

## wwPDB EM Validation Summary Report (i)

Sep 28, 2024 – 07:57 am BST

PDB ID : 9G3Y

EMDB ID : EMD-51018

Title : Structure of the Native CMG-decorated gamma-Tubulin Ring Complex from

Pig Brain

Authors: Munoz-Hernandez, H.; Wieczorek, M.

Deposited on : 2024-07-12

Resolution : 6.80 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.dev113

MolProbity: 4.02b-467

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)

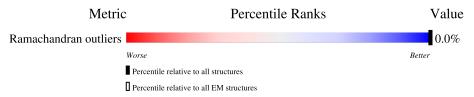
Validation Pipeline (wwPDB-VP) : 2.39

### 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 6.80 Å.

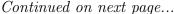
Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive $(\# \text{Entries})$	${ m EM~structures} \ (\#{ m Entries})$
	(11)	(11
Ramachandran outliers	207382	16835

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

Mol	Chain	Length	Quality of chain	
1	A	905	75%	25%
1	С	905	88%	12%
1	Е	905	88%	12%
1	G	905	88%	12%
1	M	905	86%	14%
2	В	910	68%	32%
2	D	910	68%	32%
2	F	910	68%	32%
2	Н	910	81%	19%
2	N	910	30% 79%	21%
3	I	667	91%	9%





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Mol	Chain	Length	Quality of chain	
3	K	667	91%	9%
4	J	1061	59% 41'	<b>%</b>
5	L	1715	46% 54%	
6	О	79	63% 85%	15%
6	P	79	•	
			85% •	15%
6	Q	79	81%	19%
7	V	155	29% 71%	
7	W	155	29% 71%	
7	X	155	29% 71%	
7	Y	155	33% 67%	
8	a	451	98%	
8	b	451	98%	
8	c	451	98%	
8	d	451	94%	6%
8				076
	e	451	96%	· ·
8	f	451	96%	•
8	g	451	96%	·
8	h	451	97%	
8	i	451	97%	·
8	j	451	97%	•
8	k	451	97%	
8	l	451	95%	5%
8	m	451	52%	
			92%	
8	n	451	98%	·
9	О	1663	• 98%	

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Mol	Chain	Length	Quality of chain
9	p	1663	98%
9	q	1663	• 98%
9	r	1663	• 98%
9	s	1663	• 98%
9	t	1663	• 98%
9	u	1663	• 98%
9	V	1663	• 98%
9	W	1663	• 98%
9	X	1663	• 98%



## 2 Entry composition (i)

There are 9 unique types of molecules in this entry. The entry contains 118940 atoms, of which 36534 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 Gamma-tubulin complex component.

Mol	Chain	Residues		A	toms			AltConf	Trace
1	A	682	Total	С	Н	N	О	0	0
1	Λ	002	4887	2021	1502	682	682		
1	С	797	Total	С	Η	N	O	0	0
1		191	5721	2363	1764	797	797	0	0
1	Е	797	Total	С	Н	N	О	0	0
1	12	191	5721	2363	1764	797	797	0	U
1	G	797	Total	С	Н	N	О	0	0
1	G	191	5721	2363	1764	797	797	0	0
1	M	778	Total	С	Н	N	О	0	0
1	1V1	110	5575	2307	1712	778	778	U	U

• Molecule 2 is a protein called Gamma-tubulin complex component 3.

Mol	Chain	Residues		A		AltConf	Trace		
2	В	617	Total	С	Н	N	О	0	0
	Ъ	017	4433	1826	1373	617	617	0	U
2	D	617	Total	С	Н	N	О	0	0
	ע	017	4433	1826	1373	617	617	U	U
2	F	617	Total	С	Н	N	О	0	0
2	I.	017	4433	1826	1373	617	617		U
2	Н	735	Total	С	Н	N	О	0	0
	11	139	5289	2176	1643	735	735	U	U
2	N	720	Total	С	Н	N	О	0	0
	1	120	5179	2133	1606	720	720	U	U

• Molecule 3 is a protein called Gamma-tubulin complex component.

Mol	Chain	Residues		A	AltConf	Trace				
3	Ţ	608					О	0	0	
	_	000	4325	1795	1314	608	608			
9	TZ.	608	Total	С	Η	N	O	0	0	
3	K	000	4325	1795	1314	608	608	U	U	

• Molecule 4 is a protein called Gamma-tubulin complex component.



Mol	Chain	Residues		A	AltConf	Trace			
1	Ţ	629	Total	С	Н	N	O	0	0
4	J	029	4466	1867	1341	629	629		U

• Molecule 5 is a protein called Tubulin gamma complex associated protein 6.

Mol	Chain	Residues		A	AltConf	Trace			
5	L	790	Total 5669	C 2320	Н 1769	N 790	O 790	0	0

• Molecule 6 is a protein called Mitotic spindle organizing protein 1.

Mol	Chain	Residues		At	oms		AltConf	Trace	
6	Р	67	Total 497	C 199		N 67	O 67	0	0
6	Q	64	Total 464			N 64	O 64	0	0
6	О	67	Total 497	C 199	H 164	N 67	O 67	0	0

• Molecule 7 is a protein called Mitotic-spindle organizing protein 2A isoform X4.

Mol	Chain	Residues		At	oms		AltConf	Trace	
7	V	45	Total	С	Н	N	О	0	0
'	v	40	336	132	114	45	45	U	0
7	W	45	Total	С	Н	N	О	0	0
'	VV	45	336	132	114	45	45	U	0
7	X	45	Total	С	Н	N	О	0	0
'	Λ	40	336	132	114	45	45	U	0
7	V	51	Total	С	Н	N	О	0	0
'	1	91	379	150	127	51	51	U	0

• Molecule 8 is a protein called Tubulin gamma chain.

Mol	Chain	Residues		A		AltConf	Trace			
8		444	Total	С	Н	N	О	0	0	
0	a	444	3161	1306	967	444	444	0	U	
8	b	442	Total	С	Н	N	О	0	0	
0	D	442	3146	1299	963	442	442		U	
8		440	Total	С	Н	N	О	0	0	
0	С	440	3129	1293	956	440	440	0	U	
Q	d	426	Total	С	Н	N	О	0	0	
	8 d	d 426	3030	1252	926	426	426		0	

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Mol	Chain	Residues		A	toms			AltConf	Trace
8	e	432	Total	С	Н	N	О	0	0
G	е	402	3074	1270	940	432	432	U	0
8	f	433	Total	С	Н	N	O	0	0
	1	400	3081	1273	942	433	433	U	U
8	ď	433	Total	$\mathbf{C}$	Η	N	O	0	0
	g	400	3081	1273	942	433	433	O	
8	h	439	Total	$\mathbf{C}$	Η	N	O	0	
	11	400	3122	1291	953	439	439	O	
8	i	438	Total	$\mathbf{C}$	Η	N	O	0	0
	1	490	3115	1288	951	438	438	O	
8	j	439	Total	$\mathbf{C}$	Η	N	O	0	
	J	100	3122	1292	952	439	439	0	U
8	k	438	Total	$\mathbf{C}$	Η	N	O	0	
	K	490	3115	1288	951	438	438	O	
8	1	428	Total	$\mathbf{C}$	Η	N	O	0	
	1	420	3044	1258	930	428	428	O	
8	m	444	Total	С	Η	N	O	0	0
	111	777	3161	1306	967	444	444	U	U
8	n	442	Total	$\mathbf{C}$	Η	N	O	0	0
	11	442	3146	1299	963	442	442		

• Molecule 9 is a protein called CDK5 regulatory subunit-associated protein 2.

Mol	Chain	Residues	Atoms	AltConf	Trace
9	0	33	Total C H N O	0	0
9	0	33	230 99 65 33 33	0	
9	a	33	Total C H N O	0	0
9	q	55	230 99 65 33 33	0	
9	r	33	Total C H N O	0	0
<i>J</i>	1	33	230 99 65 33 33	0	
9	S	36	Total C H N O	0	0
3	۵	30	251 108 71 36 36	0	
9	t	36	Total C H N O	0	0
<i>J</i>	U	90	251 108 71 36 36	0	U
9	v	36	Total C H N O	0	0
<i>J</i>	v	30	251 108 71 36 36	O O	0
9	u	36	Total C H N O	0	0
<i>J</i>	u	90	251 108 71 36 36	0	0
9	w	33	Total C H N O	0	0
3	VV	33	230 99 65 33 33	0	U
9	X	34	Total C H N O	0	0
	Λ	94	237 102 67 34 34		

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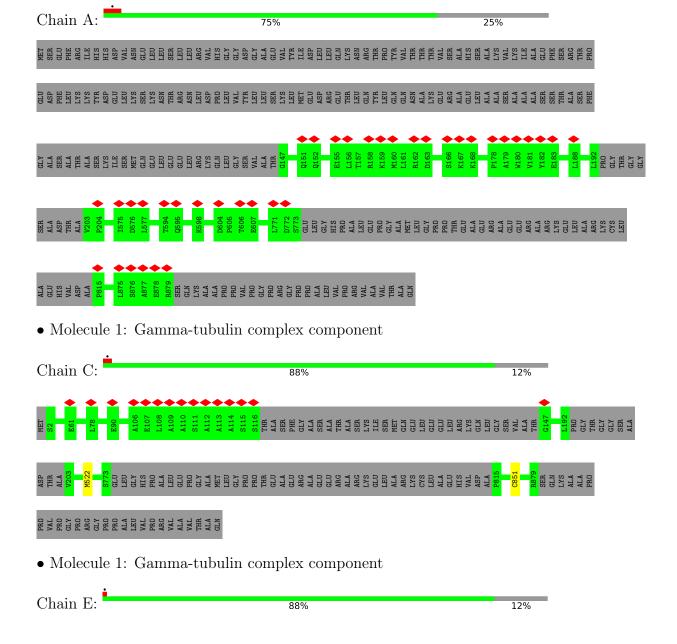
Mol	Chain	Residues		At	oms			AltConf	Trace
0	n	33	Total	С	Н	N	О	0	0
9	P	33	230	99	65	33	33	0	U



