



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 8, 2026 – 12:38 PM UTC

PDB ID : 3R6S / pdb_00003r6s
Title : Crystal structure of GlxR transcription factor from *Corynebacterium glutamicum* with cAMP
Authors : Jungwirth, B.; Pojer, F.
Deposited on : 2011-03-22
Resolution : 2.38 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ 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

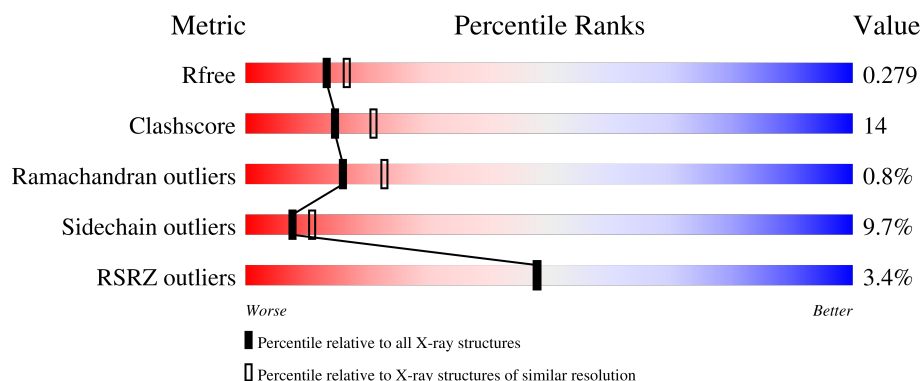
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.38 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	7164 (2.40-2.36)
Clashscore	190562	7722 (2.40-2.36)
Ramachandran outliers	187476	7626 (2.40-2.36)
Sidechain outliers	187428	7627 (2.40-2.36)
RSRZ outliers	180081	7170 (2.40-2.36)

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	247	0% 68% 20% • 9%
1	B	247	3% 61% 25% 5% 9%
1	C	247	2% 59% 27% • • 9%
1	D	247	8% 68% 21% • 9%
1	E	247	2% 66% 22% • 9%

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Mol	Chain	Length	Quality of chain
1	F	247	3% 63% 21% 5% 10%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 10745 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 transcription regulator.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	225	Total	C	N	O	S	0	2	0
			1744	1086	327	325	6			
1	B	225	Total	C	N	O	S	0	2	0
			1754	1092	333	323	6			
1	C	224	Total	C	N	O	S	0	0	0
			1727	1076	323	322	6			
1	D	224	Total	C	N	O	S	0	0	0
			1727	1076	323	322	6			
1	E	225	Total	C	N	O	S	0	1	0
			1745	1087	329	323	6			
1	F	222	Total	C	N	O	S	0	2	0
			1731	1079	326	320	6			

There are 120 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	expression tag	UNP Q79VI7
A	-18	GLY	-	expression tag	UNP Q79VI7
A	-17	SER	-	expression tag	UNP Q79VI7
A	-16	SER	-	expression tag	UNP Q79VI7
A	-15	HIS	-	expression tag	UNP Q79VI7
A	-14	HIS	-	expression tag	UNP Q79VI7
A	-13	HIS	-	expression tag	UNP Q79VI7
A	-12	HIS	-	expression tag	UNP Q79VI7
A	-11	HIS	-	expression tag	UNP Q79VI7
A	-10	HIS	-	expression tag	UNP Q79VI7
A	-9	SER	-	expression tag	UNP Q79VI7
A	-8	SER	-	expression tag	UNP Q79VI7
A	-7	GLY	-	expression tag	UNP Q79VI7
A	-6	LEU	-	expression tag	UNP Q79VI7
A	-5	VAL	-	expression tag	UNP Q79VI7
A	-4	PRO	-	expression tag	UNP Q79VI7
A	-3	ARG	-	expression tag	UNP Q79VI7

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP Q79VI7
A	-1	SER	-	expression tag	UNP Q79VI7
A	0	HIS	-	expression tag	UNP Q79VI7
B	-19	MET	-	expression tag	UNP Q79VI7
B	-18	GLY	-	expression tag	UNP Q79VI7
B	-17	SER	-	expression tag	UNP Q79VI7
B	-16	SER	-	expression tag	UNP Q79VI7
B	-15	HIS	-	expression tag	UNP Q79VI7
B	-14	HIS	-	expression tag	UNP Q79VI7
B	-13	HIS	-	expression tag	UNP Q79VI7
B	-12	HIS	-	expression tag	UNP Q79VI7
B	-11	HIS	-	expression tag	UNP Q79VI7
B	-10	HIS	-	expression tag	UNP Q79VI7
B	-9	SER	-	expression tag	UNP Q79VI7
B	-8	SER	-	expression tag	UNP Q79VI7
B	-7	GLY	-	expression tag	UNP Q79VI7
B	-6	LEU	-	expression tag	UNP Q79VI7
B	-5	VAL	-	expression tag	UNP Q79VI7
B	-4	PRO	-	expression tag	UNP Q79VI7
B	-3	ARG	-	expression tag	UNP Q79VI7
B	-2	GLY	-	expression tag	UNP Q79VI7
B	-1	SER	-	expression tag	UNP Q79VI7
B	0	HIS	-	expression tag	UNP Q79VI7
C	-19	MET	-	expression tag	UNP Q79VI7
C	-18	GLY	-	expression tag	UNP Q79VI7
C	-17	SER	-	expression tag	UNP Q79VI7
C	-16	SER	-	expression tag	UNP Q79VI7
C	-15	HIS	-	expression tag	UNP Q79VI7
C	-14	HIS	-	expression tag	UNP Q79VI7
C	-13	HIS	-	expression tag	UNP Q79VI7
C	-12	HIS	-	expression tag	UNP Q79VI7
C	-11	HIS	-	expression tag	UNP Q79VI7
C	-10	HIS	-	expression tag	UNP Q79VI7
C	-9	SER	-	expression tag	UNP Q79VI7
C	-8	SER	-	expression tag	UNP Q79VI7
C	-7	GLY	-	expression tag	UNP Q79VI7
C	-6	LEU	-	expression tag	UNP Q79VI7
C	-5	VAL	-	expression tag	UNP Q79VI7
C	-4	PRO	-	expression tag	UNP Q79VI7
C	-3	ARG	-	expression tag	UNP Q79VI7
C	-2	GLY	-	expression tag	UNP Q79VI7
C	-1	SER	-	expression tag	UNP Q79VI7

