Full wwPDB X-ray Structure Validation Report ⓘ

Nov 2, 2024 – 10:59 AM EDT

PDB ID	:	5DK3
Title	:	Crystal Structure of Pembrolizumab, a full length IgG4 antibody
Authors	:	Scapin, G.; Prosise, W.; Reichert, P.
Deposited on	:	2015-09-02
Resolution	:	2.28 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:

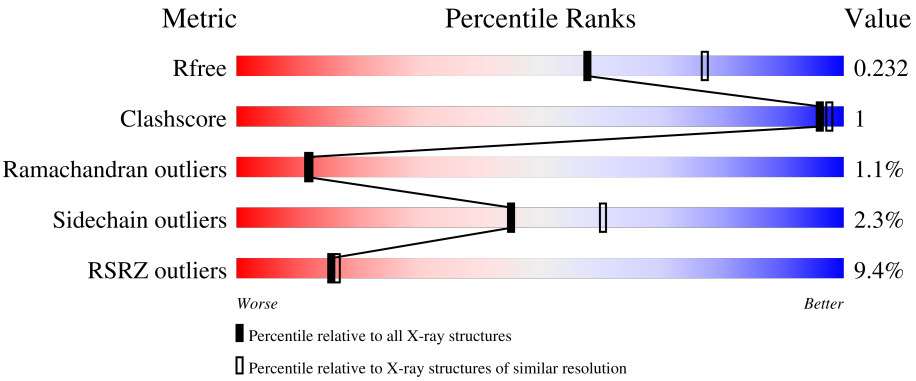
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.28 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	8487 (2.30-2.26)
Clashscore	180529	9437 (2.30-2.26)
Ramachandran outliers	177936	9341 (2.30-2.26)
Sidechain outliers	177891	9342 (2.30-2.26)
RSRZ outliers	164620	8487 (2.30-2.26)

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 <=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	218	97%
1	F	218	10% 95% 5%
2	B	444	12% 94% 5%
2	G	444	11% 94% 5%
3	C	7	29% 57% 14%

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Mol	Chain	Length	Quality of chain
4	D	7	43% 57%
5	E	2	50% 50%
5	H	2	50% 50%
5	I	2	50% 50%

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 10749 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.

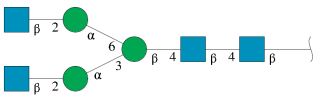
- Molecule 1 is a protein called Light Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	218	Total	C	N	O	S	0	0	0
			1668	1049	280	334	5			
1	F	218	Total	C	N	O	S	0	0	0
			1638	1029	272	332	5			

- Molecule 2 is a protein called Heavy Chain.

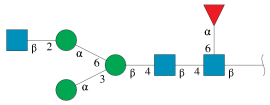
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	441	Total	C	N	O	S	0	0	0
			3344	2115	549	663	17			
2	G	438	Total	C	N	O	S	0	0	0
			3350	2120	548	664	18			

- Molecule 3 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



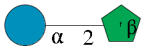
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	7	Total	C	N	O	0	0	0
			89	50	4	35			

- Molecule 4 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose.



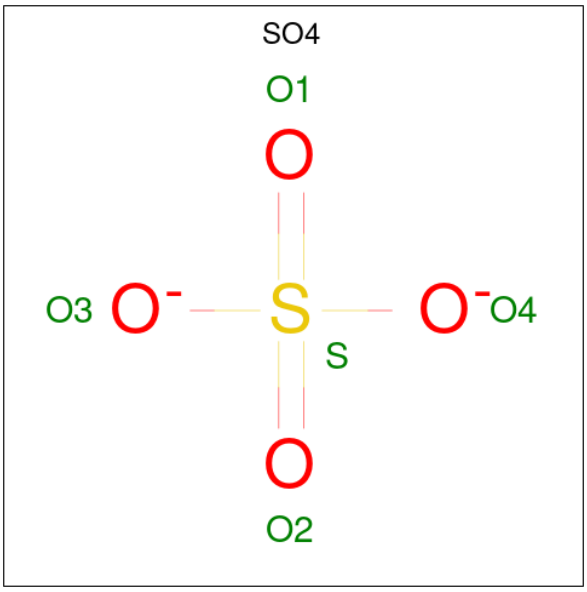
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
4	D	7	Total C N O 85 48 3 34	0	0	0

- Molecule 5 is an oligosaccharide called beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose.



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
5	E	2	Total C O 23 12 11	0	0	0
5	H	2	Total C O 23 12 11	0	0	0
5	I	2	Total C O 23 12 11	0	0	0

- Molecule 6 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total O S 5 4 1	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	B	1	Total O S 5 4 1	0	0
6	B	1	Total O S 5 4 1	0	0
6	B	1	Total O S 5 4 1	0	0
6	B	1	Total O S 5 4 1	0	0

- Molecule 7 is water.

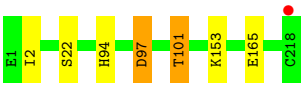
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	152	Total O 152 152	0	0
7	B	209	Total O 209 209	0	0
7	F	16	Total O 16 16	0	0
7	G	104	Total O 104 104	0	0

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.

