wwPDB X-ray Structure Validation Summary Report (i)

Jun 23, 2024 – 06:21 AM EDT

PDB ID	:	6FER
Title	:	Crystal Structure of human DDR2 kinase in complex with 2-[4,5-difluoro-2-oxo-1'-(1H-pyrazolo[3,4-b]pyridine-5-carbonyl)spiro[indole-3,4'-piperidine]-1-yl]-N-(2,2,2-trifluoroethyl)acetamide
Authors	:	Stihle, M.; Richter, H.; Benz, J.; Kuhn, B.; Rudolph, M.G.
Deposited on	:	2018-01-03
Resolution	:	2.87 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 (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:

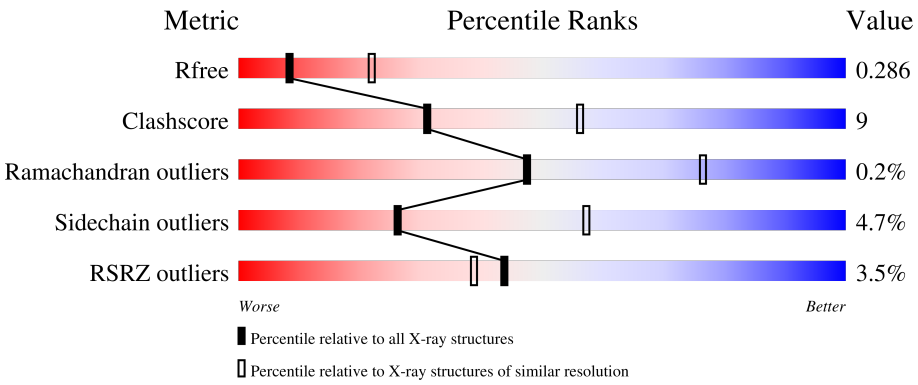
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber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

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.87 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	2691 (2.90-2.86)
Clashscore	141614	2947 (2.90-2.86)
Ramachandran outliers	138981	2868 (2.90-2.86)
Sidechain outliers	138945	2871 (2.90-2.86)
RSRZ outliers	127900	2629 (2.90-2.86)

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	309	4% 64% 22% • 12%
1	B	309	2% 71% 19% • 10%
1	C	309	3% 66% 21% • 12%
1	D	309	% 70% 19% • 9%

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Mol	Chain	Length	Quality of chain
1	E	309	%, 64%, 24%, 12%
1	F	309	70%, 18%, •, 11%
1	G	309	69%, 18%, •, 12%
1	H	309	%, 64%, 22%, •, 12%
1	I	309	6%, 59%, 27%, •, 14%
1	J	309	3%, 71%, 16%, •, 12%
1	K	309	10%, 61%, 25%, •, 13%
1	L	309	6%, 59%, 29%, 12%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 27069 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 Discoidin domain-containing receptor 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	271	2200	1408	375	401	16	0	0	0
1	B	279	2261	1442	387	416	16	0	0	0
1	C	272	2209	1413	376	404	16	0	0	0
1	D	280	2268	1447	388	417	16	0	0	0
1	E	273	2223	1422	380	405	16	0	0	0
1	F	275	2233	1427	381	409	16	0	0	0
1	G	273	2220	1419	380	405	16	0	0	0
1	H	272	2214	1417	379	402	16	0	0	0
1	I	267	2177	1394	371	396	16	0	0	0
1	J	272	2214	1417	379	402	16	0	0	0
1	K	268	2184	1398	372	398	16	0	0	0
1	L	273	2222	1421	381	404	16	0	0	0

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	903	HIS	-	expression tag	UNP Q16832
A	904	HIS	-	expression tag	UNP Q16832
A	905	HIS	-	expression tag	UNP Q16832
A	906	HIS	-	expression tag	UNP Q16832
A	907	HIS	-	expression tag	UNP Q16832

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Chain	Residue	Modelled	Actual	Comment	Reference
A	908	HIS	-	expression tag	UNP Q16832
B	903	HIS	-	expression tag	UNP Q16832
B	904	HIS	-	expression tag	UNP Q16832
B	905	HIS	-	expression tag	UNP Q16832
B	906	HIS	-	expression tag	UNP Q16832
B	907	HIS	-	expression tag	UNP Q16832
B	908	HIS	-	expression tag	UNP Q16832
C	903	HIS	-	expression tag	UNP Q16832
C	904	HIS	-	expression tag	UNP Q16832
C	905	HIS	-	expression tag	UNP Q16832
C	906	HIS	-	expression tag	UNP Q16832
C	907	HIS	-	expression tag	UNP Q16832
C	908	HIS	-	expression tag	UNP Q16832
D	903	HIS	-	expression tag	UNP Q16832
D	904	HIS	-	expression tag	UNP Q16832
D	905	HIS	-	expression tag	UNP Q16832
D	906	HIS	-	expression tag	UNP Q16832
D	907	HIS	-	expression tag	UNP Q16832
D	908	HIS	-	expression tag	UNP Q16832
E	903	HIS	-	expression tag	UNP Q16832
E	904	HIS	-	expression tag	UNP Q16832
E	905	HIS	-	expression tag	UNP Q16832
E	906	HIS	-	expression tag	UNP Q16832
E	907	HIS	-	expression tag	UNP Q16832
E	908	HIS	-	expression tag	UNP Q16832
F	903	HIS	-	expression tag	UNP Q16832
F	904	HIS	-	expression tag	UNP Q16832
F	905	HIS	-	expression tag	UNP Q16832
F	906	HIS	-	expression tag	UNP Q16832
F	907	HIS	-	expression tag	UNP Q16832
F	908	HIS	-	expression tag	UNP Q16832
G	903	HIS	-	expression tag	UNP Q16832
G	904	HIS	-	expression tag	UNP Q16832
G	905	HIS	-	expression tag	UNP Q16832
G	906	HIS	-	expression tag	UNP Q16832
G	907	HIS	-	expression tag	UNP Q16832
G	908	HIS	-	expression tag	UNP Q16832
H	903	HIS	-	expression tag	UNP Q16832
H	904	HIS	-	expression tag	UNP Q16832
H	905	HIS	-	expression tag	UNP Q16832
H	906	HIS	-	expression tag	UNP Q16832
H	907	HIS	-	expression tag	UNP Q16832

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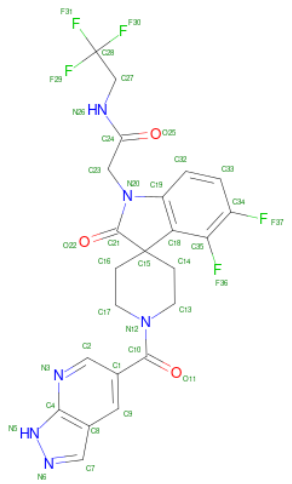
Chain	Residue	Modelled	Actual	Comment	Reference
H	908	HIS	-	expression tag	UNP Q16832
I	903	HIS	-	expression tag	UNP Q16832
I	904	HIS	-	expression tag	UNP Q16832
I	905	HIS	-	expression tag	UNP Q16832
I	906	HIS	-	expression tag	UNP Q16832
I	907	HIS	-	expression tag	UNP Q16832
I	908	HIS	-	expression tag	UNP Q16832
J	903	HIS	-	expression tag	UNP Q16832
J	904	HIS	-	expression tag	UNP Q16832
J	905	HIS	-	expression tag	UNP Q16832
J	906	HIS	-	expression tag	UNP Q16832
J	907	HIS	-	expression tag	UNP Q16832
J	908	HIS	-	expression tag	UNP Q16832
K	903	HIS	-	expression tag	UNP Q16832
K	904	HIS	-	expression tag	UNP Q16832
K	905	HIS	-	expression tag	UNP Q16832
K	906	HIS	-	expression tag	UNP Q16832
K	907	HIS	-	expression tag	UNP Q16832
K	908	HIS	-	expression tag	UNP Q16832
L	903	HIS	-	expression tag	UNP Q16832
L	904	HIS	-	expression tag	UNP Q16832
L	905	HIS	-	expression tag	UNP Q16832
L	906	HIS	-	expression tag	UNP Q16832
L	907	HIS	-	expression tag	UNP Q16832
L	908	HIS	-	expression tag	UNP Q16832

- Molecule 2 is 2-[4,5-bis(fluoranyl)-2-oxidanylidene-1'-(1 {H}-pyrazolo[3,4-b]pyridin-5-yl carbonyl)spiro[indole-3,4'-piperidine]-1-yl]- {N}-[2,2,2-tris(fluoranyl)ethyl]ethanamide (three-letter code: D6Q) (formula: $C_{23}H_{19}F_5N_6O_3$).

D6Q



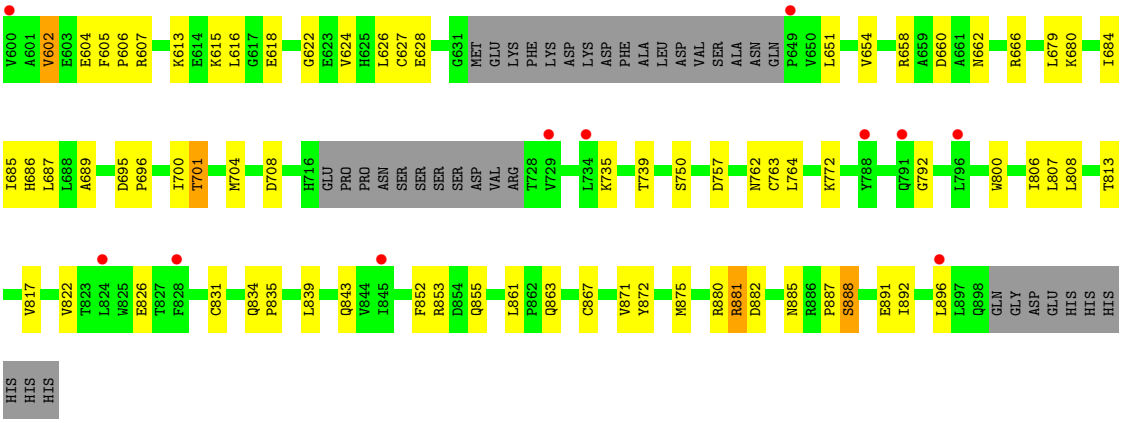
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	F	N	O		
2	A	1	37	23	5	6	3	0	0
2	B	1	37	23	5	6	3	0	0
2	C	1	37	23	5	6	3	0	0
2	D	1	37	23	5	6	3	0	0
2	E	1	37	23	5	6	3	0	0
2	F	1	37	23	5	6	3	0	0
2	G	1	37	23	5	6	3	0	0
2	H	1	37	23	5	6	3	0	0
2	I	1	37	23	5	6	3	0	0
2	J	1	37	23	5	6	3	0	0
2	K	1	37	23	5	6	3	0	0
2	L	1	37	23	5	6	3	0	0

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.

