WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB EM Validation Report (i)

Nov 5, 2024 – 10:18 AM JST

PDB ID	:	8JIP
EMDB ID	:	EMD-36323
Title	:	Cryo-EM structure of the GLP-1R/GCGR dual agonist MEDI0382-bound human GLP-1R-Gs complex
Authors	:	Yang, L.; Zhou, Q.T.; Dai, A.T.; Zhao, F.H.; Chang, R.L.; Ying, T.L.; Wu, B.L.; Yang, D.H.; Wang, M.W.; Cong, Z.T.
Deposited on	:	2023-05-27
Resolution	:	2.85 Å(reported)

This is a Full wwPDB EM 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/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:

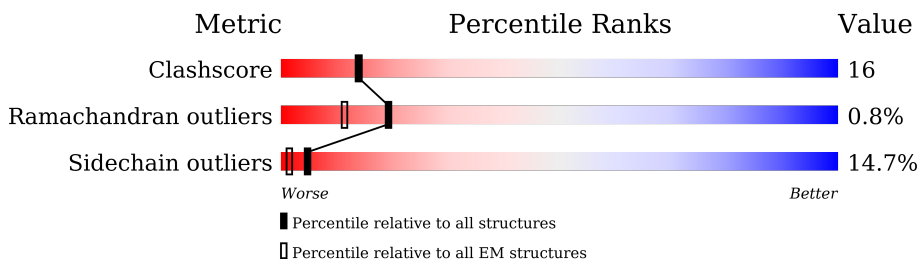|		
EMDB validation analysis	:	FAILED
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 2.85 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		16
Ramachandran outliers		0.8%
Sidechain outliers		14.7%

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	R	440	51% 28% 8% · 12%
2	A	361	49% 16% · 32%
3	P	29	66% 28% 7%
4	B	345	77% 19% · ·
5	G	70	66% 10% · 20%
6	N	140	72% 18% 10%

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 9399 atoms, of which 37 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 Glucagon-like peptide 1 receptor.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	R	386	Total	C	N	O	S	0	0
			3109	2057	501	532	19		

- Molecule 2 is a protein called Guanine nucleotide-binding protein G(s) subunit alpha isoforms short.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	A	245	Total	C	N	O	S	0	0
			2016	1273	361	374	8		

- Molecule 3 is a protein called MEDI0382.

Mol	Chain	Residues	Atoms				AltConf	Trace
3	P	29	Total	C	N	O	0	0
			231	143	38	50		

- Molecule 4 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	B	338	Total	C	N	O	S	0	0
			2590	1599	464	506	21		

There are 6 discrepancies between the modelled and reference sequences:

| Chain	Residue	Modelled	Actual	Comment	Reference
B	-4	MET	-	initiating methionine	UNP P54311
B	-3	GLY	-	expression tag	UNP P54311
B	-2	SER	-	expression tag	UNP P54311
B	-1	LEU	-	expression tag	UNP P54311
B	0	LEU	-	expression tag	UNP P54311
B	1	GLN	-	expression tag	UNP P54311

- Molecule 5 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	G	56	Total 429	C 269	N 76	O 81	S 3	0	0

- Molecule 6 is a protein called Nanobody 35.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	N	126	Total 961	C 599	N 168	O 188	S 6	0	0

- Molecule 7 is N-hexadecanoyl-L-glutamic acid (three-letter code: D6M) (formula: $C_{21}H_{39}NO_5$) (labeled as "Ligand of Interest" by depositor).
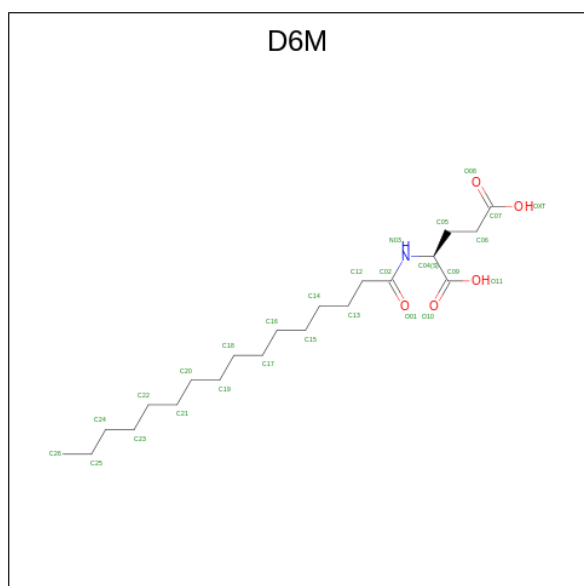

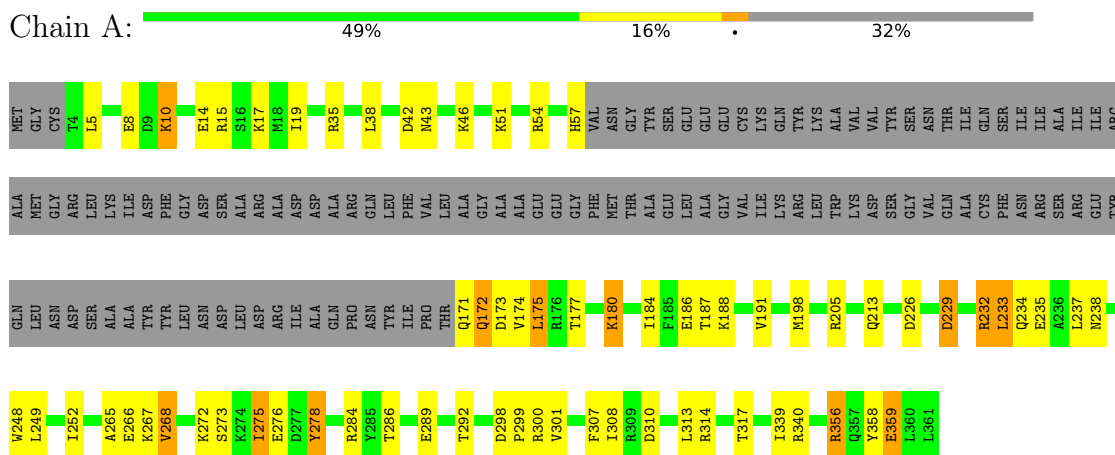| Mol	Chain	Residues	Atoms					AltConf
7	P	1	Total 63	C 21	H 37	N 1	O 4	0

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.

