



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 05:23 AM UTC

PDB ID : 1UWY / pdb_00001uwy
Title : Crystal structure of human carboxypeptidase M
Authors : Maskos, K.; Reverter, D.; Bode, W.
Deposited on : 2004-02-17
Resolution : 3.00 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)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

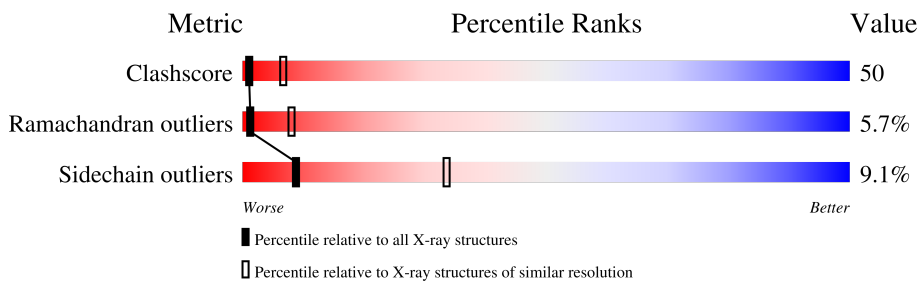
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.00 Å.

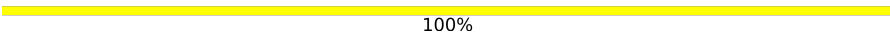
Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	190562	2977 (3.00-3.00)
Ramachandran outliers	187476	2877 (3.00-3.00)
Sidechain outliers	187428	2880 (3.00-3.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	426	
2	B	2	

2 Entry composition [i](#)

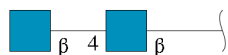
There are 4 unique types of molecules in this entry. The entry contains 3230 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 CARBOXYPEPTIDASE M.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	394	Total	C	N	O	S	90	0	1
			3176	2033	542	585	16			

- 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	3	0	0
			28	16	2	10			

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Zn	0	0
			1	1		

- Molecule 4 is water.

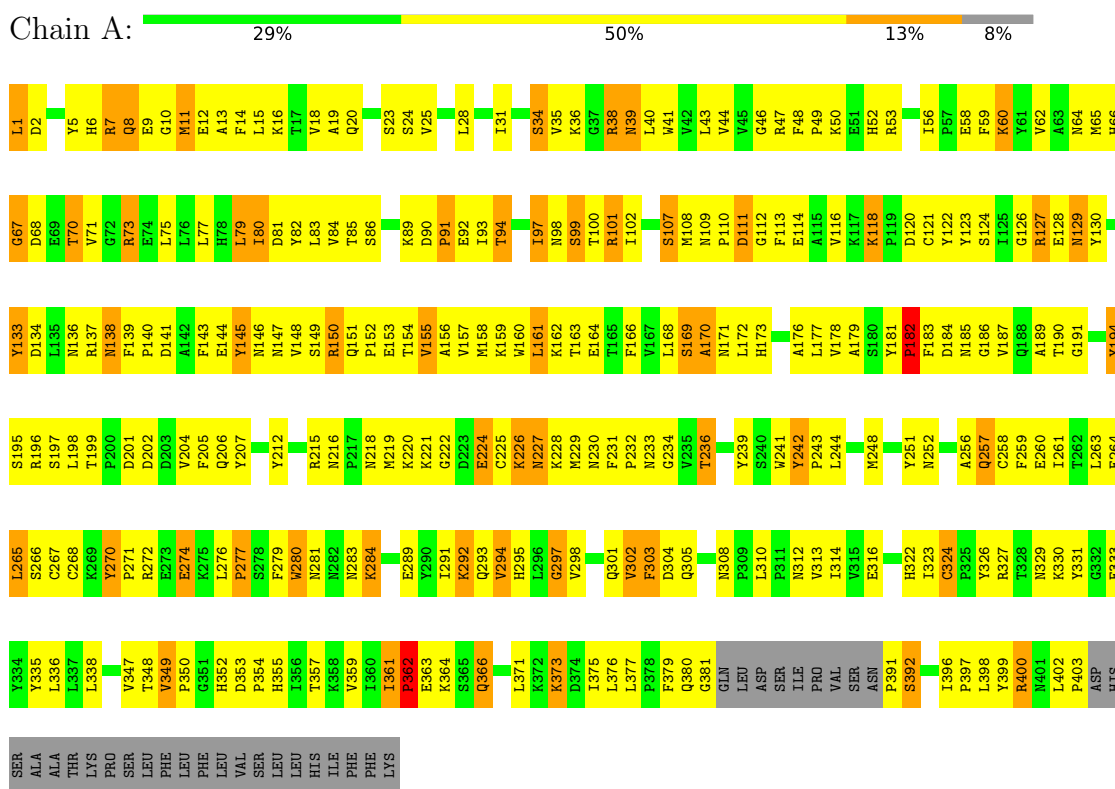
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	25	Total	O	0	0
			25	25		

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.

Note EDS was not executed.