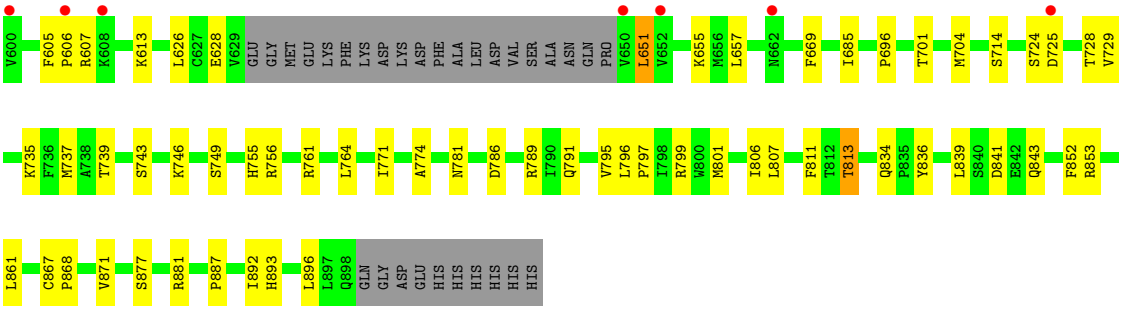
• Molecule 1: Discoidin domain-containing receptor 2

Chain A:



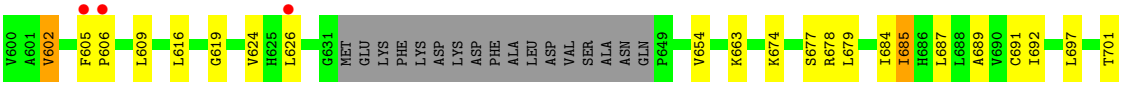
• Molecule 1: Discoidin domain-containing receptor 2

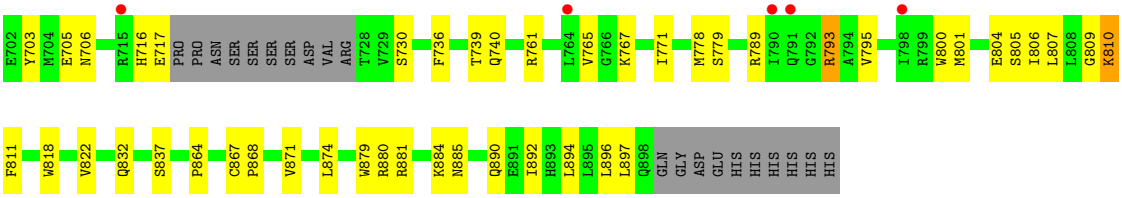
Chain B:



• Molecule 1: Discoidin domain-containing receptor 2

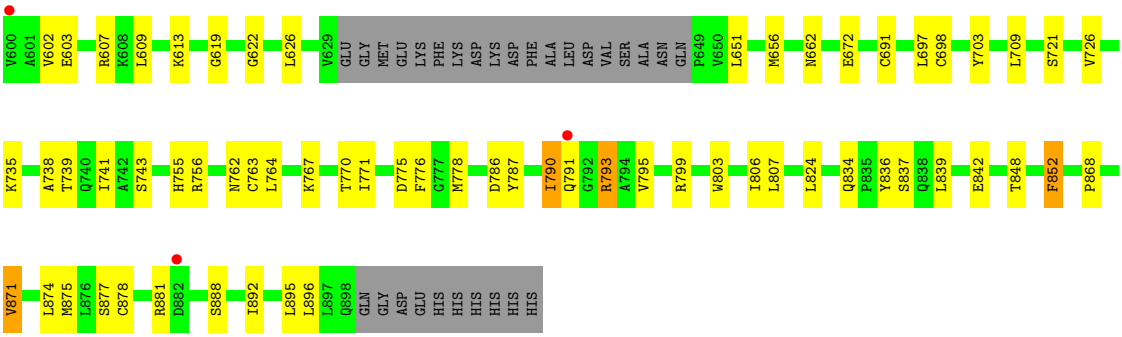
Chain C:





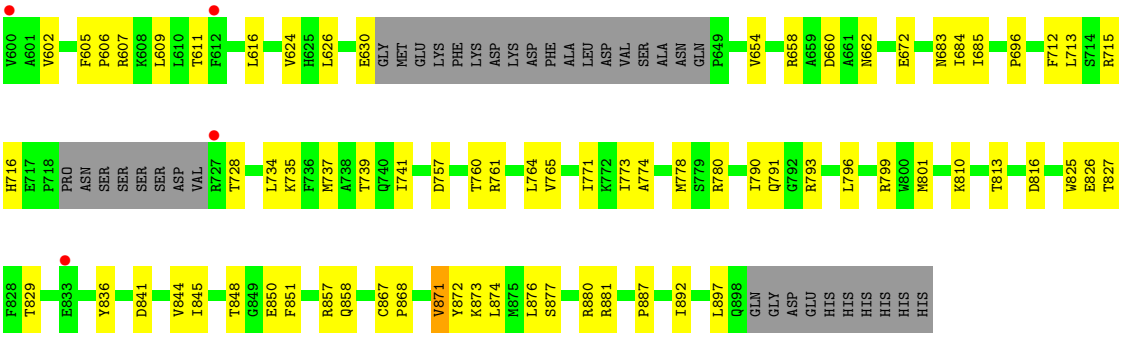
• Molecule 1: Discoidin domain-containing receptor 2

Chain D:



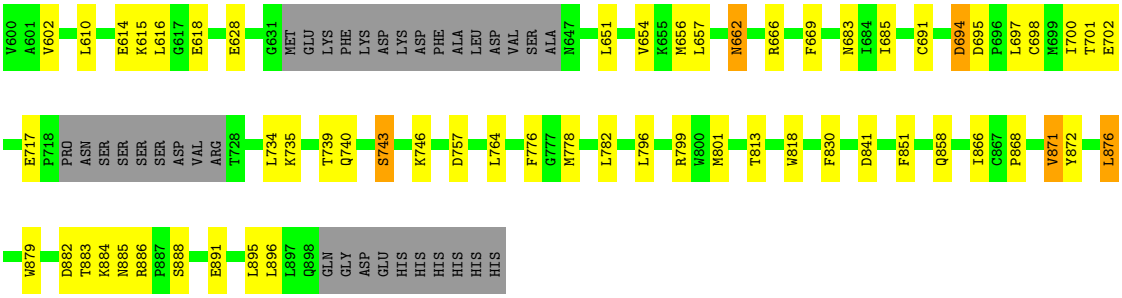
• Molecule 1: Discoidin domain-containing receptor 2

Chain E:



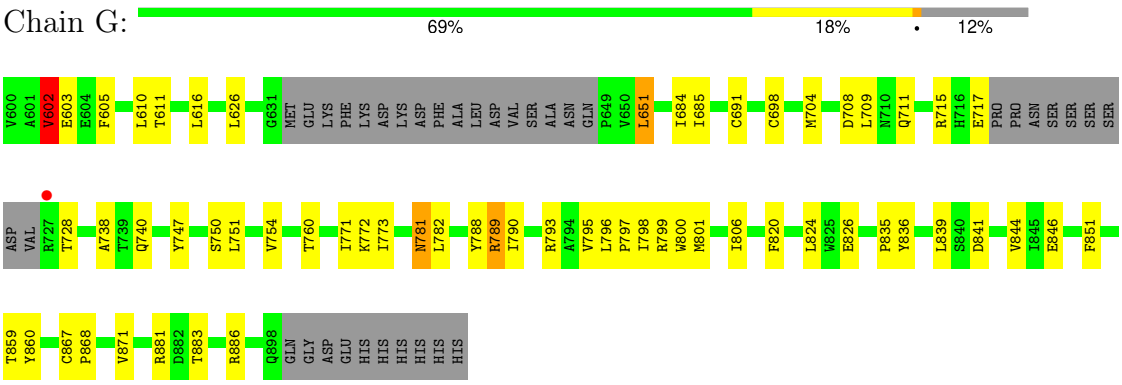
• Molecule 1: Discoidin domain-containing receptor 2

Chain F:



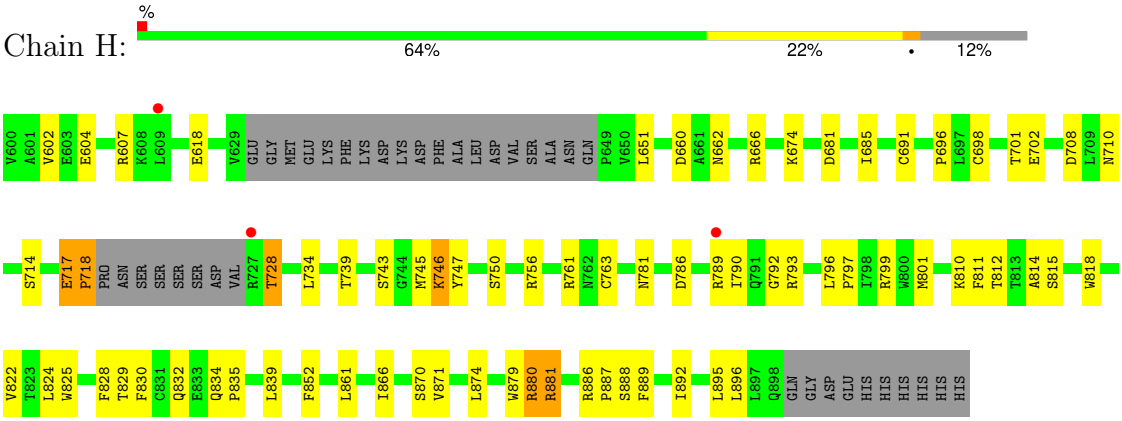
• Molecule 1: Discoidin domain-containing receptor 2

Chain G:



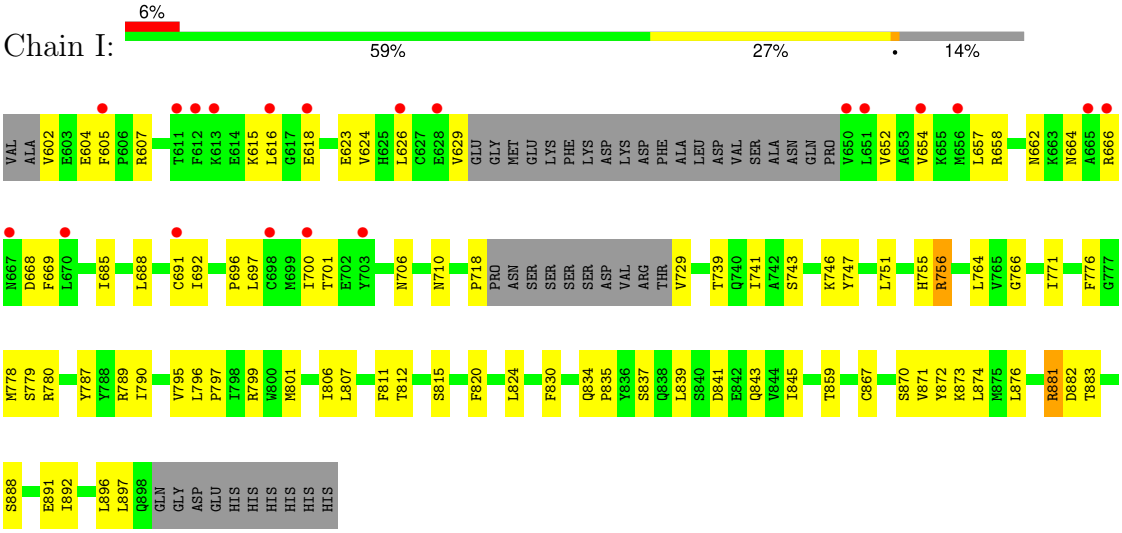
• Molecule 1: Discoidin domain-containing receptor 2

Chain H:



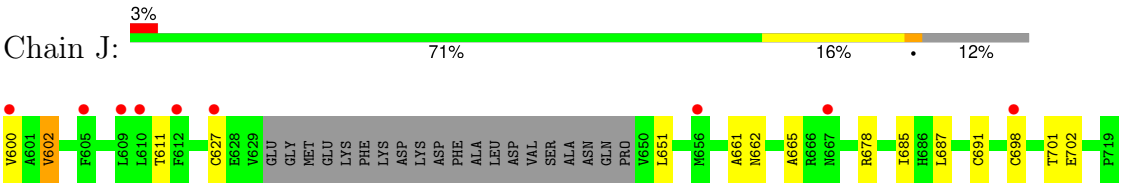
• Molecule 1: Discoidin domain-containing receptor 2

