Full wwPDB NMR Structure Validation Report (i)

Jun 11, 2024 – 08:57 PM EDT

PDB ID	:	1LL8
BMRB ID	:	5354
Title	:	Structure and interactions of PAS kinase N-terminal PAS domain: Model for intramolecular kinase regulation
Authors	:	Amezcua, C.A.; Harper, S.M.; Rutter, J.; Gardner, K.H.
Deposited on	:	2002-04-26

This is a Full wwPDB NMR 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/NMRValidationReportHelp
with specific help available everywhere you see the (i) 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 (i)) were used in the production of this report:

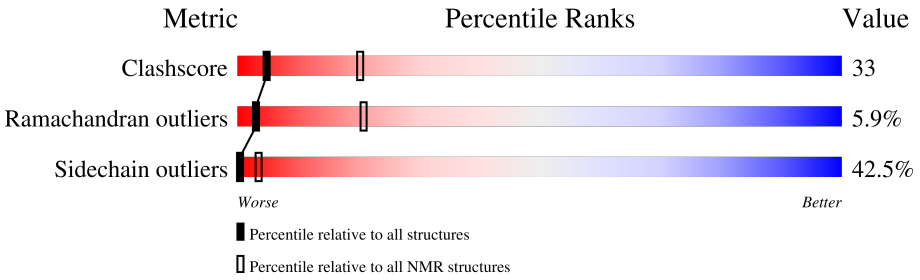
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
wwPDB-RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
wwPDB-ShiftChecker	:	v1.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1 Overall quality at a glance

The following experimental techniques were used to determine the structure:
SOLUTION NMR

The overall completeness of chemical shifts assignment is 93%.

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)	NMR archive (#Entries)
Clashscore	158937	12864
Ramachandran outliers	154571	11451
Sidechain outliers	154315	11428

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and 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 <=5%

Mol	Chain	Length	Quality of chain
1	A	114	18% 46% 13% • 22%

2 Ensemble composition and analysis (i)

This entry contains 20 models. Model 6 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *closest to the average*.

The following residues are included in the computation of the global validation metrics.

Well-defined (core) protein residues			
Well-defined core	**Residue range (total)**	**Backbone RMSD (Å)**	**Medoid model**
1	A:9-A:58, A:74-A:112 (89)	0.53	6

Ill-defined regions of proteins are excluded from the global statistics.

Ligands and non-protein polymers are included in the analysis.

The models can be grouped into 3 clusters. No single-model clusters were found.

Cluster number	Models
1	1, 4, 5, 6, 7, 9, 11, 15, 16, 17, 20
2	2, 8, 12, 13, 14, 18, 19
3	3, 10

3 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 1775 atoms, of which 891 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called PAS Kinase.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	114	1775	554	891	152	171	7	0

There are 7 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	GLY	-	cloning artifact	UNP Q96RG2
A	2	ALA	-	cloning artifact	UNP Q96RG2
A	3	MET	-	cloning artifact	UNP Q96RG2
A	4	ASP	-	cloning artifact	UNP Q96RG2
A	5	PRO	-	cloning artifact	UNP Q96RG2
A	6	GLU	-	cloning artifact	UNP Q96RG2
A	7	PHE	-	cloning artifact	UNP Q96RG2

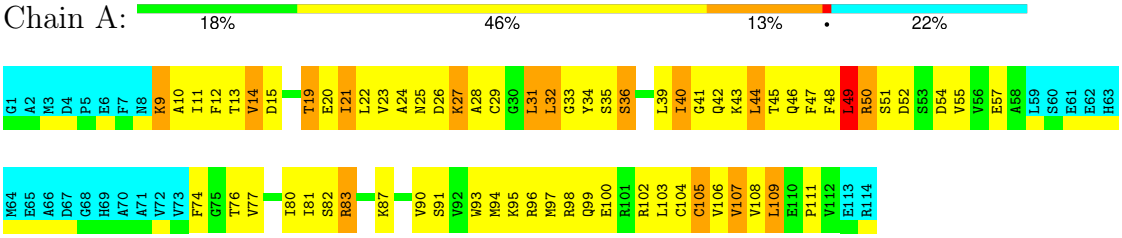
4 Residue-property plots

4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-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. Stretches of 2 or more consecutive residues without any outliers are shown as green connectors. Residues which are classified as ill-defined in the NMR ensemble, are shown in cyan with an underline colour-coded according to the previous scheme. Residues which were present in the experimental sample, but not modelled in the final structure are shown in grey.

• Molecule 1: PAS Kinase

Chain A:



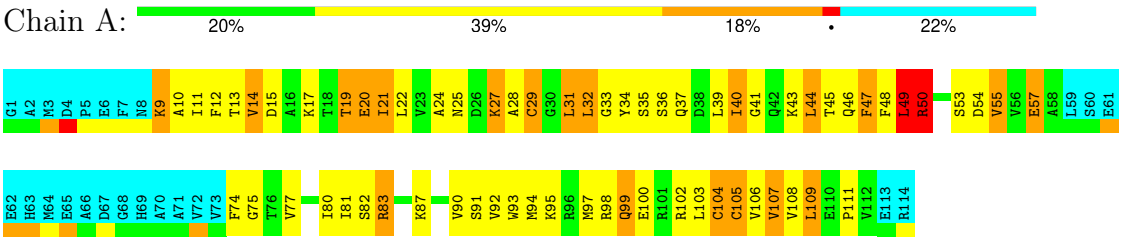
4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

• Molecule 1: PAS Kinase

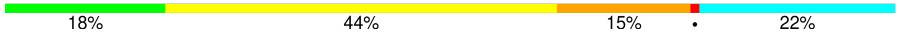
Chain A:



4.2.2 Score per residue for model 2

• Molecule 1: PAS Kinase

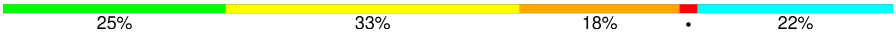
Chain A:

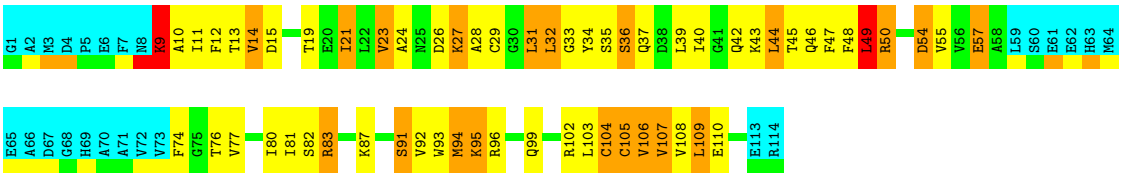


4.2.3 Score per residue for model 3

• Molecule 1: PAS Kinase

Chain A:

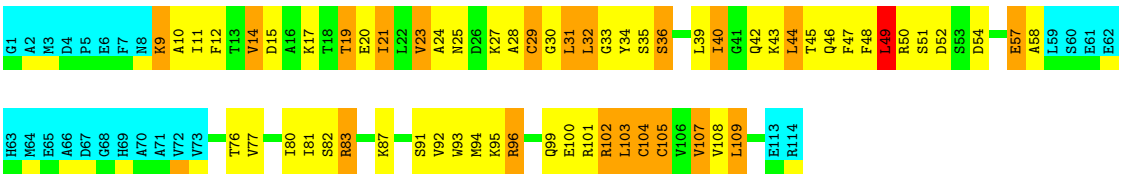




4.2.4 Score per residue for model 4

• Molecule 1: PAS Kinase

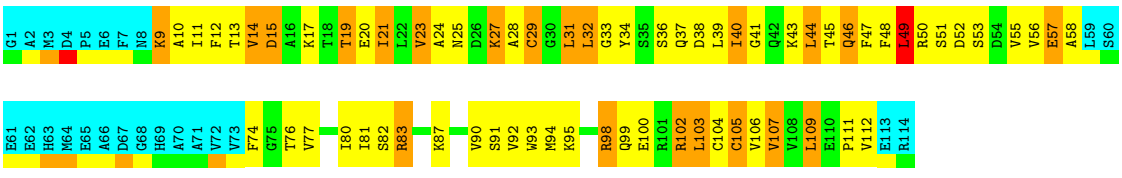
Chain A:



4.2.5 Score per residue for model 5

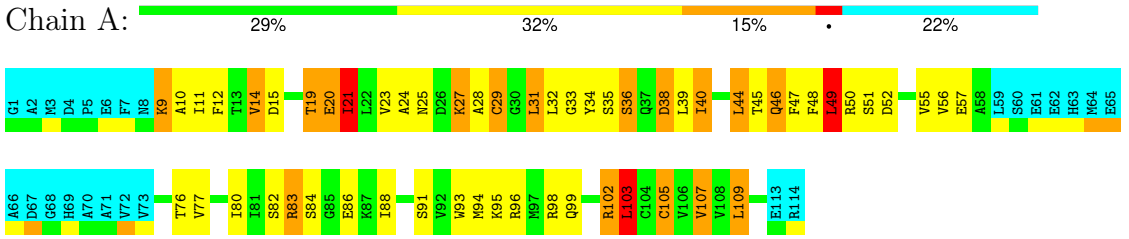
• Molecule 1: PAS Kinase

Chain A:



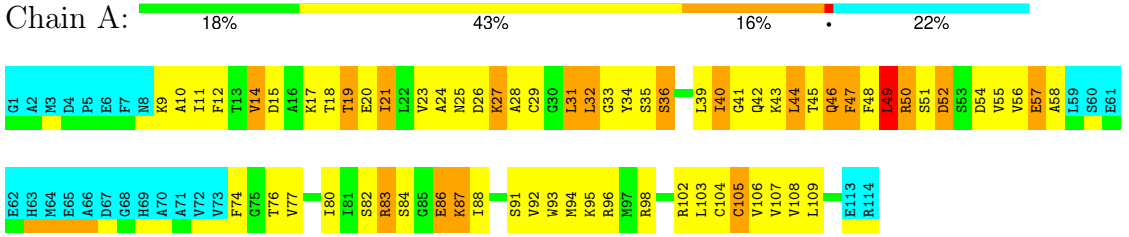
4.2.6 Score per residue for model 6 (medoid)

