

EuroPrevent 2010
Prevention in Adults: Is it good to Know?

Exercise as a Mean to Control Low Grade Systemic Inflammation



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No conflict of interest to be disclosed

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Exercise as a Mean to Control Low-Grade Systemic Inflammation

Topics

- The Complexity of the Immune System
- The Inflammatory Pathways: Pathophysiology
- The Immune System and Prognosis
- Exercise intervention and the Immune System

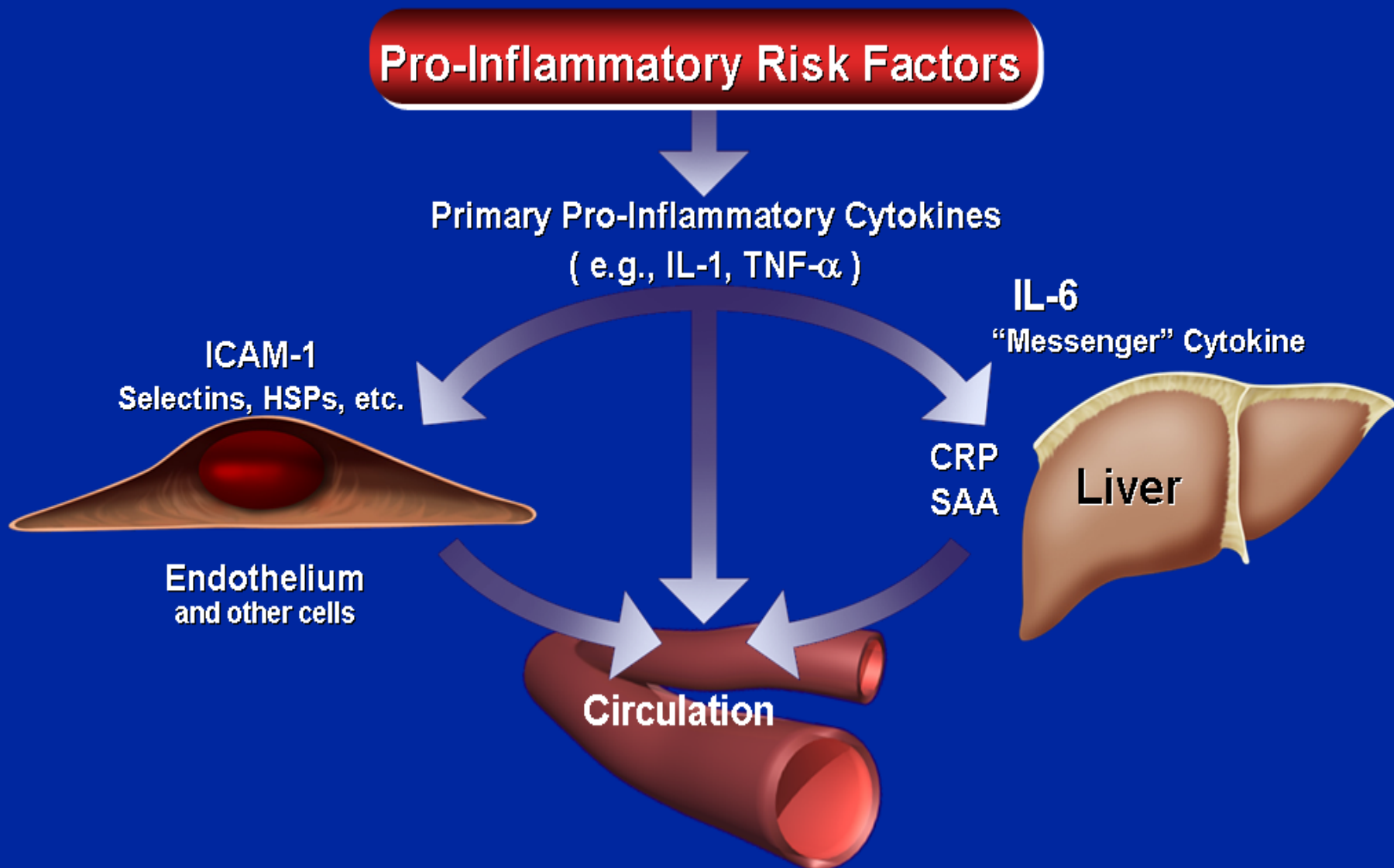
Low-Grade Systemic Inflammation

What is this ?

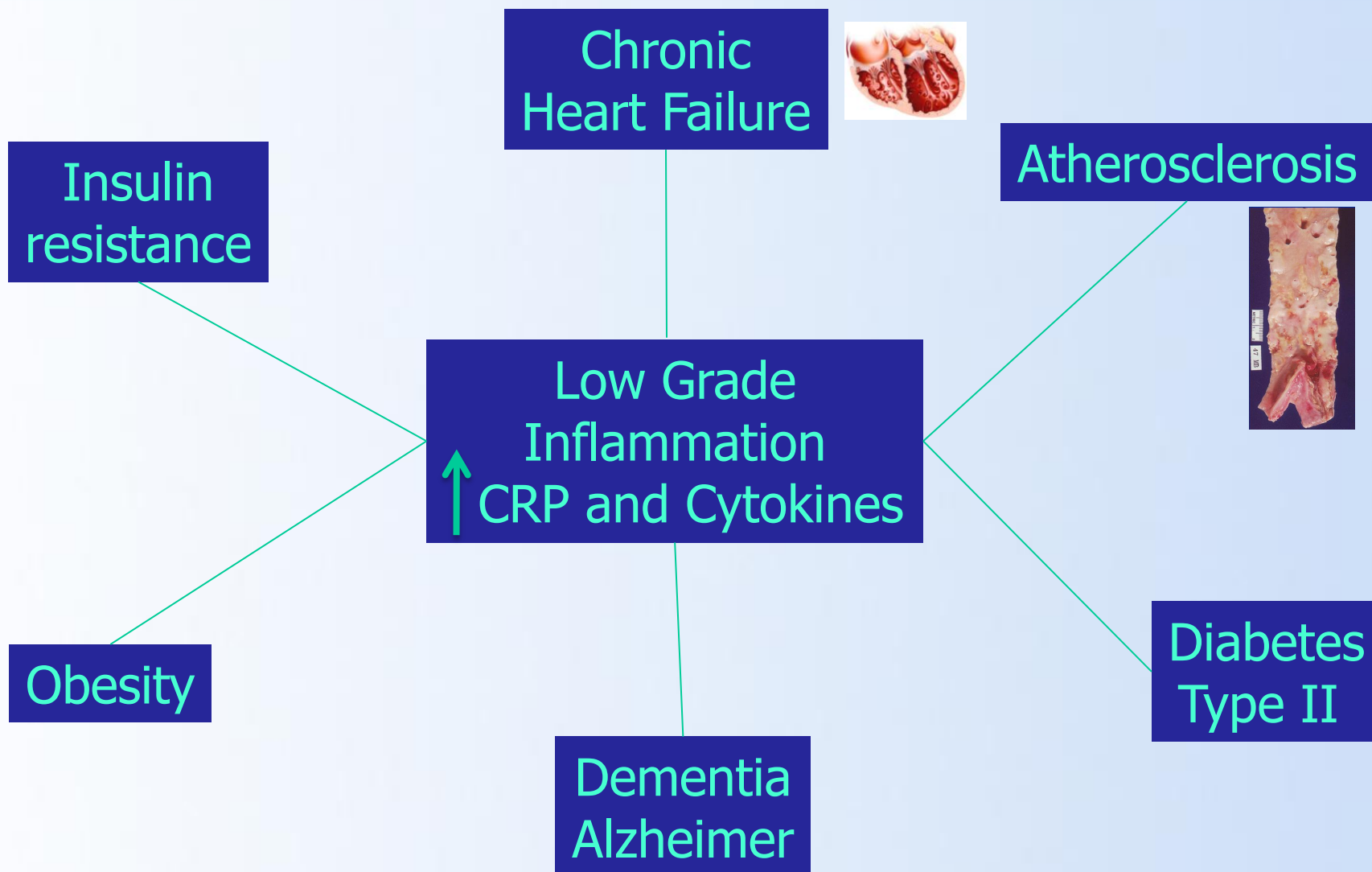
Low-Grade Systemic Inflammation

Low- grade systemic inflammation is a chronic process that has been characterized by a 2 - to - 3 fold elevation in circulating levels of some pro-inflammatory and anti-inflammatory cytokines, as well as the acute phase reactant C-reactive protein. These conditions are associated to many systemic chronic diseases