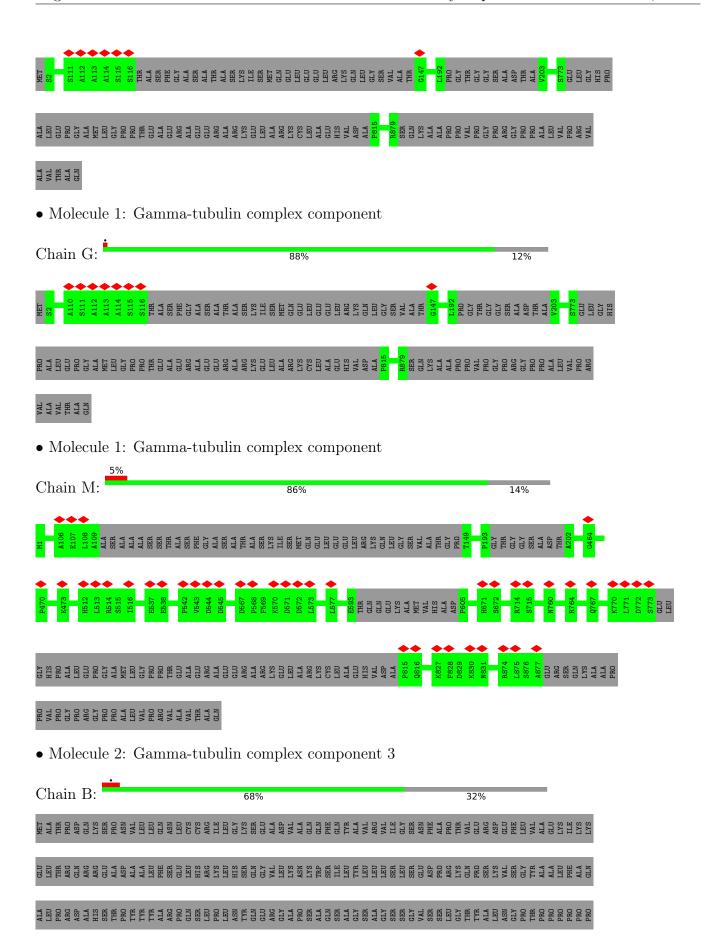
### 3 Residue-property plots (i)

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 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.

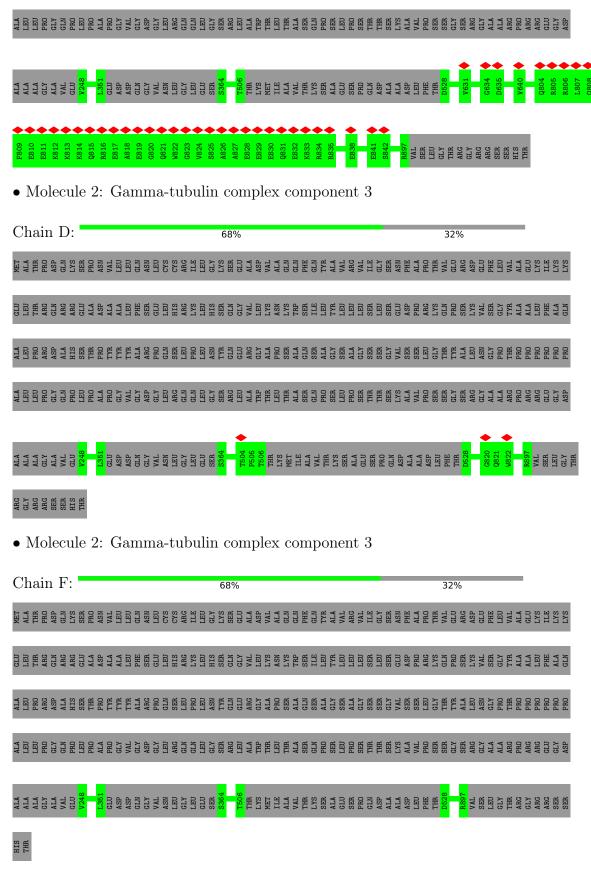
• Molecule 1: Gamma-tubulin complex component





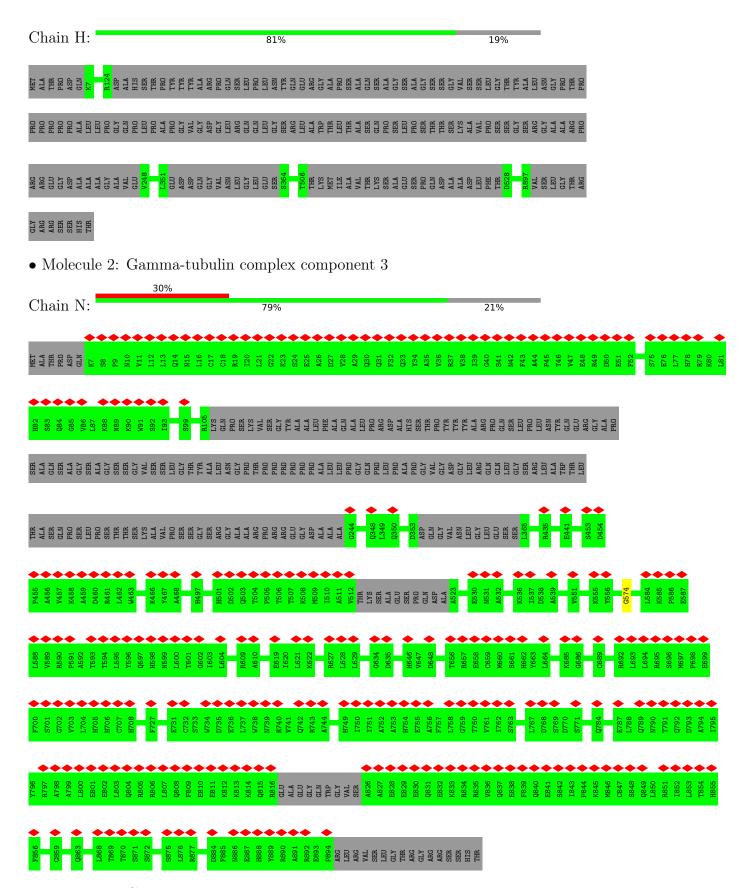






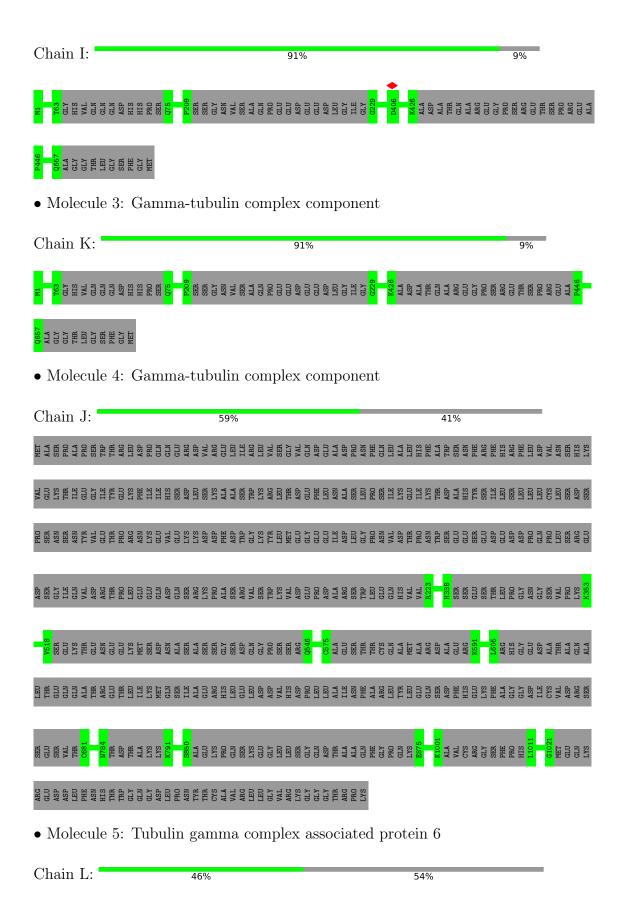
• Molecule 2: Gamma-tubulin complex component 3



