Full wwPDB EM Validation Report ⓘ

Jan 7, 2025 – 02:06 PM JST

PDB ID	:	8ZJD
EMDB ID	:	EMD-60141
Title	:	Cryo-EM structure of kisspeptin receptor bound to KP-10
Authors	:	Shen, S.; Liu, H.; Xu, H.E.
Deposited on	:	2024-05-14
Resolution	:	3.06 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:

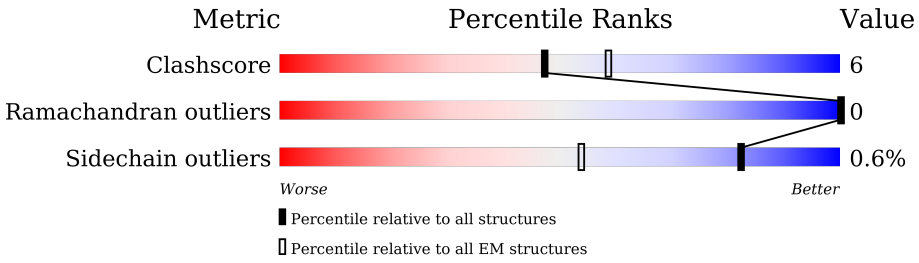
EMDB validation analysis	:	FAILED
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.06 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 <=5%

Mol	Chain	Length	Quality of chain
1	R	512	46% 9% 44%
2	L	11	73% 27%
3	B	351	87% 9% .
4	S	247	81% 12% 7%
5	G	71	73% . 24%
6	A	353	54% 10% 36%

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 8820 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 KiSS-1 receptor,KiSS-1 receptor,KiSS-1 receptor,KiSS-1 receptor,KiSS-1 receptor, G-protein coupled receptor 54, GPR54, KISS1R.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	R	285	Total	C	N	O	S	0	0
			2204	1454	380	354	16		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
R	131	TRP	ALA	conflict	UNP Q969F8

- Molecule 2 is a protein called kisspeptin-10.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	L	11	Total	C	N	O	0	1
			94	63	17	14		

- Molecule 3 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	B	338	Total	C	N	O	S	0	0
			2555	1578	460	497	20		

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-5	MET	-	initiating methionine	UNP P62873
B	-4	HIS	-	expression tag	UNP P62873
B	-3	HIS	-	expression tag	UNP P62873
B	-2	HIS	-	expression tag	UNP P62873
B	-1	HIS	-	expression tag	UNP P62873
B	0	HIS	-	expression tag	UNP P62873
B	1	HIS	-	expression tag	UNP P62873
B	2	GLY	-	expression tag	UNP P62873

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Chain	Residue	Modelled	Actual	Comment	Reference
B	3	SER	-	expression tag	UNP P62873
B	4	LEU	-	expression tag	UNP P62873
B	5	LEU	-	expression tag	UNP P62873
B	6	GLN	-	expression tag	UNP P62873

- Molecule 4 is a protein called scFv16.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	S	229	Total	C	N	O	S	0	0
			1741	1109	286	337	9		

- 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	54	Total	C	N	O	S	0	0
			386	240	68	77	1		

- Molecule 6 is a protein called Guanine nucleotide-binding protein G(i) subunit alpha-1,Guanine nucleotide-binding protein G(q) subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	A	227	Total	C	N	O	S	0	0
			1840	1173	310	348	9		

There are 4 discrepancies between the modelled and reference sequences:

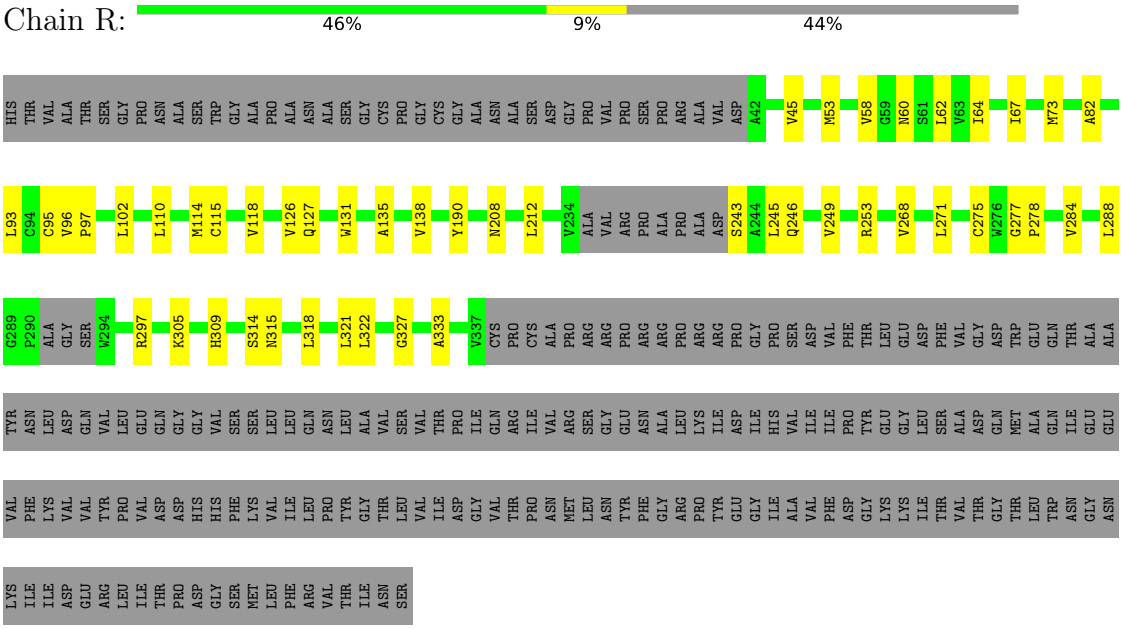
Chain	Residue	Modelled	Actual	Comment	Reference
A	29	ARG	-	linker	UNP P63096
A	30	SER	-	linker	UNP P63096
A	210	ALA	GLY	conflict	UNP P50148
A	333	SER	ALA	conflict	UNP P50148

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.

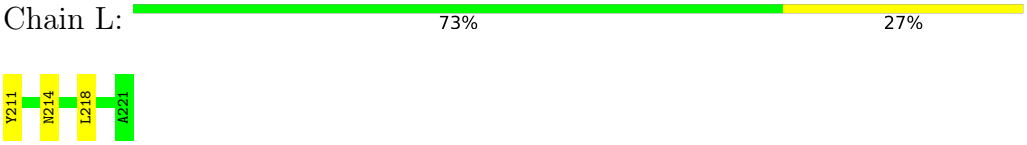
• Molecule 1: KiSS-1 receptor,KiSS-1 receptor,KiSS-1 receptor,KiSS-1 receptor,KiSS-1 receptor, G-protein coupled receptor 54, GPR54, KISS1R

Chain R:



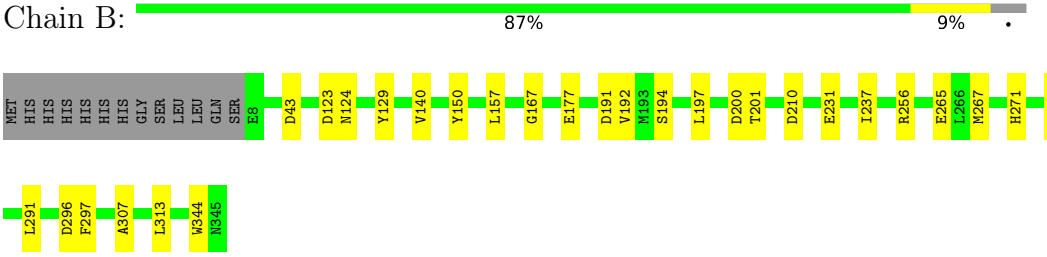
• Molecule 2: kisspeptin-10

Chain L:



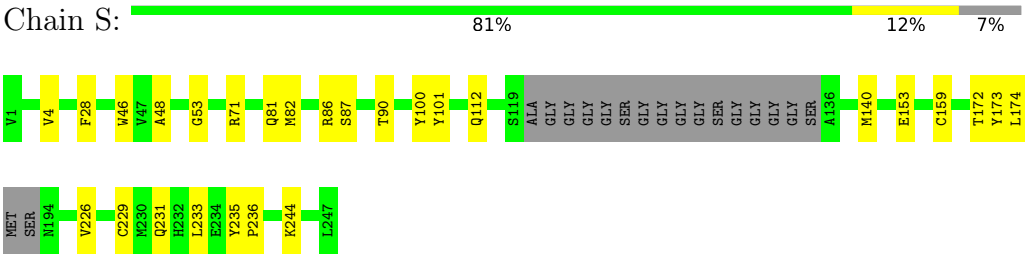
• Molecule 3: Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1