Pro-Inflammatory Pathways



Low-Grade Systemic Inflammation and Chronic Disease



Cytokines in HF

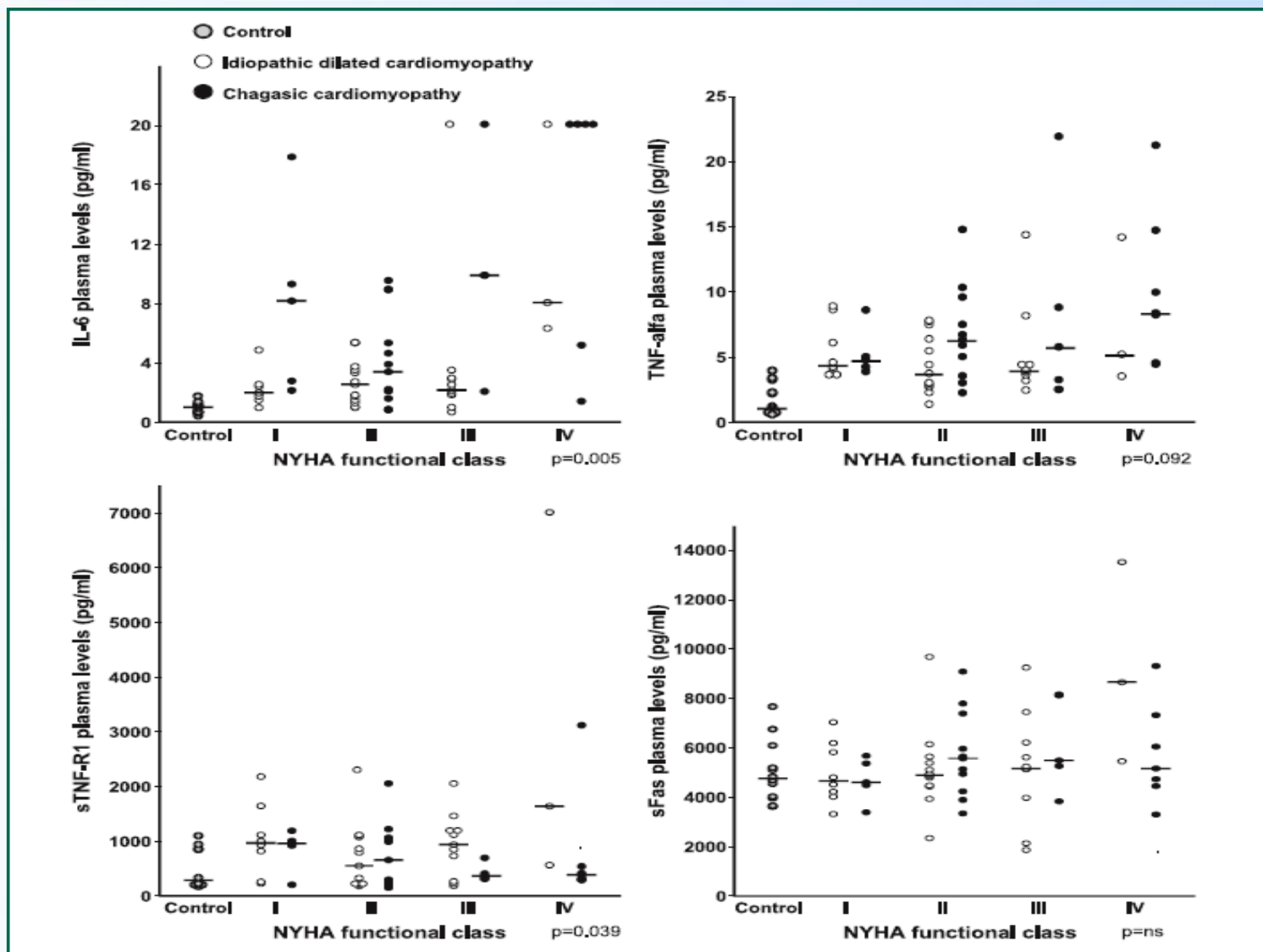
IDC and Chagas' disease etiology

n = 75

Control = 12

Chagas = 28

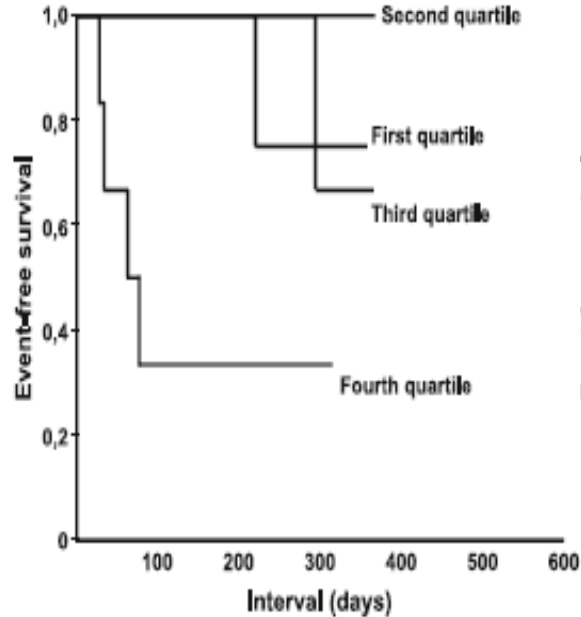
IDC = 35



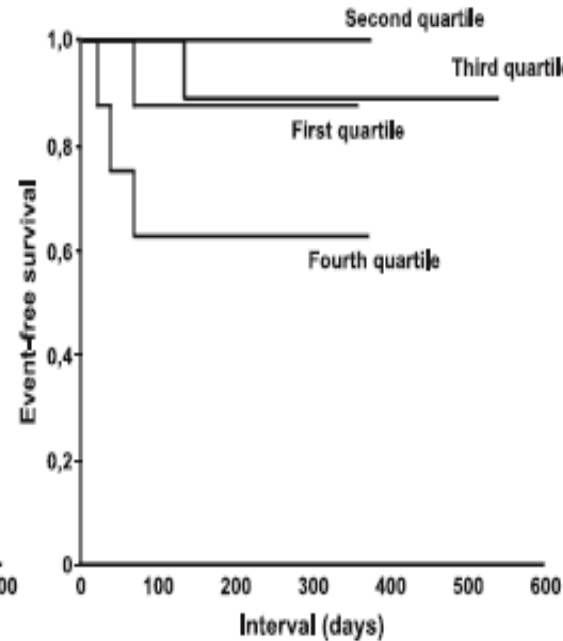
Cytokines in HF

IDC and Chagas' disease etiology

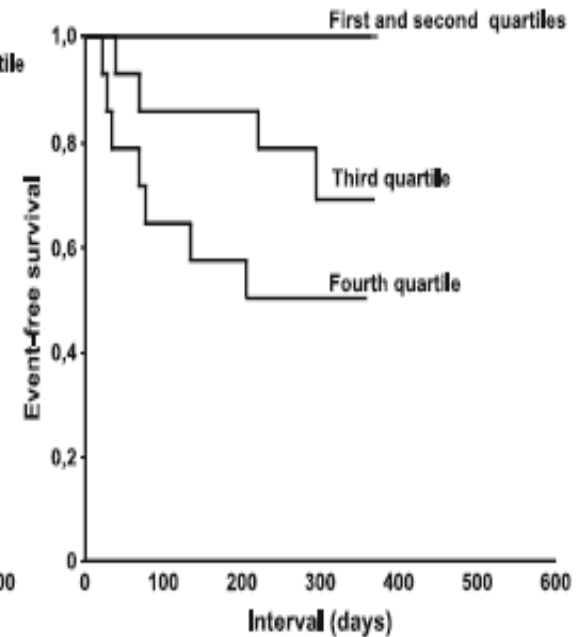
IL-6 in Chagas' heart disease



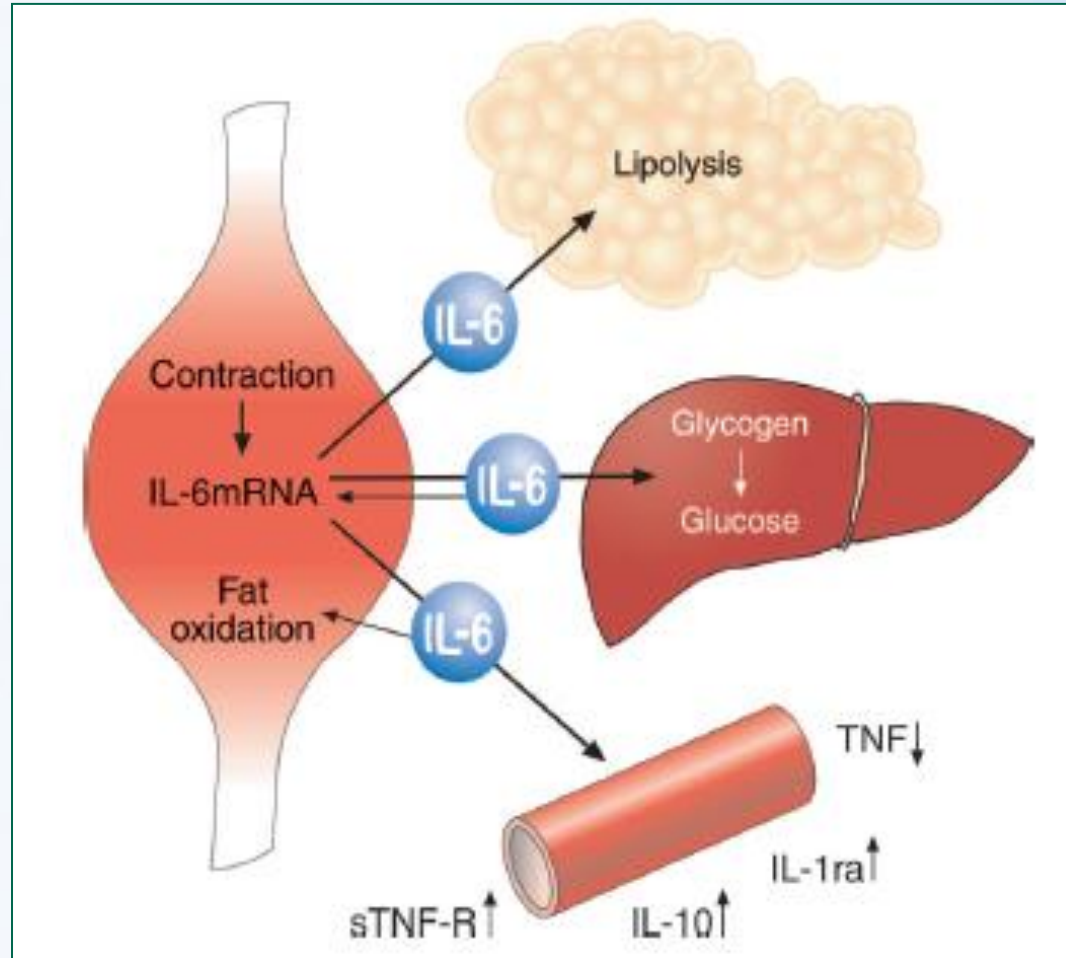
IL-6 in idiopathic dilated cardiomyopathy



