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Photothermal effect of conjugated polymer surfaces for harvesting of live cell sheets

The photothermal conversion in conductive polymers has been attracted as the important phenomena to generate heat for bio engineering as well as energy harvesting. In particular, the harvesting of living cell and cell sheet via NIR photothermal effect is of great interest in wide research area including cell therapy, transplantation, tissue engineering and regenerative medicine. In our experiments, the local heating of conductive polymer film or nanoparticles, via NIR photothermal effect of polymers, allowed to stimuli proteins that are interfaced between adherent cells and polymer surface. A collagen layer was coated on a conductive polymer surface prepared from poly (3, 4-ethylenedioxythiophene)s (PEDOT). The NIR photothermal effect of PEDOT surface induced unfolding of collagen triple helices, yielding soluble collagen structures. This dissociation of collagens provided a fast harvesting method of a living cell sheet, within few minutes of NIR irradiation. Using a systematic optical set-up, harvesting of a large area cell sheet and patterned cell sheets were achieved. Effect of the structure and composition of the conducting polymer films on the photothermal conversion as well as harvesting of cell sheets will be discussed.

Biography

Eunkyoung Kim has completed her PhD from University of Houston. She is the Director of Active Polymer Center for Pattern Integration (APCPI), an engineering research center of excellence in Korea. She has published more than 170 papers in reputed journals and was awarded the Doctor honoris causa of École Normale Supérieure de Cachan.

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