wwPDB X-ray Structure Validation Summary Report (i)

Jun 12, 2024 – 11:39 PM EDT

PDB ID	:	1E4O
Title	:	Phosphorylase recognition and phosphorolysis of its oligosaccharide substrate: answers to a long outstanding question
Authors	:	Watson, K.A.; McCleverty, C.; Geremia, S.; Cottaz, S.; Driguez, H.; Johnson, L.N.
Deposited on	:	2000-07-11
Resolution	:	2.90 Å(reported)

The following versions of software and data (see references (i)) were used in the production of this report:

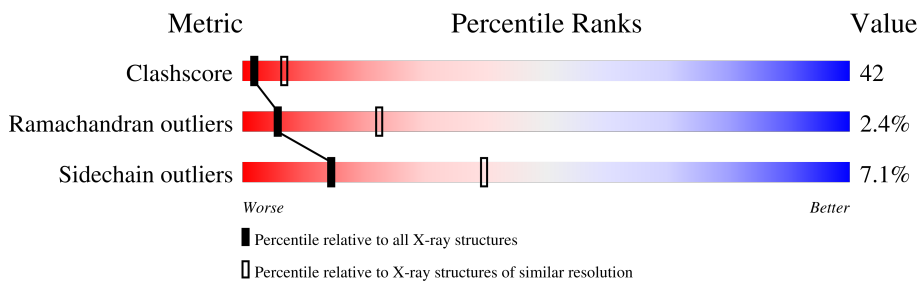|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 2.90 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
Clashscore		42
Ramachandran outliers		2.4%
Sidechain outliers		7.1%

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))
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)

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%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	796	38% 57% 6%
1	B	796	37% 57% 6%
2	C	5	40% 40% 20%
2	D	5	40% 40% 20%

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 13251 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 MALTODEXTRIN PHOSPHORYLASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	796	Total	C	N	O	S	0	0	0
			6378	4068	1127	1163	20			
1	B	796	Total	C	N	O	S	0	0	0
			6378	4068	1127	1163	20			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	293	LYS	GLU	conflict	UNP P00490
A	487	GLU	VAL	conflict	UNP P00490
A	489	PHE	LEU	conflict	UNP P00490
A	498	GLN	LEU	conflict	UNP P00490
A	501	GLU	VAL	conflict	UNP P00490
A	521	GLU	ASP	conflict	UNP P00490
A	547	HIS	ARG	conflict	UNP P00490
A	681	GLU	LYS	conflict	UNP P00490
B	293	LYS	GLU	conflict	UNP P00490
B	487	GLU	VAL	conflict	UNP P00490
B	489	PHE	LEU	conflict	UNP P00490
B	498	GLN	LEU	conflict	UNP P00490
B	501	GLU	VAL	conflict	UNP P00490
B	521	GLU	ASP	conflict	UNP P00490
B	547	HIS	ARG	conflict	UNP P00490
B	681	GLU	LYS	conflict	UNP P00490

- Molecule 2 is an oligosaccharide called alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose-(1-4)-beta-D-glucopyranose.
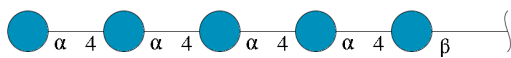
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
2	C	5	Total 56	C 30	O 26	0	0	0
2	D	5	Total 56	C 30	O 26	0	0	0

- Molecule 3 is PYRIDOXAL-5'-PHOSPHATE (three-letter code: PLP) (formula: $C_8H_{10}NO_6P$).
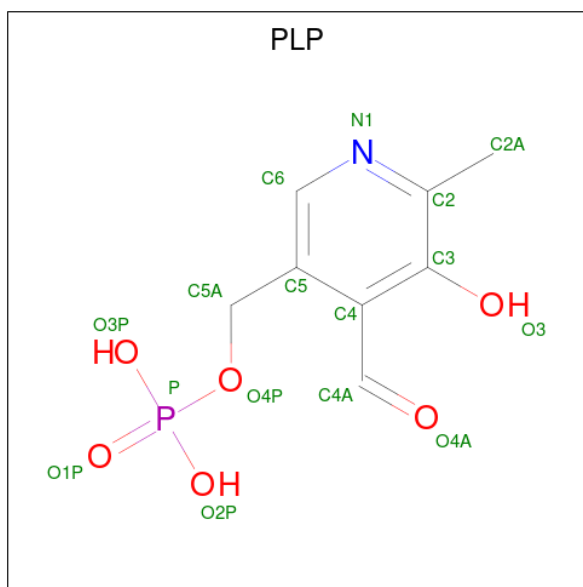
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total 15	C 8	N 1	O 5	P 1	0	0
3	B	1	Total 15	C 8	N 1	O 5	P 1	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	167	Total 167	O 167	0	0
4	B	186	Total 186	O 186	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. 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. 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.

