



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 04:58 AM UTC

PDB ID : 4D52 / pdb_00004d52
Title : CRYSTAL STRUCTURE OF FUCOSE BINDING LECTIN FROM ASPERGILLUS FUMIGATUS (AFL) IN COMPLEX WITH L-GALACTOPYRANOSE.
Authors : Houser, J.; Cioci, G.; Komarek, J.; Wimmerowa, M.; Kostlanova, N.; Lahmann, M.; Varrot, A.; Imberty, A.
Deposited on : 2014-11-01
Resolution : 1.76 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

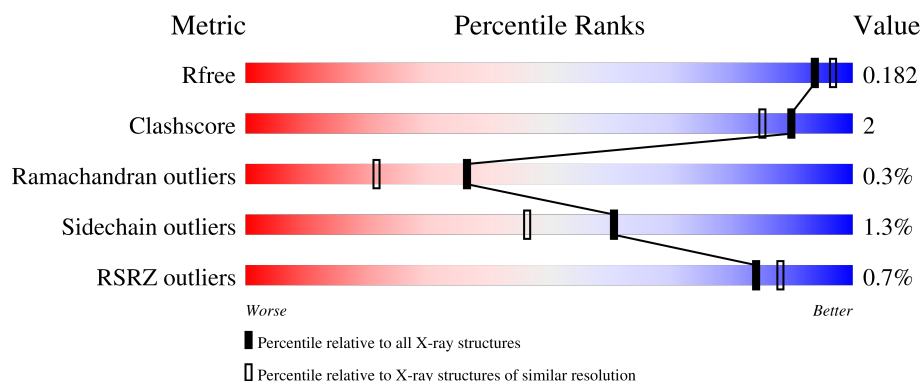
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.76 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	3183 (1.76-1.76)
Clashscore	190562	3299 (1.76-1.76)
Ramachandran outliers	187476	3274 (1.76-1.76)
Sidechain outliers	187428	3274 (1.76-1.76)
RSRZ outliers	180081	3183 (1.76-1.76)

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	315	95% 5%
2	B	315	% 94% 6%
2	D	315	% 97% .
3	C	315	% 94% 5% .

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
10	PGE	B	1324	-	-	X	-

2 Entry composition

There are 11 unique types of molecules in this entry. The entry contains 11303 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 FUCOSE-SPECIFIC LECTIN FLEA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	314	Total	C	N	O	S	0	1	0
			2449	1560	423	461	5			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	20	SER	LEU	conflict	UNP Q4WW81
A	111	CYS	ARG	conflict	UNP Q4WW81

- Molecule 2 is a protein called FUCOSE-SPECIFIC LECTIN FLEA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	314	Total	C	N	O	S	0	3	0
			2455	1564	421	465	5			
2	D	314	Total	C	N	O	S	0	1	0
			2446	1558	420	464	4			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	20	SER	LEU	conflict	UNP Q4WW81
B	111	CSD	ARG	conflict	UNP Q4WW81
D	20	SER	LEU	conflict	UNP Q4WW81
D	111	CSD	ARG	conflict	UNP Q4WW81

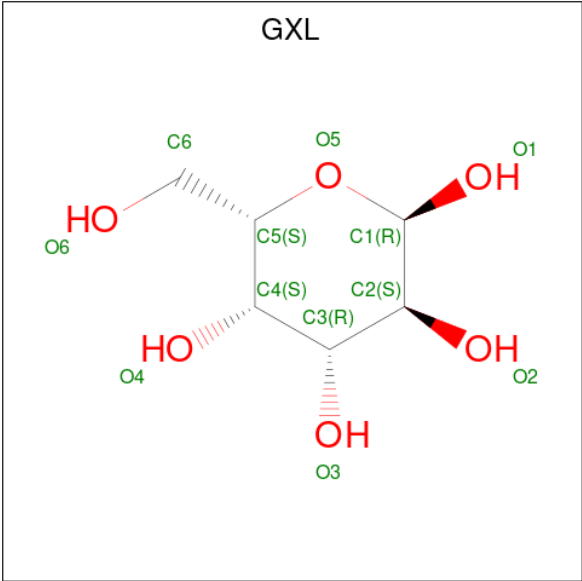
- Molecule 3 is a protein called FUCOSE-SPECIFIC LECTIN FLEA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	312	Total	C	N	O	S	0	2	0
			2439	1552	419	464	4			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	20	SER	LEU	conflict	UNP Q4WW81
C	111	CSD	ARG	conflict	UNP Q4WW81

- Molecule 4 is alpha-L-galactopyranose (CCD ID: GXL) (formula: C₆H₁₂O₆).



