



Full wwPDB EM Validation Report ⓘ

Oct 12, 2026 – 01:56 pm BST

PDB ID : 9SWW / pdb_00009sww
EMDB ID : EMD-55327
Title : GFAP intermediate filament
Authors : Beales, C.T.; Eibauer, M.; Medalia, O.
Deposited on : 2025-10-07
Resolution : 7.40 Å(reported)
Based on initial models : 6A9P, .

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

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

A user guide is available at

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

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev133
MolProbity : 4-5-2 with Phenix2.2
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.51

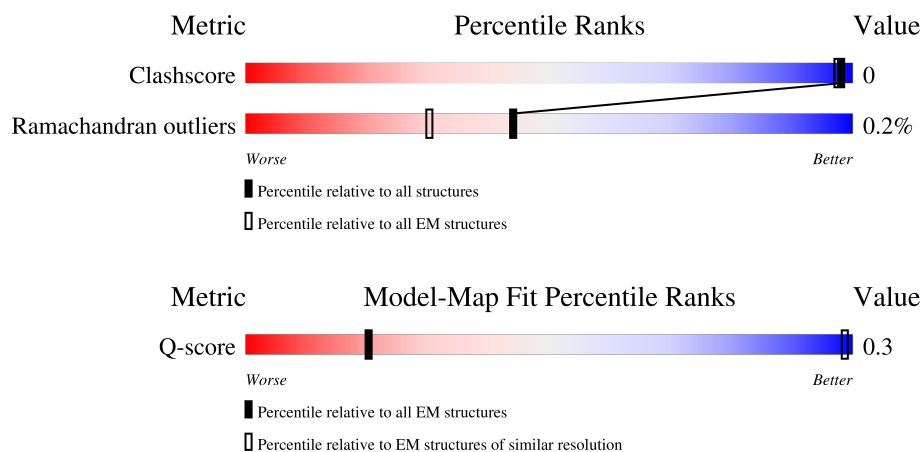
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 7.40 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.



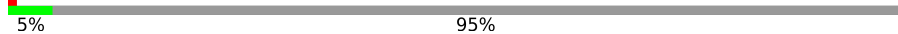
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Q-score	-	25397	412 (6.90 - 7.90)

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

Mol	Chain	Length	Quality of chain
1	0	430	 10% 90%
1	6	430	 98%
1	9	430	 5% 95%
1	A	430	 36% 64%
1	AC	430	 16% 84%

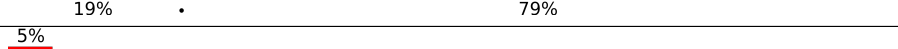
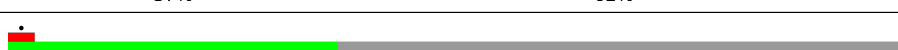
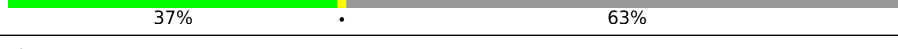
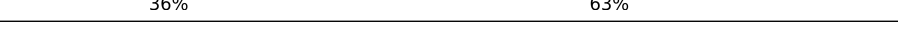
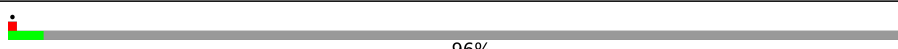
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Mol	Chain	Length	Quality of chain
1	AD	430	
1	AG	430	
1	AH	430	
1	AK	430	
1	AL	430	
1	AM	430	
1	AN	430	
1	AO	430	
1	AP	430	
1	AQ	430	
1	AR	430	
1	AS	430	
1	AT	430	
1	AU	430	
1	AV	430	
1	B	430	
1	C	430	
1	D	430	
1	E	430	
1	F	430	
1	G	430	
1	H	430	
1	I	430	
1	J	430	
1	K	430	

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Mol	Chain	Length	Quality of chain
1	L	430	
1	M	430	
1	N	430	
1	O	430	
1	P	430	
1	Q	430	
1	R	430	
1	S	430	
1	T	430	
1	V	430	
1	W	430	
1	X	430	
1	a	430	
1	b	430	
1	e	430	
1	f	430	
1	j	430	

2 Entry composition [i](#)

There is only 1 type of molecule in this entry. The entry contains 30815 atoms, of which 10295 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 Glial fibrillary acidic protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	0	43	Total	C	H	N	O	0	0
			258	86	86	43	43		
1	6	8	Total	C	H	N	O	0	0
			48	16	16	8	8		
1	9	23	Total	C	H	N	O	0	0
			139	46	47	23	23		
1	A	156	Total	C	H	N	O	0	0
			935	312	311	156	156		
1	AC	69	Total	C	H	N	O	0	0
			416	138	140	69	69		
1	AD	84	Total	C	H	N	O	0	0
			505	168	169	84	84		
1	AG	111	Total	C	H	N	O	0	0
			669	222	225	111	111		
1	AH	127	Total	C	H	N	O	0	0
			764	254	256	127	127		
1	AK	150	Total	C	H	N	O	0	0
			902	300	302	150	150		
1	AL	158	Total	C	H	N	O	0	0
			949	316	317	158	158		
1	AM	23	Total	C	H	N	O	0	0
			139	46	47	23	23		
1	AN	31	Total	C	H	N	O	0	0
			187	62	63	31	31		
1	AO	157	Total	C	H	N	O	0	0
			943	314	315	157	157		
1	AP	156	Total	C	H	N	O	0	0
			937	312	313	156	156		
1	AQ	64	Total	C	H	N	O	0	0
			384	128	128	64	64		
1	AR	69	Total	C	H	N	O	0	0
			414	138	138	69	69		
1	AS	156	Total	C	H	N	O	0	0
			937	312	313	156	156		

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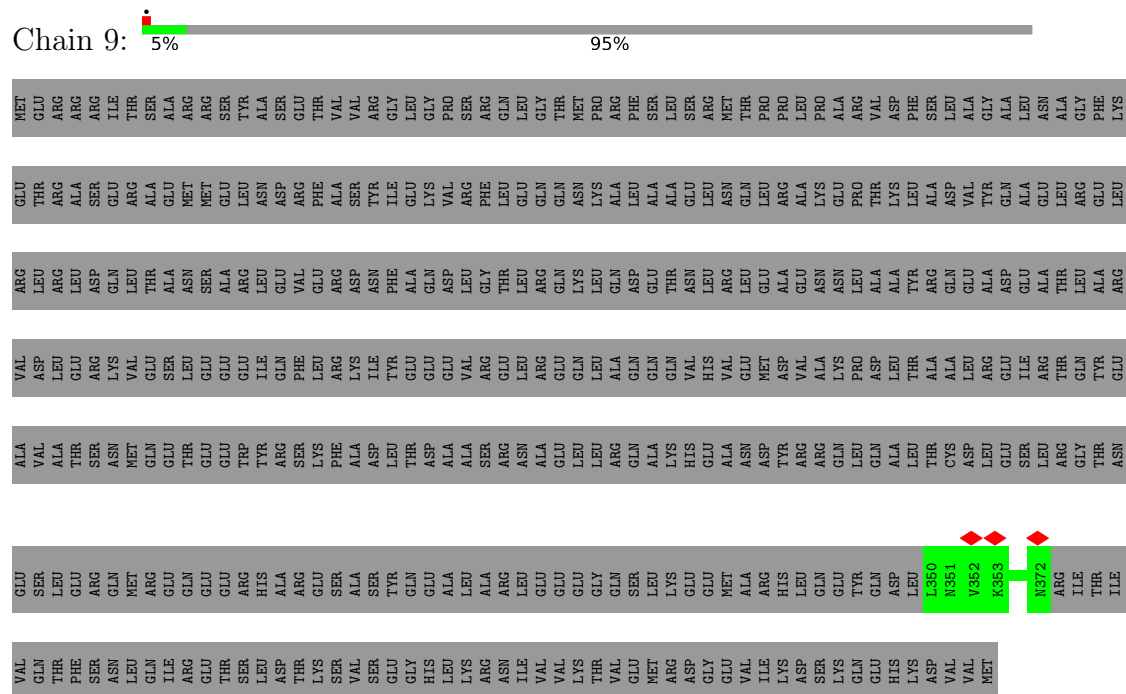
Mol	Chain	Residues	Atoms					AltConf	Trace
1	AT	158	Total	C	H	N	O	0	0
			949	316	317	158	158		
1	AU	111	Total	C	H	N	O	0	0
			667	222	223	111	111		
1	AV	112	Total	C	H	N	O	0	0
			673	224	225	112	112		
1	B	156	Total	C	H	N	O	0	0
			935	312	311	156	156		
1	C	153	Total	C	H	N	O	0	0
			919	306	307	153	153		
1	D	158	Total	C	H	N	O	0	0
			949	316	317	158	158		
1	E	161	Total	C	H	N	O	0	0
			966	322	322	161	161		
1	F	160	Total	C	H	N	O	0	0
			960	320	320	160	160		
1	G	161	Total	C	H	N	O	0	0
			965	322	321	161	161		
1	H	155	Total	C	H	N	O	0	0
			929	310	309	155	155		
1	I	127	Total	C	H	N	O	0	0
			762	254	254	127	127		
1	J	134	Total	C	H	N	O	0	0
			805	268	269	134	134		
1	K	162	Total	C	H	N	O	0	0
			972	324	324	162	162		
1	L	161	Total	C	H	N	O	0	0
			966	322	322	161	161		
1	M	81	Total	C	H	N	O	0	0
			485	162	161	81	81		
1	N	89	Total	C	H	N	O	0	0
			534	178	178	89	89		
1	O	162	Total	C	H	N	O	0	0
			972	324	324	162	162		
1	P	158	Total	C	H	N	O	0	0
			948	316	316	158	158		
1	Q	40	Total	C	H	N	O	0	0
			240	80	80	40	40		
1	R	48	Total	C	H	N	O	0	0
			289	96	97	48	48		
1	S	161	Total	C	H	N	O	0	0
			968	322	324	161	161		

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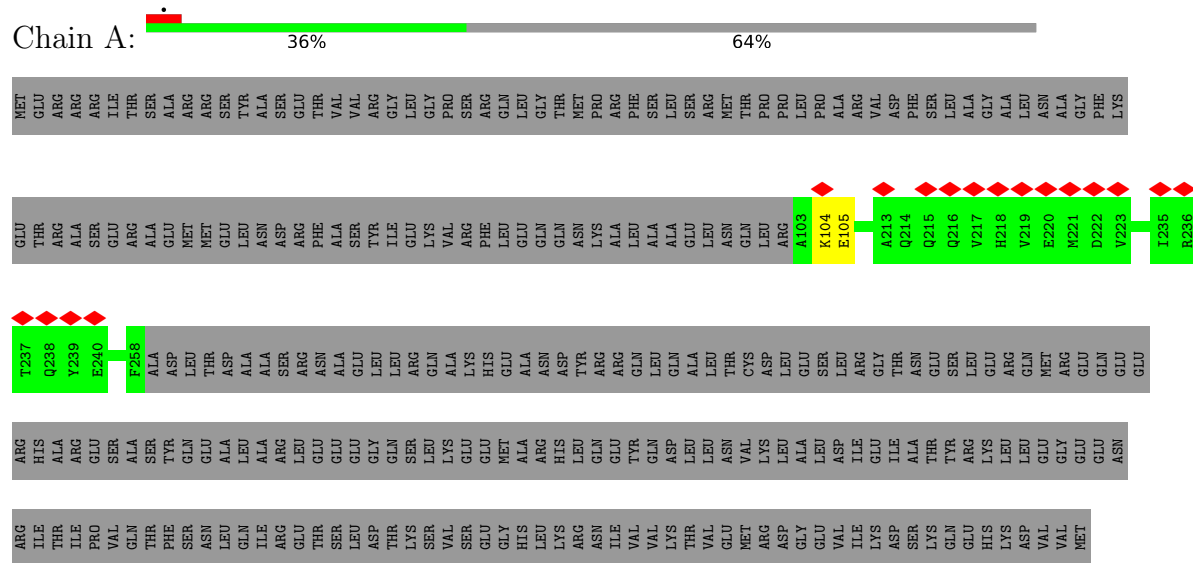
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Mol	Chain	Residues	Atoms					AltConf	Trace
1	T	157	Total	C	H	N	O	0	0
			944	314	316	157	157		
1	V	5	Total	C	H	N	O	0	0
			31	10	11	5	5		
1	W	128	Total	C	H	N	O	0	0
			771	256	259	128	128		
1	X	145	Total	C	H	N	O	0	0
			872	290	292	145	145		
1	a	86	Total	C	H	N	O	0	0
			519	172	175	86	86		
1	b	100	Total	C	H	N	O	0	0
			602	200	202	100	100		
1	e	41	Total	C	H	N	O	0	0
			247	82	83	41	41		
1	f	58	Total	C	H	N	O	0	0
			349	116	117	58	58		
1	j	17	Total	C	H	N	O	0	0
			101	34	33	17	17		

- Molecule 1: Glial fibrillary acidic protein



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[illegible]

Chain AD: 19% 80%

[illegible]

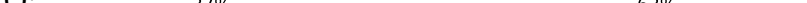
Chain AG:

MET	GLU	ARG	ARG	ARG	ILE	THR	SER	SER	ALA	ALA	ARG	ARG	SER	SER	TYR	THR	GLU	ALA	SER	THR	THR	VAL	VAL	GLY	GLY	PRO	PRO	ARG	ARG	GLN	GLY	THR	MET	PRO	PRO	ARG	PHE	SER	SER	LEU	LEU	ARG	MET	MET	THR	THR	PRO	PRO	LEU	LEU	PRO	PRO	ALA	ALA	VAL	VAL	ASP	PHE	SER	SER	LEU	LEU	ALA	ALA	GLY	GLY	PHE	PHE
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[illegible]

- Molecule 1: Glial fibrillary acidic protein

Chain AO:  37% 63%

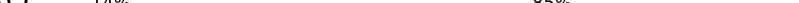
[illegible]

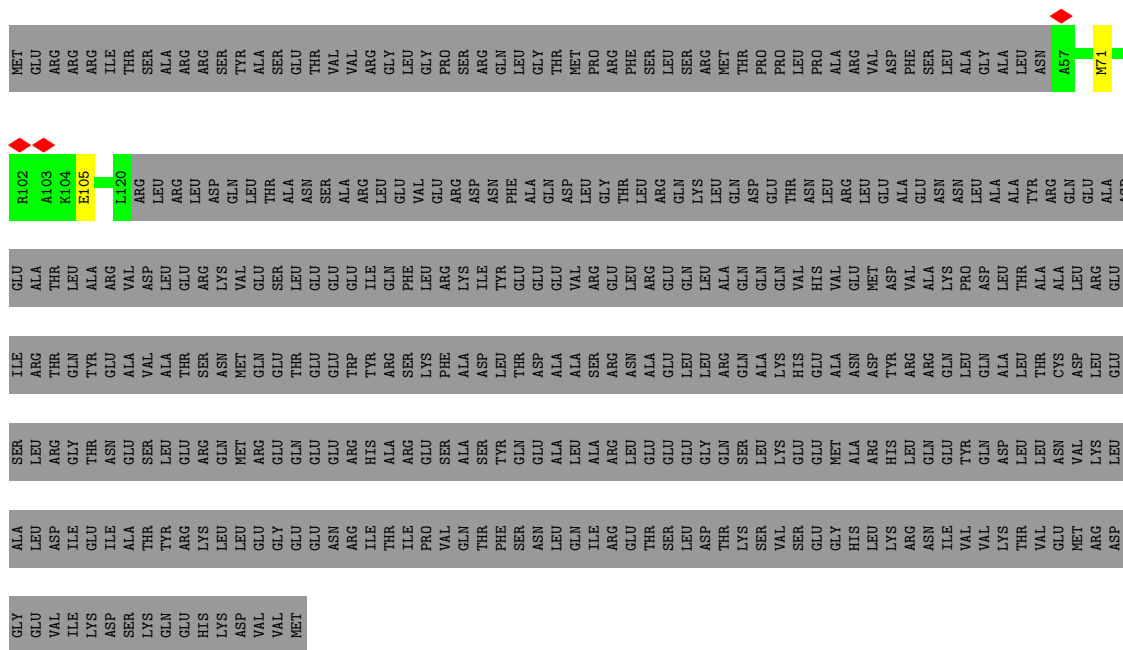
- Molecule 1: Glial fibrillary acidic protein

Chain AP: 36% 64%

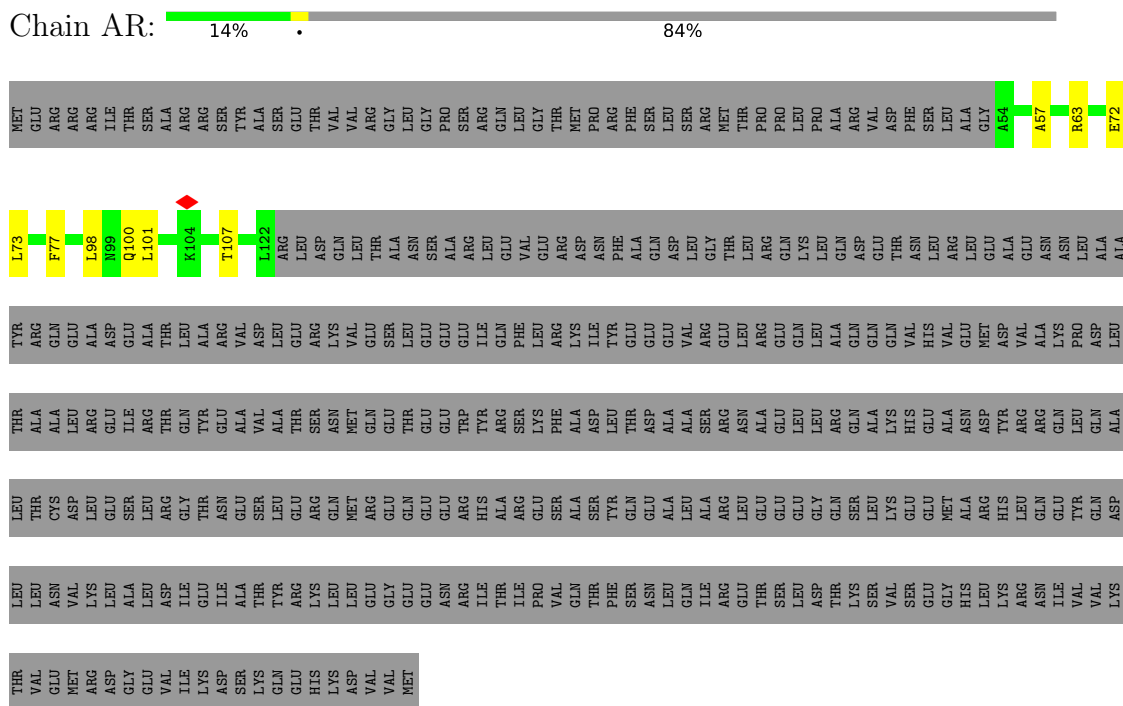
[illegible]

- Molecule 1: Glial fibrillary acidic protein

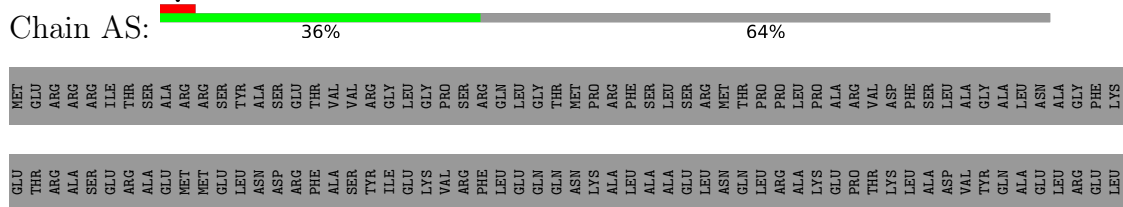
Chain AQ:  14% 85%



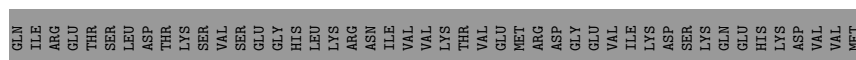
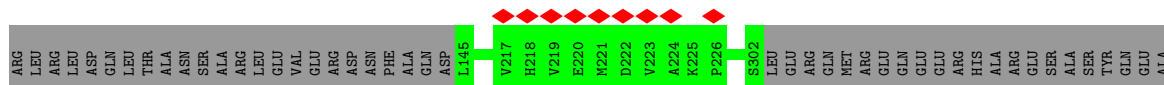
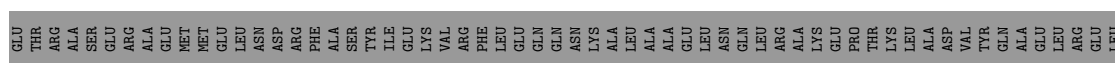
- Molecule 1: Glial fibrillary acidic protein



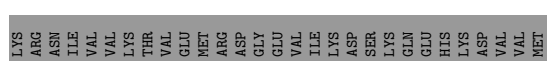
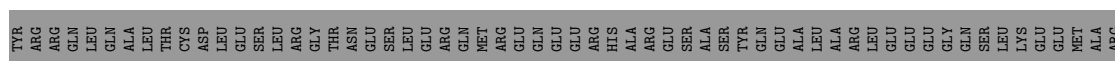
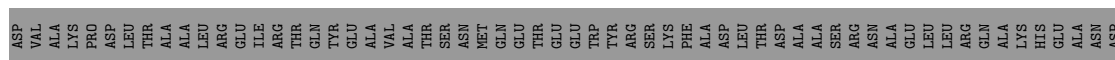
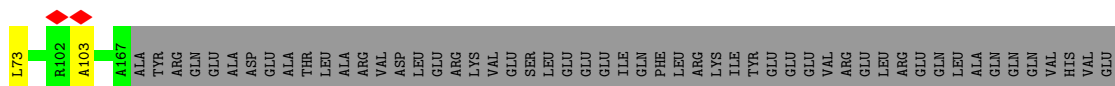
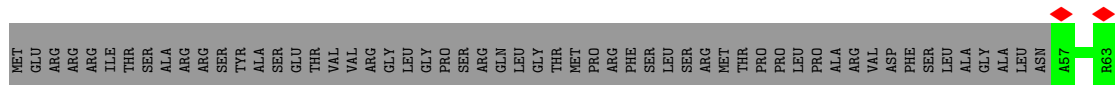
- Molecule 1: Glial fibrillary acidic protein



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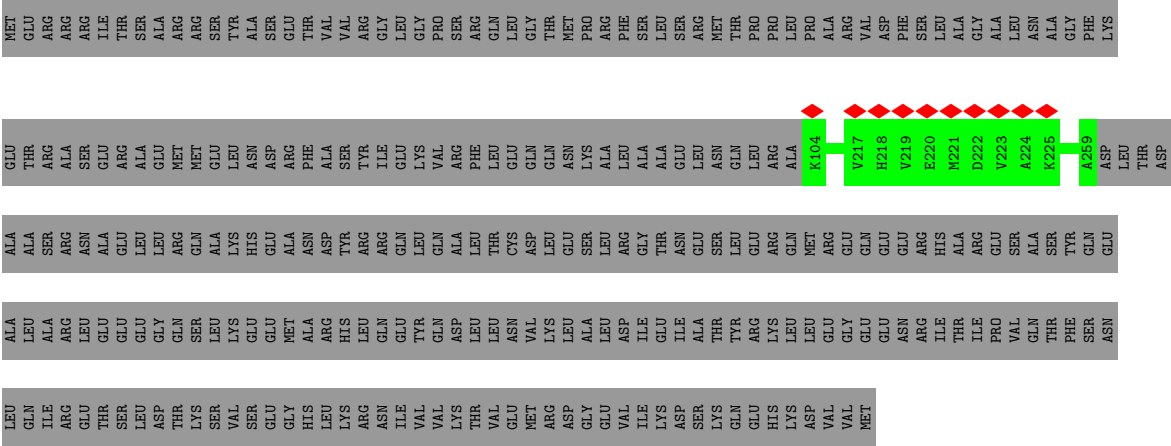


