Full wwPDB X-ray Structure Validation Report ⓘ

Oct 3, 2023 – 05:19 AM EDT

PDB ID	:	6O70
Title	:	Crystal structure of Csm6 H132A mutant in complex with cA4 by cocrystallization of cA4 and Csm6 H132A mutant
Authors	:	Jia, N.; Patel, D.J.
Deposited on	:	2019-03-07
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	:	FAILED
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	FAILED
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

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 2.30 Å.

There are no overall percentile quality scores available for this entry.

MolProbity and EDS failed to run properly - the sequence quality summary graphics cannot be shown.

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 7057 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.

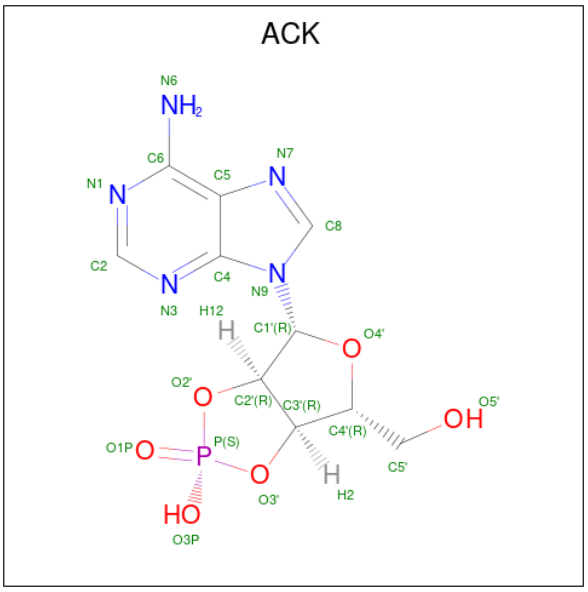
- Molecule 1 is a protein called Csm6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	433	Total	C	N	O	S	0	0	0
			3445	2217	584	636	8			
1	B	432	Total	C	N	O	S	0	0	0
			3435	2211	581	635	8			

There are 18 discrepancies between the modelled and reference sequences:

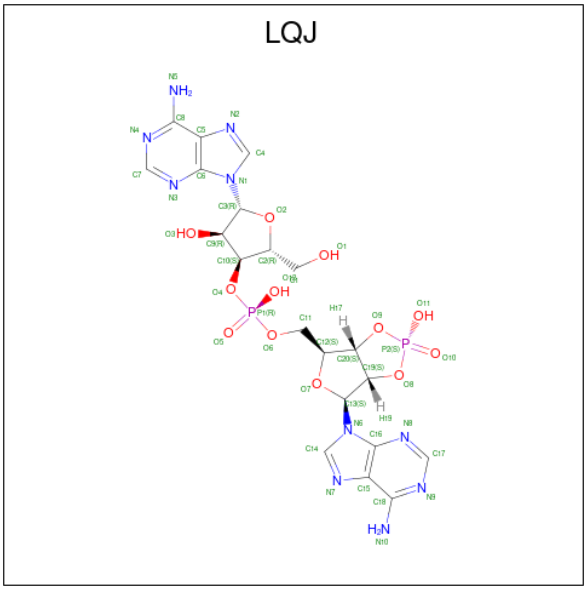
Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	MET	-	initiating methionine	UNP B6YWC3
A	0	GLY	-	expression tag	UNP B6YWC3
A	132	ALA	HIS	engineered mutation	UNP B6YWC3
A	433	HIS	-	expression tag	UNP B6YWC3
A	434	HIS	-	expression tag	UNP B6YWC3
A	435	HIS	-	expression tag	UNP B6YWC3
A	436	HIS	-	expression tag	UNP B6YWC3
A	437	HIS	-	expression tag	UNP B6YWC3
A	438	HIS	-	expression tag	UNP B6YWC3
B	-1	MET	-	initiating methionine	UNP B6YWC3
B	0	GLY	-	expression tag	UNP B6YWC3
B	132	ALA	HIS	engineered mutation	UNP B6YWC3
B	433	HIS	-	expression tag	UNP B6YWC3
B	434	HIS	-	expression tag	UNP B6YWC3
B	435	HIS	-	expression tag	UNP B6YWC3
B	436	HIS	-	expression tag	UNP B6YWC3
B	437	HIS	-	expression tag	UNP B6YWC3
B	438	HIS	-	expression tag	UNP B6YWC3

