W O R L D W I D E

wwPDB

P R O T E I N   D A T A   B A N K

wwPDB EM Validation Summary Report (i)

Mar 9, 2025 – 12:09 AM JST

PDB ID	:	9II3
EMDB ID	:	EMD-60589
Title	:	Cryo-EM Structure of the 2:1 Complex of mGlu3 and beta-arrestin1
Authors	:	Wen, T.L.; Du, M.; Yang, X.; Shen, Y.Q.
Deposited on	:	2024-06-19
Resolution	:	3.90 Å(reported)

This is a wwPDB EM Validation Summary 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/EMValidationReportHelp
with specific help available everywhere you see the (i) 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 (i)) were used in the production of this report:

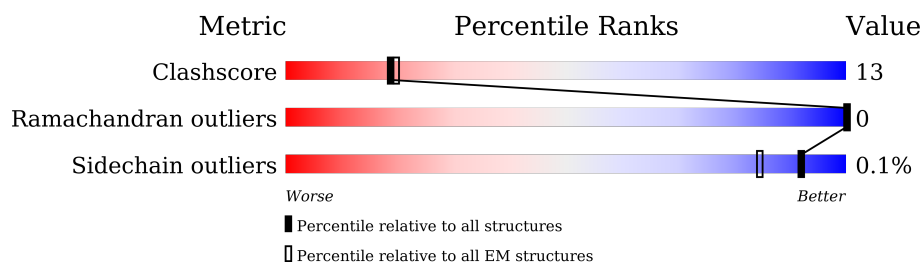|		
EMDB validation analysis	:	FAILED
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.2

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 3.90 Å.

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

Metric	Percentile Ranks	Value
Clashscore		13
Ramachandran outliers		0
Sidechain outliers		0.1%

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	B	879	64% 25% 11%
1	R	879	61% 30% 9%
2	A	418	57% 26% 17%
3	S	251	68% 20% 12%
4	C	2	50% 50%
4	D	2	100%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

WORLDWIDE
wwPDB
PROTEIN DATA BANK

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
1	SEP	R	859	-	-	X	-

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 16488 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 Metabotropic glutamate receptor 3.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	R	803	Total 6159	C 3957	N 1020	O 1133	P 3	S 46	0	0
1	B	782	Total 5977	C 3849	N 991	O 1091	S 46		0	0

- Molecule 2 is a protein called Beta-arrestin-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	A	347	Total 2630	C 1693	N 453	O 482	S 2	0	0
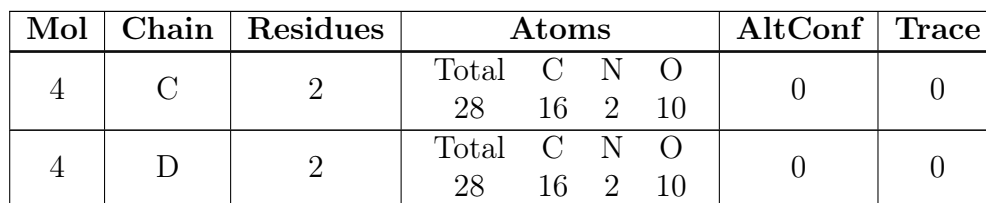
There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	59	VAL	CYS	conflict	UNP P49407
A	125	SER	CYS	conflict	UNP P49407
A	140	LEU	CYS	conflict	UNP P49407
A	150	VAL	CYS	conflict	UNP P49407
A	169	GLU	ARG	conflict	UNP P49407
A	242	VAL	CYS	conflict	UNP P49407
A	251	VAL	CYS	conflict	UNP P49407
A	269	SER	CYS	conflict	UNP P49407

- Molecule 3 is a protein called scFv30.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	S	222	Total 1592	C 1019	N 266	O 301	S 6	0	0

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

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

- Molecule 5 is GLUTAMIC ACID (three-letter code: GLU) (formula: $C_5H_9NO_4$).

Mol	Chain	Residues	Atoms				AltConf
5	R	1	Total 9	C 5	N 1	O 3	0
5	B	1	Total 9	C 5	N 1	O 3	0

- Molecule 6 is CHOLESTEROL (three-letter code: CLR) (formula: $C_{27}H_{46}O$).

