



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 13, 2017 – 05:09 pm GMT

PDB ID : 4LE8
Title : Structure of the Als3 adhesin from *Candida albicans*, residues 1-299 (mature sequence)
Authors : Lin, J.; Garnett, J.A.; Cota, E.
Deposited on : 2013-06-25
Resolution : 1.75 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
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

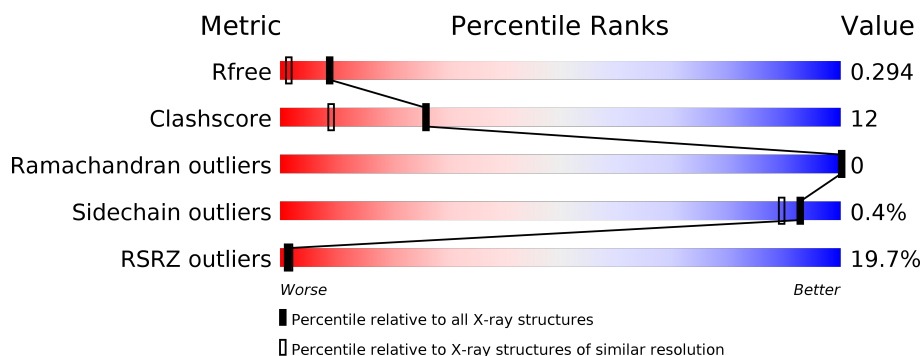
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.75 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	1762 (1.76-1.76)
Clashscore	112137	1889 (1.76-1.76)
Ramachandran outliers	110173	1868 (1.76-1.76)
Sidechain outliers	110143	1868 (1.76-1.76)
RSRZ outliers	101464	1770 (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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	300	<div> <div>22%</div> <div> <div></div> <div>83%</div> <div>17%</div> </div> </div>
1	B	300	<div> <div>18%</div> <div> <div></div> <div>85%</div> <div>15%</div> </div> </div>

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 5076 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 Agglutinin-like protein 3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	300	Total	C	N	O	S	0	8	0
			2280	1444	364	459	13			
1	B	300	Total	C	N	O	S	0	12	0
			2305	1464	364	464	13			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	GLY	-	EXPRESSION TAG	UNP O74623
B	0	GLY	-	EXPRESSION TAG	UNP O74623

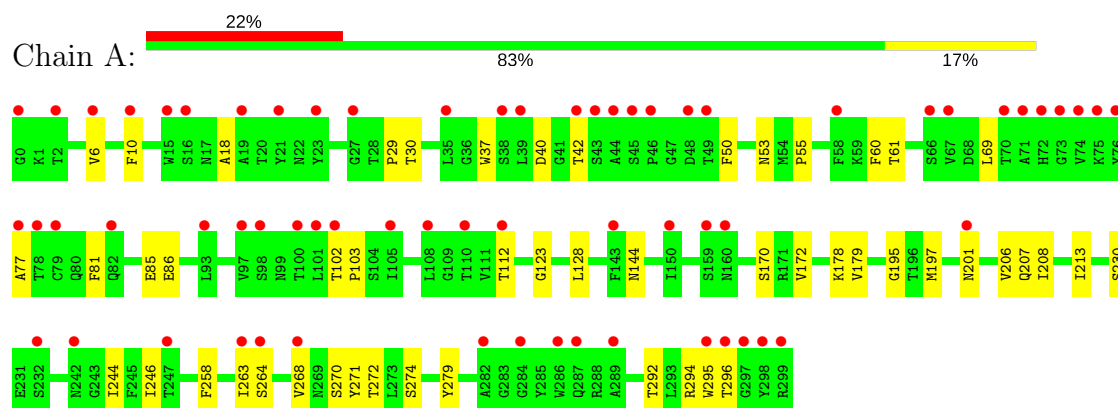
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	244	Total	O	0	0
			244	244		
2	B	247	Total	O	0	0
			247	247		

