wwPDB EM Validation Summary Report ⓘ

Apr 23, 2025 – 06:35 PM EDT

PDB ID	:	9C1H / pdb_00009c1h
EMDB ID	:	EMD-45119
Title	:	Rhesus rotavirus (upright structure at 2.88 Angstrom resolution)
Authors	:	Jenni, S.; Herrmann, T.; De Sautu, M.; Harrison, S.C.
Deposited on	:	2024-05-29
Resolution	:	2.88 Å(reported)

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

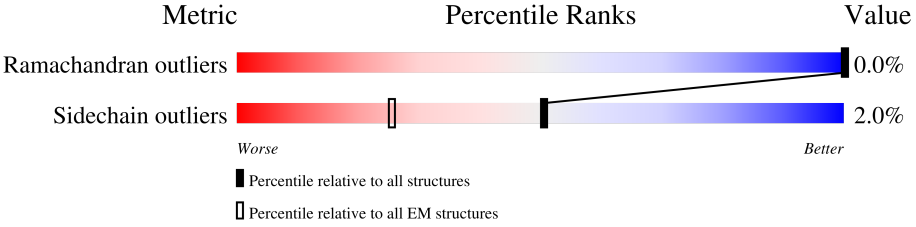
EMDB validation analysis	:	0.0.1.dev117
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.42

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 2.88 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	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	326	
1	1	326	
1	P	326	
1	Q	326	
1	R	326	
1	S	326	
1	T	326	
1	U	326	
1	V	326	
1	W	326	

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Mol	Chain	Length	Quality of chain
1	X	326	81% • 17%
1	Y	326	83% • 15%
1	Z	326	83% • 15%
1	t	326	84% 15%
1	u	326	83% • 15%
1	v	326	83% • 15%
1	w	326	84% 15%
1	x	326	82% • 17%
1	y	326	83% • 15%
2	2	776	94% • •
2	3	776	94% • •
2	4	776	67% • 30%
3	A	887	87% • 12%
3	B	887	89% • 10%
4	C	397	97% •
4	D	397	97% •
4	E	397	97% •
4	F	397	97% •
4	G	397	97% •
4	H	397	97% •
4	I	397	98% •
4	J	397	97% •
4	K	397	98% •
4	L	397	97% •
4	M	397	97% •

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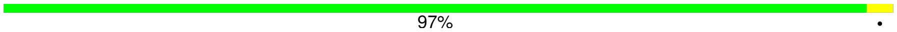
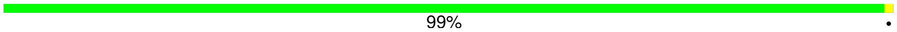
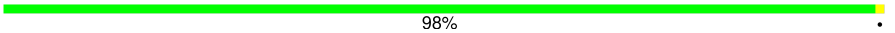
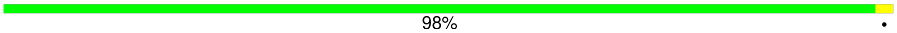
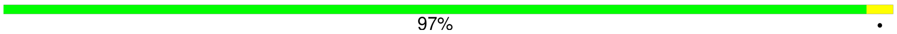
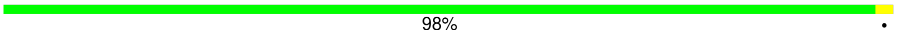
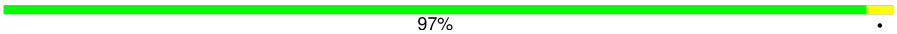
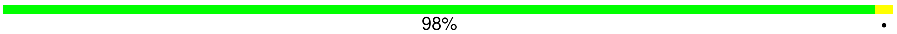
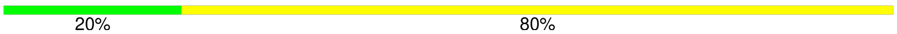
Mol	Chain	Length	Quality of chain
4	N	397	
4	O	397	
4	f	397	
4	g	397	
4	h	397	
4	i	397	
4	j	397	
4	k	397	
5	a	5	

2 Entry composition (i)

There are 9 unique types of molecules in this entry. The entry contains 258079 atoms, of which 127694 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 Outer capsid glycoprotein VP7.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
1	0	276	4312	1389	2124	348	435	16	0	0
1	1	264	4108	1322	2023	329	418	16	0	0
1	P	264	4108	1322	2023	329	418	16	0	0
1	Q	271	4234	1363	2087	341	427	16	0	0
1	R	266	4161	1338	2056	336	415	16	0	0
1	S	264	4108	1322	2023	329	418	16	0	0
1	T	276	4312	1389	2124	348	435	16	0	0
1	U	276	4312	1389	2124	348	435	16	0	0
1	V	276	4311	1389	2123	348	435	16	0	0
1	W	276	4312	1389	2124	348	435	16	0	0
1	X	271	4234	1363	2087	341	427	16	0	0
1	Y	276	4312	1389	2124	348	435	16	0	0
1	Z	276	4312	1389	2124	348	435	16	0	0
1	t	276	4312	1389	2124	348	435	16	0	0
1	u	276	4312	1389	2124	348	435	16	0	0
1	v	276	4312	1389	2124	348	435	16	0	0
1	w	276	4312	1389	2124	348	435	16	0	0

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Mol	Chain	Residues	Atoms						AltConf	Trace
1	x	271	Total 4234	C 1363	H 2087	N 341	O 427	S 16	0	0
1	y	276	Total 4312	C 1389	H 2124	N 348	O 435	S 16	0	0

- Molecule 2 is a protein called Outer capsid protein VP4.

Mol	Chain	Residues	Atoms						AltConf	Trace
2	2	750	Total 11654	C 3715	H 5753	N 990	O 1176	S 20	0	0
2	3	750	Total 11655	C 3715	H 5754	N 990	O 1176	S 20	0	0
2	4	542	Total 8465	C 2681	H 4198	N 726	O 845	S 15	0	0

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
2	73	THR	SER	conflict	UNP P12473
2	311	GLU	ASP	conflict	UNP P12473
2	338	VAL	ILE	conflict	UNP P12473
2	421	LEU	PHE	conflict	UNP P12473
2	445	SER	GLY	conflict	UNP P12473
2	446	ARG	GLY	conflict	UNP P12473
2	454	ASN	TYR	conflict	UNP P12473
2	468	PHE	LEU	conflict	UNP P12473
2	519	ASP	TYR	conflict	UNP P12473
2	690	PHE	TYR	conflict	UNP P12473
3	73	THR	SER	conflict	UNP P12473
3	311	GLU	ASP	conflict	UNP P12473
3	338	VAL	ILE	conflict	UNP P12473
3	421	LEU	PHE	conflict	UNP P12473
3	445	SER	GLY	conflict	UNP P12473
3	446	ARG	GLY	conflict	UNP P12473
3	454	ASN	TYR	conflict	UNP P12473
3	468	PHE	LEU	conflict	UNP P12473
3	519	ASP	TYR	conflict	UNP P12473
3	690	PHE	TYR	conflict	UNP P12473
4	73	THR	SER	conflict	UNP P12473
4	311	GLU	ASP	conflict	UNP P12473
4	338	VAL	ILE	conflict	UNP P12473
4	421	LEU	PHE	conflict	UNP P12473

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Chain	Residue	Modelled	Actual	Comment	Reference
4	445	SER	GLY	conflict	UNP P12473
4	446	ARG	GLY	conflict	UNP P12473
4	454	ASN	TYR	conflict	UNP P12473
4	468	PHE	LEU	conflict	UNP P12473
4	519	ASP	TYR	conflict	UNP P12473
4	690	PHE	TYR	conflict	UNP P12473

- Molecule 3 is a protein called Inner capsid protein VP2.

Mol	Chain	Residues	Atoms						AltConf	Trace
3	A	779	Total 12749	C 4041	H 6387	N 1098	O 1187	S 36	0	0
3	B	799	Total 13098	C 4154	H 6563	N 1126	O 1219	S 36	0	0

- Molecule 4 is a protein called Intermediate capsid protein VP6.

