



# Full wwPDB X-ray Structure Validation Report ⓘ

Sep 26, 2023 – 04:39 AM EDT

PDB ID : 6BHT  
Title : HIV-1 CA hexamer in complex with IP6, orthorhombic crystal form  
Authors : Zadrozny, K.; Wagner, J.M.; Ganser-Pornillos, B.K.; Pornillos, O.  
Deposited on : 2017-10-31  
Resolution : 2.69 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](mailto: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 : 2.35.1  
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) : 2.35.1

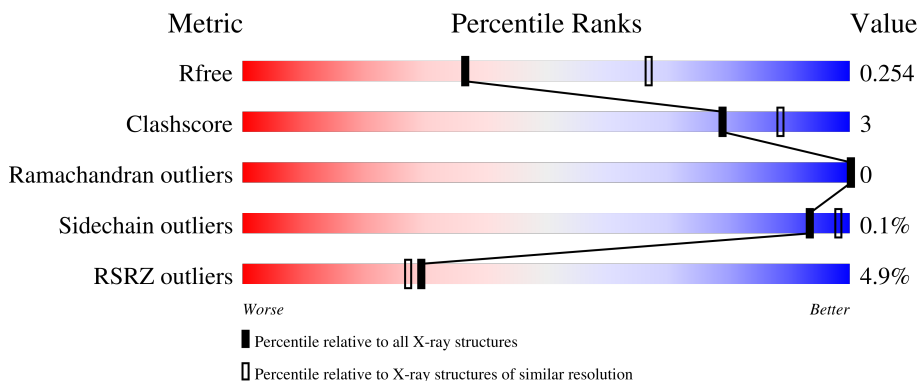
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.69 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.



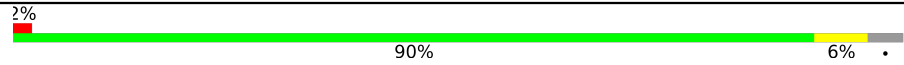
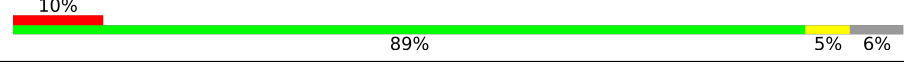
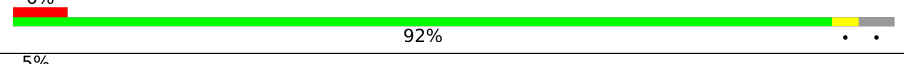
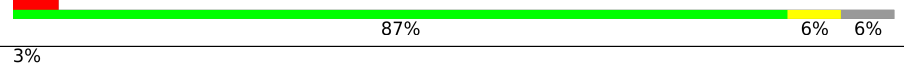

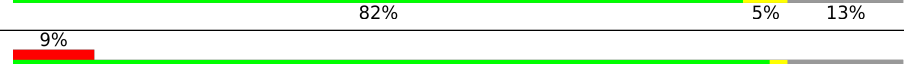
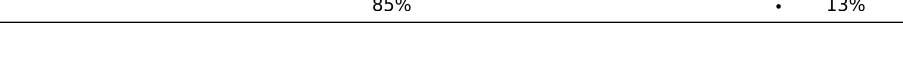
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	3863 (2.70-2.66)
Clashscore	141614	4210 (2.70-2.66)
Ramachandran outliers	138981	4141 (2.70-2.66)
Sidechain outliers	138945	4141 (2.70-2.66)
RSRZ outliers	127900	3780 (2.70-2.66)

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  $\geq 3$ , 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	231	 3% 84% 10% 5%
1	B	231	 3% 84% 6% 10%
1	C	231	 4% 86% 9% 5%
1	D	231	 2% 83% 8% 10%
1	E	231	 2% 88% 9% . 9%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	231	 2% 90% 6%
1	G	231	 10% 89% 5% 6%
1	H	231	 6% 92% . .
1	I	231	 5% 87% 6% 6%
1	J	231	 3% 84% 5% 10%
1	K	231	 6% 82% 5% 13%
1	L	231	 9% 85% . 13%

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 19794 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 p24.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	219	Total 1659	C 1042	N 291	O 312	S 14	0	0	0
1	B	209	Total 1612	C 1016	N 280	O 302	S 14	0	0	0
1	C	219	Total 1661	C 1043	N 291	O 313	S 14	0	0	0
1	D	209	Total 1599	C 1004	N 281	O 300	S 14	0	0	0
1	E	211	Total 1632	C 1026	N 286	O 307	S 13	0	0	0
1	F	221	Total 1707	C 1074	N 300	O 319	S 14	0	0	0
1	G	216	Total 1604	C 1010	N 279	O 301	S 14	0	0	0
1	H	221	Total 1662	C 1046	N 289	O 313	S 14	0	0	0
1	I	216	Total 1643	C 1037	N 287	O 305	S 14	0	0	0
1	J	207	Total 1603	C 1005	N 280	O 304	S 14	0	0	0
1	K	201	Total 1532	C 967	N 266	O 285	S 14	0	0	0
1	L	202	Total 1527	C 965	N 265	O 284	S 13	0	0	0

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	14	CYS	ALA	engineered mutation	UNP P12493
A	45	CYS	GLU	engineered mutation	UNP P12493
A	184	ALA	TRP	engineered mutation	UNP P12493
A	185	ALA	MET	engineered mutation	UNP P12493
B	14	CYS	ALA	engineered mutation	UNP P12493

*Continued on next page...*

*Continued from previous page...*

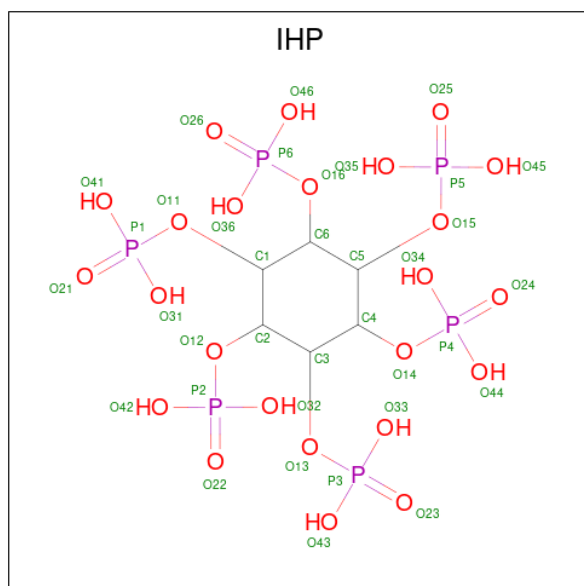
Chain	Residue	Modelled	Actual	Comment	Reference
B	45	CYS	GLU	engineered mutation	UNP P12493
B	184	ALA	TRP	engineered mutation	UNP P12493
B	185	ALA	MET	engineered mutation	UNP P12493
C	14	CYS	ALA	engineered mutation	UNP P12493
C	45	CYS	GLU	engineered mutation	UNP P12493
C	184	ALA	TRP	engineered mutation	UNP P12493
C	185	ALA	MET	engineered mutation	UNP P12493
D	14	CYS	ALA	engineered mutation	UNP P12493
D	45	CYS	GLU	engineered mutation	UNP P12493
D	184	ALA	TRP	engineered mutation	UNP P12493
D	185	ALA	MET	engineered mutation	UNP P12493
E	14	CYS	ALA	engineered mutation	UNP P12493
E	45	CYS	GLU	engineered mutation	UNP P12493
E	184	ALA	TRP	engineered mutation	UNP P12493
E	185	ALA	MET	engineered mutation	UNP P12493
F	14	CYS	ALA	engineered mutation	UNP P12493
F	45	CYS	GLU	engineered mutation	UNP P12493
F	184	ALA	TRP	engineered mutation	UNP P12493
F	185	ALA	MET	engineered mutation	UNP P12493
G	14	CYS	ALA	engineered mutation	UNP P12493
G	45	CYS	GLU	engineered mutation	UNP P12493
G	184	ALA	TRP	engineered mutation	UNP P12493
G	185	ALA	MET	engineered mutation	UNP P12493
H	14	CYS	ALA	engineered mutation	UNP P12493
H	45	CYS	GLU	engineered mutation	UNP P12493
H	184	ALA	TRP	engineered mutation	UNP P12493
H	185	ALA	MET	engineered mutation	UNP P12493
I	14	CYS	ALA	engineered mutation	UNP P12493
I	45	CYS	GLU	engineered mutation	UNP P12493
I	184	ALA	TRP	engineered mutation	UNP P12493
I	185	ALA	MET	engineered mutation	UNP P12493
J	14	CYS	ALA	engineered mutation	UNP P12493
J	45	CYS	GLU	engineered mutation	UNP P12493
J	184	ALA	TRP	engineered mutation	UNP P12493
J	185	ALA	MET	engineered mutation	UNP P12493
K	14	CYS	ALA	engineered mutation	UNP P12493
K	45	CYS	GLU	engineered mutation	UNP P12493
K	184	ALA	TRP	engineered mutation	UNP P12493
K	185	ALA	MET	engineered mutation	UNP P12493
L	14	CYS	ALA	engineered mutation	UNP P12493
L	45	CYS	GLU	engineered mutation	UNP P12493
L	184	ALA	TRP	engineered mutation	UNP P12493

*Continued on next page...*

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
L	185	ALA	MET	engineered mutation	UNP P12493

- Molecule 2 is INOSITOL HEXAKISPHOSPHATE (three-letter code: IHP) (formula:  $C_6H_{18}O_{24}P_6$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O	P		
2	C	1	36	6	24	6	0	0
2	D	1	36	6	24	6	0	0
2	K	1	36	6	24	6	0	0
2	K	1	72	12	48	12	0	1

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
3	A	27	27	27	0	0
3	B	12	12	12	0	0
3	C	13	13	13	0	0
3	D	16	16	16	0	0
3	E	18	18	18	0	0

Continued on next page...

