Full wwPDB X-ray Structure Validation Report (i)

Jun 13, 2024 – 12:09 AM EDT

|		
PDB ID	:	3WVJ
Title	:	The crystal structure of native glycosidic hydrolase
Authors	:	Chen, C.C.; Huang, J.W.; Zhao, P.; Ko, T.P.; Huang, C.H.; Chan, H.C.; Huang, Z.; Liu, W.; Cheng, Y.S.; Liu, J.R.; Guo, R.T.
Deposited on	:	2014-05-22
Resolution	:	1.95 Å(reported)

---

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 1.95 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	Percentile Ranks	Value
Rfree		0.234
Clashscore		7
Ramachandran outliers		0.2%
Sidechain outliers		6.1%
RSRZ outliers		5.7%

Worse ... *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution
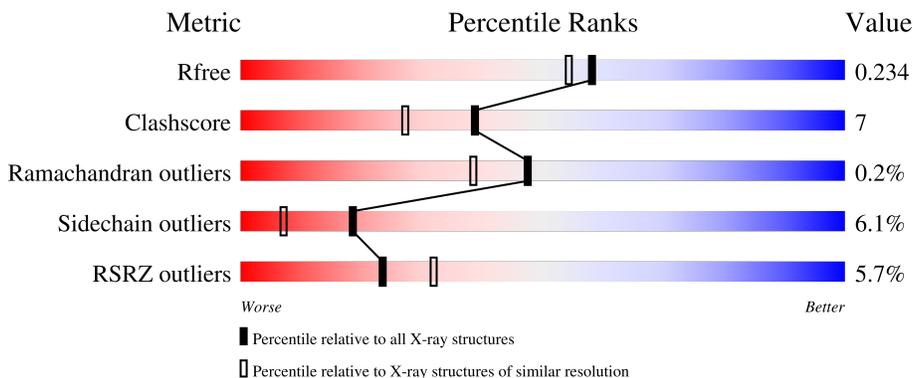
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2580 (1.96-1.96)
Clashscore	141614	2705 (1.96-1.96)
Ramachandran outliers	138981	2678 (1.96-1.96)
Sidechain outliers	138945	2678 (1.96-1.96)
RSRZ outliers	127900	2539 (1.96-1.96)

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 <=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	220	7% / 82% / 15% / ··
1	B	220	4% / 78% / 18% / ··

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 4012 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 Beta-glucanase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	219	Total	C	N	O	S	0	0	0
			1792	1164	289	334	5			
1	B	220	Total	C	N	O	S	0	0	0
			1802	1169	291	337	5			

- Molecule 2 is 2-[3-(2-HYDROXY-1,1-DIHYDROXYMETHYL-ETHYLAMINO)-PROPYL AMINO]-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (three-letter code: B3P) (formula: $C_{11}H_{26}N_2O_6$).
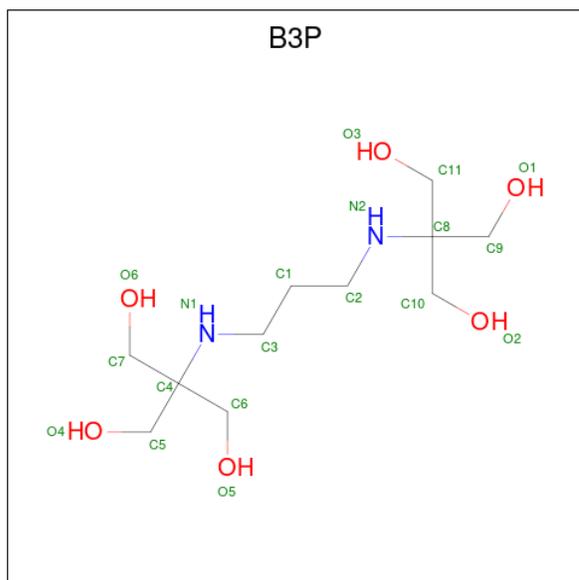
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			19	11	2	6		
2	A	1	Total	C	N	O	0	0
			19	11	2	6		
2	B	1	Total	C	N	O	0	0
			19	11	2	6		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	B	1	Total 19	C 11	N 2	O 6	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	164	Total 164	O 164	0	0
3	B	178	Total 178	O 178	0	0

