



# wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 15, 2025 – 10:20 pm BST

PDB ID : 9HEE / pdb\_00009hee  
Title : Crystal structure of methionine gamma-lyase from *Brevibacterium aurantiacum* having disordered N-terminus and devoid of PLP cofactor  
Authors : Kopecny, D.; Ferchaud, N.; Briozzo, P.  
Deposited on : 2024-11-13  
Resolution : 3.24 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

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>.

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

MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

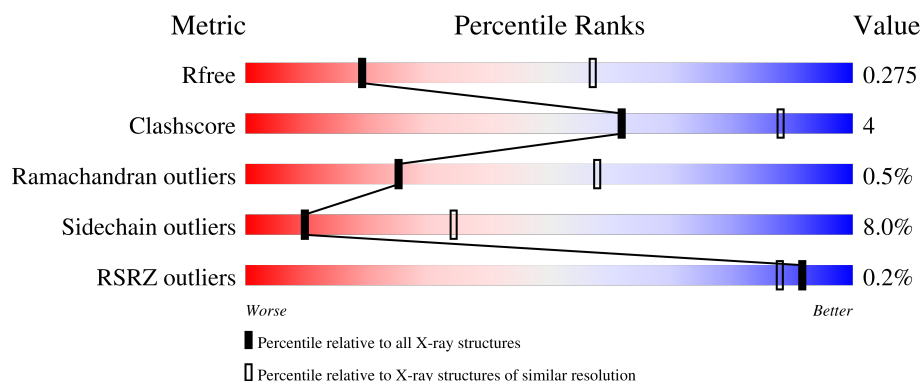
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*






The reported resolution of this entry is 3.24 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)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	164625	1999 (3.28-3.20)
Clashscore	180529	2147 (3.28-3.20)
Ramachandran outliers	177936	2118 (3.28-3.20)
Sidechain outliers	177891	2117 (3.28-3.20)
RSRZ outliers	164620	2001 (3.28-3.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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 electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	413	
1	B	413	
1	C	413	
1	D	413	
1	E	413	

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Mol	Chain	Length	Quality of chain
1	F	413	 66% 10% 24%
1	G	413	 67% 8% 24%
1	H	413	 64% 11% 24%

## 2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 18176 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 Cystathionine gamma-synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	314	Total	C	N	O	S	0	0	0
			2272	1426	404	431	11			
1	B	314	Total	C	N	O	S	0	0	0
			2272	1426	404	431	11			
1	C	314	Total	C	N	O	S	0	0	0
			2272	1426	404	431	11			
1	D	314	Total	C	N	O	S	0	0	0
			2272	1426	404	431	11			
1	E	314	Total	C	N	O	S	0	0	0
			2272	1426	404	431	11			
1	F	314	Total	C	N	O	S	0	0	0
			2272	1426	404	431	11			
1	G	314	Total	C	N	O	S	0	0	0
			2272	1426	404	431	11			
1	H	314	Total	C	N	O	S	0	0	0
			2272	1426	404	431	11			

There are 160 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	initiating methionine	UNP A0A2H1K3G9
A	-18	GLY	-	expression tag	UNP A0A2H1K3G9
A	-17	SER	-	expression tag	UNP A0A2H1K3G9
A	-16	SER	-	expression tag	UNP A0A2H1K3G9
A	-15	HIS	-	expression tag	UNP A0A2H1K3G9
A	-14	HIS	-	expression tag	UNP A0A2H1K3G9
A	-13	HIS	-	expression tag	UNP A0A2H1K3G9
A	-12	HIS	-	expression tag	UNP A0A2H1K3G9
A	-11	HIS	-	expression tag	UNP A0A2H1K3G9
A	-10	HIS	-	expression tag	UNP A0A2H1K3G9
A	-9	SER	-	expression tag	UNP A0A2H1K3G9
A	-8	SER	-	expression tag	UNP A0A2H1K3G9
A	-7	GLY	-	expression tag	UNP A0A2H1K3G9

