



International Journal of Health Care and Biological Sciences

Review Article

Open Access

Interstitial: New Shock Absorbers in Human Body

Dr.Sd. Abdul Jabbar Basha^{1*}, Dr.K.Venkata Ramana², Nagalakshmi³.¹ Department of Pharmacology, Associate Professor, ASN Pharmacy College, Tenali, Andhrapradesh, India² Department of Pharmacy, Professor and Principal, ASN Pharmacy College, Tenali, Andhrapradesh, India.³ Department of Pharmacy Practice, Pharm D IVth Year, ASN Pharmacy College, Tenali, Andhrapradesh, India.

Article History	Abstract
Received on: 28-01-2021 Revised On : 16-02-2021 Accepted on : 19-02-2021	A group of fluid-filled compartments researchers has termed the "interstitium". This looks like a mesh with the network of skin, gut, lungs, blood vessels, and muscles with a strong flexible protein. The interstitium is the largest organ of the body which has been unnoticed. The teams of the invention say that compartments may act as "shock absorbers" that protect body tissues from damage. They realized the interstitium layer drains into the lymphatic system which may also spread cancer as a noticed side effect – the network of vessels transporting lymph, which is involved in the body's immune response and providing a way for fluid to move around the body.
Keywords: Interstitium, shock absorbers, immune response.	
DOI: https://doi.org/10.46795/ijhcbcs.vi.133	

© 2021 Puoduced by South Asian Academic Publications. This is an open access article under the CC BY license (<https://creativecommons.org/licenses/by/4.0/>)

*Corresponding Author

Dr. Sd. Abdul Jabbar Basha
Associate Professor
Department of Pharmacology
ASN Pharmacy College, Tenali
Email: basha.rv20@gmail.com

Introduction

The human body contains huge amounts of fluid. More than half of this is found within the cells, and another seventh inside the heart, blood vessels, lymph nodes, and lymph vessels. The rest is known as interstitial. Now, researchers say the network that carries this interstitial fluid is its distinct organ. And, it may even be one of the largest organs in the body. The interstitium is made up of both strong (collagen) and flexible (elastin) connective tissue proteins, with interstitial fluid moving throughout. The system drains into the lymphatic system and is said to be the source of lymph, which is vital to the functioning of inflammation-causing immune cells. The discovery was made with the help of a new imaging technique called

probe-based confocal laser endomicroscopy. It allowed them to examine living tissues on the microscopic level

without the fluids drying out. A further study examined tissue specimens of bile ducts from 12 cancer patients. When the same structure was recognized in each, it also led to the discovery that it exists throughout the body as a shock absorber surrounding places where tissues subjected to force or even moved. The interstitium is a contiguous fluid-filled space existing between a structural barrier, such as a cell wall or the skin, and internal structures, such as organs, including muscles and the circulatory system [1-2]. The fluid in this space is called interstitial fluid, comprises water and solutes, and drains into the lymph system [2]. The interstitial compartment is composed of connective and supporting tissues within the body – called the extracellular matrix – that is situated outside the blood and lymphatic vessels and the parenchyma of organs.

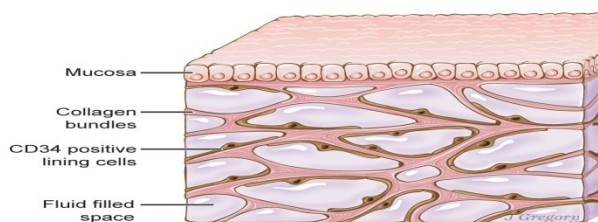
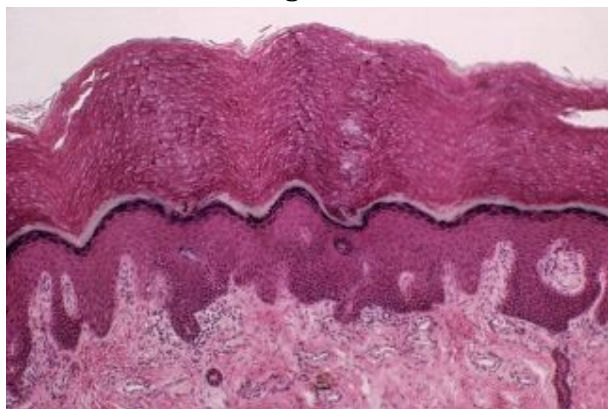
**Fig: 01****Fig: 02**

Fig 01 and 02: Fluid-filled spaces, in the body's connective tissue, including in the skin's dermis, which is shown above as the light pink layer at the bottom of this image.

