



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 14, 2023 – 04:12 PM JST

PDB ID : 8I71
Title : Hepatitis B virus core protein Y132A mutant in complex with Linvencorvir (RG7907), a Hepatitis B Virus (HBV) Core Protein Allosteric Modulator (CpAM)
Authors : Zhou, Z.; Xu, Z.H.
Deposited on : 2023-01-30
Resolution : 1.60 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 : 2.32.1
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) : 2.32.1

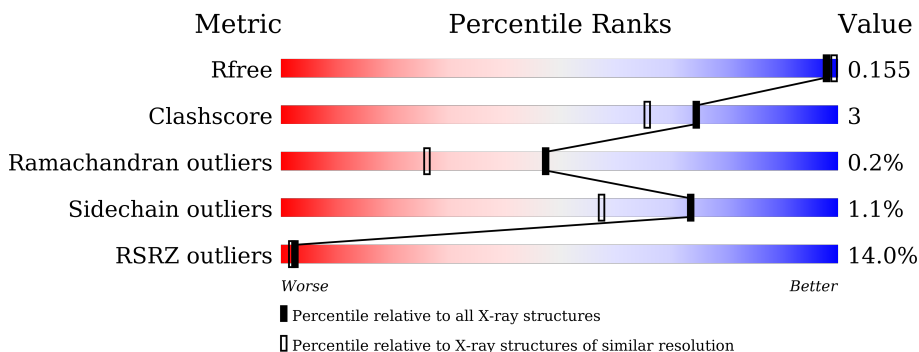
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.60 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.



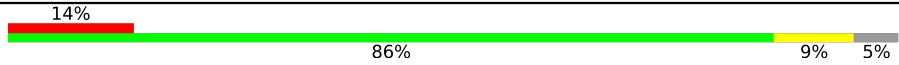
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3398 (1.60-1.60)
Clashscore	141614	3665 (1.60-1.60)
Ramachandran outliers	138981	3564 (1.60-1.60)
Sidechain outliers	138945	3563 (1.60-1.60)
RSRZ outliers	127900	3321 (1.60-1.60)

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	155	 7% 88% 8% .
1	B	155	 9% 90% 9% .
1	C	155	 17% 87% 8% . 5%
1	D	155	 17% 97% . .
1	E	155	 17% 85% 12% . .

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Mol	Chain	Length	Quality of chain
1	F	155	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into four segments: a red segment on the left labeled '14%', a large green segment labeled '86%', a yellow segment labeled '9%', and a small grey segment on the far right labeled '5%'.</p>

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 8328 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 Capsid protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	149	1207	784	198	220	5	0	2	0
1	B	155	1241	804	202	230	5	0	1	0
1	C	148	1189	770	195	219	5	0	1	0
1	D	155	1241	804	202	230	5	0	1	0
1	E	150	1213	789	198	221	5	0	2	0
1	F	148	1213	787	200	221	5	0	3	0

There are 42 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	132	ALA	TYR	engineered mutation	UNP P03147
A	150	GLU	-	expression tag	UNP P03147
A	151	ASN	-	expression tag	UNP P03147
A	152	LEU	-	expression tag	UNP P03147
A	153	TYR	-	expression tag	UNP P03147
A	154	PHE	-	expression tag	UNP P03147
A	155	GLN	-	expression tag	UNP P03147
B	132	ALA	TYR	engineered mutation	UNP P03147
B	150	GLU	-	expression tag	UNP P03147
B	151	ASN	-	expression tag	UNP P03147
B	152	LEU	-	expression tag	UNP P03147
B	153	TYR	-	expression tag	UNP P03147
B	154	PHE	-	expression tag	UNP P03147
B	155	GLN	-	expression tag	UNP P03147
C	132	ALA	TYR	engineered mutation	UNP P03147
C	150	GLU	-	expression tag	UNP P03147
C	151	ASN	-	expression tag	UNP P03147

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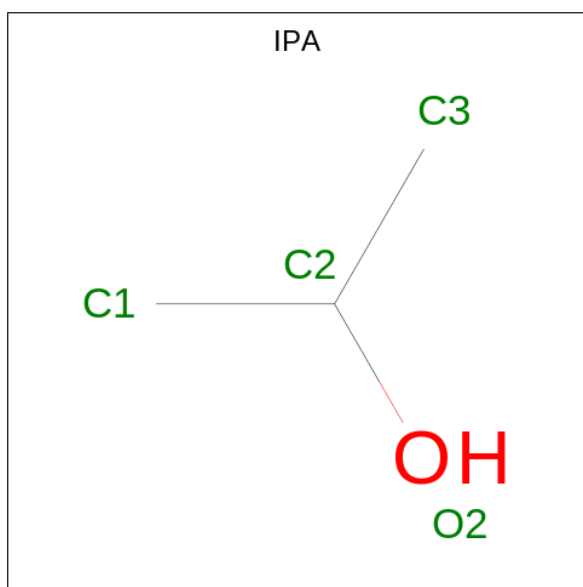
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Chain	Residue	Modelled	Actual	Comment	Reference
C	152	LEU	-	expression tag	UNP P03147
C	153	TYR	-	expression tag	UNP P03147
C	154	PHE	-	expression tag	UNP P03147
C	155	GLN	-	expression tag	UNP P03147
D	132	ALA	TYR	engineered mutation	UNP P03147
D	150	GLU	-	expression tag	UNP P03147
D	151	ASN	-	expression tag	UNP P03147
D	152	LEU	-	expression tag	UNP P03147
D	153	TYR	-	expression tag	UNP P03147
D	154	PHE	-	expression tag	UNP P03147
D	155	GLN	-	expression tag	UNP P03147
E	132	ALA	TYR	engineered mutation	UNP P03147
E	150	GLU	-	expression tag	UNP P03147
E	151	ASN	-	expression tag	UNP P03147
E	152	LEU	-	expression tag	UNP P03147
E	153	TYR	-	expression tag	UNP P03147
E	154	PHE	-	expression tag	UNP P03147
E	155	GLN	-	expression tag	UNP P03147
F	132	ALA	TYR	engineered mutation	UNP P03147
F	150	GLU	-	expression tag	UNP P03147
F	151	ASN	-	expression tag	UNP P03147
F	152	LEU	-	expression tag	UNP P03147
F	153	TYR	-	expression tag	UNP P03147
F	154	PHE	-	expression tag	UNP P03147
F	155	GLN	-	expression tag	UNP P03147

- Molecule 2 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Cl 1 1	0	0
2	C	1	Total Cl 1 1	0	0
2	D	2	Total Cl 2 2	0	0
2	E	1	Total Cl 1 1	0	0

- Molecule 3 is ISOPROPYL ALCOHOL (three-letter code: IPA) (formula: C₃H₈O).



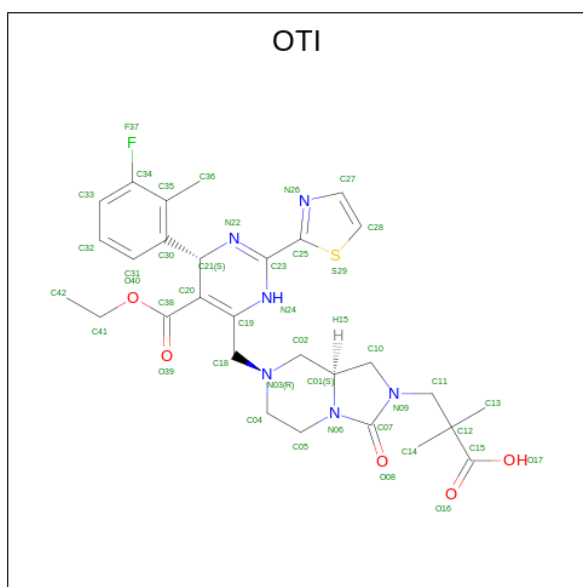
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 4 3 1	0	0
3	A	1	Total C O 4 3 1	0	0
3	B	1	Total C O 4 3 1	0	0
3	C	1	Total C O 4 3 1	0	0
3	C	1	Total C O 4 3 1	0	0
3	C	1	Total C O 4 3 1	0	0
3	D	1	Total C O 4 3 1	0	0
3	F	1	Total C O 4 3 1	0	0
3	F	1	Total C O 4 3 1	0	0