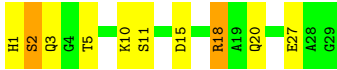• Molecule 1: Glucagon-like peptide 1 receptor

Chain R:
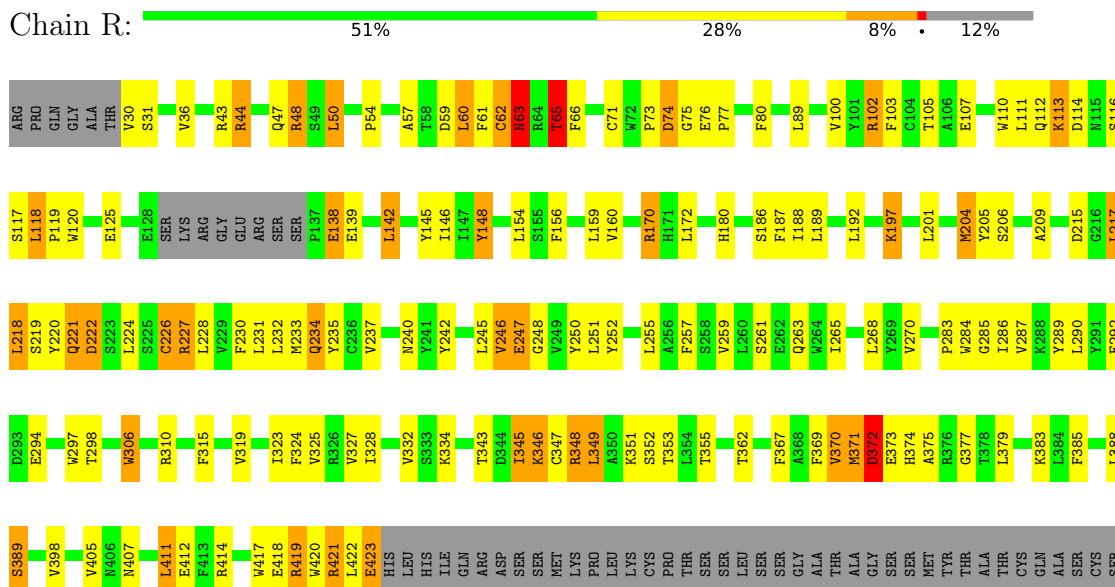
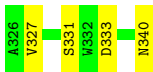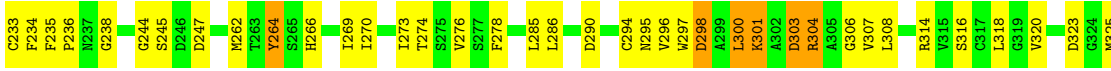• Molecule 2: Guanine nucleotide-binding protein G(s) subunit alpha isoforms short

Chain A:

• Molecule 3: MEDI0382

Chain P:

H1 S2 Q3 G4 T5 K10 S11 D15 R18 A19 Q20 E27 A28 G29

• Molecule 4: Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1

Chain B:

77% 19%

MET GLY SER LEU LEU GLN SER E3 L4 E12 N16 I33 T34 P39 L51 I58 W82 K127 V133 R134 V135 S136 L139 T159 S160 T165 W169 T178 T181 D186 L190 L210 R214 E215 G216 M217 C218 R219 Q220 T221

C233 F234 F235 P236 N237 G238 G244 S245 D246 D247 M262 T263 Y264 S265 H266 I269 I270 I273 T274 S275 V276 S277 F278 L285 L286 D290 C294 N295 V296 W297 D298 A299 L300 K301 A302 D303 R304 A305 G306 V307 L308 R314 V315 S316 C317 L318 G319 V320 D323 G324 M325

A326 V327 S331 W332 D333 N340

• Molecule 5: Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2

Chain G:

66% 10% 20%

ALA SER ASN ASN THR A7 L19 K20 M21 I25 D26 A34 M38 A39 A43 D48 L51 R62 GLU LYS LYS PHE PHE CYS ALA ILE LEU

• Molecule 6: Nanobody 35

Chain N:

72% 18% 10%

MET ALA Q1 V2 Q3 L4 Q5 E6 L20 S21 C22 V37 R38 Q39 L45 I51 G55 V64 K65 G66 R67 I70 S71 L79 Y80 L81 Y95 P100 T104 R105 D106 C107 S112 R118 V126 SER SER HIS HIS HIS HIS HIS HIS GLU PRO GLU

ALA
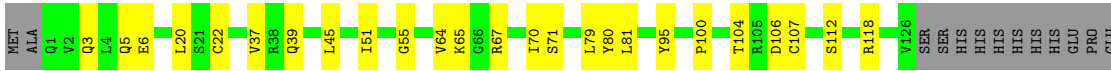
4　Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	796065	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	80	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (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: D6M

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	R	0.41	0/3203	0.57	0/4373
2	A	0.36	0/2055	0.49	0/2772
3	P	0.50	0/236	0.59	0/318
4	B	0.27	0/2637	0.47	0/3577
5	G	0.25	0/435	0.41	0/587
6	N	0.27	0/981	0.49	0/1329
All	All	0.35	0/9547	0.51	0/12956

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	R	3109	0	3019	147	0
2	A	2016	0	1975	48	0
3	P	231	0	203	16	0
4	B	2590	0	2490	62	0
5	G	429	0	441	13	0
6	N	961	0	928	14	0
7	P	26	37	37	4	0
All	All	9362	37	9093	286	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 16.

