Full wwPDB NMR Structure Validation Report (i)

Feb 16, 2022 – 08:14 AM EST

PDB ID	:	1MO7
Title	:	ATPase
Authors	:	Hilge, M.; Siegal, G.; Vuister, G.W.; Guentert, P.; Gloor, S.M.; Abrahams, J.P.
Deposited on	:	2002-09-08

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 following versions of software and data (see references (i)) were used in the production of this report:

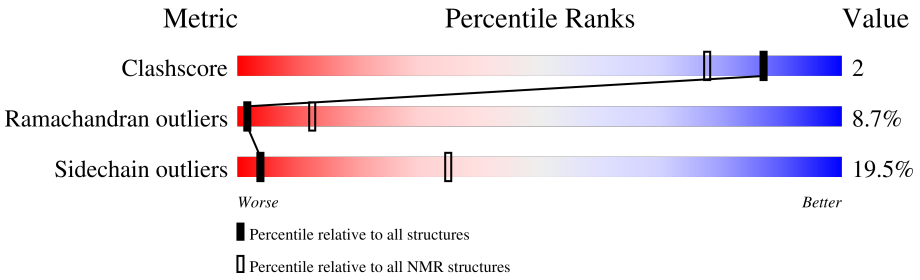
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
ShiftChecker	:	2.26
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.26

1 Overall quality at a glance (i)

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

The overall completeness of chemical shifts assignment was not calculated.

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	213	64% 17% · 17%

2 Ensemble composition and analysis

This entry contains 20 models. Model 3 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *lowest energy*.

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:386-A:398, A:416-A:434, A:442-A:481, A:487-A:546, A:552-A:595 (176)	0.54	3

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 4 clusters and 5 single-model clusters were found.

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

3 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 3303 atoms, of which 1632 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Sodium/Potassium-transporting ATPase alpha-1 chain.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	213	3303	1056	1632	282	320	13	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	385	PRO	ARG	cloning artifact	UNP P06685

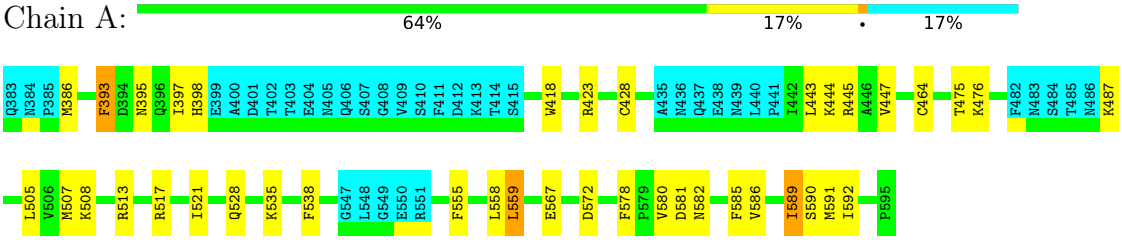
4 Residue-property plots

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: Sodium/Potassium-transporting ATPase alpha-1 chain

Chain A:



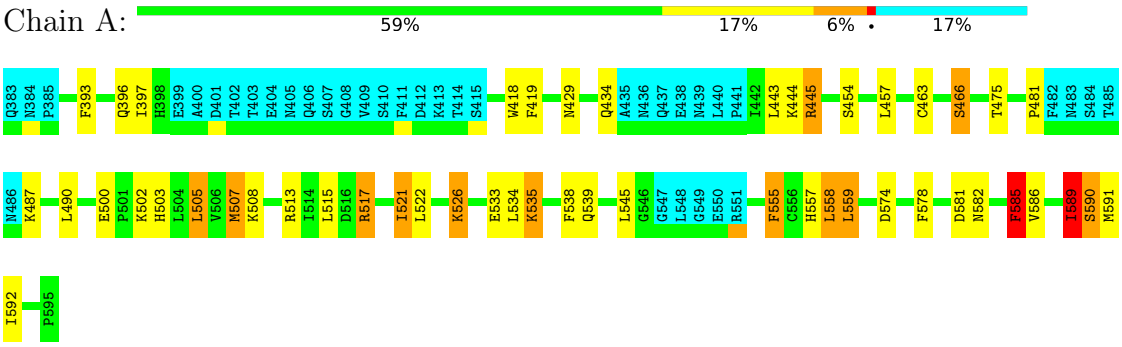
4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

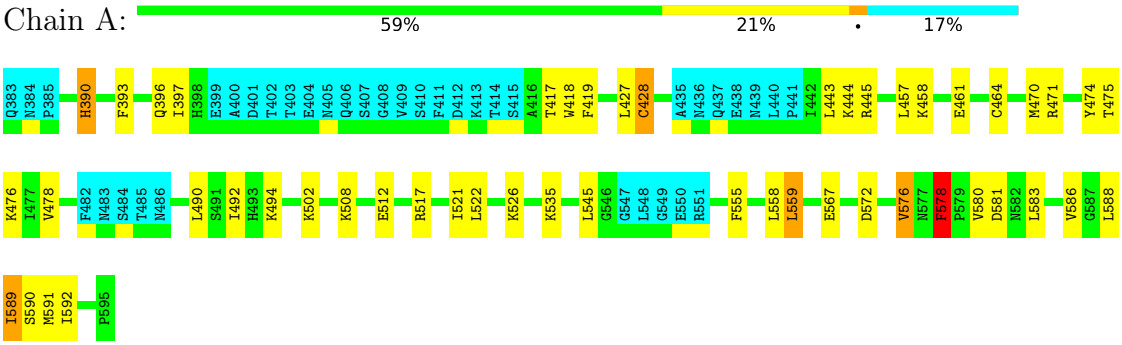
• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain

Chain A:



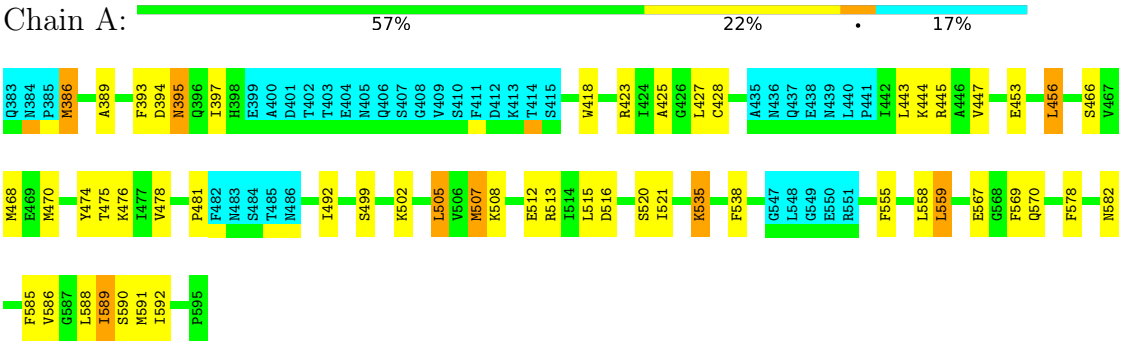
4.2.2 Score per residue for model 2

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



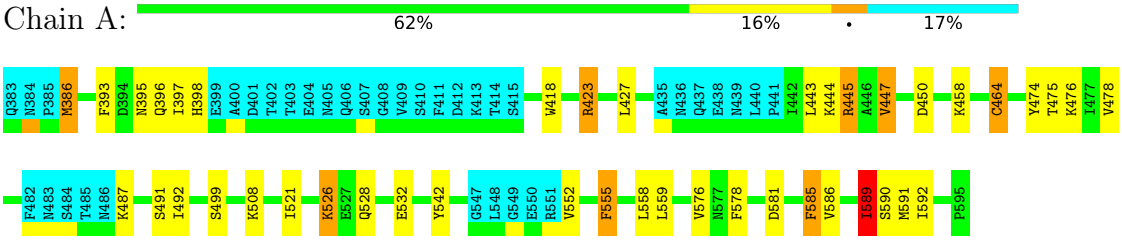
4.2.3 Score per residue for model 3 (medoid)

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



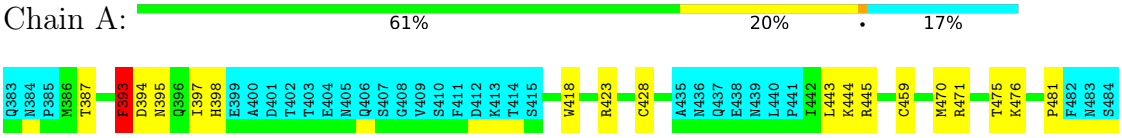
4.2.4 Score per residue for model 4

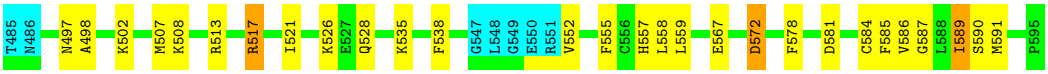
• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



4.2.5 Score per residue for model 5

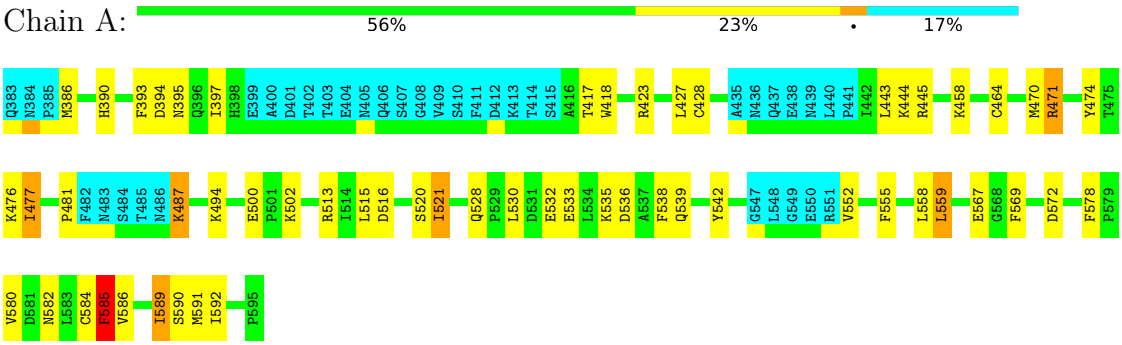
• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain





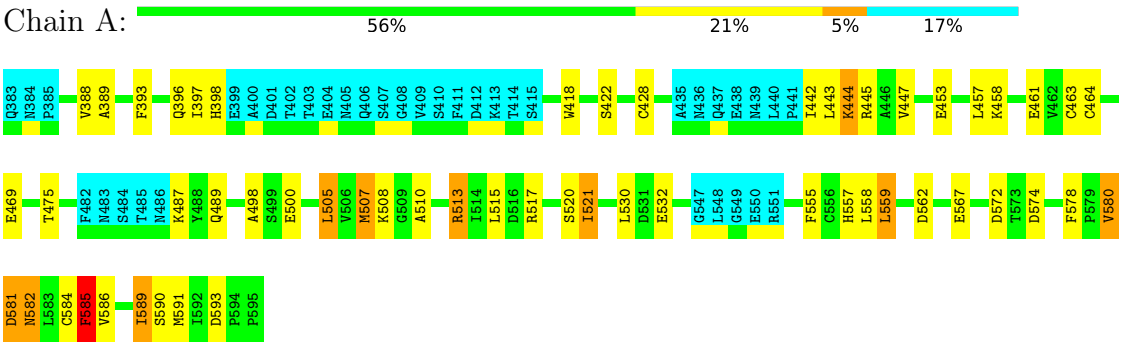
4.2.6 Score per residue for model 6

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



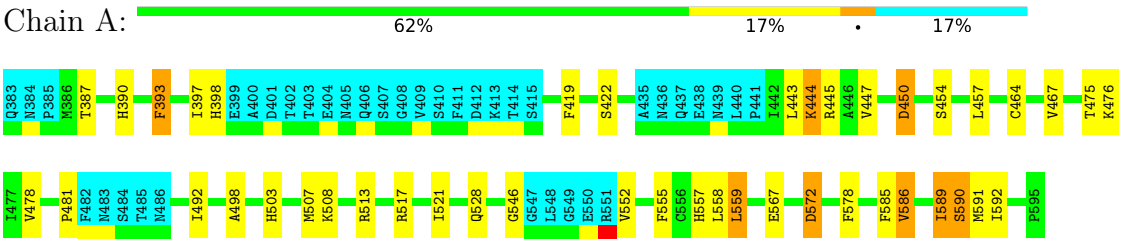
4.2.7 Score per residue for model 7

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



4.2.8 Score per residue for model 8

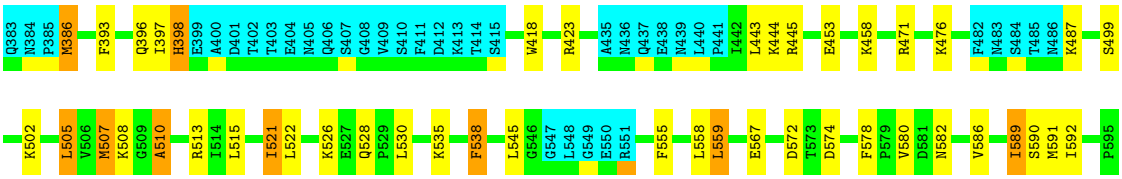
• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