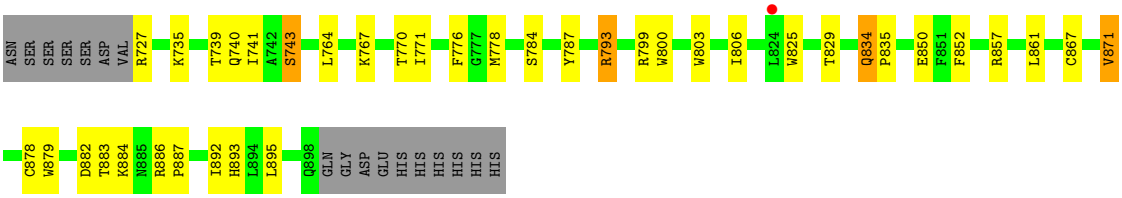
Chain I:



• Molecule 1: Discoidin domain-containing receptor 2

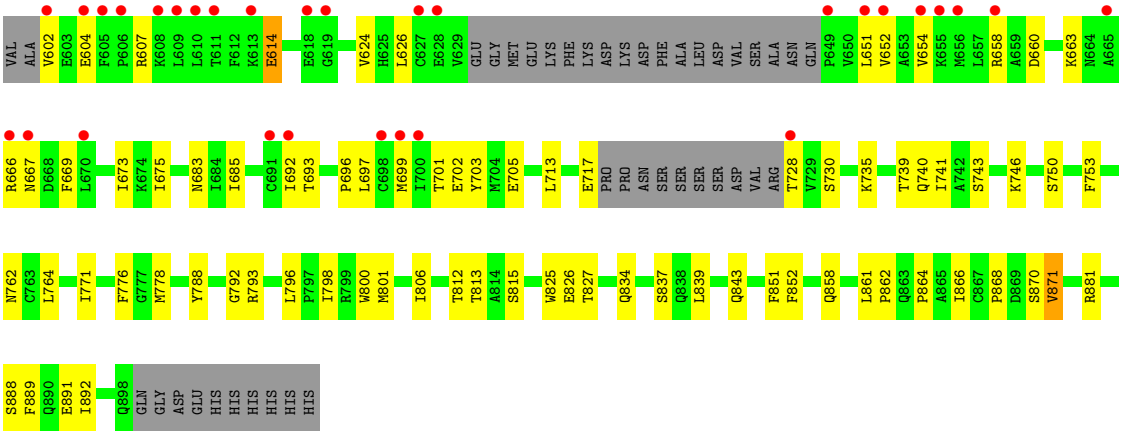
Chain J:





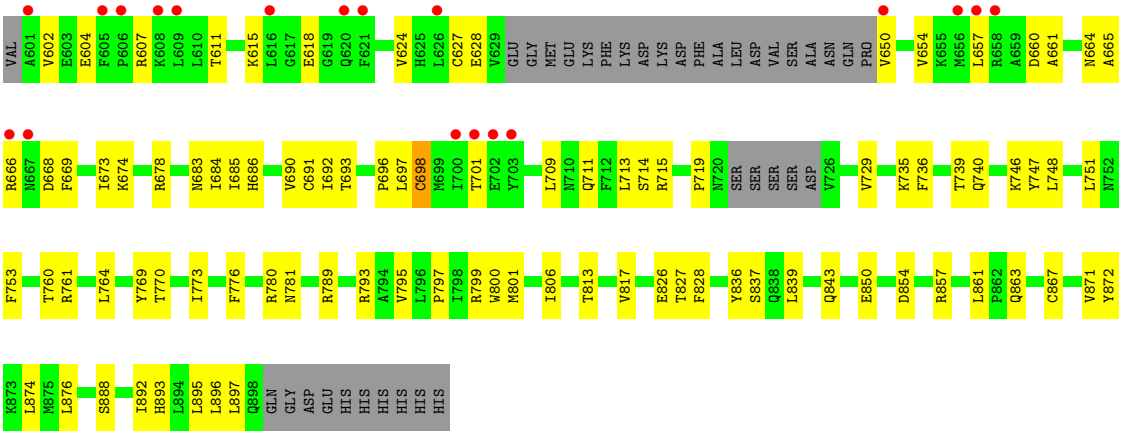
• Molecule 1: Discoidin domain-containing receptor 2

Chain K:



• Molecule 1: Discoidin domain-containing receptor 2

Chain L:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	70.91Å 155.79Å 355.99Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.96 – 2.87 47.96 – 2.87	Depositor EDS
% Data completeness (in resolution range)	99.8 (47.96-2.87) 99.8 (47.96-2.87)	Depositor EDS
R_{merge}	0.32	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.35 (at 2.86Å)	Xtriage
Refinement program	PHENIX 1.11_2558	Depositor
R, R_{free}	0.200 , 0.287 0.202 , 0.286	Depositor DCC
R_{free} test set	4484 reflections (4.92%)	wwPDB-VP
Wilson B-factor (Å^2)	58.1	Xtriage
Anisotropy	0.551	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 59.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	27069	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 5.18% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: D6Q

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	0.41	0/2247	0.58	0/3034
1	B	0.45	0/2310	0.63	0/3123
1	C	0.40	0/2256	0.58	0/3046
1	D	0.44	0/2318	0.63	0/3134
1	E	0.46	0/2271	0.65	0/3067
1	F	0.44	0/2281	0.62	0/3082
1	G	0.46	0/2267	0.65	0/3060
1	H	0.46	0/2262	0.63	0/3055
1	I	0.44	0/2224	0.60	0/3003
1	J	0.42	0/2262	0.64	0/3056
1	K	0.39	0/2231	0.57	0/3012
1	L	0.43	0/2270	0.59	0/3067
All	All	0.43	0/27199	0.62	0/36739

There are no bond length outliers.

There are no bond angle outliers.

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	2200	0	2191	48	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	2261	0	2247	35	0
1	C	2209	0	2197	40	0
1	D	2268	0	2255	37	0
1	E	2223	0	2214	42	0
1	F	2233	0	2217	33	0
1	G	2220	0	2210	35	0
1	H	2214	0	2208	49	0
1	I	2177	0	2166	53	0
1	J	2214	0	2207	34	0
1	K	2184	0	2174	45	0
1	L	2222	0	2213	59	0
2	A	37	0	0	1	0
2	B	37	0	0	0	0
2	C	37	0	0	0	0
2	D	37	0	0	0	0
2	E	37	0	0	1	0
2	F	37	0	0	1	0
2	G	37	0	0	0	0
2	H	37	0	0	0	0
2	I	37	0	0	2	0
2	J	37	0	0	1	0
2	K	37	0	0	1	0
2	L	37	0	0	0	0
All	All	27069	0	26499	486	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 9.

The worst 5 of 486 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:D:691:CYS:HB2	1:D:698:CYS:HB2	1.59	0.84
1:K:692:ILE:HG22	1:K:697:LEU:HD22	1.63	0.79
1:I:834:GLN:HG2	1:I:835:PRO:HD2	1.65	0.79
1:H:739:THR:HG22	1:H:896:LEU:HB3	1.68	0.76
1:C:806:ILE:HG22	1:C:807:LEU:HD23	1.70	0.74

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	265/309 (86%)	257 (97%)	8 (3%)	0	100	100
1	B	275/309 (89%)	264 (96%)	11 (4%)	0	100	100
1	C	266/309 (86%)	259 (97%)	7 (3%)	0	100	100
1	D	276/309 (89%)	268 (97%)	8 (3%)	0	100	100
1	E	267/309 (86%)	254 (95%)	13 (5%)	0	100	100
1	F	269/309 (87%)	260 (97%)	8 (3%)	1 (0%)	34	64
1	G	267/309 (86%)	253 (95%)	13 (5%)	1 (0%)	34	64
1	H	266/309 (86%)	258 (97%)	8 (3%)	0	100	100
1	I	261/309 (84%)	249 (95%)	10 (4%)	2 (1%)	19	48
1	J	266/309 (86%)	254 (96%)	11 (4%)	1 (0%)	34	64
1	K	262/309 (85%)	252 (96%)	10 (4%)	0	100	100
1	L	267/309 (86%)	253 (95%)	12 (4%)	2 (1%)	22	52
All	All	3207/3708 (86%)	3081 (96%)	119 (4%)	7 (0%)	47	76

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	L	719	PRO
1	F	757	ASP
1	I	756	ARG
1	I	662	ASN
1	L	854	ASP

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	243/278 (87%)	234 (96%)	9 (4%)	34	66
1	B	252/278 (91%)	243 (96%)	9 (4%)	35	67
1	C	244/278 (88%)	234 (96%)	10 (4%)	30	62
1	D	253/278 (91%)	235 (93%)	18 (7%)	14	38
1	E	246/278 (88%)	232 (94%)	14 (6%)	20	49
1	F	247/278 (89%)	234 (95%)	13 (5%)	22	52
1	G	245/278 (88%)	233 (95%)	12 (5%)	25	55
1	H	245/278 (88%)	224 (91%)	21 (9%)	10	29
1	I	241/278 (87%)	234 (97%)	7 (3%)	42	74
1	J	245/278 (88%)	238 (97%)	7 (3%)	42	74
1	K	242/278 (87%)	229 (95%)	13 (5%)	22	51
1	L	246/278 (88%)	239 (97%)	7 (3%)	43	75
All	All	2949/3336 (88%)	2809 (95%)	140 (5%)	26	57

5 of 140 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	J	743	SER
1	J	871	VAL
1	K	870	SER
1	E	662	ASN
1	E	658	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 8 such sidechains are listed below:

Mol	Chain	Res	Type
1	K	667	ASN
1	E	791	GLN
1	D	791	GLN
1	D	706	ASN
1	E	716	HIS

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 monosaccharides in this entry.

5.6 Ligand geometry (i)

12 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	D6Q	C	1001	-	41,41,41	1.73	7 (17%)	52,63,63	1.77	11 (21%)
2	D6Q	D	1001	-	41,41,41	1.71	5 (12%)	52,63,63	1.88	10 (19%)
2	D6Q	B	1001	-	41,41,41	2.21	9 (21%)	52,63,63	1.64	9 (17%)
2	D6Q	H	1001	-	41,41,41	1.75	7 (17%)	52,63,63	1.74	9 (17%)
2	D6Q	K	1001	-	41,41,41	2.03	8 (19%)	52,63,63	1.82	11 (21%)
2	D6Q	L	1001	-	41,41,41	1.80	10 (24%)	52,63,63	1.89	13 (25%)
2	D6Q	E	1001	-	41,41,41	1.65	7 (17%)	52,63,63	2.04	15 (28%)
2	D6Q	F	1001	-	41,41,41	1.91	10 (24%)	52,63,63	1.68	11 (21%)
2	D6Q	I	1001	-	41,41,41	1.80	9 (21%)	52,63,63	2.31	13 (25%)
2	D6Q	J	1001	-	41,41,41	1.78	7 (17%)	52,63,63	2.01	13 (25%)
2	D6Q	A	1001	-	41,41,41	1.69	14 (34%)	52,63,63	1.88	10 (19%)
2	D6Q	G	1001	-	41,41,41	1.81	7 (17%)	52,63,63	1.73	10 (19%)

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	D6Q	C	1001	-	-	3/18/50/50	0/5/5/5
2	D6Q	D	1001	-	-	2/18/50/50	0/5/5/5
2	D6Q	B	1001	-	-	1/18/50/50	0/5/5/5
2	D6Q	H	1001	-	-	3/18/50/50	0/5/5/5
2	D6Q	K	1001	-	-	1/18/50/50	0/5/5/5
2	D6Q	L	1001	-	-	8/18/50/50	0/5/5/5
2	D6Q	E	1001	-	-	4/18/50/50	0/5/5/5
2	D6Q	F	1001	-	-	0/18/50/50	0/5/5/5
2	D6Q	I	1001	-	-	3/18/50/50	0/5/5/5
2	D6Q	J	1001	-	-	7/18/50/50	0/5/5/5
2	D6Q	A	1001	-	-	3/18/50/50	0/5/5/5
2	D6Q	G	1001	-	-	4/18/50/50	0/5/5/5

The worst 5 of 100 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1001	D6Q	C21-N20	7.66	1.45	1.36
2	K	1001	D6Q	C21-N20	6.67	1.43	1.36
2	C	1001	D6Q	C27-C28	6.42	1.60	1.49
2	G	1001	D6Q	C21-N20	6.27	1.43	1.36
2	H	1001	D6Q	C27-C28	6.15	1.59	1.49

The worst 5 of 135 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	I	1001	D6Q	C28-C27-N26	8.85	123.29	111.82
2	J	1001	D6Q	C27-N26-C24	-7.69	113.08	123.23
2	D	1001	D6Q	C28-C27-N26	-7.00	102.74	111.82
2	A	1001	D6Q	C28-C27-N26	-6.35	103.59	111.82
2	E	1001	D6Q	O22-C21-C15	6.32	132.22	126.27

There are no chirality outliers.

