



# Full wwPDB X-ray Structure Validation Report ⓘ

May 8, 2017 – 01:45 PM EDT

PDB ID : 5UDC  
Title : Crystal Structure of RSV F A2 Bound to MEDI8897  
Authors : McLellan, J.S.  
Deposited on : 2016-12-26  
Resolution : 3.45 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

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

A user guide is available at

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.7.2 (RC1), CSD as538be (2017)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20029077  
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20029077

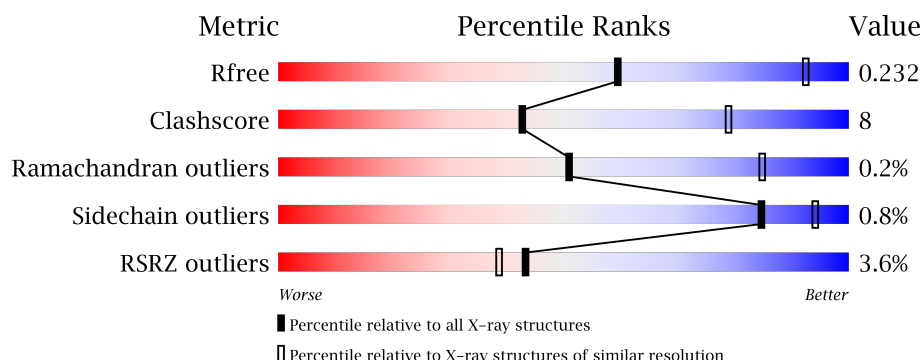
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.45 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)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	100719	1135 (3.56-3.36)
Clashscore	112137	1040 (3.52-3.40)
Ramachandran outliers	110173	1009 (3.52-3.40)
Sidechain outliers	110143	1010 (3.52-3.40)
RSRZ outliers	101464	1017 (3.54-3.38)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower 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  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	B	228	<div> <div style="width: 100%; height: 10px; background-color: red; position: relative;"> <span style="position: absolute; top: -10px; left: 0;">%</span> </div> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 79%; height: 10px; background-color: green;"></div> <div style="width: 16%; height: 10px; background-color: yellow;"></div> <div style="width: 5%; height: 10px; background-color: grey;"></div> </div> </div>
1	E	228	<div> <div style="width: 100%; height: 10px; background-color: red; position: relative;"> <span style="position: absolute; top: -10px; left: 0;">%</span> </div> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 79%; height: 10px; background-color: green;"></div> <div style="width: 17%; height: 10px; background-color: yellow;"></div> <div style="width: 4%; height: 10px; background-color: grey;"></div> </div> </div>
1	H	228	<div> <div style="width: 14%; height: 10px; background-color: red;"></div> <div style="width: 84%; height: 10px; background-color: green;"></div> <div style="width: 11%; height: 10px; background-color: yellow;"></div> <div style="width: 5%; height: 10px; background-color: grey;"></div> </div>
2	C	214	<div> <div style="width: 100%; height: 10px; background-color: red; position: relative;"> <span style="position: absolute; top: -10px; left: 0;">%</span> </div> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 81%; height: 10px; background-color: green;"></div> <div style="width: 18%; height: 10px; background-color: yellow;"></div> <div style="width: 1%; height: 10px; background-color: grey;"></div> </div> </div>
2	G	214	<div> <div style="width: 2%; height: 10px; background-color: red;"></div> <div style="width: 83%; height: 10px; background-color: green;"></div> <div style="width: 16%; height: 10px; background-color: yellow;"></div> </div>

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Mol	Chain	Length	Quality of chain
2	L	214	
3	A	568	
3	D	568	
3	F	568	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
6	MAN	F	610	-	-	-	X
6	MAN	F	611	-	-	-	X

## 2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 20324 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 MEDI8897 Fab Heavy Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	H	217	Total	C	N	O	S	0	0	0
			1618	1025	264	321	8			
1	B	218	Total	C	N	O	S	0	0	0
			1630	1033	265	324	8			
1	E	220	Total	C	N	O	S	0	0	0
			1648	1044	269	327	8			

- Molecule 2 is a protein called MEDI8897 Fab Light Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	L	211	Total	C	N	O	S	0	0	0
			1619	1014	269	331	5			
2	C	211	Total	C	N	O	S	0	0	0
			1619	1014	269	331	5			
2	G	213	Total	C	N	O	S	0	0	0
			1632	1021	271	335	5			

- Molecule 3 is a protein called Fusion glycoprotein F0.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	F	449	Total	C	N	O	S	0	0	0
			3482	2202	573	684	23			
3	A	448	Total	C	N	O	S	0	0	0
			3474	2196	572	683	23			
3	D	448	Total	C	N	O	S	0	0	0
			3473	2197	571	682	23			

There are 186 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	102	ALA	PRO	conflict	UNP P03420
F	155	CYS	SER	engineered mutation	UNP P03420

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Chain	Residue	Modelled	Actual	Comment	Reference
F	190	PHE	SER	engineered mutation	UNP P03420
F	207	LEU	VAL	engineered mutation	UNP P03420
F	290	CYS	SER	engineered mutation	UNP P03420
F	379	VAL	ILE	conflict	UNP P03420
F	447	VAL	MET	conflict	UNP P03420
F	514	SER	-	expression tag	UNP P03420
F	515	ALA	-	expression tag	UNP P03420
F	516	ILE	-	expression tag	UNP P03420
F	517	GLY	-	expression tag	UNP P03420
F	518	GLY	-	expression tag	UNP P03420
F	519	TYR	-	expression tag	UNP P03420
F	520	ILE	-	expression tag	UNP P03420
F	521	PRO	-	expression tag	UNP P03420
F	522	GLU	-	expression tag	UNP P03420
F	523	ALA	-	expression tag	UNP P03420
F	524	PRO	-	expression tag	UNP P03420
F	525	ARG	-	expression tag	UNP P03420
F	526	ASP	-	expression tag	UNP P03420
F	527	GLY	-	expression tag	UNP P03420
F	528	GLN	-	expression tag	UNP P03420
F	529	ALA	-	expression tag	UNP P03420
F	530	TYR	-	expression tag	UNP P03420
F	531	VAL	-	expression tag	UNP P03420
F	532	ARG	-	expression tag	UNP P03420
F	533	LYS	-	expression tag	UNP P03420
F	534	ASP	-	expression tag	UNP P03420
F	535	GLY	-	expression tag	UNP P03420
F	536	GLU	-	expression tag	UNP P03420
F	537	TRP	-	expression tag	UNP P03420
F	538	VAL	-	expression tag	UNP P03420
F	539	LEU	-	expression tag	UNP P03420
F	540	LEU	-	expression tag	UNP P03420
F	541	SER	-	expression tag	UNP P03420
F	542	THR	-	expression tag	UNP P03420
F	543	PHE	-	expression tag	UNP P03420
F	544	LEU	-	expression tag	UNP P03420
F	545	GLY	-	expression tag	UNP P03420
F	546	GLY	-	expression tag	UNP P03420
F	547	LEU	-	expression tag	UNP P03420
F	548	VAL	-	expression tag	UNP P03420
F	549	PRO	-	expression tag	UNP P03420
F	550	ARG	-	expression tag	UNP P03420

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Chain	Residue	Modelled	Actual	Comment	Reference
F	551	GLY	-	expression tag	UNP P03420
F	552	SER	-	expression tag	UNP P03420
F	553	HIS	-	expression tag	UNP P03420
F	554	HIS	-	expression tag	UNP P03420
F	555	HIS	-	expression tag	UNP P03420
F	556	HIS	-	expression tag	UNP P03420
F	557	HIS	-	expression tag	UNP P03420
F	558	HIS	-	expression tag	UNP P03420
F	559	SER	-	expression tag	UNP P03420
F	560	ALA	-	expression tag	UNP P03420
F	561	TRP	-	expression tag	UNP P03420
F	562	SER	-	expression tag	UNP P03420
F	563	HIS	-	expression tag	UNP P03420
F	564	PRO	-	expression tag	UNP P03420
F	565	GLN	-	expression tag	UNP P03420
F	566	PHE	-	expression tag	UNP P03420
F	567	GLU	-	expression tag	UNP P03420
F	568	LYS	-	expression tag	UNP P03420
A	102	ALA	PRO	conflict	UNP P03420
A	155	CYS	SER	engineered mutation	UNP P03420
A	190	PHE	SER	engineered mutation	UNP P03420
A	207	LEU	VAL	engineered mutation	UNP P03420
A	290	CYS	SER	engineered mutation	UNP P03420
A	379	VAL	ILE	conflict	UNP P03420
A	447	VAL	MET	conflict	UNP P03420
A	514	SER	-	expression tag	UNP P03420
A	515	ALA	-	expression tag	UNP P03420
A	516	ILE	-	expression tag	UNP P03420
A	517	GLY	-	expression tag	UNP P03420
A	518	GLY	-	expression tag	UNP P03420
A	519	TYR	-	expression tag	UNP P03420
A	520	ILE	-	expression tag	UNP P03420
A	521	PRO	-	expression tag	UNP P03420
A	522	GLU	-	expression tag	UNP P03420
A	523	ALA	-	expression tag	UNP P03420
A	524	PRO	-	expression tag	UNP P03420
A	525	ARG	-	expression tag	UNP P03420
A	526	ASP	-	expression tag	UNP P03420
A	527	GLY	-	expression tag	UNP P03420
A	528	GLN	-	expression tag	UNP P03420
A	529	ALA	-	expression tag	UNP P03420
A	530	TYR	-	expression tag	UNP P03420

