



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 18, 2026 – 12:26 AM UTC

PDB ID : 5BW9 / pdb_00005bw9
Title : Crystal Structure of Yeast V1-ATPase in the Autoinhibited Form
Authors : Oot, R.A.; Kane, P.M.; Berry, E.A.; Wilkens, S.
Deposited on : 2015-06-06
Resolution : 7.00 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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

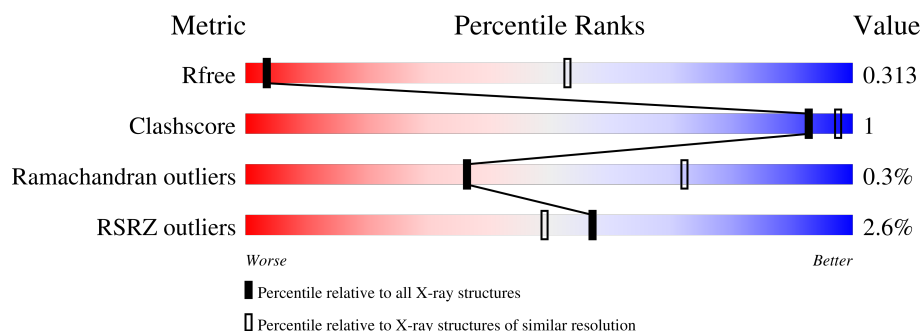
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 7.00 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	1167 (10.00-4.00)
Clashscore	190562	1007 (9.70-4.04)
Ramachandran outliers	187476	1054 (10.00-4.00)
RSRZ outliers	180081	1161 (10.00-4.00)

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	617	3% 91% 5% .
1	B	617	2% 92% . .
1	C	617	3% 92% . 5%
1	a	617	5% 91% 5% .
1	b	617	% 91% . 5%
1	c	617	2% 92% . 5%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	D	517	
2	E	517	
2	F	517	
2	d	517	
2	e	517	
2	f	517	
3	H	478	
3	h	478	
4	G	256	
4	g	256	
5	J	122	
5	L	122	
5	N	122	
5	j	122	
5	l	122	
5	n	122	
6	I	233	
6	K	233	
6	M	233	
6	i	233	
6	k	233	
6	m	233	

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 44760 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 V-type proton ATPase catalytic subunit A.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
1	A	591	Total	C	N	O	0	0	0
			2905	1723	591	591			
1	B	594	Total	C	N	O	0	0	0
			2920	1732	594	594			
1	C	589	Total	C	N	O	0	0	0
			2895	1717	589	589			
1	a	591	Total	C	N	O	0	0	0
			2905	1723	591	591			
1	b	589	Total	C	N	O	0	0	0
			2895	1717	589	589			
1	c	586	Total	C	N	O	0	0	0
			2880	1708	586	586			

- Molecule 2 is a protein called V-type proton ATPase subunit B.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	D	457	Total	C	N	O	0	0	0
			2250	1336	457	457			
2	E	453	Total	C	N	O	0	0	0
			2231	1325	453	453			
2	F	449	Total	C	N	O	0	0	0
			2211	1313	449	449			
2	d	460	Total	C	N	O	0	0	0
			2265	1345	460	460			
2	e	456	Total	C	N	O	0	0	0
			2245	1333	456	456			
2	f	449	Total	C	N	O	0	0	0
			2212	1314	449	449			

- Molecule 3 is a protein called V-type proton ATPase subunit H.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	H	445	Total	C	N	O	0	0	0
			2212	1322	445	445			
3	h	444	Total	C	N	O	0	0	0
			2208	1320	444	444			

- Molecule 4 is a protein called V-type proton ATPase subunit D.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	G	139	Total	C	N	O	0	0	0
			691	413	139	139			
4	g	141	Total	C	N	O	0	0	0
			701	419	141	141			

- Molecule 5 is a protein called V-type proton ATPase subunit G.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
5	J	104	Total	C	N	O	0	0	0
			514	306	104	104			
5	L	68	Total	C	N	O	0	0	0
			335	199	68	68			
5	N	81	Total	C	N	O	0	0	0
			400	238	81	81			
5	j	101	Total	C	N	O	0	0	0
			499	297	101	101			
5	l	66	Total	C	N	O	0	0	0
			325	193	66	66			
5	n	58	Total	C	N	O	0	0	0
			288	172	58	58			

There are 54 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
J	-7	MET	-	initiating methionine	UNP P48836
J	-6	ASP	-	expression tag	UNP P48836
J	-5	TYR	-	expression tag	UNP P48836
J	-4	LYS	-	expression tag	UNP P48836
J	-3	ASP	-	expression tag	UNP P48836
J	-2	ASP	-	expression tag	UNP P48836
J	-1	ASP	-	expression tag	UNP P48836
J	0	ASP	-	expression tag	UNP P48836
J	1	LYS	-	expression tag	UNP P48836
L	-7	MET	-	initiating methionine	UNP P48836
L	-6	ASP	-	expression tag	UNP P48836