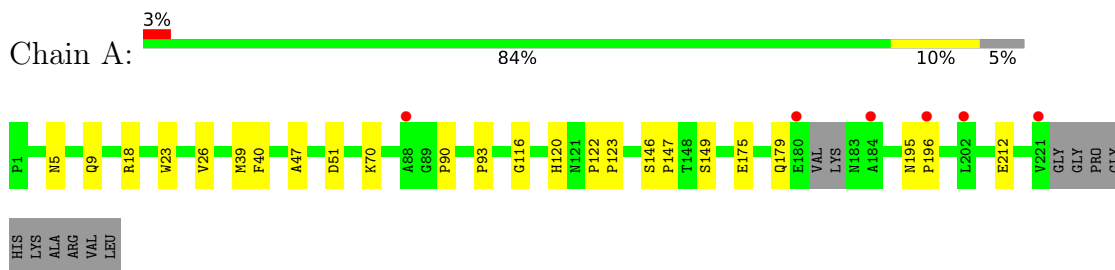
*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>	<b>ZeroOcc</b>	<b>AltConf</b>
3	F	20	Total O 20 20	0	0
3	G	2	Total O 2 2	0	0
3	H	8	Total O 8 8	0	0
3	I	17	Total O 17 17	0	0
3	J	26	Total O 26 26	0	0
3	K	8	Total O 8 8	0	0
3	L	6	Total O 6 6	0	0

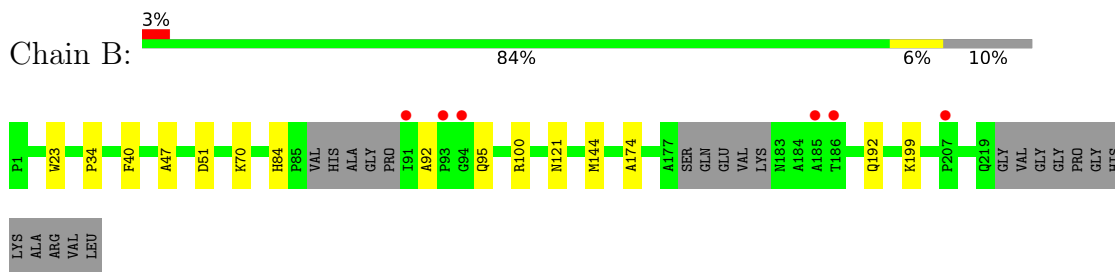
### 3 Residue-property plots [i](#)

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.

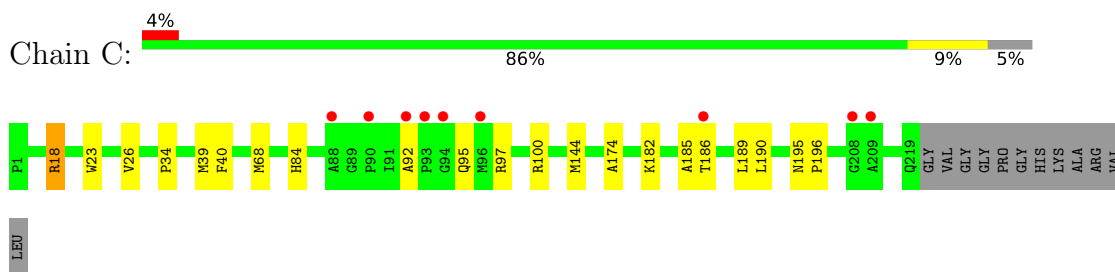
- Molecule 1: Capsid protein p24



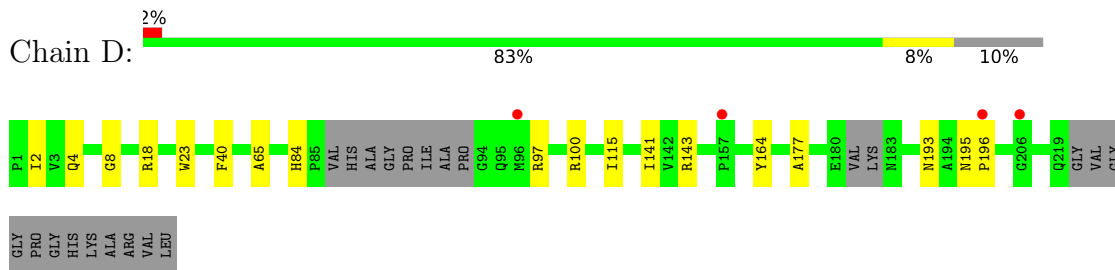
- Molecule 1: Capsid protein p24



- Molecule 1: Capsid protein p24

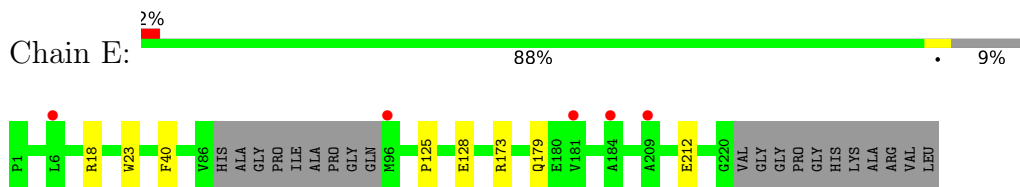


- Molecule 1: Capsid protein p24

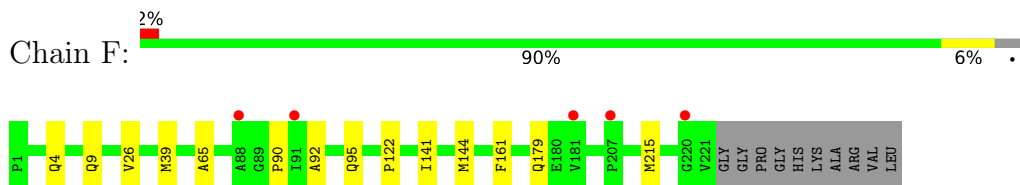




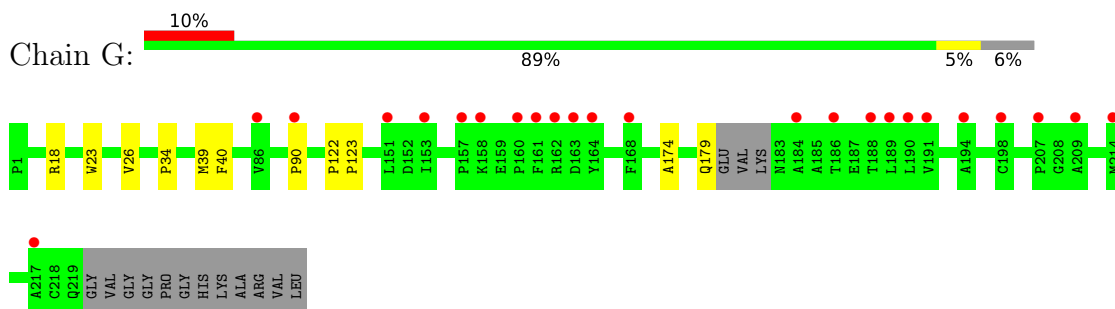
- Molecule 1: Capsid protein p24



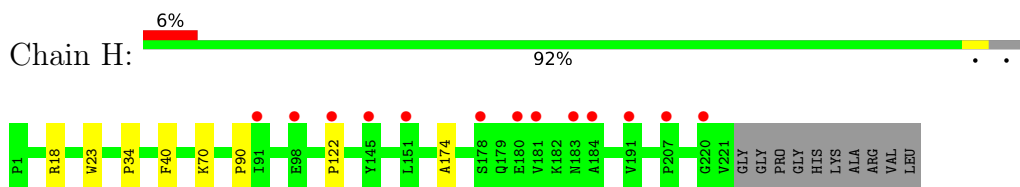
- Molecule 1: Capsid protein p24



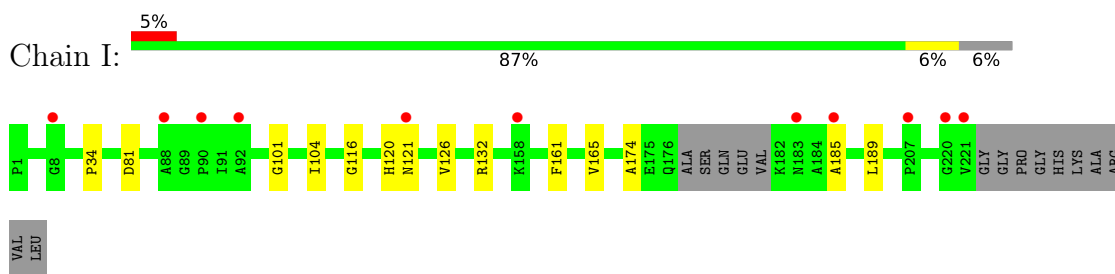
- Molecule 1: Capsid protein p24



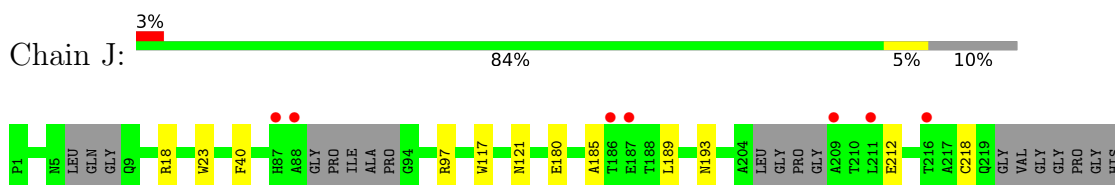
- Molecule 1: Capsid protein p24



- Molecule 1: Capsid protein p24

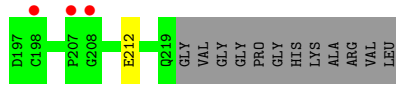
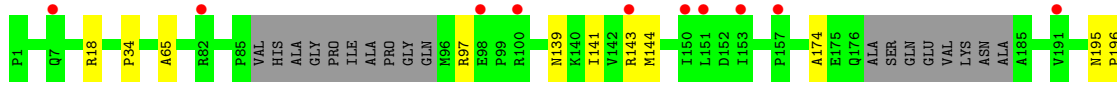
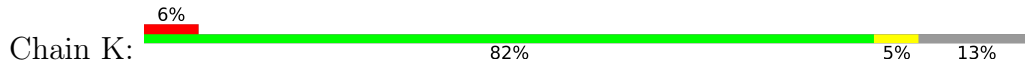