CLR

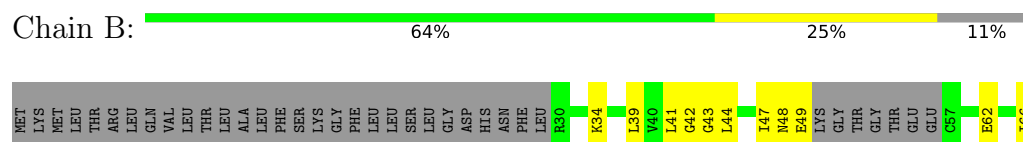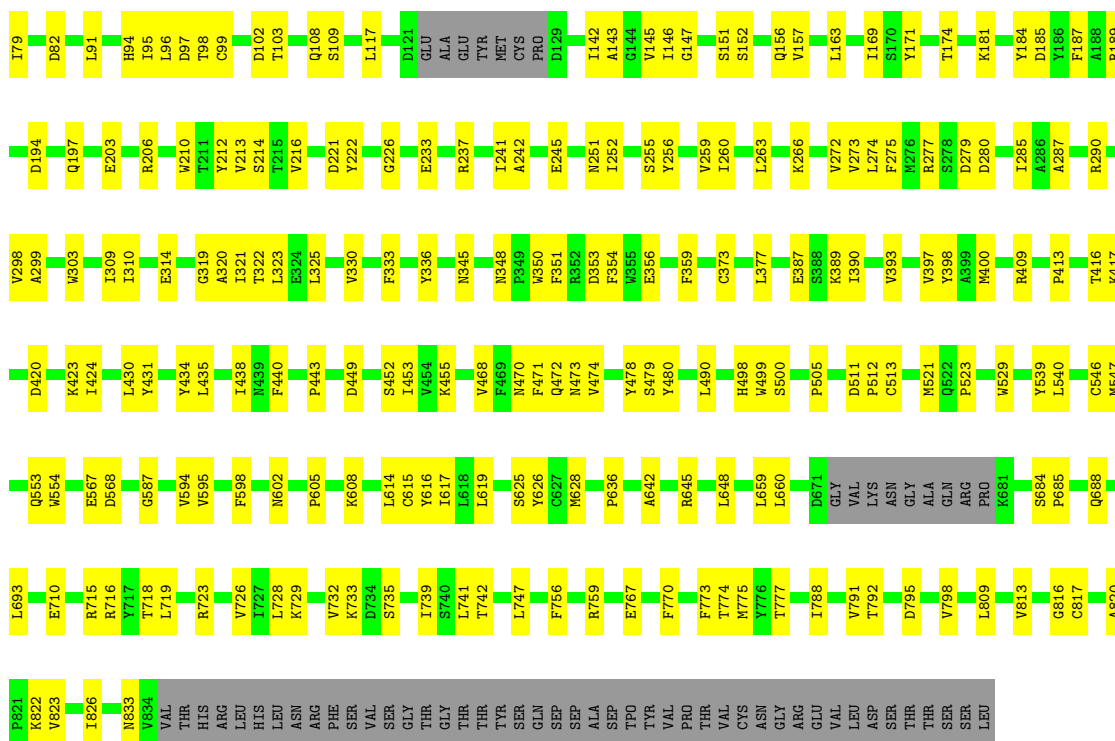| Mol	Chain	Residues	Atoms			AltConf
6	R	1	Total 28	C 27	O 1	0
6	B	1	Total 28	C 27	O 1	0

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: Metabotropic glutamate receptor 3

