



Full wwPDB EM Validation Report ⓘ

Oct 16, 2024 – 12:34 AM JST

PDB ID : 8JIS
EMDB ID : EMD-36326
Title : Cryo-EM structure of the GLP-1R/GCGR dual agonist peptide15-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 : 2.46 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 ⓘ 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:

EMDB validation analysis : **FAILED**
MolProbity : 4.02b-467
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

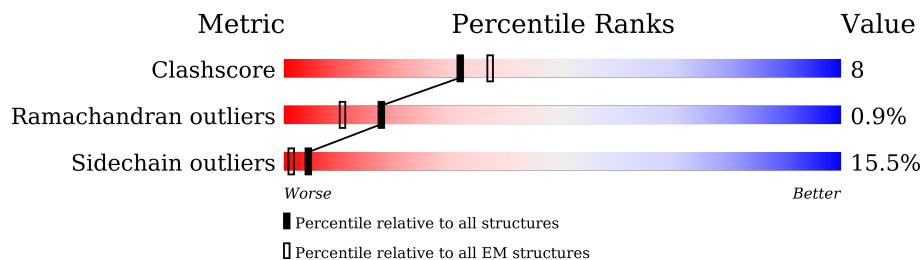
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.46 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)	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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	356	
2	B	338	
3	P	29	
4	G	57	
5	N	126	
6	R	394	

2 Entry composition i

There are 6 unique types of molecules in this entry. The entry contains 9158 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 Guanine nucleotide-binding protein G(s) subunit alpha isoforms short.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	238	Total	C	N	O	S	0	0
			1856	1166	338	344	8		

- Molecule 2 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	338	Total	C	N	O	S	0	0
			2572	1591	457	503	21		

- Molecule 3 is a protein called Peptide 15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	P	29	Total	C	N	O	S	0	0
			238	152	37	48	1		

- Molecule 4 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	G	57	Total	C	N	O	S	0	0
			427	269	74	81	3		

- Molecule 5 is a protein called Nanobody 35.

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

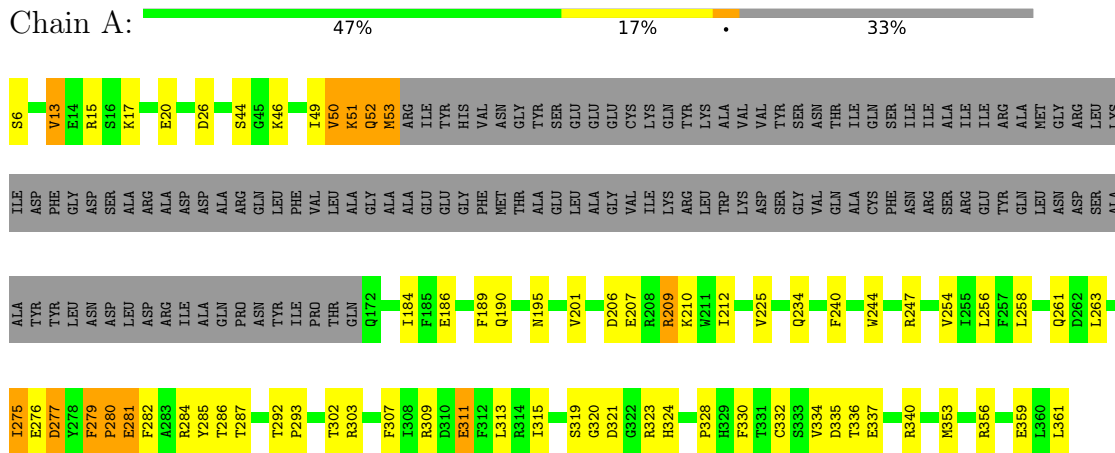
- Molecule 6 is a protein called Glucagon-like peptide 1 receptor.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	R	386	3104	2051	500	535	18	0	0