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



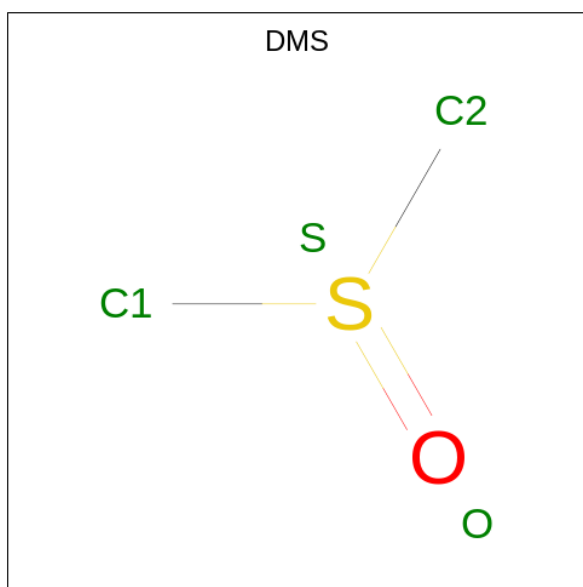
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 5 is 3-[(8 {a} {S})-7-[[5-ethoxycarbonyl-4-(3-fluoranyl-2-methyl-phenyl)-2-(1,3-thiazol-2-yl)-1,4-dihydropyrimidin-6-yl]methyl]-3-oxidanylidene-5,6,8,8 {a}-tetrahydro-1 {H}-imidazo[1,5-a]pyrazin-2-yl]-2,2-dimethyl-propanoic acid (three-letter code: OTI) (formula: C₂₉H₃₅FN₆O₅S) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf		
			Total	C	F	N	O			S	
5	A	1	Total	42	29	1	6	5	1	0	0
5	B	1	Total	42	29	1	6	5	1	0	0
5	C	1	Total	42	29	1	6	5	1	0	0
5	D	1	Total	42	29	1	6	5	1	0	0
5	E	1	Total	42	29	1	6	5	1	0	0
5	F	1	Total	42	29	1	6	5	1	0	0

- Molecule 6 is DIMETHYL SULFOXIDE (three-letter code: DMS) (formula: C₂H₆OS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O	S		
6	A	1	4	2	1	1	0	0

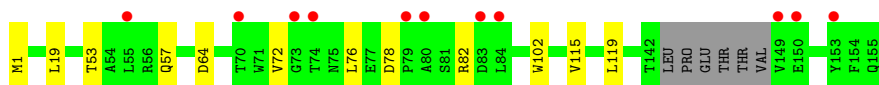
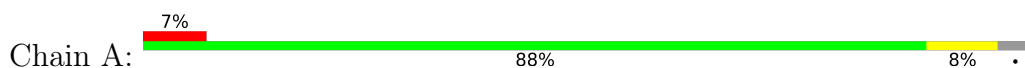
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	111	Total 111	O 111	0	0
7	B	128	Total 128	O 128	0	0
7	C	129	Total 129	O 129	0	0
7	D	116	Total 116	O 116	0	0
7	E	108	Total 108	O 108	0	0
7	F	111	Total 111	O 111	0	0

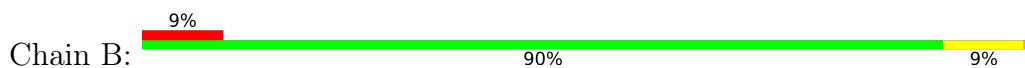
3 Residue-property plots [i](#)

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.

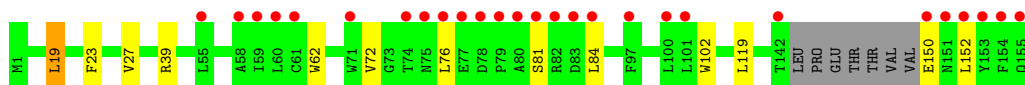
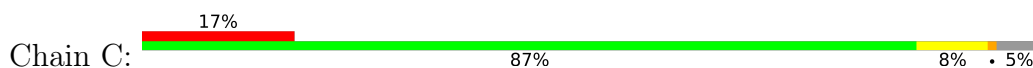
- Molecule 1: Capsid protein



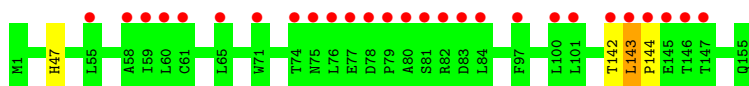
- Molecule 1: Capsid protein



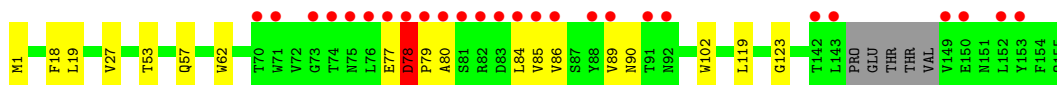
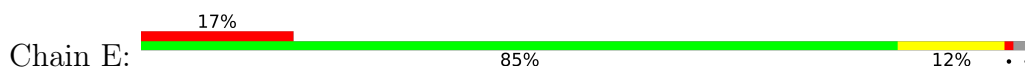
- Molecule 1: Capsid protein



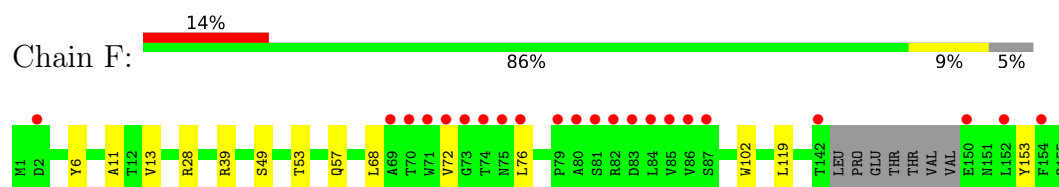
- Molecule 1: Capsid protein



- Molecule 1: Capsid protein



- Molecule 1: Capsid protein



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	64.39Å 67.56Å 86.25Å 68.60° 69.81° 83.87°	Depositor
Resolution (Å)	33.51 – 1.60 33.51 – 1.59	Depositor EDS
% Data completeness (in resolution range)	95.4 (33.51-1.60) 94.7 (33.51-1.59)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.98 (at 1.59Å)	Xtrriage
Refinement program	PHENIX 1.10	Depositor
R, R_{free}	0.155 , 0.193 0.152 , 0.155	Depositor DCC
R_{free} test set	7940 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å ²)	22.4	Xtrriage
Anisotropy	0.604	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 54.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.011 for -k,-h,-l	Xtrriage
F_o, F_c correlation	0.98	EDS
Total number of atoms	8328	wwPDB-VP
Average B, all atoms (Å ²)	41.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.53% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: DMS, CL, IPA, OTI, GOL

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	0.41	0/1242	0.52	0/1698
1	B	0.38	0/1278	0.50	0/1752
1	C	0.40	0/1224	0.54	1/1674 (0.1%)
1	D	0.40	0/1278	0.50	0/1752
1	E	0.36	0/1248	0.51	0/1708
1	F	0.39	0/1251	0.52	0/1712
All	All	0.39	0/7521	0.51	1/10296 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	19	LEU	CB-CG-CD1	-5.87	101.02	111.00

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	1207	0	1184	9	0
1	B	1241	0	1214	9	0
1	C	1189	0	1157	8	0
1	D	1241	0	1214	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	E	1213	0	1191	12	0
1	F	1213	0	1172	8	0
2	A	1	0	0	0	0
2	C	1	0	0	0	0
2	D	2	0	0	1	0
2	E	1	0	0	0	0
3	A	8	0	16	1	0
3	B	4	0	8	0	0
3	C	12	0	24	0	0
3	D	4	0	8	2	0
3	F	8	0	16	0	0
4	A	12	0	16	0	0
4	B	12	0	16	0	0
5	A	42	0	0	0	0
5	B	42	0	0	0	0
5	C	42	0	0	0	0
5	D	42	0	0	0	0
5	E	42	0	0	0	0
5	F	42	0	0	0	0
6	A	4	0	6	0	0
7	A	111	0	0	0	0
7	B	128	0	0	1	0
7	C	129	0	0	1	0
7	D	116	0	0	1	0
7	E	108	0	0	0	0
7	F	111	0	0	1	0
All	All	8328	0	7242	48	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 3.