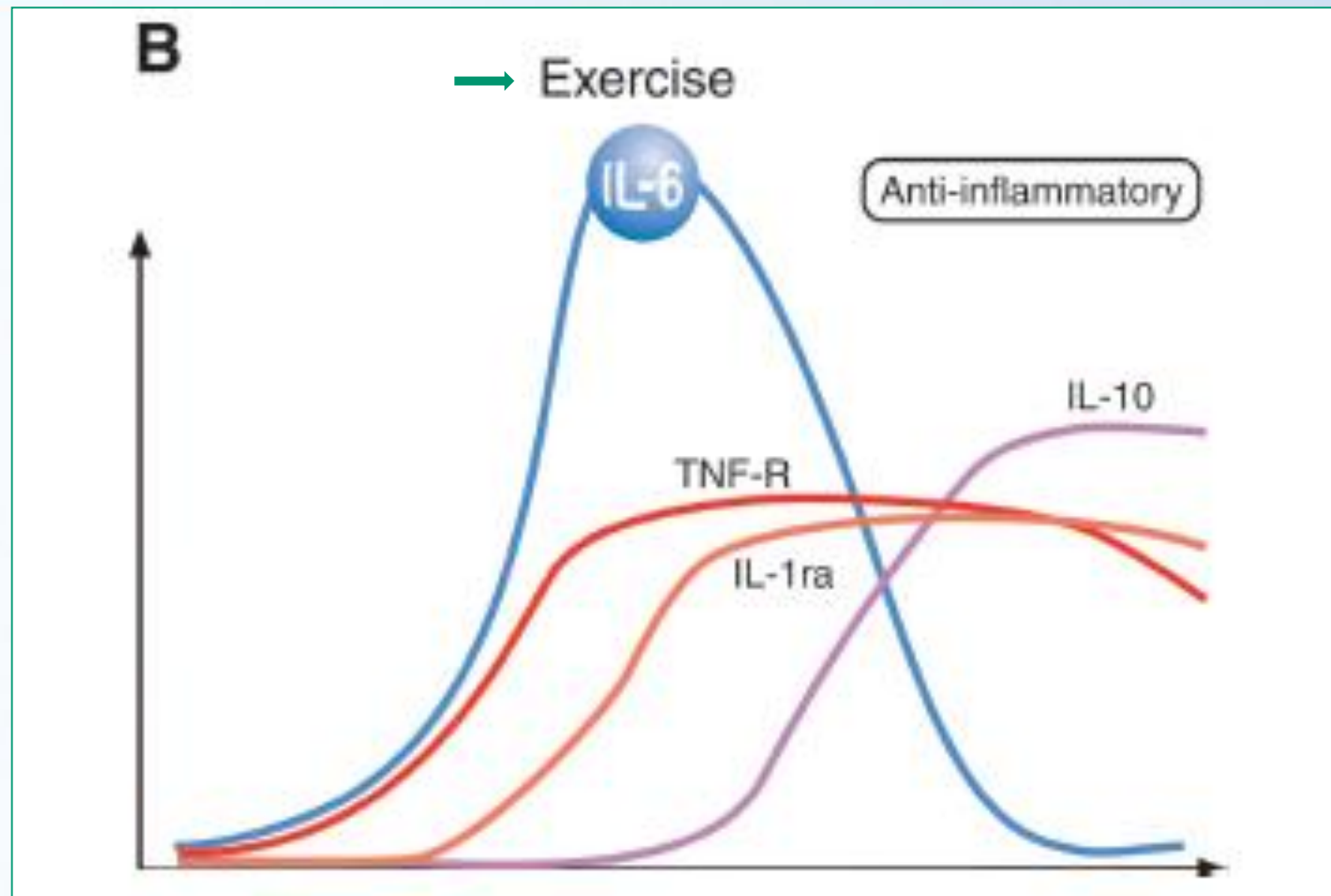
BNP in both IDC and Chagas



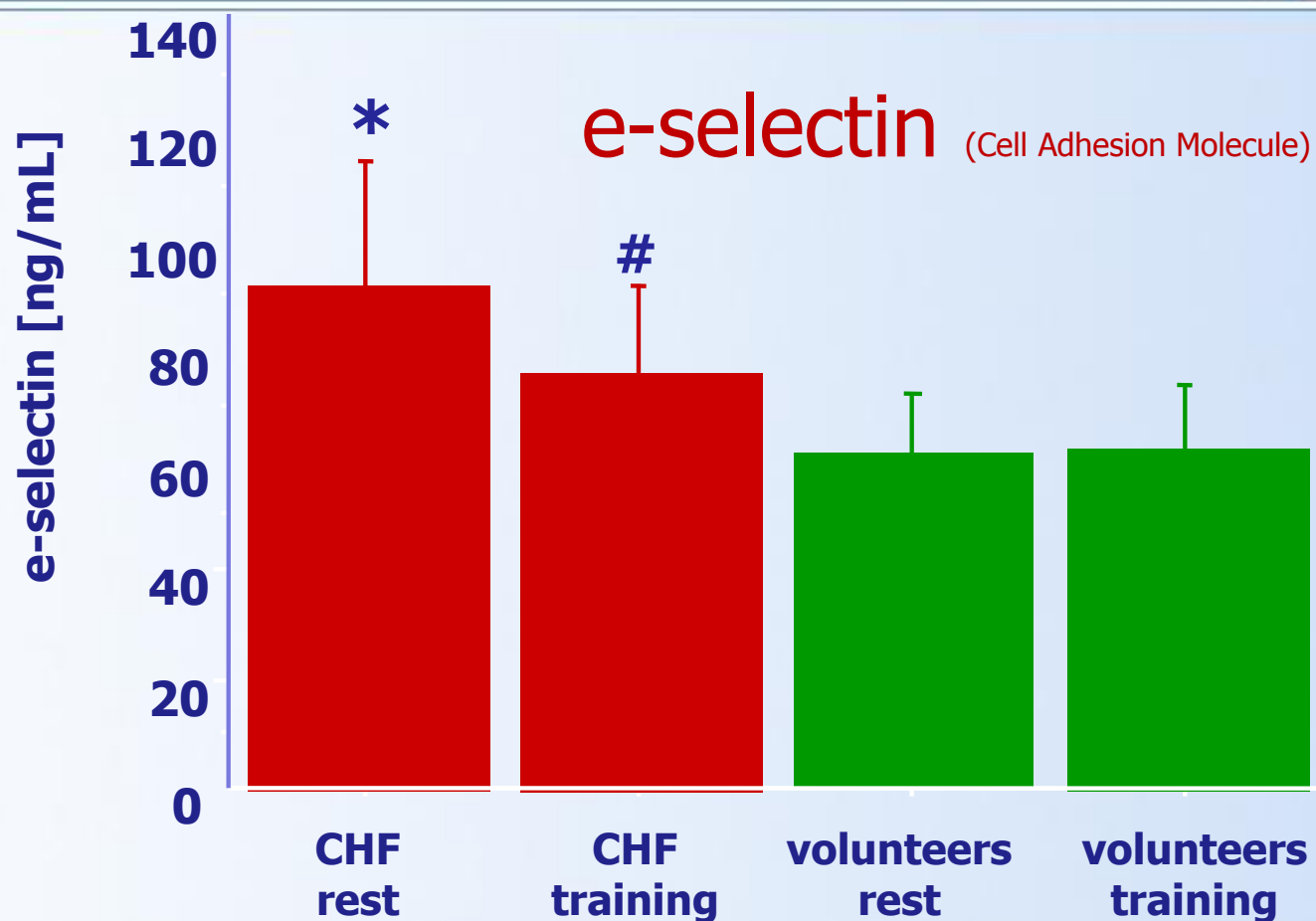
IL-6 Production and Release in Contracting Muscle