5 of 39 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	1001	D6Q	N26-C27-C28-F29
2	C	1001	D6Q	N26-C27-C28-F30
2	C	1001	D6Q	N26-C27-C28-F31
2	H	1001	D6Q	N26-C27-C28-F29
2	H	1001	D6Q	N26-C27-C28-F30

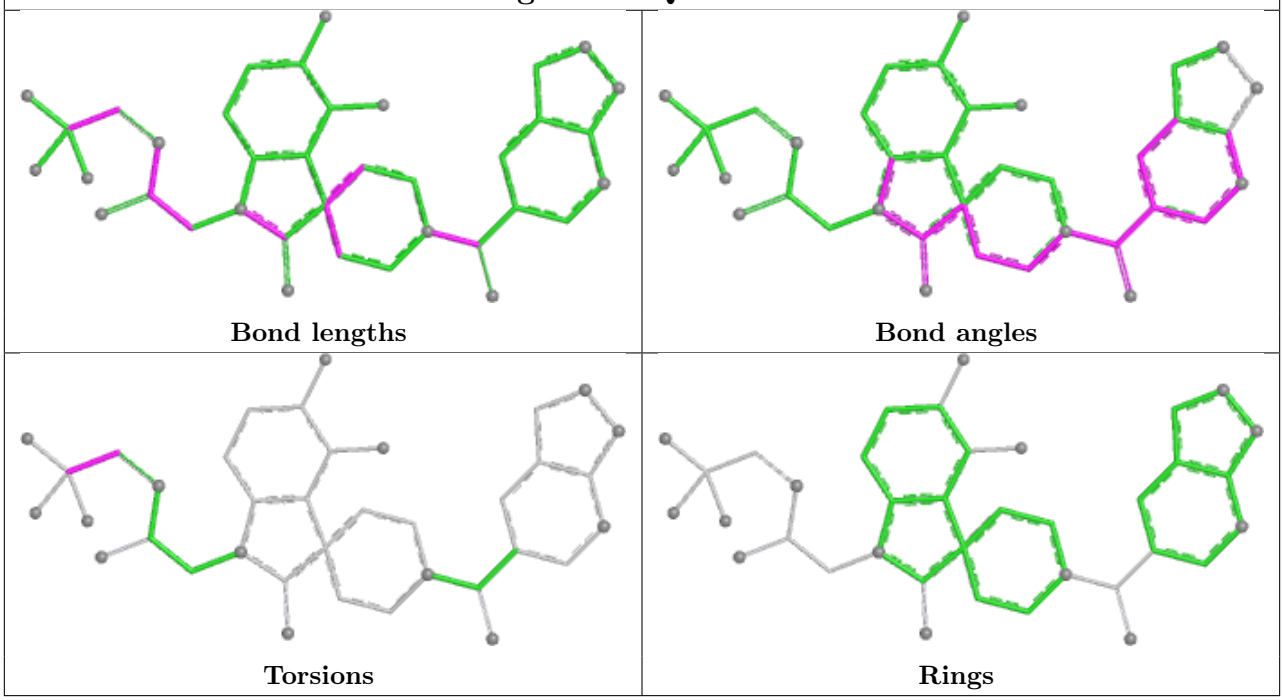
There are no ring outliers.

6 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	K	1001	D6Q	1	0
2	E	1001	D6Q	1	0
2	F	1001	D6Q	1	0
2	I	1001	D6Q	2	0
2	J	1001	D6Q	1	0
2	A	1001	D6Q	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 D6Q C 1001



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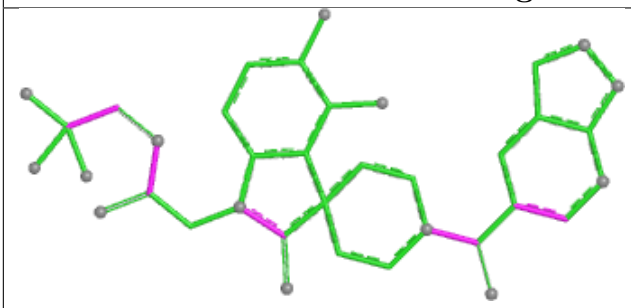
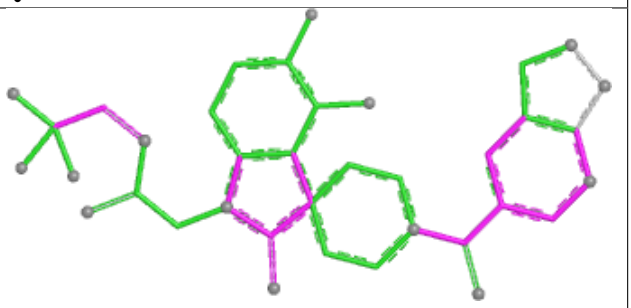
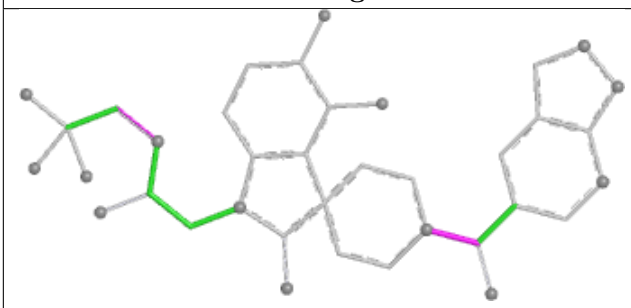
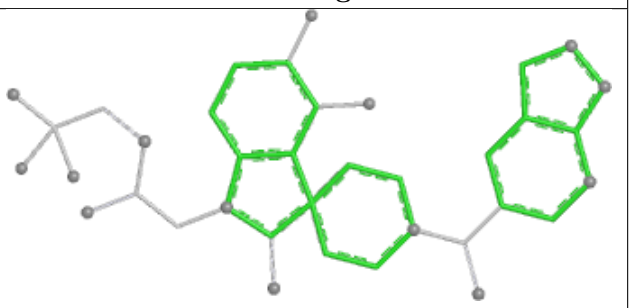
 Bond lengths	 Bond angles
 Torsions	 Rings

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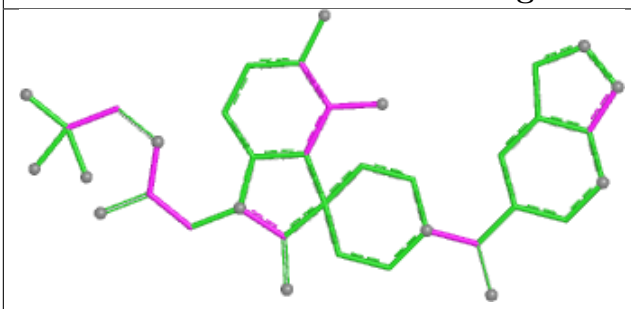
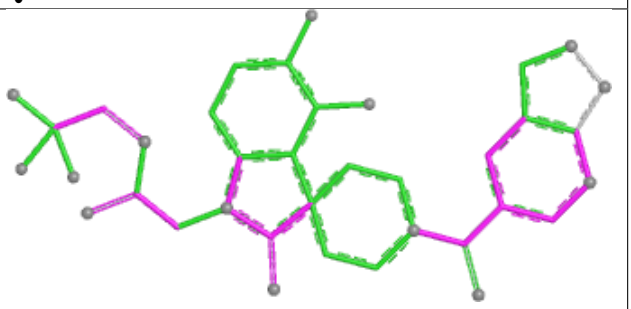
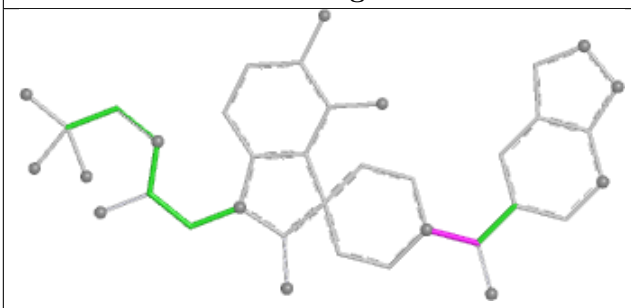
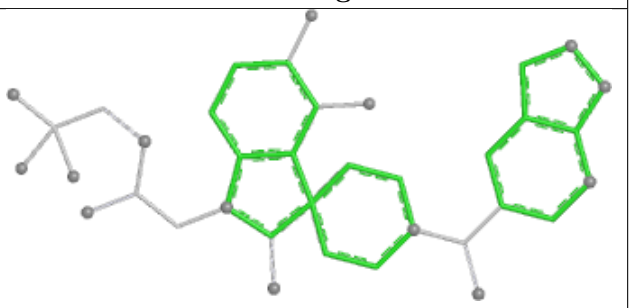
 Bond lengths	 Bond angles
 Torsions	 Rings

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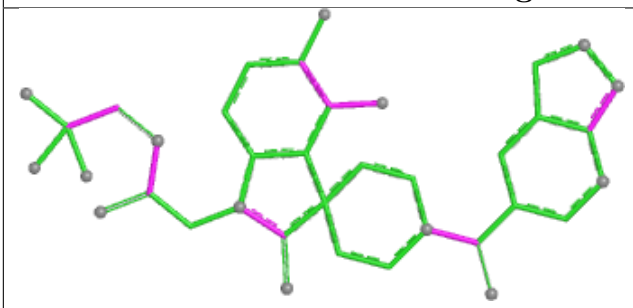
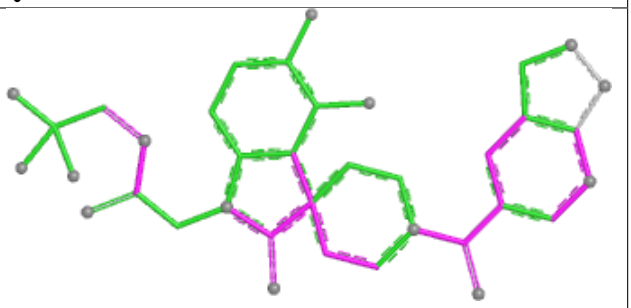


Bond lengths



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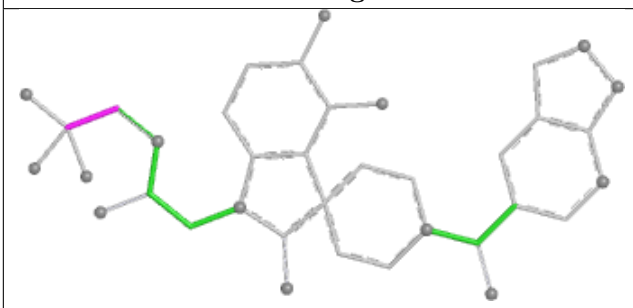

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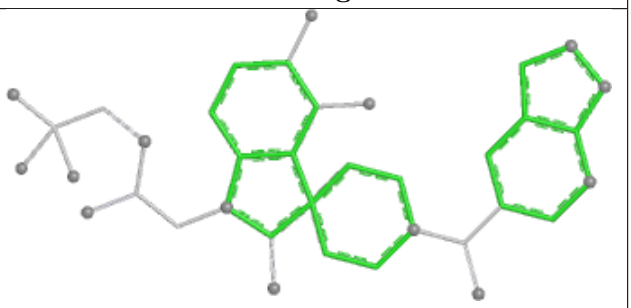

