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Pig adaptation to cold environment enhances oxidative and glycolytic Longissimus muscle metabolism

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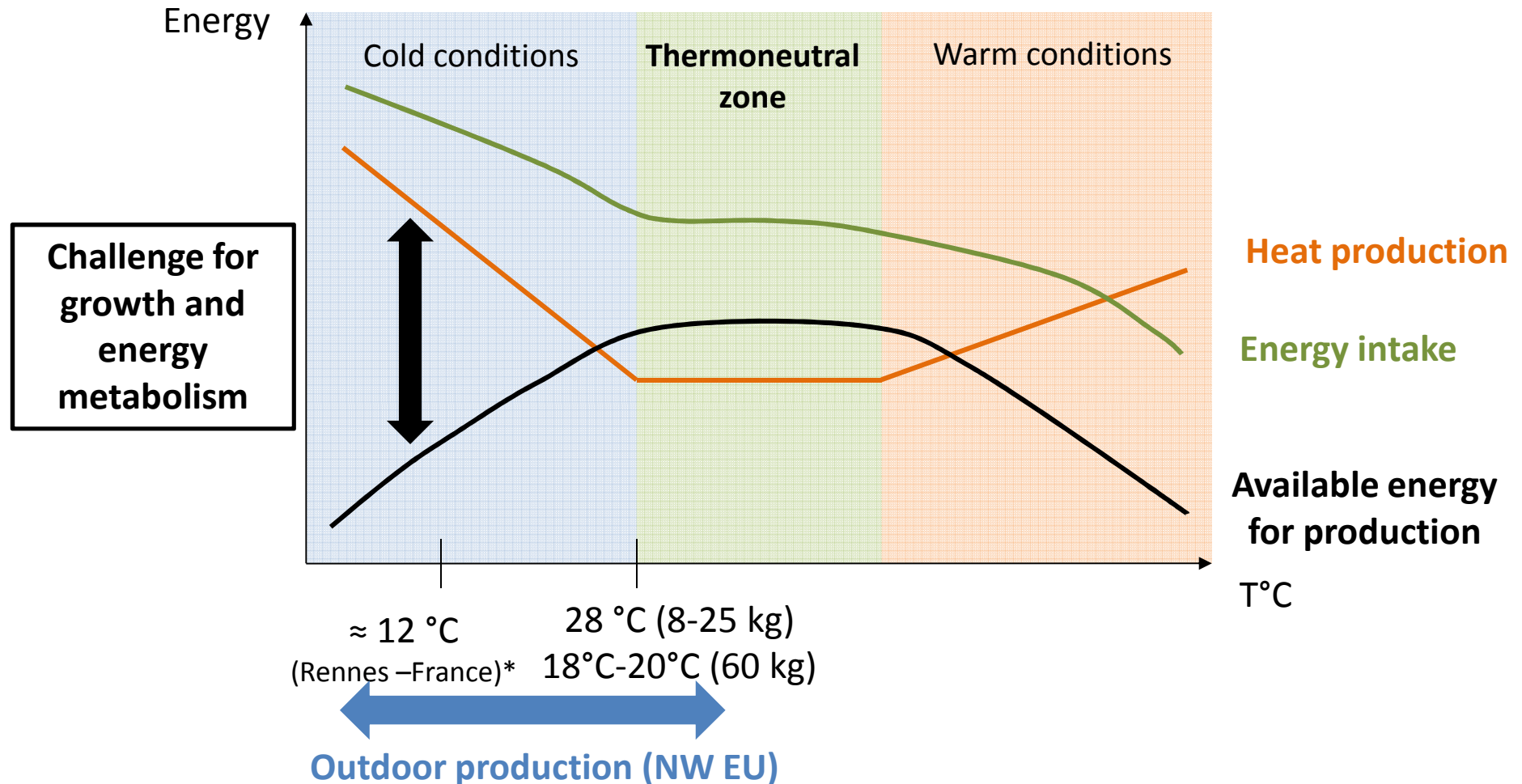
Pig adaptation to cold environment enhances oxidative and glycolytic *Longissimus* muscle metabolism

Faure J., Lebret B., Bonhomme N., Ecolan P., Kouba M., Lefaucheur L.