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
L	-5	TYR	-	expression tag	UNP P48836
L	-4	LYS	-	expression tag	UNP P48836
L	-3	ASP	-	expression tag	UNP P48836
L	-2	ASP	-	expression tag	UNP P48836
L	-1	ASP	-	expression tag	UNP P48836
L	0	ASP	-	expression tag	UNP P48836
L	1	LYS	-	expression tag	UNP P48836
N	-7	MET	-	initiating methionine	UNP P48836
N	-6	ASP	-	expression tag	UNP P48836
N	-5	TYR	-	expression tag	UNP P48836
N	-4	LYS	-	expression tag	UNP P48836
N	-3	ASP	-	expression tag	UNP P48836
N	-2	ASP	-	expression tag	UNP P48836
N	-1	ASP	-	expression tag	UNP P48836
N	0	ASP	-	expression tag	UNP P48836
N	1	LYS	-	expression tag	UNP P48836
j	-7	MET	-	initiating methionine	UNP P48836
j	-6	ASP	-	expression tag	UNP P48836
j	-5	TYR	-	expression tag	UNP P48836
j	-4	LYS	-	expression tag	UNP P48836
j	-3	ASP	-	expression tag	UNP P48836
j	-2	ASP	-	expression tag	UNP P48836
j	-1	ASP	-	expression tag	UNP P48836
j	0	ASP	-	expression tag	UNP P48836
j	1	LYS	-	expression tag	UNP P48836
l	-7	MET	-	initiating methionine	UNP P48836
l	-6	ASP	-	expression tag	UNP P48836
l	-5	TYR	-	expression tag	UNP P48836
l	-4	LYS	-	expression tag	UNP P48836
l	-3	ASP	-	expression tag	UNP P48836
l	-2	ASP	-	expression tag	UNP P48836
l	-1	ASP	-	expression tag	UNP P48836
l	0	ASP	-	expression tag	UNP P48836
l	1	LYS	-	expression tag	UNP P48836
n	-7	MET	-	initiating methionine	UNP P48836
n	-6	ASP	-	expression tag	UNP P48836
n	-5	TYR	-	expression tag	UNP P48836
n	-4	LYS	-	expression tag	UNP P48836
n	-3	ASP	-	expression tag	UNP P48836
n	-2	ASP	-	expression tag	UNP P48836
n	-1	ASP	-	expression tag	UNP P48836
n	0	ASP	-	expression tag	UNP P48836

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
n	1	LYS	-	expression tag	UNP P48836

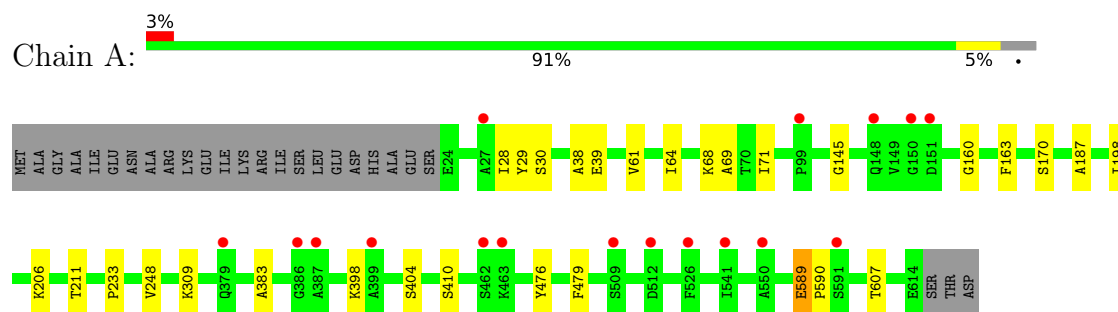
- Molecule 6 is a protein called V-type proton ATPase subunit E.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
6	I	216	Total	C	N	O	0	0	0
			1073	641	216	216			
6	K	178	Total	C	N	O	0	0	0
			883	527	178	178			
6	M	203	Total	C	N	O	0	0	0
			1008	602	203	203			
6	i	217	Total	C	N	O	0	0	0
			1078	644	217	217			
6	k	168	Total	C	N	O	0	0	0
			833	497	168	168			
6	m	181	Total	C	N	O	0	0	0
			898	536	181	181			

