Full wwPDB EM Validation Report

Jul 9, 2025 – 02:23 PM JST

PDB ID	:	8YZC / pdb_00008yzc
EMDB ID	:	EMD-39689
Title	:	Structure of BA.2.86 spike protein in complex with ACE2.
Authors	:	Wang, Y.J.; Zang, X.; Sun, L.
Deposited on	:	2024-04-06
Resolution	:	2.70 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:

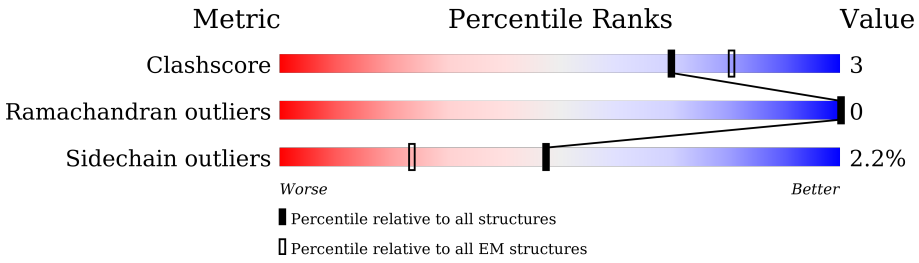
EMDB validation analysis	:	FAILED
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	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 2.70 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	1291	70% 10% 20%
1	B	1291	71% 9% 20%
1	C	1291	71% 9% • 20%
2	G	742	72% 9% 20%
2	H	742	72% 9% 20%
2	I	742	71% 9% 20%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 38973 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	1033	Total	C	N	O	S	0	0
			8121	5204	1344	1537	36		
1	B	1033	Total	C	N	O	S	0	0
			8121	5204	1344	1537	36		
1	C	1033	Total	C	N	O	S	0	0
			8121	5204	1344	1537	36		

There are 285 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	conflict	UNP P0DTC2
A	?	-	ASN	deletion	UNP P0DTC2
A	212	ILE	LEU	conflict	UNP P0DTC2
A	213	GLY	VAL	variant	UNP P0DTC2
A	216	PHE	LEU	variant	UNP P0DTC2
A	245	ASN	HIS	variant	UNP P0DTC2
A	264	ASP	ALA	variant	UNP P0DTC2
A	332	VAL	ILE	variant	UNP P0DTC2
A	339	HIS	GLY	variant	UNP P0DTC2
A	356	THR	LYS	variant	UNP P0DTC2
A	371	PHE	SER	variant	UNP P0DTC2
A	373	PRO	SER	variant	UNP P0DTC2
A	375	PHE	SER	variant	UNP P0DTC2
A	376	ALA	THR	variant	UNP P0DTC2
A	403	LYS	ARG	variant	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	variant	UNP P0DTC2
A	446	SER	GLY	variant	UNP P0DTC2
A	450	ASP	ASN	variant	UNP P0DTC2
A	452	TRP	LEU	variant	UNP P0DTC2
A	460	LYS	ASN	variant	UNP P0DTC2
A	477	ASN	SER	variant	UNP P0DTC2
A	478	LYS	THR	conflict	UNP P0DTC2
A	481	LYS	ASN	conflict	UNP P0DTC2
A	?	-	VAL	deletion	UNP P0DTC2
A	484	LYS	GLU	variant	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
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	conflict	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	conflict	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	variant	UNP P0DTC2
A	987	PRO	VAL	variant	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
B	9	TYR	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
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	conflict	UNP P0DTC2
B	?	-	ASN	deletion	UNP P0DTC2
B	212	ILE	LEU	conflict	UNP P0DTC2
B	213	GLY	VAL	variant	UNP P0DTC2
B	216	PHE	LEU	variant	UNP P0DTC2
B	245	ASN	HIS	variant	UNP P0DTC2
B	264	ASP	ALA	variant	UNP P0DTC2
B	332	VAL	ILE	variant	UNP P0DTC2
B	339	HIS	GLY	variant	UNP P0DTC2
B	356	THR	LYS	variant	UNP P0DTC2
B	371	PHE	SER	variant	UNP P0DTC2
B	373	PRO	SER	variant	UNP P0DTC2
B	375	PHE	SER	variant	UNP P0DTC2
B	376	ALA	THR	variant	UNP P0DTC2
B	403	LYS	ARG	variant	UNP P0DTC2
B	405	ASN	ASP	variant	UNP P0DTC2
B	408	SER	ARG	variant	UNP P0DTC2
B	417	ASN	LYS	variant	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	440	LYS	ASN	variant	UNP P0DTC2
B	445	HIS	VAL	variant	UNP P0DTC2
B	446	SER	GLY	variant	UNP P0DTC2
B	450	ASP	ASN	variant	UNP P0DTC2
B	452	TRP	LEU	variant	UNP P0DTC2
B	460	LYS	ASN	variant	UNP P0DTC2
B	477	ASN	SER	variant	UNP P0DTC2
B	478	LYS	THR	conflict	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	conflict	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	conflict	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	variant	UNP P0DTC2
B	987	PRO	VAL	variant	UNP P0DTC2
B	1143	LEU	PRO	conflict	UNP P0DTC2
B	1209	GLY	-	linker	UNP P0DTC2
B	1210	SER	-	linker	UNP P0DTC2
C	-3	MET	-	initiating methionine	UNP P0DTC2
C	-2	PRO	-	expression tag	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
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	conflict	UNP P0DTC2
C	?	-	ASN	deletion	UNP P0DTC2
C	212	ILE	LEU	conflict	UNP P0DTC2
C	213	GLY	VAL	variant	UNP P0DTC2
C	216	PHE	LEU	variant	UNP P0DTC2
C	245	ASN	HIS	variant	UNP P0DTC2
C	264	ASP	ALA	variant	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	332	VAL	ILE	variant	UNP P0DTC2
C	339	HIS	GLY	variant	UNP P0DTC2
C	356	THR	LYS	variant	UNP P0DTC2
C	371	PHE	SER	variant	UNP P0DTC2
C	373	PRO	SER	variant	UNP P0DTC2
C	375	PHE	SER	variant	UNP P0DTC2
C	376	ALA	THR	variant	UNP P0DTC2
C	403	LYS	ARG	variant	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	variant	UNP P0DTC2
C	446	SER	GLY	variant	UNP P0DTC2
C	450	ASP	ASN	variant	UNP P0DTC2
C	452	TRP	LEU	variant	UNP P0DTC2
C	460	LYS	ASN	variant	UNP P0DTC2
C	477	ASN	SER	variant	UNP P0DTC2
C	478	LYS	THR	conflict	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	conflict	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	conflict	UNP P0DTC2
C	764	LYS	ASN	variant	UNP P0DTC2
C	796	TYR	ASP	variant	UNP P0DTC2
C	817	PRO	PHE	conflict	UNP P0DTC2
C	892	PRO	ALA	conflict	UNP P0DTC2
C	899	PRO	ALA	conflict	UNP P0DTC2

