

Ayurveda for Holistic Enhancement of Immunity

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Traditional Indian medicines

- ❖ 80 percent people in India use some form of traditional medicine, which includes Ayurveda , Yoga and Naturopathy, Unani, Siddha and Homoeopathy
- ❖ In 1970, the Indian Medical Central Council Act was passed by the Parliament of India.
- ❖ In 1971, the Central Council of Indian Medicine (CCIM) was established under the Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (AYUSH), Ministry of Health and Family Welfare to monitor higher education in traditional medicine in India.
- ❖ The Indian government supports research and teaching in Ayurveda through many channels at both the national and state levels, and helps institutionalise traditional medicine so that it can be studied in major towns and cities.
- ❖ The state-sponsored Central Council for Research in Ayurvedic Sciences (CCRAS) is designed to do research on Ayurveda.
- ❖ As of 2013, India has over 180 training centers offer degrees in traditional Ayurvedic medicine.

Traditional knowlwdge

- ❖ To fight biopiracy and unethical patents, in 2001 the government of India set up the Traditional Knowledge Digital Library as a repository for formulations of various systems of Indian medicine, such as Ayurveda, Unani and Siddha.
- ❖ The formulations come from over 100 traditional Ayurveda books.
- ❖ An Indian Academy of Sciences document quoting a 2003-04 report informs that India had 4,32,625 registered medical practitioners, 13,925 dispensaries, 2,253 hospitals and a bed strength of 43,803. 209 under-graduate teaching institutions and 16 post-graduate institutions
- ❖ Insurance companies cover expenses for Ayurvedic treatments in case of conditions such as spinal cord disorders, bone disorder, arthritis and cancer.
- ❖ Such claims comprise 5-10 percent of the country's health insurance claims.

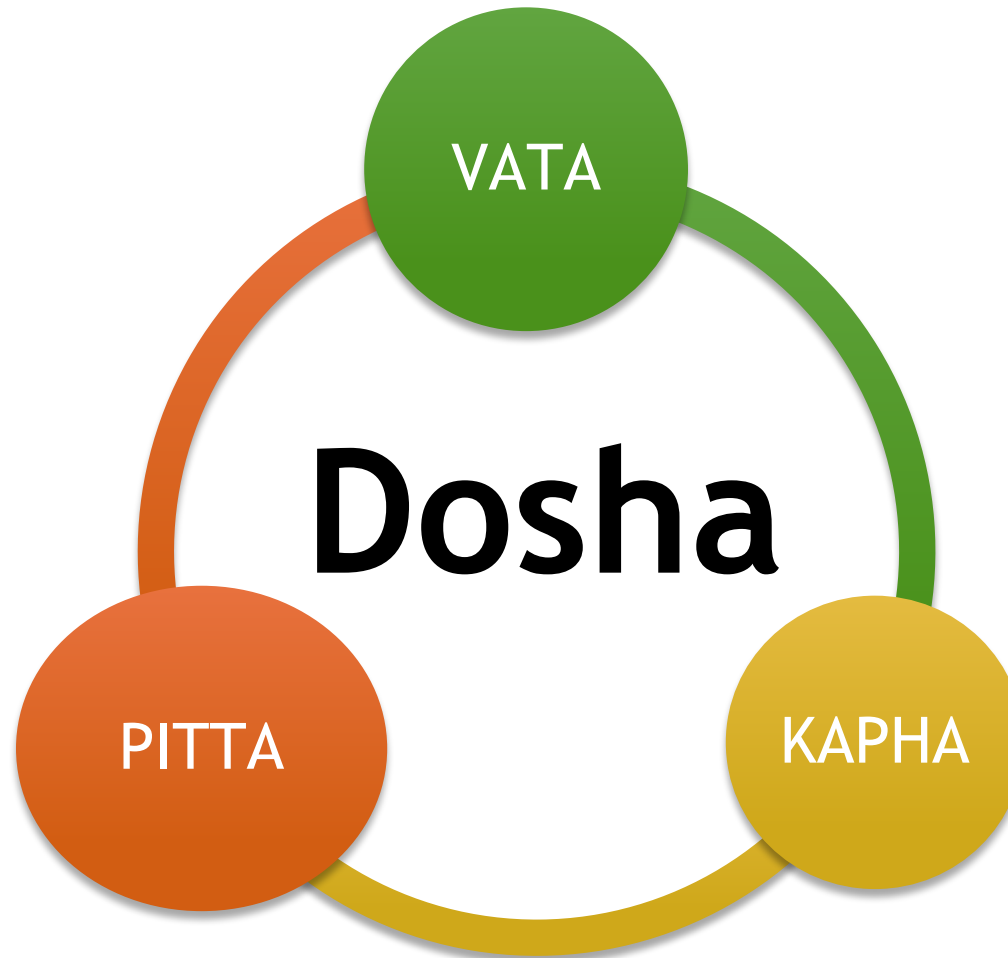
Department of AYUSH

- ❖ The Department of AYUSH is a part of the Ministry of Health & Family Welfare of Government of India.
- ❖ In collaboration with the Council for Scientific and Industrial Research (CSIR) AYUSH has set up a Traditional Knowledge Digital Library (TKDL) in 2001, to prevent biopiracy
- ❖ As an important measure nearly 805,000 Ayurvedic formulations, 98,700 Unani formulations, and 9,970 Sidha formulations have been transcribed in patent application format in five languages: English, French, German, Spanish and Japanese
- ❖ Internationally the Department continues to lay emphasis on upgradation of AYUSH educational standards, quality control and standardization of drugs, improving the availability of medicinal plant material, research and development and awareness generation about the efficacy of the systems domestically

AYURVEDA, the Ancient Traditional Indian System of Medicine

- ❖ **Ayurveda means science of long life, designed to promote good health and longevity rather than to fight disease**
- ❖ **It is 5,000-year-old system of medicine (1500–1000 BC), while Allopathy is only 200 years old.**
- ❖ **Ayurveda is based on two text books, Charaka Samhita, dealing with etiology, symptomatology, pathology, prognosis, and medical management of disease, and Sushruta Samhita dealing with surgical procedures.**
- ❖ **Ayurveda deals not only with body but with mind and spirit also.**
- ❖ **According to Ayurveda most diseases connected with the psychophysiologic and pathologic changes in the body like inflammation (sopha) are caused by imbalance in three different dosha (ie, vata, pitta, and kapha); the aim of Ayurveda is to restore this balance.**
- ❖ **The balanced coordination of body, mind, and consciousness is the ayurvedic definition of health.**

BASICS OF AYURVEDA



Imbalance in the three doshas (Tridosha) causes disease

Three fundamental principles of nature

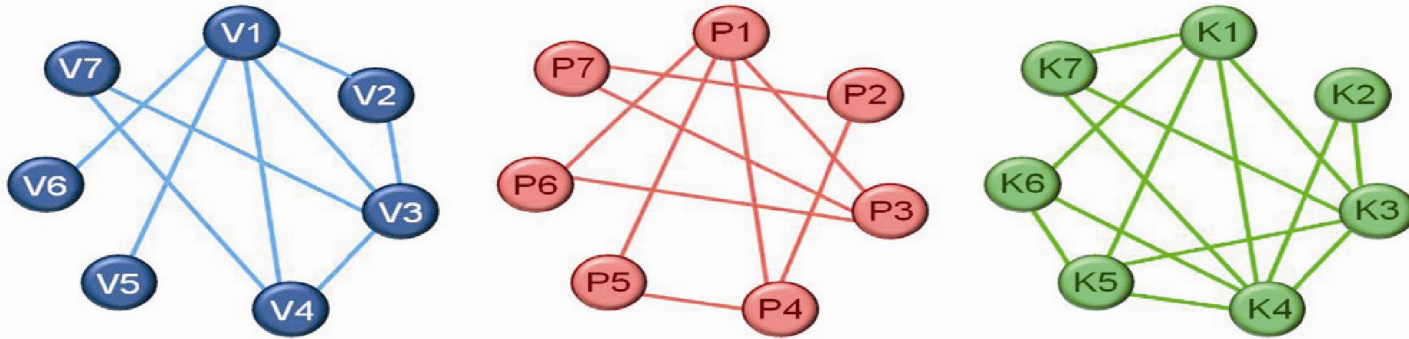
1. Vata : It is quick, cold and dry , governs motion, breathing, circulation, elimination and the flow of nerve impulses.
2. Pitta is hot and precise , governs digestion , metabolism and
the processing of food, air and water throughout the body.
3. Kapha is solid and steady , governs structure and fluid balance and forms muscle, fat, bone and sinew.

We all have a certain amount of Vata, Pita and Kapha in our constitution and while all three of them are active, one or two usually dominate

Characteristics of the three principles of nature

<i>Feature</i>	<i>Vata</i>	<i>Pitta</i>	<i>Kapha</i>
<i>1. Type of Hair</i>	<i>dry</i>	<i>fine, thinning, prematurely grey</i>	<i>thick, oily</i>
<i>2. Skin</i>	<i>dry, rough</i>	<i>soft, ruddy</i>	<i>oily, moist</i>
<i>3. Mental activity</i>	<i>quick mind, restless, imaginative</i>	<i>sharp intellect, efficient, perfectionist</i>	<i>calm, steady, stable</i>
<i>4. Memory</i>	<i>quick to learn quick to forget</i>	<i>good general memory</i>	<i>good long-term memory</i>
<i>5. Aversion to weather</i>	<i>cold</i>	<i>hot</i>	<i>damp & cool</i>
<i>6. Sleep</i>	<i>interrupted, light sleep</i>	<i>sound, medium length</i>	<i>sound, long, heavy sleep</i>
<i>7. Reaction to stress</i>	<i>excites easily, anxious</i>	<i>angers easily, irritated, critical</i>	<i>not easily ruffled, stubborn</i>
<i>8. Body size</i>	<i>small frame</i>	<i>medium frame</i>	<i>gain weight easily</i>
<i>9. Hunger</i>	<i>irregular</i>	<i>sharp</i>	<i>can easily skip meals</i>
<i>10. Walk</i>	<i>quick</i>	<i>determined</i>	<i>slow and steady</i>
<i>11. Moods</i>	<i>change quickly</i>	<i>intense, slow changing</i>	<i>steady, non-changing</i>

Functional modules of (a) Vata, (b) Pitta and (c) Kapha represented as networks.



The circles correspond to nodes representing system properties and the lines between nodes to links indicating association between properties. V1, Dryness; V2, Temperature (cold); V3, Mobility; V4, Weight (light); V5, Roughness; V6, Non-adhesive; V7, Minuteness; P1, Temperature (heat); P2, Penetrative power; P3, Fluidity; P4, pH; P5, Acrid; P6, Causing movement; P7, Lubrication (mild); K1, Stability; K2, Smoothness; K3, Lubrication; K4, Viscosity; K5, Temperature (cold); K6, Weight (heavy); K7, Adhesion.

Immunity (Immune System)

- ❖ The **immune system** is a system of biological structures and processes within an organism that protects against disease.
- ❖ It can detect a wide variety of pathogens e.g bacteria, viruses etc., and distinguish them from the organism's own healthy tissue.
- ❖ The subsystems are,
 - Innate immune system
 - Adaptive immune system
 - Humoral immunity
 - Cell – mediated immunity

Self defence for struggle for existence

- ❖ All living organisms ,plants, animals and micro-organisms have self defence system and are interdependent on each other.
- ❖ Even unicellular bacteria have rudimentary immune system in the form of enzymes which protects them against bacteriophage infections.
- ❖ Immune system recognizes the attack of pathogens (harmful organisms)through receptors

Innate immunity

- ❖ The **innate immune system** consists of cells and proteins that are always present and ready to mobilize and fight microbes at the site of infection.

- ❖ The main components of the innate immune system are,
 - 1) physical epithelial barriers,
 - 2) phagocytic leukocytes,
 - 3) dendritic cells,
 - 4) a special type of lymphocyte called a natural killer (NK) cell,
 - 5) circulating plasma proteins.

Breast feeding for baby's immune system

- ❖ Mother's milk provides virtually all the proteins, sugar, and fat baby needs to be healthy.
- ❖ Most babies will breastfeed frequently during the first couple of days after birth, getting small amounts of that colostrum (which is high in antibodies and helps to prepare the baby's digestive system)
- ❖ Antibodies, immune factors, enzymes, and white blood cells are also passed on to the baby through mother's milk.
- ❖ These substances protect the baby against a wide variety of diseases not only while he/she is breastfeeding but also long afterwards
- ❖ No other formula can offer this protection.

Adaptive (Acquired) immunity

- ❑ Adaptive immune system, is called into action against pathogens that are able to evade or overcome innate immune defenses.
- ❑ It creates immunological memory after an initial response to a specific pathogen, leading to an enhanced response to subsequent encounters with the same pathogen. This process of acquired immunity is the basis of vaccination.
- ❑ There are two types of adaptive immune responses:
 - ❑ humoral immunity, mediated by antibodies produced by B lymphocytes, and
 - ❑ cell-mediated immunity, mediated by T lymphocytes.

Leucocytes

- ❖ White blood cells or **leukocytes** are produced or stored in many locations throughout the body, mainly in the thymus, spleen, and bone marrow.
- ❖ The leukocytes circulate through the body between the organs and nodes by means of the lymphatic vessels, therefore also known as lymphocytes.
- ❖ Leukocytes can also circulate through the blood vessels.
- ❖ Thus, the immune system works in a coordinated manner to monitor the body against germs .

TYPES OF LEUCOCYTES

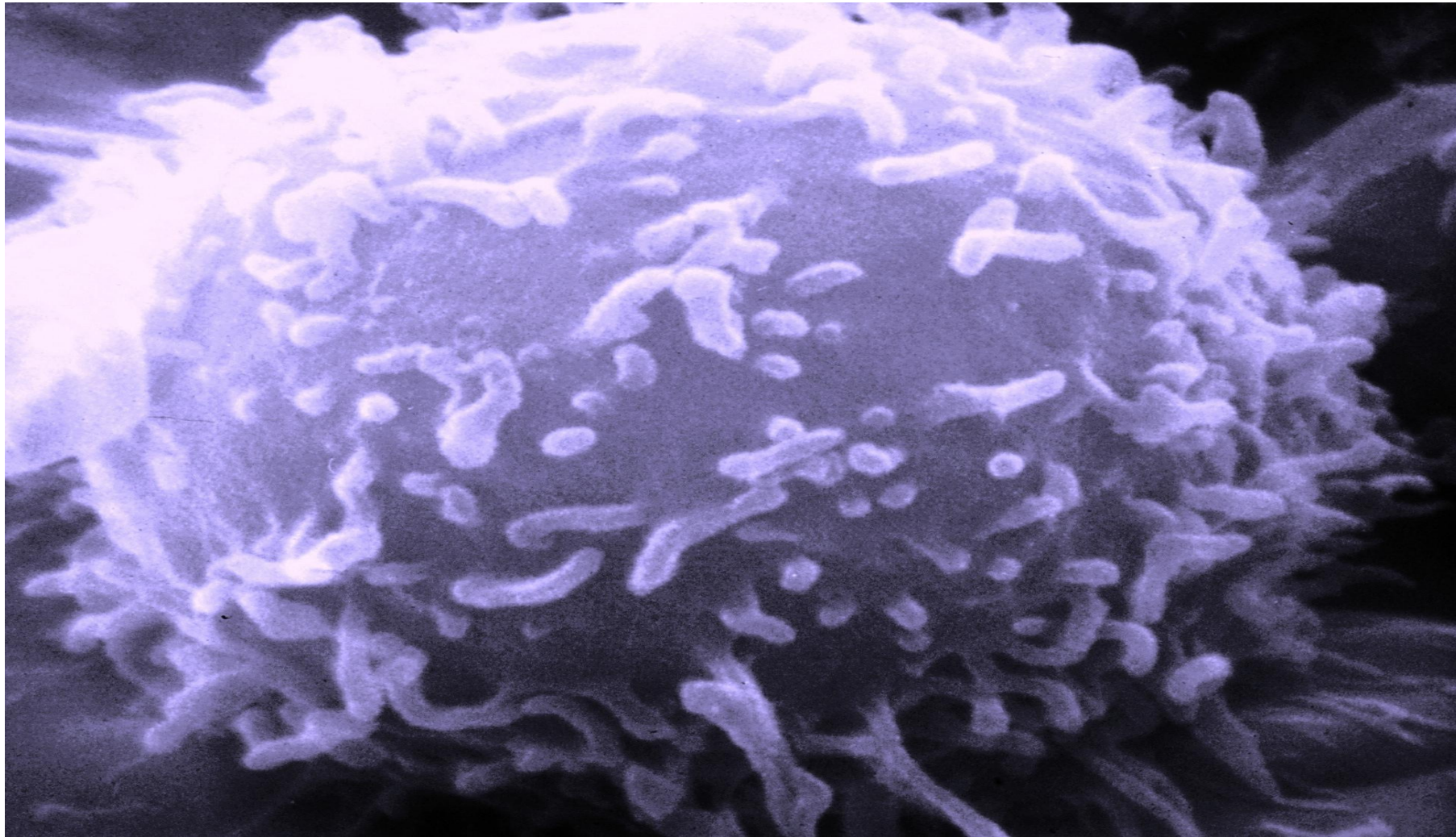
There are two basic types of leukocytes:

1. The **lymphocytes** are cells that allow the body to remember and recognize previous invaders and help the body destroy them.
2. The **phagocytes** are cells that chew up invading organisms e.g. neutrophils which primarily fight bacteria.

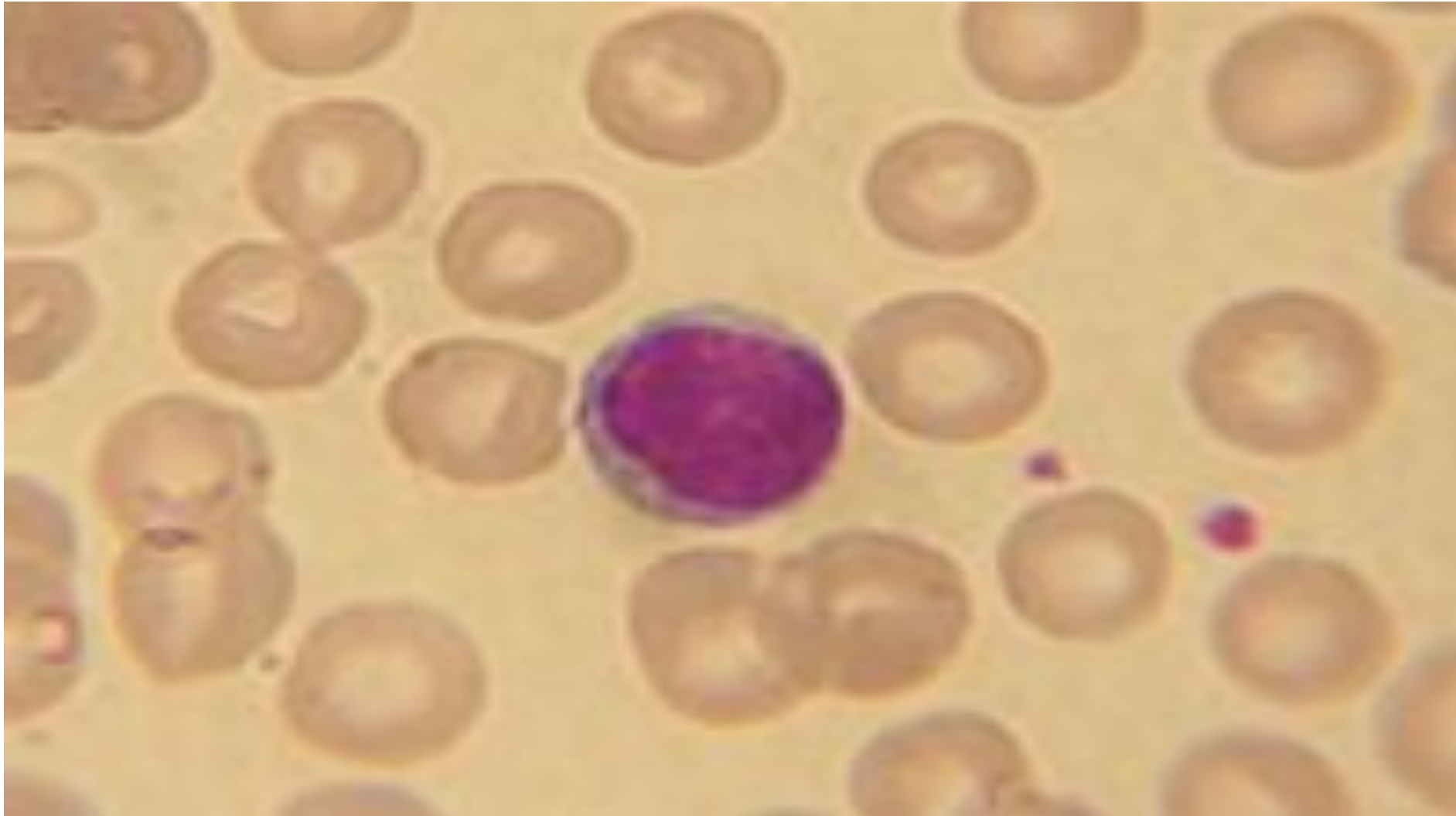
A bacterial infection is often diagnosed through blood test since increased number of neutrophils is triggered by the infection.

A scanning electron microscope (SEM) image of a single human lymphocyte.

[Wikimedia Commons Information]



A stained lymphocyte surrounded by red blood cells viewed using a light microscope (Wikimedia)



B & T Cells

- T cells (thymus cells) and B cells (bursa-derived cells) are the major cellular components of the adaptive immune response.
- A bursa is a fluid filled sac that allows smooth motion between two surfaces.
- The **thymus** is a specialized organ of the immune system within which T-cells mature.
- The function of T cells and B cells is to recognize specific “non-self” antigens, during a process known as antigen presentation.
- Once they have identified an invader, the cells generate specific responses that are tailored to maximally eliminate specific pathogens or pathogen-infected cells.

How B & T cells act?

- ❖ B cells neutralize pathogens by producing large quantities of antibodies.
- ❖ A subtype of T cells, called T helper cells, produce cytokines that direct the immune response.
- ❖ other T cells, called cytotoxic T cells, produce toxic granules that contain powerful enzymes which induce the death of pathogen-infected cells.
- ❖ Activated B and T cells leave a lasting legacy of the antigens in the form of *memory cells*. Throughout the lifetime of an animal these memory cells will “remember” each specific pathogen encountered, and are able to mount a strong and rapid response if the pathogen is detected again.

Toll - like Receptors (TLR's)

- ❑ Toll-like receptor research has been on the rise due to an explosion of studies in gut microbiota and the human microbiome in recent years.
- ❑ Toll like receptors are the link between innate and adaptive immunity.
- ❑ "Homeostasis in intestinal epithelium is orchestrated by the circadian clock and microbiota cues transduced by Toll-like receptors." (2013, *Cell* **153**, 812.)

Nutraceuticals and immunity

Almost 5000 years back Ayurveda had declared “Let food be thy medicine and medicine be thy food.”

Exploring the association between diet and health continues today.

For example, we now know that as many as 85% of all diseases can be prevented by dietary changes.

Immunity Enhancers

- ❖ Take nutraceuticals as food for enhancing immunity
- ❖ As suggested in Ayurveda daily use of herbs and spices in diet eg. ginger, turmeric, garlic, cumin, pepper, cloves, tulsi, saffron along with seasonal detoxifiers and antioxidants like neem, amla and trifla can prevent many infections as well as act as synergistics for cure of several disorders.
- ❖ Piperine from black pepper has been shown to enhance bioavailability of many active components of herbs.
- ❖ Avoidance of non-vegetarian diet can also help in preventing tumorigenesis.
- ❖ Ayurvedic medicine. Bacopa monnieri (Brahmi) and Ocimum sanctum (tulsi) are known to release stress, depression and manage insomnia and sleeplessness.

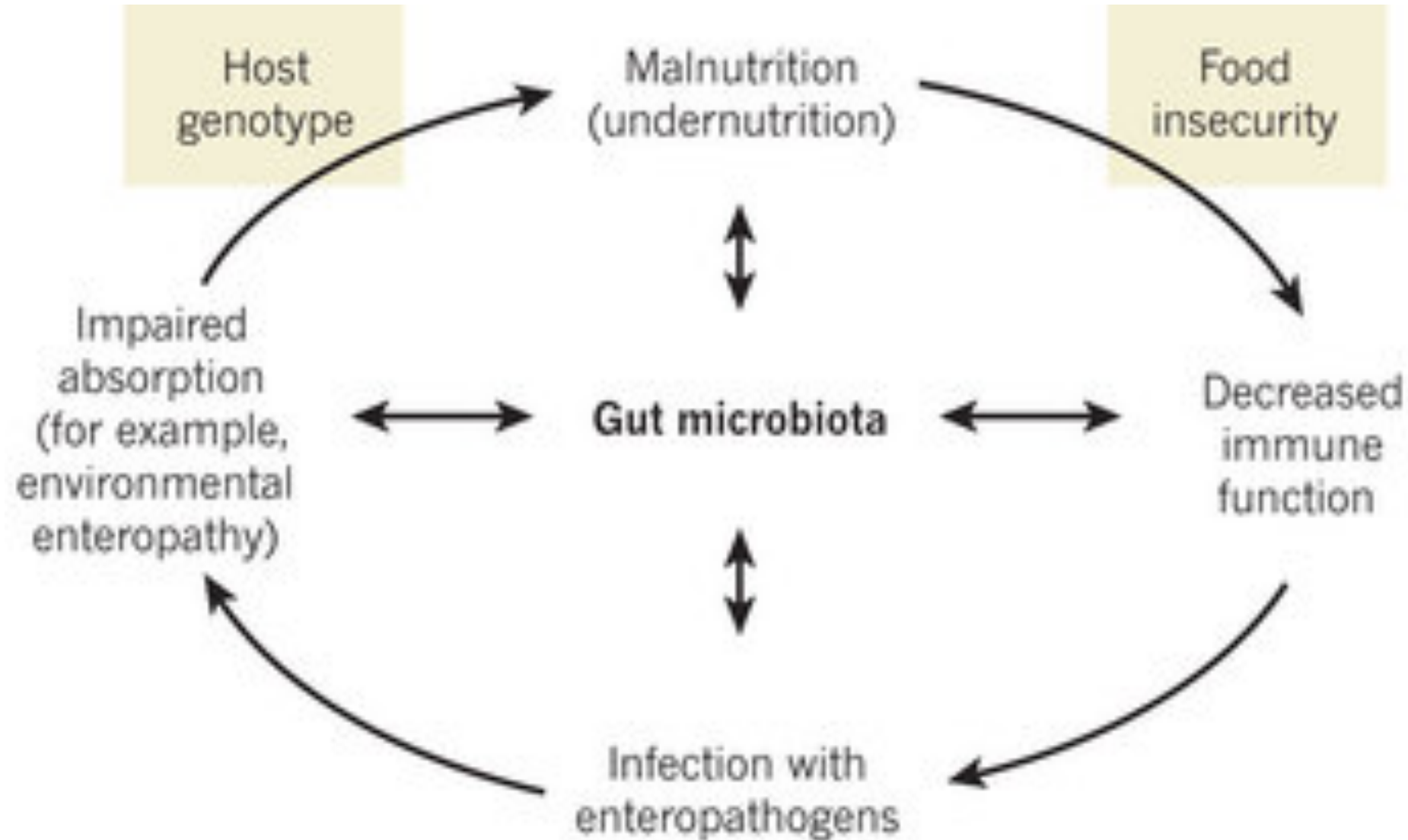
Amalgamation of Ayurveda and Modern Medicine is need of the hour

- ❑ The ayurvedic regimen rejuvenates body tissues, tones up body systems and acts as a tonic.
- ❑ Chronic nausea, change in body image and weight loss (anorexia) can be managed with herbs like *Withania somnifera*, *Sida cordifolia*, *Asparagus racemosus*, *Vitis vinifera*, *Plumbago zeylanica*, *Tinospora cordifolia*, and *Zingiber officinale*, which improve appetite, fatigue malnutrition etc.
- ❑ Digestive disorders like diarrhea, can be treated with herbs like *Holarrhena antidysenterica*, *Punica granatum*, *Emblica officinalis*, *Plumbago zeylanica* and constipation with *Terminalia chebula*. *Allium sativum* (garlic) is good for pain and ache. *Curcuma longa* and pepper is good for cough and shortness of breath specially for lung cancer patients.
- ❑ *Withania somnifera* and *Tinospora cordifolia* are powerful immunostimulants and *bael*, turmeric, ginger, triphala, and *Podophyllum hexandra* are other immunomodulating herbs.

Ayurvedic approach to Synergism in drug application, the only remedy for multidrug resistance

- ❑ Drug resistance is a natural response to the selective pressure of the drug.
- ❑ Level of resistance forces change from first line to more expensive second or third-line agents. When resistance against these drugs also emerges, the treatment options are exhausted.
- ❑ Focused research leading to the development of new/modified cost effective drugs by appropriate chemotherapeutic approach and combination therapy (synergistic effect) is the most significant remedial measure.

Proposed relationships between the gut microbiota, the immune system and malnutrition



Live a healthy life with Nutraceuticals

THANK YOU