



wwPDB X-ray Structure Validation Summary Report ⓘ

Jun 22, 2024 – 07:01 PM EDT

PDB ID : 6FNE
Title : Structure of human Brag2 (Sec7-PH domains) with the inhibitor Bragsin bound to the PH domain
Authors : Nawrotek, A.; Zeghouf, M.; Cherfils, J.
Deposited on : 2018-02-03
Resolution : 2.50 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

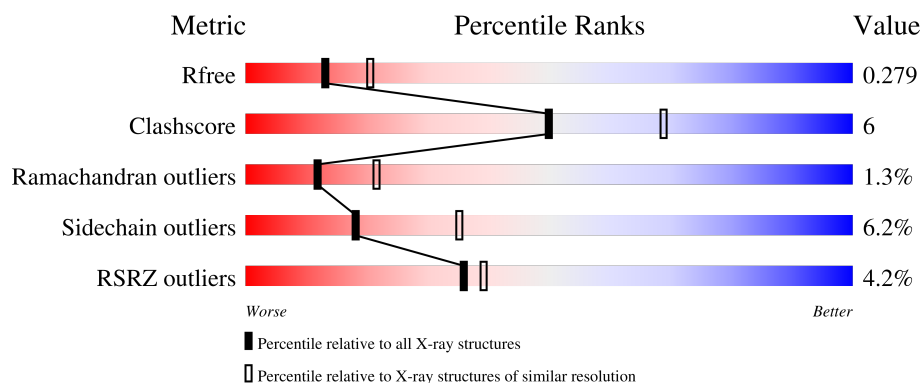
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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	405	<div> <div style="width: 100%; height: 10px; background-color: red; position: relative;"> % </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> 70% 14% • 14% </div> </div>
1	B	405	<div> <div style="width: 100%; height: 10px; background-color: red; position: relative;"> 6% </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> 68% 13% • 18% </div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	DY5	A	801	-	-	X	-

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 5706 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 IQ motif and SEC7 domain-containing protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	350	Total	C	N	O	S	0	1	0
			2888	1836	519	518	15			
1	B	334	Total	C	N	O	S	0	0	0
			2753	1755	495	489	14			

There are 62 discrepancies between the modelled and reference sequences:

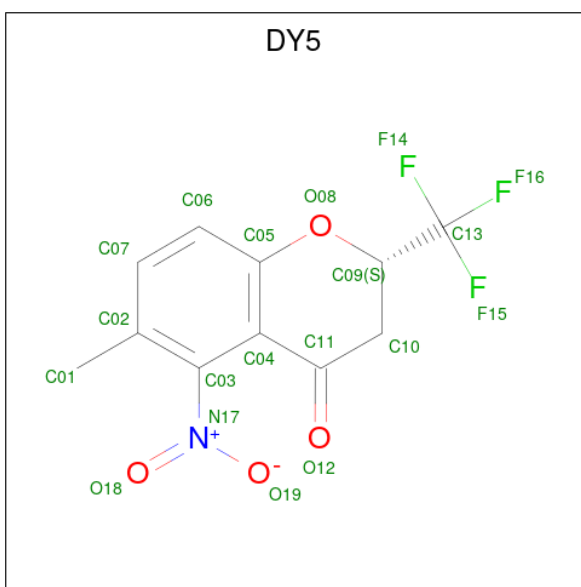
Chain	Residue	Modelled	Actual	Comment	Reference
A	359	MET	-	initiating methionine	UNP Q6DN90
A	360	SER	-	expression tag	UNP Q6DN90
A	361	TYR	-	expression tag	UNP Q6DN90
A	362	TYR	-	expression tag	UNP Q6DN90
A	363	HIS	-	expression tag	UNP Q6DN90
A	364	HIS	-	expression tag	UNP Q6DN90
A	365	HIS	-	expression tag	UNP Q6DN90
A	366	HIS	-	expression tag	UNP Q6DN90
A	367	HIS	-	expression tag	UNP Q6DN90
A	368	HIS	-	expression tag	UNP Q6DN90
A	369	ASP	-	expression tag	UNP Q6DN90
A	370	TYR	-	expression tag	UNP Q6DN90
A	371	ASP	-	expression tag	UNP Q6DN90
A	372	ILE	-	expression tag	UNP Q6DN90
A	373	PRO	-	expression tag	UNP Q6DN90
A	374	THR	-	expression tag	UNP Q6DN90
A	375	THR	-	expression tag	UNP Q6DN90
A	376	GLU	-	expression tag	UNP Q6DN90
A	377	ASN	-	expression tag	UNP Q6DN90
A	378	LEU	-	expression tag	UNP Q6DN90
A	379	TYR	-	expression tag	UNP Q6DN90
A	380	PHE	-	expression tag	UNP Q6DN90
A	381	GLN	-	expression tag	UNP Q6DN90
A	382	GLY	-	expression tag	UNP Q6DN90
A	383	ALA	-	expression tag	UNP Q6DN90

