Full wwPDB X-ray Structure Validation Report ⓘ

Jan 13, 2025 – 06:10 PM JST

PDB ID	:	8XXF
Title	:	TtCS, oxaloacetate, acetyl-CoA complex
Authors	:	Yang, L.; Fang, Y.J.
Deposited on	:	2024-01-18
Resolution	:	2.33 Å(reported)

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

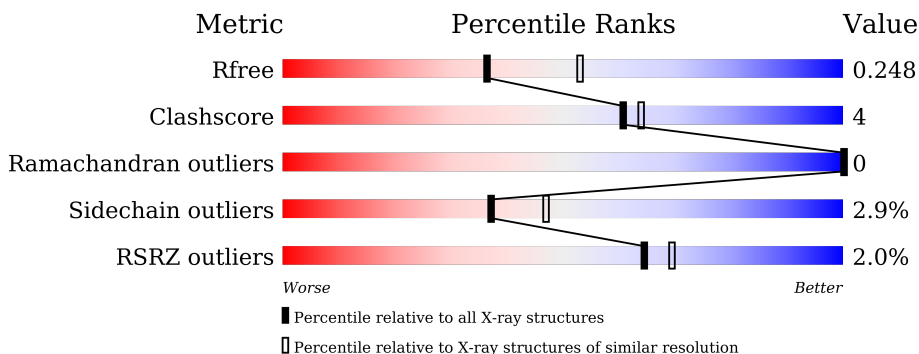|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.21
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	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 2.33 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	Percentile Ranks	Value
Rfree		0.248
Clashscore		4
Ramachandran outliers		0
Sidechain outliers		2.9%
RSRZ outliers		2.0%

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	2747 (2.36-2.32)
Clashscore	180529	2936 (2.36-2.32)
Ramachandran outliers	177936	2912 (2.36-2.32)
Sidechain outliers	177891	2912 (2.36-2.32)
RSRZ outliers	164620	2747 (2.36-2.32)

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	449	7% / 84% / 12% ·
1	B	449	% / 90% / 9% ·
1	C	449	3% / 87% / 10% ··
1	D	449	89% / 8% ·
1	E	449	% / 88% / 9% ·
1	F	449	84% / 12% ··

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 22326 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 3502	C 2254	N 599	O 628	S 21	0	0	0
1	B	449	Total 3592	C 2309	N 616	O 646	S 21	0	0	0
1	C	442	Total 3537	C 2274	N 605	O 637	S 21	0	0	0
1	D	440	Total 3545	C 2280	N 610	O 634	S 21	0	1	0
1	E	441	Total 3531	C 2271	N 604	O 635	S 21	0	0	0
1	F	441	Total 3541	C 2277	N 608	O 635	S 21	0	0	0

There are 42 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	443	LYS	-	expression tag	UNP A0A0S3QTD0
A	444	LEU	-	expression tag	UNP A0A0S3QTD0
A	445	ALA	-	expression tag	UNP A0A0S3QTD0
A	446	ALA	-	expression tag	UNP A0A0S3QTD0
A	447	ALA	-	expression tag	UNP A0A0S3QTD0
A	448	LEU	-	expression tag	UNP A0A0S3QTD0
A	449	GLU	-	expression tag	UNP A0A0S3QTD0
B	443	LYS	-	expression tag	UNP A0A0S3QTD0
B	444	LEU	-	expression tag	UNP A0A0S3QTD0
B	445	ALA	-	expression tag	UNP A0A0S3QTD0
B	446	ALA	-	expression tag	UNP A0A0S3QTD0
B	447	ALA	-	expression tag	UNP A0A0S3QTD0
B	448	LEU	-	expression tag	UNP A0A0S3QTD0
B	449	GLU	-	expression tag	UNP A0A0S3QTD0
C	443	LYS	-	expression tag	UNP A0A0S3QTD0
C	444	LEU	-	expression tag	UNP A0A0S3QTD0
C	445	ALA	-	expression tag	UNP A0A0S3QTD0

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W O R L D W I D E
wwPDB
PROTEIN DATA BANK

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Chain	Residue	Modelled	Actual	Comment	Reference
C	446	ALA	-	expression tag	UNP A0A0S3QTD0
C	447	ALA	-	expression tag	UNP A0A0S3QTD0
C	448	LEU	-	expression tag	UNP A0A0S3QTD0
C	449	GLU	-	expression tag	UNP A0A0S3QTD0
D	443	LYS	-	expression tag	UNP A0A0S3QTD0
D	444	LEU	-	expression tag	UNP A0A0S3QTD0
D	445	ALA	-	expression tag	UNP A0A0S3QTD0
D	446	ALA	-	expression tag	UNP A0A0S3QTD0
D	447	ALA	-	expression tag	UNP A0A0S3QTD0
D	448	LEU	-	expression tag	UNP A0A0S3QTD0
D	449	GLU	-	expression tag	UNP A0A0S3QTD0
E	443	LYS	-	expression tag	UNP A0A0S3QTD0
E	444	LEU	-	expression tag	UNP A0A0S3QTD0
E	445	ALA	-	expression tag	UNP A0A0S3QTD0
E	446	ALA	-	expression tag	UNP A0A0S3QTD0
E	447	ALA	-	expression tag	UNP A0A0S3QTD0
E	448	LEU	-	expression tag	UNP A0A0S3QTD0
E	449	GLU	-	expression tag	UNP A0A0S3QTD0
F	443	LYS	-	expression tag	UNP A0A0S3QTD0
F	444	LEU	-	expression tag	UNP A0A0S3QTD0
F	445	ALA	-	expression tag	UNP A0A0S3QTD0
F	446	ALA	-	expression tag	UNP A0A0S3QTD0
F	447	ALA	-	expression tag	UNP A0A0S3QTD0
F	448	LEU	-	expression tag	UNP A0A0S3QTD0
F	449	GLU	-	expression tag	UNP A0A0S3QTD0

- Molecule 2 is OXALOACETATE ION (three-letter code: OAA) (formula: $C_4H_3O_5$) (labeled as "Ligand of Interest" by depositor).

OAA

O4
O

OH O5
C4

C2 C3

C1

O2 O⁻

O3
O

O1
O
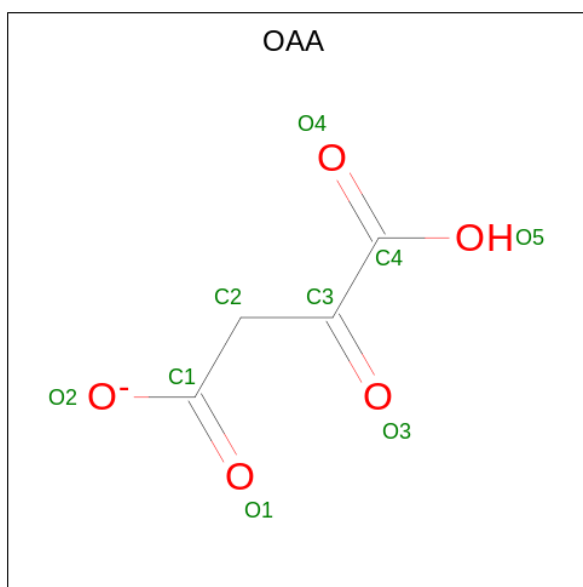
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total 9	C 4	O 5	0	0
2	B	1	Total 9	C 4	O 5	0	0
2	D	1	Total 9	C 4	O 5	0	0
2	E	1	Total 9	C 4	O 5	0	0
2	F	1	Total 9	C 4	O 5	0	0

- Molecule 3 is ACETYL COENZYME *A (three-letter code: ACO) (formula: $C_{23}H_{38}N_7O_{17}P_3S$) (labeled as "Ligand of Interest" by depositor).
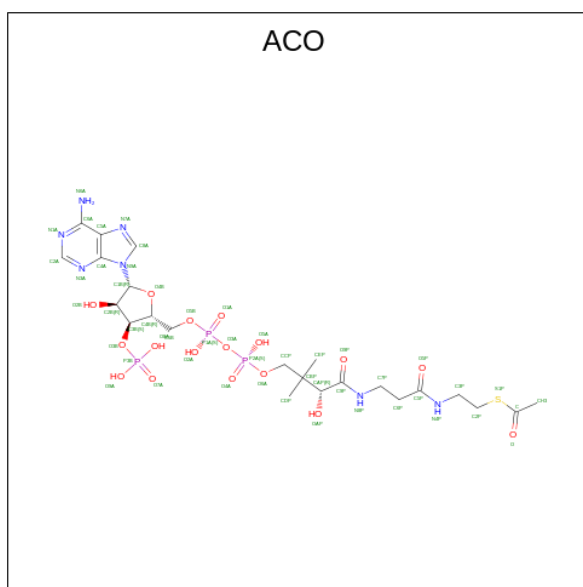
ACO

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	S	0	0
			51	23	7	17	3	1		
3	F	1	Total	C	N	O	P	S	0	0
			51	23	7	17	3	1		

- Molecule 4 is COENZYME A (three-letter code: COA) (formula: $C_{21}H_{36}N_7O_{16}P_3S$) (labeled as "Ligand of Interest" by depositor).

