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Escuela Técnica Superior de Ingeniería Agronómica y del
Medio Natural

Biotechnology degree

4th course

Mitochondrial Dynamic Processes in Left Ventricular Tissue from Heart Failure Patients

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Anexxes

SUPPLEMENTARY INFORMATION

Appendix 1

Mitochondria fusion genes				
Gene	NCBI ID	Protein location	Function (GO Biological process)	Bibliography
<i>MFN1</i>	55669	Mitochondrion outer membrane	Mitochondrial fusion, membrane organization and location	Santel et al., 2003
<i>MFN2</i>	9927	Mitochondrion outer membrane	Mitochondrial fusion, membrane organization and location	Santel et al., 2003
<i>PLD6</i>	201164	Mitochondrion outer membrane	Mitochondrial fusion	Choi et al., 2006
<i>GPAM</i>	57678	Mitochondrion outer membrane	Mitochondrial fusion	Ohba et al., 2013
<i>OPA1</i>	4976	Mitochondrion inner membrane	Mitochondrial fission, fusion and cristae morphogenesis	Ishihara et al., 2006
<i>OPA3</i>	80207	Mitochondrion	Mitochondrial fusion and morphogenesis	Ishihara et al., 2006
<i>OMA1</i>	115209	Mitochondrion inner membrane	Negative regulation of mitochondrial fusion	Baker et al., 2014
<i>YME1L</i>	10730	Mitochondrion inner membrane	Cleavage of OPA1 protein, mitochondrial fusion	Anand et al., 2014
<i>MCL1</i>	4170	Mitochondrion	Mitochondrial fusion	Perciavalle et al., 2011
<i>ADRBK1</i>	156	Mitochondrion	Mitochondria fussion	Franco et al., 2018

TOTAL OF FUSION GENES

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Appendix 2

Mitochondria fission genes				
Gene	NCBI ID	Protein location	Function (GO Biological process)	Bibliography
<i>DNM1L</i>	10059	Mitochondrion outer membrane	Mitochondrial membrane fission; heart contraction	Smirnova et al., 1998
<i>FIS1</i>	51024	Mitochondrion outer membrane	Mitochondrial fission	Loson et al., 2013
<i>MFF</i>	56947	Mitochondrion outer membrane	Mitochondrial fission, fusion and morphogenesis	Loson et al., 2013
<i>SMCR7</i>	54471	Mitochondrion outer membrane	Mitochondrial fission	Palmer et al., 2011
<i>SMCR7L</i>	125170	Mitochondrion outer membrane	Mitochondrion organization and mitochondrial fission	Loson et al., 2013
<i>MARCH5</i>	54708	Mitochondrion outer membrane	Positive regulation of mitochondrial fission	Yonashiro et al., 2006
<i>MTFP1</i>	51537	Mitochondrion inner membrane	Mitochondrial fission	Tondera et al., 2005
<i>TRAP1</i>	10131	Mitochondrion inner membrane	Mitochondrial fission, controls expression of MFF and DNML1	Takamura et al., 2012
<i>OPA1</i>	4976	Mitochondrion inner membrane	Mitochondrial fission, fusion and morphogenesis	Ishihara et al., 2006
<i>OPA3</i>	80207	Mitochondrion	Mitochondrial fusion and morphogenesis	Ishihara et al., 2006
<i>MUL1</i>	79594	Mitochondrion outer membrane	Mitochondrial fission, mitophagy	Yun et al., 2014
<i>MTFR1</i>	9650	Mitochondrion	Mitochondrial fission, mitochondrion organization	Monticone et al., 2010
<i>MTFR1L</i>	56181	Mitochondrion	Mitochondrion fission	Inferred from biological aspect of ancestor
<i>MTFR2</i>	113115	Mitochondrion	Mitochondrial fission, mitochondrion organization	Monticone et al., 2010
<i>RAB7L1</i>	419836	Cytoskeleton, Golgi apparatus, cell membrane	Mitochondrial organization	Alto et al., 2002
<i>RAB32</i>	10981	Mitochondrion outer membrane	Mitochondrial organization	Alto et al., 2002
<i>RAB38</i>	23682	Cell membrane, citoplasm	Mitochondrial organization	Alto et al., 2002
<i>INF2</i>	64423	Endoplasmic reticulum	Mitochondrial fussion	Koroboba et al., 2013