INRA-Agrocampus Ouest



Pig adaptation to ambient temperature



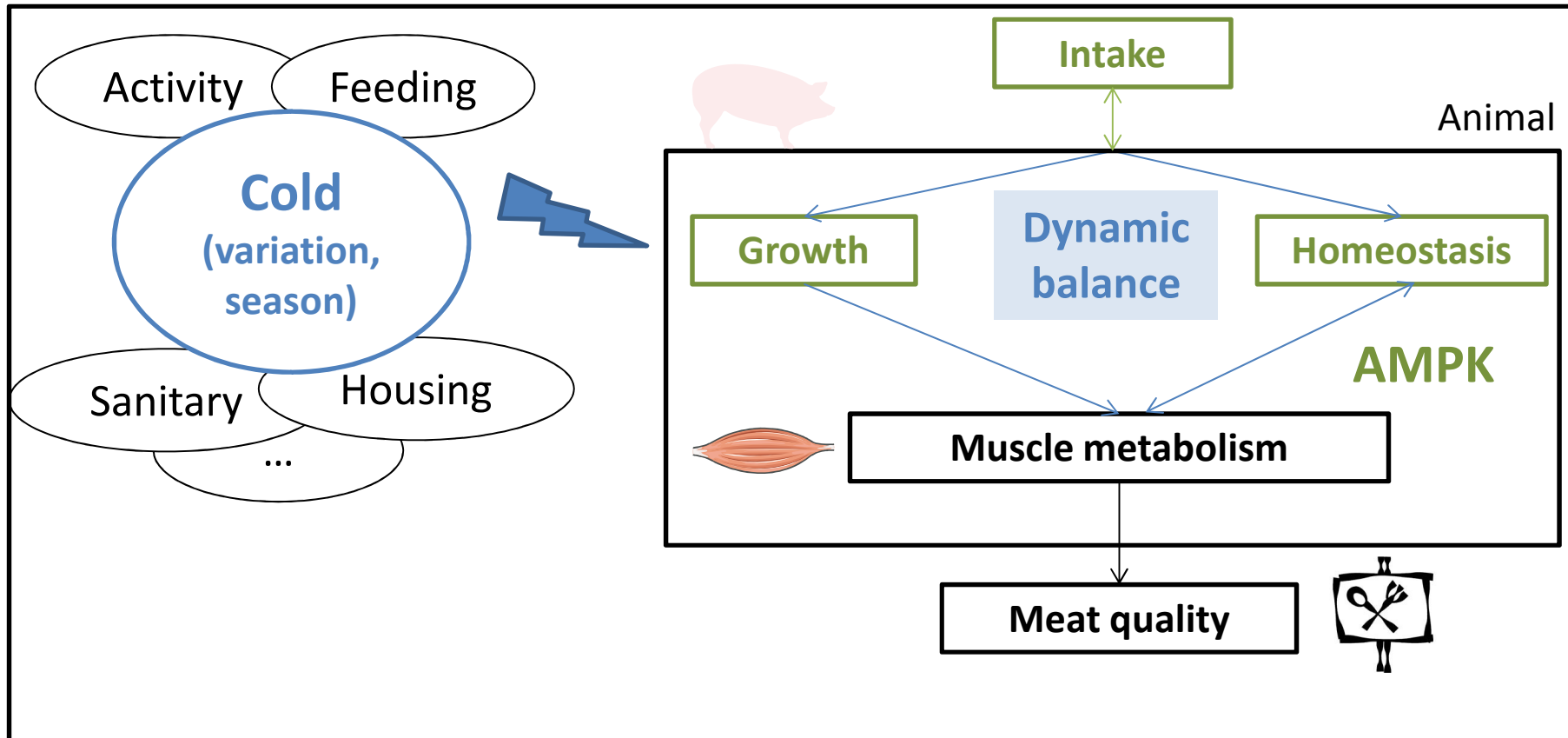
Adapted from Quiniou et al., 2000 , Le Dividich et al., 1998