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-6	LEU	-	expression tag	UNP A0A2H1K3G9
A	-5	VAL	-	expression tag	UNP A0A2H1K3G9
A	-4	PRO	-	expression tag	UNP A0A2H1K3G9
A	-3	ARG	-	expression tag	UNP A0A2H1K3G9
A	-2	GLY	-	expression tag	UNP A0A2H1K3G9
A	-1	SER	-	expression tag	UNP A0A2H1K3G9
A	0	HIS	-	expression tag	UNP A0A2H1K3G9
B	-19	MET	-	initiating methionine	UNP A0A2H1K3G9
B	-18	GLY	-	expression tag	UNP A0A2H1K3G9
B	-17	SER	-	expression tag	UNP A0A2H1K3G9
B	-16	SER	-	expression tag	UNP A0A2H1K3G9
B	-15	HIS	-	expression tag	UNP A0A2H1K3G9
B	-14	HIS	-	expression tag	UNP A0A2H1K3G9
B	-13	HIS	-	expression tag	UNP A0A2H1K3G9
B	-12	HIS	-	expression tag	UNP A0A2H1K3G9
B	-11	HIS	-	expression tag	UNP A0A2H1K3G9
B	-10	HIS	-	expression tag	UNP A0A2H1K3G9
B	-9	SER	-	expression tag	UNP A0A2H1K3G9
B	-8	SER	-	expression tag	UNP A0A2H1K3G9
B	-7	GLY	-	expression tag	UNP A0A2H1K3G9
B	-6	LEU	-	expression tag	UNP A0A2H1K3G9
B	-5	VAL	-	expression tag	UNP A0A2H1K3G9
B	-4	PRO	-	expression tag	UNP A0A2H1K3G9
B	-3	ARG	-	expression tag	UNP A0A2H1K3G9
B	-2	GLY	-	expression tag	UNP A0A2H1K3G9
B	-1	SER	-	expression tag	UNP A0A2H1K3G9
B	0	HIS	-	expression tag	UNP A0A2H1K3G9
C	-19	MET	-	initiating methionine	UNP A0A2H1K3G9
C	-18	GLY	-	expression tag	UNP A0A2H1K3G9
C	-17	SER	-	expression tag	UNP A0A2H1K3G9
C	-16	SER	-	expression tag	UNP A0A2H1K3G9
C	-15	HIS	-	expression tag	UNP A0A2H1K3G9
C	-14	HIS	-	expression tag	UNP A0A2H1K3G9
C	-13	HIS	-	expression tag	UNP A0A2H1K3G9
C	-12	HIS	-	expression tag	UNP A0A2H1K3G9
C	-11	HIS	-	expression tag	UNP A0A2H1K3G9
C	-10	HIS	-	expression tag	UNP A0A2H1K3G9
C	-9	SER	-	expression tag	UNP A0A2H1K3G9
C	-8	SER	-	expression tag	UNP A0A2H1K3G9
C	-7	GLY	-	expression tag	UNP A0A2H1K3G9
C	-6	LEU	-	expression tag	UNP A0A2H1K3G9
C	-5	VAL	-	expression tag	UNP A0A2H1K3G9