4.2.9 Score per residue for model 9

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain

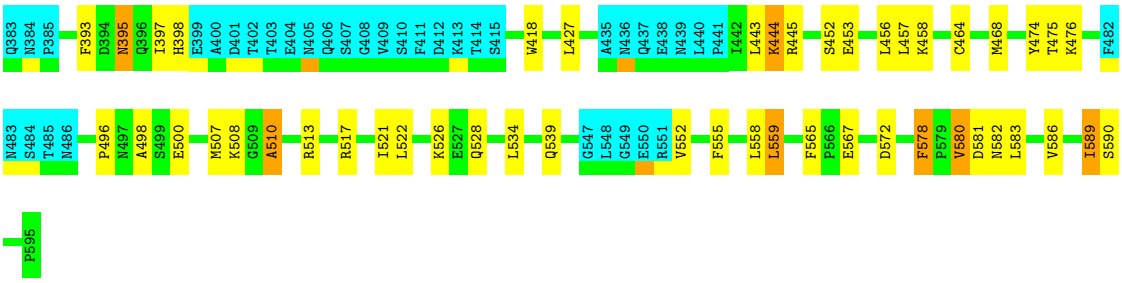
Chain A: 62% 17% 17%



4.2.10 Score per residue for model 10

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain

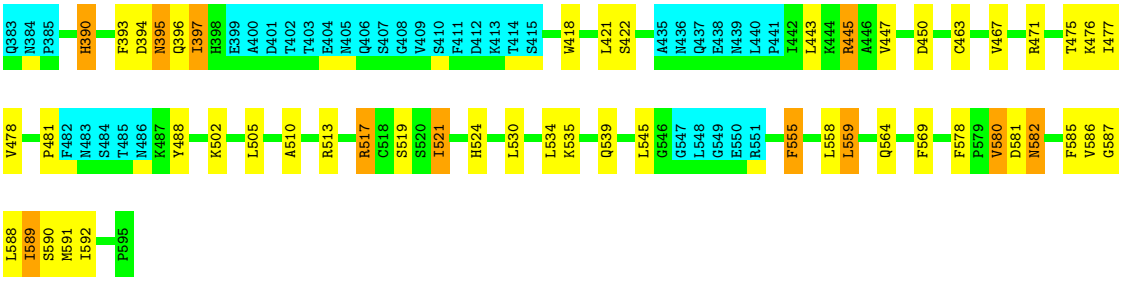
Chain A: 60% 19% 17%



4.2.11 Score per residue for model 11

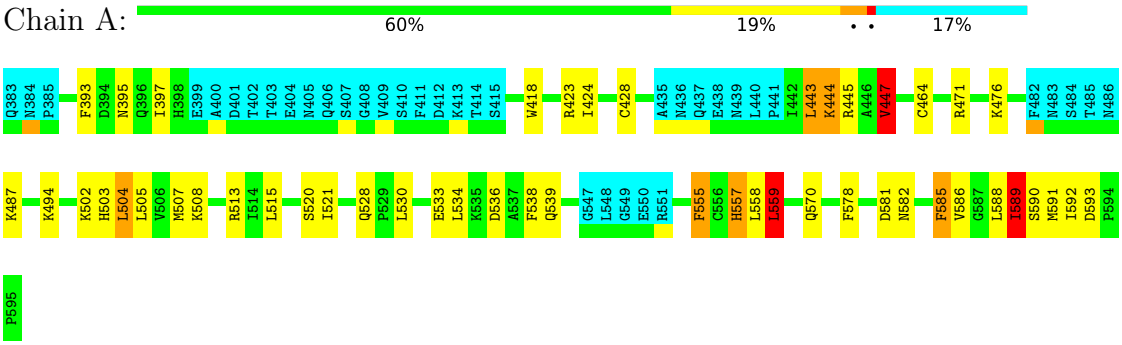
• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain

Chain A: 58% 19% 5% 17%



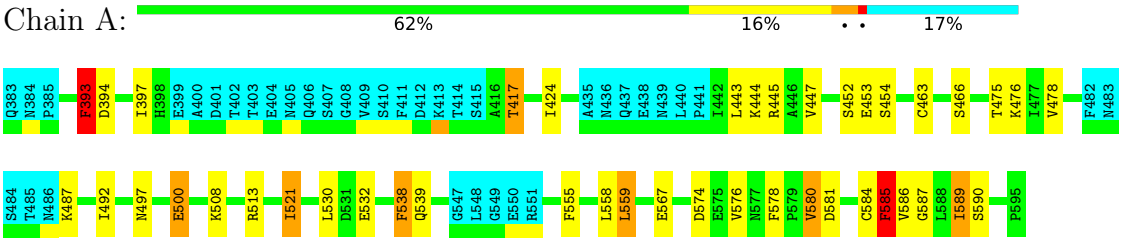
4.2.12 Score per residue for model 12

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



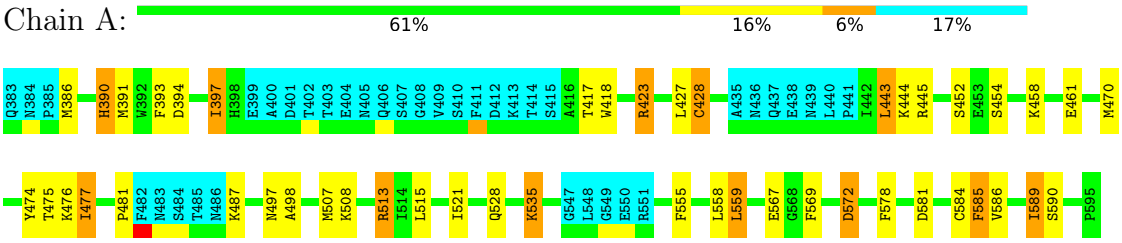
4.2.13 Score per residue for model 13

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



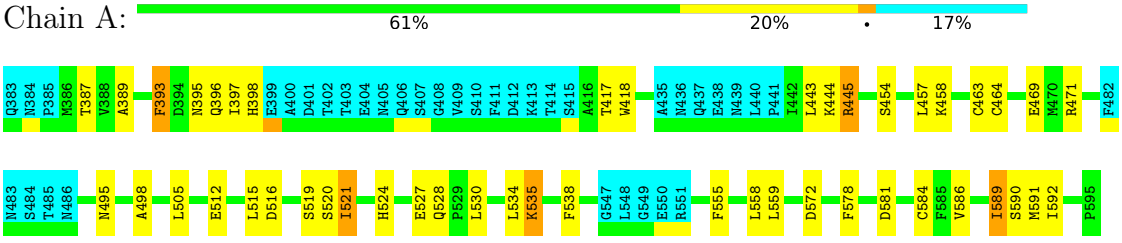
4.2.14 Score per residue for model 14

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



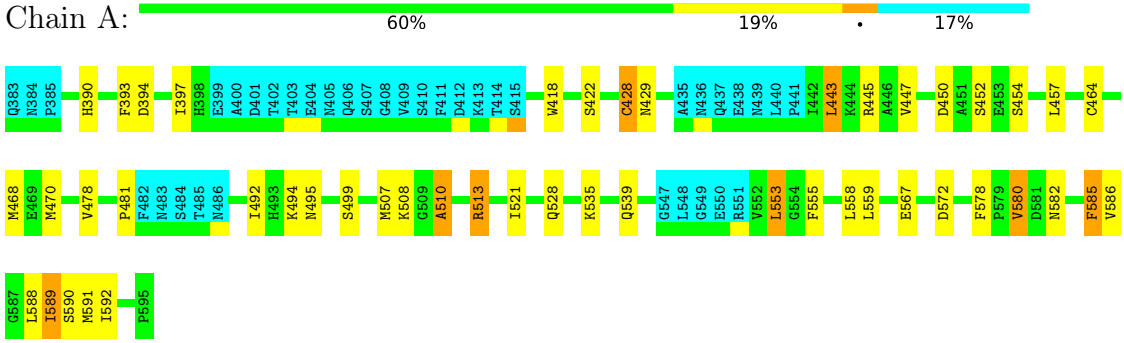
4.2.15 Score per residue for model 15

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



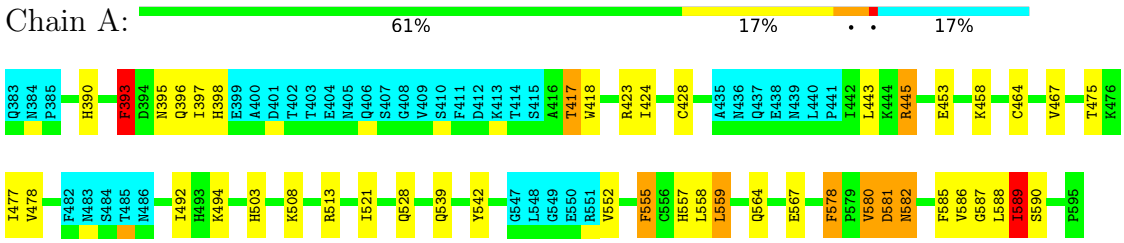
4.2.16 Score per residue for model 16

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



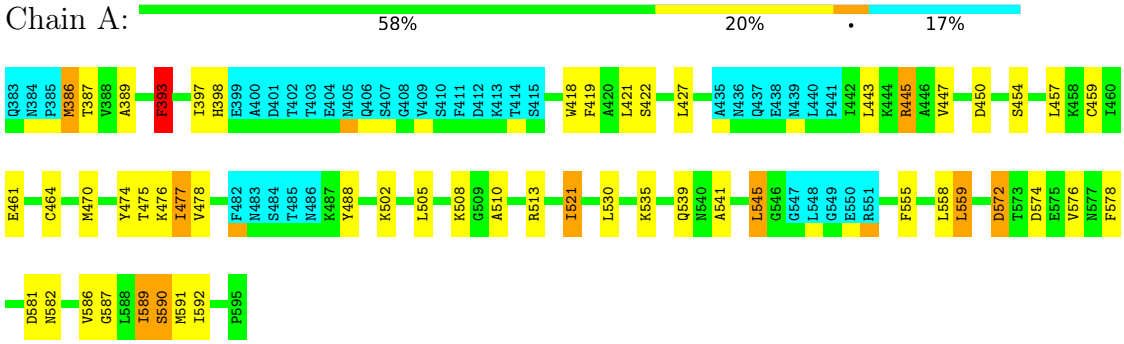
4.2.17 Score per residue for model 17

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



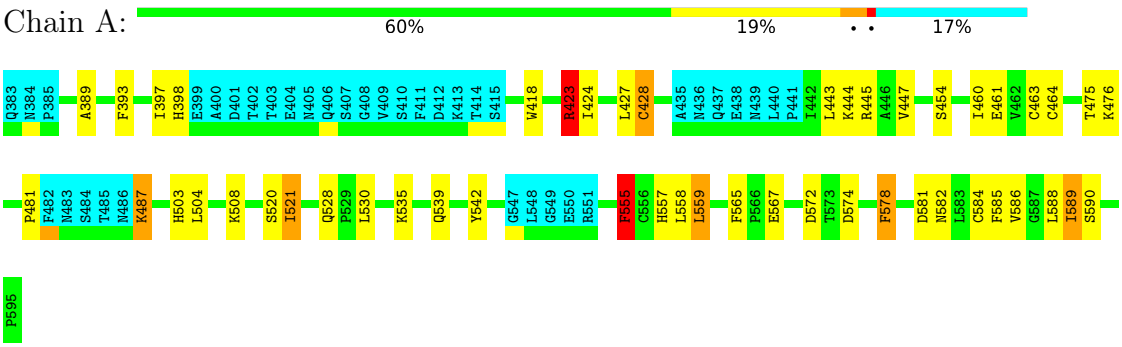
4.2.18 Score per residue for model 18

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



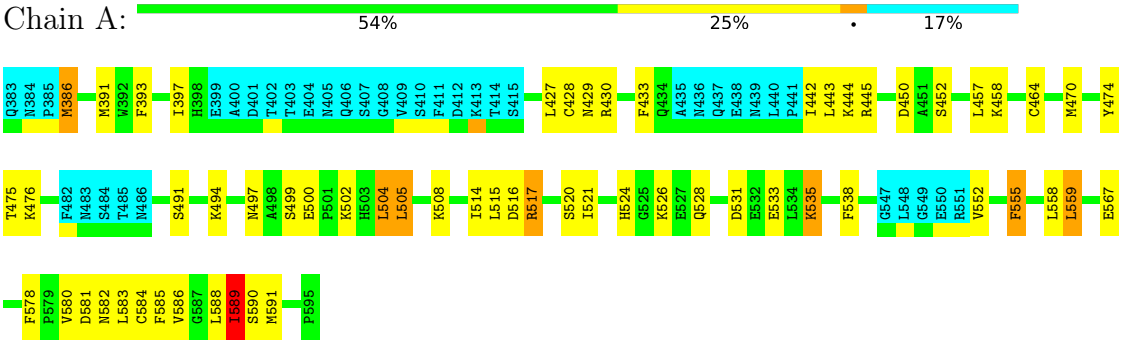
4.2.19 Score per residue for model 19

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



4.2.20 Score per residue for model 20

• Molecule 1: Sodium/Potassium-transporting ATPase alpha-1 chain



5 Refinement protocol and experimental data overview

The models were refined using the following method: *automated NOESY cross peak assignment.*

Of the 200 calculated structures, 20 were deposited, based on the following criterion: *structures with the lowest energy,target function.*

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

Software name	Classification	Version
CYANA	structure solution	1.0.5
OPALp	refinement	1.0

No chemical shift data was provided.

6 Model quality (i)

6.1 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 (average) 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±0.01	0±0/1423 (0.0± 0.0%)	1.14±0.03	2±1/1926 (0.1± 0.1%)
