



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 02:45 PM UTC

PDB ID : 4UQF / pdb_00004uqf
Title : CRYSTAL STRUCTURE OF LISTERIA MONOCYTOGENES GTP CYCLOHYDROLASE I
Authors : Schuessler, S.; Perbandt, M.; Fischer, M.; Graewert, T.
Deposited on : 2014-06-23
Resolution : 2.40 Å(reported)

This is a Full wwPDB X-ray Structure 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/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>.

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

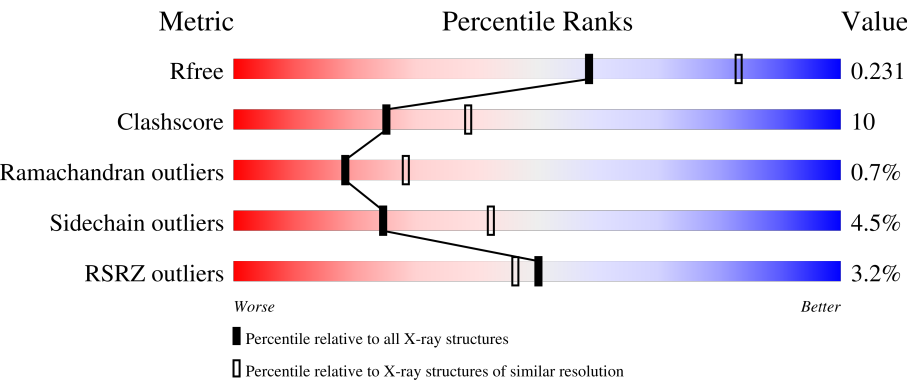
MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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)	Similar resolution (#Entries, resolution range(Å))
R _{free}	180053	4912 (2.40-2.40)
Clashscore	190562	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)
RSRZ outliers	180081	4916 (2.40-2.40)

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 ≥ 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	202	0.2% 75% 16% 8%
1	B	202	0.2% 73% 17% 8%
1	C	202	0.2% 74% 15% 8%
1	D	202	4% 74% 17% 8%
1	E	202	2% 69% 21% 8%

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Mol	Chain	Length	Quality of chain
1	F	202	4% 72% 18% • 8%
1	G	202	6% 72% 17% • 8%
1	H	202	75% 15% •• 8%
1	I	202	5% 73% 17% • 8%
1	J	202	4% 76% 13% •• 8%

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 14475 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 GTP cyclohydrolase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	186	Total	C	N	O	S	0	0	0
			1458	922	258	267	11			
1	B	186	Total	C	N	O	S	0	0	0
			1437	909	256	261	11			
1	C	186	Total	C	N	O	S	0	0	0
			1461	923	259	268	11			
1	D	186	Total	C	N	O	S	0	0	0
			1465	926	260	268	11			
1	E	186	Total	C	N	O	S	0	0	0
			1449	916	256	266	11			
1	F	186	Total	C	N	O	S	0	0	0
			1438	907	257	263	11			
1	G	186	Total	C	N	O	S	0	0	0
			1415	890	251	263	11			
1	H	186	Total	C	N	O	S	0	0	0
			1458	922	258	267	11			
1	I	186	Total	C	N	O	S	0	0	0
			1441	910	255	265	11			
1	J	186	Total	C	N	O	S	0	0	0
			1453	916	259	267	11			

There are 140 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-12	MET	-	initiating methionine	UNP A0A1D2IZD1
A	-11	HIS	-	expression tag	UNP A0A1D2IZD1
A	-10	HIS	-	expression tag	UNP A0A1D2IZD1
A	-9	HIS	-	expression tag	UNP A0A1D2IZD1
A	-8	HIS	-	expression tag	UNP A0A1D2IZD1
A	-7	HIS	-	expression tag	UNP A0A1D2IZD1
A	-6	HIS	-	expression tag	UNP A0A1D2IZD1
A	-5	GLY	-	expression tag	UNP A0A1D2IZD1
A	-4	SER	-	expression tag	UNP A0A1D2IZD1

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	ASP	-	expression tag	UNP A0A1D2IZD1
A	-2	ASP	-	expression tag	UNP A0A1D2IZD1
A	-1	ASP	-	expression tag	UNP A0A1D2IZD1
A	0	ASP	-	expression tag	UNP A0A1D2IZD1
A	1	LYS	-	expression tag	UNP A0A1D2IZD1
B	-12	MET	-	initiating methionine	UNP A0A1D2IZD1
B	-11	HIS	-	expression tag	UNP A0A1D2IZD1
B	-10	HIS	-	expression tag	UNP A0A1D2IZD1
B	-9	HIS	-	expression tag	UNP A0A1D2IZD1
B	-8	HIS	-	expression tag	UNP A0A1D2IZD1
B	-7	HIS	-	expression tag	UNP A0A1D2IZD1
B	-6	HIS	-	expression tag	UNP A0A1D2IZD1
B	-5	GLY	-	expression tag	UNP A0A1D2IZD1
B	-4	SER	-	expression tag	UNP A0A1D2IZD1
B	-3	ASP	-	expression tag	UNP A0A1D2IZD1
B	-2	ASP	-	expression tag	UNP A0A1D2IZD1
B	-1	ASP	-	expression tag	UNP A0A1D2IZD1
B	0	ASP	-	expression tag	UNP A0A1D2IZD1
B	1	LYS	-	expression tag	UNP A0A1D2IZD1
C	-12	MET	-	initiating methionine	UNP A0A1D2IZD1
C	-11	HIS	-	expression tag	UNP A0A1D2IZD1
C	-10	HIS	-	expression tag	UNP A0A1D2IZD1
C	-9	HIS	-	expression tag	UNP A0A1D2IZD1
C	-8	HIS	-	expression tag	UNP A0A1D2IZD1
C	-7	HIS	-	expression tag	UNP A0A1D2IZD1
C	-6	HIS	-	expression tag	UNP A0A1D2IZD1
C	-5	GLY	-	expression tag	UNP A0A1D2IZD1
C	-4	SER	-	expression tag	UNP A0A1D2IZD1
C	-3	ASP	-	expression tag	UNP A0A1D2IZD1
C	-2	ASP	-	expression tag	UNP A0A1D2IZD1
C	-1	ASP	-	expression tag	UNP A0A1D2IZD1
C	0	ASP	-	expression tag	UNP A0A1D2IZD1
C	1	LYS	-	expression tag	UNP A0A1D2IZD1
D	-12	MET	-	initiating methionine	UNP A0A1D2IZD1
D	-11	HIS	-	expression tag	UNP A0A1D2IZD1
D	-10	HIS	-	expression tag	UNP A0A1D2IZD1
D	-9	HIS	-	expression tag	UNP A0A1D2IZD1
D	-8	HIS	-	expression tag	UNP A0A1D2IZD1
D	-7	HIS	-	expression tag	UNP A0A1D2IZD1
D	-6	HIS	-	expression tag	UNP A0A1D2IZD1
D	-5	GLY	-	expression tag	UNP A0A1D2IZD1
D	-4	SER	-	expression tag	UNP A0A1D2IZD1

