

CONCEPTUAL REVIEW ON MEDO DHATU AND ADIPOSE TISSUE IN AYURVEDA:  
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## ABSTRACT

Our bodies contain a variety of lipid-rich tissues, such as *Medo Dhatu*, *Majja Dhatu*, and *Vasa*. The two functional components, *Dharana* and *Poshana*, are of significance to *Vasa*, *Majja*, and *Medo Dhatu*. Adipose tissue, or *Medo Dhatu*, is the fourth of the seven *Dhatu*s that give the body its essential *Snehana* (grease and unctuousness). A separate *Dhatvagni* plays a critical part in this interaction as *Dhatu*, *Upadhatu*, and *Mala* arise. In this way, *Medo Dhatvagni*'s actions framed the *Medo Dhatu*. Apart from cancer, *santarpanaja vyadhies* account for a greater percentage of deaths in developed societies. It may be caused by a variety of factors, including a sedentary lifestyle, tainted food, and pollution; in most of these illnesses, like *Prameha* and *Sthoulya*, *meda* is reported to shorten life expectancy. Although the specifics are scattered across the literature, ancient academics have expertly articulated the *Meda Dhatu* in their own special ways. In order to arrive at a logical conclusion, the current essay aims to gather references to *Meda Dhatu* and lipids from both contemporary and Ayurvedic literature.

**KEYWORDS:** *Medo Dhatu*, *Majja Dhatu*, and *Vasa*, *Dharana* and *Poshana*, *Snehana*, *Dhatvagni*, *santarpanaja vyadhies*, *Prameha* and *Sthoulya*.

## INTRODUCTION

Modern science defines a cell as the structural and functional unit of a living thing that is made up of minerals, water, lipids, proteins, and carbohydrates.<sup>[1]</sup> Like how *Dosha Dhatu* and *Mala* are the structural, functional, and constitutional unit of the living organism in Ayurveda.<sup>[2]</sup> The human body contains various tissues that are high in lipids, including the *Vasa*, *Majja*, and *Meda Dhatu*s. Among the above, *Meda* is crucial since it plays a vital part in the development of several metabolic illnesses. *Medo Dhatu* is the fourth *Dhatu* out of seven *Dhatu*s which provide *Snehana*, *Sweda*, *Dridhata*, and *Netra Gatra Snigdhatu*.<sup>[3]</sup> *Meda Dhatu* can be correlated with lipids. *Medas* is primarily found in the *Udara* (abdominal region), although it is known as *Sarakta Meda* when found inside the *Anu Asthi* (bone), and *Majja* when found in the *Sthula Asthi*. *Vasa* is the name for the pure form of *Medas* found in *Mamsa*. Nonetheless, *Medo Dhatu* is given attention since it contributes to the development of several metabolic illnesses, including *Medoroga*, *Prameha* (diabetes), *Sthoulya*, and others. It comes in three *Anjali praman* (one *Anjali* is exclusively applicable to that person and represents the volume of two hands united into the shape of a cup).<sup>[4]</sup> The term "*Meda*" literally derives from the root "*Stimida Snehane*," which stands for *Sneha*, fats, oil, etc. The fatty

substance that comes from the *mamsa* and accumulates in the abdomen is referred to as *vasa*. *Asthi Madhyagata Sneha* is known as *Majja*.

## CONCEPT OF DHATU

*Dhatu*s is focused on the body's two functioning aspects, namely *Dharana* and *Poshana*. *Dhatu*s, which are in turn constantly generated, destroyed, and reformed by the necessary nutrients provided to them by the *Poshaka Dhatu*s, are referred to as *dharana* to describe the structural support of the body provided by each *Dhatu*. It is regarded as a *Sneha* dominating *Drava Dhatu* with *Prithvi*, *Apa*, and *Teja Mahabhoota* dominance as well as *Guru* (heavy) and *Snigdha* (oily) qualities.<sup>[5]</sup>

**MEDO DHATU:** The substance known as "*meda*" is a yellowish, greasy, sticky substance; beneath the skin, many fat globules create a thick, spongy layer.

