

International  
week of Football

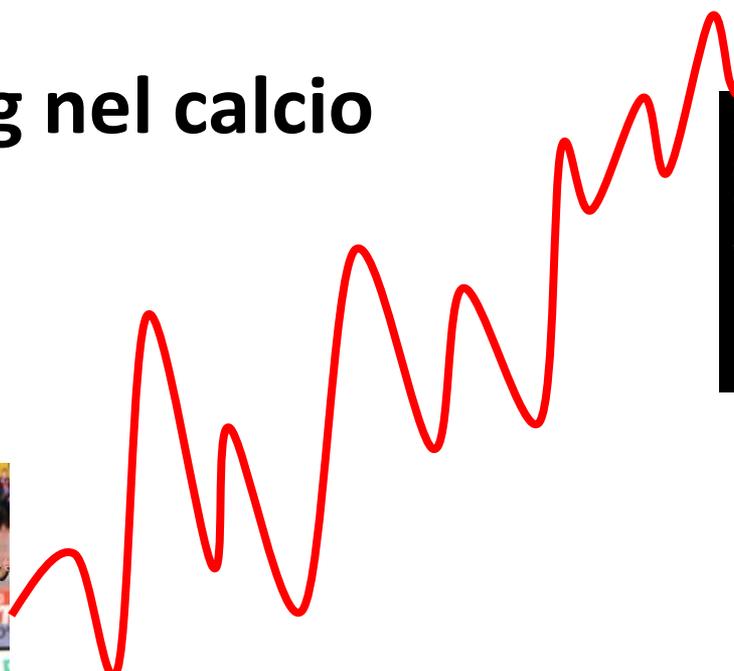


International Conference  
Science and Football  
Palermo, 15-17 April

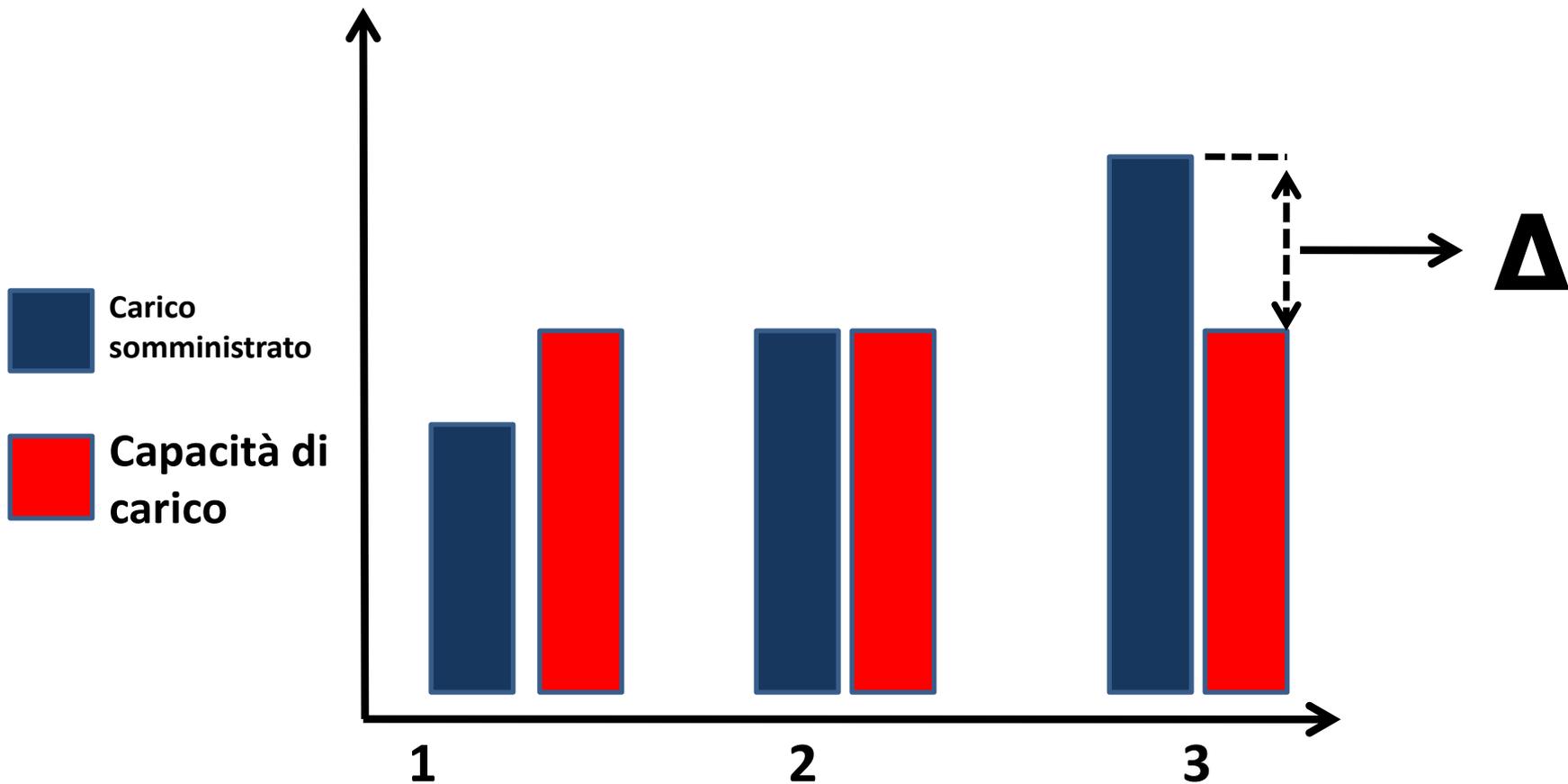
International  
Football Camp  
Catania, 11-15 April



# Monitoraggio dell'overtraining nel calcio



Dott. M Spedicato



Δ

(+) Adattamento positivo

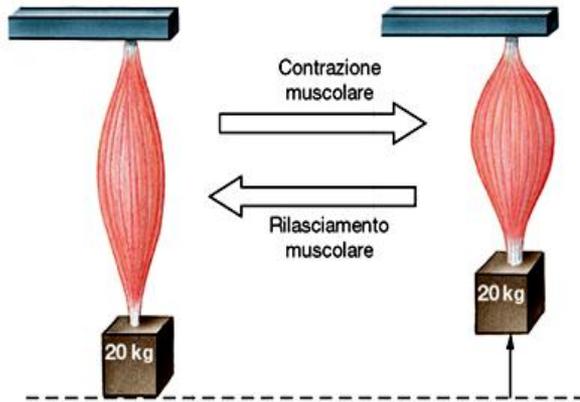
(-) Adattamento negativo

→ **EARLT**  
(effetto ritardato a lungo termine dell'allenamento).