COA
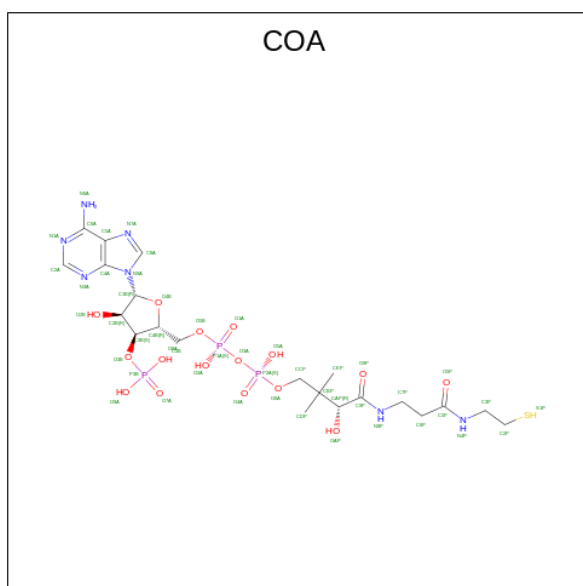
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
4	D	1	Total	C	N	O	P	S	0	0
			48	21	7	16	3	1		

• Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	117	Total 117	O 117	0	0
5	B	152	Total 152	O 152	0	0
5	C	136	Total 136	O 136	0	0
5	D	164	Total 164	O 164	0	0
5	E	147	Total 147	O 147	0	0
5	F	167	Total 167	O 167	0	0

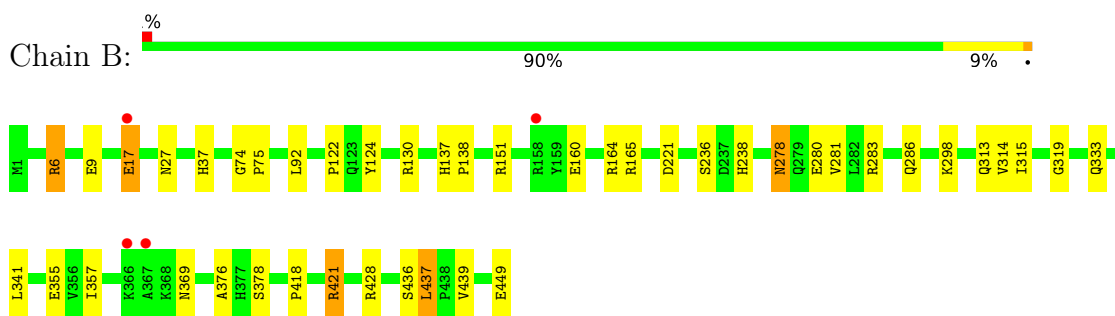# 3 Residue-property plots ⓘ

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.
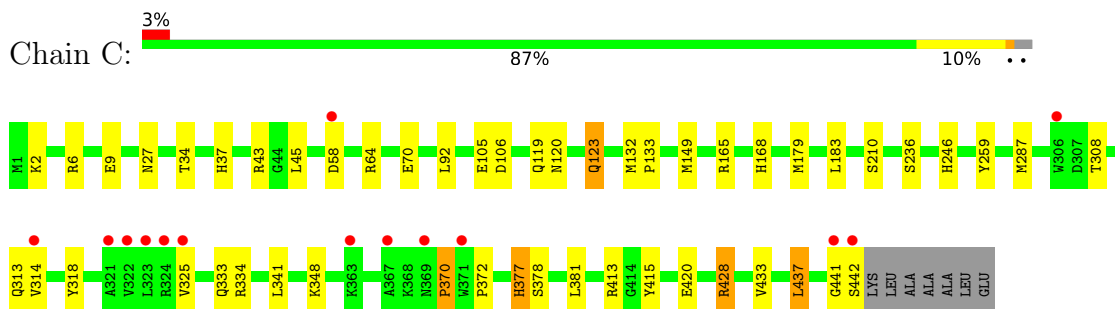
• Molecule 1: Citrate synthase

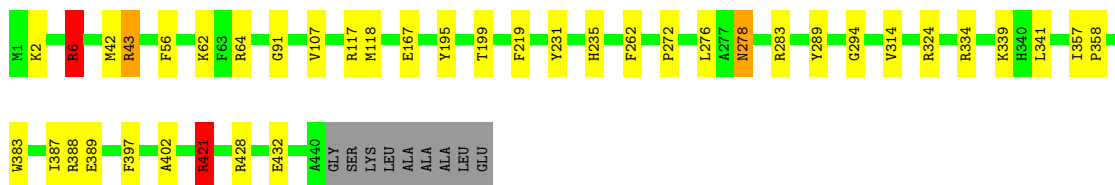Chain A:
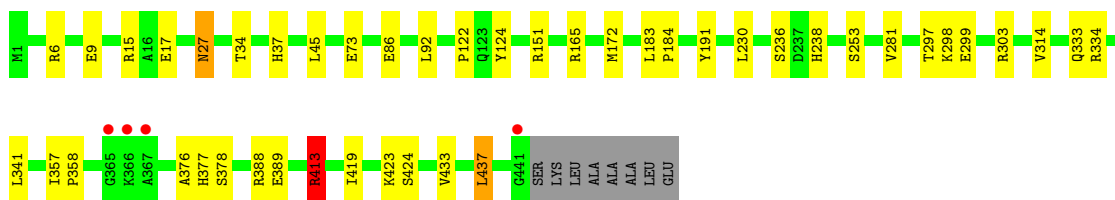

• Molecule 1: Citrate synthase

Chain B:

• Molecule 1: Citrate synthase

Chain C:

• Molecule 1: Citrate synthase

Chain D:

89%   8%   •

M1 K2 R6 M42 R43 F56 K62 F63 R64 G91 V107 R117 M118 E167 Y195 T199 F219 Y231 H235 F262 P272 L276 A277 N278 R283 Y289 G294 V314 R324 R334 K339 H340 L341 I357 P358

W383 I387 R388 E389 F397 A402 R421 R428 E432 A440 GLY SER LYS LEU ALA ALA LEU GLU

• Molecule 1: Citrate synthase

%

Chain E:

88%   9%   •

M1 R6 E9 R15 A16 E17 N27 T34 H37 L45 E73 E86 L92 P122 Q123 Y124 R151 R165 M172 L183 P184 Y191 L230 S236 D237 H238 S253 V281 T297 K298 E299 R303 V314 Q333 R334

• • •

L341 I357 P358 G365 K366 A367 A376 H377 S378 R388 E389 R413 I419 K423 S424 V433 L437 G441 SER LYS LEU ALA ALA LEU GLU

• Molecule 1: Citrate synthase

Chain F:

84%   12%   • •

M1 R6 R15 V55 R72 E73 K77 L92 E113 R117 H137 P138 R158 M172 T199 S210 M232 F233 H238 E239 N242 V243 S244 R260 S261 F262 L269 H274 A277 N278 Q279 E280 V281 L282 R283 W284 M287 L288

T297 Q300 L301 F304 A305 T308 V314 G319 H320 A321 V322 L323 Q333 L341 V350 S351 L352 E355 W371 P372 S378 G379 V380 W383 Y390 F397 S400 R401 A402 R413 R421 R428 W429 G441 SER LYS LEU ALA ALA LEU

GLU

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	108.49Å 131.76Å 207.24Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.15 – 2.33 30.15 – 2.33	Depositor EDS
% Data completeness (in resolution range)	99.9 (30.15-2.33) 99.9 (30.15-2.33)	Depositor EDS
R_{merge}	0.32	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.38 (at 2.34Å)	Xtriage
Refinement program	REFMAC 5.8.0419	Depositor
R, R_{free}	0.187 , 0.245 0.194 , 0.248	Depositor DCC
R_{free} test set	6296 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å^2)	32.8	Xtriage
Anisotropy	0.107	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 40.2	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	22326	wwPDB-VP
Average B, all atoms (Å^2)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.42% of the height of the origin peak. No significant pseudotranslation is detected.*

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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: OAA, ACO, COA

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	0.41	0/3597	0.89	3/4875 (0.1%)
1	B	0.44	0/3688	0.89	4/4999 (0.1%)
1	C	0.44	0/3633	0.90	7/4926 (0.1%)
1	D	0.44	0/3644	0.89	9/4938 (0.2%)
1	E	0.43	0/3627	0.88	1/4918 (0.0%)
1	F	0.44	0/3637	0.93	8/4929 (0.2%)
All	All	0.44	0/21826	0.89	32/29585 (0.1%)

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	D	0	4
1	E	0	5
1	F	0	3
All	All	0	17

There are no bond length outliers.