• Molecule 1: PAS Kinase



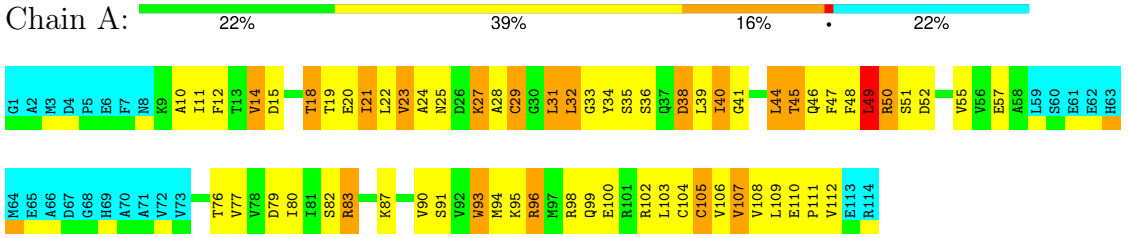
4.2.7 Score per residue for model 7

- Molecule 1: PAS Kinase



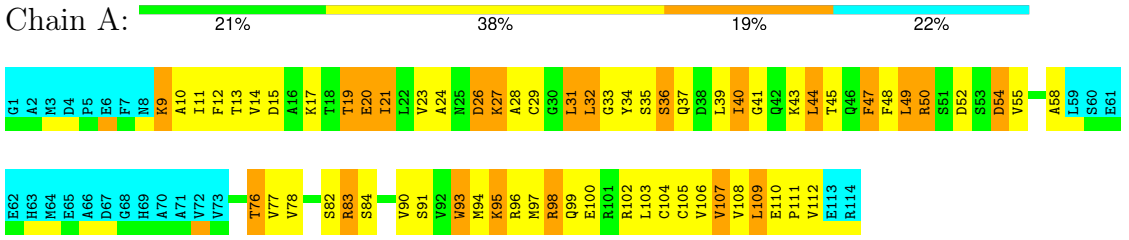
4.2.8 Score per residue for model 8

- Molecule 1: PAS Kinase



4.2.9 Score per residue for model 9

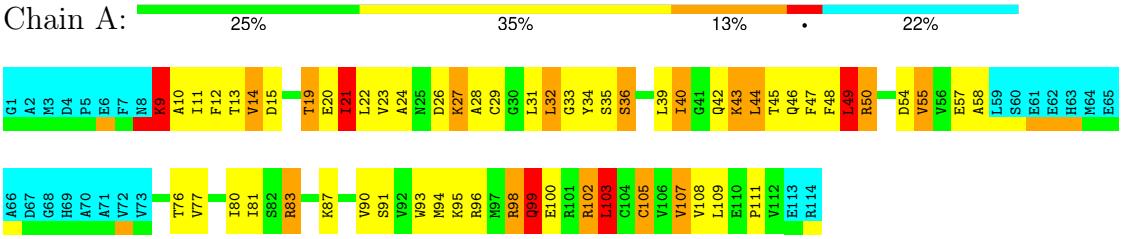
- Molecule 1: PAS Kinase



4.2.10 Score per residue for model 10

• Molecule 1: PAS Kinase

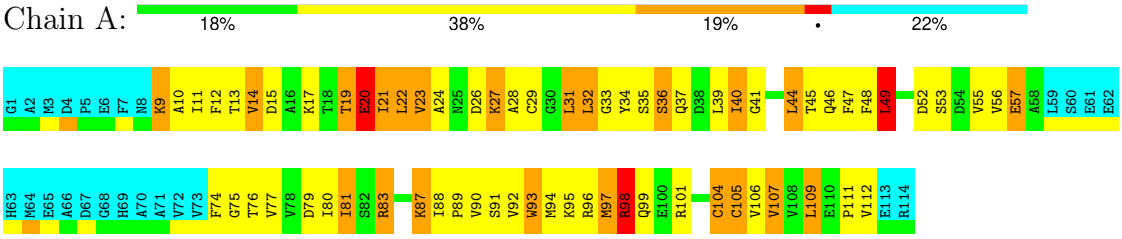
Chain A:



4.2.11 Score per residue for model 11

• Molecule 1: PAS Kinase

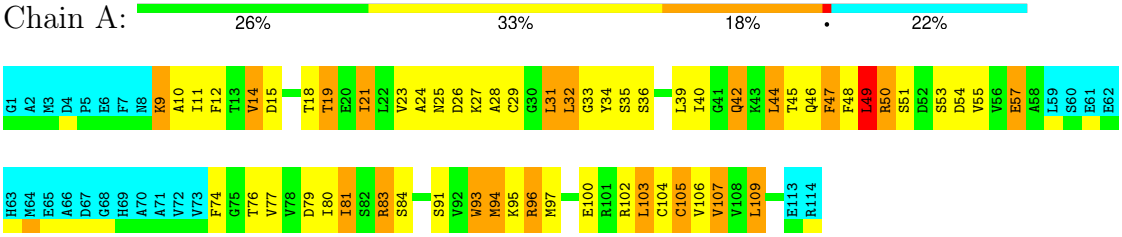
Chain A:



4.2.12 Score per residue for model 12

• Molecule 1: PAS Kinase

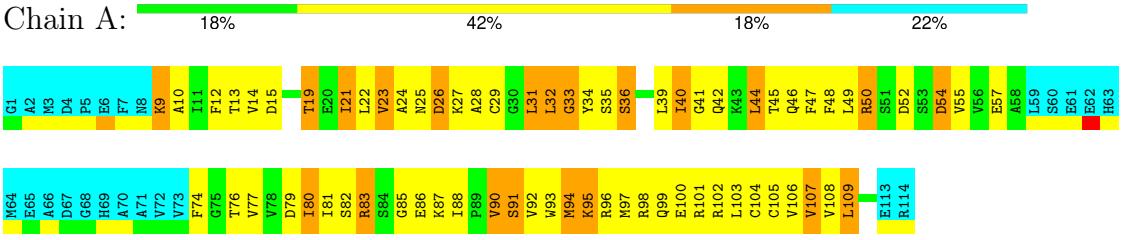
Chain A:



4.2.13 Score per residue for model 13

• Molecule 1: PAS Kinase

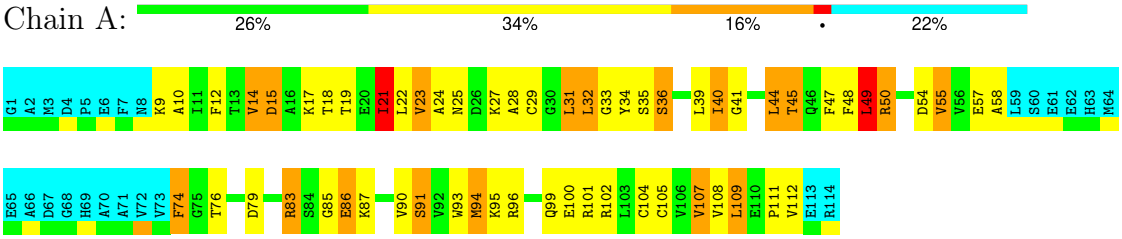
Chain A:



4.2.14 Score per residue for model 14

• Molecule 1: PAS Kinase

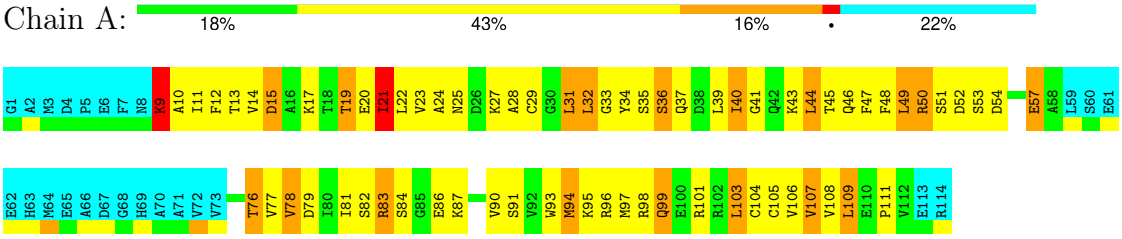
Chain A:



4.2.15 Score per residue for model 15

• Molecule 1: PAS Kinase

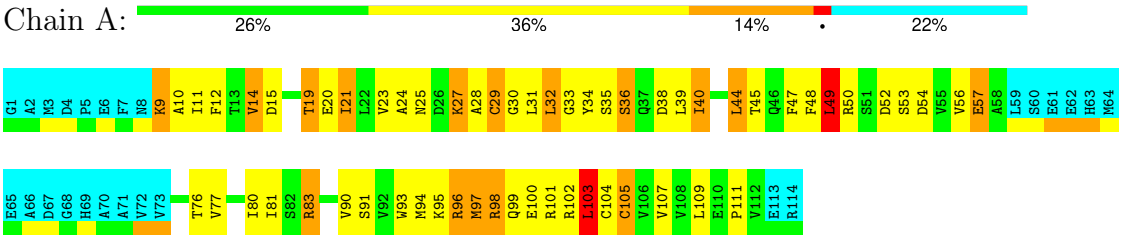
Chain A:



4.2.16 Score per residue for model 16

• Molecule 1: PAS Kinase

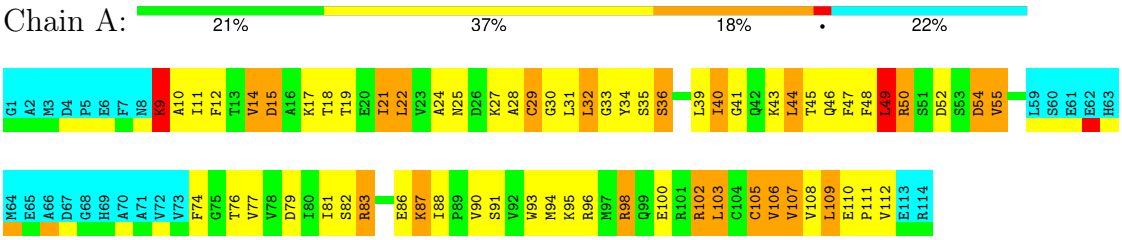
Chain A:



4.2.17 Score per residue for model 17

• Molecule 1: PAS Kinase

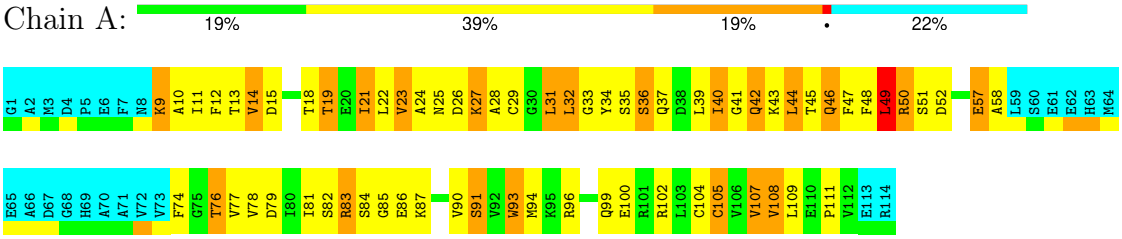
Chain A:



4.2.18 Score per residue for model 18

• Molecule 1: PAS Kinase

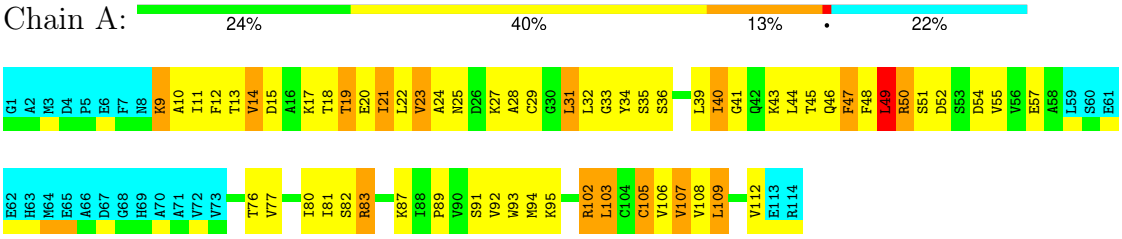
Chain A:



4.2.19 Score per residue for model 19

• Molecule 1: PAS Kinase

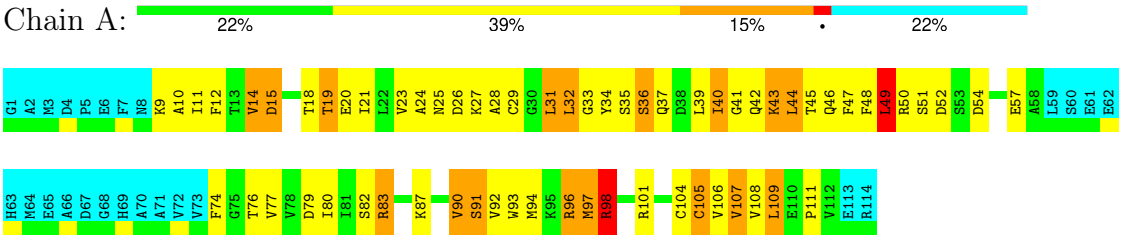
Chain A:



4.2.20 Score per residue for model 20

• Molecule 1: PAS Kinase

Chain A:



5 Refinement protocol and experimental data overview

The models were refined using the following method: *molecular dynamics/simulated annealing.*

Of the 100 calculated structures, 20 were deposited, based on the following criterion: *structures with the lowest energy.*

The following table shows the software used for structure solution, optimisation and refinement.

Software name	Classification	Version
CNS	structure solution	1.0
ARIA	refinement	1.1

The following table shows chemical shift validation statistics as aggregates over all chemical shift files. Detailed validation can be found in section 7 of this report.

Chemical shift file(s)	working_cs.cif
Number of chemical shift lists	1
Total number of shifts	1430
Number of shifts mapped to atoms	1430
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	93%

6 Model quality

6.1 Standard geometry

There are no covalent bond-length or bond-angle outliers.

There are no bond-length outliers.

There are no bond-angle outliers.

There are no chirality outliers.

There are no planarity outliers.

6.2 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 each 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 averaged over the ensemble.

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	A	693	722	722	47±5
All	All	13860	14440	14440	945

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 33.

All unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:94:MET:HG3	1:A:107:VAL:HG13	0.98	1.35	15	4
1:A:94:MET:HG3	1:A:107:VAL:HG23	0.82	1.51	12	15
1:A:14:VAL:HG12	1:A:21:ILE:HA	0.79	1.53	15	18
1:A:12:PHE:HB2	1:A:107:VAL:HG23	0.76	1.56	13	3
1:A:12:PHE:HB3	1:A:44:LEU:HD23	0.75	1.57	8	10
1:A:31:LEU:HD23	1:A:32:LEU:HG	0.75	1.57	14	5
1:A:12:PHE:HB2	1:A:107:VAL:HG12	0.74	1.57	12	3
1:A:94:MET:CG	1:A:107:VAL:HG13	0.74	2.13	15	4
1:A:90:VAL:HG12	1:A:111:PRO:HA	0.73	1.59	18	13
1:A:49:LEU:H	1:A:49:LEU:HD13	0.72	1.44	15	4
1:A:44:LEU:HD13	1:A:45:THR:N	0.72	2.00	12	1
1:A:23:VAL:HG22	1:A:36:SER:HB2	0.71	1.61	18	5
1:A:50:ARG:HB3	1:A:54:ASP:HB2	0.71	1.61	7	10
1:A:24:ALA:HB3	1:A:39:LEU:HD21	0.71	1.63	12	20

