

## Protandim and Runners

By Nathalie Chevreau PhD, RD  
 Sr Vice President of Research and Development

Research Manuscript on the Effect of Protandim in runners by SL Uebershlag et al, University of Louisville, KY has been submitted to PLoS.

### Article Abstract:

The purpose of this study was to determine if oral supplementation of Protandim® (a nutraceutical) for 90 days would improve 5-km running performance. A secondary objective was to measure serum superoxide dismutase (SOD), total glutathione (tGSH= GSH+GSSG), glutathione peroxidase (GPX) and thiobarbituric acid-reacting substances (TBARS) at rest and 10 minutes after the completion of the run before and after supplementation. In a double-blind, randomized, placebo controlled trial, completed in Louisville, KY, USA, 38 runners [mean (SD) = 34 (7) yrs; BMI = 22 (2) kg/m<sup>2</sup>] received either 90 days of Protandim® [1 pill a day, n = 19] or placebo (n = 19). Randomization was done in blocks of two, controlling for sex and 5-km baseline performance time. A 5-km race was performed at baseline and after 90 days of supplementation, with blood samples taken before and 10-min after each race. Fasting blood samples were acquired at baseline, after 30, 60, and 90 days of supplementation. Serum SOD, GSH, GPX and TBARS were assayed in an out-of-state lab. Running time was not altered by Protandim® or placebo [20.3 (2.1) minutes, with an -8 (33) seconds change in 5-km time regardless of group]. There was no change in tGSH, SOD, GPX or TBARS (at rest) after three months of Protandim® supplementation compared to placebo. However, in a subgroup ≥ 35 year of age, SOD increased by two fold in the Protandim® group after 90 days compared to only a 50% increase in the placebo group (p=0.038). The mean post-race change in TBARS (compared to pre-race) was not altered between groups, even after three months of supplementation. In conclusion, Protandim® did not (1) alter 5-km running time, (2) lower TBARS, or (3) raise antioxidant enzyme concentrations compared to placebo (with the exception of SOD in those ≥ 35 years old). The 5-km race did not induce oxidative stress as seen by unchanged mean TBARS, which remained within normal range.

### WHY?

- Athletes are constantly looking for supplements that will give them improved performance.
- With exercise comes changes within the oxidative, inflammatory and neuroendocrine systems that contribute to adaptation to the training stimulus.
- Regular training has been shown to enhance the antioxidant defense mechanisms.
- Overtraining may cause systemic oxidative stress.
- Supplements that may further increase these antioxidant defense mechanisms could be of value to those athletes.

## The effect of Protandim® supplementation on athletic performance and oxidative blood markers in runners\*

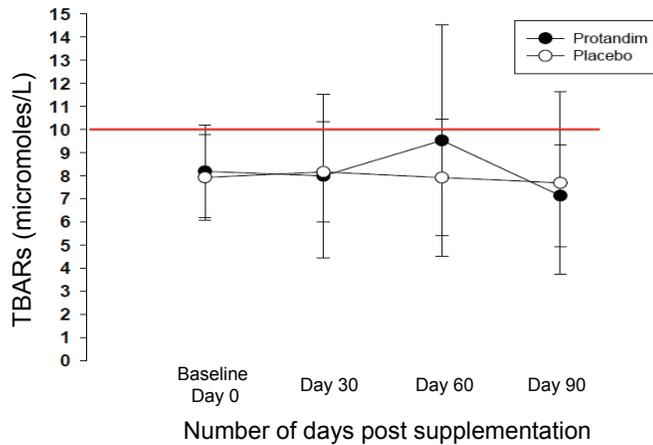
Day 1			Day 30	Day 60	Day 90		
Fasting blood draw	5K run	Blood drawn 10 min after run completed	Fasting blood draw	Fasting blood draw	Fasting blood draw	5K run	Blood drawn 10 min after run completed



- Mean age: 34 (15 over 35 years old)
- 5K running time
- Blood parameters:
  - + Blood TBARS as a measure of oxidative stress
  - + Blood SOD, Total Glutathione (GSH & GSSH), Glutathione Peroxidase (GPX)

