



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 25, 2024 – 01:08 AM EDT

PDB ID : 6LXY
Title : IRAK4 in complex with inhibitor
Authors : Ghosh, K.; Bose, S.
Deposited on : 2020-02-12
Resolution : 2.19 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.37.1
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.37.1

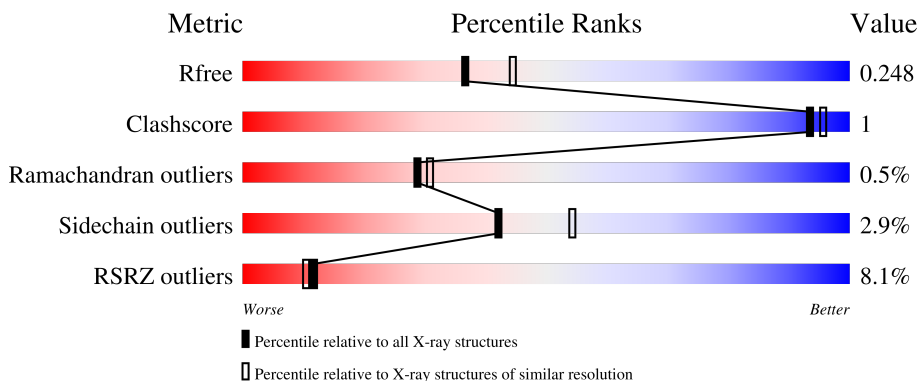
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

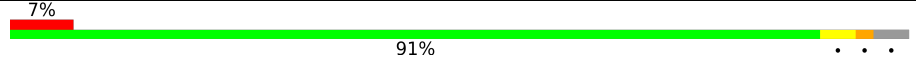
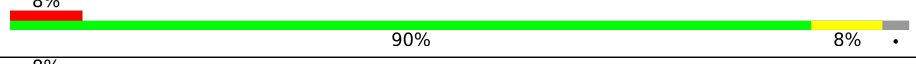
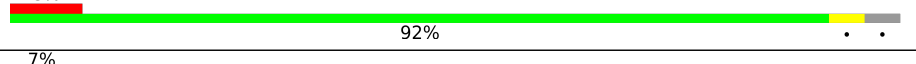

The reported resolution of this entry is 2.19 Å.

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	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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	305	 7% 91%
1	B	305	 8% 90% 8%
1	D	305	 8% 92%
1	E	305	 7% 89% 5% 6%

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 9133 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.

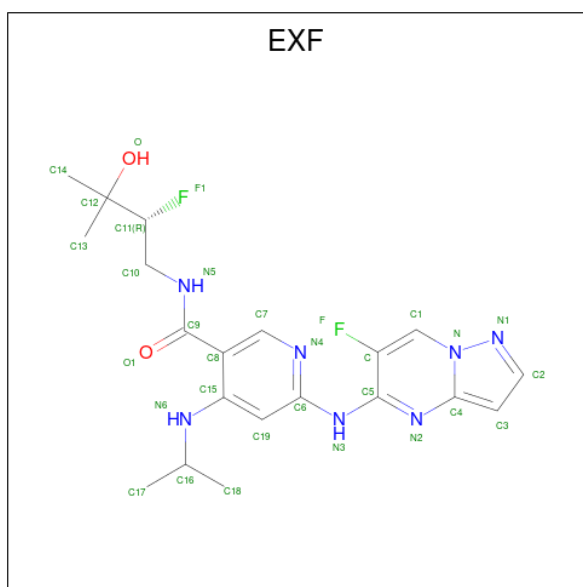
- Molecule 1 is a protein called Interleukin-1 receptor-associated kinase 4.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	P	S			
1	A	294	2182	1373	370	423	2	14	0	0	0
1	B	297	2221	1400	375	430	2	14	0	0	0
1	D	293	2178	1373	370	419	2	14	0	0	0
1	E	288	2131	1345	360	410	2	14	0	0	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	156	GLY	-	expression tag	UNP Q9NWZ3
A	157	ALA	-	expression tag	UNP Q9NWZ3
A	158	MET	-	expression tag	UNP Q9NWZ3
A	159	GLY	-	expression tag	UNP Q9NWZ3
B	156	GLY	-	expression tag	UNP Q9NWZ3
B	157	ALA	-	expression tag	UNP Q9NWZ3
B	158	MET	-	expression tag	UNP Q9NWZ3
B	159	GLY	-	expression tag	UNP Q9NWZ3
D	156	GLY	-	expression tag	UNP Q9NWZ3
D	157	ALA	-	expression tag	UNP Q9NWZ3
D	158	MET	-	expression tag	UNP Q9NWZ3
D	159	GLY	-	expression tag	UNP Q9NWZ3
E	156	GLY	-	expression tag	UNP Q9NWZ3
E	157	ALA	-	expression tag	UNP Q9NWZ3
E	158	MET	-	expression tag	UNP Q9NWZ3
E	159	GLY	-	expression tag	UNP Q9NWZ3

- Molecule 2 is N-[(2R)-2-fluoranyl-3-methyl-3-oxidanyl-butyl]-6-[(6-fluoranylpyrazolo[1,5-a]pyrimidin-5-yl)amino]-4-(propan-2-ylamino)pyridine-3-carboxamide (three-letter code: EXF) (formula: C₂₀H₂₅F₂N₇O₂) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	F	N			O
2	A	1	Total	C	F	N	O	0	0
			31	20	2	7	2		
2	B	1	Total	C	F	N	O	0	0
			31	20	2	7	2		
2	D	1	Total	C	F	N	O	0	0
			31	20	2	7	2		
2	E	1	Total	C	F	N	O	0	0
			31	20	2	7	2		

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	1	Total O S 5 4 1	0	0
3	D	1	Total O S 5 4 1	0	0
3	E	1	Total O S 5 4 1	0	0

