# Adipose tissue transcriptome in Iberian and Duroc pigs fed different energy sources

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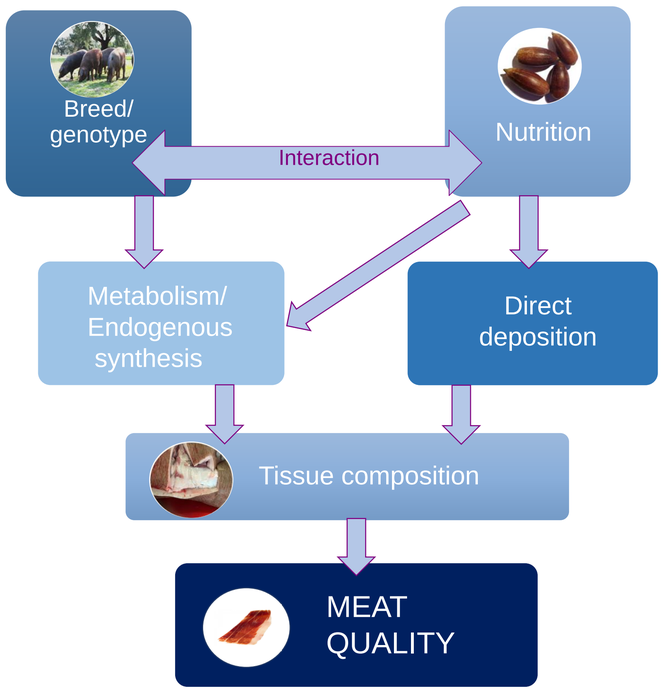
## INTRODUCTION




Meat quality depends on tissue composition which is in turn influenced by different factors, such as diet, genotype, age, or sex.

## OBJECTIVE

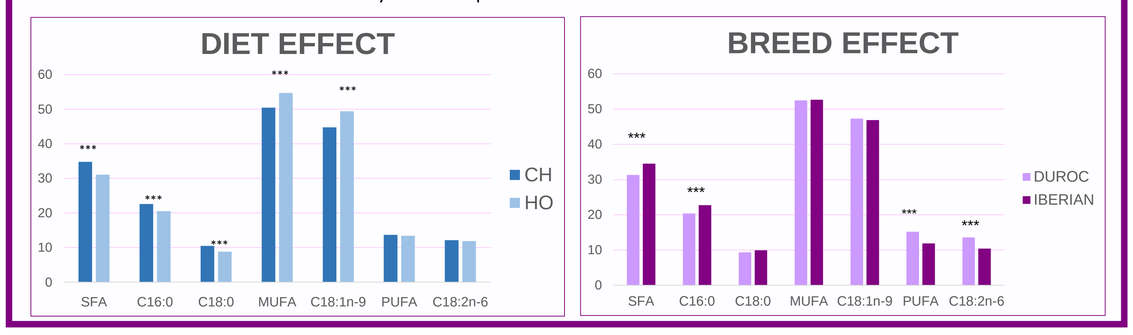
In this study, we evaluated the effects of a diet supplemented with 6% oleic sunflower oil (HO) or carbohydrates (CH) as energy source on subcutaneous ham fat composition and gene expression in growing Iberian and Duroc pigs, with RNA-seq technology.

## PHENOTYPIC RESULTS

**DIET effect** → HO Diet ↑ MUFA and oleic acid; CH Diet ↑ SFA

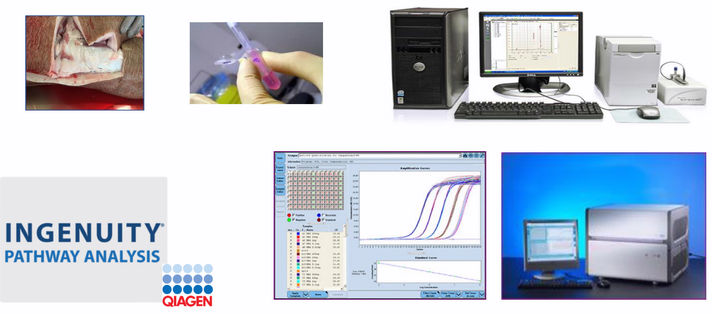
**BREED effect** → Iberian ↑ SFA; Duroc ↑ PUFA

Fatty acid composition in subcutaneous ham fat




## RNAseq DESING AND WORKFLOW

Total RNA was extracted → Quantified and quality validated → Sequencing on a Illumina HiSeq2000



INGENUITY PATHWAY ANALYSIS — QIAGEN





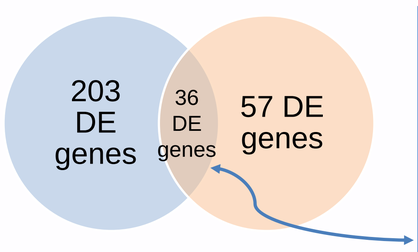
- QUALITY CONTROL: FASTQC, TRIMGALORE
- MAPPING AND ASSEMBLY **(Sscrofa11.1)**: TOPHAT, CUFFLINKS
- DIFFERENTIAL EXPRESSION ANALYSIS: CUFFMERGE, CUFFDIFF
- FUNCTIONAL INTERPRETATION: IPA
- VALIDATION RESULTS: RT qPCR

