Full wwPDB X-ray Structure Validation Report ⓘ

Oct 5, 2023 – 02:15 AM EDT

PDB ID	:	6VGC
Title	:	Crystal Structures of FLAP bound to DG-031
Authors	:	Ho, J.D.; Lee, M.R.; Rauch, C.T.; Aznavour, K.; Park, J.S.; Luz, J.G.; Antonysamy, S.; Condon, B.; Maletic, M.; Zhang, A.; Hickey, M.J.; Hughes, N.E.; Chandrasekhar, S.; Sloan, A.V.; Gooding, K.; Harvey, A.; Yu, X.P.; Kahl, S.D.; Norman, B.H.
Deposited on	:	2020-01-07
Resolution	:	2.37 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 2.37 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 5 unique types of molecules in this entry. The entry contains 7340 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 5-lipoxygenase-activating protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	144	Total	C	N	O	S	0	0	0
			1134	757	175	198	4			
1	B	149	Total	C	N	O	S	0	0	0
			1174	782	184	204	4			
1	C	151	Total	C	N	O	S	0	0	0
			1191	796	183	208	4			
1	D	155	Total	C	N	O	S	0	0	0
			1221	815	187	215	4			
1	E	154	Total	C	N	O	S	0	0	0
			1225	815	194	212	4			
1	F	148	Total	C	N	O	S	0	0	0
			1152	772	174	202	4			

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	MET	-	initiating methionine	UNP P20292
A	0	SER	-	expression tag	UNP P20292
A	1	LEU	-	expression tag	UNP P20292
A	148	ALA	LYS	conflict	UNP P20292
A	162	GLU	-	expression tag	UNP P20292
A	163	GLY	-	expression tag	UNP P20292
A	164	HIS	-	expression tag	UNP P20292
A	165	HIS	-	expression tag	UNP P20292
A	166	HIS	-	expression tag	UNP P20292
A	167	HIS	-	expression tag	UNP P20292
A	168	HIS	-	expression tag	UNP P20292
A	169	HIS	-	expression tag	UNP P20292
B	-1	MET	-	initiating methionine	UNP P20292
B	0	SER	-	expression tag	UNP P20292
B	1	LEU	-	expression tag	UNP P20292
B	148	ALA	LYS	conflict	UNP P20292
B	162	GLU	-	expression tag	UNP P20292

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Chain	Residue	Modelled	Actual	Comment	Reference
B	163	GLY	-	expression tag	UNP P20292
B	164	HIS	-	expression tag	UNP P20292
B	165	HIS	-	expression tag	UNP P20292
B	166	HIS	-	expression tag	UNP P20292
B	167	HIS	-	expression tag	UNP P20292
B	168	HIS	-	expression tag	UNP P20292
B	169	HIS	-	expression tag	UNP P20292
C	-1	MET	-	initiating methionine	UNP P20292
C	0	SER	-	expression tag	UNP P20292
C	1	LEU	-	expression tag	UNP P20292
C	148	ALA	LYS	conflict	UNP P20292
C	162	GLU	-	expression tag	UNP P20292
C	163	GLY	-	expression tag	UNP P20292
C	164	HIS	-	expression tag	UNP P20292
C	165	HIS	-	expression tag	UNP P20292
C	166	HIS	-	expression tag	UNP P20292
C	167	HIS	-	expression tag	UNP P20292
C	168	HIS	-	expression tag	UNP P20292
C	169	HIS	-	expression tag	UNP P20292
D	-1	MET	-	initiating methionine	UNP P20292
D	0	SER	-	expression tag	UNP P20292
D	1	LEU	-	expression tag	UNP P20292
D	148	ALA	LYS	conflict	UNP P20292
D	162	GLU	-	expression tag	UNP P20292
D	163	GLY	-	expression tag	UNP P20292
D	164	HIS	-	expression tag	UNP P20292
D	165	HIS	-	expression tag	UNP P20292
D	166	HIS	-	expression tag	UNP P20292
D	167	HIS	-	expression tag	UNP P20292
D	168	HIS	-	expression tag	UNP P20292
D	169	HIS	-	expression tag	UNP P20292
E	-1	MET	-	initiating methionine	UNP P20292
E	0	SER	-	expression tag	UNP P20292
E	1	LEU	-	expression tag	UNP P20292
E	148	ALA	LYS	conflict	UNP P20292
E	162	GLU	-	expression tag	UNP P20292
E	163	GLY	-	expression tag	UNP P20292
E	164	HIS	-	expression tag	UNP P20292
E	165	HIS	-	expression tag	UNP P20292
E	166	HIS	-	expression tag	UNP P20292
E	167	HIS	-	expression tag	UNP P20292
E	168	HIS	-	expression tag	UNP P20292

