



Full wwPDB EM Validation Report ⓘ

Jul 16, 2025 – 12:55 AM JST

PDB ID : 8IK3 / pdb_00008ik3
EMDB ID : EMD-35504
Title : Structure of Stimulator of interferon genes/ligand complex
Authors : Lu, D.F.; Shang, G.J.
Deposited on : 2023-02-28
Resolution : 3.30 Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp>

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:

EMDB validation analysis : **FAILED**
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0rc1
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.44

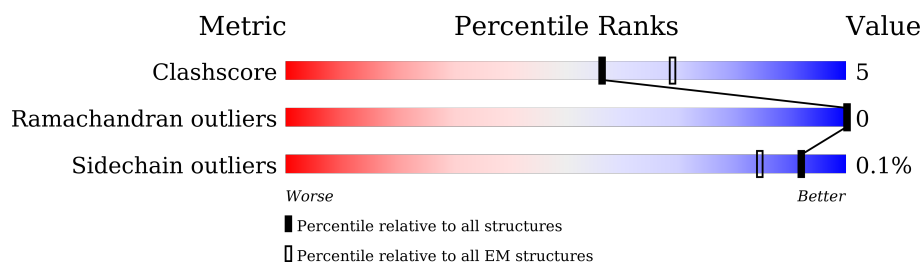
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.30 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)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	521	
1	B	521	
1	C	521	
1	D	521	
1	E	521	
1	F	521	
1	G	521	
1	H	521	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 20938 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Stimulator of interferon genes protein, Immune protein Tsi3.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	328	Total	C	N	O	S	0	0
			2587	1650	458	466	13		
1	B	327	Total	C	N	O	S	0	0
			2583	1646	457	467	13		
1	C	326	Total	C	N	O	S	0	0
			2567	1635	456	463	13		
1	D	326	Total	C	N	O	S	0	0
			2569	1640	456	460	13		
1	E	326	Total	C	N	O	S	0	0
			2567	1635	456	463	13		
1	G	326	Total	C	N	O	S	0	0
			2569	1640	456	460	13		
1	F	326	Total	C	N	O	S	0	0
			2567	1635	456	463	13		
1	H	326	Total	C	N	O	S	0	0
			2569	1640	456	460	13		

There are 152 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	232	ARG	HIS	conflict	UNP Q86WV6
A	380	LEU	-	linker	UNP Q86WV6
A	381	GLU	-	linker	UNP Q86WV6
A	382	VAL	-	linker	UNP Q86WV6
A	383	LEU	-	linker	UNP Q86WV6
A	384	PHE	-	linker	UNP Q86WV6
A	385	GLN	-	linker	UNP Q86WV6
A	386	GLY	-	linker	UNP Q86WV6
A	387	PRO	-	linker	UNP Q86WV6
A	512	SER	-	expression tag	UNP Q9HYC4
A	513	SER	-	expression tag	UNP Q9HYC4
A	514	HIS	-	expression tag	UNP Q9HYC4
A	515	HIS	-	expression tag	UNP Q9HYC4
A	516	HIS	-	expression tag	UNP Q9HYC4

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Chain	Residue	Modelled	Actual	Comment	Reference
A	517	HIS	-	expression tag	UNP Q9HYC4
A	518	HIS	-	expression tag	UNP Q9HYC4
A	519	HIS	-	expression tag	UNP Q9HYC4
A	520	HIS	-	expression tag	UNP Q9HYC4
A	521	HIS	-	expression tag	UNP Q9HYC4
B	232	ARG	HIS	conflict	UNP Q86WV6
B	380	LEU	-	linker	UNP Q86WV6
B	381	GLU	-	linker	UNP Q86WV6
B	382	VAL	-	linker	UNP Q86WV6
B	383	LEU	-	linker	UNP Q86WV6
B	384	PHE	-	linker	UNP Q86WV6
B	385	GLN	-	linker	UNP Q86WV6
B	386	GLY	-	linker	UNP Q86WV6
B	387	PRO	-	linker	UNP Q86WV6
B	512	SER	-	expression tag	UNP Q9HYC4
B	513	SER	-	expression tag	UNP Q9HYC4
B	514	HIS	-	expression tag	UNP Q9HYC4
B	515	HIS	-	expression tag	UNP Q9HYC4
B	516	HIS	-	expression tag	UNP Q9HYC4
B	517	HIS	-	expression tag	UNP Q9HYC4
B	518	HIS	-	expression tag	UNP Q9HYC4
B	519	HIS	-	expression tag	UNP Q9HYC4
B	520	HIS	-	expression tag	UNP Q9HYC4
B	521	HIS	-	expression tag	UNP Q9HYC4
C	232	ARG	HIS	conflict	UNP Q86WV6
C	380	LEU	-	linker	UNP Q86WV6
C	381	GLU	-	linker	UNP Q86WV6
C	382	VAL	-	linker	UNP Q86WV6
C	383	LEU	-	linker	UNP Q86WV6
C	384	PHE	-	linker	UNP Q86WV6
C	385	GLN	-	linker	UNP Q86WV6
C	386	GLY	-	linker	UNP Q86WV6
C	387	PRO	-	linker	UNP Q86WV6
C	512	SER	-	expression tag	UNP Q9HYC4
C	513	SER	-	expression tag	UNP Q9HYC4
C	514	HIS	-	expression tag	UNP Q9HYC4
C	515	HIS	-	expression tag	UNP Q9HYC4
C	516	HIS	-	expression tag	UNP Q9HYC4
C	517	HIS	-	expression tag	UNP Q9HYC4
C	518	HIS	-	expression tag	UNP Q9HYC4
C	519	HIS	-	expression tag	UNP Q9HYC4
C	520	HIS	-	expression tag	UNP Q9HYC4

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Chain	Residue	Modelled	Actual	Comment	Reference
C	521	HIS	-	expression tag	UNP Q9HYC4
D	232	ARG	HIS	conflict	UNP Q86WV6
D	380	LEU	-	linker	UNP Q86WV6
D	381	GLU	-	linker	UNP Q86WV6
D	382	VAL	-	linker	UNP Q86WV6
D	383	LEU	-	linker	UNP Q86WV6
D	384	PHE	-	linker	UNP Q86WV6
D	385	GLN	-	linker	UNP Q86WV6
D	386	GLY	-	linker	UNP Q86WV6
D	387	PRO	-	linker	UNP Q86WV6
D	512	SER	-	expression tag	UNP Q9HYC4
D	513	SER	-	expression tag	UNP Q9HYC4
D	514	HIS	-	expression tag	UNP Q9HYC4
D	515	HIS	-	expression tag	UNP Q9HYC4
D	516	HIS	-	expression tag	UNP Q9HYC4
D	517	HIS	-	expression tag	UNP Q9HYC4
D	518	HIS	-	expression tag	UNP Q9HYC4
D	519	HIS	-	expression tag	UNP Q9HYC4
D	520	HIS	-	expression tag	UNP Q9HYC4
D	521	HIS	-	expression tag	UNP Q9HYC4
E	232	ARG	HIS	conflict	UNP Q86WV6
E	380	LEU	-	linker	UNP Q86WV6
E	381	GLU	-	linker	UNP Q86WV6
E	382	VAL	-	linker	UNP Q86WV6
E	383	LEU	-	linker	UNP Q86WV6
E	384	PHE	-	linker	UNP Q86WV6
E	385	GLN	-	linker	UNP Q86WV6
E	386	GLY	-	linker	UNP Q86WV6
E	387	PRO	-	linker	UNP Q86WV6
E	512	SER	-	expression tag	UNP Q9HYC4
E	513	SER	-	expression tag	UNP Q9HYC4
E	514	HIS	-	expression tag	UNP Q9HYC4
E	515	HIS	-	expression tag	UNP Q9HYC4
E	516	HIS	-	expression tag	UNP Q9HYC4
E	517	HIS	-	expression tag	UNP Q9HYC4
E	518	HIS	-	expression tag	UNP Q9HYC4
E	519	HIS	-	expression tag	UNP Q9HYC4
E	520	HIS	-	expression tag	UNP Q9HYC4
E	521	HIS	-	expression tag	UNP Q9HYC4
G	232	ARG	HIS	conflict	UNP Q86WV6
G	380	LEU	-	linker	UNP Q86WV6
G	381	GLU	-	linker	UNP Q86WV6

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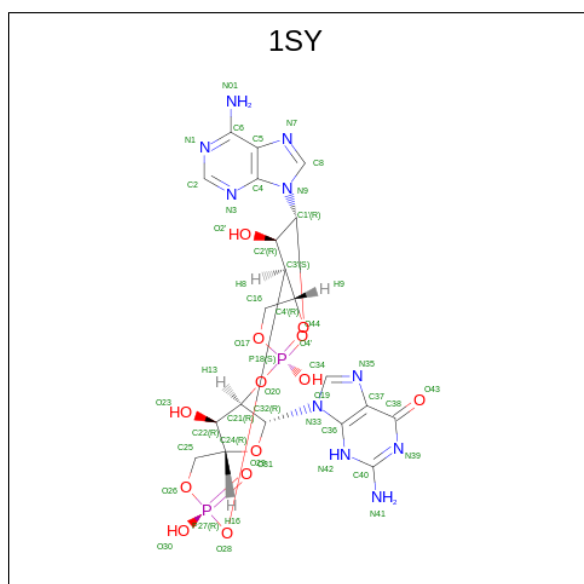
Chain	Residue	Modelled	Actual	Comment	Reference
G	382	VAL	-	linker	UNP Q86WV6
G	383	LEU	-	linker	UNP Q86WV6
G	384	PHE	-	linker	UNP Q86WV6
G	385	GLN	-	linker	UNP Q86WV6
G	386	GLY	-	linker	UNP Q86WV6
G	387	PRO	-	linker	UNP Q86WV6
G	512	SER	-	expression tag	UNP Q9HYC4
G	513	SER	-	expression tag	UNP Q9HYC4
G	514	HIS	-	expression tag	UNP Q9HYC4
G	515	HIS	-	expression tag	UNP Q9HYC4
G	516	HIS	-	expression tag	UNP Q9HYC4
G	517	HIS	-	expression tag	UNP Q9HYC4
G	518	HIS	-	expression tag	UNP Q9HYC4
G	519	HIS	-	expression tag	UNP Q9HYC4
G	520	HIS	-	expression tag	UNP Q9HYC4
G	521	HIS	-	expression tag	UNP Q9HYC4
F	232	ARG	HIS	conflict	UNP Q86WV6
F	380	LEU	-	linker	UNP Q86WV6
F	381	GLU	-	linker	UNP Q86WV6
F	382	VAL	-	linker	UNP Q86WV6
F	383	LEU	-	linker	UNP Q86WV6
F	384	PHE	-	linker	UNP Q86WV6
F	385	GLN	-	linker	UNP Q86WV6
F	386	GLY	-	linker	UNP Q86WV6
F	387	PRO	-	linker	UNP Q86WV6
F	512	SER	-	expression tag	UNP Q9HYC4
F	513	SER	-	expression tag	UNP Q9HYC4
F	514	HIS	-	expression tag	UNP Q9HYC4
F	515	HIS	-	expression tag	UNP Q9HYC4
F	516	HIS	-	expression tag	UNP Q9HYC4
F	517	HIS	-	expression tag	UNP Q9HYC4
F	518	HIS	-	expression tag	UNP Q9HYC4
F	519	HIS	-	expression tag	UNP Q9HYC4
F	520	HIS	-	expression tag	UNP Q9HYC4
F	521	HIS	-	expression tag	UNP Q9HYC4
H	232	ARG	HIS	conflict	UNP Q86WV6
H	380	LEU	-	linker	UNP Q86WV6
H	381	GLU	-	linker	UNP Q86WV6
H	382	VAL	-	linker	UNP Q86WV6
H	383	LEU	-	linker	UNP Q86WV6
H	384	PHE	-	linker	UNP Q86WV6
H	385	GLN	-	linker	UNP Q86WV6