Chain B:



• Molecule 4: scFv16

Chain S:

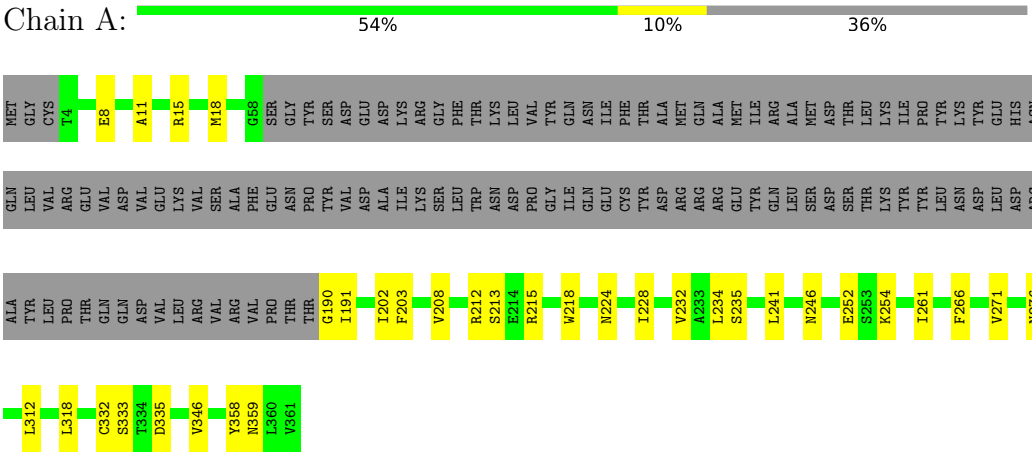


• Molecule 5: Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2

Chain G:

• Molecule 6: Guanine nucleotide-binding protein G(i) subunit alpha-1,Guanine nucleotide-binding protein G(q) subunit alpha

Chain A:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	199591	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor

5 Model quality

5.1 Standard geometry

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	0.32	0/2267	0.54	0/3102
2	L	0.43	0/98	0.83	0/132
3	B	0.27	0/2600	0.54	0/3530
4	S	0.26	0/1784	0.50	0/2424
5	G	0.25	0/390	0.45	0/532
6	A	0.35	0/1873	0.48	0/2522
All	All	0.30	0/9012	0.52	0/12242

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	2204	0	2250	33	0
2	L	94	0	80	2	0
3	B	2555	0	2439	24	0
4	S	1741	0	1656	21	0
5	G	386	0	375	2	0
6	A	1840	0	1809	35	0
All	All	8820	0	8609	100	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 6.