- Molecule 1: Capsid protein p24

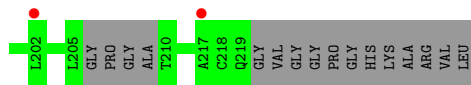
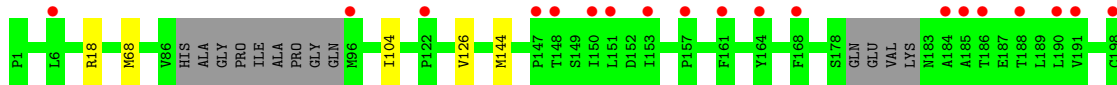
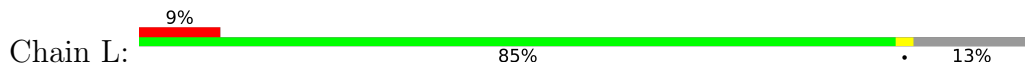


LYS  
ALA  
ARG  
VAL  
LEU

• Molecule 1: Capsid protein p24



• Molecule 1: Capsid protein p24



## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	135.32Å 137.17Å 209.35Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.77 – 2.69 39.77 – 2.69	Depositor EDS
% Data completeness (in resolution range)	88.2 (39.77-2.69) 88.3 (39.77-2.69)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.77 (at 2.69Å)	Xtrriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, $R_{free}$	0.227 , 0.255 0.227 , 0.254	Depositor DCC
$R_{free}$ test set	2000 reflections (2.08%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	39.9	Xtrriage
Anisotropy	0.116	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 38.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.025 for k,h,-l	Xtrriage
$F_o, F_c$ correlation	0.90	EDS
Total number of atoms	19794	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	53.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.97% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: IHP

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	0.25	0/1695	0.39	0/2309
1	B	0.24	0/1645	0.38	0/2235
1	C	0.24	0/1697	0.38	0/2313
1	D	0.24	0/1631	0.39	0/2215
1	E	0.24	0/1665	0.39	0/2261
1	F	0.24	0/1744	0.39	0/2371
1	G	0.24	0/1639	0.40	0/2235
1	H	0.24	0/1698	0.39	0/2314
1	I	0.24	0/1679	0.38	0/2284
1	J	0.24	0/1633	0.39	0/2216
1	K	0.24	0/1564	0.39	0/2127
1	L	0.24	0/1557	0.38	0/2119
All	All	0.24	0/19847	0.39	0/26999

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1659	0	1619	17	0

*Continued on next page...*

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1612	0	1602	10	0
1	C	1661	0	1627	16	0
1	D	1599	0	1564	11	0
1	E	1632	0	1625	6	0
1	F	1707	0	1711	9	0
1	G	1604	0	1535	9	0
1	H	1662	0	1618	7	0
1	I	1643	0	1620	8	0
1	J	1603	0	1574	9	0
1	K	1532	0	1497	13	0
1	L	1527	0	1475	6	0
2	C	36	0	6	3	0
2	D	36	0	6	4	0
2	K	108	0	18	12	0
3	A	27	0	0	0	0
3	B	12	0	0	0	0
3	C	13	0	0	0	0
3	D	16	0	0	0	0
3	E	18	0	0	0	0
3	F	20	0	0	0	0
3	G	2	0	0	0	0
3	H	8	0	0	0	0
3	I	17	0	0	1	0
3	J	26	0	0	2	0
3	K	8	0	0	0	0
3	L	6	0	0	0	0
All	All	19794	0	19097	107	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 (107) 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:D:301:IHP:O43	1:E:18:ARG:NH1	1.97	0.97
1:G:18:ARG:NH1	2:K:301:IHP:O42	2.08	0.85
1:C:185:ALA:O	1:C:189:LEU:HB2	1.82	0.79
1:K:18:ARG:NH2	2:K:301:IHP:O32	2.18	0.75
1:K:18:ARG:HH22	2:K:301:IHP:P1	2.11	0.73
2:D:301:IHP:O22	1:E:18:ARG:NH2	2.22	0.72
1:D:4:GLN:HE21	1:D:8:GLY:HA2	1.55	0.70

Continued on next page...

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:122:PRO:HB3	1:J:121:ASN:HD21	1.56	0.69
1:B:92:ALA:HB3	1:B:95:GLN:HB2	1.75	0.68
2:K:302[B]:IHP:P1	1:L:18:ARG:HH12	2.16	0.68
1:D:97:ARG:HB2	1:G:90:PRO:HB2	1.78	0.65
1:K:18:ARG:NH2	2:K:301:IHP:O11	2.24	0.65
2:K:302[B]:IHP:O41	1:L:18:ARG:NH1	2.30	0.65
1:K:212:GLU:HG3	1:L:144:MET:HE1	1.79	0.64
1:C:18:ARG:NH2	2:C:301:IHP:O16	2.30	0.63
1:J:218:CYS:SG	3:J:322:HOH:O	2.57	0.59
2:C:301:IHP:O34	2:C:301:IHP:O33	2.21	0.59
2:D:301:IHP:O34	2:D:301:IHP:O33	2.21	0.58
2:K:301:IHP:O33	2:K:301:IHP:O34	2.21	0.58
1:C:18:ARG:NH2	2:C:301:IHP:O31	2.36	0.58
2:K:302[B]:IHP:O33	2:K:302[B]:IHP:O34	2.21	0.58
1:G:179:GLN:HB3	1:H:70:LYS:HE3	1.85	0.57
1:C:92:ALA:HB3	1:C:95:GLN:HB2	1.86	0.57
2:K:302[A]:IHP:O34	2:K:302[A]:IHP:O33	2.21	0.57
1:C:97:ARG:HB3	1:H:90:PRO:HB2	1.87	0.57
1:F:90:PRO:HB2	1:K:97:ARG:HB3	1.87	0.56
1:C:182:LYS:O	1:C:186:THR:HB	2.06	0.56
1:I:185:ALA:O	1:I:189:LEU:HB2	2.06	0.56
1:A:90:PRO:HB2	1:J:97:ARG:HB2	1.89	0.55
1:A:70:LYS:HE3	1:F:179:GLN:HB3	1.88	0.54
1:J:185:ALA:O	1:J:189:LEU:HB2	2.06	0.54
1:A:149:SER:HA	1:A:175:GLU:OE2	2.07	0.53
1:E:173:ARG:CZ	1:E:179:GLN:HE21	2.20	0.53
1:D:143:ARG:HG3	1:D:177:ALA:HB2	1.90	0.53
1:K:18:ARG:CZ	2:K:301:IHP:O32	2.57	0.52
1:A:93:PRO:HG3	1:J:117:TRP:CE2	2.45	0.52
1:C:186:THR:O	1:C:190:LEU:HB3	2.09	0.52
1:I:132:ARG:NH2	3:I:301:HOH:O	2.43	0.52
1:D:18:ARG:HH22	2:D:301:IHP:P2	2.34	0.51
1:A:5:ASN:HD21	1:A:9:GLN:HB2	1.75	0.51
1:F:92:ALA:HB3	1:F:95:GLN:HG3	1.93	0.51
1:D:84:HIS:O	1:D:100:ARG:NH1	2.44	0.50
1:C:68:MET:HE1	1:C:144:MET:SD	2.51	0.50
1:A:26:VAL:HG21	1:A:39:MET:HG2	1.94	0.49
1:G:18:ARG:HH22	1:H:18:ARG:HH11	1.61	0.49
1:I:116:GLY:O	1:I:120:HIS:HB2	2.12	0.49
1:L:104:ILE:HG12	1:L:126:VAL:HG12	1.95	0.49
1:K:139:ASN:HB3	1:K:143:ARG:NH1	2.28	0.48

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:192:GLN:HA	1:B:199:LYS:HE3	1.96	0.47
1:F:26:VAL:HG21	1:F:39:MET:HG2	1.95	0.47
1:G:26:VAL:HG21	1:G:39:MET:HG2	1.96	0.47
1:I:34:PRO:HG3	1:I:174:ALA:HA	1.95	0.47
1:C:182:LYS:O	1:C:186:THR:CB	2.63	0.47
1:A:5:ASN:ND2	1:A:9:GLN:HB2	2.30	0.46
1:K:65:ALA:HB1	1:K:141:ILE:HD13	1.97	0.46
1:L:68:MET:HE2	1:L:68:MET:HB3	1.66	0.46
1:I:81:ASP:OD1	1:I:101:GLY:N	2.46	0.46
1:K:139:ASN:HB3	1:K:143:ARG:HH12	1.80	0.46
1:A:179:GLN:HB3	1:B:70:LYS:HE3	1.98	0.45
1:B:84:HIS:O	1:B:100:ARG:NH1	2.48	0.45
1:G:179:GLN:CB	1:H:70:LYS:HE3	2.46	0.45
1:C:18:ARG:HH11	1:D:18:ARG:HH21	1.65	0.44
1:I:104:ILE:HG12	1:I:126:VAL:HG12	1.98	0.44
1:A:123:PRO:HD3	1:I:121:ASN:OD1	2.17	0.44
1:C:26:VAL:HG21	1:C:39:MET:HG2	2.00	0.44
1:J:180:GLU:N	1:J:180:GLU:OE1	2.50	0.44
1:G:122:PRO:HA	1:G:123:PRO:HD3	1.90	0.43
1:J:212:GLU:HA	1:K:144:MET:HE1	2.00	0.43
1:K:34:PRO:HG3	1:K:174:ALA:HA	1.99	0.43
1:A:179:GLN:CB	1:B:70:LYS:HE3	2.49	0.43
1:D:195:ASN:HB2	1:D:196:PRO:HD2	2.00	0.43
1:G:34:PRO:HG3	1:G:174:ALA:HA	2.01	0.43
1:K:195:ASN:HB2	1:K:196:PRO:HD2	2.00	0.43
1:C:186:THR:O	1:C:190:LEU:CB	2.67	0.42
1:D:2:ILE:HD11	1:D:115:ILE:HG12	2.01	0.42
1:H:34:PRO:HG3	1:H:174:ALA:HA	2.01	0.42
1:F:4:GLN:HA	1:F:9:GLN:O	2.20	0.42
1:C:34:PRO:HG3	1:C:174:ALA:HA	2.01	0.42
1:J:23:TRP:CZ3	1:J:40:PHE:HB2	2.54	0.42
1:A:23:TRP:CZ3	1:A:40:PHE:HB2	2.55	0.41
1:A:47:ALA:HB1	1:A:51:ASP:HB2	2.02	0.41
1:A:212:GLU:HG3	1:B:144:MET:SD	2.60	0.41
1:J:193:ASN:ND2	3:J:302:HOH:O	2.39	0.41
1:B:23:TRP:CZ3	1:B:40:PHE:HB2	2.55	0.41
1:D:23:TRP:CZ3	1:D:40:PHE:HB2	2.55	0.41
1:D:164:TYR:OH	1:D:193:ASN:HB2	2.20	0.41
1:K:18:ARG:NH2	2:K:301:IHP:P1	2.87	0.41
1:D:65:ALA:HB1	1:D:141:ILE:HD13	2.03	0.41
1:B:34:PRO:HG3	1:B:174:ALA:HA	2.02	0.41