All (286) 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)
3:P:10:LYS:NZ	7:P:101:D6M:C07	1.71	1.53
4:B:39:PRO:HA	4:B:301:LYS:CE	1.47	1.43
4:B:39:PRO:CA	4:B:301:LYS:HE2	1.49	1.42
1:R:237:VAL:HG11	3:P:1:HIS:HD2	1.07	1.17
4:B:262:MET:HB3	4:B:264:TYR:CE1	1.78	1.17
1:R:289:TYR:HB2	1:R:297:TRP:HZ2	1.12	1.13
4:B:262:MET:HB3	4:B:264:TYR:HE1	1.04	1.12
1:R:227:ARG:HH11	1:R:227:ARG:HB2	1.11	1.12
1:R:289:TYR:HB2	1:R:297:TRP:CZ2	1.92	1.05
1:R:237:VAL:HG11	3:P:1:HIS:CD2	1.92	1.03
2:A:356:ARG:HH11	2:A:356:ARG:HB2	1.19	1.02
4:B:39:PRO:CB	4:B:301:LYS:HE2	1.93	0.98
1:R:217:LEU:O	1:R:221:GLN:HB2	1.62	0.98
2:A:232:ARG:HG2	2:A:232:ARG:HH11	1.30	0.96
4:B:39:PRO:CA	4:B:301:LYS:CE	2.26	0.92
3:P:10:LYS:HZ2	7:P:101:D6M:C07	1.73	0.92
4:B:39:PRO:HA	4:B:301:LYS:NZ	1.85	0.91
4:B:262:MET:CB	4:B:264:TYR:HE1	1.85	0.90
4:B:262:MET:CB	4:B:264:TYR:CE1	2.56	0.88
4:B:39:PRO:HA	4:B:301:LYS:HE2	0.88	0.87
2:A:356:ARG:HH11	2:A:356:ARG:CB	1.88	0.87
1:R:142:LEU:HD12	1:R:142:LEU:O	1.76	0.86
5:G:21:MET:HE2	5:G:21:MET:O	1.74	0.85
2:A:233:LEU:O	2:A:233:LEU:HD12	1.76	0.85
1:R:206:SER:HA	1:R:209:ALA:HB3	1.58	0.84
1:R:48:ARG:HG3	1:R:48:ARG:HH11	1.43	0.83
1:R:227:ARG:HH11	1:R:227:ARG:CB	1.90	0.82
1:R:421:ARG:HH11	1:R:421:ARG:HG3	1.41	0.81
1:R:48:ARG:HD2	1:R:48:ARG:O	1.84	0.78
2:A:276:GLU:OE1	2:A:276:GLU:N	2.16	0.78
1:R:50:LEU:HD12	1:R:50:LEU:O	1.83	0.78
1:R:170:ARG:HG3	1:R:170:ARG:HH11	1.50	0.77
3:P:10:LYS:CE	7:P:101:D6M:C07	2.63	0.77
1:R:421:ARG:HG3	1:R:421:ARG:NH1	1.98	0.74
2:A:268:VAL:HG11	2:A:301:VAL:HG12	1.68	0.74
5:G:39:ALA:O	5:G:43:ALA:HB2	1.89	0.73
4:B:39:PRO:HB3	4:B:301:LYS:HE2	1.69	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:R:234:GLN:HG3	1:R:284:TRP:CZ3	2.24	0.72
1:R:227:ARG:HB2	1:R:227:ARG:NH1	1.96	0.72
4:B:296:VAL:HG23	4:B:296:VAL:O	1.90	0.70
3:P:2:SER:HA	3:P:5:THR:HG22	1.72	0.70
4:B:300:LEU:HD23	5:G:38:MET:CE	2.21	0.70
4:B:300:LEU:HD23	5:G:38:MET:HE1	1.74	0.70
4:B:233:CYS:SG	4:B:234:PHE:N	2.65	0.69
1:R:423:GLU:HA	1:R:423:GLU:OE1	1.93	0.69
6:N:65:LYS:O	6:N:67:ARG:NH1	2.25	0.69
1:R:348:ARG:NE	1:R:348:ARG:O	2.26	0.69
1:R:47:GLN:HA	1:R:47:GLN:OE1	1.93	0.68
1:R:118:LEU:O	1:R:118:LEU:HG	1.94	0.68
1:R:419:ARG:NH1	1:R:419:ARG:HG3	2.08	0.68
6:N:3:GLN:HE22	6:N:5:GLN:HB2	1.58	0.68
1:R:419:ARG:HG3	1:R:419:ARG:HH11	1.58	0.68
4:B:296:VAL:HG22	4:B:306:GLY:CA	2.24	0.67
1:R:138:GLU:HA	1:R:138:GLU:OE2	1.94	0.67
2:A:232:ARG:HG2	2:A:232:ARG:NH1	2.02	0.67
4:B:296:VAL:CG2	4:B:306:GLY:HA3	2.24	0.66
2:A:38:LEU:HD21	2:A:46:LYS:HG3	1.78	0.66
1:R:186:SER:OG	1:R:240:ASN:HA	1.96	0.66
2:A:233:LEU:HD12	2:A:233:LEU:C	2.15	0.65
1:R:44:ARG:HG3	1:R:44:ARG:HH11	1.61	0.65
6:N:71:SER:HB2	6:N:80:TYR:HB2	1.78	0.65
4:B:296:VAL:HG22	4:B:306:GLY:HA3	1.80	0.64
1:R:306:TRP:HH2	3:P:1:HIS:ND1	1.95	0.64
2:A:356:ARG:HB2	2:A:356:ARG:NH1	2.04	0.64
2:A:359:GLU:N	2:A:359:GLU:OE1	2.31	0.63
4:B:300:LEU:HD12	4:B:300:LEU:H	1.62	0.63
1:R:219:SER:HA	1:R:222:ASP:OD1	1.99	0.63
1:R:349:LEU:C	1:R:349:LEU:HD23	2.18	0.63
1:R:160:VAL:HG12	1:R:188:ILE:CD1	2.29	0.62
1:R:170:ARG:HH11	1:R:170:ARG:CG	2.12	0.62
1:R:421:ARG:HD3	1:R:421:ARG:O	1.99	0.62
1:R:48:ARG:HH11	1:R:48:ARG:CG	2.13	0.62
1:R:306:TRP:HH2	3:P:1:HIS:CE1	2.17	0.61
1:R:310:ARG:NH1	1:R:372:ASP:HB2	2.16	0.61
2:A:186:GLU:HG2	2:A:198:MET:HB3	1.83	0.61
1:R:54:PRO:HD2	1:R:73:PRO:HD2	1.80	0.61
1:R:217:LEU:HD13	1:R:217:LEU:N	2.16	0.61
6:N:22:CYS:HB2	6:N:79:LEU:HD13	1.81	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:R:142:LEU:HD12	1:R:142:LEU:C	2.20	0.60
2:A:356:ARG:HH11	2:A:356:ARG:CG	2.15	0.60
1:R:30:VAL:HG12	1:R:30:VAL:O	2.01	0.60
1:R:44:ARG:HE	1:R:47:GLN:HB2	1.66	0.60
1:R:419:ARG:HH11	1:R:419:ARG:CG	2.14	0.60
4:B:234:PHE:HE1	4:B:238:GLY:HA2	1.66	0.59
1:R:44:ARG:HH11	1:R:44:ARG:CG	2.17	0.58
1:R:230:PHE:CD2	1:R:298:THR:HG22	2.38	0.58
4:B:320:VAL:HG23	4:B:327:VAL:HG22	1.86	0.58
1:R:224:LEU:HD23	1:R:224:LEU:O	2.02	0.58
1:R:251:LEU:HD13	2:A:358:TYR:CZ	2.39	0.58
5:G:21:MET:HE2	5:G:21:MET:C	2.23	0.58
1:R:234:GLN:HG3	1:R:284:TRP:CH2	2.38	0.57
1:R:250:TYR:O	1:R:251:LEU:C	2.42	0.57
1:R:306:TRP:CH2	3:P:1:HIS:ND1	2.73	0.57
2:A:278:TYR:CD1	2:A:278:TYR:N	2.72	0.57
2:A:172:GLN:H	2:A:172:GLN:NE2	2.01	0.57
4:B:295:ASN:HB3	4:B:304:ARG:HG3	1.87	0.57
1:R:230:PHE:CE2	1:R:298:THR:HG22	2.40	0.56
1:R:231:LEU:HD23	1:R:231:LEU:O	2.04	0.56
