Full wwPDB EM Validation Report

Jul 15, 2025 – 11:04 AM JST

PDB ID	:	8WZB / pdb_00008wzb
EMDB ID	:	EMD-37949
Title	:	RS head-neck monomer
Authors	:	Meng, X.; Cong, Y.
Deposited on	:	2023-11-01
Resolution	:	3.28 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:

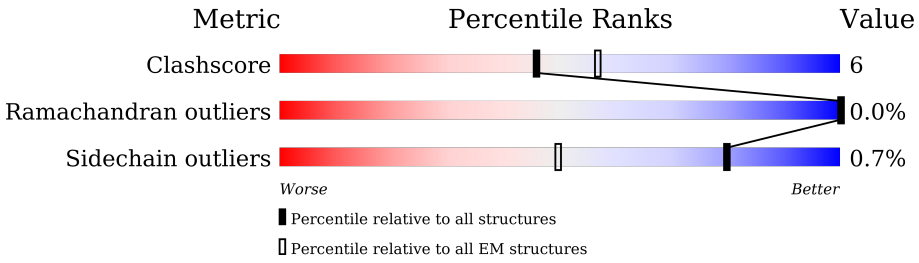
EMDB validation analysis	:	FAILED
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

1 Overall quality at a glance

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

The reported resolution of this entry is 3.28 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	A	159	26% · 71%
2	B	349	40% 10% · 48%
2	C	349	18% · 78%
3	D	389	10% · 88%
4	E	225	69% 20% 11%
5	F	313	49% 11% 41%
5	I	313	49% 10% 41%
6	G	716	45% 8% 46%
6	S	716	48% 7% 45%

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Mol	Chain	Length	Quality of chain
7	H	276	
7	c	276	

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 17594 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 DPY30 domain containing 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	46	Total	C	N	O	S	0	0
			369	238	63	66	2		

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	initiating methionine	UNP Q9D3X8
A	-18	TYR	-	expression tag	UNP Q9D3X8
A	-17	PRO	-	expression tag	UNP Q9D3X8
A	-16	TYR	-	expression tag	UNP Q9D3X8
A	-15	ASP	-	expression tag	UNP Q9D3X8
A	-14	VAL	-	expression tag	UNP Q9D3X8
A	-13	PRO	-	expression tag	UNP Q9D3X8
A	-12	ASP	-	expression tag	UNP Q9D3X8
A	-11	TYR	-	expression tag	UNP Q9D3X8
A	-10	ALA	-	expression tag	UNP Q9D3X8
A	-9	GLU	-	expression tag	UNP Q9D3X8
A	-8	ASN	-	expression tag	UNP Q9D3X8
A	-7	LEU	-	expression tag	UNP Q9D3X8
A	-6	TYR	-	expression tag	UNP Q9D3X8
A	-5	PHE	-	expression tag	UNP Q9D3X8
A	-4	GLN	-	expression tag	UNP Q9D3X8
A	-3	GLY	-	expression tag	UNP Q9D3X8
A	-2	ALA	-	expression tag	UNP Q9D3X8
A	-1	ALA	-	expression tag	UNP Q9D3X8
A	0	ALA	-	expression tag	UNP Q9D3X8

- Molecule 2 is a protein called DnaJ homolog subfamily B member 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	181	Total	C	N	O	S	0	0
			1489	965	256	263	5		

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Mol	Chain	Residues	Atoms					AltConf	Trace
2	C	78	Total	C	N	O	S	0	0
			633	420	102	108	3		

There are 66 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-32	MET	-	initiating methionine	UNP Q80Y75
B	-31	ASP	-	expression tag	UNP Q80Y75
B	-30	TYR	-	expression tag	UNP Q80Y75
B	-29	LYS	-	expression tag	UNP Q80Y75
B	-28	ASP	-	expression tag	UNP Q80Y75
B	-27	HIS	-	expression tag	UNP Q80Y75
B	-26	ASP	-	expression tag	UNP Q80Y75
B	-25	GLY	-	expression tag	UNP Q80Y75
B	-24	ASP	-	expression tag	UNP Q80Y75
B	-23	TYR	-	expression tag	UNP Q80Y75
B	-22	LYS	-	expression tag	UNP Q80Y75
B	-21	ASP	-	expression tag	UNP Q80Y75
B	-20	HIS	-	expression tag	UNP Q80Y75
B	-19	ASP	-	expression tag	UNP Q80Y75
B	-18	ILE	-	expression tag	UNP Q80Y75
B	-17	ASP	-	expression tag	UNP Q80Y75
B	-16	TYR	-	expression tag	UNP Q80Y75
B	-15	LYS	-	expression tag	UNP Q80Y75
B	-14	ASP	-	expression tag	UNP Q80Y75
B	-13	ASP	-	expression tag	UNP Q80Y75
B	-12	ASP	-	expression tag	UNP Q80Y75
B	-11	ASP	-	expression tag	UNP Q80Y75
B	-10	LYS	-	expression tag	UNP Q80Y75
B	-9	GLU	-	expression tag	UNP Q80Y75
B	-8	ASN	-	expression tag	UNP Q80Y75
B	-7	LEU	-	expression tag	UNP Q80Y75
B	-6	TYR	-	expression tag	UNP Q80Y75
B	-5	PHE	-	expression tag	UNP Q80Y75
B	-4	GLN	-	expression tag	UNP Q80Y75
B	-3	GLY	-	expression tag	UNP Q80Y75
B	-2	ALA	-	expression tag	UNP Q80Y75
B	-1	ALA	-	expression tag	UNP Q80Y75
B	0	ALA	-	expression tag	UNP Q80Y75
C	-32	MET	-	initiating methionine	UNP Q80Y75
C	-31	ASP	-	expression tag	UNP Q80Y75
C	-30	TYR	-	expression tag	UNP Q80Y75