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	F	260	ARG	NE-CZ-NH1	11.45	126.02	120.30
1	B	151	ARG	NE-CZ-NH2	-7.95	116.33	120.30
1	A	287	MET	CG-SD-CE	7.89	112.82	100.20
1	D	6	ARG	CG-CD-NE	-7.08	96.94	111.80
1	E	413	ARG	NE-CZ-NH2	-6.68	116.96	120.30
1	C	64	ARG	NE-CZ-NH1	-6.46	117.07	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	287	MET	CG-SD-CE	6.39	110.42	100.20
1	C	70	GLU	CB-CA-C	-6.21	97.98	110.40
1	F	260	ARG	CD-NE-CZ	6.18	132.25	123.60
1	A	232	MET	CG-SD-CE	6.16	110.06	100.20
1	D	64	ARG	NE-CZ-NH2	6.00	123.30	120.30
1	D	6	ARG	NE-CZ-NH1	-5.89	117.35	120.30
1	F	287	MET	CG-SD-CE	5.86	109.58	100.20
1	F	6	ARG	CG-CD-NE	-5.79	99.64	111.80
1	A	118	MET	CG-SD-CE	5.72	109.35	100.20
1	D	421	ARG	NE-CZ-NH2	-5.71	117.45	120.30
1	D	117	ARG	NE-CZ-NH1	5.71	123.15	120.30
1	D	6	ARG	N-CA-CB	-5.64	100.44	110.60
1	C	119	GLN	CB-CA-C	-5.59	99.21	110.40
1	F	260	ARG	NE-CZ-NH2	-5.54	117.53	120.30
1	D	118	MET	CG-SD-CE	-5.49	91.42	100.20
1	F	314	VAL	N-CA-CB	-5.45	99.52	111.50
1	F	15	ARG	CD-NE-CZ	5.39	131.14	123.60
1	C	64	ARG	NE-CZ-NH2	5.38	122.99	120.30
1	B	278	ASN	CB-CA-C	5.20	120.79	110.40
1	C	415	TYR	CB-CG-CD1	5.16	124.10	121.00
1	B	6	ARG	CG-CD-NE	-5.13	101.03	111.80
1	B	130	ARG	N-CA-CB	5.09	119.76	110.60
1	F	158	ARG	CG-CD-NE	5.03	122.37	111.80
1	D	283	ARG	NE-CZ-NH2	5.02	122.81	120.30
1	D	334	ARG	NE-CZ-NH1	5.00	122.80	120.30
1	C	370	PRO	N-CA-CB	-5.00	97.10	102.60

There are no chirality outliers.

All (17) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	334	ARG	Sidechain
1	A	388	ARG	Sidechain
1	A	421	ARG	Sidechain
1	A	6	ARG	Sidechain
1	A	72	ARG	Sidechain
1	D	324	ARG	Sidechain
1	D	421	ARG	Sidechain
1	D	43	ARG	Sidechain
1	D	6	ARG	Sidechain
1	E	151	ARG	Sidechain
1	E	303	ARG	Sidechain

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Mol	Chain	Res	Type	Group
1	E	388	ARG	Sidechain
1	E	413	ARG	Sidechain
1	E	73	GLU	Peptide
1	F	117	ARG	Sidechain
1	F	413	ARG	Sidechain
1	F	6	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	3502	0	3459	37	0
1	B	3592	0	3552	24	0
1	C	3537	0	3485	31	0
1	D	3545	0	3512	22	0
1	E	3531	0	3480	25	0
1	F	3541	0	3502	40	0
2	A	9	0	2	0	0
2	B	9	0	2	1	0
2	D	9	0	2	0	0
2	E	9	0	2	1	0
2	F	9	0	2	3	0
3	A	51	0	34	15	0
3	F	51	0	34	7	0
4	D	48	0	32	1	0
5	A	117	0	0	2	0
5	B	152	0	0	6	0
5	C	136	0	0	6	0
5	D	164	0	0	2	0
5	E	147	0	0	2	0
5	F	167	0	0	0	0
All	All	22326	0	21100	175	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