Rings

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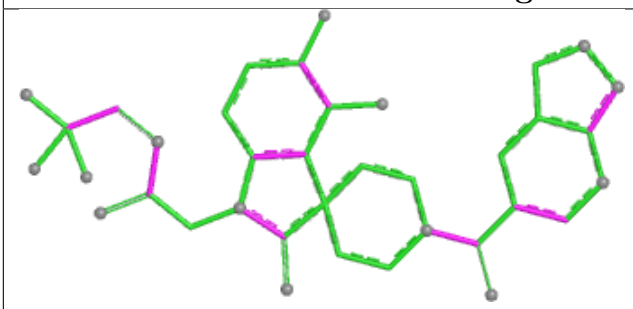

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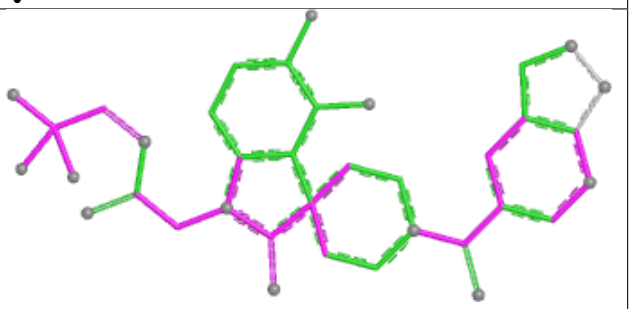

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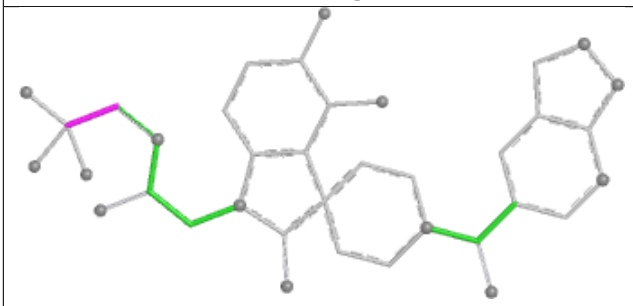

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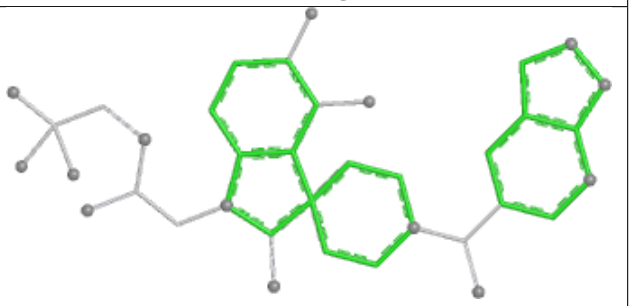

Rings

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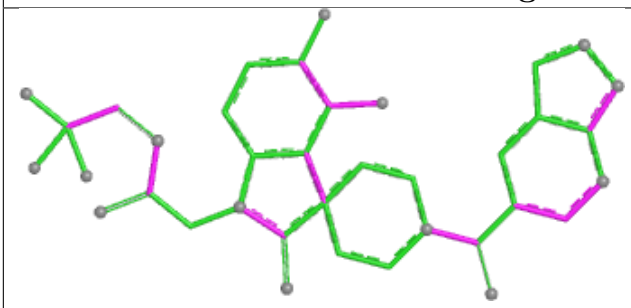
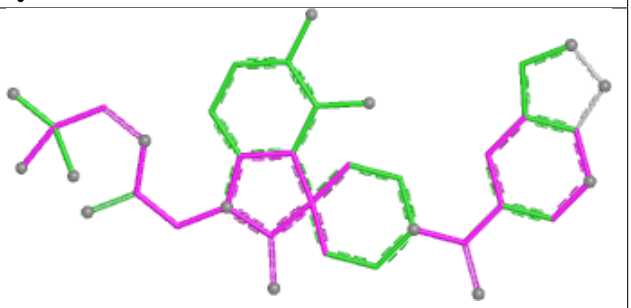
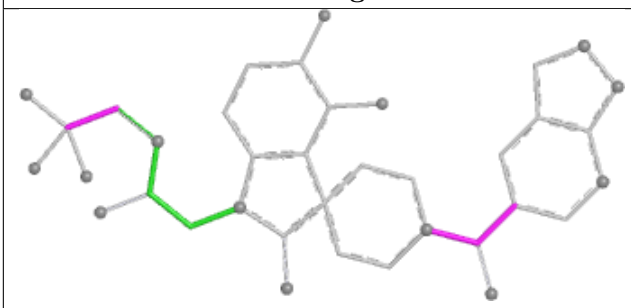
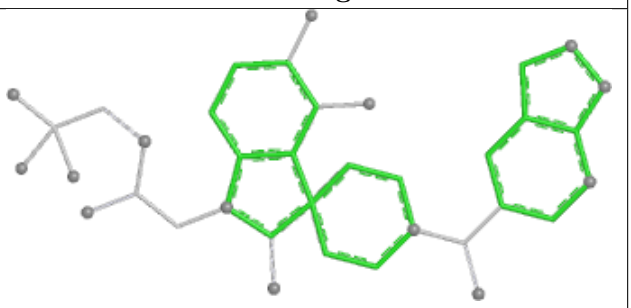
 Bond lengths	 Bond angles
 Torsions	 Rings

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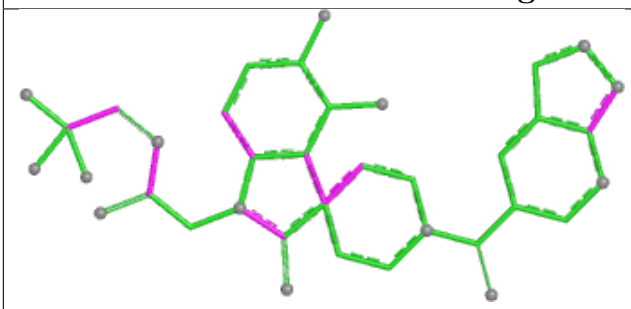
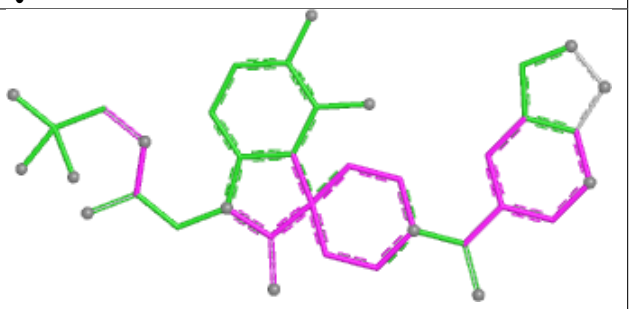
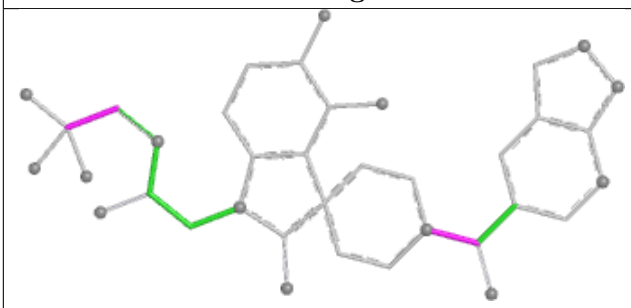
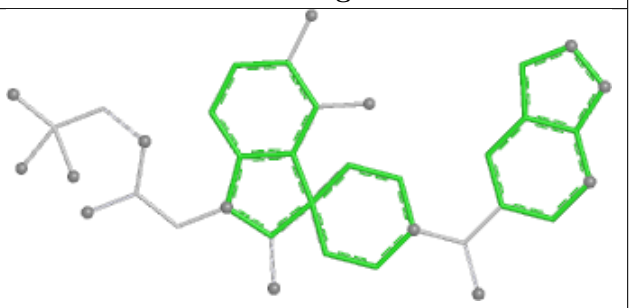
 Bond lengths	 Bond angles
 Torsions	 Rings

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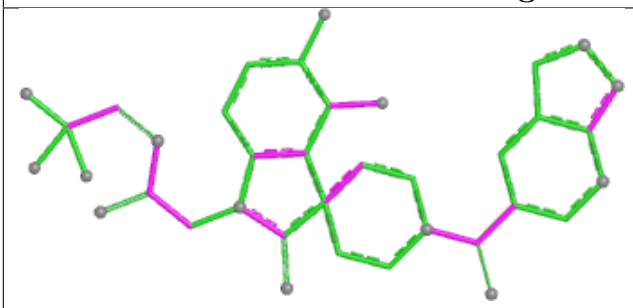
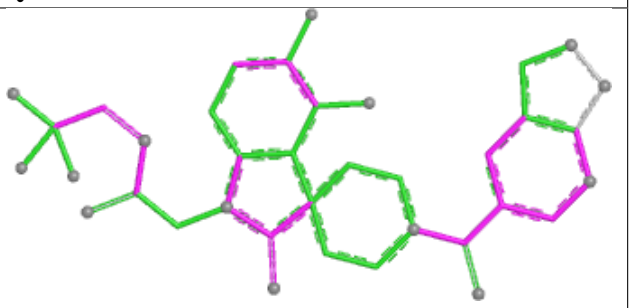
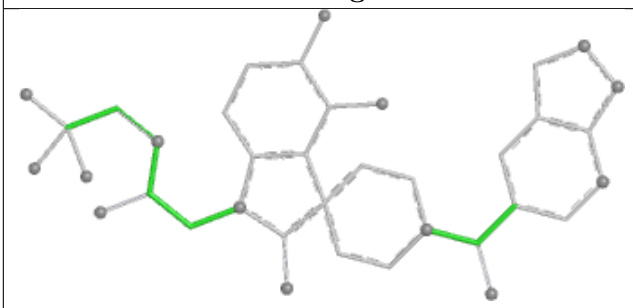