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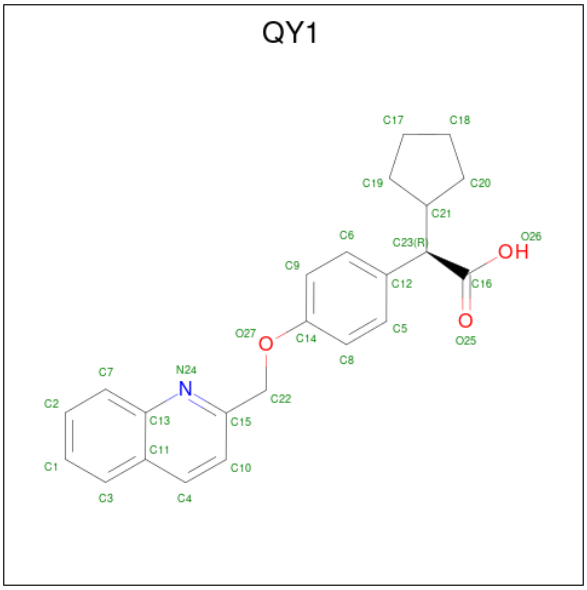
Chain	Residue	Modelled	Actual	Comment	Reference
E	169	HIS	-	expression tag	UNP P20292
F	-1	MET	-	initiating methionine	UNP P20292
F	0	SER	-	expression tag	UNP P20292
F	1	LEU	-	expression tag	UNP P20292
F	148	ALA	LYS	conflict	UNP P20292
F	162	GLU	-	expression tag	UNP P20292
F	163	GLY	-	expression tag	UNP P20292
F	164	HIS	-	expression tag	UNP P20292
F	165	HIS	-	expression tag	UNP P20292
F	166	HIS	-	expression tag	UNP P20292
F	167	HIS	-	expression tag	UNP P20292
F	168	HIS	-	expression tag	UNP P20292
F	169	HIS	-	expression tag	UNP P20292

- Molecule 2 is (2R)-cyclopentyl{4-[(quinolin-2-yl)methoxy]phenyl}acetic acid (three-letter code: QY1) (formula: $C_{23}H_{23}NO_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			27	23	1	3		
2	B	1	Total	C	N	O	0	0
			27	23	1	3		
2	C	1	Total	C	N	O	0	0
			27	23	1	3		
2	D	1	Total	C	N	O	0	0
			27	23	1	3		

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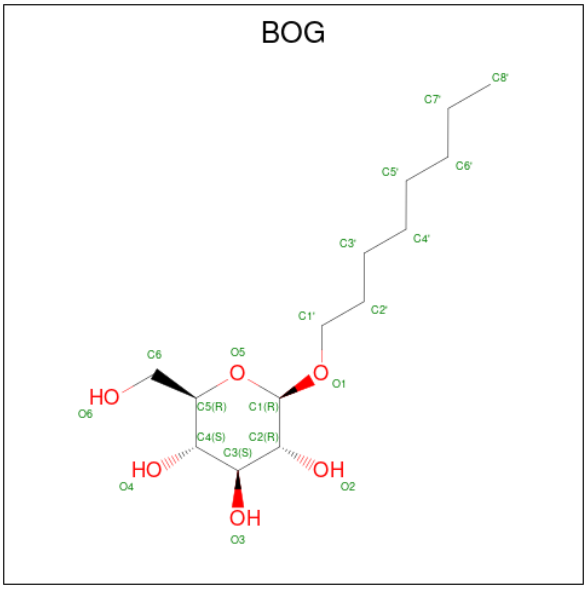
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	E	1	Total C N O 27 23 1 3	0	0
2	F	1	Total C N O 27 23 1 3	0	0

