



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 14, 2023 – 05:29 pm GMT

PDB ID : 4ADC
Title : Structural and functional study of succinyl-ornithine transaminase from E. coli
Authors : Newman, J.; Peat, T.S.
Deposited on : 2011-12-23
Resolution : 2.30 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 : 1.8.4, CSD as541be (2020)
Xtrriage (Phenix) : 1.13
EDS : **FAILED**
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

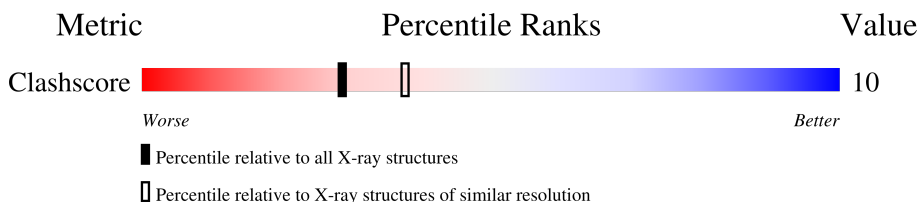
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 Å.


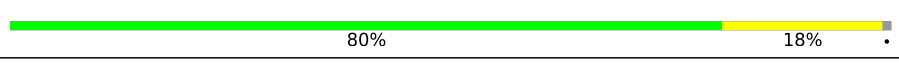


Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	5643 (2.30-2.30)

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 $\leq 5\%$

Note EDS failed to run properly.

Mol	Chain	Length	Quality of chain
1	A	406	 79% 19% .
1	B	406	 80% 18% .
1	C	406	 82% 16% .
1	D	406	 79% 19% ..

2 Entry composition [i](#)

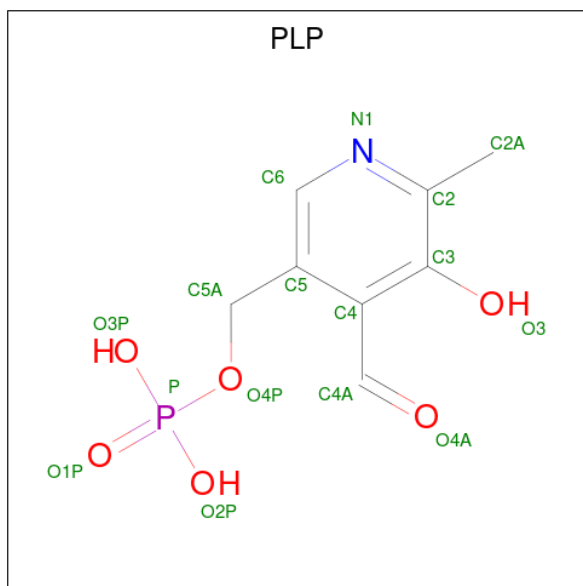
There are 5 unique types of molecules in this entry. The entry contains 12925 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 SUCCINYLORNITHINE TRANSAMINASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	400	Total	C	N	O	S	0	8	0
			3103	1961	551	580	11			
1	B	400	Total	C	N	O	S	0	7	0
			3092	1955	547	579	11			
1	C	400	Total	C	N	O	S	0	7	0
			3084	1950	545	578	11			
1	D	400	Total	C	N	O	S	0	4	0
			3061	1939	541	570	11			

- Molecule 2 is PYRIDOXAL-5'-PHOSPHATE (three-letter code: PLP) (formula: C₈H₁₀NO₆P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	Total	C	N	O	P	0	0
			16	8	1	6	1		
2	B	1	Total	C	N	O	P	0	0
			16	8	1	6	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	C	1	Total	C	N	O	P	0	0
			16	8	1	6	1		
2	D	1	Total	C	N	O	P	0	0
			16	8	1	6	1		

- Molecule 3 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	1	Total	Na	0	0
			1	1		
3	C	1	Total	Na	0	0
			1	1		

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	1	Total	Mg	0	0
			1	1		

- Molecule 5 is water.


Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	177	Total	O	0	0
			177	177		
5	B	146	Total	O	0	0
			146	146		
5	C	127	Total	O	0	0
			127	127		
5	D	68	Total	O	0	0
			68	68		

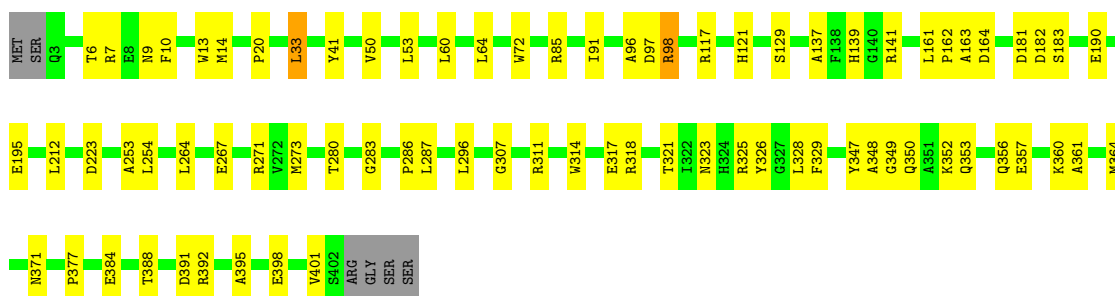
3 Residue-property plots [i](#)

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 failed to run properly.

