

## A CRITICAL REVIEW OF KAPHA DOSHA IN THE MODERN PERSPECTIVE

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### ABSTRACT

In *Ayurveda*, health is a state where the *Dosha*, *Agni*, *Dhatu*, *Mala*, all the physiological processes of the body are in homeostatic state and soul, sense organ and mind are in a state of total wellbeing. The theory of *Tridosha* is unique to *Ayurveda*. The term *Dosha* in Sanskrit means the regulatory functional factors of the body. It is three *Doshas* - *Vata*, *Pitta*, and *Kapha* are said to be responsible for maintenance of homeostasis in the body; and health is nothing but a state of equilibrium of these *Tridosha*. The Physiological function of *Kapha* are *Sneha* (unctuousness), *Bandha* (coherence), *Sthiratwa* (stability), *Gaurava* (heaviness), *Balam* (strength) etc. *Kapha* is five types and each type have its own functions. In human body a lot of proteins are presents in the form of glycoprotein and lipoprotein etc. their properties and functions are providing strength, immunity, flexibility, nutrition, lubrication as well as taste identification and helps in protecting and maintaining stability internal visceral organs. They play important role in maintaining the physiology of any living organism. This article is an attempt to correlate *Kapha* in terms of its properties and functions.

**Keywords:** *Kapha Dosha*, *Dhatu*, *Agni*, Proteins, *Ayurveda*.

### INTRODUCTION

*Jala* and *Prithivi Mahabhuta* predominate in *Kapha Dosha*. The word *Kapha* is derived from root word ‘*Slishalingane*’, mean to embrace, to cohere or to keep together. *Kapha* has the qualities such as *Guru*

(heaviness), *Sheeta* (cold), *Mridu* (soft), *Snigdha* (unctuous), *Madhura* (sweet), *Sthira* (stable) and *Pichilla* (slimy). In balance state *Kapha* is responsible for physiological functions like *Sneha* (unctuousness), *Bandha* (coherence), *Sthiratwa* (stability), *Gaurava* (heaviness), *Balam* (strength) and psychological functions like *Kshama* (forgiveness), *Dhriti* (memory), *Alobha* (absence of greed)<sup>[1]</sup> *Acharya Charak* told about *Kapha Guna* in *Sutrasthana* that are the properties of *Kapha* are heaviness, coldness, softness, unctuousness, sweetness, immobility and sliminess<sup>[2]</sup> *Charak* told about the normal functions of *Kapha* are unctuousness, binding, firmness, heaviness, potency, strength, forbearance, restraint, and absence of greed<sup>[3]</sup> *Acharya Susruta* has mentioned the normal function of *Kapha* in *Sutrasthana* that's the *Slesman* or *Kapha* favours the body by maintaining its fluid system and lubricates the joints, oleates, heals, fills, nourishes and preserve the body strength the decrease of *Slesman* manifest by dryness, a burning sensation inside the body, a feeling of emptiness in all the seats of *Slesman* (hollow viscera) specially stomach, flaccidity in the joints, thirst, weakness and insomnia.<sup>[4]</sup> the five subgroups of are in the chest, the head, the neck, the root of tongue and the joints in addition (to the stomach)<sup>[5]</sup> According to *Acharya Charak*, *Kapha*, in normal state is (responsible for ) strength but when abnormal becomes excretion. In other words, the normal *Kapha* is said as *Ojas* while the abnormal one is sinful (cause of various disorders).<sup>[6]</sup> *Acharya Vagbhatta* has described five types of *Kapha* in *Sutrasthana* are *Avalambaka*, *Kledaka*, *Bodhaka*, *Tarpaka* and *Sleshaka*.<sup>[7]</sup>

### Protein Biochemistry

A large molecule consisting of a long chain or sequence of amino acids with a general formula of  $H_2N-CHR-COOH$  aka alpha amino acids, joined in a peptide linkage, after water, proteins are the major cell constituent, and are critical for all biological structure- e.g. organelles, mitochondria, enzymes and functions- eg growth, development, immune function, motility types hormones, enzymes, antibodies<sup>[8]</sup> complex organic molecule composed of various combinations of any of twenty  $\alpha$ -amino acids linked in a genetically

controlled linear sequence into one or more peptide chains. Proteins are present in every living cell and from an essential constituent of cells. They are essential in many functions, such as growth and repair of tissue, transport of molecules throughout the body (e.g. Hemoglobin to carry oxygen), as enzymes to catalyze biochemical reactions, immunological responses, muscle contraction (with actin and myosin), signaling (e.g. Insulin which transmit a signal from a cell where it is synthesized to other cells in other tissue), or as antibodies by binding to target receptors. Many of the twenty amino acids are produced by the body. However, nine of these have to be obtained in food<sup>[9]</sup>