→ **overtraining**

# Quali problematiche per il calcio?

## Sistema muscolo tendineo



Patologia da sovraccarico: Evento traumatico diretto o indiretto a carico dell'unità muscolo tendinea, che abbia comportato l'assenza dall'allenamento successivo o dalla gara.

### 1. Incidenza in gara

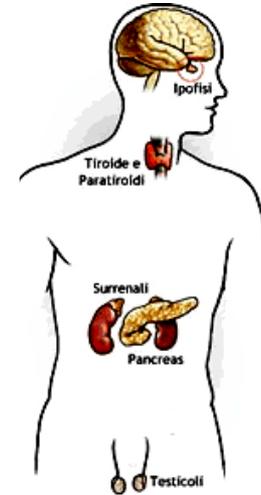
95%Conf.: 8,5-19/1000h

### 2. Incidenza in allenamento

95%Conf.: 5-6,7/1000h

Nielsen and J Yde; Astrid Junge et al.; Schmidt Olsen et al.(9-19 anni)

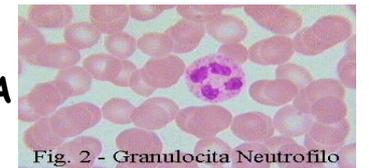
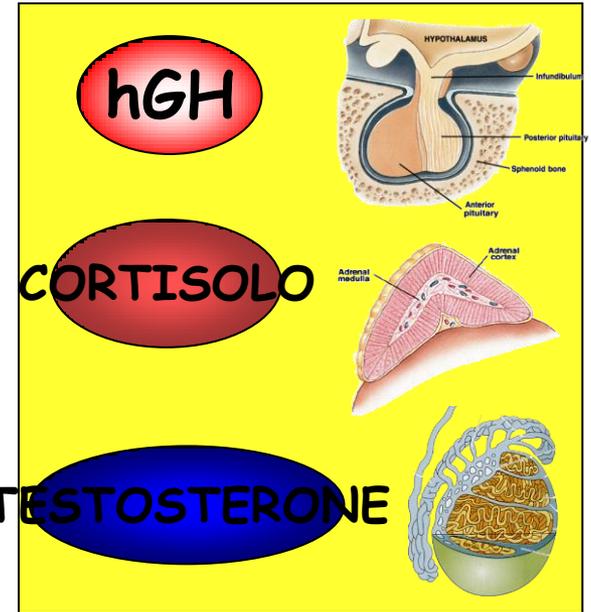
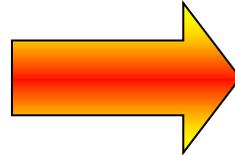
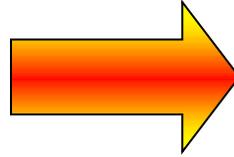
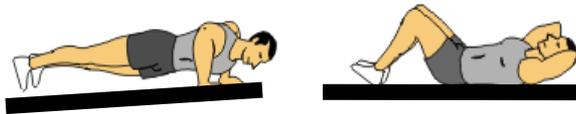
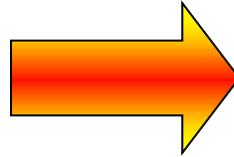
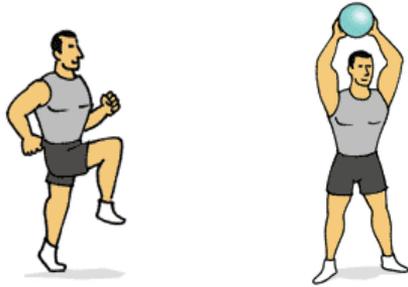
## Sistema organico



1. **FTCR<0,35 ; Variazioni negative FTCR > 30%**
2. **Idroperossidi: Range fisiologico: 250-300 U/CARR**
3. **Granulociti neutrofili: Range fisiologico: 1500-7000/mm<sup>3</sup>**

(Hakkinenet al. 1987; Vervoorn et al. 1991; Hoogeveen and Zonderland 1996; Fry et al. 2000; Handziski et al., 2006; Roi G.S., Osgnach C., Venturati F., Perondi F., Dolci A., Banfi G., 2005)

