Full wwPDB X-ray Structure Validation Report (i)

Nov 6, 2025 – 12:10 PM JST

PDB ID	:	9U4S / pdb_00009u4s
Title	:	Crystal Structure of PI5P4K-gamma in complex with n40
Authors	:	Zhao, W.F.; Xu, Y.C.
Deposited on	:	2025-03-20
Resolution	:	2.25 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 (i) 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 (i)) were used in the production of this report:

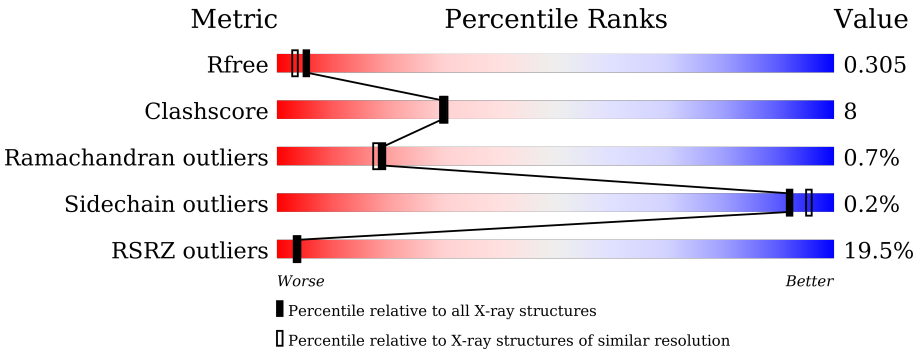
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.25 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}	164625	1763 (2.26-2.26)
Clashscore	180529	1919 (2.26-2.26)
Ramachandran outliers	177936	1884 (2.26-2.26)
Sidechain outliers	177891	1885 (2.26-2.26)
RSRZ outliers	164620	1763 (2.26-2.26)

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	349	5% 77% 13% 10%
1	B	349	29% 65% 18% 17%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 4827 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 Phosphatidylinositol 5-phosphate 4-kinase type-2 gamma.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	314	Total	C	N	O	S	0	0	0
			2524	1621	425	468	10			
1	B	291	Total	C	N	O	S	0	0	0
			2198	1410	370	410	8			

There are 86 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	31	GLY	-	expression tag	UNP Q8TBX8
A	?	-	ALA	deletion	UNP Q8TBX8
A	?	-	PRO	deletion	UNP Q8TBX8
A	?	-	VAL	deletion	UNP Q8TBX8
A	?	-	ARG	deletion	UNP Q8TBX8
A	?	-	GLU	deletion	UNP Q8TBX8
A	?	-	ASP	deletion	UNP Q8TBX8
A	?	-	GLU	deletion	UNP Q8TBX8
A	?	-	SER	deletion	UNP Q8TBX8
A	?	-	GLU	deletion	UNP Q8TBX8
A	?	-	VAL	deletion	UNP Q8TBX8
A	?	-	ASP	deletion	UNP Q8TBX8
A	?	-	GLY	deletion	UNP Q8TBX8
A	?	-	ASP	deletion	UNP Q8TBX8
A	?	-	CYS	deletion	UNP Q8TBX8
A	?	-	SER	deletion	UNP Q8TBX8
A	?	-	LEU	deletion	UNP Q8TBX8
A	?	-	THR	deletion	UNP Q8TBX8
A	?	-	GLY	deletion	UNP Q8TBX8
A	?	-	PRO	deletion	UNP Q8TBX8
A	?	-	PRO	deletion	UNP Q8TBX8
A	?	-	ALA	deletion	UNP Q8TBX8
A	?	-	LEU	deletion	UNP Q8TBX8
A	?	-	VAL	deletion	UNP Q8TBX8
A	?	-	GLY	deletion	UNP Q8TBX8

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Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	SER	deletion	UNP Q8TBX8
A	?	-	TYR	deletion	UNP Q8TBX8
A	?	-	GLY	deletion	UNP Q8TBX8
A	?	-	THR	deletion	UNP Q8TBX8
A	?	-	SER	deletion	UNP Q8TBX8
A	?	-	PRO	deletion	UNP Q8TBX8
A	?	-	GLU	deletion	UNP Q8TBX8
A	?	-	GLY	deletion	UNP Q8TBX8
A	?	-	ILE	deletion	UNP Q8TBX8
A	?	-	GLY	deletion	UNP Q8TBX8
A	?	-	GLY	deletion	UNP Q8TBX8
A	?	-	TYR	deletion	UNP Q8TBX8
A	?	-	ILE	deletion	UNP Q8TBX8
A	?	-	HIS	deletion	UNP Q8TBX8
A	?	-	SER	deletion	UNP Q8TBX8
A	?	-	HIS	deletion	UNP Q8TBX8
A	?	-	ARG	deletion	UNP Q8TBX8
A	?	-	PRO	deletion	UNP Q8TBX8
B	31	GLY	-	expression tag	UNP Q8TBX8
B	?	-	ALA	deletion	UNP Q8TBX8
B	?	-	PRO	deletion	UNP Q8TBX8
B	?	-	VAL	deletion	UNP Q8TBX8
B	?	-	ARG	deletion	UNP Q8TBX8
B	?	-	GLU	deletion	UNP Q8TBX8
B	?	-	ASP	deletion	UNP Q8TBX8
B	?	-	GLU	deletion	UNP Q8TBX8
B	?	-	SER	deletion	UNP Q8TBX8
B	?	-	GLU	deletion	UNP Q8TBX8
B	?	-	VAL	deletion	UNP Q8TBX8
B	?	-	ASP	deletion	UNP Q8TBX8
B	?	-	GLY	deletion	UNP Q8TBX8
B	?	-	ASP	deletion	UNP Q8TBX8
B	?	-	CYS	deletion	UNP Q8TBX8
B	?	-	SER	deletion	UNP Q8TBX8
B	?	-	LEU	deletion	UNP Q8TBX8
B	?	-	THR	deletion	UNP Q8TBX8
B	?	-	GLY	deletion	UNP Q8TBX8
B	?	-	PRO	deletion	UNP Q8TBX8
B	?	-	PRO	deletion	UNP Q8TBX8
B	?	-	ALA	deletion	UNP Q8TBX8
B	?	-	LEU	deletion	UNP Q8TBX8
B	?	-	VAL	deletion	UNP Q8TBX8