TOTAL OF FISSION GENES

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Appendix 3

Mitophagy genes				
Gene	NCBI ID	Protein location	Function (GO Biological process)	Bibliography
<i>PINK1</i>	65018	Mitochondrion outer membrane, mitochondrion inner membrane	Mitophagy regulation	Geisler et al., 2010
<i>PARK2</i>	5071	Mitochondrion outer membrane, mitochondrion inner membrane	Mitophagy regulation	Narendra et al., 2008
<i>PARK7</i>	11315	Mitochondrion	Regulation of mitophagy, mitochondria organization	Siebert et al., 2014
<i>USP30</i>	84749	Mitochondrion outer membrane	Mitophagy regulation, mitochondrial fusion	Bingol et al., 2014
<i>USP36</i>	57602	Nucleolus	Mitophagy regulation	Ivatt & Whitworth, 2014
<i>BNIP1</i>	662	Mitochondrion	Mitophagy regulation	Tang et al., 2011
<i>BNIP3</i>	664	Mitochondrion outer membrane	Mitophagy regulation	Ney., 2015
<i>BNIP3L</i>	665	Mitochondrion outer membrane	Mitophagy regulation	Koentjoro et al., 2017
<i>MUL1</i>	79594	Mitochondrion outer membrane	Mitochondrial fission, mitophagy regulation	Yun et al., 2014
<i>FUNDC1</i>	139341	Mitochondrion outer membrane	Mitophagy regulation	Liu et al., 2012
<i>FUNDC2</i>	65991	Mitochondrion	Mitophagy regulation	Liu et al., 2012
<i>ULK1</i>	8408	Cytosol	Mitophagy regulation	Wu et al., 2014
<i>PARL</i>	55486	Mitochondrion inner membrane	Regulation of mitochondrion organization, mitophagy regulation	G. Shi et al., 2011
<i>MAP1LC3A</i>	84557	Cytoskeleton	Autophagy of mitochondrion	Liu et al., 2012
<i>MAP1LC3B</i>	84557	Autophagosome	Mitophagy	Liu et al., 2012
<i>MAP1LC3B2</i>	643246	Cytoskeleton	Mitophagy regulation	Liu et al., 2012
<i>MAP1LC3C</i>	440738	Cytoskeleton	Mitophagy regulation	Liu et al., 2012
<i>WDR26</i>	80232	Mitochondrion	Hypoxia-mediated mitophagy	Feng et al., 2016
<i>VDAC1</i>	7416	Mitochondrion outer membrane	Mitophagy regulation	Geisler et al., 2010
<i>SQSTM1</i>	8878	Cytosol	Mitophagy regulation	Geisler et al., 2010
<i>SREBF1</i>	6720	Golgi apparatus, nucleus and endoplasmic reticulum membrane	Regulation of autophagy of mitochondrion	Ivatt et al., 2014
<i>SREBF2</i>	6721	Golgi apparatus, nucleus and endoplasmic reticulum membrane	Regulation of autophagy of mitochondrion	Ivatt et al., 2014

<i>PKD2</i>	18604	Mitochondrion matrix	Negative regulation of PINK/PRKN mitophagy	G. Shi & McQuibban, 2017
<i>SIRT1</i>	23411	Mitochondrion	Mitophagy regulation	B. L. Tang et al., 2016
<i>SIRT2</i>	22933	Cytoskeleton, nucleus	Mitophagy regulation	B. L. Tang et al., 2016
<i>SIRT3</i>	23410	Mitochondrion matrix	Activation of Parkin-mediated mitophagy	B. L. Tang et al., 2016
<i>SIRT4</i>	23409	Mitochondrion matrix	Mitochondrial quality control and mitophagy regulation	Lang et al., 2017
<i>SIRT5</i>	23408	Mitochondrion matrix, mitochondrion intermembrane space	Mitochondrial organization, mitophagy regulation	Polletta et al., 2015
<i>SIRT6</i>	51548	Nucleoplasm	Mitophagy regulation	Aggarwal et al., 2016
<i>STK4</i>	4485	Nucleus, cytoplasm	Negative regulation of mitophagy	Tang et al., 2016
<i>BAX</i>	581	Mitochondrion membrane	Mitophagy regulation	Nechsutan et al., 2001
<i>BAK1</i>	578	Mitochondrion membrane	Mitophagy regulation	Nechsutan et al., 2001
<i>SH3GLB1</i>	51100	Mitochondrion outer membrane	Mitochondrial apoptosis	Karbowski et al., 2004
<i>CALCOCO2</i>	10241	Cytoskeleton	Mitophagy regulation	Lazarou et al., 2015
<i>OPTN</i>	10133	Golgi apparatus, endosome	Mitophagy regulation	Moore & Holzbaur, 2016
<i>TAX1BP1</i>	8887	Cytosol	Mitophagy regulation	Xiao et al., 2018
<i>NBR1</i>	4077	Lysosome	Mitophagy regulation	Shi et al., 2015
<i>RHOT1</i>	55288	Mitochondrion outer membrane	Mitophagy regulation	Lahiri & Klionsky, 2017
<i>ZFYVE1</i>	53349	Golgi apparatus, endoplasmic reticulum	Mitophagy regulation	Lazarou et al., 2015
<i>WIPI1</i>	55062	Golgi apparatus, endosome, cytoskeleton	Mitophagy regulation	Lazarou et al., 2015
<i>WIPI2</i>	26100	Cytosol	Mitophagy regulation	Lazarou et al., 2015
<i>CHDH</i>	55349	Mitochondrion inner membrane	Mitophagy regulation	Park et al, 2014
<i>BCL2L1</i>	598	Inner membrane, outer membrane and matrix of mitochondria	Apoptotic mitochondrial changes, mitochondria morphogenesis	Hollville et al., 2014
<i>BCL2L13</i>	23786	Mitochondrion membrane	Mitophagy regulation	Otsu et al., 2015
<i>BCL2L2</i>	599	Mitochondrion membrane	Mitophagy regulation	Hollville et al., 2014
<i>FKBP8</i>	23770	Mitochondrion membrane	Mitophagy regulation	Bhujabal et al., 2017
<i>GABARAP</i>	11337	Golgi apparatus, cytoskeleton	Mitophagy regulation	Antón et al., 2016
<i>GABARAPL1</i>	23710	Cytoskeleton, golgi apparatus, endoplasmic reticulum	Mitophagy regulation	Boyer-Guittaut et al., 2014
<i>GABARAPL2</i>	11345	Golgi apparatus, autophagosome	Mitophagy regulation	Antón et al., 2016