Mol	Chain	Residues	Atoms						AltConf	Trace
4	C	397	Total 6275	C 2005	H 3111	N 551	O 593	S 15	0	0
4	D	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	E	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	F	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	G	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	H	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	I	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	J	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	K	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	L	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	M	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	N	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0

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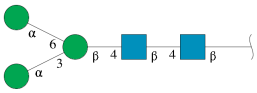
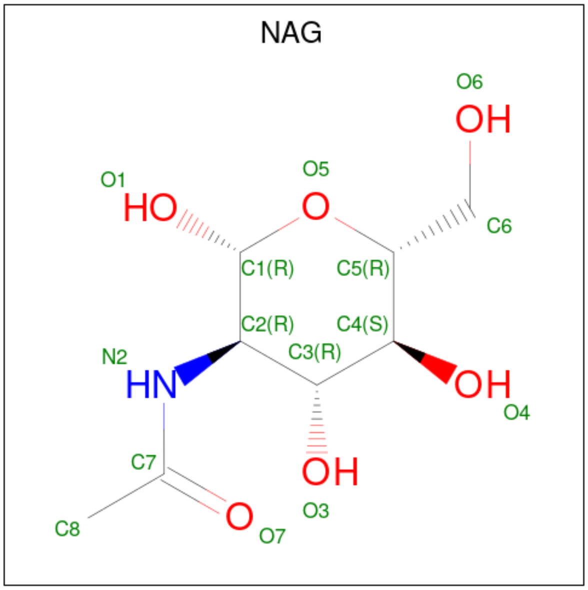
Mol	Chain	Residues	Atoms						AltConf	Trace
4	O	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	f	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	g	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	h	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	i	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	j	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0
4	k	396	Total 6253	C 1999	H 3098	N 549	O 592	S 15	0	0

- Molecule 5 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms					AltConf	Trace
5	a	5	Total 114	C 34	H 53	N 2	O 25	0	0

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms	AltConf
6	0	1	Total C H N O 28 8 14 1 5	0
6	1	1	Total C H N O 28 8 14 1 5	0
6	P	1	Total C H N O 28 8 14 1 5	0
6	Q	1	Total C H N O 28 8 14 1 5	0
6	S	1	Total C H N O 28 8 14 1 5	0
6	T	1	Total C H N O 28 8 14 1 5	0
6	U	1	Total C H N O 28 8 14 1 5	0
6	V	1	Total C H N O 28 8 14 1 5	0
6	X	1	Total C H N O 28 8 14 1 5	0
6	Y	1	Total C H N O 28 8 14 1 5	0
6	Z	1	Total C H N O 28 8 14 1 5	0
6	t	1	Total C H N O 28 8 14 1 5	0
6	u	1	Total C H N O 28 8 14 1 5	0
6	v	1	Total C H N O 28 8 14 1 5	0

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Mol	Chain	Residues	Atoms	AltConf
6	w	1	Total C H N O 28 8 14 1 5	0
6	x	1	Total C H N O 28 8 14 1 5	0
6	y	1	Total C H N O 28 8 14 1 5	0

- Molecule 7 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	AltConf
7	0	4	Total Ca 4 4	0
7	1	4	Total Ca 4 4	0
7	P	4	Total Ca 4 4	0
7	Q	4	Total Ca 4 4	0
7	R	4	Total Ca 4 4	0
7	S	4	Total Ca 4 4	0
7	T	4	Total Ca 4 4	0
7	U	4	Total Ca 4 4	0
7	V	4	Total Ca 4 4	0
7	W	4	Total Ca 4 4	0
7	X	4	Total Ca 4 4	0
7	Y	4	Total Ca 4 4	0
7	Z	4	Total Ca 4 4	0
7	t	4	Total Ca 4 4	0
7	u	4	Total Ca 4 4	0
7	v	4	Total Ca 4 4	0

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Mol	Chain	Residues	Atoms	AltConf
7	w	4	Total Ca 4 4	0
7	x	4	Total Ca 4 4	0
7	y	4	Total Ca 4 4	0

- Molecule 8 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	AltConf
8	C	2	Total Zn 2 2	0
8	D	1	Total Zn 1 1	0
8	E	1	Total Zn 1 1	0
8	F	2	Total Zn 2 2	0
8	G	1	Total Zn 1 1	0
8	H	1	Total Zn 1 1	0
8	I	2	Total Zn 2 2	0
8	J	1	Total Zn 1 1	0
8	K	1	Total Zn 1 1	0
8	L	2	Total Zn 2 2	0
8	M	1	Total Zn 1 1	0
8	N	1	Total Zn 1 1	0
8	O	2	Total Zn 2 2	0
8	f	2	Total Zn 2 2	0
8	g	1	Total Zn 1 1	0
8	h	1	Total Zn 1 1	0

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Mol	Chain	Residues	Atoms		AltConf
8	i	2	Total 2	Zn 2	0
8	j	1	Total 1	Zn 1	0
8	k	1	Total 1	Zn 1	0

- Molecule 9 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

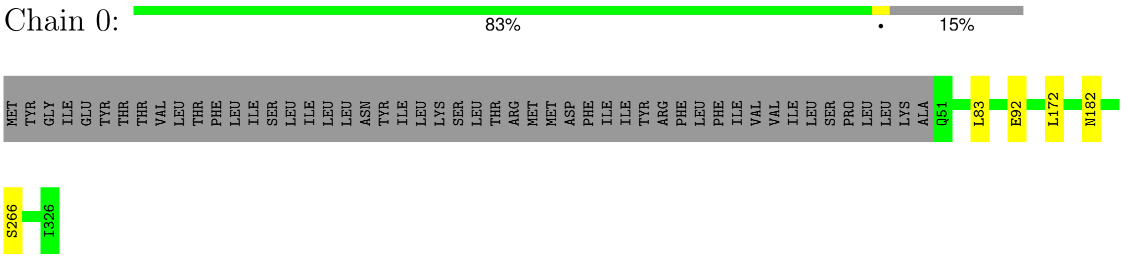
Mol	Chain	Residues	Atoms		AltConf
9	C	1	Total 1	Cl 1	0
9	F	1	Total 1	Cl 1	0
9	J	1	Total 1	Cl 1	0
9	M	1	Total 1	Cl 1	0
9	O	1	Total 1	Cl 1	0
9	h	1	Total 1	Cl 1	0
9	j	1	Total 1	Cl 1	0

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. 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.

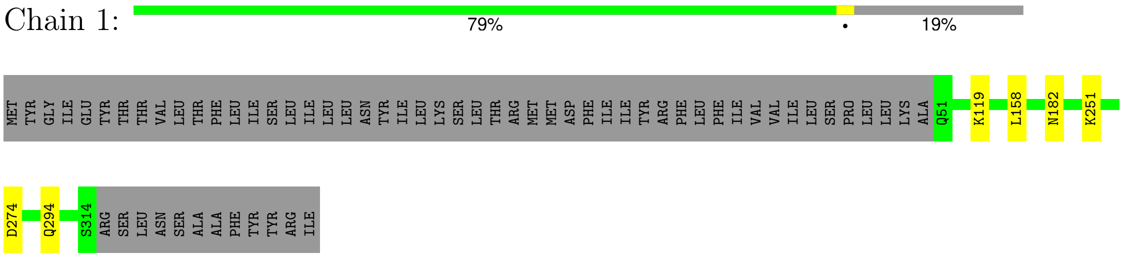
- Molecule 1: Outer capsid glycoprotein VP7

Chain 0:



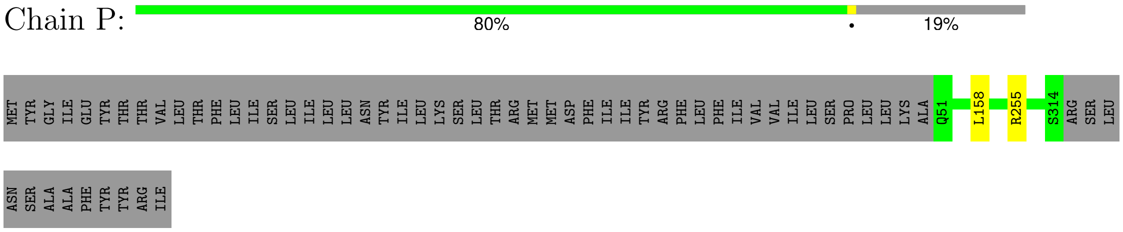
- Molecule 1: Outer capsid glycoprotein VP7

Chain 1:



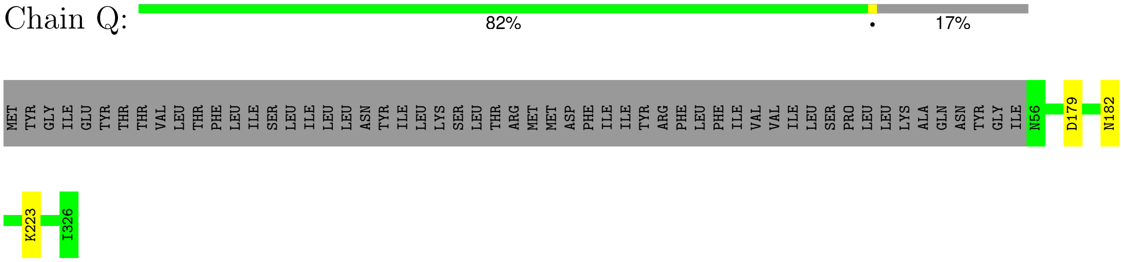
- Molecule 1: Outer capsid glycoprotein VP7