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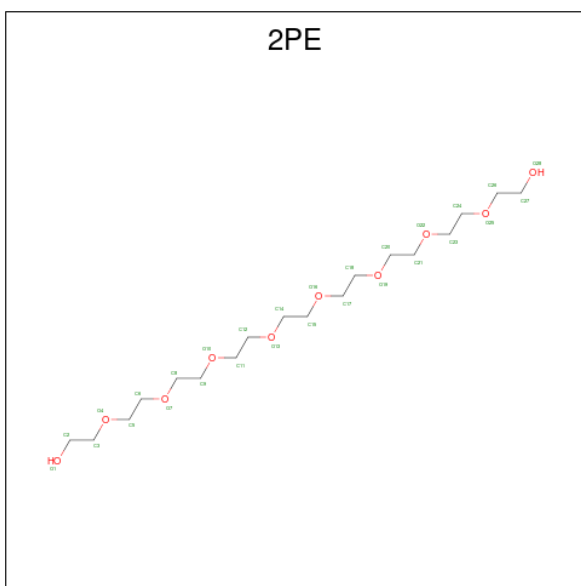
Chain	Residue	Modelled	Actual	Comment	Reference
A	384	MET	-	expression tag	UNP Q6DN90
A	385	GLY	-	expression tag	UNP Q6DN90
A	386	SER	-	expression tag	UNP Q6DN90
A	387	GLU	-	expression tag	UNP Q6DN90
A	388	PHE	-	expression tag	UNP Q6DN90
A	389	MET	-	expression tag	UNP Q6DN90
B	359	MET	-	initiating methionine	UNP Q6DN90
B	360	SER	-	expression tag	UNP Q6DN90
B	361	TYR	-	expression tag	UNP Q6DN90
B	362	TYR	-	expression tag	UNP Q6DN90
B	363	HIS	-	expression tag	UNP Q6DN90
B	364	HIS	-	expression tag	UNP Q6DN90
B	365	HIS	-	expression tag	UNP Q6DN90
B	366	HIS	-	expression tag	UNP Q6DN90
B	367	HIS	-	expression tag	UNP Q6DN90
B	368	HIS	-	expression tag	UNP Q6DN90
B	369	ASP	-	expression tag	UNP Q6DN90
B	370	TYR	-	expression tag	UNP Q6DN90
B	371	ASP	-	expression tag	UNP Q6DN90
B	372	ILE	-	expression tag	UNP Q6DN90
B	373	PRO	-	expression tag	UNP Q6DN90
B	374	THR	-	expression tag	UNP Q6DN90
B	375	THR	-	expression tag	UNP Q6DN90
B	376	GLU	-	expression tag	UNP Q6DN90
B	377	ASN	-	expression tag	UNP Q6DN90
B	378	LEU	-	expression tag	UNP Q6DN90
B	379	TYR	-	expression tag	UNP Q6DN90
B	380	PHE	-	expression tag	UNP Q6DN90
B	381	GLN	-	expression tag	UNP Q6DN90
B	382	GLY	-	expression tag	UNP Q6DN90
B	383	ALA	-	expression tag	UNP Q6DN90
B	384	MET	-	expression tag	UNP Q6DN90
B	385	GLY	-	expression tag	UNP Q6DN90
B	386	SER	-	expression tag	UNP Q6DN90
B	387	GLU	-	expression tag	UNP Q6DN90
B	388	PHE	-	expression tag	UNP Q6DN90
B	389	MET	-	expression tag	UNP Q6DN90

