



# wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 1, 2016 – 06:01 PM GMT

PDB ID : 4K67  
Title : Structure of an airborne transmissible avian influenza H5 hemagglutinin mutant from the influenza virus A/Indonesia/5/2005 complexed with human receptor analog LSTc  
Authors : Zhang, W.; Shi, Y.; Lu, X.; Shu, Y.; Gao, G.F.  
Deposited on : 2013-04-15  
Resolution : 2.70 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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.

---

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

MolProbity : 4.02b-467  
Mogul : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
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) : trunk26865

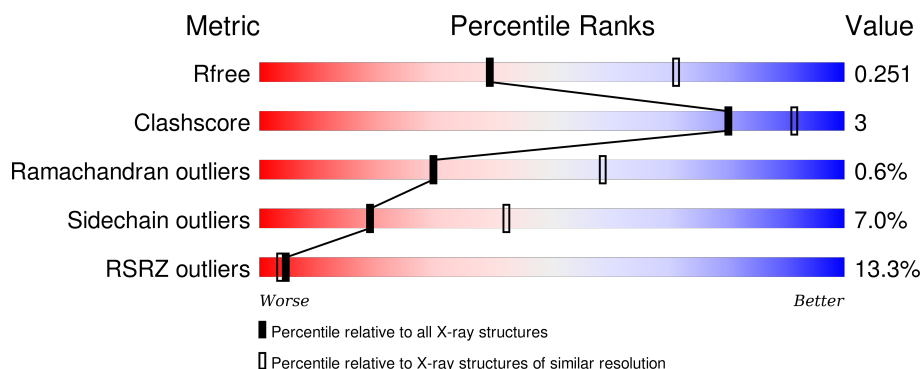
# 1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 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)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	91344	2103 (2.70-2.70)
Clashscore	102246	2422 (2.70-2.70)
Ramachandran outliers	100387	2382 (2.70-2.70)
Sidechain outliers	100360	2382 (2.70-2.70)
RSRZ outliers	91569	2107 (2.70-2.70)

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	A	321	<div> <div>2%</div> <div>85%</div> <div>14%</div> <div>.</div> </div>
1	C	321	<div> <div>2%</div> <div>85%</div> <div>14%</div> <div>.</div> </div>
1	E	321	<div> <div>6%</div> <div>85%</div> <div>14%</div> <div>.</div> </div>
1	G	321	<div> <div>6%</div> <div>86%</div> <div>13%</div> <div>.</div> </div>
2	B	164	<div> <div>18%</div> <div>84%</div> <div>15%</div> <div>.</div> </div>

*Continued on next page...*

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	D	164	<div><div></div><div>18%</div><div>84%</div><div>15%</div><div></div></div>
2	F	164	<div><div></div><div>44%</div><div>84%</div><div>14%</div><div></div></div>
2	H	164	<div><div></div><div>46%</div><div>85%</div><div>13%</div><div></div></div>

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 15692 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 Hemagglutinin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	321	Total	C	N	O	S	0	0	0
			2542	1609	433	485	15			
1	C	321	Total	C	N	O	S	0	0	0
			2542	1609	433	485	15			
1	E	321	Total	C	N	O	S	0	0	0
			2542	1609	433	485	15			
1	G	321	Total	C	N	O	S	0	0	0
			2542	1609	433	485	15			