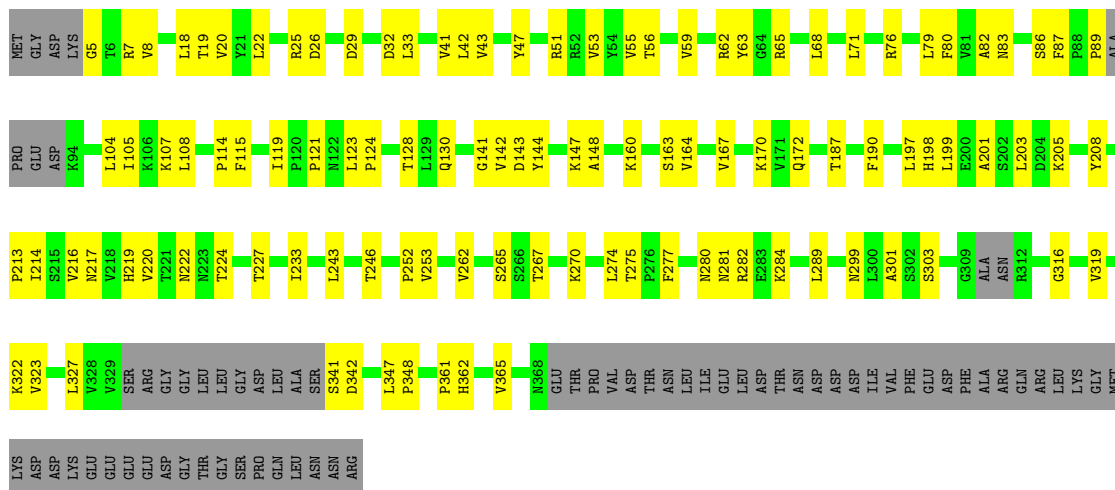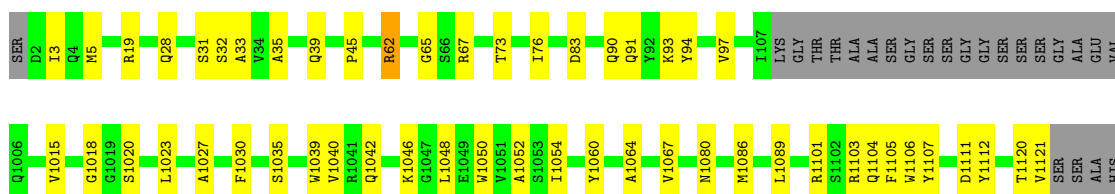Chain R:

- Molecule 1: Metabotropic glutamate receptor 3

Chain B:

I79 D82 L91 H94 I95 L96 D97 T98 C99 D102 T103 Q108 S109 L117 D121 ALA GLU TYR MET CYS PRO D129 I142 A143 G144 V145 I146 G147 S151 S152 Q156 V157 L163 I169 S170 Y171 T174 K181 Y184 D185 Y186 F187 A188 R189

D194 Q197 E203 R206 W210 T211 Y212 V213 S214 T215 V216 D221 Y222 G226 E233 R237 I241 A242 E245 N251 I252 S255 Y256 V259 I260 L263 K266 V272 V273 L274 F275 M276 R277 S278 D279 D280 I285 A286 A287 R290

V298 A299 W303 I309 I310 E314 G319 A320 I321 T322 L323 E324 L325 V330 F333 Y336 N345 N348 P349 W350 F351 R352 D353 F354 W355 E356 F359 C373 L377 E387 S388 K389 I390 V393 V397 Y398 A399 M400 R409 P413 T416 K417

D420 K423 I424 L430 Y431 Y434 L435 I438 N439 F440 P443 D449 S452 I453 V454 K455 V468 F469 N470 F471 Q472 N473 V474 Y478 S479 Y480 L490 H498 W499 S500 P505 D511 P512 C513 M521 Q522 P523 W529 Y539 L540 C546 M547

Q553 W554 E567 D568 G587 V594 V595 F598 N602 P605 K608 L614 C615 Y616 I617 L618 L619 S625 Y626 C627 M628 P636 A642 R645 L648 L659 L660 D671 GLY VAL LYS ASN GLY ALA GLN ARG PRO K681 S684 P685 Q688

L693 E710 R715 R716 Y717 T718 L719 R723 V726 I727 L728 K729 V732 K733 D734 S735 I739 S740 L741 T742 L747 F756 R759 E767 F770 F773 T774 M775 Y776 T777 I788 V791 T792 D795 V798 L809 V813 G816 C817 A820

P821 K822 V823 I826 N833 V834 VAL THR HIS ARG LEU HIS LEU ASN ARG PHE SER VAL SER GLY THR GLY THR THR TYR SER GLN SEP SEP ALA SEP TPO TYR VAL PRO THR VAL CYS ASN GLY ARG GLU VAL LEU LEU ASP SER THR THR SER SER LEU