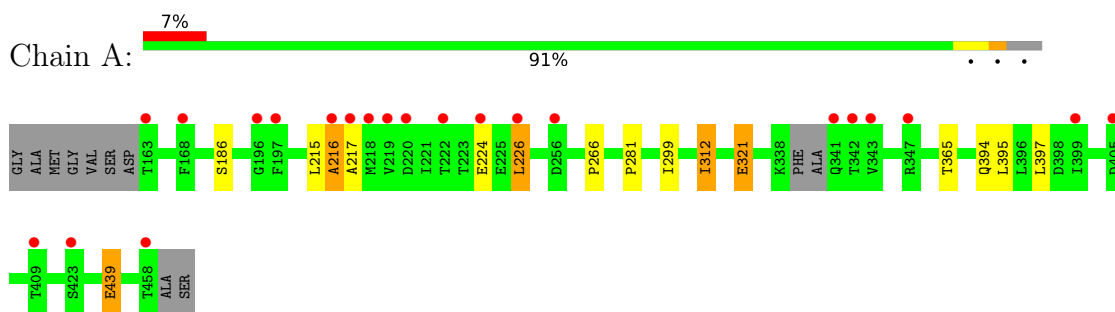
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	76	Total O 76 76	0	0
4	B	82	Total O 82 82	0	0
4	D	61	Total O 61 61	0	0
4	E	63	Total O 63 63	0	0

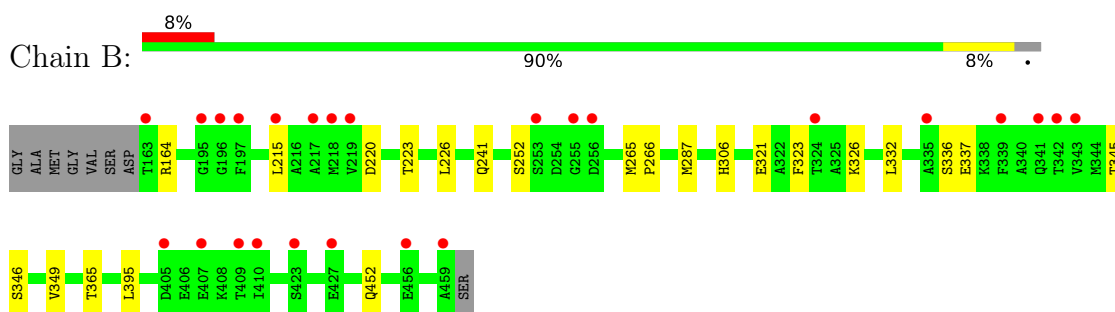
3 Residue-property plots [i](#)

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.

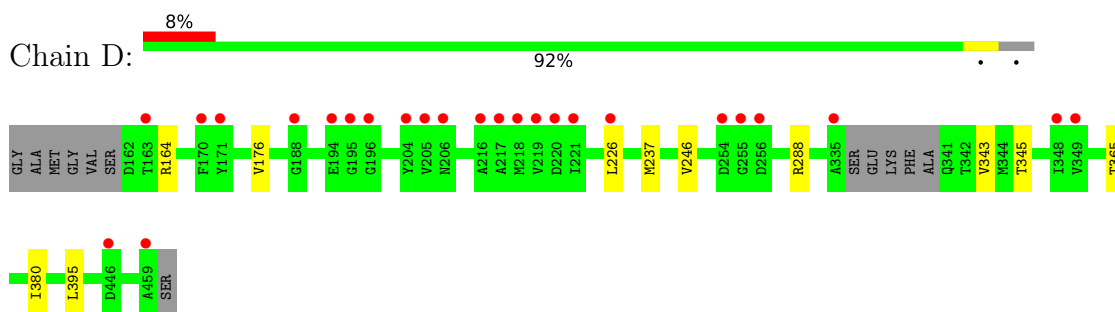
- Molecule 1: Interleukin-1 receptor-associated kinase 4



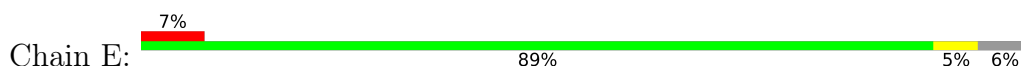
- Molecule 1: Interleukin-1 receptor-associated kinase 4

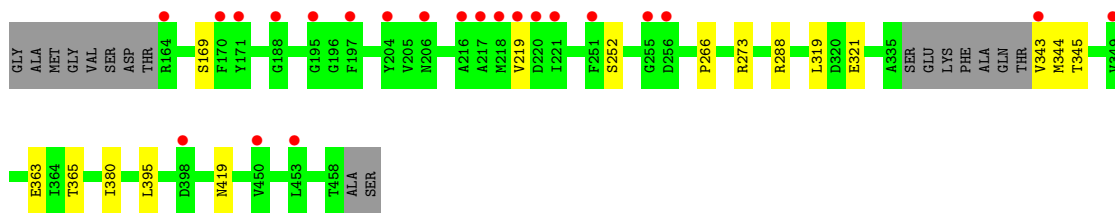


- Molecule 1: Interleukin-1 receptor-associated kinase 4



- Molecule 1: Interleukin-1 receptor-associated kinase 4





4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	135.67Å 140.81Å 86.28Å 90.00° 125.70° 90.00°	Depositor
Resolution (Å)	48.08 – 2.19 49.66 – 2.19	Depositor EDS
% Data completeness (in resolution range)	96.5 (48.08-2.19) 96.5 (49.66-2.19)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.65 (at 2.20Å)	Xtrriage
Refinement program	BUSTER	Depositor
R, R_{free}	0.201 , 0.231 0.214 , 0.248	Depositor DCC
R_{free} test set	3253 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	29.2	Xtrriage
Anisotropy	0.487	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 64.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	9133	wwPDB-VP
Average B, all atoms (Å ²)	43.0	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 29.46 % 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 1.5430e-03. 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, SEP, EXF, TPO

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	0.49	0/2198	0.64	0/2986
1	B	0.50	0/2239	0.64	0/3038
1	D	0.48	0/2193	0.61	0/2974
1	E	0.48	0/2147	0.62	0/2915
All	All	0.49	0/8777	0.63	0/11913

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	2182	0	2042	8	0
1	B	2221	0	2087	9	0
1	D	2178	0	2050	3	0
1	E	2131	0	1981	5	0
2	A	31	0	0	0	0
2	B	31	0	0	0	0
2	D	31	0	0	0	0
2	E	31	0	0	0	0
3	B	5	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	D	5	0	0	0	0
3	E	5	0	0	0	0
4	A	76	0	0	0	0
4	B	82	0	0	0	0
4	D	61	0	0	0	0
4	E	63	0	0	0	0
All	All	9133	0	8160	23	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 1.