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	1	Total Ca 1 1	0	0
3	D	1	Total Ca 1 1	0	0

- Molecule 4 is octyl beta-D-glucopyranoside (three-letter code: BOG) (formula: $C_{14}H_{28}O_6$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	F	1	Total C O 20 14 6	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	11	Total O 11 11	0	0
5	B	14	Total O 14 14	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	C	10	Total O 10 10	0	0
5	D	8	Total O 8 8	0	0
5	E	7	Total O 7 7	0	0
5	F	9	Total O 9 9	0	0

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	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	65.91Å 101.49Å 111.86Å 90.00° 99.83° 90.00°	Depositor
Resolution (Å)	30.00 – 2.37	Depositor
% Data completeness (in resolution range)	97.7 (30.00-2.37)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	0.04	Depositor
$< I/\sigma(I) >$ [1]	3.43 (at 2.37Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.254 , 0.285	Depositor
Wilson B-factor (Å^2)	47.2	Xtriage
Anisotropy	0.247	Xtriage
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	7340	wwPDB-VP
Average B, all atoms (Å^2)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.84% 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

Of 9 ligands modelled in this entry, 2 are monoatomic - leaving 7 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	QY1	D	201	-	29,30,30	0.85	0	38,41,41	0.71	0
2	QY1	B	201	-	29,30,30	0.86	0	38,41,41	0.76	1 (2%)
2	QY1	E	201	-	29,30,30	0.85	0	38,41,41	0.75	1 (2%)
2	QY1	C	201	-	29,30,30	0.85	0	38,41,41	0.76	1 (2%)
4	BOG	F	202	-	20,20,20	0.51	0	25,25,25	0.60	0
2	QY1	A	201	-	29,30,30	0.85	0	38,41,41	0.81	1 (2%)
2	QY1	F	201	-	29,30,30	0.86	0	38,41,41	0.75	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
2	QY1	D	201	-	-	0/17/24/24	0/4/4/4
2	QY1	B	201	-	-	0/17/24/24	0/4/4/4
2	QY1	E	201	-	-	9/17/24/24	0/4/4/4
2	QY1	C	201	-	-	5/17/24/24	0/4/4/4
4	BOG	F	202	-	-	7/11/31/31	0/1/1/1
2	QY1	A	201	-	-	0/17/24/24	0/4/4/4
2	QY1	F	201	-	-	7/17/24/24	0/4/4/4

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	201	QY1	C12-C23-C16	2.84	112.98	107.97
2	B	201	QY1	C12-C23-C16	2.42	112.23	107.97
2	E	201	QY1	C12-C23-C16	2.21	111.86	107.97
2	C	201	QY1	C12-C23-C16	2.07	111.62	107.97

There are no chirality outliers.

All (28) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	201	QY1	C19-C21-C23-C16

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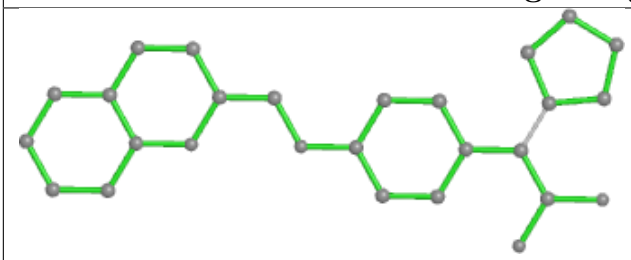
Mol	Chain	Res	Type	Atoms
2	E	201	QY1	C19-C21-C23-C12
2	E	201	QY1	C19-C21-C23-C16
2	E	201	QY1	C20-C21-C23-C12
2	E	201	QY1	C20-C21-C23-C16
2	F	201	QY1	C20-C21-C23-C12
2	F	201	QY1	C20-C21-C23-C16
4	F	202	BOG	O5-C5-C6-O6
4	F	202	BOG	C4-C5-C6-O6
2	C	201	QY1	C9-C14-O27-C22
2	C	201	QY1	C8-C14-O27-C22
2	F	201	QY1	C8-C14-O27-C22
2	F	201	QY1	C9-C14-O27-C22
4	F	202	BOG	C2'-C1'-O1-C1
4	F	202	BOG	C3'-C4'-C5'-C6'
2	F	201	QY1	C6-C12-C23-C21
4	F	202	BOG	O1-C1'-C2'-C3'
2	F	201	QY1	C5-C12-C23-C21
2	C	201	QY1	C20-C21-C23-C12
2	F	201	QY1	C19-C21-C23-C12
2	C	201	QY1	C20-C21-C23-C16
4	F	202	BOG	C2'-C3'-C4'-C5'
2	E	201	QY1	O25-C16-C23-C12
2	E	201	QY1	O26-C16-C23-C12
4	F	202	BOG	C5'-C6'-C7'-C8'
2	E	201	QY1	C5-C12-C23-C16
2	E	201	QY1	C6-C12-C23-C21
2	E	201	QY1	C6-C12-C23-C16

