



wwPDB EM Validation Summary Report ⓘ

Mar 5, 2026 – 03:28 PM UTC

PDB ID : 8RJK / pdb_00008rjk
EMDB ID : EMD-19250
Title : Pseudoatomic model of a second-order Sierpinski triangle formed by the citrate synthase from *Synechococcus elongatus*
Authors : Lo, Y.K.; Bohn, S.; Sendker, F.L.; Schuller, J.M.; Hochberg, G.
Deposited on : 2023-12-21
Resolution : 5.91 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 ⓘ 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:

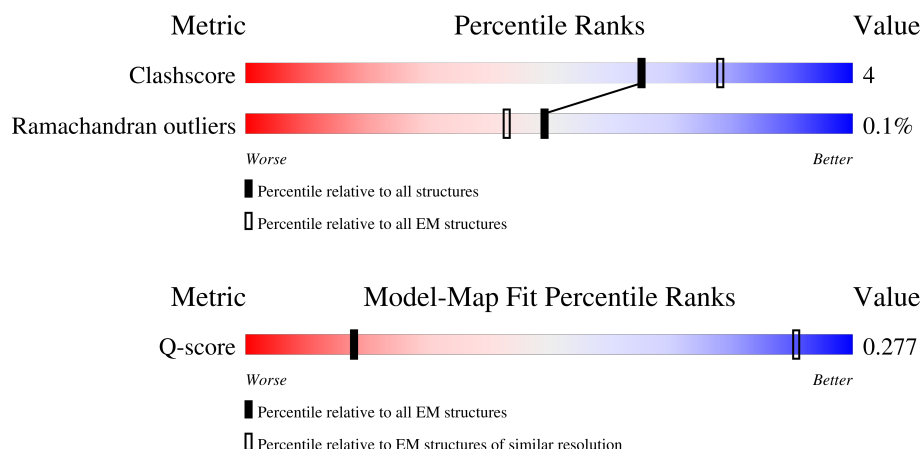
EMDB validation analysis : 0.0.1.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

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 5.91 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.



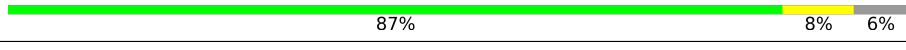
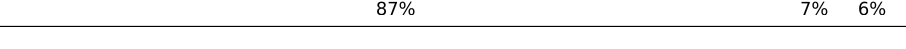
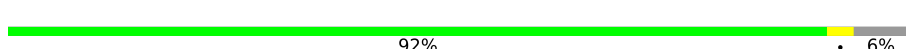
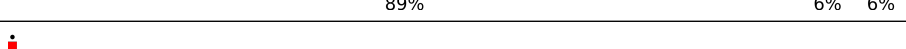
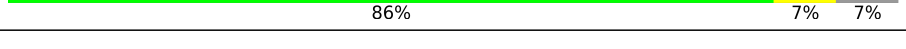
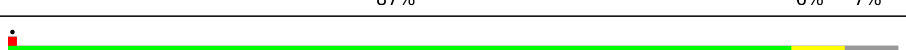
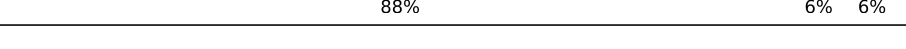
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Q-score	-	25397	472 (5.41 - 6.41)

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	394	
1	1	394	
1	2	394	
1	3	394	
1	4	394	

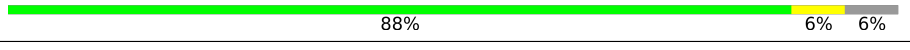
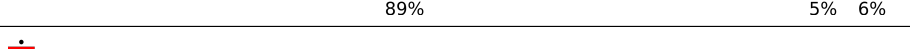
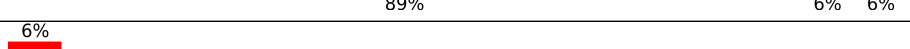
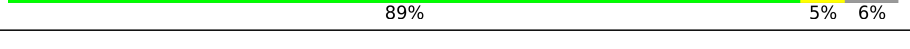
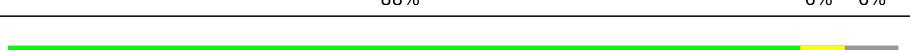
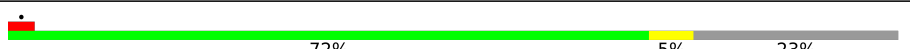
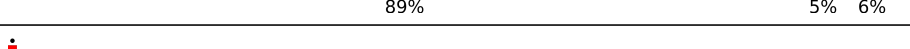
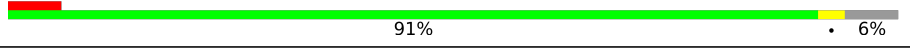
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Mol	Chain	Length	Quality of chain
1	5	394	
1	6	394	
1	7	394	
1	8	394	
1	9	394	
1	A	394	
1	B	394	
1	C	394	
1	D	394	
1	E	394	
1	F	394	
1	G	394	
1	H	394	
1	I	394	
1	J	394	
1	K	394	
1	L	394	
1	M	394	
1	N	394	
1	O	394	
1	P	394	
1	Q	394	
1	R	394	
1	S	394	
1	T	394	

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Mol	Chain	Length	Quality of chain
1	U	394	
1	V	394	
1	W	394	
1	X	394	
1	Y	394	
1	Z	394	
1	a	394	
1	b	394	
1	c	394	
1	d	394	
1	m	394	
1	n	394	
1	o	394	
1	p	394	
1	q	394	
1	r	394	
1	s	394	
1	t	394	
1	u	394	
1	v	394	
1	w	394	
1	x	394	
1	y	394	
1	z	394	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 96648 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Citrate synthase.

Mol	Chain	Residues	Atoms				AltConf	Trace
1	0	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	1	370	Total	C	N	O	0	0
			1830	1090	370	370		
1	2	370	Total	C	N	O	0	0
			1830	1090	370	370		
1	3	370	Total	C	N	O	0	0
			1830	1090	370	370		
1	4	370	Total	C	N	O	0	0
			1830	1090	370	370		
1	5	370	Total	C	N	O	0	0
			1830	1090	370	370		
1	6	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	7	370	Total	C	N	O	0	0
			1830	1090	370	370		
1	8	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	9	365	Total	C	N	O	0	0
			1805	1075	365	365		
1	A	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	B	365	Total	C	N	O	0	0
			1805	1075	365	365		
1	C	304	Total	C	N	O	0	0
			1506	898	304	304		
1	D	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	E	370	Total	C	N	O	0	0
			1830	1090	370	370		
1	F	304	Total	C	N	O	0	0
			1506	898	304	304		
1	G	371	Total	C	N	O	0	0
			1833	1091	371	371		

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Mol	Chain	Residues	Atoms				AltConf	Trace
1	H	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	I	365	Total	C	N	O	0	0
			1805	1075	365	365		
1	J	365	Total	C	N	O	0	0
			1805	1075	365	365		
1	K	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	L	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	M	370	Total	C	N	O	0	0
			1830	1090	370	370		
1	N	370	Total	C	N	O	0	0
			1830	1090	370	370		
1	O	370	Total	C	N	O	0	0
			1830	1090	370	370		
1	P	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	Q	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	R	365	Total	C	N	O	0	0
			1805	1075	365	365		
1	S	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	T	365	Total	C	N	O	0	0
			1805	1075	365	365		
1	U	304	Total	C	N	O	0	0
			1506	898	304	304		
1	V	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	W	370	Total	C	N	O	0	0
			1830	1090	370	370		
1	X	304	Total	C	N	O	0	0
			1506	898	304	304		
1	Y	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	Z	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	a	365	Total	C	N	O	0	0
			1805	1075	365	365		
1	b	365	Total	C	N	O	0	0
			1805	1075	365	365		

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Mol	Chain	Residues	Atoms				AltConf	Trace
1	c	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	d	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	m	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	n	365	Total	C	N	O	0	0
			1805	1075	365	365		
1	o	304	Total	C	N	O	0	0
			1506	898	304	304		
1	p	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	q	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	r	370	Total	C	N	O	0	0
			1830	1090	370	370		
1	s	304	Total	C	N	O	0	0
			1506	898	304	304		
1	t	365	Total	C	N	O	0	0
			1805	1075	365	365		
1	u	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	v	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	w	365	Total	C	N	O	0	0
			1805	1075	365	365		
1	x	365	Total	C	N	O	0	0
			1805	1075	365	365		
1	y	371	Total	C	N	O	0	0
			1833	1091	371	371		
1	z	371	Total	C	N	O	0	0
			1833	1091	371	371		

There are 486 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
0	369	ARG	HIS	engineered mutation	UNP Q31QM5
0	387	LEU	-	expression tag	UNP Q31QM5
0	388	GLU	-	expression tag	UNP Q31QM5
0	389	HIS	-	expression tag	UNP Q31QM5
0	390	HIS	-	expression tag	UNP Q31QM5
0	391	HIS	-	expression tag	UNP Q31QM5
0	392	HIS	-	expression tag	UNP Q31QM5

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Chain	Residue	Modelled	Actual	Comment	Reference
0	393	HIS	-	expression tag	UNP Q31QM5
0	394	HIS	-	expression tag	UNP Q31QM5
1	369	ARG	HIS	engineered mutation	UNP Q31QM5
1	387	LEU	-	expression tag	UNP Q31QM5
1	388	GLU	-	expression tag	UNP Q31QM5
1	389	HIS	-	expression tag	UNP Q31QM5
1	390	HIS	-	expression tag	UNP Q31QM5
1	391	HIS	-	expression tag	UNP Q31QM5
1	392	HIS	-	expression tag	UNP Q31QM5
1	393	HIS	-	expression tag	UNP Q31QM5
1	394	HIS	-	expression tag	UNP Q31QM5
2	369	ARG	HIS	engineered mutation	UNP Q31QM5
2	387	LEU	-	expression tag	UNP Q31QM5
2	388	GLU	-	expression tag	UNP Q31QM5
2	389	HIS	-	expression tag	UNP Q31QM5
2	390	HIS	-	expression tag	UNP Q31QM5
2	391	HIS	-	expression tag	UNP Q31QM5
2	392	HIS	-	expression tag	UNP Q31QM5
2	393	HIS	-	expression tag	UNP Q31QM5
2	394	HIS	-	expression tag	UNP Q31QM5
3	369	ARG	HIS	engineered mutation	UNP Q31QM5
3	387	LEU	-	expression tag	UNP Q31QM5
3	388	GLU	-	expression tag	UNP Q31QM5
3	389	HIS	-	expression tag	UNP Q31QM5
3	390	HIS	-	expression tag	UNP Q31QM5
3	391	HIS	-	expression tag	UNP Q31QM5
3	392	HIS	-	expression tag	UNP Q31QM5
3	393	HIS	-	expression tag	UNP Q31QM5
3	394	HIS	-	expression tag	UNP Q31QM5
4	369	ARG	HIS	engineered mutation	UNP Q31QM5
4	387	LEU	-	expression tag	UNP Q31QM5
4	388	GLU	-	expression tag	UNP Q31QM5
4	389	HIS	-	expression tag	UNP Q31QM5
4	390	HIS	-	expression tag	UNP Q31QM5
4	391	HIS	-	expression tag	UNP Q31QM5
4	392	HIS	-	expression tag	UNP Q31QM5
4	393	HIS	-	expression tag	UNP Q31QM5
4	394	HIS	-	expression tag	UNP Q31QM5
5	369	ARG	HIS	engineered mutation	UNP Q31QM5
5	387	LEU	-	expression tag	UNP Q31QM5
5	388	GLU	-	expression tag	UNP Q31QM5
5	389	HIS	-	expression tag	UNP Q31QM5

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Chain	Residue	Modelled	Actual	Comment	Reference
5	390	HIS	-	expression tag	UNP Q31QM5
5	391	HIS	-	expression tag	UNP Q31QM5
5	392	HIS	-	expression tag	UNP Q31QM5
5	393	HIS	-	expression tag	UNP Q31QM5
5	394	HIS	-	expression tag	UNP Q31QM5
6	369	ARG	HIS	engineered mutation	UNP Q31QM5
6	387	LEU	-	expression tag	UNP Q31QM5
6	388	GLU	-	expression tag	UNP Q31QM5
6	389	HIS	-	expression tag	UNP Q31QM5
6	390	HIS	-	expression tag	UNP Q31QM5
6	391	HIS	-	expression tag	UNP Q31QM5
6	392	HIS	-	expression tag	UNP Q31QM5
6	393	HIS	-	expression tag	UNP Q31QM5
6	394	HIS	-	expression tag	UNP Q31QM5
7	369	ARG	HIS	engineered mutation	UNP Q31QM5
7	387	LEU	-	expression tag	UNP Q31QM5
7	388	GLU	-	expression tag	UNP Q31QM5
7	389	HIS	-	expression tag	UNP Q31QM5
7	390	HIS	-	expression tag	UNP Q31QM5
7	391	HIS	-	expression tag	UNP Q31QM5
7	392	HIS	-	expression tag	UNP Q31QM5
7	393	HIS	-	expression tag	UNP Q31QM5
7	394	HIS	-	expression tag	UNP Q31QM5
8	369	ARG	HIS	engineered mutation	UNP Q31QM5
8	387	LEU	-	expression tag	UNP Q31QM5
8	388	GLU	-	expression tag	UNP Q31QM5
8	389	HIS	-	expression tag	UNP Q31QM5
8	390	HIS	-	expression tag	UNP Q31QM5
8	391	HIS	-	expression tag	UNP Q31QM5
8	392	HIS	-	expression tag	UNP Q31QM5
8	393	HIS	-	expression tag	UNP Q31QM5
8	394	HIS	-	expression tag	UNP Q31QM5
9	369	ARG	HIS	engineered mutation	UNP Q31QM5
9	387	LEU	-	expression tag	UNP Q31QM5
9	388	GLU	-	expression tag	UNP Q31QM5
9	389	HIS	-	expression tag	UNP Q31QM5
9	390	HIS	-	expression tag	UNP Q31QM5
9	391	HIS	-	expression tag	UNP Q31QM5
9	392	HIS	-	expression tag	UNP Q31QM5
9	393	HIS	-	expression tag	UNP Q31QM5
9	394	HIS	-	expression tag	UNP Q31QM5
A	369	ARG	HIS	engineered mutation	UNP Q31QM5

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Chain	Residue	Modelled	Actual	Comment	Reference
A	387	LEU	-	expression tag	UNP Q31QM5
A	388	GLU	-	expression tag	UNP Q31QM5
A	389	HIS	-	expression tag	UNP Q31QM5
A	390	HIS	-	expression tag	UNP Q31QM5
A	391	HIS	-	expression tag	UNP Q31QM5
A	392	HIS	-	expression tag	UNP Q31QM5
A	393	HIS	-	expression tag	UNP Q31QM5
A	394	HIS	-	expression tag	UNP Q31QM5
B	369	ARG	HIS	engineered mutation	UNP Q31QM5
B	387	LEU	-	expression tag	UNP Q31QM5
B	388	GLU	-	expression tag	UNP Q31QM5
B	389	HIS	-	expression tag	UNP Q31QM5
B	390	HIS	-	expression tag	UNP Q31QM5
B	391	HIS	-	expression tag	UNP Q31QM5
B	392	HIS	-	expression tag	UNP Q31QM5
B	393	HIS	-	expression tag	UNP Q31QM5
B	394	HIS	-	expression tag	UNP Q31QM5
C	369	ARG	HIS	engineered mutation	UNP Q31QM5
C	387	LEU	-	expression tag	UNP Q31QM5
C	388	GLU	-	expression tag	UNP Q31QM5
C	389	HIS	-	expression tag	UNP Q31QM5
C	390	HIS	-	expression tag	UNP Q31QM5
C	391	HIS	-	expression tag	UNP Q31QM5
C	392	HIS	-	expression tag	UNP Q31QM5
C	393	HIS	-	expression tag	UNP Q31QM5
C	394	HIS	-	expression tag	UNP Q31QM5
D	369	ARG	HIS	engineered mutation	UNP Q31QM5
D	387	LEU	-	expression tag	UNP Q31QM5
D	388	GLU	-	expression tag	UNP Q31QM5
D	389	HIS	-	expression tag	UNP Q31QM5
D	390	HIS	-	expression tag	UNP Q31QM5
D	391	HIS	-	expression tag	UNP Q31QM5
D	392	HIS	-	expression tag	UNP Q31QM5
D	393	HIS	-	expression tag	UNP Q31QM5
D	394	HIS	-	expression tag	UNP Q31QM5
E	369	ARG	HIS	engineered mutation	UNP Q31QM5
E	387	LEU	-	expression tag	UNP Q31QM5
E	388	GLU	-	expression tag	UNP Q31QM5
E	389	HIS	-	expression tag	UNP Q31QM5
E	390	HIS	-	expression tag	UNP Q31QM5
E	391	HIS	-	expression tag	UNP Q31QM5
E	392	HIS	-	expression tag	UNP Q31QM5