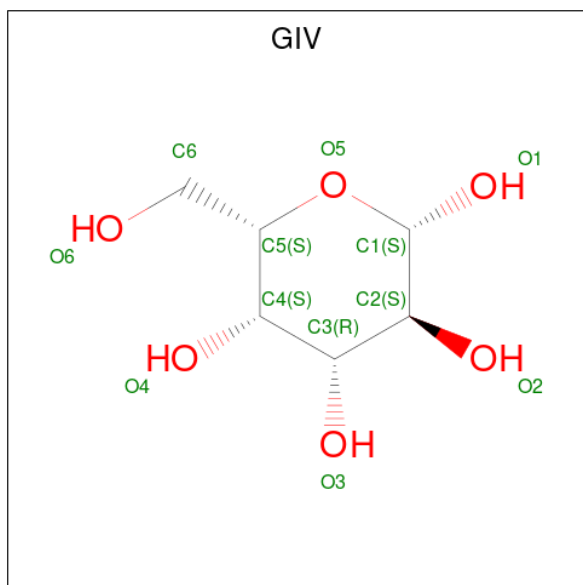
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	1
			12	6	6		
4	A	1	Total	C	O	0	0
			12	6	6		
4	A	1	Total	C	O	0	1
			12	6	6		
4	A	1	Total	C	O	0	1
			12	6	6		
4	B	1	Total	C	O	0	1
			12	6	6		
4	B	1	Total	C	O	0	0
			12	6	6		
4	B	1	Total	C	O	0	1
			12	6	6		
4	C	1	Total	C	O	0	1
			12	6	6		
4	C	1	Total	C	O	0	0
			12	6	6		
4	C	1	Total	C	O	0	1
			12	6	6		
4	C	1	Total	C	O	0	1
			12	6	6		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	D	1	Total	C	O	0	0
			12	6	6		
4	D	1	Total	C	O	0	1
			12	6	6		
4	D	1	Total	C	O	0	1
			12	6	6		

- Molecule 5 is beta-L-galactopyranose (CCD ID: GIV) (formula: $C_6H_{12}O_6$).



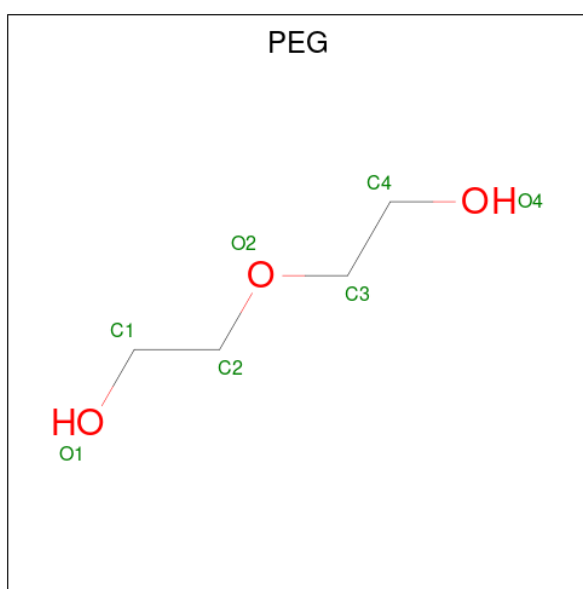
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	1
			12	6	6		
5	A	1	Total	C	O	0	1
			12	6	6		
5	A	1	Total	C	O	0	1
			12	6	6		
5	B	1	Total	C	O	0	1
			12	6	6		
5	B	1	Total	C	O	0	1
			12	6	6		
5	B	1	Total	C	O	0	0
			12	6	6		
5	C	1	Total	C	O	0	1
			12	6	6		
5	C	1	Total	C	O	0	1
			12	6	6		

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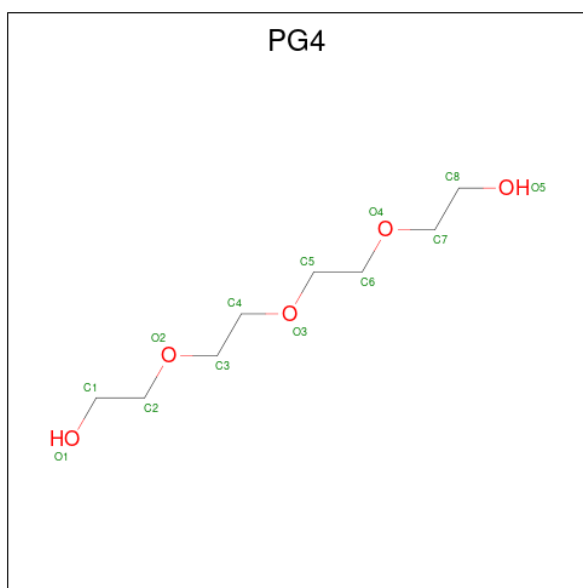
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	C	1	Total	C	O	0	1
			12	6	6		
5	D	1	Total	C	O	0	0
			12	6	6		
5	D	1	Total	C	O	0	1
			12	6	6		
5	D	1	Total	C	O	0	1
			12	6	6		