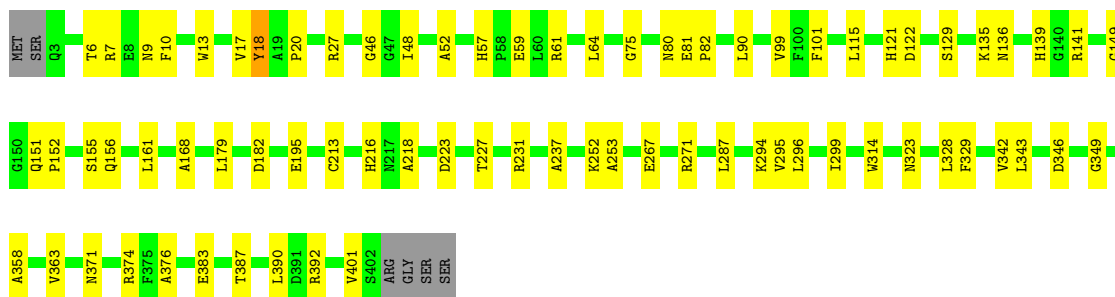
- Molecule 1: SUCCINYLORNITHINE TRANSAMINASE

Chain A:  79% 19%




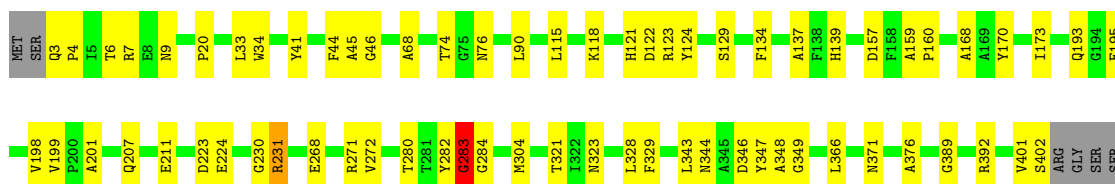
- Molecule 1: SUCCINYLORNITHINE TRANSAMINASE

Chain B:  80% 18%




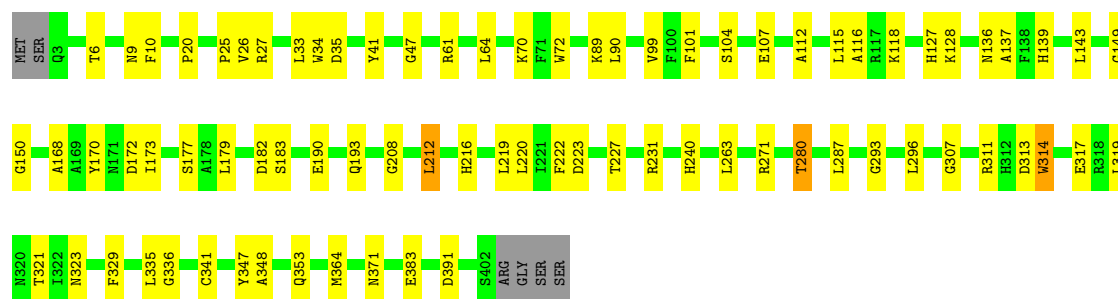
- Molecule 1: SUCCINYLORNITHINE TRANSAMINASE

Chain C:  82% 16%



- Molecule 1: SUCCINYLORNITHINE TRANSAMINASE

Chain D:  79% 19% ..



4 Data and refinement statistics

EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	184.37Å 118.28Å 109.46Å 90.00° 96.80° 90.00°	Depositor
Resolution (Å)	108.69 – 2.30	Depositor
% Data completeness (in resolution range)	97.7 (108.69-2.30)	Depositor
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.48 (at 2.30Å)	Xtrriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.170 , 0.213	Depositor
Wilson B-factor (Å ²)	23.1	Xtrriage
Anisotropy	0.102	Xtrriage
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	12925	wwPDB-VP
Average B, all atoms (Å ²)	23.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.39% of the height of the origin peak. No significant pseudotranslation is detected.*

¹ Intensities estimated from amplitudes.

² 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: MG, PLP, NA

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	1.15	4/3180 (0.1%)	1.10	12/4319 (0.3%)
1	B	1.15	5/3170 (0.2%)	1.13	11/4305 (0.3%)
1	C	1.08	5/3165 (0.2%)	1.06	13/4298 (0.3%)
1	D	1.01	3/3143 (0.1%)	1.00	7/4269 (0.2%)
All	All	1.10	17/12658 (0.1%)	1.07	43/17191 (0.3%)

