WORLDWIDE PDB
PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Dec 12, 2023 – 06:59 pm GMT

PDB ID	:	4CFF
Title	:	Structure of full length human AMPK in complex with a small molecule activator, a thienopyridone derivative (A-769662)
Authors	:	Xiao, B.; Sanders, M.J.; Carmena, D.; Bright, N.J.; Haire, L.F.; Underwood, E.; Patel, B.R.; Heath, R.B.; Walker, P.A.; Hallen, S.; Giordanetto, F.; Martin, S.R.; Carling, D.; Gamblin, S.J.
Deposited on	:	2013-11-14
Resolution	:	3.92 Å(reported)

The following versions of software and data (see references ①) were used in the production of this report:

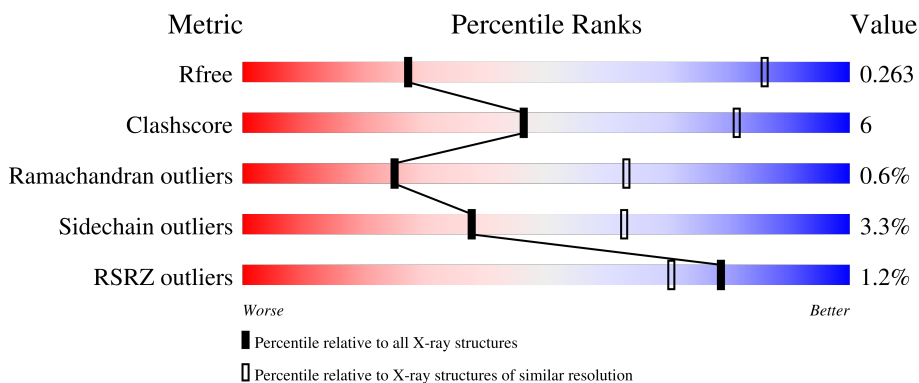|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 3.92 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.
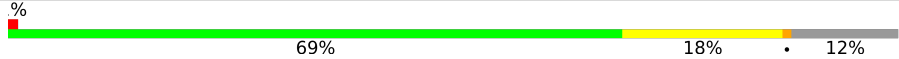
Metric	Percentile Ranks	Value
Rfree		0.263
Clashscore		6
Ramachandran outliers		0.6%
Sidechain outliers		3.3%
RSRZ outliers		1.2%

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}	130704	1019 (4.18-3.66)
Clashscore	141614	1016 (4.16-3.68)
Ramachandran outliers	138981	1039 (4.18-3.66)
Sidechain outliers	138945	1032 (4.18-3.66)
RSRZ outliers	127900	1002 (4.20-3.64)

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	571	60% 13% • 26%
1	C	571	60% 13% • 26%
2	B	286	2% 48% 12% • 40%
2	D	286	2% 48% 12% 40%
3	E	331	% 70% 18% • 10%

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Mol	Chain	Length	Quality of chain
3	F	331	

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 14484 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 5'-AMP-ACTIVATED PROTEIN KINASE CATALYTIC SUB-UNIT ALPHA-2.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	425	Total	C	N	O	P	S	0	0	0
			3403	2187	592	601	1	22			
1	C	423	Total	C	N	O	P	S	0	0	0
			3394	2182	590	599	1	22			

There are 38 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	MET	-	expression tag	UNP P54646
A	-17	SER	-	expression tag	UNP P54646
A	-16	HIS	-	expression tag	UNP P54646
A	-15	HIS	-	expression tag	UNP P54646
A	-14	HIS	-	expression tag	UNP P54646
A	-13	HIS	-	expression tag	UNP P54646
A	-12	HIS	-	expression tag	UNP P54646
A	-11	HIS	-	expression tag	UNP P54646
A	-10	SER	-	expression tag	UNP P54646
A	-9	SER	-	expression tag	UNP P54646
A	-8	GLY	-	expression tag	UNP P54646
A	-7	LEU	-	expression tag	UNP P54646
A	-6	GLU	-	expression tag	UNP P54646
A	-5	VAL	-	expression tag	UNP P54646
A	-4	LEU	-	expression tag	UNP P54646
A	-3	PHE	-	expression tag	UNP P54646
A	-2	GLN	-	expression tag	UNP P54646
A	-1	GLY	-	expression tag	UNP P54646
A	0	PRO	-	expression tag	UNP P54646
C	-18	MET	-	expression tag	UNP P54646
C	-17	SER	-	expression tag	UNP P54646
C	-16	HIS	-	expression tag	UNP P54646
C	-15	HIS	-	expression tag	UNP P54646
C	-14	HIS	-	expression tag	UNP P54646

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-13	HIS	-	expression tag	UNP P54646
C	-12	HIS	-	expression tag	UNP P54646
C	-11	HIS	-	expression tag	UNP P54646
C	-10	SER	-	expression tag	UNP P54646
C	-9	SER	-	expression tag	UNP P54646
C	-8	GLY	-	expression tag	UNP P54646
C	-7	LEU	-	expression tag	UNP P54646
C	-6	GLU	-	expression tag	UNP P54646
C	-5	VAL	-	expression tag	UNP P54646
C	-4	LEU	-	expression tag	UNP P54646
C	-3	PHE	-	expression tag	UNP P54646
C	-2	GLN	-	expression tag	UNP P54646
C	-1	GLY	-	expression tag	UNP P54646
C	0	PRO	-	expression tag	UNP P54646

- Molecule 2 is a protein called 5'-AMP-ACTIVATED PROTEIN KINASE SUBUNIT BETA-1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	B	171	Total 1351	C 872	N 227	O 246	P 1	S 5	0	0	0
2	D	172	Total 1356	C 875	N 228	O 247	P 1	S 5	0	0	0

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-15	MET	-	expression tag	UNP Q9Y478
B	-14	GLY	-	expression tag	UNP Q9Y478
B	-13	LEU	-	expression tag	UNP Q9Y478
B	-12	ASN	-	expression tag	UNP Q9Y478
B	-11	ASP	-	expression tag	UNP Q9Y478
B	-10	ILE	-	expression tag	UNP Q9Y478
B	-9	PHE	-	expression tag	UNP Q9Y478
B	-8	GLU	-	expression tag	UNP Q9Y478
B	-7	ALA	-	expression tag	UNP Q9Y478
B	-6	GLN	-	expression tag	UNP Q9Y478
B	-5	LYS	-	expression tag	UNP Q9Y478
B	-4	ILE	-	expression tag	UNP Q9Y478
B	-3	GLU	-	expression tag	UNP Q9Y478
B	-2	TRP	-	expression tag	UNP Q9Y478
B	-1	HIS	-	expression tag	UNP Q9Y478

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Chain	Residue	Modelled	Actual	Comment	Reference
B	0	GLU	-	expression tag	UNP Q9Y478
D	-15	MET	-	expression tag	UNP Q9Y478
D	-14	GLY	-	expression tag	UNP Q9Y478
D	-13	LEU	-	expression tag	UNP Q9Y478
D	-12	ASN	-	expression tag	UNP Q9Y478
D	-11	ASP	-	expression tag	UNP Q9Y478
D	-10	ILE	-	expression tag	UNP Q9Y478
D	-9	PHE	-	expression tag	UNP Q9Y478
D	-8	GLU	-	expression tag	UNP Q9Y478
D	-7	ALA	-	expression tag	UNP Q9Y478
D	-6	GLN	-	expression tag	UNP Q9Y478
D	-5	LYS	-	expression tag	UNP Q9Y478
D	-4	ILE	-	expression tag	UNP Q9Y478
D	-3	GLU	-	expression tag	UNP Q9Y478
D	-2	TRP	-	expression tag	UNP Q9Y478
D	-1	HIS	-	expression tag	UNP Q9Y478
D	0	GLU	-	expression tag	UNP Q9Y478

- Molecule 3 is a protein called 5'-AMP-ACTIVATED PROTEIN KINASE SUBUNIT GAMMA-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	299	Total 2412	C 1568	N 400	O 437	S 7	0	0	0
3	F	292	Total 2354	C 1531	N 391	O 425	S 7	0	0	0