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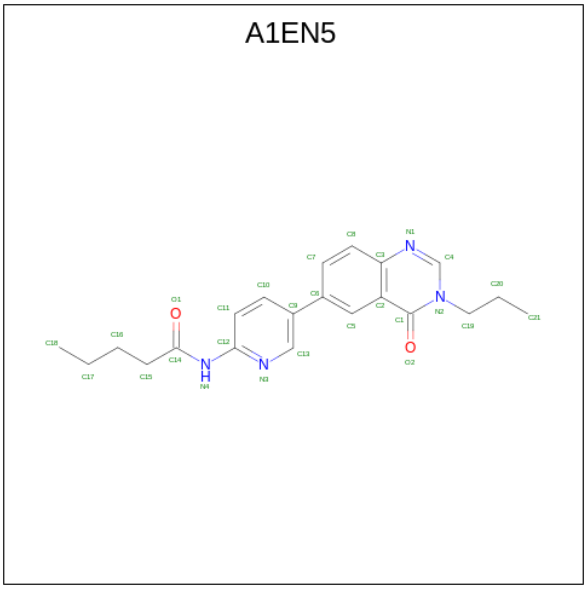
Chain	Residue	Modelled	Actual	Comment	Reference
B	?	-	GLY	deletion	UNP Q8TBX8
B	?	-	SER	deletion	UNP Q8TBX8
B	?	-	TYR	deletion	UNP Q8TBX8
B	?	-	GLY	deletion	UNP Q8TBX8
B	?	-	THR	deletion	UNP Q8TBX8
B	?	-	SER	deletion	UNP Q8TBX8
B	?	-	PRO	deletion	UNP Q8TBX8
B	?	-	GLU	deletion	UNP Q8TBX8
B	?	-	GLY	deletion	UNP Q8TBX8
B	?	-	ILE	deletion	UNP Q8TBX8
B	?	-	GLY	deletion	UNP Q8TBX8
B	?	-	GLY	deletion	UNP Q8TBX8
B	?	-	TYR	deletion	UNP Q8TBX8
B	?	-	ILE	deletion	UNP Q8TBX8
B	?	-	HIS	deletion	UNP Q8TBX8
B	?	-	SER	deletion	UNP Q8TBX8
B	?	-	HIS	deletion	UNP Q8TBX8
B	?	-	ARG	deletion	UNP Q8TBX8
B	?	-	PRO	deletion	UNP Q8TBX8

- Molecule 2 is {N}-[5-(4-oxidanylidene-3-propyl-quinazolin-6-yl)pyridin-2-yl]pentanamide (CCD ID: A1EN5) (formula: $C_{21}H_{24}N_4O_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			27	21	4	2		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	B	1	Total	C	N	O	0	0
			27	21	4	2		

- Molecule 3 is water.

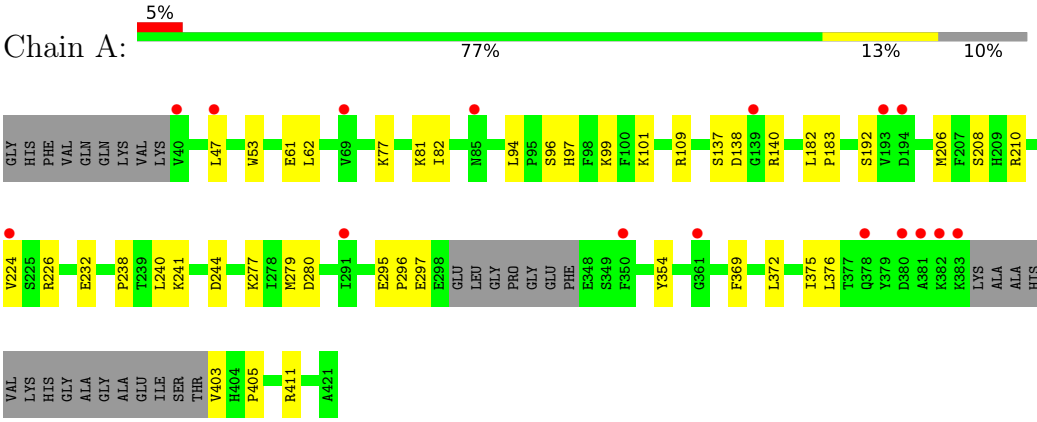
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	39	Total	O	0	0
			39	39		
3	B	12	Total	O	0	0
			12	12		

3 Residue-property plots (i)

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.

