



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 12:28 PM UTC

PDB ID : 4YDQ / pdb_00004ydq
Title : Crystal Structure of Prolyl-tRNA Synthetase (PRS) from Plasmodium falciparum in complex with Halofuginone and AMPPNP
Authors : Jain, V.; Yogavel, M.; Sharma, A.
Deposited on : 2015-02-23
Resolution : 2.30 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

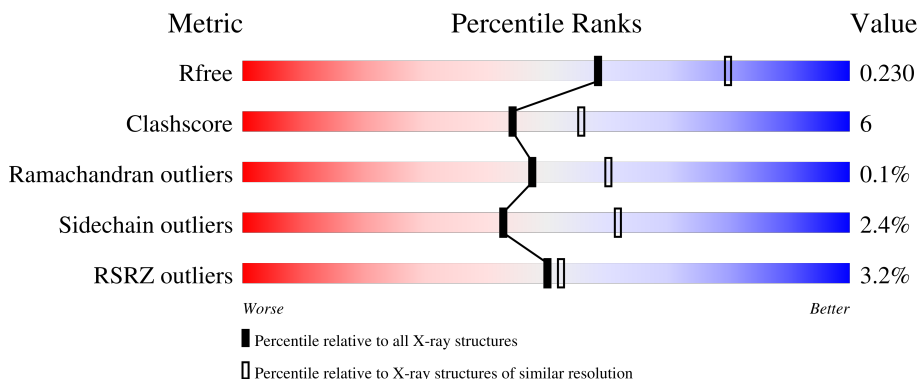
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

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 $\leq 5\%$. 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	497	3% 87% 10% ..
1	B	497	3% 81% 13% ..

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 8230 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.

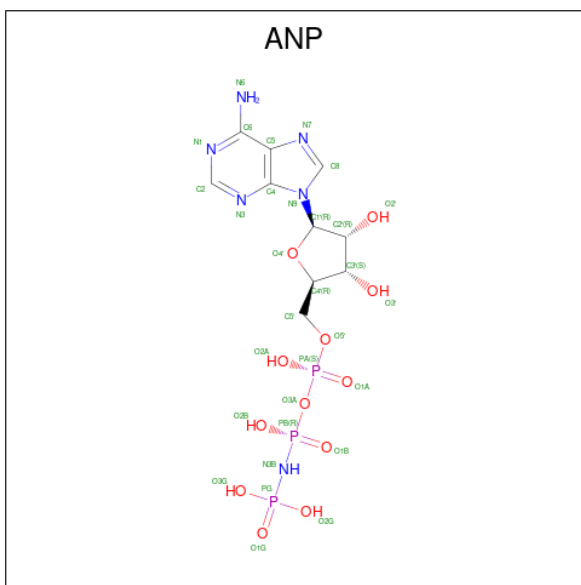
- Molecule 1 is a protein called Proline-tRNA ligase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	486	Total	C	N	O	S	0	6	0
			3942	2548	652	719	23			
1	B	478	Total	C	N	O	S	0	5	0
			3843	2486	634	700	23			

There are 8 discrepancies between the modelled and reference sequences:

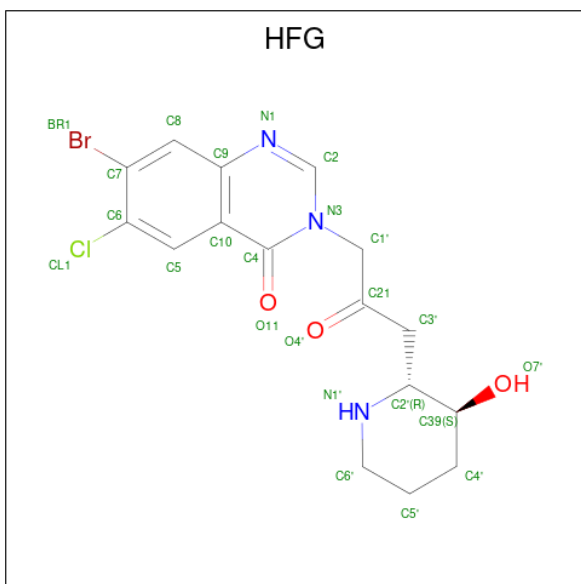
Chain	Residue	Modelled	Actual	Comment	Reference
A	250	GLY	-	expression tag	UNP Q8I5R7
A	251	ALA	-	expression tag	UNP Q8I5R7
A	252	MET	-	expression tag	UNP Q8I5R7
A	253	ALA	-	expression tag	UNP Q8I5R7
B	250	GLY	-	expression tag	UNP Q8I5R7
B	251	ALA	-	expression tag	UNP Q8I5R7
B	252	MET	-	expression tag	UNP Q8I5R7
B	253	ALA	-	expression tag	UNP Q8I5R7

- Molecule 2 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (CCD ID: ANP) (formula: $C_{10}H_{17}N_6O_{12}P_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			31	10	6	12	3		
2	B	1	Total	C	N	O	P	0	0
			31	10	6	12	3		

- Molecule 3 is 7-bromo-6-chloro-3-{3-[(2R,3S)-3-hydroxypiperidin-2-yl]-2-oxopropyl}quinazolin-4(3H)-one (CCD ID: HFG) (formula: $C_{16}H_{17}BrClN_3O_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	Br	C	Cl	N	O	0
			24	1	16	1	3	3	

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Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	B	1	Total	Br	C	Cl	N	O	0	0
			24	1	16	1	3	3		

- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

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

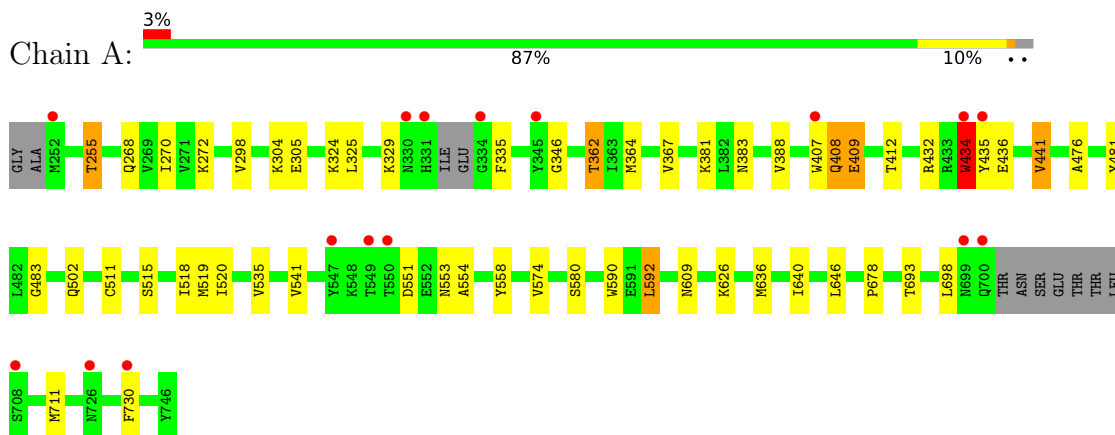
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	196	Total	O	0	0
			196	196		
5	B	137	Total	O	0	0
			137	137		

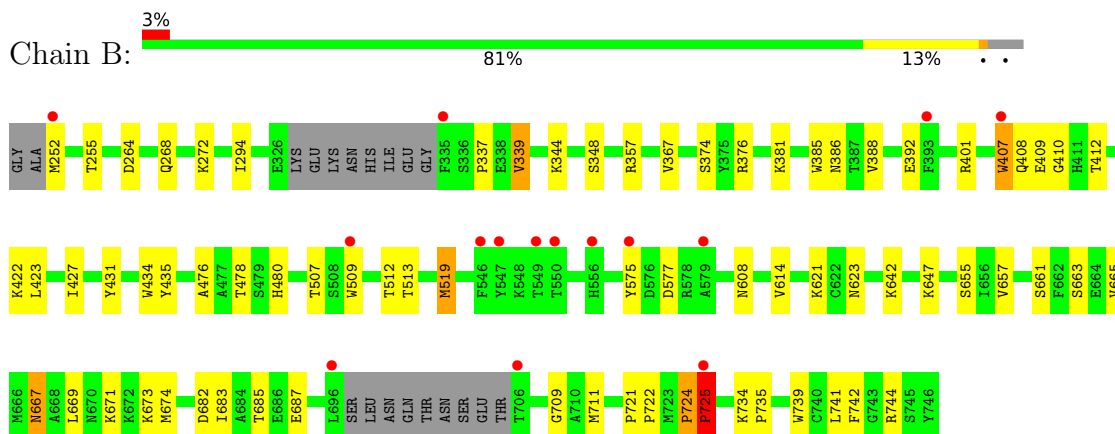
3 Residue-property plots

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: Proline-tRNA ligase



• Molecule 1: Proline-tRNA ligase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	81.03Å 88.93Å 86.30Å 90.00° 96.71° 90.00°	Depositor
Resolution (Å)	27.82 – 2.30 27.82 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.2 (27.82-2.30) 99.5 (27.82-2.30)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.65 (at 2.29Å)	Xtriage
Refinement program	PHENIX phenix.refine: 1.8.4_1496	Depositor
R, R_{free}	0.184 , 0.232 0.184 , 0.230	Depositor DCC
R_{free} test set	2742 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	36.3	Xtriage
Anisotropy	0.399	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 39.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	8230	wwPDB-VP
Average B, all atoms (Å ²)	44.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.68% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: MG, ANP, HFG

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	0.64	0/4060	0.92	4/5505 (0.1%)
1	B	0.56	0/3956	0.92	7/5368 (0.1%)
All	All	0.60	0/8016	0.92	11/10873 (0.1%)

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	724	PRO	CA-C-N	7.32	128.99	119.84
1	B	724	PRO	C-N-CA	7.32	128.99	119.84
1	A	434	TRP	CB-CA-C	6.91	121.82	110.90
1	B	407	TRP	CA-C-N	-6.15	113.15	122.81
1	B	407	TRP	C-N-CA	-6.15	113.15	122.81
1	B	665	VAL	N-CA-C	5.62	116.07	110.23
1	A	329	LYS	CB-CA-C	-5.45	110.27	116.54
1	A	409	GLU	N-CA-C	5.44	117.28	108.41
1	A	441	VAL	N-CA-C	5.26	113.73	107.73
1	B	667	ASN	N-CA-C	-5.09	105.62	111.07
1	B	367	VAL	N-CA-C	-5.02	107.96	113.43

There are no chirality outliers.

There are no planarity outliers.

