

**EXPLORING CELLULAR ADAPTATIONS THROUGH AYURVEDIC CONCEPTS: A
CORRELATIVE ANALYSIS****Dr. Gitanjali Aher*¹, Purva Rindhe²**¹Assistant Professor, Dept. of Roga Nidan Evam Vikriti Vigyan, Ashvin Rural Ayurved College, Manch Hill, Sangamner, Maharashtra.²2nd Year UG Student, Ashvin Rural Ayurved College, Manch Hill, Sangamner, Maharashtra.***Corresponding Author: Dr. Gitanjali Aher**Assistant Professor, Dept. of Roga Nidan Evam Vikriti Vigyan, Ashvin Rural Ayurved College, Manch Hill, Sangamner, Maharashtra. DOI: <https://doi.org/10.5281/zenodo.21018598>**How to cite this Article:** Dr. Gitanjali Aher*¹, Purva Rindhe². (2026). Exploring Cellular Adaptations Through Ayurvedic Concepts: A Correlative Analysis. World Journal of Pharmaceutical and Medical Research, 12(7), 136-138. This work is licensed under Creative Commons Attribution 4.0 International license.

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ABSTRACT

Cellular adaptation is a reversible response of cells to physiological and pathological stress. In modern pathology, types of cellular adaptations are hypertrophy, hyperplasia, atrophy, and metaplasia. Although Ayurveda does not describe these changes microscopically, they can be understood through the principles of *Dosha, Dhātu and Agni*. This paper aims to understand the concept of cellular adaptation described in modern pathology through Ayurvedic principles. This paper is a conceptual review based on classical Ayurvedic texts and modern pathology literature. The changes seen in cellular adaptation in modern pathology can be understood in Ayurveda through imbalance of *Dosha, Dhātu and Dhātvaṅni*. Hypertrophy is similar to *Dhātu Vrūddhi*, hyperplasia can be linked with *Vibhājana karma* of *Vata*, atrophy with *Dhātu Kshaya* and *Vata vrūddhi*, and metaplasia with abnormal tissue change caused by *Pitta* and *Dhātvaṅni Vikriti*. The cellular adaptations explained in modern pathology can be understood in Ayurveda through the concept of *Dhātu Vrūddhi, Dhātu kshaya*, and tissue transformation. Even though both systems use different terms and approaches, they describe similar ways in which the body responds to stress and disease. Understanding them together helps connect modern pathology with Ayurvedic principles and gives a broader view of disease.

KEYWORDS: Cellular adaptations, Ayurveda, *Dhātu Vrūddhi, Dhātu Kshaya, Vata, Pitta, Agni, Hypertrophy, Hyperplasia, Atrophy, Metaplasia*.**INTRODUCTION**

Maintenance of equilibrium at the cellular level is termed as cellular homeostasis in modern medicine. It refers to the balance between physiological processes within the cell. When cell is exposed to stress, injury, increased functional demand, or nutritional deficiency, cells undergo adaptive changes for survival.

If the stress is mild and temporary, adaptations are reversible. However, persistent or severe stress may lead to irreversible cell injury and death. The adaptive response may consist of an increase in the size and functional activity of cells (hypertrophy), an increase in cell number (hyperplasia), a decrease in the size and metabolic activity of cells (atrophy), or a change in the phenotype of cells (metaplasia). If the stress is

eliminated, the cell can return to its original state without having suffered any harmful consequences.^[1]

Even if Ayurveda does not describe microscopic pathology, it explains structural and functional changes through the concepts of *Doshā, Dhātu, Agni, and Srotas*.

*Samadosha samagnisha samadhatu malakriya
Prasanna atma indriya mana swasta iti abhidhiyate.*^[2]
- Su. Sutra 15/48

Disturbance in *Dosha–Dhātu–Mala Samya* and *Dhātvaṅni* leads to *Vikriti* (pathological state). Therefore, cellular adaptation can be understood as a microscopic manifestation of these Ayurvedic disturbances.

AIM

To understand the concepts of cellular adaptations described in modern pathology through Ayurvedic principles.

OBJECTIVES

- To understand the modern concept of cellular adaptation.
- To correlate cellular adaptations with concepts of *Dosha, Dhatu, and Agni*

REVIEW OF LITERATURE**Cellular Adaptation in Modern**

Adaptations are reversible functional and structural responses to changes in physiologic states and some pathologic stimuli, during which new but altered steady states are achieved, allowing the cell to survive and continue to function.^[1]

The major types include

Hypertrophy – Increase in size and functional activity of cell.

Hyperplasia – Increase in number of cells.

Atrophy – Decrease in size and metabolic activity of cells.

Metaplasia - Change in phenotype of cell

These adaptive mechanisms help maintain cellular homeostasis.^[1]

Ayurvedic Concept of Homeostasis

In Ayurveda, body's equilibrium is maintained by-

- *Dosha Samya*
- *Samagni*
- *Dhatu Samyata*
- *Mala Samyata*

If *Dhatvagni* becomes weak or disturbed and the *Dhatu's* do not get proper nourishment. Two types of changes can be seen-

- *Dhatu Vruddhi*
- *Dhatu Kshaya*

Therefore, due to imbalance of *Dhatvagni* and dominance of specific *Doshas* changes occur at tissue level.