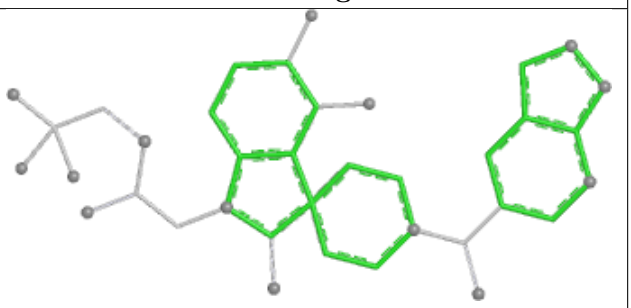
Bond lengths



Bond angles

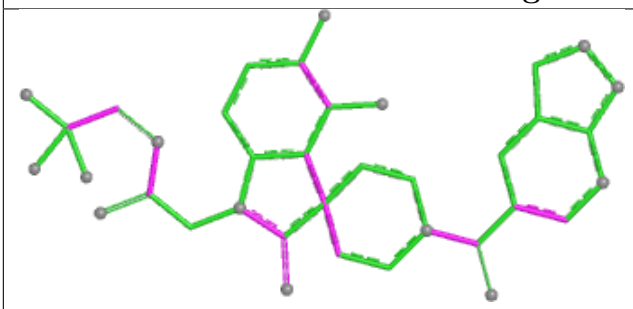


Torsions

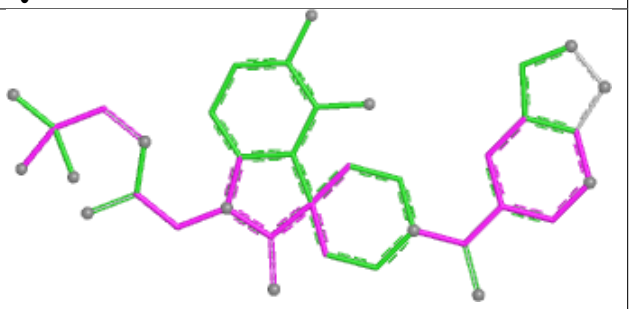


Rings

Ligand D6Q I 1001



Bond lengths



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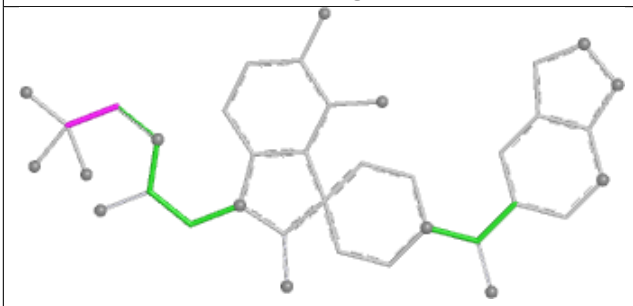
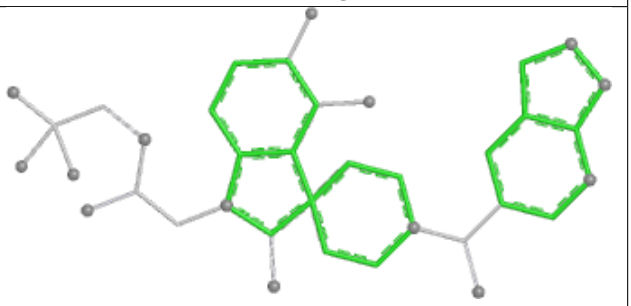
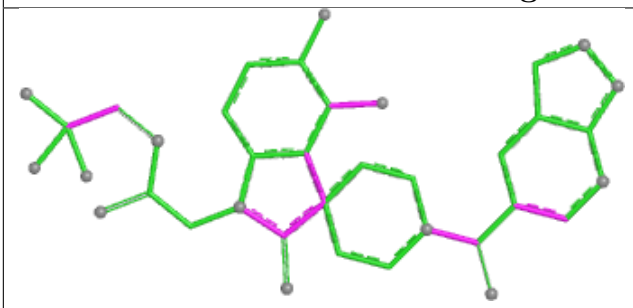


Torsions

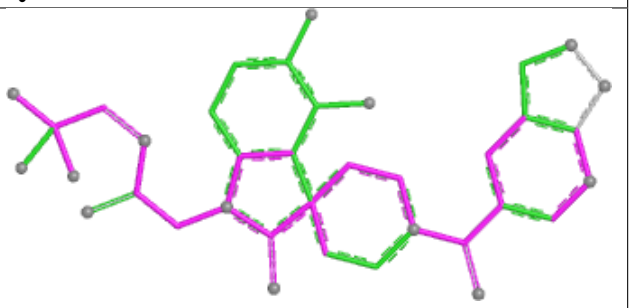


Rings

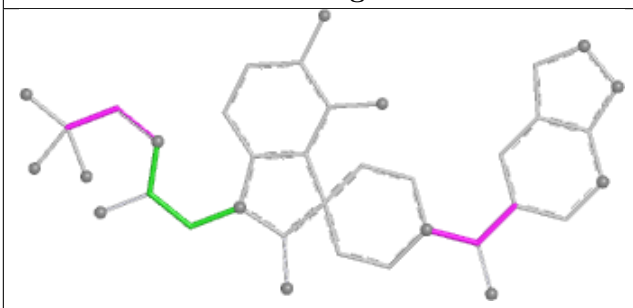
Ligand D6Q J 1001



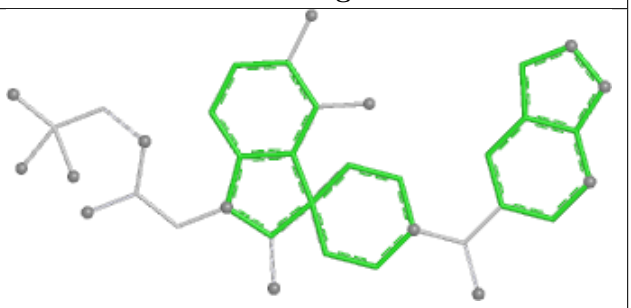
Bond lengths



Bond angles

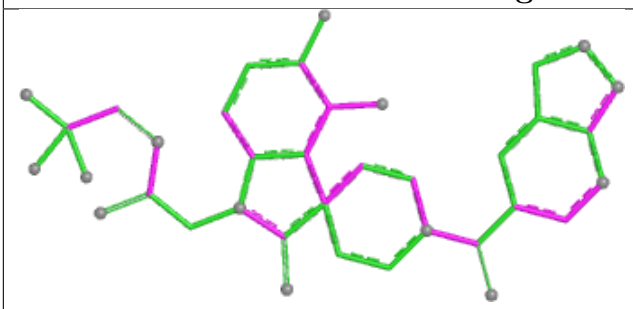


Torsions

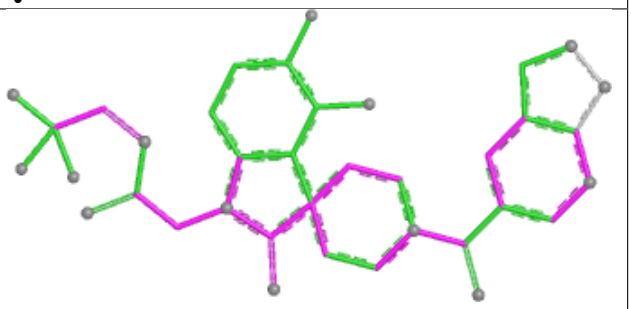


Rings

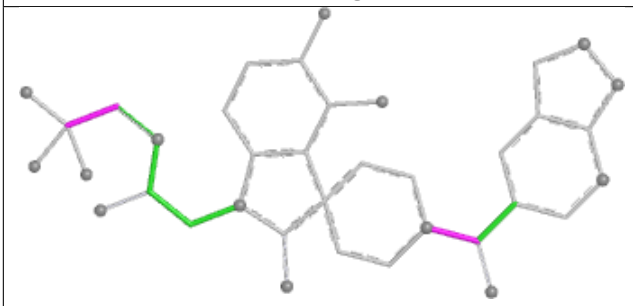
Ligand D6Q A 1001



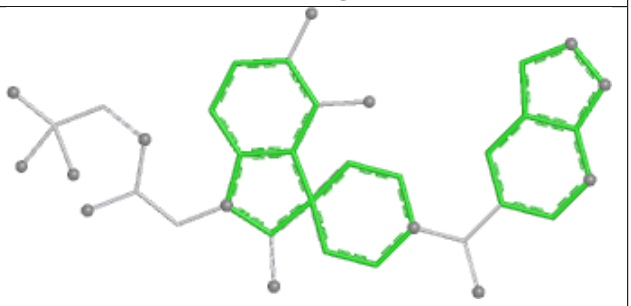
Bond lengths



Bond angles

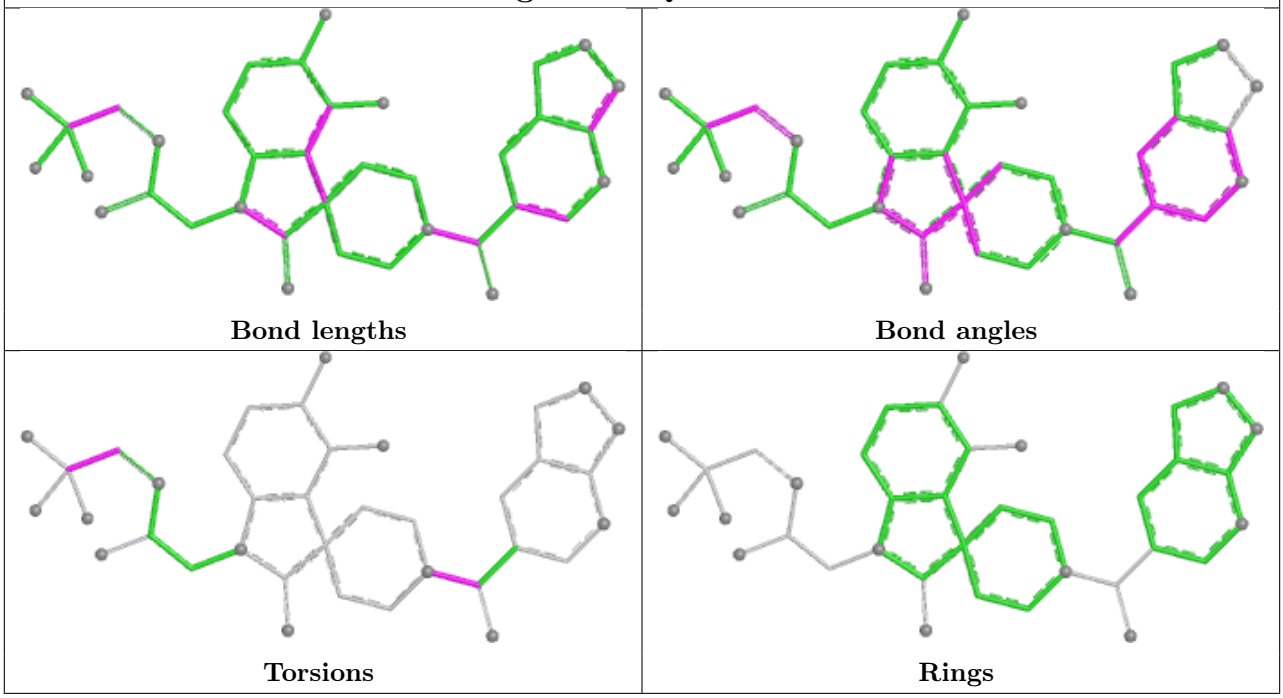


Torsions



Rings

Ligand D6Q G 1001



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	271/309 (87%)	0.12	11 (4%)	37	32	39, 69, 109, 145	0
1	B	279/309 (90%)	0.01	7 (2%)	57	55	32, 57, 113, 165	0
1	C	272/309 (88%)	0.13	8 (2%)	51	48	40, 63, 103, 170	0
1	D	280/309 (90%)	-0.06	3 (1%)	80	80	32, 53, 92, 173	0
1	E	273/309 (88%)	-0.12	4 (1%)	73	73	29, 48, 100, 168	0
1	F	275/309 (88%)	-0.12	0	100	100	32, 53, 93, 127	0
1	G	273/309 (88%)	-0.10	1 (0%)	92	92	30, 49, 91, 150	0
1	H	272/309 (88%)	-0.10	3 (1%)	80	80	27, 49, 90, 164	0
1	I	267/309 (86%)	0.34	20 (7%)	14	10	29, 58, 146, 186	0
1	J	272/309 (88%)	0.09	10 (3%)	41	37	31, 55, 107, 164	0
1	K	268/309 (86%)	0.56	30 (11%)	5	3	39, 65, 163, 212	0
1	L	273/309 (88%)	0.20	19 (6%)	16	12	33, 63, 119, 225	0
All	All	3275/3708 (88%)	0.08	116 (3%)	44	39	27, 57, 119, 225	0

The worst 5 of 116 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	I	691	CYS	10.5
1	K	698	CYS	9.7
1	K	654	VAL	8.2
1	K	609	LEU	6.7
1	K	652	VAL	6.3

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)

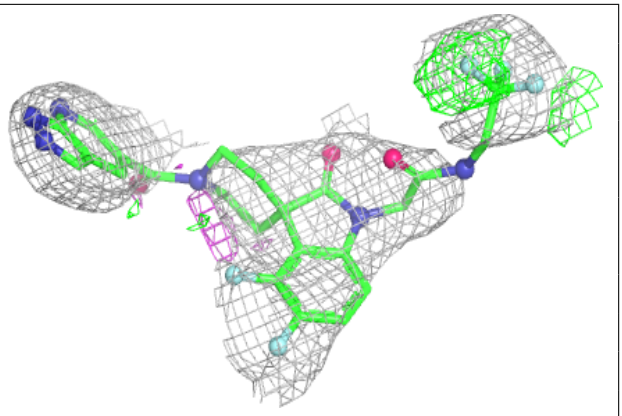
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