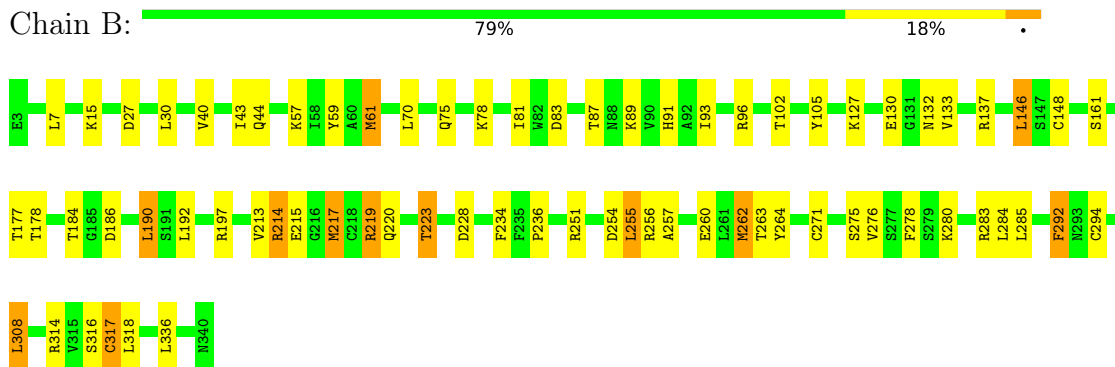
3 Residue-property plots i

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

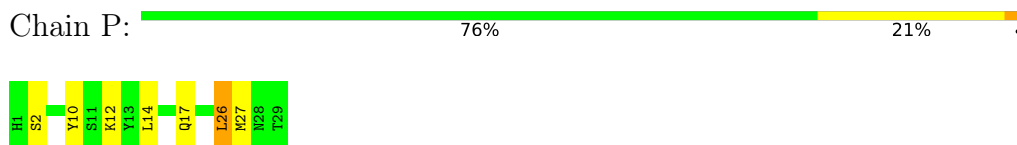
- Molecule 1: Guanine nucleotide-binding protein G(s) subunit alpha isoforms short



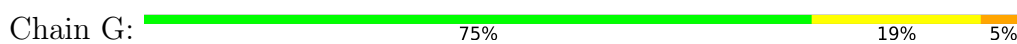
- Molecule 2: Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1

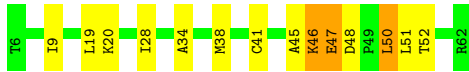


- Molecule 3: Peptide 15

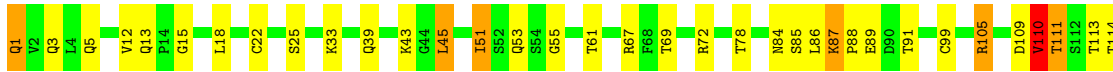


- Molecule 4: Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2

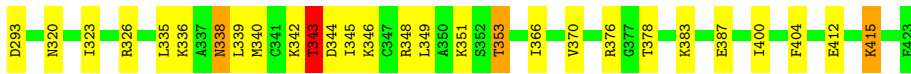
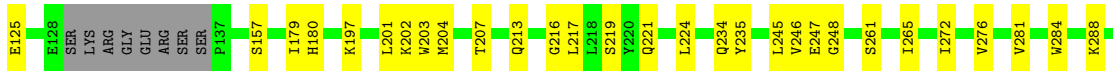
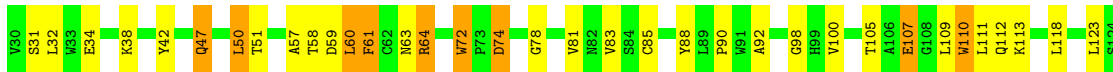




• Molecule 5: Nanobody 35



• Molecule 6: Glucagon-like peptide 1 receptor



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	1252175	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	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 [i](#)

5.1 Standard geometry [i](#)

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	0.54	0/1890	0.56	0/2560
2	B	0.53	0/2619	0.64	0/3555
3	P	0.36	0/244	0.44	0/329
4	G	0.27	0/433	0.45	0/586
5	N	0.44	0/981	0.67	0/1329
6	R	0.40	0/3197	0.52	0/4365
All	All	0.47	0/9364	0.57	0/12724

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	A	1856	0	1751	47	0
2	B	2572	0	2462	39	0
3	P	238	0	219	2	0
4	G	427	0	435	11	0
5	N	961	0	930	17	0
6	R	3104	0	3014	45	0
All	All	9158	0	8811	152	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 8.

