



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 06:30 PM UTC

PDB ID : 6RGG / pdb_00006rgg
Title : Photorhabdus laumondii lectin PLL2 in complex with O-methylated PGL-1-derived disaccharide
Authors : Houser, J.; Fujdiarova, E.; Wimmerova, M.
Deposited on : 2019-04-16
Resolution : 2.20 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

<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>.

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

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

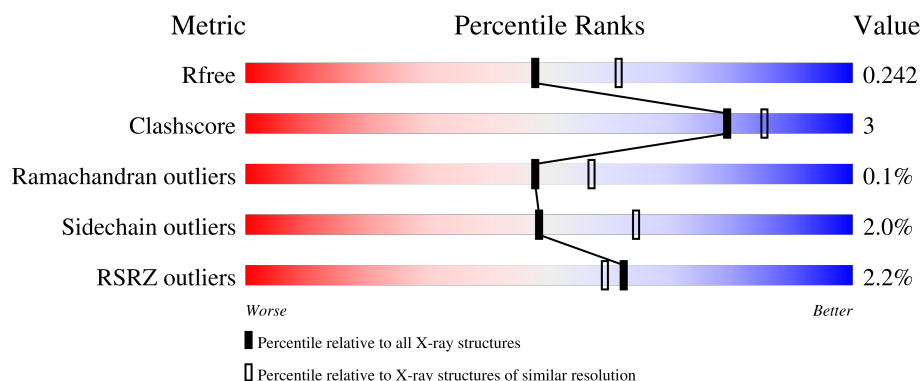
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

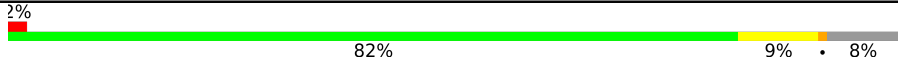
The reported resolution of this entry is 2.20 Å.

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}	180053	6164 (2.20-2.20)
Clashscore	190562	6851 (2.20-2.20)
Ramachandran outliers	187476	6768 (2.20-2.20)
Sidechain outliers	187428	6769 (2.20-2.20)
RSRZ outliers	180081	6166 (2.20-2.20)

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 ≥ 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	371	
1	B	371	

2 Entry composition [i](#)

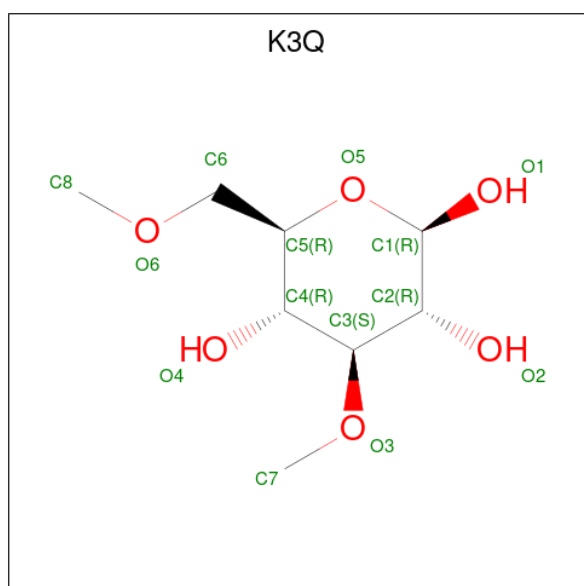
There are 6 unique types of molecules in this entry. The entry contains 5352 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 lectin PLL2 from Photorhabdus laumondii.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
1	A	340	Total	C	N	O	0	0	0
			2616	1649	470	497			
1	B	339	Total	C	N	O	0	0	0
			2603	1641	467	495			

- Molecule 2 is 3,6-O-dimethyl-D-glucose (CCD ID: K3Q) (formula: C₈H₁₆O₆).



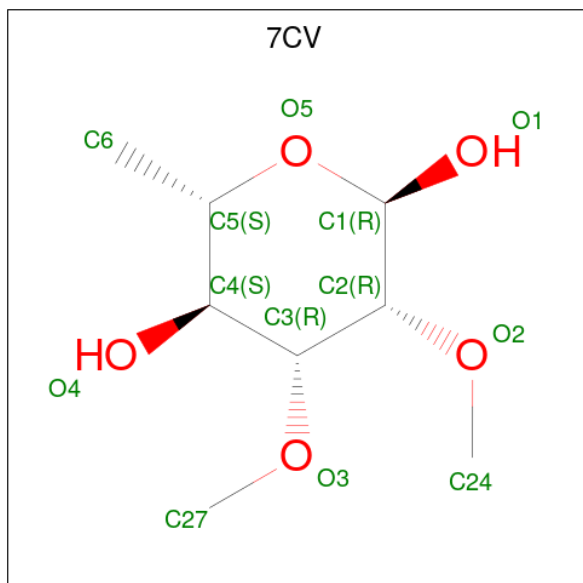
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			14	8	6		
2	A	1	Total	C	O	0	0
			14	8	6		
2	A	1	Total	C	O	0	0
			13	8	5		
2	B	1	Total	C	O	0	0
			14	8	6		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	B	1	Total	C	O	0	0
			13	8	5		
2	B	1	Total	C	O	0	0
			14	8	6		