- Molecule 1: Glial fibrillary acidic protein

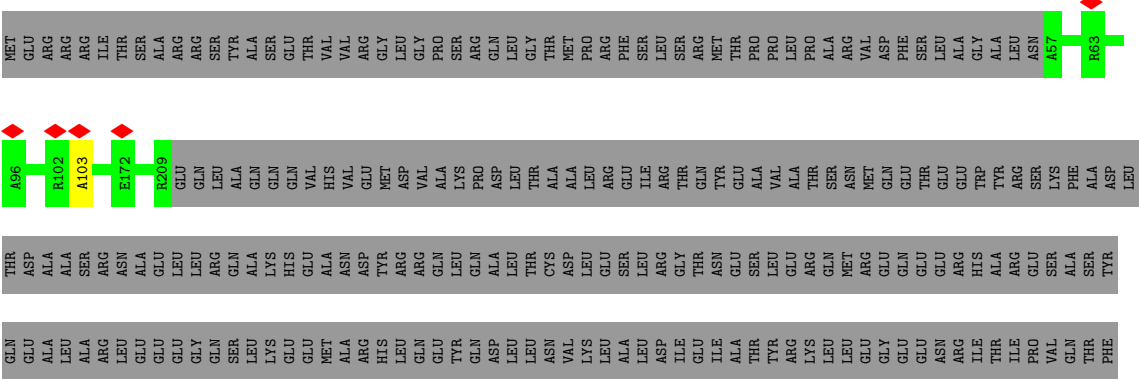




● Molecule 1: Glial fibrillary acidic protein

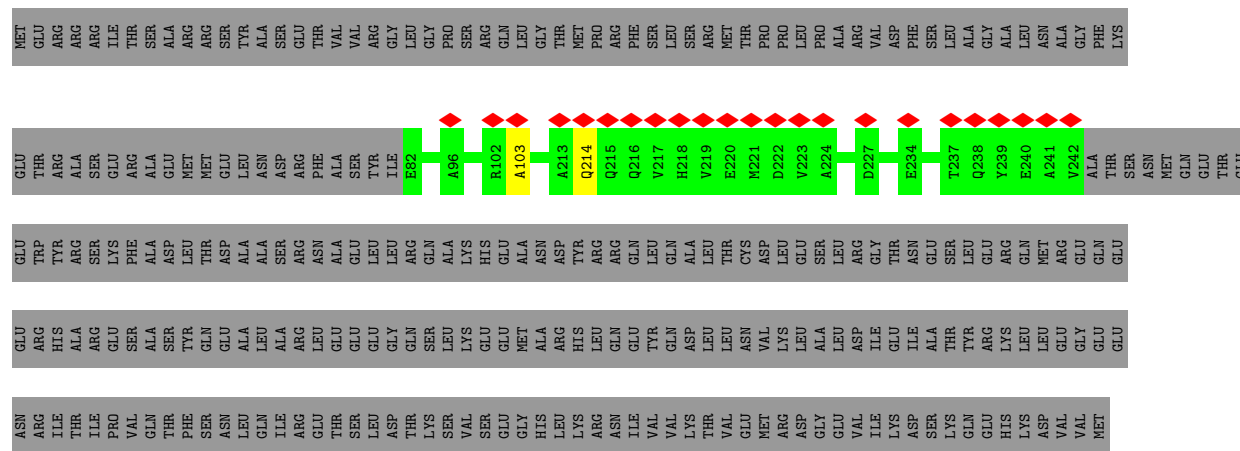


● Molecule 1: Glial fibrillary acidic protein

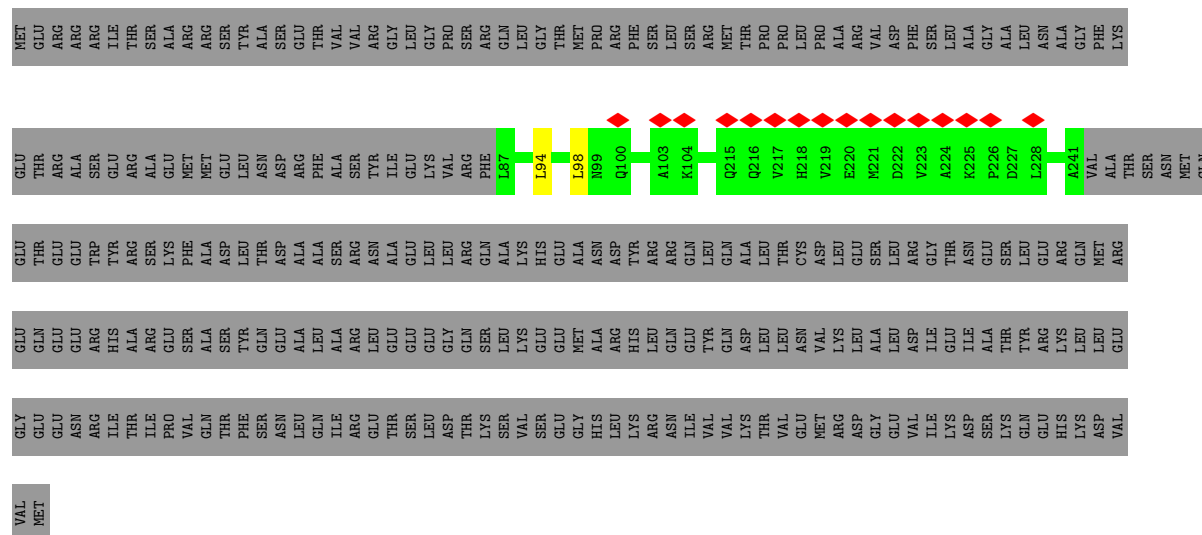


[illegible]

- Molecule 1: Glial fibrillary acidic protein

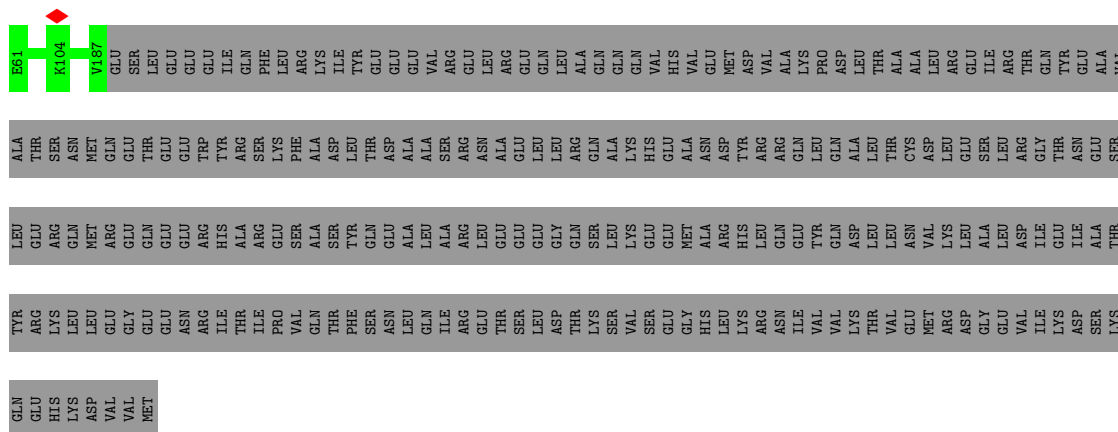


- Molecule 1: Glial fibrillary acidic protein

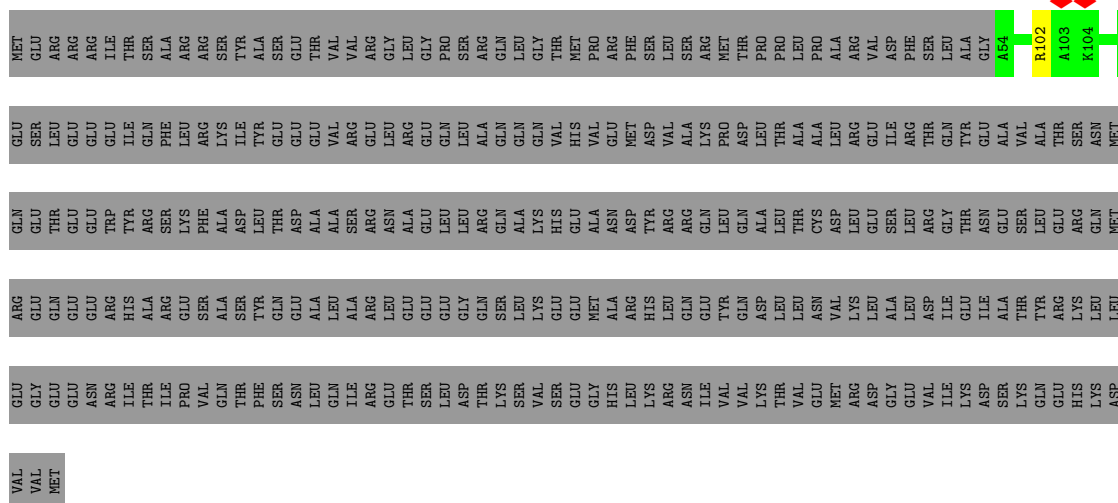


- Molecule 1: Glial fibrillary acidic protein

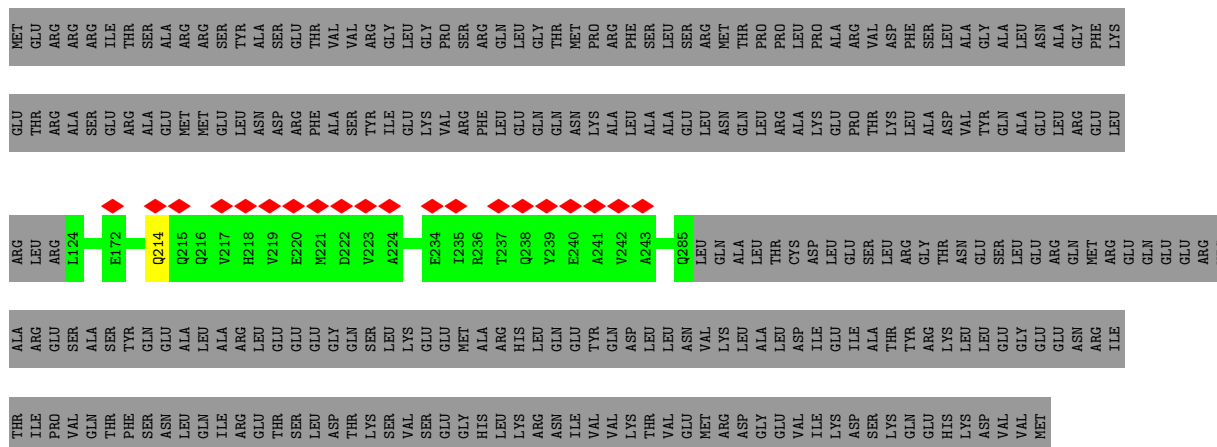




- Molecule 1: Glial fibrillary acidic protein



- Molecule 1: Glial fibrillary acidic protein



ILE	PRO	VAL	GLN	THR	PHE	SER	ASN	LEU	ILE	GLN	ARG	GLU	THR	SER	SER	SER	GLY	GLY	HIS	LEU	LYS	ARG	ASN	ILE	VAL	VAL	LYS	THR	VAL	GLU	MET	ASP	ARG	GLY	GLU	VAL	ILE	LYS	ASP	SER	SER	LYS	GLN	GLU	HIS	LYS	ASP	VAL	VAL	MET
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- Molecule 1: Glial fibrillary acidic protein



GLU	THR.	ARG	ALA	SER.	GLU	ARG	ALA	GLU	MET	MET	GLU	LEU	LEU	ASN	ASP	ARG	PHE	ALA	SER	TYR	ILE	GLU	GLY	VAL	ARG	PHE	LEU	GLU	GLN	GLN	ASN	LYS	LEU	ALA	ALA	GLU	GLU	LEU	ASN	ASN	PRO	THR	LYS	LEU	GLN	ARG	ALA	LYS	ALA	ASP	VAL	TYR	GLN	ALA	GLU	LEU	ARG	GLU	LEU
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ARG	LEU	ARG	ARG	LEU	ASP	GLN	THR	THR	ALA	ASN	SER	ALA	ARG	LEU	GLU	VAL	GLU	ARG	ASP	ASN	PHE	GLN	ALA	ASP	LEU	GLY	THR	LEU	ARG	GLN	LYS	LEU	GLN	ASP	GLU	THR	ASN	ASN	ASN	LEU	ALA	ALA	GLU	ASN	ASN	LEU	ALA	ALA	Y169	A213	Q214	Q215	Q216	V217	H218	V219	E220	M221	D222
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V223	A294	E294	I295	T297	Q298	Y299	A241	V242	A243	E330	GLU	GLY	GLN	SER	LEU	LYS	GLU	GLU	MET	ALA	ARG	HIS	LEU	GLN	TYR	GLN	ASP	LEU	LEU	ASN	VAL	LYS	LEU	ALA	LEU	ASP	ASP	ILE	ILE	ALA	THR	TYR	ARG	LYS	LEU	LEU	GLU	GLY	GLU	GLU	ASN	ARG	TLE
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ILE	PRO	VAL	GLN	THR	PHE	SER	ASN	LEU	GLN	ILE	ARG	GLU	THR	LYS	SER	VAL	GLY	HIS	LEU	LYS	ARG	ASN	ILE	VAL	VAL	LYS	THR	VAL	GLU	GLU	MET	ARG	ASP	GLY	GLY	GLU	VAL	ILE	LYS	ASP	SER	LYS	GLN	GLU	HIS	LYS	ASP	VAL	VAL	MET
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- Molecule 1: Glial fibrillary acidic protein



