



## wwPDB/EMDataBank EM Map/Model Validation Summary Report ⓘ

Feb 16, 2018 – 05:25 pm GMT

PDB ID : 5TCP  
EMDB ID: : EMD-8398  
Title : Near-atomic resolution cryo-EM structure of the periplasmic domains of PrgH and PrgK  
Authors : Worrall, L.J.; Hong, C.; Vuckovic, M.; Bergeron, J.R.C.; Huang, R.K.; Yu, Z.; Strynadka, N.C.J.  
Deposited on : 2016-09-15  
Resolution : 4.30 Å(reported)

This is a wwPDB/EMDataBank EM Map/Model Validation Summary Report for a publicly released PDB/EMDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto: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.

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MolProbity : 4.02b-467  
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk30686

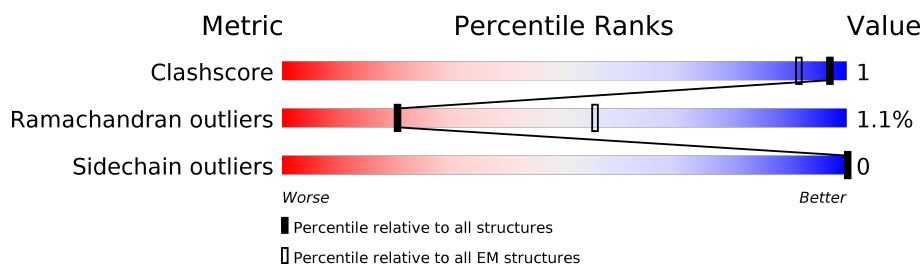
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 4.30 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	136279	1886
Ramachandran outliers	132675	1663
Sidechain outliers	132484	1531

The table below summarises the geometric issues observed across the polymeric chains. The red, orange, yellow and green segments on the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	0	235	75% 22%
1	2	235	76% 22%
1	4	235	75% 22%
1	6	235	75% 22%
1	8	235	76% 22%
1	B	235	75% 22%
1	D	235	75% 22%
1	F	235	75% 22%
1	H	235	75% 22%

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Mol	Chain	Length	Quality of chain
1	J	235	
1	L	235	
1	N	235	
1	P	235	
1	R	235	
1	T	235	
1	V	235	
1	X	235	
1	Z	235	
1	a	235	
1	c	235	
1	e	235	
1	g	235	
1	i	235	
1	k	235	
2	1	263	
2	3	263	
2	5	263	
2	7	263	
2	9	263	
2	A	263	
2	C	263	
2	E	263	
2	G	263	
2	I	263	

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Mol	Chain	Length	Quality of chain
2	K	263	 71%26%
2	M	263	 72%26%
2	O	263	 72%26%
2	Q	263	 72%26%
2	S	263	 72%26%
2	U	263	 72%26%
2	W	263	 72%26%
2	Y	263	 72%26%
2	b	263	 72%26%
2	d	263	 72%26%
2	f	263	 72%26%
2	h	263	 72%26%
2	j	263	 72%26%
2	l	263	 72%26%

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 72888 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 Lipoprotein PrgK.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	0	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	2	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	4	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	6	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	8	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	B	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	D	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	F	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	H	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	J	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	L	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	N	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	P	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	R	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	T	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	V	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	X	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		

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Mol	Chain	Residues	Atoms					AltConf	Trace
1	Z	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	a	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	c	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	e	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	g	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	i	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		
1	k	184	Total	C	N	O	S	0	0
			1437	905	250	279	3		

- Molecule 2 is a protein called Protein PrgH.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	1	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	3	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	5	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	7	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	9	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	A	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	C	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	E	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	G	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	I	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	K	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		
2	M	194	Total	C	N	O	S	0	0
			1600	1011	288	297	4		

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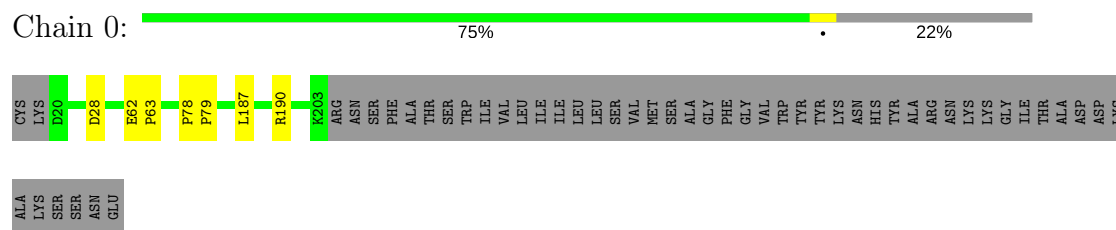
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Mol	Chain	Residues	Atoms					AltConf	Trace
2	O	194	Total 1600	C 1011	N 288	O 297	S 4	0	0
2	Q	194	Total 1600	C 1011	N 288	O 297	S 4	0	0
2	S	194	Total 1600	C 1011	N 288	O 297	S 4	0	0
2	U	194	Total 1600	C 1011	N 288	O 297	S 4	0	0
2	W	194	Total 1600	C 1011	N 288	O 297	S 4	0	0
2	Y	194	Total 1600	C 1011	N 288	O 297	S 4	0	0
2	b	194	Total 1600	C 1011	N 288	O 297	S 4	0	0
2	d	194	Total 1600	C 1011	N 288	O 297	S 4	0	0
2	f	194	Total 1600	C 1011	N 288	O 297	S 4	0	0
2	h	194	Total 1600	C 1011	N 288	O 297	S 4	0	0
2	j	194	Total 1600	C 1011	N 288	O 297	S 4	0	0
2	l	194	Total 1600	C 1011	N 288	O 297	S 4	0	0