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:23:TRP:CZ3	1:E:40:PHE:HB2	2.56	0.41
1:E:212:GLU:HG3	1:F:144:MET:HE1	2.02	0.41
1:C:84:HIS:O	1:C:100:ARG:NH1	2.49	0.41
1:I:161:PHE:O	1:I:165:VAL:HG23	2.21	0.41
1:C:23:TRP:CZ3	1:C:40:PHE:HB2	2.56	0.41
1:C:195:ASN:HB2	1:C:196:PRO:HD2	2.03	0.41
1:E:125:PRO:HB2	1:E:128:GLU:HB2	2.03	0.41
1:F:161:PHE:CD2	1:F:215:MET:HG2	2.56	0.41
2:K:302[B]:IHP:P1	1:L:18:ARG:NH1	2.90	0.41
1:A:116:GLY:O	1:A:120:HIS:HB2	2.21	0.40
1:B:121:ASN:HD21	1:H:122:PRO:HB3	1.85	0.40
1:G:23:TRP:CZ3	1:G:40:PHE:HB2	2.56	0.40
1:A:122:PRO:HA	1:A:123:PRO:HD3	1.91	0.40
1:A:146:SER:HA	1:A:147:PRO:HD3	1.91	0.40
1:F:65:ALA:HB1	1:F:141:ILE:HD13	2.02	0.40
1:A:195:ASN:HB2	1:A:196:PRO:HD2	2.02	0.40
1:B:47:ALA:HB1	1:B:51:ASP:HB2	2.02	0.40
1:H:23:TRP:CZ3	1:H:40:PHE:HB2	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	215/231 (93%)	211 (98%)	4 (2%)	0	100	100
1	B	203/231 (88%)	199 (98%)	4 (2%)	0	100	100
1	C	217/231 (94%)	211 (97%)	6 (3%)	0	100	100
1	D	203/231 (88%)	199 (98%)	4 (2%)	0	100	100
1	E	207/231 (90%)	204 (99%)	3 (1%)	0	100	100
1	F	219/231 (95%)	213 (97%)	6 (3%)	0	100	100

Continued on next page...



Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	G	212/231 (92%)	206 (97%)	6 (3%)	0	100	100
1	H	219/231 (95%)	216 (99%)	3 (1%)	0	100	100
1	I	212/231 (92%)	206 (97%)	6 (3%)	0	100	100
1	J	199/231 (86%)	196 (98%)	3 (2%)	0	100	100
1	K	195/231 (84%)	192 (98%)	3 (2%)	0	100	100
1	L	194/231 (84%)	190 (98%)	4 (2%)	0	100	100
All	All	2495/2772 (90%)	2443 (98%)	52 (2%)	0	100	100

There are no Ramachandran outliers to report.

### 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	175/193 (91%)	174 (99%)	1 (1%)	86	94
1	B	174/193 (90%)	174 (100%)	0	100	100
1	C	176/193 (91%)	175 (99%)	1 (1%)	86	94
1	D	169/193 (88%)	169 (100%)	0	100	100
1	E	177/193 (92%)	177 (100%)	0	100	100
1	F	186/193 (96%)	186 (100%)	0	100	100
1	G	163/193 (84%)	163 (100%)	0	100	100
1	H	173/193 (90%)	173 (100%)	0	100	100
1	I	174/193 (90%)	174 (100%)	0	100	100
1	J	173/193 (90%)	172 (99%)	1 (1%)	86	94
1	K	162/193 (84%)	162 (100%)	0	100	100
1	L	158/193 (82%)	158 (100%)	0	100	100
All	All	2060/2316 (89%)	2057 (100%)	3 (0%)	93	98

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	ARG
1	C	18	ARG
1	J	18	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	67	GLN
1	B	95	GLN
1	D	4	GLN
1	E	67	GLN
1	F	63	GLN
1	G	63	GLN
1	G	67	GLN
1	J	121	ASN

### 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](#)

5 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	IHP	K	302[B]	-	36,36,36	1.15	4 (11%)	54,60,60	0.87	3 (5%)
2	IHP	K	301	-	36,36,36	1.13	3 (8%)	54,60,60	0.87	2 (3%)
2	IHP	K	302[A]	-	36,36,36	1.15	4 (11%)	54,60,60	0.88	3 (5%)
2	IHP	C	301	-	36,36,36	1.16	4 (11%)	54,60,60	0.87	3 (5%)
2	IHP	D	301	-	36,36,36	1.16	4 (11%)	54,60,60	0.87	2 (3%)

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	IHP	K	302[B]	-	-	3/30/54/54	0/1/1/1
2	IHP	K	301	-	-	3/30/54/54	0/1/1/1
2	IHP	K	302[A]	-	-	3/30/54/54	0/1/1/1
2	IHP	C	301	-	-	3/30/54/54	0/1/1/1
2	IHP	D	301	-	-	3/30/54/54	0/1/1/1

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	K	302[A]	IHP	P6-O16	3.00	1.65	1.59
2	K	302[B]	IHP	P6-O16	2.98	1.64	1.59
2	D	301	IHP	P6-O16	2.98	1.64	1.59
2	K	301	IHP	P6-O16	2.96	1.64	1.59
2	C	301	IHP	P6-O16	2.94	1.64	1.59
2	D	301	IHP	P4-O14	2.25	1.63	1.59
2	C	301	IHP	P1-O11	2.22	1.63	1.59
2	D	301	IHP	P2-O12	2.17	1.63	1.59
2	K	301	IHP	P2-O12	2.16	1.63	1.59
2	K	302[A]	IHP	P2-O12	2.15	1.63	1.59
2	K	302[B]	IHP	P1-O11	2.14	1.63	1.59
2	K	302[B]	IHP	P2-O12	2.13	1.63	1.59
2	C	301	IHP	P2-O12	2.12	1.63	1.59
2	K	302[B]	IHP	P4-O14	2.11	1.63	1.59
2	K	302[A]	IHP	P4-O14	2.11	1.63	1.59
2	K	302[A]	IHP	P1-O11	2.07	1.63	1.59
2	D	301	IHP	P1-O11	2.06	1.63	1.59
2	K	301	IHP	P1-O11	2.04	1.63	1.59
2	C	301	IHP	P4-O14	2.03	1.63	1.59

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	K	301	IHP	O43-P3-O23	2.25	119.48	110.68
2	K	302[B]	IHP	O43-P3-O23	2.24	119.45	110.68
2	C	301	IHP	O43-P3-O23	2.23	119.43	110.68
2	D	301	IHP	O43-P3-O23	2.23	119.41	110.68
2	K	302[A]	IHP	O43-P3-O23	2.21	119.35	110.68
2	K	302[A]	IHP	O11-P1-O21	-2.15	101.09	109.39
2	D	301	IHP	O11-P1-O21	-2.14	101.12	109.39
2	C	301	IHP	O11-P1-O21	-2.14	101.13	109.39
2	K	302[B]	IHP	O11-P1-O21	-2.14	101.14	109.39
2	K	301	IHP	O11-P1-O21	-2.11	101.24	109.39
2	K	302[B]	IHP	O41-P1-O31	2.02	115.35	107.64
2	C	301	IHP	O41-P1-O31	2.01	115.32	107.64
2	K	302[A]	IHP	O41-P1-O31	2.01	115.31	107.64

There are no chirality outliers.

All (15) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	301	IHP	C2-O12-P2-O42
2	D	301	IHP	C2-O12-P2-O42
2	K	301	IHP	C2-O12-P2-O42
2	K	302[A]	IHP	C2-O12-P2-O42
2	K	302[B]	IHP	C2-O12-P2-O42
2	C	301	IHP	C4-O14-P4-O44
2	C	301	IHP	C5-O15-P5-O35
2	D	301	IHP	C4-O14-P4-O44
2	D	301	IHP	C5-O15-P5-O35
2	K	301	IHP	C4-O14-P4-O44
2	K	301	IHP	C5-O15-P5-O35
2	K	302[A]	IHP	C4-O14-P4-O44
2	K	302[A]	IHP	C5-O15-P5-O35
2	K	302[B]	IHP	C4-O14-P4-O44
2	K	302[B]	IHP	C5-O15-P5-O35

There are no ring outliers.