There are no ring outliers.

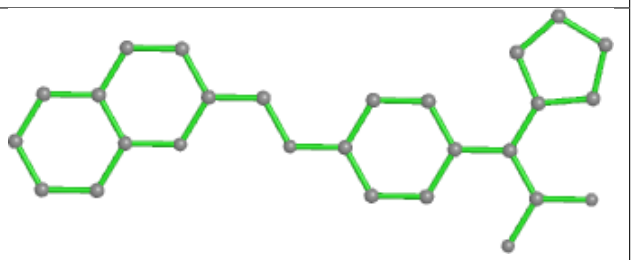
No monomer is involved in short contacts.

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.

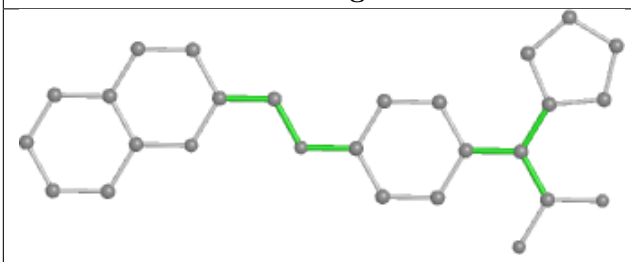
Ligand QY1 D 201



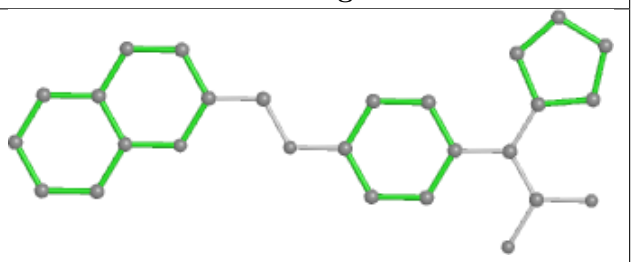
Bond lengths



Bond angles

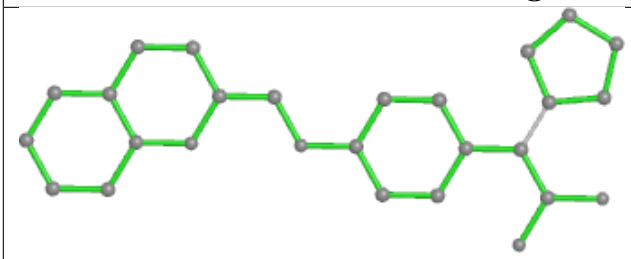


Torsions

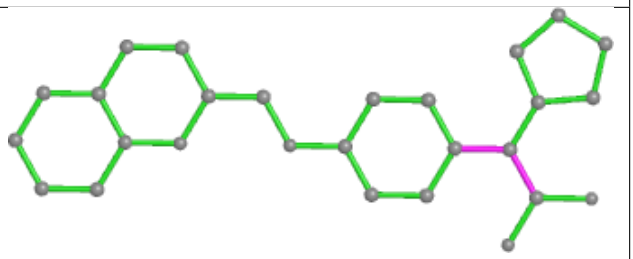


Rings

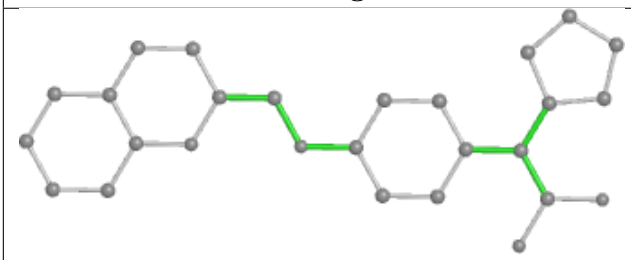
Ligand QY1 B 201



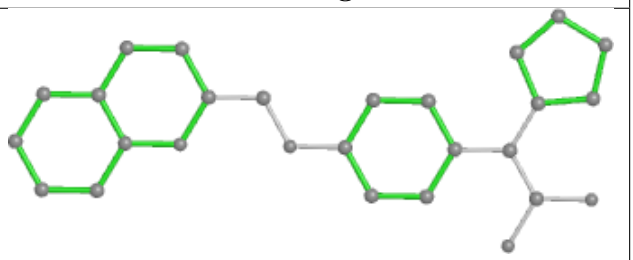
