# The interaction of gender and *MC4R* genotype on feed intake and lean meat gain in growing finishing pigs

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# Introduction

**Melanocortin 4 receptor: (**Asp298Asn polymorphism)

→ association studies→ increased daily gain and lower lean meat content in pigs

**Rodents and human:  feed intake**
**Effect on feed intake in pigs not well studied**
**Aim:**

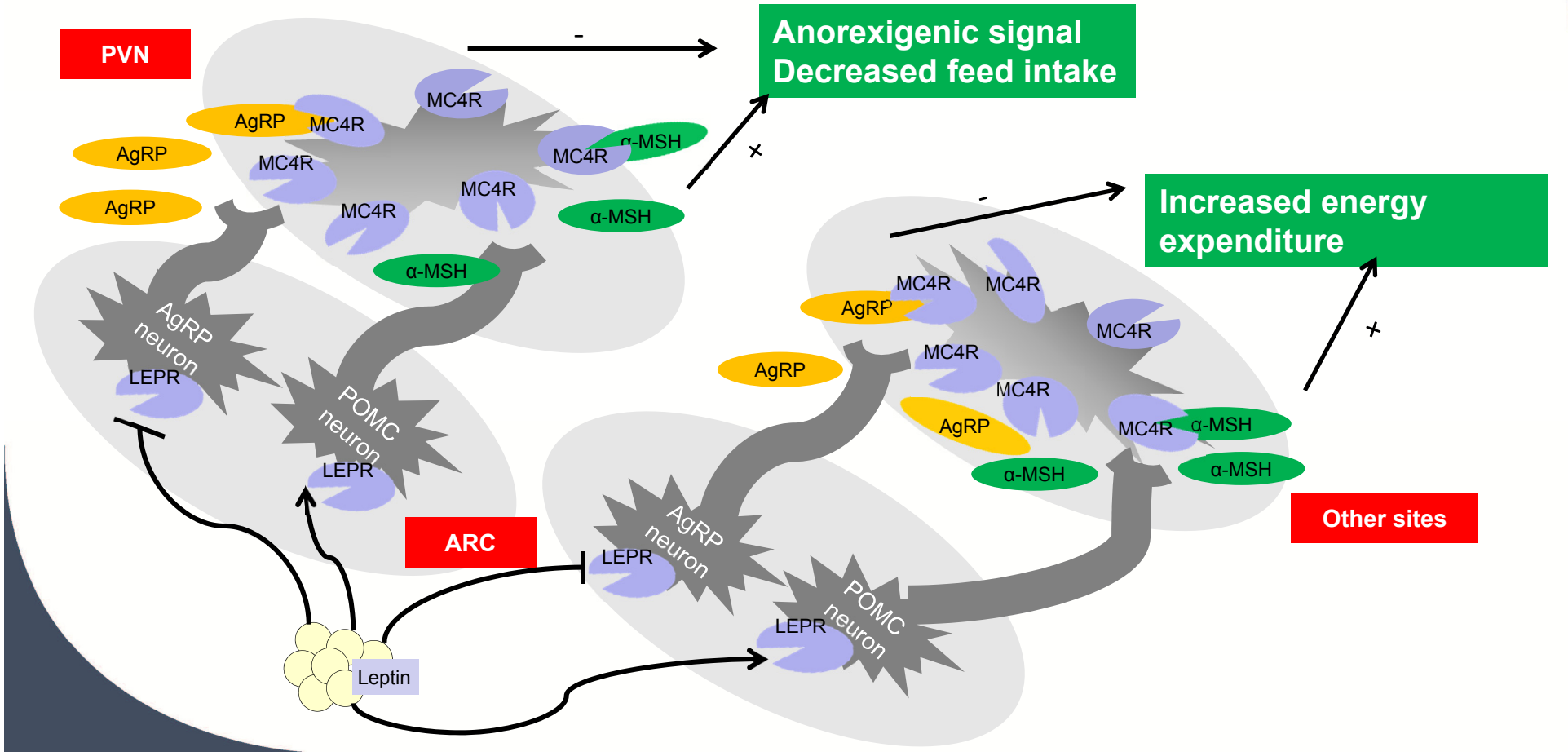
- **effect on DFI**
- **effect on  DG and DLMG**
- **effects on carcass quality**
- **effect on FCR**

