



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 03:28 AM UTC

PDB ID : 4ZTN / pdb_00004ztn
Title : Irak4-inhibitor co-structure
Authors : Fischmann, T.O.
Deposited on : 2015-05-14
Resolution : 2.23 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

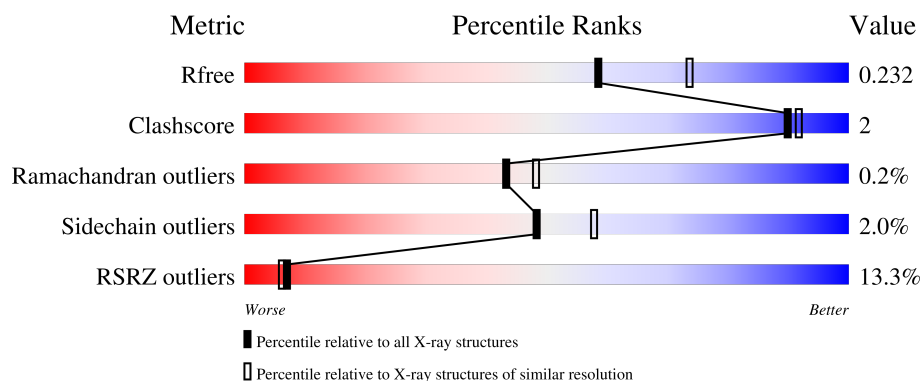
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.23 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	3416 (2.26-2.22)
Clashscore	190562	3556 (2.26-2.22)
Ramachandran outliers	187476	3500 (2.26-2.22)
Sidechain outliers	187428	3501 (2.26-2.22)
RSRZ outliers	180081	3415 (2.26-2.22)

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	301	9% 89% 7% . .
1	B	301	15% 88% 6% 5%
1	C	301	13% 88% 6% . 5%
1	D	301	13% 89% 7% .

2 Entry composition [i](#)

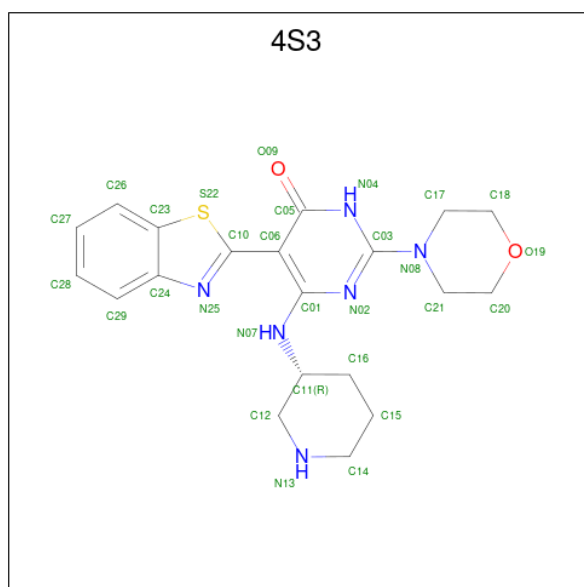
There are 3 unique types of molecules in this entry. The entry contains 9301 atoms, of which 0 are hydrogens and 0 are deuteriums.

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
1	A	289	Total	C	N	O	P	S	0	0	2
			2267	1419	382	449	3	14			
1	B	285	Total	C	N	O	P	S	0	1	3
			2232	1397	376	441	3	15			
1	C	287	Total	C	N	O	P	S	0	1	1
			2265	1419	381	447	3	15			
1	D	288	Total	C	N	O	P	S	0	0	3
			2260	1414	382	447	3	14			

- Molecule 2 is 5-(1,3-benzothiazol-2-yl)-2-(morpholin-4-yl)-6-[(3R)-piperidin-3-ylamino]pyrimidin-4(3H)-one (CCD ID: 4S3) (formula: C₂₀H₂₄N₆O₂S).



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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	C	1	Total	C	N	O	S	0	0
			29	20	6	2	1		
2	D	1	Total	C	N	O	S	0	0
			29	20	6	2	1		

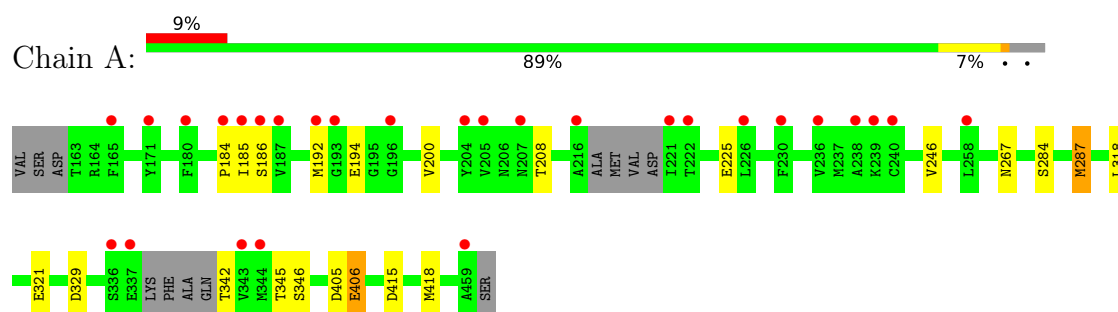
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	33	Total	O	0	0
			33	33		
3	B	38	Total	O	0	0
			38	38		
3	C	50	Total	O	0	0
			50	50		
3	D	40	Total	O	0	0
			40	40		

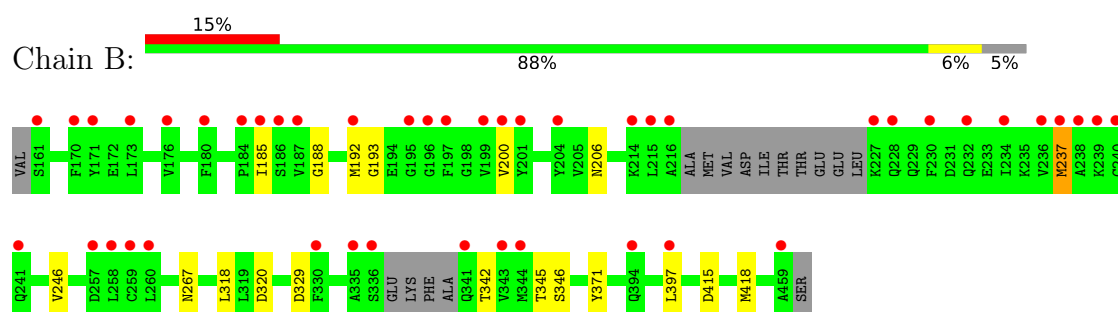
3 Residue-property plots [i](#)

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.