3 Residue-property plots ⓘ

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: Beta-glucanase
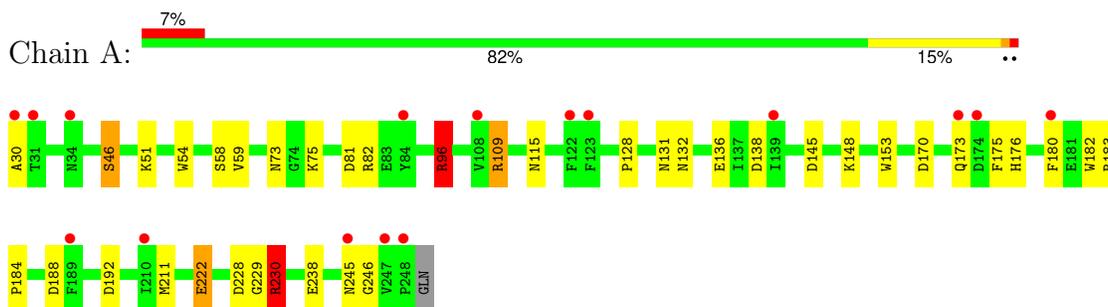
- Molecule 1: Beta-glucanase
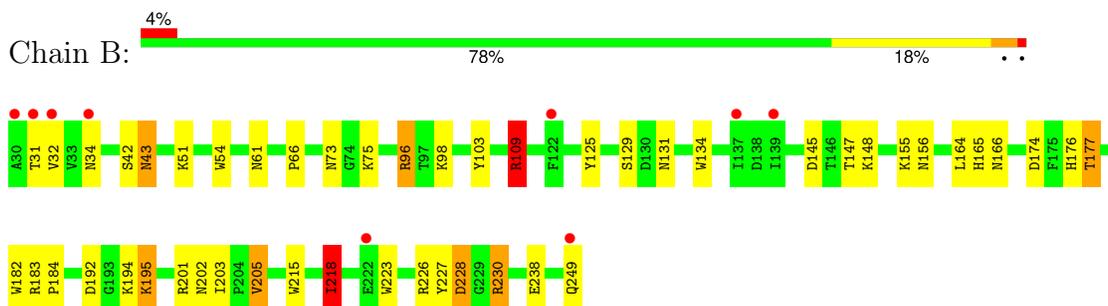
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α, β, γ	74.45Å 74.45Å 182.92Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	25.00 – 1.95 24.37 – 1.95	Depositor EDS
% Data completeness (in resolution range)	99.8 (25.00-1.95) 99.9 (24.37-1.95)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	4.14 (at 1.95Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.190 , 0.232 0.192 , 0.234	Depositor DCC
R_{free} test set	2194 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å^2)	30.6	Xtriage
Anisotropy	0.302	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 36.9	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.026 for -h,-k,l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	4012	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 4.07% of the height of the origin peak. No significant pseudotranslation is detected.*

---

[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: B3P

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	1.09	3/1855 (0.2%)	1.13	9/2523 (0.4%)
1	B	1.22	7/1865 (0.4%)	1.30	14/2535 (0.6%)
All	All	1.16	10/3720 (0.3%)	1.22	23/5058 (0.5%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	1

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	153	TRP	CD2-CE2	7.33	1.50	1.41
1	B	182	TRP	CD2-CE2	7.17	1.50	1.41
1	B	96	ARG	CD-NE	-6.86	1.34	1.46
1	A	182	TRP	CD2-CE2	6.10	1.48	1.41
1	B	223	TRP	CD2-CE2	6.06	1.48	1.41
1	B	109	ARG	CD-NE	-5.42	1.37	1.46
1	A	54	TRP	CD2-CE2	5.36	1.47	1.41
1	B	215	TRP	CD2-CE2	5.21	1.47	1.41
1	B	54	TRP	CD2-CE2	5.11	1.47	1.41
1	B	182	TRP	CG-CD1	5.07	1.43	1.36

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	96	ARG	NE-CZ-NH2	-20.62	109.99	120.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	96	ARG	NE-CZ-NH2	-17.52	111.54	120.30
1	A	96	ARG	NE-CZ-NH1	16.20	128.40	120.30
1	B	109	ARG	NE-CZ-NH2	-15.97	112.31	120.30
1	B	96	ARG	NE-CZ-NH1	14.36	127.48	120.30
1	B	109	ARG	NE-CZ-NH1	10.80	125.70	120.30
1	B	109	ARG	CG-CD-NE	-8.14	94.71	111.80
1	B	228	ASP	N-CA-CB	-7.51	97.08	110.60
1	A	96	ARG	CD-NE-CZ	6.85	133.19	123.60
1	B	96	ARG	CD-NE-CZ	6.05	132.07	123.60
1	B	205	VAL	CG1-CB-CG2	5.97	120.46	110.90
1	A	145	ASP	CB-CG-OD2	5.91	123.62	118.30
1	B	96	ARG	CG-CD-NE	-5.89	99.42	111.80
1	B	218	ILE	CB-CA-C	-5.55	100.50	111.60
1	B	201	ARG	NE-CZ-NH1	5.54	123.07	120.30
1	A	81	ASP	CB-CG-OD1	5.52	123.27	118.30
1	B	98	LYS	CD-CE-NZ	-5.47	99.12	111.70
1	B	183	ARG	C-N-CD	5.43	139.80	128.40
1	A	132	ASN	C-N-CD	5.27	139.46	128.40
1	A	96	ARG	CG-CD-NE	-5.22	100.84	111.80
1	A	109	ARG	NE-CZ-NH2	-5.20	117.70	120.30
1	A	230	ARG	NE-CZ-NH1	5.16	122.88	120.30
1	B	109	ARG	CD-NE-CZ	5.06	130.69	123.60

