

INTERRELATION BETWEEN MEDA AND SWEDA

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ABSTRACT

*Dhatu*s are the most important element of the body. *Acharya Charak* described it's in one sentence i.e. "The process by which makes *Dhatu*samyata is called *Chikitsa*". *Dhatu*s are the seven fundamental nutrients of the body and these are the most important elements that constitute human body. In seven *Dhatu*s, *Medodhatu* is the fourth *Dhatu* of the body, which is derived from *Mamsadhatu* by the action of the *Mamsaagni* and *Aapya Mahabhoota*. *Sweda* is the *Mala* of *Medodhatu* and it is formed in the metabolism of *Medodhatu*, hence *Medodhatu* control the process of *Sweda* formation. *Sweda* makes *Kleda* (moistness) and *Sukumara* (smoothing) the skin in the body. Lipids are organic compound that contain carbon, hydrogen and oxygen atoms, which forms the framework for the structure and functions of living cells. The lipids are stored in adipose tissue and liver. The fat stored in adipose tissue is called natural fat or tissue fat. The nutrient of the meal is absorbed and transported. It is used for fat synthesis, after the fat synthesis its stored in adipose tissue (white adipose tissue). During energetic demands, stored fat is breakdown & produce energy. For energy production heat loss is required which is compensated by secreting sweat, because sweat gland of the skin play an active part in the heat loss. In this article, it's tried to establish relation between *Medodhatu* (lipid or fat) and *Sweda* in our body.

Keywords: *Medodhatu*, lipids, *Sweda*

INTRODUCTION

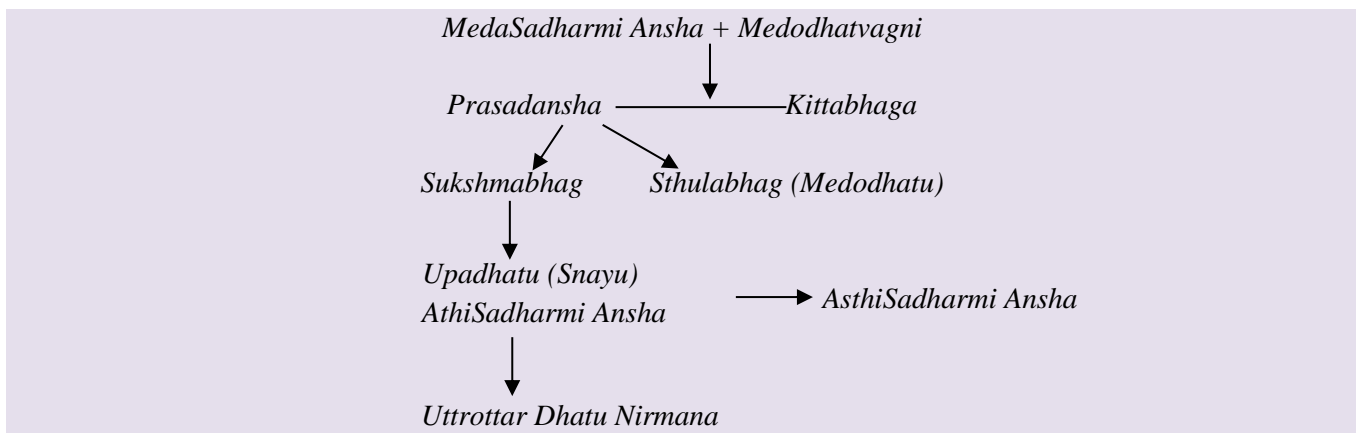
Ayurveda is the most ancient medical science of the world. It conceives and describes the basic and applied aspect of life process, health, diseases and management of the disease in term of its own principles and approaches. In Ayurveda "*DoshaDhatuMala MulamHiShariram*" states *Vataditridosha*, *Saptadhatu* and *Trimala* are the building blocks of *Sharira*.¹ *Acharya's* described seven types of *Dhatu's* i.e. *Rasa-Rakta-Mamsa-Meda-Asthi-Majja-Shukra*. Its play an important role in two important functional aspects i.e.