Chain P:



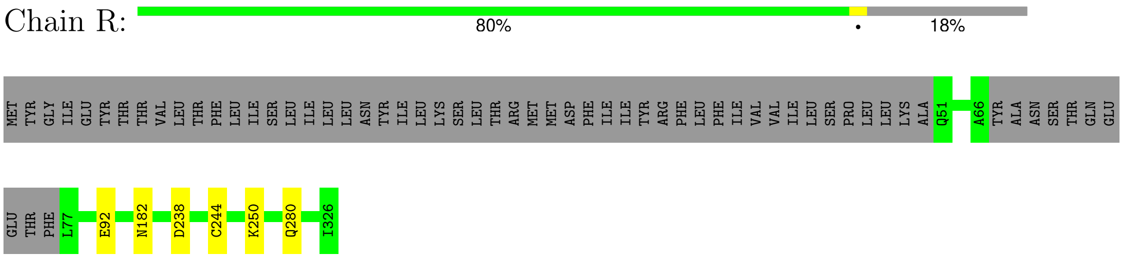
- Molecule 1: Outer capsid glycoprotein VP7

Chain Q:



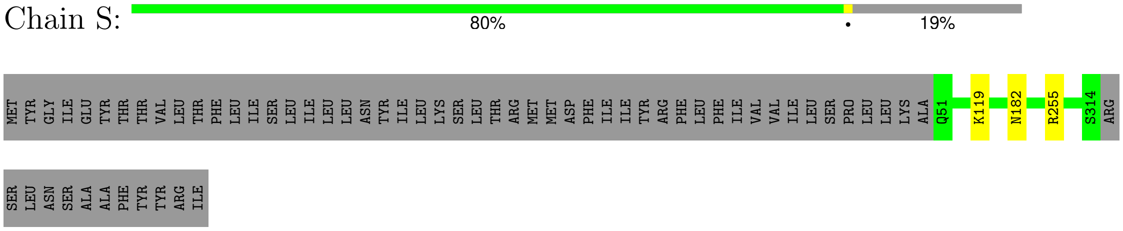
- Molecule 1: Outer capsid glycoprotein VP7

Chain R:



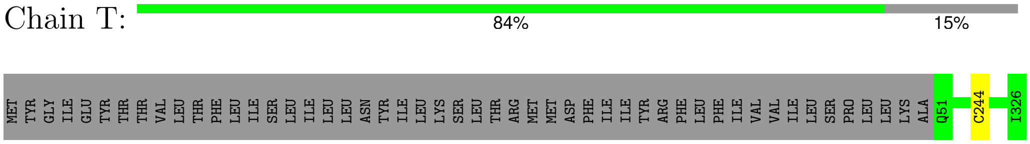
- Molecule 1: Outer capsid glycoprotein VP7

Chain S:



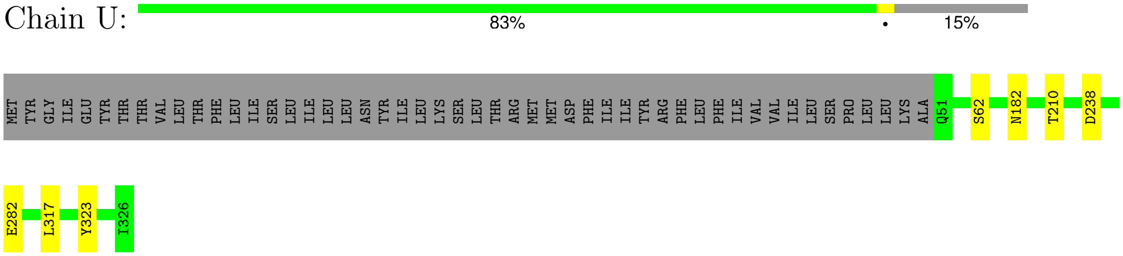
- Molecule 1: Outer capsid glycoprotein VP7

Chain T:



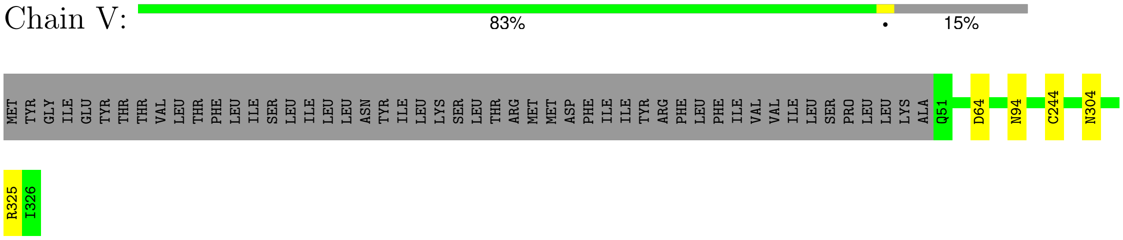
- Molecule 1: Outer capsid glycoprotein VP7

Chain U:



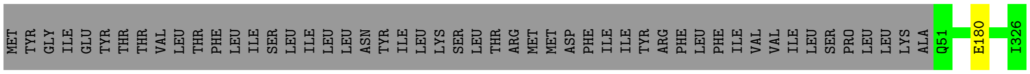
- Molecule 1: Outer capsid glycoprotein VP7

Chain V:



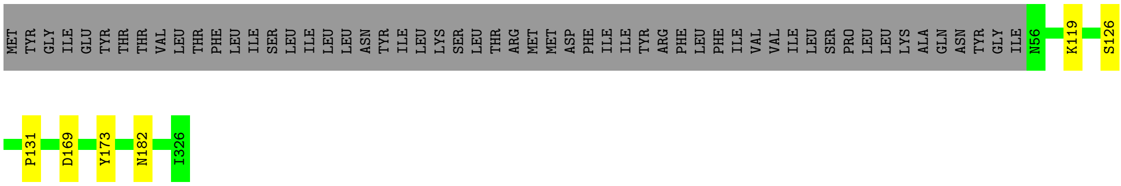
- Molecule 1: Outer capsid glycoprotein VP7

Chain W:



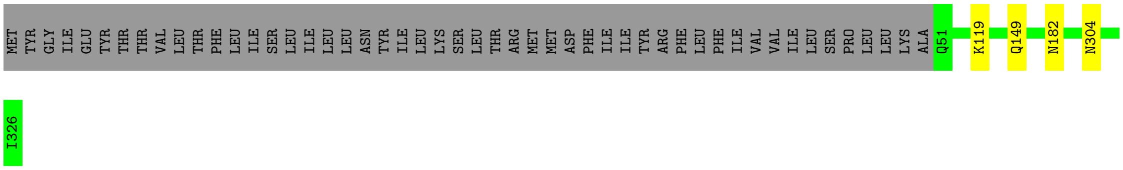
- Molecule 1: Outer capsid glycoprotein VP7

Chain X:



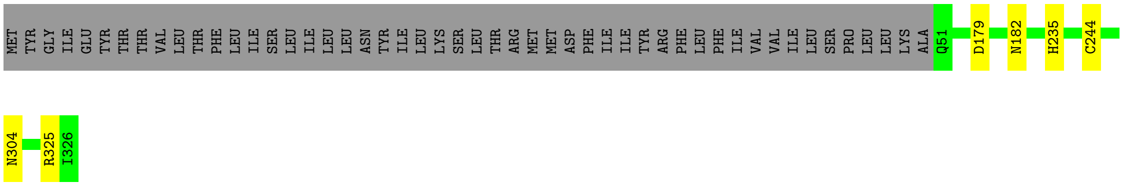
- Molecule 1: Outer capsid glycoprotein VP7

Chain Y:



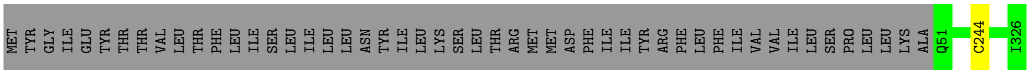
- Molecule 1: Outer capsid glycoprotein VP7

Chain Z:



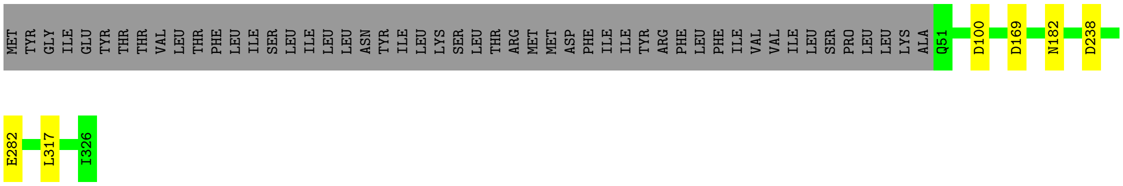
- Molecule 1: Outer capsid glycoprotein VP7

