



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 15, 2024 – 08:35 AM JST

PDB ID : 5XEB  
Title : Structure of the envelope glycoprotein of Dhori virus  
Authors : Peng, R.; Shi, Y.; Qi, J.; Gao, G.F.  
Deposited on : 2017-04-03  
Resolution : 2.50 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

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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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 : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 3.0  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
CCP4 : 9.0.003 (Gargrove)  
Density-Fitness : 1.0.11  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

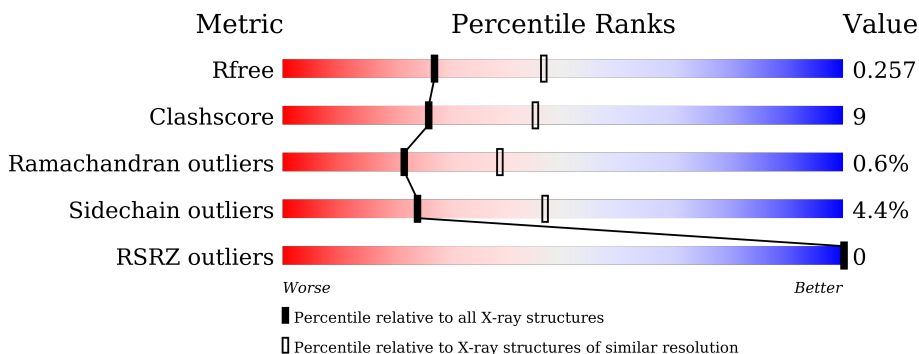
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.50 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))
$R_{free}$	164625	5504 (2.50-2.50)
Clashscore	180529	6282 (2.50-2.50)
Ramachandran outliers	177936	6191 (2.50-2.50)
Sidechain outliers	177891	6193 (2.50-2.50)
RSRZ outliers	164620	5504 (2.50-2.50)

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 of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . 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	474	
1	B	474	
1	C	474	

## 2 Entry composition [i](#)

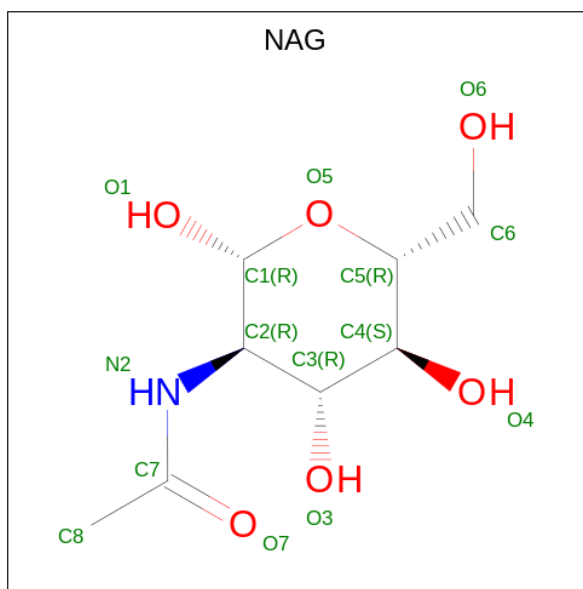
There are 3 unique types of molecules in this entry. The entry contains 9601 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Envelope glycoprotein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	390	Total 3114	C 1982	N 532	O 580	S 20	0	0	0
1	B	390	Total 3114	C 1982	N 532	O 580	S 20	0	0	0
1	C	389	Total 3116	C 1983	N 533	O 581	S 19	0	1	0

- Molecule 2 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	Total 14	C 8	N 1	O 5	0	0
2	A	1	Total 14	C 8	N 1	O 5	0	0
2	B	1	Total 14	C 8	N 1	O 5	0	0

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

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	105	Total	O	0	0
			105	105		
3	B	72	Total	O	0	0
			72	72		
3	C	24	Total	O	0	0
			24	24		



