W O R L D W I D E

wwPDB

P R O T E I N   D A T A   B A N K

wwPDB X-ray Structure Validation Summary Report ⓘ

Dec 3, 2023 – 03:47 pm GMT

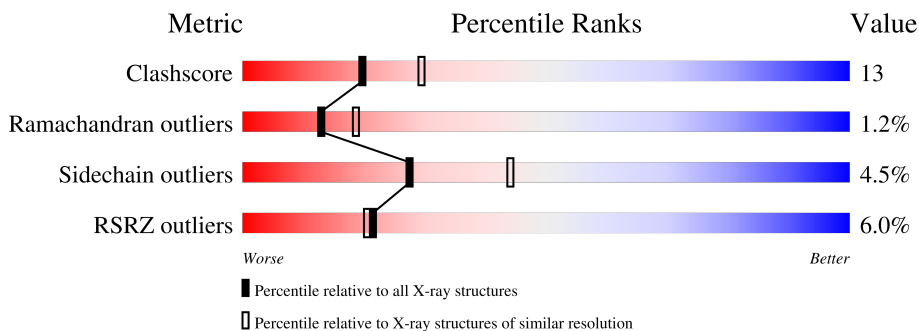|		
PDB ID	:	1E79
Title	:	Bovine F1-ATPase inhibited by DCCD (dicyclohexylcarbodiimide)
Authors	:	Gibbons, C.; Montgomery, M.G.; Leslie, A.G.W.; Walker, J.E.
Deposited on	:	2000-08-25
Resolution	:	2.40 Å(reported)

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 2.40 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.
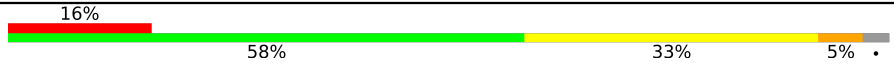
Metric	Percentile Ranks	Value
Clashscore		13
Ramachandran outliers		1.2%
Sidechain outliers		4.5%
RSRZ outliers		6.0%

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))
Clashscore	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)
RSRZ outliers	127900	3811 (2.40-2.40)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	510	4% · 75% · 20% · ·
1	B	510	5% · 70% · 24% · · ·
1	C	510	2% · 75% · 20% · ·
2	D	482	2% · 77% · 19% · ·
2	E	482	8% · 73% · 21% · ·
2	F	482	2% · 75% · 20% · ·

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Mol	Chain	Length	Quality of chain
3	G	272	16% 58% 33% 5% ·
4	H	146	21% 51% 34% · 10%
5	I	50	22% 58% 26% 8% · 6%

2 Entry composition ⓘ

There are 12 unique types of molecules in this entry. The entry contains 26318 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 ATP SYNTHASE ALPHA CHAIN HEART ISOFORM.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	492	Total 3748	C 2360	N 661	O 715	S 12	0	0	0
1	B	492	Total 3748	C 2360	N 661	O 715	S 12	0	0	0
1	C	492	Total 3748	C 2360	N 661	O 715	S 12	0	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	481	GLY	SER	cloning artifact	UNP P19483
B	481	GLY	SER	cloning artifact	UNP P19483
C	481	GLY	SER	cloning artifact	UNP P19483

- Molecule 2 is a protein called ATP SYNTHASE BETA CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	467	Total 3538	C 2243	N 601	O 683	S 11	0	0	0
2	E	466	Total 3530	C 2238	N 600	O 681	S 11	0	0	0
2	F	466	Total 3530	C 2238	N 600	O 681	S 11	0	0	0

- Molecule 3 is a protein called ATP SYNTHASE GAMMA CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	G	263	Total 2051	C 1291	N 354	O 398	S 8	0	0	0

- Molecule 4 is a protein called ATP SYNTHASE DELTA CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	H	131	Total 970	C 609	N 164	O 195	S 2	0	0	0

- Molecule 5 is a protein called ATP SYNTHASE EPSILON CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	I	47	Total 369	C 237	N 66	O 64	S 2	0	0	0

- Molecule 6 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).
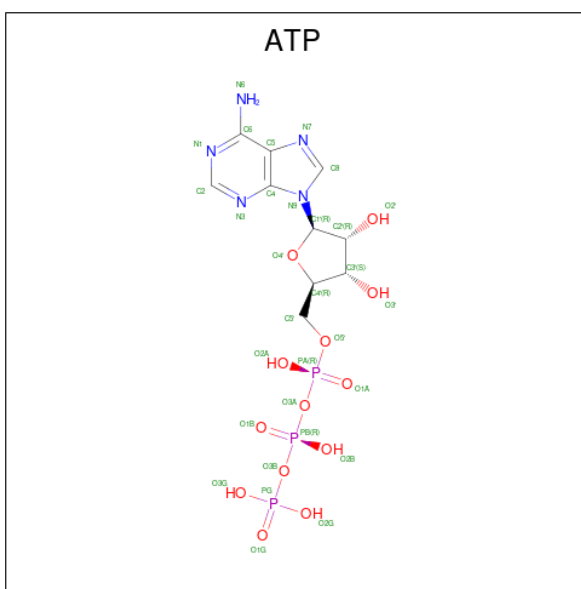
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	A	1	Total 31	C 10	N 5	O 13	P 3	0	0
6	C	1	Total 31	C 10	N 5	O 13	P 3	0	0

- Molecule 7 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total 1	Mg 1	0	0
7	B	1	Total 1	Mg 1	0	0
7	C	1	Total 1	Mg 1	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	D	1	Total Mg		0	0
			1	1		
7	F	1	Total Mg		0	0
			1	1		

- Molecule 8 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).
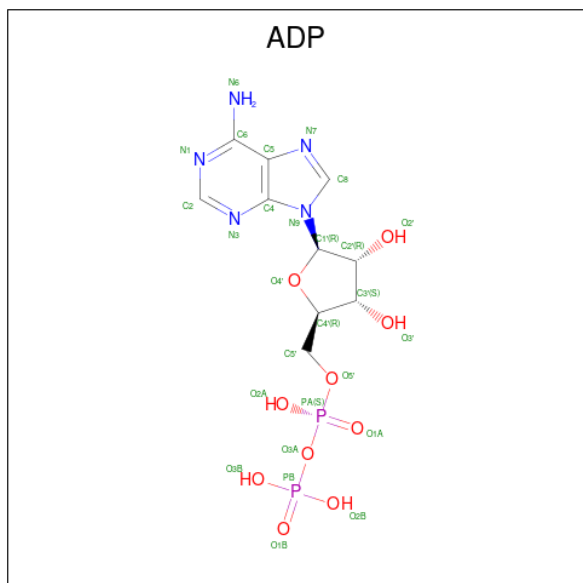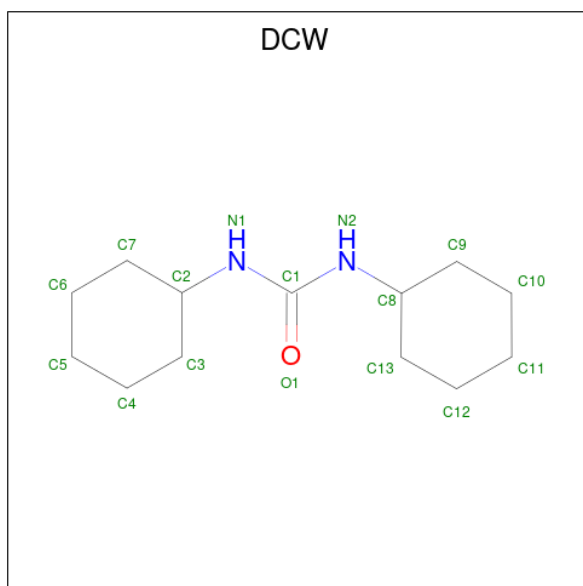

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
8	B	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
8	D	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
8	F	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

- Molecule 9 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).

