



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 14, 2017 – 07:47 am GMT

PDB ID : 4A1S
Title : Crystallographic structure of the Pins:Insc complex
Authors : Culurgioni, S.; Alfieri, A.; Pendolino, V.; Laddomada, F.; Mapelli, M.
Deposited on : 2011-09-19
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

<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

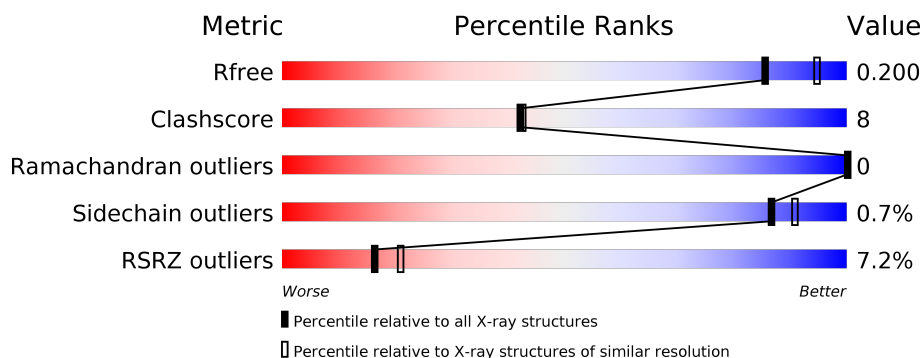
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 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}	100719	4243 (2.10-2.10)
Clashscore	112137	4788 (2.10-2.10)
Ramachandran outliers	110173	4740 (2.10-2.10)
Sidechain outliers	110143	4741 (2.10-2.10)
RSRZ outliers	101464	4275 (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 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	411	<div> <div>5%</div> <div> <div></div> <div>74%</div> <div>10%</div> <div>16%</div> </div> </div>
1	B	411	<div> <div>6%</div> <div> <div></div> <div>72%</div> <div>11%</div> <div>17%</div> </div> </div>
2	C	40	<div> <div>8%</div> <div> <div></div> <div>53%</div> <div>23%</div> <div>25%</div> </div> </div>
2	E	40	<div> <div>8%</div> <div> <div></div> <div>58%</div> <div>13%</div> <div>30%</div> </div> </div>

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 6240 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 PARTNER OF INSCUTEABLE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	346	Total	C	N	O	S	0	0	0
			2656	1638	501	504	13			
1	B	342	Total	C	N	O	S	0	0	0
			2636	1626	497	500	13			

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-4	GLY	-	EXPRESSION TAG	UNP Q9NH88
A	-3	PRO	-	EXPRESSION TAG	UNP Q9NH88
A	-2	LEU	-	EXPRESSION TAG	UNP Q9NH88
A	-1	GLY	-	EXPRESSION TAG	UNP Q9NH88
A	0	SER	-	EXPRESSION TAG	UNP Q9NH88
B	-4	GLY	-	EXPRESSION TAG	UNP Q9NH88
B	-3	PRO	-	EXPRESSION TAG	UNP Q9NH88
B	-2	LEU	-	EXPRESSION TAG	UNP Q9NH88
B	-1	GLY	-	EXPRESSION TAG	UNP Q9NH88
B	0	SER	-	EXPRESSION TAG	UNP Q9NH88

- Molecule 2 is a protein called RE60102P.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	30	Total	C	N	O	S	0	0	0
			239	150	42	44	3			
2	E	28	Total	C	N	O	S	0	0	0
			224	141	38	42	3			

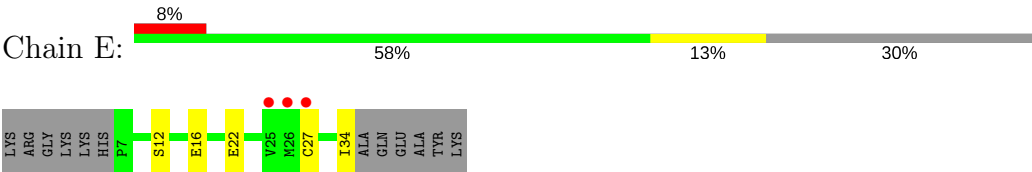
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	231	Total	O	0	0
			231	231		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	228	Total 228	O 228	0	0
3	C	13	Total 13	O 13	0	0
3	E	13	Total 13	O 13	0	0