- Molecule 2 is 2',3'- cyclic AMP (three-letter code: ACK) (formula: $C_{10}H_{12}N_5O_6P$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			22	10	5	6	1		
2	B	1	Total	C	N	O	P	0	0
			22	10	5	6	1		

- Molecule 3 is 3'-O-[(R)-{[(2S,3aS,4S,6S,6aS)-6-(6-amino-9H-purin-9-yl)-2-hydroxy-2-oxotetrahydro-2H-2lambda 5 -furo[3,4-d][1,3,2]dioxaphosphol-4-yl]methoxy}(hydroxy)phosphoryl]adenosine (three-letter code: LQJ) (formula: $C_{20}H_{24}N_{10}O_{12}P_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			44	20	10	12	2		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	B	1	Total	C	N	O	P	0	0
			44	20	10	12	2		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	21	Total	O	0	0
			21	21		
4	B	24	Total	O	0	0
			24	24		

MolProbity and EDS failed to run properly - this section is therefore empty.

3 Data and refinement statistics (i)

EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	103.12Å 163.78Å 110.71Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.30 – 2.30	Depositor
% Data completeness (in resolution range)	99.3 (48.30-2.30)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.99 (at 2.29Å)	Xtriage
Refinement program	REFMAC 5.8.0238	Depositor
R, R_{free}	0.212 , 0.262	Depositor
Wilson B-factor (Å^2)	50.4	Xtriage
Anisotropy	0.442	Xtriage
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	7057	wwPDB-VP
Average B, all atoms (Å^2)	61.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.93% 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.

4 Model quality

4.1 Standard geometry

MolProbity failed to run properly - this section is therefore empty.

4.2 Too-close contacts

MolProbity failed to run properly - this section is therefore empty.

4.3 Torsion angles

4.3.1 Protein backbone

MolProbity failed to run properly - this section is therefore empty.

4.3.2 Protein sidechains

MolProbity failed to run properly - this section is therefore empty.

4.3.3 RNA

MolProbity failed to run properly - this section is therefore empty.

4.4 Non-standard residues in protein, DNA, RNA chains

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

4.5 Carbohydrates

There are no monosaccharides in this entry.

4.6 Ligand geometry

4 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	LQJ	B	502	-	41,50,50	3.05	10 (24%)	44,78,78	2.79	11 (25%)
2	ACK	B	501	-	19,25,25	1.06	2 (10%)	19,39,39	1.80	5 (26%)
3	LQJ	A	502	-	41,50,50	3.15	10 (24%)	44,78,78	2.83	9 (20%)
2	ACK	A	501	-	19,25,25	1.08	3 (15%)	19,39,39	1.69	5 (26%)

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	LQJ	B	502	-	-	5/13/63/63	0/7/7/7
2	ACK	B	501	-	-	0/2/32/32	0/4/4/4
3	LQJ	A	502	-	-	3/13/63/63	0/7/7/7
2	ACK	A	501	-	-	0/2/32/32	0/4/4/4