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	227	TYR	Peptide

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	1792	0	1665	24	0
1	B	1802	0	1673	33	1
2	A	38	0	52	0	0
2	B	38	0	52	2	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	164	0	0	4	0
3	B	178	0	0	7	0
All	All	4012	0	3442	53	1

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 7.

All (53) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:34:ASN:HB3	3:B:435:HOH:O	1.75	0.87
1:B:148:LYS:HE3	1:B:166:ASN:HD21	1.39	0.87
1:B:147:THR:HG23	3:B:498:HOH:O	1.78	0.81
1:A:131:ASN:HD21	1:B:51:LYS:NZ	1.82	0.75
1:B:165:HIS:HD2	3:B:507:HOH:O	1.69	0.75
1:A:230:ARG:HD2	3:A:409:HOH:O	1.87	0.73
1:B:155:LYS:HD2	1:B:203:ILE:O	1.90	0.72
1:B:109:ARG:HD3	1:B:238:GLU:OE2	1.89	0.71
1:B:148:LYS:CE	1:B:166:ASN:HD21	2.04	0.69
1:B:165:HIS:HE1	3:B:429:HOH:O	1.75	0.68
1:A:75:LYS:HD3	1:A:175:PHE:CZ	2.32	0.65
1:A:82:ARG:NH2	1:A:229:GLY:O	2.31	0.64
1:B:155:LYS:HE3	3:B:557:HOH:O	1.99	0.63
1:B:176:HIS:HD2	1:B:192:ASP:OD2	1.82	0.62
1:A:131:ASN:HD21	1:B:51:LYS:HZ1	1.47	0.60
1:B:61:ASN:HB2	1:B:218:ILE:HG13	1.84	0.59
1:A:176:HIS:HE1	3:A:480:HOH:O	1.86	0.58
1:B:145:ASP:OD1	1:B:147:THR:HB	2.04	0.57
1:A:170:ASP:HB3	1:A:173:GLN:HG2	1.87	0.57
1:A:115:ASN:HD21	1:A:228:ASP:HB2	1.70	0.56
1:A:176:HIS:HD2	1:A:192:ASP:OD2	1.88	0.56
1:A:222:GLU:H	1:A:222:GLU:CD	2.09	0.56
1:A:30:ALA:N	3:A:459:HOH:O	2.38	0.56
1:A:115:ASN:OD1	1:A:230:ARG:HG2	2.06	0.56
1:A:46:SER:HB2	3:A:551:HOH:O	2.08	0.53
1:A:128:PRO:HB2	1:B:66:PRO:HG2	1.90	0.52
1:B:195:LYS:O	1:B:195:LYS:HG3	2.09	0.50
1:B:61:ASN:HB2	1:B:218:ILE:CG1	2.41	0.50
1:B:148:LYS:HE3	1:B:166:ASN:ND2	2.18	0.49
1:B:164:LEU:HB2	3:B:474:HOH:O	2.13	0.48
1:A:51:LYS:HE3	1:B:131:ASN:HD21	1.79	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:228:ASP:OD2	1:B:230:ARG:CB	2.62	0.48
1:B:147:THR:HG22	1:B:147:THR:O	2.14	0.47
1:B:42:SER:O	1:B:43:ASN:HB2	2.15	0.47
1:B:125:TYR:CD1	2:B:302:B3P:H62	2.50	0.47
1:B:176:HIS:CD2	1:B:192:ASP:OD2	2.67	0.47
1:A:136:GLU:OE2	1:A:138:ASP:OD1	2.33	0.46
1:B:109:ARG:HE	1:B:177:THR:HG22	1.79	0.46
1:A:96:ARG:HB3	1:A:211:MET:HG2	1.98	0.46
1:B:228:ASP:OD2	1:B:230:ARG:HB3	2.15	0.46
1:B:103:TYR:CZ	1:B:184:PRO:HG3	2.51	0.46
1:A:131:ASN:HD21	1:B:51:LYS:HZ2	1.62	0.45
1:A:58:SER:OG	1:A:59:VAL:N	2.50	0.44
1:B:134:TRP:C	1:B:134:TRP:CD1	2.90	0.44
1:B:147:THR:O	1:B:147:THR:CG2	2.64	0.44
1:A:245:ASN:CG	1:A:246:GLY:N	2.71	0.43
1:A:230:ARG:HE	1:A:230:ARG:HB2	1.48	0.43
1:A:180:PHE:HA	1:A:188:ASP:O	2.19	0.42
1:A:183:ARG:HB3	1:A:184:PRO:CD	2.50	0.41
1:B:109:ARG:HH21	1:B:177:THR:CG2	2.34	0.41
1:A:109:ARG:HD3	1:A:238:GLU:OE1	2.21	0.41
2:B:301:B3P:H112	2:B:301:B3P:H22	1.54	0.41
1:B:165:HIS:CD2	3:B:507:HOH:O	2.56	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:43:ASN:OD1	1:B:202:ASN:ND2[4_565]	2.05	0.15