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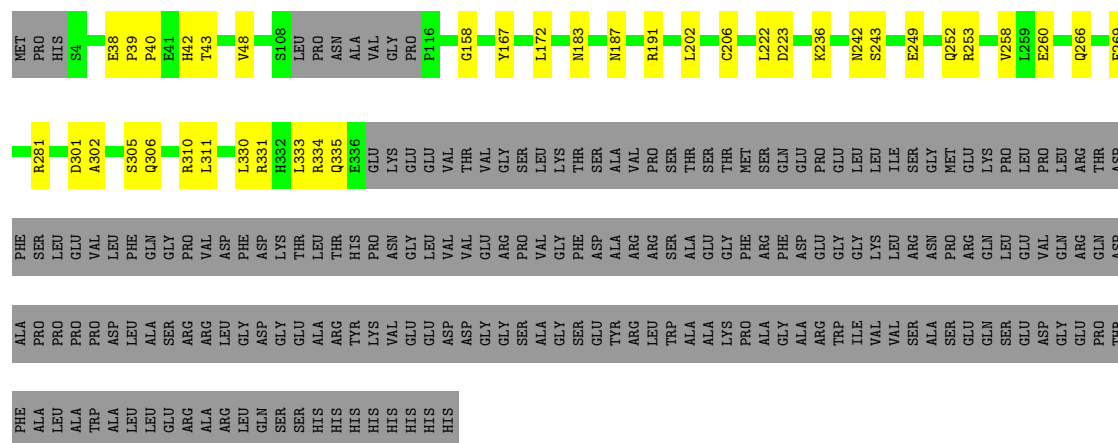
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Chain	Residue	Modelled	Actual	Comment	Reference
H	386	GLY	-	linker	UNP Q86WV6
H	387	PRO	-	linker	UNP Q86WV6
H	512	SER	-	expression tag	UNP Q9HYC4
H	513	SER	-	expression tag	UNP Q9HYC4
H	514	HIS	-	expression tag	UNP Q9HYC4
H	515	HIS	-	expression tag	UNP Q9HYC4
H	516	HIS	-	expression tag	UNP Q9HYC4
H	517	HIS	-	expression tag	UNP Q9HYC4
H	518	HIS	-	expression tag	UNP Q9HYC4
H	519	HIS	-	expression tag	UNP Q9HYC4
H	520	HIS	-	expression tag	UNP Q9HYC4
H	521	HIS	-	expression tag	UNP Q9HYC4

- Molecule 2 is cGAMP (CCD ID: 1SY) (formula: $\text{C}_{20}\text{H}_{24}\text{N}_{10}\text{O}_{13}\text{P}_2$) (labeled as "Ligand of Interest" by depositor).

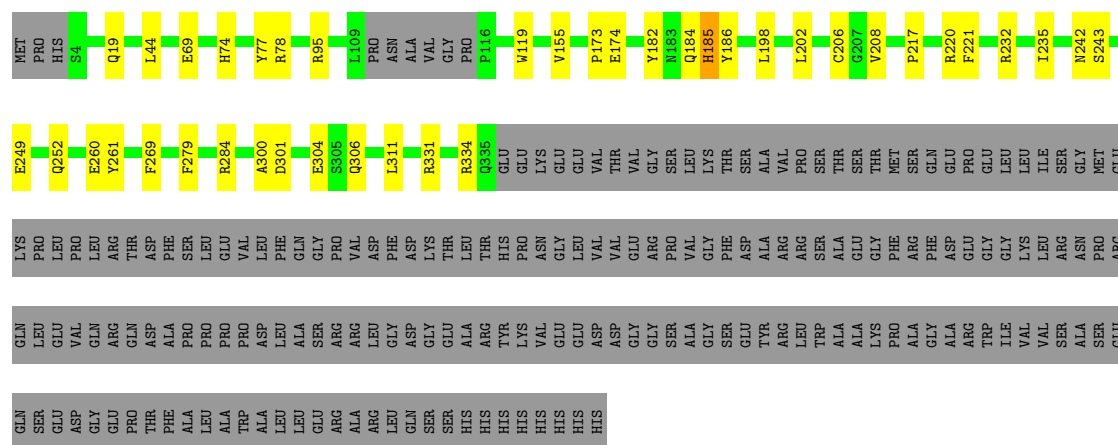


Mol	Chain	Residues	Atoms					AltConf
2	B	1	Total 90	C 40	N 20	O 26	P 4	1
2	D	1	Total 90	C 40	N 20	O 26	P 4	1
2	G	1	Total 90	C 40	N 20	O 26	P 4	1
2	F	1	Total 90	C 40	N 20	O 26	P 4	1



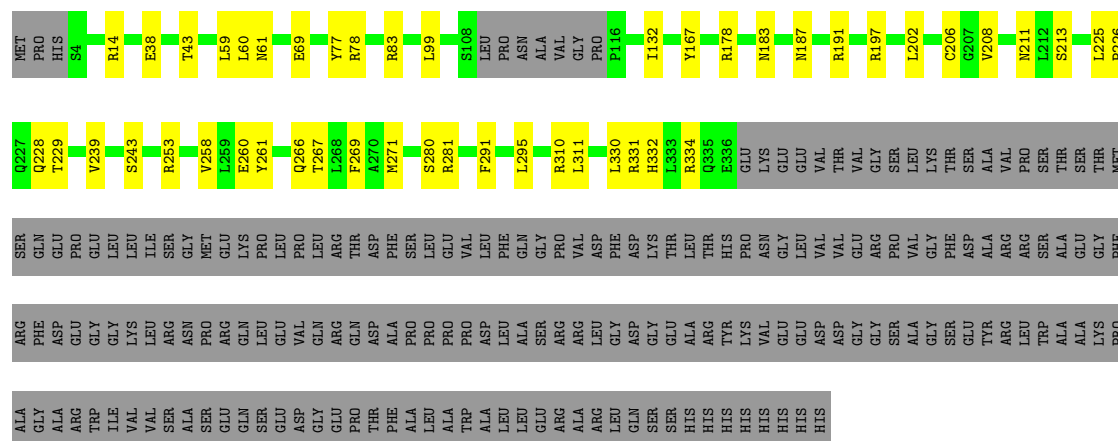
- Molecule 1: Stimulator of interferon genes protein, Immune protein Tsi3

Chain D: 55% 7% 37%



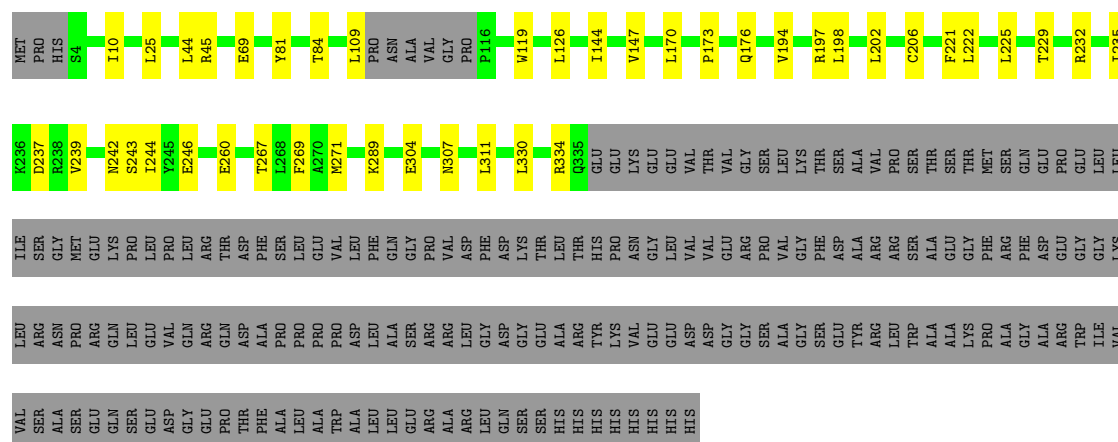
- Molecule 1: Stimulator of interferon genes protein, Immune protein Tsi3

Chain E: 54% 9% 37%



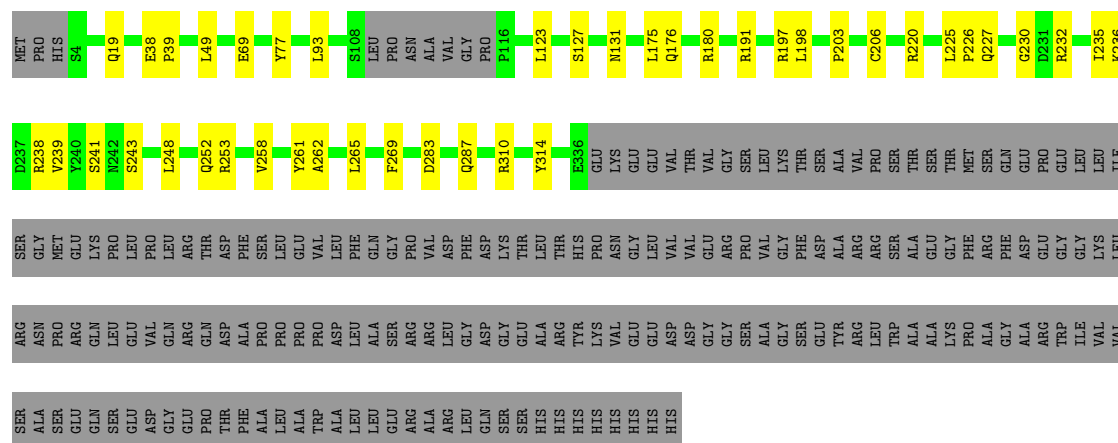
- Molecule 1: Stimulator of interferon genes protein, Immune protein Tsi3

Chain G:  55% 8% 37%



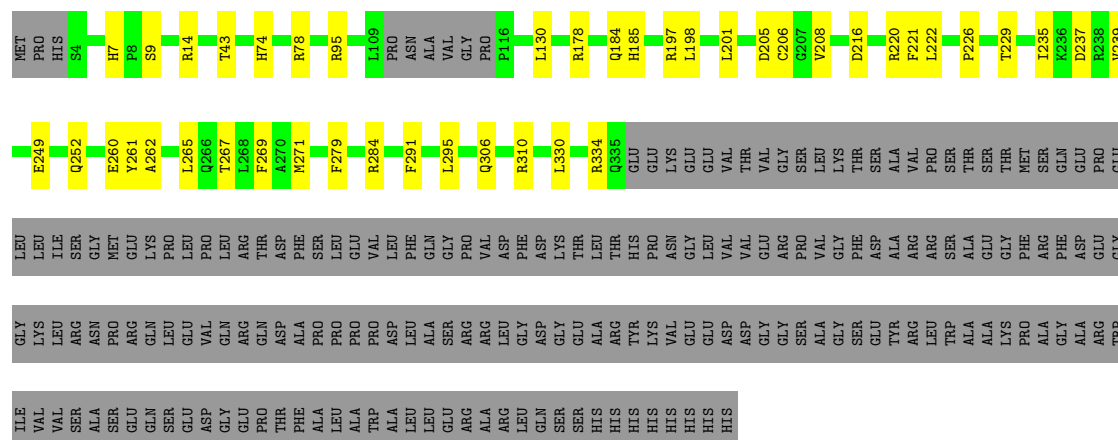
- Molecule 1: Stimulator of interferon genes protein, Immune protein Tsi3

Chain F:  55% 8% 37%



- Molecule 1: Stimulator of interferon genes protein, Immune protein Tsi3

Chain H:  54% 8% 37%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	216426	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor

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: 1SY

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	0.22	0/2643	0.37	0/3588
1	B	0.21	0/2639	0.35	0/3582
1	C	0.22	0/2622	0.35	0/3559
1	D	0.22	0/2625	0.35	0/3564
1	E	0.12	0/2622	0.30	0/3559
1	F	0.12	0/2622	0.30	0/3559
1	G	0.12	0/2625	0.31	0/3564
1	H	0.12	0/2625	0.30	0/3564
All	All	0.18	0/21023	0.33	0/28539

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	2587	0	2602	21	0
1	B	2583	0	2595	26	0
1	C	2567	0	2582	24	0
1	D	2569	0	2590	27	0
1	E	2567	0	2582	34	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	2567	0	2582	26	0
1	G	2569	0	2590	27	0
1	H	2569	0	2590	31	0
2	B	90	0	44	1	0
2	D	90	0	44	1	0
2	F	90	0	44	5	0
2	G	90	0	44	5	0
All	All	20938	0	20889	198	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 5.

