



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 18, 2026 – 11:58 AM UTC

PDB ID : 1YXA / pdb_00001yxa
Title : Serpina3n, a murine orthologue of human antichymotrypsin
Authors : Horvath, A.J.; Irving, J.A.; Law, R.H.; Rossjohn, J.; Bottomley, S.P.; Quinsey, N.S.; Pike, R.N.; Coughlin, P.B.; Whisstock, J.C.
Deposited on : 2005-02-20
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

<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

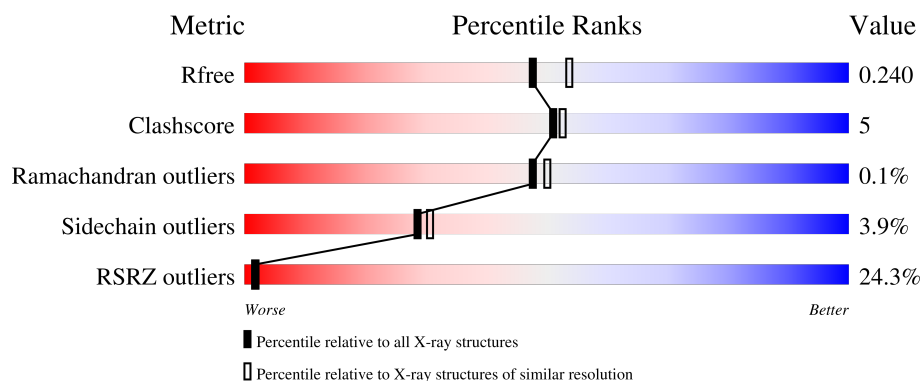
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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}	180053	6658 (2.10-2.10)
Clashscore	190562	7164 (2.10-2.10)
Ramachandran outliers	187476	7099 (2.10-2.10)
Sidechain outliers	187428	7100 (2.10-2.10)
RSRZ outliers	180081	6662 (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 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	398	24% 82% 11% 7%
1	B	398	21% 77% 14% 8%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 6137 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 serine (or cysteine) proteinase inhibitor, clade A, member 3N.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	372	Total	C	N	O	S	0	1	0
			2874	1855	461	548	10			
1	B	368	Total	C	N	O	S	0	1	0
			2867	1849	461	548	9			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	69	THR	LYS	conflict	UNP Q91WP6
A	84	LEU	VAL	conflict	UNP Q91WP6
A	85	VAL	MET	conflict	UNP Q91WP6
B	69	THR	LYS	conflict	UNP Q91WP6
B	84	LEU	VAL	conflict	UNP Q91WP6
B	85	VAL	MET	conflict	UNP Q91WP6

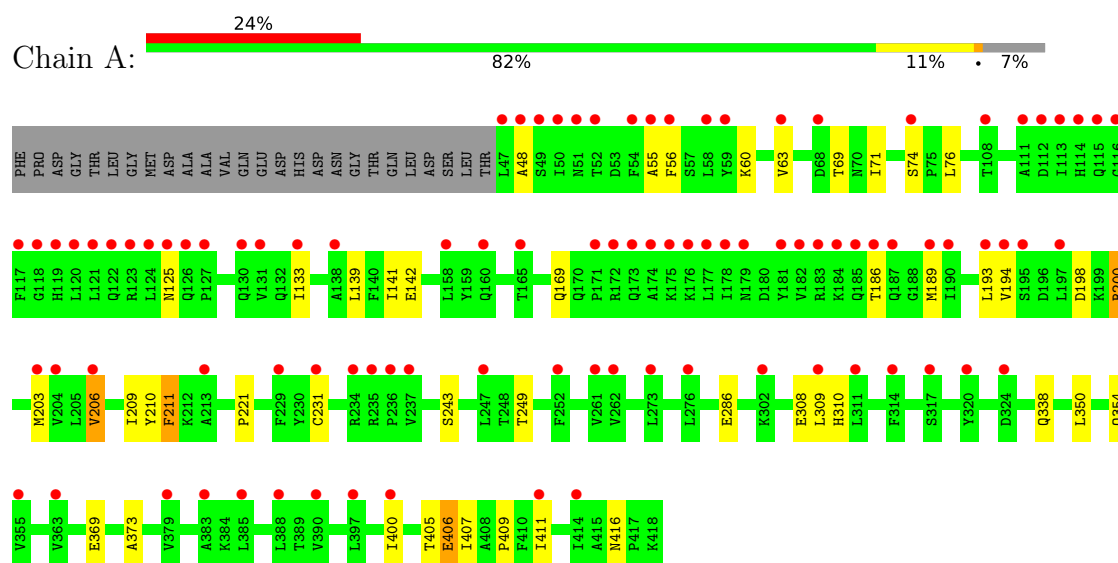
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	185	Total	O	0	0
			185	185		
2	B	211	Total	O	0	0
			211	211		