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-4	PRO	-	expression tag	UNP A0A2H1K3G9
C	-3	ARG	-	expression tag	UNP A0A2H1K3G9
C	-2	GLY	-	expression tag	UNP A0A2H1K3G9
C	-1	SER	-	expression tag	UNP A0A2H1K3G9
C	0	HIS	-	expression tag	UNP A0A2H1K3G9
D	-19	MET	-	initiating methionine	UNP A0A2H1K3G9
D	-18	GLY	-	expression tag	UNP A0A2H1K3G9
D	-17	SER	-	expression tag	UNP A0A2H1K3G9
D	-16	SER	-	expression tag	UNP A0A2H1K3G9
D	-15	HIS	-	expression tag	UNP A0A2H1K3G9
D	-14	HIS	-	expression tag	UNP A0A2H1K3G9
D	-13	HIS	-	expression tag	UNP A0A2H1K3G9
D	-12	HIS	-	expression tag	UNP A0A2H1K3G9
D	-11	HIS	-	expression tag	UNP A0A2H1K3G9
D	-10	HIS	-	expression tag	UNP A0A2H1K3G9
D	-9	SER	-	expression tag	UNP A0A2H1K3G9
D	-8	SER	-	expression tag	UNP A0A2H1K3G9
D	-7	GLY	-	expression tag	UNP A0A2H1K3G9
D	-6	LEU	-	expression tag	UNP A0A2H1K3G9
D	-5	VAL	-	expression tag	UNP A0A2H1K3G9
D	-4	PRO	-	expression tag	UNP A0A2H1K3G9
D	-3	ARG	-	expression tag	UNP A0A2H1K3G9
D	-2	GLY	-	expression tag	UNP A0A2H1K3G9
D	-1	SER	-	expression tag	UNP A0A2H1K3G9
D	0	HIS	-	expression tag	UNP A0A2H1K3G9
E	-19	MET	-	initiating methionine	UNP A0A2H1K3G9
E	-18	GLY	-	expression tag	UNP A0A2H1K3G9
E	-17	SER	-	expression tag	UNP A0A2H1K3G9
E	-16	SER	-	expression tag	UNP A0A2H1K3G9
E	-15	HIS	-	expression tag	UNP A0A2H1K3G9
E	-14	HIS	-	expression tag	UNP A0A2H1K3G9
E	-13	HIS	-	expression tag	UNP A0A2H1K3G9
E	-12	HIS	-	expression tag	UNP A0A2H1K3G9
E	-11	HIS	-	expression tag	UNP A0A2H1K3G9
E	-10	HIS	-	expression tag	UNP A0A2H1K3G9
E	-9	SER	-	expression tag	UNP A0A2H1K3G9
E	-8	SER	-	expression tag	UNP A0A2H1K3G9
E	-7	GLY	-	expression tag	UNP A0A2H1K3G9
E	-6	LEU	-	expression tag	UNP A0A2H1K3G9
E	-5	VAL	-	expression tag	UNP A0A2H1K3G9
E	-4	PRO	-	expression tag	UNP A0A2H1K3G9
E	-3	ARG	-	expression tag	UNP A0A2H1K3G9

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Chain	Residue	Modelled	Actual	Comment	Reference
E	-2	GLY	-	expression tag	UNP A0A2H1K3G9
E	-1	SER	-	expression tag	UNP A0A2H1K3G9
E	0	HIS	-	expression tag	UNP A0A2H1K3G9
F	-19	MET	-	initiating methionine	UNP A0A2H1K3G9
F	-18	GLY	-	expression tag	UNP A0A2H1K3G9
F	-17	SER	-	expression tag	UNP A0A2H1K3G9
F	-16	SER	-	expression tag	UNP A0A2H1K3G9
F	-15	HIS	-	expression tag	UNP A0A2H1K3G9
F	-14	HIS	-	expression tag	UNP A0A2H1K3G9
F	-13	HIS	-	expression tag	UNP A0A2H1K3G9
F	-12	HIS	-	expression tag	UNP A0A2H1K3G9
F	-11	HIS	-	expression tag	UNP A0A2H1K3G9
F	-10	HIS	-	expression tag	UNP A0A2H1K3G9
F	-9	SER	-	expression tag	UNP A0A2H1K3G9
F	-8	SER	-	expression tag	UNP A0A2H1K3G9
F	-7	GLY	-	expression tag	UNP A0A2H1K3G9
F	-6	LEU	-	expression tag	UNP A0A2H1K3G9
F	-5	VAL	-	expression tag	UNP A0A2H1K3G9
F	-4	PRO	-	expression tag	UNP A0A2H1K3G9
F	-3	ARG	-	expression tag	UNP A0A2H1K3G9
F	-2	GLY	-	expression tag	UNP A0A2H1K3G9
F	-1	SER	-	expression tag	UNP A0A2H1K3G9
F	0	HIS	-	expression tag	UNP A0A2H1K3G9
G	-19	MET	-	initiating methionine	UNP A0A2H1K3G9
G	-18	GLY	-	expression tag	UNP A0A2H1K3G9
G	-17	SER	-	expression tag	UNP A0A2H1K3G9
G	-16	SER	-	expression tag	UNP A0A2H1K3G9
G	-15	HIS	-	expression tag	UNP A0A2H1K3G9
G	-14	HIS	-	expression tag	UNP A0A2H1K3G9
G	-13	HIS	-	expression tag	UNP A0A2H1K3G9
G	-12	HIS	-	expression tag	UNP A0A2H1K3G9
G	-11	HIS	-	expression tag	UNP A0A2H1K3G9
G	-10	HIS	-	expression tag	UNP A0A2H1K3G9
G	-9	SER	-	expression tag	UNP A0A2H1K3G9
G	-8	SER	-	expression tag	UNP A0A2H1K3G9
G	-7	GLY	-	expression tag	UNP A0A2H1K3G9
G	-6	LEU	-	expression tag	UNP A0A2H1K3G9
G	-5	VAL	-	expression tag	UNP A0A2H1K3G9
G	-4	PRO	-	expression tag	UNP A0A2H1K3G9
G	-3	ARG	-	expression tag	UNP A0A2H1K3G9
G	-2	GLY	-	expression tag	UNP A0A2H1K3G9
G	-1	SER	-	expression tag	UNP A0A2H1K3G9

