



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 06:56 AM UTC

PDB ID : 4HY0 / pdb_00004hy0
Title : Crystal structure of XIAP BIR3 with T3256336
Authors : Snell, G.S.; Dougan, D.R.
Deposited on : 2012-11-12
Resolution : 2.84 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 : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

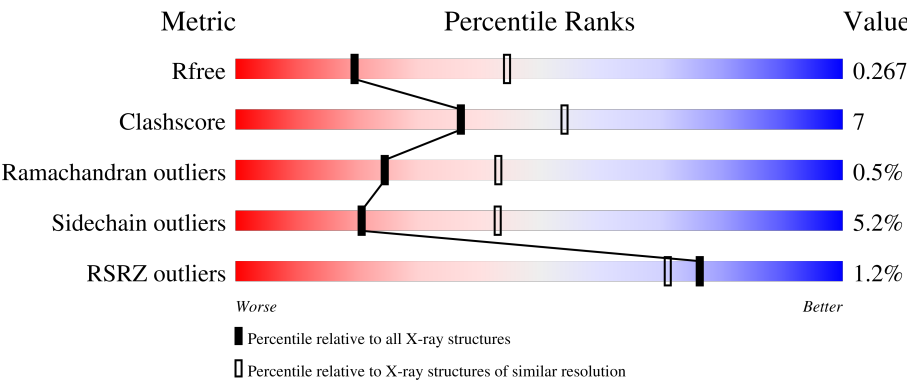
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.84 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}	180053	1520 (2.86-2.82)
Clashscore	190562	1559 (2.86-2.82)
Ramachandran outliers	187476	1517 (2.86-2.82)
Sidechain outliers	187428	1518 (2.86-2.82)
RSRZ outliers	180081	1521 (2.86-2.82)

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	125	63% 12% • 23%
1	B	125	64% 12% • 23%
1	C	125	70% 6% • 22%
1	D	125	54% 21% • 22%
1	E	125	64% 11% • 23%

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Mol	Chain	Length	Quality of chain
1	F	125	70%6%23%
1	G	125	% 66%11%•22%
1	H	125	2% 64%11%•23%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 6702 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 E3 ubiquitin-protein ligase XIAP.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	96	Total	C	N	O	S	0	0	0
			784	503	133	144	4			
1	B	96	Total	C	N	O	S	0	0	0
			784	503	133	144	4			
1	C	97	Total	C	N	O	S	0	0	0
			793	508	134	147	4			
1	D	98	Total	C	N	O	S	0	0	0
			799	511	135	148	5			
1	E	96	Total	C	N	O	S	0	0	0
			784	503	133	144	4			
1	F	96	Total	C	N	O	S	0	0	0
			784	503	133	144	4			
1	G	98	Total	C	N	O	S	0	0	0
			799	511	135	148	5			
1	H	96	Total	C	N	O	S	0	0	0
			784	503	133	144	4			

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	233	GLY	-	expression tag	UNP P98170
A	234	PRO	-	expression tag	UNP P98170
A	235	LEU	-	expression tag	UNP P98170
A	236	GLY	-	expression tag	UNP P98170
A	237	SER	-	expression tag	UNP P98170
B	233	GLY	-	expression tag	UNP P98170
B	234	PRO	-	expression tag	UNP P98170
B	235	LEU	-	expression tag	UNP P98170
B	236	GLY	-	expression tag	UNP P98170
B	237	SER	-	expression tag	UNP P98170
C	233	GLY	-	expression tag	UNP P98170
C	234	PRO	-	expression tag	UNP P98170
C	235	LEU	-	expression tag	UNP P98170

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Chain	Residue	Modelled	Actual	Comment	Reference
C	236	GLY	-	expression tag	UNP P98170
C	237	SER	-	expression tag	UNP P98170
D	233	GLY	-	expression tag	UNP P98170
D	234	PRO	-	expression tag	UNP P98170
D	235	LEU	-	expression tag	UNP P98170
D	236	GLY	-	expression tag	UNP P98170
D	237	SER	-	expression tag	UNP P98170
E	233	GLY	-	expression tag	UNP P98170
E	234	PRO	-	expression tag	UNP P98170
E	235	LEU	-	expression tag	UNP P98170
E	236	GLY	-	expression tag	UNP P98170
E	237	SER	-	expression tag	UNP P98170
F	233	GLY	-	expression tag	UNP P98170
F	234	PRO	-	expression tag	UNP P98170
F	235	LEU	-	expression tag	UNP P98170
F	236	GLY	-	expression tag	UNP P98170
F	237	SER	-	expression tag	UNP P98170
G	233	GLY	-	expression tag	UNP P98170
G	234	PRO	-	expression tag	UNP P98170
G	235	LEU	-	expression tag	UNP P98170
G	236	GLY	-	expression tag	UNP P98170
G	237	SER	-	expression tag	UNP P98170
H	233	GLY	-	expression tag	UNP P98170
H	234	PRO	-	expression tag	UNP P98170
H	235	LEU	-	expression tag	UNP P98170
H	236	GLY	-	expression tag	UNP P98170
H	237	SER	-	expression tag	UNP P98170

- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

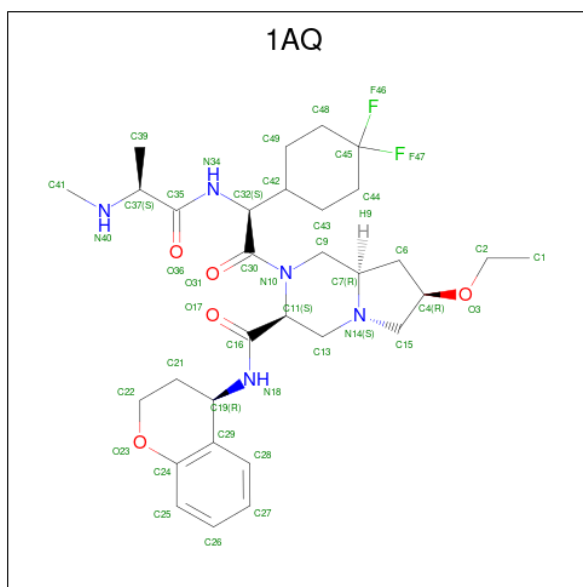
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	2	Total Zn 2 2	0	0
2	B	2	Total Zn 2 2	0	0
2	C	1	Total Zn 1 1	0	0
2	D	2	Total Zn 2 2	0	0
2	E	2	Total Zn 2 2	0	0
2	F	2	Total Zn 2 2	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	G	2	Total	Zn	0	0
			2	2		
2	H	1	Total	Zn	0	0
			1	1		

- Molecule 3 is (3S,7R,8aR)-2-{(2S)-2-(4,4-difluorocyclohexyl)-2-[(N-methyl-L-alanyl)amino]acetyl}-N-[(4R)-3,4-dihydro-2H-chromen-4-yl]-7-ethoxyoctahydropyrrolo[1,2-a]pyrazine-3-carboxamide (CCD ID: 1AQ) (formula: C₃₁H₄₅F₂N₅O₅).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	F	N	O	0	0
			43	31	2	5	5		
3	B	1	Total	C	F	N	O	0	0
			43	31	2	5	5		
3	C	1	Total	C	F	N	O	0	0
			43	31	2	5	5		
3	D	1	Total	C	F	N	O	0	0
			43	31	2	5	5		
3	E	1	Total	C	F	N	O	0	0
			43	31	2	5	5		
3	F	1	Total	C	F	N	O	0	0
			43	31	2	5	5		
3	G	1	Total	C	F	N	O	0	0
			43	31	2	5	5		
3	H	1	Total	C	F	N	O	0	0
			43	31	2	5	5		

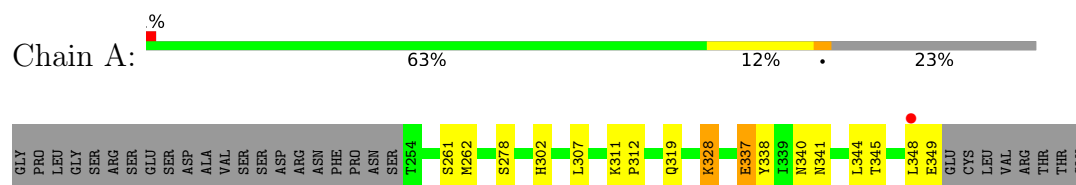
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	10	Total 10	O 10	0	0
4	B	2	Total 2	O 2	0	0
4	C	8	Total 8	O 8	0	0
4	D	3	Total 3	O 3	0	0
4	E	7	Total 7	O 7	0	0
4	F	2	Total 2	O 2	0	0
4	H	1	Total 1	O 1	0	0

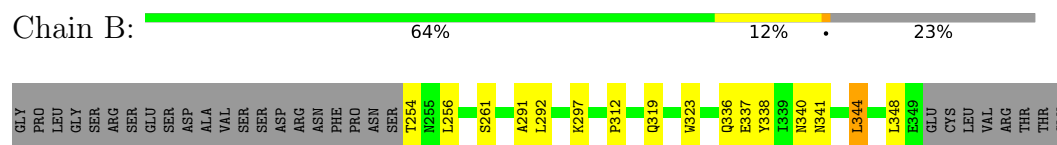
3 Residue-property plots [i](#)

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.

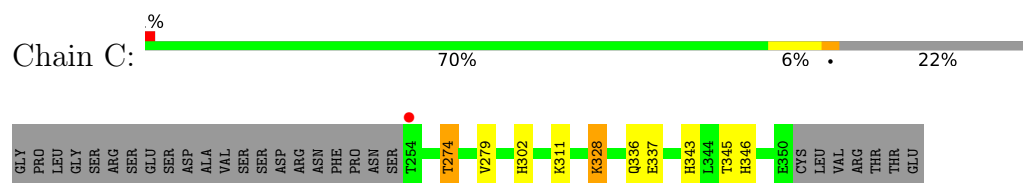
- Molecule 1: E3 ubiquitin-protein ligase XIAP



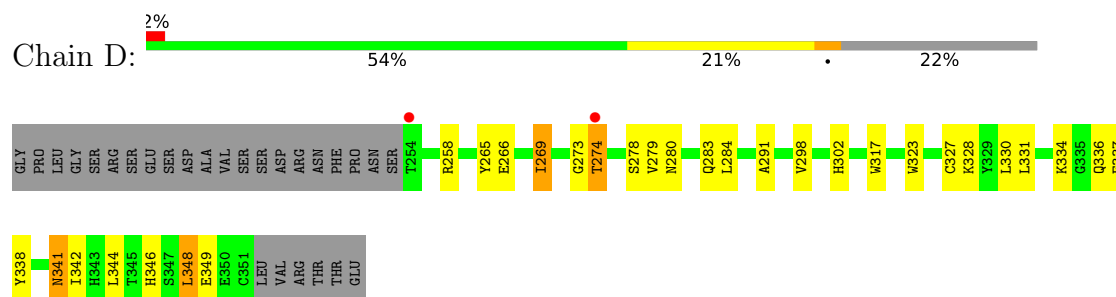
- Molecule 1: E3 ubiquitin-protein ligase XIAP