• Molecule 1: CARBOXYPEPTIDASE M



4 Data and refinement statistics

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

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α , β , γ	85.83Å 85.83Å 124.54Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	30.00 – 3.00	Depositor
% Data completeness (in resolution range)	97.8 (30.00-3.00)	Depositor
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	CNS	Depositor
R, R_{free}	0.206 , 0.286	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3230	wwPDB-VP
Average B, all atoms (Å ²)	57.0	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: NAG, ZN

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	2/3263 (0.1%)	1.26	38/4430 (0.9%)

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

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	391	PRO	CG-CD	-6.67	1.28	1.50
1	A	391	PRO	N-CD	6.18	1.56	1.47

All (38) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	121	CYS	N-CA-C	9.12	122.40	111.82
1	A	70	THR	N-CA-C	8.99	124.03	112.89
1	A	324	CYS	CA-C-N	8.50	128.51	119.76
1	A	324	CYS	C-N-CA	8.50	128.51	119.76
1	A	107	SER	N-CA-C	8.13	120.73	107.32
1	A	118	LYS	CA-C-N	8.03	128.08	119.89
1	A	118	LYS	C-N-CA	8.03	128.08	119.89
1	A	361	ILE	CA-C-N	7.34	129.02	119.84
1	A	361	ILE	C-N-CA	7.34	129.02	119.84
1	A	270	TYR	CA-C-N	7.23	127.65	119.92
1	A	270	TYR	C-N-CA	7.23	127.65	119.92

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	265	LEU	N-CA-C	7.21	122.08	113.28
1	A	182	PRO	N-CA-C	7.04	121.07	111.22
1	A	73	ARG	N-CA-C	-6.95	103.64	111.07
1	A	68	ASP	N-CA-C	6.81	121.04	112.87
1	A	79	LEU	N-CA-C	-6.80	103.79	111.07
1	A	324	CYS	N-CA-C	-6.68	96.66	108.69
1	A	138	ASN	N-CA-C	6.64	121.44	112.88
1	A	10	GLY	N-CA-C	6.28	120.49	112.83
1	A	280	TRP	N-CA-C	-6.22	104.42	111.07
1	A	8	GLN	N-CA-C	5.86	118.14	111.11
1	A	123	TYR	N-CA-C	5.78	117.96	109.24
1	A	129	ASN	N-CA-C	-5.77	102.38	110.35
1	A	297	GLY	N-CA-C	5.72	121.30	111.47
1	A	176	ALA	N-CA-C	-5.64	100.37	108.60
1	A	124	SER	N-CA-C	5.63	115.83	107.88
1	A	169	SER	N-CA-C	5.63	115.71	108.34
1	A	60	LYS	N-CA-C	5.50	117.54	109.24
1	A	261	ILE	N-CA-C	-5.50	100.77	108.80
1	A	99	SER	N-CA-C	5.33	122.16	110.80
1	A	302	VAL	N-CA-C	5.31	115.50	107.75
1	A	39	ASN	N-CA-C	5.29	118.85	109.96
1	A	120	ASP	N-CA-C	5.15	116.34	108.52
1	A	194	TYR	N-CA-C	-5.13	106.71	113.17
1	A	137	ARG	N-CA-C	-5.12	105.40	113.02
1	A	267	CYS	N-CA-C	-5.09	105.38	111.03
1	A	281	ASN	N-CA-C	5.03	117.14	111.11
1	A	353	ASP	N-CA-C	-5.01	103.46	109.83

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	133	TYR	Sidechain

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	3176	0	3094	303	3
2	B	28	0	25	2	0
3	A	1	0	0	0	0
4	A	25	0	0	1	0
All	All	3230	0	3119	303	3

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 50.

