



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 10:44 AM UTC

PDB ID : 4J6N / pdb_00004j6n
Title : Crystal structure of calcium²⁺-free wild-type CD23 lectin domain (crystal form E)
Authors : Dhaliwal, B.; Pang, M.O.Y.; Sutton, B.J.
Deposited on : 2013-02-11
Resolution : 2.85 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
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

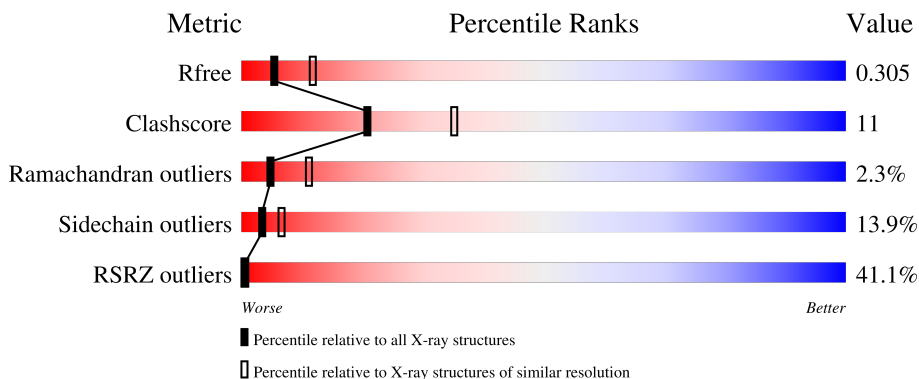
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.85 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	1407 (2.88-2.84)
Clashscore	190562	1446 (2.88-2.84)
Ramachandran outliers	187476	1406 (2.88-2.84)
Sidechain outliers	187428	1407 (2.88-2.84)
RSRZ outliers	180081	1408 (2.88-2.84)

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	143	
1	B	143	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 2186 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.

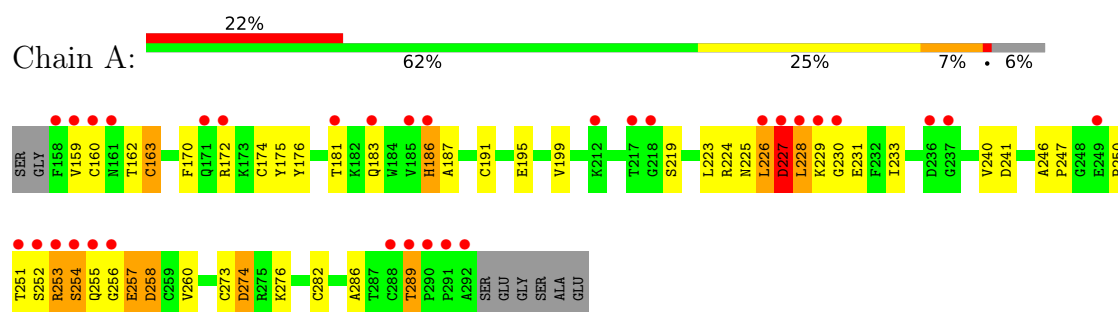
- Molecule 1 is a protein called Low affinity immunoglobulin epsilon Fc receptor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	135	Total	C	N	O	S	0	2	0
			1093	689	193	199	12			
1	B	135	Total	C	N	O	S	0	2	0
			1093	689	193	199	12			

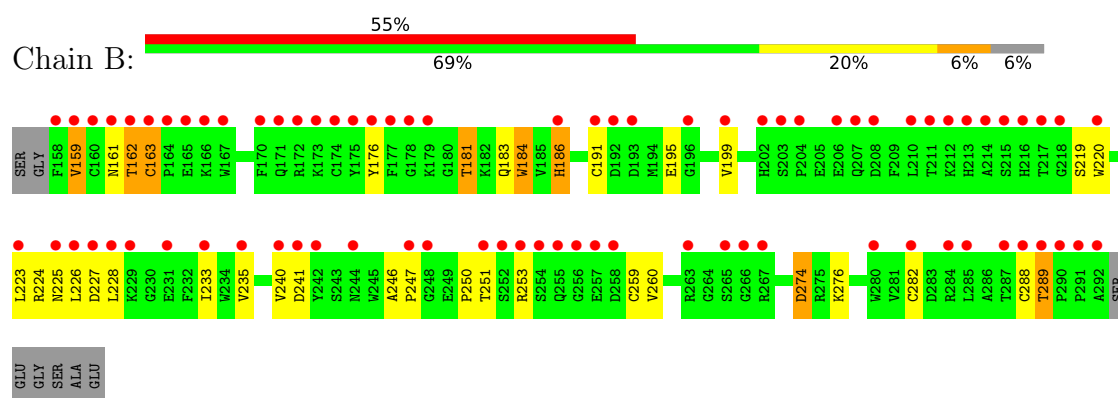
3 Residue-property plots

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: Low affinity immunoglobulin epsilon Fc receptor