All (175) 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:D:167:GLU:HG3	5:D:755:HOH:O	1.55	1.06
1:A:43:ARG:HH11	3:A:502:ACO:CCP	1.70	1.05
3:A:502:ACO:H72	3:A:502:ACO:H21	1.38	1.04
1:C:2:LYS:HB3	5:C:614:HOH:O	1.59	1.01
1:A:43:ARG:HH11	3:A:502:ACO:H121	1.34	0.90
1:A:43:ARG:HH11	3:A:502:ACO:H122	1.40	0.83
1:F:297:THR:H	1:F:300:GLN:HE21	1.29	0.80
1:F:274:HIS:ND1	3:F:502:ACO:HH31	1.97	0.80
1:A:43:ARG:NH1	3:A:502:ACO:H121	1.97	0.79
1:A:43:ARG:HE	3:A:502:ACO:H121	1.52	0.75
1:C:92:LEU:HD21	1:C:236:SER:OG	1.87	0.75
1:C:120:ASN:HA	1:F:199:THR:HG21	1.69	0.74
1:D:421:ARG:HD2	2:F:501:OAA:O1	1.88	0.74
1:F:304:PHE:O	1:F:308:THR:HG22	1.90	0.71
1:F:282:LEU:HD21	1:F:383:TRP:CE3	2.26	0.71
1:F:284:TRP:HE1	1:F:308:THR:HG21	1.57	0.70
1:D:278:ASN:C	1:D:278:ASN:HD22	1.98	0.67
1:F:274:HIS:HA	3:F:502:ACO:HH32	1.77	0.66
1:F:242:ASN:HB3	2:F:501:OAA:H21	1.80	0.63
1:A:301:LEU:HD22	1:A:352:LEU:HD23	1.78	0.63
1:F:238:HIS:O	1:F:239:GLU:HB2	1.99	0.63
1:F:278:ASN:HD22	1:F:279:GLN:N	1.96	0.63
1:B:74:GLY:HA2	5:B:615:HOH:O	1.97	0.63
1:A:43:ARG:NE	3:A:502:ACO:H121	2.13	0.62
1:B:37:HIS:HE1	5:B:722:HOH:O	1.81	0.62
1:E:27:ASN:C	1:E:27:ASN:HD22	2.03	0.61
1:E:34:THR:H	1:E:37:HIS:HD2	1.46	0.61
1:E:333:GLN:HE22	1:E:378:SER:HB3	1.66	0.60
1:A:281:VAL:HG11	1:A:376:ALA:HA	1.83	0.60
1:C:2:LYS:HD2	5:C:614:HOH:O	2.00	0.60
1:F:297:THR:HG22	1:F:300:GLN:HG3	1.84	0.60
3:A:502:ACO:H32	1:B:165:ARG:HH21	1.66	0.60
1:A:43:ARG:CZ	3:A:502:ACO:H121	2.32	0.59
1:F:55:VAL:HG23	1:F:239:GLU:HG3	1.84	0.59
1:F:333:GLN:HE22	1:F:378:SER:HB3	1.67	0.59
1:A:55:VAL:HG23	1:A:239:GLU:HG3	1.85	0.59
1:A:120:ASN:HA	1:D:199:THR:HG21	1.85	0.58
1:C:428:ARG:NH2	5:C:503:HOH:O	2.36	0.57
1:F:305:ALA:O	1:F:308:THR:HG23	2.05	0.57
3:F:502:ACO:H141	3:F:502:ACO:H32	1.86	0.57
1:A:299:GLU:OE2	1:A:303:ARG:NH1	2.35	0.56
1:F:269:LEU:HA	1:F:274:HIS:CD2	2.40	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:164:ARG:NH2	5:B:602:HOH:O	2.38	0.56
3:A:502:ACO:H133	1:B:418:PRO:HG3	1.87	0.56
1:C:123:GLN:HG2	5:C:501:HOH:O	2.06	0.55
1:D:272:PRO:HA	1:D:276:LEU:HG	1.89	0.55
1:C:428:ARG:HD3	5:C:525:HOH:O	2.06	0.54
1:A:315:ILE:HG21	1:A:357:ILE:HG21	1.90	0.54
1:F:274:HIS:HA	3:F:502:ACO:CH3	2.37	0.53
1:E:165:ARG:HD2	5:E:700:HOH:O	2.08	0.53
1:C:433:VAL:HG12	1:C:437:LEU:HD22	1.91	0.52
1:F:320:HIS:CG	1:F:323:LEU:HB2	2.44	0.52
1:B:6:ARG:NH1	1:B:9:GLU:OE2	2.43	0.52
1:C:333:GLN:HE22	1:C:378:SER:HA	1.74	0.52
1:F:297:THR:HG23	1:F:300:GLN:H	1.75	0.52
1:C:45:LEU:HD21	1:E:45:LEU:HD21	1.91	0.52
1:D:231:TYR:CE2	1:D:235:HIS:CE1	2.98	0.51
1:A:281:VAL:HG21	1:A:376:ALA:HA	1.93	0.51
1:A:430:VAL:O	1:A:434:ALA:HB2	2.11	0.51
1:D:167:GLU:CG	5:D:755:HOH:O	2.34	0.51
1:F:232:MET:HA	1:F:400:SER:HB2	1.93	0.51
1:A:92:LEU:HD21	1:A:236:SER:OG	2.11	0.51
1:E:238:HIS:HD1	2:E:501:OAA:C3	2.23	0.51
1:C:58:ASP:O	1:C:325:VAL:CG2	2.59	0.50
1:D:278:ASN:C	1:D:278:ASN:ND2	2.62	0.50
1:E:15:ARG:HD2	5:E:682:HOH:O	2.12	0.50
1:F:428:ARG:HD3	1:F:429:TRP:N	2.27	0.49
1:D:2:LYS:O	1:D:6:ARG:HB2	2.12	0.49
1:D:195:TYR:CG	1:D:389:GLU:HG2	2.47	0.49
1:E:357:ILE:N	1:E:358:PRO:CD	2.75	0.49
1:B:75:PRO:HA	5:B:615:HOH:O	2.12	0.49
1:B:122:PRO:HB3	1:B:124:TYR:CE2	2.48	0.49
1:E:433:VAL:HG12	1:E:437:LEU:HD13	1.95	0.49
1:B:333:GLN:HE22	1:B:378:SER:HB3	1.77	0.49
1:E:281:VAL:HG11	1:E:376:ALA:HA	1.95	0.48
1:A:319:GLY:HA2	5:A:698:HOH:O	2.13	0.48
3:A:502:ACO:H142	3:A:502:ACO:O2A	2.13	0.48
1:E:34:THR:H	1:E:37:HIS:CD2	2.27	0.48
1:E:172:MET:HE3	1:E:413:ARG:HD3	1.96	0.48
1:E:183:LEU:N	1:E:184:PRO:CD	2.77	0.48
1:C:6:ARG:NH1	1:C:9:GLU:OE2	2.47	0.47
1:C:333:GLN:HE21	1:C:381:LEU:HD12	1.79	0.47
3:F:502:ACO:H141	3:F:502:ACO:H62	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:238:HIS:O	1:A:239:GLU:HB2	2.14	0.47
1:A:315:ILE:HD13	1:A:357:ILE:HG23	1.97	0.47
3:A:502:ACO:H133	1:B:418:PRO:CG	2.45	0.47
1:A:253:SER:HB2	1:A:419:ILE:HA	1.97	0.47
1:D:56:PHE:CE1	1:D:62:LYS:HD2	2.50	0.47
1:C:58:ASP:O	1:C:325:VAL:HG21	2.15	0.46
1:B:281:VAL:HG11	1:B:376:ALA:HA	1.97	0.46
1:A:370:PRO:HG2	1:A:371:TRP:CD1	2.51	0.46
1:D:262:PHE:CZ	1:D:402:ALA:HB2	2.50	0.46
1:F:278:ASN:HD22	1:F:279:GLN:H	1.63	0.46
1:D:289:TYR:CE1	1:D:294:GLY:HA2	2.51	0.46
1:F:262:PHE:CZ	1:F:402:ALA:HB2	2.51	0.46
1:F:350:VAL:CG2	1:F:380:VAL:HG11	2.45	0.46
1:C:246:HIS:NE2	1:C:420:GLU:OE1	2.33	0.46
1:F:297:THR:HG22	1:F:300:GLN:CG	2.45	0.46
1:B:75:PRO:C	5:B:615:HOH:O	2.54	0.46
1:F:92:LEU:HD22	1:F:233:PHE:CD1	2.51	0.46
1:A:43:ARG:NH1	3:A:502:ACO:CCP	2.52	0.46
1:C:179:MET:O	1:C:183:LEU:HG	2.16	0.46
1:D:383:TRP:CZ3	1:D:388:ARG:HB3	2.50	0.45
1:E:92:LEU:HD21	1:E:236:SER:OG	2.17	0.45
1:B:92:LEU:HD21	1:B:236:SER:OG	2.16	0.45
1:B:137:HIS:CG	1:B:138:PRO:HD2	2.51	0.45
1:B:280:GLU:HB3	5:B:698:HOH:O	2.16	0.45
1:A:220:ASP:OD1	1:A:225:TYR:OH	2.29	0.45
1:E:191:TYR:OH	1:E:389:GLU:OE2	2.29	0.45
1:F:274:HIS:ND1	3:F:502:ACO:CH3	2.73	0.45
1:B:238:HIS:ND1	2:B:501:OAA:O2	2.49	0.45
1:F:282:LEU:HD23	1:F:390:TYR:HB3	1.99	0.45
1:C:2:LYS:HG3	1:C:106:ASP:OD1	2.17	0.45
1:A:179:MET:O	1:A:183:LEU:HG	2.17	0.44
1:B:298:LYS:HE2	1:B:355:GLU:OE1	2.17	0.44
1:C:308:THR:HG22	1:C:313:GLN:HB2	1.99	0.44
1:C:333:GLN:HE22	1:C:378:SER:CA	2.30	0.44
1:D:357:ILE:N	1:D:358:PRO:CD	2.81	0.44
1:A:362:LYS:NZ	5:A:602:HOH:O	2.34	0.44
1:F:72:ARG:O	1:F:77:LYS:NZ	2.40	0.43
1:F:320:HIS:CB	1:F:323:LEU:HB2	2.48	0.43
1:A:29:LYS:O	1:B:437:LEU:HG	2.18	0.43
1:A:43:ARG:NH2	1:B:421:ARG:HB3	2.32	0.43
1:A:287:MET:HE1	1:A:288:LEU:HG	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:431:LYS:HE2	1:B:17:GLU:OE2	2.17	0.43
1:F:242:ASN:HB3	2:F:501:OAA:C2	2.47	0.43
1:F:297:THR:HG22	1:F:300:GLN:HE21	1.83	0.43
1:A:70:GLU:HG2	1:A:75:PRO:HD2	2.00	0.43
1:B:283:ARG:HA	1:B:286:GLN:HE21	1.84	0.43
1:E:27:ASN:C	1:E:27:ASN:ND2	2.71	0.43
1:F:297:THR:H	1:F:300:GLN:NE2	2.04	0.43
1:A:195:TYR:CG	1:A:389:GLU:HG2	2.54	0.43
1:D:42:MET:O	1:D:43:ARG:C	2.58	0.43
1:E:6:ARG:NH1	1:E:9:GLU:OE2	2.52	0.43
1:C:441:GLY:O	1:C:442:SER:C	2.58	0.43
1:F:371:TRP:HB3	1:F:372:PRO:HD2	2.00	0.43
1:A:357:ILE:N	1:A:358:PRO:CD	2.82	0.42
1:C:34:THR:H	1:C:37:HIS:CD2	2.37	0.42
3:A:502:ACO:H32	1:B:165:ARG:NH2	2.34	0.42
1:B:319:GLY:HA2	1:B:369:ASN:O	2.19	0.42
1:D:91:GLY:HA2	1:D:107:VAL:HG22	2.01	0.42
1:E:253:SER:HB2	1:E:419:ILE:HA	2.00	0.42
1:A:137:HIS:CG	1:A:138:PRO:HD2	2.55	0.42
1:C:165:ARG:HA	1:C:168:HIS:CD2	2.55	0.42
1:A:327:ASP:OD1	1:A:328:PRO:HD2	2.19	0.42
3:A:502:ACO:H21	3:A:502:ACO:C7P	2.28	0.42
1:E:297:THR:OG1	1:E:299:GLU:HG2	2.20	0.42
1:F:319:GLY:HA3	3:F:502:ACO:OAP	2.20	0.42
1:C:149:MET:HG2	1:C:259:TYR:CE1	2.55	0.42
1:E:334:ARG:HA	1:E:377:HIS:NE2	2.35	0.42
1:A:320:HIS:HB3	1:A:323:LEU:HB2	2.02	0.42
1:C:413:ARG:HA	1:C:413:ARG:CZ	2.50	0.42
1:D:428[A]:ARG:NH1	1:D:432:GLU:OE2	2.44	0.41
1:C:333:GLN:NE2	1:C:378:SER:HA	2.34	0.41
1:D:219:PHE:CZ	1:D:387:ILE:HG13	2.55	0.41
1:E:423:LYS:HE3	1:E:424:SER:O	2.20	0.41
1:F:421:ARG:HH11	1:F:421:ARG:HG2	1.85	0.41
1:E:183:LEU:HB2	1:E:184:PRO:HD3	2.02	0.41
1:C:318:TYR:CE1	1:C:372:PRO:HB3	2.55	0.41
1:B:315:ILE:HD13	1:B:357:ILE:HD12	2.01	0.41
1:C:45:LEU:HD21	1:E:45:LEU:CD2	2.50	0.41
1:C:132:MET:O	1:C:133:PRO:C	2.58	0.41
1:D:421:ARG:NH2	1:F:239:GLU:OE2	2.54	0.41
1:F:244:SER:CB	1:F:274:HIS:HE2	2.33	0.41
1:F:277:ALA:O	1:F:281:VAL:HG23	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:94:TYR:CD1	1:A:102:PRO:HB3	2.56	0.41
1:C:2:LYS:CB	5:C:614:HOH:O	2.40	0.41
1:C:433:VAL:HG13	1:C:437:LEU:HD13	2.02	0.41
1:F:137:HIS:HA	1:F:138:PRO:HD3	1.96	0.41
1:E:86:GLU:OE2	1:E:230:LEU:HD13	2.20	0.40
1:F:113:GLU:HG3	1:F:117:ARG:HE	1.86	0.40
1:C:334:ARG:HA	1:C:377:HIS:NE2	2.37	0.40
1:E:122:PRO:HB3	1:E:124:TYR:CE2	2.56	0.40
1:A:120:ASN:CA	1:D:199:THR:HG21	2.50	0.40
1:D:314:VAL:HA	4:D:502:COA:C2A	2.51	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	431/449 (96%)	419 (97%)	12 (3%)	0	100	100
1	B	447/449 (100%)	439 (98%)	8 (2%)	0	100	100
1	C	440/449 (98%)	425 (97%)	15 (3%)	0	100	100
1	D	439/449 (98%)	429 (98%)	10 (2%)	0	100	100
1	E	439/449 (98%)	429 (98%)	10 (2%)	0	100	100
1	F	439/449 (98%)	428 (98%)	11 (2%)	0	100	100
All	All	2635/2694 (98%)	2569 (98%)	66 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	368/376 (98%)	357 (97%)	11 (3%)	36	45
1	B	375/376 (100%)	361 (96%)	14 (4%)	29	37
1	C	370/376 (98%)	358 (97%)	12 (3%)	34	42
1	D	372/376 (99%)	366 (98%)	6 (2%)	58	70
1	E	369/376 (98%)	363 (98%)	6 (2%)	58	70
1	F	371/376 (99%)	356 (96%)	15 (4%)	27	34
All	All	2225/2256 (99%)	2161 (97%)	64 (3%)	37	47

