Targeted Nanoplatform for delivery of siRNA and Drug

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Technology description

University of Missouri Office of Technology Management & Industry Relations Non-Confidential Abstract of Invention UM Disclosure No. 15UMC066 Targeted Nanoplatform for delivery of SiRNA and Drug INNOVATION Researchers at the University of Missouri have synthesized nanoparticle conjugates that comprise a combinatorial use of siRNAs, antibodies, and EGFR inhibitors bound to gelatin nanoparticles targeting KRAS mutant non-small cell lung cancer (NSCLC). The synergistic approach suggests a new modus-operandi for stable and targeted delivery of siRNA and a cytotoxic drug for oncogene knockdown and efficacious tumor cell elimination. Although this platform has been tested on KRAS mutant NSCLC, it shall not be limited only to this form of cancer. This platform could be modified to target other specific tumors. BACKGROUND KRAS mutant NSCLC is a known un-druggable cancer. To date, no drug has been discovered which can inhibit the mutant KRAS for effecting therapy. It is found in 25% to 30% of all lung adenocarcinomas. Delivery of small interfering RNA (siRNA) is a promising therapeutic route for several diseases in which the expression of a disease-causing target gene can be reduced by the treatment. Stable and targeted delivery of siRNA to diseased tissues as well as its transport into the cell have been key obstacles for clinical translation of siRNA-based therapeutics. In oncology, delivery of siRNA to decrease the expression of driver oncogenes is an approach to induce apoptosis of the cancer cell. However, standalone siRNA does not appear to provide enough cytotoxicity to entirely eliminate cancer cells. For definitive cytotoxic action, a molecule complementing the siRNA needs to be delivered simultaneously for inducing inclusive toxicity.

Application area

- Stable and targeted delivery of siRNA and a cytotoxic drug for oncogene knockdown
- KRAS mutant NSCLC

Advantages

- siRNA delivered effectively to cytoplasm of the infected cells
- siRNA and drug can be delivered at predetermined relative proportions for effective gene knockdown

and concomitant cytotoxicity
• Low doses of drugs can be delivered due to enzymatic degradation property of gelatin
• Targeted delivery and high bioavailability
• Synthesized nanoparticle also encapsulates a drug PATENT STATUS
• Patent pending LICENSING POTENTIAL

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