



Full wwPDB EM Validation Report ⓘ

Jul 15, 2025 – 11:05 PM JST

PDB ID : 8YZE / pdb_00008yze
EMDB ID : EMD-39691
Title : The JN.1 spike protein (S) in complex with ACE2.
Authors : Wang, Y.J.; Zhang, X.; Sun, L.
Deposited on : 2024-04-06
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 : 4-5-2 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

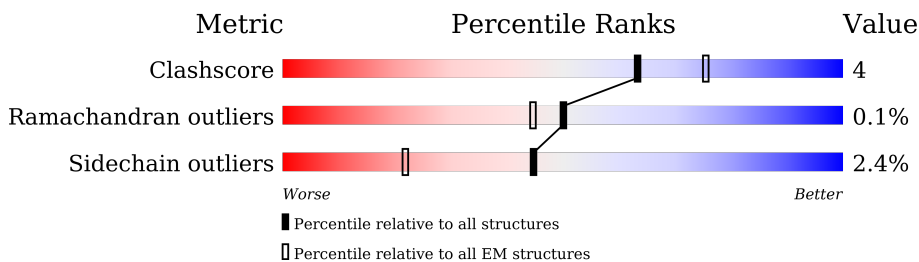
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.06 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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	1291	
1	B	1291	
1	C	1291	
2	G	742	
2	H	742	
2	I	742	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 38994 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 Spike glycoprotein,Fibritin,Expression Tag.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1034	Total	C	N	O	S	0	0
			8128	5207	1346	1539	36		
1	B	1034	Total	C	N	O	S	0	0
			8128	5207	1346	1539	36		
1	C	1034	Total	C	N	O	S	0	0
			8128	5207	1346	1539	36		

