



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 26, 2025 – 04:06 pm BST

PDB ID : 4CNU / pdb_00004cnu
Title : CRYSTAL STRUCTURE OF WT HUMAN CRMP-4 from lattice translocation
Authors : Ponnusamy, R.; Lebedev, A.; Lohkamp, B.
Deposited on : 2014-01-24
Resolution : 2.80 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 Phenix2.0rc1
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) : 2.45.1

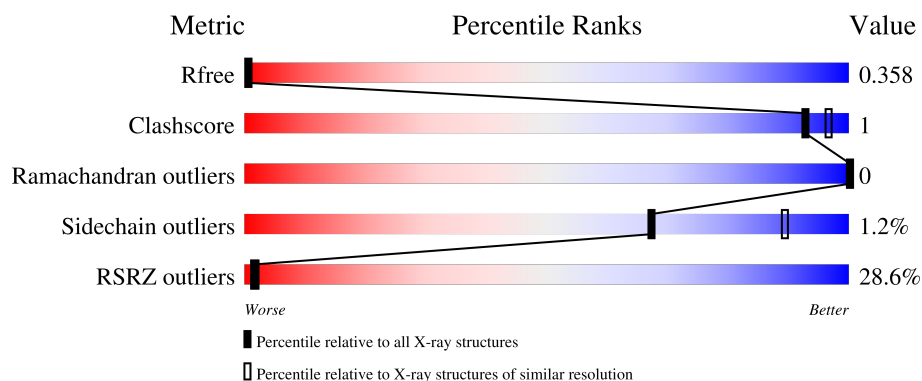
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	3657 (2.80-2.80)
Clashscore	180529	4123 (2.80-2.80)
Ramachandran outliers	177936	4071 (2.80-2.80)
Sidechain outliers	177891	4073 (2.80-2.80)
RSRZ outliers	164620	3659 (2.80-2.80)

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	570	14% 82% 14%
1	B	570	35% 82% 14%

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 7512 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 DIHYDROPYRIMIDINASE-LIKE 3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	488	Total	C	N	O	S	0	0	0
			3756	2373	635	725	23			
1	B	488	Total	C	N	O	S	0	0	0
			3756	2373	635	725	23			

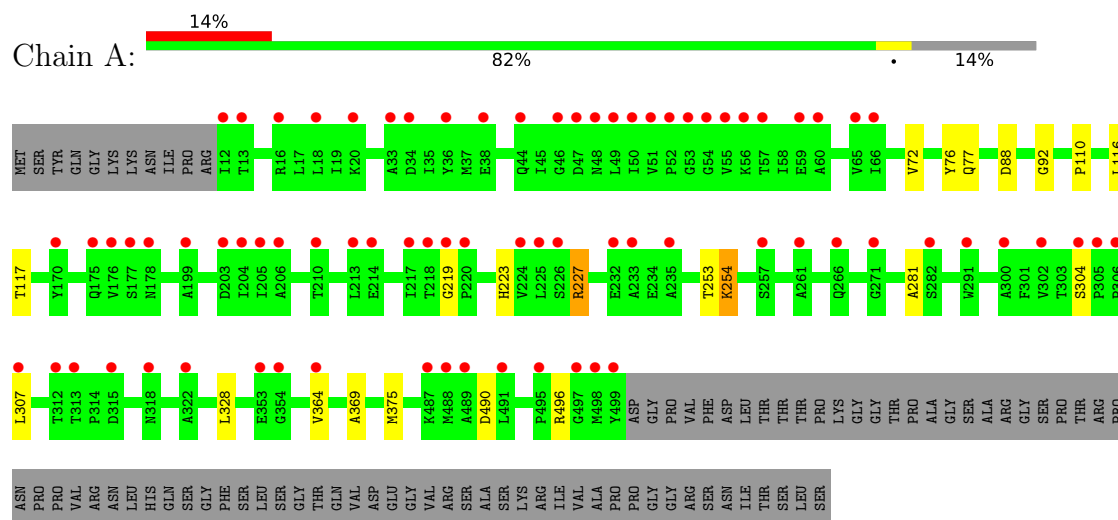
There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	76	TYR	PHE	conflict	UNP Q14195
B	76	TYR	PHE	conflict	UNP Q14195

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: DIHYDROPYRIMIDINASE-LIKE 3



• Molecule 1: DIHYDROPYRIMIDINASE-LIKE 3



[illegible]