5 monomers are involved in 19 short contacts:

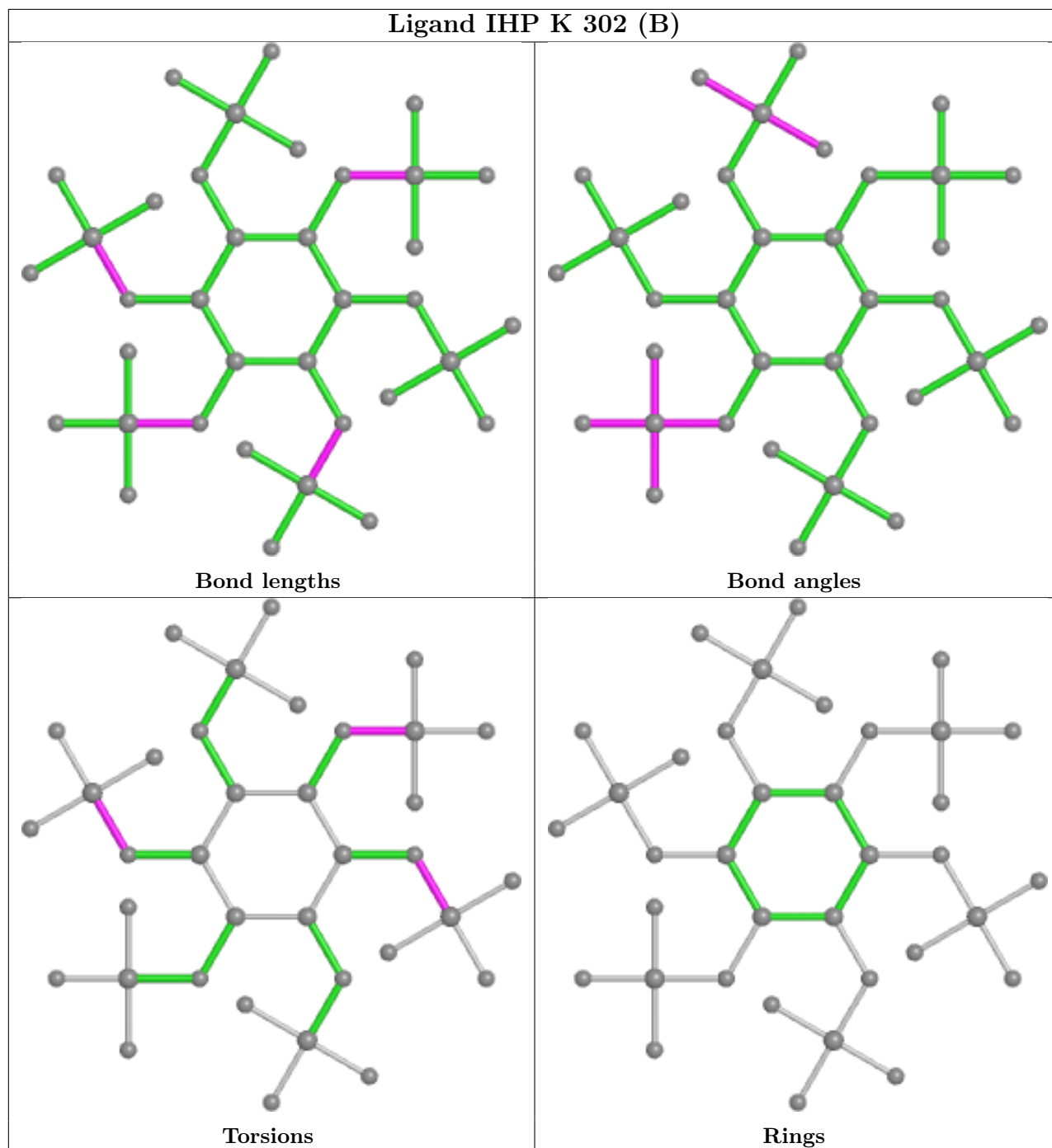
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	K	302[B]	IHP	4	0
2	K	301	IHP	7	0