Chain t:



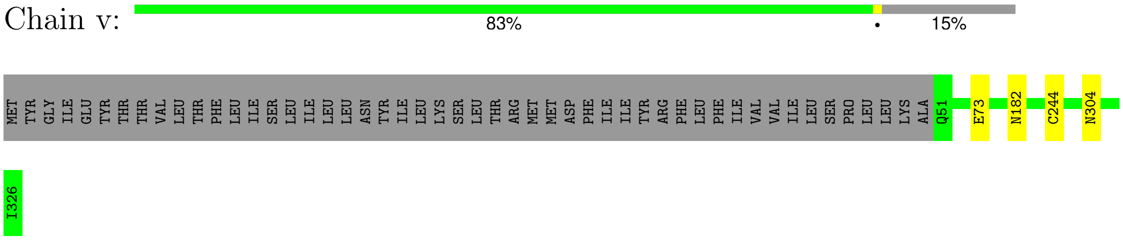
- Molecule 1: Outer capsid glycoprotein VP7

Chain u:



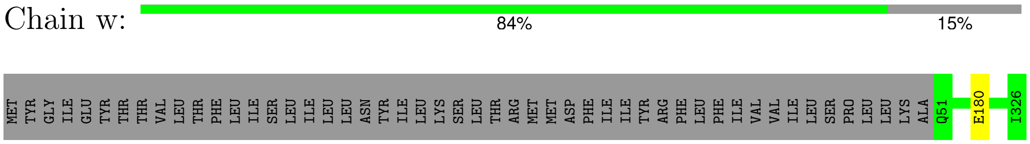
- Molecule 1: Outer capsid glycoprotein VP7

Chain v:



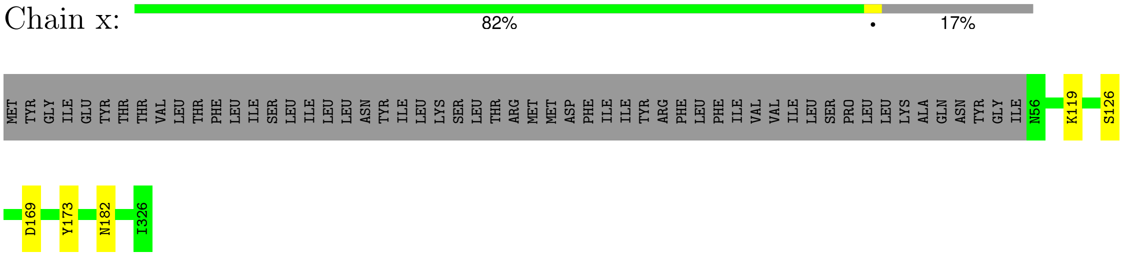
- Molecule 1: Outer capsid glycoprotein VP7

Chain w:



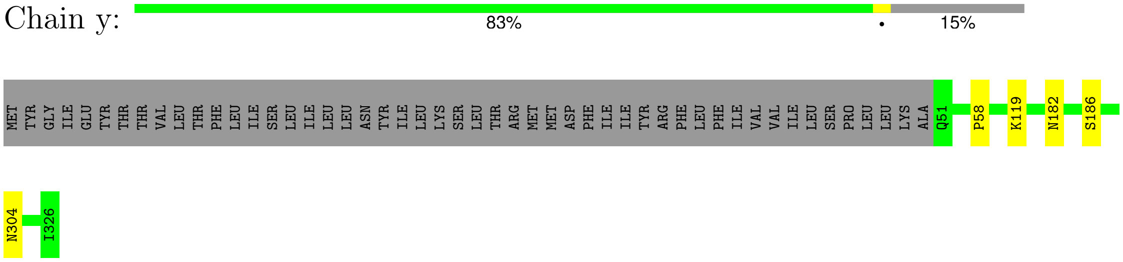
- Molecule 1: Outer capsid glycoprotein VP7

Chain x:



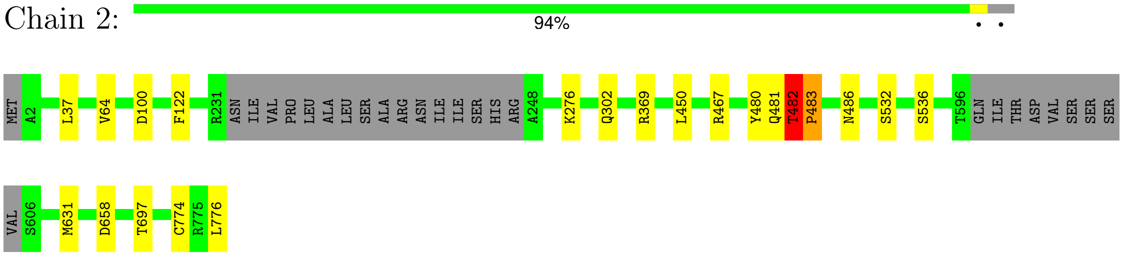
- Molecule 1: Outer capsid glycoprotein VP7

Chain y:

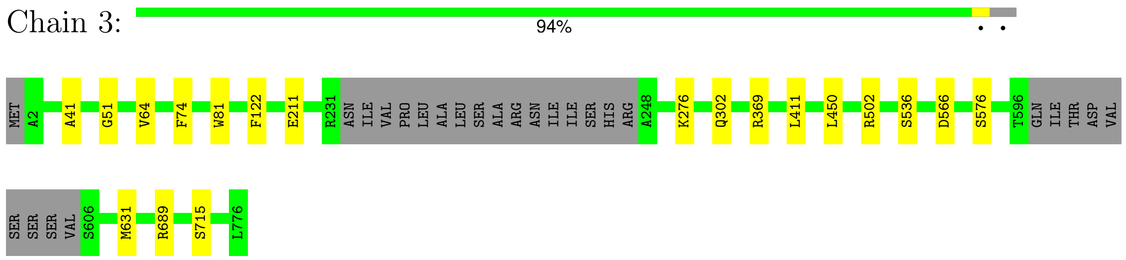


- Molecule 2: Outer capsid protein VP4

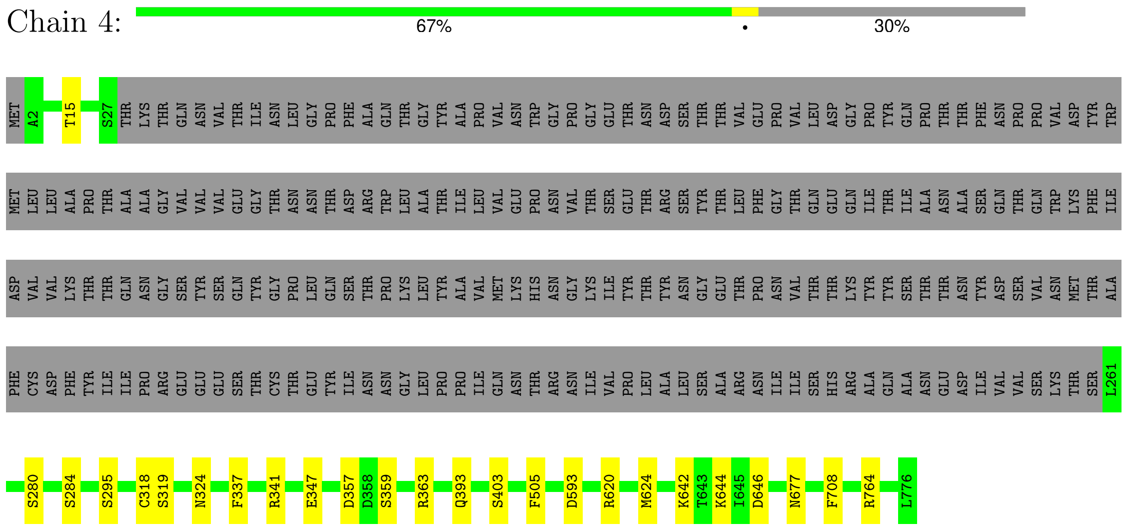
Chain 2:



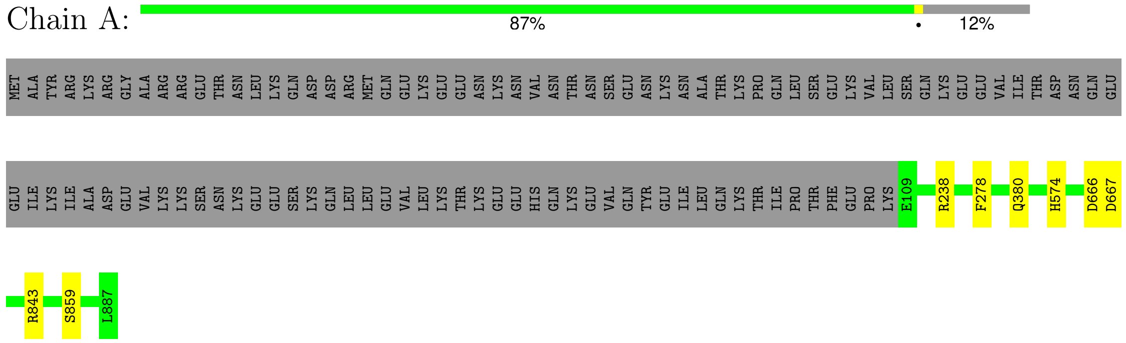
- Molecule 2: Outer capsid protein VP4



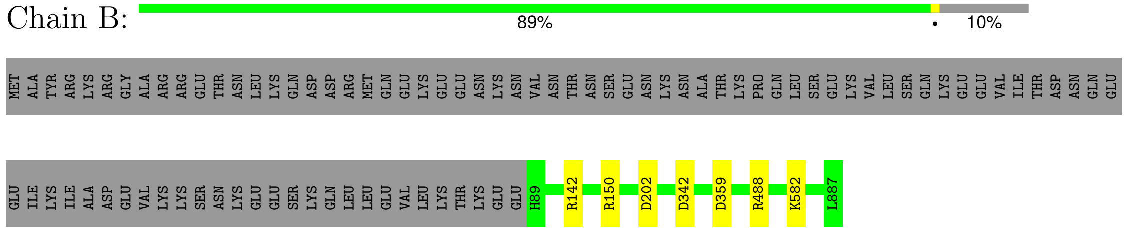
- Molecule 2: Outer capsid protein VP4



- Molecule 3: Inner capsid protein VP2

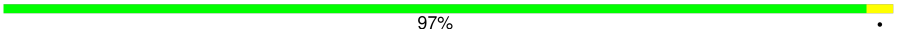


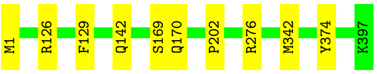
- Molecule 3: Inner capsid protein VP2



- Molecule 4: Intermediate capsid protein VP6

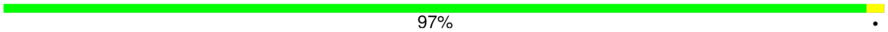
Chain C:

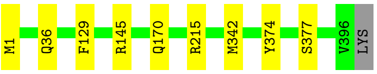




- Molecule 4: Intermediate capsid protein VP6

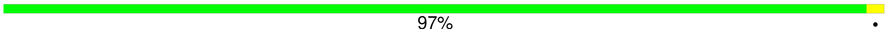
Chain D:

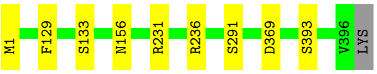




- Molecule 4: Intermediate capsid protein VP6

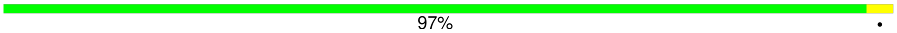
Chain E:

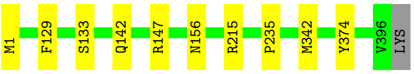




- Molecule 4: Intermediate capsid protein VP6

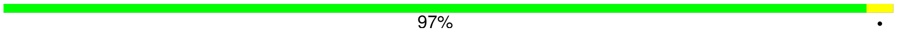
Chain F:

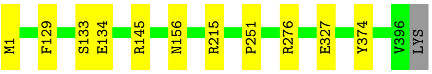




- Molecule 4: Intermediate capsid protein VP6

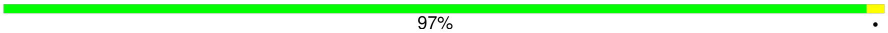
Chain G:

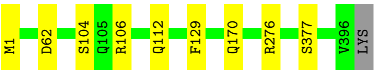




- Molecule 4: Intermediate capsid protein VP6

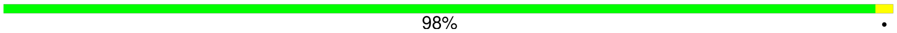
Chain H:

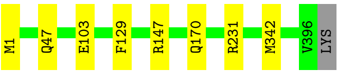




- Molecule 4: Intermediate capsid protein VP6

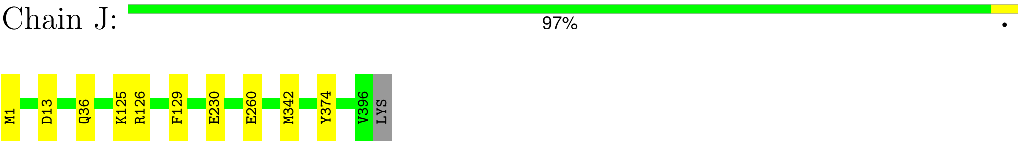
Chain I:





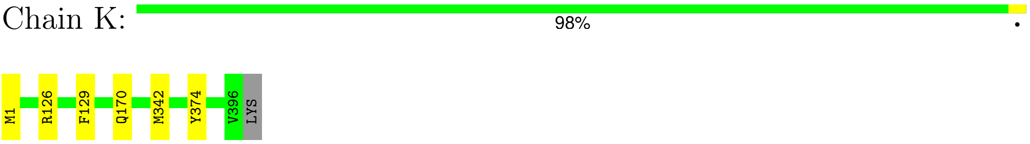
- Molecule 4: Intermediate capsid protein VP6

Chain J:



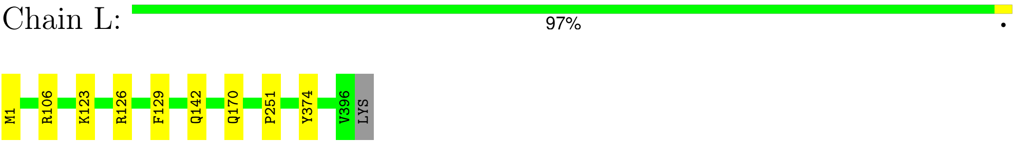
- Molecule 4: Intermediate capsid protein VP6

Chain K:



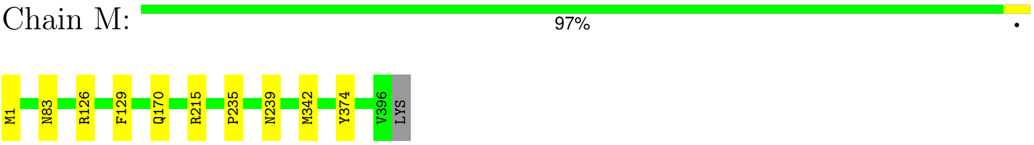
- Molecule 4: Intermediate capsid protein VP6

Chain L:



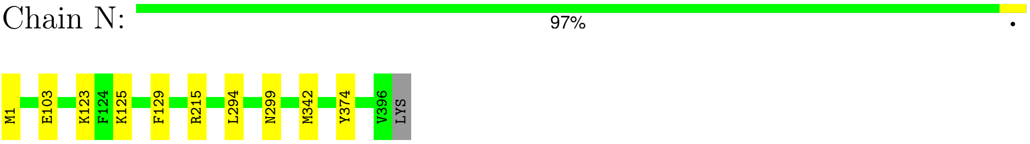
- Molecule 4: Intermediate capsid protein VP6

Chain M:



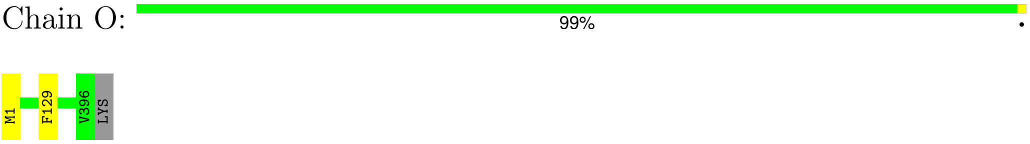
- Molecule 4: Intermediate capsid protein VP6

Chain N:



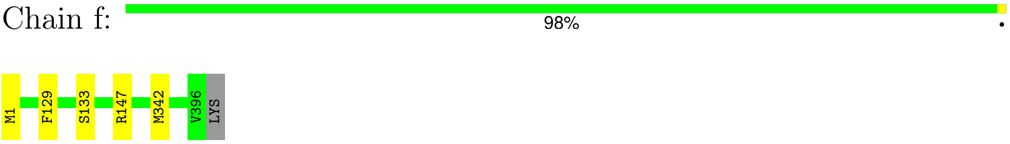
- Molecule 4: Intermediate capsid protein VP6