- Molecule 6 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			4	2	2		
6	A	1	Total	C	O	0	0
			7	4	3		
6	B	1	Total	C	O	0	0
			4	2	2		
6	B	1	Total	C	O	0	0
			7	4	3		
6	C	1	Total	C	O	0	0
			7	4	3		
6	C	1	Total	C	O	0	0
			7	4	3		
6	D	1	Total	C	O	0	0
			7	4	3		

- Molecule 7 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: $C_8H_{18}O_5$).



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

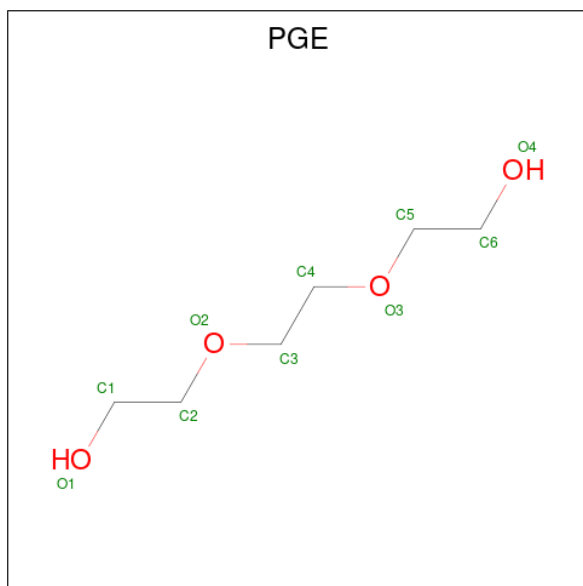
- Molecule 8 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	B	1	Total	Zn	0	0
			1	1		

- Molecule 9 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	B	1	Total	Na	0	0
			1	1		
9	C	1	Total	Na	0	0
			1	1		
9	D	1	Total	Na	0	0
			1	1		

- Molecule 10 is TRIETHYLENE GLYCOL (CCD ID: PGE) (formula: $C_6H_{14}O_4$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
10	B	1	Total	C	O	0	0
			10	6	4		
10	C	1	Total	C	O	0	0
			10	6	4		
10	D	1	Total	C	O	0	0
			10	6	4		

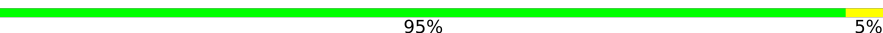
- Molecule 11 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	A	345	Total	O	0	0
			345	345		
11	B	242	Total	O	0	0
			242	242		
11	C	253	Total	O	0	0
			253	253		
11	D	220	Total	O	0	0
			220	220		

3 Residue-property plots [i](#)

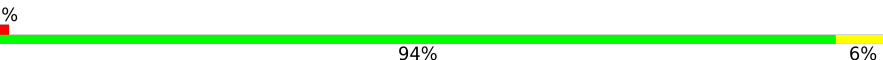
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: FUCOSE-SPECIFIC LECTIN FLEA

Chain A: 

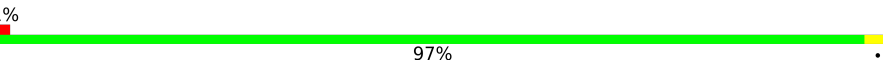


- Molecule 2: FUCOSE-SPECIFIC LECTIN FLEA

Chain B: 

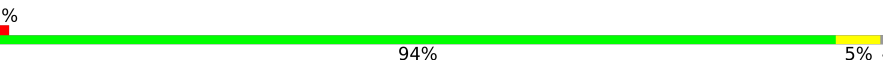


- Molecule 2: FUCOSE-SPECIFIC LECTIN FLEA

Chain D: 



- Molecule 3: FUCOSE-SPECIFIC LECTIN FLEA

Chain C: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	80.03Å 70.44Å 117.80Å 90.00° 108.34° 90.00°	Depositor
Resolution (Å)	111.82 – 1.76 111.82 – 1.76	Depositor EDS
% Data completeness (in resolution range)	97.3 (111.82-1.76) 97.4 (111.82-1.76)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.66 (at 1.76Å)	Xtriage
Refinement program	REFMAC 5.8.0049	Depositor
R, R_{free}	0.154 , 0.178 (Not available) , 0.182	Depositor DCC
R_{free} test set	6078 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	16.0	Xtriage
Anisotropy	0.121	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 37.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.025 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	11303	wwPDB-VP
Average B, all atoms (Å ²)	17.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.86% 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: ZN, PG4, GXL, NA, PGE, GIV, PEG, CSD

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	0.65	0/2520	0.74	0/3435
2	B	0.66	0/2527	0.76	0/3445
2	D	0.62	0/2512	0.76	0/3426
3	C	0.61	0/2496	0.78	0/3403
All	All	0.63	0/10055	0.76	0/13709

There are no bond length outliers.