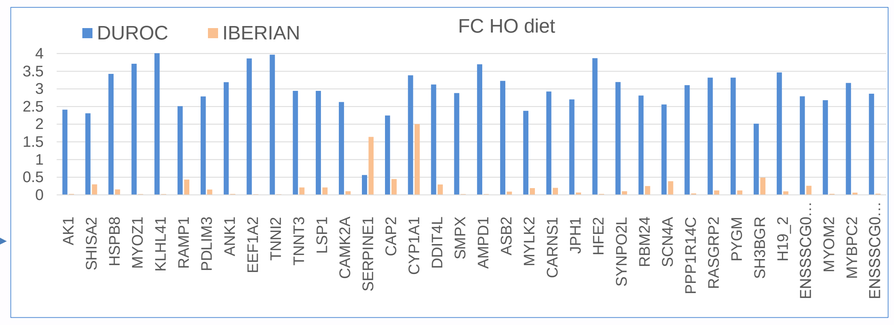
## TRANSCRIPTOMIC ANALYSIS RESULTS

Nº reads/sample: 38-55 millions
% of mapped reads: 91-93 %
Nº of expressed genes: 19181
Expression> 0.5 FPKM
Fold change ≥ 1.5 and FDR<0.1

Iberian pigs:
128 up-regulated genes in HO
75 up-regulated genes in CH

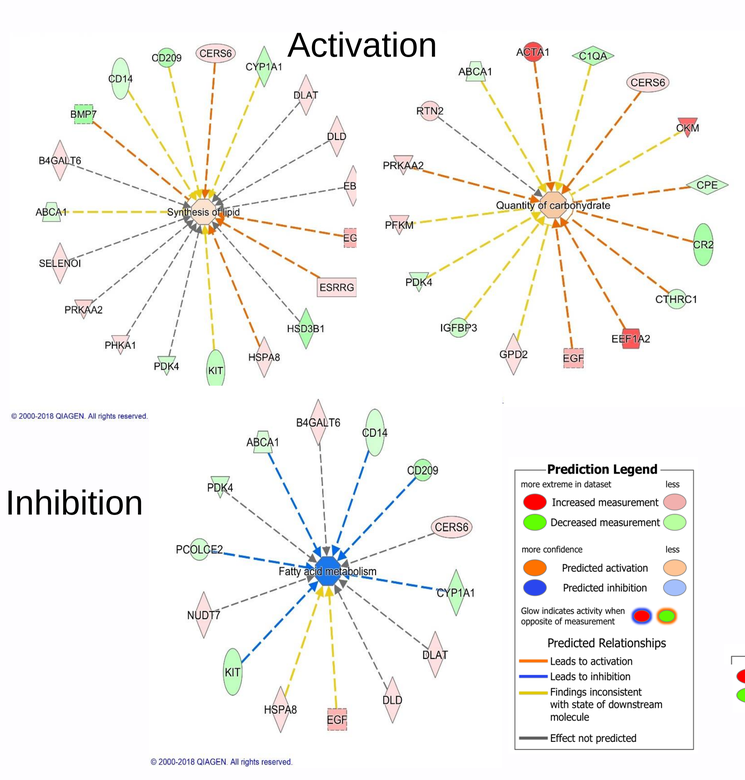
Duroc pigs:
46 up-regulated genes in HO
10 up-regulated genes in CH



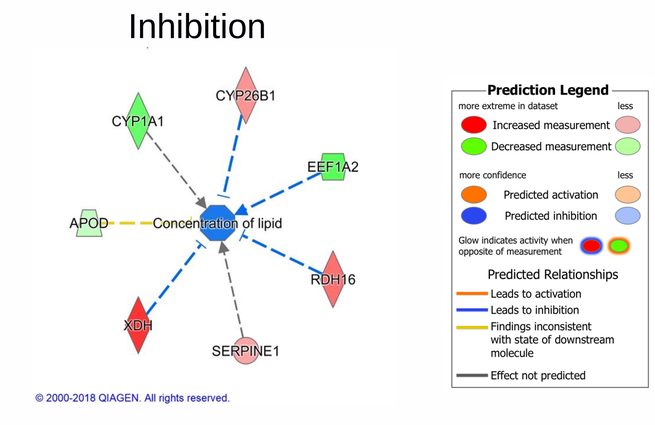

36 DE genes were common between breeds. Out of these, 34 genes were upregulated in HO diet in Duroc but upregulated in CH diet in Iberian, one gene showed the opposite regulation (SERPINE1) and only one DE gene was upregulated in HO diet in both breeds (CYP1A1). **These results indicate a strong interaction breed*diet on transcriptome.**

## FUNCTIONAL ANALYSIS IN IBERIAN PIGS




**Enriched functions**
-Carbohydrate metabolism
-Molecular transport
-Oxidation of fatty acid
-Conective tissue development and function
-Free radical scavenging
-Inflamatory response

## FUNCTIONAL ANALYSIS IN DUROC PIGS




**Enriched functions**
-Lipid metabolism (concentration and transport)
-Vitamin metabolism
-Molecular transport
-Protein synthesis
-Energy production

## REMARKS

- The results indicate the direct deposition of nutrients and a profound and different effect of the diet on adipose tissue gene expression between breeds, affecting relevant biological pathways.
- Five out of six DE genes were validated by qPCR, selected among those being DE by diet in both breeds, with the interaction being confirmed.

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