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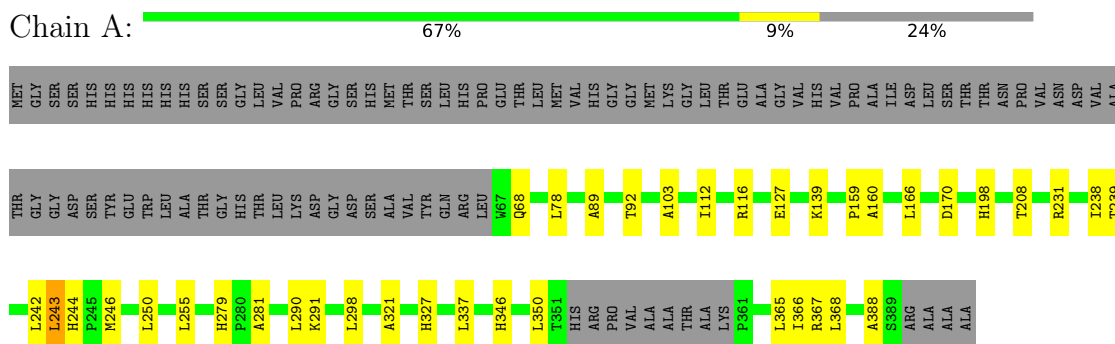
Chain	Residue	Modelled	Actual	Comment	Reference
G	0	HIS	-	expression tag	UNP A0A2H1K3G9
H	-19	MET	-	initiating methionine	UNP A0A2H1K3G9
H	-18	GLY	-	expression tag	UNP A0A2H1K3G9
H	-17	SER	-	expression tag	UNP A0A2H1K3G9
H	-16	SER	-	expression tag	UNP A0A2H1K3G9
H	-15	HIS	-	expression tag	UNP A0A2H1K3G9
H	-14	HIS	-	expression tag	UNP A0A2H1K3G9
H	-13	HIS	-	expression tag	UNP A0A2H1K3G9
H	-12	HIS	-	expression tag	UNP A0A2H1K3G9
H	-11	HIS	-	expression tag	UNP A0A2H1K3G9
H	-10	HIS	-	expression tag	UNP A0A2H1K3G9
H	-9	SER	-	expression tag	UNP A0A2H1K3G9
H	-8	SER	-	expression tag	UNP A0A2H1K3G9
H	-7	GLY	-	expression tag	UNP A0A2H1K3G9
H	-6	LEU	-	expression tag	UNP A0A2H1K3G9
H	-5	VAL	-	expression tag	UNP A0A2H1K3G9
H	-4	PRO	-	expression tag	UNP A0A2H1K3G9
H	-3	ARG	-	expression tag	UNP A0A2H1K3G9
H	-2	GLY	-	expression tag	UNP A0A2H1K3G9
H	-1	SER	-	expression tag	UNP A0A2H1K3G9
H	0	HIS	-	expression tag	UNP A0A2H1K3G9



