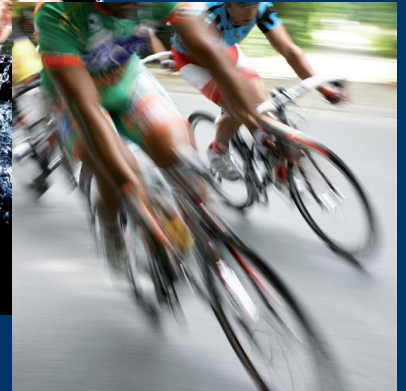




# FREE RADICALS IN SPORT





# FREE RADICALS IN SPORT

- Exhausting Physical activity → O<sub>2</sub> consumption
- Greater O<sub>2</sub> consumption → increase ATP
- Increase ATP → ROS
- ROS → OS
- OS → muscular ischemia
- Muscular ischemia → tissular damage
- Tissular damage → casualty (articular phlogosis, tendinitis, ect)



# THE SOLUTION OF THE PROBLEM

Free radicals constitute an important risk factor.

It is fundamental to keep their levels at normal values, or suffer the onset of cellular damages.

In order to intervene it is indispensable to know the values of free radicals, but up to today their measurement was very difficult in the clinical practice.

This was until the arrival of FRAS 4 Evolve which measures the level of oxidative stress in any place **IN FEW MINUTES AND AT LOW COSTS** using a drop of capillary blood taken from the finger tip.



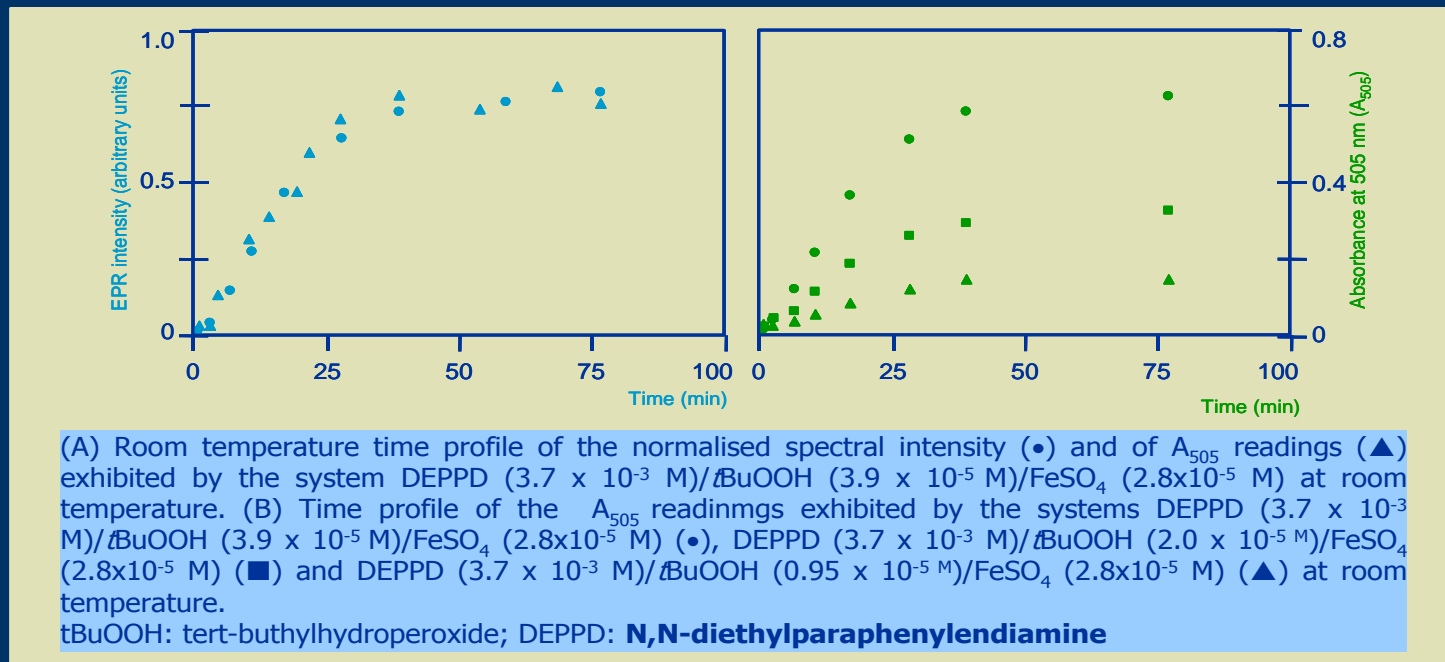
# FRAS 4 – Free Radical Analytical System