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-3	ASP	-	expression tag	UNP A0A1D2IZD1
D	-2	ASP	-	expression tag	UNP A0A1D2IZD1
D	-1	ASP	-	expression tag	UNP A0A1D2IZD1
D	0	ASP	-	expression tag	UNP A0A1D2IZD1
D	1	LYS	-	expression tag	UNP A0A1D2IZD1
E	-12	MET	-	initiating methionine	UNP A0A1D2IZD1
E	-11	HIS	-	expression tag	UNP A0A1D2IZD1
E	-10	HIS	-	expression tag	UNP A0A1D2IZD1
E	-9	HIS	-	expression tag	UNP A0A1D2IZD1
E	-8	HIS	-	expression tag	UNP A0A1D2IZD1
E	-7	HIS	-	expression tag	UNP A0A1D2IZD1
E	-6	HIS	-	expression tag	UNP A0A1D2IZD1
E	-5	GLY	-	expression tag	UNP A0A1D2IZD1
E	-4	SER	-	expression tag	UNP A0A1D2IZD1
E	-3	ASP	-	expression tag	UNP A0A1D2IZD1
E	-2	ASP	-	expression tag	UNP A0A1D2IZD1
E	-1	ASP	-	expression tag	UNP A0A1D2IZD1
E	0	ASP	-	expression tag	UNP A0A1D2IZD1
E	1	LYS	-	expression tag	UNP A0A1D2IZD1
F	-12	MET	-	initiating methionine	UNP A0A1D2IZD1
F	-11	HIS	-	expression tag	UNP A0A1D2IZD1
F	-10	HIS	-	expression tag	UNP A0A1D2IZD1
F	-9	HIS	-	expression tag	UNP A0A1D2IZD1
F	-8	HIS	-	expression tag	UNP A0A1D2IZD1
F	-7	HIS	-	expression tag	UNP A0A1D2IZD1
F	-6	HIS	-	expression tag	UNP A0A1D2IZD1
F	-5	GLY	-	expression tag	UNP A0A1D2IZD1
F	-4	SER	-	expression tag	UNP A0A1D2IZD1
F	-3	ASP	-	expression tag	UNP A0A1D2IZD1
F	-2	ASP	-	expression tag	UNP A0A1D2IZD1
F	-1	ASP	-	expression tag	UNP A0A1D2IZD1
F	0	ASP	-	expression tag	UNP A0A1D2IZD1
F	1	LYS	-	expression tag	UNP A0A1D2IZD1
G	-12	MET	-	initiating methionine	UNP A0A1D2IZD1
G	-11	HIS	-	expression tag	UNP A0A1D2IZD1
G	-10	HIS	-	expression tag	UNP A0A1D2IZD1
G	-9	HIS	-	expression tag	UNP A0A1D2IZD1
G	-8	HIS	-	expression tag	UNP A0A1D2IZD1
G	-7	HIS	-	expression tag	UNP A0A1D2IZD1
G	-6	HIS	-	expression tag	UNP A0A1D2IZD1
G	-5	GLY	-	expression tag	UNP A0A1D2IZD1
G	-4	SER	-	expression tag	UNP A0A1D2IZD1

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Chain	Residue	Modelled	Actual	Comment	Reference
G	-3	ASP	-	expression tag	UNP A0A1D2IZD1
G	-2	ASP	-	expression tag	UNP A0A1D2IZD1
G	-1	ASP	-	expression tag	UNP A0A1D2IZD1
G	0	ASP	-	expression tag	UNP A0A1D2IZD1
G	1	LYS	-	expression tag	UNP A0A1D2IZD1
H	-12	MET	-	initiating methionine	UNP A0A1D2IZD1
H	-11	HIS	-	expression tag	UNP A0A1D2IZD1
H	-10	HIS	-	expression tag	UNP A0A1D2IZD1
H	-9	HIS	-	expression tag	UNP A0A1D2IZD1
H	-8	HIS	-	expression tag	UNP A0A1D2IZD1
H	-7	HIS	-	expression tag	UNP A0A1D2IZD1
H	-6	HIS	-	expression tag	UNP A0A1D2IZD1
H	-5	GLY	-	expression tag	UNP A0A1D2IZD1
H	-4	SER	-	expression tag	UNP A0A1D2IZD1
H	-3	ASP	-	expression tag	UNP A0A1D2IZD1
H	-2	ASP	-	expression tag	UNP A0A1D2IZD1
H	-1	ASP	-	expression tag	UNP A0A1D2IZD1
H	0	ASP	-	expression tag	UNP A0A1D2IZD1
H	1	LYS	-	expression tag	UNP A0A1D2IZD1
I	-12	MET	-	initiating methionine	UNP A0A1D2IZD1
I	-11	HIS	-	expression tag	UNP A0A1D2IZD1
I	-10	HIS	-	expression tag	UNP A0A1D2IZD1
I	-9	HIS	-	expression tag	UNP A0A1D2IZD1
I	-8	HIS	-	expression tag	UNP A0A1D2IZD1
I	-7	HIS	-	expression tag	UNP A0A1D2IZD1
I	-6	HIS	-	expression tag	UNP A0A1D2IZD1
I	-5	GLY	-	expression tag	UNP A0A1D2IZD1
I	-4	SER	-	expression tag	UNP A0A1D2IZD1
I	-3	ASP	-	expression tag	UNP A0A1D2IZD1
I	-2	ASP	-	expression tag	UNP A0A1D2IZD1
I	-1	ASP	-	expression tag	UNP A0A1D2IZD1
I	0	ASP	-	expression tag	UNP A0A1D2IZD1
I	1	LYS	-	expression tag	UNP A0A1D2IZD1
J	-12	MET	-	initiating methionine	UNP A0A1D2IZD1
J	-11	HIS	-	expression tag	UNP A0A1D2IZD1
J	-10	HIS	-	expression tag	UNP A0A1D2IZD1
J	-9	HIS	-	expression tag	UNP A0A1D2IZD1
J	-8	HIS	-	expression tag	UNP A0A1D2IZD1
J	-7	HIS	-	expression tag	UNP A0A1D2IZD1
J	-6	HIS	-	expression tag	UNP A0A1D2IZD1
J	-5	GLY	-	expression tag	UNP A0A1D2IZD1
J	-4	SER	-	expression tag	UNP A0A1D2IZD1

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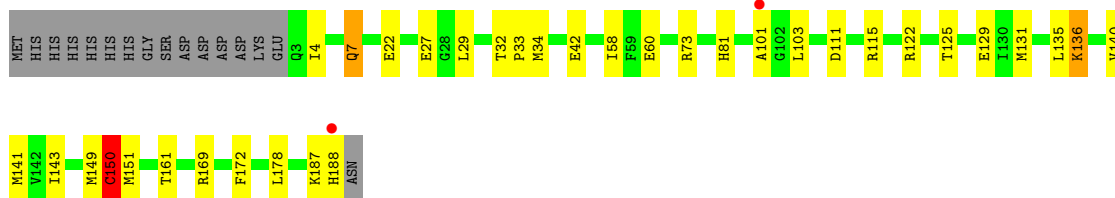
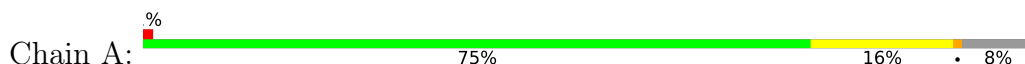
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Chain	Residue	Modelled	Actual	Comment	Reference
J	-3	ASP	-	expression tag	UNP A0A1D2IZD1
J	-2	ASP	-	expression tag	UNP A0A1D2IZD1
J	-1	ASP	-	expression tag	UNP A0A1D2IZD1
J	0	ASP	-	expression tag	UNP A0A1D2IZD1
J	1	LYS	-	expression tag	UNP A0A1D2IZD1

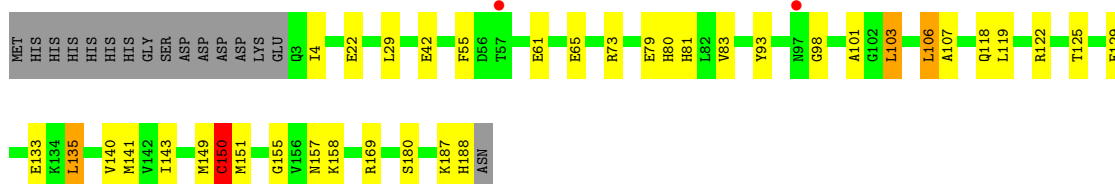
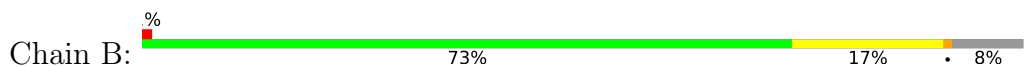
3 Residue-property plots [i](#)

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 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.