All (64) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	115	THR
1	A	212	ASN
1	A	276	LEU
1	A	287	MET
1	A	298	LYS
1	A	307	ASP
1	A	323	LEU
1	A	324	ARG
1	A	341	LEU
1	A	397	PHE
1	A	421	ARG
1	B	17	GLU
1	B	27	ASN
1	B	160	GLU
1	B	221	ASP
1	B	278	ASN
1	B	313	GLN
1	B	314	VAL
1	B	341	LEU
1	B	421	ARG
1	B	428	ARG
1	B	436	SER

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Mol	Chain	Res	Type
1	B	437	LEU
1	B	439	VAL
1	B	449	GLU
1	C	27	ASN
1	C	43	ARG
1	C	105	GLU
1	C	123	GLN
1	C	210	SER
1	C	314	VAL
1	C	341	LEU
1	C	348	LYS
1	C	370	PRO
1	C	377	HIS
1	C	428	ARG
1	C	437	LEU
1	D	6	ARG
1	D	278	ASN
1	D	339	LYS
1	D	341	LEU
1	D	397	PHE
1	D	421	ARG
1	E	17	GLU
1	E	27	ASN
1	E	298	LYS
1	E	314	VAL
1	E	341	LEU
1	E	437	LEU
1	F	73	GLU
1	F	172	MET
1	F	210	SER
1	F	278	ASN
1	F	288	LEU
1	F	301	LEU
1	F	308	THR
1	F	314	VAL
1	F	322	VAL
1	F	323	LEU
1	F	341	LEU
1	F	352	LEU
1	F	355	GLU
1	F	397	PHE
1	F	428	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (38) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	37	HIS
1	A	120	ASN
1	A	150	GLN
1	A	248	ASN
1	A	300	GLN
1	A	313	GLN
1	B	27	ASN
1	B	37	HIS
1	B	168	HIS
1	B	248	ASN
1	B	278	ASN
1	B	286	GLN
1	B	333	GLN
1	B	364	HIS
1	B	408	GLN
1	C	27	ASN
1	C	37	HIS
1	C	248	ASN
1	C	286	GLN
1	C	333	GLN
1	C	364	HIS
1	C	408	GLN
1	D	37	HIS
1	D	120	ASN
1	D	150	GLN
1	D	248	ASN
1	D	278	ASN
1	D	310	ASN
1	E	27	ASN
1	E	37	HIS
1	E	248	ASN
1	E	286	GLN
1	E	333	GLN
1	E	408	GLN
1	F	278	ASN
1	F	300	GLN
1	F	333	GLN
1	F	408	GLN

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	OAA	B	501	-	8,8,8	5.64	3 (37%)	9,10,10	1.92	2 (22%)
3	ACO	A	502	-	45,53,53	0.68	1 (2%)	56,79,79	1.30	4 (7%)
2	OAA	A	501	-	8,8,8	5.76	2 (25%)	9,10,10	1.93	4 (44%)
2	OAA	F	501	-	8,8,8	9.88	2 (25%)	9,10,10	3.84	4 (44%)
3	ACO	F	502	-	45,53,53	0.78	2 (4%)	56,79,79	1.19	6 (10%)
2	OAA	D	501	-	8,8,8	4.61	2 (25%)	9,10,10	2.26	4 (44%)
4	COA	D	502	-	41,50,50	0.64	0	52,75,75	1.10	4 (7%)
2	OAA	E	501	-	8,8,8	5.36	2 (25%)	9,10,10	2.55	3 (33%)

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	OAA	B	501	-	-	0/8/8/8	-
3	ACO	A	502	-	-	22/47/67/67	0/3/3/3
2	OAA	A	501	-	-	1/8/8/8	-
2	OAA	F	501	-	-	0/8/8/8	-
3	ACO	F	502	-	-	15/47/67/67	0/3/3/3
2	OAA	D	501	-	-	0/8/8/8	-
4	COA	D	502	-	-	4/44/64/64	0/3/3/3
2	OAA	E	501	-	-	2/8/8/8	-

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	501	OAA	C3-C4	-27.59	1.16	1.53
2	A	501	OAA	C3-C4	-15.94	1.32	1.53
2	B	501	OAA	C3-C4	-15.53	1.32	1.53
2	E	501	OAA	C3-C4	-14.59	1.33	1.53
2	D	501	OAA	C3-C4	-12.16	1.37	1.53
2	D	501	OAA	O2-C1	-3.94	1.17	1.30
2	F	501	OAA	O5-C4	-3.35	1.20	1.30
2	E	501	OAA	O5-C4	-2.67	1.22	1.30
3	F	502	ACO	C-S1P	2.59	1.90	1.75
2	A	501	OAA	O5-C4	-2.58	1.23	1.30
3	A	502	ACO	P3B-O3B	2.53	1.64	1.59
2	B	501	OAA	O2-C1	-2.22	1.23	1.30
3	F	502	ACO	P3B-O3B	2.11	1.63	1.59
2	B	501	OAA	O5-C4	-2.09	1.24	1.30

