



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 28, 2017 – 02:54 PM EDT

PDB ID : 2NZX
Title : Crystal Structure of alpha1,3-Fucosyltransferase with GDP
Authors : Sun, H.Y.; Ko, T.P.
Deposited on : 2006-11-27
Resolution : 1.90 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

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 : 1.7.2 (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

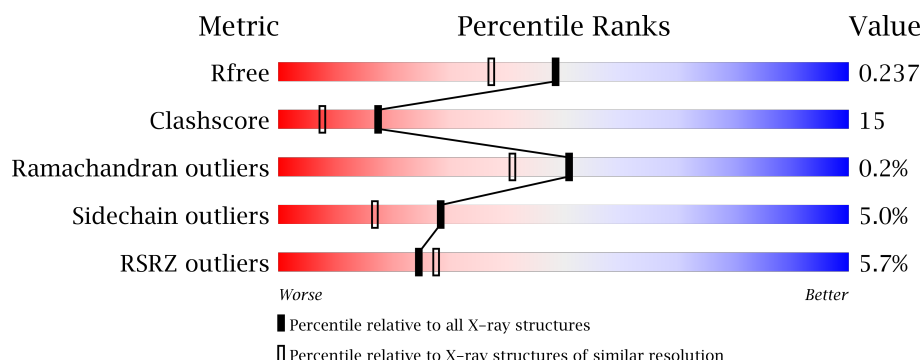
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 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	5047 (1.90-1.90)
Clashscore	112137	5731 (1.90-1.90)
Ramachandran outliers	110173	5669 (1.90-1.90)
Sidechain outliers	110143	5670 (1.90-1.90)
RSRZ outliers	101464	5100 (1.90-1.90)

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 ≥ 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	371	<div> <div>5%</div> <div> <div></div> <div>68%</div> <div>21%</div> <div>• 8%</div> </div> </div>
1	B	371	<div> <div>6%</div> <div> <div></div> <div>66%</div> <div>22%</div> <div>• 9%</div> </div> </div>
1	C	371	<div> <div>4%</div> <div> <div></div> <div>74%</div> <div>17%</div> <div>• 6%</div> </div> </div>

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 10752 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 Alpha1,3-fucosyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	340	Total	C	N	O	S	0	0	0
			2795	1811	454	523	7			
1	B	338	Total	C	N	O	S	0	0	0
			2776	1797	452	520	7			
1	C	350	Total	C	N	O	S	0	0	0
			2871	1861	468	535	7			

There are 24 discrepancies between the modelled and reference sequences:

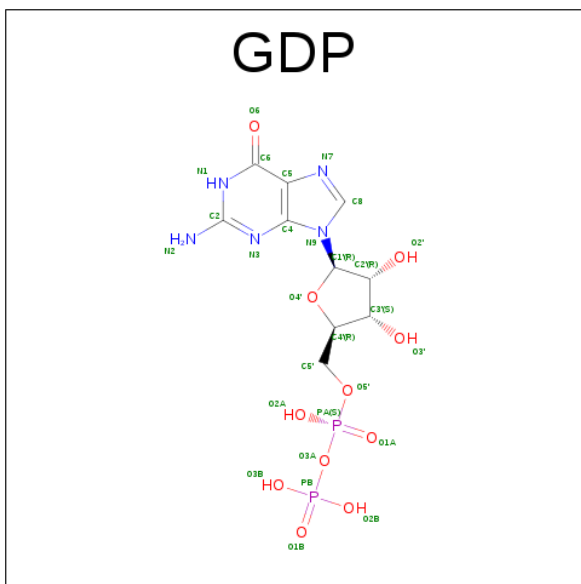
Chain	Residue	Modelled	Actual	Comment	Reference
A	364	LEU	-	EXPRESSION TAG	UNP O30511
A	365	GLU	-	EXPRESSION TAG	UNP O30511
A	366	HIS	-	EXPRESSION TAG	UNP O30511
A	367	HIS	-	EXPRESSION TAG	UNP O30511
A	368	HIS	-	EXPRESSION TAG	UNP O30511
A	369	HIS	-	EXPRESSION TAG	UNP O30511
A	370	HIS	-	EXPRESSION TAG	UNP O30511
A	371	HIS	-	EXPRESSION TAG	UNP O30511
B	364	LEU	-	EXPRESSION TAG	UNP O30511
B	365	GLU	-	EXPRESSION TAG	UNP O30511
B	366	HIS	-	EXPRESSION TAG	UNP O30511
B	367	HIS	-	EXPRESSION TAG	UNP O30511
B	368	HIS	-	EXPRESSION TAG	UNP O30511
B	369	HIS	-	EXPRESSION TAG	UNP O30511
B	370	HIS	-	EXPRESSION TAG	UNP O30511
B	371	HIS	-	EXPRESSION TAG	UNP O30511
C	364	LEU	-	EXPRESSION TAG	UNP O30511
C	365	GLU	-	EXPRESSION TAG	UNP O30511
C	366	HIS	-	EXPRESSION TAG	UNP O30511
C	367	HIS	-	EXPRESSION TAG	UNP O30511
C	368	HIS	-	EXPRESSION TAG	UNP O30511
C	369	HIS	-	EXPRESSION TAG	UNP O30511
C	370	HIS	-	EXPRESSION TAG	UNP O30511

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Chain	Residue	Modelled	Actual	Comment	Reference
C	371	HIS	-	EXPRESSION TAG	UNP O30511

- Molecule 2 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: $C_{10}H_{15}N_5O_{11}P_2$).