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	217/220 (99%)	204 (94%)	13 (6%)	0	100	100
1	B	218/220 (99%)	207 (95%)	10 (5%)	1 (0%)	29	17
All	All	435/440 (99%)	411 (94%)	23 (5%)	1 (0%)	47	38

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	43	ASN

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	188/189 (100%)	182 (97%)	6 (3%)	39	27
1	B	189/189 (100%)	172 (91%)	17 (9%)	9	2
All	All	377/378 (100%)	354 (94%)	23 (6%)	18	7

All (23) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	46	SER
1	A	73	ASN
1	A	96	ARG
1	A	148	LYS
1	A	222	GLU
1	A	230	ARG
1	B	31	THR
1	B	32	VAL
1	B	73	ASN
1	B	75	LYS
1	B	96	ARG
1	B	109	ARG
1	B	129	SER
1	B	156	ASN
1	B	174	ASP

Continued on next page...

WORLDWIDE
wwPDB
PROTEIN DATA BANK

Continued from previous page...

Mol	Chain	Res	Type
1	B	177	THR
1	B	194	LYS
1	B	195	LYS
1	B	205	VAL
1	B	218	ILE
1	B	226	ARG
1	B	230	ARG
1	B	249	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	68	GLN
1	A	131	ASN
1	A	166	ASN
1	A	176	HIS
1	A	202	ASN
1	B	131	ASN
1	B	156	ASN
1	B	165	HIS
1	B	166	ASN
1	B	173	GLN
1	B	176	HIS
1	B	202	ASN

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 monosaccharides in this entry.

5.6 Ligand geometry (i)

4 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z| > 2$	Counts	RMSZ	#$|Z| > 2$
2	B3P	A	301	-	18,18,18	1.39	3 (16%)	23,23,23	2.43	7 (30%)
2	B3P	B	301	-	18,18,18	0.88	1 (5%)	23,23,23	2.66	11 (47%)
2	B3P	A	302	-	18,18,18	3.01	8 (44%)	23,23,23	2.23	8 (34%)
2	B3P	B	302	-	18,18,18	1.84	4 (22%)	23,23,23	2.13	8 (34%)

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	B3P	A	301	-	-	5/28/28/28	-
2	B3P	B	301	-	-	13/28/28/28	-
2	B3P	A	302	-	-	6/28/28/28	-
2	B3P	B	302	-	-	3/28/28/28	-

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	302	B3P	C7-C4	8.31	1.63	1.53
2	A	302	B3P	C3-N1	5.63	1.53	1.46
2	A	302	B3P	C5-C4	4.43	1.58	1.53
2	B	302	B3P	C5-C4	-3.98	1.48	1.53
2	A	302	B3P	C9-C8	-3.60	1.49	1.53
2	B	302	B3P	C6-C4	3.35	1.57	1.53
2	B	302	B3P	C10-C8	-3.22	1.49	1.53
2	A	301	B3P	C11-C8	-3.18	1.49	1.53
2	B	302	B3P	C7-C4	3.06	1.57	1.53
2	A	302	B3P	C1-C2	2.98	1.63	1.51

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	301	B3P	C10-C8	2.72	1.56	1.53
2	A	301	B3P	C6-C4	-2.66	1.50	1.53
2	A	301	B3P	C7-C4	-2.19	1.51	1.53
2	A	302	B3P	C6-C4	2.14	1.56	1.53
2	A	302	B3P	O6-C7	2.07	1.48	1.42
2	A	302	B3P	C2-N2	2.03	1.49	1.46