All (31) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	F	501	OAA	O3-C3-C4	-8.59	106.99	119.43
2	F	501	OAA	C2-C3-C4	5.93	127.86	117.85
2	E	501	OAA	C2-C3-C4	5.91	127.83	117.85
3	A	502	ACO	C2P-S1P-C	5.80	132.21	101.68
2	B	501	OAA	C2-C3-C4	4.45	125.37	117.85
3	F	502	ACO	C2P-S1P-C	3.65	120.90	101.68
2	A	501	OAA	C2-C3-C4	3.63	123.97	117.85
2	D	501	OAA	O4-C4-C3	-3.44	117.12	121.72
4	D	502	COA	O6A-CCP-CBP	-3.25	105.33	110.55
2	D	501	OAA	O5-C4-C3	3.21	122.76	113.97
2	E	501	OAA	O3-C3-C4	-3.20	114.79	119.43
4	D	502	COA	O3B-C3B-C2B	-3.05	100.61	111.68

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	501	OAA	O3-C3-C2	3.04	124.98	120.58
3	A	502	ACO	C7P-C6P-C5P	2.89	117.17	112.36
2	D	501	OAA	O3-C3-C2	-2.89	116.40	120.58
3	F	502	ACO	CDP-CBP-CCP	2.84	112.86	108.23
2	D	501	OAA	C2-C3-C4	2.72	122.45	117.85
2	A	501	OAA	O3-C3-C2	-2.72	116.65	120.58
3	A	502	ACO	C5A-C6A-N6A	2.54	124.21	120.35
2	F	501	OAA	O5-C4-C3	-2.54	107.03	113.97
3	F	502	ACO	CEP-CBP-CAP	2.49	113.14	108.82
3	F	502	ACO	O6A-P2A-O4A	-2.37	99.81	109.07
2	E	501	OAA	O3-C3-C2	-2.29	117.26	120.58
3	F	502	ACO	O5A-P2A-O4A	2.26	123.41	112.24
3	A	502	ACO	C6P-C7P-N8P	-2.22	107.42	111.90
3	F	502	ACO	C6P-C5P-N4P	2.15	120.05	116.42
2	A	501	OAA	O4-C4-C3	-2.12	118.88	121.72
4	D	502	COA	C5A-C6A-N6A	2.12	123.57	120.35
4	D	502	COA	CDP-CBP-CAP	2.12	112.49	108.82
2	A	501	OAA	O5-C4-C3	2.10	119.72	113.97
2	B	501	OAA	O3-C3-C4	-2.02	116.51	119.43

There are no chirality outliers.

All (44) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	E	501	OAA	O2-C1-C2-C3
3	A	502	ACO	C5B-O5B-P1A-O1A
3	A	502	ACO	C5B-O5B-P1A-O2A
3	A	502	ACO	CCP-O6A-P2A-O4A
3	A	502	ACO	CCP-O6A-P2A-O5A
3	A	502	ACO	OAP-CAP-CBP-CCP
3	A	502	ACO	C9P-CAP-CBP-CCP
3	A	502	ACO	OAP-CAP-CBP-CDP
3	A	502	ACO	C9P-CAP-CBP-CDP
3	A	502	ACO	CAP-C9P-N8P-C7P
3	A	502	ACO	C3P-C2P-S1P-C
3	F	502	ACO	CAP-CBP-CCP-O6A
3	F	502	ACO	OAP-CAP-CBP-CCP
3	F	502	ACO	C9P-CAP-CBP-CCP
3	F	502	ACO	OAP-CAP-CBP-CDP
3	F	502	ACO	C9P-CAP-CBP-CDP
3	F	502	ACO	OAP-CAP-CBP-CEP
3	F	502	ACO	C9P-CAP-CBP-CEP

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Mol	Chain	Res	Type	Atoms
3	F	502	ACO	C6P-C5P-N4P-C3P
3	F	502	ACO	O5P-C5P-N4P-C3P
3	F	502	ACO	C3P-C2P-S1P-C
3	F	502	ACO	O-C-S1P-C2P
3	F	502	ACO	CH3-C-S1P-C2P
4	D	502	COA	CCP-O6A-P2A-O4A
3	A	502	ACO	O9P-C9P-N8P-C7P
3	A	502	ACO	C6P-C5P-N4P-C3P
3	A	502	ACO	O5P-C5P-N4P-C3P
3	F	502	ACO	CDP-CBP-CCP-O6A
3	F	502	ACO	CEP-CBP-CCP-O6A
3	A	502	ACO	OAP-CAP-CBP-CEP
3	A	502	ACO	P1A-O3A-P2A-O6A
2	E	501	OAA	O1-C1-C2-C3
4	D	502	COA	CCP-O6A-P2A-O3A
4	D	502	COA	CCP-O6A-P2A-O5A
3	A	502	ACO	C3B-C4B-C5B-O5B
3	A	502	ACO	O5P-C5P-C6P-C7P
3	A	502	ACO	O4B-C4B-C5B-O5B
3	A	502	ACO	C3B-O3B-P3B-O7A
3	A	502	ACO	C9P-CAP-CBP-CEP
2	A	501	OAA	C1-C2-C3-O3
3	A	502	ACO	C5B-O5B-P1A-O3A
3	A	502	ACO	CCP-O6A-P2A-O3A
3	F	502	ACO	C5B-O5B-P1A-O1A
4	D	502	COA	C5B-O5B-P1A-O1A

There are no ring outliers.

6 monomers are involved in 28 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	501	OAA	1	0
3	A	502	ACO	15	0
2	F	501	OAA	3	0
3	F	502	ACO	7	0
4	D	502	COA	1	0
2	E	501	OAA	1	0

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 OAA B 501

Bond lengths

Bond angles

Torsions

Rings

Ligand ACO A 502	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand OAA A 501	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand OAA F 501

Bond lengths

Bond angles

Torsions

Rings

Ligand ACO F 502

Bond lengths

Bond angles

Torsions

Rings

Ligand OAA D 501

Bond lengths

Bond angles

Torsions

Rings

Ligand COA D 502

Bond lengths

Bond angles

Torsions

Rings

Ligand OAA E 501

Bond lengths

Bond angles

Torsions

Rings

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	435/449 (96%)	-0.06	31 (7%)	23	29	23, 39, 107, 145	0
1	B	449/449 (100%)	-0.38	4 (0%)	81	84	21, 35, 66, 133	0
1	C	442/449 (98%)	-0.18	14 (3%)	50	57	22, 36, 77, 123	0
1	D	440/449 (97%)	-0.54	0	100	100	20, 31, 55, 77	1 (0%)
1	E	441/449 (98%)	-0.43	4 (0%)	81	84	20, 32, 63, 124	0
1	F	441/449 (98%)	-0.49	1 (0%)	92	93	21, 33, 59, 78	0
All	All	2648/2694 (98%)	-0.35	54 (2%)	64	69	20, 34, 71, 145	1 (0%)