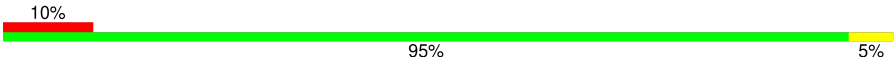
• Molecule 1: Light Chain

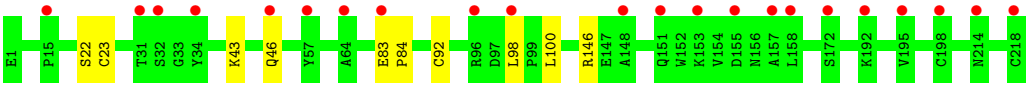
Chain A:



• Molecule 1: Light Chain

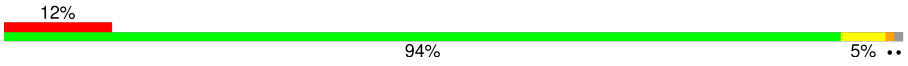
Chain F:

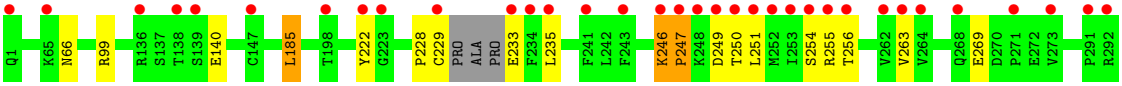


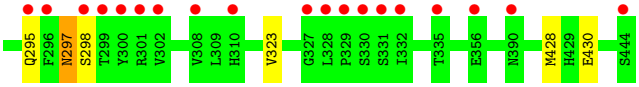


• Molecule 2: Heavy Chain

Chain B:

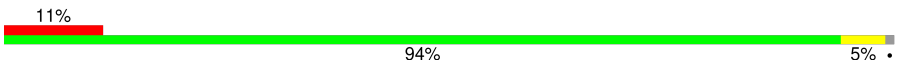


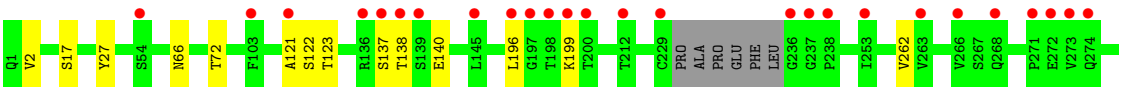


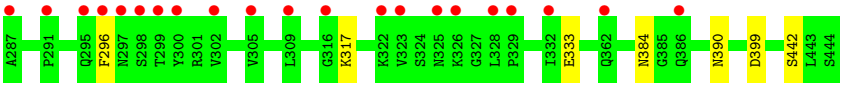


• Molecule 2: Heavy Chain

Chain G:







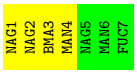
• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyra

nose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain C:

• Molecule 4: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain D:



• Molecule 5: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain E:

• Molecule 5: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain H:

• Molecule 5: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain I:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	63.83Å 110.83Å 264.96Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	33.38 – 2.28 33.38 – 2.28	Depositor EDS
% Data completeness (in resolution range)	100.0 (33.38-2.28) 99.9 (33.38-2.28)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.36 (at 2.29Å)	Xtriage
Refinement program	BUSTER 2.11.5	Depositor
R, R_{free}	0.184 , 0.224 0.199 , 0.232	Depositor DCC
R_{free} test set	4386 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å^2)	46.5	Xtriage
Anisotropy	0.335	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.39 , 69.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	10749	wwPDB-VP
Average B, all atoms (Å^2)	63.0	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.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: GLC, FUC, BMA, SO4, FRU, MAN, NAG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
1	A	0.60	0/1706	0.75	2/2318 (0.1%)
1	F	0.44	0/1676	0.66	0/2286
2	B	0.57	0/3434	0.75	2/4697 (0.0%)
2	G	0.48	0/3440	0.68	1/4698 (0.0%)
All	All	0.53	0/10256	0.71	5/13999 (0.0%)

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	G	121	ALA	C-N-CA	6.26	137.34	121.70
2	B	185	LEU	CA-CB-CG	5.37	127.65	115.30
1	A	97	ASP	CB-CA-C	-5.15	100.10	110.40
2	B	222	TYR	N-CA-C	5.15	124.90	111.00
1	A	165	GLU	CB-CA-C	-5.04	100.33	110.40

There are no chirality outliers.

There are no planarity outliers.

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	1668	0	1626	2	0
1	F	1638	0	1556	6	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	3344	0	3142	8	0
2	G	3350	0	3182	2	0
3	C	89	0	76	3	0
4	D	85	0	73	0	0
5	E	23	0	21	0	0
5	H	23	0	21	0	0
5	I	23	0	21	0	0
6	A	5	0	0	0	0
6	B	20	0	0	0	0
7	A	152	0	0	0	0
7	B	209	0	0	0	0
7	F	16	0	0	0	0
7	G	104	0	0	0	0
All	All	10749	0	9718	17	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 1.