The non-fluid parts of the interstitium are predominantly collagen types I, III, and V, elastin, and glycosaminoglycans, such as hyaluronate and proteoglycans that are cross-linked to form a honeycomb-like reticulum. Such structural components exist both for the general interstitium of the body, and within individual organs, such as the heart and kidney. The interstitium in the submucosae of visceral organs, the dermis, superficial fascia, and perivascular adventitia are fluid filled spaces supported by a collagen bundle lattice. The fluid spaces communicate with draining lymph nodes though they do not have lining cells or structures of lymphatic channels.

The interstitial fluid is a reservoir and transportation system for nutrients and solutes distributing among organs, cells, and capillaries, for signaling molecules communicating between cells, and for antigens and cytokines participating in immune regulation. The composition and chemical properties of the interstitial fluid vary among organs and change chemical composition during normal function, as well as during body growth, conditions of inflammation, and development of diseases, as in heart failure and chronic kidney disease. The total fluid volume of the interstitium during health is about 20% of body weight,

but this space is dynamic and may change in volume and composition during immune responses and in conditions such as cancer, and specifically within the interstitium of tumors. The amount of interstitial fluid varies from about 50% of the tissue weight in the skin to about 10% in skeletal muscle. It's long remained undetected due to dependence on the field's dependence on the examination of fixed tissue on microscopic slides, according to the researchers. In this process, the tissue is sliced into thin strips and dyed to highlight certain features [1].

Areas of the interstitium, previously interpreted either as unassuming "spaces" between bordering tissues or as densely-packed walls of fibrous tissue, were found to be networks of connective tissue filled mostly with fluid. This allows these areas to function as "shock absorbers" for nearby organs which routinely stretch and compress in daily function -- like the lungs, GI tract, bladder, and muscles. Based on a unique structure in which surrounding tissues directly touch this fluid-rich space (rather than encountering a barrier of dense connective tissue or cells), scientists proposed that the interstitium may enable the early spread of cancers via the body's lymphatic system, a process which is currently not well understood [2].

This mechanism may solve the mystery of cases in which the cancer is found to have spread to a nearby lymph node -- without evidence that it ever invaded the neighboring lymphatic vessels on the way there. Further research is expected to help researchers understand why some cancers (particularly melanoma, breast, lung, and gastrointestinal tumors) spread through the lymphatic system rather than the bloodstream, how to detect this spread early, and how to prevent them from doing so in the first place [3].

The cells lining the fluid and fibers of the interstitium are also unique -- they most closely resemble collagen-producing cells. Researchers suggest that these cells likely respond to mechanical forces surrounding a surgical wound or injury, and act in the process of wound healing and scar formation. Of particular interest is whether these cells contribute to the development of auto-immune conditions that cause scarring (or "fibrosis") of involved organs, such as scleroderma or inflammatory bowel disease. They also have a potential role in the formation of keloids or exaggerated scars that form underneath the skin's surface [1,2,3].

Conclusion

The human body is about 60 percent water. About two-thirds of that water is found inside cells, but the other third is outside cells and is known as "interstitial" fluid. Although researchers already knew that there is fluid between individual cells, the idea of a larger, connected interstitium — in which there are fluid-filled spaces within tissues — had been described only vaguely in the literature, Theise said. The new study, he said, expands the concept of the interstitium by showing these structured, fluid-filled spaces within tissues, and is the first to define the interstitium as an organ in and of itself. The imaging technique indeed showed the fluid-filled spaces in the connective tissue. When the tissue samples were removed from the body, they were quickly frozen, which allowed the fluid-filled spaces to stay open so the researchers could see them under a microscope. The fluid-filled spaces may act as shock absorbers to protect tissues during daily functions.

Author Contribution

All authors are contributed equally

References

1. Meet Your Interstitium, A Newfound 'Organ' By Rachael Ratter March 27, 2018.
2. Independent-UK'S largest news brand.
3. Study of interstitium in the Wikipedia.