



Full wwPDB X-ray Structure Validation Report

Feb 28, 2014 – 08:53 PM GMT

PDB ID : 1B7A
Title : STRUCTURE OF THE PHOSPHATIDYLETHANOLAMINE-BINDING
GPROTEIN FROM BOVINE BRAIN
Authors : Serre, L.; Vallee, B.; Bureau, N.; Schoentgen, F.; Zelwer, C.
Deposited on : 1999-01-21
Resolution : 2.25 Å(reported)

This is a full wwPDB validation report for a publicly released PDB entry.
We welcome your comments at validation@mail.wwpdb.org
A user guide is available at <http://wwpdb.org/ValidationPDFNotes.html>

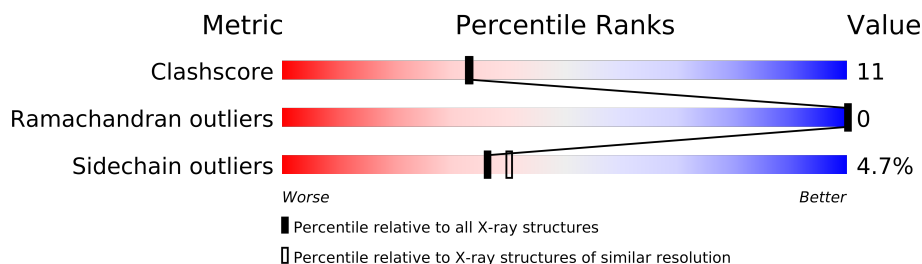
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.15 2013
Xtriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Percentile statistics : 21963
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : stable22683

1 Overall quality at a glance

The reported resolution of this entry is 2.25 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	79885	1326 (2.28-2.24)
Ramachandran outliers	78287	1291 (2.28-2.24)
Sidechain outliers	78261	1291 (2.28-2.24)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	186	
1	B	186	

The following table lists non-polymeric compounds that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Geometry	Electron density
2	OPE	A	1501[A]	X	-

2 Entry composition i

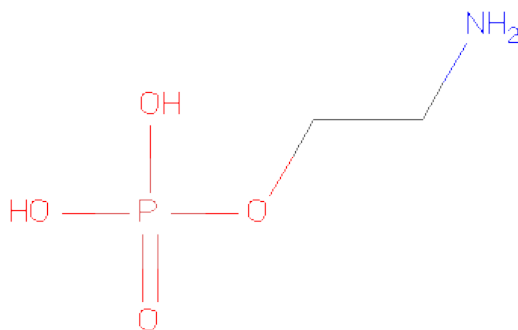
There are 3 unique types of molecules in this entry. The entry contains 3145 atoms, of which 0 are hydrogen and 0 are deuterium.

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 PHOSPHATIDYLETHANOLAMINE-BINDINGPROTEIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	186	Total	C	N	O	S	0	1	0
			1470	936	252	279	3			
1	B	186	Total	C	N	O	S	0	3	0
			1479	940	254	282	3			

- Molecule 2 is PHOSPHORIC ACID MONO-(2-AMINO-ETHYL) ESTER (three-letter code: OPE) (formula: C₂H₈NO₄P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	1
			16	4	2	8	2		
2	B	1	Total	C	N	O	P	0	1
			16	4	2	8	2		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	93	Total 93	O 93	0	0
3	B	71	Total 71	O 71	0	0

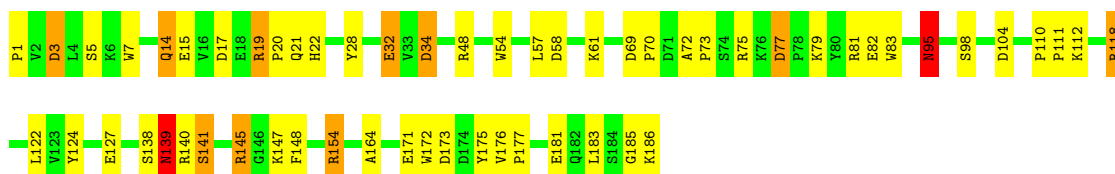
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

Note EDS was not executed.