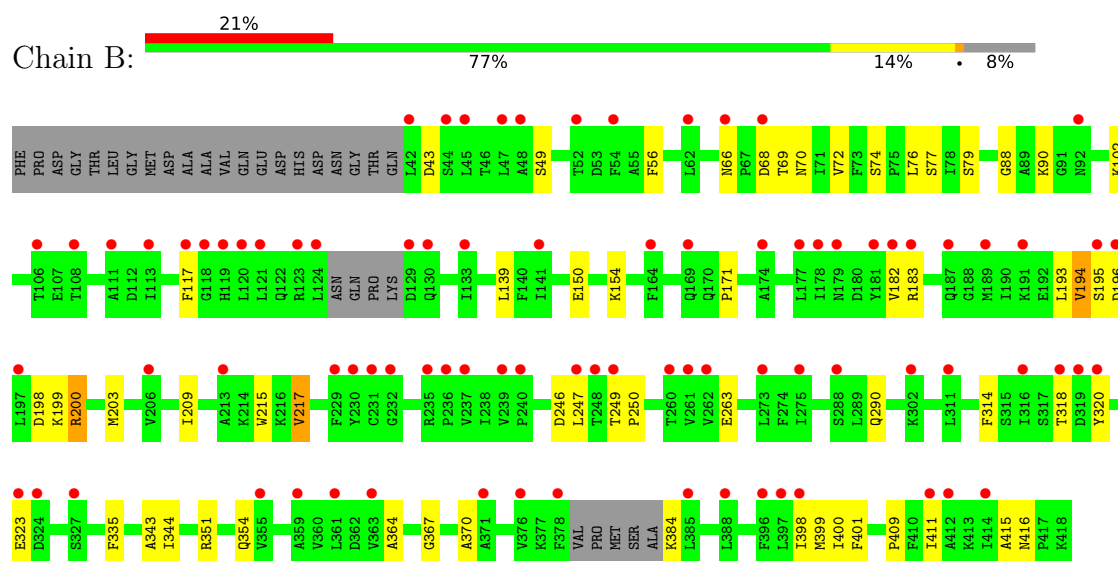
3 Residue-property plots [i](#)

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: serine (or cysteine) proteinase inhibitor, clade A, member 3N



- Molecule 1: serine (or cysteine) proteinase inhibitor, clade A, member 3N



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	83.34Å 92.62Å 118.26Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.01 – 2.10 30.01 – 2.10	Depositor EDS
% Data completeness (in resolution range)	95.1 (30.01-2.10) 95.1 (30.01-2.10)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.37 (at 2.10Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.193 , 0.239 0.195 , 0.240	Depositor DCC
R_{free} test set	2086 reflections (3.85%)	wwPDB-VP
Wilson B-factor (Å ²)	28.6	Xtriage
Anisotropy	0.750	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 49.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	6137	wwPDB-VP
Average B, all atoms (Å ²)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 13.72% 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	0.59	0/2931	0.80	0/3979
1	B	0.60	0/2919	0.82	0/3958
All	All	0.60	0/5850	0.81	0/7937

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	2874	0	2835	28	0
1	B	2867	0	2860	32	0
2	A	185	0	0	2	0
2	B	211	0	0	3	0
All	All	6137	0	5695	60	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 5.