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	96.24Å 108.22Å 118.19Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.43 – 2.80 39.43 – 2.80	Depositor EDS
% Data completeness (in resolution range)	93.0 (39.43-2.80) 93.0 (39.43-2.80)	Depositor EDS
R_{merge}	0.24	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.74 (at 2.81Å)	Xtriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.255 , 0.295 0.322 , 0.358	Depositor DCC
R_{free} test set	1465 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å ²)	41.5	Xtriage
Anisotropy	0.570	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 20.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	7512	wwPDB-VP
Average B, all atoms (Å ²)	46.0	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 68.08 % 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 4.6339e-06. 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 [i](#)

5.1 Standard geometry [i](#)

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	0.45	0/3835	0.71	2/5201 (0.0%)
1	B	0.45	0/3835	0.71	2/5201 (0.0%)
All	All	0.45	0/7670	0.71	4/10402 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	219	GLY	CA-C-N	5.80	125.93	119.32
1	B	219	GLY	C-N-CA	5.80	125.93	119.32
1	A	219	GLY	CA-C-N	5.72	125.84	119.32
1	A	219	GLY	C-N-CA	5.72	125.84	119.32

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	A	3756	0	3700	10	0
1	B	3756	0	3700	11	0
All	All	7512	0	7400	21	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 (21) 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:76:TYR:CE1	1:B:92:GLY:HA3	2.43	0.53
1:A:76:TYR:CE1	1:A:92:GLY:HA3	2.43	0.53
1:A:223:HIS:O	1:A:227:ARG:HG3	2.11	0.51
1:A:253:THR:C	1:A:254:LYS:HG2	2.36	0.49
1:B:223:HIS:O	1:B:227:ARG:HG3	2.13	0.49
1:B:77:GLN:OE1	1:B:88:ASP:HB2	2.14	0.48
1:A:77:GLN:OE1	1:A:88:ASP:HB2	2.14	0.47
1:B:253:THR:C	1:B:254:LYS:HG2	2.39	0.47
1:B:110:PRO:HG3	1:B:116:LEU:HG	1.99	0.45
1:A:110:PRO:HG3	1:A:116:LEU:HG	1.99	0.45
1:B:281:ALA:HB1	1:B:307:LEU:HD11	1.98	0.45
1:A:281:ALA:HB1	1:A:307:LEU:HD11	1.99	0.44
1:A:72:VAL:HG11	1:A:328:LEU:HD12	2.02	0.42
1:B:369:ALA:CB	1:B:375:MET:HE3	2.50	0.42
1:A:369:ALA:CB	1:A:375:MET:HE3	2.50	0.42
1:B:72:VAL:HG11	1:B:328:LEU:HD12	2.02	0.41
1:A:490:ASP:O	1:A:490:ASP:CG	2.63	0.41
1:B:490:ASP:O	1:B:490:ASP:CG	2.63	0.41
1:A:254:LYS:CE	1:A:304:SER:O	2.68	0.41
1:B:76:TYR:OH	1:B:358:VAL:HG21	2.20	0.41
1:B:254:LYS:CE	1:B:304:SER:O	2.69	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	486/570 (85%)	461 (95%)	25 (5%)	0	100	100
1	B	486/570 (85%)	463 (95%)	23 (5%)	0	100	100
All	All	972/1140 (85%)	924 (95%)	48 (5%)	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	404/471 (86%)	399 (99%)	5 (1%)	67	89
1	B	404/471 (86%)	399 (99%)	5 (1%)	67	89
All	All	808/942 (86%)	798 (99%)	10 (1%)	67	89

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	117	THR
1	A	227	ARG
1	A	254	LYS
1	A	364	VAL
1	A	496	ARG
1	B	117	THR
1	B	227	ARG
1	B	254	LYS
1	B	364	VAL
1	B	496	ARG

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

Mol	Chain	Res	Type
1	A	29	GLN
1	A	196	GLN
1	A	460	HIS
1	B	29	GLN
1	B	460	HIS

5.3.3 RNA ⓘ

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 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	488/570 (85%)	0.85	77 (15%) 6 5	26, 42, 66, 108	0
1	B	488/570 (85%)	1.80	202 (41%) 1 1	25, 46, 75, 99	0
All	All	976/1140 (85%)	1.33	279 (28%) 1 2	25, 44, 72, 108	0

All (279) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	55	VAL	9.2
1	B	489	ALA	8.8
1	B	12	ILE	8.1
1	A	51	VAL	7.8
1	B	51	VAL	7.1
1	B	13	THR	6.8
1	B	492	HIS	6.3
1	A	12	ILE	6.0
1	B	50	ILE	6.0
1	A	49	LEU	5.9
1	A	50	ILE	5.6
1	B	452	ILE	5.6
1	B	58	ILE	5.6
1	B	488	MET	5.6
1	B	491	LEU	5.5
1	A	52	PRO	5.4
1	B	49	LEU	5.3
1	A	499	TYR	5.3
1	B	18	LEU	5.2
1	A	318	ASN	5.0
1	B	35	ILE	5.0
1	B	53	GLY	5.0
1	B	499	TYR	4.9
1	B	39	ASP	4.9