All (303) 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:402:LEU:O	1:A:403:PRO:N	1.82	1.13
1:A:86:SER:HB2	1:A:93:ILE:HD13	1.29	1.13
1:A:47:ARG:HD2	2:B:1:NAG:H61	1.29	1.11
1:A:31:ILE:HG12	1:A:160:TRP:HB2	1.17	1.10
1:A:56:ILE:HD12	1:A:56:ILE:O	1.47	1.10
1:A:224:GLU:H	1:A:230:ASN:ND2	1.60	0.99
1:A:225:CYS:H	1:A:230:ASN:HD21	1.09	0.98
1:A:38:ARG:HG3	1:A:38:ARG:HH11	1.29	0.94
1:A:35:VAL:HG12	1:A:152:PRO:HG2	1.51	0.92
1:A:126:GLY:O	1:A:127:ARG:HB3	1.67	0.92
1:A:31:ILE:CG1	1:A:160:TRP:HB2	2.02	0.89
1:A:110:PRO:O	1:A:114:GLU:HG2	1.73	0.89
1:A:16:LYS:O	1:A:19:ALA:HB3	1.73	0.89
1:A:298:VAL:HG12	1:A:371:LEU:HB3	1.54	0.87
1:A:222:GLY:O	1:A:230:ASN:HB3	1.75	0.86
1:A:1:LEU:CD2	1:A:2:ASP:H	1.91	0.84
1:A:402:LEU:C	1:A:403:PRO:N	2.34	0.84
1:A:1:LEU:HD22	1:A:2:ASP:H	1.44	0.83
1:A:86:SER:CB	1:A:93:ILE:HD13	2.08	0.83
1:A:362:PRO:HD3	1:A:371:LEU:HD12	1.61	0.81
1:A:108:MET:HE3	1:A:157:VAL:HG21	1.63	0.81
1:A:60:LYS:HZ3	1:A:252:ASN:HD21	1.28	0.81
1:A:8:GLN:OE1	1:A:38:ARG:HD3	1.79	0.80
1:A:138:ASN:HD21	1:A:151:GLN:H	1.29	0.80
1:A:46:GLY:O	1:A:49:PRO:HD3	1.81	0.80
1:A:216:ASN:HB3	1:A:219:MET:HB3	1.65	0.79
1:A:301:GLN:HA	1:A:333:GLU:HA	1.65	0.78
1:A:65:MET:HE3	1:A:173:HIS:HE2	1.48	0.78
1:A:35:VAL:CG1	1:A:152:PRO:HG2	2.14	0.78
1:A:35:VAL:CG2	1:A:130:TYR:HB3	2.14	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:297:GLY:HA2	1:A:361:ILE:HD13	1.67	0.77
1:A:11:MET:HG3	1:A:77:LEU:HD11	1.64	0.77
1:A:184:ASP:HB3	1:A:244:LEU:HB3	1.66	0.76
1:A:185:ASN:HD22	1:A:186:GLY:H	1.32	0.75
1:A:304:ASP:HB3	1:A:310:LEU:HD21	1.68	0.74
1:A:47:ARG:CD	2:B:1:NAG:H61	2.15	0.74
1:A:190:THR:HG22	1:A:197:SER:HA	1.69	0.74
1:A:298:VAL:HG11	1:A:359:VAL:HG11	1.70	0.74
1:A:136:ASN:ND2	1:A:244:LEU:HD21	2.04	0.72
1:A:168:LEU:HB3	1:A:294:VAL:HG23	1.72	0.72
1:A:71:VAL:HG21	1:A:266:SER:HB3	1.70	0.72
1:A:329:ASN:OD1	1:A:333:GLU:HG2	1.89	0.72
1:A:35:VAL:HG21	1:A:130:TYR:HB3	1.71	0.72
1:A:93:ILE:O	1:A:97:ILE:HG13	1.89	0.71
1:A:225:CYS:N	1:A:230:ASN:HD21	1.86	0.71
1:A:1:LEU:HD22	1:A:2:ASP:N	2.06	0.71
1:A:159:LYS:O	1:A:162:LYS:HB2	1.92	0.70
1:A:204:VAL:HG11	1:A:259:PHE:HE2	1.55	0.69
1:A:182:PRO:HB3	1:A:183:PHE:HA	1.73	0.69
1:A:93:ILE:HG12	1:A:97:ILE:HD11	1.73	0.69
1:A:31:ILE:HG12	1:A:160:TRP:CB	2.10	0.68
1:A:67:GLY:HA3	1:A:127:ARG:H	1.59	0.68
1:A:242:TYR:HD2	1:A:242:TYR:C	2.03	0.67
1:A:8:GLN:O	1:A:12:GLU:HB2	1.94	0.67
1:A:138:ASN:ND2	1:A:154:THR:OG1	2.27	0.66
1:A:242:TYR:C	1:A:242:TYR:CD2	2.74	0.66
1:A:28:LEU:HD11	1:A:41:TRP:HE3	1.61	0.65
1:A:38:ARG:HG3	1:A:38:ARG:NH1	2.02	0.65
1:A:56:ILE:O	1:A:56:ILE:CD1	2.37	0.65
1:A:65:MET:HE3	1:A:173:HIS:NE2	2.11	0.65
1:A:185:ASN:ND2	1:A:186:GLY:H	1.92	0.65
1:A:71:VAL:O	1:A:75:LEU:HG	1.97	0.65
1:A:380:GLN:HG2	1:A:381:GLY:N	2.11	0.64
1:A:178:VAL:HG21	1:A:236:THR:HG22	1.78	0.64
1:A:316:GLU:OE2	1:A:322:HIS:HD2	1.80	0.64
1:A:60:LYS:HZ3	1:A:252:ASN:ND2	1.95	0.64
1:A:198:LEU:HD22	1:A:202:ASP:OD2	1.98	0.64
1:A:160:TRP:HA	1:A:163:THR:HG23	1.79	0.63
1:A:304:ASP:HB2	1:A:380:GLN:HA	1.80	0.63
1:A:28:LEU:HD11	1:A:41:TRP:CE3	2.33	0.63
1:A:362:PRO:CD	1:A:371:LEU:HD12	2.26	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:59:PHE:CE2	1:A:291:ILE:HA	2.34	0.62
1:A:136:ASN:HD22	1:A:244:LEU:HD21	1.63	0.62
1:A:169:SER:CB	1:A:260:GLU:HG3	2.29	0.62