* mean/year source: Météo France

Complex pig adaptation to cold environment

Introduction

Outdoor system



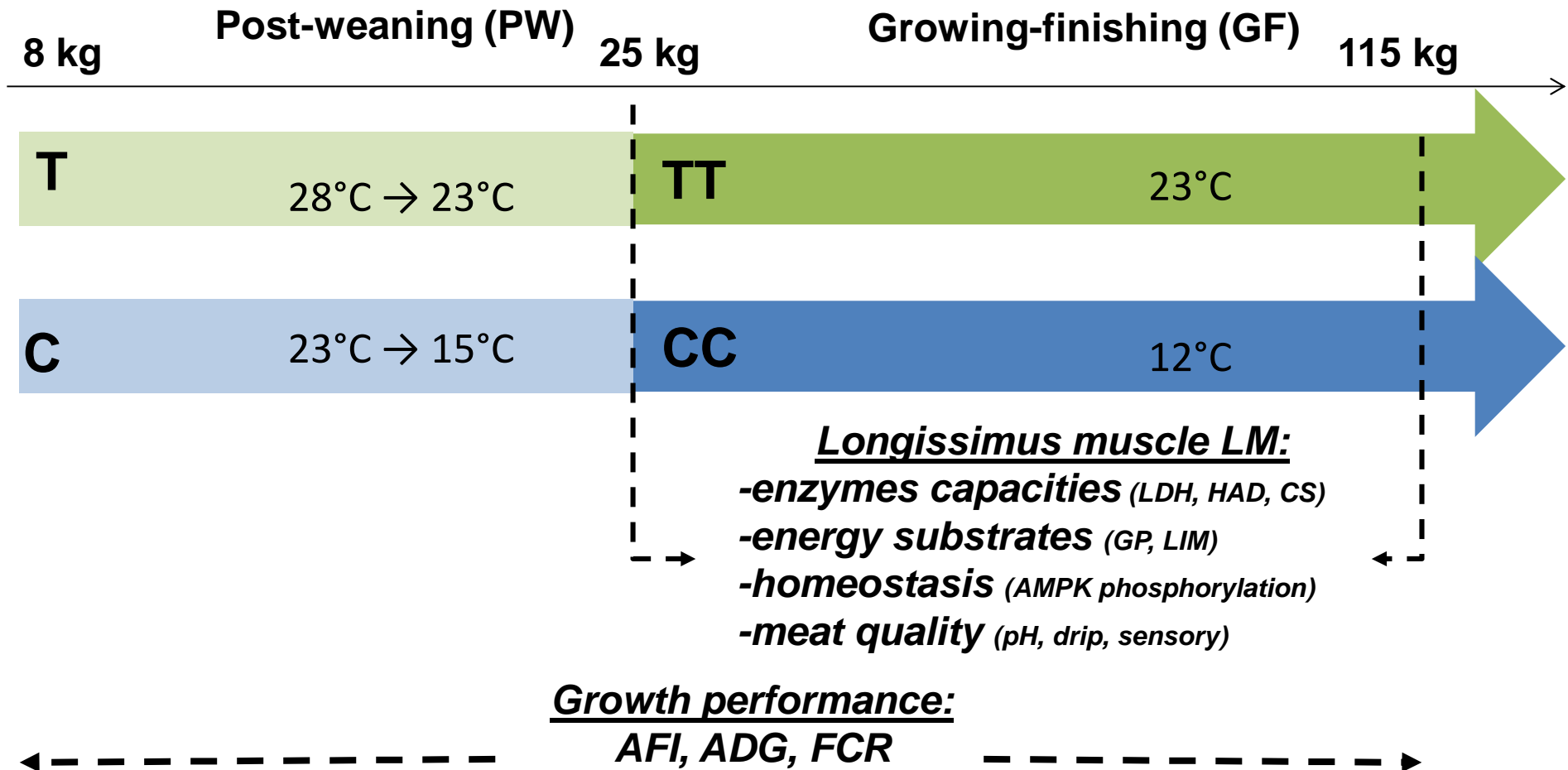
Bare effects of a constant cold exposure during growth until commercial stage (115 kg)?