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Mol	Chain	Res	Type	RSRZ
1	B	40	GLY	4.8
1	B	52	PRO	4.8
1	B	44	GLN	4.8
1	B	57	THR	4.7
1	B	19	ILE	4.6
1	B	15	ASP	4.6
1	B	407	SER	4.6
1	B	17	LEU	4.6
1	B	54	GLY	4.5
1	B	14	SER	4.5
1	B	92	GLY	4.4
1	B	158	ASP	4.4
1	B	34	ASP	4.4
1	B	402	SER	4.4
1	B	446	VAL	4.4
1	A	175	GLN	4.4
1	B	373	GLY	4.3
1	B	16	ARG	4.3
1	B	247	ASN	4.2
1	B	43	LYS	4.2
1	B	398	LYS	4.2
1	B	462	THR	4.2
1	B	461	VAL	4.2
1	B	37	MET	4.1
1	A	55	VAL	4.1
1	A	54	GLY	4.1
1	B	36	TYR	4.1
1	A	48	ASN	4.1
1	B	487	LYS	4.0
1	B	56	LYS	3.9
1	B	22	GLY	3.9
1	A	205	ILE	3.9
1	B	409	LEU	3.8
1	B	456	ASP	3.8
1	B	20	LYS	3.8
1	B	192	GLY	3.8
1	A	364	VAL	3.8
1	A	489	ALA	3.8
1	B	38	GLU	3.8
1	B	490	ASP	3.8
1	A	204	ILE	3.8
1	B	176	VAL	3.8

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Mol	Chain	Res	Type	RSRZ
1	B	45	ILE	3.7
1	B	389	ALA	3.7
1	B	157	LYS	3.7
1	B	494	VAL	3.7
1	B	486	ARG	3.7
1	B	105	ILE	3.7
1	B	467	ARG	3.6
1	B	459	LEU	3.6
1	B	196	GLN	3.6
1	B	426	GLN	3.6
1	B	335	THR	3.6
1	B	72	VAL	3.6
1	B	448	CYS	3.6
1	B	162	ASN	3.6
1	B	399	GLY	3.5
1	B	267	ALA	3.5
1	B	455	GLU	3.5
1	B	273	VAL	3.5
1	A	57	THR	3.5
1	B	406	ASP	3.5
1	B	163	SER	3.5
1	B	90	PHE	3.4
1	B	470	PRO	3.4
1	B	141	ILE	3.4
1	B	408	ASP	3.4
1	A	300	ALA	3.4
1	A	322	ALA	3.4
1	B	177	SER	3.4
1	B	189	GLY	3.4
1	A	312	THR	3.4
1	B	195	ALA	3.4
1	B	139	VAL	3.4
1	B	401	ILE	3.4
1	B	372	THR	3.3
1	A	232	GLU	3.3
1	B	405	SER	3.3
1	A	495	PRO	3.3
1	B	138	HIS	3.3
1	A	210	THR	3.3
1	B	91	GLN	3.3
1	B	450	GLY	3.3
1	B	42	ILE	3.2

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Mol	Chain	Res	Type	RSRZ
1	B	275	PHE	3.2
1	B	137	LEU	3.2
1	B	394	LEU	3.2
1	B	495	PRO	3.2
1	A	18	LEU	3.2
1	B	97	LEU	3.2
1	B	449	GLN	3.2
1	B	47	ASP	3.2
1	B	99	GLY	3.2
1	B	447	ILE	3.1
1	B	74	THR	3.1
1	B	199	ALA	3.1
1	B	24	ILE	3.1
1	B	469	ILE	3.1
1	B	175	GLN	3.1
1	B	451	LYS	3.1
1	B	468	PHE	3.1
1	B	479	TYR	3.1
1	B	66	ILE	3.1
1	A	213	LEU	3.0
1	B	445	VAL	3.0
1	B	102	THR	3.0
1	B	67	PRO	3.0
1	B	41	LEU	3.0
1	B	371	ALA	3.0
1	A	315	ASP	3.0
1	B	404	GLY	3.0
1	B	48	ASN	3.0
1	B	233	ALA	3.0
1	A	226	SER	3.0
1	B	381	VAL	3.0
1	B	493	ALA	3.0
1	B	472	SER	3.0
1	B	76	TYR	2.9
1	B	395	TYR	2.9
1	A	224	VAL	2.9
1	B	33	ALA	2.9
1	B	201	ASN	2.9
1	B	88	ASP	2.9
1	A	498	MET	2.9
1	B	164	PHE	2.9
1	B	32	TYR	2.9

