



# Full wwPDB X-ray Structure Validation Report

Feb 27, 2014 – 12:50 PM GMT

PDB ID : 3S2K  
Title : Structural basis of Wnt signaling inhibition by Dickkopf binding to LRP5/6.  
Authors : Ahn, V.E.; Chu, M.L.-H.; Choi, H.-J.; Tran, D.; Abo, A.; Weis, W.I.  
Deposited on : 2011-05-16  
Resolution : 2.80 Å(reported)

This is a full wwPDB 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/ValidationPDFNotes.html>

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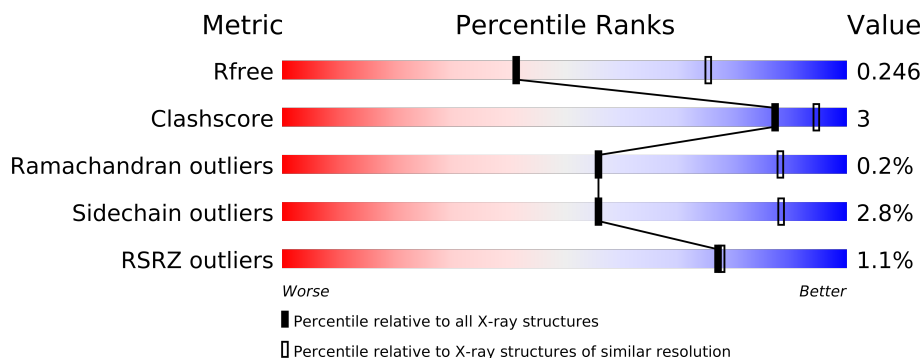
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.15 2013  
Xtriage (Phenix) : dev-1323  
EDS : stable22639  
Percentile statistics : 21963  
Refmac : 5.8.0049  
CCP4 : 6.3.0 (Settle)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)  
Validation Pipeline (wwPDB-VP) : stable22683

# 1 Overall quality at a glance

The reported resolution of this entry is 2.80 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))
$R_{free}$	66092	1799 (2.80-2.80)
Clashscore	79885	2295 (2.80-2.80)
Ramachandran outliers	78287	2252 (2.80-2.80)
Sidechain outliers	78261	2254 (2.80-2.80)
RSRZ outliers	66119	1802 (2.80-2.80)

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. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	629	
1	B	629	
2	C	97	

The following table lists non-polymeric compounds that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Geometry	Electron density
4	NAG	A	2859	-	X
4	NAG	A	2865	-	X
6	GOL	A	101	-	X

## 2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 10613 atoms, of which 0 are hydrogen and 0 are deuterium.

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 Low-density lipoprotein receptor-related protein 6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	610	Total	C	N	O	S	0	0	0
			4860	3050	860	925	25			
1	B	612	Total	C	N	O	S	0	0	0
			4873	3057	862	929	25			

There are 26 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	628	ALA	-	EXPRESSION TAG	UNP O75581
A	629	ASP	-	EXPRESSION TAG	UNP O75581
A	1062	ILE	VAL	SEE REMARK 999	UNP O75581
A	1247	HIS	-	EXPRESSION TAG	UNP O75581
A	1248	HIS	-	EXPRESSION TAG	UNP O75581
A	1249	HIS	-	EXPRESSION TAG	UNP O75581
A	1250	HIS	-	EXPRESSION TAG	UNP O75581
A	1251	HIS	-	EXPRESSION TAG	UNP O75581
A	1252	HIS	-	EXPRESSION TAG	UNP O75581
A	1253	HIS	-	EXPRESSION TAG	UNP O75581
A	1254	HIS	-	EXPRESSION TAG	UNP O75581
A	1255	HIS	-	EXPRESSION TAG	UNP O75581
A	1256	HIS	-	EXPRESSION TAG	UNP O75581
B	628	ALA	-	EXPRESSION TAG	UNP O75581
B	629	ASP	-	EXPRESSION TAG	UNP O75581
B	1062	ILE	VAL	SEE REMARK 999	UNP O75581
B	1247	HIS	-	EXPRESSION TAG	UNP O75581
B	1248	HIS	-	EXPRESSION TAG	UNP O75581
B	1249	HIS	-	EXPRESSION TAG	UNP O75581
B	1250	HIS	-	EXPRESSION TAG	UNP O75581
B	1251	HIS	-	EXPRESSION TAG	UNP O75581
B	1252	HIS	-	EXPRESSION TAG	UNP O75581
B	1253	HIS	-	EXPRESSION TAG	UNP O75581
B	1254	HIS	-	EXPRESSION TAG	UNP O75581
B	1255	HIS	-	EXPRESSION TAG	UNP O75581

