

Development of pancreatic cancer targeting aptamer using cell-SELEX and therapeutic application

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Aptamers are single-stranded oligonucleotides that fold into three-dimensional structure and bind to specific targets with high affinities. Among aptamer selection strategies, Cell-SELEX (Systemic Evolution of Ligands by EXponential Enrichment) using living cells have been developed effective aptamers capable to bind heavily modified cell surface proteins in its native conformation even though unknown structures. In this study, we selected pancreatic cancer targeting aptamer using C-MLu-1 cells from lung metastasized pancreatic cancer of CFPAC-1 mouse xenograft for positive selection. The 5th round pools showed significant enrichment from library. A DNA aptamer (SQ7, 80 nt) has been successfully selected to bind the pancreatic cancer cell surface and internalize to cells. Moreover, size-optimized aptamer, SQ7-1 (32 nt) has also the same recognition ability to target cells and can be easily possible to chemical modification more than long-length aptamers. The collective findings reinforce the plausibility of the novel Drug-Aptamer-Antibody (Cot-SQ7-1-MMAE) concept based on the cancer-specific targeting, serum stability, and antitumor efficacy by the SQ7-1 aptamer satisfied with cancer-specific targeting. Taken together, we developed the pancreatic cancer-targeting aptamer using Cell-SELEX and we hope that it will be utilized and successfully applied as a new treatment for pancreatic cancer.