6:N:39:GLN:HB2	6:N:45:LEU:HD13	1.86	0.56
4:B:331:SER:OG	4:B:333:ASP:OD1	2.22	0.56
4:B:264:TYR:CD1	4:B:264:TYR:N	2.72	0.56
4:B:270:ILE:HG13	4:B:270:ILE:O	2.06	0.56
2:A:275:ILE:O	2:A:275:ILE:HD12	2.06	0.55
3:P:2:SER:HA	3:P:5:THR:CG2	2.36	0.55
1:R:113:LYS:H	1:R:113:LYS:HD2	1.70	0.55
1:R:242:TYR:O	1:R:246:VAL:HG13	2.05	0.55
5:G:48:ASP:HB3	5:G:51:LEU:HD23	1.88	0.55
1:R:248:GLY:O	1:R:323:ILE:HG21	2.07	0.55
3:P:1:HIS:HD1	3:P:1:HIS:N	2.05	0.55
1:R:232:LEU:HD12	1:R:232:LEU:O	2.07	0.55
6:N:100:PRO:HD2	6:N:107:CYS:SG	2.47	0.55
2:A:234:GLN:O	2:A:234:GLN:NE2	2.41	0.54
1:R:246:VAL:O	1:R:246:VAL:HG23	2.07	0.54
1:R:421:ARG:HH11	1:R:421:ARG:CG	2.14	0.54
2:A:42:ASP:OD1	2:A:43:ASN:N	2.40	0.54
1:R:160:VAL:HG12	1:R:188:ILE:HD13	1.89	0.54
4:B:290:ASP:OD1	4:B:314:ARG:NE	2.38	0.54
4:B:33:ILE:HG23	4:B:34:THR:HG23	1.90	0.54
1:R:180:HIS:CE1	1:R:247:GLU:OE2	2.61	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:R:48:ARG:HD2	1:R:48:ARG:C	2.28	0.53
1:R:245:LEU:HD12	1:R:245:LEU:O	2.08	0.53
1:R:372:ASP:HA	1:R:383:LYS:NZ	2.23	0.53
2:A:276:GLU:H	2:A:276:GLU:CD	2.05	0.53
4:B:298:ASP:HB2	4:B:301:LYS:HB2	1.90	0.53
2:A:226:ASP:OD2	2:A:229:ASP:HB3	2.10	0.52
1:R:48:ARG:HG3	1:R:48:ARG:NH1	2.19	0.52
1:R:44:ARG:NE	1:R:44:ARG:HA	2.25	0.52
1:R:44:ARG:NH1	1:R:44:ARG:HB3	2.25	0.51
1:R:348:ARG:NH2	1:R:352:SER:OG	2.43	0.51
2:A:356:ARG:NH1	2:A:356:ARG:CG	2.73	0.51
1:R:156:PHE:HE1	1:R:188:ILE:HG23	1.75	0.51
1:R:44:ARG:NE	1:R:44:ARG:CA	2.73	0.51
1:R:160:VAL:HG12	1:R:188:ILE:HD11	1.91	0.51
1:R:385:PHE:O	1:R:389:SER:OG	2.25	0.50
4:B:139:LEU:HD12	4:B:169:TRP:CE3	2.47	0.50
1:R:388:LEU:N	1:R:388:LEU:HD23	2.26	0.50
1:R:226:CYS:SG	1:R:227:ARG:N	2.84	0.50
2:A:229:ASP:OD2	2:A:232:ARG:HD3	2.11	0.50
4:B:300:LEU:HD23	5:G:38:MET:HE2	1.93	0.50
1:R:57:ALA:CB	1:R:75:GLY:O	2.60	0.50
1:R:349:LEU:HG	1:R:349:LEU:O	2.10	0.50
4:B:39:PRO:HB3	4:B:301:LYS:CE	2.40	0.50
4:B:296:VAL:CG2	4:B:306:GLY:CA	2.88	0.50
4:B:323:ASP:OD1	4:B:323:ASP:N	2.41	0.50
4:B:210:LEU:HD23	4:B:219:ARG:HB2	1.94	0.50
1:R:44:ARG:CG	1:R:44:ARG:NH1	2.75	0.49
1:R:145:TYR:CD1	1:R:145:TYR:C	2.85	0.49
2:A:232:ARG:NH1	2:A:232:ARG:CG	2.73	0.49
1:R:57:ALA:HB2	1:R:76:GLU:HA	1.94	0.49
1:R:170:ARG:CG	1:R:170:ARG:NH1	2.73	0.49
4:B:294:CYS:HB2	4:B:308:LEU:HB2	1.93	0.49
1:R:148:TYR:CD1	1:R:148:TYR:C	2.86	0.49
1:R:204:MET:HG3	1:R:221:GLN:HE21	1.77	0.49
1:R:345:ILE:H	1:R:345:ILE:HG12	1.34	0.48
1:R:283:PRO:O	1:R:287:VAL:HG23	2.13	0.48
3:P:1:HIS:ND1	3:P:1:HIS:N	2.60	0.48
1:R:44:ARG:NH2	1:R:44:ARG:O	2.46	0.48
4:B:160:SER:HB2	4:B:190:LEU:HD23	1.94	0.48
5:G:19:LEU:HD22	5:G:19:LEU:O	2.13	0.48
1:R:370:VAL:HG13	1:R:371:MET:SD	2.54	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:R:66:PHE:HD1	1:R:71:CYS:HB3	1.79	0.48
1:R:255:LEU:N	1:R:255:LEU:HD23	2.28	0.48
2:A:205:ARG:NH2	4:B:186:ASP:OD1	2.47	0.48
1:R:306:TRP:HZ2	3:P:1:HIS:N	2.12	0.48
1:R:116:SER:O	1:R:116:SER:OG	2.31	0.47
1:R:103:PHE:H	1:R:120:TRP:HD1	1.62	0.47
1:R:324:PHE:CD1	1:R:324:PHE:C	2.87	0.47
2:A:314:ARG:O	2:A:317:THR:OG1	2.29	0.47
1:R:159:LEU:HD13	1:R:187:PHE:HB3	1.97	0.47
4:B:296:VAL:O	4:B:296:VAL:CG2	2.60	0.47
1:R:327:VAL:O	1:R:327:VAL:HG12	2.15	0.47
1:R:315:PHE:O	1:R:319:VAL:HG23	2.14	0.47
1:R:114:ASP:HB2	1:R:117:SER:HB2	1.97	0.46
4:B:58:ILE:O	4:B:316:SER:OG	2.23	0.46
1:R:44:ARG:HB3	1:R:44:ARG:CZ	2.46	0.46
1:R:156:PHE:CE1	1:R:188:ILE:HG23	2.50	0.46
1:R:231:LEU:HB2	1:R:297:TRP:CZ3	2.50	0.46
2:A:10:LYS:HA	2:A:10:LYS:HD3	1.40	0.46
1:R:57:ALA:HB2	1:R:75:GLY:O	2.15	0.46
1:R:217:LEU:N	1:R:217:LEU:CD1	2.77	0.46
1:R:102:ARG:HA	1:R:120:TRP:CD1	2.51	0.46
2:A:17:LYS:HA	2:A:17:LYS:HD3	1.66	0.46
1:R:65:THR:HB	1:R:66:PHE:H	1.49	0.46
1:R:286:ILE:O	1:R:290:LEU:HB2	2.15	0.46
4:B:278:PHE:CE1	4:B:285:LEU:HD13	2.51	0.46
2:A:180:LYS:HB2	2:A:180:LYS:HE2	1.58	0.46
2:A:278:TYR:H	2:A:278:TYR:HD1	1.63	0.46
4:B:127:LYS:HD3	4:B:127:LYS:HA	1.77	0.46
4:B:266:HIS:HB3	4:B:269:ILE:HG12	1.98	0.46
1:R:227:ARG:HH11	1:R:227:ARG:CG	2.29	0.45
5:G:25:ILE:HD12	5:G:26:ASP:H	1.81	0.45
1:R:230:PHE:CE2	1:R:298:THR:CG2	2.99	0.45
2:A:213:GLN:HG2	2:A:248:TRP:CD1	2.50	0.45
2:A:298:ASP:O	2:A:301:VAL:HG22	2.16	0.45
1:R:180:HIS:ND1	1:R:247:GLU:OE2	2.48	0.45
2:A:234:GLN:HE21	2:A:238:ASN:HD21	1.62	0.45
2:A:339:ILE:HD12	2:A:339:ILE:C	2.36	0.45