1:A:6:HIS:O	1:A:73:ARG:NH2	2.32	0.62
1:A:362:PRO:HD3	1:A:371:LEU:CD1	2.30	0.62
1:A:43:LEU:HD13	1:A:80:ILE:HD13	1.81	0.62
1:A:183:PHE:CZ	1:A:199:THR:HG22	2.35	0.62
1:A:185:ASN:HD22	1:A:186:GLY:N	1.97	0.62
1:A:90:ASP:OD2	1:A:93:ILE:HG22	2.00	0.62
1:A:168:LEU:HD12	1:A:169:SER:H	1.64	0.62
1:A:90:ASP:HB3	1:A:93:ILE:CG2	2.30	0.61
1:A:349:VAL:O	1:A:352:HIS:HB2	2.00	0.61
1:A:1:LEU:CD2	1:A:2:ASP:N	2.62	0.61
1:A:169:SER:HB3	1:A:260:GLU:HG3	1.82	0.61
1:A:109:ASN:ND2	1:A:112:GLY:H	1.99	0.61
1:A:183:PHE:CE1	1:A:199:THR:HG22	2.36	0.61
1:A:62:VAL:O	1:A:171:ASN:HA	2.01	0.60
1:A:144:GLU:O	1:A:145:TYR:C	2.44	0.60
1:A:64:ASN:HB3	1:A:107:SER:HA	1.84	0.59
1:A:126:GLY:O	1:A:127:ARG:CB	2.45	0.59
1:A:232:PRO:O	1:A:233:ASN:HB2	2.03	0.59
1:A:150:ARG:HG2	1:A:150:ARG:HH11	1.68	0.58
1:A:161:LEU:HD21	1:A:252:ASN:ND2	2.19	0.58
1:A:168:LEU:HD12	1:A:169:SER:N	2.18	0.58
1:A:298:VAL:HG12	1:A:371:LEU:HD22	1.86	0.58
1:A:31:ILE:O	1:A:31:ILE:HG13	2.03	0.58
1:A:152:PRO:O	1:A:155:VAL:HG12	2.03	0.58
1:A:172:LEU:CD2	1:A:263:LEU:HD12	2.34	0.58
1:A:302:VAL:HG22	1:A:375:ILE:HB	1.86	0.58
1:A:38:ARG:NH1	1:A:111:ASP:HA	2.19	0.57
1:A:201:ASP:HB3	1:A:204:VAL:HG12	1.86	0.57
1:A:224:GLU:H	1:A:230:ASN:HD22	1.48	0.57
1:A:25:VAL:HG11	1:A:47:ARG:NH1	2.19	0.57
1:A:1:LEU:HD23	1:A:2:ASP:H	1.69	0.57
1:A:257:GLN:HG3	1:A:326:TYR:CD2	2.40	0.57
1:A:49:PRO:O	1:A:50:LYS:HB3	2.02	0.56
1:A:225:CYS:H	1:A:230:ASN:ND2	1.92	0.56
1:A:77:LEU:O	1:A:80:ILE:HB	2.06	0.56
1:A:257:GLN:OE1	1:A:326:TYR:HA	2.05	0.56
1:A:272:ARG:NH2	1:A:274:GLU:OE2	2.36	0.56
1:A:178:VAL:HG21	1:A:236:THR:CG2	2.34	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:39:ASN:HB3	1:A:41:TRP:CE2	2.40	0.56
1:A:143:PHE:CD1	1:A:185:ASN:HB3	2.41	0.56
1:A:80:ILE:HG22	1:A:81:ASP:N	2.20	0.56
1:A:60:LYS:NZ	1:A:252:ASN:ND2	2.54	0.56
1:A:161:LEU:HD23	1:A:256:ALA:HB2	1.88	0.56
1:A:218:ASN:HA	1:A:221:LYS:HE2	1.89	0.55
1:A:268:CYS:O	1:A:271:PRO:HD3	2.06	0.55
1:A:60:LYS:HE2	1:A:161:LEU:HD11	1.88	0.55
1:A:239:TYR:CE2	1:A:243:PRO:HG3	2.41	0.55
1:A:323:ILE:HG23	1:A:324:CYS:N	2.22	0.55
1:A:66:HIS:O	1:A:67:GLY:C	2.50	0.55
1:A:177:LEU:HA	1:A:264:GLU:O	2.07	0.55
1:A:38:ARG:HH11	1:A:38:ARG:CG	2.09	0.55
1:A:71:VAL:HG21	1:A:266:SER:CB	2.36	0.54
1:A:276:LEU:O	1:A:277:PRO:C	2.49	0.54
1:A:178:VAL:CG2	1:A:236:THR:HG22	2.38	0.54
1:A:138:ASN:ND2	1:A:151:GLN:HG2	2.22	0.54
1:A:349:VAL:HG11	1:A:379:PHE:CE1	2.43	0.54
1:A:100:THR:HG22	1:A:101:ARG:N	2.23	0.54
1:A:101:ARG:HG2	1:A:101:ARG:NH2	2.23	0.54
1:A:161:LEU:HD23	1:A:256:ALA:CB	2.38	0.53
1:A:178:VAL:HG22	1:A:179:ALA:N	2.22	0.53
1:A:102:ILE:HD13	1:A:291:ILE:HD13	1.91	0.53
1:A:144:GLU:O	1:A:144:GLU:HG3	2.08	0.53
1:A:335:TYR:O	1:A:336:LEU:HD23	2.09	0.53
1:A:169:SER:OG	1:A:260:GLU:HG3	2.09	0.53
1:A:313:VAL:O	1:A:327:ARG:HA	2.09	0.53
1:A:252:ASN:HA	1:A:256:ALA:HB3	1.89	0.53
1:A:83:LEU:HA	1:A:93:ILE:HD11	1.90	0.52
1:A:90:ASP:HB3	1:A:93:ILE:HG22	1.91	0.52
1:A:90:ASP:CG	1:A:93:ILE:HG22	2.34	0.52
1:A:178:VAL:HG23	1:A:234:GLY:O	2.09	0.52
1:A:314:ILE:HG13	1:A:327:ARG:NH1	2.24	0.52
1:A:59:PHE:CD1	1:A:59:PHE:C	2.87	0.52
1:A:138:ASN:HD21	1:A:151:GLN:N	2.05	0.52
1:A:101:ARG:HG2	1:A:101:ARG:HH21	1.75	0.52
1:A:366:GLN:HE21	1:A:366:GLN:HA	1.75	0.52
1:A:133:TYR:OH	1:A:149:SER:HB3	2.10	0.52