GLU	THR	ARG	ALA	GLU	ARG	ALA	GLU	MET	MET	GLU	LEU	ASN	ASP	ARG	PHE	ALA	SER	TYR	ILE	GLU	GLY	LYS	VAL	ARG	PHE	LEU	GLU	GLN	GLN	ASN	LYS	ALA	ALA	ALA	GLU	GLU	LEU	ASN	ASN	GLN	LEU	ARG	LYS	LEU	ALA	ALA	GLU	ASP	VAL	TYR	GLN	ALA	GLU	LEU	ARG	GLY	LEU
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ARG	ARG	ARG	LEU	LEU	ASP	GLN	LEU	THR	ALA	ASN	SER	ALA	ARG	GLU	VAL	GLU	ARG	ASP	ASP	PHE	ALA	ALA	GLN	ASP	LEU	GLY	THR	LEU	ARG	GLN	LYS	LEU	GLN	ASP	GLU	THR	ASN	LEU	ARG	LEU	LEU	GLU	GLU	ALA	GLU	ASN	ASN	ALA	LEU	THR	ARG	TYR	ARG	Q171	Q244	Q215	Q216	Q217	H218	V219	E220	W221
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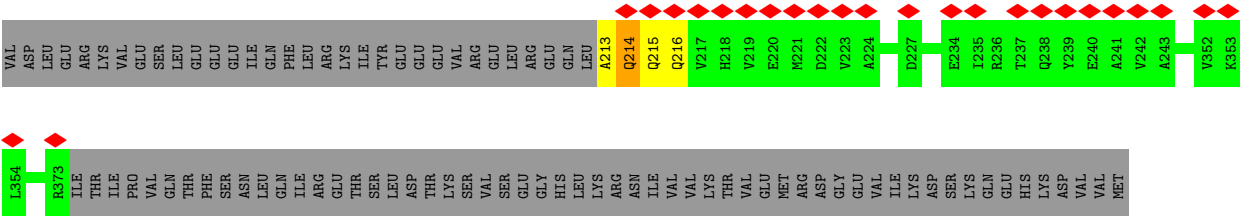
D222	V223	A224	K225	P226	D227	L228	L328	GLU	GLU	GLU	GLY	GLN	SER	LEU	LYS	GLU	GLU	GLU	MET	ALA	ARG	HIS	LEU	GLN	GLU	TYR	GLN	ASP	LEU	LEU	ASN	VAL	LYS	VAL	LEU	ALA	LEU	ASP	ILE	GLU	ILE	ALA	THR	TYR	ARG	LYS	LEU	LEU	GLU	GLY	GLU	GLU	ASN	ASN	ARG	ILE	THR	ILE	PRO	VAL	GLN
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THR	PHE	SER	ASN	LEU	GLN	ILE	ARG	GLU	THR	SER	ASP	THR	LYS	SER	SER	GLY	HIS	LEU	LEU	ARG	ASN	ILE	VAL	VAL	LYS	THR	THR	GLU	VAL	GLU	MET	ARG	ASP	ASP	GLY	GLU	VAL	ILE	LYS	ASP	SER	LYS	GLN	GLU	HIS	LYS	ASP	VAL	VAL	MET
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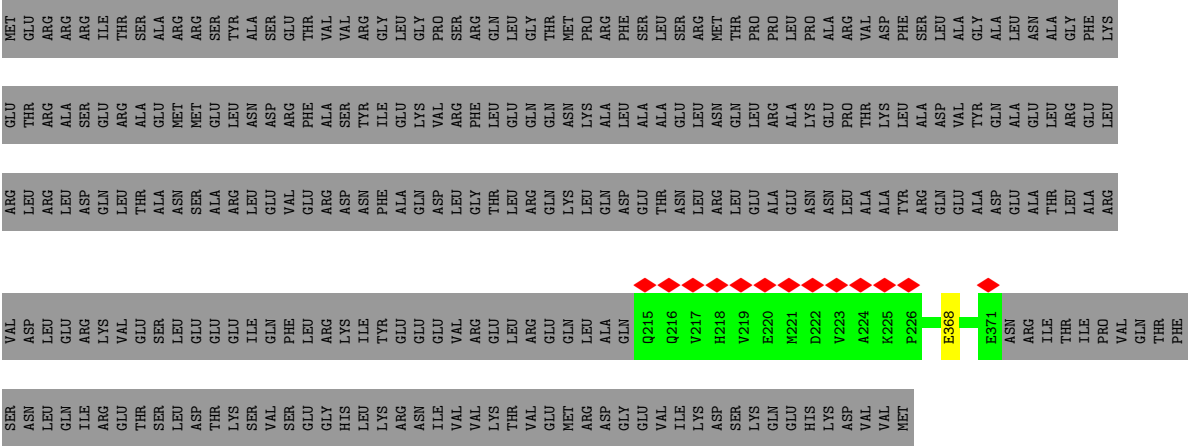
- Molecule 1: Glial fibrillary acidic protein

[illegible]





• Molecule 1: Glial fibrillary acidic protein

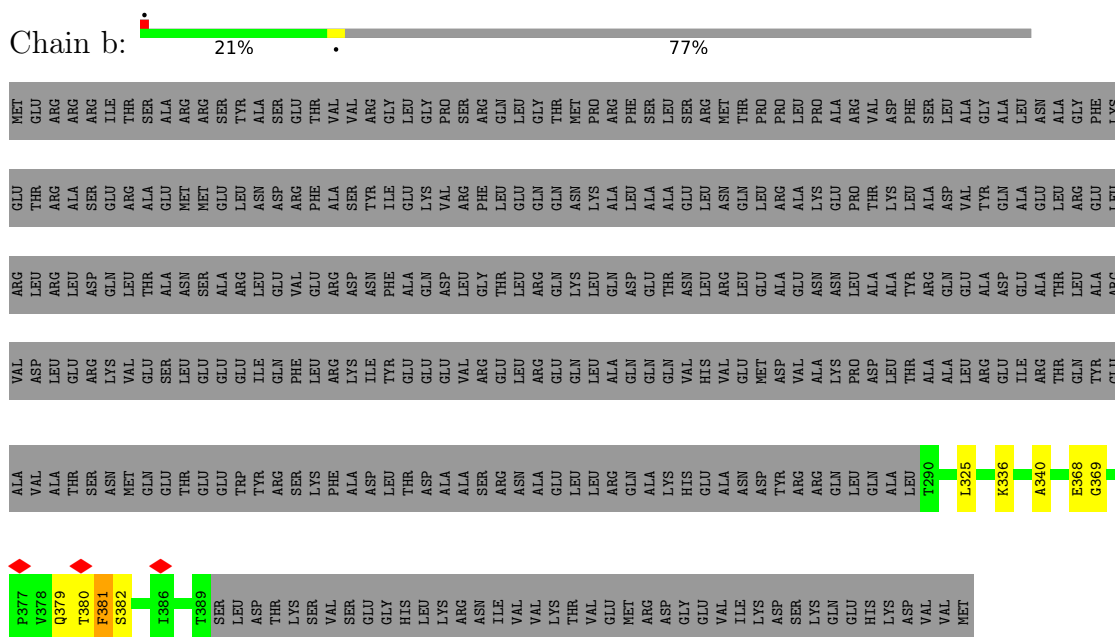


• Molecule 1: Glial fibrillary acidic protein

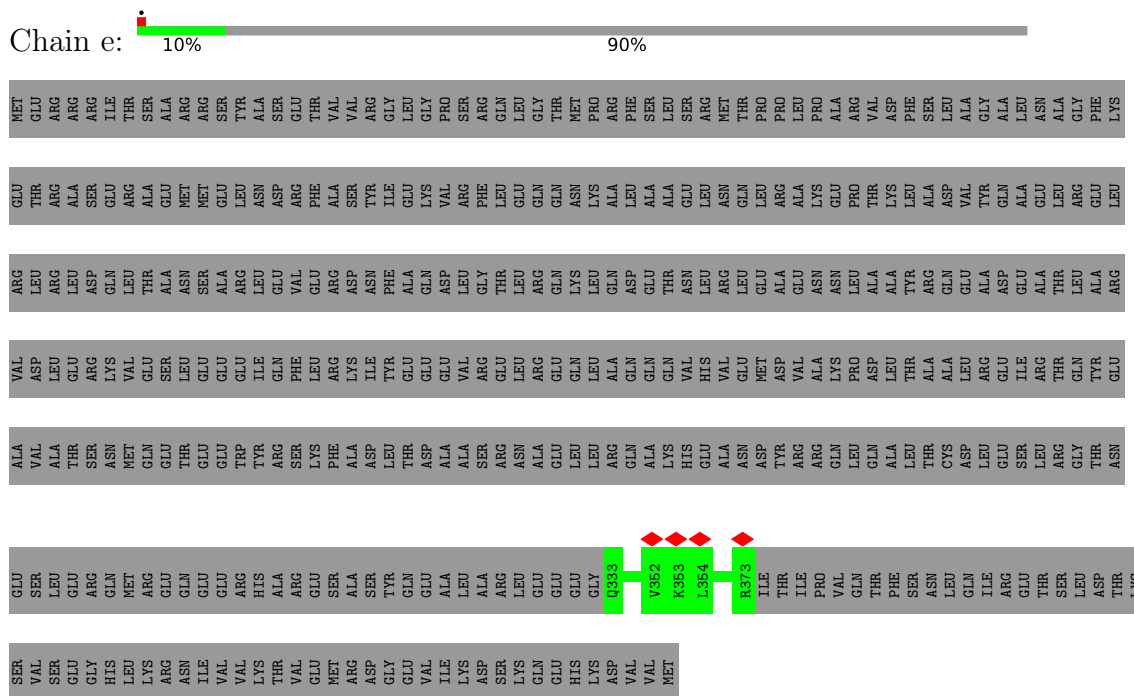


• Molecule 1: Glial fibrillary acidic protein

- Molecule 1: Glial fibrillary acidic protein



- Molecule 1: Glial fibrillary acidic protein



- Molecule 1: Glial fibrillary acidic protein

- Molecule 1: Glial fibrillary acidic protein



4 Experimental information

Property	Value	Source
EM reconstruction method	HELICAL	Depositor
Imposed symmetry	HELICAL, twist=127°, rise=63.3 Å, axial sym=C1	Depositor
Number of segments used	236160	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	3500	Depositor
Magnification	81000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.021	Depositor
Minimum map value	-0.004	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.007	Depositor
Map size (Å)	311.80798, 311.80798, 311.80798	wwPDB
Map dimensions	232, 232, 232	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.344, 1.344, 1.344	Depositor

5 Model quality

5.1 Standard geometry

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	0.83	0/171	1.61	1/212 (0.5%)
1	6	0.28	0/31	0.73	0/37
1	9	0.66	0/91	1.25	0/112
1	A	0.66	0/623	1.29	5/777 (0.6%)
1	AC	0.63	0/275	1.38	0/342
1	AD	0.68	0/335	1.22	2/417 (0.5%)
1	AG	0.64	0/443	1.23	0/552
1	AH	0.72	0/507	1.23	0/632
1	AK	0.62	0/599	1.14	0/747
1	AL	0.69	0/631	1.20	0/787
1	AM	0.88	0/91	1.61	0/112
1	AN	1.63	1/123 (0.8%)	1.80	1/152 (0.7%)
1	AO	0.59	0/627	1.13	0/782
1	AP	0.59	0/623	1.13	0/777
1	AQ	0.88	0/255	1.43	2/317 (0.6%)
1	AR	1.26	1/275 (0.4%)	1.87	5/342 (1.5%)
1	AS	0.58	0/623	1.09	1/777 (0.1%)
1	AT	0.61	0/631	1.15	0/787
1	AU	0.82	0/443	1.38	2/552 (0.4%)
1	AV	1.16	1/447 (0.2%)	1.70	7/557 (1.3%)
1	B	0.65	0/623	1.23	0/777
1	C	0.74	0/611	1.34	1/762 (0.1%)
1	D	1.14	2/631 (0.3%)	1.55	11/787 (1.4%)
1	E	0.70	0/643	1.28	1/802 (0.1%)
1	F	0.79	1/639 (0.2%)	1.41	4/797 (0.5%)
1	G	0.71	0/643	1.24	1/802 (0.1%)
1	H	0.81	0/619	1.30	3/772 (0.4%)
1	I	0.73	0/507	1.36	0/632
1	J	0.79	0/535	1.39	0/667
1	K	0.61	0/647	1.12	1/807 (0.1%)
1	L	0.58	0/643	1.11	0/802
1	M	0.78	0/323	1.43	0/402
1	N	1.08	0/355	1.70	9/442 (2.0%)
1	O	0.64	0/647	1.17	1/807 (0.1%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	P	0.58	0/631	1.13	0/787
1	Q	0.76	0/159	1.38	2/197 (1.0%)
1	R	0.90	0/191	1.63	1/237 (0.4%)
1	S	0.65	0/643	1.22	2/802 (0.2%)
1	T	0.72	0/627	1.35	1/782 (0.1%)
1	V	0.74	0/19	1.78	0/22
1	W	0.64	0/511	1.24	0/637
1	X	0.85	1/579 (0.2%)	1.39	1/722 (0.1%)
1	a	0.60	0/343	1.12	0/427
1	b	1.03	2/399 (0.5%)	1.57	6/497 (1.2%)
1	e	0.65	0/163	1.31	0/202
1	f	0.94	0/231	1.65	3/287 (1.0%)
1	j	1.14	0/67	1.20	0/82
All	All	0.76	9/20473 (0.0%)	1.31	74/25509 (0.3%)

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	89	GLN	C-O	-5.88	1.17	1.24
1	D	98	LEU	C-O	5.84	1.31	1.24
1	AN	61	GLU	C-O	5.73	1.31	1.24
1	b	325	LEU	C-O	5.72	1.30	1.24
1	D	68	ALA	C-O	5.65	1.30	1.24
1	AR	63	ARG	C-O	5.58	1.30	1.24
1	X	377	PRO	N-CA	-5.34	1.41	1.47
1	AV	107	THR	N-CA	5.08	1.52	1.46
1	b	336	LYS	C-O	5.07	1.30	1.24