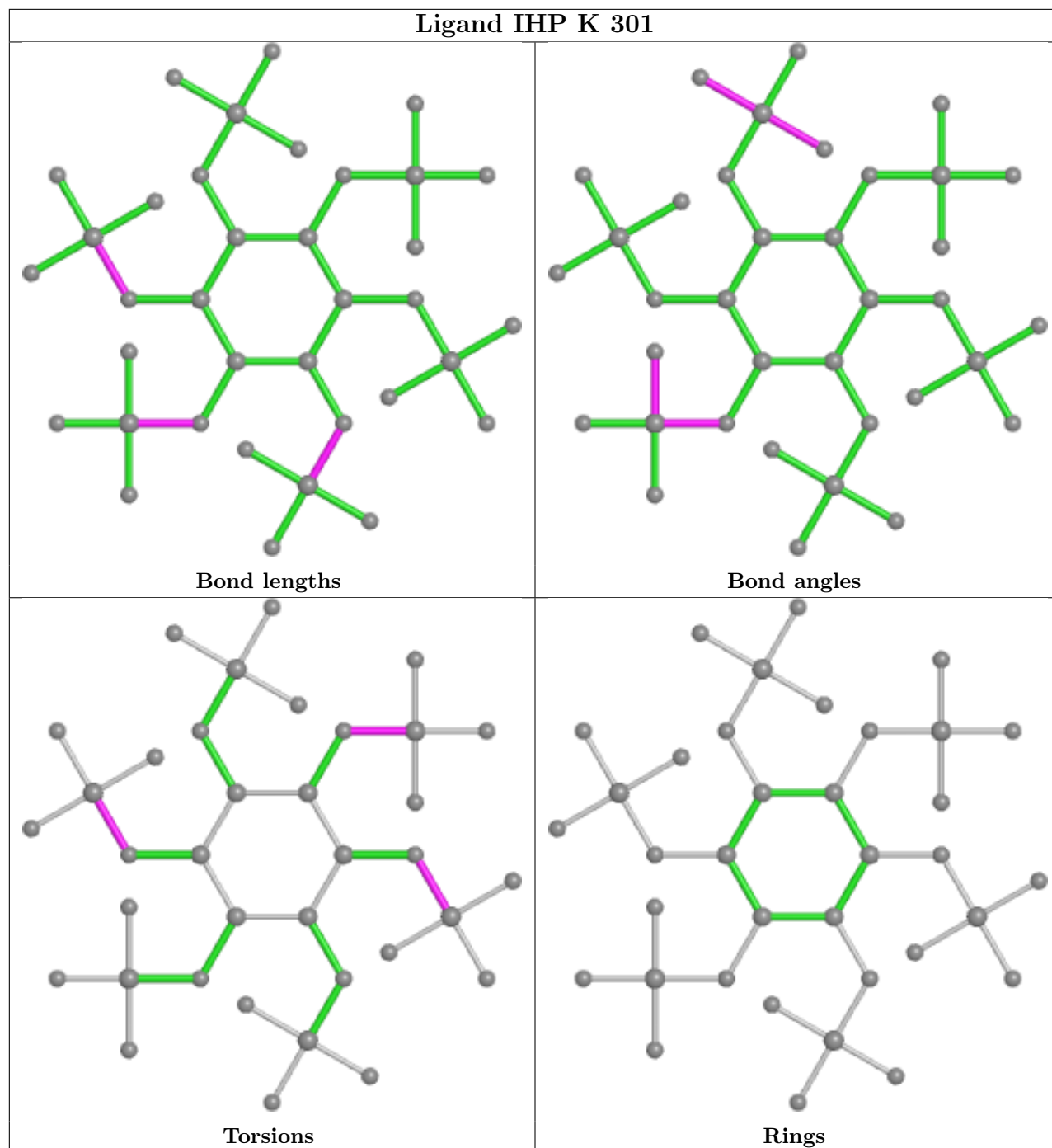
*Continued on next page...*

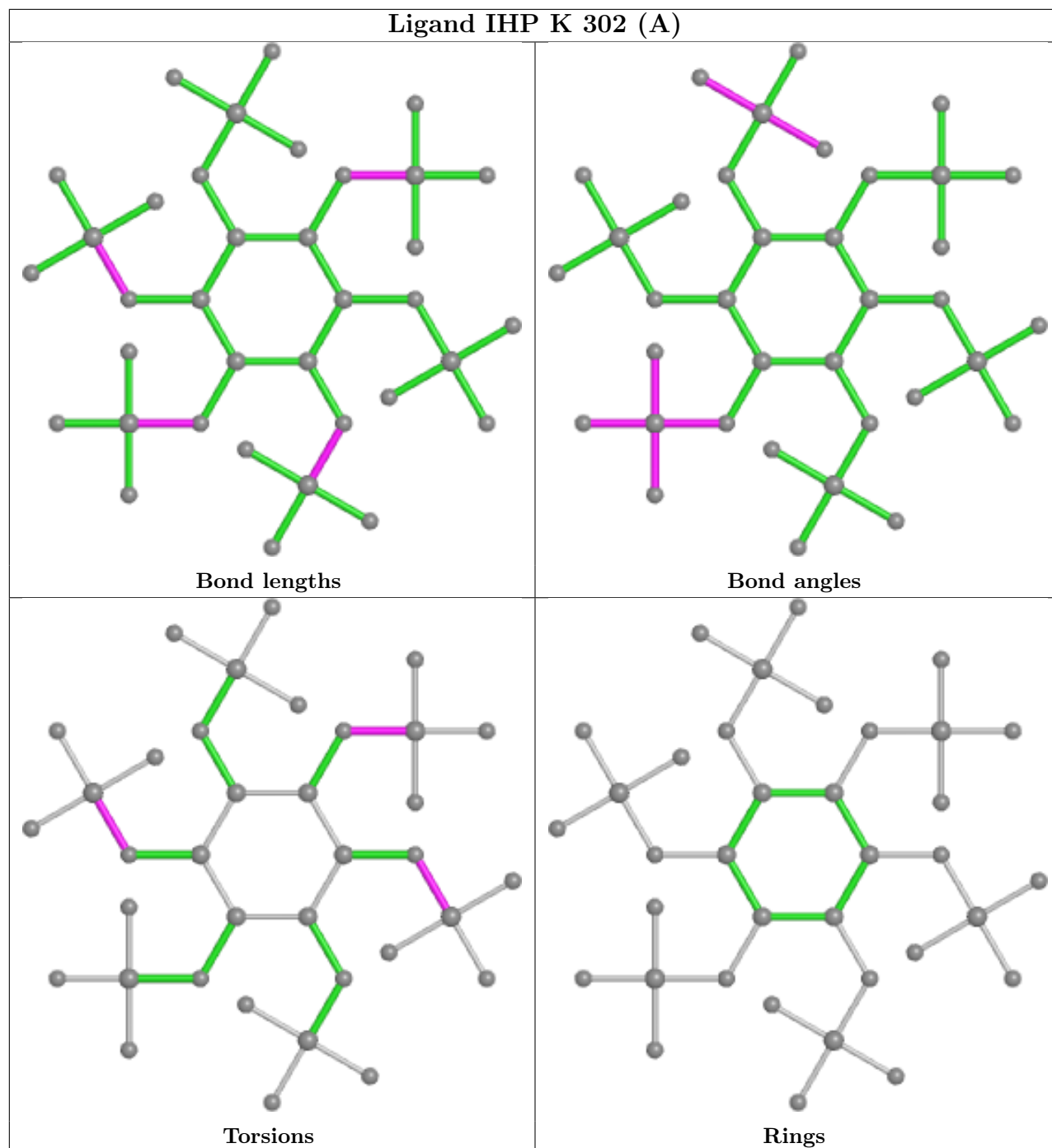
*Continued from previous page...*

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	K	302[A]	IHP	1	0
2	C	301	IHP	3	0
2	D	301	IHP	4	0

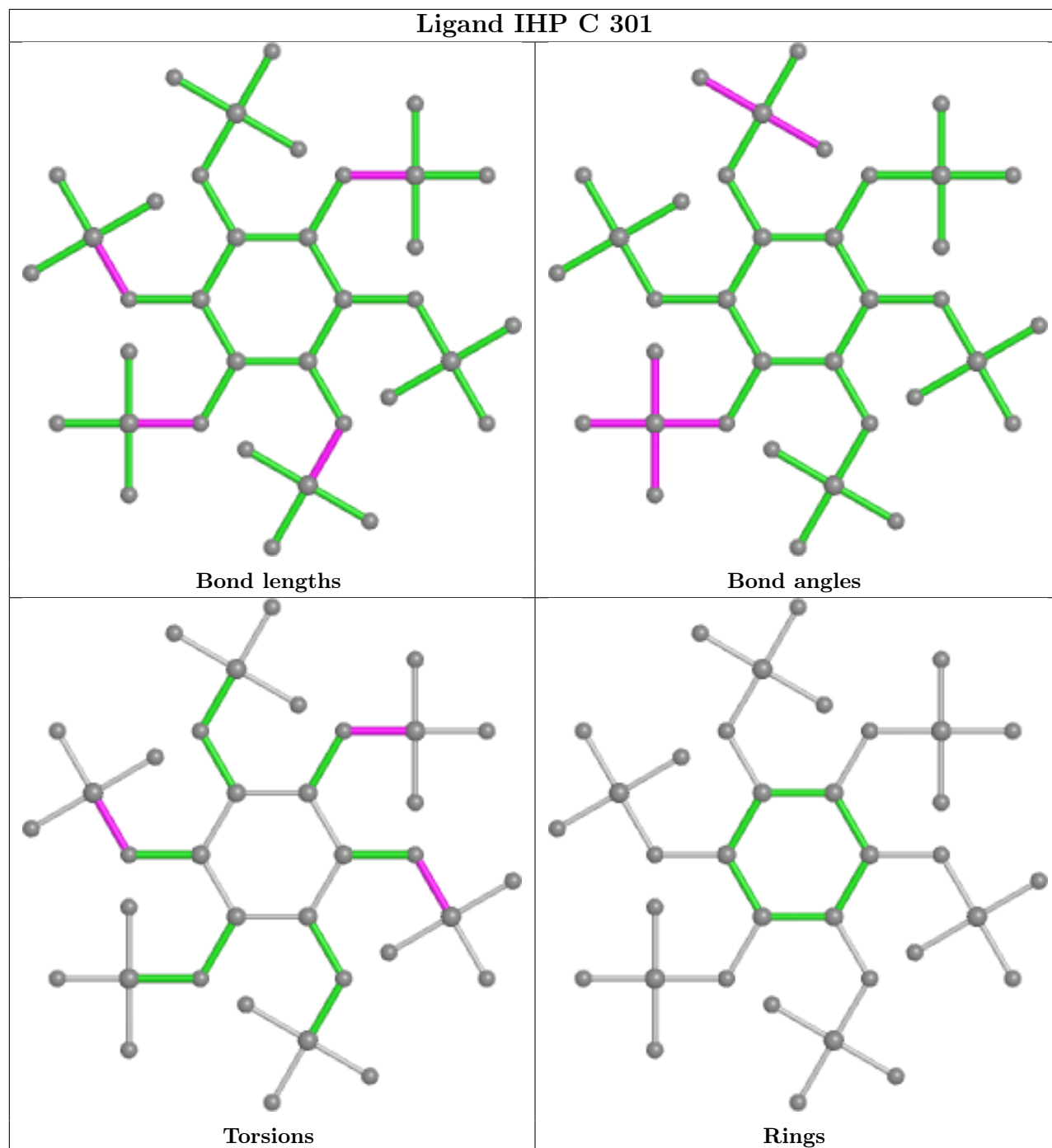
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

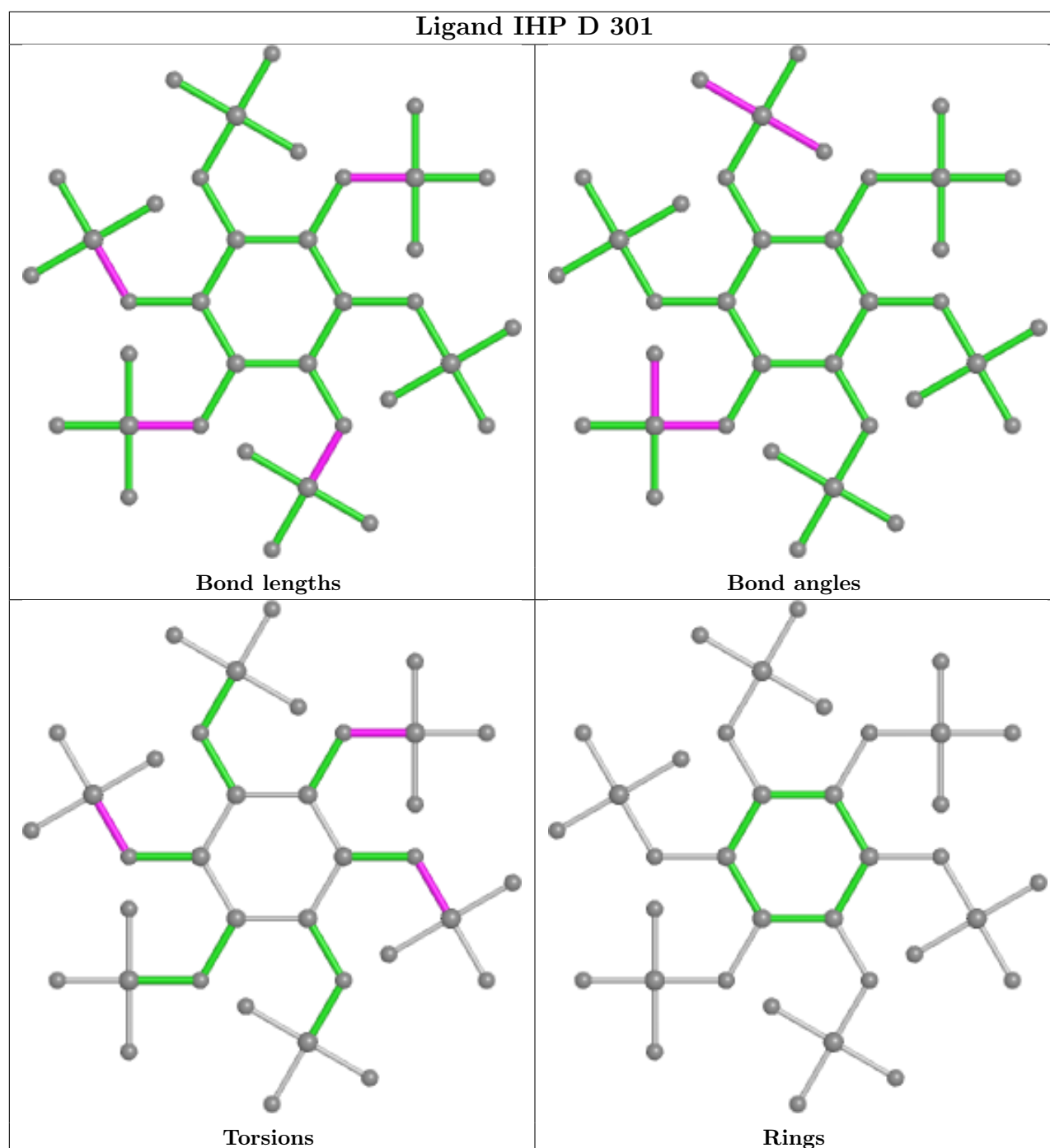












## 5.7 Other polymers [i](#)

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	219/231 (94%)	0.09	6 (2%) 54 54	8, 35, 93, 117	0
1	B	209/231 (90%)	0.18	6 (2%) 51 51	18, 43, 88, 106	0
1	C	219/231 (94%)	0.09	9 (4%) 37 35	17, 39, 99, 132	0
1	D	209/231 (90%)	0.04	4 (1%) 66 67	16, 44, 90, 120	0
1	E	211/231 (91%)	0.07	5 (2%) 59 59	16, 40, 84, 98	0
1	F	221/231 (95%)	-0.01	5 (2%) 60 60	14, 39, 77, 109	0
1	G	216/231 (93%)	0.53	24 (11%) 5 4	37, 65, 117, 141	0
1	H	221/231 (95%)	0.21	13 (5%) 22 20	34, 59, 101, 140	0
1	I	216/231 (93%)	0.26	11 (5%) 28 26	23, 48, 101, 138	0
1	J	207/231 (89%)	0.13	7 (3%) 45 44	21, 42, 94, 115	0
1	K	201/231 (87%)	0.38	13 (6%) 18 16	31, 56, 107, 140	0
1	L	202/231 (87%)	0.52	21 (10%) 6 4	42, 65, 111, 125	0
All	All	2551/2772 (92%)	0.21	124 (4%) 29 27	8, 49, 102, 141	0

