



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 08:51 PM UTC

PDB ID : 5EDK / pdb_00005edk
Title : Crystal structure of prothrombin deletion mutant residues 146-167 (Form II).
Authors : Pozzi, N.; Chen, Z.; Di Cera, E.
Deposited on : 2015-10-21
Resolution : 3.21 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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

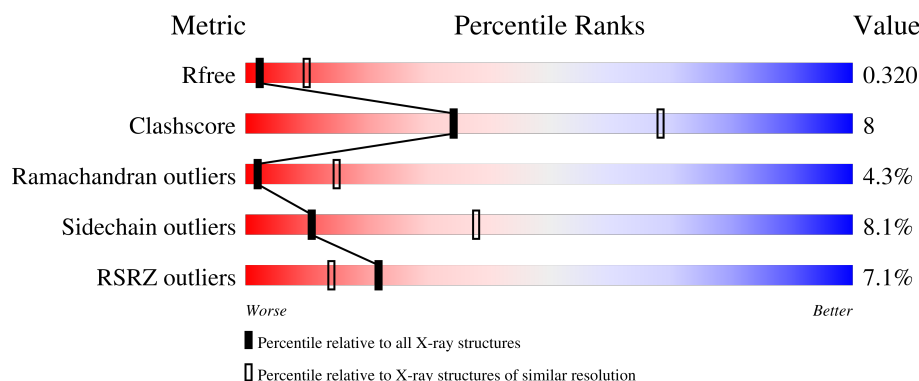
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

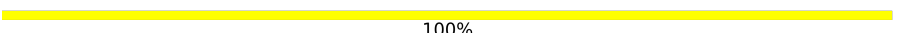
The reported resolution of this entry is 3.21 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	1768 (3.24-3.20)
Clashscore	190562	1879 (3.24-3.20)
Ramachandran outliers	187476	1844 (3.24-3.20)
Sidechain outliers	187428	1843 (3.24-3.20)
RSRZ outliers	180081	1768 (3.24-3.20)

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 $\leq 5\%$. 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	560	 7% 68% 23% • 6%
2	B	2	 100%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 4301 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 Prothrombin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	528	Total	C	N	O	S	0	0	0
			4241	2647	737	825	32			

There are 26 discrepancies between the modelled and reference sequences:

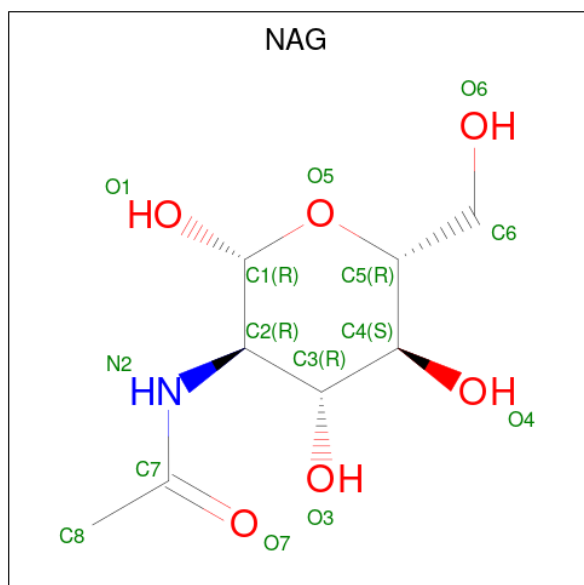
Chain	Residue	Modelled	Actual	Comment	Reference
A	122	MET	THR	variant	UNP P00734
A	?	-	ASP	deletion	UNP P00734
A	?	-	GLN	deletion	UNP P00734
A	?	-	VAL	deletion	UNP P00734
A	?	-	THR	deletion	UNP P00734
A	?	-	VAL	deletion	UNP P00734
A	?	-	ALA	deletion	UNP P00734
A	?	-	MET	deletion	UNP P00734
A	?	-	THR	deletion	UNP P00734
A	?	-	PRO	deletion	UNP P00734
A	?	-	ARG	deletion	UNP P00734
A	?	-	SER	deletion	UNP P00734
A	?	-	GLU	deletion	UNP P00734
A	?	-	GLY	deletion	UNP P00734
A	?	-	SER	deletion	UNP P00734
A	?	-	SER	deletion	UNP P00734
A	?	-	VAL	deletion	UNP P00734
A	?	-	ASN	deletion	UNP P00734
A	?	-	LEU	deletion	UNP P00734
A	?	-	SER	deletion	UNP P00734
A	?	-	PRO	deletion	UNP P00734
A	?	-	PRO	deletion	UNP P00734
A	?	-	LEU	deletion	UNP P00734
A	558	TYR	-	expression tag	UNP P00734
A	559	LEU	-	expression tag	UNP P00734
A	560	GLU	-	expression tag	UNP P00734