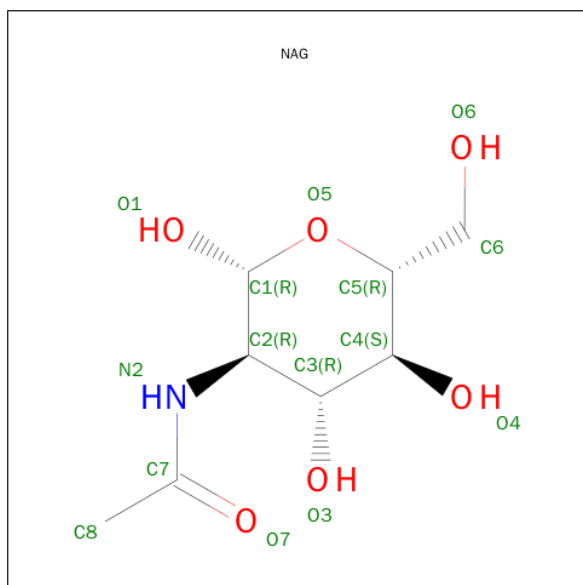
There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	4	GLN	-	EXPRESSION TAG	UNP A8HWY8
A	107	TYR	HIS	ENGINEERED MUTATION	UNP A8HWY8
A	160	ALA	THR	ENGINEERED MUTATION	UNP A8HWY8
A	226	LEU	GLN	ENGINEERED MUTATION	UNP A8HWY8
A	228	SER	GLY	ENGINEERED MUTATION	UNP A8HWY8
C	4	GLN	-	EXPRESSION TAG	UNP A8HWY8
C	107	TYR	HIS	ENGINEERED MUTATION	UNP A8HWY8
C	160	ALA	THR	ENGINEERED MUTATION	UNP A8HWY8
C	226	LEU	GLN	ENGINEERED MUTATION	UNP A8HWY8
C	228	SER	GLY	ENGINEERED MUTATION	UNP A8HWY8
E	4	GLN	-	EXPRESSION TAG	UNP A8HWY8
E	107	TYR	HIS	ENGINEERED MUTATION	UNP A8HWY8
E	160	ALA	THR	ENGINEERED MUTATION	UNP A8HWY8
E	226	LEU	GLN	ENGINEERED MUTATION	UNP A8HWY8
E	228	SER	GLY	ENGINEERED MUTATION	UNP A8HWY8
G	4	GLN	-	EXPRESSION TAG	UNP A8HWY8
G	107	TYR	HIS	ENGINEERED MUTATION	UNP A8HWY8
G	160	ALA	THR	ENGINEERED MUTATION	UNP A8HWY8
G	226	LEU	GLN	ENGINEERED MUTATION	UNP A8HWY8
G	228	SER	GLY	ENGINEERED MUTATION	UNP A8HWY8

- Molecule 2 is a protein called Hemagglutinin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	164	Total	C	N	O	S	0	0	0
			1328	828	229	263	8			
2	D	164	Total	C	N	O	S	0	0	0
			1328	828	229	263	8			
2	F	164	Total	C	N	O	S	0	0	0
			1328	828	229	263	8			
2	H	164	Total	C	N	O	S	0	0	0
			1328	828	229	263	8			

- Molecule 3 is SUGAR (N-ACETYL-D-GLUCOSAMINE) (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	C	1	Total	C	N	O	0	0
			14	8	1	5		
3	E	1	Total	C	N	O	0	0
			14	8	1	5		
3	G	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 4 is a polymer of unknown type called SUGAR (2-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	2	Total	C	N	O	0	0
			32	17	1	14		
4	C	2	Total	C	N	O	0	0
			32	17	1	14		

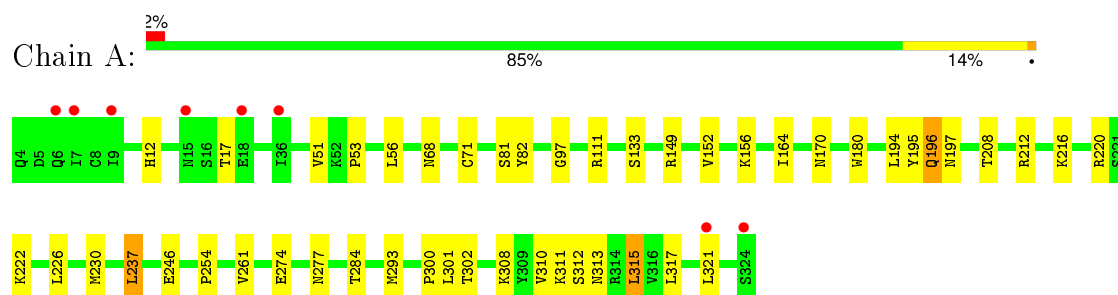
- Molecule 5 is a polymer of unknown type called SUGAR (3-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	E	3	Total	C	N	O	0	0
			46	25	2	19		
5	G	3	Total	C	N	O	0	0
			46	25	2	19		