- Molecule 2 is (2 {S})-6-methyl-5-nitro-2-(trifluoromethyl)-2,3-dihydrochromen-4-one (three-letter code: DY5) (formula: C₁₁H₈F₃NO₄) (labeled as "Ligand of Interest" by depositor).



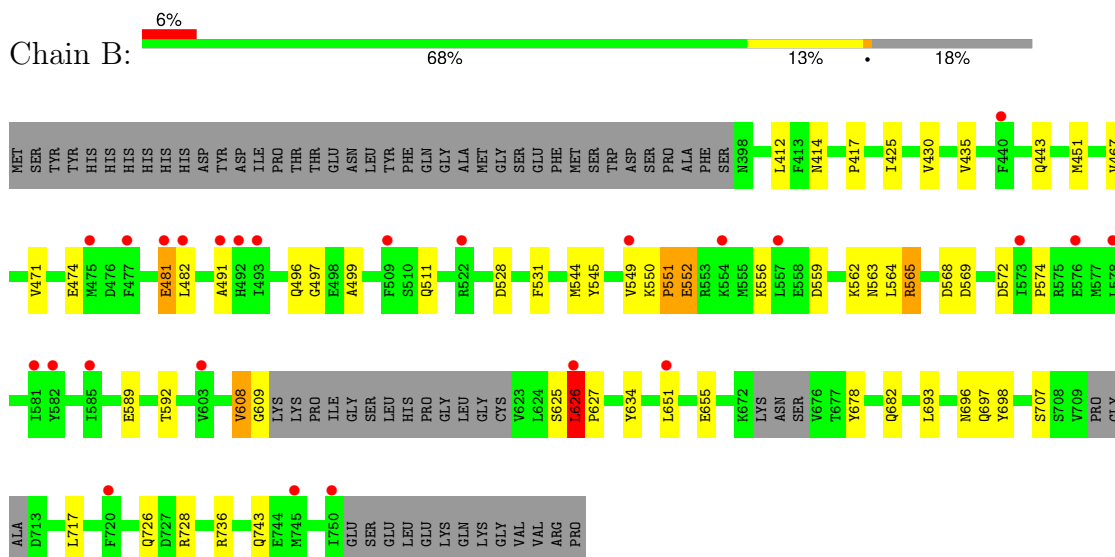
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	F	N	O	0	0
			19	11	3	1	4		

- Molecule 3 is NONAETHYLENE GLYCOL (three-letter code: 2PE) (formula: $C_{18}H_{38}O_{10}$).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	14	Total 14	O 14	0	0
4	B	4	Total 4	O 4	0	0

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.



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	65.91Å 66.16Å 218.82Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	63.33 – 2.50 63.33 – 2.50	Depositor EDS
% Data completeness (in resolution range)	64.6 (63.33-2.50) 64.6 (63.33-2.50)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.18	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.56 (at 2.51Å)	Xtriage
Refinement program	PHENIX (1.10.1_2155: ???), BUSTER	Depositor
R, R_{free}	0.218 , 0.280 0.218 , 0.279	Depositor DCC
R_{free} test set	1093 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	57.1	Xtriage
Anisotropy	0.056	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 50.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.026 for k,h,-l	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	5706	wwPDB-VP
Average B, all atoms (Å ²)	64.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.70% 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: DY5, 2PE

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	0.50	0/2941	0.66	1/3947 (0.0%)
1	B	0.41	0/2802	0.60	2/3766 (0.1%)
All	All	0.46	0/5743	0.63	3/7713 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	551	PRO	C-N-CA	6.25	137.33	121.70
1	B	551	PRO	CA-C-N	5.50	129.29	117.20
1	A	468	LEU	CB-CG-CD2	-5.26	102.05	111.00

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	2888	0	2941	38	0
1	B	2753	0	2789	29	0
2	A	19	0	0	6	0
3	A	28	0	38	4	0
4	A	14	0	0	0	0
4	B	4	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	5706	0	5768	66	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.

