WORLDWIDE wwPDB PROTEIN DATA BANK

wwPDB EM Validation Summary Report ⓘ

Apr 5, 2025 – 01:12 PM EDT

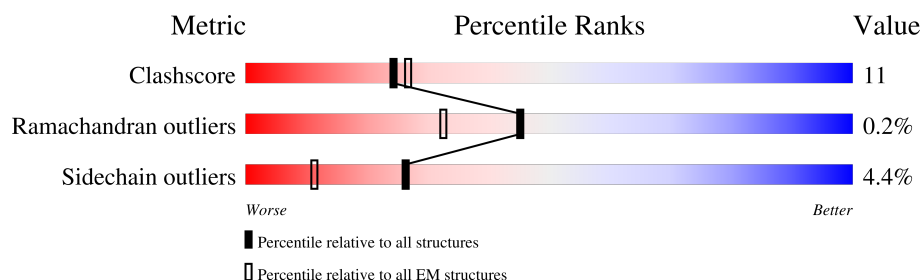|		
PDB ID	:	9D3B / pdb_00009d3b
EMDB ID	:	EMD-46530
Title	:	Gly-,Glu-,(S)-DQP-997-74 bound GluN1a-2B-2D NMDAR
Authors	:	Hyunook, K.; Hiro, F.
Deposited on	:	2024-08-09
Resolution	:	3.71 Å(reported)
Based on initial models	:	8e96, 7saa

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.71 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		11
Ramachandran outliers		0.2%
Sidechain outliers		4.4%

Worse — *Better*

▮ Percentile relative to all structures
▯ Percentile relative to all EM structures

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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%

Mol	Chain	Length	Quality of chain
1	A	825	68% 24% · 6%
1	C	825	71% 24% · ·
2	B	884	66% 19% · 14%
3	D	861	65% 21% · 13%
4	E	2	50% 50%

2 Entry composition ⓘ

There are 8 unique types of molecules in this entry. The entry contains 23783 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Glutamate receptor ionotropic, NMDA 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	773	Total 5993	C 3815	N 1039	O 1107	S 32	0	0
1	C	793	Total 6181	C 3945	N 1054	O 1148	S 34	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	844	ASN	ARG	engineered mutation	UNP Q05586
A	845	GLY	ARG	engineered mutation	UNP Q05586
A	846	ALA	LYS	engineered mutation	UNP Q05586
C	844	ASN	ARG	engineered mutation	UNP Q05586
C	845	GLY	ARG	engineered mutation	UNP Q05586
C	846	ALA	LYS	engineered mutation	UNP Q05586

- Molecule 2 is a protein called Glutamate receptor ionotropic, NMDA 2B.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	762	Total 5758	C 3719	N 932	O 1071	S 36	0	0

There are 61 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-8	TRP	-	expression tag	UNP Q13224
B	-7	SER	-	expression tag	UNP Q13224
B	-6	HIS	-	expression tag	UNP Q13224
B	-5	PRO	-	expression tag	UNP Q13224
B	-4	GLN	-	expression tag	UNP Q13224
B	-3	PHE	-	expression tag	UNP Q13224
B	-2	GLU	-	expression tag	UNP Q13224
B	-1	LYS	-	expression tag	UNP Q13224
B	0	GLY	-	expression tag	UNP Q13224

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1	GLY	-	expression tag	UNP Q13224
B	2	GLY	-	expression tag	UNP Q13224
B	3	SER	-	expression tag	UNP Q13224
B	4	GLY	-	expression tag	UNP Q13224
B	5	GLY	-	expression tag	UNP Q13224
B	6	GLY	-	expression tag	UNP Q13224
B	7	SER	-	expression tag	UNP Q13224
B	8	GLY	-	expression tag	UNP Q13224
B	9	GLY	-	expression tag	UNP Q13224
B	10	SER	-	expression tag	UNP Q13224
B	11	ALA	-	expression tag	UNP Q13224
B	12	TRP	-	expression tag	UNP Q13224
B	13	SER	-	expression tag	UNP Q13224
B	14	HIS	-	expression tag	UNP Q13224
B	15	PRO	-	expression tag	UNP Q13224
B	16	GLN	-	expression tag	UNP Q13224
B	17	PHE	-	expression tag	UNP Q13224
B	18	GLU	-	expression tag	UNP Q13224
B	19	LYS	-	expression tag	UNP Q13224
B	20	GLY	-	expression tag	UNP Q13224
B	21	ALA	-	expression tag	UNP Q13224
B	22	LEU	-	expression tag	UNP Q13224
B	23	VAL	-	expression tag	UNP Q13224
B	24	PRO	-	expression tag	UNP Q13224
B	25	ARG	-	expression tag	UNP Q13224
B	26	GLY	-	expression tag	UNP Q13224
B	588	SER	CYS	engineered mutation	UNP Q13224
B	838	SER	CYS	engineered mutation	UNP Q13224
B	849	SER	CYS	engineered mutation	UNP Q13224
B	853	GLY	-	expression tag	UNP Q13224
B	854	PRO	-	expression tag	UNP Q13224
B	855	GLY	-	expression tag	UNP Q13224
B	856	SER	-	expression tag	UNP Q13224
B	857	GLY	-	expression tag	UNP Q13224
B	858	ALA	-	expression tag	UNP Q13224
B	859	THR	-	expression tag	UNP Q13224
B	860	ASN	-	expression tag	UNP Q13224
B	861	PHE	-	expression tag	UNP Q13224
B	862	SER	-	expression tag	UNP Q13224
B	863	LEU	-	expression tag	UNP Q13224
B	864	LEU	-	expression tag	UNP Q13224
B	865	LYS	-	expression tag	UNP Q13224

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Chain	Residue	Modelled	Actual	Comment	Reference
B	866	GLN	-	expression tag	UNP Q13224
B	867	ALA	-	expression tag	UNP Q13224
B	868	GLY	-	expression tag	UNP Q13224
B	869	ASP	-	expression tag	UNP Q13224
B	870	VAL	-	expression tag	UNP Q13224
B	871	GLU	-	expression tag	UNP Q13224
B	872	GLU	-	expression tag	UNP Q13224
B	873	ASN	-	expression tag	UNP Q13224
B	874	PRO	-	expression tag	UNP Q13224
B	875	GLY	-	expression tag	UNP Q13224
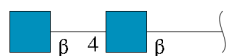
- Molecule 3 is a protein called Glutamate receptor ionotropic, NMDA 2D.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	D	749	5712	3666	973	1045	28	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	881	GLU	-	expression tag	UNP O15399
D	882	THR	-	expression tag	UNP O15399
D	883	SER	-	expression tag	UNP O15399
D	884	GLN	-	expression tag	UNP O15399
D	885	VAL	-	expression tag	UNP O15399
D	886	ALA	-	expression tag	UNP O15399
D	887	PRO	-	expression tag	UNP O15399
D	888	ALA	-	expression tag	UNP O15399

