



wwPDB EM Validation Summary Report ⓘ

May 26, 2025 – 10:06 PM EDT

PDB ID : 7MT0 / pdb_00007mt0
EMDB ID : EMD-23973
Title : Structure of the adeno-associated virus 9 capsid at pH 7.4
Authors : Penzes, J.J.; Chipman, P.; Bhattacharya, N.; Zeher, A.; Huang, R.; McKenna, R.; Agbandje-McKenna, M.
Deposited on : 2021-05-12
Resolution : 2.82 Å(reported)
Based on initial model : 3UX1

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

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

A user guide is available at

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

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

EMDB validation analysis : 0.0.1.dev118
MolProbity : 4-5-2 with Phenix2.0rc1
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.43.1

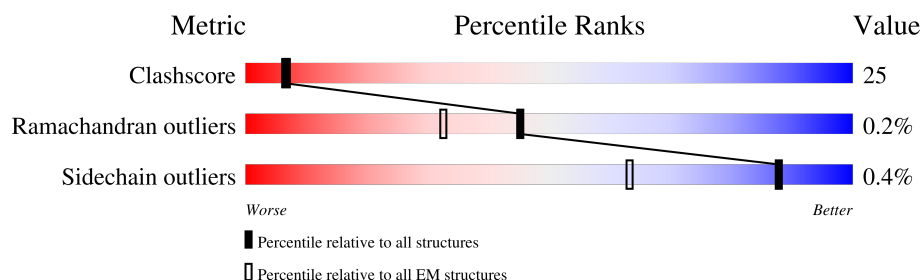
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.82 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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	1	518	58% 41% .
1	2	518	58% 41% .
1	3	518	59% 40% .
1	4	518	58% 42% .
1	5	518	57% 42% .
1	6	518	58% 41% .
1	7	518	58% 42% .
1	8	518	58% 42% .

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Mol	Chain	Length	Quality of chain	
1	A	518		58% 41%
1	B	518		58% 41%
1	C	518		58% 41%
1	D	518		58% 41%
1	E	518		58% 42%
1	F	518		59% 41%
1	G	518		58% 41%
1	H	518		58% 41%
1	I	518		58% 41%
1	J	518		58% 41%
1	K	518		58% 42%
1	L	518		58% 41%
1	M	518		58% 42%
1	N	518		58% 41%
1	O	518		57% 42%
1	P	518		58% 42%
1	Q	518		58% 41%
1	R	518		59% 40%
1	S	518		59% 41%
1	T	518		59% 41%
1	U	518		58% 41%
1	V	518		58% 41%
1	W	518		58% 41%
1	X	518		58% 41%
1	Y	518		59% 41%

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Mol	Chain	Length	Quality of chain	
1	Z	518		58% 41%
1	a	518		58% 41%
1	b	518		57% 42%
1	c	518		58% 41%
1	d	518		59% 41%
1	e	518		58% 42%
1	f	518		59% 40%
1	g	518		59% 41%
1	h	518		58% 41%
1	i	518		58% 42%
1	j	518		59% 40%
1	k	518		58% 41%
1	l	518		58% 41%
1	m	518		58% 41%
1	n	518		58% 41%
1	o	518		58% 41%
1	p	518		58% 41%
1	q	518		58% 41%
1	r	518		58% 42%
1	s	518		59% 41%
1	t	518		58% 42%
1	u	518		58% 42%
1	v	518		58% 41%
1	w	518		58% 41%
1	x	518		59% 40%

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Mol	Chain	Length	Quality of chain
1	y	518	 58% 42% •
1	z	518	 59% 41% •

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 247860 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 Capsid protein VP1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	B	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	C	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	D	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	E	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	F	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	G	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	H	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	I	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	J	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	K	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	L	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	M	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	N	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	O	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	P	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		
1	Q	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		

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Mol	Chain	Residues	Atoms					AltConf	Trace
1	R	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	S	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	T	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	U	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	V	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	W	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	X	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	Y	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	Z	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	1	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	2	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	3	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	4	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	5	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	6	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	a	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	b	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	c	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	d	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	e	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	f	518	Total 4131	C 2608	N 718	O 791	S 14	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
1	g	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	h	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	i	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	j	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	k	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	l	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	m	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	n	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	o	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	p	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	q	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	r	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	s	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	t	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	u	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	v	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	w	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	x	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	y	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	z	518	Total 4131	C 2608	N 718	O 791	S 14	0	0
1	7	518	Total 4131	C 2608	N 718	O 791	S 14	0	0

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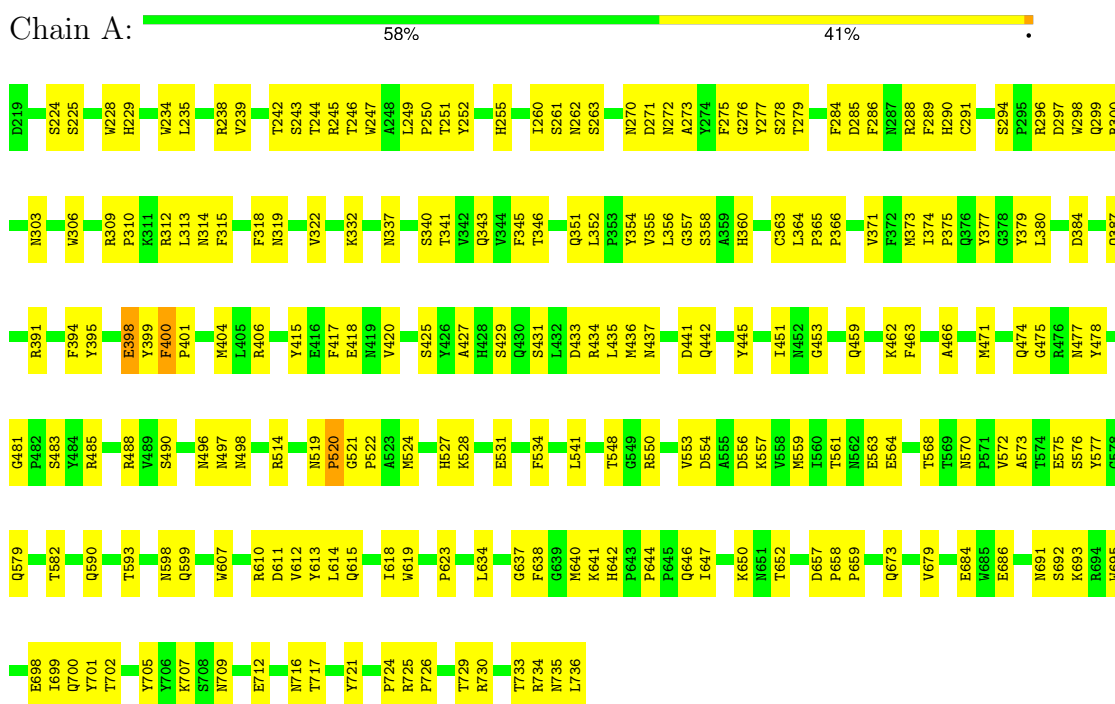
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Mol	Chain	Residues	Atoms					AltConf	Trace
1	8	518	Total	C	N	O	S	0	0
			4131	2608	718	791	14		

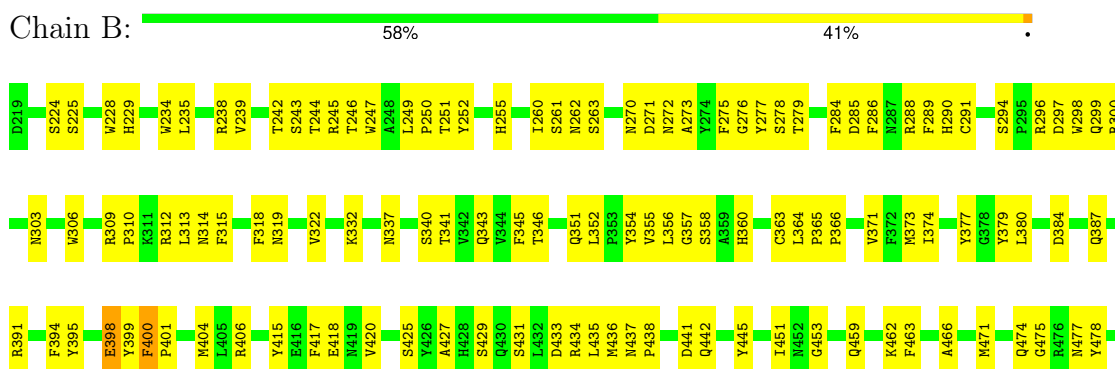
3 Residue-property plots

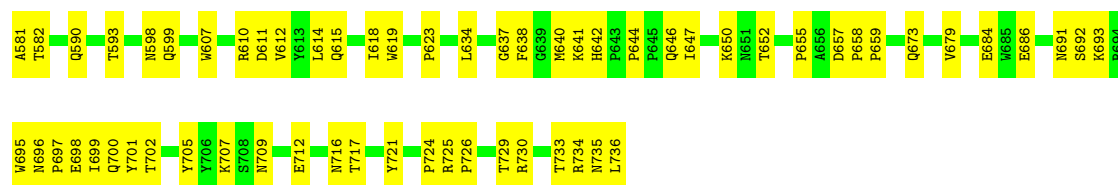
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: Capsid protein VP1