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Chain	Residue	Modelled	Actual	Comment	Reference
A	531	VAL	-	expression tag	UNP P03420
A	532	ARG	-	expression tag	UNP P03420
A	533	LYS	-	expression tag	UNP P03420
A	534	ASP	-	expression tag	UNP P03420
A	535	GLY	-	expression tag	UNP P03420
A	536	GLU	-	expression tag	UNP P03420
A	537	TRP	-	expression tag	UNP P03420
A	538	VAL	-	expression tag	UNP P03420
A	539	LEU	-	expression tag	UNP P03420
A	540	LEU	-	expression tag	UNP P03420
A	541	SER	-	expression tag	UNP P03420
A	542	THR	-	expression tag	UNP P03420
A	543	PHE	-	expression tag	UNP P03420
A	544	LEU	-	expression tag	UNP P03420
A	545	GLY	-	expression tag	UNP P03420
A	546	GLY	-	expression tag	UNP P03420
A	547	LEU	-	expression tag	UNP P03420
A	548	VAL	-	expression tag	UNP P03420
A	549	PRO	-	expression tag	UNP P03420
A	550	ARG	-	expression tag	UNP P03420
A	551	GLY	-	expression tag	UNP P03420
A	552	SER	-	expression tag	UNP P03420
A	553	HIS	-	expression tag	UNP P03420
A	554	HIS	-	expression tag	UNP P03420
A	555	HIS	-	expression tag	UNP P03420
A	556	HIS	-	expression tag	UNP P03420
A	557	HIS	-	expression tag	UNP P03420
A	558	HIS	-	expression tag	UNP P03420
A	559	SER	-	expression tag	UNP P03420
A	560	ALA	-	expression tag	UNP P03420
A	561	TRP	-	expression tag	UNP P03420
A	562	SER	-	expression tag	UNP P03420
A	563	HIS	-	expression tag	UNP P03420
A	564	PRO	-	expression tag	UNP P03420
A	565	GLN	-	expression tag	UNP P03420
A	566	PHE	-	expression tag	UNP P03420
A	567	GLU	-	expression tag	UNP P03420
A	568	LYS	-	expression tag	UNP P03420
D	102	ALA	PRO	conflict	UNP P03420
D	155	CYS	SER	engineered mutation	UNP P03420
D	190	PHE	SER	engineered mutation	UNP P03420
D	207	LEU	VAL	engineered mutation	UNP P03420

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Chain	Residue	Modelled	Actual	Comment	Reference
D	290	CYS	SER	engineered mutation	UNP P03420
D	379	VAL	ILE	conflict	UNP P03420
D	447	VAL	MET	conflict	UNP P03420
D	514	SER	-	expression tag	UNP P03420
D	515	ALA	-	expression tag	UNP P03420
D	516	ILE	-	expression tag	UNP P03420
D	517	GLY	-	expression tag	UNP P03420
D	518	GLY	-	expression tag	UNP P03420
D	519	TYR	-	expression tag	UNP P03420
D	520	ILE	-	expression tag	UNP P03420
D	521	PRO	-	expression tag	UNP P03420
D	522	GLU	-	expression tag	UNP P03420
D	523	ALA	-	expression tag	UNP P03420
D	524	PRO	-	expression tag	UNP P03420
D	525	ARG	-	expression tag	UNP P03420
D	526	ASP	-	expression tag	UNP P03420
D	527	GLY	-	expression tag	UNP P03420
D	528	GLN	-	expression tag	UNP P03420
D	529	ALA	-	expression tag	UNP P03420
D	530	TYR	-	expression tag	UNP P03420
D	531	VAL	-	expression tag	UNP P03420
D	532	ARG	-	expression tag	UNP P03420
D	533	LYS	-	expression tag	UNP P03420
D	534	ASP	-	expression tag	UNP P03420
D	535	GLY	-	expression tag	UNP P03420
D	536	GLU	-	expression tag	UNP P03420
D	537	TRP	-	expression tag	UNP P03420
D	538	VAL	-	expression tag	UNP P03420
D	539	LEU	-	expression tag	UNP P03420
D	540	LEU	-	expression tag	UNP P03420
D	541	SER	-	expression tag	UNP P03420
D	542	THR	-	expression tag	UNP P03420
D	543	PHE	-	expression tag	UNP P03420
D	544	LEU	-	expression tag	UNP P03420
D	545	GLY	-	expression tag	UNP P03420
D	546	GLY	-	expression tag	UNP P03420
D	547	LEU	-	expression tag	UNP P03420
D	548	VAL	-	expression tag	UNP P03420
D	549	PRO	-	expression tag	UNP P03420
D	550	ARG	-	expression tag	UNP P03420
D	551	GLY	-	expression tag	UNP P03420
D	552	SER	-	expression tag	UNP P03420

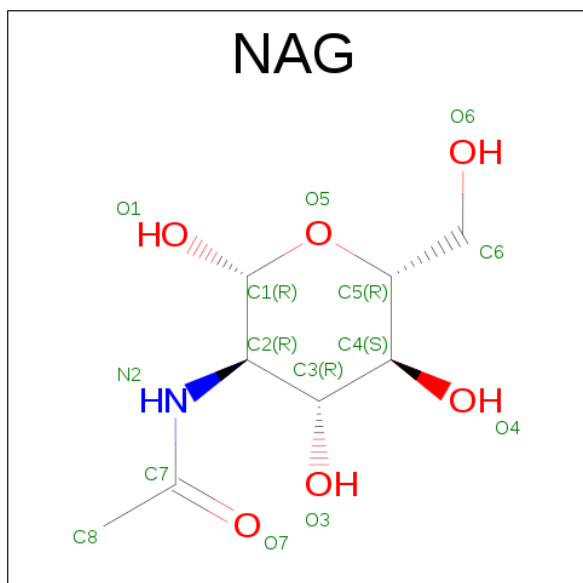
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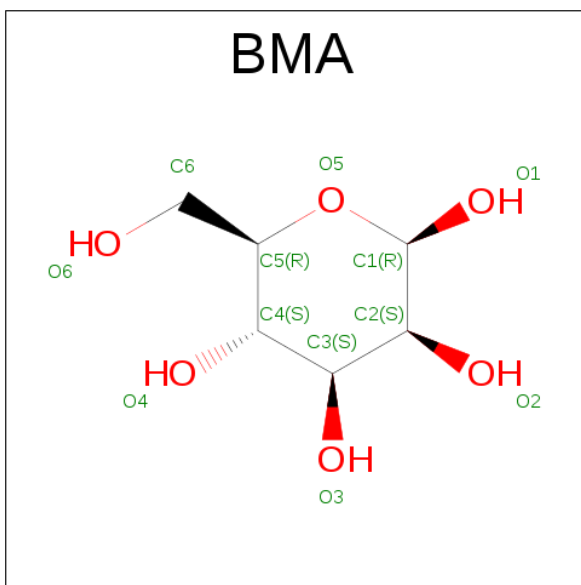
Chain	Residue	Modelled	Actual	Comment	Reference
D	553	HIS	-	expression tag	UNP P03420
D	554	HIS	-	expression tag	UNP P03420
D	555	HIS	-	expression tag	UNP P03420
D	556	HIS	-	expression tag	UNP P03420
D	557	HIS	-	expression tag	UNP P03420
D	558	HIS	-	expression tag	UNP P03420
D	559	SER	-	expression tag	UNP P03420
D	560	ALA	-	expression tag	UNP P03420
D	561	TRP	-	expression tag	UNP P03420
D	562	SER	-	expression tag	UNP P03420
D	563	HIS	-	expression tag	UNP P03420
D	564	PRO	-	expression tag	UNP P03420
D	565	GLN	-	expression tag	UNP P03420
D	566	PHE	-	expression tag	UNP P03420
D	567	GLU	-	expression tag	UNP P03420
D	568	LYS	-	expression tag	UNP P03420