All (54) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	314	VAL	7.4
1	B	367	ALA	4.2
1	A	315	ILE	4.0
1	A	364	HIS	3.8
1	B	366	LYS	3.7
1	C	306	TRP	3.6
1	A	276	LEU	3.6
1	C	322	VAL	3.5
1	A	358	PRO	3.4
1	C	323	LEU	3.4
1	C	321	ALA	3.3
1	A	325	VAL	3.2
1	C	325	VAL	3.1
1	C	324	ARG	3.1
1	A	306	TRP	3.0
1	A	321	ALA	2.9
1	A	305	ALA	2.9
1	F	441	GLY	2.8
1	C	442	SER	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	361	LEU	2.8
1	A	370	PRO	2.7
1	A	309	LEU	2.7
1	A	316	PRO	2.7
1	C	363	LYS	2.6
1	A	304	PHE	2.6
1	A	360	VAL	2.6
1	A	319	GLY	2.6
1	A	284	TRP	2.6
1	C	367	ALA	2.6
1	A	363	LYS	2.5
1	B	17	GLU	2.4
1	E	365	GLY	2.4
1	A	371	TRP	2.4
1	A	356	VAL	2.4
1	A	352	LEU	2.4
1	A	349	ILE	2.4
1	A	357	ILE	2.3
1	C	58	ASP	2.3
1	A	293	GLY	2.3
1	C	441	GLY	2.3
1	E	366	LYS	2.2
1	A	362	LYS	2.2
1	A	318	TYR	2.2
1	E	367	ALA	2.2
1	C	371	TRP	2.2
1	A	296	PRO	2.2
1	A	317	GLY	2.1
1	C	314	VAL	2.1
1	A	312	GLY	2.1
1	E	441	GLY	2.1
1	C	369	ASN	2.1
1	A	350	VAL	2.1
1	B	158	ARG	2.1
1	A	322	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
3	ACO	A	502	51/51	0.67	0.17	63,96,119,142	0
2	OAA	E	501	9/9	0.82	0.12	53,62,67,68	0
2	OAA	B	501	9/9	0.84	0.12	56,68,79,82	0
2	OAA	F	501	9/9	0.91	0.10	30,38,49,67	0
2	OAA	A	501	9/9	0.91	0.10	44,56,72,81	0
2	OAA	D	501	9/9	0.93	0.11	27,37,63,65	0
4	COA	D	502	48/48	0.93	0.08	32,45,64,80	0
3	ACO	F	502	51/51	0.97	0.07	24,30,59,90	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 ACO A 502:

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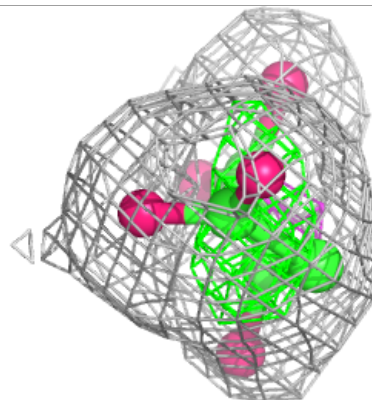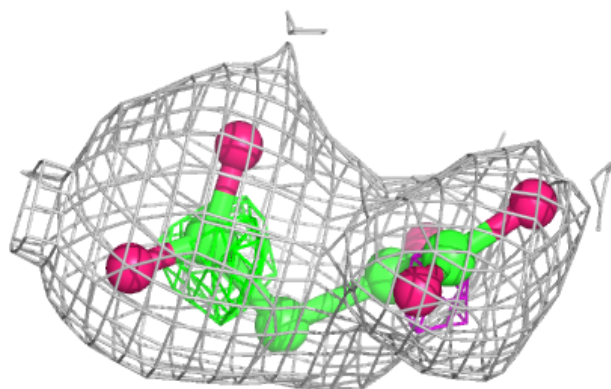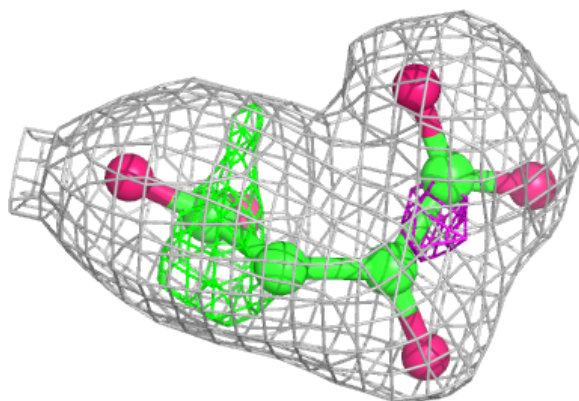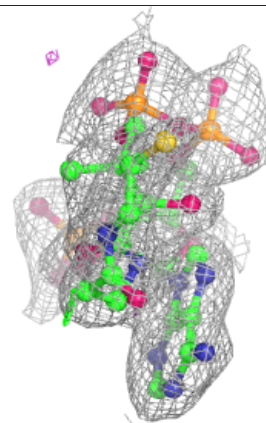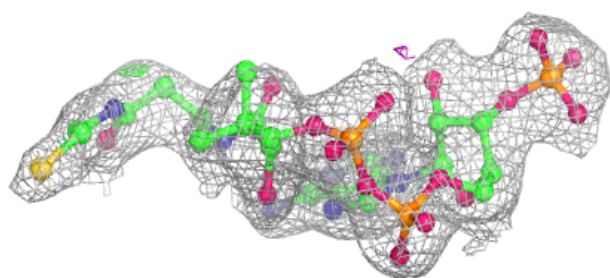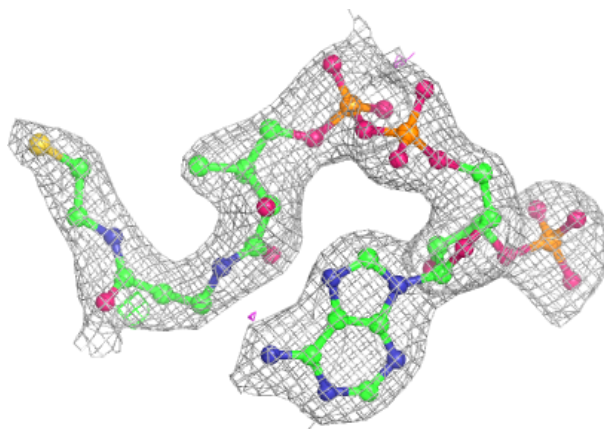mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
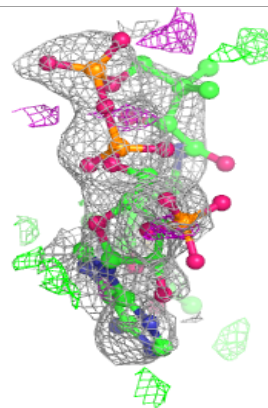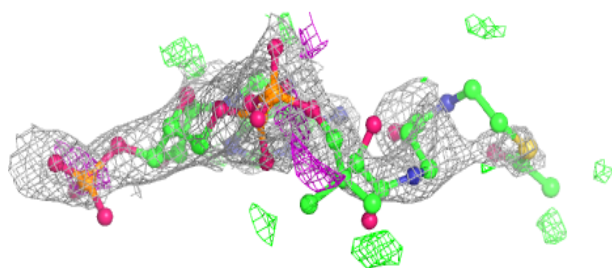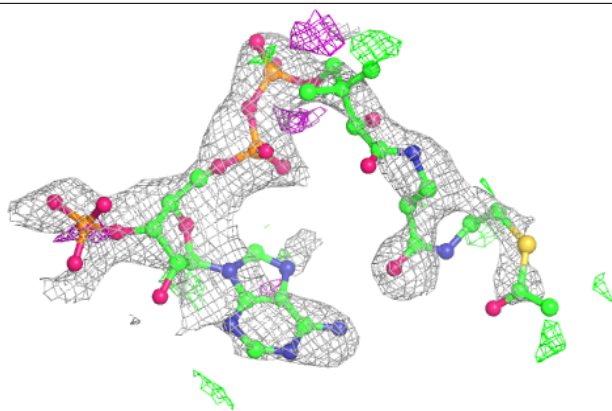
Electron density around OAA E 501:

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

Electron density around OAA 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)