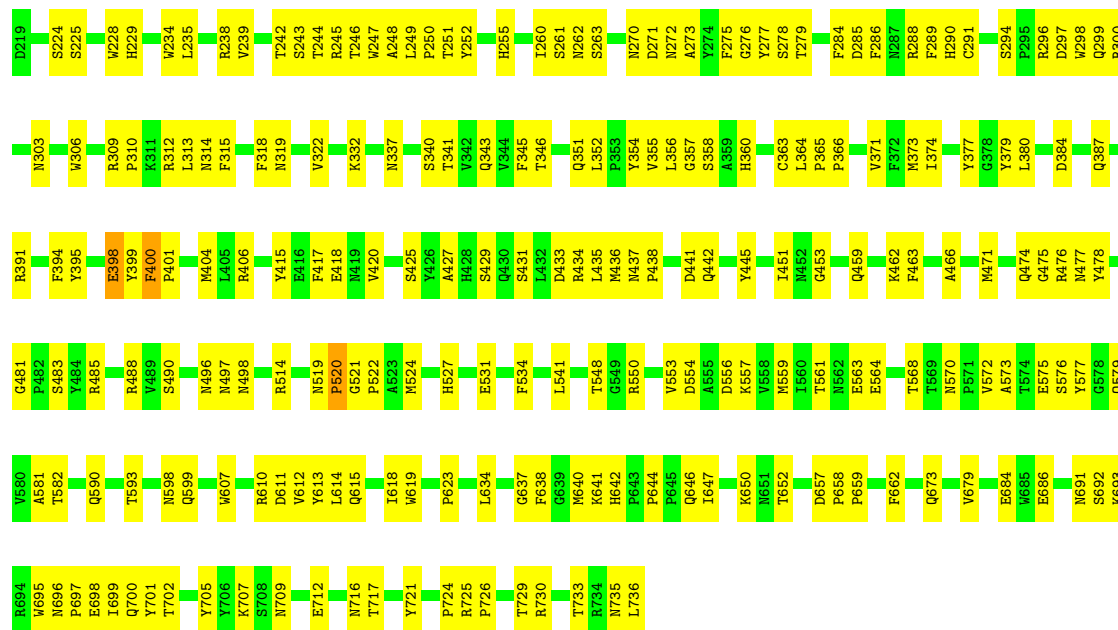
• Molecule 1: Capsid protein VP1





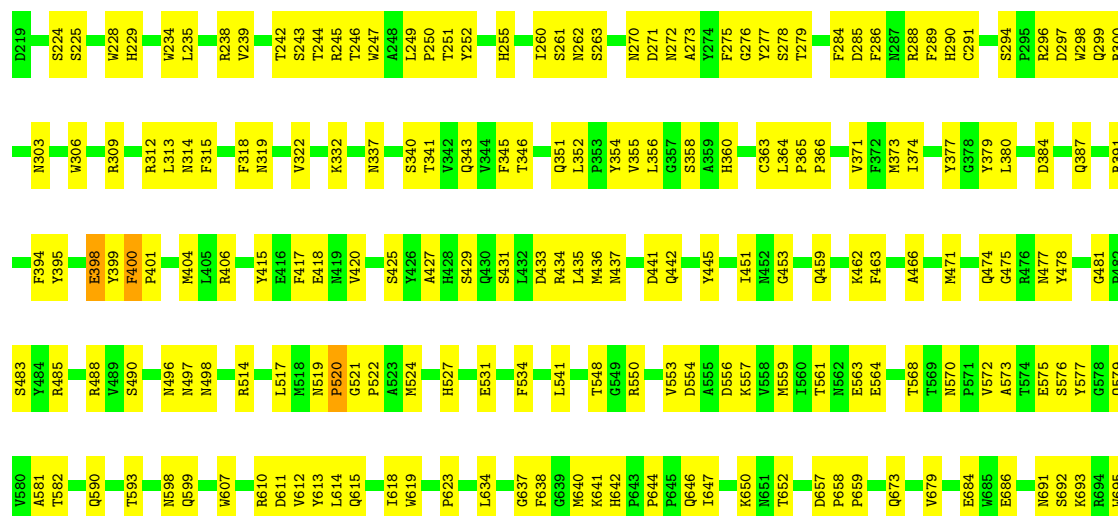
• Molecule 1: Capsid protein VP1

Chain E: 58% 42%



• Molecule 1: Capsid protein VP1

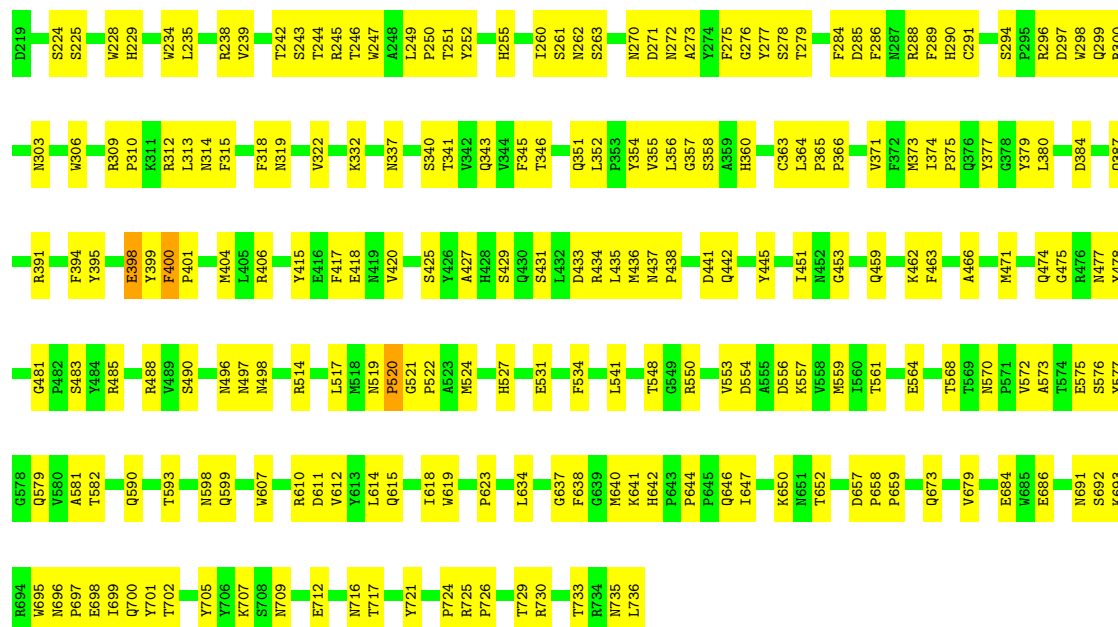
Chain F: 59% 41%





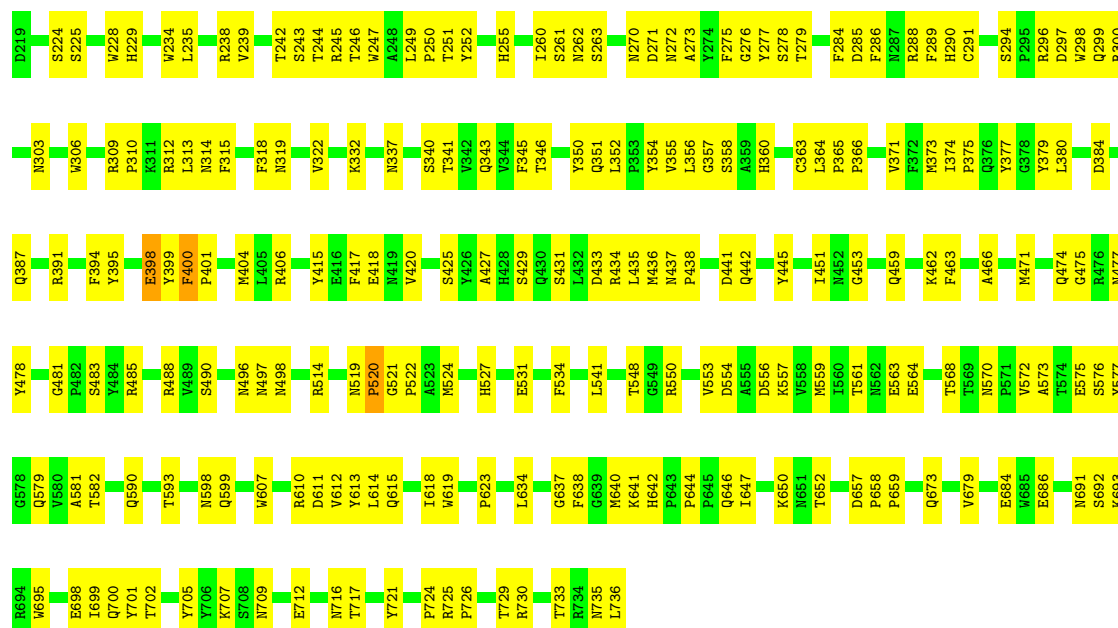
• Molecule 1: Capsid protein VP1

Chain G: 58% 41%



• Molecule 1: Capsid protein VP1

Chain H: 58% 41%



• Molecule 1: Capsid protein VP1

Opinion	Percentage
Doing a good job	58%
Doing a bad job	41%

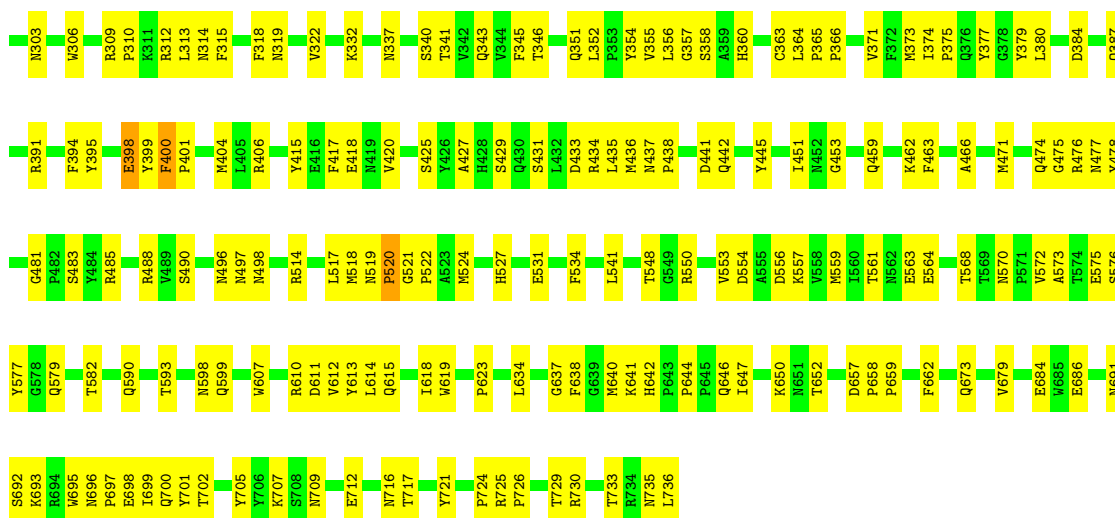


Response	Percentage
Democracy	58%
Dictatorship	41%



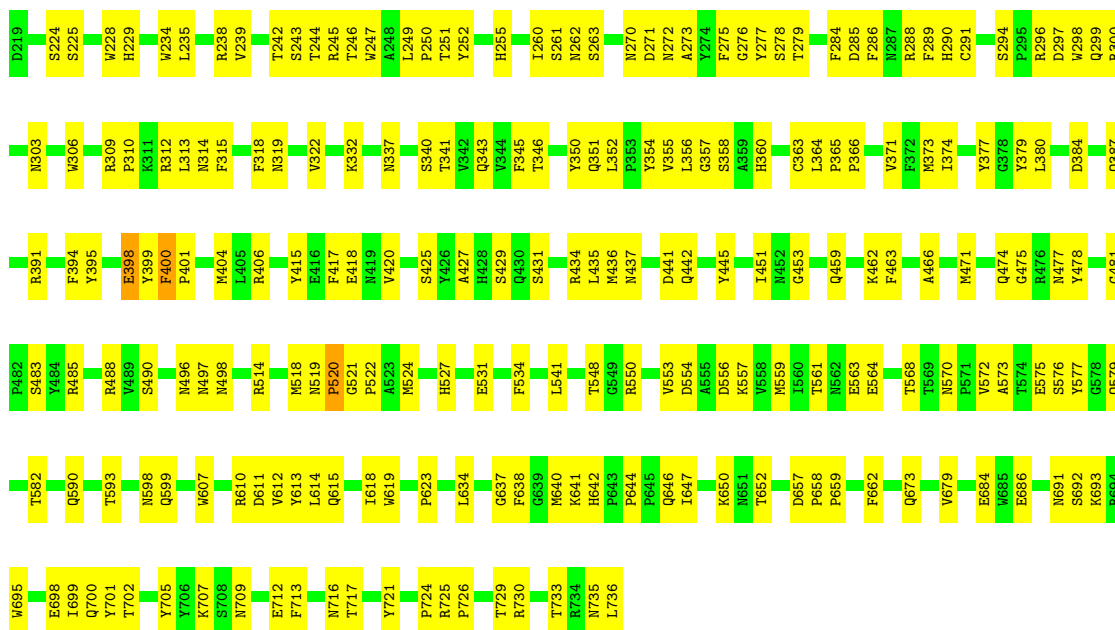
58% 42%





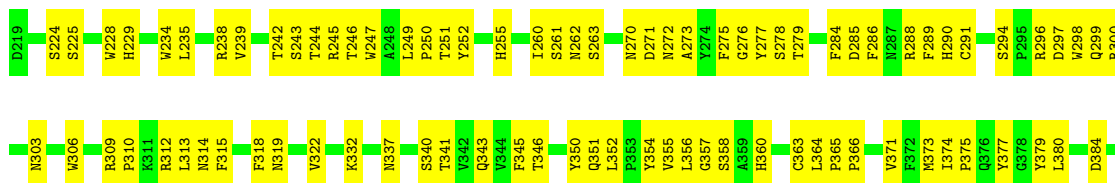
• Molecule 1: Capsid protein VP1

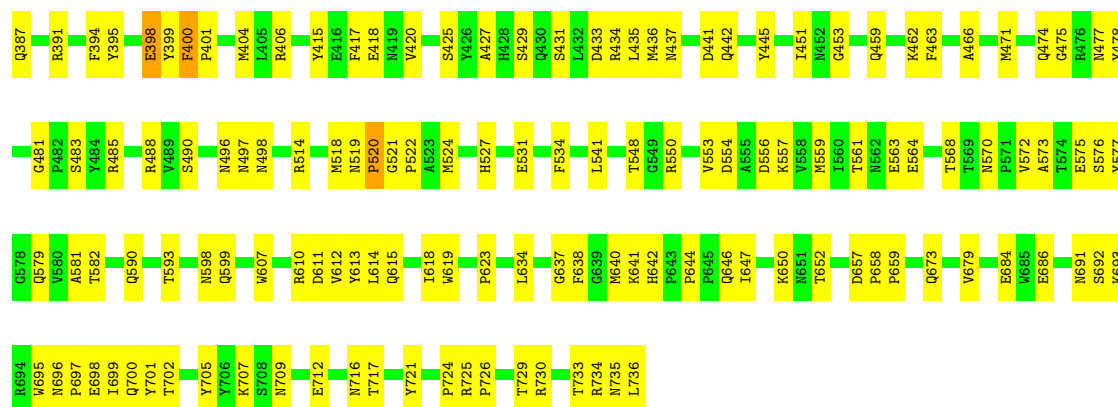
Chain L: 58% 41%



• Molecule 1: Capsid protein VP1

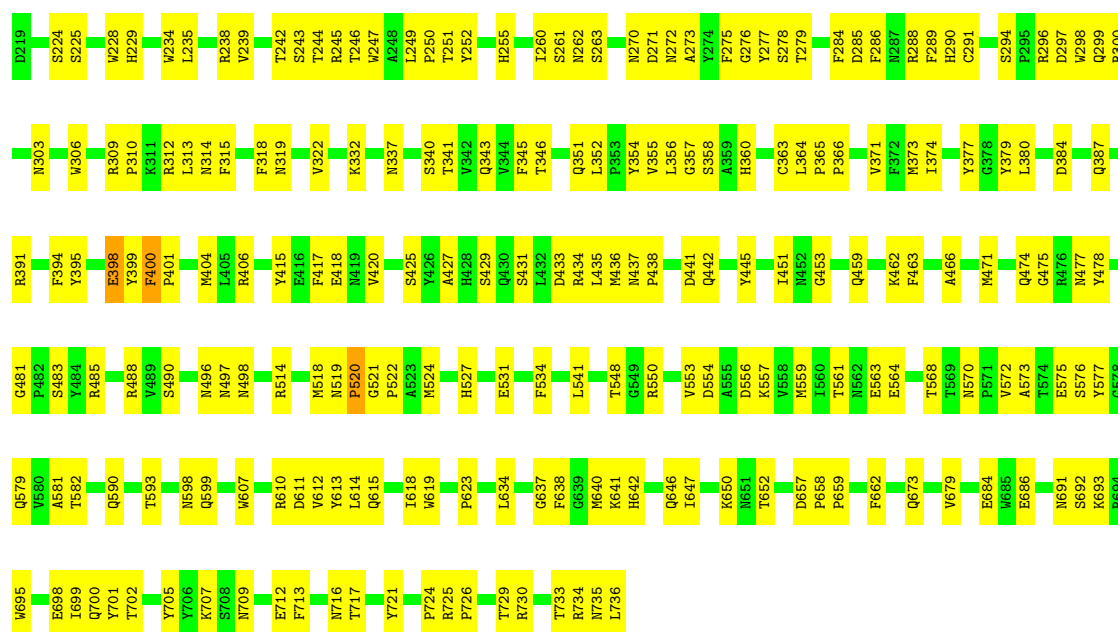
Chain M: 58% 42%





• Molecule 1: Capsid protein VP1

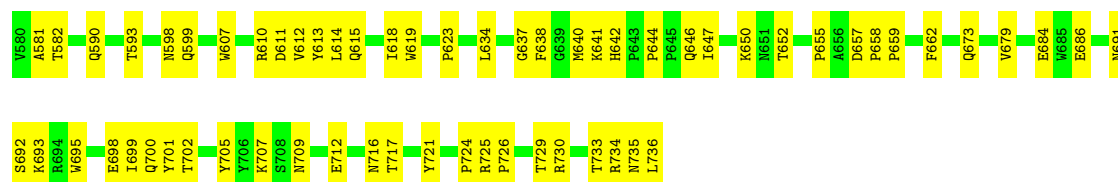
Chain N: 58% 41%



• Molecule 1: Capsid protein VP1

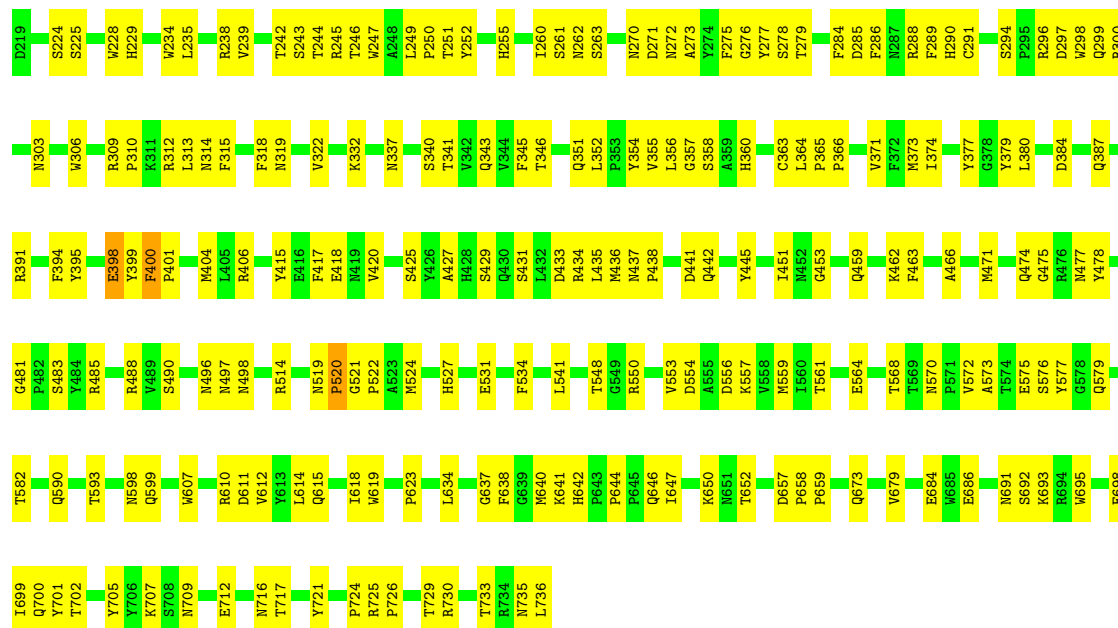
Chain O: 57% 42%





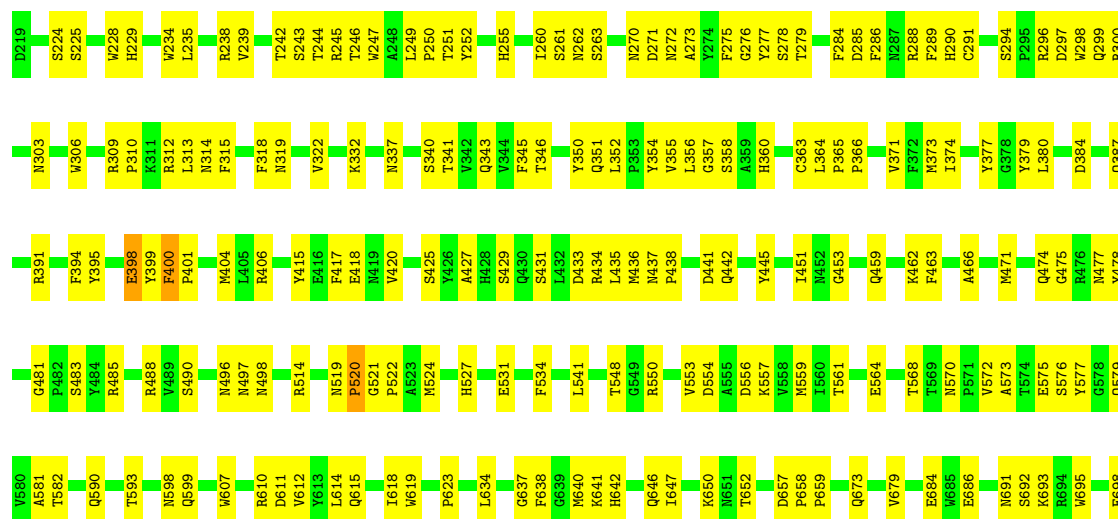
• Molecule 1: Capsid protein VP1

Chain R: 59% 40%



• Molecule 1: Capsid protein VP1

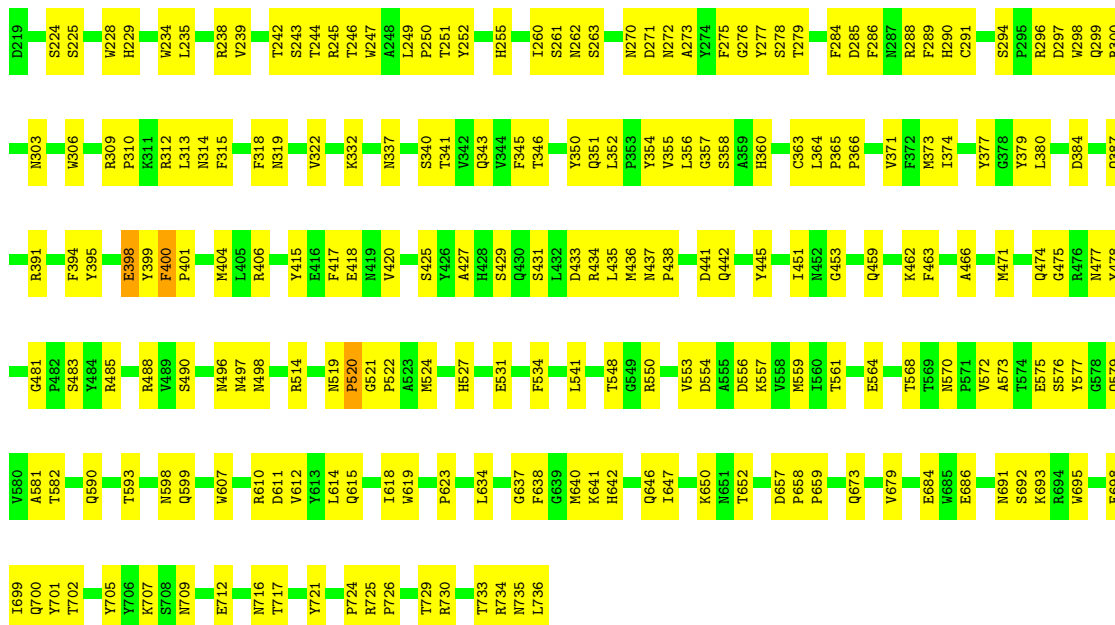
Chain S: 59% 41%





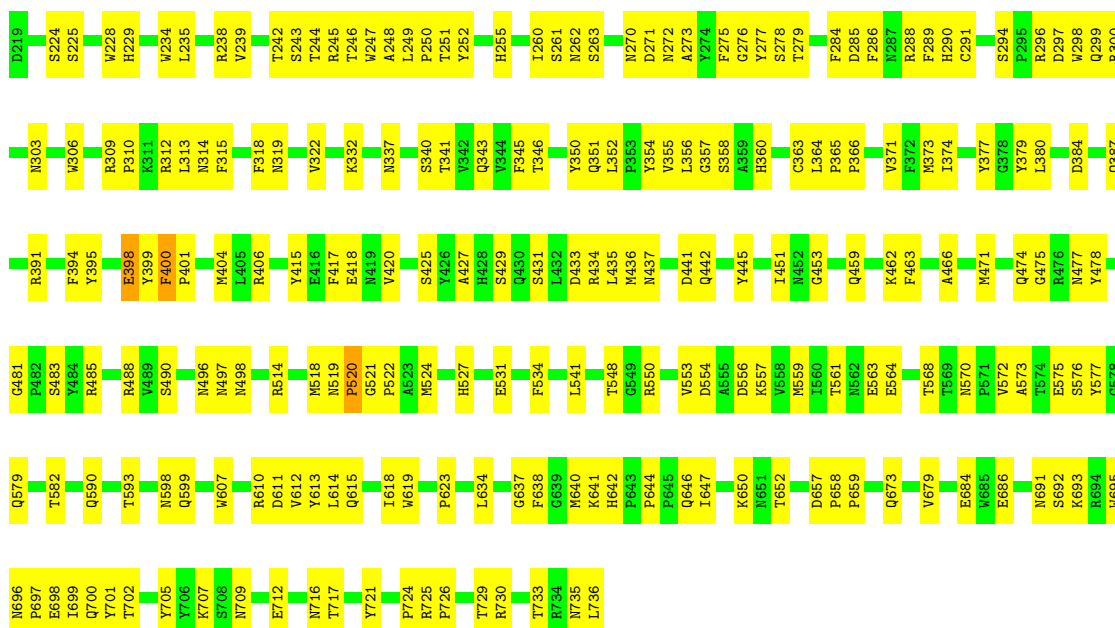
• Molecule 1: Capsid protein VP1

Chain T: 59% 41%



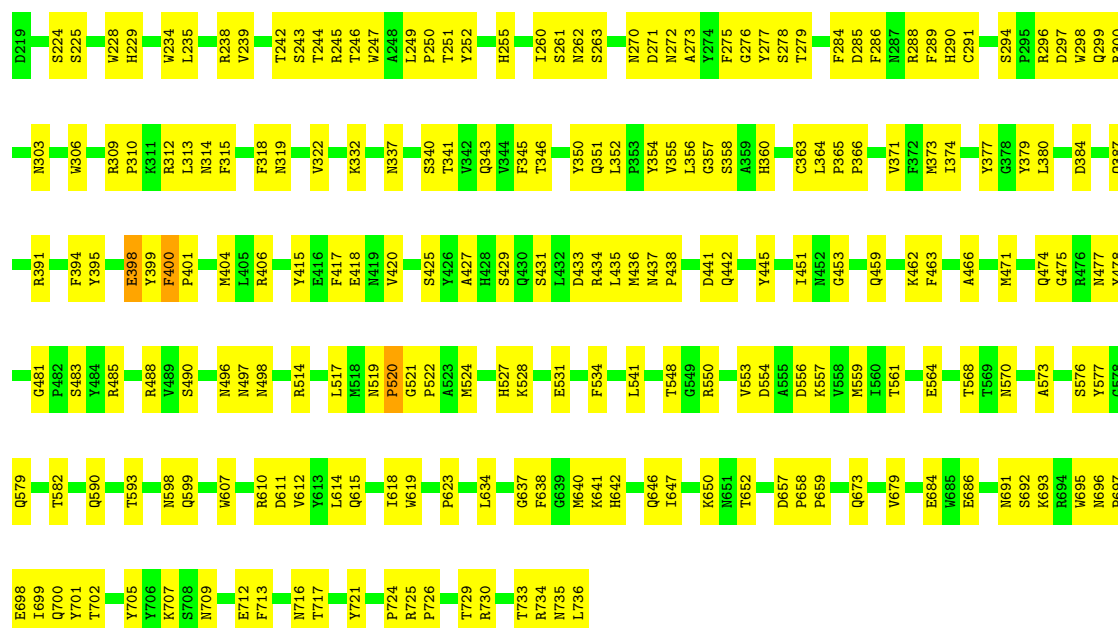
• Molecule 1: Capsid protein VP1

Chain U: 58% 41%



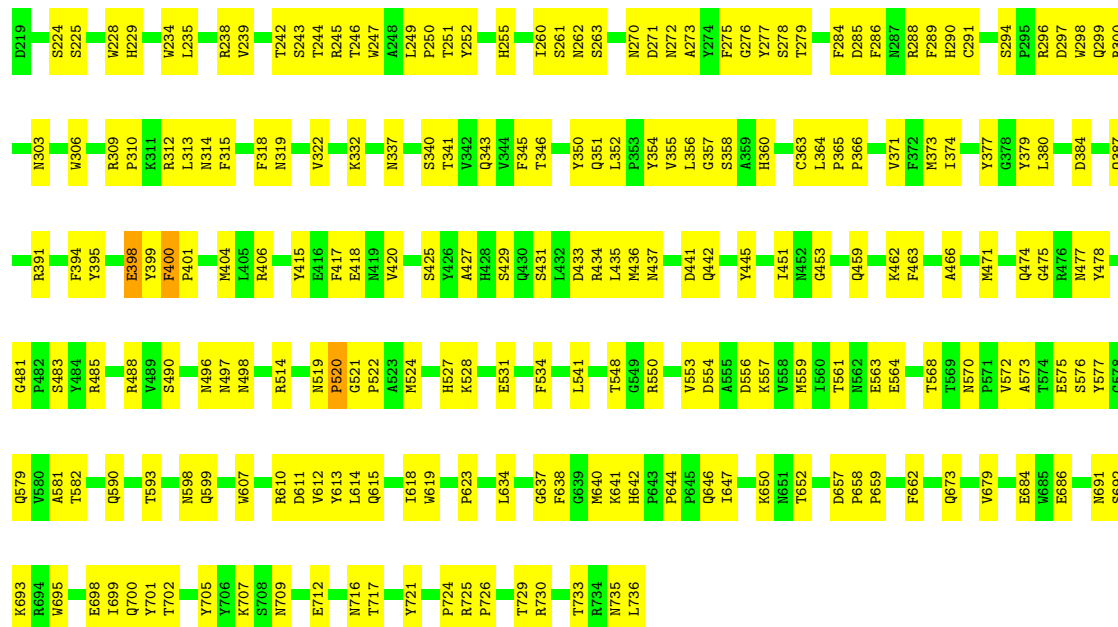
• Molecule 1: Capsid protein VP1

Chain V:  58% 41%



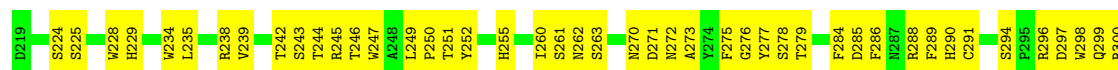
• Molecule 1: Capsid protein VP1

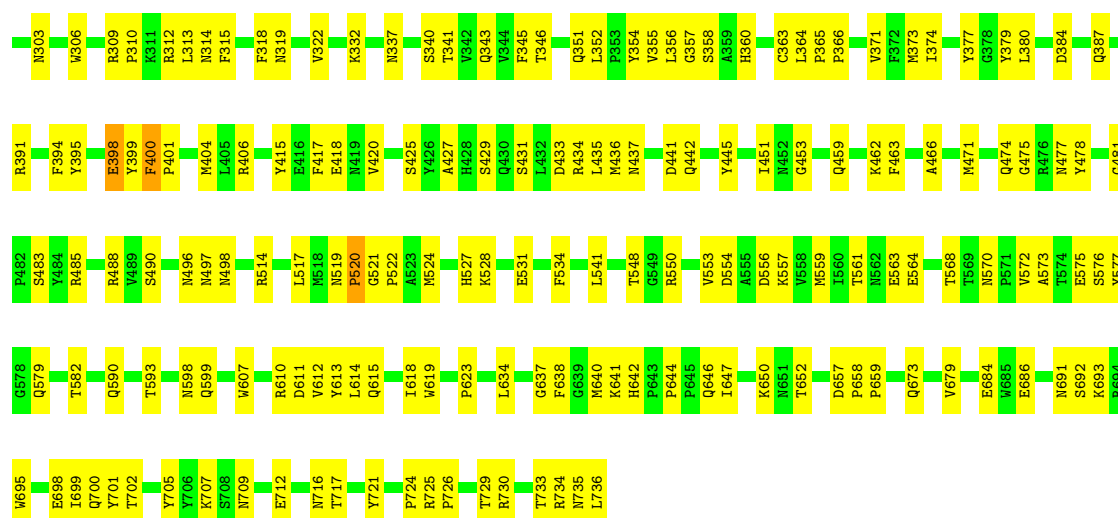
Chain W:  58% 41%