• Molecule 2: Beta-arrestin-1

Chain A: 57%   26%   17%

MET GLY ASP LYS G5 T6 R7 V8 L18 T19 V20 Y21 L22 R25 D26 D29 D32 L33 V41 L42 V43 Y47 R51 R52 V53 V54 V55 T56 V59 R62 Y63 G64 R65 L68 L71 R76 L79 F80 V81 A82 N83 S86 F87 P88 P89 ALA

PRO GLU ASP K94 L104 I105 K106 K107 L108 P114 F115 I119 P120 P121 N122 L123 P124 T128 L129 Q130 G141 V142 D143 Y144 K147 A148 K160 S163 V164 V167 K170 V171 Q172 T187 F190 L197 H198 L199 E200 A201 S202 L203 D204 K205 Y208

P213 I214 S215 V216 N217 V218 H219 V220 T221 N222 N223 T224 T227 I233 L243 T246 P252 V253 V262 S265 S266 T267 K270 L274 T275 P276 F277 N280 N281 R282 E283 K284 L289 N299 L300 A301 S302 S303 G309 ALA ASN R312 G316 V319

K322 V323 L327 V328 V329 SER ARG GLY GLY LEU LEU GLY ASP LEU ALA SER S341 D342 L347 P348 P361 H362 V365 N368 GLU THR PRO VAL ASP THR ASN LEU ILE GLU LEU ASP THR ASN ASP ASP ILE VAL PHE GLU ASP PHE ALA ARG GLN ARG ARG LEU LYS GLY MET

LYS ASP ASP LYS GLU GLU GLU ASP ASP GLY THR GLY SER PRO GLN LEU LEU ASN ASN ARG

• Molecule 3: scFv30

Chain S: 68%   20%   12%

SER D2 I3 Q4 M5 R19 Q28 S31 S32 A33 V34 A35 Q39 P45 R62 G65 S66 R67 T73 I76 D83 Q90 Q91 Y92 K93 Y94 V97 I107 LYS GLY THR THR ALA ALA SER GLY SER GLY GLY SER SER GLY ALA GLU VAL

Q1006 V1015 G1018 G1019 S1020 L1023 A1027 F1030 S1035 W1039 V1040 R1041 Q1042 K1046 G1047 L1048 E1049 W1050 V1051 A1052 S1053 I1054 Y1060 A1064 V1067 N1080 M1086 L1089 R1101 R1103 Q1104 F1105 W1106 Y1107 D1111 Y1112 T1120 V1121 SER SER ALA HIS

HIS HIS HIS HIS HIS

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

Chain C:

50%   50%

NAG1 NAG2

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

Chain D:

100%

NAG1 NAG2

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	39446	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE; CtfFind 4.1.8	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	50	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	1900	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor

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: SEP, NAG, CLR, TPO

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	B	0.26	0/6112	0.48	0/8312
1	R	0.27	0/6263	0.48	0/8516
2	A	0.26	0/2688	0.50	0/3667
3	S	0.27	0/1634	0.51	0/2236
All	All	0.26	0/16697	0.49	0/22731

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 (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	B	5977	0	5772	141	0
1	R	6159	0	5934	168	0
2	A	2630	0	2583	80	0
3	S	1592	0	1406	38	0
4	C	28	0	25	1	0
4	D	28	0	25	0	0
5	B	9	0	5	2	0
5	R	9	0	5	0	0
6	B	28	0	46	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	R	28	0	46	0	0
All	All	16488	0	15847	411	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 13.

The worst 5 of 411 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:A:59:VAL:HG13	2:A:144:TYR:CE1	1.75	1.21
2:A:222:ASN:O	2:A:265:SER:HA	1.49	1.13
3:S:19:ARG:HA	3:S:76:ILE:O	1.69	0.93
1:R:509:CYS:SG	1:R:510:SER:N	2.49	0.83
2:A:59:VAL:CG1	2:A:144:TYR:CE1	2.63	0.78