All	All	0.59	0/28460 (0.0%)	1.14	30/38520 (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	Planarity
1	A	0.0±0.0	2.5±1.0
All	All	0	50

There are no bond-length outliers.

All unique angle outliers are listed below. They are sorted according to the Z-score of the worst occurrence in the ensemble.

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})	Models	
								Worst	Total
1	A	393	PHE	CB-CG-CD2	-7.79	115.35	120.80	17	3
1	A	423	ARG	CD-NE-CZ	6.70	132.97	123.60	19	1
1	A	588	LEU	CB-CA-C	6.63	122.79	110.20	11	2
1	A	513	ARG	NE-CZ-NH2	-6.43	117.08	120.30	7	3
1	A	445	ARG	NE-CZ-NH1	6.23	123.42	120.30	15	2
1	A	471	ARG	NE-CZ-NH2	-5.98	117.31	120.30	12	1
1	A	447	VAL	CA-CB-CG1	5.88	119.72	110.90	12	1
1	A	517	ARG	NE-CZ-NH2	-5.84	117.38	120.30	1	2
1	A	578	PHE	CB-CG-CD2	-5.53	116.93	120.80	2	3
1	A	419	PHE	CB-CG-CD2	-5.49	116.96	120.80	1	1
1	A	513	ARG	NE-CZ-NH1	5.46	123.03	120.30	7	1
1	A	428	CYS	CA-CB-SG	-5.33	104.41	114.00	2	1
1	A	423	ARG	NE-CZ-NH1	5.30	122.95	120.30	14	1
1	A	517	ARG	CD-NE-CZ	5.22	130.91	123.60	7	1
1	A	423	ARG	NE-CZ-NH2	-5.12	117.74	120.30	6	3

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})	Models	
								Worst	Total
1	A	585	PHE	CB-CG-CD2	-5.10	117.23	120.80	7	2
1	A	578	PHE	CB-CG-CD1	5.09	124.37	120.80	17	1
1	A	488	TYR	CB-CG-CD2	-5.01	117.99	121.00	11	1

There are no chirality outliers.

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

Mol	Chain	Res	Type	Group	Models (Total)
1	A	582	ASN	Peptide	10
1	A	585	PHE	Peptide,Sidechain	7
1	A	517	ARG	Sidechain	6
1	A	513	ARG	Sidechain	5
1	A	471	ARG	Sidechain	3
1	A	587	GLY	Peptide	3
1	A	503	HIS	Sidechain	2
1	A	526	LYS	Peptide	2
1	A	542	TYR	Sidechain	2
1	A	423	ARG	Sidechain	2
1	A	565	PHE	Sidechain	2
1	A	445	ARG	Sidechain	1
1	A	569	PHE	Sidechain	1
1	A	581	ASP	Mainchain	1
1	A	390	HIS	Sidechain	1
1	A	488	TYR	Peptide	1
1	A	430	ARG	Sidechain	1

6.2 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 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	1391	1384	1384	6±2
All	All	27820	27680	27680	110