\*University of Louisville

### Resting TBARs Results:



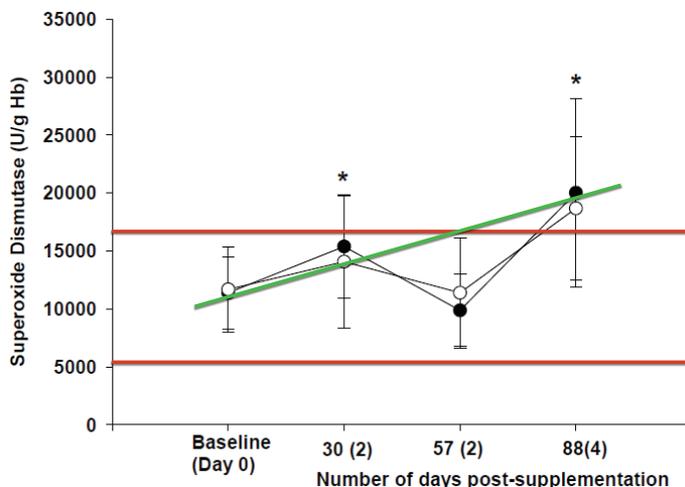
- Proprietary assay done at 3rd party commercial lab
- Normal range < 10  $\mu\text{mole/L}$
- These healthy subjects did not have oxidative stress (TBARs were within normal ranges)

### TBARs before and 10 minutes after completing the 5K run results:

TBARs ( $\mu\text{moles/L}$ )	Pre-run	10 min Post run	p value
Baseline	8.1	8.4	0.22
Day 90	7.6	7.1	0.47

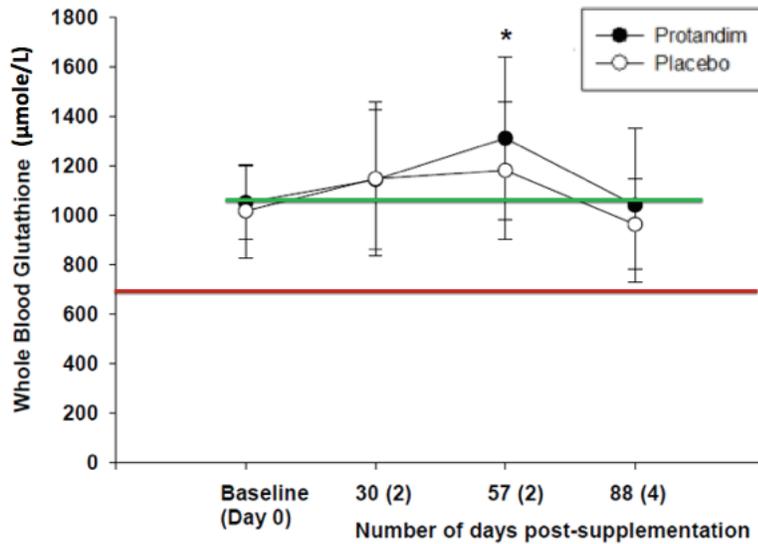
- The 5K run done by these regional runners did not produce oxidative stress. TBARs remained within normal ranges in both groups.
- Regular training has clearly allowed both groups to adapt to the exercise stimulus and enhance their antioxidant defense mechanisms.
- No difference in 5K run time between groups.

### Resting SOD Results:



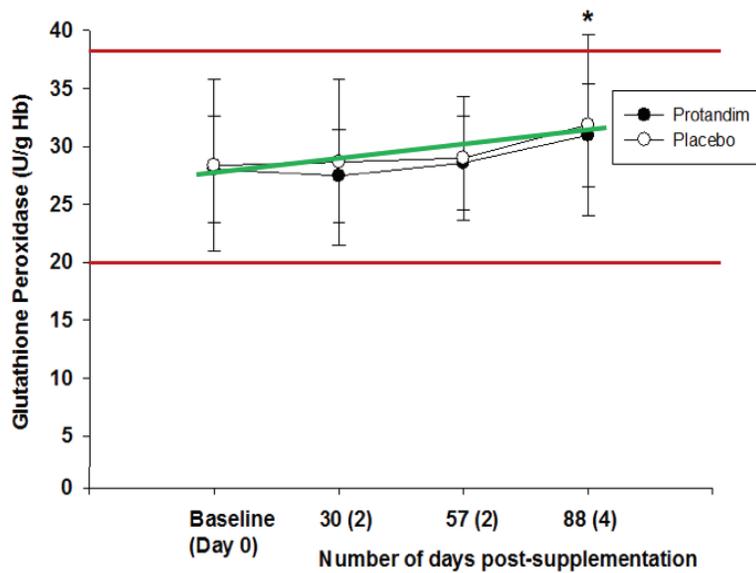
- Proprietary assay done at 3rd party commercial lab
- Normal range 5,275 to 16,662 U/g Hb
- Regular training has clearly enhanced the antioxidant defense mechanisms in both groups (shown by the upward slope of the green line)
- The data at day 57 exhibit an odd dip for both groups leading us to believe that there were technical issues at the lab when the blood assays were run