GOL

C3

OH O3

C1 C2

HO OH

O1 O2

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	B	1	Total 6	C 3	O 3	0	0

- Molecule 10 is DICYCLOHEXYLUREA (three-letter code: DCW) (formula: $C_{13}H_{24}N_2O$).

DCW

N1 N2
H   H
C7 N   N   C9
C6 C2 C1 C8 C10
C8
C5 C3 O C13 C11
C4 O1 C12

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
10	D	1	Total 16	C 13	N 2	O 1	0	0

- Molecule 11 is SULFATE ION (three-letter code: SO4) (formula: O_4S).

SO4

O1

O3 O⁻ —— S —— O⁻ O4

S

O2

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
11	E	1	Total 5	O 4	S 1	0	0

- Molecule 12 is water.

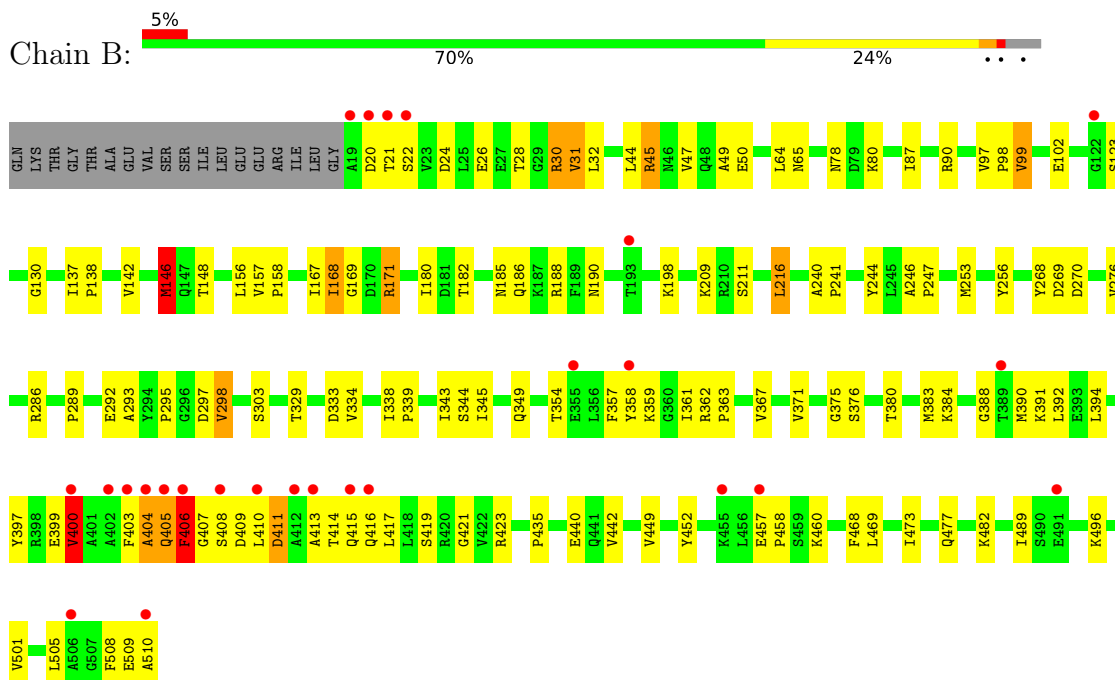| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
12	A	163	Total 163	O 163	0	0
12	B	140	Total 140	O 140	0	0
12	C	167	Total 167	O 167	0	0
12	D	148	Total 148	O 148	0	0
12	E	95	Total 95	O 95	0	0
12	F	164	Total 164	O 164	0	0
12	G	25	Total 25	O 25	0	0
12	H	5	Total 5	O 5	0	0
12	I	4	Total 4	O 4	0	0

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.
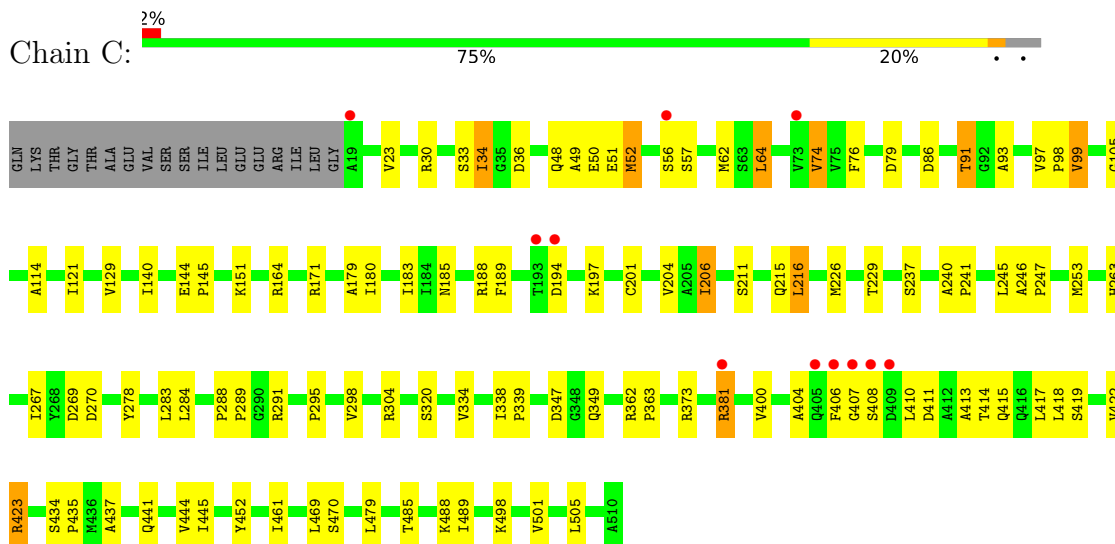
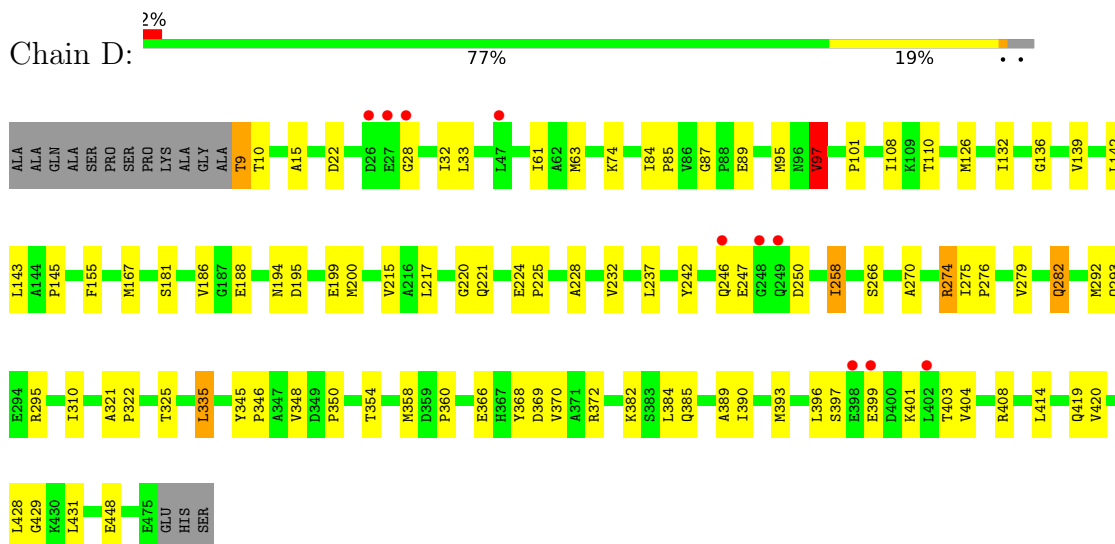• Molecule 1: ATP SYNTHASE ALPHA CHAIN HEART ISOFORM
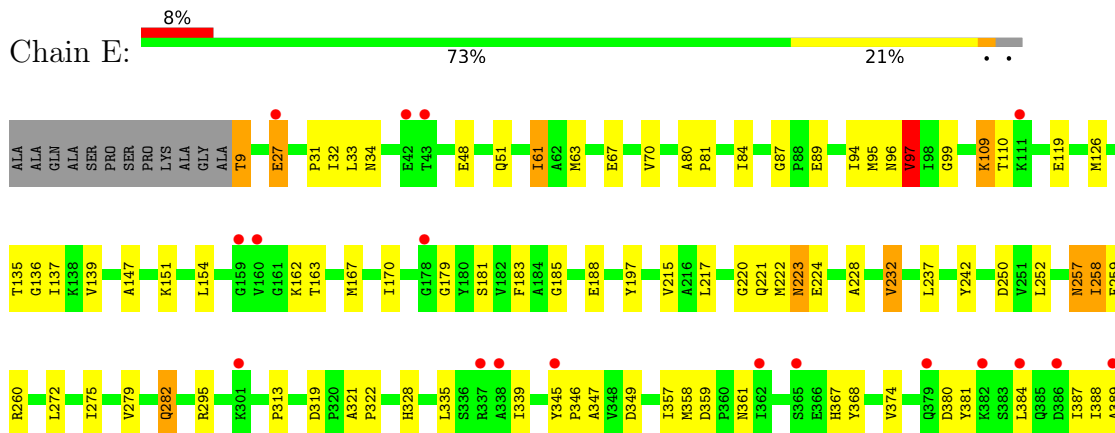