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Chain	Residue	Modelled	Actual	Comment	Reference
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	variant	UNP P0DTC2
C	987	PRO	VAL	variant	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
H	739	HIS	-	expression tag	UNP Q9BYF1
H	740	HIS	-	expression tag	UNP Q9BYF1
H	741	HIS	-	expression tag	UNP Q9BYF1

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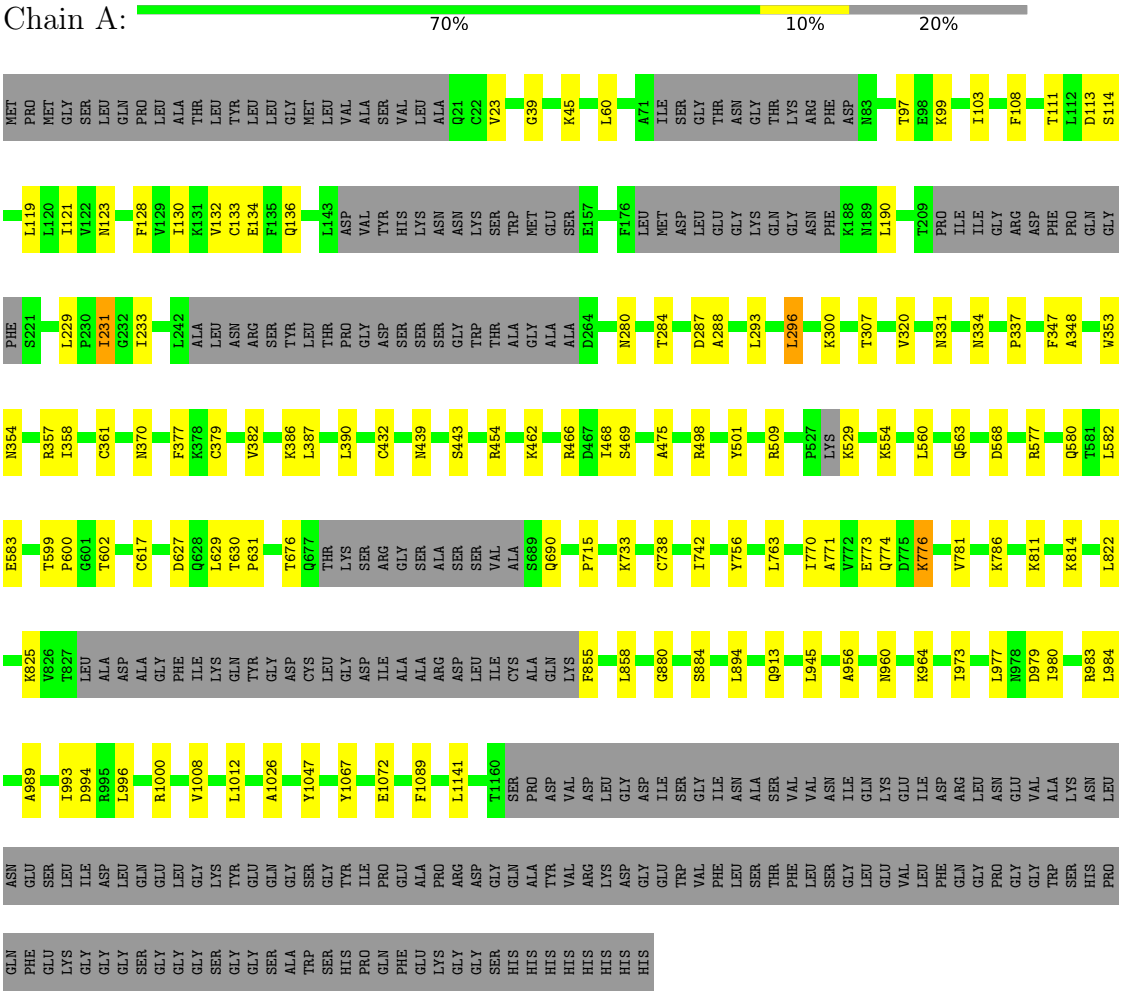
Chain	Residue	Modelled	Actual	Comment	Reference
H	742	HIS	-	expression tag	UNP Q9BYF1
I	733	SER	-	expression tag	UNP Q9BYF1
I	734	GLY	-	expression tag	UNP Q9BYF1
I	735	HIS	-	expression tag	UNP Q9BYF1
I	736	HIS	-	expression tag	UNP Q9BYF1
I	737	HIS	-	expression tag	UNP Q9BYF1
I	738	HIS	-	expression tag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

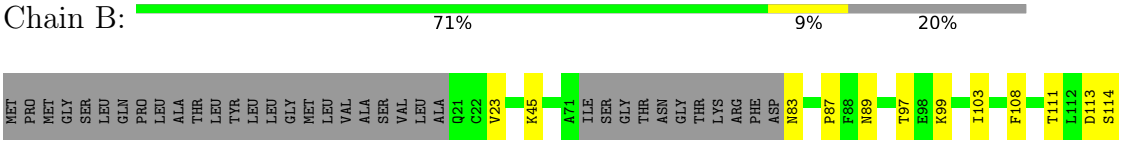
- Molecule 1: Spike glycoprotein,Fibritin,Expression Tag

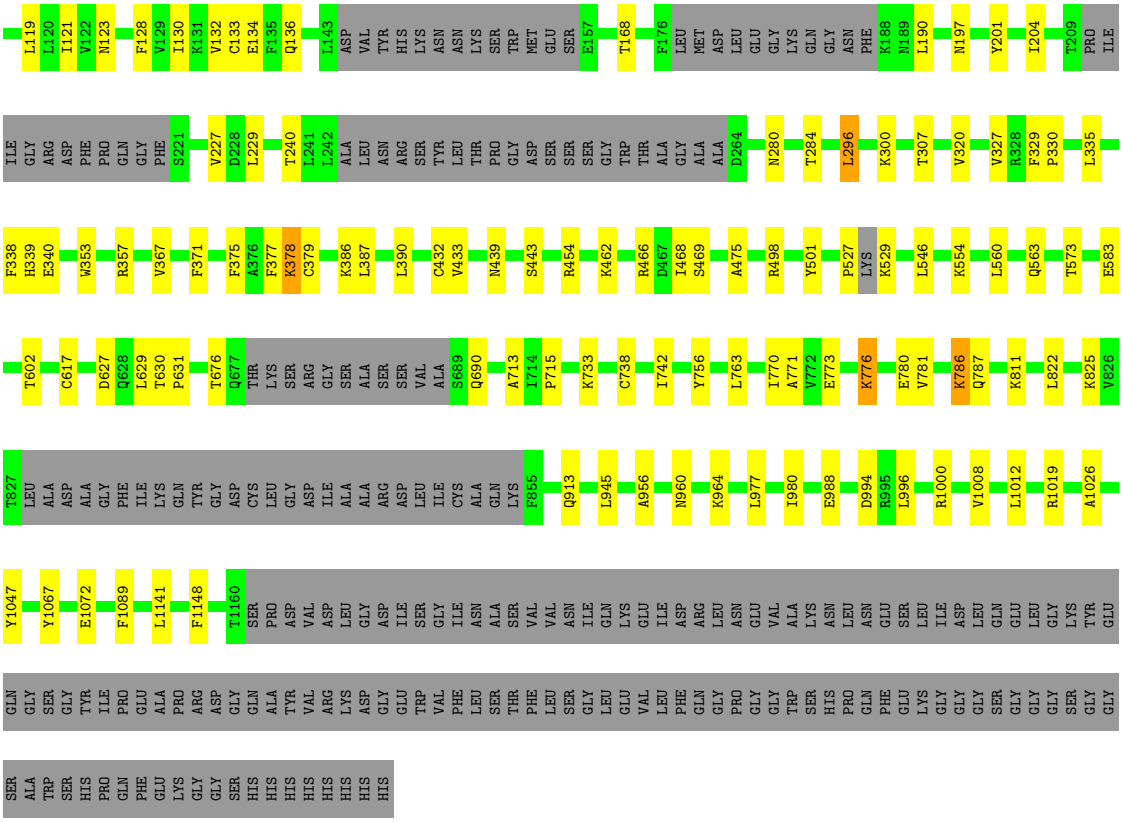
Chain A:



- Molecule 1: Spike glycoprotein,Fibritin,Expression Tag

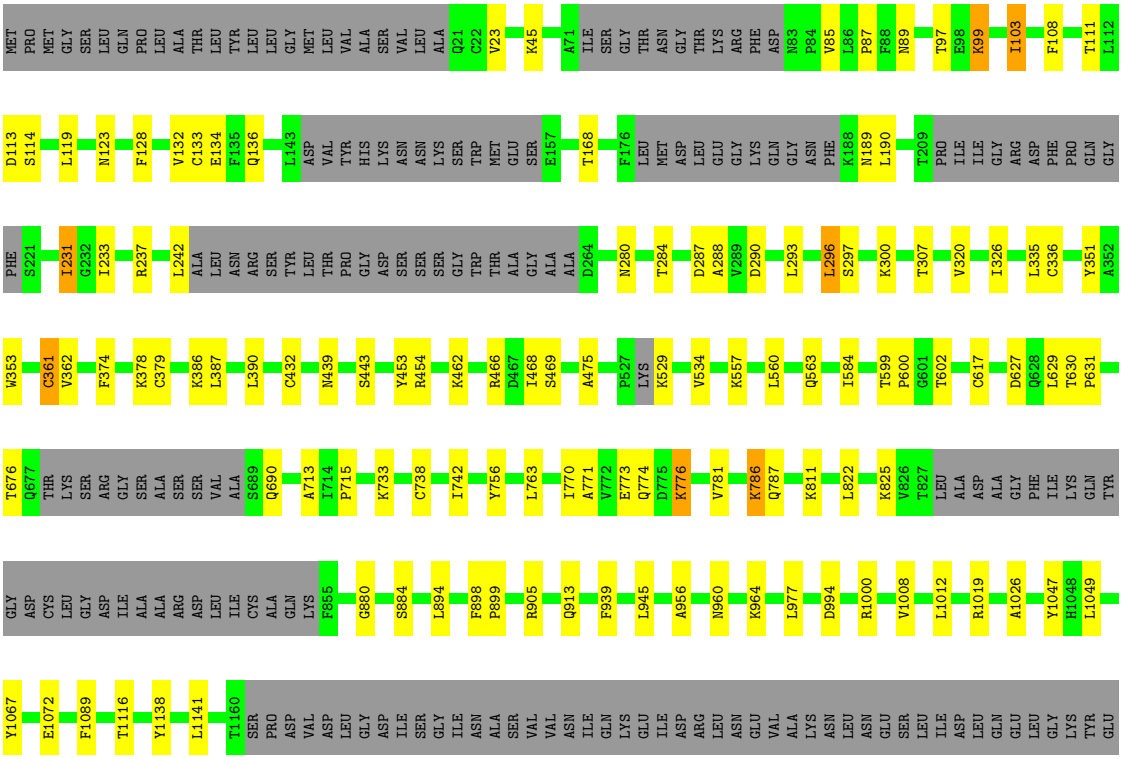
Chain B:

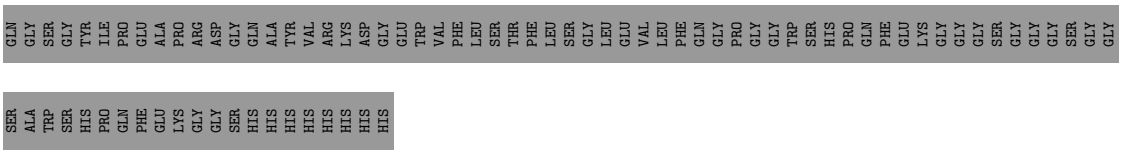




• Molecule 1: Spike glycoprotein,Fibritin,Expression Tag

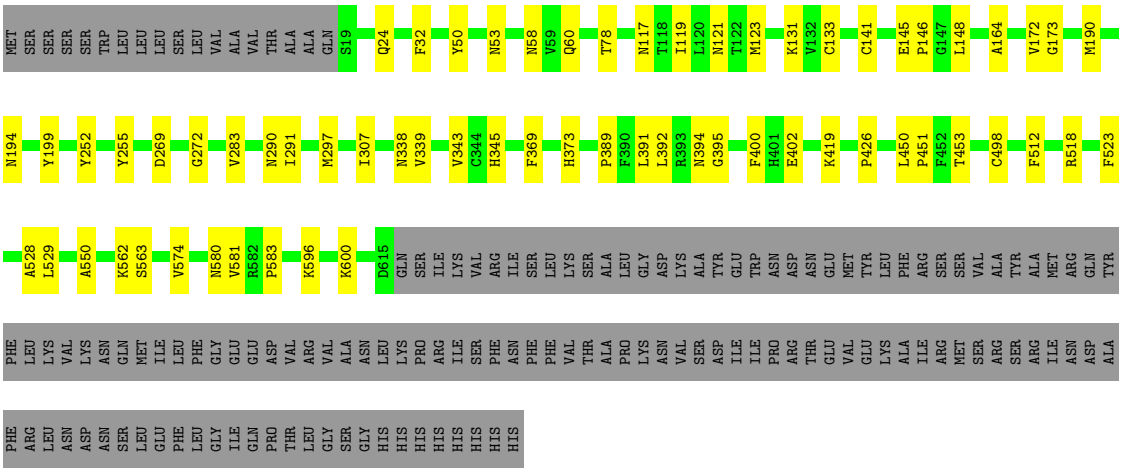
Chain C:





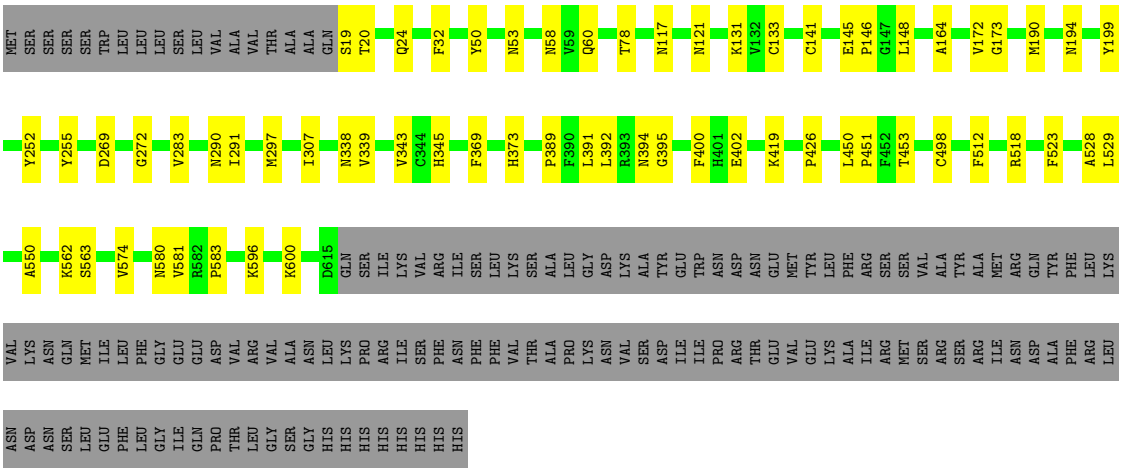
• Molecule 2: Angiotensin-converting enzyme 2

Chain G:



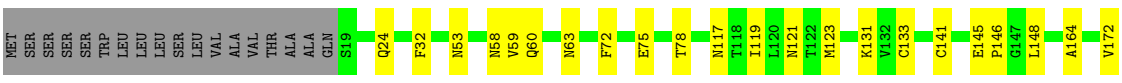
• Molecule 2: Angiotensin-converting enzyme 2

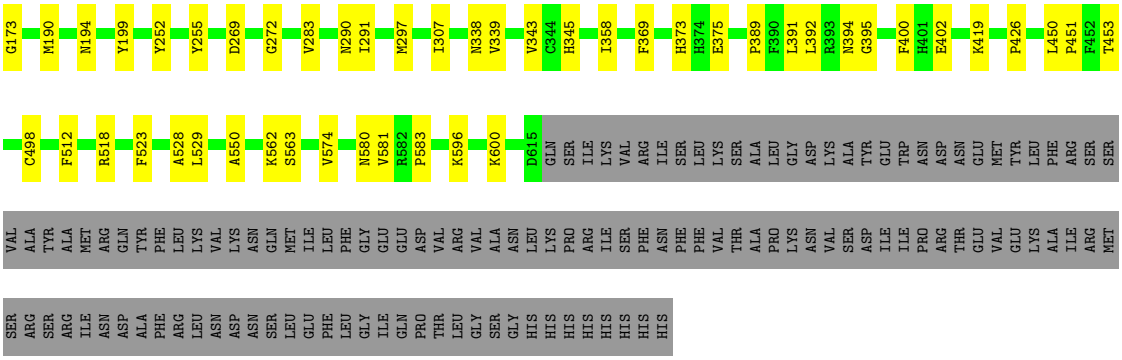
Chain H:



• Molecule 2: Angiotensin-converting enzyme 2

Chain I:




G173 M190 N194 Y199 Y252 Y255 D269 G272 V283 N290 I291 M297 I307 N338 V339 V343 C344 H345 I358 F369 H373 H374 E375 P389 F390 L391 L392 R393 N394 G395 F400 H401 E402 K419 P426 L450 P451 F452 T453
C498 F512 R518 F523 A528 L529 A550 K562 S563 V574 N580 V581 R582 P583 K596 K600 D615
GLN SER ILE LYS VAL ARG ILE SER LEU LYS SER ALA LEU GLY ASP LYS ALA TYR GLU TRP ASN ASP GLU MET TYR LEU PHE ARG SER SER
VAL ALA TYR ALA MET ARG GLN TYR PHE LEU LYS VAL LYS ASN GLN MET ILE LEU PHE GLY GLU GLU ASP VAL ARG VAL ALA ASN LEU LYS PRO ARG ILE SER PHE ASN PHE PHE VAL THR ALA PRO LYS ASN VAL SER ASP ILE ILE PRO ARG THR GLU VAL GLU LYS ALA ILE ARG MET
SER ARG SER ARG ILE ASN ASP ALA PHE ARG LEU ASN ASP ASN SER LEU GLU PHE LEU GLY ILE GLN PRO THR LEU GLY SER GLY HIS HIS HIS HIS HIS HIS HIS HIS

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	446892	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 ($e^-/Å^2$)	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

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	A	0.09	0/8316	0.24	0/11316
1	B	0.08	0/8316	0.25	0/11316
1	C	0.09	0/8316	0.25	0/11316
2	G	0.07	0/5007	0.20	0/6803
2	H	0.07	0/5007	0.20	0/6803
2	I	0.07	0/5007	0.20	0/6803
All	All	0.08	0/39969	0.23	0/54357

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	A	8121	0	7934	59	0
1	B	8121	0	7934	55	0
1	C	8121	0	7934	60	0
2	G	4870	0	4643	31	0
2	H	4870	0	4643	31	0
2	I	4870	0	4643	33	0
All	All	38973	0	37731	259	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 3.