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 2.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:423:ARG:CZ	1:A:427:LEU:HD13	0.60	2.27	19	1
1:A:514:ILE:HG23	1:A:517:ARG:NH1	0.59	2.11	20	1
1:A:397:ILE:HD11	1:A:541:ALA:HA	0.56	1.77	18	1
1:A:555:PHE:CD2	1:A:589:ILE:HD11	0.56	2.36	20	3
1:A:395:ASN:HD21	1:A:534:LEU:HD22	0.55	1.60	10	2
1:A:427:LEU:HD21	1:A:474:TYR:CD1	0.54	2.37	3	7
1:A:515:LEU:HD11	1:A:535:LYS:HG3	0.53	1.81	1	5
1:A:521:ILE:HB	1:A:530:LEU:HD13	0.53	1.80	6	8
1:A:515:LEU:HD13	1:A:585:PHE:CZ	0.52	2.39	3	2
1:A:515:LEU:HD13	1:A:585:PHE:CE2	0.52	2.39	7	3
1:A:478:VAL:CG2	1:A:492:ILE:HD12	0.52	2.35	13	7
1:A:504:LEU:HD12	1:A:505:LEU:N	0.52	2.20	12	2
1:A:555:PHE:CE2	1:A:589:ILE:HD11	0.51	2.41	17	3
1:A:510:ALA:HB3	1:A:513:ARG:HG2	0.51	1.82	9	4
1:A:477:ILE:HD12	1:A:569:PHE:HB2	0.51	1.82	6	2
1:A:505:LEU:HD22	1:A:558:LEU:HG	0.50	1.83	1	1
1:A:393:PHE:CD1	1:A:417:THR:HG21	0.50	2.42	15	1
1:A:393:PHE:CE2	1:A:421:LEU:HD13	0.50	2.41	18	1
1:A:505:LEU:HD21	1:A:507:MET:SD	0.50	2.47	3	4
1:A:393:PHE:CZ	1:A:417:THR:HG22	0.50	2.42	13	2
1:A:425:ALA:HB1	1:A:456:LEU:CD1	0.49	2.36	3	1
1:A:522:LEU:HD13	1:A:526:LYS:O	0.49	2.06	2	4
1:A:538:PHE:CD1	1:A:585:PHE:CZ	0.49	3.00	6	2
1:A:555:PHE:CD1	1:A:589:ILE:HD11	0.49	2.43	1	1
1:A:443:LEU:HD23	1:A:444:LYS:N	0.49	2.23	12	1
1:A:557:HIS:NE2	1:A:586:VAL:HG21	0.49	2.23	8	1
1:A:427:LEU:HD23	1:A:470:MET:HB3	0.48	1.84	2	6
1:A:477:ILE:HG22	1:A:478:VAL:HG22	0.48	1.85	11	2
1:A:515:LEU:HD22	1:A:538:PHE:CE1	0.48	2.44	9	1
1:A:390:HIS:CD2	1:A:397:ILE:HG23	0.48	2.44	14	1
1:A:390:HIS:CD2	1:A:391:MET:H	0.48	2.26	14	1
1:A:423:ARG:NH2	1:A:427:LEU:HD13	0.48	2.23	19	1
1:A:421:LEU:HD13	1:A:587:GLY:CA	0.47	2.39	11	1
1:A:393:PHE:CE2	1:A:417:THR:HG22	0.47	2.45	13	2
1:A:555:PHE:CD1	1:A:555:PHE:N	0.47	2.81	19	1
1:A:552:VAL:HG22	1:A:590:SER:OG	0.47	2.09	8	1
1:A:395:ASN:ND2	1:A:534:LEU:HD22	0.47	2.25	10	2
1:A:427:LEU:HD11	1:A:474:TYR:CZ	0.46	2.45	10	1
1:A:545:LEU:HD13	1:A:590:SER:CB	0.45	2.42	18	1
1:A:576:VAL:CG1	1:A:578:PHE:CD2	0.44	3.00	2	1
1:A:387:THR:HG23	1:A:389:ALA:H	0.44	1.71	18	1

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:578:PHE:CZ	1:A:580:VAL:CG1	0.44	3.01	10	1
1:A:530:LEU:HA	1:A:534:LEU:HD12	0.44	1.89	12	1
1:A:423:ARG:NE	1:A:427:LEU:HD13	0.44	2.28	19	1
1:A:393:PHE:CD2	1:A:587:GLY:HA3	0.43	2.48	18	1
1:A:557:HIS:CE1	1:A:559:LEU:HD21	0.43	2.49	12	1
1:A:545:LEU:HD13	1:A:590:SER:HB3	0.43	1.90	1	1
1:A:390:HIS:CE1	1:A:397:ILE:HG23	0.43	2.48	11	1
1:A:505:LEU:HD23	1:A:505:LEU:C	0.43	2.33	1	1
1:A:428:CYS:SG	1:A:508:LYS:HE2	0.42	2.53	16	1
1:A:443:LEU:CD2	1:A:445:ARG:H	0.42	2.27	9	1
1:A:443:LEU:HD23	1:A:444:LYS:HA	0.42	1.90	12	1
1:A:443:LEU:HD23	1:A:444:LYS:CA	0.41	2.45	12	1
1:A:433:PHE:CZ	1:A:442:ILE:HD11	0.41	2.50	20	1
1:A:490:LEU:HD21	1:A:578:PHE:CE2	0.41	2.51	2	1
1:A:443:LEU:HD22	1:A:445:ARG:H	0.41	1.75	16	1
1:A:521:ILE:HG21	1:A:534:LEU:HD13	0.40	1.92	1	1
1:A:423:ARG:HH21	1:A:557:HIS:CE1	0.40	2.34	17	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	175/213 (82%)	127±5 (73±3%)	32±6 (18±3%)	15±2 (9±1%)	1 12
All	All	3500/4260 (82%)	2549 (73%)	645 (18%)	306 (9%)	1 12