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

Mol	Chain	Residues	Atoms			AltConf	Trace
			Total	C	N	O	
4	E	2	28	16	2	10	0	0

- Molecule 5 is GLYCINE (CCD ID: GLY) (formula: $C_2H_5NO_2$) (labeled as "Ligand of Interest" by depositor).
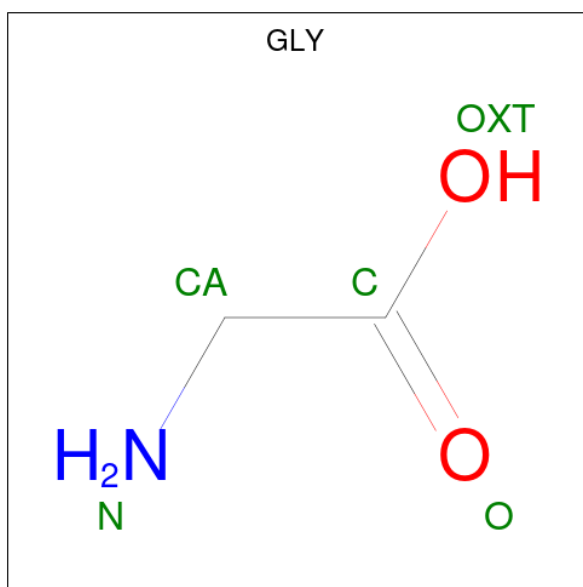
Mol	Chain	Residues	Atoms				AltConf
5	A	1	Total 5	C 2	N 1	O 2	0
5	C	1	Total 5	C 2	N 1	O 2	0

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).
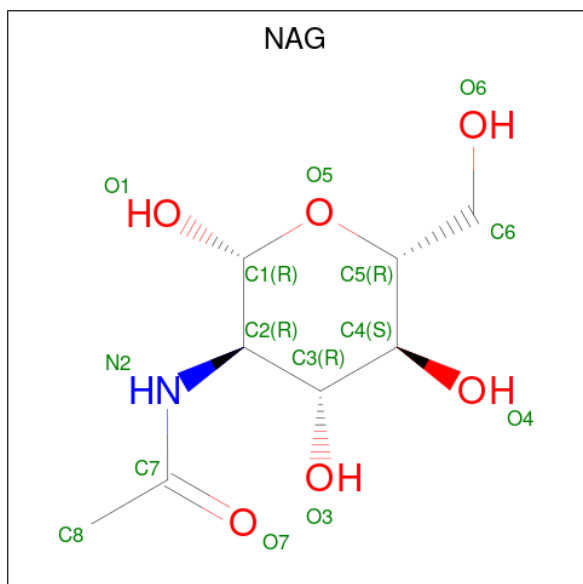
Mol	Chain	Residues	Atoms				AltConf
6	A	1	Total 14	C 8	N 1	O 5	0

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Mol	Chain	Residues	Atoms				AltConf
6	B	1	Total 14	C 8	N 1	O 5	0
6	D	1	Total 14	C 8	N 1	O 5	0

- Molecule 7 is GLUTAMIC ACID (CCD ID: GLU) (formula: $C_5H_9NO_4$) (labeled as "Ligand of Interest" by depositor).
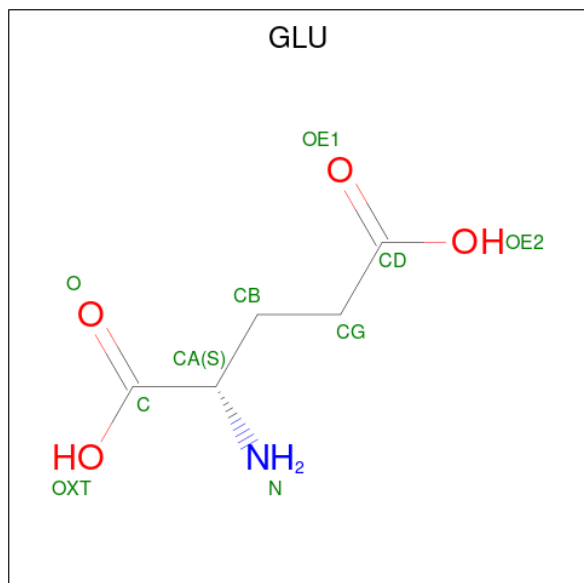
Mol	Chain	Residues	Atoms				AltConf
7	B	1	Total 10	C 5	N 1	O 4	0
7	D	1	Total 10	C 5	N 1	O 4	0