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Chain	Residue	Modelled	Actual	Comment	Reference
E	393	HIS	-	expression tag	UNP Q31QM5
E	394	HIS	-	expression tag	UNP Q31QM5
F	369	ARG	HIS	engineered mutation	UNP Q31QM5
F	387	LEU	-	expression tag	UNP Q31QM5
F	388	GLU	-	expression tag	UNP Q31QM5
F	389	HIS	-	expression tag	UNP Q31QM5
F	390	HIS	-	expression tag	UNP Q31QM5
F	391	HIS	-	expression tag	UNP Q31QM5
F	392	HIS	-	expression tag	UNP Q31QM5
F	393	HIS	-	expression tag	UNP Q31QM5
F	394	HIS	-	expression tag	UNP Q31QM5
G	369	ARG	HIS	engineered mutation	UNP Q31QM5
G	387	LEU	-	expression tag	UNP Q31QM5
G	388	GLU	-	expression tag	UNP Q31QM5
G	389	HIS	-	expression tag	UNP Q31QM5
G	390	HIS	-	expression tag	UNP Q31QM5
G	391	HIS	-	expression tag	UNP Q31QM5
G	392	HIS	-	expression tag	UNP Q31QM5
G	393	HIS	-	expression tag	UNP Q31QM5
G	394	HIS	-	expression tag	UNP Q31QM5
H	369	ARG	HIS	engineered mutation	UNP Q31QM5
H	387	LEU	-	expression tag	UNP Q31QM5
H	388	GLU	-	expression tag	UNP Q31QM5
H	389	HIS	-	expression tag	UNP Q31QM5
H	390	HIS	-	expression tag	UNP Q31QM5
H	391	HIS	-	expression tag	UNP Q31QM5
H	392	HIS	-	expression tag	UNP Q31QM5
H	393	HIS	-	expression tag	UNP Q31QM5
H	394	HIS	-	expression tag	UNP Q31QM5
I	369	ARG	HIS	engineered mutation	UNP Q31QM5
I	387	LEU	-	expression tag	UNP Q31QM5
I	388	GLU	-	expression tag	UNP Q31QM5
I	389	HIS	-	expression tag	UNP Q31QM5
I	390	HIS	-	expression tag	UNP Q31QM5
I	391	HIS	-	expression tag	UNP Q31QM5
I	392	HIS	-	expression tag	UNP Q31QM5
I	393	HIS	-	expression tag	UNP Q31QM5
I	394	HIS	-	expression tag	UNP Q31QM5
J	369	ARG	HIS	engineered mutation	UNP Q31QM5
J	387	LEU	-	expression tag	UNP Q31QM5
J	388	GLU	-	expression tag	UNP Q31QM5
J	389	HIS	-	expression tag	UNP Q31QM5

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Chain	Residue	Modelled	Actual	Comment	Reference
J	390	HIS	-	expression tag	UNP Q31QM5
J	391	HIS	-	expression tag	UNP Q31QM5
J	392	HIS	-	expression tag	UNP Q31QM5
J	393	HIS	-	expression tag	UNP Q31QM5
J	394	HIS	-	expression tag	UNP Q31QM5
K	369	ARG	HIS	engineered mutation	UNP Q31QM5
K	387	LEU	-	expression tag	UNP Q31QM5
K	388	GLU	-	expression tag	UNP Q31QM5
K	389	HIS	-	expression tag	UNP Q31QM5
K	390	HIS	-	expression tag	UNP Q31QM5
K	391	HIS	-	expression tag	UNP Q31QM5
K	392	HIS	-	expression tag	UNP Q31QM5
K	393	HIS	-	expression tag	UNP Q31QM5
K	394	HIS	-	expression tag	UNP Q31QM5
L	369	ARG	HIS	engineered mutation	UNP Q31QM5
L	387	LEU	-	expression tag	UNP Q31QM5
L	388	GLU	-	expression tag	UNP Q31QM5
L	389	HIS	-	expression tag	UNP Q31QM5
L	390	HIS	-	expression tag	UNP Q31QM5
L	391	HIS	-	expression tag	UNP Q31QM5
L	392	HIS	-	expression tag	UNP Q31QM5
L	393	HIS	-	expression tag	UNP Q31QM5
L	394	HIS	-	expression tag	UNP Q31QM5
M	369	ARG	HIS	engineered mutation	UNP Q31QM5
M	387	LEU	-	expression tag	UNP Q31QM5
M	388	GLU	-	expression tag	UNP Q31QM5
M	389	HIS	-	expression tag	UNP Q31QM5
M	390	HIS	-	expression tag	UNP Q31QM5
M	391	HIS	-	expression tag	UNP Q31QM5
M	392	HIS	-	expression tag	UNP Q31QM5
M	393	HIS	-	expression tag	UNP Q31QM5
M	394	HIS	-	expression tag	UNP Q31QM5
N	369	ARG	HIS	engineered mutation	UNP Q31QM5
N	387	LEU	-	expression tag	UNP Q31QM5
N	388	GLU	-	expression tag	UNP Q31QM5
N	389	HIS	-	expression tag	UNP Q31QM5
N	390	HIS	-	expression tag	UNP Q31QM5
N	391	HIS	-	expression tag	UNP Q31QM5
N	392	HIS	-	expression tag	UNP Q31QM5
N	393	HIS	-	expression tag	UNP Q31QM5
N	394	HIS	-	expression tag	UNP Q31QM5
O	369	ARG	HIS	engineered mutation	UNP Q31QM5

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Chain	Residue	Modelled	Actual	Comment	Reference
O	387	LEU	-	expression tag	UNP Q31QM5
O	388	GLU	-	expression tag	UNP Q31QM5
O	389	HIS	-	expression tag	UNP Q31QM5
O	390	HIS	-	expression tag	UNP Q31QM5
O	391	HIS	-	expression tag	UNP Q31QM5
O	392	HIS	-	expression tag	UNP Q31QM5
O	393	HIS	-	expression tag	UNP Q31QM5
O	394	HIS	-	expression tag	UNP Q31QM5
P	369	ARG	HIS	engineered mutation	UNP Q31QM5
P	387	LEU	-	expression tag	UNP Q31QM5
P	388	GLU	-	expression tag	UNP Q31QM5
P	389	HIS	-	expression tag	UNP Q31QM5
P	390	HIS	-	expression tag	UNP Q31QM5
P	391	HIS	-	expression tag	UNP Q31QM5
P	392	HIS	-	expression tag	UNP Q31QM5
P	393	HIS	-	expression tag	UNP Q31QM5
P	394	HIS	-	expression tag	UNP Q31QM5
Q	369	ARG	HIS	engineered mutation	UNP Q31QM5
Q	387	LEU	-	expression tag	UNP Q31QM5
Q	388	GLU	-	expression tag	UNP Q31QM5
Q	389	HIS	-	expression tag	UNP Q31QM5
Q	390	HIS	-	expression tag	UNP Q31QM5
Q	391	HIS	-	expression tag	UNP Q31QM5
Q	392	HIS	-	expression tag	UNP Q31QM5
Q	393	HIS	-	expression tag	UNP Q31QM5
Q	394	HIS	-	expression tag	UNP Q31QM5
R	369	ARG	HIS	engineered mutation	UNP Q31QM5
R	387	LEU	-	expression tag	UNP Q31QM5
R	388	GLU	-	expression tag	UNP Q31QM5
R	389	HIS	-	expression tag	UNP Q31QM5
R	390	HIS	-	expression tag	UNP Q31QM5
R	391	HIS	-	expression tag	UNP Q31QM5
R	392	HIS	-	expression tag	UNP Q31QM5
R	393	HIS	-	expression tag	UNP Q31QM5
R	394	HIS	-	expression tag	UNP Q31QM5
S	369	ARG	HIS	engineered mutation	UNP Q31QM5
S	387	LEU	-	expression tag	UNP Q31QM5
S	388	GLU	-	expression tag	UNP Q31QM5
S	389	HIS	-	expression tag	UNP Q31QM5
S	390	HIS	-	expression tag	UNP Q31QM5
S	391	HIS	-	expression tag	UNP Q31QM5
S	392	HIS	-	expression tag	UNP Q31QM5

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Chain	Residue	Modelled	Actual	Comment	Reference
S	393	HIS	-	expression tag	UNP Q31QM5
S	394	HIS	-	expression tag	UNP Q31QM5
T	369	ARG	HIS	engineered mutation	UNP Q31QM5
T	387	LEU	-	expression tag	UNP Q31QM5
T	388	GLU	-	expression tag	UNP Q31QM5
T	389	HIS	-	expression tag	UNP Q31QM5
T	390	HIS	-	expression tag	UNP Q31QM5
T	391	HIS	-	expression tag	UNP Q31QM5
T	392	HIS	-	expression tag	UNP Q31QM5
T	393	HIS	-	expression tag	UNP Q31QM5
T	394	HIS	-	expression tag	UNP Q31QM5
U	369	ARG	HIS	engineered mutation	UNP Q31QM5
U	387	LEU	-	expression tag	UNP Q31QM5
U	388	GLU	-	expression tag	UNP Q31QM5
U	389	HIS	-	expression tag	UNP Q31QM5
U	390	HIS	-	expression tag	UNP Q31QM5
U	391	HIS	-	expression tag	UNP Q31QM5
U	392	HIS	-	expression tag	UNP Q31QM5
U	393	HIS	-	expression tag	UNP Q31QM5
U	394	HIS	-	expression tag	UNP Q31QM5
V	369	ARG	HIS	engineered mutation	UNP Q31QM5
V	387	LEU	-	expression tag	UNP Q31QM5
V	388	GLU	-	expression tag	UNP Q31QM5
V	389	HIS	-	expression tag	UNP Q31QM5
V	390	HIS	-	expression tag	UNP Q31QM5
V	391	HIS	-	expression tag	UNP Q31QM5
V	392	HIS	-	expression tag	UNP Q31QM5
V	393	HIS	-	expression tag	UNP Q31QM5
V	394	HIS	-	expression tag	UNP Q31QM5
W	369	ARG	HIS	engineered mutation	UNP Q31QM5
W	387	LEU	-	expression tag	UNP Q31QM5
W	388	GLU	-	expression tag	UNP Q31QM5
W	389	HIS	-	expression tag	UNP Q31QM5
W	390	HIS	-	expression tag	UNP Q31QM5
W	391	HIS	-	expression tag	UNP Q31QM5
W	392	HIS	-	expression tag	UNP Q31QM5
W	393	HIS	-	expression tag	UNP Q31QM5
W	394	HIS	-	expression tag	UNP Q31QM5
X	369	ARG	HIS	engineered mutation	UNP Q31QM5
X	387	LEU	-	expression tag	UNP Q31QM5
X	388	GLU	-	expression tag	UNP Q31QM5
X	389	HIS	-	expression tag	UNP Q31QM5

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Chain	Residue	Modelled	Actual	Comment	Reference
X	390	HIS	-	expression tag	UNP Q31QM5
X	391	HIS	-	expression tag	UNP Q31QM5
X	392	HIS	-	expression tag	UNP Q31QM5
X	393	HIS	-	expression tag	UNP Q31QM5
X	394	HIS	-	expression tag	UNP Q31QM5
Y	369	ARG	HIS	engineered mutation	UNP Q31QM5
Y	387	LEU	-	expression tag	UNP Q31QM5
Y	388	GLU	-	expression tag	UNP Q31QM5
Y	389	HIS	-	expression tag	UNP Q31QM5
Y	390	HIS	-	expression tag	UNP Q31QM5
Y	391	HIS	-	expression tag	UNP Q31QM5
Y	392	HIS	-	expression tag	UNP Q31QM5
Y	393	HIS	-	expression tag	UNP Q31QM5
Y	394	HIS	-	expression tag	UNP Q31QM5
Z	369	ARG	HIS	engineered mutation	UNP Q31QM5
Z	387	LEU	-	expression tag	UNP Q31QM5
Z	388	GLU	-	expression tag	UNP Q31QM5
Z	389	HIS	-	expression tag	UNP Q31QM5
Z	390	HIS	-	expression tag	UNP Q31QM5
Z	391	HIS	-	expression tag	UNP Q31QM5
Z	392	HIS	-	expression tag	UNP Q31QM5
Z	393	HIS	-	expression tag	UNP Q31QM5
Z	394	HIS	-	expression tag	UNP Q31QM5
a	369	ARG	HIS	engineered mutation	UNP Q31QM5
a	387	LEU	-	expression tag	UNP Q31QM5
a	388	GLU	-	expression tag	UNP Q31QM5
a	389	HIS	-	expression tag	UNP Q31QM5
a	390	HIS	-	expression tag	UNP Q31QM5
a	391	HIS	-	expression tag	UNP Q31QM5
a	392	HIS	-	expression tag	UNP Q31QM5
a	393	HIS	-	expression tag	UNP Q31QM5
a	394	HIS	-	expression tag	UNP Q31QM5
b	369	ARG	HIS	engineered mutation	UNP Q31QM5
b	387	LEU	-	expression tag	UNP Q31QM5
b	388	GLU	-	expression tag	UNP Q31QM5
b	389	HIS	-	expression tag	UNP Q31QM5
b	390	HIS	-	expression tag	UNP Q31QM5
b	391	HIS	-	expression tag	UNP Q31QM5
b	392	HIS	-	expression tag	UNP Q31QM5
b	393	HIS	-	expression tag	UNP Q31QM5
b	394	HIS	-	expression tag	UNP Q31QM5
c	369	ARG	HIS	engineered mutation	UNP Q31QM5

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Chain	Residue	Modelled	Actual	Comment	Reference
c	387	LEU	-	expression tag	UNP Q31QM5
c	388	GLU	-	expression tag	UNP Q31QM5
c	389	HIS	-	expression tag	UNP Q31QM5
c	390	HIS	-	expression tag	UNP Q31QM5
c	391	HIS	-	expression tag	UNP Q31QM5
c	392	HIS	-	expression tag	UNP Q31QM5
c	393	HIS	-	expression tag	UNP Q31QM5
c	394	HIS	-	expression tag	UNP Q31QM5
d	369	ARG	HIS	engineered mutation	UNP Q31QM5
d	387	LEU	-	expression tag	UNP Q31QM5
d	388	GLU	-	expression tag	UNP Q31QM5
d	389	HIS	-	expression tag	UNP Q31QM5
d	390	HIS	-	expression tag	UNP Q31QM5
d	391	HIS	-	expression tag	UNP Q31QM5
d	392	HIS	-	expression tag	UNP Q31QM5
d	393	HIS	-	expression tag	UNP Q31QM5
d	394	HIS	-	expression tag	UNP Q31QM5
m	369	ARG	HIS	engineered mutation	UNP Q31QM5
m	387	LEU	-	expression tag	UNP Q31QM5
m	388	GLU	-	expression tag	UNP Q31QM5
m	389	HIS	-	expression tag	UNP Q31QM5
m	390	HIS	-	expression tag	UNP Q31QM5
m	391	HIS	-	expression tag	UNP Q31QM5
m	392	HIS	-	expression tag	UNP Q31QM5
m	393	HIS	-	expression tag	UNP Q31QM5
m	394	HIS	-	expression tag	UNP Q31QM5
n	369	ARG	HIS	engineered mutation	UNP Q31QM5
n	387	LEU	-	expression tag	UNP Q31QM5
n	388	GLU	-	expression tag	UNP Q31QM5
n	389	HIS	-	expression tag	UNP Q31QM5
n	390	HIS	-	expression tag	UNP Q31QM5
n	391	HIS	-	expression tag	UNP Q31QM5
n	392	HIS	-	expression tag	UNP Q31QM5
n	393	HIS	-	expression tag	UNP Q31QM5
n	394	HIS	-	expression tag	UNP Q31QM5
o	369	ARG	HIS	engineered mutation	UNP Q31QM5
o	387	LEU	-	expression tag	UNP Q31QM5
o	388	GLU	-	expression tag	UNP Q31QM5
o	389	HIS	-	expression tag	UNP Q31QM5
o	390	HIS	-	expression tag	UNP Q31QM5
o	391	HIS	-	expression tag	UNP Q31QM5
o	392	HIS	-	expression tag	UNP Q31QM5