- Molecule 4 is N-ACETYL-D-GLUCOSAMINE (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



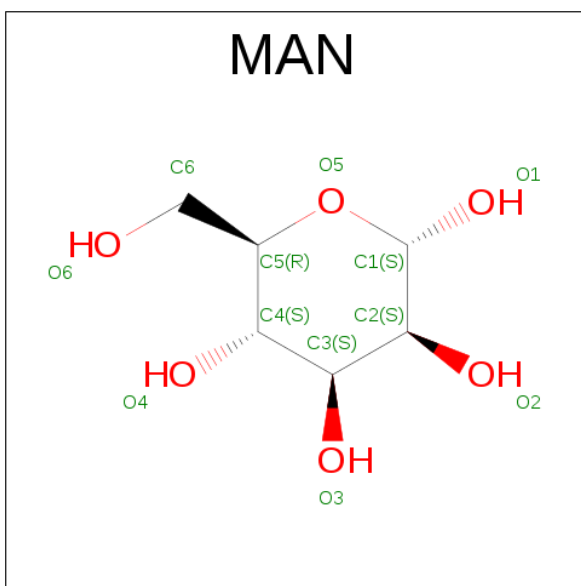
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	F	1	Total	C	N	O	0	0
			14	8	1	5		
4	F	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 5 is BETA-D-MANNOSE (three-letter code: BMA) (formula:  $C_6H_{12}O_6$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	F	1	Total	C	O	0	0
			11	6	5		

- Molecule 6 is ALPHA-D-MANNOSE (three-letter code: MAN) (formula: C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	F	1	Total	C	O	0	0
			11	6	5		
6	F	1	Total	C	O	0	0
			11	6	5		
6	F	1	Total	C	O	0	0
			11	6	5		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	F	1	Total	C	O	0	0
			11	6	5		
6	F	1	Total	C	O	0	0
			11	6	5		
6	F	1	Total	C	O	0	0
			11	6	5		
6	F	1	Total	C	O	0	0
			11	6	5		
6	F	1	Total	C	O	0	0
			11	6	5		

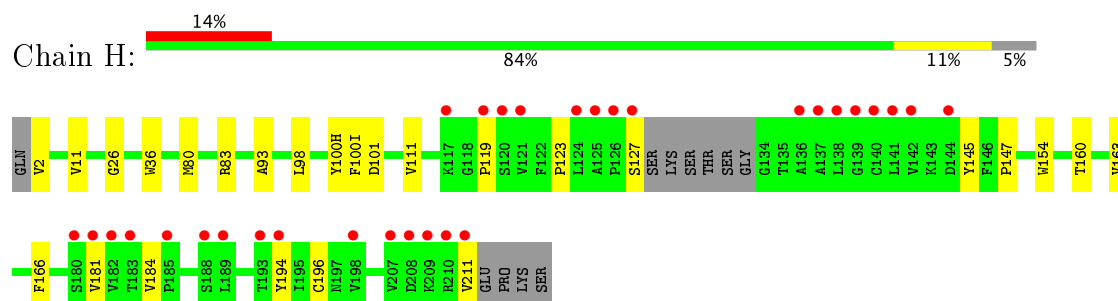
- Molecule 7 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total	Cl	0	0
			1	1		
7	F	1	Total	Cl	0	0
			1	1		

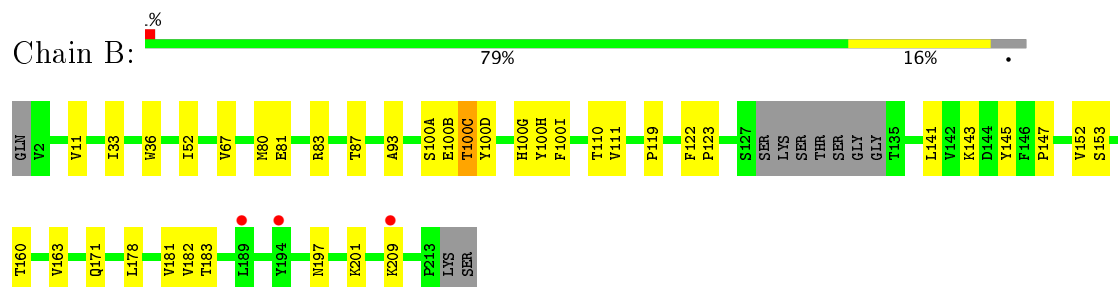
### 3 Residue-property plots [i](#)

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 and electron density. 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. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). 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.

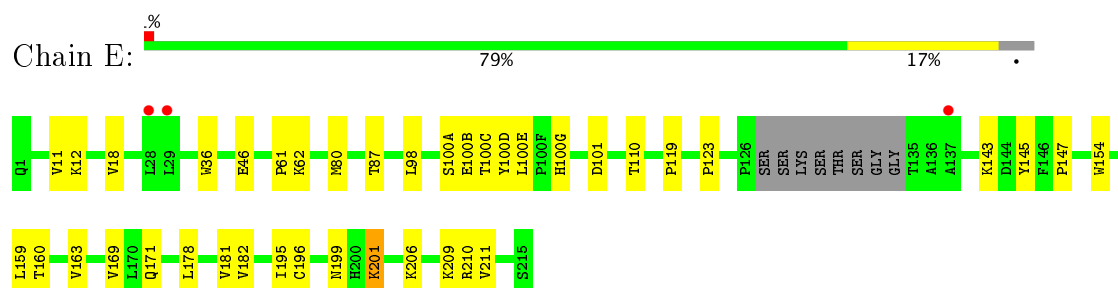
#### • Molecule 1: MEDI8897 Fab Heavy Chain



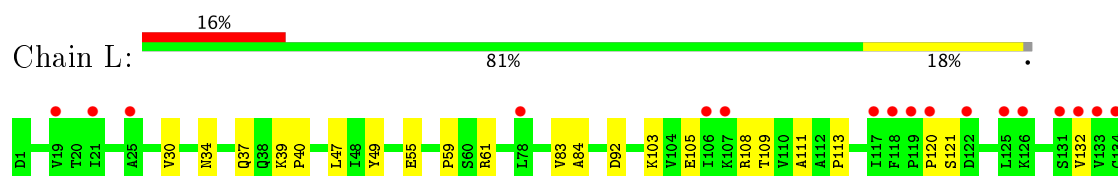
#### • Molecule 1: MEDI8897 Fab Heavy Chain