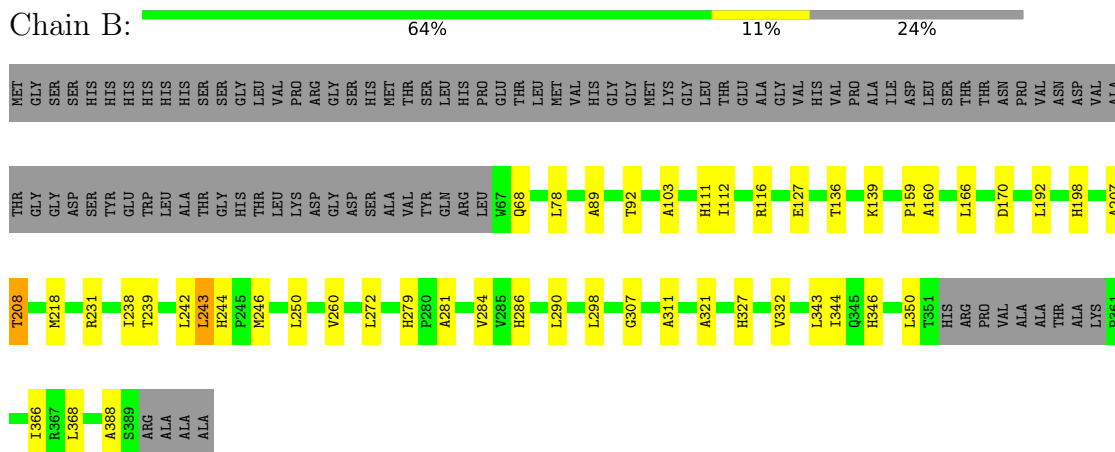
### 3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron 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 dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). 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.

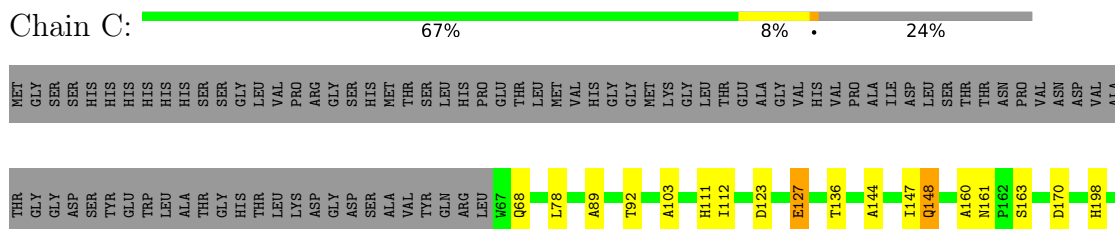
#### • Molecule 1: Cystathionine gamma-synthase



#### • Molecule 1: Cystathionine gamma-synthase



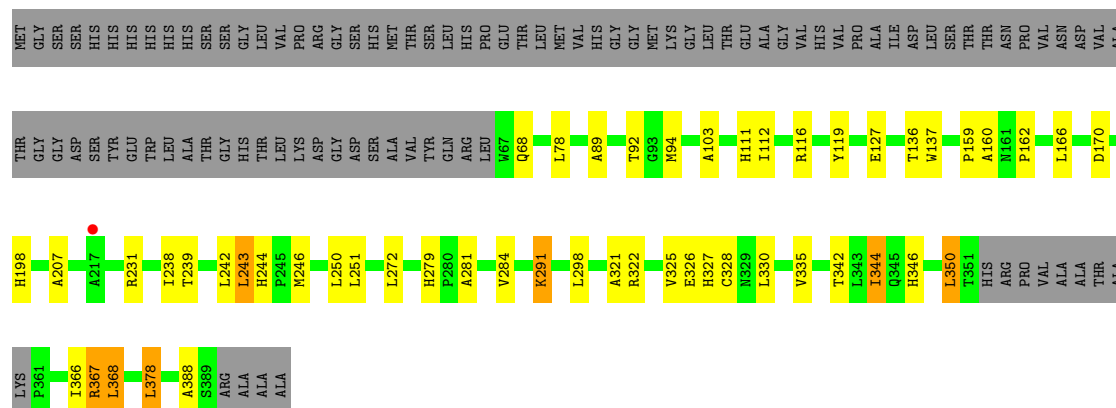
#### • Molecule 1: Cystathionine gamma-synthase