All 47 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	393	PHE	20
1	A	555	PHE	20
1	A	586	VAL	20
1	A	589	ILE	20
1	A	590	SER	20

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Models (Total)
1	A	397	ILE	19
1	A	559	LEU	16
1	A	444	LYS	15
1	A	464	CYS	13
1	A	581	ASP	12
1	A	502	LYS	10
1	A	481	PRO	9
1	A	580	VAL	9
1	A	572	ASP	9
1	A	428	CYS	8
1	A	396	GLN	7
1	A	487	LYS	6
1	A	386	MET	6
1	A	552	VAL	6
1	A	498	ALA	6
1	A	395	ASN	5
1	A	576	VAL	4
1	A	389	ALA	4
1	A	499	SER	4
1	A	445	ARG	4
1	A	477	ILE	4
1	A	510	ALA	4
1	A	500	GLU	3
1	A	466	SER	2
1	A	390	HIS	2
1	A	447	VAL	2
1	A	398	HIS	2
1	A	459	CYS	1
1	A	388	VAL	1
1	A	442	ILE	1
1	A	387	THR	1
1	A	450	ASP	1
1	A	503	HIS	1
1	A	546	GLY	1
1	A	496	PRO	1
1	A	524	HIS	1
1	A	443	LEU	1
1	A	452	SER	1
1	A	463	CYS	1
1	A	553	LEU	1
1	A	460	ILE	1
1	A	497	ASN	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	154/186 (83%)	124±4 (80±2%)	30±4 (20±2%)	4 35
All	All	3080/3720 (83%)	2479 (80%)	601 (20%)	4 35

All 98 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	521	ILE	20
1	A	558	LEU	20
1	A	559	LEU	20
1	A	578	PHE	20
1	A	589	ILE	20
1	A	443	LEU	19
1	A	418	TRP	17
1	A	445	ARG	17
1	A	508	LYS	16
1	A	475	THR	15
1	A	591	MET	15
1	A	476	LYS	15
1	A	567	GLU	14
1	A	535	LYS	13
1	A	528	GLN	13
1	A	585	PHE	12
1	A	592	ILE	11
1	A	507	MET	10
1	A	539	GLN	10
1	A	458	LYS	10
1	A	447	VAL	10
1	A	457	LEU	9
1	A	454	SER	8
1	A	505	LEU	8
1	A	538	PHE	8
1	A	398	HIS	8
1	A	584	CYS	8
1	A	572	ASP	7
1	A	394	ASP	7

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Models (Total)
1	A	520	SER	7
1	A	574	ASP	6
1	A	582	ASN	6
1	A	494	LYS	6
1	A	588	LEU	6
1	A	386	MET	6
1	A	453	GLU	6
1	A	513	ARG	6
1	A	450	ASP	6
1	A	580	VAL	6
1	A	557	HIS	5
1	A	390	HIS	5
1	A	428	CYS	5
1	A	461	GLU	5
1	A	487	LYS	5
1	A	422	SER	5
1	A	463	CYS	4
1	A	500	GLU	4
1	A	533	GLU	4
1	A	545	LEU	4
1	A	581	ASP	4
1	A	395	ASN	4
1	A	423	ARG	4
1	A	516	ASP	4
1	A	444	LYS	4
1	A	532	GLU	4
1	A	471	ARG	4
1	A	417	THR	4
1	A	452	SER	4
1	A	424	ILE	4
1	A	429	ASN	3
1	A	512	GLU	3
1	A	583	LEU	3
1	A	468	MET	3
1	A	526	LYS	3
1	A	393	PHE	3
1	A	497	ASN	3
1	A	467	VAL	3
1	A	504	LEU	3
1	A	466	SER	2
1	A	456	LEU	2
1	A	570	GLN	2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Models (Total)
1	A	491	SER	2
1	A	387	THR	2
1	A	470	MET	2
1	A	536	ASP	2
1	A	469	GLU	2
1	A	593	ASP	2
1	A	419	PHE	2
1	A	517	ARG	2
1	A	519	SER	2
1	A	555	PHE	2
1	A	564	GLN	2
1	A	503	HIS	2
1	A	495	ASN	2
1	A	524	HIS	2
1	A	434	GLN	1
1	A	490	LEU	1
1	A	464	CYS	1
1	A	489	GLN	1
1	A	562	ASP	1
1	A	569	PHE	1
1	A	396	GLN	1
1	A	527	GLU	1
1	A	553	LEU	1
1	A	459	CYS	1
1	A	391	MET	1
1	A	499	SER	1
1	A	531	ASP	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

No chemical shift data were provided