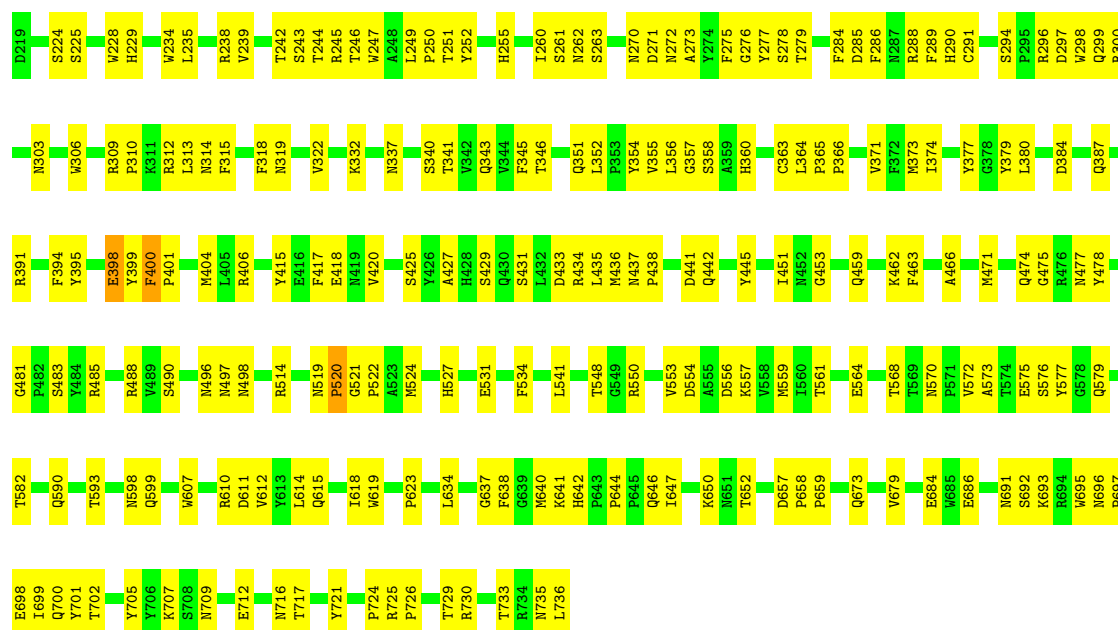
• Molecule 1: Capsid protein VP1

Chain X:  58% 41%

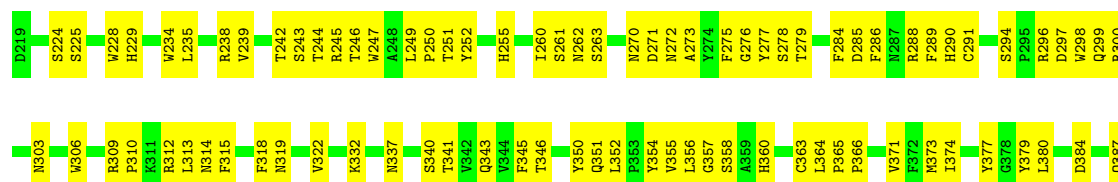


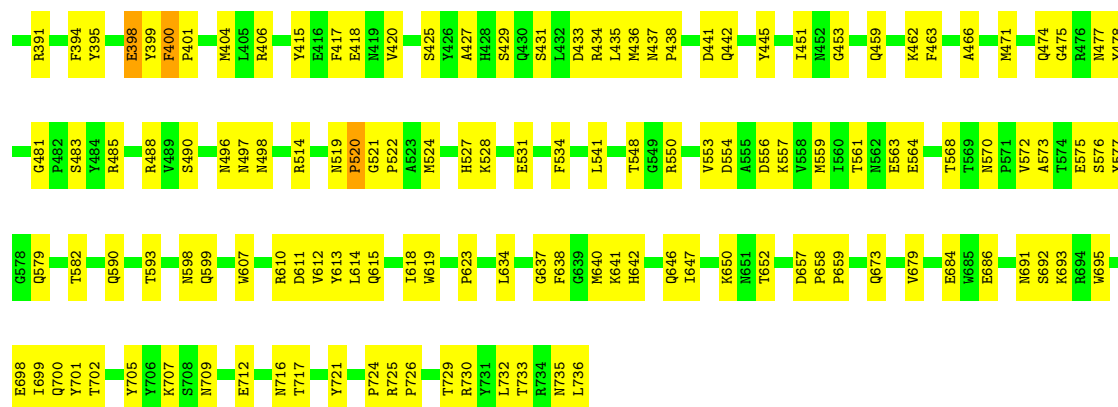


- Molecule 1: Capsid protein VP1



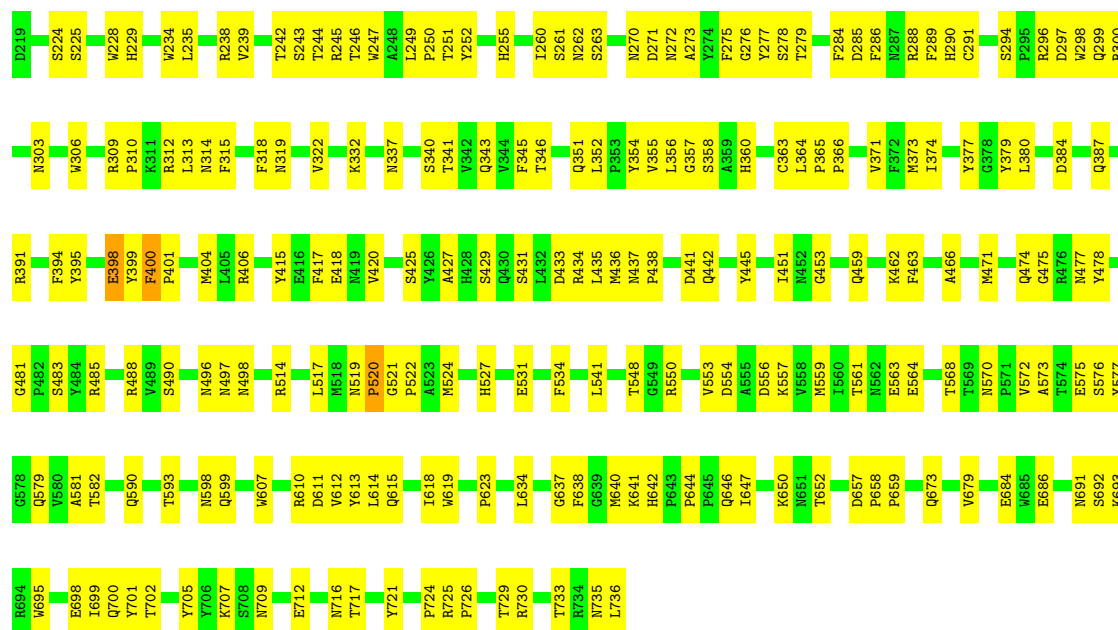
- Molecule 1: Capsid protein VP1





• Molecule 1: Capsid protein VP1

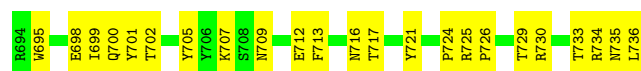
Chain 1: 58% 41%



• Molecule 1: Capsid protein VP1

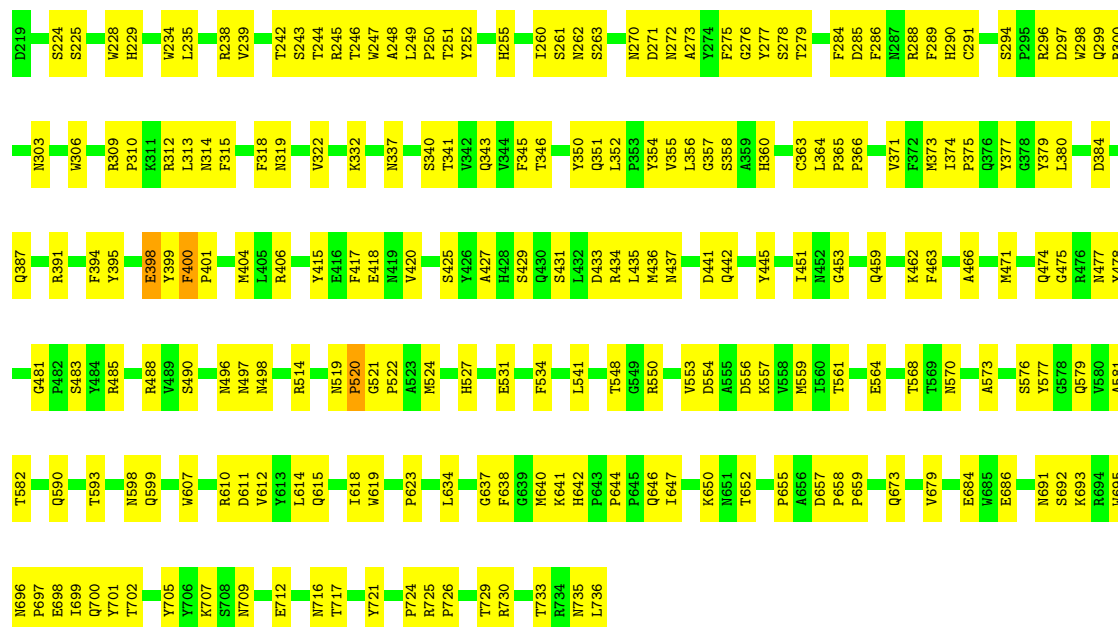
Chain 2: 58% 41%





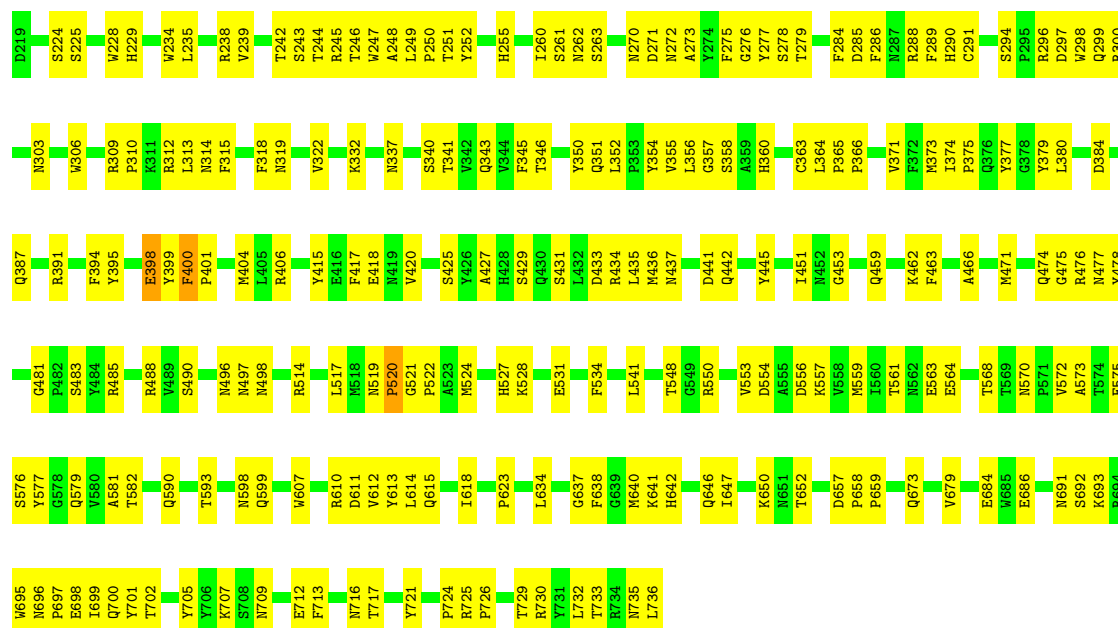
• Molecule 1: Capsid protein VP1

Chain a: 58% 41%



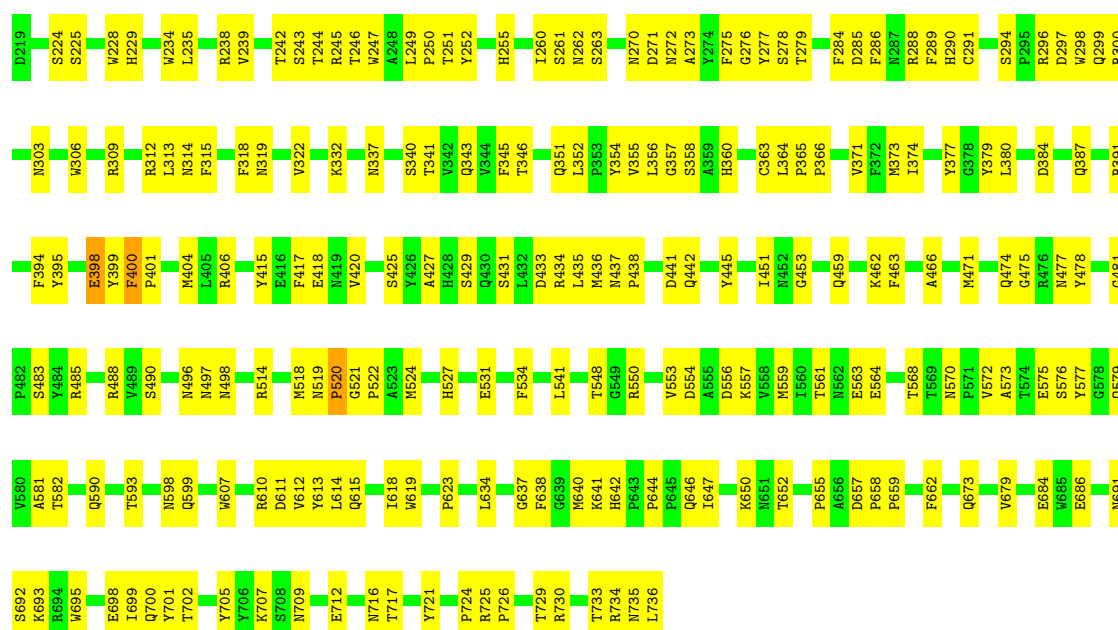
• Molecule 1: Capsid protein VP1

Chain b: 57% 42%



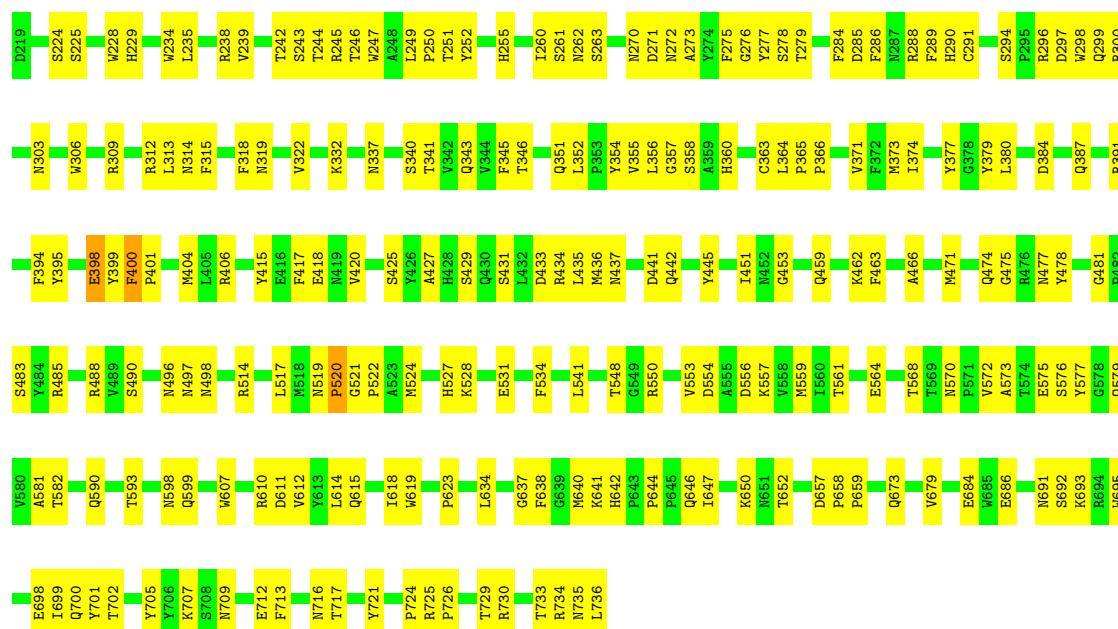
• Molecule 1: Capsid protein VP1

Chain c:  58% 41%



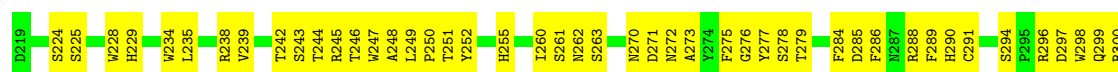
• Molecule 1: Capsid protein VP1

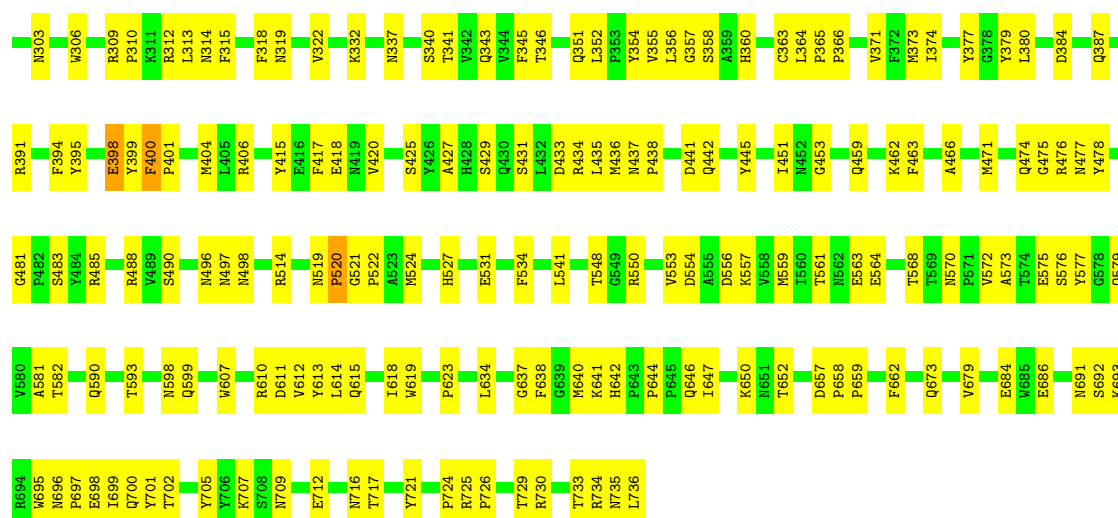
Chain d:  59% 41%



• Molecule 1: Capsid protein VP1

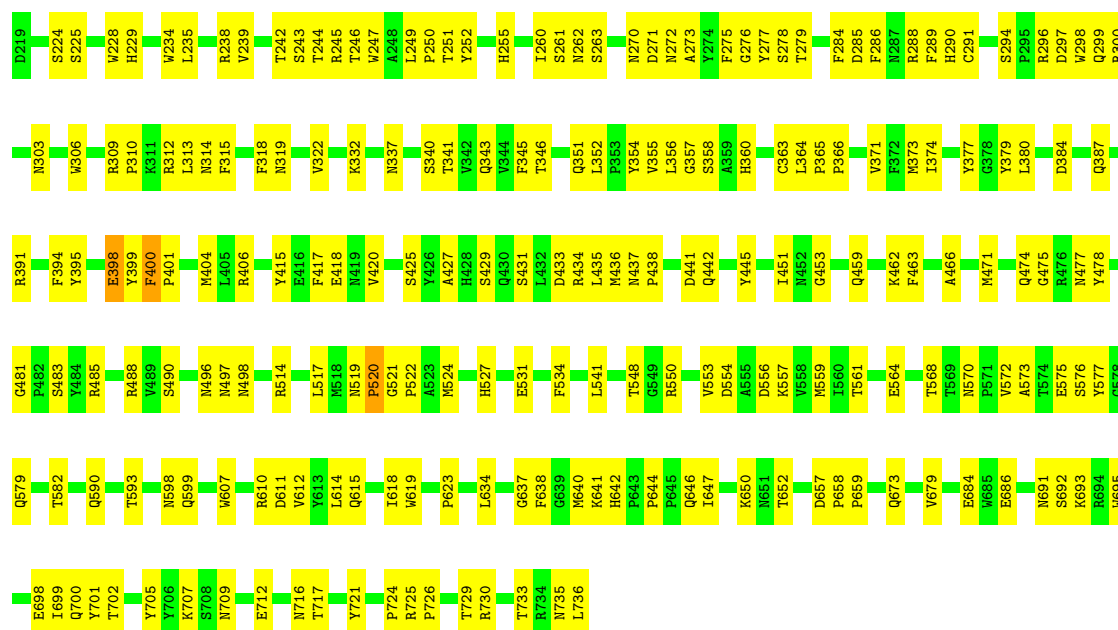
Chain e:  58% 42%





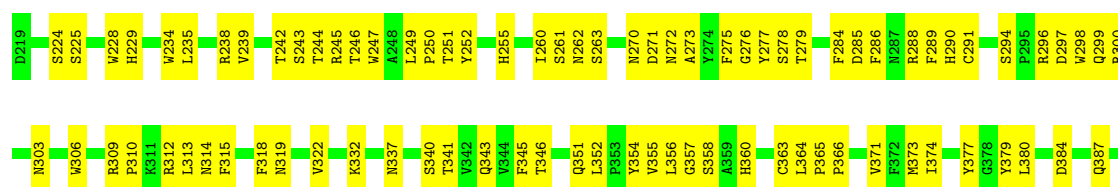
• Molecule 1: Capsid protein VP1

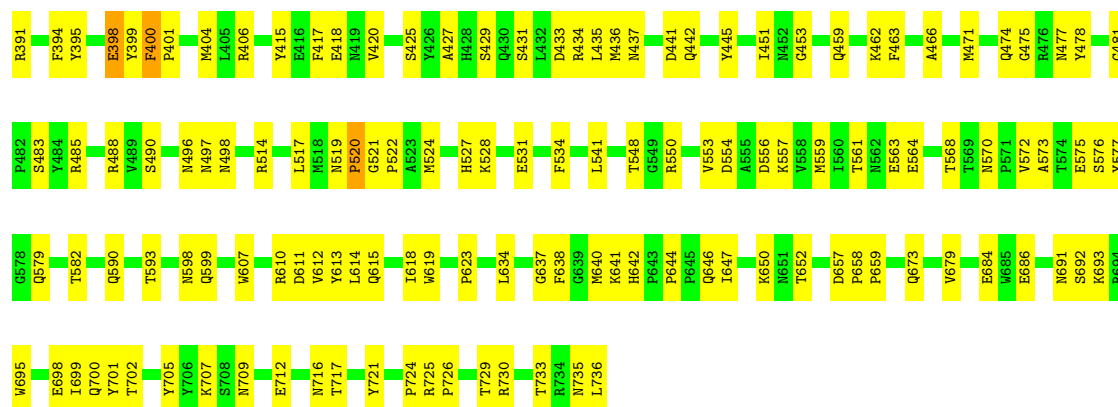
Chain f: 59% 40%



• Molecule 1: Capsid protein VP1

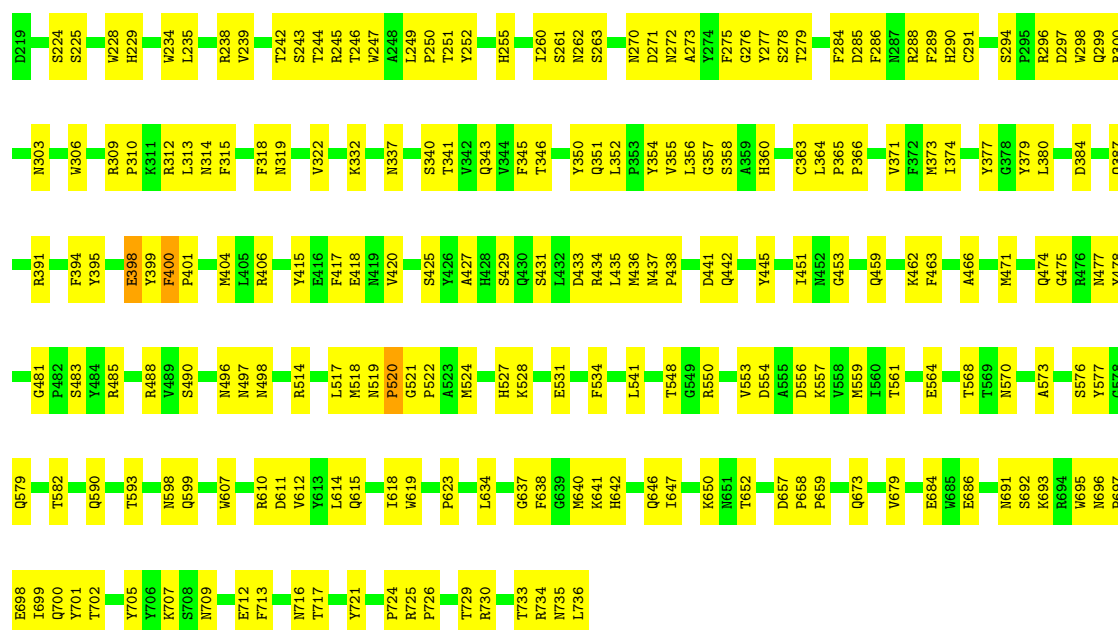
Chain g: 59% 41%





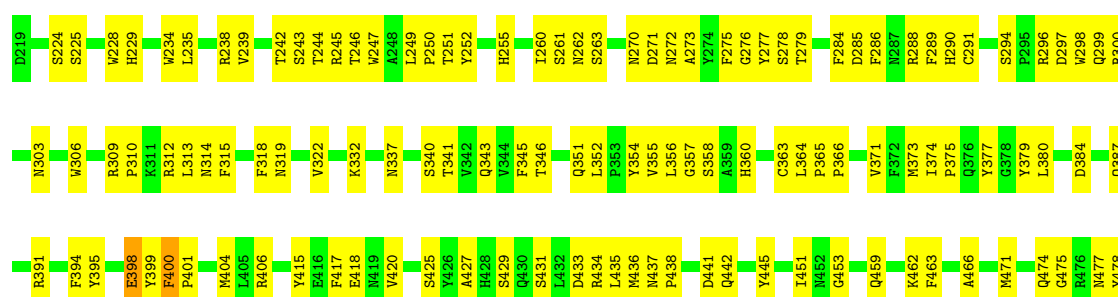
• Molecule 1: Capsid protein VP1

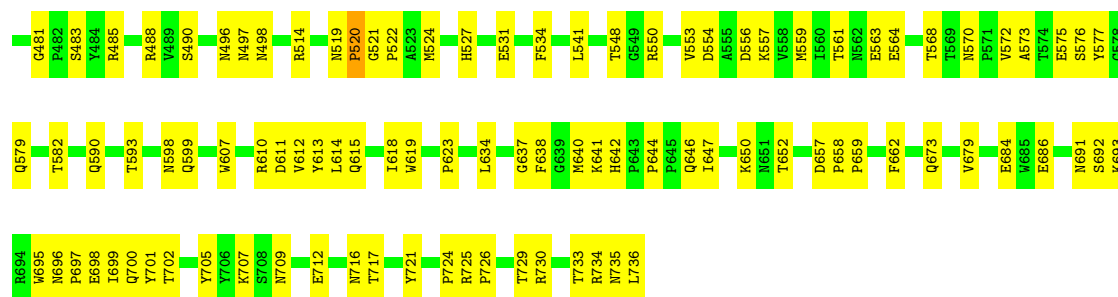
Chain h: 58% 41%



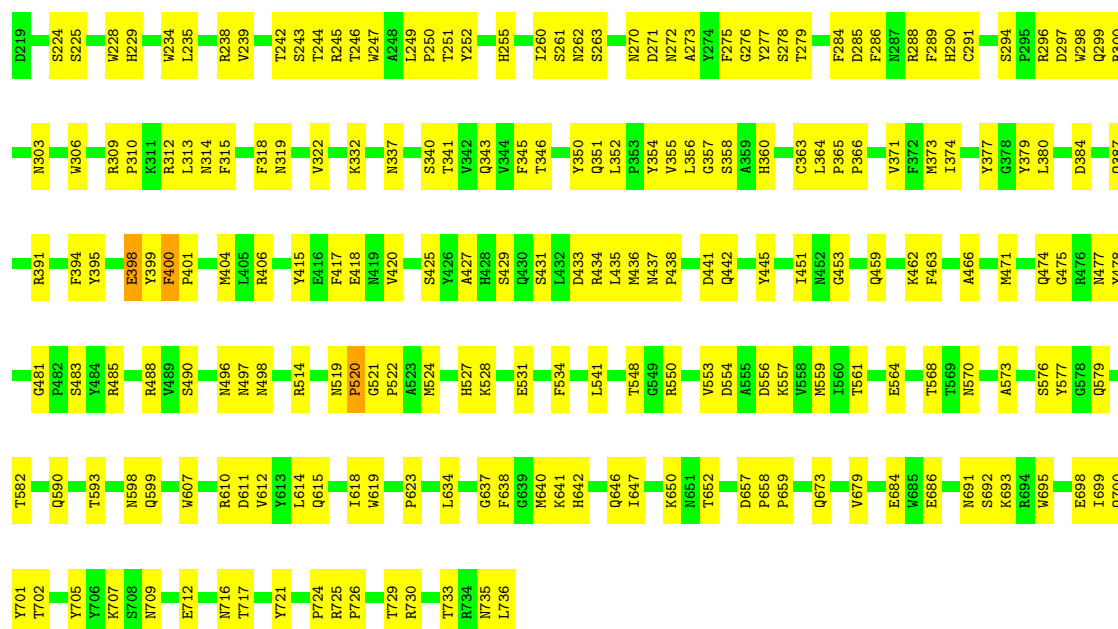
• Molecule 1: Capsid protein VP1

Chain i: 58% 42%



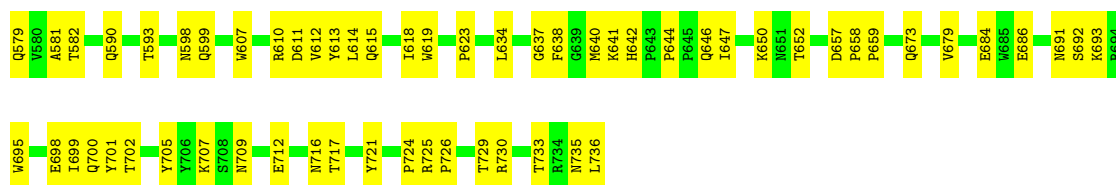


• Molecule 1: Capsid protein VP1



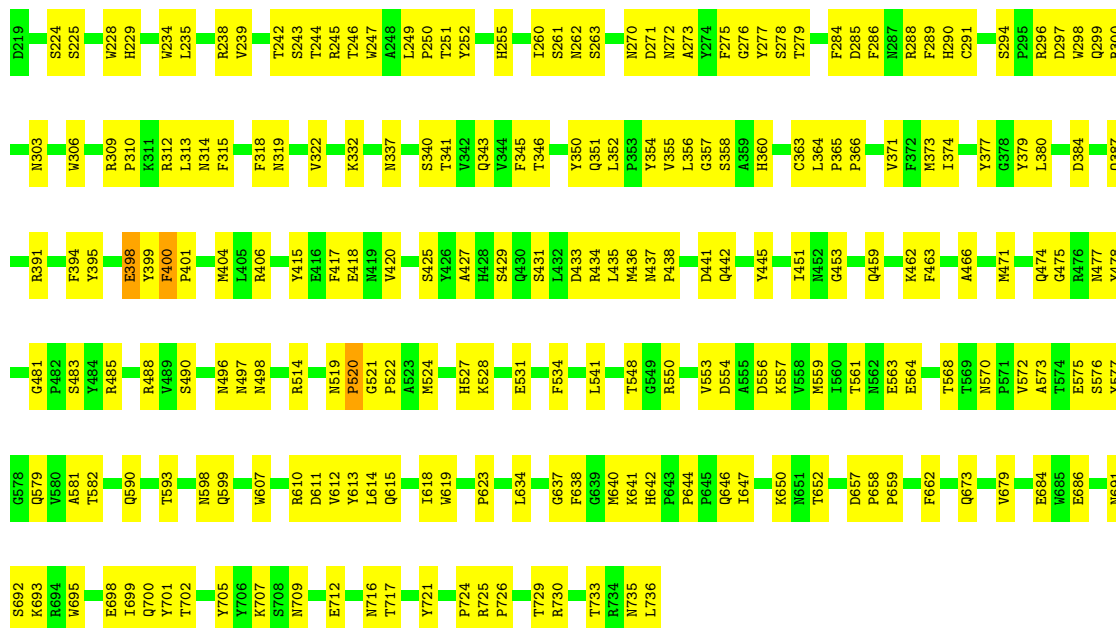
• Molecule 1: Capsid protein VP1





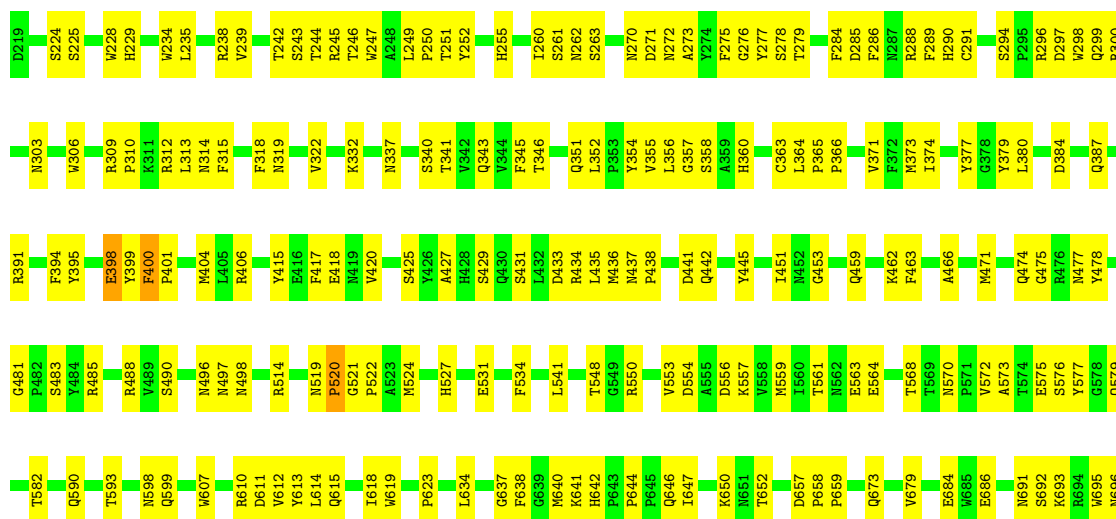
• Molecule 1: Capsid protein VP1

Chain l: 58% 41% .



