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

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

INRA-Agrocampus Ouest

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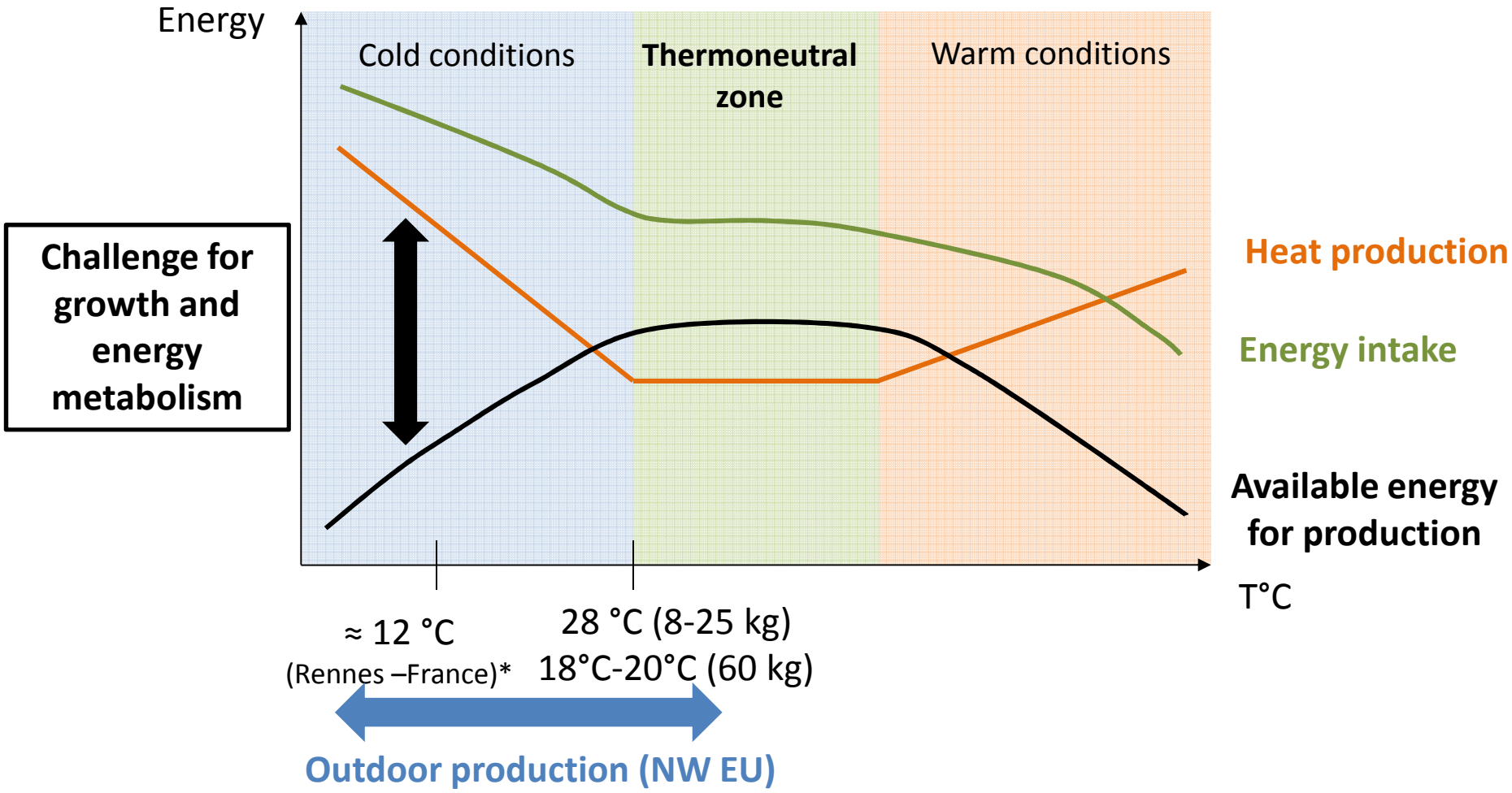
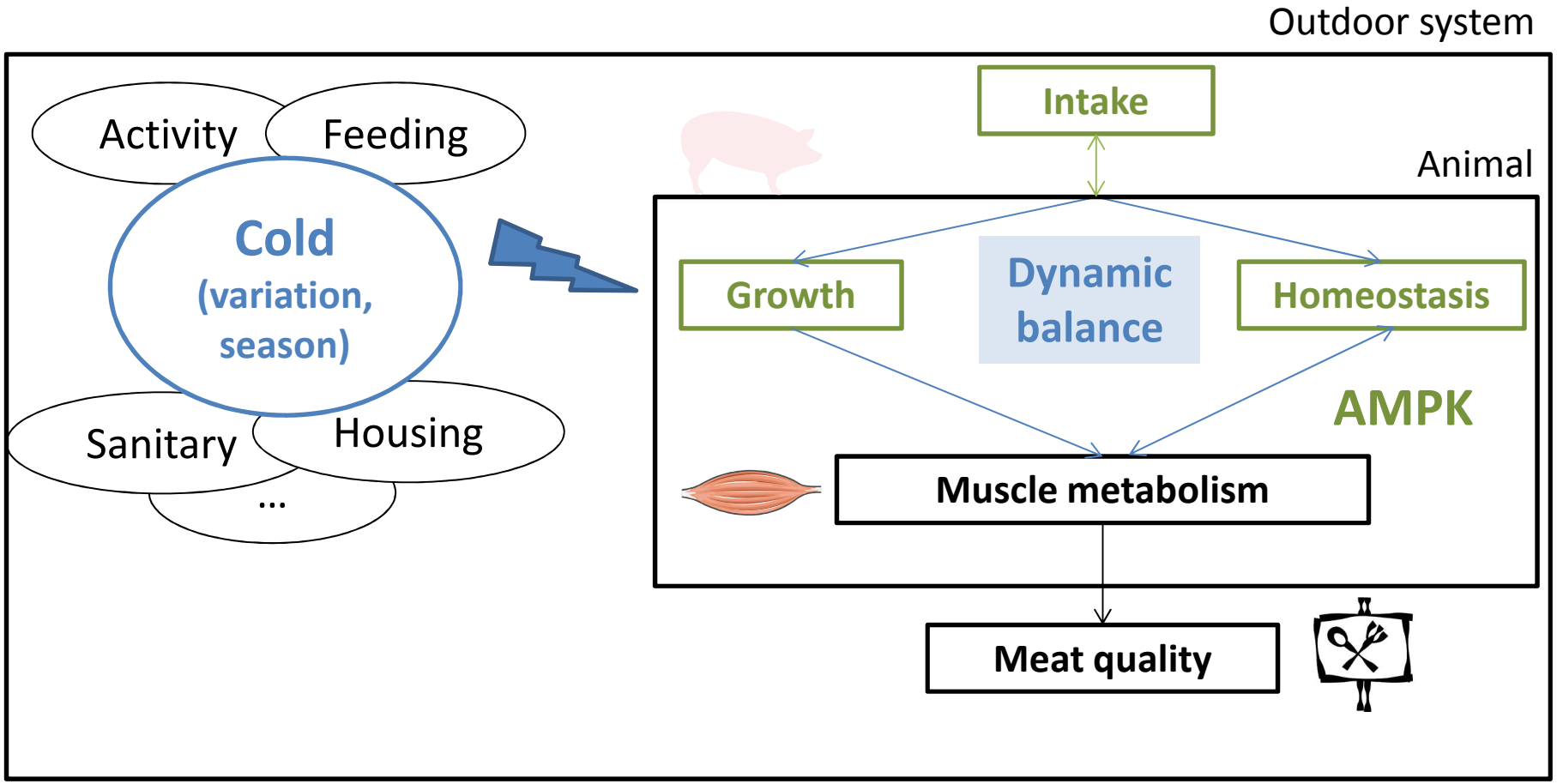
Pig adaptation to ambient temperature



