



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 13, 2017 – 04:45 pm GMT

PDB ID : 3X3F
Title : TRAIL-R2 Extracellular Region Complexed to a Fab fragment from Human Agonist Antibody KMTR2
Authors : Tamada, T.
Deposited on : 2015-01-20
Resolution : 2.10 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 : trunk28620
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) : recalc28949

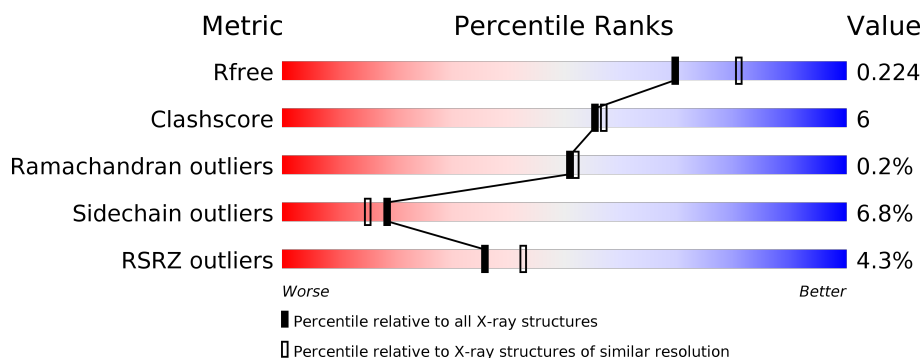
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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	4243 (2.10-2.10)
Clashscore	112137	4788 (2.10-2.10)
Ramachandran outliers	110173	4740 (2.10-2.10)
Sidechain outliers	110143	4741 (2.10-2.10)
RSRZ outliers	101464	4275 (2.10-2.10)

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	H	229	<div> <div>5%</div> <div> <div></div> <div>81%</div> <div>14%</div> <div>• •</div> </div> </div>
2	L	214	<div> <div>2%</div> <div> <div></div> <div>88%</div> <div>10%</div> <div>•</div> </div> </div>
3	A	142	<div> <div>4%</div> <div> <div></div> <div>39%</div> <div>11%</div> <div>•</div> <div>50%</div> </div> </div>

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
6	GOL	L	301	-	-	-	X
6	GOL	L	302	-	-	-	X
6	GOL	L	303	-	-	-	X
6	GOL	L	304	-	-	-	X
6	GOL	L	305	-	-	-	X

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 4199 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 Heavy chain of KMTR2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	H	222	Total	C	N	O	S	0	0	0
			1691	1062	280	338	11			

- Molecule 2 is a protein called Light chain of KMTR2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	L	214	Total	C	N	O	S	0	0	0
			1643	1027	279	332	5			

- Molecule 3 is a protein called Tumor necrosis factor receptor superfamily member 10B.

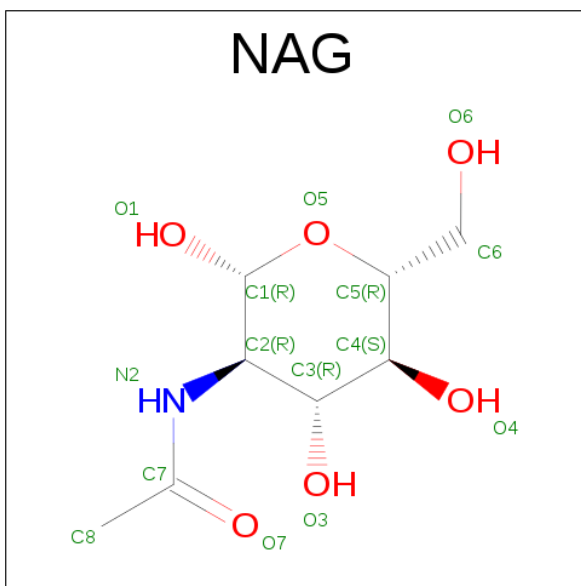
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	A	71	Total	C	N	O	S	0	0	0
			544	326	95	114	9			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	67	VAL	ALA	SEE REMARK 999	UNP O14763
A	185	SER	-	EXPRESSION TAG	UNP O14763
A	186	ARG	-	EXPRESSION TAG	UNP O14763
A	187	ALA	-	EXPRESSION TAG	UNP O14763
A	188	ASP	-	EXPRESSION TAG	UNP O14763
A	189	TYR	-	EXPRESSION TAG	UNP O14763
A	190	LYS	-	EXPRESSION TAG	UNP O14763
A	191	ASP	-	EXPRESSION TAG	UNP O14763
A	192	ASP	-	EXPRESSION TAG	UNP O14763
A	193	ASP	-	EXPRESSION TAG	UNP O14763
A	194	ASP	-	EXPRESSION TAG	UNP O14763
A	195	LYS	-	EXPRESSION TAG	UNP O14763

