

Post-synthesis functionalized hydrogel microparticles for multiplexed miRNA assay

임용준, 노윤호, 이현지, 문현준¹, 김선민², 봉기완^{1,†}

고려대학교; ¹고려대; ²서울대학교 보라매병원

(bong98@korea.ac.kr[†])

miRNAs play an important role in post-transcriptional regulation of gene expression and represent distinct expression patterns in diseases. Recently, encoded hydrogel particles have gained much attention because these particles enable high performance multiplexed miRNA assays. However, due to the low conversion of hydrogel synthesis reaction, current microparticles can incorporate only about ~10% of input ssDNA probes. Here, we present novel post-synthesis functionalized hydrogel microparticles that outperform the current particle-based miRNA assay. Based on the discovery that hydrogel microparticles contain unconverted, yet reactive double bonds inside the network, we covalently anchored ssDNA probes after the particle synthesis. With this method, the probe density increased about 8.2 times compared to that of conventional particles. We demonstrate that the increased probe density leads to a better assay capability. We also show a potential application of the post-synthesis functionalized hydrogel microparticles by conducting multiplexed miRNA detections in human plasma samples.