- Molecule 1: E3 ubiquitin-protein ligase XIAP

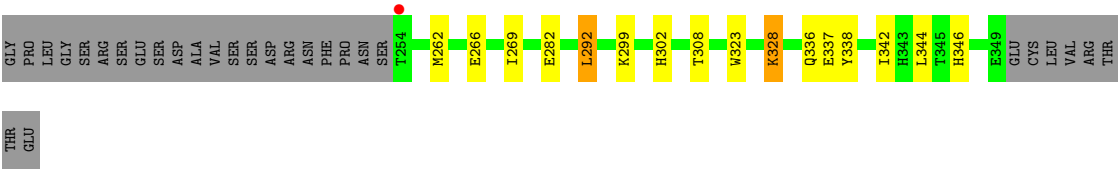


- Molecule 1: E3 ubiquitin-protein ligase XIAP



- Molecule 1: E3 ubiquitin-protein ligase XIAP





• Molecule 1: E3 ubiquitin-protein ligase XIAP



• Molecule 1: E3 ubiquitin-protein ligase XIAP



• Molecule 1: E3 ubiquitin-protein ligase XIAP



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	58.34Å 100.84Å 184.58Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	40.00 – 2.84 40.00 – 2.84	Depositor EDS
% Data completeness (in resolution range)	99.0 (40.00-2.84) 99.0 (40.00-2.84)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.80 (at 2.86Å)	Xtrriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.208 , 0.262 0.211 , 0.267	Depositor DCC
R_{free} test set	1342 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å ²)	75.7	Xtrriage
Anisotropy	0.099	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 55.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.52$, $\langle L^2 \rangle = 0.36$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6702	wwPDB-VP
Average B, all atoms (Å ²)	84.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 35.05 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 6.2026e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 1AQ, ZN

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	0.74	0/810	0.79	2/1098 (0.2%)
1	B	0.74	0/810	0.75	0/1098
1	C	0.75	0/819	0.79	2/1110 (0.2%)
1	D	0.75	0/825	0.74	0/1118
1	E	0.71	0/810	0.77	0/1098
1	F	0.70	0/810	0.74	0/1098
1	G	0.73	0/825	0.74	0/1118
1	H	0.73	0/810	0.82	1/1098 (0.1%)
All	All	0.73	0/6519	0.77	5/8836 (0.1%)

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	311	LYS	CA-C-N	5.36	126.54	119.84
1	A	311	LYS	C-N-CA	5.36	126.54	119.84
1	H	335	GLY	N-CA-C	5.17	119.20	112.68
1	C	311	LYS	CA-C-N	5.02	125.29	119.47
1	C	311	LYS	C-N-CA	5.02	125.29	119.47

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	784	0	731	16	0
1	B	784	0	731	17	0
1	C	793	0	737	15	0
1	D	799	0	742	27	0
1	E	784	0	731	18	0
1	F	784	0	731	5	0
1	G	799	0	742	11	0
1	H	784	0	731	15	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	1	0	0	0	0
2	D	2	0	0	0	0
2	E	2	0	0	0	0
2	F	2	0	0	0	0
2	G	2	0	0	0	0
2	H	1	0	0	0	0
3	A	43	0	45	6	0
3	B	43	0	45	2	0
3	C	43	0	45	0	0
3	D	43	0	45	4	0
3	E	43	0	45	3	0
3	F	43	0	45	2	0
3	G	43	0	45	1	0
3	H	43	0	45	2	0
4	A	10	0	0	0	0
4	B	2	0	0	0	0
4	C	8	0	0	1	0
4	D	3	0	0	0	0
4	E	7	0	0	0	0
4	F	2	0	0	0	0
4	H	1	0	0	0	0
All	All	6702	0	6236	91	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 7.

All (91) 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:336:GLN:HE22	1:E:302:HIS:CD2	1.82	0.97
1:A:302:HIS:CD2	1:B:336:GLN:HE22	1.86	0.94
1:C:336:GLN:HE22	1:H:302:HIS:CD2	2.00	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:336:GLN:HE22	1:E:302:HIS:HD2	1.32	0.76
1:B:341:ASN:HD22	1:D:341:ASN:ND2	1.84	0.74
1:D:302:HIS:HD2	1:E:336:GLN:HE22	1.37	0.72
1:C:336:GLN:HE22	1:H:302:HIS:HD2	1.38	0.71
1:C:343:HIS:ND1	4:C:508:HOH:O	2.23	0.71
1:D:302:HIS:CD2	1:E:336:GLN:HE22	2.09	0.70
1:A:302:HIS:CD2	1:B:336:GLN:NE2	2.59	0.68
1:C:337:GLU:HG2	1:E:338:TYR:HA	1.77	0.67
1:B:338:TYR:HA	1:D:337:GLU:HG2	1.77	0.65
1:A:338:TYR:HA	1:G:337:GLU:HG2	1.77	0.64
1:B:341:ASN:HD22	1:D:341:ASN:HD22	1.46	0.62
1:A:302:HIS:HD2	1:B:336:GLN:HE22	1.40	0.62
1:H:266:GLU:O	1:H:269:ILE:HG22	1.98	0.62
1:B:337:GLU:HB3	1:D:337:GLU:HB3	1.82	0.62
1:A:319:GLN:HE21	3:A:403:1AQ:H32	1.66	0.61
1:D:280:ASN:HB3	1:D:283:GLN:HG2	1.83	0.60
1:G:280:ASN:HB3	1:G:283:GLN:HE21	1.65	0.60
1:C:302:HIS:CD2	1:H:336:GLN:HE22	2.20	0.59
1:C:328:LYS:HB2	1:H:336:GLN:HE21	1.67	0.59
1:A:328:LYS:H	1:B:336:GLN:HE21	1.49	0.59
1:F:336:GLN:HE22	1:G:302:HIS:CD2	2.20	0.58
1:D:336:GLN:NE2	1:E:302:HIS:CD2	2.66	0.57
1:E:292:LEU:CD1	3:E:403:1AQ:H25	2.36	0.55
1:A:341:ASN:HD22	1:G:341:ASN:HD22	1.55	0.54
1:C:274:THR:O	1:C:274:THR:CG2	2.55	0.54
1:A:278:SER:HB2	1:A:312:PRO:HA	1.90	0.54
1:H:292:LEU:HD12	1:H:297:LYS:HB3	1.90	0.54
1:A:341:ASN:HD22	1:G:341:ASN:ND2	2.06	0.54
1:D:328:LYS:H	1:E:336:GLN:HE21	1.55	0.53
1:B:319:GLN:HE21	3:B:403:1AQ:H32	1.74	0.53
1:B:254:THR:HG23	1:B:256:LEU:HG	1.91	0.53
1:D:331:LEU:HD21	1:E:328:LYS:CG	2.40	0.52
1:G:338:TYR:CE2	1:G:342:ILE:HD12	2.45	0.51
1:H:262:MET:HA	1:H:262:MET:HE2	1.91	0.51
1:B:340:ASN:O	1:B:344:LEU:HD22	2.12	0.49
3:A:403:1AQ:H1	1:B:348:LEU:HD21	1.94	0.49
1:E:266:GLU:O	1:E:269:ILE:HG22	2.12	0.49
1:C:336:GLN:HE21	1:H:328:LYS:HB2	1.78	0.49
1:F:266:GLU:O	1:F:269:ILE:HG22	2.13	0.49
1:F:321:ALA:HA	1:F:330:LEU:HD21	1.94	0.49
3:A:403:1AQ:H22	1:D:349:GLU:HB3	1.95	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:292:LEU:HD12	1:H:297:LYS:CB	2.43	0.49
3:A:403:1AQ:H20	1:D:348:LEU:CD1	2.43	0.48
1:D:279:VAL:HG23	1:D:284:LEU:HD11	1.96	0.48
1:C:336:GLN:NE2	1:H:328:LYS:H	2.12	0.48
1:H:311:LYS:HB3	1:H:312:PRO:HD2	1.96	0.48
1:A:337:GLU:HG2	1:G:338:TYR:HA	1.95	0.48
1:D:258:ARG:NH1	1:E:337:GLU:OE2	2.47	0.47
1:D:302:HIS:HD2	1:E:336:GLN:NE2	2.09	0.47
1:D:302:HIS:CD2	1:E:336:GLN:NE2	2.80	0.47
1:A:341:ASN:HB2	1:G:341:ASN:HD21	1.79	0.47
1:B:341:ASN:ND2	1:D:341:ASN:ND2	2.58	0.46
1:C:302:HIS:CD2	1:H:336:GLN:NE2	2.84	0.46
1:A:319:GLN:NE2	3:A:403:1AQ:H32	2.30	0.46
1:E:308:THR:HG22	3:E:403:1AQ:H27	1.98	0.46
1:A:340:ASN:O	1:A:344:LEU:HD23	2.16	0.45
1:C:345:THR:CG2	3:D:403:1AQ:H23	2.47	0.45
1:C:345:THR:HG22	3:D:403:1AQ:H23	1.99	0.45
1:D:323:TRP:CZ3	3:D:403:1AQ:H7	2.51	0.45
1:F:302:HIS:CD2	1:G:336:GLN:HE22	2.35	0.45
1:D:317:TRP:CG	1:D:334:LYS:HE3	2.52	0.44
1:F:292:LEU:HD11	3:F:403:1AQ:H25	1.99	0.44
1:B:341:ASN:ND2	1:D:341:ASN:HD22	2.13	0.43
1:B:292:LEU:HD12	1:B:297:LYS:HB3	2.00	0.43
1:E:292:LEU:HD11	1:E:299:LYS:HG3	2.00	0.43
1:C:274:THR:O	1:C:274:THR:HG22	2.18	0.43
3:H:402:1AQ:H10	3:H:402:1AQ:H28	1.79	0.43
1:E:269:ILE:HD11	1:E:282:GLU:HG3	2.01	0.42
1:D:291:ALA:HA	1:D:298:VAL:HG12	2.00	0.42
1:D:265:TYR:OH	1:D:269:ILE:HD13	2.20	0.42
1:E:262:MET:HA	1:E:262:MET:HE2	2.02	0.42
1:D:327:CYS:HB3	1:D:330:LEU:HB3	2.00	0.42
1:C:345:THR:HG22	1:C:346:HIS:ND1	2.34	0.42
1:A:262:MET:HA	1:A:262:MET:HE2	2.02	0.41
1:A:349:GLU:HG2	3:F:403:1AQ:H22	2.00	0.41
1:H:307:LEU:HD23	3:H:402:1AQ:H12	2.01	0.41
1:A:307:LEU:HD23	3:A:403:1AQ:H12	2.02	0.41
1:G:265:TYR:CZ	1:G:269:ILE:HD13	2.55	0.41
3:D:403:1AQ:H10	3:D:403:1AQ:H28	1.90	0.41
3:G:403:1AQ:H28	3:G:403:1AQ:H10	1.90	0.41
1:H:254:THR:HG23	1:H:254:THR:O	2.20	0.41
1:B:291:ALA:O	1:B:292:LEU:HD23	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:338:TYR:CZ	1:D:342:ILE:HD11	2.55	0.41
1:E:323:TRP:CH2	3:E:403:1AQ:H7	2.56	0.41
1:B:323:TRP:CZ3	3:B:403:1AQ:H7	2.56	0.41
1:D:317:TRP:CD1	1:D:334:LYS:HE3	2.56	0.41
1:G:273:GLY:O	1:G:274:THR:HB	2.22	0.40
1:C:302:HIS:HD2	1:H:336:GLN:HE22	1.69	0.40

