Supplementary table 1 Results of studies that investigated components of fertility associated with sequence variation in the mitochondrial DNA. Studies are partitioned into those conducted on invertebrates and those conducted on vertebrates. Within each of these taxonomic groups, studies are further subdivided into each of two categories (category 1 and 2) based on whether they describe particular mutations or sets of mutations, or panels of mtDNA haplotypes, as defined in the section 'Evidence for sex-specific mitochondrial fertility effects'. For each study, we list the particular reproductive traits examined, and whether a mitochondrial genetic effect was found in males, and or females. For category 1 studies, we were able to deduce the direction of the effects (positive, negative, or no effect) in each sex, and for category 2 studies, we simply report the presence or absence of effects in each sex. We also report whether the goal of each case was to test the mother's curse hypothesis (yes or no). Method of inference denotes whether the inferences are based on experiments or associations. Finally, we note whether the mutation(s) or panels involved have been associated with other traits on organismal function that are not associated with reproductive outcomes.

Reproductive trait(s) examined	Male fertility effect	Female fertility effect	Both sexes investigated?	Goal - test of Mother's Curse?	Mutation, whole haplotype, cytoplasm examined?	Method of inference	Species	Other effects	Reference
INVERTEBRATES									
Category 1									
Sperm motility	Negative		Yes*[1]	No	uaDf5 deletion	Experimental	*C. elegans* (nematode)	Defecation negatively impacted	Liau *et al.* 2007
Offspring production	No								
Egg laying rate		Negative							
Offspring production	Negative	Neutral	Yes	Yes	Point mutation in CytB (A278T)	Experimental	*D. melanogaster* (fruit fly)		Clancy *et al.* 2011
Sperm development	Negative								
Competitive fertility (Offspring production)	Negative								Dowling *et al.* 2015
Offspring production	Negative	Neutral						High pupal viability *[2]High male longevity, short female longevity	Wolff *et al.* 2016b
									Wolff *et al.* 2017
	Negative	Neutral							Camus & Dowling 2017
Offspring production	Negative	Neutral	Yes	No	COIR301Q	Experimental	*D. melanogaster* (fruit fly)	Mitochondrial disease pathologies	Xu *et al.* 2008
	Negative	Negative (less severe than males)			COIR301S				
Offspring production	Negative	Neutral	Yes	Yes	COII point mutation	Experimental	*D. melanogaster* (fruit fly)	Infertility increased with age and temp. Decreased COX activity in both sexes	Patel *et al.* 2016
Sperm development	Negative								
Sperm viability	Negative								

	Category 2										
		Sperm competitiveness*[3]	No		No	Yes	Cytoplasm	Experimental	*C. maculatus* (seed beetle)	Cytoplasm effect of female remating	Dowling *et al.* 2007a
		Sperm morphology	Yes								Dowling *et al.* 2007b
		Offspring production		Yes	No	No					Dowling *et al.* 2009
		Egg laying rate		Yes	Yes	Yes					Immonen *et al.* 2016b
		Offspring produced	Yes								
		Competitive fertility (Offspring production)	Yes		Yes	Yes	Haplotype	Experimental	*D. melanogaster* (fruit fly)	*[5]Male-biased patterns of differential gene expression across nuclear transcriptome	Yee *et al.* 2013
		Non-competitive fertility (Offspring production)	No								
		Non-competitive fertility (Offspring production)	Yes	No						Effects on mitochondrial gene expression & mtDNA copy number	Camus *et al.* 2015
		Mating rate	Yes							*[6]Male-biased effects on longevity	Yee *et al.* 2015
		Offspring production	Yes*[4]	Yes						*[7]Effects on respiration & mitochondrial number	Camus & Dowling 2017
		Offspring production	Yes*[8]	Yes	Yes	Yes	Haplotype	Experimental	*P. scorpoides* (pseudoscorpion)		Padua *et al.* 2014
VERTEBRATES											
	Category 1										
		Sperm motility	Negative		No	No	COXII mutation	Association	*C. hircus* (goat)		Ling *et al.* 2012
		Sperm motility	Negative		No	No	Point mutation A3243G	Association	Human	Mitochondrial disease phenotypes	Folgerø *et al.* 1993
			Negative/neutral								Huang *et al.* 1994
			Negative								Spiropoulos *et al.* 2002
		Sperm morphology	Negative								Folgerø *et al.* 1993
		Sperm count	Neutral								Folgerø *et al.* 1993
		Sperm motility	Negative		No	No	4977 bp deletion	Association	Human	Implicated in colorectal cancer*[9]	Kao *et al.* 1995
											Kao *et al.* 1998
											St. John *et al.* 2001
											Colagar *et al.* 2013
											Chari *et al.* 2015