All (74) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	0	372	ASN	N-CA-C	10.29	122.38	107.88
1	S	215	GLN	N-CA-C	-9.59	101.34	113.43
1	F	93	ALA	N-CA-C	-8.29	102.33	111.36
1	b	369	GLY	N-CA-C	8.22	123.71	114.67
1	f	335	LEU	N-CA-C	-8.10	102.39	111.71
1	b	381	PHE	N-CA-C	-7.93	102.68	113.30
1	AU	103	ALA	N-CA-C	7.78	120.65	111.71
1	S	216	GLN	N-CA-C	-7.73	104.34	113.38
1	T	368	GLU	N-CA-C	7.57	120.41	111.71
1	f	369	GLY	N-CA-C	7.02	121.16	112.73
1	F	89	GLN	N-CA-C	-6.93	102.94	111.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	b	380	THR	N-CA-C	6.90	120.49	110.28
1	b	340	ALA	CA-C-N	6.87	129.37	120.44
1	b	340	ALA	C-N-CA	6.87	129.37	120.44
1	f	368	GLU	N-CA-C	6.55	120.37	112.38
1	AR	107	THR	N-CA-C	6.48	119.17	111.71
1	D	106	PRO	CA-C-N	6.46	129.58	120.28
1	D	106	PRO	C-N-CA	6.46	129.58	120.28
1	F	99	ASN	N-CA-C	6.43	119.28	111.82
1	N	101	LEU	N-CA-C	6.42	120.82	113.19
1	R	57	ALA	N-CA-C	6.35	119.88	111.75
1	Q	72	GLU	CA-C-N	6.30	129.36	120.28
1	Q	72	GLU	C-N-CA	6.30	129.36	120.28
1	E	213	ALA	N-CA-C	6.26	118.11	111.28
1	K	214	GLN	N-CA-C	6.26	117.90	111.14
1	D	98	LEU	CA-C-O	-6.17	113.13	120.10
1	G	214	GLN	N-CA-C	6.13	117.76	111.14
1	A	105	GLU	CA-C-N	6.11	125.79	119.56
1	A	105	GLU	C-N-CA	6.11	125.79	119.56
1	AS	213	ALA	N-CA-C	6.08	119.54	111.75
1	AV	107	THR	CA-C-N	6.03	128.96	120.28
1	AV	107	THR	C-N-CA	6.03	128.96	120.28
1	AD	307	MET	CA-C-N	5.97	128.21	120.44
1	AD	307	MET	C-N-CA	5.97	128.21	120.44
1	N	99	ASN	CA-C-N	5.92	128.81	120.28
1	N	99	ASN	C-N-CA	5.92	128.81	120.28
1	N	98	LEU	CA-C-O	-5.92	114.60	120.70
1	H	94	LEU	CA-C-N	5.91	128.48	120.38
1	H	94	LEU	C-N-CA	5.91	128.48	120.38
1	AU	73	LEU	N-CA-C	5.76	117.24	111.07
1	X	368	GLU	N-CA-C	5.73	118.46	111.82
1	A	105	GLU	N-CA-C	5.72	117.82	109.30
1	D	98	LEU	O-C-N	5.71	128.90	122.22
1	D	104	LYS	N-CA-C	5.69	116.91	108.60
1	D	83	LYS	CA-C-N	5.64	128.49	120.53
1	D	83	LYS	C-N-CA	5.64	128.49	120.53
1	AR	57	ALA	CA-C-N	5.60	127.18	120.13
1	AR	57	ALA	C-N-CA	5.60	127.18	120.13
1	H	94	LEU	CA-C-O	-5.60	115.14	120.90
1	N	98	LEU	N-CA-C	5.57	117.15	111.14
1	AR	98	LEU	N-CA-C	-5.56	105.12	111.07
1	AN	60	LYS	O-C-N	-5.55	115.83	122.15
1	AR	77	PHE	CA-C-O	-5.53	115.02	120.82

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	107	THR	N-CA-C	5.52	118.06	111.71
1	N	105	GLU	CA-C-N	5.46	125.14	119.56
1	N	105	GLU	C-N-CA	5.46	125.14	119.56
1	b	368	GLU	N-CA-C	5.46	118.15	111.82
1	N	100	GLN	N-CA-C	5.45	117.98	111.71
1	AQ	71	MET	CA-C-N	5.45	127.84	120.38
1	AQ	71	MET	C-N-CA	5.45	127.84	120.38
1	C	103	ALA	N-CA-C	5.43	120.28	111.37
1	AV	57	ALA	CA-C-N	5.41	126.94	120.13
1	AV	57	ALA	C-N-CA	5.41	126.94	120.13
1	A	104	LYS	CA-C-N	5.39	128.58	122.59
1	A	104	LYS	C-N-CA	5.39	128.58	122.59
1	F	94	LEU	N-CA-C	-5.28	105.61	111.36
1	AV	103	ALA	CA-C-O	-5.27	115.31	121.10
1	N	102	ARG	O-C-N	-5.21	115.66	122.59
1	D	88	GLU	N-CA-C	-5.21	104.86	111.11
1	O	214	GLN	N-CA-C	5.14	119.18	113.01
1	D	92	LYS	N-CA-C	-5.13	105.69	111.28
1	AV	58	GLY	CA-C-N	5.13	127.46	120.54
1	AV	58	GLY	C-N-CA	5.13	127.46	120.54
1	D	95	ALA	N-CA-C	-5.03	105.08	111.11

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	0	172	86	43	0	0
1	6	32	16	7	0	0
1	9	92	47	24	0	0
1	A	624	311	155	0	0
1	AC	276	140	72	0	0
1	AD	336	169	86	1	0
1	AG	444	225	116	0	0
1	AH	508	256	131	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	AK	600	302	154	0	0
1	AL	632	317	161	0	0
1	AM	92	47	24	0	0
1	AN	124	63	32	0	0
1	AO	628	315	159	0	0
1	AP	624	313	158	0	0
1	AQ	256	128	64	0	0
1	AR	276	138	69	2	0
1	AS	624	313	158	0	0
1	AT	632	317	160	0	0
1	AU	444	223	113	0	0
1	AV	448	225	114	3	0
1	B	624	311	155	0	0
1	C	612	307	155	0	0
1	D	632	317	160	1	0
1	E	644	322	161	0	0
1	F	640	320	160	0	0
1	G	644	321	160	0	0
1	H	620	309	154	1	0
1	I	508	254	127	0	0
1	J	536	269	136	1	0
1	K	648	324	162	0	0
1	L	644	322	161	0	0
1	M	324	161	79	0	0
1	N	356	178	89	0	0
1	O	648	324	162	0	0
1	P	632	316	158	0	0
1	Q	160	80	39	0	0
1	R	192	97	49	1	0
1	S	644	324	165	1	0
1	T	628	316	161	0	0
1	V	20	11	6	0	0
1	W	512	259	133	0	0
1	X	580	292	149	0	0
1	a	344	175	91	0	0
1	b	400	202	104	1	0
1	e	164	83	42	0	0
1	f	232	117	60	1	0
1	j	68	33	15	1	0
All	All	20520	10295	5193	11	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 0.

All (11) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:S:213:ALA:O	1:S:214:GLN:C	2.24	0.81
1:AD:379:GLN:CA	1:J:102:ARG:CA	2.82	0.57
1:R:101:LEU:O	1:R:102:ARG:C	2.50	0.54
1:AR:100:GLN:O	1:AR:101:LEU:C	2.51	0.52
1:b:381:PHE:O	1:b:382:SER:C	2.54	0.50
1:AR:72:GLU:O	1:AR:73:LEU:C	2.54	0.49
1:AV:100:GLN:O	1:AV:102:ARG:N	2.46	0.48
1:H:98:LEU:C	1:j:378:VAL:O	2.60	0.45
1:AV:85:ARG:O	1:AV:89:GLN:CA	2.68	0.42
1:AV:99:ASN:O	1:AV:100:GLN:C	2.62	0.41
1:D:99:ASN:O	1:f:378:VAL:CA	2.70	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	0	41/430 (10%)	38 (93%)	3 (7%)	0	100	100
1	6	6/430 (1%)	5 (83%)	1 (17%)	0	100	100
1	9	21/430 (5%)	21 (100%)	0	0	100	100
1	A	154/430 (36%)	153 (99%)	1 (1%)	0	100	100
1	AC	67/430 (16%)	67 (100%)	0	0	100	100
1	AD	82/430 (19%)	76 (93%)	5 (6%)	1 (1%)	10	44
1	AG	109/430 (25%)	109 (100%)	0	0	100	100
1	AH	125/430 (29%)	121 (97%)	4 (3%)	0	100	100
1	AK	148/430 (34%)	148 (100%)	0	0	100	100
1	AL	156/430 (36%)	152 (97%)	3 (2%)	1 (1%)	21	59

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	AM	21/430 (5%)	20 (95%)	1 (5%)	0	100	100
1	AN	29/430 (7%)	28 (97%)	1 (3%)	0	100	100
1	AO	155/430 (36%)	155 (100%)	0	0	100	100
1	AP	154/430 (36%)	153 (99%)	1 (1%)	0	100	100
1	AQ	62/430 (14%)	61 (98%)	0	1 (2%)	7	38
1	AR	67/430 (16%)	64 (96%)	3 (4%)	0	100	100
1	AS	154/430 (36%)	154 (100%)	0	0	100	100
1	AT	156/430 (36%)	155 (99%)	1 (1%)	0	100	100
1	AU	109/430 (25%)	106 (97%)	3 (3%)	0	100	100
1	AV	110/430 (26%)	103 (94%)	5 (4%)	2 (2%)	6	34
1	B	154/430 (36%)	152 (99%)	2 (1%)	0	100	100
1	C	151/430 (35%)	147 (97%)	4 (3%)	0	100	100
1	D	156/430 (36%)	150 (96%)	3 (2%)	3 (2%)	6	32
1	E	159/430 (37%)	158 (99%)	1 (1%)	0	100	100
1	F	158/430 (37%)	151 (96%)	7 (4%)	0	100	100
1	G	159/430 (37%)	156 (98%)	2 (1%)	1 (1%)	21	59
1	H	153/430 (36%)	150 (98%)	3 (2%)	0	100	100
1	I	125/430 (29%)	124 (99%)	1 (1%)	0	100	100
1	J	132/430 (31%)	130 (98%)	2 (2%)	0	100	100
1	K	160/430 (37%)	159 (99%)	1 (1%)	0	100	100
1	L	159/430 (37%)	157 (99%)	2 (1%)	0	100	100
1	M	79/430 (18%)	77 (98%)	2 (2%)	0	100	100
1	N	87/430 (20%)	83 (95%)	4 (5%)	0	100	100
1	O	160/430 (37%)	159 (99%)	1 (1%)	0	100	100
1	P	156/430 (36%)	154 (99%)	2 (1%)	0	100	100
1	Q	38/430 (9%)	38 (100%)	0	0	100	100
1	R	46/430 (11%)	46 (100%)	0	0	100	100
1	S	159/430 (37%)	157 (99%)	1 (1%)	1 (1%)	21	59
1	T	155/430 (36%)	154 (99%)	1 (1%)	0	100	100
1	V	3/430 (1%)	3 (100%)	0	0	100	100
1	W	126/430 (29%)	126 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	X	143/430 (33%)	142 (99%)	1 (1%)	0	100	100
1	a	84/430 (20%)	84 (100%)	0	0	100	100
1	b	98/430 (23%)	94 (96%)	3 (3%)	1 (1%)	12	48
1	e	39/430 (9%)	39 (100%)	0	0	100	100
1	f	56/430 (13%)	53 (95%)	2 (4%)	1 (2%)	6	34
1	j	15/430 (4%)	14 (93%)	1 (7%)	0	100	100
All	All	5036/20210 (25%)	4946 (98%)	78 (2%)	12 (0%)	44	78

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	AQ	105	GLU
1	AV	105	GLU
1	D	93	ALA
1	D	103	ALA
1	S	214	GLN
1	b	379	GLN
1	AD	374	ILE
1	AV	101	LEU
1	D	57	ALA
1	G	103	ALA
1	f	377	PRO
1	AL	374	ILE

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](#)

There are no chain breaks in this entry.

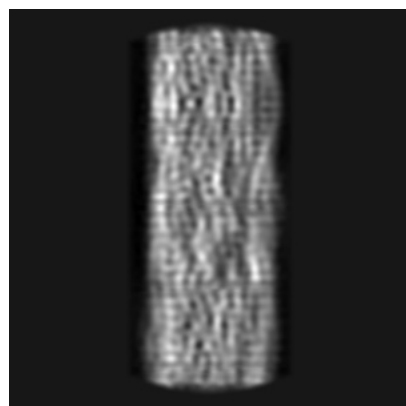
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-55327. These allow visual inspection of the internal detail of the map and identification of artifacts.