Acute response of Cytokines Cascade during Exercise

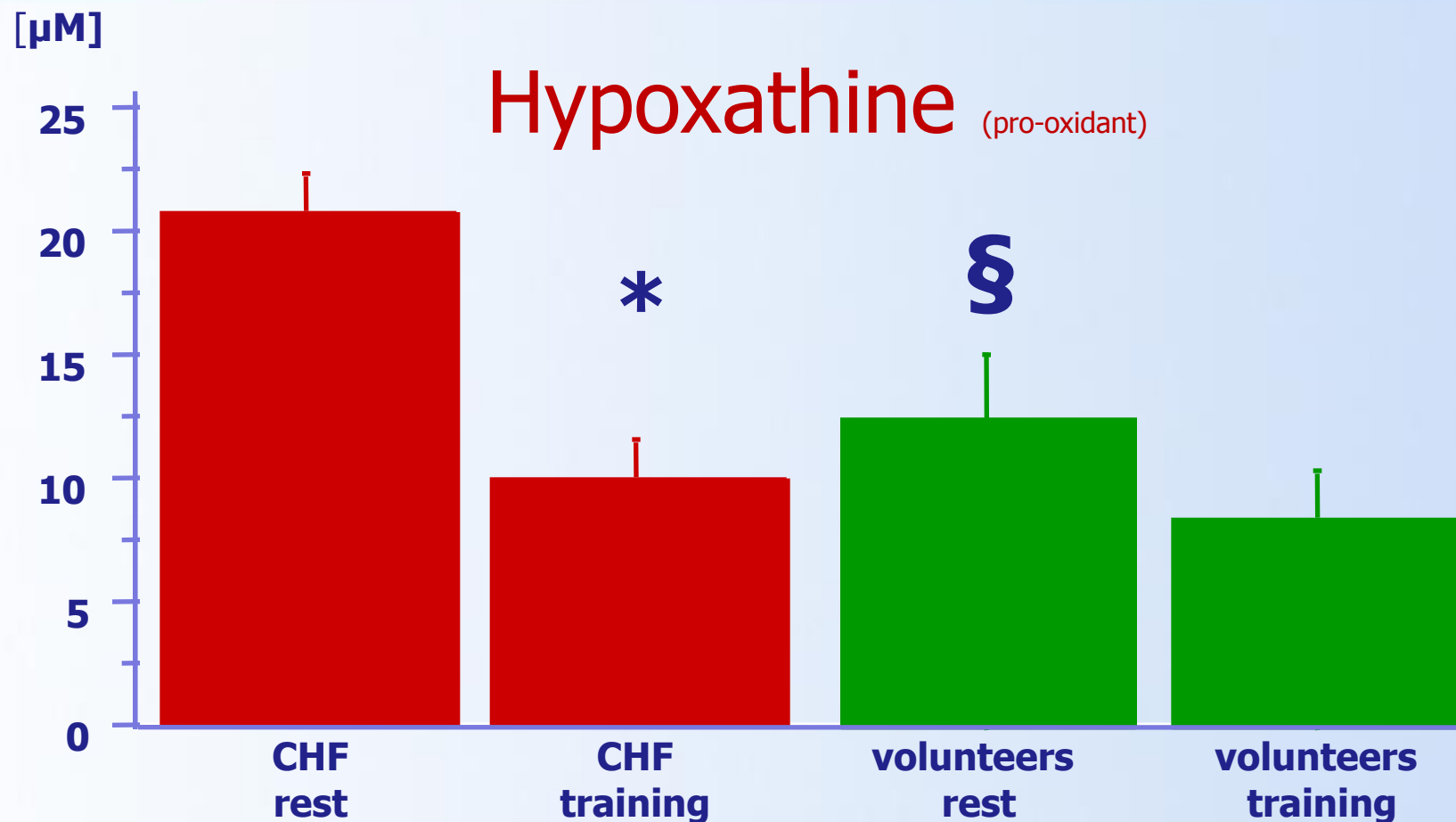


Exercise Training and Inflammatory mediators



*: $p < 0.05$ vs. volunteers rest; #: $p < 0.08$ (trend) vs CHF-rest

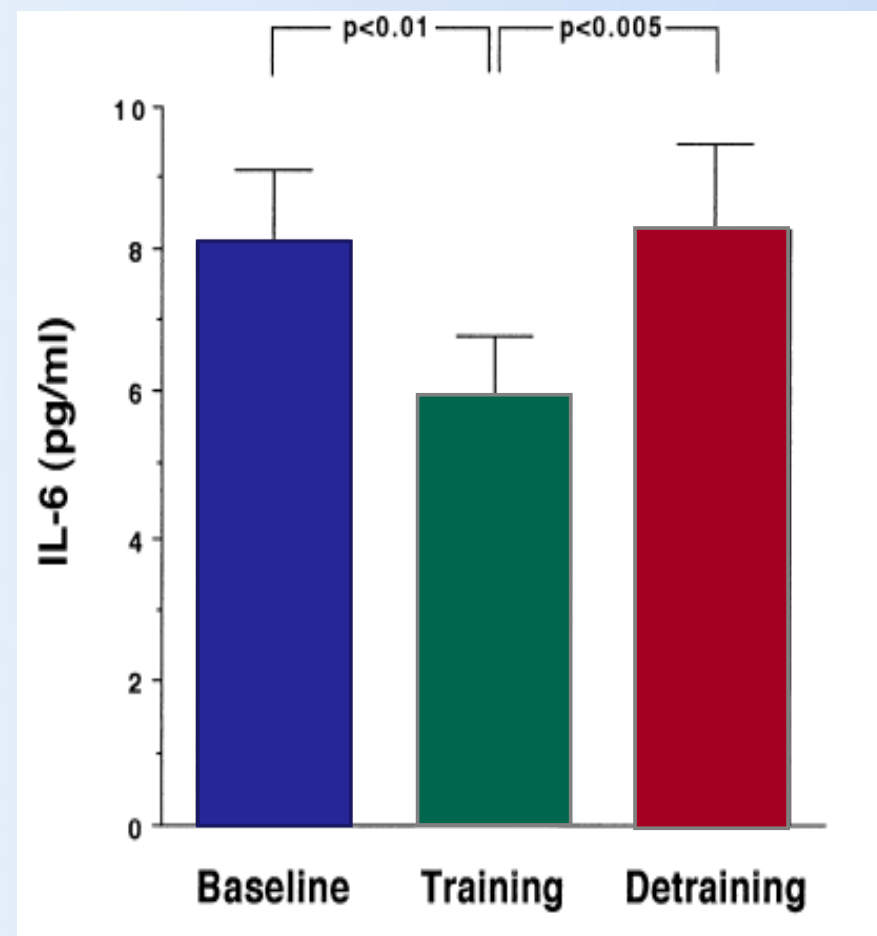
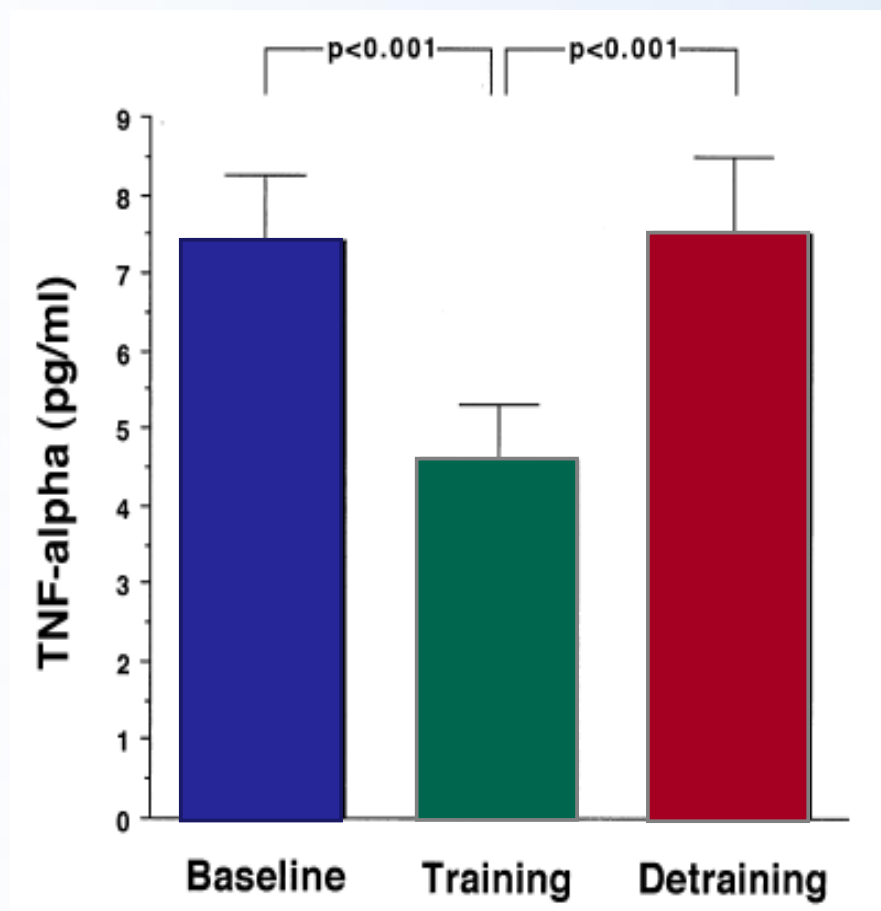
Exercise Training and Inflammatory mediators