- FRAS 4 Evolvo is the latest product by H&D and it is available to doctors and health operators allowing the Oxidative Stress Global Evaluation with the d-ROMs and BAP tests.
- FRAS 4 Evolvo is a dedicated photometer with inbuilt centrifuge allowing the operator to carry out the d-ROMs and BAP test in a simple and self-guided way through the help of the messages appearing successively on the instrument display.
- FRAS 4 Evolvo prints a ticket with the value and the date of the test. The ticket can be personalized with the name and the address of the doctor.



# d-ROMs Test

- d-ROMs test is a reliable, repeatable and precise test which allows the determination of the pro-oxidant status of a living being through the measurement of the haematic concentration of the ROS (Reactive Oxygen Metabolites = Free Radicals).
- Italian CNR (National Centre for Research) has confirmed the complete superimposition of the values of free radicals obtained with the d-ROMs test and with the “golden standard” (ESR - Electron Spin Resonance).





# d-ROMs Test

- The normality range for d-ROMs test was obtained by examining 5.000 clinically healthy subjects and is between 250 and 300 U Carr. This means that healthy population has a value of d-ROMs, or normal level of free radical activity, between 250 and 300 U Carr.

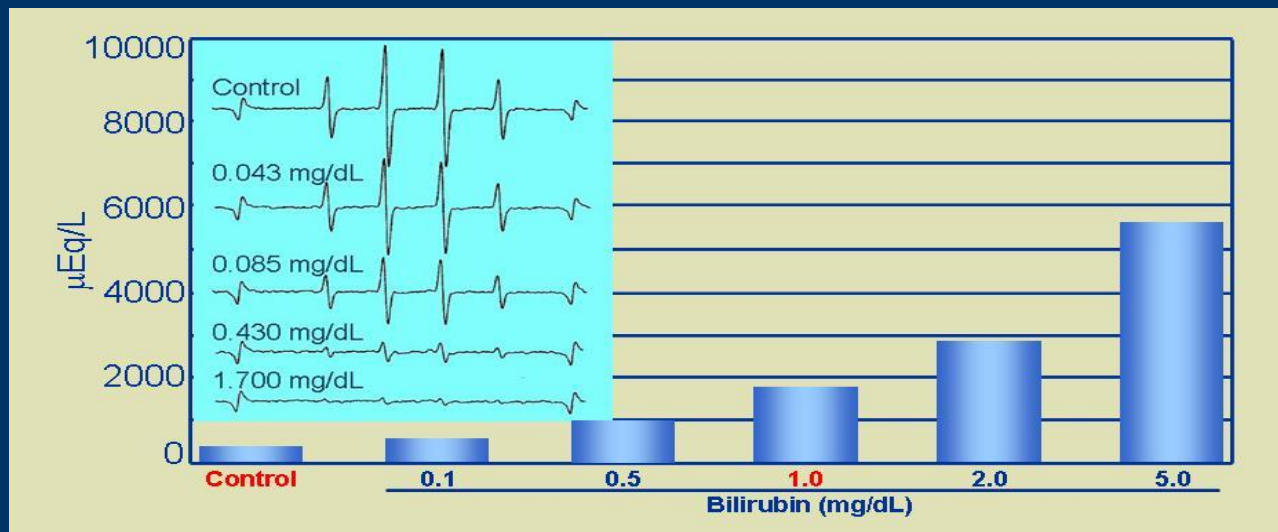
d-ROMs test REFERENCE VALUES	
250-300	Normal range
300-320	<b>Border condition</b>
321-340	<b>Low</b> level of oxidative stress
341-400	<b>Middle</b> level of oxidative stress
401-500	<b>High</b> level of oxidative stress
> 500	<b>Very high</b> level of oxidative stress
Unit of measurement U. Carr 1 U. Carr = 0.08 mg H <sub>2</sub> O <sub>2</sub> /dl	