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:11:ILE:N	1:A:28:ALA:HB2	0.70	2.02	1	18
1:A:49:LEU:N	1:A:49:LEU:HD13	0.68	2.04	11	12
1:A:29:CYS:SG	1:A:35:SER:HA	0.68	2.29	18	5
1:A:44:LEU:HD12	1:A:45:THR:N	0.67	2.04	19	10
1:A:49:LEU:H	1:A:80:ILE:HA	0.67	1.49	2	8
1:A:44:LEU:HD12	1:A:45:THR:H	0.65	1.50	13	19
1:A:25:ASN:ND2	1:A:27:LYS:HB2	0.65	2.07	7	9
1:A:32:LEU:HD12	1:A:32:LEU:H	0.64	1.53	10	14
1:A:10:ALA:HA	1:A:28:ALA:HB2	0.63	1.70	14	4
1:A:77:VAL:HA	1:A:91:SER:HA	0.63	1.69	9	19
1:A:9:LYS:HD3	1:A:11:ILE:HD11	0.63	1.69	1	2
1:A:48:PHE:C	1:A:49:LEU:HD22	0.62	2.14	8	12
1:A:14:VAL:HG12	1:A:21:ILE:HG23	0.62	1.70	11	9
1:A:96:ARG:HB2	1:A:103:LEU:HD12	0.62	1.72	4	1
1:A:44:LEU:HD22	1:A:107:VAL:HG21	0.62	1.72	13	4
1:A:15:ASP:O	1:A:19:THR:HA	0.61	1.95	6	19
1:A:14:VAL:HG21	1:A:19:THR:HG23	0.61	1.71	20	3
1:A:9:LYS:H	1:A:27:LYS:HD2	0.61	1.55	12	2
1:A:44:LEU:HD13	1:A:45:THR:H	0.61	1.53	12	1
1:A:98:ARG:N	1:A:98:ARG:HD3	0.61	2.10	5	2
1:A:32:LEU:HG	1:A:33:GLY:H	0.61	1.55	13	1
1:A:11:ILE:H	1:A:28:ALA:HB2	0.60	1.55	16	13
1:A:34:TYR:HB3	1:A:39:LEU:HB3	0.60	1.72	9	10
1:A:9:LYS:O	1:A:11:ILE:HD12	0.60	1.96	17	1
1:A:25:ASN:HD21	1:A:27:LYS:HB2	0.60	1.57	20	10
1:A:23:VAL:HG22	1:A:36:SER:HB3	0.60	1.74	11	4
1:A:10:ALA:HA	1:A:28:ALA:HA	0.60	1.74	17	15
1:A:53:SER:O	1:A:56:VAL:HG22	0.60	1.97	5	1
1:A:40:ILE:HD13	1:A:41:GLY:N	0.59	2.12	20	14
1:A:48:PHE:HD1	1:A:80:ILE:HB	0.59	1.56	7	13
1:A:10:ALA:O	1:A:108:VAL:HA	0.59	1.98	2	15
1:A:24:ALA:CB	1:A:39:LEU:HD21	0.58	2.28	1	14
1:A:27:LYS:HE2	1:A:27:LYS:HA	0.58	1.75	11	1
1:A:12:PHE:CE2	1:A:28:ALA:HB1	0.58	2.34	15	2
1:A:31:LEU:HD23	1:A:32:LEU:N	0.57	2.14	15	3
1:A:103:LEU:HD13	1:A:103:LEU:H	0.57	1.58	19	1
1:A:13:THR:HG21	1:A:99:GLN:HE21	0.57	1.59	9	5
1:A:23:VAL:HG23	1:A:36:SER:HB3	0.57	1.75	13	1
1:A:44:LEU:HD11	1:A:94:MET:HE3	0.56	1.77	14	1
1:A:81:ILE:HG22	1:A:87:LYS:H	0.56	1.59	11	1
1:A:45:THR:OG1	1:A:55:VAL:HG23	0.56	2.01	3	3

