wwPDB X-ray Structure Validation Summary Report ⓘ

Jun 12, 2024 – 01:57 PM EDT

PDB ID	:	3CF2
Title	:	Structure of P97/vcp in complex with ADP/AMP-PNP
Authors	:	Davies, J.M.; Delabarre, B.; Brunger, A.T.; Weis, W.I.
Deposited on	:	2008-03-01
Resolution	:	3.50 Å(reported)

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

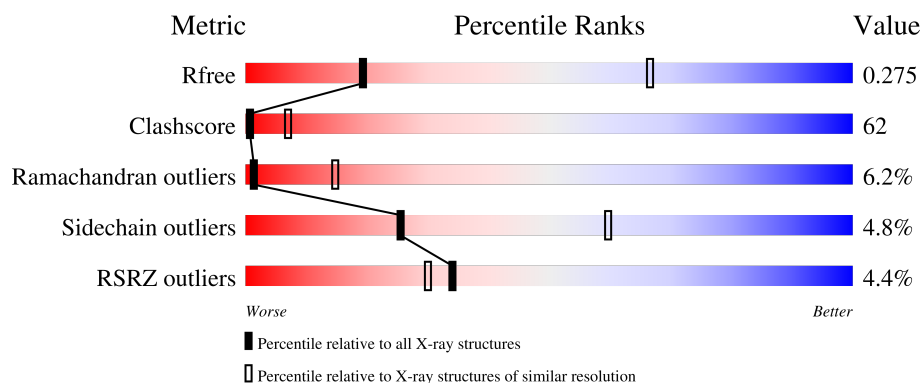|		
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.36.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 3.50 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		0.275
Clashscore		62
Ramachandran outliers		6.2%
Sidechain outliers		4.8%
RSRZ outliers		4.4%

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	1659 (3.60-3.40)
Clashscore	141614	1036 (3.58-3.42)
Ramachandran outliers	138981	1005 (3.58-3.42)
Sidechain outliers	138945	1006 (3.58-3.42)
RSRZ outliers	127900	1559 (3.60-3.40)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	806	4% / 26% 49% 7% 18%
1	B	806	3% / 27% 48% 7% 18%
1	C	806	3% / 26% 49% 7% 18%
1	D	806	4% / 26% 49% 7% 18%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 20917 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 Transitional endoplasmic reticulum ATPase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	659	Total	C	N	O	S	0	0	0
			5172	3263	903	977	29			
1	B	659	Total	C	N	O	S	0	0	0
			5172	3263	903	977	29			
1	C	659	Total	C	N	O	S	0	0	0
			5172	3263	903	977	29			
1	D	659	Total	C	N	O	S	0	0	0
			5169	3260	903	977	29			

- Molecule 2 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).
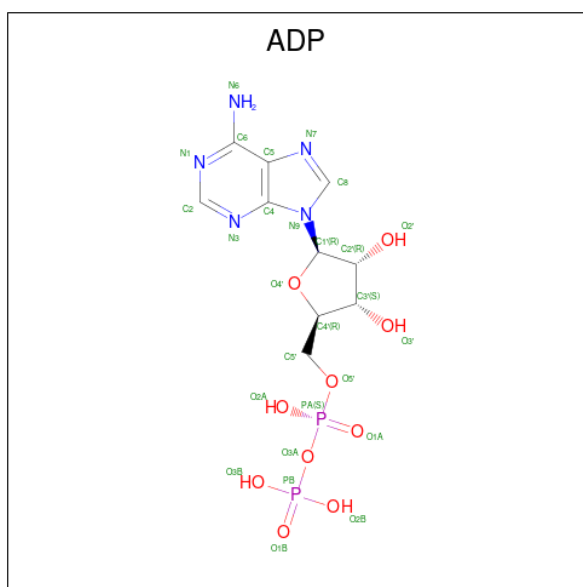
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
2	B	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	C	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
2	D	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

- Molecule 3 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (three-letter code: ANP) (formula: $C_{10}H_{17}N_6O_{12}P_3$).
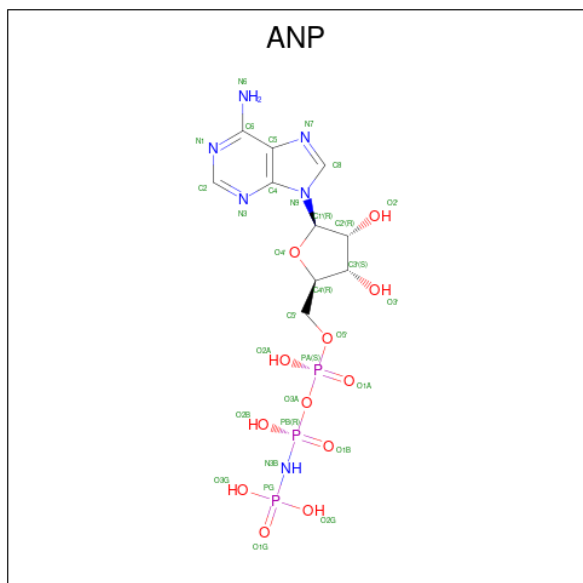
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			31	10	6	12	3		
3	B	1	Total	C	N	O	P	0	0
			31	10	6	12	3		
3	C	1	Total	C	N	O	P	0	0
			31	10	6	12	3		
3	D	1	Total	C	N	O	P	0	0
			31	10	6	12	3		