1:A:70:THR:HG21	1:A:270:TYR:CE2	2.45	0.52
1:A:100:THR:HG22	1:A:101:ARG:H	1.75	0.52
1:A:169:SER:O	1:A:170:ALA:HB2	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:349:VAL:HG13	1:A:352:HIS:HB2	1.92	0.52
1:A:149:SER:O	1:A:151:GLN:NE2	2.28	0.51
1:A:111:ASP:OD1	1:A:111:ASP:N	2.42	0.51
1:A:212:TYR:CE2	1:A:263:LEU:HD13	2.45	0.51
1:A:310:LEU:HD11	1:A:377:LEU:HD12	1.93	0.51
1:A:81:ASP:O	1:A:82:TYR:C	2.54	0.51
1:A:257:GLN:OE1	1:A:327:ARG:N	2.42	0.51
1:A:31:ILE:CG1	1:A:31:ILE:O	2.58	0.51
1:A:338:LEU:HD12	1:A:361:ILE:HD11	1.93	0.51
1:A:127:ARG:NH1	1:A:134:ASP:OD2	2.44	0.50
1:A:185:ASN:ND2	1:A:186:GLY:N	2.56	0.50
1:A:204:VAL:CG1	1:A:259:PHE:HE2	2.23	0.50
1:A:190:THR:HG22	1:A:198:LEU:H	1.77	0.50
1:A:53:ARG:O	1:A:56:ILE:HG13	2.11	0.50
1:A:56:ILE:HD12	1:A:56:ILE:C	2.30	0.50
1:A:166:PHE:O	1:A:258:CYS:HB3	2.11	0.50
1:A:305:GLN:HB2	4:A:609:HOH:O	2.11	0.50
1:A:396:ILE:O	1:A:396:ILE:HG13	2.12	0.50
1:A:219:MET:HE1	1:A:265:LEU:HD23	1.92	0.49
1:A:293:GLN:C	1:A:295:HIS:H	2.20	0.49
1:A:348:THR:OG1	1:A:354:PRO:HB3	2.12	0.49
1:A:280:TRP:CZ2	1:A:284:LYS:HG3	2.47	0.49
1:A:347:VAL:HB	1:A:355:HIS:HB3	1.93	0.49
1:A:86:SER:HB3	1:A:93:ILE:HG21	1.94	0.49
1:A:239:TYR:C	1:A:241:TRP:N	2.67	0.49
1:A:226:LYS:C	1:A:228:LYS:H	2.20	0.49
1:A:396:ILE:O	1:A:398:LEU:HD23	2.12	0.49
1:A:265:LEU:HD22	1:A:283:ASN:HD21	1.77	0.49
1:A:283:ASN:O	1:A:284:LYS:C	2.56	0.49
1:A:108:MET:SD	1:A:248:MET:HE1	2.53	0.49
1:A:190:THR:HG22	1:A:190:THR:O	2.13	0.49
1:A:190:THR:CG2	1:A:198:LEU:N	2.76	0.49
1:A:86:SER:HB2	1:A:93:ILE:CD1	2.21	0.48
1:A:109:ASN:HD21	1:A:112:GLY:H	1.60	0.48
1:A:160:TRP:HA	1:A:163:THR:CG2	2.42	0.48
1:A:239:TYR:C	1:A:241:TRP:H	2.21	0.48
1:A:224:GLU:N	1:A:230:ASN:ND2	2.45	0.48
1:A:5:TYR:CE1	1:A:270:TYR:HE2	2.32	0.47
1:A:141:ASP:OD2	1:A:143:PHE:HB2	2.14	0.47
1:A:178:VAL:H	1:A:264:GLU:HB2	1.80	0.47
1:A:12:GLU:HA	1:A:15:LEU:HD12	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:44:VAL:HA	1:A:102:ILE:O	2.15	0.47
1:A:146:ASN:O	1:A:147:ASN:C	2.58	0.47
1:A:366:GLN:NE2	1:A:366:GLN:CA	2.78	0.47
1:A:38:ARG:NH1	1:A:38:ARG:CG	2.69	0.47
1:A:60:LYS:HE2	1:A:161:LEU:CD1	2.44	0.47
1:A:116:VAL:HG21	1:A:270:TYR:HE1	1.79	0.47
1:A:155:VAL:O	1:A:156:ALA:C	2.58	0.47
1:A:215:ARG:NE	1:A:289:GLU:HG3	2.29	0.47
1:A:85:THR:O	1:A:89:LYS:HD2	2.14	0.47
1:A:108:MET:HE3	1:A:157:VAL:CG2	2.40	0.47
1:A:146:ASN:O	1:A:148:VAL:HG22	2.15	0.47
1:A:222:GLY:HA2	1:A:231:PHE:O	2.15	0.47
1:A:70:THR:HG21	1:A:270:TYR:CZ	2.50	0.47
1:A:349:VAL:HG11	1:A:379:PHE:CZ	2.50	0.47
1:A:181:TYR:CZ	1:A:206:GLN:HG2	2.50	0.46
1:A:289:GLU:OE1	1:A:292:LYS:HE3	2.15	0.46
1:A:14:PHE:O	1:A:18:VAL:HG23	2.16	0.46
1:A:187:VAL:HG12	1:A:189:ALA:H	1.79	0.46
1:A:329:ASN:CG	1:A:333:GLU:HG2	2.40	0.46
1:A:212:TYR:CD1	1:A:212:TYR:C	2.94	0.46
1:A:263:LEU:HB3	1:A:265:LEU:HD21	1.98	0.46
1:A:380:GLN:CG	1:A:381:GLY:N	2.78	0.46
1:A:91:PRO:O	1:A:92:GLU:C	2.57	0.46
1:A:313:VAL:CG1	1:A:314:ILE:N	2.78	0.46
1:A:25:VAL:C	1:A:49:PRO:HG3	2.40	0.46
1:A:190:THR:HG22	1:A:197:SER:CA	2.44	0.46
1:A:330:LYS:HD2	1:A:331:TYR:CZ	2.51	0.46
1:A:7:ARG:HA	1:A:113:PHE:HE2	1.80	0.46
1:A:153:GLU:H	1:A:153:GLU:CD	2.24	0.46
1:A:44:VAL:CG1	1:A:101:ARG:HG3	2.46	0.45
1:A:64:ASN:ND2	1:A:107:SER:OG	2.37	0.45
1:A:150:ARG:HG2	1:A:150:ARG:NH1	2.31	0.45
1:A:133:TYR:CE2	1:A:151:GLN:NE2	2.84	0.45