Bond lengths



Bond angles

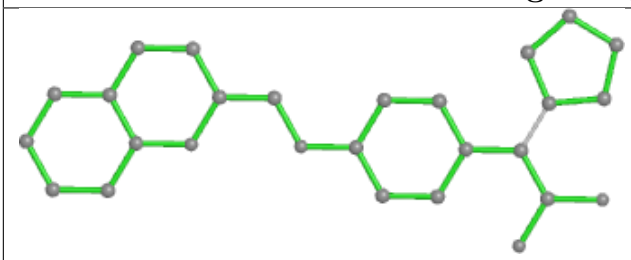


Torsions

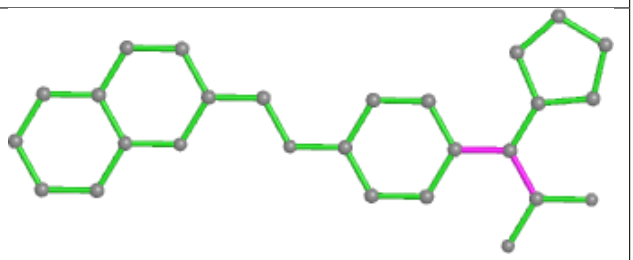


Rings

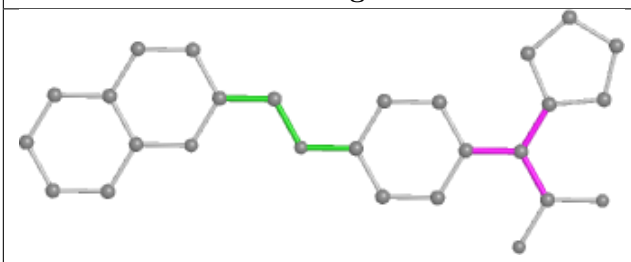
Ligand QY1 E 201



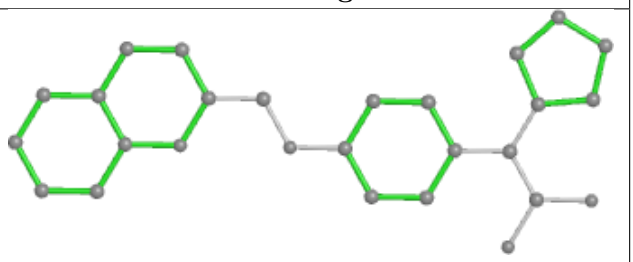
Bond lengths



Bond angles

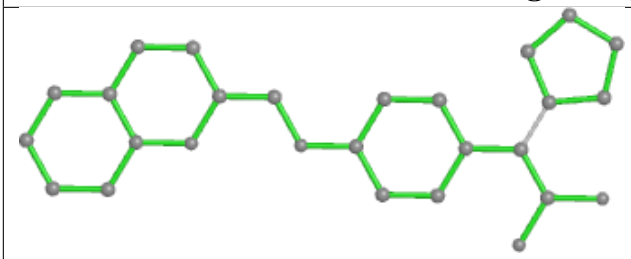


Torsions

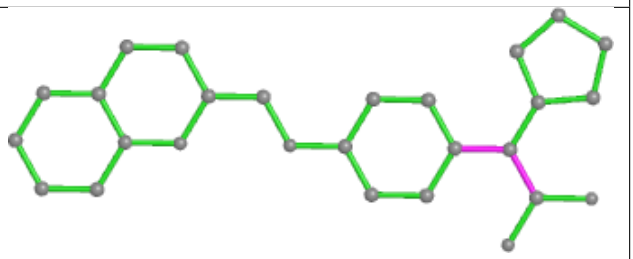


Rings

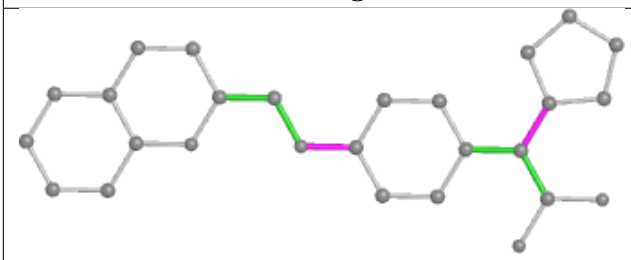
Ligand QY1 C 201



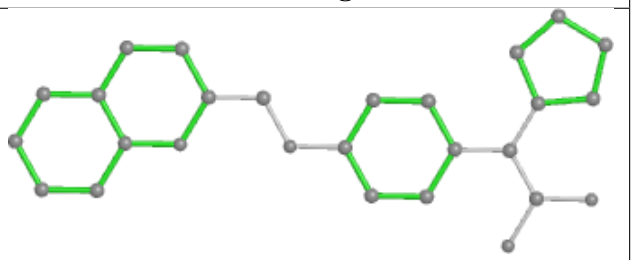
