

Supplementary Table 1 Detail variants information of V-ATPase subunits in GEFOS

Chr Gene	nSNPs	Start	Stop	FNK										SPN								
				P value			Top SNP and P value							P value			Top SNP and P value					
				Male	Female	Total	Male	Male	Female	Female	Total	Total	Male	Female	Total	Male	Male	Female	Female	Total	Total	
3	<i>ATP6VIA</i>	30	113465865	113530905	0.00596	0.00142	0.00002	rs9828099	0.00478	rs2305546	0.00111	rs2566968	0.00002	0.08991	0.19580	0.02330	rs2712353	0.03125	rs9288984	0.14600	rs2305546	0.01872
2	<i>ATP6VIB1</i>	29	71162997	71192561	0.92108	0.20480	0.17183	rs2072460	0.25990	rs1018549	0.03044	rs10210235	0.03394	0.53347	0.41059	0.43357	rs2072460	0.04621	rs1772030	0.00333	rs17720303	0.04807
8	<i>ATP6VIB2</i>	20	20054703	20079207	0.41558	0.67532	0.60539	rs9325865	0.04705	rs1709216	0.12340	rs17092158	0.07220	0.66234	0.90809	0.70529	rs1120410	0.12340	rs1042426	0.28040	rs17412009	0.17070
8	<i>ATP6VIC1</i>	53	104033247	104085285	0.63836	0.91708	0.94705	rs2458291	0.03955	rs1473820	0.36820	rs16870012	0.38550	0.41359	0.49750	0.43457	rs2454043	0.01850	rs1512350	0.11180	rs2515198	0.11100
2	<i>ATP6VIC2</i>	31	10861774	10925236	0.12587	0.38162	0.15285	rs1198844	0.00741	rs1198873	0.02091	rs1686482	0.00305	0.41658	0.57942	0.68631	rs6757005	0.05526	rs2884288	0.17600	rs12464402	0.06879
14	<i>ATP6VID</i>	17	67804580	67826720	0.41159	0.95504	0.77922	rs8006519	0.32030	rs1536274	0.45150	rs10135565	0.29940	0.38661	0.64436	0.23477	rs2031563	0.27010	rs2319777	0.07013	rs10137557	0.12730
22	<i>ATP6VIE1</i>	44	18074902	18111588	0.19580	0.37562	0.32468	rs5992766	0.09871	rs5992750	0.04060	rs1034470	0.17990	0.65135	0.25974	0.08492	rs9605343	0.19400	rs9605343	0.13930	rs12159924	0.07021
2	<i>ATP6VIE2</i>	10	46738985	46747096	0.28272	0.10090	0.01360	rs13018039	0.08064	rs896210	0.01912	rs896210	0.00293	0.88212	0.02150	0.20380	rs1301009	0.62500	rs6719054	0.00614	rs6719054	0.08252
7	<i>ATP6VIF</i>	3	128502856	128505903	0.71329	0.40959	0.49351	rs13226115	0.49620	rs1472146	0.11950	rs1472146	0.35850	0.56444	0.03160	0.45654	rs1472146	0.28280	rs1472146	0.00303	rs1472146	0.16250
9	<i>ATP6VIG1</i>	8	117349993	117361152	0.96004	0.81219	0.75624	rs4979439	0.36840	rs1098232	0.28770	rs4979439	0.12920	0.39061	0.12188	0.17283	rs4979439	0.04486	rs1098231	0.08370	rs10124511	0.04135
6	<i>ATP6VIG2</i>	5	31512227	31514625	0.72428	0.14585	0.16683	rs2071593	0.36750	rs2523502	0.01113	rs2523502	0.02159	0.32368	0.36164	0.32567	rs2523502	0.08430	rs2523504	0.27860	rs2523502	0.12490
1	<i>ATP6VIG3</i>	12	198492351	198510075	0.16384	0.01770	0.08691	rs3736930	0.01570	rs1092244	0.01372	rs3736930	0.03316	0.46653	0.42957	0.15584	rs1055160	0.18850	rs3736930	0.15140	rs1536318	0.05891
8	<i>ATP6VIH</i>	62	54628102	54755871	0.08891	0.30170	0.13387	rs4737974	0.04795	rs4738701	0.20070	rs2170444	0.02970	0.99900	0.52847	0.35864	rs1327527	0.47660	rs1327527	0.01085	rs13275279	0.10340
17	<i>ATP6VOA1</i>	12	40610861	40674597	0.44855	0.17582	0.10589	rs3785897	0.02714	rs9907126	0.09392	rs9907126	0.04555	0.16484	0.00610	0.02260	rs3785897	0.01718	rs9913501	0.00168	rs9913501	0.01592
12	<i>ATP6VOA2</i>	35	124196864	124246301	0.79720	0.38262	0.71628	rs10773025	0.05601	rs1077302	0.01035	rs10773025	0.00890	0.71728	0.10390	0.46254	rs7956769	0.18160	rs7956769	0.04256	rs10773025	0.06768
7	<i>ATP6VOA4</i>	86	138391038	138482941	0.02560	0.94406	0.84615	rs7810721	0.03255	rs1744156	0.10290	rs7799249	0.09857	0.03450	0.53646	0.61439	rs3807148	0.01054	rs1744156	0.03489	rs3734942	0.00669
1	<i>ATP6VOB</i>	4	44440601	44443972	0.94006	0.76923	0.83616	rs2286243	0.57780	rs2286243	0.29850	rs12410334	0.30850	0.45854	0.36464	0.50849	rs2286243	0.26800	rs2428954	0.19200	rs2428954	0.29270
16	<i>ATP6VOD1</i>	12	67471916	67515089	0.66434	0.84615	0.71129	rs8044652	0.06131	rs2279023	0.27720	rs8044652	0.25030	0.42757	0.55045	0.46054	rs8044652	0.00917	rs749242	0.06008	rs749242	0.01351
8	<i>ATP6VOD2</i>	93	87111138	87166454	0.20480	0.87413	0.87113	rs13268295	0.01677	rs975818	0.26690	rs11785427	0.04859	0.90410	0.30969	0.36164	rs1178542	0.03123	rs2626341	0.03776	rs6997770	0.03403
5	<i>ATP6VOE1</i>	21	172410762	172461900	0.18382	0.32667	0.16883	rs476510	0.02242	rs476510	0.12990	rs2431214	0.04477	0.70829	0.18382	0.43856	rs717838	0.06717	rs2431214	0.01302	rs252133	0.02847
7	<i>ATP6VOE2</i>	3	149570056	149577801	0.65734	0.66733	0.60639	rs12703054	0.38900	rs1270305	0.38760	rs7795944	0.31970	0.28871	0.91309	0.85015	rs1270305	0.10030	rs1270305	0.50400	rs1133480	0.47600

