WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Jan 15, 2025 – 12:14 PM JST

PDB ID	:	8XU2
Title	:	DaCS-citrate complex
Authors	:	Yang, L.Y.; Fang, Y.J.
Deposited on	:	2024-01-12
Resolution	:	2.19 Å(reported)

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

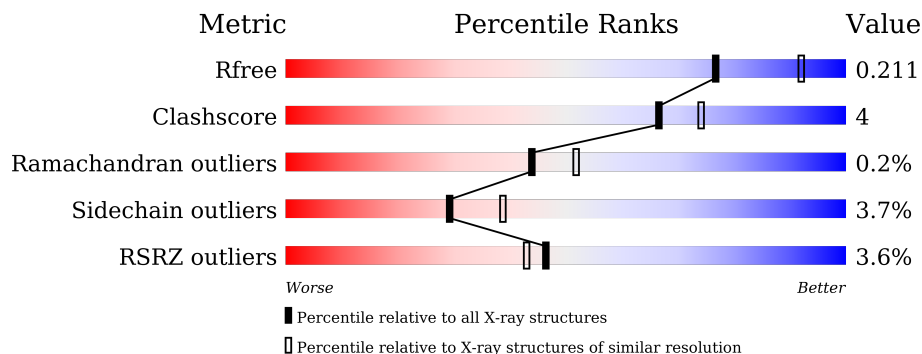|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.21
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

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 2.19 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.
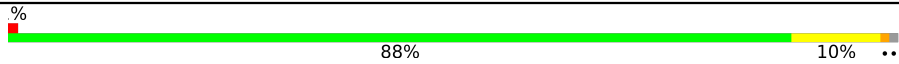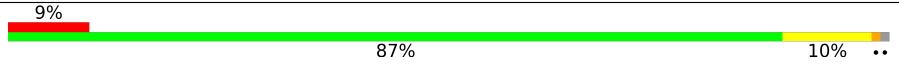

Worse — Better

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	164625	5791 (2.20-2.20)
Clashscore	180529	6634 (2.20-2.20)
Ramachandran outliers	177936	6560 (2.20-2.20)
Sidechain outliers	177891	6561 (2.20-2.20)
RSRZ outliers	164620	5791 (2.20-2.20)

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 >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	438	89% 9% ••
1	B	438	2% / 88% 10% •
1	C	438	% / 90% 8% ••
1	D	438	3% / 89% 8% ••
1	E	438	2% / 90% 8% •
1	F	438	11% / 90% 8% ••

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WORLDWIDE wwPDB PROTEIN DATA BANK

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Mol	Chain	Length	Quality of chain
1	G	438	% 88% 10% ··
1	H	438	9% 87% 10% ··

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 29116 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 citrate synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	435	Total 3436	C 2213	N 572	O 633	S 18	0	1	0
1	B	437	Total 3450	C 2222	N 575	O 635	S 18	0	1	0
1	C	435	Total 3436	C 2213	N 572	O 633	S 18	0	1	0
1	D	435	Total 3436	C 2213	N 572	O 633	S 18	0	1	0
1	E	436	Total 3441	C 2216	N 573	O 634	S 18	0	1	0
1	F	435	Total 3432	C 2210	N 571	O 633	S 18	0	1	0
1	G	435	Total 3424	C 2204	N 569	O 633	S 18	0	1	0
1	H	435	Total 3436	C 2213	N 572	O 633	S 18	0	1	0

There are 176 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	21	ARG	LYS	variant	UNP A0A7C6A739
A	29	VAL	THR	variant	UNP A0A7C6A739
A	48	SER	CYS	variant	UNP A0A7C6A739
A	90	HIS	GLN	variant	UNP A0A7C6A739
A	98	ASP	GLU	variant	UNP A0A7C6A739
A	109	ALA	VAL	variant	UNP A0A7C6A739
A	127	LYS	ARG	variant	UNP A0A7C6A739
A	140	ALA	SER	variant	UNP A0A7C6A739
A	171	PHE	TYR	variant	UNP A0A7C6A739
A	195	SER	GLY	variant	UNP A0A7C6A739
A	258	ALA	SER	variant	UNP A0A7C6A739
A	286	ILE	MET	variant	UNP A0A7C6A739
A	287	ASP	GLU	variant	UNP A0A7C6A739

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Chain	Residue	Modelled	Actual	Comment	Reference
A	288	LYS	-	insertion	UNP A0A7C6A739
A	309	SER	ASP	variant	UNP A0A7C6A739
A	330	VAL	THR	variant	UNP A0A7C6A739
A	340	MET	LEU	variant	UNP A0A7C6A739
A	353	TYR	PHE	variant	UNP A0A7C6A739
A	406	ALA	SER	variant	UNP A0A7C6A739
A	432	TRP	MET	variant	UNP A0A7C6A739
A	437	ALA	-	expression tag	UNP A0A7C6A739
A	438	ALA	-	expression tag	UNP A0A7C6A739
B	21	ARG	LYS	variant	UNP A0A7C6A739
B	29	VAL	THR	variant	UNP A0A7C6A739
B	48	SER	CYS	variant	UNP A0A7C6A739
B	90	HIS	GLN	variant	UNP A0A7C6A739
B	98	ASP	GLU	variant	UNP A0A7C6A739
B	109	ALA	VAL	variant	UNP A0A7C6A739
B	127	LYS	ARG	variant	UNP A0A7C6A739
B	140	ALA	SER	variant	UNP A0A7C6A739
B	171	PHE	TYR	variant	UNP A0A7C6A739
B	195	SER	GLY	variant	UNP A0A7C6A739
B	258	ALA	SER	variant	UNP A0A7C6A739
B	286	ILE	MET	variant	UNP A0A7C6A739
B	287	ASP	GLU	variant	UNP A0A7C6A739
B	288	LYS	-	insertion	UNP A0A7C6A739
B	309	SER	ASP	variant	UNP A0A7C6A739
B	330	VAL	THR	variant	UNP A0A7C6A739
B	340	MET	LEU	variant	UNP A0A7C6A739
B	353	TYR	PHE	variant	UNP A0A7C6A739
B	406	ALA	SER	variant	UNP A0A7C6A739
B	432	TRP	MET	variant	UNP A0A7C6A739
B	437	ALA	-	expression tag	UNP A0A7C6A739
B	438	ALA	-	expression tag	UNP A0A7C6A739
C	21	ARG	LYS	variant	UNP A0A7C6A739
C	29	VAL	THR	variant	UNP A0A7C6A739
C	48	SER	CYS	variant	UNP A0A7C6A739
C	90	HIS	GLN	variant	UNP A0A7C6A739
C	98	ASP	GLU	variant	UNP A0A7C6A739
C	109	ALA	VAL	variant	UNP A0A7C6A739
C	127	LYS	ARG	variant	UNP A0A7C6A739
C	140	ALA	SER	variant	UNP A0A7C6A739
C	171	PHE	TYR	variant	UNP A0A7C6A739
C	195	SER	GLY	variant	UNP A0A7C6A739
C	258	ALA	SER	variant	UNP A0A7C6A739

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Chain	Residue	Modelled	Actual	Comment	Reference
C	286	ILE	MET	variant	UNP A0A7C6A739
C	287	ASP	GLU	variant	UNP A0A7C6A739
C	288	LYS	-	insertion	UNP A0A7C6A739
C	309	SER	ASP	variant	UNP A0A7C6A739
C	330	VAL	THR	variant	UNP A0A7C6A739
C	340	MET	LEU	variant	UNP A0A7C6A739
C	353	TYR	PHE	variant	UNP A0A7C6A739
C	406	ALA	SER	variant	UNP A0A7C6A739
C	432	TRP	MET	variant	UNP A0A7C6A739
C	437	ALA	-	expression tag	UNP A0A7C6A739
C	438	ALA	-	expression tag	UNP A0A7C6A739
D	21	ARG	LYS	variant	UNP A0A7C6A739
D	29	VAL	THR	variant	UNP A0A7C6A739
D	48	SER	CYS	variant	UNP A0A7C6A739
D	90	HIS	GLN	variant	UNP A0A7C6A739
D	98	ASP	GLU	variant	UNP A0A7C6A739
D	109	ALA	VAL	variant	UNP A0A7C6A739
D	127	LYS	ARG	variant	UNP A0A7C6A739
D	140	ALA	SER	variant	UNP A0A7C6A739
D	171	PHE	TYR	variant	UNP A0A7C6A739
D	195	SER	GLY	variant	UNP A0A7C6A739
D	258	ALA	SER	variant	UNP A0A7C6A739
D	286	ILE	MET	variant	UNP A0A7C6A739
D	287	ASP	GLU	variant	UNP A0A7C6A739
D	288	LYS	-	insertion	UNP A0A7C6A739
D	309	SER	ASP	variant	UNP A0A7C6A739
D	330	VAL	THR	variant	UNP A0A7C6A739
D	340	MET	LEU	variant	UNP A0A7C6A739
D	353	TYR	PHE	variant	UNP A0A7C6A739
D	406	ALA	SER	variant	UNP A0A7C6A739
D	432	TRP	MET	variant	UNP A0A7C6A739
D	437	ALA	-	expression tag	UNP A0A7C6A739
D	438	ALA	-	expression tag	UNP A0A7C6A739
E	21	ARG	LYS	variant	UNP A0A7C6A739
E	29	VAL	THR	variant	UNP A0A7C6A739
E	48	SER	CYS	variant	UNP A0A7C6A739
E	90	HIS	GLN	variant	UNP A0A7C6A739
E	98	ASP	GLU	variant	UNP A0A7C6A739
E	109	ALA	VAL	variant	UNP A0A7C6A739
E	127	LYS	ARG	variant	UNP A0A7C6A739
E	140	ALA	SER	variant	UNP A0A7C6A739
E	171	PHE	TYR	variant	UNP A0A7C6A739

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Chain	Residue	Modelled	Actual	Comment	Reference
E	195	SER	GLY	variant	UNP A0A7C6A739
E	258	ALA	SER	variant	UNP A0A7C6A739
E	286	ILE	MET	variant	UNP A0A7C6A739
E	287	ASP	GLU	variant	UNP A0A7C6A739
E	288	LYS	-	insertion	UNP A0A7C6A739
E	309	SER	ASP	variant	UNP A0A7C6A739
E	330	VAL	THR	variant	UNP A0A7C6A739
E	340	MET	LEU	variant	UNP A0A7C6A739
E	353	TYR	PHE	variant	UNP A0A7C6A739
E	406	ALA	SER	variant	UNP A0A7C6A739
E	432	TRP	MET	variant	UNP A0A7C6A739
E	437	ALA	-	expression tag	UNP A0A7C6A739
E	438	ALA	-	expression tag	UNP A0A7C6A739
F	21	ARG	LYS	variant	UNP A0A7C6A739
F	29	VAL	THR	variant	UNP A0A7C6A739
F	48	SER	CYS	variant	UNP A0A7C6A739
F	90	HIS	GLN	variant	UNP A0A7C6A739
F	98	ASP	GLU	variant	UNP A0A7C6A739
F	109	ALA	VAL	variant	UNP A0A7C6A739
F	127	LYS	ARG	variant	UNP A0A7C6A739
F	140	ALA	SER	variant	UNP A0A7C6A739
F	171	PHE	TYR	variant	UNP A0A7C6A739
F	195	SER	GLY	variant	UNP A0A7C6A739
F	258	ALA	SER	variant	UNP A0A7C6A739
F	286	ILE	MET	variant	UNP A0A7C6A739
F	287	ASP	GLU	variant	UNP A0A7C6A739
F	288	LYS	-	insertion	UNP A0A7C6A739
F	309	SER	ASP	variant	UNP A0A7C6A739
F	330	VAL	THR	variant	UNP A0A7C6A739
F	340	MET	LEU	variant	UNP A0A7C6A739
F	353	TYR	PHE	variant	UNP A0A7C6A739
F	406	ALA	SER	variant	UNP A0A7C6A739
F	432	TRP	MET	variant	UNP A0A7C6A739
F	437	ALA	-	expression tag	UNP A0A7C6A739
F	438	ALA	-	expression tag	UNP A0A7C6A739
G	21	ARG	LYS	variant	UNP A0A7C6A739
G	29	VAL	THR	variant	UNP A0A7C6A739
G	48	SER	CYS	variant	UNP A0A7C6A739
G	90	HIS	GLN	variant	UNP A0A7C6A739
G	98	ASP	GLU	variant	UNP A0A7C6A739
G	109	ALA	VAL	variant	UNP A0A7C6A739
G	127	LYS	ARG	variant	UNP A0A7C6A739