Bond lengths



Bond angles

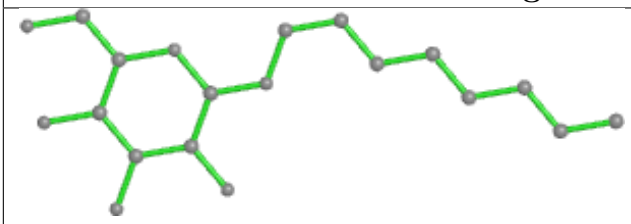


Torsions

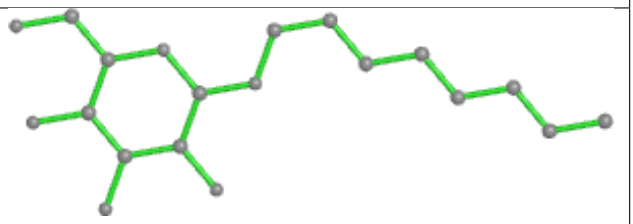


Rings

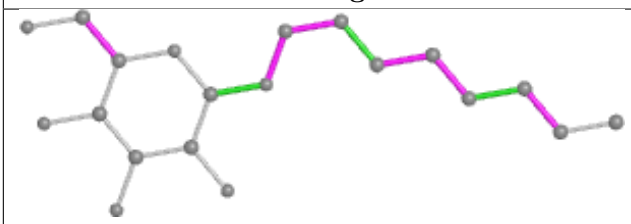
Ligand BOG F 202



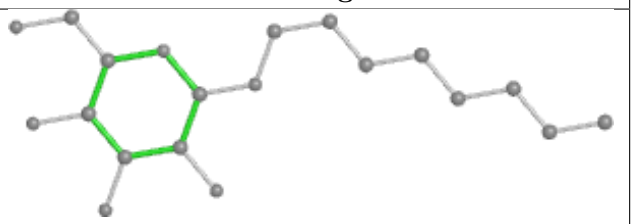
Bond lengths



Bond angles

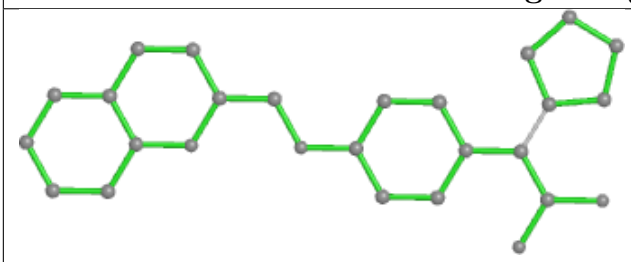


Torsions



Rings

Ligand QY1 A 201



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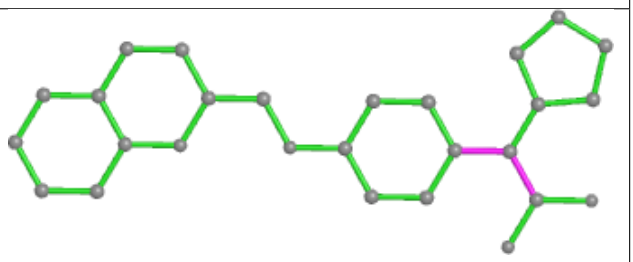
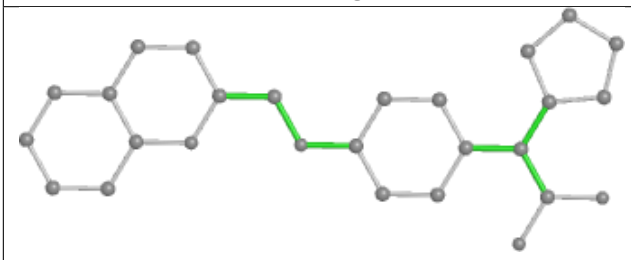