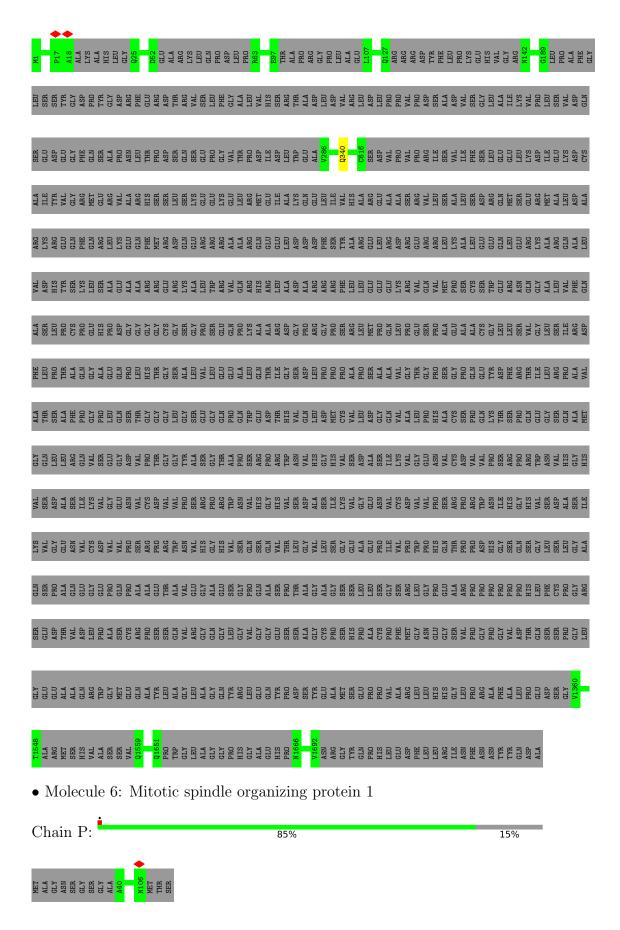


• Molecule 3: Gamma-tubulin complex component

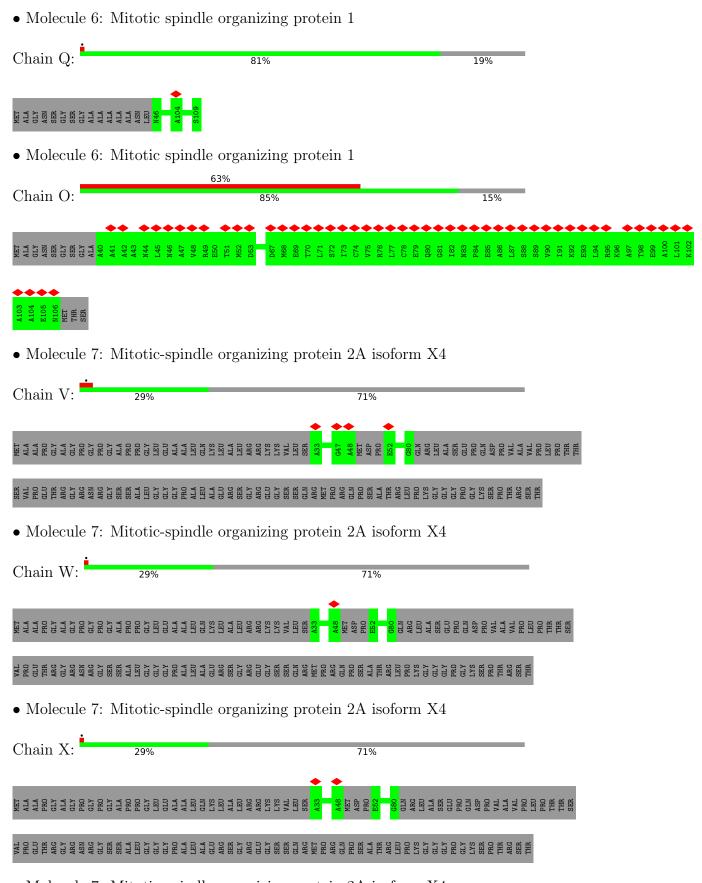






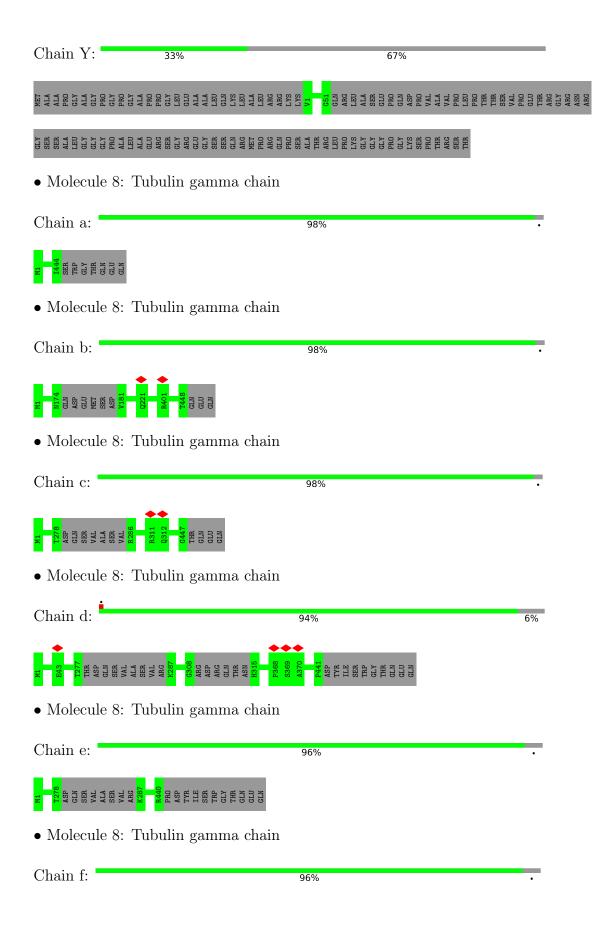






• Molecule 7: Mitotic-spindle organizing protein 2A isoform X4

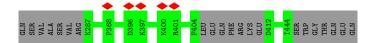






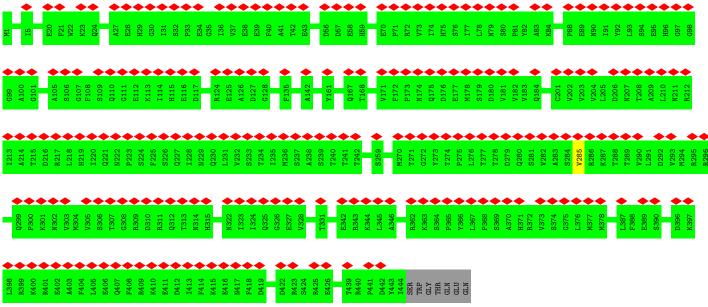






• Molecule 8: Tubulin gamma chain

Chain m: 98% .

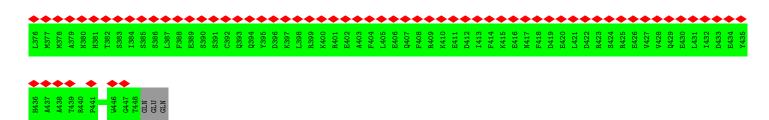


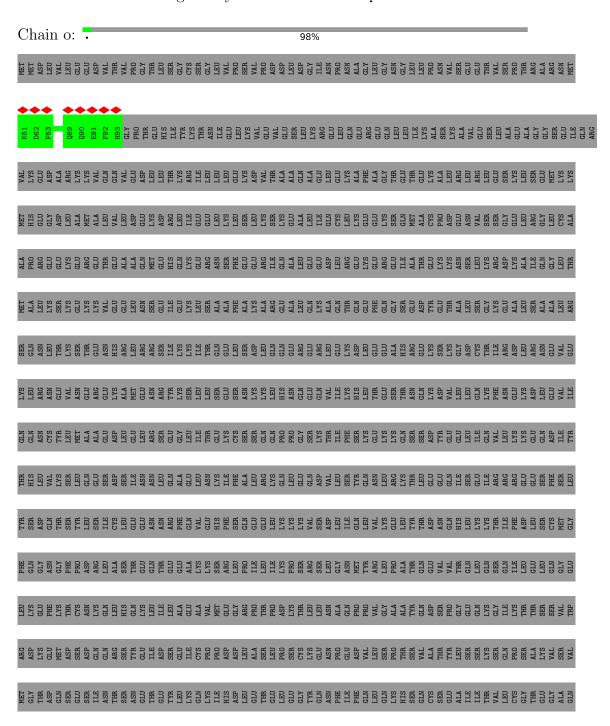
• Molecule 8: Tubulin gamma chain

Chain n: 98% .

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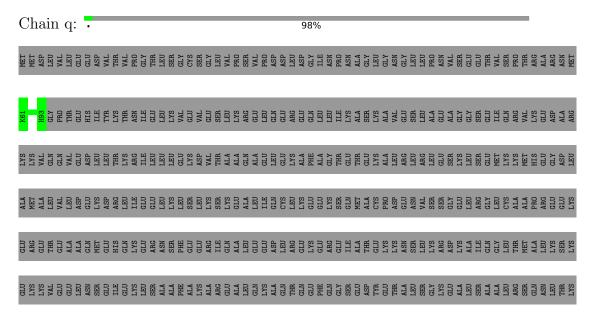