• Molecule 1: ATP SYNTHASE ALPHA CHAIN HEART ISOFORM

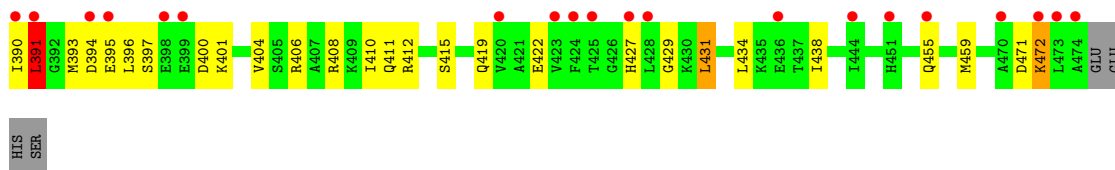● Molecule 1: ATP SYNTHASE ALPHA CHAIN HEART ISOFORM
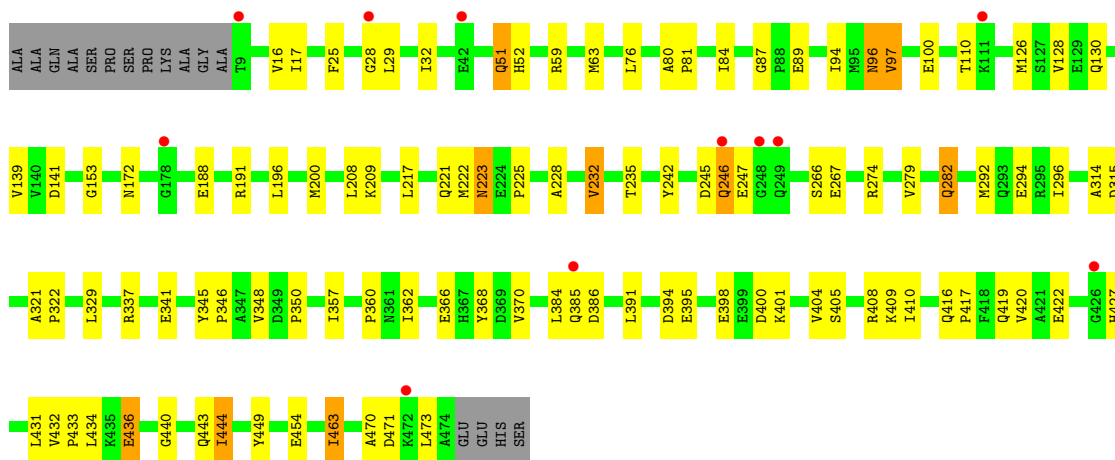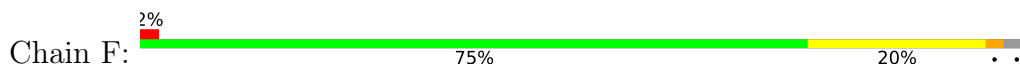
Chain C:

● Molecule 2: ATP SYNTHASE BETA CHAIN

Chain D:
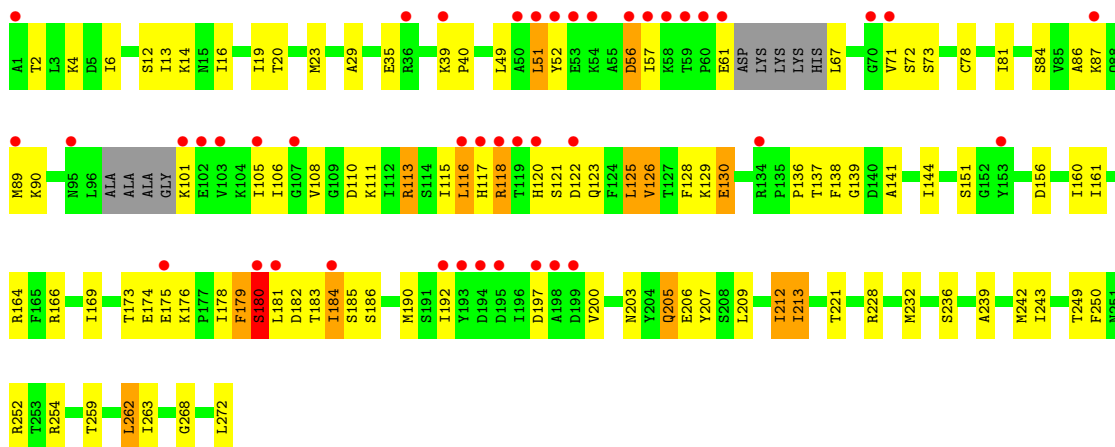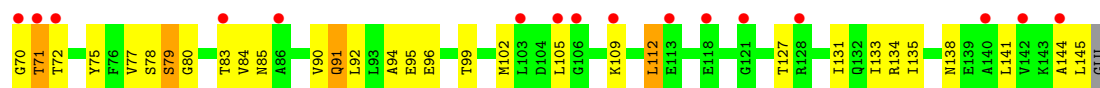
● Molecule 2: ATP SYNTHASE BETA CHAIN

Chain E:

I390 L391 G392 M393 D394 E395 L396 S397 E398 E399 D400 K401 V404 S405 R406 A407 R408 K409 I410 Q411 R412 S415 Q419 V420 A421 E422 V423 F424 T425 G426 H427 L428 G429 K430 L431 L434 K435 E436 T437 I438 I444 H451 Q455 M459 A470 D471 K472 L473 A474 GLU GLU

HIS SER

• **Molecule 2: ATP SYNTHASE BETA CHAIN**

Chain F:

2%

75% 20%

ALA ALA GLN ALA SER PRO SER PRO LYS ALA GLY ALA T9 V16 I17 F25 G28 L29 I32 E42 Q51 H52 R59 M63 L76 A80 P81 I84 G87 P88 E89 I94 M95 N96 V97 E100 T110 K111 M126 S127 V128 E129 Q130

V139 V140 D141 G153 N172 G178 E188 R191 L196 M200 L208 K209 L217 Q221 M222 N223 E224 P225 A228 V232 T235 Y242 D245 Q246 E247 G248 Q249 S266 E267 R274 V279 Q282 M292 Q293 E294 R295 I296 A314 D315

A321 P322 L329 R337 E341 Y345 P346 A347 V348 D349 P350 I357 P360 N361 I362 E366 H367 Y368 D369 V370 L384 Q385 D386 L391 D394 E395 E398 E399 D400 K401 V404 S405 R408 K409 I410 Q416 P417 F418 Q419 V420 A421 E422 G426 H427

L431 V432 P433 L434 K435 E436 G440 Q443 I444 Y449 E454 I463 A470 D471 K472 L473 A474 GLU GLU HIS SER

• **Molecule 3: ATP SYNTHASE GAMMA CHAIN**

Chain G:

16%

58% 33% 5%

A1 T2 L3 K4 D5 I6 S12 I13 K14 N15 I16 I19 T20 M23 A29 E35 R36 K39 P40 L49 A50 L51 Y52 E53 K54 A55 D56 I57 K58 T59 P60 E61 ASP LYS LYS HIS L67 G70 V71 S72 S73 C78 I81 S84 V85 A86 K87 Q88

M89 K90 N95 L96 ALA ALA GLY K101 E102 V103 K104 I105 I106 G107 V108 G109 D110 K111 I112 R113 S114 I115 L116 H117 R118 T119 H120 S121 D122 Q123 F124 L125 V126 T127 F128 K129 E130 R134 P135 P136 T137 F138 G139 D140 A141 I144 S151 G152 Y153 D156 I160 I161

R164 F165 R166 I169 T173 E174 E175 K176 P177 I178 F179 S180 L181 D182 T183 I184 S185 S186 M190 S191 I192 Y193 D194 D195 I196 D197 A198 D199 V200 N203 Y204 Q205 E206 Y207 S208 L209 I212 I213 T221 R228 M232 S236 A239 M242 I243 T249 F250 N251

R252 T253 R254 T259 L262 I263 G268 L272

• **Molecule 4: ATP SYNTHASE DELTA CHAIN**

Chain H:

21%

51% 34% 10%

ALA GLU ALA ALA ALA ALA GLN ALA PRO ALA ALA GLY PRO GLY Q15 M16 S17 F18 T19 F20 A21 S22 P23 A31 N32 V33 R34 Q35 V36 D37 V38 P39 T40 Q41 T42 F45 G46 I47 L48 A49 A50 P53 T54 L55 Q56 V57 L58 R59 L62 V63 V64 V65 H66 A67 E68 D69

G70 T71 T72 Y75 F76 V77 S78 S79 G80 T83 V84 N85 A86 V90 Q91 L92 L93 A94 E95 E96 T99 M102 L103 D104 L105 G106 K109 L112 E113 E118 G121 T127 R128 I131 Q132 I133 R134 I135 N138 E139 A140 L141 V142 K143 A144 L145 GLU

• Molecule 5: ATP SYNTHASE EPSILON CHAIN

Chain I:

22%

58%   26%   8%   •   6%

V1 W4 R5 Q6 A7 Y11 I12 V22 R23 T28 E29 F30 M35 K36 T37 S38 G39 S40 T41 I42 K46 V47 LYS LYS GLU

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	267.20Å 107.20Å 135.90Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 2.40 19.98 – 2.40	Depositor EDS
% Data completeness (in resolution range)	92.2 (20.00-2.40) 91.9 (19.98-2.40)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.93 (at 2.41Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.225 , 0.281 0.204 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å^2)	36.9	Xtriage
Anisotropy	0.222	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 57.0	EDS
L-test for twinning[2]	$< |L| > = 0.49, < L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	26318	wwPDB-VP
Average B, all atoms (Å^2)	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.07% 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: MG, ATP, DCW, SO4, GOL, ADP

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	0.39	0/3799	0.78	0/5126
1	B	0.39	0/3799	0.81	2/5126 (0.0%)
1	C	0.40	0/3799	0.81	2/5126 (0.0%)
2	D	0.40	0/3595	0.81	2/4877 (0.0%)
2	E	0.38	0/3587	0.76	1/4867 (0.0%)
2	F	0.39	0/3587	0.79	1/4867 (0.0%)
3	G	0.35	0/2074	0.72	2/2785 (0.1%)
4	H	0.33	0/982	0.67	0/1337
5	I	0.34	0/374	0.71	0/501
All	All	0.38	0/25596	0.78	10/34612 (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
2	D	0	1

There are no bond length outliers.

The worst 5 of 10 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	195	ASP	N-CA-CB	8.67	126.21	110.60
1	B	45	ARG	NE-CZ-NH2	-7.26	116.67	120.30
2	F	191	ARG	NE-CZ-NH2	-6.49	117.06	120.30
3	G	254	ARG	NE-CZ-NH2	-5.62	117.49	120.30
1	C	423	ARG	CD-NE-CZ	5.33	131.06	123.60

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	D	194	ASN	Mainchain

5.2 Too-close contacts (i)

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	3748	0	3844	76	0
1	B	3748	0	3844	106	0
1	C	3748	0	3844	75	0
2	D	3538	0	3592	83	0
2	E	3530	0	3587	89	0
2	F	3530	0	3586	88	0
3	G	2051	0	2115	108	0
4	H	970	0	972	55	0
5	I	369	0	395	20	0
6	A	31	0	12	0	0
6	C	31	0	12	1	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
7	C	1	0	0	0	0
7	D	1	0	0	0	0
7	F	1	0	0	0	0
8	B	27	0	12	0	0
8	D	27	0	12	0	0
8	F	27	0	12	0	0
9	B	6	0	8	1	0
10	D	16	0	23	6	0
11	E	5	0	0	0	0
12	A	163	0	0	4	0
12	B	140	0	0	3	0
12	C	167	0	0	2	0
12	D	148	0	0	9	0
12	E	95	0	0	0	0
12	F	164	0	0	4	0
12	G	25	0	0	1	0
12	H	5	0	0	0	0
12	I	4	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	26318	0	25870	651	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 13.

The worst 5 of 651 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)
2:D:199:GLU:HG2	10:D:700:DCW:H71C	1.32	1.08
2:D:199:GLU:CG	10:D:700:DCW:H71C	1.85	1.06
3:G:90:LYS:HB3	3:G:116:LEU:HD11	1.38	1.01
1:B:406:PHE:HB2	1:B:409:ASP:HB2	1.44	1.00
2:F:282:GLN:H	2:F:282:GLN:HE21	1.00	0.98

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	490/510 (96%)	468 (96%)	19 (4%)	3 (1%)	25	36
1	B	490/510 (96%)	451 (92%)	31 (6%)	8 (2%)	9	13
1	C	490/510 (96%)	468 (96%)	21 (4%)	1 (0%)	47	62
2	D	465/482 (96%)	437 (94%)	27 (6%)	1 (0%)	47	62
2	E	464/482 (96%)	434 (94%)	23 (5%)	7 (2%)	10	14
2	F	464/482 (96%)	433 (93%)	27 (6%)	4 (1%)	17	25
3	G	257/272 (94%)	223 (87%)	26 (10%)	8 (3%)	4	3
4	H	129/146 (88%)	118 (92%)	8 (6%)	3 (2%)	6	7
5	I	45/50 (90%)	36 (80%)	4 (9%)	5 (11%)	0	0