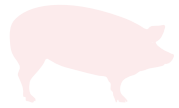
Experimental conditions

LW x (LW x Landrace)
Ad Libitum
Conventional system

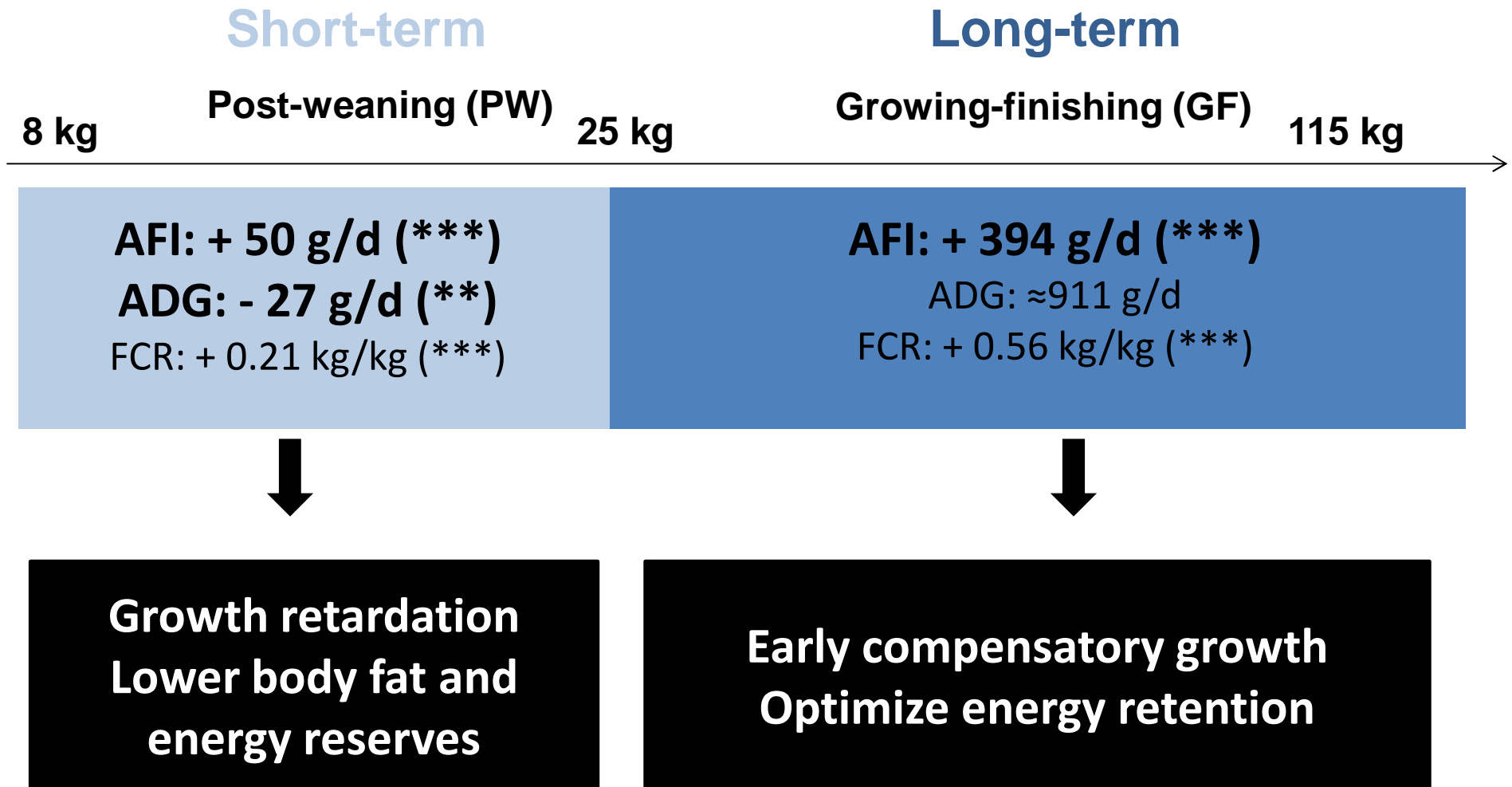
Short-term

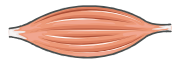
Long-term



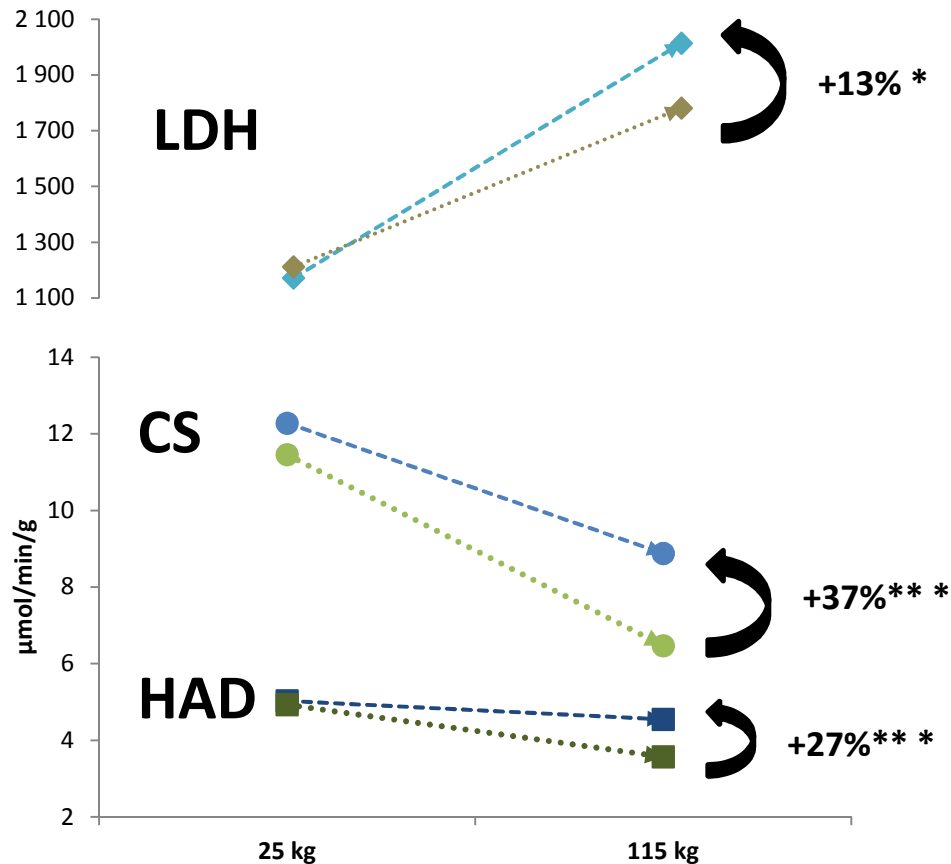


Animal adaptation depending on physiological stage





Both oxidative and glycolytic capacities enhanced by cold



↑LDH/CS *
Higher glycolysis

Long-term adaptation

↘HAD/CS **
Increase of mitochondrial oxidation
Increase of carbohydrate use

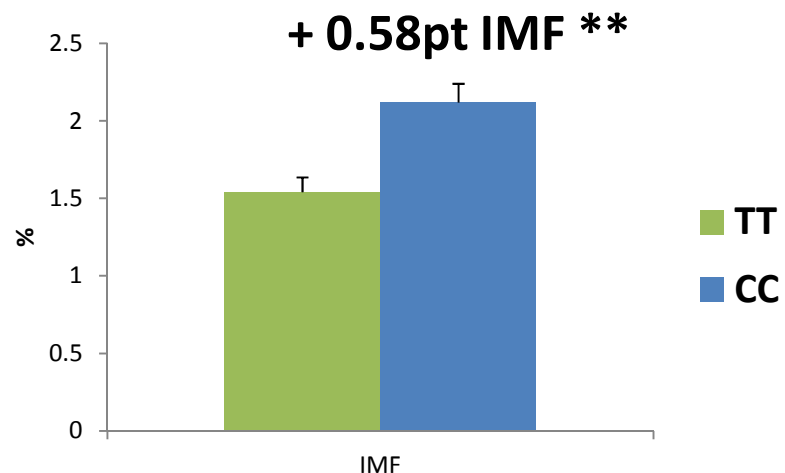
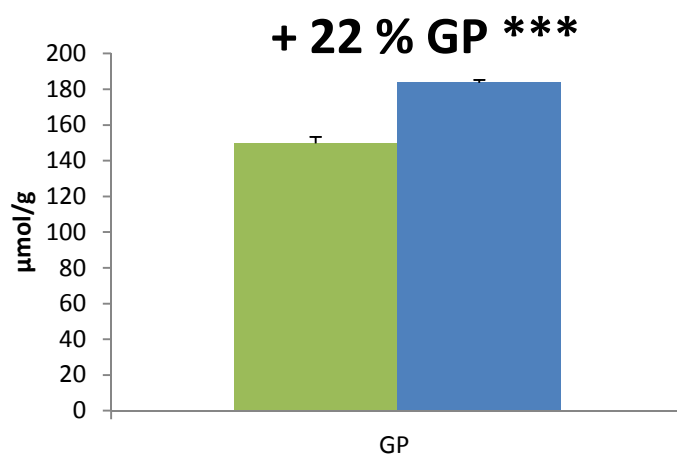
≈ pAMPK/AMPK
Homeostasis potential preserved