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	C	0	3
1	D	0	1
All	All	0	4

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	34	TRP	CD2-CE2	6.38	1.49	1.41
1	C	195	GLU	CD-OE2	6.38	1.32	1.25
1	D	34	TRP	CD2-CE2	6.33	1.49	1.41
1	C	224	GLU	CD-OE1	6.06	1.32	1.25
1	B	314	TRP	CD2-CE2	5.79	1.48	1.41
1	B	18	TYR	CE2-CZ	5.76	1.46	1.38
1	B	13	TRP	CD2-CE2	5.74	1.48	1.41
1	A	13	TRP	CD2-CE2	5.55	1.48	1.41
1	A	377	PRO	N-CA	5.30	1.56	1.47
1	D	72	TRP	CD2-CE2	5.26	1.47	1.41
1	C	283[A]	GLY	N-CA	5.18	1.53	1.46
1	C	283[B]	GLY	N-CA	5.18	1.53	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	59	GLU	CD-OE1	5.16	1.31	1.25
1	B	122	ASP	CB-CG	5.10	1.62	1.51
1	D	314	TRP	CD2-CE2	5.09	1.47	1.41
1	A	357	GLU	CD-OE2	-5.08	1.20	1.25
1	A	314	TRP	CD2-CE2	5.05	1.47	1.41

All (43) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	392	ARG	NE-CZ-NH2	-9.71	115.44	120.30
1	B	231	ARG	NE-CZ-NH1	8.49	124.54	120.30
1	C	231	ARG	NE-CZ-NH1	8.28	124.44	120.30
1	C	231	ARG	NE-CZ-NH2	-7.94	116.33	120.30
1	B	231	ARG	NE-CZ-NH2	-7.64	116.48	120.30
1	A	117	ARG	NE-CZ-NH1	-7.54	116.53	120.30
1	C	283[A]	GLY	N-CA-C	-7.37	94.67	113.10
1	C	283[B]	GLY	N-CA-C	-7.37	94.67	113.10
1	D	391	ASP	CB-CG-OD2	-7.19	111.83	118.30
1	C	304	MET	CG-SD-CE	-6.99	89.02	100.20
1	B	392	ARG	NE-CZ-NH1	6.88	123.74	120.30
1	D	313	ASP	CB-CG-OD1	6.37	124.03	118.30
1	A	273	MET	CG-SD-CE	6.21	110.13	100.20
1	D	391	ASP	CB-CG-OD1	6.16	123.84	118.30
1	B	122	ASP	CB-CG-OD1	6.15	123.83	118.30
1	A	182	ASP	CB-CG-OD2	-6.10	112.81	118.30
1	C	392	ARG	NE-CZ-NH2	-6.10	117.25	120.30
1	A	33	LEU	CA-CB-CG	6.03	129.16	115.30
1	B	90	LEU	CB-CG-CD1	5.98	121.17	111.00
1	C	90	LEU	CA-CB-CG	5.98	129.04	115.30
1	A	212	LEU	CA-CB-CG	5.91	128.90	115.30
1	C	33	LEU	CA-CB-CG	5.89	128.86	115.30
1	A	85	ARG	CG-CD-NE	-5.88	99.45	111.80
1	B	141	ARG	NE-CZ-NH2	-5.77	117.42	120.30
1	D	212	LEU	CA-CB-CG	5.72	128.46	115.30
1	D	70	LYS	CD-CE-NZ	-5.70	98.59	111.70
1	D	172	ASP	CB-CG-OD1	5.69	123.42	118.30
1	A	318	ARG	NE-CZ-NH1	5.68	123.14	120.30
1	D	280	THR	CB-CA-C	-5.58	96.54	111.60
1	A	391	ASP	CB-CG-OD2	-5.55	113.30	118.30
1	A	360	LYS	CD-CE-NZ	-5.48	99.09	111.70
1	B	149	GLY	N-CA-C	-5.46	99.45	113.10
1	C	284	GLY	N-CA-C	-5.40	99.60	113.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	321	THR	CA-CB-CG2	-5.39	104.86	112.40
1	A	296	LEU	CB-CG-CD1	-5.38	101.86	111.00
1	C	122	ASP	CB-CG-OD1	5.34	123.11	118.30
1	A	98	ARG	NE-CZ-NH2	-5.28	117.66	120.30
1	C	283[A]	GLY	C-N-CA	5.26	133.34	122.30
1	C	283[B]	GLY	C-N-CA	5.26	133.34	122.30
1	B	75	GLY	N-CA-C	-5.10	100.36	113.10
1	B	27	ARG	NE-CZ-NH2	-5.07	117.77	120.30
1	B	374	ARG	NE-CZ-NH2	5.06	122.83	120.30
1	A	141	ARG	NE-CZ-NH1	5.02	122.81	120.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	282	TYR	Peptide
1	C	283[B]	GLY	Peptide,Mainchain
1	D	150	GLY	Peptide

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	3103	0	3012	67	0
1	B	3092	0	3019	59	0
1	C	3084	0	3009	53	0
1	D	3061	0	2991	65	0
2	A	16	0	7	0	0
2	B	16	0	7	0	0
2	C	16	0	7	0	0
2	D	16	0	7	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
4	B	1	0	0	0	0
5	A	177	0	0	6	0
5	B	146	0	0	5	0
5	C	127	0	0	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	D	68	0	0	1	0
All	All	12925	0	12059	238	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 10.