### Resting Total Glutathione Results:



- Proprietary assay done at 3rd party commercial lab
- Normal range > 669 µmole/L
- Total glutathione did not change (shown by the flat green line)

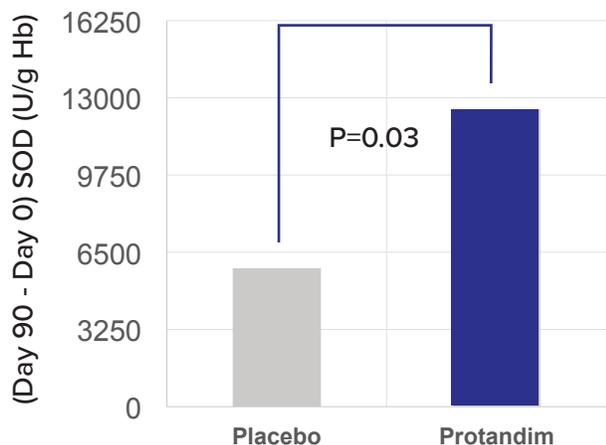
### Resting Glutathione Peroxidase (GPX) Results:



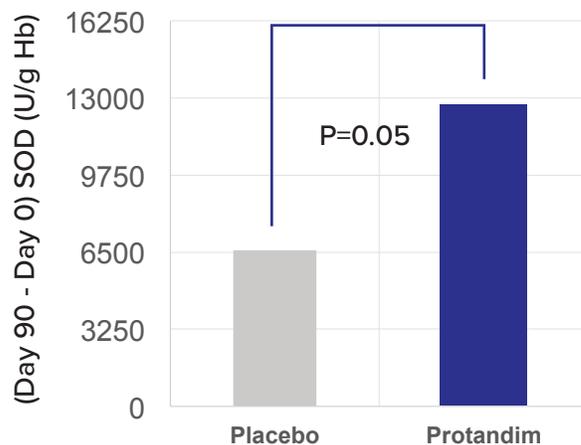
- Proprietary assay done at 3rd party commercial lab
- Normal range 20 to 38 U/g Hb
- Both groups increased GPX with regular training (shown by the upward slope of the green line)

When we look at the subgroup of participants who were 35 years of age and older, a clear trend emerges revealing a significant benefit of Protandim on anti-oxidant reserves.

### Resting (Pre-Run) SOD Change

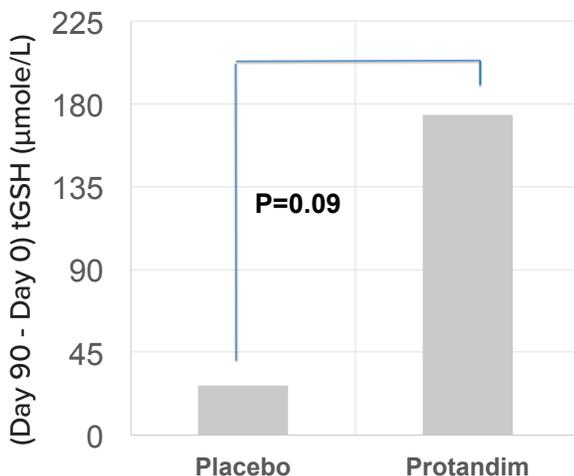


### Post Run SOD Change



The change of resting blood SOD levels between baseline and 90 days was significantly higher (200%) in the group who took Protandim compared to only a 50% increase for those who received the placebo. Furthermore, post-run SOD change was also significantly higher in the Protandim group than in placebo group.

### In Subjects 35 and Older Post Run Total Glutathione Change



Similarly, regular training and a vigorous run contributed to increasing total blood glutathione levels by 27 units from baseline in the placebo group. Protandim further increased the tGSH reserve by 174 units.

## What do we Learn from this study?

- Regular training without overtraining enhances antioxidant defense mechanisms (SOD, GPX).
- Protandim supplementation further enhances antioxidant defenses especially in those 35 years and older at rest and after an all out 5K run.
- Protandim supplementation helped prevent depletion of antioxidant enzyme reserves after a shorter bout of strenuous exercise. This preservation of antioxidant enzyme reserves could potentially help the recovery of individuals engaging in longer bouts of strenuous exercise.
- Enhancement of antioxidant defense mechanisms - first time shown in a double placebo control study.