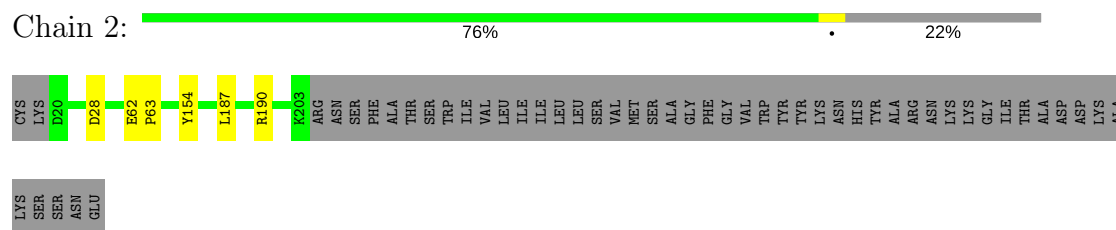
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

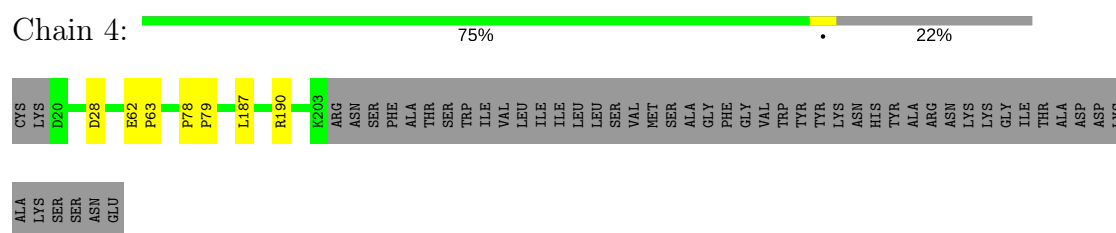
- Molecule 1: Lipoprotein PrgK



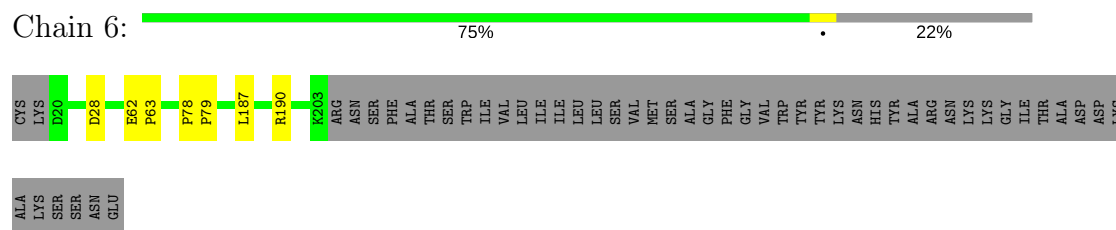
- Molecule 1: Lipoprotein PrgK



- Molecule 1: Lipoprotein PrgK




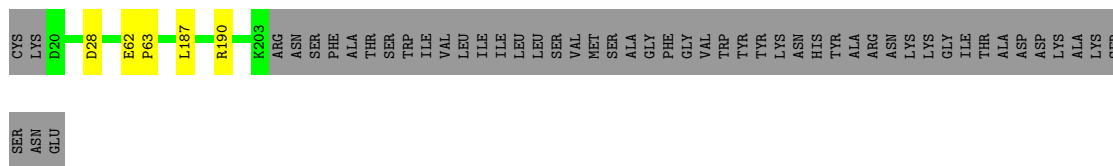
- Molecule 1: Lipoprotein PrgK




- Molecule 1: Lipoprotein PrgK

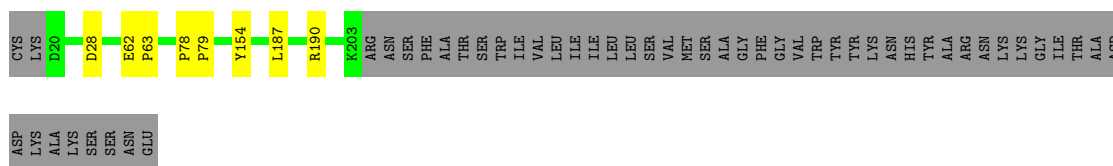


Chain 8:  76% 22%



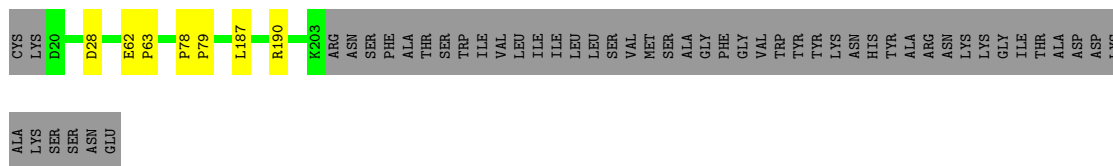
• Molecule 1: Lipoprotein PrgK

Chain B:  75% 22%



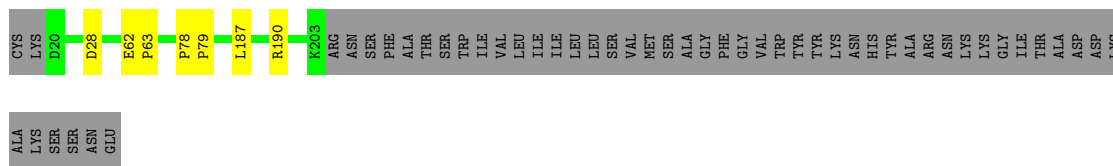
• Molecule 1: Lipoprotein PrgK

Chain D:  75% 22%



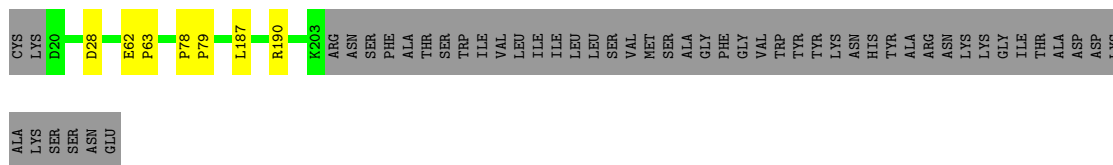
• Molecule 1: Lipoprotein PrgK

Chain F:  75% 22%



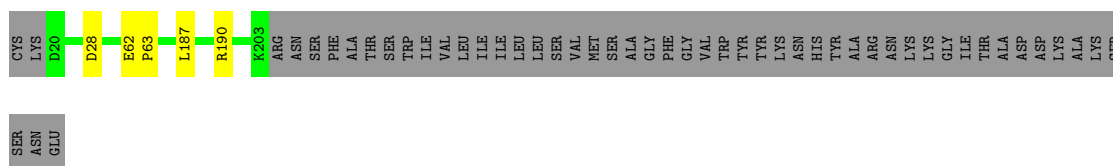
• Molecule 1: Lipoprotein PrgK