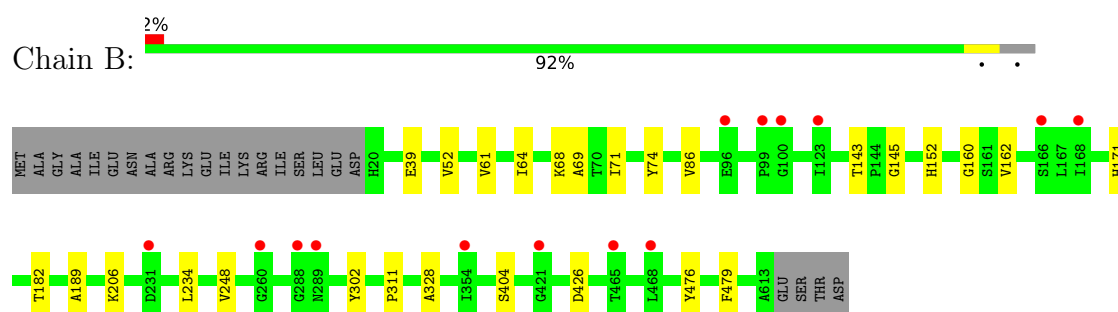
3 Residue-property plots [i](#)

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.

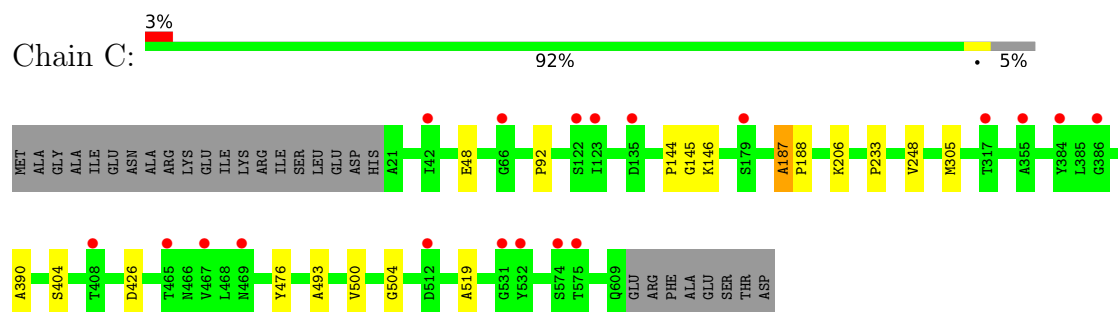
- Molecule 1: V-type proton ATPase catalytic subunit A



- Molecule 1: V-type proton ATPase catalytic subunit A

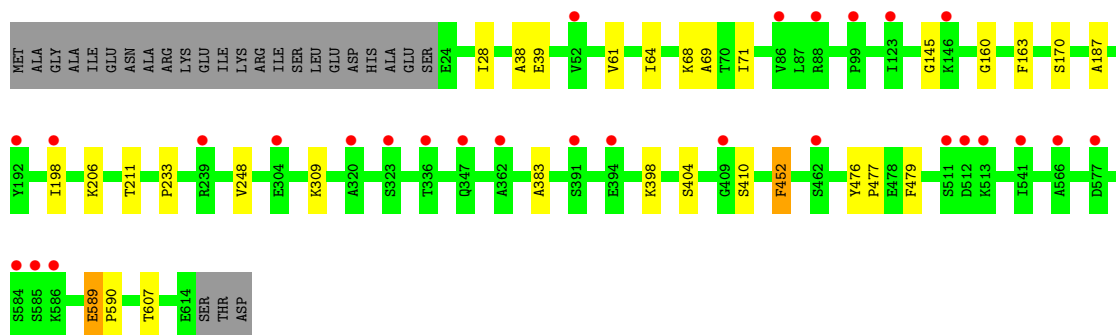


- Molecule 1: V-type proton ATPase catalytic subunit A

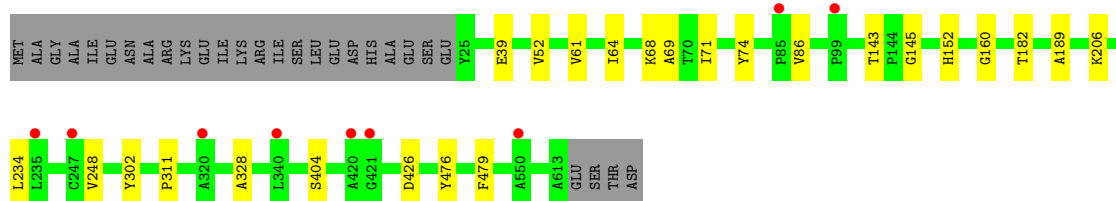
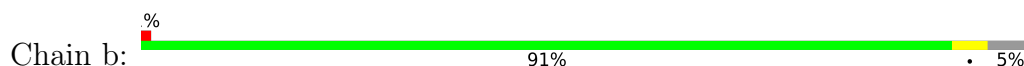