All (23) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:217:ALA:HB2	1:A:226:LEU:HD21	1.59	0.83
1:A:266:PRO:HG2	1:A:321:GLU:HG3	1.67	0.76
1:B:287:MET:HE1	1:B:323:PHE:HB2	1.89	0.55
1:B:265:MET:CE	1:B:326:LYS:HD2	2.41	0.51
1:B:215:LEU:HD23	1:B:226:LEU:HD22	1.92	0.51
1:D:237:MET:HE1	1:D:246:VAL:HG23	1.92	0.50
1:B:265:MET:HE2	1:B:326:LYS:HB2	1.94	0.50
1:A:439:GLU:H	1:A:439:GLU:CD	2.16	0.50
1:A:186:SER:HB2	1:E:419:ASN:HB2	1.94	0.49
1:A:215:LEU:O	1:A:216:ALA:C	2.51	0.49
1:B:332:LEU:HD22	1:B:349:VAL:HG21	1.95	0.48
1:E:266:PRO:HG2	1:E:321:GLU:HB3	1.96	0.47
1:E:273:ARG:HG3	1:E:319:LEU:HD12	1.97	0.47
1:B:287:MET:CE	1:B:323:PHE:HB2	2.45	0.46
1:E:344:MET:CE	1:E:363:GLU:HG2	2.48	0.44
1:D:237:MET:CE	1:D:246:VAL:HG23	2.48	0.43
1:A:321:GLU:H	1:A:321:GLU:CD	2.22	0.43
1:A:299:ILE:HD11	1:A:312:ILE:HD13	2.01	0.42
1:A:281:PRO:HD3	1:B:321:GLU:HB3	2.01	0.42
1:D:288:ARG:HB3	1:D:380:ILE:HG23	2.01	0.42
1:B:306:HIS:HB3	1:B:336:SER:O	2.20	0.42
1:B:266:PRO:HG2	1:B:321:GLU:CD	2.40	0.42
1:E:288:ARG:HB3	1:E:380:ILE:HG23	2.03	0.41

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	288/305 (94%)	284 (99%)	3 (1%)	1 (0%)	41	46
1	B	293/305 (96%)	285 (97%)	6 (2%)	2 (1%)	22	22
1	D	287/305 (94%)	277 (96%)	8 (3%)	2 (1%)	22	22
1	E	282/305 (92%)	273 (97%)	8 (3%)	1 (0%)	34	37
All	All	1150/1220 (94%)	1119 (97%)	25 (2%)	6 (0%)	29	31

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	220	ASP
1	D	343	VAL
1	B	164	ARG
1	E	219	VAL
1	A	216	ALA
1	D	164	ARG

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	219/261 (84%)	210 (96%)	9 (4%)	30	39
1	B	222/261 (85%)	215 (97%)	7 (3%)	39	50
1	D	216/261 (83%)	212 (98%)	4 (2%)	57	71
1	E	209/261 (80%)	204 (98%)	5 (2%)	49	62

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	866/1044 (83%)	841 (97%)	25 (3%)	42 54

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	224	GLU
1	A	226	LEU
1	A	312	ILE
1	A	321	GLU
1	A	365	THR
1	A	394	GLN
1	A	395	LEU
1	A	397	LEU
1	A	439	GLU
1	B	223	THR
1	B	241	GLN
1	B	252	SER
1	B	337	GLU
1	B	365	THR
1	B	395	LEU
1	B	452	GLN
1	D	176	VAL
1	D	226	LEU
1	D	365	THR
1	D	395	LEU
1	E	169	SER
1	E	252	SER
1	E	343	VAL
1	E	365	THR
1	E	395	LEU

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

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

8 non-standard protein/DNA/RNA residues 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
1	SEP	E	346	1	8,9,10	0.92	0	8,12,14	1.07	0
1	TPO	A	345	1	8,10,11	1.08	0	10,14,16	1.06	0
1	SEP	A	346	1	8,9,10	0.83	0	8,12,14	1.19	0
1	TPO	E	345	1	8,10,11	1.22	1 (12%)	10,14,16	1.11	1 (10%)
1	SEP	B	346	1	8,9,10	0.82	0	8,12,14	1.81	2 (25%)
1	TPO	D	345	1	8,10,11	1.22	2 (25%)	10,14,16	0.86	0
1	SEP	D	346	1	8,9,10	0.92	0	8,12,14	0.96	0
1	TPO	B	345	1	8,10,11	1.02	0	10,14,16	1.06	1 (10%)

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
1	SEP	E	346	1	-	0/5/8/10	-
1	TPO	A	345	1	-	3/9/11/13	-
1	SEP	A	346	1	-	0/5/8/10	-
1	TPO	E	345	1	-	3/9/11/13	-
1	SEP	B	346	1	-	0/5/8/10	-
1	TPO	D	345	1	-	3/9/11/13	-
1	SEP	D	346	1	-	0/5/8/10	-
1	TPO	B	345	1	-	3/9/11/13	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	345	TPO	CG2-CB	2.13	1.56	1.51
1	D	345	TPO	CG2-CB	2.07	1.56	1.51
1	D	345	TPO	CB-CA	2.07	1.58	1.53

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	346	SEP	P-OG-CB	-3.05	109.88	118.30
1	B	346	SEP	O3P-P-OG	3.05	114.85	106.73
1	B	345	TPO	O2P-P-OG1	2.12	115.47	105.99
1	E	345	TPO	O2P-P-OG1	2.08	115.31	105.99

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	345	TPO	N-CA-CB-OG1
1	B	345	TPO	N-CA-CB-OG1
1	B	345	TPO	CB-OG1-P-O1P
1	D	345	TPO	N-CA-CB-OG1
1	E	345	TPO	N-CA-CB-OG1
1	E	345	TPO	CB-OG1-P-O1P
1	A	345	TPO	CB-OG1-P-O1P
1	D	345	TPO	CB-OG1-P-O1P
1	A	345	TPO	O-C-CA-CB
1	B	345	TPO	O-C-CA-CB
1	D	345	TPO	O-C-CA-CB
1	E	345	TPO	O-C-CA-CB