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	94/125 (75%)	88 (94%)	6 (6%)	0	100	100
1	B	94/125 (75%)	86 (92%)	7 (7%)	1 (1%)	11	23
1	C	95/125 (76%)	93 (98%)	2 (2%)	0	100	100
1	D	96/125 (77%)	88 (92%)	6 (6%)	2 (2%)	5	12
1	E	94/125 (75%)	85 (90%)	9 (10%)	0	100	100
1	F	94/125 (75%)	90 (96%)	4 (4%)	0	100	100
1	G	96/125 (77%)	87 (91%)	9 (9%)	0	100	100
1	H	94/125 (75%)	83 (88%)	10 (11%)	1 (1%)	11	23
All	All	757/1000 (76%)	700 (92%)	53 (7%)	4 (0%)	24	43

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	274	THR
1	B	312	PRO
1	D	273	GLY
1	H	273	GLY

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	81/107 (76%)	76 (94%)	5 (6%)	16	34
1	B	81/107 (76%)	79 (98%)	2 (2%)	42	66
1	C	82/107 (77%)	79 (96%)	3 (4%)	30	55
1	D	83/107 (78%)	75 (90%)	8 (10%)	8	17
1	E	81/107 (76%)	76 (94%)	5 (6%)	16	34
1	F	81/107 (76%)	80 (99%)	1 (1%)	63	80
1	G	83/107 (78%)	77 (93%)	6 (7%)	13	28
1	H	81/107 (76%)	77 (95%)	4 (5%)	22	45
All	All	653/856 (76%)	619 (95%)	34 (5%)	21	43

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	261	SER
1	A	328	LYS
1	A	337	GLU
1	A	345	THR
1	A	348	LEU
1	B	261	SER
1	B	344	LEU
1	C	274	THR
1	C	279	VAL
1	C	328	LYS
1	D	266	GLU
1	D	269	ILE
1	D	274	THR
1	D	278	SER
1	D	341	ASN
1	D	344	LEU
1	D	346	HIS
1	D	348	LEU
1	E	292	LEU

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Mol	Chain	Res	Type
1	E	328	LYS
1	E	342	ILE
1	E	344	LEU
1	E	346	HIS
1	F	328	LYS
1	G	282	GLU
1	G	328	LYS
1	G	336	GLN
1	G	341	ASN
1	G	348	LEU
1	G	351	CYS
1	H	261	SER
1	H	262	MET
1	H	328	LYS
1	H	349	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	283	GLN
1	A	302	HIS
1	A	319	GLN
1	B	283	GLN
1	B	319	GLN
1	B	336	GLN
1	C	283	GLN
1	C	302	HIS
1	C	336	GLN
1	D	280	ASN
1	D	283	GLN
1	D	302	HIS
1	D	341	ASN
1	D	346	HIS
1	E	302	HIS
1	E	336	GLN
1	F	336	GLN
1	F	341	ASN
1	G	283	GLN
1	G	302	HIS
1	G	336	GLN
1	G	341	ASN
1	G	346	HIS

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Mol	Chain	Res	Type
1	H	259	ASN
1	H	302	HIS
1	H	333	GLN
1	H	336	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 22 ligands modelled in this entry, 14 are monoatomic - leaving 8 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
3	1AQ	C	402	-	47,47,47	0.85	1 (2%)	55,68,68	1.54	8 (14%)
3	1AQ	D	403	-	47,47,47	0.88	1 (2%)	55,68,68	1.72	10 (18%)
3	1AQ	E	403	-	47,47,47	0.88	1 (2%)	55,68,68	1.36	7 (12%)
3	1AQ	A	403	-	47,47,47	0.87	2 (4%)	55,68,68	1.61	10 (18%)
3	1AQ	H	402	-	47,47,47	0.87	2 (4%)	55,68,68	1.60	9 (16%)
3	1AQ	G	403	-	47,47,47	0.85	2 (4%)	55,68,68	1.47	9 (16%)
3	1AQ	B	403	-	47,47,47	0.89	1 (2%)	55,68,68	1.36	7 (12%)
3	1AQ	F	403	-	47,47,47	0.88	1 (2%)	55,68,68	1.66	8 (14%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	1AQ	C	402	-	-	5/33/79/79	0/5/5/5
3	1AQ	D	403	-	-	5/33/79/79	0/5/5/5
3	1AQ	E	403	-	-	2/33/79/79	0/5/5/5
3	1AQ	A	403	-	-	4/33/79/79	0/5/5/5
3	1AQ	H	402	-	-	5/33/79/79	0/5/5/5
3	1AQ	G	403	-	-	7/33/79/79	0/5/5/5
3	1AQ	B	403	-	-	1/33/79/79	0/5/5/5
3	1AQ	F	403	-	-	7/33/79/79	0/5/5/5

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	403	1AQ	C9-N10	2.30	1.49	1.46
3	H	402	1AQ	C9-N10	2.30	1.49	1.46
3	F	403	1AQ	C44-C45	2.29	1.55	1.50
3	A	403	1AQ	C9-N10	2.29	1.49	1.46
3	H	402	1AQ	C44-C45	2.21	1.55	1.50
3	A	403	1AQ	C44-C45	2.20	1.55	1.50
3	D	403	1AQ	C44-C45	2.20	1.55	1.50
3	C	402	1AQ	C44-C45	2.15	1.54	1.50
3	E	403	1AQ	C9-N10	2.06	1.49	1.46
3	G	403	1AQ	C48-C45	2.03	1.54	1.50
3	G	403	1AQ	C44-C45	2.01	1.54	1.50

All (68) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	403	1AQ	C43-C44-C45	5.88	114.01	110.75
3	H	402	1AQ	C43-C44-C45	5.07	113.56	110.75
3	F	403	1AQ	C43-C44-C45	5.03	113.54	110.75
3	G	403	1AQ	C21-C19-N18	-4.44	106.34	110.64
3	D	403	1AQ	C43-C42-C32	4.40	117.69	111.85
3	F	403	1AQ	C21-C19-N18	-4.40	106.37	110.64
3	A	403	1AQ	C21-C19-N18	-4.38	106.39	110.64
3	C	402	1AQ	C43-C42-C32	4.36	117.64	111.85
3	B	403	1AQ	C48-C45-C44	-4.30	110.06	114.33
3	A	403	1AQ	C49-C48-C45	-4.14	108.46	110.75

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	403	1AQ	C43-C42-C32	3.99	117.15	111.85
3	E	403	1AQ	C48-C45-C44	-3.87	110.49	114.33
3	A	403	1AQ	C43-C42-C32	3.78	116.87	111.85
3	G	403	1AQ	C44-C43-C42	-3.77	104.73	111.98
3	C	402	1AQ	C48-C49-C42	-3.67	104.92	111.98
3	D	403	1AQ	C48-C49-C42	-3.54	105.17	111.98
3	F	403	1AQ	C44-C43-C42	-3.53	105.18	111.98
3	A	403	1AQ	C44-C43-C42	-3.48	105.28	111.98
3	F	403	1AQ	C48-C49-C42	-3.47	105.29	111.98
3	H	402	1AQ	C43-C42-C32	3.46	116.45	111.85
3	B	403	1AQ	C49-C48-C45	-3.39	108.88	110.75
3	H	402	1AQ	C21-C19-N18	-3.34	107.40	110.64
3	C	402	1AQ	C44-C43-C42	-3.24	105.75	111.98
3	C	402	1AQ	O23-C22-C21	-3.21	107.67	112.06
3	E	403	1AQ	C49-C48-C45	-3.21	108.97	110.75
3	H	402	1AQ	C29-C19-N18	-3.17	105.36	110.22
3	H	402	1AQ	C48-C49-C42	-3.16	105.91	111.98
3	A	403	1AQ	C48-C49-C42	-3.07	106.07	111.98
3	E	403	1AQ	C21-C19-N18	-3.01	107.72	110.64
3	D	403	1AQ	C44-C43-C42	-3.00	106.21	111.98
3	G	403	1AQ	C43-C42-C32	2.97	115.79	111.85
3	D	403	1AQ	C21-C19-N18	-2.94	107.78	110.64
3	D	403	1AQ	O23-C24-C29	-2.89	119.73	122.83
3	G	403	1AQ	O23-C24-C29	-2.89	119.73	122.83
3	F	403	1AQ	C42-C32-C30	2.88	117.27	111.23
3	D	403	1AQ	C13-C11-N10	2.87	115.02	110.11
3	E	403	1AQ	C13-C11-N10	2.84	114.97	110.11
3	H	402	1AQ	C49-C48-C45	-2.82	109.19	110.75
3	C	402	1AQ	O23-C24-C29	-2.81	119.82	122.83
3	B	403	1AQ	C21-C19-N18	-2.73	107.99	110.64
3	G	403	1AQ	C6-C4-C15	2.70	105.95	103.69
3	E	403	1AQ	O23-C24-C29	-2.68	119.95	122.83
3	A	403	1AQ	C43-C44-C45	2.66	112.23	110.75
3	H	402	1AQ	C13-C11-N10	2.65	114.63	110.11
3	B	403	1AQ	C13-C11-N10	2.64	114.63	110.11
3	F	403	1AQ	C13-C11-N10	2.57	114.51	110.11
3	C	402	1AQ	C21-C19-N18	-2.56	108.16	110.64
3	E	403	1AQ	C32-C30-N10	2.51	124.81	118.65
3	E	403	1AQ	F47-C45-F46	2.48	110.85	105.34
3	B	403	1AQ	O23-C24-C29	-2.47	120.18	122.83
3	A	403	1AQ	C32-C30-N10	2.46	124.69	118.65
3	B	403	1AQ	C32-C30-N10	2.45	124.65	118.65

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	G	403	1AQ	C13-C11-N10	2.43	114.26	110.11
3	H	402	1AQ	O23-C24-C29	-2.43	120.23	122.83
3	D	403	1AQ	C6-C4-C15	2.39	105.69	103.69
3	F	403	1AQ	O23-C24-C29	-2.39	120.27	122.83
3	G	403	1AQ	C48-C49-C42	-2.37	107.42	111.98
3	D	403	1AQ	C32-C30-N10	2.30	124.29	118.65
3	A	403	1AQ	C42-C32-C30	2.29	116.02	111.23
3	C	402	1AQ	C29-C19-N18	-2.23	106.79	110.22
3	D	403	1AQ	C42-C32-C30	2.18	115.80	111.23
3	A	403	1AQ	O23-C24-C29	-2.18	120.50	122.83
3	B	403	1AQ	O31-C30-C32	-2.15	115.91	119.96
3	A	403	1AQ	C13-C11-N10	2.13	113.76	110.11
3	G	403	1AQ	C42-C32-C30	2.10	115.64	111.23
3	H	402	1AQ	C42-C32-C30	2.09	115.62	111.23
3	G	403	1AQ	C32-C30-N10	2.08	123.75	118.65
3	C	402	1AQ	O17-C16-N18	-2.06	119.27	122.96

There are no chirality outliers.