# Function MC4R

**Function MC4R** in rodents and humans**:**

- part of **leptin-melanocortin** pathway
- information **adipose tissue → hypothalamic responses**
- changes in **feed intake** and **metabolic rate**

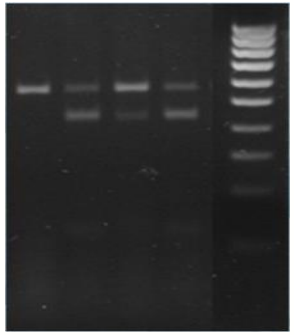
# Leptin-melanocortin pathway



# Experimental design

- **interventional** study
- offspring of a **commercial cross** (hybrid sow X Piétrain)
- Homozygous littermates of AG sow x AG sire

| n | EM | G |
|---|---|---|
| **AA** | $6^x11$ | $6^x11$ |
| **GG** | $6^x11$ | $6^x11$ |



# Performances

- ***ad libitum* three phase- feeding**
  - 20-40 kg: NEv: 9.6 MJ/kg; dLYS: 9.5 g/kg
  - 40-70 kg: NEv: 9.4 MJ/kg; dLYS: 8.5 g/kg
  - 70-110 kg: NEv 9.2 MJ/kg; dLYS: 7.5 g/kg

- **Weekly data collection**
  - individual weight
  - feed consumption per pen
- **Slaughter**: intended average live weight of **110 kg**