Related response to cold conditions
Diversity of energy use allowing muscle energy balance

Lactate Dehydrogenase (LDH), Citrate Synthase (CS), β-hydroxy-acyl-CoA (HAD))

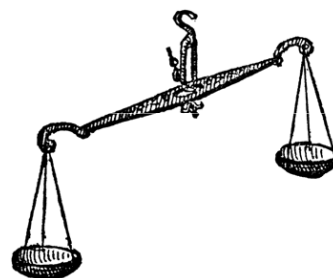


Cold effects of energy substrates modulated meat quality of loin



↓ GP

↘ ultimate pH ***
↗ Drip loss ***



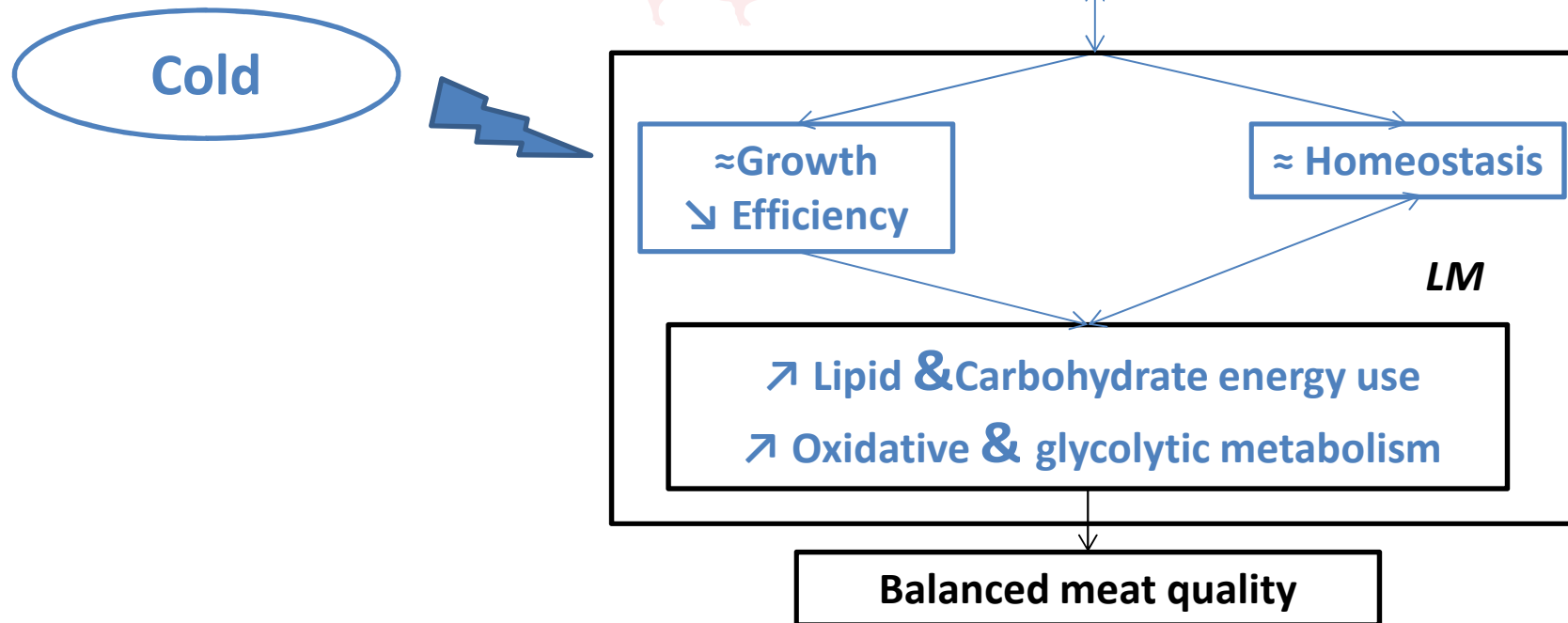
↓ IMF

≈ Juiciness and flavor

Impairment of technological meat quality but positive modulation on sensory quality

Long term effects and diversification of LM metabolism

Constant cold environment
(in a conventional pig system)



**Muscle type specific strategy = adaptation to cold conditions
LM= higher resistance to protect its energy metabolism to
another external stress?**



Thank you for your attention!

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