All (48) 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:C:19:LEU:HD11	1:C:119:LEU:HD22	1.51	0.93
1:A:19:LEU:HD11	1:A:119[B]:LEU:HD22	1.66	0.76
1:E:19:LEU:HD21	1:E:119[B]:LEU:HG	1.72	0.71
1:C:19:LEU:HD11	1:C:119:LEU:CD2	2.20	0.70
1:E:77:GLU:HB3	1:E:80:ALA:HB3	1.74	0.69
1:C:102:TRP:CZ3	1:C:119:LEU:HD21	2.34	0.62
1:A:19:LEU:HD11	1:A:119[B]:LEU:CD2	2.32	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:102:TRP:CZ3	1:A:119[B]:LEU:HD21	2.38	0.58
1:E:1:MET:HG2	1:F:39:ARG:HG3	1.85	0.57
1:E:19:LEU:CD2	1:E:119[B]:LEU:HG	2.34	0.57
1:A:1:MET:HG2	1:B:39:ARG:HG3	1.87	0.56
1:F:13:VAL:HG13	7:F:312:HOH:O	2.09	0.52
1:A:76:LEU:HB3	1:A:82:ARG:HG2	1.92	0.52
2:D:201:CL:CL	7:D:384:HOH:O	2.57	0.51
1:C:72:VAL:O	1:C:76:LEU:HG	2.10	0.51
1:B:72:VAL:HG21	1:B:85:VAL:HG11	1.91	0.51
1:F:53:THR:O	1:F:57:GLN:HG2	2.11	0.50
1:E:78:ASP:HB2	1:E:79:PRO:HD3	1.94	0.49
1:D:47:HIS:CE1	3:D:203:IPA:H13	2.49	0.47
1:A:64:ASP:OD1	1:B:96:LYS:NZ	2.30	0.46
7:C:324:HOH:O	3:D:203:IPA:H33	2.14	0.46
1:E:102:TRP:CZ3	1:E:119[A]:LEU:HD21	2.51	0.45
1:E:86:VAL:O	1:E:90:ASN:ND2	2.44	0.45
1:F:68:LEU:O	1:F:72:VAL:HG23	2.16	0.45
1:F:72:VAL:O	1:F:76:LEU:HG	2.15	0.45
1:B:53:THR:O	1:B:57:GLN:HG2	2.16	0.45
1:B:27:VAL:HG11	1:B:62:TRP:CE2	2.52	0.45
1:C:150:GLU:HB2	1:C:152:LEU:H	1.82	0.44
1:A:72:VAL:O	1:A:76:LEU:HB2	2.18	0.43
1:E:78:ASP:CB	1:E:79:PRO:HD3	2.47	0.43
1:F:102:TRP:CZ3	1:F:119:LEU:HD21	2.53	0.43
1:D:143:LEU:HD13	1:D:144:PRO:HD2	2.00	0.43
1:F:49:SER:HB2	1:F:153:TYR:CE2	2.53	0.43
1:D:143:LEU:HD22	1:D:143:LEU:HA	1.89	0.43
1:B:150:GLU:OE2	7:B:301:HOH:O	2.21	0.42
1:C:27:VAL:HG11	1:C:62:TRP:CE2	2.54	0.42
1:E:27:VAL:HG11	1:E:62:TRP:CE2	2.54	0.42
1:E:85:VAL:O	1:E:89:VAL:HG23	2.20	0.41
1:C:81:SER:HA	1:C:84:LEU:HB2	2.02	0.41
1:A:115:VAL:O	1:A:119[B]:LEU:HG	2.20	0.41
1:B:19:LEU:HD13	1:B:23:PHE:CE2	2.56	0.41
1:F:6:TYR:HB3	1:F:11:ALA:HB3	2.02	0.41
1:E:53:THR:O	1:E:57:GLN:HG2	2.21	0.41
1:C:19:LEU:HD13	1:C:23:PHE:CD2	2.57	0.40
1:A:53:THR:O	1:A:57:GLN:HG2	2.22	0.40
3:A:202:IPA:O2	1:B:64:ASP:OD2	2.35	0.40
1:B:82:ARG:HA	1:B:82:ARG:HE	1.86	0.40
1:E:18:PHE:CE2	1:E:123:GLY:HA3	2.56	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	147/155 (95%)	144 (98%)	2 (1%)	1 (1%)	22	7
1	B	154/155 (99%)	152 (99%)	2 (1%)	0	100	100
1	C	145/155 (94%)	143 (99%)	2 (1%)	0	100	100
1	D	154/155 (99%)	152 (99%)	2 (1%)	0	100	100
1	E	148/155 (96%)	142 (96%)	5 (3%)	1 (1%)	22	7
1	F	147/155 (95%)	144 (98%)	3 (2%)	0	100	100
All	All	895/930 (96%)	877 (98%)	16 (2%)	2 (0%)	47	26

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	78	ASP
1	A	78	ASP

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	133/137 (97%)	133 (100%)	0	100	100
1	B	138/137 (101%)	135 (98%)	3 (2%)	52	27
1	C	131/137 (96%)	130 (99%)	1 (1%)	81	70

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	D	138/137 (101%)	136 (99%)	2 (1%)	67	47
1	E	134/137 (98%)	132 (98%)	2 (2%)	65	44
1	F	133/137 (97%)	132 (99%)	1 (1%)	81	70
All	All	807/822 (98%)	798 (99%)	9 (1%)	73	57

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	28	ARG
1	B	82	ARG
1	B	93	VAL
1	C	39	ARG
1	D	142	THR
1	D	143	LEU
1	E	78	ASP
1	E	84	LEU
1	F	28	ARG

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](#)

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 25 ligands modelled in this entry, 5 are monoatomic - leaving 20 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and

the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	IPA	B	201	-	3,3,3	0.52	0	3,3,3	0.35	0
3	IPA	A	202	-	3,3,3	0.46	0	3,3,3	0.30	0
5	OTI	A	206	-	41,46,46	1.74	2 (4%)	43,68,68	1.94	14 (32%)
3	IPA	A	203	-	3,3,3	0.53	0	3,3,3	0.25	0
5	OTI	E	202	-	41,46,46	1.72	4 (9%)	43,68,68	1.88	15 (34%)
3	IPA	C	203	-	3,3,3	0.51	0	3,3,3	0.22	0
4	GOL	B	202	-	5,5,5	0.34	0	5,5,5	0.23	0
3	IPA	D	203	-	3,3,3	0.55	0	3,3,3	0.37	0
3	IPA	F	201	-	3,3,3	0.54	0	3,3,3	0.24	0
5	OTI	C	205	-	41,46,46	1.74	4 (9%)	43,68,68	1.77	13 (30%)
3	IPA	C	204	-	3,3,3	0.56	0	3,3,3	0.32	0
4	GOL	A	205	-	5,5,5	0.42	0	5,5,5	0.16	0
5	OTI	B	204	-	41,46,46	1.40	4 (9%)	43,68,68	1.77	13 (30%)
5	OTI	F	203	-	41,46,46	1.68	6 (14%)	43,68,68	1.96	14 (32%)
3	IPA	C	202	-	3,3,3	0.49	0	3,3,3	0.43	0
4	GOL	A	204	-	5,5,5	0.39	0	5,5,5	0.30	0
3	IPA	F	202	-	3,3,3	0.53	0	3,3,3	0.31	0
5	OTI	D	204	-	41,46,46	1.68	3 (7%)	43,68,68	1.99	15 (34%)
4	GOL	B	203	-	5,5,5	0.35	0	5,5,5	0.56	0
6	DMS	A	207	-	3,3,3	0.66	0	3,3,3	0.57	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
5	OTI	C	205	-	-	2/24/71/71	0/5/5/5
5	OTI	E	202	-	-	8/24/71/71	0/5/5/5
5	OTI	F	203	-	-	2/24/71/71	0/5/5/5
4	GOL	A	204	-	-	1/4/4/4	-
4	GOL	A	205	-	-	2/4/4/4	-
4	GOL	B	202	-	-	0/4/4/4	-
5	OTI	B	204	-	-	7/24/71/71	0/5/5/5

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	OTI	D	204	-	-	4/24/71/71	0/5/5/5
4	GOL	B	203	-	-	2/4/4/4	-
5	OTI	A	206	-	-	2/24/71/71	0/5/5/5

All (23) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	E	202	OTI	C12-C15	8.73	1.60	1.52
5	D	204	OTI	C12-C15	8.08	1.60	1.52
5	C	205	OTI	C12-C15	7.69	1.59	1.52
5	A	206	OTI	C25-C23	-6.66	1.39	1.48
5	F	203	OTI	C12-C15	6.50	1.58	1.52
5	A	206	OTI	C12-C15	6.50	1.58	1.52
5	F	203	OTI	C25-C23	-5.02	1.41	1.48
5	B	204	OTI	C12-C15	4.38	1.56	1.52
5	B	204	OTI	C25-C23	-4.24	1.42	1.48
5	C	205	OTI	C25-C23	-3.92	1.43	1.48
5	D	204	OTI	C25-C23	-3.47	1.43	1.48
5	C	205	OTI	C05-N06	-3.38	1.41	1.47
5	D	204	OTI	C05-N06	-3.01	1.41	1.47
5	C	205	OTI	C18-N03	-2.64	1.41	1.47
5	E	202	OTI	C05-N06	-2.46	1.42	1.47
5	F	203	OTI	C11-N09	2.38	1.50	1.46
5	E	202	OTI	C25-C23	-2.38	1.45	1.48
5	F	203	OTI	C25-S29	2.35	1.76	1.73
5	B	204	OTI	C05-N06	-2.32	1.42	1.47
5	F	203	OTI	C05-N06	-2.25	1.43	1.47
5	F	203	OTI	C01-N06	-2.17	1.44	1.47
5	B	204	OTI	C30-C21	-2.11	1.49	1.52
5	E	202	OTI	C11-N09	2.10	1.49	1.46