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	B	774/879 (88%)	721 (93%)	53 (7%)	0	100	100
1	R	792/879 (90%)	742 (94%)	50 (6%)	0	100	100
2	A	339/418 (81%)	316 (93%)	23 (7%)	0	100	100
3	S	218/251 (87%)	208 (95%)	10 (5%)	0	100	100
All	All	2123/2427 (88%)	1987 (94%)	136 (6%)	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 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	B	624/764 (82%)	624 (100%)	0	100	100
1	R	640/764 (84%)	639 (100%)	1 (0%)	92	94
2	A	274/372 (74%)	274 (100%)	0	100	100
3	S	145/205 (71%)	144 (99%)	1 (1%)	81	86
All	All	1683/2105 (80%)	1681 (100%)	2 (0%)	92	95

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	R	612	ARG
3	S	62	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 7 such sidechains are listed below:

Mol	Chain	Res	Type
1	R	520	ASN
1	R	833	ASN
1	B	470	ASN
1	B	386	GLN
1	R	498	HIS

5.3.3   RNA ⓘ

There are no RNA molecules in this entry.

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

4 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	SEP	R	859	1	8,9,10	1.54	1 (12%)	8,12,14	1.39	1 (12%)
1	TPO	R	860	1	8,10,11	1.09	0	10,14,16	1.97	1 (10%)
1	SEP	R	857	1	8,9,10	1.54	1 (12%)	8,12,14	1.53	2 (25%)
1	SEP	R	856	1	3,4,10	0.64	0	2,4,14	0.82	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
1	SEP	R	859	1	-	0/5/8/10	-
1	TPO	R	860	1	-	1/9/11/13	-
1	SEP	R	857	1	-	1/5/8/10	-
1	SEP	R	856	1	-	0/0/2/10	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	R	857	SEP	P-O1P	3.38	1.61	1.50
1	R	859	SEP	P-O1P	3.33	1.61	1.50

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	R	860	TPO	P-OG1-CB	-5.72	105.94	123.21
1	R	859	SEP	P-OG-CB	-2.99	110.06	118.30
1	R	857	SEP	P-OG-CB	-2.81	110.56	118.30
1	R	857	SEP	OG-CB-CA	2.68	110.76	108.14

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	R	860	TPO	N-CA-CB-OG1
1	R	857	SEP	CA-CB-OG-P

There are no ring outliers.

2 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	R	859	SEP	4	0
1	R	860	TPO	2	0

5.5   Carbohydrates ⓘ

4 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	C	1	1,4	14,14,15	2.10	6 (42%)	17,19,21	1.60	4 (23%)
4	NAG	C	2	4	14,14,15	1.99	6 (42%)	17,19,21	1.16	2 (11%)
4	NAG	D	1	1,4	14,14,15	1.95	6 (42%)	17,19,21	1.19	2 (11%)
4	NAG	D	2	4	14,14,15	1.98	5 (35%)	17,19,21	1.23	1 (5%)

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	C	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	C	2	4	-	2/6/23/26	0/1/1/1
4	NAG	D	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	D	2	4	-	0/6/23/26	0/1/1/1

The worst 5 of 23 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	2	NAG	C7-N2	4.03	1.48	1.34
4	C	2	NAG	C7-N2	4.02	1.48	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	1	NAG	C7-N2	3.94	1.47	1.34
4	D	1	NAG	C7-N2	3.93	1.47	1.34
4	C	1	NAG	O5-C1	3.77	1.49	1.43

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	C	1	NAG	C1-O5-C5	4.54	118.34	112.19
4	D	2	NAG	C4-C3-C2	3.11	115.57	111.02
4	D	1	NAG	C2-N2-C7	-2.73	119.02	122.90
4	C	2	NAG	C4-C3-C2	2.68	114.94	111.02
4	C	1	NAG	C2-N2-C7	-2.57	119.25	122.90

There are no chirality outliers.