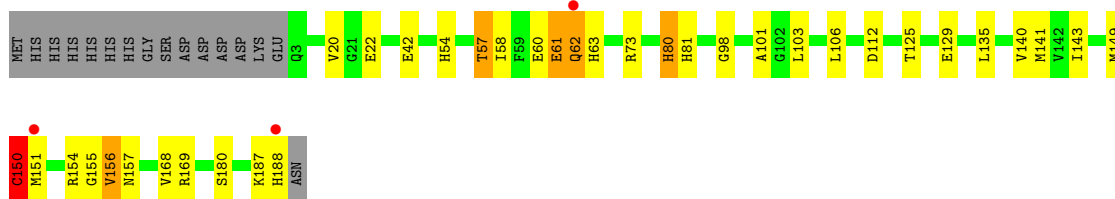
- Molecule 1: GTP cyclohydrolase 1



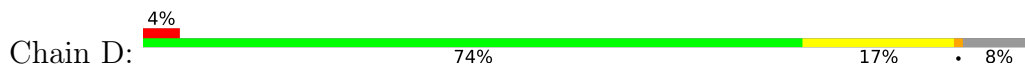
- Molecule 1: GTP cyclohydrolase 1

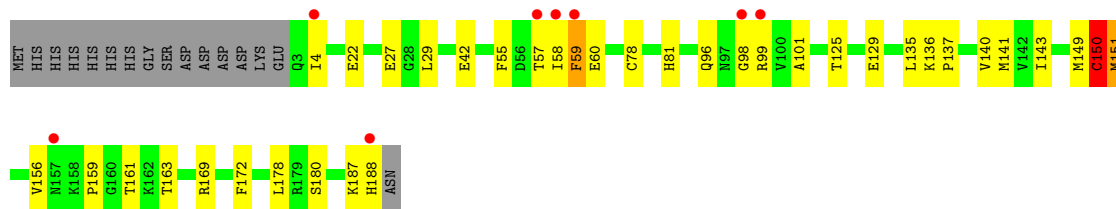


- Molecule 1: GTP cyclohydrolase 1

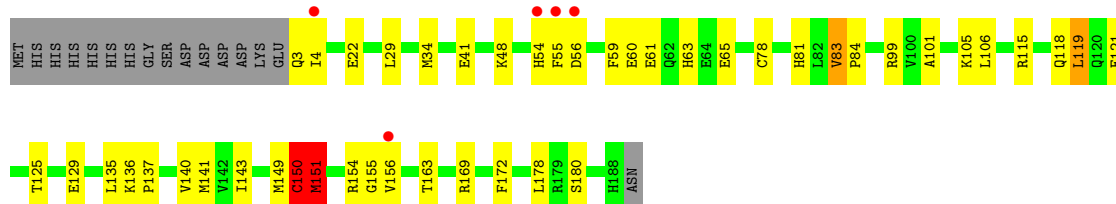


- Molecule 1: GTP cyclohydrolase 1

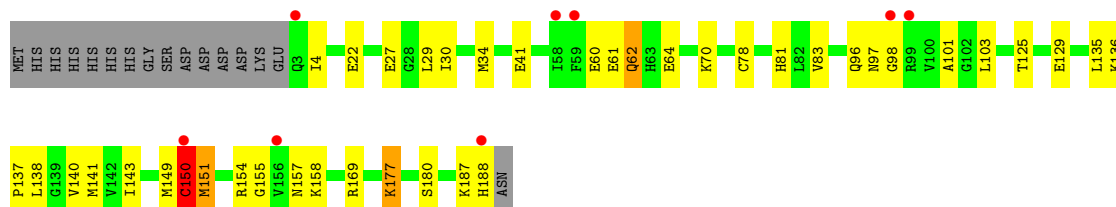




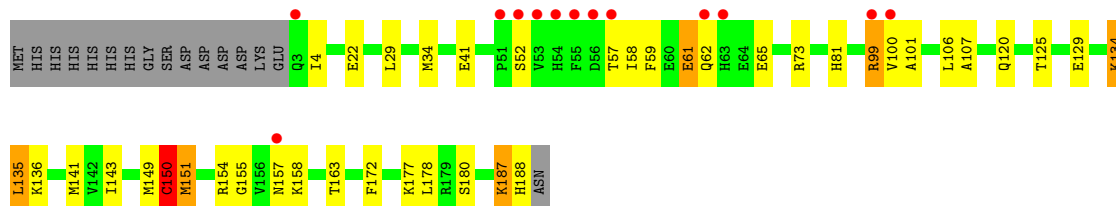
• Molecule 1: GTP cyclohydrolase 1



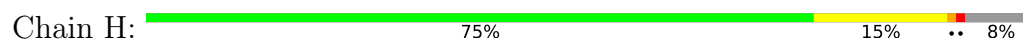
• Molecule 1: GTP cyclohydrolase 1



• Molecule 1: GTP cyclohydrolase 1

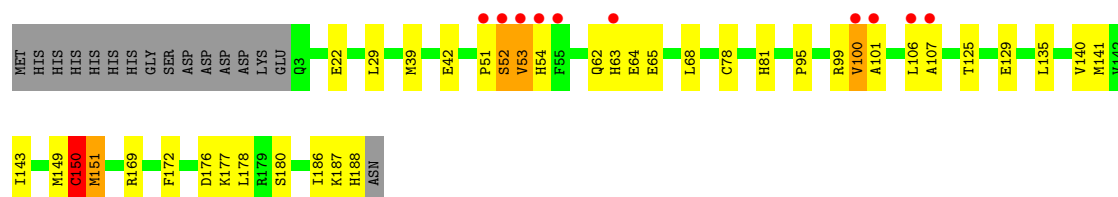


• Molecule 1: GTP cyclohydrolase 1



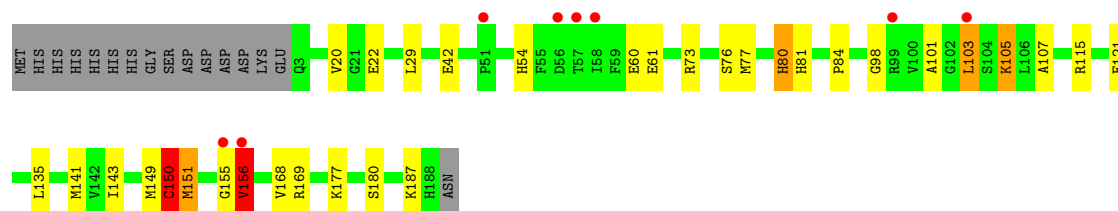
- Molecule 1: GTP cyclohydrolase 1

Chain I: 



- Molecule 1: GTP cyclohydrolase 1

Chain J: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	78.25Å 141.85Å 90.78Å 90.00° 104.61° 90.00°	Depositor
Resolution (Å)	87.84 – 2.40 87.84 – 2.40	Depositor EDS
% Data completeness (in resolution range)	99.6 (87.84-2.40) 99.6 (87.84-2.40)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.79 (at 2.39Å)	Xtriage
Refinement program	REFMAC 5.8.0071	Depositor
R, R_{free}	0.192 , 0.226 0.205 , 0.231	Depositor DCC
R_{free} test set	3752 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	36.6	Xtriage
Anisotropy	0.502	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 50.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	14475	wwPDB-VP
Average B, all atoms (Å ²)	49.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.74% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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