All (238) 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:267:GLU:OE2	1:B:271[B]:ARG:NH1	1.72	1.22
1:A:271[B]:ARG:HG2	1:A:271[B]:ARG:HH11	1.06	1.14
1:A:271[A]:ARG:HD3	1:C:271[A]:ARG:CD	1.78	1.11
1:A:271[A]:ARG:CD	1:C:271[A]:ARG:HD3	1.82	1.09
1:B:387[A]:THR:CG2	5:B:2125:HOH:O	2.04	1.04
1:A:271[A]:ARG:HD3	1:C:271[A]:ARG:HD3	1.02	1.01
1:D:271[B]:ARG:HH11	1:D:271[B]:ARG:CG	1.75	0.97
1:A:271[B]:ARG:HG2	1:A:271[B]:ARG:NH1	1.83	0.91
1:B:267:GLU:CD	1:B:271[B]:ARG:HH11	1.73	0.91
1:A:271[B]:ARG:HH11	1:A:271[B]:ARG:CG	1.83	0.91
1:D:271[B]:ARG:HH11	1:D:271[B]:ARG:HG2	1.36	0.88
1:D:90:LEU:HD13	1:D:296:LEU:HD11	1.56	0.84
1:C:3:GLN:OE1	1:C:3:GLN:C	2.16	0.83
1:A:267:GLU:OE2	1:A:271[B]:ARG:HD2	1.80	0.81
1:C:349:GLY:H	1:C:371:ASN:HD22	1.28	0.81
1:B:387[A]:THR:HG23	5:B:2125:HOH:O	1.69	0.81
1:A:349:GLY:H	1:A:371:ASN:HD22	1.29	0.79
1:B:227[A]:THR:CG2	1:B:237:ALA:HB2	2.13	0.79
1:A:348:ALA:HA	1:A:371:ASN:HD21	1.47	0.79
1:B:387[A]:THR:HG22	5:B:2125:HOH:O	1.72	0.77
1:A:353[A]:GLN:HE21	1:A:353[A]:GLN:H	1.33	0.76
1:B:7:ARG:NH2	1:B:20:PRO:HD2	2.00	0.76
1:B:267:GLU:CD	1:B:271[B]:ARG:NH1	2.35	0.76
1:B:195:GLU:OE1	5:B:2098:HOH:O	2.04	0.75
1:D:323:ASN:HD21	1:D:329:PHE:H	1.32	0.75
1:C:323:ASN:HD21	1:C:329:PHE:H	1.36	0.73
1:C:3:GLN:OE1	1:C:3:GLN:CA	2.35	0.73
1:D:271[B]:ARG:CG	1:D:271[B]:ARG:NH1	2.47	0.73
1:A:349:GLY:H	1:A:371:ASN:ND2	1.87	0.72
1:B:267:GLU:OE2	1:B:271[B]:ARG:HD2	1.89	0.72
1:B:227[A]:THR:HG21	1:B:237:ALA:HB2	1.72	0.72
1:A:325:ARG:HD3	1:A:326:TYR:CZ	2.26	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:323:ASN:HD21	1:A:329:PHE:H	1.39	0.71
1:D:182:ASP:OD1	1:D:216:HIS:HD2	1.74	0.71
1:A:14:MET:CE	5:A:2012:HOH:O	2.38	0.71
1:A:328:LEU:HD21	1:A:401:VAL:HG23	1.72	0.70
1:A:139:HIS:HD2	1:A:223:ASP:OD2	1.73	0.70
1:B:182:ASP:OD1	1:B:216:HIS:HD2	1.75	0.69
5:C:2127:HOH:O	1:D:280:THR:HG23	1.92	0.69
1:D:89:LYS:HE2	1:D:293:GLY:O	1.92	0.69
1:D:90:LEU:CD1	1:D:296:LEU:HD11	2.22	0.68
1:D:41:TYR:HB2	1:D:364:MET:CE	2.23	0.67
1:A:395:ALA:O	1:A:398:GLU:HB3	1.95	0.67
1:C:121:HIS:HE1	1:C:129:SER:OG	1.78	0.66
1:C:198:VAL:HG12	1:C:198:VAL:O	1.96	0.66
1:A:384:GLU:OE2	1:A:388:THR:HG21	1.96	0.65
1:B:139:HIS:HD2	1:B:223:ASP:OD2	1.78	0.65
1:D:271[B]:ARG:HH11	1:D:271[B]:ARG:HG3	1.62	0.65
1:A:41:TYR:HB2	1:A:364:MET:HE3	1.79	0.64
1:A:384:GLU:O	1:A:388:THR:HG23	1.98	0.64
1:D:182:ASP:OD1	1:D:216:HIS:CD2	2.50	0.64
1:A:348:ALA:CA	1:A:371:ASN:HD21	2.10	0.64
1:B:349:GLY:H	1:B:371:ASN:ND2	1.95	0.64
1:D:6:THR:H	1:D:9:ASN:ND2	1.96	0.64
1:B:64:LEU:HD12	1:B:287:LEU:HD22	1.80	0.63
1:A:91:ILE:O	5:A:2075:HOH:O	2.15	0.63
1:C:193:GLN:HB2	1:C:199:VAL:HG13	1.80	0.63