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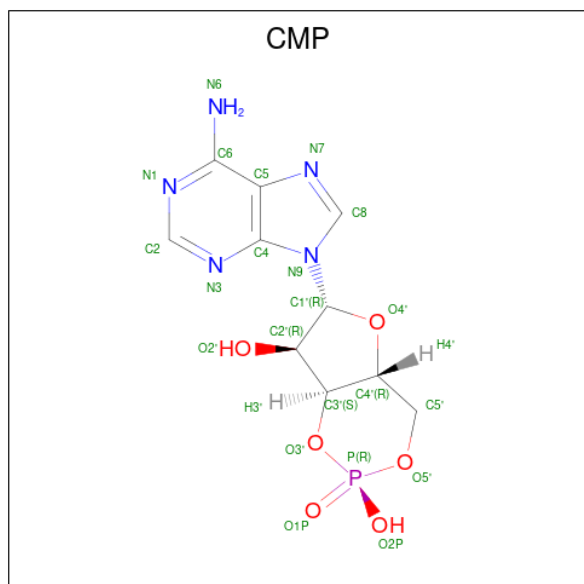
Chain	Residue	Modelled	Actual	Comment	Reference
C	0	HIS	-	expression tag	UNP Q79VI7
D	-19	MET	-	expression tag	UNP Q79VI7
D	-18	GLY	-	expression tag	UNP Q79VI7
D	-17	SER	-	expression tag	UNP Q79VI7
D	-16	SER	-	expression tag	UNP Q79VI7
D	-15	HIS	-	expression tag	UNP Q79VI7
D	-14	HIS	-	expression tag	UNP Q79VI7
D	-13	HIS	-	expression tag	UNP Q79VI7
D	-12	HIS	-	expression tag	UNP Q79VI7
D	-11	HIS	-	expression tag	UNP Q79VI7
D	-10	HIS	-	expression tag	UNP Q79VI7
D	-9	SER	-	expression tag	UNP Q79VI7
D	-8	SER	-	expression tag	UNP Q79VI7
D	-7	GLY	-	expression tag	UNP Q79VI7
D	-6	LEU	-	expression tag	UNP Q79VI7
D	-5	VAL	-	expression tag	UNP Q79VI7
D	-4	PRO	-	expression tag	UNP Q79VI7
D	-3	ARG	-	expression tag	UNP Q79VI7
D	-2	GLY	-	expression tag	UNP Q79VI7
D	-1	SER	-	expression tag	UNP Q79VI7
D	0	HIS	-	expression tag	UNP Q79VI7
E	-19	MET	-	expression tag	UNP Q79VI7
E	-18	GLY	-	expression tag	UNP Q79VI7
E	-17	SER	-	expression tag	UNP Q79VI7
E	-16	SER	-	expression tag	UNP Q79VI7
E	-15	HIS	-	expression tag	UNP Q79VI7
E	-14	HIS	-	expression tag	UNP Q79VI7
E	-13	HIS	-	expression tag	UNP Q79VI7
E	-12	HIS	-	expression tag	UNP Q79VI7
E	-11	HIS	-	expression tag	UNP Q79VI7
E	-10	HIS	-	expression tag	UNP Q79VI7
E	-9	SER	-	expression tag	UNP Q79VI7
E	-8	SER	-	expression tag	UNP Q79VI7
E	-7	GLY	-	expression tag	UNP Q79VI7
E	-6	LEU	-	expression tag	UNP Q79VI7
E	-5	VAL	-	expression tag	UNP Q79VI7
E	-4	PRO	-	expression tag	UNP Q79VI7
E	-3	ARG	-	expression tag	UNP Q79VI7
E	-2	GLY	-	expression tag	UNP Q79VI7
E	-1	SER	-	expression tag	UNP Q79VI7
E	0	HIS	-	expression tag	UNP Q79VI7
F	-19	MET	-	expression tag	UNP Q79VI7

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Chain	Residue	Modelled	Actual	Comment	Reference
F	-18	GLY	-	expression tag	UNP Q79VI7
F	-17	SER	-	expression tag	UNP Q79VI7
F	-16	SER	-	expression tag	UNP Q79VI7
F	-15	HIS	-	expression tag	UNP Q79VI7
F	-14	HIS	-	expression tag	UNP Q79VI7
F	-13	HIS	-	expression tag	UNP Q79VI7
F	-12	HIS	-	expression tag	UNP Q79VI7
F	-11	HIS	-	expression tag	UNP Q79VI7
F	-10	HIS	-	expression tag	UNP Q79VI7
F	-9	SER	-	expression tag	UNP Q79VI7
F	-8	SER	-	expression tag	UNP Q79VI7
F	-7	GLY	-	expression tag	UNP Q79VI7
F	-6	LEU	-	expression tag	UNP Q79VI7
F	-5	VAL	-	expression tag	UNP Q79VI7
F	-4	PRO	-	expression tag	UNP Q79VI7
F	-3	ARG	-	expression tag	UNP Q79VI7
F	-2	GLY	-	expression tag	UNP Q79VI7
F	-1	SER	-	expression tag	UNP Q79VI7
F	0	HIS	-	expression tag	UNP Q79VI7

- Molecule 2 is ADENOSINE-3',5'-CYCLIC-MONOPHOSPHATE (CCD ID: CMP) (formula: $C_{10}H_{12}N_5O_6P$).



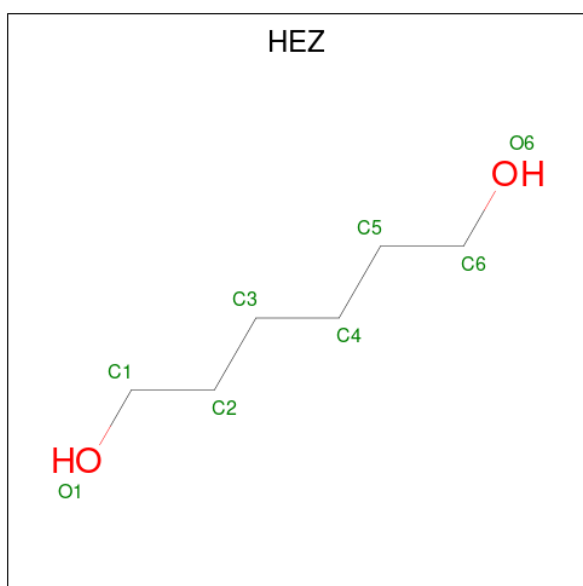
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			22	10	5	6	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	B	1	Total	C	N	O	P	0	0
			22	10	5	6	1		
2	C	1	Total	C	N	O	P	0	0
			22	10	5	6	1		
2	D	1	Total	C	N	O	P	0	0
			22	10	5	6	1		
2	E	1	Total	C	N	O	P	0	0
			22	10	5	6	1		
2	F	1	Total	C	N	O	P	0	0
			22	10	5	6	1		

- Molecule 3 is HEXANE-1,6-DIOL (CCD ID: HEZ) (formula: C₆H₁₄O₂).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	C O	0	0
			8 6 2			
3	D	1	Total	C O	0	0
			8 6 2			
3	F	1	Total	C O	0	0
			8 6 2			

- Molecule 4 is water.