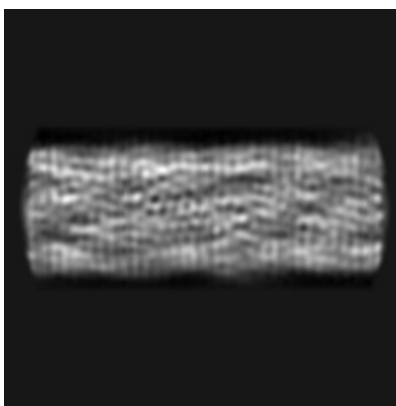
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

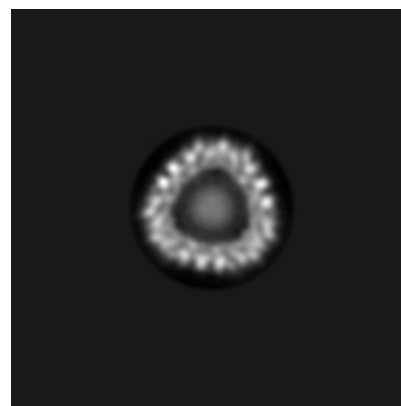
6.1.1 Primary map



X

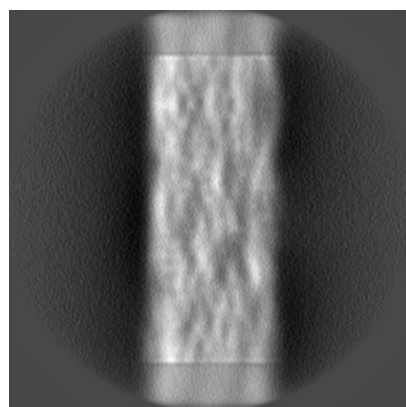


Y

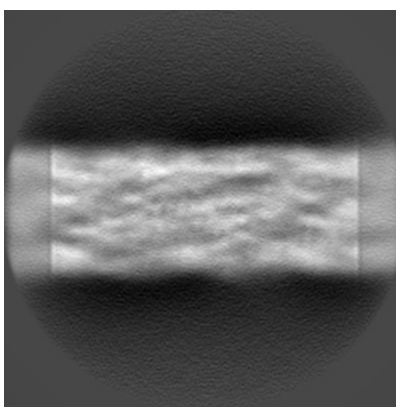


Z

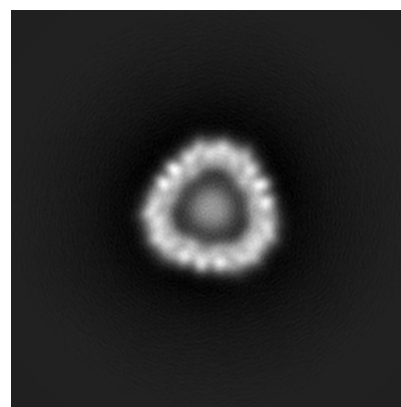
6.1.2 Raw map



X



Y

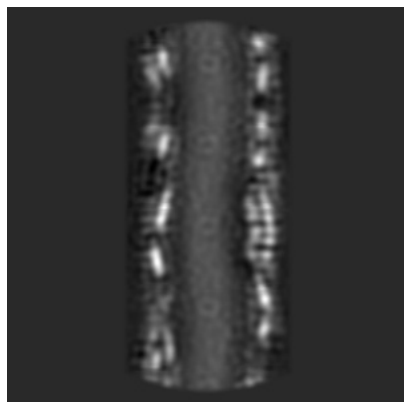


Z

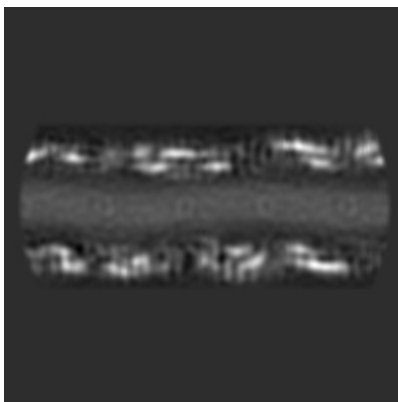
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

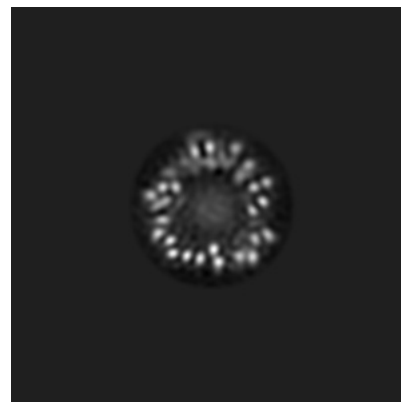
6.2.1 Primary map



X Index: 116

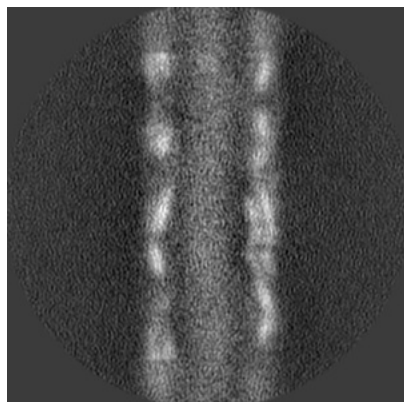


Y Index: 116

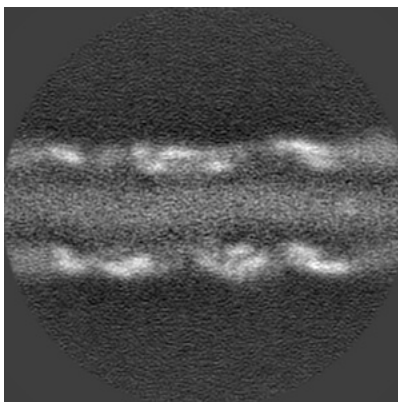


Z Index: 116

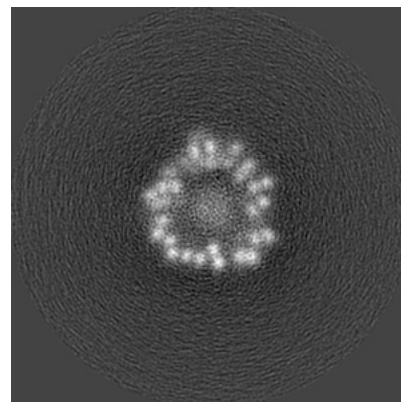
6.2.2 Raw map



X Index: 116



Y Index: 116

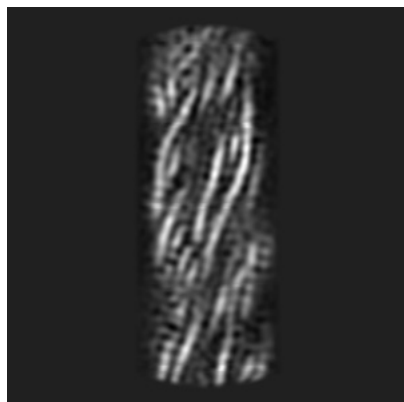


Z Index: 116

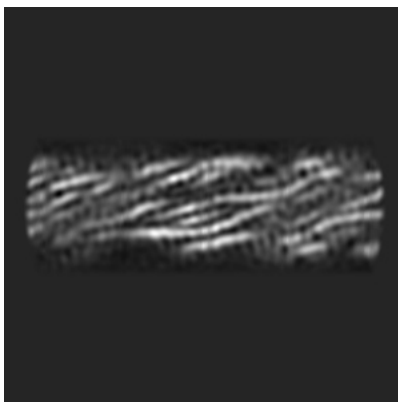
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

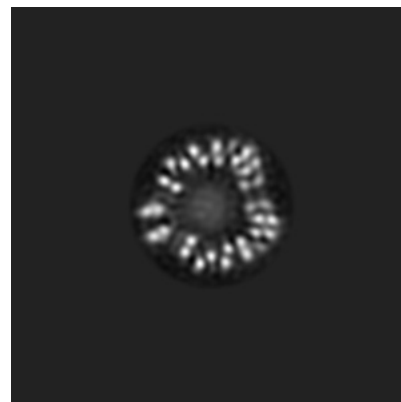
6.3.1 Primary map



X Index: 140

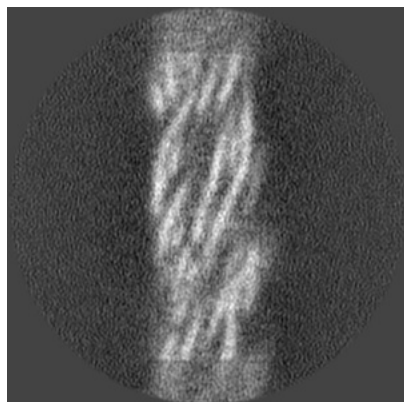


Y Index: 88

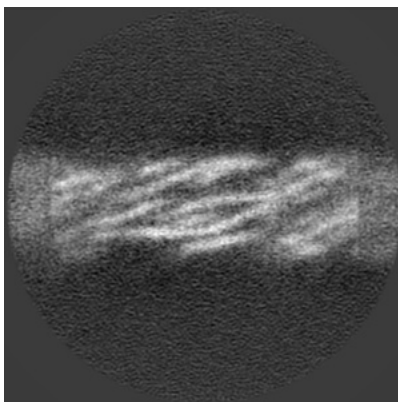


Z Index: 82

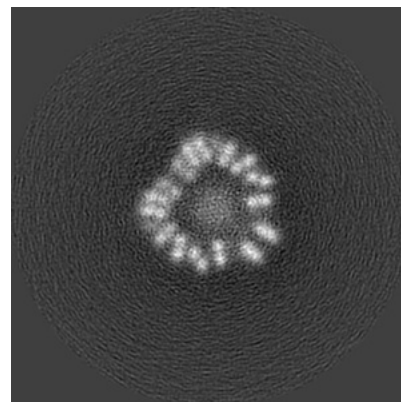
6.3.2 Raw map



X Index: 141



Y Index: 88

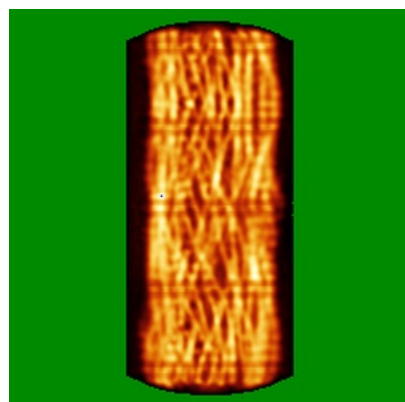


Z Index: 129

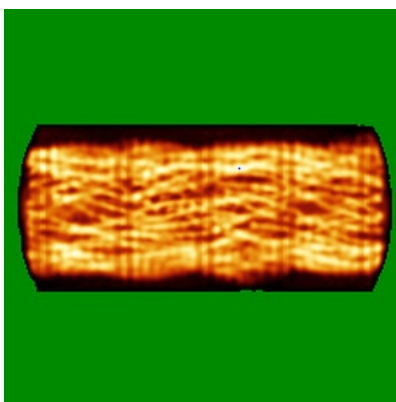
The images above show the largest variance slices of the map in three orthogonal directions.

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

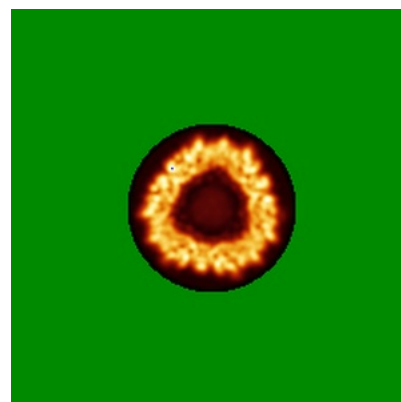
6.4.1 Primary map



X

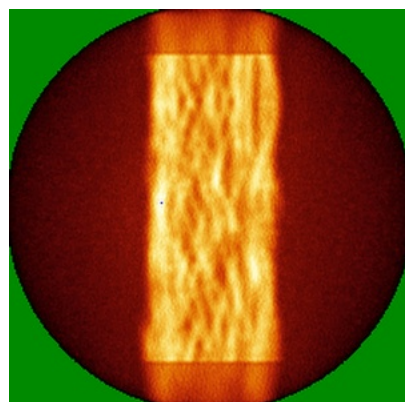


Y

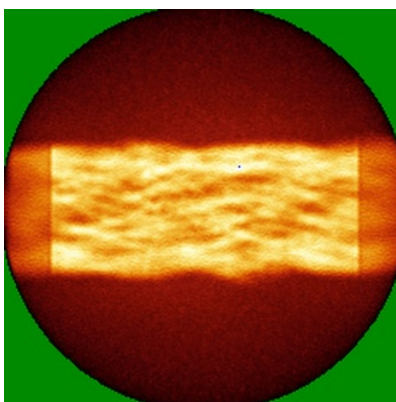


Z

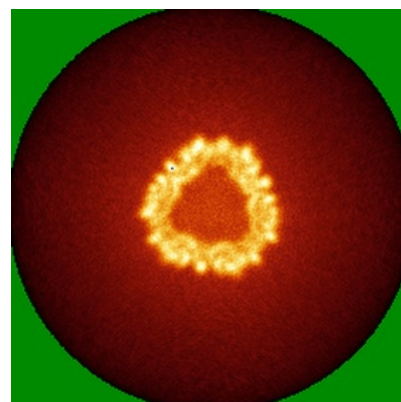
6.4.2 Raw map



X



Y



Z

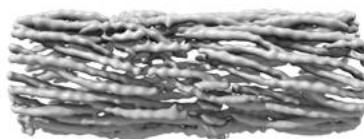
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views [i](#)

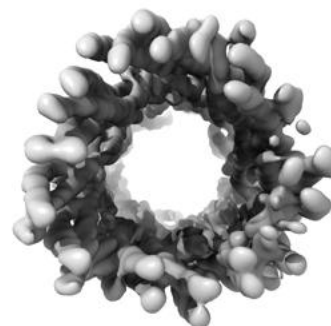
6.5.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.007. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

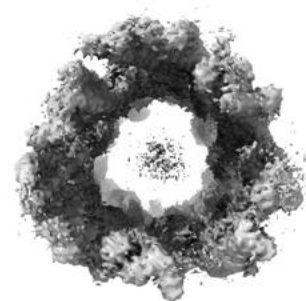
6.5.2 Raw map



X



Y



Z

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.