All (84) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	F	203	OTI	O08-C07-N06	-4.46	119.05	125.80
5	A	206	OTI	O16-C15-C12	-4.32	116.72	122.87
5	A	206	OTI	C04-C05-N06	-4.19	102.67	110.46
5	B	204	OTI	O16-C15-C12	-4.09	117.05	122.87
5	D	204	OTI	O08-C07-N06	-4.08	119.62	125.80
5	D	204	OTI	C04-C05-N06	-4.03	102.96	110.46
5	D	204	OTI	O16-C15-C12	-3.79	117.46	122.87

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	E	202	OTI	O08-C07-N06	-3.77	120.09	125.80
5	C	205	OTI	O16-C15-C12	-3.76	117.51	122.87
5	E	202	OTI	O40-C38-O39	-3.58	116.89	123.34
5	A	206	OTI	C27-N26-C25	3.53	113.51	104.39
5	F	203	OTI	O16-C15-C12	-3.50	117.88	122.87
5	E	202	OTI	C04-C05-N06	-3.49	103.96	110.46
5	A	206	OTI	O08-C07-N06	-3.49	120.52	125.80
5	B	204	OTI	O08-C07-N06	-3.49	120.52	125.80
5	D	204	OTI	C11-N09-C07	3.46	130.76	123.07
5	A	206	OTI	O40-C38-O39	-3.46	117.10	123.34
5	C	205	OTI	O40-C38-O39	-3.43	117.17	123.34
5	F	203	OTI	O40-C38-O39	-3.37	117.26	123.34
5	D	204	OTI	C27-N26-C25	3.33	112.99	104.39
5	E	202	OTI	C27-N26-C25	3.32	112.95	104.39
5	C	205	OTI	C27-N26-C25	3.30	112.92	104.39
5	C	205	OTI	C04-C05-N06	-3.29	104.35	110.46
5	F	203	OTI	C35-C30-C21	3.28	124.72	120.21
5	D	204	OTI	C38-C20-C19	3.24	126.08	121.33
5	A	206	OTI	C38-C20-C19	3.24	126.07	121.33
5	F	203	OTI	C04-C05-N06	-3.21	104.49	110.46
5	E	202	OTI	O16-C15-C12	-3.17	118.35	122.87
5	B	204	OTI	C27-N26-C25	3.15	112.51	104.39
5	F	203	OTI	C27-N26-C25	3.14	112.49	104.39
5	B	204	OTI	C38-C20-C19	3.09	125.85	121.33
5	B	204	OTI	O40-C38-O39	-3.07	117.81	123.34
5	D	204	OTI	O40-C38-O39	-2.95	118.02	123.34
5	A	206	OTI	O40-C38-C20	2.94	117.54	112.31
5	E	202	OTI	C35-C30-C21	2.93	124.24	120.21
5	E	202	OTI	O40-C38-C20	2.93	117.52	112.31
5	D	204	OTI	O08-C07-N09	2.91	128.35	125.89
5	F	203	OTI	C10-N09-C07	-2.89	107.63	111.44
5	F	203	OTI	C41-O40-C38	2.88	121.61	116.50
5	D	204	OTI	C35-C30-C21	2.88	124.17	120.21
5	A	206	OTI	C05-N06-C01	-2.82	113.64	118.92
5	C	205	OTI	O08-C07-N06	-2.81	121.55	125.80
5	E	202	OTI	C38-C20-C19	2.78	125.40	121.33
5	C	205	OTI	C35-C30-C21	2.77	124.03	120.21
5	B	204	OTI	O40-C38-C20	2.77	117.25	112.31
5	D	204	OTI	C32-C31-C30	2.77	124.52	121.01
5	E	202	OTI	C41-O40-C38	2.74	121.35	116.50
5	C	205	OTI	O40-C38-C20	2.69	117.10	112.31
5	E	202	OTI	C10-N09-C11	2.66	126.72	120.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	204	OTI	C04-C05-N06	-2.63	105.56	110.46
5	A	206	OTI	C32-C31-C30	2.63	124.34	121.01
5	E	202	OTI	C10-N09-C07	-2.62	107.98	111.44
5	B	204	OTI	C41-O40-C38	2.56	121.04	116.50
5	A	206	OTI	C10-N09-C07	-2.53	108.11	111.44
5	A	206	OTI	C35-C30-C21	2.51	123.67	120.21
5	F	203	OTI	O08-C07-N09	2.49	128.00	125.89
5	C	205	OTI	C05-N06-C01	-2.49	114.26	118.92
5	F	203	OTI	C38-C20-C19	2.43	124.89	121.33
5	D	204	OTI	O40-C38-C20	2.41	116.61	112.31
5	E	202	OTI	C32-C33-C34	-2.40	114.52	118.46
5	B	204	OTI	C32-C33-C34	-2.38	114.55	118.46
5	B	204	OTI	C35-C30-C21	2.38	123.48	120.21
5	C	205	OTI	C38-C20-C19	2.36	124.78	121.33
5	B	204	OTI	C10-N09-C07	-2.34	108.35	111.44
5	D	204	OTI	C05-N06-C01	-2.34	114.55	118.92
5	C	205	OTI	C10-N09-C07	-2.33	108.38	111.44
5	E	202	OTI	N06-C07-N09	2.32	113.66	108.77
5	A	206	OTI	C25-C23-N24	-2.32	112.99	115.18
5	F	203	OTI	C32-C33-C34	-2.30	114.68	118.46
5	D	204	OTI	C41-O40-C38	2.27	120.52	116.50
5	C	205	OTI	C41-O40-C38	2.23	120.44	116.50
5	D	204	OTI	C10-N09-C07	-2.20	108.54	111.44
5	F	203	OTI	O40-C38-C20	2.20	116.23	112.31
5	E	202	OTI	C05-N06-C01	-2.19	114.83	118.92
5	E	202	OTI	C32-C31-C30	2.17	123.76	121.01
5	D	204	OTI	F37-C34-C33	-2.16	113.79	118.59
5	B	204	OTI	C05-N06-C01	-2.15	114.90	118.92
5	F	203	OTI	C32-C31-C30	2.12	123.70	121.01
5	B	204	OTI	C10-N09-C11	2.07	125.34	120.51
5	F	203	OTI	C05-N06-C01	-2.06	115.06	118.92
5	A	206	OTI	C10-N09-C11	2.05	125.29	120.51
5	A	206	OTI	C41-O40-C38	2.04	120.12	116.50
5	C	205	OTI	C11-N09-C07	2.01	127.54	123.07
5	C	205	OTI	C32-C31-C30	2.00	123.55	121.01

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	205	GOL	O1-C1-C2-C3
4	B	203	GOL	O1-C1-C2-C3

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Mol	Chain	Res	Type	Atoms
5	A	206	OTI	C12-C11-N09-C10
5	B	204	OTI	C12-C11-N09-C10
5	E	202	OTI	C12-C11-N09-C10
5	E	202	OTI	C12-C11-N09-C07
5	F	203	OTI	C12-C11-N09-C10
4	A	204	GOL	C1-C2-C3-O3
4	B	203	GOL	O1-C1-C2-O2
5	A	206	OTI	C12-C11-N09-C07
5	B	204	OTI	C12-C11-N09-C07
5	C	205	OTI	C12-C11-N09-C07
4	A	205	GOL	O1-C1-C2-O2
5	B	204	OTI	C14-C12-C15-O17
5	E	202	OTI	C14-C12-C15-O16
5	E	202	OTI	C11-C12-C15-O17
5	E	202	OTI	C14-C12-C15-O17
5	E	202	OTI	C13-C12-C15-O17
5	B	204	OTI	C14-C12-C15-O16
5	E	202	OTI	C13-C12-C15-O16
5	F	203	OTI	C12-C11-N09-C07
5	B	204	OTI	C11-C12-C15-O16
5	B	204	OTI	C11-C12-C15-O17
5	B	204	OTI	C13-C12-C15-O17
5	C	205	OTI	C12-C11-N09-C10
5	D	204	OTI	C14-C12-C15-O16
5	D	204	OTI	C13-C12-C15-O16
5	D	204	OTI	C14-C12-C15-O17
5	D	204	OTI	C13-C12-C15-O17
5	E	202	OTI	C11-C12-C15-O16