Note EDS was not executed.

• Molecule 1: MALTODEXTRIN PHOSPHORYLASE

A768 I769 L770 A773 R774 C775 G776 M777 F778 S779 S780 D781 R782 S783 I784 R785 D786 Y787 Q788 A789 R790 I791 W792 Q793 R796

• Molecule 1: MALTODEXTRIN PHOSPHORYLASE

Chain B: 37%   57%   6%

S1 Q2 P3 N6 D7 K8 Q11 E12 A13 L14 S15 R16 Q17 W18 Q19 R20 Y21 G22 L23 N24 S25 A26 A27 E28 M29 R32 Q33 W34 W35 L36 A37 V38 S39 E40 A41 L42 A43 E44 M45 L46 R47 A48 Q49 P50 F51 A52 K53 P54 V55 A56 N57 Q58 R59 Y63 E67

F68 L69 I70 G71 R72 L73 T74 G75 N76 N77 L78 L79 N80 L81 G82 W83 Y84 Q85 D86 V87 L91 Y94 D95 L98 T99 D100 L101 L102 E103 E104 E105 P108 A109 L110 G111 N112 G113 G114 L115 G116 R117 L118 A119 A120 C121 F122 L123 D124 S125 M126 A127 T128 V129 G130 Q131 S132

A133 G137 L138 N139 Y140 Q141 Y142 G143 L144 F145 R146 Q147 S148 F149 V150 D151 G152 K153 Q154 D159 D160 W161 H162 R163 S164 F169 R170 H171 N172 L175 D176 V177 Q178 V179 G180 I181 G182 G183 K184 V185 T186 K187 D188 G189 R190 W191 E192 P193 E194 F195 T196 I197 T198 G199 Q200 A201

L204 P205 V206 V207 G208 Y209 V213 A214 Q215 P216 L217 R218 L219 W220 H224 A225 H226 P227 K232 D237 F238 L239 R240 A241 E242 Q243 Q244 G245 I246 N247 K250 L251 T252 K253 V254 L255 Y256 P257 N258 D259 N260 H261 G264 K265 K266 L267 R268 L269 M270 Q271 Q272 Y273 F274

Q275 C276 A277 C278 S279 V280 L284 R285 R286 H287 R292 K293 L294 H295 E296 L297 A298 D299 Y300 L305 N306 D307 T308 H309 P310 T311 I312 A313 L317 V320 I321 I322 D323 E324 M327 D331 I335 T336 S337 K338 T339 Y342 T343 N344 H345 T346 A351 L352 E353 R354

W355 D356 V357 K358 L359 V360 K361 G362 L363 L364 P365 R366 H367 M368 Q369 I370 I371 N372 E373 I374 N375 T376 R377 F378 K379 T380 L381 V382 E383 K384 T385 W386 P387 G388 D389 E390 K391 V392 W393 A394 K395 L396 V399 H400 D401 K402 Q403 V404 H405 M406 A407 N408 L409 C410 V411 F415 M418

G419 V420 A421 A422 L423 H424 S425 D426 L427 V428 V429 K430 D431 P434 E435 Y436 H437 W440 P441 N442 K443 N446 V447 T448 N449 G450 I451 T452 P453 R454 R455 W456 I457 K458 Q459 P462 A463 L464 A465 A466 L467 L468 D469 K474 E475 W476 A477 N478 D479 L480 D481 Q482 L483 L486

E487 K488 F489 A490 D491 D492 A493 K494 F495 R496 D497 R500 E501 I502 K503 K507 L510 A511 E512 K515 V516 R517 I520 E521 I522 N523 P524 Q525 D529 I530 Q531 I532 K533 R534 L535 H536 E537 Y538 K539 R540 Q541 H542 L543 N544 L545 I548 L549 Y552 K553 E554 I555

