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Jung Weon Lee

Editor of

Journal of Pharmaceutical Care & Health systems

- He got a Ph.D. degree in Pharmacology, from Department of Pharmacology, University of North Carolina at Chapel Hill, NC, USA. He is currently a professor at Department of Pharmacy, Seoul National University, Seoul, Korea (Republic of). His research interests in signal transduction of membrane proteins including integrin, tetraspanin, growth factor receptor, and others, which are involved in cell adhesion, morphology, migration, and invasion through activations of diverse intracellular signaling connections. More specifically, he has published reports on fibrotic and tumorigenic roles of a tetraspanin TM4SF5 that can collaborate with integrins and growth factor receptors for diverse cellular functions for tumorigenesis and metastasis. For the researches, he uses *in vitro* cell cultures in 2D or 3D ECM-surrounded system, animal system, and clinical tissues. The key words for his researches can include cancer, signal transduction, cell adhesion, actin organization, migration, invasion, 3D environment, metastasis, and epithelial-mesenchymal transition.

Biography

Signal transduction of membrane proteins including integrin, tetraspanin, growth factor receptor, and others, which are involved in cell adhesion, morphology, migration, and invasion through activations of diverse intracellular signaling connections.

Research Interests

- **Lee JW (2014) The biological significance of TM4SF5-mediated epithelial-mesenchymal transition. In preparation**
- **Kim S and Lee JW (2014) Membrane proteins involved in epithelial-mesenchymal transition and tumor invasion; studies on TMPRSS4 and TM4SF5. Submitted**
- **Y-J Choi*, H-H Kim*, H-J Kim, M Kang, M-S Lee, J Ryu, HE Song, SH Nam, D Lee, K-W Kim, and Lee JW (Co-corresponding authors). TM4SF5 suppression disturbs integrin $\alpha 5$ -related signaling and muscle development in zebrafish. Submitted. * equally contributed.**
- **J Ryu, M Kang, M-S Lee, H-J Kim, SH Nam, HE Song, D Lee, and Lee JW (Corresponding author). Cross-talk between the TM4SF5/FAK and IL6/STAT3 pathways controls invasion and immune escape of human liver cancer cells. In Revision**
- **M Kang, J Ryu, D Lee, M-S Lee, H-J Kim, SH Nam, HE Song, J Choi, G-H Lee, H Lee, SJ Kim, S-G Ye, S Kim, and Lee JW (Corresponding author) Correlations between TM4SF5, CD151, and CD63 in Liver Fibrotic Phenotypes and Hepatic Migration and Invasive Capacities. Submitted**
- **M-S Lee, S Kim, BG Kim, C Won, SH Nam, S Kang, H- Kim, M Kang, J Ryu, HE Song, D Lee, S-K Ye, NL Jeon, NH Cho, and Lee JW (Corresponding author). Snail1 induced in breast cancer cells in 3D collagen I gel environment suppresses cortactin and impairs effective invadopodia formation. In Revision**
- **Min H-J, Lee MK, Lee JW, and Kim S (2014) TMPRSS4 induces cancer cell invasion through pro-uPA processing. *Biochem. Biophys. Res. Commun.* doi: 10.1016/j.bbrc.2014.01.013.**

Recent Publications

SIGNAL TRANSDUCTION

Cell-Cell Interactions

- For a coordinated function of cells in a tissue, tissues in an organ, organs in a system and systems in the body, cells need to be able to communicate with each other.
- Each cell should be capable of sending chemical signals to other cells and of receiving chemical signals from other cells, as well as signals (chemical or other) from its immediate environment.

- A cell can communicate signals to other cells in various ways.
- **Autocrine signaling**
- **Paracrine signaling**
- **Endocrine signaling**
- **Direct signaling**
- **Synaptic signaling**

Autocrine signaling

- is a way for a cell to alter its own extracellular environment, which in turn affects the way the cell functions. The cell secretes chemicals outside of its membrane and the presence of those chemicals on the outside modifies the behavior of that **same cell**. This process is important for **growth**.

Paracrine signaling

- is a way for a cell to affect the behavior of **neighboring cells** by secreting chemicals into the common intercellular space. This is an important process during **embryonic development**.