- Molecule 1: Low affinity immunoglobulin epsilon Fc receptor



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	64.26Å 73.07Å 57.04Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.25 – 2.85 48.25 – 2.85	Depositor EDS
% Data completeness (in resolution range)	99.8 (48.25-2.85) 99.8 (48.25-2.85)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.07 (at 2.86Å)	Xtriage
Refinement program	BUSTER-TNT BUSTER 2.10.0, BUSTER 2.10.0	Depositor
R, R_{free}	0.252 , 0.317 0.304 , 0.305	Depositor DCC
R_{free} test set	604 reflections (9.05%)	wwPDB-VP
Wilson B-factor (Å ²)	29.8	Xtriage
Anisotropy	1.009	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 70.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.42$, $\langle L^2 \rangle = 0.25$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.77	EDS
Total number of atoms	2186	wwPDB-VP
Average B, all atoms (Å ²)	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.00% 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

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	0.79	0/1133	1.46	13/1535 (0.8%)
1	B	0.79	0/1133	1.37	10/1535 (0.7%)
All	All	0.79	0/2266	1.42	23/3070 (0.7%)

There are no bond length outliers.

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	254	SER	CB-CA-C	12.92	130.52	109.72
1	A	254	SER	N-CA-C	-10.41	92.74	108.46
1	B	184	TRP	N-CA-C	7.13	119.72	111.02
1	B	199	VAL	N-CA-C	6.40	118.01	109.37
1	A	254	SER	CA-C-N	6.34	133.65	121.54
1	A	254	SER	C-N-CA	6.34	133.65	121.54
1	A	199	VAL	N-CA-C	6.07	117.56	109.37
1	A	225	ASN	CA-CB-CG	5.86	118.46	112.60
1	A	187	ALA	CA-C-N	5.73	127.96	120.28
1	A	187	ALA	C-N-CA	5.73	127.96	120.28
1	B	181	THR	CB-CA-C	5.69	119.98	110.88
1	B	225	ASN	CA-CB-CG	5.41	118.01	112.60
1	B	240	VAL	N-CA-C	5.41	116.17	107.73
1	A	240	VAL	N-CA-C	5.38	116.12	107.73
1	A	162	THR	CB-CA-C	5.38	118.33	110.26
1	B	225	ASN	CA-C-N	5.35	131.76	121.54
1	B	225	ASN	C-N-CA	5.35	131.76	121.54
1	B	274	ASP	CA-CB-CG	5.23	117.83	112.60
1	B	288	CYS	N-CA-C	5.20	117.39	110.53
1	A	253	ARG	CA-C-N	5.14	132.92	121.81
1	A	253	ARG	C-N-CA	5.14	132.92	121.81
1	B	227	ASP	N-CA-C	5.13	121.72	110.80
1	A	274	ASP	CA-CB-CG	5.01	117.61	112.60

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	1093	0	1024	31	0
1	B	1093	0	1024	14	0
All	All	2186	0	2048	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 11.