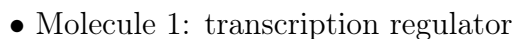
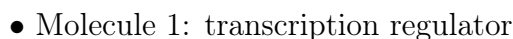
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	32	Total	O	0	0
			32 32			

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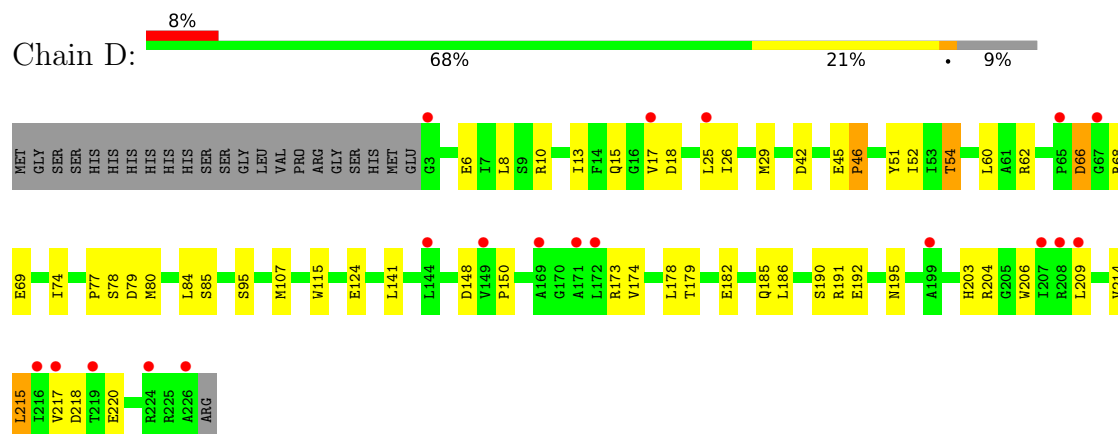
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	18	Total 18	O 18	0	0
4	C	30	Total 30	O 30	0	0
4	D	14	Total 14	O 14	0	0
4	E	45	Total 45	O 45	0	0
4	F	22	Total 22	O 22	0	0

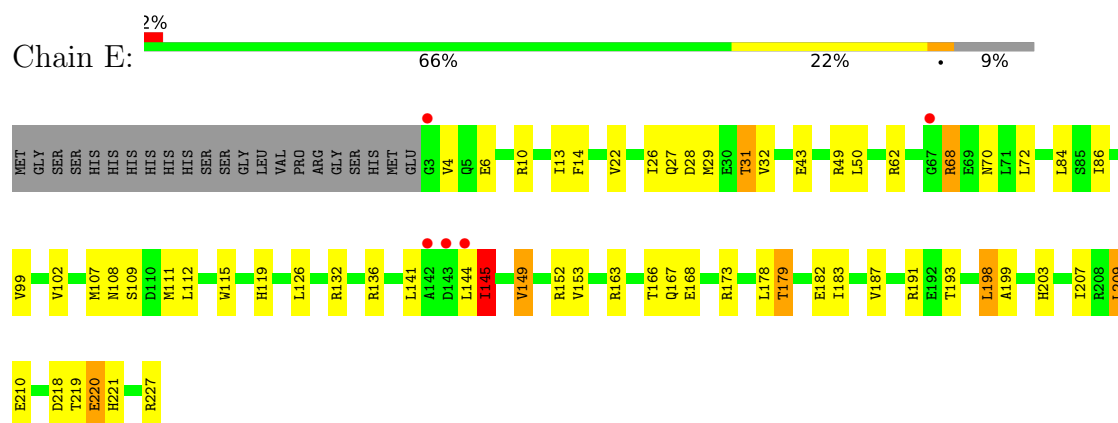
- Molecule 1: transcription regulator



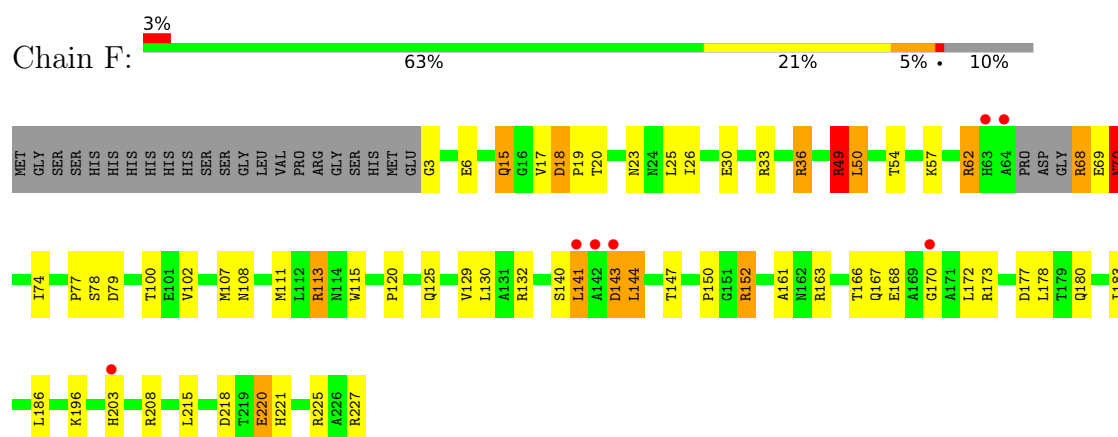
- Molecule 1: transcription regulator



- Molecule 1: transcription regulator



- Molecule 1: transcription regulator



4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	111.25Å 111.25Å 186.95Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	67.09 – 2.38 67.09 – 2.38	Depositor EDS
% Data completeness (in resolution range)	99.4 (67.09-2.38) 99.4 (67.09-2.38)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.67 (at 2.40Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.210 , 0.288 0.206 , 0.279	Depositor DCC
R_{free} test set	2742 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å ²)	41.6	Xtriage
Anisotropy	0.024	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 35.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.034 for -h,-k,l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	10745	wwPDB-VP
Average B, all atoms (Å ²)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.03% 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: HEZ, CMP

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	0.99	1/1774 (0.1%)	1.15	4/2403 (0.2%)
1	B	0.85	0/1787	1.14	7/2419 (0.3%)
1	C	0.90	0/1754	1.10	2/2377 (0.1%)
1	D	0.92	0/1754	1.09	6/2377 (0.3%)
1	E	1.03	2/1776 (0.1%)	1.18	9/2406 (0.4%)
1	F	0.93	0/1763	1.10	4/2386 (0.2%)
All	All	0.94	3/10608 (0.0%)	1.13	32/14368 (0.2%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	199	ALA	CA-CB	5.56	1.61	1.53
1	A	129	VAL	CA-CB	5.55	1.60	1.54
1	E	198	LEU	N-CA	5.00	1.52	1.46

The worst 5 of 32 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	149	VAL	CA-C-N	-8.52	110.11	118.97
1	A	149	VAL	C-N-CA	-8.52	110.11	118.97
1	F	15	GLN	N-CA-C	7.57	119.17	111.07
1	B	34	PHE	CA-C-N	-6.65	113.66	120.85
1	B	34	PHE	C-N-CA	-6.65	113.66	120.85

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	1744	0	1764	41	0
1	B	1754	0	1784	54	0
1	C	1727	0	1745	63	0
1	D	1727	0	1745	37	0
1	E	1745	0	1765	47	0
1	F	1731	0	1754	57	0
2	A	22	0	11	1	0
2	B	22	0	11	2	0
2	C	22	0	11	1	0
2	D	22	0	11	1	0
2	E	22	0	11	1	0
2	F	22	0	11	1	0
3	A	8	0	14	0	0
3	D	8	0	14	0	0
3	F	8	0	14	1	0
4	A	32	0	0	2	0
4	B	18	0	0	0	0
4	C	30	0	0	1	0
4	D	14	0	0	0	0
4	E	45	0	0	2	0
4	F	22	0	0	2	0
All	All	10745	0	10665	296	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 14.

