CURRENT RESEARCH TOPICS IN PHARMACY:

Drug Delivery

February 28th, 2023 12.00 PM ISTANBUL

FOR REGISTRATION:

First Session- *Moderator: Gülşah GEDİK 12.00-13.30 PM*

Welcome- Prof. Oya Kerimoğlu
Marmara University, Istanbul, Türkiye

Core-shell type lipid-polymer hybrid nanocarriers as novel-generation drug gelivery platform **– Assoc. Prof. Ceyda Tuğba Şengel Türk**
Ankara University, Ankara, Türkiye

Drug delivery systems used for biological products- Assist. Prof. Ongun Mehmet Saka
Ankara University, Ankara Türkiye

Viral delivery systems within the gene theraphy landscape- Dr.Ceyda Ekentok Atıcı
Marmara University, Istanbul, Türkiye

Second Session – Moderator: Ongun Mehmet SAKA 14:00-15.30 PM

Nanobiomaterials for drug delivery- Assist. Prof.Gülşah Gedik
Trakya University, Edirne, Türkiye

Microeedles : A smart approach for intradermal and transdermal drug delivery systems-Assist.Prof.Ebru Altuntaş
Istanbul University, Istanbul, Türkiye

Nose-to-brain drug delivery of nanoformulations:Preparation and in vitro evaluation– Dr.Özge Gün Eşim
Ankara University, Ankara, Türkiye

Chair
Prof. Hatice Kübra ELÇİOĞLU

Vice Chairs
Prof. Levent KABASAKAL & Assoc. Prof. Esra TATAR

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Third Session- *Moderator: Ceyda EKENTOK ATICI 16.00-18.30 PM*

Microemulsion utility in pharmaceuicals: An overwiev and pharmaceutical applications- Assist.Prof.Emre Şefik Çağlar
University of Health Sciences, Istanbul, Türkiye

Journey of the saponin from the plant to the formulation for the blocking tumor activities – Dr.Burcu Üner
The University of Health Science and Pharmacy in St. Louis, MO, USA

Development of injectable ROS reponsive nanoparticles with identified protein fpr improvement of the cardiac repiar following myocardial infarction- Dr. Renuka Khatnik
Washington University in St.Louis, MO, USA

Groundbreaking delivery systems: Liposomes-microbubbles complexes - Dr. Pankaj Dwivedi
University of Health Sciences and Pharmacy in St. Louis, MO, USA

Breaking the barriers with cutting edge intradermal delivery towards pain-free skin theraphy: Dissolvable microneedle devices for localized theraphy – Dr.Monica Dwivedi
Birla Institute of Technology, Mesra, India

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VIRAL DELIVERY SYSTEMS WITHIN THE GENE THERAPY LANDSCAPE

Ceyda EKENTOK-ATICI

Department of Pharmaceutical Biotechnology, Faculty of Pharmacy, Marmara University, Istanbul, Türkiye

ceyda.ekentok@marmara.edu.tr

Gene therapy is the treatment of a disease through transferring genetic material (DNA/RNA) into the cells of patients. The transferred gene can act following ways: (i) enabling expression of the transferred gene, (ii) inhibiting the expression of a target gene and (iii) modifying a target gene. Gene therapy clinical trials started nearly fifty years ago with treatment of inherited monogenic disorder. Soon after that, gene therapy based clinical approaches was extended to acquired diseases such as cancer [1]. Since the first successful gene therapy clinical trial on a four-year girl who had ADA deficiency was initiated in 1990, more than 30 gene therapy products have been approved worldwide by different authorities [2].

Several approaches like physical methods (electroporation, microinjection, biolistic etc.), chemical methods (polymers, lipids, peptides etc.) and biological methods (adenoviruses, adeno-associated viruses, retroviruses etc.) can be employed to deliver the DNA inside cells. No single method works best for all applications. Factors that determine the choice of the method include cost, reproducibility, toxicity, mechanism of delivery, ease of use, and efficiency [3]. Adenoviral vectors (Ads), adeno-associated viral vector (AAVs), retroviral vectors (RVs) and lentiviral vectors (LVs) are the most common viral delivery systems for gene therapy applications. These systems have the benefits of high transfection potency and constant expression of therapeutic genes. However, limitations in large scale virus production, immunogenicity, toxicity and insertional mutagenesis are their common disadvantages. Current strategies to overcome these disadvantages are; (i) localized delivery and transcriptional targeting for toxicity and off-target effects (ii) immunosuppressive drugs and anti-inflammatory agents for immune response and (iii) biomaterial-mediated viral gene delivery [4].

The polymers can be used for viral vector modification and evolving hybrid vectors is a promising strategy for gene therapy applications. Surface modification of Ads with cationic polymers can be done by (i) non-covalent coating (physical modification) (ii) covalent coating (chemical modification). Non-covalent coating strategies gain attention because of ease of manipulation [5]. In our recent study we aimed to prepare Ad/chitosan hybrid vector to deliver shPDGF-D in breast cancer cell line MDA-MB-231. We covalently coat Ad surface with different amount and molecular weight chitosan and investigate gene silencing efficiency of vectors. In vitro cell culture studies showed that both low and high molecular weight chitosan

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increased PDGF-D silencing efficiency of Ad5 vector at 48 hours significantly. Also, the invasion ability of MDA-MB-231 cells decreased after treatment with coated Ad vector correlated with PDGF-D silencing results [6]. In conclusion, the results showed that non-covalent modification of Ad surface with polymers increased in vitro silencing efficiency, which may allow decrease viral dose for safer and efficient therapy.

Keywords: Gene delivery, viral vectors, Ad, chitosan.

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