ILE	S123	PRO	D368	THR
GLU	D124	THR	S371	SER
VAL	K133	THR	S375	LEU
CYS	M134	GLU	K378	GLU
N25	E135	LEU	F379	ASP
K26	L136	SER	M380	VAL
Q29	C137	GLY	C384	VAL
Q30	H138	ALA	L385	LEU
G31	T139	TYR	SER	LEU
P42	A140	ASP	THR	GLY
L43	K141	THR	THR	ASP
M44	E142	HIS	PRO	SER
I45	L143	TYR	GLU	ASN
S46	S147	LEU	PRO	CYS
T55	M150	GLY	GLY	HIS
G61	H155	TYR	ASP	ASN
L62	L165	ASP	ASN	HIS
N63	L159	LYS	CYS	ASN
F64	S160	ASN	HIS	ASN
H65	W161	PRO	ASN	HIS
I66	R162	GLN	HIS	SER
R69	R162	F259	SER	ILE
A70	L165	M260	ILE	TYR
V71	L168	D285	TYR	ARG
W72	T168	F270	ASP	ASP
R73	H169	E271	GLY	GLY
C76	V181	L272	ARG	ARG
Y77	V186	R276	TRP	HIS
N78	I193	C279	VAL	ASN
T86	E196	L280	ASN	ASN
D91	G197	F281	ASP	ASP
L92	T198	T282	PRO	THR
I93	R199	Y285	GLN	GLN
P94	P200	K286	CYS	CYS
K95	T201	R287	PHE	LYS
S96	Y202	M293	SER	SER
P97	E205	T294	LEU	LEU
E99	Y210	M295	SER	SER
S100	L211	H296	LYS	LYS
R103	P214	P297	S420	S420
T104	K220	M298	V445	V445
W105	S106	K301	Q459	Q459
K107	F229	E304	I462	I462
K110	K230	K305	T468	T468
C111	E231	L306	G472	G472
P115	H252	L335	LYS	LYS
	I233	R359	GLY	GLY
	ARG			

## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 3	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	106.73Å 106.73Å 134.44Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	34.94 – 2.50 34.94 – 2.50	Depositor EDS
% Data completeness (in resolution range)	72.3 (34.94-2.50) 72.4 (34.94-2.50)	Depositor EDS
$R_{merge}$	0.15	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.49 (at 2.51Å)	Xtrriage
Refinement program	PHENIX (1.10.1_2155)	Depositor
R, $R_{free}$	0.231 , 0.257 0.228 , 0.257	Depositor DCC
$R_{free}$ test set	2170 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	36.7	Xtrriage
Anisotropy	0.239	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 20.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.000 for -h,-k,l 0.407 for h,-h-k,-l 0.000 for -k,-h,-l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	9601	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	64.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 35.02 % 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 6.2255e-04. 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, 0.333 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: 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	0.26	0/3192	0.46	0/4330
1	B	0.26	0/3192	0.46	0/4330
1	C	0.27	0/3194	0.51	1/4333 (0.0%)
All	All	0.26	0/9578	0.48	1/12993 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	C	0	1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	279	CYS	C-N-CA	8.90	143.94	121.70

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	43	LEU	Peptide

### 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	3114	0	3036	46	1
1	B	3114	0	3037	50	0
1	C	3116	0	3036	77	0
2	A	28	0	26	1	0
2	B	14	0	13	0	0
2	C	14	0	13	0	0
3	A	105	0	0	23	1
3	B	72	0	0	15	0
3	C	24	0	0	5	0
All	All	9601	0	9161	173	1

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 9.