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	160.20Å 64.23Å 107.60Å 90.00° 117.90° 90.00°	Depositor
Resolution (Å)	23.13 – 2.10 23.59 – 2.10	Depositor EDS
% Data completeness (in resolution range)	96.5 (23.13-2.10) 96.5 (23.59-2.10)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.43 (at 2.10Å)	Xtriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, R_{free}	0.208 , 0.256 0.200 , 0.200	Depositor DCC
R_{free} test set	2163 reflections (3.96%)	DCC
Wilson B-factor (Å ²)	35.3	Xtriage
Anisotropy	0.077	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 48.9	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	0.94	EDS
Total number of atoms	6240	wwPDB-VP
Average B, all atoms (Å ²)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.30% 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	0.89	1/2619 (0.0%)	0.83	0/3519
1	B	0.94	5/2619 (0.2%)	0.87	6/3519 (0.2%)
2	C	0.86	0/247	0.78	0/336
2	E	0.97	0/231	0.78	0/313
All	All	0.91	6/5716 (0.1%)	0.85	6/7687 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	1
All	All	0	2

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	316	THR	CB-CG2	-6.33	1.31	1.52
1	A	54	CYS	CB-SG	-5.66	1.72	1.81
1	B	275	GLU	CD-OE1	5.33	1.31	1.25
1	B	113	SER	CB-OG	5.32	1.49	1.42
1	B	146	ARG	CZ-NH1	-5.11	1.26	1.33
1	B	171	TYR	CD2-CE2	5.10	1.47	1.39

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	316	THR	OG1-CB-CG2	-7.84	91.97	110.00
1	B	244	ARG	NE-CZ-NH2	-7.35	116.62	120.30
1	B	323	ARG	NE-CZ-NH1	-5.78	117.41	120.30
1	B	114	MET	CG-SD-CE	5.59	109.14	100.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	116	ASP	CB-CG-OD1	5.35	123.11	118.30
1	B	244	ARG	NE-CZ-NH1	5.05	122.82	120.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	39	GLY	Peptide
1	B	39	GLY	Peptide

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	2656	0	2502	39	0
1	B	2636	0	2498	39	0
2	C	239	0	223	9	0
2	E	224	0	212	4	0
3	A	231	0	0	14	0
3	B	228	0	0	11	0
3	C	13	0	0	1	0
3	E	13	0	0	1	0
All	All	6240	0	5435	88	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 8.

All (88) 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)
2:C:6:HIS:HB2	2:C:7:PRO:HD3	1.36	1.06
1:B:67:GLN:OE1	3:B:2020:HOH:O	1.83	0.97
1:A:78:ARG:NH2	2:C:34:ILE:O	1.98	0.95
1:B:299:GLN:HE22	1:B:339:ARG:HH22	1.16	0.91
1:A:254:ARG:NH2	3:A:2178:HOH:O	2.02	0.91