- Molecule 1: V-type proton ATPase catalytic subunit A

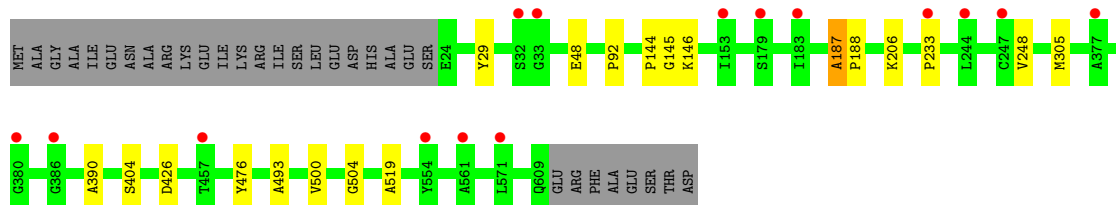
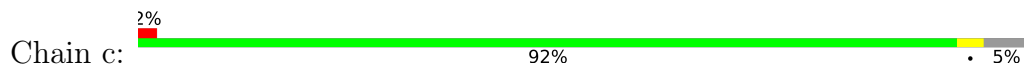




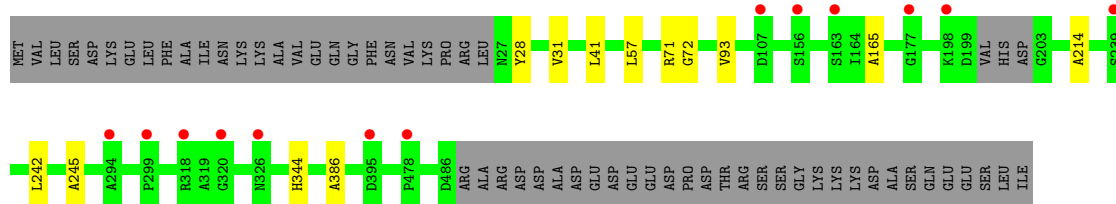
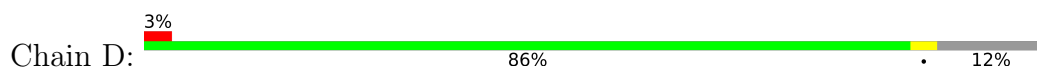
• Molecule 1: V-type proton ATPase catalytic subunit A



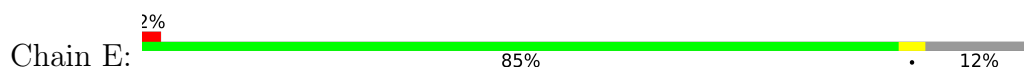
• Molecule 1: V-type proton ATPase catalytic subunit A

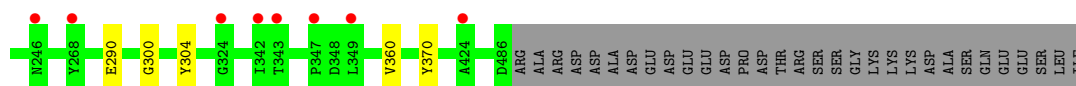


• Molecule 2: V-type proton ATPase subunit B

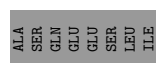
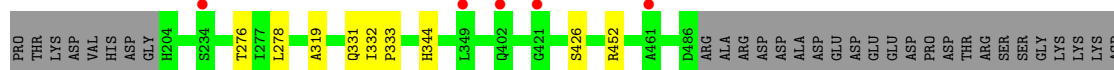
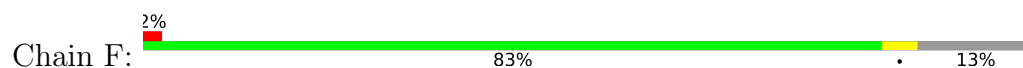


• Molecule 2: V-type proton ATPase subunit B

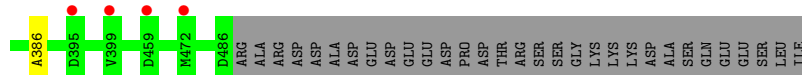
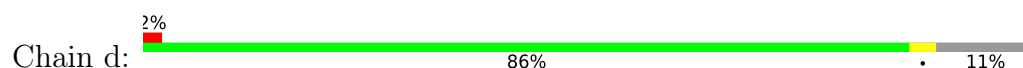