- Molecule 4 is STAUROSPORINE (three-letter code: STU) (formula: $C_{28}H_{26}N_4O_3$).
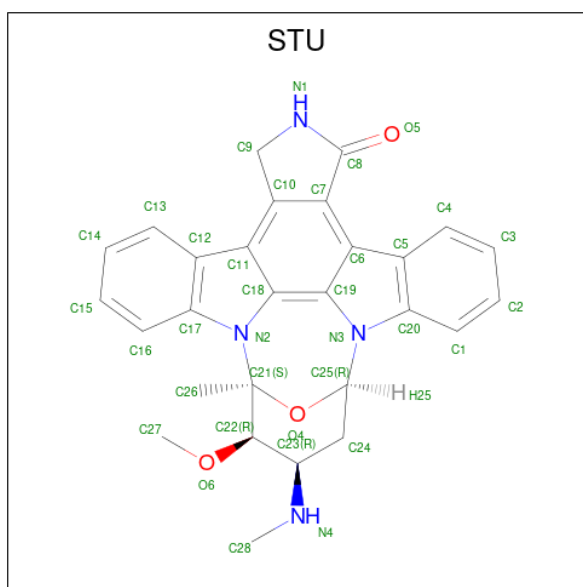
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total 35	C 28	N 4	O 3	0	0
4	C	1	Total 35	C 28	N 4	O 3	0	0

- Molecule 5 is 3-[4-(2-hydroxyphenyl)phenyl]-4-oxidanyl-6-oxidanylidene-7H-thieno[2,3-b]py ridine-5-carbonitrile (three-letter code: C1V) (formula: $C_{20}H_{12}N_2O_3S$).
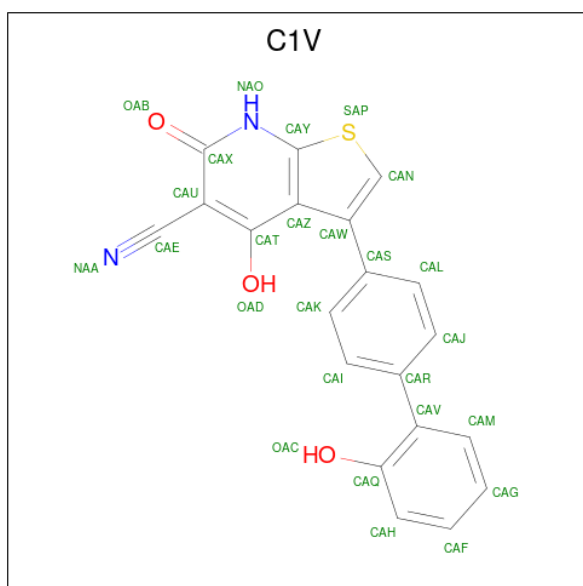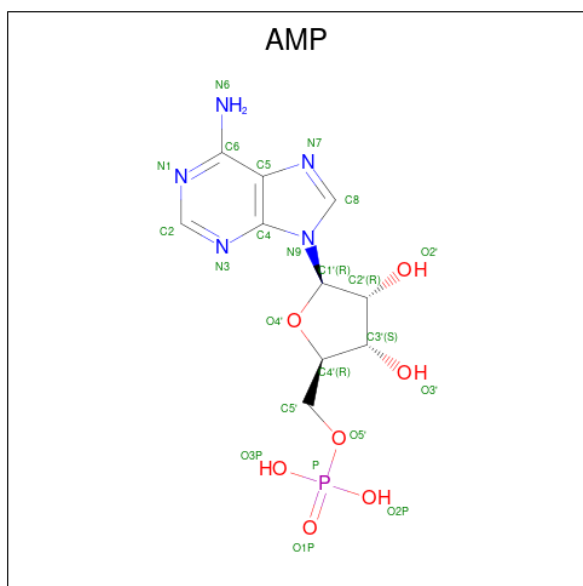

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	B	1	Total 26	C 20	N 2	O 3	S 1	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	C	1	Total	C	N	O	S	0	0
			26	20	2	3	1		

- Molecule 6 is ADENOSINE MONOPHOSPHATE (three-letter code: AMP) (formula: $C_{10}H_{14}N_5O_7P$).
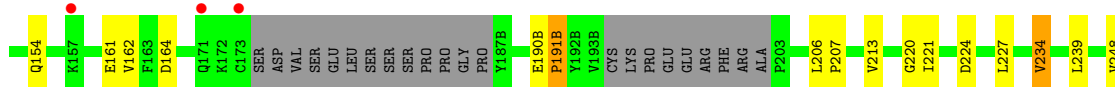

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	E	1	Total	C	N	O	P	0	0
			23	10	5	7	1		
6	E	1	Total	C	N	O	P	0	0
			23	10	5	7	1		
6	F	1	Total	C	N	O	P	0	0
			23	10	5	7	1		
6	F	1	Total	C	N	O	P	0	0
			23	10	5	7	1		

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: 5'-AMP-ACTIVATED PROTEIN KINASE CATALYTIC SUBUNIT ALPHA-2

Chain A:

• Molecule 1: 5'-AMP-ACTIVATED PROTEIN KINASE CATALYTIC SUBUNIT ALPHA-2

Chain C:

D473 ASP GLU VAL VAL GLU GLN ARG GLY SER GLY SER SER THR PRO GLN ARG SER CYS SER ALA ALA GLY LEU HIS ARG PRO ARG SER SER PHE ASP SER THR THR ALA GLU SER HIS SER LEU SER GLY SER LEU THR GLY SER LEU THR GLY SER THR THR LEU SER SER VAL SER PRO ARG

L532 A551 ARG

• Molecule 2: 5'-AMP-ACTIVATED PROTEIN KINASE SUBUNIT BETA-1

Chain B:

MET GLY LEU ASN ASP ILE PHE GLU ALA GLN LYS ILE GLU TRP HIS GLU MET GLY ASN THR SER SER GLU ARG ALA ALA LEU GLU ARG HIS GLY HIS LYS THR PRO ARG ARG ASP SER SER GLY GLY THR LYS ASP GLY ASP ARG PRO LYS ILE LEU MET ASP SER PRO GLU ASP ALA

ASP LEU PHE HIS SER GLU GLU ILE LYS ALA PRO GLU LYS GLU GLU PHE LEU ALA TRP GLN HIS ASP LEU GLU VAL ASN ASP LYS ALA PRO ALA GLN ALA R78 W84 G88 K89 N98 T106 R107 S108 H109 F112 V113 A114 I115 E122 V129 D136 P137 N150

Q154 K157 E161 V162 F163 D164 Q171 K172 C173 SER ASP VAL SER GLU LEU SER SER SER PRO PRO GLY PRO Y187B E190B P191B Y192B V193B CYS LYS PRO GLU GLU ARG PHE ARG ALA P203 L206 P207 V213 G220 I221 D224 L227 V234 L239 V248

L251 R256 Y257 K258 T264 K268 P269 I270

• Molecule 2: 5'-AMP-ACTIVATED PROTEIN KINASE SUBUNIT BETA-1

Chain D:

MET GLY LEU ASN ASP ILE PHE GLU ALA GLN LYS ILE GLU TRP HIS GLU MET GLY ASN THR SER SER GLU ARG ALA ALA LEU GLU ARG HIS GLY HIS LYS THR PRO ARG ARG ASP SER SER GLY GLY THR LYS ASP GLY ASP ARG PRO LYS ILE LEU MET ASP SER PRO GLU ASP ALA

ASP LEU PHE HIS SER GLU GLU ILE LYS ALA PRO GLU LYS GLU GLU GLU VAL ASN ASP LYS ALA PRO ALA GLN ALA R78 P79 T80 V81 W84 G87 G88 N98 F112 I115 L118 P119 E122 K126 W133 P137

Q145 L146 G147 Q154 E161 D164 A165 L166 D169 C173 SER ASP VAL SER GLU LEU SER SER SER PRO PRO GLY PRO TYR HIS Q189D E190D P191D Y192D V193D C194D K195D P196D GLU GLU ARG PHE ARG ALA P203 P204 I205 L206 P207 V213 I221 D224 L227 N232 H233

L239 D246 G247 V248 T264 Y267 K268 P269 I270

• Molecule 3: 5'-AMP-ACTIVATED PROTEIN KINASE SUBUNIT GAMMA-1

Chain E:

MET GLU THR VAL ILE SER SER ASP SER SER PRO ALA VAL GLU ASN GLU HIS PRO GLN GLU THR PRO GLU SER ASN ASN S27 M33 R37 C38 V39 D40 L41 I42 P43 S46 K47 L48 V49 Q56 R70 P73 L74 L86 T87 I88 I92 N93 I94 Y98

S101 A102 E108 L109 E110 L122 Q123 D124 S125 F126 F139 L145 R152 N162 I166 L167 T168 H169 I172 L173 F183 P184 K185 P186 R208 T209 T210 T211 P212 V215 A216 L217 D239 I240 F244 I247 N256 T263 R269 S270 H271 Y272 F273