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-29	LYS	-	expression tag	UNP Q80Y75
C	-28	ASP	-	expression tag	UNP Q80Y75
C	-27	HIS	-	expression tag	UNP Q80Y75
C	-26	ASP	-	expression tag	UNP Q80Y75
C	-25	GLY	-	expression tag	UNP Q80Y75
C	-24	ASP	-	expression tag	UNP Q80Y75
C	-23	TYR	-	expression tag	UNP Q80Y75
C	-22	LYS	-	expression tag	UNP Q80Y75
C	-21	ASP	-	expression tag	UNP Q80Y75
C	-20	HIS	-	expression tag	UNP Q80Y75
C	-19	ASP	-	expression tag	UNP Q80Y75
C	-18	ILE	-	expression tag	UNP Q80Y75
C	-17	ASP	-	expression tag	UNP Q80Y75
C	-16	TYR	-	expression tag	UNP Q80Y75
C	-15	LYS	-	expression tag	UNP Q80Y75
C	-14	ASP	-	expression tag	UNP Q80Y75
C	-13	ASP	-	expression tag	UNP Q80Y75
C	-12	ASP	-	expression tag	UNP Q80Y75
C	-11	ASP	-	expression tag	UNP Q80Y75
C	-10	LYS	-	expression tag	UNP Q80Y75
C	-9	GLU	-	expression tag	UNP Q80Y75
C	-8	ASN	-	expression tag	UNP Q80Y75
C	-7	LEU	-	expression tag	UNP Q80Y75
C	-6	TYR	-	expression tag	UNP Q80Y75
C	-5	PHE	-	expression tag	UNP Q80Y75
C	-4	GLN	-	expression tag	UNP Q80Y75
C	-3	GLY	-	expression tag	UNP Q80Y75
C	-2	ALA	-	expression tag	UNP Q80Y75
C	-1	ALA	-	expression tag	UNP Q80Y75
C	0	ALA	-	expression tag	UNP Q80Y75

- Molecule 3 is a protein called Radial spoke head protein 3 homolog B.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	D	46	Total	C	N	O	S	0	0
			387	242	69	72	4		

- Molecule 4 is a protein called Nucleoside diphosphate kinase homolog 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	E	201	Total	C	N	O	S	0	0
			1612	1047	266	289	10		

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	-13	MET	-	initiating methionine	UNP Q99MH5
E	-12	GLU	-	expression tag	UNP Q99MH5
E	-11	GLN	-	expression tag	UNP Q99MH5
E	-10	LYS	-	expression tag	UNP Q99MH5
E	-9	LEU	-	expression tag	UNP Q99MH5
E	-8	ILE	-	expression tag	UNP Q99MH5
E	-7	SER	-	expression tag	UNP Q99MH5
E	-6	GLU	-	expression tag	UNP Q99MH5
E	-5	GLU	-	expression tag	UNP Q99MH5
E	-4	ASP	-	expression tag	UNP Q99MH5
E	-3	LEU	-	expression tag	UNP Q99MH5
E	-2	GLY	-	expression tag	UNP Q99MH5
E	-1	SER	-	expression tag	UNP Q99MH5
E	0	GLY	-	expression tag	UNP Q99MH5

- Molecule 5 is a protein called Radial spoke head 1 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	F	185	Total	C	N	O	S	0	0
			1514	939	274	299	2		
5	I	185	Total	C	N	O	S	0	0
			1514	939	274	299	2		

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	-11	MET	-	initiating methionine	UNP Q8VIG3
F	-10	TRP	-	expression tag	UNP Q8VIG3
F	-9	SER	-	expression tag	UNP Q8VIG3
F	-8	HIS	-	expression tag	UNP Q8VIG3
F	-7	PRO	-	expression tag	UNP Q8VIG3
F	-6	GLN	-	expression tag	UNP Q8VIG3
F	-5	PHE	-	expression tag	UNP Q8VIG3
F	-4	GLU	-	expression tag	UNP Q8VIG3
F	-3	LYS	-	expression tag	UNP Q8VIG3
F	-2	GLY	-	expression tag	UNP Q8VIG3
F	-1	SER	-	expression tag	UNP Q8VIG3
F	0	GLY	-	expression tag	UNP Q8VIG3
I	-11	MET	-	initiating methionine	UNP Q8VIG3
I	-10	TRP	-	expression tag	UNP Q8VIG3
I	-9	SER	-	expression tag	UNP Q8VIG3

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Chain	Residue	Modelled	Actual	Comment	Reference
I	-8	HIS	-	expression tag	UNP Q8VIG3
I	-7	PRO	-	expression tag	UNP Q8VIG3
I	-6	GLN	-	expression tag	UNP Q8VIG3
I	-5	PHE	-	expression tag	UNP Q8VIG3
I	-4	GLU	-	expression tag	UNP Q8VIG3
I	-3	LYS	-	expression tag	UNP Q8VIG3
I	-2	GLY	-	expression tag	UNP Q8VIG3
I	-1	SER	-	expression tag	UNP Q8VIG3
I	0	GLY	-	expression tag	UNP Q8VIG3

- Molecule 6 is a protein called Radial spoke head protein 4 homolog A.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	G	387	Total	C	N	O	S	0	0
			3099	1997	506	586	10		
6	S	392	Total	C	N	O	S	0	0
			3139	2021	515	592	11		

- Molecule 7 is a protein called Radial spoke head protein 9 homolog.

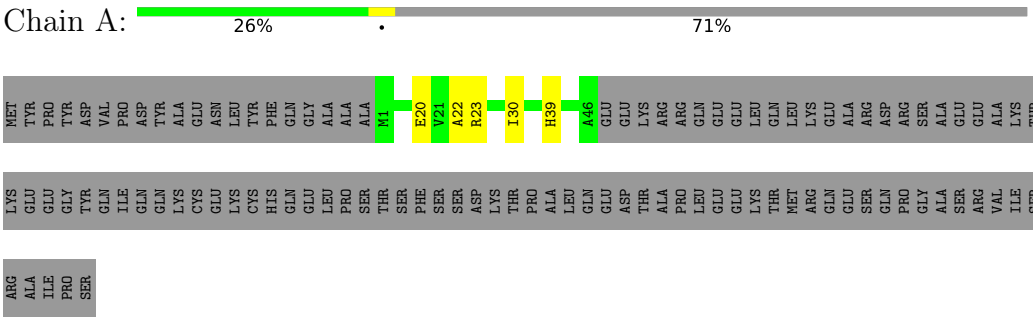
Mol	Chain	Residues	Atoms					AltConf	Trace
7	H	239	Total	C	N	O	S	0	0
			1912	1228	324	351	9		
7	c	241	Total	C	N	O	S	0	0
			1926	1238	326	353	9		

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.