There are 288 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	MET	-	initiating methionine	UNP P0DTC2
A	-2	PRO	-	expression tag	UNP P0DTC2
A	-1	MET	-	expression tag	UNP P0DTC2
A	0	GLY	-	expression tag	UNP P0DTC2
A	1	SER	-	expression tag	UNP P0DTC2
A	2	LEU	-	expression tag	UNP P0DTC2
A	3	GLN	-	expression tag	UNP P0DTC2
A	4	PRO	-	expression tag	UNP P0DTC2
A	5	LEU	-	expression tag	UNP P0DTC2
A	6	ALA	-	expression tag	UNP P0DTC2
A	7	THR	-	expression tag	UNP P0DTC2
A	8	LEU	-	expression tag	UNP P0DTC2
A	9	TYR	-	expression tag	UNP P0DTC2
A	10	LEU	-	expression tag	UNP P0DTC2
A	11	LEU	-	expression tag	UNP P0DTC2
A	12	GLY	-	expression tag	UNP P0DTC2
A	13	MET	-	expression tag	UNP P0DTC2
A	14	LEU	-	expression tag	UNP P0DTC2
A	15	VAL	-	expression tag	UNP P0DTC2
A	16	ALA	-	expression tag	UNP P0DTC2
A	17	SER	-	expression tag	UNP P0DTC2
A	18	VAL	-	expression tag	UNP P0DTC2
A	19	LEU	-	expression tag	UNP P0DTC2
A	20	ALA	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	26	ILE	THR	variant	UNP P0DTC2
A	28	THR	ARG	conflict	UNP P0DTC2
A	?	-	LEU	deletion	UNP P0DTC2
A	?	-	PRO	deletion	UNP P0DTC2
A	?	-	PRO	deletion	UNP P0DTC2
A	31	SER	ALA	variant	UNP P0DTC2
A	54	LEU	SER	conflict	UNP P0DTC2
A	?	-	HIS	deletion	UNP P0DTC2
A	?	-	VAL	deletion	UNP P0DTC2
A	128	PHE	VAL	conflict	UNP P0DTC2
A	144	ASP	GLY	variant	UNP P0DTC2
A	?	-	TYR	deletion	UNP P0DTC2
A	158	SER	PHE	conflict	UNP P0DTC2
A	159	GLY	ARG	variant	UNP P0DTC2
A	?	-	ASN	deletion	UNP P0DTC2
A	212	ILE	LEU	variant	UNP P0DTC2
A	213	GLY	VAL	variant	UNP P0DTC2
A	216	PHE	LEU	conflict	UNP P0DTC2
A	245	ASN	HIS	conflict	UNP P0DTC2
A	264	ASP	ALA	conflict	UNP P0DTC2
A	332	VAL	ILE	conflict	UNP P0DTC2
A	339	HIS	GLY	variant	UNP P0DTC2
A	356	THR	LYS	conflict	UNP P0DTC2
A	371	PHE	SER	variant	UNP P0DTC2
A	373	PRO	SER	conflict	UNP P0DTC2
A	375	PHE	SER	conflict	UNP P0DTC2
A	376	ALA	THR	conflict	UNP P0DTC2
A	403	LYS	ARG	conflict	UNP P0DTC2
A	405	ASN	ASP	variant	UNP P0DTC2
A	408	SER	ARG	variant	UNP P0DTC2
A	417	ASN	LYS	variant	UNP P0DTC2
A	440	LYS	ASN	variant	UNP P0DTC2
A	445	HIS	VAL	conflict	UNP P0DTC2
A	446	SER	GLY	variant	UNP P0DTC2
A	450	ASP	ASN	conflict	UNP P0DTC2
A	452	TRP	LEU	conflict	UNP P0DTC2
A	455	SER	LEU	conflict	UNP P0DTC2
A	460	LYS	ASN	variant	UNP P0DTC2
A	477	ASN	SER	variant	UNP P0DTC2
A	478	LYS	THR	variant	UNP P0DTC2
A	481	LYS	ASN	conflict	UNP P0DTC2
A	?	-	VAL	deletion	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	484	LYS	GLU	variant	UNP P0DTC2
A	486	PRO	PHE	variant	UNP P0DTC2
A	498	ARG	GLN	variant	UNP P0DTC2
A	501	TYR	ASN	variant	UNP P0DTC2
A	505	HIS	TYR	variant	UNP P0DTC2
A	554	LYS	GLU	conflict	UNP P0DTC2
A	570	VAL	ALA	conflict	UNP P0DTC2
A	614	GLY	ASP	variant	UNP P0DTC2
A	621	SER	PRO	conflict	UNP P0DTC2
A	655	TYR	HIS	variant	UNP P0DTC2
A	670	VAL	ILE	conflict	UNP P0DTC2
A	679	LYS	ASN	variant	UNP P0DTC2
A	681	ARG	PRO	variant	UNP P0DTC2
A	682	GLY	ARG	conflict	UNP P0DTC2
A	683	SER	ARG	conflict	UNP P0DTC2
A	685	SER	ARG	variant	UNP P0DTC2
A	764	LYS	ASN	variant	UNP P0DTC2
A	796	TYR	ASP	variant	UNP P0DTC2
A	817	PRO	PHE	conflict	UNP P0DTC2
A	892	PRO	ALA	conflict	UNP P0DTC2
A	899	PRO	ALA	conflict	UNP P0DTC2
A	939	PHE	SER	conflict	UNP P0DTC2
A	942	PRO	ALA	conflict	UNP P0DTC2
A	954	HIS	GLN	variant	UNP P0DTC2
A	969	LYS	ASN	variant	UNP P0DTC2
A	986	PRO	LYS	conflict	UNP P0DTC2
A	987	PRO	VAL	conflict	UNP P0DTC2
A	1143	LEU	PRO	conflict	UNP P0DTC2
A	1209	GLY	-	linker	UNP P0DTC2
A	1210	SER	-	linker	UNP P0DTC2
B	-3	MET	-	initiating methionine	UNP P0DTC2
B	-2	PRO	-	expression tag	UNP P0DTC2
B	-1	MET	-	expression tag	UNP P0DTC2
B	0	GLY	-	expression tag	UNP P0DTC2
B	1	SER	-	expression tag	UNP P0DTC2
B	2	LEU	-	expression tag	UNP P0DTC2
B	3	GLN	-	expression tag	UNP P0DTC2
B	4	PRO	-	expression tag	UNP P0DTC2
B	5	LEU	-	expression tag	UNP P0DTC2
B	6	ALA	-	expression tag	UNP P0DTC2
B	7	THR	-	expression tag	UNP P0DTC2
B	8	LEU	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	9	TYR	-	expression tag	UNP P0DTC2
B	10	LEU	-	expression tag	UNP P0DTC2
B	11	LEU	-	expression tag	UNP P0DTC2
B	12	GLY	-	expression tag	UNP P0DTC2
B	13	MET	-	expression tag	UNP P0DTC2
B	14	LEU	-	expression tag	UNP P0DTC2
B	15	VAL	-	expression tag	UNP P0DTC2
B	16	ALA	-	expression tag	UNP P0DTC2
B	17	SER	-	expression tag	UNP P0DTC2
B	18	VAL	-	expression tag	UNP P0DTC2
B	19	LEU	-	expression tag	UNP P0DTC2
B	20	ALA	-	expression tag	UNP P0DTC2
B	26	ILE	THR	variant	UNP P0DTC2
B	28	THR	ARG	conflict	UNP P0DTC2
B	?	-	LEU	deletion	UNP P0DTC2
B	?	-	PRO	deletion	UNP P0DTC2
B	?	-	PRO	deletion	UNP P0DTC2
B	31	SER	ALA	variant	UNP P0DTC2
B	54	LEU	SER	conflict	UNP P0DTC2
B	?	-	HIS	deletion	UNP P0DTC2
B	?	-	VAL	deletion	UNP P0DTC2
B	128	PHE	VAL	conflict	UNP P0DTC2
B	144	ASP	GLY	variant	UNP P0DTC2
B	?	-	TYR	deletion	UNP P0DTC2
B	158	SER	PHE	conflict	UNP P0DTC2
B	159	GLY	ARG	variant	UNP P0DTC2
B	?	-	ASN	deletion	UNP P0DTC2
B	212	ILE	LEU	variant	UNP P0DTC2
B	213	GLY	VAL	variant	UNP P0DTC2
B	216	PHE	LEU	conflict	UNP P0DTC2
B	245	ASN	HIS	conflict	UNP P0DTC2
B	264	ASP	ALA	conflict	UNP P0DTC2
B	332	VAL	ILE	conflict	UNP P0DTC2
B	339	HIS	GLY	variant	UNP P0DTC2
B	356	THR	LYS	conflict	UNP P0DTC2
B	371	PHE	SER	variant	UNP P0DTC2
B	373	PRO	SER	conflict	UNP P0DTC2
B	375	PHE	SER	conflict	UNP P0DTC2
B	376	ALA	THR	conflict	UNP P0DTC2
B	403	LYS	ARG	conflict	UNP P0DTC2
B	405	ASN	ASP	variant	UNP P0DTC2
B	408	SER	ARG	variant	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	417	ASN	LYS	variant	UNP P0DTC2
B	440	LYS	ASN	variant	UNP P0DTC2
B	445	HIS	VAL	conflict	UNP P0DTC2
B	446	SER	GLY	variant	UNP P0DTC2
B	450	ASP	ASN	conflict	UNP P0DTC2
B	452	TRP	LEU	conflict	UNP P0DTC2
B	455	SER	LEU	conflict	UNP P0DTC2
B	460	LYS	ASN	variant	UNP P0DTC2
B	477	ASN	SER	variant	UNP P0DTC2
B	478	LYS	THR	variant	UNP P0DTC2
B	481	LYS	ASN	conflict	UNP P0DTC2
B	?	-	VAL	deletion	UNP P0DTC2
B	484	LYS	GLU	variant	UNP P0DTC2
B	486	PRO	PHE	variant	UNP P0DTC2
B	498	ARG	GLN	variant	UNP P0DTC2
B	501	TYR	ASN	variant	UNP P0DTC2
B	505	HIS	TYR	variant	UNP P0DTC2
B	554	LYS	GLU	conflict	UNP P0DTC2
B	570	VAL	ALA	conflict	UNP P0DTC2
B	614	GLY	ASP	variant	UNP P0DTC2
B	621	SER	PRO	conflict	UNP P0DTC2
B	655	TYR	HIS	variant	UNP P0DTC2
B	670	VAL	ILE	conflict	UNP P0DTC2
B	679	LYS	ASN	variant	UNP P0DTC2
B	681	ARG	PRO	variant	UNP P0DTC2
B	682	GLY	ARG	conflict	UNP P0DTC2
B	683	SER	ARG	conflict	UNP P0DTC2
B	685	SER	ARG	variant	UNP P0DTC2
B	764	LYS	ASN	variant	UNP P0DTC2
B	796	TYR	ASP	variant	UNP P0DTC2
B	817	PRO	PHE	conflict	UNP P0DTC2
B	892	PRO	ALA	conflict	UNP P0DTC2
B	899	PRO	ALA	conflict	UNP P0DTC2
B	939	PHE	SER	conflict	UNP P0DTC2
B	942	PRO	ALA	conflict	UNP P0DTC2
B	954	HIS	GLN	variant	UNP P0DTC2
B	969	LYS	ASN	variant	UNP P0DTC2
B	986	PRO	LYS	conflict	UNP P0DTC2
B	987	PRO	VAL	conflict	UNP P0DTC2
B	1143	LEU	PRO	conflict	UNP P0DTC2
B	1209	GLY	-	linker	UNP P0DTC2
B	1210	SER	-	linker	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-3	MET	-	initiating methionine	UNP P0DTC2
C	-2	PRO	-	expression tag	UNP P0DTC2
C	-1	MET	-	expression tag	UNP P0DTC2
C	0	GLY	-	expression tag	UNP P0DTC2
C	1	SER	-	expression tag	UNP P0DTC2
C	2	LEU	-	expression tag	UNP P0DTC2
C	3	GLN	-	expression tag	UNP P0DTC2
C	4	PRO	-	expression tag	UNP P0DTC2
C	5	LEU	-	expression tag	UNP P0DTC2
C	6	ALA	-	expression tag	UNP P0DTC2
C	7	THR	-	expression tag	UNP P0DTC2
C	8	LEU	-	expression tag	UNP P0DTC2
C	9	TYR	-	expression tag	UNP P0DTC2
C	10	LEU	-	expression tag	UNP P0DTC2
C	11	LEU	-	expression tag	UNP P0DTC2
C	12	GLY	-	expression tag	UNP P0DTC2
C	13	MET	-	expression tag	UNP P0DTC2
C	14	LEU	-	expression tag	UNP P0DTC2
C	15	VAL	-	expression tag	UNP P0DTC2
C	16	ALA	-	expression tag	UNP P0DTC2
C	17	SER	-	expression tag	UNP P0DTC2
C	18	VAL	-	expression tag	UNP P0DTC2
C	19	LEU	-	expression tag	UNP P0DTC2
C	20	ALA	-	expression tag	UNP P0DTC2
C	26	ILE	THR	variant	UNP P0DTC2
C	28	THR	ARG	conflict	UNP P0DTC2
C	?	-	LEU	deletion	UNP P0DTC2
C	?	-	PRO	deletion	UNP P0DTC2
C	?	-	PRO	deletion	UNP P0DTC2
C	31	SER	ALA	variant	UNP P0DTC2
C	54	LEU	SER	conflict	UNP P0DTC2
C	?	-	HIS	deletion	UNP P0DTC2
C	?	-	VAL	deletion	UNP P0DTC2
C	128	PHE	VAL	conflict	UNP P0DTC2
C	144	ASP	GLY	variant	UNP P0DTC2
C	?	-	TYR	deletion	UNP P0DTC2
C	158	SER	PHE	conflict	UNP P0DTC2
C	159	GLY	ARG	variant	UNP P0DTC2
C	?	-	ASN	deletion	UNP P0DTC2
C	212	ILE	LEU	variant	UNP P0DTC2
C	213	GLY	VAL	variant	UNP P0DTC2
C	216	PHE	LEU	conflict	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	245	ASN	HIS	conflict	UNP P0DTC2
C	264	ASP	ALA	conflict	UNP P0DTC2
C	332	VAL	ILE	conflict	UNP P0DTC2
C	339	HIS	GLY	variant	UNP P0DTC2
C	356	THR	LYS	conflict	UNP P0DTC2
C	371	PHE	SER	variant	UNP P0DTC2
C	373	PRO	SER	conflict	UNP P0DTC2
C	375	PHE	SER	conflict	UNP P0DTC2
C	376	ALA	THR	conflict	UNP P0DTC2
C	403	LYS	ARG	conflict	UNP P0DTC2
C	405	ASN	ASP	variant	UNP P0DTC2
C	408	SER	ARG	variant	UNP P0DTC2
C	417	ASN	LYS	variant	UNP P0DTC2
C	440	LYS	ASN	variant	UNP P0DTC2
C	445	HIS	VAL	conflict	UNP P0DTC2
C	446	SER	GLY	variant	UNP P0DTC2
C	450	ASP	ASN	conflict	UNP P0DTC2
C	452	TRP	LEU	conflict	UNP P0DTC2
C	455	SER	LEU	conflict	UNP P0DTC2
C	460	LYS	ASN	variant	UNP P0DTC2
C	477	ASN	SER	variant	UNP P0DTC2
C	478	LYS	THR	variant	UNP P0DTC2
C	481	LYS	ASN	conflict	UNP P0DTC2
C	?	-	VAL	deletion	UNP P0DTC2
C	484	LYS	GLU	variant	UNP P0DTC2
C	486	PRO	PHE	variant	UNP P0DTC2
C	498	ARG	GLN	variant	UNP P0DTC2
C	501	TYR	ASN	variant	UNP P0DTC2
C	505	HIS	TYR	variant	UNP P0DTC2
C	554	LYS	GLU	conflict	UNP P0DTC2
C	570	VAL	ALA	conflict	UNP P0DTC2
C	614	GLY	ASP	variant	UNP P0DTC2
C	621	SER	PRO	conflict	UNP P0DTC2
C	655	TYR	HIS	variant	UNP P0DTC2
C	670	VAL	ILE	conflict	UNP P0DTC2
C	679	LYS	ASN	variant	UNP P0DTC2
C	681	ARG	PRO	variant	UNP P0DTC2
C	682	GLY	ARG	conflict	UNP P0DTC2
C	683	SER	ARG	conflict	UNP P0DTC2
C	685	SER	ARG	variant	UNP P0DTC2
C	764	LYS	ASN	variant	UNP P0DTC2
C	796	TYR	ASP	variant	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	817	PRO	PHE	conflict	UNP P0DTC2
C	892	PRO	ALA	conflict	UNP P0DTC2
C	899	PRO	ALA	conflict	UNP P0DTC2
C	939	PHE	SER	conflict	UNP P0DTC2
C	942	PRO	ALA	conflict	UNP P0DTC2
C	954	HIS	GLN	variant	UNP P0DTC2
C	969	LYS	ASN	variant	UNP P0DTC2
C	986	PRO	LYS	conflict	UNP P0DTC2
C	987	PRO	VAL	conflict	UNP P0DTC2
C	1143	LEU	PRO	conflict	UNP P0DTC2
C	1209	GLY	-	linker	UNP P0DTC2
C	1210	SER	-	linker	UNP P0DTC2