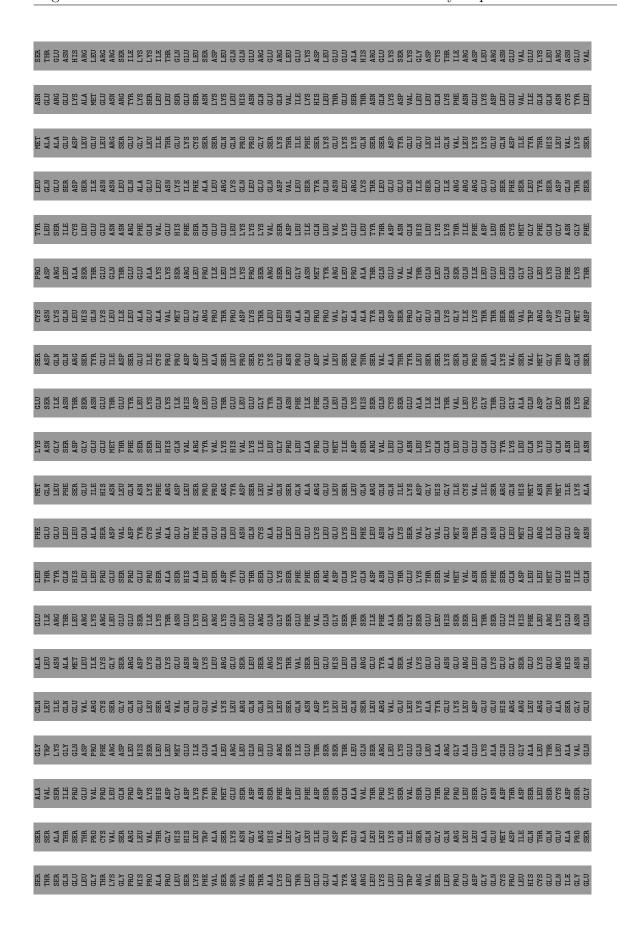




ASP	GLY	SER	LYS	PRO	ASN	SER	ASP	GLY	OID	MET	THR	SER	SER	LEU	GLN	VAL	TYR	VAL	LYS	VAL	LYS	ILE	GLY	PRO	LEU	PRO	GLU	MET	ASP	SER	VAL	LEU	ASN	LEU	LYS	GLN	LEU	GLU	GLN	GLU	LYS	LEU	117
LYS	GLU	ASN	LEU	ASN	GLN	HE HE	SER	GLU	HIS	ASN	LEU	ASN	LYS	PHE	ASP	LEU	PRO	PRO	ARG	ASP	SER	LEU	GLN	SER	GLN	ALA	GLU	LEU	red F	GLN	GLN	GLN	LYS	ASP	GLY	GLY	ILE	CYS	日日	SER	GLN	HIS	1111
ASN	THR	ILE	LYS	ALA PHE	GLU	FEG	LEU	GLN AT A	SER	ASP	VAL	TYR	CYS	VAL	CLU	GLY	GLN	CLU	GLN	ASN	GLN	CYS	GLU	LEU	LEU	CLU	LEU	GLU 1 v s	ren ren	PHE	ASN	GLY	SER	VAL	GLY	GLU	MET	ASN	GLN	ASN	GEU LEU	MET	212
ARG	ILE	GLU	ASP	ASN	THR	GLN	HIS	LEU	PRO	GLU	SER	GLU	PRO	SER.	SER	HIS	ALA	SER	ASP	GLU	THR	SER	LYS	SER	PHE	SER	ARG	ASP	LYS	GLN	ASN	GLU	GLU	LYS	THR	VAL	MET	VAL	SER	PHE	GLN	ASP	211
LEU	MET	HIS	ILE	GLU	ILE	THR	LEU	ARG	ARG	LEU	GLU	SER	ILE	LYS	ASN	OLU	LEU	ARG	LYS	LEU	GLU	ARG	GLY	SER	GLU	VAL	GLN	GLY	TH	SER	PHE	ALA	GLY	SER	GLU	HIS	SER	SER	TH	SER	GLU	HIS	777
LEU	ARG	GLN	ASN	GLN	LEU	ALA	MET	LEU	LYS	GLY	SER	ASP	LYS	GLN	GLU	ASN	LYS	LEU	ARG	SER	LEU	SER	LYS	THR	VAL	LEU	GLU	HIS	GLN	ARG	TYR	ALA	VAL	LYS	GLU	ASN	GLU	ARG	GLN	LYS	GLU GLY	SER	213
LYS	GLU	HIS	ASN	GLN	LEU	CLN	GLU	VAL	CYS	SER	GLY	GLU	LEU	SER	VAL	GLN	GLU	VAL	LYS	ARG	GLN	GLN	LEU	SER	GLN	ASP	LYS	LEU	GLN	SER	ARG	VAL	LEU	LYS	ALA	GLU	LYS	LEU	GLU	GLU	ARG	ARG	21
ARG	GLU	SER	GLY	GLU	TRP	GLY	GLN	ASP	PHE	ARG	ASP	HIS	SER	LEU	MET	GLU	GLN	ALA	LEU	LEU	GLN	LEU	ARG	SER	ILE	THR	SER	SER	LEU	GLN	ARG	LEU	GLU	GLN	LEU AI A	ARG	GLY	ALA	LYS	ALA	GLU	GLY	474
LEU	THE	ALA	VAL	GLN	VAL	TLE	PRO	GLU	PRO	LEU	GLN	ASP	LYS	HIS	GLY	ASP	TYR	PRO	MET	SER	ASP	ASN	PER H	ASP	LEU	ASP	SER	SER	ALA	VAL	PRO	LYS	VAL	SER	GLU	PRO	PRO	LEU	GLY	ASN	THR	ASP	2112
LEU	SER	ASP	SER	GLY	SER	THR	SER	THR	CYS	VAL	SER	LEU	VAL	THR	HIS	HIS	TRP	ALA	SER	ASN	GLY	ARG	VAL	LEU	GLY	TIE	GLU	ASP	GLU	ALA	LEU	LYS	ILE	SER	GLN	GLN	ARG	LEU	ALA	OTO	MET ASP	ILE	1
THR	GLN	ALA	PRO	SER	THR	GLN	GLU	LEU	THR	LYS	GLY	HIS	PRO	ALA	LEU	SER	PHE	VAL	SER	VAL	SER	THR	LYS	LEU	THR	GLU	GLU	ALA	ARG	ARG	LYS	LEU	TRP	ARG	VAL	LEU	PRO	GLU	GLY	GLN	CYS	LEU	2111
CYS	GLU	ILE	GLY	GEU	LYS	GLU	VAL	THR	LEU	HIS	LYS	LEU	PHE	GLU	CLU	LYS	LEU	GLN	ASN	MET	LYS	LEU	GLN	LEU	SER	ARG	GLN	GLU	VAL	ILE	ASP	GLN	VAL	VAL	THR	LYS	ILE	LEU	LYS	ALA	ARG GL.Y	ASN	211
BLU	DEU.	PRO	SLY	3LY ALA	HIS	3LY	THR	CYS	2 P. C.	SER	ARG	J.KO	SER																														

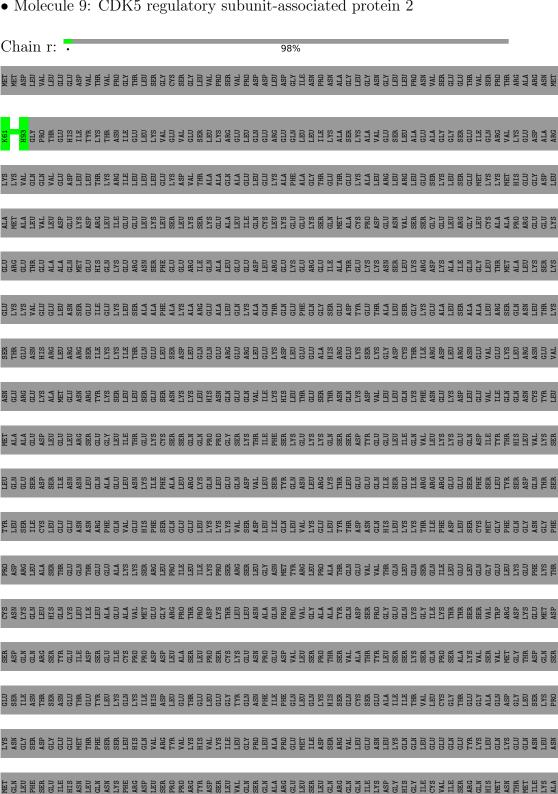








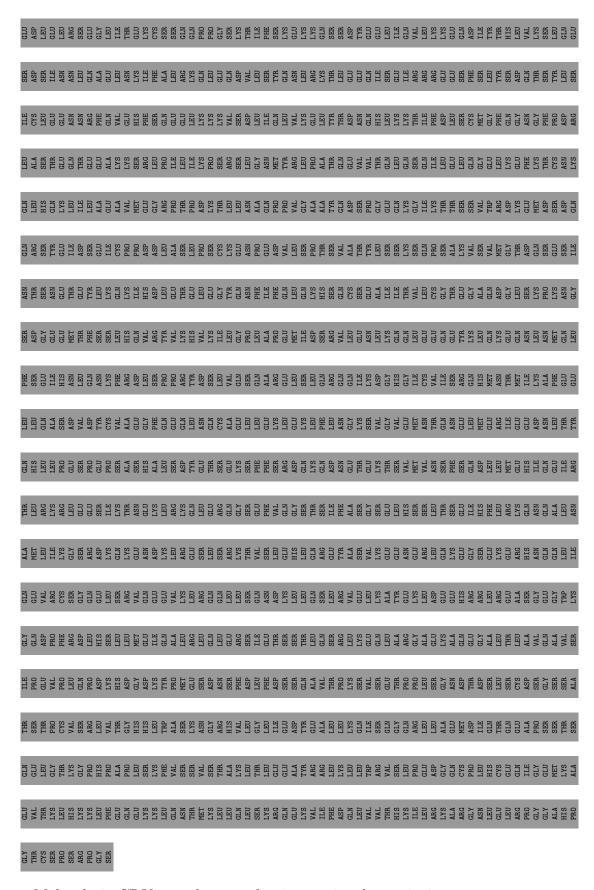
ALA HIS PRO GLY THR CYS SER PRO SER ARG GLY