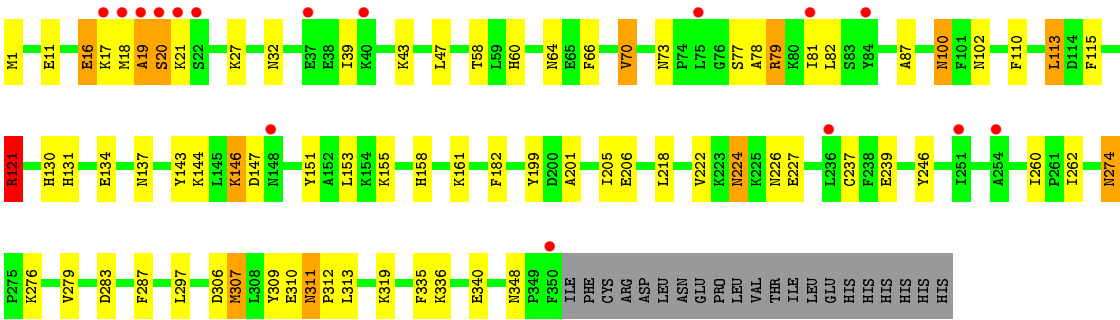




Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	C	1	Total	O	S	0	0
			5	4	1		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	797	Total	O	0	0
			797	797		
4	B	650	Total	O	0	0
			650	650		
4	C	774	Total	O	0	0
			774	774		



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	104.15Å 136.25Å 96.38Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 1.90 27.81 – 1.90	Depositor EDS
% Data completeness (in resolution range)	89.2 (30.00-1.90) 89.1 (27.81-1.90)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.15 (at 1.89Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.190 , 0.237 0.190 , 0.237	Depositor DCC
R_{free} test set	4859 reflections (5.02%)	DCC
Wilson B-factor (Å ²)	28.4	Xtriage
Anisotropy	0.151	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 64.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	10752	wwPDB-VP
Average B, all atoms (Å ²)	40.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.87% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: GDP, SO4

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	0.88	0/2880	0.85	5/3910 (0.1%)
1	B	0.94	0/2859	0.91	3/3880 (0.1%)
1	C	1.06	4/2958 (0.1%)	1.18	12/4015 (0.3%)
All	All	0.96	4/8697 (0.0%)	0.99	20/11805 (0.2%)

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	A	0	2
1	B	0	2
All	All	0	4

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	237	CYS	CB-SG	-8.70	1.67	1.82
1	C	121	ARG	CG-CD	6.52	1.68	1.51
1	C	307	MET	SD-CE	-6.10	1.43	1.77
1	C	239	GLU	CB-CG	5.29	1.62	1.52

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	121	ARG	NE-CZ-NH1	-32.17	104.22	120.30
1	C	121	ARG	NE-CZ-NH2	28.98	134.79	120.30
1	C	121	ARG	CD-NE-CZ	11.88	140.23	123.60
1	A	113	LEU	CA-CB-CG	7.93	133.54	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	113	LEU	CA-CB-CG	7.82	133.28	115.30
1	C	121	ARG	CG-CD-NE	-7.41	96.24	111.80
1	C	79	ARG	NE-CZ-NH1	-7.37	116.62	120.30
1	C	79	ARG	NE-CZ-NH2	6.78	123.69	120.30
1	C	113	LEU	CA-CB-CG	6.23	129.63	115.30
1	B	262	ILE	N-CA-C	-6.21	94.24	111.00
1	C	283	ASP	CB-CA-C	-6.08	98.23	110.40
1	A	137	ASN	N-CA-C	-5.78	95.39	111.00
1	A	339	LEU	CA-CB-CG	-5.64	102.33	115.30
1	C	137	ASN	N-CA-C	-5.55	96.00	111.00
1	C	283	ASP	CB-CG-OD2	-5.50	113.35	118.30
1	A	262	ILE	N-CA-C	-5.44	96.32	111.00
1	A	20	SER	N-CA-C	5.22	125.09	111.00
1	B	283	ASP	CB-CG-OD2	-5.18	113.64	118.30
1	C	262	ILE	N-CA-C	-5.10	97.23	111.00
1	C	70	VAL	N-CA-C	-5.08	97.30	111.00

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	119	TYR	Sidechain
1	A	92	TYR	Sidechain
1	B	263	TYR	Sidechain
1	B	9	TYR	Sidechain

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2795	0	2669	86	0
1	B	2776	0	2653	98	0
1	C	2871	0	2756	77	0
2	A	28	0	12	0	0
2	B	28	0	12	1	0
2	C	28	0	12	0	0
3	C	5	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	797	0	0	22	4
4	B	650	0	0	28	5
4	C	774	0	0	25	3
All	All	10752	0	8114	257	8

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 15.