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	A	1.04	2/1481 (0.1%)	1.02	5/1996 (0.3%)
1	B	0.98	3/1460 (0.2%)	0.95	2/1970 (0.1%)
1	C	0.98	3/1484 (0.2%)	0.98	3/2000 (0.1%)
1	D	0.95	2/1488 (0.1%)	0.99	3/2004 (0.1%)
1	E	0.97	3/1471 (0.2%)	1.00	4/1984 (0.2%)
1	F	0.99	3/1460 (0.2%)	1.01	5/1969 (0.3%)
1	G	0.91	2/1435 (0.1%)	1.04	6/1939 (0.3%)
1	H	0.98	3/1481 (0.2%)	1.01	4/1996 (0.2%)
1	I	0.92	4/1463 (0.3%)	1.00	2/1975 (0.1%)
1	J	0.89	3/1475 (0.2%)	1.03	5/1988 (0.3%)
All	All	0.96	28/14698 (0.2%)	1.00	39/19821 (0.2%)

All (28) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	136	LYS	CA-CB	7.88	1.59	1.52
1	E	150	CYS	CA-CB	7.25	1.65	1.53
1	G	150	CYS	CA-CB	6.85	1.65	1.53
1	H	150	CYS	CA-CB	6.77	1.65	1.53
1	D	150	CYS	CA-CB	6.65	1.64	1.53
1	I	150	CYS	CA-CB	6.56	1.64	1.53
1	C	150	CYS	CA-CB	6.46	1.64	1.53
1	B	150	CYS	CA-CB	6.44	1.64	1.53
1	J	150	CYS	CA-CB	6.39	1.64	1.53
1	J	150	CYS	CA-C	6.32	1.61	1.52
1	A	150	CYS	CA-CB	6.20	1.64	1.53
1	H	150	CYS	N-CA	6.09	1.54	1.46
1	F	150	CYS	CA-CB	6.04	1.63	1.53
1	E	150	CYS	CA-C	5.86	1.60	1.52
1	C	150	CYS	N-CA	5.76	1.53	1.46
1	J	150	CYS	N-CA	5.69	1.53	1.46
1	C	150	CYS	CA-C	5.54	1.60	1.52
1	B	150	CYS	CA-C	5.52	1.60	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	I	150	CYS	N-CA	5.52	1.53	1.46
1	E	55	PHE	CA-C	-5.44	1.46	1.53
1	D	150	CYS	N-CA	5.39	1.53	1.46
1	G	150	CYS	N-CA	5.34	1.53	1.46
1	B	133	GLU	CA-CB	-5.13	1.45	1.53
1	H	150	CYS	CA-C	5.12	1.59	1.52
1	I	51	PRO	N-CD	5.07	1.54	1.47
1	F	150	CYS	N-CA	5.02	1.52	1.46
1	F	27	GLU	CA-CB	5.01	1.61	1.53
1	I	62	GLN	CA-CB	5.01	1.61	1.53

All (39) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	J	156	VAL	N-CA-C	-12.89	100.72	111.81
1	G	187	LYS	N-CA-C	-10.48	97.51	110.41
1	A	136	LYS	CB-CA-C	8.98	117.58	111.20
1	H	56	ASP	N-CA-C	-8.67	96.16	109.95
1	D	59	PHE	N-CA-C	7.70	121.62	107.99
1	E	150	CYS	CA-CB-SG	7.63	131.94	114.40
1	D	150	CYS	CA-CB-SG	7.54	131.75	114.40
1	F	150	CYS	CA-CB-SG	7.54	131.74	114.40
1	G	150	CYS	CA-CB-SG	7.48	131.60	114.40
1	I	150	CYS	CA-CB-SG	7.31	131.21	114.40
1	B	150	CYS	CA-CB-SG	7.30	131.19	114.40
1	H	150	CYS	CA-CB-SG	7.29	131.18	114.40
1	F	151	MET	N-CA-C	7.15	122.13	113.41
1	J	150	CYS	CA-CB-SG	7.05	130.63	114.40
1	J	187	LYS	CB-CA-C	-7.03	99.87	111.68
1	C	150	CYS	CA-CB-SG	7.03	130.56	114.40
1	A	150	CYS	CA-CB-SG	6.97	130.43	114.40
1	G	151	MET	N-CA-C	6.82	121.72	113.41
1	G	61	GLU	N-CA-C	6.79	123.07	114.31
1	G	57	THR	N-CA-C	-6.54	96.07	108.17
1	J	155	GLY	N-CA-C	6.21	127.90	113.18
1	H	151	MET	N-CA-C	6.04	121.70	113.97
1	F	62	GLN	N-CA-C	6.02	118.59	107.99
1	J	151	MET	N-CA-C	5.95	121.59	113.97
1	I	151	MET	N-CA-C	5.83	121.44	113.97
1	F	60	GLU	N-CA-C	5.80	120.35	113.16
1	E	48	LYS	CA-CB-CG	-5.77	102.55	114.10
1	H	131	MET	N-CA-C	5.74	117.62	111.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	151	MET	CB-CA-C	-5.62	99.41	109.24
1	C	61	GLU	N-CA-C	-5.58	101.66	109.69
1	D	151	MET	N-CA-C	5.52	121.03	113.97
1	A	58	ILE	N-CA-C	-5.45	101.80	109.21
1	B	65	GLU	N-CA-C	5.45	118.52	110.46
1	C	63	HIS	N-CA-C	5.23	117.76	109.24
1	A	7	GLN	CA-CB-CG	-5.21	103.68	114.10
1	A	7	GLN	CB-CA-C	5.18	119.66	110.85
1	F	30	ILE	CB-CA-C	5.15	118.78	112.04
1	E	151	MET	N-CA-C	5.07	120.46	113.97
1	E	118	GLN	N-CA-C	5.06	116.68	109.14

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	A	1458	0	1493	31	0
1	B	1437	0	1454	41	0
1	C	1461	0	1497	28	0
1	D	1465	0	1508	39	0
1	E	1449	0	1479	34	0
1	F	1438	0	1460	35	0
1	G	1415	0	1413	33	0
1	H	1458	0	1493	23	0
1	I	1441	0	1456	33	0
1	J	1453	0	1485	36	0
All	All	14475	0	14738	282	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 10.

