



**Highlights from EuroPRevent in Stockholm, May 2009**

**What is new in Cardiovascular  
Prevention and Rehabilitation?**

**Basic and Translational Research**

**Øyvind Ellingsen**

**Norwegian University of Science and Technology**

**Trondheim, Norway**

# Overview

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Pre-arranged sessions

Oral abstract sessions: 1 (6)

Moderated poster session: 1 (10)

Poster session: 1 (9)

*less is more.....*

Exercise  
is on the rise

# **Regular Exercise Training Prevents Aortic Valve Disease in Mice**

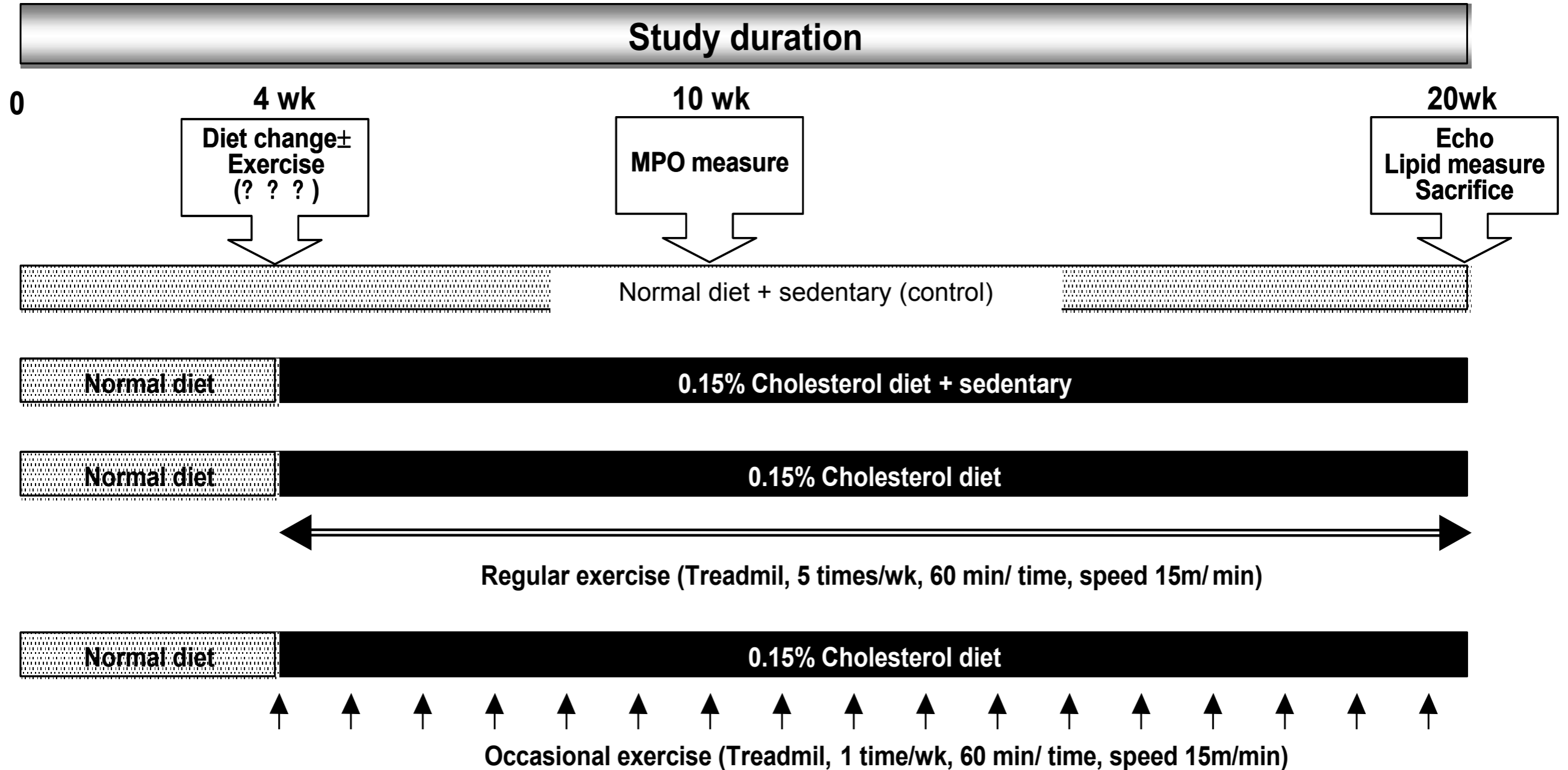
*Matsumoto Y, Adams V, Jacob S, Linke A, Schuler G  
University of Leipzig, Heart Center, Department of Cardiology*

*EUROPREVENT 2009  
Stockholm 08. May 2009*

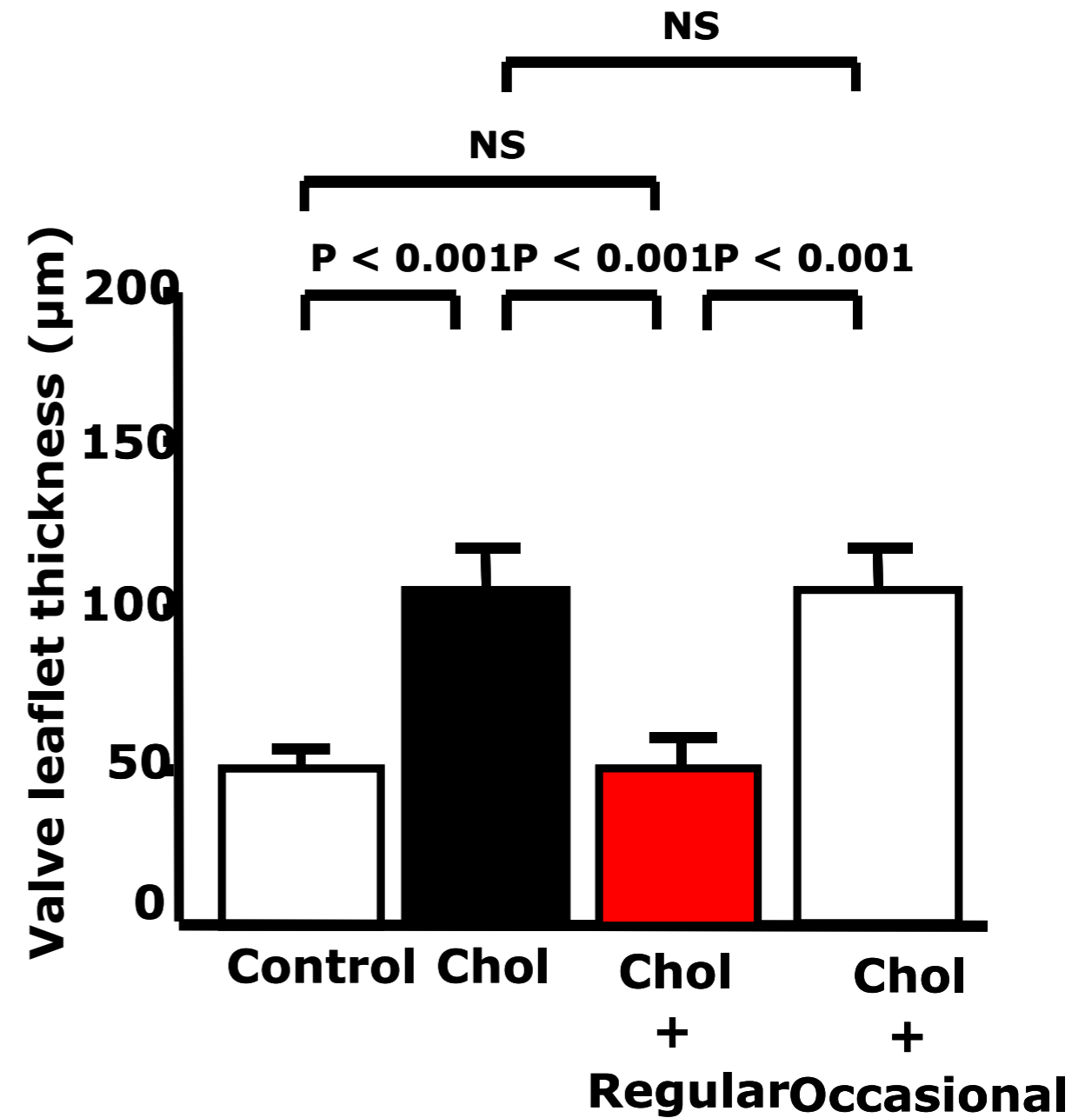
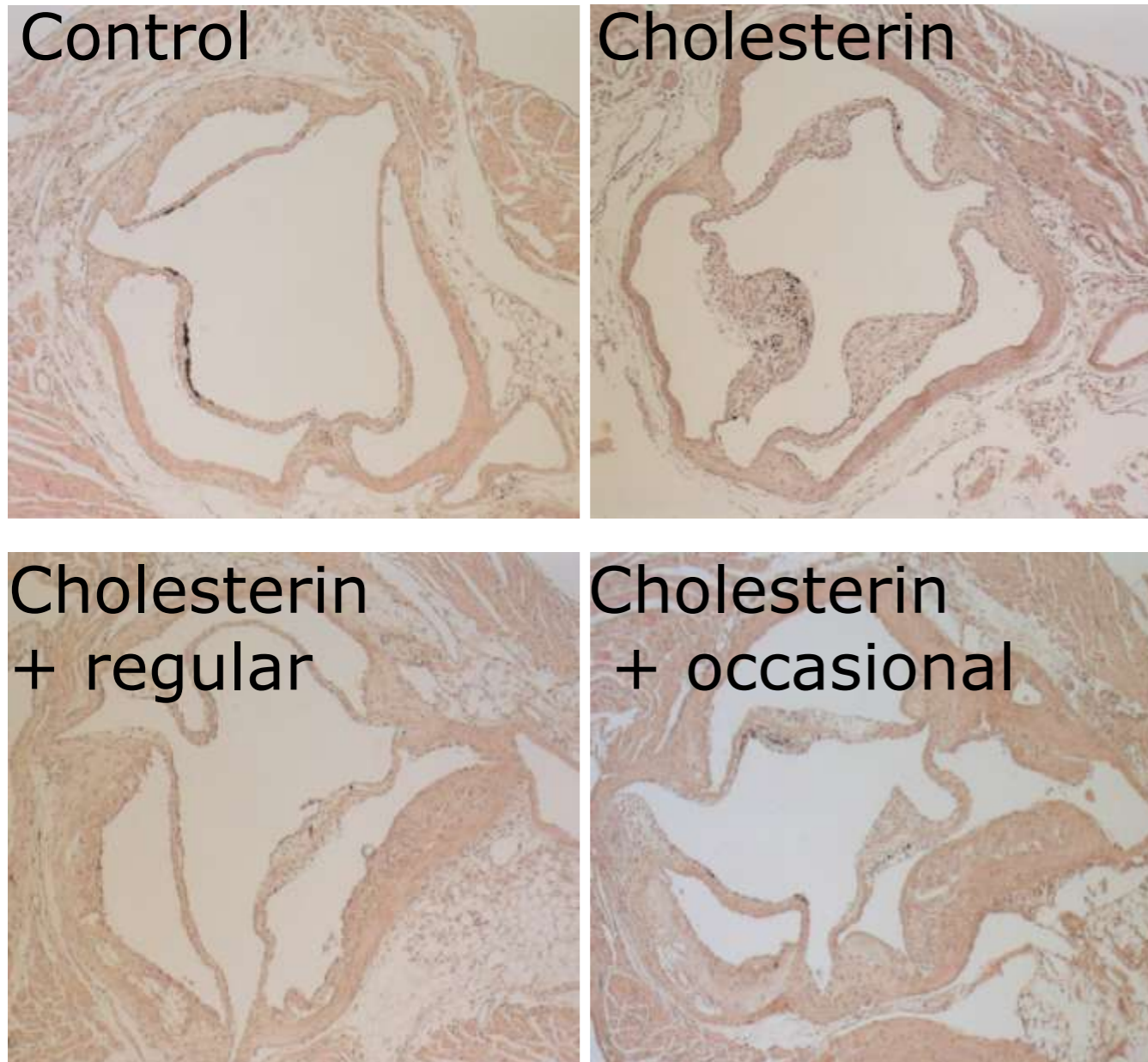
**UNIVERSITÄT LEIPZIG**  
**HERZZENTRUM**