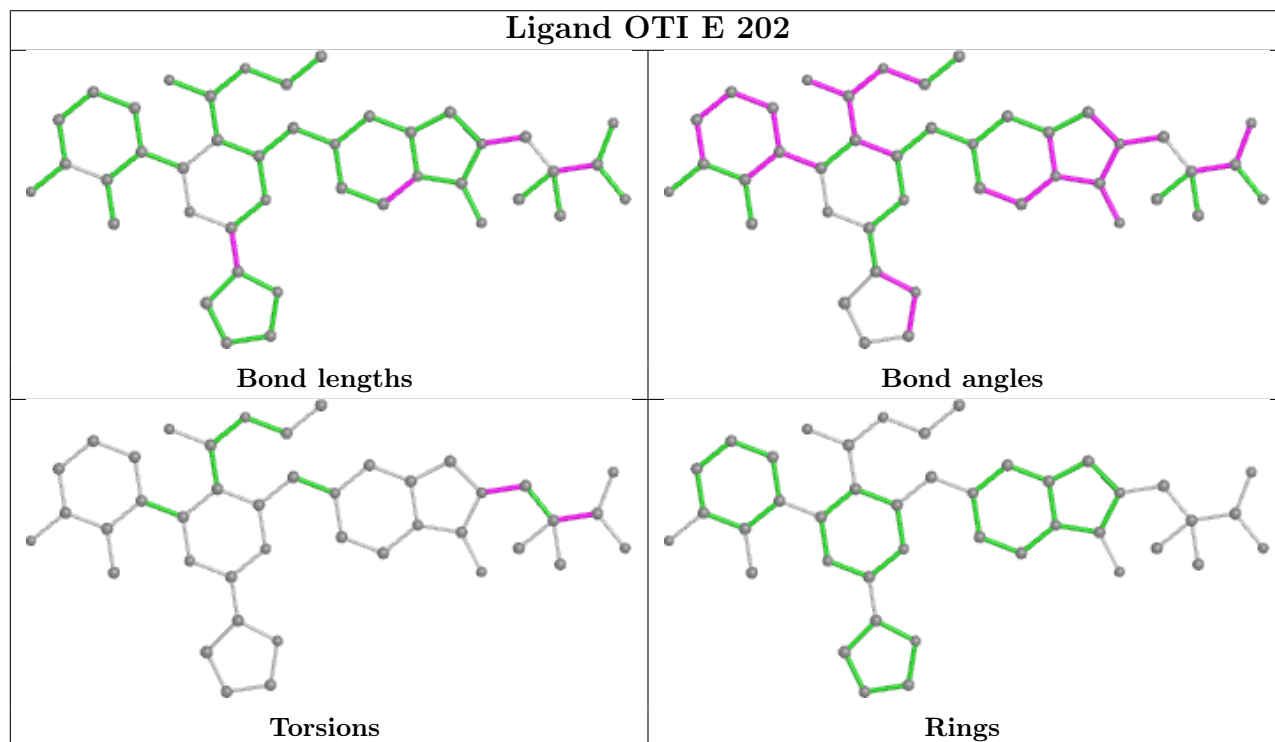
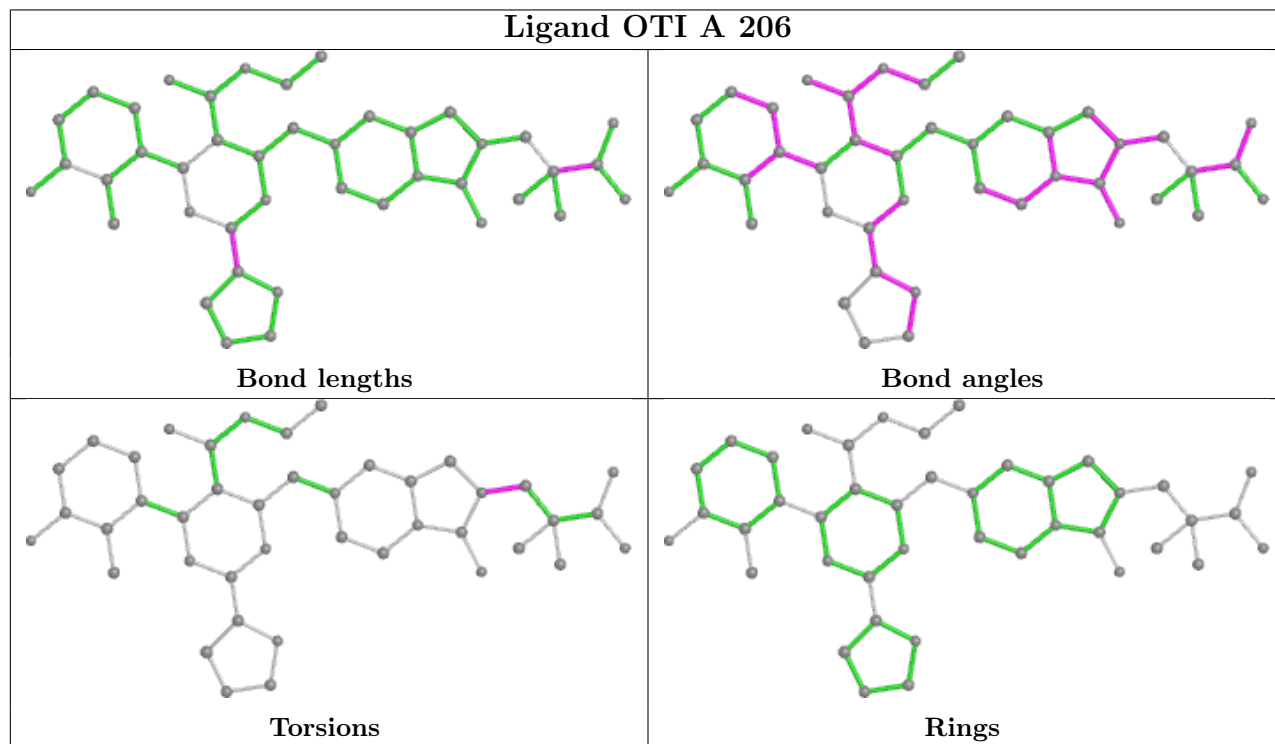
There are no ring outliers.