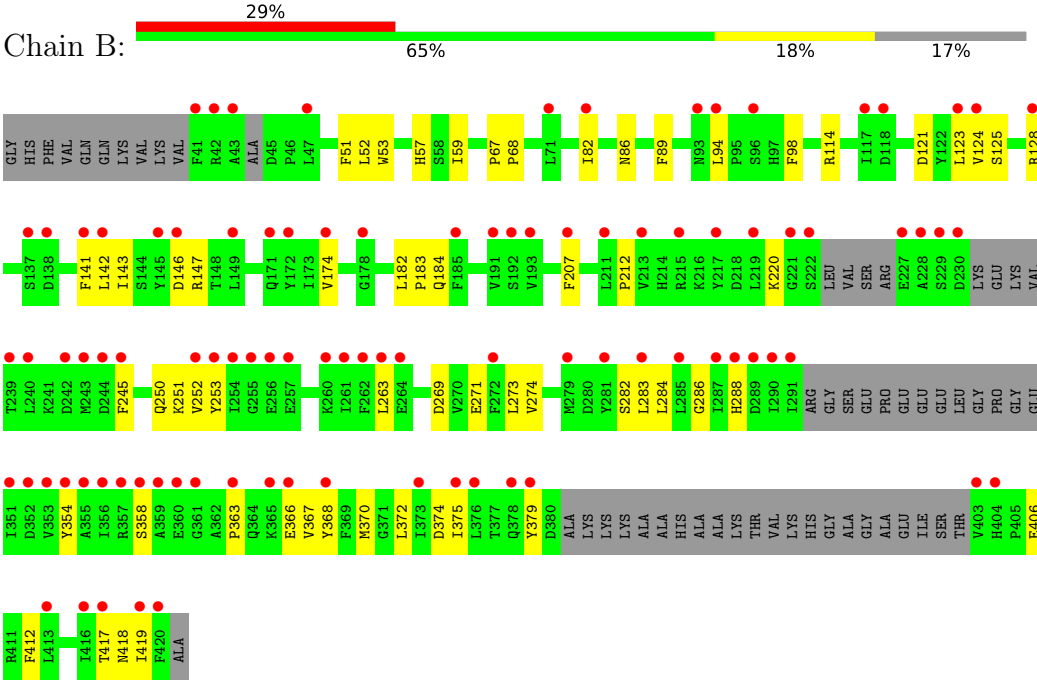
• Molecule 1: Phosphatidylinositol 5-phosphate 4-kinase type-2 gamma

Chain A:



• Molecule 1: Phosphatidylinositol 5-phosphate 4-kinase type-2 gamma

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 2 21	Depositor
Cell constants a, b, c, α, β, γ	263.91Å 47.76Å 66.28Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	59.23 – 2.25 59.23 – 2.25	Depositor EDS
% Data completeness (in resolution range)	99.9 (59.23-2.25) 99.9 (59.23-2.25)	Depositor EDS
R_{merge}	0.31	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.56 (at 2.25Å)	Xtriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, R_{free}	0.279 , 0.304 0.279 , 0.305	Depositor DCC
R_{free} test set	2026 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å^2)	41.1	Xtriage
Anisotropy	0.411	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 47.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.41$, $< L^2 > = 0.24$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.90	EDS
Total number of atoms	4827	wwPDB-VP
Average B, all atoms (Å^2)	59.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.36% of the height of the origin peak. No significant pseudotranslation is detected.*

[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: A1EN5

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	0.21	0/2581	0.43	0/3487
1	B	0.25	0/2248	0.50	2/3057 (0.1%)
All	All	0.23	0/4829	0.47	2/6544 (0.0%)

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	B	238	PRO	CA-C-N	-6.14	114.31	122.85
1	B	238	PRO	C-N-CA	-6.14	114.31	122.85

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	2524	0	2460	23	0
1	B	2198	0	1972	56	0
2	A	27	0	0	0	0
2	B	27	0	0	1	0
3	A	39	0	0	0	0
3	B	12	0	0	0	0
All	All	4827	0	4432	77	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 8.