• Molecule 1: Capsid protein VP1

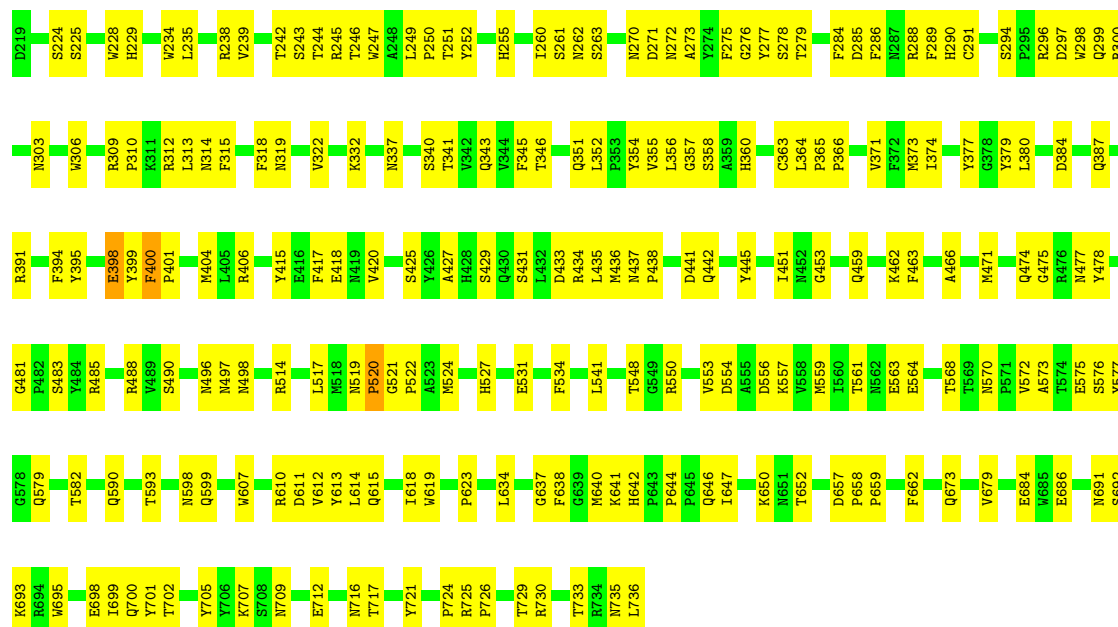
Chain m: 58% 41% .





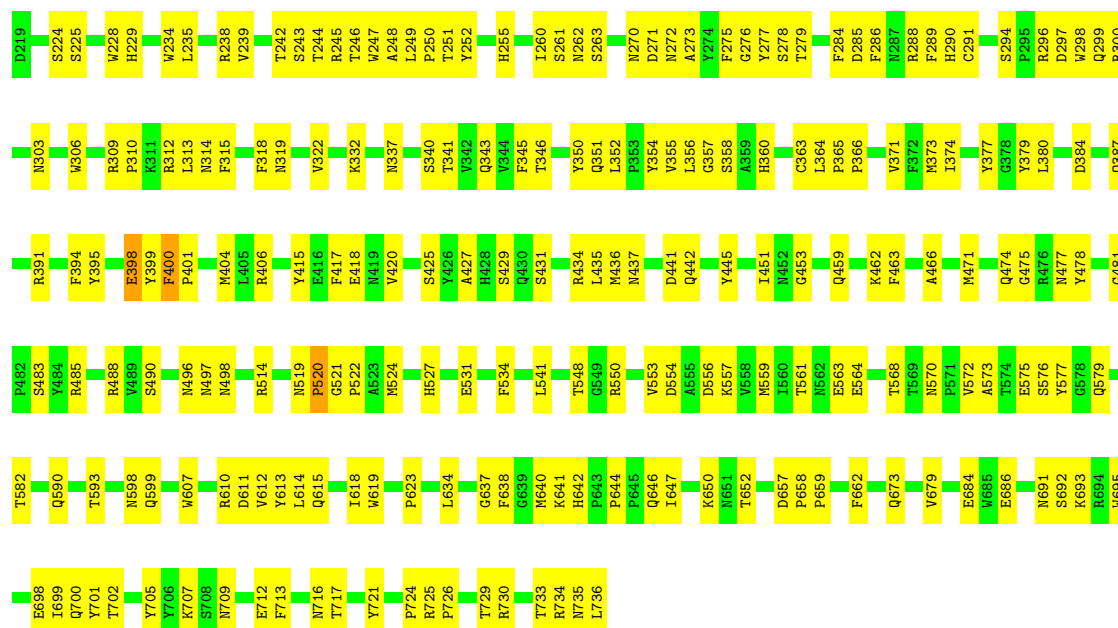
● Molecule 1: Capsid protein VP1

Chain n: 58% 41%



● Molecule 1: Capsid protein VP1

Chain o: 58% 41%

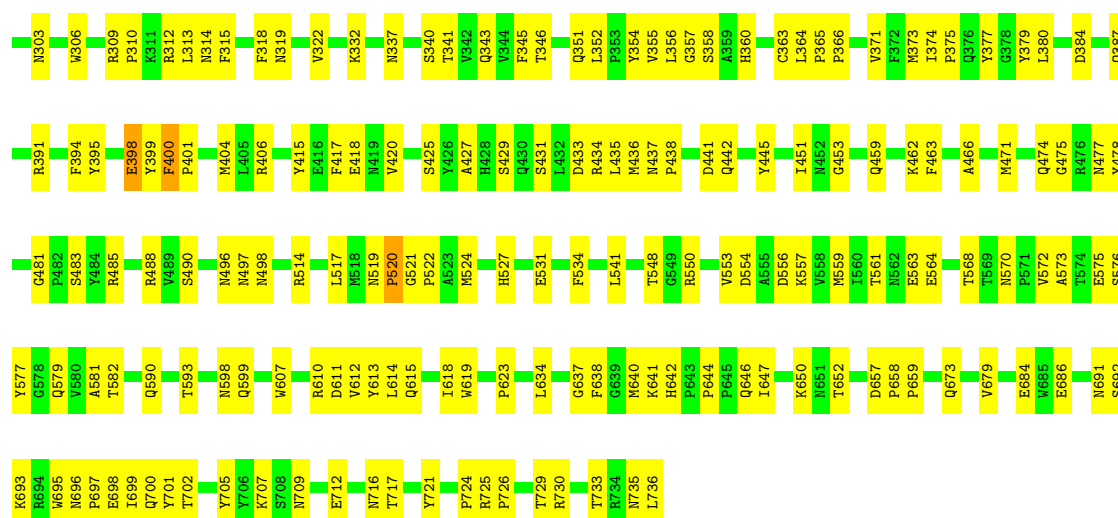


● Molecule 1: Capsid protein VP1

P697	Q579	P492	F394	N303	D219
E698	S580	S483	F395	N303	S224
I699	A581	V484	Y395	W306	S225
Q700	T582	R485	E398	R309	W228
T701	Q590	R488	Y399	R312	H229
T702	T593	V489	F400	N313	W234
Y705	T593	S490	P401	N314	L235
Y706	N598	N496	M404	F315	W238
K707	Q599	N497	L405		
S708		N498	R406	F318	R238
N709	W607		Y415	N319	V239
E712	R610	B514	E416	T242	
N716	D611	L517	F417	V322	T243
T717	D612	N518	E418	T244	S243
Y721	Y613	N519	N419	K332	T244
	L614	P520	V420	T246	R245
T724	Q615	G521		N337	W247
R725		P522	S425		
P726	I618	A523	Y426	S340	A248
	W619	N524	A427	T341	L249
T729	P623	H527	R428	V342	P250
R730	L634	E531	Q430	Q343	T251
T733	G637	F534	L432	T346	Y252
R734	F638		R434		
N735	G639	L541	L435	Q351	L260
L736	M640		M436	L352	S261
	K641	T548	N437	V354	S263
	H642	G549	P438	V355	
		B550		L356	N270
	Q646		D441	G357	D271
	I647	V553	Q442	S358	N272
	K650	D554	Y445	A359	A273
	N651	A555		H360	Y274
	T652	D556	L451	G363	F275
		V558	N452	L364	G276
	D657	N559	G453	P365	Y277
	P658	L560		P366	S278
	P659	T561	Q459		T279
	Q673	N562		F284	
	W679	E563		F285	
		E564	F463	F286	
		T568	A466	N373	N287
	E684	N569		I374	R288
	W685	P570	M471	V371	F289
	E686	N571		Y377	H290
	N691	V572	Q474	Y379	C291
	S692	A573	G475	L380	
	K693	T574	R476	D384	S294
	R694	E575	N477		F295
		S576	Y478	Q387	R296
	W695	V577			W298
	N696	E578	C481	P301	Q299

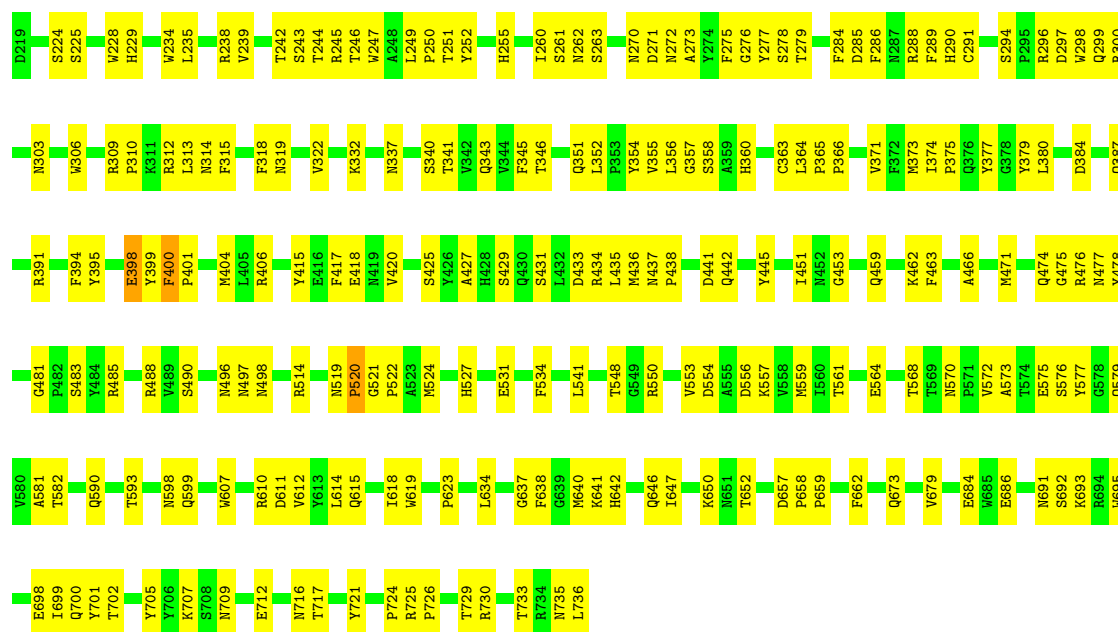
Q	Q579	Q481	R391	N803	D219
	Q598	Q482	R391	N803	S224