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:60:ARG:NH2	3:B:2018:HOH:O	2.09	0.85
1:B:146:ARG:HH21	1:B:150:LEU:HD21	1.43	0.83
1:B:146:ARG:NH2	1:B:150:LEU:HD21	1.94	0.83
1:A:299:GLN:HE22	1:A:339:ARG:HH22	1.28	0.81
1:B:299:GLN:NE2	1:B:339:ARG:HH22	1.79	0.80
1:A:294:ARG:HG3	1:A:294:ARG:HH11	1.47	0.80
2:E:27:CYS:SG	3:E:2008:HOH:O	2.40	0.80
1:A:312:HIS:ND1	3:A:2209:HOH:O	2.16	0.79
1:B:243:GLU:OE1	1:B:246:ARG:NH1	2.16	0.79
1:A:243:GLU:OE1	1:A:246:ARG:NH1	2.19	0.76
3:A:2180:HOH:O	2:C:22:GLU:OE1	2.05	0.74
1:B:78:ARG:NH2	3:B:2028:HOH:O	1.96	0.73
1:A:299:GLN:NE2	1:A:339:ARG:HH22	1.86	0.73
1:B:210:ASP:OD1	3:B:2151:HOH:O	2.08	0.72
1:A:146:ARG:NH2	1:A:150:LEU:HD21	2.05	0.71
1:B:294:ARG:HG3	1:B:294:ARG:HH11	1.56	0.71
2:C:12:SER:O	2:C:16:GLU:HG3	1.91	0.70
1:A:322:ASN:OD1	3:A:2215:HOH:O	2.09	0.69
1:A:210:ASP:OD1	3:A:2142:HOH:O	2.13	0.67
2:C:6:HIS:CB	2:C:7:PRO:HD3	2.19	0.66
2:E:12:SER:O	2:E:16:GLU:HG3	1.96	0.66
1:B:60:ARG:HG2	1:B:60:ARG:HH11	1.60	0.65
2:C:6:HIS:HB2	2:C:7:PRO:CD	2.20	0.65
1:A:294:ARG:NH1	1:A:294:ARG:HG3	2.12	0.64
1:A:337:GLU:HG2	1:A:367:LEU:HD11	1.82	0.62
2:C:30:GLN:HG3	3:C:2007:HOH:O	2.00	0.61
3:B:2182:HOH:O	2:E:22:GLU:HG2	2.04	0.58
1:B:91:TYR:CE1	1:B:99:LYS:HD3	2.39	0.58
1:A:185:LYS:HG3	1:A:186:PHE:N	2.18	0.57
1:A:146:ARG:HH21	1:A:150:LEU:HD21	1.70	0.57
1:B:224:LEU:HD22	1:B:228:TYR:CE2	2.41	0.56
1:A:201:TYR:HB3	1:A:224:LEU:HG	1.88	0.56
1:B:239:GLU:OE1	3:B:2165:HOH:O	2.18	0.55
1:A:334:ARG:NE	3:A:2220:HOH:O	2.39	0.55
1:A:322:ASN:CG	3:A:2215:HOH:O	2.44	0.55
1:B:337:GLU:HG2	1:B:367:LEU:HD11	1.88	0.55
1:A:86:GLN:NE2	2:C:31:HIS:CE1	2.75	0.55
1:B:258:ARG:HD3	1:B:296:VAL:HG11	1.88	0.55
1:B:185:LYS:HG3	1:B:186:PHE:N	2.23	0.54
1:B:294:ARG:HG3	1:B:294:ARG:NH1	2.22	0.53
1:B:243:GLU:HA	1:B:246:ARG:NH1	2.24	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:120:GLU:OE2	3:B:2076:HOH:O	2.19	0.51
1:B:67:GLN:CD	3:B:2020:HOH:O	2.40	0.51
1:B:201:TYR:HB3	1:B:224:LEU:HG	1.92	0.50
1:A:60:ARG:HG2	1:A:60:ARG:HH11	1.77	0.49
1:A:246:ARG:NH2	3:A:2162:HOH:O	2.26	0.49
1:A:221:CYS:SG	1:A:243:GLU:HG2	2.53	0.49
1:A:337:GLU:HG2	1:A:367:LEU:CD1	2.42	0.49
1:A:136:ARG:HD2	3:A:2097:HOH:O	2.13	0.48
1:B:60:ARG:CG	1:B:60:ARG:HH11	2.26	0.48
1:A:258:ARG:HD3	1:A:296:VAL:HG11	1.96	0.47
1:A:243:GLU:HA	1:A:246:ARG:NH1	2.28	0.47
1:B:221:CYS:SG	1:B:243:GLU:HG2	2.55	0.47
1:A:224:LEU:HD22	1:A:228:TYR:CE2	2.49	0.47
1:B:78:ARG:NH2	2:E:34:ILE:O	2.42	0.47
1:A:294:ARG:CG	1:A:294:ARG:HH11	2.23	0.47
1:B:294:ARG:NH1	1:B:330:GLU:OE2	2.47	0.46
1:B:324:HIS:CD2	1:B:340:ALA:HB2	2.50	0.46
1:B:91:TYR:CZ	1:B:99:LYS:HD3	2.51	0.46
1:A:319:GLU:OE2	3:A:2213:HOH:O	2.21	0.45
1:B:337:GLU:HG2	1:B:367:LEU:CD1	2.46	0.45
1:B:52:ARG:O	3:B:2009:HOH:O	2.21	0.45
1:A:201:TYR:CB	1:A:224:LEU:HG	2.46	0.44
1:A:294:ARG:HA	1:A:294:ARG:HD2	1.84	0.44
1:B:378:UNK:O	1:B:379:UNK:C	2.65	0.44
1:B:324:HIS:HD2	1:B:340:ALA:HB2	1.83	0.43
1:B:214:ARG:NH2	1:B:250:GLU:OE2	2.50	0.43
1:B:77:LEU:HA	1:B:77:LEU:HD23	1.76	0.43
1:A:294:ARG:NH1	1:A:330:GLU:OE2	2.52	0.43
1:A:136:ARG:NH1	3:A:2097:HOH:O	2.28	0.42
1:A:166:ASN:O	1:A:170:VAL:HG23	2.19	0.42
1:A:312:HIS:CE1	3:A:2209:HOH:O	2.69	0.42
1:A:335:ILE:HG23	3:A:2221:HOH:O	2.19	0.42
1:B:57:GLY:O	3:B:2013:HOH:O	2.22	0.42
1:A:356:ARG:HD2	1:A:356:ARG:HA	1.82	0.42
1:B:356:ARG:HA	1:B:356:ARG:HD2	1.76	0.42
1:B:117:ARG:HB2	3:B:2072:HOH:O	2.20	0.41
1:A:213:ASP:O	1:A:217:GLN:HG3	2.20	0.41
1:A:324:HIS:CD2	1:A:340:ALA:HB2	2.55	0.41
1:A:254:ARG:NH1	1:A:257:GLU:OE1	2.53	0.41
1:B:201:TYR:CZ	1:B:223:ASN:HB3	2.56	0.41
1:B:313:GLU:O	1:B:316:THR:HG22	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:2208:HOH:O	2:C:9:PRO:HB2	2.20	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	328/411 (80%)	321 (98%)	7 (2%)	0	100	100
1	B	328/411 (80%)	321 (98%)	7 (2%)	0	100	100
2	C	28/40 (70%)	27 (96%)	1 (4%)	0	100	100
2	E	26/40 (65%)	25 (96%)	1 (4%)	0	100	100
All	All	710/902 (79%)	694 (98%)	16 (2%)	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	254/283 (90%)	251 (99%)	3 (1%)	75	81
1	B	254/283 (90%)	253 (100%)	1 (0%)	93	95
2	C	26/34 (76%)	26 (100%)	0	100	100
2	E	25/34 (74%)	25 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	559/634 (88%)	555 (99%)	4 (1%)	87	91