- Molecule 8 is 4-{(3R,5S)-5-(4-chlorophenyl)-3-[4-(4-chlorophenyl)-2-oxo-1,2-dihydroqui nolin-3-yl]pyrazolidin-1-yl}-3,3-difluoro-4-oxobutanoic acid (CCD ID: A1A15) (formula: $C_{28}H_{21}Cl_2F_2N_3O_4$) (labeled as "Ligand of Interest" by depositor).
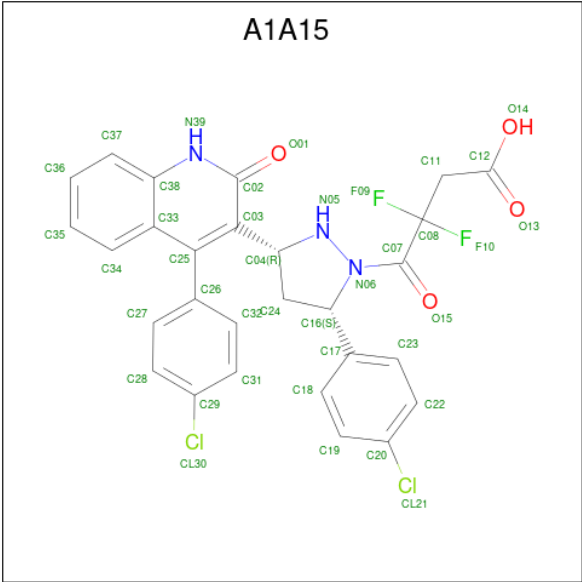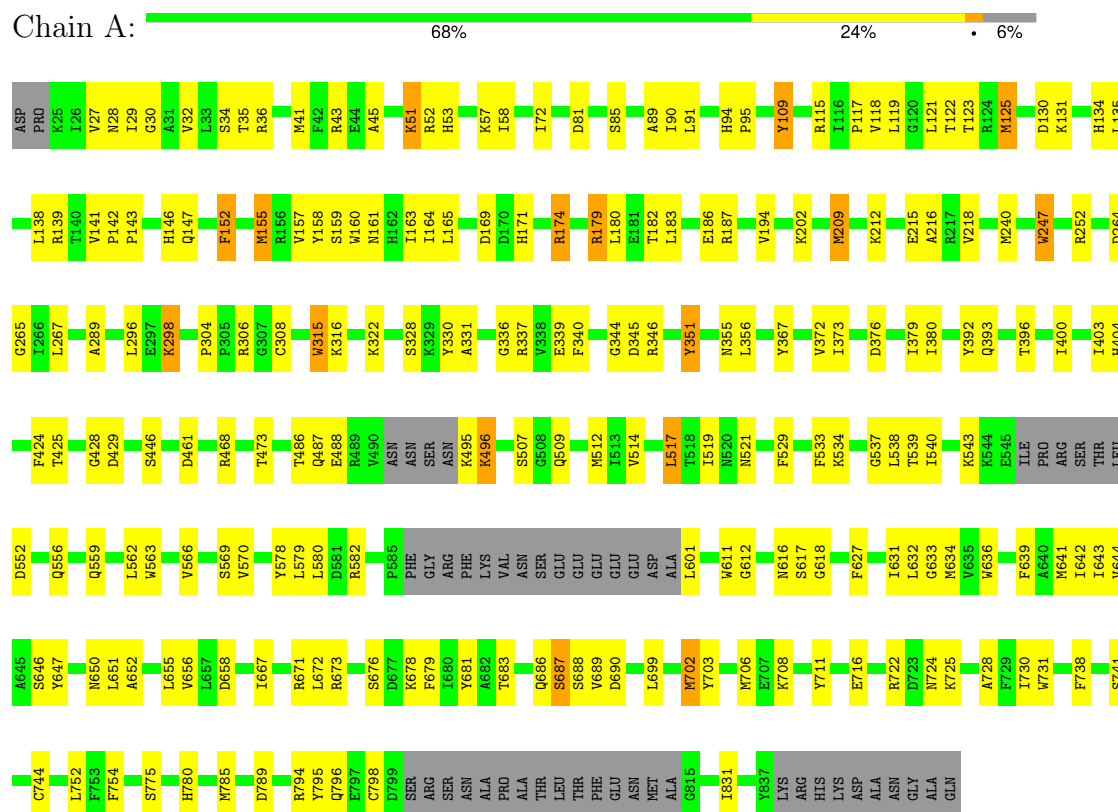
Mol	Chain	Residues	Atoms						AltConf
8	D	1	Total	C	Cl	F	N	O	0
			39	28	2	2	3	4	
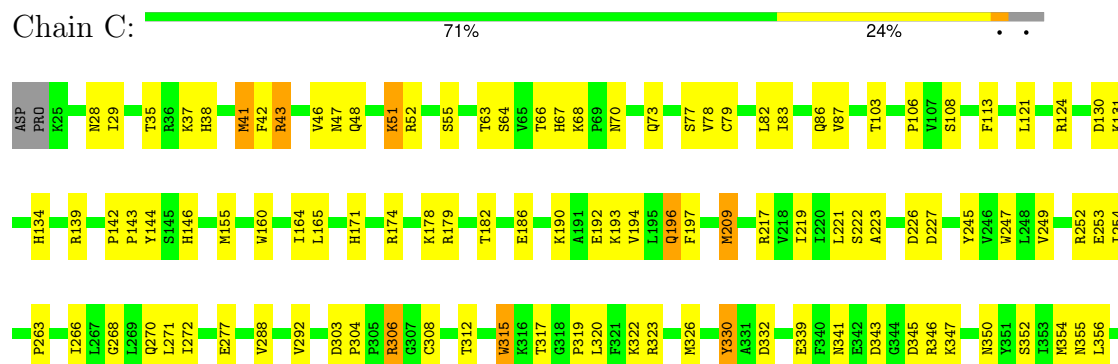
3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. 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.

• Molecule 1: Glutamate receptor ionotropic, NMDA 1

Chain A:

• Molecule 1: Glutamate receptor ionotropic, NMDA 1

Chain C:

K360 Q363 V364 G365 I366 P374 R377 K378 I379 I380 V401 T402 P407 F408 V409 T442 S443 H477 L478 N499 L505 A510 I513 R523 E528 F529 S530 K531 P532 F533 K534 Y535 T539 I540 K544 E545 D552 S553 F554 M555 F558 L562

W563 L564 L565 L568 S569 M576 L577 Y578 L579 P585 PHE GLY ARG PHE LYS VAL ASN SER GLU GLU GLU GLU ASP ALA LEU T602 L603 S604 S605 A606 M607 W608 F609 V613 L614 L615 N616 S617 G618 R630 I631 V635 W636 A637 G638 F639 A640 M641 I642 I643 V644 Y647

T648 A649 A653 F654 L655 V656 L657 D658 P670 R671 L672 R673 N674 Y681 A682 Q686 S687 S688 R694 R695 E698 L699 S700 Y703 R704 H705 M706 E707 K708 V721 L726 L736 V747 S766 N771 D789 Q796 S800 ARG SER ASN ALA PRO ALA

T807 L808 E811 N812 F817 V820 I828 F832 R839 HIS LYS ASP ALA ASN GLY ALA GLN

• Molecule 2: Glutamate receptor ionotropic, NMDA 2B

Chain B:

66% 19% • 14%

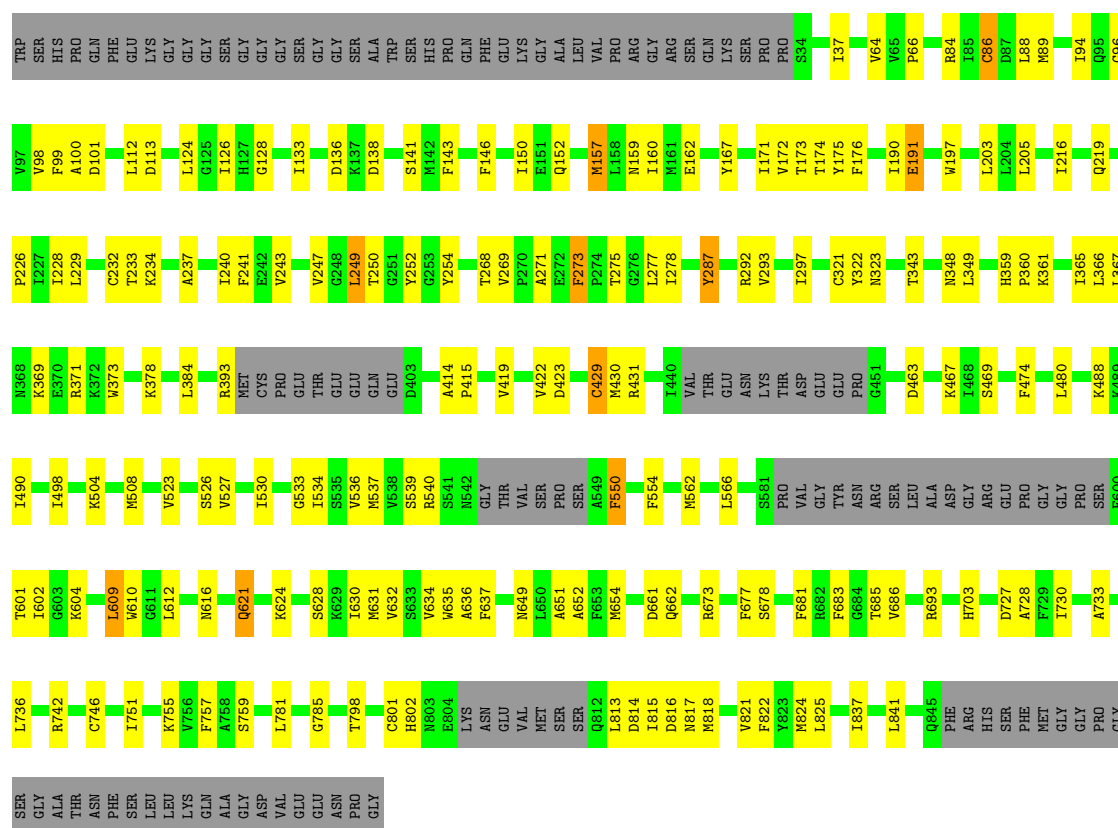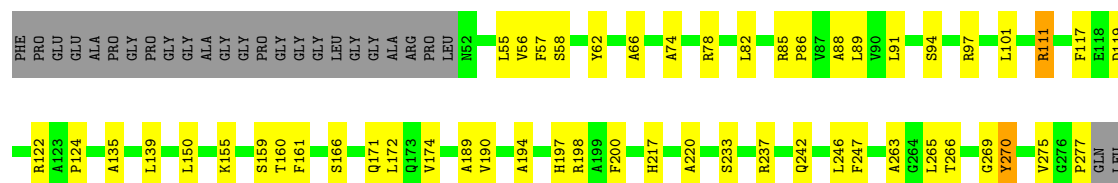TRP SER HIS PRO GLN PHE GLU LYS GLY GLY SER GLY GLY SER GLY LYS SER ALA TRP SER HIS PRO GLN PHE GLU LYS GLY ALA LEU VAL PRO ARG GLY SER GLN LYS SER PRO PRO S34 I37 V64 V65 P66 R84 I85 C86 D87 L88 M89 I94 Q95 G96