All (257) 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:C:260:ILE:CG2	1:C:307:MET:HE3	1.81	1.10
1:C:260:ILE:HG21	1:C:307:MET:HE3	1.21	1.09
1:C:287:PHE:HD1	4:C:3726:HOH:O	1.37	1.05
1:B:319:LYS:HD2	4:B:3651:HOH:O	1.55	1.05
1:A:349:PRO:HD2	4:A:3750:HOH:O	1.58	1.02
1:C:260:ILE:HG21	1:C:307:MET:CE	1.93	0.97
1:B:223:LYS:H	1:B:223:LYS:HD3	1.30	0.97
1:B:92:TYR:OH	4:B:3100:HOH:O	1.77	0.95
1:A:132:LYS:NZ	1:A:226:ASN:HD21	1.66	0.93
1:A:132:LYS:HZ2	1:A:226:ASN:HD21	0.96	0.90
1:A:116:ASN:HB3	4:A:3775:HOH:O	1.72	0.88
1:A:74:PRO:CD	4:A:3623:HOH:O	2.20	0.87
1:C:1:MET:HE2	1:C:309:TYR:HD1	1.37	0.87
4:A:3539:HOH:O	1:C:58:THR:HG21	1.75	0.86
1:B:315:THR:HG23	4:B:3073:HOH:O	1.76	0.85
1:B:223:LYS:N	1:B:223:LYS:HD3	1.90	0.84
1:A:132:LYS:HZ2	1:A:226:ASN:ND2	1.75	0.83
1:C:110:PHE:O	1:C:121:ARG:HD2	1.77	0.83
1:B:162:GLU:HB2	4:B:3446:HOH:O	1.76	0.83
1:C:130:HIS:HD2	1:C:151:TYR:OH	1.62	0.83
1:B:100:ASN:HD22	1:B:100:ASN:C	1.82	0.82
1:B:60:HIS:HD2	1:B:62:ASN:H	1.24	0.82
1:A:11:GLU:HG3	4:A:3756:HOH:O	1.79	0.80
1:B:207:PRO:HB2	4:B:3584:HOH:O	1.80	0.80
1:C:260:ILE:HD13	1:C:307:MET:CE	2.12	0.80
1:B:203:ASN:ND2	1:B:207:PRO:HA	1.98	0.78
1:B:262:ILE:HD13	1:B:294:ILE:HD13	1.64	0.78
1:B:223:LYS:H	1:B:223:LYS:CD	1.95	0.78
1:A:222:VAL:HG21	1:A:228:PHE:HB2	1.67	0.76
1:B:40:LYS:NZ	4:B:3343:HOH:O	2.18	0.76