V276 L277 K278 I289 L292 H298 R299 D304 E305 N306 D307 L315 T325 GLY GLY GLU LYS LYS PRO

• Molecule 3: 5'-AMP-ACTIVATED PROTEIN KINASE SUBUNIT GAMMA-1

Chain F:

69%   18%   •   12%

MET GLU THR VAL ILE SER SER ASP SER SER PRO ALA VAL VAL GLU ASN GLU HIS PRO GLN GLU THR PRO GLU SER ASN ASN S27 T30 K34 P43 S46 K47 L48 V49 L55 K58 F62 N67 G68 V69 R70 P73 L74 S77 Q80 G84 M85 L86

T87 I88 I92 N93 I94 Y98 E108 L109 Y121 LEU GLN ASP SER PHE LYS P128 L129 R152 D157 L164 Y165 I166 L173 F183 E187 Y201 A202 A205 R208 T209 T210 V215 A216 L217 G218 I219 F244 D245 V246 I247 K253 N256

R269 Y272 F273 E274 G275 V276 L277 K278 I289 H298 R299 L300 V301 E305 N306 D307 K310 G311 I312 L324 THR GLY GLY GLU LYS LYS PRO

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	76.02Å 134.79Å 141.29Å 90.00° 93.04° 90.00°	Depositor
Resolution (Å)	19.93 – 3.92 19.93 – 3.92	Depositor EDS
% Data completeness (in resolution range)	94.1 (19.93-3.92) 94.2 (19.93-3.92)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.07 (at 3.94Å)	Xtriage
Refinement program	PHENIX (PHENIX.REFINE: 1.8.2_1309)	Depositor
R, R_{free}	0.208 , 0.264 0.208 , 0.263	Depositor DCC
R_{free} test set	1208 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å^2)	124.8	Xtriage
Anisotropy	0.604	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.25 , 31.1	EDS
L-test for twinning [2]	$< |L| > = 0.48, < L^2 > = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	14484	wwPDB-VP
Average B, all atoms (Å^2)	87.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.02% 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 ⓘ

5.1　Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: STU, TPO, C1V, SEP, AMP

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	0.23	0/3470	0.39	0/4687
1	C	0.22	0/3461	0.37	0/4675
2	B	0.23	0/1376	0.44	1/1872 (0.1%)
2	D	0.24	0/1381	0.46	2/1879 (0.1%)
3	E	0.26	0/2463	0.43	0/3344
3	F	0.23	0/2403	0.40	0/3261
All	All	0.23	0/14554	0.41	3/19718 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	191(D)	PRO	N-CA-CB	5.86	110.33	103.30
2	B	191(B)	PRO	N-CA-CB	5.71	110.16	103.30
2	D	196(D)	PRO	N-CA-CB	5.53	109.94	103.30

There are no chirality outliers.

There are no planarity outliers.

5.2　Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3403	0	3394	46	0
1	C	3394	0	3386	44	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	1351	0	1328	22	0
2	D	1356	0	1329	23	0
3	E	2412	0	2483	35	0
3	F	2354	0	2426	30	0
4	A	35	0	26	3	0
4	C	35	0	26	3	0
5	B	26	0	12	1	0
5	C	26	0	12	0	0
6	E	46	0	24	1	0
6	F	46	0	24	2	0
All	All	14484	0	14470	183	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 6.