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Chain	Residue	Modelled	Actual	Comment	Reference
G	140	ALA	SER	variant	UNP A0A7C6A739
G	171	PHE	TYR	variant	UNP A0A7C6A739
G	195	SER	GLY	variant	UNP A0A7C6A739
G	258	ALA	SER	variant	UNP A0A7C6A739
G	286	ILE	MET	variant	UNP A0A7C6A739
G	287	ASP	GLU	variant	UNP A0A7C6A739
G	288	LYS	-	insertion	UNP A0A7C6A739
G	309	SER	ASP	variant	UNP A0A7C6A739
G	330	VAL	THR	variant	UNP A0A7C6A739
G	340	MET	LEU	variant	UNP A0A7C6A739
G	353	TYR	PHE	variant	UNP A0A7C6A739
G	406	ALA	SER	variant	UNP A0A7C6A739
G	432	TRP	MET	variant	UNP A0A7C6A739
G	437	ALA	-	expression tag	UNP A0A7C6A739
G	438	ALA	-	expression tag	UNP A0A7C6A739
H	21	ARG	LYS	variant	UNP A0A7C6A739
H	29	VAL	THR	variant	UNP A0A7C6A739
H	48	SER	CYS	variant	UNP A0A7C6A739
H	90	HIS	GLN	variant	UNP A0A7C6A739
H	98	ASP	GLU	variant	UNP A0A7C6A739
H	109	ALA	VAL	variant	UNP A0A7C6A739
H	127	LYS	ARG	variant	UNP A0A7C6A739
H	140	ALA	SER	variant	UNP A0A7C6A739
H	171	PHE	TYR	variant	UNP A0A7C6A739
H	195	SER	GLY	variant	UNP A0A7C6A739
H	258	ALA	SER	variant	UNP A0A7C6A739
H	286	ILE	MET	variant	UNP A0A7C6A739
H	287	ASP	GLU	variant	UNP A0A7C6A739
H	288	LYS	-	insertion	UNP A0A7C6A739
H	309	SER	ASP	variant	UNP A0A7C6A739
H	330	VAL	THR	variant	UNP A0A7C6A739
H	340	MET	LEU	variant	UNP A0A7C6A739
H	353	TYR	PHE	variant	UNP A0A7C6A739
H	406	ALA	SER	variant	UNP A0A7C6A739
H	432	TRP	MET	variant	UNP A0A7C6A739
H	437	ALA	-	expression tag	UNP A0A7C6A739
H	438	ALA	-	expression tag	UNP A0A7C6A739

- Molecule 2 is CITRIC ACID (three-letter code: CIT) (formula: $C_6H_8O_7$) (labeled as "Ligand of Interest" by depositor).

CIT

O5
O

O2
OH

C2   C1

C6   C3

HO

O6

C4   O1

HO

O7

C5

O
O3

OH
O4
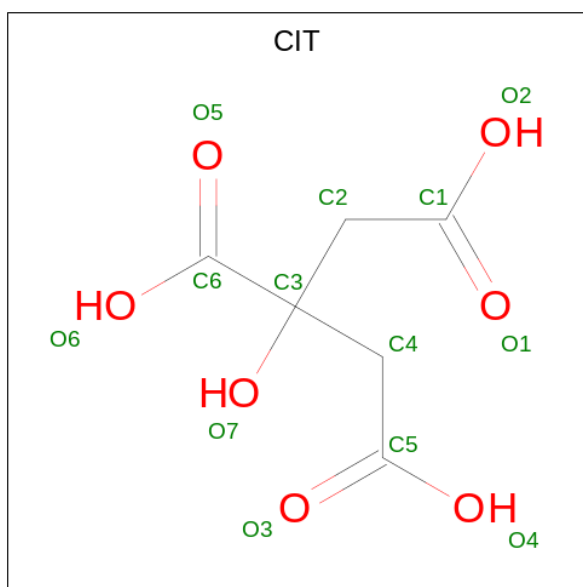
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total 13	C 6	O 7	0	0
2	B	1	Total 13	C 6	O 7	0	0
2	C	1	Total 13	C 6	O 7	0	0
2	D	1	Total 13	C 6	O 7	0	0
2	E	1	Total 13	C 6	O 7	0	0
2	F	1	Total 13	C 6	O 7	0	0
2	G	1	Total 13	C 6	O 7	0	0
2	H	1	Total 13	C 6	O 7	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	199	Total 199	O 199	0	0
3	B	203	Total 203	O 203	0	0
3	C	161	Total 161	O 161	0	0
3	D	172	Total 172	O 172	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	E	187	Total 187	O 187	0	0
3	F	147	Total 147	O 147	0	0
3	G	225	Total 225	O 225	0	0
3	H	227	Total 227	O 227	0	0

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: citrate synthase
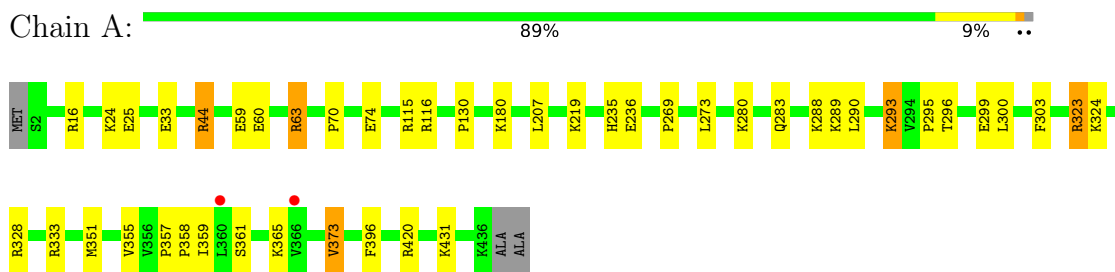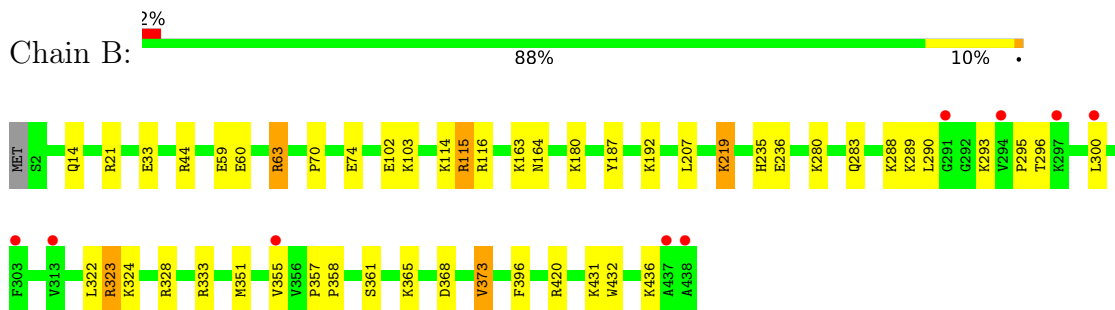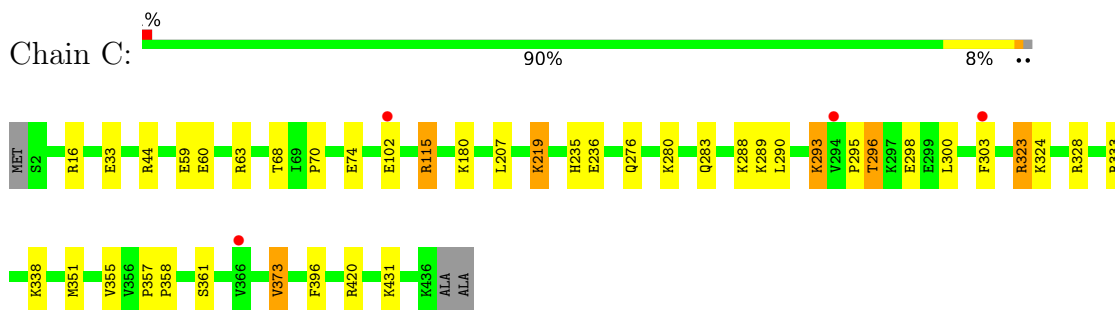
Chain A:

• Molecule 1: citrate synthase

Chain B:

• Molecule 1: citrate synthase

Chain C:

• Molecule 1: citrate synthase

Chain D:

• Molecule 1: citrate synthase

Chain E:

2%
90%　　8%

• Molecule 1: citrate synthase

Chain F:

11%
90%　　8%

• Molecule 1: citrate synthase

Chain G:

%
88%　　10%

• Molecule 1: citrate synthase

Chain H:

9%
87%　　10%

L300 K301 K302 F303 V304 T307 L308 G311 Q312 V313 I314 P315 G316 Y317 G318 V321 L322 R323 K324 T325 R328 Y329 R333 K338 V348 V349 S350 M351 L352 Y353 E354 V355 V356 P357 P358 I359 L360 S361 S362 L363 G364 K365 V366 K367 D368 P369 W370 P371 N372 V373 D374 A375

F396 R420 K431 K436 ALA ALA
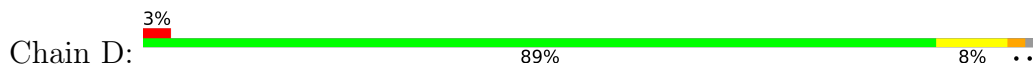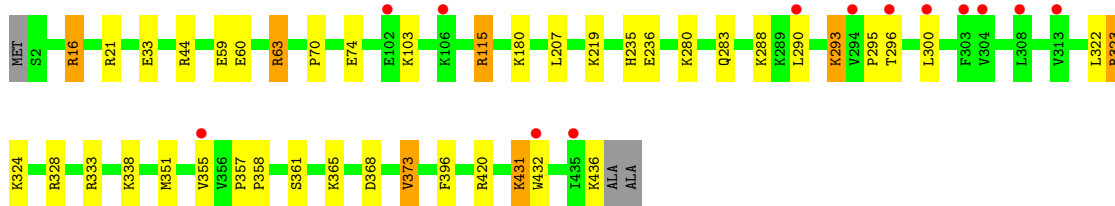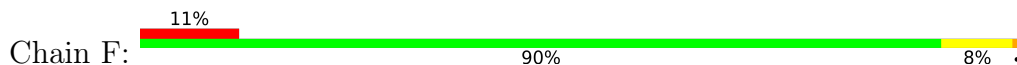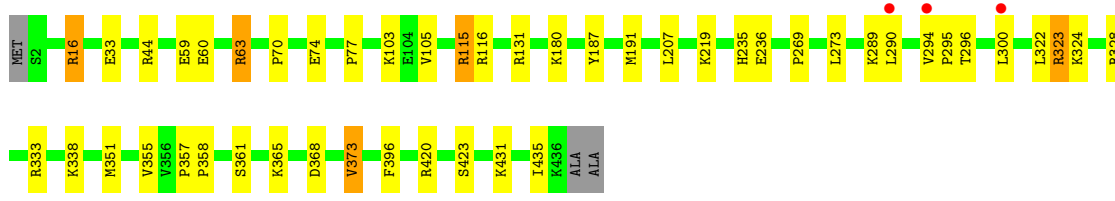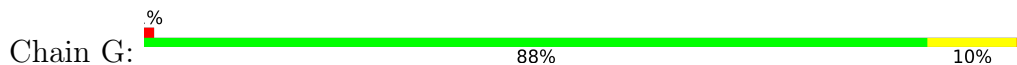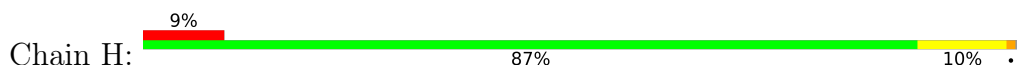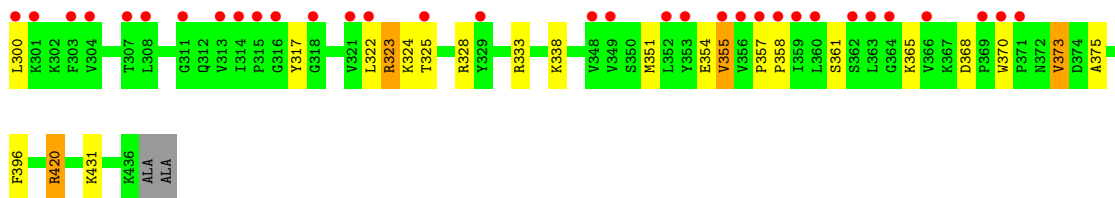
4 Data and refinement statistics (i)