All (36) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	403	1AQ	C30-C32-C42-C43
3	A	403	1AQ	N34-C32-C42-C43
3	A	403	1AQ	N34-C32-C42-C49
3	A	403	1AQ	C1-C2-O3-C4
3	B	403	1AQ	C1-C2-O3-C4
3	C	402	1AQ	C30-C32-C42-C43
3	C	402	1AQ	C30-C32-C42-C49
3	C	402	1AQ	N34-C32-C42-C43
3	C	402	1AQ	N34-C32-C42-C49
3	C	402	1AQ	C1-C2-O3-C4
3	D	403	1AQ	C30-C32-C42-C43
3	D	403	1AQ	C30-C32-C42-C49
3	D	403	1AQ	N34-C32-C42-C43
3	D	403	1AQ	N34-C32-C42-C49
3	F	403	1AQ	C30-C32-C42-C43
3	F	403	1AQ	C30-C32-C42-C49
3	F	403	1AQ	N34-C32-C42-C43
3	F	403	1AQ	N34-C32-C42-C49
3	F	403	1AQ	C6-C4-O3-C2
3	G	403	1AQ	C30-C32-C42-C43
3	G	403	1AQ	C30-C32-C42-C49

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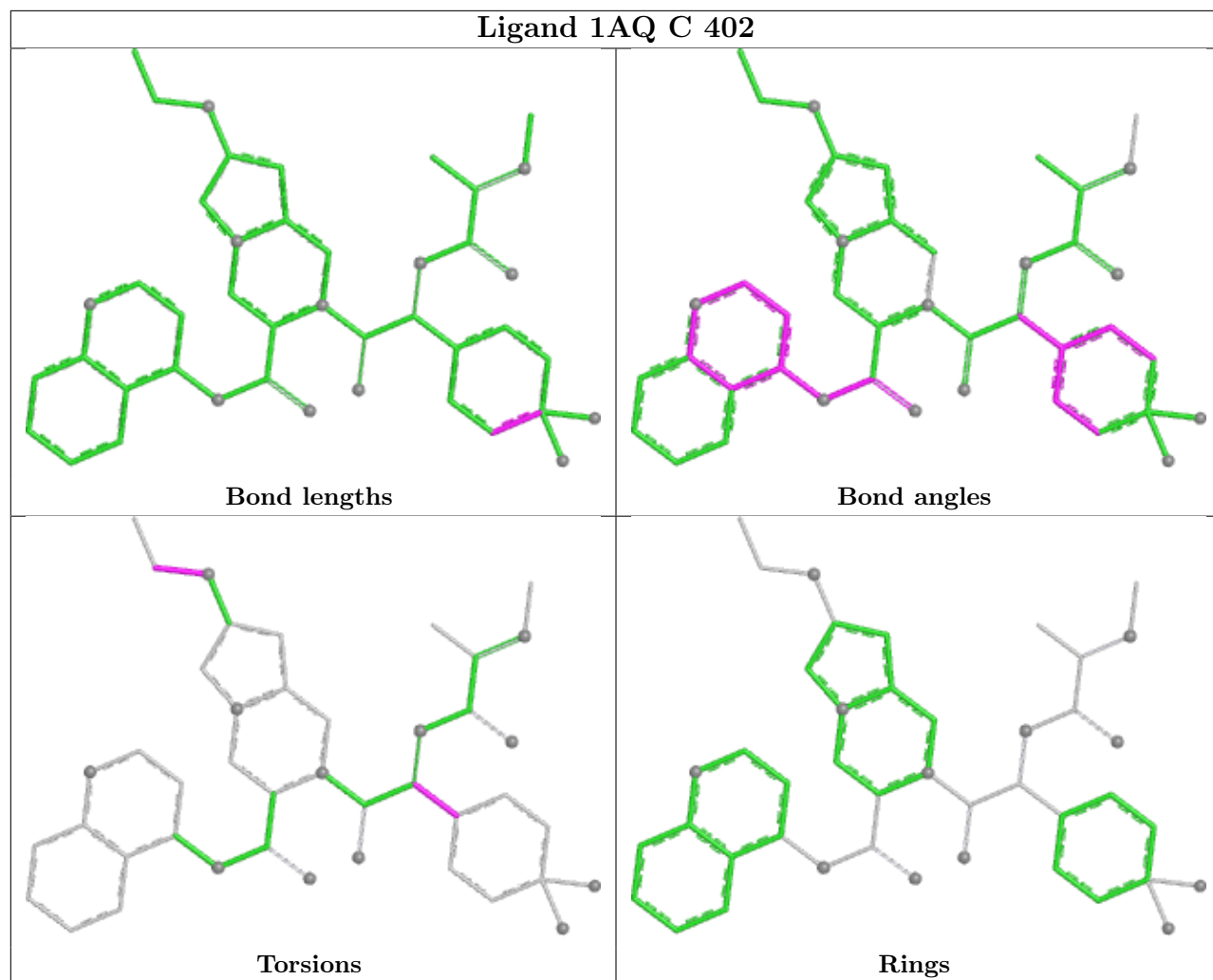
Mol	Chain	Res	Type	Atoms
3	G	403	1AQ	N34-C32-C42-C43
3	G	403	1AQ	N34-C32-C42-C49
3	G	403	1AQ	C6-C4-O3-C2
3	G	403	1AQ	C15-C4-O3-C2
3	H	402	1AQ	C30-C32-C42-C43
3	H	402	1AQ	C30-C32-C42-C49
3	H	402	1AQ	N34-C32-C42-C43
3	H	402	1AQ	N34-C32-C42-C49
3	H	402	1AQ	C1-C2-O3-C4
3	D	403	1AQ	C1-C2-O3-C4
3	F	403	1AQ	C15-C4-O3-C2
3	G	403	1AQ	C1-C2-O3-C4
3	E	403	1AQ	C1-C2-O3-C4
3	F	403	1AQ	C1-C2-O3-C4
3	E	403	1AQ	C29-C19-N18-C16

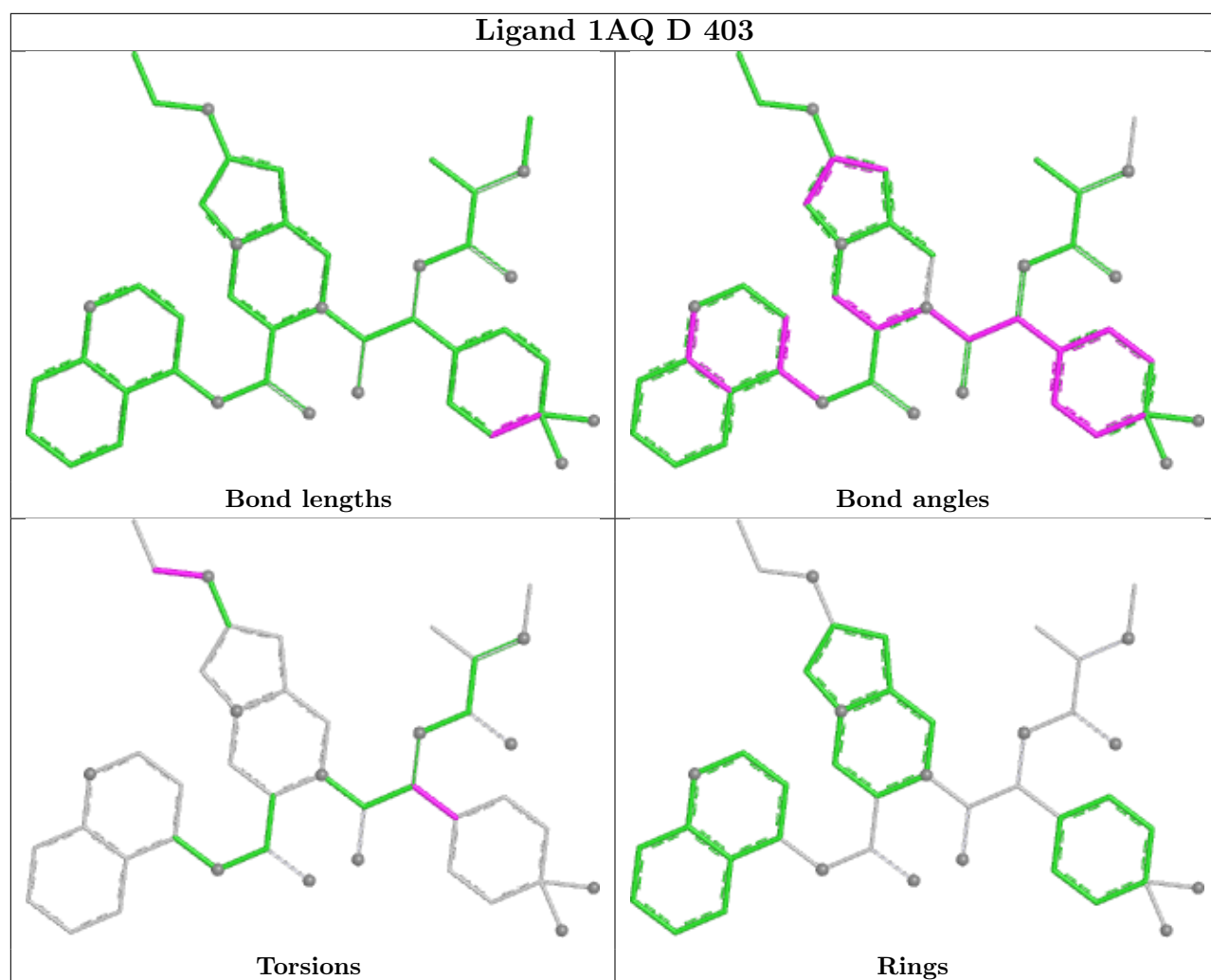
There are no ring outliers.

7 monomers are involved in 20 short contacts:

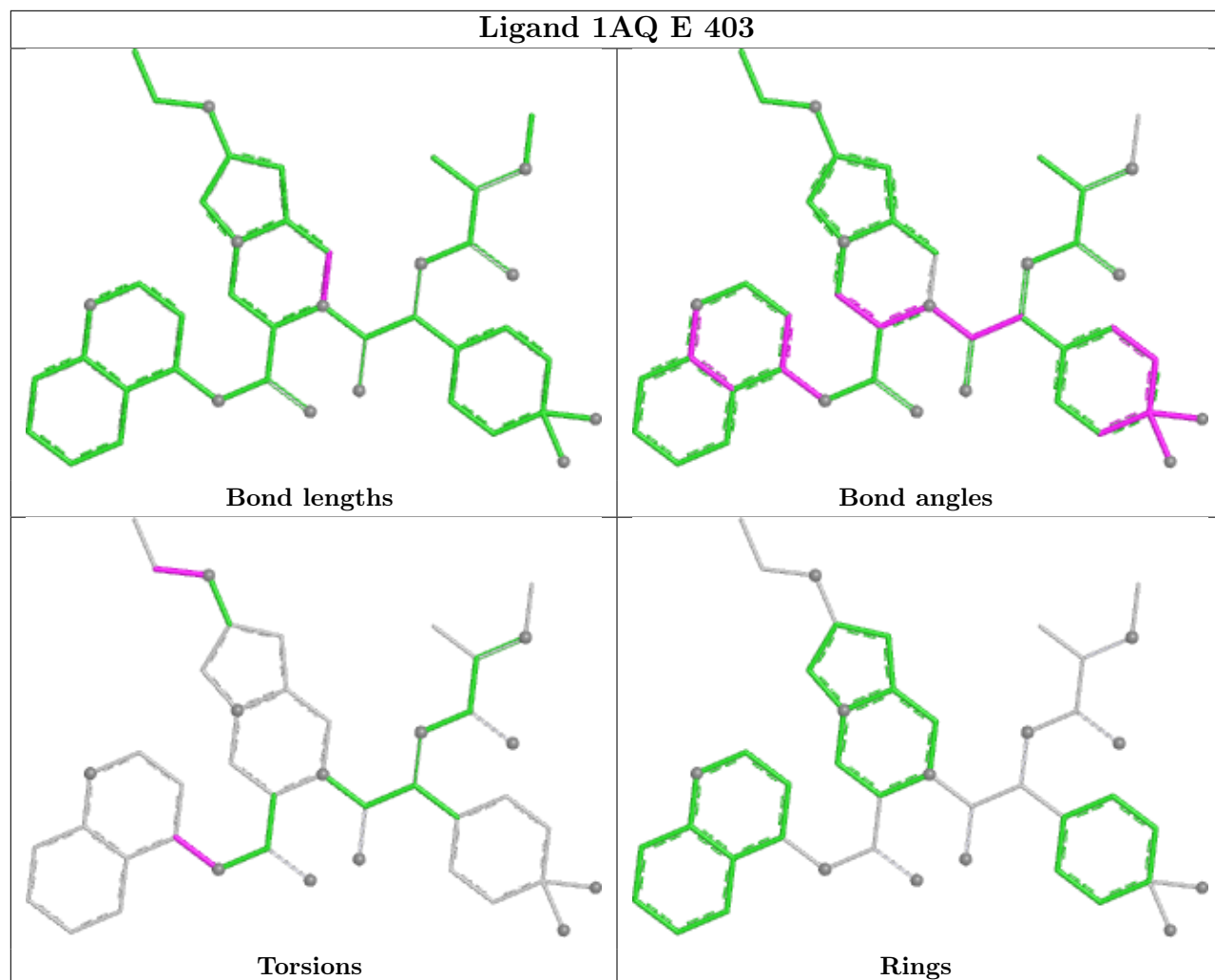
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	403	1AQ	4	0
3	E	403	1AQ	3	0
3	A	403	1AQ	6	0
3	H	402	1AQ	2	0
3	G	403	1AQ	1	0
3	B	403	1AQ	2	0
3	F	403	1AQ	2	0

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.

