



# Full wwPDB X-ray Structure Validation Report ⓘ

Apr 24, 2025 – 10:14 AM JST

PDB ID : 8HZ2 / pdb\_00008hz2  
Title : Tumor Necrosis Factor Receptor Associated Factor 6 (TRAF6) N-terminal Domain  
Authors : Guven, O.; Ciftci, H.; DeMirci, H.  
Deposited on : 2023-01-07  
Resolution : 2.60 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](mailto: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>.

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

MolProbity	:	4.02b-467
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.42

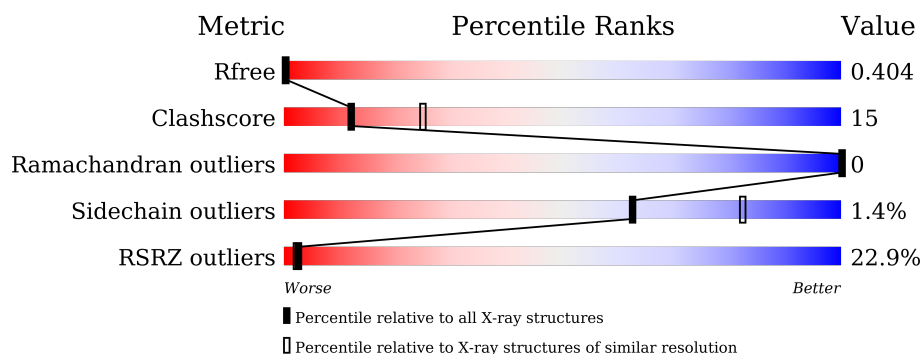
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.60 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	3775 (2.60-2.60)
Clashscore	180529	4181 (2.60-2.60)
Ramachandran outliers	177936	4129 (2.60-2.60)
Sidechain outliers	177891	4129 (2.60-2.60)
RSRZ outliers	164620	3775 (2.60-2.60)

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  $\geq 3$ , 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	157	<div> <div>13%</div> <div>78%</div> <div>22%</div> </div>
1	B	157	<div> <div>32%</div> <div>71%</div> <div>29%</div> <div>.</div> </div>

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 2574 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 TNF receptor-associated factor 6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	157	Total	C	N	O	S	0	0	0
			1259	785	225	229	20			
1	B	157	Total	C	N	O	S	0	0	0
			1259	785	225	229	20			

- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	5	Total	Zn	5	0
			5	5		
2	B	5	Total	Zn	5	0
			5	5		

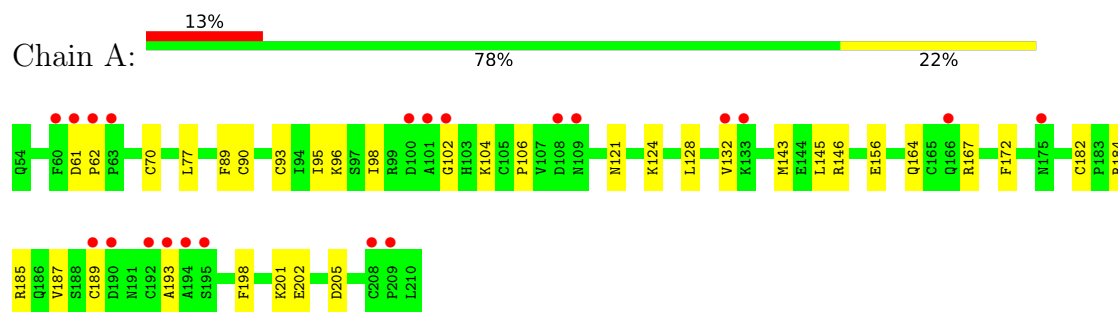
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	19	Total	O	0	0
			19	19		
3	B	27	Total	O	0	0
			27	27		

