Long-Acting Injectable Drug Combinations for Sustained Cancer Therapy and Beyond

These innovations enable the formulation of long-acting injectable drug combinations, including chemotherapies, by transforming short-acting agents into stable, sustained-release nanoparticles or suspensions. The technologies offer a platform approach to improve treatment adherence, reduce dosing frequency, and enhance drug exposure at disease sites.

What is the Problem?

Many therapeutic agents, including chemotherapies and antivirals, require frequent dosing due to their short half-lives in the body. This can lead to poor patient adherence, increased healthcare costs, and suboptimal treatment outcomes. In oncology, combination therapies are often necessary to improve efficacy and reduce resistance, but co-administering multiple drugs with differing pharmacokinetics presents formulation challenges. Additionally, current long-acting drug delivery systems often focus on single agents and may not achieve sustained, synchronized release of multiple drugs. There is a need for versatile, scalable technologies that can deliver multiple drugs over extended periods in a single injection.

What is the Solution?

These innovations provide two complementary approaches to address the limitations of short-acting drug combinations. The first is a method for converting combinations of short-acting drugs into long-acting formulations using lipid-based nanoparticles. These nanoparticles encapsulate both water-soluble and water-insoluble drugs, enabling synchronized, extended release from a single injection. The second innovation is a composition and method for preparing injectable aqueous suspensions containing multiple cancer drugs, such as gemcitabine and paclitaxel. These suspensions are designed for subcutaneous or intramuscular administration and maintain drug stability and bioavailability over time. Together, these technologies offer a flexible platform for developing long-acting combination therapies across therapeutic areas, with demonstrated application in metastatic breast cancer models.

What is the Competitive Advantage?

-Enables co-formulation of multiple drugs with differing solubility and pharmacokinetics into a single long-acting injectable.

-Demonstrated enhanced drug exposure and localization in disease sites, such as metastatic nodules in preclinical cancer models.

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Category

Therapeutics/Infection
Therapeutics/Oncology
Selection of Available Technologies
Therapeutics/Other

Authors

Rodney Ho

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-Reduces dosing frequency, which may improve patient adherence and reduce treatment burden.

-Compatible with scalable manufacturing processes and adaptable to a range of therapeutic combinations.

Patent Information:

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References

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2. Yu, J., Mu, Q., Perazzolo, S., Griffin, J. I., Zhu, L., McConnachie, L. A., Shen, D. D., Ho, R. J.(2020) , https://pmc.ncbi.nlm.nih.gov/articles/PMC8686529/, https://link.springer.com/journal/11095, 37, 197