All (25) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	502	LQJ	C17-N8	10.63	1.49	1.32
3	B	502	LQJ	C17-N8	10.43	1.48	1.32
3	A	502	LQJ	C7-N3	10.19	1.48	1.32
3	B	502	LQJ	C7-N3	10.16	1.48	1.32
3	A	502	LQJ	C7-N4	7.94	1.48	1.33
3	A	502	LQJ	C17-N9	7.89	1.48	1.33
3	B	502	LQJ	C17-N9	7.67	1.48	1.33
3	B	502	LQJ	C7-N4	7.62	1.48	1.33
3	A	502	LQJ	O2-C3	3.35	1.45	1.41
3	A	502	LQJ	O7-C13	3.29	1.45	1.41
3	B	502	LQJ	C15-C16	-2.56	1.34	1.40
3	A	502	LQJ	C5-C6	-2.53	1.34	1.40
3	B	502	LQJ	O2-C3	2.53	1.44	1.41
3	B	502	LQJ	C5-C6	-2.45	1.34	1.40
3	A	502	LQJ	C15-C16	-2.45	1.34	1.40
3	B	502	LQJ	C18-C15	-2.42	1.34	1.43
3	A	502	LQJ	C8-C5	-2.39	1.34	1.43
3	A	502	LQJ	C18-C15	-2.34	1.34	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	ACK	C5-C4	2.31	1.47	1.40
3	B	502	LQJ	C8-C5	-2.30	1.34	1.43
3	B	502	LQJ	O7-C13	2.27	1.44	1.41
2	A	501	ACK	C2-N3	2.23	1.35	1.32
2	A	501	ACK	C5-C4	2.20	1.46	1.40
2	B	501	ACK	C2-N3	2.10	1.35	1.32
2	A	501	ACK	O4'-C1'	2.03	1.43	1.41

All (30) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	502	LQJ	N3-C7-N4	-11.44	110.79	128.68
3	B	502	LQJ	N8-C17-N9	-11.41	110.84	128.68
3	A	502	LQJ	N8-C17-N9	-11.36	110.92	128.68
3	B	502	LQJ	N3-C7-N4	-11.04	111.43	128.68
2	B	501	ACK	O3P-P-O1P	3.88	122.42	109.89
2	B	501	ACK	N3-C2-N1	-3.68	122.93	128.68
2	A	501	ACK	O3P-P-O1P	3.64	121.63	109.89
3	B	502	LQJ	C13-N6-C16	3.61	132.99	126.64
2	A	501	ACK	N3-C2-N1	-3.50	123.21	128.68
3	A	502	LQJ	O7-C13-C19	-3.44	100.62	106.59
3	A	502	LQJ	C13-N6-C16	3.22	132.29	126.64
3	B	502	LQJ	O11-P2-O10	3.04	119.70	109.89
3	A	502	LQJ	O11-P2-O10	2.97	119.47	109.89
3	B	502	LQJ	O8-P2-O10	-2.87	108.18	115.76
3	A	502	LQJ	O9-P2-O10	-2.76	108.48	115.76
3	B	502	LQJ	O8-C19-C20	2.63	109.90	105.08
3	A	502	LQJ	O8-P2-O10	-2.56	109.01	115.76
3	B	502	LQJ	C15-C18-N10	-2.54	116.50	120.35
2	A	501	ACK	O2'-P-O1P	-2.52	109.11	115.76
2	B	501	ACK	O2'-P-O1P	-2.51	109.14	115.76
2	B	501	ACK	O3'-P-O1P	-2.50	109.15	115.76
3	A	502	LQJ	C15-C18-N10	-2.47	116.60	120.35
3	B	502	LQJ	O9-P2-O10	-2.42	109.37	115.76
3	B	502	LQJ	O9-C20-C19	2.39	109.46	105.08
3	A	502	LQJ	C5-C8-N5	-2.36	116.76	120.35
2	A	501	ACK	O3'-P-O1P	-2.20	109.96	115.76
2	B	501	ACK	C4-C5-N7	-2.18	107.13	109.40
2	A	501	ACK	C4-C5-N7	-2.17	107.14	109.40
3	B	502	LQJ	C6-C5-N2	-2.04	107.27	109.40
3	B	502	LQJ	C5-C8-N5	-2.03	117.26	120.35

There are no chirality outliers.