The worst 5 of 66 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:667:LYS:HZ3	2:A:801:DY5:C06	1.91	0.83
1:A:667:LYS:NZ	2:A:801:DY5:C06	2.43	0.81
1:B:549:VAL:HG13	1:B:550:LYS:HB2	1.73	0.69
1:A:403:LYS:HB3	3:A:802:2PE:H212	1.75	0.68
1:B:568:ASP:OD1	1:B:569:ASP:N	2.27	0.65

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	345/405 (85%)	326 (94%)	16 (5%)	3 (1%)	17	31
1	B	326/405 (80%)	296 (91%)	24 (7%)	6 (2%)	8	14
All	All	671/810 (83%)	622 (93%)	40 (6%)	9 (1%)	12	21

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	556	LYS
1	B	481	GLU
1	B	552	GLU
1	B	482	LEU

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Mol	Chain	Res	Type
1	A	490	GLN

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	322/370 (87%)	301 (94%)	21 (6%)	17	33
1	B	305/370 (82%)	287 (94%)	18 (6%)	19	37
All	All	627/740 (85%)	588 (94%)	39 (6%)	18	35

5 of 39 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	544	MET
1	B	697	GLN
1	B	565	ARG
1	B	626	LEU
1	B	736	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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

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	DY5	A	801	-	20,20,20	5.01	3 (15%)	21,31,31	2.73	3 (14%)
3	2PE	A	802	-	27,27,27	0.57	0	26,26,26	0.61	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	DY5	A	801	-	-	6/6/22/22	0/2/2/2
3	2PE	A	802	-	-	20/25/25/25	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	801	DY5	O08-C09	-17.94	1.33	1.44
2	A	801	DY5	C10-C09	-10.69	1.32	1.52
2	A	801	DY5	C03-N17	6.73	1.57	1.45

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	801	DY5	O08-C09-C10	11.33	123.29	110.15
2	A	801	DY5	C05-C04-C11	-2.72	117.64	120.29
2	A	801	DY5	O18-N17-C03	-2.18	115.47	119.02

There are no chirality outliers.

5 of 26 torsion outliers are listed below:

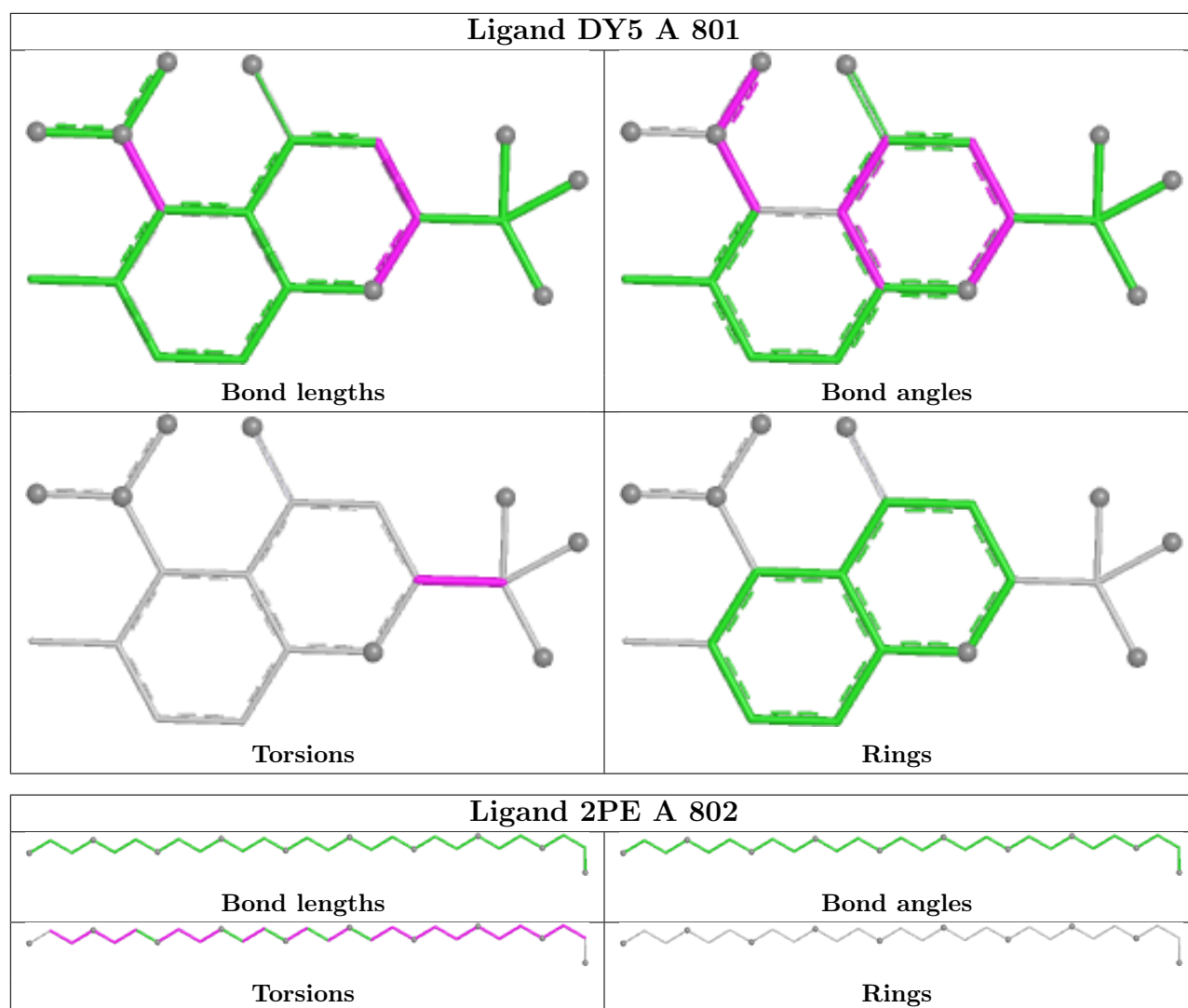
Mol	Chain	Res	Type	Atoms
2	A	801	DY5	O08-C09-C13-F14
2	A	801	DY5	O08-C09-C13-F15
2	A	801	DY5	O08-C09-C13-F16
3	A	802	2PE	O4-C5-C6-O7
3	A	802	2PE	O16-C17-C18-O19

There are no ring outliers.

2 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	801	DY5	6	0
3	A	802	2PE	4	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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	350/405 (86%)	0.10	4 (1%) 80 82	25, 49, 90, 156	0
1	B	334/405 (82%)	0.41	25 (7%) 14 14	47, 70, 114, 127	0
All	All	684/810 (84%)	0.25	29 (4%) 36 39	25, 60, 108, 156	0

The worst 5 of 29 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	756	LYS	5.1
1	B	554	LYS	5.1
1	B	482	LEU	4.0
1	B	477	PHE	4.0
1	A	757	GLN	3.4

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 monosaccharides in this entry.