All (259) 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:B:629:LEU:HG	1:B:631:PRO:HD2	1.70	0.73
1:C:977:LEU:HB3	1:C:1000:ARG:HH22	1.55	0.71
1:C:629:LEU:HG	1:C:631:PRO:HD2	1.72	0.71
1:A:629:LEU:HG	1:A:631:PRO:HD2	1.72	0.71
1:A:763:LEU:HG	1:A:1008:VAL:HG21	1.75	0.69
1:C:763:LEU:HG	1:C:1008:VAL:HG21	1.74	0.67
1:B:197:ASN:ND2	1:B:201:TYR:O	2.30	0.65
1:B:763:LEU:HG	1:B:1008:VAL:HG21	1.78	0.64
2:I:453:THR:HG23	2:I:512:PHE:HB3	1.80	0.64
2:H:453:THR:HG23	2:H:512:PHE:HB3	1.79	0.64
1:B:742:ILE:O	1:B:1000:ARG:NH1	2.31	0.64
2:G:453:THR:HG23	2:G:512:PHE:HB3	1.80	0.63
1:C:742:ILE:O	1:C:1000:ARG:NH1	2.31	0.63
1:A:331:ASN:HA	1:A:580:GLN:HG2	1.79	0.63
1:B:108:PHE:HB2	1:B:119:LEU:HB3	1.81	0.63
1:B:756:TYR:OH	1:B:994:ASP:OD1	2.17	0.62
1:C:956:ALA:O	1:C:960:ASN:ND2	2.29	0.62
1:A:466:ARG:HE	1:A:468:ILE:HD11	1.63	0.62
1:C:466:ARG:HE	1:C:468:ILE:HD11	1.64	0.62
1:B:466:ARG:HE	1:B:468:ILE:HD11	1.65	0.62
1:C:353:TRP:O	1:C:466:ARG:NH2	2.33	0.61
2:H:117:ASN:O	2:H:121:ASN:ND2	2.32	0.61
1:C:361:CYS:SG	1:C:362:VAL:N	2.74	0.61
1:C:108:PHE:HB2	1:C:119:LEU:HB3	1.83	0.60
1:A:756:TYR:OH	1:A:994:ASP:OD1	2.20	0.60
1:B:977:LEU:HB3	1:B:1000:ARG:HH22	1.66	0.60
1:A:111:THR:OG1	1:A:113:ASP:OD2	2.20	0.60
1:A:353:TRP:O	1:A:466:ARG:NH2	2.35	0.59
1:A:977:LEU:HB3	1:A:1000:ARG:HH22	1.66	0.59
2:I:117:ASN:O	2:I:121:ASN:ND2	2.32	0.59
1:A:956:ALA:O	1:A:960:ASN:ND2	2.32	0.59
2:G:117:ASN:O	2:G:121:ASN:ND2	2.32	0.59
1:A:108:PHE:HB2	1:A:119:LEU:HB3	1.84	0.58
1:B:111:THR:OG1	1:B:113:ASP:OD2	2.20	0.58
1:B:956:ALA:O	1:B:960:ASN:ND2	2.29	0.58
1:C:296:LEU:HD22	1:C:300:LYS:HE3	1.86	0.57
1:A:577:ARG:HH21	1:A:582:LEU:HB3	1.69	0.57
1:C:351:TYR:HB3	1:C:453:TYR:HA	1.85	0.57
1:A:554:LYS:NZ	1:A:583:GLU:OE2	2.37	0.57
1:B:554:LYS:NZ	1:B:583:GLU:OE2	2.38	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:379:CYS:HA	1:A:432:CYS:HA	1.87	0.57
1:C:756:TYR:OH	1:C:994:ASP:OD1	2.21	0.56
1:C:326:ILE:HD11	1:C:534:VAL:HG12	1.87	0.56
1:B:546:LEU:HD21	1:B:573:THR:HG21	1.87	0.55
1:B:133:CYS:SG	1:B:134:GLU:N	2.79	0.55
1:C:111:THR:OG1	1:C:113:ASP:OD2	2.19	0.55
1:C:773:GLU:OE2	1:C:1019:ARG:NE	2.39	0.55
1:C:231:ILE:HD12	1:C:233:ILE:HG23	1.89	0.55
2:G:53:ASN:O	2:G:58:ASN:ND2	2.39	0.55
1:B:353:TRP:O	1:B:466:ARG:NH2	2.35	0.55
2:H:419:LYS:HE3	2:H:426:PRO:HA	1.89	0.55
1:B:379:CYS:HA	1:B:432:CYS:HA	1.89	0.55
1:A:296:LEU:HD22	1:A:300:LYS:HE3	1.88	0.55
1:B:1089:PHE:HB3	1:C:913:GLN:HE21	1.72	0.55
1:B:114:SER:OG	1:B:136:GLN:NE2	2.39	0.54
1:A:913:GLN:HE21	1:C:1089:PHE:HB3	1.71	0.54
1:B:83:ASN:ND2	1:B:240:THR:O	2.40	0.54
1:C:379:CYS:HA	1:C:432:CYS:HA	1.89	0.54
2:G:419:LYS:HE3	2:G:426:PRO:HA	1.89	0.54
2:I:529:LEU:HD22	2:I:550:ALA:HB1	1.90	0.54
1:C:114:SER:OG	1:C:136:GLN:NE2	2.41	0.54
1:A:1089:PHE:HB3	1:B:913:GLN:HE21	1.73	0.54
1:A:114:SER:OG	1:A:136:GLN:NE2	2.40	0.54
2:I:419:LYS:HE3	2:I:426:PRO:HA	1.89	0.53
1:B:773:GLU:OE2	1:B:1019:ARG:NE	2.42	0.53
1:B:296:LEU:HD22	1:B:300:LYS:HE3	1.90	0.53
2:I:53:ASN:O	2:I:58:ASN:ND2	2.41	0.53
1:C:336:CYS:HB2	1:C:362:VAL:H	1.74	0.53
1:A:337:PRO:HD2	1:A:358:ILE:HG23	1.90	0.53
1:C:99:LYS:HZ1	1:C:189:ASN:H	1.55	0.53
2:H:133:CYS:HA	2:H:141:CYS:HA	1.91	0.53
1:C:280:ASN:ND2	1:C:284:THR:O	2.42	0.53
2:G:529:LEU:HD22	2:G:550:ALA:HB1	1.90	0.53
2:G:269:ASP:OD1	2:G:272:GLY:N	2.40	0.52
2:H:529:LEU:HD22	2:H:550:ALA:HB1	1.90	0.52
2:H:53:ASN:O	2:H:58:ASN:ND2	2.41	0.51
1:A:287:ASP:OD1	1:A:288:ALA:N	2.43	0.51
1:A:773:GLU:HA	1:A:776:LYS:HG2	1.92	0.51
1:A:979:ASP:O	1:A:983:ARG:NE	2.37	0.51
2:I:133:CYS:HA	2:I:141:CYS:HA	1.91	0.51
2:I:269:ASP:OD1	2:I:272:GLY:N	2.40	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:G:133:CYS:HA	2:G:141:CYS:HA	1.91	0.51
2:H:269:ASP:OD1	2:H:272:GLY:N	2.40	0.51
1:A:880:GLY:O	1:A:884:SER:OG	2.27	0.50
1:C:133:CYS:SG	1:C:134:GLU:N	2.85	0.50
1:A:280:ASN:ND2	1:A:284:THR:O	2.44	0.50
1:A:973:ILE:HD11	1:A:984:LEU:HD21	1.93	0.50
2:I:173:GLY:O	2:I:498:CYS:N	2.45	0.50
2:G:173:GLY:O	2:G:498:CYS:N	2.45	0.50
1:B:387:LEU:HD12	1:B:390:LEU:HD12	1.93	0.50
1:C:387:LEU:HD12	1:C:390:LEU:HD12	1.93	0.50
2:I:394:ASN:HB3	2:I:562:LYS:HD2	1.94	0.50
2:H:173:GLY:O	2:H:498:CYS:N	2.44	0.49
1:A:387:LEU:HD12	1:A:390:LEU:HD12	1.95	0.49
1:A:742:ILE:O	1:A:1000:ARG:NH1	2.38	0.49
1:B:130:ILE:HD13	1:B:229:LEU:HD11	1.93	0.49
2:I:290:ASN:OD1	2:I:291:ILE:N	2.46	0.49
2:G:290:ASN:OD1	2:G:291:ILE:N	2.45	0.49
2:I:402:GLU:HB2	2:I:518:ARG:HG3	1.94	0.49
2:H:290:ASN:OD1	2:H:291:ILE:N	2.46	0.49
1:C:123:ASN:HD22	1:C:128:PHE:HD1	1.61	0.49
1:C:439:ASN:O	1:C:443:SER:OG	2.28	0.49
2:H:389:PRO:HD2	2:H:392:LEU:HD12	1.95	0.49
1:A:133:CYS:SG	1:A:134:GLU:N	2.85	0.48
2:G:145:GLU:HB3	2:G:146:PRO:HD3	1.96	0.48
2:G:389:PRO:HD2	2:G:392:LEU:HD12	1.96	0.48
2:H:145:GLU:HB3	2:H:146:PRO:HD3	1.96	0.48
1:A:334:ASN:HD21	1:A:361:CYS:HA	1.77	0.48
2:I:145:GLU:HB3	2:I:146:PRO:HD3	1.96	0.48
2:I:389:PRO:HD2	2:I:392:LEU:HD12	1.96	0.48
1:B:280:ASN:ND2	1:B:284:THR:OG1	2.41	0.48
1:A:348:ALA:HB1	1:A:354:ASN:H	1.79	0.48
2:H:528:ALA:HB2	2:H:574:VAL:HG12	1.96	0.48
1:A:676:THR:HA	1:A:690:GLN:HG2	1.96	0.48
1:A:822:LEU:HD22	1:A:945:LEU:HD21	1.96	0.48
1:C:770:ILE:HD11	1:C:1012:LEU:HD23	1.96	0.48
1:C:627:ASP:OD1	1:C:627:ASP:N	2.47	0.48
2:H:190:MET:O	2:H:194:ASN:ND2	2.35	0.48
2:H:394:ASN:HB3	2:H:562:LYS:HD2	1.96	0.48
1:A:231:ILE:HD12	1:A:233:ILE:HG23	1.94	0.47
2:H:392:LEU:HD13	2:H:563:SER:HB3	1.96	0.47
2:H:402:GLU:HB2	2:H:518:ARG:HG3	1.94	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:287:ASP:OD1	1:C:288:ALA:N	2.43	0.47
2:G:402:GLU:HB2	2:G:518:ARG:HG3	1.94	0.47
2:I:528:ALA:HB2	2:I:574:VAL:HG12	1.96	0.47
1:B:204:ILE:HB	1:B:227:VAL:HG12	1.95	0.47
1:B:498:ARG:NH1	1:B:501:TYR:OH	2.45	0.47
1:C:454:ARG:NH2	1:C:469:SER:O	2.45	0.47
1:C:85:VAL:HG11	1:C:237:ARG:HE	1.80	0.47
1:A:454:ARG:NH2	1:A:469:SER:O	2.46	0.47
1:B:715:PRO:HA	1:B:1072:GLU:HA	1.97	0.47
1:C:880:GLY:O	1:C:884:SER:OG	2.26	0.47
2:G:392:LEU:HD13	2:G:563:SER:HB3	1.97	0.47
2:G:580:ASN:OD1	2:G:581:VAL:N	2.48	0.47
2:H:343:VAL:HG12	2:H:345:HIS:H	1.80	0.47
2:I:369:PHE:O	2:I:373:HIS:ND1	2.47	0.47
1:C:560:LEU:HB2	1:C:563:GLN:HG2	1.96	0.47
2:G:394:ASN:HB3	2:G:562:LYS:HD2	1.96	0.47
