

RNA Three-Way Junction on Ag@Bi₂Se₃ for Neuroblastoma Differentiation

이찬용, 김동연, Mohsen mohammadnaei, 최정우[†]
서강대학교
(jwchoi@sogang.ac.kr[†])

Nanoparticle-based cell differentiation therapy has gained huge attention as a promising alternative to traditional cancer treatments. Biocompatibility and plasmonic features were remarkably represented by the topological insulator bismuth selenide nanoparticle (Bi₂Se₃ NP) was core-shelled with silver (Ag@Bi₂Se₃). Moreover, the newly developed RNA three-way junction structure (3WJ) was designed for the quad-functionalization of nanoparticle and surface. One leg of the 3WJ was attached to the Ag@Bi₂Se₃, another leg to RNA with fluorescence tag, and the other leg was assigned to inhibit microRNA-17 (miR-17) and to release retinoic acid (RA). This new drug delivery system was developed based on the slow release of RA through inhibition of miR-17 within cytosol. A simple method to solve the hydrophobicity challenges of RA was reported through a stimulus-responsive cross-linker. The developed nanobio hybrid material could completely differentiate SH-SY5Y cancer cells into neurons and stop their growth in 6 days without sequential treatment. The fabricated nanobiohybrid material can be a new platform in the fabrication of different diagnostic/therapeutic agents.