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

* mean/year source: Météo France

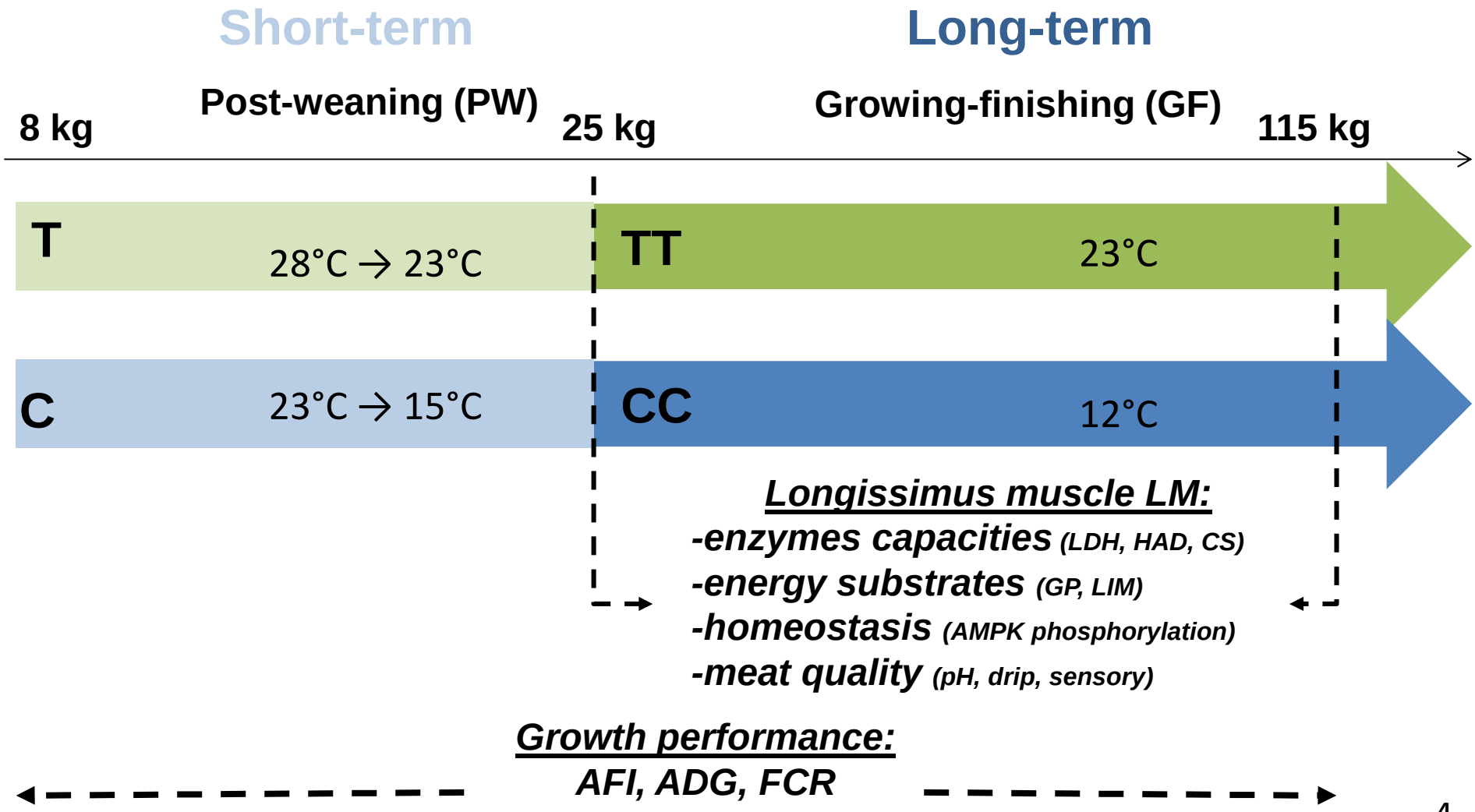
Complex pig adaptation to cold environment



