



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 20, 2024 – 10:29 PM EDT

PDB ID : 9CQJ
Title : CRYSTAL STRUCTURE OF GAGA-DOG HSP47(36-418) IN COMPLEX WITH ADNECTIN-53
Authors : Sheriff, S.
Deposited on : 2024-07-19
Resolution : 2.08 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 : 4.02b-467
Xtriage (Phenix) : 1.20.1
EDS : 3.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.003 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

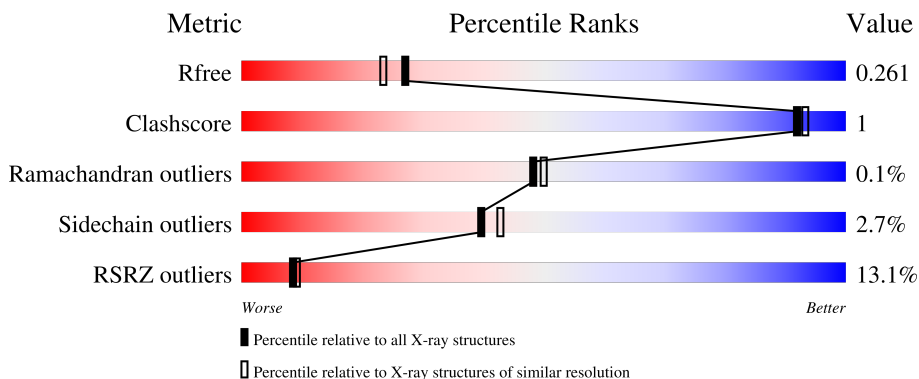
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.08 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	7574 (2.10-2.06)
Clashscore	180529	8325 (2.10-2.06)
Ramachandran outliers	177936	8271 (2.10-2.06)
Sidechain outliers	177891	8272 (2.10-2.06)
RSRZ outliers	164620	7574 (2.10-2.06)

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	387	 12% 93% 5%
1	B	387	 14% 91% 6%
2	D	103	 11% 89% 7%
2	E	103	 12% 86% 8%

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 14354 atoms, of which 7024 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 Serpin H1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
1	A	380	5753	1851	2851	498	540	13	2851	0	0
1	B	377	5715	1840	2837	490	536	12	2837	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	32	GLY	-	expression tag	UNP C7C419
A	33	ALA	-	expression tag	UNP C7C419
A	34	GLY	-	expression tag	UNP C7C419
A	35	ALA	-	expression tag	UNP C7C419
B	32	GLY	-	expression tag	UNP C7C419
B	33	ALA	-	expression tag	UNP C7C419
B	34	GLY	-	expression tag	UNP C7C419
B	35	ALA	-	expression tag	UNP C7C419

- Molecule 2 is a protein called anti-HSP47 Adnectin-53.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	H	N	O			
2	D	96	1396	463	671	118	144	671	0	0
2	E	95	1380	456	665	117	142	665	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	48	Total	O	0	1
			49	49		
3	B	25	Total	O	0	0
			25	25		

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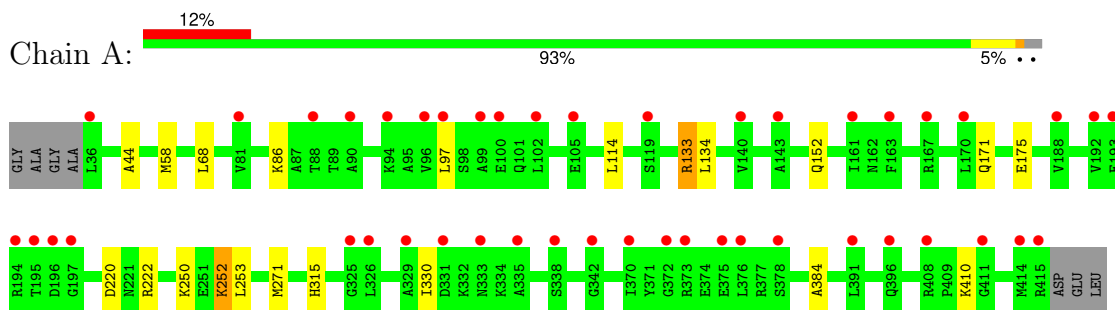
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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	D	19	Total O 19 19	0	0
3	E	17	Total O 17 17	0	0