		Offspring production	Negative								Kao *et al*. 1995
											Kao *et al*. 1998
		Sperm count	Neutral								Cummins *et al*. 1998
			Negative								Colagar *et al*. 2013
			Neutral								St. John *et al*. 2001
		Sperm morphology	Negative		No						Colagar *et al*. 2013
		Sperm motility	Negative		No	No	mtDNA deletions*[10]	Association	Human	Mitochondrial disease phenotypes	Fadic *et al*. 1997
		Sperm count	Negative		No	No	mtDNA deletions*[11]	Association	Human	Possible mitochondrial disease	Lestienne *et al*. 1997
		Sperm motility									
		Sperm motility	Negative		No	No	7345 bp deletion	Association	Human		Kao *et al*. 1998
			Neutral								St. John *et al*. 2001
		Offspring production	Negative								Kao *et al*. 1998
		Sperm count	Neutral								St. John *et al*. 2001
		Sperm motility	Negative		No	No	7599 bp deletion	Association	Human		Kao *et al*. 1998
											Colagar *et al*. 2013
		Offspring production									Kao *et al*. 1998
		Sperm count									Colagar *et al*. 2013
		Sperm morphology									
		Sperm count	Negative/neutral		No	No	8821 point mutation in ATPase6	Association	Human		Holyoake *et al*. 1999
		Sperm motility	Neutral		No	No	15 bp COX deletion	Association	Human		St. John *et al*. 2001
		Sperm count									
		Sperm motility	Negative/neutral		No	No	Point mutations*[12]	Association	Human		Holyoake *et al*. 2001
		Sperm count									
		Offspring production	Neutral		No	No	Point mutations/ pathogenic deletion*[13]	Association	Human		Thangaraj *et al*. 2003
		Sperm count	Negative								
		Sperm motility	Negative								
		Sperm morphology	Negative								
		Sperm count	Negative		No	No	Point mutations*[14]	Association	Human		Kumar *et al*. 2009
		Sperm motility	Negative								
		Sperm count	Neutral		No	No	Point mutations*[15]	Association	Human		Güney *et al*. 2012
		Sperm motility	Negative		No	No	7491 bp deletion	Association	Human		Colagar *et al*. 2013
		Sperm count									

		Sperm morphology									
		Sperm motility	Negative/neutral		No	No	Non-R haplogroups	Association	Human		Feng *et al.* 2013
		Sperm motility	Negative		No	No	Point mutation in COXI	Association	Human		Baklouti-Gargouri *et al.* 2013 a
		Sperm motility	Negative		No	No	9387 mutation in COXIII	Association	Human		Baklouti-Gargouri *et al.* 2013b
		Sperm motility	Negative		No	No	C16179T	Association	Human		Lu *et al.* 2015
		Sperm count	Negative								
		Sperm motility	Neutral				A12361G				
		Sperm count	Negative								
		IVF fertilization success	Negative		No	No	A8701G mutation in ATP6	Association	Human		Mao *et al.* 2015
							G15301A mutation in CytB				
		Sperm motility	Negative/neutral		No	No	4866 bp deletion	Association	Human		Chari *et al.* 2015
		IVF fertilization success	Negative		No	No	G9053A mutation in ATPase 6	Association	Human		Mao *et al.* 2016
			Negative				Haplogroup Z				
			Positive				10397 mutation in ND3				
		Offspring production	Negative	Neutral	Yes (previous studies*[16])	No	Various mitochondrial disease mutations*[17] and 3243A>G	Association	Human		Martikainen *et al.* 2017
		Sperm motility	Negative		No	No	11177 mutation	Association	*G. domesticus* (rooster)		Froman & Kirby 2005
		ND1 point mutations	Negative	Negative (less severe than males)	Yes	No	Point mutations*[18]	Experimental	*M. musculus* (mouse)	Mitochondrial disease phenotypes, infertility increased with age	Trifunovic *et al.* 2004
		Sperm count	Negative								
		Testes size	Negative								
		Offspring production	Negative	Neutral	Yes (earlier paper)	No	4,696-bp deletion	Experimental	*M. musculus* (mouse)	Mitochondrial disease phenotypes	Nakada *et al.* 2006
											Inoue *et al.* 2000
		Fertilization rate									Nakada *et al.* 2006
		Sperm count									
		Sperm morphology									
		Sperm motility									
		Sperm velocity	Neutral (No effect)		No	Yes	Haplotype	Association	*T. guttata* (zebra finch)		Mossman *et al.* 2010