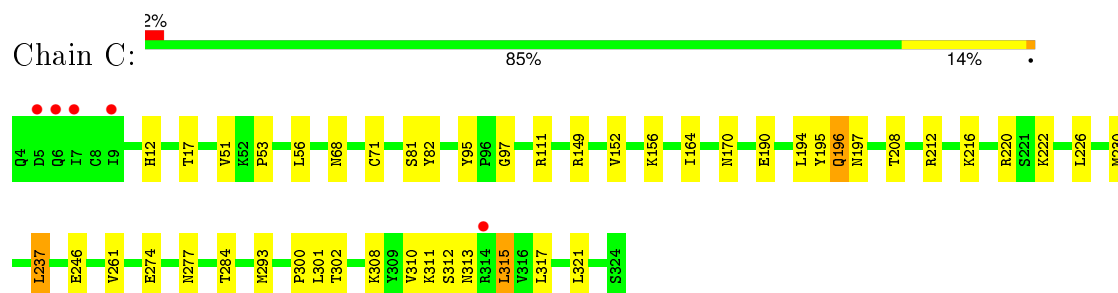
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

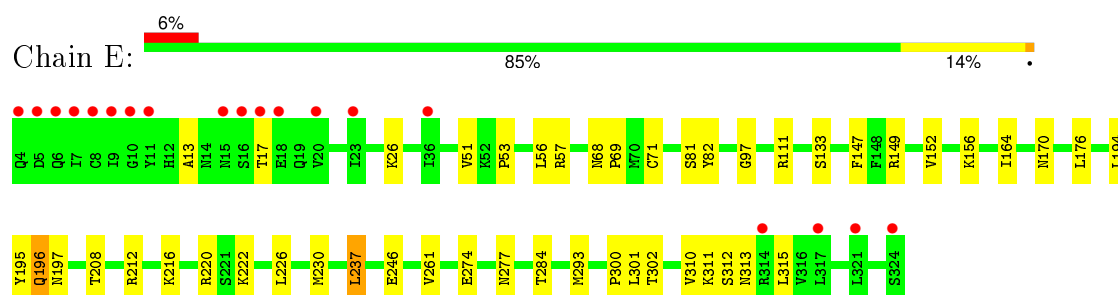
#### • Molecule 1: Hemagglutinin



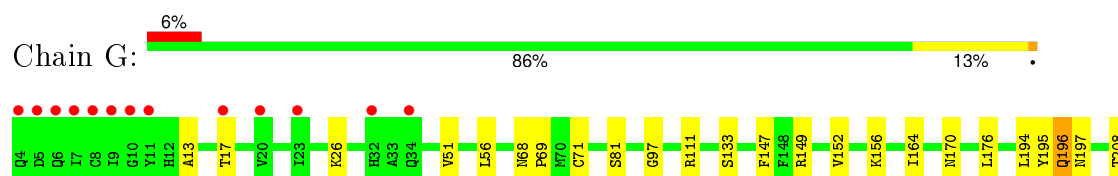
#### • Molecule 1: Hemagglutinin



#### • Molecule 1: Hemagglutinin

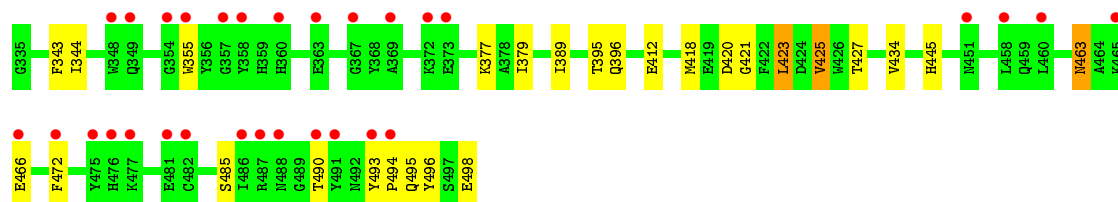
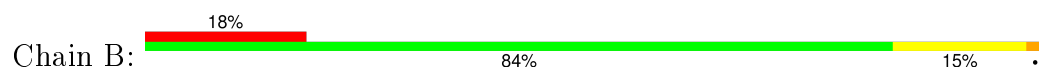