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Chain	Residue	Modelled	Actual	Comment	Reference
o	393	HIS	-	expression tag	UNP Q31QM5
o	394	HIS	-	expression tag	UNP Q31QM5
p	369	ARG	HIS	engineered mutation	UNP Q31QM5
p	387	LEU	-	expression tag	UNP Q31QM5
p	388	GLU	-	expression tag	UNP Q31QM5
p	389	HIS	-	expression tag	UNP Q31QM5
p	390	HIS	-	expression tag	UNP Q31QM5
p	391	HIS	-	expression tag	UNP Q31QM5
p	392	HIS	-	expression tag	UNP Q31QM5
p	393	HIS	-	expression tag	UNP Q31QM5
p	394	HIS	-	expression tag	UNP Q31QM5
q	369	ARG	HIS	engineered mutation	UNP Q31QM5
q	387	LEU	-	expression tag	UNP Q31QM5
q	388	GLU	-	expression tag	UNP Q31QM5
q	389	HIS	-	expression tag	UNP Q31QM5
q	390	HIS	-	expression tag	UNP Q31QM5
q	391	HIS	-	expression tag	UNP Q31QM5
q	392	HIS	-	expression tag	UNP Q31QM5
q	393	HIS	-	expression tag	UNP Q31QM5
q	394	HIS	-	expression tag	UNP Q31QM5
r	369	ARG	HIS	engineered mutation	UNP Q31QM5
r	387	LEU	-	expression tag	UNP Q31QM5
r	388	GLU	-	expression tag	UNP Q31QM5
r	389	HIS	-	expression tag	UNP Q31QM5
r	390	HIS	-	expression tag	UNP Q31QM5
r	391	HIS	-	expression tag	UNP Q31QM5
r	392	HIS	-	expression tag	UNP Q31QM5
r	393	HIS	-	expression tag	UNP Q31QM5
r	394	HIS	-	expression tag	UNP Q31QM5
s	369	ARG	HIS	engineered mutation	UNP Q31QM5
s	387	LEU	-	expression tag	UNP Q31QM5
s	388	GLU	-	expression tag	UNP Q31QM5
s	389	HIS	-	expression tag	UNP Q31QM5
s	390	HIS	-	expression tag	UNP Q31QM5
s	391	HIS	-	expression tag	UNP Q31QM5
s	392	HIS	-	expression tag	UNP Q31QM5
s	393	HIS	-	expression tag	UNP Q31QM5
s	394	HIS	-	expression tag	UNP Q31QM5
t	369	ARG	HIS	engineered mutation	UNP Q31QM5
t	387	LEU	-	expression tag	UNP Q31QM5
t	388	GLU	-	expression tag	UNP Q31QM5
t	389	HIS	-	expression tag	UNP Q31QM5

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Chain	Residue	Modelled	Actual	Comment	Reference
t	390	HIS	-	expression tag	UNP Q31QM5
t	391	HIS	-	expression tag	UNP Q31QM5
t	392	HIS	-	expression tag	UNP Q31QM5
t	393	HIS	-	expression tag	UNP Q31QM5
t	394	HIS	-	expression tag	UNP Q31QM5
u	369	ARG	HIS	engineered mutation	UNP Q31QM5
u	387	LEU	-	expression tag	UNP Q31QM5
u	388	GLU	-	expression tag	UNP Q31QM5
u	389	HIS	-	expression tag	UNP Q31QM5
u	390	HIS	-	expression tag	UNP Q31QM5
u	391	HIS	-	expression tag	UNP Q31QM5
u	392	HIS	-	expression tag	UNP Q31QM5
u	393	HIS	-	expression tag	UNP Q31QM5
u	394	HIS	-	expression tag	UNP Q31QM5
v	369	ARG	HIS	engineered mutation	UNP Q31QM5
v	387	LEU	-	expression tag	UNP Q31QM5
v	388	GLU	-	expression tag	UNP Q31QM5
v	389	HIS	-	expression tag	UNP Q31QM5
v	390	HIS	-	expression tag	UNP Q31QM5
v	391	HIS	-	expression tag	UNP Q31QM5
v	392	HIS	-	expression tag	UNP Q31QM5
v	393	HIS	-	expression tag	UNP Q31QM5
v	394	HIS	-	expression tag	UNP Q31QM5
w	369	ARG	HIS	engineered mutation	UNP Q31QM5
w	387	LEU	-	expression tag	UNP Q31QM5
w	388	GLU	-	expression tag	UNP Q31QM5
w	389	HIS	-	expression tag	UNP Q31QM5
w	390	HIS	-	expression tag	UNP Q31QM5
w	391	HIS	-	expression tag	UNP Q31QM5
w	392	HIS	-	expression tag	UNP Q31QM5
w	393	HIS	-	expression tag	UNP Q31QM5
w	394	HIS	-	expression tag	UNP Q31QM5
x	369	ARG	HIS	engineered mutation	UNP Q31QM5
x	387	LEU	-	expression tag	UNP Q31QM5
x	388	GLU	-	expression tag	UNP Q31QM5
x	389	HIS	-	expression tag	UNP Q31QM5
x	390	HIS	-	expression tag	UNP Q31QM5
x	391	HIS	-	expression tag	UNP Q31QM5
x	392	HIS	-	expression tag	UNP Q31QM5
x	393	HIS	-	expression tag	UNP Q31QM5
x	394	HIS	-	expression tag	UNP Q31QM5
y	369	ARG	HIS	engineered mutation	UNP Q31QM5

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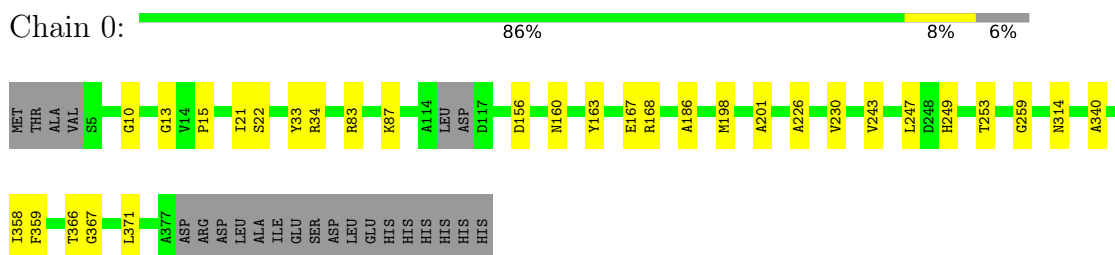
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Chain	Residue	Modelled	Actual	Comment	Reference
y	387	LEU	-	expression tag	UNP Q31QM5
y	388	GLU	-	expression tag	UNP Q31QM5
y	389	HIS	-	expression tag	UNP Q31QM5
y	390	HIS	-	expression tag	UNP Q31QM5
y	391	HIS	-	expression tag	UNP Q31QM5
y	392	HIS	-	expression tag	UNP Q31QM5
y	393	HIS	-	expression tag	UNP Q31QM5
y	394	HIS	-	expression tag	UNP Q31QM5
z	369	ARG	HIS	engineered mutation	UNP Q31QM5
z	387	LEU	-	expression tag	UNP Q31QM5
z	388	GLU	-	expression tag	UNP Q31QM5
z	389	HIS	-	expression tag	UNP Q31QM5
z	390	HIS	-	expression tag	UNP Q31QM5
z	391	HIS	-	expression tag	UNP Q31QM5
z	392	HIS	-	expression tag	UNP Q31QM5
z	393	HIS	-	expression tag	UNP Q31QM5
z	394	HIS	-	expression tag	UNP Q31QM5

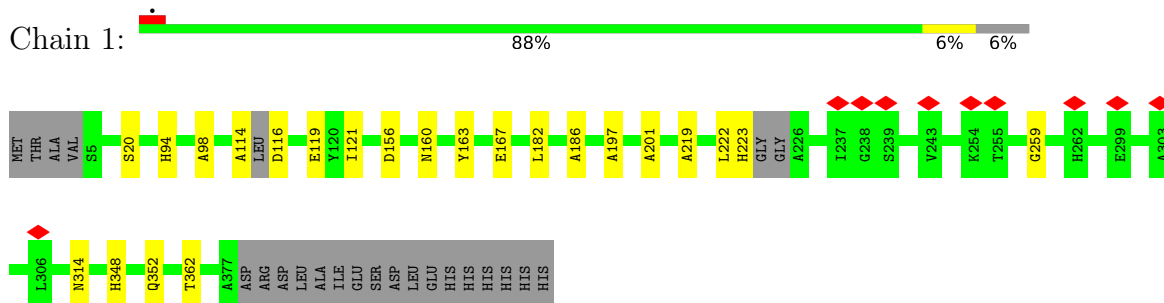
3 Residue-property plots [i](#)

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.

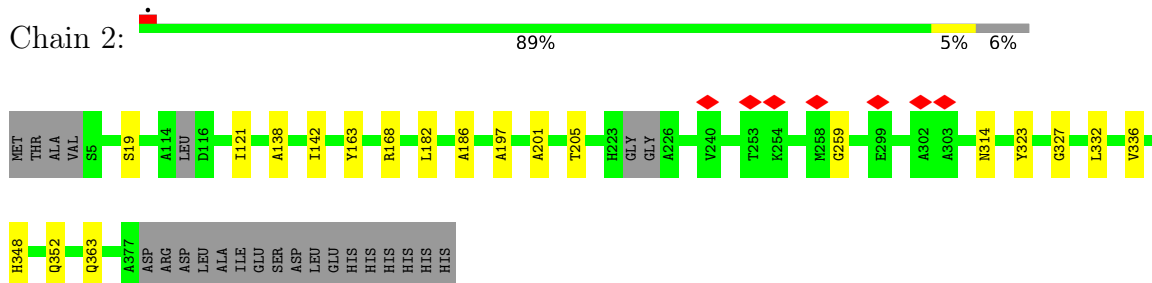
- Molecule 1: Citrate synthase



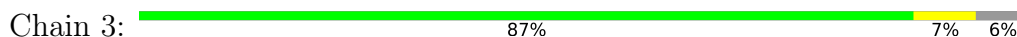
- Molecule 1: Citrate synthase

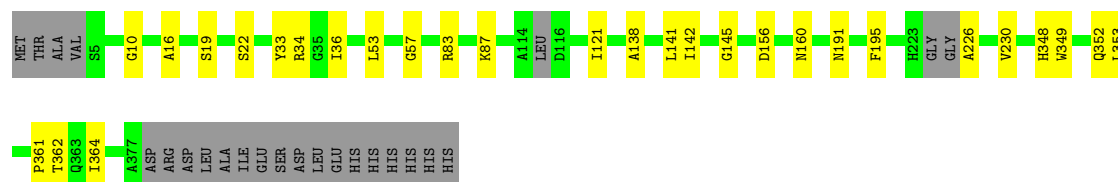


- Molecule 1: Citrate synthase

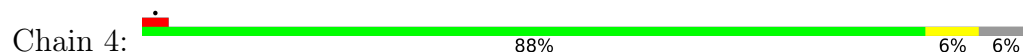


- Molecule 1: Citrate synthase

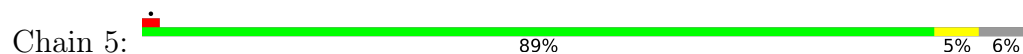




- Molecule 1: Citrate synthase



- Molecule 1: Citrate synthase



- Molecule 1: Citrate synthase



- Molecule 1: Citrate synthase



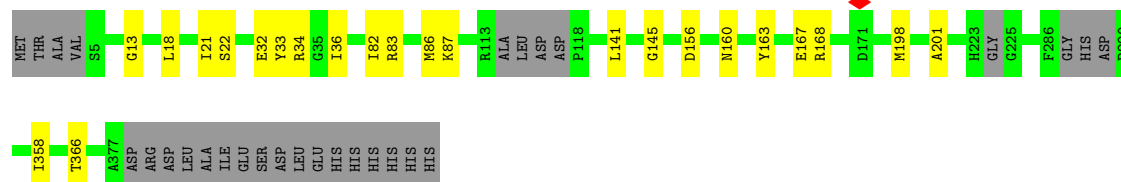
- Molecule 1: Citrate synthase

Chain 8:  91% 6%



• Molecule 1: Citrate synthase

Chain 9:  87% 6% 7%



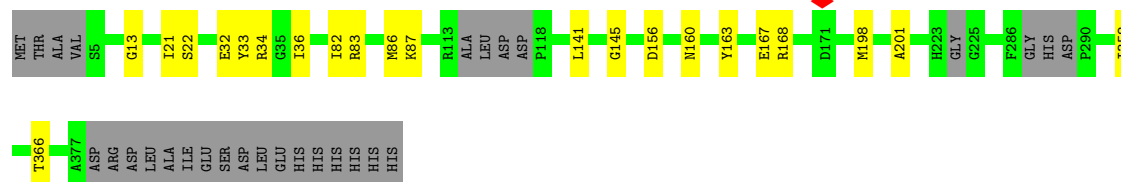
• Molecule 1: Citrate synthase

Chain A:  92% 6%



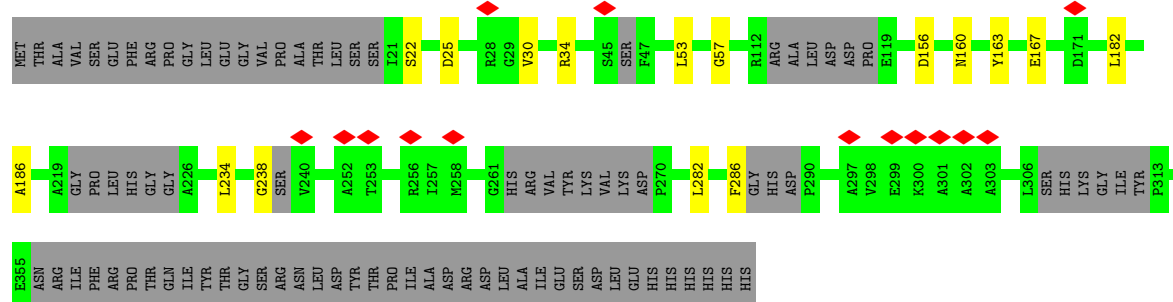
• Molecule 1: Citrate synthase

Chain B:  87% 6% 7%



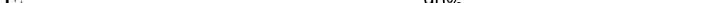
• Molecule 1: Citrate synthase

Chain C:  73% 23%

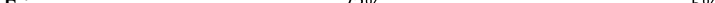


• Molecule 1: Citrate synthase

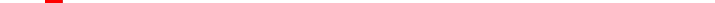
ALA	MET
ILE	THR
GLU	ALA
SER	VAL
ASP	S5
LEU	A16
GLU	HIS
HIS	S22
HIS	E32
HIS	Y33
HIS	R34
HIS	G35
	I36
	Y52
	G57
	A114
	LEU
	ASP
	D117
	Y163
	E167
	A197
	A201
	A226
	V230
	V243
	L247
	G259
	N314
	Y323
	G327
	I358
	P361
	L371
	A377
	ASP
	ARG
	ASP
	LEU