1:A:190:THR:HG22	1:A:198:LEU:N	2.31	0.45
1:A:14:PHE:HE1	1:A:80:ILE:HG21	1.81	0.45
1:A:90:ASP:CB	1:A:93:ILE:HG22	2.46	0.45
1:A:155:VAL:CG1	1:A:156:ALA:N	2.80	0.45
1:A:204:VAL:HG13	1:A:205:PHE:N	2.32	0.45
1:A:396:ILE:O	1:A:398:LEU:N	2.49	0.45
1:A:93:ILE:O	1:A:97:ILE:CG1	2.63	0.44
1:A:108:MET:SD	1:A:248:MET:CE	3.05	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:140:PRO:HG3	1:A:150:ARG:NH2	2.32	0.44
1:A:138:ASN:CG	1:A:138:ASN:O	2.60	0.44
1:A:229:MET:CG	1:A:230:ASN:N	2.80	0.44
1:A:366:GLN:HA	1:A:366:GLN:NE2	2.32	0.44
1:A:116:VAL:O	1:A:116:VAL:HG23	2.17	0.44
1:A:191:GLY:O	1:A:196:ARG:O	2.36	0.44
1:A:108:MET:CE	1:A:157:VAL:HG21	2.43	0.44
1:A:169:SER:OG	1:A:170:ALA:N	2.50	0.44
1:A:116:VAL:CG2	1:A:270:TYR:HE1	2.31	0.44
1:A:159:LYS:O	1:A:162:LYS:N	2.40	0.44
1:A:172:LEU:HD21	1:A:263:LEU:HD12	1.99	0.43
1:A:222:GLY:CA	1:A:231:PHE:O	2.66	0.43
1:A:116:VAL:HG21	1:A:270:TYR:CE1	2.52	0.43
1:A:178:VAL:HG23	1:A:234:GLY:C	2.43	0.43
1:A:178:VAL:O	1:A:264:GLU:HB2	2.18	0.43
1:A:323:ILE:HG23	1:A:324:CYS:H	1.82	0.43
1:A:380:GLN:HG2	1:A:381:GLY:OXT	2.17	0.43
1:A:58:GLU:OE2	1:A:101:ARG:NH2	2.51	0.43
1:A:64:ASN:HD22	1:A:107:SER:CB	2.29	0.43
1:A:91:PRO:HG2	1:A:92:GLU:H	1.83	0.43
1:A:399:TYR:O	1:A:400:ARG:C	2.62	0.43
1:A:93:ILE:HG23	1:A:94:THR:N	2.34	0.43
1:A:34:SER:C	1:A:36:LYS:H	2.27	0.43
1:A:12:GLU:O	1:A:13:ALA:C	2.61	0.43
1:A:108:MET:HE1	1:A:139:PHE:HZ	1.84	0.42
1:A:293:GLN:C	1:A:295:HIS:N	2.75	0.42
1:A:313:VAL:HG12	1:A:314:ILE:N	2.34	0.42
1:A:133:TYR:CZ	1:A:149:SER:HB3	2.54	0.42
1:A:265:LEU:HD22	1:A:283:ASN:ND2	2.33	0.42
1:A:361:ILE:O	1:A:362:PRO:O	2.38	0.42
1:A:158:MET:HG2	1:A:251:TYR:CZ	2.55	0.42
1:A:231:PHE:CD2	1:A:231:PHE:N	2.87	0.42
1:A:40:LEU:N	1:A:40:LEU:HD23	2.35	0.42
1:A:151:GLN:HB3	1:A:152:PRO:HD2	2.01	0.42
1:A:91:PRO:O	1:A:94:THR:N	2.53	0.42
1:A:190:THR:HG21	1:A:197:SER:OG	2.19	0.42
1:A:377:LEU:HD23	1:A:377:LEU:HA	1.80	0.42
1:A:20:GLN:HA	1:A:20:GLN:NE2	2.35	0.42
1:A:79:LEU:O	1:A:82:TYR:HB3	2.20	0.42
1:A:242:TYR:CD2	1:A:243:PRO:O	2.73	0.42
1:A:289:GLU:OE1	1:A:292:LYS:CE	2.67	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:194:TYR:O	1:A:195:SER:HB2	2.20	0.41
1:A:359:VAL:CG2	1:A:373:LYS:HG3	2.50	0.41
1:A:59:PHE:CD1	1:A:60:LYS:N	2.88	0.41
1:A:218:ASN:CA	1:A:221:LYS:HE2	2.50	0.41
1:A:226:LYS:C	1:A:228:LYS:N	2.78	0.41
1:A:182:PRO:CB	1:A:183:PHE:HA	2.41	0.41
1:A:39:ASN:C	1:A:40:LEU:HD23	2.45	0.41
1:A:83:LEU:O	1:A:84:VAL:C	2.59	0.41
1:A:298:VAL:CG1	1:A:371:LEU:HB3	2.39	0.41
1:A:28:LEU:HD11	1:A:41:TRP:HB3	2.02	0.41
1:A:101:ARG:HH21	1:A:101:ARG:CG	2.32	0.41
1:A:207:TYR:CD1	1:A:207:TYR:C	2.98	0.41
1:A:160:TRP:CA	1:A:163:THR:HG23	2.49	0.41
1:A:161:LEU:HD21	1:A:252:ASN:CG	2.46	0.41
1:A:242:TYR:HD2	1:A:243:PRO:N	2.18	0.41
1:A:172:LEU:HD22	1:A:263:LEU:HB2	2.02	0.41
1:A:279:PHE:O	1:A:280:TRP:C	2.63	0.41
1:A:122:TYR:HE2	1:A:227:ASN:HB2	1.85	0.40
1:A:242:TYR:O	1:A:243:PRO:C	2.64	0.40
1:A:52:HIS:NE2	1:A:333:GLU:OE1	2.51	0.40
1:A:178:VAL:CG2	1:A:179:ALA:N	2.84	0.40
1:A:220:LYS:HE2	1:A:220:LYS:HB3	1.87	0.40
1:A:239:TYR:CE2	1:A:243:PRO:HB3	2.57	0.40
1:A:323:ILE:CG2	1:A:324:CYS:N	2.85	0.40
1:A:127:ARG:HG3	1:A:128:GLU:N	2.36	0.40
1:A:158:MET:HE3	1:A:251:TYR:CE1	2.57	0.40
1:A:303:PHE:HB3	1:A:308:ASN:N	2.36	0.40