PHE	GLU	LEU	LEU	ALA	SER	VAL	ASP	TYR	VAL	ALA	GLU	GLY	GLN	GLU	GLN	LEU	NCA.	CYS	ALA	OTO	LEU	GLU	LYS	LEU	075	LEU	PHE	LEU	GLY	LYS	SER	GLY	VAL	GLU	ASN	THR	GLN	ASN GLU	LEG CE	MET	GLU	ILE	GLU	GLU	ASN
LEU	THE	GLN	HIS	EE	PRO	SER	PRO	OTO	SER	ALA	SER	HIS	LEU	SER	ASP	TYR		SER	GLU	LYS	PHF	H	SER	ARG	ASP	LYS	GLN	ASP	GLU	TH	OTO	E E	SER	VAL	VAL	ASN	SER	HH SE	GLN	ASP		MET	GLU	HIS	GLN
GLU	ILE	THR	LEU	LYS	ARG	GLU	GLU	NEK 11 F	LYS	THR	ASN	GLU	LEU	ARG	LYS	GLN	GI.II	ARG	GLN	GLY	SER GL11	PHE	VAL	GLN	GLY	THR	SER	ILE	ALA	SER	GLY	GLU	LEU	HIS	SER	LEU	THR	SER GLU	ILE	HIS	PHE	ARG	LYS	GLN	GLN
ALA	LEU	ALA	MET	ILE	LYS	SER	ARG	ASP	GLN	LYS	GLU	ASN	LYS	LEU	ARG	GLU	JEN T	SER	ARG	LYS	IHK VAT.	SER	LEU	GLU	HIS	GLN	ARG	GLU	ALA	SER	VAL	GLU	GLU	ASN	ARG	LEU	GLN	CLU	GLY	SER	GLU 1.YS	GLU	ARG	HIS	GLN
GLN	LEU	GLN	GLU	ARG	CYS	GLY	GLN	075	SER	ARG	VAL	GLN	075	VAL	LYS	TEO	GI.N	GLN	LEU	LEU	SER GI.N	ASN	ASP	LYS	LEO	GLN	SER	LEU	VAL	OLU	LEU	ALA	TYR	0.15	LEG	ASP	GLU	GLU	ARG	ARG	LEU	GLU	ALA	SER GI.Y	GLU
GLY	TRP	GLY	GLN	PRO	PHE	ASP	LEU	HIS	LEU	LEU	MET	GLU	GLN	ALA	LEU	ARG	GLN	LEG	GLU	ARG	NEK T.F.	OLU	THR	SER	SEK TEK	LEU	GLN	SER	LEU	LYS	GLU	LEG	ALA	ARG	ALA	GLU	LYS	ALA	OLU	GLY	ALA LEU	THE	EG.	ALA VAI.	GLN
ALA	VAL	ILE	PRO	VAL	PRO	GLN	PRO	ASP	HIS	ASP	GLY	ASP	TYR	PRO	MET	OTO CED	ASP	ASN	SER	PHE	ASP LEU	PHE	ASP	SER	SER	ALA	VAL	THR	LYS	SER	VAL	GLU	THR	PRO	LEU	SER	GLY	ASN	THR	ASP	SER	SER	CYS	SER	GLY
SER	SER AT A	THR	SER	PRO	CYS	SER	ARG	UAT VAT	THR	GLY	HIS	HIS	TRP	ALA	SER	LYS	M.T.	ARG	HIS	VAL	01.7	LEU	ILE	CLU	ASP	GLU	ALA	LEU	LYS	GLN	ILE	GLN	GLY	GLN	LEU	LEU	ALA	GLU	ASP	ILE	GEN	GLN	GLU	ALA	SER
SER	THR	GLN	GLU	GLY	THR	GLY	PRO	HIS	ALA	PRO	LEU	SER	PHE	VAL	SER	SER	SER	THL	ALA	LYS	THR	LEU	GLU	GLU	ALA	ARG	ARG	LEU	LEU	LEU	TRP	VAL	SER	LEU	GIU	ASP	GLY	CYS	PRO	LEU	HIS	GLU	GLN	ILE	GLU
MET	LYS	GLU	VAL	LYS	LEU	LYS	LYS	097	GLU	GLN	OLU	LYS	LEU	GLN	ASN	THR	I.YS	LEU	LEU	GLN	SER	LYS	ARG	GLN	075	VAL	ILE	PHE	GLN	LEU	VAL	THR	HIS	LYS	TEG TEG	ARG	LYS	ALA	GLY	ASN	CEU	LEU	ARG	PRO GLY	GLY
ALA	HIS	GLY	THR	SER	PRO	ARG	PRO	GLY	NEW																																				

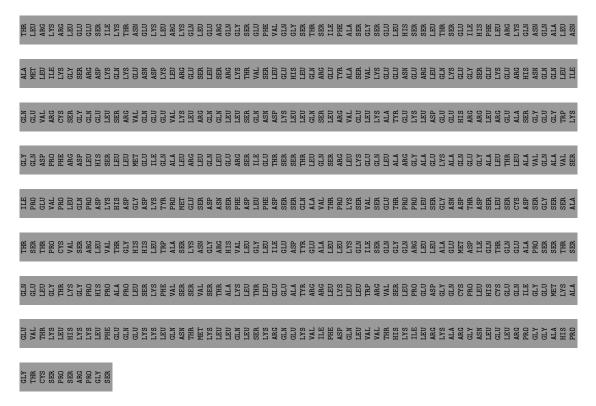






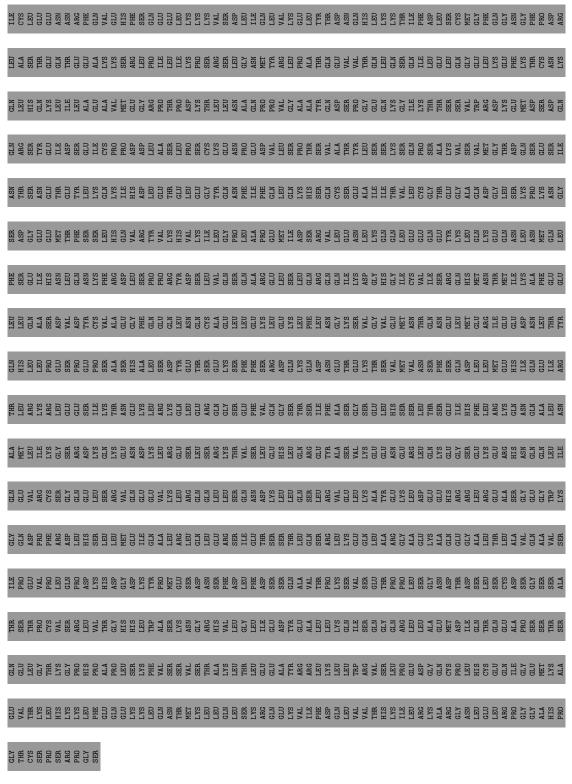
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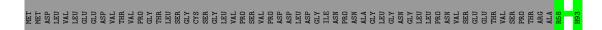


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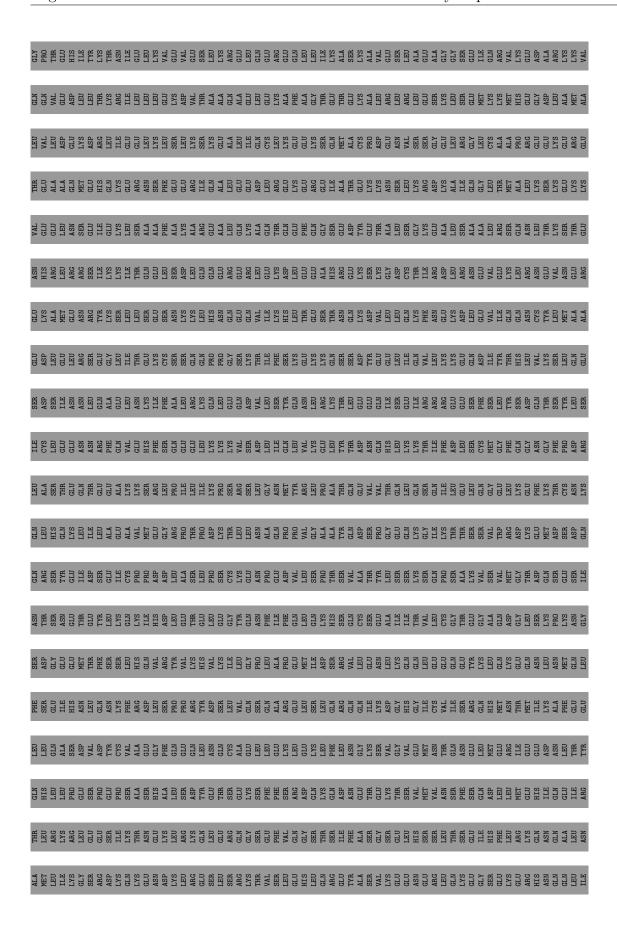




