

**Supplementary Table S1.** Distribution of the conserved CLEAR elements in the transcriptional unit of V-type ATPase genes in *D. melanogaster*.

Gene cluster	Gene name	Predicted function	CLEAR element <sup>^</sup>	Position*
Atp6v1A	Vha68-2 (CG3762)	subunit A	cttgTCAGCTGAcgcc tttgTCAGCTGAcggc tctgTCACGTGAaacg cttgTCAGCTGAcaga	470 691 981 1177
Atp6v1B	Vha55 (CG17369)	subunit B	cgggTCATGTGAcggc gccgTCACATGAccgt acagTCAGCTGAcata acttTCATGTGAgcat	45 701 1052 1141
Atp6v1C	Vha44 (CG8048)	subunit C	gccaTCACGTGAatct actgTCATGTGActgt	-40 565
Atp6v1D	Vha36-1 (CG8186)	subunit D	agggTCATCTGActtg acagTCACATGAcagc	1142 1193
Atp6v1E	Vha26 (CG1088)	subunit E	gaaaTCATATGAtcga caggTCATGTGAactt ctggTCATGTGAcacg gttaTCATGTGAcaca tgtgTCATGTGAtaga	48 447 614 794 -3
Atp6v1F	Vha14-1 (CG8210)	subunit F		
Atp6v1G	Vha13 (CG6213)	subunit G	ttcgTCATATGAcatt tgggTCACATGAtgtg	9 317
Atp6v1H	VhaSFD (CG17332)	subunit H	ccagTCAGCTGAattt	36
Atp6v0a	Vha100-2 (CG18617)	subunit a	tctaTCATGTGAtctt	685
Atp6v0b	VhaPPA1-1 (CG7007)	subunit b	tacgTCATGTGAttgt	47
Atp6v0c	Vha16-1 (CG3161)	subunit c	ctaaTCACGTGAggtga gcggTCATGTGAggct acgaTCACATGAggtc cgaaTCACATGActcg accgTCACATGAaact gcgaTCATGTGActgc	130 165 2528 4381 4527 4906
Atp6v0d	VhaAC39-1 (CG2934)	subunit d	aaaaTCATATGActtg tgggTCACATGAccag	47 437
Atp6v0e	VhaM9.7-b (CG7625)	subunit e	tccgTCATGTGAtatt	38
Atp6ap1	VhaAC45 (CG8029)	accessory protein 1	cgcaTCACATGAccgt	-4
Atp6ap2	VhaM8.9 (CG8444)	accessory protein 2	ttcaTCACATGAtagt ttcgTCATATGAttaa	-1 52
Vma21	CG5969	assembly integral membrane	tttaTCATGTGAtttg	-11
Tmem199	CG7071	vacuolar ER assembly factor, Vma12	tttcTCATGTGAcagc	6
CCDC115	CG14671	V-type ATPase complex assemblyCCDC115	gcgaTCATATGAttga	-12

<sup>^</sup>Only canonical CLEAR elements are reported. \*Position refers to the transcriptional start site