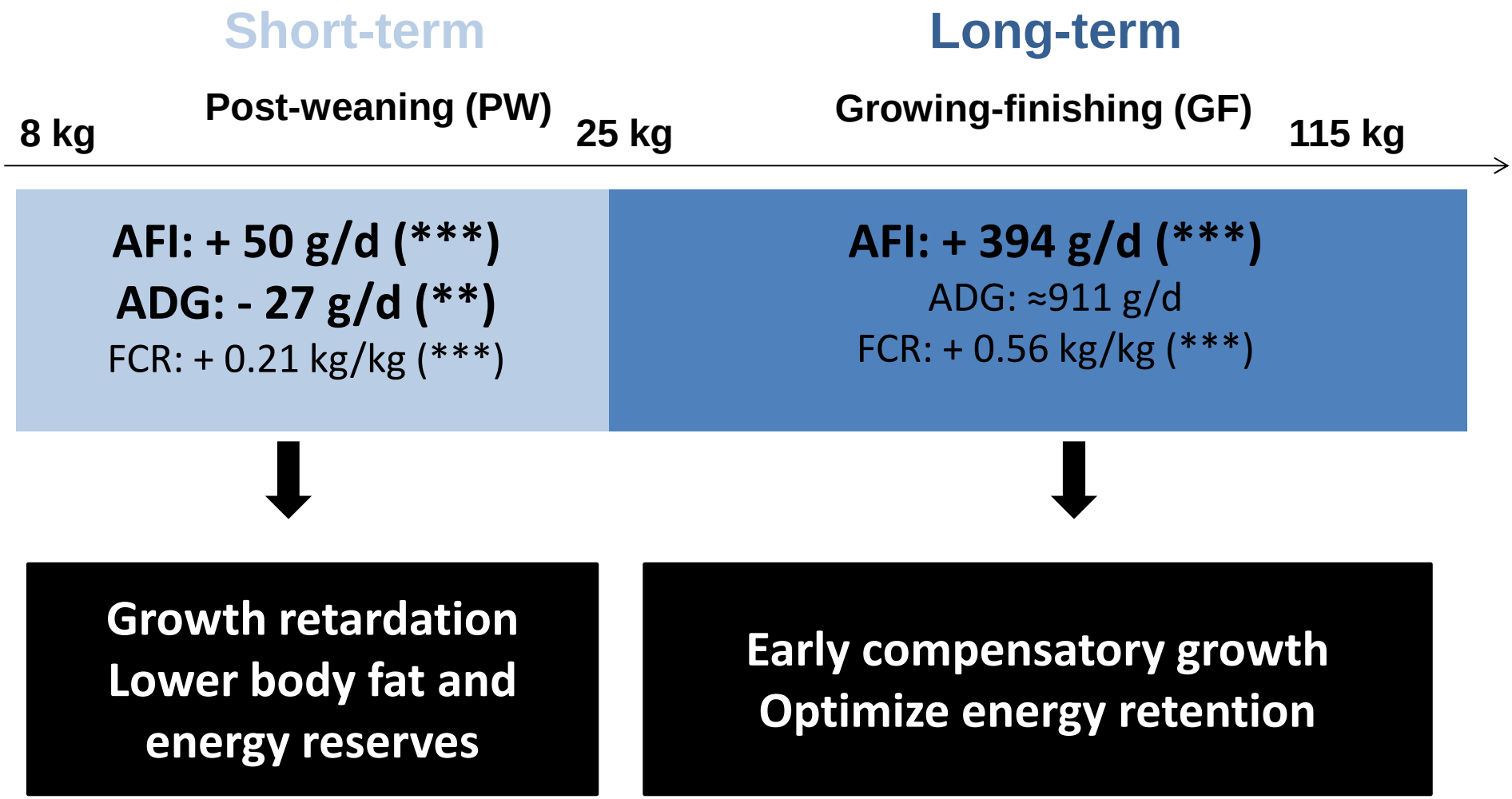
Bare effects of a constant cold exposure during growth until commercial stage (115 kg)?