Endocrine signaling

- **utilizes hormones.** A cell secretes chemicals into the bloodstream. Those chemicals affect the behavior of **distant target cells.**

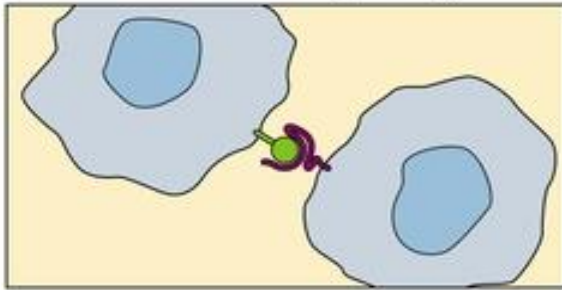
Direct signaling

- is a transfer of ions or small molecules from **one cell to its neighbor through pores in the membrane**. Those pores are built out of membrane proteins and are called **gap junctions**. This is the **fastest mode** of cell-cell communication and is found in places where extremely fast and well-coordinated activity of cells is needed. An example of this process can be found in the **heart**. The muscle cells in the heart communicate with each other via gap junctions which allows all heart cells to contract almost simultaneously.

Synaptic signaling

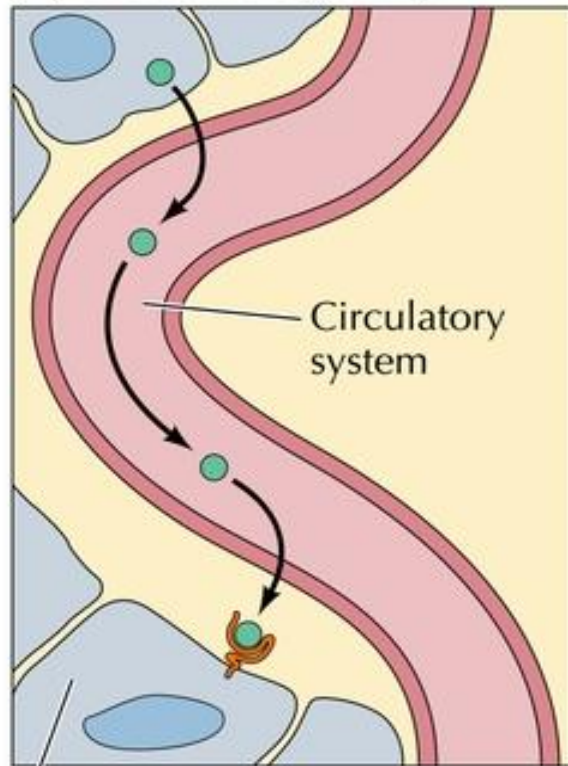
- is found in the **nervous system**. It is a highly specific and localized type of paracrine signaling between **two nerve cells** or between **a nerve cell and a muscle cell**.

Direct Cell-Cell Signaling



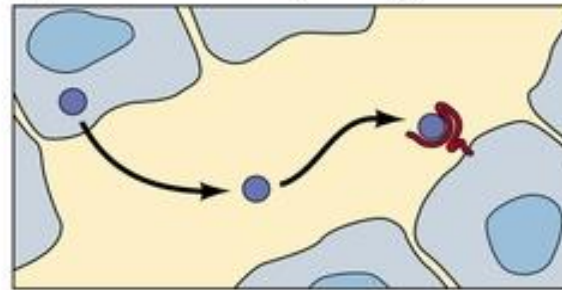
Signaling by Secreted Molecules

(A) Endocrine signaling

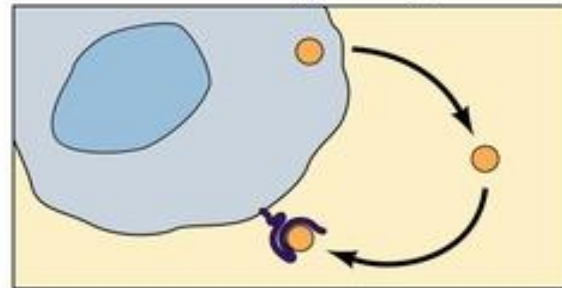


Target cell

(B) Paracrine signaling



(C) Autocrine signaling



Target cells

Specific cells are affected by hormone and respond in unique fashion:

- Cells have specific receptors on membrane or in cell that respond to hormone
- Can have receptors for several different hormones
- Number of active receptors can change
 - ▣ Down-regulation - number of receptors decreases & target is less sensitive
 - ▣ Up-regulation - number increases & target is more sensitive

How does a cell receive a signal?

- Some small molecules are capable of entering the cell through the plasma membrane.
- Some small hormones also enter the cell directly, by passing through the membrane. Examples are steroid hormones and thyroid hormones.

Approved By

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