All (198) 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:F:127:SER:O	1:F:131:ASN:ND2	2.18	0.77
1:E:191:ARG:HG3	1:E:253:ARG:HH12	1.56	0.70
1:H:229:THR:HG23	1:H:237:ASP:HA	1.75	0.69
1:D:300:ALA:HA	1:D:306:GLN:HE22	1.58	0.69
1:H:306:GLN:O	1:H:310:ARG:NH1	2.27	0.67
1:A:252:GLN:NE2	1:A:253:ARG:O	2.28	0.67
1:D:249:GLU:N	1:D:252:GLN:O	2.28	0.66
1:D:235:ILE:HD12	2:D:601[B]:1SY:H22	1.60	0.66
1:B:235:ILE:HD12	2:B:601[B]:1SY:H22	1.59	0.66
1:C:266:GLN:OE1	1:D:232:ARG:NH2	2.23	0.66
1:G:206:CYS:HB3	1:G:269:PHE:HB2	1.78	0.66
1:E:178:ARG:NH2	1:E:226:PRO:O	2.29	0.64
1:C:331:ARG:HG2	1:C:335:GLN:HE22	1.63	0.64
1:B:101:LEU:HD11	1:H:130:LEU:HD21	1.78	0.64
1:C:301:ASP:OD1	1:E:281:ARG:NH1	2.33	0.62
1:E:239:VAL:HG21	1:G:239:VAL:HB	1.80	0.62
1:A:232:ARG:NH2	1:B:266:GLN:OE1	2.31	0.62
1:B:281:ARG:NH1	1:D:301:ASP:OD2	2.32	0.62
1:D:69:GLU:OE2	1:D:77:TYR:OH	2.15	0.62
1:B:300:ALA:HA	1:B:306:GLN:HE22	1.65	0.61
1:G:235:ILE:HD12	2:G:601[B]:1SY:H22	1.64	0.61
1:F:191:ARG:HG3	1:F:253:ARG:HH12	1.65	0.61
1:A:44:LEU:HD22	1:D:44:LEU:HD21	1.83	0.60
1:A:69:GLU:OE2	1:A:77:TYR:OH	2.15	0.60
1:G:194:VAL:HG11	1:G:244:ILE:HD13	1.84	0.60
1:H:216:ASP:O	1:H:220:ARG:NH2	2.35	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:229:THR:HG23	1:G:237:ASP:HA	1.85	0.59
1:E:38:GLU:OE1	1:G:119:TRP:NE1	2.36	0.58
1:C:206:CYS:HB3	1:C:269:PHE:HB2	1.85	0.57
1:E:206:CYS:HB3	1:E:269:PHE:HB2	1.86	0.57
1:C:191:ARG:HG3	1:C:253:ARG:HH12	1.70	0.56
1:H:279:PHE:HE2	1:H:284:ARG:HB3	1.70	0.56
1:D:184:GLN:HG3	1:D:185:HIS:ND1	2.20	0.56
1:B:59:LEU:HD11	1:B:99:LEU:HD12	1.87	0.56
2:G:601[A]:1SY:H18	2:G:601[A]:1SY:H21	1.87	0.56
1:F:197:ARG:HB3	1:F:310:ARG:HG3	1.86	0.56
1:A:301:ASP:OD2	1:C:281:ARG:NH1	2.39	0.56
1:A:330:LEU:O	1:A:334:ARG:HG2	2.05	0.56
1:E:202:LEU:HD11	1:E:311:LEU:HD22	1.87	0.56
1:C:167:TYR:OH	1:C:260:GLU:OE2	2.22	0.55
1:F:69:GLU:OE2	1:H:14:ARG:NE	2.39	0.55
1:D:173:PRO:HG3	1:D:304:GLU:HG2	1.89	0.54
1:B:40:PRO:O	1:B:43:THR:OG1	2.21	0.53
1:E:331:ARG:HH21	1:E:332:HIS:HE1	1.56	0.53
1:F:262:ALA:HB3	1:F:265:LEU:HD12	1.90	0.53
1:E:183:ASN:HA	1:E:187:ASN:HB3	1.90	0.53
1:H:201:LEU:HD22	1:H:261:TYR:HE1	1.73	0.53
1:E:266:GLN:OE1	1:G:232:ARG:NH2	2.35	0.53
1:H:206:CYS:HB3	1:H:269:PHE:HB2	1.90	0.53
1:B:82:TRP:HE1	1:B:86:ARG:HH22	1.58	0.52
1:G:202:LEU:HD11	1:G:311:LEU:HD22	1.91	0.51
1:D:279:PHE:HE2	1:D:284:ARG:HB3	1.75	0.51
1:G:267:THR:O	1:G:271:MET:HG3	2.10	0.51
1:H:178:ARG:HB3	1:H:226:PRO:HG2	1.92	0.51
1:A:332:HIS:HA	1:A:335:GLN:HG3	1.93	0.51
1:D:198:LEU:HD11	1:D:260:GLU:HG3	1.91	0.50
1:H:74:HIS:HA	1:H:78:ARG:O	2.11	0.50
1:H:205:ASP:O	1:H:284:ARG:NH1	2.45	0.50
1:A:302:ALA:O	1:A:305:SER:OG	2.18	0.50
1:G:144:ILE:HA	1:G:147:VAL:HG12	1.94	0.50
1:C:39:PRO:HG2	1:C:42:HIS:HD2	1.75	0.50
1:C:202:LEU:HD11	1:C:311:LEU:HD22	1.94	0.50
1:F:232:ARG:HB2	1:F:238:ARG:HD3	1.93	0.50
1:C:40:PRO:O	1:C:43:THR:OG1	2.22	0.50
1:B:82:TRP:HE1	1:B:86:ARG:NH2	2.09	0.50
1:C:48:VAL:HG21	1:G:44:LEU:HD11	1.93	0.50
1:E:14:ARG:NE	1:G:69:GLU:OE2	2.28	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:239:VAL:HG21	1:H:239:VAL:HB	1.92	0.49
1:B:326:SER:O	1:B:330:LEU:HG	2.12	0.49
1:C:302:ALA:O	1:C:305:SER:OG	2.24	0.49
1:G:221:PHE:HE1	1:G:243:SER:HB2	1.78	0.49
1:E:78:ARG:HD3	1:E:83:ARG:HH12	1.77	0.49
1:E:183:ASN:OD1	1:E:187:ASN:ND2	2.33	0.49
1:F:227:GLN:HG2	1:F:241:SER:HB3	1.95	0.49
1:E:197:ARG:HB3	1:E:310:ARG:HG3	1.94	0.49
1:A:206:CYS:HB3	1:A:269:PHE:HB2	1.95	0.49
2:F:601[B]:1SY:H18	2:F:601[B]:1SY:H21	1.95	0.48
1:H:208:VAL:HG13	1:H:261:TYR:HD2	1.78	0.48
1:E:69:GLU:HB3	1:E:77:TYR:HE2	1.78	0.48
1:C:242:ASN:ND2	1:C:260:GLU:OE2	2.47	0.48
1:D:208:VAL:HG13	1:D:261:TYR:CD2	2.48	0.48
1:H:178:ARG:NH2	1:H:226:PRO:O	2.41	0.48
1:C:306:GLN:O	1:C:310:ARG:NH1	2.46	0.48
1:G:198:LEU:HD11	1:G:260:GLU:HG3	1.94	0.48
2:F:601[B]:1SY:H22	1:H:235:ILE:HD12	1.79	0.48
1:B:206:CYS:HB3	1:B:269:PHE:HB2	1.96	0.48
1:F:243:SER:O	1:F:258:VAL:HG13	2.14	0.48
2:F:601[A]:1SY:H10	2:F:601[A]:1SY:H14	1.96	0.47
1:E:330:LEU:O	1:E:334:ARG:HG2	2.13	0.47
1:F:283:ASP:O	1:F:287:GLN:HG2	2.14	0.47
1:B:39:PRO:HG2	1:B:42:HIS:HD2	1.79	0.47
1:D:206:CYS:HB3	1:D:269:PHE:HB2	1.96	0.47
2:G:601[B]:1SY:H10	2:G:601[B]:1SY:H14	1.96	0.47
1:A:257:CYS:SG	1:A:333:LEU:HD11	2.55	0.47
1:E:59:LEU:HD13	1:E:99:LEU:HD11	1.97	0.47
1:A:197:ARG:HA	1:A:308:ASN:O	2.15	0.47
1:C:38:GLU:OE1	1:D:119:TRP:NE1	2.48	0.47
1:G:197:ARG:NH1	1:G:307:ASN:HA	2.30	0.47
1:H:249:GLU:N	1:H:252:GLN:O	2.44	0.47
1:A:225:LEU:HD12	1:A:226:PRO:HD2	1.97	0.46
1:E:211:ASN:OD1	1:E:213:SER:OG	2.21	0.46
1:C:330:LEU:O	1:C:334:ARG:HG2	2.15	0.46
1:D:173:PRO:HB2	1:D:174:GLU:OE1	2.15	0.46
1:D:242:ASN:ND2	1:D:260:GLU:OE2	2.48	0.46
1:E:178:ARG:NH1	1:E:228:GLN:HB2	2.30	0.46
1:E:208:VAL:HG13	1:E:261:TYR:CD2	2.51	0.46
1:A:93:LEU:HD13	1:D:19:GLN:HB3	1.96	0.46
1:A:249:GLU:N	1:A:252:GLN:O	2.37	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:93:LEU:HD23	1:F:19:GLN:HB3	1.96	0.46
1:D:279:PHE:CE2	1:D:284:ARG:HB3	2.50	0.46
1:F:203:PRO:HG3	1:F:261:TYR:HE1	1.80	0.46
1:A:44:LEU:CD2	1:D:44:LEU:HD21	2.45	0.46
1:E:43:THR:HG22	1:G:119:TRP:HE1	1.81	0.46
1:H:208:VAL:HG13	1:H:261:TYR:CD2	2.51	0.46
1:B:236:LYS:HB3	1:B:236:LYS:HE2	1.69	0.46
1:E:208:VAL:HG13	1:E:261:TYR:HD2	1.80	0.46
1:G:81:TYR:HA	1:G:84:THR:HG22	1.98	0.46
1:B:197:ARG:HH21	1:B:336:GLU:HG3	1.82	0.45
1:E:331:ARG:HH21	1:E:332:HIS:CE1	2.32	0.45
1:B:148:CYS:HB2	1:B:153:PHE:HB2	1.97	0.45
1:F:235:ILE:HG13	2:F:601[A]:1SY:H22	1.81	0.45
1:B:279:PHE:HE2	1:B:284:ARG:HB3	1.82	0.45
1:E:60:LEU:HD22	1:G:25:LEU:HD11	1.99	0.45
1:A:236:LYS:HG3	1:B:221:PHE:CE1	2.51	0.44
1:H:7:HIS:CD2	1:H:9:SER:H	2.36	0.44
1:H:7:HIS:HD2	1:H:9:SER:HB3	1.82	0.44
1:E:225:LEU:HG	1:E:226:PRO:HD2	1.99	0.44
1:C:183:ASN:HA	1:C:187:ASN:HB3	1.98	0.44
1:E:167:TYR:OH	1:E:260:GLU:OE2	2.34	0.44
1:H:184:GLN:HG3	1:H:185:HIS:ND1	2.32	0.44
1:B:202:LEU:HD11	1:B:311:LEU:HD22	2.00	0.44
1:G:225:LEU:HD12	1:G:242:ASN:HB2	2.00	0.44
1:E:267:THR:O	1:E:271:MET:HG3	2.18	0.44
1:G:176:GLN:CD	1:G:176:GLN:H	2.26	0.44
1:A:211:ASN:ND2	1:A:213:SER:OG	2.51	0.43
1:G:173:PRO:HG3	1:G:304:GLU:HG2	2.00	0.43
1:F:69:GLU:HB3	1:F:77:TYR:HE2	1.83	0.43
1:F:206:CYS:HB3	1:F:269:PHE:HB2	1.99	0.43
1:E:228:GLN:NE2	1:E:229:THR:O	2.51	0.43
1:F:123:LEU:HD21	1:H:43:THR:HG23	2.00	0.43
1:C:172:LEU:HD23	1:C:172:LEU:HA	1.87	0.43
1:E:197:ARG:HD3	1:E:310:ARG:HH11	1.83	0.43
1:E:243:SER:O	1:E:258:VAL:HG13	2.19	0.43
1:A:230:GLY:O	1:A:238:ARG:N	2.49	0.43
1:B:212:LEU:HD13	1:B:261:TYR:CE2	2.54	0.43
1:D:74:HIS:HA	1:D:78:ARG:O	2.19	0.43
1:G:45:ARG:HD2	1:G:109:LEU:HD22	1.99	0.43
1:C:236:LYS:HB3	1:C:236:LYS:HE2	1.78	0.43
1:F:230:GLY:O	1:F:238:ARG:N	2.52	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:247:LEU:HD13	1:B:330:LEU:HD23	2.00	0.43
2:G:601[B]:1SY:H21	2:G:601[B]:1SY:H18	2.00	0.43
1:F:236:LYS:HG3	1:H:221:PHE:CE2	2.54	0.43
1:D:217:PRO:O	1:D:220:ARG:NH1	2.52	0.43
1:F:175:LEU:HD21	1:F:198:LEU:HB2	2.01	0.43
1:H:330:LEU:O	1:H:334:ARG:HG2	2.18	0.42
1:C:333:LEU:HD23	1:C:333:LEU:HA	1.90	0.42
1:D:182:TYR:HA	1:D:186:TYR:CD2	2.54	0.42
1:E:280:SER:OG	1:E:281:ARG:N	2.52	0.42
1:A:280:SER:OG	1:A:281:ARG:N	2.52	0.42
1:C:158:GLY:HA3	1:D:155:VAL:HG13	2.02	0.42
1:C:222:LEU:HD23	1:C:223:ASP:HB2	2.01	0.42
1:F:203:PRO:HB3	1:F:314:TYR:CZ	2.54	0.42
1:F:176:GLN:HB2	1:F:180:ARG:NH1	2.34	0.42
1:G:10:ILE:HD13	1:G:289:LYS:HD2	2.01	0.42
1:A:214:MET:HE2	1:A:214:MET:HB3	1.97	0.42
1:B:309:CYS:O	1:B:310:ARG:HD3	2.20	0.42
1:D:95:ARG:HD3	1:D:95:ARG:HA	1.85	0.41
1:B:19:GLN:HB3	1:F:93:LEU:HD13	2.03	0.41
1:B:74:HIS:HA	1:B:78:ARG:O	2.19	0.41
1:F:225:LEU:HG	1:F:226:PRO:HD2	2.02	0.41
2:F:601[B]:1SY:H14	2:F:601[B]:1SY:H10	2.02	0.41
1:H:95:ARG:HA	1:H:95:ARG:HD3	1.84	0.41
1:H:291:PHE:O	1:H:295:LEU:HD23	2.21	0.41
1:E:197:ARG:HD3	1:E:310:ARG:NH1	2.35	0.41
1:F:38:GLU:CD	1:F:39:PRO:HD2	2.46	0.41
1:H:262:ALA:HB3	1:H:265:LEU:HG	2.02	0.41
1:B:180:ARG:HG2	1:B:184:GLN:OE1	2.20	0.41
1:G:222:LEU:HD13	1:G:246:GLU:HB3	2.02	0.41
1:A:78:ARG:NH1	1:A:83:ARG:HH12	2.18	0.41
1:D:331:ARG:HA	1:D:334:ARG:HG3	2.02	0.41
1:E:291:PHE:O	1:E:295:LEU:HD23	2.21	0.41
1:C:249:GLU:N	1:C:252:GLN:O	2.35	0.41
1:G:126:LEU:HD12	1:G:126:LEU:HA	1.92	0.41
2:G:601[A]:1SY:H14	2:G:601[A]:1SY:H10	2.03	0.41
1:D:221:PHE:HE1	1:D:243:SER:HB2	1.86	0.41
1:F:220:ARG:HH11	1:F:248:LEU:HD11	1.85	0.41
1:H:197:ARG:HD3	1:H:310:ARG:CZ	2.51	0.41
1:B:172:LEU:HD23	1:B:172:LEU:HA	1.91	0.41
1:C:243:SER:O	1:C:258:VAL:HG13	2.21	0.41
1:H:267:THR:O	1:H:271:MET:HG3	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:202:LEU:HD11	1:D:311:LEU:HD23	2.02	0.40
1:H:198:LEU:HD11	1:H:260:GLU:HG3	2.02	0.40
1:E:61:ASN:OD1	1:E:132:ILE:HD11	2.21	0.40
1:G:170:LEU:HD21	1:G:232:ARG:HD2	2.03	0.40
1:F:49:LEU:HD23	1:F:49:LEU:HA	1.88	0.40
1:H:222:LEU:HD12	1:H:222:LEU:HA	1.97	0.40
1:G:330:LEU:O	1:G:334:ARG:HG2	2.21	0.40
1:H:7:HIS:CD2	1:H:9:SER:HB3	2.56	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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	324/521 (62%)	302 (93%)	22 (7%)	0	100	100
1	B	323/521 (62%)	305 (94%)	18 (6%)	0	100	100
1	C	322/521 (62%)	301 (94%)	21 (6%)	0	100	100
1	D	322/521 (62%)	300 (93%)	22 (7%)	0	100	100
1	E	322/521 (62%)	311 (97%)	11 (3%)	0	100	100
1	F	322/521 (62%)	307 (95%)	15 (5%)	0	100	100
1	G	322/521 (62%)	307 (95%)	15 (5%)	0	100	100
1	H	322/521 (62%)	307 (95%)	15 (5%)	0	100	100
All	All	2579/4168 (62%)	2440 (95%)	139 (5%)	0	100	100