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1256	HIS	-	EXPRESSION TAG	UNP O75581

- Molecule 2 is a protein called Dickkopf-related protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	76	Total	C	N	O	S	0	0	0
			596	362	123	101	10			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	175	ALA	-	EXPRESSION TAG	UNP O94907
C	176	ASP	-	EXPRESSION TAG	UNP O94907
C	177	PRO	-	EXPRESSION TAG	UNP O94907
C	267	HIS	-	EXPRESSION TAG	UNP O94907
C	268	HIS	-	EXPRESSION TAG	UNP O94907
C	269	HIS	-	EXPRESSION TAG	UNP O94907
C	270	HIS	-	EXPRESSION TAG	UNP O94907
C	271	HIS	-	EXPRESSION TAG	UNP O94907

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

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	3	Total	C	N	O	0	0
			38	22	2	14		
3	B	3	Total	C	N	O	0	0
			38	22	2	14		

There are 26 discrepancies between the modelled and reference sequences:

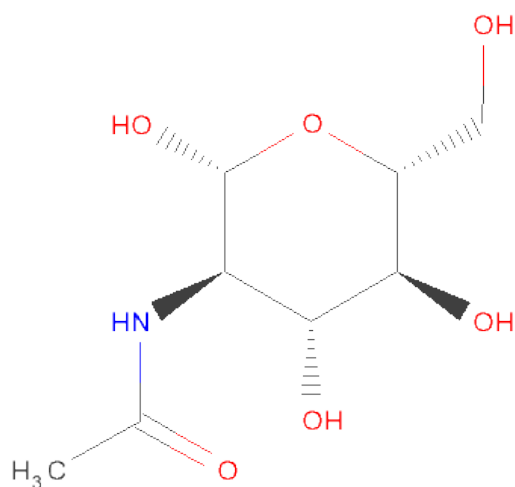
Chain	Residue	Modelled	Actual	Comment	Reference
A	628	ALA	-	EXPRESSION TAG	UNP O75581
A	629	ASP	-	EXPRESSION TAG	UNP O75581
A	1062	ILE	VAL	SEE REMARK 999	UNP O75581
A	1247	HIS	-	EXPRESSION TAG	UNP O75581
A	1248	HIS	-	EXPRESSION TAG	UNP O75581
A	1249	HIS	-	EXPRESSION TAG	UNP O75581
A	1250	HIS	-	EXPRESSION TAG	UNP O75581
A	1251	HIS	-	EXPRESSION TAG	UNP O75581
A	1252	HIS	-	EXPRESSION TAG	UNP O75581
A	1253	HIS	-	EXPRESSION TAG	UNP O75581
A	1254	HIS	-	EXPRESSION TAG	UNP O75581

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1255	HIS	-	EXPRESSION TAG	UNP O75581
A	1256	HIS	-	EXPRESSION TAG	UNP O75581
B	628	ALA	-	EXPRESSION TAG	UNP O75581
B	629	ASP	-	EXPRESSION TAG	UNP O75581
B	1062	ILE	VAL	SEE REMARK 999	UNP O75581
B	1247	HIS	-	EXPRESSION TAG	UNP O75581
B	1248	HIS	-	EXPRESSION TAG	UNP O75581
B	1249	HIS	-	EXPRESSION TAG	UNP O75581
B	1250	HIS	-	EXPRESSION TAG	UNP O75581
B	1251	HIS	-	EXPRESSION TAG	UNP O75581
B	1252	HIS	-	EXPRESSION TAG	UNP O75581
B	1253	HIS	-	EXPRESSION TAG	UNP O75581
B	1254	HIS	-	EXPRESSION TAG	UNP O75581
B	1255	HIS	-	EXPRESSION TAG	UNP O75581
B	1256	HIS	-	EXPRESSION TAG	UNP O75581

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



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

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

- Molecule 5 is a polymer of unknown type called SUGAR (2-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	2	Total	C	N	O	0	0
			28	16	2	10		
5	B	2	Total	C	N	O	0	0
			28	16	2	10		

There are 26 discrepancies between the modelled and reference sequences:

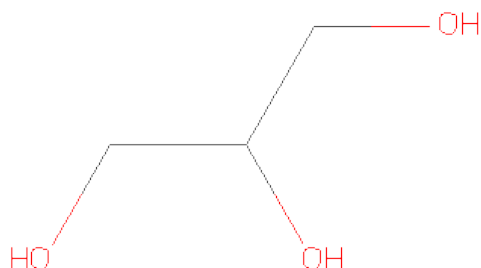
Chain	Residue	Modelled	Actual	Comment	Reference
A	628	ALA	-	EXPRESSION TAG	UNP O75581
A	629	ASP	-	EXPRESSION TAG	UNP O75581
A	1062	ILE	VAL	SEE REMARK 999	UNP O75581
A	1247	HIS	-	EXPRESSION TAG	UNP O75581
A	1248	HIS	-	EXPRESSION TAG	UNP O75581
A	1249	HIS	-	EXPRESSION TAG	UNP O75581
A	1250	HIS	-	EXPRESSION TAG	UNP O75581
A	1251	HIS	-	EXPRESSION TAG	UNP O75581
A	1252	HIS	-	EXPRESSION TAG	UNP O75581
A	1253	HIS	-	EXPRESSION TAG	UNP O75581
A	1254	HIS	-	EXPRESSION TAG	UNP O75581
A	1255	HIS	-	EXPRESSION TAG	UNP O75581
A	1256	HIS	-	EXPRESSION TAG	UNP O75581
B	628	ALA	-	EXPRESSION TAG	UNP O75581
B	629	ASP	-	EXPRESSION TAG	UNP O75581
B	1062	ILE	VAL	SEE REMARK 999	UNP O75581
B	1247	HIS	-	EXPRESSION TAG	UNP O75581
B	1248	HIS	-	EXPRESSION TAG	UNP O75581
B	1249	HIS	-	EXPRESSION TAG	UNP O75581
B	1250	HIS	-	EXPRESSION TAG	UNP O75581
B	1251	HIS	-	EXPRESSION TAG	UNP O75581
B	1252	HIS	-	EXPRESSION TAG	UNP O75581
B	1253	HIS	-	EXPRESSION TAG	UNP O75581
B	1254	HIS	-	EXPRESSION TAG	UNP O75581

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1255	HIS	-	EXPRESSION TAG	UNP O75581
B	1256	HIS	-	EXPRESSION TAG	UNP O75581

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula:  $C_3H_8O_3$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			6	3	3		
6	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 7 is water.

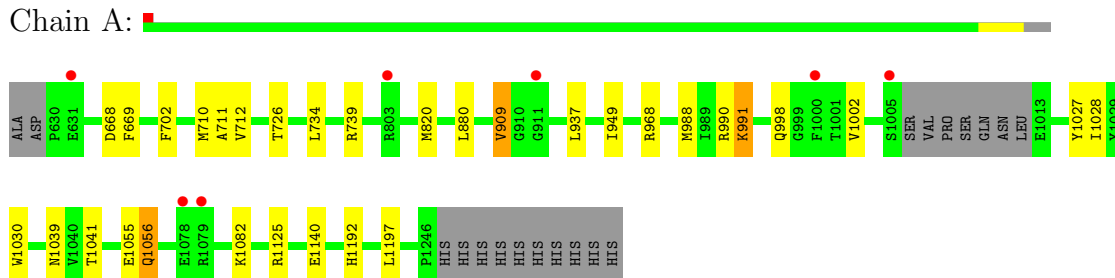
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	22	Total	O	0	0
			22	22		
7	B	30	Total	O	0	0
			30	30		
7	C	4	Total	O	0	0
			4	4		

### 3 Residue-property plots

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.

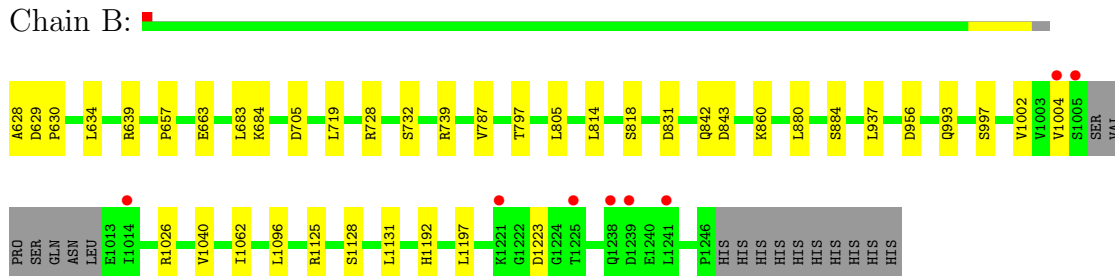
- Molecule 1: Low-density lipoprotein receptor-related protein 6