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	3942	0	3868	46	0
1	B	3843	0	3742	49	0
2	A	31	0	13	0	0
2	B	31	0	13	0	0
3	A	24	0	17	2	0
3	B	24	0	17	1	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
5	A	196	0	0	1	0
5	B	137	0	0	3	0
All	All	8230	0	7670	93	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 (93) 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:407:TRP:CZ3	1:A:409:GLU:HB3	2.06	0.90
1:A:434:TRP:HH2	1:A:515:SER:HB3	1.36	0.89
1:B:407:TRP:CZ3	1:B:409:GLU:HB3	2.09	0.87
1:A:434:TRP:CH2	1:A:515:SER:HB3	2.12	0.82
1:A:298:VAL:HB	1:A:434:TRP:CD1	2.15	0.82
1:A:324:LYS:HG2	1:A:362[A]:THR:HG23	1.63	0.81
1:A:435:TYR:CE2	1:A:476:ALA:HB1	2.18	0.78
1:A:434:TRP:HZ3	1:A:435:TYR:CE2	2.03	0.77
1:B:422:LYS:NZ	5:B:1025:HOH:O	2.24	0.70
1:B:431:TYR:HH	1:B:509:TRP:CD1	2.09	0.69
1:B:431:TYR:HH	1:B:509:TRP:HD1	1.41	0.68
1:B:674:MET:HE3	1:B:741:LEU:HD22	1.76	0.67
1:B:264:ASP:OD2	1:B:268:GLN:NE2	2.26	0.67
1:A:298:VAL:HB	1:A:434:TRP:NE1	2.08	0.67
1:A:407:TRP:CD1	1:A:407:TRP:N	2.64	0.65
1:B:657:VAL:HG23	1:B:673:LYS:HG2	1.80	0.64
1:A:434:TRP:CH2	1:A:515:SER:CB	2.82	0.63
1:A:693:THR:HG21	1:A:711:MET:HG2	1.80	0.62
1:A:434:TRP:HZ3	1:A:435:TYR:CD2	2.18	0.62
1:B:392:GLU:OE1	5:B:1034:HOH:O	2.16	0.60
1:A:551:ASP:OD1	1:A:553:ASN:N	2.36	0.59
1:A:325:LEU:HA	1:A:362[A]:THR:HG21	1.84	0.58
1:A:346:GLY:HA3	1:B:337:PRO:HA	1.85	0.58
1:A:383:ASN:OD1	1:A:408:GLN:HG2	2.03	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:407:TRP:CD1	1:B:407:TRP:N	2.72	0.58
1:A:435:TYR:CZ	1:A:476:ALA:HB1	2.40	0.57
1:A:580:SER:OG	1:B:376:ARG:NH1	2.38	0.57
1:A:551:ASP:OD1	1:A:554:ALA:N	2.36	0.56
1:B:388:VAL:HG13	1:B:407:TRP:HE1	1.70	0.56
1:B:357:ARG:HG3	1:B:388:VAL:HG12	1.88	0.55
1:B:410:GLY:HA3	1:B:509:TRP:CE2	2.42	0.55
1:B:709:GLY:O	1:B:744:ARG:NE	2.33	0.55
1:B:339:VAL:HG23	3:B:802:HFG:BR1	2.62	0.54
1:A:388:VAL:HG22	1:A:407:TRP:NE1	2.23	0.53
1:A:434:TRP:CH2	1:A:511:CYS:SG	3.01	0.53
1:B:734:LYS:HG2	1:B:735:PRO:HD2	1.91	0.52
1:A:678:PRO:O	1:A:730:PHE:HD2	1.93	0.52
1:A:407:TRP:CH2	1:A:409:GLU:HB3	2.45	0.51
1:B:407:TRP:HZ3	1:B:409:GLU:HB3	1.73	0.51
1:B:614:VAL:HG22	1:B:621:LYS:HG2	1.91	0.51
1:B:575:TYR:CZ	1:B:577:ASP:HB3	2.46	0.51
1:B:252[A]:MET:HG2	1:B:272:LYS:HE2	1.93	0.51
1:A:255:THR:HB	1:A:268:GLN:HE22	1.75	0.51
1:B:381:LYS:HA	1:B:412:THR:HG22	1.93	0.51
1:A:324:LYS:HG2	1:A:362[A]:THR:CG2	2.39	0.50
1:B:407:TRP:CH2	1:B:409:GLU:HB3	2.44	0.50
1:B:407:TRP:HB3	1:B:512:THR:HG22	1.93	0.50
1:B:423:LEU:HD21	1:B:509:TRP:CZ3	2.46	0.50
1:B:661:SER:OG	1:B:663:SER:OG	2.18	0.49
1:B:507:THR:HG1	1:B:509:TRP:HZ3	1.59	0.49
1:A:558:TYR:CE1	1:A:626:LYS:HD2	2.50	0.47
1:B:294:ILE:HD13	1:B:519:MET:HE1	1.96	0.47
1:B:431:TYR:OH	1:B:509:TRP:HD1	1.96	0.47
1:B:412:THR:HG23	1:B:509:TRP:CH2	2.50	0.47
1:A:388:VAL:HG11	1:A:407:TRP:HZ2	1.80	0.46
1:A:434:TRP:CZ3	1:A:435:TYR:CE2	2.94	0.46
1:A:432:ARG:NH1	1:A:436:GLU:OE1	2.43	0.45
1:B:674:MET:HB2	1:B:742:PHE:O	2.15	0.45
1:B:667:ASN:O	1:B:671:LYS:HG3	2.16	0.45
1:B:427:ILE:HG21	1:B:509:TRP:CG	2.52	0.45
1:B:385:TRP:CE3	1:B:408:GLN:HB3	2.51	0.45
1:B:294:ILE:HD13	1:B:519:MET:CE	2.47	0.45
1:B:721:PRO:HG2	1:B:739:TRP:CD1	2.52	0.44
1:A:434:TRP:CZ3	1:A:435:TYR:CD2	3.02	0.44
1:A:636:MET:O	1:A:640:ILE:HG13	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:335:PHE:HB3	3:A:802:HFG:C7	2.47	0.44
1:B:682:ASP:HB2	1:B:685:THR:HG23	1.99	0.44
1:A:362[A]:THR:HB	5:A:937:HOH:O	2.17	0.44
1:A:381:LYS:HA	1:A:412:THR:HG22	1.99	0.44
1:A:541:VAL:HG21	1:A:590:TRP:CD1	2.52	0.43
1:B:722:PRO:O	1:B:724:PRO:HD3	2.19	0.43
1:B:435:TYR:CZ	1:B:476:ALA:HB1	2.54	0.43
1:A:435:TYR:HB3	1:A:441:VAL:O	2.19	0.43
1:B:669:LEU:HD11	1:B:711:MET:HB3	2.00	0.43
1:A:434:TRP:CZ2	1:A:515:SER:CB	3.01	0.43
1:A:270:ILE:HG22	1:A:520:ILE:HD13	2.01	0.42
1:A:407:TRP:HZ3	3:A:802:HFG:H8	1.84	0.42
1:A:481:TYR:CZ	1:A:483:GLY:HA2	2.53	0.42
1:A:272:LYS:HB3	1:A:592:LEU:HD21	2.01	0.42
1:B:724:PRO:HA	1:B:725:PRO:HD3	1.88	0.42
1:B:655:SER:O	1:B:673:LYS:HG3	2.20	0.42
1:B:357:ARG:NH2	1:B:386:ASN:HB2	2.34	0.42
1:B:478[B]:THR:HG21	1:B:480:HIS:CE1	2.54	0.42
1:B:344:LYS:HB3	1:B:344:LYS:HE2	1.93	0.41
1:A:364:MET:O	1:A:367[B]:VAL:HG22	2.20	0.41
1:B:642:LYS:HE3	1:B:642:LYS:HB2	1.92	0.41
1:A:304:LYS:HE3	1:A:305:GLU:OE2	2.21	0.41
1:A:435:TYR:OH	1:A:518:ILE:HD12	2.20	0.41
1:B:392:GLU:CD	1:B:401:ARG:HD3	2.46	0.41
1:A:519:MET:HE2	1:A:535:VAL:HG21	2.03	0.40
1:A:646:LEU:HD23	1:A:646:LEU:HA	1.93	0.40
1:B:623:ASN:ND2	5:B:983:HOH:O	2.54	0.40
1:B:434:TRP:CD1	1:B:434:TRP:C	3.00	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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	486/497 (98%)	475 (98%)	11 (2%)	0	100	100
1	B	476/497 (96%)	461 (97%)	14 (3%)	1 (0%)	43	55
All	All	962/994 (97%)	936 (97%)	25 (3%)	1 (0%)	48	60