All (152) 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:292:THR:O	1:A:292:THR:HG23	1.66	0.94
5:N:45:LEU:HB3	5:N:110:VAL:HG22	1.53	0.91
1:A:53:MET:HG3	1:A:189:PHE:HB2	1.61	0.82
1:A:53:MET:HG3	1:A:189:PHE:CB	2.12	0.79
2:B:130:GLU:OE1	2:B:132:ASN:HB2	1.82	0.79
6:R:179:ILE:HG22	6:R:247:GLU:OE1	1.83	0.78
1:A:337:GLU:HG2	1:A:337:GLU:O	1.85	0.74
6:R:343:THR:C	6:R:345:ILE:H	1.96	0.67
6:R:180:HIS:CE1	6:R:247:GLU:OE2	2.48	0.66
4:G:47:GLU:HA	4:G:47:GLU:OE2	1.94	0.66
1:A:280:PRO:C	1:A:282:PHE:N	2.41	0.65
6:R:335:LEU:HA	6:R:338:ASN:HB2	1.77	0.65
6:R:343:THR:C	6:R:345:ILE:N	2.49	0.64
2:B:130:GLU:OE2	2:B:132:ASN:HB3	1.97	0.64
2:B:130:GLU:OE2	2:B:132:ASN:CB	2.46	0.64
1:A:26:ASP:OD2	2:B:78:LYS:NZ	2.27	0.64
1:A:277:ASP:C	1:A:279:PHE:H	2.02	0.62
1:A:292:THR:O	1:A:292:THR:CG2	2.40	0.62
2:B:81:ILE:HD13	2:B:91:HIS:HB2	1.82	0.61
6:R:412:GLU:HA	6:R:415:LYS:HE2	1.82	0.61
6:R:342:LYS:C	6:R:344:ASP:H	2.04	0.60
2:B:283:ARG:HB3	4:G:51:LEU:HD21	1.84	0.59
1:A:49:ILE:O	1:A:53:MET:HG2	2.03	0.58
2:B:254:ASP:HB3	2:B:257:ALA:HB3	1.85	0.58
6:R:180:HIS:HE1	6:R:247:GLU:OE2	1.85	0.58
6:R:63:ASN:HB2	6:R:74:ASP:HA	1.84	0.58
2:B:276:VAL:HG13	2:B:285:LEU:HD11	1.86	0.57
4:G:46:LYS:HD2	4:G:46:LYS:O	2.05	0.57
2:B:284:LEU:HD12	4:G:50:LEU:HB3	1.86	0.56
2:B:236:PRO:HG3	2:B:280:LYS:O	2.06	0.56
2:B:292:PHE:CD1	2:B:292:PHE:N	2.71	0.55
3:P:26:LEU:HD23	3:P:27:MET:HG2	1.89	0.55
2:B:219:ARG:HB2	2:B:220:GLN:OE1	2.06	0.54
4:G:41:CYS:O	4:G:45:ALA:HB2	2.08	0.54
1:A:337:GLU:O	1:A:337:GLU:CG	2.55	0.54
2:B:255:LEU:HD23	2:B:255:LEU:N	2.22	0.54
2:B:280:LYS:HB3	4:G:48:ASP:CB	2.37	0.54
2:B:27:ASP:N	2:B:27:ASP:OD1	2.41	0.54
2:B:197:ARG:HH21	2:B:214:ARG:HG3	1.73	0.54
1:A:209:ARG:HG2	1:A:210:LYS:HG2	1.88	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:R:179:ILE:CG2	6:R:247:GLU:OE1	2.54	0.53
6:R:110:TRP:HA	6:R:110:TRP:CE3	2.44	0.53
2:B:251:ARG:HG2	2:B:263:THR:HG22	1.91	0.53
1:A:52:GLN:HB3	1:A:53:MET:SD	2.49	0.52
1:A:53:MET:HG3	1:A:189:PHE:HB3	1.90	0.52
1:A:225:VAL:CG1	1:A:258:LEU:HD23	2.39	0.52
5:N:12:VAL:HG13	5:N:126:VAL:HG23	1.90	0.52
6:R:64:ARG:HE	6:R:72:TRP:HE1	1.57	0.52
1:A:256:LEU:HB3	1:A:328:PRO:HA	1.91	0.51