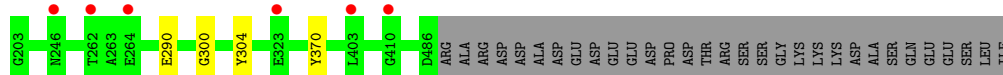
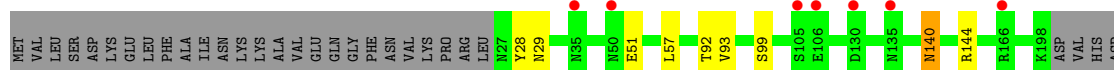
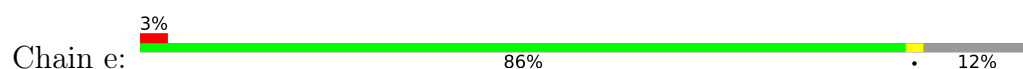
• Molecule 2: V-type proton ATPase subunit B



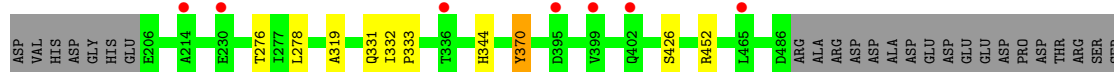
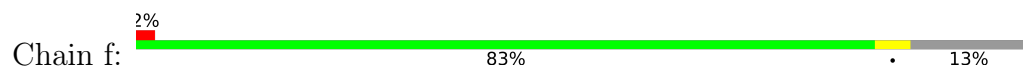
• Molecule 2: V-type proton ATPase subunit B



• Molecule 2: V-type proton ATPase subunit B

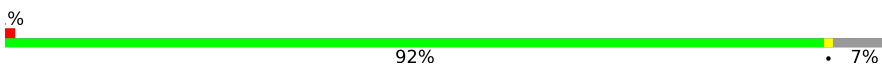


• Molecule 2: V-type proton ATPase subunit B



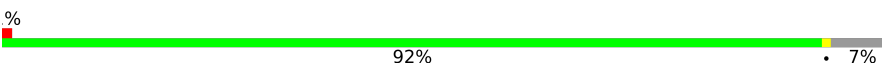
GLY
LYS
LYS
LYS
ASP
SER
GLN
GLU
GLU
SER
LEU
ILE

• Molecule 3: V-type proton ATPase subunit H

Chain H:  92% 7%

MET G2 S10 K53 LYS ASN ILE ILE GLY ASP GLY LEU SER SER SER SER ASN ASN ALA HIS SER SER GLY PHE K71 G134 D223 SER GLN LEU LEU ALA THR ARG ILE VAL ALA THR ASN SER ASN H237 E352 L353 T354 S355 D365 Y475 T476 PHE LYS

• Molecule 3: V-type proton ATPase subunit H

Chain h:  92% 7%

MET GLY A3 K53 LYS ASN ILE ILE GLY ASP GLY LEU SER SER SER SER ASN ASN ALA HIS SER SER GLY TYR PHE K71 Q152 D223 SER GLN LEU LEU ALA THR ARG ILE VAL ALA THR ASN ASN H237 C297 R301 E352 L353 T354 S355 G378 I473 G474 Y475 T476 PHE LYS

• Molecule 4: V-type proton ATPase subunit D

Chain G:  54% 46%

MET SER ILE ASP GLY ASN ARG GLU VAL F9 Q62 THR ALA PHE SER LEU LEU ALA GLY THR ARG GLY LEU VAL VAL SER TYR PHE THR ALA THR GLY GLU ASN ILE TYR GLN VAL GLN SER SER VAL ARG A135 I138 V147 H175 K219 GLU MET LYS LEU LYS ARG ASP ALA PHE GLU LYS VAL ARG ALA SER GLN VAL ALA ASP GLU GLU VAL PRO GLN SER GLY THR PHE GLU SER

TYR ILE ASP PRO GLU ILE ASP PHE ARG LEU THR GLY LEU LEU ARG GLY GLN VAL VAL SER TYR PHE THR ALA THR GLY GLU ASN ILE TYR GLN VAL GLN SER SER VAL ARG A135 I138 V147 H175 K219 GLU MET LYS LEU LYS ARG ASP ALA PHE GLU LYS VAL ARG ALA SER GLN VAL ALA ASP GLU GLU VAL PRO GLN SER GLY THR PHE GLU SER

ALA
ASP
GLN
GLU
ASP
ASP
VAL
ILE
PHE

• Molecule 4: V-type proton ATPase subunit D

Chain g:  55% 45%

MET SER TYR ILE ASP PRO GLU ILE ASP PHE ARG LEU THR GLY LEU LEU ALA GLY THR ARG GLY LEU VAL VAL SER TYR PHE THR ALA THR GLY GLU ASN ILE TYR GLN VAL GLN SER SER VAL ARG A135 I138 V147 H175 K219 GLU MET LYS LEU LYS ARG ASP ALA PHE GLU LYS VAL ARG ALA SER GLN VAL ALA ASP GLU GLU VAL PRO GLN SER GLY THR PHE GLU SER