1:R:48:ARG:CG	1:R:48:ARG:NH1	2.73	0.45
1:R:420:TRP:CE3	1:R:420:TRP:C	2.89	0.45
1:R:420:TRP:O	1:R:420:TRP:CD2	2.70	0.45
4:B:300:LEU:CD2	5:G:38:MET:CE	2.93	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:R:417:TRP:CH2	1:R:421:ARG:NH1	2.85	0.45
2:A:307:PHE:CG	2:A:307:PHE:O	2.69	0.45
6:N:112:SER:O	6:N:118:ARG:NH2	2.39	0.45
1:R:324:PHE:O	1:R:324:PHE:CG	2.70	0.45
1:R:154:LEU:HD13	7:P:101:D6M:H262	1.99	0.45
2:A:172:GLN:H	2:A:172:GLN:CD	2.21	0.45
1:R:385:PHE:CD1	1:R:385:PHE:C	2.91	0.44
1:R:44:ARG:CZ	1:R:44:ARG:CB	2.94	0.44
1:R:110:TRP:HD1	1:R:119:PRO:HB3	1.82	0.44
3:P:1:HIS:HD1	3:P:1:HIS:H3	1.65	0.44
6:N:37:VAL:HG13	6:N:95:TYR:HB2	1.99	0.44
1:R:231:LEU:CD1	1:R:285:GLY:HA3	2.47	0.44
2:A:175:LEU:HD13	2:A:175:LEU:HA	1.79	0.44
4:B:159:THR:OG1	4:B:169:TRP:NE1	2.41	0.44
1:R:420:TRP:CE3	1:R:420:TRP:O	2.70	0.44
5:G:39:ALA:O	5:G:43:ALA:CB	2.63	0.44
1:R:220:TYR:CD1	1:R:220:TYR:O	2.70	0.44
6:N:51:ILE:HG12	6:N:55:GLY:HA2	1.99	0.44
1:R:205:TYR:HB3	1:R:206:SER:H	1.56	0.44
1:R:218:LEU:O	1:R:222:ASP:N	2.51	0.44
1:R:252:TYR:O	1:R:252:TYR:CG	2.70	0.44
1:R:289:TYR:CG	1:R:289:TYR:O	2.70	0.44
1:R:367:PHE:HD2	1:R:371:MET:HE1	1.82	0.44
4:B:39:PRO:CB	4:B:301:LYS:CE	2.79	0.44
4:B:298:ASP:CB	4:B:301:LYS:HB2	2.47	0.44
1:R:324:PHE:CD1	1:R:324:PHE:O	2.70	0.43
1:R:306:TRP:CZ2	3:P:1:HIS:N	2.87	0.43
1:R:411:LEU:N	1:R:411:LEU:HD23	2.32	0.43
2:A:310:ASP:HA	2:A:313:LEU:HB2	2.00	0.43
1:R:346:LYS:HD2	1:R:346:LYS:HA	1.38	0.43
4:B:296:VAL:HG22	4:B:306:GLY:C	2.38	0.43
1:R:328:ILE:O	1:R:328:ILE:HG22	2.18	0.43
4:B:300:LEU:CD2	5:G:38:MET:HE2	2.49	0.43
4:B:325:MET:O	4:B:340:ASN:ND2	2.51	0.43
2:A:191:VAL:HG21	2:A:339:ILE:HD13	1.99	0.43
4:B:286:LEU:HB3	4:B:318:LEU:HD21	2.01	0.43
3:P:18:ARG:HA	3:P:18:ARG:HD3	1.49	0.43
1:R:306:TRP:HA	1:R:306:TRP:CE3	2.54	0.43
1:R:50:LEU:HD12	1:R:50:LEU:C	2.38	0.42
6:N:20:LEU:HB2	6:N:81:LEU:HB2	2.01	0.42
6:N:51:ILE:HB	6:N:70:ILE:HD12	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:356:ARG:O	2:A:356:ARG:HG2	2.19	0.42
4:B:235:PHE:CG	4:B:236:PRO:HD2	2.55	0.42
1:R:233:MET:C	1:R:235:TYR:H	2.23	0.42
1:R:102:ARG:HE	1:R:102:ARG:HB3	1.66	0.42
2:A:249:LEU:HA	2:A:252:ILE:HD13	2.01	0.42
2:A:268:VAL:CG1	2:A:301:VAL:HG12	2.43	0.42
4:B:296:VAL:HG22	4:B:306:GLY:O	2.19	0.42
1:R:417:TRP:HH2	1:R:421:ARG:HH12	1.66	0.42
4:B:165:THR:HG22	4:B:181:THR:HG22	2.02	0.42
1:R:306:TRP:HA	1:R:306:TRP:HE3	1.85	0.42
2:A:46:LYS:HB3	2:A:46:LYS:HE3	1.75	0.42
1:R:377:GLY:C	1:R:379:LEU:N	2.72	0.41
1:R:63:ASN:HD22	1:R:63:ASN:HA	1.56	0.41
1:R:422:LEU:HA	1:R:422:LEU:HD23	1.77	0.41
2:A:265:ALA:O	2:A:266:GLU:C	2.58	0.41
4:B:51:LEU:HB3	4:B:82:TRP:CZ3	2.54	0.41
1:R:186:SER:OG	1:R:240:ASN:CA	2.66	0.41
1:R:197:LYS:HE3	1:R:197:LYS:HB3	1.66	0.41
1:R:347:CYS:O	1:R:347:CYS:SG	2.79	0.41
2:A:186:GLU:H	2:A:186:GLU:HG3	1.68	0.41
4:B:274:THR:HG21	4:B:316:SER:HA	2.02	0.41
1:R:289:TYR:O	1:R:289:TYR:CD2	2.74	0.41
1:R:231:LEU:HD13	1:R:297:TRP:HZ3	1.86	0.41
4:B:245:SER:HB2	4:B:247:ASP:OD1	2.20	0.41
4:B:297:TRP:CE2	4:B:304:ARG:HB2	2.56	0.41
6:N:6:GLU:OE2	6:N:6:GLU:N	2.53	0.41
1:R:102:ARG:HB2	1:R:110:TRP:CE3	2.55	0.41
2:A:340:ARG:HA	2:A:340:ARG:HD3	1.67	0.41
4:B:244:GLY:HA3	4:B:273:ILE:HG21	2.02	0.41
1:R:160:VAL:CG1	1:R:188:ILE:HD11	2.51	0.41
2:A:298:ASP:HA	2:A:299:PRO:HD3	1.97	0.41
4:B:276:VAL:HG13	4:B:285:LEU:HD11	2.02	0.41
6:N:64:VAL:O	6:N:64:VAL:HG13	2.21	0.41
1:R:110:TRP:HB2	1:R:111:LEU:H	1.69	0.40
1:R:59:ASP:HB3	1:R:60:LEU:H	1.66	0.40
4:B:219:ARG:H	4:B:219:ARG:HG2	1.61	0.40
4:B:303:ASP:O	4:B:304:ARG:C	2.59	0.40
6:N:104:THR:HG22	6:N:106:ASP:H	1.86	0.40
1:R:374:HIS:O	1:R:375:ALA:C	2.60	0.40
2:A:229:ASP:OD2	2:A:232:ARG:HB2	2.22	0.40
4:B:12:GLU:O	4:B:16:ASN:ND2	2.54	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:R:248:GLY:C	1:R:323:ILE:HD13	2.42	0.40
1:R:265:ILE:HD13	1:R:265:ILE:HA	1.94	0.40
5:G:34:ALA:O	5:G:38:MET:HG2	2.22	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 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	R	382/440 (87%)	337 (88%)	38 (10%)	7 (2%)	7	16
2	A	241/361 (67%)	221 (92%)	19 (8%)	1 (0%)	30	49
3	P	27/29 (93%)	25 (93%)	1 (4%)	1 (4%)	2	5
4	B	336/345 (97%)	321 (96%)	15 (4%)	0	100	100
5	G	54/70 (77%)	53 (98%)	1 (2%)	0	100	100
6	N	124/140 (89%)	121 (98%)	3 (2%)	0	100	100
All	All	1164/1385 (84%)	1078 (93%)	77 (7%)	9 (1%)	19	32