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:96:ARG:HB2	1:A:103:LEU:HD11	0.56	1.76	12	2
1:A:14:VAL:HA	1:A:22:LEU:HG	0.55	1.78	13	8
1:A:49:LEU:HD13	1:A:49:LEU:H	0.55	1.62	17	7
1:A:94:MET:HA	1:A:106:VAL:O	0.55	2.01	13	14
1:A:94:MET:HG2	1:A:105:CYS:SG	0.55	2.42	20	12
1:A:10:ALA:HA	1:A:28:ALA:CA	0.54	2.32	7	19
1:A:44:LEU:HB2	1:A:48:PHE:HE2	0.54	1.62	4	13
1:A:93:TRP:CZ2	1:A:108:VAL:HG21	0.54	2.37	18	1
1:A:46:GLN:O	1:A:51:SER:HB3	0.54	2.02	6	7
1:A:74:PHE:CE2	1:A:107:VAL:HG21	0.54	2.36	1	4
1:A:92:VAL:HG22	1:A:109:LEU:HD23	0.54	1.79	3	9
1:A:31:LEU:HD12	1:A:109:LEU:HD13	0.54	1.79	19	2
1:A:95:LYS:HG3	1:A:97:MET:HE2	0.54	1.79	13	1
1:A:50:ARG:HG2	1:A:54:ASP:H	0.54	1.62	15	2
1:A:12:PHE:CE1	1:A:28:ALA:HB1	0.54	2.37	4	14
1:A:74:PHE:CE2	1:A:107:VAL:HG11	0.54	2.37	13	1
1:A:96:ARG:HB2	1:A:103:LEU:HD21	0.54	1.79	8	1
1:A:99:GLN:HG3	1:A:104:CYS:HB2	0.53	1.80	13	2
1:A:98:ARG:HG2	1:A:103:LEU:HA	0.53	1.78	15	3
1:A:14:VAL:O	1:A:105:CYS:N	0.53	2.42	4	12
1:A:10:ALA:HA	1:A:28:ALA:CB	0.53	2.34	14	4
1:A:28:ALA:O	1:A:31:LEU:HB3	0.53	2.04	4	19
1:A:9:LYS:O	1:A:27:LYS:HB2	0.53	2.03	2	7
1:A:36:SER:O	1:A:40:ILE:HB	0.53	2.04	8	18
1:A:21:ILE:HD11	1:A:44:LEU:N	0.52	2.18	19	2
1:A:25:ASN:O	1:A:29:CYS:SG	0.52	2.68	18	5
1:A:96:ARG:CB	1:A:103:LEU:HD11	0.52	2.35	8	1
1:A:98:ARG:HA	1:A:103:LEU:HA	0.52	1.79	10	1
1:A:80:ILE:HG12	1:A:90:VAL:HG21	0.52	1.81	13	2
1:A:34:TYR:CE1	1:A:83:ARG:HB3	0.52	2.40	15	16
1:A:58:ALA:HB1	1:A:74:PHE:HB2	0.52	1.80	7	2
1:A:48:PHE:O	1:A:49:LEU:C	0.51	2.48	14	13
1:A:97:MET:O	1:A:98:ARG:HG2	0.51	2.05	16	1
1:A:44:LEU:HD12	1:A:45:THR:HG23	0.51	1.83	15	3
1:A:97:MET:O	1:A:104:CYS:N	0.51	2.43	12	1
1:A:45:THR:HA	1:A:48:PHE:HD2	0.51	1.64	8	10
1:A:9:LYS:HG2	1:A:11:ILE:HD11	0.51	1.81	20	2
1:A:44:LEU:HD21	1:A:74:PHE:CE2	0.51	2.41	12	1
1:A:48:PHE:O	1:A:50:ARG:N	0.51	2.43	16	4
1:A:14:VAL:HG11	1:A:44:LEU:HG	0.51	1.82	8	1
1:A:99:GLN:HG3	1:A:104:CYS:SG	0.51	2.46	3	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:43:LYS:HD3	1:A:46:GLN:HE21	0.51	1.65	20	1
1:A:49:LEU:HD13	1:A:54:ASP:HB3	0.51	1.81	16	1
1:A:14:VAL:HG11	1:A:44:LEU:CD2	0.50	2.36	13	2
1:A:44:LEU:HD13	1:A:45:THR:HG23	0.50	1.84	12	1
1:A:35:SER:N	1:A:39:LEU:HD23	0.50	2.21	9	12
1:A:44:LEU:C	1:A:44:LEU:HD22	0.50	2.26	12	1
1:A:53:SER:O	1:A:56:VAL:HG12	0.50	2.07	16	1
1:A:48:PHE:O	1:A:49:LEU:HD12	0.49	2.07	7	2
1:A:102:ARG:HG2	1:A:103:LEU:N	0.49	2.21	4	5
1:A:10:ALA:HB3	1:A:109:LEU:O	0.49	2.06	11	6
1:A:83:ARG:HD3	1:A:84:SER:N	0.49	2.23	7	1
1:A:29:CYS:HB3	1:A:34:TYR:O	0.49	2.06	14	5
1:A:86:GLU:HG2	1:A:88:ILE:HG12	0.49	1.84	7	1
1:A:103:LEU:HD22	1:A:103:LEU:N	0.49	2.22	19	1
1:A:29:CYS:HB3	1:A:34:TYR:C	0.49	2.28	19	5
1:A:35:SER:O	1:A:39:LEU:HG	0.49	2.08	1	10
1:A:49:LEU:HD22	1:A:49:LEU:N	0.49	2.23	9	3
1:A:94:MET:HG3	1:A:107:VAL:CG1	0.49	2.27	13	1
1:A:48:PHE:C	1:A:49:LEU:HD12	0.49	2.28	2	2
1:A:44:LEU:HA	1:A:47:PHE:CE2	0.48	2.44	19	4
1:A:90:VAL:HA	1:A:112:VAL:HG13	0.48	1.85	14	6
1:A:97:MET:O	1:A:103:LEU:HA	0.48	2.09	16	1
1:A:34:TYR:OH	1:A:83:ARG:HB3	0.48	2.09	7	1
1:A:12:PHE:HD2	1:A:21:ILE:HG21	0.48	1.69	4	8
1:A:45:THR:OG1	1:A:55:VAL:HG22	0.48	2.09	8	1
1:A:98:ARG:HA	1:A:104:CYS:H	0.47	1.69	15	4
1:A:53:SER:O	1:A:57:GLU:HG2	0.47	2.09	15	5
1:A:51:SER:HA	1:A:55:VAL:CG2	0.47	2.39	8	2
1:A:77:VAL:HG22	1:A:91:SER:HB3	0.47	1.85	20	1
1:A:86:GLU:HG3	1:A:88:ILE:HG12	0.47	1.86	6	2
1:A:49:LEU:N	1:A:49:LEU:CD1	0.47	2.75	20	6
1:A:35:SER:OG	1:A:38:ASP:HB2	0.47	2.09	6	2
1:A:35:SER:H	1:A:39:LEU:HD23	0.47	1.69	1	6
1:A:13:THR:HG23	1:A:99:GLN:HE21	0.47	1.69	13	4
1:A:76:THR:O	1:A:78:VAL:HG22	0.47	2.08	15	3
1:A:12:PHE:HZ	1:A:32:LEU:HD21	0.47	1.69	13	1
1:A:93:TRP:CZ3	1:A:108:VAL:HG11	0.47	2.45	18	1
1:A:13:THR:HG21	1:A:99:GLN:NE2	0.47	2.25	15	1
1:A:85:GLY:C	1:A:86:GLU:HG2	0.46	2.31	14	3
1:A:9:LYS:HB3	1:A:27:LYS:HD2	0.46	1.87	20	1
1:A:42:GLN:HB3	1:A:46:GLN:NE2	0.46	2.25	20	4