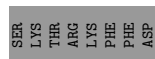
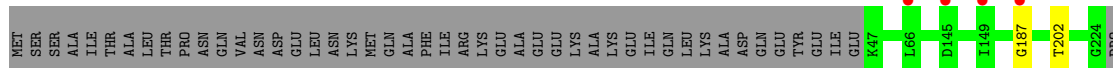
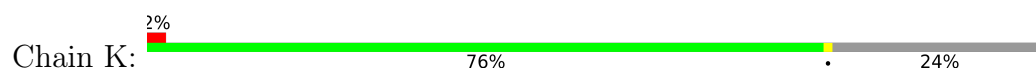
SER TYR ILE ASP PRO GLU ILE ASP PHE ARG LEU THR GLY LEU LEU ALA GLY THR ARG GLY LEU VAL VAL SER TYR PHE THR ALA THR GLY GLU ASN ILE TYR GLN VAL GLN SER SER VAL ARG A135 I138 V147 H175 K219 GLU MET LYS LEU LYS ARG ASP ALA PHE GLU LYS VAL ARG ALA SER GLN VAL ALA ASP GLU GLU VAL PRO GLN SER GLY THR PHE GLU SER

VAL
ILE
PHE

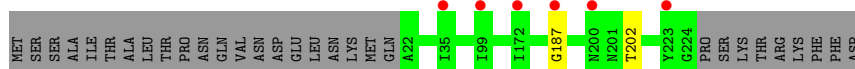
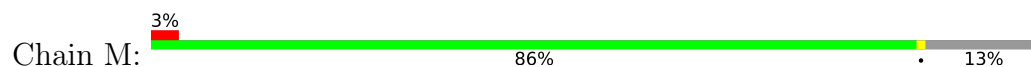
• Molecule 5: V-type proton ATPase subunit G

Chain J:  85% 15%

MET ASP TYR LYS ASP ASP ASP LYS SER Q3 I43 I103 S106 ALA GLU VAL HIS ILE ASN ALA LEU



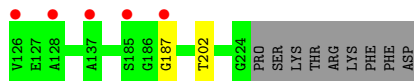
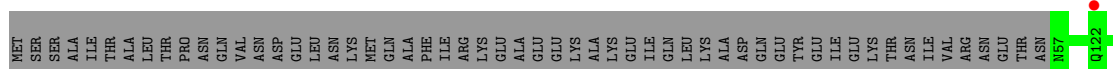
- Molecule 6: V-type proton ATPase subunit E



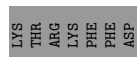
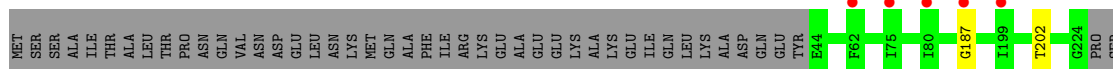
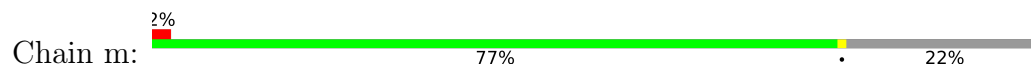
- Molecule 6: V-type proton ATPase subunit E