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	R	62	CYS
1	R	63	ASN
1	R	65	THR
2	A	272	LYS
3	P	3	GLN
1	R	74	ASP
1	R	234	GLN
1	R	372	ASP
1	R	77	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 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	R	327/392 (83%)	246 (75%)	81 (25%)	0	0
2	A	218/316 (69%)	180 (83%)	38 (17%)	1	2
3	P	24/24 (100%)	18 (75%)	6 (25%)	0	0
4	B	279/287 (97%)	260 (93%)	19 (7%)	13	27
5	G	45/57 (79%)	42 (93%)	3 (7%)	13	27
6	N	104/116 (90%)	104 (100%)	0	100	100
All	All	997/1192 (84%)	850 (85%)	147 (15%)	5	4

All (147) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	R	31	SER
1	R	36	VAL
1	R	43	ARG
1	R	44	ARG
1	R	48	ARG
1	R	50	LEU
1	R	60	LEU
1	R	61	PHE
1	R	62	CYS
1	R	63	ASN
1	R	65	THR
1	R	74	ASP
1	R	80	PHE
1	R	89	LEU
1	R	100	VAL
1	R	102	ARG
1	R	105	THR
1	R	107	GLU
1	R	112	GLN
1	R	113	LYS
1	R	118	LEU
1	R	125	GLU