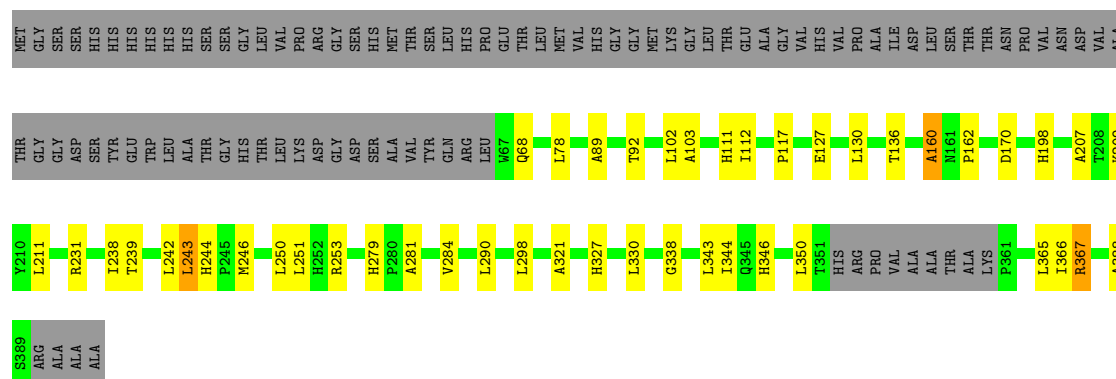
• Molecule 1: Cystathionine gamma-synthase

Chain D: 63% 11% 24%



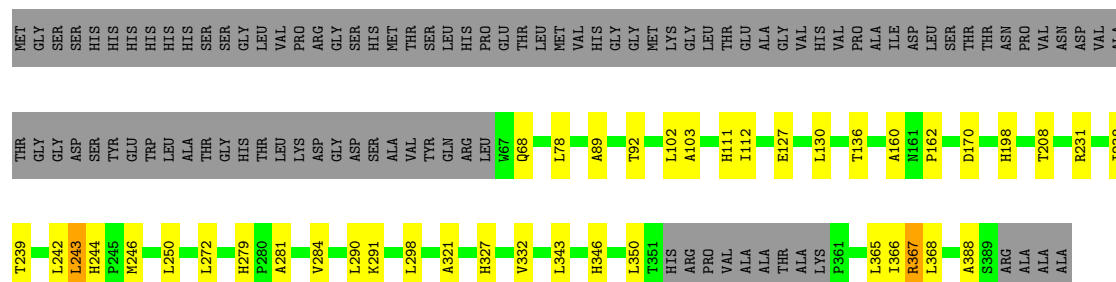
• Molecule 1: Cystathionine gamma-synthase

Chain E: 65% 10% 24%



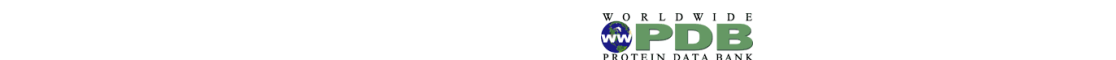
• Molecule 1: Cystathionine gamma-synthase