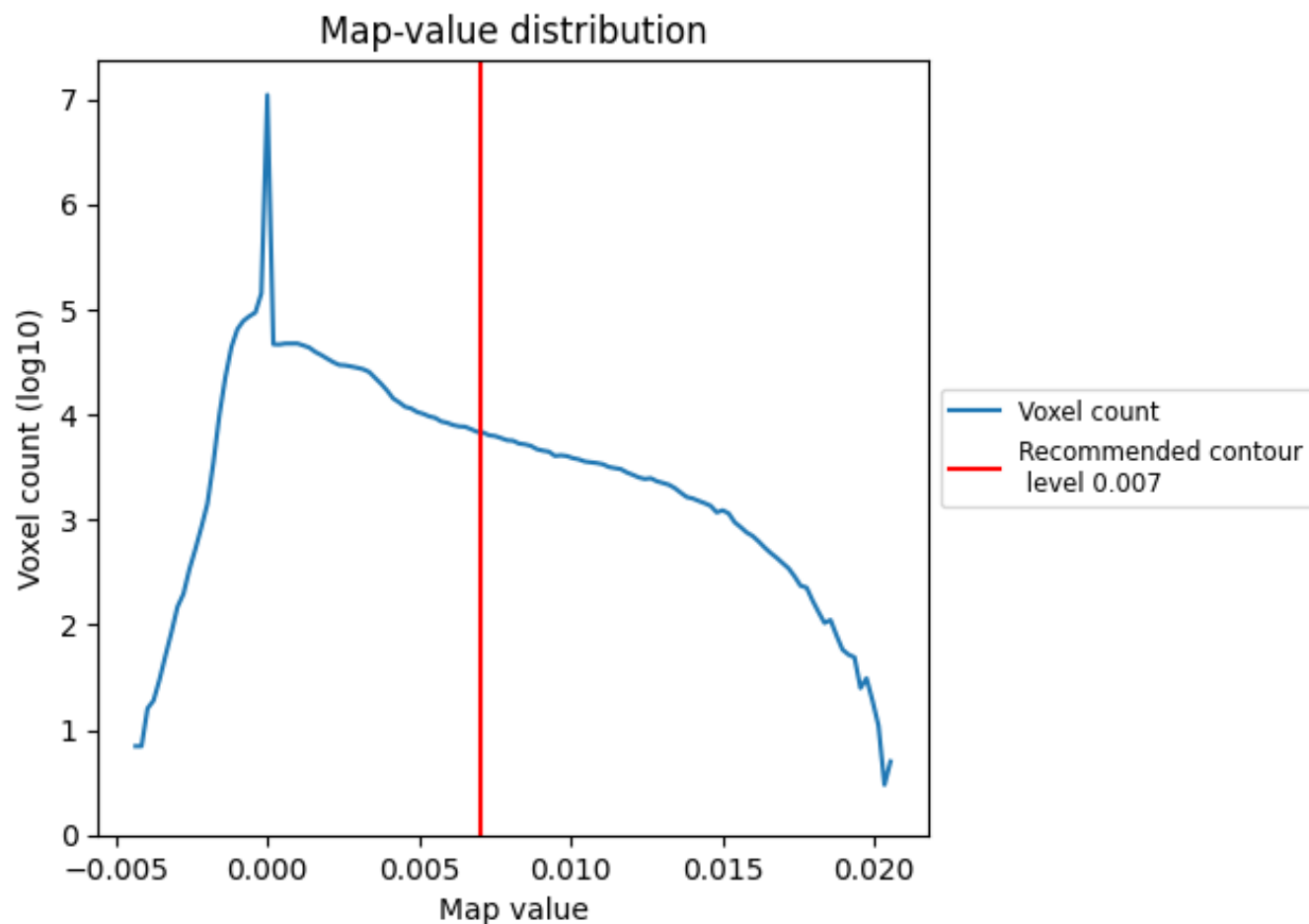
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

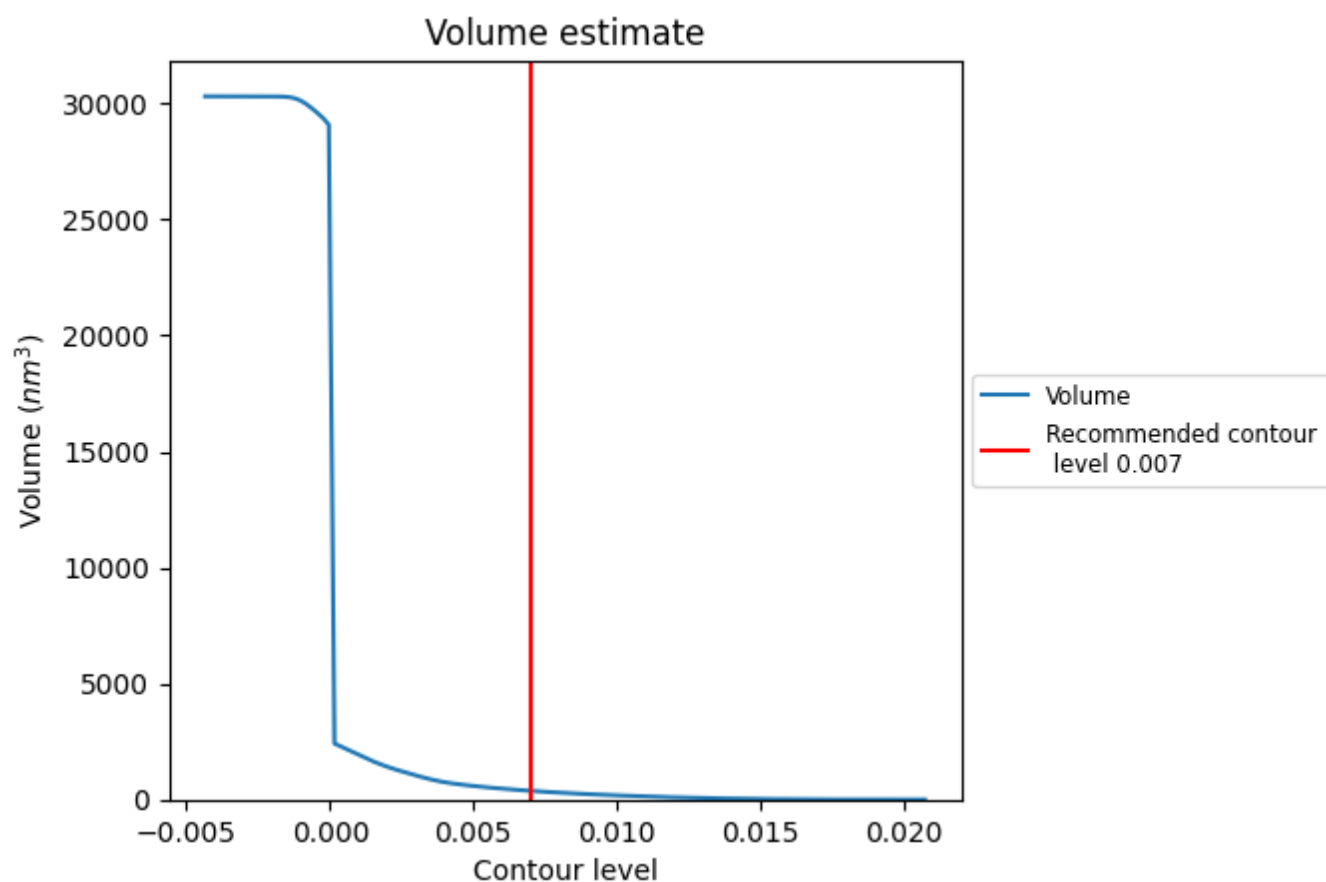
This section contains the results of statistical analysis of the map.

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.

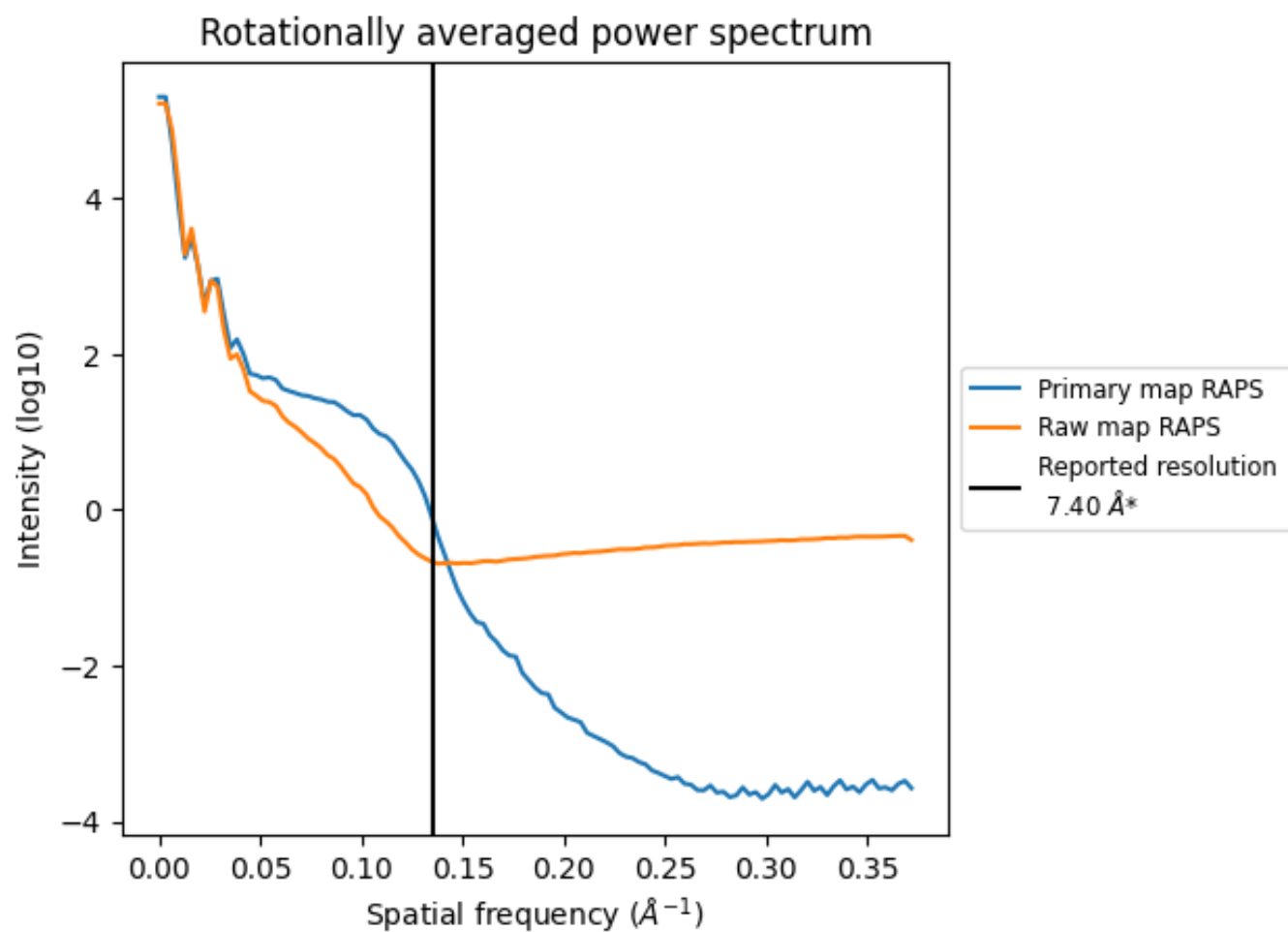
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 375 nm³; this corresponds to an approximate mass of 339 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](#)