All (282) 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:B:81:HIS:HD2	1:B:150:CYS:SG	1.53	1.30
1:H:81:HIS:HD2	1:H:150:CYS:SG	1.55	1.29
1:J:81:HIS:HD2	1:J:150:CYS:SG	1.56	1.29
1:G:81:HIS:HD2	1:G:150:CYS:SG	1.56	1.28
1:C:80:HIS:HD2	1:C:150:CYS:SG	1.57	1.27
1:E:119:LEU:HD23	1:E:121:GLU:OE1	1.35	1.26
1:A:81:HIS:HD2	1:A:150:CYS:SG	1.58	1.26
1:J:80:HIS:HD2	1:J:150:CYS:SG	1.62	1.22
1:H:81:HIS:CD2	1:H:150:CYS:SG	2.33	1.21
1:J:81:HIS:CD2	1:J:150:CYS:SG	2.35	1.20
1:A:81:HIS:CD2	1:A:150:CYS:SG	2.36	1.19
1:B:81:HIS:CD2	1:B:150:CYS:SG	2.35	1.18
1:G:81:HIS:CD2	1:G:150:CYS:SG	2.35	1.18
1:J:80:HIS:CD2	1:J:150:CYS:SG	2.44	1.10
1:C:80:HIS:CD2	1:C:150:CYS:SG	2.47	1.08
1:F:187:LYS:O	1:F:188:HIS:CG	2.08	1.07
1:B:103:LEU:HD21	1:D:163:THR:HG21	1.41	1.03
1:J:151:MET:HG2	1:J:156:VAL:HG21	1.42	1.01
1:I:63:HIS:NE2	1:I:100:VAL:HG12	1.79	0.96
1:C:81:HIS:ND1	1:C:150:CYS:SG	2.38	0.95
1:B:101:ALA:HB2	1:B:135:LEU:HD11	1.47	0.95
1:B:79:GLU:OE2	1:B:119:LEU:HD11	1.64	0.95
1:E:81:HIS:ND1	1:E:150:CYS:SG	2.41	0.93
1:F:81:HIS:ND1	1:F:150:CYS:SG	2.42	0.93
1:H:151:MET:HE1	1:H:161:THR:HG21	1.50	0.93
1:I:107:ALA:HB3	1:J:156:VAL:HG11	1.52	0.92
1:I:81:HIS:ND1	1:I:150:CYS:SG	2.43	0.91
1:D:81:HIS:ND1	1:D:150:CYS:SG	2.44	0.89
1:D:99:ARG:O	1:D:135:LEU:HD22	1.75	0.87
1:J:77:MET:HE1	1:J:84:PRO:HG3	1.56	0.86
1:I:63:HIS:CD2	1:I:100:VAL:HG12	2.10	0.85
1:F:187:LYS:O	1:F:188:HIS:CD2	2.29	0.85
1:B:79:GLU:CD	1:B:119:LEU:HD11	2.02	0.84
1:D:151:MET:HE1	1:D:161:THR:HG21	1.59	0.83
1:F:70:LYS:NZ	1:F:188:HIS:HB3	1.95	0.81
1:C:156:VAL:HG21	1:G:107:ALA:HB3	1.63	0.81
1:G:163:THR:HG21	1:J:103:LEU:HD21	1.61	0.80
1:E:83:VAL:HG22	1:E:84:PRO:HD2	1.62	0.80
1:A:73:ARG:HG2	1:A:73:ARG:HH11	1.48	0.78
1:F:103:LEU:HB3	1:I:151:MET:HE2	1.67	0.76
1:D:151:MET:HE1	1:D:161:THR:CG2	2.17	0.74
1:D:99:ARG:O	1:D:135:LEU:CD2	2.35	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:156:VAL:HG21	1:H:104:SER:HB2	1.70	0.74
1:C:54:HIS:HE1	1:C:112:ASP:OD2	1.69	0.74
1:E:119:LEU:HD23	1:E:121:GLU:CD	2.14	0.71
1:J:151:MET:HG2	1:J:156:VAL:CG2	2.20	0.70
1:D:57:THR:O	1:D:58:ILE:HG13	1.91	0.70
1:E:163:THR:OG1	1:H:103:LEU:HD11	1.91	0.69
1:E:119:LEU:CD2	1:E:121:GLU:OE1	2.28	0.69
1:B:79:GLU:CD	1:B:119:LEU:CD1	2.66	0.68
1:J:80:HIS:HB2	1:J:81:HIS:CD2	2.28	0.67
1:B:155:GLY:CA	1:C:42:GLU:OE2	2.43	0.67
1:C:54:HIS:CE1	1:C:112:ASP:OD2	2.48	0.66
1:F:70:LYS:HZ1	1:F:188:HIS:HB3	1.59	0.66
1:B:119:LEU:N	1:B:119:LEU:HD12	2.10	0.65
1:J:76:SER:O	1:J:77:MET:HE2	1.96	0.65
1:B:83:VAL:HG12	1:B:149:MET:HB2	1.79	0.65
1:B:103:LEU:CD2	1:D:163:THR:HG21	2.23	0.64
1:F:83:VAL:HG12	1:F:149:MET:HB2	1.81	0.63
1:D:58:ILE:CG2	1:D:99:ARG:HA	2.28	0.63
1:E:83:VAL:HG22	1:E:84:PRO:CD	2.28	0.63
1:B:83:VAL:CG1	1:B:149:MET:HB2	2.28	0.63
1:B:4:ILE:HD12	1:C:20:VAL:HA	1.81	0.63
1:I:107:ALA:HB3	1:J:156:VAL:CG1	2.27	0.63
1:J:73:ARG:HG3	1:J:73:ARG:HH11	1.64	0.63
1:F:83:VAL:CG1	1:F:149:MET:HB2	2.29	0.62
1:D:42:GLU:OE2	1:G:155:GLY:CA	2.47	0.62
1:B:119:LEU:HD13	1:B:122:ARG:NH2	2.16	0.61
1:I:65:GLU:OE2	1:J:169:ARG:NH1	2.31	0.61
1:I:107:ALA:CB	1:J:156:VAL:HG11	2.27	0.61
1:H:101:ALA:HB2	1:H:135:LEU:HD11	1.82	0.61
1:F:70:LYS:HZ2	1:F:188:HIS:HB3	1.65	0.61
1:H:4:ILE:HD12	1:J:20:VAL:HA	1.83	0.60
1:G:154:ARG:O	1:G:157:ASN:CG	2.44	0.60
1:H:151:MET:HE1	1:H:161:THR:CG2	2.29	0.60
1:G:73:ARG:HG3	1:G:73:ARG:HH11	1.67	0.60
1:D:57:THR:C	1:D:58:ILE:HG13	2.25	0.59
1:A:42:GLU:OE2	1:F:155:GLY:CA	2.50	0.59
1:C:156:VAL:HG21	1:G:107:ALA:CB	2.31	0.59
1:G:52:SER:O	1:G:134:LYS:HD2	2.02	0.59
1:E:101:ALA:HB2	1:E:135:LEU:HD11	1.85	0.59
1:J:61:GLU:O	1:J:98:GLY:HA3	2.03	0.58
1:A:73:ARG:HH11	1:A:73:ARG:CG	2.16	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:60:GLU:O	1:E:61:GLU:C	2.46	0.58
1:G:151:MET:HE3	1:J:103:LEU:HB3	1.86	0.57
1:B:155:GLY:HA2	1:C:42:GLU:OE2	2.04	0.57
1:C:103:LEU:HB3	1:F:151:MET:HE1	1.87	0.57
1:B:157:ASN:HD22	1:F:157:ASN:HD22	1.51	0.57
1:D:101:ALA:HB2	1:D:135:LEU:HD11	1.86	0.57
1:J:77:MET:HE1	1:J:84:PRO:CG	2.32	0.57
1:J:101:ALA:HB2	1:J:135:LEU:HD11	1.87	0.57
1:B:119:LEU:HD13	1:B:122:ARG:CZ	2.35	0.56
1:D:59:PHE:O	1:D:98:GLY:O	2.23	0.56
1:D:151:MET:HE1	1:D:161:THR:CB	2.34	0.56
1:I:68:LEU:HD11	1:I:186:ILE:HD11	1.88	0.56
1:A:101:ALA:HB2	1:A:135:LEU:HD11	1.87	0.56
1:E:155:GLY:HA3	1:I:42:GLU:OE2	2.06	0.56
1:F:101:ALA:HB2	1:F:135:LEU:HD11	1.86	0.56
1:A:169:ARG:NH1	1:E:65:GLU:OE2	2.39	0.56
1:D:58:ILE:HG21	1:D:99:ARG:HA	1.88	0.56
1:D:60:GLU:HA	1:D:98:GLY:O	2.06	0.56
1:F:141:MET:HE2	1:F:143:ILE:HD11	1.88	0.55
1:E:141:MET:HE2	1:E:143:ILE:HD11	1.88	0.55
1:B:61:GLU:O	1:B:98:GLY:HA3	2.07	0.55
1:C:61:GLU:HG3	1:C:62:GLN:N	2.21	0.55
1:E:154:ARG:HD2	1:I:39:MET:HG3	1.89	0.55
1:G:141:MET:HE2	1:G:143:ILE:HD11	1.89	0.55
1:A:141:MET:HE2	1:A:143:ILE:HD11	1.89	0.55
1:C:101:ALA:HB2	1:C:135:LEU:HD11	1.88	0.55
1:I:52:SER:CA	1:I:53:VAL:CB	2.85	0.55
1:A:7:GLN:NE2	1:A:34:MET:HE3	2.22	0.54
1:A:140:VAL:HG12	1:A:169:ARG:HB2	1.90	0.54
1:B:42:GLU:OE2	1:C:155:GLY:HA2	2.08	0.54
1:F:140:VAL:HG12	1:F:169:ARG:HB2	1.89	0.54
1:H:140:VAL:HG12	1:H:169:ARG:HB2	1.90	0.54
1:H:56:ASP:HB3	1:H:105:LYS:HD3	1.90	0.54
1:J:141:MET:HE2	1:J:143:ILE:HD11	1.89	0.54
1:H:141:MET:HE2	1:H:143:ILE:HD11	1.90	0.54
1:B:141:MET:HE2	1:B:143:ILE:HD11	1.88	0.53
1:G:99:ARG:HH11	1:G:99:ARG:HA	1.73	0.53
1:B:103:LEU:HB3	1:D:151:MET:SD	2.48	0.53
1:C:141:MET:HE2	1:C:143:ILE:HD11	1.89	0.53
1:I:141:MET:HE2	1:I:143:ILE:HD11	1.89	0.53
1:D:141:MET:HE2	1:D:143:ILE:HD11	1.89	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:61:GLU:O	1:C:98:GLY:HA3	2.08	0.53
1:D:140:VAL:HG12	1:D:169:ARG:HB2	1.89	0.53
1:G:101:ALA:HB2	1:G:135:LEU:HD11	1.90	0.53
1:B:119:LEU:CD1	1:B:119:LEU:N	2.72	0.53
1:A:125:THR:HG21	1:E:63:HIS:CD2	2.44	0.52
1:A:151:MET:HE1	1:A:161:THR:HG21	1.91	0.52
1:I:101:ALA:HB2	1:I:135:LEU:HD11	1.89	0.52
1:B:140:VAL:HG12	1:B:169:ARG:HB2	1.92	0.52
1:I:63:HIS:NE2	1:I:95:PRO:HG2	2.25	0.52
1:J:61:GLU:O	1:J:98:GLY:CA	2.58	0.52
1:B:157:ASN:ND2	1:F:157:ASN:HD22	2.07	0.52
1:I:140:VAL:HG12	1:I:169:ARG:HB2	1.92	0.52
1:C:154:ARG:O	1:C:157:ASN:CG	2.54	0.52
1:F:149:MET:C	1:F:151:MET:N	2.68	0.52