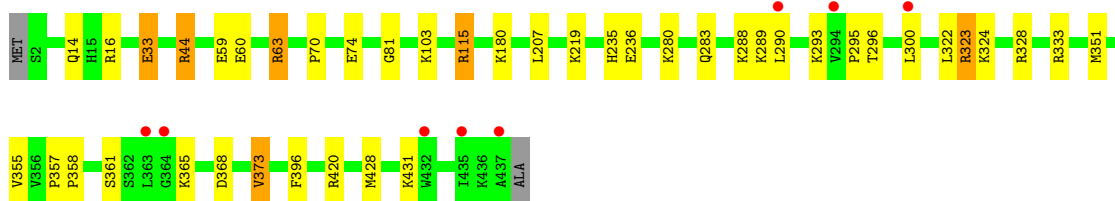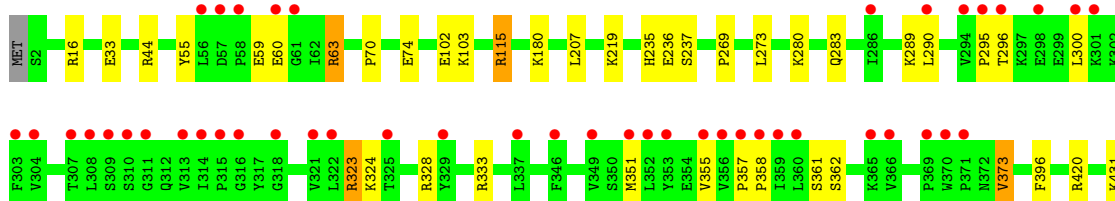| Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, α, β, γ	362.33Å 362.33Å 77.89Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	24.66 – 2.19 24.66 – 2.19	Depositor EDS
% Data completeness (in resolution range)	97.5 (24.66-2.19) 97.5 (24.66-2.19)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.07 (at 2.19Å)	Xtriage
Refinement program	REFMAC 5.8.0352	Depositor
R, R_{free}	0.175 , 0.203 0.184 , 0.211	Depositor DCC
R_{free} test set	9668 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å^2)	28.1	Xtriage
Anisotropy	0.073	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 34.7	EDS
L-test for twinning [2]	$< |L| > = 0.49, < L^2 > = 0.31$	Xtriage
Estimated twinning fraction	0.018 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	29116	wwPDB-VP
Average B, all atoms (Å^2)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 32.25 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 9.6879e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ 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)

Bond lengths and bond angles in the following residue types are not validated in this section: CIT

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	0.42	0/3527	0.67	2/4780 (0.0%)
1	B	0.44	1/3541 (0.0%)	0.69	2/4798 (0.0%)
1	C	0.40	0/3527	0.66	0/4780
1	D	0.41	0/3527	0.67	1/4780 (0.0%)
1	E	0.43	1/3532 (0.0%)	0.67	0/4787
1	F	0.41	0/3523	0.67	0/4776
1	G	0.43	0/3515	0.68	1/4768 (0.0%)
1	H	0.45	0/3527	0.71	3/4780 (0.1%)
All	All	0.42	2/28219 (0.0%)	0.68	9/38249 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	5
1	B	0	5
1	C	0	6
1	D	0	7
1	E	0	6
1	F	0	6
1	G	0	5
1	H	0	7
All	All	0	47

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	33	GLU	CD-OE2	5.46	1.31	1.25
1	B	102	GLU	CD-OE2	5.15	1.31	1.25

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	H	116	ARG	NE-CZ-NH2	-5.96	117.32	120.30
1	H	115	ARG	NE-CZ-NH2	-5.95	117.33	120.30
1	B	116	ARG	NE-CZ-NH2	-5.69	117.46	120.30
1	A	116	ARG	NE-CZ-NH2	-5.57	117.52	120.30
1	H	420	ARG	NE-CZ-NH2	-5.51	117.54	120.30
1	A	44	ARG	NE-CZ-NH1	5.42	123.01	120.30
1	D	16	ARG	NE-CZ-NH2	-5.34	117.63	120.30
1	G	115	ARG	NE-CZ-NH2	-5.26	117.67	120.30
1	B	115	ARG	NE-CZ-NH2	-5.20	117.70	120.30

There are no chirality outliers.

All (47) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	16	ARG	Sidechain
1	A	323	ARG	Sidechain
1	A	333	ARG	Sidechain
1	A	44	ARG	Sidechain
1	A	63	ARG	Sidechain
1	B	21	ARG	Sidechain
1	B	323	ARG	Sidechain
1	B	333	ARG	Sidechain
1	B	44	ARG	Sidechain
1	B	63	ARG	Sidechain
1	C	115	ARG	Sidechain
1	C	16	ARG	Sidechain
1	C	323	ARG	Sidechain
1	C	333	ARG	Sidechain
1	C	44	ARG	Sidechain
1	C	63	ARG	Sidechain
1	D	115	ARG	Sidechain
1	D	16	ARG	Sidechain
1	D	21	ARG	Sidechain
1	D	323	ARG	Sidechain
1	D	333	ARG	Sidechain
1	D	44	ARG	Sidechain
1	D	63	ARG	Sidechain
1	E	115	ARG	Sidechain
1	E	16	ARG	Sidechain
1	E	323	ARG	Sidechain
1	E	333	ARG	Sidechain

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Mol	Chain	Res	Type	Group
1	E	44	ARG	Sidechain
1	E	63	ARG	Sidechain
1	F	115	ARG	Sidechain
1	F	16	ARG	Sidechain
1	F	323	ARG	Sidechain
1	F	333	ARG	Sidechain
1	F	44	ARG	Sidechain
1	F	63	ARG	Sidechain
1	G	16	ARG	Sidechain
1	G	323	ARG	Sidechain
1	G	333	ARG	Sidechain
1	G	44	ARG	Sidechain
1	G	63	ARG	Sidechain
1	H	115	ARG	Sidechain
1	H	16	ARG	Sidechain
1	H	21	ARG	Sidechain
1	H	323	ARG	Sidechain
1	H	333	ARG	Sidechain
1	H	44	ARG	Sidechain
1	H	63	ARG	Sidechain

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	3436	0	3415	28	0
1	B	3450	0	3436	28	0
1	C	3436	0	3415	27	0
1	D	3436	0	3415	22	0
1	E	3441	0	3420	22	1
1	F	3432	0	3404	21	1
1	G	3424	0	3382	29	0
1	H	3436	0	3415	28	0
2	A	13	0	5	0	0
2	B	13	0	5	0	0
2	C	13	0	5	0	0
2	D	13	0	5	0	0
2	E	13	0	5	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	F	13	0	5	0	0
2	G	13	0	5	0	0
2	H	13	0	5	0	0
3	A	199	0	0	9	0
3	B	203	0	0	8	0
3	C	161	0	0	8	0
3	D	172	0	0	3	0
3	E	187	0	0	0	0
3	F	147	0	0	4	0
3	G	225	0	0	8	0
3	H	227	0	0	10	0
All	All	29116	0	27342	197	1

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.