There are 2 types of *Medo Dhatu*; The first sort of *Medo Dhatu*, which is immobile by nature and is kept in *Medodharakala*, is *Baddha Meda/Poshya Medo Dhatu*. *Udara* is the location of *Medodharakala*, and *Anuasthi*, *Udara Sphika Stana*, and *Gala* are all *Poshya Meda* warehouses.<sup>[6]</sup>

The second type of *dhatu* is *Abaddha Meda/Poshaka Medo Dhatu*, which is mobile by nature and distributed throughout the body with *Rasa Rakta Dhatu* to feed *Poshya Medo Dhatu*.<sup>[7]</sup> It is possible to see how the blood circulates with lipids and cholesterol using a variety of imaging techniques. There are two *Anjali pramana* of *Meda* in all. *Vasa's* is composed of three *Anjali*, though it may vary slightly depending on the individual.

#### FORMATION OF MEDO DHATU

According to *Ayurveda*, *Agni* should be typical for *Dosha*, *Dhatu*, and *Mala* to be in a condition of proportionality (*Samagni*). *Agni* is made up of enzyme and coenzyme activity, digestive and other hormones, as well as other substances that aid in metabolism and digestion. Following ingestion, the *prana vayu* transports the food to the *koshtha*, where it is softened by fatty substances and broken down by gastric juices before being affected by the digestive fire, or *Jathragni*, which is then acted upon by *Saman Vayu*. Therefore, the *Jathragni* aids in food digestion to create *Ahararasa* and *Mala*.<sup>[8]</sup> The food is then broken down into five different physicochemical groups by the *jathragni*, which are *Parthiva*, *Aapya*, *Agneya*, *Vayavya*, and *Nabhasa*.<sup>[9]</sup> It is then claimed that the *Bhautikagni* present in each group's substances digests those substances, drastically altering their qualities. As a result, the dietary substances are *mada* assimilable and can be built up into the equivalent *Bhutas* class of substances found in *Dhatu*. According to *acharya Charaka* the living organism is formed of five *mahabhutas* and the food of a living organic necessarily assumes the character of its corporeal components. The five *mahabhutas* in the food are digested by the five *mahabhutagnis*, and each of their principal processes proceeds to augur its own analogue in the human body. As a result, according to *Ayurveda*, the *gunas* (qualities) that may be present in *Ahara dravyas* are brought to life by *Jathragnipaka* and actualized by *Bhutagnipaka* in the last stage of digestion before being used in *Dhatupaka*. Before the nutritional substance is *mada* available to the seven species of *Dhatu* through their respective or specific channel's to be utilised by them, *Dhatwagni* mediate or catalyse further metabolic transformations of the nutrient substance. The body's nutrients, as per *Charaka*, are subjected to *paka* once more when the seven *Dhatwagnis* act upon them, resulting in the formation of *kitta* and *Prasad*.<sup>[10]</sup> *Charak* reiterated that the nutrients that sustain the *Dhatu* are subjected to *paka* by the *dhatu's ushma*, which is *Agni*, and then made accessible to the *Dhatu* through the appropriate channels. Hence, if the *Dhatu ushma*, are not compromised, the *Dhatupaka* is anticipated in due course, and the prepared *dhatwaharas* give the *Dhatu* strength, a beautiful complexion, happiness, longevity, and offer vitality. According to *ayurvedic* theory, this is how *Dhatu* generally functions. Thus, the *Meda* was created. *Medadhatwagni* catalyses the reaction that results in *dhatu*, and the products of the reaction are referred to as *asthayi* or *poshak Medo dhau*.<sup>[11]</sup> This *Agni*

oversees *Ahararasa's* digestion or bioconversion. In this instance, *agni* is *Dhatvagni*. It works on *Ahararasa* and oversees digesting and splitting into *Sara* and *Kitta* portions. Three hypotheses were put forth in the *Ayurveda* context to explain this process of nourishment: the *Prasad* an of *Rasa* nourishes *Rakta*, *Rakta* nourishes *Mamsa*, *Mamsa* nourishes *Meda*, *Meda* nourishes *Asthi*, *Asthi* nourishes *Majja*, and *Majja* nourishes *Shukra*.<sup>[12]</sup> All the nutritional requirements of *Dhatu* *Ksirdadhinyaya*, *Kedarkulyanyaya*, and *Khalekapotanyaya* are naturally satisfied by these three laws.