## DISCUSSION

### Provide *Sthiritvam* (Collagen fibers)

Due to abundance of *Prithvi Mahabhuta* (Earth property), the *Kapha Dosha* has properties of stability, a similar property is found in the collagen fibers which acts to stabilize different organ and structures in the body. The collagen fibers are flexible with a high tensile strength. Generally, each collagen fiber is made up of thread-like subunits called collagen fibrils. The fibril's strength is due to covalent bonds between collagen molecules of adjacent rows. The collagen molecule (called Tropo-collagen) is composed of three intertwined polypeptide chains Sugar groups are associated with the triple helix, so collagen is properly called a Glycoprotein.<sup>[10]</sup> Collagen is the most abundant protein in our body. It is the major component of connective tissues that make up several body parts, including tendons, ligaments, skin, and muscles. Collagen has many important functions, including providing our skin with structure and strengthening our bones. Collagen helps maintain the integrity of our cartilage, which is the rubber-like tissue that protects our joints. As the amount of collagen in our body decreases as we get older, our risk of developing degenerative joint disorders such as osteoarthritis increases.<sup>[11]</sup>

### Provide *Pushti* (Could boost muscle mass)

Between 1–10% of muscle tissue is composed of collagen. This protein is necessary to keep our

muscles strong and functioning properly. Studies suggest that collagen supplements help boost muscle mass in people with sarcopenia, the loss of muscle mass that happens with age. In one study, 27 frail men took 15 grams of collagen while participating in an exercise program daily for 12 weeks. Compared with men who exercised but did not take collagen, they gained significantly more muscle mass and strength. Researchers have suggested that taking collagen may promote the synthesis of muscle proteins like creatine, as well as stimulate muscle growth after exercise.<sup>[11]</sup>

#### **Guru Guna (Heaviness)**

The proteins generally have large molecular weights ranging between  $5 \times 10^3$  and  $1 \times 10^6$ . It might be noted that the values of molecular weights of many proteins lie close to or multiples of 35,000 and 70,000.

#### **Pichhila, Snigdha (Colloidal Nature)**

Because of their giant size, the proteins exhibit many colloidal properties, such as Their diffusion rates are extremely slow and they may produce considerable light-scattering in solution, thus resulting in visible turbidity (Tyndall effect).

**Mridutva:** Researchers has conducted study to find out softness of athrogenic lipoproteins by comparing VLDL (Very low-density lipoprotein) and LDL (Low density lipoprotein) using elastic incoherent neutron scattering their result revealed that lipoprotein particles are extremely soft and flexible.<sup>[12]</sup>

**Bodhak Kapha (G protein-coupled receptors):** *Bodhaka Kapha* is present or situated in tongue (and also in the throat) enables taste perception.<sup>[13]</sup> Taste buds are able to distinguish between different tastes through detecting interaction with different molecules or ions. Sweet, savories, and bitter tastes are triggered by the binding of molecules to G protein-coupled receptors on the cell membranes of taste buds.<sup>[14]</sup>

**Sleshaka Kapha (Lubricin):** This is the type of *Kapha* which is located in all the bony joints keep them strongly or firmly united, protects their articulation and prevents disunion.

Synovial fluid contains lubricin (glycoprotein), secreted by synovial fibroblasts.<sup>[15]</sup> Chiefly, it is responsible for so-called boundary-layer lubrication, which reduces friction between opposing surfaces of

cartilage. There also is some evidence that it helps regulate synovial cell growth.<sup>[16]</sup>

**Tarpak Kapha (CSF Protein):** *Tarpaka Kapha* is located in the head nourishes and smoothens the sense organs by virtue of its *Snehana* or oily property. *Tarpana* means nourishment and so, it is known as *Tarpaka Kapha*. The Cerebro Spinal Fluid contains glucose, proteins, lipids, and electrolytes, providing essential Central Nervous System nutrition. albumin is the protein which is present in Cerebro spinal fluid.<sup>[17]</sup> Biochemical constituents and electrolytes maintain the osmotic pressure responsible for normal Cerebro Spinal Fluid pressure which is essential to maintaining normal cerebral perfusion<sup>[18]</sup>