All (124) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	151	LEU	6.1
1	G	189	LEU	5.6
1	G	190	LEU	5.6
1	E	6	LEU	5.6
1	K	207	PRO	4.7
1	G	188	THR	4.3
1	L	151	LEU	4.2
1	L	190	LEU	3.9
1	D	157	PRO	3.8
1	G	161	PHE	3.8
1	L	217	ALA	3.7

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	K	151	LEU	3.7
1	L	96	MET	3.7
1	E	96	MET	3.6
1	B	93	PRO	3.5
1	B	91	ILE	3.5
1	G	184	ALA	3.4
1	I	221	VAL	3.4
1	J	87	HIS	3.4
1	A	184	ALA	3.4
1	K	153	ILE	3.4
1	C	93	PRO	3.3
1	B	207	PRO	3.3
1	I	88	ALA	3.2
1	L	168	PHE	3.2
1	H	184	ALA	3.1
1	I	220	GLY	3.1
1	C	90	PRO	3.1
1	G	162	ARG	3.1
1	H	207	PRO	3.0
1	J	88	ALA	3.0
1	L	122	PRO	3.0
1	L	184	ALA	3.0
1	F	88	ALA	2.9
1	G	168	PHE	2.9
1	G	153	ILE	2.9
1	C	88	ALA	2.9
1	G	198	CYS	2.9
1	G	160	PRO	2.9
1	K	157	PRO	2.9
1	D	96	MET	2.8
1	E	184	ALA	2.8
1	H	181	VAL	2.8
1	L	157	PRO	2.8
1	L	150	ILE	2.8
1	H	180	GLU	2.8
1	B	94	GLY	2.8
1	C	94	GLY	2.8
1	C	92	ALA	2.7
1	L	202	LEU	2.7
1	K	208	GLY	2.7
1	L	153	ILE	2.7
1	F	207	PRO	2.7

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	G	191	VAL	2.7
1	K	143	ARG	2.7
1	I	207	PRO	2.7
1	L	148	THR	2.7
1	I	121	ASN	2.6
1	L	161	PHE	2.6
1	C	208	GLY	2.6
1	I	92	ALA	2.6
1	B	185	ALA	2.5
1	G	186	THR	2.5
1	G	90	PRO	2.5
1	G	207	PRO	2.5
1	I	90	PRO	2.5
1	F	91	ILE	2.5
1	I	185	ALA	2.5
1	H	122	PRO	2.5
1	H	220	GLY	2.5
1	J	216	THR	2.5
1	H	183	ASN	2.5
1	H	178	SER	2.5
1	G	164	TYR	2.5
1	G	214	MET	2.5
1	H	145	TYR	2.4
1	G	163	ASP	2.4
1	A	196	PRO	2.4
1	C	186	THR	2.4
1	G	158	LYS	2.4
1	L	188	THR	2.4
1	L	191	VAL	2.4
1	I	158	LYS	2.4
1	G	194	ALA	2.4
1	L	6	LEU	2.4
1	L	186	THR	2.3
1	J	187	GLU	2.3
1	F	220	GLY	2.3
1	L	147	PRO	2.3
1	B	186	THR	2.3
1	G	217	ALA	2.3
1	K	191	VAL	2.3
1	J	186	THR	2.2
1	G	86	VAL	2.2
1	H	191	VAL	2.2

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
1	D	206	GLY	2.2
1	L	198	CYS	2.2
1	E	181	VAL	2.2
1	K	82	ARG	2.2
1	K	98	GLU	2.1
1	C	209	ALA	2.1
1	C	96	MET	2.1
1	K	150	ILE	2.1
1	G	209	ALA	2.1
1	L	185	ALA	2.1
1	I	8	GLY	2.1
1	J	211	LEU	2.1
1	J	209	ALA	2.1
1	A	88	ALA	2.1
1	A	221	VAL	2.1
1	F	181	VAL	2.1
1	H	98	GLU	2.1
1	D	196	PRO	2.1
1	G	157	PRO	2.1
1	K	100	ARG	2.1
1	A	202	LEU	2.1
1	H	151	LEU	2.0
1	H	91	ILE	2.0
1	E	209	ALA	2.0
1	I	183	ASN	2.0
1	A	180	GLU	2.0
1	L	164	TYR	2.0
1	K	7	GLN	2.0
1	K	198	CYS	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

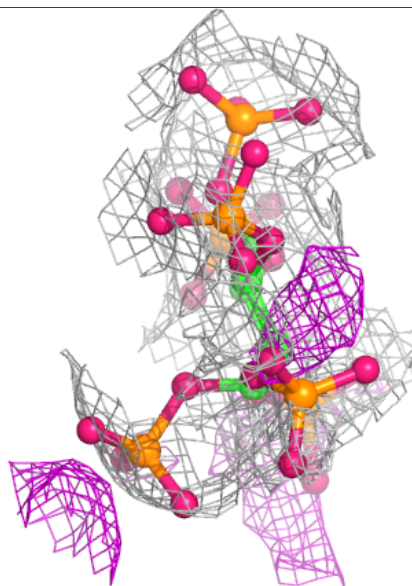
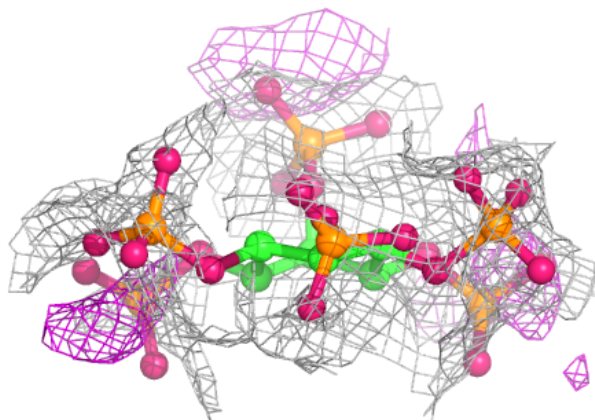
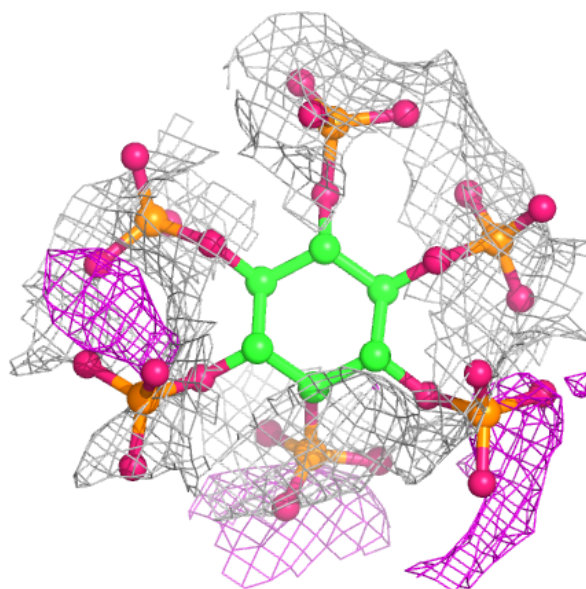
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	IHP	K	301	36/36	0.58	0.28	135,152,156,157	0
2	IHP	C	301	36/36	0.61	0.27	153,166,172,174	0
2	IHP	D	301	36/36	0.64	0.26	162,172,180,180	0
2	IHP	K	302[A]	36/36	0.64	0.32	134,142,144,145	36
2	IHP	K	302[B]	36/36	0.64	0.32	128,142,144,145	36

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 IHP K 301:**

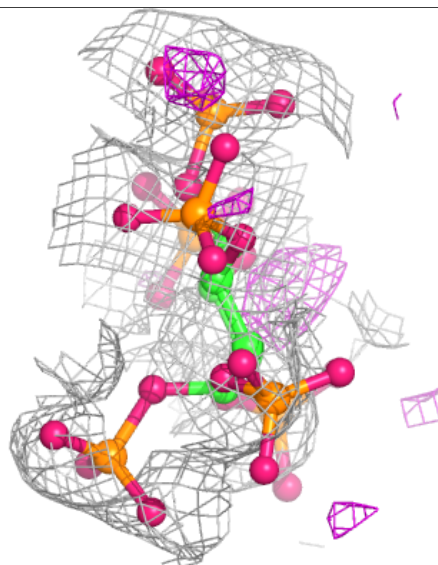
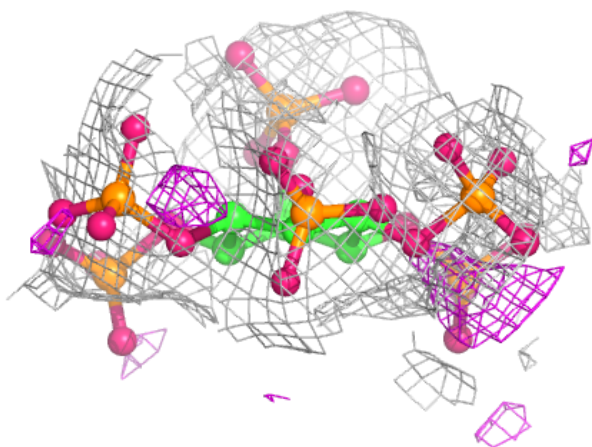
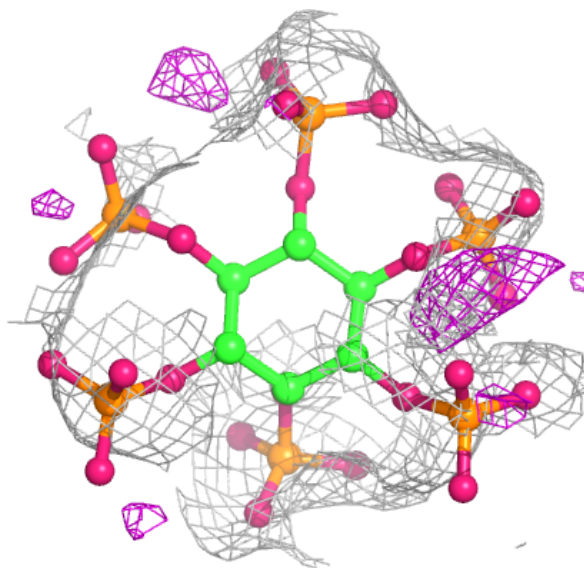
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