Chain A:



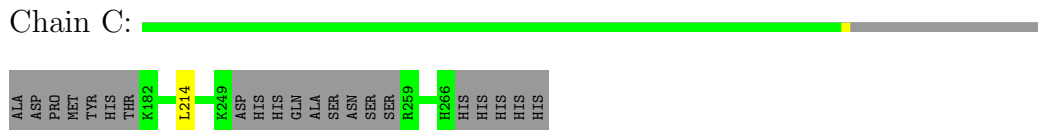
- Molecule 1: Low-density lipoprotein receptor-related protein 6

Chain B:



- Molecule 2: Dickkopf-related protein 1

Chain C:





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	96.04Å 108.01Å 173.12Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	45.82 – 2.80 49.46 – 2.80	Depositor EDS
% Data completeness (in resolution range)	99.8 (45.82-2.80) 99.7 (49.46-2.80)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.57 (at 2.81Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.7.1_743)	Depositor
R, $R_{free}$	0.194 , 0.251 0.188 , 0.246	Depositor DCC
$R_{free}$ test set	2235 reflections (4.97%)	DCC
Wilson B-factor (Å <sup>2</sup> )	60.6	Xtriage
Anisotropy	0.178	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.31 , 28.1	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Outliers	0 of 45089 reflections	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	10613	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	61.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.09% of the height of the origin peak. No significant pseudotranslation is detected.*

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

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, NAG, FUC

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	0.22	0/4963	0.40	0/6734
1	B	0.23	0/4976	0.42	0/6753
2	C	0.23	0/605	0.40	0/801
All	All	0.23	0/10544	0.41	0/14288

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4860	0	0	11	0
1	B	4873	0	0	13	0
2	C	596	0	0	0	0
3	A	38	0	34	0	0
3	B	38	0	34	0	0
4	A	42	0	39	0	0
4	B	42	0	39	2	0
5	A	28	0	25	1	0
5	B	28	0	25	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	A	6	0	8	1	0
6	B	6	0	8	0	0
7	A	22	0	0	0	0
7	B	30	0	0	0	0
7	C	4	0	0	0	0
All	All	10613	0	212	27	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 3.

All (27) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:1192:HIS:ND1	6:A:101:GOL:H12	2.19	0.58
1:B:937:LEU:O	1:B:1192:HIS:N	2.39	0.55
1:A:702:PHE:O	1:A:739:ARG:NH2	2.43	0.52
1:A:988:MET:SD	1:A:990:ARG:NE	2.86	0.49
1:B:629:ASP:N	1:B:630:PRO:CD	2.77	0.48
1:A:1030:TRP:CZ2	1:A:1039:ASN:ND2	2.83	0.46
4:B:2865:NAG:O7	4:B:2865:NAG:H3	2.15	0.46
1:B:993:GLN:NE2	1:B:997:SER:OG	2.49	0.45
1:B:684:LYS:NZ	1:B:705:ASP:O	2.50	0.45
1:B:843:ASP:OD1	1:B:843:ASP:N	2.49	0.45
4:B:2859:NAG:H3	4:B:2859:NAG:O7	2.16	0.45
1:B:831:ASP:OD2	1:B:831:ASP:N	2.50	0.44
1:A:991:LYS:NZ	1:A:998:GLN:O	2.51	0.44
5:A:3039:NAG:O7	5:A:3039:NAG:H3	2.18	0.43
1:B:1223:ASP:N	1:B:1223:ASP:OD1	2.52	0.42
1:A:668:ASP:OD2	1:A:712:VAL:N	2.52	0.42
1:B:719:LEU:N	1:B:732:SER:O	2.52	0.42
1:B:842:GLN:O	1:B:860:LYS:NZ	2.52	0.42
1:A:1055:GLU:O	1:A:1056:GLN:CB	2.67	0.42
1:A:1028:ILE:N	1:A:1041:THR:O	2.52	0.42
1:A:668:ASP:OD1	1:A:669:PHE:N	2.53	0.42
1:B:805:LEU:N	1:B:818:SER:O	2.52	0.42
1:A:710:MET:CG	1:A:711:ALA:N	2.82	0.42
1:B:639:ARG:NE	1:B:663:GLU:OE2	2.53	0.42
1:B:628:ALA:N	1:B:884:SER:OG	2.53	0.42
1:A:937:LEU:O	1:A:1192:HIS:N	2.54	0.40
1:B:728:ARG:NH2	1:B:956:ASP:O	2.55	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	606/629 (96%)	553 (91%)	51 (8%)	2 (0%)	50	84
1	B	608/629 (97%)	565 (93%)	42 (7%)	1 (0%)	56	88
2	C	72/97 (74%)	67 (93%)	5 (7%)	0	100	100
All	All	1286/1355 (95%)	1185 (92%)	98 (8%)	3 (0%)	56	88