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:A:227:ASP:O	1:A:229:LYS:N	1.85	1.10
1:A:227:ASP:O	1:A:230:GLY:N	1.91	1.04
1:A:252:SER:HB2	1:A:254:SER:O	1.64	0.96
1:A:227:ASP:C	1:A:229:LYS:H	1.80	0.87
1:A:254:SER:HB3	1:A:258:ASP:OD1	1.82	0.80
1:A:252:SER:CB	1:A:254:SER:O	2.33	0.76
1:A:183:GLN:HB2	1:A:186:HIS:CD2	2.21	0.76
1:B:191:CYS:HG	1:B:282:CYS:HG	1.31	0.75
1:A:223:LEU:HB3	1:A:260:VAL:HB	1.74	0.69
1:A:191:CYS:HG	1:A:282:CYS:HG	1.38	0.68
1:B:183:GLN:HB2	1:B:186:HIS:CD2	2.31	0.66
1:A:227:ASP:OD1	1:A:228:LEU:N	2.31	0.63
1:A:176:TYR:HB3	1:A:282:CYS:HB2	1.81	0.61
1:B:176:TYR:HB3	1:B:282:CYS:HB2	1.82	0.60
1:A:227:ASP:C	1:A:230:GLY:H	2.08	0.59
1:B:186:HIS:CD2	1:B:186:HIS:H	2.21	0.59
1:A:226:LEU:HB2	1:A:229:LYS:HE3	1.86	0.57
1:A:227:ASP:HB3	1:A:256:GLY:HA2	1.87	0.57
1:B:223:LEU:HB3	1:B:260:VAL:HB	1.88	0.56
1:A:227:ASP:O	1:A:229:LYS:C	2.49	0.55
1:A:186:HIS:CD2	1:A:186:HIS:H	2.24	0.54
1:B:246:ALA:HB1	1:B:247:PRO:HD2	1.89	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:252:SER:C	1:A:254:SER:H	2.16	0.53
1:B:184:TRP:CG	1:B:259:CYS:HG	2.26	0.53
1:A:160:CYS:HB3	1:A:286:ALA:HB3	1.91	0.52
1:A:160:CYS:HB2	1:A:172:ARG:HG2	1.92	0.51
1:A:246:ALA:HB1	1:A:247:PRO:HD2	1.92	0.51
1:A:181:THR:HG23	1:A:276:LYS:HB3	1.94	0.50
1:B:186:HIS:CD2	1:B:186:HIS:N	2.80	0.49
1:A:227:ASP:O	1:A:228:LEU:C	2.52	0.49
1:B:181:THR:HG23	1:B:276:LYS:HB3	1.95	0.48
1:A:227:ASP:O	1:A:229:LYS:CA	2.62	0.47
1:A:159:VAL:O	1:A:289:THR:HB	2.15	0.47
1:A:186:HIS:CD2	1:A:186:HIS:N	2.83	0.46
1:B:186:HIS:H	1:B:186:HIS:HD2	1.63	0.46
1:A:226:LEU:O	1:A:229:LYS:HG2	2.15	0.45
1:B:184:TRP:HD1	1:B:220:TRP:CE3	2.34	0.45
1:B:224:ARG:HH21	1:B:235:VAL:HA	1.83	0.43
1:A:226:LEU:O	1:A:227:ASP:C	2.61	0.43
1:B:159:VAL:O	1:B:289:THR:HB	2.18	0.43
1:A:163:CYS:SG	1:A:174:CYS:SG	3.01	0.41
1:A:183:GLN:HB2	1:A:186:HIS:CG	2.55	0.41
1:A:223:LEU:HD23	1:A:260:VAL:HG21	2.02	0.41
1:A:170:PHE:HB3	1:A:175:TYR:HE1	1.86	0.40
1:B:162:THR:HG22	1:B:163:CYS:H	1.87	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	135/143 (94%)	115 (85%)	15 (11%)	5 (4%)	2	5
1	B	135/143 (94%)	117 (87%)	17 (13%)	1 (1%)	18	35

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	270/286 (94%)	232 (86%)	32 (12%)	6 (2%)	5	12

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	228	LEU
1	A	227	ASP
1	A	255	GLN
1	A	257	GLU
1	A	250	PRO
1	B	250	PRO

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	117/120 (98%)	100 (86%)	17 (14%)	3	6
1	B	117/120 (98%)	102 (87%)	15 (13%)	4	7
All	All	234/240 (98%)	202 (86%)	32 (14%)	3	7

All (32) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	163	CYS
1	A	186	HIS
1	A	195	GLU
1	A	219	SER
1	A	224	ARG
1	A	226	LEU
1	A	227	ASP
1	A	231	GLU
1	A	233	ILE
1	A	241	ASP
1	A	251	THR
1	A	253	ARG

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Mol	Chain	Res	Type
1	A	257	GLU
1	A	258	ASP
1	A	273	CYS
1	A	274	ASP
1	A	289	THR
1	B	159	VAL
1	B	161	ASN
1	B	162	THR
1	B	163	CYS
1	B	186	HIS
1	B	195	GLU
1	B	219	SER
1	B	226	LEU
1	B	228	LEU
1	B	233	ILE
1	B	241	ASP
1	B	251	THR
1	B	253	ARG
1	B	274	ASP
1	B	289	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	183	GLN
1	A	186	HIS
1	A	197	GLN
1	B	161	ASN
1	B	186	HIS
1	B	197	GLN