Chain u: • 98%





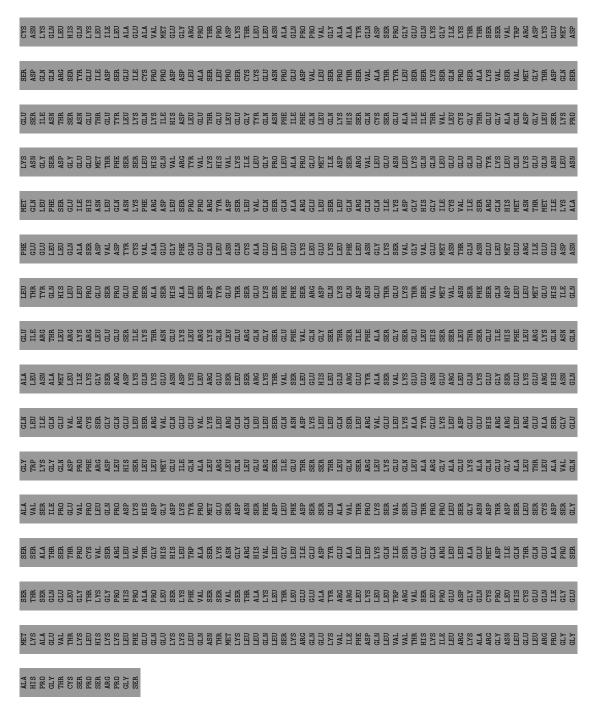




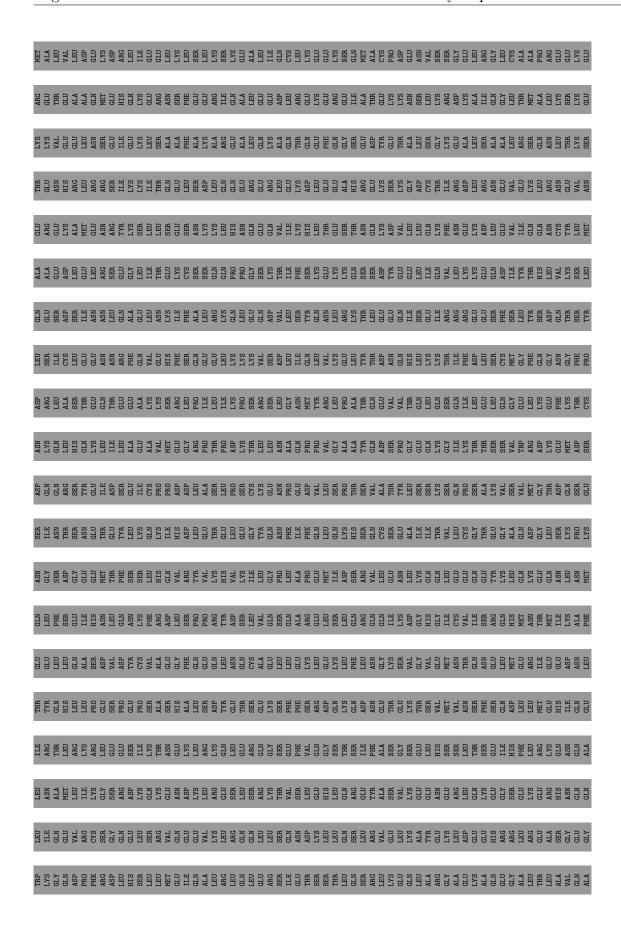
CIN	GEO	VAL	CYS	GLY	GLN	LEU	SER	VAI.	GLN	GLU	GLU	VAL LVS	LEU	ARG	GLN	LEU	LEU	SER	GLN	ASP	LYS	LEU	LEU	SER	LEU	ARG	VAL	GLU	LYS	ALA	TYR	0.15 1.7S	LEU	ASP	015	HIS	ARG	ARG	ARG	GLU	ALA	SER	GEO	GLY	TRP
V 12	GEN	ASP	PHE	ASP	LEU	SER	LEU	MET	GLU	ILE	GLN	ALA	ARG	LEU	GLN	GLU	ARG	SER	ILE	出	SER	SER	THE I	GLN	SER	ARG	LEU	LYS	GLN	LEU	ALA	ARG GLV	ALA	GLU	LYS	GLN	CLU	GLY	ALA	出目	LEU	ALA	GLN	ALA	VAL
HIF	PRO	GLU	PRO	GLN	PRO	LYS	HIS	GI.Y	ASP	LYS	TYR	MET	GLU	SER	ASP	SER	PHE	ASP	LEU	ASP	SER	SER	GLN	VAL	THR	PRO	LYS	SER	SER	GLU	THR	PRO	LEU	SER	GLY	ASP	THR	ASP	NEK LEII	SER	CYS	ASP	GLY	SER	SER ALA
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21.11	VAL	THR	LEU	LYS	LYS	HE HE	GLU	NTD CLII	TAS	LYS	LEU	A SN	THR	MET	LYS	LEU	GLN	LEU	SER	ARG	GLN	GLU	LYS	ILE	PHE	ASP	GLN	LEU	VAL	THR	HIS	LYS	LEU	ARG	LYS	ARG	GLY	ASN	037	LEU	ARG	PRO GI V	GLY	ALA	HIS PRO
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Chain w: MAGNA | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.0 SER ARGE CITY OF THE CITY OF T SER ASSENCE OF THE CONTROL OF THE CO 





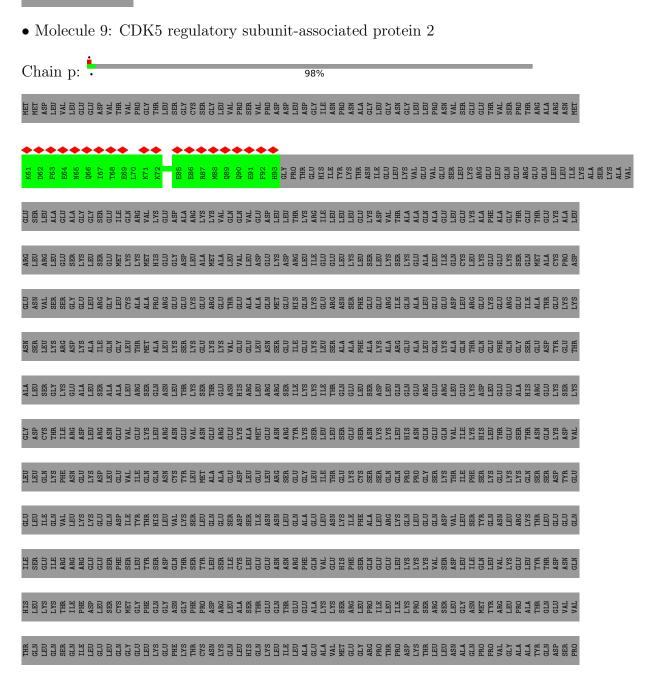




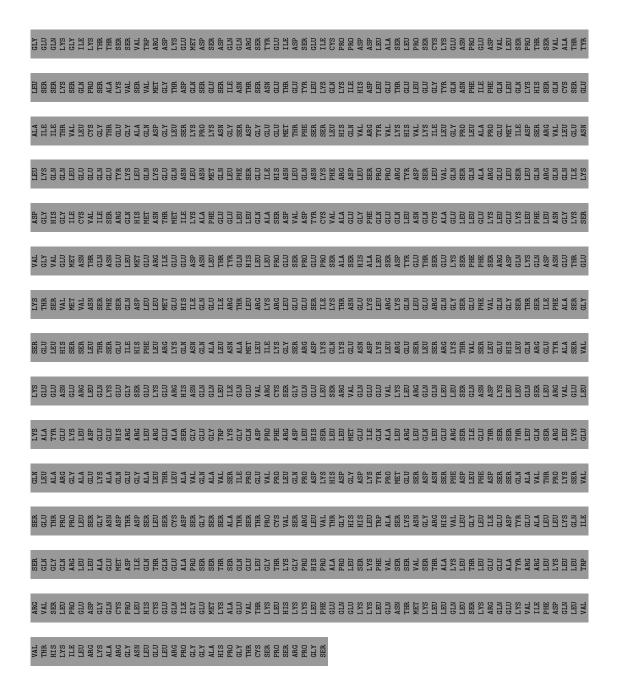




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# 4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	16448	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	55	Depositor
Minimum defocus (nm)	900	Depositor
Maximum defocus (nm)	2900	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.715	Depositor
Minimum map value	-0.183	Depositor
Average map value	0.004	Depositor
Map value standard deviation	0.033	Depositor
Recommended contour level	0.125	Depositor
Map size (Å)	542.7199, 542.7199, 542.7199	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.413333, 1.413333, 1.413333	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	langles
IVIOI	Chain	RMSZ	# Z  > 5	RMSZ	# Z >5
1	A	0.26	0/3382	0.47	0/4715
1	С	0.26	0/3953	0.45	0/5511
1	Е	0.26	0/3953	0.46	0/5511
1	G	0.26	0/3953	0.43	0/5511
1	M	0.24	0/3857	0.42	0/5374
2	В	0.24	0/3057	0.44	0/4260
2	D	0.26	0/3057	0.44	0/4260
2	F	0.25	0/3057	0.41	0/4260
2	Н	0.26	0/3642	0.41	0/5075
2	N	0.23	0/3568	0.39	0/4971
3	I	0.26	0/3007	0.44	0/4186
3	K	0.25	0/3007	0.41	0/4186
4	J	0.24	0/3117	0.42	0/4339
5	L	0.25	0/3891	0.44	0/5403
6	О	0.23	0/332	0.34	0/462
6	Р	0.27	0/332	0.44	0/462
6	Q	0.22	0/317	0.35	0/441
7	V	0.23	0/220	0.40	0/303
7	W	0.24	0/220	0.42	0/303
7	X	0.24	0/220	0.37	0/303
7	Y	0.26	0/251	0.41	0/348
8	a	0.26	0/2193	0.48	0/3053
8	b	0.26	0/2181	0.49	0/3034
8	С	0.27	0/2171	0.49	0/3020
8	d	0.28	0/2101	0.50	0/2921
8	е	0.27	0/2132	0.48	0/2966
8	f	0.27	0/2137	0.48	0/2973
8	g	0.27	0/2137	0.48	0/2973
8	h	0.27	0/2167	0.50	0/3015
8	i	0.27	0/2162	0.49	0/3008
8	j	0.26	0/2168	0.49	0/3017
8	k	0.26	0/2162	0.49	0/3008
8	1	0.25	0/2111	0.47	0/2935
8	m	0.26	0/2193	0.45	0/3053



Mol	Chain	Bond	lengths	Bond	langles
IVIOI	Chain	RMSZ	# Z  > 5	RMSZ	# Z  > 5
8	n	0.25	0/2181	0.45	0/3034
9	О	0.19	0/164	0.28	0/228
9	p	0.22	0/164	0.39	0/228
9	q	0.22	0/164	0.36	0/228
9	r	0.22	0/164	0.29	0/228
9	S	0.22	0/179	0.31	0/249
9	t	0.21	0/179	0.32	0/249
9	u	0.22	0/179	0.33	0/249
9	V	0.22	0/179	0.32	0/249
9	W	0.21	0/164	0.32	0/228
9	X	0.21	0/169	0.32	0/235
All	All	0.26	0/82294	0.45	0/114565