	E699	S483	F394	W306	S225
	Q700	W484	Y395		
	Q701	W485			
	Q702				W228
	T593	R488	E398	R309	H229
	Y705	W489	Y399	P310	
	Y706	S490	F400	R312	W234
	Q707	Q599	P401	L313	L235
S	S708	W496		N314	
	W607	W497	W404	F315	R238
		W498	L405		V239
	E712	R514	R406		
	D611	R514	Y415	N318	T242
	W612	R519	F416	N319	S243
	Y613	R520	F417	V322	T244
	L614	P520	F417		R245
	Q615	G521	W418	K332	T246
	Y721	P522	W419		W247
T	T618	W523	W420	N337	A248
	W619	W524			L249
	P623	H527	S425	S340	P250
		K528	Y426	T341	T251
	L634		A427	V342	Y252
		E531	W428	Q343	
	G637	P534	S429	W344	H255
	R734	F638	Q430	F345	
	W735	G639	G431	T346	L260
	L736	M640	L432	Q351	S261
Y	Y737	K641	R434	L352	N262
	H642	T548	L435	P353	S263
	P644	G643	W436		
	P645	G649	M437	R353	N270
	Q646	B550		V355	D271
	I647	W553	D441	L356	N272
	K650	D554	Q442	G357	A273
	N651	A555	Y445	S358	Y275
	T652	W556		A359	F276
	D657	M559	L451	H360	G276
F	P658	T561	W452	C363	S278
	P659	W562	G453	L364	T279
	Q673	E563	Q459	P366	
		E564			F284
	W679	T568	K462	V371	D285
	E684	N570	F463	F372	F286
	W685	P571		M373	M287
	E686	W572		I374	R288
		A573	A466	P375	F289
	N691	T574		H290	H290
R	S692	E575		C291	
	K693	S676	W471	Q376	
		W577		Y377	
	R694			G378	
		A578	Q474		S294
			G475	Y379	F295
			W476	L380	R296
			N477	D297	W298
			Y478	D384	Q299
					R300

D219	S224	S225	W228	H229	W234	L235	R238	V239	T242	S243	T244	R245	T246	W247	A248	L249	P250	T251	Y252	H255	L260	S261	N262	S263	W270	D271	T272	A273	Y274	T275	G276	Y277	S278	T279			D284	D285	F286	S287	R288	F289	H290		C291		S294	P295	R296	D297	F298	Q299	L300
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	--	--	------	------	------	-------------	------	------	------	--	------	--	------	-------------	------	------	------	------	------