All (173) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:128:CYS:SG	3:B:725:HOH:O	2.29	0.91
1:B:199:ARG:HD2	1:B:200:PRO:HD2	1.61	0.82
1:B:384:CYS:SG	1:B:385:LEU:N	2.58	0.73
1:C:111:CYS:SG	1:C:141:LYS:NZ	2.54	0.73
1:C:45:ILE:HD11	1:C:229:PHE:HB3	1.70	0.73
1:A:336:ASP:OD1	3:A:701:HOH:O	2.08	0.71
1:A:26:LYS:HE3	1:A:28:GLN:H	1.56	0.70
1:A:44:ASN:HD22	2:A:602:NAG:C7	2.05	0.69
1:B:300:TRP:O	3:B:701:HOH:O	2.11	0.68
1:C:97:PRO:O	1:C:202:TYR:OH	2.14	0.66
1:A:464:THR:OG1	3:A:702:HOH:O	2.13	0.66
1:C:280:LEU:HD22	1:C:285:TYR:HE2	1.60	0.65
1:A:80:GLY:N	3:A:703:HOH:O	2.30	0.65
1:B:375:SER:HB3	1:B:378:LYS:HB2	1.77	0.65
1:B:95:LYS:HB2	3:B:704:HOH:O	1.97	0.64
1:C:287:ARG:NH1	3:C:704:HOH:O	2.29	0.64
1:B:78:ASN:OD1	3:B:702:HOH:O	2.15	0.64
1:C:138:HIS:HB3	1:C:141:LYS:HE3	1.79	0.64
1:A:78:ASN:OD1	3:A:703:HOH:O	2.16	0.63
1:C:115:PRO:O	1:C:161:TRP:NE1	2.29	0.63
1:C:64:PHE:CE2	1:C:66:ILE:HD11	2.35	0.62
1:C:110:LYS:HE3	1:C:137:CYS:HB2	1.82	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:230:LYS:O	3:B:703:HOH:O	2.16	0.62
1:C:359:ARG:NH2	1:C:368:ASP:OD1	2.33	0.61
1:A:352:SER:O	3:A:704:HOH:O	2.16	0.60
1:B:95:LYS:O	3:B:704:HOH:O	2.17	0.60
1:A:369:VAL:HA	1:A:382:SER:O	2.02	0.59
1:C:270:PHE:HE1	1:C:272:LEU:HD23	1.67	0.59
1:A:39:GLN:OE1	3:A:705:HOH:O	2.17	0.59
1:A:24:CYS:N	3:A:733:HOH:O	2.35	0.59
1:A:232:HIS:HA	1:A:259:PHE:HA	1.85	0.58
1:B:112:CYS:HA	1:B:137:CYS:HA	1.86	0.58
1:B:368:ASP:HB3	1:B:385:LEU:HA	1.86	0.58
1:B:69:ARG:HA	1:B:162:ARG:O	2.05	0.57
1:C:78:ASN:HD22	1:C:150[B]:ASN:HA	1.70	0.56
1:C:265:ASP:OD2	1:C:285:TYR:OH	2.17	0.56
1:C:375:SER:HG	1:C:378:LYS:H	1.54	0.56
1:B:28:GLN:O	1:B:30:GLN:N	2.36	0.56
1:A:371:SER:HA	1:A:380:MET:O	2.06	0.55
1:A:113:THR:HG22	1:A:136:LEU:O	2.06	0.55
1:A:339:PHE:HB2	3:A:701:HOH:O	2.07	0.55
1:A:187:MET:SD	3:A:709:HOH:O	2.58	0.55
1:A:362:GLY:HA2	1:A:369:VAL:HG12	1.88	0.55
1:B:421:GLN:N	3:B:708:HOH:O	2.39	0.54
1:A:109:GLN:OE1	3:A:706:HOH:O	2.18	0.54
1:A:48:ILE:HG12	3:A:708:HOH:O	2.08	0.54
1:A:116:ASP:OD2	3:A:707:HOH:O	2.19	0.53
1:B:69:ARG:HG3	1:B:163:CYS:HB3	1.90	0.53
1:C:66:ILE:O	1:C:165:LEU:HA	2.08	0.53
1:A:167:SER:OG	3:A:706:HOH:O	2.19	0.53
1:C:186:VAL:O	3:C:701:HOH:O	2.19	0.52
1:C:76:CYS:SG	3:C:714:HOH:O	2.58	0.52
1:B:99:GLU:HG3	1:B:211:LEU:HD13	1.93	0.51
1:C:71:VAL:HG23	1:C:93:ILE:HB	1.92	0.51
1:A:230:LYS:NZ	3:A:741:HOH:O	2.44	0.51
1:C:147:SER:HB3	1:C:468:THR:HG21	1.93	0.51
1:A:66:ILE:HG12	1:A:210:TYR:HD1	1.76	0.50
1:A:99:GLU:HG3	1:A:211:LEU:HD13	1.94	0.50
