

# repeat sprints

is further **enhanced** by intensive

## training in hypoxia than in normoxia

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### Introduction

Specific altitude training modalities for intermittent sports (e.g. team and racquet sports) are still unknown.

Vogt et al. (1) have shown specific muscular adaptations induced by high intensity hypoxic training.

Our study evaluates the effects of repeated sprints training in hypoxia or in normoxia on specific RSA performance

### Hypothesis

Specific high intensity training in hypoxia is more beneficial than the same training in normoxia due to molecular adaptations at the muscular level induced during hypoxic training.

### Methods

50 healthy subjects (35 ± 7 years, 75 ± 9 kg, 179 ± 5cm)

3 groups (Control C, Normoxic N or hypoxic training H)

2 repeated sprints training sessions (3x 5 sprints 10s-20s) weekly during 4 weeks

PRE and POST tests on cycle ergometer:

Isolated sprint (10s)

Repeated sprints to exhaustion(RSA) (10s-20s)

Wingate (30s) & 3-min all-out

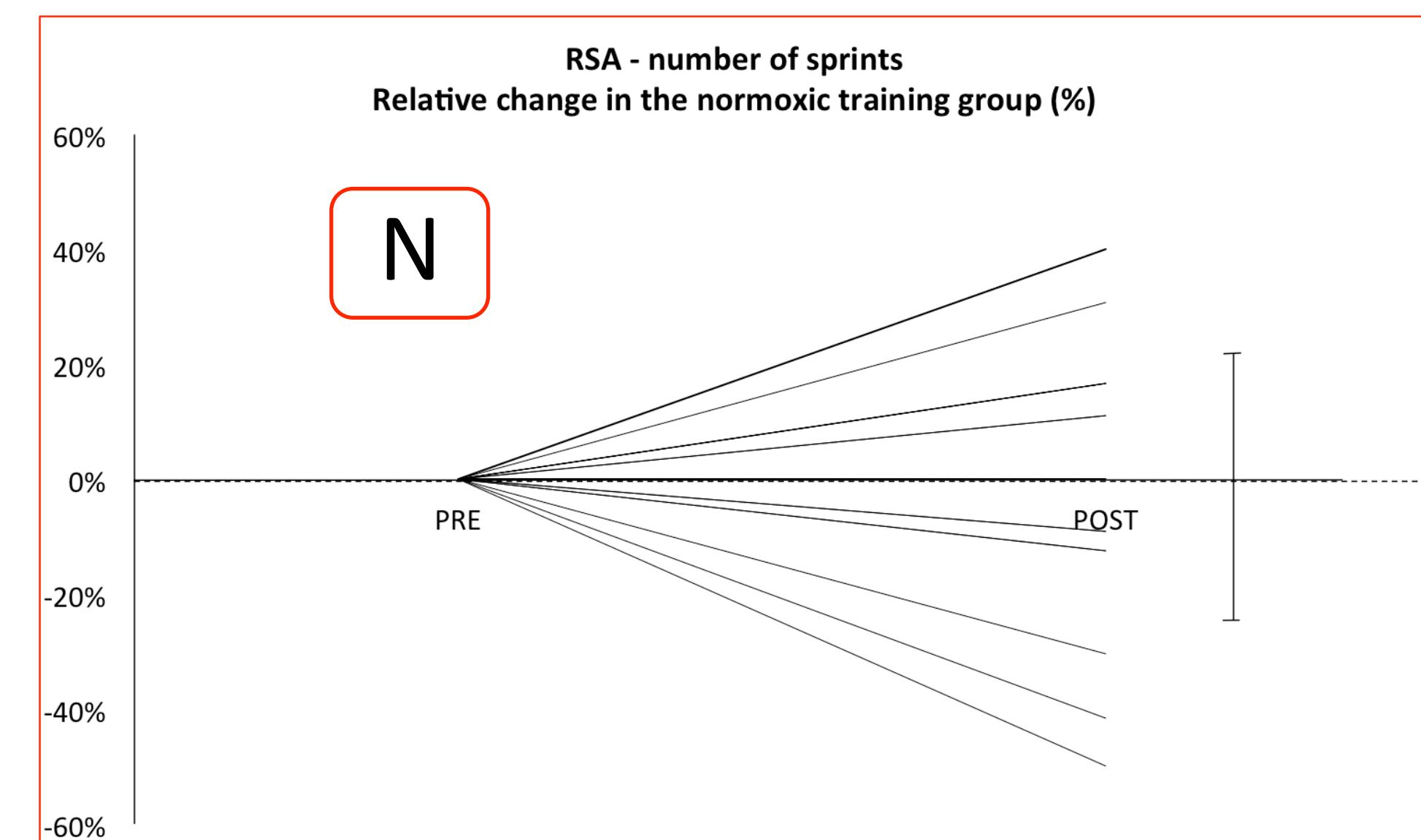
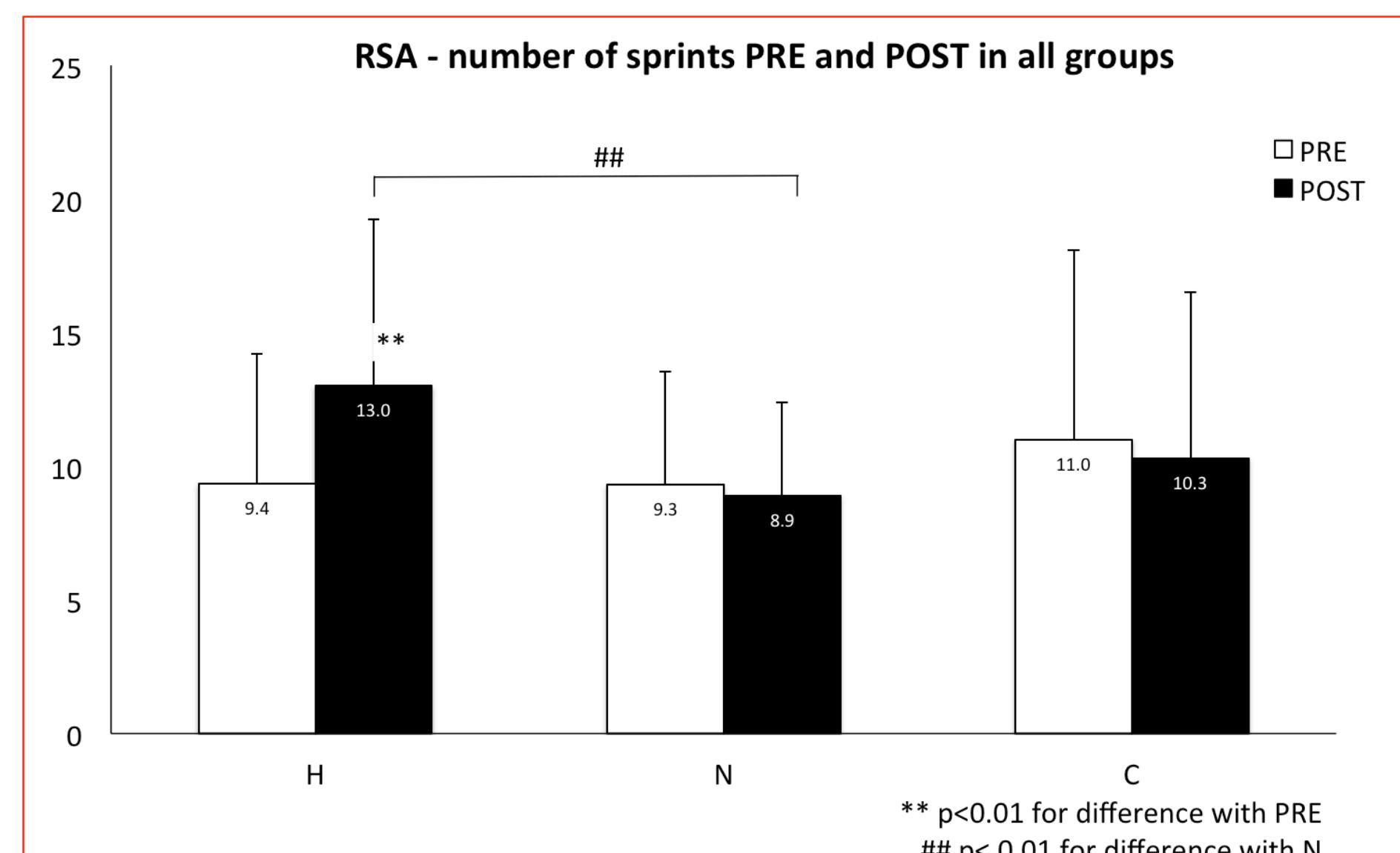
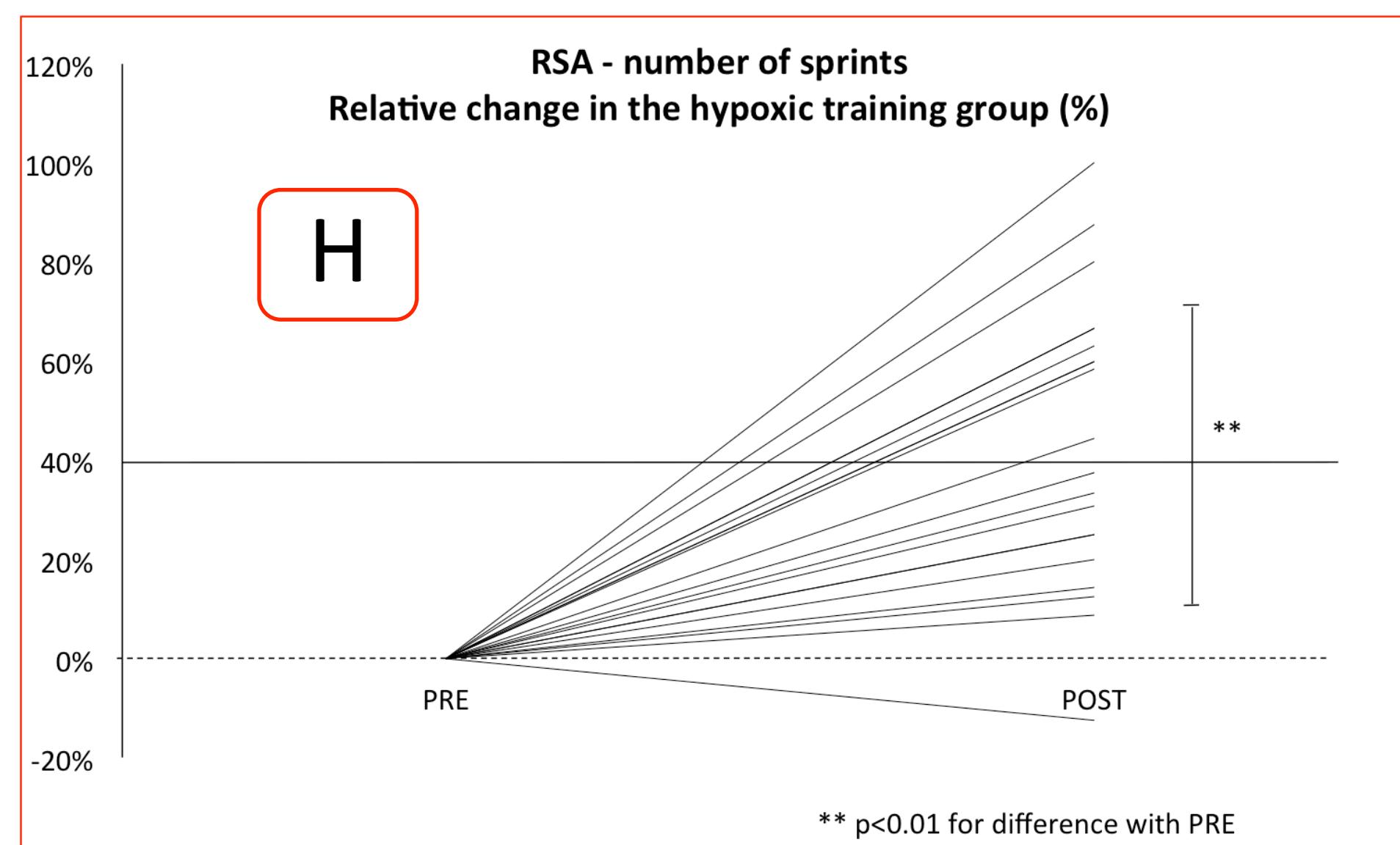
Measured parameters : number of sprints, average and instantaneous power output & lactate ([La])