V97 V98 F99 A100 D101 L112 D113 L124 G125 I126 H127 G128 I133 D136 K137 D138 S141 M142 F143 F146 I150 E151 Q152 M157 L158 N159 I160 M161 E162 Y167 I171 V172 T173 T174 Y175 F176 I190 E191 W197 L203 L204 L205 I216 Q219

P226 I227 I228 L229 C232 T233 K234 A237 I240 F241 E242 V243 V247 G248 L249 T250 G251 Y252 G253 Y254 T268 V269 P270 A271 F273 P274 T275 G276 L277 I278 Y287 R292 V293 I297 C321 Y322 N323 T343 N348 L349 H359 P360 K361 I365 L366 L367

N368 K369 E370 R371 K372 W373 K378 L384 R393 MET CYS PRO GLU THR GLU GLU GLN GLU D403 A414 P415 V419 V422 D423 C429 M430 R431 I440 VAL THR GLU ASN LYS THR ASP GLU GLU PRO G451 D463 K467 I468 S469 F474 L480 K488 K489

I490 I498 K504 M508 V523 S526 V527 I530 G533 I534 S535 V536 M537 V538 S539 R540 S541 N542 GLY THR VAL SER PRO SER A549 F550 F554 M562 L566 S581 PRO VAL GLY TYR ASN ARG SER LEU ALA ASP GLY ARG GLU PRO GLY GLY PRO SER F600

T601 I602 G603 K604 L609 W610 G611 L612 N616 Q621 K624 S628 K629 I630 M631 V632 S633 V634 W635 A636 F637 N649 L650 A651 A652 F653 M654 D661 Q662 R673 F677 S678 F681 R682 F683 G684 T685 V686 R693 H703 D727 A728 F729 I730 A733

L736 R742 C746 I751 K755 V756 F757 A758 S759 L781 G785 T798 C801 H802 N803 E804 LYS ASN GLU VAL MET SER SER Q812 L813 D814 I815 D816 N817 M818 V821 F822 Y823 M824 L825 I837 L841 Q845 PHE ARG HIS SER PHE MET GLY GLY PRO GLY

SER GLY ALA THR ASN PHE SER LEU LEU LYS GLN ALA GLY ASP VAL GLU GLU ASN PRO GLY

• Molecule 3: Glutamate receptor ionotropic, NMDA 2D

Chain D:

65% 21% • 13%

PHE PRO GLU GLU ALA PRO GLY PRO GLY ALA GLY GLY PRO GLY GLY LEU GLY GLY ALA ARG PRO LEU N52 L55 V56 F57 S58 Y62 A66 A74 R78 L82 R85 P86 V87 A88 L89 V90 L91 S94 R97 L101 R111 F117 E118 D119

R122 A123 P124 A135 L139 L150 K155 S159 T160 F161 S166 Q171 L172 Q173 V174 A189 V190 A194 H197 R198 A199 F200 H217 A220 S233 R237 Q242 L246 F247 A263 G264 L265 T266 G269 Y270 V275 G276 P277 GLN LEU

ALA GLY GLY GLY GLY SER GLY ALA PRO GLY GLU PRO PRO LEU LEU PRO GLY GLY ALA P299 L300 P301 S309 A310 G311 D314 R318 R319 V326 R329 G330 A331 L335 P342 E343 L344 G345 L360 M365 N366 I367 S386 L387 V388 G402 R410 L411

R418 L423 V426 D427 D428 T429 Q430 V434 L437 E438 E439 R440 P441 F442 I451 R457 D458 S464 Q465 LEU ASN ARG THR HIS SER PRO PRO ASP ALA PRO ARG P479 F487 D490 I491 L492 L495 A496 H497 D504 L505 Y506 K512 V528 Q531

M535 A536 I537 R546 I549 V550 S553 V554 S562 V563 M564 N569 GLY THR V572 S573 P574 S575 A576 F577 L578 E579 P580 Y581 S582 P583 A584 V596 V597 L607 SER PRO VAL GLY TYR ASN ARG SER LEU ALA THR GLY LYS ARG PRO GLY GLY SER THR PHE T628

I633 W634 W637 A638 L639 V640 F641 N642 N643 S644 V645 T654 W662 A663 V667 I668 F669 L670 A671 S672 Y673 T674 A675 N676 A679 F680 E684 GLU TYR VAL ASP THR VAL SER GLY L693 S694 D695 L708 K709 F710 G711 T712 S717 I722 R723 H730 S731 Y732

Y736 R740 E743 Q747 K752 A755 F756 I757 Y758 D759 L763 N764 Y765 R768 C773 T777 K782 A792 L793 H794 K795 G796 S797 R798 L805 L808 D813 E817 I827 C828 D831 LYS ILE GLU VAL MET SER SER LYS L840 D841 I842 D843

N844 M856 G857 R872 LEU ARG HIS CYS LEU GLY PRO THR GLU THR SER GLN VAL ALA PRO ALA

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

Chain E: 50%   50%

NAG1 NAG2

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	100870	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	61	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor

5   Model quality ⓘ

5.1   Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, A1A15

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	0.24	0/6124	0.49	0/8304
1	C	0.24	0/6321	0.51	0/8580
2	B	0.24	0/5880	0.47	0/7999
3	D	0.24	0/5841	0.50	0/7954
All	All	0.24	0/24166	0.49	0/32837

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	5993	0	5888	144	0
1	C	6181	0	6084	142	0
2	B	5758	0	5543	110	0
3	D	5712	0	5586	126	0
4	E	28	0	25	1	0
5	A	5	0	2	0	0
5	C	5	0	2	0	0
6	A	14	0	13	0	0
6	B	14	0	13	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	D	14	0	13	0	0
7	B	10	0	5	0	0
7	D	10	0	5	2	0
8	D	39	0	0	1	0
All	All	23783	0	23179	495	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 11.

