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**KRAMA PARINAMA OF DHATU: A NEW WAY OF APPROACH****HARIKRISHNA BN¹, PANKAJ KOTHARI², C.R. YADAV³**

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ABSTRACT:

Detailed knowledge of normal Human body is necessary to understand the health and diseases both. As per Ayurveda, the dosha, dhatu and mala are the basic things, upon which the physiology is dependent. Among these, Dhatu are the basic tissues which sustain and nourish our body continuously. The formation and nourishment of dhatu are explained by number of theories and attempts have been going on to understand them. Krama Parinama is one such theory which probably explains how actually a Dhatu is formed from its previous Dhatu in Post-natal life. There are few researches going on in the contemporary modern science regarding the multi potency of a tissue to form another tissue. Some of the Results of these give close hints towards the Krama Parinama mode of Dhatu formation. But these are only the hints but the clear picture can be obtained only when more number of researches give out fruitful outcomes.

KEY WORDS: *Dosha, Dhatu, Mala, Krama Parinama, Tissue.*

INTRODUCTION

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Shareera Vicaya i.e. Detailed knowledge of human body is helpful to understand the factors influencing the health. This is the reason, why it is widely appreciated in Ayurveda¹. Physiology of the body as per Ayurveda is a bush around *Dosha, Dhatu* and *Mala*. As the Root of a tree is a *Moola* during *Sambhava, Sthithi* and *Pralaya* for that tree, in the same way

Dosha, Dhatu and Mala are the *Moola* for *Shareera*². Though it is difficult to understand the physiology of body by means of these basic things, these are indeed very important to be understood to proceed way towards understanding pathology. Among these three, *Dhatu* are the anabolic compounds which sustain and nourish the body³. Even though it is said, whichever the substances in the body, which do sustainment and nourishment of body as *dhatu*⁴, literally *Dhatu* are only seven in number⁵. The formation and nourishment of *Dhatu* have been under so many queries as there is difference of opinion among the theories which are postulated to explain the nourishment of *Dhatu*. *Ksheeradadhinyaya*⁶, *Khalekapotanyaaya*⁷, *Kedarikulya nyaya*⁸ and *Ekakala dhatuposhana nyaya*⁹ are few important postulations popular in the *Samhita*, which explain the *Dahtuposhana* in their own style. Though, literally one can see the difference in the mode of nourishment of *Dhatu*, practically one can understand that all the modes of nourishment essentially take place in the

body. Among these *Khalekapota, kedarikulya* and *Eka kala dhatu poshana nyaya* explain purely the mode of nourishment, where as *Krama parinamapaksha* seems unique, which probably explains us the formation of new tissues in the post natal life.

MATERIALS AND METHODS

Available literatures of *Ayurveda* along with the commentaries were studied for the comprehensive understanding of the process of *Dhatu poshana*. Available information was also taken from various text books, research articles, journals and internet source based on availability and necessity, for the comprehensive understanding of the subject. All the information thus collected, were critically studied and analyzed and the discussion has been prepared. Here the attempt has been made to understand the *Krama parinamanyaya* of *Dhatu* in a better way based on the available research results which may be useful to understand the science.

DISCUSSION

KRAMA PARINAMA PAKSHA:

Our books of *Ayurveda* say that the root of *Dhatuposhana* is *Rasa*. This *Rasa* of course is not the first *Dhatu*, instead it is the essence of the food what we take i.e. *Poshaka*. From this *Ahararasa*, the first *Dhatu* i.e. *Rasa Dhatu* is formed (*Poshya*), and from *Rasa*, *Rakta* is formed, in this manner *Mamsa, Medha, Asthi, Majja* and *Shukra* are formed one by one by their respective previous *Dhatu*¹⁰. This is the base outline of the *Krama parinamanyaya*. Here *Krama* and *Parinama* refer to step wise nourishment and transformation from one *Dhatu* to other *Dhatu* respectively. This line of

transformation is just similar to the *Sankhya'svyavahara* of *Indriya, mana, buddhi* and *ahankara*¹¹.