# Study Design

LDLR-/-

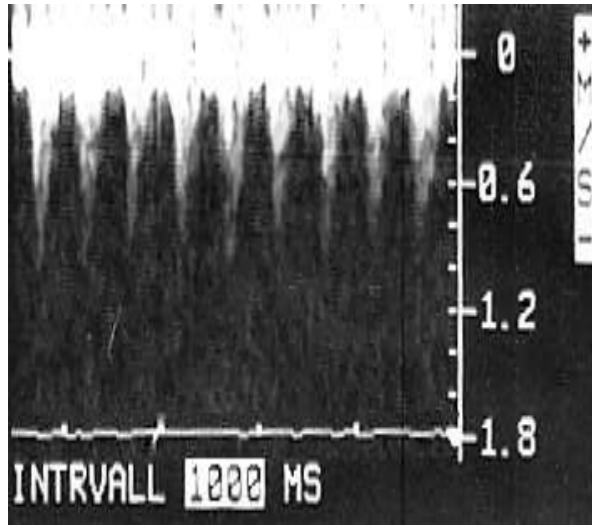


# Results – Valve Thickness

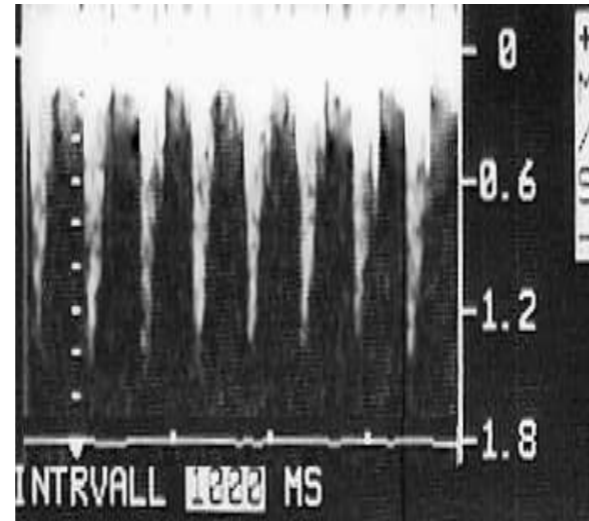


# Results – Blood Flow Velocity

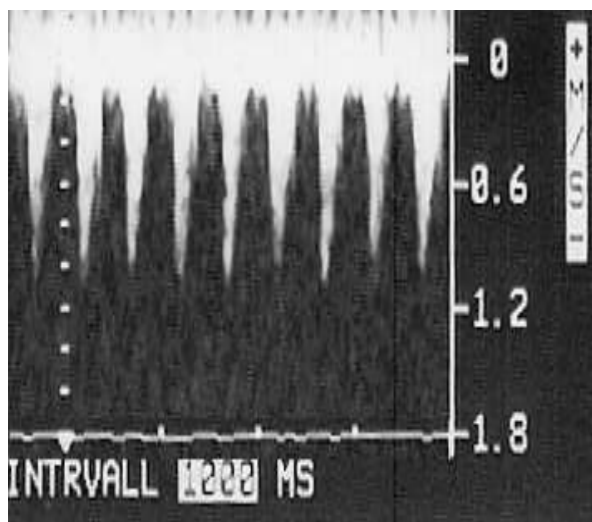
**Control**



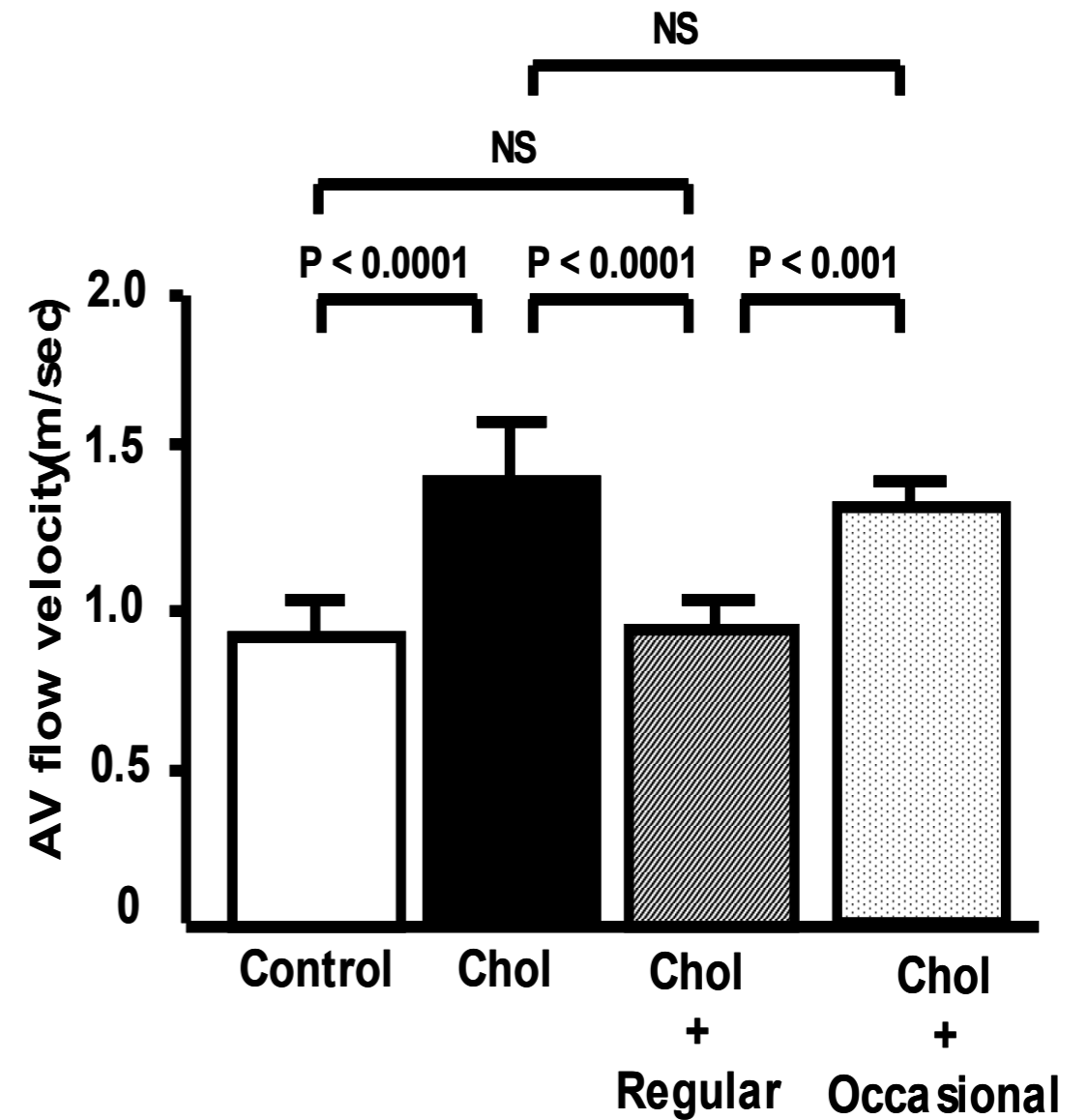
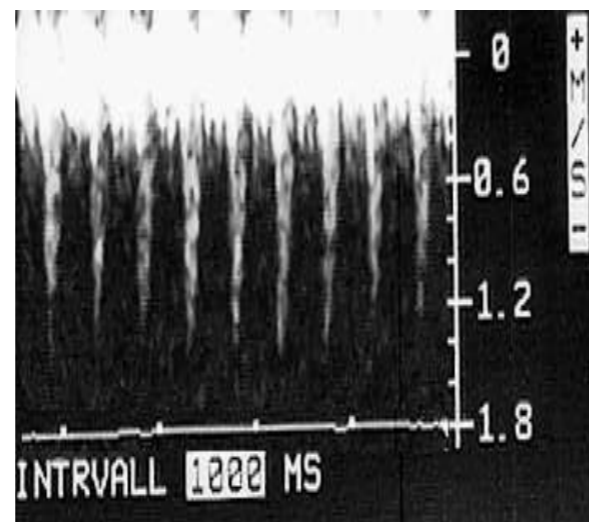
**Cholesterin**