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

7 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	EXF	E	502	-	26,33,33	2.12	8 (30%)	31,48,48	1.59	2 (6%)
2	EXF	B	502	-	26,33,33	1.96	9 (34%)	31,48,48	1.66	4 (12%)
3	SO4	B	501	-	4,4,4	0.21	0	6,6,6	0.11	0
3	SO4	D	501	-	4,4,4	0.16	0	6,6,6	0.16	0
2	EXF	A	501	-	26,33,33	2.10	8 (30%)	31,48,48	1.59	4 (12%)
2	EXF	D	502	-	26,33,33	1.92	8 (30%)	31,48,48	1.41	3 (9%)
3	SO4	E	501	-	4,4,4	0.12	0	6,6,6	0.24	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	EXF	A	501	-	-	4/19/23/23	0/3/3/3
2	EXF	D	502	-	-	0/19/23/23	0/3/3/3
2	EXF	B	502	-	-	3/19/23/23	0/3/3/3
2	EXF	E	502	-	-	2/19/23/23	0/3/3/3

All (33) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	502	EXF	C4-N2	5.51	1.40	1.34
2	A	501	EXF	C5-C	4.48	1.46	1.40
2	A	501	EXF	C4-N2	4.47	1.39	1.34
2	E	502	EXF	C5-N2	3.97	1.36	1.31
2	D	502	EXF	C4-N2	3.94	1.38	1.34
2	B	502	EXF	C19-C15	3.85	1.45	1.39
2	D	502	EXF	C5-N3	3.82	1.43	1.36
2	E	502	EXF	C19-C15	3.38	1.44	1.39
2	B	502	EXF	C8-C15	3.38	1.46	1.41
2	E	502	EXF	C9-N5	3.36	1.41	1.33
2	B	502	EXF	C4-N2	3.24	1.38	1.34
2	D	502	EXF	C19-C15	3.15	1.44	1.39
2	A	501	EXF	C19-C15	3.09	1.44	1.39
2	A	501	EXF	C6-N4	3.00	1.39	1.34
2	A	501	EXF	C8-C15	2.98	1.45	1.41
2	D	502	EXF	C5-C	2.97	1.44	1.40
2	A	501	EXF	C5-N2	2.88	1.35	1.31
2	E	502	EXF	O-C12	-2.72	1.39	1.44
2	B	502	EXF	C9-N5	2.63	1.39	1.33

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	502	EXF	F1-C11	-2.59	1.35	1.40
2	A	501	EXF	C5-N3	2.58	1.41	1.36
2	A	501	EXF	F1-C11	-2.55	1.35	1.40
2	B	502	EXF	C5-N3	2.54	1.41	1.36
2	B	502	EXF	C13-C12	2.51	1.56	1.52
2	D	502	EXF	C6-N4	2.48	1.38	1.34
2	B	502	EXF	C5-N2	2.40	1.34	1.31
2	B	502	EXF	C6-N4	2.37	1.38	1.34
2	D	502	EXF	C6-N3	2.36	1.42	1.38
2	D	502	EXF	C9-N5	2.33	1.38	1.33
2	B	502	EXF	F1-C11	-2.28	1.36	1.40
2	E	502	EXF	C6-N3	2.20	1.42	1.38
2	E	502	EXF	C5-C	2.05	1.43	1.40
2	E	502	EXF	C5-N3	2.01	1.40	1.36

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	502	EXF	C-C5-N2	7.04	123.50	119.41
2	E	502	EXF	C-C5-N2	6.39	123.12	119.41
2	A	501	EXF	C-C5-N2	5.64	122.68	119.41
2	D	502	EXF	C-C5-N2	5.09	122.36	119.41
2	A	501	EXF	N3-C5-N2	-3.32	115.71	119.84
2	A	501	EXF	C15-N6-C16	2.55	128.33	124.99
2	A	501	EXF	C14-C12-C13	-2.41	107.11	110.56
2	E	502	EXF	C17-C16-C18	-2.39	106.27	111.58
2	B	502	EXF	O-C12-C14	2.38	113.01	107.90
2	B	502	EXF	C2-N1-N	2.09	105.22	103.70
2	B	502	EXF	F-C-C1	2.03	121.50	117.51
2	D	502	EXF	C14-C12-C13	-2.02	107.67	110.56
2	D	502	EXF	C15-C8-C9	2.01	123.75	120.99

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	EXF	C-C5-N3-C6
2	E	502	EXF	C-C5-N3-C6
2	A	501	EXF	N2-C5-N3-C6
2	E	502	EXF	N2-C5-N3-C6
2	A	501	EXF	C7-C8-C9-O1
2	B	502	EXF	C7-C8-C9-O1

Continued on next page...