All (183) 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:C:370:MET:HG3	3:F:68:GLY:HA2	1.66	0.77
1:A:179:TYR:HA	1:A:202:VAL:HG11	1.73	0.71
1:C:430:TRP:HB3	1:C:440:VAL:HA	1.71	0.70
2:D:122:GLU:HG2	2:D:154:GLN:HG2	1.74	0.70
1:C:402:TRP:HB2	2:D:213:VAL:HG11	1.74	0.69
2:B:264:THR:HG22	3:E:48:LEU:HD23	1.75	0.68
3:F:98:TYR:CG	3:F:108:GLU:HG3	2.29	0.67
1:A:194:GLU:O	1:A:256:ARG:NH1	2.24	0.67
3:E:92:ILE:HG23	3:E:217:LEU:HD22	1.77	0.67
3:E:98:TYR:CG	3:E:108:GLU:HG3	2.31	0.65
1:A:100:GLU:OE2	4:A:1552:STU:N4	2.31	0.64
1:C:194:GLU:O	1:C:256:ARG:NH1	2.29	0.64
1:C:179:TYR:HA	1:C:202:VAL:HG11	1.79	0.64
3:F:94:ILE:HG21	3:F:109:LEU:HD13	1.81	0.63
3:F:88:ILE:HG23	3:F:247:ILE:HG23	1.82	0.62
3:E:74:LEU:HD21	3:E:86:LEU:HB2	1.80	0.62
1:A:423:MET:HB3	1:A:428:PHE:HB2	1.83	0.61
2:D:269:PRO:HG3	3:F:55:LEU:HA	1.81	0.61
1:C:158:PHE:O	1:C:160:LEU:N	2.33	0.61
1:C:63:ARG:NH2	1:C:162:ASN:OD1	2.34	0.61
4:C:1552:STU:H261	4:C:1552:STU:H16	1.83	0.61
3:E:244:PHE:HB3	6:E:1326:AMP:H5'1	1.84	0.60
1:A:142:PRO:HD3	1:A:203:ILE:HG12	1.82	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:277:LEU:HB2	6:F:1325:AMP:N1	2.17	0.59
1:C:423:MET:HB3	1:C:428:PHE:HB2	1.83	0.59
3:E:43:PRO:HG2	3:E:46:SER:HB3	1.85	0.58
1:C:454:SER:HB3	1:C:470:LYS:HB3	1.86	0.57
4:A:1552:STU:H261	4:A:1552:STU:H16	1.86	0.57
2:B:248:VAL:HA	2:B:269:PRO:HA	1.85	0.57
3:E:37:ARG:HD3	3:E:39:TYR:HB3	1.86	0.57
3:F:278:LYS:NZ	3:F:307:ASP:OD1	2.35	0.57
1:A:82:VAL:HG13	2:B:162:VAL:HG21	1.86	0.57
1:C:462:ASN:N	1:C:462:ASN:OD1	2.38	0.57
1:A:165:SER:HB2	1:A:168:GLU:HB2	1.86	0.56
1:A:63:ARG:O	1:A:67:ASN:ND2	2.32	0.56
1:A:218:HIS:CD2	1:A:220:PRO:HD2	2.40	0.56
1:A:11:VAL:HG22	2:B:115:ILE:HD12	1.88	0.56
1:A:22:LEU:HD21	1:A:32:ILE:HB	1.88	0.56
2:B:206:LEU:HD12	2:B:207:PRO:HD2	1.87	0.55
1:A:428:PHE:HE1	1:A:442:ARG:HD3	1.71	0.55
1:C:428:PHE:HE1	1:C:442:ARG:HD3	1.71	0.55
3:E:304:ASP:O	3:E:306:ASN:N	2.39	0.55
3:F:209:THR:HG23	3:F:210:THR:HG23	1.89	0.54
1:C:85:THR:HG22	2:D:79:PRO:HG2	1.89	0.54
1:A:469:PHE:HE2	1:A:546:LEU:HD23	1.72	0.54
1:A:429:GLU:OE1	1:A:441:ARG:NH1	2.41	0.54
2:B:122:GLU:HG2	2:B:154:GLN:HG2	1.90	0.54
1:A:454:SER:HB3	1:A:470:LYS:HB3	1.90	0.53
1:A:412:PRO:HG3	1:A:465:TYR:CZ	2.44	0.53
1:A:134:MET:HA	1:A:164:MET:HE2	1.91	0.52
2:D:267:TYR:HE1	3:F:67:ASN:HD21	1.57	0.52
3:E:56:GLN:NE2	3:E:110:GLU:O	2.42	0.52
3:E:88:ILE:HG23	3:E:247:ILE:HG23	1.90	0.52
3:F:92:ILE:HG23	3:F:217:LEU:HD22	1.90	0.52
1:A:469:PHE:HB2	2:B:239:LEU:HB3	1.92	0.52
3:F:84:GLY:HA2	3:F:129:LEU:HD13	1.91	0.52
1:C:73:HIS:CG	1:C:74:PRO:HD2	2.45	0.51
3:E:33:MET:O	3:E:139:PHE:N	2.43	0.51
2:D:126:LYS:HE3	2:D:133:TRP:CE3	2.45	0.51
1:C:132:ARG:CZ	1:C:278:PRO:HG2	2.41	0.51
3:E:70:ARG:HH21	3:E:244:PHE:HB2	1.75	0.51
1:A:369:ARG:NH2	2:B:220:GLY:O	2.45	0.50
3:F:298:HIS:HB3	3:F:299:ARG:NH2	2.26	0.50
2:D:224:ASP:HB3	2:D:227:LEU:HG	1.92	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:74:LEU:HD21	3:F:86:LEU:HB2	1.93	0.50
3:E:173:LEU:HD21	3:E:289:ILE:HG23	1.94	0.50
2:B:108:SEP:OG	2:B:109:HIS:N	2.38	0.50
1:C:218:HIS:CD2	1:C:220:PRO:HD2	2.46	0.49
2:B:256:ARG:NH1	2:B:258:LYS:O	2.36	0.49
1:A:443:LYS:NZ	1:A:448:GLY:O	2.45	0.49
2:D:81:VAL:HG22	2:D:115:ILE:HG12	1.94	0.49
3:F:77:SER:O	3:F:80:GLN:NE2	2.34	0.49
1:C:366:HIS:HB3	1:C:369:ARG:HG2	1.93	0.49
1:C:434:ASN:HB3	1:C:437:HIS:HB3	1.94	0.48
3:E:27:SER:N	3:E:325:THR:HG1	2.11	0.48
2:D:84:TRP:HB3	2:D:112:PHE:HB2	1.95	0.48
3:F:58:LYS:HE2	3:F:62:PHE:CE2	2.49	0.48
1:A:229:GLY:HA3	1:A:251:VAL:HG22	1.95	0.48
3:E:94:ILE:HG21	3:E:109:LEU:HD13	1.95	0.48
3:E:73:PRO:HD3	3:E:166:ILE:HD11	1.95	0.48
2:D:206:LEU:HD12	2:D:207:PRO:HD2	1.96	0.47
1:A:26:THR:HG21	1:A:160:LEU:HG	1.95	0.47
1:C:157:ASP:HB2	4:C:1552:STU:H273	1.96	0.47
3:E:145:LEU:HD13	3:E:169:HIS:CD2	2.50	0.47
1:A:247:HIS:CG	1:A:257:ALA:HB2	2.49	0.47
1:C:112:GLU:HG2	1:C:114:MET:H	1.80	0.47
1:C:272:LEU:HD12	1:C:273:PRO:HD2	1.97	0.47
3:E:101:SER:OG	3:E:102:ALA:N	2.48	0.47
2:D:221:ILE:H	2:D:221:ILE:HD13	1.79	0.47
1:A:278:PRO:HA	1:A:283:TYR:CG	2.49	0.47
1:C:66:GLN:HA	1:C:69:LYS:HE3	1.96	0.47
3:E:49:VAL:O	3:E:73:PRO:HD2	2.15	0.47
1:C:123:ILE:HD11	1:C:145:VAL:HG11	1.95	0.47
3:F:85:MET:HE1	3:F:166:ILE:HD13	1.96	0.47
1:A:430:TRP:HB3	1:A:440:VAL:HG12	1.96	0.47
3:E:41:LEU:HD21	3:E:172:ILE:HA	1.97	0.47
1:A:35:HIS:HB3	1:A:39:GLY:H	1.79	0.47
1:A:402:TRP:HB2	2:B:213:VAL:HG11	1.97	0.47
1:C:21:THR:HG22	1:C:23:GLY:H	1.80	0.46
2:D:161:GLU:HB3	2:D:164:ASP:HB2	1.97	0.46
1:A:366:HIS:HB3	1:A:369:ARG:HG2	1.97	0.46
1:C:117:ARG:NH1	1:C:267:TRP:O	2.44	0.46
1:C:60:LYS:HA	1:C:63:ARG:HH11	1.81	0.46
1:C:365:PRO:HA	2:D:221:ILE:O	2.16	0.45
2:B:84:TRP:HB3	2:B:112:PHE:HB2	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:212:PRO:HB2	3:E:215:VAL:HG23	1.99	0.45
3:F:49:VAL:O	3:F:73:PRO:HD2	2.16	0.45
1:A:63:ARG:HH21	1:A:163:MET:HG2	1.81	0.45
1:A:138:ARG:HH12	1:A:172:TPO:HB	1.82	0.45
2:D:118:LEU:HA	2:D:119:PRO:HD3	1.87	0.45
1:A:112:GLU:HG2	1:A:114:MET:H	1.81	0.45
3:E:209:THR:O	3:E:263:THR:OG1	2.28	0.45
3:E:108:GLU:H	3:E:108:GLU:HG2	1.50	0.45
3:F:62:PHE:CZ	3:F:253:LYS:HE3	2.52	0.45
3:F:274:GLU:HA	3:F:275:GLY:HA3	1.69	0.45
1:A:434:ASN:HB3	1:A:437:HIS:HB3	1.99	0.44
1:C:247:HIS:CG	1:C:257:ALA:HB2	2.52	0.44
2:D:193(D):VAL:HA	2:D:194(D):CYS:CB	2.47	0.44
3:E:298:HIS:HB3	3:E:299:ARG:NH2	2.33	0.44
3:F:70:ARG:HH21	3:F:244:PHE:HB2	1.82	0.44
1:A:182:PRO:HD3	1:A:198:TRP:CE2	2.52	0.44
3:E:37:ARG:NH1	3:E:40:ASP:OD2	2.51	0.44
1:A:30:VAL:HG21	4:A:1552:STU:C17	2.47	0.44
1:A:214:PHE:HE2	1:A:230:VAL:H	1.65	0.44
3:E:123:GLN:OE1	3:E:124:ASP:N	2.51	0.44
2:B:224:ASP:HB3	2:B:227:LEU:HG	2.00	0.44
1:C:168:GLU:OE2	1:C:470:LYS:NZ	2.47	0.44
2:B:239:LEU:HD11	2:B:251:LEU:HB3	2.00	0.43
3:F:157:ASP:HB2	3:F:164:LEU:HD11	2.00	0.43
1:C:53:ARG:NH2	2:D:169:ASP:OD1	2.52	0.43
2:B:84:TRP:CZ2	2:B:129:VAL:HG21	2.53	0.43
2:B:108:SEP:P	2:B:109:HIS:H	2.41	0.43
1:C:12:LYS:HG2	1:C:17:VAL:HG22	1.99	0.43
1:A:126:ALA:HB3	1:A:155:ILE:HD13	1.98	0.43
3:E:70:ARG:NH2	3:E:244:PHE:HB2	2.34	0.43
1:A:167:GLY:HA2	2:B:234:VAL:O	2.19	0.43
1:C:322:VAL:HG12	1:C:326:LEU:HD23	2.00	0.43
3:E:315:LEU:HD12	3:E:315:LEU:HA	1.83	0.43
1:C:192:GLY:N	1:C:194:GLU:OE2	2.45	0.43
3:E:239:ASP:OD1	3:E:240:ILE:N	2.46	0.43
3:F:173:LEU:HD21	3:F:289:ILE:HG23	2.01	0.43
1:A:370:MET:HA	1:A:371:PRO:HD3	1.94	0.43
1:A:536:THR:OG1	3:E:162:ASN:ND2	2.52	0.43
1:C:469:PHE:HB2	2:D:239:LEU:HB3	2.01	0.43
3:E:122:LEU:HD22	3:E:125:SER:OG	2.19	0.43
1:C:83:ILE:HB	1:C:90:PHE:HB2	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:123:ILE:HG23	1:C:155:ILE:HD11	2.01	0.42
1:C:62:LYS:HB2	2:D:166:LEU:HD13	2.01	0.42
3:F:215:VAL:O	3:F:219:ILE:HG13	2.19	0.42
3:F:205:ALA:N	6:F:1326:AMP:N1	2.60	0.42
1:A:139:ASP:O	1:A:144:ASN:ND2	2.40	0.42
1:A:51:LYS:HD2	1:A:51:LYS:HA	1.81	0.42
3:F:201:TYR:CD1	3:F:311:GLY:HA3	2.54	0.42
1:A:73:HIS:CG	1:A:74:PRO:HD2	2.54	0.42
1:A:107:LYS:HG2	1:A:108:HIS:ND1	2.35	0.42
1:A:101:LEU:O	1:A:105:ILE:HG13	2.20	0.41
1:A:11:VAL:HG21	2:B:113:VAL:HG13	2.02	0.41
1:C:87:THR:OG1	2:D:81:VAL:HB	2.20	0.41
2:D:203:PRO:HA	2:D:204:PRO:HD3	1.88	0.41
3:F:30:THR:HG22	3:F:34:LYS:HE3	2.03	0.41
2:B:268:LYS:HA	2:B:269:PRO:HD2	1.95	0.41
3:F:301:VAL:HA	3:F:312:ILE:HD13	2.02	0.41
2:B:106:THR:HG22	5:B:1271:C1V:HAG	2.02	0.41
3:E:278:LYS:NZ	3:E:307:ASP:OD1	2.53	0.41
1:C:96:VAL:HG11	1:C:154:LYS:HG3	2.02	0.41
2:D:232:ASN:OD1	2:D:233:HIS:N	2.53	0.41
2:D:264:THR:HG22	3:F:48:LEU:HB3	2.03	0.41
1:C:48:ASN:O	1:C:52:ILE:HG12	2.21	0.41
3:F:43:PRO:HG2	3:F:46:SER:HB3	2.02	0.41
2:B:161:GLU:HB3	2:B:164:ASP:HB2	2.03	0.41
3:F:92:ILE:HG12	3:F:246:VAL:HG11	2.03	0.40
1:C:193:PRO:O	1:C:197:ILE:HG12	2.20	0.40
1:C:164:MET:HB2	1:C:164:MET:HE3	1.96	0.40
4:C:1552:STU:H22	4:C:1552:STU:H283	1.91	0.40
3:E:98:TYR:CD2	3:E:108:GLU:HG3	2.56	0.40
3:E:209:THR:HG23	3:E:210:THR:HG23	2.03	0.40
1:A:8:ASP:HA	1:A:10:ARG:NH1	2.36	0.40
2:B:136:ASP:HA	2:B:137:PRO:HD3	1.93	0.40
1:C:31:LYS:HD2	1:C:46:ILE:HD11	2.04	0.40
1:C:406:ILE:HD12	1:C:406:ILE:HA	1.99	0.40
1:C:412:PRO:HG3	1:C:465:TYR:CZ	2.55	0.40
2:D:248:VAL:HA	2:D:269:PRO:HA	2.02	0.40
3:E:167:LEU:HD12	3:E:167:LEU:HA	1.93	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	414/571 (72%)	388 (94%)	26 (6%)	0	100	100
1	C	412/571 (72%)	390 (95%)	21 (5%)	1 (0%)	47	79
2	B	164/286 (57%)	157 (96%)	5 (3%)	2 (1%)	13	49
2	D	165/286 (58%)	153 (93%)	9 (6%)	3 (2%)	8	41
3	E	297/331 (90%)	278 (94%)	15 (5%)	4 (1%)	12	48
3	F	288/331 (87%)	275 (96%)	12 (4%)	1 (0%)	41	75
All	All	1740/2376 (73%)	1641 (94%)	88 (5%)	11 (1%)	25	63