Chain H:  75% 22%



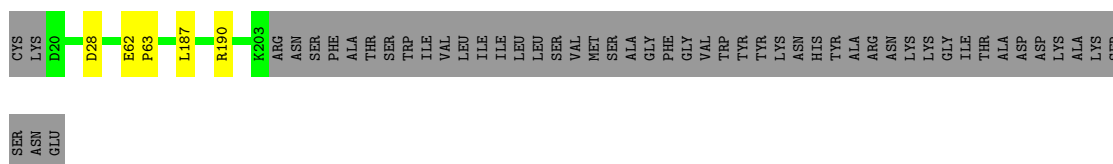
• Molecule 1: Lipoprotein PrgK

Chain J:  76% 22%



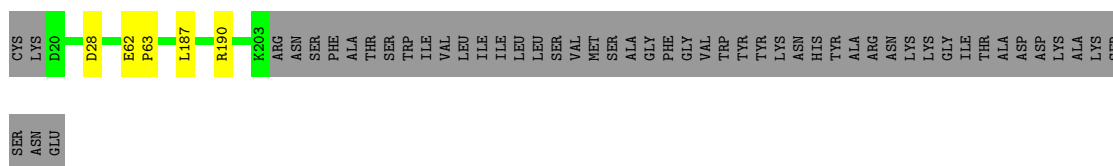
- Molecule 1: Lipoprotein PrgK

Chain L: 76% 22%



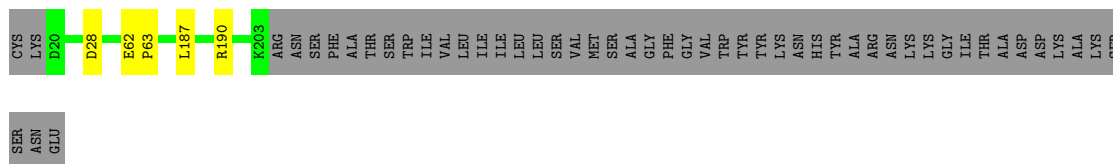
- Molecule 1: Lipoprotein PrgK

Chain N: 76% 22%



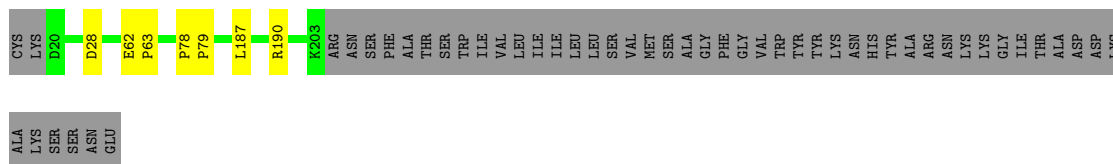
- Molecule 1: Lipoprotein PrgK

Chain P: 76% 22%



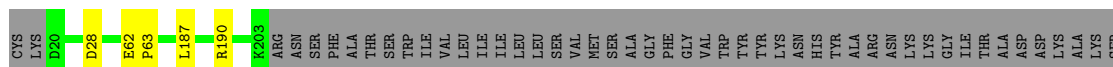
- Molecule 1: Lipoprotein PrgK

Chain R: 75% 22%



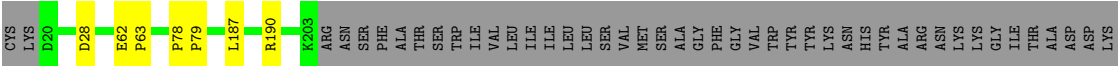
- Molecule 1: Lipoprotein PrgK

Chain T: 76% 22%



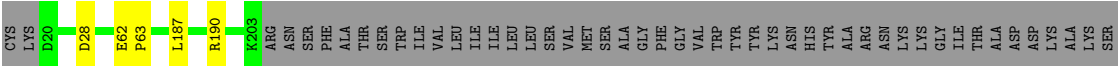
SER  
ASN  
GLU

• Molecule 1: Lipoprotein PrgK



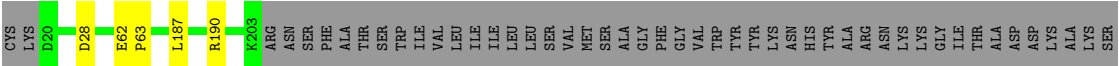
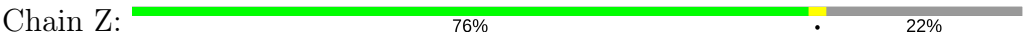
ALA  
LYS  
SER  
SER  
ASN  
GLU