# BAP Test

## Biological Antioxidant Potential

- The BAP test is a reliable, repeatable and precise test which allows determining the haematic concentration of the anti-oxidant compounds.
- The BAP test has been validated through the comparison with the “golden standard” (ESR - Electron Spin Resonance) by the Showa University School of Medicine in Tokyo.





# BAP Test

## Biological Antioxidant Potential

- The BAP test is thus a test able to determine in a specific manner the scavenging/antioxidant activities in living beings.
- The normality value for the BAP test was obtained by examining a large population of healthy subjects and is more than 2.200 micro-mol/litres. This means that healthy population has a value of BAP above 2.200 micro-mol/litres.

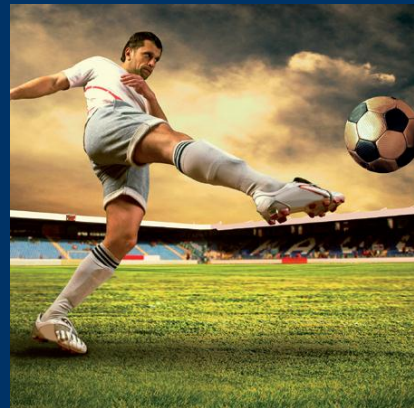
<b>BAP test</b> REFERENCE VALUES	
2200 – 4000	Optimum value
2200 – 2000	Border line
2000 – 1800	Moderate shortage
1800 – 1600	Shortage
1600 – 1400	Severe shortage
< 1400	Veri severe shortage
µMol/L	