1:B:227[A]:THR:HG22	1:B:237:ALA:HB2	1.80	0.63
1:C:74:THR:O	1:D:47:GLY:HA2	1.99	0.63
1:D:90:LEU:HD13	1:D:296:LEU:CD1	2.27	0.62
1:A:10:PHE:CZ	1:A:20:PRO:HD3	2.35	0.62
1:D:353:GLN:H	1:D:353:GLN:HE21	1.47	0.62
1:A:41:TYR:HB2	1:A:364:MET:CE	2.30	0.62
5:A:2148:HOH:O	1:B:252:LYS:NZ	2.30	0.62
1:C:3:GLN:HG2	1:C:4:PRO:HD2	1.80	0.62
1:C:349:GLY:H	1:C:371:ASN:ND2	1.94	0.62
1:B:99:VAL:HG21	1:B:101:PHE:CZ	2.34	0.61
1:C:348:ALA:HA	1:C:371:ASN:HD21	1.66	0.61
1:A:139:HIS:HE1	5:A:2098:HOH:O	1.83	0.61
1:C:121:HIS:CE1	1:C:129:SER:OG	2.54	0.61
1:A:384:GLU:OE2	1:A:388:THR:CG2	2.50	0.60
1:D:64:LEU:HD12	1:D:287:LEU:HD22	1.82	0.60
1:D:104:SER:OG	1:D:107:GLU:HG3	2.01	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:137:ALA:O	1:D:149:GLY:O	2.21	0.59
1:A:10:PHE:CE1	1:A:20:PRO:HD3	2.37	0.59
1:C:159:ALA:HB1	1:C:160:PRO:HA	1.84	0.59
1:A:353[A]:GLN:HE21	1:A:353[A]:GLN:N	2.00	0.59
1:D:128:LYS:HG3	1:D:183:SER:HA	1.85	0.59
1:A:97:ASP:O	1:A:98:ARG:HG2	2.03	0.58
1:B:121:HIS:CE1	1:B:129:SER:OG	2.57	0.58
1:B:135:LYS:O	1:B:136:ASN:HB2	2.03	0.58
1:B:10:PHE:CZ	1:B:20:PRO:HD3	2.39	0.58
1:C:118:LYS:HD3	1:C:272:VAL:HG13	1.86	0.58
1:A:328:LEU:CD2	1:A:401:VAL:HG23	2.34	0.57
1:A:6:THR:H	1:A:9:ASN:ND2	2.02	0.57
1:A:348:ALA:HA	1:A:371:ASN:ND2	2.18	0.57
1:B:323:ASN:ND2	1:B:328:LEU:H	2.03	0.57
1:C:3:GLN:OE1	1:C:3:GLN:O	2.23	0.57
1:A:64:LEU:HD12	1:A:287:LEU:HD22	1.87	0.57
1:B:6:THR:H	1:B:9:ASN:ND2	2.03	0.56
1:A:41:TYR:CB	1:A:364:MET:HE3	2.35	0.56
1:C:68:ALA:O	1:D:61:ARG:HD2	2.06	0.56
1:C:349:GLY:N	1:C:371:ASN:HD22	2.01	0.56
1:D:173:ILE:HD13	1:D:208:GLY:HA3	1.88	0.56
1:C:3:GLN:OE1	1:C:3:GLN:N	2.38	0.56
5:C:2126:HOH:O	1:D:280:THR:HG22	2.06	0.55
1:C:115:LEU:C	1:C:115:LEU:HD23	2.27	0.55
1:C:347:TYR:OH	1:C:401:VAL:HG13	2.06	0.55
1:B:121:HIS:HE1	1:B:129:SER:OG	1.88	0.55
1:C:115:LEU:HD23	1:C:115:LEU:O	2.07	0.54
1:A:10:PHE:CE1	1:A:20:PRO:CD	2.90	0.54
1:B:152:PRO:O	1:B:156:GLN:HG3	2.07	0.54
1:C:157:ASP:OD2	1:D:118:LYS:HE2	2.08	0.54
1:D:10:PHE:CZ	1:D:20:PRO:HD3	2.43	0.54
1:D:139:HIS:HD2	1:D:223:ASP:OD2	1.89	0.54
1:C:280:THR:HG21	1:C:283[B]:GLY:HA3	1.90	0.53
1:A:353[A]:GLN:H	1:A:353[A]:GLN:NE2	2.04	0.53
1:C:6:THR:H	1:C:9:ASN:ND2	2.06	0.53
1:D:348:ALA:HB1	1:D:371:ASN:HD21	1.73	0.53
1:A:349:GLY:N	1:A:371:ASN:HD22	2.03	0.53
1:B:323:ASN:HD21	1:B:329:PHE:H	1.55	0.53
1:A:280:THR:HG21	1:A:283:GLY:HA3	1.91	0.52
1:D:137:ALA:HB1	1:D:139:HIS:CE1	2.43	0.52
1:A:181:ASP:OD1	1:A:183:SER:HB2	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:7:ARG:NH2	1:A:20:PRO:HD2	2.24	0.52
1:D:41:TYR:HB2	1:D:364:MET:HE2	1.90	0.51
1:A:121[A]:HIS:HE1	1:A:129:SER:OG	1.93	0.51
1:D:271[B]:ARG:NH1	1:D:271[B]:ARG:HG3	2.23	0.51
