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ROS-induced cell sheet delivery method based on photofunctional polymer film**Min-Ah Koo, Mi Hee Lee, Gyeong Mi Seon, Seung Hee Hong and Jong-Chul Park**

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Cell transplantation is one of the promising technologies for the repair and regeneration of damaged tissues. Previous approaches have been applied the direct injections of cell suspensions and the implantation of biodegradable three-dimensional scaffolds seeded cells. However, these treatments have limits due to poor localization of the injected cells and insufficient delivery of oxygen and nutrients to cells, host inflammatory reactions by scaffolds. Cell sheet engineering was recently proposed as a new approach transplanting cell sheets to the lesion without scaffolds. To harvest cultured cell sheets, most studies has focused on culture surface property variations (e.g. wettability, pH, electricity, magnetism). Photodynamic action causes production of reactive oxygen species (ROS) by interaction of light with photosensitive agents and oxygen. This study investigated ROS-induced cell detachment system to transfer cell sheet directly at target area without harvesting procedure. To produce exogenous ROS, a photosensitizer-

immobilized polymer film was prepared by spin coating method. Treatment of green light to activate photosensitizer contained in the film generates ROS, which in turn causes cell sheet detachment from the film. We have found optimum conditions to detach an intact cell sheet with extracellular matrix (ECM) protein. This method is capable of efficiently transplanting cells in a simple process, by contacting the cultured film with the lesion where the cell is to be delivered and irradiating light. Also, the study demonstrated in vivo efficacy of applying this approach to subcutaneous tissues of nude mice. Therefore, the study indicates that ROS-induced method for cell sheet transplantation has potential application in tissue engineering.

Speaker Biography

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