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Development of Chitosan-based Nanofiber Dressing with Incorporated Antibiotics for Tissue Regeneration

Katarina Virijevic*[1], Jelena Grujic[1], Fatima Zivic[2], Marko Zivanovic[1], Nenad Filipovic[2]

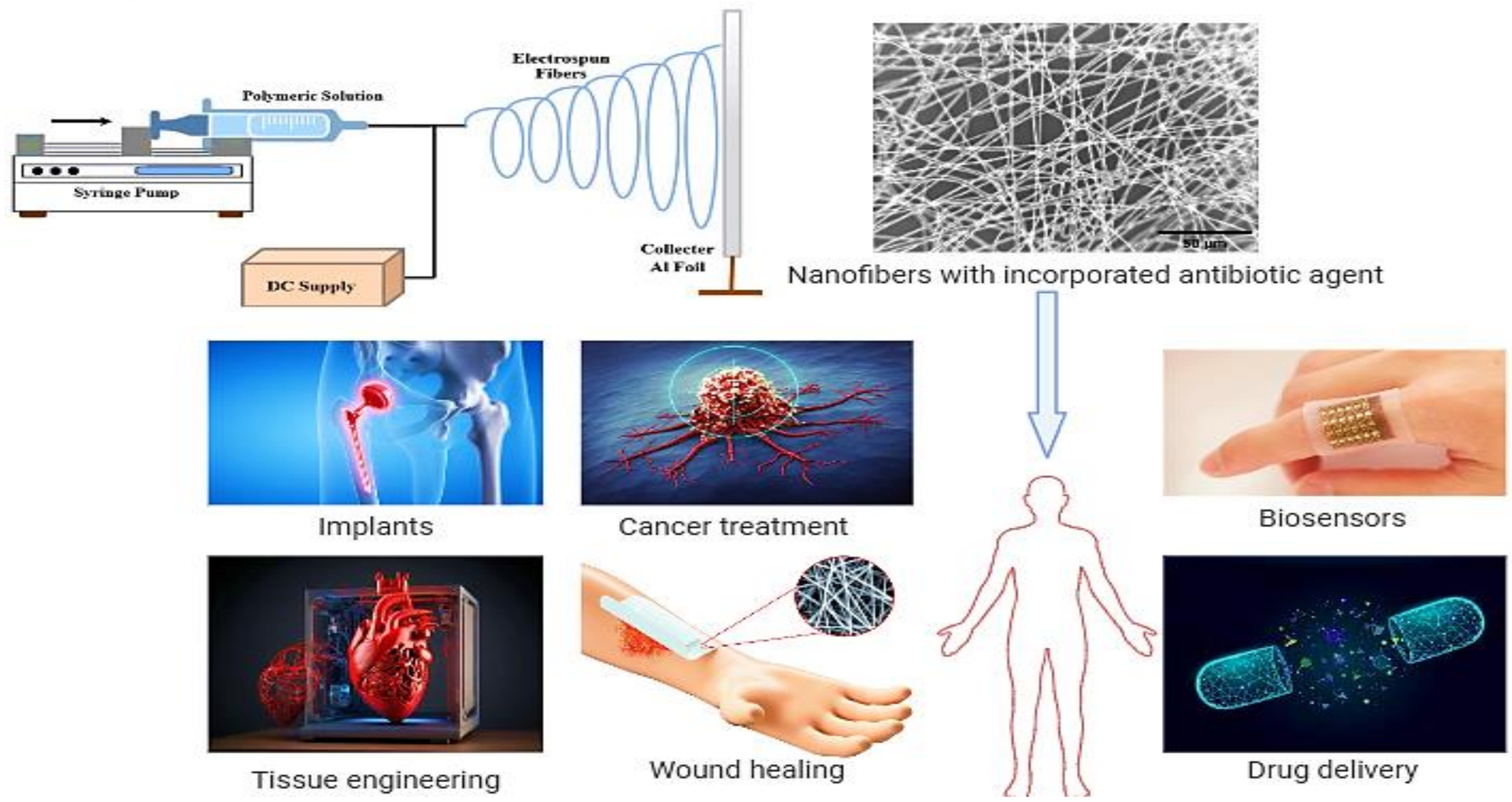
[1]Institute for Information Technologies, University of Kragujevac, Jovana Cvijića bb, 34000 Kragujevac, Serbia

[2]Faculty of Engineering, University of Kragujevac, Sestre Janjić 6, 34000 Kragujevac, Serbia

Abstract

In recent decades, the application of advanced materials in the field of regenerative medicine has become increasingly attractive. Artificial polymeric materials obtained by versatile electrospinning techniques have emerged as promising candidates in the field of tissue engineering. Chitosan is one of the most important biopolymers for the production of nanofibers due to its superior micro- and nanoscale performance, non-toxicity, biodegradability, biocompatibility, and ability to mimic the extracellular matrix (ECM) of the damaged organ/tissue. The possibility of incorporating antibiotics into nanofiber mats extends the range of applications and makes the resulting materials antibacterial, which is important in the field of tissue regeneration.

Considering this, the fabricated chitosan nanofibers with ciprofloxacin hydrochloride (CH) are capable of accelerating wound healing along with antibacterial effects during the tissue regeneration process.



Due to the exceptionally superior properties of nanomaterials, they offer a lot of potential in many fields, particularly in biomedicine, tissue engineering, drug delivery, biosensing, medical implants, etc. Many nanomaterials have been used in various therapies, including the treatment of cancer, diabetes, infection, and inflammation. The most recent application of nanomaterials in medicine is as a carrier system in the mRNA-based COVID-19 vaccine.

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Contact:

msc.katarina.virijevic@gmail.com

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