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:118:LYS:NZ	1:A:133:TYR:CE2[5_555]	1.65	0.55
1:A:118:LYS:NZ	1:A:133:TYR:CD2[5_555]	1.94	0.26
1:A:118:LYS:NZ	1:A:133:TYR:CZ[5_555]	2.18	0.02

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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	389/426 (91%)	320 (82%)	47 (12%)	22 (6%)	1 8

All (22) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	127	ARG
1	A	362	PRO
1	A	363	GLU
1	A	364	LYS
1	A	392	SER
1	A	397	PRO
1	A	67	GLY
1	A	99	SER
1	A	170	ALA
1	A	226	LYS
1	A	284	LYS
1	A	312	ASN
1	A	7	ARG
1	A	9	GLU
1	A	23	SER
1	A	91	PRO
1	A	145	TYR
1	A	400	ARG
1	A	227	ASN
1	A	292	LYS
1	A	34	SER
1	A	98	ASN

5.3.2 Protein sidechains [i](#)

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	351/382 (92%)	319 (91%)	32 (9%)	9	33

All (32) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	LEU
1	A	11	MET
1	A	24	SER
1	A	38	ARG
1	A	48	PHE
1	A	80	ILE
1	A	94	THR
1	A	97	ILE
1	A	101	ARG
1	A	111	ASP
1	A	129	ASN
1	A	150	ARG
1	A	155	VAL
1	A	161	LEU
1	A	164	GLU
1	A	182	PRO
1	A	224	GLU
1	A	236	THR
1	A	242	TYR
1	A	257	GLN
1	A	274	GLU
1	A	277	PRO
1	A	294	VAL
1	A	303	PHE
1	A	349	VAL
1	A	350	PRO
1	A	357	THR
1	A	362	PRO
1	A	366	GLN
1	A	373	LYS
1	A	376	LEU
1	A	392	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	4	ASN
1	A	20	GLN
1	A	21	ASN
1	A	27	HIS
1	A	64	ASN
1	A	109	ASN
1	A	138	ASN
1	A	146	ASN
1	A	185	ASN
1	A	230	ASN
1	A	237	ASN
1	A	245	GLN
1	A	252	ASN
1	A	283	ASN
1	A	301	GLN
1	A	306	ASN
1	A	308	ASN
1	A	322	HIS
1	A	352	HIS
1	A	355	HIS
1	A	366	GLN
1	A	380	GLN

5.3.3 RNA ⓘ

There are no RNA molecules 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 ⓘ

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	0.72	0	17,19,21	0.90	0
2	NAG	B	2	2	14,14,15	0.58	0	17,19,21	0.73	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
2	NAG	B	1	1,2	-	4/6/23/26	0/1/1/1
2	NAG	B	2	2	-	4/6/23/26	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	2	NAG	C2-N2-C7	-2.08	120.11	122.90

There are no chirality outliers.