All (8) torsion outliers are listed below:

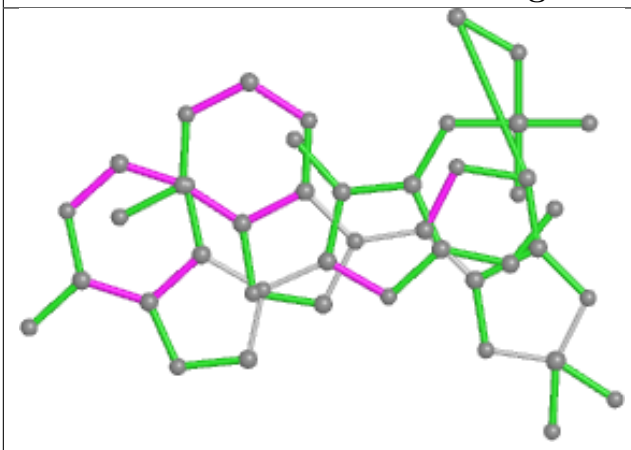
Mol	Chain	Res	Type	Atoms
3	B	502	LQJ	C11-O6-P1-O4
3	B	502	LQJ	C11-O6-P1-O5
3	B	502	LQJ	C11-O6-P1-O12
3	B	502	LQJ	O6-C11-C12-O7
3	B	502	LQJ	O6-C11-C12-C20
3	A	502	LQJ	C11-O6-P1-O4
3	A	502	LQJ	C11-O6-P1-O5
3	A	502	LQJ	C12-C11-O6-P1

There are no ring outliers.

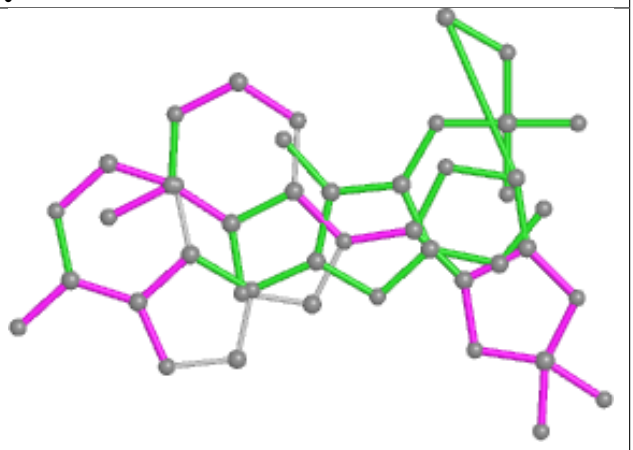
No monomer is involved in short contacts.

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.