Dharana (Holding) and *Poshna* (Nutrition) of the body.² *Medodhatu* is the fourth *Dhatu* of the body, which is formed by *Mamsa Dhatu*, by the action of the *Mamsaagni* and *Aapya Mahabhoota*. During action of the *Medodhatwagni* on *Medasadharmi-ansh* produced *Sweda* as *Kittabhagroopa* or *Malaroopa*. The formation of *Sweda* occurs during the metabolism of *Medodhatu*.³ Lipids are biomolecules, made up of carbon hydrogen and oxygen, like the carbohydrates, but as a rule they contain much less oxygen. Lipids are

mostly consumed in the form of natural fats, which are also known as triglycerides. The fat serves as efficient sources of energy when stored in an adipose tissue. It serves as an insulating material in the subcutaneous tissues and around certain organs. It provided building blocks for different high molecular weight substance, e.g., acetic acid and can be used for the synthesis of cholesterol and certain hormones. They produce metabolites through oxidation in the tissues which are used in the introversion of substances.

Medodhatu: The human body is made up of seven body element one is *Medodhatu*, it is considered as *Sneha* dominant *Drava Dhatu* which is having *Guru* (heavy), *Snigdha* (oiliness) properties and dominance of *Prithvi*, *Apa* (water) and *Teja Mahabhoota*.⁴ Quantity of *Medodhatu* is 2 *Anjali* (approximate 400ml).⁵ As states by different *Acharya's Snehana* (lubrication), *Sweda* (Sweat), *Dridhatva* (Stability), *Astipushti* (Nutrition of bones), and *Netra-Gatra-Snigdhatu* (Smoothness in eyes and body) are the main functions of *Medodhatu*.⁶

Formation of Medadhatu



In the formation of *Medodhatu*, *Medodhatvagni's* action on the *Medasadharmi Ansha*, due to this action *Prasadansha* and *Kitta* (*Sweda*) are produced. There are two types of *Prasadansha* i.e. *Sthulabhaga* and *Sukshmabhaga*. *Sthulabhaga* is called *Medodhatu* and *Sukshmabhaga* is divided into two parts i.e. *Updhatu* (*Snayu* or Ligaments) and *Asthisadharmiansha*.

Type of Medodhatu

Chakrapani has classified all the *Dhatu*s into two types, based on their function, accordingly; *Medodhatu* is classified into *Poshaka* (Nutrient) and *Poshya*. Among these two, *Poshaka Medodhatu* is *Gatiyukta* (mobile in nature); which is circulated in the whole body along with the *Gatiyukta Rasa-Rakta Dhatu*; to give the nutrition of *Poshya Medodhatu*. Second *Poshya Medodhatu* is *Gativivarjita* (immobile in nature); which is stored in *Medodharakala*. The site of *Medodharakala* is *Udara* (abdomen), *AnuAsthi* (small bones), *Udara*,

Sphik, *Sthna* are also deposits sites of *Poshya Medodhatu*.⁷

Medodhara Kala⁸

Kalas are the fine membrane like structures, which separates the *Dhatu* from their *Ashayas*. *Medodharakala* is the 3rd *Kala* in the body and supports the *Medodhatu*.

- According to *Acharya Sushruta*, *Medodharakala* is the layered structure around abdominal organs and small joints.
- *Acharya Charak* said that the *Medodhara Kala* is peritoneal membrane which holds abdominal organs in position. It's also stores fats. Fat stored in *Medodharakala* of abdomen (*Udara*) is called as visceral fat.