5 of 6 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	C	2	NAG	O5-C5-C6-O6
4	D	1	NAG	O5-C5-C6-O6
4	C	2	NAG	C4-C5-C6-O6
4	D	1	NAG	C4-C5-C6-O6
4	C	1	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	C	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 C

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain D
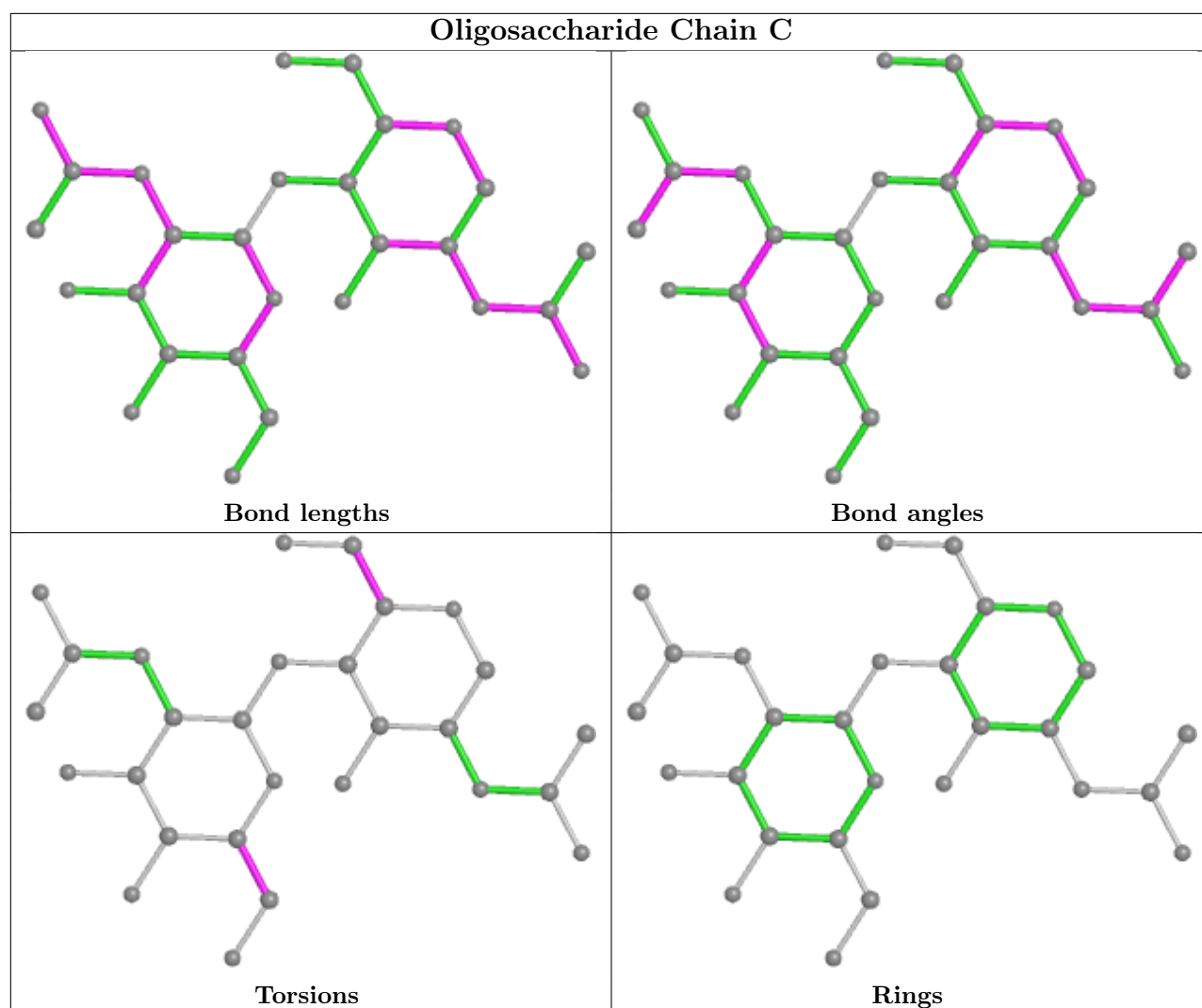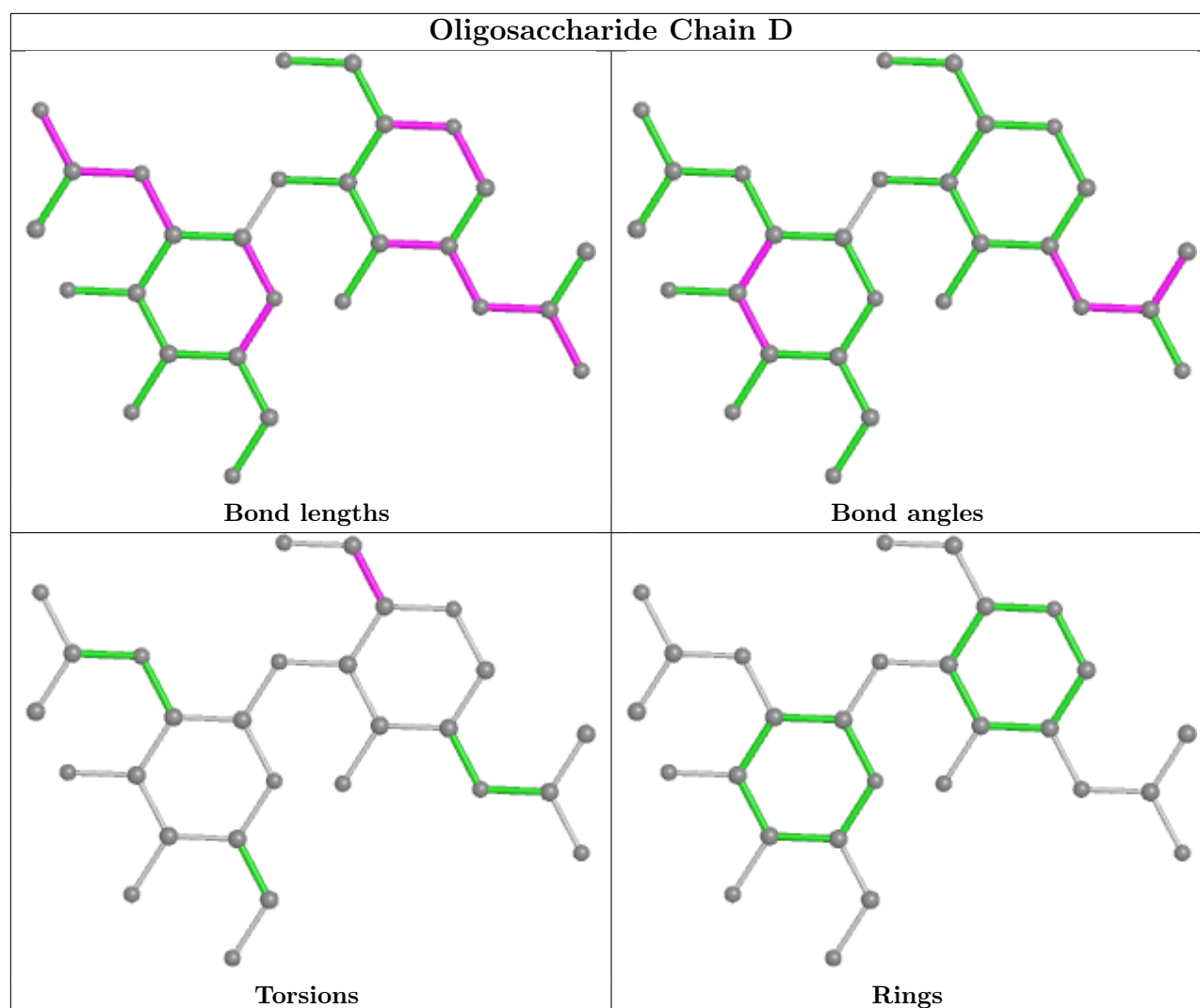
5.6 Ligand geometry ⓘ