- Molecule 2 is a protein called Angiotensin-converting enzyme 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	G	597	Total	C	N	O	S	0	0
			4870	3115	806	920	29		
2	H	597	Total	C	N	O	S	0	0
			4870	3115	806	920	29		
2	I	597	Total	C	N	O	S	0	0
			4870	3115	806	920	29		

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	733	SER	-	expression tag	UNP Q9BYF1
G	734	GLY	-	expression tag	UNP Q9BYF1
G	735	HIS	-	expression tag	UNP Q9BYF1
G	736	HIS	-	expression tag	UNP Q9BYF1
G	737	HIS	-	expression tag	UNP Q9BYF1
G	738	HIS	-	expression tag	UNP Q9BYF1
G	739	HIS	-	expression tag	UNP Q9BYF1
G	740	HIS	-	expression tag	UNP Q9BYF1
G	741	HIS	-	expression tag	UNP Q9BYF1
G	742	HIS	-	expression tag	UNP Q9BYF1
H	733	SER	-	expression tag	UNP Q9BYF1
H	734	GLY	-	expression tag	UNP Q9BYF1
H	735	HIS	-	expression tag	UNP Q9BYF1
H	736	HIS	-	expression tag	UNP Q9BYF1
H	737	HIS	-	expression tag	UNP Q9BYF1
H	738	HIS	-	expression tag	UNP Q9BYF1

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Chain	Residue	Modelled	Actual	Comment	Reference
H	739	HIS	-	expression tag	UNP Q9BYF1
H	740	HIS	-	expression tag	UNP Q9BYF1
H	741	HIS	-	expression tag	UNP Q9BYF1
H	742	HIS	-	expression tag	UNP Q9BYF1
I	733	SER	-	expression tag	UNP Q9BYF1
I	734	GLY	-	expression tag	UNP Q9BYF1
I	735	HIS	-	expression tag	UNP Q9BYF1
I	736	HIS	-	expression tag	UNP Q9BYF1
I	737	HIS	-	expression tag	UNP Q9BYF1
I	738	HIS	-	expression tag	UNP Q9BYF1
I	739	HIS	-	expression tag	UNP Q9BYF1
I	740	HIS	-	expression tag	UNP Q9BYF1
I	741	HIS	-	expression tag	UNP Q9BYF1
I	742	HIS	-	expression tag	UNP Q9BYF1

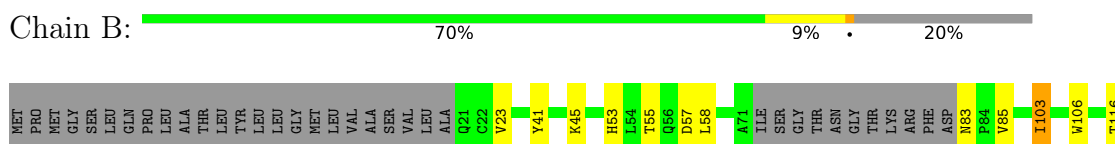
3 Residue-property plots

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: Spike glycoprotein,Fibritin,Expression Tag



- Molecule 1: Spike glycoprotein,Fibritin,Expression Tag



HIS	ASN	ILE	L392	P146
	PHE	SER		
	PHE	LEU	N397	E150
	VAL	SER	E398	
	THR		G399	S155
	ALA	ALA	F400	L156
	PRO	LEU	H401	
	LYS	GLY	E402	R177
	ASN	ASP	A403	
	VAL	LYS	V404	M190
	SER	ALA		
	ASP	TYR	K419	N194
	ILE	GLU		
	ILE	TRP	P426	E208
	PRO	ASN		
	ARG	ASP	L450	Y217
	THR	ASN	P451	S218
	GLU	GLU		R219
	VAL	MET	M455	
	GLU	TYR		L222
	LYS	LEU	V485	
	ALA	PHE		Y237
	ILE	ARG	E495	
	ARG	SER		K247
	MET	SER	F512	L248
	SER	VAL		
	ARG	ALA	R518	A251
	SER	TYR	T519	
	ARG	ALA		L256
	ILE	MET	Q524	
	ASN	ARG		P263
	ASP	GLN	L529	
	ALA	TYR		L266
	PHE	PHE	H535	L267
	ARG	LEU		G268
	LEU	LYS	C542	D269
	ASN	VAL		
	ASP	LYS	A550	C272
	ASN	ASN		
	SER	GLN	L558	N277
	LEU	MET		
	GLU	ILE	S563	T282
	PHE	LEU		
	LEU	PHE	L570	Q340
	GLY	GLY		
	ILE	GLU	V574	L351
	GLN	GLU		
	PRO	ASP	P583	D355
	THR	VAL		
	LEU	ARG	D597	L359
	GLY	VAL		
	SER	ALA	K600	T362
	GLY	ASN		
	HIS	LEU	D615	D368
	HIS	LYS	GLN	
	HIS	PRO		Y381
	HIS	ARG	ILE	D382
	HIS	ILE	LYS	
	HIS	SER	VAL	Y385
	HIS	THR	ARG	

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	58284	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 ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k 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	0.21	0/8324	0.42	6/11327 (0.1%)
1	B	0.21	0/8324	0.41	4/11327 (0.0%)
1	C	0.20	0/8324	0.41	5/11327 (0.0%)
2	G	0.12	0/5007	0.31	0/6803
2	H	0.13	0/5007	0.31	1/6803 (0.0%)
2	I	0.12	0/5007	0.31	0/6803
All	All	0.18	0/39993	0.38	16/54390 (0.0%)

There are no bond length outliers.

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	333	THR	N-CA-C	8.66	123.78	110.36
1	C	330	PRO	N-CA-C	7.32	122.75	111.11
1	A	335	LEU	N-CA-C	6.32	118.18	110.41
1	A	896	ILE	CA-C-N	-6.13	113.66	119.85
1	A	896	ILE	C-N-CA	-6.13	113.66	119.85
1	C	531	THR	CB-CA-C	-5.97	107.76	116.53
1	C	896	ILE	CA-C-N	-5.96	113.83	119.85
1	C	896	ILE	C-N-CA	-5.96	113.83	119.85
1	A	986	PRO	N-CA-C	5.94	117.95	110.70
1	B	986	PRO	N-CA-C	5.89	117.89	110.70
2	H	154	ASN	N-CA-C	5.37	116.88	110.44
1	B	329	PHE	CA-C-N	-5.18	111.97	120.88
1	B	329	PHE	C-N-CA	-5.18	111.97	120.88
1	A	224	GLU	CA-C-N	-5.14	115.28	120.31
1	A	224	GLU	C-N-CA	-5.14	115.28	120.31
1	C	531	THR	N-CA-C	5.11	113.65	108.75

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	A	8128	0	7942	65	0
1	B	8128	0	7942	64	0
1	C	8128	0	7942	62	0
2	G	4870	0	4643	46	0
2	H	4870	0	4643	38	0
2	I	4870	0	4643	40	0
All	All	38994	0	37755	303	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 4.

All (303) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:204:ILE:HG12	1:A:227:VAL:HG23	1.51	0.92
1:A:204:ILE:HG12	1:A:227:VAL:CG2	2.19	0.72
1:B:742:ILE:O	1:B:1000:ARG:NH2	2.27	0.67
1:A:763:LEU:HG	1:A:1008:VAL:HG21	1.74	0.67
1:B:763:LEU:HG	1:B:1008:VAL:HG21	1.76	0.66
1:C:763:LEU:HG	1:C:1008:VAL:HG21	1.78	0.66
1:C:629:LEU:HG	1:C:631:PRO:HD2	1.78	0.66
1:C:977:LEU:HB3	1:C:1000:ARG:HH12	1.60	0.65
1:A:629:LEU:HG	1:A:631:PRO:HD2	1.79	0.65
1:C:804:GLN:NE2	1:C:935:GLN:OE1	2.29	0.65
1:A:1125:ASN:HD22	1:A:1127:ASP:H	1.45	0.65
1:C:1125:ASN:HD22	1:C:1127:ASP:H	1.45	0.64
1:A:331:ASN:HA	1:A:580:GLN:HG2	1.80	0.63
1:B:977:LEU:HB3	1:B:1000:ARG:HH12	1.62	0.63
1:B:629:LEU:HG	1:B:631:PRO:HD2	1.79	0.63
1:B:1125:ASN:HD22	1:B:1127:ASP:H	1.46	0.63
1:C:956:ALA:O	1:C:960:ASN:ND2	2.32	0.63
1:A:956:ALA:O	1:A:960:ASN:ND2	2.32	0.63
1:B:956:ALA:O	1:B:960:ASN:ND2	2.32	0.62
1:A:742:ILE:O	1:A:1000:ARG:NH2	2.33	0.62
2:I:29:LEU:O	2:I:33:ASN:ND2	2.31	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:I:117:ASN:O	2:I:121:ASN:ND2	2.32	0.61
2:H:117:ASN:O	2:H:121:ASN:ND2	2.32	0.61
2:H:247:LYS:HD3	2:H:282:THR:HA	1.82	0.61
1:C:742:ILE:O	1:C:1000:ARG:NH2	2.34	0.60
2:H:29:LEU:O	2:H:33:ASN:ND2	2.31	0.60
1:A:571:ASP:OD2	1:B:964:LYS:NZ	2.35	0.60
1:C:557:LYS:HB2	1:C:584:ILE:HG21	1.82	0.60
1:A:964:LYS:NZ	1:C:571:ASP:OD2	2.35	0.59
2:G:117:ASN:O	2:G:121:ASN:ND2	2.32	0.59
2:I:177:ARG:NH2	2:I:495:GLU:O	2.36	0.59
1:A:994:ASP:OD2	1:C:995:ARG:NH1	2.36	0.59
1:C:756:TYR:OH	1:C:994:ASP:OD1	2.20	0.59
2:I:402:GLU:HB2	2:I:518:ARG:HG3	1.85	0.59
1:B:571:ASP:OD2	1:C:964:LYS:NZ	2.35	0.59
2:H:450:LEU:HD21	2:H:519:THR:HG21	1.86	0.58
2:H:177:ARG:NH2	2:H:495:GLU:O	2.36	0.58
2:G:402:GLU:HB2	2:G:518:ARG:HG3	1.85	0.58
1:A:296:LEU:HD22	1:A:300:LYS:HE3	1.85	0.58
1:B:498:ARG:NH2	1:B:501:TYR:OH	2.34	0.58
1:C:1116:THR:HG22	1:C:1138:TYR:HB3	1.85	0.58
1:C:498:ARG:NH2	1:C:501:TYR:OH	2.33	0.58
2:H:529:LEU:HD22	2:H:550:ALA:HB1	1.85	0.57
2:H:53:ASN:O	2:H:58:ASN:ND2	2.35	0.57
1:B:554:LYS:NZ	1:B:583:GLU:OE2	2.36	0.57
2:G:524:GLN:HB3	2:G:574:VAL:HG11	1.86	0.57
1:A:554:LYS:NZ	1:A:583:GLU:OE2	2.37	0.57
1:B:773:GLU:OE2	1:B:1019:ARG:NE	2.38	0.56
1:C:977:LEU:HB2	1:C:981:LEU:HD12	1.86	0.56
1:A:498:ARG:NH2	1:A:501:TYR:OH	2.34	0.56
1:C:101:ASN:ND2	1:C:103:ILE:O	2.38	0.56
1:B:676:THR:HA	1:B:690:GLN:HG2	1.88	0.56
2:G:392:LEU:HD13	2:G:563:SER:HB3	1.87	0.56
1:A:773:GLU:OE2	1:A:1019:ARG:NE	2.38	0.56
2:H:47:SER:O	2:H:51:ASN:ND2	2.34	0.56
1:A:83:ASN:ND2	1:A:240:THR:O	2.39	0.55
2:I:47:SER:O	2:I:51:ASN:ND2	2.35	0.55
2:G:151:ILE:HA	2:G:155:SER:HB3	1.86	0.55
2:G:53:ASN:O	2:G:58:ASN:ND2	2.35	0.55
1:C:442:ASP:O	1:C:448:ASN:ND2	2.40	0.55
2:H:402:GLU:HB2	2:H:518:ARG:HG3	1.87	0.55
2:I:597:ASP:HA	2:I:600:LYS:HE3	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:83:ASN:ND2	1:C:240:THR:O	2.41	0.54
2:I:269:ASP:OD1	2:I:272:GLY:N	2.40	0.54
1:B:296:LEU:HD22	1:B:300:LYS:HE3	1.88	0.54
1:C:350:VAL:HG22	1:C:422:ASN:HB3	1.89	0.54
2:I:247:LYS:HD3	2:I:282:THR:HA	1.89	0.54
1:A:676:THR:HA	1:A:690:GLN:HG2	1.90	0.54
1:C:296:LEU:HD22	1:C:300:LYS:HE3	1.88	0.54
1:A:350:VAL:HG22	1:A:422:ASN:HB3	1.89	0.54
2:G:177:ARG:NH2	2:G:495:GLU:O	2.41	0.54
2:I:529:LEU:HD22	2:I:550:ALA:HB1	1.88	0.54
1:A:204:ILE:CG1	1:A:227:VAL:CG2	2.85	0.53
2:H:269:ASP:OD1	2:H:272:GLY:N	2.39	0.53
1:A:85:VAL:HG11	1:A:237:ARG:HE	1.74	0.53
2:H:351:LEU:HB2	2:H:355:ASP:HB3	1.91	0.53
2:I:133:CYS:HA	2:I:141:CYS:HA	1.91	0.53
2:G:190:MET:O	2:G:194:ASN:ND2	2.38	0.53
2:G:582:ARG:HD2	2:G:585:LEU:HD12	1.91	0.53
1:A:629:LEU:O	1:A:634:ARG:NH1	2.37	0.53
2:G:269:ASP:OD1	2:G:272:GLY:N	2.42	0.53
2:H:190:MET:O	2:H:194:ASN:ND2	2.38	0.53
1:A:500:THR:HG1	2:G:41:TYR:HH	1.54	0.52
1:C:781:VAL:HG22	1:C:1026:ALA:HB2	1.90	0.52
1:C:676:THR:HA	1:C:690:GLN:HG2	1.90	0.52
2:H:392:LEU:HD13	2:H:563:SER:HB3	1.92	0.52
2:I:419:LYS:HE3	2:I:426:PRO:HA	1.92	0.52
2:G:523:PHE:HB3	2:G:583:PRO:HB2	1.91	0.52
2:H:510:TYR:HB3	2:H:514:ARG:HH22	1.74	0.52
1:C:231:ILE:HD12	1:C:233:ILE:HG23	1.91	0.52
2:G:529:LEU:HD22	2:G:550:ALA:HB1	1.91	0.52
2:I:53:ASN:HB2	2:I:340:GLN:HE21	1.75	0.52
1:C:773:GLU:OE2	1:C:1019:ARG:NE	2.41	0.52
1:B:500:THR:HG1	2:H:41:TYR:HH	1.48	0.52
1:A:474:GLN:NE2	1:A:478:LYS:O	2.43	0.52
1:B:83:ASN:ND2	1:B:240:THR:O	2.43	0.51
2:H:524:GLN:HB3	2:H:574:VAL:HG11	1.93	0.51
1:A:557:LYS:HB2	1:A:584:ILE:HG21	1.92	0.51
2:I:80:ALA:O	2:I:101:GLN:NE2	2.40	0.51
2:I:450:LEU:HD21	2:I:519:THR:HG21	1.92	0.51
1:B:85:VAL:HG11	1:B:237:ARG:HE	1.75	0.51
2:G:263:PRO:HG2	2:G:266:LEU:HD12	1.93	0.51
1:C:85:VAL:HG11	1:C:237:ARG:HE	1.76	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:475:ALA:HB1	2:G:24:GLN:HG2	1.93	0.51
2:G:47:SER:O	2:G:51:ASN:ND2	2.36	0.51
1:A:379:CYS:HA	1:A:432:CYS:HA	1.93	0.51
1:C:207:LYS:NZ	1:C:208:HIS:O	2.40	0.50
1:A:770:ILE:HD11	1:A:1012:LEU:HD23	1.93	0.50
1:C:99:LYS:HE2	1:C:189:ASN:HB2	1.93	0.50
1:B:106:TRP:HB2	1:B:121:ILE:HD11	1.94	0.50
1:C:335:LEU:HD22	1:C:364:ASP:HB2	1.92	0.50
2:I:53:ASN:O	2:I:58:ASN:ND2	2.38	0.50
1:A:106:TRP:HB2	1:A:121:ILE:HD11	1.94	0.49
1:B:437:ASN:ND2	1:B:506:GLN:OE1	2.44	0.49
1:C:103:ILE:HA	1:C:242:LEU:HA	1.94	0.49
1:C:196:LYS:HD2	1:C:203:LYS:HE2	1.94	0.49
2:G:597:ASP:HA	2:G:600:LYS:HE3	1.93	0.49
1:C:106:TRP:HB2	1:C:121:ILE:HD11	1.94	0.49
1:B:557:LYS:HB2	1:B:584:ILE:HG21	1.93	0.49
1:B:560:LEU:HB2	1:B:563:GLN:HG2	1.94	0.49
1:B:773:GLU:HA	1:B:776:LYS:HG2	1.94	0.49
1:A:103:ILE:HA	1:A:242:LEU:HA	1.95	0.49
1:B:350:VAL:HG22	1:B:422:ASN:HB3	1.93	0.49
2:I:351:LEU:HB2	2:I:355:ASP:HB3	1.93	0.49
2:G:52:THR:O	2:G:340:GLN:NE2	2.46	0.49
1:A:980:ILE:HD11	1:A:996:LEU:HD11	1.94	0.49
2:G:133:CYS:HA	2:G:141:CYS:HA	1.94	0.49
2:H:133:CYS:HA	2:H:141:CYS:HA	1.93	0.49
1:C:474:GLN:NE2	1:C:478:LYS:O	2.45	0.49
2:I:524:GLN:HG2	2:I:583:PRO:HG2	1.95	0.49
1:A:352:ALA:HB1	1:A:466:ARG:HH11	1.78	0.48
1:A:1089:PHE:HB3	1:B:913:GLN:HE21	1.77	0.48
1:B:474:GLN:NE2	1:B:478:LYS:O	2.46	0.48
1:C:280:ASN:ND2	1:C:284:THR:OG1	2.42	0.48
2:H:144:LEU:HA	2:H:148:LEU:HD12	1.95	0.48
2:I:382:ASP:HA	2:I:385:TYR:CZ	2.47	0.48
1:C:123:ASN:HD22	1:C:128:PHE:HD1	1.61	0.48
2:G:92:THR:HG23	2:G:392:LEU:HD11	1.94	0.48
1:B:715:PRO:HA	1:B:1072:GLU:HA	1.96	0.48
1:C:980:ILE:HD11	1:C:996:LEU:HD11	1.95	0.48
2:G:228:HIS:NE2	2:G:232:GLU:OE2	2.47	0.48
2:I:392:LEU:HD13	2:I:563:SER:HB3	1.94	0.48
1:A:280:ASN:ND2	1:A:284:THR:OG1	2.45	0.48
1:A:977:LEU:HB2	1:A:981:LEU:HD12	1.95	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:G:173:GLY:HA3	2:G:498:CYS:H	1.77	0.47
2:H:53:ASN:HB2	2:H:340:GLN:HE21	1.79	0.47
1:C:352:ALA:HB1	1:C:466:ARG:HH11	1.79	0.47
2:H:228:HIS:NE2	2:H:232:GLU:OE2	2.47	0.47
2:I:524:GLN:HB3	2:I:574:VAL:HG11	1.95	0.47
2:H:248:LEU:HB3	2:H:256:ILE:HG13	1.96	0.47
1:B:103:ILE:HA	1:B:242:LEU:HA	1.97	0.47
1:B:770:ILE:HD11	1:B:1012:LEU:HD23	1.96	0.47
1:C:379:CYS:HA	1:C:432:CYS:HA	1.96	0.47
2:G:389:PRO:HD2	2:G:392:LEU:HD12	1.95	0.47
2:H:419:LYS:HE3	2:H:426:PRO:HA	1.97	0.47
1:A:207:LYS:NZ	1:A:208:HIS:O	2.41	0.47
1:A:560:LEU:HB2	1:A:563:GLN:HG2	1.95	0.47
1:A:822:LEU:HD22	1:A:945:LEU:HD21	1.96	0.47
1:B:331:ASN:HB2	1:B:579:PRO:HB2	1.97	0.47
2:G:123:MET:HG2	2:G:176:LEU:HD22	1.96	0.47
2:G:314:PHE:O	2:G:317:SER:OG	2.33	0.47
2:I:190:MET:O	2:I:194:ASN:ND2	2.39	0.47
1:A:121:ILE:HG22	1:A:130:ILE:HG12	1.96	0.47
1:A:781:VAL:HG22	1:A:1026:ALA:HB2	1.97	0.47
1:B:973:ILE:HD11	1:B:984:LEU:HD21	1.97	0.47
1:B:85:VAL:HB	1:B:237:ARG:HH11	1.80	0.46
1:B:196:LYS:HD2	1:B:203:LYS:HE2	1.97	0.46
1:A:368:LEU:HB3	1:A:375:PHE:HE2	1.80	0.46
2:H:143:LEU:HB2	2:H:146:PRO:HD2	1.98	0.46
2:H:382:ASP:HA	2:H:385:TYR:CZ	2.51	0.46
1:B:123:ASN:HD22	1:B:128:PHE:HD1	1.64	0.46
2:G:198:ASP:OD1	2:G:201:ASP:N	2.45	0.46
1:B:207:LYS:NZ	1:B:208:HIS:O	2.42	0.46
1:C:68:TRP:HE1	1:C:264:ASP:HB3	1.81	0.46
1:C:715:PRO:HA	1:C:1072:GLU:HA	1.97	0.46
1:A:529:LYS:HE2	1:A:529:LYS:HB2	1.52	0.45
1:B:433:VAL:HG13	1:B:512:VAL:HG22	1.98	0.45
1:A:715:PRO:HA	1:A:1072:GLU:HA	1.98	0.45
1:B:157:GLU:HG3	1:B:159:GLY:H	1.81	0.45
1:C:121:ILE:HG22	1:C:130:ILE:HG12	1.98	0.45
2:I:143:LEU:HB2	2:I:146:PRO:HD2	1.99	0.45
1:B:121:ILE:HG22	1:B:130:ILE:HG12	1.98	0.45
1:C:560:LEU:HB2	1:C:563:GLN:HG2	1.98	0.45
2:G:247:LYS:HD3	2:G:282:THR:HA	1.99	0.45
2:G:248:LEU:HB3	2:G:256:ILE:HG13	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:G:189:GLU:HG2	2:G:192:ARG:HH11	1.81	0.45
2:H:597:ASP:HA	2:H:600:LYS:HE3	1.99	0.45
1:B:229:LEU:HB3	1:B:231:ILE:HG12	1.99	0.45
2:G:268:GLY:O	2:G:277:ASN:ND2	2.38	0.45
2:H:263:PRO:HG2	2:H:266:LEU:HD12	1.98	0.45
2:I:362:THR:HG23	2:I:368:ASP:HB3	1.99	0.45
1:A:328:ARG:HD2	1:A:328:ARG:HA	1.60	0.45
1:B:391:CYS:HA	1:B:525:CYS:HA	1.99	0.44
1:B:418:ILE:HA	1:B:422:ASN:HD22	1.82	0.44
2:H:217:TYR:HE2	2:H:222:LEU:HB2	1.82	0.44
1:C:26:ILE:HG22	1:C:70:HIS:HB2	1.99	0.44
2:I:381:TYR:HE2	2:I:400:PHE:HB3	1.81	0.44
1:C:418:ILE:HA	1:C:422:ASN:HD22	1.83	0.44
2:G:382:ASP:HA	2:G:385:TYR:CZ	2.53	0.44
2:I:404:VAL:HG21	2:I:558:LEU:HD21	1.98	0.44
1:A:124:ASN:ND2	1:A:127:ASN:OD1	2.43	0.44
2:I:85:LEU:HD22	2:I:94:LYS:HG3	1.98	0.44
1:B:352:ALA:HB1	1:B:466:ARG:HH11	1.82	0.44
1:C:979:ASP:O	1:C:983:ARG:NE	2.36	0.44
2:G:248:LEU:HA	2:G:251:ALA:HB3	1.99	0.44
1:A:453:TYR:OH	1:A:493:GLN:NE2	2.50	0.44
1:B:980:ILE:HD11	1:B:996:LEU:HD11	2.00	0.44
1:A:418:ILE:HA	1:A:422:ASN:HD22	1.82	0.44
1:B:53:HIS:HD1	1:B:55:THR:HG1	1.65	0.44
1:B:453:TYR:OH	1:B:493:GLN:NE2	2.51	0.44
2:I:397:ASN:OD1	2:I:398:GLU:N	2.45	0.44
2:H:198:ASP:OD1	2:H:201:ASP:N	2.46	0.44
1:A:1028:LYS:NZ	1:A:1042:PHE:O	2.43	0.44
1:B:984:LEU:HA	1:B:984:LEU:HD23	1.60	0.44
1:C:108:PHE:HB2	1:C:119:LEU:HB3	1.99	0.44
1:A:528:LYS:HA	1:A:528:LYS:HD3	1.43	0.43
2:G:535:HIS:NE2	2:G:538:PRO:O	2.42	0.43
1:A:984:LEU:HA	1:A:984:LEU:HD23	1.77	0.43
2:H:248:LEU:HA	2:H:251:ALA:HB3	2.00	0.43
1:A:119:LEU:HD23	1:A:132:VAL:HB	2.01	0.43
1:A:608:VAL:O	1:A:636:TYR:OH	2.26	0.43
1:C:676:THR:HG22	1:C:690:GLN:HE21	1.84	0.43
2:H:72:PHE:HA	2:H:75:GLU:HG2	2.01	0.43
1:C:733:LYS:HE3	1:C:771:ALA:HB1	2.00	0.43
1:A:68:TRP:HE1	1:A:264:ASP:HB3	1.83	0.43
1:C:126:THR:HG23	1:C:127:ASN:HD22	1.82	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:I:119:ILE:HG22	2:I:123:MET:HE2	2.01	0.43
1:C:119:LEU:HD23	1:C:132:VAL:HB	2.01	0.43
2:G:32:PHE:HE2	2:G:391:LEU:HD21	1.83	0.43
2:I:535:HIS:CD2	2:I:542:CYS:HB2	2.54	0.43
1:B:713:ALA:HB3	1:C:894:LEU:HB3	2.01	0.42
1:C:391:CYS:HA	1:C:525:CYS:HA	2.00	0.42
2:G:397:ASN:HD22	2:G:521:TYR:HE2	1.68	0.42
2:I:248:LEU:HA	2:I:251:ALA:HB3	2.01	0.42
2:I:455:MET:HE3	2:I:455:MET:HB3	1.94	0.42
1:B:733:LYS:HE3	1:B:771:ALA:HB1	2.01	0.42
1:C:157:GLU:HG3	1:C:159:GLY:H	1.84	0.42
2:I:263:PRO:HG2	2:I:266:LEU:HD12	2.02	0.42
2:I:268:GLY:O	2:I:277:ASN:ND2	2.39	0.42
1:A:454:ARG:NH1	1:A:469:SER:O	2.45	0.42
1:B:119:LEU:HD23	1:B:132:VAL:HB	2.01	0.42
2:I:237:TYR:CD1	2:I:451:PRO:HG2	2.55	0.42
1:B:378:LYS:HB2	1:B:378:LYS:HE2	1.45	0.42
2:H:142:LEU:HB3	2:H:147:GLY:HA3	2.02	0.42
1:B:57:ASP:OD1	1:B:58:LEU:N	2.47	0.42
2:G:455:MET:HE3	2:G:455:MET:HB3	1.96	0.42
2:G:535:HIS:CD2	2:G:542:CYS:HB2	2.54	0.42
1:A:630:THR:HB	1:A:631:PRO:HD3	2.02	0.42
1:B:901:GLN:HE21	1:B:905:ARG:HH11	1.68	0.42
1:C:531:THR:HB	1:C:532:ASN:H	1.60	0.42
1:B:630:THR:HB	1:B:631:PRO:HD3	2.02	0.41
2:G:450:LEU:HD21	2:G:519:THR:HG21	2.02	0.41
2:H:346:PRO:HG3	2:H:360:MET:HG3	2.02	0.41
2:G:381:TYR:HE2	2:G:400:PHE:HB3	1.85	0.41
2:H:119:ILE:HG22	2:H:123:MET:HE2	2.02	0.41
2:I:248:LEU:HB3	2:I:256:ILE:HG13	2.02	0.41
1:C:630:THR:HB	1:C:631:PRO:HD3	2.03	0.41
2:I:72:PHE:HA	2:I:75:GLU:HG2	2.02	0.41
2:I:217:TYR:HE2	2:I:222:LEU:HB2	1.85	0.41
1:A:401:VAL:HG22	1:A:509:ARG:HG2	2.02	0.41
1:A:1047:TYR:HB2	1:A:1067:TYR:HB3	2.02	0.41
1:B:770:ILE:O	1:B:774:GLN:HG2	2.21	0.41
2:G:217:TYR:HE2	2:G:222:LEU:HB2	1.86	0.41
2:H:404:VAL:HG21	2:H:558:LEU:HD21	2.01	0.41
2:G:524:GLN:NE2	2:G:570:LEU:HD11	2.36	0.41
2:H:369:PHE:HE2	2:H:412:ALA:HB1	1.86	0.41
2:I:524:GLN:HE22	2:I:570:LEU:HD21	1.86	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:360:ASN:H	1:A:523:THR:HB	1.85	0.41
1:A:633:TRP:CD1	1:A:633:TRP:H	2.38	0.41
1:A:983:ARG:O	1:A:984:LEU:C	2.64	0.41
1:A:502:GLY:O	1:A:506:GLN:HG3	2.21	0.41
1:B:755:GLN:H	1:B:755:GLN:HG3	1.53	0.41
2:G:315:PHE:HD2	2:G:320:LEU:HD12	1.85	0.41
1:B:331:ASN:O	1:B:332:VAL:C	2.64	0.41
1:B:901:GLN:HE21	1:B:905:ARG:HE	1.68	0.41
1:B:1152:LEU:HD11	1:C:1152:LEU:HG	2.02	0.41
1:C:770:ILE:HD11	1:C:1012:LEU:HD23	2.03	0.41
2:G:385:TYR:HE2	2:G:401:HIS:HE1	1.68	0.41
2:H:455:MET:HE3	2:H:455:MET:HB3	1.94	0.41
2:I:450:LEU:HB2	2:I:451:PRO:HD3	2.03	0.41
1:A:773:GLU:HA	1:A:776:LYS:HG2	2.02	0.41
1:B:41:TYR:HA	1:B:223:LEU:H	1.86	0.41
1:B:502:GLY:O	1:B:506:GLN:HG3	2.21	0.41
1:B:703:ASN:OD1	1:B:704:SER:N	2.54	0.41
2:I:208:GLU:OE1	2:I:219:ARG:NH2	2.54	0.40
1:A:825:LYS:NZ	1:A:938:LEU:O	2.55	0.40
1:B:995:ARG:HH12	1:C:994:ASP:CG	2.29	0.40
1:C:417:ASN:O	1:C:422:ASN:ND2	2.55	0.40
2:H:524:GLN:OE1	2:H:580:ASN:N	2.46	0.40
1:A:157:GLU:HG3	1:A:159:GLY:H	1.87	0.40
1:A:733:LYS:HE3	1:A:771:ALA:HB1	2.02	0.40
1:B:440:LYS:H	1:B:440:LYS:HD2	1.86	0.40
1:B:825:LYS:NZ	1:B:938:LEU:O	2.54	0.40
2:G:389:PRO:O	2:G:393:ARG:HG3	2.22	0.40
2:G:457:GLU:HG2	2:G:513:ILE:HB	2.04	0.40
1:B:457:ARG:NH2	1:B:459:SER:OG	2.54	0.40
1:B:676:THR:HG22	1:B:690:GLN:HE21	1.86	0.40
1:C:502:GLY:O	1:C:506:GLN:HG3	2.21	0.40
2:G:119:ILE:HG22	2:G:123:MET:HE2	2.03	0.40
2:H:450:LEU:HB2	2:H:451:PRO:HD3	2.03	0.40
1:A:1152:LEU:HD12	1:C:1152:LEU:HD11	2.03	0.40
1:C:347:PHE:HD2	1:C:399:SER:HB2	1.86	0.40
1:C:977:LEU:O	1:C:981:LEU:HB2	2.21	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	A	1018/1291 (79%)	983 (97%)	33 (3%)	2 (0%)	44	71
1	B	1018/1291 (79%)	990 (97%)	26 (3%)	2 (0%)	44	71
1	C	1018/1291 (79%)	991 (97%)	25 (2%)	2 (0%)	44	71
2	G	595/742 (80%)	587 (99%)	7 (1%)	1 (0%)	44	71
2	H	595/742 (80%)	588 (99%)	7 (1%)	0	100	100
2	I	595/742 (80%)	587 (99%)	8 (1%)	0	100	100
All	All	4839/6099 (79%)	4726 (98%)	106 (2%)	7 (0%)	50	77