- Molecule 2 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	B	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		

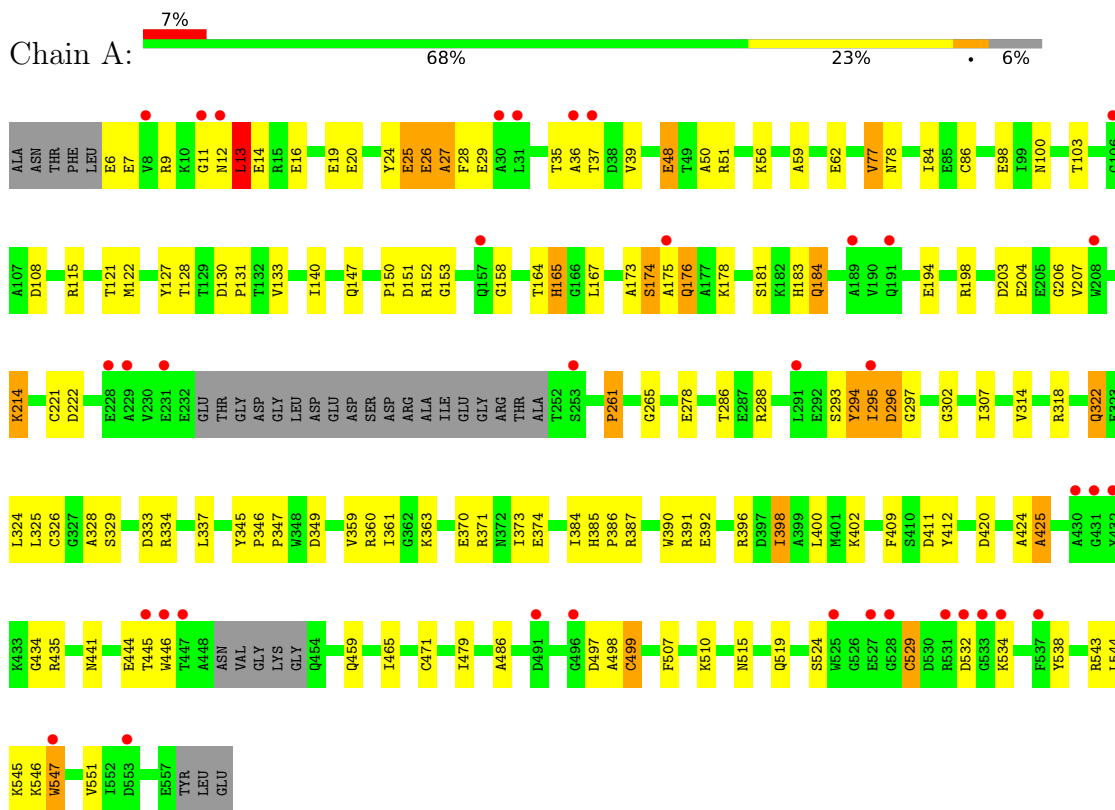
- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	4	Total	Mg	0	0
			4	4		

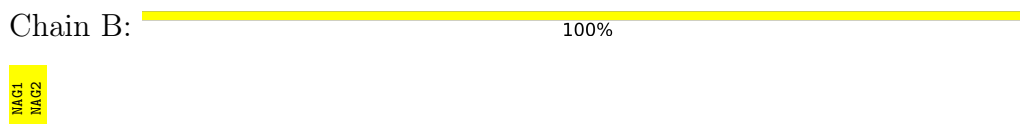
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Prothrombin



- Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α , β , γ	84.19Å 84.19Å 346.43Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	86.61 – 3.21 86.61 – 3.21	Depositor EDS
% Data completeness (in resolution range)	92.2 (86.61-3.21) 92.2 (86.61-3.21)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.16 (at 3.25Å)	Xtriage
Refinement program	REFMAC 5.8.0073	Depositor
R, R_{free}	0.291 , 0.323 0.292 , 0.320	Depositor DCC
R_{free} test set	1009 reflections (4.73%)	wwPDB-VP
Wilson B-factor (Å ²)	79.5	Xtriage
Anisotropy	0.093	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 44.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.36$, $\langle L^2 \rangle = 0.19$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.84	EDS
Total number of atoms	4301	wwPDB-VP
Average B, all atoms (Å ²)	87.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.55% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: CGU, NAG, MG

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	0.52	2/4218 (0.0%)	0.81	1/5704 (0.0%)

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	3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	165	HIS	C-N	-6.74	1.25	1.33
1	A	127	TYR	C-N	5.70	1.41	1.33

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	346	PRO	N-CA-C	5.10	116.92	110.70

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	12	ASN	Peptide
1	A	24	TYR	Peptide
1	A	532	ASP	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	4241	0	3982	63	0
2	B	28	0	25	0	0
3	A	28	0	26	0	0
4	A	4	0	0	0	0
All	All	4301	0	4033	63	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 8.

All (63) 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:314:VAL:HB	1:A:328:ALA:HB3	1.70	0.72
1:A:25:CGU:O	1:A:27:ALA:N	2.24	0.71
1:A:203:ASP:HA	1:A:546:LYS:HG3	1.75	0.69
1:A:293:SER:O	1:A:295:ILE:N	2.27	0.67
1:A:78:ASN:O	1:A:86:CYS:SG	2.54	0.66
1:A:445:THR:HG1	1:A:446:TRP:CD1	2.17	0.62
1:A:13:LEU:O	1:A:14:CGU:C	2.48	0.59
1:A:337:LEU:HD12	1:A:519:GLN:HE22	1.68	0.57
1:A:84:ILE:HG21	1:A:128:THR:HB	1.87	0.56
1:A:360:ARG:HD3	1:A:363:LYS:HD2	1.87	0.56
1:A:48:GLU:O	1:A:51:ARG:HG2	2.05	0.56
1:A:165:HIS:NE2	1:A:386:PRO:O	2.40	0.55
1:A:35:THR:O	1:A:39:VAL:HG13	2.08	0.54
1:A:302:GLY:O	1:A:459:GLN:NE2	2.41	0.53
1:A:324:LEU:HD23	1:A:324:LEU:C	2.34	0.53
1:A:547:TRP:O	1:A:551:VAL:HG23	2.09	0.53
1:A:26:CGU:C	1:A:28:PHE:H	2.21	0.53
1:A:486:ALA:HB3	1:A:538:TYR:HE2	1.74	0.52
1:A:36:ALA:HA	1:A:39:VAL:HG22	1.93	0.51
1:A:386:PRO:HD3	1:A:547:TRP:CZ3	2.45	0.51
1:A:544:LEU:O	1:A:546:LYS:N	2.45	0.50
1:A:77:VAL:HG11	1:A:140:ILE:HD11	1.94	0.49
1:A:510:LYS:NZ	1:A:515:ASN:OD1	2.44	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:360:ARG:HD3	1:A:374:GLU:OE1	2.12	0.49
1:A:424:ALA:O	1:A:425:ALA:HB3	2.12	0.49
1:A:128:THR:OG1	1:A:133:VAL:O	2.28	0.49
1:A:324:LEU:HD23	1:A:325:LEU:N	2.29	0.47
1:A:174:SER:O	1:A:176:GLN:N	2.48	0.46
1:A:295:ILE:O	1:A:297:GLY:N	2.49	0.46
1:A:398:ILE:HD13	1:A:544:LEU:HD21	1.97	0.46
1:A:390:TRP:CZ3	1:A:391:ARG:HG2	2.50	0.45
1:A:100:ASN:OD1	1:A:103:THR:HG23	2.16	0.45
1:A:158:GLY:O	1:A:198:ARG:NH2	2.42	0.45
1:A:204:GLU:O	1:A:543:ARG:HD3	2.16	0.45
1:A:294:TYR:O	1:A:296:ASP:N	2.49	0.45
1:A:337:LEU:CD1	1:A:519:GLN:HE22	2.29	0.45
1:A:183:HIS:O	1:A:184:GLN:CB	2.64	0.45
1:A:214:LYS:HE3	1:A:214:LYS:HA	1.99	0.45
1:A:293:SER:O	1:A:294:TYR:C	2.60	0.45
1:A:373:ILE:HG23	1:A:412:TYR:CD2	2.52	0.45
1:A:322:GLN:HE21	1:A:322:GLN:HA	1.82	0.44
1:A:26:CGU:C	1:A:28:PHE:N	2.80	0.44
1:A:445:THR:C	1:A:446:TRP:CD1	2.95	0.44
1:A:173:ALA:HA	1:A:178:LYS:HB3	1.99	0.44
1:A:153:GLY:HA3	1:A:207:VAL:HG13	2.00	0.44
1:A:434:GLY:HA3	1:A:507:PHE:CZ	2.52	0.44
1:A:345:TYR:CZ	1:A:347:PRO:HG2	2.52	0.43
1:A:390:TRP:CH2	1:A:391:ARG:HG2	2.53	0.43
1:A:441:ASN:O	1:A:441:ASN:ND2	2.51	0.43
1:A:360:ARG:CD	1:A:363:LYS:HD2	2.49	0.43
1:A:387:ARG:HB3	1:A:396:ARG:HG3	2.00	0.43
1:A:108:ASP:O	1:A:115:ARG:NE	2.52	0.42
1:A:384:ILE:O	1:A:385:HIS:C	2.62	0.42
1:A:164:THR:HG22	1:A:222:ASP:HB2	2.01	0.42
1:A:329:SER:OG	1:A:337:LEU:HB2	2.20	0.41
1:A:50:ALA:HB1	1:A:56:LYS:HG2	2.03	0.41
1:A:152:ARG:O	1:A:206:GLY:HA2	2.20	0.41
1:A:59:ALA:O	1:A:62:GLU:O	2.38	0.41
1:A:333:ASP:HB3	1:A:409:PHE:CZ	2.56	0.41
1:A:286:THR:HG23	1:A:435:ARG:NH2	2.36	0.40
1:A:498:ALA:O	1:A:499:CYS:HB2	2.21	0.40
1:A:261:PRO:O	1:A:265:GLY:N	2.52	0.40
1:A:130:ASP:HA	1:A:131:PRO:HD3	1.96	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	513/560 (92%)	417 (81%)	74 (14%)	22 (4%)	2	15