1:B:199:ARG:HD2	1:B:200:PRO:CD	2.38	0.50
1:C:66:ILE:HD12	1:C:210:TYR:HD1	1.77	0.50
1:C:61:GLY:O	1:C:169:HIS:ND1	2.45	0.50
1:C:293:ASN:HB3	1:C:295:MET:O	2.12	0.50
1:B:48:ILE:HD13	1:B:230:LYS:HE2	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:205:GLU:OE1	1:C:210:TYR:OH	2.20	0.49
1:B:205:GLU:HG2	1:B:210:TYR:HE2	1.78	0.49
1:B:324:GLU:OE2	3:B:705:HOH:O	2.19	0.49
1:B:224:THR:OG1	1:B:225:PHE:N	2.46	0.49
1:C:91:ASP:OD2	1:C:93:ILE:HG13	2.12	0.49
1:C:200:PRO:HB3	1:C:211:LEU:HD11	1.94	0.49
1:B:25:ASN:OD1	1:B:26:LYS:N	2.46	0.48
1:C:45:ILE:HD13	1:C:231:GLU:HB2	1.94	0.48
1:C:55:THR:HG21	1:C:181:VAL:HG11	1.96	0.48
1:B:359:ARG:NH2	1:B:368:ASP:OD1	2.42	0.48
1:C:66:ILE:HD12	1:C:210:TYR:CD1	2.49	0.47
1:C:138:HIS:C	1:C:141:LYS:HE3	2.34	0.47
1:C:233:ILE:HG13	3:C:713:HOH:O	2.14	0.47
1:B:230:LYS:HA	1:B:260:ASN:O	2.14	0.47
1:C:282:THR:N	3:C:706:HOH:O	2.35	0.47
1:A:264:ARG:NH2	3:A:714:HOH:O	2.43	0.47
1:C:196:GLU:HB2	1:C:198:THR:HG22	1.95	0.47
1:C:105:TRP:CZ3	1:C:111:CYS:HB2	2.50	0.47
1:A:46:SER:O	3:A:708:HOH:O	2.20	0.47
1:C:45:ILE:HG13	1:C:46:SER:N	2.28	0.47
1:C:186:VAL:HG12	1:C:445:VAL:HG11	1.96	0.47
1:A:205:GLU:OE1	3:A:709:HOH:O	2.21	0.47
1:A:383:PRO:HB2	1:A:384:CYS:H	1.53	0.47
1:B:46:SER:OG	3:B:703:HOH:O	2.20	0.47
1:B:133:LYS:HD3	1:B:133:LYS:HA	1.76	0.47
1:B:113:THR:HG22	1:B:136:LEU:O	2.14	0.47
1:C:142:GLU:OE2	1:C:162:ARG:NE	2.47	0.47
1:C:186:VAL:HG11	1:C:445:VAL:HG21	1.97	0.47
1:B:295:MET:HG2	1:B:296:HIS:H	1.79	0.46
1:B:105:TRP:HB3	1:B:165:LEU:HD22	1.96	0.46
1:C:138:HIS:CE1	1:C:139:THR:HG22	2.51	0.46
1:B:125:ALA:HA	1:B:157:CYS:HB3	1.96	0.46
1:C:124:ASP:N	1:C:124:ASP:OD1	2.48	0.46
1:C:25:ASN:OD1	1:C:26:LYS:N	2.49	0.46
1:C:71:VAL:O	1:C:92:LEU:HA	2.16	0.46
1:C:198:THR:HG23	1:C:199:ARG:N	2.30	0.46
1:B:46:SER:N	3:B:703:HOH:O	2.48	0.46
1:C:138:HIS:CG	1:C:139:THR:H	2.34	0.46
1:A:291:ILE:H	1:A:291:ILE:HG13	1.55	0.46
1:B:360:LEU:O	1:B:363:THR:HG22	2.16	0.46
1:A:126:ARG:NH2	3:A:723:HOH:O	2.29	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:141:LYS:HB2	1:C:162:ARG:HA	1.98	0.45
1:C:45:ILE:HD12	1:C:230:LYS:O	2.17	0.45
1:A:26:LYS:HB3	1:A:28:GLN:HB3	1.97	0.45
1:A:85:ASN:ND2	3:A:736:HOH:O	2.41	0.45
1:A:133:LYS:HD3	1:A:133:LYS:HA	1.82	0.45
1:B:286:LYS:HE3	1:B:292:VAL:HG23	1.99	0.45
1:C:200:PRO:CB	1:C:211:LEU:HD11	2.47	0.45
1:B:368:ASP:CG	1:B:385:LEU:HD23	2.38	0.45
1:B:71:VAL:HG22	1:B:161:TRP:CZ3	2.52	0.45
1:C:384:CYS:SG	1:C:385:LEU:N	2.89	0.45
1:A:57:VAL:HA	1:A:218:GLU:O	2.17	0.44