• Molecule 1: Lipoprotein PrgK



SER  
ASN  
GLU

• Molecule 1: Lipoprotein PrgK

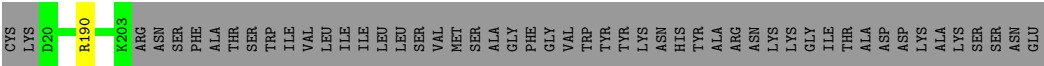


SER  
ASN  
GLU

• Molecule 1: Lipoprotein PrgK

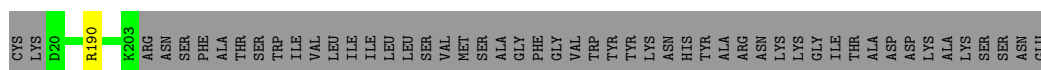


• Molecule 1: Lipoprotein PrgK



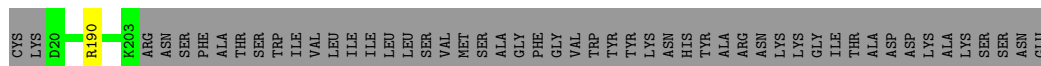
• Molecule 1: Lipoprotein PrgK





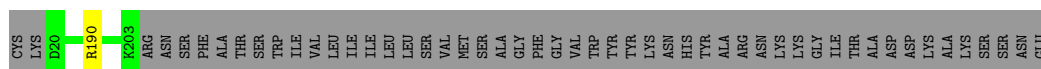
- Molecule 1: Lipoprotein PrgK

Chain g: 78% 22%



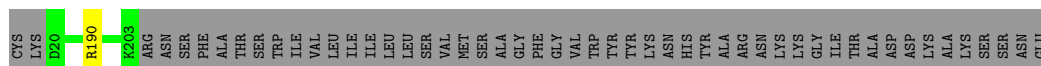
- Molecule 1: Lipoprotein PrgK

Chain i: 78% 22%



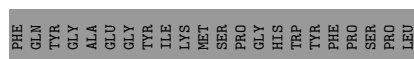
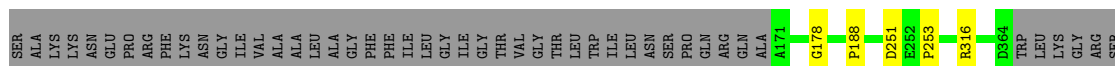
- Molecule 1: Lipoprotein PrgK

Chain k: 78% 22%



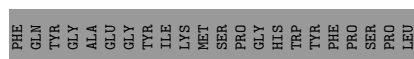
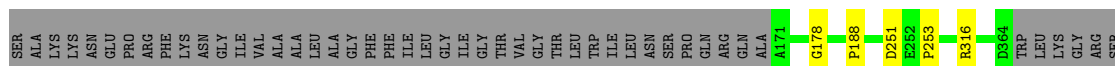
- Molecule 2: Protein PrgH

Chain 1: 72% 26%



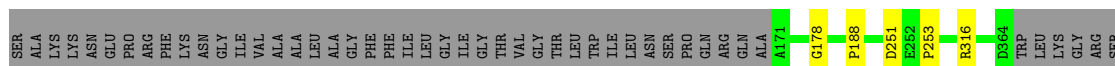
- Molecule 2: Protein PrgH

Chain 3: 72% 26%



- Molecule 2: Protein PrgH

Chain 5: 72% 26%



PHE  
GLN  
TYR  
GLY  
ALA  
GLU  
GLY  
TYR  
ILE  
LYS  
MET  
SER  
PRO  
GLY  
HIS  
TRP  
PHE  
PHE  
PRO  
PRO  
LEU

• Molecule 2: Protein PrgH



SER  
ALA  
LYS  
LYS  
ASN  
GLU  
PRO  
ARG  
PHE  
LYS  
ASN  
GLY  
ILE  
VAL  
ALA  
LEU  
ALA  
GLY  
PHE  
PHE  
ILE  
ILE  
GLY  
THR  
VAL  
GLY  
THR  
THR  
LEU  
TRP  
ILE  
LEU  
ASN  
SER  
PRO  
GLN  
ARG  
GLN  
ALA  
A171  
G178  
P188  
D251  
E252  
P253  
R316  
D364  
TRP  
LEU  
LYS  
GLY  
ARG  
SER

PHE  
GLN  
TYR  
GLY  
ALA  
GLU  
GLY  
TYR  
ILE  
LYS  
MET  
SER  
PRO  
GLY  
HIS  
TRP  
PHE  
PHE  
PRO  
PRO  
LEU