CONCEPTUAL CORRELATION**Correlation of *Dhatu Vruddhi* with Hypertrophy**

Acharya Vagbhata says:

Sarvada sarvabhavanam samanya vrudhikaranam rasahetu visheshah cha pravrutirubhayasyatu.^[3]

- *Cha. Sutra 1/44*

This means that any *Dhatu* increases when it is exposed to similar qualities substances and it decreases when exposed to opposite qualities.

Hypertrophy means an increase in the size of individual cells, which causes the organ to become larger. This usually happens when there is continuous workload or

hormonal stimulation. In this process, the cells produce more proteins and structural material, but the number of cells does not increase.

If we compare both concepts, hypertrophy is similar to *Dhatu Vruddhi* because both describe an increase in tissue size due to repeated or continuous stimulation. Just as similar qualities increase a *Dhatu* in Ayurveda, continuous stress or demand makes cells grow bigger in modern pathology.

Therefore, hypertrophy can be understood as the microscopic form of *Dhatu Vruddhi*.

Correlation of Hyperplasia with *Vata Dosha*

Acharya Sushruta says

Vayu vibhajati...^[4]

- *Su. Sharir 5/3*

Above shloka tells that *Vata dosha* is responsible for *Vibhajan karma* (cell division) Hyperplasia means an increase in the number of cells due to increased cell division.

Since cell division (*Vibhajana*) is mainly controlled by *Vata dosha*, hyperplasia can be related to increased activity of *Vata*. Also, *Kapha* helps in forming and supporting the extra tissue that develops.

Thus, hyperplasia can be understood as increased cell growth mainly caused by *Vata*, with *Kapha* helping to build and maintain the new tissue.

Correlation of Metaplasia with *Pitta* and *Dhatvagni Vikrti*

Acharya Vagbhata says

Swasthansthasya kayagnernsha dhatushu sanshrita tesham sadatidiptibhyam dhatuvruddhikshyaudhbhava.^[5]

- *Ashtang. Hridaya Sutra 11/34*

Dhatvagni derived from *Kaya Agni* controls the normal state of the *Dhatu*s. If *Dhatvagni* becomes weak or too strong, it can cause abnormal changes in the tissues. Metaplasia means one type of mature cell is replaced by another type of mature cell, usually because of long-term stress or irritation.

Since *Pitta* is responsible for transformation and metabolism in the body, any disturbance in *Pitta* (*pachak pitta*) especially *prakopa* can lead to abnormal tissue changes.

Thus, metaplasia can be understood as an abnormal transformation of tissue caused by disturbed *Dhatvagni*, mainly influenced by increased *Pitta*.

Correlation of *Dhatu Kshaya* with Atrophy

Acharya Charaka describes as:

Sarvada sarvabhavanam samanya vrudhikaranam rasahetu visheshah cha pravrutirubhayasyatu.^[3]

- *Cha. Sutra 1/44*

Atrophy, defined in modern pathology as the reduction in size and function of cells or tissues, can be correlated in Ayurveda with the concept of *Dhatu Kshaya* (depletion of body tissues). The fundamental principle explaining *Dhatu kshaya* in *Charaka Samhita* which states that substances possessing similar qualities cause increase, whereas those with opposite qualities lead to decrease. When tissues are deprived of proper nourishment or exposed to opposing factors, *Dhatu Kshaya* occurs, which results in structural and functional decline comparable to atrophy.

Vayudhatukshayat kopo marmasyavranena cha.^[6]
- *Cha. Chikitsa* 28/59

Furthermore, *Acharya Charaka* explain that *Dhatu Kshaya* leads to *Vata Vriddhi*, Increased *Vata* is characterized by properties such as *Ruksha* (dryness) and *Laghu* (lightness) and promotes degenerative and wasting processes within tissues. Thus, the combined concepts of *Dhatu Kshaya* and *Vata Vriddhi* provide a theoretical Ayurvedic framework for understanding the pathological process of atrophy. Therefore, atrophy can be understood as the microscopic form of *Dhatu Kshaya*.

DISCUSSION

Modern pathology explains cellular adaptation at microscopic level, whereas Ayurveda explains tissue changes through *Dosha*, *Dhatu*, and *Agni* imbalance.

1. Hypertrophy - *Dhatu Vriddhi*
2. Hyperplasia - *Vata Vibhajana*
3. Atrophy - *Dhatu Kshaya* and *Vata Vriddhi*
4. Metaplasia - *Pitta-Dhatvagni Vikriti*

So, even though modern and Ayurveda use different terms, the basic idea is similar, both explain how the body adapts or changes during stress or disease.

CONCLUSION

Cellular adaptations seen in modern pathology can be understood as microscopic changes and the same changes in Ayurveda are explained through *Dosha*, *Dhatu* and *Agni* imbalance. What modern science observes as changes in cells, Ayurveda explains as changes in body tissues and metabolism.

So, both systems describe similar processes in different ways. Understanding them together helps better to connect between modern pathology and Ayurveda and improves overall understanding of disease.

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