The worst 5 of 495 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)
2:B:429:CYS:SG	2:B:430:MET:N	2.58	0.77
1:A:160:TRP:HB3	1:A:163:ILE:HD11	1.67	0.76
1:C:602:THR:N	1:C:605:SER:HG	1.83	0.76
2:B:365:ILE:HD11	2:B:373:TRP:HB3	1.68	0.75
1:C:578:TYR:HB3	1:C:603:LEU:HD12	1.75	0.69

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 PDB entries followed by that with respect to all EM entries.

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	763/825 (92%)	709 (93%)	52 (7%)	2 (0%)	37	67
1	C	787/825 (95%)	726 (92%)	61 (8%)	0	100	100
2	B	750/884 (85%)	705 (94%)	44 (6%)	1 (0%)	48	78
3	D	735/861 (85%)	676 (92%)	57 (8%)	2 (0%)	37	67
All	All	3035/3395 (89%)	2816 (93%)	214 (7%)	5 (0%)	45	72

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	D	428	ASP
1	A	667	ILE
2	B	678	SER
1	A	429	ASP
3	D	582	SER

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 PDB entries followed by that with respect to all EM entries.

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	638/710 (90%)	606 (95%)	32 (5%)	20	47
1	C	667/710 (94%)	637 (96%)	30 (4%)	23	49
2	B	598/760 (79%)	569 (95%)	29 (5%)	21	48
3	D	592/701 (84%)	574 (97%)	18 (3%)	36	58
All	All	2495/2881 (87%)	2386 (96%)	109 (4%)	26	50

5 of 109 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	802	HIS
1	C	277	GLU
3	D	418	ARG
2	B	824	MET
1	C	113	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 9 such sidechains are listed below:

Mol	Chain	Res	Type
3	D	197	HIS
3	D	569	ASN
1	C	73	GLN
1	C	280	HIS
1	C	674	ASN

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)

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	$\#|Z| > 2$
4	NAG	E	1	4,1	14,14,15	0.37	0	17,19,21	0.55	0
4	NAG	E	2	4	14,14,15	0.23	0	17,19,21	0.46	0

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
4	NAG	E	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	E	2	4	-	<mark>2/6/23/26</mark>	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.
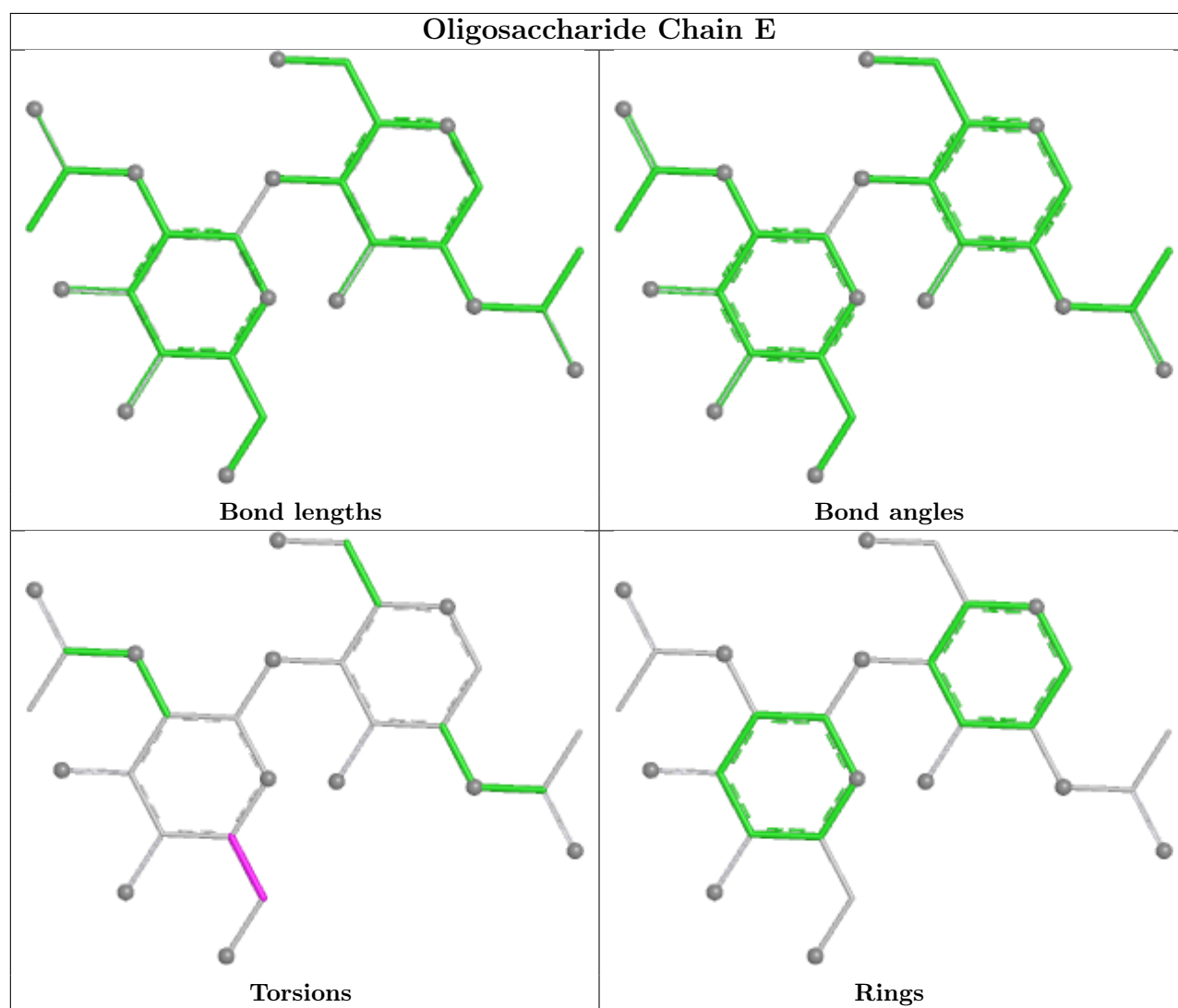
All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	E	2	NAG	O5-C5-C6-O6
4	E	2	NAG	C4-C5-C6-O6

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	1	NAG	1	0

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

Oligosaccharide Chain E

Bond lengths

Bond angles

Torsions

Rings

5.6 Ligand geometry ⓘ

8 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	$\#|Z| > 2$
5	GLY	A	901	-	4,4,4	1.15	1 (25%)	3,4,4	1.71	2 (66%)
7	GLU	D	901	-	8,9,9	1.13	1 (12%)	8,11,11	1.20	1 (12%)
6	NAG	A	902	1	14,14,15	0.45	0	17,19,21	0.72	1 (5%)
6	NAG	D	903	3	14,14,15	0.37	0	17,19,21	0.73	1 (5%)
5	GLY	C	901	-	4,4,4	1.16	1 (25%)	3,4,4	1.64	1 (33%)
6	NAG	B	902	2	14,14,15	0.43	0	17,19,21	0.48	0
8	A1A15	D	902	-	38,43,43	2.99	10 (26%)	51,64,64	2.33	8 (15%)
7	GLU	B	901	-	8,9,9	1.11	1 (12%)	8,11,11	1.20	1 (12%)