N558 P559 Q560 A561 D562 R563 V564 P565 R566 V567 F568 L569 A574 A575 Y578 Y579 L580 A581 I584 I585 F586 A587 I588 N589 K590 V591 A592 D593 V594 I595 N596 N597 D598 P599 L600 V601 G602 D603 V607 V608 F609 L610 N612 Y613 E619 K620 L621 I622 P623 A624 A625 D626 I627

S628 I631 S632 T633 A634 G635 K636 E637 A638 S639 G640 T641 G642 N643 M644 K645 L646 L652 T653 V654 G655 T656 L657 D658 G659 A660 N661 V662 E663 I664 A665 K667 V668 G669 E670 E671 N672 I673 F674 I675 F676 V680 E681 Q682 V683 I686 L687 A688 K689 G690 Y691 D692 P693 V694 K695

W696 R697 K698 K699 D700 K701 V702 L703 V706 L707 K708 E709 L710 E711 S712 G713 K714 Y715 S716 H721 A722 F723 D724 Q725 M726 L727 H728 S729 I730 Q733 D736 P737 Y738 L739 A742 D743 F744 V748 E749 A750 Q751 K752 Q753 V754 D755 V756 L757 Y758 R759 D760 Q761 E762 A763 W764

T765 R766 A767 A768 I769 L770 A773 R774 C775 G776 M777 F778 S779 S780 D781 R782 S783 I784 R785 D786 Y787 Q788 A789 R790 I791 W792 Q793 R796

• Molecule 2: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose-(1-4)-beta-D-glucopyranose

Chain C: 40%   40%   20%

BGC1 GLC2 GLC3 GLC4 GLC5

• Molecule 2: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose-(1-4)-beta-D-glucopyranose

Chain D:

40%   40%   20%

BGC1 GLC2 GLC3 GLC4 GLC5

4 Data and refinement statistics ⓘ

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	74.45Å 105.69Å 214.91Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 2.90	Depositor
% Data completeness (in resolution range)	77.2 (50.00-2.90)	Depositor
R_{merge}	0.18	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR 3.5	Depositor
R, R_{free}	0.245 , 0.306	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	13251	wwPDB-VP
Average B, all atoms (Å^2)	47.0	wwPDB-VP

5   Model quality ⓘ

5.1   Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: PLP, BGC, GLC

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	0/6528	0.63	0/8853
1	B	0.41	0/6528	0.63	0/8853
All	All	0.41	0/13056	0.63	0/17706

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 ⓘ

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	6378	0	6306	531	6
1	B	6378	0	6306	541	5
2	C	56	0	48	6	0
2	D	56	0	48	7	0
3	A	15	0	7	1	0
3	B	15	0	7	1	0
4	A	167	0	0	33	0
4	B	186	0	0	35	0
All	All	13251	0	12722	1064	6

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 42.

The worst 5 of 1064 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:A:715:TYR:N	4:A:2151:HOH:O	1.70	1.23
1:B:715:TYR:N	4:B:2164:HOH:O	1.70	1.23
1:B:338:LYS:HD3	4:B:2106:HOH:O	1.08	1.21
1:B:300:TYR:CE1	4:B:2096:HOH:O	1.99	1.14
1:A:300:TYR:CE1	4:A:2088:HOH:O	1.99	1.13

The worst 5 of 6 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:A:774:ARG:NH1	1:B:701:LYS:CE[2_555]	1.71	0.49
1:A:95:ASP:OD2	1:B:261:HIS:CB[3_555]	1.73	0.47
1:A:774:ARG:NH2	1:B:701:LYS:NZ[2_555]	1.79	0.41
1:A:774:ARG:CZ	1:B:701:LYS:NZ[2_555]	1.87	0.33
1:A:331:ASP:OD2	1:A:720:LYS:NZ[1_655]	2.09	0.11

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	794/796 (100%)	654 (82%)	121 (15%)	19 (2%)	6	22
1	B	794/796 (100%)	654 (82%)	121 (15%)	19 (2%)	6	22
All	All	1588/1592 (100%)	1308 (82%)	242 (15%)	38 (2%)	6	22

5 of 38 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	2	GLN
1	A	389	ASP

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Mol	Chain	Res	Type
1	A	402	LYS
1	A	457	ILE
1	A	479	ASP