• Molecule 2: Protein PrgH



SER  
ALA  
LYS  
LYS  
ASN  
GLU  
PRO  
ARG  
PHE  
LYS  
ASN  
GLY  
ILE  
VAL  
ALA  
LEU  
ALA  
GLY  
PHE  
PHE  
ILE  
ILE  
GLY  
THR  
VAL  
GLY  
THR  
THR  
LEU  
TRP  
ILE  
LEU  
ASN  
SER  
PRO  
GLN  
ARG  
GLN  
ALA  
A171  
G178  
P188  
D251  
E252  
P253  
R316  
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TRP  
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PHE  
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TYR  
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GLU  
GLY  
TYR  
ILE  
LYS  
MET  
SER  
PRO  
GLY  
HIS  
TRP  
PHE  
PHE  
PRO  
PRO  
LEU

• Molecule 2: Protein PrgH



SER  
ALA  
LYS  
LYS  
ASN  
GLU  
PRO  
ARG  
PHE  
LYS  
ASN  
GLY  
ILE  
VAL  
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ASN  
SER  
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GLN  
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GLN  
ALA  
A171  
G178  
L187  
P188  
D251  
E252  
P253  
R316  
D364  
TRP  
LEU  
LYS  
GLY  
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SER  
PHE  
GLN  
TYR  
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ALA  
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GLY  
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LYS  
MET  
SER  
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GLY  
HIS  
TRP  
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PHE  
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PRO  
LEU

• Molecule 2: Protein PrgH



SER  
ALA  
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ASN  
GLU  
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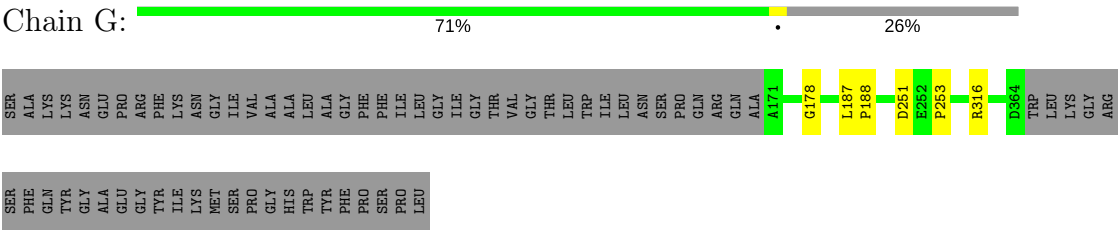
• Molecule 2: Protein PrgH



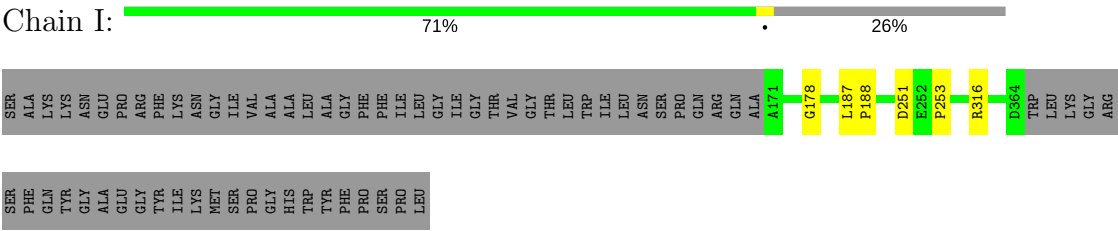
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GLU  
PRO  
ARG  
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PHE  
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LEU  
ASN  
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GLN  
ARG  
GLN  
ALA  
A171  
G178  
L187  
P188  
D251  
E252  
P253  
R316  
D364  
TRP  
LEU  
LYS  
GLY  
ARG

SER  
PHE  
GLN  
TYR  
GLY  
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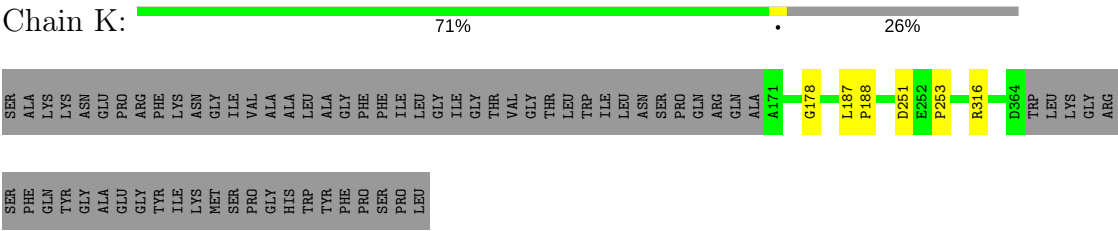
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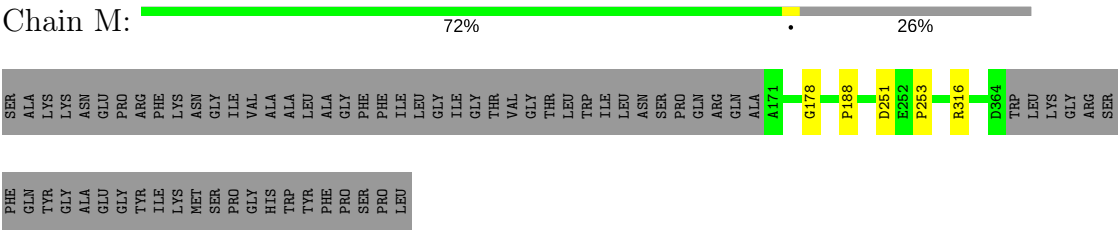
• Molecule 2: Protein PrgH