Gene	Probe	Log2FC	Log10P	Log2FC	Log10P	Log2FC	Log10P	Log2FC	Log10P	Log2FC	Log10P	Log2FC	Log10P	Log2FC	Log10P	Log2FC	Log10P	Log2FC	Log10P
AZF9YAG2	6	rs2071994	31512720	2.898	0.1008	1.173	0.2787	1.126	0.2495										
6	rs2071993	31512799	0.0251	0.8838	3.038	0.0818	4.901	0.0248											
6	rs2121583	31513559	3.466	0.06283	6.888	0.00822	0.6141	0.4259											
AZF9YAG2	7	rs7338353	34628736																
8	rs4891908	34628739																	
8	rs4891907	34628781																	
8	rs4891908	34648433																	
8	rs4737564	34648708																	
8	rs4737568	34648425																	
8	rs2730611	34651305																	
8	rs4738884	34651615	0.246	0.0199	0.0222	0.3369	4.917	0.0266											
8	rs4891907	34661279																	
8	rs4891908	34661685																	
8	rs4891907	34661799																	
8	rs1521146	34674723																	
8	rs4891907	34748338																	
8	rs4891908	34748441																	
8	rs4891908	34751691																	

Group description
 G1 G2 G3 G4 G5
 Spline 2 <-2 (include) (-2,-1) (-1,-1) 1-2 (include) >-2
 none -2 (include) -1 (include) 1 2
 n 35 209 1125 212 46
 Only numbers with a significant P-value (<0.05) are listed.

Supplementary Table 3 Primer information for all V-ATPase subunits in Q-PCR analysis