#### • Molecule 1: Hemagglutinin

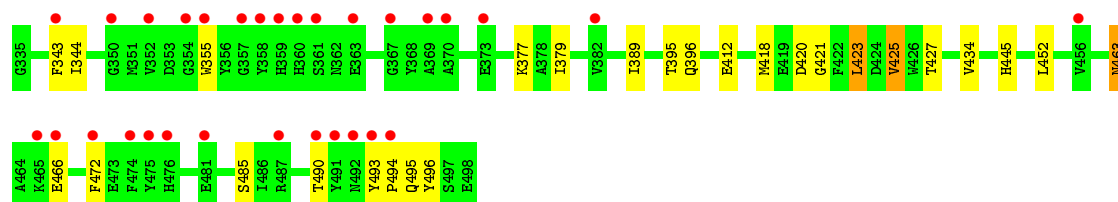
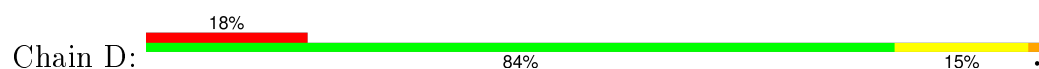




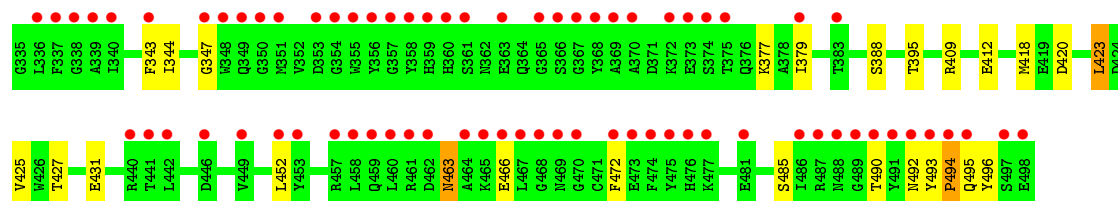
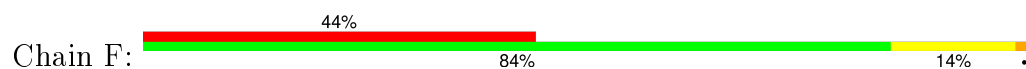
• Molecule 2: Hemagglutinin



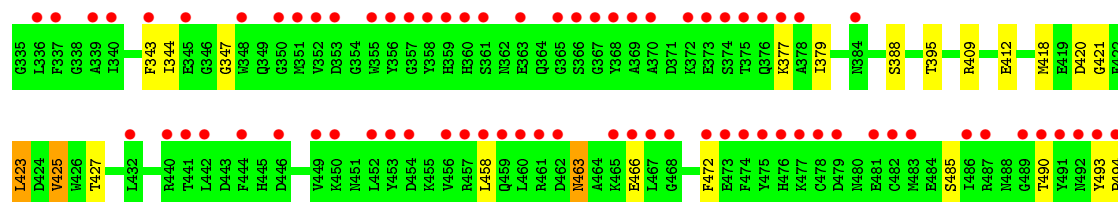
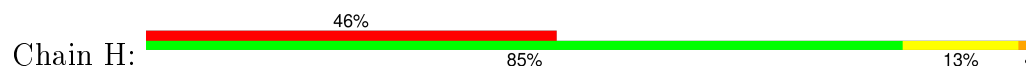
• Molecule 2: Hemagglutinin