All (197) 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:G:105:VAL:HB	3:G:779:HOH:O	1.33	1.27
3:A:697:HOH:O	1:E:14:GLN:HG3	1.38	1.23
1:B:187:TYR:CE2	3:B:602:HOH:O	2.01	1.12
1:B:187:TYR:HE2	3:B:602:HOH:O	1.34	1.06
1:H:78:LYS:HE3	3:H:729:HOH:O	1.62	0.97
1:D:63:ARG:HD3	3:D:601:HOH:O	1.68	0.93
1:H:63:ARG:HD3	3:H:795:HOH:O	1.70	0.91
1:B:14:GLN:HG3	3:B:788:HOH:O	1.70	0.90
1:H:317:TYR:HB3	3:H:620:HOH:O	1.73	0.86
1:G:187:TYR:CE2	3:G:636:HOH:O	2.27	0.86
1:G:187:TYR:HE2	3:G:636:HOH:O	1.59	0.84
1:H:102:GLU:OE2	3:H:601:HOH:O	2.01	0.79
1:G:116:ARG:HB3	3:G:617:HOH:O	1.89	0.72
1:H:325:THR:HG22	3:H:681:HOH:O	1.89	0.71
1:C:102:GLU:HG2	3:C:753:HOH:O	1.89	0.71
1:G:351:MET:HG3	3:G:684:HOH:O	1.92	0.68
1:B:436:LYS:HA	3:F:679:HOH:O	1.94	0.67
1:A:25:GLU:HG3	3:A:745:HOH:O	1.96	0.66
1:E:60[B]:GLU:CD	1:E:63:ARG:HH11	1.99	0.66
1:B:164:ASN:HB3	3:B:729:HOH:O	1.96	0.65
1:F:362:SER:HB2	3:F:735:HOH:O	1.98	0.64
1:C:276:GLN:HG3	3:C:750:HOH:O	1.98	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:60[B]:GLU:OE1	1:F:63:ARG:NH1	2.33	0.62
1:B:164:ASN:CB	3:B:729:HOH:O	2.47	0.62
1:H:328:ARG:CB	1:H:373:VAL:HG13	2.31	0.61
1:A:359:ILE:HG13	3:A:677:HOH:O	2.01	0.61
1:F:328:ARG:CB	1:F:373:VAL:HG13	2.31	0.60
1:E:328:ARG:CB	1:E:373:VAL:HG13	2.32	0.60
1:B:328:ARG:CB	1:B:373:VAL:HG13	2.32	0.60
1:A:328:ARG:CB	1:A:373:VAL:HG13	2.32	0.59
1:G:328:ARG:CB	1:G:373:VAL:HG13	2.32	0.59
1:E:33:GLU:HA	1:F:33:GLU:HA	1.85	0.59
1:D:328:ARG:CB	1:D:373:VAL:HG13	2.33	0.59
1:D:59:GLU:OE1	1:D:324:LYS:HE2	2.04	0.58
1:C:328:ARG:CB	1:C:373:VAL:HG13	2.33	0.57
1:C:33:GLU:HA	1:D:33:GLU:HA	1.87	0.57
1:A:60[B]:GLU:CD	1:A:63:ARG:HH11	2.10	0.55
1:G:60[B]:GLU:CD	1:G:63:ARG:HH11	2.10	0.55
1:C:298:GLU:HB2	3:C:733:HOH:O	2.06	0.55
1:F:362:SER:CB	3:F:735:HOH:O	2.56	0.54
1:H:355:VAL:HB	3:H:758:HOH:O	2.07	0.54
1:A:25:GLU:CG	3:A:745:HOH:O	2.54	0.54
1:H:59:GLU:OE1	1:H:324:LYS:HE2	2.08	0.53
1:G:59:GLU:OE1	1:G:324:LYS:HE2	2.07	0.53
1:B:60[B]:GLU:CD	1:B:63:ARG:HH11	2.12	0.53
1:A:59:GLU:OE1	1:A:324:LYS:HE2	2.09	0.53
1:E:59:GLU:OE1	1:E:324:LYS:HE2	2.09	0.53
1:A:24:LYS:HG2	3:A:745:HOH:O	2.08	0.53
1:B:59:GLU:OE1	1:B:324:LYS:HE2	2.08	0.52
1:F:59:GLU:OE1	1:F:324:LYS:HE3	2.09	0.52
1:G:300:LEU:HD22	1:G:351:MET:HE2	1.90	0.52
1:F:328:ARG:HB2	1:F:373:VAL:HG13	1.91	0.52
1:E:60[B]:GLU:CD	1:E:63:ARG:NH1	2.62	0.52
1:E:290:LEU:O	1:E:293:LYS:HG2	2.08	0.52
1:B:328:ARG:HB2	1:B:373:VAL:HG13	1.92	0.52
1:G:33:GLU:HA	1:H:33:GLU:HA	1.92	0.52
1:A:33:GLU:OE1	3:A:601:HOH:O	2.19	0.51
1:D:328:ARG:HB2	1:D:373:VAL:HG13	1.93	0.51
1:H:328:ARG:HB2	1:H:373:VAL:HG13	1.92	0.51
1:G:77:PRO:HG3	3:G:656:HOH:O	2.11	0.51
1:H:290:LEU:HD13	1:H:295:PRO:HG3	1.92	0.51
1:C:300:LEU:HD22	1:C:351:MET:HE2	1.93	0.51
1:A:296:THR:OG1	1:A:299:GLU:HG3	2.11	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:697:HOH:O	1:E:14:GLN:CG	2.20	0.51
1:E:60[B]:GLU:OE1	1:E:63:ARG:NH1	2.44	0.51
1:C:180:LYS:HE2	3:C:636:HOH:O	2.10	0.50
1:C:328:ARG:HB2	1:C:373:VAL:HG13	1.93	0.50
1:E:328:ARG:HB2	1:E:373:VAL:HG13	1.93	0.50
1:A:24:LYS:CG	3:A:745:HOH:O	2.58	0.50
1:G:328:ARG:HB2	1:G:373:VAL:HG13	1.93	0.50
1:A:290:LEU:HD13	1:A:295:PRO:HG3	1.94	0.50
1:A:328:ARG:HB2	1:A:373:VAL:HG13	1.93	0.50
1:F:300:LEU:HD22	1:F:351:MET:HE2	1.93	0.50
1:F:237:SER:HB2	3:F:618:HOH:O	2.10	0.50
1:C:296:THR:CG2	3:C:733:HOH:O	2.59	0.49
1:E:428:MET:SD	1:F:55:TYR:CE1	3.05	0.49
1:H:300:LEU:HD22	1:H:351:MET:HE2	1.95	0.49
1:B:115:ARG:O	1:B:180:LYS:NZ	2.46	0.49
1:E:115:ARG:O	1:E:180:LYS:NZ	2.46	0.49
1:F:290:LEU:HD13	1:F:295:PRO:HG3	1.93	0.49
1:E:300:LEU:HD22	1:E:351:MET:HE2	1.95	0.48
1:D:60[B]:GLU:CD	1:D:63:ARG:HH11	2.16	0.48
1:H:70:PRO:O	1:H:74:GLU:HB3	2.13	0.48
1:B:70:PRO:O	1:B:74:GLU:HB3	2.14	0.48
1:C:115:ARG:O	1:C:180:LYS:NZ	2.47	0.48
1:F:70:PRO:O	1:F:74:GLU:HB3	2.14	0.48
1:G:290:LEU:HD13	1:G:295:PRO:HG3	1.96	0.48
1:B:300:LEU:HD22	1:B:351:MET:HE2	1.95	0.48
1:A:115:ARG:O	1:A:180:LYS:NZ	2.46	0.47
1:D:300:LEU:HD22	1:D:351:MET:HE2	1.96	0.47
1:D:115:ARG:O	1:D:180:LYS:NZ	2.45	0.47
1:G:77:PRO:HG2	1:G:105:VAL:HG21	1.95	0.47
1:A:33:GLU:HA	1:B:33:GLU:HA	1.96	0.47
1:C:70:PRO:O	1:C:74:GLU:HB3	2.14	0.47
1:H:115:ARG:O	1:H:180:LYS:NZ	2.46	0.47
1:D:70:PRO:O	1:D:74:GLU:HB3	2.15	0.47
1:A:70:PRO:O	1:A:74:GLU:HB3	2.14	0.47
1:F:60[B]:GLU:CD	1:F:63:ARG:HH11	2.18	0.47
1:G:70:PRO:O	1:G:74:GLU:HB3	2.14	0.47
1:D:207:LEU:C	1:D:207:LEU:HD23	2.35	0.47
1:F:115:ARG:O	1:F:180:LYS:NZ	2.46	0.47
1:H:354:GLU:HB3	3:H:758:HOH:O	2.15	0.47
1:C:60[B]:GLU:OE2	1:C:68:THR:HG22	2.15	0.46
1:G:338:LYS:HE2	1:G:338:LYS:HB3	1.81	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:207:LEU:HD23	1:C:207:LEU:C	2.35	0.46
1:B:207:LEU:C	1:B:207:LEU:HD23	2.36	0.46
1:G:60[B]:GLU:CD	1:G:63:ARG:NH1	2.69	0.46
1:E:70:PRO:O	1:E:74:GLU:HB3	2.15	0.46
1:H:370:TRP:N	3:H:620:HOH:O	2.49	0.46
1:B:164:ASN:ND2	1:D:432:TRP:O	2.48	0.46
1:G:191:MET:HE1	3:G:636:HOH:O	2.16	0.46
1:G:115:ARG:O	1:G:180:LYS:NZ	2.47	0.46
1:D:436:LYS:CA	3:D:754:HOH:O	2.64	0.45
1:C:70:PRO:O	3:C:601:HOH:O	2.20	0.45
1:G:207:LEU:C	1:G:207:LEU:HD23	2.36	0.45
1:E:207:LEU:C	1:E:207:LEU:HD23	2.36	0.45
1:E:290:LEU:HD13	1:E:295:PRO:HG3	1.98	0.45
1:C:290:LEU:HD13	1:C:295:PRO:HG3	1.97	0.45
1:A:130:PRO:HB3	1:G:131:ARG:HG2	1.99	0.45
1:E:328:ARG:HB3	1:E:373:VAL:HG13	1.98	0.45
1:B:328:ARG:HB3	1:B:373:VAL:HG13	1.98	0.45
1:H:180:LYS:HE2	3:H:775:HOH:O	2.17	0.45
1:C:102:GLU:CG	3:C:753:HOH:O	2.57	0.44
1:F:207:LEU:C	1:F:207:LEU:HD23	2.37	0.44
1:H:328:ARG:HB3	1:H:373:VAL:HG13	1.98	0.44
1:F:328:ARG:HB3	1:F:373:VAL:HG13	1.98	0.44
1:A:300:LEU:HD22	1:A:351:MET:HE2	1.99	0.44
1:D:436:LYS:HA	3:D:754:HOH:O	2.18	0.44
1:C:219:LYS:HD3	3:C:728:HOH:O	2.16	0.44
1:B:290:LEU:HD13	1:B:295:PRO:HG3	1.99	0.44
1:D:290:LEU:HD13	1:D:295:PRO:HG3	1.99	0.44
1:H:207:LEU:C	1:H:207:LEU:HD23	2.38	0.44
1:A:207:LEU:C	1:A:207:LEU:HD23	2.37	0.44
1:B:219:LYS:HD3	3:B:744:HOH:O	2.18	0.44
1:A:328:ARG:HB3	1:A:373:VAL:HG13	2.00	0.43
1:C:338:LYS:HE2	1:C:338:LYS:HB3	1.80	0.43
1:A:180:LYS:HE2	3:A:715:HOH:O	2.19	0.43
1:F:290:LEU:HD13	1:F:295:PRO:CG	2.49	0.43
1:B:192:LYS:NZ	3:B:618:HOH:O	2.51	0.43
1:D:338:LYS:HE2	1:D:338:LYS:HB3	1.80	0.43
1:G:357:PRO:HB2	1:G:358:PRO:HD3	2.00	0.43
1:G:328:ARG:HB3	1:G:373:VAL:HG13	1.99	0.43
1:A:280:LYS:HA	1:A:283:GLN:HE21	1.84	0.43
1:D:328:ARG:HB3	1:D:373:VAL:HG13	2.00	0.43
1:E:357:PRO:HB2	1:E:358:PRO:HD3	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:293:LYS:HE3	1:D:293:LYS:HA	2.01	0.43
1:F:280:LYS:HA	1:F:283:GLN:HE21	1.84	0.43
1:D:357:PRO:HB2	1:D:358:PRO:HD3	2.01	0.42
1:B:114:LYS:CD	3:B:797:HOH:O	2.67	0.42
1:G:16:ARG:NH2	3:G:620:HOH:O	2.52	0.42
1:H:280:LYS:HA	1:H:283:GLN:HE21	1.85	0.42
1:A:290:LEU:HD13	1:A:295:PRO:CG	2.49	0.42
1:B:163:LYS:HZ1	1:D:431:LYS:HE3	1.84	0.42
1:C:357:PRO:HB2	1:C:358:PRO:HD3	2.01	0.42
1:E:290:LEU:HD13	1:E:295:PRO:CG	2.50	0.42
1:B:280:LYS:HA	1:B:283:GLN:HE21	1.85	0.42
1:A:357:PRO:HB2	1:A:358:PRO:HD3	2.01	0.42
1:C:328:ARG:HB3	1:C:373:VAL:HG13	2.00	0.42
1:F:269:PRO:HA	1:F:273:LEU:HD22	2.02	0.42
1:H:180:LYS:CE	3:H:775:HOH:O	2.68	0.41
1:H:290:LEU:HD13	1:H:295:PRO:CG	2.49	0.41
1:B:60[B]:GLU:CD	1:B:63:ARG:NH1	2.72	0.41
1:B:357:PRO:HB2	1:B:358:PRO:HD3	2.01	0.41
1:C:289:LYS:HG2	1:C:303:PHE:CE1	2.55	0.41
1:H:338:LYS:HB3	1:H:338:LYS:HE2	1.82	0.41
1:C:290:LEU:HD13	1:C:295:PRO:CG	2.50	0.41
1:E:322:LEU:O	1:E:368:ASP:HB2	2.21	0.41
1:F:289:LYS:O	1:F:290:LEU:HD23	2.20	0.41
1:H:269:PRO:HA	1:H:273:LEU:HD22	2.02	0.41
1:H:322:LEU:O	1:H:368:ASP:HB2	2.20	0.41
1:H:293:LYS:HE3	1:H:293:LYS:HA	2.02	0.41
1:A:289:LYS:O	1:A:290:LEU:HD23	2.21	0.41
1:D:322:LEU:O	1:D:368:ASP:HB2	2.21	0.41
1:E:280:LYS:HA	1:E:283:GLN:HE21	1.86	0.41
1:A:60[B]:GLU:CD	1:A:63:ARG:NH1	2.74	0.41
1:C:280:LYS:HA	1:C:283:GLN:HE21	1.85	0.41
1:G:269:PRO:HA	1:G:273:LEU:HD22	2.03	0.41
1:D:280:LYS:HA	1:D:283:GLN:HE21	1.85	0.41
1:F:357:PRO:HB2	1:F:358:PRO:HD3	2.03	0.41
1:G:290:LEU:HD13	1:G:295:PRO:CG	2.49	0.41
1:G:322:LEU:O	1:G:368:ASP:HB2	2.20	0.41
1:H:357:PRO:HB2	1:H:358:PRO:HD3	2.03	0.41
1:B:290:LEU:HD13	1:B:295:PRO:CG	2.51	0.41
1:C:59:GLU:OE1	1:C:324:LYS:HE3	2.21	0.41
1:D:290:LEU:HD13	1:D:295:PRO:CG	2.51	0.41
1:G:289:LYS:O	1:G:290:LEU:HD23	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:294:VAL:HG23	1:G:294:VAL:O	2.21	0.41
1:A:269:PRO:HA	1:A:273:LEU:HD22	2.03	0.40
1:A:293:LYS:HE3	1:A:293:LYS:HA	2.01	0.40
1:E:289:LYS:O	1:E:290:LEU:HD23	2.21	0.40
1:A:289:LYS:HG2	1:A:303:PHE:CE1	2.57	0.40
1:B:289:LYS:O	1:B:290:LEU:HD23	2.21	0.40
1:B:322:LEU:O	1:B:368:ASP:HB2	2.21	0.40
1:C:293:LYS:HE3	1:C:293:LYS:HA	2.03	0.40
1:H:278:VAL:HG11	1:H:375:ALA:HA	2.02	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:81:GLY:N	1:F:102:GLU:OE2[1_554]	2.16	0.04