- Chain E:  90% 6%

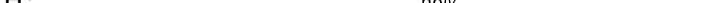
ASP	MET
LEU	ALA
GLU	THR
HIS	VAL
HIS	S5
HIS	E12
HIS	S22
HIS	F23
HIS	E32
HIS	F33
HIS	R34
HIS	G35
HIS	I62
HIS	M66
HIS	A114
HIS	LEU
HIS	D116
HIS	D156
HIS	M160
HIS	V163
HIS	E167
HIS	H223
HIS	GLY
HIS	GLY
HIS	A226
HIS	S239
HIS	I257
HIS	F260
HIS	A297
HIS	H348
HIS	Q352
HIS	Q363
HIS	A377
ASP	ASP
ARG	ARG
ASP	ASP
LEU	LEU
ALA	ALA
ILE	ILE
GLU	GLU

- Chain F:  72% 5% 23%

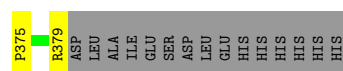
[illegible]

- Chain G:  87% 7% 6%

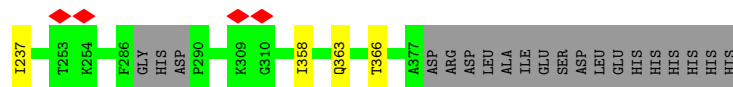
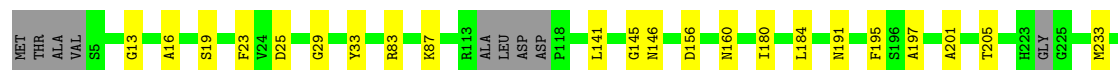
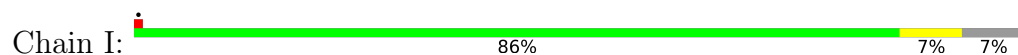
[illegible]

- Chain H:  89% 6% 6%

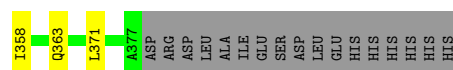
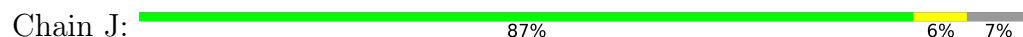
Met	Thr	Ala	Val	S6	P15	F23	E32	G35	Y52	G57	G93	R112	ARG	ALA	LEU	ASP	D117	I121	D156	N160	Y163	E167	C181	H185	A186	S239	V240	D289	A297	A302	A303	P335	A338	I339	A340	G363
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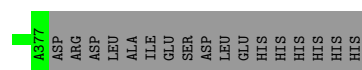
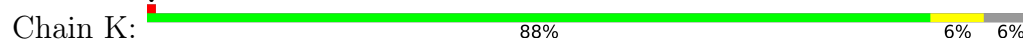
- Molecule 1: Citrate synthase



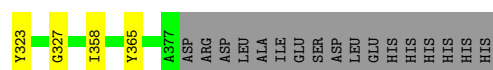
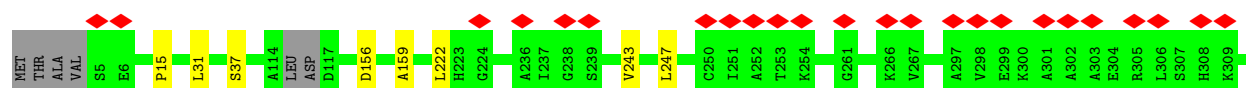
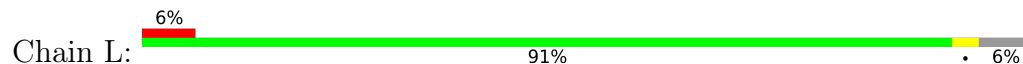
- Molecule 1: Citrate synthase



- Molecule 1: Citrate synthase

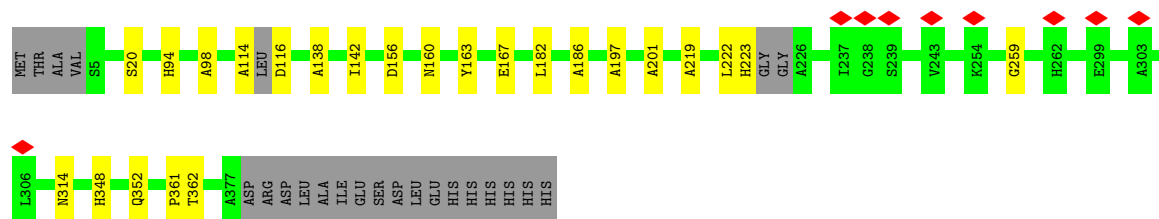


- Molecule 1: Citrate synthase



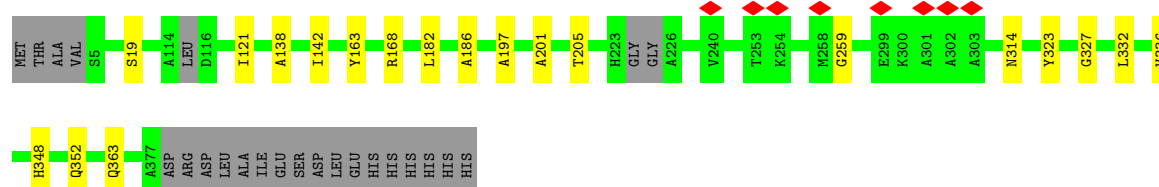
- Molecule 1: Citrate synthase





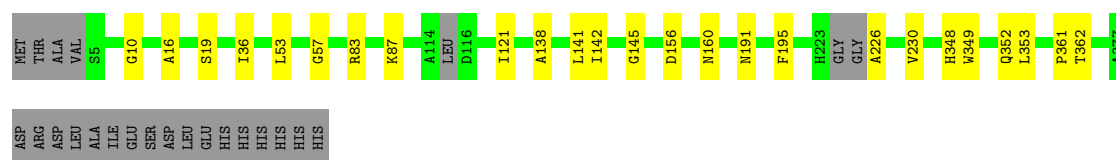
• Molecule 1: Citrate synthase

Chain N: 89% 5% 6%



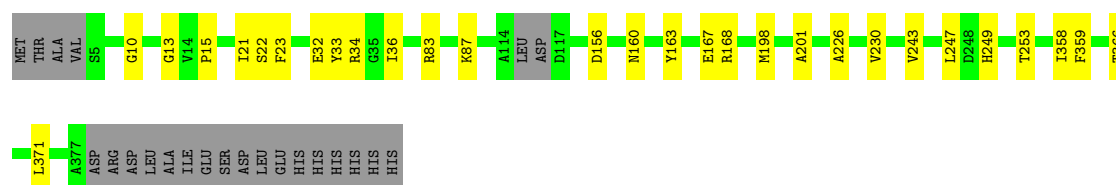
• Molecule 1: Citrate synthase

Chain O: 88% 6% 6%



• Molecule 1: Citrate synthase

Chain P: 87% 7% 6%



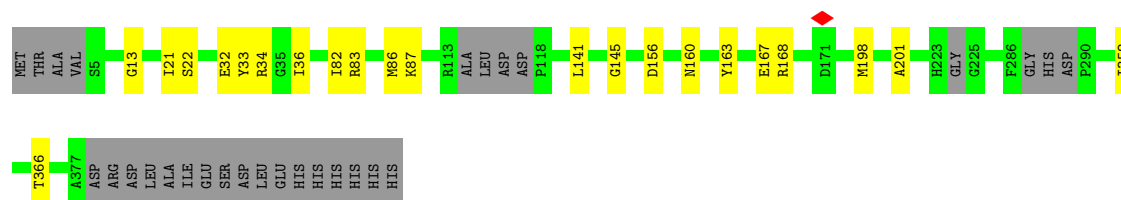
• Molecule 1: Citrate synthase

Chain Q: 92% 6% 2%

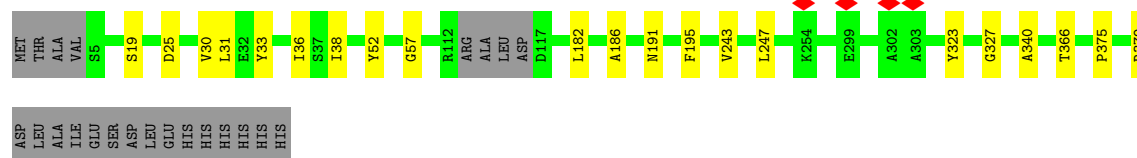
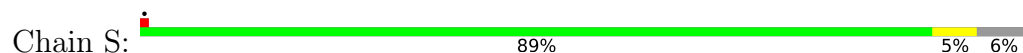


• Molecule 1: Citrate synthase

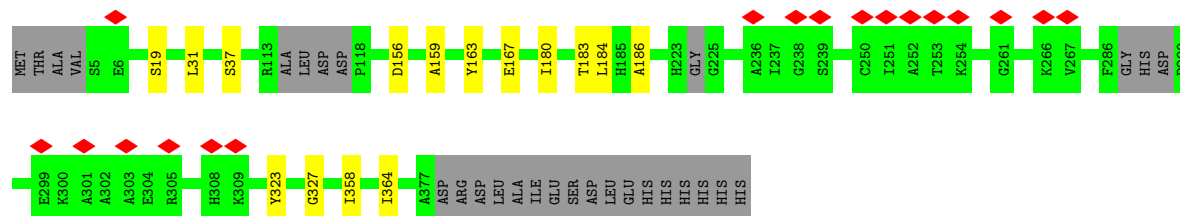
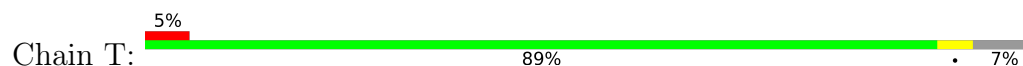
Chain R: 87% 6% 7%



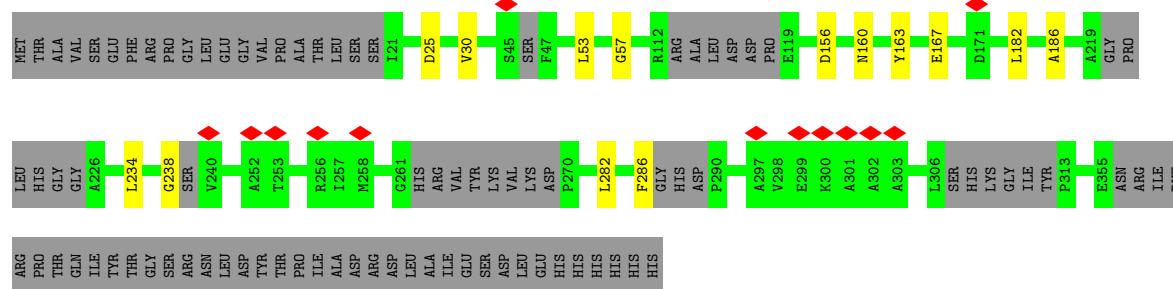
• Molecule 1: Citrate synthase



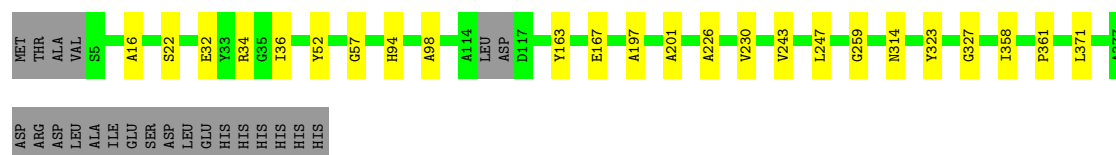
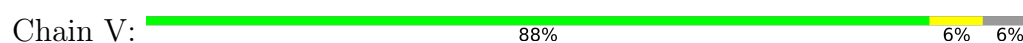
• Molecule 1: Citrate synthase



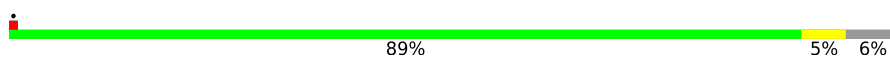
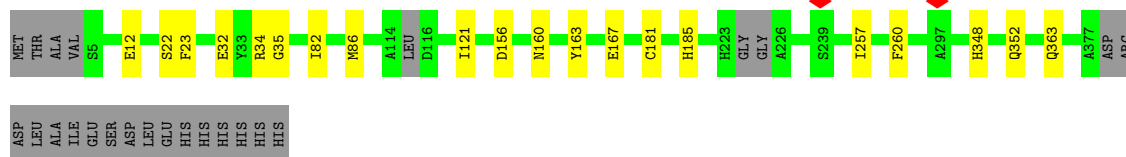
• Molecule 1: Citrate synthase