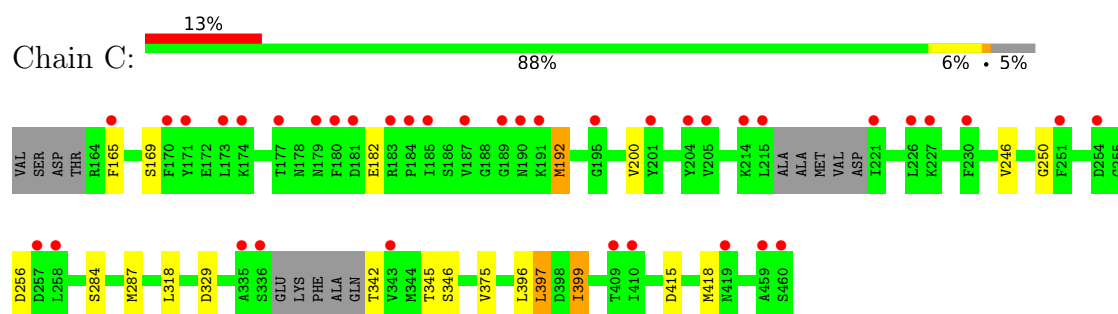
- Molecule 1: Interleukin-1 receptor-associated kinase 4



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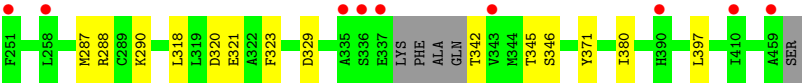
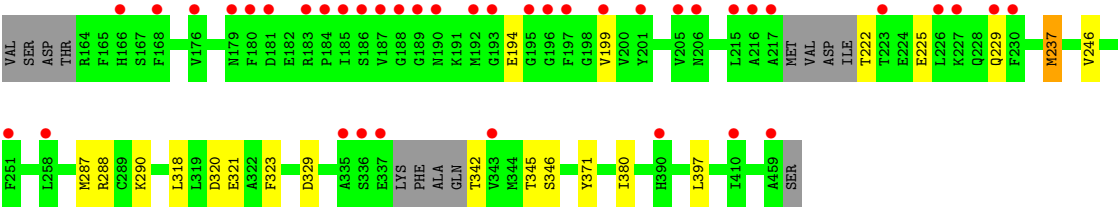


- Molecule 1: Interleukin-1 receptor-associated kinase 4



- 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	142.89Å 139.18Å 87.60Å 90.00° 125.28° 90.00°	Depositor
Resolution (Å)	37.45 – 2.23 37.45 – 2.23	Depositor EDS
% Data completeness (in resolution range)	99.0 (37.45-2.23) 98.9 (37.45-2.23)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.22 (at 2.22Å)	Xtriage
Refinement program	BUSTER 2.11.6	Depositor
R, R_{free}	0.209 , 0.224 0.219 , 0.232	Depositor DCC
R_{free} test set	3433 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	45.4	Xtriage
Anisotropy	0.433	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.39 , 53.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.117 for -h-2*k,l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	9301	wwPDB-VP
Average B, all atoms (Å ²)	65.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 18.26% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: TPO, 4S3, SEP

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	0.86	1/2271 (0.0%)	1.13	6/3060 (0.2%)
1	B	0.84	1/2235 (0.0%)	1.10	2/3009 (0.1%)
1	C	0.86	1/2269 (0.0%)	1.13	1/3056 (0.0%)
1	D	0.85	1/2264 (0.0%)	1.12	1/3050 (0.0%)
All	All	0.85	4/9039 (0.0%)	1.12	10/12175 (0.1%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	287	MET	SD-CE	-6.99	1.62	1.79
1	D	237	MET	SD-CE	-6.92	1.62	1.79
1	B	237	MET	SD-CE	-6.18	1.64	1.79
1	C	192	MET	C-N	5.01	1.37	1.33

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	405	ASP	CA-C-N	7.12	135.13	121.54
1	A	405	ASP	C-N-CA	7.12	135.13	121.54
1	A	186	SER	N-CA-C	5.81	117.41	111.14
1	C	169	SER	N-CA-C	-5.74	102.80	110.55
1	B	267	ASN	CA-CB-CG	-5.43	107.17	112.60
1	B	320	ASP	CA-CB-CG	5.29	117.89	112.60
1	A	184	PRO	CA-C-N	5.23	127.34	120.60
1	A	184	PRO	C-N-CA	5.23	127.34	120.60
1	A	267	ASN	CA-CB-CG	-5.08	107.52	112.60
1	D	320	ASP	CA-CB-CG	5.04	117.64	112.60

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	2267	0	2225	4	0
1	B	2232	0	2178	6	0
1	C	2265	0	2225	9	0
1	D	2260	0	2218	9	0
2	A	29	0	24	1	0
2	B	29	0	24	3	0
2	C	29	0	24	1	0
2	D	29	0	24	1	0
3	A	33	0	0	0	0
3	B	38	0	0	1	0
3	C	50	0	0	1	0
3	D	40	0	0	0	0
All	All	9301	0	8942	33	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 2.

All (33) 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:B:193:GLY:HA3	2:B:501:4S3:H11	1.79	0.65
1:A:284:SER:H	1:A:287:MET:HE3	1.65	0.60
1:D:237:MET:HE1	1:D:246:VAL:HG23	1.86	0.58
1:C:375:VAL:HG22	1:C:397:LEU:CD1	2.35	0.56
2:C:501:4S3:S22	2:C:501:4S3:O09	2.66	0.53
1:B:237:MET:HE1	1:B:246:VAL:HG23	1.91	0.53
1:D:287:MET:HE1	1:D:290:LYS:HD3	1.90	0.52
1:D:287:MET:HE2	1:D:323:PHE:CB	2.41	0.51
1:C:397:LEU:HD13	3:C:630:HOH:O	2.12	0.50
1:C:375:VAL:HG22	1:C:397:LEU:HD12	1.93	0.50
1:B:192:MET:HE3	1:B:200:VAL:HG12	1.94	0.49
1:D:194:GLU:HG3	1:D:199:VAL:HG22	1.94	0.48
1:B:246:VAL:HG11	1:B:318:LEU:HD12	1.97	0.46
1:D:246:VAL:HG11	1:D:318:LEU:HD12	1.97	0.46
1:D:287:MET:HE2	1:D:323:PHE:HB2	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:246:VAL:HG11	1:A:318:LEU:HD12	1.99	0.45
1:B:415:ASP:HB3	1:B:418:MET:HE2	1.99	0.44
1:C:415:ASP:HB3	1:C:418:MET:HE2	2.00	0.44
1:A:192:MET:HE3	1:A:200:VAL:HG12	1.97	0.44
1:C:284:SER:H	1:C:287[B]:MET:HE3	1.83	0.43
1:C:246:VAL:HG11	1:C:318:LEU:HD12	1.99	0.43
1:C:396:LEU:O	1:C:399:ILE:HB	2.18	0.43
2:A:501:4S3:N07	2:A:501:4S3:N25	2.65	0.43
1:C:192:MET:HE3	1:C:200:VAL:HG12	2.01	0.42
2:B:501:4S3:N25	2:B:501:4S3:N07	2.65	0.42
2:D:501:4S3:O09	2:D:501:4S3:S22	2.77	0.42
1:A:415:ASP:HB3	1:A:418:MET:HE2	2.00	0.42
1:B:371:TYR:OH	1:B:397:LEU:HD22	2.19	0.42
1:D:371:TYR:OH	1:D:397:LEU:HD22	2.19	0.41
1:D:288:ARG:HB3	1:D:380:ILE:HG23	2.03	0.41
2:B:501:4S3:H8	3:B:601:HOH:O	2.20	0.41
1:D:287:MET:HE2	1:D:323:PHE:HB3	2.02	0.41
1:C:165:PHE:HB3	1:C:250:GLY:HA2	2.03	0.41