1:C:80:HIS:HB2	1:C:81:HIS:ND1	2.25	0.51
1:B:93:TYR:CE2	1:B:135:LEU:HD21	2.44	0.51
1:I:22:GLU:HG3	1:I:29:LEU:CD1	2.40	0.51
1:E:140:VAL:HG12	1:E:169:ARG:HB2	1.91	0.51
1:F:125:THR:O	1:F:129:GLU:HG2	2.10	0.51
1:E:119:LEU:CD2	1:E:121:GLU:CD	2.80	0.51
1:I:63:HIS:NE2	1:I:95:PRO:CG	2.74	0.51
1:I:63:HIS:CE1	1:I:100:VAL:HG12	2.42	0.51
1:A:22:GLU:HG3	1:A:29:LEU:CD1	2.41	0.51
1:B:187:LYS:O	1:B:188:HIS:C	2.54	0.51
1:H:121:GLU:H	1:H:121:GLU:CD	2.18	0.50
1:A:125:THR:HG21	1:E:63:HIS:HD2	1.77	0.50
1:F:61:GLU:O	1:F:98:GLY:HA3	2.11	0.50
1:E:22:GLU:CG	1:E:29:LEU:CD1	2.90	0.50
1:F:96:GLN:NE2	1:F:138:LEU:CD2	2.75	0.50
1:B:22:GLU:HG3	1:B:29:LEU:CD1	2.41	0.50
1:C:61:GLU:HG3	1:C:62:GLN:H	1.75	0.50
1:C:140:VAL:HG12	1:C:169:ARG:HB2	1.93	0.50
1:C:187:LYS:O	1:C:188:HIS:C	2.55	0.50
1:D:149:MET:C	1:D:151:MET:N	2.69	0.50
1:G:58:ILE:HA	1:G:100:VAL:O	2.11	0.50
1:E:22:GLU:HG3	1:E:29:LEU:CD1	2.42	0.50
1:E:125:THR:O	1:E:129:GLU:HG2	2.11	0.49
1:A:73:ARG:CG	1:A:73:ARG:NH1	2.73	0.49
1:A:125:THR:O	1:A:129:GLU:HG2	2.11	0.49
1:G:125:THR:O	1:G:129:GLU:HG2	2.12	0.49
1:I:22:GLU:CG	1:I:29:LEU:CD1	2.90	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:125:THR:O	1:D:129:GLU:HG2	2.13	0.49
1:I:125:THR:O	1:I:129:GLU:HG2	2.11	0.49
1:A:103:LEU:HD23	1:B:151:MET:HG3	1.93	0.49
1:B:125:THR:O	1:B:129:GLU:HG2	2.12	0.49
1:H:125:THR:O	1:H:129:GLU:HG2	2.13	0.49
1:D:55:PHE:C	1:D:57:THR:H	2.20	0.49
1:H:22:GLU:CG	1:H:29:LEU:CD1	2.90	0.49
1:B:22:GLU:CG	1:B:29:LEU:CD1	2.91	0.49
1:G:149:MET:C	1:G:151:MET:N	2.70	0.49
1:H:22:GLU:HG3	1:H:29:LEU:CD1	2.42	0.49
1:C:125:THR:O	1:C:129:GLU:HG2	2.13	0.48
1:I:22:GLU:CG	1:I:29:LEU:HD11	2.43	0.48
1:E:22:GLU:CG	1:E:29:LEU:HD11	2.44	0.48
1:F:22:GLU:HG3	1:F:29:LEU:CD1	2.44	0.48
1:J:22:GLU:CG	1:J:29:LEU:CD1	2.91	0.48
1:A:22:GLU:CG	1:A:29:LEU:CD1	2.90	0.48
1:I:149:MET:C	1:I:151:MET:N	2.71	0.48
1:A:42:GLU:OE2	1:F:155:GLY:HA2	2.14	0.48
1:A:149:MET:C	1:A:151:MET:N	2.70	0.48
1:H:22:GLU:CG	1:H:29:LEU:HD11	2.44	0.48
1:H:155:GLY:CA	1:J:42:GLU:OE2	2.60	0.48
1:J:22:GLU:HG3	1:J:29:LEU:CD1	2.43	0.48
1:B:55:PHE:HZ	1:B:106:LEU:HD12	1.79	0.48
1:D:22:GLU:HG3	1:D:29:LEU:CD1	2.44	0.48
1:G:22:GLU:HG3	1:G:29:LEU:CD1	2.44	0.48
1:A:22:GLU:CG	1:A:29:LEU:HD11	2.44	0.48
1:B:22:GLU:CG	1:B:29:LEU:HD11	2.44	0.47
1:D:22:GLU:CG	1:D:29:LEU:CD1	2.92	0.47
1:G:73:ARG:HG3	1:G:73:ARG:NH1	2.28	0.47
1:F:22:GLU:CG	1:F:29:LEU:CD1	2.93	0.47
1:D:151:MET:HE1	1:D:161:THR:HB	1.95	0.47
1:A:7:GLN:CD	1:A:34:MET:HE1	2.40	0.47
1:A:129:GLU:CD	1:A:169:ARG:HH21	2.20	0.47
1:F:103:LEU:HB3	1:I:151:MET:CE	2.43	0.47
1:G:22:GLU:CG	1:G:29:LEU:CD1	2.92	0.47
1:I:52:SER:HA	1:I:53:VAL:CB	2.44	0.47
1:H:149:MET:C	1:H:151:MET:N	2.74	0.47
1:C:80:HIS:HB2	1:C:81:HIS:CE1	2.50	0.46
1:J:22:GLU:CG	1:J:29:LEU:HD11	2.45	0.46
1:D:55:PHE:C	1:D:57:THR:N	2.73	0.46
1:E:149:MET:C	1:E:151:MET:N	2.72	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:122:ARG:NE	1:E:60:GLU:OE2	2.41	0.46
1:G:22:GLU:CG	1:G:29:LEU:HD11	2.46	0.46
1:B:61:GLU:O	1:B:98:GLY:CA	2.64	0.46
1:B:73:ARG:NH2	1:G:73:ARG:HH22	2.14	0.46
1:F:177:LYS:HE2	1:I:176:ASP:OD2	2.14	0.46
1:G:61:GLU:O	1:G:62:GLN:CB	2.64	0.46
1:B:149:MET:C	1:B:151:MET:N	2.73	0.46
1:F:96:GLN:NE2	1:F:138:LEU:HD21	2.31	0.45
1:B:118:GLN:C	1:B:119:LEU:HD12	2.41	0.45
1:C:103:LEU:HB3	1:F:151:MET:CE	2.45	0.45
1:D:22:GLU:CG	1:D:29:LEU:HD11	2.46	0.45
1:G:187:LYS:O	1:G:188:HIS:CB	2.64	0.45
1:I:187:LYS:O	1:I:188:HIS:C	2.59	0.45
1:A:60:GLU:OE1	1:B:80:HIS:HE1	2.00	0.45
1:H:119:LEU:HB3	1:H:121:GLU:OE1	2.16	0.45
1:D:27:GLU:OE2	1:J:60:GLU:O	2.34	0.45
1:F:4:ILE:HD11	1:F:41:GLU:HB2	1.99	0.45
1:C:149:MET:C	1:C:151:MET:N	2.75	0.45
1:E:54:HIS:O	1:E:56:ASP:N	2.49	0.45
1:A:60:GLU:OE1	1:B:80:HIS:CE1	2.70	0.45
1:A:111:ASP:OD1	1:B:158:LYS:NZ	2.39	0.45
1:C:73:ARG:O	1:F:158:LYS:HE3	2.17	0.45
1:D:42:GLU:OE2	1:G:155:GLY:HA2	2.17	0.45
1:F:22:GLU:CG	1:F:29:LEU:HD11	2.47	0.44
1:G:61:GLU:O	1:G:62:GLN:HB2	2.17	0.44
1:D:159:PRO:HG2	1:G:73:ARG:NH1	2.32	0.44
1:J:149:MET:C	1:J:151:MET:N	2.75	0.44
1:F:61:GLU:HG3	1:F:62:GLN:N	2.31	0.44
1:J:73:ARG:HG3	1:J:73:ARG:NH1	2.30	0.44
1:H:187:LYS:O	1:H:188:HIS:C	2.60	0.44
1:D:151:MET:CE	1:D:161:THR:HB	2.47	0.44
1:F:96:GLN:HE21	1:F:138:LEU:HD21	1.84	0.43
1:D:58:ILE:HG21	1:D:99:ARG:HG2	2.00	0.43
1:I:63:HIS:CE1	1:J:121:GLU:HG2	2.54	0.43
1:G:120:GLN:OE1	1:G:163:THR:OG1	2.37	0.43
1:F:151:MET:O	1:F:151:MET:HG3	2.19	0.42
1:A:187:LYS:O	1:A:188:HIS:C	2.62	0.42
1:D:172:PHE:CE1	1:D:178:LEU:HG	2.54	0.42
1:H:60:GLU:O	1:H:61:GLU:C	2.61	0.42
1:D:187:LYS:O	1:D:188:HIS:C	2.62	0.42
1:E:154:ARG:HG3	1:I:39:MET:HG3	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:131:MET:O	1:A:135:LEU:HB2	2.20	0.42
1:D:58:ILE:HG21	1:D:99:ARG:CA	2.49	0.42
1:F:78:CYS:SG	1:F:81:HIS:HB2	2.60	0.42
1:H:172:PHE:CE1	1:H:178:LEU:HG	2.55	0.42
1:E:4:ILE:HD11	1:E:41:GLU:HB2	2.02	0.42
1:D:58:ILE:HG22	1:D:99:ARG:HA	2.00	0.42
1:E:169:ARG:NH1	1:H:65:GLU:OE2	2.31	0.41
1:E:59:PHE:CE1	1:E:99:ARG:HG2	2.56	0.41
1:G:158:LYS:NZ	1:J:107:ALA:HB1	2.35	0.41
1:I:78:CYS:SG	1:I:81:HIS:HB2	2.61	0.41
1:C:168:VAL:HG22	1:G:65:GLU:OE1	2.20	0.41
1:E:59:PHE:HE1	1:E:99:ARG:HG2	1.86	0.41
1:E:78:CYS:SG	1:E:81:HIS:HB2	2.60	0.41
1:B:149:MET:O	1:B:150:CYS:C	2.64	0.41
1:C:57:THR:C	1:C:58:ILE:HG12	2.44	0.41
1:G:4:ILE:HD11	1:G:41:GLU:HB2	2.01	0.41
1:J:77:MET:HE2	1:J:84:PRO:HA	2.01	0.41
1:E:172:PHE:CE1	1:E:178:LEU:HG	2.56	0.41
1:J:54:HIS:O	1:J:105:LYS:HG3	2.20	0.41
1:D:136:LYS:N	1:D:137:PRO:HD3	2.36	0.41
1:G:187:LYS:O	1:G:188:HIS:HB2	2.21	0.41
1:I:65:GLU:OE1	1:J:168:VAL:HG22	2.20	0.41
1:J:80:HIS:HD2	1:J:81:HIS:HD2	1.68	0.41
1:J:151:MET:O	1:J:156:VAL:HG23	2.21	0.41
1:B:107:ALA:HB3	1:D:156:VAL:HG21	2.03	0.41
1:D:78:CYS:SG	1:D:81:HIS:HB2	2.61	0.41
1:A:32:THR:N	1:A:33:PRO:CD	2.84	0.40
1:G:59:PHE:C	1:G:99:ARG:HH12	2.29	0.40
1:E:149:MET:O	1:E:150:CYS:C	2.63	0.40
1:F:136:LYS:N	1:F:137:PRO:HD3	2.37	0.40
1:E:136:LYS:N	1:E:137:PRO:HD3	2.37	0.40
1:I:63:HIS:CD2	1:I:63:HIS:O	2.74	0.40
1:A:172:PHE:CE1	1:A:178:LEU:HG	2.57	0.40
1:G:172:PHE:CE1	1:G:178:LEU:HG	2.57	0.40
1:I:172:PHE:CE1	1:I:178:LEU:HG	2.56	0.40