There are no Ramachandran outliers to report.

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 PDB entries followed by that with respect to all EM entries.

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	277/438 (63%)	277 (100%)	0	100	100
1	B	277/438 (63%)	277 (100%)	0	100	100
1	C	275/438 (63%)	275 (100%)	0	100	100
1	D	275/438 (63%)	274 (100%)	1 (0%)	89	93
1	E	275/438 (63%)	275 (100%)	0	100	100
1	F	275/438 (63%)	274 (100%)	1 (0%)	89	93
1	G	275/438 (63%)	275 (100%)	0	100	100
1	H	275/438 (63%)	275 (100%)	0	100	100
All	All	2204/3504 (63%)	2202 (100%)	2 (0%)	92	96

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	185	HIS
1	F	252	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	16	HIS
1	A	287	GLN
1	A	335	GLN
1	B	55	GLN
1	B	61	ASN
1	B	332	HIS
1	C	61	ASN
1	C	242	ASN
1	C	287	GLN
1	C	315	GLN
1	C	335	GLN
1	E	307	ASN

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Mol	Chain	Res	Type
1	E	335	GLN
1	G	228	GLN
1	G	327	GLN
1	F	55	GLN
1	F	218	ASN
1	F	315	GLN
1	H	7	HIS
1	H	42	HIS
1	H	72	HIS
1	H	128	GLN
1	H	131	ASN
1	H	287	GLN
1	H	327	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](#)

8 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	1SY	B	601[A]	-	41,51,51	2.40	18 (43%)	51,80,80	1.99	7 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	1SY	D	601[A]	-	41,51,51	2.41	17 (41%)	51,80,80	2.02	7 (13%)
2	1SY	B	601[B]	-	41,51,51	2.41	18 (43%)	51,80,80	2.01	8 (15%)
2	1SY	G	601[A]	-	41,51,51	2.44	18 (43%)	51,80,80	1.97	8 (15%)
2	1SY	D	601[B]	-	41,51,51	2.41	18 (43%)	51,80,80	1.99	9 (17%)
2	1SY	G	601[B]	-	41,51,51	2.44	18 (43%)	51,80,80	1.99	8 (15%)
2	1SY	F	601[A]	-	41,51,51	2.44	18 (43%)	51,80,80	1.98	8 (15%)
2	1SY	F	601[B]	-	41,51,51	2.44	18 (43%)	51,80,80	1.96	8 (15%)

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	1SY	B	601[A]	-	-	9/22/62/62	0/6/7/7
2	1SY	D	601[A]	-	-	9/22/62/62	0/6/7/7
2	1SY	B	601[B]	-	-	8/22/62/62	0/6/7/7
2	1SY	G	601[A]	-	-	7/22/62/62	0/6/7/7
2	1SY	D	601[B]	-	-	10/22/62/62	0/6/7/7
2	1SY	G	601[B]	-	-	7/22/62/62	0/6/7/7
2	1SY	F	601[A]	-	-	8/22/62/62	0/6/7/7
2	1SY	F	601[B]	-	-	6/22/62/62	0/6/7/7