1:C:323:ASN:ND2	1:C:329:PHE:H	2.06	0.51
1:B:10:PHE:CE1	1:B:20:PRO:HD3	2.45	0.51
1:D:323:ASN:HD21	1:D:329:PHE:N	2.05	0.51
1:B:358:ALA:HB1	1:B:363:VAL:HG13	1.93	0.51
1:D:116:ALA:HA	1:D:219:LEU:HD12	1.93	0.50
1:D:307:GLY:O	1:D:311:ARG:HD2	2.11	0.50
1:A:6:THR:H	1:A:9:ASN:HD22	1.57	0.50
1:A:195[A]:GLU:OE1	5:A:2128:HOH:O	2.19	0.50
1:B:182:ASP:OD1	1:B:216:HIS:CD2	2.62	0.50
5:C:2127:HOH:O	1:D:280:THR:CG2	2.57	0.50
1:B:346:ASP:OD1	1:B:346:ASP:N	2.44	0.50
1:C:7:ARG:NH2	1:C:20:PRO:HD2	2.27	0.50
1:D:26:VAL:HG23	1:D:27:ARG:HG2	1.93	0.49
1:A:33:LEU:HD12	1:A:364:MET:CE	2.42	0.49
1:B:295:VAL:HG13	1:B:299:ILE:HD12	1.95	0.49
1:C:46:GLY:HA3	1:C:376:ALA:O	2.12	0.48
1:A:317:GLU:O	1:A:321:THR:HG23	2.13	0.48
1:D:41:TYR:CB	1:D:364:MET:HE3	2.42	0.48
1:A:347:TYR:O	1:A:350:GLN:HB2	2.12	0.48
1:C:76:ASN:HD21	1:C:283[A]:GLY:HA2	1.78	0.48
1:D:353:GLN:HE21	1:D:353:GLN:N	2.10	0.48
1:B:115:LEU:HD23	1:B:115:LEU:O	2.14	0.48
1:B:383:GLU:O	1:B:387[B]:THR:HG22	2.12	0.48
1:D:127:HIS:CD2	1:D:183:SER:HB3	2.49	0.48
1:D:317:GLU:O	1:D:321:THR:HG23	2.13	0.48
1:D:127:HIS:HD2	1:D:183:SER:HB3	1.77	0.48
1:D:41:TYR:CB	1:D:364:MET:CE	2.92	0.47
1:D:314:TRP:CH2	1:D:383:GLU:HB2	2.49	0.47
1:D:136:ASN:HB2	1:D:193:GLN:HE22	1.79	0.47
1:B:52:ALA:HB2	1:B:253:ALA:HB1	1.97	0.47
1:B:227[A]:THR:HG21	1:B:237:ALA:CB	2.42	0.47
1:B:296:LEU:HD23	1:B:296:LEU:HA	1.65	0.47
1:C:123:ARG:HD3	1:C:124:TYR:CE2	2.50	0.47
1:A:96:ALA:HB2	1:A:264:LEU:HB3	1.96	0.47
1:A:253:ALA:O	1:A:254:LEU:C	2.53	0.47
1:A:349:GLY:N	1:A:371:ASN:ND2	2.60	0.47
1:D:6:THR:H	1:D:9:ASN:HD22	1.62	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:41:TYR:CD1	1:C:41:TYR:N	2.82	0.47
1:B:155:SER:HB2	1:B:161:LEU:HD11	1.96	0.46
1:B:81:GLU:N	1:B:82:PRO:CD	2.79	0.46
1:C:170:TYR:OH	1:C:201:ALA:HB2	2.16	0.46
1:A:163:ALA:O	1:A:164:ASP:HB2	2.16	0.46
1:A:325:ARG:HD3	1:A:326:TYR:CE2	2.50	0.46
1:D:112:ALA:HB2	1:D:263:LEU:HD13	1.97	0.46
1:C:123:ARG:HD3	1:C:124:TYR:CZ	2.51	0.46
1:C:323:ASN:ND2	1:C:328:LEU:H	2.14	0.46
1:C:134:PHE:HA	1:C:168:ALA:O	2.16	0.46
1:D:41:TYR:HB2	1:D:364:MET:HE3	1.94	0.46
1:D:319:LEU:HD13	1:D:341:CYS:SG	2.56	0.46
1:A:50:VAL:O	1:A:253:ALA:HA	2.15	0.46
1:B:99:VAL:CG2	1:B:101:PHE:CE2	2.99	0.46
1:B:401:VAL:O	1:B:401:VAL:CG1	2.64	0.45
1:C:45:ALA:HB1	1:C:366:LEU:HD21	1.99	0.45
1:C:139:HIS:HD2	1:C:223:ASP:OD2	1.99	0.45
1:D:25:PRO:HA	1:D:35:ASP:HA	1.99	0.45
1:B:323:ASN:HD21	1:B:328:LEU:H	1.65	0.45
1:C:401:VAL:O	1:C:402:SER:OG	2.28	0.45
1:B:48:ILE:O	1:B:252:LYS:CE	2.64	0.45
1:C:268[B]:GLU:CD	1:C:268[B]:GLU:H	2.20	0.45
1:D:177:SER:HB3	1:D:212:LEU:HD11	1.98	0.45
1:A:53:LEU:HD12	1:A:60:LEU:HD11	1.99	0.44