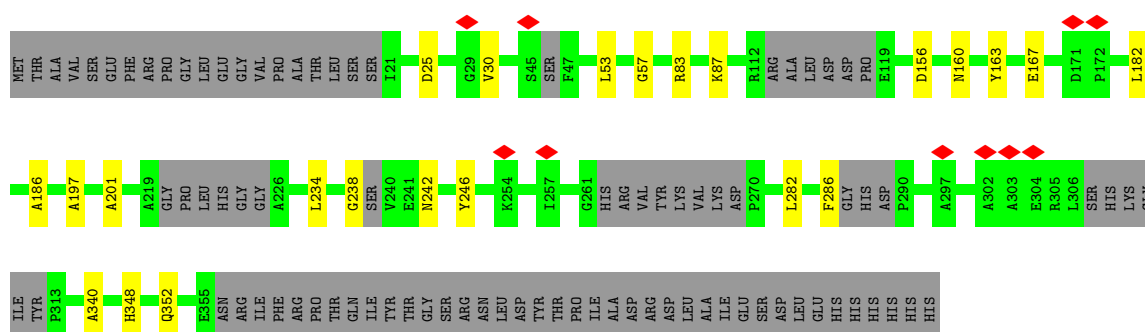
• Molecule 1: Citrate synthase



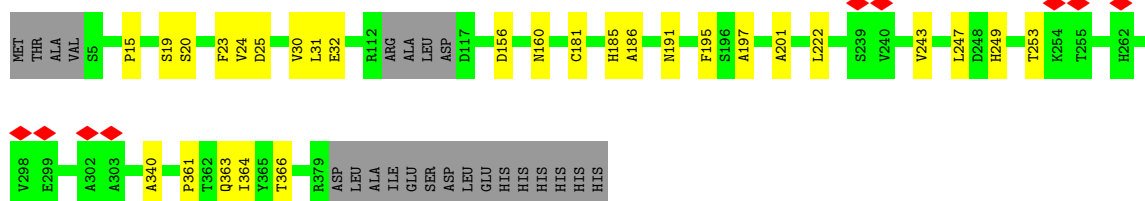
● Molecule 1: Citrate synthase

Chain W:  89% 5% 6%

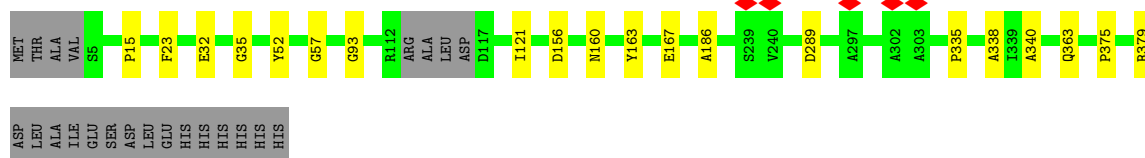
● Molecule 1: Citrate synthase

Chain X:  71% 6% 23%

● Molecule 1: Citrate synthase

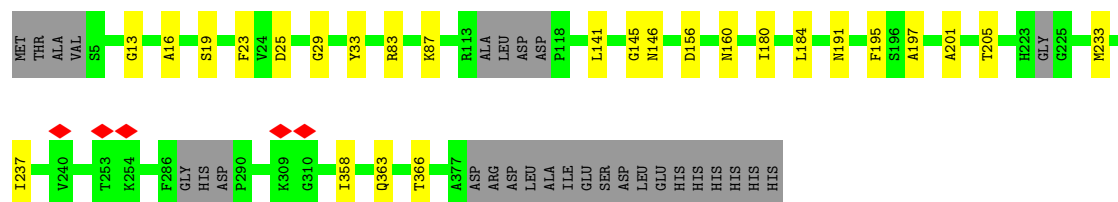
Chain Y:  87% 7% 6%

● Molecule 1: Citrate synthase

Chain Z:  89% 5% 6%

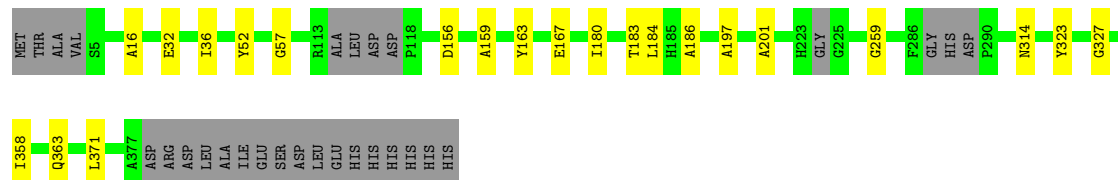
● Molecule 1: Citrate synthase

Chain a:  86% 7% 7%



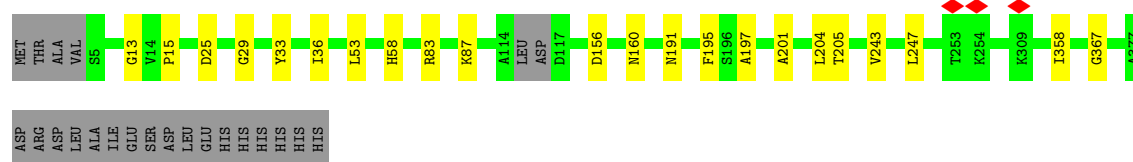
- Molecule 1: Citrate synthase

Chain b: 87% 6% 7%



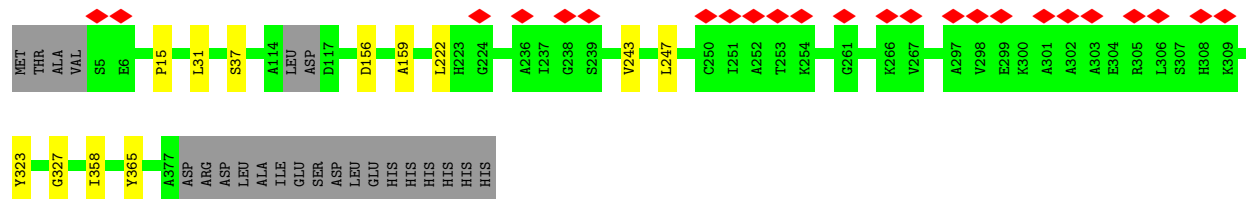
- Molecule 1: Citrate synthase

Chain c: 89% 6% 6%



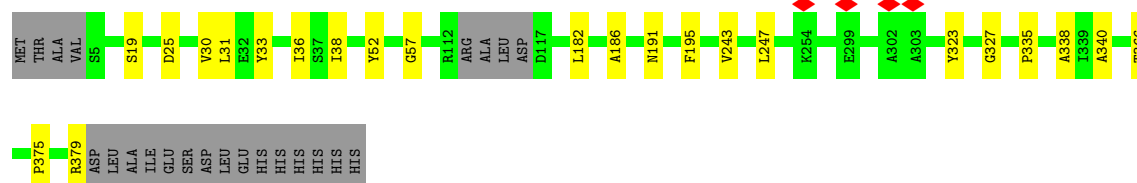
- Molecule 1: Citrate synthase

Chain d: 91% 6% 6%

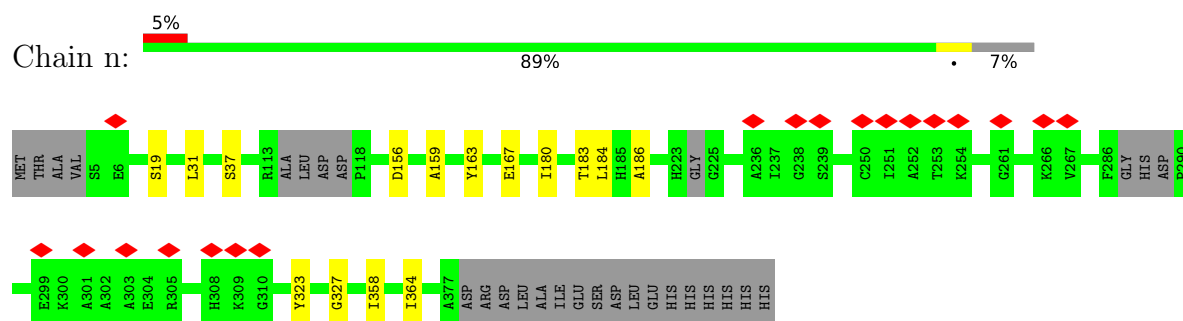


- Molecule 1: Citrate synthase

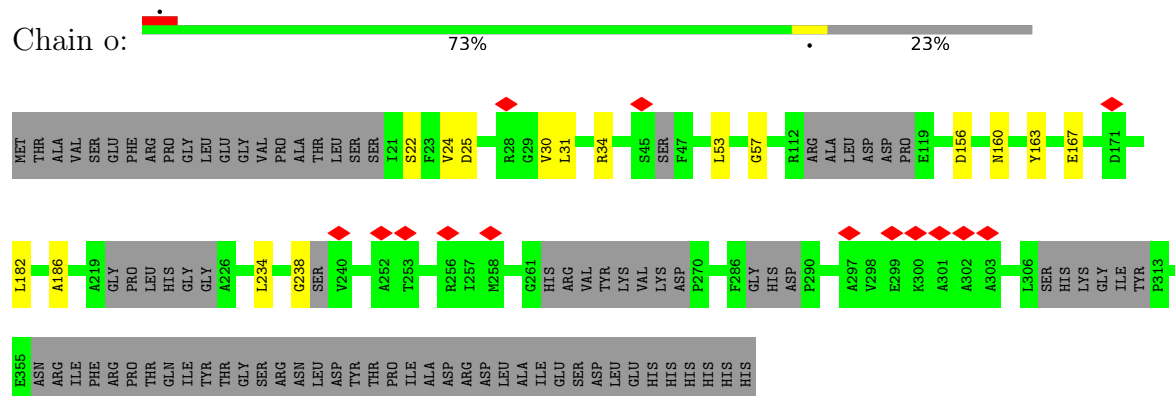
Chain m: 88% 6% 6%



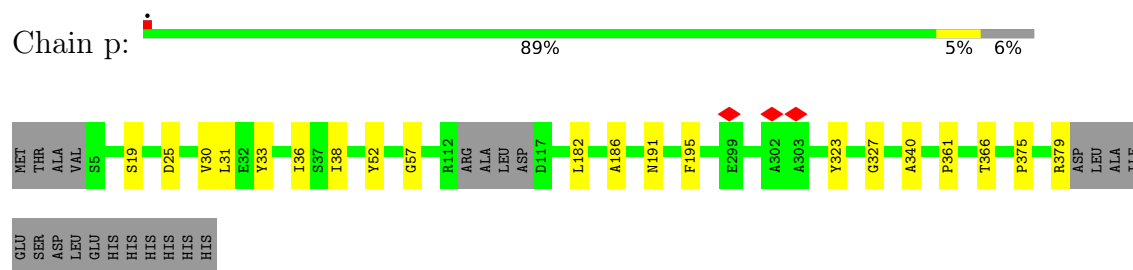
- Molecule 1: Citrate synthase



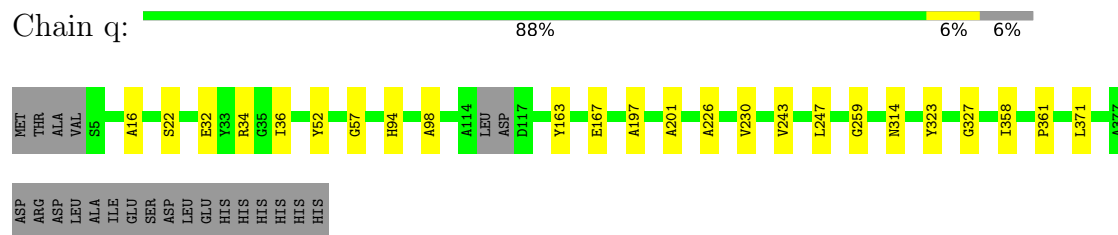
- Molecule 1: Citrate synthase



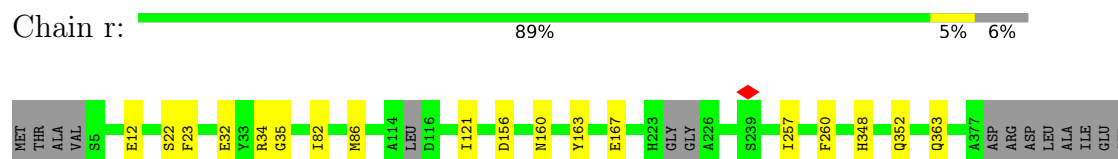
- Molecule 1: Citrate synthase



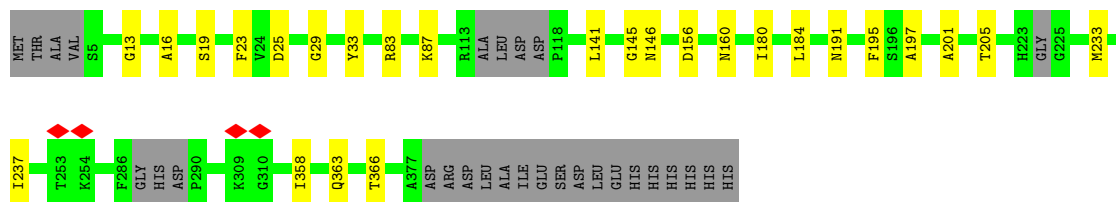
- Molecule 1: Citrate synthase



- Molecule 1: Citrate synthase

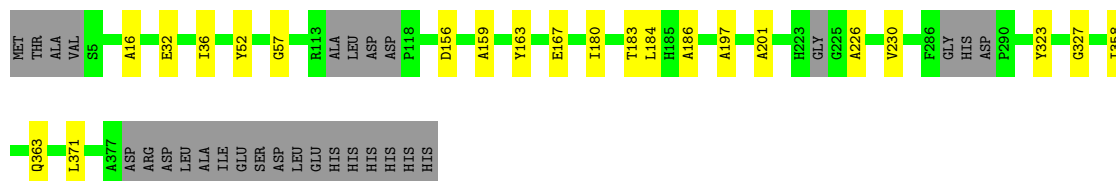


Chain w:  86% 7% 7%



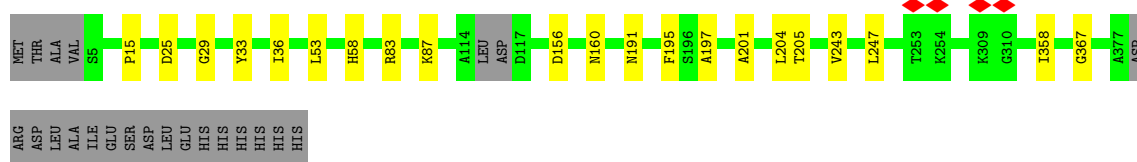
- Molecule 1: Citrate synthase

Chain x:  87% 6% 7%



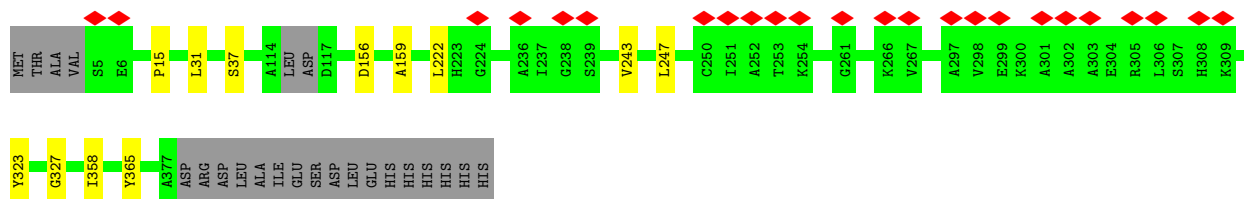
- Molecule 1: Citrate synthase

Chain y:  89% 5% 6%



- Molecule 1: Citrate synthase

Chain z:  91% 6% 6%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	17191	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	0.918	Depositor
Minimum map value	-0.333	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.026	Depositor
Recommended contour level	0.2	Depositor
Map size (Å)	948.0, 948.0, 948.0	wwPDB
Map dimensions	600, 600, 600	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.58, 1.58, 1.58	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	0.17	0/1831	0.43	0/2547
1	1	0.15	0/1827	0.43	0/2541
1	2	0.16	0/1827	0.46	1/2541 (0.0%)
1	3	0.16	0/1827	0.47	1/2541 (0.0%)
1	4	0.15	0/1827	0.42	0/2541
1	5	0.16	0/1827	0.44	0/2541
1	6	0.17	0/1831	0.43	0/2547
1	7	0.16	0/1827	0.44	0/2541
1	8	0.16	0/1831	0.43	0/2547
1	9	0.18	0/1801	0.45	0/2503
1	A	0.16	0/1831	0.43	0/2547
1	B	0.18	0/1801	0.45	0/2503
1	C	0.12	0/1498	0.38	0/2076
1	D	0.17	0/1831	0.49	0/2547
1	E	0.17	0/1827	0.46	0/2541
1	F	0.13	0/1498	0.37	0/2076
1	G	0.16	0/1831	0.44	0/2547
1	H	0.17	0/1831	0.50	3/2547 (0.1%)
1	I	0.17	0/1801	0.48	0/2503
1	J	0.17	0/1801	0.51	0/2503
1	K	0.17	0/1831	0.45	0/2547
1	L	0.17	0/1831	0.46	0/2547
1	M	0.15	0/1827	0.43	0/2541
1	N	0.16	0/1827	0.46	1/2541 (0.0%)
1	O	0.16	0/1827	0.46	1/2541 (0.0%)
1	P	0.17	0/1831	0.43	0/2547
1	Q	0.16	0/1831	0.43	0/2547
1	R	0.17	0/1801	0.45	0/2503
1	S	0.16	0/1831	0.45	0/2547
1	T	0.16	0/1801	0.46	0/2503
1	U	0.12	0/1498	0.37	0/2076
1	V	0.17	0/1831	0.49	0/2547
1	W	0.17	0/1827	0.47	1/2541 (0.0%)
1	X	0.13	0/1498	0.37	0/2076

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	Y	0.16	0/1831	0.44	0/2547
1	Z	0.17	0/1831	0.51	3/2547 (0.1%)
1	a	0.17	0/1801	0.48	0/2503
1	b	0.16	0/1801	0.51	0/2503
1	c	0.16	0/1831	0.45	0/2547
1	d	0.16	0/1831	0.46	0/2547
1	m	0.15	0/1831	0.43	0/2547
1	n	0.16	0/1801	0.47	0/2503
1	o	0.12	0/1498	0.37	0/2076
1	p	0.15	0/1831	0.44	0/2547
1	q	0.17	0/1831	0.50	0/2547
1	r	0.17	0/1827	0.48	1/2541 (0.0%)
1	s	0.13	0/1498	0.38	0/2076
1	t	0.16	0/1801	0.47	0/2503
1	u	0.16	0/1831	0.44	0/2547
1	v	0.17	0/1831	0.52	3/2547 (0.1%)
1	w	0.17	0/1801	0.48	0/2503
1	x	0.17	0/1801	0.52	0/2503
1	y	0.17	0/1831	0.45	0/2547
1	z	0.17	0/1831	0.47	0/2547
All	All	0.16	0/96468	0.45	15/134112 (0.0%)

There are no bond length outliers.