# Obiettivi della programmazione





**25 calciatori**  
**Età:  $18,5 \pm 1$**   
**Peso:  $72 \pm 6,7$  Kg**  
**Altezza:  $180 \pm 9$  Cm**



# METABOLISMO



**corsa continua o con  
variazioni di velocità  
(min/Sett)**

**AEROBICO**



**salti orizzontali e verticali,  
velocità, rapidità  
(rip/Sett)**

**ANAEROBICO  
ALATTACIDO**



**sprint con recuperi brevi  
(mt/Sett)**

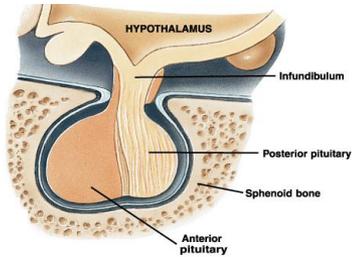
**ANAEROBICO  
LATTACIDO**



**esercitazioni tecnico-  
tattiche e gare  
(min/Sett)**

**AEROBICO  
ANAEROBICO  
ALTERNATO**

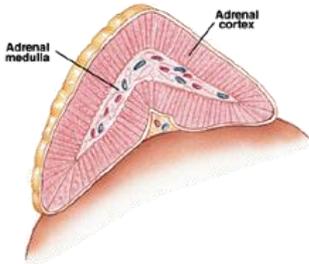
# MATERIALI E METODI



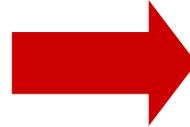
**hGH**



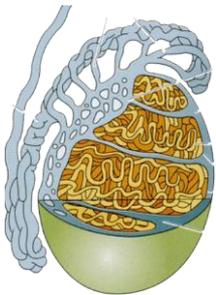
**SAGGIO IMMUNOENZIMATICO  
(AIA 600)**



**CORTISOLO**



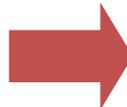
