Effects of porcine *LEPR* and *MC4R* genes on productive and meat and fat quality traits in a Duroc x Iberian commercial cross

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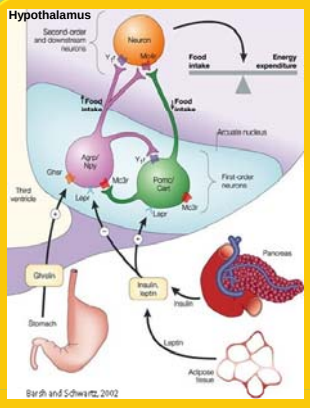

- Leptin (*LEPR*) and melanocortin 4 (*MC4R*) receptors play a critical role in the **regulation** in mammals of **food intake**, **body weight**, and **energy expenditure**.
- Both genes are **candidates** for **body composition** and **growth-related traits** in **pigs**.
- Porcine Single Nucleotide Polymorphisms (SNP) ***LEPR* c.2002C>T** and ***MC4R* c.1426A>G** have been **associated** with **feed intake**, **growth** and **fatness**.

OBJECTIVE

Analyze the effects of these **non-synonymous SNPs** on different **production** and **meat quality traits** in **commercial Duroc x Iberian crossbred pigs**.

MATERIALS AND METHODS

- **ANIMALS**: **529 pigs** (295 males and 234 females) born from **9 Duroc boars** belonging to two different lines and heterozygotes for both SNPs and **91 Iberian sows**.
- **Growth** and **Carcass traits** were recorded on farm and slaughterhouse.
- **Meat** and **Fat quality parameters** were determined in Loin and Backfat samples.
- Both SNPs were genotyped by **PYROSEQUENCING**.
- **STATISTICAL ANALISYS**:

No interaction effects between both genes on economic traits were detected in a preliminary analysis.

Model of Fixed Effects:

y = *LEPR* + *MC4R* + Sire Line + Boar (Line) + Gender + Batch + Covs

RESULTS

Significant Effects of the *LEPR T* allele

PRODUCTION TRAITS	Mean	*Additive* (SE)	Significance
Body Weight 225 d, kg	131.4	2.52 (.66)	***
ADG, gr	457	44 (17)	*
BFT at 130 kg, mm	25.3	1.47 (.43)	***
Loin Weight‡, kg	6.4	-0.29 (.05)	***
Shoulder Weight‡, kg	15.3	-0.28 (.07)	***
Ham Weight‡, kg	25.1	-0.5 (.10)	***
Premium Cuts Yield, %	40	-0.92 (.16)	***

MEAT QUALITY TRAITS	Mean	*Additive* (SE)	Significance
Loin IMF,%	6.21	0.66 (.16)	***
Loin Protein content,%	22.1	-0.3 (.06)	***
Minolta lightness	40.13	1.1 (.34)	***
Meat Shear Force	4.23	-0.3 (.14)	*
Backfat Fatty Acid Composition			
SFA	38.51	0.6 (.12)	***
MUFA	52.84	-0.35 (.12)	**
PUFA	8.65	-0.25 (.06)	***

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$; ‡Adjusted for Carcass Weight

No Significant Effects were detected for the *MC4R* SNP

REMARKS

- The positive effects of the *LEPR T* allele on growth, fat accumulation, and saturated fatty acid content may be explained by a primary effect on the feed intake.
- Fat carcasses usually present low Premium Cuts Performance and MUFA and PUFA contents. It may explain the detected negative effects of the *LEPR T* allele on these traits.
- This analysis has failed to confirm the association between the porcine *MC4R* c.1426A>G SNP with growth and fatness traits. The discrepancy of our results with other analyses in different breeds and crosses suggests that the association analyses of other recently reported *MC4R* SNPs would be advisable.