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	191(B)	PRO
1	C	159	GLY
3	E	184	PRO
3	F	277	LEU
2	D	193(D)	VAL
2	D	195(D)	LYS
3	E	186	PRO
3	E	305	GLU
2	B	190(B)	GLU
2	D	221	ILE
3	E	276	VAL

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	364/503 (72%)	354 (97%)	10 (3%)	44	67
1	C	364/503 (72%)	355 (98%)	9 (2%)	47	69
2	B	149/253 (59%)	145 (97%)	4 (3%)	44	67
2	D	149/253 (59%)	147 (99%)	2 (1%)	69	82
3	E	275/304 (90%)	260 (94%)	15 (6%)	21	51
3	F	268/304 (88%)	257 (96%)	11 (4%)	30	57
All	All	1569/2120 (74%)	1518 (97%)	51 (3%)	38	63

All (51) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	VAL
1	A	27	PHE
1	A	82	VAL
1	A	140	LEU
1	A	166	ASP
1	A	168	GLU
1	A	171	ARG
1	A	178	ASN
1	A	194	GLU
1	A	247	HIS
2	B	98	ASN
2	B	150	ASN
2	B	221	ILE
2	B	234	VAL
1	C	10	ARG
1	C	27	PHE
1	C	137	HIS
1	C	140	LEU
1	C	168	GLU
1	C	171	ARG
1	C	194	GLU
1	C	247	HIS
1	C	462	ASN
2	D	98	ASN
2	D	221	ILE
3	E	37	ARG
3	E	98	TYR
3	E	108	GLU
3	E	123	GLN
3	E	124	ASP

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Mol	Chain	Res	Type
3	E	126	PHE
3	E	152	ARG
3	E	183	PHE
3	E	208	ARG
3	E	256	ASN
3	E	269	ARG
3	E	273	PHE
3	E	292	LEU
3	E	299	ARG
3	E	315	LEU
3	F	69	VAL
3	F	108	GLU
3	F	152	ARG
3	F	183	PHE
3	F	187	GLU
3	F	208	ARG
3	F	256	ASN
3	F	269	ARG
3	F	272	TYR
3	F	305	GLU
3	F	310	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	336	GLN
3	F	223	HIS

5.3.3　RNA ⓘ

There are no RNA molecules in this entry.

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

4 non-standard protein/DNA/RNA residues 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	$\#|Z| > 2$
1	TPO	A	172	1	8,10,11	0.81	0	10,14,16	1.05	1 (10%)
2	SEP	D	108	2	8,9,10	0.92	0	8,12,14	0.77	0
1	TPO	C	172	1	8,10,11	0.80	0	10,14,16	1.05	1 (10%)
2	SEP	B	108	2	8,9,10	0.91	0	8,12,14	0.68	0

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
1	TPO	A	172	1	-	1/9/11/13	-
2	SEP	D	108	2	-	2/5/8/10	-
1	TPO	C	172	1	-	0/9/11/13	-
2	SEP	B	108	2	-	1/5/8/10	-

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	172	TPO	P-OG1-CB	-2.22	116.50	123.21
1	A	172	TPO	CG2-CB-CA	-2.00	109.21	113.16

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	108	SEP	N-CA-CB-OG
1	A	172	TPO	CB-OG1-P-O2P
2	B	108	SEP	N-CA-CB-OG
2	D	108	SEP	CB-OG-P-O2P

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	172	TPO	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	108	SEP	2	0

5.5 Carbohydrates ⓘ

There are no monosaccharides 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	#$|Z| > 2$
4	STU	A	1552	-	30,42,42	1.01	2 (6%)	31,68,68	2.23	9 (29%)
5	C1V	B	1271	-	29,29,29	3.00	12 (41%)	30,42,42	3.43	6 (20%)
4	STU	C	1552	-	30,42,42	0.96	2 (6%)	31,68,68	2.16	9 (29%)
6	AMP	F	1325	-	22,25,25	0.88	1 (4%)	25,38,38	1.24	2 (8%)
6	AMP	F	1326	-	22,25,25	0.89	1 (4%)	25,38,38	1.20	2 (8%)
6	AMP	E	1327	-	22,25,25	0.93	1 (4%)	25,38,38	1.14	2 (8%)
6	AMP	E	1326	-	22,25,25	0.92	1 (4%)	25,38,38	1.20	2 (8%)
5	C1V	C	1553	-	29,29,29	3.03	12 (41%)	30,42,42	3.59	5 (16%)

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
4	STU	A	1552	-	-	1/4/42/42	-
5	C1V	B	1271	-	-	0/8/10/10	0/4/4/4
4	STU	C	1552	-	-	1/4/42/42	-
6	AMP	F	1325	-	-	1/6/26/26	0/3/3/3
6	AMP	F	1326	-	-	0/6/26/26	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	AMP	E	1327	-	-	3/6/26/26	0/3/3/3
6	AMP	E	1326	-	-	3/6/26/26	0/3/3/3
5	C1V	C	1553	-	-	4/8/10/10	0/4/4/4

All (32) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	C	1553	C1V	OAB-CAX	8.98	1.40	1.23
5	B	1271	C1V	OAB-CAX	8.86	1.40	1.23
5	C	1553	C1V	CAW-CAZ	7.99	1.50	1.41
5	B	1271	C1V	CAW-CAZ	7.86	1.50	1.41
5	C	1553	C1V	CAN-CAW	5.58	1.40	1.37
5	B	1271	C1V	CAN-CAW	5.55	1.40	1.37
5	C	1553	C1V	CAE-CAU	4.49	1.52	1.43
5	B	1271	C1V	CAE-CAU	4.29	1.51	1.43
5	B	1271	C1V	CAW-CAS	3.52	1.55	1.49
5	C	1553	C1V	CAW-CAS	3.35	1.55	1.49
5	C	1553	C1V	CAV-CAR	3.26	1.55	1.49
5	B	1271	C1V	CAU-CAX	-3.14	1.39	1.44
5	B	1271	C1V	CAV-CAR	3.08	1.55	1.49
5	C	1553	C1V	CAY-NAO	-2.81	1.34	1.37
5	B	1271	C1V	CAY-NAO	-2.78	1.34	1.37
5	C	1553	C1V	OAD-CAT	2.77	1.40	1.33
5	C	1553	C1V	OAC-CAQ	2.76	1.42	1.36
5	C	1553	C1V	CAU-CAX	-2.74	1.40	1.44
5	B	1271	C1V	OAC-CAQ	2.72	1.41	1.36
5	B	1271	C1V	OAD-CAT	2.64	1.40	1.33
5	C	1553	C1V	CAU-CAT	2.60	1.43	1.38
5	B	1271	C1V	CAX-NAO	-2.57	1.32	1.35
4	A	1552	STU	O4-C25	-2.57	1.39	1.43
6	E	1326	AMP	C5-C4	2.55	1.47	1.40
6	E	1327	AMP	C5-C4	2.46	1.47	1.40
6	F	1325	AMP	C5-C4	2.44	1.47	1.40
4	C	1552	STU	O4-C25	-2.41	1.39	1.43
6	F	1326	AMP	C5-C4	2.41	1.47	1.40
4	A	1552	STU	C10-C11	-2.40	1.39	1.42
5	B	1271	C1V	CAU-CAT	2.30	1.43	1.38
5	C	1553	C1V	CAX-NAO	-2.26	1.32	1.35
4	C	1552	STU	C10-C11	-2.16	1.39	1.42