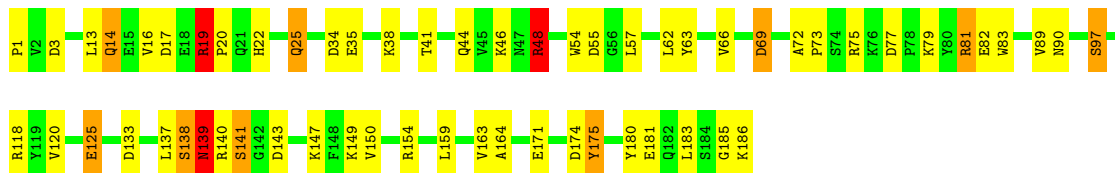
• Molecule 1: PHOSPHATIDYLETHANOLAMINE-BINDINGPROTEIN

Chain A: 



• Molecule 1: PHOSPHATIDYLETHANOLAMINE-BINDINGPROTEIN

Chain B: 



4 Data and refinement statistics

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

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	44.20Å 77.16Å 107.48Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	12.50 – 2.25	Depositor
% Data completeness (in resolution range)	90.0 (12.50-2.25)	Depositor
R_{merge}	0.06	Depositor
R_{sym}	4.90	Depositor
Refinement program	REFMAC	Depositor
R, R_{free}	0.208 , 0.279	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3145	wwPDB-VP
Average B, all atoms (Å ²)	24.0	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: OPE

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	0.74	0/1513	1.83	41/2056 (2.0%)
1	B	0.71	0/1521	1.75	40/2063 (1.9%)
All	All	0.73	0/3034	1.79	81/4119 (2.0%)

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	A	0	1
1	B	0	3
All	All	0	4

There are no bond length outliers.

All (81) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	48	ARG	NE-CZ-NH2	18.78	129.69	120.30
1	B	19	ARG	NE-CZ-NH1	13.83	127.21	120.30
1	A	139	ASN	CB-CA-C	-11.68	87.05	110.40
1	A	75	ARG	NE-CZ-NH2	-11.42	114.59	120.30
1	B	81	ARG	CD-NE-CZ	10.33	138.06	123.60
1	A	98	SER	CA-C-N	10.29	136.78	116.20
1	A	118	ARG	NE-CZ-NH2	-9.73	115.44	120.30
1	B	140	ARG	NE-CZ-NH1	9.71	125.16	120.30
1	A	81	ARG	NE-CZ-NH1	9.45	125.02	120.30
1	B	139	ASN	CB-CA-C	-9.28	91.84	110.40
1	B	77	ASP	CB-CG-OD1	9.25	126.63	118.30
1	A	145	ARG	NE-CZ-NH1	-9.08	115.76	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	118	ARG	NE-CZ-NH1	8.88	124.74	120.30
1	B	175	TYR	CB-CG-CD1	8.64	126.19	121.00
1	B	77	ASP	CB-CG-OD2	-8.58	110.58	118.30
1	B	139	ASN	N-CA-CB	-8.55	95.21	110.60
1	A	48	ARG	NH1-CZ-NH2	-8.22	110.36	119.40
1	B	3	ASP	CB-CG-OD1	8.20	125.68	118.30
1	B	17	ASP	CB-CG-OD1	8.06	125.56	118.30
1	A	98	SER	CA-C-O	-8.04	103.22	120.10
1	A	140	ARG	CD-NE-CZ	7.94	134.71	123.60
1	A	171	GLU	OE1-CD-OE2	-7.76	113.98	123.30
1	A	19	ARG	NE-CZ-NH2	-7.67	116.47	120.30
1	A	185	GLY	C-N-CA	7.64	140.80	121.70
1	A	175	TYR	CB-CG-CD1	7.50	125.50	121.00
1	A	15	GLU	OE1-CD-OE2	-7.48	114.32	123.30
1	B	19	ARG	NH1-CZ-NH2	-7.41	111.25	119.40
1	A	81	ARG	NE-CZ-NH2	-7.38	116.61	120.30
1	B	118	ARG	NE-CZ-NH1	7.27	123.94	120.30