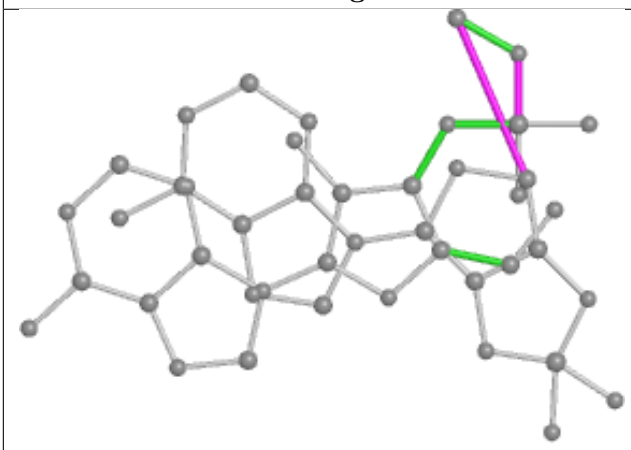
Ligand LQJ B 502



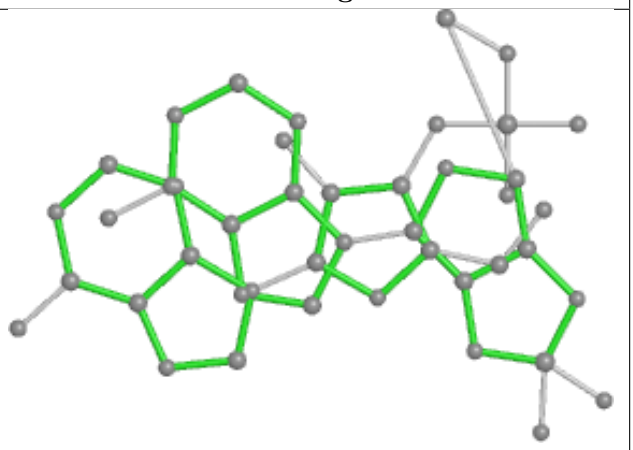
Bond lengths



Bond angles

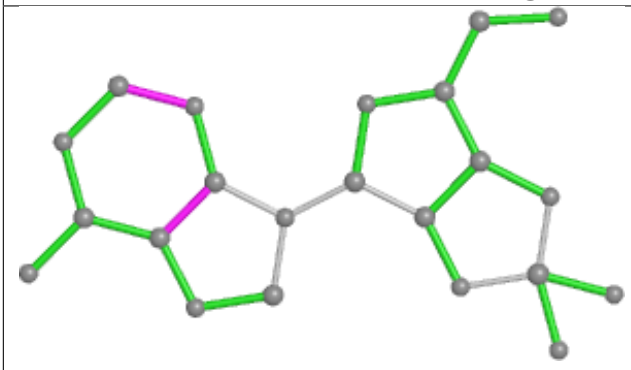


Torsions

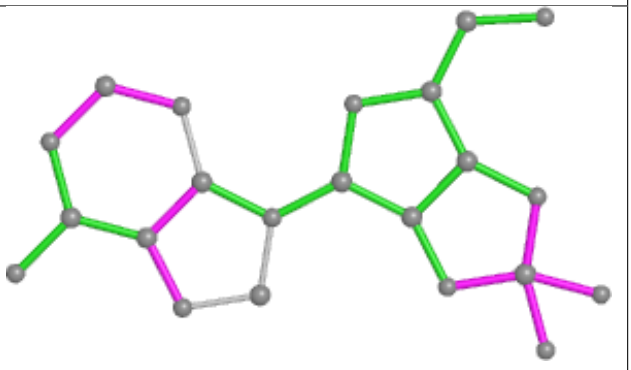


Rings

