Cell-Detachment from Plamonically Active Polyethylene Terephthalate (PET) Subtrates by Application of Near-Infrared Light

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Cell culture is a multibillion dollar industry with applications in a wide range of fields. Currently there is a need for cheap, efficient and non-damaging methods to detach cells from cell culture substrates. Plasmonically active gold surfaces are particularly useful in this regard as they can be utilized to efficiently induce cell detachment via the application of near-infrared light.[1] In this work, PET substrates have been rendered plamonically active with the aim of fabricating cell culture device. Arrays of gold nanoseeds have been formed using block co-polymer micelle nanolithography and from these, anisotropic gold nanostructures have been grown via the reduction of gold chloride in solution. The resulting substrates show broad plasmon bands in NIR region of light as evidenced by UV spectroscopy. HeLa cells have been successfully grown on these substrates and detached under the application of 980 nm light. Once the conditions for the efficient detachment of a wide variety of cells has been determined it is planned that this process will be scaled-up to allow existing cell culture devices, such as T-flasks and roller bottles, to be rendered plamonically active for facile cell harvesting post cell-culture. Furthermore, additional methods to fabricate plasmonics surfaces using alternative cell culture substrates will be explored.

References

[1] Juan J. Giner-Casares, Malou Henriksen-Lacey, Isabel García, Angew Chem Int Ed Engl. 55 (3) 2016, 974–978

Figures

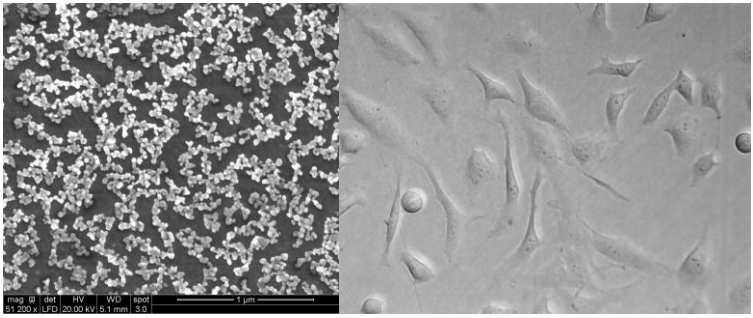

Figure 1: SEM image of anisotropic gold nanostructures grown on PET (left). Optical microscopy image of HeLa cells grown on plasmonically active PET substrates (right).