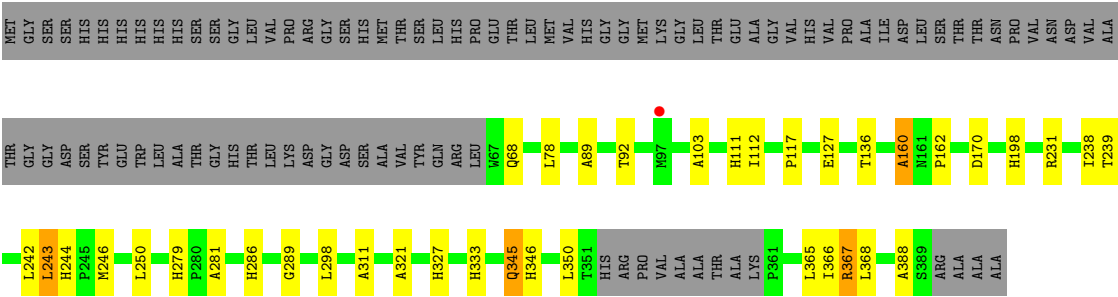
Chain F: 66% 10% 24%



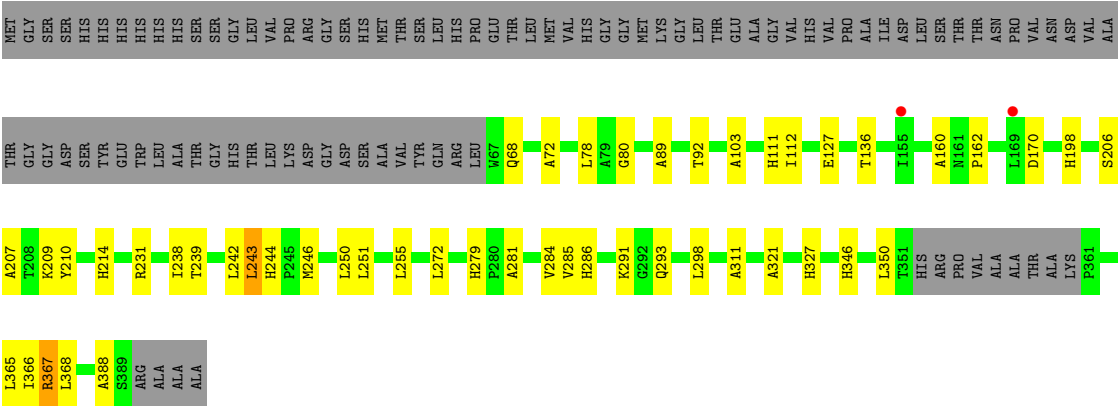
• Molecule 1: Cystathionine gamma-synthase

Chain G: 67% 8% 24%





● Molecule 1: Cystathionine gamma-synthase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	165.85Å 165.85Å 209.26Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	32.76 – 3.24 32.76 – 3.24	Depositor EDS
% Data completeness (in resolution range)	65.8 (32.76-3.24) 65.6 (32.76-3.24)	Depositor EDS
$R_{merge}$	0.15	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.61 (at 3.25Å)	Xtriage
Refinement program	BUSTER 2.10.4	Depositor
R, $R_{free}$	0.247 , 0.284 0.243 , 0.275	Depositor DCC
$R_{free}$ test set	1518 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	121.5	Xtriage
Anisotropy	0.067	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 107.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	18176	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	163.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.22% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z  > 5$	RMSZ	# $ Z  > 5$
1	A	0.63	0/2313	1.02	0/3155
1	B	0.62	0/2313	1.02	0/3155
1	C	0.66	0/2313	1.03	5/3155 (0.2%)
1	D	0.63	0/2313	1.04	0/3155
1	E	0.56	0/2313	1.00	0/3155
1	F	0.58	0/2313	0.99	0/3155
1	G	0.56	0/2313	1.01	0/3155
1	H	0.59	0/2313	1.00	2/3155 (0.1%)
All	All	0.60	0/18504	1.01	7/25240 (0.0%)

There are no bond length outliers.