All (17) 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:297:ASN:ND2	3:C:1:NAG:O5	1.91	1.02
1:F:83:GLU:HG3	1:F:84:PRO:CD	1.90	1.02
1:F:83:GLU:HG3	1:F:84:PRO:HD2	1.62	0.81
2:B:297:ASN:ND2	3:C:1:NAG:C1	2.49	0.76
1:A:2:ILE:O	1:A:101:THR:HG21	1.95	0.67
1:F:83:GLU:HG3	1:F:84:PRO:HD3	1.75	0.66
2:B:233:GLU:N	2:G:137:SER:HG	1.99	0.60
1:A:94:HIS:CD2	1:A:101:THR:HG22	2.43	0.53
2:B:263:VAL:HG21	2:B:323:VAL:HG11	1.95	0.48
2:B:254:SER:N	2:B:255:ARG:CB	2.76	0.48
1:F:43:LYS:HB2	1:F:46:GLN:OE1	2.13	0.48
1:F:98:LEU:HD23	1:F:100:LEU:CD2	2.46	0.45
2:B:246:LYS:CB	2:B:247:PRO:HA	2.48	0.43
2:G:2:VAL:HG13	2:G:27:TYR:CD1	2.54	0.41
1:F:23:CYS:HG	1:F:92:CYS:CB	2.28	0.41
2:B:297:ASN:HD22	3:C:1:NAG:C1	2.28	0.41
2:B:228:PRO:O	2:B:229:CYS:HB2	2.22	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	216/218 (99%)	209 (97%)	7 (3%)	0	100	100
1	F	216/218 (99%)	207 (96%)	9 (4%)	0	100	100
2	B	437/444 (98%)	409 (94%)	20 (5%)	8 (2%)	7	5
2	G	434/444 (98%)	411 (95%)	17 (4%)	6 (1%)	9	8
All	All	1303/1324 (98%)	1236 (95%)	53 (4%)	14 (1%)	12	12

All (14) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	246	LYS
2	B	247	PRO
2	B	298	SER
2	G	138	THR
2	G	122	SER
2	G	296	PHE
2	B	295	GLN
2	B	297	ASN
2	G	66	ASN
2	G	317	LYS
2	G	384	ASN
2	B	66	ASN
2	B	249	ASP
2	B	256	THR

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	188/189 (100%)	184 (98%)	4 (2%)	48	63
1	F	181/189 (96%)	179 (99%)	2 (1%)	70	81
2	B	374/398 (94%)	365 (98%)	9 (2%)	44	59
2	G	380/398 (96%)	369 (97%)	11 (3%)	37	51
All	All	1123/1174 (96%)	1097 (98%)	26 (2%)	45	60

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	22	SER
1	A	97	ASP
1	A	101	THR
1	A	153	LYS
2	B	99	ARG
2	B	140	GLU
2	B	185	LEU
2	B	235	LEU
2	B	250	THR
2	B	251	LEU
2	B	269	GLU
2	B	428	MET
2	B	430	GLU
1	F	22	SER
1	F	146	ARG
2	G	17	SER
2	G	72	THR
2	G	123	THR
2	G	140	GLU
2	G	196	LEU
2	G	199	LYS
2	G	262	VAL
2	G	333	GLU
2	G	390	ASN
2	G	399	ASP
2	G	442	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	297	ASN
2	G	59	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

20 monosaccharides 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	C	1	3	14,14,15	0.24	0	17,19,21	1.14	1 (5%)
3	NAG	C	2	3	14,14,15	0.29	0	17,19,21	0.81	1 (5%)
3	BMA	C	3	3	11,11,12	0.28	0	15,15,17	0.85	1 (6%)
3	MAN	C	4	3	11,11,12	0.33	0	15,15,17	0.61	0
3	NAG	C	5	3	14,14,15	0.28	0	17,19,21	0.82	1 (5%)
3	MAN	C	6	3	11,11,12	0.34	0	15,15,17	0.64	0
3	NAG	C	7	3	14,14,15	0.27	0	17,19,21	0.74	1 (5%)
4	NAG	D	1	4,2	14,14,15	0.47	0	17,19,21	1.21	1 (5%)
4	NAG	D	2	4	14,14,15	0.29	0	17,19,21	0.96	1 (5%)
4	BMA	D	3	4	11,11,12	0.19	0	15,15,17	0.74	1 (6%)
4	MAN	D	4	4	11,11,12	0.26	0	15,15,17	0.79	1 (6%)
4	NAG	D	5	4	14,14,15	0.28	0	17,19,21	0.58	0
4	MAN	D	6	4	11,11,12	0.27	0	15,15,17	0.57	0
4	FUC	D	7	4	10,10,11	0.49	0	14,14,16	0.73	0
5	GLC	E	1	5	11,11,12	0.33	0	15,15,17	0.75	1 (6%)
5	FRU	E	2	5	11,12,12	0.65	0	10,18,18	0.38	0
5	GLC	H	1	5	11,11,12	0.26	0	15,15,17	0.76	1 (6%)
5	FRU	H	2	5	11,12,12	0.47	0	10,18,18	0.46	0
5	GLC	I	1	5	11,11,12	0.33	0	15,15,17	1.25	1 (6%)
5	FRU	I	2	5	11,12,12	0.61	0	10,18,18	0.56	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	NAG	C	1	3	-	0/6/23/26	0/1/1/1
3	NAG	C	2	3	-	0/6/23/26	0/1/1/1
3	BMA	C	3	3	-	0/2/19/22	0/1/1/1
3	MAN	C	4	3	-	0/2/19/22	0/1/1/1
3	NAG	C	5	3	-	0/6/23/26	0/1/1/1
3	MAN	C	6	3	-	0/2/19/22	0/1/1/1
3	NAG	C	7	3	-	1/6/23/26	0/1/1/1
4	NAG	D	1	4,2	-	0/6/23/26	0/1/1/1
4	NAG	D	2	4	-	2/6/23/26	0/1/1/1
4	BMA	D	3	4	-	0/2/19/22	0/1/1/1
4	MAN	D	4	4	-	0/2/19/22	0/1/1/1
4	NAG	D	5	4	-	0/6/23/26	0/1/1/1
4	MAN	D	6	4	-	0/2/19/22	0/1/1/1
4	FUC	D	7	4	-	-	0/1/1/1
5	GLC	E	1	5	-	0/2/19/22	0/1/1/1
5	FRU	E	2	5	-	3/5/24/24	0/1/1/1
5	GLC	H	1	5	-	0/2/19/22	0/1/1/1
5	FRU	H	2	5	-	0/5/24/24	0/1/1/1
5	GLC	I	1	5	-	1/2/19/22	0/1/1/1
5	FRU	I	2	5	-	1/5/24/24	0/1/1/1