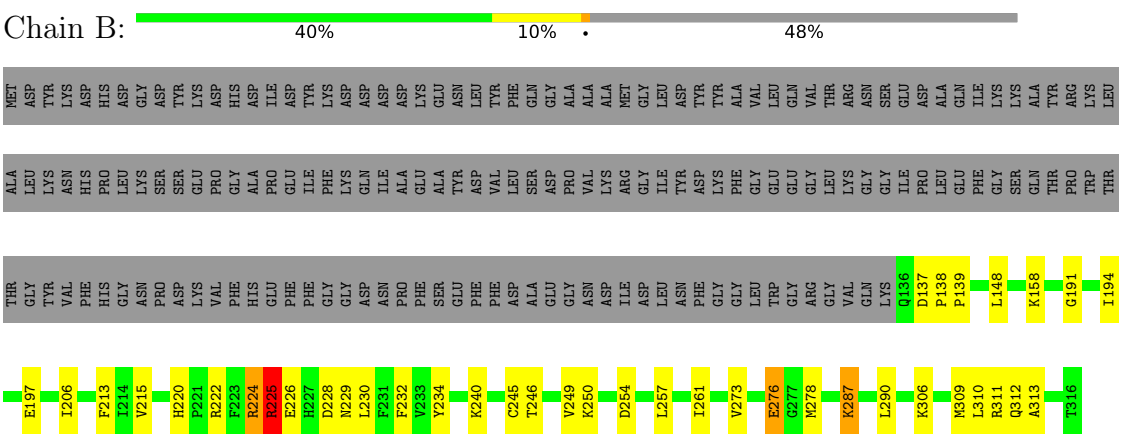
• Molecule 1: DPY30 domain containing 2

Chain A:



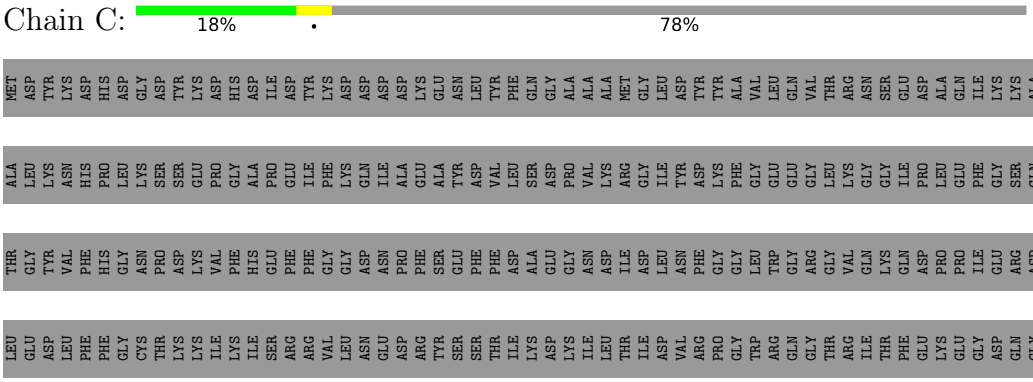
• Molecule 2: DnaJ homolog subfamily B member 13

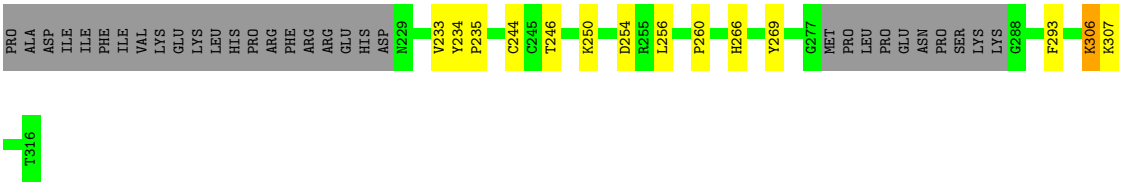
Chain B:



• Molecule 2: DnaJ homolog subfamily B member 13

Chain C:



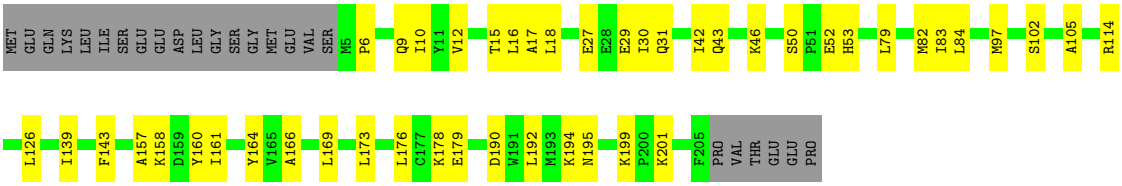


• Molecule 3: Radial spoke head protein 3 homolog B

Chain D:

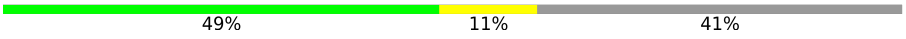
• Molecule 4: Nucleoside diphosphate kinase homolog 5

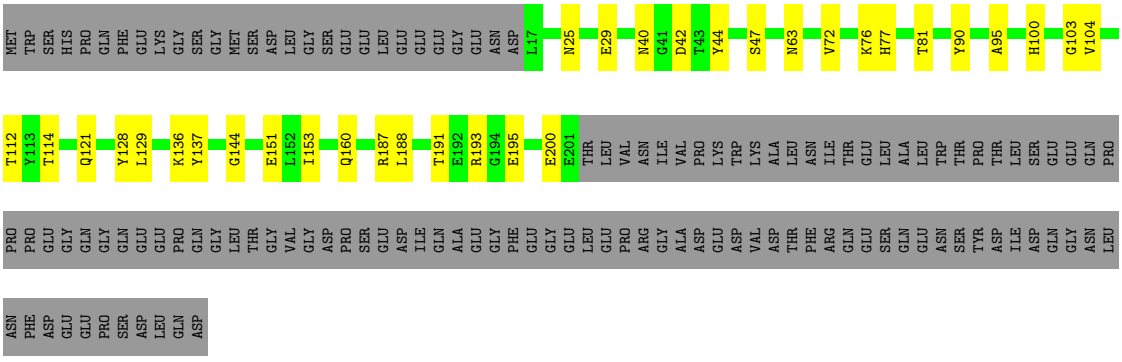
Chain E:



• Molecule 5: Radial spoke head 1 homolog

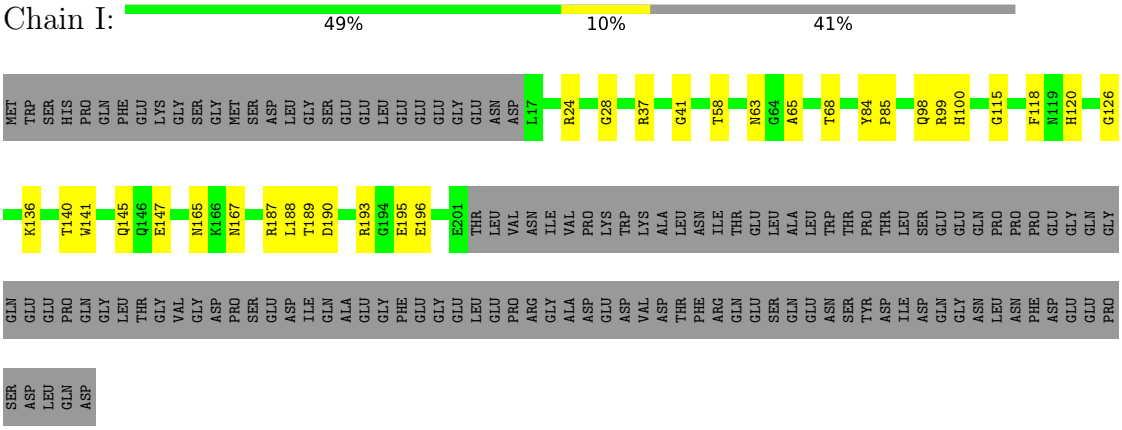
Chain F:





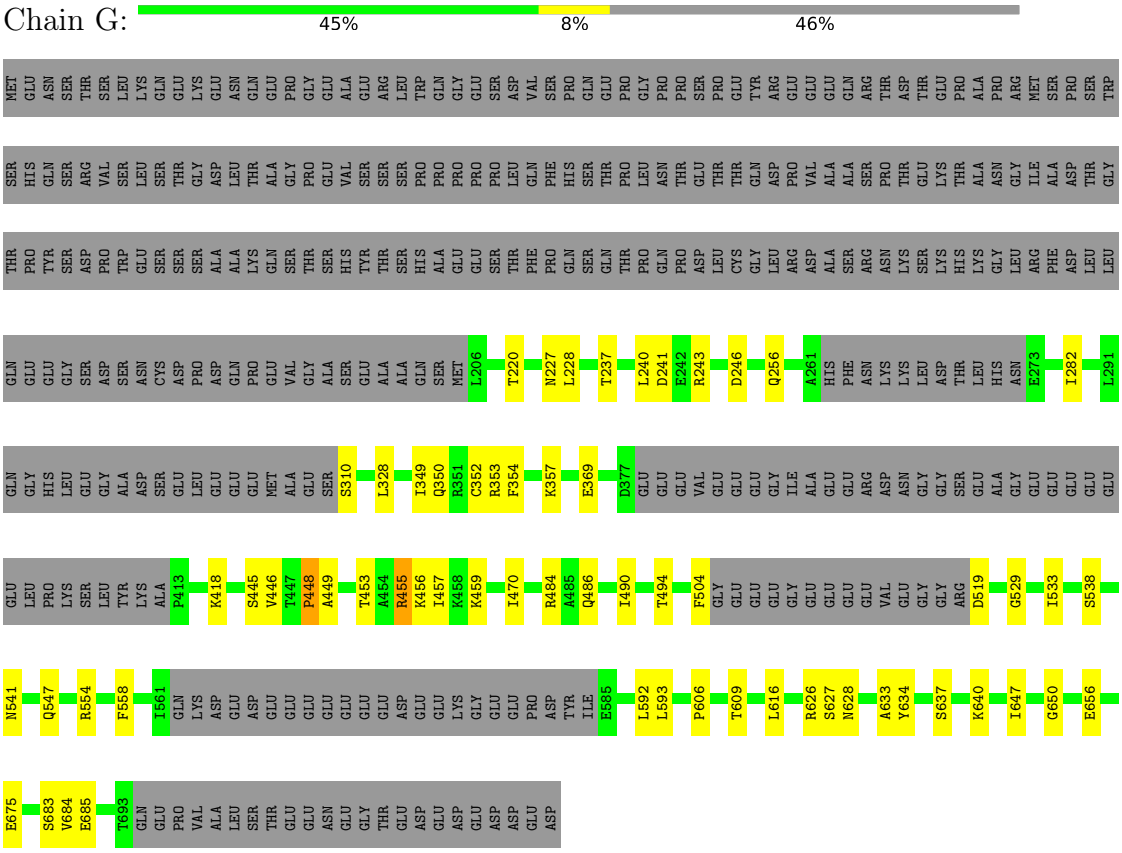
• Molecule 5: Radial spoke head 1 homolog

Chain I:



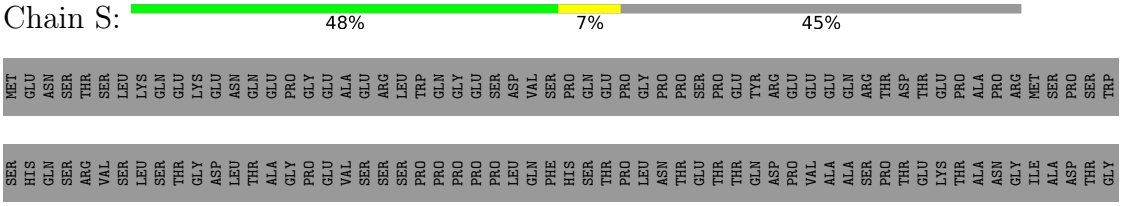
• Molecule 6: Radial spoke head protein 4 homolog A

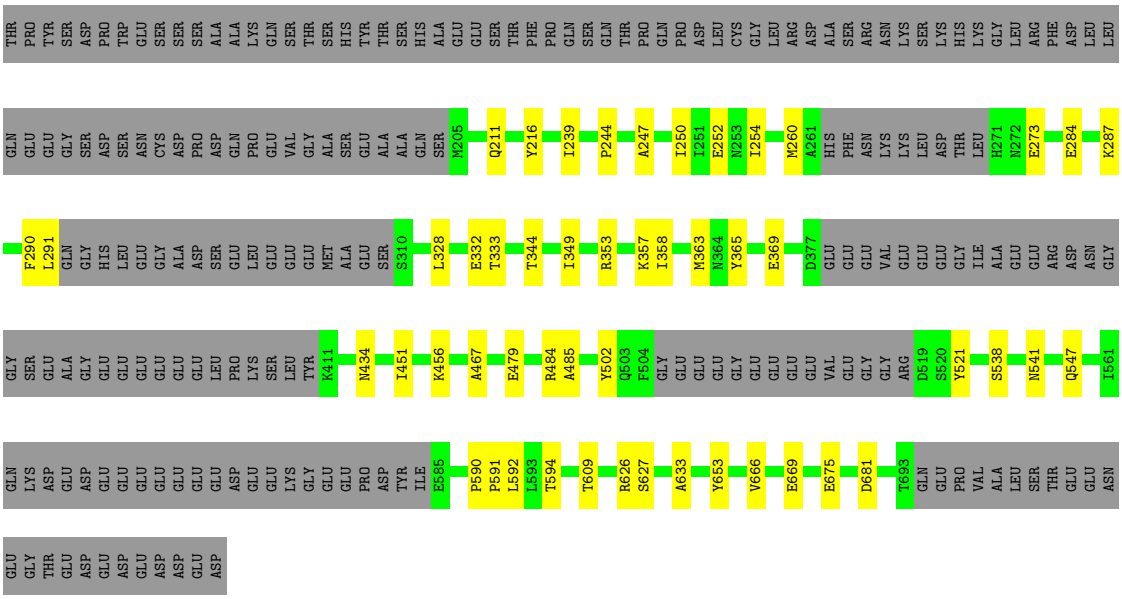
Chain G:



• Molecule 6: Radial spoke head protein 4 homolog A

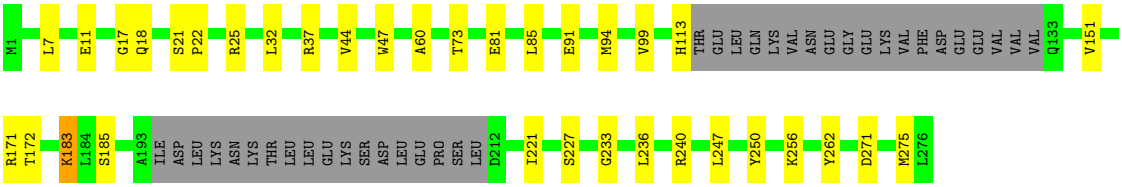
Chain S:





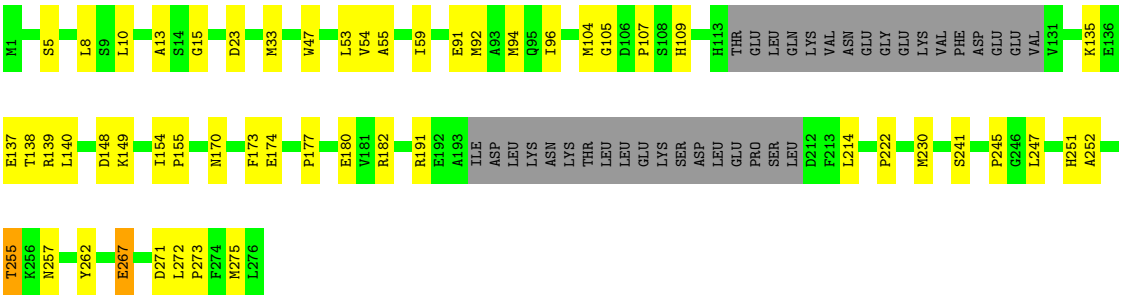
• Molecule 7: Radial spoke head protein 9 homolog

Chain H:



• Molecule 7: Radial spoke head protein 9 homolog

Chain c:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	433940	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 ($e^-/Å^2$)	54	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2700	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	0.16	0/379	0.42	0/517
2	B	0.26	0/1525	0.63	2/2061 (0.1%)
2	C	0.26	0/648	0.74	3/877 (0.3%)
3	D	0.26	0/393	0.67	1/528 (0.2%)
4	E	0.23	0/1657	0.53	0/2251
5	F	0.19	0/1558	0.54	2/2096 (0.1%)
5	I	0.17	0/1558	0.48	0/2096
6	G	0.27	1/3183 (0.0%)	0.77	6/4335 (0.1%)
6	S	0.19	0/3224	0.49	0/4390
7	H	0.24	0/1956	0.62	2/2645 (0.1%)
7	c	0.25	0/1970	0.98	11/2665 (0.4%)
All	All	0.23	1/18051 (0.0%)	0.66	27/24461 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	G	448	PRO	CG-CD	-6.80	1.27	1.50

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	G	448	PRO	CA-N-CD	-19.92	84.11	112.00
7	c	255	THR	CA-C-N	16.59	151.57	121.70
7	c	255	THR	C-N-CA	16.59	151.57	121.70
7	c	251	HIS	CA-C-N	15.88	150.29	121.70
7	c	251	HIS	C-N-CA	15.88	150.29	121.70
6	G	637	SER	CA-C-N	14.87	148.46	121.70
6	G	637	SER	C-N-CA	14.87	148.46	121.70
7	H	183	LYS	CA-C-N	11.33	142.09	121.70
7	H	183	LYS	C-N-CA	11.33	142.09	121.70
7	c	257	ASN	CA-C-N	11.26	141.97	121.70
7	c	257	ASN	C-N-CA	11.26	141.97	121.70
7	c	174	GLU	CA-C-N	10.29	140.23	121.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	c	174	GLU	C-N-CA	10.29	140.23	121.70
6	G	448	PRO	N-CD-CG	-8.75	90.08	103.20
2	C	256	LEU	CA-C-N	7.45	135.12	121.70
2	C	256	LEU	C-N-CA	7.45	135.12	121.70
2	B	224	ARG	CB-CG-CD	7.09	127.60	111.30
6	G	455	ARG	CA-CB-CG	6.89	127.88	114.10
2	B	225	ARG	N-CA-C	6.54	118.97	110.53
6	G	448	PRO	CA-CB-CG	-6.46	92.23	104.50
7	c	33	MET	CB-CG-SD	6.37	131.80	112.70
3	D	290	GLY	N-CA-C	5.64	115.34	110.21
7	c	245	PRO	CA-C-N	5.42	131.46	121.70
7	c	245	PRO	C-N-CA	5.42	131.46	121.70
5	F	195	GLU	CA-C-N	5.11	130.90	121.70
5	F	195	GLU	C-N-CA	5.11	130.90	121.70
2	C	306	LYS	CA-CB-CG	5.07	124.23	114.10