All (60) 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:141:ILE:HD11	1:A:203:MET:HE3	1.39	1.01

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:141:ILE:CD1	1:A:203:MET:HE3	1.97	0.94
1:A:55:ALA:HB1	1:A:411:ILE:HD12	1.61	0.83
1:B:351:ARG:HD2	2:B:506:HOH:O	1.77	0.83
1:A:48:ALA:HA	1:A:407:ILE:HD13	1.64	0.80
1:A:141:ILE:HD11	1:A:203:MET:CE	2.15	0.73
1:A:308:GLU:OE2	1:A:310:HIS:HE1	1.74	0.70
1:A:56:PHE:O	1:A:60:LYS:HG2	1.91	0.70
1:B:139:LEU:HD22	1:B:203:MET:HE2	1.79	0.65
1:B:217:VAL:HG11	1:B:247:LEU:CD1	2.28	0.64
1:B:198:ASP:OD1	1:B:200:ARG:HD3	1.99	0.63
1:A:141:ILE:HD13	1:A:203:MET:HG3	1.80	0.63
1:A:198:ASP:OD1	1:A:200:ARG:HD3	1.98	0.63
1:B:399:MET:HE3	1:B:411:ILE:HD12	1.82	0.61
1:A:141:ILE:HD12	1:A:350:LEU:HD21	1.83	0.60
1:B:70:ASN:HD21	1:B:416:ASN:H	1.47	0.60
1:A:74:SER:HB2	1:A:209:ILE:HG21	1.84	0.59
1:A:231:CYS:SG	1:A:416:ASN:HB2	2.42	0.59
1:B:400:ILE:O	1:B:409:PRO:HD2	2.03	0.58
1:A:221:PRO:HB2	1:A:373:ALA:HB2	1.86	0.57
1:A:405:THR:O	1:A:406:GLU:HB2	2.06	0.55
1:A:55:ALA:HB1	1:A:411:ILE:CD1	2.35	0.53
1:A:308:GLU:OE2	1:A:310:HIS:CE1	2.58	0.53
1:B:323[A]:GLU:HG3	1:B:335:PHE:CD1	2.44	0.53
1:A:63:VAL:HG22	1:A:71:ILE:CD1	2.40	0.52
1:A:139:LEU:HD22	1:A:203:MET:HE2	1.93	0.51
1:A:354:GLN:NE2	2:A:458:HOH:O	2.43	0.51
1:A:60:LYS:HE2	1:A:286:GLU:O	2.12	0.49
1:B:74:SER:HB2	1:B:209:ILE:HG21	1.94	0.48
1:B:56:PHE:HZ	1:B:399:MET:HE1	1.79	0.48
1:B:66:ASN:O	1:B:69:THR:HG22	2.13	0.48
1:B:246:ASP:OD1	1:B:384:LYS:NZ	2.43	0.47
1:B:399:MET:HE2	1:B:401:PHE:CZ	2.50	0.47
1:B:70:ASN:HD22	1:B:415:ALA:H	1.63	0.46
1:B:215:TRP:CD1	1:B:367:GLY:HA2	2.51	0.45
1:B:217:VAL:HG11	1:B:247:LEU:HD11	1.99	0.45
1:B:150:GLU:HG2	1:B:154:LYS:HD2	1.98	0.45
1:A:189:MET:HG2	1:A:210:TYR:CD2	2.53	0.44
1:B:384:LYS:N	2:B:435:HOH:O	2.49	0.44
1:B:72:VAL:O	1:B:320:TYR:HE2	2.00	0.44
1:B:194:VAL:HG13	1:B:195:SER:O	2.18	0.43
1:A:133:ILE:HD13	1:A:211:PHE:HB2	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:243:SER:HA	1:A:309:LEU:O	2.19	0.43
1:B:88:GLY:HA3	1:B:344:ILE:HG13	1.99	0.43
1:A:193:LEU:HD21	1:A:206:VAL:HG13	2.00	0.43
1:B:364:ALA:HB1	1:B:370:ALA:HA	2.01	0.42
1:B:90:LYS:HE3	1:B:343:ALA:HB2	2.01	0.42
1:A:400:ILE:O	1:A:409:PRO:HD2	2.20	0.42
1:B:171:PRO:HG3	1:B:199:LYS:HG2	2.01	0.42
1:B:354:GLN:NE2	2:B:497:HOH:O	2.52	0.42
1:B:399:MET:HE2	1:B:401:PHE:HZ	1.84	0.42
1:B:314:PHE:HZ	1:B:398:ILE:HD11	1.84	0.42
1:B:56:PHE:CZ	1:B:399:MET:HE1	2.55	0.41
1:B:182:VAL:HG21	1:B:193:LEU:CD2	2.50	0.41
1:B:74:SER:HB3	1:B:77:SER:HB3	2.01	0.41
1:A:193:LEU:CD2	1:A:206:VAL:HG13	2.50	0.41
1:B:79:SER:HB3	1:B:117:PHE:HZ	1.86	0.41
1:A:186:THR:HB	1:A:189:MET:HB3	2.02	0.40
1:A:125:ASN:N	2:A:597:HOH:O	2.53	0.40
1:B:250:PRO:HB2	1:B:263:GLU:HB3	2.03	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	371/398 (93%)	363 (98%)	8 (2%)	0	100	100
1	B	363/398 (91%)	359 (99%)	3 (1%)	1 (0%)	36	36
All	All	734/796 (92%)	722 (98%)	11 (2%)	1 (0%)	48	50