The worst 5 of 296 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)
2:F:301:CMP:C2	2:F:301:CMP:H2	0.97	1.50
2:B:301:CMP:H2	2:B:301:CMP:C2	0.97	1.49
2:E:301:CMP:H2	2:E:301:CMP:C2	0.97	1.48
2:D:301:CMP:C2	2:D:301:CMP:H2	0.97	1.47
2:A:301:CMP:C2	2:A:301:CMP:H2	0.97	1.46

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	224/247 (91%)	213 (95%)	10 (4%)	1 (0%)	30	40
1	B	225/247 (91%)	210 (93%)	11 (5%)	4 (2%)	6	8
1	C	222/247 (90%)	210 (95%)	9 (4%)	3 (1%)	9	11
1	D	222/247 (90%)	210 (95%)	11 (5%)	1 (0%)	24	34
1	E	224/247 (91%)	213 (95%)	10 (4%)	1 (0%)	30	40
1	F	220/247 (89%)	209 (95%)	11 (5%)	0	100	100
All	All	1337/1482 (90%)	1265 (95%)	62 (5%)	10 (1%)	16	26

5 of 10 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	204	ARG
1	B	205	GLY
1	B	203	HIS
1	A	65	PRO
1	D	46	PRO

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	184/202 (91%)	170 (92%)	14 (8%)	12	19

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	185/202 (92%)	169 (91%)	16 (9%)	10	14
1	C	182/202 (90%)	164 (90%)	18 (10%)	7	10
1	D	182/202 (90%)	166 (91%)	16 (9%)	9	14
1	E	184/202 (91%)	168 (91%)	16 (9%)	9	14
1	F	183/202 (91%)	157 (86%)	26 (14%)	3	4
All	All	1100/1212 (91%)	994 (90%)	106 (10%)	8	11

5 of 106 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	141	LEU
1	E	132	ARG
1	F	147	THR
1	D	209	LEU
1	E	13	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 42 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	185	GLN
1	E	221	HIS
1	D	195	ASN
1	E	63	HIS
1	F	119	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

9 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$
3	HEZ	A	228	-	7,7,7	0.44	0	6,6,6	0.75	0
2	CMP	B	301	-	25,25,25	2.11	3 (12%)	37,39,39	2.61	15 (40%)
3	HEZ	D	228	-	7,7,7	0.38	0	6,6,6	0.94	0
2	CMP	E	301	-	25,25,25	2.47	8 (32%)	37,39,39	2.48	12 (32%)
2	CMP	A	301	-	25,25,25	2.35	5 (20%)	37,39,39	2.48	13 (35%)
2	CMP	F	301	-	25,25,25	1.49	3 (12%)	37,39,39	3.04	20 (54%)
2	CMP	C	301	-	25,25,25	1.48	5 (20%)	37,39,39	2.57	16 (43%)
2	CMP	D	301	-	25,25,25	1.51	5 (20%)	37,39,39	2.52	16 (43%)
3	HEZ	F	228	-	7,7,7	0.23	0	6,6,6	0.77	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
3	HEZ	A	228	-	-	1/5/5/5	-
2	CMP	B	301	-	-	0/4/31/31	0/4/4/4
3	HEZ	D	228	-	-	3/5/5/5	-
2	CMP	E	301	-	-	0/4/31/31	0/4/4/4
2	CMP	A	301	-	-	0/4/31/31	0/4/4/4
2	CMP	F	301	-	-	0/4/31/31	0/4/4/4
2	CMP	C	301	-	-	0/4/31/31	0/4/4/4
2	CMP	D	301	-	-	0/4/31/31	0/4/4/4
3	HEZ	F	228	-	-	3/5/5/5	-

The worst 5 of 29 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	301	CMP	P-O5'	8.87	1.67	1.57
2	B	301	CMP	P-O5'	8.46	1.67	1.57
2	E	301	CMP	P-O5'	8.29	1.67	1.57
2	E	301	CMP	O4'-C1'	5.06	1.53	1.42
2	A	301	CMP	O4'-C4'	-4.09	1.35	1.45

The worst 5 of 92 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	301	CMP	O3'-C3'-C4'	-7.91	104.74	110.71
2	E	301	CMP	O5'-P-O3'	-7.51	95.65	105.70
2	F	301	CMP	O5'-P-O3'	-6.24	97.35	105.70
2	A	301	CMP	C5-C4-N3	-6.12	118.29	126.72
2	C	301	CMP	C5'-C4'-C3'	-5.95	101.38	112.56

There are no chirality outliers.

5 of 7 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	228	HEZ	C3-C4-C5-C6
3	D	228	HEZ	C4-C5-C6-O6
3	F	228	HEZ	O1-C1-C2-C3
3	F	228	HEZ	C4-C5-C6-O6
3	A	228	HEZ	C1-C2-C3-C4