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	909	VAL
1	A	1056	GLN
1	B	657	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	532/550 (97%)	518 (97%)	14 (3%)	59	90
1	B	533/550 (97%)	516 (97%)	17 (3%)	51	85
2	C	66/85 (78%)	65 (98%)	1 (2%)	76	96
All	All	1131/1185 (95%)	1099 (97%)	32 (3%)	56	88

All (32) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	726	THR
1	A	734	LEU
1	A	820	MET

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Mol	Chain	Res	Type
1	A	880	LEU
1	A	909	VAL
1	A	949	ILE
1	A	968	ARG
1	A	991	LYS
1	A	1002	VAL
1	A	1027	TYR
1	A	1082	LYS
1	A	1125	ARG
1	A	1140	GLU
1	A	1197	LEU
1	B	634	LEU
1	B	683	LEU
1	B	739	ARG
1	B	787	VAL
1	B	797	THR
1	B	814	LEU
1	B	880	LEU
1	B	1002	VAL
1	B	1004	VAL
1	B	1026	ARG
1	B	1040	VAL
1	B	1062	ILE
1	B	1096	LEU
1	B	1125	ARG
1	B	1128	SER
1	B	1131	LEU
1	B	1197	LEU
2	C	214	LEU

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

### 5.3.3 RNA ⓘ

There are no RNA chains 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	$\# Z  > 2$
3	NAG	A	2692	1,3	12,14,15	0.67	0	15,19,21	1.16	2 (13%)
3	NAG	A	2693	3	12,14,15	0.65	0	15,19,21	0.88	1 (6%)
3	FUC	A	2694	3	9,10,11	0.87	1 (11%)	10,14,16	0.54	0
5	NAG	A	3039	1,5	12,14,15	0.60	0	15,19,21	1.09	1 (6%)
5	NAG	A	3040	5	12,14,15	0.64	0	15,19,21	0.83	1 (6%)
3	NAG	B	2692	1,3	12,14,15	0.64	0	15,19,21	1.19	1 (6%)
3	NAG	B	2693	3	12,14,15	0.60	0	15,19,21	0.87	1 (6%)
3	FUC	B	2694	3	9,10,11	0.84	0	10,14,16	0.70	0
5	NAG	B	3039	1,5	12,14,15	0.60	0	15,19,21	1.24	1 (6%)
5	NAG	B	3040	5	12,14,15	0.62	0	15,19,21	0.84	1 (6%)

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	2692	1,3	-	0/6/23/26	0/1/1/1
3	NAG	A	2693	3	-	0/6/23/26	0/1/1/1
3	FUC	A	2694	3	-	0/0/17/20	0/1/1/1
5	NAG	A	3039	1,5	-	0/6/23/26	0/1/1/1
5	NAG	A	3040	5	-	0/6/23/26	0/1/1/1
3	NAG	B	2692	1,3	-	0/6/23/26	0/1/1/1
3	NAG	B	2693	3	-	0/6/23/26	0/1/1/1
3	FUC	B	2694	3	-	0/0/17/20	0/1/1/1
5	NAG	B	3039	1,5	-	0/6/23/26	0/1/1/1
5	NAG	B	3040	5	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	2694	FUC	O5-C5	-2.00	1.41	1.45

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	2692	NAG	O5-C5-C6	3.92	111.10	106.98
3	A	2692	NAG	O5-C5-C6	3.57	110.73	106.98
5	B	3039	NAG	O5-C5-C4	3.42	114.99	110.65
3	A	2693	NAG	O5-C5-C6	2.67	109.78	106.98
3	B	2693	NAG	O5-C5-C6	2.58	109.69	106.98
5	B	3040	NAG	O5-C5-C6	2.43	109.53	106.98
5	A	3040	NAG	O5-C5-C6	2.41	109.51	106.98
5	A	3039	NAG	O5-C5-C4	2.26	113.52	110.65
3	A	2692	NAG	C3-C2-N2	-2.20	108.42	111.76