There are no bond angle outliers.

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	2449	0	2333	7	0
2	B	2455	0	2337	15	0
2	D	2446	0	2318	4	0
3	C	2439	0	2306	10	0
4	A	48	0	42	0	0
4	B	36	0	36	0	0
4	C	48	0	48	0	0
4	D	36	0	36	0	0
5	A	36	0	30	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	B	36	0	36	0	0
5	C	36	0	36	0	0
5	D	36	0	36	0	0
6	A	11	0	15	1	0
6	B	11	0	15	0	0
6	C	14	0	20	0	0
6	D	7	0	10	0	0
7	A	13	0	18	0	0
7	B	13	0	18	1	0
7	C	26	0	36	0	0
7	D	13	0	18	1	0
8	B	1	0	0	0	0
9	B	1	0	0	0	0
9	C	1	0	0	0	0
9	D	1	0	0	0	0
10	B	10	0	14	6	0
10	C	10	0	14	0	0
10	D	10	0	14	1	0
11	A	345	0	0	1	0
11	B	242	0	0	0	0
11	C	253	0	0	2	0
11	D	220	0	0	0	0
All	All	11303	0	9786	36	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 2.

All (36) 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)
2:B:281:LEU:HD11	10:B:1324:PGE:H52	1.63	0.80
2:B:242:GLN:HE22	10:B:1324:PGE:H3	1.54	0.73
2:B:230:ARG:HE	10:B:1324:PGE:H5	1.57	0.70
3:C:277:ASN:OD1	3:C:301:ARG:HD2	1.92	0.69
2:B:230:ARG:CZ	2:B:244[A]:CYS:SG	2.88	0.62
2:B:189:GLN:NE2	2:B:251:TYR:OH	2.39	0.55
1:A:196:LYS:HD2	1:A:199:TYR:CE2	2.43	0.54
2:B:220:PHE:CZ	2:B:279:PRO:HG3	2.46	0.51
2:D:230:ARG:HE	10:D:1322:PGE:H62	1.77	0.50
2:B:230:ARG:NH1	2:B:244[A]:CYS:SG	2.86	0.49
1:A:167:ARG:HH11	1:A:167:ARG:HG2	1.79	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:281:LEU:CD1	10:B:1324:PGE:H52	2.40	0.47
3:C:34:SER:OG	3:C:55:ASN:ND2	2.48	0.47
3:C:301:ARG:HG2	11:C:3222:HOH:O	2.14	0.47
2:B:189:GLN:HE22	7:B:1323:PG4:H42	1.80	0.47
3:C:126:ARG:C	3:C:127:ILE:HD13	2.40	0.46
3:C:303:HIS:HB2	11:C:3234:HOH:O	2.15	0.46
2:B:140:MET:HE2	2:B:147:LYS:HE2	1.97	0.46
3:C:297:TRP:CH2	3:C:299:TRP:HB2	2.51	0.45
2:D:189:GLN:HE22	7:D:1321:PG4:H42	1.81	0.45
5:A:2319[B]:GIV:O1	3:C:49:GLU:OE2	2.30	0.45
1:A:186:LYS:HG2	1:A:207:ASP:O	2.17	0.44
3:C:283:LEU:HD12	3:C:297:TRP:CE3	2.53	0.44
2:B:230:ARG:HE	10:B:1324:PGE:C5	2.27	0.44
2:D:34:SER:OG	2:D:55:ASN:ND2	2.51	0.44
2:B:192:TYR:CE2	2:B:197:GLY:HA2	2.54	0.43
6:A:1317:PEG:H12	11:A:3339:HOH:O	2.18	0.42
1:A:167:ARG:NH2	1:A:172:ASN:HA	2.35	0.42
1:A:137:GLN:OE1	3:C:4:PRO:HG2	2.19	0.42
2:D:49:GLU:H	2:D:49:GLU:CD	2.28	0.42
1:A:152:LEU:HD13	1:A:178:ILE:HD11	2.02	0.41
3:C:277:ASN:O	3:C:277:ASN:CG	2.63	0.41
2:B:230:ARG:NE	10:B:1324:PGE:H5	2.30	0.41
2:B:171:TYR:HE2	2:B:195:HIS:CE1	2.39	0.40
1:A:34:SER:OG	1:A:55:ASN:ND2	2.55	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	313/315 (99%)	305 (97%)	7 (2%)	1 (0%)	36 21