Training sessions in a normobaric hypoxic chamber



or H ; 3000 m ; F<sub>O<sub>2</sub></sub> = 14.5%  
N ; 485 m ; F<sub>O<sub>2</sub></sub> = 20.9%

### Results



1

Specific training increased significantly (p<0.01) the number of repeated sprints in H (9.4 ± 4.8 vs. 13 ± 6.2 sprints) but not in N (9.3 ± 4.2 vs. 8.9 ± 3.5) or in C (11.0 ± 7.1 vs 10.3 ± 6.2).

2

10s sprint and Wingate performance improved (p<0.01) similarly in H and N.

3 min all-out performance and post-RSA lactate were similar PRE and POST in all groups.

	Sprint 10s (W)		[La] post-RSA (mmol/l)		3 min all-out (W)		Wingate (W)	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
H	870 ± 132	925 ± 120*	15.0 ± 2.3	15.4 ± 2.1	368 ± 45	383 ± 39	699 ± 102	718 ± 94*
N	879 ± 131	940 ± 131*	14.2 ± 1.7	14.8 ± 1.6	371 ± 49	382 ± 47	688 ± 75	723 ± 86*
C	890 ± 151	877 ± 163	14.8 ± 2.0	13.8 ± 1.5	385 ± 48	378 ± 48	670 ± 87	689 ± 105

\* p<0.01 for difference with PRE

### Discussion

Specific repeated sprints training in hypoxia allows further enhancement of repeated sprint performance than the same training in normoxia. Systemic aerobic (3min all-out), glycolytic (Wingate, [La]) and alactic (isolated sprint) performances being similar H and N, this improvement in RSA can only be due to peripheral molecular adaptations at the muscular level induced by high intensity hypoxic training.

Muscles biopsies and blood samples are currently being analyzed for a complete evaluation of the involved genes and enzymes as well as of the oxidative stress.