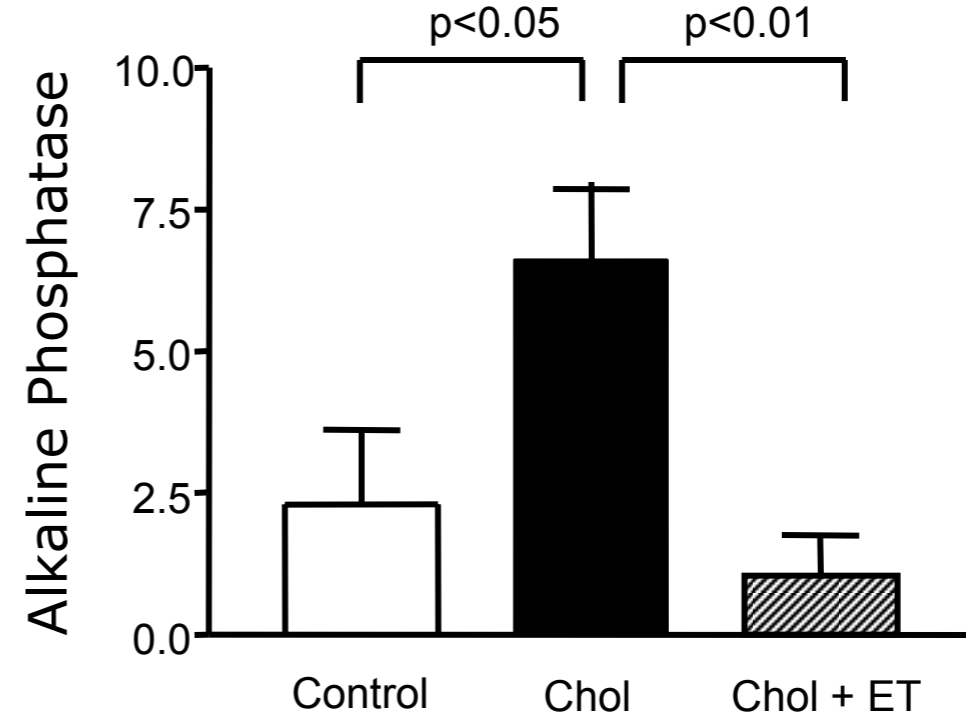
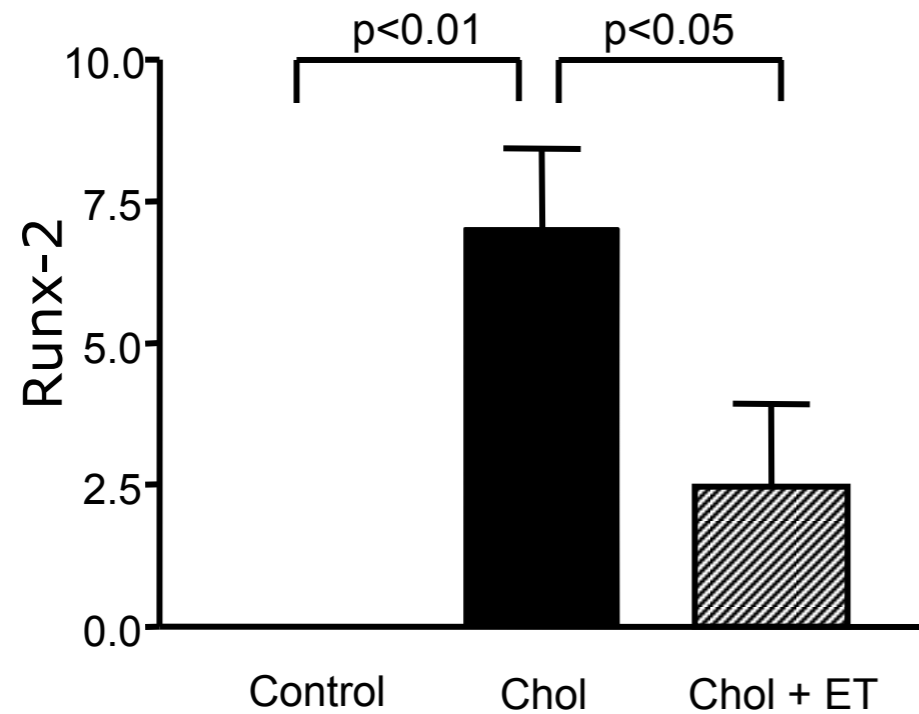
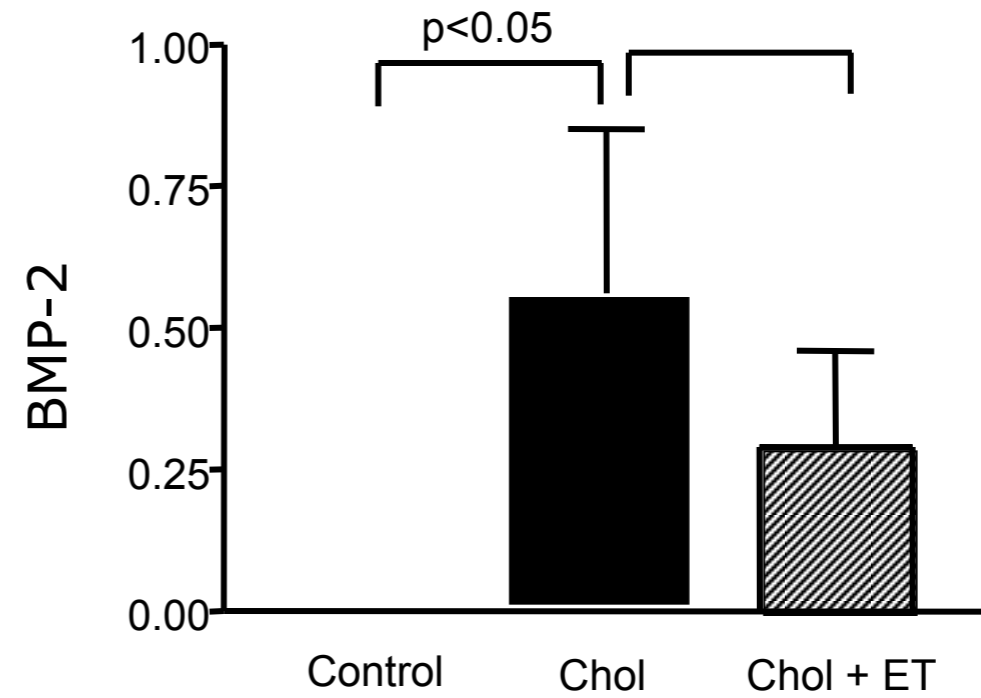
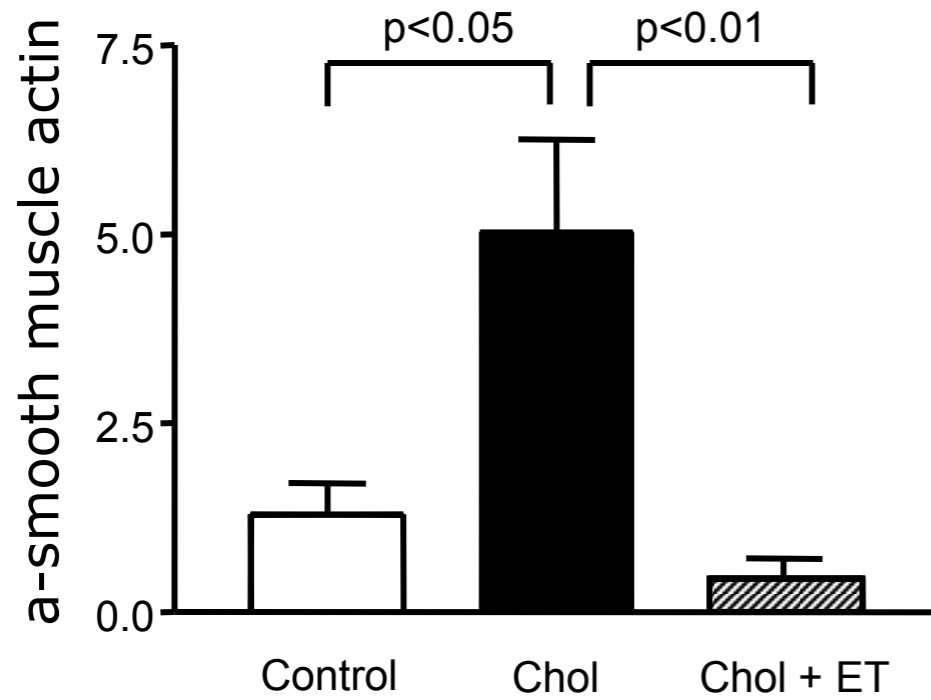
**Chol+Regular**



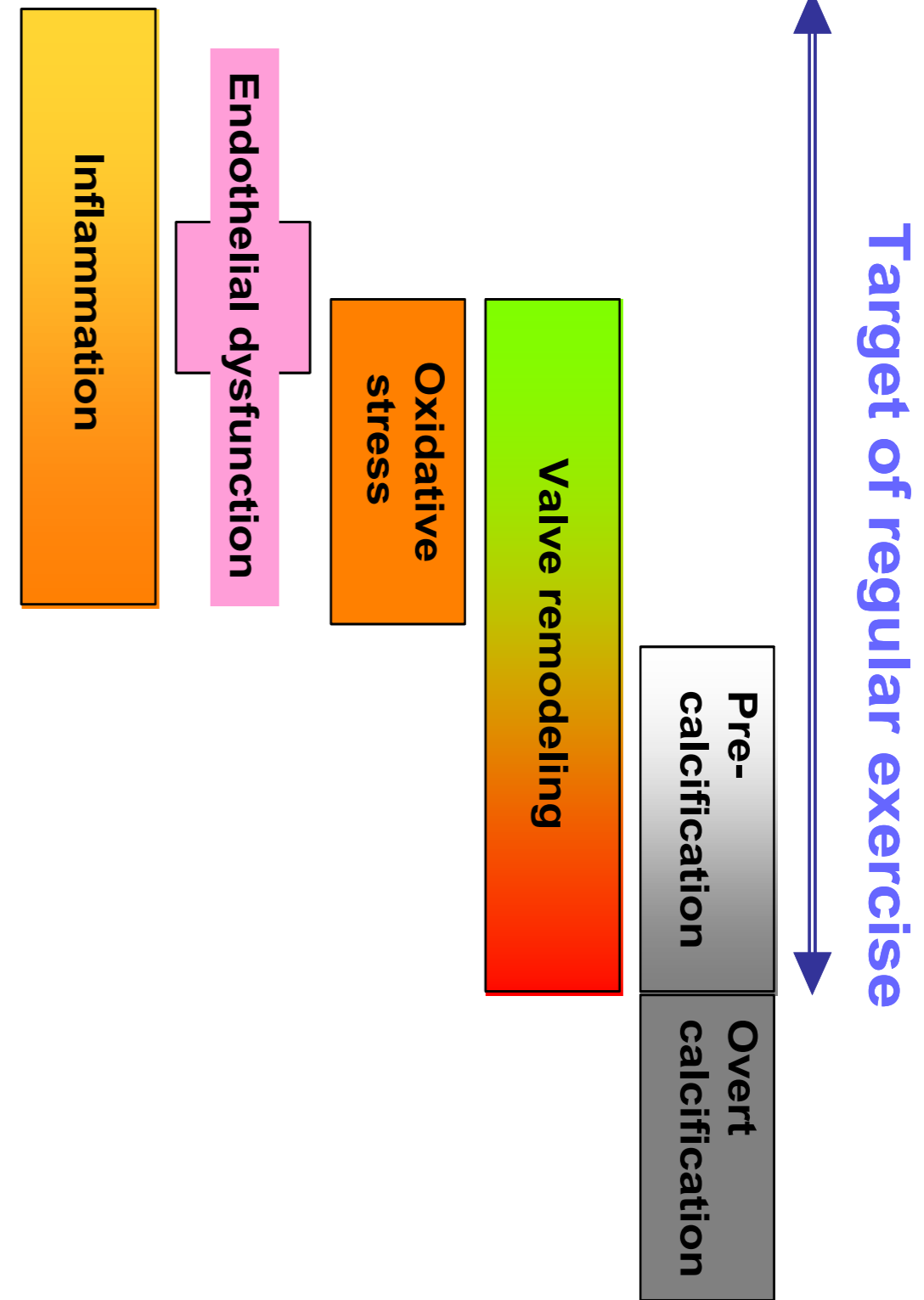
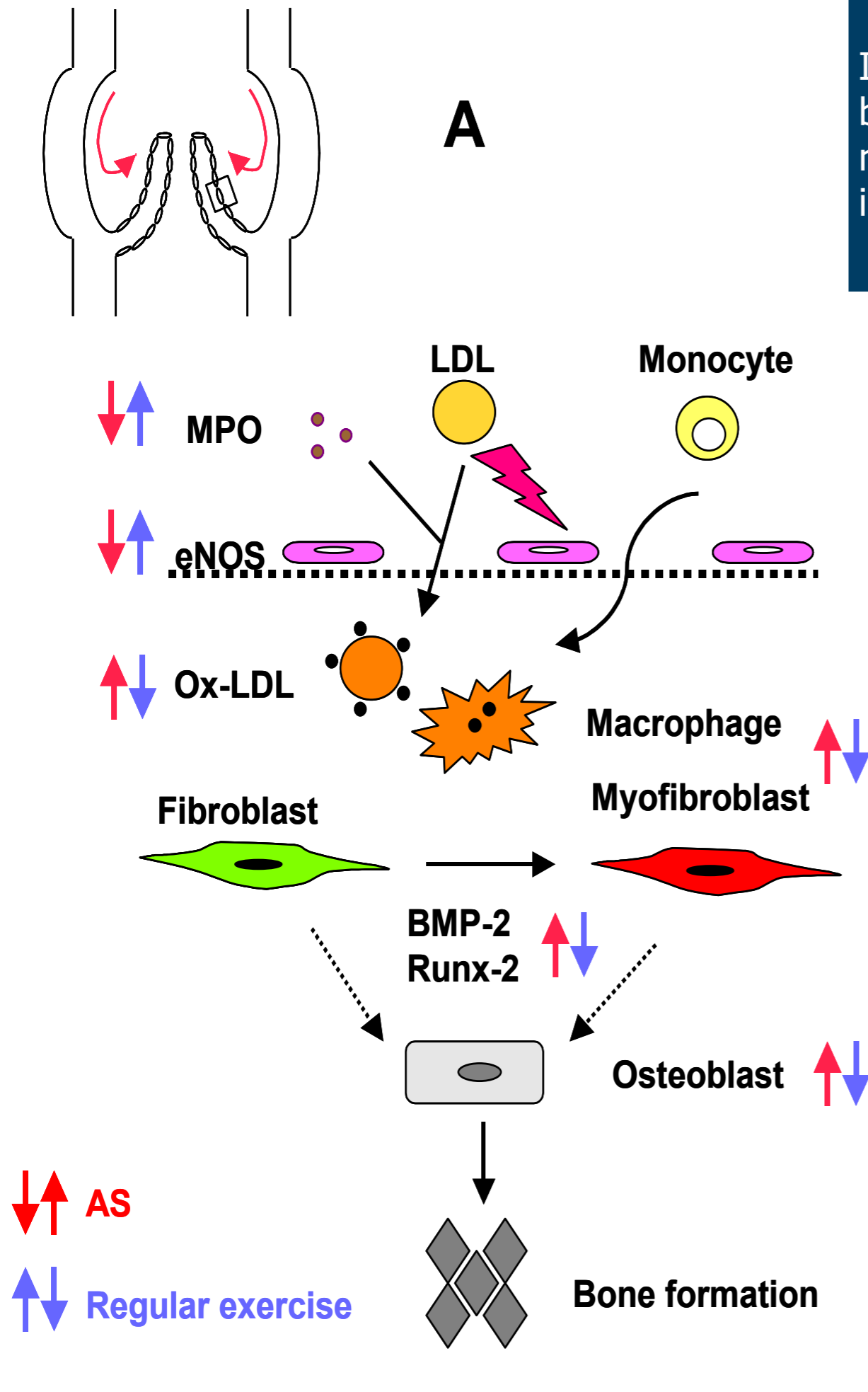
**Chol+Occasional**



