

**Inhibitory effects on the growth of cancer cells using surface topography**

**Masaru Tanaka**

(Tohoku University, Institute of Multidisciplinary Research for Advanced Materials,  
Associate Professor)

**【Outline of survey】**

Three-dimensional (3D) porous scaffolds fabricated from biodegradable polymers have widely been used as temporary extracellular matrices, and play critical roles in tissue engineering. We have already known that nano-micro patterns on the surface of the scaffold have significant influences on the morphology, proliferation, differentiation and functions of various normal cells. However, effects of the scaffolds on cancer cells are not known yet. We have reported a honeycomb-patterned polymer film (honeycomb film) with highly regular pores that is formed by self-organization. The honeycomb films exerted a strong influence on cell morphology, proliferation, cytoskeleton, focal adhesion, and ECM production profiles. On the other hand, we have found the growth inhibition on the honeycomb film. In this study, we will examine the influence of the surface topography on the behavior of cancer cells, such as cell adhesion, detachment, cell-cycle, and motility on the honeycomb films as well as on a flat film in order to clarify the growth inhibition of cancer cells and how the cell recognize the surface topography.

**【Expected results】**

The design of nano- and microstructures based on self-organization would be a key area of research in the search for new materials, and it has a variety of potential applications in cancer and tissue engineering scaffolds. These results would have the potential benefit of honeycomb film in cancer research. This is the first study to propose novel concept of anti-cancer strategy using surface topography.

**【References by the principal investigator】**

- M. Tanaka, A. Takyama, E. Ito, H. Sunami, S. Yamamoto M. Shimomura, Effect of pore size of self-organized honeycomb-patterned polymer films on spreading, focal adhesion, proliferation, and function of endothelial cells, *J. Nanosci. Nanotech*, 7, 763-772, 2007.

**【Term of project】** FY2008—2012

**【Budget allocation】**

**74,500,000 yen** (direct cost)

**【Homepage address】**

<http://poly.tagen.tohoku.ac.jp/Site/Top.html>