#### • Molecule 1: MEDI8897 Fab Heavy Chain

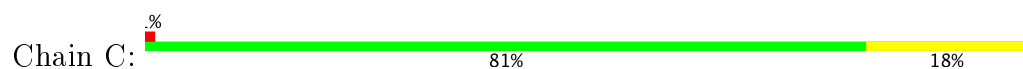


#### • Molecule 2: MEDI8897 Fab Light Chain

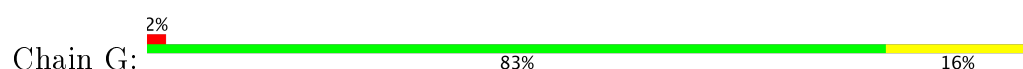




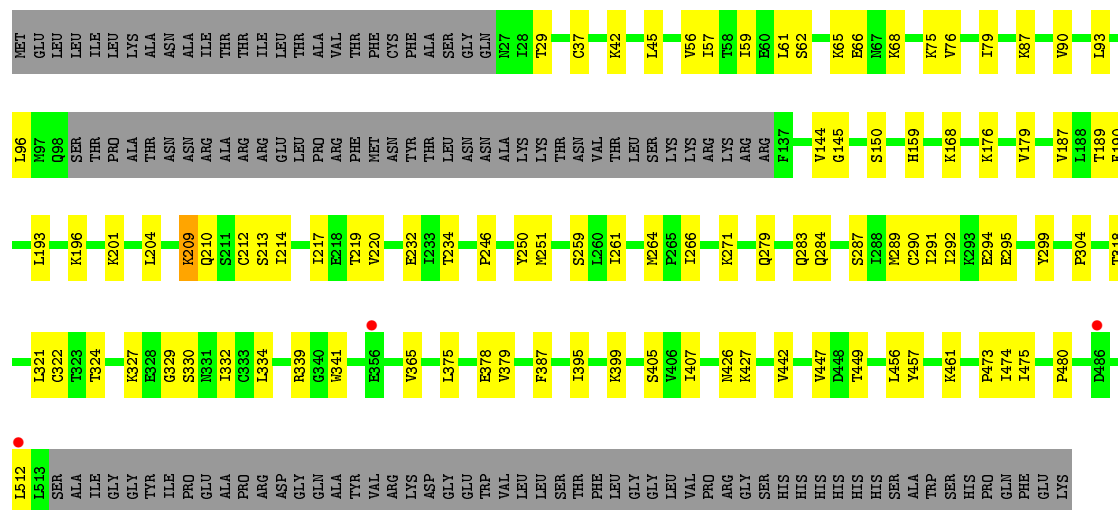
• Molecule 2: MEDI8897 Fab Light Chain



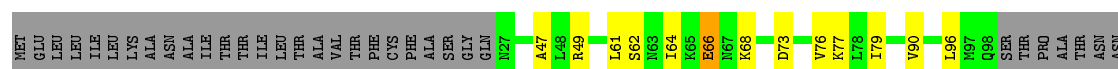
• Molecule 2: MEDI8897 Fab Light Chain



• Molecule 3: Fusion glycoprotein F0



• Molecule 3: Fusion glycoprotein F0





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	103.78Å 126.31Å 162.31Å 90.00° 102.56° 90.00°	Depositor
Resolution (Å)	43.14 – 3.45 43.14 – 3.45	Depositor EDS
% Data completeness (in resolution range)	98.9 (43.14-3.45) 98.9 (43.14-3.45)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.17 (at 3.48Å)	Xtriage
Refinement program	PHENIX	Depositor
R, $R_{free}$	0.175 , 0.232 0.174 , 0.232	Depositor DCC
$R_{free}$ test set	2647 reflections (4.96%)	DCC
Wilson B-factor (Å <sup>2</sup> )	111.2	Xtriage
Anisotropy	0.582	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.27 , 72.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	20324	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	138.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.19% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: CL, BMA, NAG, MAN

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	B	0.33	0/1670	0.56	0/2285
1	E	0.37	0/1688	0.60	1/2308 (0.0%)
1	H	0.34	0/1657	0.60	0/2266
2	C	0.30	0/1652	0.56	0/2247
2	G	0.33	0/1665	0.56	0/2264
2	L	0.29	0/1652	0.53	0/2247
3	A	0.37	0/3524	0.58	0/4773
3	D	0.38	0/3523	0.59	0/4772
3	F	0.43	0/3532	0.64	0/4784
All	All	0.36	0/20563	0.59	1/27946 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
1	E	178	LEU	CA-CB-CG	5.50	127.94	115.30

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1630	0	1590	25	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	E	1648	0	1614	27	0
1	H	1618	0	1580	19	0
2	C	1619	0	1579	24	0
2	G	1632	0	1588	21	0
2	L	1619	0	1579	24	0
3	A	3474	0	3515	66	0
3	D	3473	0	3518	76	0
3	F	3482	0	3525	69	0
4	F	28	0	24	0	0
5	F	11	0	8	2	0
6	F	88	0	74	2	0
7	A	1	0	0	0	0
7	F	1	0	0	0	0
All	All	20324	0	20194	314	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 8.