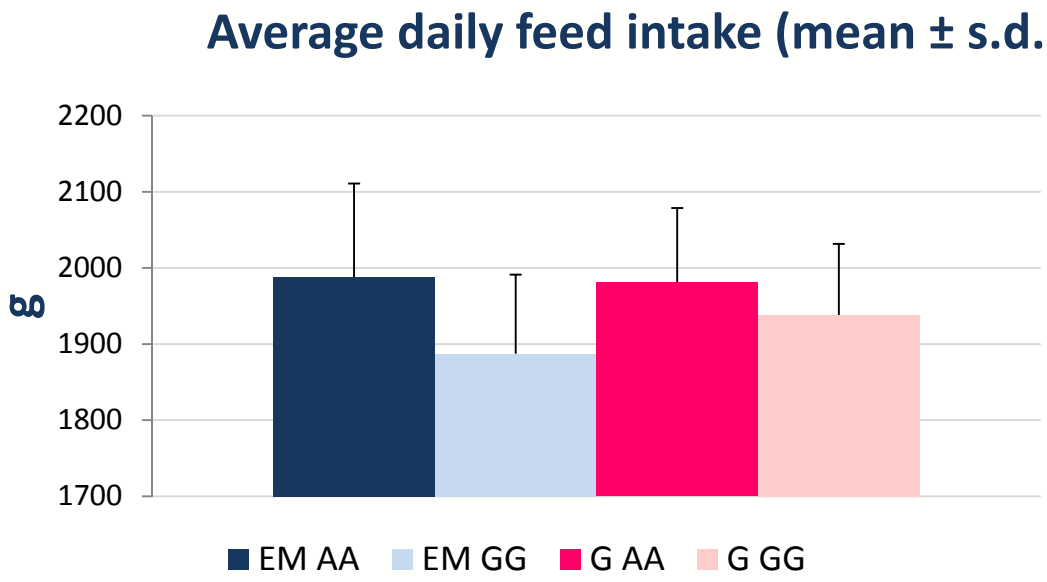
# Carcass quality

**Carcass quality (n= 237)**

Individual data collection  in slaughterhouse

- muscle thickness
- backfat thickness
- meat percentage

# Performances: DFI

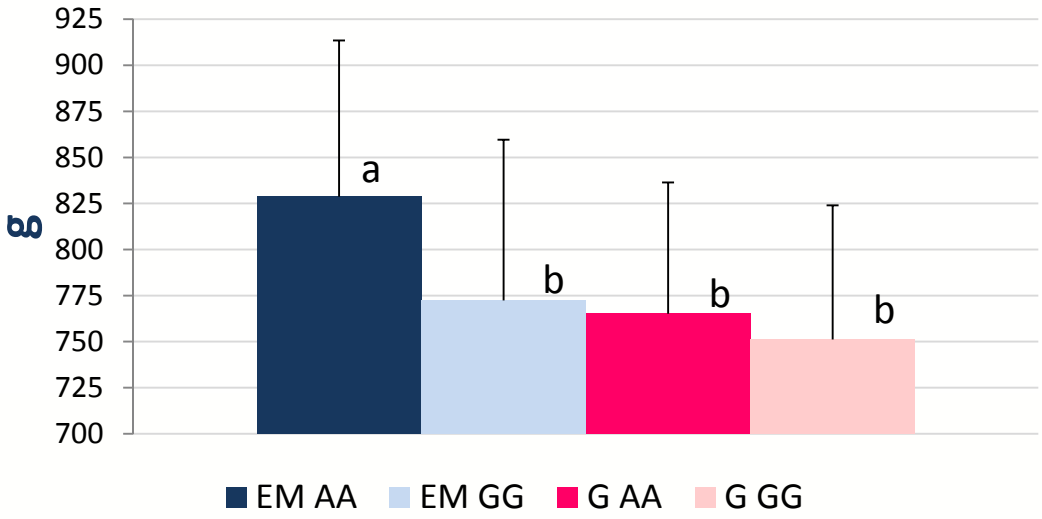



n=44 pens

| | |
|---|---|
| Gender | P=0.528 |
| **Genotype** | **P=0.001** |

# Performances: ADG

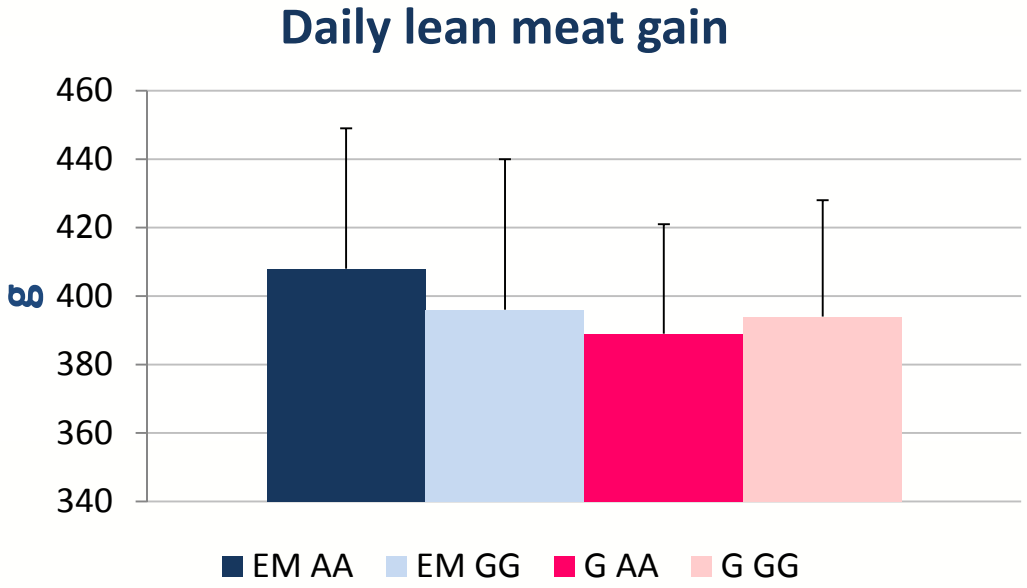
## Average daily gain




n=254 animals

| | |
|---|---|
| **Gender** | **P<0.001** |
| **Genotype** | **P<0.001** |
| **Gender^x^Genotype** | **P=0.044** |