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

Mol	Chain	Res	Type
1	A	112	LYS
1	A	244	ARG
1	A	316	THR
1	B	244	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	299	GLN
1	B	299	GLN
1	B	324	HIS

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 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 ⓘ

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	330/411 (80%)	0.34	21 (6%) 20 25	24, 37, 70, 93	0
1	B	330/411 (80%)	0.40	25 (7%) 15 19	24, 37, 68, 93	0
2	C	30/40 (75%)	0.15	3 (10%) 8 10	27, 40, 56, 77	0
2	E	28/40 (70%)	0.28	3 (10%) 7 8	27, 36, 49, 55	0
All	All	718/902 (79%)	0.36	52 (7%) 16 21	24, 37, 69, 93	0

All (52) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	366	GLN	5.7
1	A	355	GLU	5.0
1	B	352	GLY	4.5
1	B	181	ARG	4.5
1	A	181	ARG	4.1
1	B	332	GLY	3.8
1	A	180	GLN	3.7
1	A	39	GLY	3.7
1	A	359	LYS	3.5
1	A	365	LEU	3.5
1	A	352	GLY	3.4
1	A	55	ASN	3.3
1	B	355	GLU	3.3
2	E	27	CYS	3.3
1	A	354	HIS	3.2
1	B	368	ALA	3.2
1	B	93	TYR	3.2
2	C	25	VAL	3.0
1	B	39	GLY	3.0
1	B	113	SER	3.0
1	B	365	LEU	3.0

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Mol	Chain	Res	Type	RSRZ
1	A	182	ASN	2.9
1	B	182	ASN	2.8
1	B	55	ASN	2.8
1	B	359	LYS	2.7
1	A	368	ALA	2.7
2	E	25	VAL	2.7
1	A	353	GLY	2.6
1	B	214	ARG	2.6
1	B	164	LEU	2.5
1	A	366	GLN	2.5
1	B	114	MET	2.5
1	A	358	LEU	2.5
2	C	35	ALA	2.4
1	B	351	ILE	2.4
1	A	93	TYR	2.4
2	E	26	MET	2.3
1	B	167	LEU	2.3
2	C	6	HIS	2.3
1	A	65	PHE	2.2
1	A	224	LEU	2.2
1	B	75	GLU	2.2
1	B	115	ASN	2.2
1	A	211	LEU	2.2
1	A	117	ARG	2.2
1	A	225	GLY	2.1
1	B	144	CYS	2.1
1	A	351	ILE	2.1
1	B	87	LEU	2.1
1	B	334	ARG	2.0
1	B	335	ILE	2.0
1	B	180	GLN	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

There are no ligands in this entry.

6.5 Other polymers

There are no such residues in this entry.