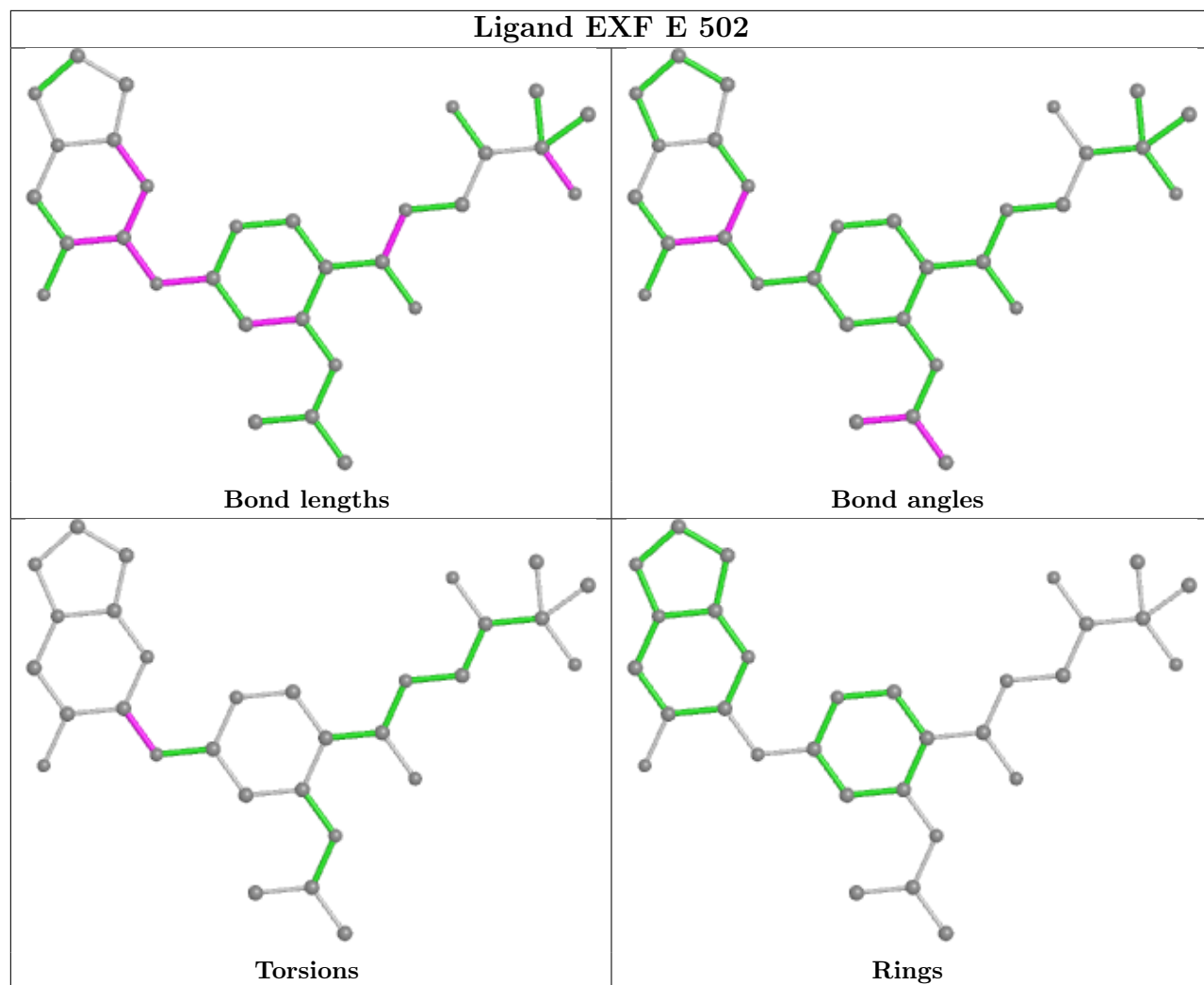
Continued from previous page...

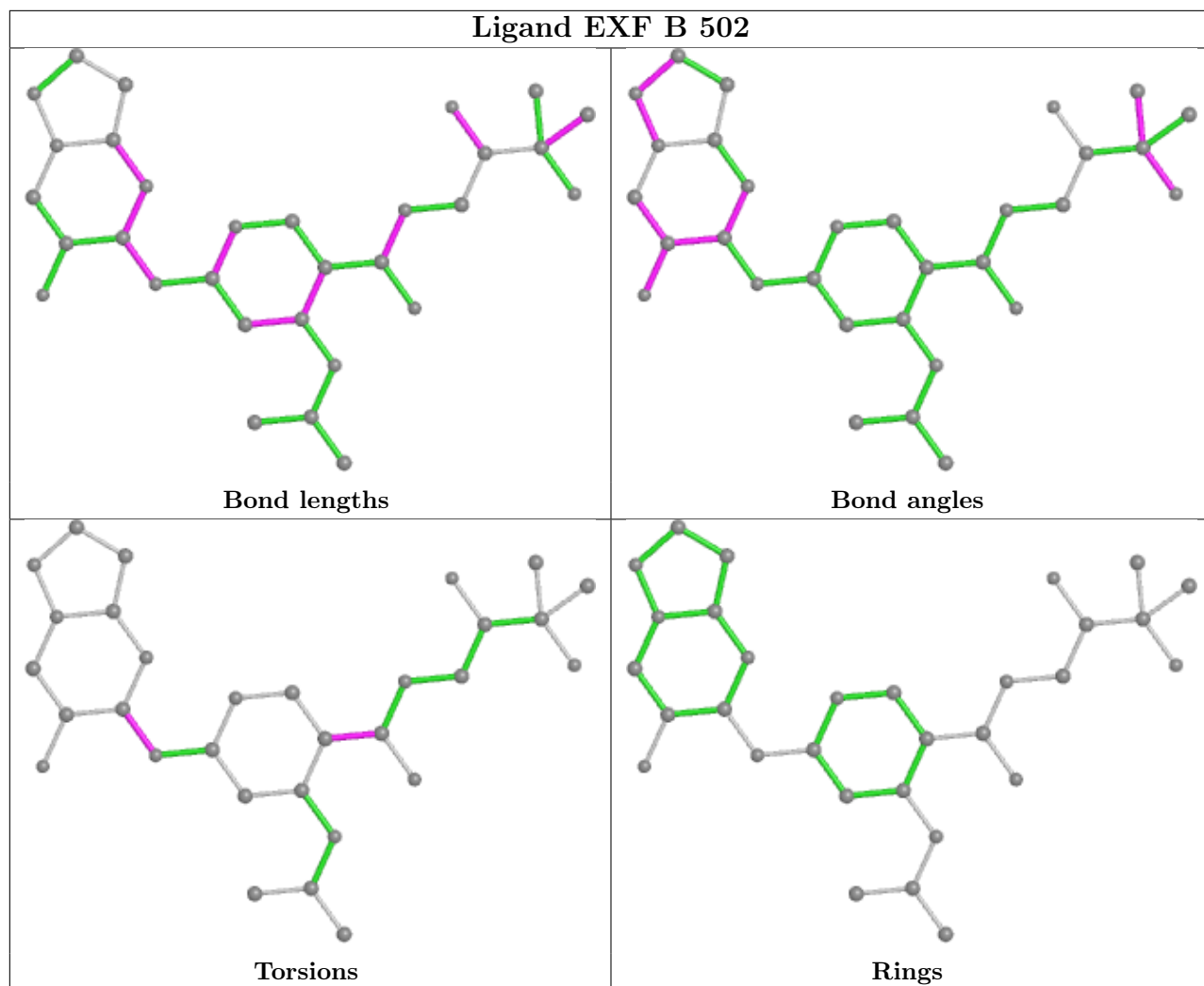
Mol	Chain	Res	Type	Atoms
2	B	502	EXF	C-C5-N3-C6
2	B	502	EXF	C7-C8-C9-N5
2	A	501	EXF	C7-C8-C9-N5

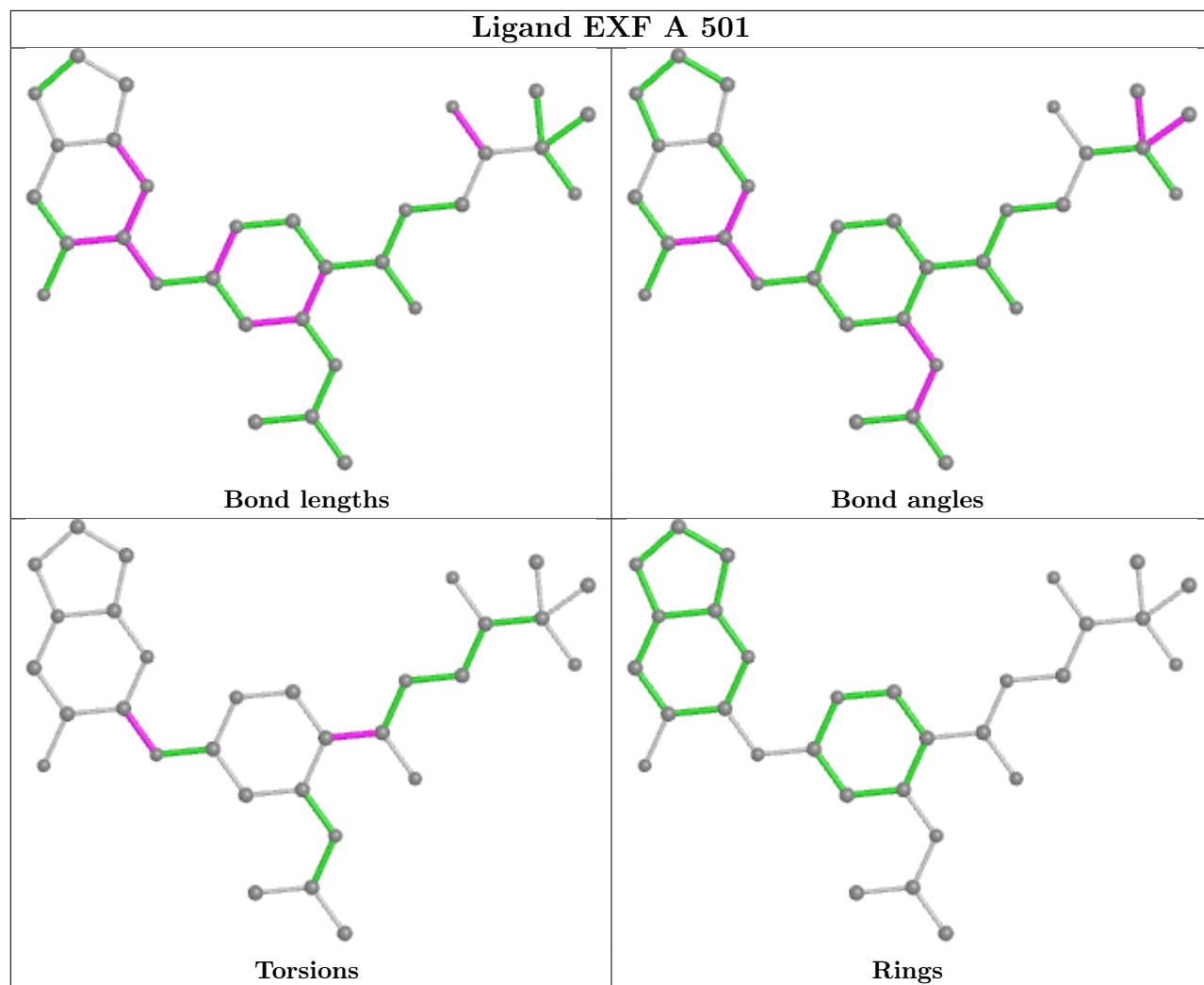
There are no ring outliers.

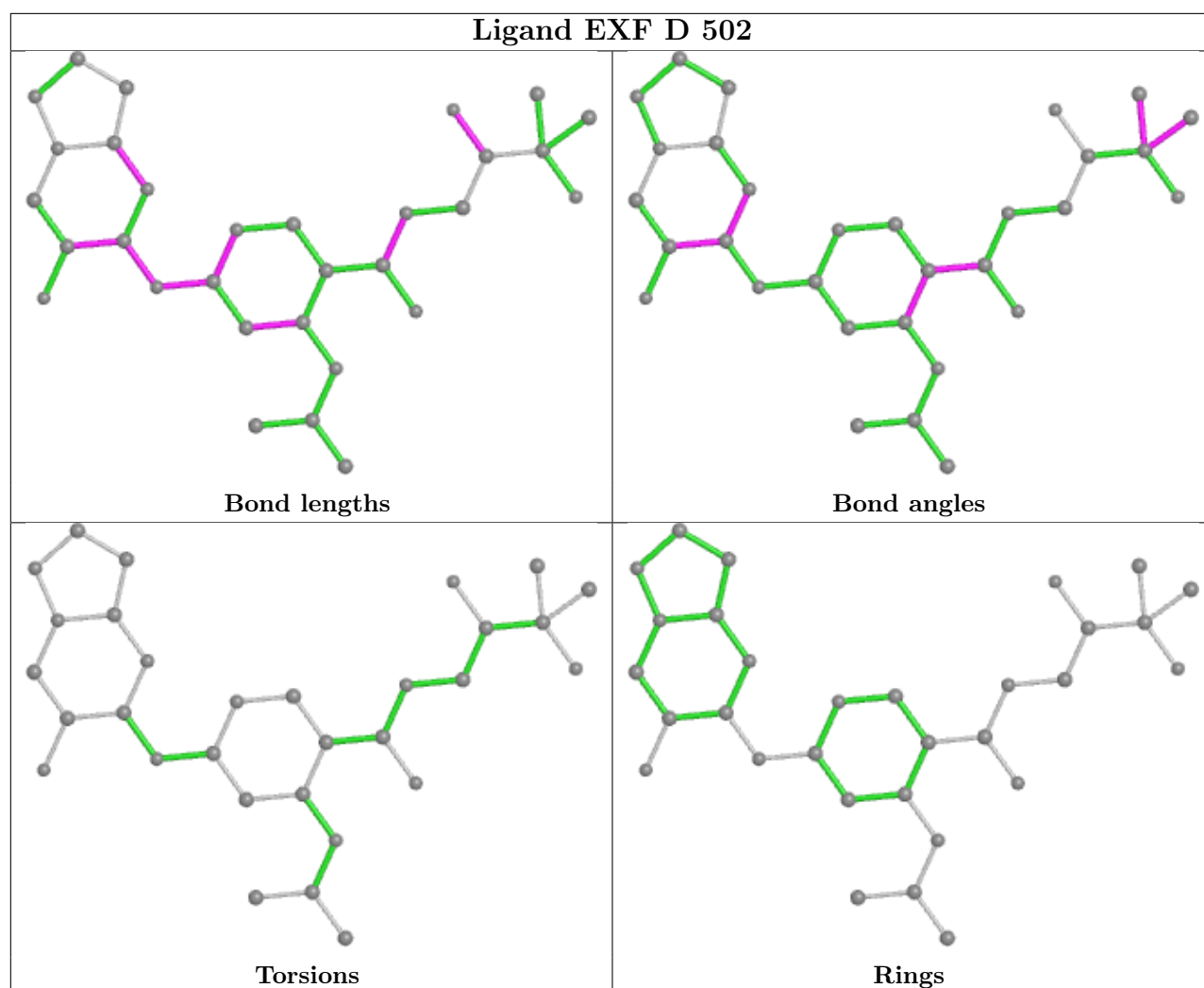
No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.