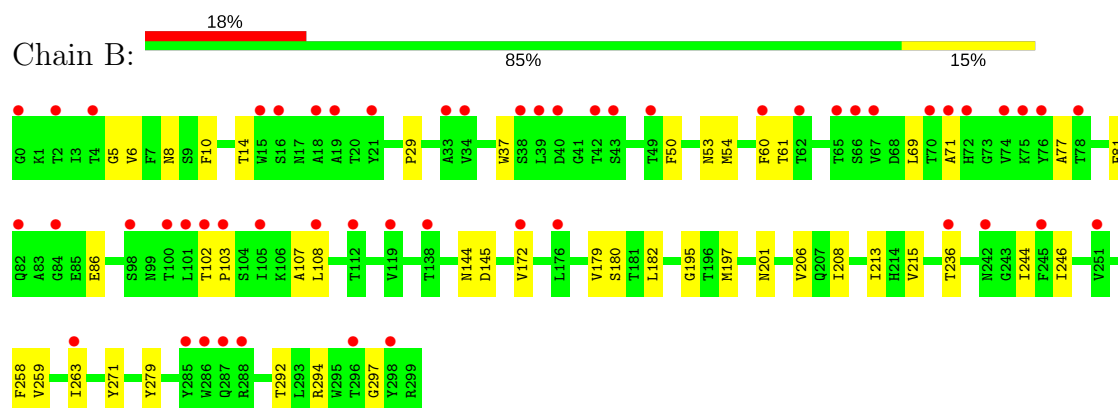
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA 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: Agglutinin-like protein 3



• Molecule 1: Agglutinin-like protein 3



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	140.63Å 30.89Å 143.19Å 90.00° 91.86° 90.00°	Depositor
Resolution (Å)	71.56 – 1.75 71.56 – 1.80	Depositor EDS
% Data completeness (in resolution range)	87.0 (71.56-1.75) 87.0 (71.56-1.80)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.04 (at 1.80Å)	Xtriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.257 , 0.291 0.269 , 0.294	Depositor DCC
R_{free} test set	2797 reflections (5.36%)	DCC
Wilson B-factor (Å ²)	15.6	Xtriage
Anisotropy	0.543	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 26.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.43$, $\langle L^2 \rangle = 0.25$	Xtriage
Estimated twinning fraction	0.044 for -h,-k,l	Xtriage
Reported twinning fraction	0.883 for H, K, L 0.117 for H, -K, -L	Depositor
Outliers	1 of 55086 reflections (0.002%)	Xtriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	5076	wwPDB-VP
Average B, all atoms (Å ²)	20.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 40.70 % of the origin peak, indicating pseudo translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo translational symmetry is equal to 2.6325e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

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	0.58	0/2364	0.72	0/3233
1	B	0.58	0/2400	0.71	0/3285
All	All	0.58	0/4764	0.71	0/6518

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

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	2280	0	2159	62	0
1	B	2305	0	2185	43	0
2	A	244	0	0	30	0
2	B	247	0	0	25	0
All	All	5076	0	4344	105	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 12.

All (105) 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:A:268:VAL:HG11	2:A:484:HOH:O	1.51	1.10