#### DHATU MALA

*Mala* are waste substances produced by metabolism in the body. These *Dhatumala* do not nourish the other *Dhatu*, *updhātu*, or *mala* in the body; instead, they oversee providing the body's sustenance, which is *Dharan karma*. *Sweda* was referred to by all *Acharyas* as *Medo Dhatu's Mala*, and *Acharya Sharangdhar* gave his two perspectives on the *Mala*. *Sweda* and *Rasana Danta*, as well as waste elements that he also put in *malas*.<sup>[13]</sup>

#### FUNCTION OF MEDO DHATU

*Snehana*: *Sneha* quality aids in preserving the lustre of the skin, hair, eyes, etc.

*Sweda*: *Sweda* is listed as *Mala* (excreta) of *Meda* and is produced by *Meda*.<sup>[14]</sup>

*Asthi Pushiti*: The nutrition of subsequent *Dhatu's*, such as *Asthi* and its *Updhatus Snayu* and *Sandhi*, is another function of *Meda*.

*Dridhatva*: With the help of *Snayu*, the *Updhātu* of *Meda*, it is feasible. The *Asthi Dhatu* has a direct connection to both *Snayu* and *Sandhi*. *Asthi* and *Sandhi* are supported by *Snayu*, who also aids in the construction of their joint. *Medas* help in the binding of significant organs and help numerous organs. The layer of adipose tissue that forms over the underlying organ protects it from external friction and strain.

#### Medovaha Srotasa<sup>[15]</sup>

*Srotasa* are just the body's pathways through which the *Malas* and *Poshaka Dhatu's* go to and from the stable *Dhatu's*. The *Medovaha Srotas* are the channels that provide the *Medo Dhatu* with nutrients. The *Medovaha Srotas* were regarded by Dr. Ghanekar as the omentum's and perinephric tissue's capillaries. The network of capillary blood capillaries that are dispersed to the fat cells serves as the main structural support for them. *Medodushti* or *Medoroga* are the locations of *Medovaha Srotasa's* vitiation.

*Moola* (Roots) of *Medovaha Srotas*:

According to *Acharya Charaka* - *Vrikka* and *Vapavahana*,

According to *Acharya Shusruta* - *Vrikka* and *Kati*,

According to *Acharya Vagbhata* - *Vrikka* and *Mamsa*. The three *Acharyas* have considered unanimously *Vrikka* (Kidney and its related area) as one of the *Moola* (root) of *Medovaha srotasa*.

### Modern Review

Triglycerides, commonly referred to as neutral fats, are the most common kind of lipids that are ingested. Glycerol nucleus and free fatty acids make up triglycerides. Triglycerides are a prominent component of foods of animal origin but just a minor one of diets of plant origin. In addition to triglycerides, cholesterol is also present in modest amounts in the typical diet. There are two categories of dietary fat: saturated and unsaturated.

1. Saturated Fats: Saturated fatty acids are defined as lipids with a high concentration of hydrogen ions but no double bonds between the carbon atoms.
2. Unsaturated fats: Dehydrogenation of saturated fatty acids produces unsaturated fatty acids.

Unsaturated fats are classified into three subtypes.

1. Monounsaturated fats.
2. Polyunsaturated fats.
3. Trans fats.

### Digestion of Lipids

Lingual lipase can be found in saliva. The lingual glands in the mouth and stomach release this enzyme, which is then ingested with saliva. Hence, the digestion of lipids does not start in the mouth. Due to the presence of bile salts, pancreatic enzyme, and intestinal lipase, almost all lipids are digested in the small intestine. final outcome of the digestion of fat as a result of lipid digestion, fatty acids, cholesterol, and monoglycerides are produced. Through simple diffusion, monoglycerides, cholesterol, and fatty acids from the micelles reach the cells of the intestinal mucosa. The upper portion of the small intestine is where most lipids are absorbed. Bile must be present for fat to be absorbed.

Storage of lipids: The liver and adipose tissue both store lipids. Neutral fat or tissue fat is the name for the fat that is kept in adipose tissue. The lipoprotein lipase enzyme, which is found in the capillary endothelium, hydrolyses the triglycerides of chylomicrons as they pass through the capillaries of adipose tissue or the liver. This results in free fatty acids (FFA) and glycerol. The adipocytes in adipose tissue or liver cells absorb free fatty acids (FFA) and glycerol. Once further transformed into triglycerides, free fatty acids (FFA) and glycerol are then stored in these cells. Additional chylomicron components that are discharged into the blood, like cholesterol and phospholipids, mix with proteins to produce lipoproteins. Triglycerides held in adipose tissue are hydrolysed into free fatty acids (FFA) and glycerol when other body tissues require energy. The blood carries free fatty acids (FFA) to the bodily tissues.<sup>[16]</sup> lipoproteins Along with albumin, free fatty acids are carried in the blood. The blood carries more lipids in the form of lipoproteins. According to their density, lipoproteins can be divided into four categories.