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	725	PRO

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	426/450 (95%)	416 (98%)	10 (2%)	44	63
1	B	410/450 (91%)	399 (97%)	11 (3%)	39	58
All	All	836/900 (93%)	815 (98%)	21 (2%)	43	60

All (21) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	255	THR
1	A	362[A]	THR
1	A	362[B]	THR
1	A	408	GLN
1	A	434	TRP
1	A	502	GLN
1	A	574	VAL
1	A	592	LEU
1	A	609	ASN
1	A	698	LEU
1	B	255	THR
1	B	339	VAL
1	B	348	SER
1	B	374	SER
1	B	513	THR

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Mol	Chain	Res	Type
1	B	519	MET
1	B	608	ASN
1	B	647	LYS
1	B	683	ILE
1	B	687	GLU
1	B	725	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	310	ASN
1	A	506	GLN
1	A	609	ASN
1	A	667	ASN
1	B	458	ASN
1	B	506	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 6 ligands modelled in this entry, 2 are monoatomic - leaving 4 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
2	ANP	B	801	4	33,33,33	1.19	4 (12%)	45,52,52	1.01	3 (6%)
2	ANP	A	801	4	33,33,33	1.71	5 (15%)	45,52,52	1.09	3 (6%)
3	HFG	A	802	-	26,26,26	3.22	14 (53%)	29,37,37	2.78	9 (31%)
3	HFG	B	802	-	26,26,26	3.19	13 (50%)	29,37,37	3.06	8 (27%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	ANP	B	801	4	-	4/18/38/38	0/3/3/3
2	ANP	A	801	4	-	2/18/38/38	0/3/3/3
3	HFG	A	802	-	-	0/8/19/19	0/3/3/3
3	HFG	B	802	-	-	0/8/19/19	0/3/3/3

All (36) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	802	HFG	C2-N1	9.42	1.40	1.28
3	B	802	HFG	C2-N1	9.26	1.40	1.28
2	A	801	ANP	PG-O1G	7.93	1.58	1.46
3	A	802	HFG	C9-N1	6.48	1.50	1.40
3	B	802	HFG	C9-N1	6.10	1.50	1.40
3	A	802	HFG	O4'-C21	4.78	1.30	1.21
3	B	802	HFG	O4'-C21	4.60	1.29	1.21
3	A	802	HFG	C4-N3	4.43	1.44	1.39
3	B	802	HFG	C4-N3	4.14	1.44	1.39
3	B	802	HFG	C10-C9	-3.97	1.35	1.40
3	A	802	HFG	C1'-N3	-3.62	1.41	1.46
3	B	802	HFG	C2-N3	3.60	1.41	1.36
3	A	802	HFG	C10-C9	-3.56	1.35	1.40
3	B	802	HFG	C39-C2'	-3.55	1.49	1.52
3	B	802	HFG	C8-C9	-3.22	1.35	1.40
3	A	802	HFG	C5-C10	3.15	1.44	1.39
3	A	802	HFG	C2-N3	3.15	1.40	1.36
3	A	802	HFG	C39-C2'	-3.09	1.49	1.52
3	B	802	HFG	C5-C6	-3.09	1.33	1.38
3	B	802	HFG	C1'-N3	-3.09	1.42	1.46
3	B	802	HFG	C5-C10	3.01	1.44	1.39
2	B	801	ANP	PB-O3A	-3.00	1.55	1.59

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	801	ANP	PG-O1G	2.88	1.50	1.46
2	A	801	ANP	PB-O3A	-2.86	1.55	1.59
2	A	801	ANP	PG-N3B	2.75	1.70	1.63
3	A	802	HFG	C6-CL1	2.66	1.79	1.73
2	B	801	ANP	PG-N3B	2.60	1.70	1.63
2	B	801	ANP	PB-O1B	2.57	1.50	1.46
3	B	802	HFG	C6-CL1	2.55	1.79	1.73
3	B	802	HFG	C5'-C4'	-2.49	1.46	1.53
2	A	801	ANP	PB-O1B	2.41	1.49	1.46
3	A	802	HFG	C5'-C4'	-2.29	1.47	1.53
3	A	802	HFG	C8-C9	-2.26	1.36	1.40
2	A	801	ANP	PG-O2G	-2.25	1.50	1.56
3	A	802	HFG	C5-C6	-2.17	1.35	1.38
3	A	802	HFG	C3'-C21	2.01	1.54	1.51