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:16:GLU:OE1	1:B:54:ARG:NH2	2.20	0.74
1:B:100:ASN:ND2	1:B:102:ASN:H	1.85	0.74
1:B:130:HIS:HD2	1:B:151:TYR:OH	1.70	0.74
1:B:16:GLU:CD	1:B:16:GLU:H	1.91	0.74
1:B:93:THR:HG22	4:B:3109:HOH:O	1.86	0.74
1:C:205:ILE:HG22	4:C:3704:HOH:O	1.87	0.74
1:B:203:ASN:HD22	1:B:207:PRO:HA	1.54	0.73
1:B:222:VAL:HG11	1:B:228:PHE:HB2	1.71	0.73
1:A:348:ASN:HD22	1:C:64:ASN:HD22	1.35	0.72
1:B:38:GLU:HG2	4:B:3167:HOH:O	1.87	0.72
1:C:1:MET:HE2	1:C:309:TYR:CD1	2.23	0.72
1:C:260:ILE:HD13	1:C:307:MET:HE3	1.72	0.71
1:B:43:LYS:HE2	1:B:59:LEU:HD23	1.71	0.71
1:C:73:ASN:OD1	1:C:79:ARG:NH1	2.25	0.69
1:B:7:ASP:HA	1:B:146:LYS:HE3	1.75	0.69
1:A:84:TYR:HA	4:C:3530:HOH:O	1.92	0.69
1:A:200:ASP:OD1	1:A:215:ARG:NH1	2.27	0.68
1:A:100:ASN:HD21	1:A:102:ASN:HB2	1.57	0.68
1:B:100:ASN:HD22	1:B:102:ASN:H	1.42	0.68
1:C:100:ASN:HD22	1:C:100:ASN:C	1.98	0.67
1:C:206:GLU:OE1	4:C:3778:HOH:O	2.12	0.67
1:C:260:ILE:HG23	1:C:307:MET:HE3	1.75	0.67
1:B:146:LYS:H	1:B:146:LYS:CD	2.07	0.67
1:B:297:LEU:HD21	4:B:3140:HOH:O	1.94	0.67
1:A:64:ASN:HD22	1:C:348:ASN:HD22	1.42	0.67
1:C:224:ASN:ND2	1:C:227:GLU:H	1.92	0.67
1:A:84:TYR:N	1:A:84:TYR:CD1	2.64	0.66
1:C:134:GLU:OE1	4:C:3764:HOH:O	2.12	0.66
1:B:60:HIS:CD2	1:B:62:ASN:H	2.09	0.66
1:C:17:LYS:HE3	4:C:3771:HOH:O	1.96	0.66
1:C:146:LYS:HG3	4:C:3596:HOH:O	1.95	0.66
1:B:153:LEU:HD13	4:B:3485:HOH:O	1.97	0.65
1:A:85:GLN:HG2	4:A:3154:HOH:O	1.98	0.64
1:C:260:ILE:HD13	1:C:307:MET:HE2	1.79	0.64
1:A:291:ILE:HD13	1:A:292:ASP:N	2.13	0.63
1:A:224:ASN:OD1	1:A:227:GLU:N	2.30	0.63
1:B:222:VAL:HG13	1:B:223:LYS:NZ	2.14	0.63
1:C:39:ILE:CG2	1:C:43:LYS:HE3	2.29	0.63
1:B:299:THR:OG1	1:B:300:HIS:HD2	1.81	0.62
1:A:124:LEU:HD12	1:A:248:THR:HG22	1.80	0.62
1:C:1:MET:CE	1:C:309:TYR:CD1	2.82	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:72:GLY:C	1:B:73:ASN:HD22	2.01	0.62
1:A:21:LYS:C	1:A:23:PRO:HD3	2.20	0.62
1:A:100:ASN:C	1:A:100:ASN:HD22	2.01	0.62
1:A:74:PRO:HD2	4:A:3623:HOH:O	1.90	0.61
1:C:1:MET:CE	1:C:309:TYR:HD1	2.10	0.61
1:B:146:LYS:H	1:B:146:LYS:HD2	1.66	0.61
1:A:100:ASN:HD22	1:A:102:ASN:H	1.46	0.61
1:A:348:ASN:HD22	1:C:64:ASN:ND2	1.98	0.61
1:B:22:SER:HB2	4:B:3489:HOH:O	2.01	0.61
1:B:22:SER:O	1:B:24:PRO:HD3	1.99	0.61
1:C:279:VAL:HG23	1:C:307:MET:HE1	1.82	0.61
1:A:274:ASN:HD22	1:A:275:PRO:HD2	1.65	0.61
1:B:20:SER:O	4:B:3487:HOH:O	2.16	0.61
1:A:113:LEU:HD22	1:A:119:TYR:CD2	2.37	0.60
1:A:217:THR:O	1:A:217:THR:HG22	2.02	0.60
1:C:311:ASN:HD22	1:C:312:PRO:N	2.00	0.59
1:B:233:LYS:NZ	4:B:3125:HOH:O	2.24	0.58
1:C:336:LYS:HE2	4:C:3745:HOH:O	2.02	0.58
1:C:153:LEU:HD11	4:C:3173:HOH:O	2.02	0.58
1:B:209:THR:HG21	1:B:232:TYR:OH	2.04	0.58
1:C:205:ILE:CG2	4:C:3704:HOH:O	2.49	0.58
1:B:274:ASN:HD22	1:B:275:PRO:HD2	1.69	0.58
1:A:233:LYS:HD3	1:A:298:HIS:CD2	2.38	0.57
1:A:311:ASN:ND2	1:A:313:LEU:H	2.03	0.57
1:A:100:ASN:ND2	1:A:102:ASN:H	2.01	0.57
1:C:297:LEU:HD13	1:C:307:MET:HE2	1.87	0.57
1:C:11:GLU:HB3	4:C:3607:HOH:O	2.04	0.56
1:C:182:PHE:CD2	1:C:206:GLU:HG3	2.39	0.56
1:C:100:ASN:HD21	1:C:102:ASN:HB2	1.70	0.56
1:C:131:HIS:CD2	4:C:3273:HOH:O	2.57	0.56
1:C:201:ALA:O	1:C:205:ILE:HD13	2.05	0.56
1:A:40:LYS:HE2	4:A:3604:HOH:O	2.05	0.56
1:B:176:ASP:OD2	1:B:179:LYS:HG3	2.05	0.56
1:C:130:HIS:CD2	1:C:151:TYR:OH	2.52	0.56
