

Peptide/Lipid-Associated Nucleic Acids as a Multicomponent siRNA Delivery System

Chapman Case #2020-004

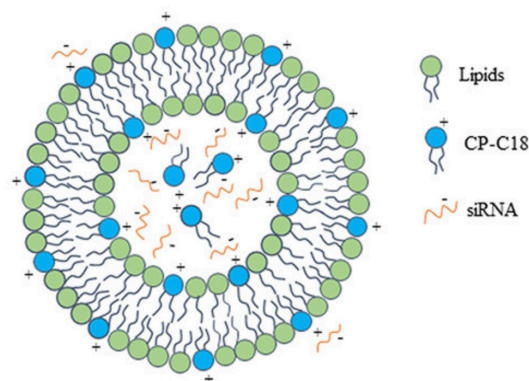
Market Need

RNA interference (RNAi) is a biological process to prevent the translation of mRNA to protein. This mechanism is beneficial in preventing the overexpression of proteins in cancer. However, the cellular delivery of effectors of RNAi (small interfering RNA or siRNA, CRISPR/Cas9, or plasmids) has proven to be challenging due to its inherent negative charge and relative instability. Therefore, there is a need for an efficient nucleic acid delivery system to address these challenges for research and potential clinical purposes.

Chapman Solution

[Dr. Montazeri Aliabadi](#) and [Dr. Keykavous Parang](#), along with graduate student researchers at Chapman University invented a unique delivery system that can efficiently deliver nucleic acids into specific cancer cells. The delivery system was made by incorporating Chapman-designed hydrophobically modified cyclic, linear, or hybrid peptides into a multi-component nanoparticle, named Peptide/Lipid-Associated Nucleic Acid (PLANA).

When compared to positive control, preliminary research data showed that, siRNA that was incorporated into PLANA was internalized into breast cancer cells efficiently (similar to commercially available transfection agents). Moreover, the PLANA formulations showed no sign of toxicity in human healthy or cancer cells, showed a controlled release pattern over a 72 hour period, and were not affected by presence of nuclease enzymes present in serum.



Applications

- Efficient delivery of siRNA into a wide range of cancer cells
- Efficient transfection for gene delivery
- CRISPR/Cas9 transfection

Key Publication

- [Peptide/Lipid-Associated Nucleic Acids \(PLANAs\) as a Multicomponent siRNA Delivery System](#), ACS Publications, January 2021

Intellectual Property

- Patent pending - US 17/170,785

Stage of Development

- *In vitro* demonstration of siRNA delivery into breast cancer cells with the PLANA delivery system
- Available for licensing and further research collaborations

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