# Results – mRNA expression of Osteoblastic genes



In LDL<sup>-/-</sup> mice, regular ET prevents AoV sclerosis by multiple mechanisms including reduced macrophage infiltration and transdifferentiation into myofibroblasts and/or osteoblasts



# Expression of adiponectin and adiponectin receptors in the skeletal muscle of CHF patients and the effect of exercise training

EuroPrevent 2009

A. Van Berendoncks, A. Garnier, P. Beckers, V. Hoymans, N. Possemiers, D. Fortin, V. Van Hoof, C. Vrints, R. Ventura-Clapier, V. Conraads

Department of Cardiology,  
Antwerp University Hospital  
Belgium



# Introduction: Adiponectin

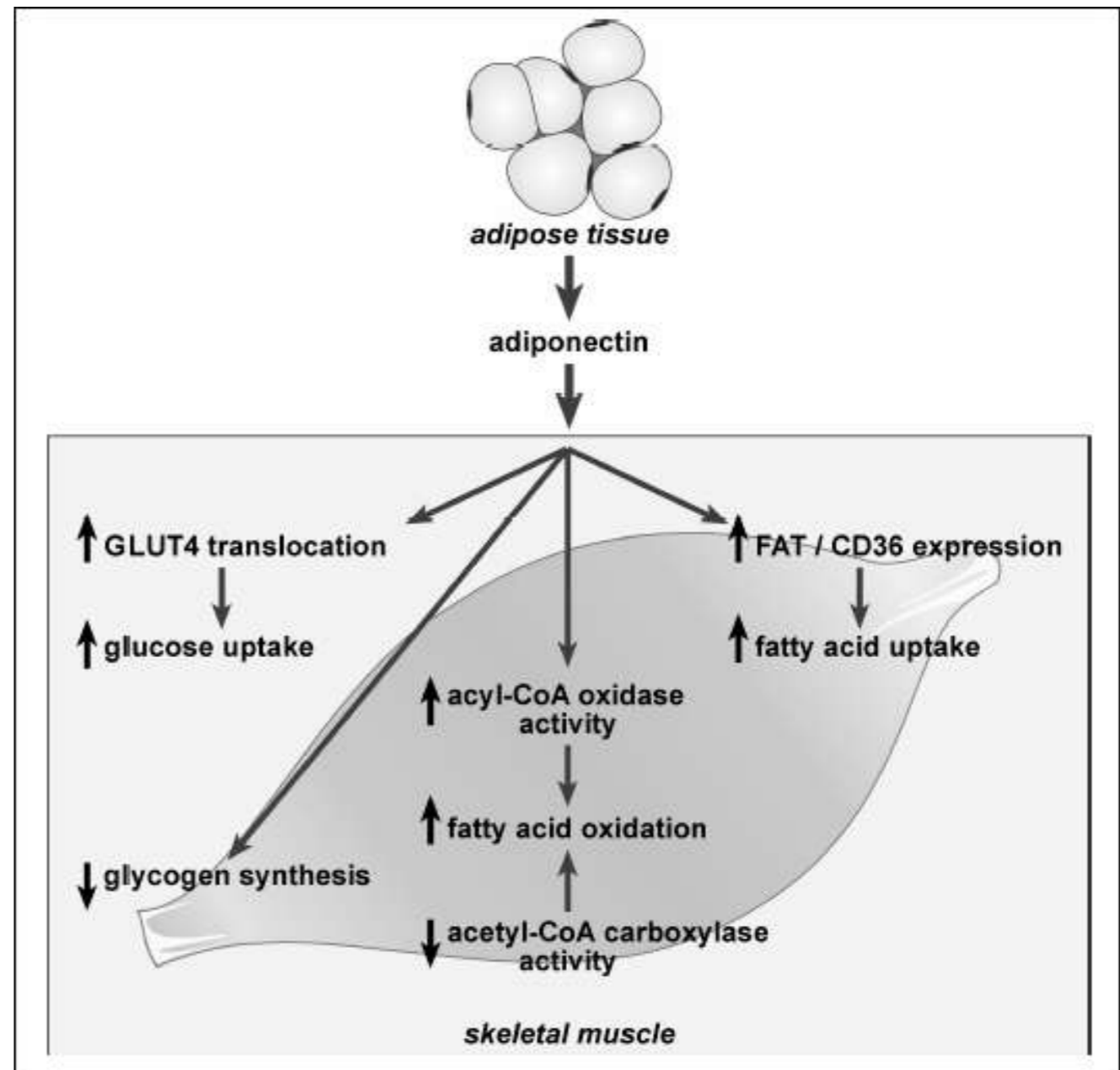
Anti-atherogenic

Anti-inflammatory

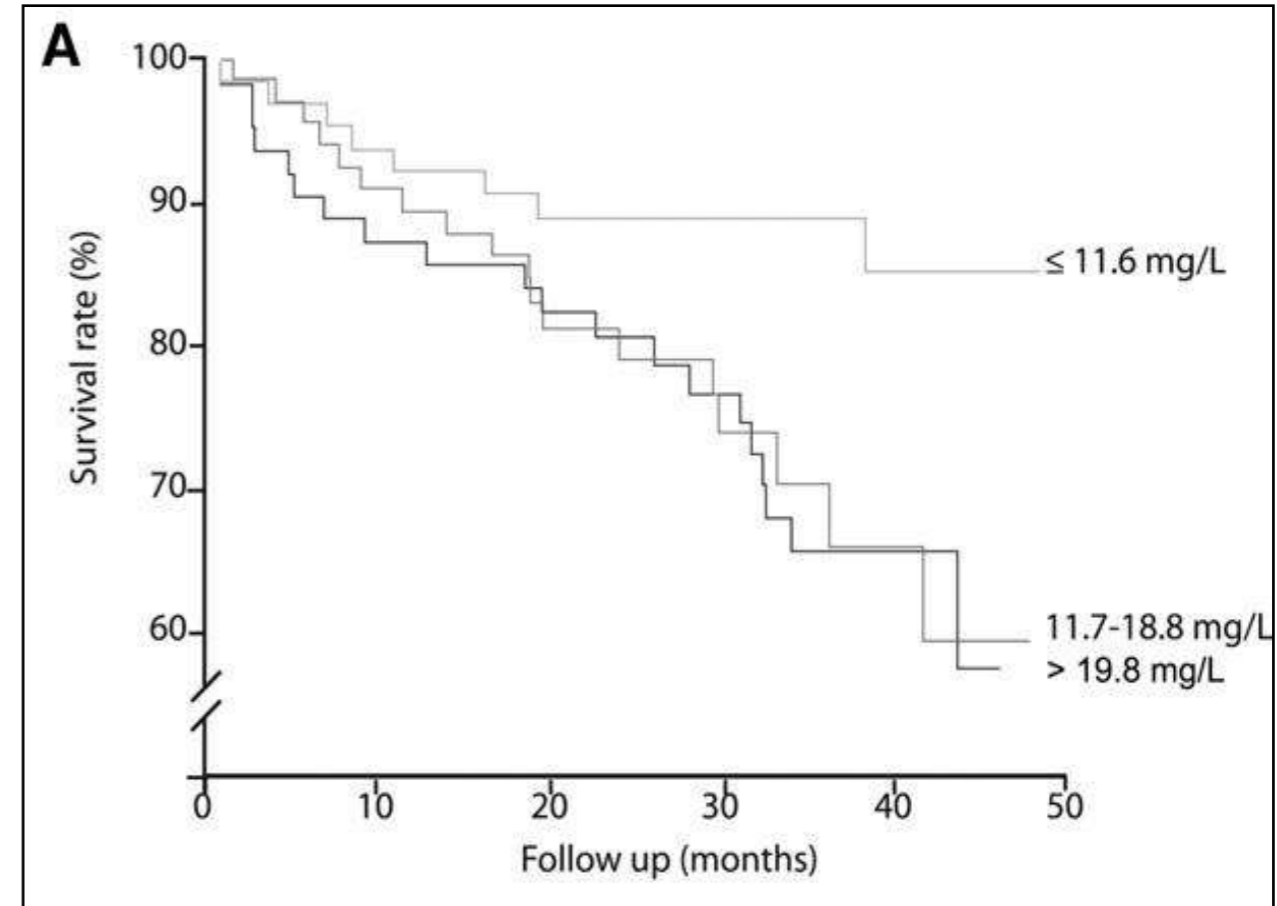
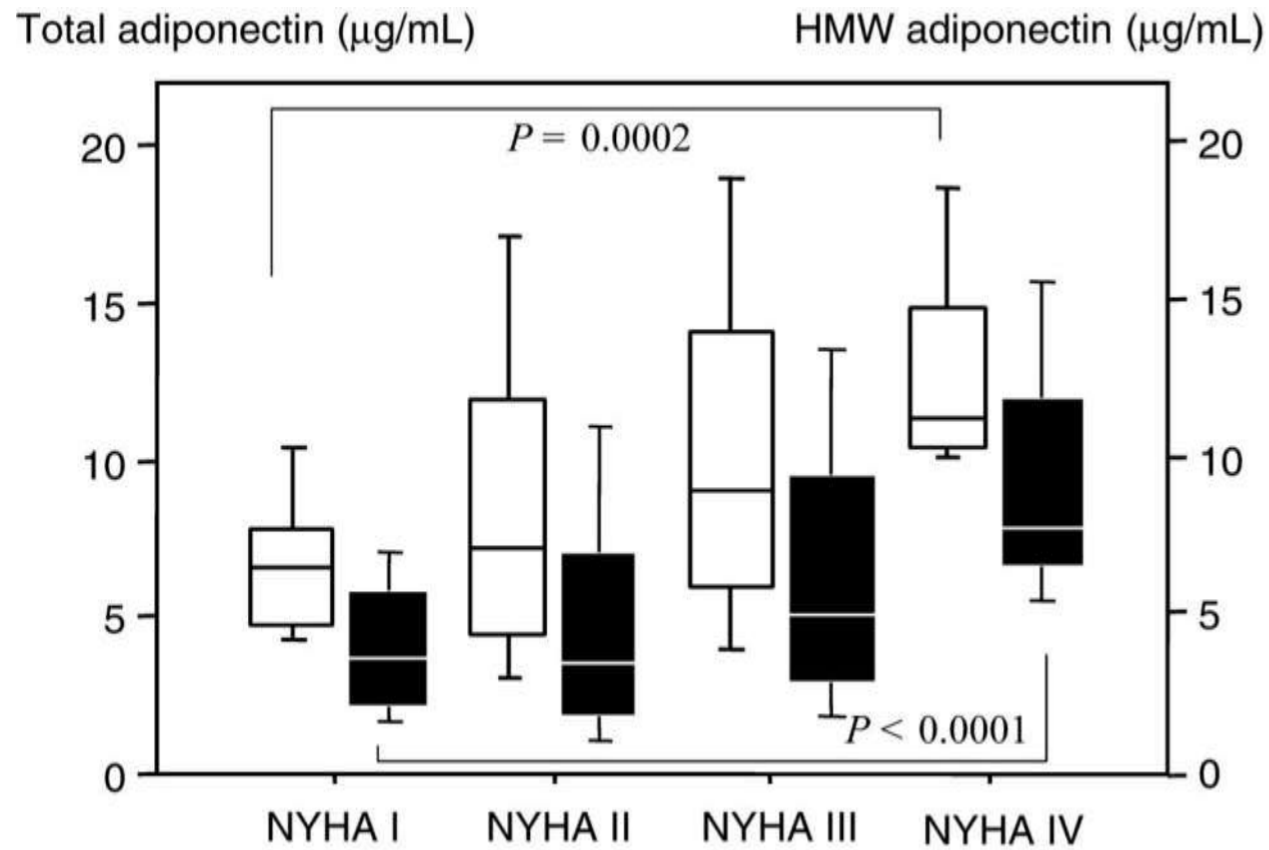
Insulin-sensitizing