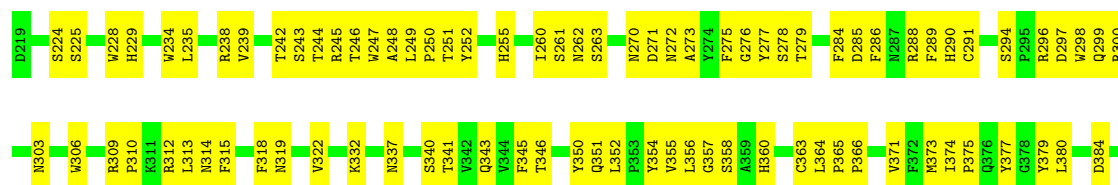
• Molecule 1: Capsid protein VP1

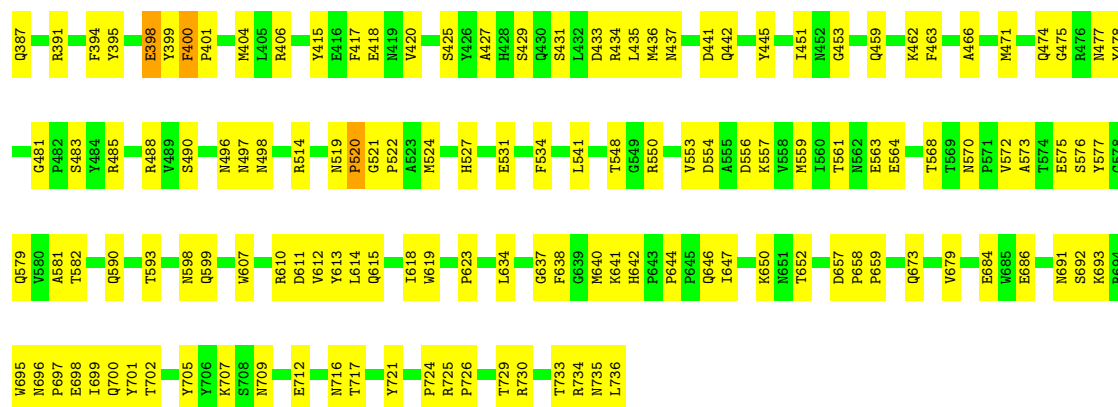
Chain s: 59% 41%



• Molecule 1: Capsid protein VP1

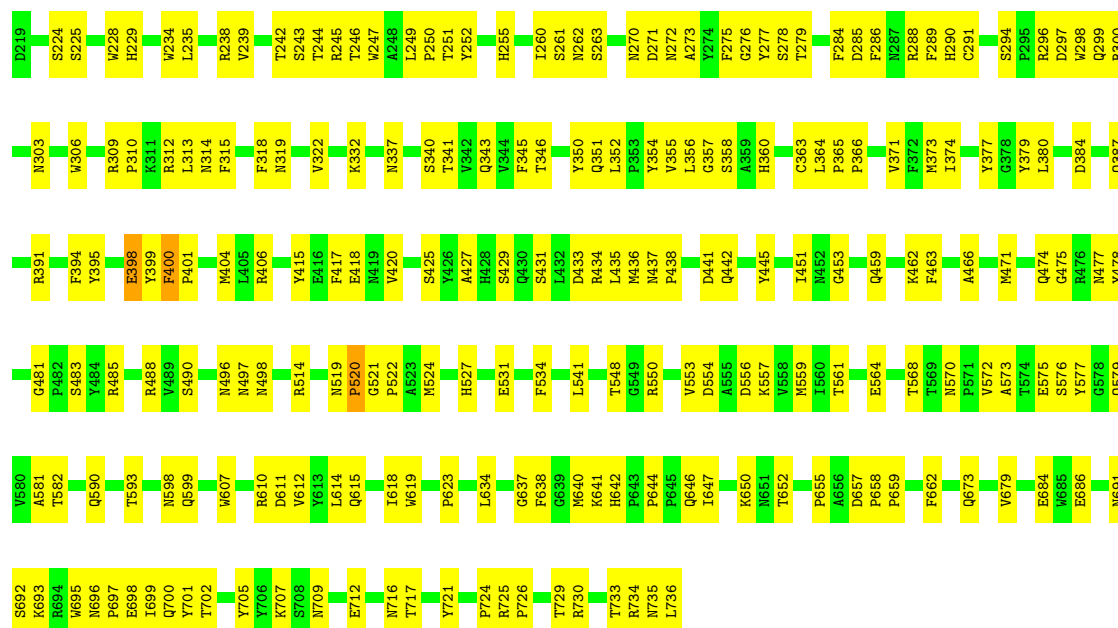
Chain t: 58% 42%





• Molecule 1: Capsid protein VP1

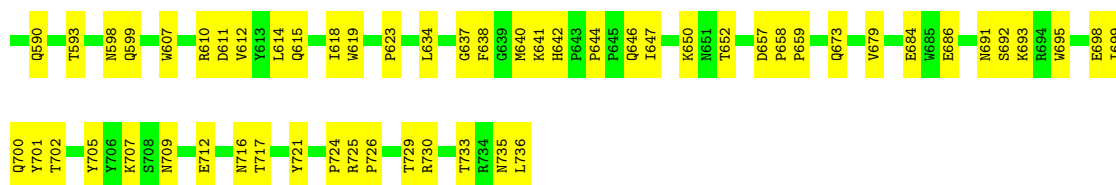
Chain u: 58% 42%



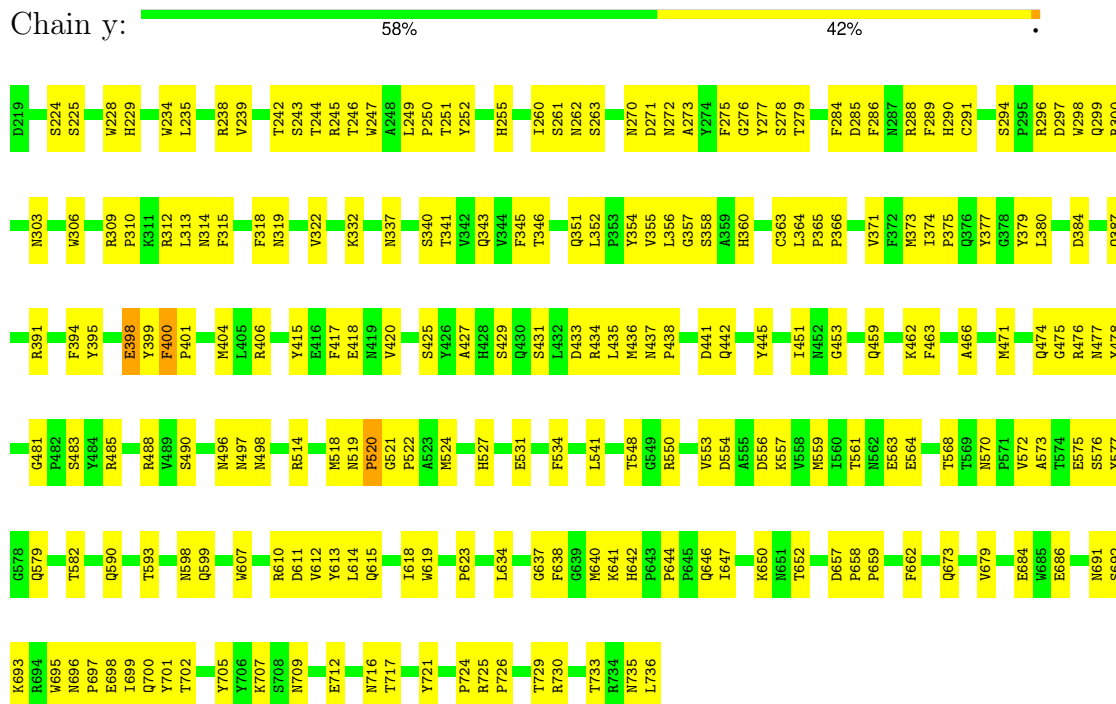
• Molecule 1: Capsid protein VP1

Chain v: 58% 41%

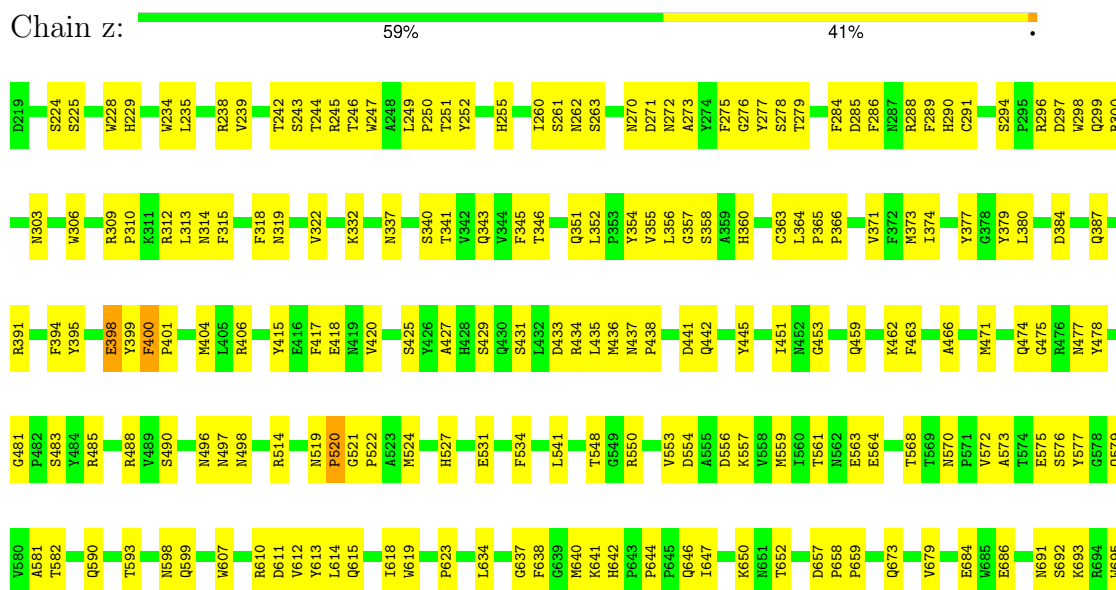




• Molecule 1: Capsid protein VP1

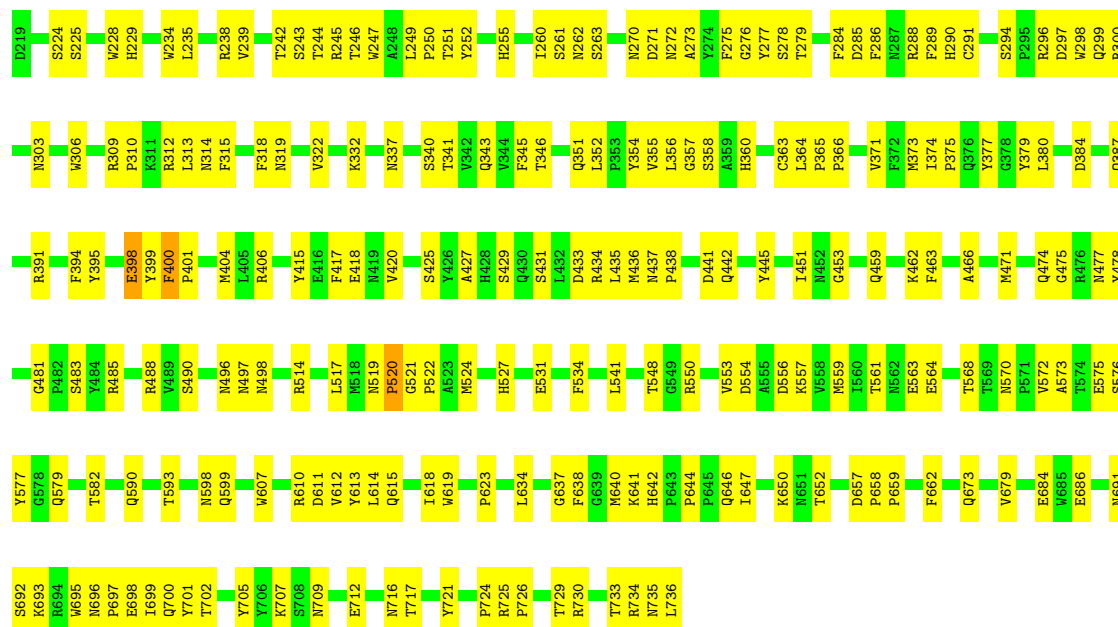


• Molecule 1: Capsid protein VP1

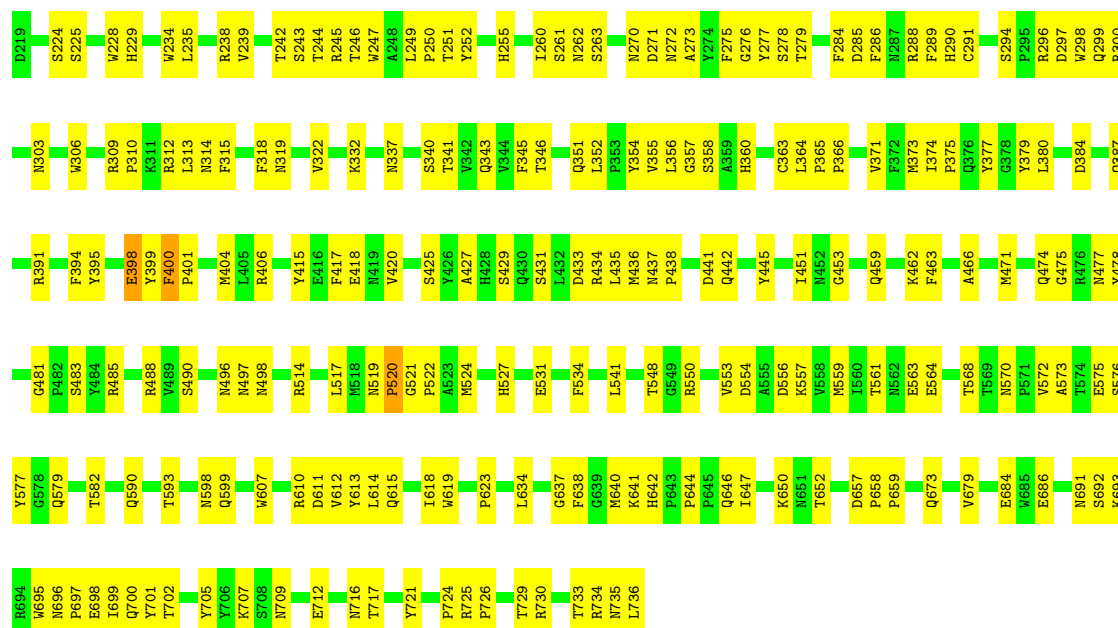




● Molecule 1: Capsid protein VP1



● Molecule 1: Capsid protein VP1



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, I	Depositor
Number of particles used	150469	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	17.699	Depositor
Minimum map value	-9.359	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	1.000	Depositor
Recommended contour level	1	Depositor
Map size ($\text{\AA}$)	390.574, 390.574, 390.574	wwPDB
Map dimensions	401, 401, 401	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	0.97400004, 0.97400004, 0.97400004	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	1	0.46	0/4256	0.56	1/5800 (0.0%)
1	2	0.46	0/4256	0.56	1/5800 (0.0%)
1	3	0.46	0/4256	0.56	1/5800 (0.0%)
1	4	0.46	0/4256	0.56	2/5800 (0.0%)
1	5	0.46	0/4256	0.56	1/5800 (0.0%)
1	6	0.46	0/4256	0.56	1/5800 (0.0%)
1	7	0.46	0/4256	0.56	1/5800 (0.0%)
1	8	0.46	0/4256	0.56	1/5800 (0.0%)
1	A	0.46	0/4256	0.56	1/5800 (0.0%)
1	B	0.46	0/4256	0.56	1/5800 (0.0%)
1	C	0.46	0/4256	0.56	1/5800 (0.0%)
1	D	0.46	0/4256	0.56	2/5800 (0.0%)
1	E	0.46	0/4256	0.56	1/5800 (0.0%)
1	F	0.46	0/4256	0.56	1/5800 (0.0%)
1	G	0.46	0/4256	0.56	1/5800 (0.0%)
1	H	0.46	0/4256	0.56	1/5800 (0.0%)
1	I	0.46	0/4256	0.56	1/5800 (0.0%)
1	J	0.46	0/4256	0.56	2/5800 (0.0%)
1	K	0.46	0/4256	0.56	2/5800 (0.0%)
1	L	0.46	0/4256	0.56	2/5800 (0.0%)
1	M	0.46	0/4256	0.56	2/5800 (0.0%)
1	N	0.46	0/4256	0.56	2/5800 (0.0%)
1	O	0.46	0/4256	0.56	2/5800 (0.0%)
1	P	0.46	0/4256	0.56	1/5800 (0.0%)
1	Q	0.46	0/4256	0.56	1/5800 (0.0%)
1	R	0.46	0/4256	0.56	1/5800 (0.0%)
1	S	0.46	0/4256	0.56	1/5800 (0.0%)
1	T	0.46	0/4256	0.56	1/5800 (0.0%)
1	U	0.46	0/4256	0.56	2/5800 (0.0%)
1	V	0.46	0/4256	0.56	1/5800 (0.0%)
1	W	0.46	0/4256	0.56	1/5800 (0.0%)
1	X	0.46	0/4256	0.56	1/5800 (0.0%)
1	Y	0.46	0/4256	0.56	1/5800 (0.0%)
1	Z	0.46	0/4256	0.56	1/5800 (0.0%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	a	0.46	0/4256	0.56	1/5800 (0.0%)
1	b	0.46	0/4256	0.56	1/5800 (0.0%)
1	c	0.46	0/4256	0.56	2/5800 (0.0%)
1	d	0.46	0/4256	0.56	1/5800 (0.0%)
1	e	0.46	0/4256	0.56	1/5800 (0.0%)
1	f	0.46	0/4256	0.56	1/5800 (0.0%)
1	g	0.46	0/4256	0.56	1/5800 (0.0%)
1	h	0.46	0/4256	0.56	2/5800 (0.0%)
1	i	0.46	0/4256	0.56	1/5800 (0.0%)
1	j	0.46	0/4256	0.56	1/5800 (0.0%)
1	k	0.46	0/4256	0.56	1/5800 (0.0%)
1	l	0.46	0/4256	0.56	1/5800 (0.0%)
1	m	0.46	0/4256	0.56	1/5800 (0.0%)
1	n	0.46	0/4256	0.56	1/5800 (0.0%)
1	o	0.46	0/4256	0.56	1/5800 (0.0%)
1	p	0.46	0/4256	0.56	2/5800 (0.0%)
1	q	0.46	0/4256	0.56	1/5800 (0.0%)
1	r	0.46	0/4256	0.56	1/5800 (0.0%)
1	s	0.46	0/4256	0.56	1/5800 (0.0%)
1	t	0.46	0/4256	0.56	1/5800 (0.0%)
1	u	0.46	0/4256	0.56	1/5800 (0.0%)
1	v	0.46	0/4256	0.56	1/5800 (0.0%)
1	w	0.46	0/4256	0.56	1/5800 (0.0%)
1	x	0.46	0/4256	0.56	1/5800 (0.0%)
1	y	0.46	0/4256	0.56	2/5800 (0.0%)
1	z	0.46	0/4256	0.56	1/5800 (0.0%)
All	All	0.46	0/255360	0.56	73/348000 (0.0%)

There are no bond length outliers.