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 oligosaccharides 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	135/143 (94%)	1.44	32 (23%)	2 2	14, 32, 82, 155	2 (1%)
1	B	135/143 (94%)	2.61	79 (58%)	0 0	27, 68, 123, 173	2 (1%)
All	All	270/286 (94%)	2.02	111 (41%)	0 0	14, 48, 114, 173	4 (1%)

All (111) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	257	GLU	7.5
1	A	292	ALA	7.2
1	B	292	ALA	7.1
1	B	291	PRO	6.2
1	A	228	LEU	6.0
1	A	158	PHE	5.8
1	A	254	SER	5.8
1	B	159	VAL	5.8
1	B	210	LEU	5.7
1	B	229	LYS	5.7
1	B	158	PHE	5.5
1	B	252	SER	5.5
1	B	290	PRO	5.4
1	B	227	ASP	5.3
1	A	291	PRO	5.3
1	A	159	VAL	5.2
1	A	255	GLN	5.1
1	B	240	VAL	5.1
1	B	226	LEU	5.0
1	A	290	PRO	4.8
1	B	254	SER	4.7
1	A	227	ASP	4.7
1	B	211	THR	4.7
1	B	216	HIS	4.5

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Mol	Chain	Res	Type	RSRZ
1	B	289	THR	4.5
1	B	251	THR	4.5
1	B	253	ARG	4.5
1	B	161	ASN	4.2
1	B	186	HIS	4.1
1	A	256	GLY	4.1
1	B	287	THR	4.1
1	B	212	LYS	4.1
1	A	183	GLN	4.0
1	A	226	LEU	3.9
1	B	192	ASP	3.9
1	B	256	GLY	3.9
1	B	228	LEU	3.9
1	A	253	ARG	3.9
1	B	215	SER	3.9
1	B	162	THR	3.7
1	B	207	GLN	3.6
1	B	266	GLY	3.6
1	B	204	PRO	3.6
1	A	186	HIS	3.6
1	B	285	LEU	3.5
1	B	255	GLN	3.5
1	A	230	GLY	3.5
1	A	217	THR	3.5
1	A	229	LYS	3.5
1	B	247	PRO	3.5
1	B	171	GLN	3.4
1	B	170	PHE	3.4
1	B	167	TRP	3.4
1	B	282	CYS	3.4
1	B	265	SER	3.4
1	B	284	ARG	3.4
1	B	166	LYS	3.3
1	A	252	SER	3.3
1	B	160	CYS	3.2
1	B	248	GLY	3.2
1	B	193	ASP	3.1
1	B	225	ASN	3.1
1	B	174	CYS	3.1
1	B	258	ASP	3.0
1	B	163	CYS	3.0
1	A	251	THR	3.0

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Mol	Chain	Res	Type	RSRZ
1	B	214	ALA	3.0
1	B	172	ARG	3.0
1	B	196	GLY	3.0
1	B	164	PRO	2.9
1	A	181	THR	2.8
1	B	280	TRP	2.7
1	B	288	CYS	2.7
1	B	235	VAL	2.7
1	B	176	TYR	2.7
1	B	242	TYR	2.7
1	B	223	LEU	2.6
1	B	233	ILE	2.5
1	A	172	ARG	2.5
1	A	288	CYS	2.5
1	B	203	SER	2.5
1	B	177	PHE	2.5
1	B	263	ARG	2.5
1	A	160	CYS	2.5
1	B	208	ASP	2.4
1	A	237	GLY	2.4
1	B	231	GLU	2.4
1	B	173	LYS	2.4
1	B	217	THR	2.4
1	A	185	VAL	2.3
1	B	206	GLU	2.3
1	A	236	ASP	2.3
1	B	175	TYR	2.3
1	B	191	CYS	2.3
1	B	199	VAL	2.3
1	B	165	GLU	2.3
1	A	171	GLN	2.3
1	A	249	GLU	2.2
1	B	244	ASN	2.2
1	B	179	LYS	2.2
1	B	213	HIS	2.2
1	A	218	GLY	2.2
1	A	289	THR	2.2
1	B	178	GLY	2.2
1	B	267	ARG	2.2
1	A	161	ASN	2.2
1	A	212	LYS	2.2
1	B	218	GLY	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	241	ASP	2.1
1	B	202	HIS	2.1
1	B	220	TRP	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 oligosaccharides 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.