Self Assembly of Alkylated Peptide Amphiphiles as a Promising Carrier for siRNA Delivery to Cancer Cells

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Effective and safe delivery of siRNA stands as a substantial barrier in RNA interference-based cancer therapies. Peptide-based siRNA delivery systems are promising because of their biocompatibility and facile synthesis. However, several limitations such as high critical micelle concentration and insufficient siRNA binding ability have hindered their clinical translation. To overcome this obstacle, we synthesized peptide-based siRNA delivery carrier, Oc-GAVILR8, derived from GAVILRR peptide. Compared to the prototype, Oc-GAVILR8 exhibits desirable properties for efficient siRNA delivery to cancer cells. Remarkably, Oc-GAVILR8 demonstrates excellent siRNA binding ability and can form stable nanoparticles with siRNA in low concentration with a size of approximately 110 nm, suggesting the potential for enhanced permeability and retention effect in the extracellular environment of tumor tissues. Moreover, Oc-GAVILR8 exhibited proficient siRNA delivery into AsPC1 pancreatic ductal adenocarcinoma cells. As shown in Figure 1, siRNA internalization was detected by flow cytometry with the internalization showing an upward trend when the concentration of nanoparticles was elevated. These findings suggest that Oc-GAVILR8 may offer a promising solution for the development of effective siRNA delivery systems in pancreatic cancer. Subsequence exploration is necessary to optimize and validate the potential clinical application of this peptide-based siRNA delivery carrier.

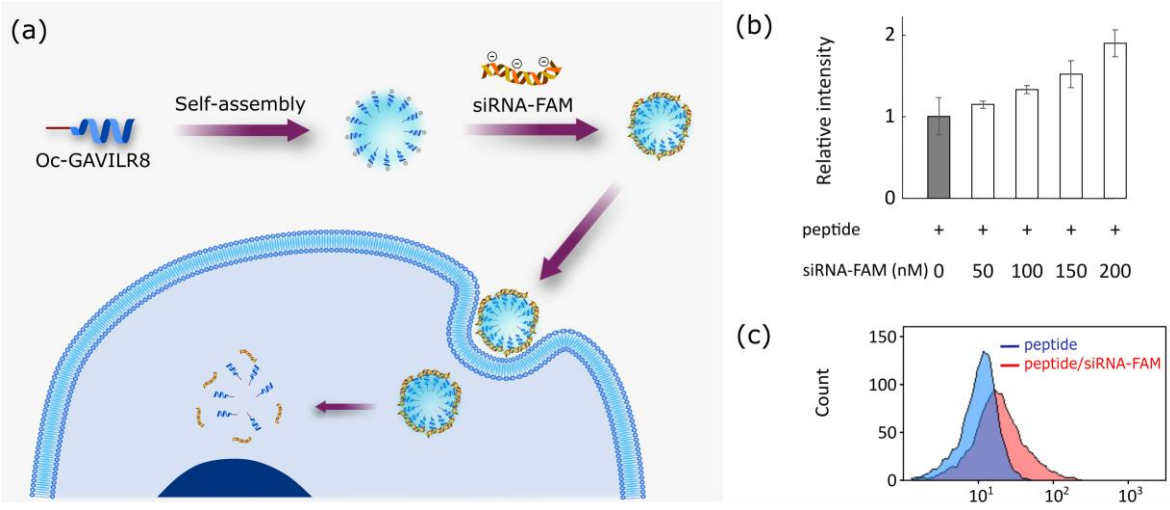

Figure 1. Oc-GAVILR8 nanoparticles (NPs) for siRNA delivery to a cell. (a) Schematic illustration of self-assembled Oc-GAVILR8/siRNA. (b) Internalization of siRNA-FAM loaded NPs into AsPC1 cells in various concentration. (c) Flow cytometry analysis of in vitro transfection efficiency of siRNA-FAM loaded NPs vs empty NPs in AsPC1 cells.