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Development of Theranostic Nanoparticles for Cancers

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Cancer is the leading cause of death in Thailand. Despite advances in cancer research during the past decades, the survival of cancer patients has only marginally improved and the cure remains unlikely. Complex genomic heterogeneity and limited drug delivery represent major obstacles for effective antineoplastic treatments. Thus, new therapeutic strategies to increase drug delivery may improve outcome for cancer patients. Among several approaches, nanoparticle conjugate is a promising modality with distinct characteristics that are favorable for cancer drug delivery. Nanoparticles can be developed not only to improve drug delivery, but also to offer diagnostic and monitoring capabilities. This emerging molecular platform is called "theranostics". Theranostic nanoparticles include liposomes, micelles, dendrimers, nanospheres and others. These particles can protect drugs and deliver them to targets in a controlled manner. In addition, they can be decorated with "molecular antennae"such as antibodies or aptamers on their surface to allow specific interaction with targets of interest. During this presentation, current collaborative research efforts between NANOTEC and Faculty of Medicine Siriraj Hospital, Mahidol University exploiting nanoparticles to target brain, liver, colorectal, breast and gynecologic cancers will be discussed.

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