Experimental conditions

LW x (LW x Landrace)
Ad Libitum
Conventional system

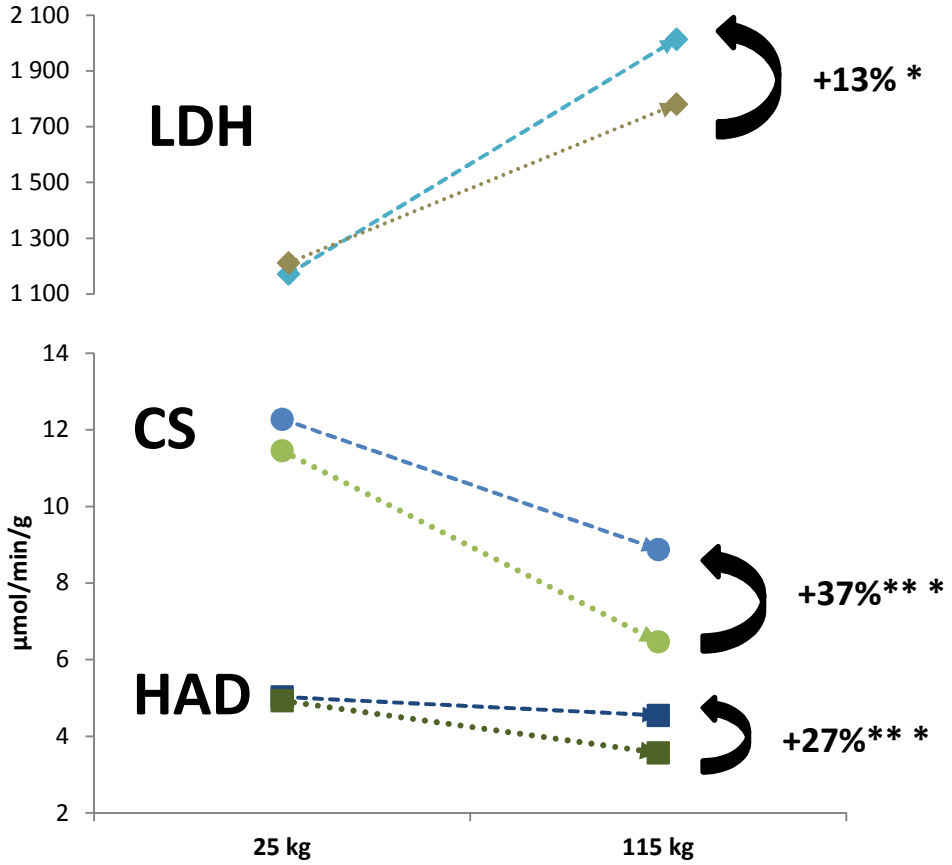


Animal adaptation depending on physiological stage



Average Feed Intake (AFI), Average Daily Gain (ADG), Feed Conversion Ratio (FCR)

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

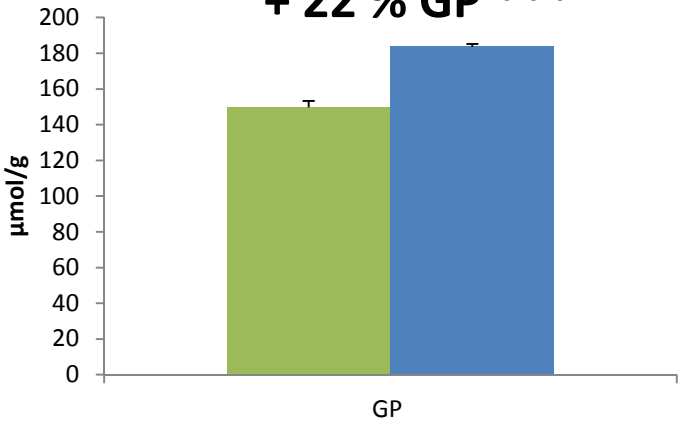
≈ pAMPK/AMPK
Homeostasis potential preserved

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

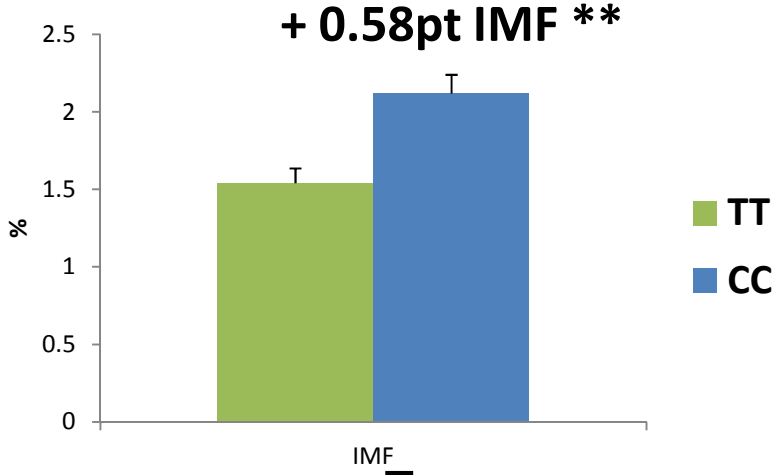
Lactate Dehydrogenase (LDH), Citrate Synthase (CS), β-hydroxy-acyl-CoA (HAD))