Chain O:



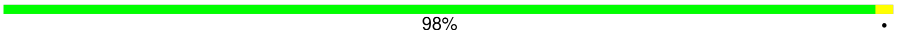
- Molecule 4: Intermediate capsid protein VP6

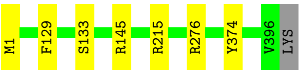
Chain f:



- Molecule 4: Intermediate capsid protein VP6

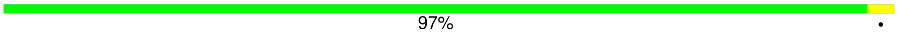
Chain g:

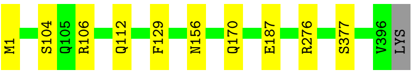




- Molecule 4: Intermediate capsid protein VP6

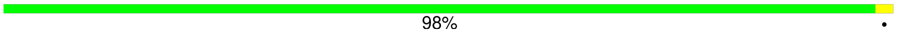
Chain h:

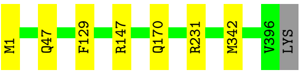




- Molecule 4: Intermediate capsid protein VP6

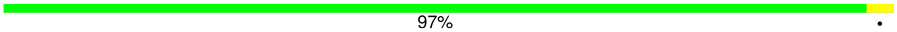
Chain i:

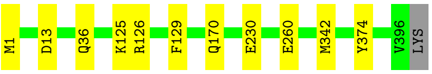




- Molecule 4: Intermediate capsid protein VP6

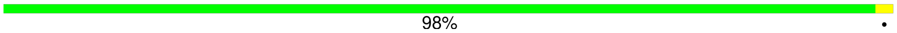
Chain j:

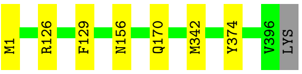




- Molecule 4: Intermediate capsid protein VP6

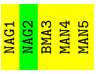
Chain k:





- Molecule 5: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain a:



4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	542965	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: BMA, NAG, ZN, CL, CA, MAN, FME

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
1	0	0.27	0/2234	0.49	0/3051
1	1	0.26	0/2128	0.47	0/2908
1	P	0.26	0/2128	0.47	0/2908
1	Q	0.27	0/2192	0.49	0/2994
1	R	0.27	0/2148	0.48	0/2932
1	S	0.26	0/2128	0.48	0/2908
1	T	0.26	0/2234	0.48	0/3051
1	U	0.26	0/2234	0.49	0/3051
1	V	0.27	0/2234	0.49	0/3051
1	W	0.26	0/2234	0.47	0/3051
1	X	0.26	0/2192	0.48	0/2994
1	Y	0.26	0/2234	0.48	0/3051
1	Z	0.27	0/2234	0.50	0/3051
1	t	0.27	0/2234	0.49	0/3051
1	u	0.27	0/2234	0.50	0/3051
1	v	0.26	0/2234	0.48	0/3051
1	w	0.26	0/2234	0.47	0/3051
1	x	0.26	0/2192	0.48	0/2994
1	y	0.26	0/2234	0.48	0/3051
2	2	0.27	0/6021	0.55	2/8192 (0.0%)
2	3	0.26	0/6021	0.54	0/8192
2	4	0.28	0/4343	0.57	0/5885
3	A	0.27	0/6477	0.50	0/8788
3	B	0.27	0/6655	0.50	0/9029
4	C	0.28	0/3224	0.53	0/4387
4	D	0.27	0/3215	0.53	0/4376
4	E	0.27	0/3215	0.52	0/4376
4	F	0.27	0/3215	0.53	0/4376
4	G	0.27	0/3215	0.52	0/4376
4	H	0.27	0/3215	0.53	0/4376
4	I	0.27	0/3215	0.53	0/4376
4	J	0.28	0/3215	0.53	0/4376

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
4	K	0.27	0/3215	0.52	0/4376
4	L	0.27	0/3215	0.52	0/4376
4	M	0.27	0/3215	0.53	0/4376
4	N	0.27	0/3215	0.53	0/4376
4	O	0.27	0/3215	0.53	0/4376
4	f	0.27	0/3215	0.53	0/4376
4	g	0.27	0/3215	0.52	0/4376
4	h	0.27	0/3215	0.52	0/4376
4	i	0.27	0/3215	0.53	0/4376
4	j	0.27	0/3215	0.53	0/4376
4	k	0.27	0/3215	0.52	0/4376
All	All	0.27	0/132527	0.51	2/180491 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	2	0	4
2	3	0	1
All	All	0	5

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	2	482	THR	C-N-CD	-6.01	107.37	120.60
2	2	483	PRO	CA-N-CD	-6.00	103.11	111.50

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	2	480	TYR	Peptide
2	2	481	GLN	Peptide
2	2	482	THR	Peptide
2	2	631	MET	Peptide
2	3	41	ALA	Peptide

5.2 Too-close contacts ⓘ

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

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	0	274/326 (84%)	266 (97%)	8 (3%)	0	100	100
1	1	262/326 (80%)	254 (97%)	8 (3%)	0	100	100
1	P	262/326 (80%)	254 (97%)	8 (3%)	0	100	100
1	Q	269/326 (82%)	264 (98%)	5 (2%)	0	100	100
1	R	262/326 (80%)	256 (98%)	6 (2%)	0	100	100
1	S	262/326 (80%)	252 (96%)	10 (4%)	0	100	100
1	T	274/326 (84%)	272 (99%)	2 (1%)	0	100	100
1	U	274/326 (84%)	262 (96%)	12 (4%)	0	100	100
1	V	274/326 (84%)	263 (96%)	11 (4%)	0	100	100
1	W	274/326 (84%)	270 (98%)	4 (2%)	0	100	100
1	X	269/326 (82%)	262 (97%)	7 (3%)	0	100	100
1	Y	274/326 (84%)	264 (96%)	10 (4%)	0	100	100
1	Z	274/326 (84%)	263 (96%)	11 (4%)	0	100	100
1	t	274/326 (84%)	269 (98%)	5 (2%)	0	100	100
1	u	274/326 (84%)	265 (97%)	9 (3%)	0	100	100
1	v	274/326 (84%)	263 (96%)	11 (4%)	0	100	100
1	w	274/326 (84%)	270 (98%)	4 (2%)	0	100	100
1	x	269/326 (82%)	264 (98%)	5 (2%)	0	100	100
1	y	274/326 (84%)	269 (98%)	5 (2%)	0	100	100
2	2	744/776 (96%)	681 (92%)	59 (8%)	4 (0%)	25	53
2	3	744/776 (96%)	689 (93%)	53 (7%)	2 (0%)	37	63

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	4	538/776 (69%)	500 (93%)	38 (7%)	0	100	100
3	A	777/887 (88%)	766 (99%)	11 (1%)	0	100	100
3	B	797/887 (90%)	782 (98%)	15 (2%)	0	100	100
4	C	395/397 (100%)	380 (96%)	15 (4%)	0	100	100
4	D	394/397 (99%)	387 (98%)	7 (2%)	0	100	100
4	E	394/397 (99%)	387 (98%)	7 (2%)	0	100	100
4	F	394/397 (99%)	387 (98%)	7 (2%)	0	100	100
4	G	394/397 (99%)	380 (96%)	14 (4%)	0	100	100
4	H	394/397 (99%)	385 (98%)	9 (2%)	0	100	100
4	I	394/397 (99%)	383 (97%)	11 (3%)	0	100	100
4	J	394/397 (99%)	385 (98%)	9 (2%)	0	100	100
4	K	394/397 (99%)	384 (98%)	10 (2%)	0	100	100
4	L	394/397 (99%)	387 (98%)	7 (2%)	0	100	100
4	M	394/397 (99%)	383 (97%)	11 (3%)	0	100	100
4	N	394/397 (99%)	387 (98%)	7 (2%)	0	100	100
4	O	394/397 (99%)	388 (98%)	6 (2%)	0	100	100
4	f	394/397 (99%)	381 (97%)	13 (3%)	0	100	100
4	g	394/397 (99%)	382 (97%)	12 (3%)	0	100	100
4	h	394/397 (99%)	387 (98%)	7 (2%)	0	100	100
4	i	394/397 (99%)	385 (98%)	9 (2%)	0	100	100
4	j	394/397 (99%)	383 (97%)	11 (3%)	0	100	100
4	k	394/397 (99%)	383 (97%)	11 (3%)	0	100	100
All	All	16230/17839 (91%)	15724 (97%)	500 (3%)	6 (0%)	100	100

5 of 6 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	2	64	VAL
2	2	482	THR
2	2	483	PRO
2	3	64	VAL
2	2	486	ASN