All (100) 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)
4:S:159:CYS:HG	4:S:229:CYS:HG	1.44	0.66
6:A:212:ARG:HG2	6:A:212:ARG:O	1.98	0.62
1:R:126:VAL:HG12	1:R:212:LEU:HD23	1.82	0.62
1:R:284:VAL:O	1:R:288:LEU:HD23	2.01	0.61
3:B:150:TYR:O	3:B:167:GLY:N	2.33	0.61
3:B:313:LEU:HD23	3:B:344:TRP:CD2	2.36	0.61
6:A:215:ARG:HG2	6:A:218:TRP:CZ2	2.36	0.60
4:S:173:TYR:CD2	6:A:8:GLU:OE2	2.55	0.59
6:A:261:ILE:HD13	6:A:271:VAL:HG21	1.84	0.59
4:S:226:VAL:HG22	4:S:244:LYS:HD3	1.84	0.59
3:B:157:LEU:HD11	3:B:197:LEU:HD21	1.85	0.59
1:R:271:LEU:HD11	1:R:318:LEU:HD12	1.85	0.58
6:A:228:ILE:HD11	6:A:266:PHE:CG	2.38	0.58
1:R:118:VAL:HG11	2:L:218:LEU:HD11	1.86	0.57
6:A:202:ILE:HD12	6:A:202:ILE:N	2.19	0.56
6:A:232:VAL:O	6:A:276:ASN:N	2.36	0.56
4:S:173:TYR:HD2	6:A:8:GLU:OE2	1.90	0.55
6:A:203:PHE:HE1	6:A:346:VAL:HG11	1.71	0.54
1:R:245:LEU:HD12	6:A:312:LEU:HD22	1.89	0.54
1:R:245:LEU:CD1	6:A:312:LEU:CD2	2.86	0.53
1:R:245:LEU:HD12	6:A:312:LEU:CD2	2.38	0.53
3:B:124:ASN:ND2	6:A:190:GLY:N	2.57	0.53
1:R:243:SER:HB3	1:R:246:GLN:HB3	1.90	0.53
1:R:73:MET:O	1:R:73:MET:CG	2.57	0.52
1:R:60:ASN:O	1:R:64:ILE:HG22	2.09	0.52
1:R:73:MET:HE1	1:R:333:ALA:HB1	1.92	0.52
4:S:46:TRP:NE1	4:S:48:ALA:O	2.43	0.52
4:S:153:GLU:HA	4:S:153:GLU:OE1	2.10	0.52
1:R:127:GLN:OE1	1:R:131:TRP:NE1	2.36	0.51
4:S:172:THR:HG23	4:S:172:THR:O	2.10	0.51
1:R:297:ARG:O	2:L:211:TYR:OH	2.29	0.51
3:B:177:GLU:HA	3:B:177:GLU:OE2	2.09	0.51
3:B:313:LEU:HD23	3:B:344:TRP:CG	2.46	0.51
6:A:228:ILE:HD11	6:A:266:PHE:CD1	2.46	0.51
6:A:224:ASN:OD1	6:A:224:ASN:N	2.45	0.50
4:S:188:LEU:C	4:S:189:ILE:HD13	2.31	0.50
4:S:90:THR:HG23	4:S:90:THR:O	2.12	0.50
1:R:126:VAL:CG1	1:R:212:LEU:HD23	2.41	0.49
1:R:321:LEU:HD23	1:R:322:LEU:N	2.27	0.49
3:B:150:TYR:HD1	6:A:213:SER:HG	1.58	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:194:SER:OG	3:B:237:ILE:HG22	2.11	0.49
3:B:191:ASP:OD1	3:B:192:VAL:N	2.46	0.49
3:B:231:GLU:OE2	3:B:231:GLU:HA	2.13	0.49
4:S:231:GLN:OE1	4:S:233:LEU:N	2.43	0.48
4:S:4:VAL:HG13	4:S:112:GLN:OE1	2.13	0.48
6:A:332:CYS:N	6:A:335:ASP:OD1	2.45	0.48
1:R:73:MET:O	1:R:73:MET:HG3	2.14	0.48
6:A:261:ILE:CD1	6:A:271:VAL:HG21	2.43	0.48
4:S:140:MET:HE2	4:S:174:LEU:HD23	1.95	0.48
1:R:67:ILE:HG21	1:R:82:ALA:HB2	1.95	0.47
3:B:271:HIS:H	3:B:274:ILE:HD11	1.79	0.47
6:A:241:LEU:HD22	6:A:252:GLU:CD	2.34	0.47
3:B:210:ASP:OD1	3:B:210:ASP:O	2.32	0.47
6:A:202:ILE:HD12	6:A:202:ILE:H	1.79	0.46
4:S:235:TYR:N	4:S:236:PRO:HD2	2.30	0.46
6:A:241:LEU:HD22	6:A:252:GLU:OE2	2.15	0.46
6:A:279:ASP:OD1	6:A:280:LEU:N	2.47	0.46
1:R:268:VAL:CG2	1:R:322:LEU:HD21	2.46	0.46
4:S:101:TYR:HB3	6:A:15:ARG:HD3	1.98	0.46
4:S:173:TYR:HE2	6:A:8:GLU:HB2	1.81	0.46
6:A:254:LYS:HG3	6:A:318:LEU:HD11	1.98	0.45