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: Transitional endoplasmic reticulum ATPase

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ASP ASP PRO V728 P729 E730 ILE ARG ARG ASP H735 E738 A739 M740 ARG PHE ALA ARG ARG SER VAL SER ASP ASN ILE ARG LYS TYR E756 M757 F758 A759 GLN THR LEU GLN GLN SER ARG GLY PHE GLY SER PHE ARG PRO SER ASN GLN GLY GLY ALA GLY PRO SER GLN

GLY SER GLY GLY THR GLY SER VAL TYR THR ASP ASP ASN ASP ASP LEU TYR GLY

● Molecule 1: Transitional endoplasmic reticulum ATPase

Chain C:

MET ALA SER GLY ALA ASP SER LYS GLY ASP ASP LEU SER THR ALA ILE LEU LYS GLN LYS N21 R22 R25 L26 I27 V28 I32 N33 E34 D35 N36 S37 V38 V39 S40 L41 S42 Q43 P44 K45 L49 Q50 L51 F52 R53 G54 D55 T56 V57 L58 L59 K60 G61 K62 K63 R64 R65

E66 A67 V68 C69 I70 V71 L72 S73 D74 D75 T76 C77 S78 D79 E80 K81 I82 R83 M84 N85 R86 V87 V88 R89 N90 N91 L92 R93 V94 R95 L96 G97 D98 V99 I100 S101 I102 Q103 P104 D107 V108 K109 Y110 G111 K112 R113 I114 L117 P118 I119 D120 D121 T122 V123 E124 G125 I126 T127

G128 N129 L130 F131 E132 V133 Y134 L135 K136 P137 Y138 F139 Y143 R144 P145 I146 R147 D150 I151 F152 L153 V154 R155 M158 R159 A160 V161 E162 F163 K164 V165 T168 D169 P170 S171 P172 Y173 C174 I175 V176 A177 P178 D179 T180 V181 I182 H183 E187 P188 I189 K190 R191 E192 D193 E194

S197 L198 N199 E200 V201 G202 Y203 D204 D205 I206 G207 G208 C209 R210 K211 Q212 L213 A214 Q215 I216 K217 V220 E221 L222 P223 L224 R225 H226 P227 A228 L229 F230 I233 G234 V235 K236 P237 P238 R239 G240 I241 L242 L243 Y244 T249 G250 K251 T252 L253 I254 A255 R256 A257 V258 A259 N260

E261 L268 I269 N270 G271 P272 E273 I274 M275 S276 K277 L278 A279 G280 E281 S282 E283 S284 N285 L286 R287 K288 A289 F290 E291 E292 A293 E294 K295 N296 A297 P298 I301 F302 E305 L306 D307 A308 I309 A310 P311 K312 R313 E314 K315 T316 H317 R323 S326 Q327 L328 L329 T330 L331 M332

D333 Q337 H340 V341 I342 V343 M344 A345 A346 T347 N348 R349 P350 N351 S352 I353 D354 P355 A356 L357 R358 R362 F363 D364 R365 V366 V367 D368 I369 P372 D373 A374 T375 G376 R377 L378 E379 I380 L381 Q382 I383 H384 T385 K386 N387 M388 K389 L390 A391 V394 E397 Q398 V399 A400

N401 E402 V407 G408 A409 D410 L411 A412 A413 L414 E417 A418 A419 L420 Q421 A422 I423 R424 A425 K426 M427 D428 L429 I430 D431 L432 E433 D434 E435 T436 I437 D438 A439 E440 V441 M442 N443 S444 L445 A446 M449 A455 Q458 S459 N460 P461 R465 E466 T467 V468 V469 E470 V471 P472

Q473 V474 T475 W476 E477 D478 I479 L482 E483 D484 V485 K486 R487 E488 L489 Q490 E491 L492 V493 Q494 Y495 P496 V497 E498 H499 D500 D501 K502 F503 L504 K505 F506 S511 V514 L515 F516 Y517 G518 P519 P520 G521 C522 G523 K524 T525 L526 L527 A528 K529 A530 I531 A532 N533 E534 S538 F539

I540 S541 I542 K543 G544 P546 E546 L547 L548 T549 M550 W551 F552 S555 E556 A557 N558 V559 I562 F563 A566 A570 P571 C572 V573 L574 F575 F576 D577 E578 L579 I582 ALA LYS ALA ARG GLY GLY ASN ILE GLY ASP GLY GLY GLY ALA A597 D598 R599 V600 I601 N602 Q603 I604 L605