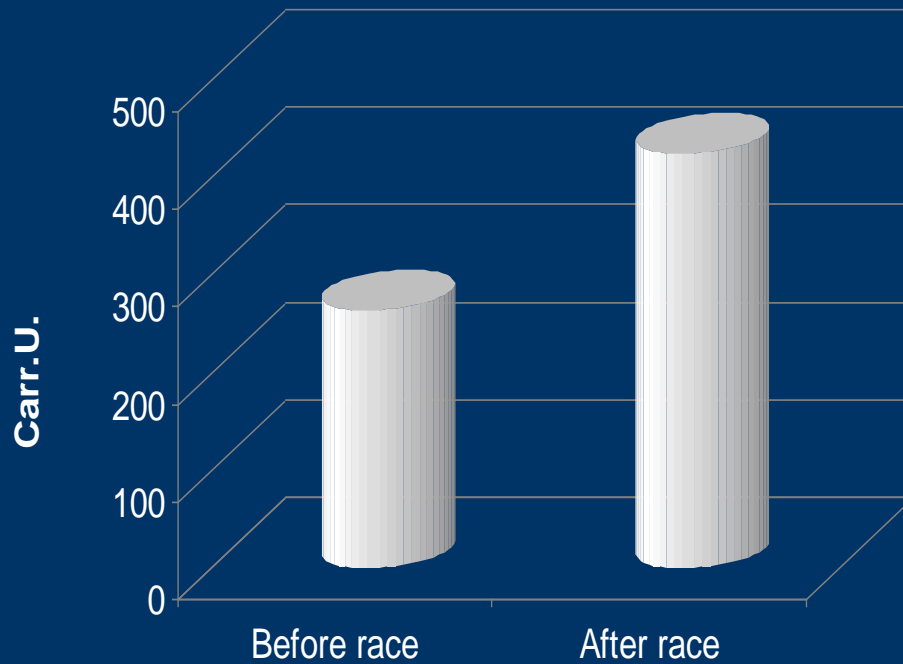
# SPORT MONITORED WITH FRAS 4 EVOLVO

- Cycling
- Baseball
- Softball
- Golf
- Running
- Triathlon





# Amateur Cycling

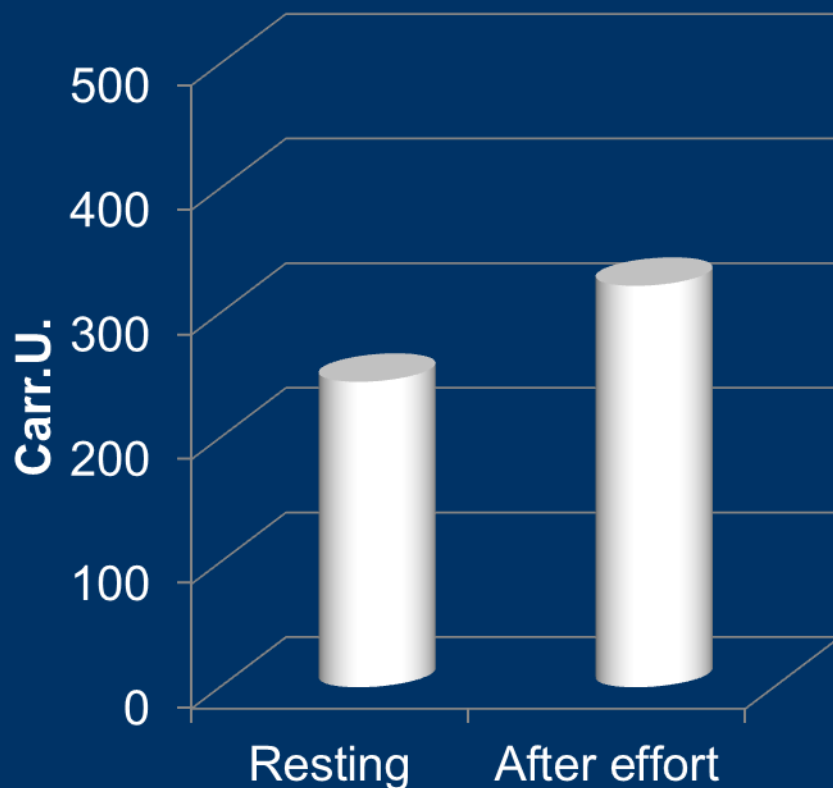


Cycling endurance race 150 km.