1:R:314:SER:O	1:R:318:LEU:HG	2.16	0.45
3:B:296:ASP:OD1	3:B:297:PHE:N	2.50	0.45
1:R:58:VAL:O	1:R:62:LEU:HD13	2.17	0.45
6:A:246:ASN:N	6:A:246:ASN:OD1	2.50	0.45
4:S:87:SER:O	4:S:90:THR:HG22	2.17	0.44
1:R:245:LEU:O	1:R:249:VAL:HG23	2.17	0.44
1:R:208:ASN:OD1	1:R:212:LEU:HD22	2.17	0.44
1:R:138:VAL:O	1:R:138:VAL:HG22	2.18	0.43
6:A:208:VAL:HG21	6:A:218:TRP:CH2	2.53	0.43
6:A:332:CYS:SG	6:A:333:SER:N	2.91	0.43
4:S:53:GLY:HA3	6:A:18:MET:HE1	1.99	0.43
1:R:53:MET:HE1	1:R:93:LEU:HA	2.01	0.43
3:B:123:ASP:HA	6:A:191:ILE:HG22	2.01	0.43
3:B:150:TYR:OH	3:B:191:ASP:OD2	2.30	0.43
1:R:45:VAL:HG11	1:R:102:LEU:HD13	2.01	0.43
3:B:275:ILE:HG23	3:B:275:ILE:O	2.19	0.43
3:B:43:ASP:N	3:B:43:ASP:OD1	2.52	0.43
6:A:235:SER:O	6:A:235:SER:OG	2.35	0.43
3:B:284:SER:OG	5:G:47:ASP:OD2	2.37	0.42
1:R:245:LEU:HD13	6:A:312:LEU:CD2	2.50	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:S:81:GLN:OE1	4:S:82:MET:N	2.52	0.42
1:R:275:CYS:HB3	1:R:315:ASN:HB2	2.02	0.42
4:S:100:TYR:HB2	6:A:11:ALA:HB1	2.02	0.41
3:B:291:LEU:HD12	3:B:291:LEU:N	2.35	0.41
3:B:297:PHE:N	3:B:297:PHE:CD1	2.87	0.41
3:B:267:MET:CE	3:B:307:ALA:HB2	2.51	0.41
4:S:86:ARG:HH11	4:S:86:ARG:HG2	1.85	0.41
1:R:110:LEU:HB3	1:R:114:MET:HG2	2.02	0.41
3:B:256:ARG:NE	3:B:265:GLU:OE1	2.44	0.41
3:B:129:TYR:CE2	3:B:140:VAL:HG22	2.55	0.41
1:R:305:LYS:O	1:R:309:HIS:HD2	2.03	0.41
1:R:277:GLY:N	1:R:278:PRO:CD	2.84	0.41
5:G:57:GLU:OE1	5:G:57:GLU:N	2.54	0.41
3:B:200:ASP:O	3:B:201:THR:OG1	2.33	0.40
1:R:135:ALA:O	1:R:138:VAL:HG12	2.21	0.40
1:R:327:GLY:HA3	6:A:359:ASN:HB3	2.02	0.40
6:A:234:LEU:HB3	6:A:281:LEU:HD22	2.02	0.40
4:S:28:PHE:O	4:S:71:ARG:NH2	2.53	0.40
1:R:96:VAL:N	1:R:97:PRO:HD2	2.36	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	R	279/512 (54%)	269 (96%)	10 (4%)	0	100	100
2	L	9/11 (82%)	6 (67%)	3 (33%)	0	100	100
3	B	336/351 (96%)	327 (97%)	9 (3%)	0	100	100
4	S	223/247 (90%)	215 (96%)	8 (4%)	0	100	100
5	G	52/71 (73%)	51 (98%)	1 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
6	A	223/353 (63%)	217 (97%)	6 (3%)	0	100 100
All	All	1122/1545 (73%)	1085 (97%)	37 (3%)	0	100 100

There are no Ramachandran outliers to report.

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	R	225/416 (54%)	221 (98%)	4 (2%)	54 74
2	L	9/9 (100%)	8 (89%)	1 (11%)	5 17
3	B	269/293 (92%)	269 (100%)	0	100 100
4	S	186/198 (94%)	186 (100%)	0	100 100
5	G	37/58 (64%)	37 (100%)	0	100 100
6	A	201/321 (63%)	200 (100%)	1 (0%)	86 91
All	All	927/1295 (72%)	921 (99%)	6 (1%)	82 90

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	R	95	CYS
1	R	115	CYS
1	R	190	TYR
1	R	253	ARG
2	L	214	ASN
6	A	358	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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.