All (314) 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)
3:A:66:GLU:OE2	3:A:68:LYS:HG3	1.10	1.22
3:A:66:GLU:OE2	3:A:68:LYS:CG	2.01	1.09
3:D:407:ILE:HD11	3:D:457:TYR:HB3	1.44	1.00
3:F:214:ILE:HD11	3:F:219:THR:HB	1.47	0.94
3:A:246:PRO:HB3	3:A:283:GLN:HA	1.56	0.87
3:F:387:PHE:HE2	3:F:474:ILE:HD12	1.49	0.77
2:C:120:PRO:HD3	2:C:132:VAL:HG22	1.67	0.76
3:D:64:ILE:HG23	3:D:87:LYS:HE2	1.68	0.73
3:F:332:ILE:HG22	3:F:475:ILE:HD11	1.70	0.73
3:A:310:ASP:OD1	3:A:364:ARG:NH1	2.22	0.73
1:B:123:PRO:HD3	1:B:209:LYS:HE2	1.69	0.72
2:L:151:ASP:OD1	2:L:189:HIS:ND1	2.22	0.72
3:A:66:GLU:HG2	3:A:68:LYS:HG2	1.72	0.71
2:C:92:ASP:O	3:A:201:LYS:NZ	2.16	0.71
2:C:108:ARG:HD2	2:C:171:SER:HB2	1.74	0.70
3:D:387:PHE:HE2	3:D:474:ILE:HD11	1.56	0.70
3:A:387:PHE:HE2	3:A:474:ILE:HD12	1.57	0.69
3:A:66:GLU:CD	3:A:68:LYS:HG3	2.11	0.69
3:D:54:THR:O	3:D:187:VAL:HG23	1.92	0.68
3:F:145:GLY:HA2	3:D:407:ILE:HD12	1.77	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:L:37:GLN:HB2	2:L:47:LEU:HD11	1.76	0.67
3:F:76:VAL:HG22	3:F:213:SER:HA	1.78	0.66
3:D:61:LEU:HD13	3:D:90:VAL:HG22	1.76	0.65
3:D:246:PRO:HB3	3:D:283:GLN:HA	1.77	0.65
3:F:168:LYS:HZ1	3:F:295:GLU:H	1.45	0.65
3:F:442:VAL:HG11	3:F:447:VAL:HG21	1.78	0.65
3:A:250:TYR:OH	3:D:235:ARG:NH1	2.30	0.64
2:L:120:PRO:HD3	2:L:132:VAL:HG22	1.78	0.64
3:D:405:SER:HB3	3:D:457:TYR:CE2	2.32	0.64
1:H:100(H):TYR:HB3	2:L:34:ASN:ND2	2.13	0.64
3:F:387:PHE:CE2	3:F:474:ILE:HD12	2.33	0.63
3:D:261:ILE:HD13	3:D:274:MET:HB3	1.81	0.63
1:B:163:VAL:HG12	1:B:182:VAL:HB	1.81	0.63
2:L:137:ASN:OD1	2:L:138:ASN:ND2	2.31	0.63
3:A:332:ILE:HG22	3:A:475:ILE:HD11	1.79	0.62
2:C:37:GLN:HB2	2:C:47:LEU:HD11	1.82	0.62
3:D:167:ILE:HG23	3:D:189:THR:HG21	1.81	0.62
1:E:143:LYS:NZ	1:E:171:GLN:OE1	2.33	0.62
3:A:62:SER:HB3	3:A:196:LYS:HA	1.82	0.61
3:D:332:ILE:HG22	3:D:475:ILE:HD11	1.81	0.61
1:E:123:PRO:HD3	1:E:209:LYS:HE2	1.81	0.61
1:E:181:VAL:HG11	2:G:135:LEU:HD22	1.84	0.60
3:F:332:ILE:HD11	3:F:480:PRO:HA	1.82	0.60
2:L:55:GLU:OE2	3:F:209:LYS:NZ	2.29	0.60
2:L:113:PRO:HB3	2:L:139:PHE:HB3	1.83	0.60
3:A:318:THR:O	3:A:339:ARG:NH2	2.32	0.60
2:C:161:GLU:HB3	2:C:177:SER:HB3	1.82	0.59
3:F:375:LEU:HB3	3:F:379:VAL:HG21	1.84	0.59
3:A:442:VAL:HG11	3:A:447:VAL:HG21	1.85	0.59
1:B:119:PRO:HB3	1:B:145:TYR:HB3	1.84	0.59
3:A:405:SER:HB3	3:A:457:TYR:CE2	2.38	0.59
2:G:137:ASN:OD1	2:G:138:ASN:ND2	2.36	0.59
1:H:2:VAL:N	6:F:605:MAN:HO6	1.99	0.59
3:F:334:LEU:HD11	3:F:395:ILE:HD12	1.84	0.59
2:G:142:ARG:NH2	2:G:163:VAL:HG11	2.18	0.59
2:G:33:LEU:HD22	2:G:71:PHE:CG	2.38	0.59
3:D:482:VAL:HG21	3:D:503:LEU:HD13	1.85	0.58
1:B:100(D):TYR:CZ	1:B:100(G):HIS:HE1	2.21	0.58
3:D:334:LEU:HD11	3:D:395:ILE:HB	1.86	0.58
3:D:45:LEU:HD23	3:D:310:ASP:HA	1.85	0.57
1:H:119:PRO:HB3	1:H:145:TYR:HB3	1.85	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:449:THR:HB	3:A:456:LEU:HD11	1.86	0.57
3:D:76:VAL:HG22	3:D:213:SER:HA	1.86	0.57
3:A:387:PHE:CE2	3:A:474:ILE:HD12	2.37	0.57
3:A:76:VAL:HG22	3:A:213:SER:HA	1.86	0.56
2:C:108:ARG:HH12	2:C:111:ALA:HB2	1.69	0.56
3:F:284:GLN:HB2	3:F:304:PRO:HG3	1.87	0.56
3:A:178:VAL:HG12	3:A:188:LEU:HD12	1.86	0.56
3:F:210:GLN:HB3	3:F:213:SER:O	2.05	0.56
1:E:101:ASP:HB2	3:D:209:LYS:NZ	2.21	0.56
1:B:100(A):SER:O	1:B:100(D):TYR:HB2	2.06	0.56
2:G:108:ARG:HD2	2:G:171:SER:HB2	1.86	0.55
3:D:400:THR:HG22	3:D:402:VAL:HG23	1.87	0.55
1:H:36:TRP:CE2	1:H:80:MET:HB2	2.40	0.55
3:A:66:GLU:CG	3:A:68:LYS:HG2	2.35	0.55
3:F:512:LEU:HD13	3:D:512:LEU:HD21	1.89	0.55
3:F:168:LYS:NZ	3:F:294:GLU:HB3	2.22	0.55
2:G:151:ASP:HA	2:G:191:VAL:HG13	1.88	0.55
1:B:201:LYS:NZ	1:B:201:LYS:O	2.26	0.55
3:F:96:LEU:HD13	3:D:279:GLN:HG2	1.88	0.55
1:H:83:ARG:O	1:H:111:VAL:HG11	2.06	0.55
3:A:284:GLN:HB2	3:A:304:PRO:HG3	1.88	0.55
2:L:108:ARG:HH12	2:L:111:ALA:HB2	1.72	0.55
3:F:261:ILE:HA	3:F:264:MET:HE2	1.88	0.55
3:A:267:THR:HB	3:A:270:GLN:H	1.71	0.54
1:B:83:ARG:O	1:B:111:VAL:HG11	2.08	0.54
3:D:171:LEU:HD13	3:D:191:LYS:HB2	1.88	0.54
3:F:318:THR:O	3:F:339:ARG:NH2	2.41	0.54
2:G:92:ASP:O	3:D:201:LYS:HE3	2.08	0.54
3:A:214:ILE:HD12	3:A:219:THR:HB	1.90	0.54
3:D:375:LEU:HB3	3:D:379:VAL:HG21	1.91	0.53
3:D:28:ILE:HG23	3:D:410:LEU:HD11	1.91	0.53
1:E:11:VAL:HB	1:E:147:PRO:HG3	1.91	0.53
3:F:159:HIS:CE1	3:F:291:ILE:HG23	2.44	0.53
3:F:93:LEU:HB3	3:F:292:ILE:HD11	1.89	0.53
3:F:62:SER:HB3	3:F:196:LYS:HA	1.90	0.53
2:G:37:GLN:HB2	2:G:47:LEU:HD11	1.91	0.53
3:A:49:ARG:HE	3:A:368:ASP:CG	2.12	0.53
2:C:33:LEU:HD22	2:C:71:PHE:CG	2.44	0.53
1:E:195:ILE:HG23	1:E:210:ARG:HG2	1.91	0.53
3:D:379:VAL:HG22	3:D:391:TYR:CZ	2.45	0.52
1:E:201:LYS:O	1:E:201:LYS:HD2	2.08	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:512:LEU:HD21	3:D:512:LEU:HD13	1.90	0.52
2:C:197:THR:HG22	2:C:204:PRO:HB3	1.92	0.52
2:L:105:GLU:OE1	2:L:173:TYR:OH	2.28	0.52
3:A:214:ILE:HD11	3:A:220:VAL:HG23	1.90	0.52
1:B:143:LYS:NZ	1:B:171:GLN:OE1	2.40	0.51
2:C:161:GLU:HA	2:C:177:SER:HA	1.93	0.51
3:F:168:LYS:HZ2	3:F:294:GLU:HB3	1.76	0.51
3:F:56:VAL:HG23	3:F:187:VAL:HG11	1.92	0.51
3:F:61:LEU:HD13	3:F:90:VAL:HG22	1.92	0.51
1:B:100(A):SER:HA	3:A:64:ILE:HA	1.93	0.51
3:F:144:VAL:CG2	3:D:406:VAL:HG13	2.40	0.51
3:A:266:ILE:HG13	3:A:271:LYS:HG3	1.93	0.51
3:A:264:MET:HE2	3:A:266:ILE:HD13	1.93	0.51
1:E:195:ILE:HD12	1:E:210:ARG:HG2	1.93	0.51
3:F:29:THR:OG1	3:F:42:LYS:HG3	2.11	0.51
2:G:108:ARG:HH12	2:G:111:ALA:HB2	1.76	0.51
2:C:4:MET:HB2	2:C:99:GLY:HA2	1.92	0.50
3:D:381:LEU:HA	3:D:384:VAL:HG22	1.92	0.50
3:D:64:ILE:HD13	3:D:83:LEU:HD21	1.93	0.50
3:A:399:LYS:HB3	3:D:494:GLN:NE2	2.27	0.50
3:A:338:ASP:O	3:A:342:TYR:OH	2.20	0.50
2:C:186:TYR:O	2:C:192:TYR:OH	2.30	0.50
3:A:73:ASP:HB3	3:A:76:VAL:HB	1.94	0.50
3:F:341:TRP:CZ3	3:F:365:VAL:HG21	2.46	0.50
3:F:426:ASN:OD1	3:F:427:LYS:N	2.45	0.50
2:G:186:TYR:O	2:G:192:TYR:OH	2.30	0.50
2:L:49:TYR:CZ	3:F:209:LYS:HG2	2.47	0.50
3:D:49:ARG:HE	3:D:368:ASP:CG	2.15	0.49
1:E:163:VAL:HG12	1:E:182:VAL:HB	1.94	0.49
3:A:145:GLY:HA3	3:A:370:MET:SD	2.52	0.49
3:D:148:ILE:HD13	3:D:243:VAL:HG11	1.94	0.49
2:G:30:VAL:O	2:G:68:GLY:N	2.44	0.49
1:B:11:VAL:HB	1:B:147:PRO:HG3	1.94	0.49
3:F:251:MET:HG2	3:F:287:SER:OG	2.11	0.49
1:H:123:PRO:O	2:L:121:SER:OG	2.29	0.49
3:A:290:CYS:SG	3:A:300:VAL:HG23	2.52	0.49
3:D:64:ILE:HG23	3:D:87:LYS:CE	2.40	0.49
3:F:217:ILE:O	3:F:220:VAL:HG12	2.12	0.49
3:A:47:ALA:HB2	3:A:364:ARG:HD2	1.95	0.49
1:E:119:PRO:HB3	1:E:145:TYR:HB3	1.94	0.49
1:E:46:GLU:OE2	1:E:62:LYS:HD3	2.13	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:L:92:ASP:O	3:F:201:LYS:HE2	2.12	0.49
3:A:332:ILE:HD12	3:A:483:PHE:CD2	2.48	0.49
2:C:142:ARG:CZ	2:C:163:VAL:HG11	2.42	0.49
3:F:37:CYS:HB2	3:F:321:LEU:HD13	1.95	0.49
3:F:405:SER:HB3	3:F:457:TYR:CE1	2.48	0.49
3:D:266:ILE:HG13	3:D:271:LYS:HG3	1.95	0.49
3:F:266:ILE:HG13	3:F:271:LYS:HG3	1.95	0.49
2:L:59:PRO:HB2	2:L:61:ARG:HG2	1.95	0.49
3:F:324:THR:HG22	3:F:324:THR:O	2.12	0.48
3:A:61:LEU:HD13	3:A:90:VAL:HG22	1.95	0.48
1:B:87:THR:OG1	1:B:111:VAL:HG12	2.13	0.48
2:C:146:VAL:HG22	2:C:196:VAL:HG22	1.94	0.48
3:D:352:PHE:CE2	3:D:372:SER:HB3	2.49	0.48
3:D:79:ILE:O	3:D:83:LEU:HB2	2.14	0.48