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:44:LEU:HD22	1:A:107:VAL:CG2	0.46	2.41	9	3
1:A:25:ASN:ND2	1:A:27:LYS:HE2	0.46	2.25	13	1
1:A:49:LEU:HD13	1:A:49:LEU:N	0.46	2.23	18	2
1:A:29:CYS:HB2	1:A:34:TYR:C	0.46	2.31	6	7
1:A:49:LEU:N	1:A:49:LEU:HD22	0.46	2.26	18	1
1:A:23:VAL:HG22	1:A:36:SER:OG	0.46	2.10	9	1
1:A:45:THR:OG1	1:A:55:VAL:HA	0.46	2.10	14	1
1:A:13:THR:HG22	1:A:22:LEU:HD12	0.45	1.88	19	2
1:A:14:VAL:HG22	1:A:105:CYS:O	0.45	2.12	20	2
1:A:44:LEU:CD2	1:A:107:VAL:HG21	0.45	2.41	19	1
1:A:31:LEU:HD22	1:A:109:LEU:HD12	0.45	1.88	15	1
1:A:18:THR:HG23	1:A:20:GLU:HB2	0.45	1.88	19	1
1:A:39:LEU:HA	1:A:42:GLN:HE21	0.45	1.71	10	1
1:A:31:LEU:HD22	1:A:31:LEU:O	0.45	2.12	1	8
1:A:97:MET:SD	1:A:99:GLN:HB2	0.45	2.52	11	1
1:A:14:VAL:HG21	1:A:19:THR:CG2	0.45	2.42	12	1
1:A:93:TRP:CD1	1:A:93:TRP:N	0.45	2.84	18	4
1:A:83:ARG:HG2	1:A:84:SER:N	0.45	2.27	18	3
1:A:48:PHE:O	1:A:49:LEU:HD22	0.44	2.12	11	2
1:A:9:LYS:O	1:A:27:LYS:HB3	0.44	2.12	11	1
1:A:103:LEU:HD13	1:A:103:LEU:N	0.44	2.26	19	1
1:A:46:GLN:HG3	1:A:55:VAL:HG21	0.44	1.89	10	1
1:A:15:ASP:OD1	1:A:102:ARG:HD3	0.44	2.12	2	4
1:A:15:ASP:OD1	1:A:22:LEU:HD21	0.44	2.13	8	1
1:A:9:LYS:HE2	1:A:108:VAL:HG11	0.44	1.89	4	1
1:A:51:SER:HA	1:A:55:VAL:CG1	0.44	2.43	19	2
1:A:103:LEU:H	1:A:103:LEU:HD22	0.44	1.73	19	1
1:A:44:LEU:CD1	1:A:45:THR:HG23	0.44	2.43	12	2
1:A:43:LYS:O	1:A:46:GLN:HB2	0.44	2.13	10	2
1:A:91:SER:O	1:A:109:LEU:HA	0.43	2.13	1	3
1:A:39:LEU:O	1:A:42:GLN:HG2	0.43	2.13	12	2
1:A:25:ASN:HD22	1:A:27:LYS:HE2	0.43	1.73	4	1
1:A:96:ARG:HG3	1:A:105:CYS:SG	0.43	2.53	16	1
1:A:49:LEU:N	1:A:80:ILE:HA	0.43	2.25	2	1
1:A:19:THR:O	1:A:20:GLU:C	0.43	2.56	11	1
1:A:74:PHE:O	1:A:74:PHE:CG	0.43	2.72	11	1
1:A:9:LYS:N	1:A:27:LYS:HD2	0.43	2.28	12	2
1:A:50:ARG:HG3	1:A:52:ASP:H	0.43	1.73	7	1
1:A:34:TYR:CE1	1:A:83:ARG:HD2	0.43	2.48	8	4
1:A:93:TRP:HE3	1:A:95:LYS:HE2	0.43	1.74	9	1
1:A:89:PRO:O	1:A:112:VAL:HG22	0.43	2.13	11	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:34:TYR:CZ	1:A:83:ARG:HB3	0.43	2.48	14	1
1:A:14:VAL:HG22	1:A:105:CYS:HB3	0.43	1.89	6	1
1:A:26:ASP:O	1:A:27:LYS:C	0.43	2.56	10	6
1:A:15:ASP:HA	1:A:104:CYS:HA	0.43	1.91	5	2
1:A:12:PHE:HD1	1:A:21:ILE:HG21	0.43	1.73	15	2
1:A:15:ASP:HB2	1:A:102:ARG:HD2	0.43	1.89	5	1
1:A:29:CYS:HB2	1:A:34:TYR:O	0.43	2.14	17	2
1:A:12:PHE:CZ	1:A:32:LEU:HD21	0.42	2.49	13	1
1:A:15:ASP:CG	1:A:22:LEU:HD21	0.42	2.34	8	1
1:A:49:LEU:HB3	1:A:79:ASP:O	0.42	2.14	12	1
1:A:50:ARG:O	1:A:54:ASP:HB2	0.42	2.13	20	1
1:A:9:LYS:HG3	1:A:10:ALA:N	0.42	2.30	19	1
1:A:14:VAL:HG23	1:A:15:ASP:O	0.42	2.15	5	5
1:A:42:GLN:HG3	1:A:47:PHE:HZ	0.42	1.75	12	1
1:A:12:PHE:HZ	1:A:32:LEU:HD11	0.42	1.73	18	1
1:A:88:ILE:N	1:A:88:ILE:HD13	0.42	2.29	2	1
1:A:32:LEU:HG	1:A:33:GLY:N	0.42	2.27	13	1
1:A:96:ARG:HB3	1:A:103:LEU:HD23	0.42	1.91	16	1
1:A:31:LEU:HD22	1:A:31:LEU:C	0.42	2.35	1	4
1:A:29:CYS:SG	1:A:30:GLY:N	0.42	2.93	16	3
1:A:51:SER:HA	1:A:55:VAL:HG23	0.42	1.90	6	1
1:A:13:THR:HG21	1:A:99:GLN:HG3	0.42	1.91	9	1
1:A:31:LEU:C	1:A:31:LEU:HD22	0.42	2.35	12	1
1:A:74:PHE:CE1	1:A:92:VAL:HG11	0.42	2.50	5	1
1:A:50:ARG:HD3	1:A:53:SER:OG	0.41	2.15	1	1
1:A:95:LYS:HG3	1:A:106:VAL:HG23	0.41	1.92	3	1
1:A:32:LEU:HD12	1:A:32:LEU:N	0.41	2.27	10	1
1:A:15:ASP:OD2	1:A:17:LYS:HB3	0.41	2.15	19	1
1:A:43:LYS:HD3	1:A:46:GLN:NE2	0.41	2.30	20	1
1:A:74:PHE:O	1:A:92:VAL:HB	0.41	2.15	5	1
1:A:14:VAL:CG2	1:A:105:CYS:HB3	0.41	2.46	6	1
1:A:21:ILE:O	1:A:40:ILE:HG12	0.41	2.15	14	1
1:A:13:THR:O	1:A:22:LEU:N	0.41	2.53	18	1
1:A:44:LEU:HD11	1:A:94:MET:HE1	0.41	1.92	2	1
1:A:12:PHE:CD2	1:A:21:ILE:HG21	0.41	2.51	5	2
1:A:104:CYS:O	1:A:104:CYS:SG	0.41	2.78	1	1
1:A:77:VAL:HG23	1:A:90:VAL:O	0.41	2.16	9	1
1:A:45:THR:OG1	1:A:55:VAL:HB	0.41	2.16	11	1
1:A:21:ILE:HG12	1:A:44:LEU:HB3	0.41	1.93	12	1
1:A:11:ILE:HD12	1:A:25:ASN:ND2	0.41	2.31	1	1
1:A:77:VAL:HA	1:A:90:VAL:O	0.41	2.16	16	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:54:ASP:HA	1:A:57:GLU:HG3	0.40	1.92	7	1
1:A:50:ARG:H	1:A:81:ILE:HD11	0.40	1.75	12	1
1:A:15:ASP:OD2	1:A:22:LEU:HD21	0.40	2.16	15	1
1:A:54:ASP:O	1:A:57:GLU:HG2	0.40	2.16	3	1
1:A:14:VAL:HG23	1:A:15:ASP:N	0.40	2.30	4	1
1:A:31:LEU:HD12	1:A:109:LEU:CD1	0.40	2.46	12	1
1:A:18:THR:O	1:A:19:THR:CB	0.40	2.68	20	1
1:A:24:ALA:O	1:A:36:SER:HB3	0.40	2.17	1	1
1:A:14:VAL:O	1:A:104:CYS:HB2	0.40	2.16	8	1
1:A:9:LYS:HD3	1:A:10:ALA:H	0.40	1.77	6	1
1:A:18:THR:OG1	1:A:20:GLU:HB2	0.40	2.15	8	1
1:A:14:VAL:O	1:A:104:CYS:HB3	0.40	2.16	12	1
1:A:96:ARG:O	1:A:97:MET:HB3	0.40	2.17	20	1
1:A:98:ARG:CD	1:A:98:ARG:N	0.40	2.85	20	1