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	3294/3444 (96%)	3068 (93%)	186 (6%)	40 (1%)	13	19

5 of 40 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	23	VAL
1	B	404	ALA
1	B	405	GLN
1	B	406	PHE
1	B	411	ASP

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	397/412 (96%)	380 (96%)	17 (4%)	29	46
1	B	397/412 (96%)	378 (95%)	19 (5%)	25	41
1	C	397/412 (96%)	374 (94%)	23 (6%)	20	32
2	D	377/386 (98%)	367 (97%)	10 (3%)	44	65
2	E	376/386 (97%)	359 (96%)	17 (4%)	27	44
2	F	376/386 (97%)	363 (96%)	13 (4%)	36	55
3	G	225/230 (98%)	210 (93%)	15 (7%)	16	26
4	H	104/109 (95%)	100 (96%)	4 (4%)	33	51
5	I	38/41 (93%)	35 (92%)	3 (8%)	12	19
All	All	2687/2774 (97%)	2566 (96%)	121 (4%)	27	44

5 of 121 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	485	THR
3	G	205	GLN
2	E	61	ILE
3	G	190	MET

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Mol	Chain	Res	Type
5	I	37	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 49 such sidechains are listed below:

Mol	Chain	Res	Type
2	E	223	ASN
2	F	194	ASN
2	E	257	ASN
2	E	411	GLN
2	F	223	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 ⓘ

Of 13 ligands modelled in this entry, 5 are monoatomic - leaving 8 for Mogul analysis.

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	#$|Z| > 2$
10	DCW	D	700	2	17,17,17	1.14	1 (5%)	21,21,21	1.22	1 (4%)
6	ATP	C	600	7	26,33,33	0.87	0	31,52,52	0.96	1 (3%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
8	ADP	D	600	7	24,29,29	0.91	0	29,45,45	0.96	1 (3%)
8	ADP	B	600	7	24,29,29	0.86	0	29,45,45	0.91	1 (3%)
11	SO4	E	630	-	4,4,4	0.64	0	6,6,6	0.08	0
8	ADP	F	600	7	24,29,29	0.84	0	29,45,45	0.98	1 (3%)
6	ATP	A	600	7	26,33,33	0.81	0	31,52,52	0.87	0
9	GOL	B	701	-	5,5,5	0.26	0	5,5,5	0.38	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
10	DCW	D	700	2	-	3/8/24/24	0/2/2/2
6	ATP	C	600	7	-	4/18/38/38	0/3/3/3
8	ADP	D	600	7	-	3/12/32/32	0/3/3/3
8	ADP	B	600	7	-	2/12/32/32	0/3/3/3
8	ADP	F	600	7	-	2/12/32/32	0/3/3/3
6	ATP	A	600	7	-	7/18/38/38	0/3/3/3
9	GOL	B	701	-	-	2/4/4/4	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	D	700	DCW	C1-N1	2.48	1.40	1.35

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
10	D	700	DCW	C8-N2-C1	3.37	130.15	123.02
8	F	600	ADP	C5-C6-N6	2.78	124.58	120.35
8	B	600	ADP	C5-C6-N6	2.68	124.43	120.35
8	D	600	ADP	C5-C6-N6	2.37	123.95	120.35
6	C	600	ATP	C5-C6-N6	2.31	123.87	120.35

There are no chirality outliers.

5 of 23 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	600	ATP	PB-O3B-PG-O2G
6	C	600	ATP	PB-O3B-PG-O2G
8	B	600	ADP	PA-O3A-PB-O2B
8	D	600	ADP	PA-O3A-PB-O2B
8	F	600	ADP	PA-O3A-PB-O2B

There are no ring outliers.

3 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	D	700	DCW	6	0
6	C	600	ATP	1	0
9	B	701	GOL	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 ATP C 600