1:C:69:ARG:HA	1:C:162:ARG:O	2.16	0.44
1:A:143:LEU:HD12	3:A:702:HOH:O	2.18	0.44
1:A:230:LYS:N	3:A:708:HOH:O	2.40	0.44
1:C:115:PRO:O	1:C:159:LEU:HD23	2.17	0.44
1:C:168:THR:OG1	1:C:169:HIS:N	2.50	0.44
1:C:138:HIS:ND1	1:C:139:THR:HG22	2.33	0.44
1:C:200:PRO:HA	1:C:214:PRO:HD3	2.00	0.44
1:B:467:TYR:CZ	1:B:469:LYS:HE3	2.53	0.43
1:A:205:GLU:HG2	1:A:210:TYR:HE2	1.83	0.43
1:C:99:GLU:OE2	1:C:211:LEU:HD13	2.18	0.43
1:C:69:ARG:HB3	1:C:95:LYS:O	2.18	0.43
1:C:371:SER:HA	1:C:380:MET:O	2.19	0.43
1:A:69:ARG:HA	1:A:162:ARG:O	2.18	0.43
1:A:112:CYS:HA	1:A:137:CYS:HA	2.00	0.43
1:A:321:LEU:O	1:A:325:THR:HG23	2.18	0.43
1:B:303:SER:OG	3:B:707:HOH:O	2.21	0.43
1:C:301:LYS:HD2	1:C:304:GLU:HG3	2.01	0.43
1:B:383:PRO:O	1:B:384:CYS:HB2	2.18	0.43
1:C:92:LEU:HD11	1:C:143:LEU:HD21	2.01	0.43
1:B:196:GLU:O	3:B:706:HOH:O	2.21	0.43
1:C:77:TYR:HB2	1:C:155:HIS:ND1	2.34	0.43
1:B:259:PHE:N	3:B:734:HOH:O	2.52	0.43
1:C:78:ASN:HA	1:C:86:THR:HG23	2.01	0.43
1:C:44:ASN:HB3	1:C:45:ILE:H	1.59	0.42
1:C:205:GLU:HB2	1:C:210:TYR:CE2	2.54	0.42
1:C:233:ILE:HG12	1:C:260:ASN:OD1	2.19	0.42
1:B:26:LYS:HD2	1:B:27:ALA:H	1.83	0.42
1:C:73:ARG:HB2	1:C:159:LEU:HD12	2.01	0.42
1:C:133:LYS:O	1:C:135:GLU:HG3	2.19	0.42
1:A:125:ALA:HA	1:A:157:CYS:HB3	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:224:THR:OG1	1:A:225:PHE:N	2.49	0.42
1:A:355:LYS:HB2	3:A:704:HOH:O	2.20	0.42
1:C:201:THR:O	1:C:211:LEU:HD12	2.20	0.42
1:C:295:MET:HG3	1:C:296:HIS:N	2.35	0.42
1:C:296:HIS:N	1:C:297:PRO:HD3	2.35	0.42
1:B:355:LYS:NZ	1:B:376:PRO:HA	2.35	0.42
1:C:105:TRP:HB3	1:C:165:LEU:HD22	2.02	0.41
1:A:105:TRP:HB3	1:A:165:LEU:HD22	2.03	0.41
1:B:230:LYS:HD3	1:B:261:TYR:CE1	2.55	0.41
1:C:93:ILE:H	1:C:93:ILE:HD12	1.85	0.41
1:C:295:MET:HG3	1:C:296:HIS:H	1.84	0.41
1:C:459:GLN:OE1	1:C:462:ILE:HD11	2.20	0.41
1:B:105:TRP:CD2	1:B:111:CYS:HA	2.56	0.41
1:C:276:ARG:NH2	1:C:298:ASN:OD1	2.54	0.41
1:A:200:PRO:HA	1:A:214:PRO:HD3	2.01	0.41
1:B:72:TRP:CH2	1:B:90:ASN:HB3	2.55	0.41
1:B:301:LYS:HB3	1:B:304:GLU:HG3	2.02	0.41
1:B:421:GLN:O	3:B:708:HOH:O	2.22	0.41
1:A:186:VAL:HG22	1:A:192:LEU:HD22	2.02	0.41
1:B:78:ASN:O	1:B:153:ALA:N	2.53	0.41
1:C:103:ARG:HG3	1:C:107:LYS:HZ3	1.86	0.41
1:C:306:LEU:HD23	1:C:445:VAL:HB	2.02	0.41
1:B:368:ASP:OD2	1:B:385:LEU:HD23	2.21	0.41
1:C:43:LEU:HB3	1:C:44:ASN:H	1.69	0.41
1:C:99:GLU:HG2	1:C:202:TYR:CG	2.56	0.41
1:B:369:VAL:O	3:B:710:HOH:O	2.22	0.40
1:A:232:HIS:O	3:A:710:HOH:O	2.21	0.40
1:C:29:GLN:O	1:C:31:GLY:N	2.53	0.40