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:258:PHE:CE1	2:A:518:HOH:O	2.20	0.95
1:A:292:THR:HB	2:A:336:HOH:O	1.67	0.92
1:A:29:PRO:HA	2:A:478:HOH:O	1.72	0.90
1:A:294:ARG:CZ	1:A:296:THR:HG21	2.03	0.88
1:B:14[A]:THR:HG22	2:B:539:HOH:O	1.75	0.85
1:B:258:PHE:HB2	2:B:445:HOH:O	1.77	0.83
1:A:264:SER:HB3	2:A:533:HOH:O	1.81	0.80
1:A:55:PRO:HD3	2:A:355:HOH:O	1.80	0.80
1:A:53:ASN:ND2	2:A:355:HOH:O	2.20	0.74
1:A:53:ASN:HD22	1:A:144:ASN:HD21	1.35	0.73
1:B:86:GLU:HG3	2:B:524:HOH:O	1.90	0.70
1:B:182:LEU:HD12	2:B:445:HOH:O	1.91	0.70
1:A:207:GLN:HB2	2:A:533:HOH:O	1.91	0.69
1:B:107:ALA:HB1	2:B:540:HOH:O	1.91	0.69
1:A:268:VAL:HG22	2:A:396:HOH:O	1.93	0.68
1:B:259:VAL:N	2:B:445:HOH:O	2.26	0.68
1:B:53:ASN:HD22	1:B:144:ASN:HD21	1.41	0.68
1:A:271:TYR:HA	2:B:441:HOH:O	1.93	0.67
1:A:112:THR:O	1:A:112:THR:HG23	1.93	0.66
1:A:272:THR:CG2	2:A:336:HOH:O	2.44	0.66
1:A:294:ARG:NE	2:A:513:HOH:O	2.28	0.65
1:A:230:SER:HB2	2:A:532:HOH:O	1.96	0.65
1:A:208:ILE:HD13	1:A:263:ILE:HG22	1.77	0.65
1:A:294:ARG:NH2	1:A:296:THR:HG21	2.11	0.65
1:A:272:THR:HG21	2:A:336:HOH:O	1.96	0.64
1:B:236[A]:THR:HG21	2:B:432:HOH:O	1.97	0.64
1:A:123:GLY:HA2	2:A:532:HOH:O	1.97	0.64
1:A:144:ASN:ND2	2:A:355:HOH:O	2.31	0.63
1:B:172[A]:VAL:HG22	1:B:179:VAL:HG22	1.80	0.62
1:B:5:GLY:HA2	2:B:537:HOH:O	1.99	0.62
1:B:108:LEU:N	2:B:540:HOH:O	2.33	0.62
1:A:172[A]:VAL:HG22	1:A:179:VAL:HG22	1.83	0.61
1:A:128:LEU:HD21	2:A:532:HOH:O	2.01	0.59
1:B:54[B]:MET:CE	1:B:81:PHE:HE1	2.17	0.57
1:B:208:ILE:HD13	1:B:263:ILE:HG22	1.86	0.57
1:B:297:GLY:CA	2:B:528:HOH:O	2.53	0.57
1:B:180:SER:HB3	2:B:483:HOH:O	2.05	0.57
1:A:170[B]:SER:HB3	1:A:295:TRP:CZ3	2.41	0.56
1:B:5:GLY:CA	2:B:537:HOH:O	2.53	0.56
1:A:197[A]:MET:HE1	1:A:246:ILE:HD11	1.87	0.55
1:B:263:ILE:HD11	1:B:271:TYR:OH	2.08	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:69:LEU:HD12	1:B:77:ALA:HB3	1.90	0.54
1:B:294:ARG:NH1	2:B:422:HOH:O	2.41	0.54
1:A:69:LEU:HD12	1:A:77:ALA:HB3	1.91	0.53
1:A:294:ARG:CD	2:A:513:HOH:O	2.57	0.53
1:A:112:THR:O	1:A:112:THR:CG2	2.56	0.52
1:A:178:LYS:HD3	2:A:538:HOH:O	2.09	0.52
1:A:42:THR:CA	2:A:420:HOH:O	2.57	0.52
1:B:14[A]:THR:HG23	2:B:538:HOH:O	2.09	0.52
1:A:294:ARG:HG2	1:A:296:THR:HG23	1.93	0.51
1:B:54[B]:MET:CE	1:B:81:PHE:CE1	2.94	0.51
1:B:180:SER:CB	2:B:483:HOH:O	2.59	0.50
1:A:37:TRP:CD1	1:A:69:LEU:HD22	2.47	0.50
1:B:292:THR:HG21	2:B:499:HOH:O	2.12	0.50
1:B:69:LEU:HB2	1:B:77:ALA:HB3	1.93	0.50
1:A:201:ASN:ND2	1:A:206:VAL:CG2	2.75	0.49