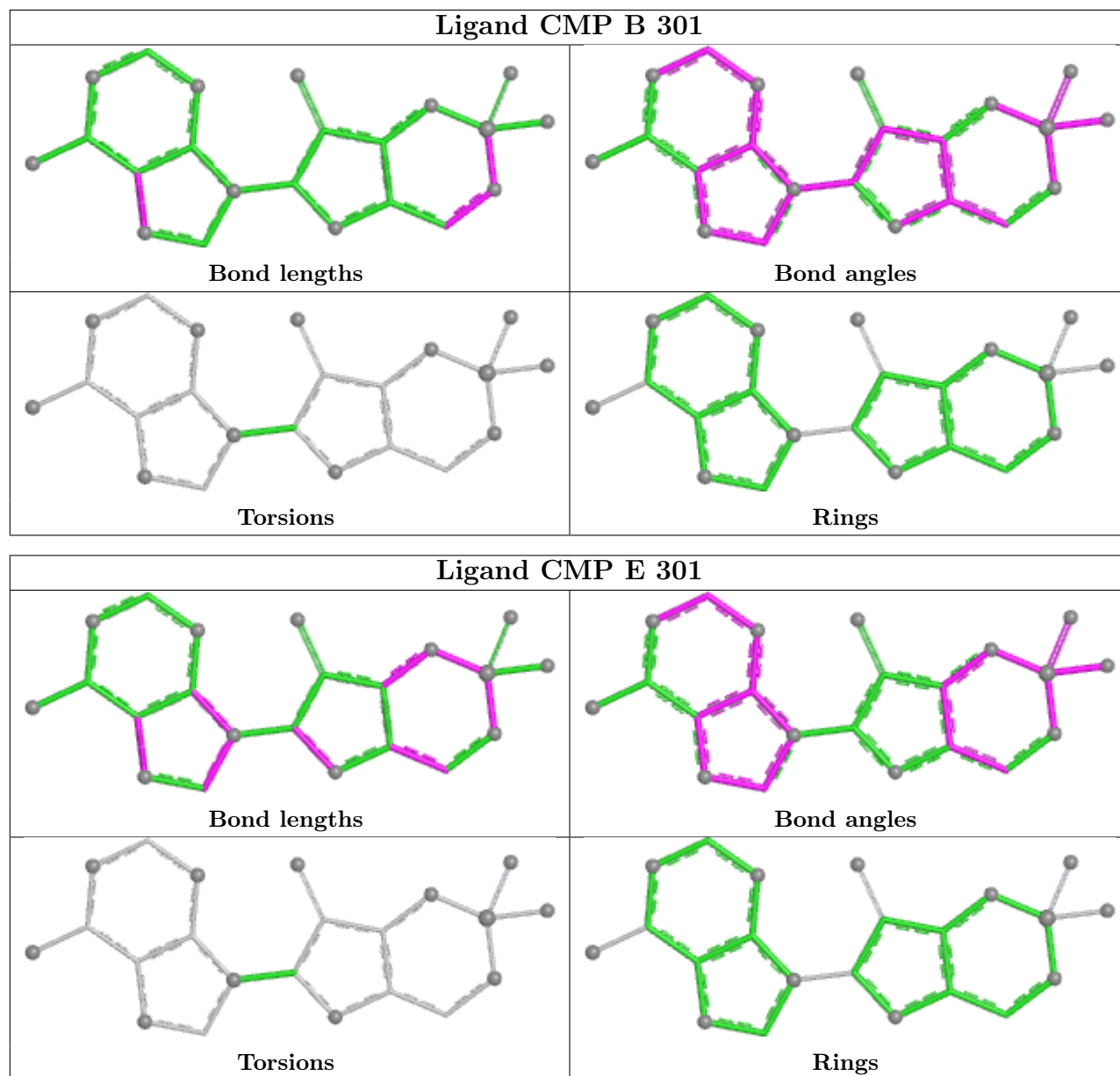
There are no ring outliers.

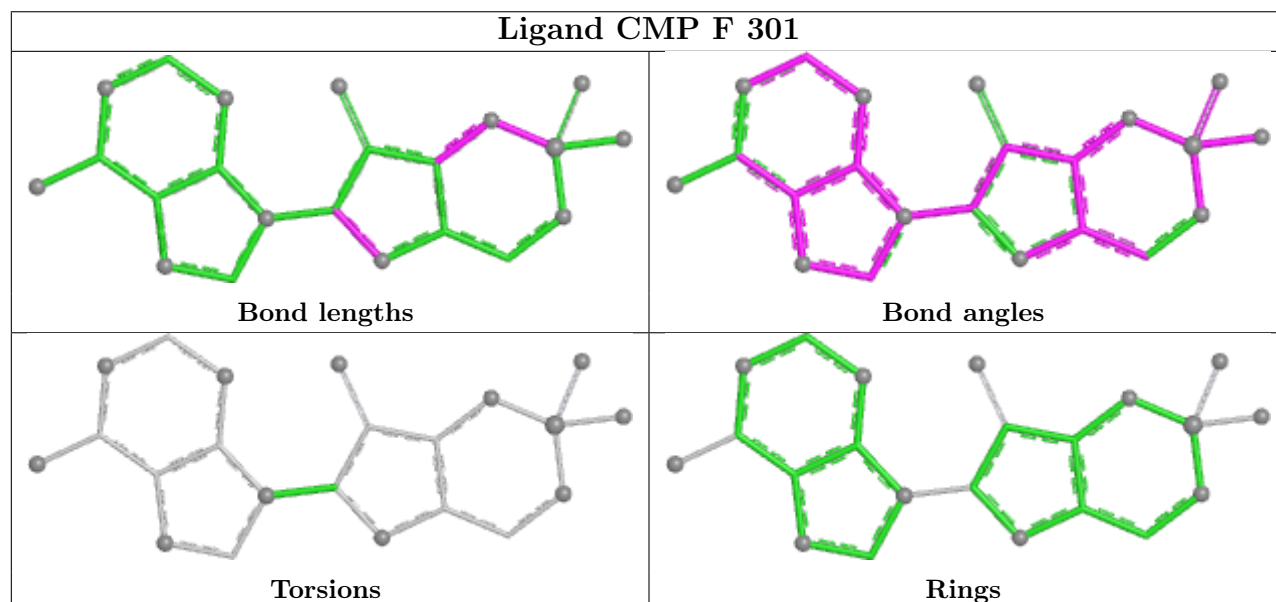
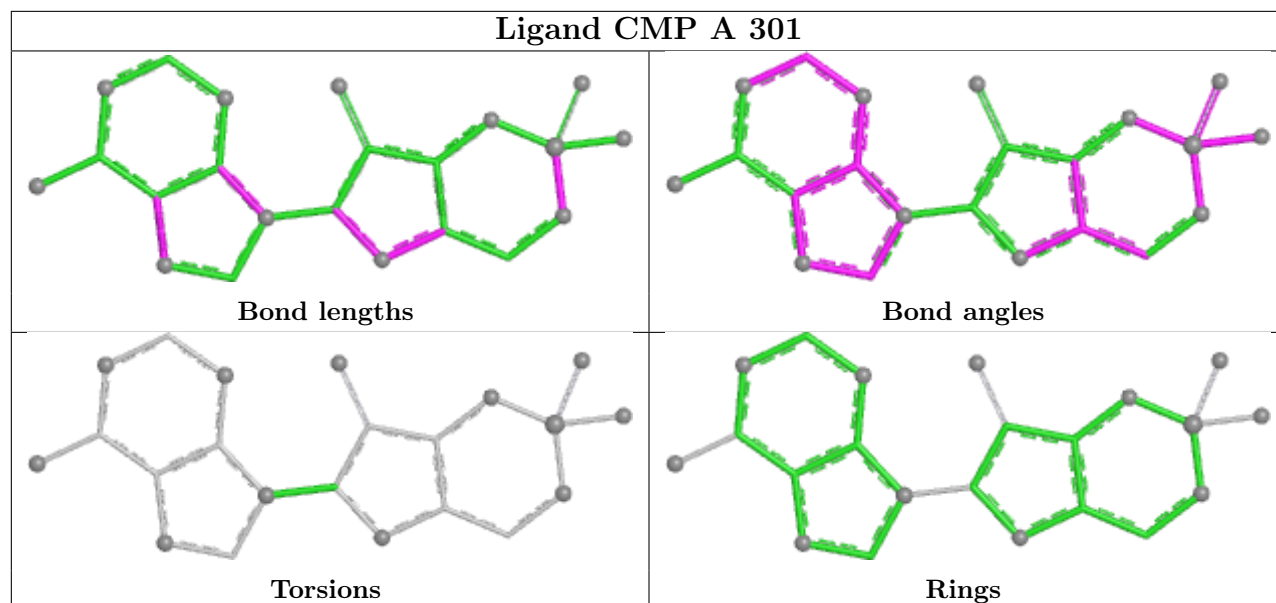
7 monomers are involved in 8 short contacts:

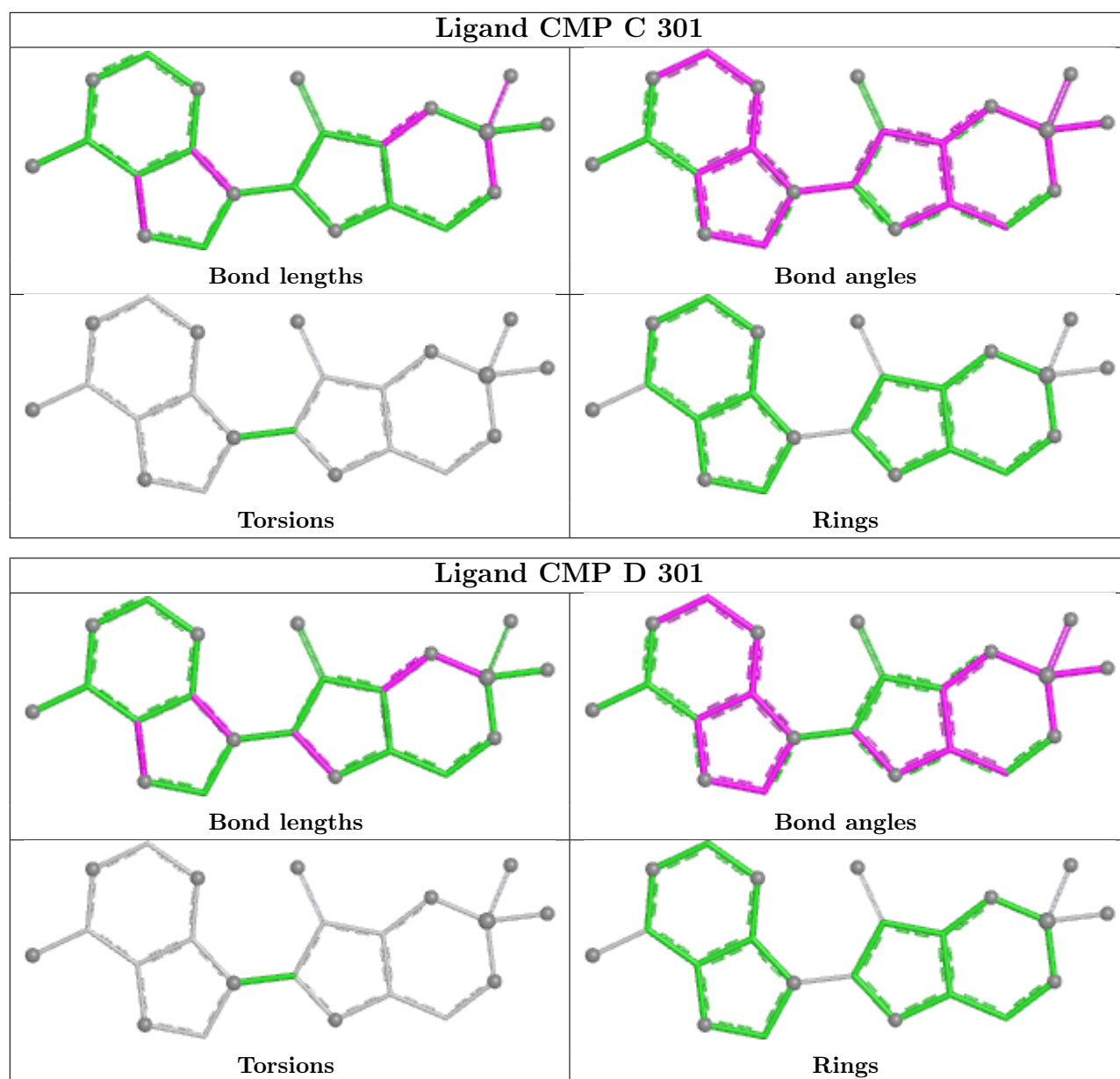
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	301	CMP	2	0
2	E	301	CMP	1	0
2	A	301	CMP	1	0
2	F	301	CMP	1	0
2	C	301	CMP	1	0
2	D	301	CMP	1	0
3	F	228	HEZ	1	0

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	225/247 (91%)	0.09	2 (0%) 81 80	14, 40, 58, 68	2 (0%)
1	B	225/247 (91%)	0.29	8 (3%) 46 46	23, 44, 66, 77	2 (0%)
1	C	224/247 (90%)	0.14	5 (2%) 62 61	26, 41, 63, 70	0
1	D	224/247 (90%)	0.47	19 (8%) 16 15	25, 46, 75, 83	0
1	E	225/247 (91%)	-0.06	5 (2%) 62 61	19, 33, 55, 65	1 (0%)
1	F	222/247 (89%)	0.13	7 (3%) 50 50	21, 40, 58, 67	2 (0%)
All	All	1345/1482 (90%)	0.18	46 (3%) 48 48	14, 40, 64, 83	7 (0%)

The worst 5 of 46 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	142	ALA	5.4
1	D	226	ALA	4.9
1	D	169	ALA	4.9
1	F	64	ALA	4.1
1	D	171	ALA	3.4