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	369	0	363	5	0
2	B	1489	0	1538	29	0
2	C	633	0	660	9	0
3	D	387	0	380	5	0
4	E	1612	0	1623	28	0
5	F	1514	0	1346	18	0
5	I	1514	0	1346	19	0
6	G	3099	0	3009	41	0
6	S	3139	0	3048	36	0
7	H	1912	0	1907	24	0
7	c	1926	0	1925	28	0
All	All	17594	0	17145	207	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 (207) 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)
6:G:490:ILE:O	6:G:494:THR:HB	1.81	0.79
2:B:225:ARG:HD3	2:B:278:MET:HE2	1.71	0.73
4:E:190:ASP:O	4:E:194:LYS:HB2	1.93	0.68
4:E:160:TYR:O	4:E:164:TYR:HB2	1.93	0.68
2:B:225:ARG:HD2	2:B:226:GLU:O	1.97	0.64
2:B:306:LYS:O	2:B:310:LEU:HB2	1.98	0.63
7:c:247:LEU:HD12	7:c:262:TYR:HB2	1.80	0.62
7:H:151:VAL:HG23	7:H:247:LEU:HD13	1.82	0.60
2:B:273:VAL:HB	2:B:290:LEU:HB3	1.85	0.59
7:H:236:LEU:HD11	7:H:250:TYR:HB2	1.83	0.59
6:G:609:THR:HB	6:G:626:ARG:HB3	1.85	0.58
3:D:320:VAL:HG13	3:D:323:ARG:HH21	1.69	0.58
6:G:647:ILE:HD13	7:H:17:GLY:HA3	1.87	0.57
5:F:151:GLU:HG3	5:F:160:GLN:HG2	1.86	0.57
7:c:104:MET:SD	7:c:104:MET:N	2.78	0.57
6:S:547:GLN:HG3	6:S:592:LEU:HD13	1.86	0.57
6:G:228:LEU:HD12	6:S:247:ALA:HB1	1.87	0.57
2:B:194:ILE:HB	2:B:213:PHE:HB2	1.87	0.56
5:F:104:VAL:HG13	5:F:114:THR:HG22	1.88	0.56
7:H:227:SER:HB3	7:H:240:ARG:HB2	1.88	0.56
6:G:683:SER:OG	6:G:684:VAL:N	2.37	0.56
6:S:609:THR:HB	6:S:626:ARG:HB3	1.89	0.55
5:I:193:ARG:NH1	5:I:195:GLU:OE1	2.40	0.55
5:I:98:GLN:HG2	5:I:120:HIS:HB2	1.88	0.55
4:E:42:ILE:HB	4:E:83:ILE:HB	1.88	0.55
2:B:191:GLY:H	2:B:215:VAL:HB	1.72	0.54
4:E:18:LEU:HD22	4:E:79:LEU:HD11	1.88	0.54
7:c:241:SER:HB3	7:c:247:LEU:HB3	1.87	0.54
7:H:11:GLU:OE1	7:H:25:ARG:NH2	2.41	0.54
7:H:47:TRP:H	7:H:60:ALA:HA	1.72	0.54
2:B:310:LEU:HD23	2:B:313:ALA:HB3	1.90	0.53
5:I:84:TYR:OH	5:I:99:ARG:NH1	2.41	0.53
5:I:100:HIS:ND1	5:I:118:PHE:O	2.40	0.53
5:I:58:THR:HG23	5:I:68:THR:HG22	1.90	0.53
6:G:627:SER:HB3	6:G:633:ALA:HB3	1.89	0.53
4:E:16:LEU:HD13	4:E:139:ILE:HG12	1.90	0.53
4:E:173:LEU:HD23	4:E:176:LEU:HD23	1.90	0.53
5:F:188:LEU:HB2	5:F:191:THR:HG22	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:S:590:PRO:HB2	6:S:594:THR:HG21	1.91	0.53
4:E:102:SER:HA	4:E:105:ALA:HB3	1.91	0.52
5:F:72:VAL:HB	5:F:77:HIS:HB3	1.91	0.52
7:H:22:PRO:HA	7:H:25:ARG:HB2	1.90	0.52
6:S:675:GLU:OE2	5:I:63:ASN:ND2	2.42	0.52
7:c:107:PRO:HB3	7:c:137:GLU:HB2	1.91	0.52
6:G:486:GLN:NE2	6:G:650:GLY:O	2.43	0.52
6:S:287:LYS:HE3	6:S:291:LEU:HD11	1.92	0.52
7:c:10:LEU:HB3	7:c:13:ALA:HB3	1.91	0.52
4:E:50:SER:HB3	4:E:53:HIS:HB2	1.92	0.51
6:G:228:LEU:HD11	6:S:239:ILE:HD13	1.90	0.51
7:c:177:PRO:HG2	7:c:180:GLU:HG3	1.93	0.51
1:A:39:HIS:NE2	6:S:260:MET:O	2.42	0.51
6:S:451:ILE:HG22	6:S:485:ALA:HB2	1.93	0.51
2:B:311:ARG:NH2	2:C:244:CYS:O	2.44	0.51
2:B:234:TYR:OH	2:B:240:LYS:NZ	2.42	0.51
7:c:55:ALA:HB3	7:c:105:GLY:HA2	1.91	0.51
2:C:254:ASP:OD1	2:C:254:ASP:N	2.43	0.51
2:B:245:CYS:HB2	2:B:261:ILE:HB	1.93	0.51
5:F:63:ASN:ND2	6:G:675:GLU:OE1	2.42	0.50
7:H:171:ARG:O	7:H:256:LYS:NZ	2.45	0.50
4:E:46:LYS:HG3	6:S:273:GLU:HB2	1.94	0.50
5:F:187:ARG:HD3	5:F:193:ARG:HD2	1.94	0.49
6:G:310:SER:N	6:G:350:GLN:O	2.45	0.49
7:c:154:ILE:HD12	7:c:155:PRO:HD2	1.94	0.49
6:G:282:ILE:HD13	7:H:233:GLY:H	1.77	0.49
6:G:353:ARG:NH1	6:G:354:PHE:O	2.45	0.49
7:c:149:LYS:O	7:c:191:ARG:NH1	2.43	0.49
6:S:357:LYS:NZ	7:c:15:GLY:O	2.44	0.49
6:S:627:SER:HB3	6:S:633:ALA:HB3	1.95	0.49
2:B:312:GLN:O	2:C:306:LYS:NZ	2.45	0.49
5:F:40:ASN:ND2	5:F:42:ASP:OD1	2.45	0.49
6:G:446:VAL:HG23	6:G:484:ARG:HG3	1.94	0.49
7:c:272:LEU:HA	7:c:275:MET:HE2	1.95	0.49
2:B:225:ARG:HG2	2:B:229:ASN:O	2.12	0.49
6:S:669:GLU:OE2	5:I:99:ARG:NH2	2.45	0.49
4:E:17:ALA:HB3	4:E:82:MET:HG3	1.94	0.49
5:I:167:ASN:ND2	5:I:189:THR:O	2.44	0.49
6:G:616:LEU:HD21	6:S:290:PHE:HA	1.95	0.49
2:B:310:LEU:HA	2:B:313:ALA:HB3	1.95	0.48
6:G:519:ASP:N	6:G:519:ASP:OD1	2.45	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:225:ARG:HG2	2:B:230:LEU:HD12	1.94	0.48
3:D:318:ARG:HH22	4:E:10:ILE:HG23	1.78	0.48
7:H:247:LEU:HA	7:H:262:TYR:HA	1.95	0.48
7:H:99:VAL:HG22	7:H:113:HIS:HB2	1.93	0.48
1:A:22:ALA:HB2	4:E:161:ILE:HD11	1.95	0.48
6:G:547:GLN:HG3	6:G:592:LEU:HD13	1.96	0.48
7:c:53:LEU:HB3	7:c:104:MET:HB3	1.95	0.48
7:c:91:GLU:HA	7:c:94:MET:HE3	1.95	0.48
4:E:6:PRO:HD2	4:E:9:GLN:HB2	1.96	0.48
4:E:97:MET:HG3	4:E:114:ARG:HE	1.79	0.48
5:F:187:ARG:HH22	6:G:656:GLU:HG3	1.78	0.48
6:G:459:LYS:HA	7:H:275:MET:HA	1.94	0.48
6:G:606:PRO:O	6:G:628:ASN:ND2	2.44	0.48
2:C:246:THR:HA	2:C:260:PRO:HA	1.96	0.48
6:S:358:ILE:HB	6:S:365:TYR:HB2	1.96	0.48
5:I:167:ASN:ND2	5:I:190:ASP:OD1	2.47	0.47
2:B:249:VAL:HB	2:B:257:LEU:HB2	1.96	0.47
6:S:467:ALA:HB3	6:S:479:GLU:HB2	1.95	0.47
1:A:30:ILE:HG23	4:E:192:LEU:HD22	1.97	0.47
4:E:166:ALA:HA	4:E:169:LEU:HB2	1.96	0.47
4:E:27:GLU:O	4:E:31:GLN:HB2	2.15	0.47
4:E:30:ILE:HD11	4:E:126:LEU:HD21	1.95	0.47
6:S:666:VAL:HG11	5:I:141:TRP:HH2	1.80	0.47
2:C:233:VAL:HG22	2:C:293:PHE:HB2	1.97	0.47
5:F:44:TYR:OH	5:F:47:SER:O	2.29	0.47
2:B:250:LYS:NZ	2:B:254:ASP:OD1	2.47	0.47
6:S:591:PRO:HD2	6:S:594:THR:HB	1.95	0.47
2:B:225:ARG:CZ	2:B:278:MET:HE1	2.45	0.47