1:A:275:ILE:C	1:A:277:ASP:H	2.14	0.51
1:A:311:GLU:OE2	1:A:311:GLU:HA	2.10	0.51
2:B:262:MET:HB3	2:B:264:TYR:CE1	2.46	0.50
6:R:201:LEU:HA	6:R:204:MET:HG3	1.93	0.50
5:N:109:ASP:C	5:N:111:THR:H	2.14	0.50
1:A:20:GLU:OE2	2:B:89:LYS:NZ	2.35	0.50
1:A:240:PHE:HE1	1:A:254:VAL:HG21	1.77	0.50
6:R:224:LEU:HD23	6:R:224:LEU:O	2.11	0.50
1:A:280:PRO:C	1:A:282:PHE:H	2.13	0.50
6:R:342:LYS:O	6:R:344:ASP:N	2.45	0.50
1:A:277:ASP:C	1:A:279:PHE:N	2.65	0.50
5:N:39:GLN:HB2	5:N:45:LEU:HD13	1.93	0.50
1:A:13:VAL:O	1:A:17:LYS:HG3	2.12	0.49
2:B:57:LYS:HG3	2:B:75:GLN:HG3	1.95	0.49
5:N:105:ARG:NE	5:N:105:ARG:HA	2.28	0.49
6:R:349:LEU:O	6:R:353:THR:OG1	2.30	0.49
1:A:44:SER:O	1:A:44:SER:OG	2.29	0.49
1:A:280:PRO:O	1:A:281:GLU:C	2.51	0.49
1:A:280:PRO:HB2	1:A:307:PHE:CE1	2.49	0.48
6:R:213:GLN:OE1	6:R:216:GLY:N	2.36	0.47
1:A:309:ARG:HG2	1:A:309:ARG:O	2.13	0.47
2:B:148:CYS:HB3	2:B:190:LEU:HD23	1.96	0.47
5:N:51:ILE:HG23	5:N:55:GLY:HA2	1.97	0.47
5:N:13:GLN:OE1	5:N:13:GLN:HA	2.15	0.47
6:R:98:GLY:HA3	6:R:125:GLU:HB3	1.97	0.46
1:A:285:TYR:O	1:A:303:ARG:NH1	2.49	0.46
6:R:113:LYS:HB2	6:R:118:LEU:HD21	1.96	0.46
4:G:46:LYS:HE2	4:G:46:LYS:HB3	1.71	0.46
5:N:43:LYS:NZ	5:N:43:LYS:HB3	2.30	0.46
6:R:60:LEU:HD13	6:R:60:LEU:HA	1.80	0.46
1:A:313:LEU:HD21	1:A:328:PRO:HG3	1.97	0.46
5:N:87:LYS:HB3	5:N:87:LYS:HE3	1.61	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:280:PRO:O	1:A:282:PHE:N	2.49	0.46
1:A:244:TRP:HE1	1:A:320:GLY:H	1.64	0.45
2:B:130:GLU:CD	2:B:132:ASN:HB2	2.36	0.45
6:R:90:PRO:C	6:R:92:ALA:H	2.18	0.45
6:R:335:LEU:HA	6:R:338:ASN:HD22	1.81	0.45
1:A:340:ARG:HE	1:A:340:ARG:HB2	1.67	0.45
1:A:46:LYS:O	1:A:50:VAL:HG22	2.16	0.45
6:R:342:LYS:C	6:R:344:ASP:N	2.70	0.45
2:B:133:VAL:O	2:B:133:VAL:HG23	2.18	0.44
2:B:223:THR:HG21	5:N:1:GLN:HG2	1.99	0.44
6:R:235:TYR:HA	6:R:281:VAL:HG21	1.98	0.44
1:A:244:TRP:HZ3	1:A:254:VAL:HG22	1.83	0.44
2:B:30:LEU:HD23	2:B:262:MET:HB2	1.99	0.44
6:R:248:GLY:O	6:R:323:ILE:HG21	2.17	0.44
6:R:110:TRP:HA	6:R:110:TRP:HE3	1.83	0.43
1:A:50:VAL:O	1:A:53:MET:N	2.50	0.43
2:B:256:ARG:HB3	4:G:28:ILE:HG12	2.00	0.43
2:B:292:PHE:N	2:B:292:PHE:HD1	2.16	0.43
6:R:201:LEU:HA	6:R:201:LEU:HD12	1.89	0.43
5:N:18:LEU:HD12	5:N:18:LEU:HA	1.83	0.43