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Mol	Chain	Res	Type
1	R	138	GLU
1	R	139	GLU
1	R	142	LEU
1	R	146	ILE
1	R	148	TYR
1	R	170	ARG
1	R	172	LEU
1	R	189	LEU
1	R	192	LEU
1	R	197	LYS
1	R	201	LEU
1	R	204	MET
1	R	215	ASP
1	R	217	LEU
1	R	218	LEU
1	R	221	GLN
1	R	222	ASP
1	R	226	CYS
1	R	227	ARG
1	R	228	LEU
1	R	246	VAL
1	R	247	GLU
1	R	257	PHE
1	R	259	VAL
1	R	261	SER
1	R	263	GLN
1	R	268	LEU
1	R	270	VAL
1	R	292	GLU
1	R	294	GLU
1	R	306	TRP
1	R	325	VAL
1	R	332	VAL
1	R	334	LYS
1	R	343	THR
1	R	345	ILE
1	R	346	LYS
1	R	348	ARG
1	R	349	LEU
1	R	351	LYS
1	R	353	THR
1	R	355	THR

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Mol	Chain	Res	Type
1	R	362	THR
1	R	369	PHE
1	R	370	VAL
1	R	371	MET
1	R	372	ASP
1	R	373	GLU
1	R	389	SER
1	R	398	VAL
1	R	405	VAL
1	R	407	ASN
1	R	411	LEU
1	R	412	GLU
1	R	414	ARG
1	R	418	GLU
1	R	419	ARG
1	R	421	ARG
1	R	423	GLU
2	A	5	LEU
2	A	8	GLU
2	A	10	LYS
2	A	14	GLU
2	A	15	ARG
2	A	19	ILE
2	A	35	ARG
2	A	51	LYS
2	A	54	ARG
2	A	57	HIS
2	A	171	GLN
2	A	172	GLN
2	A	173	ASP
2	A	174	VAL
2	A	175	LEU
2	A	177	THR
2	A	180	LYS
2	A	184	ILE
2	A	187	THR
2	A	188	LYS
2	A	229	ASP
2	A	232	ARG
2	A	233	LEU
2	A	235	GLU
2	A	237	LEU