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	$\#\|Z\| > 2$
6	CLR	R	902	-	31,31,31	0.30	0	48,48,48	0.64	0
5	GLU	B	901	-	7,8,9	0.86	0	4,9,11	1.04	0
5	GLU	R	901	-	7,8,9	0.85	0	4,9,11	1.00	0
6	CLR	B	902	-	31,31,31	0.29	0	48,48,48	0.53	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
6	CLR	R	902	-	-	1/10/68/68	0/4/4/4
5	GLU	B	901	-	-	0/6/7/9	-
5	GLU	R	901	-	-	1/6/7/9	-
6	CLR	B	902	-	-	<mark>4/10/68/68</mark>	0/4/4/4

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.
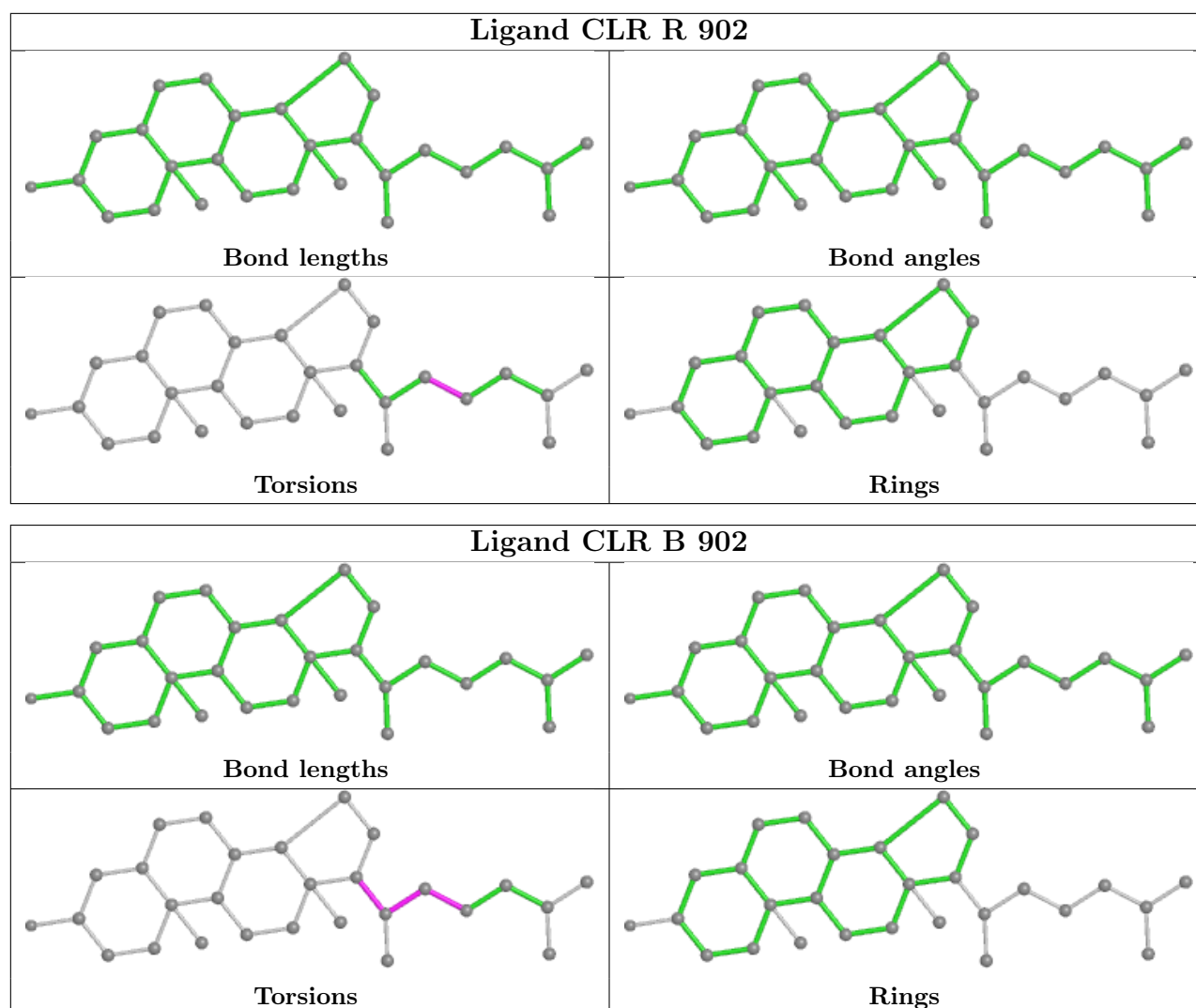
5 of 6 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	R	901	GLU	O-C-CA-CB
6	B	902	CLR	C21-C20-C22-C23
6	B	902	CLR	C17-C20-C22-C23
6	R	902	CLR	C20-C22-C23-C24
6	B	902	CLR	C20-C22-C23-C24

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	901	GLU	2	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 CLR R 902	
Bond lengths	Bond angles
Torsions	Rings

Ligand CLR B 902	
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.