# Performances: DLMG



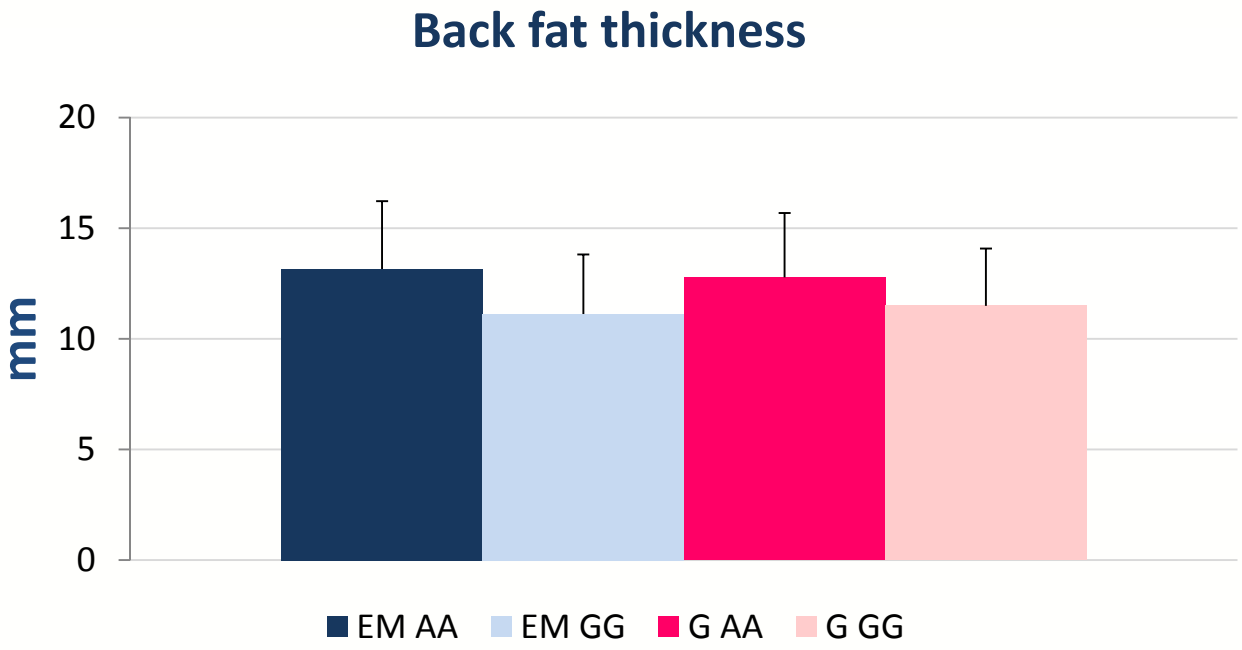

**n=254 animals**

| | |
|---|---|
| Gender | *P=0.051* |
| Genotype | P=0.544 |

# Carcass quality

- **No gender x genotype interaction** for any carcass trait