1. Very-low-density lipoproteins (VLDL).
2. Intermediate-density lipoprotein (IDL).
3. Low-density lipoprotein (LDL).

4. High-density lipoproteins (HDL).

VLDL – Through the liver to the adipose tissue, carries triglycerides. Moreover, it has been linked to cardiac conditions and atherosclerosis.

IDL –Transports triglycerides, cholesterol, and phospholipids from liver to peripheral tissue.

LDL – Carries phospholipids and cholesterol from the liver to tissues and organs, including the heart. Because it transports phospholipids and cholesterol from the liver to the body's muscles, other tissues, and organs like the heart, low-density lipoprotein (LDL) is regarded as harmful cholesterol. It oversees the cholesterol build-up on artery walls that results in atherosclerosis. Heart disease risk rises with high LDL levels.

HDL – Transports phospholipids and cholesterol from tissues and organs like the heart to the liver. Because HDL transports cholesterol and phospholipids from tissues and organs back to the liver for oxidation and removal, it is sometimes referred to as the "good cholesterol." By keeping cholesterol away from arteries to the liver, it prevents the build-up of cholesterol on the walls of arteries. Because it lowers blood cholesterol levels, a high amount of HDL is a favourable sign of a healthy heart. Moreover, HDL supports the healthy operation of a few hormones and a few bodily tissues. Moreover, it helps the liver produce bile.

### Adipose Tissue

Adipose tissue contains connective tissue matrix, nerve tissue, stromovascular cells, and immunological cells. It is now known that adipose tissue expresses and secretes a variety of bioactive peptides. Together, these components work as a seamless unit. Adipose tissue produces and secretes substances with significant endocrine functions in addition to responding to afferent signals from the central nervous system and conventional hormone systems. Leptin, other cytokines, adiponectin, complement proteins, plasminogen activator inhibitor-1, and renin-angiotensin system proteins are some of these factors. Adipocytes, also known as lipocytes or fat cells, make up its structure. Obesity is a function of body fat, primarily adipose tissue, rather than body weight. There are two forms of adipose tissue: brown adipose tissue and white adipose tissue.

White Adipose: Storage of lipids is the primary purpose of white adipose tissue. Depending on the blood glucose level, hormones, especially insulin, control how fat is used for storage. White adipose tissue surrounds and serves as a mechanical cushion for the body's interior organs, providing additional protection.

Brown Adipose Tissue: It is a unique type of adipose tissue with a purpose different from white adipose tissue. It is only found in a few places on the body, such the intrascapular region and the back of the neck. Instead of storing lipids, brown adipose tissue produces heat by burning them. Brown adipose tissue is crucial for non-

shivering thermogenesis, which controls body temperature in new-borns and animals hibernating.<sup>[17]</sup>

## CONCLUSION

Lipids and *Medo Dhatu* are related when the *Ayurveda* and modern texts are examined. The *Medo Dhatu* has a profound impact on *Dharana* and *Poshana*, two essential functional aspects of the organism. Lipids and *Medo Dhatu* both possess the quality of *snehatva*. Increased levels of lipids and stable and unstable *medo Dhatu* are caused by excessive eating of sweet and fatty foods. For instance, according to *Ayurveda* writings, excessive ingestion of *shleshma vardhak ahar and vihar* results in excessive growth of both stable and unstable *medo Dhatu*. The main source of nutrition for all of *Dhatu is Rasa*, which carries those nutrients with it. Like how the nutrients of the stable and unstable *medo dhatus* are delivered by the *rasa dhatus*, stable *medo dhatus* and unstable *medo dhatuses* can both be associated with an increase in serum lipid levels in the body. Obesity and high lipid levels are usually associated, and the pathophysiology of *medoroga* is greatly influenced by vitiation and excessive accumulation of *Medo Dhatu* (fatty tissue). Considering all the text's sources, we may consequently draw the conclusion that *Medo Dhatu* and lipids are comparable.

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