**SAGGIO IMMUNOMETRICO  
CHEMIOLUMINESCENTE  
(IMMULITE 2000)**



**TESTOSTERONE**

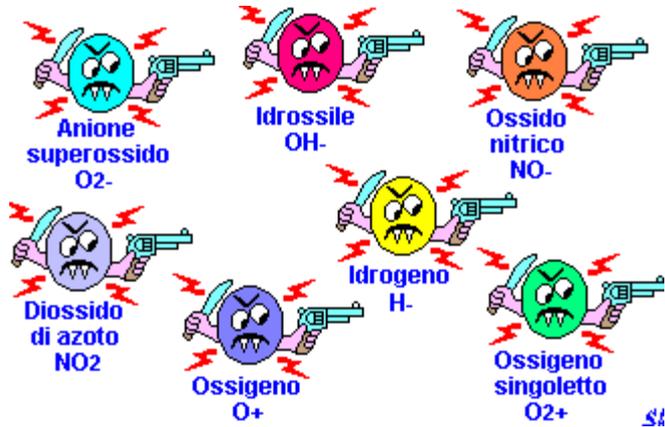


**TESTOSTERONE  
LIBERO**



**SAGGIO  
RADIOIMMUNOLOGICO  
(RIA)**

# MATERIALI E METODI



**Stress ossidativo**



**Test spettrofotometrico (d-ROM Test)**

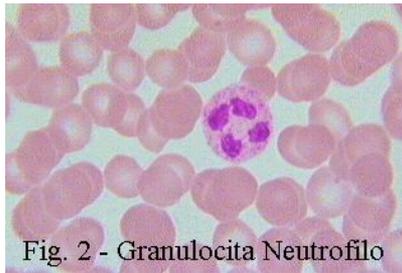


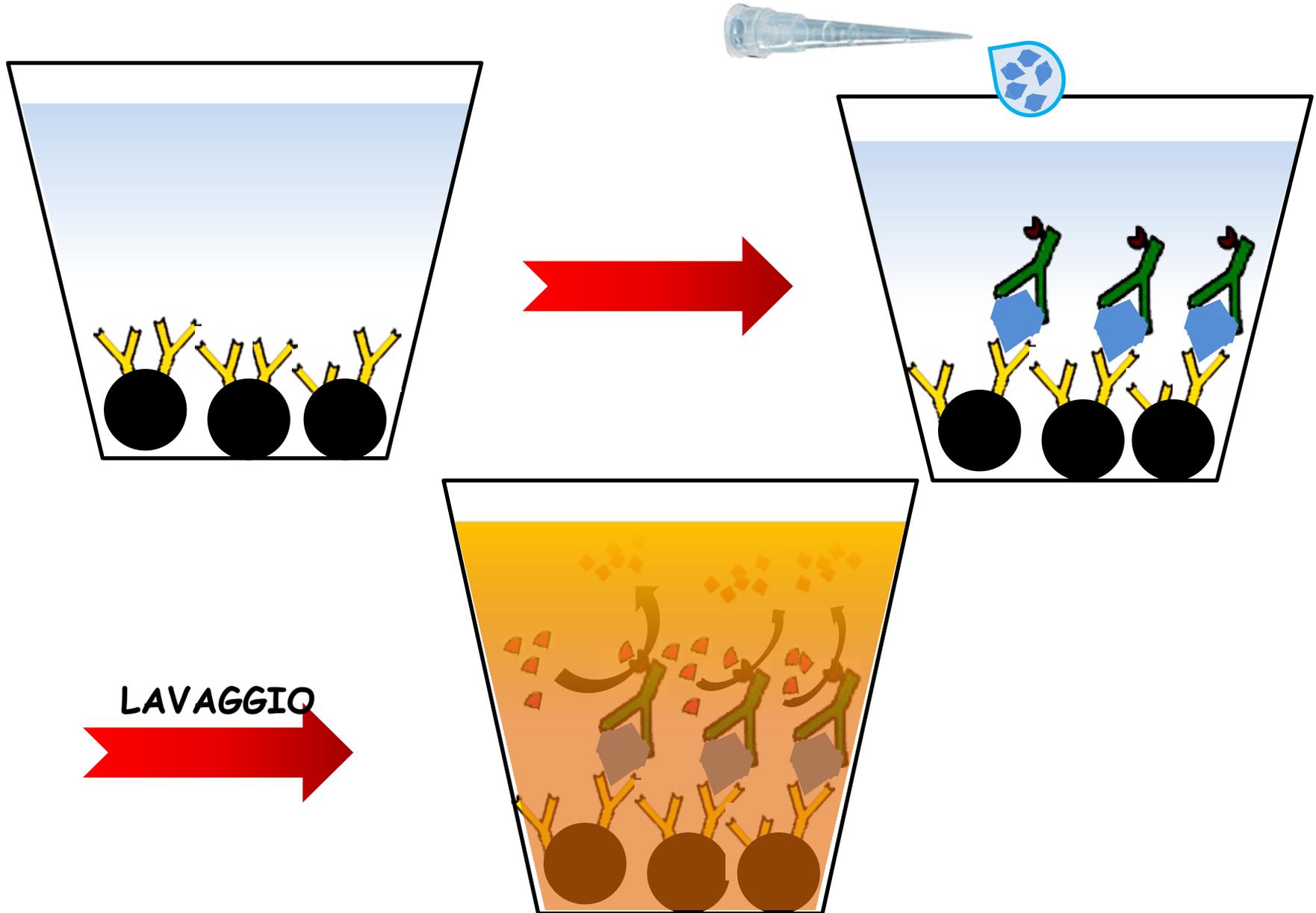
Fig. 2 - Granulocita Neutrofilo

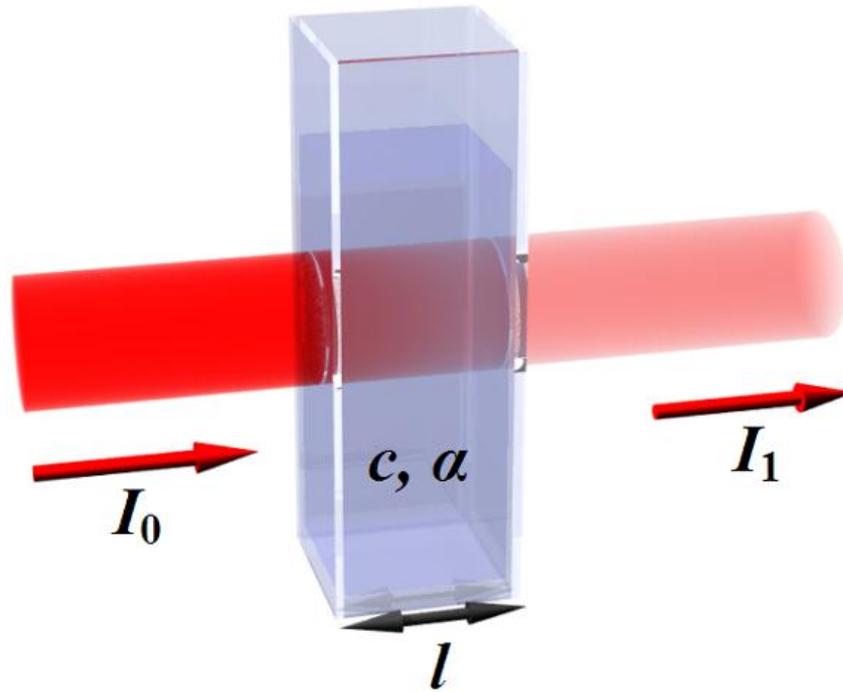
**RISPOSTA IMMUNITARIA**



**Test emocromocitometrico (ADVIA 2120)**

# MATERIALI E METODI

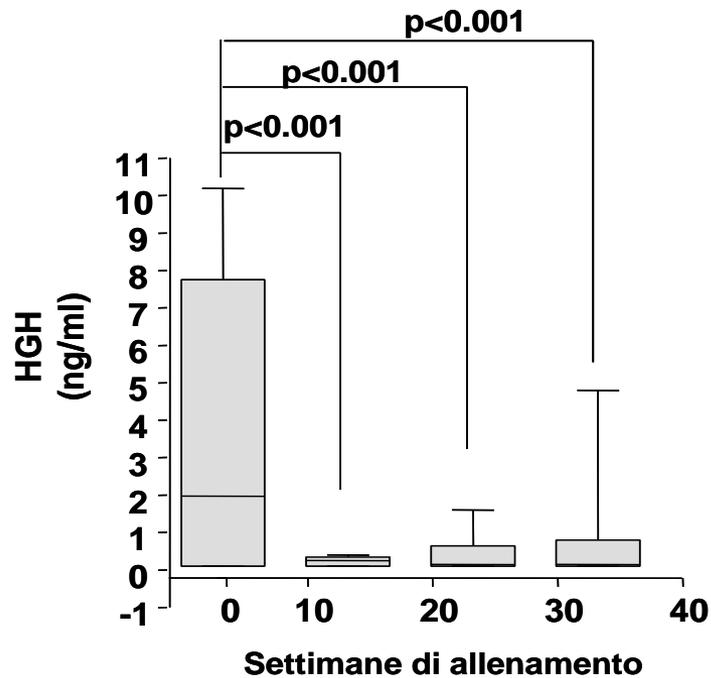
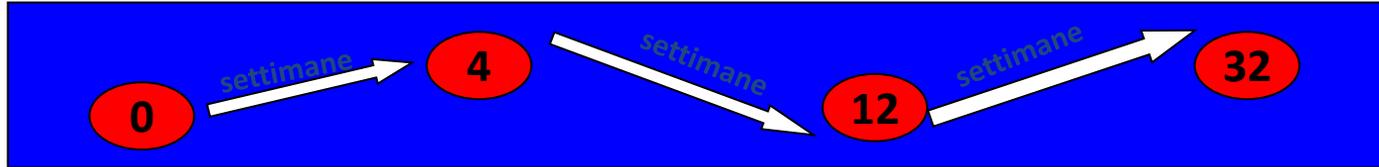




## Legge di Lambert-Beer

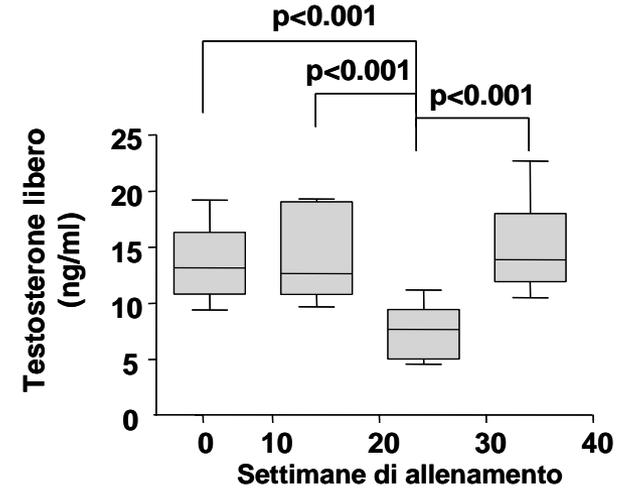
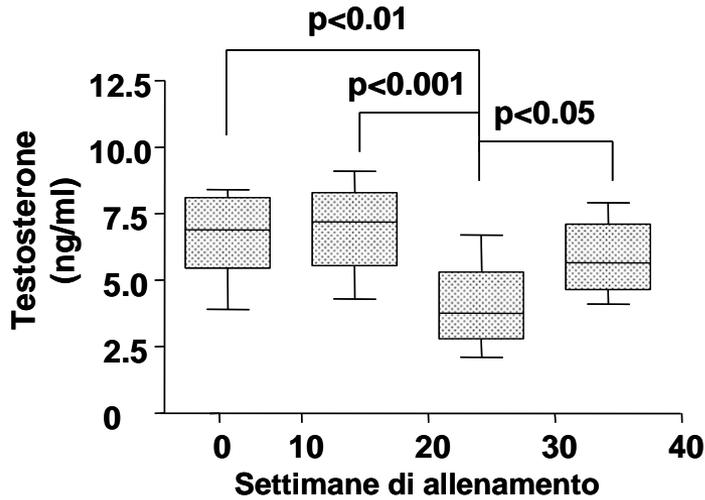
$$\frac{I_1}{I_0} = 10^{-k_{\lambda} l} = T = 10^{-A}$$