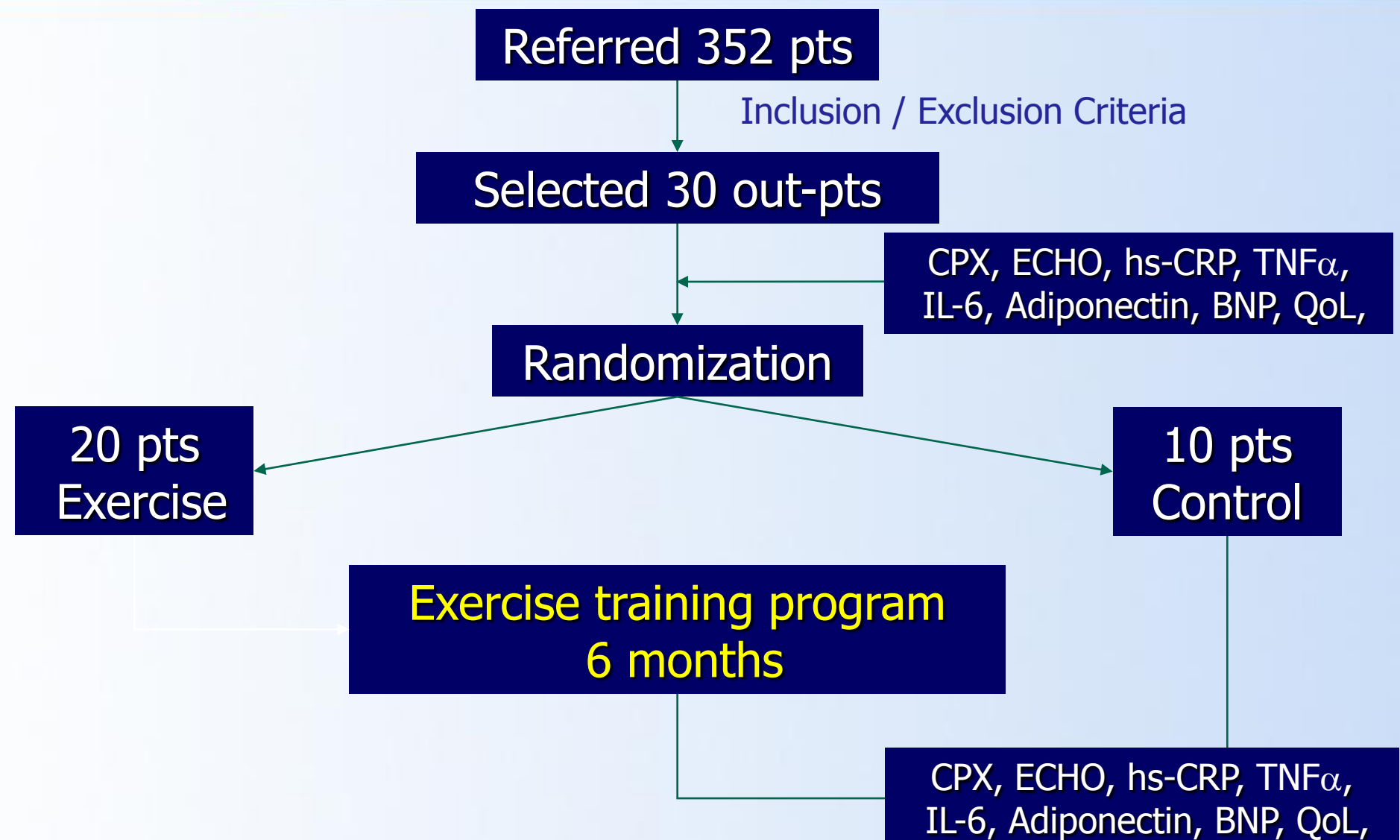
*: $p < 0.02$ vs CHF rest; §: $p < 0.05$ vs CHF rest