Official Gene Names	Location	Transcript Number	Q-PCR Primer Sequence (5'-3')
<i>Atp6v1a</i>	Chromosome 16, NC_000082.6 (44085404..44139711, comple	NM_007508.5	TCTGCAACGCTGGGTATTGT AAAGAGGCCTTTCCACGAG
<i>Atp6v1b1</i>	Chromosome 6, NC_000072.6 (83743017..83758810)	NM_134157.2	GGCTGTGACCCGAAACTACA ATCCGACCCAGCATGTCTTC
<i>Atp6v1b2</i>	Chromosome 8, NC_000074.6 (69088736..69113718)	NM_007509.3	ATGCGGGGAATCGTGAACG AGGCTGGGATAGGTAGTTCCG
<i>Atp6v1c1</i>	Chromosome 15, NC_000081.6 (38661904..38692444)	NM_025494.3	GCAGTATGAAACGCTCGCAG CACCGGCAAGCCATACCTTA
<i>Atp6v1c2</i>	Chromosome 12, NC_000078.6 (17284721..17325386, comple	NM_001159632.1	TATCGGACATGGTGGTCCCT TAGCGGGGCTACCTTAACCT
<i>Atp6v1d</i>	Chromosome 12, NC_000078.6 (78842982..78861638, comple	NM_023721.2	GCTTCCCTGCAGACTTCCTT TAGGCAAGGTGCGTTCAAT
<i>Atp6v1e1</i>	Chromosome 6, NC_000072.6 (120795244..120822685, comple	NM_007510.2	AAGGCCGCAGTACAAAAGC CAACGCCACCAGCTATTTC
<i>Atp6v1e2</i>	Chromosome 17, NC_000083.6 (86944109..86947887, comple	NM_029121.3	TGGAAGTGGGAGGAGCAGAC TTGTCTCGGGCTCTCAGGAC
<i>Atp6v1f</i>	Chromosome 6, NC_000072.6 (29467783..29470509)	NM_025381.2	GATCGAAGACACTTTCAGGCA GTAGGGATGCTCCTTGGACG
<i>Atp6v1g1</i>	Chromosome 4, NC_000070.6 (63544765..63550701)	NM_024173.2	CCGTTCTCTCAGCCCAAAGT CTCCGGTTCTTTCGCTTGC
<i>Atp6v1g2</i>	Chromosome 17, NC_000083.6 (35235166..35238767)	NM_001347351.1	ATCAAGCCCGGATGTTCGC TGCTCCACCTCCATTTGAGC
<i>Atp6v1g3</i>	Chromosome 1, NC_000067.6 (138273738..138289462)	NM_177397.3	GCAGGCTAAGATAATGGGCTCT CGCACACCATGCTCAATAGC
<i>Atp6v1h</i>	Chromosome 1, NC_000067.6 (5082978..5163213)	NM_133826.5	GGATGCTGCTGCCAACTAA TCTCTTGCTTGCTCCTCGAAC
<i>Atp6v0a1</i>	Chromosome 11, NC_000077.6 (101009447..101063719)	NM_016920.3	CTTCCCTCGGGACATGATCG AACTGCTGGGTTTTTCGCAG
<i>Atp6v0a2</i>	Chromosome 5, NC_000071.6 (124629052..124724455)	NM_011596.5	GTGCAGTCCGAGACCTCAA GTTTAAGAGGTGGTGCGGGA
<i>Tcirg1</i>	Chromosome 19, NC_000085.6 (3896050..3907133, comple	NM_016921.3	CACAGGGTCTGCTTACAACCTG CGTCTACCACGAAGCGTCTC
<i>Atp6v0a4</i>	Chromosome 6, NC_000072.6 (38048483..38124586, comple	NM_080467.3	GGAGAGCTTGGCTTGGTTCA CTAGAGTCGTCTCCAGGGTG
<i>Atp6v0c</i>	Chromosome 17, NC_000083.6 (24163866..24169429, comple	NM_009729.3	GCATCACCTCTACAGGAGTTT GCCACGATGAGACCGTAGAG
<i>Atp6v0b</i>	Chromosome 4, NC_000070.6 (117884330..117887329, comple	NM_033617.3	TGCATGGTCTGTGGGAAT TGATTCTGGGGGCTTTACC
<i>Atp6v0d1</i>	Chromosome 8, NC_000074.6 (105524470..105566040, comple	NM_013477.3	CCATGTCGTTCTTCCCGGAG TAGGTGCAGCTTCAAGTCCTC
<i>Atp6v0d2</i>	Chromosome 4, NC_000070.6 (19876838..19922566, comple	NM_175406.3	CAGAGCTGTACTTCAATGTGGA AGG TCTCACACTGCACTAGGT
<i>Atp6v0e</i>	Chromosome 17, NC_000083.6 (26676396..26699647)	NM_025272.2	GGGTCCTAACCGGGGAGTTA ACAGAGGATTGAGCTGTGCC
<i>Atp6v0e2</i>	Chromosome 6, NC_000072.6 (48537569..48541801)	NM_001347164.1	GATACCCACCTGAGCATCG CACAGCAGGGCATAAGAGGTA