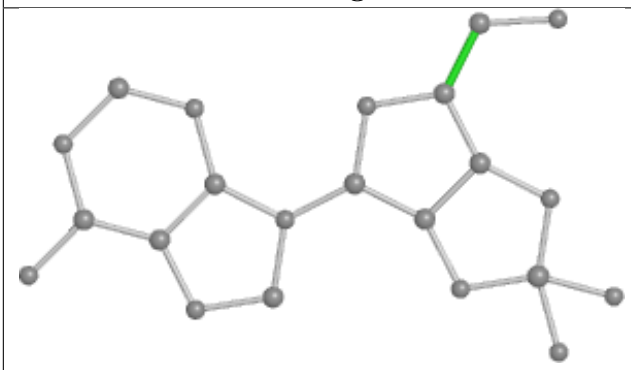
Ligand ACK B 501



Bond lengths



Bond angles



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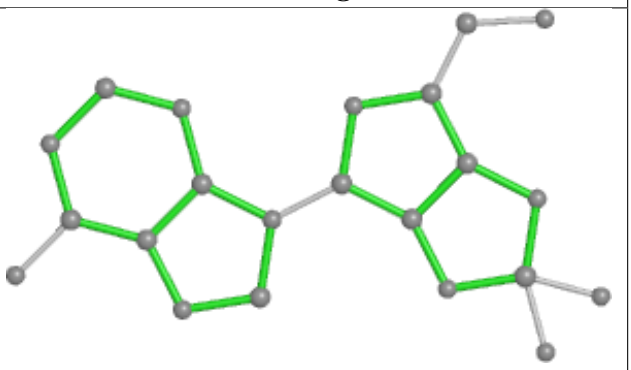
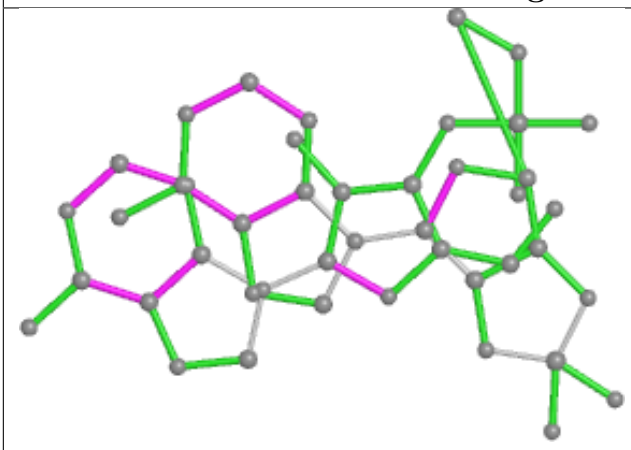
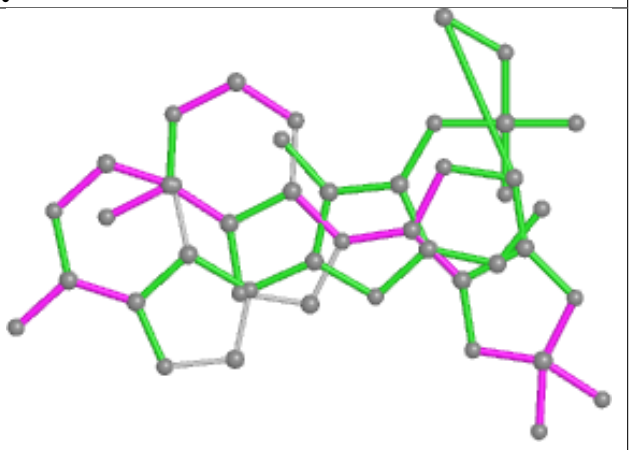