- Molecule 6: V-type proton ATPase subunit E



- Molecule 6: V-type proton ATPase subunit E



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	468.48Å 159.74Å 245.04Å 90.00° 113.88° 90.00°	Depositor
Resolution (Å)	40.10 – 7.00 40.10 – 7.00	Depositor EDS
% Data completeness (in resolution range)	99.3 (40.10-7.00) 89.8 (40.10-7.00)	Depositor EDS
R_{merge}	0.19	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.75 (at 7.33Å)	Xtriage
Refinement program	PHENIX (phenix.refine: dev_1957)	Depositor
R, R_{free}	0.260 , 0.309 0.268 , 0.313	Depositor DCC
R_{free} test set	2000 reflections (7.66%)	wwPDB-VP
Wilson B-factor (Å ²)	321.6	Xtriage
Anisotropy	0.269	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.39 , 999.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.81	EDS
Total number of atoms	44760	wwPDB-VP
Average B, all atoms (Å ²)	290.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.45% 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	0.30	0/2904	0.90	8/4034 (0.2%)
1	B	0.29	0/2919	0.87	9/4055 (0.2%)
1	C	0.30	0/2894	0.87	9/4020 (0.2%)
1	a	0.30	0/2904	0.91	12/4034 (0.3%)
1	b	0.30	0/2894	0.87	9/4020 (0.2%)
1	c	0.30	0/2879	0.86	9/3999 (0.2%)
2	D	0.30	0/2248	0.85	4/3123 (0.1%)
2	E	0.30	0/2229	0.85	6/3097 (0.2%)
2	F	0.29	0/2209	0.84	5/3069 (0.2%)
2	d	0.30	0/2264	0.85	6/3147 (0.2%)
2	e	0.30	0/2243	0.86	6/3116 (0.2%)
2	f	0.30	0/2210	0.84	7/3071 (0.2%)
3	H	0.31	0/2209	0.84	2/3080 (0.1%)
3	h	0.31	0/2205	0.84	2/3075 (0.1%)
4	G	0.30	0/689	0.80	0/959
4	g	0.30	0/699	0.78	0/973
5	J	0.29	0/513	0.79	0/713
5	L	0.30	0/334	0.81	0/463
5	N	0.30	0/399	0.80	0/554
5	j	0.29	0/498	0.78	0/692
5	l	0.30	0/324	0.81	0/449
5	n	0.29	0/286	0.75	0/396
6	I	0.29	0/1072	0.83	2/1495 (0.1%)
6	K	0.29	0/882	0.83	0/1229
6	M	0.29	0/1007	0.78	0/1404
6	i	0.29	0/1077	0.83	2/1502 (0.1%)
6	k	0.29	0/832	0.83	0/1159
6	m	0.29	0/897	0.79	0/1250
All	All	0.30	0/44720	0.85	98/62178 (0.2%)

There are no bond length outliers.

The worst 5 of 98 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	a	589	GLU	CA-C-N	11.55	134.27	119.84
1	a	589	GLU	C-N-CA	11.55	134.27	119.84
1	A	589	GLU	CA-C-N	11.10	133.71	119.84
1	A	589	GLU	C-N-CA	11.10	133.71	119.84
1	a	479	PHE	CA-C-N	9.61	130.27	119.32

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	2905	0	1339	12	0
1	B	2920	0	1348	11	0
1	C	2895	0	1335	5	0
1	a	2905	0	1339	10	0
1	b	2895	0	1335	10	0
1	c	2880	0	1326	6	0
2	D	2250	0	1015	7	0
2	E	2231	0	1006	7	0
2	F	2211	0	999	8	0
2	d	2265	0	1022	5	0
2	e	2245	0	1013	6	0
2	f	2212	0	998	9	0
3	H	2212	0	951	2	0
3	h	2208	0	948	2	0
4	G	691	0	311	0	0
4	g	701	0	312	0	0
5	J	514	0	248	0	0
5	L	335	0	160	0	0
5	N	400	0	189	0	0
5	j	499	0	243	0	0
5	l	325	0	150	0	0
5	n	288	0	136	0	0
6	I	1073	0	481	0	0
6	K	883	0	394	1	0
6	M	1008	0	456	1	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	i	1078	0	483	0	0
6	k	833	0	374	1	0
6	m	898	0	400	1	0
All	All	44760	0	20311	97	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 1.

The worst 5 of 97 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)
3:H:353:LEU:H	3:H:354:THR:C	1.97	0.73
3:H:352:GLU:HA	3:H:355:SER:HA	1.72	0.72
3:h:353:LEU:H	3:h:354:THR:C	1.97	0.71
3:h:352:GLU:HA	3:h:355:SER:HA	1.73	0.69
2:d:28:TYR:H	2:d:93:VAL:H	1.39	0.69

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	589/617 (96%)	550 (93%)	34 (6%)	5 (1%)	16	54
1	B	592/617 (96%)	557 (94%)	35 (6%)	0	100	100
1	C	587/617 (95%)	548 (93%)	33 (6%)	6 (1%)	12	48
1	a	589/617 (96%)	550 (93%)	33 (6%)	6 (1%)	12	48
1	b	587/617 (95%)	552 (94%)	35 (6%)	0	100	100
1	c	584/617 (95%)	545 (93%)	33 (6%)	6 (1%)	12	48
2	D	453/517 (88%)	425 (94%)	28 (6%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	E	449/517 (87%)	428 (95%)	21 (5%)	0	100	100
2	F	445/517 (86%)	420 (94%)	25 (6%)	0	100	100
2	d	458/517 (89%)	429 (94%)	28 (6%)	1 (0%)	43	78
2	e	452/517 (87%)	431 (95%)	21 (5%)	0	100	100
2	f	445/517 (86%)	421 (95%)	23 (5%)	1 (0%)	43	78
3	H	439/478 (92%)	412 (94%)	27 (6%)	0	100	100
3	h	438/478 (92%)	412 (94%)	25 (6%)	1 (0%)	43	78
4	G	135/256 (53%)	130 (96%)	4 (3%)	1 (1%)	18	56
4	g	137/256 (54%)	134 (98%)	3 (2%)	0	100	100
5	J	102/122 (84%)	100 (98%)	2 (2%)	0	100	100
5	L	66/122 (54%)	65 (98%)	1 (2%)	0	100	100
5	N	79/122 (65%)	75 (95%)	4 (5%)	0	100	100
5	j	99/122 (81%)	97 (98%)	2 (2%)	0	100	100
5	l	64/122 (52%)	63 (98%)	1 (2%)	0	100	100
5	n	54/122 (44%)	51 (94%)	3 (6%)	0	100	100
6	I	214/233 (92%)	213 (100%)	1 (0%)	0	100	100
6	K	176/233 (76%)	175 (99%)	1 (1%)	0	100	100
6	M	201/233 (86%)	200 (100%)	1 (0%)	0	100	100
6	i	215/233 (92%)	213 (99%)	2 (1%)	0	100	100
6	k	166/233 (71%)	165 (99%)	1 (1%)	0	100	100
6	m	179/233 (77%)	178 (99%)	1 (1%)	0	100	100
All	All	8994/10402 (86%)	8539 (95%)	428 (5%)	27 (0%)	36	72