- Molecule 4 is SUGAR (N-ACETYL-D-GLUCOSAMINE) (three-letter code: NAG) (formula:

C₈H₁₅NO₆).

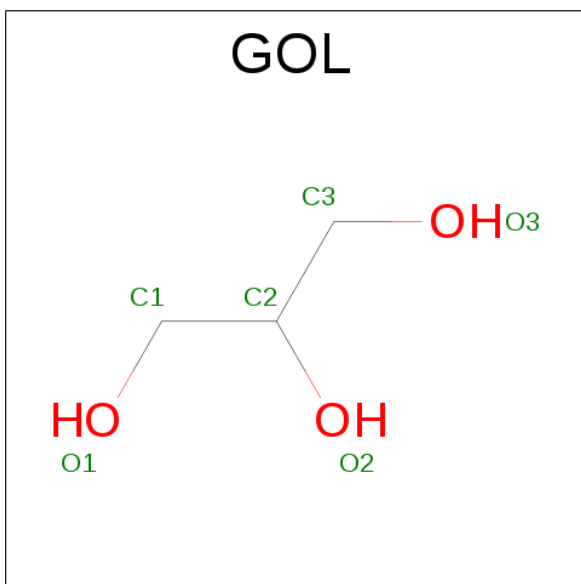


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	H	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	H	1	Total	Cl	0	0
			1	1		

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	H	126	Total	O	0	0
			126	126		
7	L	114	Total	O	0	0
			114	114		
7	A	36	Total	O	0	0
			36	36		

4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, α , β , γ	144.97Å 151.56Å 65.04Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.67 – 2.10 46.72 – 2.10	Depositor EDS
% Data completeness (in resolution range)	94.8 (47.67-2.10) 94.8 (46.72-2.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.08	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.72 (at 2.10Å)	Xtriage
Refinement program	REFMAC 5.8.0049	Depositor
R, R_{free}	0.186 , 0.224 0.186 , 0.224	Depositor DCC
R_{free} test set	1994 reflections (5.26%)	DCC
Wilson B-factor (Å ²)	25.6	Xtriage
Anisotropy	0.134	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 44.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	0.017 for -k,-h,-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	4199	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.45% 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: GOL, NAG, CL

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	H	0.42	0/1733	0.64	1/2359 (0.0%)
2	L	0.44	0/1679	0.64	1/2281 (0.0%)
3	A	0.40	0/556	0.68	0/754
All	All	0.43	0/3968	0.65	2/5394 (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	H	191	LEU	CA-CB-CG	5.23	127.32	115.30
2	L	78	LEU	CA-CB-CG	5.14	127.11	115.30

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	H	1691	0	1628	21	0
2	L	1643	0	1596	17	0
3	A	544	0	482	7	0
4	H	14	0	13	2	0
5	H	1	0	0	0	0
6	L	30	0	40	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	A	36	0	0	0	0
7	H	126	0	0	1	0
7	L	114	0	0	1	0
All	All	4199	0	3759	45	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 6.