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
5	GLY	A	901	-	-	0/2/2/2	-
7	GLU	D	901	-	-	5/9/9/9	-
6	NAG	A	902	1	-	4/6/23/26	0/1/1/1
6	NAG	D	903	3	-	2/6/23/26	0/1/1/1
5	GLY	C	901	-	-	0/2/2/2	-
6	NAG	B	902	2	-	0/6/23/26	0/1/1/1
8	A1A15	D	902	-	-	2/23/39/39	0/5/5/5
7	GLU	B	901	-	-	4/9/9/9	-

The worst 5 of 14 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	D	902	A1A15	C25-C03	10.50	1.47	1.35
8	D	902	A1A15	C38-N39	7.88	1.53	1.39
8	D	902	A1A15	C02-N39	7.85	1.46	1.35
8	D	902	A1A15	C24-C04	-7.30	1.37	1.54
8	D	902	A1A15	C24-C16	2.89	1.58	1.54

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
8	D	902	A1A15	C17-C16-N06	11.22	123.93	112.31
8	D	902	A1A15	C24-C16-C17	-6.75	100.55	114.09
8	D	902	A1A15	C24-C04-N05	5.25	111.34	103.05
8	D	902	A1A15	F10-C08-F09	3.81	109.52	104.96
8	D	902	A1A15	C38-N39-C02	-3.54	119.87	124.82

There are no chirality outliers.

5 of 17 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	B	901	GLU	C-CA-CB-CG
8	D	902	A1A15	C02-C03-C04-C24
8	D	902	A1A15	C02-C03-C04-N05
6	D	903	NAG	O5-C5-C6-O6
6	A	902	NAG	O5-C5-C6-O6

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	D	901	GLU	2	0
8	D	902	A1A15	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand GLY A 901