- Molecule 3 is 6-deoxy-2,3-di-O-methyl- α -L-mannopyranose (CCD ID: 7CV) (formula: $C_8H_{16}O_5$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			13	8	5		
3	B	1	Total	C	O	0	0
			13	8	5		

- Molecule 4 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	4	Total	Na	0	0
			4	4		
4	B	1	Total	Na	0	0
			1	1		

- Molecule 5 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	B	1	Total	C	O	0	0
			4	2	2		

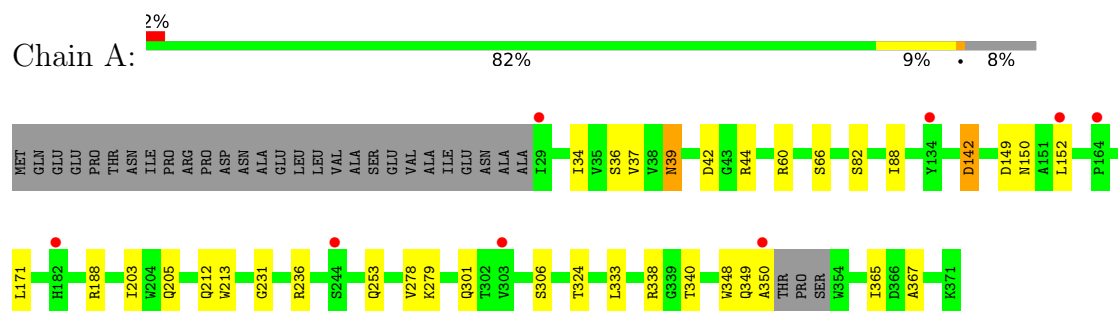
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	10	Total	O	0	0
			10	10		
6	B	6	Total	O	0	0
			6	6		

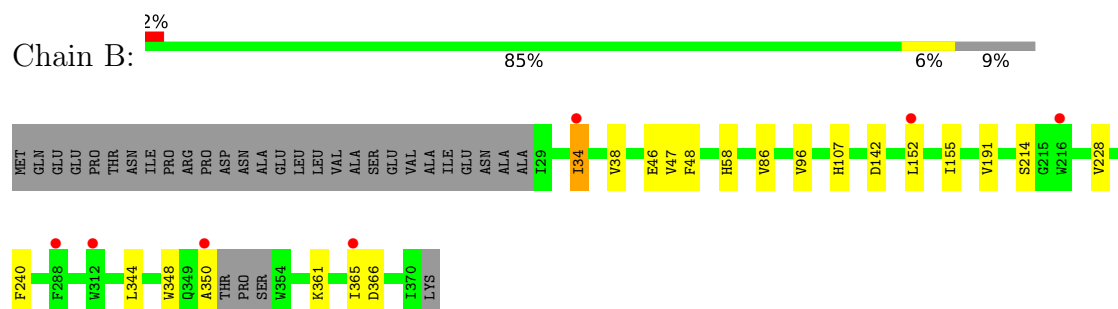
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: lectin PLL2 from *Phototrhhabdus laumondii*



- Molecule 1: lectin PLL2 from *Phototrhhabdus laumondii*



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	68.30Å 89.35Å 68.40Å 90.00° 101.35° 90.00°	Depositor
Resolution (Å)	67.03 – 2.20 67.03 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.1 (67.03-2.20) 99.1 (67.03-2.20)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.40 (at 2.20Å)	Xtriage
Refinement program	REFMAC 5.8.0238	Depositor
R, R_{free}	0.199 , 0.224 (Not available) , 0.242	Depositor DCC
R_{free} test set	2033 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	60.3	Xtriage
Anisotropy	0.048	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 34.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.127 for l,-k,h	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	5352	wwPDB-VP
Average B, all atoms (Å ²)	68.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.19% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: NA, EDO, K3Q, 7CV

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	1.02	0/2696	1.30	1/3705 (0.0%)
1	B	1.02	0/2683	1.28	1/3691 (0.0%)
All	All	1.02	0/5379	1.29	2/7396 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	155	ILE	CA-C-O	-5.42	116.41	120.96
1	A	142	ASP	CA-CB-CG	5.30	117.90	112.60