All (22) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	13	LEU
1	A	184	GLN
1	A	294	TYR
1	A	295	ILE
1	A	296	ASP
1	A	529	CYS
1	A	545	LYS
1	A	11	GLY
1	A	174	SER
1	A	534	LYS
1	A	9	ARG
1	A	147	GLN
1	A	181	SER
1	A	425	ALA
1	A	27	ALA
1	A	392	GLU
1	A	175	ALA
1	A	194	GLU
1	A	499	CYS
1	A	48	GLU
1	A	150	PRO
1	A	261	PRO

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	444/469 (95%)	408 (92%)	36 (8%)	11	38

All (36) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	13	LEU
1	A	37	THR
1	A	77	VAL
1	A	98	GLU
1	A	121	THR
1	A	122	MET
1	A	151	ASP
1	A	167	LEU
1	A	176	GLN
1	A	214	LYS
1	A	221	CYS
1	A	278	GLU
1	A	288	ARG
1	A	307	ILE
1	A	318	ARG
1	A	322	GLN
1	A	326	CYS
1	A	334	ARG
1	A	349	ASP
1	A	359	VAL
1	A	361	ILE
1	A	370	GLU
1	A	371	ARG
1	A	398	ILE
1	A	400	LEU
1	A	402	LYS
1	A	411	ASP
1	A	420	ASP
1	A	444	GLU
1	A	465	ILE
1	A	471	CYS
1	A	479	ILE
1	A	497	ASP
1	A	524	SER
1	A	529	CYS

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Mol	Chain	Res	Type
1	A	547	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	87	GLN
1	A	95	HIS
1	A	154	GLN
1	A	184	GLN
1	A	260	ASN
1	A	322	GLN
1	A	389	ASN
1	A	414	HIS
1	A	429	GLN
1	A	459	GLN
1	A	519	GLN
1	A	549	GLN
1	A	554	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