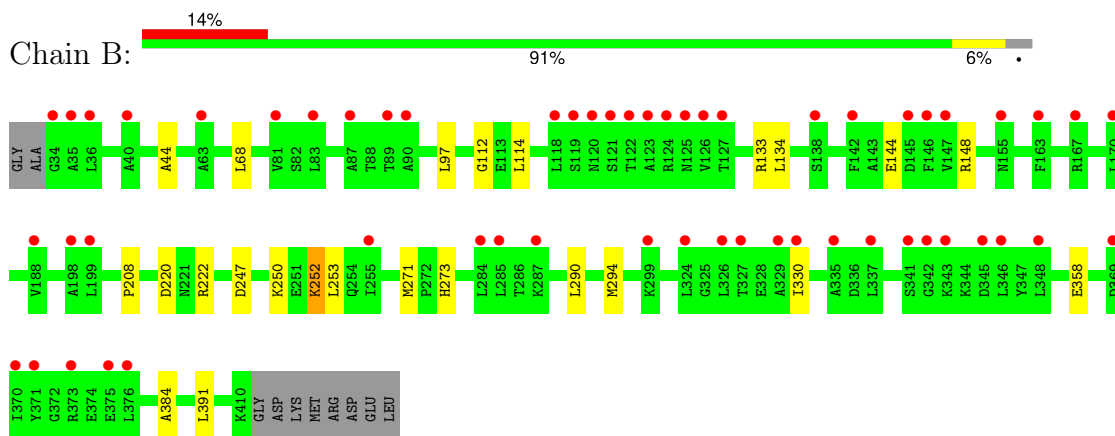
3 Residue-property plots [i](#)

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.

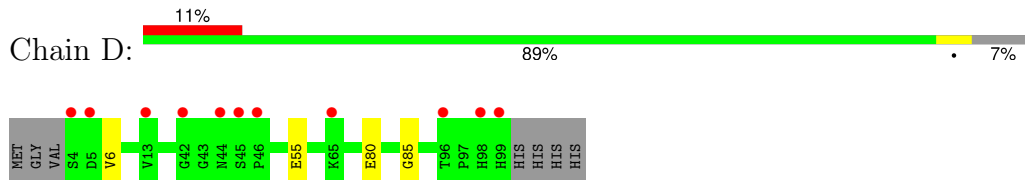
- Molecule 1: Serpin H1



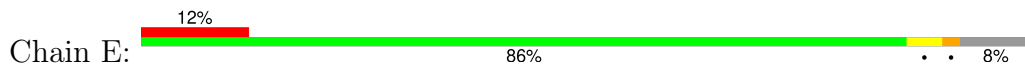
- Molecule 1: Serpin H1

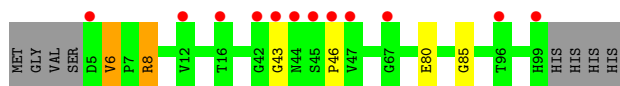


- Molecule 2: anti-HSP47 Adnectin-53



- Molecule 2: anti-HSP47 Adnectin-53





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	86.81Å 129.06Å 78.22Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	78.22 – 2.08 78.22 – 2.08	Depositor EDS
% Data completeness (in resolution range)	87.2 (78.22-2.08) 87.2 (78.22-2.08)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.61 (at 2.07Å)	Xtrriage
Refinement program	BUSTER 2.11.8	Depositor
R, R_{free}	0.248 , 0.273 0.240 , 0.261	Depositor DCC
R_{free} test set	2359 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	48.5	Xtrriage
Anisotropy	0.018	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 38.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	14354	wwPDB-VP
Average B, all atoms (Å ²)	54.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.24% 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 [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	0.41	0/2962	0.60	0/4009
1	B	0.41	0/2938	0.59	0/3977
2	D	0.41	0/747	0.61	0/1029
2	E	0.42	0/736	0.61	0/1014
All	All	0.41	0/7383	0.60	0/10029

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 [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	2902	2851	2852	8	1
1	B	2878	2837	2837	9	0
2	D	725	671	671	1	1
2	E	715	665	665	3	0
3	A	49	0	0	0	0
3	B	25	0	0	1	0
3	D	19	0	0	0	0
3	E	17	0	0	0	0
All	All	7330	7024	7025	21	1