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 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	281/301 (93%)	272 (97%)	8 (3%)	1 (0%)	30	30
1	B	277/301 (92%)	265 (96%)	11 (4%)	1 (0%)	30	30
1	C	280/301 (93%)	269 (96%)	11 (4%)	0	100	100
1	D	280/301 (93%)	265 (95%)	15 (5%)	0	100	100
All	All	1118/1204 (93%)	1071 (96%)	45 (4%)	2 (0%)	43	48

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	406	GLU
1	B	188	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	247/259 (95%)	240 (97%)	7 (3%)	38	45
1	B	242/259 (93%)	239 (99%)	3 (1%)	63	72
1	C	247/259 (95%)	242 (98%)	5 (2%)	48	58
1	D	246/259 (95%)	241 (98%)	5 (2%)	48	58
All	All	982/1036 (95%)	962 (98%)	20 (2%)	48	58

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	185	ILE
1	A	194	GLU
1	A	208	THR
1	A	225	GLU
1	A	321	GLU
1	A	329	ASP
1	A	406	GLU
1	B	185	ILE
1	B	206	ASN
1	B	329	ASP
1	C	182	GLU
1	C	256	ASP
1	C	329	ASP
1	C	397	LEU
1	C	399	ILE
1	D	222	THR
1	D	225	GLU
1	D	229	GLN
1	D	321	GLU
1	D	329	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	244	ASN
1	A	390	HIS
1	A	451	GLN
1	B	207	ASN
1	B	244	ASN
1	B	307	HIS
1	B	452	GLN
1	C	166	HIS
1	C	451	GLN
1	D	166	HIS
1	D	207	ASN
1	D	297	ASN
1	D	390	HIS
1	D	451	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

12 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	A	346	1	8,9,10	0.83	0	7,12,14	2.27	2 (28%)
1	TPO	D	342	1	8,10,11	1.09	1 (12%)	10,14,16	1.36	2 (20%)
1	TPO	D	345	1	8,10,11	1.25	1 (12%)	10,14,16	1.31	1 (10%)
1	TPO	B	342	1	8,10,11	1.14	1 (12%)	10,14,16	1.31	1 (10%)
1	TPO	C	345	1	8,10,11	1.40	1 (12%)	10,14,16	1.12	1 (10%)
1	TPO	A	345	1	8,10,11	1.40	2 (25%)	10,14,16	1.25	1 (10%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	SEP	D	346	1	8,9,10	0.96	1 (12%)	7,12,14	2.16	1 (14%)
1	TPO	B	345	1	8,10,11	1.23	2 (25%)	10,14,16	1.28	1 (10%)
1	SEP	C	346	1	8,9,10	0.87	0	7,12,14	2.09	1 (14%)
1	TPO	A	342	1	8,10,11	1.19	1 (12%)	10,14,16	1.17	1 (10%)
1	SEP	B	346	1	8,9,10	0.88	0	7,12,14	2.15	1 (14%)
1	TPO	C	342	1	8,10,11	1.04	1 (12%)	10,14,16	1.28	2 (20%)

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 Torsions and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	SEP	A	346	1	-	2/6/8/10	-
1	TPO	D	342	1	-	0/9/11/13	-
1	TPO	D	345	1	-	3/9/11/13	-
1	TPO	B	342	1	-	0/9/11/13	-
1	TPO	C	345	1	-	2/9/11/13	-
1	TPO	A	345	1	-	3/9/11/13	-
1	SEP	D	346	1	-	2/6/8/10	-
1	TPO	B	345	1	-	3/9/11/13	-
1	SEP	C	346	1	-	2/6/8/10	-
1	TPO	A	342	1	-	0/9/11/13	-
1	SEP	B	346	1	-	2/6/8/10	-
1	TPO	C	342	1	-	0/9/11/13	-

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	345	TPO	CB-CA	2.73	1.59	1.53
1	D	345	TPO	CB-CA	2.60	1.59	1.53
1	A	345	TPO	CB-CA	2.51	1.59	1.53
1	B	342	TPO	P-OG1	-2.48	1.55	1.59
1	B	345	TPO	CB-CA	2.41	1.58	1.53
1	A	342	TPO	P-OG1	-2.36	1.55	1.59
1	D	342	TPO	P-OG1	-2.25	1.55	1.59
1	A	345	TPO	CG2-CB	2.21	1.56	1.51
1	D	346	SEP	P-O1P	2.11	1.57	1.50
1	C	342	TPO	P-OG1	-2.06	1.55	1.59

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	345	TPO	CG2-CB	2.06	1.56	1.51

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	346	SEP	OG-CB-CA	5.30	113.30	108.14
1	D	346	SEP	OG-CB-CA	5.24	113.25	108.14
1	C	346	SEP	OG-CB-CA	5.22	113.22	108.14
1	A	346	SEP	OG-CB-CA	5.20	113.20	108.14
1	D	345	TPO	O3P-P-OG1	2.95	117.34	105.85
1	B	345	TPO	O3P-P-OG1	2.83	116.89	105.85
1	C	342	TPO	P-OG1-CB	-2.65	116.12	123.33
1	D	342	TPO	P-OG1-CB	-2.62	116.21	123.33
1	B	342	TPO	P-OG1-CB	-2.60	116.26	123.33
1	A	342	TPO	P-OG1-CB	-2.56	116.37	123.33
1	C	345	TPO	OG1-P-O1P	2.39	117.85	109.33
1	A	345	TPO	O2P-P-OG1	2.21	114.47	105.85
1	A	346	SEP	O3P-P-OG	2.12	112.21	106.67
1	D	342	TPO	O2P-P-OG1	2.05	113.84	105.85
1	C	342	TPO	O3P-P-OG1	2.05	113.82	105.85

There are no chirality outliers.

All (19) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	345	TPO	N-CA-CB-OG1
1	A	346	SEP	C-CA-CB-OG
1	B	345	TPO	N-CA-CB-OG1
1	B	346	SEP	C-CA-CB-OG
1	C	345	TPO	N-CA-CB-OG1
1	C	346	SEP	C-CA-CB-OG
1	D	345	TPO	N-CA-CB-OG1
1	D	346	SEP	N-CA-CB-OG
1	D	346	SEP	C-CA-CB-OG
1	B	345	TPO	CB-OG1-P-O1P
1	D	345	TPO	CB-OG1-P-O1P
1	A	346	SEP	N-CA-CB-OG
1	B	346	SEP	N-CA-CB-OG
1	C	346	SEP	N-CA-CB-OG
1	A	345	TPO	CB-OG1-P-O1P
1	A	345	TPO	O-C-CA-CB
1	B	345	TPO	O-C-CA-CB

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Mol	Chain	Res	Type	Atoms
1	C	345	TPO	O-C-CA-CB
1	D	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

4 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	4S3	A	501	-	32,33,33	0.75	2 (6%)	36,46,46	1.49	4 (11%)
2	4S3	B	501	-	32,33,33	0.64	1 (3%)	36,46,46	1.25	4 (11%)
2	4S3	C	501	-	32,33,33	0.62	1 (3%)	36,46,46	1.00	1 (2%)
2	4S3	D	501	-	32,33,33	0.68	2 (6%)	36,46,46	1.49	3 (8%)

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	4S3	A	501	-	-	2/11/28/28	0/5/5/5
2	4S3	B	501	-	-	2/11/28/28	0/5/5/5
2	4S3	C	501	-	-	1/11/28/28	0/5/5/5
2	4S3	D	501	-	-	2/11/28/28	0/5/5/5

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	4S3	C03-N08	2.70	1.44	1.34
2	D	501	4S3	C03-N08	2.64	1.43	1.34
2	A	501	4S3	C06-C01	2.64	1.47	1.40
2	B	501	4S3	C03-N08	2.55	1.43	1.34
2	C	501	4S3	C06-C01	2.48	1.46	1.40
2	D	501	4S3	C06-C01	2.15	1.45	1.40

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	4S3	C11-N07-C01	5.55	130.91	122.74
2	D	501	4S3	C03-N02-C01	5.36	122.25	112.44
2	C	501	4S3	C03-N02-C01	5.18	121.92	112.44
2	D	501	4S3	C11-N07-C01	5.02	130.13	122.74
2	A	501	4S3	C03-N02-C01	4.96	121.52	112.44
2	B	501	4S3	C03-N02-C01	4.77	121.16	112.44
2	D	501	4S3	C12-C11-N07	3.64	114.71	109.98
2	A	501	4S3	C06-C10-N25	-3.02	118.98	123.82
2	B	501	4S3	C06-C10-N25	-2.80	119.34	123.82
2	B	501	4S3	C11-N07-C01	2.72	126.75	122.74
2	A	501	4S3	C06-C10-S22	2.56	125.31	121.06
2	B	501	4S3	C06-C10-S22	2.35	124.95	121.06

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	4S3	N02-C03-N08-C17
2	B	501	4S3	N02-C03-N08-C17
2	D	501	4S3	C12-C11-N07-C01
2	A	501	4S3	N04-C03-N08-C17
2	B	501	4S3	N04-C03-N08-C17
2	D	501	4S3	N04-C03-N08-C17
2	C	501	4S3	N02-C03-N08-C21

There are no ring outliers.

4 monomers are involved in 6 short contacts:

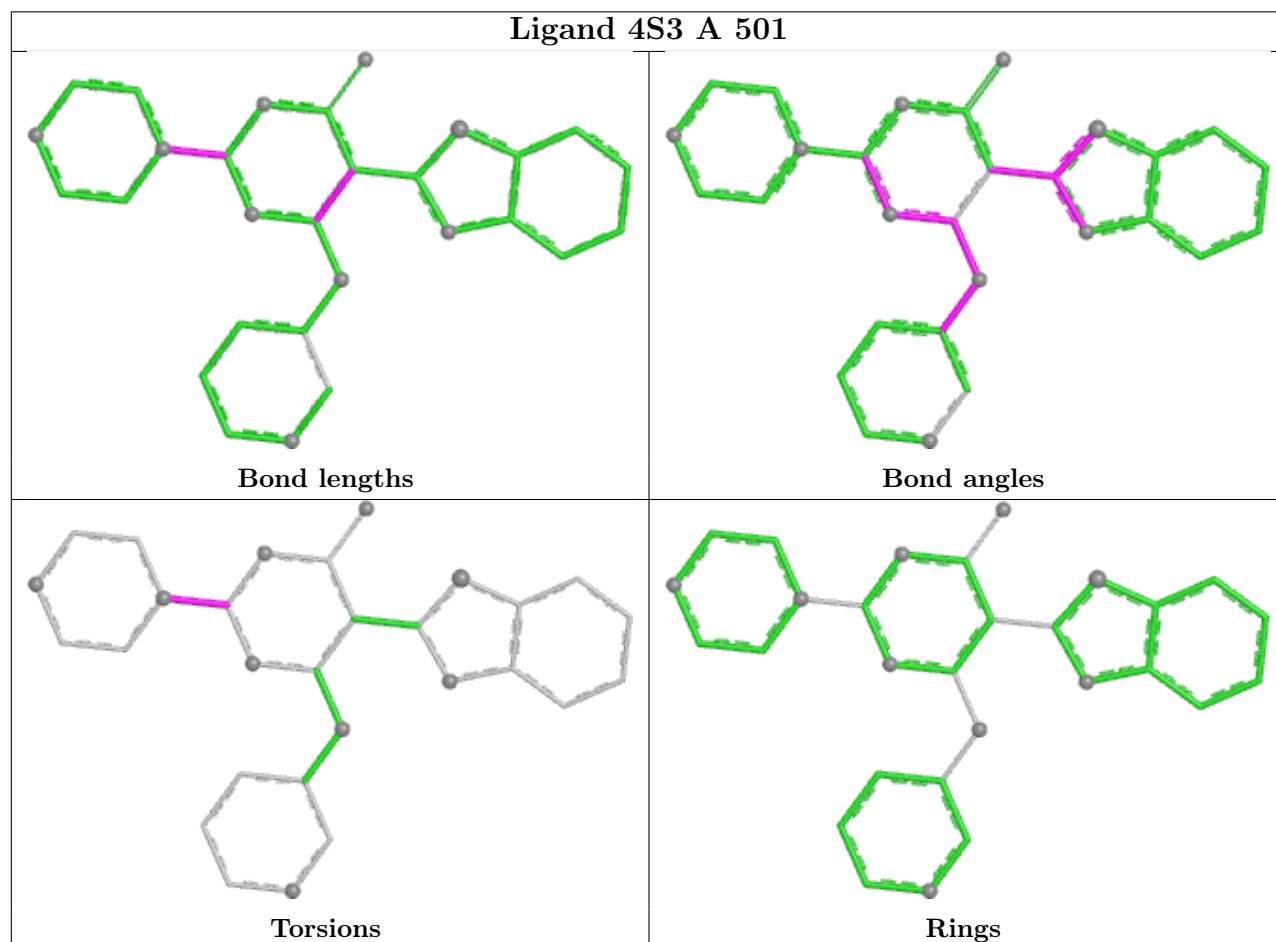
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	501	4S3	1	0

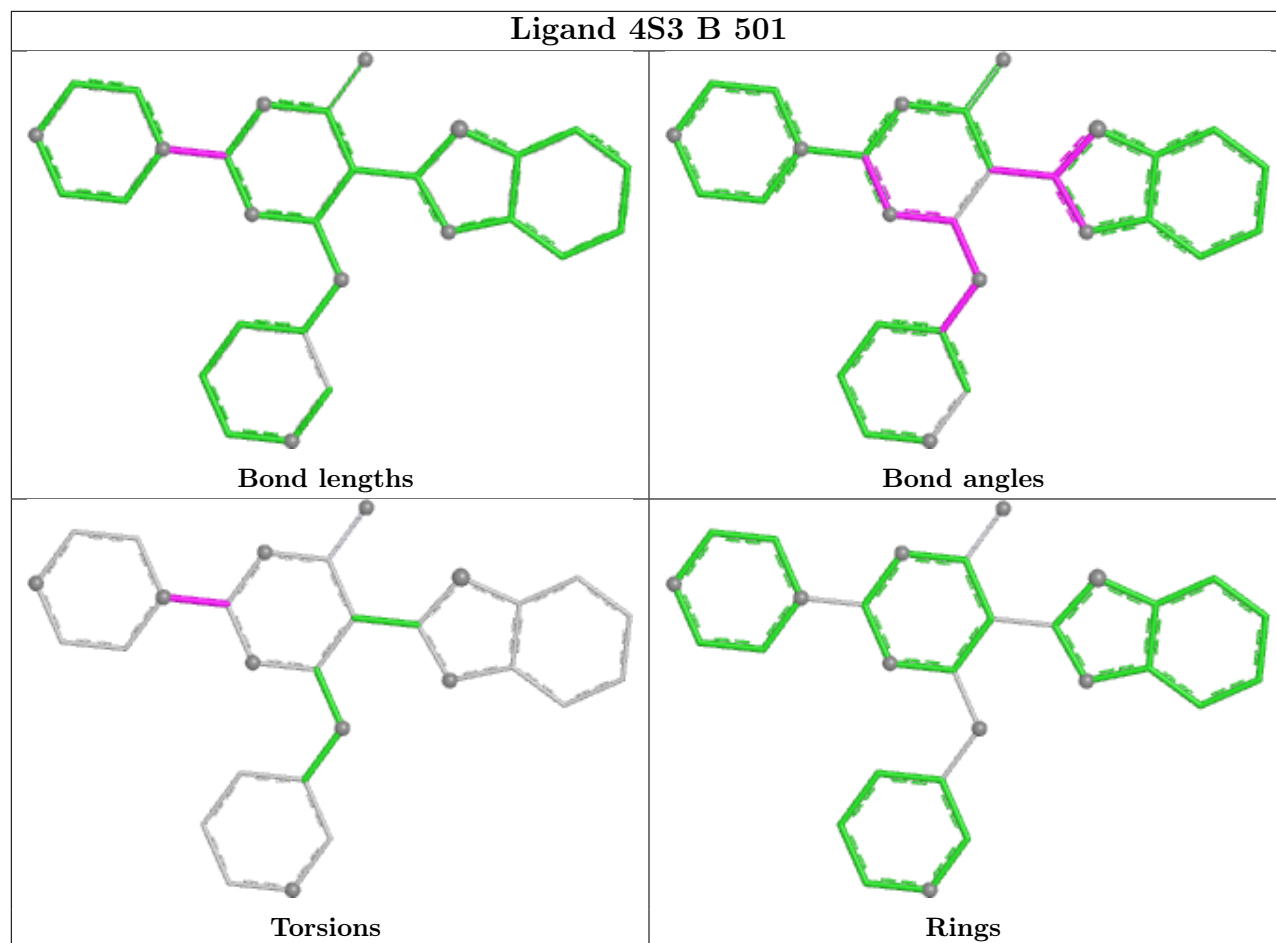
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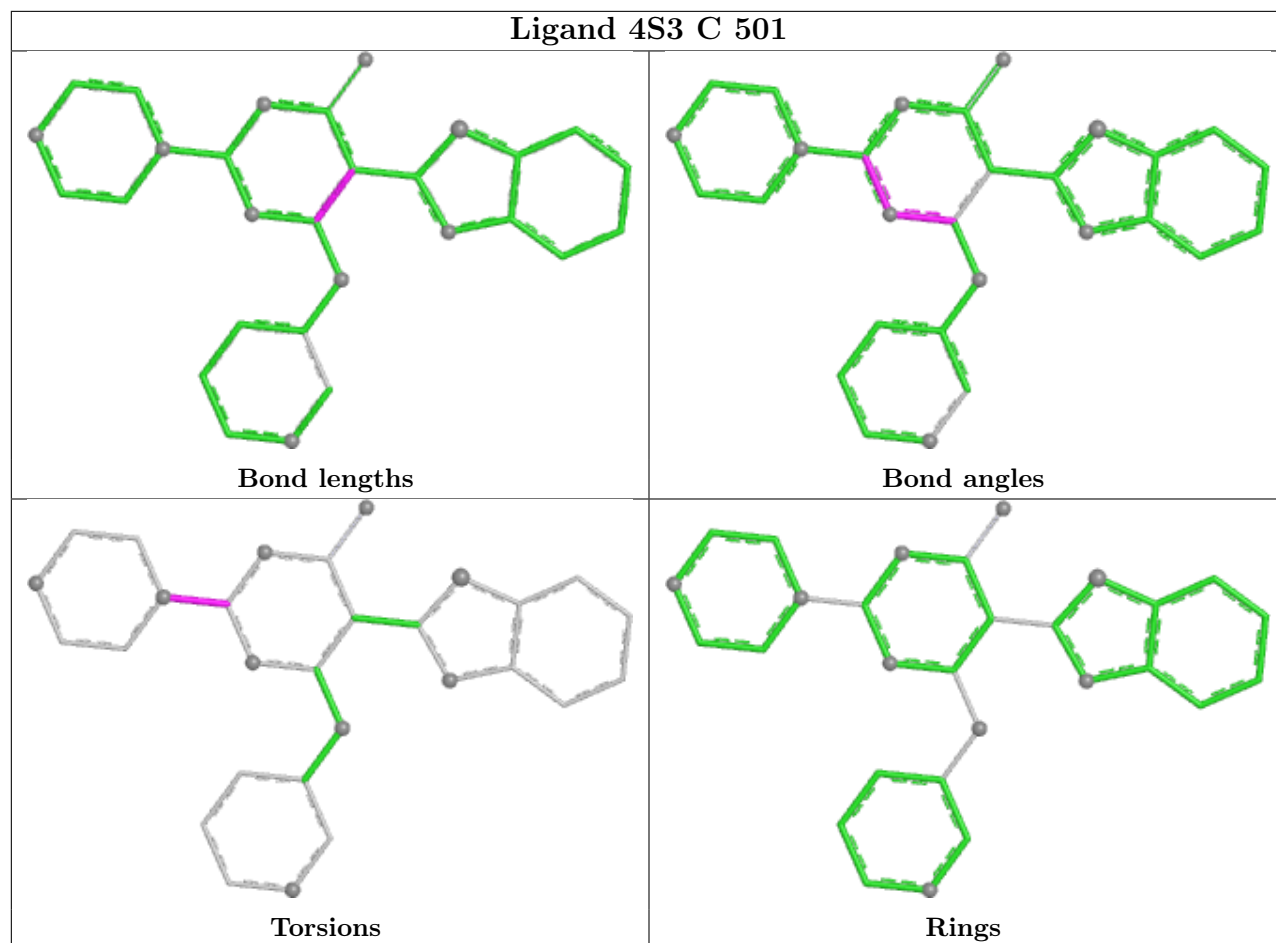
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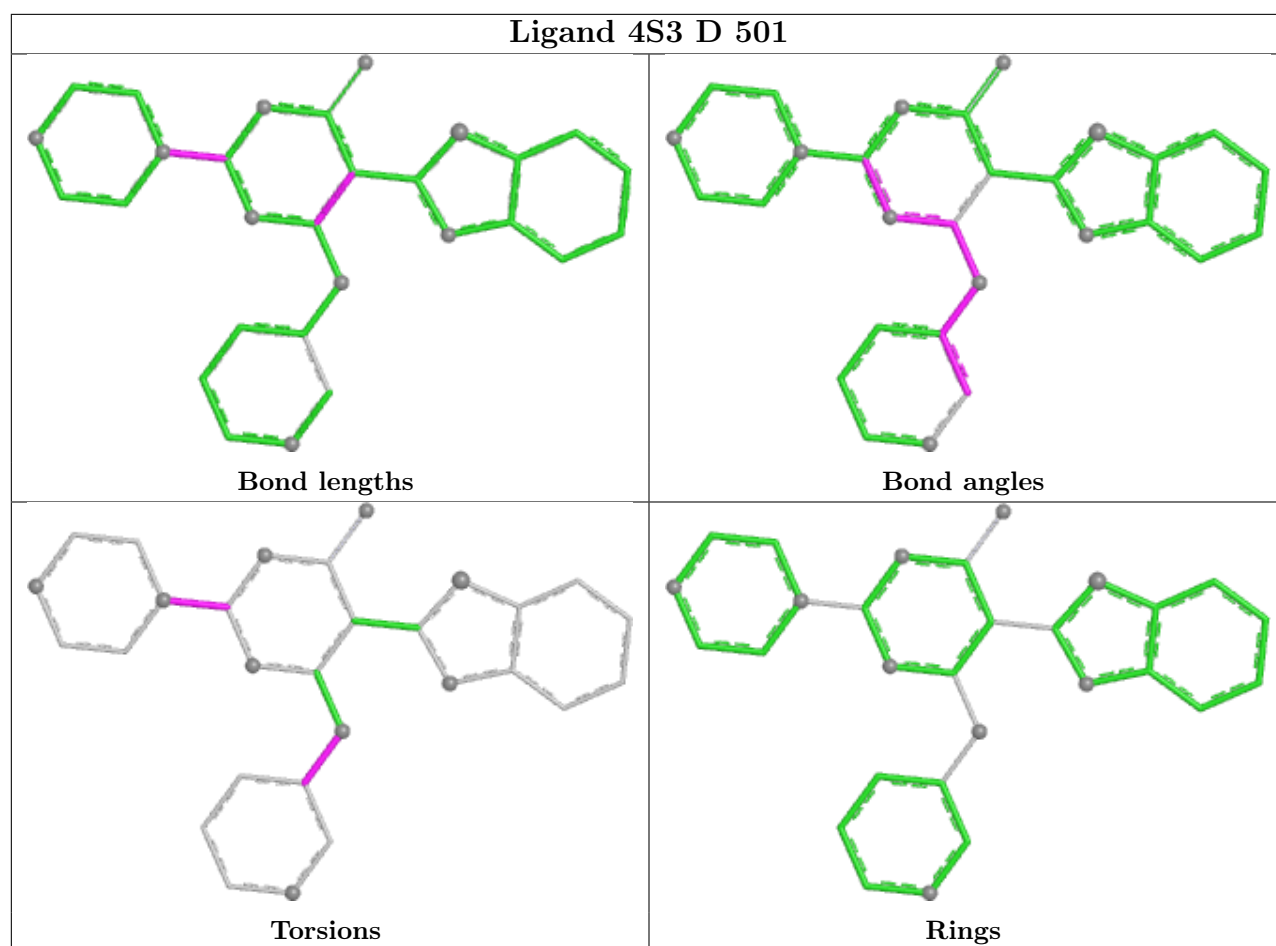
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	501	4S3	3	0
2	C	501	4S3	1	0
2	D	501	4S3	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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	286/301 (95%)	0.70	28 (9%) 13 12	36, 62, 110, 142	0
1	B	282/301 (93%)	0.84	45 (15%) 5 4	20, 63, 124, 146	1 (0%)
1	C	284/301 (94%)	0.67	38 (13%) 7 6	21, 56, 102, 117	1 (0%)
1	D	285/301 (94%)	0.82	40 (14%) 6 5	35, 57, 104, 121	0
All	All	1137/1204 (94%)	0.76	151 (13%) 7 6	20, 59, 110, 146	2 (0%)