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	802	HFG	C10-C4-N3	11.00	120.29	113.76
3	A	802	HFG	C10-C4-N3	10.28	119.86	113.76
3	B	802	HFG	N3-C2-N1	-8.15	119.52	126.31
3	A	802	HFG	N3-C2-N1	-7.44	120.11	126.31
3	B	802	HFG	C4'-C39-C2'	-5.89	107.04	110.89
3	A	802	HFG	C4'-C39-C2'	-3.81	108.40	110.89
3	B	802	HFG	C9-N1-C2	3.32	120.07	116.69
3	A	802	HFG	C9-N1-C2	3.31	120.06	116.69
3	B	802	HFG	C5-C6-CL1	3.06	123.46	118.45
2	B	801	ANP	O1G-PG-N3B	-3.02	107.32	111.77
2	A	801	ANP	O5'-C5'-C4'	-2.90	99.14	108.99
2	B	801	ANP	O1B-PB-N3B	-2.76	107.71	111.77
3	B	802	HFG	C7-C6-CL1	-2.65	116.17	121.10
2	A	801	ANP	O3A-PA-O1A	2.65	118.66	110.70
2	B	801	ANP	C5-C4-N9	2.36	108.39	105.81
3	A	802	HFG	BR1-C7-C6	2.36	124.16	121.18
3	A	802	HFG	C2-N3-C4	-2.34	120.14	121.89
3	A	802	HFG	C5-C6-CL1	2.34	122.28	118.45
3	B	802	HFG	C4'-C5'-C6'	2.30	115.43	110.55
3	B	802	HFG	C2-N3-C4	-2.29	120.18	121.89
3	A	802	HFG	C7-C6-CL1	-2.14	117.11	121.10
3	A	802	HFG	C10-C9-N1	-2.07	119.76	122.51
2	A	801	ANP	PA-O5'-C5'	2.02	132.91	121.35

There are no chirality outliers.

All (6) torsion outliers are listed below:

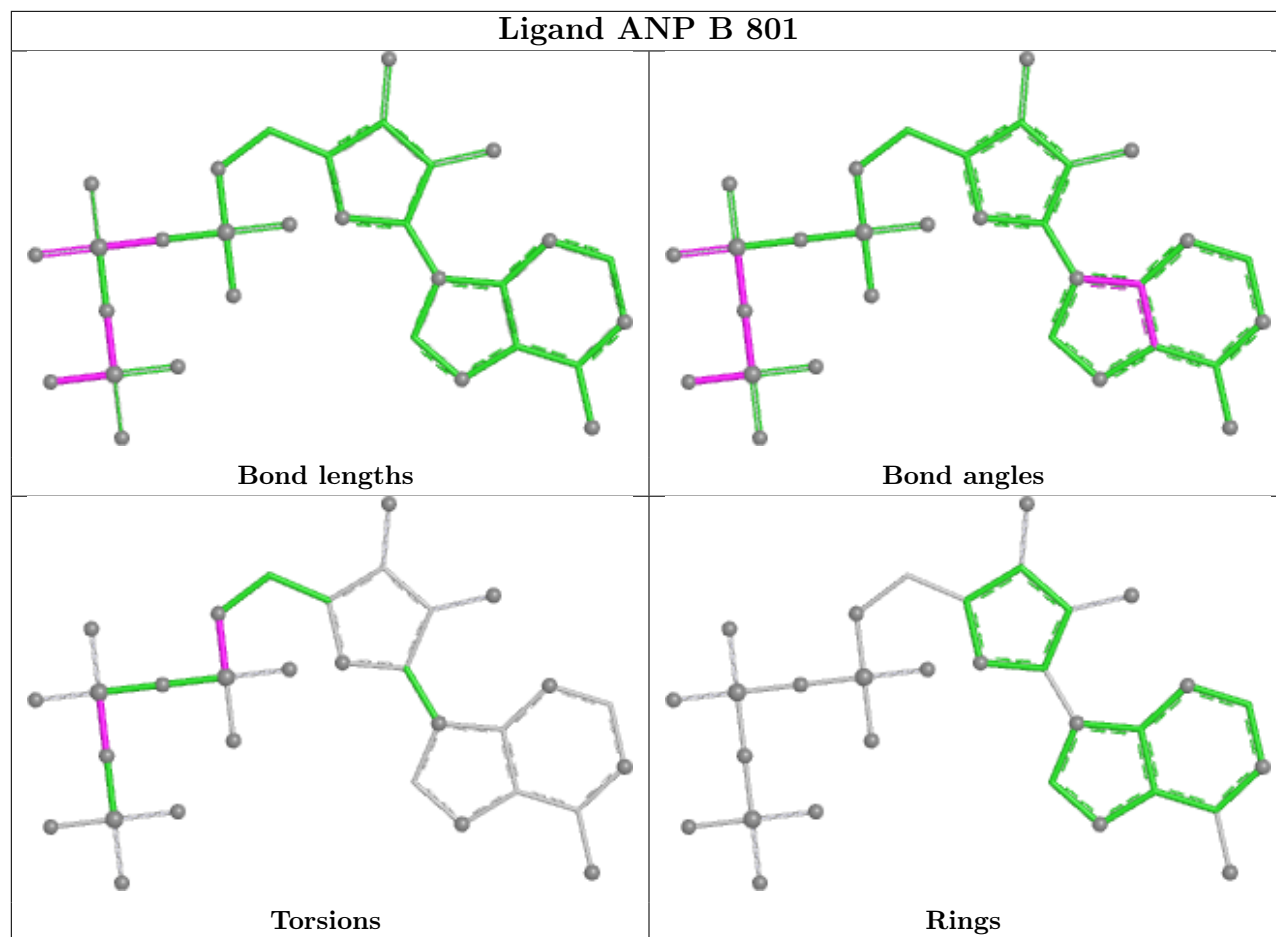
Mol	Chain	Res	Type	Atoms
2	A	801	ANP	PG-N3B-PB-O1B
2	B	801	ANP	PG-N3B-PB-O1B
2	B	801	ANP	C5'-O5'-PA-O2A
2	B	801	ANP	C5'-O5'-PA-O3A
2	A	801	ANP	C5'-O5'-PA-O1A
2	B	801	ANP	C5'-O5'-PA-O1A