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	0	247/295 (84%)	242 (98%)	5 (2%)	50	78
1	1	237/295 (80%)	231 (98%)	6 (2%)	42	73
1	P	237/295 (80%)	235 (99%)	2 (1%)	79	92
1	Q	243/295 (82%)	240 (99%)	3 (1%)	67	87
1	R	238/295 (81%)	232 (98%)	6 (2%)	42	73
1	S	237/295 (80%)	234 (99%)	3 (1%)	65	86
1	T	247/295 (84%)	246 (100%)	1 (0%)	89	96
1	U	247/295 (84%)	240 (97%)	7 (3%)	38	70
1	V	247/295 (84%)	242 (98%)	5 (2%)	50	78
1	W	247/295 (84%)	246 (100%)	1 (0%)	89	96
1	X	243/295 (82%)	237 (98%)	6 (2%)	42	73
1	Y	247/295 (84%)	243 (98%)	4 (2%)	58	82
1	Z	247/295 (84%)	241 (98%)	6 (2%)	44	74
1	t	247/295 (84%)	246 (100%)	1 (0%)	89	96
1	u	247/295 (84%)	241 (98%)	6 (2%)	44	74
1	v	247/295 (84%)	243 (98%)	4 (2%)	58	82
1	w	247/295 (84%)	246 (100%)	1 (0%)	89	96
1	x	243/295 (82%)	238 (98%)	5 (2%)	48	76
1	y	247/295 (84%)	242 (98%)	5 (2%)	50	78
2	2	664/688 (96%)	650 (98%)	14 (2%)	48	76
2	3	664/688 (96%)	648 (98%)	16 (2%)	44	74
2	4	481/688 (70%)	456 (95%)	25 (5%)	19	47
3	A	715/818 (87%)	707 (99%)	8 (1%)	70	88
3	B	735/818 (90%)	728 (99%)	7 (1%)	73	90
4	C	349/349 (100%)	340 (97%)	9 (3%)	41	72
4	D	348/349 (100%)	340 (98%)	8 (2%)	45	75

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	E	348/349 (100%)	340 (98%)	8 (2%)	45	75
4	F	348/349 (100%)	339 (97%)	9 (3%)	41	72
4	G	348/349 (100%)	338 (97%)	10 (3%)	37	69
4	H	348/349 (100%)	340 (98%)	8 (2%)	45	75
4	I	348/349 (100%)	341 (98%)	7 (2%)	50	78
4	J	348/349 (100%)	339 (97%)	9 (3%)	41	72
4	K	348/349 (100%)	343 (99%)	5 (1%)	62	85
4	L	348/349 (100%)	340 (98%)	8 (2%)	45	75
4	M	348/349 (100%)	339 (97%)	9 (3%)	41	72
4	N	348/349 (100%)	339 (97%)	9 (3%)	41	72
4	O	348/349 (100%)	347 (100%)	1 (0%)	91	97
4	f	348/349 (100%)	344 (99%)	4 (1%)	70	88
4	g	348/349 (100%)	342 (98%)	6 (2%)	56	81
4	h	348/349 (100%)	339 (97%)	9 (3%)	41	72
4	i	348/349 (100%)	342 (98%)	6 (2%)	56	81
4	j	348/349 (100%)	338 (97%)	10 (3%)	37	69
4	k	348/349 (100%)	342 (98%)	6 (2%)	56	81
All	All	14514/15936 (91%)	14226 (98%)	288 (2%)	50	78

5 of 288 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	g	145	ARG
1	y	186	SER
4	h	129	PHE
4	k	126	ARG
4	D	377	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 18 such sidechains are listed below:

Mol	Chain	Res	Type
1	u	305	GLN
1	y	305	GLN
1	x	305	GLN
1	Y	305	GLN

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Mol	Chain	Res	Type
1	t	305	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

19 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	FME	H	1	4	8,9,10	0.38	0	8,9,11	1.00	1 (12%)
4	FME	E	1	4	8,9,10	0.37	0	8,9,11	1.01	1 (12%)
4	FME	N	1	4	8,9,10	0.36	0	8,9,11	1.02	1 (12%)
4	FME	F	1	4	8,9,10	0.37	0	8,9,11	1.02	1 (12%)
4	FME	D	1	4	8,9,10	0.36	0	8,9,11	1.07	1 (12%)
4	FME	C	1	4	8,9,10	0.37	0	8,9,11	1.03	1 (12%)
4	FME	L	1	4	8,9,10	0.36	0	8,9,11	1.04	1 (12%)
4	FME	O	1	4	8,9,10	0.37	0	8,9,11	1.01	1 (12%)
4	FME	f	1	4	8,9,10	0.37	0	8,9,11	1.01	1 (12%)
4	FME	j	1	4	8,9,10	0.38	0	8,9,11	0.99	1 (12%)
4	FME	K	1	4	8,9,10	0.37	0	8,9,11	1.02	1 (12%)
4	FME	h	1	4	8,9,10	0.37	0	8,9,11	0.99	1 (12%)
4	FME	G	1	4	8,9,10	0.36	0	8,9,11	1.02	1 (12%)
4	FME	i	1	4	8,9,10	0.38	0	8,9,11	0.96	1 (12%)
4	FME	M	1	4	8,9,10	0.37	0	8,9,11	0.95	1 (12%)
4	FME	k	1	4	8,9,10	0.37	0	8,9,11	1.00	1 (12%)
4	FME	J	1	4	8,9,10	0.37	0	8,9,11	0.99	1 (12%)
4	FME	I	1	4	8,9,10	0.38	0	8,9,11	0.95	1 (12%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
4	FME	g	1	4	8,9,10	0.37	0	8,9,11	0.96	1 (12%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	FME	H	1	4	-	1/7/9/11	-
4	FME	E	1	4	-	2/7/9/11	-
4	FME	N	1	4	-	1/7/9/11	-
4	FME	F	1	4	-	1/7/9/11	-
4	FME	D	1	4	-	1/7/9/11	-
4	FME	C	1	4	-	1/7/9/11	-
4	FME	L	1	4	-	1/7/9/11	-
4	FME	O	1	4	-	1/7/9/11	-
4	FME	f	1	4	-	1/7/9/11	-
4	FME	j	1	4	-	2/7/9/11	-
4	FME	K	1	4	-	1/7/9/11	-
4	FME	h	1	4	-	1/7/9/11	-
4	FME	G	1	4	-	1/7/9/11	-
4	FME	i	1	4	-	1/7/9/11	-
4	FME	M	1	4	-	2/7/9/11	-
4	FME	k	1	4	-	1/7/9/11	-
4	FME	J	1	4	-	1/7/9/11	-
4	FME	I	1	4	-	2/7/9/11	-
4	FME	g	1	4	-	2/7/9/11	-

There are no bond length outliers.

The worst 5 of 19 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	D	1	FME	CA-N-CN	2.46	126.60	122.82
4	C	1	FME	CA-N-CN	2.32	126.38	122.82
4	L	1	FME	CA-N-CN	2.31	126.37	122.82
4	N	1	FME	CA-N-CN	2.29	126.34	122.82
4	K	1	FME	CA-N-CN	2.27	126.32	122.82

There are no chirality outliers.

5 of 24 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	C	1	FME	O1-CN-N-CA
4	D	1	FME	O1-CN-N-CA
4	E	1	FME	O1-CN-N-CA
4	F	1	FME	O1-CN-N-CA
4	G	1	FME	O1-CN-N-CA

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates (i)

5 monosaccharides are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
5	NAG	a	1	1,5	14,14,15	0.71	0	17,19,21	1.04	1 (5%)
5	NAG	a	2	5	14,14,15	0.73	0	17,19,21	0.81	0
5	BMA	a	3	5	11,11,12	0.80	0	15,15,17	1.64	1 (6%)
5	MAN	a	4	5	11,11,12	0.75	0	15,15,17	1.01	1 (6%)
5	MAN	a	5	5	11,11,12	0.79	1 (9%)	15,15,17	1.11	1 (6%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	a	1	1,5	-	4/6/23/26	0/1/1/1
5	NAG	a	2	5	-	0/6/23/26	0/1/1/1
5	BMA	a	3	5	-	2/2/19/22	0/1/1/1
5	MAN	a	4	5	-	1/2/19/22	0/1/1/1
5	MAN	a	5	5	-	0/2/19/22	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	a	5	MAN	O5-C1	-2.00	1.40	1.43

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	a	3	BMA	C1-O5-C5	4.88	118.72	112.19
5	a	5	MAN	C1-O5-C5	2.78	115.91	112.19
5	a	4	MAN	C1-O5-C5	2.64	115.73	112.19
5	a	1	NAG	O5-C1-C2	-2.45	107.51	111.29

There are no chirality outliers.

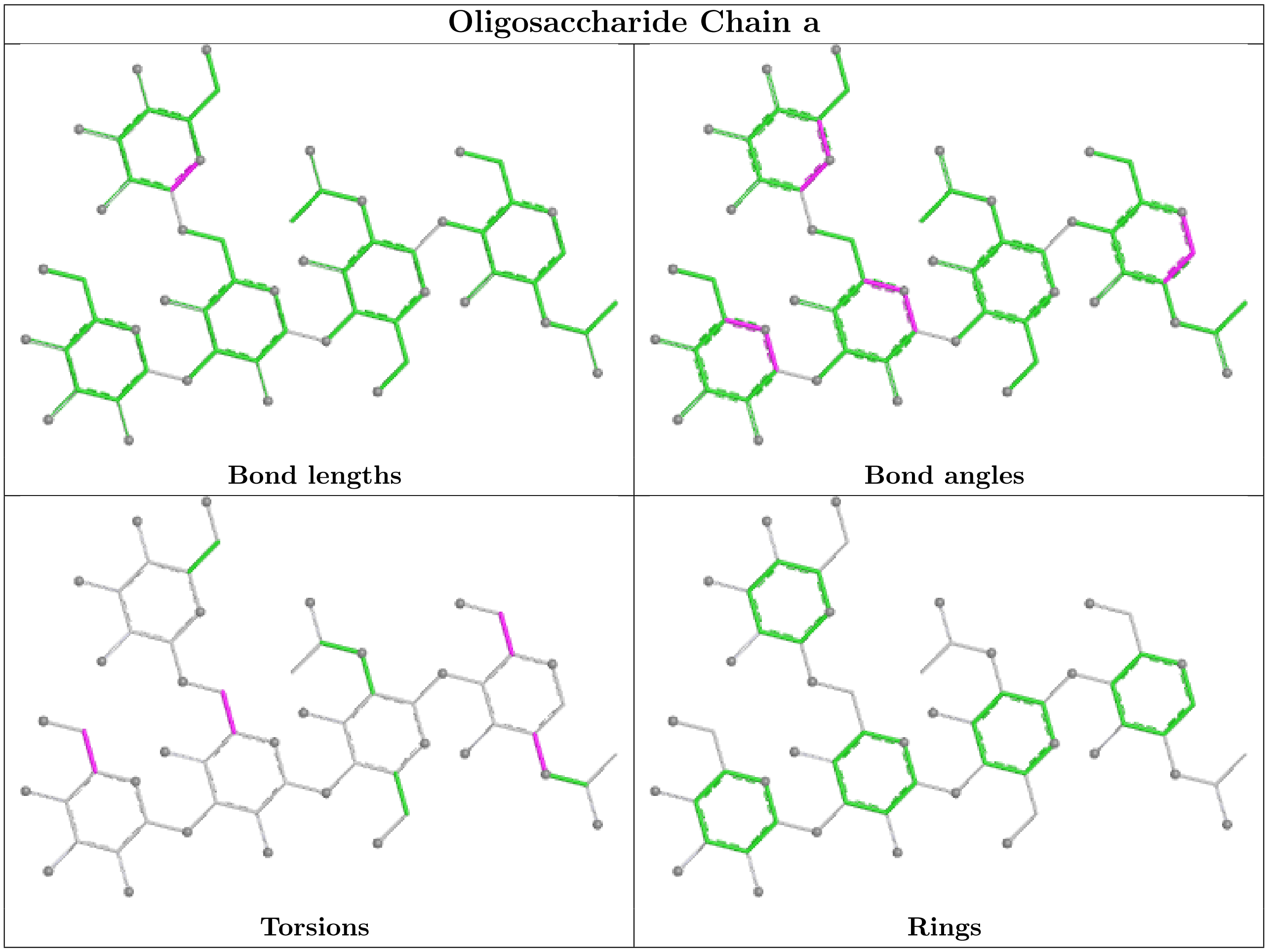
5 of 7 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	a	1	NAG	C1-C2-N2-C7
5	a	1	NAG	O5-C5-C6-O6
5	a	1	NAG	C4-C5-C6-O6
5	a	3	BMA	C4-C5-C6-O6
5	a	3	BMA	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.



5.6 Ligand geometry ⓘ

Of 126 ligands modelled in this entry, 109 are monoatomic - leaving 17 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
6	NAG	x	401	1	14,14,15	0.69	0	17,19,21	0.87	0
6	NAG	P	401	1	14,14,15	0.72	0	17,19,21	1.02	1 (5%)
6	NAG	0	401	1	14,14,15	0.67	0	17,19,21	0.96	1 (5%)
6	NAG	U	401	1	14,14,15	0.71	0	17,19,21	0.96	0
6	NAG	X	401	1	14,14,15	0.68	0	17,19,21	0.99	1 (5%)
6	NAG	Y	401	1	14,14,15	0.68	0	17,19,21	1.09	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
6	NAG	V	401	1	14,14,15	0.72	0	17,19,21	1.05	1 (5%)
6	NAG	t	401	1	14,14,15	0.72	0	17,19,21	0.87	0
6	NAG	v	401	1	14,14,15	0.71	0	17,19,21	0.97	1 (5%)
6	NAG	w	401	1	14,14,15	0.73	0	17,19,21	1.04	0
6	NAG	1	401	1	14,14,15	0.71	0	17,19,21	0.86	0
6	NAG	S	401	1	14,14,15	0.70	0	17,19,21	0.91	0
6	NAG	y	401	1	14,14,15	0.70	0	17,19,21	0.94	0
6	NAG	Q	401	1	14,14,15	0.72	0	17,19,21	0.88	0
6	NAG	Z	401	1	14,14,15	0.70	0	17,19,21	0.94	1 (5%)
6	NAG	T	401	1	14,14,15	0.71	0	17,19,21	0.91	0
6	NAG	u	401	1	14,14,15	0.71	0	17,19,21	1.36	2 (11%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	NAG	x	401	1	-	4/6/23/26	0/1/1/1
6	NAG	P	401	1	-	4/6/23/26	0/1/1/1
6	NAG	0	401	1	-	2/6/23/26	0/1/1/1
6	NAG	U	401	1	-	2/6/23/26	0/1/1/1
6	NAG	X	401	1	-	3/6/23/26	0/1/1/1
6	NAG	Y	401	1	-	2/6/23/26	0/1/1/1
6	NAG	V	401	1	-	4/6/23/26	0/1/1/1
6	NAG	t	401	1	-	4/6/23/26	0/1/1/1
6	NAG	v	401	1	-	2/6/23/26	0/1/1/1
6	NAG	w	401	1	-	4/6/23/26	0/1/1/1
6	NAG	1	401	1	-	2/6/23/26	0/1/1/1
6	NAG	S	401	1	-	4/6/23/26	0/1/1/1
6	NAG	y	401	1	-	2/6/23/26	0/1/1/1
6	NAG	Q	401	1	-	4/6/23/26	0/1/1/1
6	NAG	Z	401	1	-	4/6/23/26	0/1/1/1
6	NAG	T	401	1	-	2/6/23/26	0/1/1/1
6	NAG	u	401	1	-	3/6/23/26	0/1/1/1

There are no bond length outliers.

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	u	401	NAG	C2-N2-C7	3.51	127.60	122.90
6	P	401	NAG	O5-C1-C2	-2.56	107.34	111.29
6	u	401	NAG	O5-C1-C2	-2.56	107.34	111.29
6	V	401	NAG	O5-C1-C2	-2.29	107.75	111.29
6	X	401	NAG	O5-C1-C2	-2.24	107.83	111.29

There are no chirality outliers.

5 of 52 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	0	401	NAG	C1-C2-N2-C7
6	Y	401	NAG	C1-C2-N2-C7
6	u	401	NAG	C3-C2-N2-C7
6	u	401	NAG	O5-C5-C6-O6
6	P	401	NAG	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-45119. These allow visual inspection of the internal detail of the map and identification of artifacts.

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

6.1 Orthogonal projections ⓘ

This section was not generated.

6.2 Central slices ⓘ

This section was not generated.

6.3 Largest variance slices ⓘ

This section was not generated.

6.4 Orthogonal standard-deviation projections (False-color) ⓘ

This section was not generated.

6.5 Orthogonal surface views ⓘ

This section was not generated.

6.6 Mask visualisation ⓘ

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

7 Map analysis ⓘ

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

7.1 Map-value distribution ⓘ

This section was not generated.

7.2 Volume estimate versus contour level ⓘ

This section was not generated.

7.3 Rotationally averaged power spectrum ⓘ

This section was not generated. The rotationally averaged power spectrum had issues being displayed.

8 Fourier-Shell correlation

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

9 Map-model fit ⓘ

This section was not generated.