*Beneficial*

*The higher, the better*



# Adiponectin in chronic heart failure



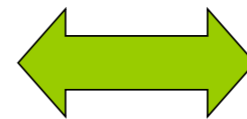
Tsutamoto T et al. *Eur Heart J* 2007; 28: 1723-30

Kistorp C et al. *Circulation* 2005; 112: 1756-62

# Adiponectin in chronic heart failure: Why?

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- Compensatory mechanism
  - Insulin resistance
  - Inflammation
- Stimulation by natriuretic peptides
- Adiponectin resistance

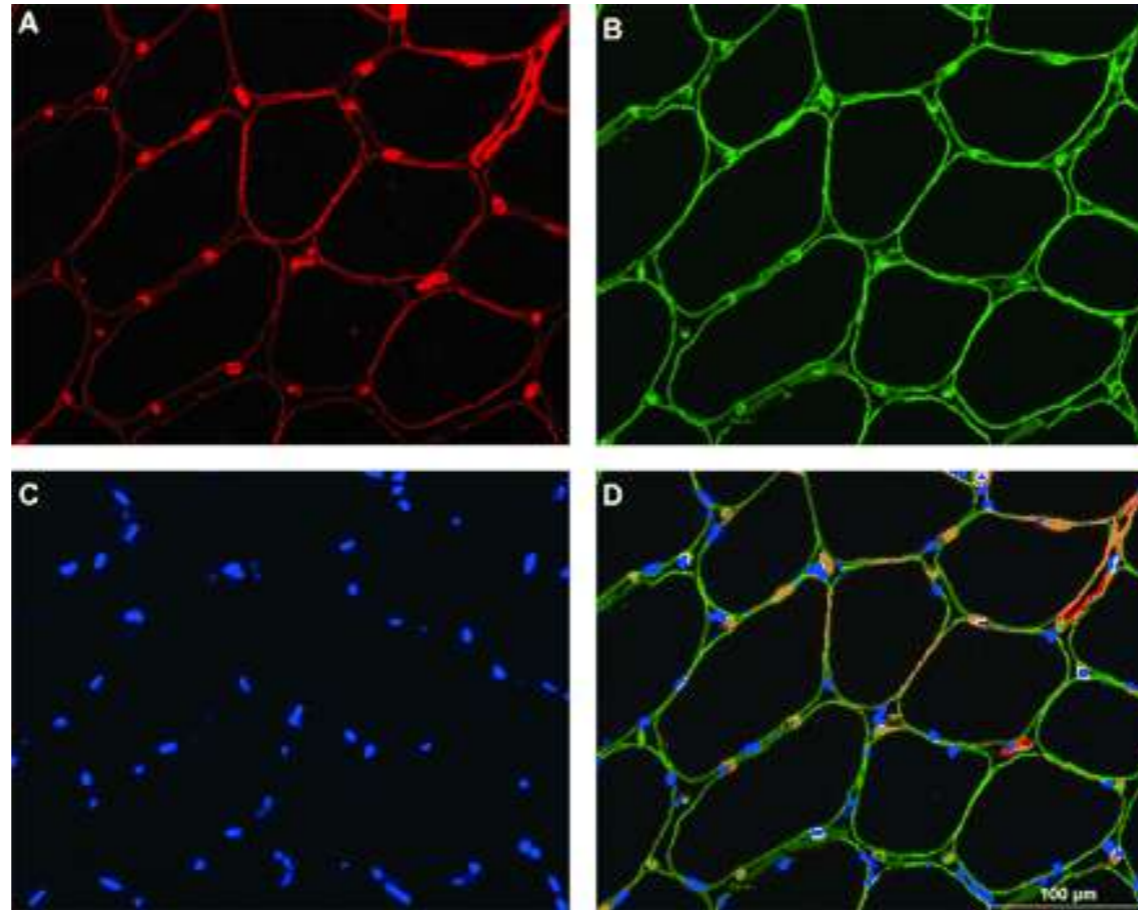


Harmful

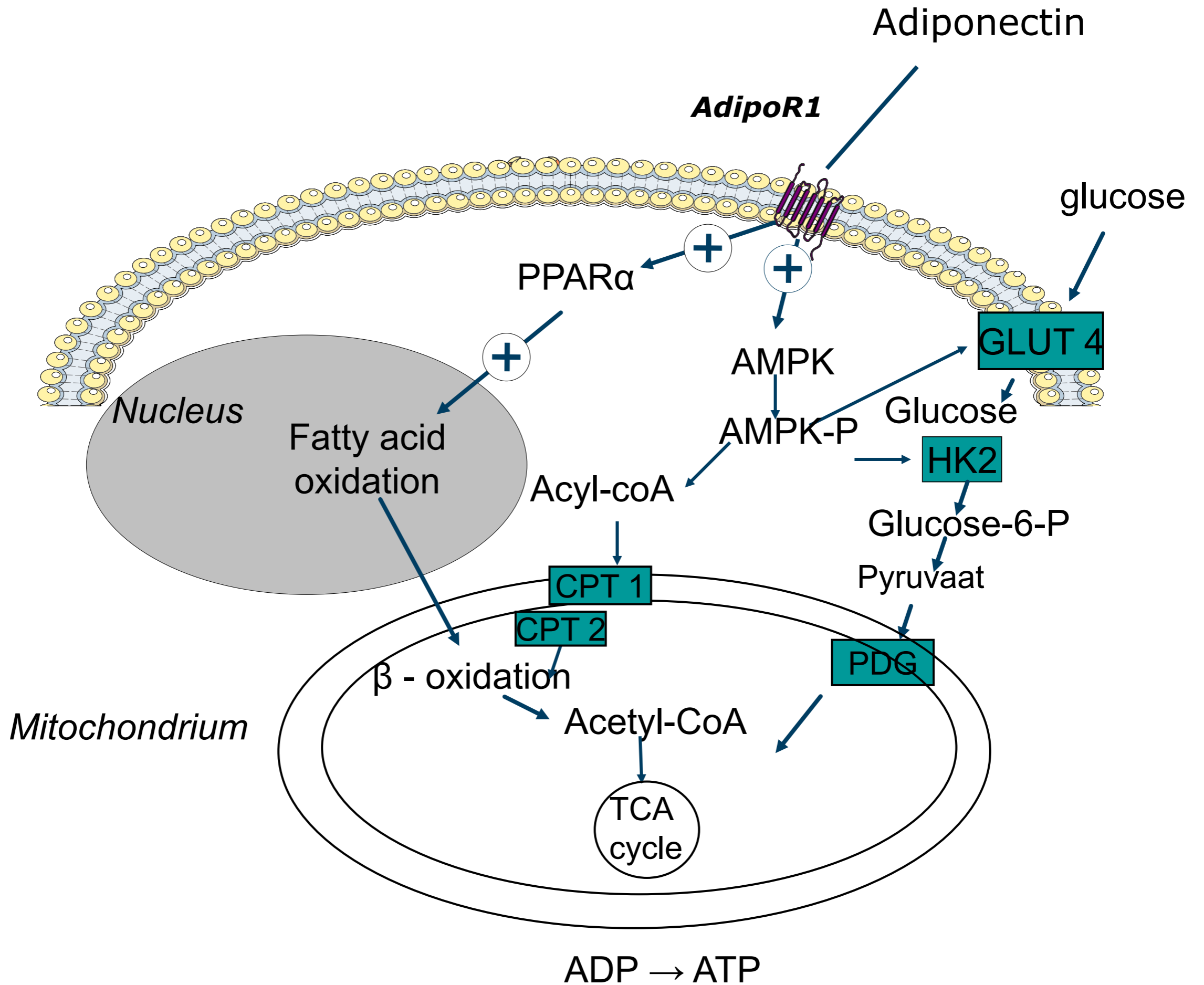