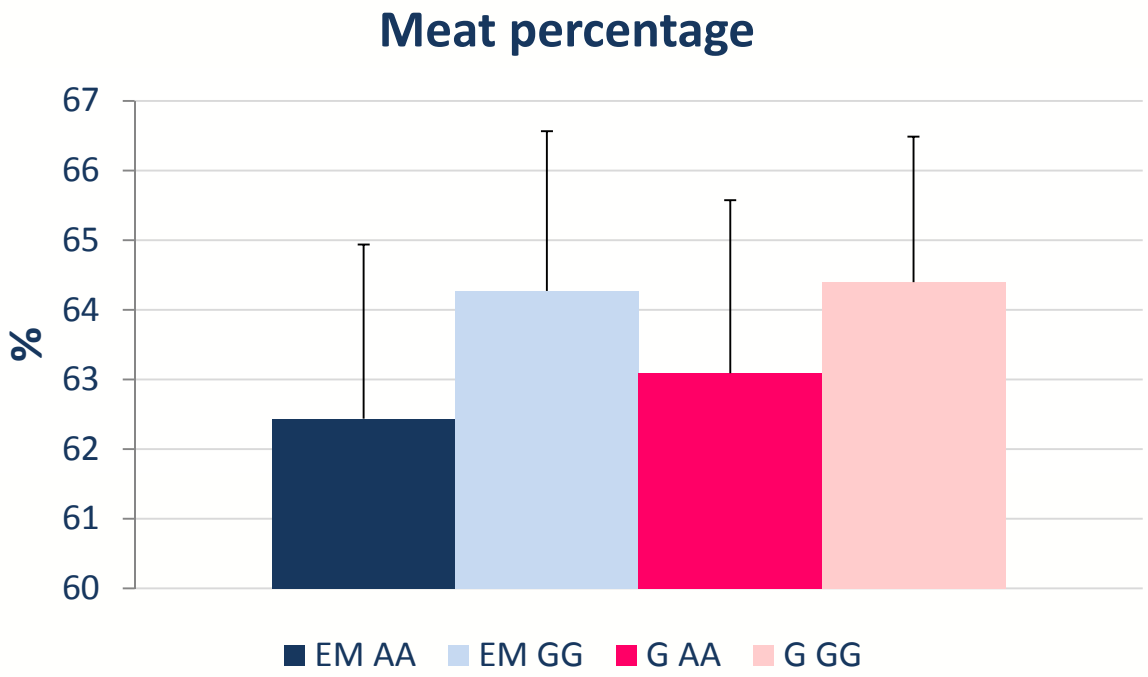
# Carcass quality: fat




| | |
|---|---|
| Gender | P=0.875 |
| **Genotype** | **P<0.001** |

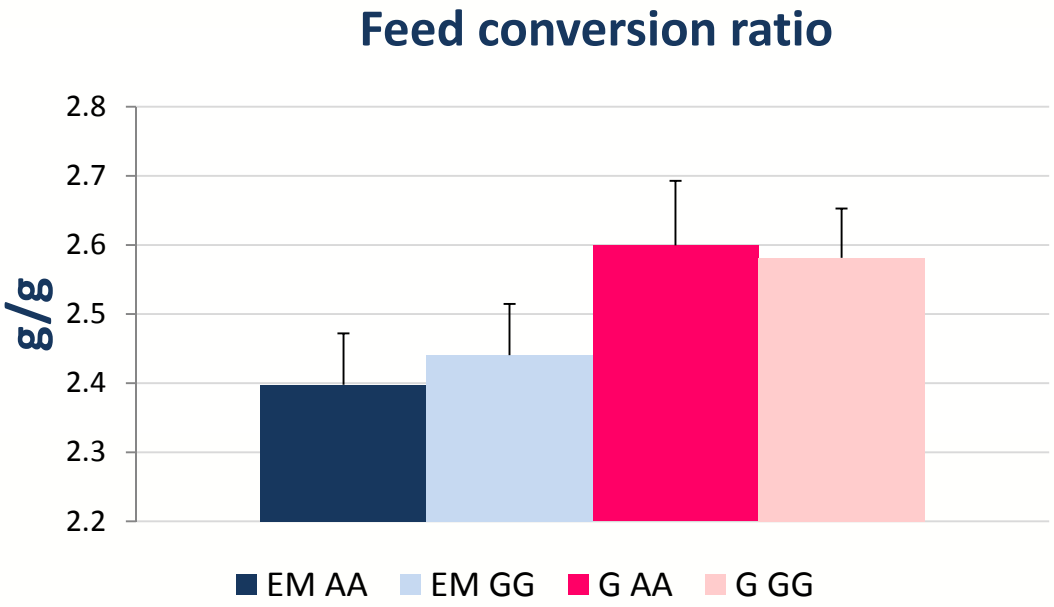
**CGM device**

# Carcass quality




| | |