1:C:32:ASN:ND2	4:C:3194:HOH:O	2.39	0.56
1:B:161:LYS:HE3	4:B:3266:HOH:O	2.05	0.55
1:B:72:GLY:HA3	4:B:3338:HOH:O	2.05	0.55
1:B:72:GLY:O	1:B:73:ASN:ND2	2.30	0.55
1:B:231:GLN:NE2	4:B:3633:HOH:O	2.38	0.55
1:C:311:ASN:ND2	1:C:313:LEU:H	2.04	0.55
1:A:95:GLU:O	4:A:3069:HOH:O	2.18	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:311:ASN:HD22	1:A:313:LEU:H	1.55	0.55
1:B:222:VAL:HG11	1:B:228:PHE:CB	2.37	0.54
1:C:206:GLU:CD	4:C:3778:HOH:O	2.45	0.54
1:A:200:ASP:CG	1:A:215:ARG:HH12	2.10	0.54
1:C:274:ASN:ND2	1:C:276:LYS:H	2.05	0.54
1:C:287:PHE:CD1	4:C:3726:HOH:O	2.27	0.54
1:C:77:SER:O	1:C:81:ILE:HG13	2.08	0.54
1:C:205:ILE:HD12	1:C:205:ILE:N	2.23	0.54
1:A:286:ASN:HD21	1:A:289:GLU:HG3	1.73	0.54
1:A:201:ALA:O	1:A:205:ILE:HD13	2.08	0.54
1:B:100:ASN:ND2	1:B:100:ASN:C	2.56	0.54
1:A:254:ALA:HB3	1:A:261:PRO:HG3	1.91	0.53
1:A:14:SER:HA	4:A:3019:HOH:O	2.09	0.53
1:A:254:ALA:CB	1:A:261:PRO:HG3	2.38	0.53
1:B:158:HIS:HB2	4:B:3559:HOH:O	2.08	0.53
1:B:299:THR:OG1	1:B:300:HIS:CD2	2.59	0.53
1:B:130:HIS:HE1	4:B:3102:HOH:O	1.91	0.53
1:C:224:ASN:HD21	1:C:226:ASN:HB2	1.72	0.53
1:B:224:ASN:OD1	4:B:3246:HOH:O	2.19	0.53
1:C:224:ASN:HD22	1:C:224:ASN:C	2.12	0.53
1:A:311:ASN:HD22	1:A:312:PRO:N	2.06	0.52
1:A:291:ILE:HA	1:A:294:ILE:HD12	1.90	0.52
1:C:158:HIS:HD2	4:C:3776:HOH:O	1.92	0.52
1:C:297:LEU:HD13	1:C:307:MET:CE	2.40	0.52
1:B:100:ASN:HD21	1:B:102:ASN:HB2	1.74	0.52
1:B:43:LYS:HE3	4:B:3503:HOH:O	2.09	0.52
1:B:16:GLU:OE2	1:B:329:LYS:HE2	2.08	0.52
1:A:64:ASN:ND2	1:C:348:ASN:HD22	2.06	0.52
1:A:239:GLU:CG	1:A:265:GLY:HA3	2.41	0.51
1:A:84:TYR:N	1:A:84:TYR:HD1	2.05	0.51
1:B:216:ASN:OD1	1:B:217:THR:N	2.43	0.51
1:A:116:ASN:CB	4:A:3775:HOH:O	2.44	0.51
1:B:146:LYS:HD2	1:B:146:LYS:N	2.25	0.51
2:B:3002:GDP:O2B	4:B:3358:HOH:O	2.20	0.51
1:B:311:ASN:HD22	1:B:312:PRO:N	2.09	0.51
1:B:1:MET:CE	1:B:309:TYR:CD1	2.94	0.51
1:A:74:PRO:HD3	4:A:3623:HOH:O	1.98	0.50
1:B:210:GLY:H	1:B:217:THR:HB	1.76	0.50
1:A:299:THR:HA	4:A:3678:HOH:O	2.10	0.50
1:B:1:MET:HE2	1:B:309:TYR:HD1	1.76	0.50
1:B:18:MET:HE2	4:B:3640:HOH:O	2.12	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:222:VAL:HG21	1:A:228:PHE:CB	2.39	0.50
1:B:222:VAL:CG1	1:B:223:LYS:HZ2	2.25	0.50
1:A:86:ASN:ND2	1:A:346:HIS:NE2	2.59	0.50
1:A:164:HIS:HB3	1:A:167:LEU:HB3	1.93	0.49
1:A:291:ILE:HD13	1:A:291:ILE:C	2.32	0.49
1:C:319:LYS:HG3	4:C:3750:HOH:O	2.12	0.49
1:B:140:THR:HB	1:B:161:LYS:HB2	1.94	0.49
1:C:16:GLU:H	1:C:16:GLU:CD	2.15	0.49
1:A:217:THR:O	1:A:217:THR:CG2	2.60	0.49
1:A:204:SER:OG	1:A:205:ILE:HD12	2.13	0.49
1:A:205:ILE:N	1:A:205:ILE:HD12	2.28	0.49
1:C:47:LEU:HD11	1:C:335:PHE:CE2	2.48	0.49
1:A:74:PRO:C	4:A:3043:HOH:O	2.51	0.48
1:C:143:TYR:C	1:C:144:LYS:HD3	2.34	0.48
1:B:1:MET:HE1	1:B:309:TYR:CD1	2.48	0.48
1:B:199:TYR:CE1	1:B:215:ARG:HB3	2.48	0.48
1:B:274:ASN:ND2	4:B:3153:HOH:O	2.45	0.48
1:A:224:ASN:ND2	4:A:3134:HOH:O	2.47	0.48
1:A:198:PHE:HD1	1:A:287:PHE:CD1	2.32	0.48
1:B:146:LYS:HE3	4:B:3068:HOH:O	2.14	0.47
1:C:311:ASN:C	1:C:311:ASN:HD22	2.18	0.47
1:B:10:VAL:HG11	1:B:146:LYS:HD3	1.95	0.47
1:B:32:ASN:ND2	1:B:32:ASN:H	2.11	0.47
1:A:212:GLY:O	1:A:216:ASN:HB2	2.15	0.47
1:B:218:LEU:HD13	1:B:220:TYR:CE1	2.50	0.47
1:C:16:GLU:HG2	4:C:3622:HOH:O	2.15	0.47
1:A:144:LYS:HG3	4:A:3758:HOH:O	2.14	0.47
1:C:78:ALA:HA	1:C:81:ILE:HD12	1.95	0.47