	Category 2										
		Sperm motility	Yes		No	Yes	Haplogroup T	Association	Human	Decreased OXPHOS capacity	Ruiz-Pesini *et al*. 2000a
		Sperm count	No								Ruiz-Pesini *et al*. 2000b
		Sperm motility	No		No	Yes	Haplogroups	Association	Human		Pereira *et al*. 2007
		Sperm motility	Yes		No	No	Haplogroup U sublineages	Association	Human	Possible OXPHOS uncoupling	Montiel-Sosa *et al*. 2006
		Sperm vitality									
		Offspring production	Yes (negative)*[19]	No	Yes	No	Haplotype	Experimental	*M. musculus* (mouse)		Ma *et al*. 2016
		Sperm velocity	Yes		No	Yes	Haplotypes	Experimental	*M. musculus* (mouse)	*[20]autoimmune encephalomyelitis and anxiety-related behavior	Tourmente *et al*. 2017
		Offspring production	Yes*[21]	No	Yes	Yes	Haplotype	Association	*L. europaeus* (European brown hare)		Smith *et al*. 2010
		Offspring production		Yes*[22]	No	No	G7778T mutation in ATP 8	Experimental	*M. musculus* (mouse)	Autoimmune disorders, alterations in mitochondrial structure and function	Yu *et al*. 2009a

*[1]True males and spermless hermaphrodites; *[2]Camus *et al.* 2015; *[3]Sperm competitiveness is gauged by male reproductive success when female mates with 2 different males within same reproductive bout); *[4]Haplotypes which conferred higher female reproductive success, had lower success in males; *[5]Innocenti *et al.* 2011; *[6]Camus *et al.* 2012; *[7]Wolff *et al*. 2016; *[8]Uncovered a sexually antagonistic effect of the B2 haplotype when compared to the other A haplotype; *[9]Chen *et al*. 2011; *[10]A patient with mitochondrial disease phenotypes and abnormal sperm traits possessed mtDNA with various deletions; *[11]A patient with mitochondrial disease phenotypes and reduced sperm motility/count possessed mtDNA with various deletions; *[12]All patients with sperm abnormalities had mtDNA substitutions which were rarely found in normospermic males; *[13]36 substitutions uncovered: 8 in COI, 13 in COII, 5 in ATPase8, and 10 in ATPase6. 2-bp deletion was found at nucleotide positions 8195 and 8196 in COII resulting in a stop codon at position 8216; *[14]ATPase 6 (9098), ATPase 8 (8394, 8701, 8860, 8879), ND2 (4769, 5400), ND3 (10165, 10172, 10207, 10398, ND4 (11719), ND5 (12705, 13707, 13708, 13946); *[15]ATPase 6, CytB, ND1 point mutations; *[16]Moilanen & Majamaa 2001, Gorman et al. 2015; *[17]Single deletion, 8344A>G, 7989T>C, 8839G>C, 8993T>C, 9185T>C, 12271T>C, 12283A>G, 13051A>G, 13513G>A, 14674T>C, 14709T>C; *[18]A defective mitochondrial polymerase was introduced into transgenic mice, causing random mutations and deletions within mtDNA sequences; *[19] MR1 cybrid embryos supported normal development of F1 offspring with reduced male fertility but unaffected reproductive fitness in females; *[20] Yu *et al.* 2009a & Yu *et al.* 2009b; *[21]One of two haplotypes was associated with low male offspring number; *[22] Effects observed in one (MRL/MpJ) of several nuclear backgrounds, male reproduction not quantified for this genotype

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