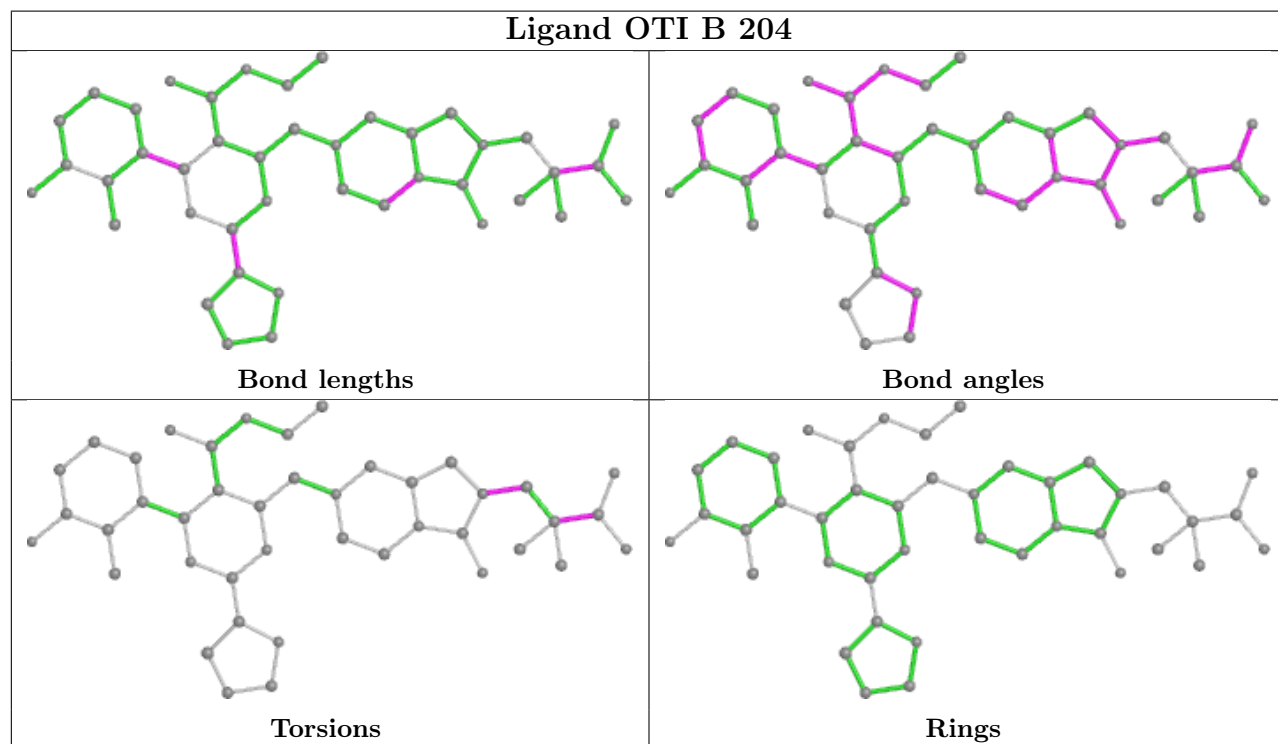
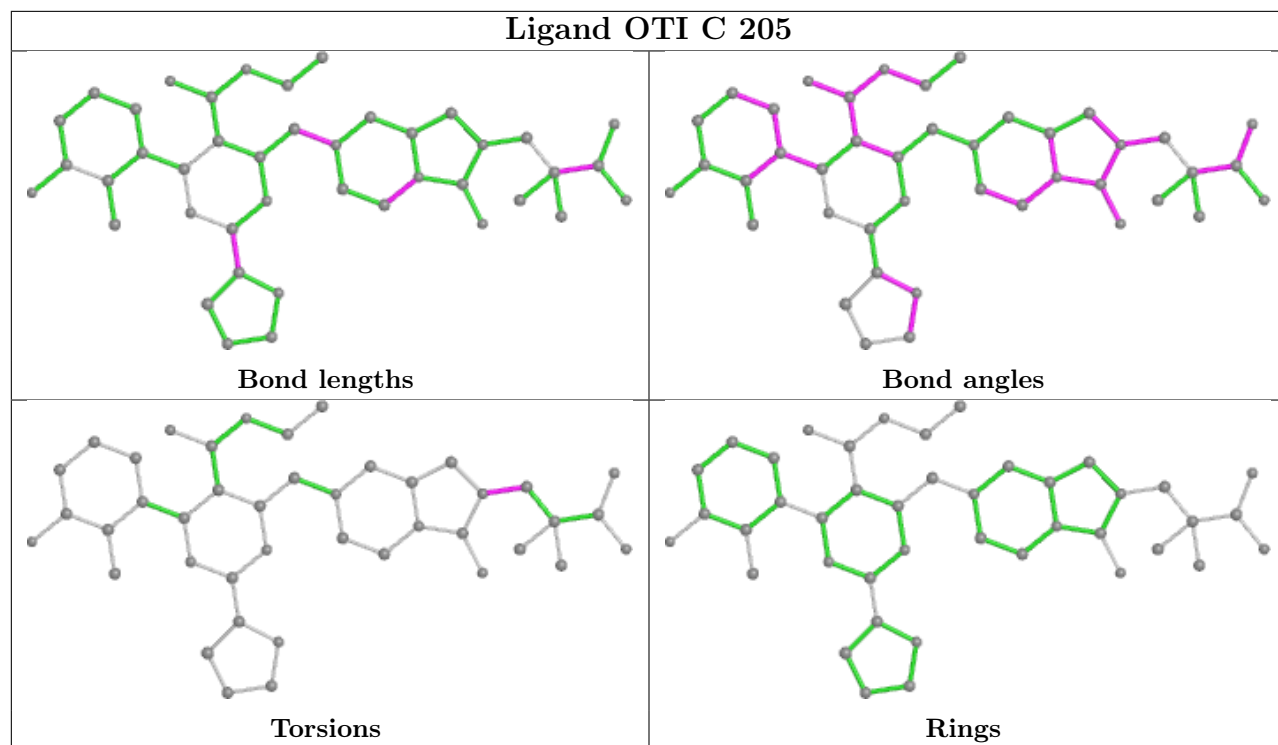
2 monomers are involved in 3 short contacts:

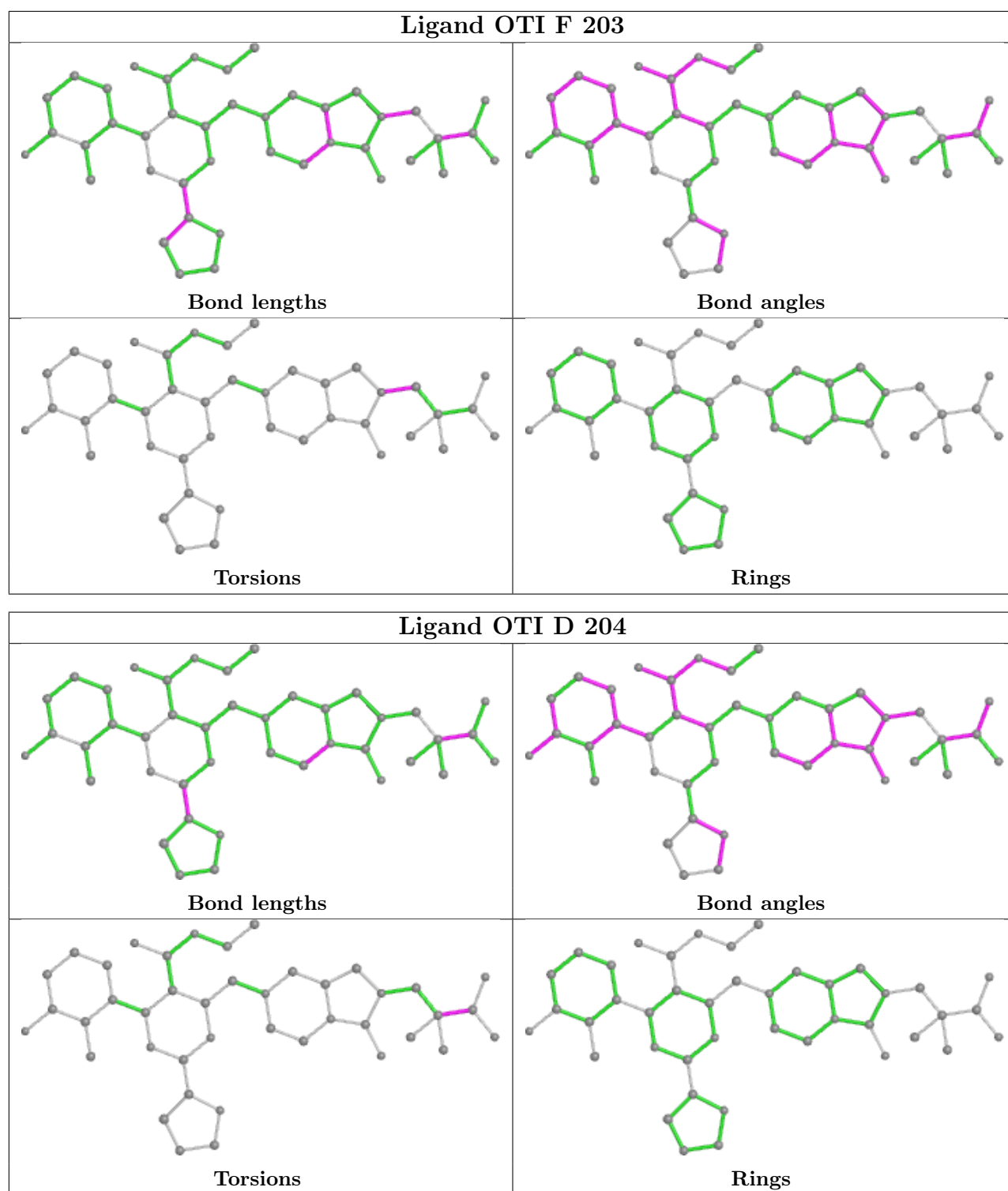
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	202	IPA	1	0
3	D	203	IPA	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.