<i>GABARAPL3</i>	23766	Cytoskeleton	Mitophagy regulation	Antón et al., 2016
<i>TBC1D15</i>	64786	Cytoplasm	Mitophagy regulation	Onoue et al., 2012
<i>TBC1D17</i>	79735	Autophagosome	Mitophagy regulation	Yamano et al., 2014
<i>AMBRA1</i>	55626	Autophagosome	Mitophagy regulation	Strappazzon et al., 2015
<i>ATG5</i>	11793	Cytoplasm	Autophagy of mitochondrion	Mai et al., 2012
<i>ATG12</i>	9140	Cytoplasm	Autophagy of mitochondrion	Mai et al., 2012
<i>BECN1</i>	8678	Mitochondrion membrane	Mitophagy regulation	Fogel et al., 2013
<i>RNF185</i>	91445	Mitochondrion outer membrane	Mitophagy regulation	F. Tang et al., 2011

TOTAL OF MITOPHAGY GENES	57
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Appendix 4

Mitochondria cristae genes

Gene	NCBI ID	Protein location	Function (GO Biological process)	Bibliography
<i>OPA1</i>	4976	Mitochondrion inner membrane	Mitochondrial fission, fusion and cristae morphogenesis	Ishihara et al., 2006
<i>STOML2</i>	30968	Mitochondrion inner membrane	Mitochondrion organization	Cristie et al., 2011
<i>TMEM11</i>	8834	Mitochondrion inner membrane	Mitochondrion organization	Rival et al., 2011
<i>PHB</i>	5245	Mitochondrion inner membrane	Cristae formation	Merkwirth & Langer, 2009
<i>PHB2</i>	11331	Mitochondrion inner membrane	Cristae formation	Merkwirth & Langer, 2009
<i>LETM1</i>	3954	Mitochondrion inner membrane	Cristae formation	Tamai et al., 2008
<i>LETM2</i>	137994	Mitochondrion inner membrane	Cristae formation	Homology with LETM1
<i>TAZ</i>	6901	Mitochondrion outer membrane	Cristae morphology	Acehan et al 2007
<i>RPS6KB1</i>	6198	Mitochondrion outer membrane	Mitochondrial morphology	Tran et al., 2018
MICOS/MINOS/MITOS Complex				Alkhaja et al., 2012
<i>SAMM50</i>	25813	Mitochondrion outer membrane	Cristae formation	Ott et al., 2012
<i>DNAJC11</i>	55735	Mitochondrion outer membrane	Cristae formation	Kozjak-Pavlovic, 2017
<i>C19orf70</i>	125988	Mitochondrion inner membrane	Cristae formation	Anand et al., 2016
<i>CHCHD2</i>	51142	Mitochondrion intermembrane space	Mitochondrial organization	Inferred from biological aspect of ancestor
<i>CHCHD3</i>	54927	Mitochondrion inner membrane	Cristae formation	Christine Ott et al., 2015
<i>CHCHD6</i>	84303	Mitochondrion inner membrane	Cristae formation	An et al., 2012
<i>CHCHD10</i>	400916	Mitochondrion intermembrane space	Mitochondrial organization	Bannwarth et al., 2014
<i>APOOL</i>	139322	Mitochondrion inner membrane	Cristae formation	Weber et al., 2013
<i>APOO</i>	79135	Mitochondrion inner membrane	Cristae formation	Koob et al., 2015
<i>IMMT</i>	10989	Mitochondrion inner membrane	Cristae formation	Christine Ott et al., 2015
<i>MINOS1</i>	440574	Mitochondrion inner membrane	Cristae formation	Rival et al., 2011

ATP synthase complex				Paumard et al., 2002
<i>ATP5A1</i>	498	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5B</i>	506	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5C1</i>	509	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5D</i>	513	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5E</i>	514	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5F1</i>	515	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5G1</i>	516	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5G2</i>	517	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5G3</i>	518	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5H</i>	10476	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5I</i>	521	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5J</i>	522	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5J2</i>	9551	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5L</i>	10632	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>ATP5O</i>	539	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>MT-ATP6</i>	4508	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
<i>MT-ATP8</i>	4509	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002
ATP synthase complex inhibitor				
<i>ATPIF1</i>	93974	Mitochondrion inner membrane	Cristae formation	Paumard et al., 2002

TOTAL OF CRISTAE FORMATION GENES

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