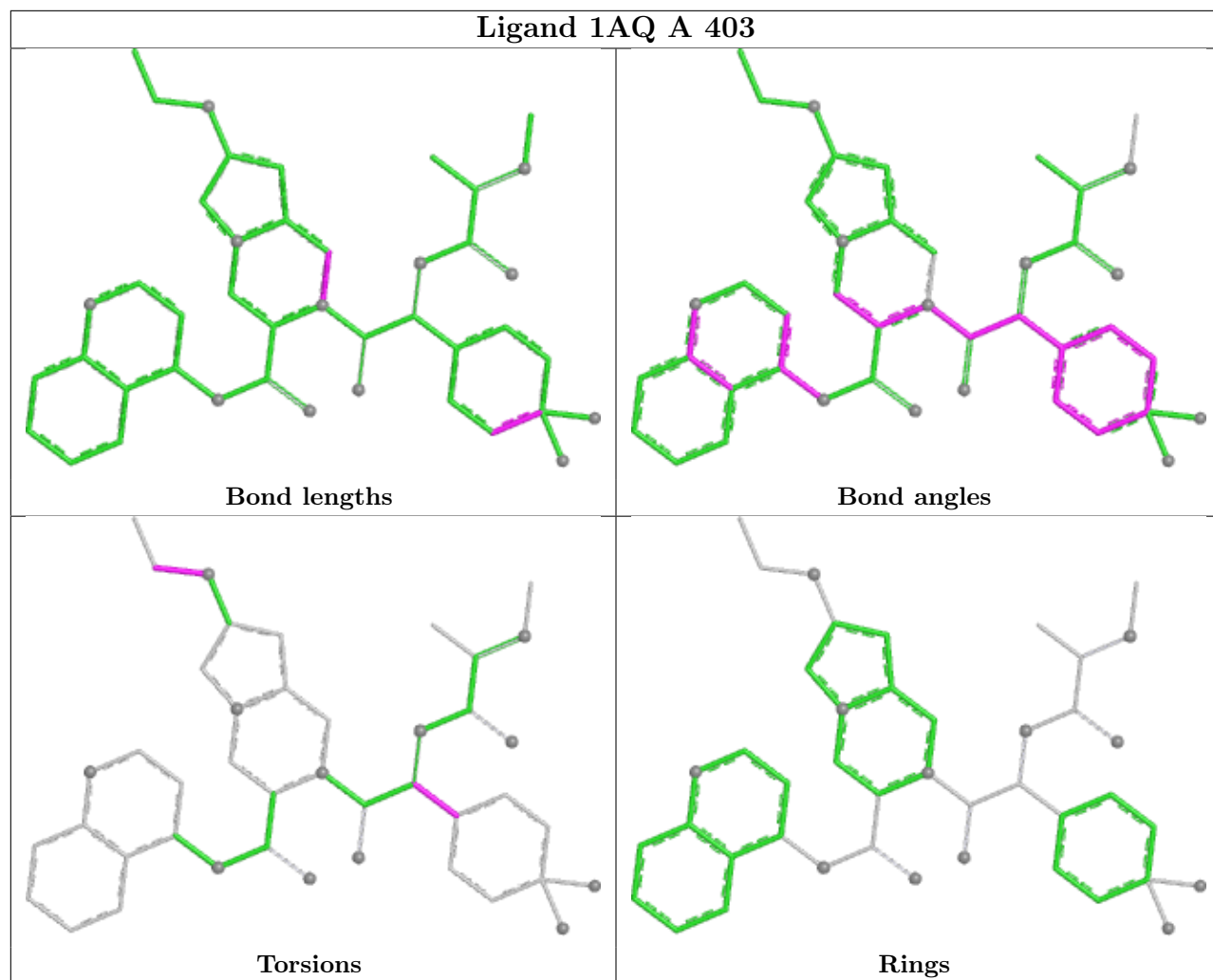




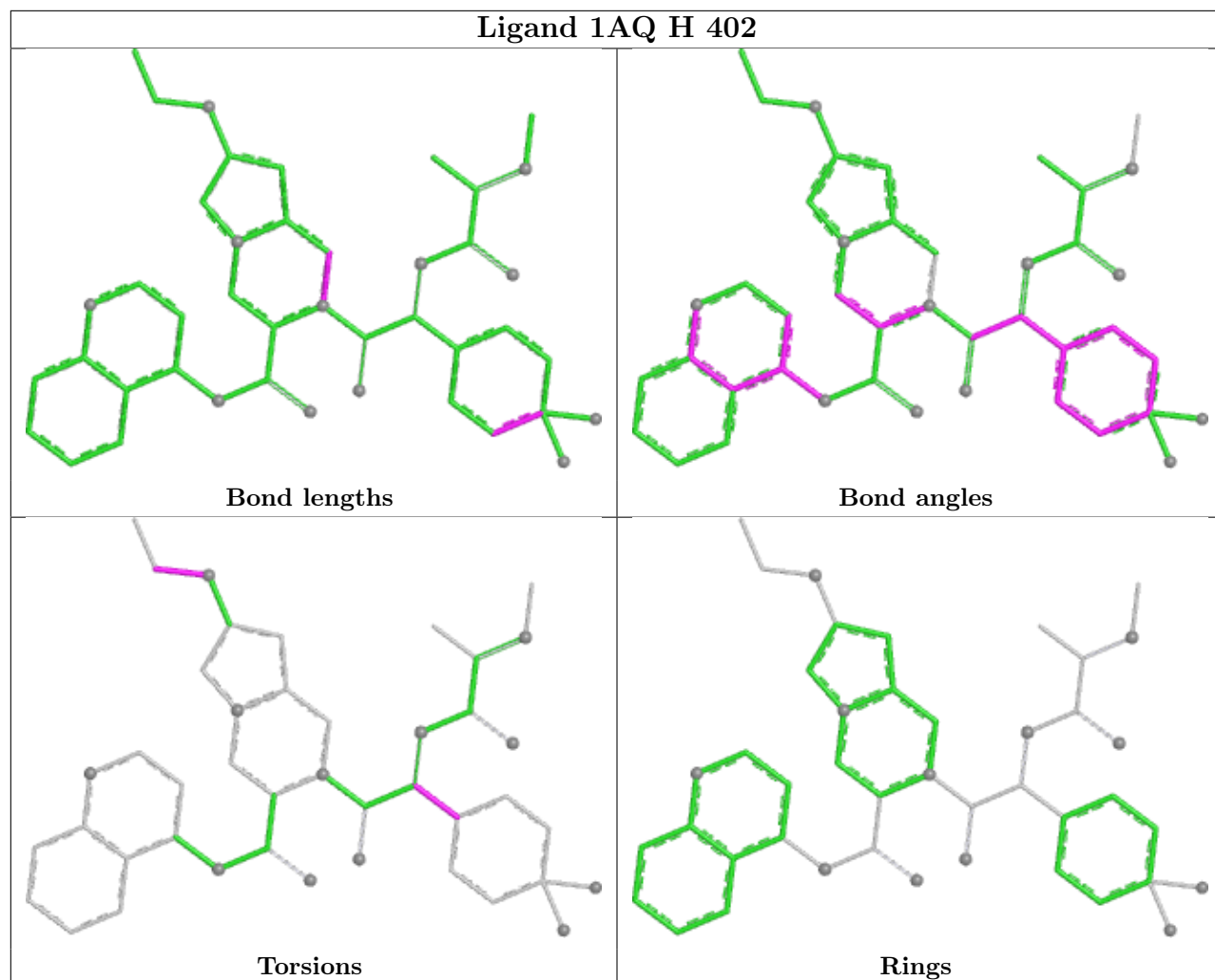
Ligand 1AQ E 403



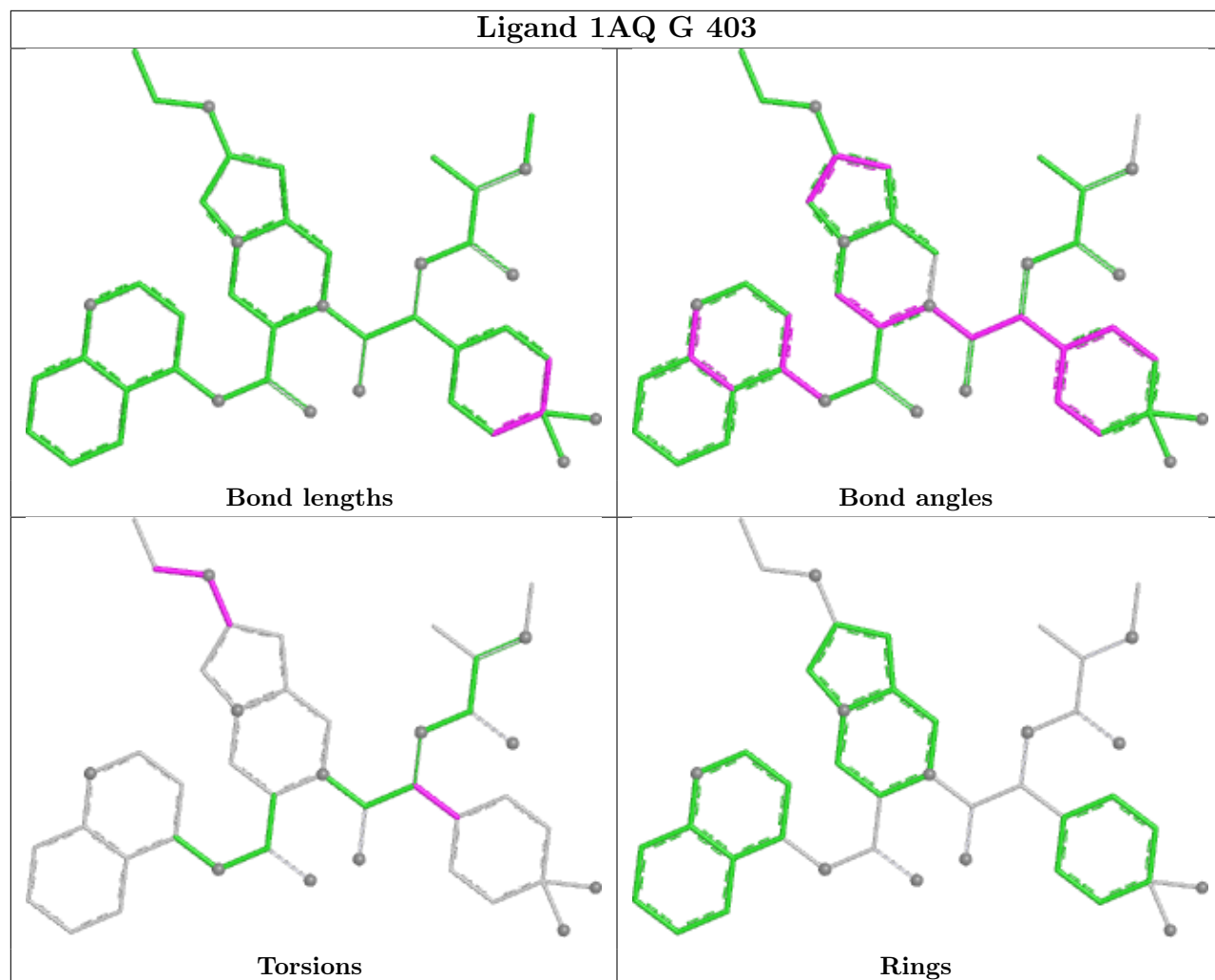
Ligand 1AQ A 403



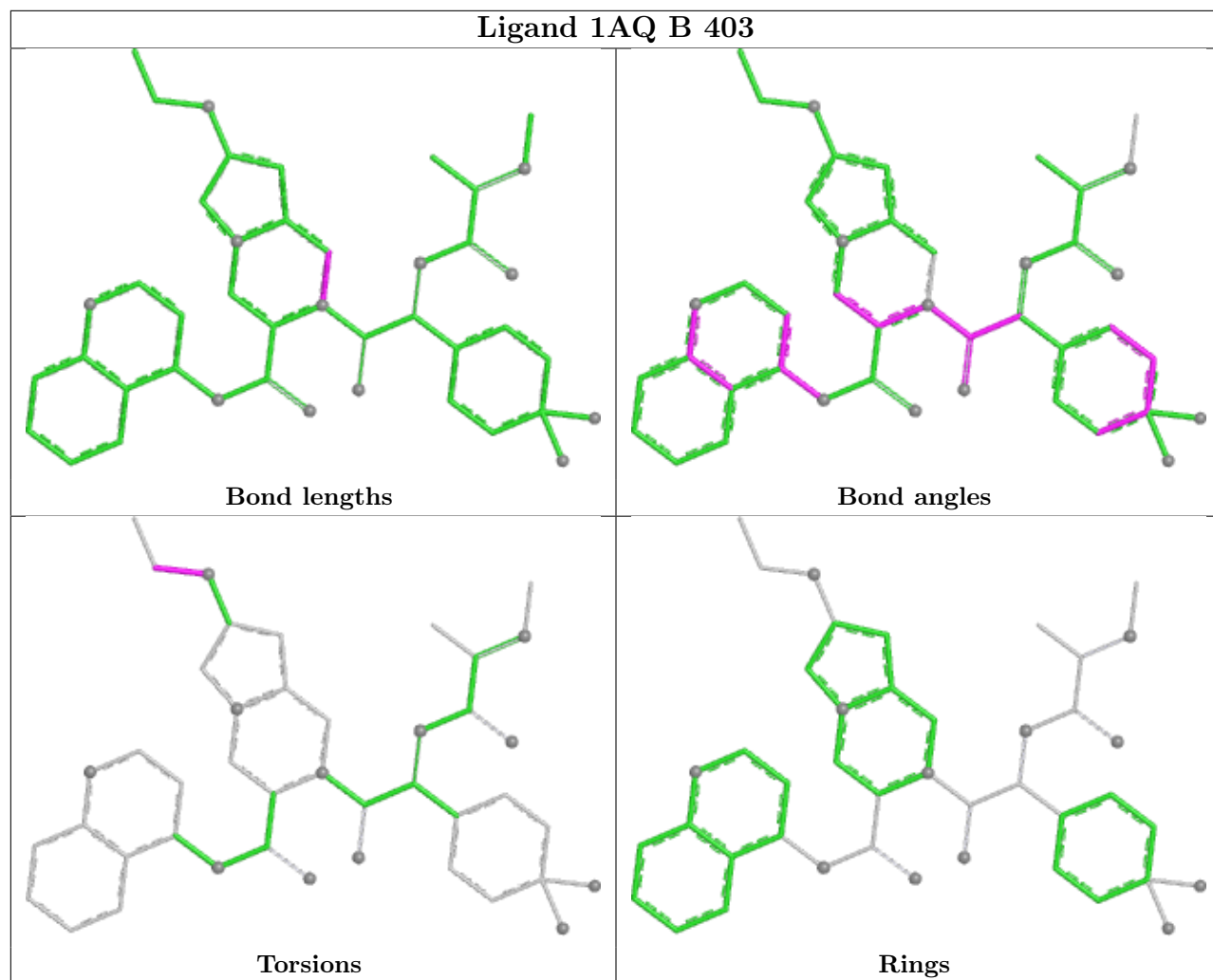
Ligand 1AQ H 402

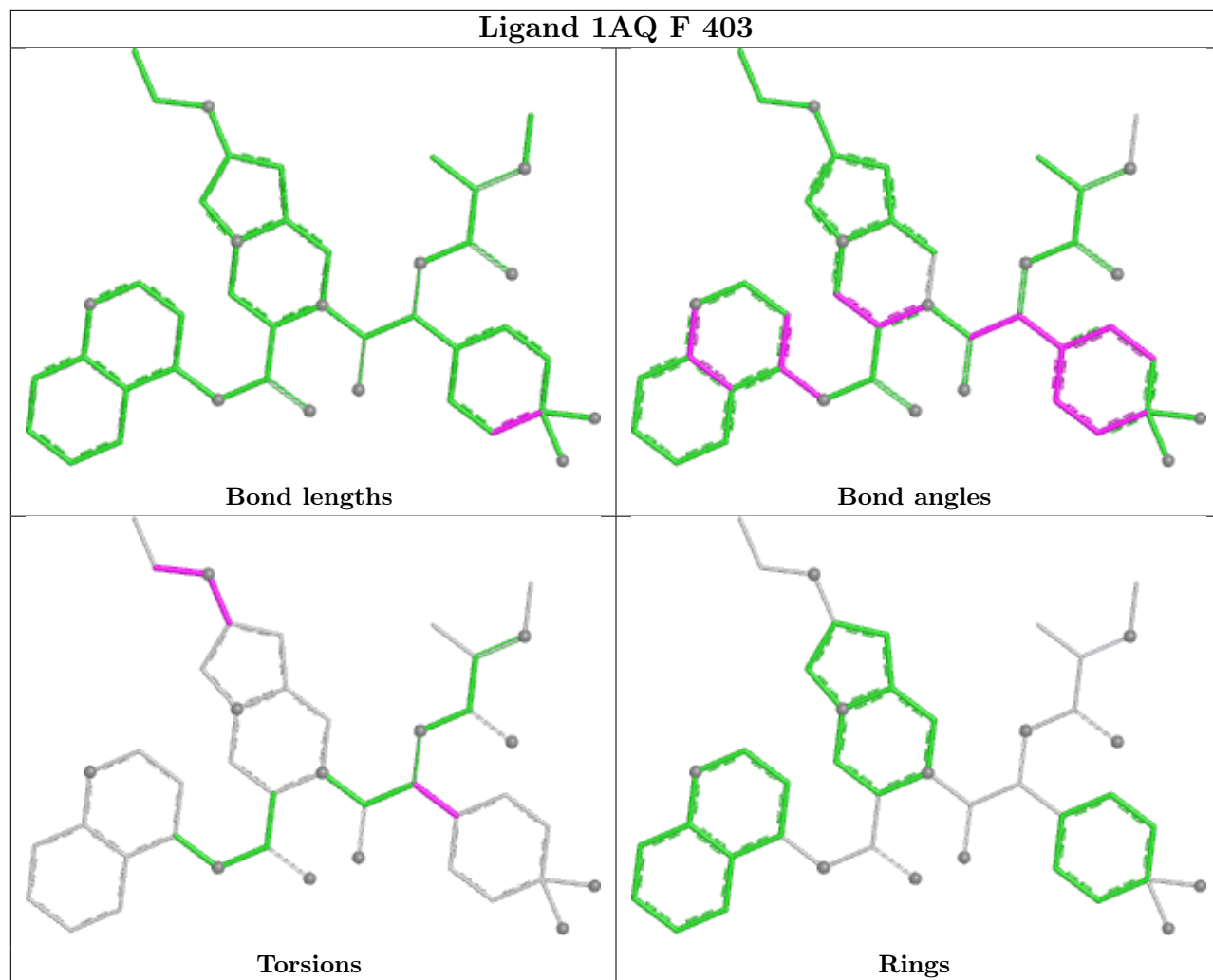


Ligand 1AQ G 403



Ligand 1AQ B 403





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	96/125 (76%)	-0.32	1 (1%) 79 75	47, 64, 106, 114	0
1	B	96/125 (76%)	-0.05	0 100 100	47, 90, 131, 156	0
1	C	97/125 (77%)	-0.20	1 (1%) 79 75	46, 62, 96, 153	0
1	D	98/125 (78%)	-0.09	2 (2%) 65 57	45, 77, 115, 143	0
1	E	96/125 (76%)	0.06	1 (1%) 79 75	48, 91, 133, 163	0
1	F	96/125 (76%)	-0.14	0 100 100	48, 86, 134, 152	0
1	G	98/125 (78%)	0.11	1 (1%) 79 75	56, 93, 138, 151	0
1	H	96/125 (76%)	0.54	3 (3%) 51 42	48, 95, 140, 158	0
All	All	773/1000 (77%)	-0.01	9 (1%) 76 71	45, 80, 132, 163	0

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	254	THR	4.0
1	G	254	THR	3.3
1	C	254	THR	2.5
1	H	270	PHE	2.4
1	A	348	LEU	2.4
1	E	254	THR	2.2
1	H	346	HIS	2.2
1	D	274	THR	2.1
1	H	279	VAL	2.0

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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