There are no bond length outliers.

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	I	1	GLC	C1-O5-C5	4.64	118.41	112.19
4	D	1	NAG	C1-O5-C5	4.11	117.70	112.19
3	C	1	NAG	O5-C1-C2	-4.01	105.08	111.29
4	D	2	NAG	O5-C1-C2	-3.14	106.43	111.29
3	C	3	BMA	C1-O5-C5	2.98	116.18	112.19
4	D	4	MAN	C1-O5-C5	2.81	115.95	112.19
5	H	1	GLC	C1-O5-C5	2.74	115.85	112.19
3	C	2	NAG	O5-C1-C2	-2.67	107.16	111.29
4	D	3	BMA	C1-O5-C5	2.62	115.70	112.19
3	C	5	NAG	O5-C1-C2	-2.33	107.68	111.29
5	E	1	GLC	C1-O5-C5	2.33	115.31	112.19
3	C	7	NAG	O5-C1-C2	-2.02	108.17	111.29

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	E	2	FRU	O1-C1-C2-C3
5	E	2	FRU	O1-C1-C2-O2
5	E	2	FRU	O1-C1-C2-O5
4	D	2	NAG	C4-C5-C6-O6
4	D	2	NAG	O5-C5-C6-O6
5	I	1	GLC	O5-C5-C6-O6
3	C	7	NAG	C1-C2-N2-C7
5	I	2	FRU	O1-C1-C2-C3

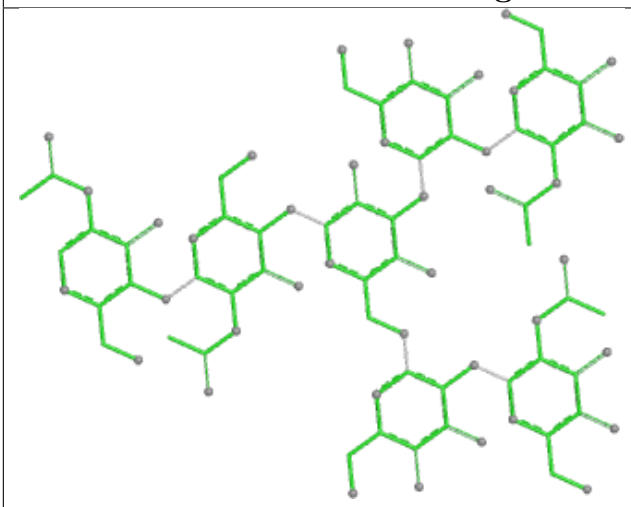
There are no ring outliers.

1 monomer is involved in 3 short contacts:

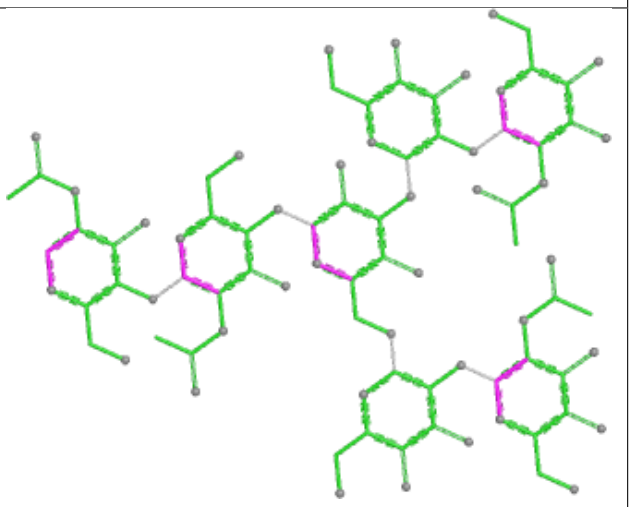
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	1	NAG	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