T606 E607 M608 D609 G610 M611 S612 T613 K614 K615 N616 V617 F618 I619 I620 G621 A622 THR N624 R625 P626 D627 I628 I629 D630 P631 A632 I633 L634 R635 P636 G637 R638 L639 D640 Q641 L642 I643 Y644 I645 PRO LEU PRO ASP GLU K651 S652 R653 V654 A655 T656 L657 K658 A659 N660 L661 R662 K663 S664 PRO

VAL A667 K668 D669 VAL ASP LEU GLU PHE LEU ALA LYS MET THR ASN GLY PHE SER GLY ALA D686 L687 T688 E689 I690 C691 Q692 C695 K696 L697 A698 I699 R700 E701 S702 I703 E704 SER GLU ILE ARG ARG GLU ARG GLU ARG GLN THR ASN PRO SER ALA MET GLU VAL GLU GLU ASP ASP

PRO V728 P729 E730 ILE ARG ARG ASP H735 E738 A739 M740 ARG PHE ALA ARG ARG SER VAL SER ASP ASN ILE ARG LYS TYR E756 M757 F758 A759 GLN THR LEU GLN GLN SER ARG GLY PHE GLY SER PHE ARG PRO SER ASN GLN GLY GLY ALA GLY PRO SER GLN GLY GLY SER

GLY GLY GLY THR GLY SER VAL TYR THR GLU ASP ASN ASP ASP LEU TYR GLY

• Molecule 1: Transitional endoplasmic reticulum ATPase

Chain D:

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 3	Depositor
Cell constants a, b, c, α, β, γ	144.90Å 144.90Å 164.40Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	23.00 – 3.50 22.79 – 3.20	Depositor EDS
% Data completeness (in resolution range)	99.6 (23.00-3.50) 90.8 (22.79-3.20)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.22 (at 3.23Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.271 , 0.285 0.258 , 0.275	Depositor DCC
R_{free} test set	6358 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å^2)	75.9	Xtriage
Anisotropy	0.841	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 72.8	EDS
L-test for twinning[2]	$< \vert L \vert > = 0.44, < L^2 > = 0.27$	Xtriage
Estimated twinning fraction	0.369 for -h,-k,l 0.377 for h,-h-k,-l 0.369 for -k,-h,-l	Xtriage
F_o,F_c correlation	0.89	EDS
Total number of atoms	20917	wwPDB-VP
Average B, all atoms (Å^2)	148.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.63% 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 $< \vert L \vert >$, $< L^2 >$ 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: ADP, ANP

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	0.48	2/5250 (0.0%)	0.67	1/7082 (0.0%)
1	B	0.48	2/5250 (0.0%)	0.67	1/7082 (0.0%)
1	C	0.48	2/5250 (0.0%)	0.67	1/7082 (0.0%)
1	D	0.48	2/5247 (0.0%)	0.67	1/7078 (0.0%)
All	All	0.48	8/20997 (0.0%)	0.67	4/28324 (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	2
1	B	0	2
1	C	0	2
1	D	0	2
All	All	0	8

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	425	LYS	C-N	-12.18	1.06	1.34
1	C	425	LYS	C-N	-12.14	1.06	1.34
1	D	425	LYS	C-N	-12.14	1.06	1.34
1	A	425	LYS	C-N	-12.14	1.06	1.34
1	B	438	ASP	C-N	-7.39	1.17	1.34

All (4) bond angle outliers are listed below:

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	538	ASN	O-C-N	5.67	131.78	122.70
1	B	538	ASN	O-C-N	5.66	131.75	122.70
1	C	538	ASN	O-C-N	5.65	131.74	122.70
1	A	538	ASN	O-C-N	5.64	131.72	122.70

There are no chirality outliers.

5 of 8 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	433	GLU	Peptide
1	A	545	PRO	Peptide
1	B	433	GLU	Peptide
1	B	545	PRO	Peptide
1	C	433	GLU	Peptide

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	5172	0	5238	723	39
1	B	5172	0	5236	728	39
1	C	5172	0	5238	730	38
1	D	5169	0	5226	719	38
2	A	27	0	12	3	0
2	B	27	0	12	3	0
2	C	27	0	12	3	0
2	D	27	0	12	3	0
3	A	31	0	13	1	0
3	B	31	0	13	1	0
3	C	31	0	13	1	0
3	D	31	0	13	1	0
All	All	20917	0	21038	2616	77

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 62.