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	2616	0	2459	16	0
1	B	2603	0	2437	12	0
2	A	41	0	0	0	0
2	B	41	0	0	0	0
3	A	13	0	0	0	0
3	B	13	0	0	0	0
4	A	4	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	1	0	0	0	0
5	B	4	0	6	0	0
6	A	10	0	0	0	0
6	B	6	0	0	0	0
All	All	5352	0	4902	28	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (28) 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:34:ILE:HD11	1:B:365:ILE:O	1.85	0.77
1:B:348:TRP:CZ3	1:B:350:ALA:HB2	2.31	0.65
1:B:34:ILE:HD11	1:B:365:ILE:C	2.30	0.57
1:B:47:VAL:HG11	1:B:344:LEU:CD2	2.38	0.54
1:A:152:LEU:HD23	1:A:171:LEU:HD12	1.89	0.52
1:A:349:GLN:O	1:A:349:GLN:HG2	2.10	0.52
1:B:47:VAL:O	1:B:58:HIS:HA	2.10	0.51
1:A:39:ASN:ND2	1:A:39:ASN:H	2.11	0.49
1:A:34:ILE:HD13	1:A:338:ARG:HD3	1.95	0.47
1:A:231:GLY:O	1:A:279:LYS:HE2	2.15	0.47
1:B:34:ILE:HD13	1:B:366:ASP:HA	1.97	0.46
1:B:96:VAL:O	1:B:107:HIS:HA	2.18	0.44
1:A:188:ARG:HD2	1:A:205:GLN:O	2.18	0.44
1:B:152:LEU:HD21	1:B:191:VAL:HG11	1.98	0.44
1:A:37:VAL:HG23	1:A:324:THR:HG21	1.99	0.43
1:A:348:TRP:CZ3	1:A:350:ALA:HA	2.54	0.42
1:B:34:ILE:CD1	1:B:366:ASP:HA	2.50	0.42
1:A:42:ASP:OD2	1:A:44:ARG:NH2	2.52	0.42
1:A:44:ARG:NH1	1:A:60:ARG:NE	2.67	0.42
1:A:82:SER:HA	1:A:367:ALA:O	2.20	0.42
1:A:149:ASP:O	1:A:150:ASN:HB2	2.20	0.41
1:A:301:GLN:HE22	1:A:306:SER:N	2.17	0.41
1:B:38:VAL:HG13	1:B:86:VAL:HG13	2.02	0.41
1:A:236:ARG:HD2	1:A:253:GLN:O	2.21	0.41
1:A:278:VAL:HG11	1:A:333:LEU:HD22	2.03	0.41
1:B:46:GLU:HG2	1:B:48:PHE:CE1	2.56	0.41
1:B:228:VAL:CG1	1:B:240:PHE:HB2	2.51	0.41
1:A:203:ILE:HG12	1:A:213:TRP:HE3	1.86	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	336/371 (91%)	322 (96%)	14 (4%)	0	100	100
1	B	335/371 (90%)	318 (95%)	16 (5%)	1 (0%)	36	42
All	All	671/742 (90%)	640 (95%)	30 (4%)	1 (0%)	48	57

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	214	SER

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	273/299 (91%)	265 (97%)	8 (3%)	37	51
1	B	271/299 (91%)	268 (99%)	3 (1%)	65	79
All	All	544/598 (91%)	533 (98%)	11 (2%)	48	64

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	36	SER
1	A	39	ASN

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Mol	Chain	Res	Type
1	A	66	SER
1	A	88	ILE
1	A	142	ASP
1	A	212	GLN
1	A	340	THR
1	A	365	ILE
1	B	34	ILE
1	B	142	ASP
1	B	361	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	182	HIS
1	B	103	ASN
1	B	114	ASN
1	B	150	ASN
1	B	169	GLN
1	B	172	ASN
1	B	211	ASN

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](#)

Of 14 ligands modelled in this entry, 5 are monoatomic - leaving 9 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and