1:B:151:GLN:HG3	5:B:2076:HOH:O	2.16	0.44
1:D:170:TYR:CE2	1:D:193:GLN:HG3	2.53	0.44
1:C:173:ILE:HG22	5:C:2090:HOH:O	2.17	0.44
1:D:227:THR:O	1:D:231:ARG:HB3	2.16	0.44
1:D:139:HIS:HE1	5:D:2038:HOH:O	1.99	0.44
1:B:48:ILE:O	1:B:252:LYS:HE2	2.17	0.44
1:C:348:ALA:HA	1:C:371:ASN:ND2	2.30	0.44
1:D:137:ALA:HA	1:D:190:GLU:OE2	2.17	0.44
1:A:14:MET:HE2	5:A:2012:HOH:O	2.11	0.44
1:A:401:VAL:HG13	1:A:401:VAL:O	2.18	0.44
1:C:76:ASN:HD21	1:C:283[A]:GLY:CA	2.30	0.43
1:D:170:TYR:CZ	1:D:193:GLN:HG3	2.53	0.43
1:C:280:THR:CG2	1:C:283[B]:GLY:HA3	2.48	0.43
1:B:80:ASN:OD1	1:B:82:PRO:HD2	2.18	0.43
1:B:390:LEU:HD23	1:B:390:LEU:HA	1.83	0.43
1:B:213:CYS:HB3	1:B:218:ALA:O	2.18	0.43
1:C:344[A]:ASN:OD1	1:C:346:ASP:HB2	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:44:PHE:CZ	1:C:389:GLY:HA3	2.53	0.43
1:D:33:LEU:HD12	1:D:364:MET:CE	2.49	0.43
1:D:99:VAL:HG22	1:D:101:PHE:CE2	2.53	0.43
1:C:329:PHE:CD1	1:C:343:LEU:HD23	2.53	0.43
1:A:323:ASN:ND2	1:A:329:PHE:H	2.11	0.43
1:A:137:ALA:HB1	1:A:139:HIS:CE1	2.53	0.43
1:B:6:THR:H	1:B:9:ASN:HD22	1.66	0.43
1:D:143:LEU:HD12	1:D:143:LEU:HA	1.84	0.43
1:A:161:LEU:O	1:A:162:PRO:C	2.54	0.42
1:A:121[A]:HIS:CE1	1:A:129:SER:OG	2.71	0.42
1:A:33:LEU:HD12	1:A:364:MET:HE1	2.01	0.42
1:B:294:LYS:HZ3	1:B:294:LYS:HG2	1.79	0.42
1:B:57:HIS:O	1:B:61:ARG:HG3	2.20	0.42
1:B:349:GLY:N	1:B:371:ASN:ND2	2.65	0.42
1:D:240:HIS:CD2	1:D:335:LEU:HD21	2.54	0.42
1:A:307:GLY:O	1:A:311:ARG:HD2	2.20	0.42
1:C:344[A]:ASN:OD1	1:C:344[A]:ASN:C	2.58	0.42
1:D:115:LEU:HD23	1:D:115:LEU:C	2.39	0.42
1:B:329:PHE:HA	1:B:342:VAL:O	2.20	0.42
1:C:207:GLN:NE2	1:C:211:GLU:OE2	2.53	0.42
1:B:46:GLY:HA3	1:B:376:ALA:O	2.20	0.42
1:C:3:GLN:C	1:C:3:GLN:CD	2.77	0.42
1:D:271[B]:ARG:HG2	1:D:271[B]:ARG:NH1	2.17	0.42
1:C:230:GLY:O	1:C:231:ARG:C	2.56	0.42
1:B:227[A]:THR:HG22	1:B:227[A]:THR:O	2.19	0.41
1:D:168:ALA:HB2	1:D:179:LEU:HD12	2.02	0.41
1:A:72:TRP:O	1:A:286:PRO:HD2	2.20	0.41
1:A:223:ASP:OD1	1:A:223:ASP:C	2.58	0.41
1:A:361:ALA:O	1:A:392:ARG:HB3	2.20	0.41
1:C:137:ALA:HB1	1:C:139:HIS:CE1	2.56	0.41
1:A:271[B]:ARG:NH1	1:A:271[B]:ARG:CG	2.54	0.41
1:A:352:LYS:O	1:A:356:GLN:HG3	2.20	0.41
1:B:168:ALA:HB2	1:B:179:LEU:HD12	2.02	0.41
1:D:335:LEU:O	1:D:336:GLY:C	2.59	0.41
1:B:17:VAL:HG23	1:B:18:TYR:CD2	2.55	0.41
1:D:223:ASP:C	1:D:223:ASP:OD1	2.60	0.41
1:A:137:ALA:HA	1:A:190:GLU:OE2	2.22	0.40
1:D:220:LEU:HD11	1:D:222:PHE:HE1	1.87	0.40
1:D:347:TYR:O	1:D:348:ALA:C	2.59	0.40
1:B:115:LEU:HD23	1:B:115:LEU:C	2.42	0.40
1:B:267:GLU:HG3	1:B:271[B]:ARG:HD2	2.04	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:343:LEU:HD23	1:B:343:LEU:HA	1.88	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