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 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	184/202 (91%)	181 (98%)	2 (1%)	1 (0%)	24	37
1	B	184/202 (91%)	180 (98%)	3 (2%)	1 (0%)	24	37
1	C	184/202 (91%)	180 (98%)	3 (2%)	1 (0%)	24	37
1	D	184/202 (91%)	175 (95%)	8 (4%)	1 (0%)	24	37
1	E	184/202 (91%)	179 (97%)	4 (2%)	1 (0%)	24	37
1	F	184/202 (91%)	181 (98%)	2 (1%)	1 (0%)	24	37
1	G	184/202 (91%)	181 (98%)	2 (1%)	1 (0%)	24	37
1	H	184/202 (91%)	181 (98%)	2 (1%)	1 (0%)	24	37
1	I	184/202 (91%)	176 (96%)	4 (2%)	4 (2%)	5	6
1	J	184/202 (91%)	182 (99%)	1 (0%)	1 (0%)	24	37
All	All	1840/2020 (91%)	1796 (98%)	31 (2%)	13 (1%)	18	28

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	I	53	VAL
1	E	150	CYS
1	F	150	CYS
1	I	52	SER
1	I	54	HIS
1	A	150	CYS
1	B	150	CYS
1	D	150	CYS
1	G	150	CYS
1	H	150	CYS
1	I	150	CYS
1	J	150	CYS
1	C	150	CYS