The worst 5 of 73 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	K	398	GLU	N-CA-C	5.67	119.45	112.54
1	U	398	GLU	N-CA-C	5.67	119.45	112.54
1	4	398	GLU	N-CA-C	5.67	119.45	112.54
1	m	398	GLU	N-CA-C	5.66	119.45	112.54
1	q	398	GLU	N-CA-C	5.66	119.45	112.54

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	1	4131	0	3884	247	0
1	2	4131	0	3884	248	0
1	3	4131	0	3884	241	0
1	4	4131	0	3884	247	0
1	5	4131	0	3884	251	0
1	6	4131	0	3884	245	0
1	7	4131	0	3884	249	0
1	8	4131	0	3884	247	0
1	A	4131	0	3884	245	0
1	B	4131	0	3884	243	0
1	C	4131	0	3884	249	0
1	D	4131	0	3884	247	0
1	E	4131	0	3884	248	0
1	F	4131	0	3884	243	0
1	G	4131	0	3884	243	0
1	H	4131	0	3884	245	0
1	I	4131	0	3884	246	0
1	J	4131	0	3884	243	0
1	K	4131	0	3884	251	0
1	L	4131	0	3884	243	0
1	M	4131	0	3884	245	0
1	N	4131	0	3884	245	0
1	O	4131	0	3884	250	0
1	P	4131	0	3884	249	0
1	Q	4131	0	3884	246	0
1	R	4131	0	3884	241	0
1	S	4131	0	3884	244	0
1	T	4131	0	3884	243	0
1	U	4131	0	3884	245	0
1	V	4131	0	3884	244	0
1	W	4131	0	3884	246	0
1	X	4131	0	3884	246	0
1	Y	4131	0	3884	240	0
1	Z	4131	0	3884	247	0
1	a	4131	0	3884	246	0
1	b	4131	0	3884	251	0
1	c	4131	0	3884	248	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	d	4131	0	3884	239	0
1	e	4131	0	3884	248	0
1	f	4131	0	3884	238	0
1	g	4131	0	3884	245	0
1	h	4131	0	3884	245	0
1	i	4131	0	3884	245	0
1	j	4131	0	3884	244	0
1	k	4131	0	3884	244	0
1	l	4131	0	3884	248	0
1	m	4131	0	3884	242	0
1	n	4131	0	3884	243	0
1	o	4131	0	3884	246	0
1	p	4131	0	3884	245	0
1	q	4131	0	3884	245	0
1	r	4131	0	3884	243	0
1	s	4131	0	3884	245	0
1	t	4131	0	3884	246	0
1	u	4131	0	3884	250	0
1	v	4131	0	3884	250	0
1	w	4131	0	3884	245	0
1	x	4131	0	3884	241	0
1	y	4131	0	3884	250	0
1	z	4131	0	3884	245	0
All	All	247860	0	233040	11887	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 25.

The worst 5 of 11887 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:N:559:MET:SD	1:N:726:PRO:HD3	1.26	1.75
1:I:559:MET:SD	1:I:726:PRO:HD3	1.26	1.75
1:b:559:MET:SD	1:b:726:PRO:HD3	1.26	1.75
1:P:559:MET:SD	1:P:726:PRO:HD3	1.26	1.75
1:6:559:MET:SD	1:6:726:PRO:HD3	1.26	1.75

There are no symmetry-related clashes.

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	1	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	2	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	3	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	4	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	5	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	6	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	7	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	8	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	A	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	B	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	C	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	D	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	E	516/518 (100%)	504 (98%)	11 (2%)	1 (0%)	44	71
1	F	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	G	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	H	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	I	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	J	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	K	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	L	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	M	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	N	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	O	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	P	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	Q	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	R	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	S	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	T	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	U	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	V	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	W	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	X	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	Y	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	Z	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	a	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	b	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	c	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	d	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	e	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	f	516/518 (100%)	504 (98%)	11 (2%)	1 (0%)	44	71
1	g	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	h	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	i	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	j	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	k	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	l	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	m	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	n	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	o	516/518 (100%)	504 (98%)	11 (2%)	1 (0%)	44	71
1	p	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	q	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	r	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	s	516/518 (100%)	504 (98%)	11 (2%)	1 (0%)	44	71
1	t	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	u	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	v	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	w	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	x	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	y	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
1	z	516/518 (100%)	503 (98%)	12 (2%)	1 (0%)	44	71
All	All	30960/31080 (100%)	30184 (98%)	716 (2%)	60 (0%)	45	71

5 of 60 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	520	PRO
1	B	520	PRO
1	C	520	PRO
1	D	520	PRO
1	E	520	PRO

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	1	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	2	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	3	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	4	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	5	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	6	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	7	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	8	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	A	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	B	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	C	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	D	453/453 (100%)	451 (100%)	2 (0%)	89	96

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	F	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	G	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	H	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	I	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	J	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	K	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	L	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	M	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	N	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	O	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	P	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	Q	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	R	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	S	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	T	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	U	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	V	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	W	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	X	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	Y	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	Z	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	a	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	b	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	c	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	d	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	e	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	f	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	g	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	h	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	i	453/453 (100%)	451 (100%)	2 (0%)	89	96

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	j	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	k	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	l	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	m	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	n	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	o	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	p	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	q	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	r	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	s	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	t	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	u	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	v	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	w	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	x	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	y	453/453 (100%)	451 (100%)	2 (0%)	89	96
1	z	453/453 (100%)	451 (100%)	2 (0%)	89	96
All	All	27180/27180 (100%)	27060 (100%)	120 (0%)	88	96

5 of 120 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	3	400	PHE
1	x	239	VAL
1	d	400	PHE
1	w	400	PHE
1	8	239	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 1031 such sidechains are listed below:

Mol	Chain	Res	Type
1	v	691	ASN
1	x	459	GLN
1	v	673	GLN
1	W	527	HIS

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Mol	Chain	Res	Type
1	W	255	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

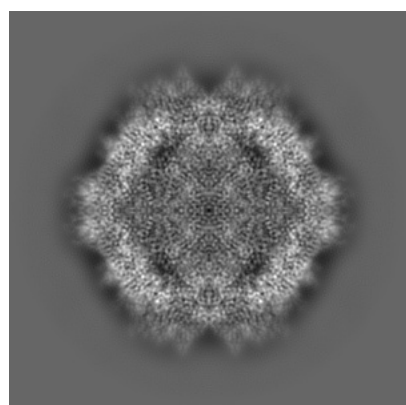
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-23973. These allow visual inspection of the internal detail of the map and identification of artifacts.

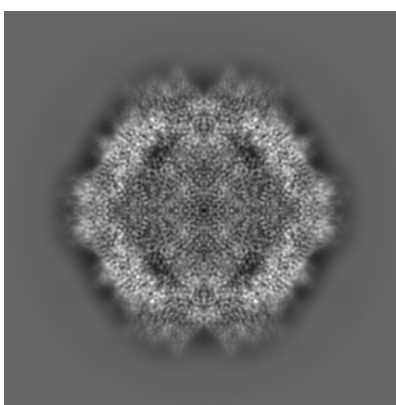
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

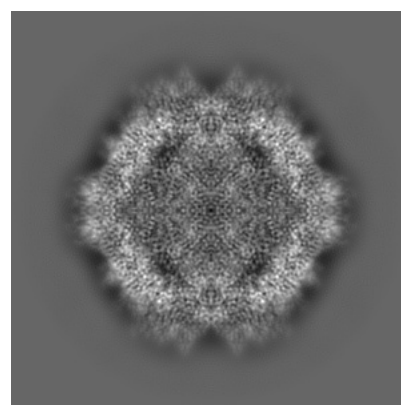
6.1.1 Primary map



X



Y

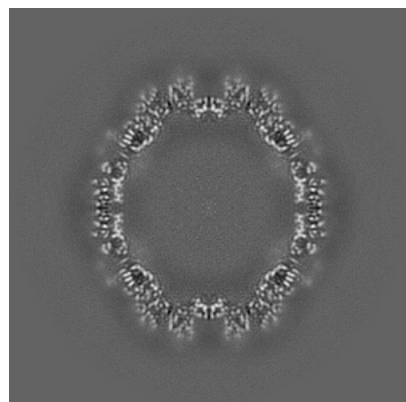


Z

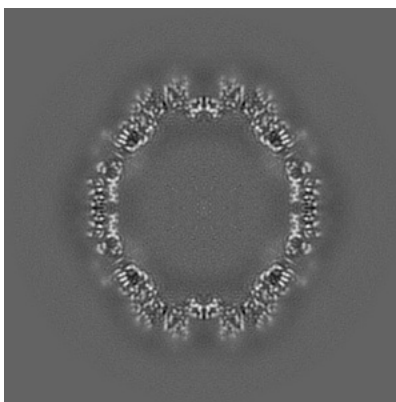
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

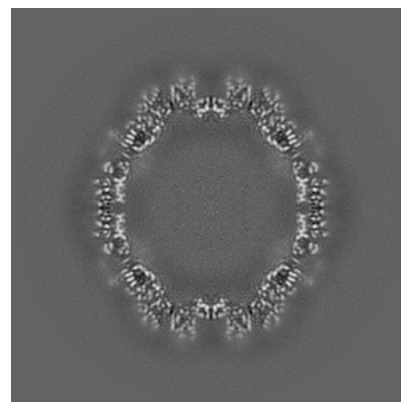
6.2.1 Primary map



X Index: 200



Y Index: 200

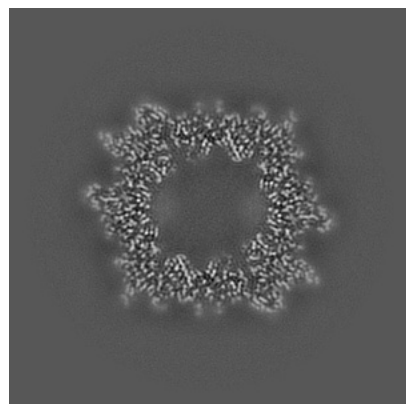


Z Index: 200

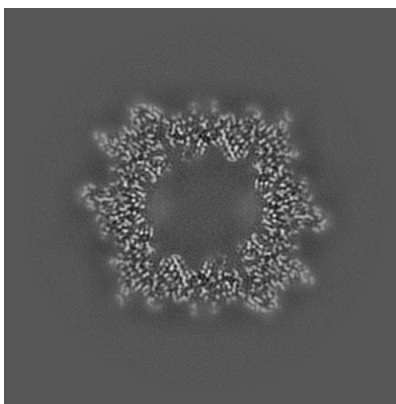
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

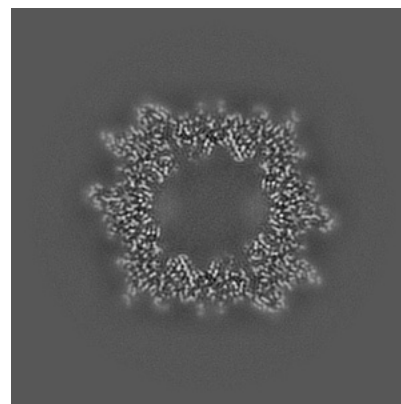
6.3.1 Primary map



X Index: 267



Y Index: 267

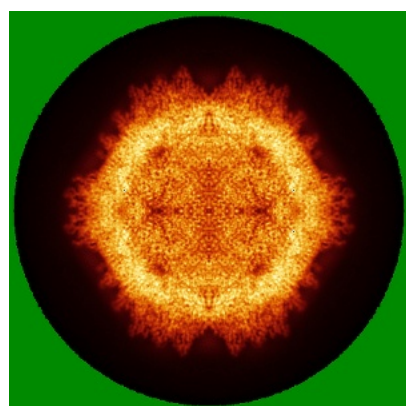


Z Index: 267

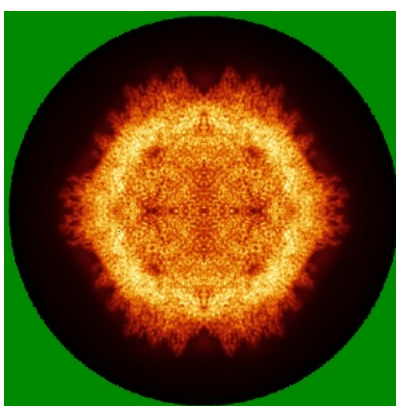
The images above show the largest variance slices of the map in three orthogonal directions.

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

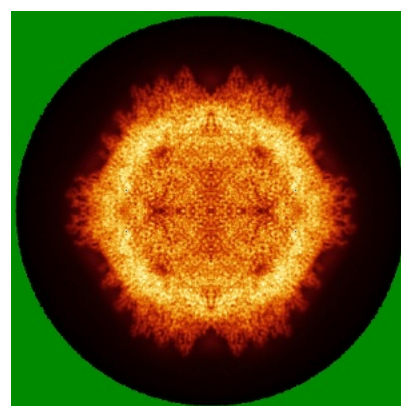
6.4.1 Primary map



X



Y

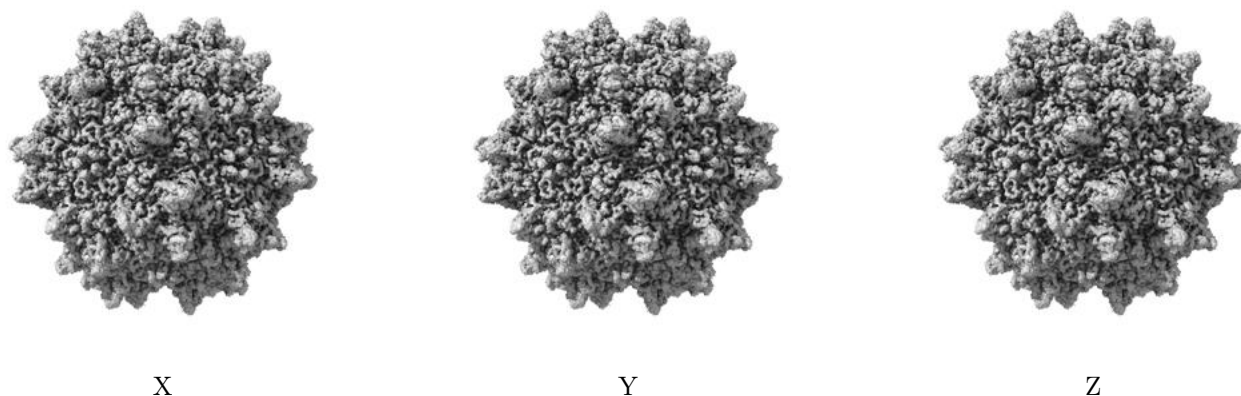


Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 1.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

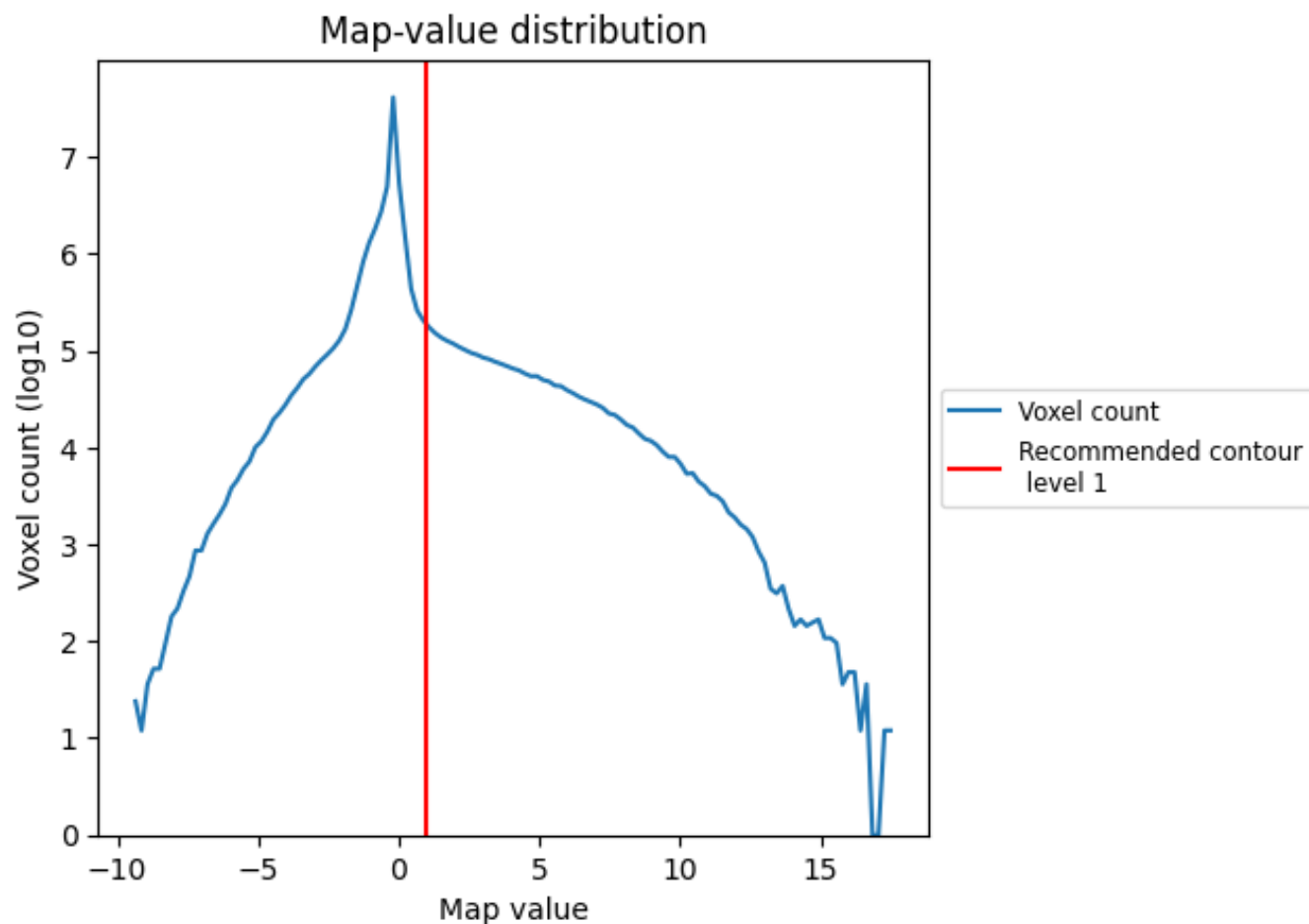
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