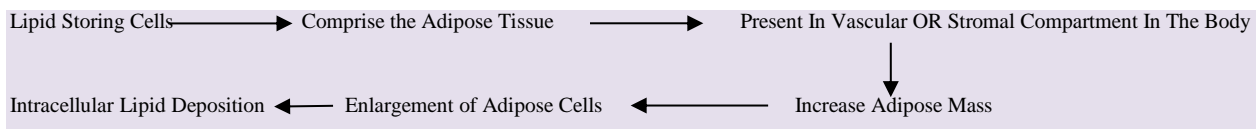
Mala of Meda: *Sweda* is the *Mala* of the *Medodhatu*. It is formed during the metabolism of *Medodhatu*. *Swedavaha Srotas* is the site of *Sweda*. *Medodhatu* and *Lomakupa* (pores of skins) are the roots of

SwedavahaSrotas, is the site of *Samana Vayu*. It's regulates excretion of *Sweda* and regulates body heat.^{9,10}

Lipid: Lipids are organic compound that contain carbon, hydrogen and oxygen atoms, which forms the framework for the structure and functions of living cells. Lipid is insoluble in plasma, and hence, cannot be transported directly through the blood. It is now recognised that lipids (fat/cholesterol) in their various forms are transported by lipoproteins. The functions of lipoprotein particles include absorption of dietary fat and transportation of lipids (triglyceride and cholesterol), absorption of and transportation of fat-soluble vitamins; and transportation of cholesterol from peripheral tissues back to the liver.¹¹

Storage of Lipids: The lipids are stored in adipose tissue and liver. The fat stored in adipose tissue is called natural fat or tissue fat. When the chylomicrons are

traveling through capillaries of adipose tissue or liver, the enzyme called lipoprotein lipase present in capillary endothelium, hydrolyzes triglycerides of chylomicrons into free fatty acids (FFA) and glycerol. FFA and glycerol enter the fat cells (adipocytes or lipocytes) of the adipose tissue or liver cells. Then, the FFA and glycerol are again converted into triglycerides and stored in these cells. Other contents of chylomicrons such as cholesterol and phospholipids which are released into the blood combine with proteins to form lipoproteins. When other tissues of the body need energy, the triglycerides stored in adipose tissue is hydrolyzed into FFA and glycerol. The free fatty acids are transported to the body tissues through blood, in combination with albumin. Other lipids are transported in the blood in the lipoproteins.¹²



Adipose Tissue¹³: Adipose tissue or fat is a loose connective tissue that forms the storage site of fat in the form of triglycerides. It's composed of adipocytes, which is also called fat cells or lipocytes.

It is of two types:

1. White adipose tissue or White fat: It is distributed through the body beneath the skin forming subcutaneous fat. It is also surrounding the internal organs. It is formed by fat cells which are unilocular, this cell contains one large vacule filled with fat. The main functions are the white adipose tissues are storage, insulation function is due to subcutaneous tissue, protection of internal organs.
2. Brown adipose tissue or brown fat: it is a specialized form of adipose tissue it is present only in certain areas of the body such as back of the neck and inter scapular region. Brown adipose tissue does not store lipids but generates heat by burning lipids. In infants and hibernating animals, adipose tissue plays an important role in regulating body temperature via non shivering thermogenesis. Heat production in brown

fat is very essential for survival of infants and small animals in cold environment.