All (77) 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:B:252:VAL:HG12	1:B:419:ILE:CG2	2.03	0.88
1:B:252:VAL:H	1:B:419:ILE:HG22	1.39	0.85
1:B:252:VAL:H	1:B:419:ILE:CG2	1.92	0.81
1:A:82:ILE:HD11	1:B:82:ILE:HD11	1.68	0.76
1:B:182:LEU:HD21	1:B:273:LEU:HD21	1.71	0.73
1:B:245:PHE:CE2	1:B:419:ILE:HG12	2.23	0.73
1:B:252:VAL:HG12	1:B:419:ILE:HG22	1.72	0.69
1:A:295:GLU:O	1:A:297:GLU:N	2.30	0.64
1:A:220:LYS:NZ	1:A:280:ASP:OD1	2.29	0.64
1:B:252:VAL:HG12	1:B:419:ILE:HG21	1.81	0.63
1:B:288:HIS:O	1:B:366:GLU:HG2	1.99	0.63
1:B:245:PHE:HE2	1:B:419:ILE:HG12	1.64	0.63
1:B:53:TRP:CD1	1:B:94:LEU:HD21	2.39	0.58
1:B:114:ARG:NE	1:B:174:VAL:HG12	2.19	0.57
1:B:51:PHE:HD2	1:B:52:LEU:HD12	1.70	0.56
1:B:121:ASP:HA	1:B:124:VAL:HG12	1.89	0.55
1:B:252:VAL:HG23	1:B:368:TYR:CE2	2.42	0.55
1:B:114:ARG:CZ	1:B:174:VAL:HG12	2.37	0.55
1:B:245:PHE:CZ	1:B:419:ILE:HG12	2.42	0.54
1:A:81:LYS:HD3	1:A:101:LYS:HE2	1.90	0.54
1:A:99:LYS:HB2	1:A:192:SER:HB2	1.91	0.53
1:A:375:ILE:HG13	1:A:376:LEU:HD13	1.92	0.52
1:B:124:VAL:HG23	1:B:128:ARG:HD2	1.91	0.52
1:A:222:SER:HA	1:A:411:ARG:CZ	2.39	0.51
1:B:207:PHE:CE1	1:B:286:GLY:HA3	2.45	0.51
1:B:94:LEU:HD23	1:B:98:PHE:CZ	2.46	0.50
1:B:283:LEU:HD11	1:B:370:MET:HB3	1.92	0.50
1:B:418:ASN:O	1:B:419:ILE:HG13	2.11	0.50
1:B:86:ASN:HB3	1:B:89:PHE:HB3	1.94	0.49
1:B:183:PRO:HD3	1:B:372:LEU:O	2.12	0.49
1:B:212:PRO:O	1:B:288:HIS:ND1	2.44	0.49
1:B:125:SER:HA	1:B:146:ASP:OD2	2.12	0.49
1:B:245:PHE:CE1	1:B:250:GLN:HB3	2.48	0.49
1:A:206:MET:HA	1:A:354:TYR:CD1	2.48	0.48
1:A:183:PRO:HD3	1:A:372:LEU:O	2.14	0.48
1:B:288:HIS:HB3	1:B:367:VAL:HG23	1.96	0.48
1:A:53:TRP:HB2	1:A:94:LEU:HD21	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:251:LYS:HA	1:B:419:ILE:HG23	1.95	0.48
1:B:288:HIS:C	1:B:366:GLU:HG2	2.38	0.47
1:B:358:SER:CB	1:B:366:GLU:H	2.26	0.47
1:B:59:ILE:HG21	1:B:123:LEU:HB2	1.96	0.47
1:B:220:LYS:HE2	1:B:282:SER:OG	2.15	0.47
1:B:220:LYS:HE3	1:B:220:LYS:HB2	1.63	0.46
1:B:142:LEU:C	1:B:143:ILE:HD12	2.40	0.46
1:B:408:TYR:CD1	1:B:408:TYR:C	2.95	0.45
1:B:53:TRP:CG	1:B:94:LEU:HD21	2.51	0.45
1:A:232:GLU:O	1:A:238:PRO:HB3	2.16	0.45
1:A:279:MET:HE1	1:A:403:VAL:HB	1.98	0.45
1:B:406:GLU:H	1:B:406:GLU:CD	2.25	0.45
1:A:96:SER:OG	1:A:97:HIS:ND1	2.49	0.45
1:B:124:VAL:HG23	1:B:128:ARG:CD	2.46	0.44
1:B:252:VAL:HG23	1:B:368:TYR:CD2	2.53	0.44
1:B:263:LEU:HD21	1:B:417:THR:HA	1.98	0.44
1:B:284:LEU:O	1:B:370:MET:HA	2.17	0.44
1:A:240:LEU:HB3	1:A:244:ASP:HB2	1.98	0.44
1:B:146:ASP:O	1:B:147:ARG:HB2	2.18	0.44
1:B:245:PHE:CD1	1:B:250:GLN:HB3	2.53	0.44
1:A:61:GLU:CD	1:B:53:TRP:HE1	2.24	0.44
1:B:67:PRO:HA	1:B:68:PRO:HD3	1.90	0.44
1:B:141:PHE:CE1	1:B:143:ILE:HD11	2.53	0.44
1:B:114:ARG:CD	1:B:174:VAL:HG12	2.49	0.43
1:A:77:LYS:HB3	1:A:77:LYS:HE3	1.66	0.43
1:A:182:LEU:HD22	1:A:375:ILE:HD13	2.01	0.43
1:A:47:LEU:HD23	1:A:140:ARG:HD2	2.01	0.43
1:A:62:LEU:O	1:A:109:ARG:NH2	2.51	0.43
1:B:184:GLN:HG3	1:B:354:TYR:OH	2.19	0.43
1:B:57:HIS:NE2	1:B:82:ILE:HD12	2.34	0.42
1:A:137:SER:OG	1:A:138:ASP:N	2.52	0.42
1:A:226:ARG:HB3	1:A:241:LYS:HD3	2.01	0.42
1:B:253:TYR:CE2	1:B:363:PRO:HD2	2.54	0.42
1:B:271:GLU:HA	1:B:274:VAL:HG22	2.01	0.41
1:A:208:SER:HB2	1:A:369:PHE:CE1	2.55	0.41
1:B:269:ASP:O	1:B:273:LEU:HD22	2.21	0.41
1:A:277:LYS:HE3	1:A:405:PRO:HG2	2.03	0.41
1:B:374:ASP:HA	2:B:501:A1EN5:C14	2.51	0.41
1:B:409:ALA:O	1:B:412:PHE:N	2.53	0.41
1:B:418:ASN:C	1:B:419:ILE:HG13	2.45	0.41