Cold effects of energy substrates modulated meat quality of loin

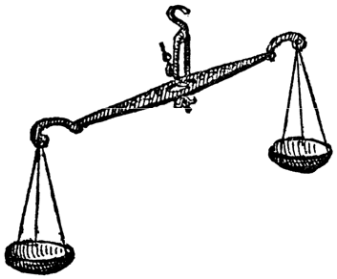
+ 22 % GP ***



+ 0.58pt IMF **



↘ ultimate pH ***
↗ Drip loss ***



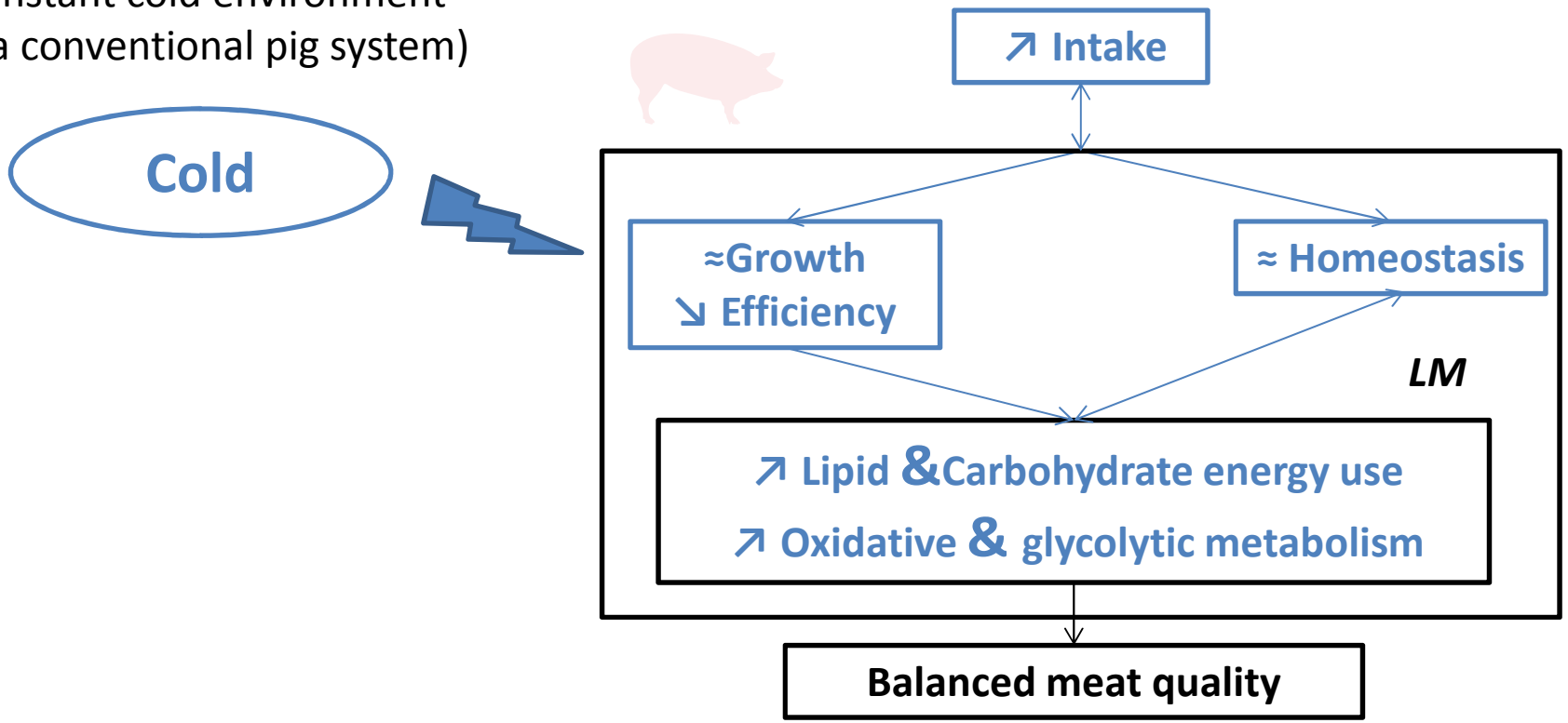
≈ Juiciness and flavor

Impairement of technological meat quality but positive modulation on sensory quality

Glycolytic Potential(GP), Intramuscular Fat content (IMF)

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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