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP D 600

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP B 600

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP F 600

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP A 600

Bond lengths   Bond angles

Torsions   Rings
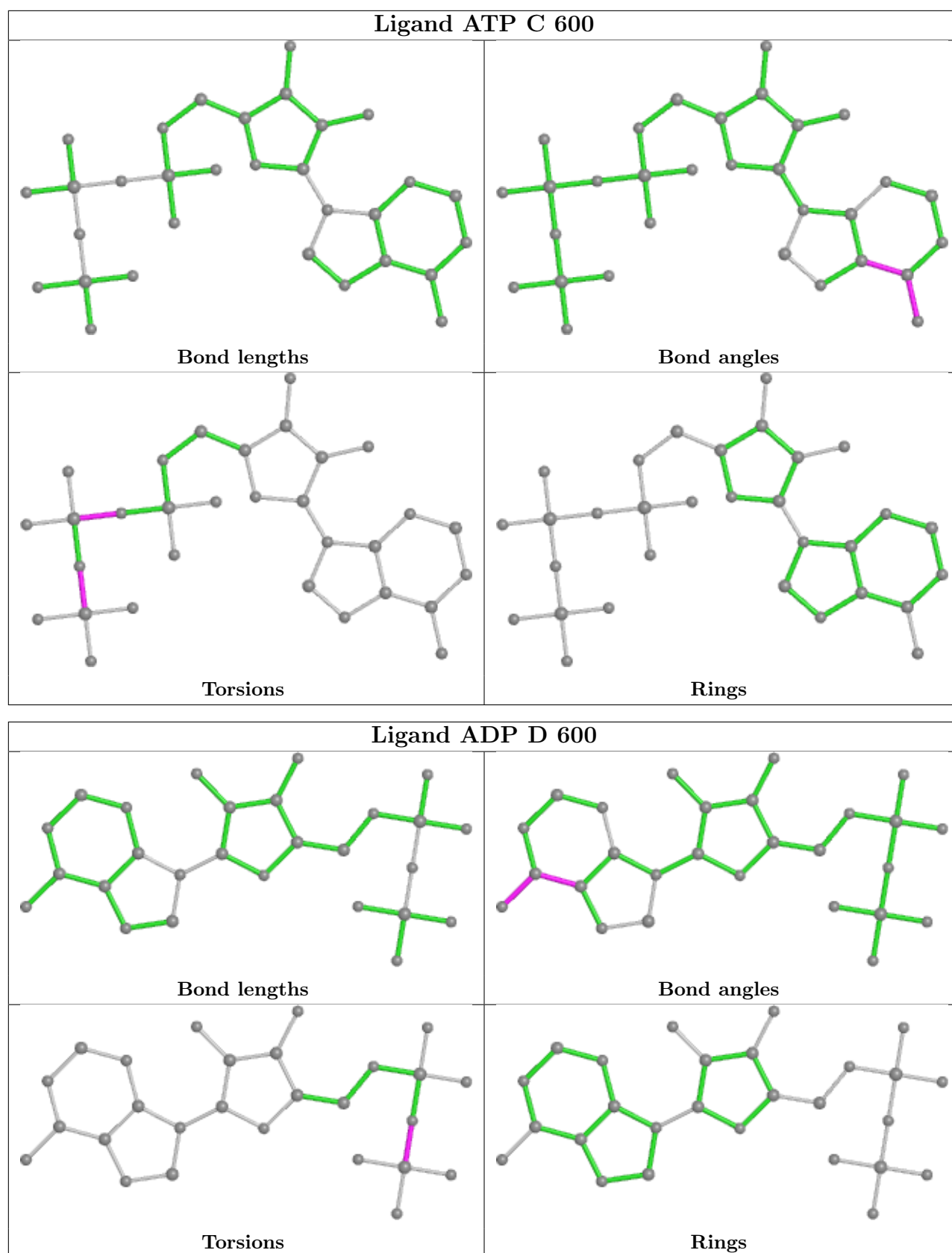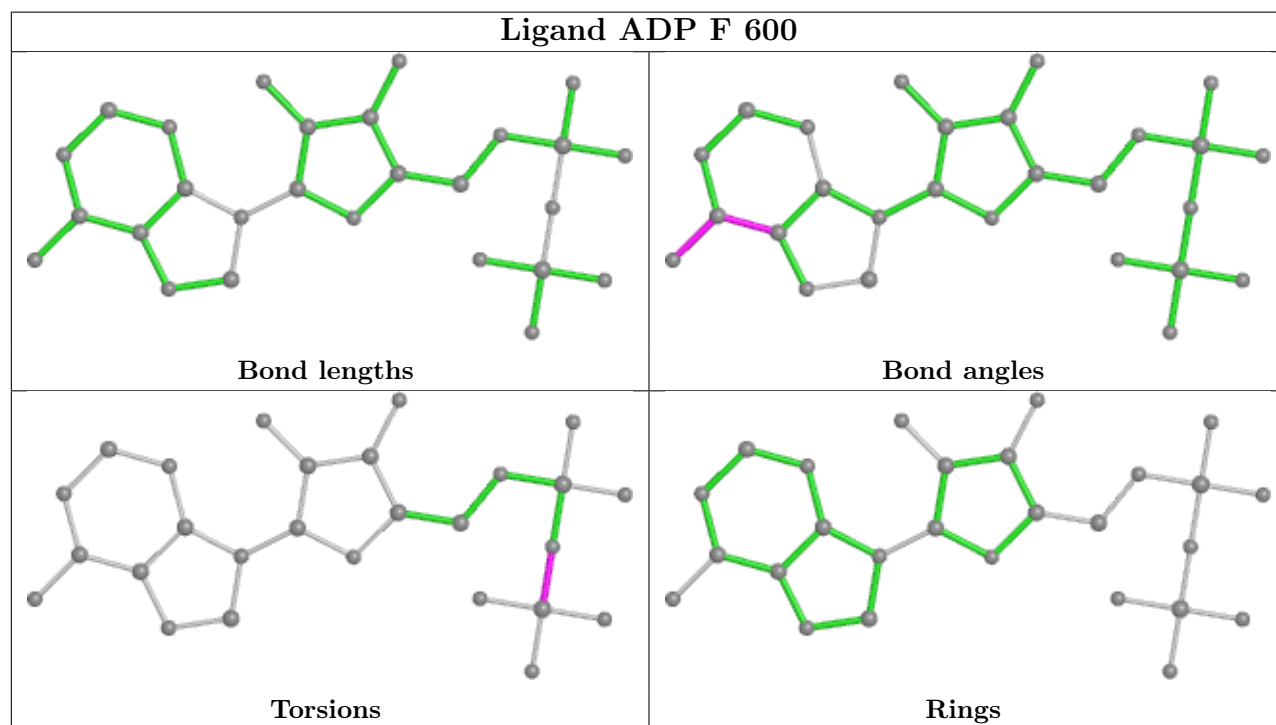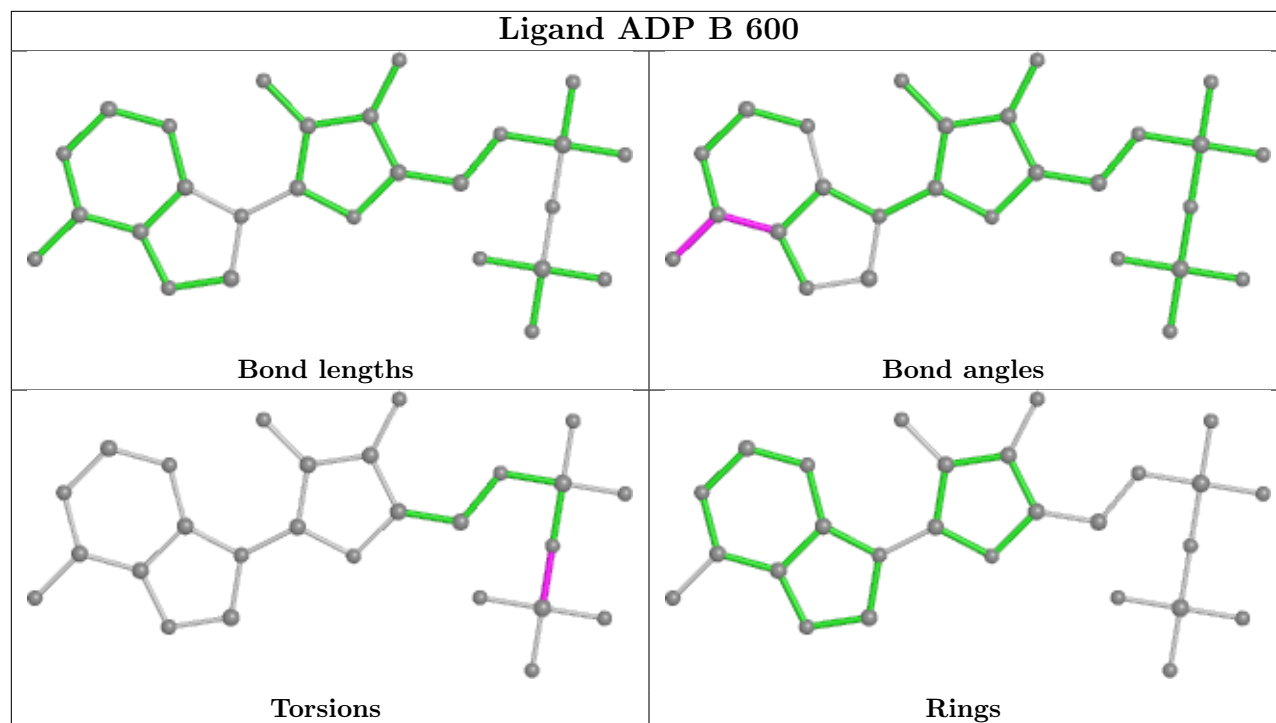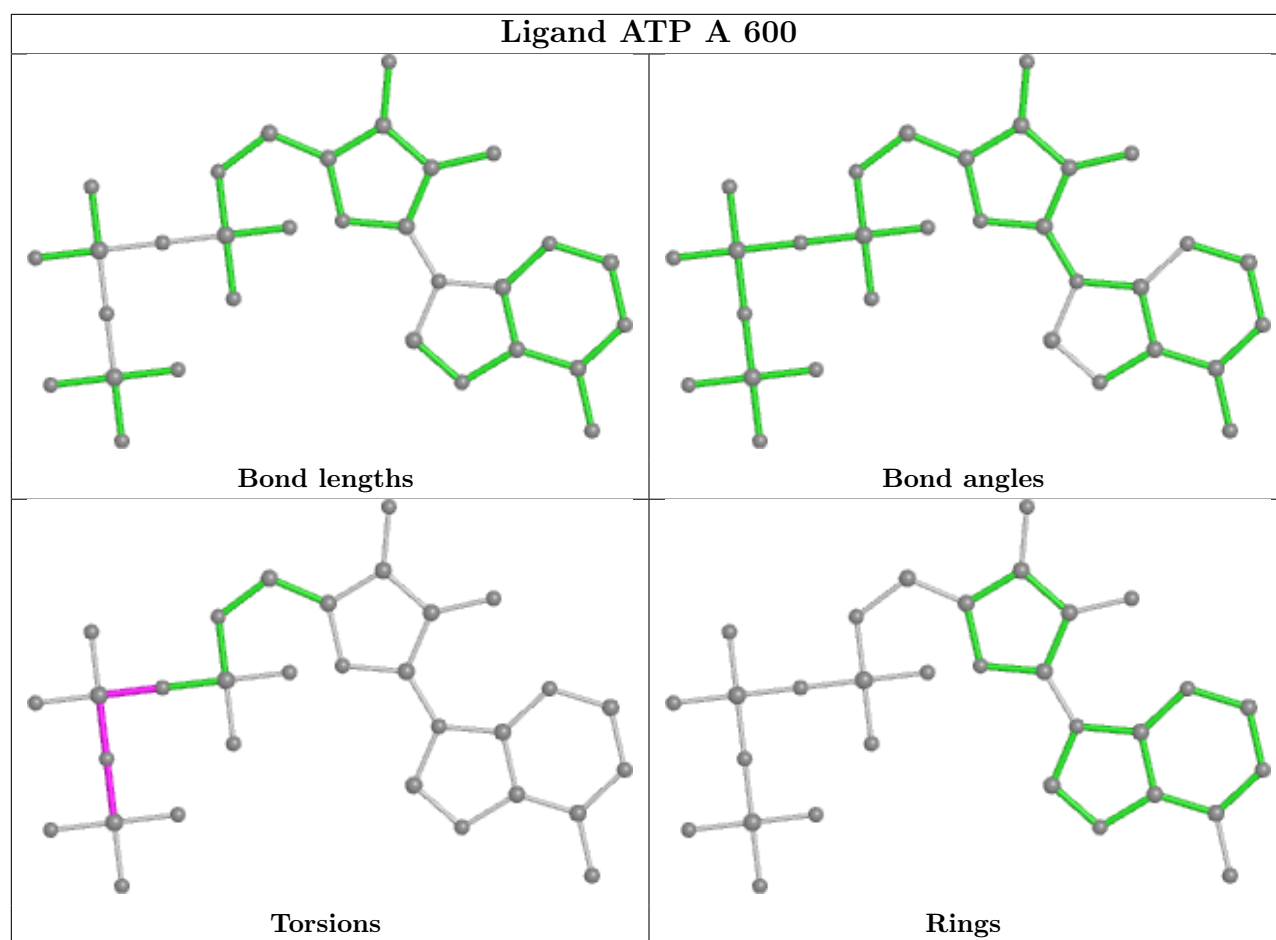
5.7 Other polymers ⓘ