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	314/315 (100%)	307 (98%)	6 (2%)	1 (0%)	36	21
2	D	312/315 (99%)	304 (97%)	7 (2%)	1 (0%)	36	21
3	C	308/315 (98%)	300 (97%)	7 (2%)	1 (0%)	36	21
All	All	1247/1260 (99%)	1216 (98%)	27 (2%)	4 (0%)	36	21

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	46	ASN
2	B	46	ASN
3	C	46	ASN
2	D	46	ASN

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	250/250 (100%)	245 (98%)	5 (2%)	48	29
2	B	250/249 (100%)	248 (99%)	2 (1%)	73	64
2	D	247/249 (99%)	243 (98%)	4 (2%)	55	38
3	C	246/248 (99%)	243 (99%)	3 (1%)	63	49
All	All	993/996 (100%)	979 (99%)	14 (1%)	61	44

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	39	LEU
1	A	50	LYS
1	A	111[A]	CYS
1	A	111[B]	CYS
1	A	280	ASP
2	B	127	ILE
2	B	280	ASP

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Mol	Chain	Res	Type
3	C	39	LEU
3	C	127	ILE
3	C	280	ASP
2	D	49	GLU
2	D	147	LYS
2	D	202	LEU
2	D	280	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	7	GLN
1	A	46	ASN
1	A	55	ASN
2	B	46	ASN
2	B	55	ASN
2	B	105	GLN
2	B	134	ASN
2	B	189	GLN
2	B	242	GLN
3	C	46	ASN
3	C	55	ASN
3	C	134	ASN
3	C	238	ASN
2	D	7	GLN
2	D	46	ASN
2	D	55	ASN
2	D	96	ASN
2	D	105	GLN
2	D	134	ASN
2	D	189	GLN
2	D	238	ASN
2	D	242	GLN
2	D	303	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

4 non-standard protein/DNA/RNA residues 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	CSD	D	111	2	4,7,8	1.12	0	1,8,10	2.10	1 (100%)
3	CSD	C	244	3	4,7,8	2.23	2 (50%)	1,8,10	0.07	0
2	CSD	B	111	2	4,7,8	2.65	2 (50%)	1,8,10	3.95	1 (100%)
3	CSD	C	111	3	4,7,8	3.20	2 (50%)	1,8,10	0.26	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	CSD	D	111	2	-	1/2/6/8	-
3	CSD	C	244	3	-	0/2/6/8	-
2	CSD	B	111	2	-	2/2/6/8	-
3	CSD	C	111	3	-	2/2/6/8	-

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	111	CSD	OD1-SG	-5.79	1.42	1.47
2	B	111	CSD	OD1-SG	-4.58	1.43	1.47
3	C	244	CSD	OD1-SG	-3.77	1.44	1.47
3	C	111	CSD	CB-SG	-2.40	1.65	1.79
2	B	111	CSD	CB-SG	-2.26	1.66	1.79
3	C	244	CSD	CB-SG	-2.15	1.67	1.79

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	111	CSD	OD1-SG-CB	-3.95	98.33	105.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	111	CSD	OD1-SG-CB	2.10	109.48	105.60

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	111	CSD	N-CA-CB-SG
3	C	111	CSD	N-CA-CB-SG
3	C	111	CSD	CA-CB-SG-OD1
2	D	111	CSD	N-CA-CB-SG
2	B	111	CSD	CA-CB-SG-OD1