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

## 5.6 Ligand geometry ⓘ

8 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	$\# Z  > 2$
6	GOL	A	101	-	5,5,5	0.34	0	5,5,5	0.25	0
4	NAG	A	2859	1	12,14,15	0.71	1 (8%)	15,19,21	0.73	0
4	NAG	A	2865	1	12,14,15	0.64	0	15,19,21	0.92	1 (6%)
4	NAG	A	2926	1	12,14,15	0.62	0	15,19,21	0.88	1 (6%)
6	GOL	B	102	-	5,5,5	0.36	0	5,5,5	0.22	0
4	NAG	B	2859	1	12,14,15	0.62	0	15,19,21	0.82	0
4	NAG	B	2865	1	12,14,15	0.58	0	15,19,21	0.99	1 (6%)
4	NAG	B	2926	1	12,14,15	0.63	0	15,19,21	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
6	GOL	A	101	-	-	0/4/4/4	0/0/0/0
4	NAG	A	2859	1	-	0/6/23/26	0/1/1/1
4	NAG	A	2865	1	-	0/6/23/26	0/1/1/1
4	NAG	A	2926	1	-	0/6/23/26	0/1/1/1
6	GOL	B	102	-	-	0/4/4/4	0/0/0/0
4	NAG	B	2859	1	-	0/6/23/26	0/1/1/1
4	NAG	B	2865	1	-	0/6/23/26	0/1/1/1
4	NAG	B	2926	1	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	2859	NAG	O5-C5	-2.12	1.41	1.45

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	2865	NAG	O5-C5-C6	2.84	109.96	106.98
4	A	2926	NAG	O5-C5-C6	2.64	109.75	106.98
4	B	2865	NAG	O5-C5-C6	2.37	109.47	106.98

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

## 5.7 Other polymers ⓘ

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.



## 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	610/629 (96%)	-0.29	7 (1%) 77 78	38, 61, 102, 132	0
1	B	612/629 (97%)	-0.32	8 (1%) 74 75	31, 51, 89, 125	0
2	C	76/97 (78%)	-0.41	0 100 100	35, 56, 93, 106	0
All	All	1298/1355 (95%)	-0.31	15 (1%) 77 76	31, 56, 97, 132	0

All (15) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	1238	GLN	3.0
1	A	1078	GLU	2.9
1	B	1005	SER	2.7
1	A	1079	ARG	2.7
1	A	1000	PHE	2.7
1	B	1239	ASP	2.7
1	A	1005	SER	2.5
1	B	1241	LEU	2.5
1	B	1004	VAL	2.5
1	B	1221	LYS	2.2
1	A	803	ARG	2.1
1	A	631	GLU	2.1
1	A	911	GLY	2.1
1	B	1225	THR	2.1
1	B	1014	ILE	2.0

### 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	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
3	FUC	A	2694	10/11	0.25	11.83	127,135,140,144	0
5	NAG	A	3040	14/15	0.43	10.92	94,129,143,149	0
3	NAG	B	2693	14/15	0.29	4.85	110,138,145,145	0
3	FUC	B	2694	10/11	0.22	4.66	93,105,124,129	0
5	NAG	B	3040	14/15	0.32	2.16	67,95,102,102	0
3	NAG	B	2692	14/15	0.17	1.07	61,85,98,118	0
3	NAG	A	2692	14/15	0.15	0.73	80,94,109,132	0
5	NAG	B	3039	14/15	0.24	0.52	62,81,99,100	0
5	NAG	A	3039	14/15	0.22	-0.02	70,89,106,113	0
3	NAG	A	2693	14/15	0.26	-	145,150,158,160	0

### 6.4 Ligands ⓘ

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	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
6	GOL	A	101	6/6	0.25	4.41	97,103,106,107	0
4	NAG	A	2859	14/15	0.26	3.82	76,88,92,93	0
4	NAG	A	2865	14/15	0.23	3.05	61,97,103,104	0
4	NAG	B	2859	14/15	0.22	1.88	64,86,102,107	0
4	NAG	A	2926	14/15	0.14	0.90	93,101,105,106	0
4	NAG	B	2926	14/15	0.17	0.27	80,98,117,119	0
6	GOL	B	102	6/6	0.19	0.06	71,77,84,88	0
4	NAG	B	2865	14/15	0.31	-	88,121,132,135	0

### 6.5 Other polymers ⓘ

There are no such residues in this entry.