The worst 5 of 2616 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:699:ILE:HG12	1:B:506:PHE:CG	1.22	1.67
1:C:699:ILE:HG12	1:D:506:PHE:CG	1.29	1.66
1:A:549:THR:CB	1:B:602:ASN:HD22	1.13	1.57
1:C:549:THR:CB	1:D:602:ASN:HD22	1.14	1.57
1:A:550:MET:HG3	1:B:606:THR:CB	1.41	1.50

The worst 5 of 77 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:A:491:GLU:OE2	1:B:700:ARG:NH1[3_765]	0.38	1.82
1:C:491:GLU:OE1	1:D:700:ARG:CD[2_765]	0.38	1.82
1:C:491:GLU:OE2	1:D:700:ARG:NH1[2_765]	0.40	1.80
1:A:491:GLU:OE1	1:B:700:ARG:CD[3_765]	0.41	1.79
1:C:25:ARG:NH2	1:D:432:LEU:C[2_765]	0.80	1.40

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	641/806 (80%)	471 (74%)	130 (20%)	40 (6%)	1	15
1	B	641/806 (80%)	470 (73%)	131 (20%)	40 (6%)	1	15
1	C	641/806 (80%)	471 (74%)	130 (20%)	40 (6%)	1	15
1	D	641/806 (80%)	470 (73%)	131 (20%)	40 (6%)	1	15
All	All	2564/3224 (80%)	1882 (73%)	522 (20%)	160 (6%)	1	15

5 of 160 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	87	VAL
1	A	312	LYS

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Mol	Chain	Res	Type
1	B	87	VAL
1	B	312	LYS
1	C	87	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	565/678 (83%)	538 (95%)	27 (5%)	25	60
1	B	565/678 (83%)	538 (95%)	27 (5%)	25	60
1	C	565/678 (83%)	538 (95%)	27 (5%)	25	60
1	D	564/678 (83%)	537 (95%)	27 (5%)	25	60
All	All	2259/2712 (83%)	2151 (95%)	108 (5%)	25	60

5 of 108 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	91	ASN
1	C	503	PHE
1	D	534	GLU
1	C	127	THR
1	C	237	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 62 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	533	ASN
1	D	384	HIS
1	C	215	GLN
1	D	348	ASN
1	D	533	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 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	$\#|Z| > 2$
3	ANP	B	901	-	29,33,33	2.16	11 (37%)	31,52,52	1.86	4 (12%)
3	ANP	C	901	-	29,33,33	2.16	11 (37%)	31,52,52	1.85	4 (12%)
2	ADP	A	807	-	24,29,29	1.84	5 (20%)	29,45,45	1.84	3 (10%)
2	ADP	D	807	-	24,29,29	1.84	5 (20%)	29,45,45	1.83	3 (10%)
2	ADP	B	807	-	24,29,29	1.84	5 (20%)	29,45,45	1.83	3 (10%)
3	ANP	A	901	-	29,33,33	2.16	11 (37%)	31,52,52	1.86	4 (12%)
2	ADP	C	807	-	24,29,29	1.84	5 (20%)	29,45,45	1.84	3 (10%)
3	ANP	D	901	-	29,33,33	2.16	11 (37%)	31,52,52	1.86	4 (12%)

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
3	ANP	B	901	-	-	7/14/38/38	0/3/3/3
3	ANP	C	901	-	-	7/14/38/38	0/3/3/3
2	ADP	A	807	-	-	6/12/32/32	0/3/3/3
2	ADP	D	807	-	-	6/12/32/32	0/3/3/3
2	ADP	B	807	-	-	6/12/32/32	0/3/3/3
3	ANP	A	901	-	-	7/14/38/38	0/3/3/3
2	ADP	C	807	-	-	6/12/32/32	0/3/3/3
3	ANP	D	901	-	-	7/14/38/38	0/3/3/3

The worst 5 of 64 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	807	ADP	PA-O3A	-5.34	1.53	1.59
2	C	807	ADP	PA-O3A	-5.33	1.53	1.59
2	D	807	ADP	PA-O3A	-5.33	1.53	1.59
2	B	807	ADP	PA-O3A	-5.33	1.53	1.59
3	B	901	ANP	PB-N3B	-4.48	1.51	1.63

The worst 5 of 28 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	807	ADP	N3-C2-N1	-7.82	118.06	128.67
2	A	807	ADP	N3-C2-N1	-7.81	118.07	128.67
2	D	807	ADP	N3-C2-N1	-7.80	118.08	128.67
2	B	807	ADP	N3-C2-N1	-7.78	118.11	128.67
3	B	901	ANP	N3-C2-N1	-7.76	118.14	128.67

There are no chirality outliers.

5 of 52 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	807	ADP	C5'-O5'-PA-O1A
2	A	807	ADP	C5'-O5'-PA-O2A
2	A	807	ADP	C5'-O5'-PA-O3A
2	A	807	ADP	O4'-C4'-C5'-O5'
2	B	807	ADP	C5'-O5'-PA-O1A

There are no ring outliers.

8 monomers are involved in 16 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	901	ANP	1	0
3	C	901	ANP	1	0
2	A	807	ADP	3	0
2	D	807	ADP	3	0
2	B	807	ADP	3	0
3	A	901	ANP	1	0
2	C	807	ADP	3	0
3	D	901	ANP	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 ANP B 901

Bond lengths

Bond angles

Torsions

Rings

Ligand ANP C 901

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP A 807

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP D 807

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP B 807

Bond lengths

Bond angles

Torsions

Rings

Ligand ANP A 901

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP C 807

Bond lengths

Bond angles

Torsions

Rings

Ligand ANP D 901

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	2
1	B	2
1	C	2
1	D	2

The worst 5 of 8 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	438:ASP	C	439:ALA	N	1.17
1	B	438:ASP	C	439:ALA	N	1.17

Continued on next page...