|---|---|
| Gender | P=0.281 |
| **Genotype** | **P<0.001** |

# Performances: FCR




**n=44 pens**

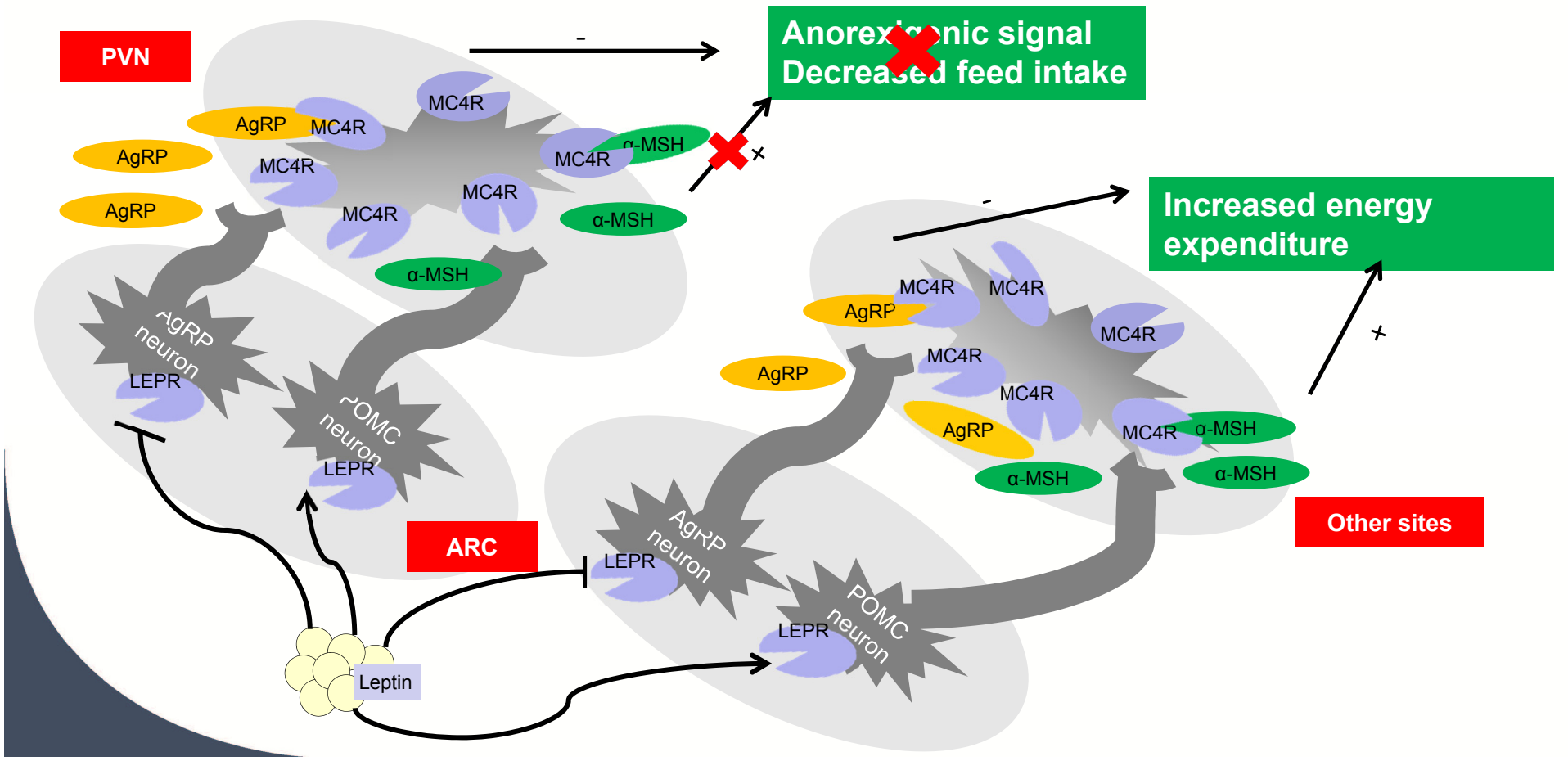
| **Gender** | **P<0.001** |
|---|---|
| Genotype | P=0.570 |