3:F:407:ILE:HD11	3:F:457:TYR:HB3	1.96	0.48
3:A:426:ASN:OD1	3:A:427:LYS:N	2.47	0.48
3:D:320:PRO:HA	3:D:335:THR:OG1	2.13	0.48
2:G:120:PRO:HD3	2:G:132:VAL:HG22	1.94	0.48
1:H:93:ALA:HB1	1:H:100(I):PHE:HB3	1.96	0.48
2:G:155:GLN:HB3	2:G:158:ASN:HD21	1.79	0.47
3:A:406:VAL:HG13	3:D:144:VAL:HB	1.95	0.47
3:D:376:PRO:O	3:D:379:VAL:HG23	2.15	0.47
1:E:101:ASP:HB2	3:D:209:LYS:HZ3	1.80	0.47
2:C:121:SER:HB2	2:C:124:GLN:H	1.78	0.47
3:A:329:GLY:O	3:A:399:LYS:HE3	2.15	0.47
1:B:122:PHE:HB3	2:C:121:SER:OG	2.15	0.47
1:B:36:TRP:CE2	1:B:80:MET:HB2	2.49	0.47
3:D:85:LYS:HB2	3:D:85:LYS:HE3	1.61	0.47
2:G:33:LEU:HD22	2:G:71:PHE:CD2	2.49	0.47
2:L:166:GLN:HG2	2:L:171:SER:HA	1.96	0.47
3:A:314:TRP:CE2	3:A:342:TYR:HB2	2.49	0.47
2:L:103:LYS:HE2	2:L:105:GLU:OE2	2.14	0.47
1:E:169:VAL:HG21	2:G:160:GLN:HB3	1.96	0.47
1:H:26:GLY:O	5:F:603:BMA:H3	2.15	0.47
3:F:65:LYS:HG3	3:F:66:GLU:HG2	1.97	0.46
1:H:11:VAL:HB	1:H:147:PRO:HG3	1.97	0.46
1:B:181:VAL:HG11	2:C:135:LEU:HD22	1.96	0.46
3:D:338:ASP:HB2	3:D:342:TYR:OH	2.16	0.46
3:F:327:LYS:HB2	3:F:330:SER:OG	2.15	0.46
3:A:251:MET:HG2	3:A:287:SER:OG	2.16	0.46
1:H:101:ASP:HB2	3:F:209:LYS:HZ2	1.80	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:445:LYS:NZ	3:A:464:GLY:O	2.39	0.46
3:A:210:GLN:HB2	3:A:213:SER:O	2.16	0.46
3:A:426:ASN:HB3	3:A:429:ARG:HB2	1.96	0.46
3:F:232:GLU:HG2	3:F:250:TYR:CE2	2.50	0.46
3:F:246:PRO:HB3	3:F:283:GLN:HA	1.97	0.46
3:A:405:SER:HB2	3:A:452:VAL:HG21	1.97	0.46
3:F:204:LEU:HA	3:F:204:LEU:HD23	1.67	0.46
3:F:59:ILE:HG23	3:F:193:LEU:HB3	1.98	0.46
3:D:76:VAL:CG2	3:D:213:SER:HA	2.44	0.46
3:D:217:ILE:O	3:D:220:VAL:HG12	2.16	0.46
1:H:154:TRP:CZ3	1:H:196:CYS:HB3	2.50	0.46
3:F:93:LEU:HD21	3:F:234:THR:HA	1.98	0.45
1:E:98:LEU:N	3:D:208:ASN:OD1	2.42	0.45
1:E:160:THR:O	1:E:163:VAL:HG22	2.16	0.45
3:F:93:LEU:HD22	3:F:289:MET:CE	2.46	0.45
3:D:251:MET:HG3	3:D:299:TYR:CE2	2.51	0.45
3:D:334:LEU:HD11	3:D:395:ILE:HD12	1.97	0.45
3:F:329:GLY:O	3:F:399:LYS:HE3	2.17	0.45
3:F:261:ILE:HA	3:F:264:MET:CE	2.47	0.45
1:B:100(B):GLU:O	1:B:100(C):THR:OG1	2.18	0.45
3:A:252:LEU:HD12	3:A:252:LEU:HA	1.76	0.45
2:L:108:ARG:NH1	2:L:109:THR:O	2.50	0.45
1:E:154:TRP:CH2	1:E:196:CYS:HB3	2.51	0.45
2:C:142:ARG:NH2	2:C:163:VAL:HG11	2.32	0.44
3:A:61:LEU:O	3:A:196:LYS:HB2	2.17	0.44
3:D:426:ASN:OD1	3:D:427:LYS:N	2.51	0.44
3:F:87:LYS:HB2	3:F:87:LYS:HE3	1.88	0.44
1:B:160:THR:O	1:B:163:VAL:HG22	2.18	0.44
1:E:100(E):LEU:O	1:E:100(G):HIS:CE1	2.71	0.44
3:A:66:GLU:CG	3:A:68:LYS:CG	2.95	0.44
1:B:11:VAL:HA	1:B:110:THR:O	2.17	0.44
3:F:144:VAL:HG22	3:D:406:VAL:HG22	1.99	0.44
2:G:63:SER:O	2:G:73:LEU:HD12	2.16	0.44
3:F:179:VAL:HG21	3:F:189:THR:HG21	2.00	0.44
3:A:77:LYS:HB2	3:A:77:LYS:HE3	1.70	0.44
2:C:86:TYR:O	2:C:101:GLY:HA2	2.18	0.44
3:F:378:GLU:OE1	3:F:378:GLU:N	2.47	0.44
1:B:152:VAL:HA	1:B:197:ASN:O	2.18	0.44
1:E:36:TRP:CE2	1:E:80:MET:HB2	2.53	0.44
3:A:246:PRO:HG2	3:D:239:VAL:HG13	1.99	0.43
3:A:260:LEU:HD23	3:A:260:LEU:HA	1.82	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:509:SER:O	3:D:512:LEU:HB3	2.17	0.43
3:F:45:LEU:HD23	3:F:45:LEU:HA	1.68	0.43
3:A:361:GLN:C	3:A:362:SER:HG	2.19	0.43
3:A:249:THR:OG1	3:D:235:ARG:HG2	2.19	0.43
1:E:159:LEU:HD21	1:E:182:VAL:HG21	2.01	0.43
2:G:167:ASP:OD1	2:G:169:LYS:HG2	2.19	0.43
1:B:33:ILE:HG12	1:B:52:ILE:HG12	2.00	0.43
3:D:387:PHE:CE2	3:D:474:ILE:HD11	2.45	0.43
3:D:67:ASN:OD1	3:D:67:ASN:N	2.52	0.43
2:L:167:ASP:OD1	2:L:169:LYS:HG2	2.18	0.43
3:F:76:VAL:HG13	3:F:212:CYS:O	2.18	0.43
3:F:79:ILE:HG12	3:F:220:VAL:HG23	1.99	0.43
3:D:338:ASP:N	3:D:338:ASP:OD1	2.49	0.43
3:D:378:GLU:N	3:D:378:GLU:OE1	2.52	0.43
3:F:150:SER:HB3	3:D:458:TYR:CG	2.53	0.43
2:G:146:VAL:HG22	2:G:196:VAL:HG22	1.99	0.43
2:L:39:LYS:HG2	2:L:84:ALA:HB2	2.01	0.43
1:B:153:SER:OG	1:B:197:ASN:HB2	2.18	0.43
3:D:178:VAL:HG12	3:D:188:LEU:HD12	2.01	0.43
3:D:319:SER:OG	3:D:320:PRO:HD2	2.19	0.43
1:E:199:ASN:OD1	1:E:206:LYS:HB3	2.18	0.43
1:H:101:ASP:HB2	3:F:209:LYS:NZ	2.34	0.43
3:F:322:CYS:HA	3:F:475:ILE:HD13	2.01	0.43
1:E:87:THR:HG23	1:E:110:THR:HA	2.01	0.42
1:H:98:LEU:HD21	3:F:68:LYS:O	2.20	0.42
1:B:141:LEU:HD12	1:B:178:LEU:O	2.19	0.42
3:D:332:ILE:HA	3:D:332:ILE:HD13	1.90	0.42
3:F:96:LEU:CD1	3:D:279:GLN:HG2	2.50	0.42
1:E:100(A):SER:O	1:E:100(D):TYR:HB2	2.19	0.42
2:G:86:TYR:O	2:G:101:GLY:HA2	2.19	0.42
1:H:181:VAL:HG11	2:L:135:LEU:HD22	2.00	0.42
3:A:322:CYS:HA	3:A:475:ILE:HD13	2.00	0.42
3:D:232:GLU:HG2	3:D:250:TYR:CE2	2.55	0.42
3:F:61:LEU:O	3:F:295:GLU:HB3	2.19	0.42
3:A:400:THR:HG22	3:A:402:VAL:HG23	2.01	0.42
1:B:100(H):TYR:HB3	2:C:34:ASN:ND2	2.33	0.42
3:F:449:THR:HB	3:F:456:LEU:HD11	2.00	0.42
1:H:123:PRO:HB3	1:H:211:VAL:HB	2.02	0.42
3:A:204:LEU:N	3:A:205:PRO:HD2	2.33	0.42
3:D:46:SER:HB3	3:D:313:CYS:SG	2.59	0.42
2:L:40:PRO:CB	2:L:165:GLU:HG3	2.50	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:21:ILE:O	2:C:72:SER:HA	2.20	0.42
1:E:100(B):GLU:O	1:E:100(C):THR:OG1	2.33	0.42
1:E:123:PRO:HB3	1:E:211:VAL:HG12	2.01	0.42
3:F:321:LEU:HD11	3:F:473:PRO:HB3	2.01	0.42
1:E:61:PRO:HD2	2:G:95:PRO:HG3	2.01	0.42
3:D:260:LEU:HA	3:D:260:LEU:HD23	1.76	0.42
3:D:474:ILE:HD12	3:D:474:ILE:HA	1.82	0.42
3:D:93:LEU:HB3	3:D:292:ILE:HD11	2.01	0.42
3:F:176:LYS:NZ	3:F:259:SER:HB3	2.35	0.42
3:A:137:PHE:HB3	3:A:138:LEU:H	1.63	0.41
3:F:461:LYS:HA	3:F:461:LYS:HD2	1.88	0.41
1:B:93:ALA:HB1	1:B:100(I):PHE:HB3	2.02	0.41
2:C:151:ASP:HA	2:C:191:VAL:HG13	2.02	0.41
3:D:388:ASN:OD1	3:D:391:TYR:N	2.43	0.41
3:A:261:ILE:HD13	3:A:274:MET:HB3	2.02	0.41
3:D:321:LEU:HD11	3:D:473:PRO:HB3	2.02	0.41
1:H:166:PHE:CD2	2:L:164:THR:HG23	2.55	0.41
1:E:12:LYS:HG3	1:E:18:VAL:HB	2.02	0.41
2:G:140:TYR:CG	2:G:141:PRO:HA	2.56	0.41
2:L:147:GLN:NE2	2:L:195:GLU:OE1	2.53	0.41
2:L:143:GLU:OE1	2:L:143:GLU:N	2.51	0.41
2:C:39:LYS:HB2	2:C:42:LYS:HD2	2.02	0.41
3:D:327:LYS:HB2	3:D:330:SER:OG	2.21	0.41
5:F:603:BMA:H62	6:F:607:MAN:H2	1.48	0.41
3:A:338:ASP:HB2	3:A:342:TYR:OH	2.20	0.41
3:A:461:LYS:HA	3:A:461:LYS:HD2	1.85	0.41
3:A:313:CYS:SG	3:A:342:TYR:O	2.79	0.41
3:A:79:ILE:HG12	3:A:220:VAL:HG22	2.03	0.41
3:A:96:LEU:HD21	3:A:237:PHE:HB3	2.03	0.41
3:D:67:ASN:ND2	3:D:83:LEU:HD22	2.36	0.41
3:F:57:ILE:HB	3:F:299:TYR:CE2	2.56	0.41
1:H:160:THR:O	1:H:163:VAL:HG22	2.20	0.41
1:B:183:THR:HG21	2:C:137:ASN:ND2	2.36	0.40
1:B:67:VAL:HA	1:B:81:GLU:O	2.21	0.40
3:D:75:LYS:HB3	3:D:214:ILE:HG23	2.04	0.40
1:E:100(A):SER:HA	3:D:64:ILE:HA	2.02	0.40
1:H:123:PRO:HB3	1:H:211:VAL:CG1	2.51	0.40
1:H:184:VAL:HG11	1:H:194:TYR:OH	2.21	0.40
2:C:113:PRO:HB3	2:C:139:PHE:HB3	2.03	0.40
3:D:171:LEU:HD11	3:D:189:THR:HG22	2.03	0.40
2:L:83:VAL:HG11	2:L:166:GLN:HB3	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:402:VAL:HG11	3:D:373:LEU:HD22	2.03	0.40
3:A:66:GLU:OE1	3:A:66:GLU:N	2.55	0.40
3:A:66:GLU:CD	3:A:68:LYS:CG	2.82	0.40
3:D:314:TRP:CE2	3:D:342:TYR:HB2	2.57	0.40
3:D:80:LYS:NZ	3:D:84:ASP:OD2	2.54	0.40
3:F:264:MET:HB2	3:F:264:MET:HE2	1.90	0.40
3:F:93:LEU:HD22	3:F:289:MET:HE3	2.02	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 X-ray entries followed by that with respect to entries of similar resolution.