WORLDWIDE
wwPDB
PROTEIN DATA BANK

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Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	C	438:ASP	C	439:ALA	N	1.17
1	D	438:ASP	C	439:ALA	N	1.17
1	A	425:LYS	C	426:LYS	N	1.06

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(Å²)	Q<0.9
1	A	659/806 (81%)	0.06	29 (4%)	34	30	17, 128, 281, 412	0
1	B	659/806 (81%)	0.10	28 (4%)	36	32	17, 128, 281, 412	0
1	C	659/806 (81%)	0.04	25 (3%)	40	36	17, 128, 281, 412	0
1	D	659/806 (81%)	0.06	33 (5%)	28	25	17, 128, 281, 412	0
All	All	2636/3224 (81%)	0.06	115 (4%)	34	30	17, 128, 281, 412	0

The worst 5 of 115 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	660	ASN	7.8
1	B	498	GLU	6.2
1	A	498	GLU	6.0
1	D	618	PHE	5.8
1	B	478	ASP	5.6

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	ANP	D	901	31/31	0.80	0.20	150,150,150,150	0
3	ANP	C	901	31/31	0.84	0.20	150,150,150,150	0
3	ANP	B	901	31/31	0.86	0.19	150,150,150,150	0
3	ANP	A	901	31/31	0.89	0.22	150,150,150,150	0
2	ADP	D	807	27/27	0.90	0.31	163,163,163,163	0
2	ADP	C	807	27/27	0.91	0.32	163,163,163,163	0
2	ADP	A	807	27/27	0.91	0.34	163,163,163,163	0
2	ADP	B	807	27/27	0.91	0.33	163,163,163,163	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 ANP D 901:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
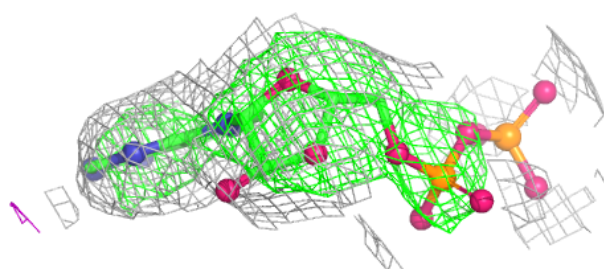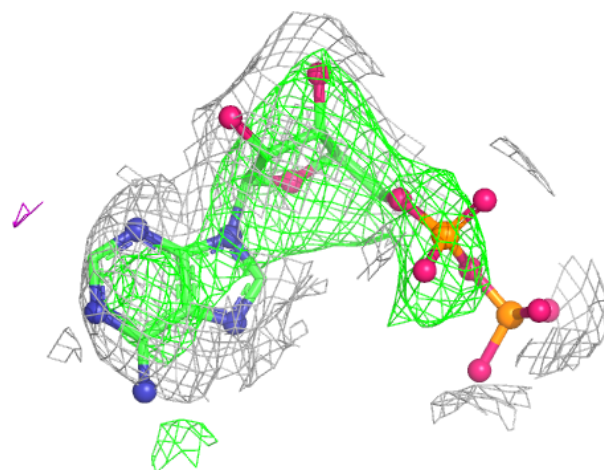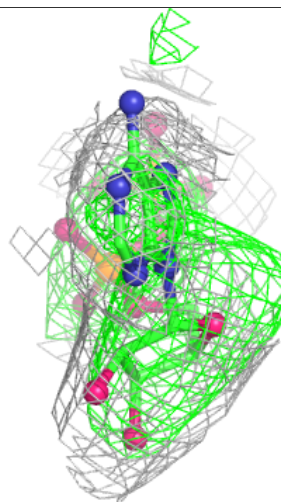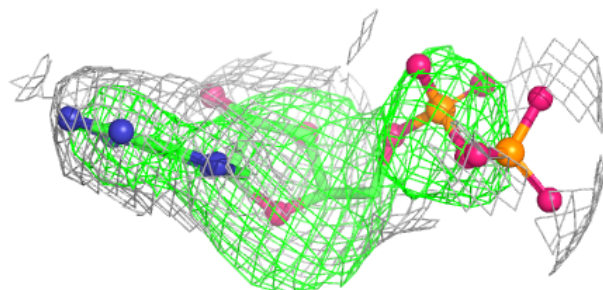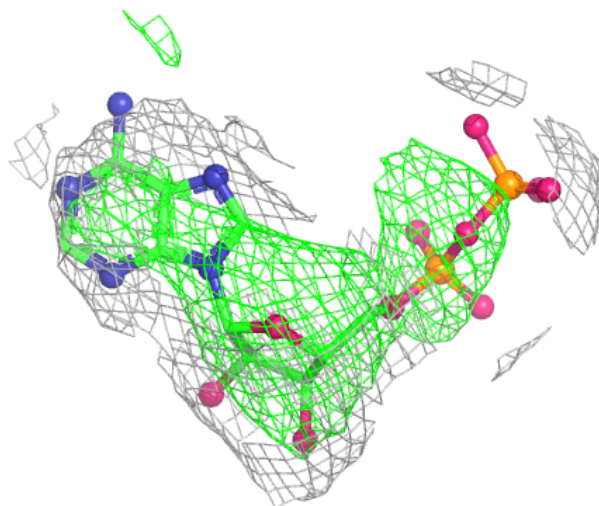$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative) and green (positive)
