

## **“Oxidants and Antioxidants” Course in TurkHeltox Congress**

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A wide variety of degenerative processes, diseases and syndromes, including mutagenesis, cancer, cardiovascular and neurodegenerative diseases, and cataract are major health problems in today's world. A common feature of these problems is the involvement of free radical reactions in their pathogenesis.

It has been well-known that a small amount of reactive oxygen species is generated through aerobic respiration even under physiological conditions. However, high levels of reactive oxygen or nitrogen species capable of damaging proteins, carbohydrates, lipids, nucleic acids and other macromolecules, and have thus been implicated in the etiology of many diseases as indicated above. On the other hand, all aerobic organisms use a series of antioxidant defenses including antioxidant compounds, antioxidant enzymes and proteins in an attempt to protect against oxidant damage. Nevertheless, despite the antioxidant and repair mechanisms, oxidative damage remains an inevitable result of aerobic life, and numerous environmental pollutants, drugs, and physical agents such as ionizing radiation could be inducers of this process. Therefore, it is of great importance to monitor oxidative damage using different indicators.

Main topics of the course are listed below:

- 1- Introduction to oxidative stress and antioxidant systems.
  - a- Free radicals and reactive oxygen species
    - Their sources
    - Singlet oxygen and free radicals
    - Hydrogen peroxide
  - b- Lipid peroxides and related molecules
- 2- Antioxidant systems
  - a- Glutathione, superoxide dismutases, glutathione peroxidase, and catalase
- 3- Measurement of oxidative stress and free radical species in biological systems
  - a- Measurement of radical species
  - b- Measurement of lipid peroxidation
  - c- Measurement of enzymatic and non-enzymatic antioxidant levels
  - d- Measurement of antioxidant potential
- 4- Future directions
- 5- Question time