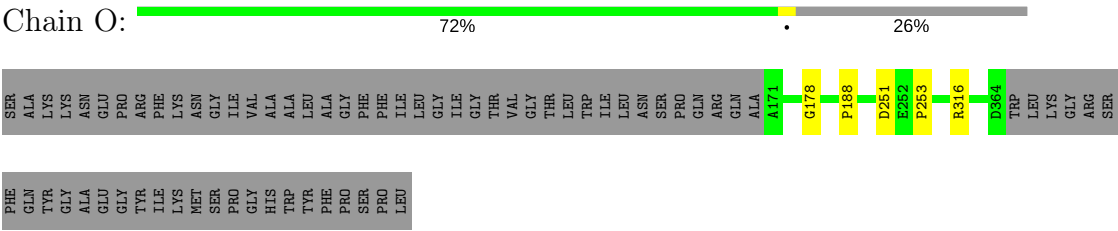
• Molecule 2: Protein PrgH



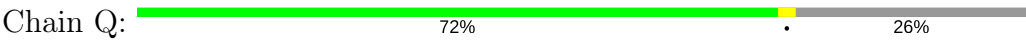
• Molecule 2: Protein PrgH



• Molecule 2: Protein PrgH



• Molecule 2: Protein PrgH



SER	ALA	LYS	LYS	ASN	GLU	PRO	ARG	PHE	LYS	ASN	GLY	ILE	VAL	ALA	ALA	LEU	ALA	GLY	PHE	PHE	ILE	LEU	GLY	ILE	GLY	THR	VAL	GLY	THR	THR	LEU	TRP	TRP	ILE	LEU	ASN	SER	SER	PRO	GLN	GLN	ARG	GLN	ALA	A171	G178	P188	D251	E252	P253	R316	D364	TRP	LEU	LYS	GLY	ARG	SER																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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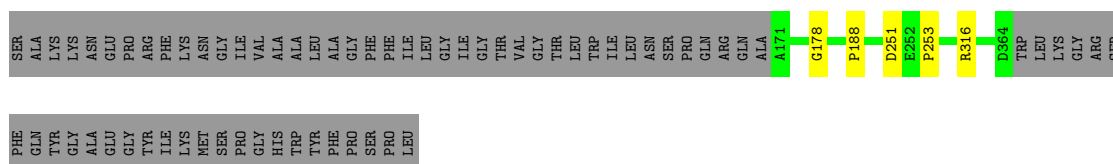
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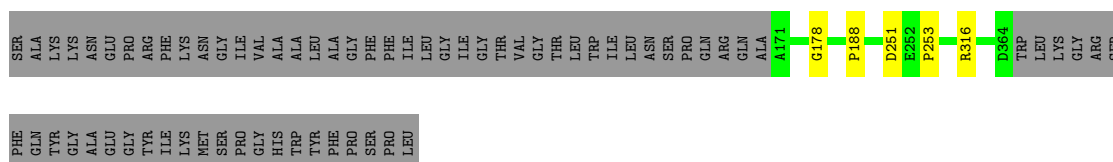
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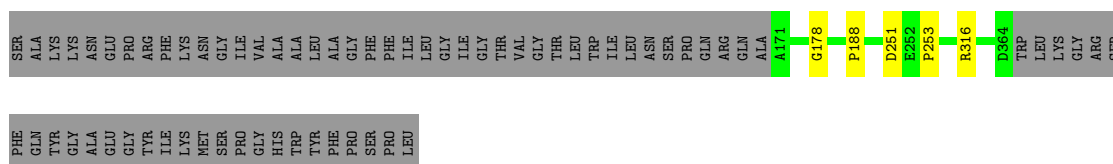




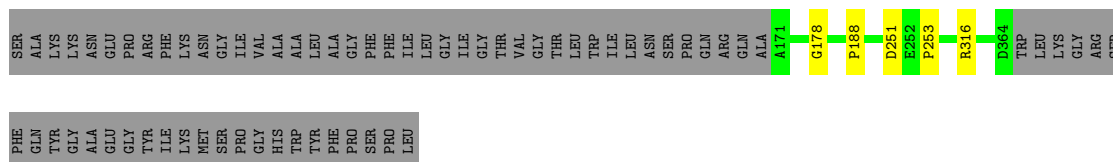
- Molecule 2: Protein PrgH



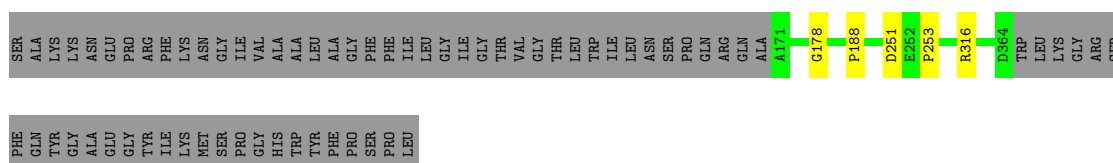
- Molecule 2: Protein PrgH



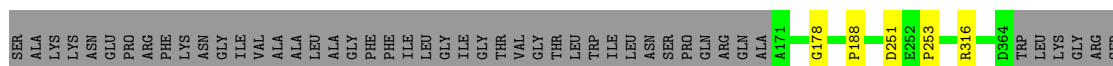
- Molecule 2: Protein PrgH



- Molecule 2: Protein PrgH



- Molecule 2: Protein PrgH





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## 4 Experimental information