# RISULTATI

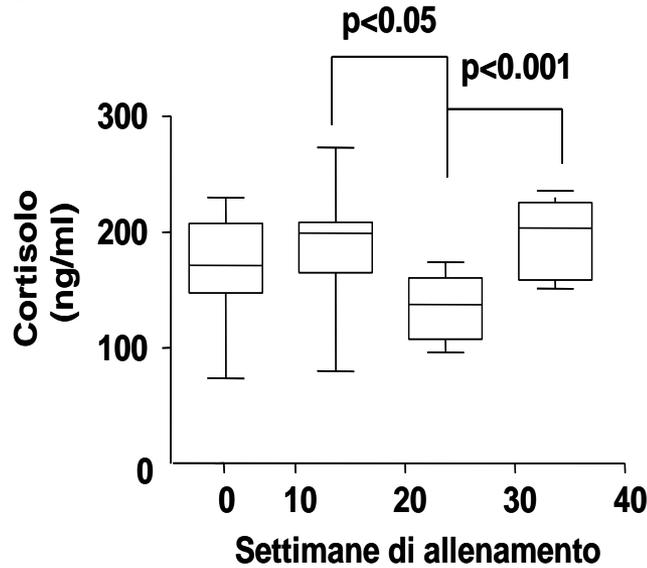


Range fisiologico: 0-7 ng/ml

# RISULTATI



Range fisiologico:  
3-9 ng/ml



Range fisiologico:  
9-47 ng/ml

Range fisiologico: 70-250ng/ml

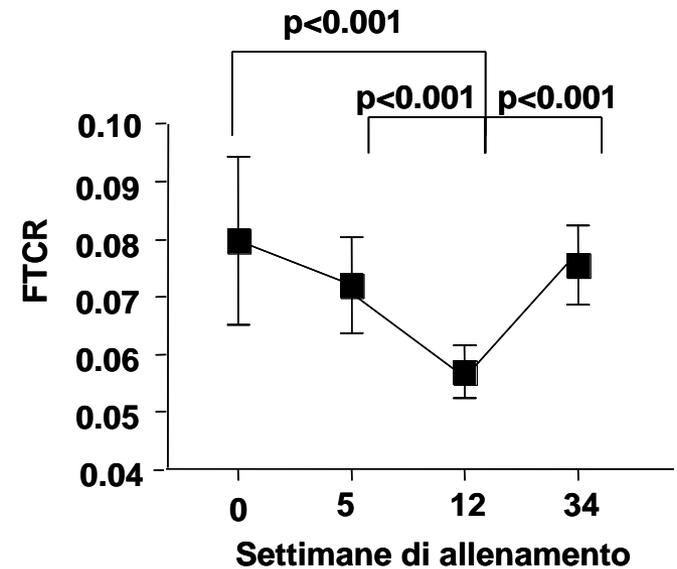
# RISULTATI



“Il calcio è uno sport, la cui pratica sollecita fortemente il sistema ormonale. La variazione, in aumento, della concentrazione plasmatica di Testosterone libero e Cortisolo, entro determinati parametri, è un indicatore predittivo della condizione di overtraining

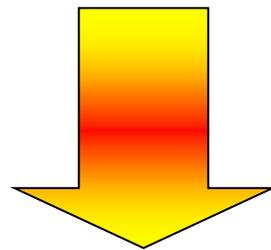
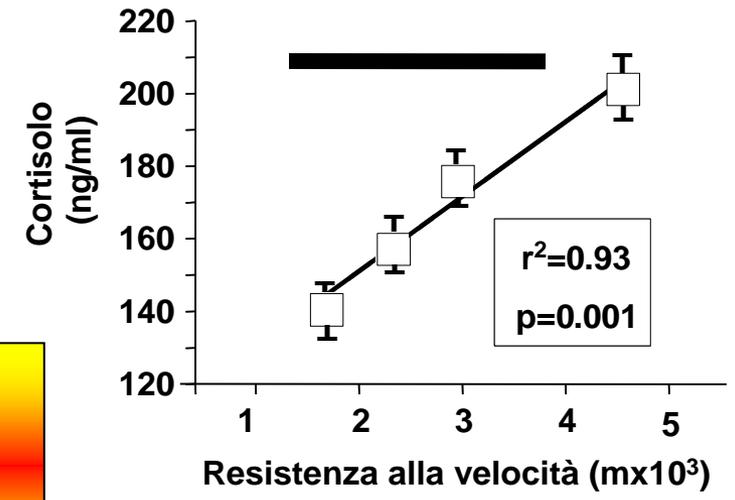
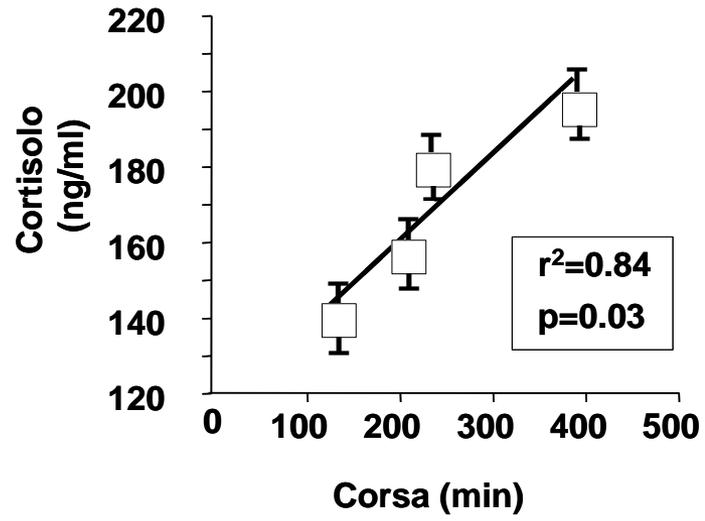
- 1. FTCR < 0,35**
- 2. Variazioni negative FTCR > 30%**

(Hakkinen et al. 1987; Vervoorn et al. 1991; Hoogeveen and Zonderland 1996; Fry et al. 2000; Handziski et al., 2006; Roi G.S., Osgnach C., Venturati F., Perondi F., Dolci A., Banfi G., 2005)