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Mol	Chain	Res	Type	RSRZ
1	B	185	PHE	2.8
1	A	491	LEU	2.8
1	B	21	GLY	2.8
1	A	44	GLN	2.8
1	B	471	CYS	2.8
1	A	16	ARG	2.8
1	B	124	ARG	2.8
1	B	191	LEU	2.8
1	B	473	PRO	2.8
1	A	60	ALA	2.8
1	B	483	LYS	2.8
1	B	70	ILE	2.8
1	B	160	GLY	2.8
1	A	53	GLY	2.8
1	A	13	THR	2.8
1	A	59	GLU	2.7
1	A	217	ILE	2.7
1	B	156	ILE	2.7
1	B	100	GLY	2.7
1	B	65	VAL	2.7
1	B	197	VAL	2.7
1	B	274	VAL	2.7
1	B	94	LYS	2.7
1	B	385	SER	2.7
1	B	136	ALA	2.7
1	B	478	VAL	2.7
1	A	266	GLN	2.7
1	B	125	GLU	2.7
1	A	488	MET	2.7
1	B	498	MET	2.7
1	B	95	ALA	2.6
1	A	34	ASP	2.6
1	B	140	ASP	2.6
1	B	194	ILE	2.6
1	A	304	SER	2.6
1	A	235	ALA	2.6
1	B	169	ALA	2.6
1	B	266	GLN	2.6
1	B	391	ILE	2.6
1	A	20	LYS	2.6
1	A	46	GLY	2.6
1	A	177	SER	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	257	SER	2.6
1	B	244	SER	2.6
1	A	203	ASP	2.6
1	B	159	LYS	2.5
1	A	219	GLY	2.5
1	A	218	THR	2.5
1	B	30	SER	2.5
1	B	134	ASP	2.5
1	B	29	GLN	2.5
1	B	69	GLY	2.5
1	B	85	THR	2.5
1	B	270	LYS	2.5
1	A	38	GLU	2.5
1	B	129	GLY	2.5
1	B	166	VAL	2.5
1	B	186	THR	2.5
1	A	33	ALA	2.5
1	B	120	TYR	2.5
1	A	307	LEU	2.5
1	A	302	VAL	2.5
1	B	161	VAL	2.5
1	A	313	THR	2.5
1	B	322	ALA	2.5
1	B	485	ARG	2.4
1	B	107	HIS	2.4
1	B	59	GLU	2.4
1	A	66	ILE	2.4
1	B	135	TYR	2.4
1	B	454	LEU	2.4
1	B	78	MET	2.4
1	B	370	VAL	2.4
1	B	257	SER	2.4
1	A	199	ALA	2.4
1	B	248	CYS	2.4
1	A	36	TYR	2.3
1	B	181	LEU	2.3
1	A	214	GLU	2.3
1	B	253	THR	2.3
1	B	458	ASN	2.3
1	A	225	LEU	2.3
1	A	65	VAL	2.3
1	A	497	GLY	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	89	PHE	2.3
1	B	465	ALA	2.3
1	A	56	LYS	2.3
1	B	104	ILE	2.3
1	B	123	TRP	2.3
1	A	206	ALA	2.3
1	B	323	SER	2.3
1	B	326	LEU	2.3
1	B	46	GLY	2.2
1	A	47	ASP	2.2
1	B	142	THR	2.2
1	B	271	GLY	2.2
1	B	388	ALA	2.2
1	A	220	PRO	2.2
1	A	354	GLY	2.2
1	A	305	PRO	2.2
1	A	282	SER	2.2
1	B	236	VAL	2.2
1	B	336	PHE	2.2
1	B	481	ARG	2.2
1	B	68	GLY	2.1
1	A	487	LYS	2.1
1	B	250	LEU	2.1
1	B	75	HIS	2.1
1	B	101	THR	2.1
1	B	496	ARG	2.1
1	A	353	GLU	2.1
1	A	291	TRP	2.1
1	B	240	ILE	2.1
1	A	271	GLY	2.1
1	A	261	ALA	2.1
1	A	178	ASN	2.1
1	B	149	LYS	2.1
1	B	179	THR	2.1
1	A	170	TYR	2.1
1	A	306	PRO	2.1
1	B	453	MET	2.1
1	B	345	LYS	2.1
1	B	392	PHE	2.1
1	A	176	VAL	2.0
1	B	238	ARG	2.0
1	B	425	HIS	2.0

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Mol	Chain	Res	Type	RSRZ
1	A	233	ALA	2.0
1	B	319	SER	2.0
1	B	403	VAL	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 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.