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C24	Depositor
Number of particles used	67800	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 ( $e^-/\text{\AA}^2$ )	1.3	Depositor
Minimum defocus (nm)	1300	Depositor
Maximum defocus (nm)	3200	Depositor
Magnification	29240	Depositor
Image detector	GATAN K2 QUANTUM (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	$\# Z  > 2$	RMSZ	$\# Z  > 2$
1	0	0.77	0/1465	0.68	1/1989 (0.1%)
1	2	0.77	0/1465	0.68	2/1989 (0.1%)
1	4	0.77	0/1465	0.68	1/1989 (0.1%)
1	6	0.77	0/1465	0.68	1/1989 (0.1%)
1	8	0.77	0/1465	0.68	1/1989 (0.1%)
1	B	0.77	0/1465	0.68	2/1989 (0.1%)
1	D	0.77	0/1465	0.68	1/1989 (0.1%)
1	F	0.77	0/1465	0.68	1/1989 (0.1%)
1	H	0.77	0/1465	0.68	1/1989 (0.1%)
1	J	0.77	0/1465	0.68	1/1989 (0.1%)
1	L	0.77	0/1465	0.68	1/1989 (0.1%)
1	N	0.77	0/1465	0.68	1/1989 (0.1%)
1	P	0.77	0/1465	0.68	1/1989 (0.1%)
1	R	0.77	0/1465	0.68	1/1989 (0.1%)
1	T	0.77	0/1465	0.68	1/1989 (0.1%)
1	V	0.77	0/1465	0.68	1/1989 (0.1%)
1	X	0.77	0/1465	0.68	1/1989 (0.1%)
1	Z	0.77	0/1465	0.68	1/1989 (0.1%)
1	a	0.77	0/1465	0.68	1/1989 (0.1%)
1	c	0.77	0/1465	0.68	1/1989 (0.1%)
1	e	0.77	0/1465	0.68	1/1989 (0.1%)
1	g	0.77	0/1465	0.68	1/1989 (0.1%)
1	i	0.77	0/1465	0.68	1/1989 (0.1%)
1	k	0.77	0/1465	0.68	1/1989 (0.1%)
2	1	0.77	0/1632	0.70	1/2204 (0.0%)
2	3	0.77	0/1632	0.70	1/2204 (0.0%)
2	5	0.77	0/1632	0.71	1/2204 (0.0%)
2	7	0.77	0/1632	0.70	1/2204 (0.0%)
2	9	0.77	0/1632	0.70	1/2204 (0.0%)
2	A	0.77	0/1632	0.70	1/2204 (0.0%)
2	C	0.77	0/1632	0.70	1/2204 (0.0%)
2	E	0.77	0/1632	0.70	1/2204 (0.0%)
2	G	0.77	0/1632	0.71	1/2204 (0.0%)
2	I	0.77	0/1632	0.70	1/2204 (0.0%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >2	RMSZ	# Z  >2
2	K	0.77	0/1632	0.70	1/2204 (0.0%)
2	M	0.77	0/1632	0.70	1/2204 (0.0%)
2	O	0.77	0/1632	0.70	1/2204 (0.0%)
2	Q	0.77	0/1632	0.70	1/2204 (0.0%)
2	S	0.77	0/1632	0.70	1/2204 (0.0%)
2	U	0.77	0/1632	0.70	1/2204 (0.0%)
2	W	0.76	0/1632	0.70	1/2204 (0.0%)
2	Y	0.77	0/1632	0.70	1/2204 (0.0%)
2	b	0.77	0/1632	0.70	1/2204 (0.0%)
2	d	0.77	0/1632	0.70	1/2204 (0.0%)
2	f	0.77	0/1632	0.70	1/2204 (0.0%)
2	h	0.77	0/1632	0.70	1/2204 (0.0%)
2	j	0.77	0/1632	0.70	1/2204 (0.0%)
2	l	0.77	0/1632	0.70	1/2204 (0.0%)
All	All	0.77	0/74328	0.69	50/100632 (0.0%)

There are no bond length outliers.

The worst 5 of 50 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	Z	190	ARG	NE-CZ-NH2	-5.78	117.41	120.30
1	4	190	ARG	NE-CZ-NH2	-5.78	117.41	120.30
1	N	190	ARG	NE-CZ-NH2	-5.78	117.41	120.30
1	P	190	ARG	NE-CZ-NH2	-5.75	117.42	120.30
1	e	190	ARG	NE-CZ-NH2	-5.74	117.43	120.30

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	0	1437	0	1434	5	0
1	2	1437	0	1434	4	0
1	4	1437	0	1434	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	6	1437	0	1434	5	0
1	8	1437	0	1434	4	0
1	B	1437	0	1434	5	0
1	D	1437	0	1434	5	0
1	F	1437	0	1434	5	0
1	H	1437	0	1434	5	0
1	J	1437	0	1434	4	0
1	L	1437	0	1434	4	0
1	N	1437	0	1434	4	0
1	P	1437	0	1434	4	0
1	R	1437	0	1434	5	0
1	T	1437	0	1434	4	0
1	V	1437	0	1434	5	0
1	X	1437	0	1434	4	0
1	Z	1437	0	1434	4	0
1	a	1437	0	1434	0	0
1	c	1437	0	1434	0	0
1	e	1437	0	1434	0	0
1	g	1437	0	1434	0	0
1	i	1437	0	1434	0	0
1	k	1437	0	1434	0	0
2	1	1600	0	1580	0	0
2	3	1600	0	1580	0	0
2	5	1600	0	1580	0	0
2	7	1600	0	1580	0	0
2	9	1600	0	1580	0	0
2	A	1600	0	1580	2	0
2	C	1600	0	1580	2	0
2	E	1600	0	1580	2	0
2	G	1600	0	1580	2	0
2	I	1600	0	1580	2	0
2	K	1600	0	1580	2	0
2	M	1600	0	1580	0	0
2	O	1600	0	1580	0	0
2	Q	1600	0	1580	0	0
2	S	1600	0	1580	0	0
2	U	1600	0	1580	0	0
2	W	1600	0	1580	0	0
2	Y	1600	0	1580	0	0
2	b	1600	0	1580	0	0
2	d	1600	0	1580	0	0
2	f	1600	0	1580	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	h	1600	0	1580	0	0
2	j	1600	0	1580	0	0
2	l	1600	0	1580	0	0
All	All	72888	0	72336	93	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 1.

