

Table S1 - Candidate genes and gene variants for obesity and related metabolic disease in companion animals. Gene variants used to test for association with obesity/obesity-related traits in candidate gene studies in companion animal species. N/A = not available, - = not applicable. *POMC*, proopiomelanocortin gene; *FTO*, FTO alpha-ketoglutarate dependent dioxygenase gene; *INSIG2*, Insulin induced gene 2; *FFAR4*, Free fatty acid receptor 4 gene; *GPR120*, G-protein coupled receptor 120 gene; *MC4R*, Melanocortin 4 receptor gene; *MC3R*, Melanocortin 3 receptor gene; *PPARG*, Peroxisome proliferator activated receptor gamma gene; *TNF*, Tumor necrosis factor gene; *IL6*, Interleukin 6; *RETN*, Resistin gene; *FAM174A*, Family with sequence similarity 174 member A gene; BCS, body condition score.

Gene	Species: Breed(s)	Genome build used	Variant(s) referenced in original paper	Alternative variant name used in current review (realigned to CanFam 3.1 where applicable)	Variant consequence	Trait/association tested	Reference
<i>POMC</i>	<i>Canis familiaris</i> : Labrador retriever, flat-coated retriever	CanFam 3.1	17:19431664, G>T, S239I	c.716C>A, p.Ser239Ile, rs852254866	Nonsynonymous, missense	No significant association found with BCS	Raffan et al., 2016 [1]
			17:19431807, GCGCCGGCCCCGGGA> -, P187fs, (17:19431807-19431821)	c.560_573del AGGGCCCCGCCGCG, p.Q186fs, (17:19431807-19431821)	Frameshift, deletion	Significant association found with body weight, adiposity and appetite	
			17:19431813, C>G	c.567G>C, p.Pro189Pro, rs851551584	Synonymous coding	No significant association found with BCS	
			17:19431820, A>AG, P187PE	c.559_560insG, p.Gln187Argfs, rs852143109	Frameshift, insertion		
			17:19431850, C>G, R178G	c.532C>G, p.Arg178Gly, rs852665700	Nonsynonymous, missense		
			17:19431861, A>G, K174R	c.521A>G, p.Lys174Arg, rs851770148	Nonsynonymous, missense		
			17:19431983, C>G	c.399C>T, p.Arg133Arg	Synonymous coding		
			17:19432208, G>A	c.174G>A, p.Thr58Thr	Synonymous coding		
			17:19432226, C>A	c.156C>A, p.Pro52Pro, rs851959389	Synonymous coding		

			17:19432391, GGGCGAGCTCCTG > -	N/A	Intronic deletion		
			17:19432427, C>G	-	Intronic		
			17:19432428, A>C	-	Intronic		
			17:19434068, T>C	-	Intronic		
MC4R	<i>Canis familiaris</i> ; various	CHORI-82: Canine Boxer (F) (C. familiaris) BAC Library	G637T	c.637G>T, p.Val213Phe, rs852614811	Non- synonymous, missense	No association test conducted in dogs	Skorczyk et al., 2007 [2]
			T777C	c.777T>C, p.Ala259Ala, rs851987283	Synonymous coding		
			(+33)G	c.*33C>G, rs851539399	3'UTR		
	<i>Canis familiaris</i> ; golden retriever	N/A	c.637G>T	c.637G>T, p.Val213Phe, rs852614811	Non- synonymous, missense	No significant association found with morphological measurements	van den Berg et al., 2010 [3]
			c.777T>C	c.777T>C, p.Ala259Ala, rs851987283	Synonymous coding	No significant association found with morphological measurements	
			c.*33C>G	c.*33C>G, rs851539399	3'UTR	No association test conducted	
			c.868C>T	c.868C>T, p.Leu290Leu, rs851062983	Synonymous coding	No significant association found with morphological measurements	
	<i>Canis familiaris</i> ; beagle	CHORI-82: Canine Boxer (F) (C. familiaris) BAC Library	C895T	c.777T>C, p.Ala259Ala, rs851987283	Synonymous coding	Significant association found with body weight in females	Zeng et al., 2014 [4]
			A420C	c.302C>A, p.Thr101Asn	Non- synonymous, missense	Significant association found with body weight	
	<i>Canis familiaris</i> ; Labrador	CanFam 3.1	1:16132817, G>T, S330I	c.989G>T, p.Ser330Ile	Non- synonymous, missense	No significant association found with BCS	Raffan et al., 2016 [1]