1:C:161:LYS:HE3	4:C:3221:HOH:O	2.15	0.46
1:B:1:MET:CE	1:B:309:TYR:HD1	2.27	0.46
1:B:203:ASN:HA	1:B:208:VAL:HG23	1.97	0.46
1:B:319:LYS:CD	4:B:3651:HOH:O	2.36	0.46
1:B:222:VAL:HG13	1:B:223:LYS:HZ2	1.80	0.46
1:A:287:PHE:O	1:A:291:ILE:HG23	2.16	0.46
1:C:158:HIS:CD2	4:C:3776:HOH:O	2.65	0.46
1:A:128:ARG:NH2	4:A:3614:HOH:O	2.47	0.46
1:C:205:ILE:CD1	1:C:205:ILE:N	2.79	0.46
1:A:113:LEU:HD22	1:A:119:TYR:CG	2.50	0.45
1:B:113:LEU:HD22	1:B:119:TYR:CD2	2.51	0.45
1:A:301:LYS:HG3	1:A:302:ASN:N	2.32	0.45
1:B:1:MET:O	1:B:4:PRO:HD2	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:225:LYS:HE2	1:B:229:LEU:HD11	1.99	0.45
1:C:100:ASN:HD22	1:C:102:ASN:H	1.65	0.45
1:A:84:TYR:HB3	4:C:3530:HOH:O	2.17	0.44
1:B:311:ASN:ND2	1:B:313:LEU:H	2.15	0.44
1:A:233:LYS:NZ	1:A:298:HIS:CD2	2.86	0.44
1:B:233:LYS:NZ	1:B:298:HIS:CD2	2.85	0.44
1:B:233:LYS:NZ	1:B:298:HIS:HD2	2.16	0.44
1:C:19:ALA:O	1:C:20:SER:C	2.56	0.44
4:A:3539:HOH:O	1:C:60:HIS:HE1	2.00	0.44
1:A:216:ASN:OD1	1:A:216:ASN:C	2.56	0.44
1:A:23:PRO:HA	1:A:24:PRO:HD2	1.83	0.44
1:C:70:VAL:HG23	1:C:87:ALA:HB3	2.00	0.44
1:C:79:ARG:HG2	4:C:3379:HOH:O	2.18	0.44
1:C:79:ARG:O	1:C:82:LEU:HB3	2.18	0.43
1:C:246:TYR:HD2	4:C:3276:HOH:O	2.01	0.43
1:B:100:ASN:ND2	1:B:102:ASN:N	2.63	0.43
1:C:100:ASN:ND2	1:C:102:ASN:H	2.17	0.43
1:B:1:MET:HE2	1:B:309:TYR:HA	2.01	0.43
1:B:216:ASN:C	1:B:216:ASN:OD1	2.57	0.43
1:C:311:ASN:HD22	1:C:313:LEU:H	1.65	0.43
1:A:40:LYS:HE3	4:A:3770:HOH:O	2.18	0.43
1:A:233:LYS:NZ	1:A:298:HIS:HD2	2.17	0.43
1:B:167:LEU:O	1:B:171:VAL:HG23	2.19	0.43
1:A:344:ILE:HG12	1:C:66:PHE:CZ	2.53	0.43
1:B:168:CYS:O	1:B:172:ASN:HB2	2.18	0.42
1:B:290:ALA:O	1:B:294:ILE:HG13	2.20	0.42
1:A:167:LEU:HD12	1:A:167:LEU:O	2.19	0.42
1:C:20:SER:HA	4:C:3264:HOH:O	2.20	0.42
1:A:86:ASN:HD22	1:A:86:ASN:HA	1.61	0.42
1:B:146:LYS:CD	1:B:146:LYS:N	2.75	0.42
1:B:130:HIS:CD2	1:B:151:TYR:OH	2.60	0.42
1:B:31:ALA:HB1	1:B:33:TRP:CD2	2.54	0.42
1:C:218:LEU:CD2	1:C:222:VAL:HG13	2.49	0.42
1:A:19:ALA:HB1	4:A:3237:HOH:O	2.18	0.42
1:B:212:GLY:O	1:B:216:ASN:HB2	2.20	0.42
1:A:164:HIS:N	1:A:165:PRO:HD3	2.34	0.42
1:A:190:PRO:O	1:A:192:ALA:N	2.50	0.42
1:A:347:ASP:O	1:A:349:PRO:HD3	2.20	0.42
1:A:100:ASN:C	1:A:100:ASN:ND2	2.73	0.42
1:B:222:VAL:HG13	1:B:223:LYS:HZ1	1.81	0.42
1:B:344:ILE:HD13	1:B:344:ILE:HA	1.90	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:203:ASN:ND2	1:B:208:VAL:H	2.18	0.41
1:A:108:ILE:HG21	1:A:122:MET:HE3	2.02	0.41
1:A:11:GLU:CG	4:A:3756:HOH:O	2.54	0.41
1:A:311:ASN:HD22	1:A:311:ASN:C	2.24	0.41
1:C:199:TYR:CD1	1:C:199:TYR:C	2.93	0.41
1:C:336:LYS:O	1:C:340:GLU:HG3	2.21	0.41
1:A:188:SER:O	1:A:190:PRO:HD3	2.20	0.41
1:A:227:GLU:HA	1:A:227:GLU:OE1	2.21	0.41
1:B:198:PHE:CD2	1:B:236:LEU:HD11	2.56	0.41
1:C:1:MET:HE1	1:C:309:TYR:CD1	2.56	0.41
1:B:132:LYS:NZ	1:B:226:ASN:OD1	2.54	0.41
1:B:1:MET:HE2	1:B:309:TYR:CD1	2.54	0.41
1:A:180:ARG:HG2	4:A:3400:HOH:O	2.20	0.41
1:A:239:GLU:HG3	1:A:265:GLY:HA3	2.02	0.41
1:B:218:LEU:HD13	1:B:220:TYR:CZ	2.55	0.41
1:B:93:THR:HG22	4:B:3517:HOH:O	2.20	0.40
1:A:87:ALA:HA	4:C:3321:HOH:O	2.22	0.40
1:A:233:LYS:HZ3	1:A:298:HIS:HD2	1.68	0.40
1:B:45:SER:HB2	4:B:3100:HOH:O	2.21	0.40
1:A:148:ASN:N	1:A:148:ASN:ND2	2.67	0.40
1:B:93:THR:N	4:B:3517:HOH:O	2.30	0.40
1:C:306:ASP:O	1:C:310:GLU:HG2	2.22	0.40