Shukra Dhatu is the last *Dhatu* to be formed, i.e. it is the last product of the transformation. It means that it has all the other *Dhatu* transformed within it, which makes only it to be capable for reproduction not any other *Dhatu*. Another uniqueness seen in this mode of transformation is the dependency. That is, the increase or decrease in one *Dhatu* will be reflecting the same changes in the succeeding or preceding *Dhatu* too¹². This can be well understood with the example

of *Sthaulya*. In this, at first from *Ahararasa*, *Rasa Dhatu* is formed, from this *Rasa Dhatu*, *Rakta* is formed, from *Rakta*, *Mamsa* is formed. From this *Meda* is formed, where the actual pathology exists and here *Pratistrotanyaaya* comes in to existence. I.e. from *Meda*, *Visheshtahavruddhi* of *Mamsa* takes place, same mechanism continues till *Vishetahavruddhi* of *Rasa Dhatu* takes

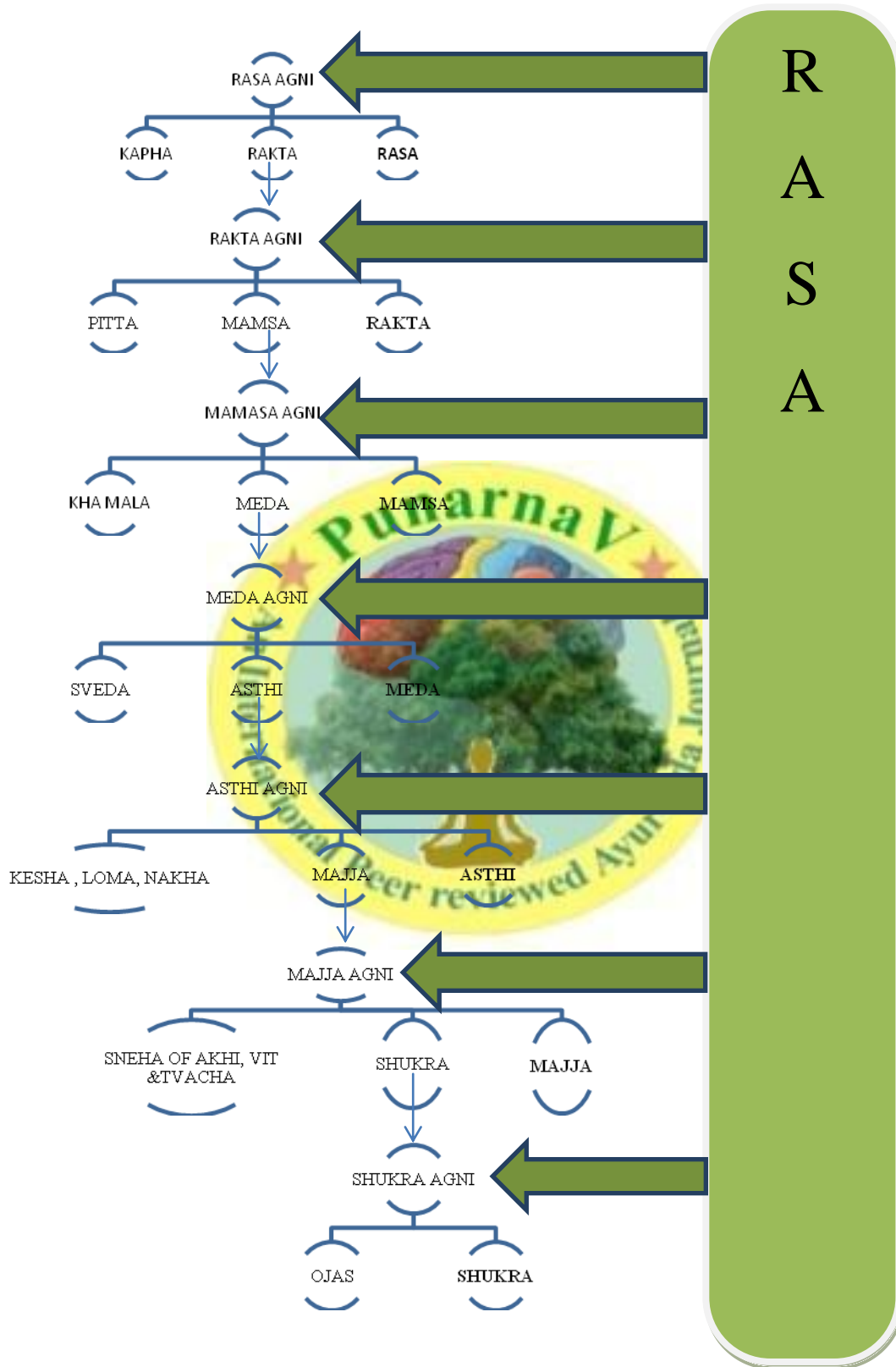
place. Again when *Rasa* is fully formed it leads to the excess formation of succeeding *Dhatu* till *Medo Dhatu*. Due to the *Avarana* or obstruction in the *Medodhatu*, formation of the *Asthi* and other two *dhatu* do not take place. That is why in case of *Staulya* only *Apyaayana* of *Medottaradhatu* takes place not the *Upacaya*¹³.