All (151) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	217	ALA	9.0
1	C	460	SER	6.9
1	B	240	CYS	6.5
1	A	216	ALA	6.1
1	A	337	GLU	6.0
1	A	240	CYS	5.9
1	D	337	GLU	5.7
1	B	227	LYS	5.6
1	C	221	ILE	5.4
1	A	221	ILE	5.3
1	B	216	ALA	5.1
1	D	459	ALA	5.0
1	B	230	PHE	4.9
1	B	336	SER	4.8
1	A	185	ILE	4.5
1	A	459	ALA	4.4
1	C	180	PHE	4.4
1	B	341	GLN	4.1
1	C	215	LEU	4.1
1	D	226	LEU	4.1
1	C	170	PHE	3.8

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Mol	Chain	Res	Type	RSRZ
1	D	196	GLY	3.8
1	C	336	SER	3.7
1	D	184	PRO	3.6
1	D	185	ILE	3.5
1	D	215	LEU	3.5
1	D	227	LYS	3.5
1	C	343	VAL	3.5
1	D	205	VAL	3.5
1	B	330	PHE	3.5
1	B	459	ALA	3.4
1	D	180	PHE	3.3
1	D	230	PHE	3.3
1	D	223	THR	3.3
1	D	188	GLY	3.3
1	B	187	VAL	3.3
1	D	187	VAL	3.3
1	D	335	ALA	3.2
1	D	192	MET	3.2
1	D	176	VAL	3.2
1	A	193	GLY	3.2
1	C	257	ASP	3.2
1	B	176	VAL	3.1
1	B	343	VAL	3.1
1	C	179	ASN	3.1
1	C	258	LEU	3.1
1	C	185	ILE	3.1
1	D	168	PHE	3.1
1	B	199	VAL	3.1
1	C	191	LYS	3.1
1	C	177	THR	3.0
1	B	238	ALA	3.0
1	B	204	TYR	3.0
1	A	184	PRO	3.0
1	C	459	ALA	2.9
1	C	190	ASN	2.9
1	C	226	LEU	2.9
1	C	195	GLY	2.9
1	B	234	ILE	2.9
1	A	343	VAL	2.9
1	B	161	SER	2.8
1	B	171	TYR	2.8
1	B	241	GLN	2.8

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Mol	Chain	Res	Type	RSRZ
1	D	216	ALA	2.8
1	B	195	GLY	2.8
1	A	192	MET	2.8
1	B	344	MET	2.8
1	D	186	SER	2.7
1	A	344	MET	2.7
1	D	195	GLY	2.7
1	B	197	PHE	2.7
1	A	204	TYR	2.6
1	D	258	LEU	2.6
1	C	183	ARG	2.6
1	C	409	THR	2.6
1	A	207	ASN	2.6
1	C	251	PHE	2.6
1	A	258	LEU	2.5
1	B	196	GLY	2.5
1	A	187	VAL	2.5
1	B	239	LYS	2.5
1	D	410	ILE	2.5
1	B	236	VAL	2.5
1	B	185	ILE	2.5
1	C	181	ASP	2.5
1	D	336	SER	2.5
1	B	192	MET	2.5
1	B	257	ASP	2.5
1	D	183	ARG	2.4
1	D	197	PHE	2.4
1	C	214	LYS	2.4
1	D	181	ASP	2.4
1	B	228	GLN	2.4
1	C	335	ALA	2.4
1	D	193	GLY	2.4
1	C	230	PHE	2.4
1	B	258	LEU	2.4
1	B	180	PHE	2.4
1	B	214	LYS	2.4
1	B	259	CYS	2.4
1	B	215	LEU	2.4
1	B	394	GLN	2.4
1	C	184	PRO	2.4
1	A	236	VAL	2.4
1	A	205	VAL	2.3

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Mol	Chain	Res	Type	RSRZ
1	D	199	VAL	2.3
1	D	251	PHE	2.3
1	D	189	GLY	2.3
1	A	165	PHE	2.3
1	A	230	PHE	2.3
1	B	232	GLN	2.3
1	B	173	LEU	2.3
1	B	335	ALA	2.3
1	D	343	VAL	2.3
1	B	184	PRO	2.3
1	B	237	MET	2.3
1	B	186	SER	2.3
1	D	229	GLN	2.3
1	B	260	LEU	2.2
1	C	201	TYR	2.2
1	B	170	PHE	2.2
1	D	179	ASN	2.2
1	C	189	GLY	2.2
1	A	222	THR	2.2
1	A	186	SER	2.2
1	A	180	PHE	2.2
1	C	254	ASP	2.2
1	A	238	ALA	2.2
1	D	201	TYR	2.1
1	B	200	VAL	2.1
1	C	187	VAL	2.1
1	A	239	LYS	2.1
1	C	165	PHE	2.1
1	A	336	SER	2.1
1	C	204	TYR	2.1
1	C	174	LYS	2.1
1	C	173	LEU	2.1
1	C	171	TYR	2.1
1	C	410	ILE	2.1
1	D	206	ASN	2.1
1	D	390	HIS	2.1
1	A	171	TYR	2.1
1	C	205	VAL	2.1
1	A	196	GLY	2.1
1	B	397	LEU	2.0
1	D	190	ASN	2.0
1	B	201	TYR	2.0

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Mol	Chain	Res	Type	RSRZ
1	C	227	LYS	2.0
1	D	166	HIS	2.0
1	A	226	LEU	2.0
1	C	419	ASN	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	B	346	10/11	0.46	0.16	102,106,111,111	0
1	SEP	D	346	10/11	0.69	0.13	85,90,96,97	0
1	TPO	D	342	11/12	0.70	0.16	92,96,103,103	0
1	SEP	C	346	10/11	0.70	0.15	79,86,94,94	0
1	SEP	A	346	10/11	0.71	0.12	91,94,100,100	0
1	TPO	A	342	11/12	0.72	0.16	105,106,112,112	0
1	TPO	C	342	11/12	0.77	0.15	86,89,97,98	0
1	TPO	B	342	11/12	0.80	0.15	103,105,106,106	0
1	TPO	A	345	11/12	0.85	0.12	89,90,94,94	0
1	TPO	B	345	11/12	0.87	0.13	99,100,104,104	0
1	TPO	D	345	11/12	0.89	0.11	80,82,84,86	0
1	TPO	C	345	11/12	0.92	0.10	73,76,78,79	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	4S3	A	501	29/29	0.83	0.17	66,70,86,87	0
2	4S3	B	501	29/29	0.85	0.15	64,76,88,90	0