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	308/349 (88%)	298 (97%)	8 (3%)	2 (1%)	22 21
1	B	279/349 (80%)	259 (93%)	18 (6%)	2 (1%)	19 18
All	All	587/698 (84%)	557 (95%)	26 (4%)	4 (1%)	19 18

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	224	VAL
1	B	379	TYR
1	A	296	PRO
1	B	375	ILE

5.3.2 Protein sidechains (i)

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	276/313 (88%)	275 (100%)	1 (0%)	89 92
1	B	218/313 (70%)	218 (100%)	0	100 100
All	All	494/626 (79%)	493 (100%)	1 (0%)	92 95

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	210	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	57	HIS
1	A	171	GLN
1	B	120	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)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	A1EN5	A	501	-	29,29,29	0.66	0	38,39,39	0.69	1 (2%)
2	A1EN5	B	501	-	29,29,29	0.67	0	38,39,39	0.72	1 (2%)

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	A1EN5	A	501	-	-	5/15/15/15	0/3/3/3
2	A1EN5	B	501	-	-	2/15/15/15	0/3/3/3

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	501	A1EN5	C2-C1-N2	2.81	115.44	113.80
2	A	501	A1EN5	C2-C1-N2	2.65	115.35	113.80

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	501	A1EN5	C20-C19-N2-C1
2	A	501	A1EN5	C14-C15-C16-C17
2	A	501	A1EN5	O1-C14-N4-C12
2	A	501	A1EN5	C15-C14-N4-C12
2	A	501	A1EN5	O1-C14-C15-C16
2	A	501	A1EN5	N4-C14-C15-C16
2	B	501	A1EN5	C20-C19-N2-C4

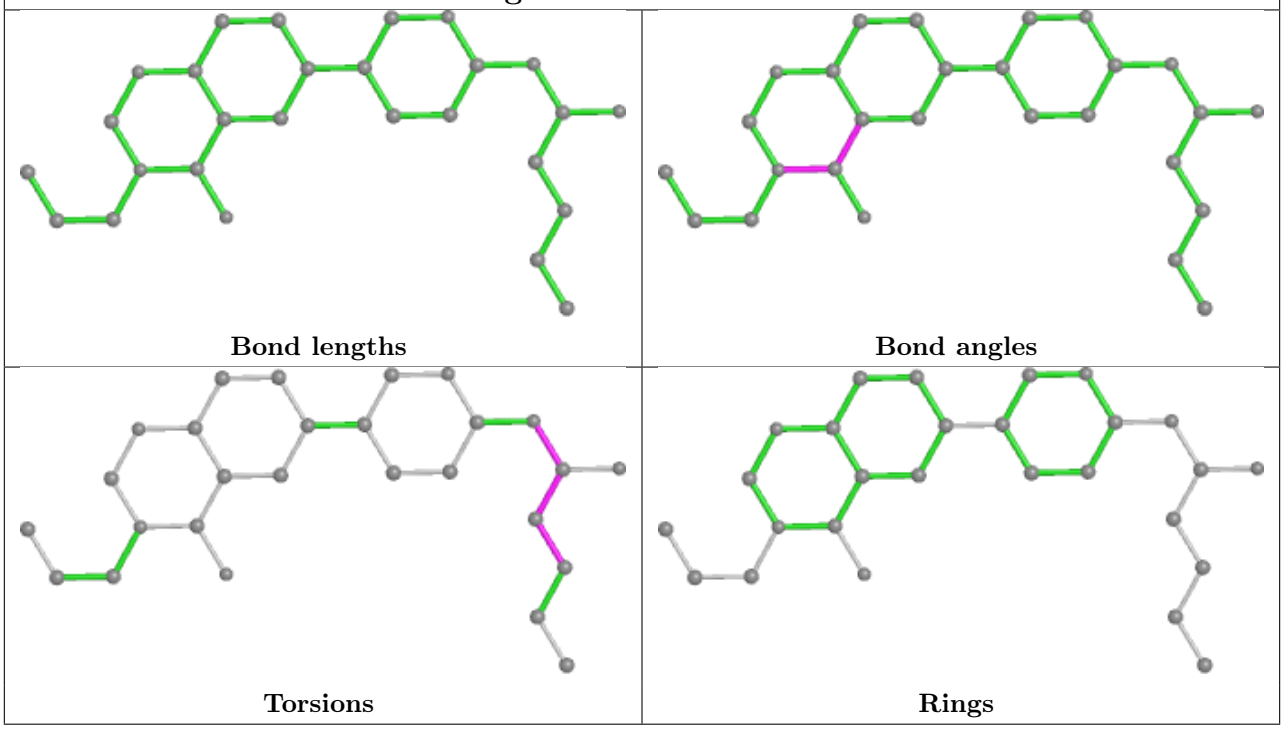
There are no ring outliers.