5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues

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	149/155 (96%)	0.22	11 (7%) 14 13	25, 34, 69, 82	0
1	B	155/155 (100%)	0.14	14 (9%) 9 8	24, 35, 68, 86	0
1	C	148/155 (95%)	0.57	27 (18%) 1 1	23, 31, 83, 107	0
1	D	155/155 (100%)	0.44	27 (17%) 1 1	24, 32, 77, 103	0
1	E	150/155 (96%)	0.61	26 (17%) 1 1	26, 36, 100, 110	0
1	F	148/155 (95%)	0.49	22 (14%) 2 1	23, 32, 82, 94	0
All	All	905/930 (97%)	0.41	127 (14%) 2 2	23, 34, 82, 110	0

All (127) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	76	LEU	11.5
1	E	143	LEU	9.4
1	D	76	LEU	9.2
1	E	79	PRO	8.7
1	E	81	SER	7.3
1	D	143	LEU	6.9
1	E	80	ALA	6.6
1	C	151	ASN	6.3
1	F	80	ALA	6.3
1	C	153	TYR	6.2
1	E	86	VAL	6.2
1	A	149	VAL	6.0
1	E	149	VAL	5.9
1	F	71[A]	TRP	5.9
1	E	82	ARG	5.7
1	C	78	ASP	5.7
1	E	85	VAL	5.6
1	F	72	VAL	5.6
1	C	80	ALA	5.6

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Mol	Chain	Res	Type	RSRZ
1	C	79	PRO	5.5
1	C	76	LEU	5.4
1	F	154	PHE	5.2
1	E	74	THR	5.1
1	C	152	LEU	5.1
1	E	84	LEU	5.0
1	D	145	GLU	5.0
1	C	154	PHE	5.0
1	F	79	PRO	4.9
1	F	74	THR	4.9
1	A	79	PRO	4.8
1	E	83	ASP	4.8
1	B	80	ALA	4.7
1	E	88	TYR	4.7
1	E	75	ASN	4.6
1	F	85	VAL	4.6
1	D	81	SER	4.6
1	F	84	LEU	4.6
1	B	146	THR	4.6
1	C	77	GLU	4.5
1	D	79	PRO	4.5
1	D	77	GLU	4.3
1	B	82	ARG	4.2
1	A	74	THR	4.1
1	A	84	LEU	4.1
1	B	145	GLU	4.1
1	E	77	GLU	4.0
1	F	83	ASP	4.0
1	D	80	ALA	4.0
1	C	84	LEU	3.9
1	E	71	TRP	3.9
1	B	143	LEU	3.8
1	E	78	ASP	3.8
1	F	81	SER	3.7
1	D	146	THR	3.7
1	F	73	GLY	3.7
1	B	144	PRO	3.6
1	F	86	VAL	3.6
1	C	82	ARG	3.5
1	D	78	ASP	3.5
1	D	58	ALA	3.4
1	F	152	LEU	3.4

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Mol	Chain	Res	Type	RSRZ
1	C	100	LEU	3.3
1	C	58	ALA	3.2
1	D	84	LEU	3.2
1	A	70	THR	3.2
1	A	80	ALA	3.1
1	D	59	ILE	3.1
1	C	74	THR	3.0
1	B	147	THR	3.0
1	D	74	THR	3.0
1	D	60	LEU	3.0
1	B	81	SER	2.9
1	E	153	TYR	2.9
1	A	150	GLU	2.9
1	C	55	LEU	2.9
1	E	73	GLY	2.9
1	C	75	ASN	2.9
1	A	153	TYR	2.9
1	F	70	THR	2.9
1	C	97	PHE	2.8
1	A	73	GLY	2.8
1	C	71	TRP	2.8
1	E	92	ASN	2.8
1	D	55	LEU	2.8
1	D	82	ARG	2.7
1	C	142	THR	2.7
1	D	75	ASN	2.7
1	C	155	GLN	2.7
1	B	148	VAL	2.6
1	E	152	LEU	2.6
1	B	79	PRO	2.6
1	E	89	VAL	2.6
1	F	142	THR	2.6
1	D	65	LEU	2.6
1	F	82	ARG	2.5
1	B	72	VAL	2.5
1	F	76	LEU	2.5
1	A	83	ASP	2.5
1	F	2	ASP	2.5
1	D	61	CYS	2.5
1	C	59	ILE	2.5
1	A	55	LEU	2.5
1	D	144	PRO	2.4

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Mol	Chain	Res	Type	RSRZ
1	C	61	CYS	2.4
1	E	142	THR	2.4
1	C	101	LEU	2.4
1	E	150	GLU	2.4
1	C	150	GLU	2.4
1	C	60	LEU	2.4
1	D	83	ASP	2.4
1	F	75	ASN	2.3
1	F	69	ALA	2.3
1	C	81	SER	2.3
1	D	100	LEU	2.3
1	D	101	LEU	2.3
1	B	74	THR	2.3
1	B	149	VAL	2.3
1	D	71	TRP	2.2
1	D	147	THR	2.2
1	C	83	ASP	2.2
1	D	142	THR	2.2
1	F	87	SER	2.2
1	E	70	THR	2.2
1	E	91	THR	2.1
1	D	97	PHE	2.1
1	F	150	GLU	2.0
1	B	2	ASP	2.0

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 monosaccharides in this entry.

6.4 Ligands [i](#)

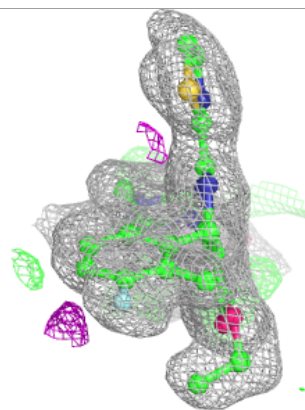
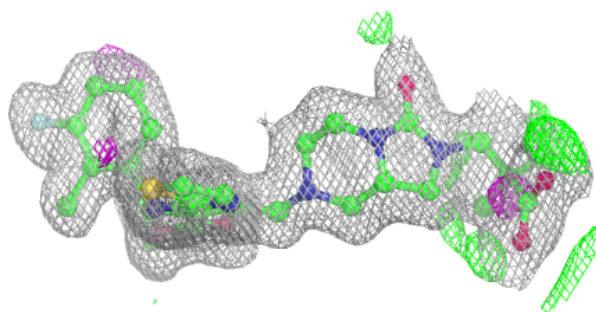
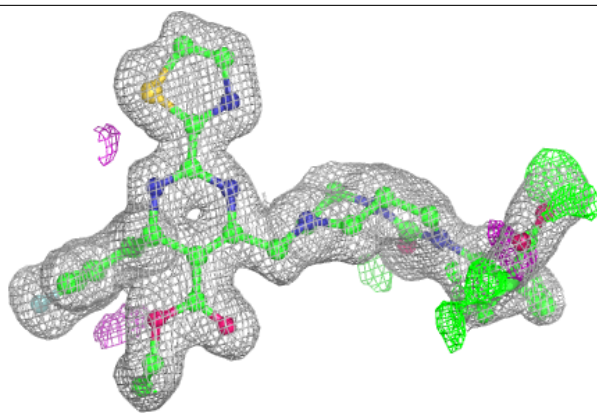
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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	IPA	C	204	4/4	0.78	0.12	62,62,63,64	0
2	CL	A	201	1/1	0.88	0.08	83,83,83,83	0
3	IPA	D	203	4/4	0.90	0.13	53,57,57,58	0
3	IPA	F	201	4/4	0.91	0.21	35,40,42,45	0
4	GOL	B	203	6/6	0.91	0.11	48,53,56,56	0
3	IPA	F	202	4/4	0.93	0.10	58,60,61,61	0
4	GOL	A	205	6/6	0.93	0.17	43,53,59,62	0
4	GOL	B	202	6/6	0.93	0.17	54,59,60,61	0
3	IPA	A	202	4/4	0.93	0.19	29,31,32,32	0
6	DMS	A	207	4/4	0.93	0.15	84,85,86,87	0
4	GOL	A	204	6/6	0.94	0.14	40,51,54,55	0
3	IPA	C	202	4/4	0.95	0.32	30,34,35,37	0
3	IPA	A	203	4/4	0.96	0.23	48,52,53,55	0
5	OTI	A	206	42/42	0.96	0.09	26,28,54,58	0
5	OTI	E	202	42/42	0.96	0.09	28,31,54,60	0
5	OTI	F	203	42/42	0.96	0.09	24,26,48,57	0
3	IPA	B	201	4/4	0.96	0.10	56,57,57,58	0
2	CL	D	201	1/1	0.97	0.09	70,70,70,70	0
5	OTI	B	204	42/42	0.97	0.09	24,28,55,67	0
5	OTI	C	205	42/42	0.97	0.08	22,26,49,60	0
5	OTI	D	204	42/42	0.97	0.07	24,28,44,50	0
2	CL	D	202	1/1	0.97	0.06	68,68,68,68	0
2	CL	C	201	1/1	0.97	0.08	69,69,69,69	0
3	IPA	C	203	4/4	0.97	0.30	41,46,46,49	0
2	CL	E	201	1/1	0.98	0.04	78,78,78,78	0