6.3 Torsion angles (i)

6.3.1 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 PDB entries followed by that with respect to all NMR entries. 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	89/114 (78%)	65±2 (73±2%)	19±2 (21±2%)	5±2 (6±2%)	3	21
All	All	1780/2280 (78%)	1303 (73%)	372 (21%)	105 (6%)	3	21

All 15 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	33	GLY	20
1	A	49	LEU	17
1	A	50	ARG	14
1	A	19	THR	11
1	A	20	GLU	11
1	A	9	LYS	6
1	A	103	LEU	5
1	A	99	GLN	4

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Mol	Chain	Res	Type	Models (Total)
1	A	21	ILE	4
1	A	98	ARG	4
1	A	87	LYS	3
1	A	100	GLU	3
1	A	75	GLY	1
1	A	101	ARG	1
1	A	97	MET	1

6.3.2 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 PDB entries followed by that with respect to all NMR entries. 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	79/98 (81%)	45±3 (57±4%)	34±3 (43±4%)	0 3
All	All	1580/1960 (81%)	908 (57%)	672 (43%)	0 3

All 65 unique residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	21	ILE	20
1	A	40	ILE	20
1	A	47	PHE	20
1	A	49	LEU	20
1	A	83	ARG	20
1	A	93	TRP	20
1	A	105	CYS	20
1	A	32	LEU	19
1	A	44	LEU	19
1	A	109	LEU	19
1	A	76	THR	19
1	A	31	LEU	18
1	A	95	LYS	18
1	A	107	VAL	18
1	A	9	LYS	17
1	A	14	VAL	17
1	A	23	VAL	17
1	A	96	ARG	17

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Mol	Chain	Res	Type	Models (Total)
1	A	36	SER	16
1	A	29	CYS	15
1	A	57	GLU	15
1	A	82	SER	15
1	A	87	LYS	15
1	A	52	ASP	15
1	A	102	ARG	15
1	A	27	LYS	13
1	A	81	ILE	13
1	A	103	LEU	12
1	A	43	LYS	11
1	A	46	GLN	10
1	A	100	GLU	10
1	A	98	ARG	10
1	A	17	LYS	9
1	A	37	GLN	9
1	A	104	CYS	9
1	A	79	ASP	9
1	A	54	ASP	8
1	A	101	ARG	7
1	A	50	ARG	6
1	A	55	VAL	6
1	A	26	ASP	6
1	A	99	GLN	6
1	A	18	THR	6
1	A	97	MET	5
1	A	19	THR	5
1	A	91	SER	5
1	A	94	MET	5
1	A	15	ASP	5
1	A	20	GLU	4
1	A	42	GLN	4
1	A	110	GLU	4
1	A	38	ASP	4
1	A	88	ILE	3
1	A	90	VAL	3
1	A	74	PHE	3
1	A	86	GLU	3
1	A	106	VAL	2
1	A	56	VAL	2
1	A	84	SER	2
1	A	45	THR	2

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Mol	Chain	Res	Type	Models (Total)
1	A	22	LEU	2
1	A	80	ILE	2
1	A	51	SER	1
1	A	78	VAL	1
1	A	108	VAL	1

6.3.3 RNA

There are no RNA molecules in this entry.

6.4 Non-standard residues in protein, DNA, RNA chains

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

6.5 Carbohydrates

There are no monosaccharides in this entry.

6.6 Ligand geometry

There are no ligands in this entry.

6.7 Other polymers

There are no such molecules in this entry.

6.8 Polymer linkage issues

There are no chain breaks in this entry.

7 Chemical shift validation

The completeness of assignment taking into account all chemical shift lists is 93% for the well-defined parts and 92% for the entire structure.

7.1 Chemical shift list 1

File name: working_cs.cif

Chemical shift list name: *assigned_chem_shift_list_1*

7.1.1 Bookkeeping

The following table shows the results of parsing the chemical shift list and reports the number of nuclei with statistically unusual chemical shifts.

Total number of shifts	1430
Number of shifts mapped to atoms	1430
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	0

7.1.2 Chemical shift referencing

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction ± precision, *ppm*	Suggested action
$^{13}C_{\alpha}$	112	-0.45 ± 0.12	None needed (< 0.5 ppm)
$^{13}C_{\beta}$	106	0.08 ± 0.10	None needed (< 0.5 ppm)
$^{13}C'$	105	-0.18 ± 0.08	None needed (< 0.5 ppm)
^{15}N	108	0.16 ± 0.36	None needed (< 0.5 ppm)

7.1.3 Completeness of resonance assignments

The following table shows the completeness of the chemical shift assignments for the well-defined regions of the structure. The overall completeness is 93%, i.e. 1154 atoms were assigned a chemical shift out of a possible 1237. 0 out of 20 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	435/446 (98%)	178/181 (98%)	172/178 (97%)	85/87 (98%)
Sidechain	660/730 (90%)	446/477 (94%)	205/224 (92%)	9/29 (31%)

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	Total	^{1}H	^{13}C	^{15}N
Aromatic	59/61 (97%)	30/30 (100%)	28/30 (93%)	1/1 (100%)
Overall	1154/1237 (93%)	654/688 (95%)	405/432 (94%)	95/117 (81%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 92%, i.e. 1430 atoms were assigned a chemical shift out of a possible 1546. 0 out of 23 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^{1}H	^{13}C	^{15}N
Backbone	551/571 (96%)	226/232 (97%)	217/228 (95%)	108/111 (97%)
Sidechain	804/888 (91%)	544/579 (94%)	249/276 (90%)	11/33 (33%)
Aromatic	75/87 (86%)	38/43 (88%)	36/39 (92%)	1/5 (20%)
Overall	1430/1546 (92%)	808/854 (95%)	502/543 (92%)	120/149 (81%)

7.1.4 Statistically unusual chemical shifts (i)

There are no statistically unusual chemical shifts.

7.1.5 Random Coil Index (RCI) plots (i)

The image below reports *random coil index* values for the protein chains in the structure. The height of each bar gives a probability of a given residue to be disordered, as predicted from the available chemical shifts and the amino acid sequence. A value above 0.2 is an indication of significant predicted disorder. The colour of the bar shows whether the residue is in the well-defined core (black) or in the ill-defined residue ranges (cyan), as described in section 2 on ensemble composition.If well-defined core and ill-defined regions are not identified then it is shown as gray bars.

Random coil index (RCI) for chain A: