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TITLE

Creation of Drug-binding Modified DNA Aptamers as a Novel Class of Drug Carriers

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Many compounds with potent antitumor activity have been discovered; however, to date, no compound has been found that acts only on cancer cells. Therefore, the development of methodologies to maximize favorable drug effects and minimize adverse effects is currently desired. Development of drug delivery systems (DDS) is expected to be one of the solutions to this problem. Recently, use of DNA aptamers as drug carriers has emerged as a new trial strategy for DDS. Previously, we reported a modified DNA aptamer that was bound to the (R)-isomer of a thalidomide derivative with high enantioselectivity. The modified groups introduced to this aptamer were found to play a crucial role in molecular recognition. In this study, we screened new aptamers targeted to a camptothecin derivative from two different libraries, i.e., natural DNA and modified DNA by employing the method of systematic evolution of ligands by exponential enrichment (SELEX). Camptothecin and its derivatives are known to be potent anticancer drugs that exhibit efficacy against a broad spectrum of cancerous tumors. The aptamers isolated as individual clones from the enriched pools were sequenced and their binding properties were assessed. As a result, the modified and natural aptamers significantly differed from each other in emerging sequences, indicating that both would differ in terms of binding mode to the target molecule and single-strand folding. Nucleic acid aptamers that were functionally modified with foreign substituents would be applicable to DDS as a novel class of drug carriers

Biography

Masayasu Kuwahara has completed his Ph.D at the age of 27 years from Okayama University in 1999, and postdoctoral studies from the University of Virginia. He arrived at his post as an Assistant Professor at Gunma University in 2001, then promoted to an Associate Professor in 2009. During this time, in 2004, he was selected as a researcher of the JST PRESTO. In 2009, he received the Young Scientists' Prize of the Commendation for Science and Technology by Japanese government. His research interests include developments of artificial nucleic acids towards practical uses by rational design approaches and random screening methods.