2:H:580:ASN:OD1	2:H:581:VAL:N	2.48	0.47
1:B:770:ILE:HD11	1:B:1012:LEU:HD23	1.96	0.46
1:C:676:THR:HA	1:C:690:GLN:HG2	1.97	0.46
1:C:781:VAL:HG22	1:C:1026:ALA:HB2	1.96	0.46
2:I:392:LEU:HD13	2:I:563:SER:HB3	1.96	0.46
2:G:528:ALA:HB2	2:G:574:VAL:HG12	1.96	0.46
2:I:394:ASN:OD1	2:I:395:GLY:N	2.48	0.46
2:I:580:ASN:OD1	2:I:581:VAL:N	2.48	0.46
1:A:715:PRO:HA	1:A:1072:GLU:HA	1.97	0.46
2:G:343:VAL:HG12	2:G:345:HIS:H	1.80	0.46
1:A:307:THR:HA	1:A:602:THR:HG21	1.97	0.46
1:A:39:GLY:HA3	1:A:60:LEU:HB3	1.96	0.46
1:C:715:PRO:HA	1:C:1072:GLU:HA	1.97	0.46
1:A:97:THR:HB	1:A:190:LEU:HD13	1.98	0.46
1:B:676:THR:HA	1:B:690:GLN:HG2	1.97	0.46
1:B:980:ILE:HD11	1:B:996:LEU:HD11	1.97	0.46
2:G:394:ASN:OD1	2:G:395:GLY:N	2.49	0.46
1:B:713:ALA:HB3	1:C:894:LEU:HB3	1.97	0.45
1:A:781:VAL:HG22	1:A:1026:ALA:HB2	1.99	0.45
1:B:560:LEU:HB2	1:B:563:GLN:HG2	1.97	0.45
2:I:148:LEU:HD22	2:I:164:ALA:HB1	1.99	0.45
1:A:560:LEU:HB2	1:A:563:GLN:HG2	1.97	0.45
1:B:121:ILE:HG22	1:B:130:ILE:HG12	1.98	0.45
1:C:307:THR:HA	1:C:602:THR:HG21	1.99	0.45
2:H:394:ASN:OD1	2:H:395:GLY:N	2.50	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:G:450:LEU:HB2	2:G:451:PRO:HD3	1.99	0.45
1:C:786:LYS:HG2	1:C:787:GLN:HG3	1.99	0.45
1:A:733:LYS:HE3	1:A:771:ALA:HB1	1.99	0.45
1:B:329:PHE:HB3	1:B:330:PRO:HD3	1.99	0.45
1:B:454:ARG:NH2	1:B:469:SER:O	2.45	0.45
1:B:123:ASN:HD22	1:B:128:PHE:HD1	1.64	0.45
2:H:369:PHE:O	2:H:373:HIS:ND1	2.47	0.44
1:A:894:LEU:HB3	1:C:713:ALA:HB3	1.99	0.44
2:I:343:VAL:HG12	2:I:345:HIS:H	1.81	0.44
2:G:32:PHE:HE2	2:G:391:LEU:HD21	1.83	0.44
2:G:148:LEU:HD22	2:G:164:ALA:HB1	1.99	0.44
2:G:190:MET:O	2:G:194:ASN:ND2	2.34	0.44
1:B:97:THR:HB	1:B:190:LEU:HD13	1.99	0.44
1:B:822:LEU:HD22	1:B:945:LEU:HD21	1.99	0.44
1:B:781:VAL:HG22	1:B:1026:ALA:HB2	2.00	0.44
1:C:822:LEU:HD22	1:C:945:LEU:HD21	1.99	0.44
2:G:369:PHE:O	2:G:373:HIS:ND1	2.48	0.44
1:C:786:LYS:H	1:C:786:LYS:HD3	1.83	0.44
1:A:123:ASN:HD22	1:A:128:PHE:HD1	1.65	0.43
1:B:307:THR:HA	1:B:602:THR:HG21	2.01	0.43
1:B:527:PRO:O	1:B:529:LYS:NZ	2.50	0.43
1:A:357:ARG:NH2	1:B:168:THR:O	2.52	0.43
2:I:59:VAL:O	2:I:63:ASN:ND2	2.35	0.43
2:I:252:TYR:HB3	2:I:255:TYR:HD2	1.83	0.43
1:B:357:ARG:NH2	1:C:168:THR:O	2.52	0.43
2:H:252:TYR:HB3	2:H:255:TYR:HD2	1.83	0.43
1:B:475:ALA:O	2:H:24:GLN:NE2	2.51	0.43
1:C:1116:THR:HG22	1:C:1138:TYR:HB3	2.00	0.43
2:G:252:TYR:HB3	2:G:255:TYR:HD2	1.82	0.43
2:I:450:LEU:HB2	2:I:451:PRO:HD3	1.99	0.43
2:H:32:PHE:HE2	2:H:391:LEU:HD21	1.83	0.43
2:G:596:LYS:O	2:G:600:LYS:HG3	2.19	0.43
2:H:148:LEU:HD22	2:H:164:ALA:HB1	1.99	0.43
1:A:770:ILE:HD11	1:A:1012:LEU:HD23	2.01	0.43
1:C:475:ALA:O	2:I:24:GLN:NE2	2.51	0.43
1:A:475:ALA:O	2:G:24:GLN:NE2	2.52	0.43
1:A:439:ASN:O	1:A:443:SER:OG	2.29	0.43
1:A:630:THR:HB	1:A:631:PRO:HD3	2.01	0.43
2:H:450:LEU:HB2	2:H:451:PRO:HD3	1.99	0.43
2:H:523:PHE:HB3	2:H:583:PRO:HB2	2.01	0.43
2:I:32:PHE:HE2	2:I:391:LEU:HD21	1.84	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:I:596:LYS:O	2:I:600:LYS:HG3	2.19	0.43
2:H:596:LYS:O	2:H:600:LYS:HG3	2.19	0.42
1:A:1047:TYR:HB2	1:A:1067:TYR:HB3	2.00	0.42
1:C:630:THR:HB	1:C:631:PRO:HD3	2.01	0.42
1:C:773:GLU:HA	1:C:776:LYS:HG2	2.01	0.42
2:I:297:MET:HE1	2:I:307:ILE:HD11	2.01	0.42
2:I:523:PHE:HB3	2:I:583:PRO:HB2	2.00	0.42
1:B:378:LYS:HB2	1:B:433:VAL:HB	2.01	0.42
1:B:630:THR:HB	1:B:631:PRO:HD3	2.01	0.42
2:G:50:TYR:HA	2:G:58:ASN:HB3	2.01	0.42
1:A:627:ASP:OD1	1:A:627:ASP:N	2.47	0.42
2:I:338:ASN:ND2	2:I:339:VAL:H	2.18	0.42
2:H:50:TYR:HA	2:H:58:ASN:HB3	2.02	0.42
2:H:338:ASN:ND2	2:H:339:VAL:H	2.18	0.42
1:A:855:PHE:HD2	1:A:858:LEU:HD12	1.83	0.41
2:I:190:MET:O	2:I:194:ASN:ND2	2.35	0.41
1:A:989:ALA:O	1:A:993:ILE:HG12	2.21	0.41
1:B:776:LYS:NZ	1:B:780:GLU:OE2	2.51	0.41
1:B:786:LYS:HG2	1:B:787:GLN:HG3	2.02	0.41
1:C:557:LYS:HB2	1:C:584:ILE:HG21	2.02	0.41
1:C:599:THR:HA	1:C:600:PRO:HD3	1.92	0.41
1:B:87:PRO:HB2	1:B:89:ASN:HD21	1.85	0.41
2:G:119:ILE:HG22	2:G:123:MET:HE2	2.02	0.41
1:A:599:THR:HA	1:A:600:PRO:HD3	1.92	0.41
1:B:339:HIS:ND1	1:B:340:GLU:HG2	2.35	0.41
1:B:733:LYS:HE3	1:B:771:ALA:HB1	2.01	0.41
1:B:1047:TYR:HB2	1:B:1067:TYR:HB3	2.02	0.41
1:C:103:ILE:HA	1:C:242:LEU:HA	2.01	0.41
2:G:338:ASN:ND2	2:G:339:VAL:H	2.18	0.41
1:A:498:ARG:NH1	1:A:501:TYR:OH	2.50	0.41
2:H:297:MET:HE1	2:H:307:ILE:HD11	2.02	0.41
1:A:980:ILE:HD11	1:A:996:LEU:HD11	2.02	0.41
1:C:898:PHE:N	1:C:899:PRO:HD2	2.36	0.41
1:A:770:ILE:O	1:A:774:GLN:HG2	2.20	0.41
1:B:786:LYS:H	1:B:786:LYS:HD3	1.86	0.41
1:C:1047:TYR:HB2	1:C:1067:TYR:HB3	2.03	0.41
2:G:297:MET:HE1	2:G:307:ILE:HD11	2.02	0.41
1:A:130:ILE:HG21	1:A:229:LEU:HD21	2.03	0.41
1:A:347:PHE:CE2	1:A:509:ARG:HB3	2.56	0.41
1:B:627:ASP:OD1	1:B:627:ASP:N	2.47	0.41
1:C:290:ASP:O	1:C:297:SER:HB3	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:733:LYS:HE3	1:C:771:ALA:HB1	2.02	0.41
1:C:770:ILE:O	1:C:774:GLN:HG2	2.21	0.41
2:I:72:PHE:HA	2:I:75:GLU:HG2	2.03	0.41
1:A:121:ILE:HG22	1:A:130:ILE:HG12	2.03	0.40
1:B:439:ASN:O	1:B:443:SER:OG	2.32	0.40
1:C:87:PRO:HB2	1:C:89:ASN:HD21	1.87	0.40
1:C:97:THR:HB	1:C:190:LEU:HD13	2.02	0.40
2:H:19:SER:OG	2:H:20:THR:N	2.54	0.40
2:I:119:ILE:HG22	2:I:123:MET:HE2	2.03	0.40
1:A:382:VAL:HG21	1:A:387:LEU:HD13	2.03	0.40
1:C:905:ARG:NH1	1:C:1049:LEU:O	2.54	0.40
1:C:85:VAL:HG11	1:C:237:ARG:NE	2.36	0.40
2:G:523:PHE:HB3	2:G:583:PRO:HB2	2.01	0.40
2:I:358:ILE:HD13	2:I:375:GLU:HB3	2.04	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	1015/1291 (79%)	991 (98%)	24 (2%)	0	100	100
1	B	1015/1291 (79%)	985 (97%)	30 (3%)	0	100	100
1	C	1015/1291 (79%)	983 (97%)	32 (3%)	0	100	100
2	G	595/742 (80%)	589 (99%)	6 (1%)	0	100	100
2	H	595/742 (80%)	588 (99%)	7 (1%)	0	100	100
2	I	595/742 (80%)	589 (99%)	6 (1%)	0	100	100
All	All	4830/6099 (79%)	4725 (98%)	105 (2%)	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	A	912/1115 (82%)	888 (97%)	24 (3%)	41	70
1	B	912/1115 (82%)	885 (97%)	27 (3%)	36	65
1	C	912/1115 (82%)	887 (97%)	25 (3%)	40	69
2	G	527/656 (80%)	520 (99%)	7 (1%)	65	85
2	H	527/656 (80%)	520 (99%)	7 (1%)	65	85
2	I	527/656 (80%)	520 (99%)	7 (1%)	65	85
All	All	4317/5313 (81%)	4220 (98%)	97 (2%)	47	76