1:A:69:LEU:HB2	1:A:77:ALA:HB3	1.93	0.49
1:B:37:TRP:CD1	1:B:69:LEU:HD22	2.48	0.48
1:A:270:SER:HA	1:A:296:THR:HG22	1.95	0.48
1:A:263:ILE:HD11	1:A:271:TYR:CZ	2.49	0.48
1:A:258:PHE:HZ	2:A:532:HOH:O	1.96	0.48
1:A:40:ASP:CG	1:A:42:THR:HG22	2.35	0.47
1:A:18:ALA:HB3	2:A:331:HOH:O	2.14	0.47
1:A:258:PHE:CD1	2:A:518:HOH:O	2.59	0.46
1:B:145:ASP:HB3	2:B:537:HOH:O	2.15	0.46
1:B:71:ALA:HA	2:B:484:HOH:O	2.14	0.46
1:A:197[A]:MET:CE	1:A:246:ILE:HD11	2.45	0.46
1:A:144:ASN:ND2	2:A:324:HOH:O	2.41	0.46
1:A:201:ASN:ND2	1:A:206:VAL:HB	2.31	0.46
1:A:213:ILE:HD13	1:A:244:ILE:HD11	1.98	0.46
1:A:6:VAL:HG11	1:A:50:PHE:CE2	2.51	0.45
1:B:6:VAL:HG11	1:B:50:PHE:CE2	2.51	0.45
1:B:8:ASN:HB3	2:B:488:HOH:O	2.16	0.45
1:B:197[A]:MET:HE1	1:B:246:ILE:HD11	1.97	0.45
1:B:29:PRO:HB3	1:B:61:THR:HG21	1.98	0.45
1:A:42:THR:HA	2:A:420:HOH:O	2.16	0.45
1:B:197[A]:MET:CE	1:B:246:ILE:HD11	2.47	0.45
1:A:29:PRO:HB3	1:A:61:THR:HG21	1.98	0.45
1:A:102:THR:HB	1:A:103:PRO:HD2	1.99	0.44
1:A:195:GLY:HA2	1:A:279:TYR:HA	1.99	0.44
1:B:236[A]:THR:CG2	2:B:432:HOH:O	2.62	0.44
1:B:297:GLY:C	2:B:528:HOH:O	2.55	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:201:ASN:ND2	1:A:206:VAL:HG21	2.33	0.44
1:A:179:VAL:HB	1:A:263:ILE:HG13	2.00	0.43
1:A:30:THR:HA	2:A:478:HOH:O	2.17	0.43
1:A:112:THR:CG2	2:A:416:HOH:O	2.66	0.43
1:A:60:PHE:CD1	1:A:81:PHE:CE2	3.06	0.43
1:B:195:GLY:HA2	1:B:279:TYR:HA	2.01	0.43
1:A:274[B]:SER:HB2	1:A:292:THR:HG22	2.01	0.43
1:A:42:THR:N	2:A:420:HOH:O	2.50	0.43
1:B:5:GLY:N	2:B:537:HOH:O	2.52	0.43
1:B:213:ILE:HD13	1:B:244:ILE:HD11	2.01	0.42
1:B:201:ASN:ND2	1:B:206:VAL:CG2	2.82	0.42
1:B:60:PHE:CD1	1:B:81:PHE:CE2	3.06	0.42
1:B:102:THR:HB	1:B:103:PRO:HD2	2.01	0.42
1:A:178:LYS:CD	2:A:538:HOH:O	2.66	0.42
1:A:123:GLY:N	2:A:518:HOH:O	2.52	0.41
1:B:215:VAL:HG22	1:B:259:VAL:HG23	2.02	0.41
1:A:292:THR:CB	2:A:336:HOH:O	2.45	0.41
1:B:71:ALA:HB1	2:B:418:HOH:O	2.21	0.41
1:A:85:GLU:HB3	1:A:86:GLU:H	1.64	0.41
1:B:292:THR:HG23	2:B:426:HOH:O	2.19	0.41
1:A:29:PRO:HA	1:A:30:THR:HA	1.83	0.40
1:A:213:ILE:HD13	1:A:244:ILE:CD1	2.51	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	307/300 (102%)	295 (96%)	12 (4%)	0	100	100
1	B	311/300 (104%)	300 (96%)	11 (4%)	0	100	100
All	All	618/600 (103%)	595 (96%)	23 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	254/253 (100%)	253 (100%)	1 (0%)	93	89
1	B	258/253 (102%)	257 (100%)	1 (0%)	93	89
All	All	512/506 (101%)	510 (100%)	2 (0%)	93	89