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	434/438 (99%)	428 (99%)	5 (1%)	1 (0%)	44	52
1	B	436/438 (100%)	429 (98%)	6 (1%)	1 (0%)	44	52
1	C	434/438 (99%)	428 (99%)	5 (1%)	1 (0%)	44	52
1	D	434/438 (99%)	428 (99%)	5 (1%)	1 (0%)	44	52
1	E	435/438 (99%)	429 (99%)	5 (1%)	1 (0%)	44	52
1	F	434/438 (99%)	428 (99%)	5 (1%)	1 (0%)	44	52
1	G	434/438 (99%)	427 (98%)	6 (1%)	1 (0%)	44	52
1	H	434/438 (99%)	428 (99%)	5 (1%)	1 (0%)	44	52
All	All	3475/3504 (99%)	3425 (99%)	42 (1%)	8 (0%)	44	52

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	236	GLU
1	B	236	GLU
1	C	236	GLU
1	E	236	GLU
1	F	236	GLU
1	H	236	GLU
1	D	236	GLU
1	G	236	GLU

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	363/366 (99%)	351 (97%)	12 (3%)	33	44
1	B	364/366 (100%)	349 (96%)	15 (4%)	26	34
1	C	363/366 (99%)	351 (97%)	12 (3%)	33	44
1	D	363/366 (99%)	349 (96%)	14 (4%)	27	37
1	E	363/366 (99%)	349 (96%)	14 (4%)	27	37
1	F	362/366 (99%)	351 (97%)	11 (3%)	36	48
1	G	360/366 (98%)	346 (96%)	14 (4%)	27	37
1	H	363/366 (99%)	348 (96%)	15 (4%)	26	34
All	All	2901/2928 (99%)	2794 (96%)	107 (4%)	29	39

All (107) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	219	LYS
1	A	235	HIS
1	A	288	LYS
1	A	293	LYS
1	A	323	ARG
1	A	355	VAL

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Mol	Chain	Res	Type
1	A	361	SER
1	A	365	LYS
1	A	373	VAL
1	A	396	PHE
1	A	420	ARG
1	A	431	LYS
1	B	103	LYS
1	B	219	LYS
1	B	235	HIS
1	B	288	LYS
1	B	293	LYS
1	B	296	THR
1	B	323	ARG
1	B	355	VAL
1	B	361	SER
1	B	365	LYS
1	B	373	VAL
1	B	396	PHE
1	B	420	ARG
1	B	431	LYS
1	B	432	TRP
1	C	219	LYS
1	C	235	HIS
1	C	288	LYS
1	C	293	LYS
1	C	296	THR
1	C	323	ARG
1	C	355	VAL
1	C	361	SER
1	C	373	VAL
1	C	396	PHE
1	C	420	ARG
1	C	431	LYS
1	D	103	LYS
1	D	219	LYS
1	D	235	HIS
1	D	288	LYS
1	D	293	LYS
1	D	296	THR
1	D	323	ARG
1	D	355	VAL
1	D	361	SER

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Mol	Chain	Res	Type
1	D	365	LYS
1	D	373	VAL
1	D	396	PHE
1	D	420	ARG
1	D	431	LYS
1	E	44	ARG
1	E	103	LYS
1	E	219	LYS
1	E	235	HIS
1	E	288	LYS
1	E	296	THR
1	E	323	ARG
1	E	355	VAL
1	E	361	SER
1	E	365	LYS
1	E	373	VAL
1	E	396	PHE
1	E	420	ARG
1	E	431	LYS
1	F	103	LYS
1	F	219	LYS
1	F	235	HIS
1	F	296	THR
1	F	323	ARG
1	F	355	VAL
1	F	361	SER
1	F	373	VAL
1	F	396	PHE
1	F	420	ARG
1	F	431	LYS
1	G	103	LYS
1	G	219	LYS
1	G	235	HIS
1	G	296	THR
1	G	323	ARG
1	G	355	VAL
1	G	361	SER
1	G	365	LYS
1	G	373	VAL
1	G	396	PHE
1	G	420	ARG
1	G	423	SER

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Mol	Chain	Res	Type
1	G	431	LYS
1	G	435	ILE
1	H	103	LYS
1	H	219	LYS
1	H	235	HIS
1	H	288	LYS
1	H	289	LYS
1	H	293	LYS
1	H	296	THR
1	H	323	ARG
1	H	355	VAL
1	H	361	SER
1	H	365	LYS
1	H	373	VAL
1	H	396	PHE
1	H	420	ARG
1	H	431	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	283	GLN
1	A	347	GLN
1	A	407	ASN
1	B	283	GLN
1	B	347	GLN
1	B	407	ASN
1	C	283	GLN
1	C	347	GLN
1	C	407	ASN
1	D	283	GLN
1	D	347	GLN
1	D	407	ASN
1	E	283	GLN
1	E	347	GLN
1	E	407	ASN
1	F	283	GLN
1	F	347	GLN
1	F	407	ASN
1	G	283	GLN
1	G	347	GLN
1	G	407	ASN

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Mol	Chain	Res	Type
1	H	283	GLN
1	H	347	GLN
1	H	407	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

8 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
2	CIT	A	501	-	12,12,12	1.08	0	17,17,17	1.25	2 (11%)
2	CIT	G	501	-	12,12,12	1.18	0	17,17,17	1.74	2 (11%)
2	CIT	C	501	-	12,12,12	1.31	1 (8%)	17,17,17	1.35	3 (17%)
2	CIT	F	501	-	12,12,12	1.30	1 (8%)	17,17,17	1.32	2 (11%)
2	CIT	E	501	-	12,12,12	1.14	1 (8%)	17,17,17	1.67	3 (17%)
2	CIT	H	501	-	12,12,12	1.34	1 (8%)	17,17,17	1.39	2 (11%)
2	CIT	D	501	-	12,12,12	1.31	2 (16%)	17,17,17	1.52	3 (17%)
2	CIT	B	501	-	12,12,12	1.23	1 (8%)	17,17,17	1.51	3 (17%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	CIT	A	501	-	-	9/16/16/16	-
2	CIT	G	501	-	-	6/16/16/16	-
2	CIT	C	501	-	-	8/16/16/16	-
2	CIT	F	501	-	-	7/16/16/16	-
2	CIT	E	501	-	-	5/16/16/16	-
2	CIT	H	501	-	-	8/16/16/16	-
2	CIT	D	501	-	-	5/16/16/16	-
2	CIT	B	501	-	-	5/16/16/16	-

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	501	CIT	C3-C6	2.73	1.56	1.53
2	H	501	CIT	C3-C6	2.55	1.56	1.53
2	C	501	CIT	C3-C6	2.53	1.56	1.53
2	E	501	CIT	C3-C6	2.16	1.55	1.53
2	B	501	CIT	O6-C6	-2.15	1.22	1.30
2	D	501	CIT	C3-C6	2.03	1.55	1.53
2	D	501	CIT	O5-C6	2.02	1.28	1.22

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	G	501	CIT	O5-C6-C3	-5.09	115.05	122.25
2	E	501	CIT	O5-C6-C3	-4.26	116.22	122.25
2	D	501	CIT	O5-C6-C3	-4.14	116.39	122.25
2	B	501	CIT	O5-C6-C3	-3.66	117.07	122.25
2	H	501	CIT	O5-C6-C3	-3.43	117.40	122.25
2	G	501	CIT	O6-C6-C3	3.40	118.95	113.05
2	E	501	CIT	O6-C6-C3	3.01	118.27	113.05
2	F	501	CIT	O5-C6-C3	-2.84	118.23	122.25
2	C	501	CIT	O5-C6-C3	-2.57	118.61	122.25
2	H	501	CIT	O6-C6-C3	2.52	117.43	113.05
2	A	501	CIT	O5-C6-C3	-2.40	118.85	122.25
2	B	501	CIT	C3-C4-C5	2.34	119.48	113.81
2	D	501	CIT	O6-C6-C3	2.34	117.11	113.05
2	C	501	CIT	C3-C4-C5	2.31	119.42	113.81

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	501	CIT	O3-C5-C4	-2.29	116.26	122.94
2	C	501	CIT	O3-C5-C4	-2.25	116.36	122.94
2	F	501	CIT	O3-C5-C4	-2.13	116.71	122.94
2	E	501	CIT	C3-C4-C5	2.09	118.87	113.81
2	D	501	CIT	O1-C1-C2	-2.08	116.87	122.94
2	B	501	CIT	O6-C6-C3	2.02	116.55	113.05

There are no chirality outliers.

All (53) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	CIT	O7-C3-C6-O5
2	A	501	CIT	O7-C3-C6-O6
2	A	501	CIT	C4-C3-C6-O5
2	A	501	CIT	C4-C3-C6-O6
2	C	501	CIT	O7-C3-C6-O5
2	C	501	CIT	O7-C3-C6-O6
2	C	501	CIT	C4-C3-C6-O5
2	C	501	CIT	C4-C3-C6-O6
2	F	501	CIT	O7-C3-C6-O5
2	F	501	CIT	O7-C3-C6-O6
2	F	501	CIT	C4-C3-C6-O5
2	F	501	CIT	C4-C3-C6-O6
2	H	501	CIT	O7-C3-C6-O5
2	H	501	CIT	O7-C3-C6-O6
2	H	501	CIT	C4-C3-C6-O5
2	H	501	CIT	C4-C3-C6-O6
2	B	501	CIT	C4-C3-C6-O5
2	E	501	CIT	C4-C3-C6-O6
2	G	501	CIT	C4-C3-C6-O6
2	C	501	CIT	C1-C2-C3-C4
2	H	501	CIT	C3-C4-C5-O3
2	C	501	CIT	C3-C4-C5-O4
2	A	501	CIT	C1-C2-C3-C4
2	H	501	CIT	C1-C2-C3-C4
2	H	501	CIT	C3-C4-C5-O4
2	B	501	CIT	C4-C3-C6-O6
2	D	501	CIT	C4-C3-C6-O5
2	D	501	CIT	C4-C3-C6-O6
2	A	501	CIT	C3-C4-C5-O3
2	C	501	CIT	C3-C4-C5-O3
2	B	501	CIT	C1-C2-C3-C4

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Mol	Chain	Res	Type	Atoms
2	E	501	CIT	C1-C2-C3-C4
2	F	501	CIT	C1-C2-C3-C4
2	G	501	CIT	C1-C2-C3-C4
2	A	501	CIT	C3-C4-C5-O4
2	E	501	CIT	C4-C3-C6-O5
2	G	501	CIT	C2-C3-C6-O6
2	F	501	CIT	C3-C4-C5-O4
2	F	501	CIT	C3-C4-C5-O3
2	A	501	CIT	C2-C3-C6-O6
2	B	501	CIT	C2-C3-C6-O5
2	D	501	CIT	C2-C3-C6-O6
2	E	501	CIT	C2-C3-C6-O5
2	E	501	CIT	C2-C3-C6-O6
2	G	501	CIT	C2-C3-C6-O5
2	G	501	CIT	C4-C3-C6-O5
2	D	501	CIT	C1-C2-C3-C4
2	B	501	CIT	C2-C3-C6-O6
2	D	501	CIT	C2-C3-C6-O5
2	A	501	CIT	C1-C2-C3-C6
2	C	501	CIT	C1-C2-C3-C6
2	G	501	CIT	C1-C2-C3-C6
2	H	501	CIT	C1-C2-C3-C6