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 45 ligands modelled in this entry, 4 are monoatomic - leaving 41 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	$\# Z > 2$
5	GIV	A	2322[B]	-	12,12,12	0.47	0	17,17,17	0.77	0
7	PG4	B	1323	-	12,12,12	0.52	0	11,11,11	0.37	0
4	GXL	B	1319[A]	-	12,12,12	0.54	0	17,17,17	0.74	0
5	GIV	B	2326	-	12,12,12	0.52	0	17,17,17	0.98	0
5	GIV	D	2324[B]	-	12,12,12	0.50	0	17,17,17	0.94	0
10	PGE	D	1322	-	9,9,9	0.53	0	8,8,8	0.29	0
4	GXL	D	1324[A]	-	12,12,12	0.53	0	17,17,17	0.97	0
7	PG4	D	1321	-	12,12,12	0.58	0	11,11,11	0.38	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	GIV	A	2316[A]	-	12,12,12	0.62	0	17,17,17	0.92	1 (5%)
5	GIV	C	2327[B]	-	12,12,12	0.54	0	17,17,17	0.67	0
4	GXL	D	1319	-	12,12,12	0.70	0	17,17,17	0.90	1 (5%)
5	GIV	B	2319[B]	-	12,12,12	0.52	0	17,17,17	0.74	0
4	GXL	C	1327[A]	-	12,12,12	0.49	0	17,17,17	0.69	0
5	GIV	C	2319[B]	-	12,12,12	0.40	0	17,17,17	0.72	0
10	PGE	C	1325	-	9,9,9	0.49	0	8,8,8	0.55	0
4	GXL	A	1318	-	12,12,12	0.68	0	17,17,17	0.60	0
4	GXL	C	1321	-	12,12,12	0.70	0	17,17,17	0.60	0
4	GXL	A	1322[A]	-	12,12,12	0.50	0	17,17,17	0.78	0
4	GXL	A	1316[A]	-	12,12,12	0.66	0	17,17,17	0.94	1 (5%)
10	PGE	B	1324	-	9,9,9	0.53	0	8,8,8	0.53	0
5	GIV	D	2320[B]	-	12,12,12	0.46	0	17,17,17	0.95	1 (5%)
5	GIV	D	1318	-	12,12,12	0.52	0	17,17,17	1.15	1 (5%)
7	PG4	C	1324	-	12,12,12	0.43	0	11,11,11	0.45	0
4	GXL	A	1319[A]	-	12,12,12	0.56	0	17,17,17	0.79	0
4	GXL	D	1320[A]	-	12,12,12	0.50	0	17,17,17	0.86	1 (5%)
4	GXL	B	1321	-	12,12,12	0.47	0	17,17,17	0.63	0
6	PEG	B	1325	-	6,6,6	0.42	0	5,5,5	0.30	0
4	GXL	C	1319[A]	-	12,12,12	0.44	0	17,17,17	0.71	0
6	PEG	A	1321	-	6,6,6	0.46	0	5,5,5	0.21	0
4	GXL	B	1322[A]	-	12,12,12	0.51	0	17,17,17	0.69	0
6	PEG	C	1326	-	6,6,6	0.39	0	5,5,5	0.30	0
6	PEG	C	1320	-	6,6,6	0.55	0	5,5,5	0.56	0
6	PEG	D	1323	-	6,6,6	0.37	0	5,5,5	0.33	0
5	GIV	A	2319[B]	-	12,12,12	0.52	0	17,17,17	0.75	0
5	GIV	B	2322[B]	-	12,12,12	0.48	0	17,17,17	0.72	0
7	PG4	C	1323	-	12,12,12	0.50	0	11,11,11	0.36	0
4	GXL	C	1322[A]	-	12,12,12	0.59	0	17,17,17	0.65	0
5	GIV	C	2322[B]	-	12,12,12	0.60	0	17,17,17	0.72	0
6	PEG	A	1317	-	3,3,6	0.31	0	2,2,5	0.43	0
7	PG4	A	1320	-	12,12,12	0.54	0	11,11,11	1.02	1 (9%)
6	PEG	B	1320	-	3,3,6	0.36	0	2,2,5	0.01	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
5	GIV	A	2322[B]	-	-	0/2/22/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	PG4	B	1323	-	-	4/10/10/10	-
4	GXL	B	1319[A]	-	-	0/2/22/22	0/1/1/1
5	GIV	B	2326	-	-	0/2/22/22	0/1/1/1
5	GIV	D	2324[B]	-	-	0/2/22/22	0/1/1/1
10	PGE	D	1322	-	-	1/7/7/7	-
4	GXL	D	1324[A]	-	-	0/2/22/22	0/1/1/1
7	PG4	D	1321	-	-	4/10/10/10	-
5	GIV	A	2316[A]	-	-	0/2/22/22	0/1/1/1
5	GIV	C	2327[B]	-	-	0/2/22/22	0/1/1/1
4	GXL	D	1319	-	-	0/2/22/22	0/1/1/1
5	GIV	B	2319[B]	-	-	0/2/22/22	0/1/1/1
4	GXL	C	1327[A]	-	-	0/2/22/22	0/1/1/1
5	GIV	C	2319[B]	-	-	0/2/22/22	0/1/1/1
10	PGE	C	1325	-	-	1/7/7/7	-
4	GXL	A	1318	-	-	0/2/22/22	0/1/1/1
4	GXL	C	1321	-	-	0/2/22/22	0/1/1/1
4	GXL	A	1322[A]	-	-	0/2/22/22	0/1/1/1
4	GXL	A	1316[A]	-	-	0/2/22/22	0/1/1/1
10	PGE	B	1324	-	-	2/7/7/7	-
5	GIV	D	2320[B]	-	-	0/2/22/22	0/1/1/1
5	GIV	D	1318	-	-	0/2/22/22	0/1/1/1
7	PG4	C	1324	-	-	4/10/10/10	-
4	GXL	A	1319[A]	-	-	0/2/22/22	0/1/1/1
4	GXL	D	1320[A]	-	-	0/2/22/22	0/1/1/1
4	GXL	B	1321	-	-	0/2/22/22	0/1/1/1
6	PEG	B	1325	-	-	3/4/4/4	-
4	GXL	C	1319[A]	-	-	0/2/22/22	0/1/1/1
6	PEG	A	1321	-	-	2/4/4/4	-
4	GXL	B	1322[A]	-	-	0/2/22/22	0/1/1/1
6	PEG	C	1326	-	-	2/4/4/4	-
6	PEG	C	1320	-	-	2/4/4/4	-
6	PEG	D	1323	-	-	2/4/4/4	-
5	GIV	A	2319[B]	-	-	0/2/22/22	0/1/1/1
5	GIV	B	2322[B]	-	-	0/2/22/22	0/1/1/1
7	PG4	C	1323	-	-	3/10/10/10	-
4	GXL	C	1322[A]	-	-	0/2/22/22	0/1/1/1
5	GIV	C	2322[B]	-	-	0/2/22/22	0/1/1/1
6	PEG	A	1317	-	-	1/1/1/4	-
7	PG4	A	1320	-	-	2/10/10/10	-
6	PEG	B	1320	-	-	0/1/1/4	-