All (45) 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:H:73:ASN:HD21	4:H:301:NAG:C1	1.59	1.15
2:L:147:GLN:HG2	2:L:154:LEU:HD11	1.45	0.98
1:H:11:MET:CE	1:H:159:PHE:HE1	1.79	0.94
1:H:11:MET:HE3	1:H:159:PHE:HE1	1.34	0.91
1:H:73:ASN:ND2	4:H:301:NAG:C1	2.36	0.88
1:H:11:MET:CE	1:H:159:PHE:CE1	2.61	0.83
1:H:11:MET:HE3	1:H:159:PHE:CE1	2.16	0.77
1:H:11:MET:HE1	1:H:159:PHE:CE1	2.23	0.74
2:L:147:GLN:HG2	2:L:154:LEU:CD1	2.18	0.73
1:H:23:LYS:HG2	1:H:78:THR:HG22	1.75	0.69
1:H:28:THR:HG22	1:H:30:THR:HG22	1.75	0.69
3:A:140:GLU:O	3:A:142:GLY:N	2.28	0.66
2:L:24:ARG:HD2	6:L:304:GOL:H12	1.79	0.65
3:A:143:THR:HG22	3:A:144:PHE:HB3	1.84	0.59
1:H:76:ILE:HG13	1:H:78:THR:HG23	1.85	0.57
2:L:119:PRO:HG3	2:L:214:CYS:SG	2.45	0.56
3:A:84:GLY:HA2	3:A:131:THR:O	2.07	0.55
2:L:107:LYS:HD3	7:L:468:HOH:O	2.08	0.52
1:H:136:PRO:HD3	1:H:222:LYS:HE2	1.91	0.52
1:H:40:ALA:HB3	1:H:43:GLN:HG3	1.92	0.51
2:L:5:THR:HB	6:L:304:GOL:H31	1.93	0.51
2:L:20:THR:HG23	2:L:72:THR:CG2	2.41	0.50
1:H:4:LEU:HD13	1:H:115:VAL:HG22	1.92	0.49
1:H:36:TRP:CE2	1:H:81:MET:HB2	2.48	0.49
2:L:147:GLN:CG	2:L:154:LEU:HD11	2.30	0.49
1:H:67:ARG:NH2	1:H:90:ASP:OD2	2.45	0.48
2:L:142:ARG:HG3	2:L:142:ARG:HH11	1.78	0.47
2:L:186:TYR:CZ	2:L:211:ARG:HG3	2.50	0.47
1:H:166:SER:HB3	1:H:210:ASN:HB2	1.99	0.45
2:L:20:THR:HG23	2:L:72:THR:HG23	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:L:140:TYR:CG	2:L:141:PRO:HA	2.52	0.44
3:A:140:GLU:C	3:A:142:GLY:H	2.21	0.44
1:H:28:THR:CG2	1:H:30:THR:HG22	2.46	0.44
2:L:39:LYS:NZ	2:L:81:GLU:HB2	2.32	0.43
2:L:24:ARG:HD2	6:L:304:GOL:C1	2.48	0.42
2:L:120:PRO:HD3	2:L:132:VAL:HG22	2.01	0.42
3:A:143:THR:HA	3:A:144:PHE:HA	1.87	0.42
1:H:92:ALA:HB3	1:H:94:TYR:CE1	2.55	0.42
1:H:226:SER:HB2	7:H:448:HOH:O	2.21	0.41
3:A:76:PRO:HD3	3:A:92:ARG:O	2.21	0.41
2:L:24:ARG:HA	2:L:69:THR:O	2.20	0.41
1:H:197:VAL:HG11	1:H:207:TYR:CE1	2.56	0.41
2:L:142:ARG:NH1	2:L:142:ARG:HG3	2.35	0.41
1:H:11:MET:HE1	1:H:159:PHE:CD1	2.56	0.41
3:A:81:CYS:O	3:A:107:TRP:HA	2.20	0.41

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	H	218/229 (95%)	215 (99%)	3 (1%)	0	100	100
2	L	212/214 (99%)	207 (98%)	5 (2%)	0	100	100
3	A	69/142 (49%)	66 (96%)	2 (3%)	1 (1%)	13	7
All	All	499/585 (85%)	488 (98%)	10 (2%)	1 (0%)	51	52

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	A	141	GLU

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	H	191/197 (97%)	175 (92%)	16 (8%)	13	8
2	L	185/185 (100%)	177 (96%)	8 (4%)	33	32
3	A	65/128 (51%)	59 (91%)	6 (9%)	11	7
All	All	441/510 (86%)	411 (93%)	30 (7%)	18	15