There are no protein backbone outliers to report in this entry.

5.3.2 Protein sidechains [i](#)

There are no protein residues with a non-rotameric sidechain to report in this entry.

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 7 ligands modelled in this entry, 3 are monoatomic - leaving 4 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
2	PLP	D	1403	-	16,16,16	1.89	3 (18%)	20,23,23	1.92	7 (35%)
2	PLP	C	1403	-	16,16,16	2.36	3 (18%)	20,23,23	2.18	8 (40%)
2	PLP	B	1403	-	16,16,16	2.56	3 (18%)	20,23,23	2.17	7 (35%)
2	PLP	A	1403	-	16,16,16	2.32	4 (25%)	20,23,23	1.97	6 (30%)

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	PLP	D	1403	-	-	3/8/8/8	0/1/1/1
2	PLP	C	1403	-	-	2/8/8/8	0/1/1/1
2	PLP	B	1403	-	-	2/8/8/8	0/1/1/1
2	PLP	A	1403	-	-	3/8/8/8	0/1/1/1

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1403	PLP	C4-C5	6.19	1.49	1.42
2	C	1403	PLP	C4-C3	6.13	1.50	1.40
2	B	1403	PLP	C3-C2	6.11	1.47	1.40
2	D	1403	PLP	C4-C3	5.06	1.48	1.40
2	A	1403	PLP	C3-C2	5.03	1.45	1.40
2	C	1403	PLP	C4-C5	4.84	1.48	1.42
2	A	1403	PLP	C4-C5	4.75	1.48	1.42
2	A	1403	PLP	C4-C3	4.63	1.47	1.40
2	C	1403	PLP	C3-C2	4.49	1.45	1.40
2	B	1403	PLP	C4-C3	4.48	1.47	1.40
2	D	1403	PLP	C3-C2	3.53	1.44	1.40
2	D	1403	PLP	C4-C5	3.21	1.46	1.42
2	A	1403	PLP	P-O3P	-2.71	1.44	1.54

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1403	PLP	O4A-C4A-C4	-5.46	113.00	124.91
2	C	1403	PLP	O4A-C4A-C4	-5.04	113.92	124.91
2	B	1403	PLP	C4-C3-C2	-5.04	117.07	120.19
2	B	1403	PLP	C6-N1-C2	4.20	126.94	119.17

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	1403	PLP	O4A-C4A-C4	-4.10	115.99	124.91
2	C	1403	PLP	C4-C3-C2	-3.98	117.72	120.19
2	B	1403	PLP	O2P-P-O4P	-3.70	96.87	106.73
2	D	1403	PLP	O3P-P-O4P	-3.57	97.23	106.73
2	C	1403	PLP	C6-N1-C2	3.57	125.78	119.17
2	A	1403	PLP	C6-N1-C2	3.19	125.07	119.17
2	D	1403	PLP	C3-C4-C5	-3.09	115.89	118.26
2	B	1403	PLP	C5-C6-N1	-2.94	118.92	123.82
2	C	1403	PLP	O2P-P-O4P	-2.94	98.92	106.73
2	A	1403	PLP	O4P-C5A-C5	-2.94	103.76	109.35
2	A	1403	PLP	O3P-P-O4P	2.89	114.43	106.73
2	B	1403	PLP	O4P-C5A-C5	-2.85	103.93	109.35
2	A	1403	PLP	C3-C2-N1	-2.73	117.24	120.77
2	D	1403	PLP	O3P-P-O1P	2.72	121.33	110.68
2	C	1403	PLP	C2A-C2-C3	2.46	123.93	120.89
2	D	1403	PLP	C2A-C2-N1	2.35	122.27	117.67
2	D	1403	PLP	C6-N1-C2	2.35	123.52	119.17
2	D	1403	PLP	C2A-C2-C3	-2.28	118.07	120.89
2	B	1403	PLP	O4A-C4A-C4	-2.27	119.95	124.91
2	C	1403	PLP	O3P-P-O2P	2.20	116.06	107.64
2	A	1403	PLP	C2A-C2-N1	2.09	121.75	117.67
2	B	1403	PLP	O3-C3-C2	2.07	122.01	117.49
2	C	1403	PLP	O3P-P-O4P	-2.06	101.24	106.73
2	C	1403	PLP	O2P-P-O1P	2.04	118.69	110.68

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	1403	PLP	C5A-O4P-P-O1P
2	D	1403	PLP	C5A-O4P-P-O2P
2	A	1403	PLP	C3-C4-C4A-O4A
2	B	1403	PLP	C3-C4-C4A-O4A
2	C	1403	PLP	C3-C4-C4A-O4A
2	A	1403	PLP	C5A-O4P-P-O1P
2	D	1403	PLP	C3-C4-C4A-O4A
2	C	1403	PLP	C5-C4-C4A-O4A
2	A	1403	PLP	C5-C4-C4A-O4A
2	B	1403	PLP	C5-C4-C4A-O4A

There are no ring outliers.

No monomer is involved in short contacts.

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

EDS failed to run properly - this section is therefore empty.

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

EDS failed to run properly - this section is therefore empty.

6.3 Carbohydrates

EDS failed to run properly - this section is therefore empty.

6.4 Ligands

EDS failed to run properly - this section is therefore empty.

6.5 Other polymers

EDS failed to run properly - this section is therefore empty.