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	C	1553	C1V	CAW-CAN-SAP	-16.59	107.90	112.53
5	B	1271	C1V	CAW-CAN-SAP	-15.69	108.15	112.53
5	C	1553	C1V	CAU-CAX-NAO	7.72	121.71	114.89
5	B	1271	C1V	CAU-CAX-NAO	7.24	121.29	114.89
4	A	1552	STU	C9-N1-C8	-5.67	108.40	113.85
4	C	1552	STU	C9-N1-C8	-5.42	108.64	113.85
4	A	1552	STU	C10-C9-N1	4.35	106.18	101.76
4	A	1552	STU	C7-C8-N1	4.31	110.73	106.37
4	C	1552	STU	C10-C9-N1	4.28	106.11	101.76
4	C	1552	STU	C7-C8-N1	4.06	110.48	106.37
5	B	1271	C1V	CAN-CAW-CAS	-4.02	119.42	125.52
4	A	1552	STU	C27-O6-C22	-3.93	107.67	114.44
4	C	1552	STU	C26-C21-C22	-3.90	105.04	112.64
5	C	1553	C1V	CAN-CAW-CAZ	3.83	112.74	111.69
5	C	1553	C1V	CAN-CAW-CAS	-3.79	119.76	125.52
4	C	1552	STU	C27-O6-C22	-3.70	108.05	114.44
4	A	1552	STU	O5-C8-C7	-3.62	125.02	129.32
4	A	1552	STU	C26-C21-C22	-3.48	105.86	112.64
4	C	1552	STU	O5-C8-C7	-3.28	125.43	129.32
6	F	1325	AMP	N3-C2-N1	-3.27	123.57	128.68
6	E	1326	AMP	N3-C2-N1	-3.20	123.67	128.68
6	F	1326	AMP	C4-C5-N7	-3.01	106.26	109.40
6	E	1327	AMP	N3-C2-N1	-2.94	124.09	128.68
6	F	1326	AMP	N3-C2-N1	-2.86	124.20	128.68
6	E	1327	AMP	C4-C5-N7	-2.81	106.47	109.40
5	B	1271	C1V	CAN-CAW-CAZ	2.75	112.44	111.69
4	A	1552	STU	C13-C12-C17	2.70	122.81	119.39
6	E	1326	AMP	C4-C5-N7	-2.69	106.60	109.40
6	F	1325	AMP	C4-C5-N7	-2.69	106.60	109.40
5	C	1553	C1V	OAB-CAX-CAU	-2.68	118.90	124.18
5	B	1271	C1V	OAB-CAX-CAU	-2.66	118.94	124.18
4	C	1552	STU	C3-C4-C5	-2.38	116.86	120.86
4	C	1552	STU	C13-C12-C17	2.37	122.39	119.39
4	A	1552	STU	C3-C4-C5	-2.35	116.91	120.86
5	B	1271	C1V	CAR-CAV-CAQ	-2.06	120.56	122.36
4	A	1552	STU	C14-C13-C12	-2.05	117.41	120.86
4	C	1552	STU	C14-C13-C12	-2.00	117.50	120.86

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	E	1326	AMP	C5'-O5'-P-O2P

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Mol	Chain	Res	Type	Atoms
6	E	1326	AMP	C5'-O5'-P-O3P
6	E	1327	AMP	C5'-O5'-P-O2P
6	E	1327	AMP	C5'-O5'-P-O3P
5	C	1553	C1V	CAL-CAS-CAW-CAZ
5	C	1553	C1V	CAK-CAS-CAW-CAZ
5	C	1553	C1V	CAL-CAS-CAW-CAN
4	C	1552	STU	C24-C23-N4-C28
6	F	1325	AMP	C5'-O5'-P-O1P
4	A	1552	STU	C24-C23-N4-C28
6	E	1327	AMP	O4'-C4'-C5'-O5'
6	E	1326	AMP	C5'-O5'-P-O1P
5	C	1553	C1V	CAK-CAS-CAW-CAN

There are no ring outliers.

6 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1552	STU	3	0
5	B	1271	C1V	1	0
4	C	1552	STU	3	0
6	F	1325	AMP	1	0
6	F	1326	AMP	1	0
6	E	1326	AMP	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 STU A 1552

Bond lengths

Bond angles

Torsions

Rings

Ligand C1V B 1271

Bond lengths

Bond angles

Torsions

Rings

Ligand STU C 1552

Bond lengths

Bond angles

Torsions

Rings

Ligand AMP F 1325

Bond lengths

Bond angles

Torsions

Rings

Ligand AMP F 1326

Bond lengths

Bond angles

Torsions

Rings

Ligand AMP E 1327

Bond lengths

Bond angles

Torsions

Rings

Ligand AMP E 1326

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	424/571 (74%)	-0.20	2 (0%)	91	85	32, 79, 136, 159	0
1	C	422/571 (73%)	-0.19	2 (0%)	91	85	50, 92, 140, 161	0
2	B	170/286 (59%)	0.08	5 (2%)	51	41	48, 100, 152, 182	0
2	D	171/286 (59%)	0.02	6 (3%)	44	35	58, 101, 145, 173	0
3	E	299/331 (90%)	-0.37	4 (1%)	77	68	29, 68, 140, 192	0
3	F	292/331 (88%)	-0.44	2 (0%)	87	82	44, 73, 124, 147	0
All	All	1778/2376 (74%)	-0.22	21 (1%)	79	70	29, 83, 141, 192	0

All (21) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	E	124	ASP	5.2
2	B	89	LYS	4.6
2	B	88	GLY	4.3
2	B	171	GLN	3.2
1	A	375	ALA	2.9
3	E	305	GLU	2.9
2	D	147	GLY	2.5
2	D	87	GLY	2.4
2	D	88	GLY	2.4
2	D	137	PRO	2.4
3	E	271	HIS	2.4
2	B	157	LYS	2.2
2	B	173	CYS	2.2
2	D	246	ASP	2.1
2	D	145	GLN	2.1
1	C	215	ASP	2.1
3	F	305	GLU	2.1
1	C	55	LEU	2.1
1	A	171	ARG	2.0

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Mol	Chain	Res	Type	RSRZ
3	F	202	ALA	2.0
3	E	273	PHE	2.0

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

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	SEP	B	108	10/11	0.91	0.18	93,103,114,115	0
1	TPO	A	172	11/12	0.93	0.13	54,71,75,76	0
1	TPO	C	172	11/12	0.94	0.12	66,92,95,95	0
2	SEP	D	108	10/11	0.94	0.18	83,98,109,111	0