1	A	154	ARG	NE-CZ-NH2	-7.26	116.67	120.30
1	A	173	ASP	CB-CG-OD2	-7.26	111.77	118.30
1	A	139	ASN	N-CA-CB	-7.24	97.56	110.60
1	A	69	ASP	CB-CG-OD2	7.24	124.81	118.30
1	A	186	LYS	N-CA-C	7.19	130.40	111.00
1	B	48	ARG	NE-CZ-NH1	7.10	123.85	120.30
1	B	81	ARG	NE-CZ-NH2	7.03	123.82	120.30
1	A	81	ARG	CD-NE-CZ	6.99	133.38	123.60
1	B	138	SER	C-N-CA	6.67	138.38	121.70
1	A	104	ASP	CB-CG-OD2	6.67	124.30	118.30
1	B	133	ASP	CB-CG-OD1	6.62	124.25	118.30
1	A	95	ASN	CB-CG-OD1	6.54	134.69	121.60
1	B	181	GLU	N-CA-CB	6.53	122.36	110.60
1	B	125	GLU	OE1-CD-OE2	6.52	131.13	123.30
1	B	185[A]	GLY	C-N-CA	6.51	137.97	121.70
1	B	185[B]	GLY	C-N-CA	6.51	137.97	121.70
1	A	173	ASP	CB-CG-OD1	6.32	123.99	118.30
1	A	75	ARG	NH1-CZ-NH2	6.32	126.35	119.40
1	A	122	LEU	CA-CB-CG	6.31	129.82	115.30
1	B	175	TYR	CB-CG-CD2	-6.20	117.28	121.00
1	A	104	ASP	CB-CG-OD1	6.17	123.85	118.30
1	B	55	ASP	CB-CG-OD1	6.09	123.78	118.30
1	A	127	GLU	OE1-CD-OE2	-6.05	116.03	123.30
1	A	185	GLY	CA-C-O	6.04	131.47	120.60
1	A	104	ASP	OD1-CG-OD2	-6.03	111.85	123.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	3	ASP	CB-CG-OD1	5.97	123.68	118.30
1	B	143	ASP	CB-CG-OD2	5.78	123.50	118.30
1	B	17	ASP	OD1-CG-OD2	-5.77	112.34	123.30
1	B	171	GLU	OE1-CD-OE2	-5.71	116.44	123.30
1	B	140	ARG	NE-CZ-NH2	-5.68	117.46	120.30
1	A	77	ASP	CB-CG-OD2	-5.65	113.22	118.30
1	B	19	ARG	CD-NE-CZ	5.59	131.43	123.60
1	B	186[A]	LYS	N-CA-C	5.58	126.06	111.00
1	B	186[B]	LYS	N-CA-C	5.58	126.06	111.00
1	A	175	TYR	CB-CG-CD2	-5.55	117.67	121.00
1	A	28	TYR	CB-CG-CD1	-5.49	117.71	121.00
1	B	69	ASP	CB-CG-OD2	5.49	123.24	118.30
1	B	97	SER	CA-C-N	5.46	129.22	117.20
1	B	174	ASP	CB-CG-OD2	-5.42	113.42	118.30
1	A	28	TYR	CB-CG-CD2	5.39	124.23	121.00
1	B	174	ASP	CB-CG-OD1	5.36	123.12	118.30
1	B	138	SER	CA-C-O	5.29	131.20	120.10
1	A	17	ASP	N-CA-CB	5.21	119.97	110.60
1	A	34	ASP	CB-CG-OD2	5.15	122.94	118.30
1	B	66	VAL	CG1-CB-CG2	-5.13	102.69	110.90
1	A	32	GLU	OE1-CD-OE2	5.13	129.45	123.30
1	B	75	ARG	NE-CZ-NH2	5.12	122.86	120.30
1	A	138	SER	C-N-CA	5.08	134.41	121.70
1	B	143	ASP	OD1-CG-OD2	-5.07	113.67	123.30
1	B	185[A]	GLY	CA-C-O	5.04	129.68	120.60
1	B	185[B]	GLY	CA-C-O	5.04	129.68	120.60
1	B	143	ASP	CB-CG-OD1	5.03	122.83	118.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	139	ASN	Mainchain
1	B	13	LEU	Mainchain
1	B	139	ASN	Mainchain
1	B	83	TRP	Mainchain

