



Design and intracellular trafficking of hybrid adenoviral gene delivery vector

Yasmine Gabal

Oklahoma State University, School of Chemical Engineering, USA

Abstract:

The first gene therapy clinical trials were started nearly 30 years ago, but the field only now seems to be on the verge of widespread adoption. Safe and efficient gene delivery, however, is still a major obstacle. Adenovirus (Ad) is the most common viral vector in gene therapy clinical trial. Adenovirus fiber, however, mediate an immunogenic response and relies on interaction of the virus with the coxsackie adenovirus receptor (CAR), which limits the ability of the virus to deliver genes into CAR-negative cells such as cancer cells. Our goal was to develop a hybrid vector that overcomes Ad drawbacks as well as. understand how our hybrid vector compare to the native virus in intracellular trafficking. A fiberless adenovirus (FlAd) was used with a replacement for the removed fiber protein by poly-L-lysine copolymer grafted polyethylene glycol (PLL-g-PEG). Hybrid vectors were evaluated by their ability to infect CAR-positive (HEK 293) and CAR-negative (NIH 3T3) cells. PLL-g-PEG-FlAd hybrid vectors were able to transduce CAR-positive and CAR-negative cells with a 3.5- and 10.2-fold increase compared to unmodified flAd. In addition, hybrid vector was non-cytotoxic on both cell types, of lower innate immune response, and showed good serum stability up to 50%. The removal of the fibers besides the surface modification with PLL-g-PEG copolymer have modified the intracellular trafficking of the hybrid vector to affect the efficiency of the expression of the targeted gene. This stepwise transition from viral to non-viral vectors will lead to novel vectors that are both safe and highly efficient.



Biography:

Yasmine Gabal has a B.Sc. and Msc in pharmaceutical sciences at Ain Shams University (ASU), Egypt and is completing her PhD in Biomedical Engineering at OSU. She has a research and teaching experience working as an assistant lecturer in pharmaceuticals and industrial pharmacy then a research assistant in biomedical engineering. She serves as a journal reviewer in a number of peer-reviewed journals.

Publication of speakers:

1. Gabal, Yasmine & Kamel, Amany & Sammour, Omaira & Elshafeey, Ahmed. (2014). Effect of surface charge on the brain delivery of nanostructured lipid carriers in situ gels via the nasal route. *International journal of pharmaceuticals*. 473. 10.1016/j.ijpharm.2014.07.025.
2. Willi, Yasmine. (2020). Suffizienz in ländlichen Räumen.
3. Willi, Yasmine & Pütz, Marco. (2018). Governance of regional development: How can regions unlock their potential?. 10.1080/13673882.2018.00001040.
4. Willi, Yasmine & Pütz, Marco. (2018). Governance of regional development: How can regions unlock their potential?. 10.1080/13673882.2018.00001040.

International conference on pharmaceuticals and Drug Discovery

Citation: Yasmine Gabal; Current drug-delivery nanotechnologies to infection control in endodontics, Euro pharma 2020 : July 15, 2020; London, UK