The worst 5 of 93 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)
1:8:28:ASP:C	1:8:28:ASP:OD1	2.48	0.52
1:2:187:LEU:HD12	1:2:187:LEU:C	2.31	0.52
2:K:187:LEU:C	2:K:187:LEU:HD12	4.98	0.52
1:R:187:LEU:HD12	1:R:187:LEU:C	2.31	0.51
1:Z:187:LEU:HD12	1:Z:187:LEU:C	2.31	0.51

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	0	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	2	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	4	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	6	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	8	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	B	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	D	182/235 (77%)	175 (96%)	7 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	F	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	H	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	J	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	L	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	N	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	P	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	R	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	T	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	V	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	X	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	Z	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	a	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	c	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	e	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	g	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	i	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
1	k	182/235 (77%)	175 (96%)	7 (4%)	0	100	100
2	1	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	3	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	5	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	7	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	9	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	A	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	C	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	E	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	G	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	I	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	K	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	M	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	O	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	Q	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	S	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	U	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	W	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	Y	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	b	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	d	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	f	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	h	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	j	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
2	l	192/263 (73%)	182 (95%)	6 (3%)	4 (2%)	8	44
All	All	8976/11952 (75%)	8568 (96%)	312 (4%)	96 (1%)	20	57

5 of 96 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	1	251	ASP
2	3	251	ASP
2	5	251	ASP
2	7	251	ASP
2	9	251	ASP

### 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	0	157/200 (78%)	157 (100%)	0	100	100
1	2	157/200 (78%)	157 (100%)	0	100	100
1	4	157/200 (78%)	157 (100%)	0	100	100
1	6	157/200 (78%)	157 (100%)	0	100	100
1	8	157/200 (78%)	157 (100%)	0	100	100
1	B	157/200 (78%)	157 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	D	157/200 (78%)	157 (100%)	0	100	100
1	F	157/200 (78%)	157 (100%)	0	100	100
1	H	157/200 (78%)	157 (100%)	0	100	100
1	J	157/200 (78%)	157 (100%)	0	100	100
1	L	157/200 (78%)	157 (100%)	0	100	100
1	N	157/200 (78%)	157 (100%)	0	100	100
1	P	157/200 (78%)	157 (100%)	0	100	100
1	R	157/200 (78%)	157 (100%)	0	100	100
1	T	157/200 (78%)	157 (100%)	0	100	100
1	V	157/200 (78%)	157 (100%)	0	100	100
1	X	157/200 (78%)	157 (100%)	0	100	100
1	Z	157/200 (78%)	157 (100%)	0	100	100
1	a	157/200 (78%)	157 (100%)	0	100	100
1	c	157/200 (78%)	157 (100%)	0	100	100
1	e	157/200 (78%)	157 (100%)	0	100	100
1	g	157/200 (78%)	157 (100%)	0	100	100
1	i	157/200 (78%)	157 (100%)	0	100	100
1	k	157/200 (78%)	157 (100%)	0	100	100
2	1	167/221 (76%)	167 (100%)	0	100	100
2	3	167/221 (76%)	167 (100%)	0	100	100
2	5	167/221 (76%)	167 (100%)	0	100	100
2	7	167/221 (76%)	167 (100%)	0	100	100
2	9	167/221 (76%)	167 (100%)	0	100	100
2	A	167/221 (76%)	167 (100%)	0	100	100
2	C	167/221 (76%)	167 (100%)	0	100	100
2	E	167/221 (76%)	167 (100%)	0	100	100
2	G	167/221 (76%)	167 (100%)	0	100	100
2	I	167/221 (76%)	167 (100%)	0	100	100
2	K	167/221 (76%)	167 (100%)	0	100	100
2	M	167/221 (76%)	167 (100%)	0	100	100
2	O	167/221 (76%)	167 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	Q	167/221 (76%)	167 (100%)	0	100	100
2	S	167/221 (76%)	167 (100%)	0	100	100
2	U	167/221 (76%)	167 (100%)	0	100	100
2	W	167/221 (76%)	167 (100%)	0	100	100
2	Y	167/221 (76%)	167 (100%)	0	100	100
2	b	167/221 (76%)	167 (100%)	0	100	100
2	d	167/221 (76%)	167 (100%)	0	100	100
2	f	167/221 (76%)	167 (100%)	0	100	100
2	h	167/221 (76%)	167 (100%)	0	100	100
2	j	167/221 (76%)	167 (100%)	0	100	100
2	l	167/221 (76%)	167 (100%)	0	100	100
All	All	7776/10104 (77%)	7776 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

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

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates [i](#)

There are no carbohydrates 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.