10 non-standard protein/DNA/RNA residues 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	$\# Z > 2$
1	CGU	A	25	1,4	9,11,12	1.11	0	10,14,16	1.60	3 (30%)
1	CGU	A	29	1,4	9,11,12	1.06	0	10,14,16	1.41	1 (10%)
1	CGU	A	7	1	9,11,12	1.03	0	10,14,16	1.09	1 (10%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	CGU	A	16	1,4	9,11,12	1.07	0	10,14,16	1.04	1 (10%)
1	CGU	A	14	1	9,11,12	1.06	0	10,14,16	0.79	0
1	CGU	A	6	1	9,11,12	1.15	0	10,14,16	1.09	1 (10%)
1	CGU	A	32	1	9,11,12	1.05	0	10,14,16	0.97	0
1	CGU	A	20	1,4	9,11,12	1.23	0	10,14,16	1.13	2 (20%)
1	CGU	A	26	1,4	9,11,12	1.19	0	10,14,16	1.05	1 (10%)
1	CGU	A	19	1,4	9,11,12	1.07	0	10,14,16	1.16	1 (10%)

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
1	CGU	A	25	1,4	-	2/13/14/16	-
1	CGU	A	29	1,4	-	4/13/14/16	-
1	CGU	A	7	1	-	3/13/14/16	-
1	CGU	A	16	1,4	-	5/13/14/16	-
1	CGU	A	14	1	-	1/13/14/16	-
1	CGU	A	6	1	-	3/13/14/16	-
1	CGU	A	32	1	-	4/13/14/16	-
1	CGU	A	20	1,4	-	2/13/14/16	-
1	CGU	A	26	1,4	-	4/13/14/16	-
1	CGU	A	19	1,4	-	1/13/14/16	-

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	25	CGU	CB-CA-C	3.76	116.78	110.99
1	A	29	CGU	CB-CA-N	3.66	118.48	110.48
1	A	19	CGU	CB-CA-N	2.64	116.25	110.48
1	A	16	CGU	CB-CG-CD1	-2.49	108.06	113.11
1	A	20	CGU	CB-CG-CD1	-2.29	108.46	113.11
1	A	25	CGU	CB-CA-N	2.22	115.34	110.48
1	A	6	CGU	CB-CG-CD2	-2.20	108.64	113.11
1	A	26	CGU	CB-CG-CD2	-2.19	108.66	113.11
1	A	20	CGU	CB-CG-CD2	-2.13	108.78	113.11
1	A	25	CGU	CB-CG-CD1	-2.12	108.81	113.11

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	7	CGU	CB-CG-CD2	-2.03	108.98	113.11

There are no chirality outliers.

All (29) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	6	CGU	N-CA-CB-CG
1	A	6	CGU	C-CA-CB-CG
1	A	7	CGU	N-CA-CB-CG
1	A	7	CGU	C-CA-CB-CG
1	A	14	CGU	C-CA-CB-CG
1	A	16	CGU	N-CA-CB-CG
1	A	16	CGU	CA-CB-CG-CD2
1	A	20	CGU	N-CA-CB-CG
1	A	20	CGU	C-CA-CB-CG
1	A	25	CGU	O-C-CA-CB
1	A	26	CGU	N-CA-CB-CG
1	A	26	CGU	C-CA-CB-CG
1	A	29	CGU	N-CA-CB-CG
1	A	32	CGU	CA-CB-CG-CD1
1	A	32	CGU	CA-CB-CG-CD2
1	A	16	CGU	OE11-CD1-CG-CB
1	A	16	CGU	OE12-CD1-CG-CB
1	A	29	CGU	OE21-CD2-CG-CB
1	A	32	CGU	OE21-CD2-CG-CB
1	A	32	CGU	OE22-CD2-CG-CB
1	A	26	CGU	OE11-CD1-CG-CD2
1	A	26	CGU	OE12-CD1-CG-CD2
1	A	16	CGU	C-CA-CB-CG
1	A	6	CGU	OE12-CD1-CG-CB
1	A	7	CGU	OE12-CD1-CG-CB
1	A	29	CGU	OE22-CD2-CG-CB
1	A	19	CGU	OE12-CD1-CG-CD2
1	A	25	CGU	OE11-CD1-CG-CD2
1	A	29	CGU	OE21-CD2-CG-CD1

