 4070	C 2549	N 692	O 806	S 23	0	0
6	r	526	Total 4070	C 2549	N 692	O 806	S 23	0	0
6	s	526	Total 4070	C 2549	N 692	O 806	S 23	0	0
6	t	526	Total 4070	C 2549	N 692	O 806	S 23	0	0
6	u	526	Total 4070	C 2549	N 692	O 806	S 23	0	0

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. 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. 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.

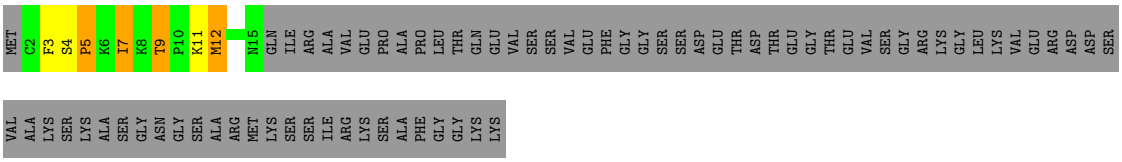
- Molecule 1: Protein 6.7

Chain 0: 5% 8% • 84%



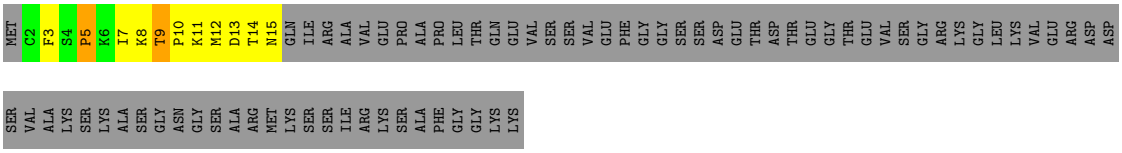
- Molecule 1: Protein 6.7

Chain 3: 8% • 5% 84%



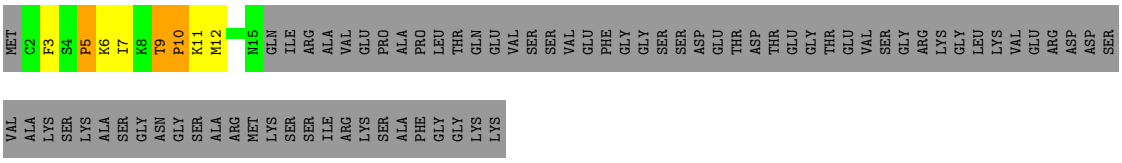
- Molecule 1: Protein 6.7

Chain 4: • 10% • 84%



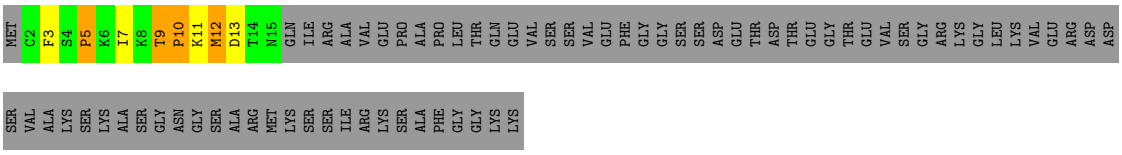
- Molecule 1: Protein 6.7

Chain 5: 7% 6% • 84%



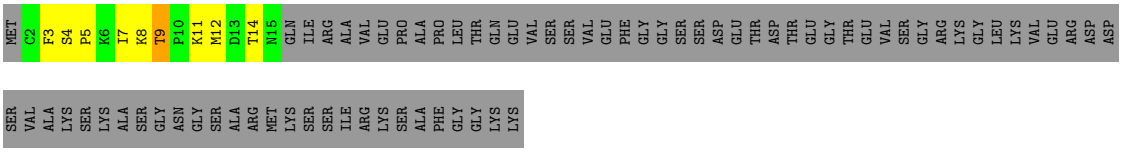
- Molecule 1: Protein 6.7

Chain 6: 7% 5% 5% 84%



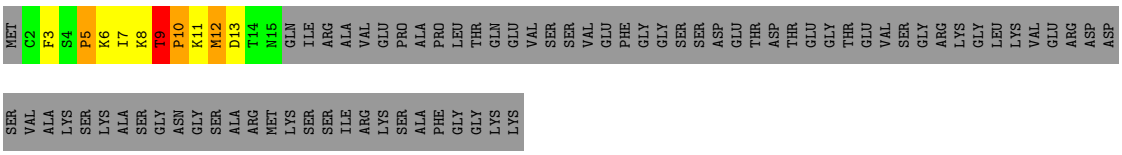
- Molecule 1: Protein 6.7

Chain 7: 6% 9% • 84%



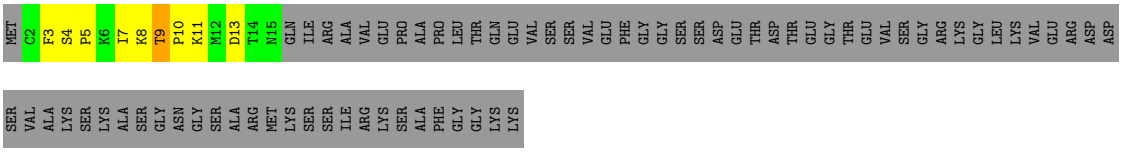
- Molecule 1: Protein 6.7

Chain 8: 5% 7% • • 84%



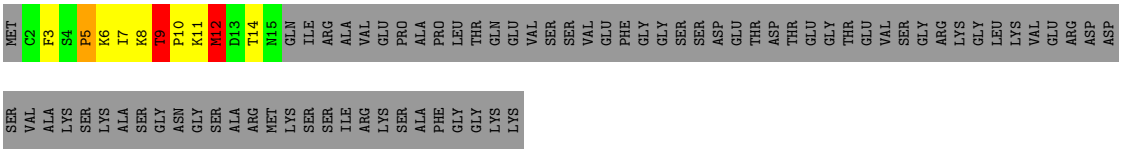
- Molecule 1: Protein 6.7

Chain 9: 6% 9% • 84%



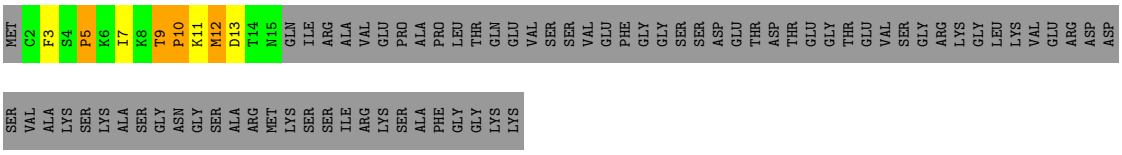
- Molecule 1: Protein 6.7

Chain AA: 5% 8% • • 84%



- Molecule 1: Protein 6.7

Chain AB: 7% 5% 5% 84%



- Molecule 1: Protein 6.7

Chain AC: 11% 84%

MET C2 F3 S4 P5 K6 I7 K8 T9 P10 K11 M12 D13 T14 N15 GLN ILE ARG ALA VAL GLU PRO ALA PRO LEU THR GLN GLU VAL SER SER VAL GLU PHE GLY GLY SER SER ASP GLU THR ASP THR GLU GLY THR GLU VAL SER GLY ARG LYS GLY LEU LYS VAL GLU ARG ASP ASP

SER VAL ALA LYS SER LYS ALA SER GLY ASN GLY SER ALA ARG MET LYS SER SER ILE ARG LYS SER ALA PHE GLY GLY LYS LYS

- Molecule 1: Protein 6.7

Chain AD: 6% 7% 84%

MET C2 F3 S4 P5 K6 I7 K8 T9 P10 K11 M12 D13 T14 N15 GLN ILE ARG ALA VAL GLU PRO ALA PRO LEU THR GLN GLU VAL SER SER VAL GLU PHE GLY GLY SER SER ASP GLU THR ASP THR GLU GLY THR GLU VAL SER GLY ARG LYS GLY LEU LYS VAL GLU ARG ASP ASP

SER VAL ALA LYS SER LYS ALA SER GLY ASN GLY SER ALA ARG MET LYS SER SER ILE ARG LYS SER ALA PHE GLY GLY LYS LYS

- Molecule 2: Protein 7.3

Chain 1: 12% 85%

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

GLU LYS GLU VAL SER THR GLU ASP GLU ALA GLN THR GLU SER GLY ARG LYS LYS ALA ARG ALA GLY GLY K84 L87 S88 V89 A90 R91 N98 ILE

- Molecule 2: Protein 7.3

Chain 2: 11% 85%

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

GLU LYS GLU VAL SER THR GLU ASP GLU ALA GLN THR GLU SER GLY ARG LYS LYS ALA ARG ALA GLY GLY K84 L87 S88 V89 A90 R91 I97 N98 ILE

- Molecule 2: Protein 7.3

Chain v: 12% 85%

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

GLU LYS GLU VAL SER THR GLU ASP GLU ALA GLN THR GLU SER GLY ARG LYS LYS ALA ARG ALA GLY GLY K84 L87 S88 V89 A90 R91 N98 ILE