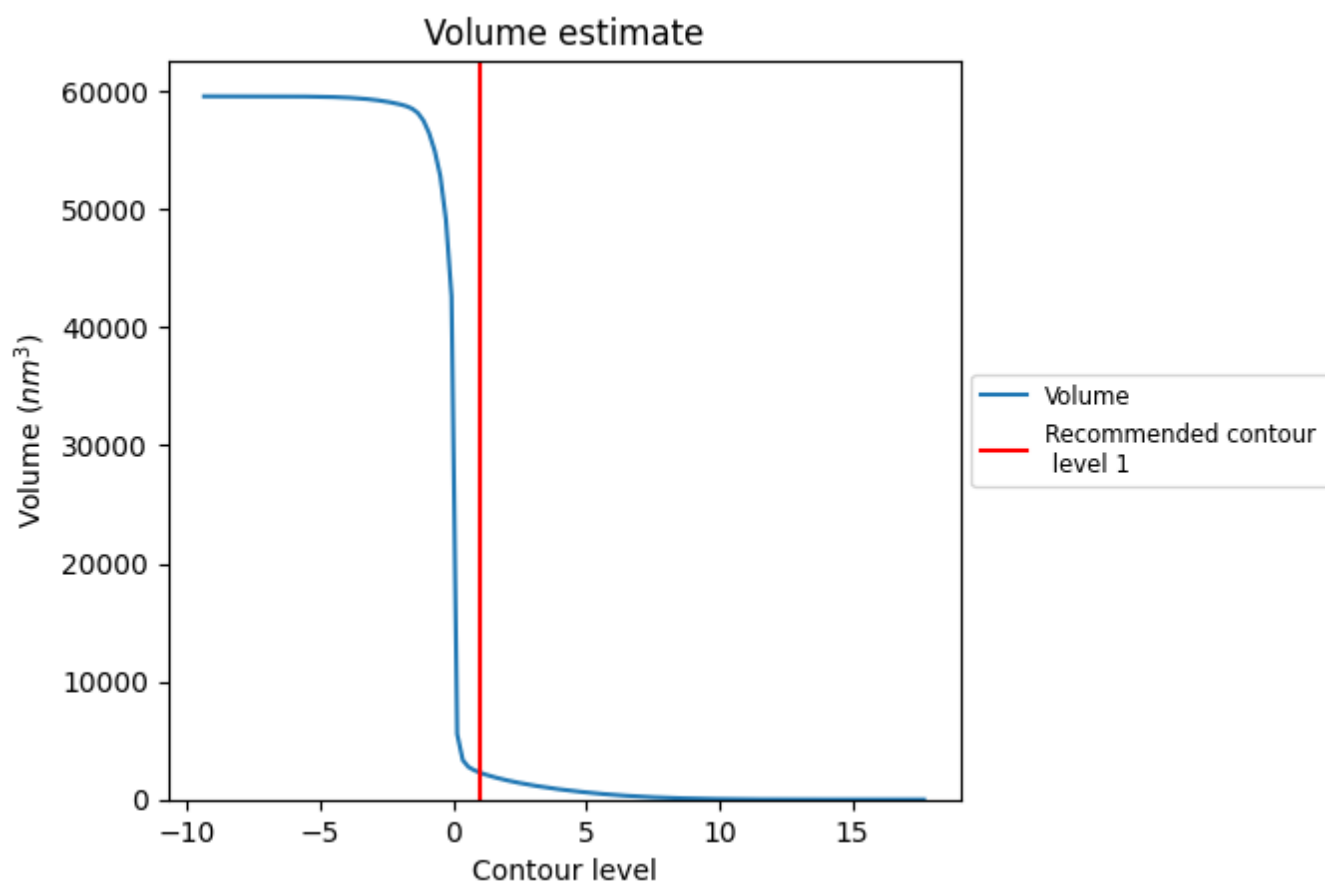
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

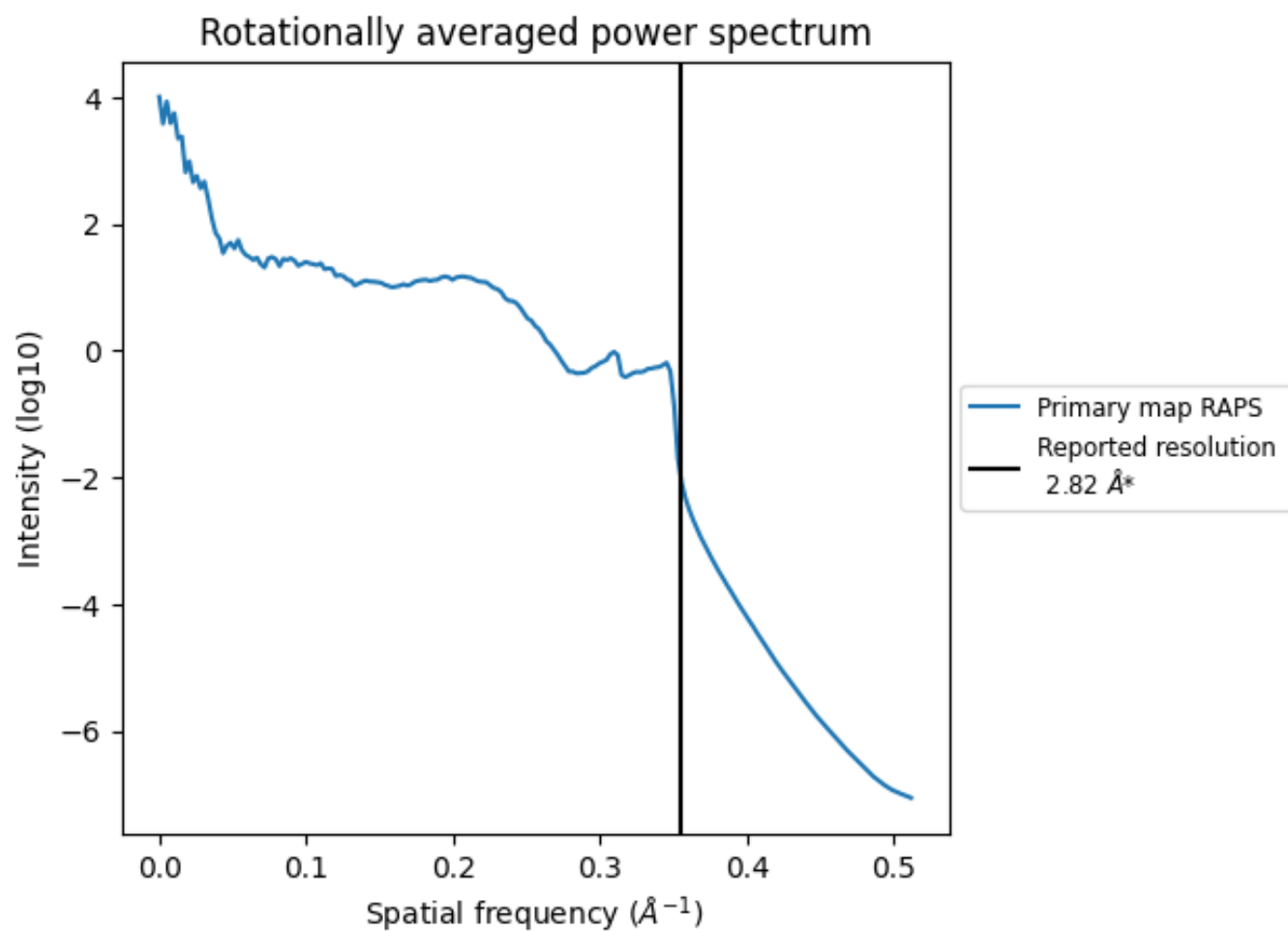
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 2292 nm³; this corresponds to an approximate mass of 2070 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum ⓘ



*Reported resolution corresponds to spatial frequency of 0.355 Å⁻¹

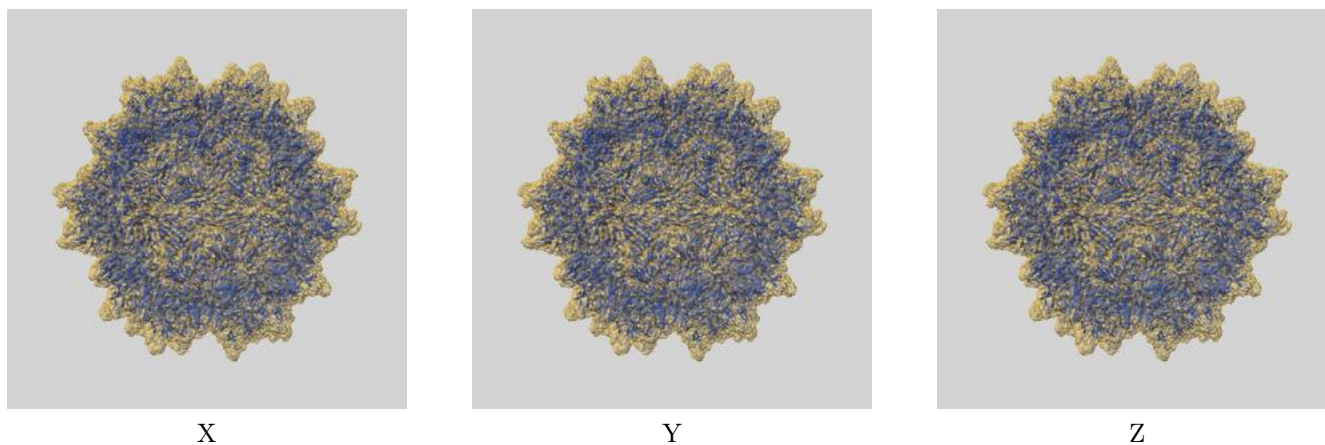
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

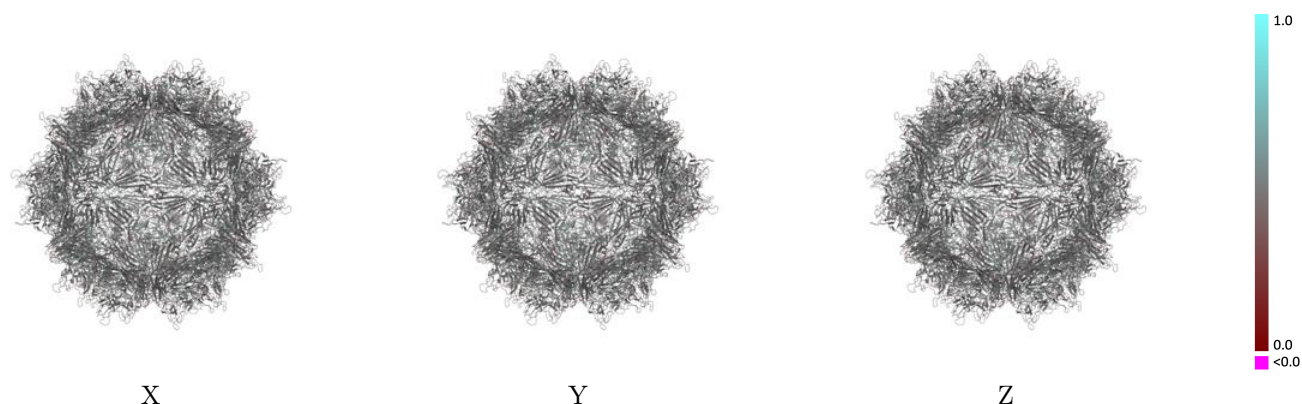
This section contains information regarding the fit between EMDB map EMD-23973 and PDB model 7MT0. Per-residue inclusion information can be found in section 3 on page 10.

9.1 Map-model overlay [i](#)



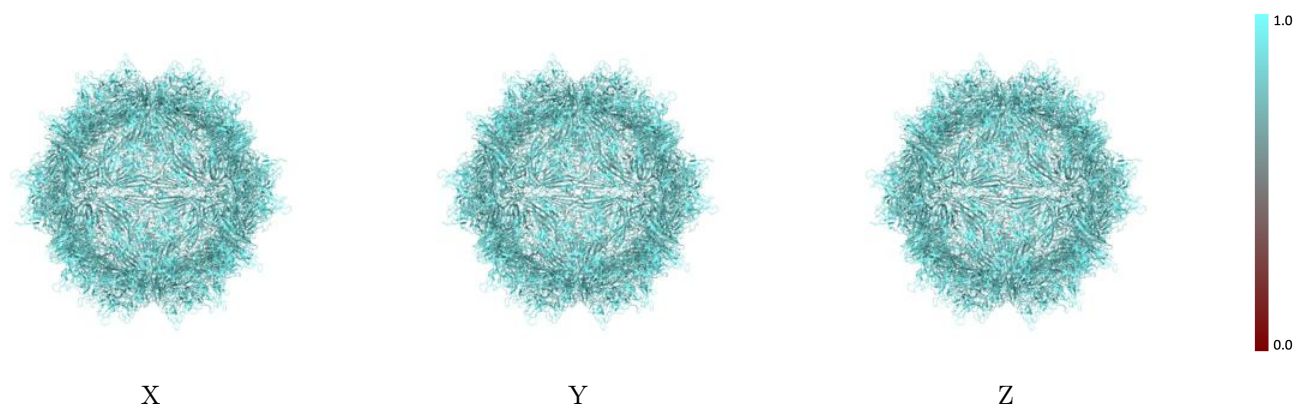
The images above show the 3D surface view of the map at the recommended contour level 1.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



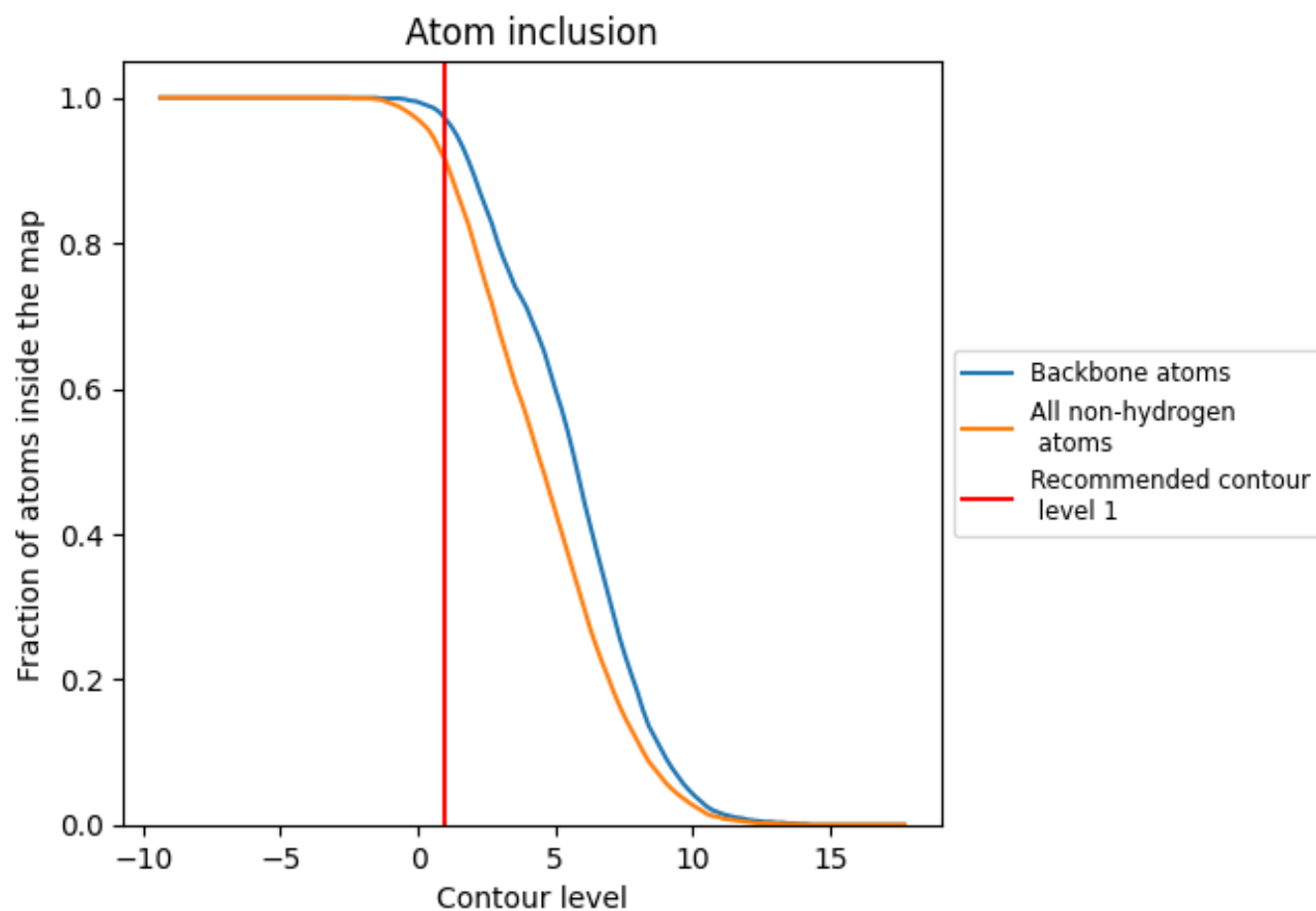
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (1).

9.4 Atom inclusion [i](#)



At the recommended contour level, 97% of all backbone atoms, 91% 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 (1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9140	 0.4730
1	 0.9140	 0.4730
2	 0.9140	 0.4730
3	 0.9160	 0.4740
4	 0.9140	 0.4740
5	 0.9140	 0.4730
6	 0.9140	 0.4750
7	 0.9110	 0.4730
8	 0.9110	 0.4720
A	 0.9130	 0.4710
B	 0.9140	 0.4720
C	 0.9140	 0.4740
D	 0.9110	 0.4730
E	 0.9160	 0.4730
F	 0.9160	 0.4740
G	 0.9110	 0.4730
H	 0.9110	 0.4720
I	 0.9140	 0.4720
J	 0.9140	 0.4710
K	 0.9140	 0.4730
L	 0.9140	 0.4720
M	 0.9110	 0.4730
N	 0.9140	 0.4730
O	 0.9140	 0.4720
P	 0.9140	 0.4740
Q	 0.9160	 0.4740
R	 0.9140	 0.4740
S	 0.9110	 0.4740
T	 0.9110	 0.4730
U	 0.9140	 0.4740
V	 0.9140	 0.4740
W	 0.9140	 0.4730
X	 0.9140	 0.4730
Y	 0.9140	 0.4720
Z	 0.9160	 0.4710



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Chain	Atom inclusion	Q-score
a	 0.9110	 0.4730
b	 0.9140	 0.4720
c	 0.9160	 0.4730
d	 0.9170	 0.4730
e	 0.9150	 0.4740
f	 0.9140	 0.4730
g	 0.9140	 0.4720
h	 0.9140	 0.4720
i	 0.9160	 0.4730
j	 0.9160	 0.4720
k	 0.9110	 0.4720
l	 0.9140	 0.4710
m	 0.9140	 0.4720
n	 0.9140	 0.4720
o	 0.9140	 0.4730
p	 0.9140	 0.4730
q	 0.9130	 0.4730
r	 0.9110	 0.4710
s	 0.9140	 0.4720
t	 0.9110	 0.4720
u	 0.9140	 0.4730
v	 0.9130	 0.4730
w	 0.9160	 0.4730
x	 0.9160	 0.4730
y	 0.9140	 0.4730
z	 0.9140	 0.4740