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	492/510 (96%)	-0.16	18 (3%)	41	41	32, 46, 74, 104	0
1	B	492/510 (96%)	0.02	26 (5%)	26	25	32, 48, 95, 143	0
1	C	492/510 (96%)	-0.25	11 (2%)	62	60	30, 44, 63, 102	0
2	D	467/482 (96%)	-0.24	10 (2%)	63	61	31, 45, 69, 100	0
2	E	466/482 (96%)	0.22	38 (8%)	11	10	34, 54, 101, 132	0
2	F	466/482 (96%)	-0.20	11 (2%)	59	57	32, 44, 74, 89	0
3	G	263/272 (96%)	0.67	43 (16%)	1	1	36, 68, 116, 133	0
4	H	131/146 (89%)	1.33	31 (23%)	0	0	67, 97, 131, 136	0
5	I	47/50 (94%)	1.33	11 (23%)	0	0	58, 91, 127, 129	0
All	All	3316/3444 (96%)	0.04	199 (6%)	21	20	30, 48, 102, 143	0

The worst 5 of 199 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	E	473	LEU	8.8
1	C	407	GLY	8.7
2	E	474	ALA	8.4
1	B	400	VAL	8.4
2	E	390	ILE	8.3

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 (i)

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
10	DCW	D	700	16/16	0.74	0.31	69,73,78,78	0
7	MG	A	601	1/1	0.77	0.12	44,44,44,44	0
11	SO4	E	630	5/5	0.83	0.45	100,100,100,100	0
7	MG	C	601	1/1	0.90	0.15	43,43,43,43	0
6	ATP	A	600	31/31	0.92	0.13	42,44,56,56	0
6	ATP	C	600	31/31	0.94	0.12	36,42,51,52	0
7	MG	F	601	1/1	0.95	0.08	34,34,34,34	0
8	ADP	F	600	27/27	0.97	0.10	41,42,45,45	0
9	GOL	B	701	6/6	0.97	0.12	39,43,44,45	0
7	MG	D	601	1/1	0.97	0.18	35,35,35,35	0
7	MG	B	601	1/1	0.97	0.06	46,46,46,46	0
8	ADP	B	600	27/27	0.98	0.10	44,52,56,56	0
8	ADP	D	600	27/27	0.98	0.11	35,37,38,39	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 ATP A 600:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
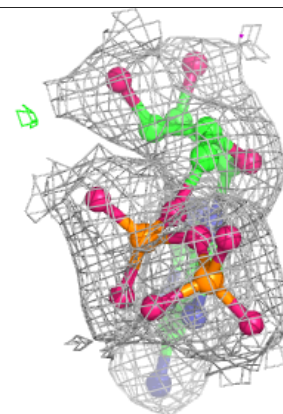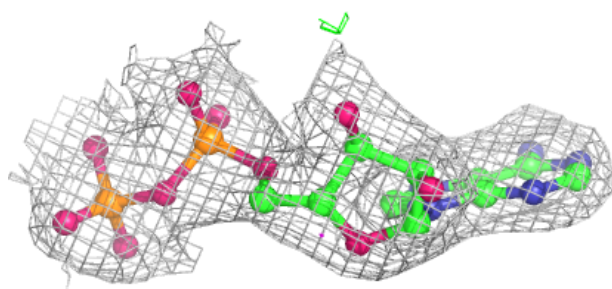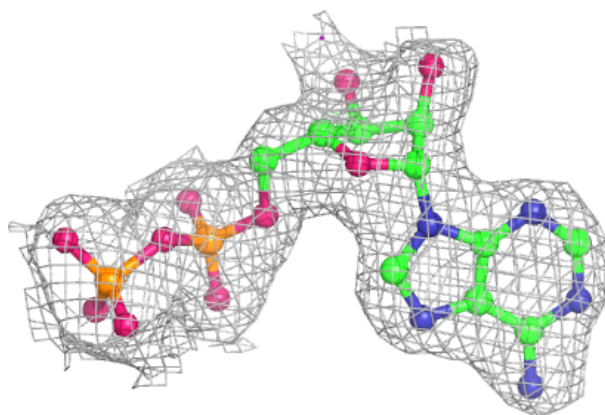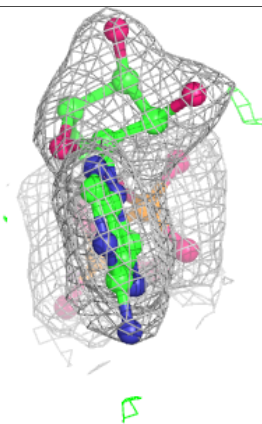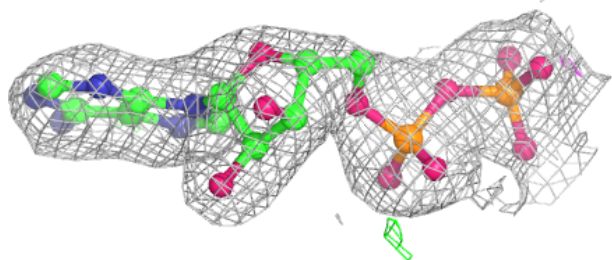and green (positive)
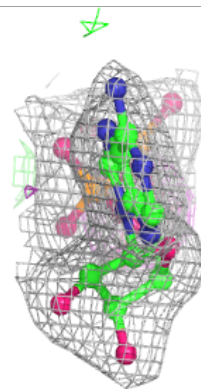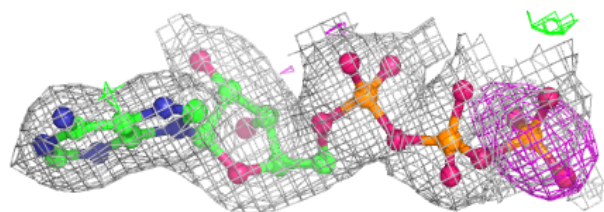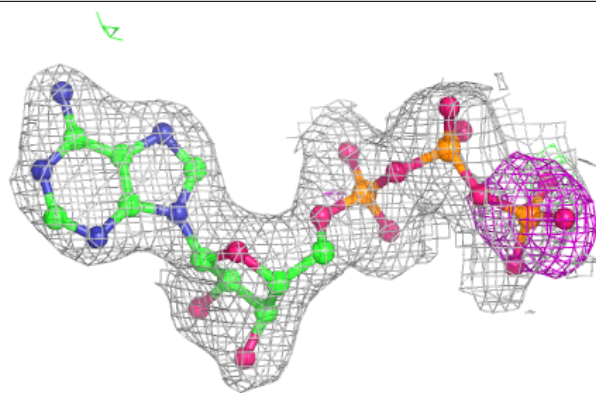
Electron density around ATP C 600:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
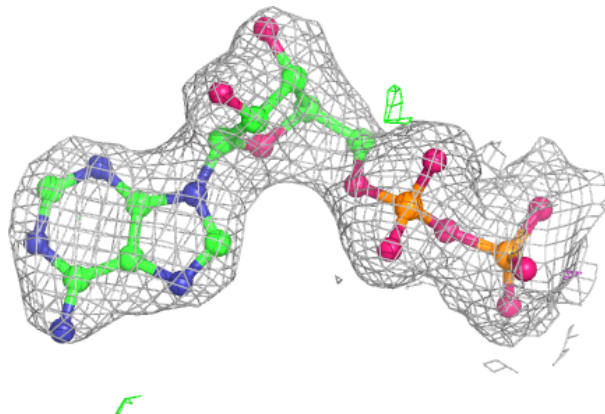mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
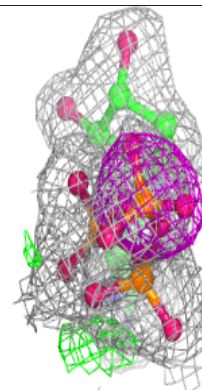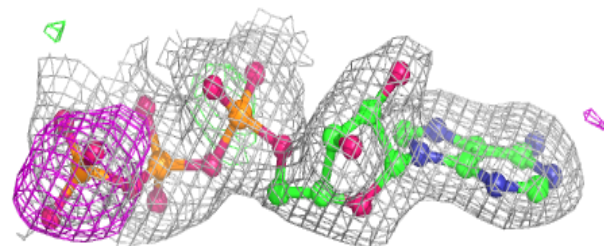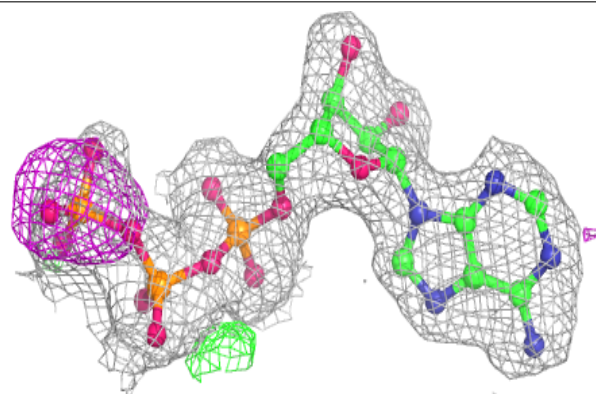
Electron density around ADP F 600:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
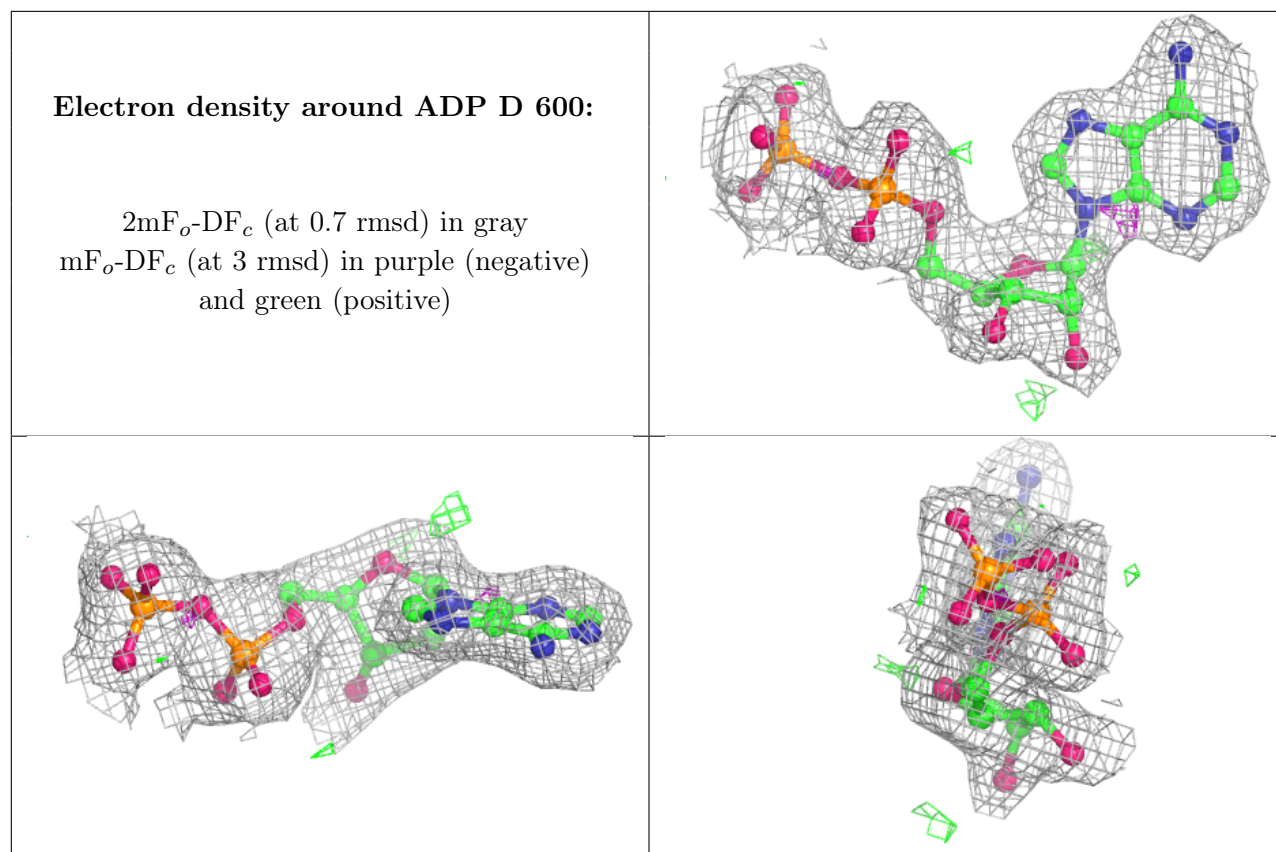mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around ADP B 600:

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 D 600:

$2mF_o$-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.