6:G:634:TYR:OH	7:H:18:GLN:NE2	2.48	0.47
2:B:148:LEU:HD23	2:B:220:HIS:HB2	1.97	0.46
4:E:12:VAL:HG22	6:S:211:GLN:HG2	1.96	0.46
7:c:222:PRO:HG3	7:c:273:PRO:HG3	1.98	0.46
2:C:246:THR:HG22	2:C:260:PRO:HB3	1.98	0.46
3:D:296:MET:HB3	4:E:158:LYS:HE3	1.97	0.46
1:A:22:ALA:HB1	4:E:157:ALA:HB1	1.97	0.46
6:S:328:LEU:HB2	6:S:333:THR:HB	1.98	0.46
6:S:538:SER:OG	6:S:541:ASN:OD1	2.33	0.46
6:G:353:ARG:NE	6:G:369:GLU:OE1	2.45	0.46
6:S:653:TYR:OH	7:c:267:GLU:OE2	2.33	0.46
7:c:170:ASN:HB3	7:c:173:PHE:HB2	1.98	0.46
6:S:344:THR:HA	6:S:349:ILE:HD12	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:S:363:MET:SD	6:S:434:ASN:ND2	2.85	0.45
5:I:187:ARG:HG3	5:I:188:LEU:HG	1.98	0.45
2:B:158:LYS:HG2	4:E:52:GLU:HB3	1.96	0.45
2:B:224:ARG:HH21	2:B:226:GLU:HB2	1.79	0.45
2:B:246:THR:OG1	7:H:81:GLU:OE2	2.29	0.45
5:F:25:ASN:HD21	5:F:29:GLU:HB2	1.82	0.45
6:S:244:PRO:HG2	6:S:250:ILE:HD13	1.98	0.45
3:D:308:VAL:HA	3:D:311:THR:HG22	1.99	0.45
6:S:502:TYR:HB3	6:S:521:TYR:HB2	1.98	0.45
4:E:15:THR:HG22	4:E:84:LEU:HB2	1.99	0.45
6:G:538:SER:OG	6:G:541:ASN:OD1	2.34	0.45
5:F:121:GLN:O	5:F:144:GLY:N	2.50	0.45
6:G:683:SER:OG	6:G:685:GLU:OE2	2.32	0.45
2:B:230:LEU:HD11	2:B:278:MET:HG3	1.98	0.44
7:c:135:LYS:HD3	7:c:135:LYS:HA	1.83	0.44
6:G:418:LYS:HD2	6:G:445:SER:HB2	1.98	0.44
6:G:455:ARG:O	6:G:457:ILE:N	2.49	0.44
7:c:59:ILE:HD11	7:c:140:LEU:HD11	1.98	0.44
5:F:90:TYR:HE1	5:F:103:GLY:HA3	1.83	0.44
5:I:24:ARG:NH1	5:I:28:GLY:O	2.43	0.44
6:S:681:ASP:OD1	6:S:681:ASP:N	2.47	0.44
2:B:222:ARG:HB3	2:B:232:PHE:HE1	1.82	0.44
4:E:43:GLN:HG2	4:E:143:PHE:HE2	1.83	0.44
1:A:20:GLU:HA	1:A:23:ARG:HB3	2.00	0.43
2:B:197:GLU:OE1	4:E:201:LYS:NZ	2.46	0.43
3:D:323:ARG:NH2	6:G:237:THR:OG1	2.50	0.43
7:H:37:ARG:HH12	6:S:284:GLU:HG2	1.83	0.43
5:F:95:ALA:HB3	5:F:100:HIS:HB3	1.99	0.43
2:B:276:GLU:HA	2:B:287:LYS:HD2	1.99	0.43
6:G:349:ILE:HG21	6:G:352:CYS:HB2	1.99	0.43
6:G:243:ARG:N	6:S:216:TYR:OH	2.52	0.43
6:G:456:LYS:H	6:G:456:LYS:HG2	1.66	0.43
6:G:490:ILE:O	6:G:494:THR:CB	2.59	0.43
4:E:178:LYS:HA	4:E:179:GLU:HA	1.88	0.43
7:c:54:VAL:HG22	7:c:104:MET:HB2	2.01	0.43
5:F:112:THR:HB	5:F:129:LEU:HB3	1.99	0.43
7:H:91:GLU:HA	7:H:94:MET:HE2	2.01	0.43
6:S:456:LYS:H	6:S:456:LYS:HG3	1.56	0.43
4:E:199:LYS:HA	4:E:199:LYS:HD3	1.89	0.42
6:G:449:ALA:O	6:G:453:THR:OG1	2.30	0.42
7:c:252:ALA:O	7:c:255:THR:OG1	2.37	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:I:145:GLN:NE2	5:I:165:ASN:OD1	2.47	0.42
6:G:220:THR:HG22	6:G:227:ASN:HB3	2.01	0.42
7:H:7:LEU:HB3	7:c:10:LEU:HD21	2.01	0.42
7:H:172:THR:O	7:H:172:THR:OG1	2.35	0.42
7:c:271:ASP:OD1	7:c:271:ASP:N	2.52	0.42
2:C:250:LYS:HA	2:C:250:LYS:HD3	1.83	0.42
5:F:128:TYR:HB3	5:F:137:TYR:HB3	2.01	0.42
5:F:200:GLU:HB2	7:H:221:ILE:HD12	2.01	0.42
6:G:504:PHE:HB2	6:G:593:LEU:HD12	2.02	0.42
5:I:115:GLY:HA3	5:I:126:GLY:HA2	2.02	0.42
2:B:224:ARG:NE	2:B:225:ARG:O	2.36	0.42
6:G:240:LEU:HD23	6:G:240:LEU:HA	1.90	0.42
6:S:328:LEU:HB3	6:S:332:GLU:HG3	2.01	0.42
7:c:92:MET:SD	7:c:138:THR:OG1	2.78	0.42
5:F:136:LYS:O	5:F:153:ILE:N	2.52	0.42
6:G:554:ARG:HH11	6:G:558:PHE:HB2	1.84	0.42
2:B:306:LYS:HA	2:B:309:MET:HE3	2.02	0.42
5:F:76:LYS:HB2	5:F:76:LYS:HE2	1.93	0.42
6:G:241:ASP:O	6:S:216:TYR:OH	2.32	0.42
2:B:138:PRO:HA	2:B:139:PRO:HD3	1.95	0.41
6:G:529:GLY:HA3	6:G:640:LYS:HD3	2.02	0.41
6:S:353:ARG:NE	6:S:369:GLU:OE1	2.53	0.41
2:B:137:ASP:H	2:B:206:ILE:HG23	1.86	0.41
5:I:136:LYS:HB2	5:I:136:LYS:HE2	1.74	0.41
7:c:182:ARG:NH2	7:c:230:MET:SD	2.93	0.41
7:c:47:TRP:NE1	7:c:148:ASP:OD1	2.46	0.41
6:G:246:ASP:O	7:H:171:ARG:NH2	2.52	0.41
6:G:256:GLN:HE22	6:S:252:GLU:HG2	1.85	0.41
5:I:65:ALA:HB2	5:I:85:PRO:HG3	2.02	0.41
6:G:328:LEU:HD22	6:G:357:LYS:HE2	2.03	0.41
6:S:484:ARG:HD2	6:S:484:ARG:HA	1.87	0.41
7:c:5:SER:HB2	7:c:8:LEU:HB2	2.03	0.41
7:H:73:THR:HG23	7:H:85:LEU:HB2	2.03	0.41
5:I:195:GLU:HA	5:I:196:GLU:HA	1.85	0.41
6:G:533:ILE:HD12	6:G:533:ILE:HA	1.94	0.41
5:I:140:THR:OG1	5:I:147:GLU:O	2.38	0.41
2:C:307:LYS:HE3	2:C:307:LYS:HB2	1.93	0.40
7:c:96:ILE:HG21	7:c:139:ARG:HD2	2.02	0.40
5:I:37:ARG:HH22	5:I:41:GLY:HA2	1.85	0.40
2:C:234:TYR:HA	2:C:235:PRO:HD3	1.97	0.40
4:E:195:ASN:OD1	4:E:195:ASN:N	2.55	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:H:21:SER:O	7:H:25:ARG:N	2.51	0.40
7:H:183:LYS:HB2	7:H:185:SER:H	1.86	0.40
6:S:254:ILE:HD13	6:S:254:ILE:HA	1.93	0.40
7:c:135:LYS:HB3	7:c:138:THR:HG22	2.02	0.40
7:H:32:LEU:HD13	7:H:44:VAL:HG12	2.03	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	44/159 (28%)	41 (93%)	3 (7%)	0	100	100
2	B	179/349 (51%)	171 (96%)	8 (4%)	0	100	100
2	C	74/349 (21%)	71 (96%)	3 (4%)	0	100	100
3	D	44/389 (11%)	44 (100%)	0	0	100	100
4	E	199/225 (88%)	191 (96%)	8 (4%)	0	100	100
5	F	183/313 (58%)	172 (94%)	11 (6%)	0	100	100
5	I	183/313 (58%)	179 (98%)	4 (2%)	0	100	100
6	G	375/716 (52%)	353 (94%)	21 (6%)	1 (0%)	37	67
6	S	380/716 (53%)	367 (97%)	13 (3%)	0	100	100
7	H	233/276 (84%)	226 (97%)	7 (3%)	0	100	100
7	c	235/276 (85%)	223 (95%)	12 (5%)	0	100	100
All	All	2129/4081 (52%)	2038 (96%)	90 (4%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
6	G	448	PRO