# RISULTATI

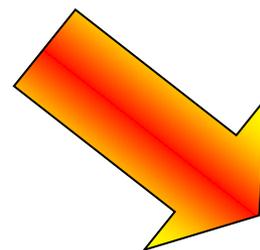
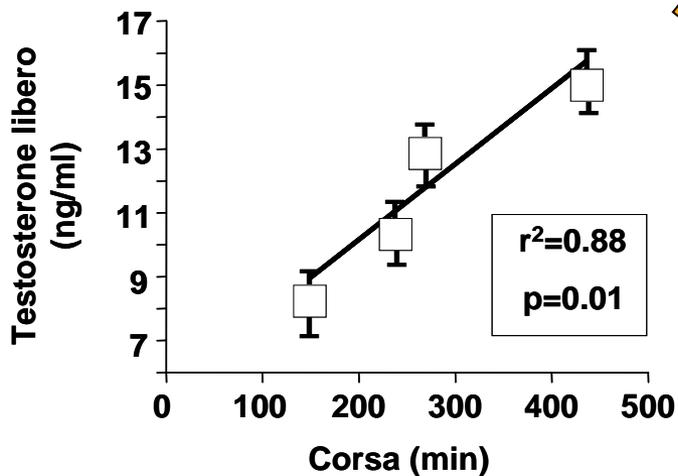
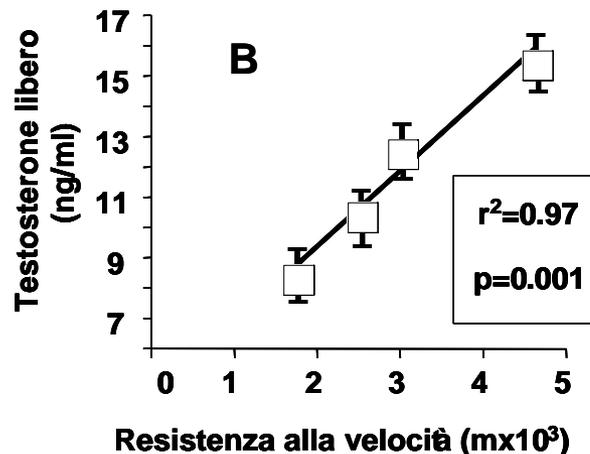
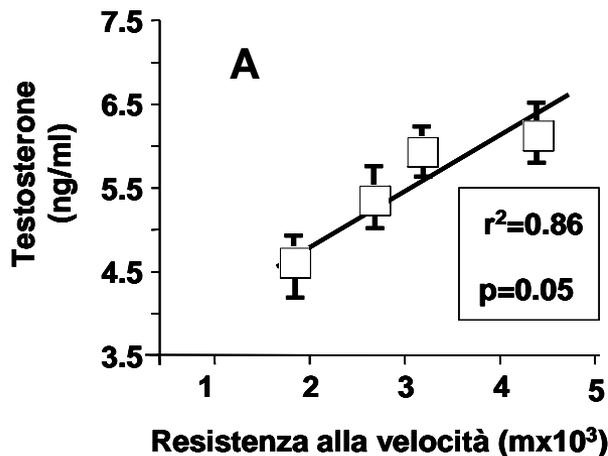
CORTISOLO



**Il cortisolo si correla positivamente con il lavoro aerobico e anaerobico lattacido**

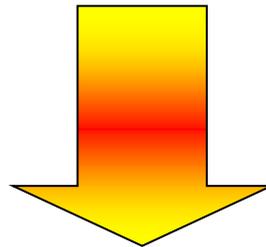
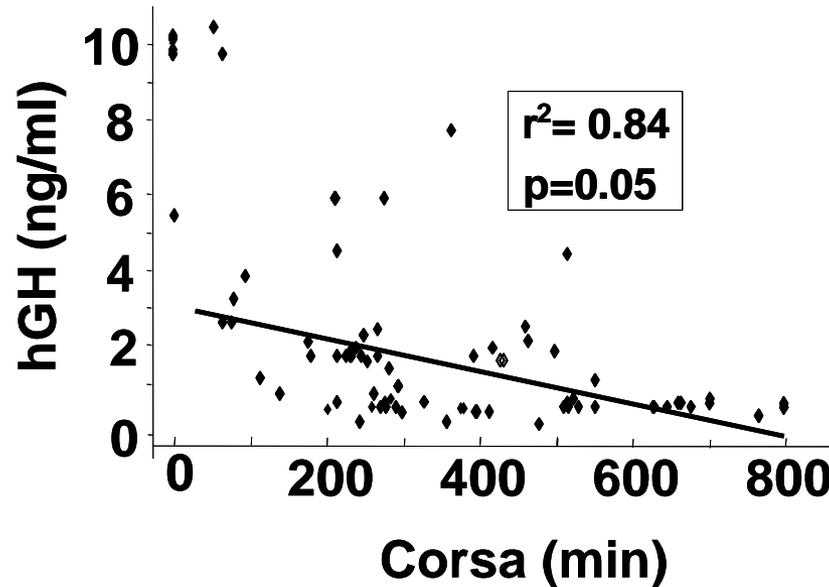
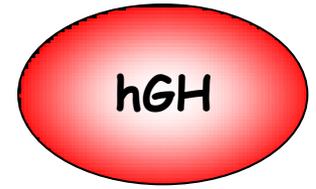
# TESTOSTERONE

# RISULTATI



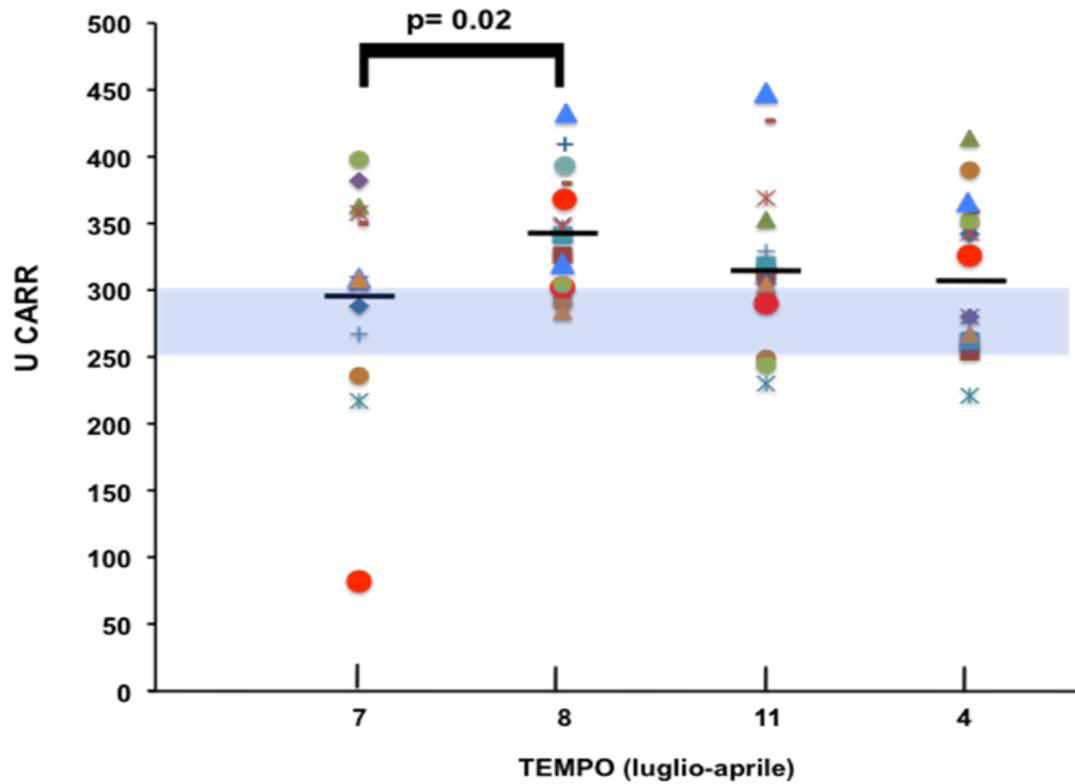
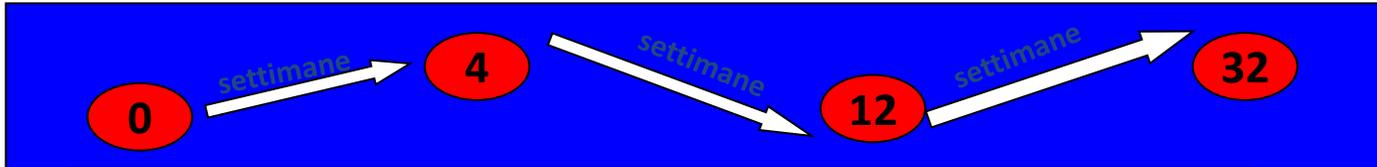
**Testosterone totale e libero si correla con lavoro aerobico e anaerobico lattacido.**