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	102	LYS

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	305/350 (87%)	293 (96%)	12 (4%)	28	31
1	B	309/350 (88%)	297 (96%)	12 (4%)	28	31
All	All	614/700 (88%)	590 (96%)	24 (4%)	28	31

All (24) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	69	THR
1	A	76	LEU
1	A	142	GLU
1	A	169	GLN
1	A	194	VAL
1	A	200	ARG
1	A	206	VAL
1	A	211	PHE
1	A	249	THR
1	A	338	GLN
1	A	369	GLU
1	A	406	GLU
1	B	43	ASP
1	B	49	SER
1	B	68	ASP
1	B	76	LEU
1	B	183	ARG
1	B	194	VAL
1	B	196	ASP
1	B	200	ARG
1	B	217	VAL
1	B	249	THR
1	B	290	GLN

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Mol	Chain	Res	Type
1	B	318	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	51	ASN
1	A	92	ASN
1	A	132	GLN
1	A	146	GLN
1	A	152	GLN
1	A	310	HIS
1	A	338	GLN
1	A	354	GLN
1	B	70	ASN
1	B	92	ASN
1	B	122	GLN
1	B	170	GLN
1	B	173	GLN
1	B	290	GLN
1	B	338	GLN
1	B	354	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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, 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	372/398 (93%)	1.48	95 (25%)	1 2	14, 32, 60, 75	1 (0%)
1	B	368/398 (92%)	1.28	85 (23%)	2 2	15, 31, 53, 66	1 (0%)
All	All	740/796 (92%)	1.38	180 (24%)	2 2	14, 32, 58, 75	2 (0%)

All (180) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	124	LEU	8.1
1	A	385	LEU	6.3
1	A	121	LEU	5.9
1	A	117	PHE	5.6
1	A	47	LEU	5.5
1	A	120	LEU	5.5
1	A	123	ARG	5.1
1	B	124	LEU	5.0
1	A	231	CYS	4.9
1	B	378	PHE	4.7
1	A	113	ILE	4.5
1	A	116	GLY	4.5
1	B	195	SER	4.4
1	A	178	ILE	4.0
1	A	114	HIS	4.0
1	A	182	VAL	4.0
1	A	111	ALA	3.8
1	B	235	ARG	3.7
1	A	190	ILE	3.7
1	A	383	ALA	3.7
1	A	52	THR	3.7
1	A	50	ILE	3.5
1	B	236	PRO	3.5
1	A	118	GLY	3.5