6.3 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

6.4 Ligands ⓘ

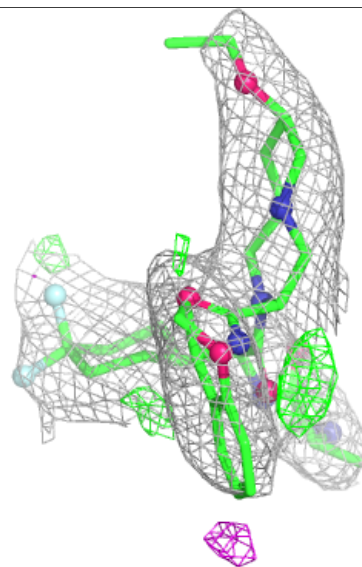
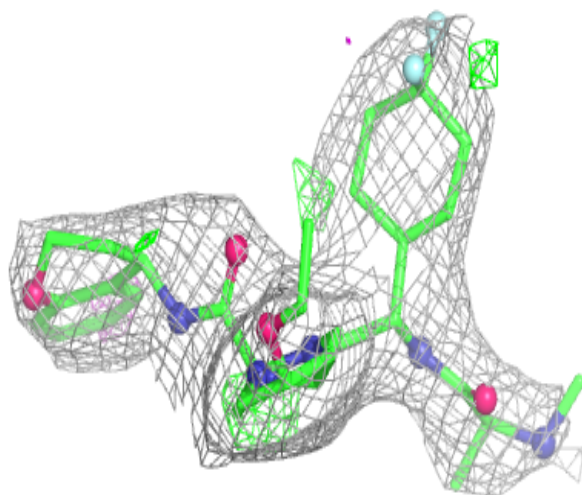
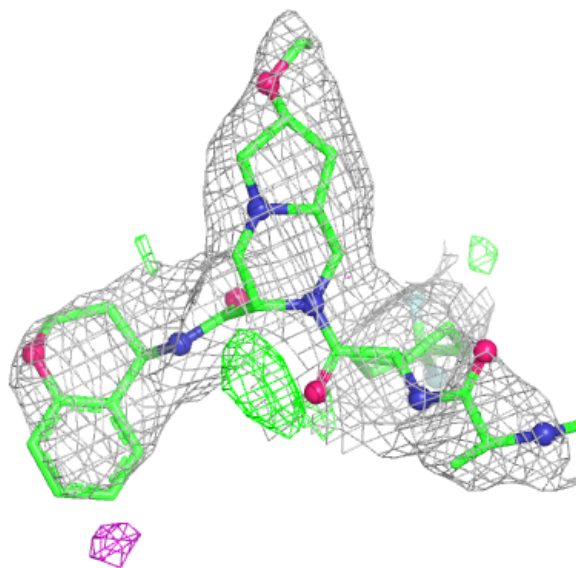
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	1AQ	H	402	43/43	0.83	0.14	82,90,108,118	0
2	ZN	D	402	1/1	0.87	0.16	116,116,116,116	0
3	1AQ	D	403	43/43	0.89	0.11	65,80,92,98	0
2	ZN	F	402	1/1	0.89	0.10	110,110,110,110	0
3	1AQ	B	403	43/43	0.90	0.11	70,85,105,108	0
3	1AQ	G	403	43/43	0.91	0.12	69,80,87,98	0
3	1AQ	E	403	43/43	0.91	0.09	62,75,97,105	0
3	1AQ	F	403	43/43	0.92	0.09	57,74,86,101	0
2	ZN	B	402	1/1	0.93	0.11	99,99,99,99	0
3	1AQ	C	402	43/43	0.94	0.08	56,65,81,91	0
3	1AQ	A	403	43/43	0.94	0.10	66,72,90,93	0
2	ZN	E	402	1/1	0.94	0.09	115,115,115,115	0
2	ZN	A	402	1/1	0.96	0.08	94,94,94,94	0
2	ZN	G	402	1/1	0.98	0.03	100,100,100,100	0
2	ZN	G	401	1/1	0.99	0.02	71,71,71,71	0
2	ZN	B	401	1/1	0.99	0.02	64,64,64,64	0
2	ZN	D	401	1/1	1.00	0.03	59,59,59,59	0
2	ZN	A	401	1/1	1.00	0.02	51,51,51,51	0
2	ZN	E	401	1/1	1.00	0.02	66,66,66,66	0
2	ZN	H	401	1/1	1.00	0.02	69,69,69,69	0
2	ZN	C	401	1/1	1.00	0.02	47,47,47,47	0
2	ZN	F	401	1/1	1.00	0.02	67,67,67,67	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.

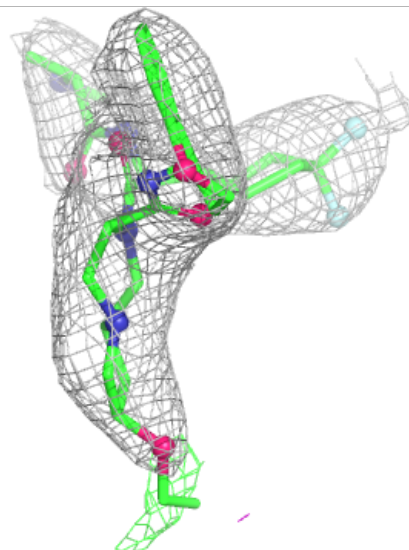
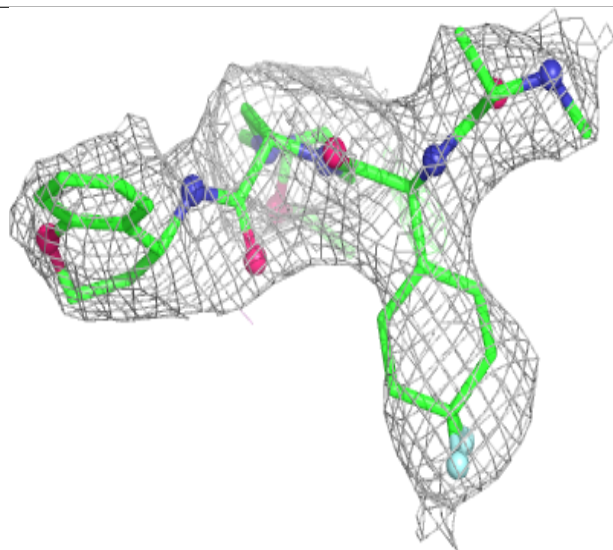
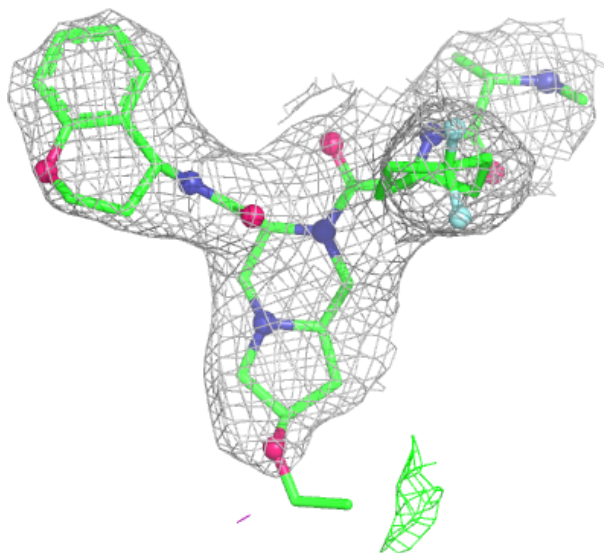
Electron density around 1AQ H 402:

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



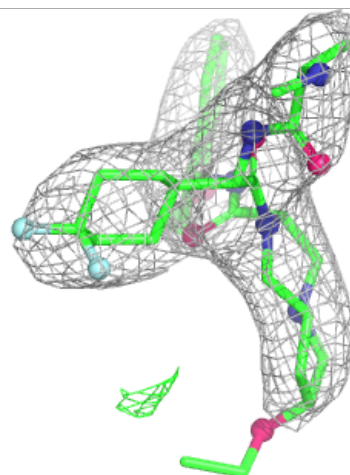
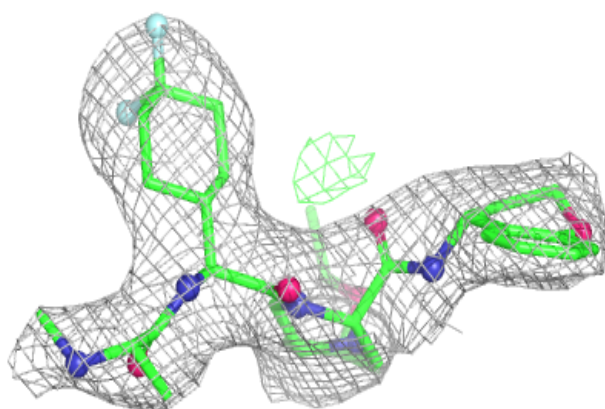
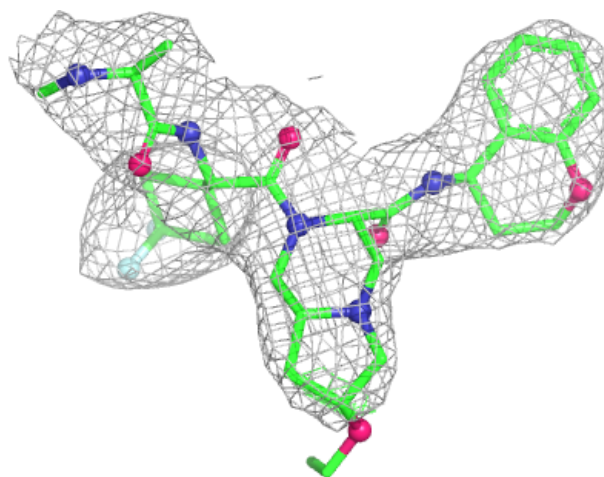
Electron density around 1AQ D 403:

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



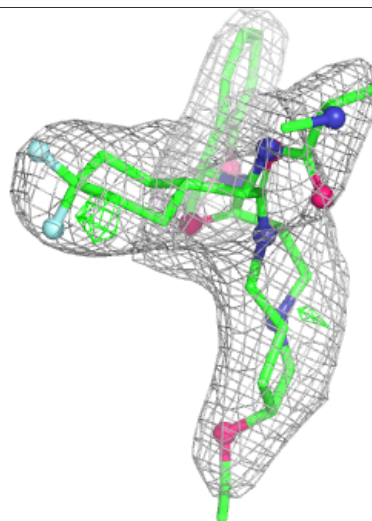
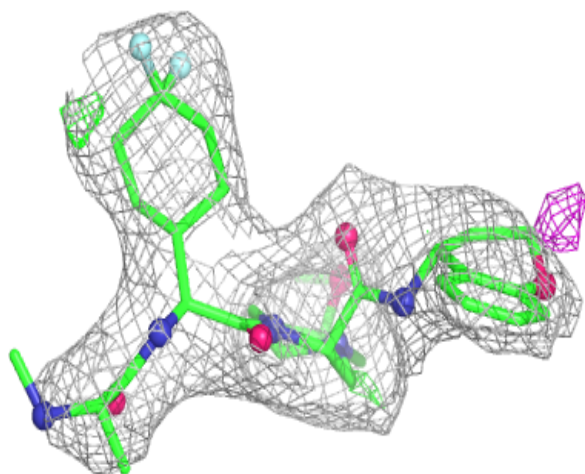
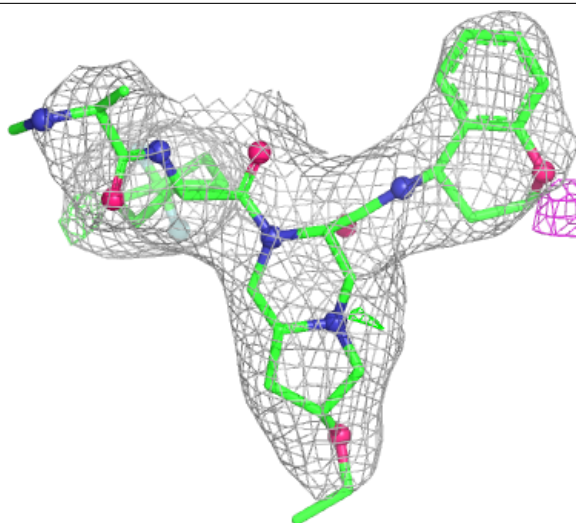
Electron density around 1AQ B 403:

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



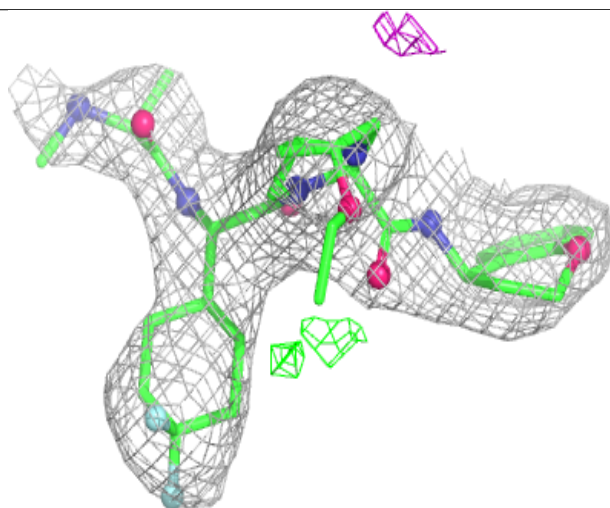
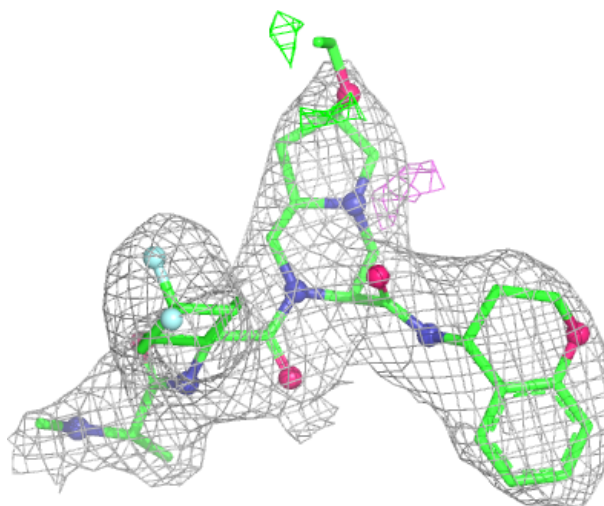
Electron density around 1AQ G 403:

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



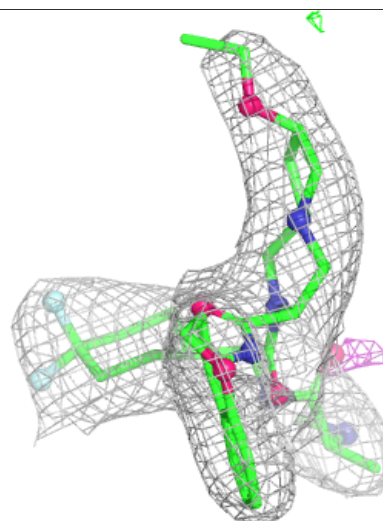
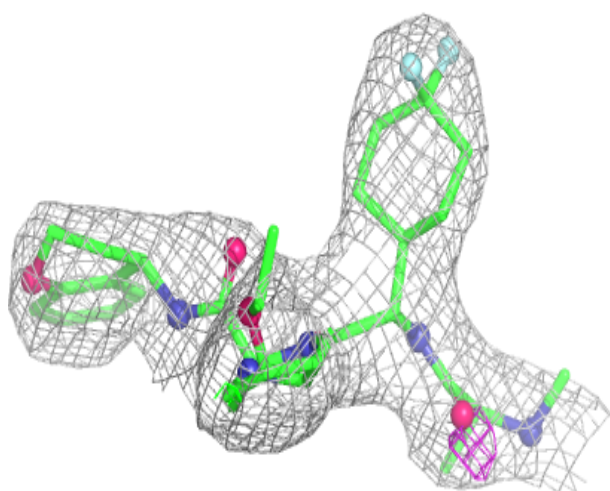
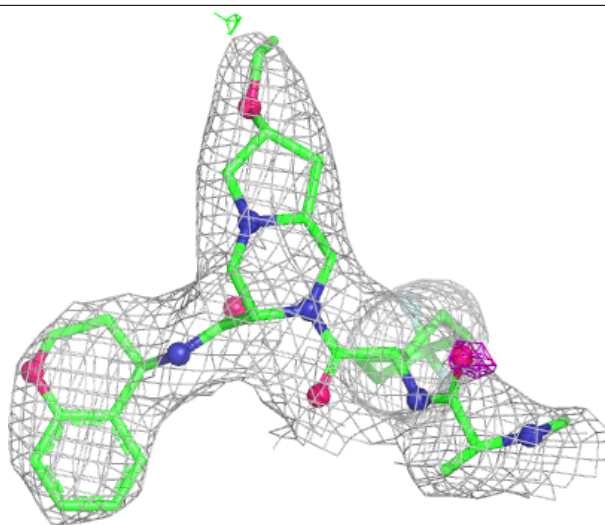
Electron density around 1AQ E 403:

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



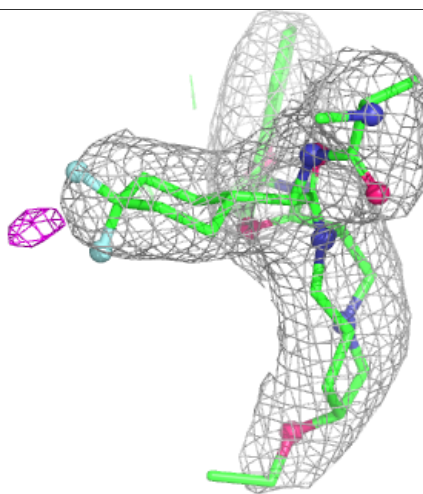
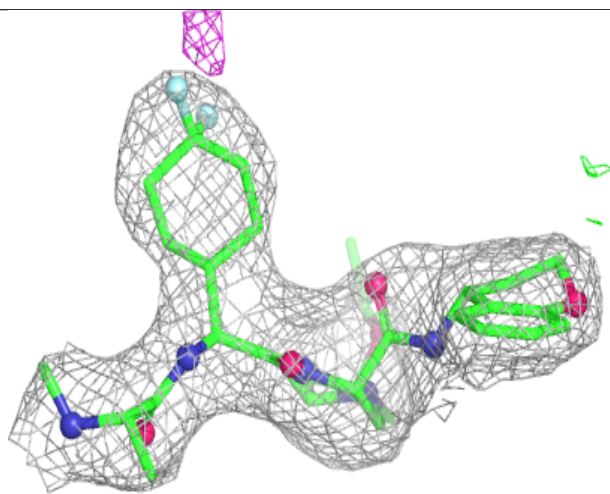
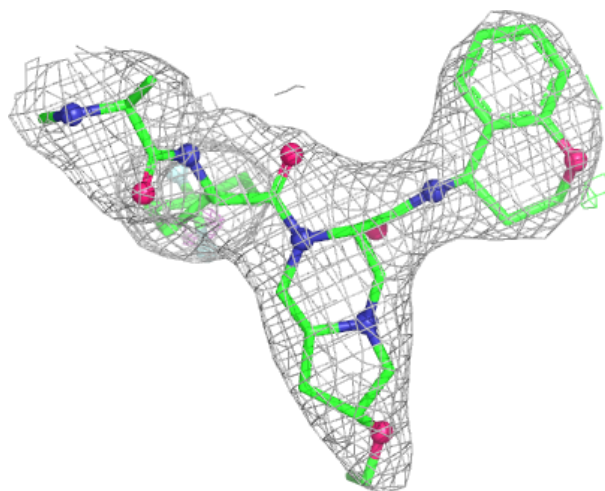
Electron density around 1AQ F 403:

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



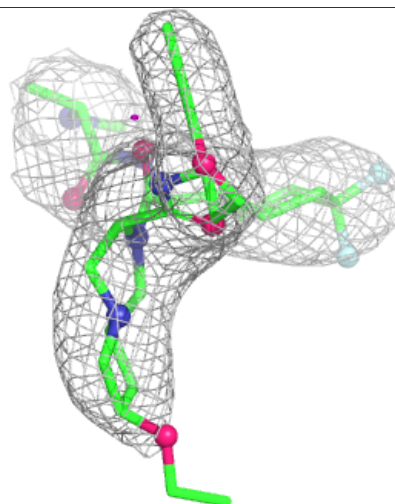
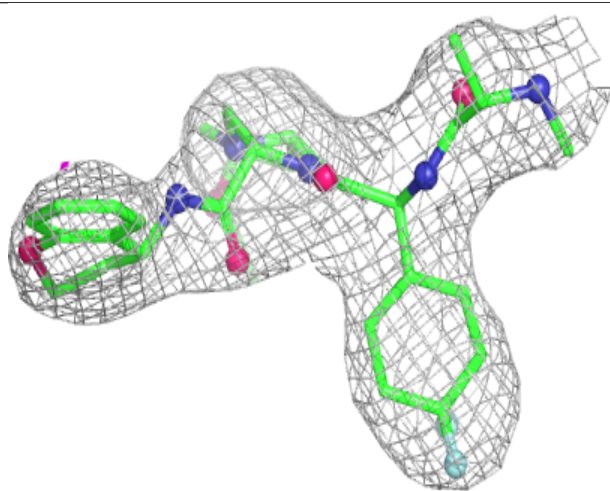
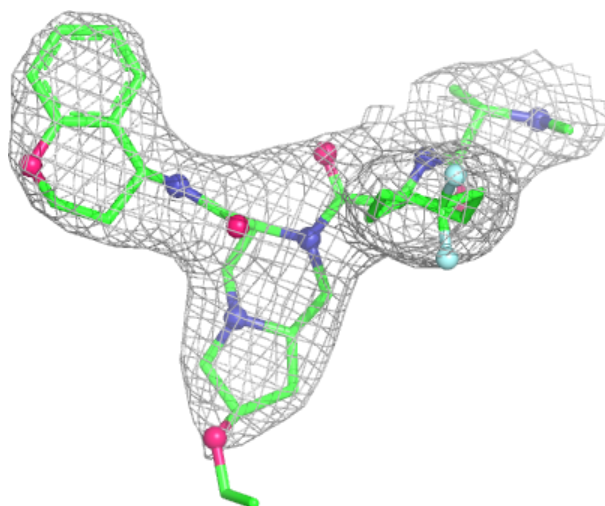
Electron density around 1AQ C 402:

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



Electron density around 1AQ A 403:

$2mF_o-DF_c$ (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.