All (34) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	301	B3P	C2-N2-C8	-6.94	106.01	116.17
2	A	302	B3P	O6-C7-C4	-6.02	99.43	111.68
2	B	302	B3P	C11-C8-C10	-5.37	98.25	110.02
2	A	301	B3P	O2-C10-C8	-5.30	100.89	111.68
2	A	301	B3P	C7-C4-C6	-4.90	99.28	110.02
2	A	301	B3P	C2-N2-C8	-4.76	109.21	116.17
2	B	301	B3P	O2-C10-C8	-4.63	102.27	111.68
2	B	302	B3P	C3-N1-C4	-4.14	110.10	116.17
2	A	301	B3P	C7-C4-N1	3.64	119.88	109.02
2	A	301	B3P	O4-C5-C4	-3.53	104.51	111.68
2	A	302	B3P	O3-C11-C8	-3.53	104.51	111.68
2	B	301	B3P	C3-N1-C4	3.51	121.30	116.17
2	B	301	B3P	C10-C8-C9	3.43	117.54	110.02
2	A	302	B3P	C11-C8-C9	-3.25	102.89	110.02
2	A	302	B3P	C2-N2-C8	-3.16	111.54	116.17
2	B	301	B3P	O4-C5-C4	-3.14	105.30	111.68
2	B	301	B3P	C7-C4-C6	-3.13	103.17	110.02
2	B	302	B3P	C5-C4-N1	-3.07	99.86	109.02
2	B	301	B3P	C11-C8-C9	-3.02	103.40	110.02
2	B	301	B3P	C1-C3-N1	-2.96	103.82	110.98
2	B	302	B3P	O5-C6-C4	-2.90	105.79	111.68
2	B	302	B3P	C10-C8-N2	2.78	117.31	109.02
2	A	301	B3P	C10-C8-C9	-2.75	103.99	110.02
2	B	301	B3P	C6-C4-N1	2.64	116.89	109.02
2	B	301	B3P	C5-C4-N1	-2.60	101.27	109.02
2	A	302	B3P	O5-C6-C4	-2.44	106.72	111.68
2	A	302	B3P	C9-C8-N2	2.36	116.05	109.02
2	A	302	B3P	C5-C4-N1	-2.32	102.09	109.02
2	A	302	B3P	C6-C4-N1	2.26	115.77	109.02
2	B	302	B3P	C6-C4-N1	2.25	115.72	109.02
2	B	302	B3P	C3-C1-C2	-2.19	106.35	114.15
2	B	302	B3P	O1-C9-C8	-2.18	107.24	111.68

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	301	B3P	C3-C1-C2	-2.14	106.52	114.15
2	B	301	B3P	O3-C11-C8	-2.11	107.39	111.68

There are no chirality outliers.

All (27) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	301	B3P	N1-C4-C7-O6
2	A	301	B3P	C5-C4-C7-O6
2	A	302	B3P	N2-C8-C9-O1
2	A	302	B3P	C10-C8-C9-O1
2	A	302	B3P	C11-C8-C9-O1
2	A	302	B3P	O2-C10-C8-C9
2	B	301	B3P	C5-C4-N1-C3
2	B	301	B3P	C6-C4-N1-C3
2	B	301	B3P	C7-C4-N1-C3
2	B	301	B3P	N1-C4-C7-O6
2	B	301	B3P	C5-C4-C7-O6
2	B	301	B3P	C6-C4-C7-O6
2	A	301	B3P	C2-C1-C3-N1
2	B	302	B3P	O2-C10-C8-C9
2	B	301	B3P	C1-C2-N2-C8
2	A	301	B3P	N1-C4-C5-O4
2	B	301	B3P	N1-C4-C5-O4
2	B	301	B3P	N2-C8-C9-O1
2	A	301	B3P	C6-C4-C7-O6
2	A	302	B3P	O2-C10-C8-N2
2	B	301	B3P	C11-C8-C9-O1
2	B	302	B3P	C11-C8-C9-O1
2	B	302	B3P	O3-C11-C8-C9
2	B	301	B3P	C5-C4-C6-O5
2	B	301	B3P	C6-C4-C5-O4
2	B	301	B3P	C7-C4-C6-O5
2	A	302	B3P	O2-C10-C8-C11

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	301	B3P	1	0
2	B	302	B3P	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 then 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.