5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

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	292/305 (95%)	0.63	22 (7%) 14 13	20, 39, 72, 100	0
1	B	295/305 (96%)	0.66	25 (8%) 10 9	20, 39, 71, 106	0
1	D	291/305 (95%)	0.68	25 (8%) 10 9	23, 42, 73, 86	0
1	E	286/305 (93%)	0.55	22 (7%) 13 12	21, 41, 67, 86	0
All	All	1164/1220 (95%)	0.63	94 (8%) 12 10	20, 40, 72, 106	0

All (94) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	219	VAL	10.7
1	B	459	ALA	8.8
1	B	219	VAL	8.4
1	D	218	MET	7.7
1	A	216	ALA	7.5
1	D	217	ALA	7.3
1	E	217	ALA	6.0
1	E	197	PHE	5.9
1	B	163	THR	5.9
1	B	197	PHE	5.5
1	E	220	ASP	5.5
1	B	407	GLU	5.4
1	D	255	GLY	5.4
1	A	219	VAL	5.2
1	D	221	ILE	5.2
1	E	218	MET	5.1
1	B	196	GLY	5.0
1	A	341	GLN	4.9
1	A	196	GLY	4.8
1	B	405	ASP	4.7
1	A	399	ILE	4.7

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	405	ASP	4.7
1	D	196	GLY	4.5
1	D	216	ALA	4.4
1	B	217	ALA	4.3
1	D	459	ALA	4.2
1	E	221	ILE	4.1
1	A	226	LEU	4.0
1	E	204	TYR	4.0
1	A	220	ASP	3.9
1	A	222	THR	3.9
1	E	349	VAL	3.8
1	E	256	ASP	3.8
1	B	343	VAL	3.8
1	A	217	ALA	3.8
1	B	195	GLY	3.7
1	B	341	GLN	3.6
1	A	197	PHE	3.6
1	D	220	ASP	3.5
1	D	349	VAL	3.3
1	D	195	GLY	3.3
1	D	163	THR	3.2
1	E	251	PHE	3.2
1	A	342	THR	3.1
1	E	171	TYR	3.1
1	A	256	ASP	3.1
1	E	206	ASN	3.0
1	E	216	ALA	3.0
1	D	446	ASP	3.0
1	A	163	THR	3.0
1	B	218	MET	3.0
1	D	194	GLU	3.0
1	B	410	ILE	3.0
1	A	343	VAL	2.9
1	D	206	ASN	2.9
1	E	398	ASP	2.9
1	E	164	ARG	2.8
1	D	171	TYR	2.8
1	A	218	MET	2.7
1	B	427	GLU	2.6
1	D	335	ALA	2.5
1	E	195	GLY	2.5
1	E	255	GLY	2.5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	D	256	ASP	2.5
1	B	215	LEU	2.5
1	A	458	THR	2.4
1	D	254	ASP	2.4
1	B	339	PHE	2.4
1	B	335	ALA	2.4
1	B	456	GLU	2.4
1	A	168	PHE	2.3
1	E	343	VAL	2.3
1	E	188	GLY	2.3
1	E	219	VAL	2.3
1	A	423	SER	2.3
1	A	409	THR	2.2
1	D	188	GLY	2.2
1	B	324	THR	2.2
1	D	170	PHE	2.2
1	E	170	PHE	2.2
1	A	347	ARG	2.2
1	B	342	THR	2.2
1	B	423	SER	2.2
1	E	450	VAL	2.1
1	E	453	LEU	2.1
1	D	205	VAL	2.1
1	B	409	THR	2.1
1	D	204	TYR	2.1
1	A	224	GLU	2.0
1	B	253	SER	2.0
1	B	256	ASP	2.0
1	D	226	LEU	2.0
1	D	348	ILE	2.0
1	B	255	GLY	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
1	SEP	E	346	10/11	0.69	0.28	65,73,84,84	0
1	SEP	D	346	10/11	0.71	0.37	75,81,90,90	0

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
1	SEP	A	346	10/11	0.77	0.29	73,79,86,87	0
1	SEP	B	346	10/11	0.77	0.28	73,78,86,86	0
1	TPO	D	345	11/12	0.86	0.15	67,69,72,74	0
1	TPO	A	345	11/12	0.92	0.10	68,71,73,73	0
1	TPO	B	345	11/12	0.94	0.10	69,74,78,78	0
1	TPO	E	345	11/12	0.95	0.09	54,56,62,63	0