Bond lengths

Bond angles

Torsions

Rings

Ligand GLU D 901

Bond lengths

Bond angles

Torsions

Rings

Ligand GLY C 901

Bond lengths

Bond angles

Torsions

Rings

Ligand A1A15 D 902

Bond lengths

Bond angles

Torsions

Rings

Ligand GLU B 901

Bond lengths

Bond angles

Torsions

Rings
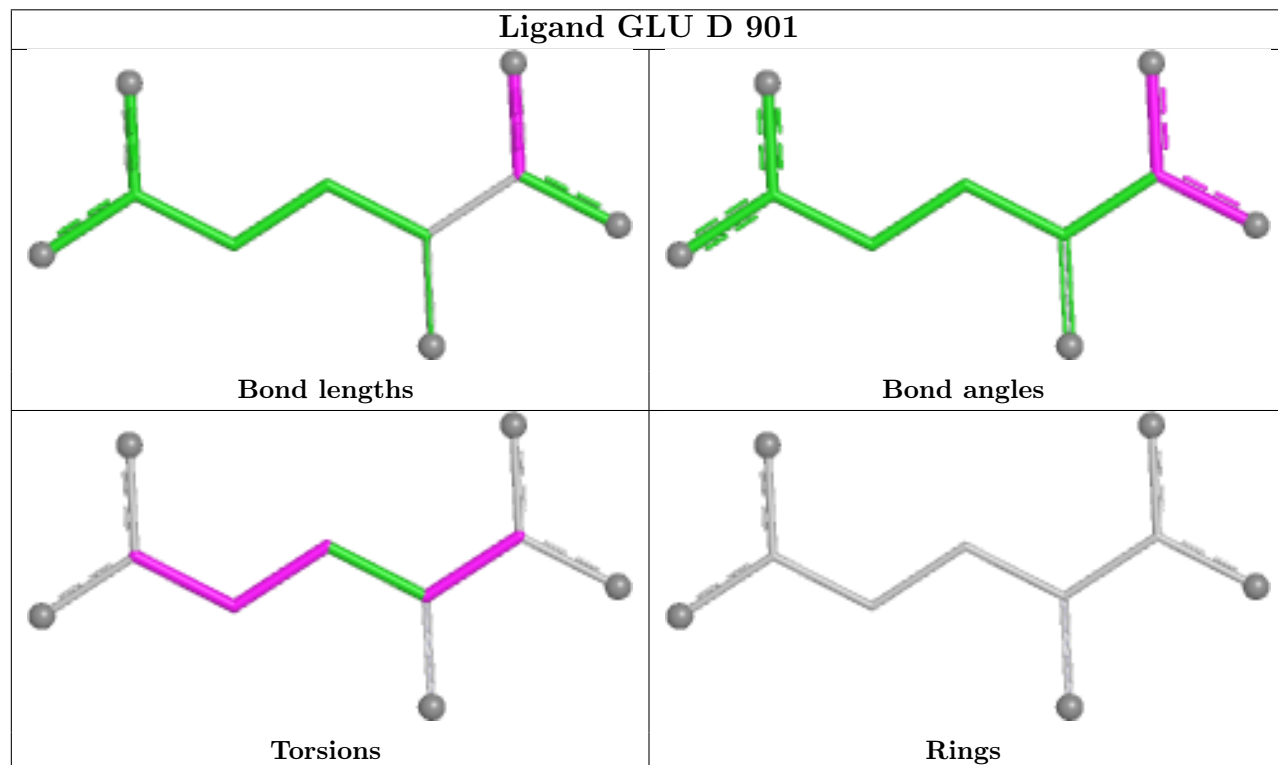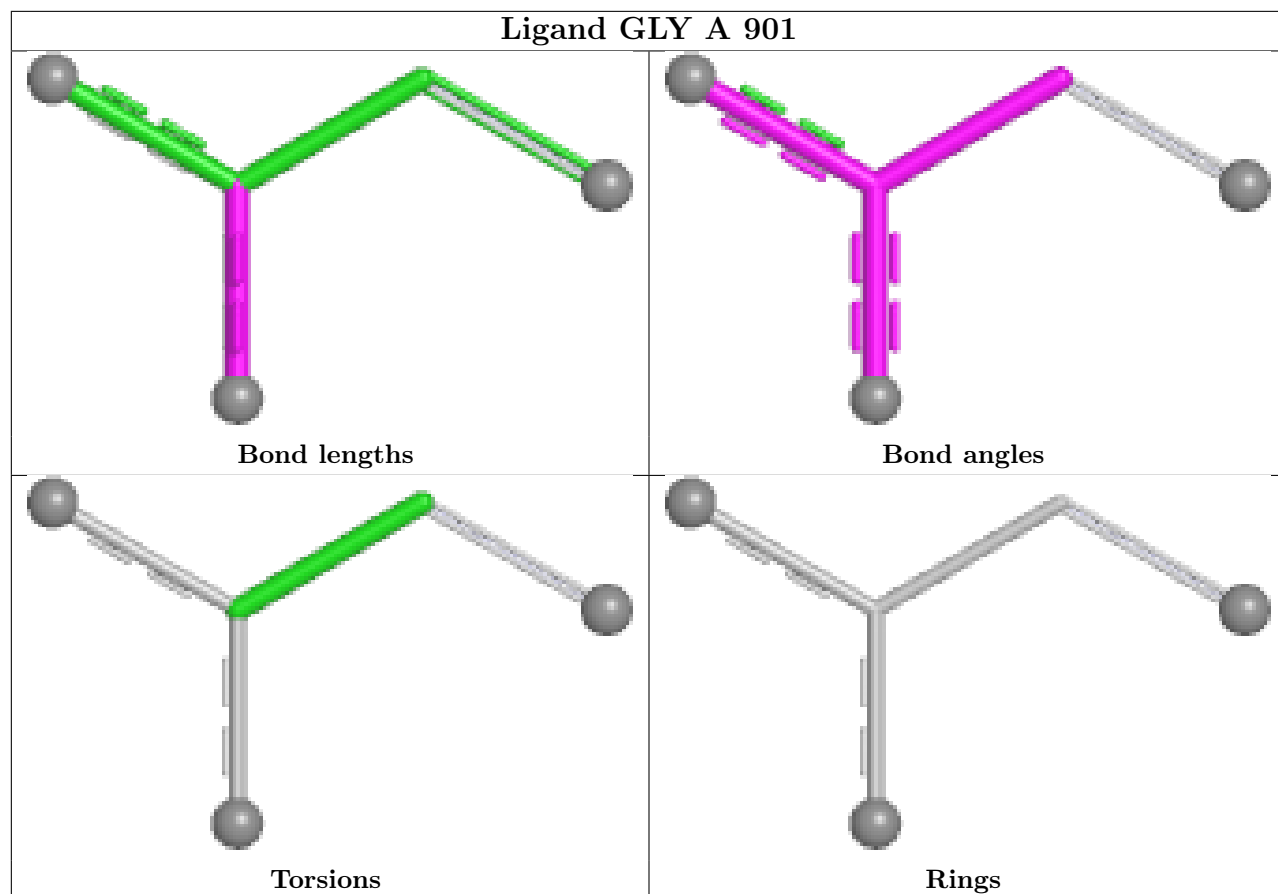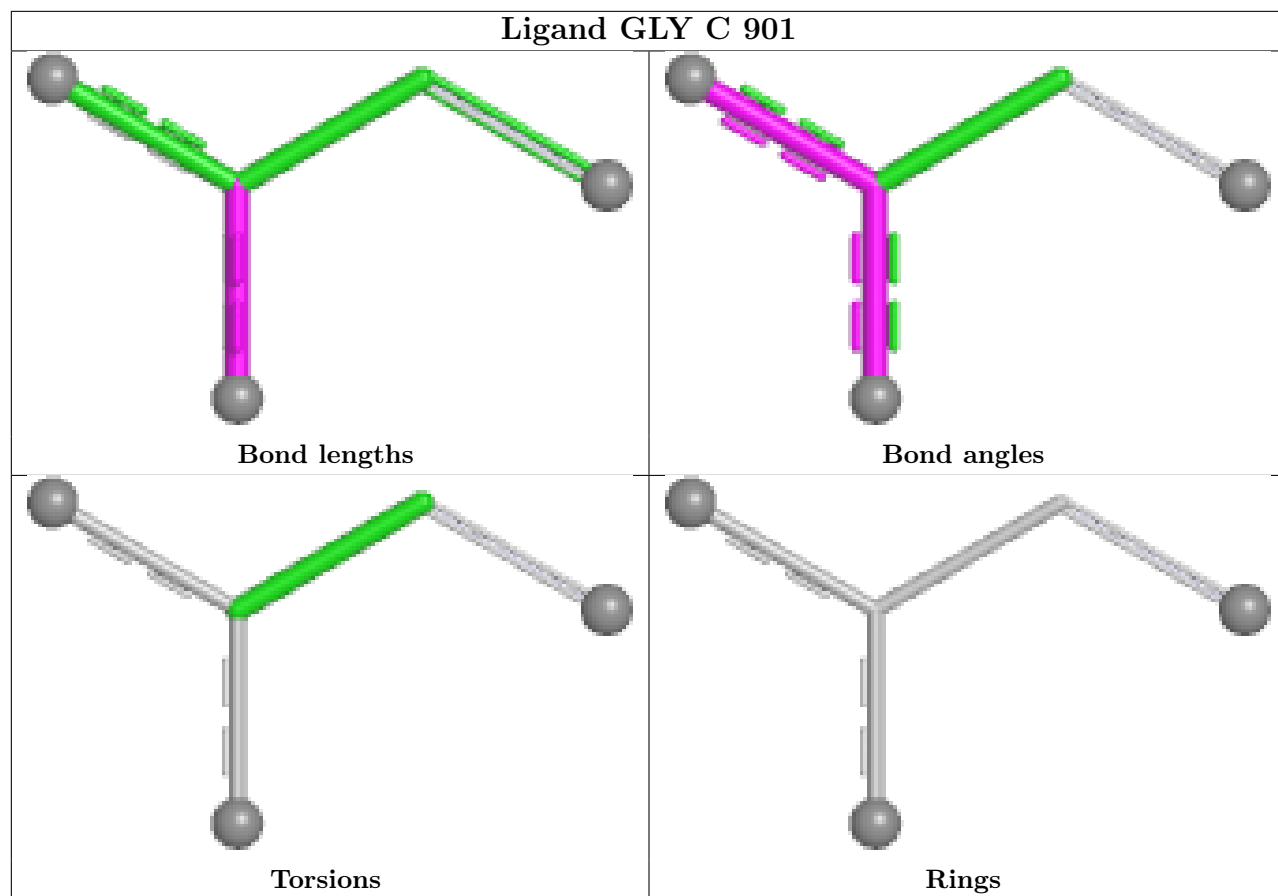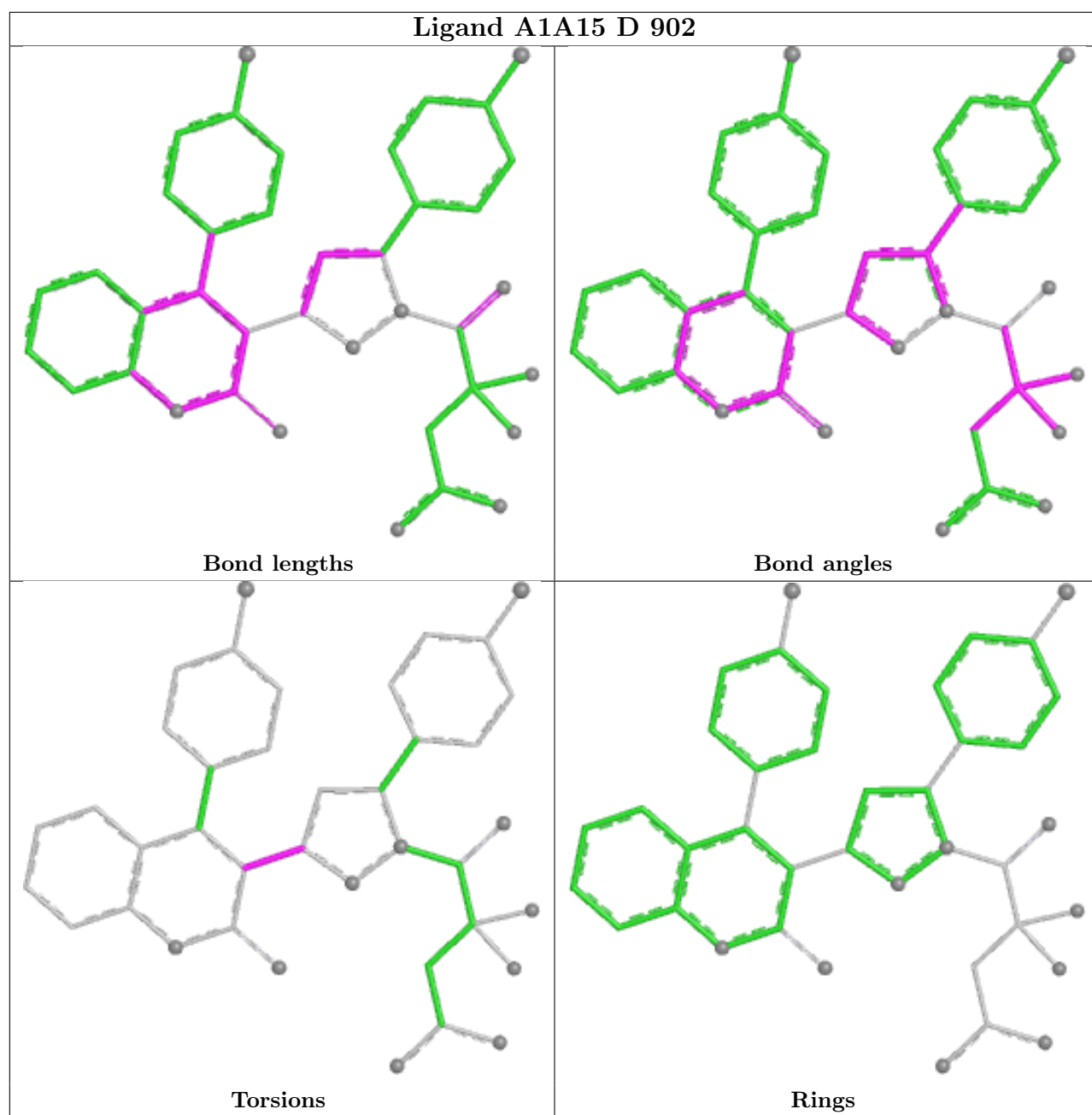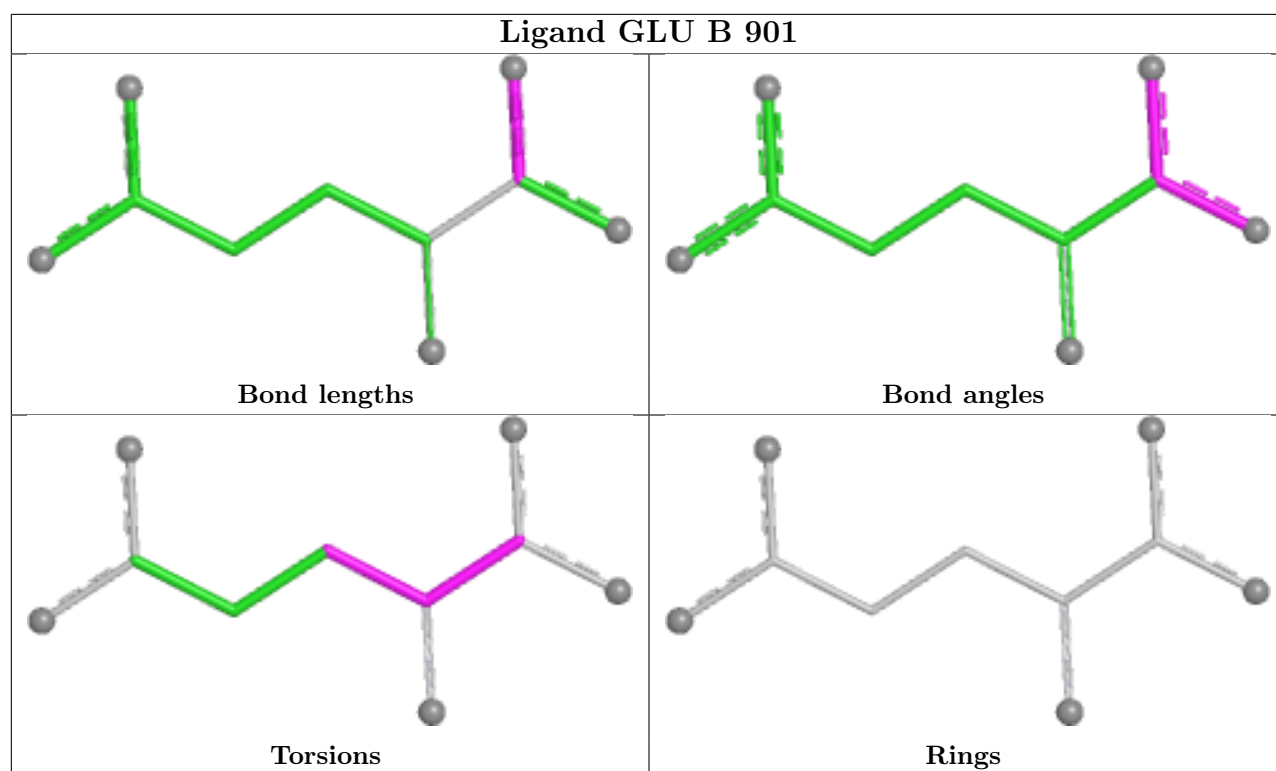
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6　Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-46530. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1　Orthogonal projections ⓘ

This section was not generated.

6.2　Central slices ⓘ

This section was not generated.

6.3　Largest variance slices ⓘ

This section was not generated.

6.4　Orthogonal standard-deviation projections (False-color) ⓘ

This section was not generated.

6.5　Orthogonal surface views ⓘ

This section was not generated.

6.6　Mask visualisation ⓘ

This section was not generated. No masks/segmentation were deposited.

7   Map analysis ⓘ

This section contains the results of statistical analysis of the map.

7.1   Map-value distribution ⓘ

This section was not generated.

7.2   Volume estimate versus contour level ⓘ

This section was not generated.

7.3   Rotationally averaged power spectrum ⓘ

This section was not generated. The rotationally averaged power spectrum had issues being displayed.

8 Fourier-Shell correlation ⓘ

This section was not generated. No FSC curve or half-maps provided.

9   Map-model fit ⓘ

This section was not generated.