**G. Beltrami**



# Professional Cycling: Giro d'Italia

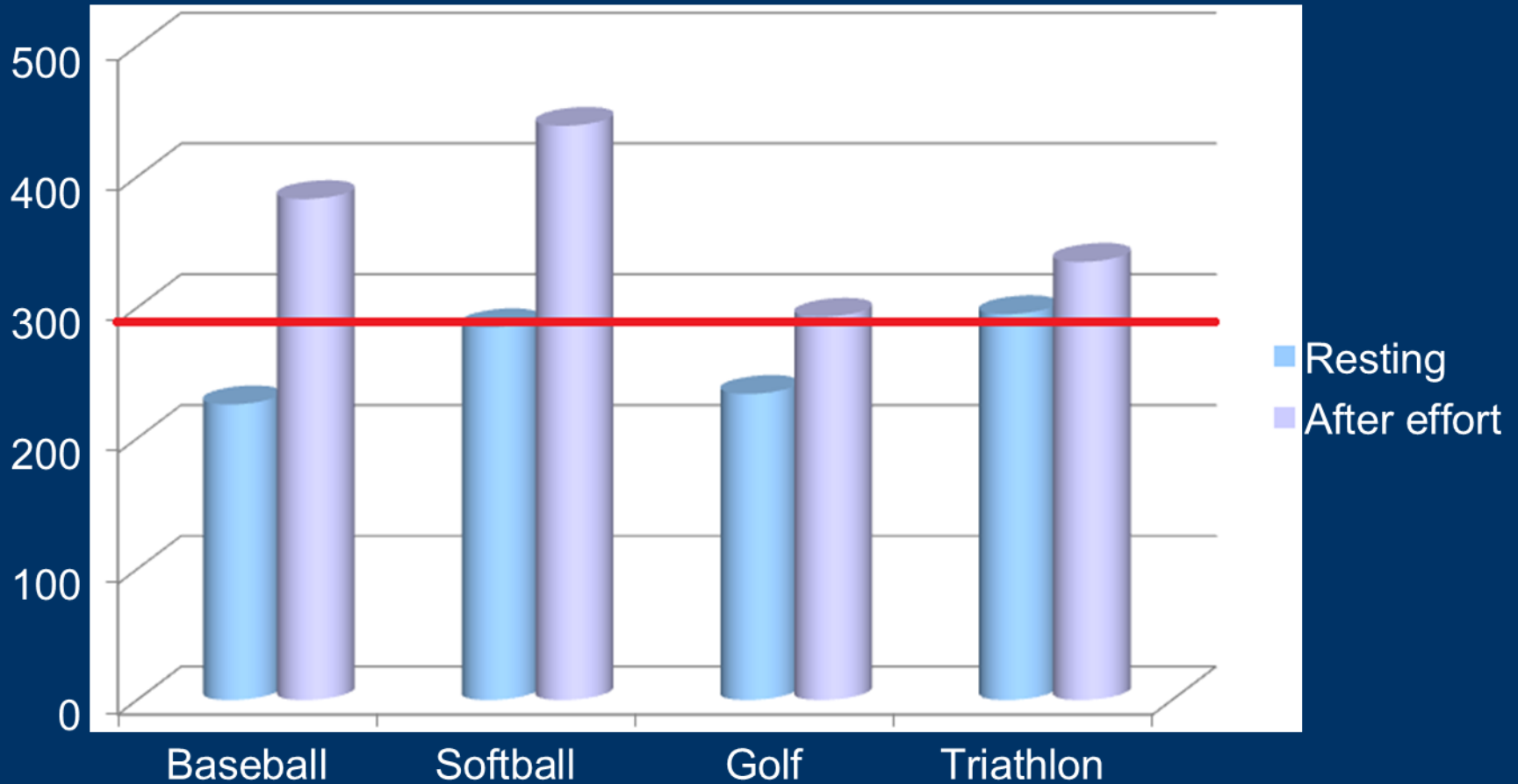


Strenuous physical exercise causes OS characterized by a sharp increase in lipid peroxidation.

Redox balance assessment is a useful tool to: a) monitor athletic performance and predict the onset of redox inflammatory state (RI), which might be detrimental to the athlete's physical condition.