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Mol	Chain	Res	Type
2	A	267	LYS
2	A	268	VAL
2	A	273	SER
2	A	275	ILE
2	A	278	TYR
2	A	284	ARG
2	A	286	THR
2	A	289	GLU
2	A	292	THR
2	A	300	ARG
2	A	308	ILE
2	A	356	ARG
2	A	359	GLU
3	P	2	SER
3	P	11	SER
3	P	15	ASP
3	P	18	ARG
3	P	20	GLN
3	P	27	GLU
4	B	4	LEU
4	B	127	LYS
4	B	133	VAL
4	B	134	ARG
4	B	135	VAL
4	B	136	SER
4	B	178	THR
4	B	214	ARG
4	B	215	GLU
4	B	217	MET
4	B	220	GLN
4	B	221	THR
4	B	264	TYR
4	B	298	ASP
4	B	300	LEU
4	B	301	LYS
4	B	303	ASP
4	B	304	ARG
4	B	307	VAL
5	G	19	LEU
5	G	21	MET
5	G	25	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10)

such sidechains are listed below:

Mol	Chain	Res	Type
1	R	63	ASN
1	R	112	GLN
1	R	177	ASN
1	R	221	GLN
1	R	234	GLN
1	R	394	GLN
2	A	172	GLN
2	A	238	ASN
2	A	338	ASN
6	N	3	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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

1 ligand is 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	$\#|Z| > 2$
7	D6M	P	101	-	25,25,26	0.61	0	27,27,29	0.96	1 (3%)

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
7	D6M	P	101	-	-	3/26/27/28	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	P	101	D6M	O08-C07-C06	-2.51	110.41	126.89

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	P	101	D6M	C16-C17-C18-C19
7	P	101	D6M	C04-C05-C06-C07
7	P	101	D6M	C12-C13-C14-C15

There are no ring outliers.

1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	P	101	D6M	4	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 D6M P 101	
 Bond lengths	 Bond angles
 Torsions	 Rings
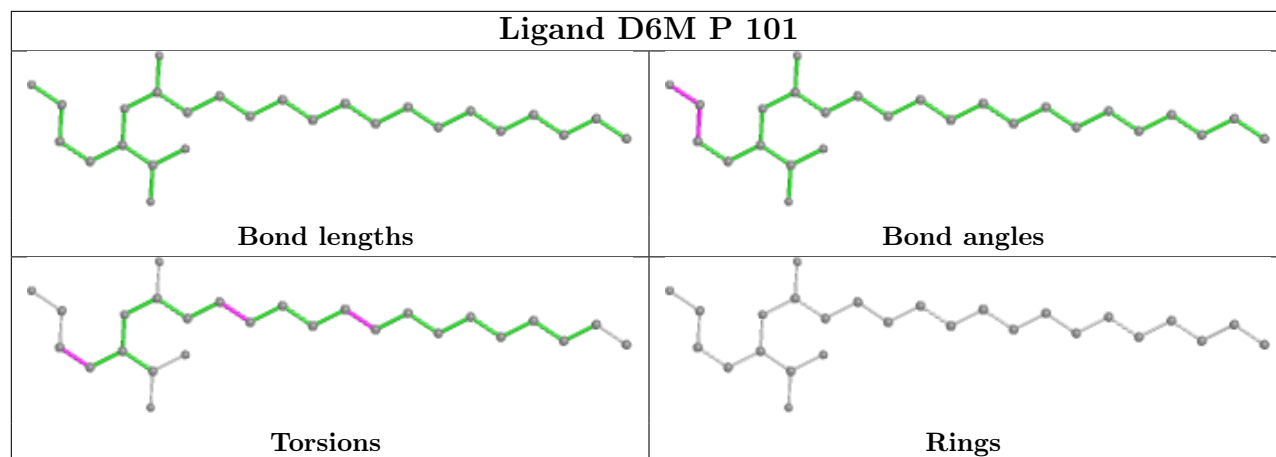
5.7　Other polymers ⓘ

There are no such residues in this entry.

5.8　Polymer linkage issues ⓘ

There are no chain breaks in this entry.