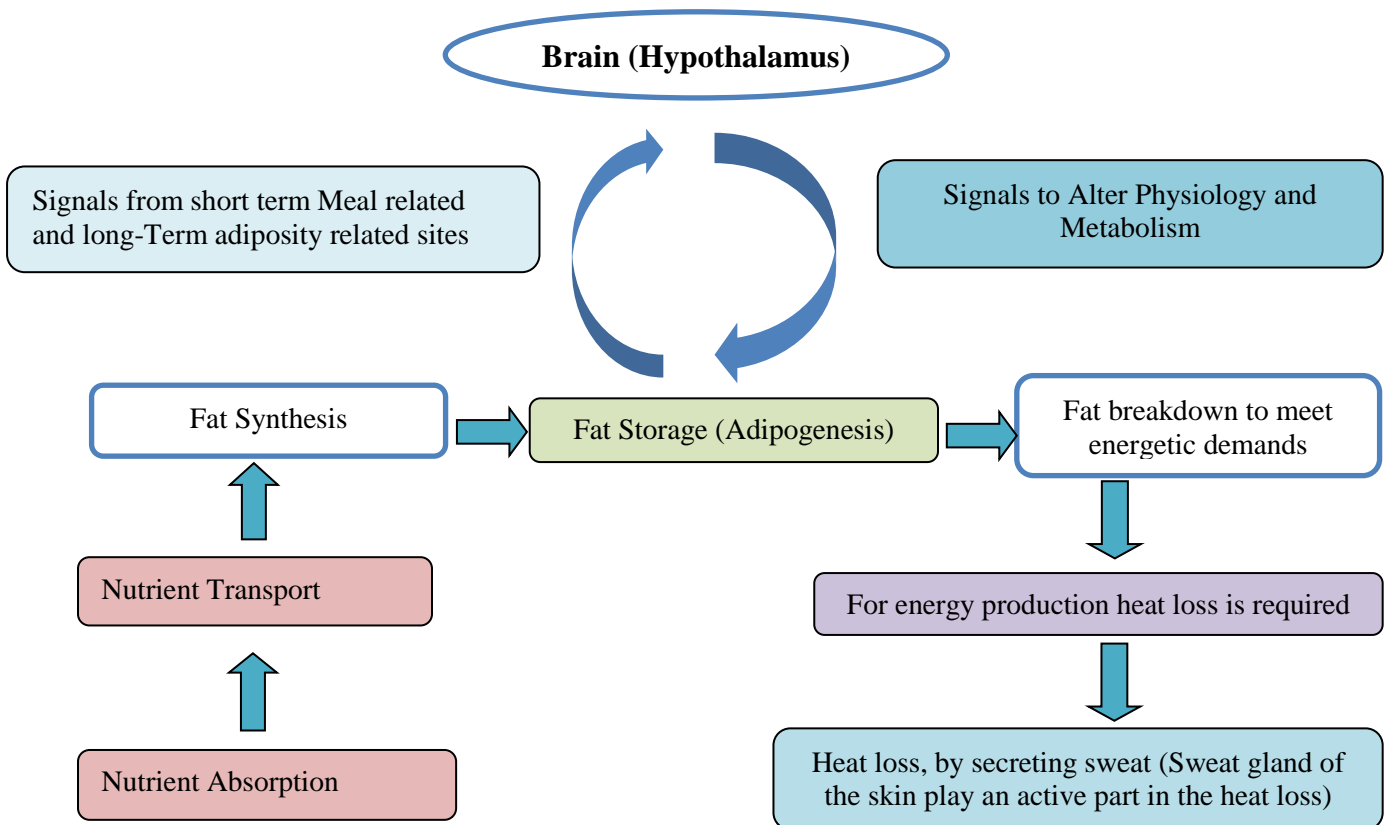
Sweat: Sweat is a clear salty liquid produced by glands in human skin. Sweat is secreting through sweat glands. These are two types: Eccrine glands and Apocrine glands. Eccrine glands are distributed throughout the body. It plays an important role in regulating the body temperature by secreting sweat. But apocrine glands don't play any role in temperature regulation like eccrine gland. During the regulation of the body temperature heat balance is maintain. Heat balance is the balance between heat produced in the body and heat loss from the body. Normally, the temperature is maintained at the constant level by some mechanisms in the body. It is by adjusting the heat production in accordance to heat loss. The major portion of heat produced in the body is due to the metabolism of food stuffs. It's called heat metabolism. Most of the metabolic reactions occur in liver. Heat production is more during metabolism of fat. About 9 calories of heat is produced during metabolism of fats, when 1 liter of oxygen is utilized.¹