All (8) 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)
4:B:3154:HOH:O	4:B:3154:HOH:O[2_565]	1.81	0.39
4:B:3459:HOH:O	4:B:3459:HOH:O[2_565]	1.90	0.30
4:A:3568:HOH:O	4:A:3568:HOH:O[2_565]	2.06	0.14
4:A:3784:HOH:O	4:C:3457:HOH:O[3_557]	2.10	0.10
4:A:3726:HOH:O	4:B:3497:HOH:O[4_466]	2.10	0.10
4:A:3285:HOH:O	4:C:3518:HOH:O[2_665]	2.12	0.08
4:B:3079:HOH:O	4:B:3651:HOH:O[2_565]	2.13	0.07
4:B:3029:HOH:O	4:C:3087:HOH:O[3_556]	2.17	0.03

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	336/371 (91%)	321 (96%)	15 (4%)	0	100	100
1	B	334/371 (90%)	326 (98%)	8 (2%)	0	100	100
1	C	348/371 (94%)	336 (97%)	10 (3%)	2 (1%)	28	16
All	All	1018/1113 (92%)	983 (97%)	33 (3%)	2 (0%)	51	41

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	19	ALA
1	C	20	SER

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	305/334 (91%)	290 (95%)	15 (5%)	29	17
1	B	303/334 (91%)	286 (94%)	17 (6%)	25	13
1	C	313/334 (94%)	299 (96%)	14 (4%)	32	21
All	All	921/1002 (92%)	875 (95%)	46 (5%)	28	17

All (46) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	MET

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Mol	Chain	Res	Type
1	A	27	LYS
1	A	44	ASN
1	A	84	TYR
1	A	85	GLN
1	A	86	ASN
1	A	100	ASN
1	A	113	LEU
1	A	115	PHE
1	A	175	SER
1	A	223	LYS
1	A	291	ILE
1	A	295	LYS
1	A	311	ASN
1	A	319	LYS
1	B	16	GLU
1	B	18	MET
1	B	33	TRP
1	B	44	ASN
1	B	95	GLU
1	B	100	ASN
1	B	113	LEU
1	B	115	PHE
1	B	144	LYS
1	B	146	LYS
1	B	166	ASN
1	B	205	ILE
1	B	206	GLU
1	B	207	PRO
1	B	223	LYS
1	B	274	ASN
1	B	311	ASN
1	C	16	GLU
1	C	18	MET
1	C	21	LYS
1	C	27	LYS
1	C	100	ASN
1	C	113	LEU
1	C	115	PHE
1	C	121	ARG
1	C	146	LYS
1	C	147	ASP
1	C	155	LYS

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Mol	Chain	Res	Type
1	C	224	ASN
1	C	274	ASN
1	C	311	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (41) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	60	HIS
1	A	64	ASN
1	A	86	ASN
1	A	100	ASN
1	A	148	ASN
1	A	172	ASN
1	A	196	ASN
1	A	221	ASN
1	A	226	ASN
1	A	274	ASN
1	A	298	HIS
1	A	300	HIS
1	A	311	ASN
1	B	60	HIS
1	B	73	ASN
1	B	86	ASN
1	B	100	ASN
1	B	130	HIS
1	B	131	HIS
1	B	172	ASN
1	B	196	ASN
1	B	203	ASN
1	B	231	GLN
1	B	274	ASN
1	B	298	HIS
1	B	300	HIS
1	B	311	ASN
1	C	32	ASN
1	C	60	HIS
1	C	64	ASN
1	C	85	GLN
1	C	100	ASN
1	C	130	HIS
1	C	131	HIS
1	C	166	ASN

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Mol	Chain	Res	Type
1	C	172	ASN
1	C	196	ASN
1	C	224	ASN
1	C	274	ASN
1	C	300	HIS
1	C	311	ASN

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 ⓘ

There are no carbohydrates in this entry.