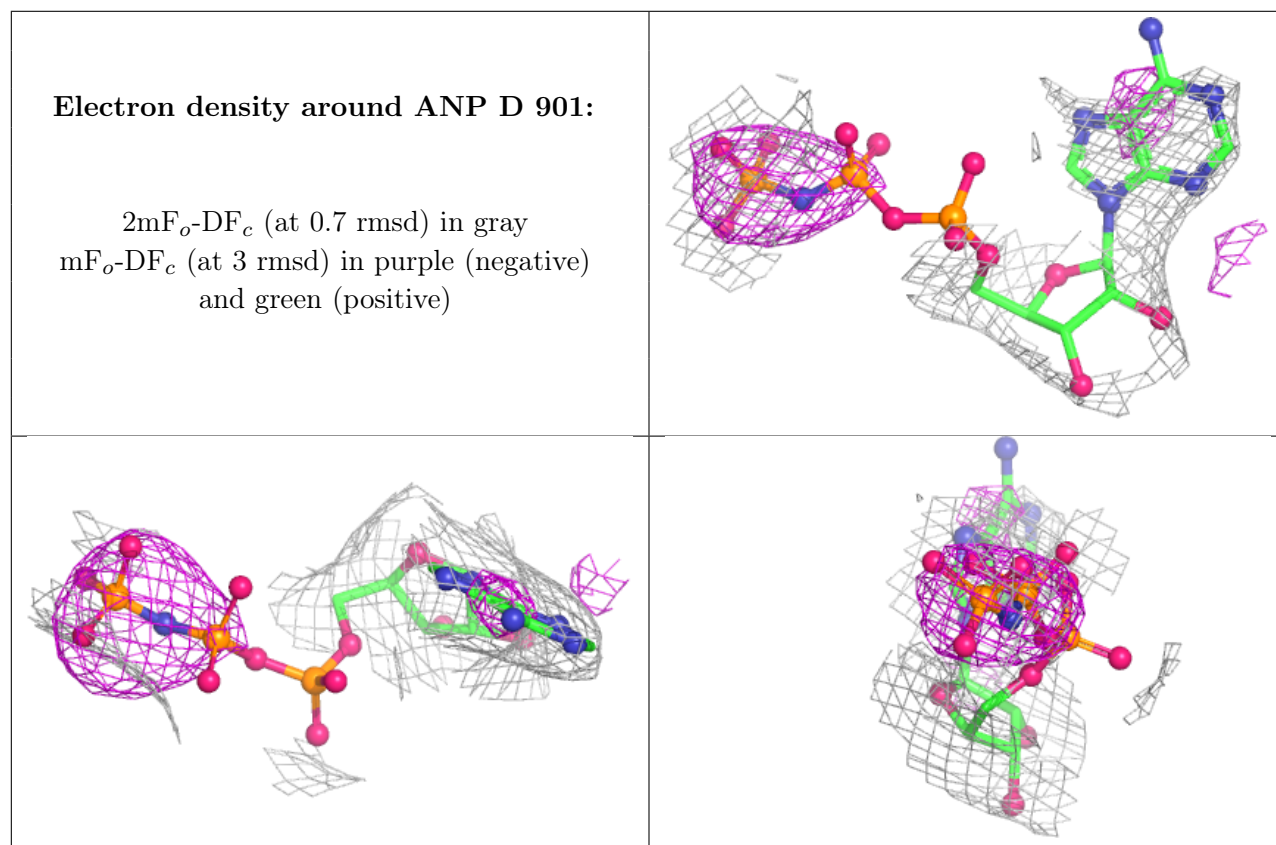
Electron density around ANP C 901:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
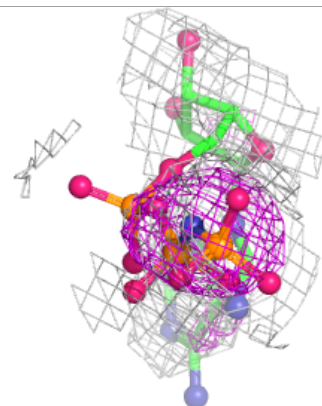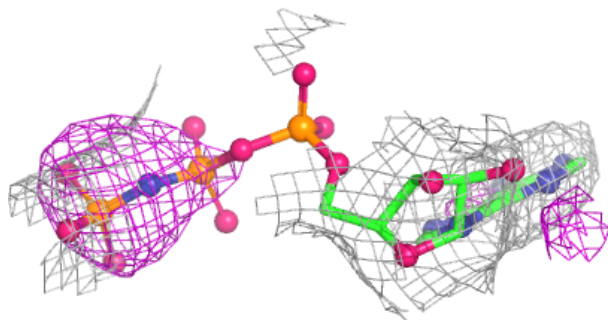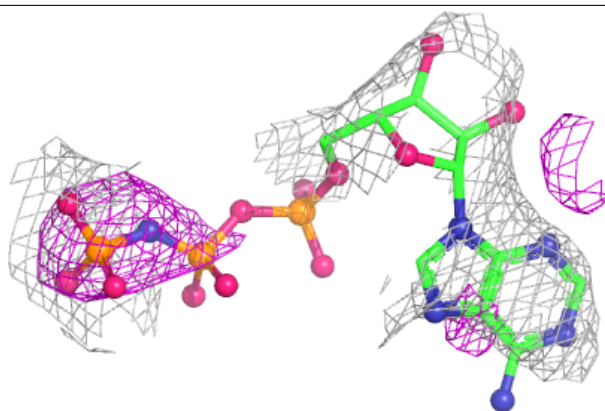
Electron density around ANP B 901:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
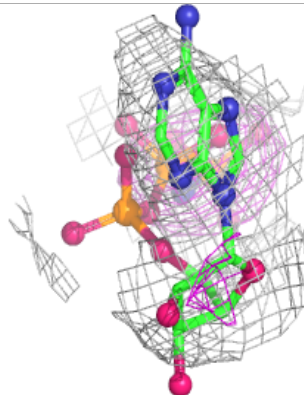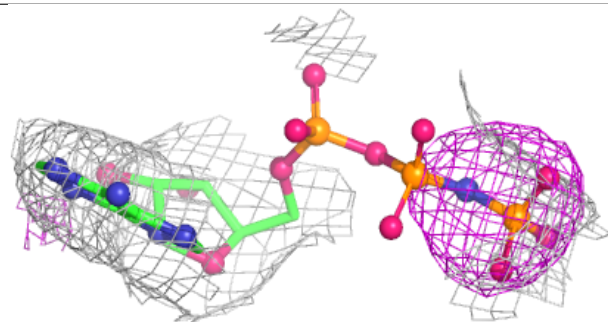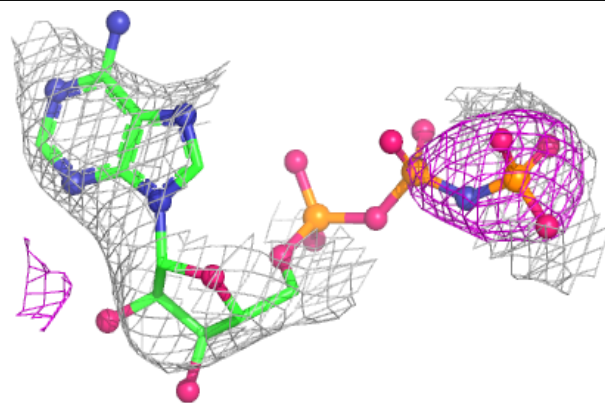
Electron density around ANP A 901:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
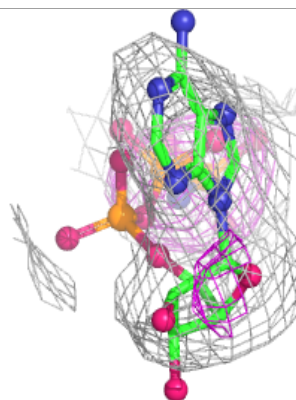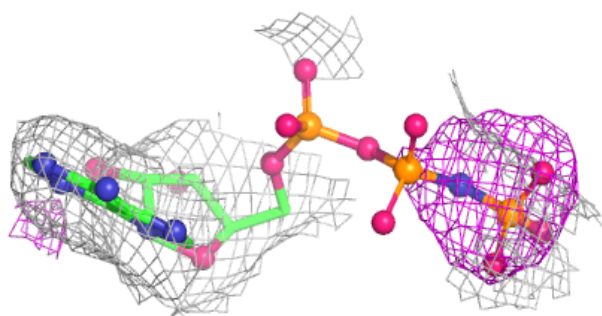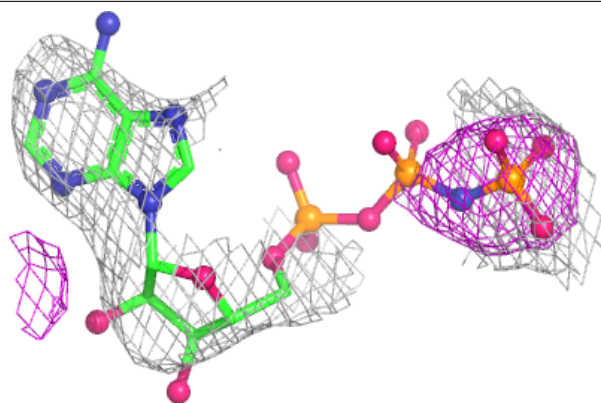