# RISULTATI



**hGH si correla negativamente con lavoro aerobico ed anaerobico lattacido**

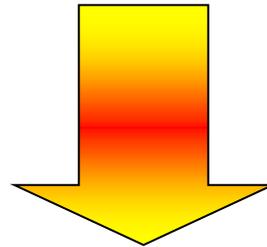
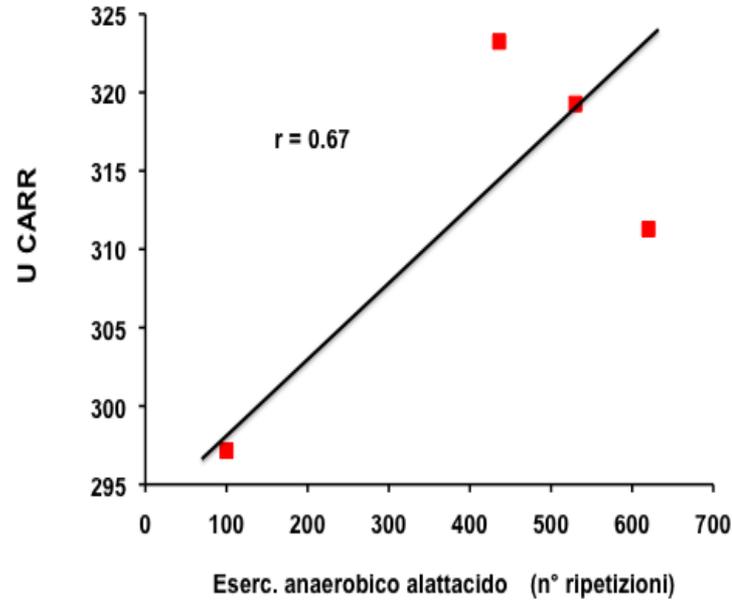
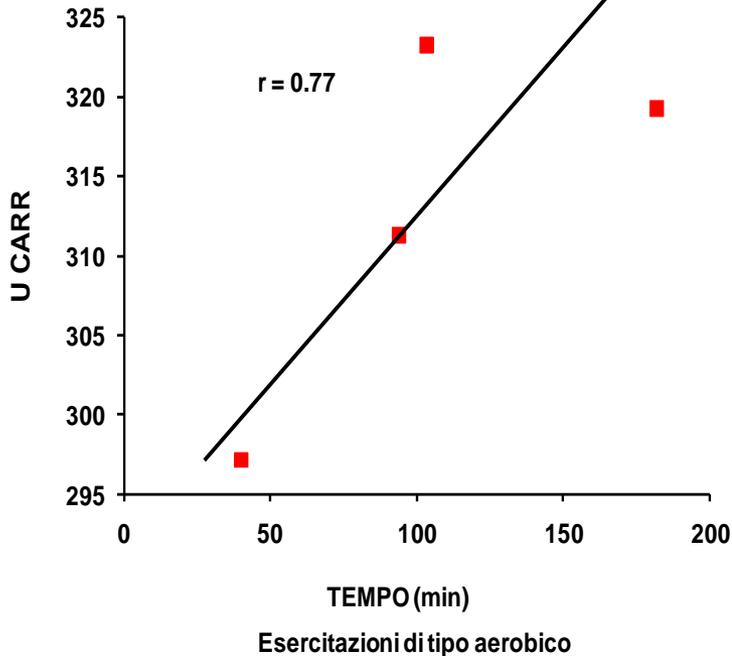
# RISULTATI