the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
3	7CV	A	404	2	13,13,13	1.13	2 (15%)	17,18,18	1.53	5 (29%)
2	K3Q	A	402	-	14,14,14	0.73	0	19,19,19	1.02	1 (5%)
5	EDO	B	404	-	3,3,3	0.10	0	2,2,2	0.21	0
3	7CV	B	403	2	13,13,13	0.82	0	17,18,18	1.51	2 (11%)
2	K3Q	B	402	3	13,13,14	0.36	0	16,17,19	0.83	1 (6%)
2	K3Q	A	403	3	13,13,14	0.47	0	16,17,19	1.16	2 (12%)
2	K3Q	A	401	-	14,14,14	0.70	0	19,19,19	1.36	3 (15%)
2	K3Q	B	401	-	14,14,14	0.47	0	19,19,19	1.30	2 (10%)
2	K3Q	B	405	-	14,14,14	0.58	0	19,19,19	0.86	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	7CV	A	404	2	-	0/4/24/24	0/1/1/1
2	K3Q	A	402	-	-	3/5/25/25	0/1/1/1
5	EDO	B	404	-	-	0/1/1/1	-
3	7CV	B	403	2	-	0/4/24/24	0/1/1/1
2	K3Q	B	402	3	-	0/5/22/25	0/1/1/1
2	K3Q	A	403	3	-	0/5/22/25	0/1/1/1
2	K3Q	A	401	-	-	0/5/25/25	0/1/1/1
2	K3Q	B	401	-	-	0/5/25/25	0/1/1/1
2	K3Q	B	405	-	-	2/5/25/25	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	404	7CV	C1-C2	2.70	1.55	1.52
3	A	404	7CV	O1-C1	2.45	1.47	1.39

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	401	K3Q	O5-C1-C2	-3.79	103.64	110.30
2	A	401	K3Q	C1-O5-C5	-3.40	107.07	113.65
2	A	403	K3Q	C6-C5-C4	2.91	118.17	112.07
3	A	404	7CV	C4-C3-C2	-2.89	105.22	111.72
3	B	403	7CV	C1-O5-C5	-2.86	109.93	114.37
2	B	402	K3Q	C2-C3-C4	-2.72	108.55	110.91
2	A	401	K3Q	O5-C1-C2	-2.61	105.70	110.30
2	A	402	K3Q	O5-C1-C2	-2.46	105.97	110.30
3	A	404	7CV	O5-C5-C4	2.44	113.95	109.55
3	A	404	7CV	O2-C2-C3	-2.44	103.29	108.93
2	B	401	K3Q	O1-C1-C2	2.38	115.88	108.98
3	A	404	7CV	C27-O3-C3	2.37	120.56	114.47
2	A	403	K3Q	O5-C5-C4	-2.18	105.52	110.83
2	A	401	K3Q	O5-C5-C4	2.12	113.52	109.70
3	A	404	7CV	O1-C1-C2	2.05	118.77	109.70
3	B	403	7CV	C4-C3-C2	-2.03	107.16	111.72

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	402	K3Q	O5-C5-C6-O6
2	B	405	K3Q	O5-C5-C6-O6
2	A	402	K3Q	C4-C5-C6-O6
2	B	405	K3Q	C4-C5-C6-O6
2	A	402	K3Q	C5-C6-O6-C8

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 [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, 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%)	0.33	8 (2%) 59 56	48, 64, 85, 112	0
1	B	339/371 (91%)	0.30	7 (2%) 63 60	51, 69, 88, 105	0
All	All	679/742 (91%)	0.32	15 (2%) 62 59	48, 66, 86, 112	0

All (15) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	350	ALA	6.2
1	A	350	ALA	4.0
1	A	303	VAL	3.9
1	A	152	LEU	3.3
1	B	288	PHE	3.0
1	B	34	ILE	2.8
1	B	365	ILE	2.5
1	A	29	ILE	2.3
1	B	152	LEU	2.3
1	A	182	HIS	2.3
1	A	134	TYR	2.1
1	A	164	PRO	2.1
1	B	312	TRP	2.1
1	B	216	TRP	2.0
1	A	244	SER	2.0

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides 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, 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	B-factors(Å ²)	Q<0.9
4	NA	B	406	1/1	0.83	0.17	74,74,74,74	0
2	K3Q	B	405	14/14	0.85	0.14	88,109,118,121	0
2	K3Q	A	401	14/14	0.85	0.15	78,88,91,95	0
2	K3Q	A	402	14/14	0.87	0.13	71,96,125,126	0
2	K3Q	B	401	14/14	0.88	0.13	75,81,95,97	0
4	NA	A	406	1/1	0.90	0.11	89,89,89,89	0
4	NA	A	405	1/1	0.91	0.13	70,70,70,70	0
3	7CV	A	404	13/13	0.91	0.10	57,65,73,77	0
4	NA	A	407	1/1	0.91	0.14	86,86,86,86	0
3	7CV	B	403	13/13	0.91	0.12	80,92,99,103	0
2	K3Q	B	402	13/14	0.92	0.10	73,80,101,108	0
5	EDO	B	404	4/4	0.93	0.19	88,94,94,95	0
2	K3Q	A	403	13/14	0.95	0.09	59,66,91,102	0
4	NA	A	408	1/1	0.96	0.07	81,81,81,81	0

6.5 Other polymers [i](#)

There are no such residues in this entry.