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	1320	PG4	C3-O2-C2	2.64	124.79	113.26
4	A	1316[A]	GXL	O5-C5-C6	2.45	112.52	106.44
5	A	2316[A]	GIV	O5-C5-C6	2.45	112.52	106.44
4	D	1319	GXL	C4-C3-C2	-2.44	106.55	110.83
5	D	1318	GIV	C1-O5-C5	-2.10	109.58	113.65
4	D	1320[A]	GXL	O2-C2-C3	-2.04	105.57	110.38
5	D	2320[B]	GIV	O2-C2-C3	-2.04	105.57	110.38

There are no chirality outliers.

All (33) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	1320	PG4	C1-C2-O2-C3
6	C	1320	PEG	C4-C3-O2-C2
7	C	1324	PG4	O2-C3-C4-O3
6	C	1326	PEG	O2-C3-C4-O4
6	D	1323	PEG	O1-C1-C2-O2
6	B	1325	PEG	O2-C3-C4-O4
10	B	1324	PGE	O1-C1-C2-O2
10	D	1322	PGE	O3-C5-C6-O4
7	C	1323	PG4	O1-C1-C2-O2
10	C	1325	PGE	O3-C5-C6-O4
6	A	1317	PEG	O1-C1-C2-O2
7	D	1321	PG4	C1-C2-O2-C3
7	C	1324	PG4	C8-C7-O4-C6
7	D	1321	PG4	O2-C3-C4-O3
7	C	1324	PG4	O1-C1-C2-O2
6	B	1325	PEG	C1-C2-O2-C3
7	D	1321	PG4	C3-C4-O3-C5
6	A	1321	PEG	C1-C2-O2-C3
7	C	1323	PG4	C3-C4-O3-C5
7	A	1320	PG4	C3-C4-O3-C5
7	B	1323	PG4	C3-C4-O3-C5
6	B	1325	PEG	C4-C3-O2-C2
7	B	1323	PG4	C1-C2-O2-C3
6	D	1323	PEG	C4-C3-O2-C2
7	C	1324	PG4	C1-C2-O2-C3
6	C	1320	PEG	O1-C1-C2-O2
6	C	1326	PEG	O1-C1-C2-O2
6	A	1321	PEG	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
10	B	1324	PGE	O2-C3-C4-O3
7	D	1321	PG4	C6-C5-O3-C4
7	B	1323	PG4	O2-C3-C4-O3
7	B	1323	PG4	C6-C5-O3-C4
7	C	1323	PG4	C1-C2-O2-C3

There are no ring outliers.

6 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	B	1323	PG4	1	0
10	D	1322	PGE	1	0
7	D	1321	PG4	1	0
10	B	1324	PGE	6	0
5	A	2319[B]	GIV	1	0
6	A	1317	PEG	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	314/315 (99%)	-0.40	0 100 100	7, 14, 25, 40	1 (0%)
2	B	313/315 (99%)	-0.34	2 (0%) 85 89	10, 15, 26, 35	3 (0%)
2	D	313/315 (99%)	-0.15	4 (1%) 75 81	11, 17, 31, 51	1 (0%)
3	C	310/315 (98%)	-0.33	3 (0%) 79 84	9, 15, 27, 57	2 (0%)
All	All	1250/1260 (99%)	-0.30	9 (0%) 84 88	7, 15, 27, 57	7 (0%)