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	$\# Z > 2$
2	GDP	A	3001	-	25,30,30	1.65	5 (20%)	26,47,47	1.95	6 (23%)
2	GDP	B	3002	-	25,30,30	1.48	2 (8%)	26,47,47	1.99	5 (19%)
2	GDP	C	3003	-	25,30,30	2.00	5 (20%)	26,47,47	1.93	5 (19%)
3	SO4	C	3004	-	4,4,4	0.43	0	6,6,6	0.23	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	GDP	A	3001	-	-	0/12/32/32	0/3/3/3
2	GDP	B	3002	-	-	0/12/32/32	0/3/3/3
2	GDP	C	3003	-	-	0/12/32/32	0/3/3/3
3	SO4	C	3004	-	-	0/0/0/0	0/0/0/0

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	3001	GDP	C8-N7	-2.72	1.29	1.34
2	A	3001	GDP	PB-O3A	2.15	1.63	1.60
2	C	3003	GDP	O2'-C2'	2.35	1.48	1.43
2	C	3003	GDP	C3'-C4'	2.80	1.60	1.53
2	A	3001	GDP	C2-N1	2.88	1.40	1.35
2	B	3002	GDP	O4'-C1'	3.21	1.45	1.41
2	B	3002	GDP	PB-O3A	3.23	1.65	1.60
2	A	3001	GDP	O4'-C1'	3.23	1.45	1.41
2	C	3003	GDP	C6-N1	3.59	1.39	1.33
2	A	3001	GDP	C6-N1	4.16	1.40	1.33
2	C	3003	GDP	PB-O3A	4.63	1.67	1.60
2	C	3003	GDP	O4'-C1'	6.38	1.50	1.41

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	3001	GDP	N3-C2-N1	-4.40	121.04	127.46
2	C	3003	GDP	N3-C2-N1	-4.28	121.21	127.46
2	B	3002	GDP	N3-C2-N1	-4.26	121.24	127.46
2	A	3001	GDP	C5-C6-N1	-4.08	117.67	123.48
2	C	3003	GDP	C5-C6-N1	-3.86	117.99	123.48
2	B	3002	GDP	C5-C6-N1	-3.75	118.14	123.48
2	C	3003	GDP	C6-C5-C4	-3.57	117.29	120.84
2	B	3002	GDP	C6-C5-C4	-3.31	117.56	120.84
2	A	3001	GDP	C6-C5-C4	-2.29	118.56	120.84
2	A	3001	GDP	C4-C5-N7	-2.28	107.20	109.41
2	A	3001	GDP	C6-N1-C2	3.03	120.42	116.06
2	B	3002	GDP	C6-N1-C2	3.61	121.25	116.06
2	C	3003	GDP	C6-N1-C2	3.92	121.70	116.06
2	C	3003	GDP	C2-N3-C4	4.60	120.53	115.16
2	B	3002	GDP	C2-N3-C4	5.58	121.67	115.16
2	A	3001	GDP	C2-N3-C4	5.68	121.79	115.16

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	3002	GDP	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, 95th 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 ²)	Q<0.9
1	A	340/371 (91%)	0.30	19 (5%)	25 28	20, 37, 66, 79	0
1	B	338/371 (91%)	0.28	24 (7%)	17 19	19, 36, 61, 74	0
1	C	350/371 (94%)	0.01	16 (4%)	33 37	18, 28, 50, 77	0
All	All	1028/1113 (92%)	0.20	59 (5%)	24 28	18, 33, 62, 79	0

All (59) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	20	SER	8.4
1	C	19	ALA	8.1
1	A	19	ALA	7.6
1	B	19	ALA	7.4
1	C	20	SER	5.4
1	C	17	LYS	4.6
1	C	18	MET	4.3
1	A	316	LEU	4.3
1	B	20	SER	4.2
1	A	18	MET	4.1
1	A	205	ILE	4.1
1	B	18	MET	3.9
1	B	148	ASN	3.9
1	B	33	TRP	3.8
1	A	17	LYS	3.7
1	C	75	LEU	3.7
1	A	22	SER	3.5
1	A	74	PRO	3.4
1	A	317	ASP	3.3
1	A	148	ASN	3.3
1	C	22	SER	3.2
1	C	21	LYS	3.2
1	A	285	LYS	3.2

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Mol	Chain	Res	Type	RSRZ
1	A	251	ILE	3.1
1	B	73	ASN	3.1
1	B	158	HIS	3.1
1	C	37	GLU	3.1
1	B	62	ASN	3.0
1	C	148	ASN	2.8
1	B	22	SER	2.7
1	B	236	LEU	2.7
1	B	157	SER	2.7
1	A	204	SER	2.7
1	B	220	TYR	2.6
1	B	63	PRO	2.5
1	A	223	LYS	2.5
1	C	84	TYR	2.5
1	B	64	ASN	2.4
1	C	350	PHE	2.4
1	B	74	PRO	2.4
1	B	254	ALA	2.4
1	B	296	TYR	2.3
1	A	21	LYS	2.3
1	B	153	LEU	2.2
1	A	221	ASN	2.2
1	B	66	PHE	2.2
1	C	236	LEU	2.2
1	B	251	ILE	2.2
1	A	212	GLY	2.2
1	B	234	PHE	2.2
1	C	254	ALA	2.1
1	B	260	ILE	2.1
1	C	81	ILE	2.1
1	C	251	ILE	2.1
1	A	252	ILE	2.1
1	A	201	ALA	2.1
1	B	204	SER	2.0
1	C	40	LYS	2.0
1	B	259	THR	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 [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, 95th 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(\AA^2)	Q<0.9
2	GDP	A	3001	28/28	0.95	0.11	-0.56	42,51,56,57	0
2	GDP	B	3002	28/28	0.94	0.11	-0.78	34,37,51,52	0
2	GDP	C	3003	28/28	0.98	0.06	-1.38	21,24,29,35	0
3	SO4	C	3004	5/5	0.94	0.14	-	68,68,69,70	0

6.5 Other polymers [i](#)

There are no such residues in this entry.