All (143) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	601[B]	1SY	P27-O28	5.73	1.75	1.60
2	F	601[A]	1SY	P27-O28	5.73	1.75	1.60
2	G	601[B]	1SY	P27-O28	5.71	1.75	1.60
2	G	601[A]	1SY	P27-O28	5.71	1.75	1.60
2	B	601[A]	1SY	P27-O28	5.63	1.75	1.60
2	D	601[A]	1SY	P27-O28	5.60	1.75	1.60
2	D	601[B]	1SY	P27-O28	5.60	1.75	1.60
2	B	601[B]	1SY	P27-O28	5.59	1.75	1.60
2	G	601[A]	1SY	C40-N41	5.25	1.46	1.34
2	D	601[A]	1SY	C40-N41	5.23	1.46	1.34
2	B	601[A]	1SY	C40-N41	5.20	1.46	1.34
2	D	601[B]	1SY	C40-N41	5.19	1.46	1.34
2	F	601[A]	1SY	C40-N41	5.18	1.46	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	601[B]	1SY	C40-N41	5.18	1.46	1.34
2	G	601[B]	1SY	C40-N41	5.17	1.46	1.34
2	F	601[B]	1SY	C40-N41	5.17	1.46	1.34
2	G	601[B]	1SY	C40-N39	4.71	1.44	1.33
2	F	601[A]	1SY	C40-N39	4.69	1.44	1.33
2	B	601[B]	1SY	C40-N39	4.68	1.44	1.33
2	D	601[B]	1SY	C40-N39	4.67	1.44	1.33
2	F	601[B]	1SY	C40-N39	4.65	1.44	1.33
2	D	601[A]	1SY	C40-N39	4.65	1.44	1.33
2	G	601[A]	1SY	C40-N39	4.63	1.44	1.33
2	B	601[A]	1SY	C40-N39	4.59	1.44	1.33
2	G	601[B]	1SY	P18-O20	4.20	1.71	1.60
2	F	601[A]	1SY	P18-O20	4.18	1.71	1.60
2	G	601[A]	1SY	P18-O20	4.17	1.71	1.60
2	F	601[B]	1SY	P18-O20	4.15	1.71	1.60
2	G	601[A]	1SY	C40-N42	3.97	1.47	1.37
2	F	601[A]	1SY	C40-N42	3.94	1.47	1.37
2	D	601[A]	1SY	P18-O20	3.93	1.70	1.60
2	D	601[A]	1SY	C40-N42	3.92	1.47	1.37
2	B	601[B]	1SY	P18-O20	3.91	1.70	1.60
2	F	601[B]	1SY	C40-N42	3.91	1.47	1.37
2	G	601[B]	1SY	C40-N42	3.90	1.47	1.37
2	D	601[B]	1SY	P18-O20	3.89	1.70	1.60
2	B	601[A]	1SY	P18-O20	3.84	1.70	1.60
2	B	601[A]	1SY	C40-N42	3.78	1.47	1.37
2	B	601[B]	1SY	C40-N42	3.78	1.47	1.37
2	G	601[A]	1SY	O31-C32	3.77	1.46	1.41
2	F	601[A]	1SY	O31-C32	3.72	1.46	1.41
2	F	601[B]	1SY	O31-C32	3.70	1.46	1.41
2	D	601[B]	1SY	C40-N42	3.69	1.46	1.37
2	G	601[B]	1SY	O31-C32	3.64	1.46	1.41
2	F	601[B]	1SY	P18-O17	3.55	1.73	1.59
2	G	601[A]	1SY	P18-O17	3.53	1.73	1.59
2	F	601[A]	1SY	C37-C38	3.53	1.54	1.47
2	G	601[B]	1SY	P18-O17	3.51	1.73	1.59
2	G	601[B]	1SY	C37-C38	3.51	1.54	1.47
2	G	601[A]	1SY	C37-C38	3.50	1.54	1.47
2	F	601[A]	1SY	P18-O17	3.49	1.73	1.59
2	F	601[B]	1SY	C37-C38	3.48	1.54	1.47
2	B	601[A]	1SY	P18-O17	3.40	1.73	1.59
2	D	601[B]	1SY	P18-O17	3.37	1.73	1.59
2	D	601[B]	1SY	C37-C38	3.33	1.54	1.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	601[B]	1SY	C37-C38	3.32	1.54	1.47
2	B	601[A]	1SY	C37-C38	3.31	1.54	1.47
2	D	601[A]	1SY	C37-C38	3.29	1.54	1.47
2	B	601[B]	1SY	C2'-C3'	-3.26	1.45	1.52
2	D	601[A]	1SY	C2'-C3'	-3.26	1.45	1.52
2	D	601[A]	1SY	P18-O17	3.24	1.72	1.59
2	B	601[B]	1SY	P18-O17	3.23	1.72	1.59
2	D	601[B]	1SY	C2'-C3'	-3.17	1.45	1.52
2	B	601[A]	1SY	C2'-C3'	-3.14	1.45	1.52
2	D	601[A]	1SY	C3'-C4'	-3.09	1.44	1.52
2	B	601[B]	1SY	C3'-C4'	-3.08	1.44	1.52
2	D	601[A]	1SY	O31-C32	3.06	1.45	1.41
2	B	601[B]	1SY	O31-C32	3.05	1.45	1.41
2	D	601[B]	1SY	C3'-C4'	-3.03	1.44	1.52
2	B	601[A]	1SY	C3'-C4'	-3.00	1.44	1.52
2	F	601[A]	1SY	C2'-C3'	-3.00	1.46	1.52
2	G	601[A]	1SY	C2'-C3'	-2.98	1.46	1.52
2	B	601[A]	1SY	O31-C32	2.98	1.45	1.41
2	G	601[B]	1SY	C2'-C3'	-2.97	1.46	1.52
2	D	601[B]	1SY	O31-C32	2.97	1.45	1.41
2	B	601[A]	1SY	C5-C4	-2.96	1.33	1.40
2	F	601[B]	1SY	C2'-C3'	-2.96	1.46	1.52
2	D	601[B]	1SY	C5-C4	-2.92	1.33	1.40
2	F	601[A]	1SY	C6-N01	2.91	1.44	1.34
2	F	601[B]	1SY	C6-N01	2.91	1.44	1.34
2	B	601[B]	1SY	C5-C4	-2.91	1.33	1.40
2	G	601[B]	1SY	C6-N01	2.91	1.44	1.34
2	G	601[A]	1SY	C6-N01	2.90	1.44	1.34
2	D	601[A]	1SY	C5-C4	-2.89	1.33	1.40
2	B	601[B]	1SY	C6-N01	2.88	1.44	1.34
2	B	601[A]	1SY	C6-N01	2.87	1.44	1.34
2	D	601[B]	1SY	C6-N01	2.87	1.44	1.34
2	D	601[A]	1SY	C6-N01	2.87	1.44	1.34
2	B	601[B]	1SY	C22-C21	-2.82	1.46	1.52
2	B	601[A]	1SY	C22-C21	-2.82	1.46	1.52
2	D	601[B]	1SY	C22-C21	-2.79	1.46	1.52
2	D	601[A]	1SY	C22-C21	-2.78	1.46	1.52
2	G	601[B]	1SY	C3'-C4'	-2.76	1.45	1.52
2	F	601[A]	1SY	C3'-C4'	-2.75	1.45	1.52
2	F	601[A]	1SY	C5-C4	-2.71	1.33	1.40
2	G	601[B]	1SY	C5-C4	-2.70	1.33	1.40
2	G	601[A]	1SY	C3'-C4'	-2.69	1.45	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	601[B]	1SY	C3'-C4'	-2.67	1.45	1.52
2	B	601[B]	1SY	O43-C38	-2.67	1.19	1.23
2	D	601[A]	1SY	O43-C38	-2.65	1.19	1.23
2	G	601[B]	1SY	P27-O26	2.65	1.70	1.59
2	G	601[A]	1SY	C5-C4	-2.65	1.33	1.40
2	F	601[A]	1SY	P27-O26	2.65	1.70	1.59
2	G	601[A]	1SY	P27-O26	2.63	1.69	1.59
2	D	601[B]	1SY	O43-C38	-2.59	1.19	1.23
2	F	601[B]	1SY	C5-C4	-2.58	1.34	1.40
2	D	601[B]	1SY	C2'-C1'	-2.57	1.49	1.53
2	B	601[A]	1SY	C2'-C1'	-2.57	1.49	1.53
2	F	601[A]	1SY	C22-C21	-2.57	1.47	1.52
2	F	601[B]	1SY	P27-O26	2.57	1.69	1.59
2	B	601[A]	1SY	O43-C38	-2.55	1.19	1.23
2	F	601[B]	1SY	C22-C21	-2.55	1.47	1.52
2	G	601[B]	1SY	C22-C21	-2.54	1.47	1.52
2	G	601[A]	1SY	C22-C21	-2.53	1.47	1.52
2	D	601[A]	1SY	C2'-C1'	-2.53	1.49	1.53
2	B	601[B]	1SY	C2'-C1'	-2.51	1.49	1.53
2	B	601[B]	1SY	P27-O26	2.48	1.69	1.59
2	D	601[A]	1SY	P27-O26	2.47	1.69	1.59
2	G	601[B]	1SY	O43-C38	-2.44	1.19	1.23
2	F	601[B]	1SY	C38-N39	2.40	1.43	1.39
2	F	601[B]	1SY	O43-C38	-2.40	1.19	1.23
2	F	601[A]	1SY	O43-C38	-2.39	1.19	1.23
2	G	601[B]	1SY	C38-N39	2.37	1.43	1.39
2	G	601[A]	1SY	O43-C38	-2.37	1.19	1.23
2	D	601[B]	1SY	P27-O26	2.35	1.68	1.59
2	B	601[A]	1SY	P27-O26	2.34	1.68	1.59
2	G	601[A]	1SY	C38-N39	2.33	1.43	1.39
2	F	601[A]	1SY	C38-N39	2.31	1.43	1.39
2	F	601[B]	1SY	O4'-C1'	2.31	1.44	1.41
2	G	601[B]	1SY	O4'-C1'	2.26	1.44	1.41
2	G	601[A]	1SY	O4'-C1'	2.26	1.44	1.41
2	F	601[A]	1SY	O4'-C1'	2.25	1.44	1.41
2	D	601[B]	1SY	C38-N39	2.21	1.43	1.39
2	F	601[B]	1SY	C2-N3	2.20	1.35	1.32
2	B	601[B]	1SY	C38-N39	2.16	1.43	1.39
2	B	601[A]	1SY	C38-N39	2.14	1.43	1.39
2	G	601[A]	1SY	C2-N3	2.14	1.35	1.32
2	B	601[A]	1SY	C2-N3	2.13	1.35	1.32
2	G	601[B]	1SY	C2-N3	2.13	1.35	1.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	601[A]	1SY	C2-N3	2.09	1.35	1.32
2	D	601[A]	1SY	C38-N39	2.07	1.43	1.39
2	D	601[B]	1SY	C2-N3	2.05	1.35	1.32
2	B	601[B]	1SY	C2-N3	2.05	1.35	1.32

All (63) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	601[B]	1SY	C5-C6-N01	7.98	132.48	120.35
2	D	601[A]	1SY	C5-C6-N01	7.94	132.42	120.35
2	F	601[A]	1SY	C5-C6-N01	7.93	132.41	120.35
2	B	601[B]	1SY	C5-C6-N01	7.90	132.35	120.35
2	G	601[A]	1SY	C5-C6-N01	7.86	132.29	120.35
2	F	601[B]	1SY	C5-C6-N01	7.80	132.21	120.35
2	B	601[A]	1SY	C5-C6-N01	7.73	132.10	120.35
2	D	601[B]	1SY	C5-C6-N01	7.72	132.09	120.35
2	F	601[A]	1SY	N3-C2-N1	-5.61	119.91	128.68
2	B	601[B]	1SY	N3-C2-N1	-5.61	119.91	128.68
2	G	601[B]	1SY	N3-C2-N1	-5.61	119.91	128.68
2	D	601[A]	1SY	N3-C2-N1	-5.60	119.92	128.68
2	B	601[A]	1SY	N3-C2-N1	-5.58	119.96	128.68
2	D	601[B]	1SY	N3-C2-N1	-5.55	120.01	128.68
2	G	601[A]	1SY	N3-C2-N1	-5.52	120.05	128.68
2	F	601[B]	1SY	N3-C2-N1	-5.48	120.11	128.68
2	D	601[A]	1SY	N01-C6-N1	-5.32	107.53	118.57
2	B	601[B]	1SY	N01-C6-N1	-5.29	107.59	118.57
2	D	601[B]	1SY	N01-C6-N1	-5.27	107.63	118.57
2	B	601[A]	1SY	N01-C6-N1	-5.26	107.66	118.57
2	G	601[B]	1SY	N01-C6-N1	-5.24	107.70	118.57
2	F	601[A]	1SY	N01-C6-N1	-5.23	107.71	118.57
2	G	601[A]	1SY	N01-C6-N1	-5.20	107.78	118.57
2	F	601[B]	1SY	N01-C6-N1	-5.19	107.79	118.57
2	D	601[B]	1SY	P27-O28-C3'	-3.27	107.49	119.41
2	B	601[A]	1SY	P27-O28-C3'	-3.26	107.55	119.41
2	D	601[A]	1SY	P27-O28-C3'	-3.19	107.80	119.41
2	B	601[B]	1SY	P27-O28-C3'	-3.16	107.89	119.41
2	D	601[B]	1SY	O30-P27-O28	3.04	118.76	106.78
2	F	601[A]	1SY	P27-O28-C3'	-3.03	108.37	119.41
2	B	601[A]	1SY	O30-P27-O28	3.00	118.61	106.78
2	G	601[B]	1SY	P27-O28-C3'	-2.97	108.60	119.41
2	G	601[A]	1SY	P27-O28-C3'	-2.93	108.73	119.41
2	B	601[B]	1SY	O30-P27-O28	2.92	118.32	106.78

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	601[B]	1SY	P27-O28-C3'	-2.92	108.77	119.41
2	D	601[A]	1SY	O30-P27-O28	2.91	118.27	106.78
2	F	601[B]	1SY	O30-P27-O28	2.82	117.92	106.78
2	G	601[A]	1SY	O30-P27-O28	2.80	117.82	106.78
2	F	601[B]	1SY	P18-O20-C21	-2.76	109.36	119.41
2	G	601[A]	1SY	P18-O20-C21	-2.75	109.39	119.41
2	G	601[B]	1SY	O30-P27-O28	2.65	117.25	106.78
2	G	601[A]	1SY	C34-N35-C37	2.63	108.00	102.99
2	G	601[B]	1SY	C34-N35-C37	2.63	108.00	102.99
2	D	601[A]	1SY	C34-N35-C37	2.62	107.98	102.99
2	F	601[A]	1SY	C34-N35-C37	2.62	107.98	102.99
2	F	601[B]	1SY	C34-N35-C37	2.62	107.98	102.99
2	F	601[A]	1SY	O30-P27-O28	2.62	117.11	106.78
2	B	601[B]	1SY	C34-N35-C37	2.59	107.93	102.99
2	D	601[B]	1SY	C34-N35-C37	2.59	107.93	102.99
2	B	601[A]	1SY	C34-N35-C37	2.58	107.91	102.99
2	B	601[A]	1SY	P18-O20-C21	-2.53	110.18	119.41
2	G	601[B]	1SY	P18-O20-C21	-2.52	110.22	119.41
2	F	601[A]	1SY	P18-O20-C21	-2.52	110.23	119.41
2	D	601[B]	1SY	P18-O20-C21	-2.50	110.33	119.41
2	D	601[A]	1SY	P18-O20-C21	-2.36	110.83	119.41
2	B	601[B]	1SY	P18-O20-C21	-2.31	111.00	119.41
2	B	601[B]	1SY	O31-C32-C21	2.16	110.34	106.59
2	G	601[B]	1SY	C1'-N9-C4	2.04	130.22	126.64
2	G	601[A]	1SY	O30-P27-O26	2.03	117.18	107.75
2	D	601[B]	1SY	P27-O26-C25	-2.03	109.79	121.68
2	F	601[A]	1SY	O30-P27-O26	2.03	117.16	107.75
2	D	601[B]	1SY	O31-C32-C21	2.02	110.09	106.59
2	F	601[B]	1SY	C1'-N9-C4	2.02	130.18	126.64

There are no chirality outliers.