# Adiponectin in the skeletal muscle

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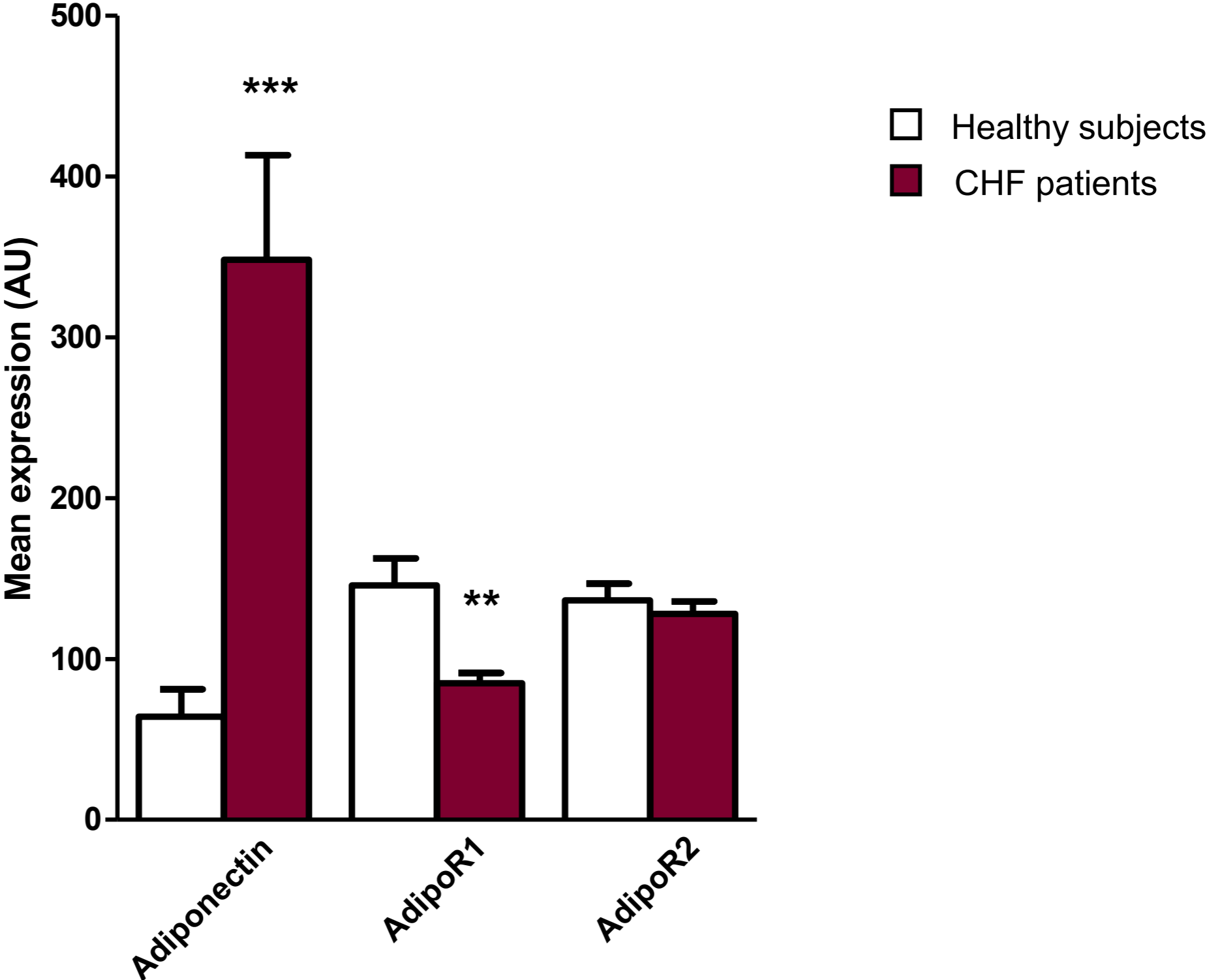
*Adiponectin is abundantly expressed  
in skeletal muscle*



*Punyadeera C et al. Eur J Endocrinol 2005; 152: 427-36.*



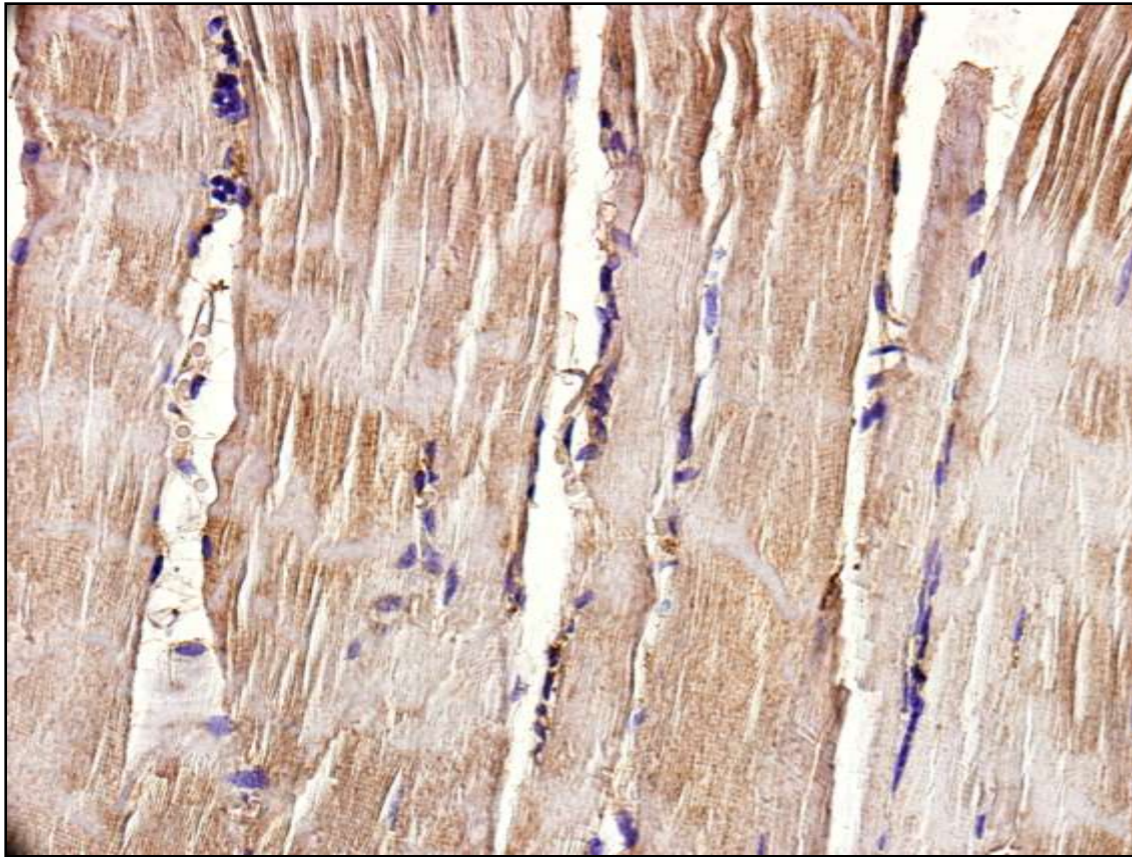
# Deregulation adiponectin system



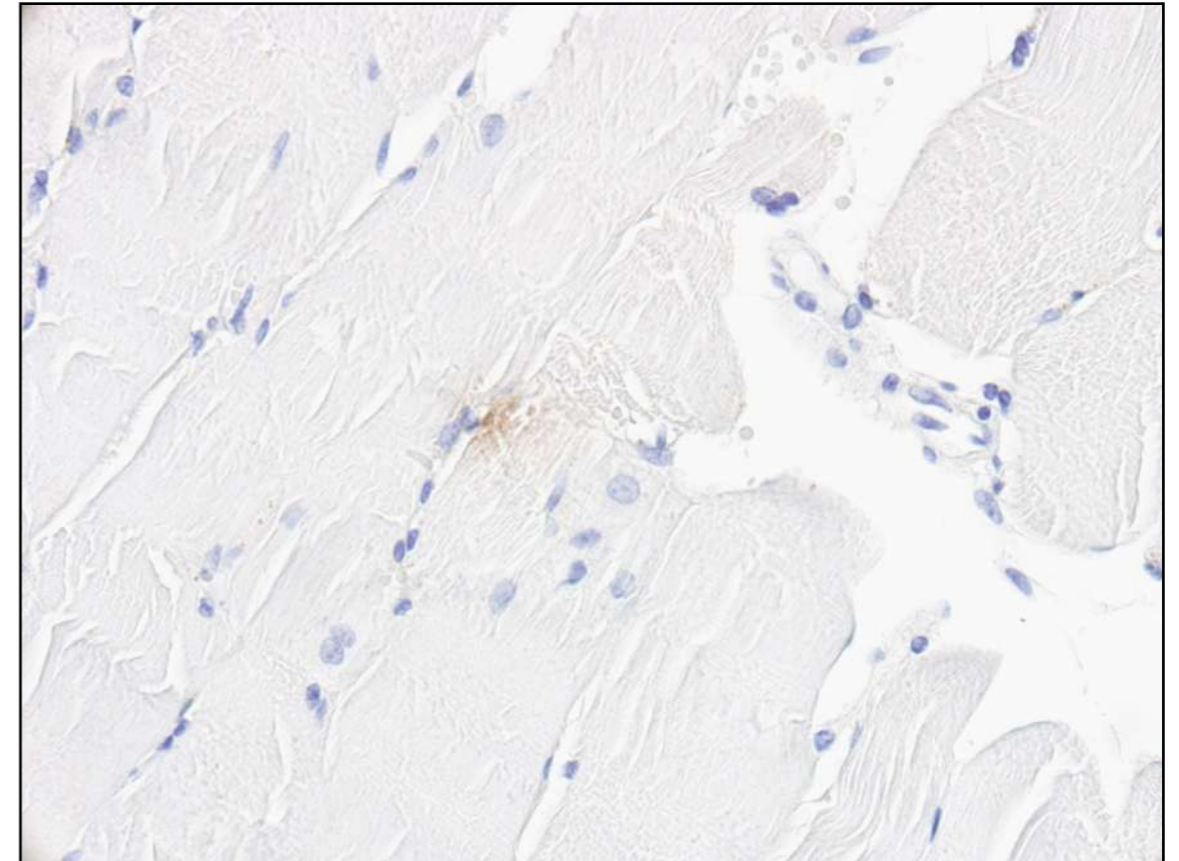
# Confirmation of adiponectin at protein level

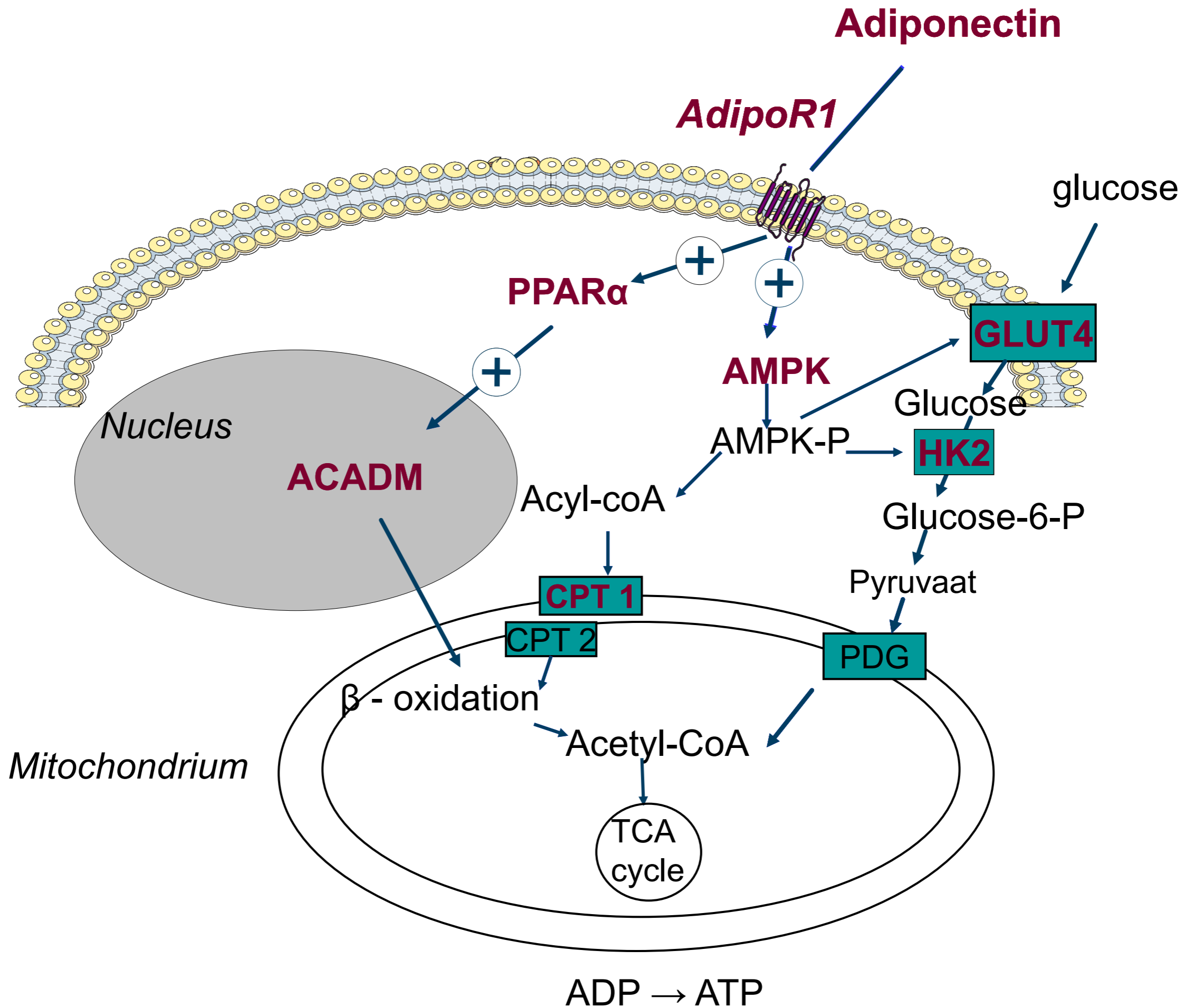
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CHF patient