DISCUSSION

According to Ayurveda formation of *Medodhatu* takes place in early embryonic period and after birth *Medodhatu* gets nourished from *Ahararasa* formed from digested part of food. Due to action of *Medodhatvagni* on nutrients of *Medodhatu*, *Poshya*, *Poshak Medodhatu* and *Mala* of *Medodhatu* (*Sweda*) are formed in *Medovaha Srotas*. Among these two *Poshka medodhatu* is mobile in nature; which is circulated in the whole body along with the *Rasa Rakta Dhatu*; to give the nutrition of *Poshya Medodhatu* (correlate with cholesterol or lipids). Second *Poshya Medodhatu* is immobile in nature; which is stored in *Medodharakala* (correlate with adipose tissue). *Poshya Medodhatu* gets stored at its own sites and performs its physiological functions. *Sweda* is the *Mala* of *Medodhatu* and it is formed in the metabolism of *Medodhatu*, hence *Medodhatu* control the process of *Sweda* formation. It insulates body by altering sweating process and maintenance body temperature but reduces the metabolism. The balance between energy intake (food consumption)

and energy expenditure (BMR, i.e. biochemical process required to maintain cellular viability, physical activity and adaptive thermogenesis) is tightly regulated.

According to modern Sweating is controlled from a center in the pre-optic and anterior regions of the brain's hypothalamus, where thermo-sensitive neurons are located. Regulations of energy balance is co-ordinate in the hypothalamus, which receives afferent signals that indicate nutritional status in the short term (ex-stomach hormone's ghrelin, which falls immediately after eating and rise gradually thereafter, to suppress satiety and signal that it is time for the next meal) and long term (ex- the adipose hormone leptin, which increases with growing fat mass and stimulates satiety). The nutrient in the meal is the absorbed and transported. It's used for fat synthesis and it storage in adipose tissue. During energetic demands storage fat is breakdown. For energy production heat loss is required, which is compensated by secreting sweat, because sweat gland of the skin plays an active part in the heat loss.



CONCLUSION

The human physiology depends on the balanced state of *Dosha*, *Dhatu* and *Mala*. *Doshas* are the main bio-energies which control all physiological activities. *Acharya's* described seven types of *Dhatu's* i.e. *Rasa-Rakta-Mamsa-Meda-Asthi-Majja-Shukra*. In seven *Dhatus*, *Medodhatu* is the fourth *Dhatu* of the body, which is derived from *Mamsa Dhatu* by the action of the *Mamsaagni* and *Aapya Mahabhoota*. Due to action of *Medodhatvagni* on nutrients of *Medodhatu*, *Poshya*, *Poshak Medodhatu* and *Mala of Medodhatu (Sweda)* are formed in *Medovaha Srotas*. Among these two *Poshka Medodhatu* is mobile in nature; which is circulated in the whole body along with the *Rasa RaktaDhatu*; to give the nutrition of *Poshya Medodhatu* (correlate with cholesterol or lipids). Second *Poshya Medodhatu* is immobile in nature; which is stored in *Medodharakala* (correlate with adipose tissue). *PoshyaMedodhatu* gets stored at its own sites and performs its physiological functions. *Sweda* is the *Mala of Medodhatu* and it is formed in the metabolism of *Medodhatu*, hence *Medodhatu* control the process of *Sweda* formation. In modern science during regulation of energy balance, is coordinated in the hypothalamus, which receives afferent signals that indicate nutritional status in the short term and long term. The nutrient in the meal is the absorbed and transported. It's used for fat synthesis and its storage in adipose tissue (white adipose tissue). During energetic demands storage fat is breakdown & produce energy. For energy production heat loss is required, which is compensated by secreting sweat, because sweat gland of the skin plays an active part in the heat loss. In this article, it's tried to establish relation between *Medodhatu* (lipid or fat) and *Sweda* in our body. Therefore, in obese people lots of sweating during a small work because of a large amount of deposit fat in their body, due to which excess heat loss for a small energetic demand which is compensate by sweating. Based on these facts it can be concluded that sweating may be use full in lipid management.

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