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
5	C1V	B	1271	26/26	0.92	0.21	90,90,94,94	0
4	STU	C	1552	35/35	0.93	0.20	119,122,127,127	0
5	C1V	C	1553	26/26	0.93	0.24	92,96,108,110	0
6	AMP	E	1326	23/23	0.93	0.20	80,83,99,101	0
4	STU	A	1552	35/35	0.94	0.21	102,107,111,114	0
6	AMP	E	1327	23/23	0.94	0.16	71,75,79,81	0
6	AMP	F	1326	23/23	0.95	0.16	52,55,62,64	0
6	AMP	F	1325	23/23	0.96	0.16	52,59,69,74	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 C1V B 1271:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
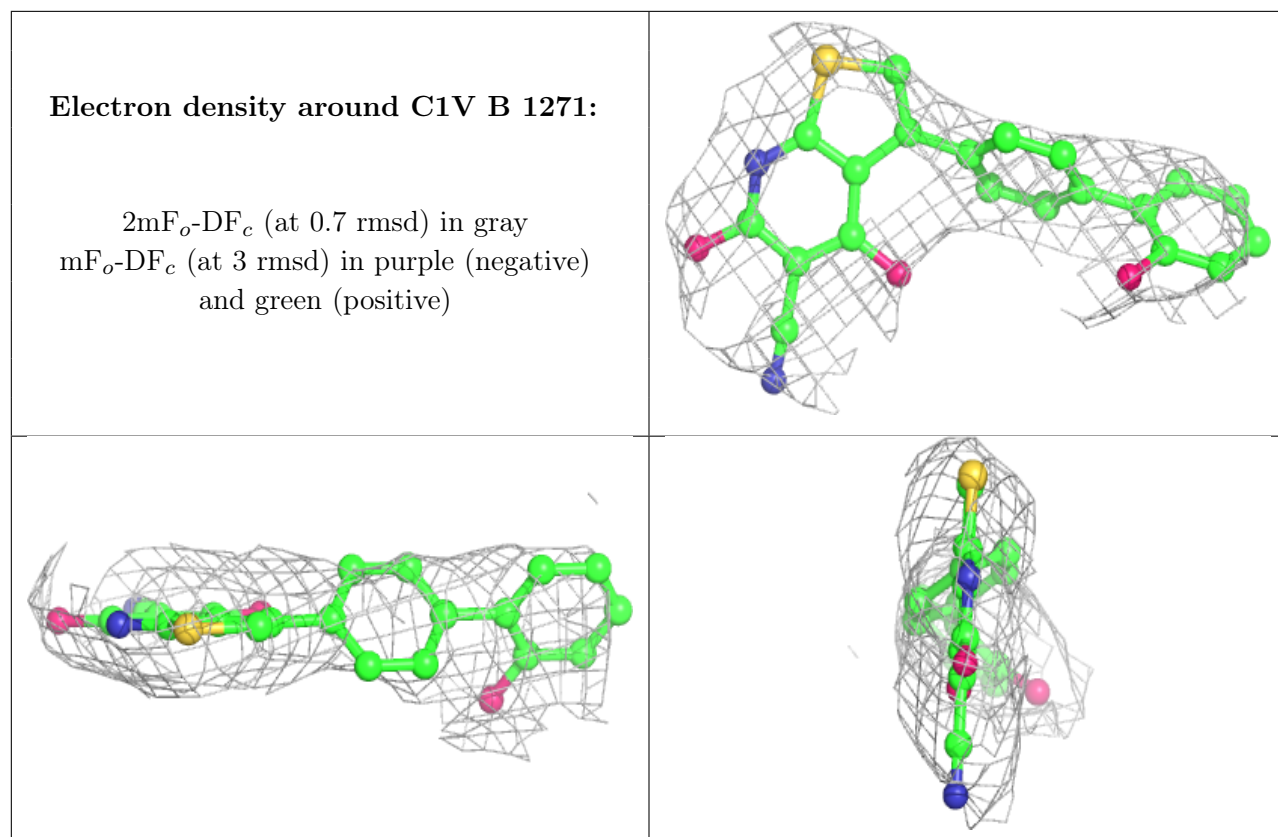
Electron density around STU C 1552:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
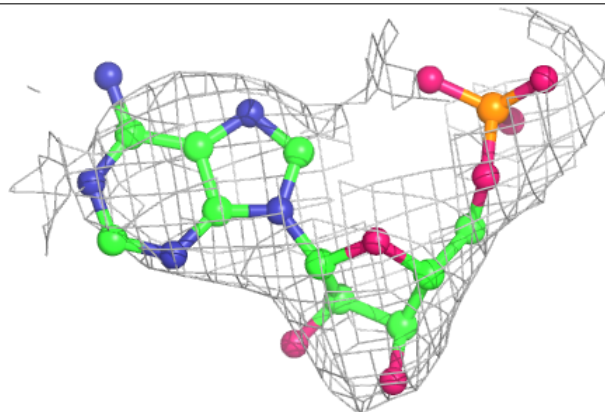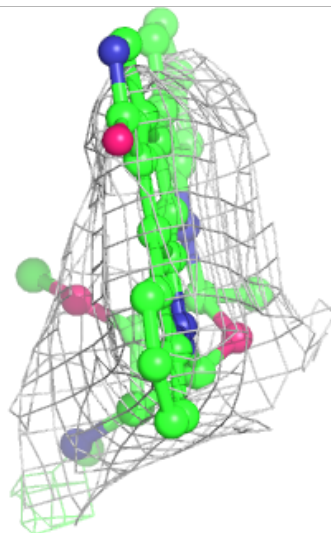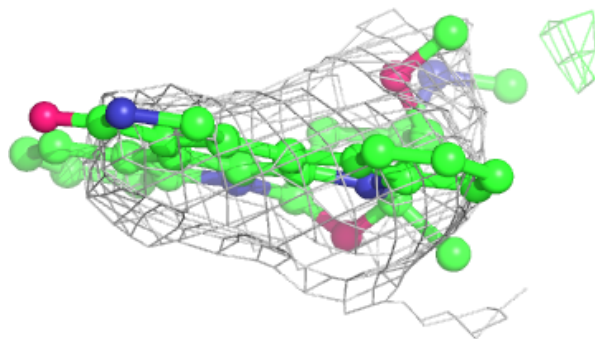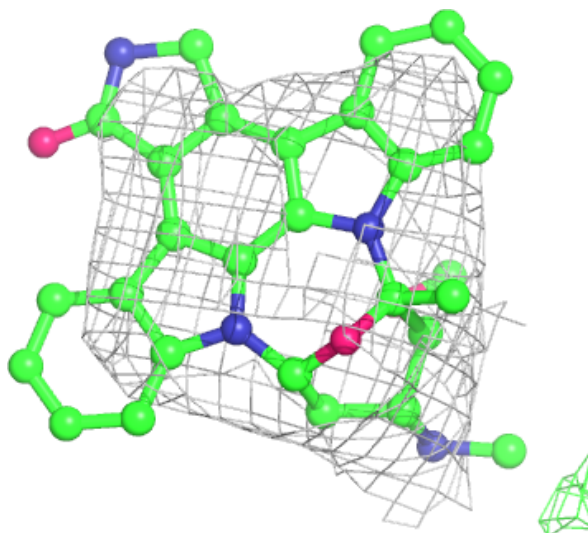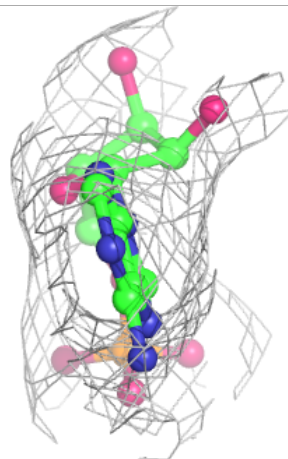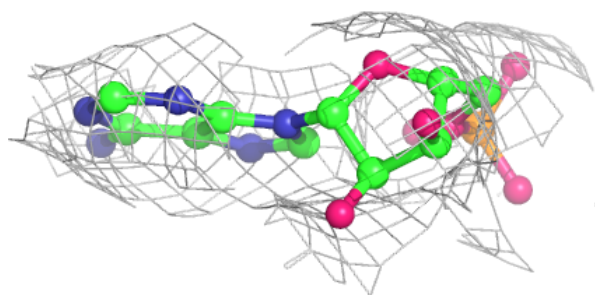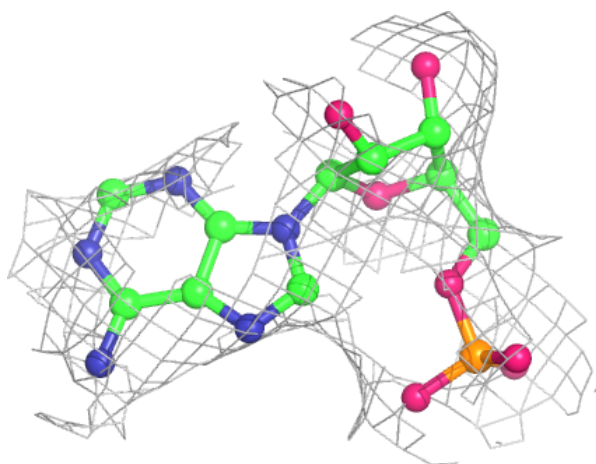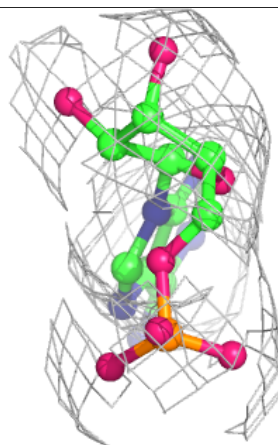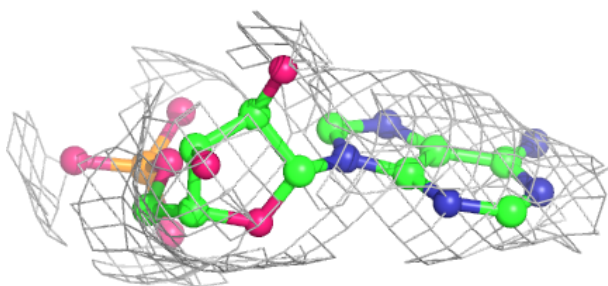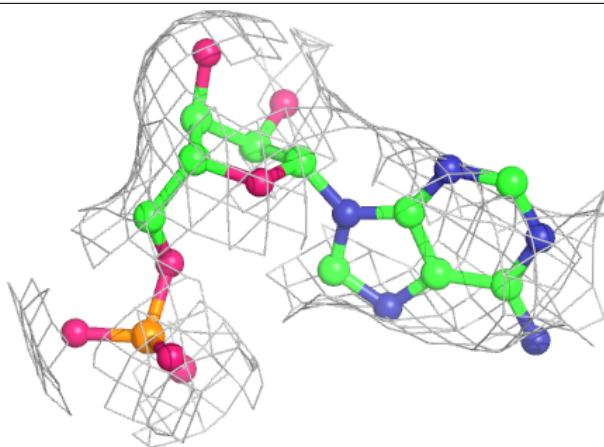mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