Ligand B3P A 301

Ligand B3P B 301

Ligand B3P A 302

Bond lengths

Bond angles

Torsions

Rings

Ligand B3P B 302

Bond lengths

Bond angles

Torsions

Rings
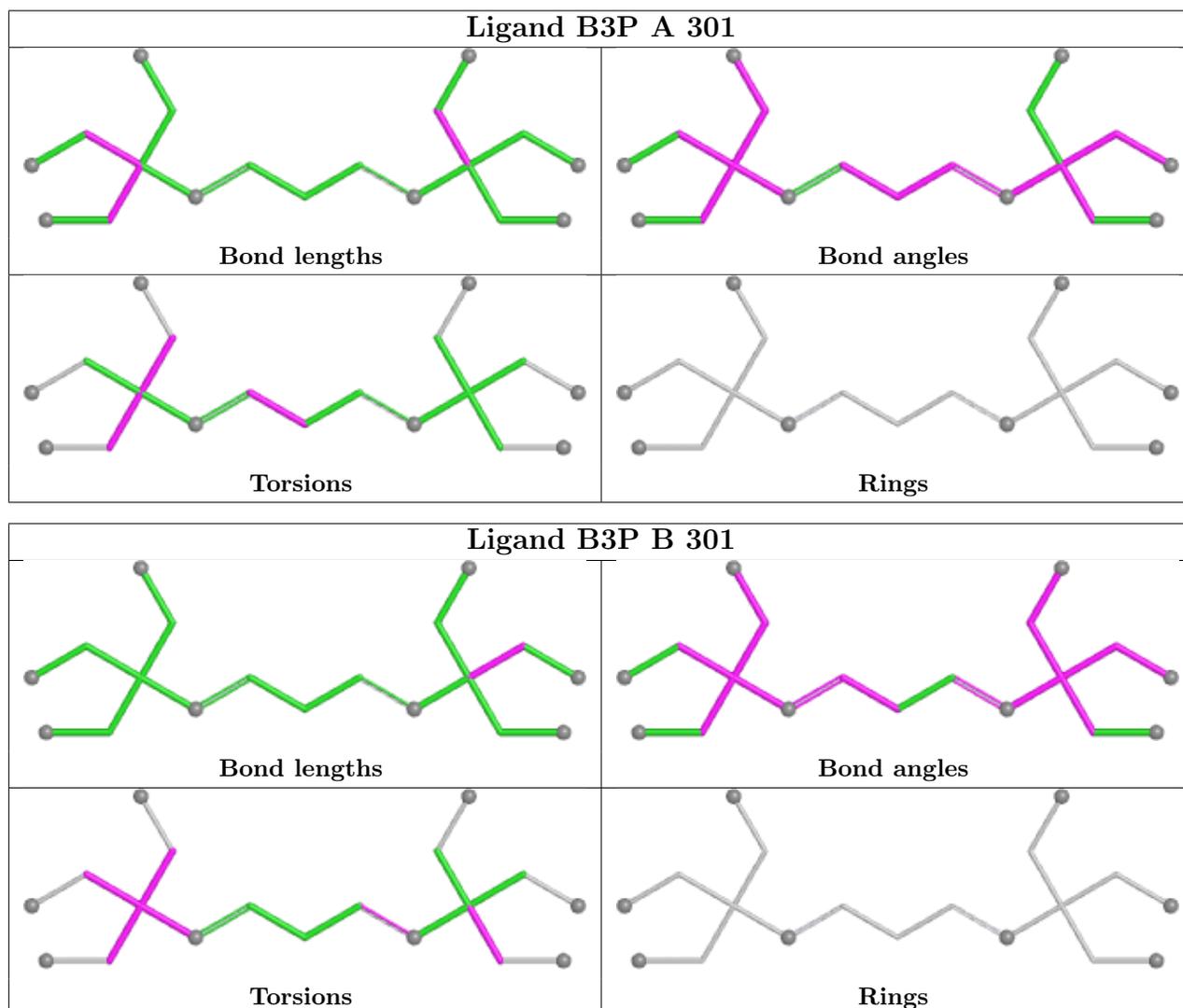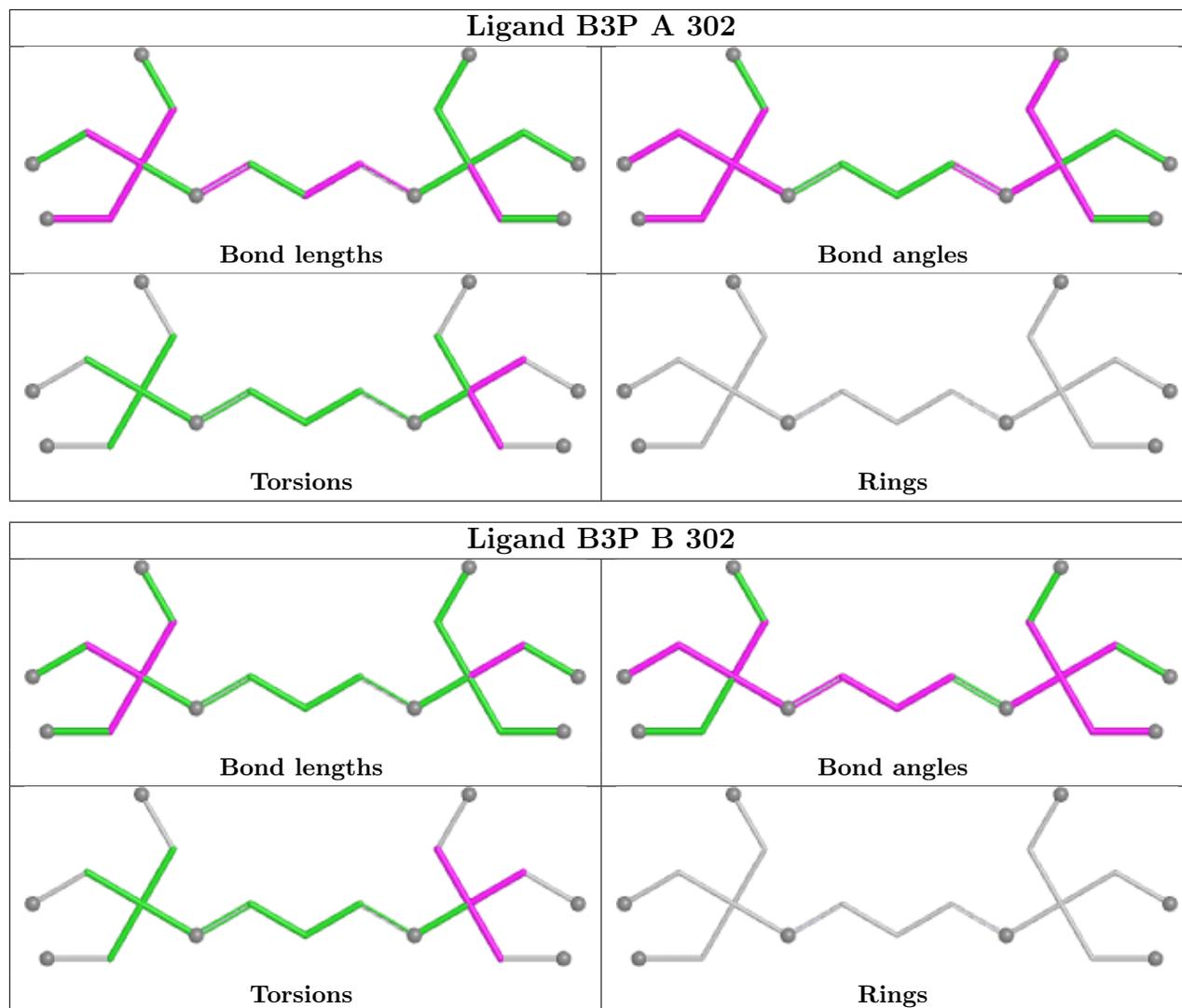
5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	219/220 (99%)	0.25	16 (7%)	15	23	28, 42, 67, 88	0
1	B	220/220 (100%)	0.01	9 (4%)	37	46	28, 38, 53, 96	0
All	All	439/440 (99%)	0.13	25 (5%)	23	32	28, 39, 62, 96	0