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.
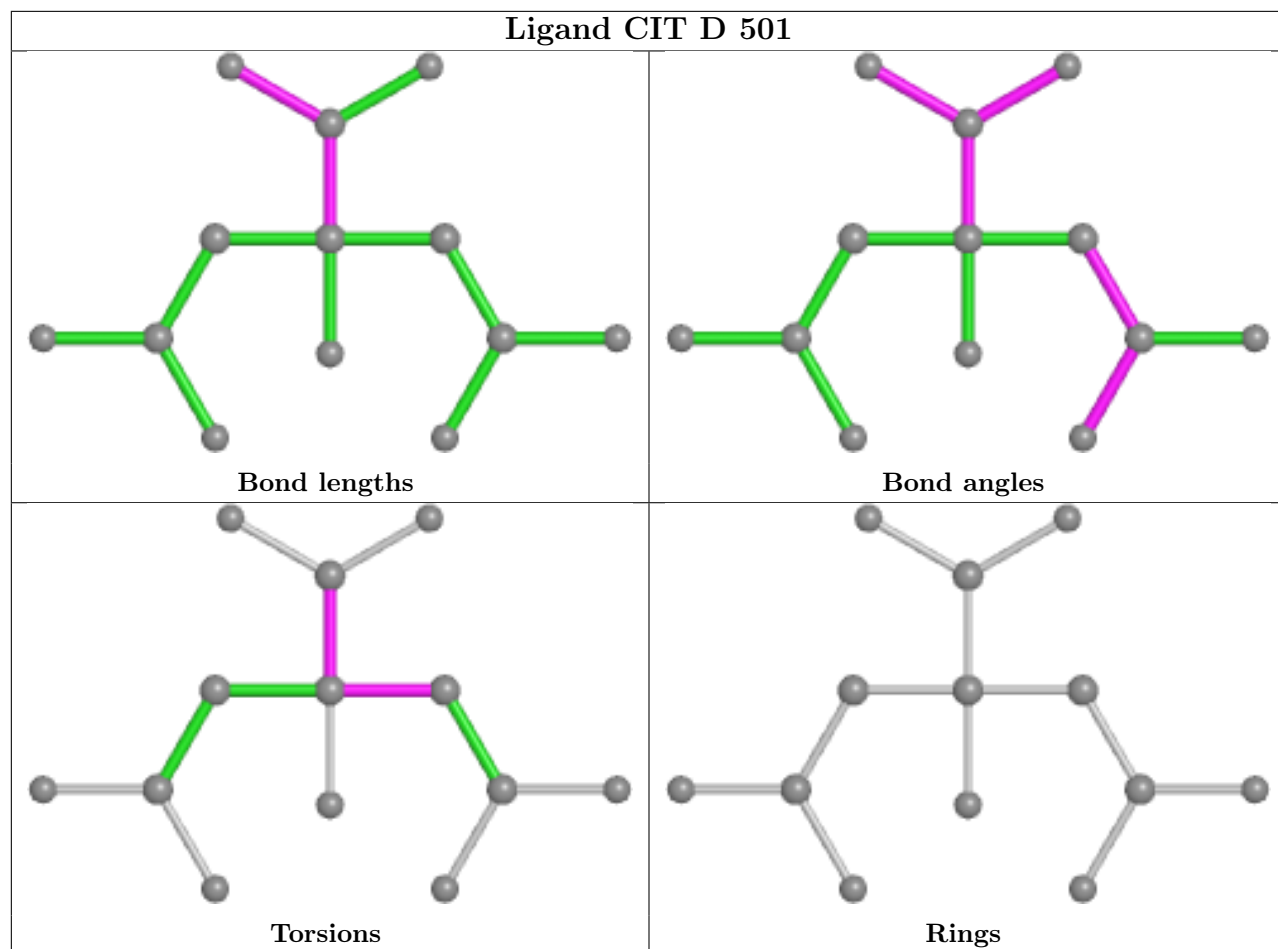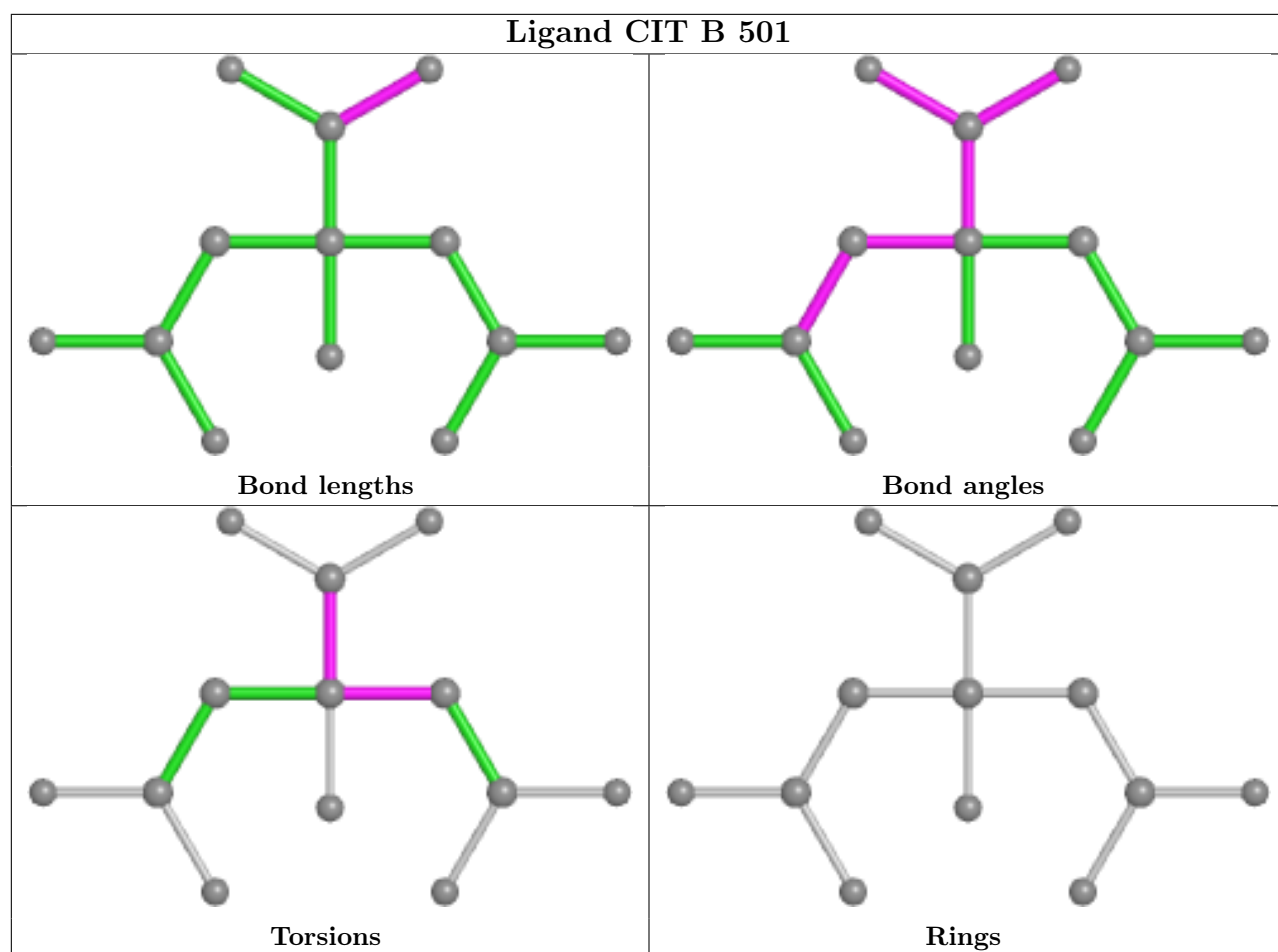
Ligand CIT A 501

Bond lengths

Bond angles

Torsions

Rings

Ligand CIT G 501

Bond lengths

Bond angles

Torsions

Rings

Ligand CIT C 501

Bond lengths

Bond angles

Torsions

Rings

Full wwPDB X-ray Structure Validation Report

Ligand CIT F 501

Bond lengths

Bond angles

Torsions

Rings

Ligand CIT E 501

Bond lengths

Bond angles

Torsions

Rings

Ligand CIT H 501

Bond lengths

Bond angles

Torsions

Rings

Ligand CIT D 501

Bond lengths

Bond angles

Torsions

Rings

Ligand CIT B 501

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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	435/438 (99%)	-0.21	2 (0%)	87	85	18, 33, 81, 100	1 (0%)
1	B	437/438 (99%)	-0.18	9 (2%)	63	59	17, 31, 85, 117	1 (0%)
1	C	435/438 (99%)	-0.11	4 (0%)	81	78	19, 38, 80, 115	1 (0%)
1	D	435/438 (99%)	-0.08	13 (2%)	52	49	21, 36, 87, 118	1 (0%)
1	E	436/438 (99%)	-0.14	8 (1%)	67	64	17, 33, 85, 117	1 (0%)
1	F	435/438 (99%)	0.26	46 (10%)	13	10	16, 36, 115, 148	1 (0%)
1	G	435/438 (99%)	-0.23	3 (0%)	84	82	17, 30, 86, 108	1 (0%)
1	H	435/438 (99%)	0.03	41 (9%)	15	13	16, 30, 95, 113	1 (0%)
All	All	3483/3504 (99%)	-0.08	126 (3%)	46	43	16, 33, 90, 148	8 (0%)

All (126) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	355	VAL	5.3
1	F	366	VAL	4.8
1	F	300	LEU	4.6
1	F	360	LEU	4.5
1	H	360	LEU	4.4
1	E	437	ALA	4.4
1	H	313	VAL	4.1
1	H	316	GLY	4.0
1	F	370	TRP	4.0
1	H	314	ILE	4.0
1	H	318	GLY	4.0
1	H	366	VAL	3.9
1	F	359	ILE	3.9
1	F	356	VAL	3.9
1	F	314	ILE	3.8
1	C	366	VAL	3.8

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Mol	Chain	Res	Type	RSRZ
1	H	296	THR	3.7
1	H	357	PRO	3.7
1	D	300	LEU	3.7
1	B	438	ALA	3.7
1	H	304	VAL	3.6
1	F	303	PHE	3.6
1	F	369	PRO	3.5
1	H	355	VAL	3.5
1	E	432	TRP	3.5
1	F	371	PRO	3.4
1	H	363	LEU	3.4
1	F	358	PRO	3.4
1	H	321	VAL	3.3
1	F	325	THR	3.3
1	H	308	LEU	3.3
1	F	313	VAL	3.3
1	H	359	ILE	3.2
1	F	353	TYR	3.2
1	B	437	ALA	3.2
1	C	102	GLU	3.2
1	F	307	THR	3.1
1	F	296	THR	3.1
1	F	304	VAL	3.1
1	H	300	LEU	3.1
1	F	311	GLY	3.1
1	H	56	LEU	3.1
1	F	58	PRO	3.0
1	H	303	PHE	3.0
1	E	300	LEU	3.0
1	F	316	GLY	2.9
1	F	308	LEU	2.9
1	H	294	VAL	2.9
1	F	321	VAL	2.8
1	H	353	TYR	2.8
1	D	432	TRP	2.8
1	E	290	LEU	2.8
1	F	351	MET	2.8
1	F	357	PRO	2.8
1	B	313	VAL	2.8
1	D	296	THR	2.7
1	D	102	GLU	2.7
1	H	370	TRP	2.7

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Mol	Chain	Res	Type	RSRZ
1	D	435	ILE	2.7
1	G	300	LEU	2.7
1	H	356	VAL	2.7
1	F	298	GLU	2.7
1	H	371	PRO	2.6
1	F	352	LEU	2.6
1	H	297	LYS	2.6
1	A	366	VAL	2.6
1	E	294	VAL	2.6
1	D	304	VAL	2.6
1	F	301	LYS	2.6
1	H	315	PRO	2.6
1	F	309	SER	2.5
1	F	294	VAL	2.5
1	F	329	TYR	2.5
1	D	303	PHE	2.5
1	F	290	LEU	2.5
1	F	322	LEU	2.5
1	F	337	LEU	2.5
1	H	311	GLY	2.5
1	B	294	VAL	2.5
1	H	352	LEU	2.5
1	C	294	VAL	2.5
1	H	307	THR	2.5
1	F	61	GLY	2.4
1	F	56	LEU	2.4
1	H	325	THR	2.4
1	B	355	VAL	2.4
1	H	369	PRO	2.4
1	F	310	SER	2.4
1	F	57	ASP	2.4
1	F	349	VAL	2.4
1	C	303	PHE	2.4
1	E	364	GLY	2.4
1	G	294	VAL	2.3
1	D	106	LYS	2.3
1	D	308	LEU	2.3
1	H	57	ASP	2.3
1	H	364	GLY	2.3
1	H	301	LYS	2.3
1	H	322	LEU	2.3
1	F	295	PRO	2.2

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Mol	Chain	Res	Type	RSRZ
1	F	318	GLY	2.2
1	A	360	LEU	2.2
1	H	290	LEU	2.2
1	H	358	PRO	2.2
1	D	294	VAL	2.2
1	H	348	VAL	2.2
1	B	300	LEU	2.2
1	D	290	LEU	2.2
1	B	297	LYS	2.2
1	F	365	LYS	2.2
1	F	315	PRO	2.2
1	H	295	PRO	2.2
1	D	355	VAL	2.1
1	F	60[A]	GLU	2.1
1	B	303	PHE	2.1
1	H	329	TYR	2.1
1	H	349	VAL	2.1
1	E	435	ILE	2.1
1	F	286	ILE	2.1
1	F	346	PHE	2.1
1	G	290	LEU	2.1
1	H	362	SER	2.1
1	B	291	GLY	2.1
1	E	363	LEU	2.1
1	H	60[A]	GLU	2.0
1	D	313	VAL	2.0

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
2	CIT	F	501	13/13	0.91	0.09	35,44,59,67	0
2	CIT	D	501	13/13	0.94	0.06	27,33,38,39	0
2	CIT	C	501	13/13	0.95	0.06	28,36,43,44	0
2	CIT	H	501	13/13	0.95	0.06	24,35,45,55	0
2	CIT	E	501	13/13	0.96	0.05	26,30,38,42	0
2	CIT	A	501	13/13	0.96	0.05	26,31,38,39	0
2	CIT	G	501	13/13	0.96	0.06	24,27,33,38	0
2	CIT	B	501	13/13	0.96	0.06	25,31,37,45	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.
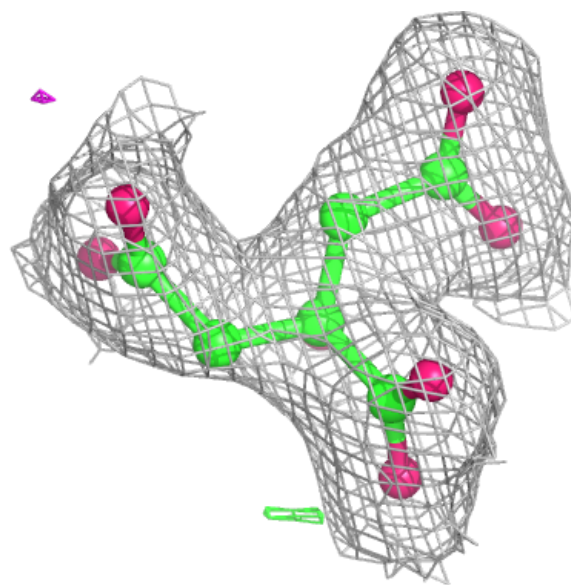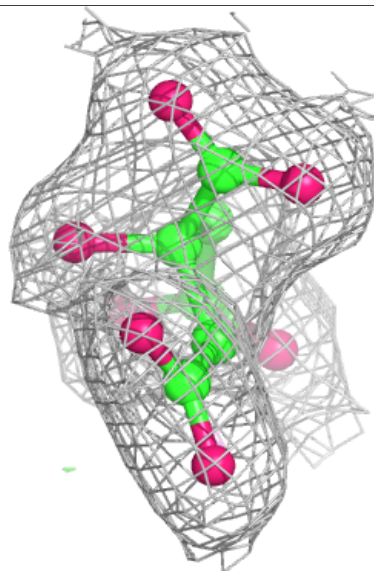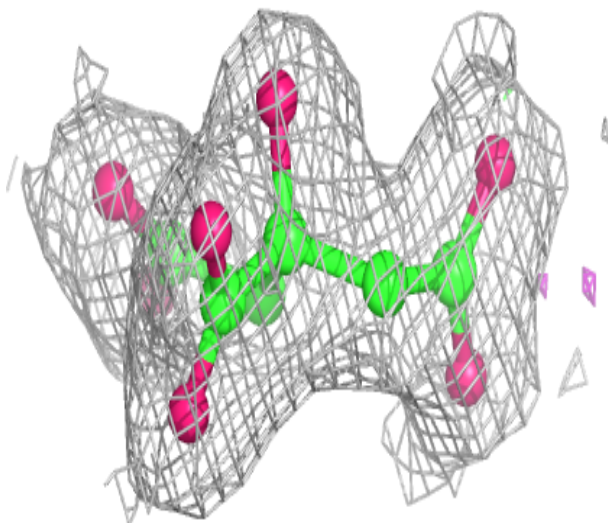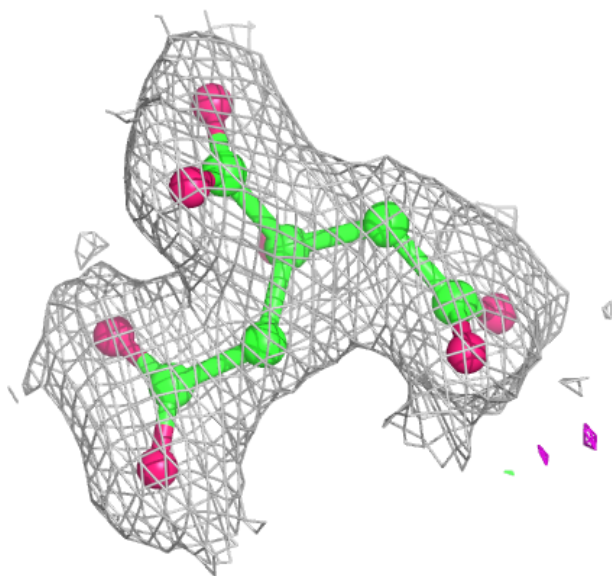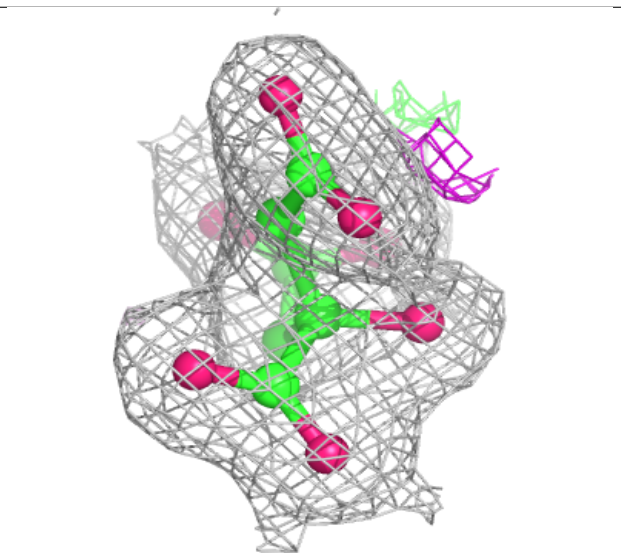
Electron density around CIT F 501:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
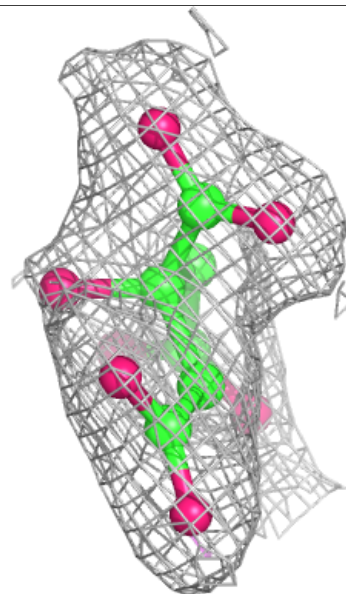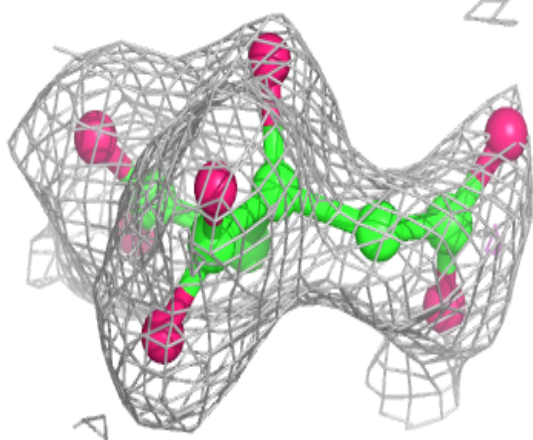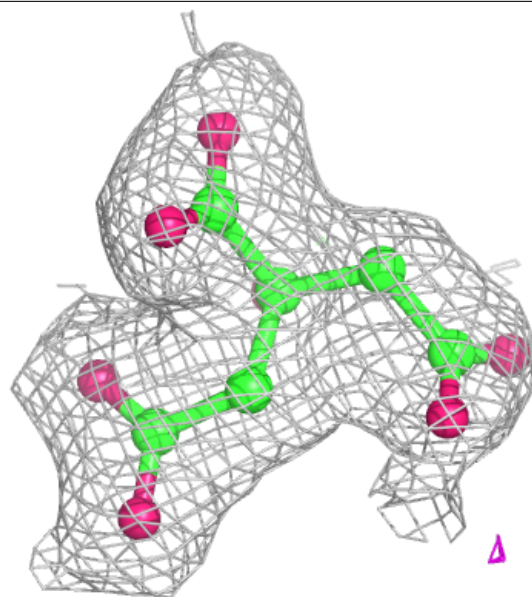
Electron density around CIT D 501:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
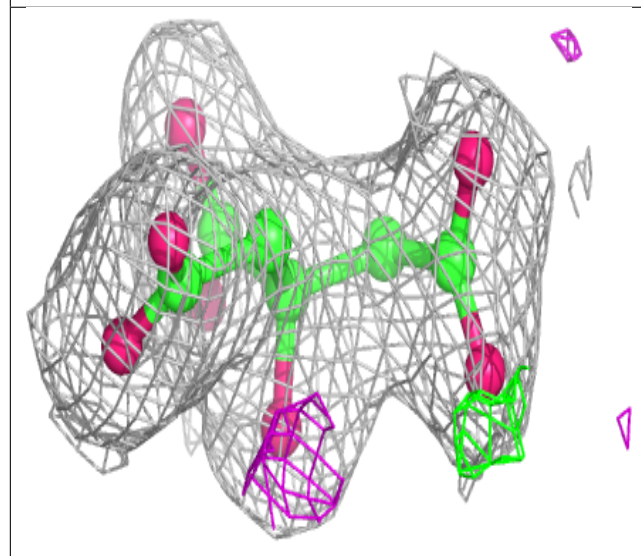and green (positive)