# Discussion

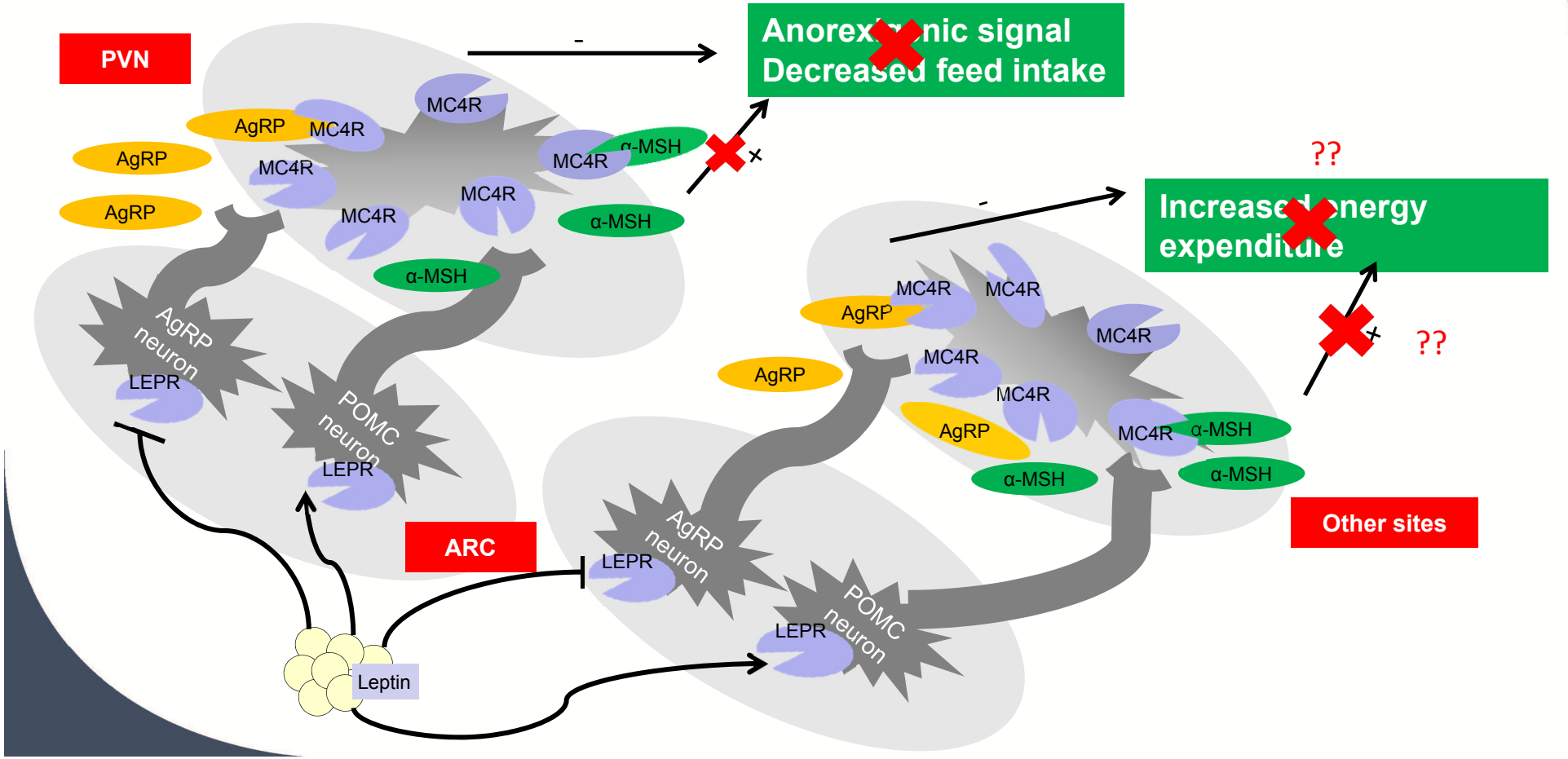
- ↑ DG of AA animals due to↑ DFI
- No effect on DLMG
- Extra DG: extra fat deposition

- No effect on FCR although AA lower lean meat percentage:
  - faster growth AA animals: relatively lower maintenance requirements
  - decreased energy expenditure??

# Leptin-melanocortin pathway

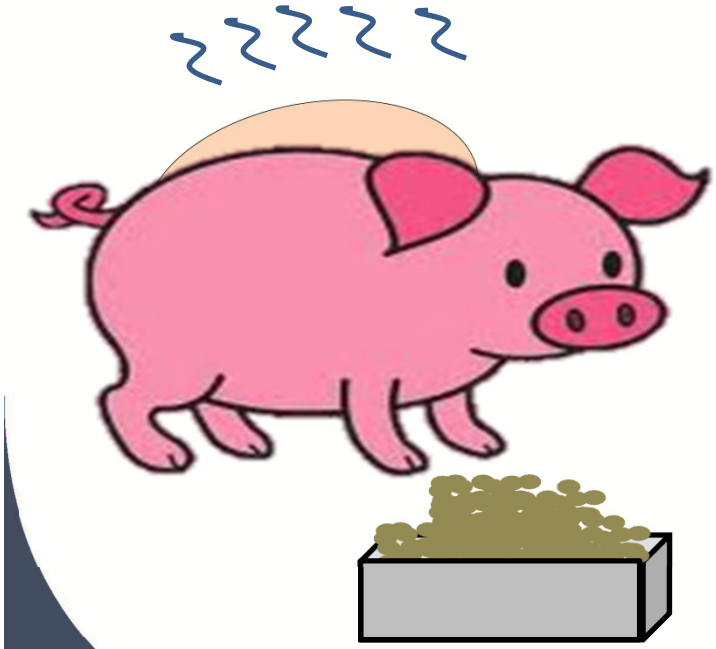


# Leptin-melanocortin pathway



# Conclusions

**AA**



| | | |
|---|---|---|
| ↑ | ADFI | ↓ |
| ↑ | ADG, EM | ↓ |
| ↓ | Meat percentage | ↑ |
| ↑ | Back fat thickness | ↓ |

**GG**

**Thank you for your attention!**