5 of 27 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	187	ALA
1	C	188	PRO
4	G	138	ILE
1	c	187	ALA
1	c	188	PRO

5.3.2 Protein sidechains [i](#)

There are no protein residues with a non-rotameric sidechain to report in this entry.

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 [i](#)

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	591/617 (95%)	-0.01	17 (2%)	53	47	126, 311, 475, 652	0
1	B	594/617 (96%)	-0.14	14 (2%)	59	52	107, 290, 447, 594	0
1	C	589/617 (95%)	0.00	19 (3%)	50	45	111, 281, 475, 610	0
1	a	591/617 (95%)	0.15	28 (4%)	36	37	126, 314, 475, 658	0
1	b	589/617 (95%)	-0.12	9 (1%)	72	60	107, 292, 450, 597	0
1	c	586/617 (94%)	-0.05	15 (2%)	57	49	111, 282, 473, 614	0
2	D	457/517 (88%)	0.01	13 (2%)	55	48	92, 239, 384, 587	0
2	E	453/517 (87%)	0.10	11 (2%)	59	52	124, 258, 413, 663	0
2	F	449/517 (86%)	-0.03	10 (2%)	62	53	146, 287, 414, 584	0
2	d	460/517 (88%)	-0.09	10 (2%)	62	53	94, 241, 390, 586	0
2	e	456/517 (88%)	-0.01	13 (2%)	53	47	125, 258, 415, 667	0
2	f	449/517 (86%)	-0.05	10 (2%)	62	53	145, 288, 416, 573	0
3	H	445/478 (93%)	-0.31	4 (0%)	81	70	65, 163, 317, 625	0
3	h	444/478 (92%)	-0.22	7 (1%)	70	59	61, 164, 321, 631	0
4	G	139/256 (54%)	-0.28	2 (1%)	73	62	93, 212, 488, 554	0
4	g	141/256 (55%)	-0.32	1 (0%)	84	74	97, 213, 493, 560	0
5	J	104/122 (85%)	-0.20	2 (1%)	66	56	154, 290, 427, 498	0
5	L	68/122 (55%)	0.22	3 (4%)	39	39	283, 418, 525, 566	0
5	N	81/122 (66%)	-0.10	2 (2%)	58	50	200, 450, 574, 740	0
5	j	101/122 (82%)	-0.31	0	100	100	151, 282, 419, 497	0
5	l	66/122 (54%)	-0.14	0	100	100	279, 422, 522, 566	0
5	n	58/122 (47%)	-0.13	2 (3%)	48	44	200, 441, 509, 541	0
6	I	216/233 (92%)	0.17	13 (6%)	27	32	112, 345, 497, 643	0
6	K	178/233 (76%)	-0.13	4 (2%)	62	53	186, 344, 491, 599	0

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å ²)	Q<0.9
6	M	203/233 (87%)	0.13	6 (2%)	52	46	200, 410, 571, 626	0
6	i	217/233 (93%)	0.02	8 (3%)	45	43	91, 345, 511, 638	0
6	k	168/233 (72%)	0.22	6 (3%)	46	43	187, 331, 466, 514	0
6	m	181/233 (77%)	0.03	5 (2%)	55	48	200, 402, 542, 587	0
All	All	9074/10402 (87%)	-0.05	234 (2%)	57	49	61, 281, 479, 740	0

The worst 5 of 234 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	123	ILE	7.4
2	e	105	SER	5.3
1	B	123	ILE	5.3
3	h	473	ILE	5.2
1	A	151	ASP	5.0

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 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.