

wwPDB EM Validation Summary Report (i)

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)

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

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

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

The following versions of software and data (see references (1)) 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 (i)

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	$egin{array}{c} { m Whole \ archive}\ (\#{ m Entries}) \end{array}$	${f EM} {f structures} \ (\#{f Entries})$
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	83%	• 15%
1	1	326	79%	19%
1	Р	326	80% •	19%
1	Q	326	82%	17%
1	R	326	80% .	18%
1	S	326	80% •	19%
1	Т	326	84%	15%
1	U	326	83%	• 15%
1	V	326	83%	• 15%
1	W	326	84%	15%



Mol	Chain	Length	Quality of chain	
1	Х	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	у	326	83% •	15%
2	2	776	94%	
2	3	776	94%	
2	4	776	67% • 30%	
3	А	887	87%	12%
3	В	887	89%	• 10%
4	С	397	97%	
4	D	397	97%	
4	E	397	97%	
4	F	397	97%	
4	G	397	97%	
4	Н	397	97%	
4	T	397	98%	
4	.I	397	Q7%	
<u>т</u> Д	K	307	000/	•
- <u>+</u> /	T	307	30%	•
4	М	207	97%	•
4	IVI	391	9/%	•



Contr	nueu fron	i previous	puge
Mol	Chain	\mathbf{Length}	Quality of chain
4	Ν	397	97%
4	0	397	99%
4	f	397	98%
4	g	397	98%
4	h	397	97% •
4	i	397	98% .
4	j	397	97% •
4	k	397	98% •
5	a	5	20% 80%



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.

Mol	Chain	Residues			Atom	.S			AltConf	Trace
1	0	976	Total	С	Η	Ν	Ο	S	0	0
1	0	270	4312	1389	2124	348	435	16	0	0
1	1	0.04	Total	С	Η	Ν	0	S	0	0
	1	204	4108	1322	2023	329	418	16	0	0
1	р	964	Total	С	Η	Ν	0	S	0	0
	P	204	4108	1322	2023	329	418	16	0	0
1	0	971	Total	С	Η	Ν	0	S	0	0
1	Q	271	4234	1363	2087	341	427	16	0	0
1	р	266	Total	С	Η	Ν	0	S	0	0
1	n	200	4161	1338	2056	336	415	16	0	0
1	C	264	Total	С	Η	Ν	0	S	0	0
1	G	204	4108	1322	2023	329	418	16	0	0
1	т	976	Total	С	Η	Ν	0	S	0	0
	1	270	4312	1389	2124	348	435	16	0	0
1	TT	976	Total	С	Н	Ν	0	S	0	0
1	U	270	4312	1389	2124	348	435	16		0
1	V	976	Total	С	Н	Ν	0	S	0	0
1	v	270	4311	1389	2123	348	435	16	0	0
1	XX7	276	Total	С	Н	Ν	0	S	0	0
1	vv	270	4312	1389	2124	348	435	16	0	0
1	v	971	Total	С	Η	Ν	0	\mathbf{S}	0	0
1	Λ	271	4234	1363	2087	341	427	16	0	0
1	V	976	Total	С	Η	Ν	0	S	0	0
1	I	270	4312	1389	2124	348	435	16	0	0
1	7	976	Total	С	Η	Ν	0	S	0	0
1		270	4312	1389	2124	348	435	16	0	0
1	+	976	Total	С	Η	Ν	0	S	0	0
1	U	270	4312	1389	2124	348	435	16	0	0
1		976	Total	С	Η	Ν	0	S	0	0
	u	270	4312	1389	2124	348	435	16	0	0
1	77	976	Total	С	Н	Ν	Ο	\mathbf{S}	0	0
	v	270	4312	1389	2124	348	435	16	0	U
1	117	276	Total	С	Η	Ν	0	S	0	0
	W	270	4312	1389	2124	348	435	16		U

• Molecule 1 is a protein called Outer capsid glycoprotein VP7.



Mol	Chain	Residues		Atoms						Trace
1	37	971	Total	С	Η	Ν	0	\mathbf{S}	0	0
1 X	271	4234	1363	2087	341	427	16	0	0	
1	1	y 976	Total	С	Η	Ν	0	S	0	0
ı y	270	4312	1389	2124	348	435	16	0	U	

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

Mol	Chain	Residues			Atom	ıs			AltConf	Trace
9	2	750	Total	С	Η	Ν	Ο	S	0	0
	750	11654	3715	5753	990	1176	20	0	0	
0	2	750	Total	С	Η	Ν	Ο	S	0	0
	5	150	11655	3715	5754	990	1176	20	0	0
0	4	549	Total	С	Η	Ν	Ο	S	0	0
	4	042	8465	2681	4198	726	845	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



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	
2	Δ	A 779	Total	С	Η	Ν	Ο	S	0	0
J	A		12749	4041	6387	1098	1187	36	0	
9	D	700	Total	С	Η	Ν	Ο	S	0	0
3	3 B 799	199	13098	4154	6563	1126	1219	36		U

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

Mol	Chain	Residues			Atom	.S			AltConf	Trace
4	C	207	Total	С	Η	Ν	0	S	0	0
4	U	397	6275	2005	3111	551	593	15	0	0
4	р	206	Total	С	Н	Ν	0	S	0	0
4	D	390	6253	1999	3098	549	592	15	0	0
4	F	206	Total	С	Η	Ν	0	S	0	0
4	Ľ	390	6253	1999	3098	549	592	15	0	0
4	F	306	Total	С	Η	Ν	0	S	0	0
4	I.	590	6253	1999	3098	549	592	15	0	0
4	C	206	Total	С	Η	Ν	0	S	0	0
4	G	390	6253	1999	3098	549	592	15		0
4	п	Н 396	Total	С	Η	Ν	0	S	0	0
4	11		6253	1999	3098	549	592	15	0	0
4	т	306	Total	С	Η	Ν	0	S	0	0
4	1	390	6253	1999	3098	549	592	15	0	0
4	т	306	Total	С	Η	Ν	0	S	0	0
4	J	590	6253	1999	3098	549	592	15	0	0
4	K	306	Total	С	Η	Ν	0	S	0	0
4	Γ	590	6253	1999	3098	549	592	15	0	0
4	т	306	Total	С	Η	Ν	0	S	0	0
4		590	6253	1999	3098	549	592	15	0	0
4	М	306	Total	С	Η	Ν	0	S	0	0
4	111	M 390	6253	1999	3098	549	592	15	U	U
4	N	306	Total	С	Η	Ν	0	S	0	0
4	1 N	396	6253	1999	3098	549	592	15		0



Mol	Chain	Residues			Atom	.s			AltConf	Trace
4	0	206	Total	С	Н	Ν	0	S	0	0
4	+ U	- 390	6253	1999	3098	549	592	15	0	0
4	f	206	Total	С	Н	Ν	0	S	0	0
4	1	- 590	6253	1999	3098	549	592	15	0	0
4	C.	206	Total	С	Η	Ν	0	S	0	0
4 g	- 590	6253	1999	3098	549	592	15	0	0	
4	4 h	h 396	Total	С	Η	Ν	0	S	0	0
4	11		6253	1999	3098	549	592	15		0
4	i	306	Total	С	Η	Ν	0	\mathbf{S}	0	0
4	1	590	6253	1999	3098	549	592	15	0	0
4	i	306	Total	С	Η	Ν	0	S	0	0
4	4 J	390	6253	1999	3098	549	592	15	0	0
4	k	306	Total	Ċ	H	N	0	S	0	0
4	4 k	396	6253	1999	3098	549	592	15		0

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



Mol	Chain	Residues		At	\mathbf{oms}			AltConf	Trace
5	a	5	Total 114	C 34	Н 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
C	0	1	Total	С	Η	Ν	0	0
0	0	1	28	8	14	1	5	0
C	1	1	Total	С	Η	Ν	0	0
0	1	1	28	8	14	1	5	0
C	р	1	Total	С	Η	Ν	Ο	0
0	P	1	28	8	14	1	5	0
G	0	1	Total	С	Η	Ν	Ο	0
0	Q	L	28	8	14	1	5	0
6	C	1	Total	С	Η	Ν	Ο	0
0	S	L	28	8	14	1	5	0
6	т	1	Total	С	Η	Ν	0	0
0	1	L	28	8	14	1	5	0
6	T	1	Total	С	Η	Ν	0	0
0	U	T	28	8	14	1	5	0
6	V	1	Total	С	Η	Ν	Ο	0
0	v	T	28	8	14	1	5	0
6	v	1	Total	С	Η	Ν	Ο	0
0	1	I	28	8	14	1	5	0
6	v	1	Total	С	Η	Ν	Ο	0
0	T	T	28	8	14	1	5	0
6	7	1	Total	С	Η	Ν	Ο	0
0		T	28	8	14	1	5	0
6	+	1	Total	С	Η	Ν	Ο	0
0	U	I	28	8	14	1	5	0
6	11	1	Total	С	Η	Ν	Ο	0
	u	1	28	8	14	1	5	0
6	v	1	Total	С	Η	Ν	0	0
0 V		28	8	14	1	5		



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Mol	Chain	Residues	Atoms				AltConf	
C		1	Total	С	Η	Ν	Ο	0
0	W	L	28	8	14	1	5	0
6		1	Total	С	Η	Ν	Ο	0
0	X	L	28	8	14	1	5	0
6	У	1	Total	С	Η	Ν	Ο	0
		у 1	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	Р	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	Т	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	Х	4	Total Ca 4 4	0
7	Y	4	Total Ca 4 4	0
7	Ζ	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	х	4	Total Ca 4 4	0
7	У	4	Total Ca 4 4	0

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

Mol	Chain	Residues	Atoms	AltConf
8	С	2	Total Zn 2 2	0
8	D	1	Total Zn 1 1	0
8	Е	1	Total Zn 1 1	0
8	F	2	Total Zn 2 2	0
8	G	1	Total Zn 1 1	0
8	Н	1	Total Zn 1 1	0
8	Ι	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	М	1	Total Zn 1 1	0
8	Ν	1	Total Zn 1 1	0
8	О	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 Zn 2 2	0
8	j	1	Total Zn 1 1	0
8	k	1	Total Zn 1 1	0

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

Mol	Chain	Residues	Atoms	AltConf
9	С	1	Total Cl 1 1	0
9	F	1	Total Cl 1 1	0
9	J	1	Total Cl 1 1	0
9	М	1	Total Cl 1 1	0
9	Ο	1	Total Cl 1 1	0
9	h	1	Total Cl 1 1	0
9	j	1	Total Cl 1 1	0



3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: Outer capsid glycoprotein VP7

Chain 0:	83% •	15%	
MET TYR GLY GLV GLU THR THR	VILLA VILLA LEU LEU LEU LEU LEU LEU LEU LEU LEU LEU	ALA Q51 L83 E92	L172 N182
S266			
• Molecule	e 1: Outer capsid glycoprotein VP7		
Chain 1:	79% .	19%	
MET TYR GLY ILE GLU TYR THR	VILL VILL LEU LEU LEU LEU LEU LEU LEU LEU LEU L	ALA Q51 K119 L158 L158	N182 K251
D274 Q294 S314 ARG SER I FUI	ALM SER ALA ALA ALA ALA ALA ALA IT TYR ARG ILE		
• Molecule	e 1: Outer capsid glycoprotein VP7		
Chain P:	80% •	19%	
MET TYR GLY GLU GLU TYR THR THR	VAL VAL THR PHE ILEU ILEU ILEU ILEU ILEU ILEU ILEU ARG ARG ARG ARG ARG ARG ARG ARG ARG ARG	ALA Q51 L158 R255	<mark>S314</mark> ARG SER LEU
ASN SER ALA ALA PHE TYR TYR	TLE		
• Molecule	e 1: Outer capsid glycoprotein VP7		
Chain Q:	82%	17%	
MET TYR GLY JLE GLU TYR THR	VILLA VILLA LEU LEU LEU LEU LEU LEU LEU LEU LEU LEU	ALA GLN ASN TYR GLY ILE ILE	D179 N182



• Molecule 1:	Outer capsid glycoprotein VP7		
Chain R:	80%	• 18%	-
MET TYR GLY CLU CLU CLU TYR THR VAL LEU	THR PHE LEU TLE TLE TLE TLE TLE TTE TTE TTE TTE TTE	11.E VAL VAL 11.E 11.E 11.E 11.E PRO E.EU 1.EU 1.EU 1.EU 1.EU 1.EU 1.F 1.A 4.6 4.6 4.6 4.6 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7	ALA ASN SER THR GLN GLU
GLU THR PHE E92 N182 N182 D238	C2 14 0 28 13 26 13 26		
• Molecule 1:	Outer capsid glycoprotein VP7		
Chain S:	80%	• 19%	-
MET TYR GLY ILE CLU CLU TYR THR VAL LEU	THR THR LEU LEU LEU LEU LEU LEU LEU LEU LEU LEU	LLE VAL VAL VAL ILE EEU FRO FRO FRO FRO FRO FRO FRO FRO FRO FRO	N182 R255 S314 ARG
SER LEU ASN ALA ALA PHE TYR TYR ARG	IIE		
• Molecule 1:	Outer capsid glycoprotein VP7		
Chain T:	84%	15%	
MET TYR GLY ILE GLU TYR THR THR VAL LEU	THR THR LLEU LLEU LLEU LLEU LLEU LLEU LLEU LLE	ILE VAL VAL TLEU ILEU ELEU LYS ALA ALA ALA C244 C244	I326
• Molecule 1:	Outer capsid glycoprotein VP7		
Chain U:	83%	• 15%	-
MET TYR GLY GLV GLU TYR THR THR VAL LEU	THR PHE LEU ILEU ILEU ILEU ILEU ILEU ILEU LEU LEU NAC NAC ILEU NAC ILEU NAC ILEU NAC ILEU NAC ILEU NAC ILEU NAC ILEU ILEU ASSI ASSI ASSI ASSI ASSI ASSI ASSI ASS	ILE VAL VAL ILEU ILEU LEU LEU LEU LEU LYS ALA ALA ALA ALA S62	N182 T210 D238
E282 L317 V323 L326 L326			
• Molecule 1:	Outer capsid glycoprotein VP7		
Chain V:	83%	• 15%	-
MET TYR GLY ILE GLU CLU TYR THR THR VAL LEU	THR PHE LLEU SER SER LLEU LLEU LLEU LLEU LLEU LLEU ASP ASP MET ASP ASP MET ASP ASP PHE TTR ASP PHE TLE TLE TLE TLE TLE TLE	LLE VAL VAL VAL LLEU LLEU LLEU LLEU LLEU LLEU LLA ALA ALA ALA	N94 C244 N304
T326			
• Molecule 1:	Outer capsid glycoprotein VP7		

Chain W:

84%



15%

MET TYR CLY CLU CLU CLU CLU CLU CLU CLU CLU CLEU CLE
• Molecule 1: Outer capsid glycoprotein VP7
Chain X: 81% · 17%
MET TYR TYR TYR THR THR THR THR THR THR THR THR THR TH
P131 1132 1132 1132 1132 1132 1132 1132
• Molecule 1: Outer capsid glycoprotein VP7
Chain Y: 83% • 15%
MET TYR TYR TYR TYR THR THR THR THR THR THR THR THR THR TH
• Molecule 1: Outer capsid glycoprotein VP7
Chain Z: 83% • 15%
Chain Z: 83% 15%
Chain Z: 83% 15%
Chain Z: 83% 15% Image: State of the s
Chain Z: 83% 15% Image: Image
Chain Z: 83% 15% Image: Im
Chain Z: 83% 15% Image: Im
Chain Z: 83% 15% ####################################
Chain Z: 83% 15% ####################################



• Molecule 1: C	Outer capsid glycoprotein VP7	
Chain v:	83%	• 15%
MET TYR GLY GLU GLU THR THR THR THR THR THR	PHE LEU LEU LEU LEU LEU LEU LEU LEU LEU LE	LEU SER PRO LEU LEU LEU LEU LEU LYS ALA 651 651 651 8182 8182 8182 8182 8182 8182 8182 81
I326		
• Molecule 1: C	Outer capsid glycoprotein VP7	
Chain w:	84%	15%
MET TYR GLY GLU TYR THR THR VAL LEU LEU	PHE LLEU LLEU LLEU LLEU LLEU LLEU LLEU LL	LEU ERU PRO PRO LUEU LUEU LUEU LLEU ALA ALA ALA 1326 I326
• Molecule 1: C	Outer capsid glycoprotein VP7	
Chain x:	82%	• 17%
MET TYR GLY GLU GLU THR THR VAL LEU THR	PHE LLEU TLEU TLEU TLEU TLEU LLEU LLEU LLE	LEU BER PRO LEU LEU LEU LEU ALA ALA ALA ALA ALA ALA ALA ALA ALA AL
D169 Y173 N182 I326		
• Molecule 1: C	Outer capsid glycoprotein VP7	
Chain y:	83%	• 15%
MET TYR GLY CLL CLL CLU THR THR THR LLEU THR	PHE LLEU SER SER LLEU LLEU LLEU LLEU LLEU LLEU LLEU LL	LEU PRO LEU LEU LEU ALA ALA ALA ALA ALA S186 S186 S186 S186 S186
204 206		
• Molecule 2: (Duter capsid protein VP4	
Chain 2:		
	^{0,+0}	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
ME DI DI FI	RS LEBRA ALL ALL ARR ARR ARR ARR ARR ARR ARR A	P4 N4 N4 N4 N4 N4 N4 N4 N4 N2 N5 N5 N5 N5 N5 N5 N5 N5 N5 N5 N5 N5 N5
VAL S606 M631 M631 D658 T697 T697 T775	L776	

• Molecule 2: Outer capsid protein VP4



Chain 3:	94%	• •
MET A2 A41 G5 <u>1</u>	V64 F74 F74 W81 F122 E311 E311 E311 F122 F122 E311 F122 F122 F122 F122 F122 F122 F122 F	D566 S576 S576 GLM THR THR ASP VAL
SER SER SER VAL S606	16531 8715 11776	
• Molecu	ule 2: Outer capsid protein VP4	
Chain 4:	: 67% · 30%	
MET A2 T15 S27	THR THR THR THR THR VAL ASN ASN ASN ASN ASN ASN ASN ASN ASN ASN	PKU THR PHE ASN PRO PRO PRO VAL ASP TYR TYR
MET LEU LEU ALA PRO THR	ALA ALA CLA CLA CLA CLA CLA CLA CLA CLA	ALIA ASIN ALIA SER GLN THP CLN TRP LYS PHE ILE
ASP VAL VAL LYS THR THR	GLN GLN GLY SER TTR SER CLY CLU CLU CLU CLU CLU CLU CLU CLU CLU CLU	LHK THR ASN ASP ASP SER VAL ASN MET ALA
PHE CYS ASP PHE TYR ILE	TILE PILE ARG OLUU OLUU OLUU OLUU OLUU OLUU OLUU TTRR ARSN ARSN ARSN ARSN ARSN ARSN ARSN AR	ASN GLU ASP ILE VAL VAL VAL SER LYS SER SER SER
S280 S284 S284 S295	C318 C318 C318 C318 C319 C337 F337 F337 F337 C3359 C347 C347 C345 C355 C355 C355 C355 C355 C355 C355	
• Molecu	ule 3: Inner capsid protein VP2	
Chain A	.: 87% .	12%
MET ALA TYR ARG LYS ARG	GLY ARG ARG ARG CLU ARN CLU ARN ARG ARG ARG ARG ARG ARG ARG ARG ARG ARG	GLN LYS GLU GLU VAL THR ASP ASP GLN GLN
GLU ILE LYS ILE ALA ASP	CLU VAL LYS LYS SER SER ASN ASN ASN ASN ASN CLU CLU CLU CLU CLU CLU CLU CLU CLU CLU	R238 F278 Q380 H574 D666 D666
R843 859 L887		
• Molecu	ule 3: Inner capsid protein VP2	
Chain B	: 89%	• 10%
MET ALA TYR ARG LYS ARG	ALA ARG ARG ARG CLIN CLIN CLIN CLIN ARG ARG ARG ARG ARG ARG ARG ARG ARG ARG	GLU LYS GLU GLU GLU THR ASP ASP GLN GLN
GLU ILE LYS ILE ALA ASP	0.1U VAL LYS SER ASN ASN ASN ASN ASN ASN ASN ASN ASN ASN	
• Molect	ule 4: Intermediate capsid protein VP6	



Chain C: 97% • Molecule 4: Intermediate capsid protein VP6 Chain D: 97% • Molecule 4: Intermediate capsid protein VP6 Chain E: 97% • Molecule 4: Intermediate capsid protein VP6 Chain F: 97% R14 S10 01⁴ • Molecule 4: Intermediate capsid protein VP6 Chain G: 97% • Molecule 4: Intermediate capsid protein VP6 Chain H: 97% • Molecule 4: Intermediate capsid protein VP6 Chain I: 98%

• Molecule 4: Intermediate capsid protein VP6



Chain J: 97% • Molecule 4: Intermediate capsid protein VP6 Chain K: 98% • Molecule 4: Intermediate capsid protein VP6 Chain L: 97% • Molecule 4: Intermediate capsid protein VP6 Chain M: 97% R126 F129 Q1. • Molecule 4: Intermediate capsid protein VP6 Chain N: 97% • Molecule 4: Intermediate capsid protein VP6 Chain O: 99% • Molecule 4: Intermediate capsid protein VP6 Chain f: 98%

• Molecule 4: Intermediate capsid protein VP6



Chain g:



• Molecule 4: Intermediate capsid protein VP6

Chain h: 97% ·

98%

 \bullet Molecule 4: Intermediate capsid protein VP6

Chain i: 98% •

• Molecule 4: Intermediate capsid protein VP6

 Chain j:
 97%

 Image: Second second

Chain k: 98% .



 \bullet 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:	20%	80%
NAG1 NAG2 BMA3 MAN4 MAN5 MAN5		



4 Experimental information (i)

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	Depositor
	CORRECTION	
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{\AA}^2)$	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 $(6k \ge 4k)$	Depositor



5 Model quality (i)

5.1 Standard geometry (i)

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).

Mal	Chain	Bond	lengths	B	ond angles
	Ullalli	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	Р	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	Т	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	Х	0.26	0/2192	0.48	0/2994
1	Y	0.26	0/2234	0.48	0/3051
1	Ζ	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	Х	0.26	0/2192	0.48	0/2994
1	У	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	А	0.27	0/6477	0.50	0/8788
3	В	0.27	0/6655	0.50	0/9029
4	С	0.28	0/3224	0.53	0/4387
4	D	0.27	0/3215	0.53	0/4376
4	Е	0.27	0/3215	0.52	0/4376
4	F	0.27	$0/3\overline{215}$	0.53	$0/4\overline{376}$
4	G	0.27	0/3215	0.52	0/4376
4	Н	0.27	0/3215	0.53	0/4376
4	Ι	0.27	0/3215	0.53	0/4376
4	J	0.28	0/3215	0.53	0/4376



Mal	Chain	Bond lengths		Bond angles	
		RMSZ	# Z > 5	RMSZ	# Z > 5
4	Κ	0.27	0/3215	0.52	0/4376
4	L	0.27	0/3215	0.52	0/4376
4	М	0.27	0/3215	0.53	0/4376
4	Ν	0.27	0/3215	0.53	0/4376
4	0	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 (i)

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

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Perce	entiles
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	Р	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	Т	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	х	269/326~(82%)	264 (98%)	5 (2%)	0	100	100
1	У	$\overline{274/326}\ (84\%)$	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



\mathbf{Mol}	Chain	Analysed	Favoured	Allowed	Outliers	Perce	entiles
2	4	538/776~(69%)	500~(93%)	38 (7%)	0	100	100
3	А	777/887~(88%)	766~(99%)	11 (1%)	0	100	100
3	В	797/887~(90%)	782~(98%)	15 (2%)	0	100	100
4	С	395/397~(100%)	380~(96%)	15 (4%)	0	100	100
4	D	394/397~(99%)	387~(98%)	7 (2%)	0	100	100
4	Е	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	Н	394/397~(99%)	385~(98%)	9 (2%)	0	100	100
4	Ι	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	М	394/397~(99%)	383~(97%)	11 (3%)	0	100	100
4	Ν	394/397~(99%)	387~(98%)	7 (2%)	0	100	100
4	Ο	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 (i)

In the following table, the Percentiles column shows the percent side chain 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 side chain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Analysed Rotameric		Percentiles	
1	0	247/295~(84%)	242 (98%)	5(2%)	50	78
1	1	237/295~(80%)	231~(98%)	6(2%)	42	73
1	Р	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	Т	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	Х	243/295~(82%)	237~(98%)	6 (2%)	42	73
1	Y	247/295~(84%)	243 (98%)	4 (2%)	58	82
1	Ζ	247/295~(84%)	241 (98%)	6 (2%)	44	74
1	\mathbf{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	х	243/295~(82%)	238 (98%)	5 (2%)	48	76
1	У	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	А	715/818~(87%)	707~(99%)	8 (1%)	70	88
3	В	$\overline{735/818}\ (90\%)$	728 (99%)	7 (1%)	73	90
4	С	349/349~(100%)	340 (97%)	9 (3%)	41	72
4	D	348/349~(100%)	340 (98%)	8 (2%)	45	75



Mol	Chain	Analysed	Rotameric	Outliers	Perce	ntiles
4	Ε	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	Н	348/349~(100%)	340~(98%)	8 (2%)	45	75
4	Ι	348/349~(100%)	341~(98%)	7(2%)	50	78
4	J	348/349~(100%)	339~(97%)	9(3%)	41	72
4	Κ	348/349~(100%)	343~(99%)	5 (1%)	62	85
4	L	348/349~(100%)	340~(98%)	8 (2%)	45	75
4	М	348/349~(100%)	339~(97%)	9(3%)	41	72
4	Ν	348/349~(100%)	339~(97%)	9~(3%)	41	72
4	Ο	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%)	$3\overline{38}\ (97\%)$	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 side chain are listed below:

Mol	Chain	\mathbf{Res}	Type
4	g	145	ARG
1	у	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	у	305	GLN
1	Х	305	GLN
1	Y	305	GLN



Continued from previous page...

Mol	Chain	Res	Type
1	t	305	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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).

Mal	Tuno	Chain	Dog	Link	B	ond leng	gths	Bond angles		
	туре	Unam	nes		Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	FME	Н	1	4	8,9,10	0.38	0	8,9,11	1.00	1 (12%)
4	FME	Е	1	4	8,9,10	0.37	0	8,9,11	1.01	1 (12%)
4	FME	Ν	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	С	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	0	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	М	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	Ι	1	4	8,9,10	0.38	0	8,9,11	0.95	1 (12%)



Mol Type	Tuno	Chain	Dog	Tink	B	ond leng	gths	В	ond ang	gles
	Type		nes	LIIIK	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	Н	1	4	-	1/7/9/11	-
4	FME	Е	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	С	1	4	-	1/7/9/11	-
4	FME	L	1	4	-	1/7/9/11	-
4	FME	0	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	Κ	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	М	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	Ι	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	$\mathbf{Observed}(^{o})$	$Ideal(^{o})$
4	D	1	FME	CA-N-CN	2.46	126.60	122.82
4	С	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	Κ	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	С	1	FME	O1-CN-N-CA
4	D	1	FME	O1-CN-N-CA
4	Е	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).

Mal	True	Chain	Dec	Link	Bo	ond leng	$_{\rm ths}$	Bond angles		
	Type	Chain	nes		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



$\Delta 11$ ((1)	hond	longth	outliers	aro	listed	helow	
AII ((L)	Dona	length	outners	are	nsteu	below.	

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	$\operatorname{Ideal}(\operatorname{\AA})$
5	а	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 (i)

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).

Mal	Turne	e Chain Res		Tink	Bo	ond leng	$_{\rm ths}$	В	ond ang	les
	туре	Unain	nes	Res Link	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	Р	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	Х	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%)



Mal	Turne	Chain	Dec	Tink	Bo	ond leng	ths	Bond angles		
WIOI	туре	Unain	nes		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	У	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	Т	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	х	401	1	-	4/6/23/26	0/1/1/1
6	NAG	Р	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	Х	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	У	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	Т	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.



Mol	Chain	Res	Type	Atoms	Z	$Observed(^{o})$	$Ideal(^{o})$
6	u	401	NAG	C2-N2-C7	3.51	127.60	122.90
6	Р	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	Х	401	NAG	O5-C1-C2	-2.24	107.83	111.29

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

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	Р	401	NAG	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

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-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 (i)

This section was not generated.

6.2 Central slices (i)

This section was not generated.

6.3 Largest variance slices (i)

This section was not generated.

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

This section was not generated.

6.5 Orthogonal surface views (i)

This section was not generated.

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)

This section was not generated.

7.2 Volume estimate versus contour level (i)

This section was not generated.

7.3 Rotationally averaged power spectrum (i)

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



8 Fourier-Shell correlation (i)

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



9 Map-model fit (i)

This section was not generated.