Electron density around ADP D 807:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
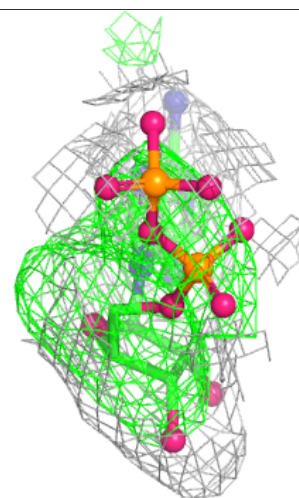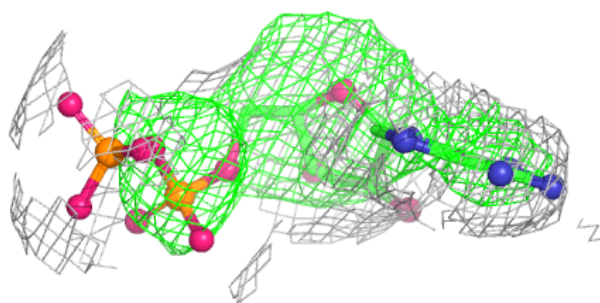$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
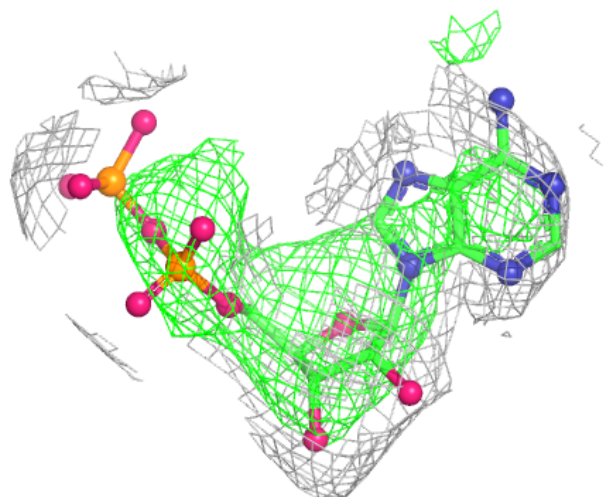and green (positive)
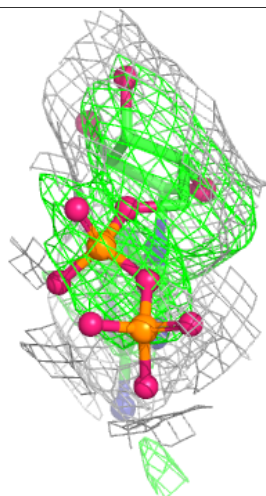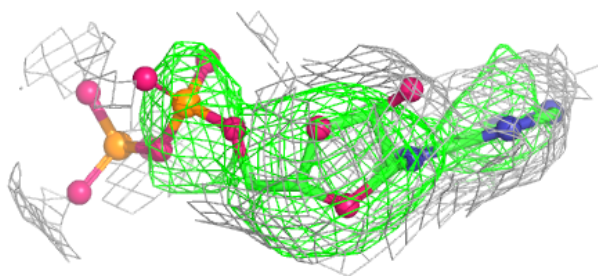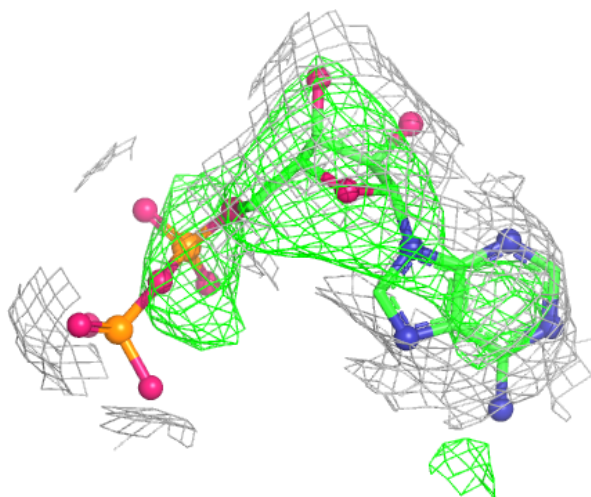
Electron density around ADP C 807:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
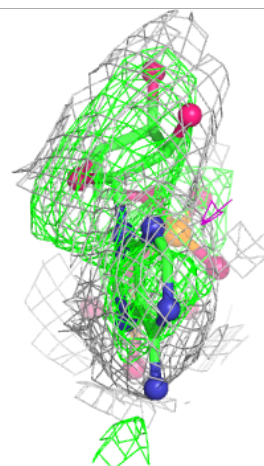
Electron density around ADP A 807:

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

Electron density around ADP B 807:

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.