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	665/667 (100%)	618 (93%)	47 (7%)	14	40
1	B	665/667 (100%)	618 (93%)	47 (7%)	14	40
All	All	1330/1334 (100%)	1236 (93%)	94 (7%)	14	40

5 of 94 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	110	LEU
1	B	364	LEU
1	B	117	ARG
1	B	198	THR
1	B	517	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 69 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	478	ASN
1	B	525	GLN
1	B	728	HIS
1	A	525	GLN
1	A	504	GLN

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 ⓘ

10 monosaccharides 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	BGC	C	1	2	12,12,12	0.46	0	17,17,17	0.65	0
2	GLC	C	2	2	11,11,12	0.52	0	15,15,17	0.56	0
2	GLC	C	3	2	11,11,12	0.49	0	15,15,17	0.58	0
2	GLC	C	4	2	11,11,12	0.67	0	15,15,17	0.74	0
2	GLC	C	5	2	11,11,12	0.50	0	15,15,17	1.02	2 (13%)
2	BGC	D	1	2	12,12,12	0.46	0	17,17,17	0.65	0
2	GLC	D	2	2	11,11,12	0.51	0	15,15,17	0.56	0
2	GLC	D	3	2	11,11,12	0.50	0	15,15,17	0.57	0
2	GLC	D	4	2	11,11,12	0.67	0	15,15,17	0.74	0
2	GLC	D	5	2	11,11,12	0.49	0	15,15,17	1.02	2 (13%)

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	BGC	C	1	2	-	1/2/22/22	0/1/1/1
2	GLC	C	2	2	-	0/2/19/22	0/1/1/1
2	GLC	C	3	2	-	0/2/19/22	0/1/1/1
2	GLC	C	4	2	-	0/2/19/22	0/1/1/1
2	GLC	C	5	2	-	0/2/19/22	0/1/1/1
2	BGC	D	1	2	-	1/2/22/22	0/1/1/1
2	GLC	D	2	2	-	0/2/19/22	0/1/1/1
2	GLC	D	3	2	-	0/2/19/22	0/1/1/1
2	GLC	D	4	2	-	0/2/19/22	0/1/1/1

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PROTEIN DATA BANK

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GLC	D	5	2	-	0/2/19/22	0/1/1/1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	5	GLC	C1-C2-C3	2.68	112.96	109.67
2	C	5	GLC	C1-C2-C3	2.66	112.94	109.67
2	C	5	GLC	C1-O5-C5	2.43	115.49	112.19
2	D	5	GLC	C1-O5-C5	2.41	115.46	112.19

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	1	BGC	O5-C5-C6-O6
2	D	1	BGC	O5-C5-C6-O6

There are no ring outliers.

6 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	4	GLC	2	0
2	D	5	GLC	4	0
2	D	3	GLC	1	0
2	D	4	GLC	2	0
2	C	3	GLC	1	0
2	C	5	GLC	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

