

## Correlation between free radicals and Reactive Oxygen Species (ROS).

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### Introduction.

A free radical is an atom or group of atoms that have one or more unpaired electrons. Radicals can have positive, negative or neutral charge. A prominent feature of radicals is that they have extremely high chemical reactivity, which explains not only their normal biological activities, but how they inflict damage on cells.

### Methods.

Persistent oxidative stress is one of the major causes of most lifestyle-related diseases, cancer and the aging process <sup>(1-2)</sup>. Oxidative stress arises from the strong cellular oxidizing potential of excess ROS <sup>(3)</sup>.

There are many types of radicals, but those of most concern in biological systems are derived from oxygen, and known collectively as ROS.

Many antioxidant supplements could not prevent cancer, myocardial infarction and atherosclerosis, but rather conversely increase mortality <sup>(4-5)</sup>.

### Results.

It is well known that it is important to be aware of side effects when developing an effective antioxidant for the prevention of oxidative stress-related diseases.

ROS are generated inside the body throughout our daily lives, such as during hard exercise, smoking, exposure to ultraviolet rays or air pollution, aging, physical or psychological stress <sup>(6-7)</sup>. Inside every aerobic organism, ROS are generated when breathing consumes oxygen.

### Conclusion.

ROS are one of the major causes of acute and chronic diseases.

Acute oxidative stress arises from various different situations: inflammation, cardiac or cerebral infarction, organ transplantation, heavy exercise, cessation of operative bleeding and others <sup>(8)</sup>.

### References.

1. Andersen JK. Oxidative stress in neurodegeneration: cause or consequence?  
*Nat Med* 2004; 10 suppl: S18-25.
2. Finkel T. et al. Oxidants, oxidative stress and the biology of ageing.  
*Nature* 2000; 408: 239-47.
3. Wallace DC. A mitochondrial paradigm of metabolic and degenerative diseases, aging, and cancer: a dawn for evolutionary medicine.  
*Annu Rev Genet* 2005; 39: 359-407.
4. Steinhubl SR. Why have antioxidants failed in clinical trials?  
*Am J Cardiol* 2008; 101: 14D-19D.
5. Hckam DG. Review: antioxidant supplements for primary and secondary prevention do not decrease mortality.  
*ACP J Club* 2007; 147: 4.
6. Harma MI et al. measuring plasma oxidative stress biomarkers in sport medicine.  
*Eur J Appl Physiol* 2006; 97: 505: author reply 6-8.
7. Agarwal R. Smoking, oxidative stress and inflammation: impact on resting energy expenditure in diabetic nephropathy.  
*BMC Nephrol* 2005; 6: 13.
8. Ferrari R. et al. The occurrence of oxidative stress during reperfusion in experimental animals and men.  
*Cardiovasc Drugs Ther* 1991; 5 suppl 2: 277-287.