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	25	CGU	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	14	CGU	1	0
1	A	26	CGU	2	0

5.5 Carbohydrates

2 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	NAG	B	1	1,2	14,14,15	0.59	0	17,19,21	1.11	1 (5%)
2	NAG	B	2	2	14,14,15	0.48	0	17,19,21	1.22	3 (17%)

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	NAG	B	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	B	2	2	-	4/6/23/26	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(°)	Ideal(°)
2	B	1	NAG	C4-C3-C2	2.80	115.12	111.02
2	B	2	NAG	C8-C7-N2	2.46	120.19	116.12
2	B	2	NAG	O5-C1-C2	-2.09	108.06	111.29
2	B	2	NAG	O7-C7-C8	-2.03	118.44	122.05

There are no chirality outliers.

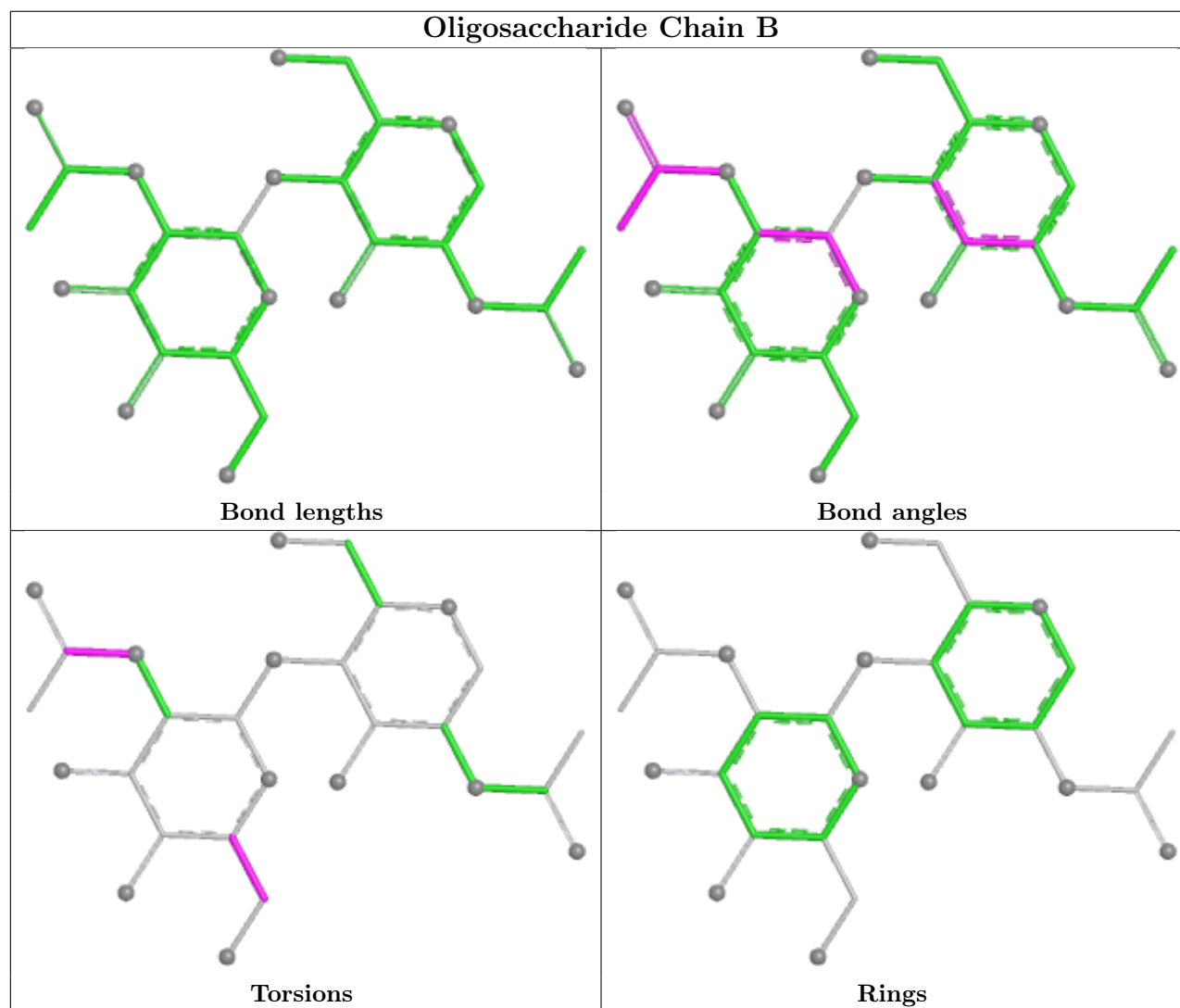
All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	2	NAG	C8-C7-N2-C2
2	B	2	NAG	O7-C7-N2-C2
2	B	2	NAG	O5-C5-C6-O6
2	B	2	NAG	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