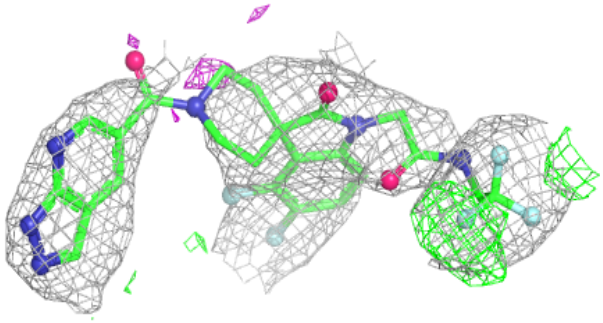
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	D6Q	I	1001	37/37	0.92	0.30	13,68,92,101	0
2	D6Q	K	1001	37/37	0.92	0.29	31,81,95,104	0
2	D6Q	C	1001	37/37	0.95	0.22	40,60,78,81	0
2	D6Q	L	1001	37/37	0.95	0.24	25,62,79,87	0
2	D6Q	J	1001	37/37	0.96	0.21	22,48,63,70	0
2	D6Q	G	1001	37/37	0.96	0.19	19,43,56,59	0
2	D6Q	A	1001	37/37	0.96	0.19	26,45,63,64	0
2	D6Q	E	1001	37/37	0.97	0.17	17,42,61,74	0
2	D6Q	F	1001	37/37	0.97	0.17	17,37,47,54	0
2	D6Q	B	1001	37/37	0.97	0.17	26,43,57,60	0
2	D6Q	H	1001	37/37	0.97	0.18	9,38,51,57	0
2	D6Q	D	1001	37/37	0.98	0.16	27,39,55,61	0

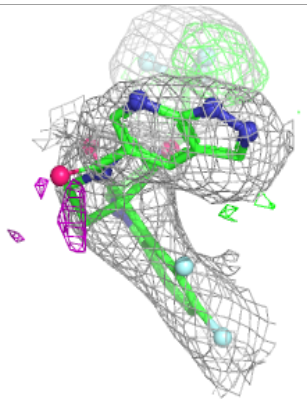
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around D6Q I 1001:

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

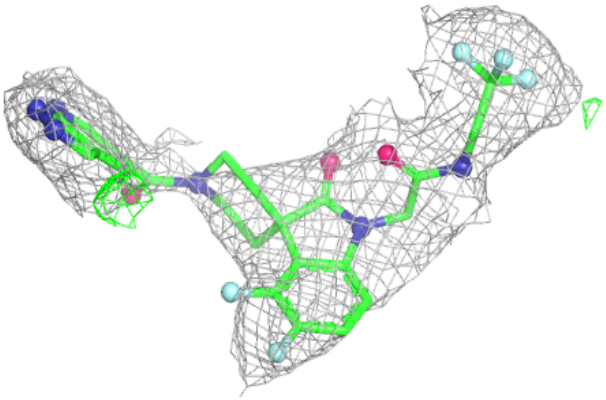


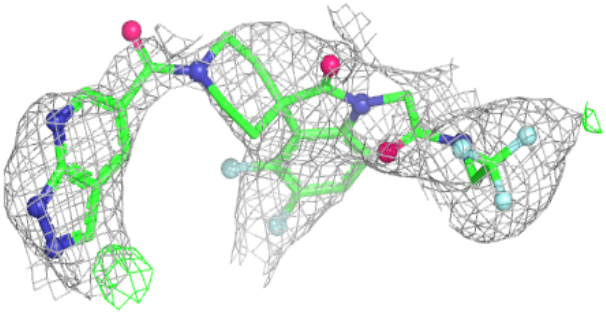


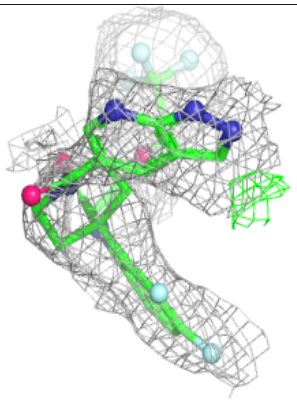


Electron density around D6Q K 1001:

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

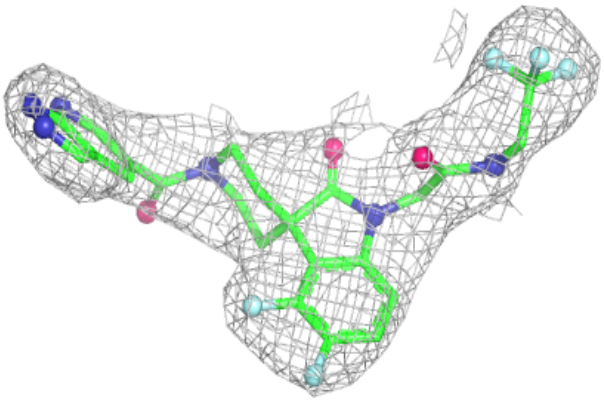


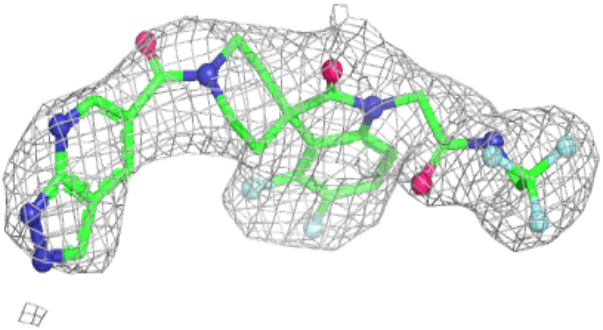


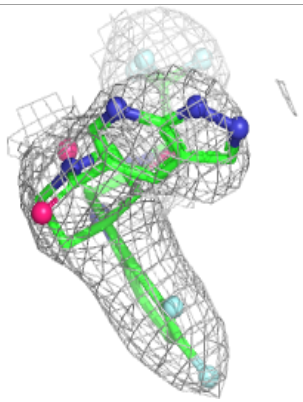


Electron density around D6Q C 1001:

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







Electron density around D6Q L 1001:

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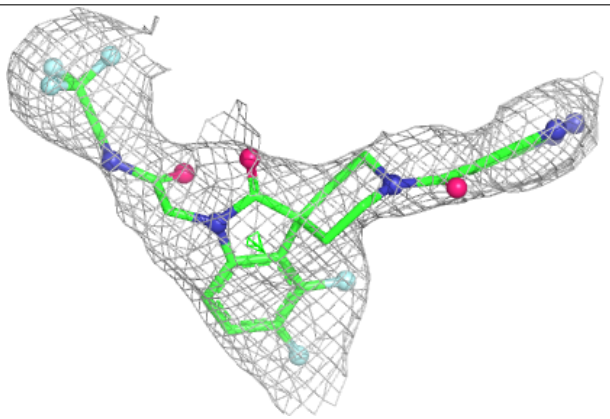
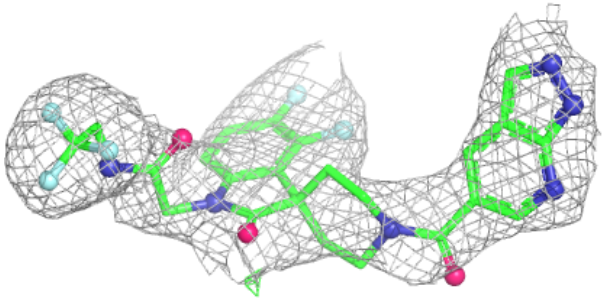
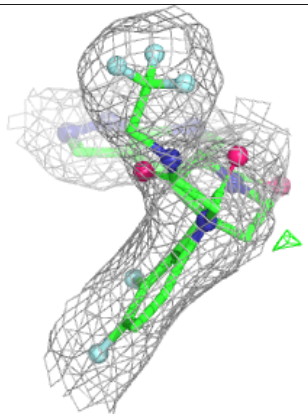
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)







Electron density around D6Q J 1001:

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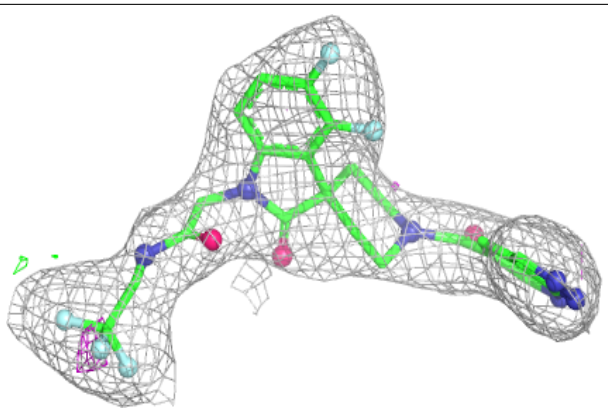
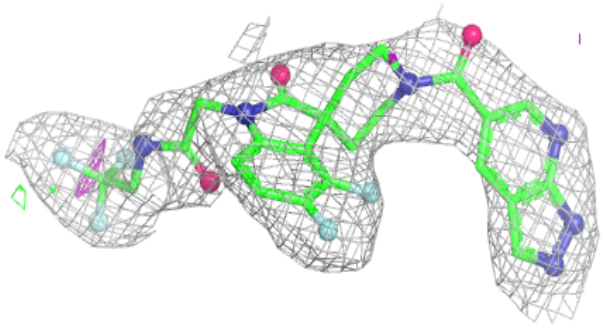
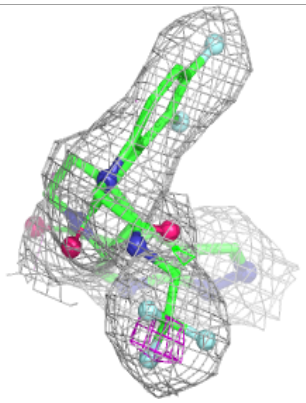
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)







Electron density around D6Q G 1001:

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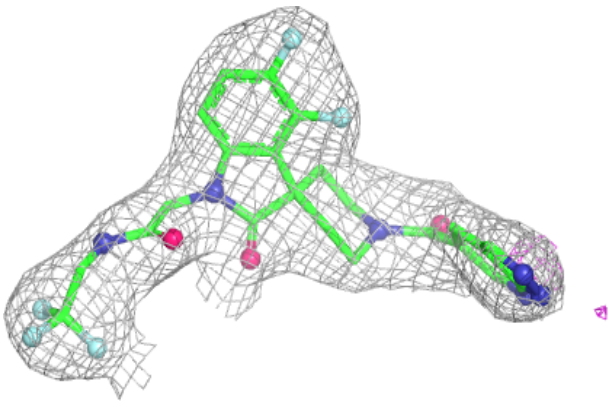
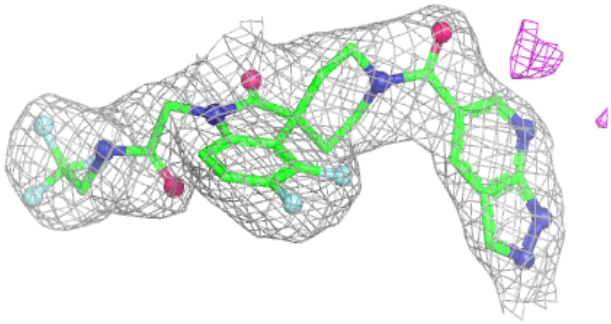
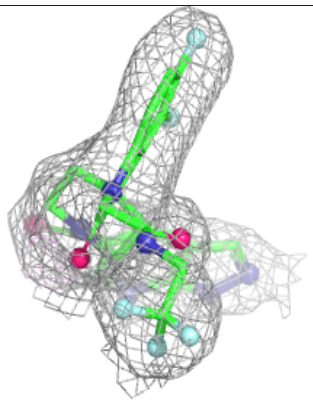
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