HOW EXACTLY PARINAMA TAKES PLACE?

There are so many queries regarding the exact mechanism of *Kramaparinama*. This is because of the name of the *Nyaaya* it is given with i.e. *Ksheeradadhi Nyaaya*. Some *Acharya* oppose this *Nyaaya* stating that, if the transformation of one *Dhatu* to another *Dhatu* takes just similar to the transformation of *Ksheera* in to *Dadhi* and so on, then the transformation is of complete type which implies that the *Uttaradhatu* is formed only after the complete transformation of the *Poorvadhatu* and the *Poorvadhatu* no more exists¹⁴, and also states that if a person goes for fasting for 1 month then the body would become *Shukramaya* and no other *Dhatu* exists¹⁵. This debate is true in a sense it has been argued, but the reality is not so. *Acharya Arunadata* clears this aspect by saying that, transformation is never a complete one¹⁶; it is just a precursor of the *Uttaradhatu* that is formed from the *Poorvadhatu*. And this is much clear when we look in to *Acharya Dalhana's* comments. He says that, *Parinama* of any *Dhatu* takes place in three forms i.e. formation of *Malabhaga*,

Sthula and *Anubhaga*. For example, after the *Agnipaka* of *Rasadhatu*, as a *Mala*, *Kapha* is formed, as a *Sthoolabhaga*, *Rasadhatu* is formed and *Anubhaga* of *raktadhatu* is formed¹⁷. This *Anubhaga* (minor part) itself can be termed as a precursor. This is what exactly is happening as a *Kramaparinama* of *Dhatu*, not the complete transformation. And there is a slight modification when it comes to the *Shukra Dhatu*, where the formation of *Mala* is not seen, as *Shukra Dhatu* is in utmost pure form, and *sookshmabhaga* is the *Ojas*¹⁸. In this way, the *Parinama* of *Dhatu* takes place by giving the precursor for a succeeding *Dhatu* by the help of *Dhatvagni*. Time duration for the completion of this mode of *Dhatu* formation varies, because it is chiefly dependent on *Agni*. I.e. If the *Agni* is *Teekshna*, the speed of the process resembles the velocity of light, if the *Agni* is *Madyama*, the velocity of this formation is similar to noise and if the *Agni* is *Manda* the velocity of process resembles that of water¹⁹. Based on this, the *Dhatu* formation is completed early or late.

KRAMA PARINAMA OF DHATU ALONG WITH RASA APYAYANA



RECENT RESEARCHES GIVING THE HINT OF KRAMAPARINAMA OF DHATU

Previously it was believed that fat tissue is a source of excess energy. But

now the researchers say that more than that fat tissue is also a source of certain