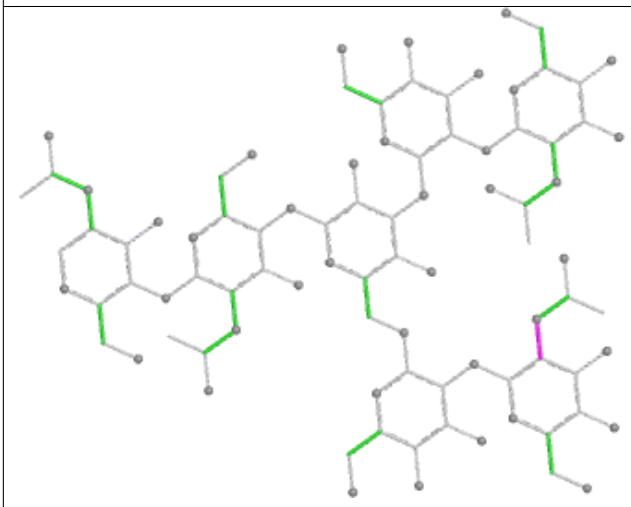
Oligosaccharide Chain C



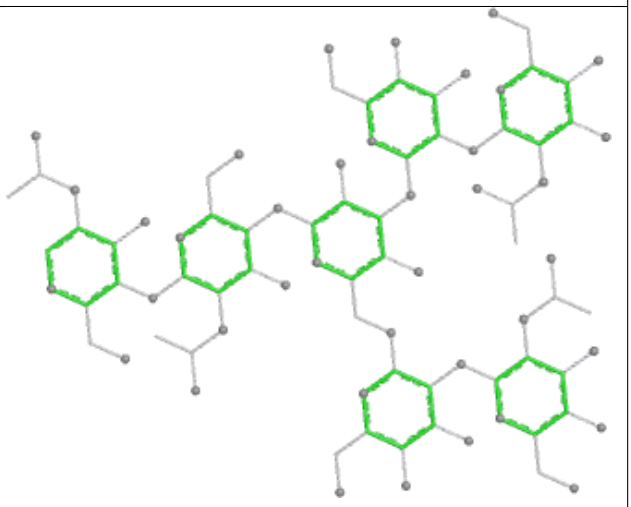
Bond lengths



Bond angles

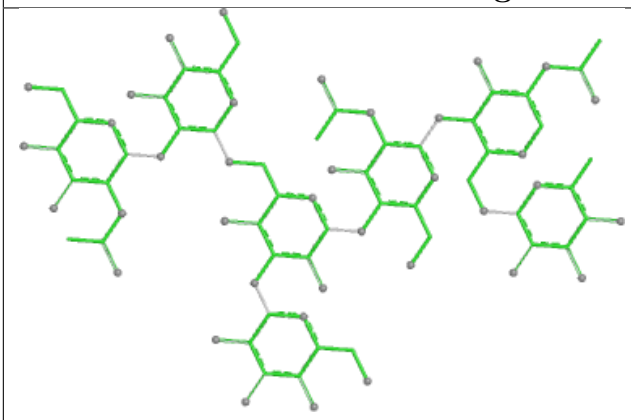


Torsions

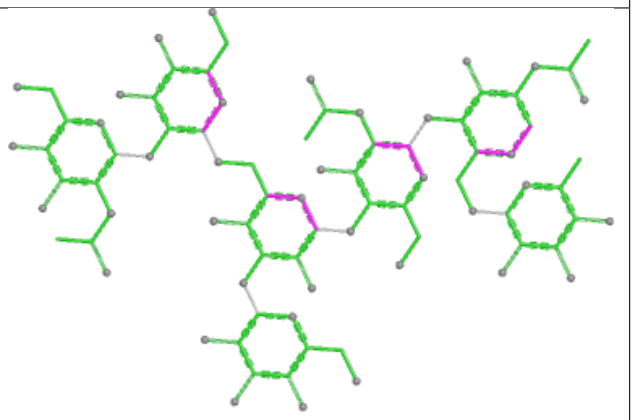


Rings

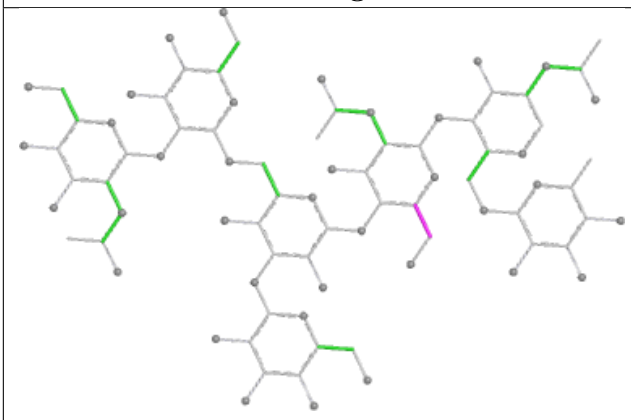
Oligosaccharide Chain D



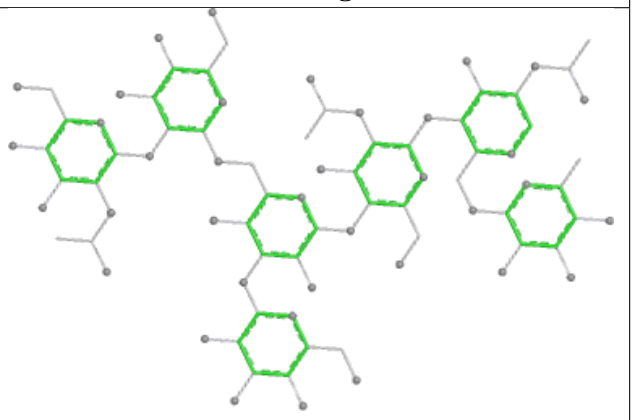
Bond lengths



Bond angles

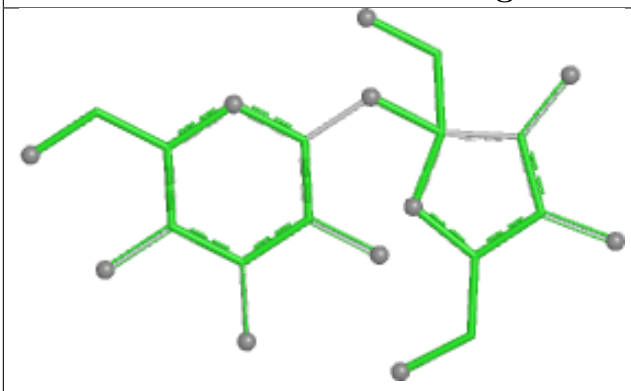


Torsions

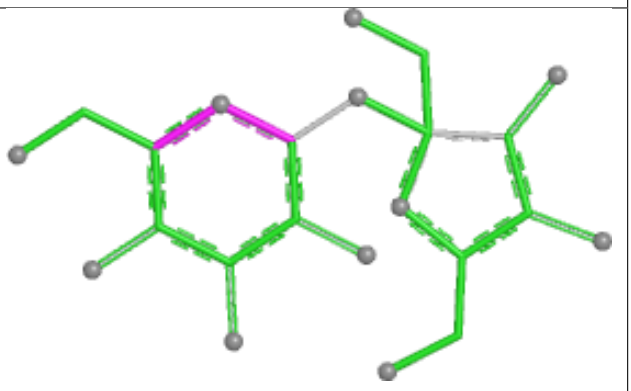


Rings

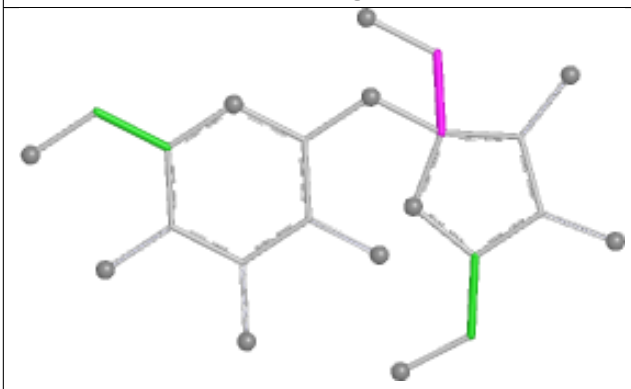
Oligosaccharide Chain E