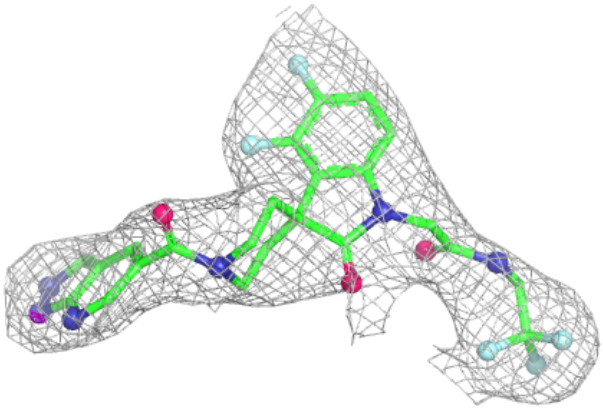


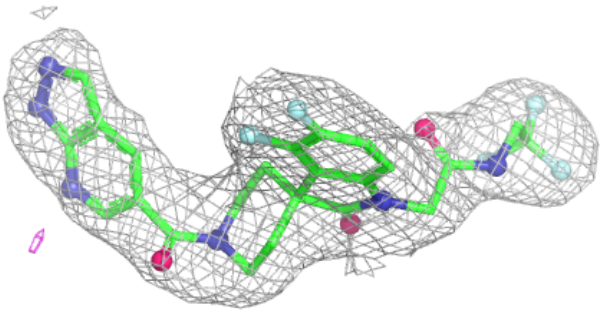


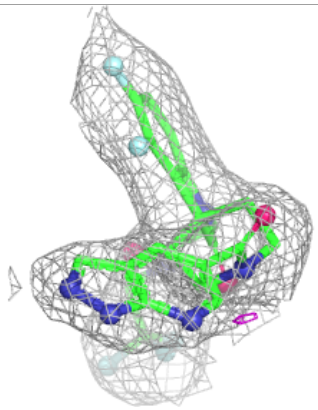


Electron density around D6Q A 1001:

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

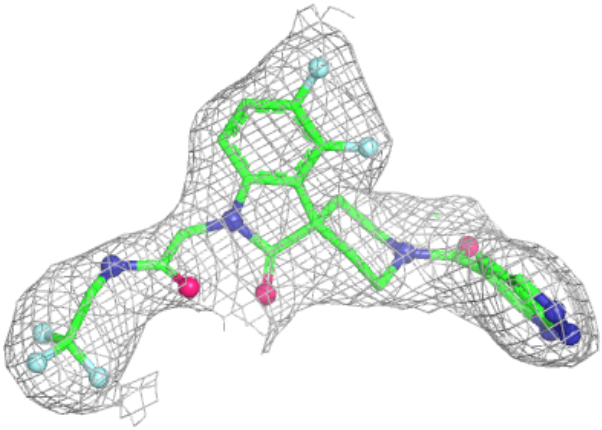


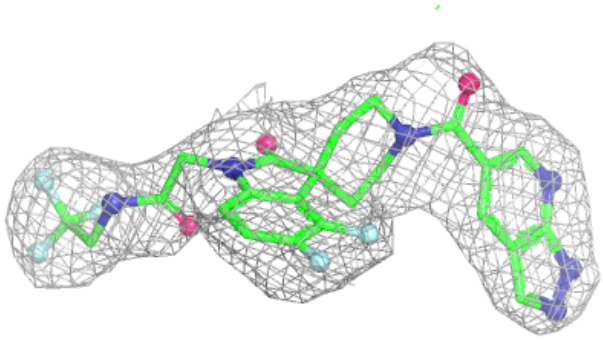


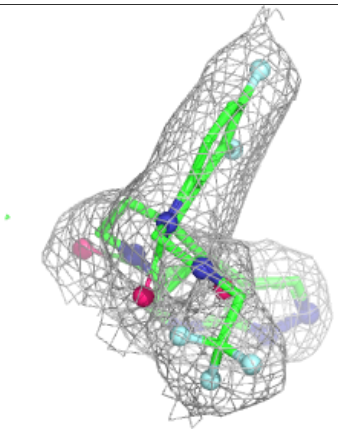


Electron density around D6Q E 1001:

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

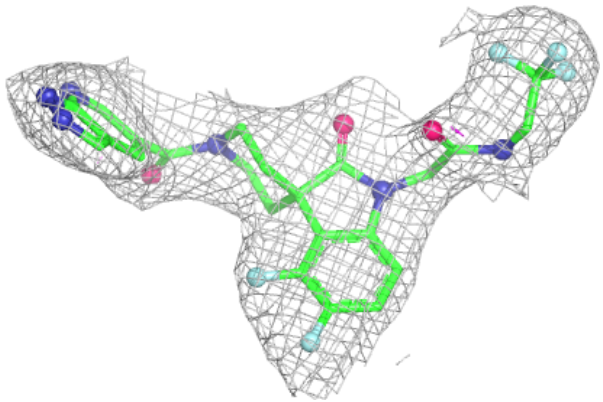


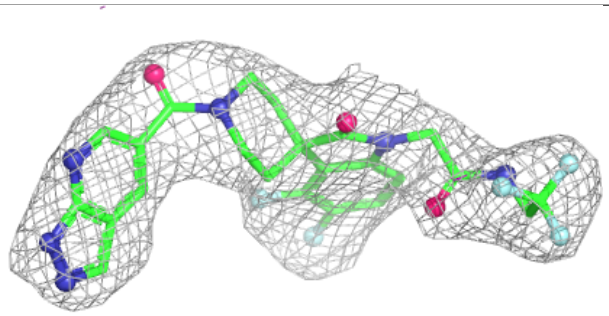


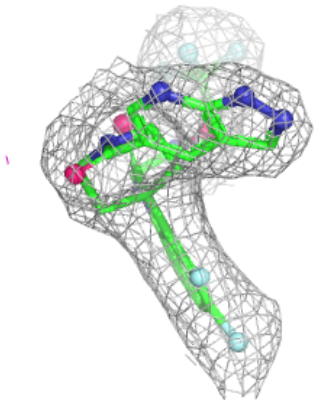


Electron density around D6Q F 1001:

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







Electron density around D6Q B 1001:

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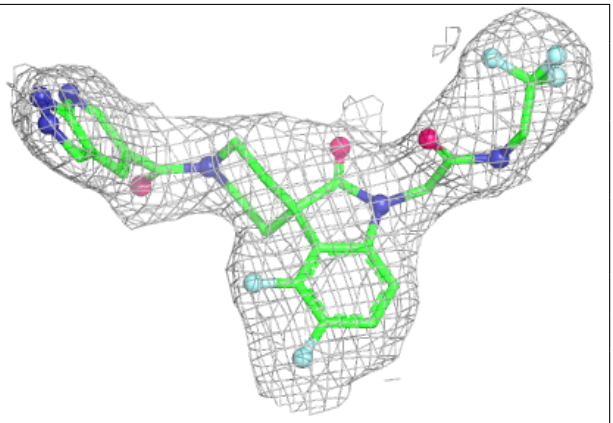
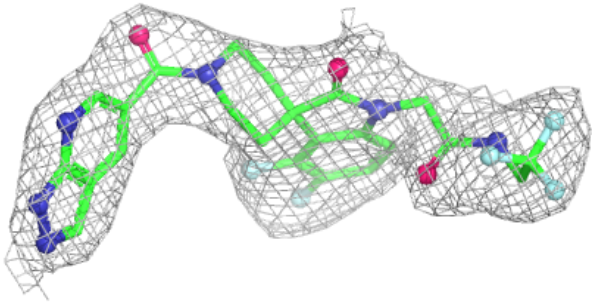
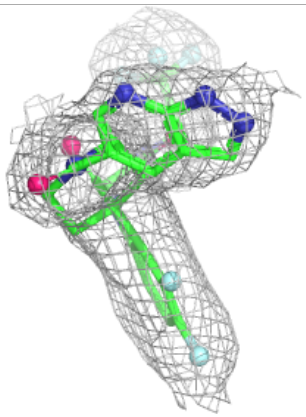
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

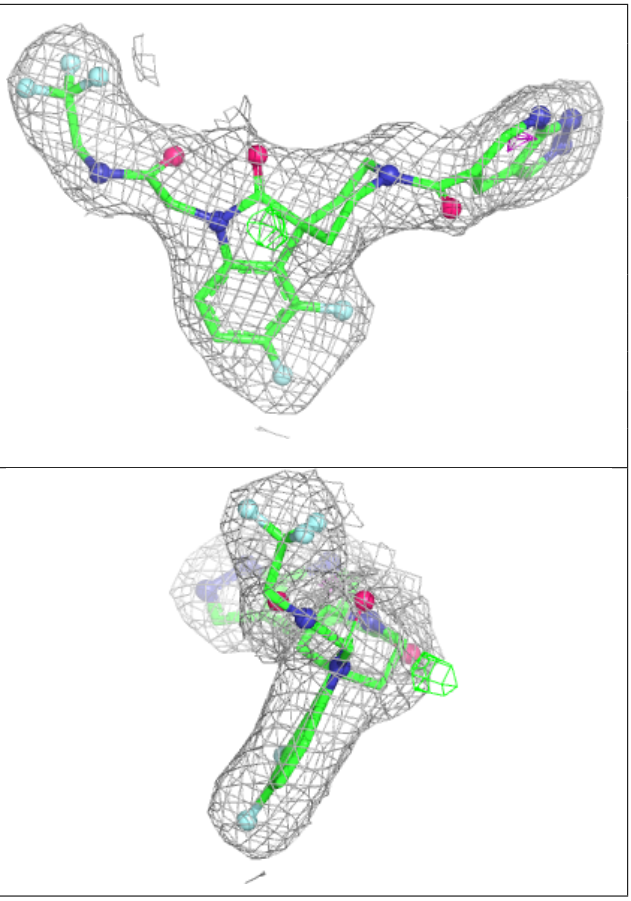






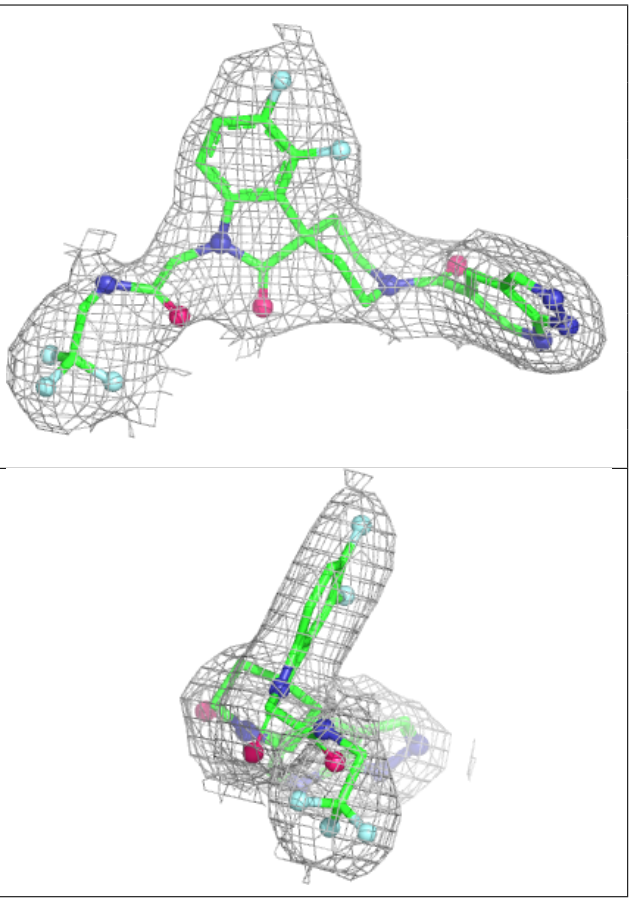
Electron density around D6Q H 1001:

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



Electron density around D6Q D 1001:

$2mF_o$-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.