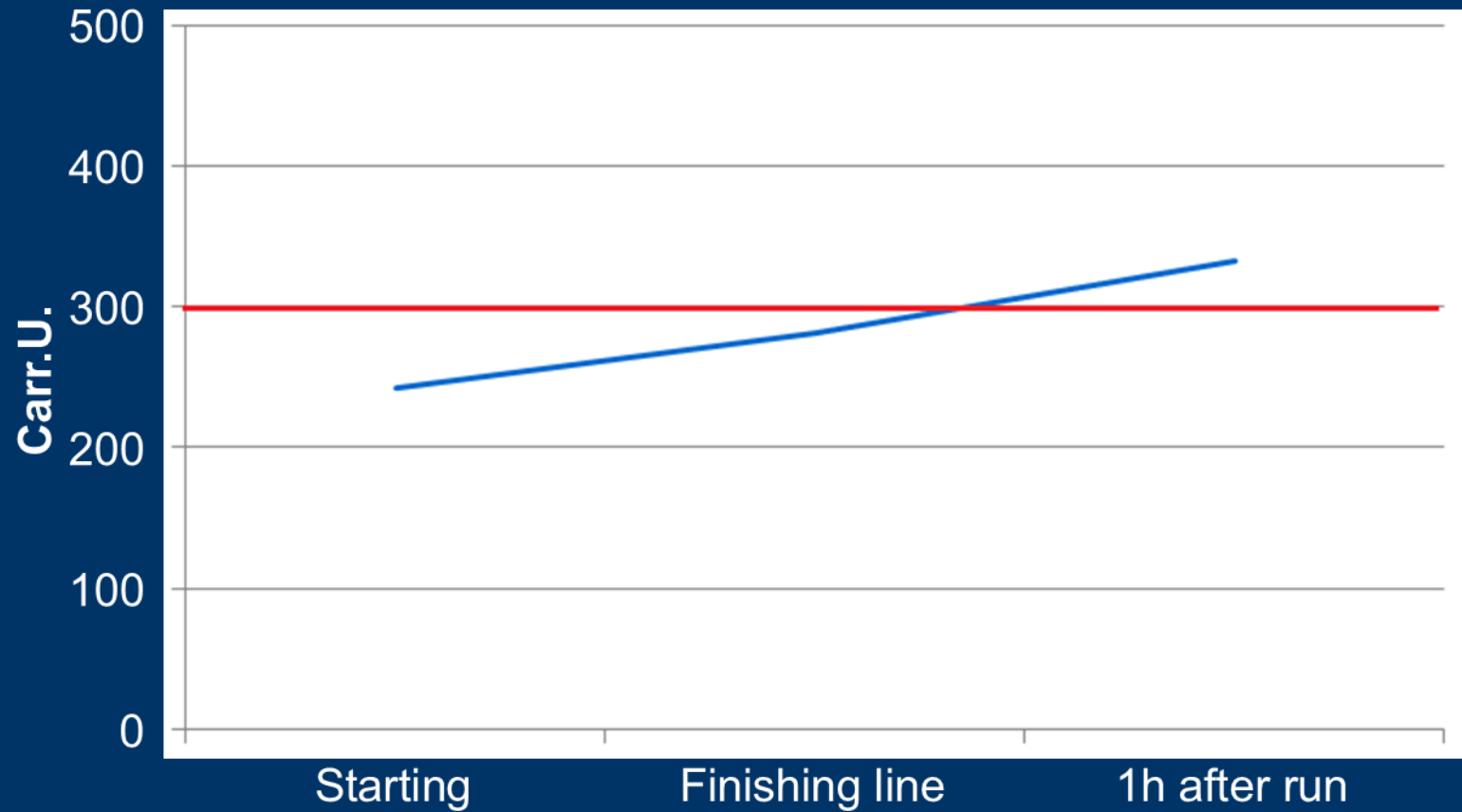


# Baseball, Softball, Golf, Triathlon





# Running



Iorio et al., 2001. International Conference of Oxidative Stress and Aging. Maui, Hawaii- USA.



# USEFULL SUGGESTIONS

Everyone undergoing physical activity, and in particular the athletes, should periodically carry out an evaluation of the oxidative stress levels because:

- *It highlights in basal conditions the level of psycho-physical wellbeing of the athlete*
- *It highlights the level of oxidative stress after the competition and it allows to*
- *monitor the recovery after the physical effort*
- *It allows to verify if the work loads are appropriate, if the athlete is in overtraining and it allows the optimizing of the training*
- *It allows to advise, in case of oxidative stress, several dietary habits and eventually an antioxidant therapy*
- *It allows to monitor the efficacy of antioxidant therapies*