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	B	214/228 (94%)	207 (97%)	6 (3%)	1 (0%)	32	73
1	E	216/228 (95%)	209 (97%)	7 (3%)	0	100	100
1	H	213/228 (93%)	207 (97%)	6 (3%)	0	100	100
2	C	209/214 (98%)	198 (95%)	10 (5%)	1 (0%)	32	73
2	G	211/214 (99%)	201 (95%)	9 (4%)	1 (0%)	32	73
2	L	209/214 (98%)	198 (95%)	10 (5%)	1 (0%)	32	73
3	A	444/568 (78%)	427 (96%)	17 (4%)	0	100	100
3	D	444/568 (78%)	424 (96%)	20 (4%)	0	100	100
3	F	445/568 (78%)	429 (96%)	16 (4%)	0	100	100
All	All	2605/3030 (86%)	2500 (96%)	101 (4%)	4 (0%)	51	85

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	100(C)	THR

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Mol	Chain	Res	Type
2	L	30	VAL
2	C	30	VAL
2	G	30	VAL

### 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 X-ray entries followed by that with respect to entries of similar resolution.

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	B	185/193 (96%)	185 (100%)	0	100	100
1	E	187/193 (97%)	186 (100%)	1 (0%)	91	96
1	H	183/193 (95%)	182 (100%)	1 (0%)	91	96
2	C	186/188 (99%)	186 (100%)	0	100	100
2	G	187/188 (100%)	186 (100%)	1 (0%)	91	96
2	L	186/188 (99%)	186 (100%)	0	100	100
3	A	409/510 (80%)	405 (99%)	4 (1%)	80	92
3	D	409/510 (80%)	402 (98%)	7 (2%)	66	87
3	F	410/510 (80%)	405 (99%)	5 (1%)	75	90
All	All	2342/2673 (88%)	2323 (99%)	19 (1%)	85	94

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	H	127	SER
3	F	75	LYS
3	F	190	PHE
3	F	209	LYS
3	F	279	GLN
3	F	290	CYS
3	A	66	GLU
3	A	190	PHE
3	A	209	LYS
3	A	313	CYS
1	E	201	LYS

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Mol	Chain	Res	Type
2	G	145	LYS
3	D	67	ASN
3	D	190	PHE
3	D	210	GLN
3	D	279	GLN
3	D	290	CYS
3	D	324	THR
3	D	364	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
3	A	202	GLN

### 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](#)

Of 13 ligands modelled in this entry, 2 are monoatomic - leaving 11 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the chemical component dictionary. The Link column lists molecule types, if any, to which the group is linked. 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  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	NAG	F	601	3,4	14,14,15	0.30	0	15,19,21	0.58	0
4	NAG	F	602	5,4	14,14,15	0.26	0	15,19,21	0.81	0
5	BMA	F	603	4,6	11,11,12	1.34	1 (9%)	13,15,17	1.67	3 (23%)
6	MAN	F	604	5,6	11,11,12	0.73	0	13,15,17	1.14	2 (15%)
6	MAN	F	605	6	11,11,12	0.77	0	13,15,17	1.47	3 (23%)
6	MAN	F	606	6	11,11,12	0.99	0	13,15,17	0.89	0
6	MAN	F	607	5,6	11,11,12	1.87	4 (36%)	13,15,17	1.73	4 (30%)
6	MAN	F	608	6	11,11,12	0.66	0	13,15,17	1.63	3 (23%)
6	MAN	F	609	6	11,11,12	0.79	0	13,15,17	1.56	4 (30%)
6	MAN	F	610	6	11,11,12	1.14	0	13,15,17	1.22	1 (7%)
6	MAN	F	611	6	11,11,12	0.89	0	13,15,17	1.44	2 (15%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the chemical component dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	F	601	3,4	-	0/6/23/26	0/1/1/1
4	NAG	F	602	5,4	-	0/6/23/26	0/1/1/1
5	BMA	F	603	4,6	-	0/2/19/22	0/1/1/1
6	MAN	F	604	5,6	-	0/2/19/22	0/1/1/1
6	MAN	F	605	6	-	0/2/19/22	0/1/1/1
6	MAN	F	606	6	-	0/2/19/22	0/1/1/1
6	MAN	F	607	5,6	-	0/2/19/22	0/1/1/1
6	MAN	F	608	6	-	0/2/19/22	0/1/1/1
6	MAN	F	609	6	-	0/2/19/22	0/1/1/1
6	MAN	F	610	6	-	0/2/19/22	0/1/1/1
6	MAN	F	611	6	-	0/2/19/22	0/1/1/1