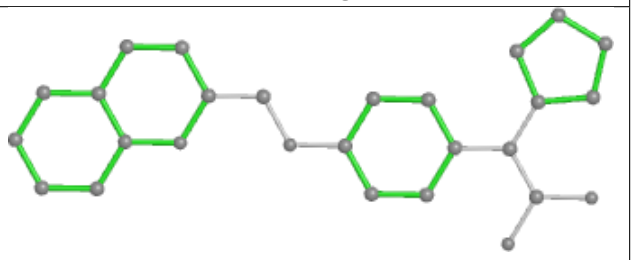


Bond angles

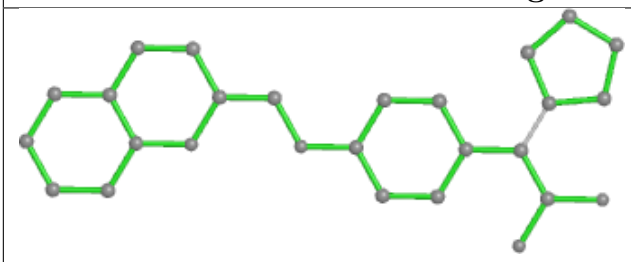


Torsions



Rings

Ligand QY1 F 201



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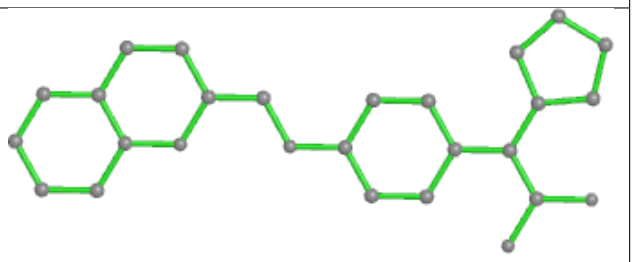
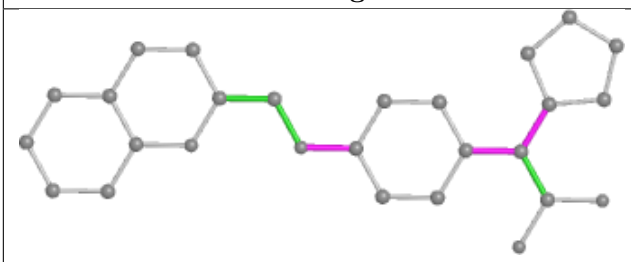
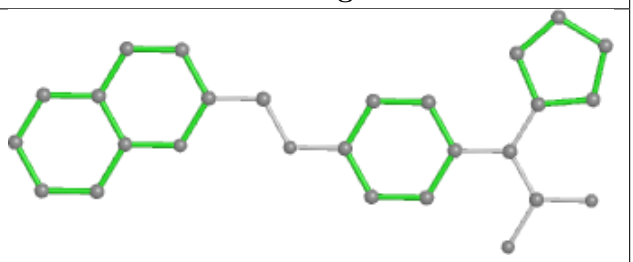


Bond angles



Torsions



Rings

4.7 Other polymers

There are no such residues in this entry.

4.8 Polymer linkage issues

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.