Training and Immunomodulation in CHF

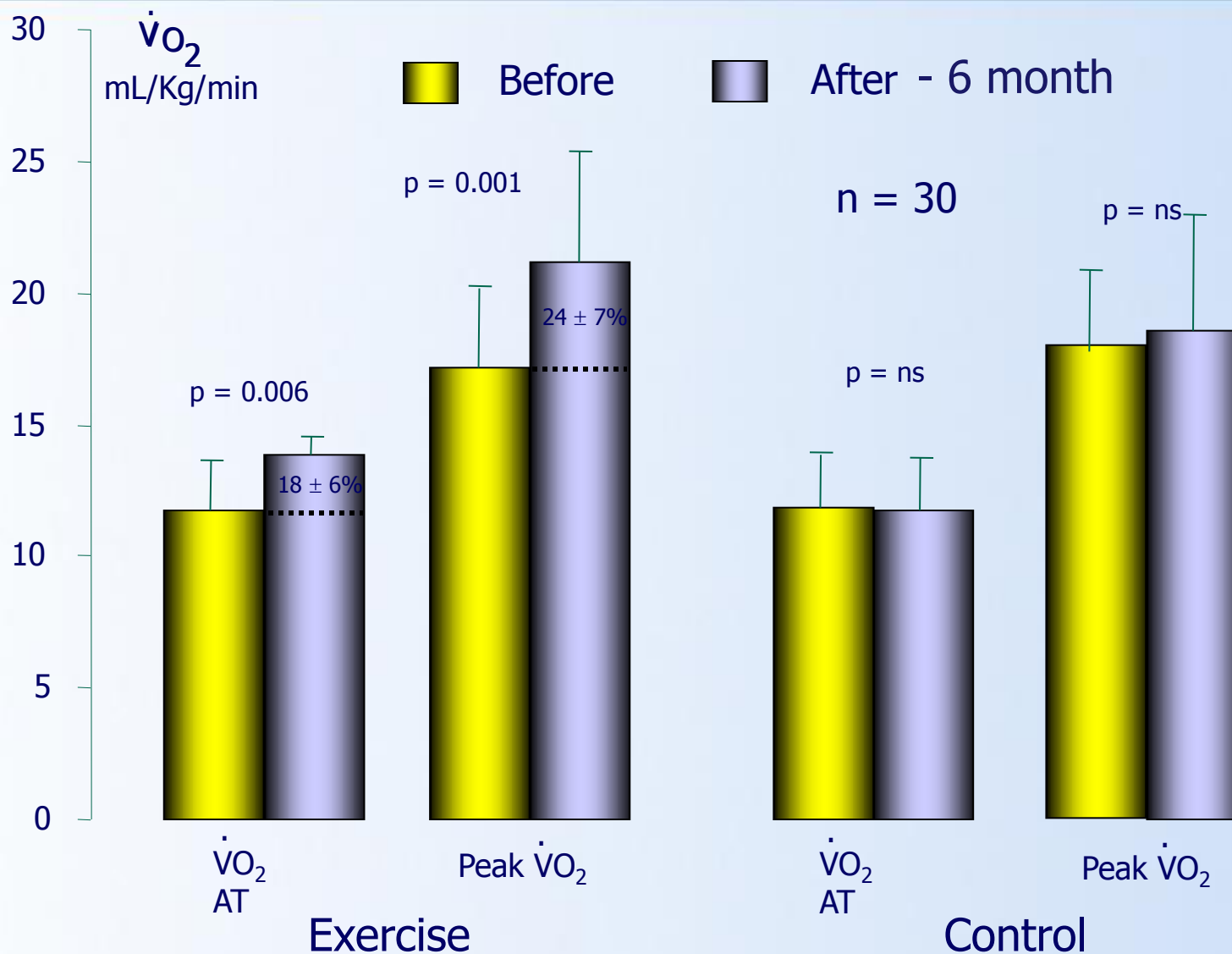
n = 44 12 weeks



Study Design

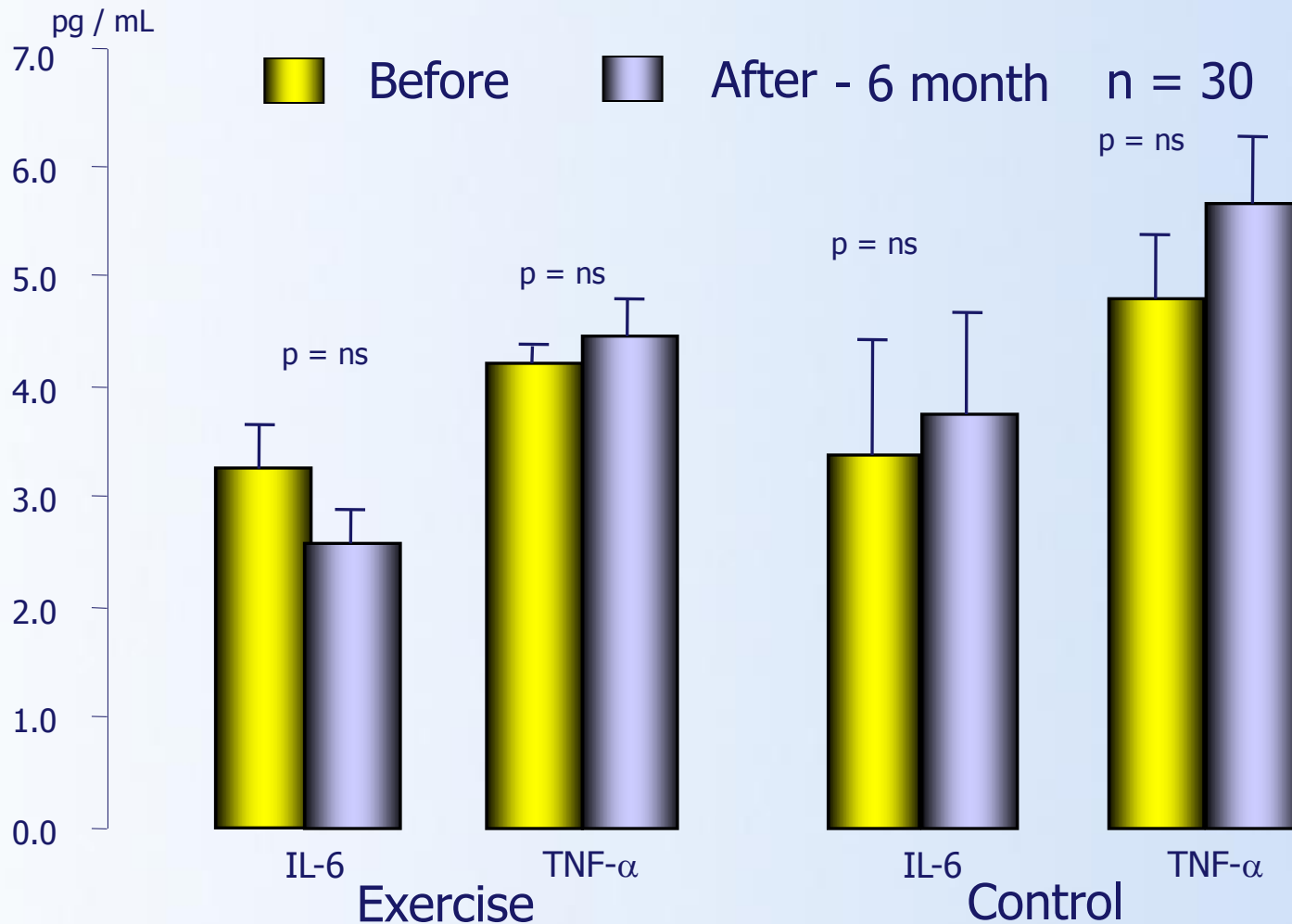


Exercise Training and Oxygen Consumption