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	160/177 (90%)	155 (97%)	5 (3%)	35	57
1	B	154/177 (87%)	149 (97%)	5 (3%)	34	56
1	C	161/177 (91%)	152 (94%)	9 (6%)	19	33
1	D	162/177 (92%)	158 (98%)	4 (2%)	42	64
1	E	158/177 (89%)	148 (94%)	10 (6%)	16	29
1	F	155/177 (88%)	148 (96%)	7 (4%)	24	42
1	G	149/177 (84%)	140 (94%)	9 (6%)	17	31
1	H	160/177 (90%)	154 (96%)	6 (4%)	29	49
1	I	155/177 (88%)	148 (96%)	7 (4%)	24	42
1	J	159/177 (90%)	151 (95%)	8 (5%)	22	38
All	All	1573/1770 (89%)	1503 (96%)	70 (4%)	24	42

All (70) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	ILE
1	A	27	GLU
1	A	115	ARG
1	A	136	LYS
1	A	150	CYS
1	B	103	LEU
1	B	106	LEU
1	B	135	LEU
1	B	150	CYS
1	B	180	SER
1	C	22	GLU
1	C	57	THR
1	C	60	GLU
1	C	62	GLN
1	C	80	HIS
1	C	106	LEU

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Mol	Chain	Res	Type
1	C	150	CYS
1	C	156	VAL
1	C	180	SER
1	D	4	ILE
1	D	96	GLN
1	D	150	CYS
1	D	180	SER
1	E	3	GLN
1	E	34	MET
1	E	83	VAL
1	E	105	LYS
1	E	106	LEU
1	E	115	ARG
1	E	119	LEU
1	E	150	CYS
1	E	151	MET
1	E	180	SER
1	F	34	MET
1	F	64	GLU
1	F	97	ASN
1	F	150	CYS
1	F	154	ARG
1	F	177	LYS
1	F	180	SER
1	G	34	MET
1	G	99	ARG
1	G	106	LEU
1	G	134	LYS
1	G	135	LEU
1	G	136	LYS
1	G	150	CYS
1	G	177	LYS
1	G	180	SER
1	H	18	GLU
1	H	49	LYS
1	H	105	LYS
1	H	150	CYS
1	H	151	MET
1	H	180	SER
1	I	64	GLU
1	I	99	ARG
1	I	100	VAL

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Mol	Chain	Res	Type
1	I	106	LEU
1	I	150	CYS
1	I	177	LYS
1	I	180	SER
1	J	80	HIS
1	J	103	LEU
1	J	105	LYS
1	J	115	ARG
1	J	150	CYS
1	J	156	VAL
1	J	177	LYS
1	J	180	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (33) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	7	GLN
1	A	63	HIS
1	A	81	HIS
1	A	96	GLN
1	A	188	HIS
1	B	63	HIS
1	B	80	HIS
1	B	81	HIS
1	B	96	GLN
1	C	7	GLN
1	C	54	HIS
1	C	80	HIS
1	C	97	ASN
1	D	7	GLN
1	D	80	HIS
1	D	188	HIS
1	E	63	HIS
1	E	97	ASN
1	F	63	HIS
1	F	96	GLN
1	F	97	ASN
1	F	157	ASN
1	F	188	HIS
1	G	63	HIS
1	G	81	HIS
1	H	7	GLN

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Mol	Chain	Res	Type
1	H	81	HIS
1	H	97	ASN
1	I	62	GLN
1	I	148	HIS
1	I	188	HIS
1	J	80	HIS
1	J	81	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

6.1 Protein, DNA and RNA chains

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, 95th 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 ²)	Q<0.9
1	A	186/202 (92%)	-0.02	2 (1%) 78 74	25, 39, 72, 98	0
1	B	186/202 (92%)	0.09	2 (1%) 78 74	26, 43, 79, 102	0
1	C	186/202 (92%)	-0.01	3 (1%) 70 66	26, 42, 75, 96	0
1	D	186/202 (92%)	0.15	8 (4%) 40 36	26, 44, 93, 123	0
1	E	186/202 (92%)	0.13	5 (2%) 56 52	28, 46, 81, 107	0
1	F	186/202 (92%)	0.10	8 (4%) 40 36	28, 43, 88, 112	0
1	G	186/202 (92%)	0.23	13 (6%) 22 19	27, 48, 90, 116	0
1	H	186/202 (92%)	-0.08	0 100 100	28, 41, 68, 97	0
1	I	186/202 (92%)	0.32	10 (5%) 31 28	28, 49, 88, 103	0
1	J	186/202 (92%)	0.24	8 (4%) 40 36	32, 51, 93, 116	0
All	All	1860/2020 (92%)	0.12	59 (3%) 50 46	25, 45, 85, 123	0

All (59) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	I	52	SER	6.7
1	D	59	PHE	5.4
1	G	55	PHE	5.2
1	E	156	VAL	5.0
1	F	59	PHE	4.2
1	I	53	VAL	3.9
1	D	57	THR	3.9
1	I	54	HIS	3.6
1	G	51	PRO	3.4
1	G	62	GLN	3.3
1	A	101	ALA	3.2
1	I	106	LEU	3.2
1	I	51	PRO	3.1

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Mol	Chain	Res	Type	RSRZ
1	G	54	HIS	3.1
1	E	56	ASP	3.0
1	D	58	ILE	2.9
1	I	55	PHE	2.9
1	J	57	THR	2.9
1	F	99	ARG	2.8
1	E	54	HIS	2.8
1	I	100	VAL	2.8
1	I	101	ALA	2.8
1	F	150	CYS	2.8
1	C	188	HIS	2.8
1	G	100	VAL	2.7
1	B	97	ASN	2.7
1	D	99	ARG	2.6
1	D	188	HIS	2.6
1	J	58	ILE	2.5
1	J	103	LEU	2.5
1	J	156	VAL	2.5
1	I	63	HIS	2.5
1	F	188	HIS	2.4
1	B	57	THR	2.4
1	G	99	ARG	2.4
1	G	53	VAL	2.4
1	D	98	GLY	2.3
1	D	4	ILE	2.3
1	G	3	GLN	2.3
1	J	155	GLY	2.3
1	F	3	GLN	2.3
1	F	58	ILE	2.3
1	J	99	ARG	2.2
1	G	57	THR	2.2
1	A	188	HIS	2.2
1	I	107	ALA	2.2
1	G	63	HIS	2.1
1	G	56	ASP	2.1
1	J	56	ASP	2.1
1	F	156	VAL	2.1
1	G	157	ASN	2.1
1	C	62	GLN	2.1
1	F	98	GLY	2.1
1	C	151	MET	2.1
1	E	55	PHE	2.0

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Mol	Chain	Res	Type	RSRZ
1	G	52	SER	2.0
1	D	157	ASN	2.0
1	E	4	ILE	2.0
1	J	51	PRO	2.0

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.