5.2 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 hydrogens

added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1470	0	1435	25	0
1	B	1479	0	1436	31	0
2	A	16	0	4	5	0
2	B	16	0	4	7	0
3	A	93	0	0	0	0
3	B	71	0	0	5	0
All	All	3145	0	2879	65	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 11.

All (65) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
2:B:2501[B]:OPE:CB	2:B:2501[B]:OPE:N	1.69	1.56
2:A:1501[A]:OPE:N	2:A:1501[A]:OPE:CB	1.71	1.51
2:A:1501[B]:OPE:N	2:A:1501[B]:OPE:CB	1.69	1.50
2:B:2501[A]:OPE:N	2:B:2501[A]:OPE:CB	1.71	1.50
2:B:2501[A]:OPE:N	2:B:2501[A]:OPE:CA	2.07	1.18
2:A:1501[A]:OPE:CA	2:A:1501[A]:OPE:N	2.05	1.17
2:B:2501[B]:OPE:CA	2:B:2501[B]:OPE:N	2.10	1.12
2:A:1501[B]:OPE:N	2:A:1501[B]:OPE:CA	2.12	1.11
1:A:14:GLN:H	1:A:14:GLN:HE21	1.14	0.96
1:A:58:ASP:HB3	1:A:61:LYS:HD2	1.61	0.83
1:B:14:GLN:H	1:B:14:GLN:HE21	1.30	0.80
1:B:19:ARG:NH1	1:B:20:PRO:O	2.19	0.75
1:B:19:ARG:HG2	1:B:19:ARG:HH11	1.54	0.72
1:A:14:GLN:H	1:A:14:GLN:NE2	1.88	0.70
1:B:16:VAL:HG21	1:B:120:VAL:HG21	1.74	0.70
1:B:73:PRO:HA	2:B:2501[B]:OPE:CB	2.31	0.61
1:A:14:GLN:N	1:A:14:GLN:HE21	1.92	0.61
1:B:35:GLU:HG2	3:B:2569:HOH:O	2.02	0.58
1:A:54:TRP:CH2	1:A:57:LEU:HD13	2.39	0.57
1:B:141:SER:HA	1:B:183:LEU:O	2.06	0.55
1:A:124:TYR:CE2	1:A:154:ARG:HG2	2.41	0.55
1:A:3:ASP:OD1	1:A:5:SER:OG	2.25	0.55
1:B:25:GLN:HA	1:B:25:GLN:HE21	1.73	0.53
1:B:22:HIS:O	1:B:164:ALA:HA	2.07	0.53
2:B:2501[A]:OPE:N	2:B:2501[A]:OPE:O4	2.42	0.52

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:B:48:ARG:HG2	3:B:2536:HOH:O	2.09	0.52
1:A:58:ASP:CB	1:A:61:LYS:HD2	2.37	0.50
1:B:41:THR:OG1	1:B:44:GLN:HG3	2.11	0.50
1:B:34:ASP:OD1	1:B:38:LYS:HD2	2.12	0.49
1:A:95:ASN:HD22	1:A:95:ASN:C	2.16	0.49
1:A:82:GLU:HB2	1:A:148:PHE:O	2.12	0.48
1:A:141:SER:HA	1:A:183:LEU:O	2.12	0.48
1:B:1:PRO:HD2	3:B:2569:HOH:O	2.13	0.48
1:A:112:LYS:HB2	1:A:172:TRP:CD1	2.49	0.48
1:B:1:PRO:N	1:B:34:ASP:O	2.47	0.47
1:B:19:ARG:NH1	1:B:19:ARG:HG2	2.24	0.46
1:A:181:GLU:HG3	1:B:180:TYR:CE2	2.51	0.46
1:B:72:ALA:HA	1:B:73:PRO:HA	1.70	0.45
1:A:7:TRP:CE2	1:A:20:PRO:HD3	2.52	0.44
1:B:137:LEU:HB3	3:B:2556:HOH:O	2.17	0.44
1:B:73:PRO:HD3	1:B:79:LYS:HG2	1.98	0.44
1:A:72:ALA:HA	1:A:73:PRO:HA	1.79	0.44
1:B:154:ARG:HA	1:B:159:LEU:HD12	2.00	0.43
1:B:62:LEU:HB3	1:B:90:ASN:HA	2.00	0.43
1:A:83:TRP:CH2	1:A:145:ARG:HG3	2.54	0.43
1:A:5:SER:HA	1:A:19:ARG:NH2	2.34	0.43
1:B:63:TYR:CE1	1:B:125:GLU:HG3	2.53	0.43
1:B:149:LYS:O	1:B:150:VAL:C	2.57	0.42
1:A:176:VAL:HB	1:A:177:PRO:HD3	2.00	0.42
1:B:138:SER:HB2	3:B:2558:HOH:O	2.20	0.42
1:A:73:PRO:HD2	1:A:77:ASP:O	2.19	0.42
1:A:110:PRO:HA	1:A:111:PRO:HD3	1.87	0.42
1:A:124:TYR:CZ	1:A:154:ARG:HG2	2.55	0.42
2:A:1501[A]:OPE:CA	2:A:1501[A]:OPE:HN1	2.19	0.41
1:A:70:PRO:HD2	1:A:118:ARG:O	2.21	0.41
1:B:54:TRP:CH2	1:B:57:LEU:HD13	2.56	0.41
1:A:73:PRO:HD2	1:A:79:LYS:HG2	2.03	0.41
1:B:89:VAL:O	1:B:90:ASN:HB2	2.21	0.41
1:A:22:HIS:O	1:A:164:ALA:HA	2.21	0.41
1:B:81:ARG:HA	1:B:82:GLU:HA	1.72	0.41
1:B:69:ASP:OD2	2:B:2501[A]:OPE:O3	2.39	0.40
1:A:1:PRO:N	1:A:34:ASP:O	2.53	0.40
1:B:46:LYS:HB2	1:B:175:TYR:CZ	2.56	0.40

There are no symmetry-related clashes.