retriever, flat coated retriever		1:16133054, C>T	c.*227C>T	3'UTR		
		1:16132465, G>T, V213F	c.637G>T, p.Val213Phe, rs852614811	Non-synonymous, missense		
		1:16132860, C>G	c.*33C>G, rs851539399	3'UTR		
		1:16132605, T>C	c.777T>C, p.Ala259Ala, rs851987283	Synonymous coding		
<i>Canis familiaris</i> ; Labrador retriever, golden retriever, beagle, cocker spaniel	CanFam 3.1	c.637G>T, p.Val213Phe, rs852614811	c.637G>T, p.Val213Phe, rs852614811	Non-synonymous, missense	Significant association found with BCS in beagles <i>only</i>	Mankowska et al, 2017 [5]
		c.777T>C, rs851987283	c.777T>C, p.Ala259Ala, rs851987283	Synonymous coding	Significant association found with BCS in golden retrievers <i>only</i>	
		c.868C>T, rs851062983	c.868C>T, p.Leu290Leu, rs851062983	Synonymous coding	Significant association found with BCS in golden retrievers <i>only</i>	
		c.*33C>G, rs851539399	c.*33C>G, rs851539399	3'UTR	Significant association found with BCS in golden retrievers <i>only</i>	
		c.*227C>T	c.*227C>T	3'UTR	No significant association found with BCS in any breed	
		c.-435T>C, rs852471376	c.-435T>C, rs852471376	5' flanking	Significant association found with BCS in beagles <i>only</i>	
		c.301A>C **not found in genotyped cohort but referred to	c.302C>A, p.Thr101Asn	Non-synonymous, missense	No association test conducted	

	<i>Felis catus</i> ; domestic short haired, Burmese	Felis_catus- 6.2	c.92 C>T	c.92 C>T, p.Leu31Pro, rs783632116	Non- synonymous, missense	Significant association found with obese diabetics vs nondiabetics in DSH cats only	Forcada et al., 2014 [6]
			c.297C>T	c.297C>T, p.Ser99Ser	Synonymous coding	No association test conducted	
			c.303C>T	c.303C>T, p.Thr101Thr, rs785927510	Synonymous coding	No association test conducted	
<i>FTO</i>	<i>Canis familiaris</i> ; various	CHORI-82: Canine Boxer (F) (C. familiaris) BAC Library	23 C/T, Thr1Met I1; 192 A/T I1; 223 T/C 378053 G/A 378284 T/C 378318 G/C	c.23C>T, p.Thr8Met, rs852870212 - - - -	Non- synonymous, missense Intronic Intronic 3' flanking 3' flanking 3' flanking	No association test conducted in dogs	Grzes et al., 2011 [7]
<i>MC3R</i>	<i>Canis familiaris</i> ; various	CHORI-82: Canine Boxer (F) (C. familiaris) BAC Library	c.-90T(11_13); 5' flanking c.142C>T	c.-90delT, rs853092001 c.142C>T, p.Leu48Leu, rs8916554	5'UTR, deletion Synonymous coding	No association test conducted in dogs	Skorczyk et al., 2011 [8]
<i>INSIG2</i>	<i>Canis familiaris</i> ; various	CHORI-82: Canine Boxer (F) (C. familiaris) BAC Library	-91 G/A; 5' flanking c.-1C>T; 5' flanking 40 C/A; Arg>Ser I1; 1483 A/T I1; 1637 C/T I1; 2169 G/A I4; 10820 T/A	c.-90G>A, rs852813691 c.-1C>T c.40C>A, p.Arg14Ser, rs850773724 - - - -	5' UTR 5' UTR Non- synonymous, missense Intronic Intronic Intronic Intronic	No association test conducted in dogs	Grzes et al., 2011 [7]
<i>GPR120/FFAR4</i>	<i>Canis familiaris</i> ; various	CanFam 3.1	c.252C>G, p.Ala84Ala c.282C>G, p.Asp94Asp	c.252C>G, p.Ala84Ala, rs852631320 c.282C>G, p.Pro94Pro, rs851850900	Synonymous coding Synonymous coding	No association test conducted No association test conducted	Miyabe et al., 2015 [9]

