Design of Novel 2D and 3D Biocompatible Surfaces to Control Cell functions

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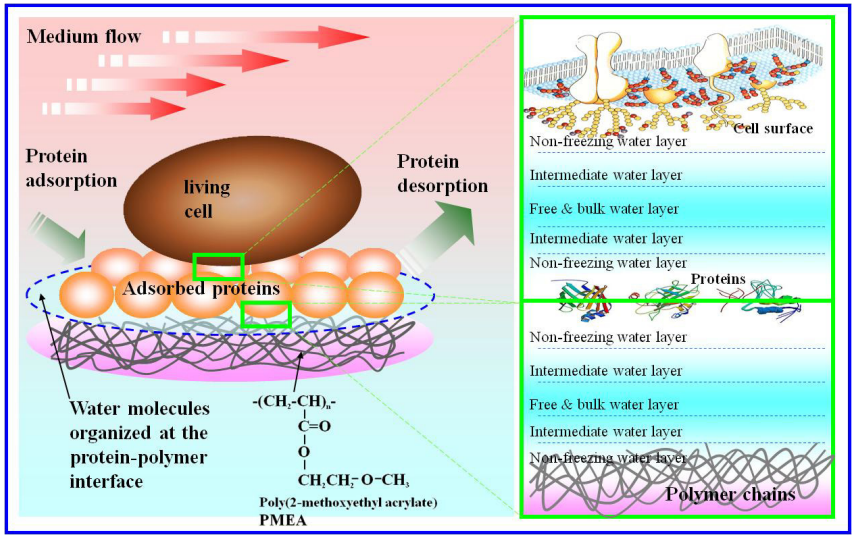
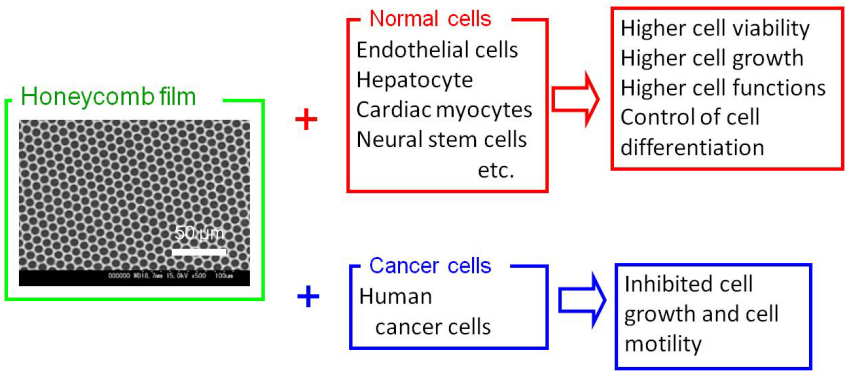


Schematic representation of the PMEA and cell interface



Cell behavior on the honeycomb films
Cell morphologies and specific functions were greatly influenced by topography of the patterned film

Content:

The design of biocompatible 2D surfaces and 3D nano/micro topographies based on self-organization has a variety of potential applications in medical devices and tissue engineering. We have reported that biocompatible 2D surface using poly(2-methoxyethyl acrylate) (PMEA) and honeycomb-patterned 3D films with regular interconnected pores that is formed by self-organization. It is expected that surfaces will have great potentials as biomaterials for tissue regeneration in a growth factor free proliferation process of stem cells.

We have been focusing on 1) the reasons for this compatibility by comparing the structure of water in hydrated PMEA to the water structure of other polymers and 2) the reasons that honeycomb films exerted a strong influence on normal, cancer and stem cells morphology, proliferation, differentiation, cytoskeleton, focal adhesion, and functions including matrix production profiles.

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