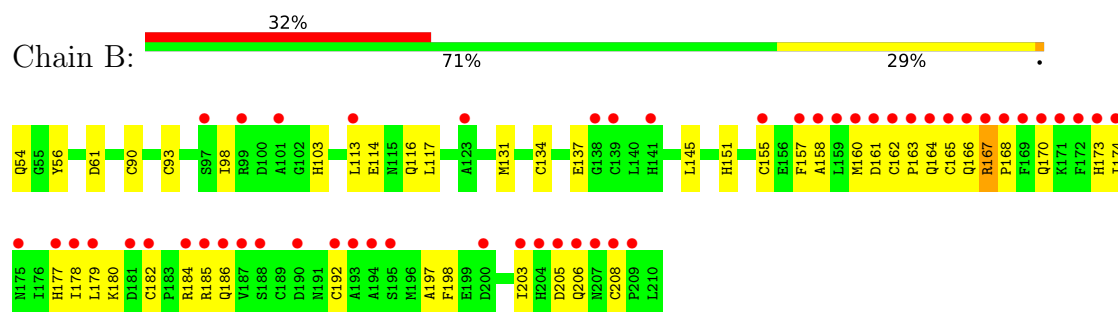
### 3 Residue-property plots [i](#)

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: TNF receptor-associated factor 6



- Molecule 1: TNF receptor-associated factor 6



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	45.88Å 51.70Å 54.30Å 91.04° 112.15° 108.43°	Depositor
Resolution (Å)	6.00 – 2.60 6.00 – 2.60	Depositor EDS
% Data completeness (in resolution range)	98.5 (6.00-2.60) 90.5 (6.00-2.60)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.01 (at 2.58Å)	Xtriage
Refinement program	PHENIX 1.20.1	Depositor
R, $R_{free}$	0.348 , 0.409 0.345 , 0.404	Depositor DCC
$R_{free}$ test set	11019 reflections (10.08%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	39.4	Xtriage
Anisotropy	0.156	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.44 , 90.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.77	EDS
Total number of atoms	2574	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	112.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 15.69% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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

Bond lengths and bond angles in the following residue types are not validated in this section: ZN

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	0.25	0/1288	0.45	0/1736
1	B	0.24	0/1288	0.48	0/1736
All	All	0.24	0/2576	0.47	0/3472

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	1259	0	1207	32	1
1	B	1259	0	1207	44	1
2	A	5	0	0	0	0
2	B	5	0	0	0	0
3	A	19	0	0	18	1
3	B	27	0	0	18	1
All	All	2574	0	2414	76	2

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 15.

All (76) close contacts within the same asymmetric unit are listed below, sorted by their clash

magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:163:PRO:CA	3:B:402:HOH:O	1.85	1.23
1:B:166:GLN:NE2	3:B:402:HOH:O	1.82	1.10
1:B:163:PRO:HA	3:B:402:HOH:O	1.42	1.08
1:B:177:HIS:CE1	3:B:401:HOH:O	1.96	1.07
1:A:102:GLY:N	3:A:403:HOH:O	1.94	0.99
1:B:182:CYS:CB	3:B:412:HOH:O	2.12	0.96
1:B:163:PRO:O	3:B:402:HOH:O	1.84	0.96
1:A:98:ILE:N	3:A:402:HOH:O	1.90	0.94
1:B:182:CYS:HB2	3:B:412:HOH:O	1.71	0.87
1:A:102:GLY:CA	3:A:403:HOH:O	2.18	0.87
1:A:128:LEU:HB3	1:A:146:ARG:HG3	1.59	0.85
1:A:96:LYS:N	3:A:401:HOH:O	1.75	0.83
1:B:179:LEU:HD23	3:B:409:HOH:O	1.79	0.81
1:A:102:GLY:C	3:A:403:HOH:O	2.24	0.76
1:A:187:VAL:CG1	3:A:418:HOH:O	2.36	0.73
1:B:182:CYS:HB2	1:B:185:ARG:HB3	1.71	0.71
1:B:162:CYS:N	1:B:167:ARG:O	2.22	0.70
1:B:185:ARG:CA	3:B:412:HOH:O	2.39	0.70
1:B:185:ARG:HA	3:B:412:HOH:O	1.92	0.70
1:A:187:VAL:HG11	3:A:418:HOH:O	1.93	0.68
1:A:198:PHE:HB2	3:A:418:HOH:O	1.94	0.68
1:B:168:PRO:O	3:B:403:HOH:O	2.11	0.68
1:B:98:ILE:HG23	1:B:103:HIS:HA	1.75	0.67
1:A:95:ILE:N	3:A:401:HOH:O	2.27	0.67
1:B:161:ASP:HA	1:B:168:PRO:HA	1.77	0.66
1:A:189:CYS:O	1:A:193:ALA:N	2.29	0.66
1:B:90:CYS:HB2	1:B:93:CYS:SG	2.38	0.64
1:B:163:PRO:CB	3:B:402:HOH:O	2.33	0.63
1:A:198:PHE:HD1	3:A:418:HOH:O	1.81	0.63
1:B:164:GLN:OE1	1:B:186:GLN:NE2	2.31	0.63
1:A:90:CYS:HB2	1:A:93:CYS:SG	2.38	0.62
1:B:186:GLN:CD	3:B:410:HOH:O	2.37	0.61
1:A:95:ILE:CA	3:A:401:HOH:O	2.48	0.61
1:A:182:CYS:O	1:A:185:ARG:NE	2.33	0.60
1:A:167:ARG:NH1	3:A:406:HOH:O	2.39	0.56
1:B:205:ASP:HA	1:B:208:CYS:HB2	1.88	0.56
1:A:121:ASN:HA	1:A:124:LYS:HB3	1.88	0.55
1:B:178:ILE:HG22	3:B:409:HOH:O	2.07	0.54
1:B:185:ARG:HG2	1:B:198:PHE:HB2	1.90	0.54
1:A:104:LYS:HE2	1:A:106:PRO:HA	1.89	0.54
1:A:187:VAL:HG13	3:A:418:HOH:O	2.04	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:182:CYS:HB3	3:B:412:HOH:O	1.96	0.53
1:A:104:LYS:NZ	3:A:408:HOH:O	2.42	0.52
1:A:185:ARG:NH1	3:A:405:HOH:O	2.33	0.52
1:B:203:ILE:HA	1:B:206:GLN:HE22	1.73	0.52
1:B:134:CYS:SG	1:B:151:HIS:CD2	3.03	0.51
1:B:155:CYS:HB3	1:B:158:ALA:HB2	1.93	0.50
1:A:201:LYS:NZ	1:A:205:ASP:OD2	2.37	0.50
1:B:54:GLN:N	3:B:411:HOH:O	2.44	0.50
1:A:132:VAL:HG11	1:A:145:LEU:HD13	1.93	0.50
1:A:198:PHE:CD1	3:A:418:HOH:O	2.54	0.50
1:B:173:HIS:O	1:B:173:HIS:ND1	2.44	0.50
1:A:102:GLY:O	3:A:403:HOH:O	2.19	0.49
1:A:95:ILE:HB	3:A:401:HOH:O	2.13	0.49
1:B:180:LYS:HA	1:B:185:ARG:NH1	2.28	0.49
1:A:61:ASP:HB2	1:A:62:PRO:HD3	1.94	0.48
1:A:89:PHE:CZ	1:A:106:PRO:HD2	2.50	0.47
1:B:185:ARG:N	3:B:412:HOH:O	2.47	0.46
1:B:177:HIS:CE1	1:B:182:CYS:SG	2.82	0.46
1:B:170:GLN:O	1:B:174:ILE:N	2.49	0.46
1:B:56:TYR:CG	1:B:145:LEU:HD21	2.50	0.46
1:B:114:GLU:HA	1:B:117:LEU:HD12	1.99	0.45
1:B:164:GLN:HG3	1:B:178:ILE:HG23	1.98	0.44
1:B:173:HIS:HE1	1:B:177:HIS:HB2	1.82	0.44
1:B:137:GLU:O	1:B:157:PHE:HB3	2.18	0.44
1:B:160:MET:N	1:B:160:MET:SD	2.91	0.44
1:B:192:CYS:HB3	1:B:208:CYS:SG	2.58	0.43
1:B:184:ARG:CZ	1:B:197:ALA:HB2	2.49	0.42
1:B:174:ILE:O	1:B:178:ILE:HG13	2.19	0.42
1:A:164:GLN:HB3	1:A:184:ARG:HB2	2.02	0.42
1:B:116:GLN:HB3	3:B:405:HOH:O	2.19	0.41
1:A:143:MET:HB2	1:A:143:MET:HE2	1.99	0.41
1:B:178:ILE:HA	1:B:182:CYS:SG	2.61	0.41
1:B:61:ASP:O	1:B:131:MET:HB2	2.21	0.41
1:A:70:CYS:HB2	1:A:77:LEU:HD23	2.04	0.40
1:A:156:GLU:HB3	1:A:172:PHE:HB3	2.03	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:168:PRO:CG	3:A:403:HOH:O[1_665]	1.57	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:104:LYS:CD	3:B:414:HOH:O[1_445]	1.85	0.35