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:A:250:LYS:O	1:A:252:LYS:HE3	1.99	0.62
1:B:250:LYS:O	1:B:252:LYS:HE3	2.00	0.61
1:B:290:LEU:O	1:B:294:MET:HG2	2.02	0.60
2:E:43:GLY:O	2:E:46:PRO:HD3	2.03	0.58
1:B:220:ASP:OD1	1:B:222:ARG:HD3	2.04	0.58
1:A:220:ASP:OD1	1:A:222:ARG:HD3	2.03	0.58
1:B:144:GLU:O	1:B:148:ARG:HG2	2.05	0.57
1:A:58:MET:HE1	1:A:315:HIS:CE1	2.43	0.54
2:D:80:GLU:O	2:D:85:GLY:HA3	2.10	0.52
2:E:80:GLU:O	2:E:85:GLY:HA3	2.11	0.50
1:A:271:MET:SD	1:A:384:ALA:HA	2.53	0.49
1:B:247:ASP:OD1	1:B:273:HIS:NE2	2.40	0.49
1:B:271:MET:SD	1:B:384:ALA:HA	2.54	0.47
1:A:44:ALA:HB2	1:A:114:LEU:HD21	1.96	0.46
1:A:58:MET:CE	1:A:315:HIS:ND1	2.79	0.45
1:B:44:ALA:HB2	1:B:114:LEU:HD21	1.99	0.45
1:B:208:PRO:HD2	1:B:358:GLU:O	2.18	0.44
1:B:112:GLY:HA3	3:B:516:HOH:O	2.19	0.43
1:A:58:MET:CE	1:A:315:HIS:CE1	3.02	0.42
1:A:171:GLN:O	1:A:175:GLU:HG2	2.19	0.41
2:E:6:VAL:O	2:E:8:ARG:HD3	2.20	0.41

All (1) 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:A:133:ARG:HH22	2:D:55:GLU:OE1[2_555]	1.47	0.13

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	378/387 (98%)	362 (96%)	15 (4%)	1 (0%)	37	36
1	B	375/387 (97%)	360 (96%)	15 (4%)	0	100	100
2	D	94/103 (91%)	92 (98%)	2 (2%)	0	100	100
2	E	93/103 (90%)	90 (97%)	3 (3%)	0	100	100
All	All	940/980 (96%)	904 (96%)	35 (4%)	1 (0%)	48	50

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	410	LYS

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	300/328 (92%)	291 (97%)	9 (3%)	36	38
1	B	298/328 (91%)	290 (97%)	8 (3%)	40	43
2	D	74/86 (86%)	73 (99%)	1 (1%)	62	68
2	E	73/86 (85%)	71 (97%)	2 (3%)	40	43
All	All	745/828 (90%)	725 (97%)	20 (3%)	40	43

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	68	LEU
1	A	86	LYS
1	A	97	LEU
1	A	133	ARG
1	A	134	LEU
1	A	152	GLN
1	A	252	LYS
1	A	253	LEU
1	A	330	ILE
1	B	68	LEU

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Mol	Chain	Res	Type
1	B	97	LEU
1	B	133	ARG
1	B	134	LEU
1	B	252	LYS
1	B	253	LEU
1	B	330	ILE
1	B	391	LEU
2	D	6	VAL
2	E	6	VAL
2	E	8	ARG

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

Mol	Chain	Res	Type
1	A	152	GLN
1	A	368	GLN
1	B	209	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 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

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	380/387 (98%)	0.79	45 (11%) 10 11	15, 26, 48, 59	0
1	B	377/387 (97%)	0.91	56 (14%) 7 7	16, 28, 52, 65	0
2	D	96/103 (93%)	1.03	11 (11%) 11 12	18, 28, 48, 60	0
2	E	95/103 (92%)	1.03	12 (12%) 9 10	17, 28, 45, 55	0
All	All	948/980 (96%)	0.89	124 (13%) 8 9	15, 27, 50, 65	0