1 monomer is involved in 1 short contact:

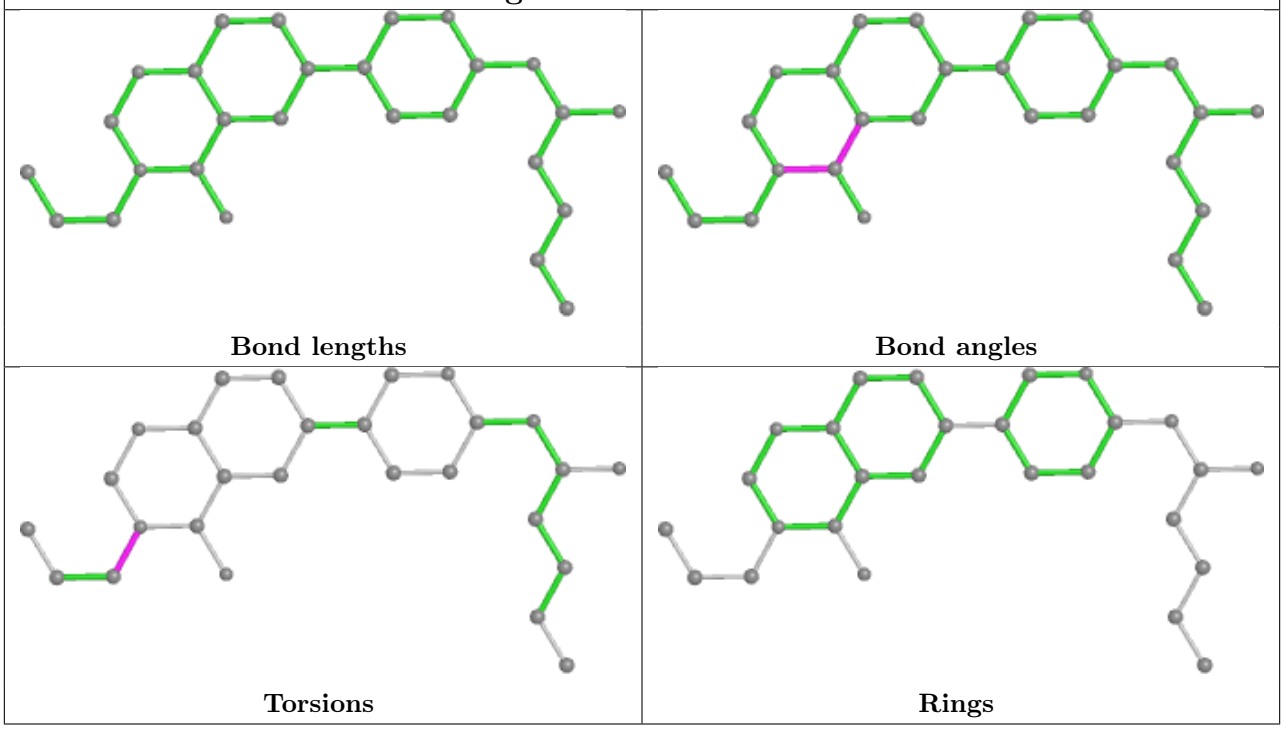
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	501	A1EN5	1	0

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 A1EN5 A 501



Ligand A1EN5 B 501



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, 95^{th} 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	314/349 (89%)	0.64	17 (5%) 32 32	27, 43, 62, 71	0
1	B	291/349 (83%)	1.75	101 (34%) 1 0	47, 76, 106, 116	0
All	All	605/698 (86%)	1.18	118 (19%) 4 3	27, 57, 102, 116	0

All (118) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	291	ILE	5.9
1	B	230	ASP	5.6
1	B	41	PHE	5.1
1	B	290	ILE	4.8
1	B	240	LEU	4.5
1	B	237	LEU	4.4
1	B	353	VAL	4.3
1	B	228	ALA	4.2
1	B	42	ARG	4.1
1	B	379	TYR	3.8
1	B	261	ILE	3.7
1	B	192	SER	3.7
1	B	351	ILE	3.6
1	B	193	VAL	3.6
1	B	263	LEU	3.5
1	B	357	ARG	3.4
1	A	224	VAL	3.4
1	B	227	GLU	3.4
1	B	378	GLN	3.3
1	B	363	PRO	3.3
1	B	134	SER	3.3
1	B	413	LEU	3.3
1	B	254	ILE	3.3
1	B	141	PHE	3.3