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



5.6 Ligand geometry [i](#)

Of 6 ligands modelled in this entry, 4 are monoatomic - leaving 2 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	$\# Z > 2$
3	NAG	A	604	1	14,14,15	0.52	0	17,19,21	1.35	2 (11%)
3	NAG	A	601	1	14,14,15	0.56	0	17,19,21	1.35	2 (11%)

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	NAG	A	604	1	-	2/6/23/26	0/1/1/1
3	NAG	A	601	1	-	1/6/23/26	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(°)	Ideal(°)
3	A	604	NAG	O5-C1-C2	-4.30	104.63	111.29
3	A	601	NAG	C4-C3-C2	3.39	115.98	111.02
3	A	601	NAG	C3-C4-C5	2.95	115.58	110.23
3	A	604	NAG	O7-C7-C8	-2.24	118.07	122.05

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	604	NAG	O5-C5-C6-O6
3	A	604	NAG	C4-C5-C6-O6
3	A	601	NAG	C4-C5-C6-O6

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 ⓘ

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	518/560 (92%)	0.67	37 (7%) 22 14	50, 83, 129, 157	0

All (37) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	528	GLY	5.0
1	A	445	THR	4.6
1	A	229	ALA	4.2
1	A	446	TRP	4.1
1	A	231	GLU	4.0
1	A	31	LEU	3.9
1	A	228	GLU	3.7
1	A	291	LEU	3.7
1	A	30	ALA	3.4
1	A	553	ASP	3.3
1	A	533	GLY	3.3
1	A	547	TRP	3.2
1	A	491	ASP	3.1
1	A	537	PHE	3.1
1	A	253	SER	3.0
1	A	37	THR	2.9
1	A	532	ASP	2.9
1	A	534	LYS	2.8
1	A	106	GLY	2.8
1	A	525	TRP	2.7
1	A	527	GLU	2.7
1	A	157	GLN	2.7
1	A	8	VAL	2.6
1	A	431	GLY	2.6
1	A	432	TYR	2.5
1	A	295	ILE	2.4
1	A	175	ALA	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	208	TRP	2.3
1	A	11	GLY	2.3
1	A	191	GLN	2.3
1	A	189	ALA	2.3
1	A	531	ARG	2.3
1	A	36	ALA	2.2
1	A	496	GLY	2.1
1	A	447	THR	2.1
1	A	430	ALA	2.1
1	A	12	ASN	2.1

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

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.