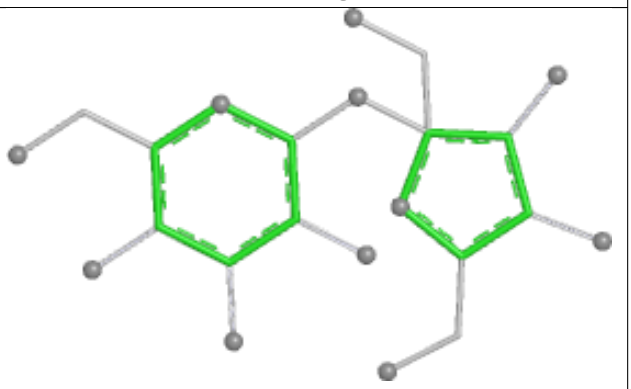
Bond lengths



Bond angles

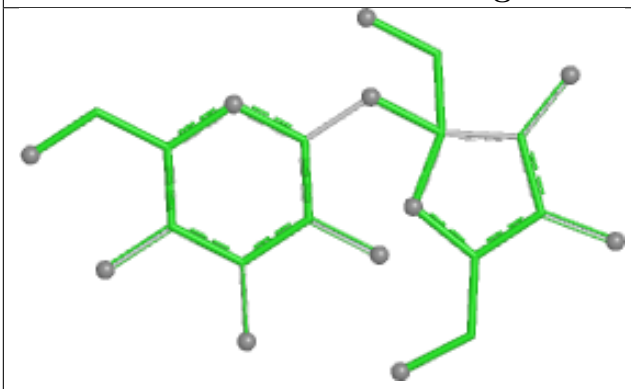


Torsions

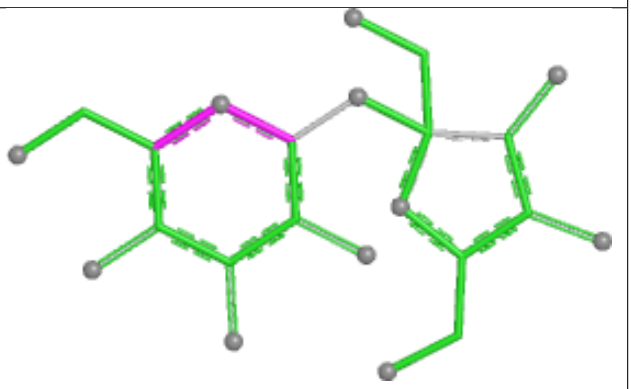


Rings

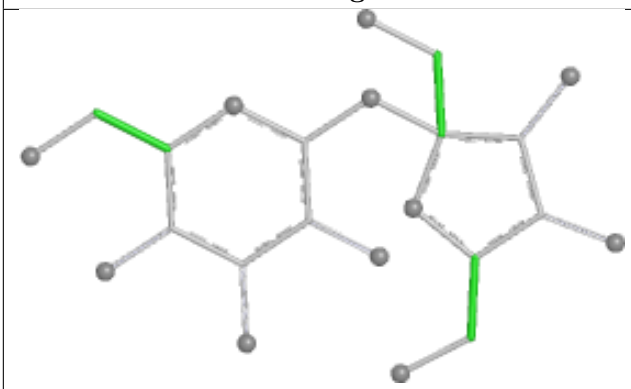
Oligosaccharide Chain H



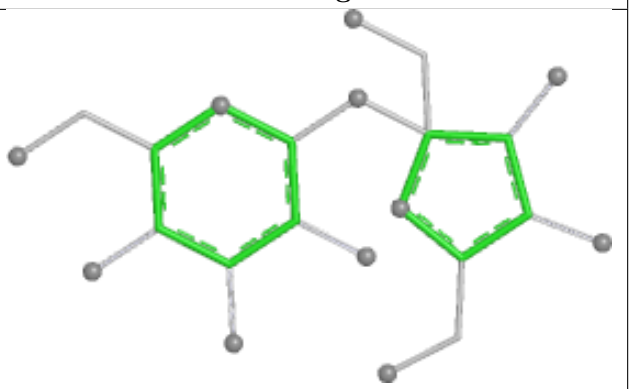
Bond lengths



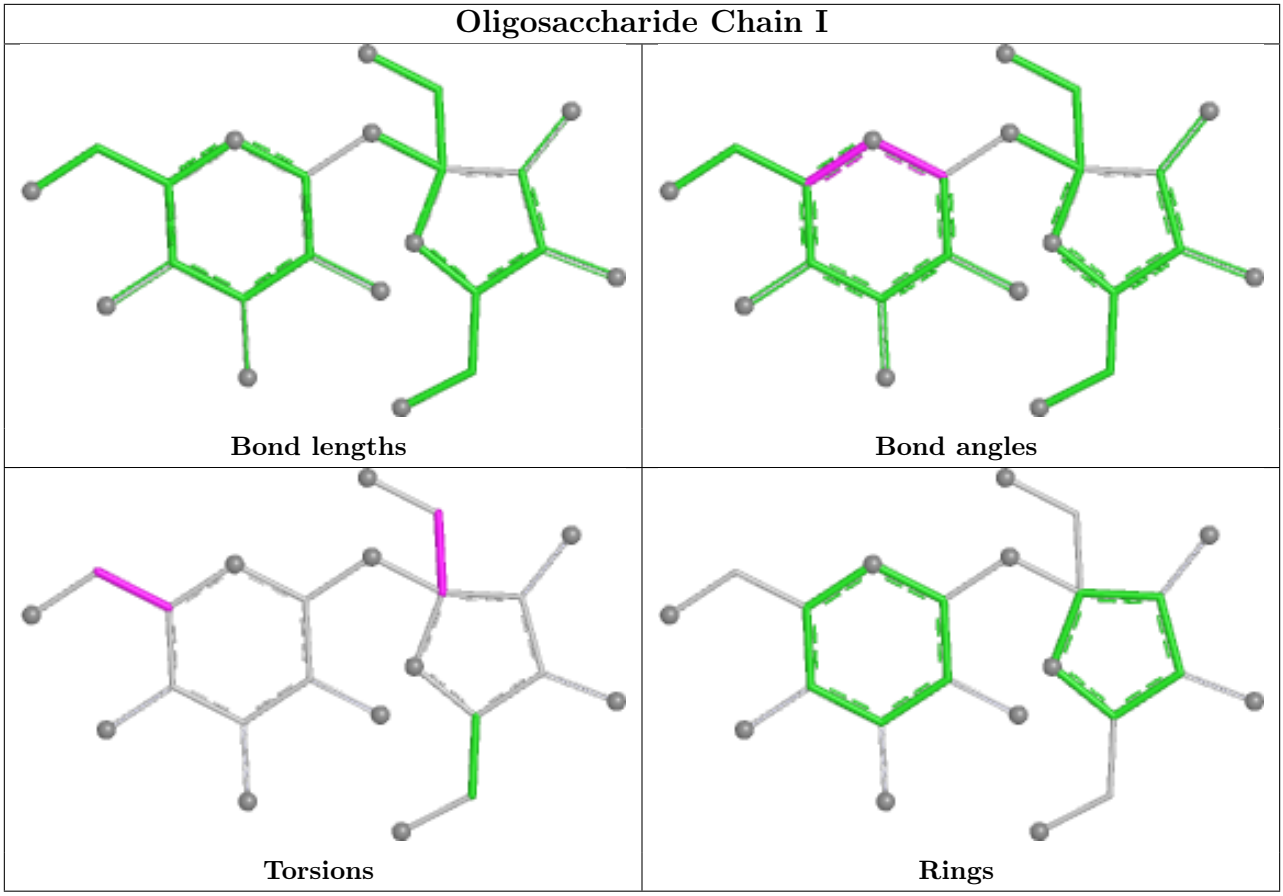
Bond angles



Torsions



Rings



5.6 Ligand geometry (i)

5 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	SO4	B	503	-	4,4,4	0.38	0	6,6,6	0.26	0
6	SO4	B	502	-	4,4,4	0.18	0	6,6,6	0.21	0
6	SO4	B	501	-	4,4,4	0.38	0	6,6,6	0.25	0
6	SO4	B	504	-	4,4,4	0.33	0	6,6,6	0.19	0
6	SO4	A	301	-	4,4,4	0.61	0	6,6,6	0.39	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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^{th} 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	218/218 (100%)	-0.39	1 (0%)	87	88	29, 41, 64, 98	0
1	F	218/218 (100%)	0.97	22 (10%)	14	15	35, 87, 121, 139	0
2	B	441/444 (99%)	0.31	53 (12%)	10	11	30, 49, 109, 133	0
2	G	438/444 (98%)	0.61	47 (10%)	12	13	37, 65, 107, 125	0
All	All	1315/1324 (99%)	0.40	123 (9%)	15	16	29, 59, 111, 139	0