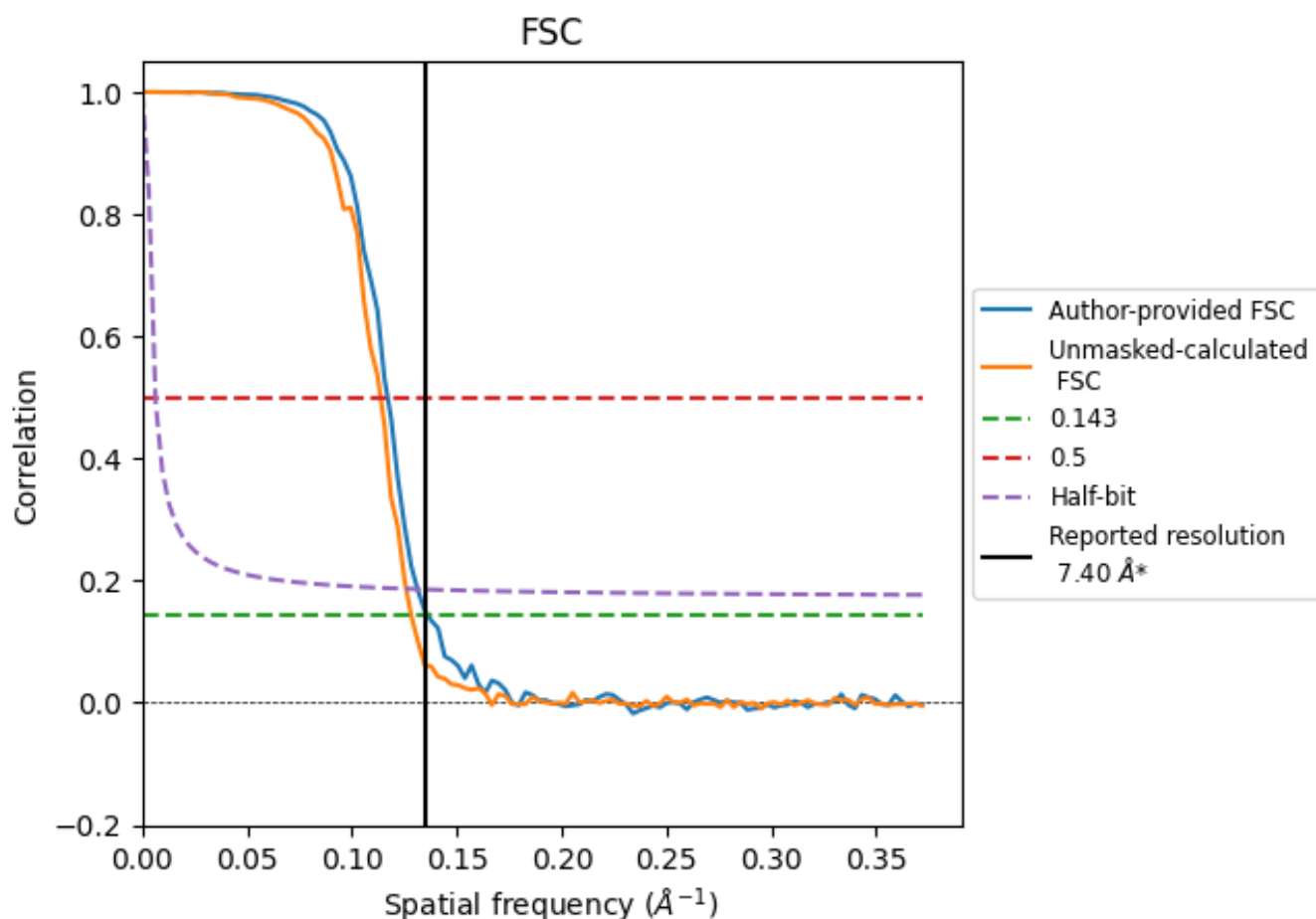


*Reported resolution corresponds to spatial frequency of 0.135 $\text{\AA}^{-1}$

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](#)



*Reported resolution corresponds to spatial frequency of 0.135 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

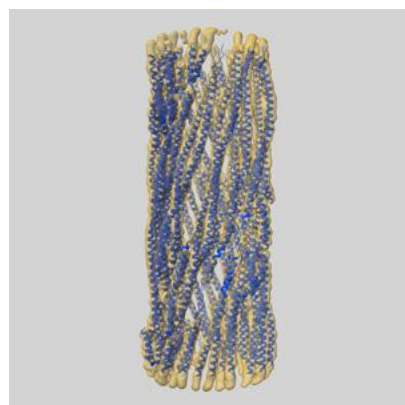
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	7.40	-	-
Author-provided FSC curve	7.34	8.55	7.62
Unmasked-calculated*	7.79	8.80	7.94

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-55327 and PDB model 9SWW. Per-residue inclusion information can be found in section 3 on page 8.

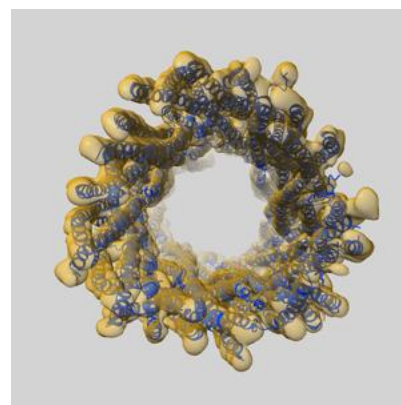
9.1 Map-model overlay [i](#)



X



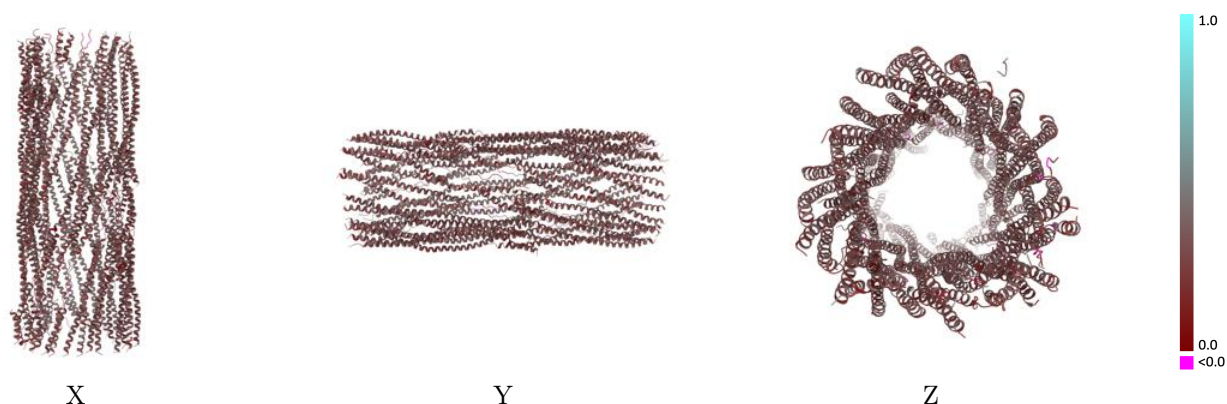
Y



Z

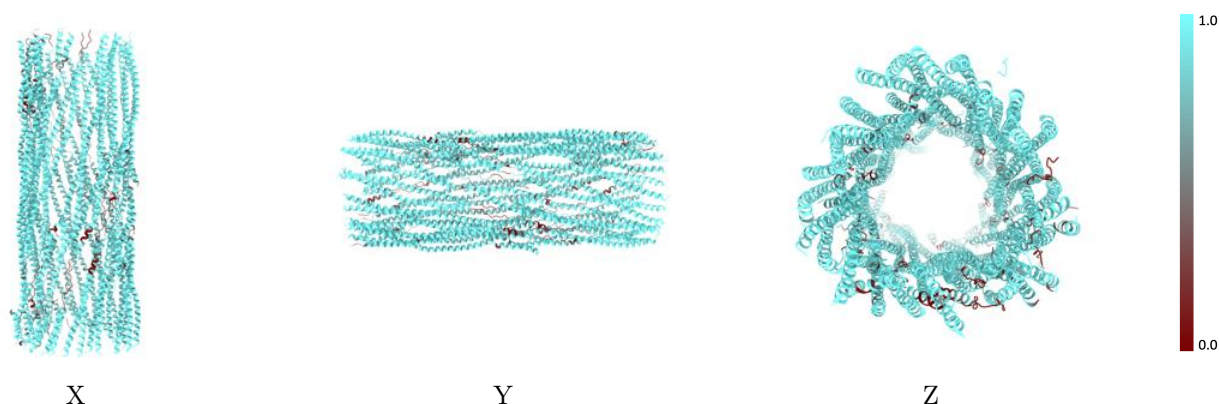
The images above show the 3D surface view of the map at the recommended contour level 0.007 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



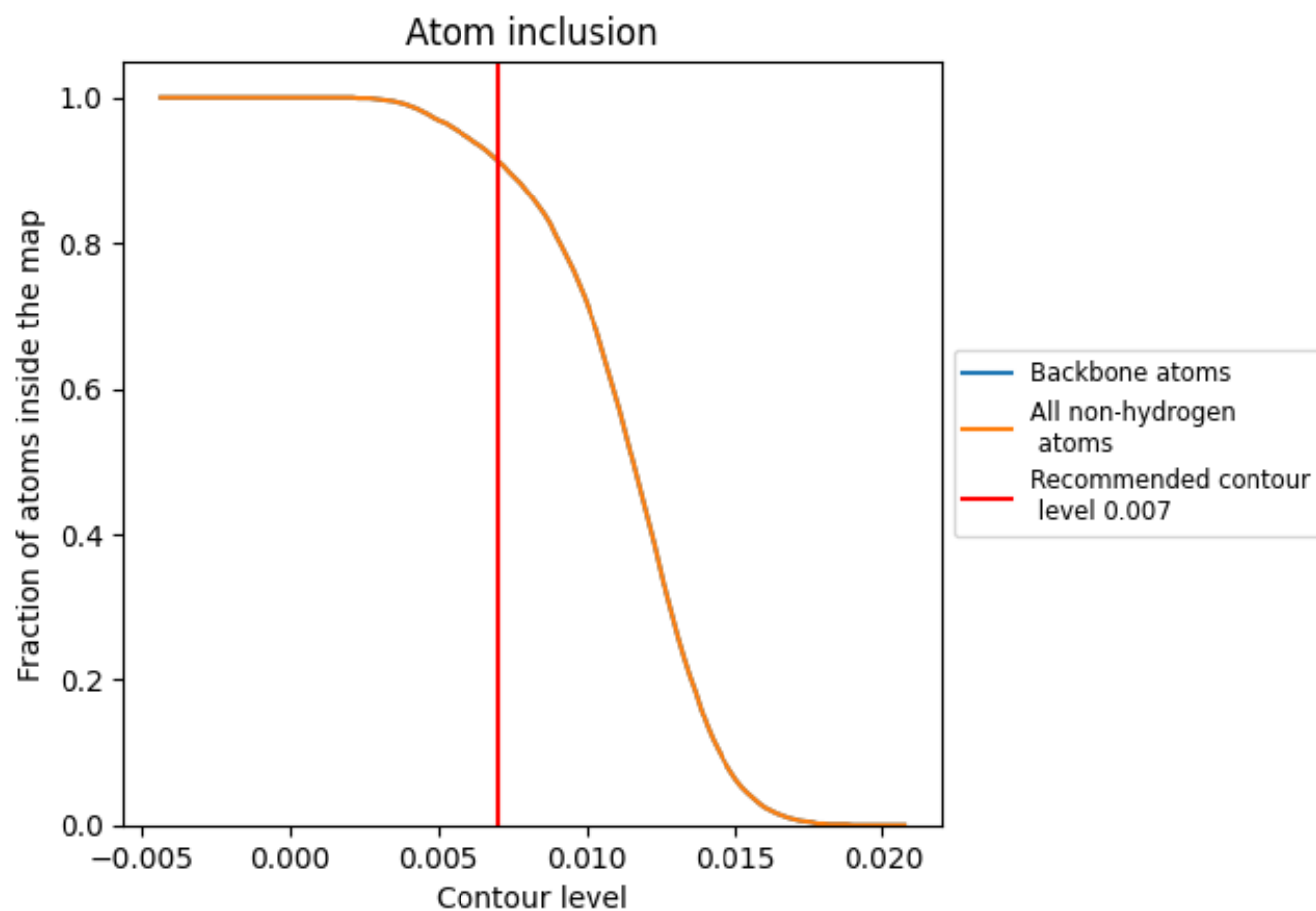
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.007).

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 ⓘ

The table lists the average atom inclusion at the recommended contour level (0.007) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9150	 0.3000
0	 0.8720	 0.3030
6	 0.3750	 0.2420
9	 0.8480	 0.2730
A	 0.8700	 0.2940
AC	 0.9350	 0.2940
AD	 0.8810	 0.2870
AG	 0.9690	 0.2960
AH	 0.9210	 0.3000
AK	 0.9150	 0.2960
AL	 0.9590	 0.3060
AM	 0.8700	 0.2810
AN	 0.9520	 0.3160
AO	 0.8770	 0.2990
AP	 0.9260	 0.3140
AQ	 0.9020	 0.2740
AR	 0.9640	 0.3180
AS	 0.8700	 0.2990
AT	 0.9330	 0.3060
AU	 0.9460	 0.2940
AV	 0.9710	 0.2950
B	 0.9280	 0.3030
C	 0.9510	 0.2970
D	 0.9780	 0.3050
E	 0.9220	 0.2910
F	 0.9440	 0.2990
G	 0.8370	 0.2890
H	 0.8850	 0.2940
I	 0.9720	 0.3100
J	 0.9800	 0.3100
K	 0.8570	 0.2970
L	 0.9150	 0.3040
M	 0.9540	 0.2970
N	 0.9580	 0.3080
O	 0.8600	 0.3020



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Chain	Atom inclusion	Q-score
P	 0.9110	 0.3150
Q	 0.9440	 0.2960
R	 0.9740	 0.3100
S	 0.8280	 0.2900
T	 0.9120	 0.3000
V	 1.0000	 0.4070
W	 0.9590	 0.3030
X	 0.9430	 0.3000
a	 0.9540	 0.2990
b	 0.9380	 0.3080
e	 0.8780	 0.2970
f	 0.8450	 0.2790
j	 0.5740	 0.2140