5:N:86:LEU:HB3	5:N:126:VAL:HG21	2.01	0.43
2:B:146:LEU:HD22	2:B:146:LEU:HA	1.82	0.43
2:B:262:MET:HB3	2:B:264:TYR:HE1	1.83	0.43
2:B:294:CYS:HB2	2:B:308:LEU:HG	2.01	0.43
6:R:107:GLU:H	6:R:107:GLU:HG3	1.46	0.43
2:B:214:ARG:H	2:B:214:ARG:HG2	1.69	0.43
2:B:220:GLN:OE1	2:B:220:GLN:N	2.52	0.43
5:N:53:GLN:OE1	5:N:53:GLN:N	2.49	0.43
1:A:244:TRP:HE1	1:A:320:GLY:N	2.16	0.43
2:B:217:MET:H	2:B:217:MET:HG3	1.67	0.43
3:P:14:LEU:HD12	3:P:14:LEU:HA	1.76	0.43
1:A:190:GLN:NE2	1:A:195:ASN:OD1	2.52	0.42
6:R:272:ILE:HA	6:R:276:VAL:HG23	2.01	0.42
1:A:261:GLN:HG3	1:A:330:PHE:HB3	2.00	0.42
1:A:51:LYS:HZ3	1:A:51:LYS:N	2.17	0.42
6:R:345:ILE:H	6:R:345:ILE:HG12	1.65	0.42
6:R:57:ALA:HB3	6:R:61:PHE:HB3	2.02	0.42
1:A:50:VAL:O	1:A:51:LYS:C	2.55	0.42
2:B:40:VAL:HG11	2:B:43:ILE:HD11	2.02	0.42
6:R:47:GLN:HA	6:R:50:LEU:HB2	2.01	0.42
1:A:315:ILE:O	1:A:315:ILE:HG22	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:61:MET:HG3	2:B:317:CYS:HB2	2.02	0.42
6:R:235:TYR:HB2	6:R:281:VAL:HG11	2.01	0.42
6:R:246:VAL:O	6:R:246:VAL:HG12	2.20	0.42
5:N:88:PRO:HA	5:N:126:VAL:CG1	2.50	0.41
6:R:234:GLN:HG3	6:R:284:TRP:CZ3	2.55	0.41
6:R:245:LEU:HD12	6:R:245:LEU:O	2.19	0.41
2:B:137:ARG:HD3	2:B:137:ARG:HA	1.84	0.41
1:A:293:PRO:HB3	1:A:302:THR:HG21	2.01	0.41
6:R:85:CYS:HB2	6:R:98:GLY:O	2.20	0.41
6:R:338:ASN:O	6:R:340:MET:N	2.54	0.41
4:G:34:ALA:O	4:G:38:MET:HG3	2.21	0.41
2:B:15:LYS:HG3	4:G:19:LEU:HD21	2.03	0.41
4:G:52:THR:O	4:G:52:THR:OG1	2.37	0.41
6:R:38:LYS:HE2	6:R:38:LYS:HB2	1.44	0.41
6:R:123:LEU:HD12	6:R:123:LEU:C	2.41	0.41
2:B:83:ASP:O	2:B:87:THR:N	2.54	0.41
5:N:15:GLY:HA2	5:N:85:SER:HA	2.02	0.41
6:R:400:ILE:HA	6:R:404:PHE:CD2	2.55	0.41
6:R:203:TRP:HA	6:R:207:THR:OG1	2.21	0.41
6:R:326:ARG:HA	6:R:326:ARG:HD2	1.84	0.41
1:A:209:ARG:HE	1:A:209:ARG:HB3	1.52	0.40
1:A:280:PRO:HG2	1:A:307:PHE:HE1	1.85	0.40
1:A:234:GLN:HG2	5:N:61:THR:HG23	2.02	0.40
1:A:263:LEU:HD23	1:A:263:LEU:HA	1.91	0.40
1:A:275:ILE:HG13	1:A:276:GLU:H	1.87	0.40
6:R:90:PRO:C	6:R:92:ALA:N	2.75	0.40
1:A:337:GLU:OE1	1:A:337:GLU:N	2.50	0.40
2:B:93:ILE:HG12	2:B:133:VAL:HG21	2.02	0.40
5:N:51:ILE:HG21	5:N:72:ARG:HG2	2.02	0.40
6:R:213:GLN:HE22	6:R:217:LEU:N	2.19	0.40

