

# Recent Developments in Drug Delivery

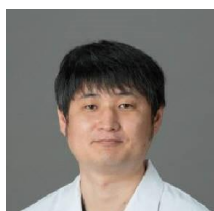
## Guest Editor



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## Message from the Guest Editor

Dear Colleagues,

Drug delivery system (DDS) is a method for delivery of the drugs to the target. Conventional cancer chemotherapy is based on the principle that rapidly proliferating cancer cells are killed by small molecule anti-cancer agents (ACAs). Unfortunately, the current ACAs lack the specificity to kill cancer cells without damaging proliferating normal cells. To resolve these drawbacks of ACAs, various drug formulations have been developed to date. One of the main strategies in designing DDS is the “passive targeting” approach, which is based on differences between tumor blood vessels and normal vessels, and results in the so-called EPR (enhanced permeability and retention) effect. High molecular weight prodrugs, such as ACAs incorporated in micelles or liposomes, can permeate through the gaps in the walls of the tumor blood vessels and accumulate in the tumor tissue, but do not extravasate from normal vessels. Another major strategy is “active targeting” which is based exploiting the specificity

of antigen-antibody interactions. In the last decade, several armed antibodies, such as antibody-drug conjugates (ADCs), radio-immunotherapy (RIT) and photo-immunotherapy (PIT), have been approved for treatment of solid tumors.

In 2020, lipid nanoparticle-formulated, nucleoside-modified RNA vaccines against SARS-CoV-2 were approved. These vaccines based on DDS technology are stable in a body and can produce SARS-CoV-2 spike protein efficiently; thus, these vaccines conferred 95% protection against Covid-19. These technologies can also be applied to cancer vaccines. Drugs need to be developed taking into account absorption, distribution, metabolism, and excretion (ADME), thus, oral or transdermal technologies with absorption equivalent to that of intravenous administration will be developed.

In this Special Issue of the Frontiers in Bioscience-Landmark, original research, mini-review, and review articles regarding novel methodology and technology for drug delivery are invited. This Special Issue focuses on the DDS for not only oncology but also infectious diseases *in vitro*, *in vivo*, and clinical studies.

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*Guest Editors*

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