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Mol	Chain	Res	Type	RSRZ
1	B	350	PHE	3.3
1	B	138	ASP	3.3
1	B	171	GLN	3.3
1	B	191	VAL	3.3
1	A	381	ALA	3.2
1	B	420	PHE	3.2
1	B	82	ILE	3.2
1	B	356	ILE	3.1
1	B	219	LEU	3.1
1	B	242	ASP	3.1
1	B	366	GLU	3.1
1	A	69	VAL	3.1
1	B	137	SER	3.0
1	B	376	LEU	2.9
1	B	283	LEU	2.9
1	A	291	ILE	2.9
1	B	94	LEU	2.9
1	B	211	LEU	2.9
1	B	222	SER	2.9
1	B	410	LYS	2.8
1	B	174	VAL	2.8
1	B	215	ARG	2.8
1	B	289	ASP	2.8
1	B	361	GLY	2.8
1	A	194	ASP	2.7
1	B	355	ALA	2.7
1	B	221	GLY	2.7
1	A	223	LEU	2.7
1	A	40	VAL	2.7
1	B	358	SER	2.7
1	B	244	ASP	2.7
1	B	368	TYR	2.7
1	B	178	GLY	2.6
1	B	354	TYR	2.6
1	B	256	GLU	2.6
1	B	93	ASN	2.6
1	B	260	LYS	2.6
1	B	375	ILE	2.6
1	B	279	MET	2.5
1	B	272	PHE	2.5
1	B	239	THR	2.5
1	A	350	PHE	2.5

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Mol	Chain	Res	Type	RSRZ
1	B	43	ALA	2.5
1	A	139	GLY	2.5
1	B	285	LEU	2.5
1	B	360	GLU	2.5
1	B	207	PHE	2.5
1	A	193	VAL	2.4
1	B	403	VAL	2.4
1	B	130	PRO	2.4
1	B	419	ILE	2.4
1	B	365	LYS	2.4
1	A	361	GLY	2.4
1	B	245	PHE	2.4
1	B	253	TYR	2.4
1	B	47	LEU	2.4
1	B	252	VAL	2.4
1	B	288	HIS	2.4
1	B	124	VAL	2.3
1	B	185	PHE	2.3
1	B	262	PHE	2.3
1	B	142	LEU	2.3
1	B	352	ASP	2.3
1	B	281	TYR	2.3
1	B	243	MET	2.3
1	B	238	PRO	2.3
1	B	417	THR	2.3
1	B	373	ILE	2.3
1	B	123	LEU	2.3
1	A	380	ASP	2.3
1	B	118	ASP	2.3
1	A	383	LYS	2.2
1	B	217	TYR	2.2
1	B	213	VAL	2.2
1	B	229	SER	2.2
1	A	47	LEU	2.2
1	B	145	TYR	2.2
1	A	378	GLN	2.2
1	B	96	SER	2.2
1	B	255	GLY	2.2
1	B	359	ALA	2.1
1	B	146	ASP	2.1
1	B	264	GLU	2.1
1	A	382	LYS	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	257	GLU	2.1
1	B	128	ARG	2.1
1	B	416	ILE	2.1
1	B	404	HIS	2.1
1	B	287	ILE	2.1
1	B	149	LEU	2.1
1	B	172	TYR	2.0
1	A	85	ASN	2.0
1	B	71	LEU	2.0
1	B	117	ILE	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)

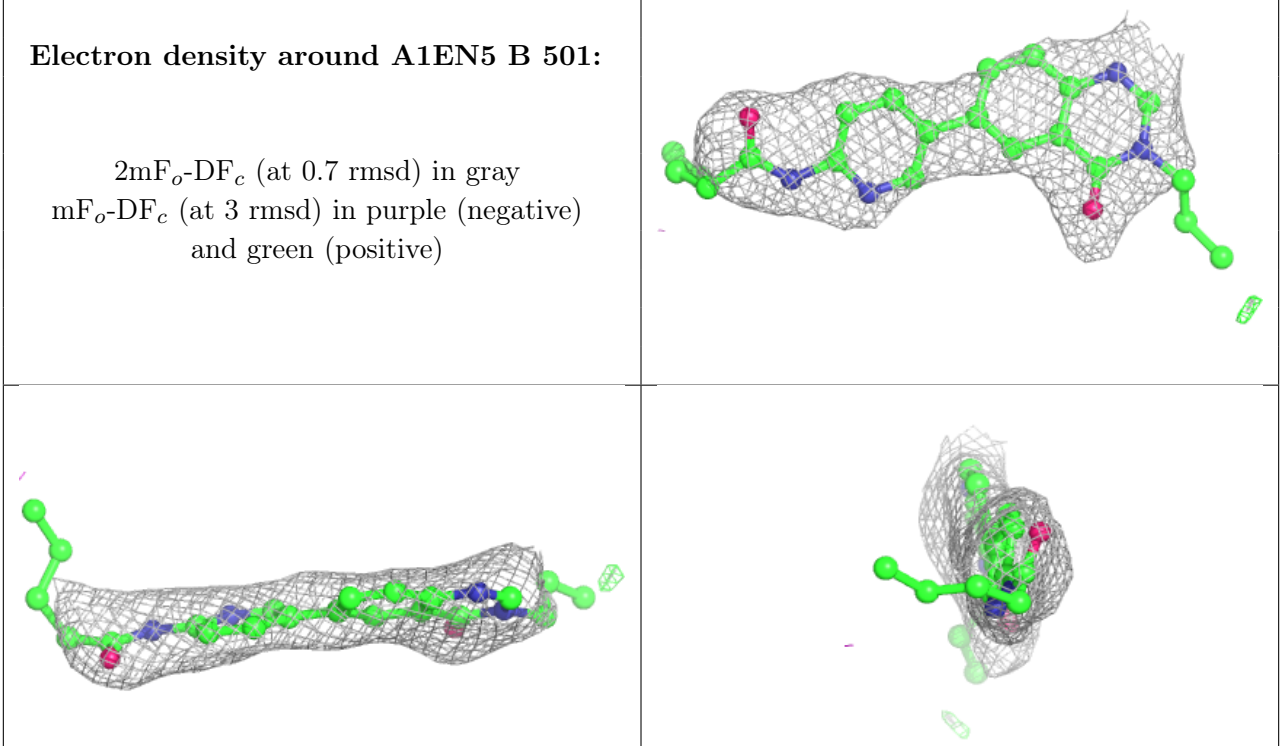
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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	A1EN5	B	501	27/27	0.84	0.19	64,68,83,83	0
2	A1EN5	A	501	27/27	0.92	0.11	33,37,46,56	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.