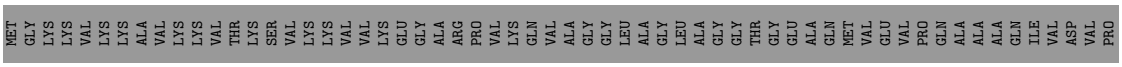
- Molecule 2: Protein 7.3

Chain w: 11% 85%

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

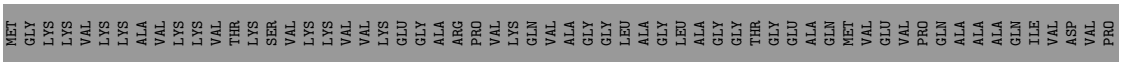
• Molecule 2: Protein 7.3

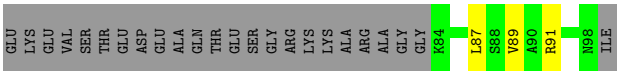
Chain y: 11% • 85%



• Molecule 2: Protein 7.3

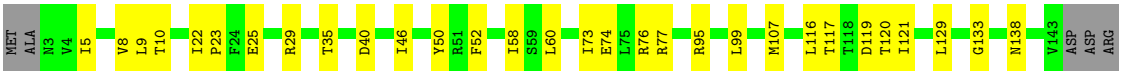
Chain z: 12% • 85%

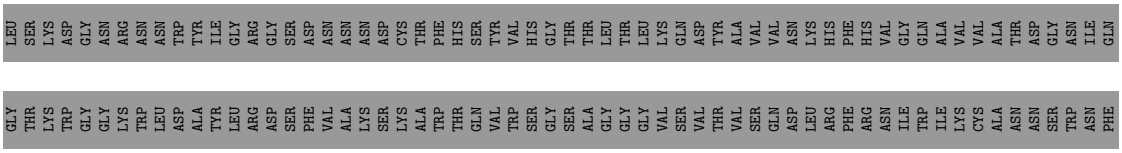




• Molecule 3: Tail fiber protein

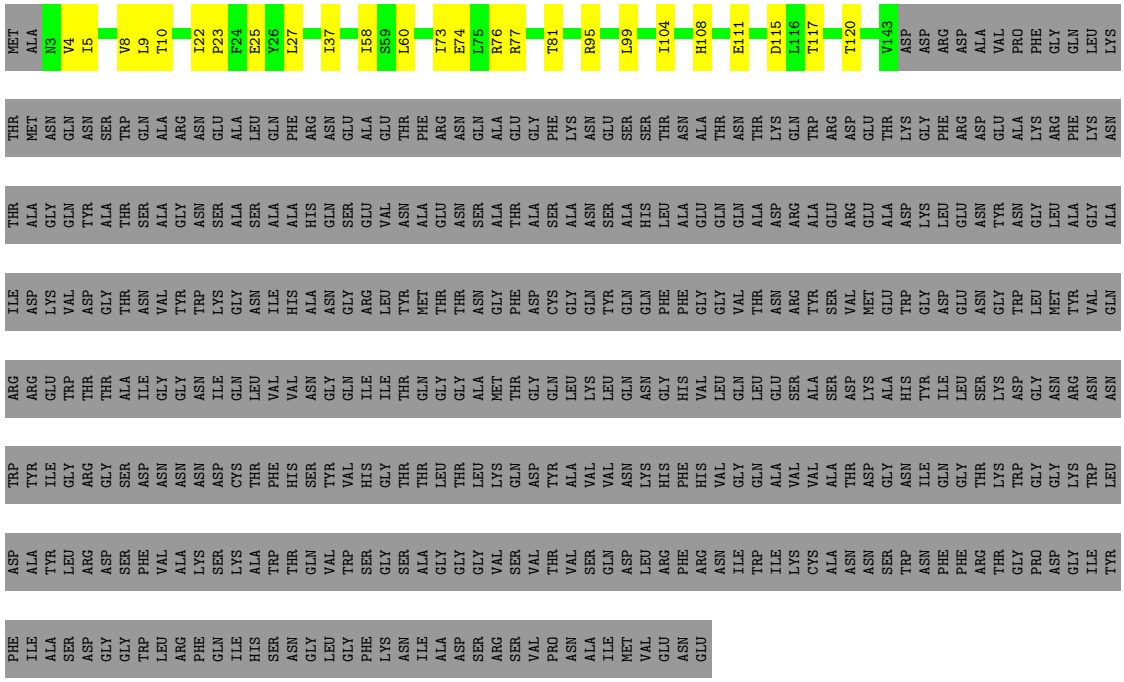
Chain A: 20% 5% 75%





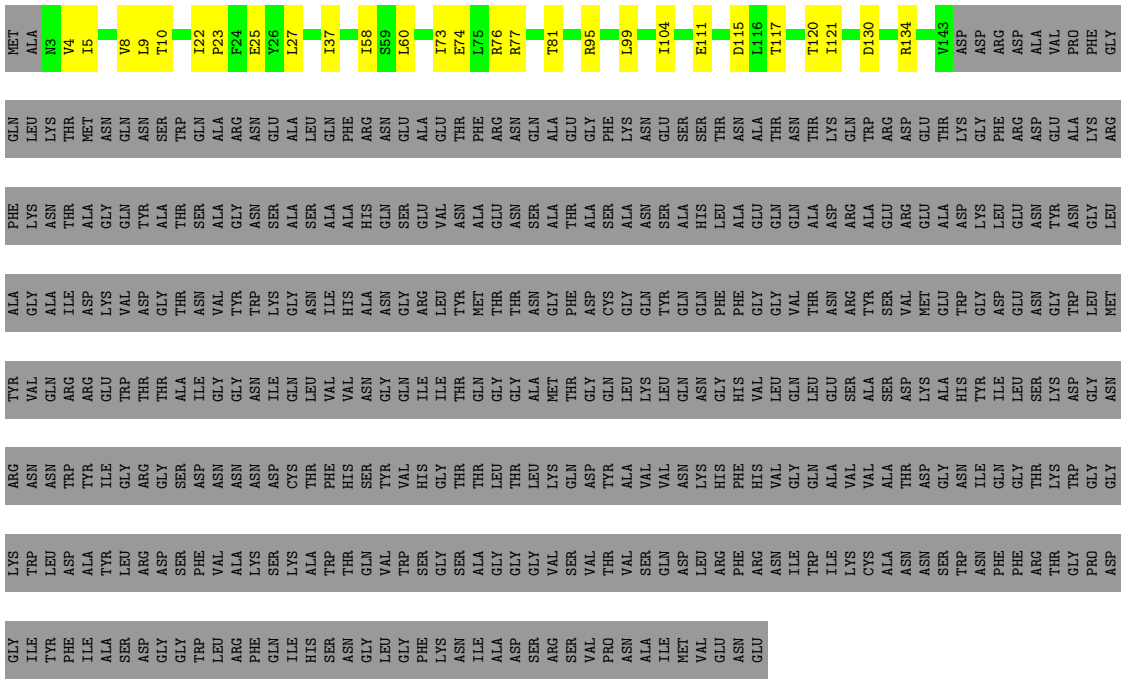
• Molecule 3: Tail fiber protein

Chain B: 21% 5% 75%



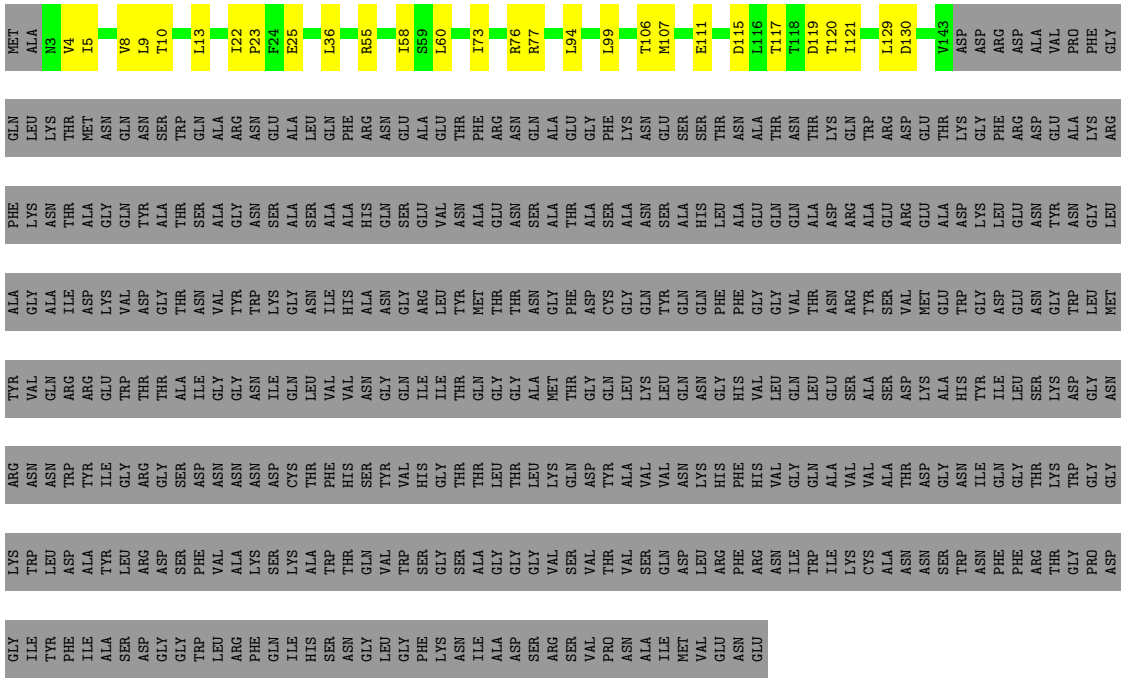
- Molecule 3: Tail fiber protein