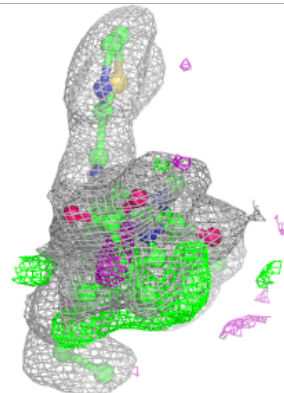
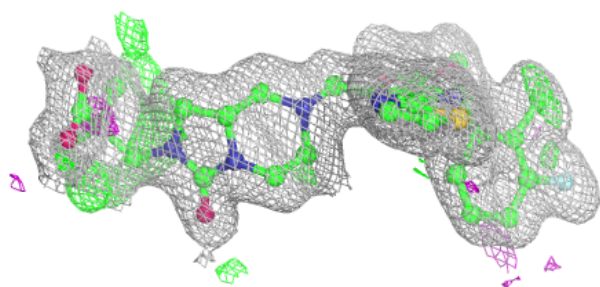
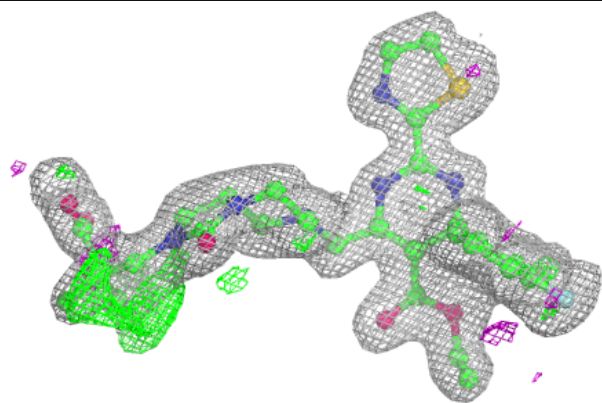
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around OTI A 206:

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

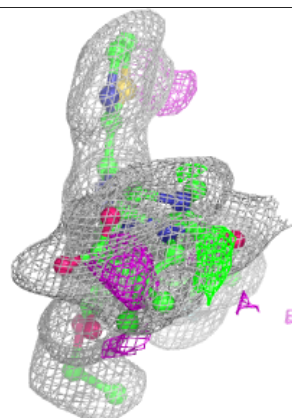
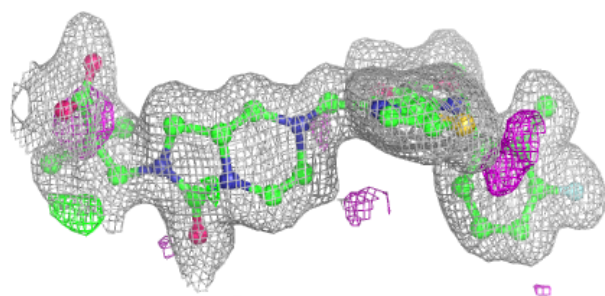
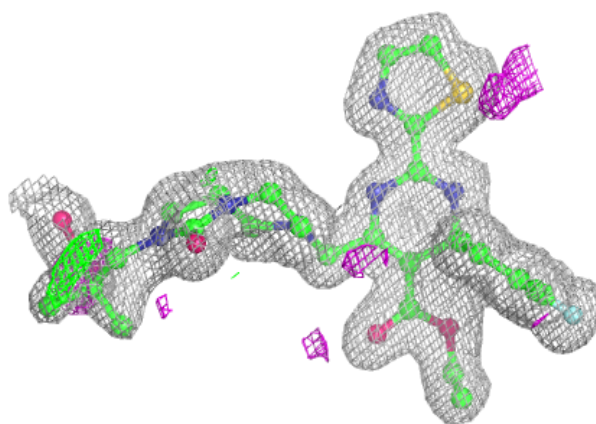
**Electron density around OTI E 202:**

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

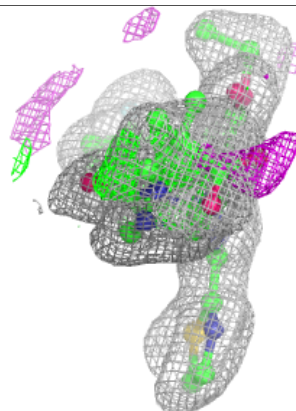
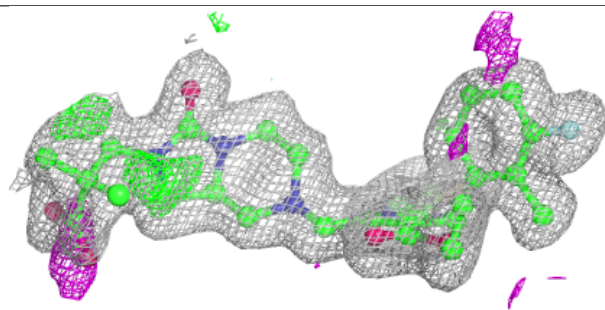
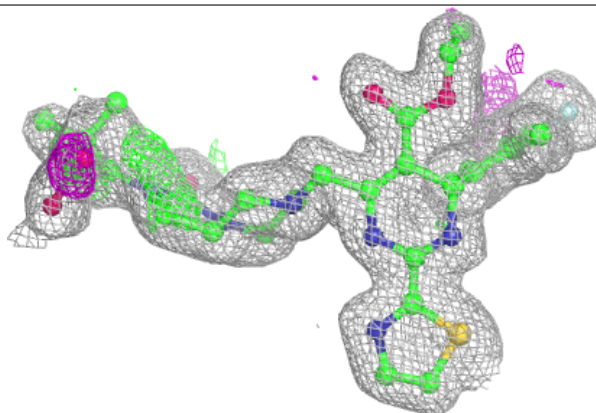


Electron density around OTI F 203:

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

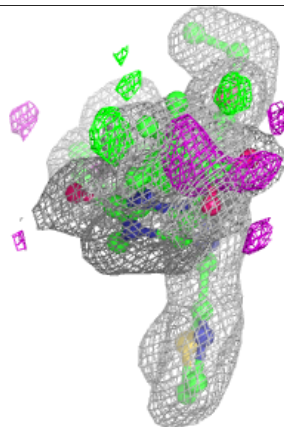
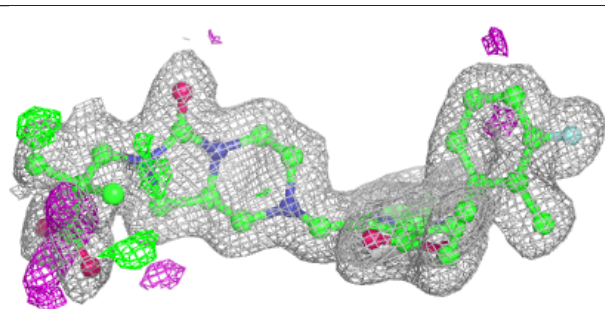
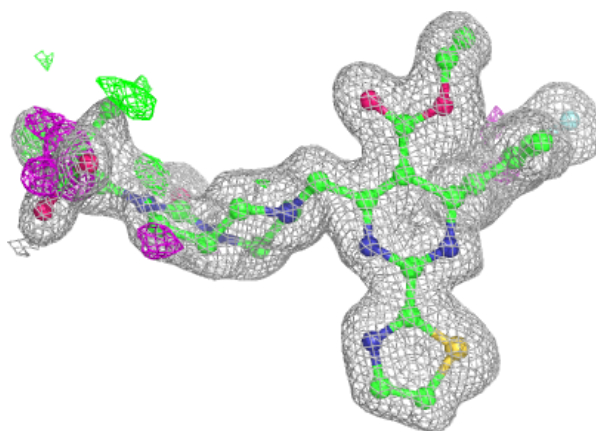
**Electron density around OTI B 204:**

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

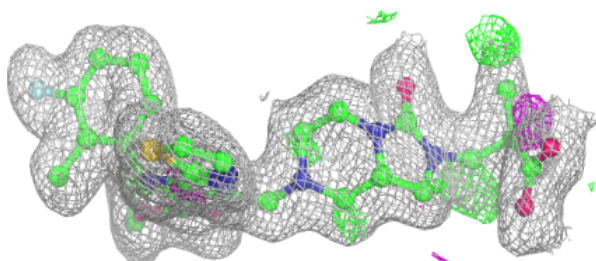
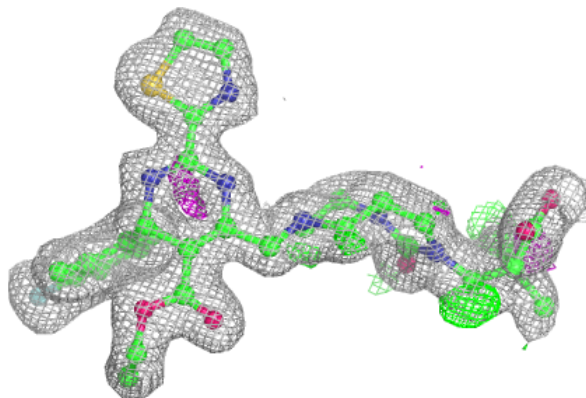


Electron density around OTI C 205:

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

**Electron density around OTI D 204:**

$2mF_o-DF_c$ (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.