**Kledak Kapha (Mucin):** *Kledaka Kapha* is located in the *Amashaya* (stomach) moistens the food which is swallowed, disintegrates it, breaks it and liquefies it. Gastric mucus (mucin) is a glycoprotein that serves two purposes: the lubrication of food masses in order to facilitate movement within the stomach and the formation of a protective layer over the lining epithelium of the stomach cavity.<sup>[19]</sup>

**Avlambak Kapha (pericardial, fluid surfactant, pleural fluid):** The type of *Kapha*, which is located in the chest supports the *Trika* which also means a meeting point of three structures. This support is caused with its *Svavirya* (intrinsic quality or own power). It also supports *Hridaya* (heart) by its own power and by the power obtained through the *Anna Virya* (energy derived from the food consumed). It provides *Avalambana* (basis foundation, infrastructure) to the other seats of *Kapha* by virtue of its watery nature and that is why it is known as *Avalambaka Kapha*: Pulmonary surfactant is a mixture of lipids and proteins which is secreted by the epithelial type II cells into the alveolar space.<sup>[20]</sup> It is established that pulmonary surfactant reduces surface tension at the air-water interface in the alveoli, thereby preventing collapse of these structures at end-expiration.<sup>[21]</sup> In pericardial fluid from higher to lower concentration being albumin, globulins, macroglobulins, and fibrinogen are present. The normal pericardium contributes to important

functions. This is necessary for: (1) lubricating the moving surfaces of the heart, (2) stabilizing the heart anatomic position, (3) isolating the heart from the adjacent anatomical structures, (4) limiting heart dilatation during diastole, reducing the endomyocardial tension.<sup>[22]</sup> Ben-Horin *et al.* studied the composition of pericardial fluid in patients undergoing open heart surgery. They found that the fluid is made up of a high concentration of lactate dehydrogenase (LDH), protein and lymphocytes. In a healthy adult there is up to 50 ml of clear, straw-colored fluid.<sup>[23]</sup> The pleural fluid functions as a lubricant to allow the two layers of the pleura to glide smoothly and it also maintains the negative pressure between the lungs and thoracic cavity, which is necessary for inhalation while also preventing the lungs from collapsing.<sup>[24]</sup>

#### **Prakrit Sleshma, Bala (Immunoglobulin)**

The normal *Kapha* constitute the body-strength while the mobilized *Kapha* becomes a vitiated element.<sup>[25]</sup> Immunoglobulin's, also known as antibodies, are glycoprotein molecules produced by plasma cells (white blood cells). They act as a critical part of the immune response by specifically recognizing and binding to particular antigens, such as bacteria or viruses, and aiding in their destruction <sup>[26]</sup> Immunoglobulin is abbreviated Ig. The classes of immunoglobulins are termed immunoglobulin A (IgA), immunoglobulin G (IgG), immunoglobulin M (IgM), immunoglobulin D (IgD) and immunoglobulin E (IgE).<sup>[27]</sup>

#### **Vrishata (Sperm-associated antigen 11B, Follicle-stimulating hormone)**

Sperm-associated antigen 11B is a protein that in humans is encoded by the SPAG11B gene. This gene encodes several androgen-dependent, epididymis-specific secretory proteins. The specific functions of these proteins have not been determined, but they are thought to be involved in sperm maturation<sup>[28]</sup> Follicular fluid contains large no. of proteins associated with the regulation of sperm function such as sperm motility, capacitation and acrosomal reaction, as well as the sperm-oocyte fusion. Motility regulatory proteins may be useful in human infertility

clinics to solve some of the problems of human infertility.<sup>[29]</sup> Follicle-stimulating hormone (FSH) is a gonadotropin,

a glycoprotein polypeptide hormone.<sup>[30]</sup> Follicle Stimulating Hormone is synthesized and secreted by the gonadotropic cells of the anterior pituitary gland, Follicle Stimulating Hormone stimulates the maturation of primordial germ cells which causes initiation of spermatogenesis.<sup>[31]</sup>

### **CONCLUSION**

It can be concluded that the *Kapha Dosha* cannot be limited by simply comparing it with protein as *Kapha Dosha* is involved in any systemic activity. So, functions of *Kapha Dosha* can be partially correlated with the functions of glycoprotein and lipoprotein. There is a need of further research to evaluate in detail of all other *Kapha Dosha*, *Kshaya*, *Vridhhi*, *Prakopa* for betterment of mankind.

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