Chain C: 21% 5% 75%



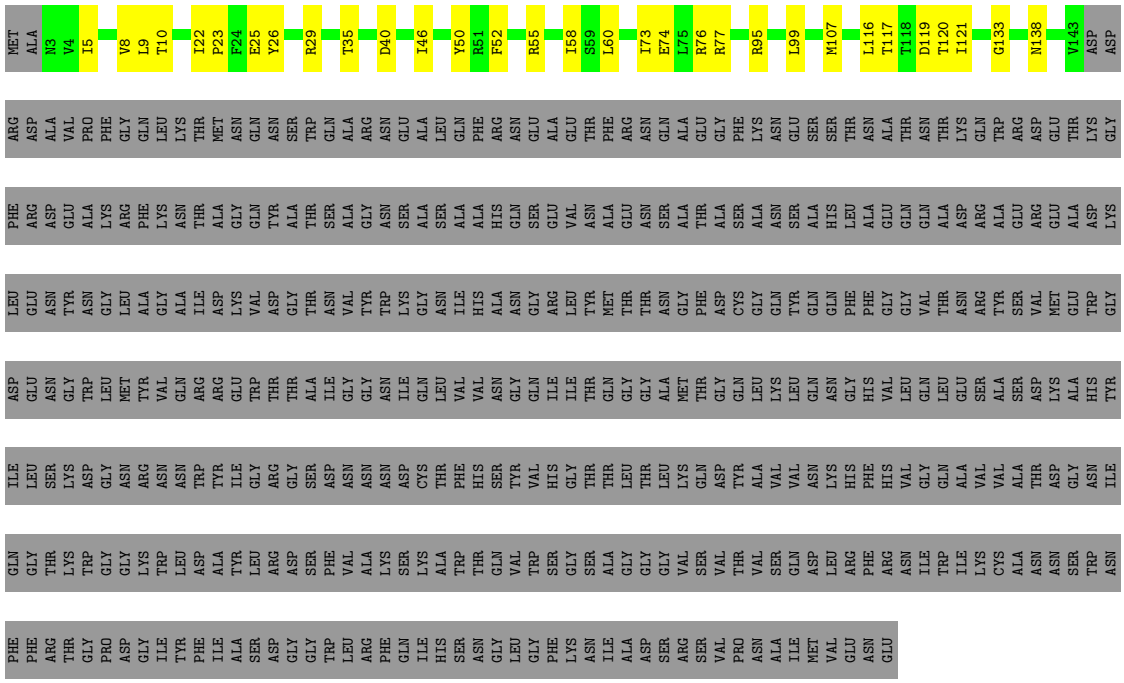
- Molecule 3: Tail fiber protein

Chain D: 20% 5% 75%



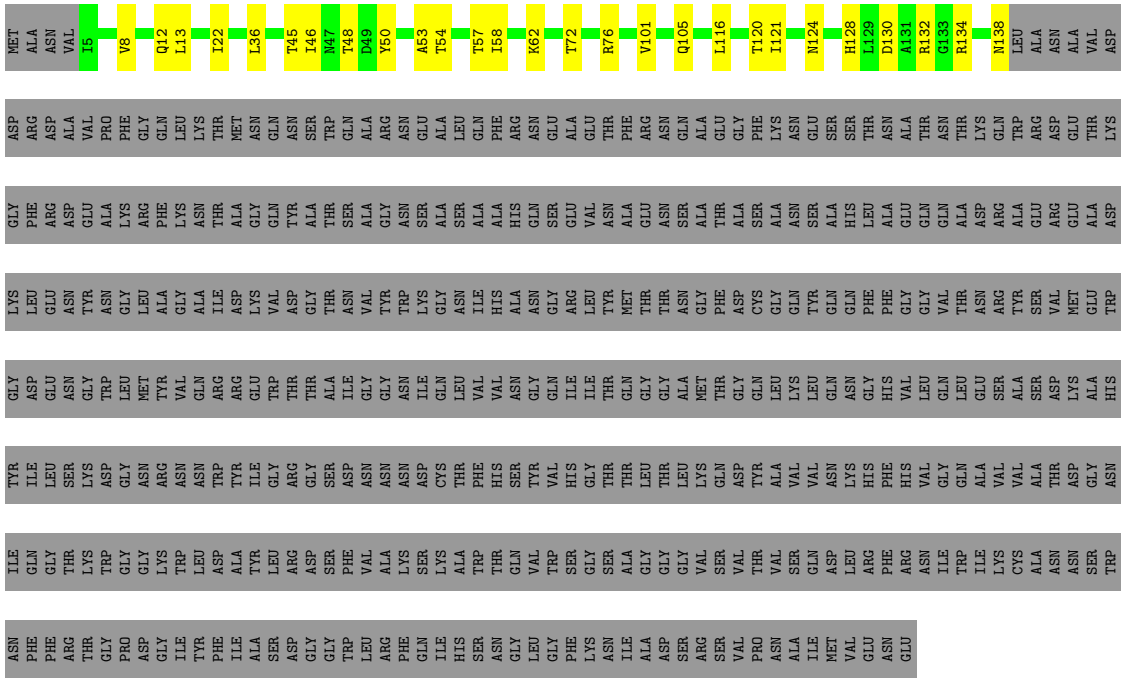
- Molecule 3: Tail fiber protein

Chain E: 20% 6% 75%



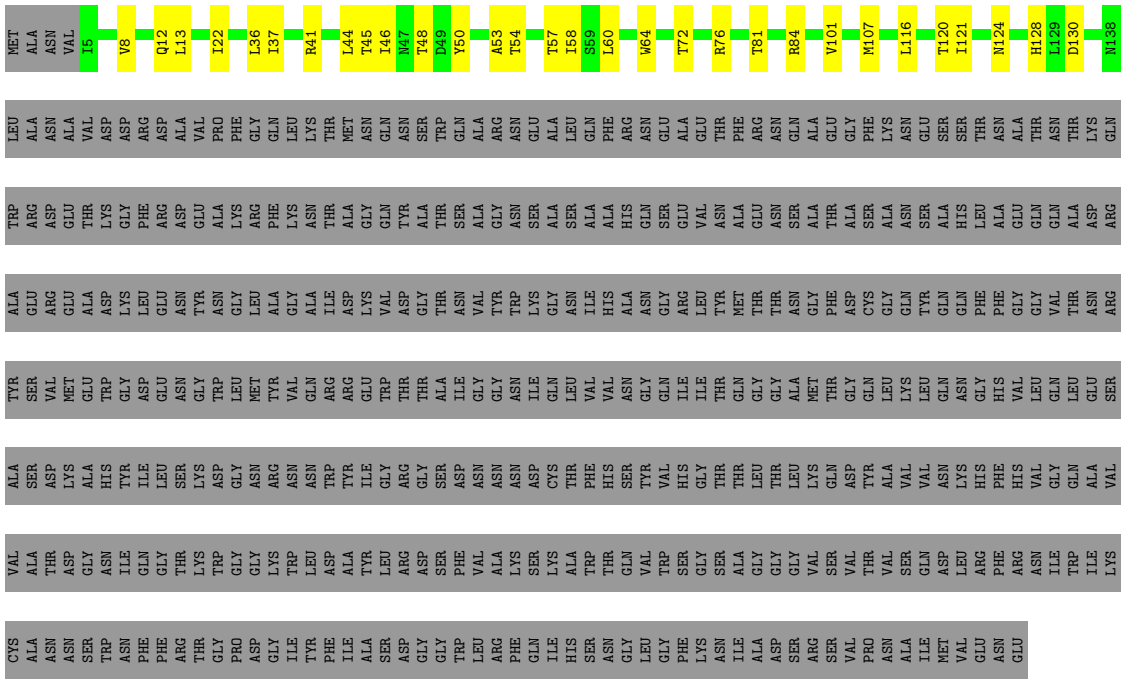
- Molecule 3: Tail fiber protein

Chain F: 19% 5% 76%



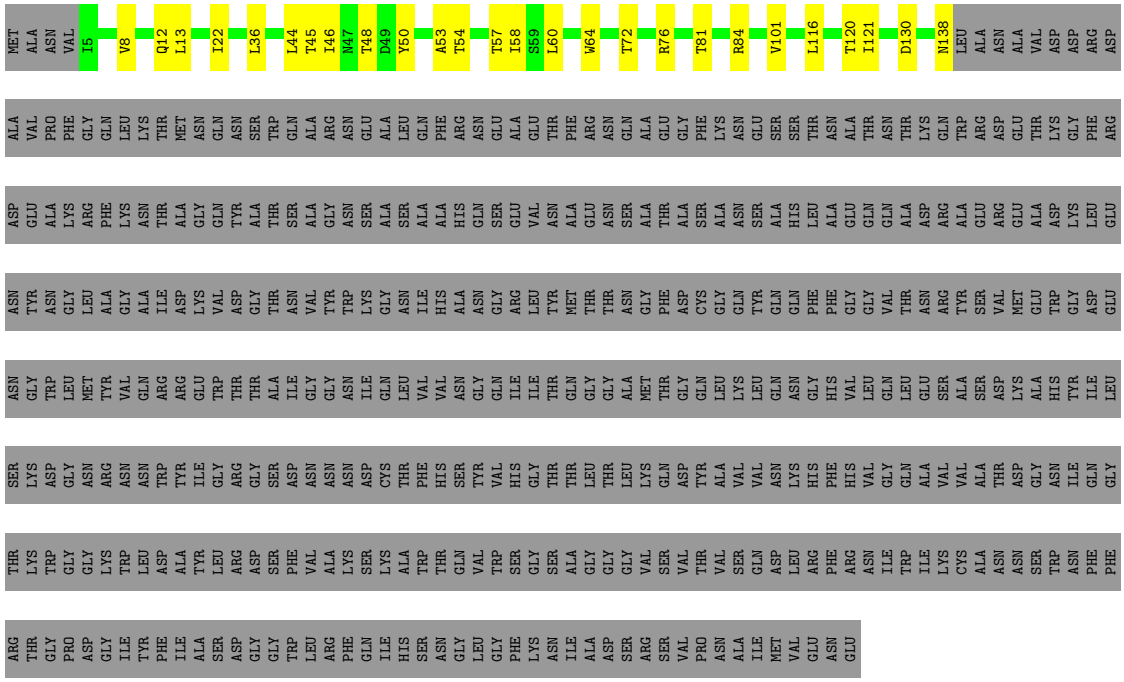
- Molecule 3: Tail fiber protein

Chain G:



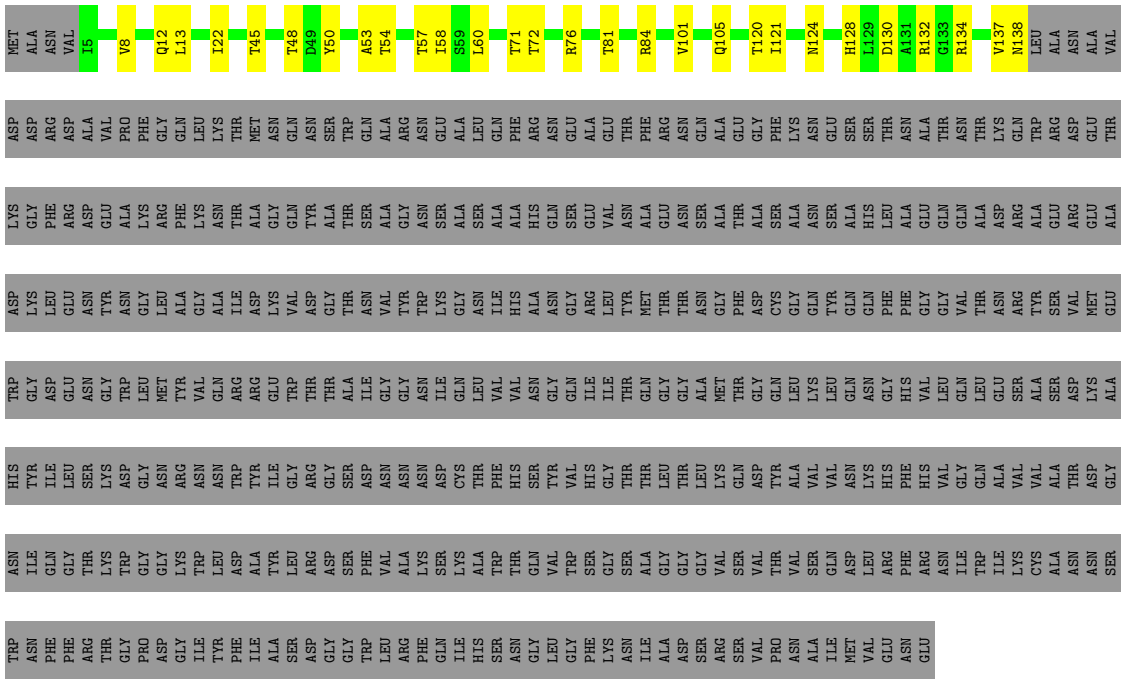
- Molecule 3: Tail fiber protein

Chain H:



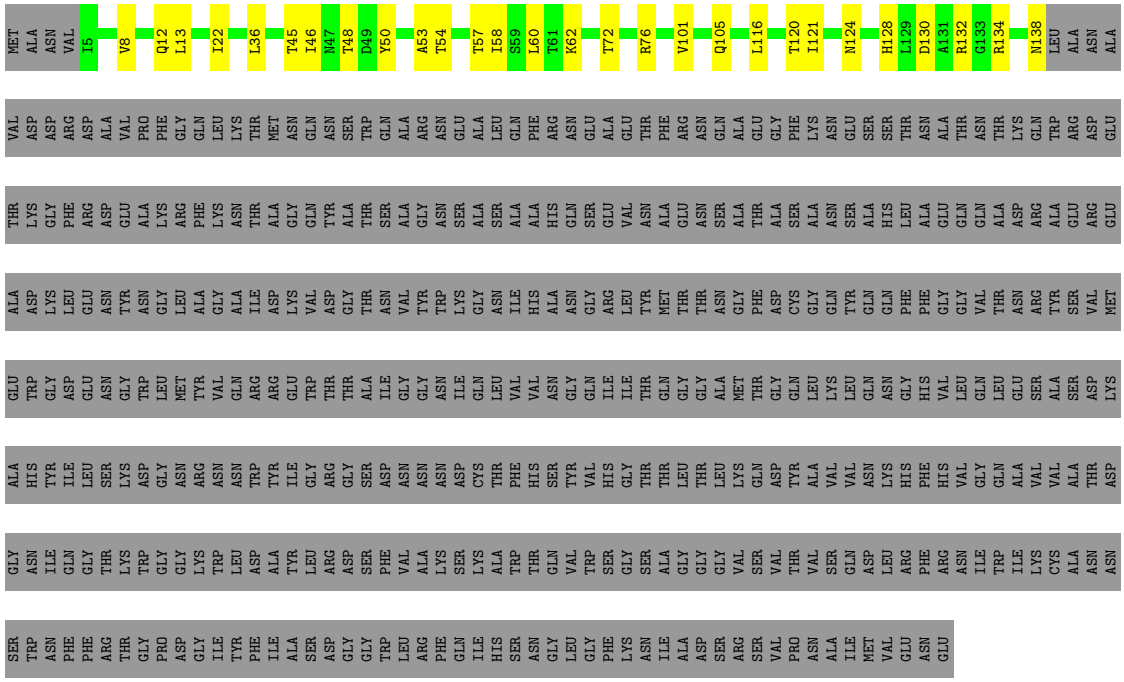
- Molecule 3: Tail fiber protein

Chain I:



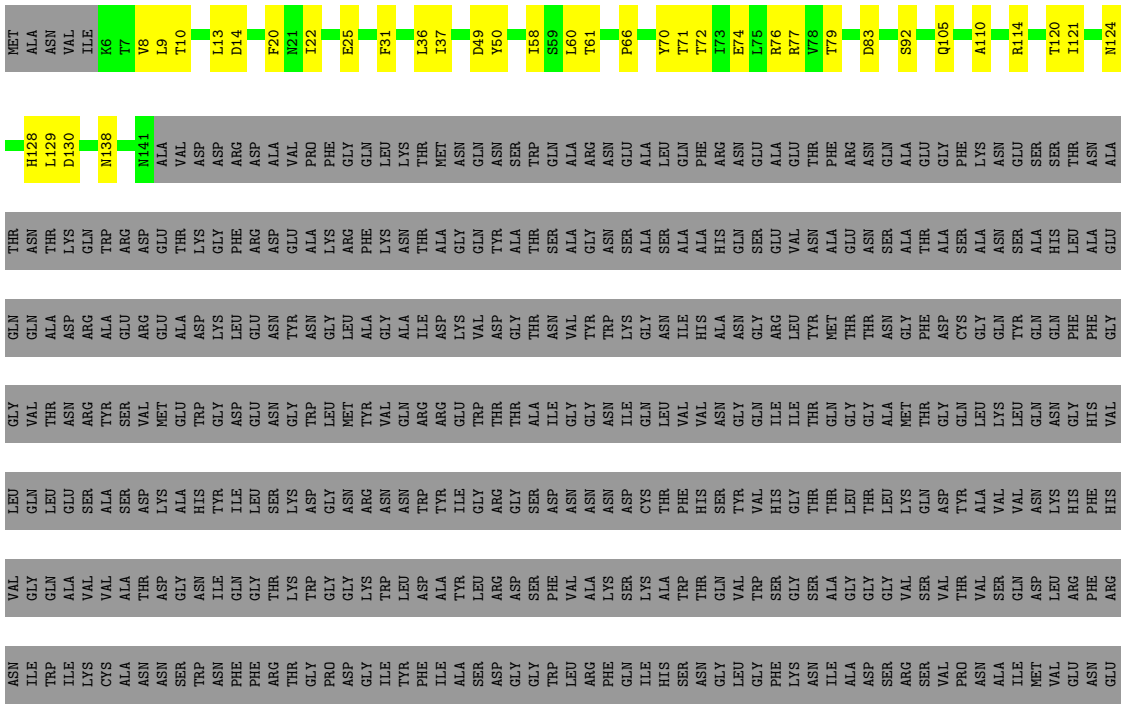
- Molecule 3: Tail fiber protein

Chain J:



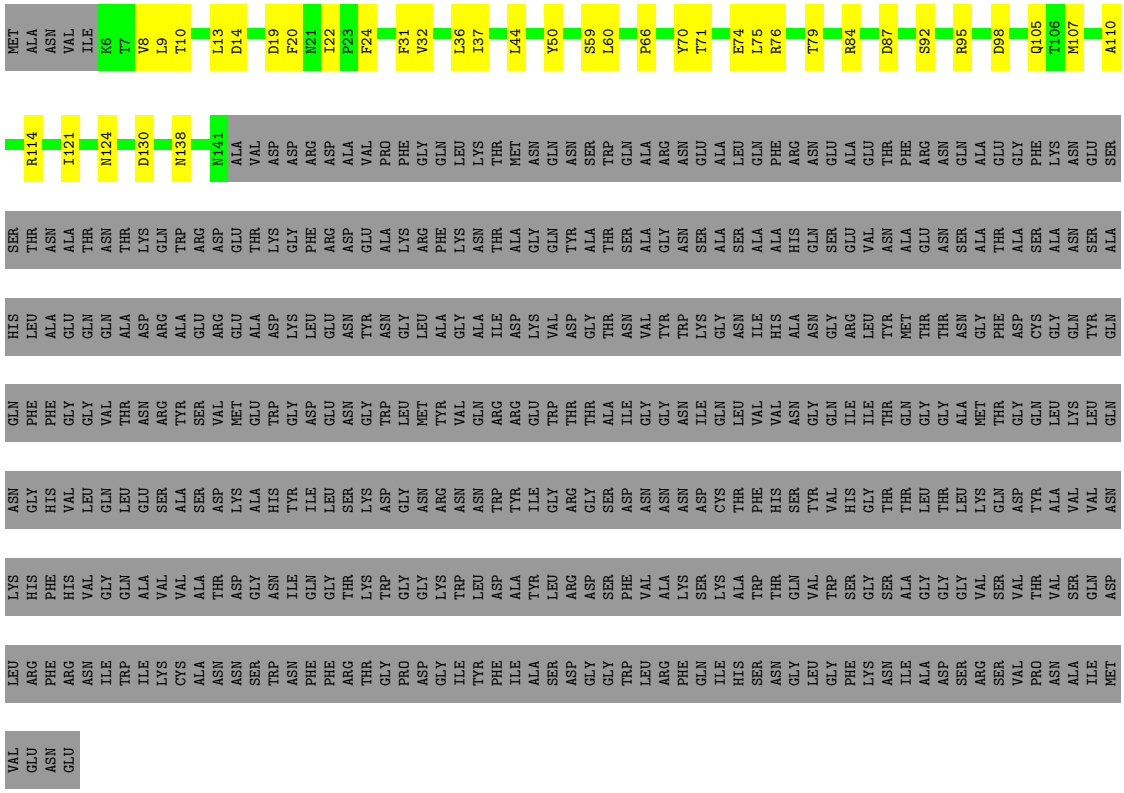
- Molecule 3: Tail fiber protein

Chain K:



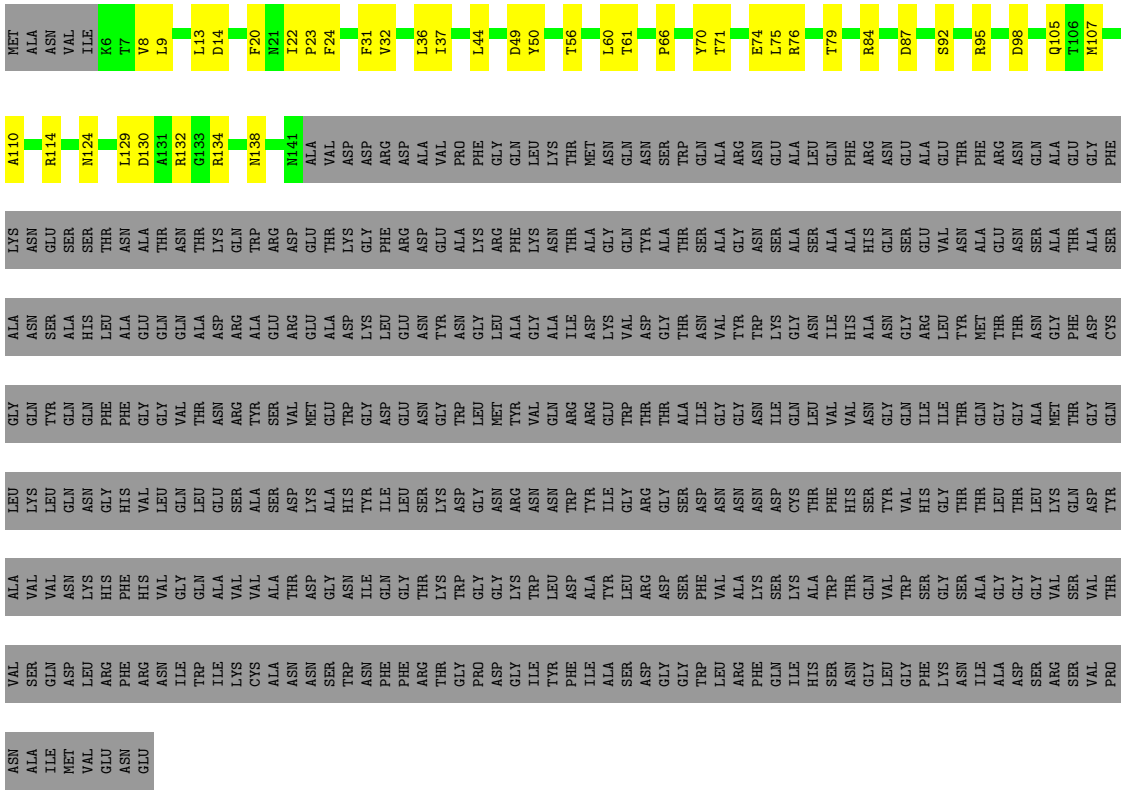
- Molecule 3: Tail fiber protein

Chain L:



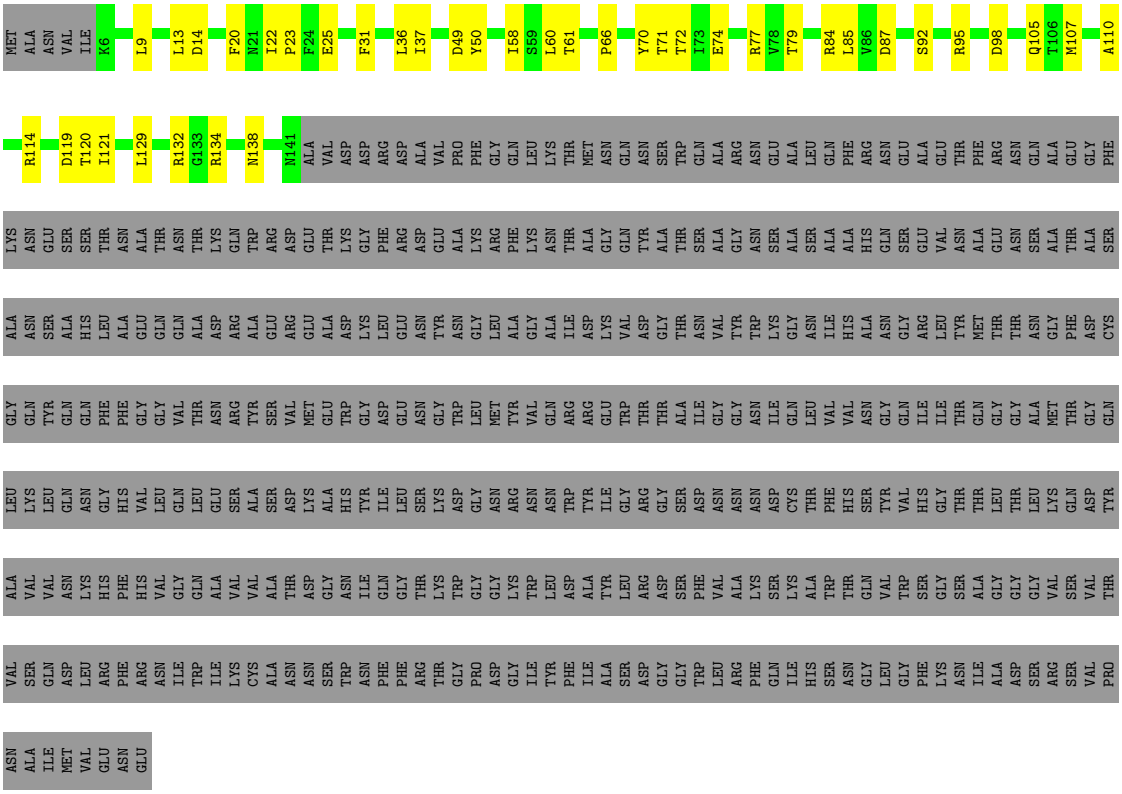
- Molecule 3: Tail fiber protein

Chain M: 17% 7% 75%



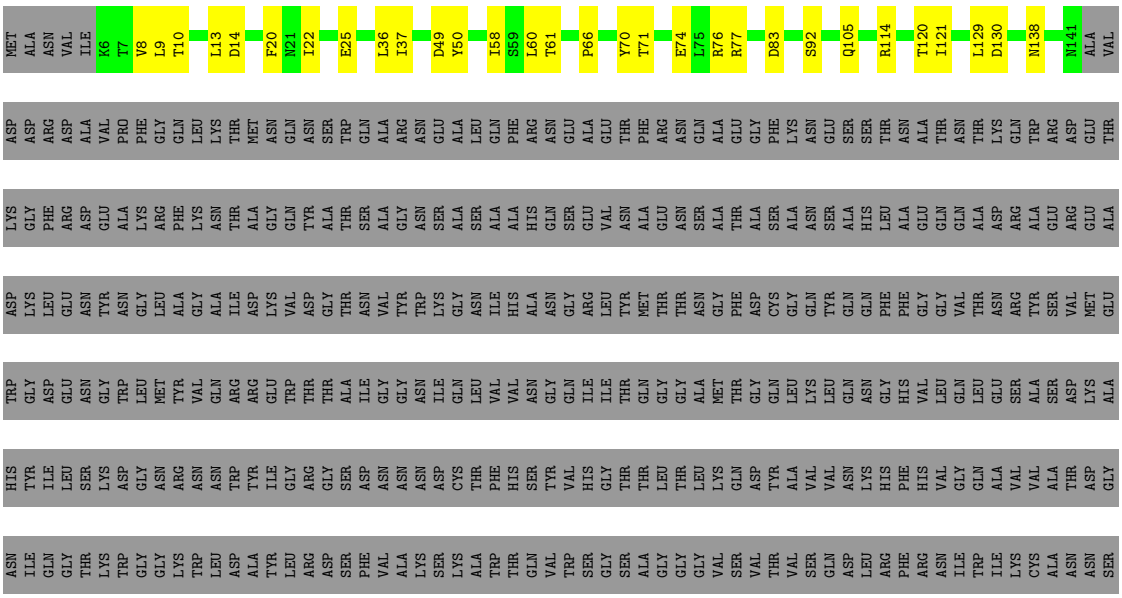
- Molecule 3: Tail fiber protein

Chain N: 18% 7% 75%



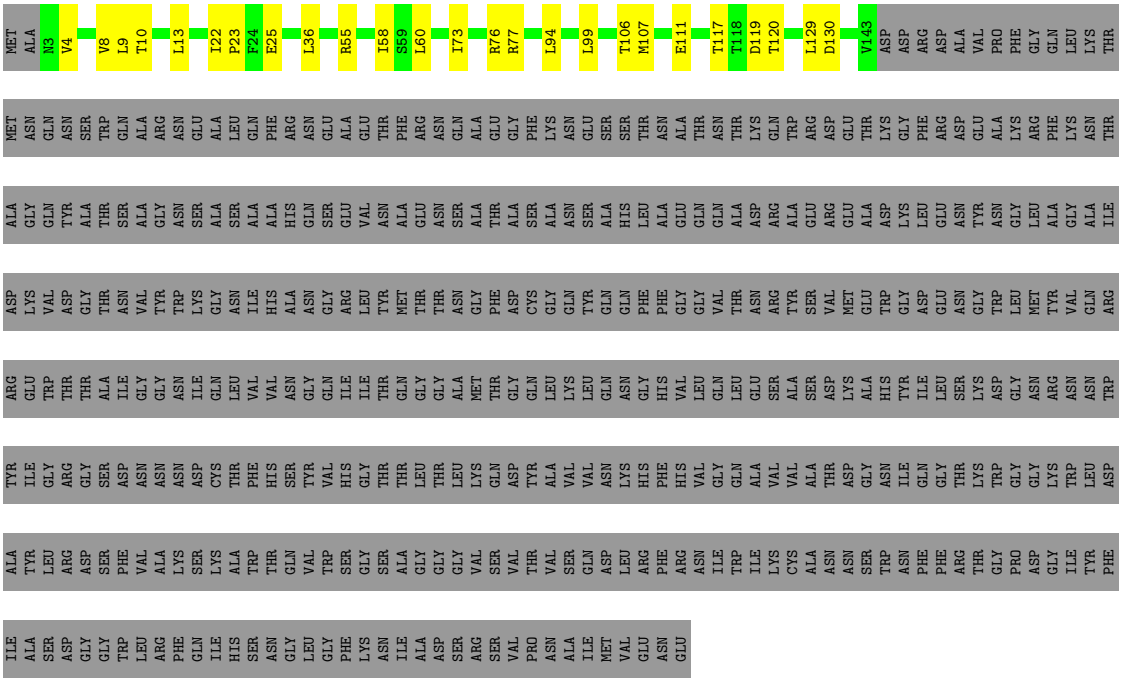
- Molecule 3: Tail fiber protein

Chain O: 19% 5% 75%



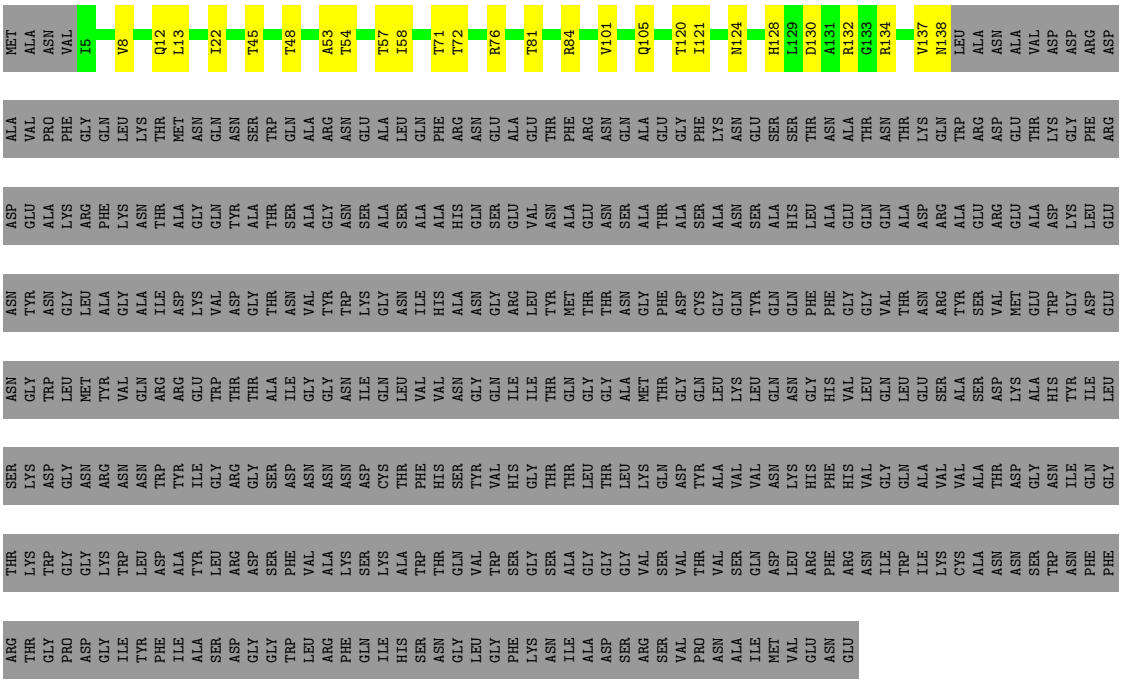
- Molecule 3: Tail fiber protein

Chain a:



- Molecule 3: Tail fiber protein

Chain b:



• Molecule 3: Tail fiber protein

Chain c: 19% 6% 75%

MET ALA ASN VAL ILE K6 L9 L13 D14 F20 N21 I22 P23 F24 E25 L36 I37 D49 Y50 I58 S59 L60 T61 K62 P66 Y70 T71 T72 I73 E74 R77 L85 S92 R95 D98 Q105 T106 M107 A110 R114 D119 R132

G133 R134 N138 N141 ALA VAL ASP ASP ARG ASP ALA VAL PRO PHE GLY GLN LEU LYS THR MET ASN GLN ASN SER TRP GLN ALA ARG ASN GLU ALA LEU GLN PHE ARG ASN GLU ALA GLU THR PHE ARG ASN GLN ALA GLU GLY PHE LYS ASN GLU SER SER THR ASN ALA THR ASN

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

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

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

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

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

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

• Molecule 4: Tail tubular protein gp12

Chain P: 79% 21%

MET A2 L3 K9 S16 I21 L22 R23 Y24 P25 E38 K44 R45 P46 P47 L48 V49 F50 L51 G61 I66 H67 L68 R71 E75 I86 V98 T109 D115 M118 V119 T120 V121 T125 F126 K136 V141 N147 Q150 L153

I154 R157 Q160 L165 I166 V167 A175 K176 V188 T191 L196 A197 Q217 I220 T235 K236 D237 L243 I244 N245 P246 V247 L257 V270 S276 V282 D285 R288 K289 V290 W291 E300 D301 Q302 V303 R314 G318 P329

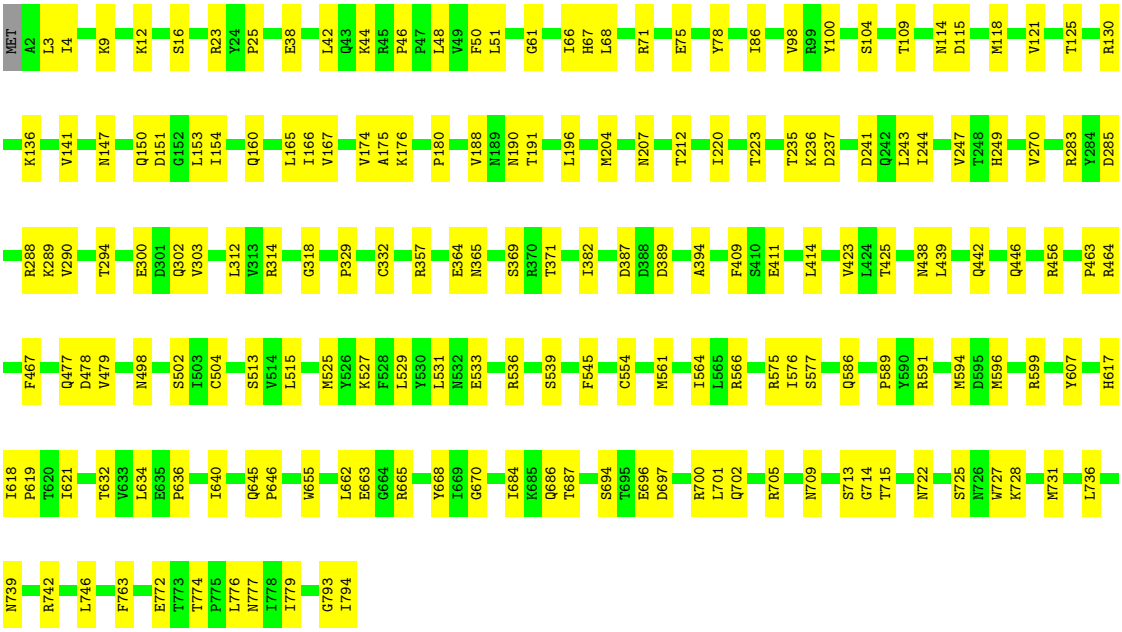
C332 F353 R357 N365 S369 R370 T371 A372 K373 I382 D387 D388 D389 A394 N398 E411 E412 L413 L414 I415 W416 V423 L424 T425 E436 L437 N438 Q446 R456 P463 R464 F467 Q477 D478 V479 V482 V492 Y495 N498

S502 I503 C504 S513 V514 L515 K522 M525 Y526 K527 E533 S539 H542 W543 D544 F545 I557 I564 L565 R566 R575 I576 M596 N608 D609 D610 I618 I621 G627 R628 T632 V633 L634 I640 Q645 P646 G649 Y668 N672

Q686 S694 R700 L701 Q702 R705 N709 S713 G714 T715 E721 N722 S725 N726 W727 K728 M731 L736 N739 R742 L746 F763 Y767 D771 E772 T773 T774 P775 L776 N777 I778 I779 Y787 G793 I794

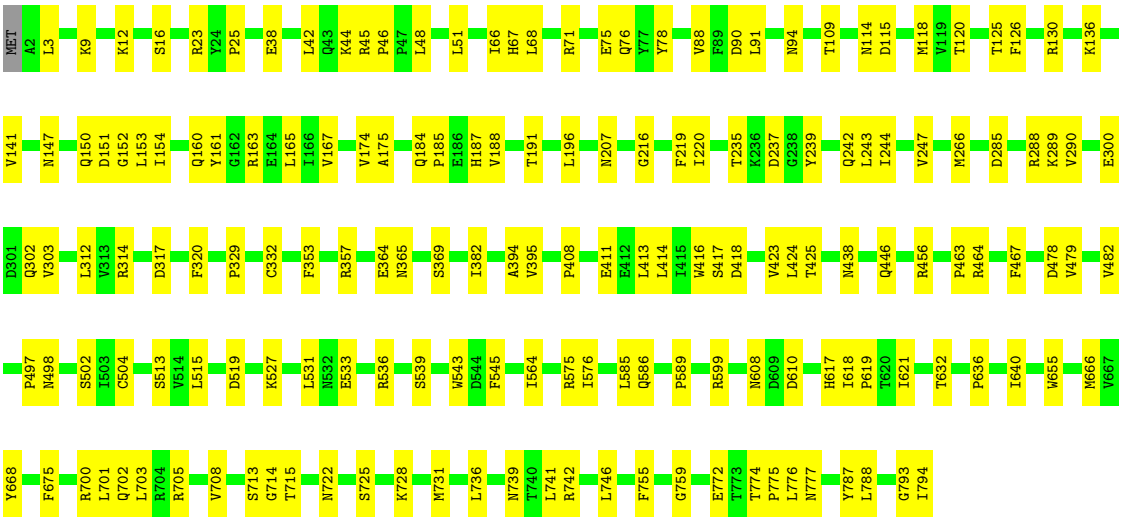
• Molecule 4: Tail tubular protein gp12

Chain Q: 77% 22%



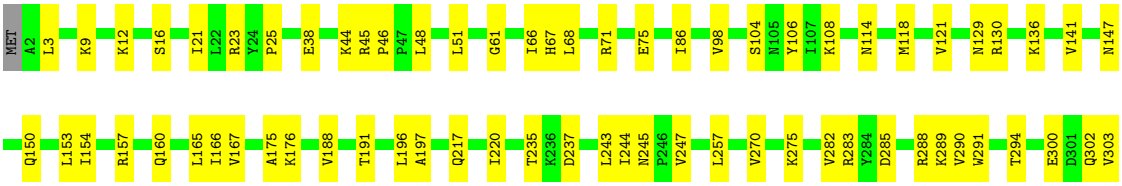
- Molecule 4: Tail tubular protein gp12

Chain R:



- Molecule 4: Tail tubular protein gp12

Chain S:



R314 G318 K323 W324 P329 C332 R357 N365 S369 R370 T371 A372 K373 I382 D387 D388 D389 A394 N398 L413 L414 I415 W416 V423 L424 T425 N438 Q446 R456 P463 R464 F467 Q477 D478 V479 V482 K483 N498

S502 I503 C504 S513 V514 L515 K522 K527 E533 R536 S539 H542 W543 D544 F545 I557 I564 L565 R566 R575 I576 M594 D595 M596 N608 D609 D610 I618 I621 R628 T632 V633 L634 I640 Q645 G649 Y668 I669 G670

F671 N672 Q686 T687 E696 R700 L701 Q702 R705 N709 S713 G714 T715 E721 N722 S725 K728 M731 L736 N739 R742 L746 F763 Y767 D771 E772 T773 T774 P775 L776 N777 I778 I779 Y787 G793 I794

- Molecule 4: Tail tubular protein gp12

Chain T: 80% 20%

MET A2 L3 I4 K9 S16 R23 Y24 P25 E38 L42 Q43 K44 R45 P46 P47 L48 V49 F50 L51 G61 I66 H67 L68 R71 E75 Y78 I86 V98 R99 Y100 S104 T109 D115 M118 V121 T125 K136 N147

Q150 D151 G152 L153 I154 R157 Q160 L165 I166 V167 V174 A175 V188 T191 L196 M204 N207 T212 G216 F219 I220 T223 T235 K236 D237 D241 Q242 L243 I244 N245 P246 V247 T248 H249 V270 R283 Y284 D285 R288 K289 V290

T294 Q302 V303 L312 V313 R314 D317 G318 P329 R357 E364 N365 S369 R370 T371 D387 D388 D389 A394 Y405 V423 L424 T425 Q446 D447 R456 P463 R464 F467 Q477 D478 N498 S502 I503 C504 S513 V514 L515 M525 Y526

K527 F528 L529 Y530 L531 N532 E533 R536 S539 F545 C554 M561 I564 L565 R566 R575 I576 S577 Q586 P589 Y590 R591 M596 R599 Y607 T632 V633 L634 E635 P636 I640 Q645 P646 L662 E663 G664 R665 Y668 I684 K685 Q686

S694 T695 E696 D697 R700 L701 Q702 R705 N709 S713 G714 T715 N722 S725 K728 M731 L736 N739 R742 L746 E772 T773 T774 P775 L776 N777 I778 I779 G793 I794