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	C	274	PHE	5.2
2	D	275	ALA	4.0
2	D	274	PHE	3.3
3	C	273	SER	2.9
2	D	276	ASN	2.7
2	B	172	ASN	2.7
2	D	121	ASP	2.5
3	C	172	ASN	2.5
2	B	276	ASN	2.3

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

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
2	CSD	D	111	8/9	0.88	0.10	13,15,27,28	0
3	CSD	C	111	8/9	0.89	0.11	14,17,34,38	0
2	CSD	B	111	8/9	0.92	0.09	12,15,30,33	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	CSD	C	244	8/9	0.96	0.08	16,17,23,23	2

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($\text{\AA}^2$)	Q<0.9
10	PGE	D	1322	10/10	0.82	0.14	30,35,41,42	0
6	PEG	A	1317	4/7	0.84	0.12	32,32,35,36	0
7	PG4	C	1324	13/13	0.85	0.14	36,39,42,45	0
5	GIV	B	2326	12/12	0.86	0.25	16,17,18,19	12
10	PGE	C	1325	10/10	0.86	0.12	25,29,36,39	0
6	PEG	D	1323	7/7	0.86	0.12	39,39,42,46	0
6	PEG	C	1326	7/7	0.88	0.11	38,39,42,43	0
10	PGE	B	1324	10/10	0.88	0.11	30,32,37,40	0
4	GXL	B	1322[A]	12/12	0.89	0.07	14,15,16,16	12
6	PEG	C	1320	7/7	0.89	0.12	26,27,33,34	0
6	PEG	A	1321	7/7	0.91	0.10	27,28,30,30	0
4	GXL	D	1320[A]	12/12	0.91	0.08	18,20,23,23	12
5	GIV	D	2320[B]	12/12	0.92	0.08	18,20,22,23	12
7	PG4	C	1323	13/13	0.92	0.09	18,20,31,36	0
6	PEG	B	1325	7/7	0.93	0.10	35,37,39,40	0
4	GXL	D	1319	12/12	0.93	0.07	18,19,22,24	0
4	GXL	D	1324[A]	12/12	0.93	0.07	19,20,23,23	12
6	PEG	B	1320	4/7	0.93	0.12	26,27,27,28	0
7	PG4	B	1323	13/13	0.93	0.08	21,23,31,32	0
5	GIV	D	1318	12/12	0.94	0.06	17,19,21,21	0
5	GIV	A	2319[B]	12/12	0.94	0.06	13,15,17,18	12
4	GXL	B	1319[A]	12/12	0.94	0.05	14,15,16,16	12
7	PG4	A	1320	13/13	0.95	0.07	17,18,29,31	0
4	GXL	A	1318	12/12	0.95	0.06	13,15,17,19	0
7	PG4	D	1321	13/13	0.95	0.08	20,21,37,43	0
4	GXL	A	1319[A]	12/12	0.96	0.06	13,15,17,18	12
5	GIV	A	2322[B]	12/12	0.96	0.06	11,13,14,16	12

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
5	GIV	B	2319[B]	12/12	0.96	0.05	14,15,15,16	12
5	GIV	B	2322[B]	12/12	0.96	0.05	14,15,16,16	12
4	GXL	C	1319[A]	12/12	0.96	0.05	13,14,14,15	12
5	GIV	C	2319[B]	12/12	0.96	0.05	13,14,14,15	12
5	GIV	C	2322[B]	12/12	0.96	0.05	14,15,17,17	12
5	GIV	C	2327[B]	12/12	0.96	0.05	13,15,17,17	12
4	GXL	C	1327[A]	12/12	0.96	0.05	13,15,17,17	12
4	GXL	A	1322[A]	12/12	0.96	0.05	11,13,15,16	12
5	GIV	D	2324[B]	12/12	0.96	0.06	19,20,22,23	12
4	GXL	A	1316[A]	12/12	0.96	0.05	11,11,11,11	12
4	GXL	B	1321	12/12	0.96	0.05	14,15,16,17	0
4	GXL	C	1321	12/12	0.97	0.04	15,15,17,18	1
5	GIV	A	2316[A]	12/12	0.97	0.04	11,11,11,11	12
9	NA	D	1317	1/1	0.98	0.04	15,15,15,15	0
4	GXL	C	1322[A]	12/12	0.98	0.04	14,16,17,17	12
9	NA	B	1318	1/1	0.99	0.04	13,13,13,13	0
9	NA	C	1318	1/1	0.99	0.03	20,20,20,20	0
8	ZN	B	1317	1/1	0.99	0.02	16,16,16,16	1

6.5 Other polymers

There are no such residues in this entry.