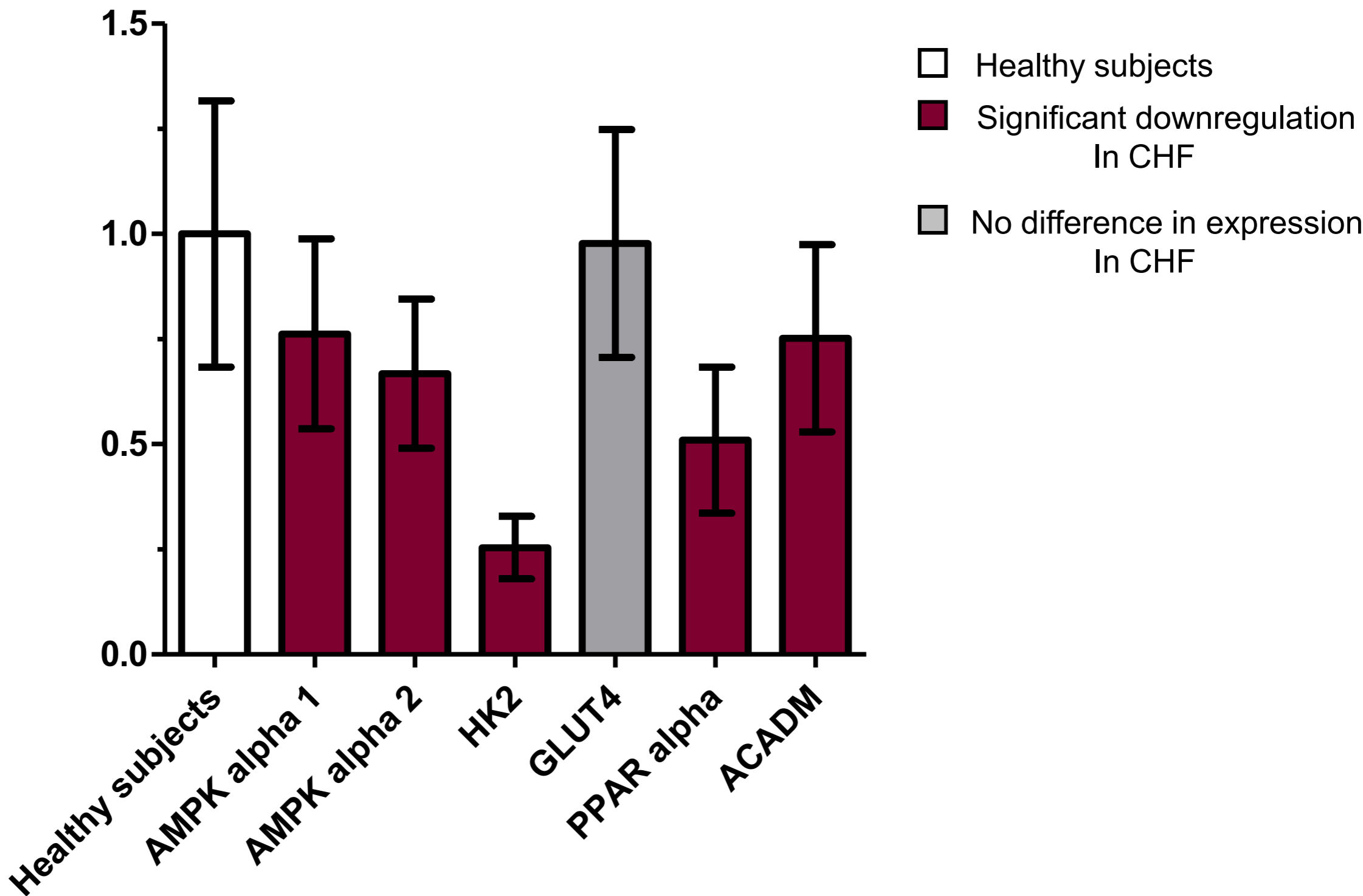


Healthy subject

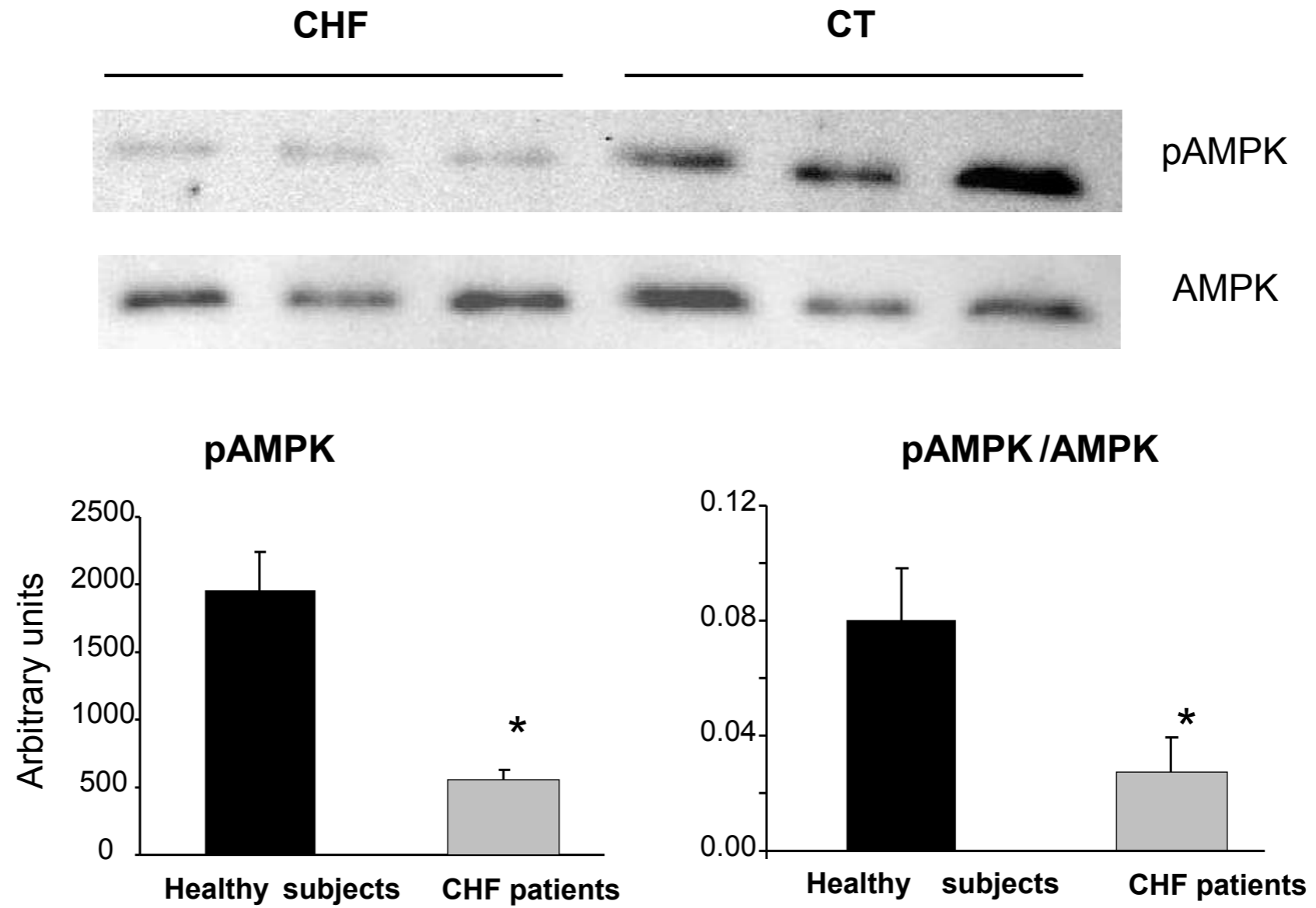




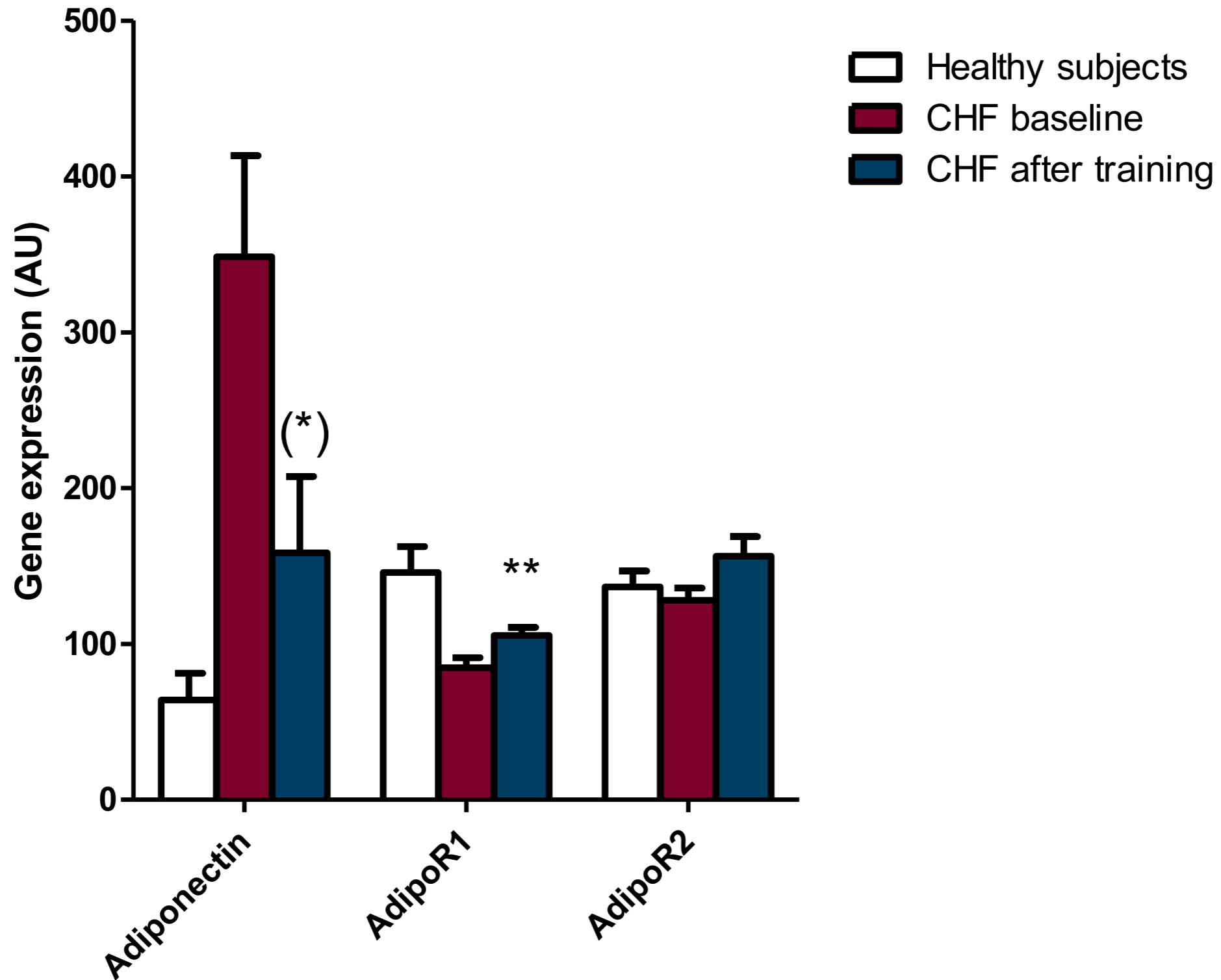
# Downstream pathway



# Decreased phosphorylation of AMPK

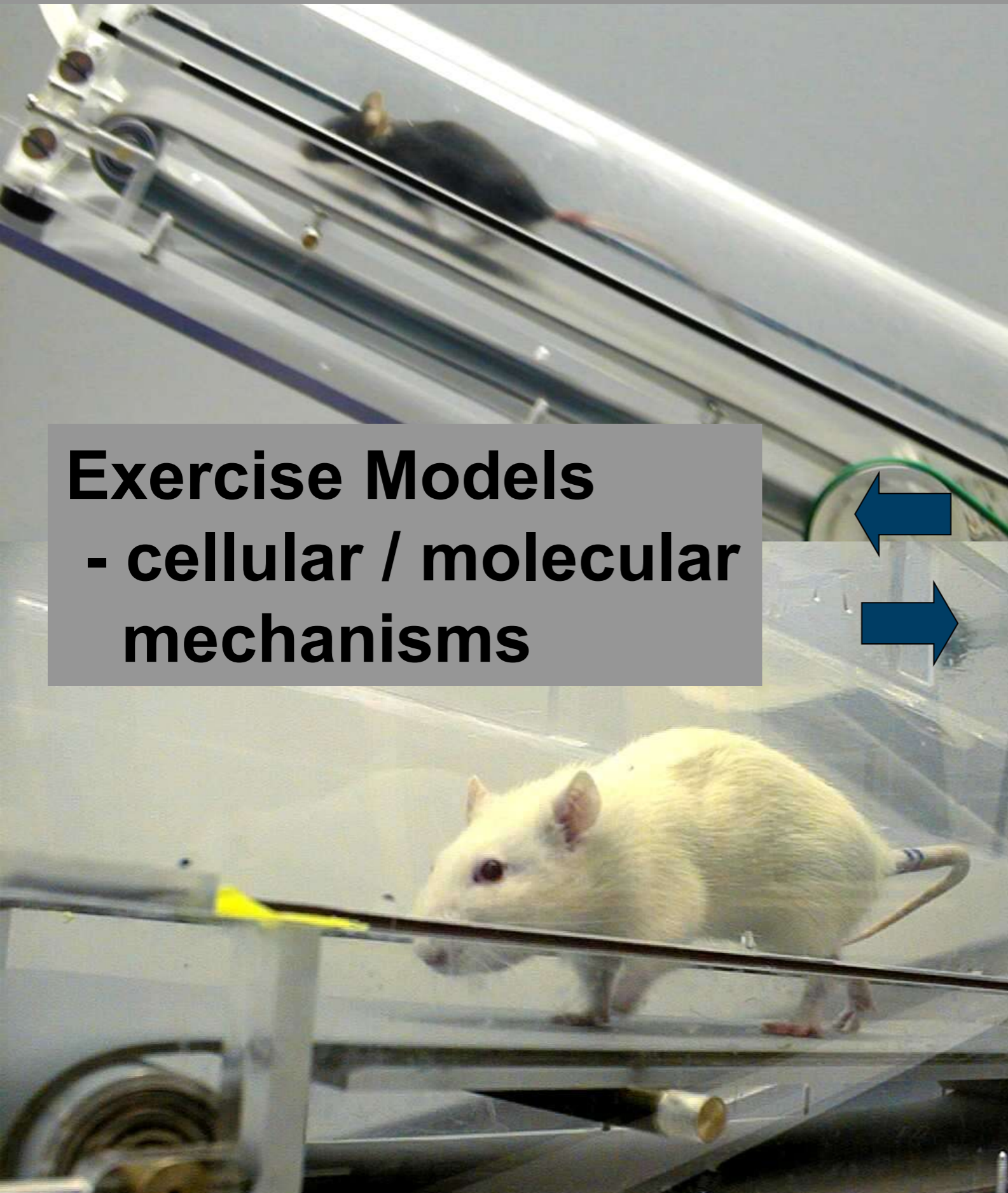


# Effect of exercise training: in progress



# Translational Research in Progress

# Basic and Translational Research



**Exercise Models**  
- cellular / molecular mechanisms



**Evidence-Based Training Programs For Defined Groups**

- Heart failure
- Coronary disease
- Metabolic syndrome
- Hypertension

# SMART-EX HF study

Study of Myocardial Recovery after Exercise Training in Heart Failure

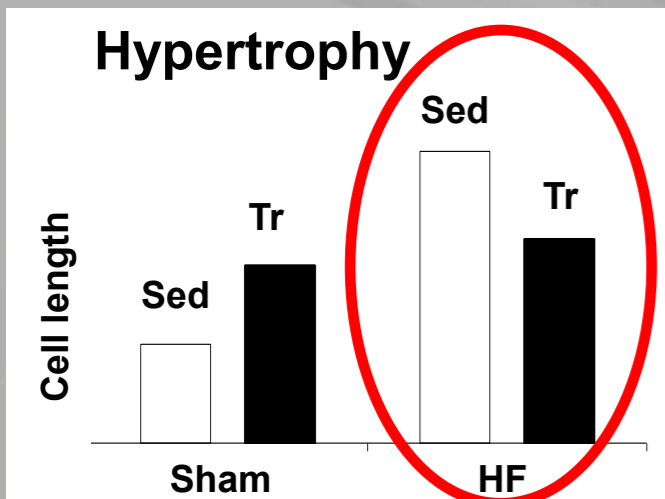


*"I have no special talent. I am only passionately curious"*

# Working Hypothesis

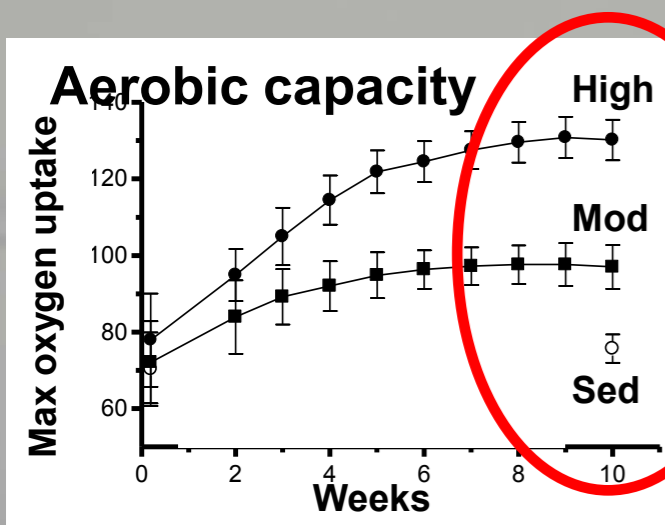
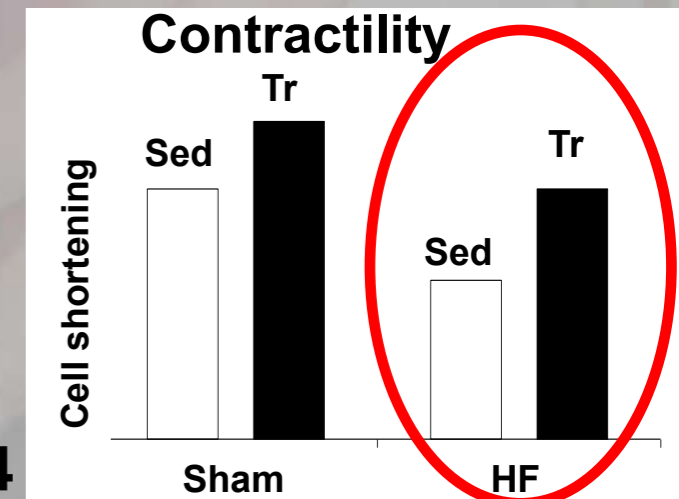
## Training Effect in Heart Failure

### Depends on Exercise Intensity



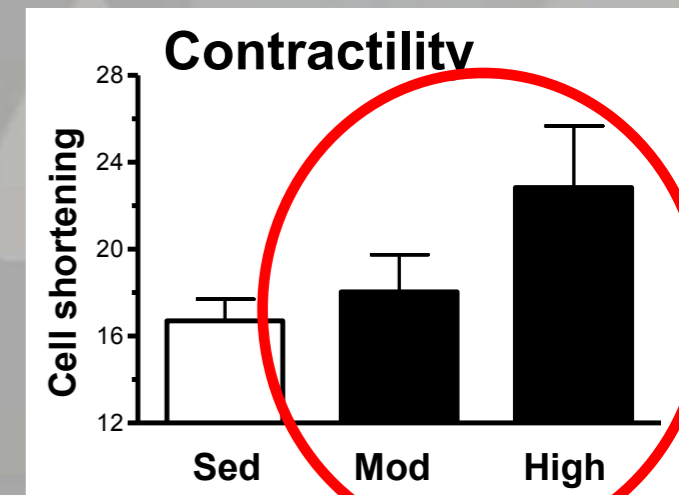
**Reduced Cardiac Hypertrophy and Increased Myocyte Contractility In Heart Failure**

Wisløff U. 2002. *Cardiovasc Res* 54: 162-174



**Larger Effects With High Versus Moderate Exercise Intensity on Aerobic Capacity and Contractility**

Kemi OJ. 2005. *Cardiovasc Res* 67: 161-72.



Chronic Heart Failure  
NYHA II-III  
LVEF < 35%

Aerobic  
Interval  
Training  
N=70

Moderate  
Continuous  
Training  
N=70

Recommendation  
Regular  
Exercise  
N=70

*Primary Endpoint:  
Reverse remodeling/Echo + MRI*

CPET derived prognostic markers

Skeletal Muscle Energy metabolism

Skeletal Muscle Anabolic/Catabolic

Skeletal Muscle contractility

Stress Echocardiography

Coronary Flow Reserve

Endothelial Progenitor Cells

Metabolic Fitness

Peripheral Endothelial Dysfunction

Right ventricular Function

The background of the slide is a faded image of a laboratory or gym. On the right, a person is running on a treadmill. On the left, a white mouse is visible on a platform. In the background, there are scientific posters on a wall. One poster on the right has the text "High intensity aerobic intensity is superior for increasing aerobic capacity in patients".

# **Basic and Translational Research**

## **In Cardiovascular Prevention and Rehabilitation**

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