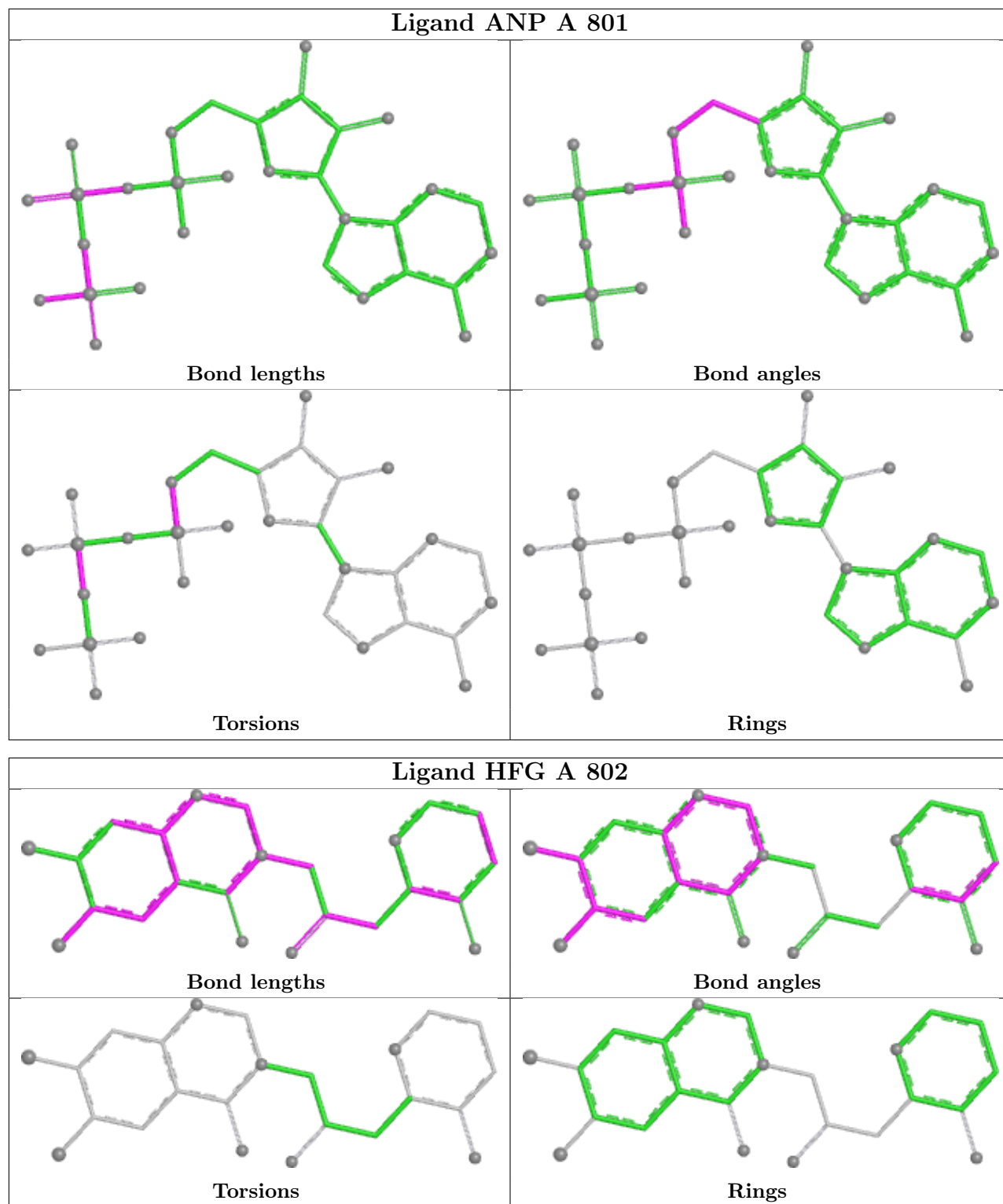
There are no ring outliers.

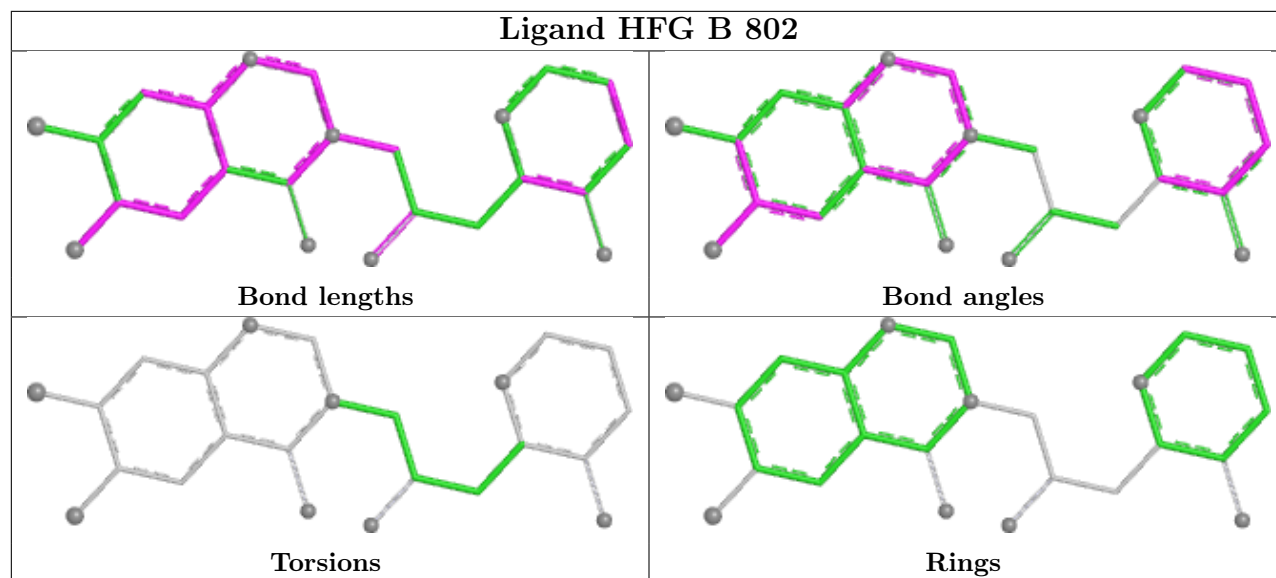
2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	802	HFG	2	0
3	B	802	HFG	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 than 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.