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	184/186 (99%)	180 (98%)	4 (2%)	0	100	100
1	B	185/186 (100%)	176 (95%)	9 (5%)	0	100	100
All	All	369/372 (99%)	356 (96%)	13 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	161/162 (99%)	154 (96%)	7 (4%)	40	45
1	B	161/162 (99%)	153 (95%)	8 (5%)	34	36
All	All	322/324 (99%)	307 (95%)	15 (5%)	36	40

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	14	GLN
1	A	21	GLN
1	A	32	GLU
1	A	95	ASN
1	A	139	ASN
1	A	141	SER
1	A	147	LYS
1	B	14	GLN
1	B	19	ARG
1	B	25	GLN
1	B	48	ARG

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Mol	Chain	Res	Type
1	B	139	ASN
1	B	141	SER
1	B	147	LYS
1	B	163	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	14	GLN
1	A	95	ASN
1	A	139	ASN
1	B	14	GLN
1	B	25	GLN
1	B	139	ASN

5.3.3 RNA ⓘ

There are no RNA chains 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 carbohydrates in this entry.

5.6 Ligand geometry ⓘ

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	OPE	A	1501[A]	-	7,7,7	4.80	4 (57%)	9,9,9	2.96	6 (66%)
2	OPE	A	1501[B]	-	7,7,7	4.75	3 (42%)	9,9,9	4.99	2 (22%)
2	OPE	B	2501[A]	-	7,7,7	4.70	3 (42%)	9,9,9	2.82	3 (33%)
2	OPE	B	2501[B]	-	7,7,7	4.76	4 (57%)	9,9,9	4.32	2 (22%)

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	OPE	A	1501[A]	-	-	0/5/5/5	0/0/0/0
2	OPE	A	1501[B]	-	-	0/5/5/5	0/0/0/0
2	OPE	B	2501[A]	-	-	0/5/5/5	0/0/0/0
2	OPE	B	2501[B]	-	-	0/5/5/5	0/0/0/0

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1501[B]	OPE	CB-CA	-11.04	1.07	1.49
2	B	2501[B]	OPE	CB-CA	-10.91	1.07	1.49
2	A	1501[A]	OPE	CB-CA	-10.73	1.08	1.49
2	B	2501[A]	OPE	CB-CA	-10.59	1.08	1.49
2	B	2501[A]	OPE	P-O3	5.17	1.68	1.51
2	B	2501[B]	OPE	P-O3	5.04	1.68	1.51
2	A	1501[A]	OPE	P-O3	5.01	1.68	1.51
2	A	1501[B]	OPE	P-O3	4.84	1.67	1.51
2	B	2501[A]	OPE	CB-N	2.90	1.71	1.45
2	A	1501[A]	OPE	CB-N	2.90	1.71	1.45
2	A	1501[B]	OPE	CB-N	2.73	1.69	1.45
2	B	2501[B]	OPE	CB-N	2.68	1.69	1.45
2	A	1501[A]	OPE	P-O1	-2.42	1.45	1.54
2	B	2501[B]	OPE	P-O2	-2.07	1.47	1.54

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1501[B]	OPE	P-O4-CA	12.41	154.08	118.19
2	B	2501[B]	OPE	P-O4-CA	11.76	152.20	118.19
2	A	1501[B]	OPE	O4-CA-CB	8.03	141.43	108.95
2	B	2501[A]	OPE	P-O4-CA	5.84	135.08	118.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1501[A]	OPE	O4-CA-CB	5.82	132.49	108.95
2	B	2501[A]	OPE	O4-CA-CB	4.92	128.84	108.95
2	A	1501[A]	OPE	P-O4-CA	4.79	132.05	118.19
2	B	2501[B]	OPE	O4-CA-CB	4.76	128.18	108.95
2	A	1501[A]	OPE	O2-P-O4	-2.56	99.58	106.65
2	A	1501[A]	OPE	CA-CB-N	-2.41	91.57	114.75
2	B	2501[A]	OPE	CA-CB-N	-2.28	92.79	114.75
2	A	1501[A]	OPE	O2-P-O1	2.13	115.92	107.61
2	A	1501[A]	OPE	O1-P-O4	2.13	112.53	106.65

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

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 will therefore be empty.

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

EDS was not executed - this section will therefore be empty.

6.3 Carbohydrates ⓘ

EDS was not executed - this section will therefore be empty.

6.4 Ligands ⓘ

EDS was not executed - this section will therefore be empty.

6.5 Other polymers ⓘ

EDS was not executed - this section will therefore be empty.