All (97) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	23	VAL
1	A	45	LYS
1	A	99	LYS
1	A	103	ILE
1	A	132	VAL
1	A	231	ILE
1	A	293	LEU
1	A	296	LEU
1	A	320	VAL
1	A	370	ASN
1	A	377	PHE
1	A	386	LYS
1	A	462	LYS
1	A	529	LYS
1	A	568	ASP
1	A	617	CYS
1	A	738	CYS
1	A	776	LYS
1	A	786	LYS
1	A	811	LYS
1	A	814	LYS
1	A	825	LYS

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Mol	Chain	Res	Type
1	A	964	LYS
1	A	1141	LEU
1	B	23	VAL
1	B	45	LYS
1	B	99	LYS
1	B	103	ILE
1	B	132	VAL
1	B	296	LEU
1	B	320	VAL
1	B	327	VAL
1	B	335	LEU
1	B	338	PHE
1	B	367	VAL
1	B	371	PHE
1	B	375	PHE
1	B	377	PHE
1	B	378	LYS
1	B	386	LYS
1	B	462	LYS
1	B	617	CYS
1	B	738	CYS
1	B	776	LYS
1	B	786	LYS
1	B	811	LYS
1	B	825	LYS
1	B	964	LYS
1	B	988	GLU
1	B	1141	LEU
1	B	1148	PHE
1	C	23	VAL
1	C	45	LYS
1	C	99	LYS
1	C	103	ILE
1	C	132	VAL
1	C	231	ILE
1	C	293	LEU
1	C	296	LEU
1	C	320	VAL
1	C	335	LEU
1	C	361	CYS
1	C	374	PHE
1	C	378	LYS