Rings

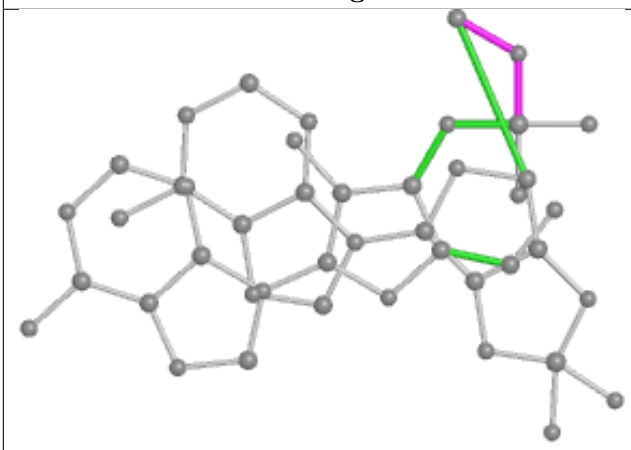
Ligand LQJ A 502



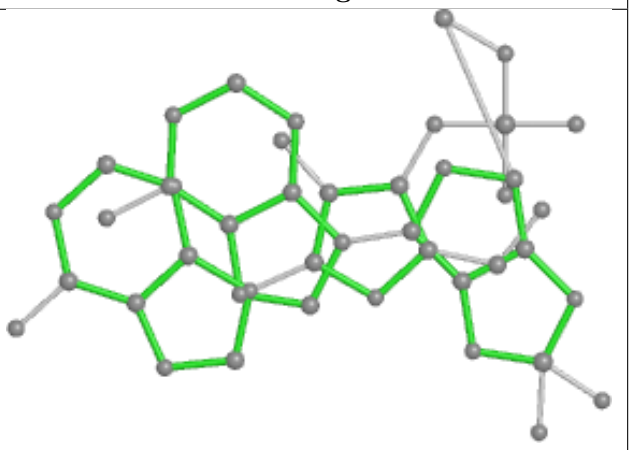
Bond lengths



Bond angles

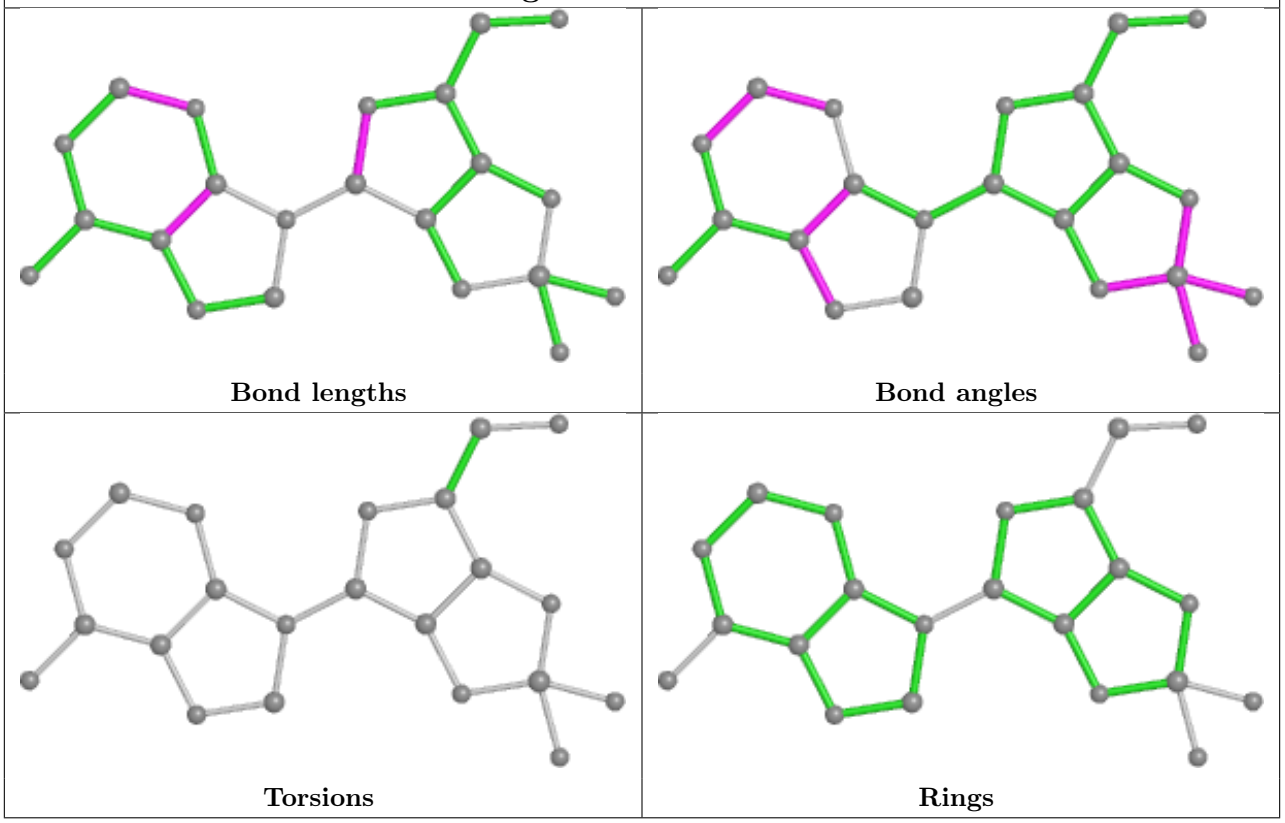


Torsions



Rings

Ligand ACK A 501



4.7 Other polymers (i)

There are no such residues in this entry.

4.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

5 Fit of model and data

5.1 Protein, DNA and RNA chains

EDS failed to run properly - this section is therefore empty.

5.2 Non-standard residues in protein, DNA, RNA chains

EDS failed to run properly - this section is therefore empty.

5.3 Carbohydrates

EDS failed to run properly - this section is therefore empty.

5.4 Ligands

EDS failed to run properly - this section is therefore empty.

5.5 Other polymers

EDS failed to run properly - this section is therefore empty.