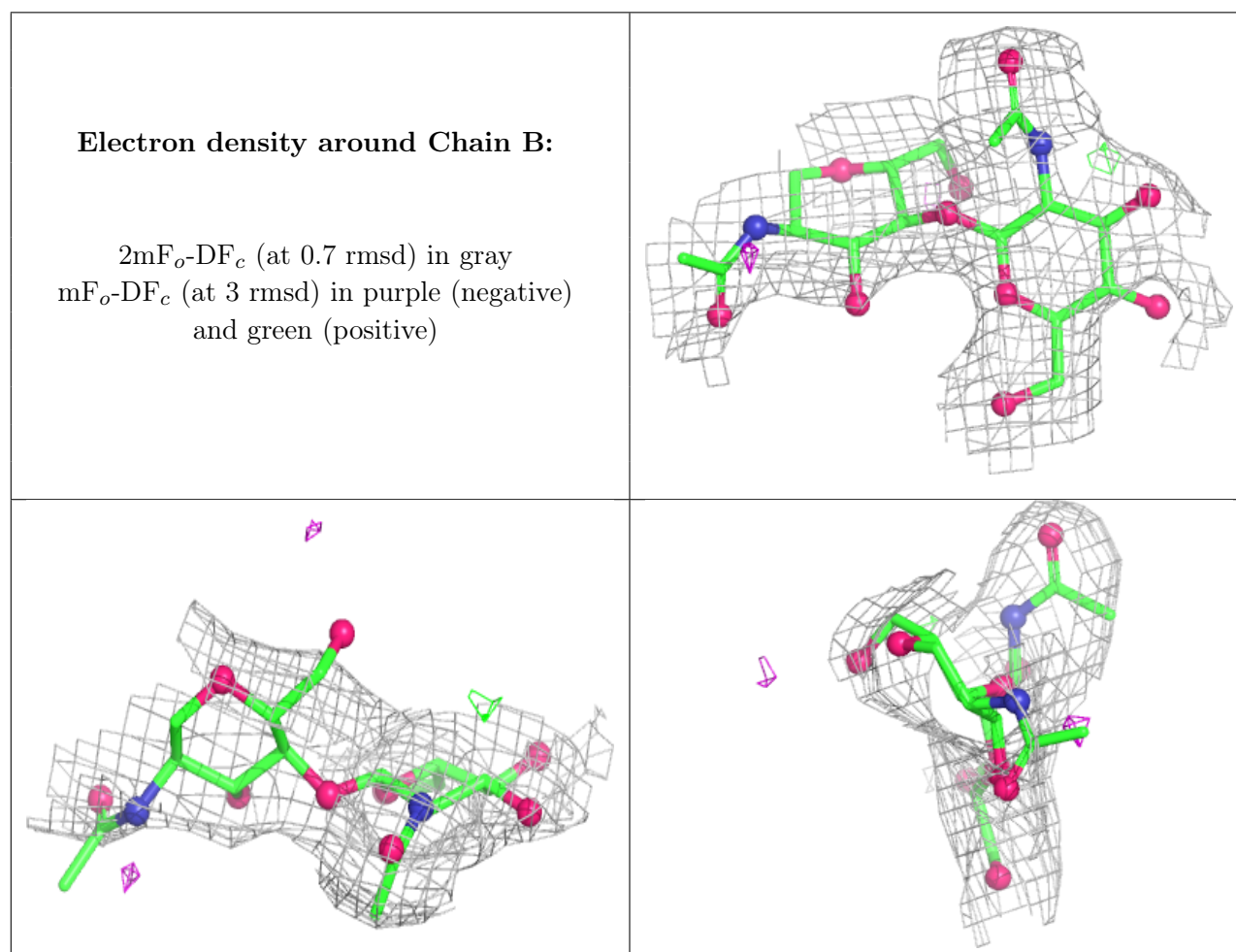
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
1	CGU	A	7	12/13	0.56	0.12	103,109,114,119	0
1	CGU	A	32	12/13	0.61	0.19	123,128,131,134	0
1	CGU	A	29	12/13	0.79	0.13	104,110,125,125	0
1	CGU	A	25	12/13	0.82	0.13	92,100,106,109	0
1	CGU	A	16	12/13	0.84	0.10	71,79,83,87	0
1	CGU	A	26	12/13	0.84	0.12	83,95,102,103	0
1	CGU	A	14	12/13	0.87	0.11	62,72,79,80	0
1	CGU	A	6	12/13	0.88	0.13	78,91,95,96	0
1	CGU	A	20	12/13	0.92	0.15	68,81,87,90	0
1	CGU	A	19	12/13	0.93	0.09	50,54,65,66	0

6.3 Carbohydrates ⓘ

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	NAG	B	2	14/15	0.64	0.15	114,126,129,133	0
2	NAG	B	1	14/15	0.92	0.19	107,116,121,124	0

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.



6.4 Ligands [i](#)

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($\text{\AA}^2$)	Q<0.9
3	NAG	A	601	14/15	0.79	0.11	75,82,87,87	0
4	MG	A	607	1/1	0.86	0.07	74,74,74,74	0
3	NAG	A	604	14/15	0.90	0.11	61,67,70,70	0
4	MG	A	606	1/1	0.92	0.18	77,77,77,77	0
4	MG	A	608	1/1	0.95	0.08	51,51,51,51	0
4	MG	A	605	1/1	0.98	0.06	35,35,35,35	0

6.5 Other polymers [i](#)

There are no such residues in this entry.