Oligosaccharide Chain C

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain D

Bond lengths

Bond angles

Torsions

Rings
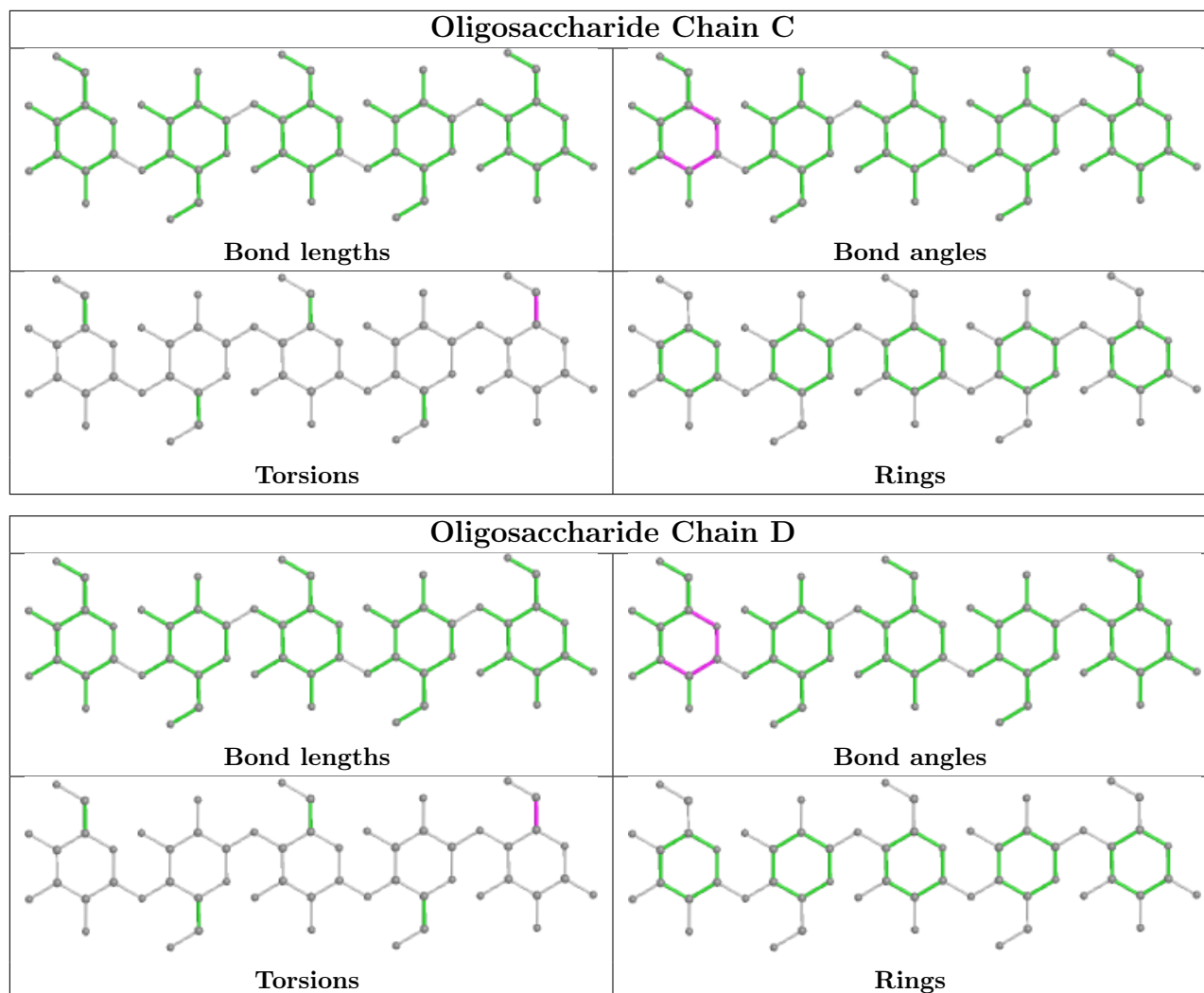
5.6 Ligand geometry ⓘ

2 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z|$ > 2	Counts	RMSZ	#$|Z|$ > 2
3	PLP	B	999	1	15,15,16	2.66	6 (40%)	20,22,23	2.03	9 (45%)
3	PLP	A	999	1	15,15,16	2.66	6 (40%)	20,22,23	2.03	9 (45%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	PLP	B	999	1	-	1/6/6/8	0/1/1/1
3	PLP	A	999	1	-	1/6/6/8	0/1/1/1

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	999	PLP	P-O1P	5.49	1.68	1.50
3	A	999	PLP	P-O1P	5.49	1.68	1.50
3	A	999	PLP	P-O4P	-4.17	1.46	1.60
3	B	999	PLP	P-O4P	-4.16	1.46	1.60
3	B	999	PLP	C2-N1	3.97	1.41	1.33

The worst 5 of 18 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	999	PLP	C5-C6-N1	-3.61	117.80	123.82
3	A	999	PLP	C5-C6-N1	-3.60	117.82	123.82
3	A	999	PLP	C4A-C4-C3	-3.37	114.79	120.50
3	B	999	PLP	C4A-C4-C3	-3.37	114.79	120.50
3	A	999	PLP	C5A-C5-C6	-3.24	114.05	119.37

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	999	PLP	C4-C5-C5A-O4P
3	B	999	PLP	C4-C5-C5A-O4P

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	999	PLP	1	0
3	A	999	PLP	1	0

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 ⓘ

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates ⓘ

EDS was not executed - this section is therefore empty.

6.4 Ligands ⓘ

EDS was not executed - this section is therefore empty.

6.5 Other polymers ⓘ

EDS was not executed - this section is therefore empty.