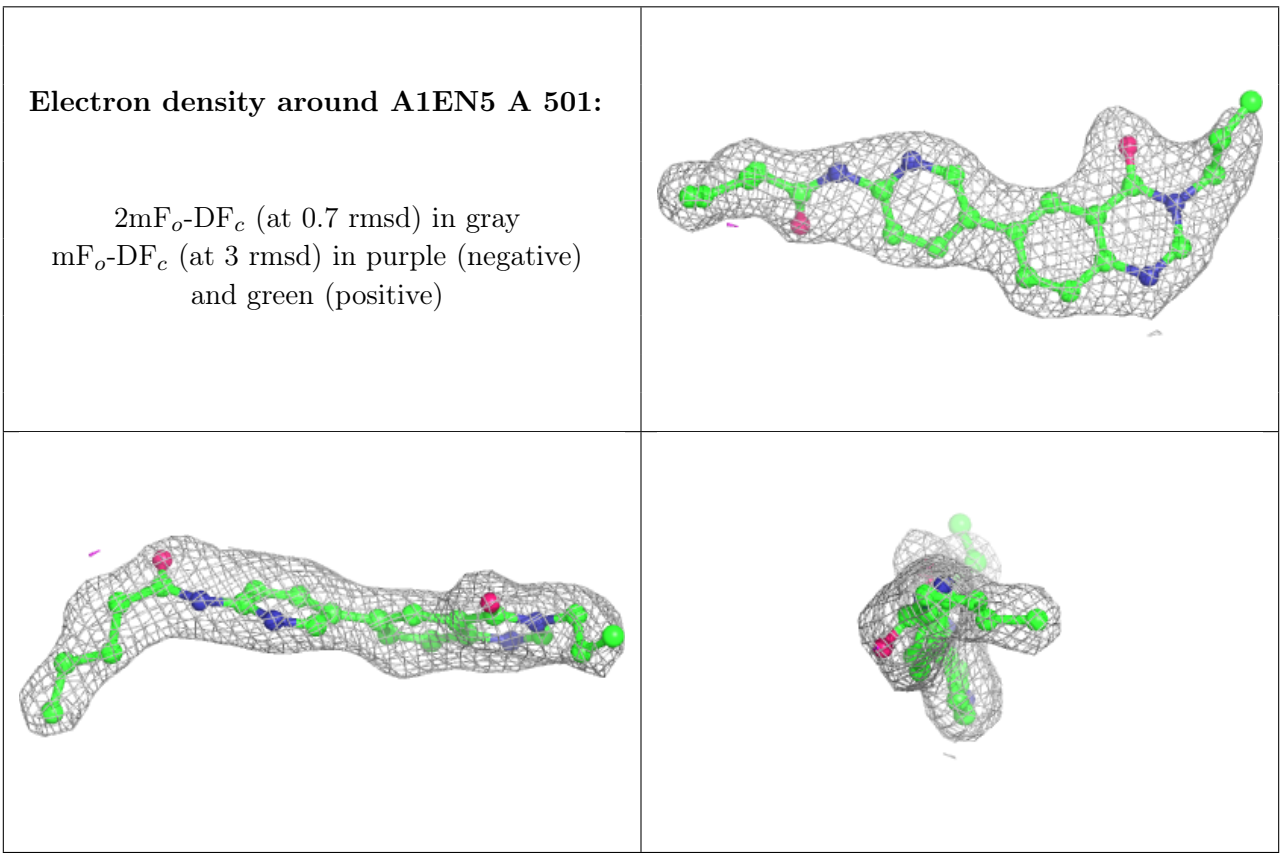
Electron density around A1EN5 B 501:

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



Electron density around A1EN5 A 501:

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



6.5 Other polymers (i)

There are no such residues in this entry.