All (64) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	601[A]	1SY	C16-O17-P18-O44
2	B	601[A]	1SY	C21-O20-P18-O17
2	B	601[A]	1SY	C25-O26-P27-O28
2	B	601[A]	1SY	C25-O26-P27-O29
2	B	601[A]	1SY	C25-O26-P27-O30
2	B	601[B]	1SY	C21-O20-P18-O17
2	B	601[B]	1SY	C25-O26-P27-O28
2	B	601[B]	1SY	C25-O26-P27-O29

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Mol	Chain	Res	Type	Atoms
2	B	601[B]	1SY	C25-O26-P27-O30
2	D	601[A]	1SY	C21-O20-P18-O17
2	D	601[A]	1SY	C25-O26-P27-O28
2	D	601[A]	1SY	C25-O26-P27-O29
2	D	601[A]	1SY	C25-O26-P27-O30
2	D	601[B]	1SY	C16-O17-P18-O44
2	D	601[B]	1SY	C21-O20-P18-O17
2	D	601[B]	1SY	C25-O26-P27-O28
2	D	601[B]	1SY	C25-O26-P27-O29
2	D	601[B]	1SY	C25-O26-P27-O30
2	G	601[A]	1SY	C21-O20-P18-O17
2	G	601[A]	1SY	C21-O20-P18-O44
2	G	601[B]	1SY	C16-O17-P18-O44
2	G	601[B]	1SY	C21-O20-P18-O17
2	G	601[B]	1SY	C21-O20-P18-O44
2	G	601[B]	1SY	O31-C24-C25-O26
2	F	601[A]	1SY	C16-O17-P18-O44
2	F	601[A]	1SY	C21-O20-P18-O17
2	F	601[A]	1SY	O31-C24-C25-O26
2	F	601[B]	1SY	C21-O20-P18-O17
2	B	601[B]	1SY	C22-C24-C25-O26
2	G	601[A]	1SY	O31-C24-C25-O26
2	F	601[B]	1SY	O31-C24-C25-O26
2	B	601[A]	1SY	C22-C24-C25-O26
2	B	601[A]	1SY	O31-C24-C25-O26
2	B	601[B]	1SY	O31-C24-C25-O26
2	D	601[A]	1SY	C22-C24-C25-O26
2	D	601[A]	1SY	O31-C24-C25-O26
2	D	601[B]	1SY	C22-C24-C25-O26
2	D	601[B]	1SY	O31-C24-C25-O26
2	G	601[B]	1SY	C22-C24-C25-O26
2	F	601[A]	1SY	C22-C24-C25-O26
2	G	601[B]	1SY	C25-O26-P27-O28
2	F	601[A]	1SY	C25-O26-P27-O28
2	F	601[B]	1SY	C22-C24-C25-O26
2	G	601[A]	1SY	C22-C24-C25-O26
2	B	601[A]	1SY	C21-O20-P18-O44
2	B	601[B]	1SY	C21-O20-P18-O44
2	D	601[A]	1SY	C21-O20-P18-O44
2	D	601[B]	1SY	C21-O20-P18-O44
2	F	601[A]	1SY	C21-O20-P18-O44
2	F	601[B]	1SY	C21-O20-P18-O44

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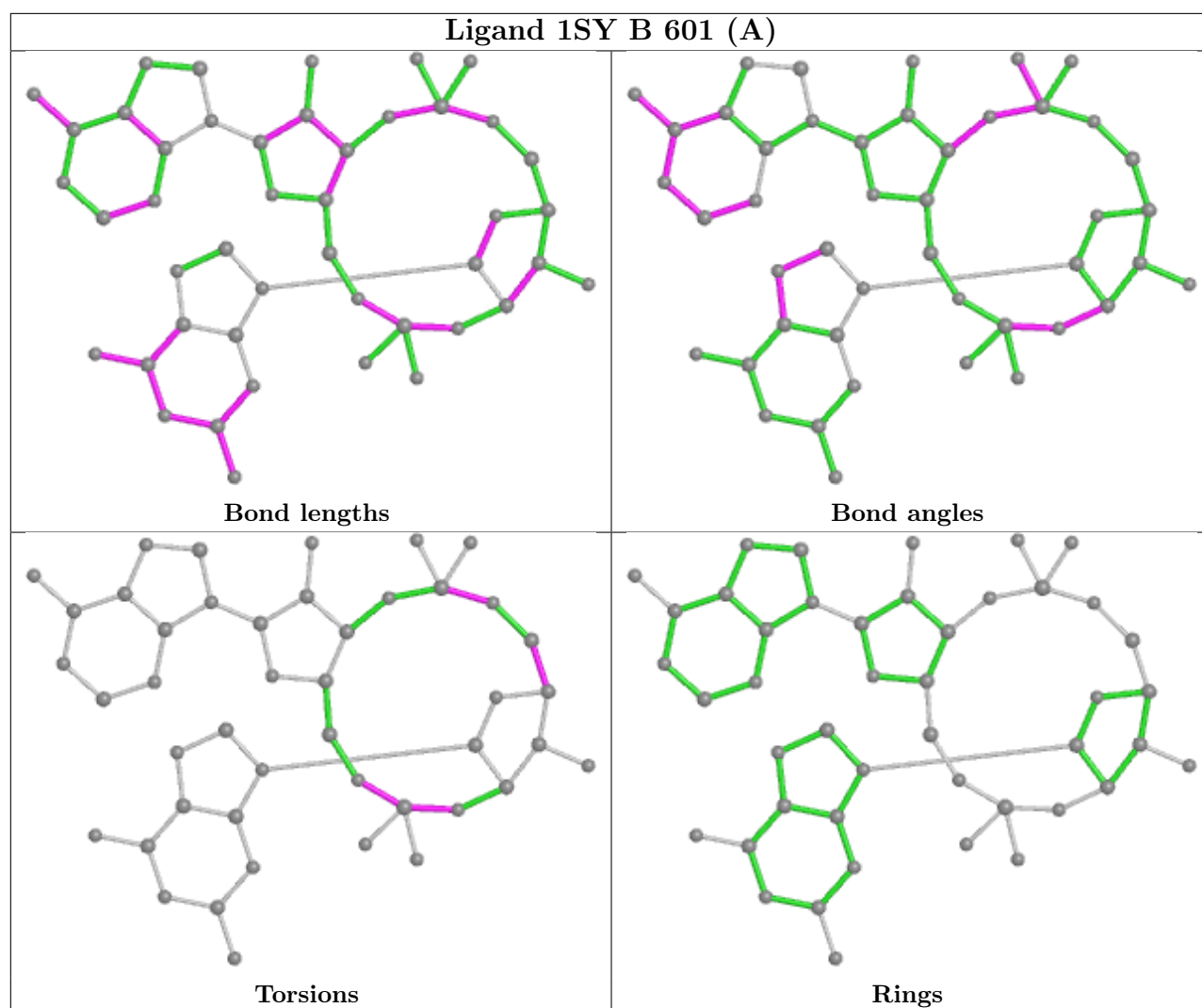
Mol	Chain	Res	Type	Atoms
2	F	601[A]	1SY	C16-O17-P18-O20
2	B	601[A]	1SY	C16-O17-P18-O19
2	B	601[B]	1SY	C16-O17-P18-O19
2	D	601[A]	1SY	C16-O17-P18-O19
2	D	601[B]	1SY	C16-O17-P18-O19
2	G	601[A]	1SY	C16-O17-P18-O19
2	G	601[B]	1SY	C16-O17-P18-O19
2	F	601[A]	1SY	C16-O17-P18-O19
2	F	601[B]	1SY	C16-O17-P18-O19
2	G	601[A]	1SY	C25-O26-P27-O28
2	F	601[B]	1SY	C25-O26-P27-O28
2	D	601[A]	1SY	C21-O20-P18-O19
2	D	601[B]	1SY	C21-O20-P18-O19
2	G	601[A]	1SY	C25-O26-P27-O29

There are no ring outliers.

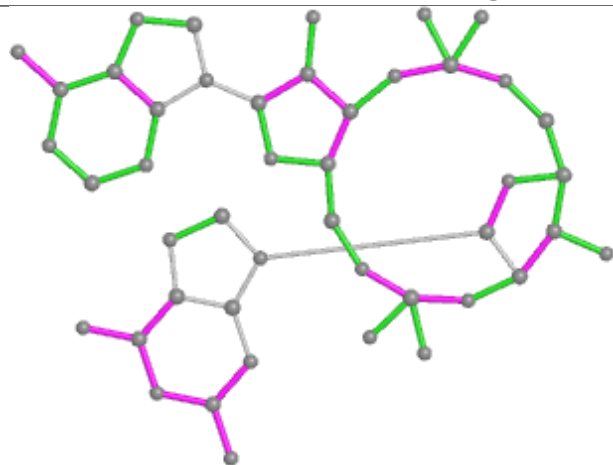
6 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	601[B]	1SY	1	0
2	G	601[A]	1SY	2	0
2	D	601[B]	1SY	1	0
2	G	601[B]	1SY	3	0
2	F	601[A]	1SY	2	0
2	F	601[B]	1SY	3	0

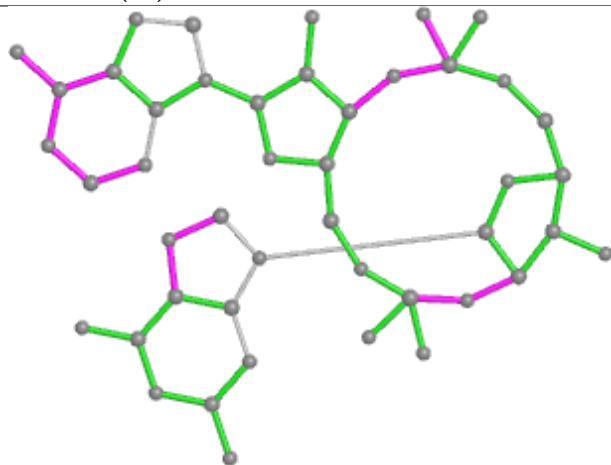
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.