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Mol	Chain	Res	Type	RSRZ
1	A	112	ASP	3.4
1	A	115	GLN	3.3
1	A	119	HIS	3.3
1	A	172	ARG	3.3
1	A	320	TYR	3.2
1	A	49	SER	3.2
1	B	318	THR	3.2
1	A	174	ALA	3.2
1	B	197	LEU	3.2
1	B	42	LEU	3.2
1	A	125	ASN	3.1
1	B	261	VAL	3.1
1	A	181	TYR	3.1
1	A	262	VAL	3.1
1	A	247	LEU	3.1
1	A	234	ARG	3.0
1	A	122	GLN	3.0
1	B	249	THR	3.0
1	B	174	ALA	3.0
1	A	206	VAL	3.0
1	B	45	LEU	2.9
1	A	355	VAL	2.9
1	A	175	LYS	2.9
1	A	204	VAL	2.9
1	B	169	GLN	2.9
1	A	186	THR	2.9
1	B	248	THR	2.9
1	A	273	LEU	2.8
1	B	68	ASP	2.8
1	A	177	LEU	2.8
1	B	108	THR	2.8
1	B	129	ASP	2.8
1	B	247	LEU	2.8
1	A	55	ALA	2.7
1	A	59	TYR	2.7
1	B	121	LEU	2.7
1	A	74	SER	2.7
1	B	324	ASP	2.7
1	A	197	LEU	2.7
1	B	320	TYR	2.7
1	A	183	ARG	2.7
1	A	54	PHE	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	185	GLN	2.7
1	B	231	CYS	2.6
1	B	189	MET	2.6
1	B	385	LEU	2.6
1	B	319	ASP	2.6
1	B	133	ILE	2.6
1	A	176	LYS	2.6
1	B	388	LEU	2.6
1	A	237	VAL	2.5
1	A	411	ILE	2.5
1	A	127	PRO	2.5
1	B	213	ALA	2.5
1	A	131	VAL	2.5
1	A	379	VAL	2.5
1	B	48	ALA	2.5
1	A	58	LEU	2.5
1	A	158	LEU	2.5
1	A	388	LEU	2.5
1	B	62	LEU	2.5
1	B	311	LEU	2.5
1	A	194	VAL	2.5
1	B	196	ASP	2.5
1	B	371	ALA	2.5
1	B	119	HIS	2.5
1	B	44	SER	2.4
1	A	276	LEU	2.4
1	A	311	LEU	2.4
1	A	252	PHE	2.4
1	B	179	ASN	2.4
1	B	113	ILE	2.4
1	B	182	VAL	2.4
1	B	239	VAL	2.4
1	B	92	ASN	2.4
1	A	363	VAL	2.4
1	B	398	ILE	2.4
1	B	106	THR	2.4
1	B	181	TYR	2.4
1	A	397	LEU	2.4
1	B	47	LEU	2.4
1	A	184	LYS	2.4
1	B	123	ARG	2.4
1	B	237	VAL	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	108	THR	2.4
1	B	260	THR	2.4
1	B	183	ARG	2.3
1	A	195	SER	2.3
1	B	275	ILE	2.3
1	A	173	GLN	2.3
1	B	414	ILE	2.3
1	B	240	PRO	2.3
1	A	51	ASN	2.3
1	A	138	ALA	2.3
1	B	361	LEU	2.3
1	A	302	LYS	2.3
1	A	133	ILE	2.3
1	A	261	VAL	2.3
1	A	171	PRO	2.3
1	A	236	PRO	2.3
1	B	66	ASN	2.3
1	B	111	ALA	2.3
1	A	126	GLN	2.2
1	B	117	PHE	2.2
1	A	400	ILE	2.2
1	B	141	ILE	2.2
1	A	179	ASN	2.2
1	A	189	MET	2.2
1	A	213	ALA	2.2
1	A	165	THR	2.2
1	B	376	VAL	2.2
1	A	324	ASP	2.2
1	A	193	LEU	2.2
1	A	309	LEU	2.2
1	A	56	PHE	2.2
1	A	229	PHE	2.2
1	B	164	PHE	2.2
1	B	178	ILE	2.2
1	B	396	PHE	2.2
1	B	262	VAL	2.2
1	B	363	VAL	2.2
1	B	130	GLN	2.2
1	B	327	SER	2.2
1	B	229	PHE	2.1
1	A	63	VAL	2.1
1	A	160	GLN	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	187	GLN	2.1
1	B	120	LEU	2.1
1	A	68	ASP	2.1
1	A	130	GLN	2.1
1	A	414	ILE	2.1
1	A	390	VAL	2.1
1	B	359	ALA	2.1
1	B	191	LYS	2.1
1	B	52	THR	2.1
1	B	232	GLY	2.1
1	B	411	ILE	2.1
1	B	177	LEU	2.1
1	B	323[A]	GLU	2.1
1	A	187	GLN	2.1
1	B	302	LYS	2.1
1	B	355	VAL	2.1
1	A	48	ALA	2.1
1	A	203	MET	2.0
1	B	273	LEU	2.0
1	B	316	ILE	2.0
1	A	314	PHE	2.0
1	B	54	PHE	2.0
1	B	206	VAL	2.0
1	A	317	SER	2.0
1	B	288	SER	2.0
1	B	412	ALA	2.0
1	B	397	LEU	2.0
1	A	235	ARG	2.0
1	B	118	GLY	2.0
1	B	230	TYR	2.0

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates ⓘ

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.