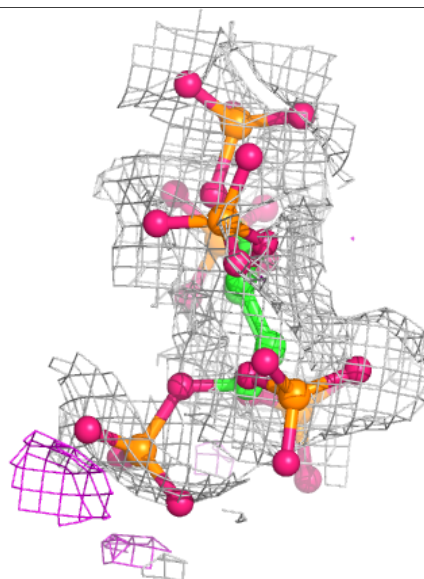
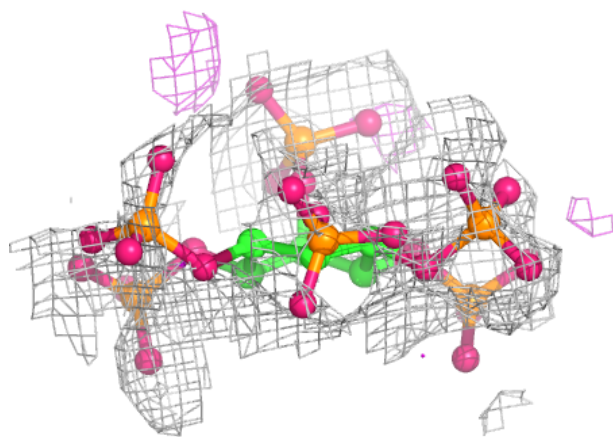
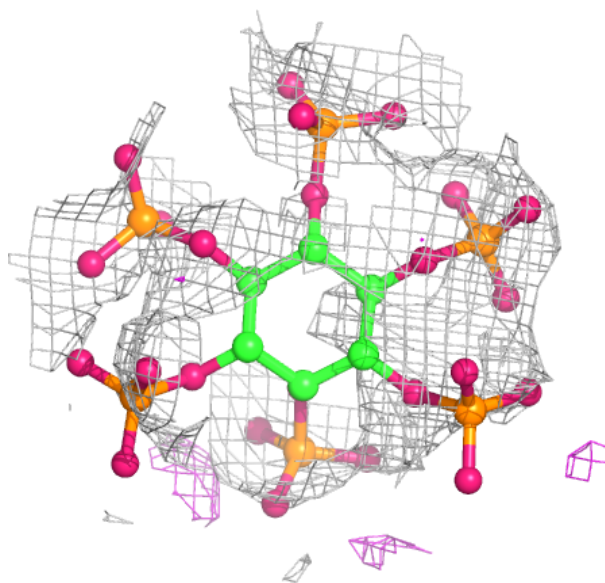
**Electron density around IHP C 301:**

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



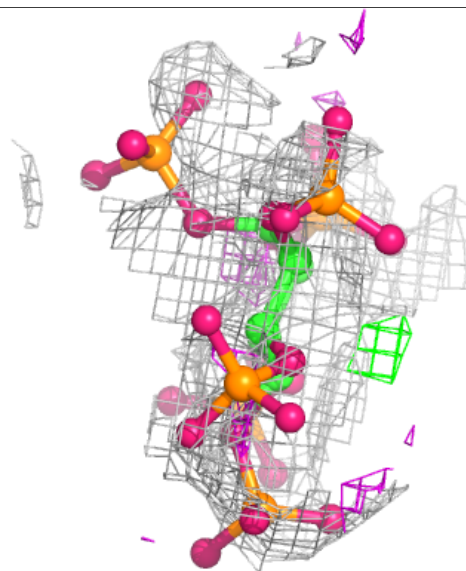
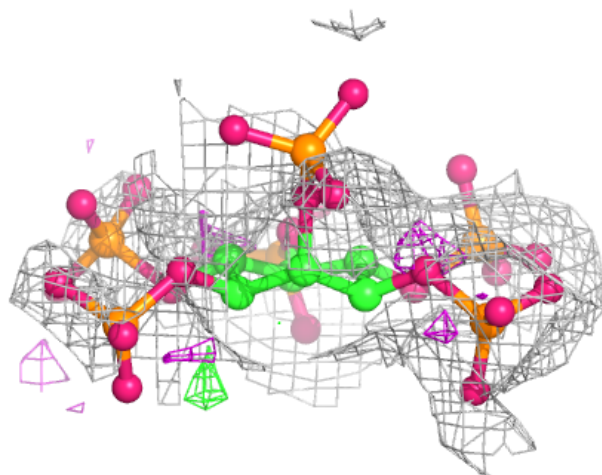
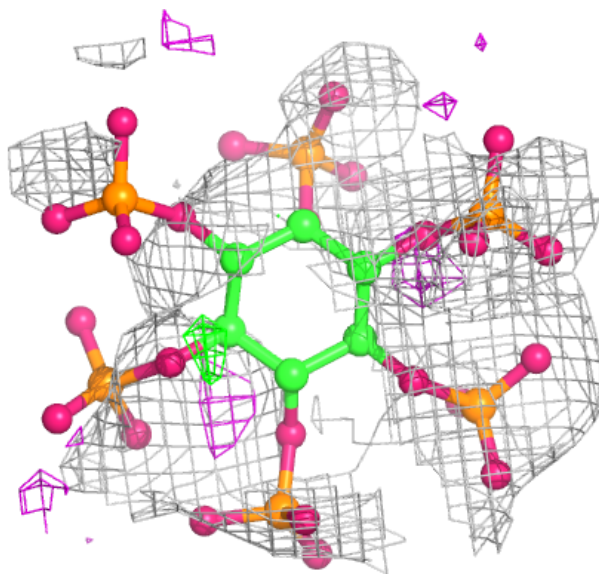
**Electron density around IHP D 301:**

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



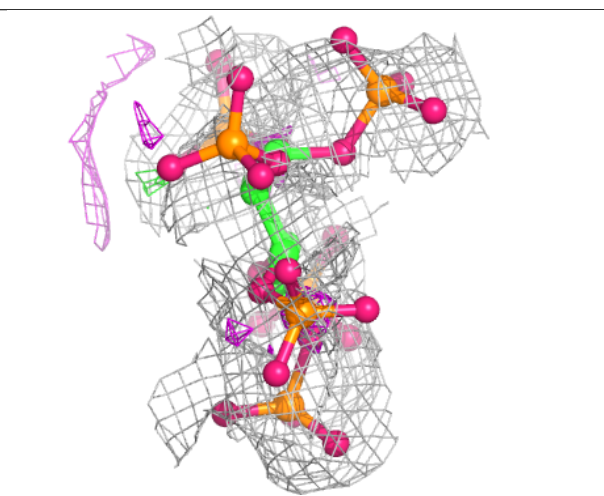
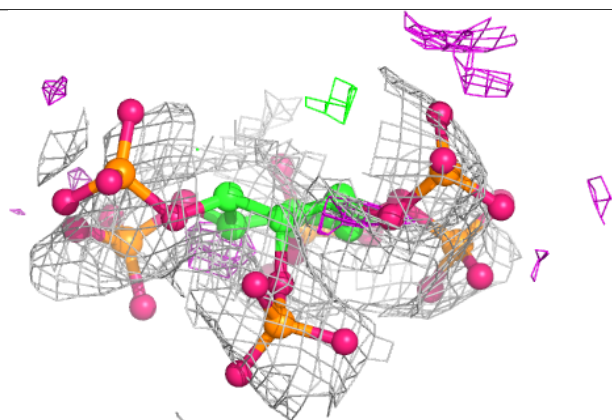
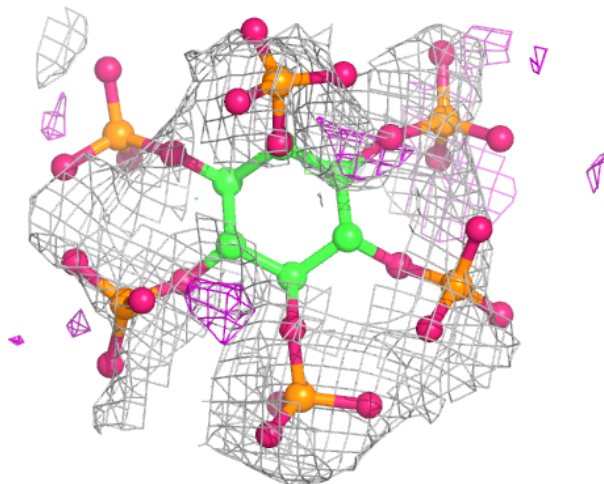
**Electron density around IHP K 302 (A):**

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



**Electron density around IHP K 302 (B):**

$2mF_o-DF_c$  (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.