All (124) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	163	PHE	5.4
1	B	126	VAL	5.3
1	A	99	ALA	4.5
1	B	342	GLY	4.4
2	D	42	GLY	4.4
2	D	4	SER	4.4
1	A	96	VAL	4.3
2	E	45	SER	4.3
1	B	122	THR	4.3
2	D	45	SER	4.2
1	B	163	PHE	4.0
2	E	99	HIS	4.0
1	B	125	ASN	3.9
1	B	346	LEU	3.9
1	B	145	ASP	3.8
2	E	5	ASP	3.7
1	B	326	LEU	3.7
1	B	198	ALA	3.6
2	E	43	GLY	3.6
1	B	119	SER	3.5
2	D	96	THR	3.5

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Mol	Chain	Res	Type	RSRZ
1	B	170	LEU	3.4
2	E	96	THR	3.3
1	A	372	GLY	3.3
1	B	188	VAL	3.2
1	B	123	ALA	3.2
1	B	118	LEU	3.2
1	A	375	GLU	3.2
1	A	192	VAL	3.1
1	B	287	LYS	3.1
1	A	414	MET	3.0
1	A	195	THR	3.0
2	D	44	ASN	3.0
2	D	46	PRO	2.9
1	B	329	ALA	2.9
1	A	94	LYS	2.9
1	B	337	LEU	2.9
1	B	348	LEU	2.9
1	A	97	LEU	2.9
1	A	329	ALA	2.9
1	B	120	ASN	2.9
1	B	371	TYR	2.9
2	D	5	ASP	2.8
1	B	376	LEU	2.8
1	A	331	ASP	2.7
1	B	121	SER	2.7
2	E	44	ASN	2.7
1	B	343	LYS	2.7
1	A	102	LEU	2.7
1	B	142	PHE	2.7
1	B	124	ARG	2.7
1	A	370	ILE	2.7
1	B	330	ILE	2.7
2	D	99	HIS	2.7
1	A	188	VAL	2.6
1	B	35	ALA	2.6
1	A	88	THR	2.6
1	B	375	GLU	2.6
1	A	119	SER	2.6
1	A	376	LEU	2.6
1	B	40	ALA	2.6
1	A	170	LEU	2.6
2	D	13	VAL	2.5

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Mol	Chain	Res	Type	RSRZ
2	E	46	PRO	2.5
1	A	161	ILE	2.5
1	B	370	ILE	2.5
1	B	199	LEU	2.5
1	B	34	GLY	2.5
1	A	196	ASP	2.5
1	B	369	ASP	2.5
1	B	87	ALA	2.5
1	A	140	VAL	2.5
1	A	167	ARG	2.4
1	A	90	ALA	2.4
1	A	333	ASN	2.4
2	E	42	GLY	2.4
1	B	324	LEU	2.4
1	B	63	ALA	2.4
1	B	327	THR	2.4
1	A	338	SER	2.4
1	B	138	SER	2.4
1	A	373	ARG	2.4
1	A	197	GLY	2.4
1	B	147	VAL	2.3
1	A	81	VAL	2.3
1	A	326	LEU	2.3
1	A	194	ARG	2.3
1	A	415	ARG	2.3
1	A	325	GLY	2.3
2	D	98	HIS	2.3
1	A	105	GLU	2.2
2	D	65	LYS	2.2
1	B	127	THR	2.2
2	E	16	THR	2.2
1	A	391	LEU	2.2
1	B	83	LEU	2.2
1	A	411	GLY	2.2
1	B	255	ILE	2.2
1	B	89	THR	2.2
1	A	378	SER	2.2
1	B	335	ALA	2.2
1	B	341	SER	2.2
1	A	408	ARG	2.2
2	E	67	GLY	2.2
2	E	12	VAL	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	193	GLU	2.1
1	B	284	LEU	2.1
1	A	143	ALA	2.1
2	E	47	VAL	2.1
1	A	100	GLU	2.1
1	A	36	LEU	2.1
1	B	36	LEU	2.1
1	B	167	ARG	2.1
1	B	345	ASP	2.1
1	B	373	ARG	2.1
1	B	90	ALA	2.1
1	B	155	ASN	2.1
1	A	335	ALA	2.1
1	A	342	GLY	2.1
1	B	81	VAL	2.1
1	B	299	LYS	2.1
1	B	285	LEU	2.1
1	A	396	GLN	2.1
1	B	146	PHE	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](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.