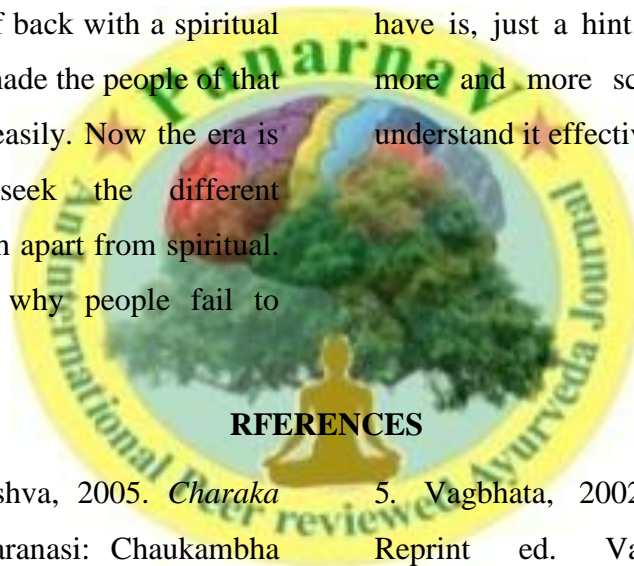
hormones²⁰. Leptin is one such hormone which is now believed to be involved in the formation of osteoblasts thus playing important role in bone homeostasis²¹. It is found that leptin receptors are found in osteoblasts, bone marrow stromal cells and chondrocytes²². It is demonstrated in Vivo that Leptin is involved in the formation of Osteocytes²³ by inhibiting osteoclastogenesis²⁴ and stimulating FGF₂₃(Fibrogen growth factor) secretion. Study says that intra peritoneal injection of Leptin in mice, increased the concentration of serum calcium and VitD₃ [1-25(OH)₂ D₃]²⁵. Probable Effects of Leptin is understood in 2 ways so far i.e. Central activation and direct effects²⁶. Leptin can cross blood brain barrier and activates its receptors at hypothalamus thus stimulating energy expenditure and osteoblast production²⁷. Addition to this peripheral administration of Leptin found to increase femoral length and bone mass²⁸. Study also has been done establishing the fact that circulating Leptin is involved in the increased bone mass in Pre and post-Menopausal women^{29, 30, 31}. Available data from animal models also suggest a possible link between BAT (Brown Adipose Tissue) and bone metabolism³². Even a study done involving a pediatric case says that, Brown adipose tissue besides its thermoregulation action has the capacity to differentiate in to osteoblasts, which is believed to be

mediated by Retinoblastoma³³. Other than this, a recent laboratory research has characterized a population of cells from adipose tissue, termed processed lipoaspirate (PLA) cells, which have multilineage potential similar to bone-marrow-derived mesenchymal stem cells (MSCs)³⁴. Leptin stimulates expression of cocaine amphetamine regulated transcript (CART) in the hypothalamus, inhibiting RANKL expression resulting in high bone mass by supporting the hypothesis of adipose tissue stimulating osteoblastogenesis³⁵. It can be assumed that adipose tissue exerts independent effects on bone remodeling by releasing a number of biologically active substances. Moreover, it seems that the main mechanism of action of these substances is closely related to the type and location of adipose tissue in the body³⁶. Here the outcome is that, Leptin of Adipose tissue is inducing the osteocyte production. This is almost similar to the concept of transformation from one *Dhatu* to another. The process of formation of osteoblast from adipose tissue through Leptin is nothing but transformation. Apart from this, a Research done on bone marrow stem cells show that, Spermatogonial cells are also formed from the bone marrow stem cells³⁷. Which once again gives the hint of *kramaparinama*.

CONCLUSION

Understanding Physiology is important for a medical person to be successful in his profession. In *Ayurveda*, the physiology is unique and without the thorough knowledge of this, it is tough to understand the further concepts. For any science to be alive, it needs updates from time to time. Ayurveda is a practical science and its concepts are still applicable. The problem lies in understanding the concepts. It was written thousands of years of back with a spiritual back ground which made the people of that era to understand it easily. Now the era is changed. People seek the different materialistic approach apart from spiritual. This is the reason why people fail to

understand most of the concepts of Ayurveda. In this era, understanding of some of the concepts like this is possible with the help of contemporary modern science. None of the concepts of *Ayurveda* was written without the applicability, it does have the applicability provided it is supported by a stream of researches. The process of Transformation of tissue is just an example to show how it can be understood in this era. At present what we have is, just a hint. It requires support of more and more scientific researches to understand it effectively and clearly.



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