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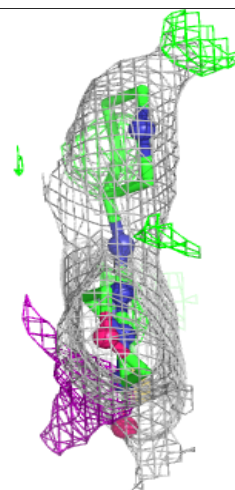
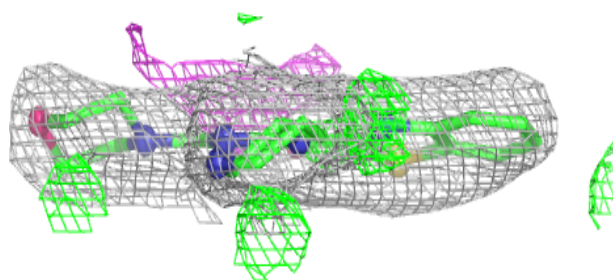
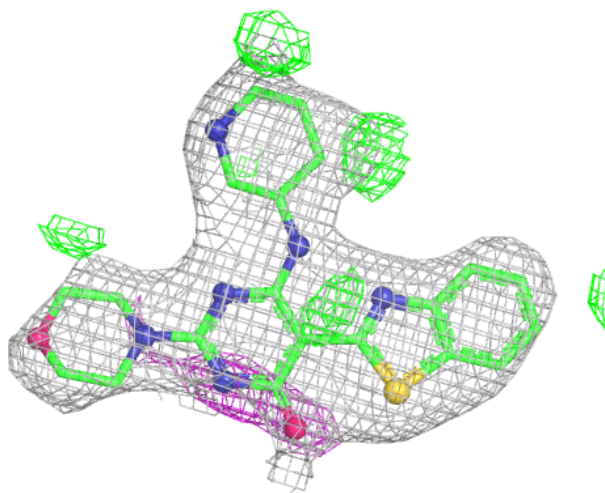
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	4S3	D	501	29/29	0.88	0.14	56,71,84,86	0
2	4S3	C	501	29/29	0.96	0.09	43,53,73,75	0

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.

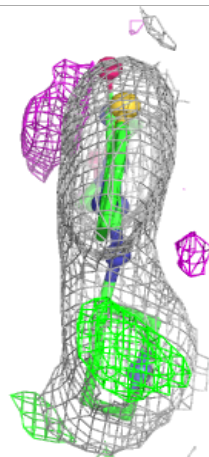
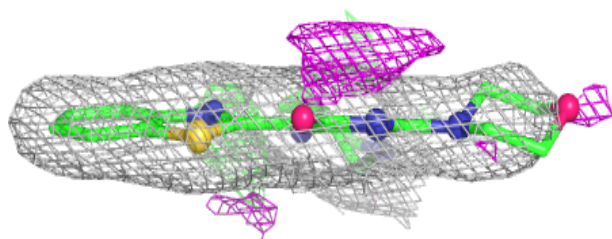
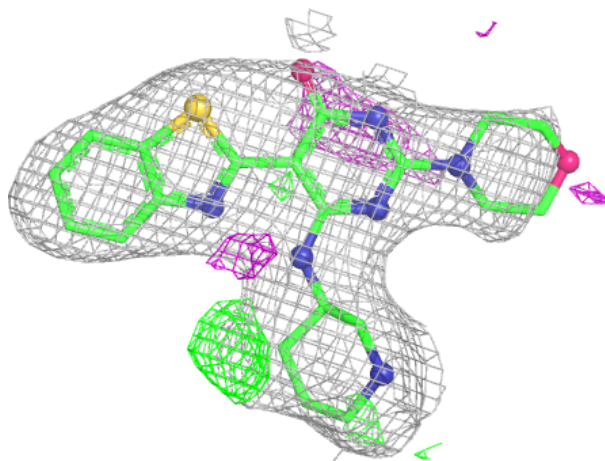
Electron density around 4S3 A 501:

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



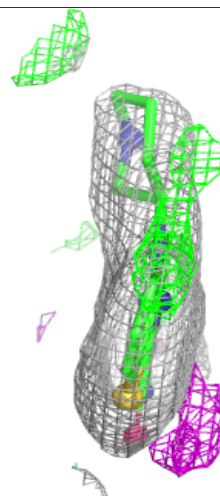
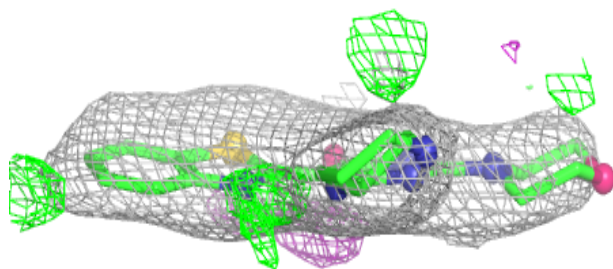
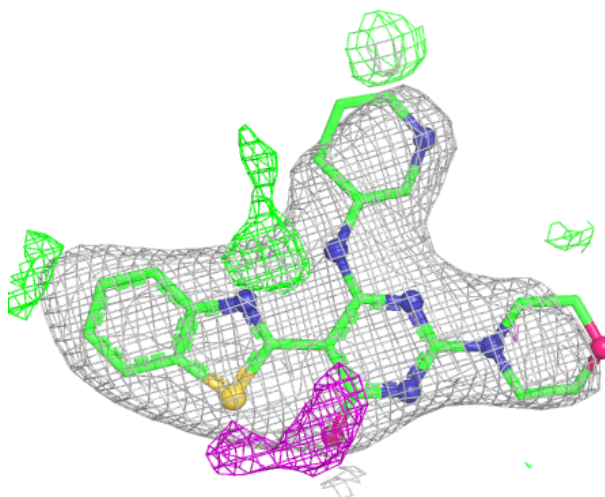
Electron density around 4S3 B 501:

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



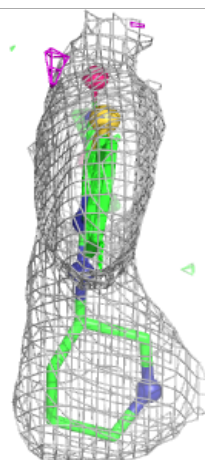
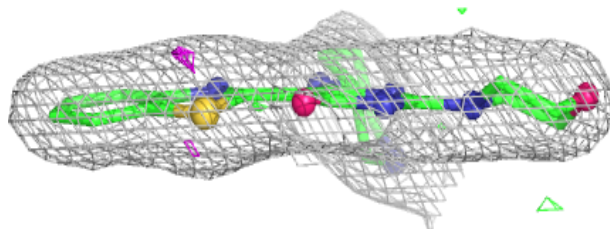
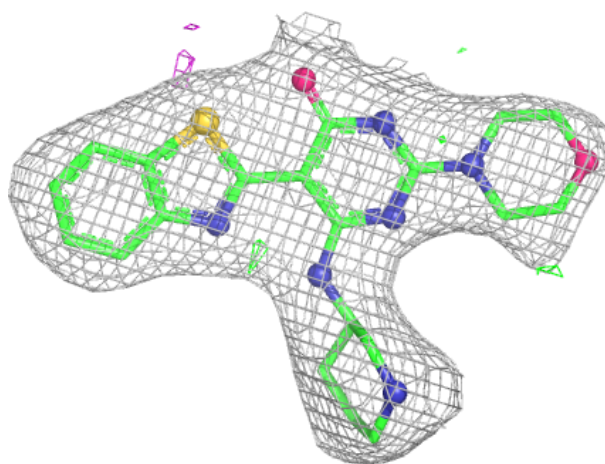
Electron density around 4S3 D 501:

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



Electron density around 4S3 C 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 ⓘ

There are no such residues in this entry.