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 maintain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
2	N	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	N	574	GLY	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	ntiles
1	A	$676/905\ (75\%)$	625 (92%)	51 (8%)	0	100	100
1	С	789/905~(87%)	749 (95%)	38 (5%)	2 (0%)	37	73
1	E	$789/905\ (87\%)$	763 (97%)	26 (3%)	0	100	100
1	G	789/905 (87%)	764 (97%)	25 (3%)	0	100	100
1	M	766/905 (85%)	751 (98%)	15 (2%)	0	100	100
2	В	611/910 (67%)	585 (96%)	26 (4%)	0	100	100
2	D	611/910 (67%)	590 (97%)	21 (3%)	0	100	100
2	F	611/910 (67%)	597 (98%)	14 (2%)	0	100	100
2	Н	727/910 (80%)	702 (97%)	25 (3%)	0	100	100
2	N	710/910 (78%)	698 (98%)	12 (2%)	0	100	100
3	I	600/667 (90%)	577 (96%)	23 (4%)	0	100	100
3	K	600/667 (90%)	568 (95%)	32 (5%)	0	100	100
4	J	613/1061 (58%)	578 (94%)	35 (6%)	0	100	100
5	L	772/1715 (45%)	697 (90%)	74 (10%)	1 (0%)	48	83
6	О	65/79~(82%)	65 (100%)	0	0	100	100
6	P	$65/79\ (82\%)$	64 (98%)	1 (2%)	0	100	100
6	Q	62/79~(78%)	62 (100%)	0	0	100	100
7	V	$41/155\ (26\%)$	39 (95%)	2 (5%)	0	100	100
7	W	$41/155\ (26\%)$	41 (100%)	0	0	100	100
7	X	$41/155\ (26\%)$	40 (98%)	1 (2%)	0	100	100
7	Y	$49/155\ (32\%)$	48 (98%)	1 (2%)	0	100	100
8	a	$442/451\ (98\%)$	429 (97%)	13 (3%)	0	100	100
8	b	$438/451\ (97\%)$	429 (98%)	9 (2%)	0	100	100
8	c	$436/451\ (97\%)$	426 (98%)	10 (2%)	0	100	100
8	d	$420/451\ (93\%)$	410 (98%)	10 (2%)	0	100	100
8	e	428/451 (95%)	418 (98%)	10 (2%)	0	100	100
8	f	$429/451 \; (95\%)$	422 (98%)	7 (2%)	0	100	100
8	g	429/451 (95%)	424 (99%)	5 (1%)	0	100	100
8	h	$435/451\ (96\%)$	426 (98%)	9 (2%)	0	100	100
8	i	434/451 (96%)	426 (98%)	8 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Perce	ntiles
8	j	435/451~(96%)	400 (92%)	34 (8%)	1 (0%)	44	78
8	k	$434/451 \ (96\%)$	392 (90%)	42 (10%)	0	100	100
8	1	$422/451 \; (94\%)$	394 (93%)	28 (7%)	0	100	100
8	m	442/451 (98%)	435 (98%)	6 (1%)	1 (0%)	44	78
8	n	438/451 (97%)	425 (97%)	12 (3%)	1 (0%)	44	78
9	О	31/1663 (2%)	30 (97%)	1 (3%)	0	100	100
9	p	31/1663 (2%)	31 (100%)	0	0	100	100
9	q	31/1663 (2%)	31 (100%)	0	0	100	100
9	r	31/1663 (2%)	31 (100%)	0	0	100	100
9	S	34/1663 (2%)	34 (100%)	0	0	100	100
9	t	34/1663 (2%)	34 (100%)	0	0	100	100
9	u	34/1663 (2%)	34 (100%)	0	0	100	100
9	V	34/1663 (2%)	34 (100%)	0	0	100	100
9	W	31/1663 (2%)	31 (100%)	0	0	100	100
9	X	32/1663~(2%)	32 (100%)	0	0	100	100
All	All	16413/36986 (44%)	15781 (96%)	626 (4%)	6 (0%)	100	100

5 of 6 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
8	n	285	VAL
1	С	522	MET
1	С	851	CYS
5	L	340	GLN
8	j	285	VAL

### 5.3.2 Protein sidechains (i)

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

#### 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)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	M	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	M	850:ASP	С	851:CYS	N	2.92



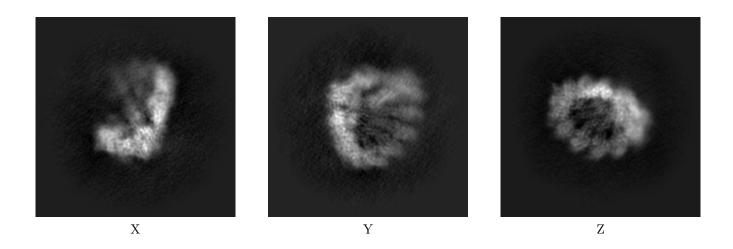
# 6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-51018. These allow visual inspection of the internal detail of the map and identification of artifacts.

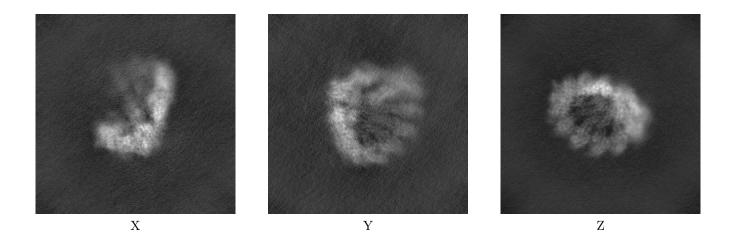
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections (i)

#### 6.1.1 Primary map



#### 6.1.2 Raw map

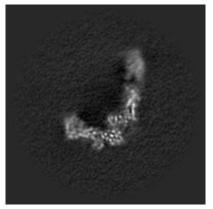


The images above show the map projected in three orthogonal directions.

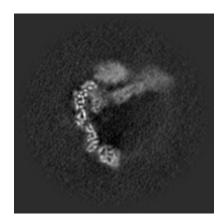


# 6.2 Central slices (i)

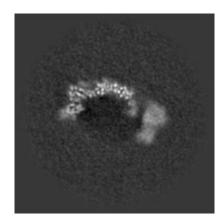
#### 6.2.1 Primary map





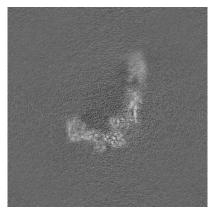


Y Index: 192

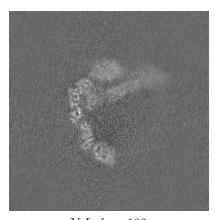


Z Index: 192

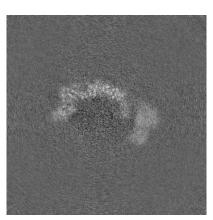
### 6.2.2 Raw map



X Index: 192



Y Index: 192



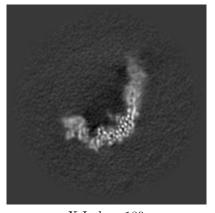
Z Index: 192

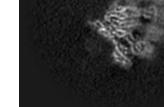
The images above show central slices of the map in three orthogonal directions.

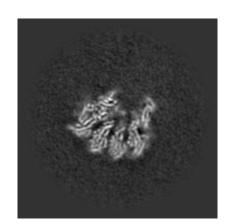


## 6.3 Largest variance slices (i)

#### 6.3.1 Primary map







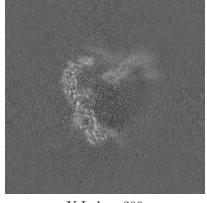
X Index: 180

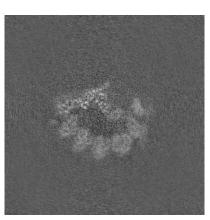
Y Index: 238

Z Index: 145

### 6.3.2 Raw map







X Index: 185

Y Index: 209

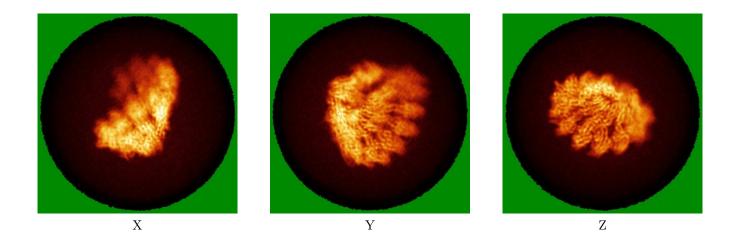
Z Index: 161

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

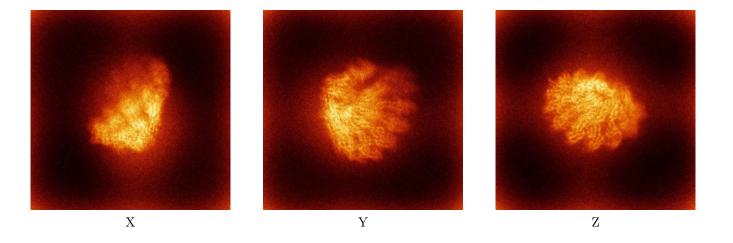


### 6.4 Orthogonal standard-deviation projections (False-color) (i)

#### 6.4.1 Primary map



#### 6.4.2 Raw map

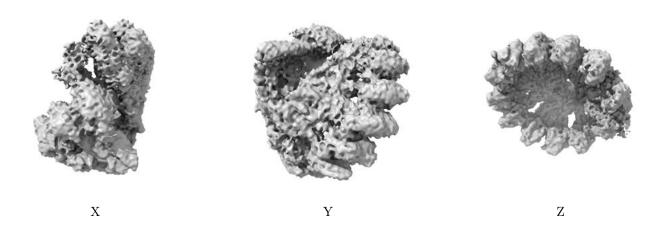


The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.



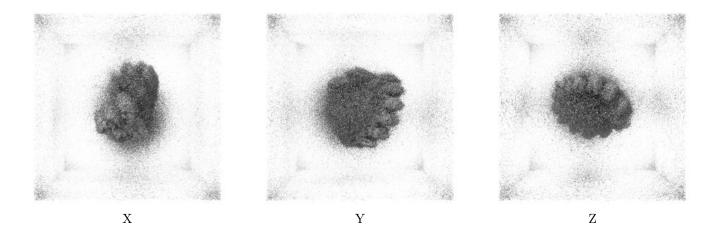
### 6.5 Orthogonal surface views (i)

#### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.125. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

#### 6.5.2 Raw map



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

### 6.6 Mask visualisation (i)

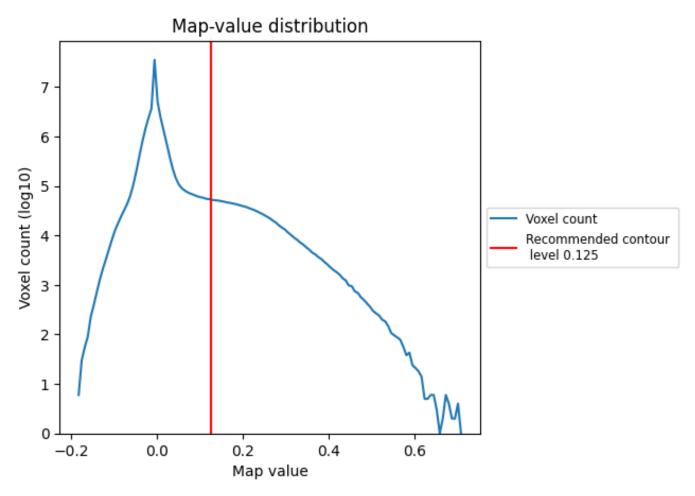
This section was not generated. No masks/segmentation were deposited.



