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Sugar based monomeric surfactants as nanocarriers in drug and nucleic acid delivery

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The development in nanotechnology and genetic engineering in recent years resulted in the discovery of modern methods of drug and nucleic acids delivery systems into cells with using nanocarriers including both a viral and non-viral. The determination of their efficiency in targeted therapy and the knowledge about potential risk of their administration is crucial in making decision in their usage in novel treatment procedures. It has been shown that surfactants - non-viral nanocarriers are able to form stable complexes with nucleic acids and efficiently mediate transfection. The non-viral nanocarriers are characterized by the high degree of biodegradability, are not mutagenic and non-immunogenic. In contrast to viral ones, they are also easier to prepare and carrying smaller risk of infection. It makes surfactants more and more important in the process of designing the new drug and nucleic acids delivery systems [1].

The work is focused on the study of novel sugar based monomeric surfactants dedicated to their potential application as a non-viral vector. The structure of the surfactant consists of two parts: the head, which is a glucose, and the tail, which is made of alkyl chains of various lengths. To ensure the stability a counterion of bromine was incorporated into the system. Exceptional use of glucose can provide biocompatibility, biodegradability and low toxicity which are highly demanded when creating a nanocarrier.

Three sugar-based surfactants, derivates of sulfobetaine with different alkyl chain lengths and their complexes with nucleic acid derived from salmon sperm were studied by the circular dichroism (CD), conductivity measurements and electrophoresis. Based on the obtained results we could determine the critical micelle concentration (CMC) of studied surfactants, the influence of surfactants on the DNA conformation and conditions, in which stable complexes of surfactant-DNA are created. As a result of our studies, it was possible to indicate, which studied sugar-based surfactant is most promising agent for nucleic acid deliver.

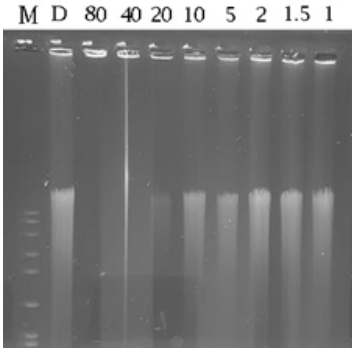

Fig (1). An image of agarose gel post electrophoresis for complexes of DNA and GA12Br. The following stands for: M- marker (mass determination of DNA), D – DNA, 80-1 the concentration of surfactant in DNA-Surf complexes.

Biography

Ms C Joanna Patalas is a PhD Candidate in University of Adam Mickiewicz in Poznan. She pursues her doctoral studies in Faculty of Physics at Biomedical Physics Department under the Prof. Maciej Kozak. Her current work is based on the improvement of modern drug delivery methods based on surfactants. Her interests include the use of physics to improve new medical methods. In earlier years, she also worked on the synthesis of ribbon-shaped gold nanoparticles that could be used as biosensors.

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Sustainable textiles industries in brand technology between technologies of brands

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Sustainable textiles industries in brand technology between technologies of production brands, The technology industry thrives on change, requiring constant experimentation and innovation. Rather than deterring new entries, highly saturated markets beckon for potentially technology products and ideas. other hand; To stimulate customer loyalty and differentiate from competitors, tech brands strive to continually deliver technology software updates of textiles, communicate novel use cases or launch new systems of textiles technology and brand if textiles; to know how strategic tech company branding and marketing can help your company generate a competitive advantage in this fast-moving space.

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