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	10	PHE
1	B	10	PHE

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

Mol	Chain	Res	Type
1	A	72	HIS
1	A	144	ASN
1	A	187	GLN
1	A	190	ASN
1	B	144	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 [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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	300/300 (100%)	1.39	65 (21%)  	9, 18, 45, 60	0
1	B	300/300 (100%)	1.26	53 (17%)  	10, 18, 41, 59	0
All	All	600/600 (100%)	1.33	118 (19%)  	9, 18, 42, 60	0

All (118) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	297	GLY	11.6
1	A	76	TYR	7.5
1	B	286	TRP	7.0
1	A	0	GLY	5.7
1	B	76	TYR	5.6
1	B	0	GLY	5.6
1	B	18	ALA	5.4
1	A	100	THR	5.3
1	A	67	VAL	5.2
1	A	298	TYR	5.2
1	B	285	TYR	5.1
1	A	108	LEU	5.1
1	A	74	VAL	4.9
1	B	108	LEU	4.8
1	A	97	VAL	4.8
1	B	67	VAL	4.6
1	A	296	THR	4.4
1	B	42	THR	4.4
1	A	282	ALA	4.2
1	B	263	ILE	4.2
1	A	44	ALA	4.0
1	B	101	LEU	3.9
1	A	75	LYS	3.8
1	A	284	GLY	3.7

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Mol	Chain	Res	Type	RSRZ
1	A	286	TRP	3.7
1	B	298	TYR	3.6
1	A	160	ASN	3.6
1	B	66	SER	3.6
1	A	105	ILE	3.6
1	B	16[A]	SER	3.4
1	A	46	PRO	3.4
1	B	74	VAL	3.3
1	A	264	SER	3.3
1	A	66	SER	3.3
1	A	71	ALA	3.3
1	B	19	ALA	3.2
1	B	176	LEU	3.2
1	B	60	PHE	3.2
1	B	98	SER	3.1
1	B	72	HIS	3.1
1	A	49	THR	3.0
1	A	6	VAL	3.0
1	A	16	SER	3.0
1	A	242	ASN	2.9
1	B	172[A]	VAL	2.9
1	A	77	ALA	2.8
1	B	2	THR	2.8
1	B	100	THR	2.8
1	B	105	ILE	2.8
1	A	287	GLN	2.8
1	A	35	LEU	2.8
1	A	39	LEU	2.8
1	A	21	TYR	2.7
1	B	21	TYR	2.7
1	A	112	THR	2.7
1	B	75	LYS	2.7
1	A	102	THR	2.7
1	A	299	ARG	2.6
1	B	65	THR	2.6
1	B	138[A]	THR	2.6
1	B	296	THR	2.6
1	B	71	ALA	2.6
1	B	102	THR	2.6
1	A	263	ILE	2.6
1	A	19	ALA	2.6
1	A	38	SER	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	73	GLY	2.5
1	A	45	SER	2.5
1	A	110	THR	2.5
1	B	34	VAL	2.5
1	A	42	THR	2.5
1	B	49	THR	2.5
1	A	150	ILE	2.5
1	A	93	LEU	2.5
1	A	82	GLN	2.5
1	B	38	SER	2.5
1	B	103	PRO	2.4
1	A	23	TYR	2.4
1	A	78	THR	2.4
1	A	247	THR	2.4
1	B	15	TRP	2.4
1	B	119	VAL	2.4
1	A	232	SER	2.4
1	A	101	LEU	2.4
1	A	58	PHE	2.4
1	B	287	GLN	2.4
1	A	201	ASN	2.3
1	B	112	THR	2.3
1	A	48	ASP	2.3
1	B	245	PHE	2.3
1	A	2	THR	2.3
1	A	159	SER	2.3
1	B	242	ASN	2.3
1	A	79	CYS	2.2
1	A	70	THR	2.2
1	B	82	GLN	2.2
1	B	40	ASP	2.2
1	A	72	HIS	2.2
1	A	143	PHE	2.2
1	A	268	VAL	2.2
1	A	27	GLY	2.2
1	B	78	THR	2.1
1	B	43	SER	2.1
1	A	295	TRP	2.1
1	A	10	PHE	2.1
1	B	84	GLY	2.1
1	A	43	SER	2.1
1	B	4	THR	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	70[A]	THR	2.1
1	B	33	ALA	2.1
1	B	288	ARG	2.1
1	B	251	VAL	2.1
1	B	62	THR	2.0
1	A	289	ALA	2.0
1	A	98	SER	2.0
1	B	39	LEU	2.0
1	B	236[A]	THR	2.0
1	A	15	TRP	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 carbohydrates in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.