• Molecule 2: Hemagglutinin



• Molecule 2: Hemagglutinin





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 3	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	70.63Å 70.63Å 494.52Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	49.12 – 2.70 49.12 – 2.70	Depositor EDS
% Data completeness (in resolution range)	95.2 (49.12-2.70) 95.3 (49.12-2.70)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.50 (at 2.69Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.7.3_928)	Depositor
R, $R_{free}$	0.227 , 0.255 0.218 , 0.251	Depositor DCC
$R_{free}$ test set	3626 reflections (5.02%)	DCC
Wilson B-factor (Å <sup>2</sup> )	51.0	Xtriage
Anisotropy	0.531	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 33.2	EDS
Estimated twinning fraction	0.221 for -h,-k,l 0.437 for -h,-k,l 0.069 for h,-h-k,-l 0.062 for -k,-h,-l	Xtriage
Reported twinning fraction	0.221 for -h,-k,l	Depositor
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtriage
Outliers	0 of 72276 reflections	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	15692	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	77.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 21.78 % of the origin peak, indicating pseudo translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo translational symmetry is equal to 6.5285e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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, 0.375 respectively for untwinned datasets, and 0.333, 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: SIA, GAL, NAG

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	0.32	0/2604	0.51	0/3539
1	C	0.32	0/2604	0.51	0/3539
1	E	0.33	0/2604	0.68	3/3539 (0.1%)
1	G	0.32	0/2604	0.51	0/3539
2	B	0.27	0/1355	0.43	0/1823
2	D	0.27	0/1355	0.43	0/1823
2	F	0.27	0/1355	0.43	0/1823
2	H	0.27	0/1355	0.44	0/1823
All	All	0.31	0/15836	0.52	3/21448 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	57	ARG	NE-CZ-NH1	-19.37	110.61	120.30
1	E	57	ARG	NE-CZ-NH2	15.61	128.10	120.30
1	E	57	ARG	CD-NE-CZ	10.20	137.88	123.60

There are no chirality outliers.

There are no planarity outliers.

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

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2542	0	2483	22	0
1	C	2542	0	2483	23	0
1	E	2542	0	2483	18	1
1	G	2542	0	2483	18	1
2	B	1328	0	1231	12	0
2	D	1328	0	1231	13	0
2	F	1328	0	1231	9	1
2	H	1328	0	1231	8	1
3	A	14	0	13	0	0
3	C	14	0	13	0	0
3	E	14	0	13	0	0
3	G	14	0	13	0	0
4	A	32	0	27	1	0
4	C	32	0	27	2	0
5	E	46	0	39	1	0
5	G	46	0	39	1	0
All	All	15692	0	15040	104	2

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.

The worst 5 of 104 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:E:216:LYS:O	1:E:220:ARG:NH2	2.22	0.73
1:A:216:LYS:O	1:A:220:ARG:NH2	2.23	0.72
1:C:216:LYS:O	1:C:220:ARG:NH2	2.24	0.71
1:G:216:LYS:O	1:G:220:ARG:NH2	2.25	0.70
1:C:95:TYR:OH	4:C:602:SIA:H91	2.00	0.62

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:26:LYS:NZ	2:H:388:SER:OG[3_665]	2.06	0.14
1:E:26:LYS:NZ	2:F:388:SER:OG[3_655]	2.06	0.14

## 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 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	A	319/321 (99%)	305 (96%)	13 (4%)	1 (0%)	46	75
1	C	319/321 (99%)	306 (96%)	12 (4%)	1 (0%)	46	75
1	E	319/321 (99%)	307 (96%)	11 (3%)	1 (0%)	46	75
1	G	319/321 (99%)	306 (96%)	12 (4%)	1 (0%)	46	75
2	B	162/164 (99%)	150 (93%)	10 (6%)	2 (1%)	16	39
2	D	162/164 (99%)	149 (92%)	11 (7%)	2 (1%)	16	39
2	F	162/164 (99%)	149 (92%)	11 (7%)	2 (1%)	16	39
2	H	162/164 (99%)	150 (93%)	10 (6%)	2 (1%)	16	39
All	All	1924/1940 (99%)	1822 (95%)	90 (5%)	12 (1%)	30	59