5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

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	486/497 (97%)	-0.22	16 (3%)	49	51	19, 37, 63, 125	6 (1%)
1	B	478/497 (96%)	0.16	15 (3%)	51	53	22, 45, 83, 110	5 (1%)
All	All	964/994 (96%)	-0.03	31 (3%)	50	52	19, 40, 80, 125	11 (1%)

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	434	TRP	7.2
1	A	407	TRP	5.9
1	B	407	TRP	5.2
1	B	335	PHE	5.1
1	B	706	THR	4.6
1	A	700	GLN	3.8
1	B	696	LEU	3.8
1	A	330	ASN	3.5
1	A	549	THR	3.3
1	A	550	THR	3.1
1	A	547	TYR	3.1
1	B	547	TYR	3.0
1	B	546	PHE	3.0
1	B	549	THR	3.0
1	B	393	PHE	3.0
1	A	699	ASN	2.9
1	A	730	PHE	2.8
1	B	252[A]	MET	2.6
1	B	509	TRP	2.6
1	A	331	HIS	2.4
1	A	726	ASN	2.4
1	B	550	THR	2.3
1	B	556	HIS	2.3
1	A	334	GLY	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	579	ALA	2.1
1	A	345	TYR	2.1
1	A	708	SER	2.1
1	A	252	MET	2.1
1	B	575	TYR	2.1
1	B	725	PRO	2.0
1	A	435	TYR	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

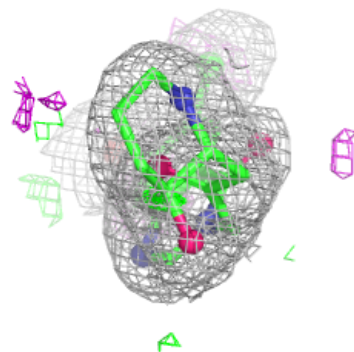
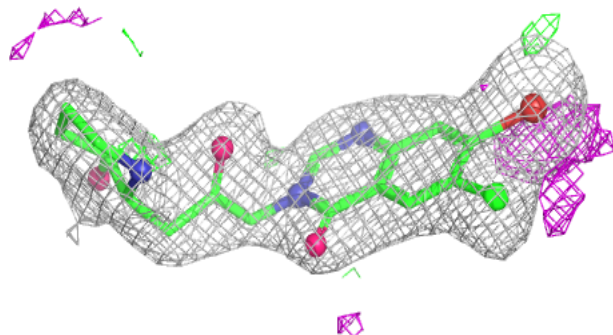
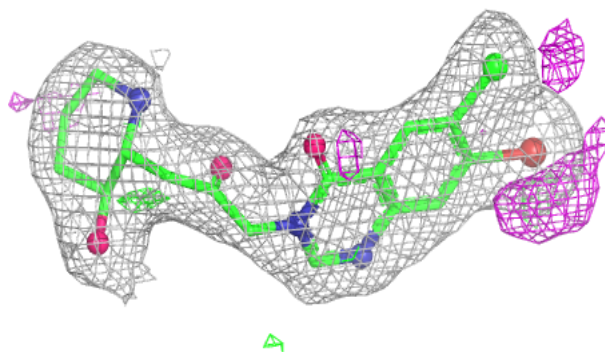
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	HFG	B	802	24/24	0.91	0.11	24,34,43,77	24
2	ANP	B	801	31/31	0.95	0.09	31,39,70,76	0
4	MG	B	803	1/1	0.95	0.07	56,56,56,56	0
2	ANP	A	801	31/31	0.96	0.07	26,32,48,113	0
3	HFG	A	802	24/24	0.96	0.07	22,29,38,53	0
4	MG	A	803	1/1	0.98	0.05	45,45,45,45	0

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

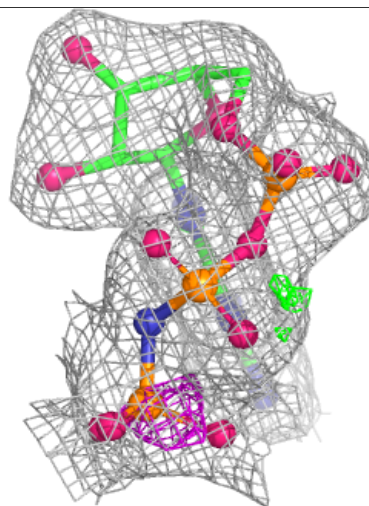
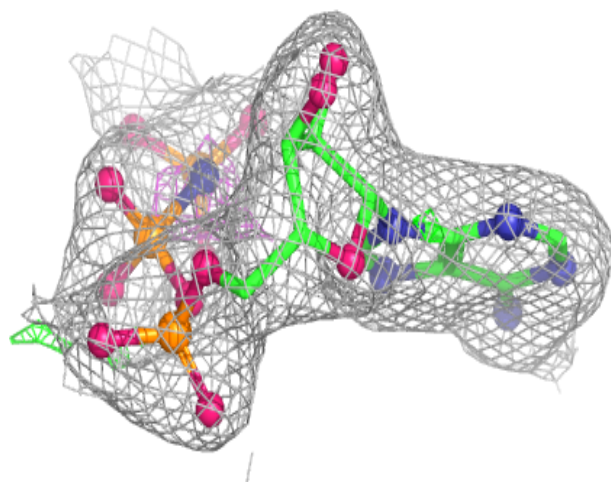
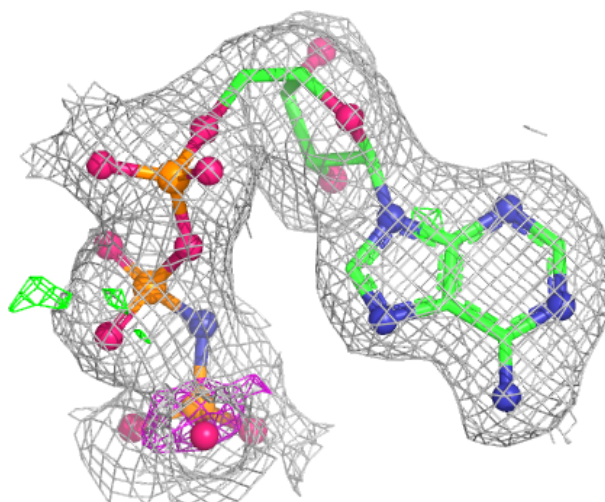
Electron density around HFG B 802:

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



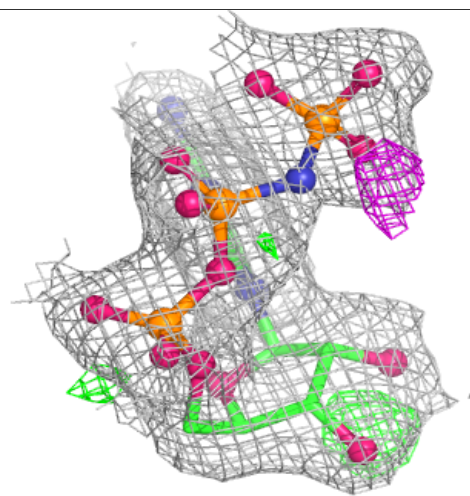
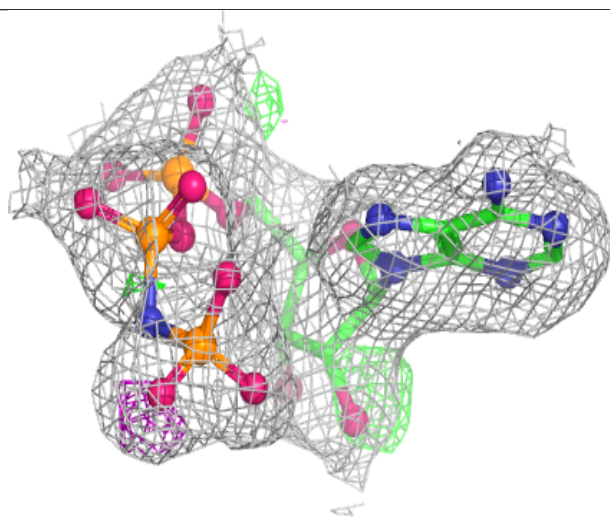
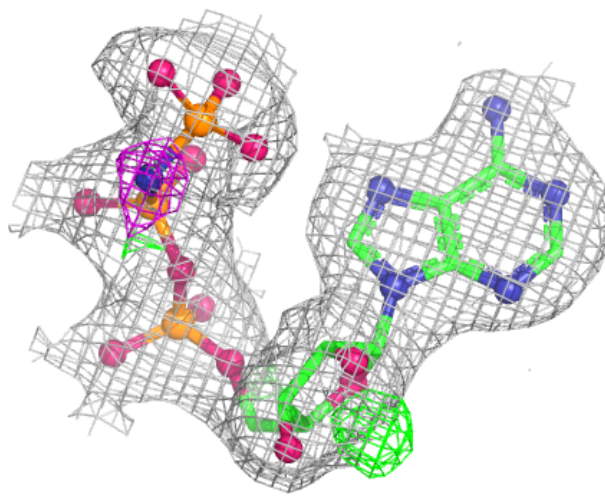
Electron density around ANP B 801:

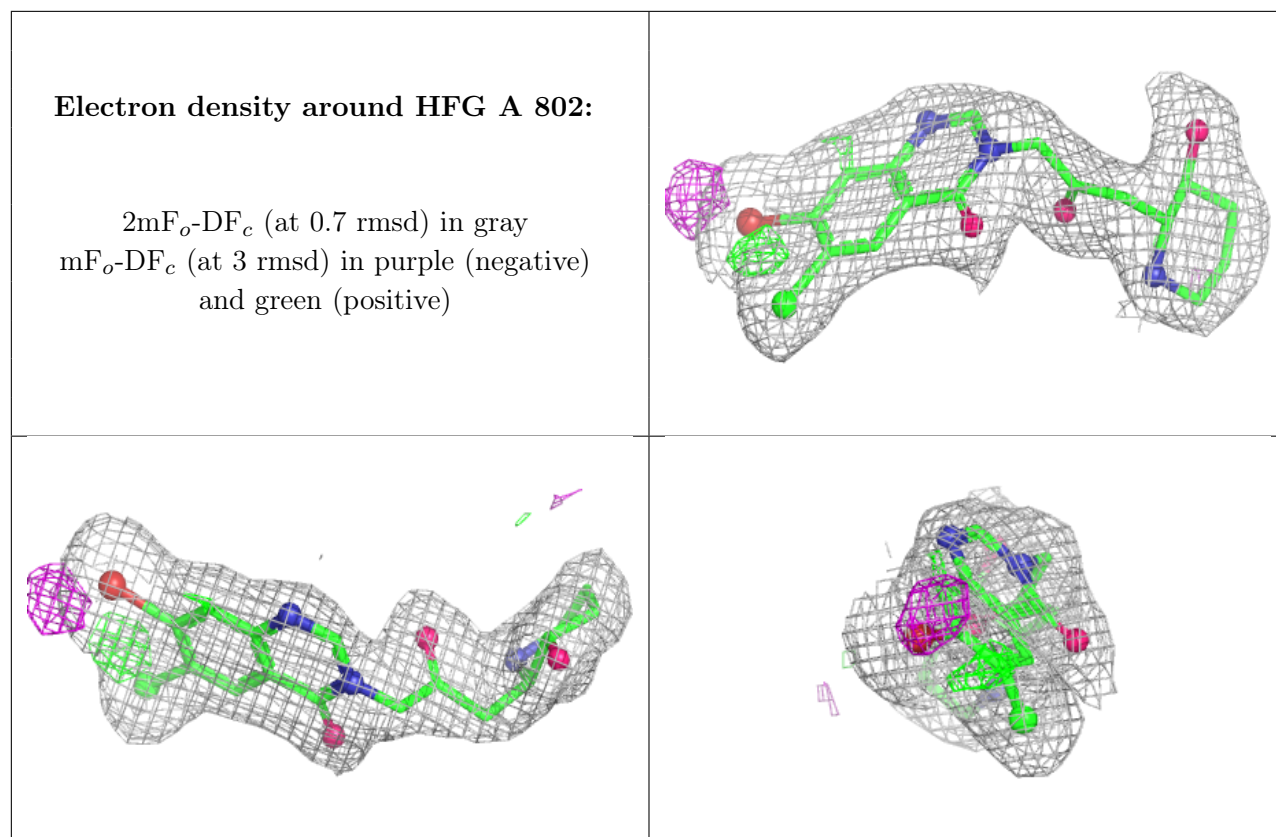
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around ANP A 801:

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





6.5 Other polymers [i](#)

There are no such residues in this entry.