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

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

6.3 Carbohydrates [i](#)

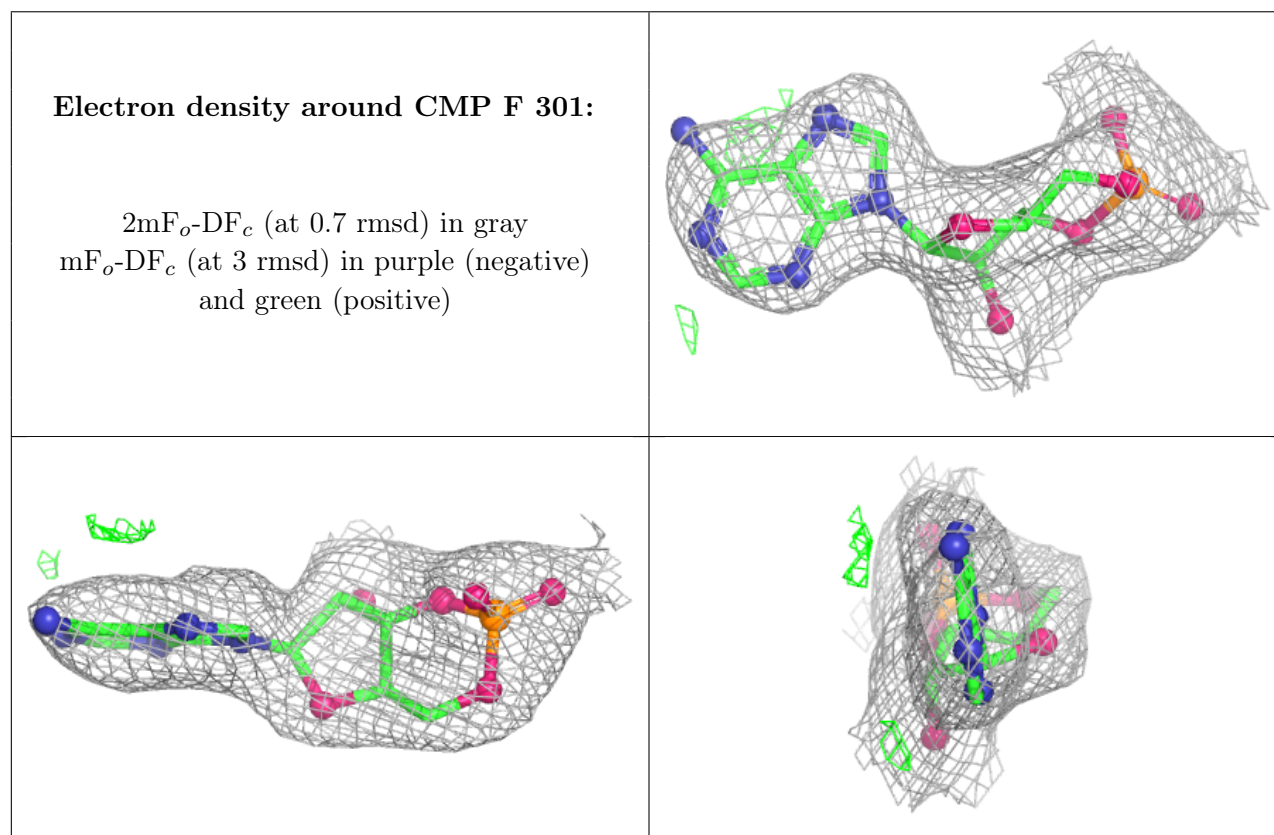
There are no oligosaccharides in this entry.

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.

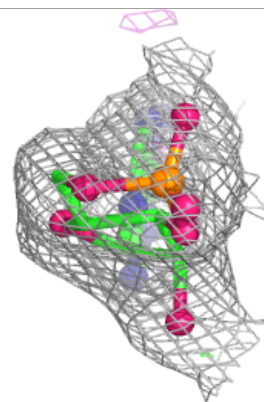
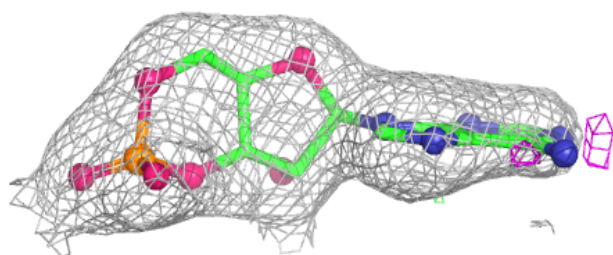
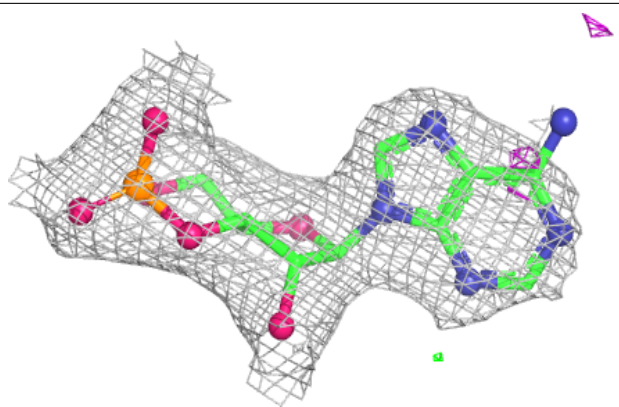
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	HEZ	D	228	8/8	0.89	0.12	34,37,39,40	0
3	HEZ	A	228	8/8	0.92	0.09	29,32,34,37	0
3	HEZ	F	228	8/8	0.92	0.11	37,40,41,42	0
2	CMP	F	301	22/22	0.96	0.08	32,37,54,55	0
2	CMP	E	301	22/22	0.96	0.07	25,31,49,51	0
2	CMP	D	301	22/22	0.97	0.05	25,28,31,32	0
2	CMP	A	301	22/22	0.97	0.06	22,26,29,31	0
2	CMP	B	301	22/22	0.97	0.05	25,31,35,37	0
2	CMP	C	301	22/22	0.98	0.05	23,27,33,36	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.

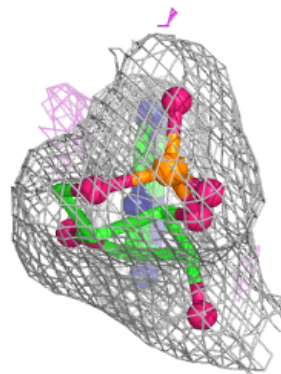
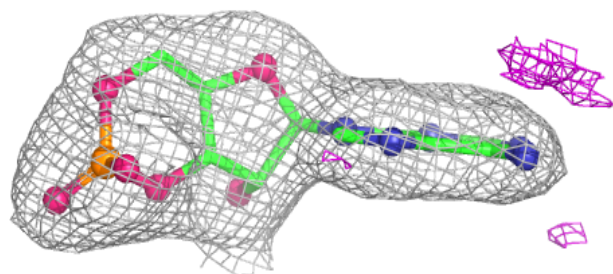
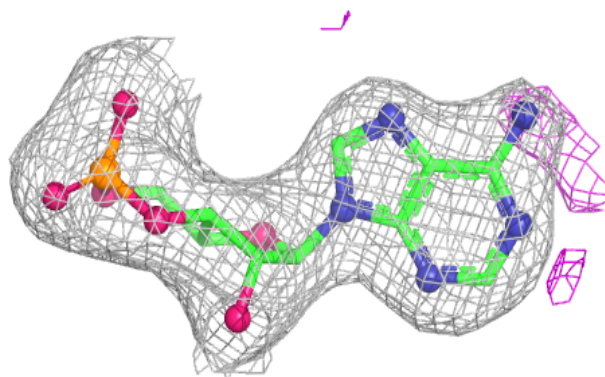