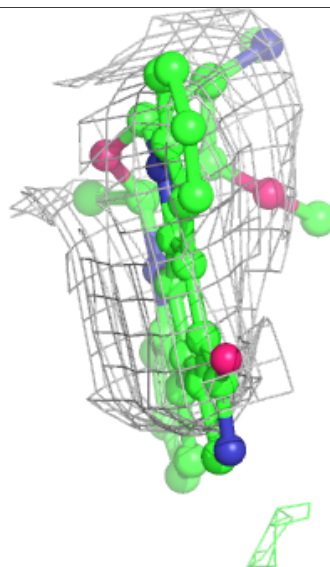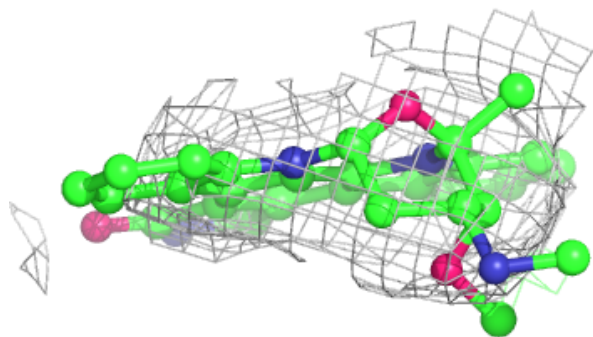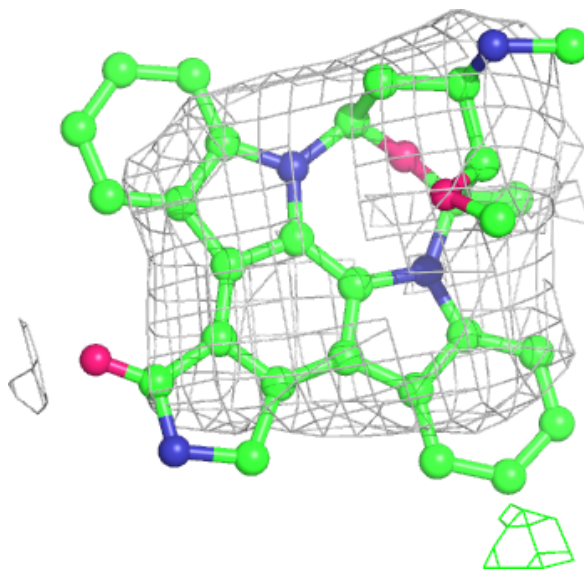
Electron density around C1V C 1553:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
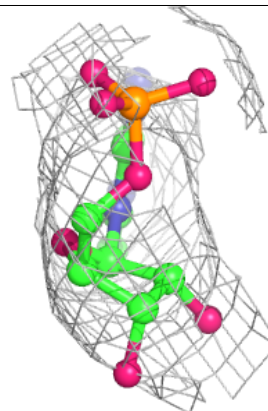and green (positive)
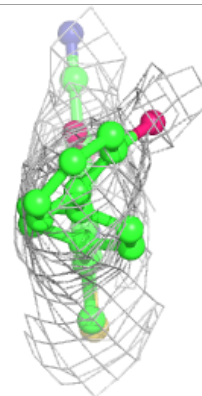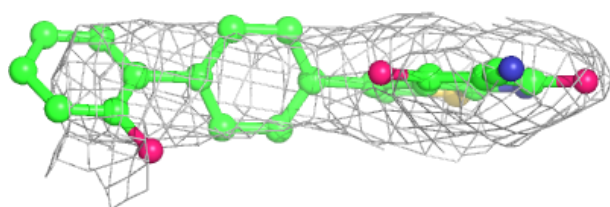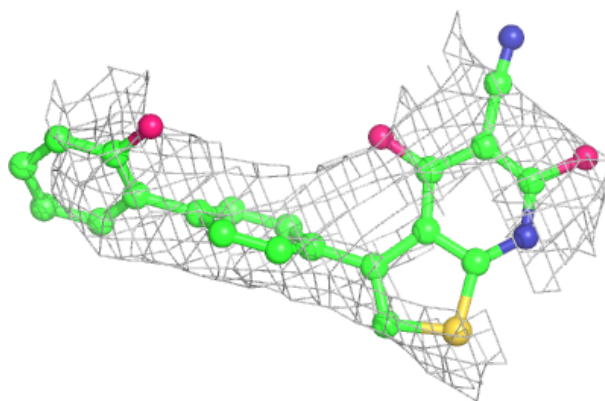
Electron density around AMP E 1326:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
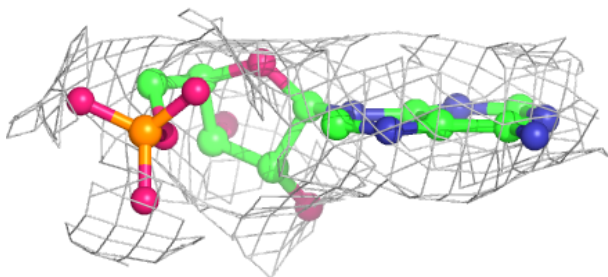$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
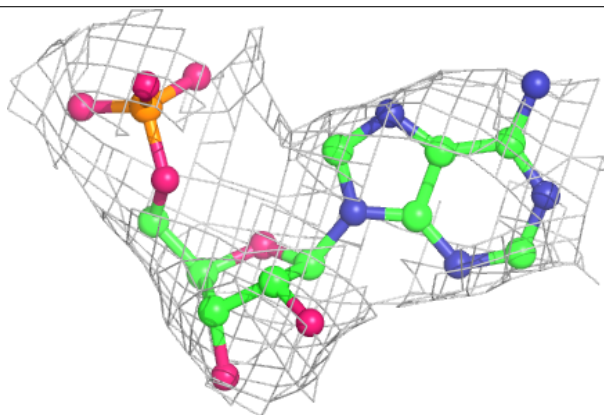and green (positive)
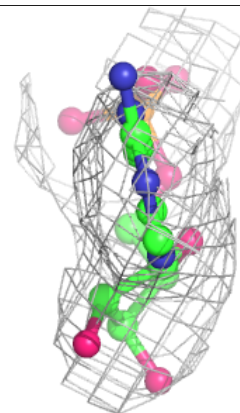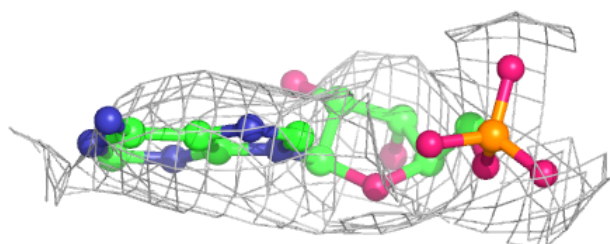
Electron density around STU A 1552:

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

Electron density around AMP E 1327:

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

Electron density around AMP F 1326:

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

Electron density around AMP F 1325:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.