- Molecule 4: Tail tubular protein gp12

Chain x: 78% 22%

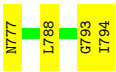
MET A2 L3 K12 S16 R23 Y24 P25 E38 L42 Q43 K44 R45 P46 P47 L48 L51 I66 H67 L68 R71 D72 E73 H74 E75 Q76 Y77 Y78 R87 V88 F89 D90 L91 N94 E95 T109 N114 D115 M118 V119 T120 T125 F126 R130

K136 V141 N147 Q150 D151 G152 L153 I154 N155 V156 R157 Q160 L165 I166 V167 V174 A175 Q184 P185 E186 H187 V188 T191 L196 L200 M204 N207 T212 G216 F219 I220 T223 T235 K236 D237 L243 I244 N245 P246 V247 P258

M266 D285 R288 K289 V290 E300 D301 Q302 V303 L312 V313 R314 D317 F320 P329 C332 F353 F354 R355 N356 R357 E364 N365 S369 I382 A383 N384 A394 V395 Y405 P408 E411 E412 L413 L414 I415 W416 S417 D418 V423 L424 T425

Q446 D447 R456 P463 R464 F467 Q477 D478 V479 V482 E486 P497 N498 S502 I503 C504 S513 V514 L515 D519 K527 L531 N532 E533 R536 S539 W543 D544 F545 I557 I564 R575 I576 L585 P589 R599 N608

D609 D610 H617 I618 P619 T620 I621 T632 P636 I640 W655 M666 F675 R700 L701 Q702 L703 R704 R705 V708 S713 G714 T715 N722 S725 K728 M731 L736 N739 T740 L741 R742 L746 F755 G759 E772 T773 T774 P775 L776



• Molecule 5: Tail tubular protein gp11

Chain U:

• Molecule 5: Tail tubular protein gp11

Chain V:

• Molecule 5: Tail tubular protein gp11

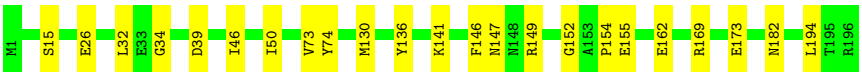
Chain W:

• Molecule 5: Tail tubular protein gp11

Chain X:

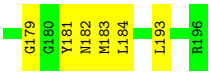
• Molecule 5: Tail tubular protein gp11

Chain Y:



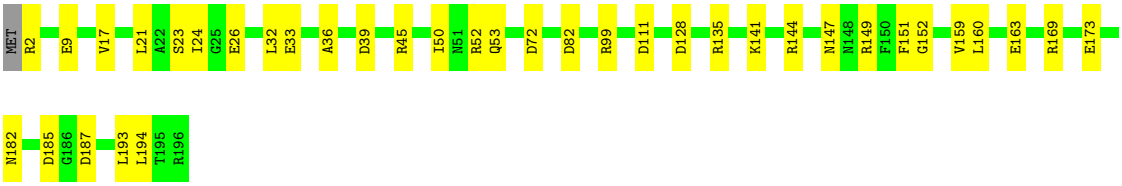
• Molecule 5: Tail tubular protein gp11

Chain Z:



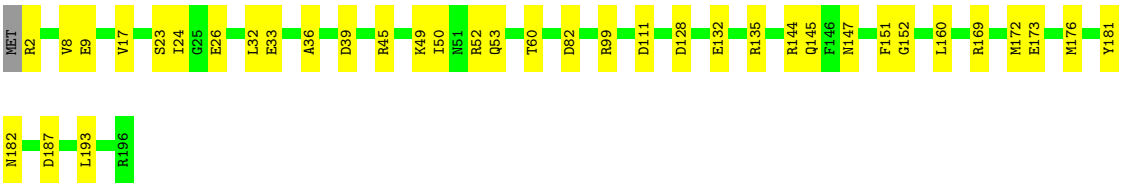
• Molecule 5: Tail tubular protein gp11

Chain d:



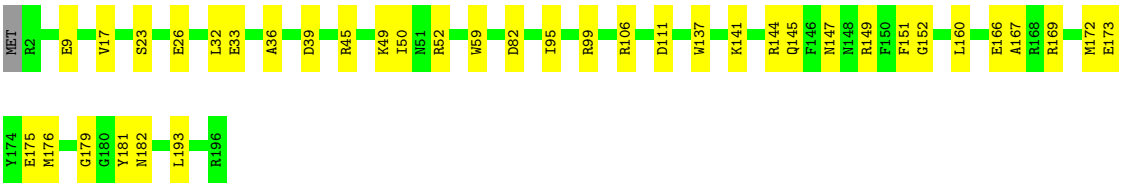
• Molecule 5: Tail tubular protein gp11

Chain e:



• Molecule 5: Tail tubular protein gp11

Chain f:



• Molecule 5: Tail tubular protein gp11

Chain g:

• Molecule 5: Tail tubular protein gp11

Chain h:

- Molecule 5: Tail tubular protein gp11

Chain i: 80% 20%

MET R2 V8 E9 V17 S23 I24 G25 E26 L32 E33 A36 D39 R45 K49 I50 N51 R52 Q53 P71 D82 R99 D111 G116 D128 E132 R135 Y136 W137 R144 Q145 F146 N147 F151 G152 L160 A167 R168 R169 L170

C171 M172 E173 M176 N182 D187 L193 R196

- Molecule 6: Portal protein

Chain j: 77% 21%

MET ALA GLU LYS R5 T6 E10 A13 K14 S15 V16 Y17 E18 R19 R24 R30 I39 P40 Y54 Q59 R64 G65 L66 M74 F78 T82 S89 E90 Y91 E92 E108 M118 I121 E122 Y126 R127 V138 L144 K159 L160 Y161

V167 V168 Q169 R170 D171 A172 F173 M179 Q184 D193 I194 R195 E199 D208 D220 Y226 L227 R228 E231 Y244 P245 K246 Y251 I254 R255 D260 G261 E262 S263 Y264 G265 I269 N281 L282 Q283 K288 M289 S290 I297 P302 D318

T321 G322 R323 D326 F329 L330 K334 Q335 V344 M357 S360 A361 V362 Q363 R364 R368 V369 T370 I374 E380 L385 G386 Y389 L396 L405 L417 E423 S427 THR GLY LEU GLU ALA ILE G434 Q437 L442 V446 W449

I466 R469 M492 Q495 M499 G511 A516 T517 M523 A524 A525 A526 A527 D528 S529 V530 G531 L532 Q533 I536

- Molecule 6: Portal protein

Chain k: 79% 20%

MET ALA GLU LYS R5 A13 Y17 R24 P40 S41 L42 A50 Y54 W58 L66 L73 M74 F78 T82 L86 S89 E90 Y91 E92 Q95 M112 V113 E114 R115 M118 I121 Y126 E132 A133 L134 L137 V138 V139 L144

Y161 V167 V168 Q169 R170 D171 A172 V176 L177 Q178 M179 V180 Q184 L190 I194 D208 H216 D220 L227 R228 Y229 E230 E231 M235 E236 R255 G261 E262 S263 Y264 G265 E284 K288 M289 S290 K295 D318 T321 K334 Q335 A336

V344 S353 L358 N359 R368 V369 T370 E373 G386 G387 V388 Y389 E395 L396 Q397 L408 Q409 I414 E423 P424 T425 I426 S427 THR GLY LEU GLU ALA ILE G434 R435 C445 L452 M455 L463 A464 M465 I474 T478 K491 Q494

M501 A506 Q510 G511 M512 M523 A524 A525 A526 A527 D528 S529 V530 G531 L532 Q533 I536

- Molecule 6: Portal protein

Chain l: 77% 21%

MET ALA GLU LYS R5 T6 G7 E10 K14 E18 R24 R30 P40 D46 S47 Y54 Q59 L66 L73 P79 T82 L86 E90 Y91 Q95 M112 V113 E114 I117 M118 I121 Y126 R127 V128 F131 E132 K135

V139 L144 Y161 V167 V168 Q169 R170 D171 A172 Q178 Q184 L190 R195 V198 E199 D220 E225 Y226 L227 R228 Y229 E230 E231 V232 K246 R255 M256 V257 R258 G261 E262 S263 Y264 G265 N281 L282 Q283 S290 K295 V296 I297 F319 V320

T321 G322 R323 D326 L330 Q335 V344 S353 M357 L358 V362 Q363 R364 R368 V369 T370 E373 I374 V377 E380 L385 G386 G387 V388 Y389 S390 I391 L392 S393 Q394 E395 L396 Q397 L405 L408 L417 E423 P424 T425 I426 S427 THR GLY LEU

GLU ALA ILE G434 R435 I481 L482 L483 T484 K488 M492 Q498 L508 M512 T517 A525 A526 A527 D528 S529 V530 G531 L532 Q533 I536

- Molecule 6: Portal protein

Chain m: 77% 21%

MET ALA GLU LYS R5 Y17 E18 K21 R24 P40 A50 Y54 Q59 K72 L73 M74 L77 F78 T82 R85 I88 S89 E90 Y91 E92 Q95 L96 L97 S98 D99 P100 D101 G102 L103 L110 S111 M112 R115 M118 I121 Y126

L144 K159 L160 Y161 V167 V168 Q169 R170 D171 A172 Q178 M179 V180 Q184 L190 V198 D208 I211 D220 Y226 L227 R228 Y229 E230 E231 V232 M235 E236 Y244 P245 K246 R255 G261 E262 S263 Y264 G265 E280 M289 S290 P302 I305

T306 D318 T321 G322 R323 D326 I327 K334 Q335 A336 V344 M357 L358 N359 R368 V369 T370 E373 I374 R375 Y376 V377 A378 S379 E380 L381 E382 L385 G386 G387 V388 Y389 E395 L396 Q397 Q413 E423 S427 THR GLY LEU GLU ALA ILE G434 D438

L442 C445 I474 D477 I481 T484 Q487 M492 A493 Q494 G511 M512 A513 T517 M523 A524 A525 A526 A527 V530 G531 L532 I536

- Molecule 6: Portal protein

Chain n: 76% 22%

MET ALA GLU LYS R5 L8 K14 S15 V16 Y17 E18 R19 R30 Y37 P40 S41 L42 D46 S47 Y54 R64 G65 L69 P79 T82 W83 E90 Y91 E92 A93 K94 Q95 L96 L97 G102 K105 E114 M118 I121 Y126 R127

F131 K135 L144 K159 L160 Y161 V168 Q169 R170 D171 A172 Q178 M179 F187 P191 I194 R195 E199 K205 E209 D220 Y226 L227 R228 Y229 E230 K246 R255 G261 E262 S263 Y264 G265 Y268 R277 N281 K288 W289 S290

K295 V296 I297 P302 D318 F319 V320 T321 F329 L330 Q331 Q335 V344 S353 M357 L358 N359 S360 A361 V362 R368 V369 T370 I374 V377 E380 L381 L385 G386 Y389 E395 L396 Q397 L405 L417 E423 P424 T425 I426 S427 THR GLY LEU

GLU ALA ILE G434 R435 I466 R469 T484 K488 M492 M497 Q498 A506 A507 L508 A509 Q510 G511 M512 A513 T517 M523 A524 A525 A526 A527 D528 S529 V530 G531 L532 Q533 I536

- Molecule 6: Portal protein

Chain o: 77% 21%

MET ALA GLU LYS R5 Y17 R24 R30 P40 A50 Y54 W58 V61 G65 S71 K72 L73 M74 L75 M80 Q81 T82 Y91 Q95 R115 M118 I121 Y126 L144 P150 K159 L160 Y161 V167 V168 Q169 R170 D171 A172

Q178 M179 V180 Q184 L190 I194 D208 D220 L227 R228 Y229 M235 E236 Y244 R255 G261 E262 S263 Y264 G265 E284 V287 S290 K295 I305 T306 T321 G322 R323 D326 I327 S328 F329 K334 Q335 A336 D337 V344 M357

L358 N359 V362 R368 V369 T370 E373 V377 A378 S379 E382 D383 T384 L385 G386 G387 V388 Y389 E395 L398 T411 E423 S427 THR GLY LEU GLU ALA ILE G434 R435 C445 L452 D457 L463 I474 T478 I481 M492 A493 Q494 Q495

Q498 M501 D502 N503 G504 A505 A506 A507 Q510 G511 M512 A513 A516 T517 M523 A524 A525 A526 A527 D528 S529 V530 G531 L532 Q533 P534 G535 I536

- Molecule 6: Portal protein

Chain p:

MET ALA GLU LYS R5 T6 G7 L8 A9 E10 A13 K14 S15 V16 Y17 E18 R19 R24 R30 I39 P40 D46 S47 Y54 Q59 R64 G65 L66 M74 F78 S89 E90 Y91 E92 E108 M118 I121 E122 Y126 R127 V138 L144