## 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	155/157 (99%)	149 (96%)	6 (4%)	0	100	100
1	B	155/157 (99%)	147 (95%)	8 (5%)	0	100	100
All	All	310/314 (99%)	296 (96%)	14 (4%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	143/143 (100%)	142 (99%)	1 (1%)	81	93
1	B	143/143 (100%)	140 (98%)	3 (2%)	48	73
All	All	286/286 (100%)	282 (99%)	4 (1%)	62	82

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	202	GLU
1	B	113	LEU

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Mol	Chain	Res	Type
1	B	165	CYS
1	B	167	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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 ⓘ

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry ⓘ

Of 10 ligands modelled in this entry, 10 are monoatomic - leaving 0 for Mogul analysis.

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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	157/157 (100%)	0.73	21 (13%) <b>8</b> <b>6</b>	36, 69, 177, 317	0
1	B	157/157 (100%)	1.53	51 (32%) <b>1</b> <b>1</b>	35, 86, 324, 447	0
All	All	314/314 (100%)	1.13	72 (22%) <b>2</b> <b>2</b>	35, 73, 304, 447	0

All (72) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	182	CYS	9.8
1	A	61	ASP	8.2
1	B	165	CYS	7.5
1	A	101	ALA	7.2
1	B	158	ALA	7.0
1	A	102	GLY	6.5
1	B	174	ILE	6.5
1	B	169	PHE	6.3
1	B	168	PRO	6.0
1	B	138	GLY	5.7
1	B	170	GLN	5.7
1	A	100	ASP	5.7
1	B	155	CYS	5.6
1	B	208	CYS	5.2
1	B	171	LYS	5.2
1	B	161	ASP	5.2
1	B	178	ILE	5.2
1	B	163	PRO	5.1
1	A	192	CYS	4.9
1	B	159	LEU	4.7
1	B	194	ALA	4.7
1	B	187	VAL	4.3
1	B	160	MET	4.3
1	B	205	ASP	4.2

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Mol	Chain	Res	Type	RSRZ
1	B	164	GLN	4.1
1	B	113	LEU	4.1
1	B	141	HIS	4.1
1	B	200	ASP	4.1
1	B	162	CYS	4.0
1	B	179	LEU	3.9
1	B	177	HIS	3.8
1	B	186	GLN	3.8
1	A	62	PRO	3.7
1	B	157	PHE	3.6
1	A	208	CYS	3.5
1	B	166	GLN	3.4
1	A	190	ASP	3.4
1	B	203	ILE	3.3
1	B	139	CYS	3.3
1	A	195	SER	3.3
1	B	204	HIS	3.3
1	A	60	PHE	3.2
1	B	192	CYS	3.1
1	A	109	ASN	3.0
1	B	167	ARG	3.0
1	A	194	ALA	3.0
1	B	185	ARG	2.9
1	A	175	ASN	2.9
1	B	188	SER	2.9
1	B	181	ASP	2.8
1	B	207	ASN	2.8
1	B	172	PHE	2.8
1	B	209	PRO	2.6
1	B	184	ARG	2.6
1	B	101	ALA	2.5
1	B	195	SER	2.5
1	B	206	GLN	2.5
1	B	123	ALA	2.4
1	B	175	ASN	2.4
1	B	193	ALA	2.4
1	A	209	PRO	2.4
1	A	63	PRO	2.3
1	A	108	ASP	2.2
1	A	133	LYS	2.2
1	B	190	ASP	2.2
1	A	193	ALA	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	132	VAL	2.2
1	B	173	HIS	2.1
1	B	99	ARG	2.1
1	A	166	GLN	2.1
1	B	97	SER	2.1
1	A	189	CYS	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 monosaccharides in this entry.

## 6.4 Ligands [i](#)

LIGAND-RSR INFOmissingINFO

## 6.5 Other polymers [i](#)

There are no such residues in this entry.