Electron density around CMP E 301:

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

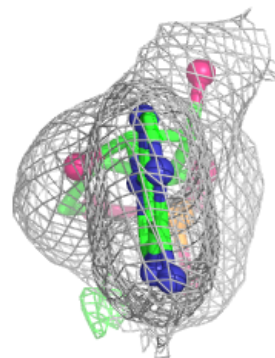
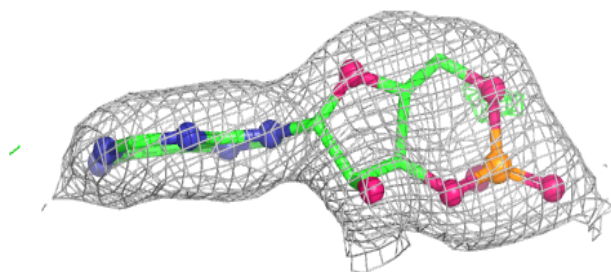
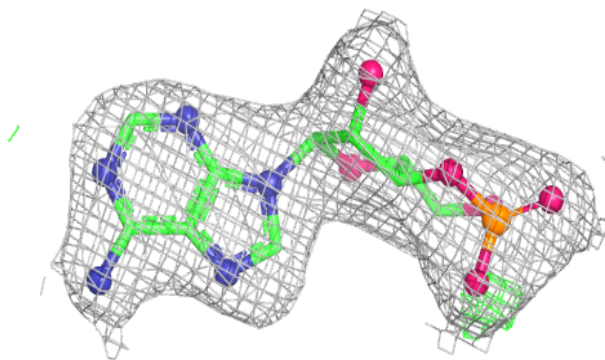
**Electron density around CMP D 301:**

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

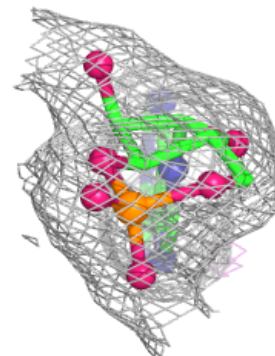
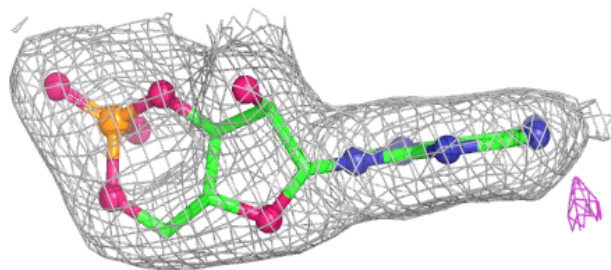
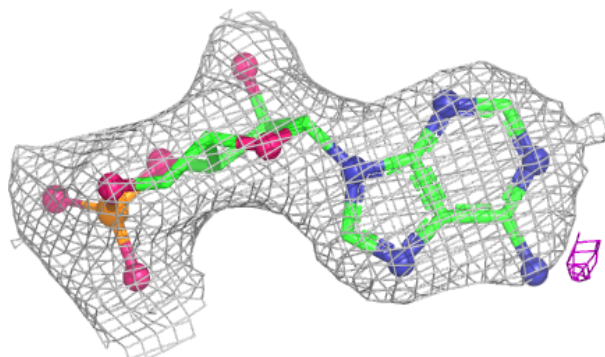


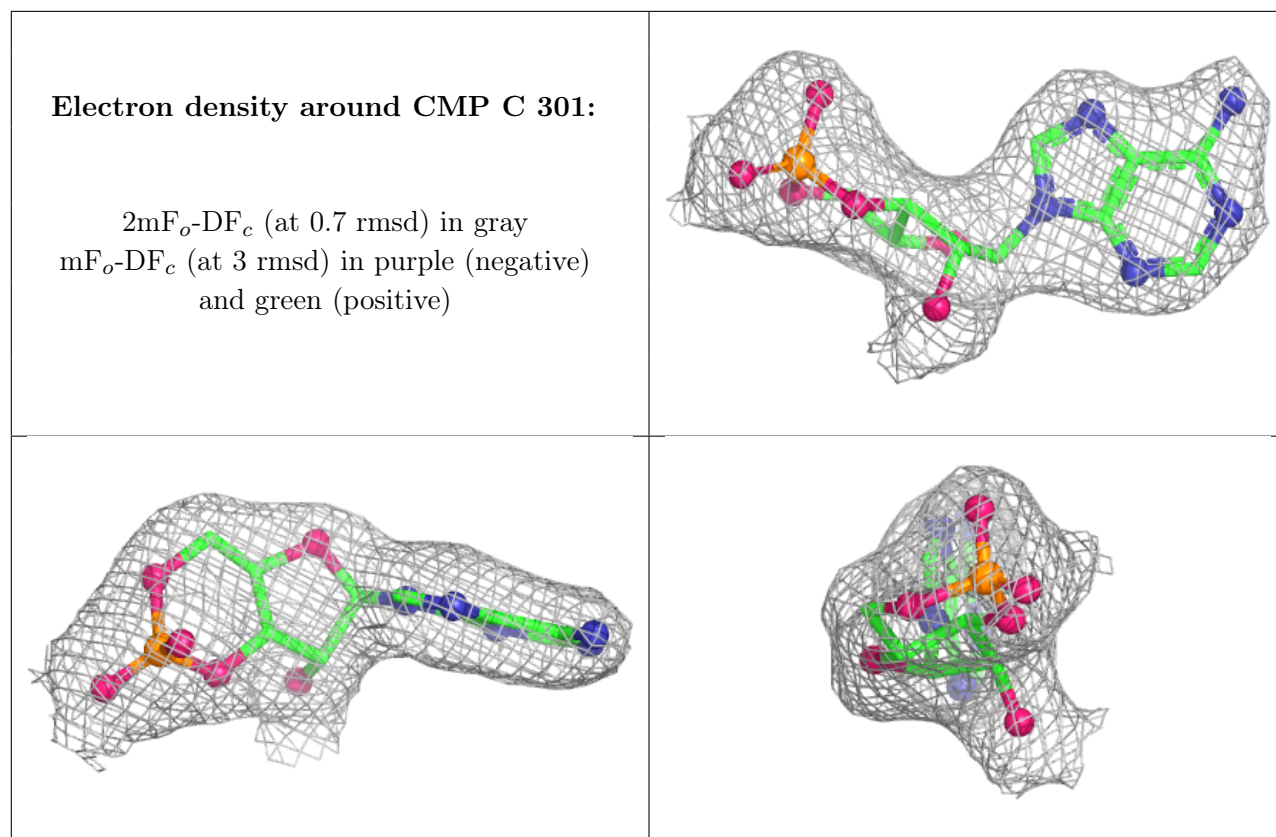
Electron density around CMP A 301:

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

**Electron density around CMP B 301:**

$2mF_o-DF_c$ (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.