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	332	VAL
2	G	146	PRO
1	A	331	ASN
1	C	372	ALA
1	A	529	LYS
1	C	530	SER
1	B	942	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	A	913/1115 (82%)	880 (96%)	33 (4%)	30	57

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	913/1115 (82%)	884 (97%)	29 (3%)	34	60
1	C	913/1115 (82%)	891 (98%)	22 (2%)	44	67
2	G	527/656 (80%)	520 (99%)	7 (1%)	65	80
2	H	527/656 (80%)	520 (99%)	7 (1%)	65	80
2	I	527/656 (80%)	520 (99%)	7 (1%)	65	80
All	All	4320/5313 (81%)	4215 (98%)	105 (2%)	45	67

All (105) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	23	VAL
1	A	45	LYS
1	A	116	THR
1	A	132	VAL
1	A	226	LEU
1	A	227	VAL
1	A	231	ILE
1	A	293	LEU
1	A	296	LEU
1	A	320	VAL
1	A	328	ARG
1	A	332	VAL
1	A	333	THR
1	A	335	LEU
1	A	339	HIS
1	A	366	SER
1	A	368	LEU
1	A	374	PHE
1	A	375	PHE
1	A	440	LYS
1	A	528	LYS
1	A	529	LYS
1	A	530	SER
1	A	544	ASN
1	A	617	CYS
1	A	738	CYS
1	A	776	LYS
1	A	786	LYS
1	A	811	LYS
1	A	816	SER

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Mol	Chain	Res	Type
1	A	943	SER
1	A	976	VAL
1	A	985	ASP
1	B	23	VAL
1	B	45	LYS
1	B	103	ILE
1	B	116	THR
1	B	132	VAL
1	B	293	LEU
1	B	296	LEU
1	B	320	VAL
1	B	331	ASN
1	B	332	VAL
1	B	333	THR
1	B	368	LEU
1	B	374	PHE
1	B	375	PHE
1	B	378	LYS
1	B	440	LYS
1	B	529	LYS
1	B	530	SER
1	B	531	THR
1	B	544	ASN
1	B	617	CYS
1	B	738	CYS
1	B	755	GLN
1	B	776	LYS
1	B	811	LYS
1	B	816	SER
1	B	943	SER
1	B	976	VAL
1	B	985	ASP
1	C	45	LYS
1	C	132	VAL
1	C	231	ILE
1	C	293	LEU
1	C	296	LEU
1	C	320	VAL
1	C	332	VAL
1	C	333	THR
1	C	371	PHE
1	C	440	LYS

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Mol	Chain	Res	Type
1	C	528	LYS
1	C	529	LYS
1	C	544	ASN
1	C	617	CYS
1	C	738	CYS
1	C	776	LYS
1	C	786	LYS
1	C	811	LYS
1	C	816	SER
1	C	943	SER
1	C	976	VAL
1	C	985	ASP
2	G	78	THR
2	G	129	THR
2	G	155	SER
2	G	156	LEU
2	G	359	LEU
2	G	365	THR
2	G	485	VAL
2	H	129	THR
2	H	155	SER
2	H	156	LEU
2	H	359	LEU
2	H	365	THR
2	H	485	VAL
2	H	512	PHE
2	I	129	THR
2	I	150	GLU
2	I	155	SER
2	I	156	LEU
2	I	359	LEU
2	I	485	VAL
2	I	512	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (87) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	24	ASN
1	A	70	HIS
1	A	139	ASN
1	A	174	GLN
1	A	321	GLN

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Mol	Chain	Res	Type
1	A	339	HIS
1	A	354	ASN
1	A	360	ASN
1	A	370	ASN
1	A	405	ASN
1	A	493	GLN
1	A	628	GLN
1	A	677	GLN
1	A	787	GLN
1	A	872	GLN
1	A	901	GLN
1	A	1002	GLN
1	A	1071	GLN
1	A	1106	GLN
1	A	1125	ASN
1	A	1142	GLN
1	B	123	ASN
1	B	139	ASN
1	B	174	GLN
1	B	321	GLN
1	B	360	ASN
1	B	370	ASN
1	B	405	ASN
1	B	493	GLN
1	B	580	GLN
1	B	628	GLN
1	B	677	GLN
1	B	784	GLN
1	B	872	GLN
1	B	901	GLN
1	B	914	ASN
1	B	965	GLN
1	B	1002	GLN
1	B	1010	GLN
1	B	1071	GLN
1	B	1106	GLN
1	B	1125	ASN
1	B	1142	GLN
1	C	70	HIS
1	C	123	ASN
1	C	174	GLN
1	C	321	GLN

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Mol	Chain	Res	Type
1	C	331	ASN
1	C	334	ASN
1	C	370	ASN
1	C	405	ASN
1	C	477	ASN
1	C	493	GLN
1	C	628	GLN
1	C	677	GLN
1	C	801	ASN
1	C	804	GLN
1	C	872	GLN
1	C	914	ASN
1	C	935	GLN
1	C	955	ASN
1	C	957	GLN
1	C	965	GLN
1	C	1002	GLN
1	C	1010	GLN
1	C	1071	GLN
1	C	1106	GLN
1	C	1125	ASN
1	C	1142	GLN
2	G	24	GLN
2	G	221	GLN
2	G	378	HIS
2	G	401	HIS
2	G	522	GLN
2	H	34	HIS
2	H	42	GLN
2	H	60	GLN
2	H	340	GLN
2	H	508	ASN
2	H	578	ASN
2	I	34	HIS
2	I	42	GLN
2	I	340	GLN
2	I	378	HIS
2	I	508	ASN
2	I	522	GLN
2	I	578	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.