All (8) torsion outliers are listed below:

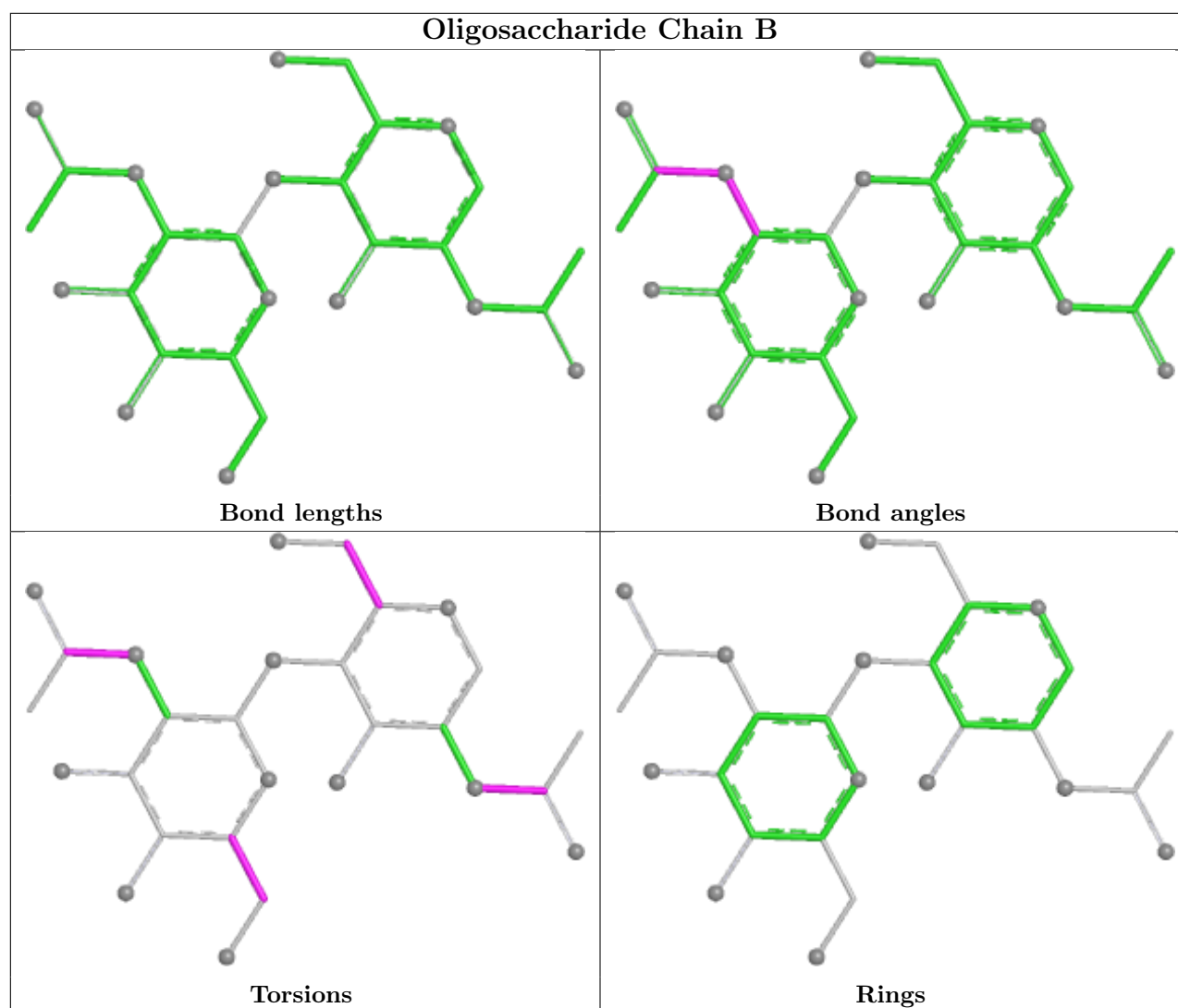
Mol	Chain	Res	Type	Atoms
2	B	1	NAG	C8-C7-N2-C2
2	B	1	NAG	O7-C7-N2-C2
2	B	2	NAG	C8-C7-N2-C2
2	B	2	NAG	O7-C7-N2-C2
2	B	1	NAG	O5-C5-C6-O6
2	B	2	NAG	O5-C5-C6-O6
2	B	1	NAG	C4-C5-C6-O6
2	B	2	NAG	C4-C5-C6-O6

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1	NAG	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 oligosaccharide.



5.6 Ligand geometry [i](#)

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

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

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	402:LEU	C	403:PRO	N	2.34

6 Fit of model and data

6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.