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	F	607	MAN	O5-C1	-4.05	1.37	1.43
5	F	603	BMA	O5-C1	-3.38	1.38	1.43
6	F	607	MAN	C4-C3	2.19	1.57	1.52
6	F	607	MAN	C1-C2	2.48	1.58	1.52
6	F	607	MAN	C2-C3	2.98	1.56	1.52

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	F	604	MAN	O2-C2-C3	-3.07	104.14	110.17
6	F	607	MAN	O6-C6-C5	-2.62	102.51	111.34
6	F	608	MAN	O2-C2-C3	-2.51	105.25	110.17
6	F	605	MAN	O2-C2-C3	-2.38	105.50	110.17
6	F	611	MAN	O2-C2-C3	-2.33	105.60	110.17
5	F	603	BMA	C1-C2-C3	-2.26	106.79	109.65
6	F	609	MAN	C3-C4-C5	-2.21	106.32	110.22
6	F	607	MAN	O2-C2-C3	-2.21	105.83	110.17
6	F	605	MAN	O5-C1-C2	2.13	114.12	110.79
6	F	609	MAN	O5-C1-C2	2.24	114.30	110.79
6	F	609	MAN	O3-C3-C2	2.25	114.11	110.02
6	F	604	MAN	C1-O5-C5	2.29	115.32	112.17
6	F	608	MAN	O5-C1-C2	2.36	114.48	110.79
5	F	603	BMA	C3-C4-C5	2.45	114.53	110.22
6	F	610	MAN	C1-O5-C5	2.71	115.91	112.17
6	F	607	MAN	C2-C3-C4	2.75	115.68	110.88
6	F	609	MAN	C1-O5-C5	2.84	116.08	112.17
6	F	607	MAN	C1-C2-C3	3.38	113.94	109.65
6	F	605	MAN	C1-O5-C5	3.64	117.18	112.17
6	F	611	MAN	C1-O5-C5	3.74	117.33	112.17
5	F	603	BMA	C1-O5-C5	3.87	117.50	112.17
6	F	608	MAN	C1-O5-C5	4.35	118.16	112.17

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	F	603	BMA	2	0
6	F	605	MAN	1	0
6	F	607	MAN	1	0

## 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.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	B	218/228 (95%)	0.05	3 (1%) 75 70	90, 132, 185, 210	0
1	E	220/228 (96%)	-0.06	3 (1%) 75 70	90, 131, 188, 224	0
1	H	217/228 (95%)	0.64	31 (14%) 3 4	84, 144, 253, 311	0
2	C	211/214 (98%)	0.17	2 (0%) 84 78	94, 155, 203, 245	0
2	G	213/214 (99%)	0.12	5 (2%) 61 54	98, 153, 210, 247	0
2	L	211/214 (98%)	0.80	35 (16%) 2 3	88, 203, 286, 336	0
3	A	448/568 (78%)	0.06	8 (1%) 69 62	70, 127, 198, 245	0
3	D	448/568 (78%)	0.04	6 (1%) 77 71	74, 118, 188, 242	0
3	F	449/568 (79%)	-0.03	3 (0%) 87 83	62, 104, 173, 243	0
All	All	2635/3030 (86%)	0.15	96 (3%) 43 39	62, 131, 227, 336	0

All (96) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	127	SER	20.1
1	H	126	PRO	10.1
1	H	137	ALA	9.6
1	H	138	LEU	7.1
1	H	121	VAL	5.6
1	H	125	ALA	5.6
2	L	106	ILE	5.3
1	H	139	GLY	5.0
1	H	181	VAL	4.8
3	F	486	ASP	4.8
1	H	136	ALA	4.7
2	L	192	TYR	4.6
2	L	131	SER	4.5
1	H	194	TYR	4.5
2	L	134	CYS	4.3

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Mol	Chain	Res	Type	RSRZ
2	L	133	VAL	4.1
2	G	78	LEU	4.0
1	H	210	ARG	3.8
1	E	29	LEU	3.8
2	L	118	PHE	3.8
2	L	117	ILE	3.7
1	H	124	LEU	3.6
2	L	156	SER	3.6
2	L	119	PRO	3.5
1	H	209	LYS	3.5
1	H	182	VAL	3.5
2	L	209	PHE	3.4
2	L	193	ALA	3.4
1	H	189	LEU	3.3
2	L	132	VAL	3.2
2	L	201	LEU	3.1
2	L	148	TRP	3.1
2	L	176	SER	3.1
2	L	120	PRO	3.1
2	L	107	LYS	3.1
1	H	141	LEU	3.1
2	L	146	VAL	3.0
2	L	194	CYS	2.9
2	L	210	ASN	2.9
2	L	150	VAL	2.9
3	A	475	ILE	2.9
3	A	356	GLU	2.9
1	B	209	LYS	2.9
3	A	354	GLN	2.8
1	H	183	THR	2.8
1	H	180	SER	2.8
3	D	356	GLU	2.7
3	A	512	LEU	2.7
2	L	21	ILE	2.6
3	D	139	GLY	2.6
2	G	113	PRO	2.6
1	H	142	VAL	2.6
3	D	306	TYR	2.6
1	H	140	CYS	2.5
1	H	211	VAL	2.5
1	H	207	VAL	2.5
3	F	356	GLU	2.5

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Mol	Chain	Res	Type	RSRZ
1	H	119	PRO	2.5
2	L	135	LEU	2.5
3	D	354	GLN	2.5
1	E	137	ALA	2.4
1	E	28	LEU	2.4
3	A	489	ASP	2.4
2	L	25	ALA	2.4
2	L	199	GLN	2.4
2	G	187	GLU	2.4
2	G	17	ASP	2.3
1	H	188	SER	2.3
3	A	474	ILE	2.3
2	C	107	LYS	2.3
2	L	78	LEU	2.3
1	H	198	VAL	2.3
2	L	19	VAL	2.3
2	L	186	TYR	2.3
2	G	136	LEU	2.2
3	A	332	ILE	2.2
1	H	193	THR	2.2
2	L	157	GLY	2.2
2	L	126	LYS	2.2
1	H	120	SER	2.2
3	A	357	THR	2.2
1	H	144	ASP	2.1
1	H	208	ASP	2.1
2	C	88	CYS	2.1
1	H	117	LYS	2.1
2	L	122	ASP	2.1
1	H	185	PRO	2.1
3	D	505	PHE	2.1
2	L	180	THR	2.1
1	B	194	TYR	2.1
2	L	181	LEU	2.0
3	F	512	LEU	2.0
2	L	125	LEU	2.0
2	L	183	LYS	2.0
1	B	189	LEU	2.0
3	D	478	TYR	2.0



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

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

## 6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
6	MAN	F	610	11/12	0.93	0.33	2.89	124,126,140,151	0
6	MAN	F	611	11/12	0.82	0.45	1.30	142,144,152,154	0
4	NAG	F	602	14/15	0.91	0.25	0.16	141,158,164,168	0
7	CL	F	612	1/1	0.97	0.09	-3.58	95,95,95,95	0
6	MAN	F	604	11/12	0.96	0.16	-	170,172,179,181	0
5	BMA	F	603	11/12	0.90	0.23	-	158,168,170,171	0
6	MAN	F	607	11/12	0.92	0.18	-	129,147,152,156	0
6	MAN	F	605	11/12	0.88	0.24	-	175,180,185,185	0
4	NAG	F	601	14/15	0.92	0.22	-	130,144,150,156	0
6	MAN	F	609	11/12	0.91	0.26	-	158,160,164,169	0
7	CL	A	601	1/1	0.75	0.53	-	146,146,146,146	0
6	MAN	F	606	11/12	0.84	0.37	-	173,181,184,185	0
6	MAN	F	608	11/12	0.95	0.14	-	153,161,167,171	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.