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	3	121	ILE	N-CA-C	-9.25	104.92	113.71
1	O	121	ILE	N-CA-C	-9.23	104.94	113.71
1	v	93	GLY	CA-C-N	8.14	132.60	121.20
1	v	93	GLY	C-N-CA	8.14	132.60	121.20
1	N	121	ILE	N-CA-C	-7.33	106.74	113.71

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	1833	0	864	19	0
1	1	1830	0	859	14	0
1	2	1830	0	859	11	0
1	3	1830	0	859	19	0
1	4	1830	0	859	14	0
1	5	1830	0	859	11	0
1	6	1833	0	864	19	0
1	7	1830	0	859	17	0
1	8	1833	0	861	7	0
1	9	1805	0	847	13	0
1	A	1833	0	861	6	0
1	B	1805	0	847	12	0
1	C	1506	0	716	8	0
1	D	1833	0	864	12	0
1	E	1830	0	859	10	0
1	F	1506	0	716	11	0
1	G	1833	0	861	19	0
1	H	1833	0	861	12	0
1	I	1805	0	847	17	0
1	J	1805	0	847	12	0
1	K	1833	0	864	13	0
1	L	1833	0	864	7	0
1	M	1830	0	859	15	0
1	N	1830	0	859	11	0
1	O	1830	0	859	15	0
1	P	1833	0	864	18	0
1	Q	1833	0	861	6	0
1	R	1805	0	847	12	0
1	S	1833	0	861	12	0
1	T	1805	0	847	8	0
1	U	1506	0	716	7	0
1	V	1833	0	864	13	0
1	W	1830	0	859	11	0
1	X	1506	0	716	12	0
1	Y	1833	0	861	19	0
1	Z	1833	0	861	11	0
1	a	1805	0	847	18	0
1	b	1805	0	847	12	0
1	c	1833	0	864	13	0
1	d	1833	0	864	7	0
1	m	1833	0	861	13	0
1	n	1805	0	847	8	0
1	o	1506	0	716	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	p	1833	0	861	12	0
1	q	1833	0	864	13	0
1	r	1830	0	859	10	0
1	s	1506	0	716	11	0
1	t	1805	0	847	10	0
1	u	1833	0	861	19	0
1	v	1833	0	861	10	0
1	w	1805	0	847	17	0
1	x	1805	0	847	12	0
1	y	1833	0	864	12	0
1	z	1833	0	864	7	0
All	All	96648	0	45468	568	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 4.

The worst 5 of 568 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:Z:363:GLN:HA	1:b:16:ALA:H	1.47	0.79
1:q:16:ALA:H	1:r:363:GLN:HA	1.48	0.78
1:D:16:ALA:H	1:E:363:GLN:HA	1.48	0.78
1:H:363:GLN:HA	1:J:16:ALA:H	1.49	0.78
1:N:363:GLN:HA	1:d:15:PRO:HA	1.69	0.75

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	0	367/394 (93%)	336 (92%)	30 (8%)	1 (0%)	36 72

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	1	364/394 (92%)	342 (94%)	22 (6%)	0	100	100
1	2	364/394 (92%)	341 (94%)	23 (6%)	0	100	100
1	3	364/394 (92%)	335 (92%)	29 (8%)	0	100	100
1	4	364/394 (92%)	343 (94%)	21 (6%)	0	100	100
1	5	364/394 (92%)	338 (93%)	26 (7%)	0	100	100
1	6	367/394 (93%)	337 (92%)	29 (8%)	1 (0%)	36	72
1	7	364/394 (92%)	333 (92%)	31 (8%)	0	100	100
1	8	367/394 (93%)	343 (94%)	24 (6%)	0	100	100
1	9	357/394 (91%)	323 (90%)	33 (9%)	1 (0%)	36	72
1	A	367/394 (93%)	345 (94%)	22 (6%)	0	100	100
1	B	357/394 (91%)	320 (90%)	36 (10%)	1 (0%)	36	72
1	C	288/394 (73%)	280 (97%)	8 (3%)	0	100	100
1	D	367/394 (93%)	335 (91%)	31 (8%)	1 (0%)	36	72
1	E	364/394 (92%)	336 (92%)	28 (8%)	0	100	100
1	F	288/394 (73%)	279 (97%)	9 (3%)	0	100	100
1	G	367/394 (93%)	350 (95%)	17 (5%)	0	100	100
1	H	367/394 (93%)	341 (93%)	25 (7%)	1 (0%)	36	72
1	I	357/394 (91%)	328 (92%)	28 (8%)	1 (0%)	36	72
1	J	357/394 (91%)	318 (89%)	38 (11%)	1 (0%)	36	72
1	K	367/394 (93%)	333 (91%)	33 (9%)	1 (0%)	36	72
1	L	367/394 (93%)	341 (93%)	25 (7%)	1 (0%)	36	72
1	M	364/394 (92%)	344 (94%)	20 (6%)	0	100	100
1	N	364/394 (92%)	340 (93%)	24 (7%)	0	100	100
1	O	364/394 (92%)	335 (92%)	29 (8%)	0	100	100
1	P	367/394 (93%)	334 (91%)	32 (9%)	1 (0%)	36	72
1	Q	367/394 (93%)	345 (94%)	22 (6%)	0	100	100
1	R	357/394 (91%)	324 (91%)	32 (9%)	1 (0%)	36	72
1	S	367/394 (93%)	343 (94%)	24 (6%)	0	100	100
1	T	357/394 (91%)	329 (92%)	27 (8%)	1 (0%)	36	72
1	U	288/394 (73%)	280 (97%)	8 (3%)	0	100	100
1	V	367/394 (93%)	331 (90%)	35 (10%)	1 (0%)	36	72

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	W	364/394 (92%)	334 (92%)	30 (8%)	0	100	100
1	X	288/394 (73%)	280 (97%)	8 (3%)	0	100	100
1	Y	367/394 (93%)	350 (95%)	17 (5%)	0	100	100
1	Z	367/394 (93%)	340 (93%)	26 (7%)	1 (0%)	36	72
1	a	357/394 (91%)	324 (91%)	32 (9%)	1 (0%)	36	72
1	b	357/394 (91%)	323 (90%)	33 (9%)	1 (0%)	36	72
1	c	367/394 (93%)	335 (91%)	31 (8%)	1 (0%)	36	72
1	d	367/394 (93%)	338 (92%)	28 (8%)	1 (0%)	36	72
1	m	367/394 (93%)	344 (94%)	23 (6%)	0	100	100
1	n	357/394 (91%)	327 (92%)	29 (8%)	1 (0%)	36	72
1	o	288/394 (73%)	282 (98%)	6 (2%)	0	100	100
1	p	367/394 (93%)	340 (93%)	27 (7%)	0	100	100
1	q	367/394 (93%)	335 (91%)	31 (8%)	1 (0%)	36	72
1	r	364/394 (92%)	335 (92%)	29 (8%)	0	100	100
1	s	288/394 (73%)	279 (97%)	9 (3%)	0	100	100
1	t	357/394 (91%)	326 (91%)	30 (8%)	1 (0%)	36	72
1	u	367/394 (93%)	349 (95%)	18 (5%)	0	100	100
1	v	367/394 (93%)	340 (93%)	26 (7%)	1 (0%)	36	72
1	w	357/394 (91%)	330 (92%)	26 (7%)	1 (0%)	36	72
1	x	357/394 (91%)	317 (89%)	39 (11%)	1 (0%)	36	72
1	y	367/394 (93%)	333 (91%)	33 (9%)	1 (0%)	36	72
1	z	367/394 (93%)	339 (92%)	27 (7%)	1 (0%)	36	72
All	All	19188/21276 (90%)	17782 (93%)	1379 (7%)	27 (0%)	49	83

5 of 27 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	0	358	ILE
1	6	358	ILE
1	D	358	ILE
1	P	358	ILE
1	V	358	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.

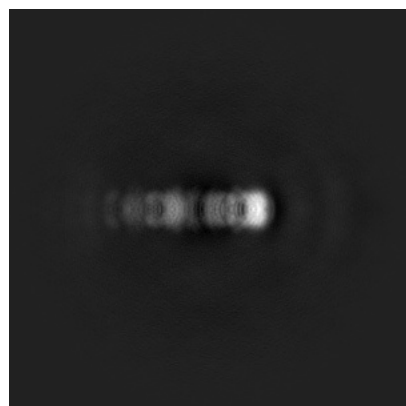
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-19250. These allow visual inspection of the internal detail of the map and identification of artifacts.

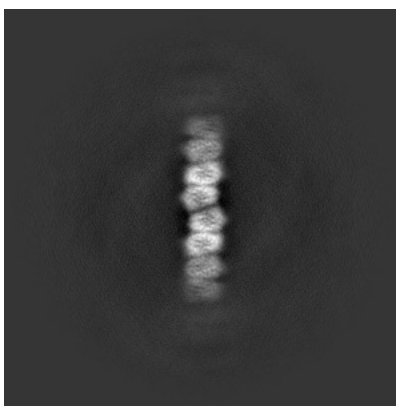
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

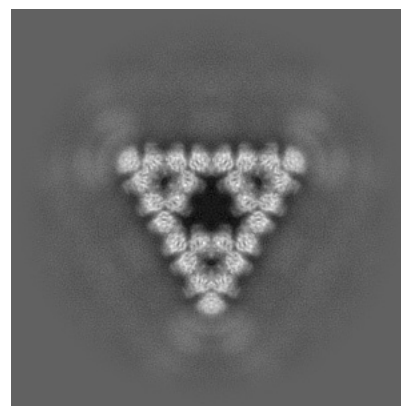
6.1.1 Primary map



X

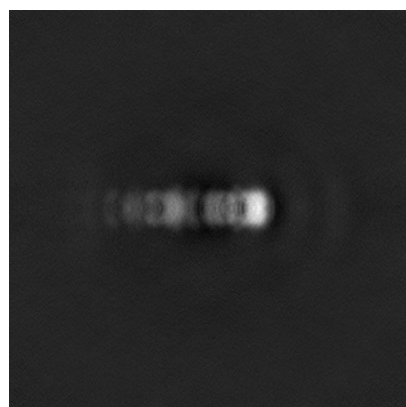


Y

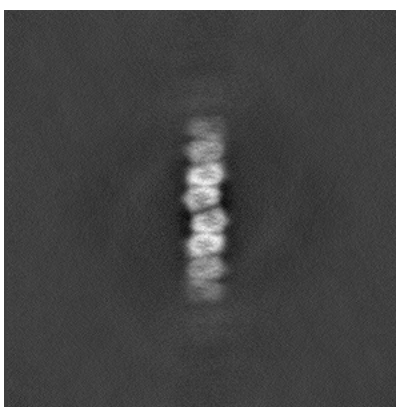


Z

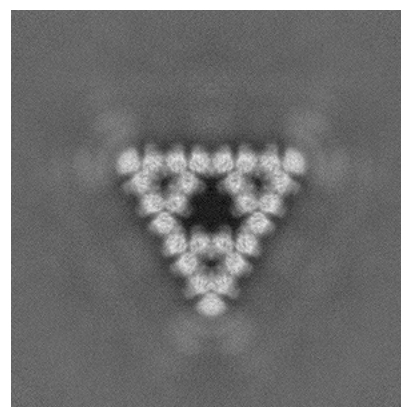
6.1.2 Raw map



X



Y

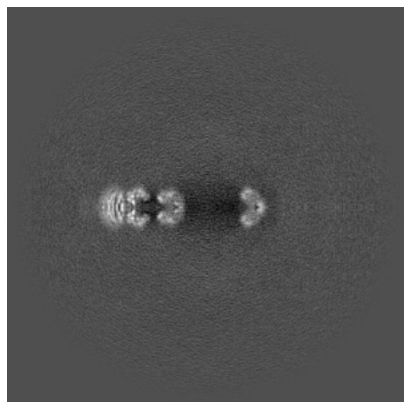


Z

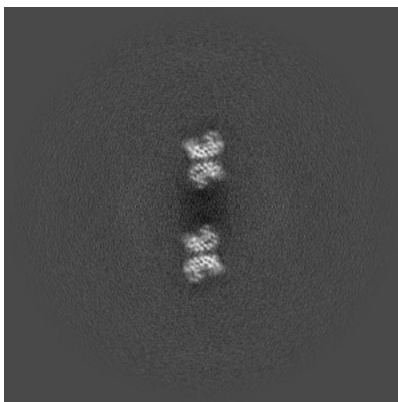
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

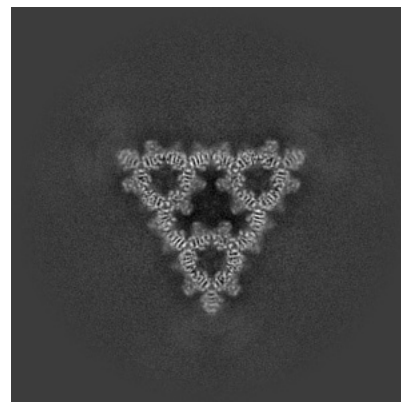
6.2.1 Primary map



X Index: 300

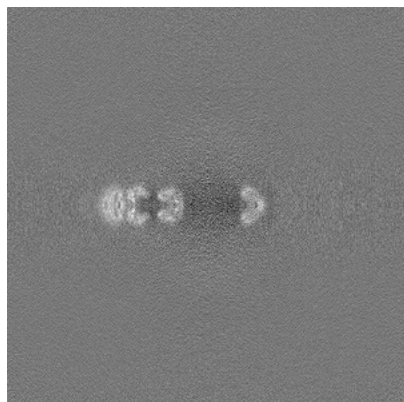


Y Index: 300

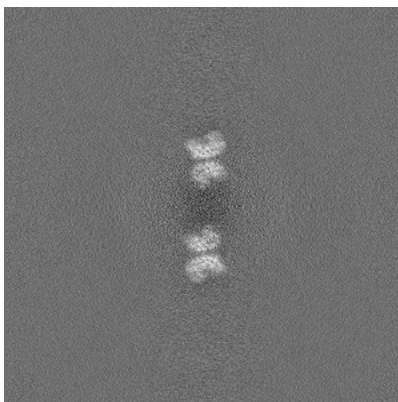


Z Index: 300

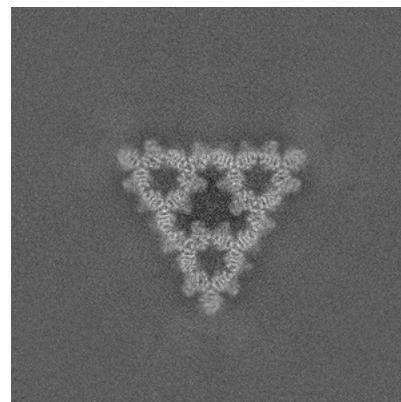
6.2.2 Raw map



X Index: 300



Y Index: 300

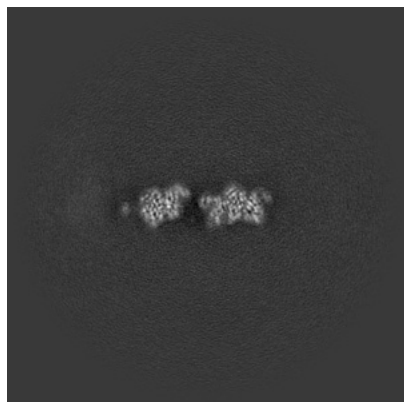


Z Index: 300

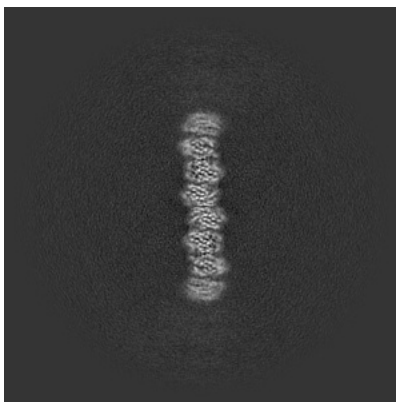
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