All (1) 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:A:338:ARG:NH1	3:A:701:HOH:O[2_555]	2.11	0.09

## 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	A	384/474 (81%)	363 (94%)	19 (5%)	2 (0%)	25	44
1	B	384/474 (81%)	365 (95%)	18 (5%)	1 (0%)	37	56
1	C	384/474 (81%)	353 (92%)	27 (7%)	4 (1%)	13	25
All	All	1152/1422 (81%)	1081 (94%)	64 (6%)	7 (1%)	22	39

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	383	PRO
1	B	384	CYS
1	C	43	LEU
1	C	30	GLN
1	C	44	ASN
1	A	384	CYS
1	C	42	PRO

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	344/417 (82%)	327 (95%)	17 (5%)	21	42
1	B	344/417 (82%)	332 (96%)	12 (4%)	31	57
1	C	344/417 (82%)	328 (95%)	16 (5%)	22	44
All	All	1032/1251 (82%)	987 (96%)	45 (4%)	24	47

All (45) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	28	GLN
1	A	39	GLN
1	A	43	LEU
1	A	62	LEU
1	A	100	SER
1	A	196	GLU
1	A	233	ILE
1	A	272	LEU
1	A	291	ILE
1	A	293	ASN
1	A	306	LEU
1	A	328	LEU
1	A	335	LEU
1	A	369	VAL
1	A	380	MET
1	A	384	CYS
1	A	385	LEU
1	B	41	LYS
1	B	43	LEU
1	B	100	SER
1	B	157	CYS
1	B	303	SER
1	B	328	LEU
1	B	335	LEU
1	B	363	THR
1	B	364	LEU
1	B	368	ASP
1	B	385	LEU
1	B	433	LEU
1	C	43	LEU
1	C	62	LEU
1	C	71	VAL
1	C	73	ARG
1	C	100	SER
1	C	123	SER
1	C	124	ASP
1	C	159	LEU
1	C	186	VAL
1	C	193	ILE
1	C	220	LYS
1	C	272	LEU
1	C	276	ARG

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Mol	Chain	Res	Type
1	C	293	ASN
1	C	335	LEU
1	C	359	ARG

Sometimes 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 oligosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

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	$\# Z  > 2$
2	NAG	A	601	1	14,14,15	0.30	0	17,19,21	0.40	0
2	NAG	C	601	1	14,14,15	0.47	0	17,19,21	0.78	1 (5%)
2	NAG	B	601	1	14,14,15	0.24	0	17,19,21	0.36	0
2	NAG	A	602	1	14,14,15	0.15	0	17,19,21	0.42	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
2	NAG	A	601	1	-	0/6/23/26	0/1/1/1
2	NAG	C	601	1	-	2/6/23/26	0/1/1/1
2	NAG	B	601	1	-	0/6/23/26	0/1/1/1
2	NAG	A	602	1	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	601	NAG	C1-O5-C5	2.79	115.97	112.19

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	601	NAG	O5-C5-C6-O6
2	C	601	NAG	C4-C5-C6-O6

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	602	NAG	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 [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

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	390/474 (82%)	-1.29	0 100 100	15, 43, 91, 125	0
1	B	390/474 (82%)	-1.29	0 100 100	16, 45, 94, 171	0
1	C	389/474 (82%)	-0.85	0 100 100	33, 93, 150, 193	1 (0%)
All	All	1169/1422 (82%)	-1.14	0 100 100	15, 58, 128, 193	1 (0%)

There are no RSRZ outliers to report.

### 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 monosaccharides 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. 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	B-factors(Å <sup>2</sup> )	Q<0.9
2	NAG	A	602	14/15	0.96	0.06	120,123,126,128	0
2	NAG	C	601	14/15	0.97	0.06	77,92,99,100	0
2	NAG	B	601	14/15	0.98	0.03	51,63,75,75	0
2	NAG	A	601	14/15	0.99	0.04	57,74,82,84	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.