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	38/137 (28%)	38 (100%)	0	100	100
2	B	169/307 (55%)	165 (98%)	4 (2%)	44	67
2	C	72/307 (24%)	70 (97%)	2 (3%)	38	63
3	D	44/349 (13%)	44 (100%)	0	100	100
4	E	177/199 (89%)	176 (99%)	1 (1%)	84	90
5	F	148/259 (57%)	147 (99%)	1 (1%)	81	88
5	I	148/259 (57%)	148 (100%)	0	100	100
6	G	339/625 (54%)	338 (100%)	1 (0%)	91	94
6	S	343/625 (55%)	343 (100%)	0	100	100
7	H	207/243 (85%)	206 (100%)	1 (0%)	86	91
7	c	209/243 (86%)	205 (98%)	4 (2%)	52	72
All	All	1894/3553 (53%)	1880 (99%)	14 (1%)	80	88

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	225	ARG
2	B	228	ASP
2	B	276	GLU
2	B	287	LYS
2	C	266	HIS
2	C	269	TYR
4	E	29	GLU
5	F	81	THR
6	G	470	ILE
7	H	271	ASP
7	c	23	ASP
7	c	109	HIS
7	c	214	LEU
7	c	267	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
5	F	125	GLN
5	F	165	ASN
5	F	183	HIS
6	G	253	ASN
6	G	313	ASN
6	G	486	GLN
6	G	544	HIS
6	G	556	ASN
6	G	611	GLN
7	H	18	GLN
7	H	109	HIS
6	S	481	ASN
6	S	495	HIS

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

There are no ligands in this entry.

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.