Role of *LEP* gene on porcine productive traits related to appetite, interaction with *LEPR* c.1987C>T SNP

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✓LEP signaling (LEP and LEPR) plays a fundamental role in food intake and energy expenditure

✓Previous association analysis of several *LEP* gene polymorphisms with productive and reproductive traits have shown controversial results (Chen et al., 2004; Amills et al., 2008)

✓The *LEPR* c.1987C>T polymorphism has been associated with growth, fatness and body conformation traits (Óvilo et al., 2005; 2010)

AIM: Analysis *LEP* gene sequence in an Iberian x Landrace cross, investigate the association of relevant polymorphisms with growth, fatness and conformation traits and to explore the joint effects of *LEP* and LEPR polymorphisms

IBMAP (Iberian x Landrace)

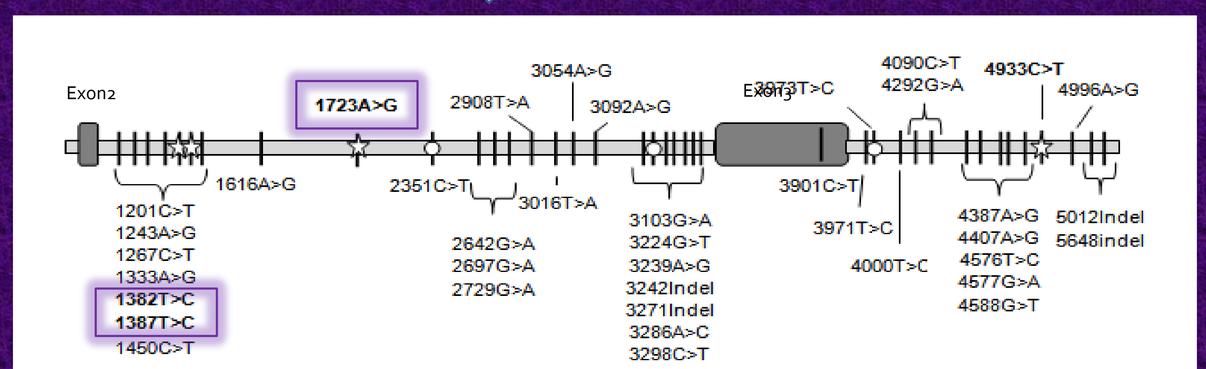
Phenotypic data from 658 pigs of the F2 and F3 generations:

Growth: BW150d, BW100kg, CW

Fatness: BFT1, BFT2, BFT3, BBW, IMF

Conformation: HW, SW, BLW

LEP gene sequencing in 10 animals of the parental population



Selected 1387T>C and 1723A>G polymorphisms were genotyped by pyrosequencing in the F2 and F3 animals

Association analyses:

Model 1 – additive and dominant effects of LEP polymorphism

Model 2 – additive effects of LEP polymorphism

Model 3 – joint LEP and LEPR polymorphisms

Model 4 – interaction effects (a x a, a x d, d x a and d x d)

(sex and batch were fitted in the model)

RESULTS

LEP g. 1387C>T association analysis revealed interesting results:

LEP g.1387T→ Additive effects on growth

Trait	Additive effect (SE)	Dominant effect (SE)	*P*-value
Growth related traits			
W150d	1.465 (0.772)	--	0.059
W100k	1.816 (0.680)	--	0.008
CW	1.325 (0.549)	--	0.016

LEP g.1387T→ Dominant effects on fatness

Trait	Additive effect (SE)	Dominant effect (SE)	*P*-value
Fatness related traits			
BFT1	0.003 (0.039)	0.134 (0.052)	0.029
BFT2	0.041 (0.030)	0.060 (0.040)	0.183
BFT3	0.076 (0.046)	0.180 (0.061)	0.009
BBW	0.073 (0.034)	0.168 (0.045)	$3.9x10^{-4}$
IMF	0.041 (0.039)	0.053 (0.051)	0.424

LEP and *LEPR* polymorphisms joint analyses:

Interaction *LEP- LEPR* effects on body conformation

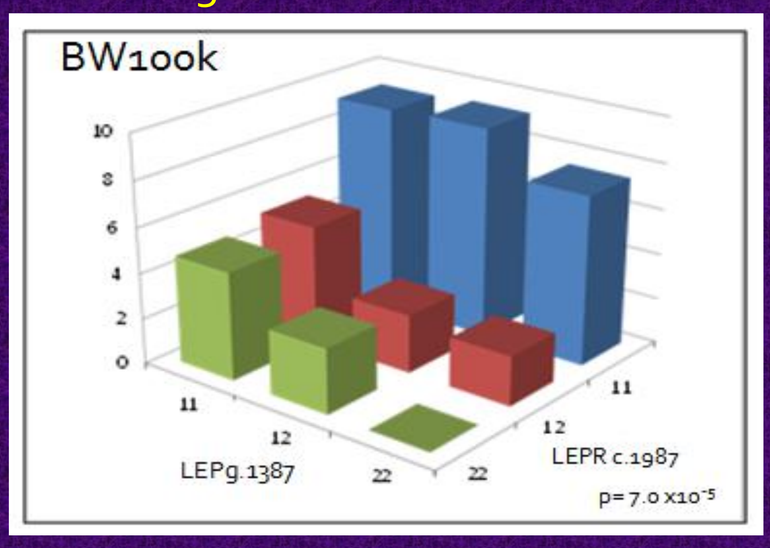
Trait	*Additive x Additive* (SE)	*P*-value	*Dominant x Additive* (SE)	*P*-value	Joint *P*-value
SW	-0.081(0.032)	0.012	0.139(0.043)	0.001	$3.3x10^{-7}$
BLW	-0.191(0.093)	0.043	0.173(0.125)	0.170	$2.9x10^{-4}$

REMARKS:

LEP g.1387T allele, fixed in Iberian parental population, has complementary effects to the previously reported *LEPR* c.1987T effects. These effects on body weight ,fatness and conformation are probably mediated through an increased appetite.

The present study point out the relevance of *LEP* polymorphisms on the determination of important productive traits.

Complementary effects *LEP*g.1387C>T -*LEPR* c.1987C>T on growth and fatness



Purely additive effects on body weight