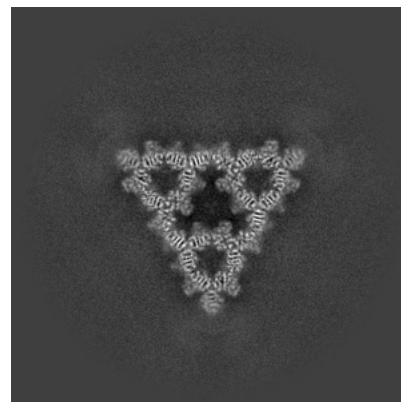
6.3.1 Primary map



X Index: 259

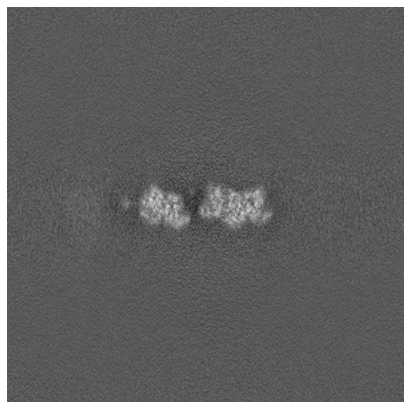


Y Index: 373

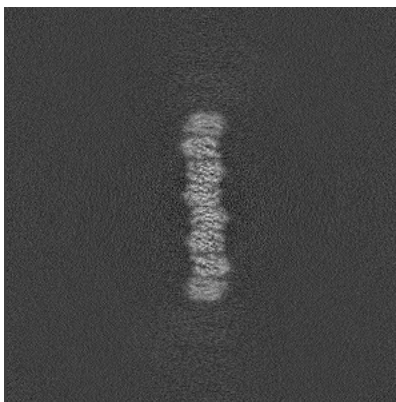


Z Index: 301

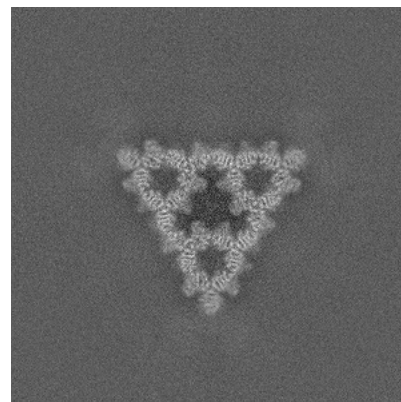
6.3.2 Raw map



X Index: 342



Y Index: 372

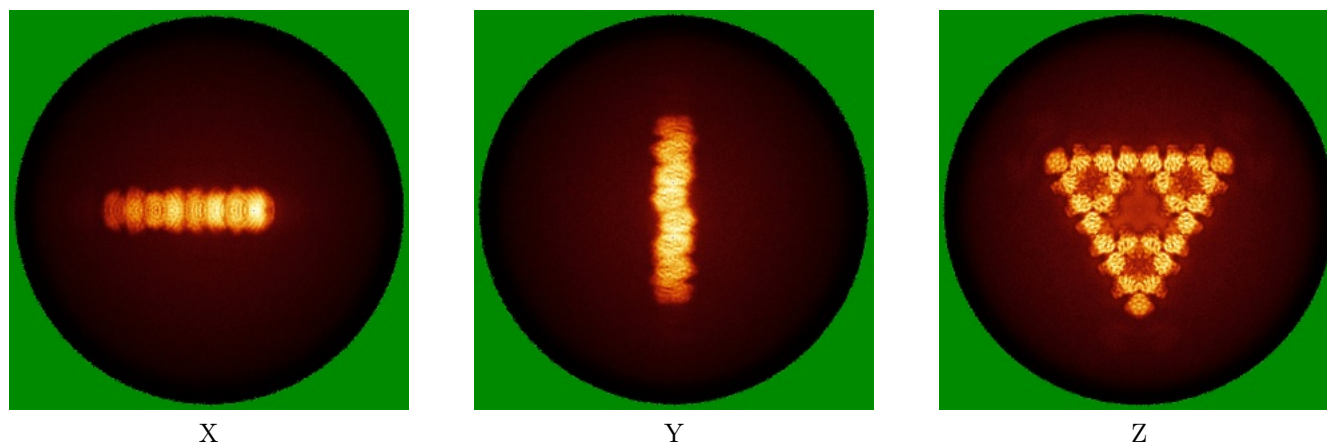


Z Index: 300

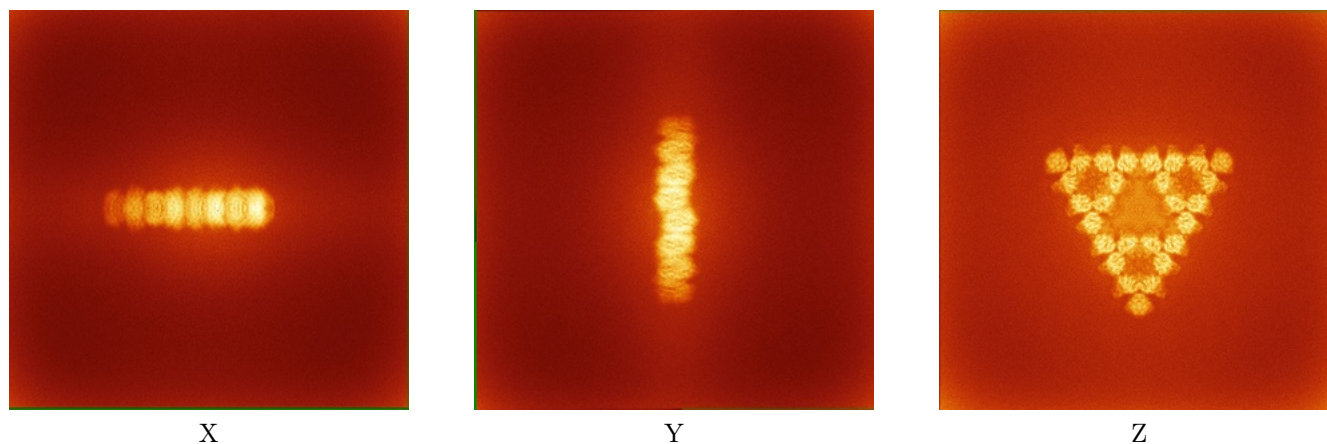
The images above show the largest variance slices of the map in three orthogonal directions.

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](#)

This section was not generated.

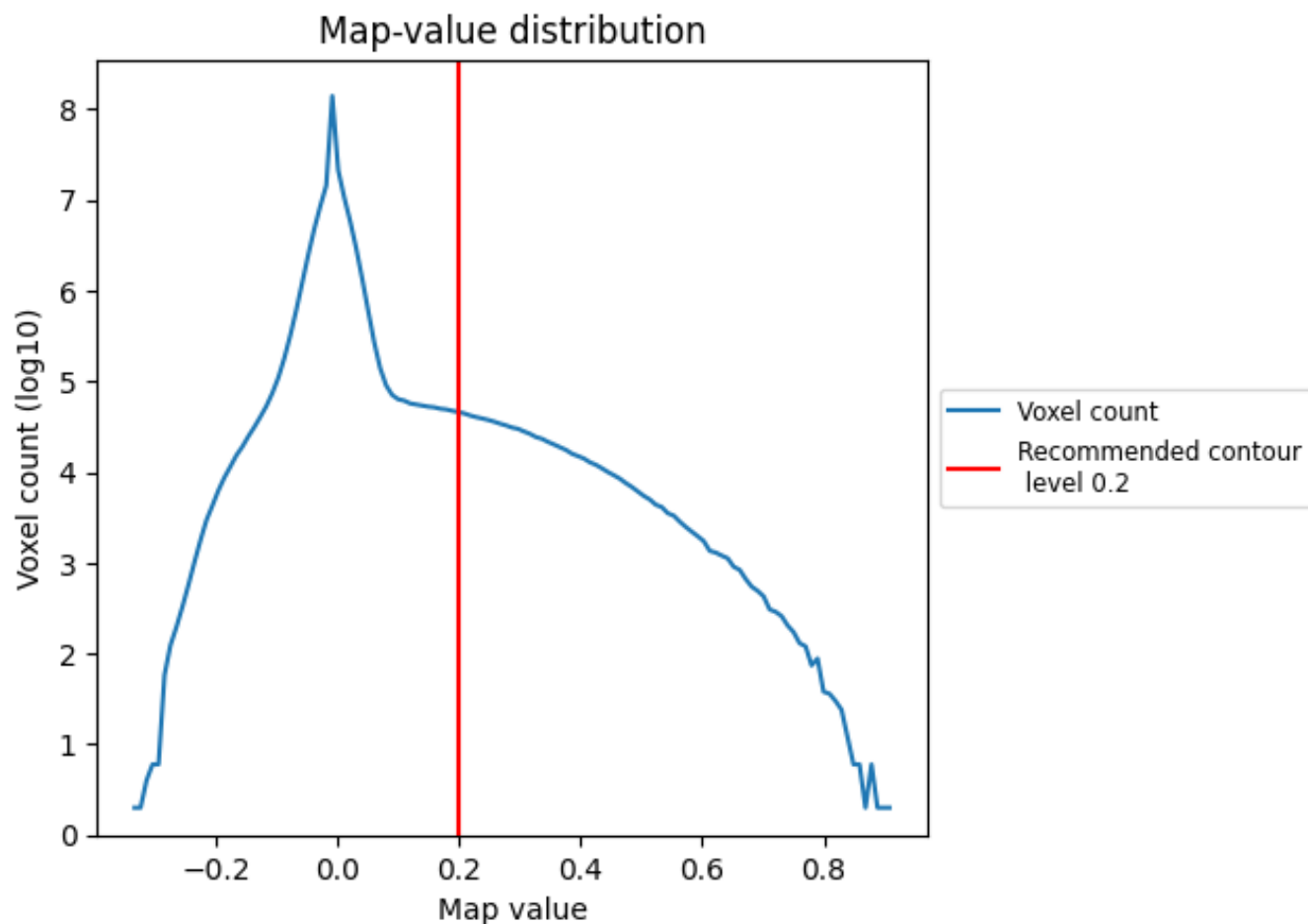
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

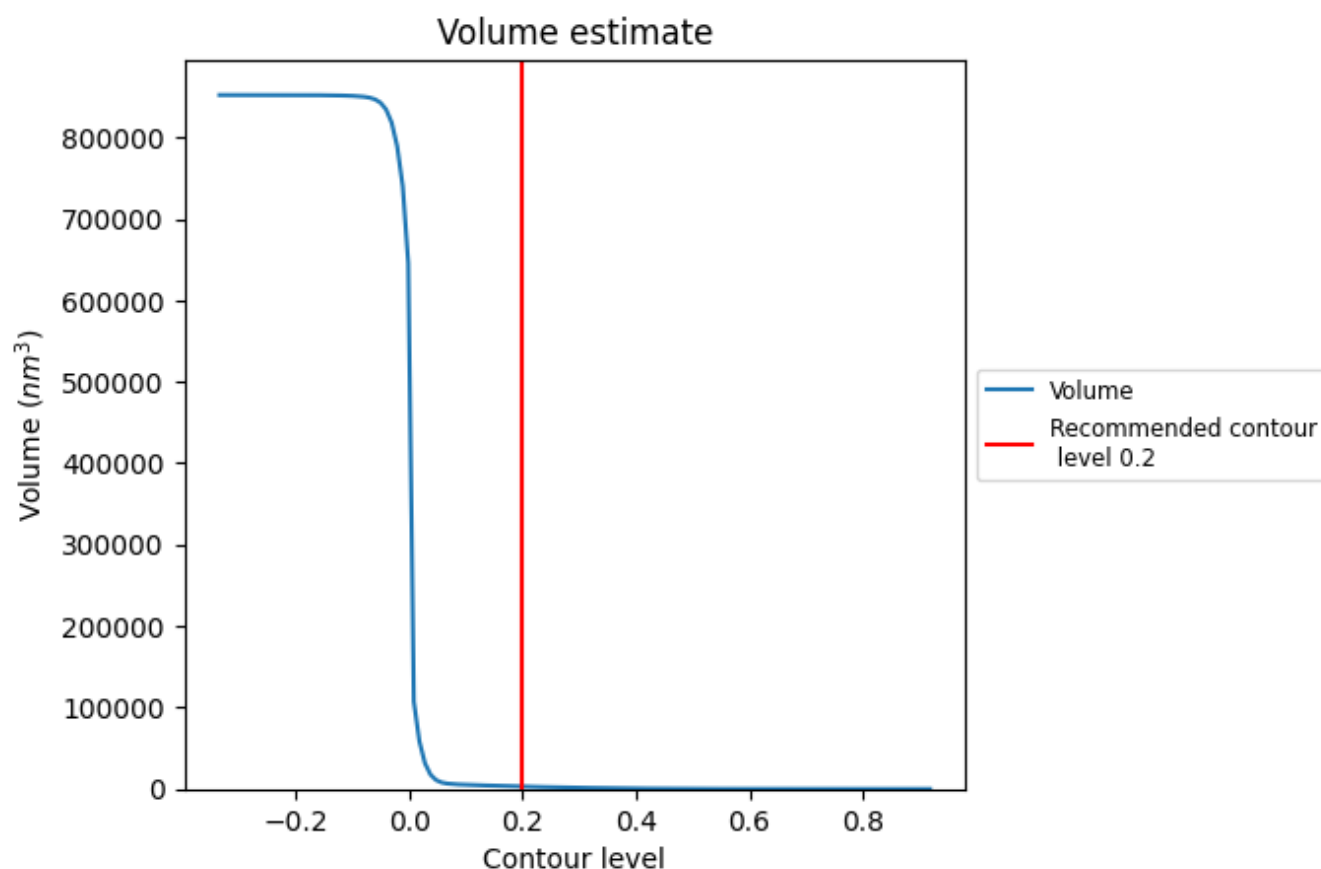
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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.

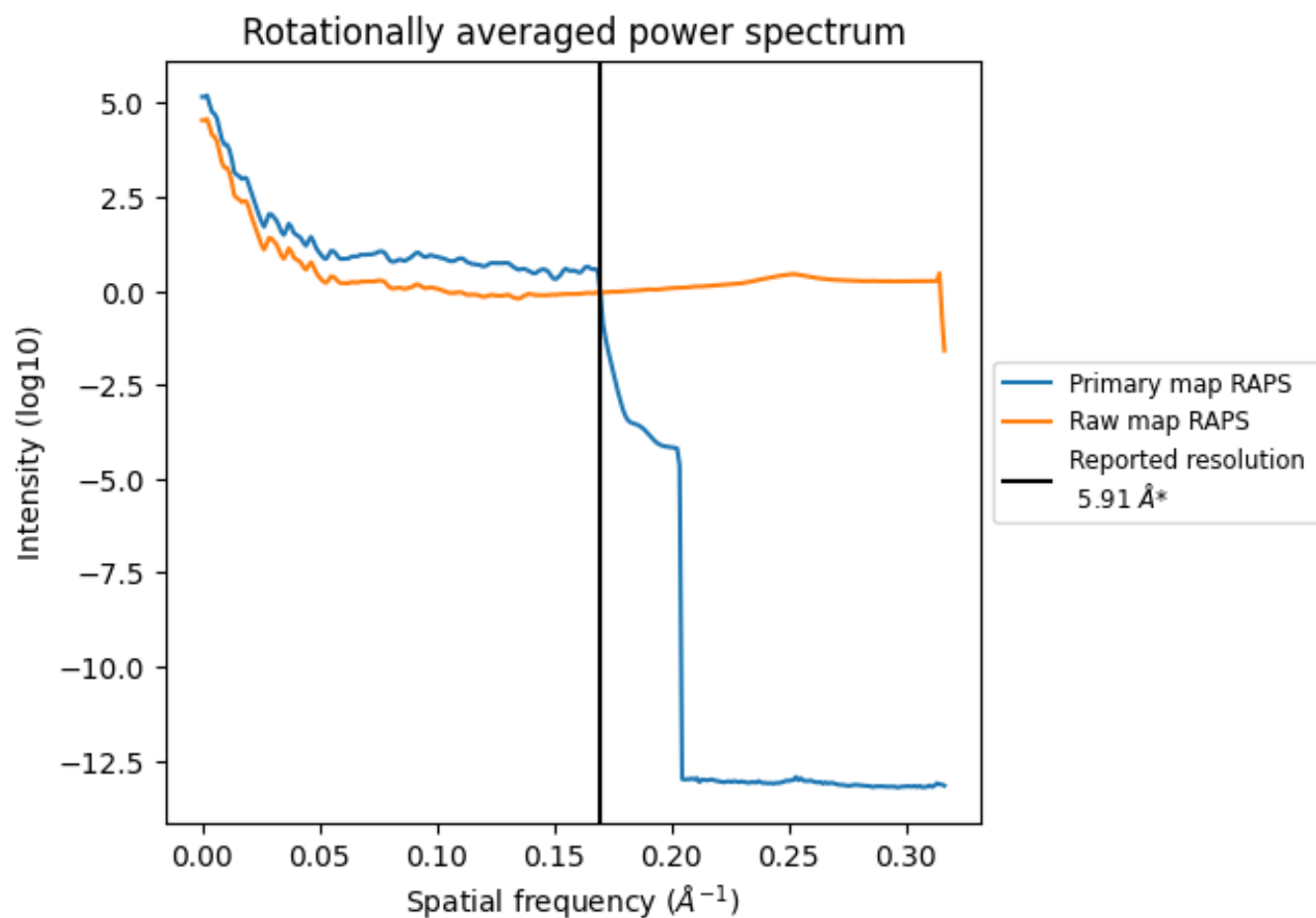
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 3006 nm³; this corresponds to an approximate mass of 2715 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ

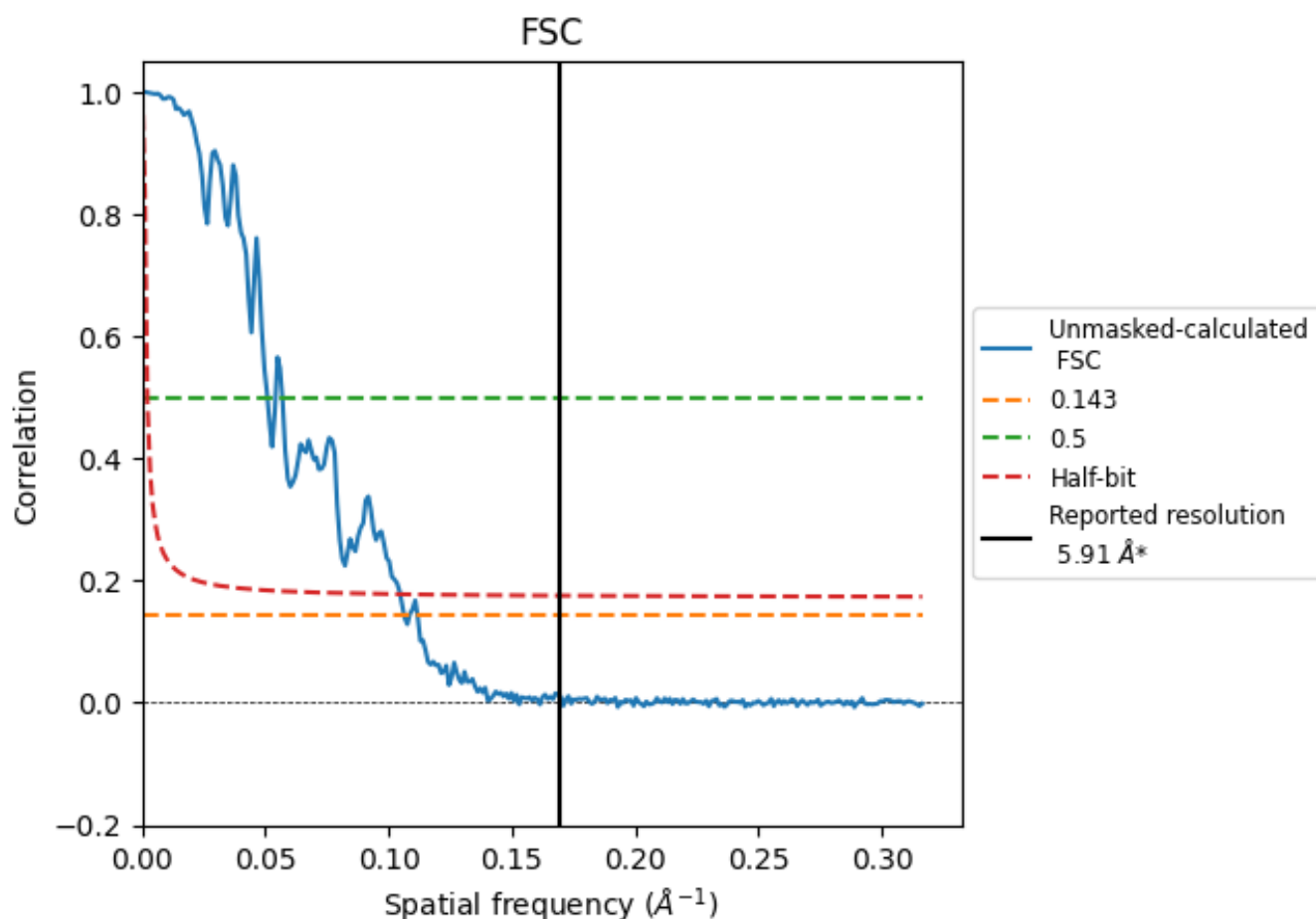


*Reported resolution corresponds to spatial frequency of 0.169 Å⁻¹

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 0.169 Å⁻¹

8.2 Resolution estimates [i](#)

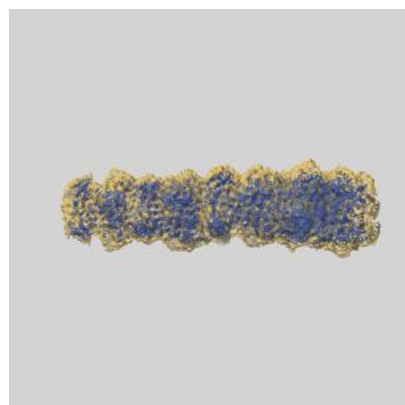
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	5.91	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	9.41	19.69	9.55

*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 9.41 differs from the reported value 5.91 by more than 10 %

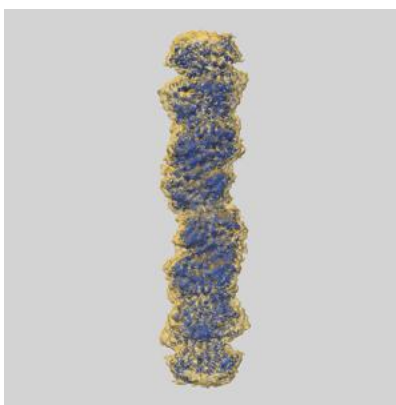
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-19250 and PDB model 8RJK. Per-residue inclusion information can be found in section [3](#) on page [20](#).

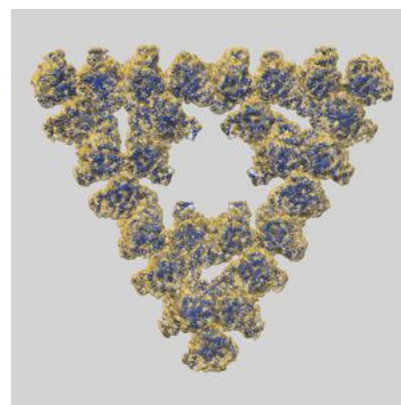
9.1 Map-model overlay [i](#)



X



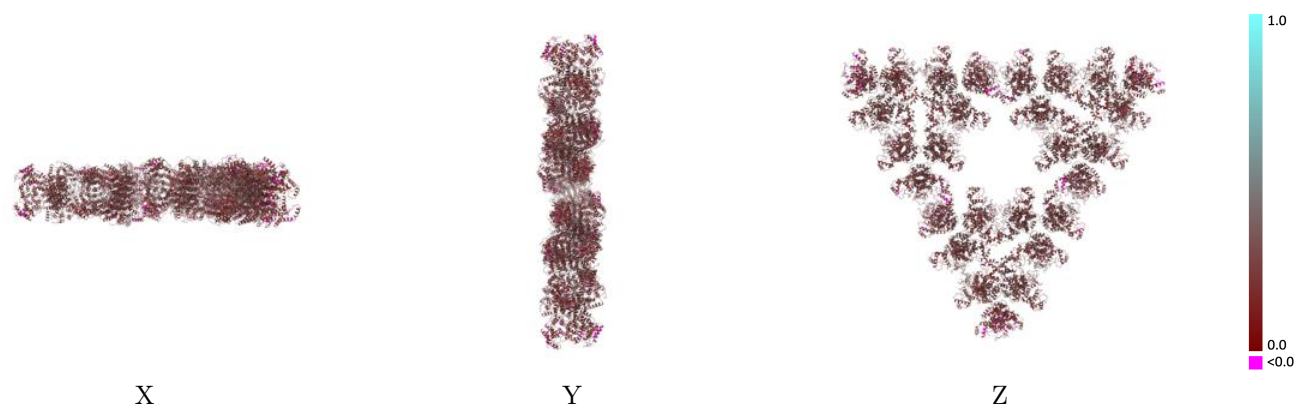
Y



Z

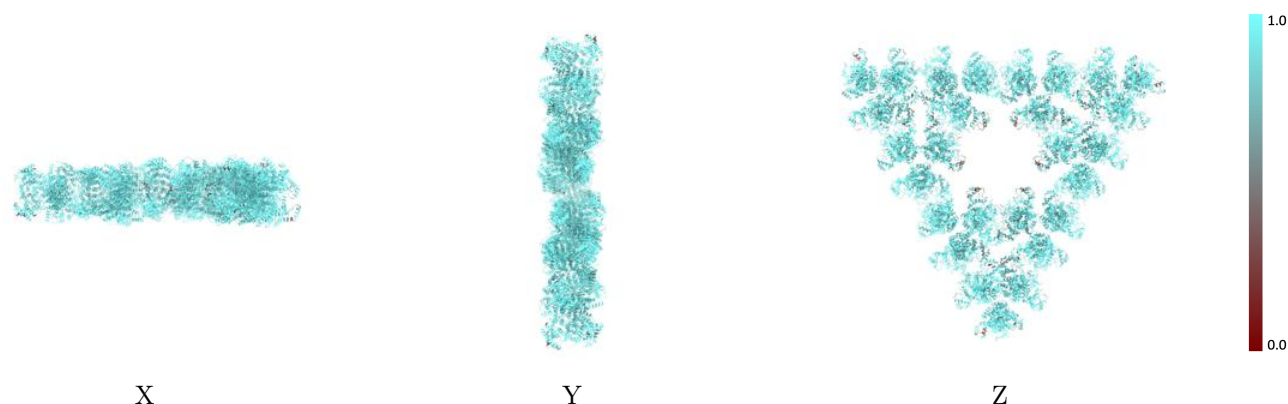
The images above show the 3D surface view of the map at the recommended contour level 0.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



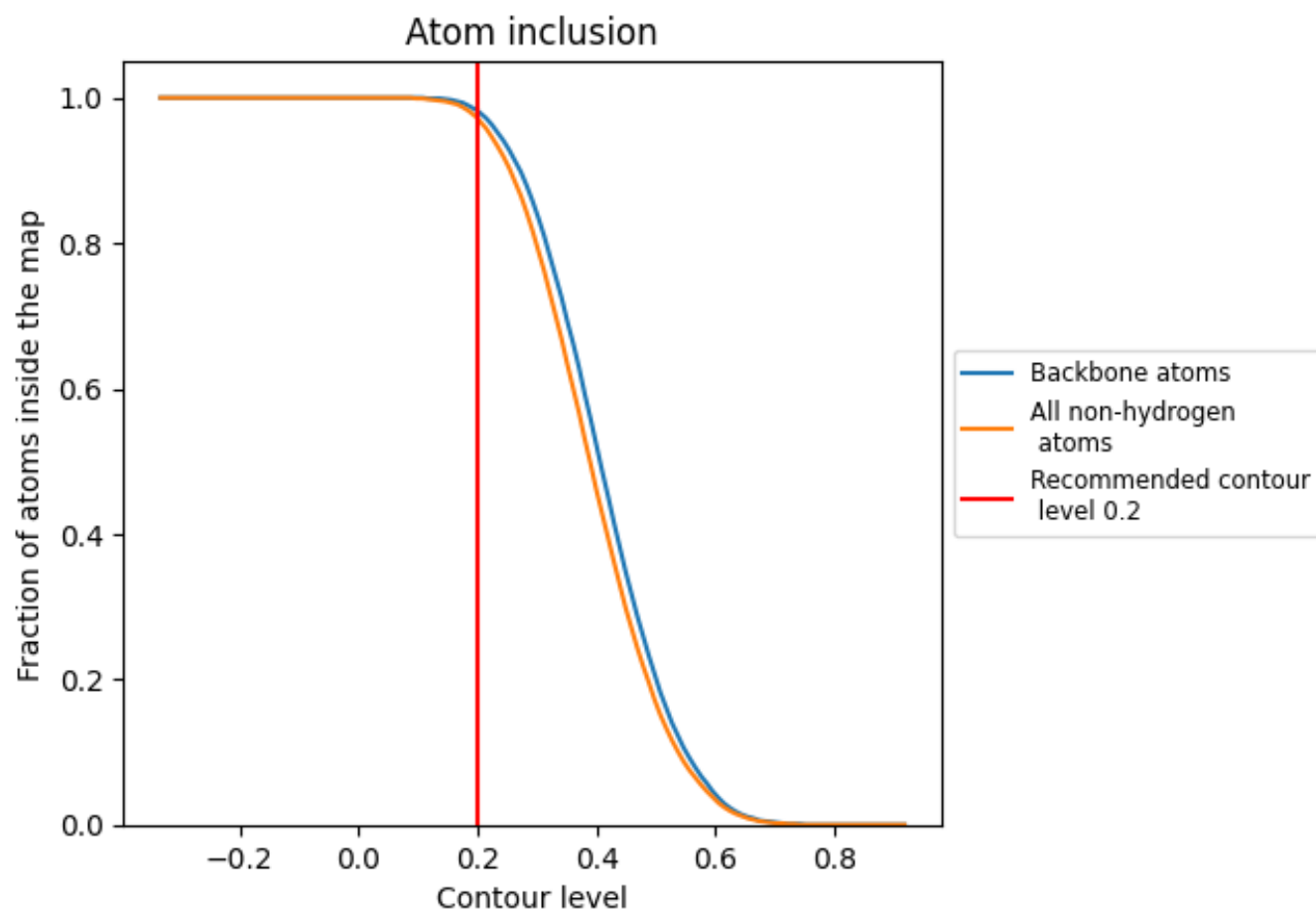
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.2).

9.4 Atom inclusion [i](#)



At the recommended contour level, 98% of all backbone atoms, 97% 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 (0.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9720	 0.2770
0	 0.9930	 0.2810
1	 0.9650	 0.2840
2	 0.9730	 0.2810
3	 0.9950	 0.2750
4	 0.9660	 0.2820
5	 0.9720	 0.2810
6	 0.9940	 0.2800
7	 0.9960	 0.2750
8	 0.9910	 0.2710
9	 0.9910	 0.2770
A	 0.9930	 0.2710
B	 0.9910	 0.2780
C	 0.9420	 0.2270
D	 0.9870	 0.2930
E	 0.9840	 0.2870
F	 0.9410	 0.2220
G	 0.9610	 0.2790
H	 0.9800	 0.2870
I	 0.9730	 0.2740
J	 0.9900	 0.2950
K	 0.9740	 0.2780
L	 0.9240	 0.2800
M	 0.9650	 0.2800
N	 0.9730	 0.2810
O	 0.9950	 0.2740
P	 0.9940	 0.2810
Q	 0.9920	 0.2700
R	 0.9900	 0.2760
S	 0.9800	 0.2880
T	 0.9310	 0.2840
U	 0.9430	 0.2240
V	 0.9880	 0.2940
W	 0.9840	 0.2870
X	 0.9420	 0.2250



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Chain	Atom inclusion	Q-score
Y	 0.9630	 0.2800
Z	 0.9790	 0.2870
a	 0.9720	 0.2760
b	 0.9890	 0.2970
c	 0.9740	 0.2790
d	 0.9240	 0.2800
m	 0.9810	 0.2880
n	 0.9300	 0.2880
o	 0.9440	 0.2260
p	 0.9820	 0.2890
q	 0.9870	 0.2980
r	 0.9850	 0.2890
s	 0.9420	 0.2240
t	 0.9300	 0.2850
u	 0.9610	 0.2760
v	 0.9800	 0.2860
w	 0.9750	 0.2740
x	 0.9900	 0.2960
y	 0.9720	 0.2790
z	 0.9230	 0.2800