			c.702A>G, p.Thr234Thr	c.702A>G, p.Thr234Thr	Synonymous coding	No association test conducted	
			c.726G>A, p.Thr242Thr	c.726G>A, p.Thr242Thr	Synonymous coding	No association test conducted	
			c.984T>C, p.Asn328Asn	c.984T>C, p.Asn328Asn, rs852472019	Synonymous coding	No association test conducted	
			c.287T>G, p.Leu96Arg	c.287T>G, p.Leu96Arg	Non-synonymous, missense	No association test conducted	
			c.307G>A, p.Ala103Thr	c.307G>A, p.Ala103Thr	Non-synonymous, missense	No association test conducted	
			c.446G>C, p.Gly149Ala	c.446G>C, p.Gly149Ala	Non-synonymous, missense	No association test conducted	
			c.595C>A, p.Pro199Thr	c.595A>C, p.Thr199Pro, rs853030954	Non-synonymous, missense	Significant association found with body condition	
<i>PPARG</i>	<i>Canis familiaris</i> ; various inc, mongrels	CanFam 2.0	E7, C1362T	N/A	N/A	No association test conducted	Nishii et al., 2007 [10]
<i>TNF</i>	<i>Canis familiaris</i> ; various inc. mongrels	N/A	c.-40A>C	c.-40A>C, rs22216187	5' UTR	Significant association found with body condition in Labrador retrievers <i>only</i>	Mankowska et al., 2016 [11]
			c.249C>T	c.249C>T, p.Thr83Thr, rs9095590	Synonymous coding	No association test conducted	
			c.548A>T, p.Glu183Val	c.548A>T, p.Glu183Val, rs851883595	Non-synonymous, missense	No association test conducted	
			c.627C>T	c.627C>T, p.Ser209Ser, rs850991197	Synonymous coding	No association test conducted	
			c.186+16A>G	-	Intronic	No association test conducted	
			c.186 +174GAAT(5_7)	-	Intronic, insertion	No association test conducted	

			c.186+211C>T	-	Intronic	No association test conducted
			c.187-47T>C	-	Intronic	No association test conducted
			c.233-54T>C	-	Intronic	No association test conducted
			c.233+14G>A	-	Intronic	Significant association found with body condition in Labrador retrievers <i>only</i>
			c.233+17G>T	-	Intronic	No association test conducted
			c.233+108A>G	-	Intronic	No association test conducted
			c.*107G>A	c.*107G>A, rs852784980	3' UTR	No association test conducted
IL6	Canis familiaris; various inc. mongrels	N/A	c.102T>C	N/A	Synonymous coding	No association test conducted
			c.572G>A	N/A	Synonymous coding	No association test conducted
			c.309+215T>C	-	Intronic	No significant association found with BCS
			c.*283G>A	c.*283G>A, rs850980833	3' UTR	No association test conducted
RETN	Canis familiaris; various inc. mongrels	N/A	c.75G>A	c.75G>A, p.Glu25Glu, rs852185407	Synonymous coding	No significant association found with BCS
			c.141C>T	c.141C>T, p.Gly47Gly, rs852329356	Synonymous coding	No association test conducted
			Synonymous coding: c.236C>G	c.236C>G, p.Ser79Cys, rs851766760	Non-synonymous, missense	No association test conducted
			c.19C>T, p.Leu7Phe	c.19C>T, p.Leu7Phe, rs852470997	Non-synonymous, missense	No association test conducted

			c.194-69T>A	c.194-69T>A, rs853182485	Intronic	No significant association found with BCS	
			c.115+29G>C;	-	Intronic	No association test conducted	
			c.115+143T>G	-	Intronic	No association test conducted	
			c.116-179G>A	-	Intronic	No association test conducted	
FAM174A	<i>Equus ferus caballus</i> ; Arabian horses	EquCab2.0	BIEC2-262534, chr14:69276814 T > C	N/A	Intronic	Associated with various metabolic measures	Lewis et al. 2016/2017 [12, 13]
			FAM174A 11-G	N/A	3' UTR		

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