

Creating Mechanism of Cell-to-Cell Communication

KEN-ICHIRO OGAWA and YOSHIHIRO MIYAKE

*Department of Computational Intelligence and Systems Science,
Tokyo Institute of Technology
k-ogawa@miyoshipat.co.jp, miyake@dis.titech.ac.jp*

In a variety of technological fields such as computers, distributions, transportations and many more, the recent trend towards huge systems has made it essential to construct controllable autonomous decentralized systems. The self-organizing phenomena of multicellular organisms have always served as a major guideline for modeling autonomous decentralized systems. In this situation, “re-differentiation of cancer cells” has recently known as an interesting phenomenon that cancer cells return to normal ones when the cancer cells are transplanted into the womb of a female mouse. The phenomenon leads us to several new findings to self-organizing mechanisms of multicellular organisms. The most important thing in these findings is to recover communication between “different kinds” of cells via extracellular environment. Therefore, to study how cancer cells recover relationships with the surrounding normal cells is an exciting challenge for investigating creating mechanisms of cell-to-cell communication. In the present research, we have theoretically studied creation mechanisms of cell-to-cell communication, based on the knowledge about the re-differentiation phenomenon of cancer cells. In this seminar, using our idea “the compensation field” that mediates signal transmitting in communication between different kinds of cells we will discuss roles of such a field in several situations of cell-to-cell communication.