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	H	1	GLN
1	H	23	LYS
1	H	34	ILE
1	H	50	TRP
1	H	72	ARG
1	H	78	THR
1	H	87	ARG
1	H	115	VAL
1	H	137	LEU
1	H	140	CYS
1	H	163	VAL
1	H	166	SER
1	H	172	LEU
1	H	188	LEU
1	H	191	LEU
1	H	223	ARG
2	L	78	LEU
2	L	105	GLU
2	L	123	GLU
2	L	142	ARG
2	L	146	VAL
2	L	154	LEU
2	L	179	LEU
2	L	187	GLU
3	A	111	LEU
3	A	114	LEU

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Mol	Chain	Res	Type
3	A	120	ASP
3	A	126	LEU
3	A	133	ARG
3	A	143	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	H	31	ASN
1	H	62	GLN
1	H	73	ASN
2	L	42	GLN
3	A	138	GLN

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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 7 ligands modelled in this entry, 1 is monoatomic - leaving 6 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
4	NAG	H	301	-	14,14,15	0.56	0	15,19,21	2.66	5 (33%)
6	GOL	L	301	-	5,5,5	0.22	0	5,5,5	0.31	0
6	GOL	L	302	-	5,5,5	0.36	0	5,5,5	0.32	0
6	GOL	L	303	-	5,5,5	0.57	0	5,5,5	0.60	0
6	GOL	L	304	-	5,5,5	0.39	0	5,5,5	0.71	0
6	GOL	L	305	-	5,5,5	0.42	0	5,5,5	0.46	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
4	NAG	H	301	-	-	0/6/23/26	0/1/1/1
6	GOL	L	301	-	-	0/4/4/4	0/0/0/0
6	GOL	L	302	-	-	0/4/4/4	0/0/0/0
6	GOL	L	303	-	-	0/4/4/4	0/0/0/0
6	GOL	L	304	-	-	0/4/4/4	0/0/0/0
6	GOL	L	305	-	-	0/4/4/4	0/0/0/0

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	H	301	NAG	C4-C3-C2	-4.59	104.29	111.02
4	H	301	NAG	O5-C1-C2	-3.76	106.24	111.47
4	H	301	NAG	C1-O5-C5	3.49	116.97	112.17
4	H	301	NAG	C1-C2-N2	4.68	118.48	110.49
4	H	301	NAG	C2-N2-C7	5.49	130.95	122.94

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	H	301	NAG	2	0
6	L	304	GOL	3	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	H	222/229 (96%)	0.14	11 (4%) 30 36	17, 29, 66, 85	0
2	L	214/214 (100%)	0.09	5 (2%) 61 66	15, 28, 54, 83	0
3	A	71/142 (50%)	0.26	6 (8%) 11 15	19, 29, 78, 97	0
All	All	507/585 (86%)	0.14	22 (4%) 36 43	15, 29, 61, 97	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	226	SER	5.8
1	H	204	THR	5.6
3	A	143	THR	5.4
3	A	144	PHE	5.2
1	H	141	SER	4.7
2	L	212	GLY	4.3
2	L	214	CYS	4.0
1	H	225	GLU	3.3
1	H	140	CYS	3.3
3	A	141	GLU	3.2
1	H	202	LEU	3.1
1	H	200	SER	2.9
3	A	124	VAL	2.7
1	H	201	SER	2.6
3	A	140	GLU	2.4
1	H	203	GLY	2.4
1	H	146	GLU	2.3
1	H	66	GLY	2.3
2	L	125	LEU	2.3
2	L	122	ASP	2.2
2	L	126	LYS	2.2
3	A	138	GLN	2.1

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 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(Å ²)	Q<0.9
6	GOL	L	303	6/6	0.75	0.25	11.31	46,48,51,52	0
6	GOL	L	304	6/6	0.75	0.36	11.23	54,57,59,63	0
6	GOL	L	302	6/6	0.71	0.24	6.60	56,58,59,62	0
6	GOL	L	301	6/6	0.93	0.22	5.35	45,47,49,52	0
6	GOL	L	305	6/6	0.85	0.29	5.22	42,51,54,56	0
5	CL	H	302	1/1	0.99	0.08	-4.94	20,20,20,20	0
4	NAG	H	301	14/15	0.68	0.20	-	55,66,69,70	0

6.5 Other polymers [i](#)

There are no such residues in this entry.