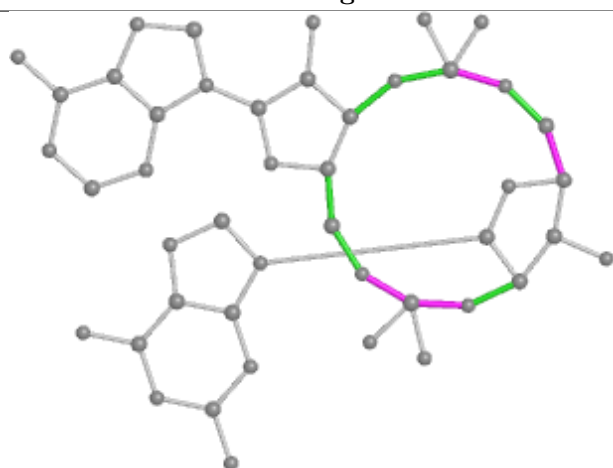
Ligand 1SY D 601 (A)



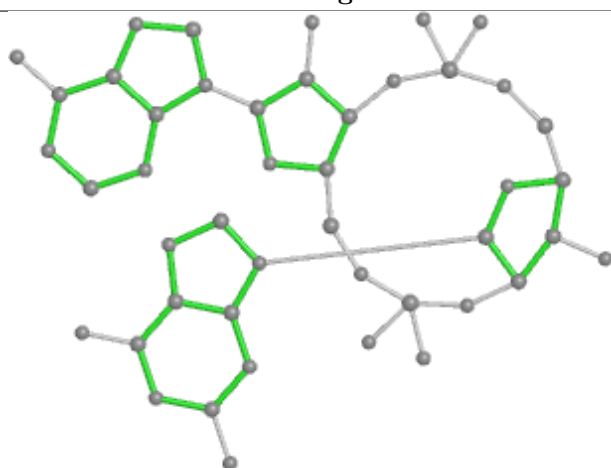
Bond lengths



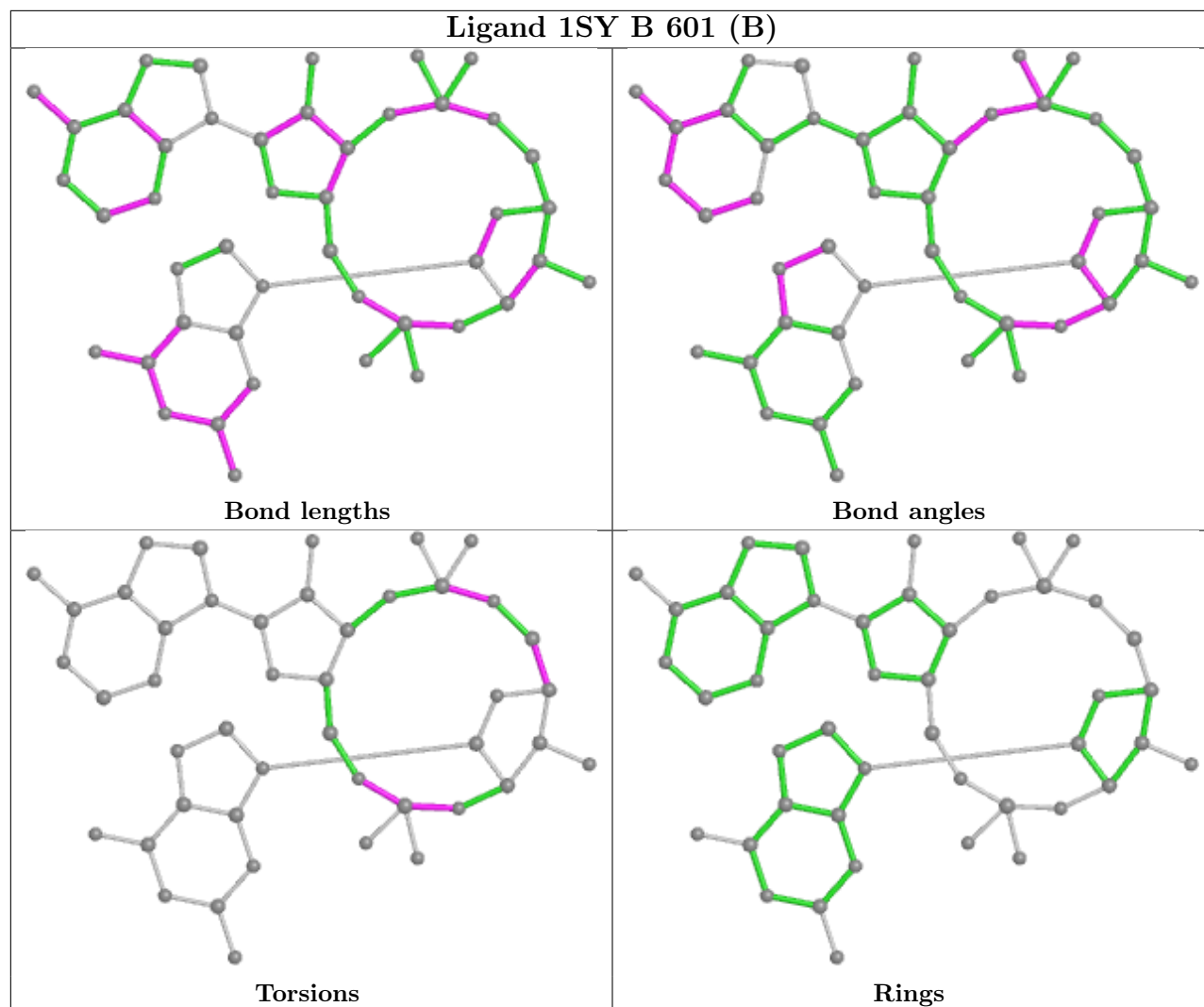
Bond angles

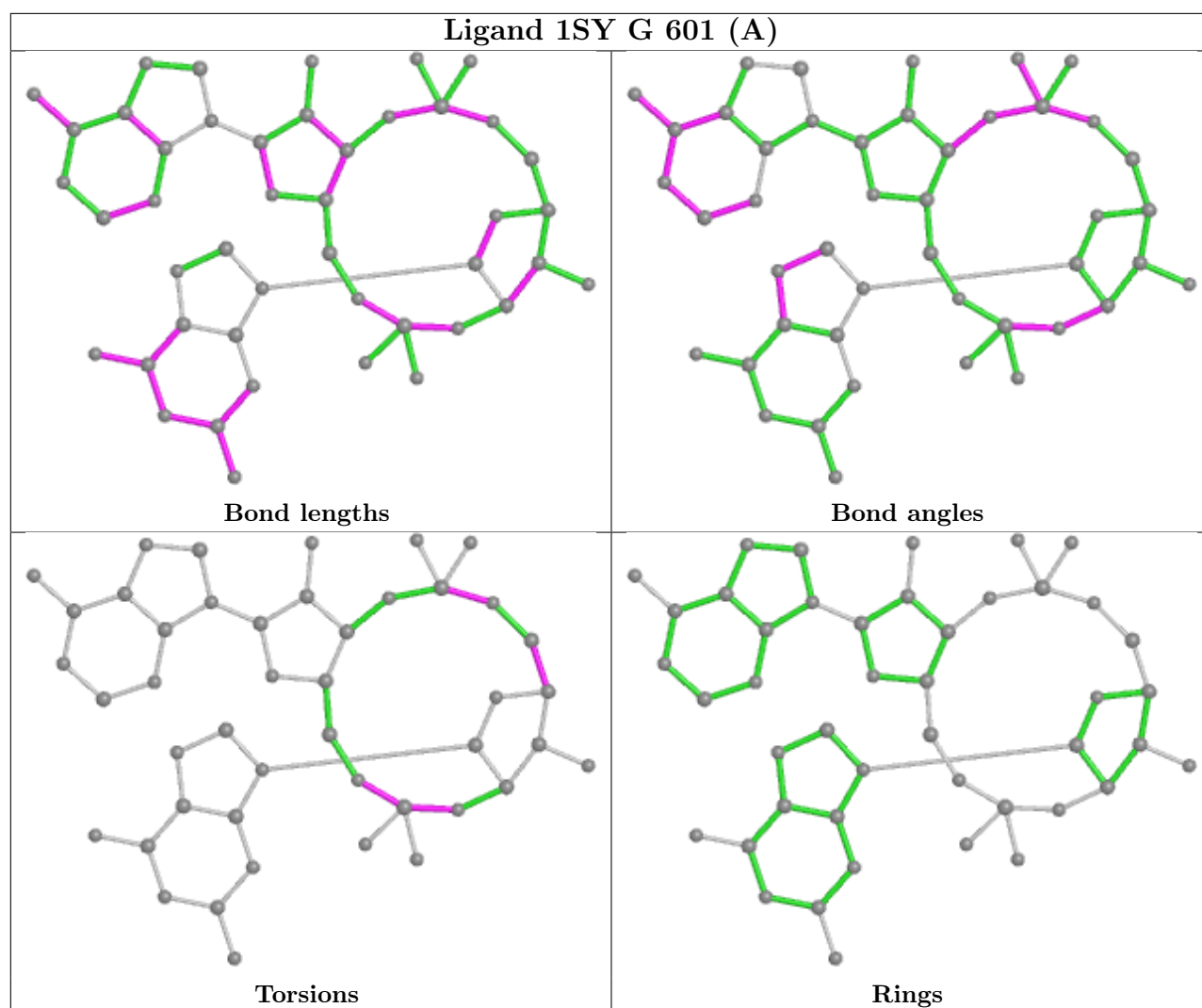


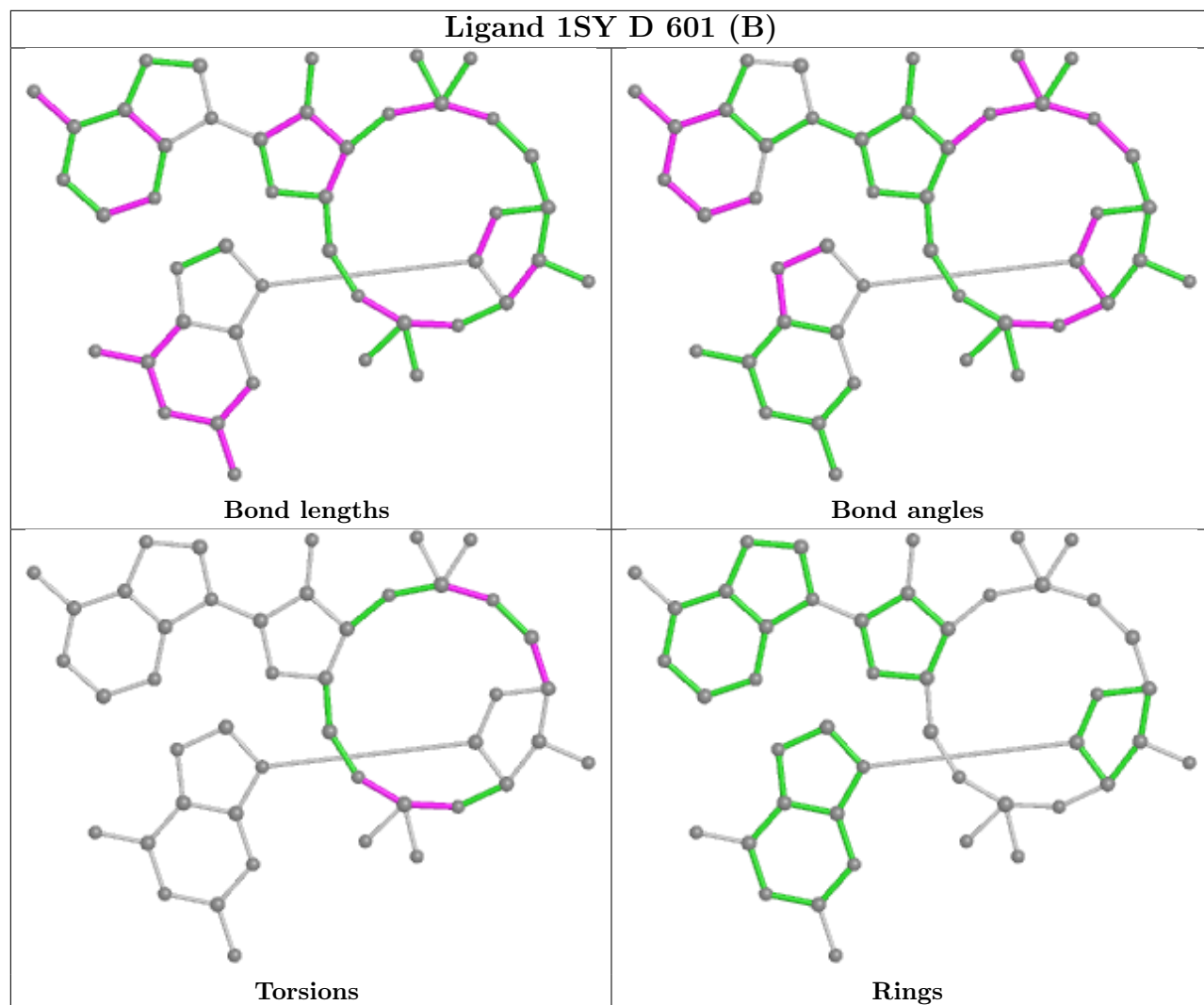
Torsions



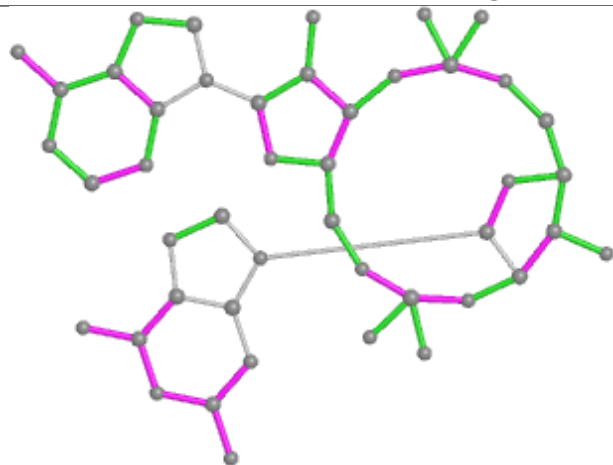
Rings