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	30	ALA	7.7
1	A	30	ALA	5.7
1	B	31	THR	5.1
1	A	84	TYR	4.8
1	B	249	GLN	4.4
1	A	139	ILE	4.2
1	A	122	PHE	3.8
1	A	248	PRO	3.4
1	A	245	ASN	3.4
1	A	247	VAL	3.1
1	B	222	GLU	3.1
1	A	31	THR	3.1
1	B	122	PHE	3.0
1	A	108	VAL	2.8
1	A	173	GLN	2.8
1	A	123	PHE	2.7
1	B	34	ASN	2.7
1	B	137	ILE	2.7
1	A	180	PHE	2.7
1	A	34	ASN	2.6
1	A	174	ASP	2.5
1	B	139	ILE	2.3
1	B	32	VAL	2.2
1	A	210	ILE	2.1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	189	PHE	2.0

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

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

## 6.3 Carbohydrates ⓘ

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, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
2	B3P	B	301	19/19	0.87	0.13	40,51,64,66	0
2	B3P	A	302	19/19	0.93	0.10	22,27,44,48	0
2	B3P	A	301	19/19	0.93	0.09	27,38,52,52	0
2	B3P	B	302	19/19	0.93	0.11	26,35,49,49	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.

WORLDWIDE
wwPDB
PROTEIN DATA BANK

Electron density around B3P B 301:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
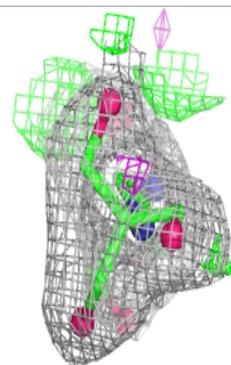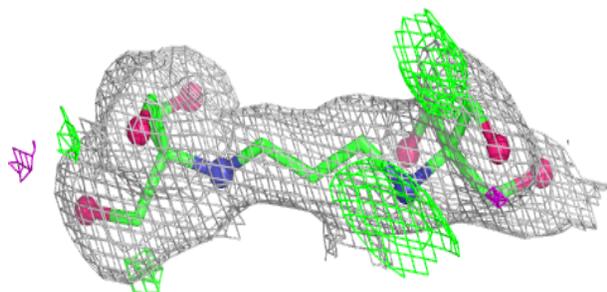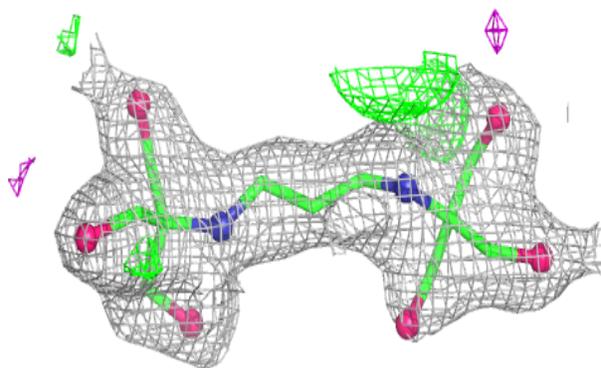
Electron density around B3P A 302:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
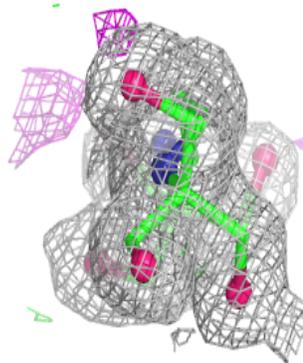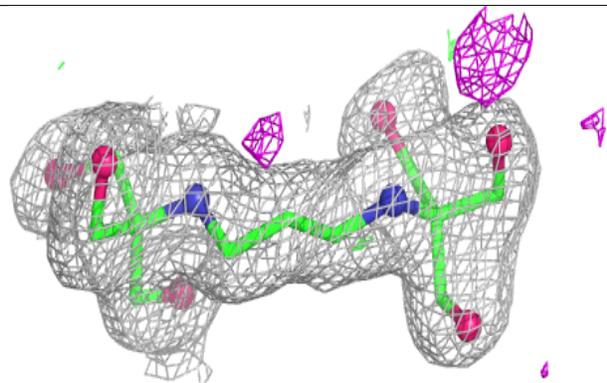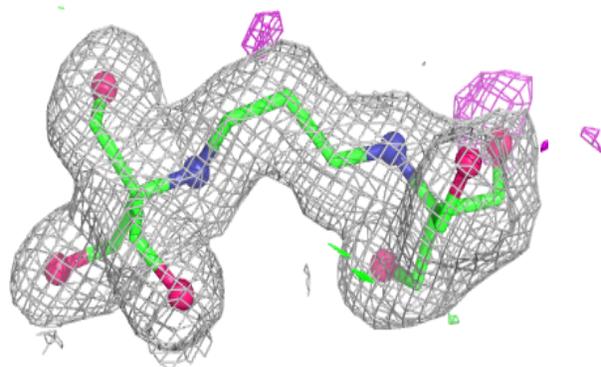
Electron density around B3P A 301:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)
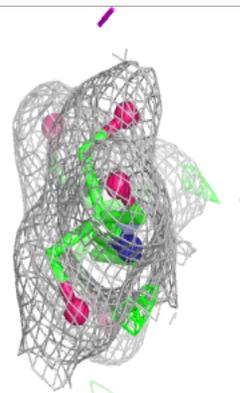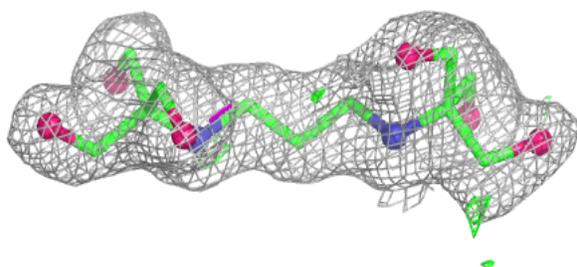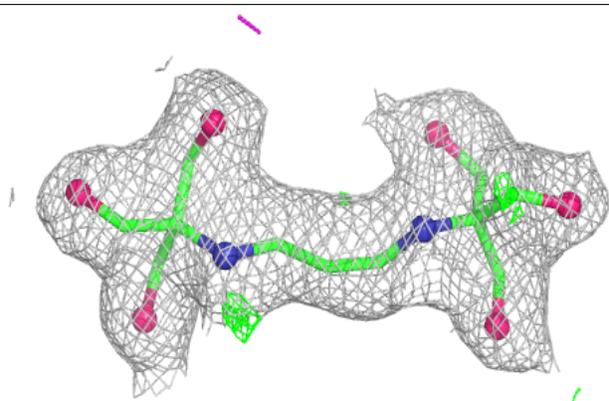
Electron density around B3P B 302:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.