K159 L160 Y161 V167 V168 Q169 R170 D171 A172 F173 Q178 M179 P191 E192 D193 I194 V198 D220 Y226 L227 R228 E231 Y244 P245 K246 Y251 I254 R255 G261 E262 S263 Y264 G265 I269 N281 L282 Q283 K288 M289 S290 I297 P302 D318

F319 V320 T321 G322 R323 D326 F329 L330 K334 Q335 V344 M357 S360 A361 V362 Q363 R364 R368 V369 T370 I374 E380 L381 T384 L385 G386 Y389 E395 L396 L405 L417 E423 S427 THR GLY LEU GLU ALA ILE G434 Q437 L442

V446 I466 N472 M492 L508 A509 Q510 G511 T517 P520 M523 A524 A525 A526 A527 V530 G531 L532 Q533 I536

- Molecule 6: Portal protein

Chain q:

MET ALA GLU LYS R5 A13 Y17 R24 P40 S41 L42 A50 Y54 W58 L66 L69 L73 M74 L77 F78 T82 L86 Y91 Q95 E114 R115 M118 I121 Y126 E132 A133 L134 L137 V138 V139 L144 Y161

V167 V168 Q169 R170 D171 A172 V176 L177 Q178 M179 V180 Q184 L190 I194 D208 D220 L227 R228 Y229 E230 E231 M235 E236 R255 G261 E262 S263 Y264 G265 E284 K288 M289 S290 K295 D318 F319 V320 T321 K334 Q335 A336 V344

S353 L358 N359 R368 V369 T370 E373 L385 G386 G387 V388 Y389 E395 L396 Q397 L404 L408 I414 E423 P424 T425 I426 S427 THR GLY LEU GLU ALA ILE G434 R435 K441 C445 L452 R456 L463 A464 M465 I474 G475 I476 D477 T478 A507

G511 M512 A513 A516 M523 A524 A525 A526 A527 D528 S529 L532 I536

- Molecule 6: Portal protein

Chain r:

MET ALA GLU LYS R5 T6 G7 E10 K14 E18 R24 R30 P40 D46 S47 Y54 Q59 L66 L73 P79 T82 L86 E90 V113 E114 I117 M118 I121 Y126 R127 V128 F131 E132 K135 V139 L144

E149 P150 Y161 V167 V168 Q169 R170 D171 A172 Q178 Q184 D208 D220 E225 Y226 L227 R228 Y229 E230 K246 R255 M256 V257 R258 G261 E262 S263 Y264 G265 M281 L282 Q283 S290 K295 V296 I297 F319 V320 T321 L330 Q335 V344

S353 M357 L358 V362 Q363 R364 R368 V369 T370 E373 I374 V377 E380 L385 G386 G387 V388 Y389 S390 I391 L392 S393 Q394 E395 L396 Q397 L404 L405 L408 L417 E423 P424 T425 I426 S427 THR GLY LEU GLU ALA ILE G434 R435 D457 T484 K488

Q498 A506 A507 L508 A509 Q510 G511 M512 P520 M523 A524 A525 A526 A527 D528 S529 V530 G531 L532 Q533 I536

- Molecule 6: Portal protein

Chain s: 76% 22%

MET ALA GLU LYS R5 Y17 E18 K21 R24 P40 N49 A50 S51 Y54 Q59 K72 L73 M74 L77 F78 T82 R85 I88 S89 E90 Y91 E92 Q95 D99 P100 D101 L110 R115 M118 I121 Y126 T129 L134

L137 L144 M158 Y161 V167 V168 Q169 R170 D171 A172 Q178 M179 V180 Q184 L190 V198 D208 I211 D220 L227 R228 Y229 E230 E231 V232 M235 E236 Y244 R255 M256 G261 E262 S263 Y264 G265 Y268 E280 M289 S290 P302

I305 T306 D318 T321 G322 R323 D326 I327 K334 Q335 A336 V344 M357 L358 N359 V362 R368 V369 T370 E373 I374 R375 Y376 V377 A378 S379 E380 L381 E382 G386 G387 V388 Y389 E395 L396 Q397 L404 Q413 E423 S427 THR GLY LEU GLU

ALA ILE G434 D438 L442 C445 I474 D477 I481 K491 M492 A493 Q494 M499 D502 M512 A513 A514 Q515 A516 T517 A518 S519 M523 A524 A525 A526 A527 V530 G531 L532 I536

- Molecule 6: Portal protein

Chain t: 77% 21%

MET ALA GLU LYS R5 L8 K14 S15 V16 Y17 E18 R19 R30 Y37 P40 S41 L42 D46 S47 Y54 R64 G65 L69 P79 T82 W83 E90 Y91 E92 A93 K94 Q95 L96 L97 G102 K105 M118 I121 Y126 R127 F131 E132

K135 L144 K159 L160 Y161 V168 Q169 R170 D171 A172 Q178 M179 Q184 F187 P191 I194 R195 E199 K205 D208 E209 D220 Y226 L227 R228 Y229 E230 K246 R255 G261 E262 S263 Y264 G265 Y268 R277 N281 K288 M289

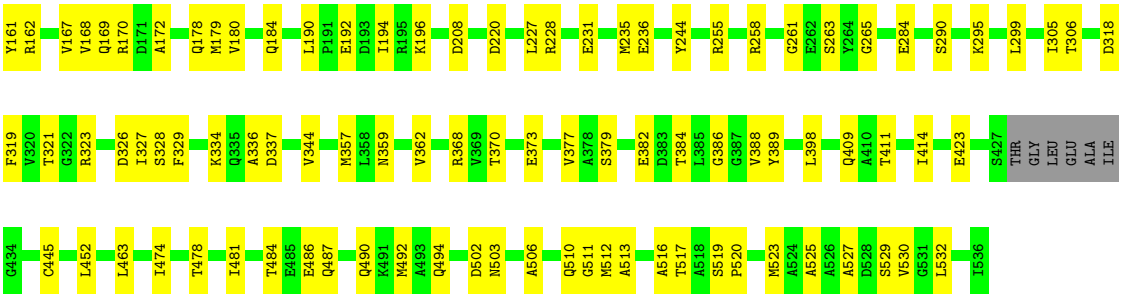
S290 I297 T306 D318 T321 I327 S328 F329 L330 Q331 Q335 V344 S353 M357 L358 N359 S360 A361 V362 R368 V369 T370 I374 V377 E380 L381 L385 G386 Y389 E395 L396 Q397 L405 L417 T425 I426 S427 THR GLY LEU GLU

ALA ILE G434 I466 R469 T484 K488 M492 M497 Q498 A506 Q510 G511 M512 T517 A525 A526 A527 D528 S529 V530 G531 L532 Q533 I536

- Molecule 6: Portal protein

Chain u: 76% 22%

MET ALA GLU LYS R5 A13 Y17 R24 R30 P40 A50 Y54 W58 V61 G65 S71 K72 L73 N74 L75 M80 Q81 T82 Y91 Q95 L96 L97 L103 M112 R115 M118 I121 Y126 L144 P150 K159 L160


Y161
R162
V167
V168
Q169
R170
D171
A172
Q178
M179
V180
Q184
L190
P191
E192
D193
I194
R195
K196
D208
D220
L227
R228
E231
M235
E236
Y244
R255
R258
G261
E262
S263
Y264
G265
E284
S290
K295
L299
I305
T306
D318
F319
V320
T321
G322
R323
D326
I327
S328
F329
K334
Q335
A336
D337
V344
M357
L358
N359
V362
R368
V369
T370
E373
V377
A378
S379
E382
D383
T384
L385
G386
G387
V388
Y389
L398
Q409
A410
T411
I414
E423
S427
THR
GLY
LEU
GLU
ALA
ILE
G434
C445
L452
L463
I474
T478
I481
T484
E485
E486
Q487
Q490
K491
M492
A493
Q494
D502
N503
A506
Q510
G511
M512
A513
A516
T517
A518
S519
P520
M523
A524
A525
A526
A527
D528
S529
V530
G531
L532
I536

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	65620	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	35	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	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	0.61	0/112	1.38	2/149 (1.3%)
1	3	0.55	0/112	1.44	2/149 (1.3%)
1	4	0.60	0/112	1.40	3/149 (2.0%)
1	5	0.55	0/112	1.45	3/149 (2.0%)
1	6	0.63	0/112	1.40	4/149 (2.7%)
1	7	0.55	0/112	1.54	2/149 (1.3%)
1	8	0.58	0/112	1.41	5/149 (3.4%)
1	9	0.23	0/112	0.63	0/149
1	AA	0.53	0/112	1.47	4/149 (2.7%)
1	AB	0.63	0/112	1.39	4/149 (2.7%)
1	AC	0.52	0/112	1.50	4/149 (2.7%)
1	AD	0.58	0/112	1.32	3/149 (2.0%)
2	1	0.12	0/100	0.30	0/130
2	2	0.13	0/100	0.31	0/130
2	v	0.13	0/100	0.32	0/130
2	w	0.12	0/100	0.30	0/130
2	y	0.13	0/100	0.32	0/130
2	z	0.14	0/100	0.32	0/130
3	A	0.13	0/1130	0.30	0/1538
3	B	0.13	0/1130	0.28	0/1538
3	C	0.13	0/1130	0.28	0/1538
3	D	0.13	0/1130	0.30	0/1538
3	E	0.13	0/1130	0.30	0/1538
3	F	0.12	0/1082	0.30	0/1471
3	G	0.13	0/1082	0.31	0/1471
3	H	0.13	0/1082	0.30	0/1471
3	I	0.13	0/1082	0.32	0/1471
3	J	0.12	0/1082	0.29	0/1471
3	K	0.14	0/1095	0.38	0/1489
3	L	0.14	0/1095	0.38	0/1489
3	M	0.13	0/1095	0.37	0/1489
3	N	0.14	0/1095	0.37	0/1489
3	O	0.13	0/1095	0.38	0/1489
3	a	0.14	0/1130	0.30	0/1538

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
3	b	0.13	0/1082	0.32	0/1471
3	c	0.14	0/1095	0.37	0/1489
4	P	0.16	0/6473	0.31	0/8804
4	Q	0.15	0/6473	0.31	0/8804
4	R	0.15	0/6473	0.32	0/8804
4	S	0.16	0/6473	0.32	0/8804
4	T	0.15	0/6473	0.31	0/8804
4	x	0.15	0/6473	0.32	0/8804
5	U	0.16	0/1592	0.31	0/2153
5	V	0.17	0/1592	0.30	0/2153
5	W	0.15	0/1592	0.29	0/2153
5	X	0.15	0/1592	0.30	0/2153
5	Y	0.17	0/1592	0.32	0/2153
5	Z	0.17	0/1584	0.32	0/2143
5	d	0.16	0/1584	0.33	0/2143
5	e	0.16	0/1584	0.33	0/2143
5	f	0.16	0/1584	0.31	0/2143
5	g	0.16	0/1584	0.32	0/2143
5	h	0.15	0/1592	0.28	0/2153
5	i	0.16	0/1584	0.34	0/2143
6	j	0.14	0/4131	0.32	0/5590
6	k	0.14	0/4131	0.31	0/5590
6	l	0.14	0/4131	0.31	0/5590
6	m	0.15	0/4131	0.31	0/5590
6	n	0.15	0/4131	0.33	0/5590
6	o	0.14	0/4131	0.31	0/5590
6	p	0.14	0/4131	0.32	0/5590
6	q	0.14	0/4131	0.31	0/5590
6	r	0.14	0/4131	0.32	0/5590
6	s	0.15	0/4131	0.32	0/5590
6	t	0.15	0/4131	0.33	0/5590
6	u	0.16	0/4131	0.32	0/5590
All	All	0.16	0/129252	0.34	36/175236 (0.0%)

There are no bond length outliers.

The worst 5 of 36 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	AC	14	THR	N-CA-C	8.22	120.25	111.28
1	7	14	THR	N-CA-C	7.26	119.19	111.28
1	AD	10	PRO	N-CA-C	7.16	123.71	113.47
1	4	5	PRO	N-CA-C	6.67	122.33	113.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	5	5	PRO	N-CA-C	6.64	122.75	113.53

There are no chirality outliers.

There are no planarity outliers.