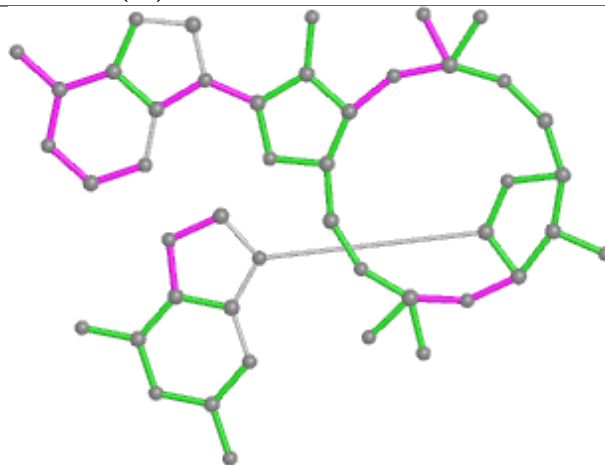




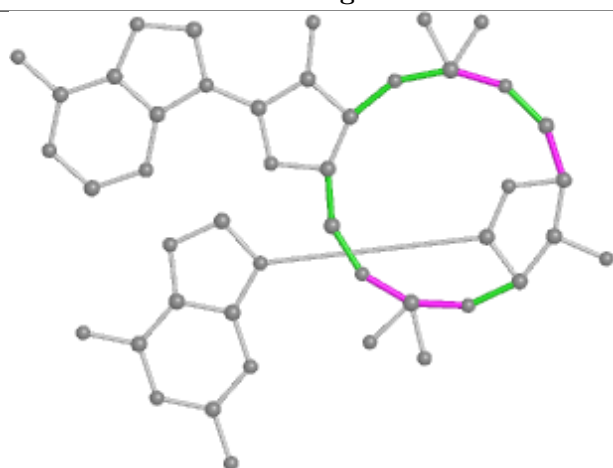
Ligand 1SY G 601 (B)



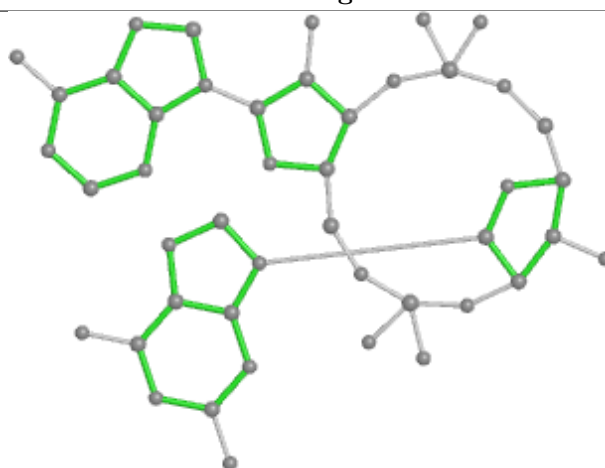
Bond lengths



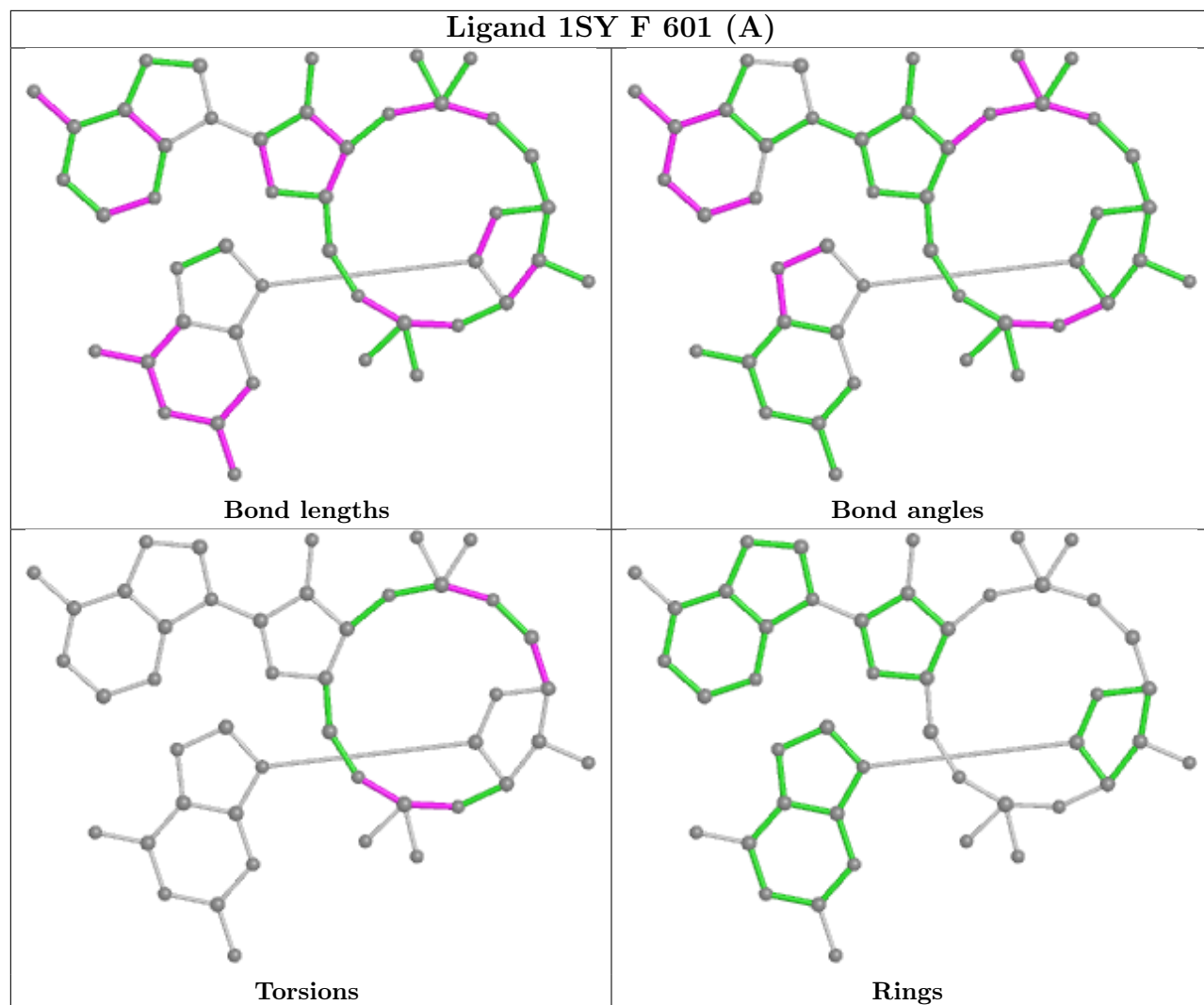
Bond angles

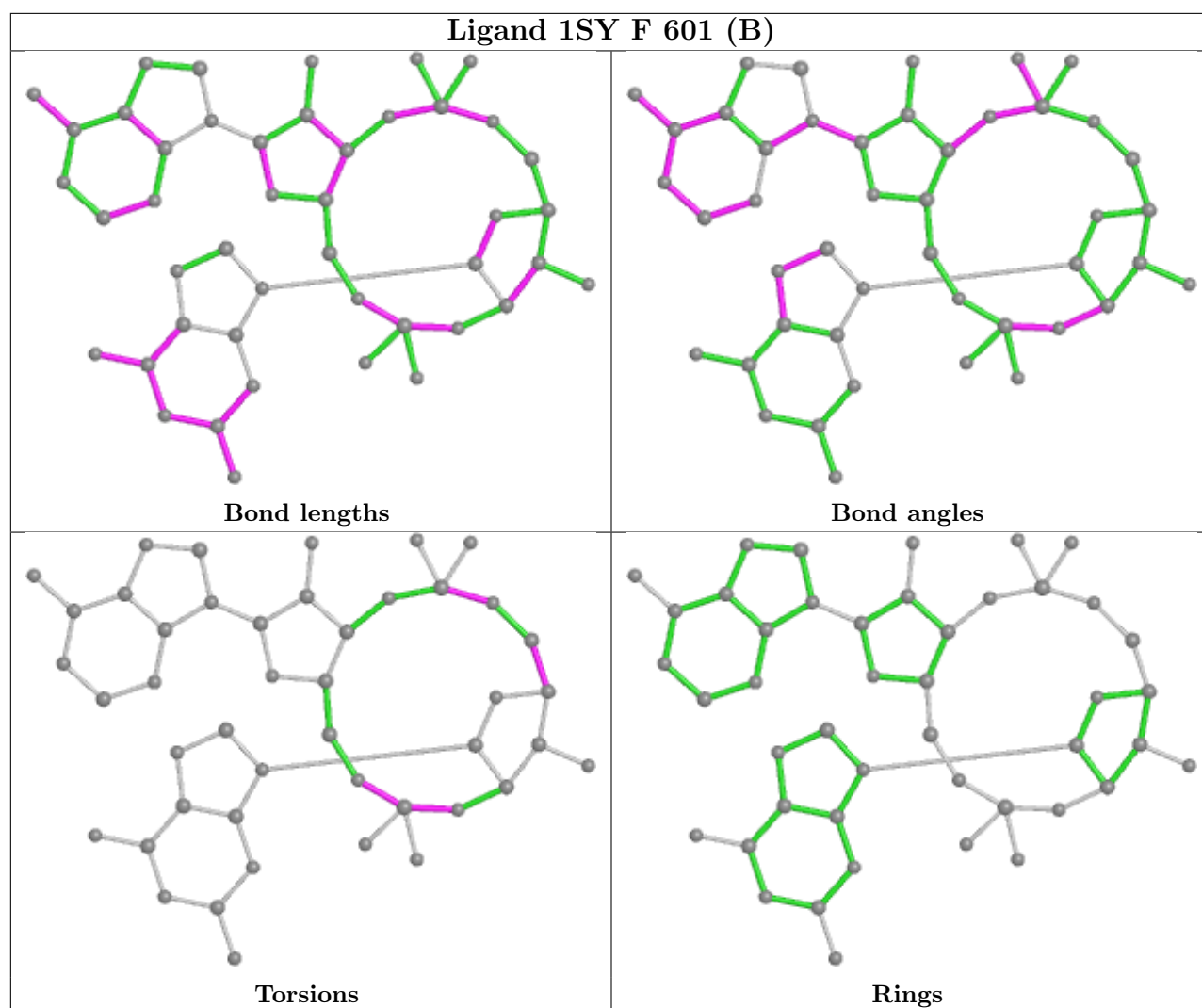


Torsions



Rings





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.