Exercise Training and Inflammatory Markers in CHF

Circulating IL-6 and TNF- α



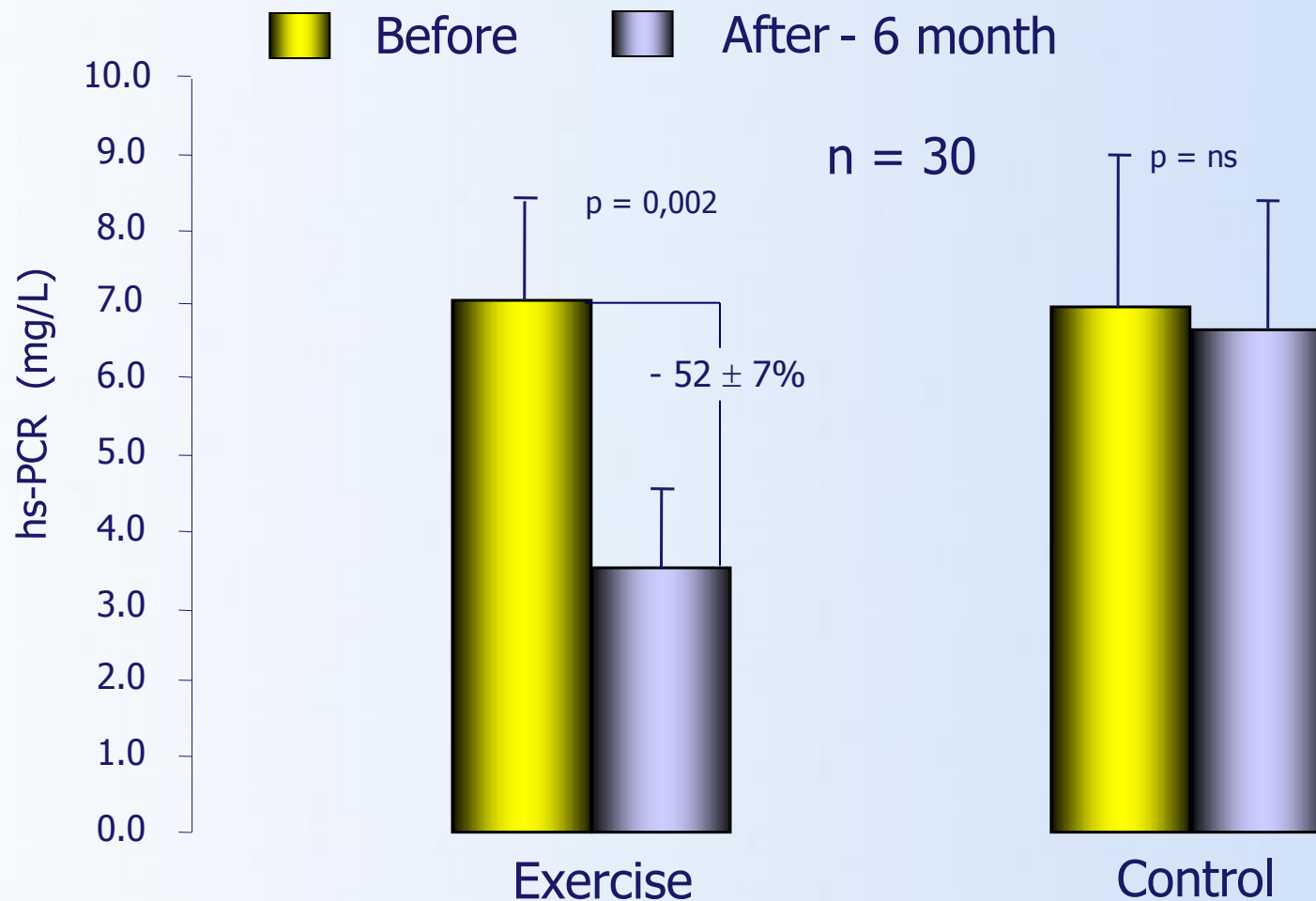
Effect of Exercise on Circulating and Local Cytokines in CHF

