

Hydrogel with Hyaluronic acid modified gold nanoparticle for Augmentation of biohybrid robot Motion Performance

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The biohybrid robot has much attention for development a biological applications such as drug screening platform. Enhanced motion of Skeletal muscle cell is one of the important parts for biohybrid robot. In this study, to increase the motion of the skeletal muscle cell, extracellular matrix (ECM) and hyaluronic acid (HA) modified gold nanoparticle (HA@GNP) was applied to skeletal muscle cell for fabrication of muscle bundle (HA@GNP/muscle bundle). To fabricate the HA@GNP/muscle bundle, HA@GNP was synthesized using thiol modified HA for immobilization to GNP. The HA@GNP/muscle bundle indicated high motion performance than muscle bundle without HA@GNP. Polydimethylsiloxane (PDMS), fabricated by using 3D printer, was used as a supporting structure for biohybrid robot. Developed biohybrid robot showed highly enhanced forward motion performance of through the HA@GNP/muscle bundle contraction. The proposed biohybrid robot can be applied to drug screening platform. Acknowledgments: This research was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIT) (No. 2019R1A2C3002300) and by Ministry of Science and ICT(NRF-2021M3H4A1A01079399).