# 7 Map analysis (i)

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

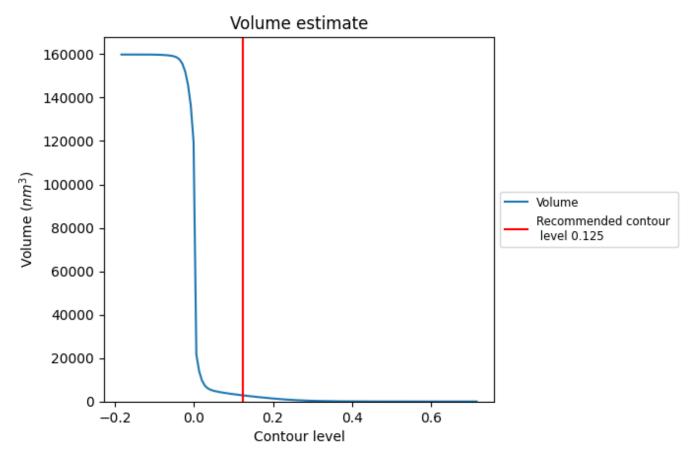
### 7.1 Map-value distribution (i)



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)

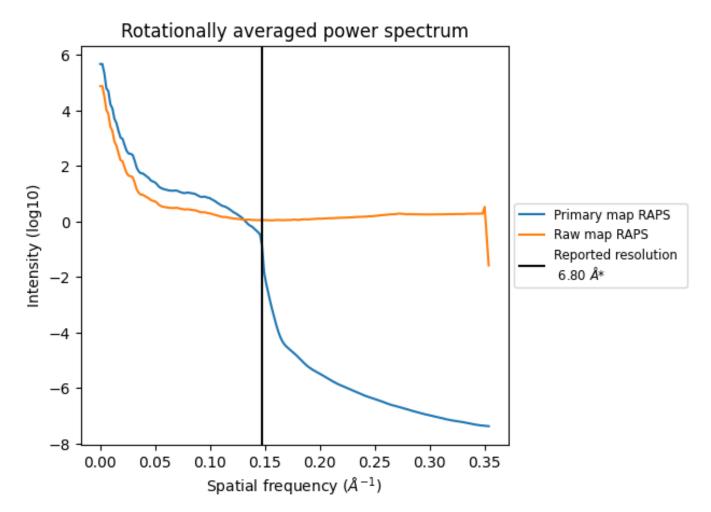


The volume at the recommended contour level is  $2794~\mathrm{nm^3}$ ; this corresponds to an approximate mass of  $2524~\mathrm{kDa}$ .

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 (i)



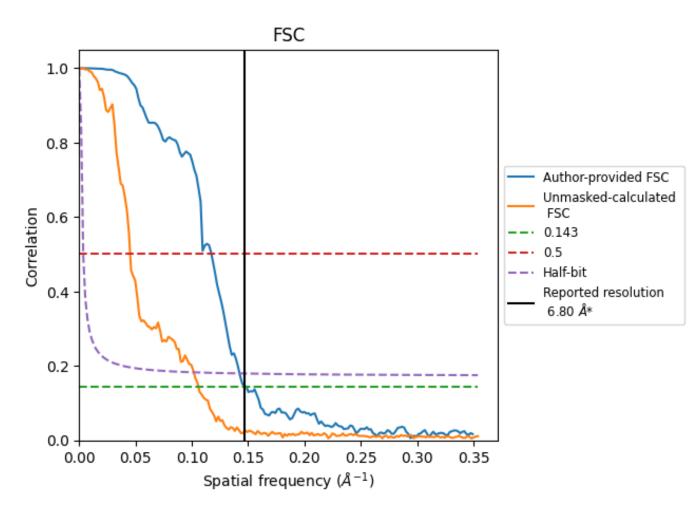
<sup>\*</sup>Reported resolution corresponds to spatial frequency of 0.147  $\rm \mathring{A}^{-1}$ 



# 8 Fourier-Shell correlation (i)

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

### 8.1 FSC (i)



<sup>\*</sup>Reported resolution corresponds to spatial frequency of 0.147  $\rm \mathring{A}^{-1}$ 



# 8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)			
rtesolution estimate (A)	0.143	0.5	Half-bit	
Reported by author	6.80	-	-	
Author-provided FSC curve	6.83	8.52	7.03	
Unmasked-calculated*	9.44	22.08	9.83	

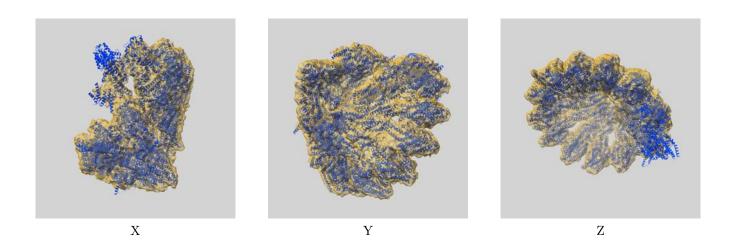
<sup>\*</sup>Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 9.44 differs from the reported value 6.8 by more than 10 %



# 9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-51018 and PDB model 9G3Y. Per-residue inclusion information can be found in section 3 on page 9.

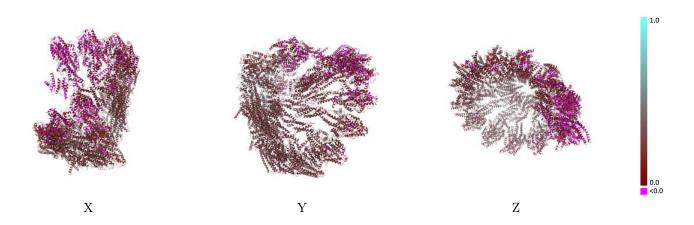
## 9.1 Map-model overlay (i)



The images above show the 3D surface view of the map at the recommended contour level 0.125 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.

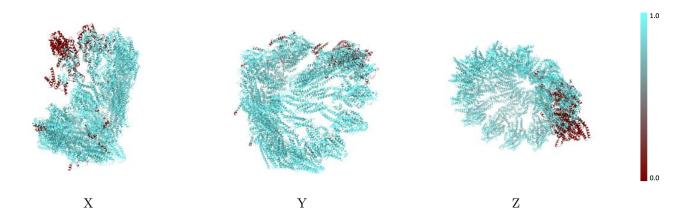


### 9.2 Q-score mapped to coordinate model (i)



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.

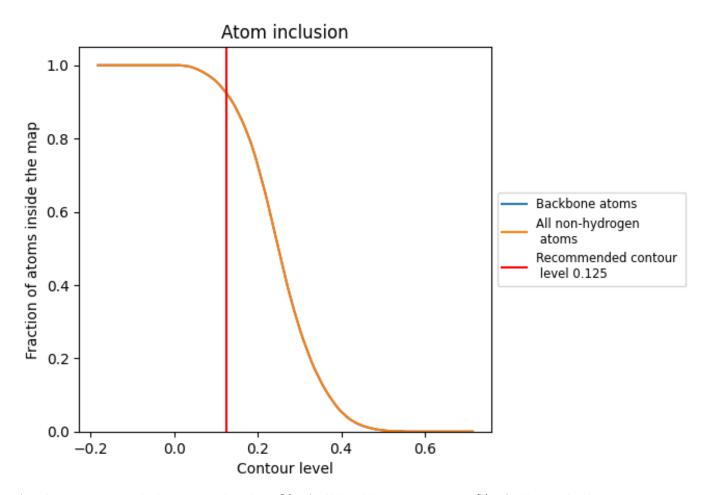
### 9.3 Atom inclusion mapped to coordinate model (i)



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 (0.125).



## 9.4 Atom inclusion (i)



At the recommended contour level, 92% of all backbone atoms, 92% of all non-hydrogen atoms, are inside the map.



## 9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.125) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9240	0.1970
A	0.9470	0.1740
В	0.9380	0.2180
С	0.9820	0.2490
D	0.9930	0.2630
E	0.9910	0.2730
F	0.9980	0.2760
G	0.9900	0.2760
Н	1.0000	0.2790
I	0.9980	0.2650
J	0.9990	0.2310
K	0.9980	0.2200
L	0.9970	0.1970
M	0.9410	0.1400
N	0.6140	0.0890
О	0.2670	0.0270
P	0.9760	0.2810
Q	0.9810	0.2490
V	0.8960	0.2290
W	0.9780	0.2560
X	0.9690	0.2570
Y	1.0000	0.1690
a	1.0000	0.0820
b	0.9950	0.0760
С	0.9890	0.1420
d	0.9870	0.1650
e	0.9990	0.2370
f	0.9930	0.2360
g	0.9930	0.2530
h	0.9950	0.2500
i	0.9960	0.2090
j	1.0000	0.1710
k	0.9840	0.1300
1	0.8760	0.1070
m	0.4770	0.0490



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### $Continued\ from\ previous\ page...$

Chain	Atom inclusion	Q-score
n	0.0730	0.0360
О	0.7460	0.1430
p	0.3580	0.0780
q	1.0000	0.2470
r	1.0000	0.2200
S	1.0000	0.2540
t	1.0000	0.2640
u	1.0000	0.2530
V	1.0000	0.2650
W	0.9820	0.0260
X	0.9940	0.1150