There are no symmetry-related clashes.

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 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	234/356 (66%)	210 (90%)	20 (8%)	4 (2%)	7	6
2	B	336/338 (99%)	320 (95%)	16 (5%)	0	100	100
3	P	27/29 (93%)	26 (96%)	1 (4%)	0	100	100
4	G	55/57 (96%)	54 (98%)	1 (2%)	0	100	100
5	N	124/126 (98%)	114 (92%)	9 (7%)	1 (1%)	16	21
6	R	382/394 (97%)	344 (90%)	33 (9%)	5 (1%)	10	10
All	All	1158/1300 (89%)	1068 (92%)	80 (7%)	10 (1%)	17	18

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	277	ASP
1	A	280	PRO
1	A	284	ARG
6	R	339	LEU
1	A	279	PHE
6	R	343	THR
6	R	58	THR
5	N	110	VAL
6	R	366	ILE
6	R	78	GLY

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 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	188/312 (60%)	156 (83%)	32 (17%)	1	1
2	B	275/281 (98%)	237 (86%)	38 (14%)	3	2
3	P	25/25 (100%)	20 (80%)	5 (20%)	1	0
4	G	44/46 (96%)	39 (89%)	5 (11%)	4	4

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
5	N	104/104 (100%)	81 (78%)	23 (22%)	1	0
6	R	327/354 (92%)	281 (86%)	46 (14%)	3	2
All	All	963/1122 (86%)	814 (84%)	149 (16%)	4	1

All (149) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	SER
1	A	13	VAL
1	A	15	ARG
1	A	50	VAL
1	A	51	LYS
1	A	52	GLN
1	A	53	MET
1	A	184	ILE
1	A	186	GLU
1	A	201	VAL
1	A	206	ASP
1	A	207	GLU
1	A	209	ARG
1	A	212	ILE
1	A	247	ARG
1	A	275	ILE
1	A	281	GLU
1	A	286	THR
1	A	287	THR
1	A	311	GLU
1	A	319	SER
1	A	321	ASP
1	A	323	ARG
1	A	324	HIS
1	A	332	CYS
1	A	334	VAL
1	A	335	ASP
1	A	336	THR
1	A	353	MET
1	A	356	ARG
1	A	359	GLU
1	A	361	LEU
2	B	7	LEU
2	B	44	GLN

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Mol	Chain	Res	Type
2	B	59	TYR
2	B	61	MET
2	B	70	LEU
2	B	96	ARG
2	B	102	THR
2	B	105	TYR
2	B	127	LYS
2	B	146	LEU
2	B	161	SER
2	B	177	THR
2	B	178	THR
2	B	184	THR
2	B	186	ASP
2	B	190	LEU
2	B	192	LEU
2	B	213	VAL
2	B	214	ARG
2	B	215	GLU
2	B	217	MET
2	B	219	ARG
2	B	223	THR
2	B	228	ASP
2	B	234	PHE
2	B	255	LEU
2	B	260	GLU
2	B	262	MET
2	B	271	CYS
2	B	275	SER
2	B	278	PHE
2	B	292	PHE
2	B	308	LEU
2	B	314	ARG
2	B	316	SER
2	B	317	CYS
2	B	318	LEU
2	B	336	LEU
3	P	2	SER
3	P	10	TYR
3	P	12	LYS
3	P	17	GLN
3	P	26	LEU
4	G	9	ILE

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Mol	Chain	Res	Type
4	G	20	LYS
4	G	46	LYS
4	G	47	GLU
4	G	50	LEU
5	N	1	GLN
5	N	3	GLN
5	N	5	GLN
5	N	22	CYS
5	N	25	SER
5	N	33	LYS
5	N	45	LEU
5	N	51	ILE
5	N	67	ARG
5	N	69	THR
5	N	78	THR
5	N	84	ASN
5	N	87	LYS
5	N	89	GLU
5	N	91	THR
5	N	99	CYS
5	N	105	ARG
5	N	110	VAL
5	N	111	THR
5	N	113	THR
5	N	114	THR
5	N	117	TYR
5	N	122	THR
6	R	31	SER
6	R	32	LEU
6	R	34	GLU
6	R	42	TYR
6	R	47	GLN
6	R	50	LEU
6	R	51	THR
6	R	59	ASP
6	R	60	LEU
6	R	61	PHE
6	R	64	ARG
6	R	72	TRP
6	R	74	ASP
6	R	81	VAL
6	R	83	VAL

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Mol	Chain	Res	Type
6	R	88	TYR
6	R	100	VAL
6	R	105	THR
6	R	107	GLU
6	R	109	LEU
6	R	110	TRP
6	R	111	LEU
6	R	112	GLN
6	R	157	SER
6	R	197	LYS
6	R	202	LYS
6	R	219	SER
6	R	221	GLN
6	R	261	SER
6	R	265	ILE
6	R	288	LYS
6	R	293	ASP
6	R	320	ASN
6	R	336	LYS
6	R	338	ASN
6	R	343	THR
6	R	346	LYS
6	R	348	ARG
6	R	351	LYS
6	R	353	THR
6	R	370	VAL
6	R	376	ARG
6	R	378	THR
6	R	383	LYS
6	R	387	GLU
6	R	415	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	338	ASN
4	G	44	HIS
6	R	180	HIS
6	R	406	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](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.