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	110	0	115	13	0
1	3	110	0	115	11	0
1	4	110	0	115	17	0
1	5	110	0	115	10	0
1	6	110	0	115	11	0
1	7	110	0	115	12	0
1	8	110	0	115	11	0
1	9	110	0	115	13	0
1	AA	110	0	115	11	0
1	AB	110	0	115	12	0
1	AC	110	0	115	14	0
1	AD	110	0	115	11	0
2	1	101	0	109	5	0
2	2	101	0	109	5	0
2	v	101	0	109	4	0
2	w	101	0	109	5	0
2	y	101	0	109	6	0
2	z	101	0	109	5	0
3	A	1115	0	1122	26	0
3	B	1115	0	1122	21	0
3	C	1115	0	1122	21	0
3	D	1115	0	1122	25	0
3	E	1115	0	1122	25	0
3	F	1067	0	1071	20	0
3	G	1067	0	1071	21	0
3	H	1067	0	1071	18	0
3	I	1067	0	1071	23	0
3	J	1067	0	1071	19	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	K	1080	0	1082	24	0
3	L	1080	0	1082	24	0
3	M	1080	0	1082	26	0
3	N	1080	0	1082	23	0
3	O	1080	0	1082	19	0
3	a	1115	0	1122	22	0
3	b	1067	0	1071	22	0
3	c	1080	0	1082	19	0
4	P	6313	0	6075	114	0
4	Q	6313	0	6075	122	0
4	R	6313	0	6075	111	0
4	S	6313	0	6075	108	0
4	T	6313	0	6075	110	0
4	x	6313	0	6075	119	0
5	U	1565	0	1485	26	0
5	V	1565	0	1485	28	0
5	W	1565	0	1485	26	0
5	X	1565	0	1485	25	0
5	Y	1565	0	1485	22	0
5	Z	1557	0	1473	33	0
5	d	1557	0	1473	28	0
5	e	1557	0	1473	29	0
5	f	1557	0	1473	31	0
5	g	1557	0	1473	31	0
5	h	1565	0	1485	25	0
5	i	1557	0	1473	30	0
6	j	4070	0	4060	80	0
6	k	4070	0	4060	76	0
6	l	4070	0	4060	84	0
6	m	4070	0	4060	85	0
6	n	4070	0	4060	95	0
6	o	4070	0	4060	83	0
6	p	4070	0	4060	84	0
6	q	4070	0	4060	73	0
6	r	4070	0	4060	81	0
6	s	4070	0	4060	89	0
6	t	4070	0	4060	91	0
6	u	4070	0	4060	87	0
All	All	126948	0	124602	2088	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 8.

The worst 5 of 2088 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)
1:0:7:ILE:HA	6:n:530:VAL:HG21	1.39	1.01
1:4:7:ILE:HA	6:t:530:VAL:HG21	1.45	0.99
1:6:7:ILE:HA	6:r:530:VAL:HG21	1.46	0.97
1:AB:7:ILE:HA	6:l:530:VAL:HG21	1.49	0.93
1:AD:7:ILE:HA	6:j:530:VAL:HG21	1.51	0.90

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	12/88 (14%)	11 (92%)	0	1 (8%)	0 1
1	3	12/88 (14%)	11 (92%)	0	1 (8%)	0 1
1	4	12/88 (14%)	11 (92%)	0	1 (8%)	0 1
1	5	12/88 (14%)	11 (92%)	0	1 (8%)	0 1
1	6	12/88 (14%)	11 (92%)	0	1 (8%)	0 1
1	7	12/88 (14%)	10 (83%)	1 (8%)	1 (8%)	0 1
1	8	12/88 (14%)	11 (92%)	0	1 (8%)	0 1
1	9	12/88 (14%)	10 (83%)	1 (8%)	1 (8%)	0 1
1	AA	12/88 (14%)	11 (92%)	0	1 (8%)	0 1
1	AB	12/88 (14%)	11 (92%)	0	1 (8%)	0 1
1	AC	12/88 (14%)	11 (92%)	0	1 (8%)	0 1
1	AD	12/88 (14%)	10 (83%)	1 (8%)	1 (8%)	0 1
2	1	13/99 (13%)	12 (92%)	1 (8%)	0	100 100
2	2	13/99 (13%)	12 (92%)	1 (8%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	v	13/99 (13%)	12 (92%)	1 (8%)	0	100	100
2	w	13/99 (13%)	12 (92%)	1 (8%)	0	100	100
2	y	13/99 (13%)	12 (92%)	1 (8%)	0	100	100
2	z	13/99 (13%)	12 (92%)	1 (8%)	0	100	100
3	A	139/553 (25%)	135 (97%)	4 (3%)	0	100	100
3	B	139/553 (25%)	134 (96%)	5 (4%)	0	100	100
3	C	139/553 (25%)	134 (96%)	5 (4%)	0	100	100
3	D	139/553 (25%)	134 (96%)	5 (4%)	0	100	100
3	E	139/553 (25%)	135 (97%)	4 (3%)	0	100	100
3	F	132/553 (24%)	128 (97%)	4 (3%)	0	100	100
3	G	132/553 (24%)	129 (98%)	3 (2%)	0	100	100
3	H	132/553 (24%)	129 (98%)	3 (2%)	0	100	100
3	I	132/553 (24%)	128 (97%)	4 (3%)	0	100	100
3	J	132/553 (24%)	129 (98%)	3 (2%)	0	100	100
3	K	134/553 (24%)	127 (95%)	7 (5%)	0	100	100
3	L	134/553 (24%)	127 (95%)	7 (5%)	0	100	100
3	M	134/553 (24%)	127 (95%)	7 (5%)	0	100	100
3	N	134/553 (24%)	127 (95%)	7 (5%)	0	100	100
3	O	134/553 (24%)	127 (95%)	7 (5%)	0	100	100
3	a	139/553 (25%)	134 (96%)	5 (4%)	0	100	100
3	b	132/553 (24%)	128 (97%)	4 (3%)	0	100	100
3	c	134/553 (24%)	127 (95%)	7 (5%)	0	100	100
4	P	791/794 (100%)	773 (98%)	18 (2%)	0	100	100
4	Q	791/794 (100%)	775 (98%)	16 (2%)	0	100	100
4	R	791/794 (100%)	776 (98%)	15 (2%)	0	100	100
4	S	791/794 (100%)	774 (98%)	17 (2%)	0	100	100
4	T	791/794 (100%)	775 (98%)	16 (2%)	0	100	100
4	x	791/794 (100%)	774 (98%)	17 (2%)	0	100	100
5	U	194/196 (99%)	193 (100%)	1 (0%)	0	100	100
5	V	194/196 (99%)	192 (99%)	2 (1%)	0	100	100
5	W	194/196 (99%)	193 (100%)	1 (0%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
5	X	194/196 (99%)	193 (100%)	1 (0%)	0	100	100
5	Y	194/196 (99%)	193 (100%)	1 (0%)	0	100	100
5	Z	193/196 (98%)	191 (99%)	2 (1%)	0	100	100
5	d	193/196 (98%)	191 (99%)	2 (1%)	0	100	100
5	e	193/196 (98%)	191 (99%)	2 (1%)	0	100	100
5	f	193/196 (98%)	191 (99%)	2 (1%)	0	100	100
5	g	193/196 (98%)	191 (99%)	2 (1%)	0	100	100
5	h	194/196 (99%)	192 (99%)	2 (1%)	0	100	100
5	i	193/196 (98%)	191 (99%)	2 (1%)	0	100	100
6	j	522/536 (97%)	514 (98%)	8 (2%)	0	100	100
6	k	522/536 (97%)	513 (98%)	9 (2%)	0	100	100
6	l	522/536 (97%)	515 (99%)	7 (1%)	0	100	100
6	m	522/536 (97%)	515 (99%)	7 (1%)	0	100	100
6	n	522/536 (97%)	515 (99%)	7 (1%)	0	100	100
6	o	522/536 (97%)	513 (98%)	9 (2%)	0	100	100
6	p	522/536 (97%)	514 (98%)	8 (2%)	0	100	100
6	q	522/536 (97%)	515 (99%)	7 (1%)	0	100	100
6	r	522/536 (97%)	515 (99%)	7 (1%)	0	100	100
6	s	522/536 (97%)	514 (98%)	8 (2%)	0	100	100
6	t	522/536 (97%)	514 (98%)	8 (2%)	0	100	100
6	u	522/536 (97%)	514 (98%)	8 (2%)	0	100	100
All	All	15984/25152 (64%)	15660 (98%)	312 (2%)	12 (0%)	50	73

5 of 12 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	9	9	THR
1	0	9	THR
1	6	9	THR
1	AB	9	THR
1	AC	9	THR

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	14/73 (19%)	12 (86%)	2 (14%)	2	7
1	3	14/73 (19%)	12 (86%)	2 (14%)	2	7
1	4	14/73 (19%)	13 (93%)	1 (7%)	12	30
1	5	14/73 (19%)	14 (100%)	0	100	100
1	6	14/73 (19%)	14 (100%)	0	100	100
1	7	14/73 (19%)	13 (93%)	1 (7%)	12	30
1	8	14/73 (19%)	13 (93%)	1 (7%)	12	30
1	9	14/73 (19%)	14 (100%)	0	100	100
1	AA	14/73 (19%)	12 (86%)	2 (14%)	2	7
1	AB	14/73 (19%)	14 (100%)	0	100	100
1	AC	14/73 (19%)	12 (86%)	2 (14%)	2	7
1	AD	14/73 (19%)	13 (93%)	1 (7%)	12	30
2	1	11/72 (15%)	11 (100%)	0	100	100
2	2	11/72 (15%)	11 (100%)	0	100	100
2	v	11/72 (15%)	11 (100%)	0	100	100
2	w	11/72 (15%)	11 (100%)	0	100	100
2	y	11/72 (15%)	11 (100%)	0	100	100
2	z	11/72 (15%)	11 (100%)	0	100	100
3	A	122/451 (27%)	122 (100%)	0	100	100
3	B	122/451 (27%)	122 (100%)	0	100	100
3	C	122/451 (27%)	122 (100%)	0	100	100
3	D	122/451 (27%)	122 (100%)	0	100	100
3	E	122/451 (27%)	122 (100%)	0	100	100
3	F	117/451 (26%)	117 (100%)	0	100	100
3	G	117/451 (26%)	117 (100%)	0	100	100
3	H	117/451 (26%)	117 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	I	117/451 (26%)	117 (100%)	0	100	100
3	J	117/451 (26%)	117 (100%)	0	100	100
3	K	118/451 (26%)	118 (100%)	0	100	100
3	L	118/451 (26%)	118 (100%)	0	100	100
3	M	118/451 (26%)	118 (100%)	0	100	100
3	N	118/451 (26%)	118 (100%)	0	100	100
3	O	118/451 (26%)	118 (100%)	0	100	100
3	a	122/451 (27%)	122 (100%)	0	100	100
3	b	117/451 (26%)	117 (100%)	0	100	100
3	c	118/451 (26%)	118 (100%)	0	100	100
4	P	687/688 (100%)	687 (100%)	0	100	100
4	Q	687/688 (100%)	687 (100%)	0	100	100
4	R	687/688 (100%)	686 (100%)	1 (0%)	92	98
4	S	687/688 (100%)	687 (100%)	0	100	100
4	T	687/688 (100%)	687 (100%)	0	100	100
4	x	687/688 (100%)	686 (100%)	1 (0%)	92	98
5	U	169/169 (100%)	169 (100%)	0	100	100
5	V	169/169 (100%)	168 (99%)	1 (1%)	84	94
5	W	169/169 (100%)	169 (100%)	0	100	100
5	X	169/169 (100%)	169 (100%)	0	100	100
5	Y	169/169 (100%)	169 (100%)	0	100	100
5	Z	168/169 (99%)	168 (100%)	0	100	100
5	d	168/169 (99%)	168 (100%)	0	100	100
5	e	168/169 (99%)	168 (100%)	0	100	100
5	f	168/169 (99%)	168 (100%)	0	100	100
5	g	168/169 (99%)	168 (100%)	0	100	100
5	h	169/169 (100%)	169 (100%)	0	100	100
5	i	168/169 (99%)	168 (100%)	0	100	100
6	j	435/442 (98%)	435 (100%)	0	100	100
6	k	435/442 (98%)	435 (100%)	0	100	100
6	l	435/442 (98%)	435 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
6	m	435/442 (98%)	435 (100%)	0	100	100
6	n	435/442 (98%)	434 (100%)	1 (0%)	92	98
6	o	435/442 (98%)	434 (100%)	1 (0%)	92	98
6	p	435/442 (98%)	435 (100%)	0	100	100
6	q	435/442 (98%)	435 (100%)	0	100	100
6	r	435/442 (98%)	435 (100%)	0	100	100
6	s	435/442 (98%)	435 (100%)	0	100	100
6	t	435/442 (98%)	435 (100%)	0	100	100
6	u	435/442 (98%)	433 (100%)	2 (0%)	86	95
All	All	13740/20886 (66%)	13721 (100%)	19 (0%)	92	98

5 of 19 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
6	n	423	GLU
6	u	519	SER
4	x	71	ARG
6	u	30	ARG
1	AA	12	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 126 such sidechains are listed below:

Mol	Chain	Res	Type
5	h	93	GLN
6	t	359	ASN
6	k	487	GLN
6	t	335	GLN
6	u	498	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

There are no ligands in this entry.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.