Range fisiologico: 250-300 UCARR

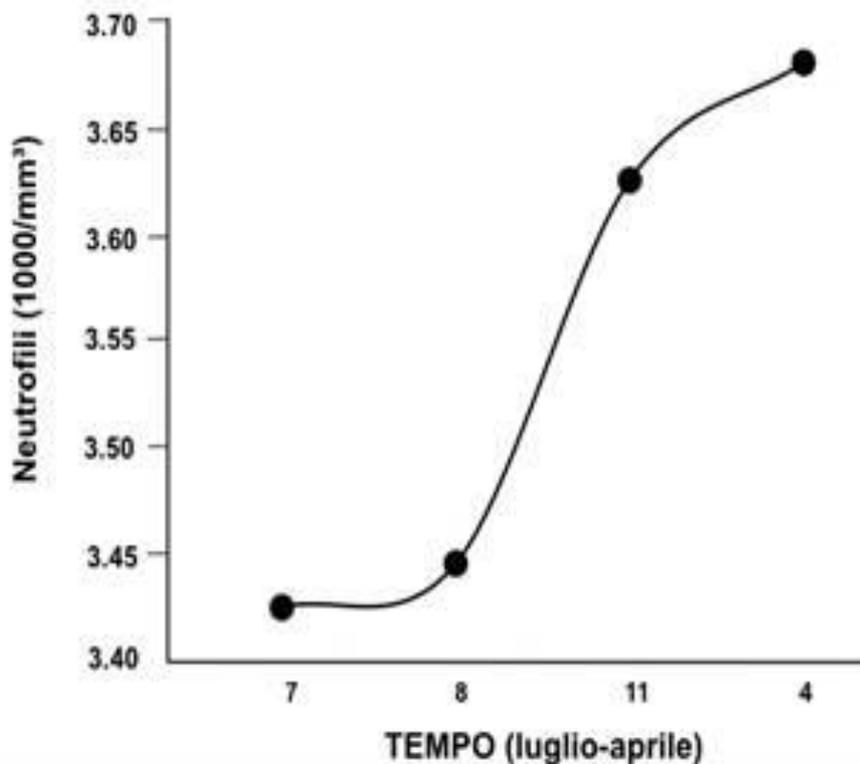
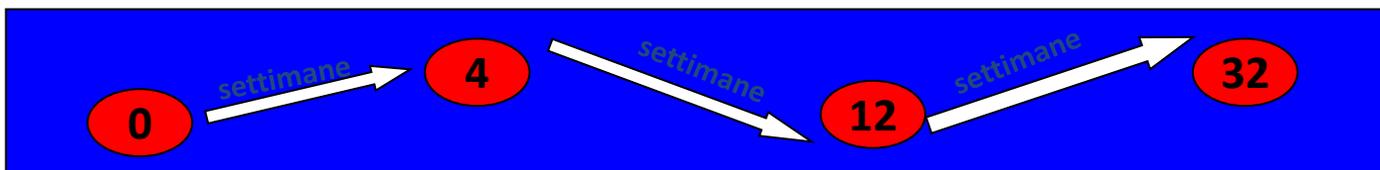
# RISULTATI

STRESS  
OSSIDATIVO



**I livelli sierici di idroperossidi, si correlano positivamente con il lavoro aerobico ed anaerobico lattacido**

# RISULTATI

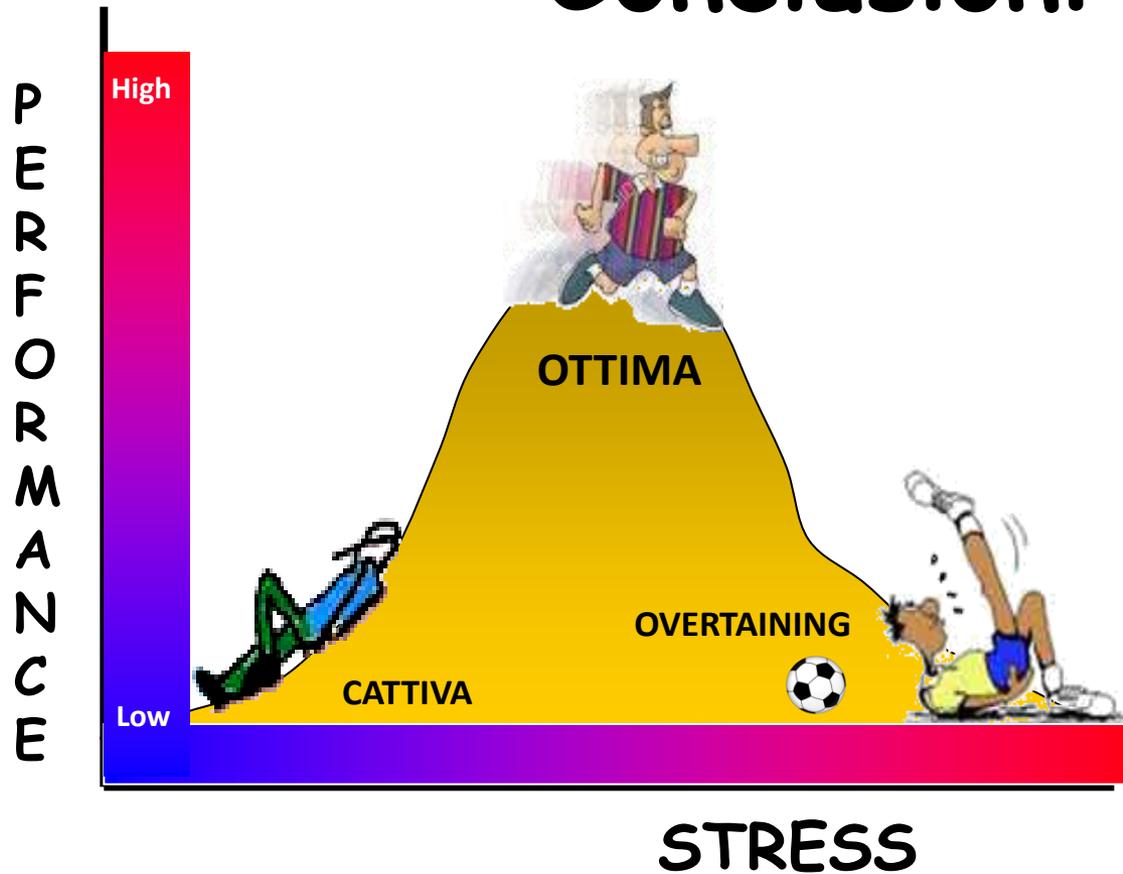


granulociti neutrofili  
(% dei globuli bianchi)

	n.1	n.2	n.3	n.4
1	33,6	47	35	38,1
2	53,7	46,5	55,1	48
3	70,6	40,9	45,7	59,7
4	51	45,4	45	50
5	43,8	49,7	51,8	59,3
6	61,6	53,9	64,5	54,3
7	54,3	49,5	56,3	53,6
8	38,6	45,1	38,1	37,3
9	44,7	45,6	46,1	60
10	57,7	64,3	61,4	56,6
11	30,6	52,6	45,7	45,6
12	52,8	53,6	55,7	54,6
13	44,8	46,4	56	46,5
14	40,6	39	39,8	47,3
15	50,4	51,4	53	53,6
Medie	48,59	48,73	49,95 7	51,06
S.D.	± 10,28	± 5,88	± 8,30	± 4,35

Range fisiologico: 1500-7000/mm<sup>3</sup>

# Conclusioni



**E' necessario stabilire un protocollo che promuova il corretto adattamento ai carichi di lavoro senza causare sindromi da sovraccarico.**



# Grazie

