

## A Comprehensive Study on Immune System with Respective to Free Radicals and Antioxidants

Chetan Nimbalkar<sup>1</sup>, Mahadev P Mangane<sup>2</sup>, Ravichandra Menthe<sup>3</sup>, Praveen Simpi<sup>4</sup>

**Author Affiliation:** <sup>1</sup>Assistant Professor, Department of Kayachikista, <sup>2</sup>Assistant Professor, Department of Kaumarbritya, <sup>3</sup>Associate Professor, Department of Agadatantra, <sup>4</sup>Associate Professor, Department of Rasashastra and Baishajya Kalpana, N K Jabshetty Ayurvedic Medical College and P G Center, Bidar, Karnataka 585403, India.

**Corresponding Author: Mahadev P Mangane**, Assistant Professor, Department of Kaumarbritya, N K Jabshetty Ayurvedic Medical College and P G Center, Bidar, Karnataka 585403, India.

**E-mail:** [drmahadevmangane@gmail.com](mailto:drmahadevmangane@gmail.com)

### Abstract

The main aim for this research paper is to understand the concept of Immunity, Free Radicals, Antioxidants, Oxidative Stress and the Ayurvedic herbs acting as Antioxidants. This study explains the interlink among Immunity, Free Radicals, Antioxidants and Oxidative Stress. In this modern era or stressful life, it has become very difficult for every individual to maintain the healthy life and remain happy. This study even explains the factors which are responsible for acting as antioxidants that aid to enhance the defense act of our Immune system and prevent from many chronic diseases. This study also highlights the Ayurvedic medicinal plants having the chemical constituents being antioxidants helps to maintain the good health and slow down the ageing process.

**Keywords:** Immunity; Antioxidants; Free radicals; Ayurveda.

### How to cite this article:

Chetan Nimbalkar, Mahadev P Mangane, Ravichandra Menthe / A Comprehensive Study on Immune System with Respective to Free Radicals and Antioxidants. Indian J Ancien Med Yog. 2020;13(4):179-181.

### Introduction

Ayurveda always stands for prevention prior to the concept of cure and defines as swasthashya swastha rakshanama and aaturashya vikar prashanama cha . when it comes to the components which are helpful for maintaining the swasthya is vyadhi kshamatwa that states the both components of treatments i.e. vyadhi bala virodhitwam and vyadhi pratibandhakatwam. Day by day era getting modernized with sedentary life style and fast food added with the loads of job stress that's making the us to get sheltered lots many disease. According to Ayurveda and WHO the psychological factor also considered as prime component in keeping healthy status of human being. Here some attempt is made in collecting all.

### Immune System

The immune system is the defense mechanism of our human body which plays a very important role

to fight against the pathogens or harmful organisms or the foreign bodies. Immunity is something we can co-relate to the resistance capacity of our body which protect us from disease by identifying the pathogens and fighting against them. For Immune system to be in an excellent condition, even Free Radicals & Antioxidants play a very important role. As some of the immune cells in our body also produce free radicals and antioxidants to fight against the harmful pathogens. During the normal metabolic process, a low amount of free radicals are produced by our human cells. These free radicals which are less in number protect our body from any pathogens or foreign body if any. At the same time, our human cells also produce Antioxidants. These antioxidants fight against foreign body contributing our Immune system and even it neutralizes the free radicals produced in the body as the balance between Antioxidants and Free Radicals is very much necessary to avoid cell or tissue damage and keeps the person healthy.

### **Free Radicals**

Free Radicals are the Atom or group of Atoms in an molecule with minimum one unpaired electron. When Atom loses its electron, it becomes free radical and it become unstable. This unstable free radical tries to take the electron from neighboring atom of stable molecule and attain the stability. Then this targeted molecule from which free radical took the electron becomes unstable and now this molecule is called as free radical. Later, this molecule tries to steal the electron from another atom of different molecule, so this chain reaction of free radical theory continues. Due to this free radical theory, group of cells or the whole the tissue start dysfunctioning. The body's immune cells namely neutrophil and monocytes also produce the free radicals. These free radicals which are produced in minimum amount help our immune system to fight against harmful pathogens. When these free radicals are produced in excess in our body, it leads to destruction of our cells and tissue. At the same time, our human cells also produce antioxidants to neutralize the free radicals and try to protect our body cells.

### **Antioxidants**

Antioxidants are the substances which can be produced naturally in the body and may be artificially gained. Naturally generated antioxidants are known as Endogenous Antioxidants whereas artificial source or externally gained through food supplements antioxidants are known as Exogenous Antioxidants. The main aim of Antioxidants is to neutralize the excess free radicals produced in the body and protect our human body from cell/tissue damage. Antioxidants even contribute our immune system to fight against the pathogens. By neutralizing the excess free radicals, antioxidants maintain the balance between them and free radicals preventing from the diseases. When there is excess free radicals and less of antioxidants, the balance between both of them in our body disturbed. The imbalance between free radicals and antioxidants leads to the environment or the situation known as Oxidative Stress which leads to tissue damage and disease manifestation.

### **Oxidative stress**

The imbalance between free radicals and antioxidants in our body is known as Oxidative Stress. Long term Oxidative Stress can lead to the following conditions:

- Damages the cell membrane and tissue

- Affects the metabolism of protein, lipid and DNA
- Triggers the ageing process
- Manifests the chronic conditions like Cancer, Rheumatoid arthritis, Diabetes mellitus, Asthma,
- Chronic bronchitis, Renal failure, Alzheimer's, Parkinson, Memory loss, Cataract,
- Hypertension, Arteriosclerosis, Ischemic conditions and more.

### **Factors responsible for excess free radicals and oxidative stress**

- Unhealthy and untimely food intake
- Less nutritive diet
- Exposure to pollution, radiation and pesticides
- Cigarette smoking
- Inadequate sleep
- Anxiety, Stress, Worries and no physical exercise

Therefore these factors decrease the immune capacity of the body to fight against the pathogens and pay the way for disease conditions.

Our Human body has the wonderful immune response to act against these excess free radicals and oxidative stress by producing Antioxidants naturally known as Endogenous Antioxidants.

Nowadays, because of the stressful lifestyle, these endogenous antioxidants would not be enough to neutralize these excess free radicals and prevent from diseases. Therefore, it becomes very important in this modern era, to take the Antioxidants externally i.e. exogenous antioxidants as well to improve our Immune system and remain healthy.

So the factors which act as exogenous antioxidants are as follows:

- A good regular nutritive diet
- Timely food intake
- Intake of green leafy vegetables and fruits
- Moderate physical exercise
- Yoga and Meditation
- Sound sleep
- Ayurvedic Herbs like Ashwagandha, Guduchi, Tulasi, Shunti, Maricha, Amalaki etc

- Vitamins A, B, E & C
- Chemical constituents like Betacarotene, Flavonoids, Carotenoid, Selenium, Tannins, Curcumin, Glutathiane, Ascorbic acid, Acetyl L-carnitine, Alpha Lipoic Acid etc

Thus, these above factors act as Antioxidants which enhance defense of our Immune system, nourishes the cell tissues and even slow or extend the process of ageing.

#### *Ayurvedic Herbs as Exogenous Antioxidants*

Ayurvedic medicinal plants are the most important and natural source of exogenous antioxidants.

Many of the Ayurvedic herbs constitutes the chemical components which act as antioxidants

And they help in neutralizing the excess free radicals in our body and keep the person healthy and devoid of diseases.

According to the many research studies and recent data, Synthetic source of antioxidants are very harmful. Hence, Ayurvedic herbs Ashwagandha, Guduchi, Tulasi, Shunti, Maricha, Amalaki, Haridra, Twak, and Arjuna etc play a very important role as antioxidants as they are natural source and are not harmful as well.

#### **Discussion**

Our Human body cells produce free radicals and endogenous antioxidants. A low concentration of free radicals and balance between antioxidants & free radicals aid our immune system to fight against pathogens. Excess free radicals produced due to unhealthy food, low nutritive diet, and exposure to air pollution, cigarette smoking, stress, mental worries etc lead to destruction of cell or tissue and pave the way for oxidative stress and produce many chronic diseases. Antioxidants help to prevent the cell or tissue damage by neutralizing the excess free

radicals. It is difficult and harmful to use synthetic antioxidants according to the latest research studies. Hence, in addition to the endogenous antioxidants, Ayurvedic medicinal plants are the natural source of exogenous antioxidants with good nutritive food like green vegetables and fruits which are rich in vitamins, proteins and carbohydrates and along with good sleep, moderate exercise, yoga and meditation strengthens our immunity and extends our process of ageing.

#### **Conclusion**

Further research studies with integrated scientific approach of Ayurveda and Modern Scientific methods may yield a huge contribution for the society to maintain the healthy life.

#### **References:**

1. Rasayana Sarvaswam by Dr Santosh N Belavadi chapter 8 pg.no 128-142, published Vaishnavi publications First Edition: November 2011.
2. <https://www.cancerfoundation.com/about> published on 3-Jan-2012
3. Pharmacogn Rev.2010 July Dec;4(8):118-126. Doi:10.4103/0973-7847.70902 Revised 2010 Mar 8.
4. <https://www.livescience.com/54901-free-radicals.html>
5. [www.medicalnewstoday.com/articles](http://www.medicalnewstoday.com/articles) Medically reviewed by Stacy Sampson. D.O-written by Janie Eske on April 2019.
6. [www.medicalnewstoday.com/articles](http://www.medicalnewstoday.com/articles) Medically reviewed by Rebra Rose Wilson, PhD, MSN.RN; IBCLC, AHN.BC, CHT-written by Zown Villines on July 2017.
7. Int J Biomed Sci.2008 Jun; 4(2): 89-96. PMID: 23675073 Accepted 2008 May 5.