5 of 12 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	496	TYR
2	D	496	TYR
2	F	496	TYR
2	H	496	TYR
2	B	494	PRO

### 5.3.2 Protein sidechains

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	A	288/288 (100%)	271 (94%)	17 (6%)	24	51

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	288/288 (100%)	271 (94%)	17 (6%)	24	51
1	E	288/288 (100%)	271 (94%)	17 (6%)	24	51
1	G	288/288 (100%)	271 (94%)	17 (6%)	24	51
2	B	140/140 (100%)	127 (91%)	13 (9%)	11	25
2	D	140/140 (100%)	128 (91%)	12 (9%)	13	29
2	F	140/140 (100%)	127 (91%)	13 (9%)	11	25
2	H	140/140 (100%)	127 (91%)	13 (9%)	11	25
All	All	1712/1712 (100%)	1593 (93%)	119 (7%)	19	42

5 of 119 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	D	423	LEU
1	E	212	ARG
2	H	409	ARG
2	D	427	THR
1	E	56	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 6 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	12	HIS
2	H	396	GLN
2	F	396	GLN
2	D	396	GLN
1	G	12	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 ⓘ

10 carbohydrates are modelled in this entry.

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	SIA	A	602	4	16,20,21	2.69	5 (31%)	18,28,31	2.25	3 (16%)
4	GAL	A	603	4	12,12,12	0.48	0	17,17,17	1.24	1 (5%)
4	SIA	C	602	4	16,20,21	2.72	6 (37%)	18,28,31	2.02	3 (16%)
4	GAL	C	603	4	12,12,12	0.44	0	17,17,17	0.91	1 (5%)
5	SIA	E	602	5	16,20,21	2.77	6 (37%)	18,28,31	2.21	3 (16%)
5	GAL	E	603	5	11,11,12	0.62	0	14,15,17	1.77	1 (7%)
5	NAG	E	604	5	15,15,15	0.39	0	17,21,21	0.97	0
5	SIA	G	602	5	16,20,21	2.82	6 (37%)	18,28,31	2.28	4 (22%)
5	GAL	G	603	5	11,11,12	0.66	0	14,15,17	1.61	1 (7%)
5	NAG	G	604	5	15,15,15	0.40	0	17,21,21	0.76	0

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	SIA	A	602	4	-	0/14/34/38	0/1/1/1
4	GAL	A	603	4	-	0/2/22/22	0/1/1/1
4	SIA	C	602	4	-	0/14/34/38	0/1/1/1
4	GAL	C	603	4	-	0/2/22/22	0/1/1/1
5	SIA	E	602	5	-	0/14/34/38	0/1/1/1
5	GAL	E	603	5	-	0/2/19/22	0/1/1/1
5	NAG	E	604	5	-	0/6/26/26	0/1/1/1
5	SIA	G	602	5	-	0/14/34/38	0/1/1/1
5	GAL	G	603	5	-	0/2/19/22	0/1/1/1
5	NAG	G	604	5	-	0/6/26/26	0/1/1/1

The worst 5 of 23 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	G	602	SIA	C7-C6	-8.30	1.42	1.52
5	E	602	SIA	C7-C6	-8.23	1.42	1.52
4	C	602	SIA	C7-C6	-7.90	1.42	1.52
4	A	602	SIA	C7-C6	-7.82	1.43	1.52
5	G	602	SIA	O7-C7	-2.27	1.37	1.43

The worst 5 of 17 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	G	602	SIA	O6-C2-C3	-7.22	95.97	109.86
4	A	602	SIA	O6-C2-C3	-7.07	96.27	109.86
5	E	602	SIA	O6-C2-C3	-6.88	96.63	109.86
4	C	602	SIA	O6-C2-C3	-6.42	97.51	109.86
5	E	603	GAL	C1-O5-C5	-5.73	104.98	112.25

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	602	SIA	1	0
4	C	602	SIA	2	0
5	E	602	SIA	1	0
5	G	602	SIA	1	0

## 5.6 Ligand geometry ⓘ

4 ligands are modelled in this entry.