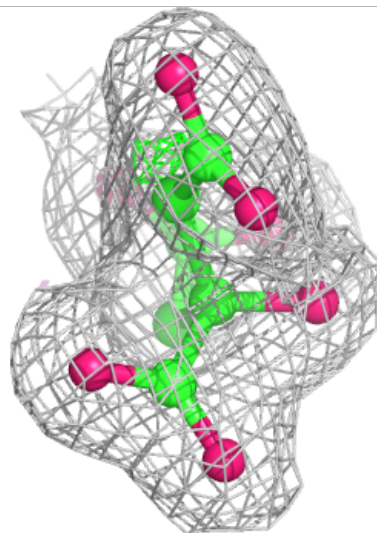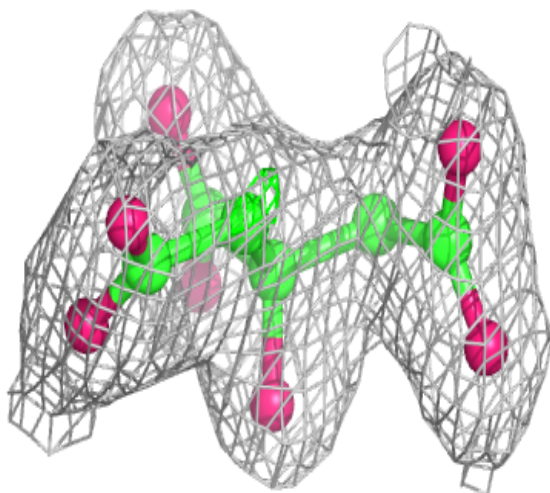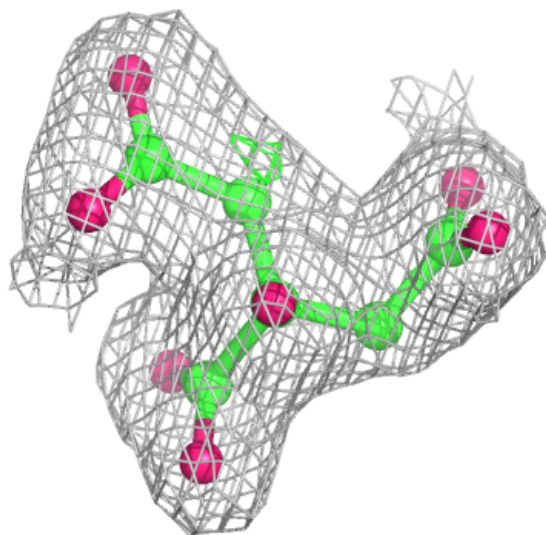
Electron density around CIT C 501:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
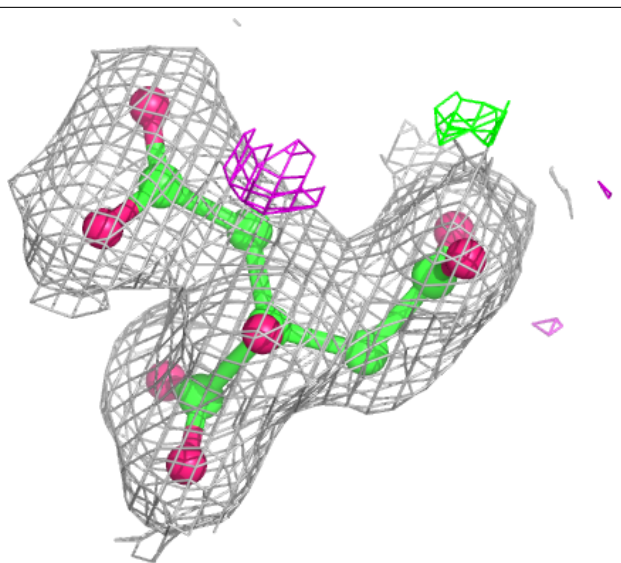and green (positive)
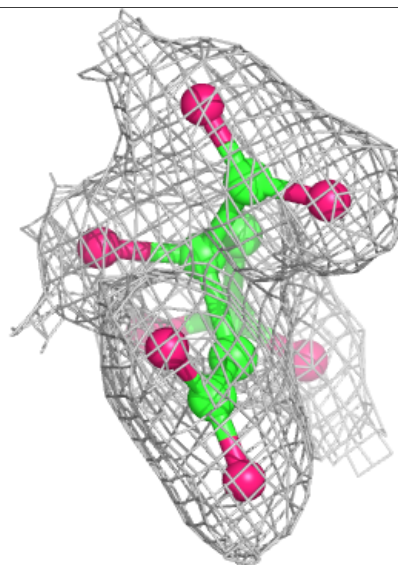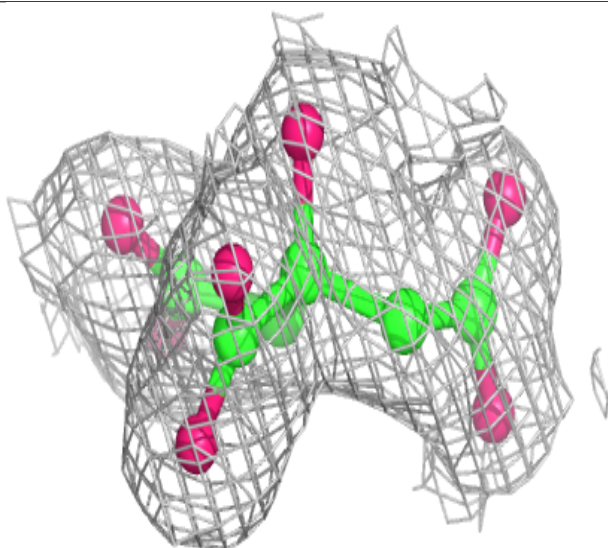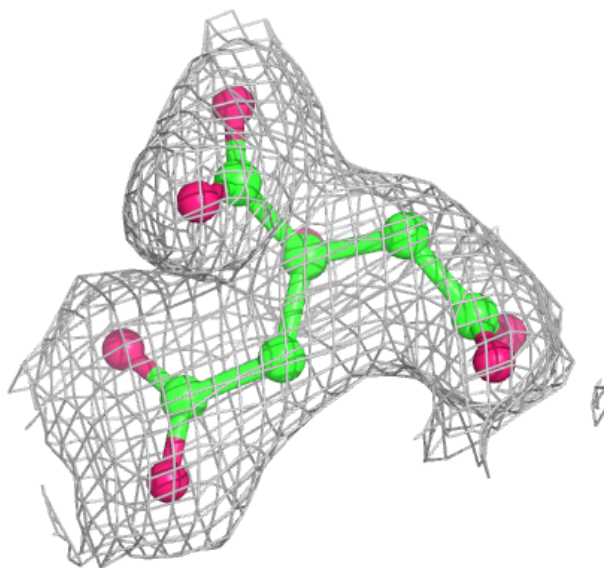
Electron density around CIT H 501:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
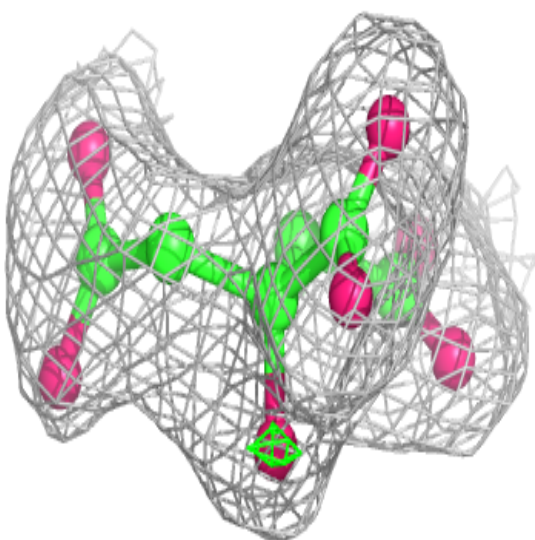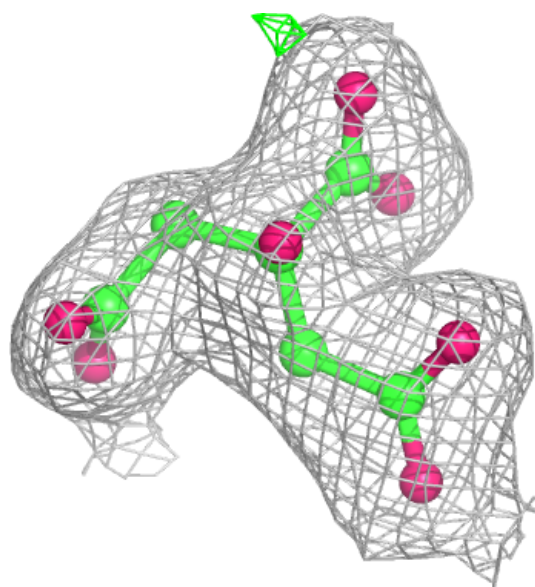
Electron density around CIT E 501:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
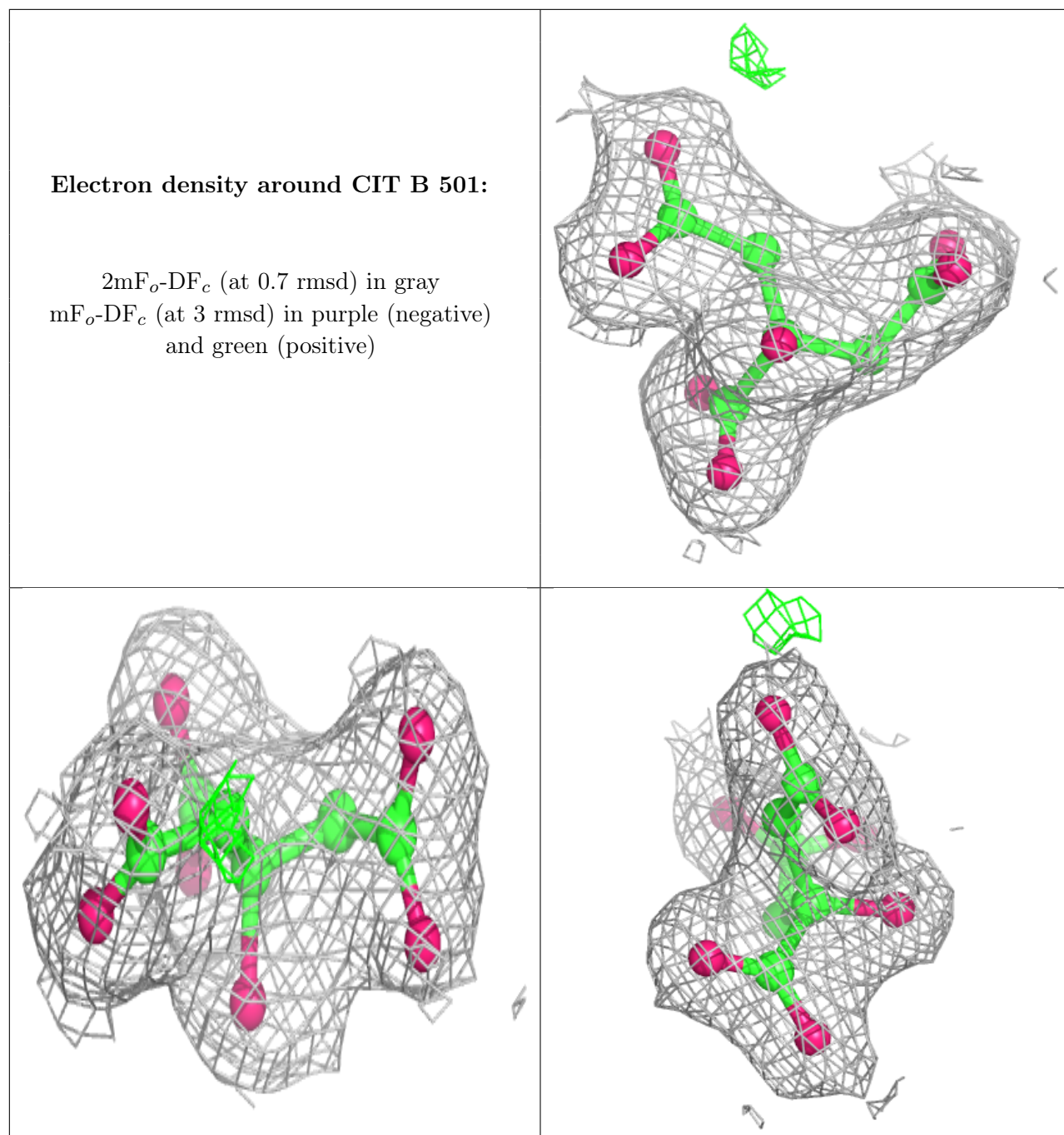and green (positive)
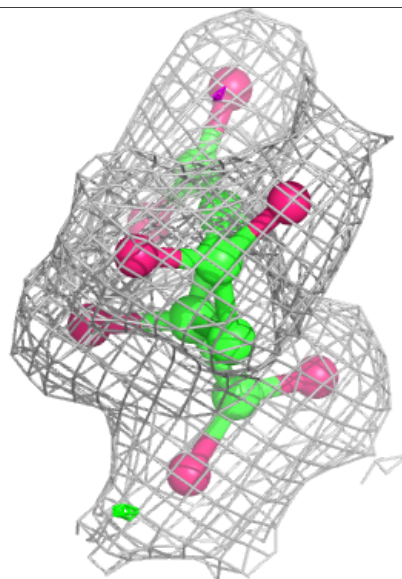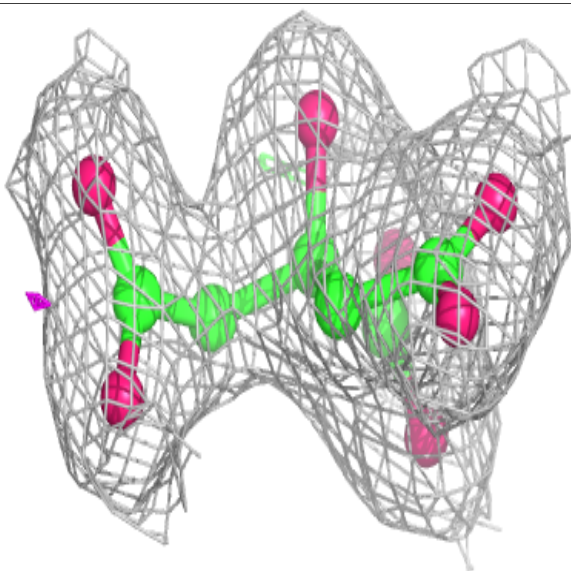
Electron density around CIT A 501:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around CIT G 501:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around CIT B 501:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

6.5 Other polymers ⓘ

There are no such residues in this entry.