

Correlating Three Germ Layers and Tridosha – A Conceptual Study

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ABSTRACT

Ancient ayurveda scholars like Charaka, Sushruta have described the development of Garbha (Embryo) as 'Garbhavkranti'. Thousands of years ago without help of microscope or ultrasound Sonography machines they have perfectly described the anatomical changes in the growth of embryo. The modern embryology describes the formation of three germinal layers in the 4th week to 8th week of development. We can correlate the three germ layers with tridosha. This correlation helps in better understanding of embryology and useful in treatment perspective.

Keywords: Tridosha, Garbhavkranti, Vata, Pitta, Kapha, Dosha

INTRODUCTION

Embryology is the science of the development of individual during the embryonic stage and by extension, in several or even all preceding and subsequent stages of life cycle [1]. The embryology is recently developed branch.

Charak, Sushruta have mentioned and described the development of Garbha as Garbhavkranti. Vata, Pitta and Kapha are together known as tridosha [2]. These tridosha run and control basic functions of body. Tridosha in equilibrium maintain health while when imbalanced they cause disease. Vata is most active of all and is responsible for all kind of movements in body [3]. Pitta is responsible for digestion, energy transformation, skin color and intellect [4]. Kapha is responsible for stability, oleation, binding properties in body [5].

After the fertilization the zygote divides and increases cell mass. After blastula stage it gets implanted in uterus. Cells are arranged in particular manner so outer cell mass and inner cell mass is seen. Later on embryo gets disc shaped, three layers are formed. The outermost layer is ectoderm, middle mesoderm and inner most is endoderm. All these three germ layers give rise to various organs and systems of the body.

In this study we will try to correlate tridosha and three germinal layers on the basis of germinal layer derivatives and sites and functions of dosha.

The development of embryo is also divided into three distinct layers. The unified egg cells divide into ectoderm, mesoderm and endoderm. The ectoderm relates to outer

covering and develops into nervous system and skin that are both influence by Vata. The mesoderm is the middle germinal layer develops into vascular system that includes blood vessels, heart, muscles, bone and urinary system that are primarily Pittaja in nature. European Journal of Pharmaceutical and Medical Research bone is frequently associated with some of its functions like managing red blood cell production through bone marrow can be correlated with Pitta. From the endoderm, the inner germ layer, comes the inner layer of the mucous membrane lined digestive tract, respiratory system and urinary system that are regulated by Kapha [6].

MATERIALS AND METHODS

Since this is a conceptual study, literature study was done regarding three germ layers, derivatives of germ layers and tridosha.

RESULTS AND DISCUSSION

The embryonic period extends from 4th week to 8th week of intrauterine life. This is the period when three germ layers

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gives rise to its own tissue and organ systems.

1. The outermost ectoderm layer gives rise to organs and structures that maintain contact with outside world.
 - a. Central nervous system
 - b. Peripheral nervous system
 - c. Sensory epithelium of Ear, Nose, Eye
 - d. Skin including nails and hair
 - e. Pituitary, Mammary, Sweat glands, teeth enamel

We can correlate ectoderm with Vata. All the systems and organs developed by ectoderm have functions controlled by Vata. Vata is responsible for all movements in body. All movements (voluntary and involuntary) are controlled by Central Nervous System & Peripheral Nervous System. Sense organs perceive specific senses and that knowledge is analyzed. All these functions are controlled by Vata. Skin is derivative of ectoderm. The one of site of Vata is skin. Also when vitiated Vata gives skin darkening. Hence we can correlate Vata and ectoderm.

2. The middle mesoderm gives rise to:
 - a. Vascular system
 - b. Urogenital system
 - c. Spleen
 - d. Adrenal glands
 - e. Subcutaneous tissue

This mesoderm can be correlated with Pitta. Vascular system, i.e., heart and blood vessels are derived from mesoderm. Hriday (heart) is the site of Pitta dosha. Pleeha (spleen) also site of Pitta which is developed by mesoderm. Adrenalin secreted by adrenal glands shows activity of courage/bravery in situations of 'Fight or Flight' which is said to be function of Pitta.

3. The innermost endoderm gives rise to:
 - a. Epithelial lining of Gastro Intestinal tract
 - b. Epithelial lining of Respiratory tract
 - c. Epithelial lining of Urinary bladder
 - d. Parenchyma of tonsils, thyroid, parathyroid, thymus, liver and pancreas

The endoderm can be correlated to Kapha dosha. The inner lining of gastro intestinal tract is endodermal in origin which secretes mucus. This can be correlated as Kledak Kapha. The respiratory system lining is endodermal and it is site of avalambak Kapha. Thyroid, Parathyroid, thymus are responsible for body growth. The growth is one of function of Kapha.

As above we can conceptually correlate these three germ layers with tridosha. Although all organs and systems are made up of tridosha, on the basis of function/activity we can correlate germ layer.

This concept can be useful in the cases of congenital anomalies. In cases where there is history of congenital anomaly we can look for type of it, the germ layer involved and hence dosha involved. For example in anomalies related to Central Nervous System we can consider it is due to vitiated Vata dosha as ectoderm correlates with Vata. So to avoid such anomalies in next case we can treat Vata in pregnancy especially in early trimester.

CONCLUSION

The three germ layers can be correlated to three dosha along the basis of germinal derivatives and functions with dosha functions and sites. We can conclude that the three germ layers correlate with tridosha. Ectoderm correlates to Vata, Mesoderm with Pitta and Endoderm with Kapha. This correlation can be useful for the prevention of congenital anomalies.

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