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	$\# Z  > 2$
3	NAG	A	601	1	14,14,15	0.48	0	15,19,21	1.47	2 (13%)
3	NAG	C	601	1	14,14,15	0.45	0	15,19,21	1.42	2 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	NAG	E	601	1	14,14,15	0.53	0	15,19,21	0.91	0
3	NAG	G	601	1	14,14,15	0.54	0	15,19,21	0.65	0

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
3	NAG	A	601	1	-	0/6/23/26	0/1/1/1
3	NAG	C	601	1	-	0/6/23/26	0/1/1/1
3	NAG	E	601	1	-	0/6/23/26	0/1/1/1
3	NAG	G	601	1	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	601	NAG	C2-N2-C7	-2.85	119.38	123.04
3	C	601	NAG	C2-N2-C7	-2.84	119.39	123.04
3	C	601	NAG	C1-O5-C5	3.42	116.58	112.25
3	A	601	NAG	C1-O5-C5	3.62	116.84	112.25

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 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	A	321/321 (100%)	0.16	8 (2%) 61 61	19, 46, 102, 171	0
1	C	321/321 (100%)	0.12	5 (1%) 74 75	18, 46, 99, 165	0
1	E	321/321 (100%)	0.33	19 (5%) 26 24	18, 48, 130, 244	0
1	G	321/321 (100%)	0.29	18 (5%) 28 26	22, 46, 124, 234	0
2	B	164/164 (100%)	1.03	30 (18%) 2 1	27, 103, 164, 204	0
2	D	164/164 (100%)	1.08	30 (18%) 2 1	28, 103, 167, 189	0
2	F	164/164 (100%)	2.33	72 (43%) 0 0	26, 144, 214, 255	0
2	H	164/164 (100%)	2.46	76 (46%) 0 0	28, 147, 223, 253	0
All	All	1940/1940 (100%)	0.73	258 (13%) 4 3	18, 58, 177, 255	0

The worst 5 of 258 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	H	356	TYR	11.8
1	E	10	GLY	10.9
1	G	10	GLY	10.8
2	F	491	TYR	9.6
2	H	366	SER	9.5

### 6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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

### 6.3 Carbohydrates ⓘ

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
5	SIA	E	602	20/21	0.96	0.16	-0.67	31,47,59,61	0
4	SIA	C	602	20/21	0.97	0.14	-1.16	26,46,56,58	0
4	SIA	A	602	20/21	0.97	0.14	-1.42	30,43,49,53	0
5	SIA	G	602	20/21	0.97	0.13	-2.15	35,47,57,60	0
4	GAL	A	603	12/12	0.82	0.24	-	87,101,125,135	0
5	NAG	G	604	15/15	0.82	0.19	-	95,118,133,134	0
5	NAG	E	604	15/15	0.78	0.23	-	110,121,137,139	0
4	GAL	C	603	12/12	0.86	0.17	-	71,111,126,129	0
5	GAL	E	603	11/12	0.87	0.19	-	61,88,126,129	0
5	GAL	G	603	11/12	0.90	0.16	-	60,92,113,123	0

## 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
3	NAG	G	601	14/15	0.90	0.16	0.25	40,68,80,82	0
3	NAG	E	601	14/15	0.90	0.16	-0.32	44,68,84,85	0
3	NAG	C	601	14/15	0.91	0.15	-0.41	50,64,83,96	0
3	NAG	A	601	14/15	0.91	0.15	-0.56	49,75,89,98	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.