6.4 Ligands [i](#)

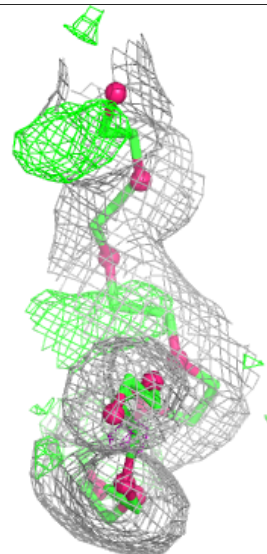
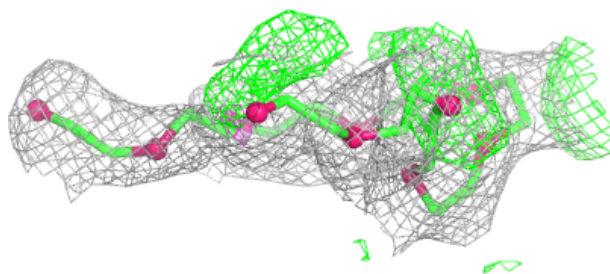
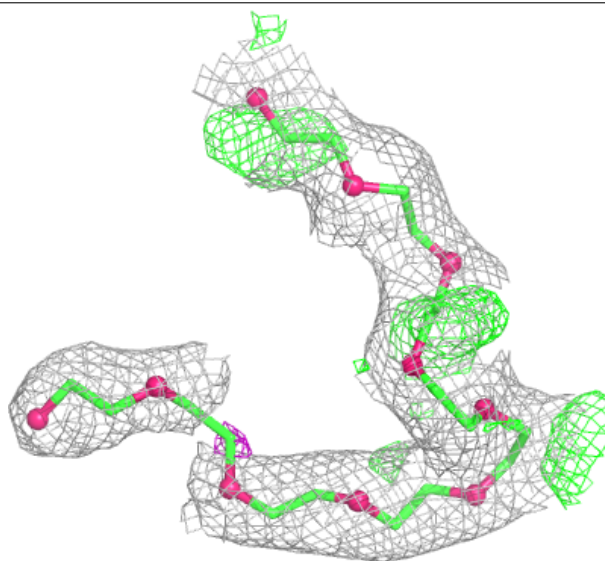
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	2PE	A	802	28/28	0.72	0.22	55,73,89,90	0
2	DY5	A	801	19/19	0.87	0.17	40,65,80,85	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.

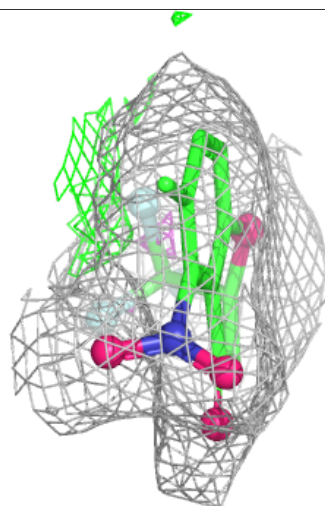
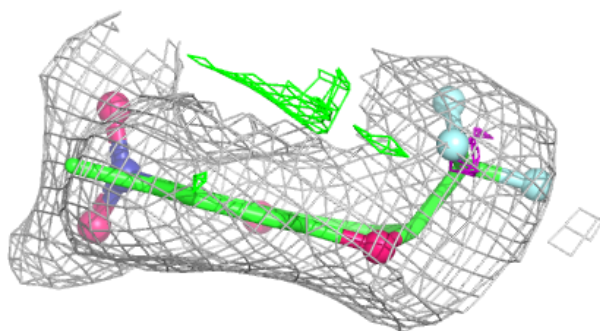
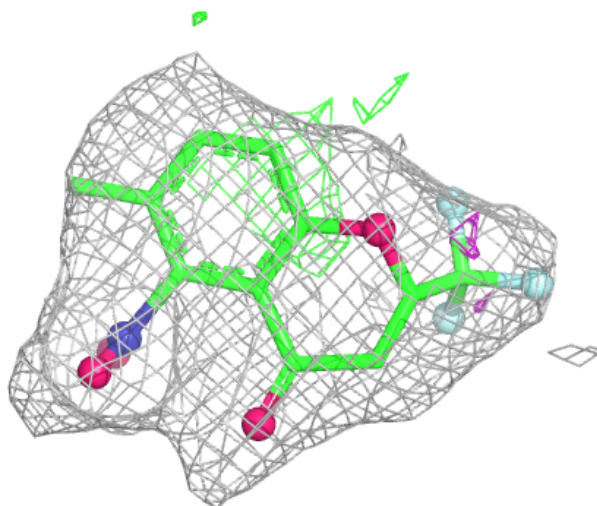
Electron density around 2PE A 802:

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 DY5 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.