Electron density around OAA 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)
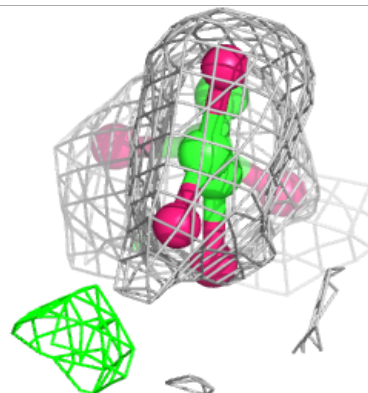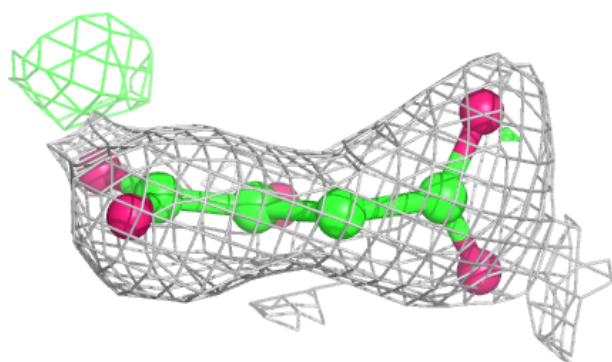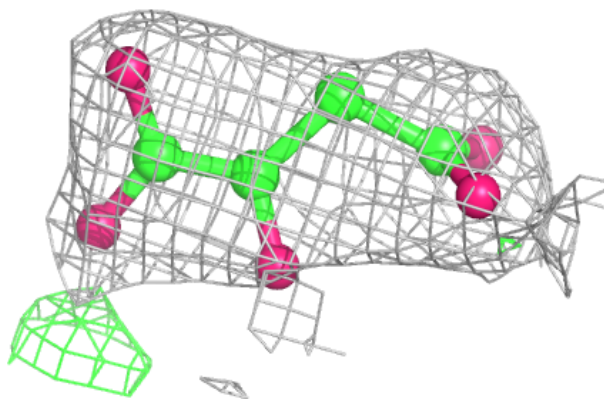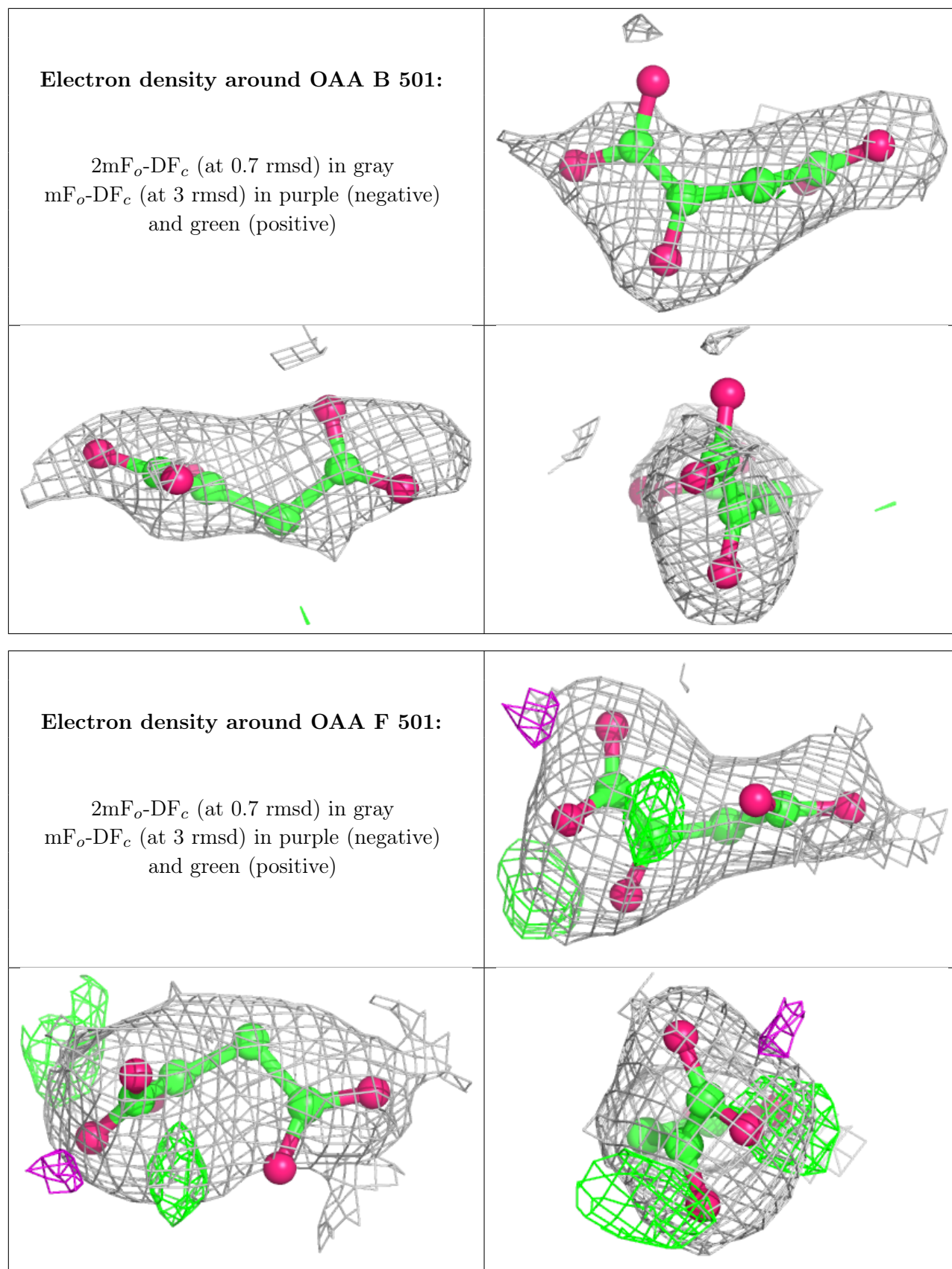
Electron density around OAA A 501:

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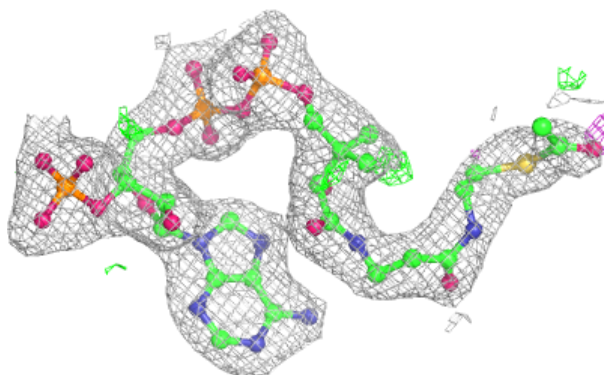and green (positive)
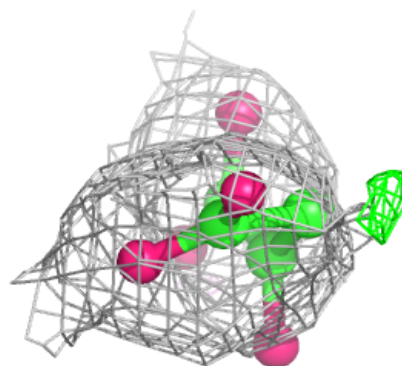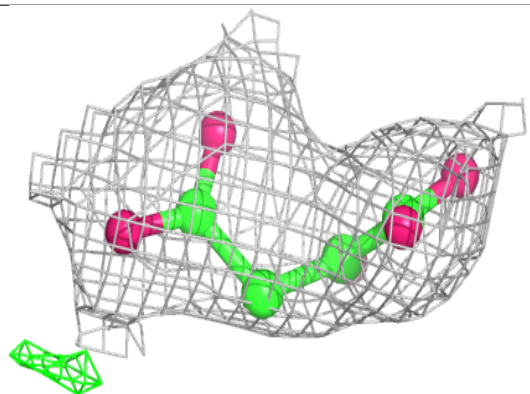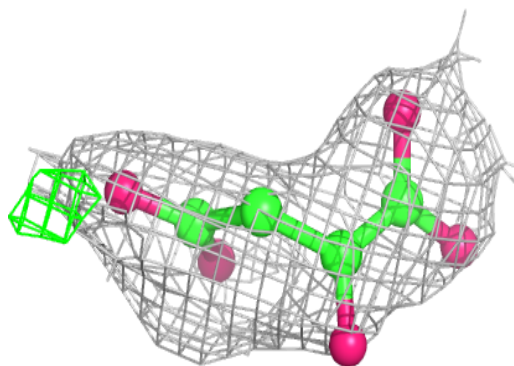
Electron density around OAA D 501:

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

Electron density around COA D 502:

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

Electron density around ACO F 502:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
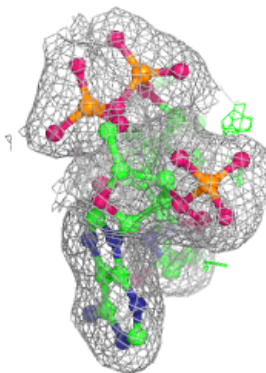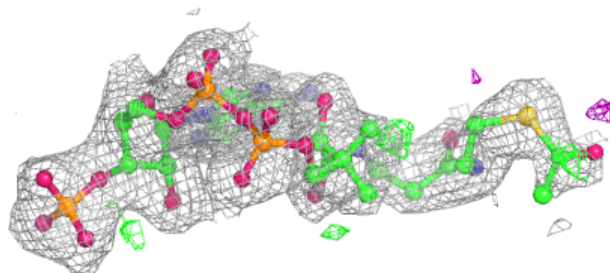
6.5 Other polymers (i)

There are no such residues in this entry.