All (123) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	57	TYR	7.3
2	B	252	MET	6.7
2	G	273	VAL	6.4
2	B	251	LEU	6.4
2	B	254	SER	6.0
2	G	103	PHE	5.7
2	B	247	PRO	5.6
2	B	331	SER	5.1
2	B	302	VAL	5.1
1	F	98	LEU	5.0
2	B	229	CYS	4.7
2	G	196	LEU	4.6
2	G	229	CYS	4.6
2	G	298	SER	4.4
2	G	199	LYS	4.3
2	G	329	PRO	4.2
2	B	296	PHE	4.2
1	F	83	GLU	4.1
2	G	238	PRO	4.0
2	B	253	ILE	4.0
2	G	138	THR	3.9

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Mol	Chain	Res	Type	RSRZ
2	B	138	THR	3.8
1	F	218	CYS	3.8
2	B	235	LEU	3.8
1	F	64	ALA	3.7
2	G	237	GLY	3.7
2	G	266	VAL	3.7
2	B	249	ASP	3.7
2	B	271	PRO	3.7
2	G	309	LEU	3.7
2	B	250	THR	3.6
2	G	299	THR	3.6
2	G	274	GLN	3.5
2	B	248	LYS	3.5
2	G	386	GLN	3.4
2	G	136	ARG	3.3
1	F	192	LYS	3.3
2	G	328	LEU	3.3
2	B	256	THR	3.3
2	B	330	SER	3.3
2	G	296	PHE	3.2
2	G	332	ILE	3.2
2	B	300	TYR	3.1
2	B	329	PRO	3.1
2	G	236	GLY	3.1
2	B	241	PHE	3.1
2	B	444	SER	3.1
2	B	263	VAL	3.1
2	G	300	TYR	3.0
2	G	198	THR	3.0
1	F	198	CYS	3.0
2	G	268	GLN	3.0
1	F	32	SER	3.0
2	G	295	GLN	3.0
2	B	310	HIS	2.9
1	A	218	CYS	2.9
2	G	271	PRO	2.9
2	B	291	PRO	2.8
2	B	222	TYR	2.8
2	B	308	VAL	2.8
2	B	268	GLN	2.8
2	B	328	LEU	2.8
2	G	200	THR	2.7

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Mol	Chain	Res	Type	RSRZ
2	B	301	ARG	2.7
2	B	198	THR	2.7
2	B	299	THR	2.7
2	B	262	VAL	2.7
1	F	34	TYR	2.7
1	F	96	ARG	2.6
2	G	263	VAL	2.6
1	F	151	GLN	2.6
1	F	46	GLN	2.6
2	G	287	ALA	2.5
2	G	326	LYS	2.5
2	B	295	GLN	2.5
2	G	121	ALA	2.5
2	G	302	VAL	2.5
1	F	15	PRO	2.5
2	B	332	ILE	2.4
2	G	139	SER	2.4
1	F	31	THR	2.4
2	B	139	SER	2.3
2	B	136	ARG	2.3
1	F	157	ALA	2.3
2	B	390	ASN	2.3
2	B	147	CYS	2.3
2	B	243	PHE	2.3
2	G	272	GLU	2.3
2	B	246	LYS	2.3
2	B	65	LYS	2.3
2	G	322	LYS	2.3
2	B	264	VAL	2.3
2	B	273	VAL	2.3
2	G	362	GLN	2.3
2	G	316	GLY	2.3
2	G	212	THR	2.2
2	G	253	ILE	2.2
1	F	153	LYS	2.2
2	G	54	SER	2.2
1	F	172	SER	2.2
2	G	137	SER	2.2
2	B	233	GLU	2.2
1	F	214	ASN	2.2
2	G	297	ASN	2.2
1	F	195	VAL	2.2

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Mol	Chain	Res	Type	RSRZ
2	B	327	GLY	2.1
2	G	325	ASN	2.1
2	G	305	VAL	2.1
1	F	155	ASP	2.1
2	B	356	GLU	2.1
2	G	291	PRO	2.1
2	B	1	GLN	2.1
2	B	255	ARG	2.1
1	F	148	ALA	2.1
2	B	234	PHE	2.1
2	B	223	GLY	2.1
2	B	292	ARG	2.0
2	G	323	VAL	2.0
1	F	158	LEU	2.0
2	G	145	LEU	2.0
2	B	335	THR	2.0
2	G	197	GLY	2.0
2	B	298	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)

SUGAR-RSR INFOmissingINFO

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} 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
6	SO4	B	504	5/5	0.57	0.16	113,113,114,115	0
6	SO4	A	301	5/5	0.91	0.14	59,70,72,75	0
6	SO4	B	502	5/5	0.92	0.09	82,84,84,89	0
6	SO4	B	501	5/5	0.92	0.08	99,99,99,100	0
6	SO4	B	503	5/5	0.93	0.09	69,77,78,79	0

6.5 Other polymers (i)

There are no such residues in this entry.