Vastus Lateralis - biopsy

Ex Training - 6 month

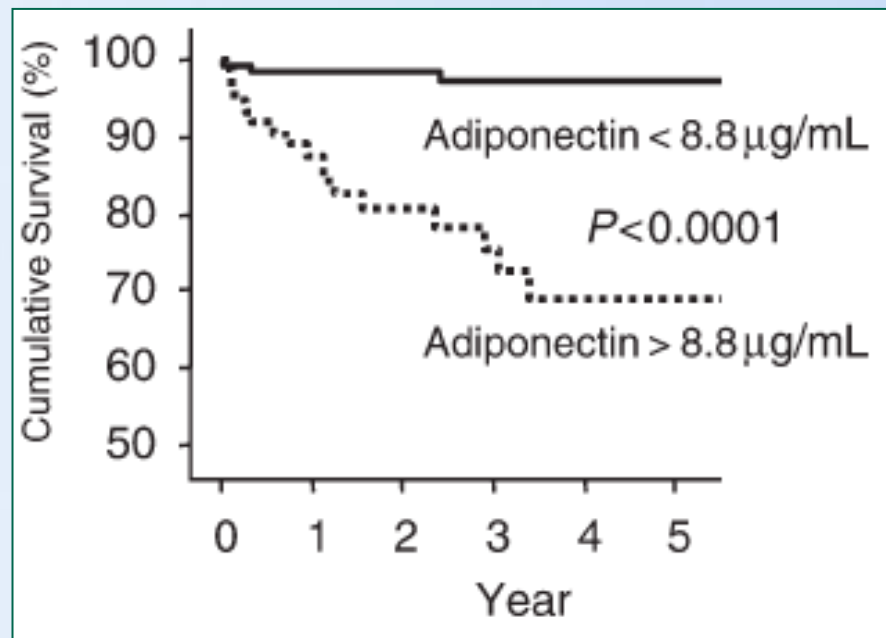
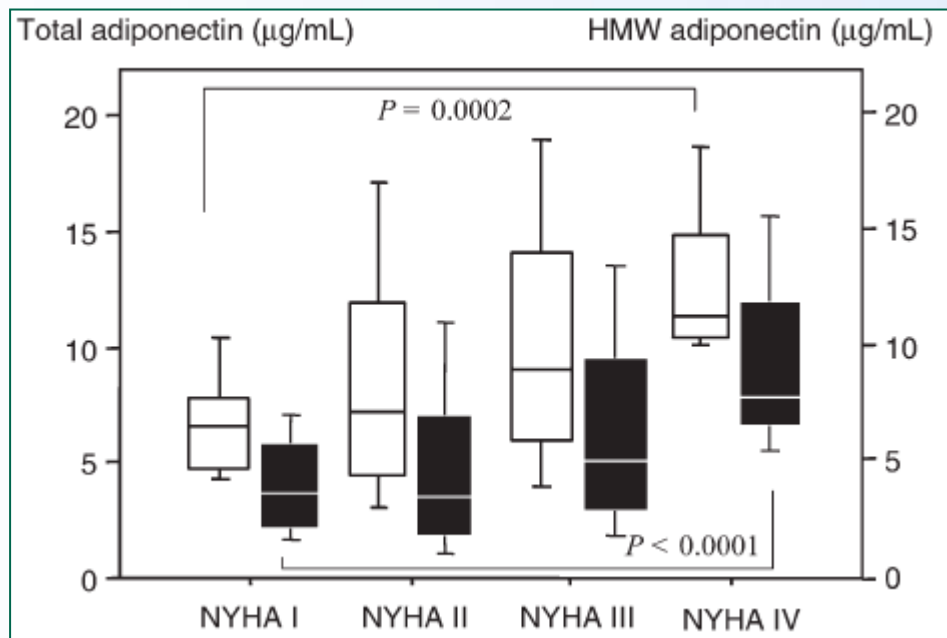
	CHF Patients, Group T		CHF Patients, Group C	
	Begin	6 Mo	Begin	6 Mo
TNF- α serum	2.24 \pm 0.21	2.10 \pm 0.31	2.05 \pm 0.26	2.47 \pm 0.61
TNF- α mRNA	1.71 \pm 0.39	0.92 \pm 0.19*	1.86 \pm 0.38	2.29 \pm 0.60
TNF- α protein	1.43 \pm 0.09	1.04 \pm 0.11†	1.37 \pm 0.09	1.46 \pm 0.10
IL-1 β , serum	0.59 \pm 0.26	0.42 \pm 0.18	0.67 \pm 0.32	0.48 \pm 0.17
IL-1 β mRNA	2.79 \pm 0.73	1.81 \pm 0.67*	2.78 \pm 0.37	3.38 \pm 0.46
IL-1 β protein	1.12 \pm 0.10	0.78 \pm 0.07†	1.06 \pm 0.13	1.26 \pm 0.13

Exercise Training and hs-CRP in CHF



Adiponectin: Inflammatory Mediator in CHF

Adiponectin is an adipocyte-specific cytokine and its high plasma Level has been demonstrated to be a predictor of mortality in CHF

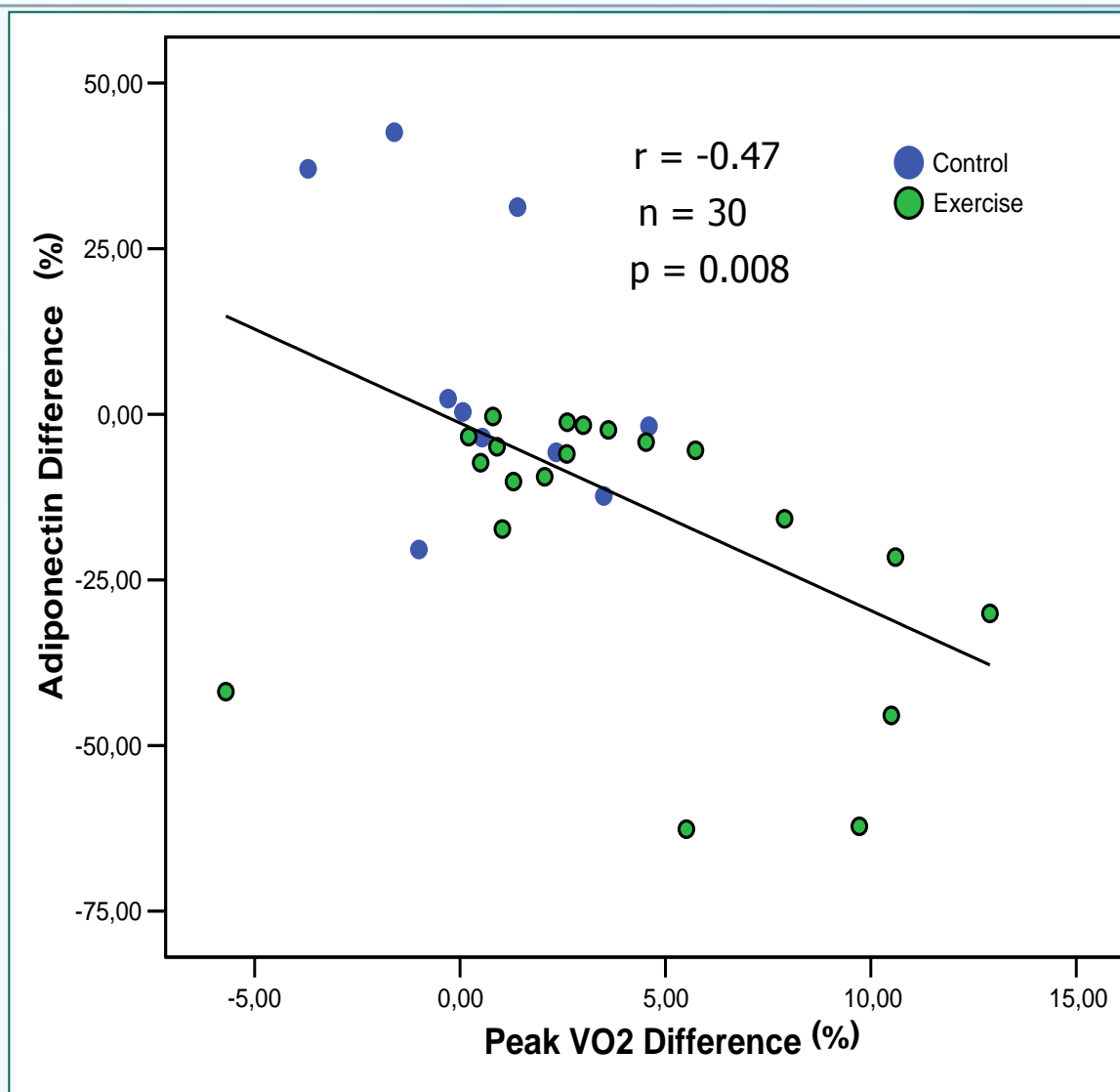


n = 449 follow up : 1.27-3.91 years

Exercise Training and Adiponectin in CHF



Correlation between Adiponectin and Peak VO₂



Conclusions

- ✓ Exercise may reduce some inflammatory markers
- ✓ Exercise may protect against systemic low grade inflammation in chronic heart failure
- ✓ The link between effects of exercise and the long term benefits remain to be proven.

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THANK YOU *Very Much!*