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

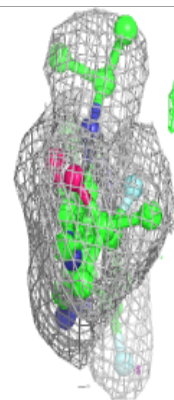
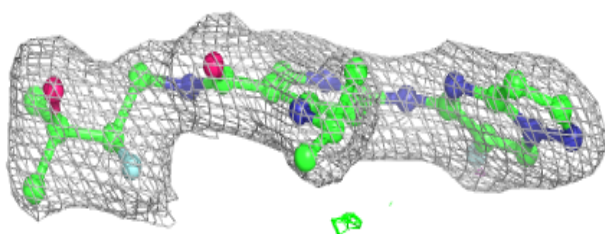
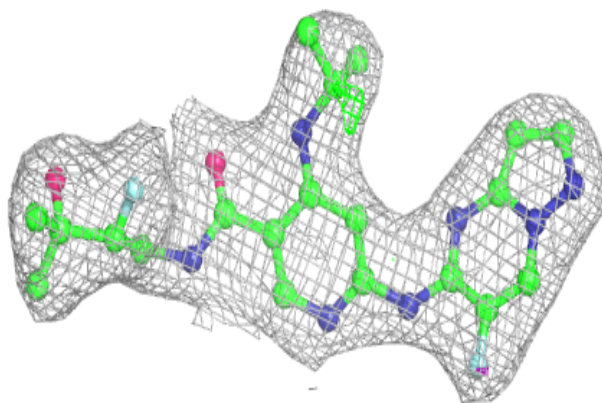
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q < 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	SO4	B	501	5/5	0.75	0.26	121,122,123,123	0
3	SO4	E	501	5/5	0.93	0.14	77,78,80,82	0
3	SO4	D	501	5/5	0.94	0.15	61,65,66,66	0
2	EXF	E	502	31/31	0.95	0.13	26,31,36,37	0
2	EXF	B	502	31/31	0.96	0.14	25,28,31,34	0
2	EXF	D	502	31/31	0.96	0.13	29,31,34,37	0
2	EXF	A	501	31/31	0.96	0.14	23,27,31,32	0

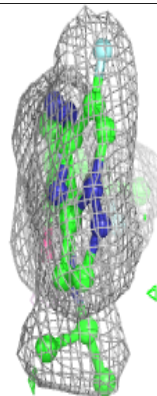
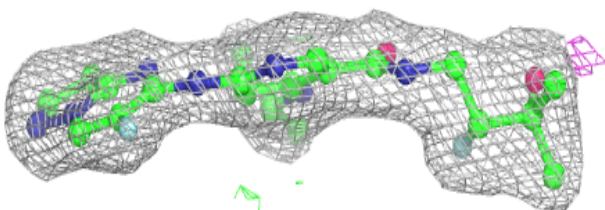
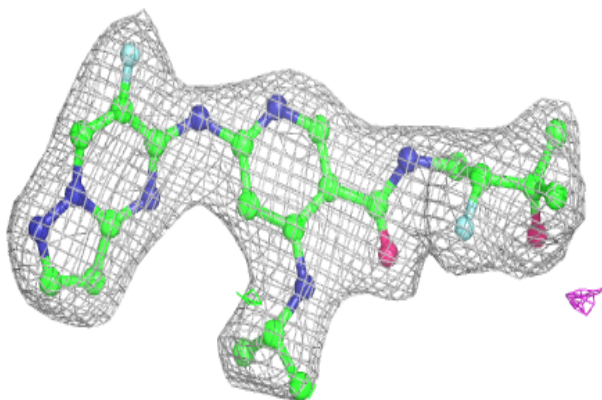
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around EXF E 502:

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

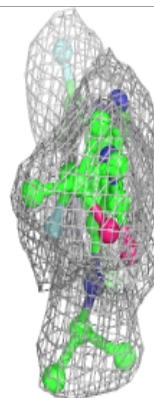
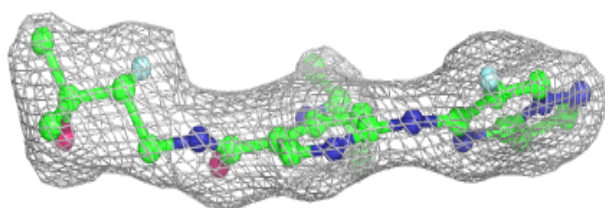
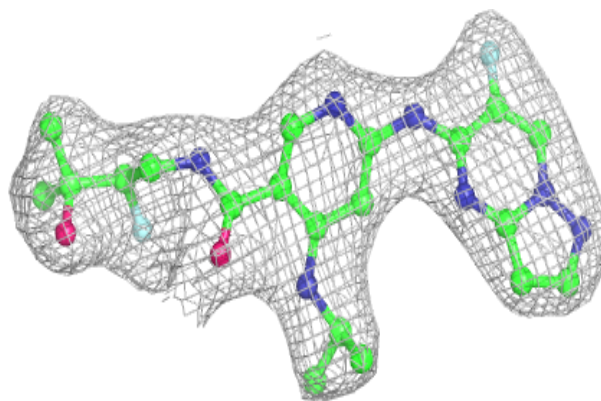
**Electron density around EXF B 502:**

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

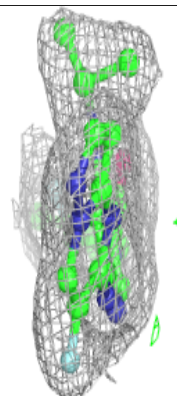
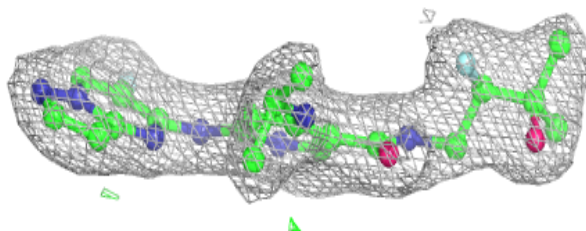
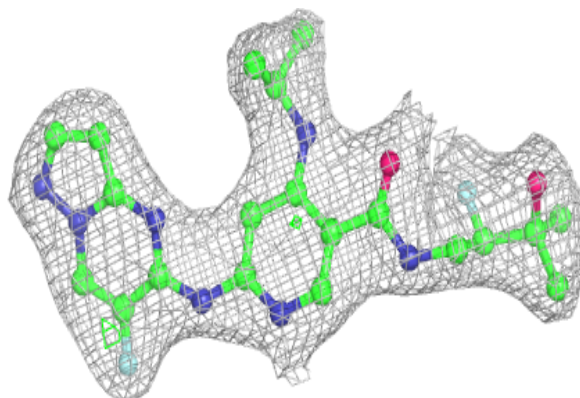


Electron density around EXF D 502:

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

**Electron density around EXF A 501:**

$2mF_o-DF_c$ (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.