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	163	SER	CA-C-N	6.53	131.40	122.19
1	C	163	SER	C-N-CA	6.53	131.40	122.19
1	H	206	SER	CA-C-N	5.82	132.66	121.54
1	H	206	SER	C-N-CA	5.82	132.66	121.54
1	C	161	ASN	CA-CB-CG	5.07	117.67	112.60

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

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	A	2272	0	2272	19	0
1	B	2272	0	2272	25	0
1	C	2272	0	2272	15	0
1	D	2272	0	2272	25	0
1	E	2272	0	2272	21	0
1	F	2272	0	2272	18	0
1	G	2272	0	2272	18	0
1	H	2272	0	2272	22	0
All	All	18176	0	18176	145	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 145 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:A:242:LEU:HD12	1:B:92:THR:HG21	1.72	0.71
1:C:242:LEU:HD12	1:D:92:THR:HG21	1.74	0.68
1:E:242:LEU:HD12	1:F:92:THR:HG21	1.77	0.67
1:B:116:ARG:NH2	1:B:139:LYS:NZ	2.42	0.67
1:F:244:HIS:HD2	1:F:246:MET:HB3	1.62	0.65

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 X-ray entries followed by that with respect to entries of similar resolution.

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	A	310/413 (75%)	292 (94%)	17 (6%)	1 (0%)	37 67
1	B	310/413 (75%)	295 (95%)	13 (4%)	2 (1%)	22 54
1	C	310/413 (75%)	298 (96%)	11 (4%)	1 (0%)	37 67
1	D	310/413 (75%)	297 (96%)	11 (4%)	2 (1%)	22 54

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	E	310/413 (75%)	298 (96%)	10 (3%)	2 (1%)	22	54
1	F	310/413 (75%)	296 (96%)	13 (4%)	1 (0%)	37	67
1	G	310/413 (75%)	295 (95%)	13 (4%)	2 (1%)	22	54
1	H	310/413 (75%)	296 (96%)	13 (4%)	1 (0%)	37	67
All	All	2480/3304 (75%)	2367 (95%)	101 (4%)	12 (0%)	25	58

5 of 12 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	160	ALA
1	B	160	ALA
1	C	160	ALA
1	D	160	ALA
1	F	160	ALA

### 5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	229/306 (75%)	211 (92%)	18 (8%)	10	35
1	B	229/306 (75%)	212 (93%)	17 (7%)	11	37
1	C	229/306 (75%)	212 (93%)	17 (7%)	11	37
1	D	229/306 (75%)	207 (90%)	22 (10%)	7	26
1	E	229/306 (75%)	210 (92%)	19 (8%)	9	33
1	F	229/306 (75%)	210 (92%)	19 (8%)	9	33
1	G	229/306 (75%)	214 (93%)	15 (7%)	14	42
1	H	229/306 (75%)	210 (92%)	19 (8%)	9	33
All	All	1832/2448 (75%)	1686 (92%)	146 (8%)	10	34

5 of 146 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G	127	GLU
1	H	366	ILE
1	G	250	LEU
1	H	127	GLU
1	C	298	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 39 such sidechains are listed below:

Mol	Chain	Res	Type
1	F	244	HIS
1	H	83	HIS
1	F	279	HIS
1	G	244	HIS
1	H	244	HIS

### 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 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	314/413 (76%)	-0.44	0 100 100	80, 129, 232, 262	0
1	B	314/413 (76%)	-0.36	0 100 100	89, 119, 220, 249	0
1	C	314/413 (76%)	-0.38	0 100 100	70, 110, 224, 258	0
1	D	314/413 (76%)	-0.48	1 (0%) 90 84	79, 131, 188, 207	0
1	E	314/413 (76%)	-0.41	0 100 100	131, 196, 239, 250	0
1	F	314/413 (76%)	-0.39	0 100 100	133, 205, 241, 258	0
1	G	314/413 (76%)	-0.42	1 (0%) 90 84	139, 206, 240, 247	0
1	H	314/413 (76%)	-0.30	2 (0%) 85 76	108, 177, 236, 251	0
All	All	2512/3304 (76%)	-0.40	4 (0%) 92 88	70, 168, 237, 262	0

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	155	ILE	2.4
1	G	97	MET	2.4
1	H	169	LEU	2.2
1	D	217	ALA	2.1

### 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

### 6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 6.4 Ligands [i](#)

There are no ligands in this entry.

## 6.5 Other polymers [i](#)

There are no such residues in this entry.