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Mol	Chain	Res	Type
1	C	386	LYS
1	C	462	LYS
1	C	529	LYS
1	C	617	CYS
1	C	738	CYS
1	C	776	LYS
1	C	786	LYS
1	C	811	LYS
1	C	825	LYS
1	C	939	PHE
1	C	964	LYS
1	C	1141	LEU
2	G	60	GLN
2	G	78	THR
2	G	131	LYS
2	G	172	VAL
2	G	199	TYR
2	G	283	VAL
2	G	400	PHE
2	H	60	GLN
2	H	78	THR
2	H	131	LYS
2	H	172	VAL
2	H	199	TYR
2	H	283	VAL
2	H	400	PHE
2	I	60	GLN
2	I	78	THR
2	I	131	LYS
2	I	172	VAL
2	I	199	TYR
2	I	283	VAL
2	I	400	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (104) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	34	ASN
1	A	89	ASN
1	A	123	ASN
1	A	136	GLN
1	A	165	ASN

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Mol	Chain	Res	Type
1	A	174	GLN
1	A	197	ASN
1	A	271	GLN
1	A	321	GLN
1	A	439	ASN
1	A	474	GLN
1	A	493	GLN
1	A	540	ASN
1	A	544	ASN
1	A	607	GLN
1	A	628	GLN
1	A	677	GLN
1	A	872	GLN
1	A	913	GLN
1	A	955	ASN
1	A	1002	GLN
1	A	1010	GLN
1	A	1071	GLN
1	A	1083	HIS
1	A	1106	GLN
1	A	1142	GLN
1	B	89	ASN
1	B	123	ASN
1	B	136	GLN
1	B	165	ASN
1	B	174	GLN
1	B	321	GLN
1	B	331	ASN
1	B	439	ASN
1	B	474	GLN
1	B	493	GLN
1	B	607	GLN
1	B	628	GLN
1	B	677	GLN
1	B	787	GLN
1	B	804	GLN
1	B	872	GLN
1	B	913	GLN
1	B	1002	GLN
1	B	1010	GLN
1	B	1071	GLN
1	B	1083	HIS

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Mol	Chain	Res	Type
1	B	1088	HIS
1	B	1106	GLN
1	B	1142	GLN
1	C	34	ASN
1	C	89	ASN
1	C	123	ASN
1	C	136	GLN
1	C	165	ASN
1	C	174	GLN
1	C	197	ASN
1	C	271	GLN
1	C	321	GLN
1	C	334	ASN
1	C	354	ASN
1	C	388	ASN
1	C	437	ASN
1	C	439	ASN
1	C	474	GLN
1	C	493	GLN
1	C	544	ASN
1	C	580	GLN
1	C	607	GLN
1	C	628	GLN
1	C	677	GLN
1	C	787	GLN
1	C	872	GLN
1	C	913	GLN
1	C	1002	GLN
1	C	1010	GLN
1	C	1071	GLN
1	C	1106	GLN
1	C	1142	GLN
2	G	58	ASN
2	G	60	GLN
2	G	137	ASN
2	G	338	ASN
2	G	340	GLN
2	G	472	GLN
2	G	508	ASN
2	G	535	HIS
2	H	58	ASN
2	H	60	GLN

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Mol	Chain	Res	Type
2	H	137	ASN
2	H	338	ASN
2	H	340	GLN
2	H	472	GLN
2	H	508	ASN
2	H	535	HIS
2	I	58	ASN
2	I	60	GLN
2	I	137	ASN
2	I	338	ASN
2	I	340	GLN
2	I	401	HIS
2	I	472	GLN
2	I	508	ASN
2	I	535	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.