NANOCELLULOSE-BASED HYBRID PLATFORM FOR LIGHT-TRIGGERED THERAPEUTIC APPLICATION

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Nanocellulose is emerging as a highly promising delivery platform for biomedical applications due to its unique combination of structural versatility, biocompatibility, and sustainable origin. With a large surface area, excellent mechanical properties, and ease of chemical modification, it serves as an ideal scaffold for the development of multifunctional nanomaterials.[1] In this study, nanocellulose was functionalized with carboxyl groups to enable the attachment of Indium Tin Oxide nanoparticles (ITO NPs), selected for their absorption in the near-infrared (NIR) region (1700–1800 nm). This property enables localized photothermal effects upon NIR irradiation, suitable for the treatment of superficial tumors.[2] In a parallel study, photoactive molecules, either known or newly synthesized, capable of generating reactive oxygen species (ROS) upon visible light exposure were also conjugated to the nanocellulose surface.[3] The resulting hybrid systems exhibit photothermal and photodynamic functionalities, respectively, offering promising platforms for the development of minimally invasive light-triggered therapies for anticancer and antifungal/antimicrobial applications.

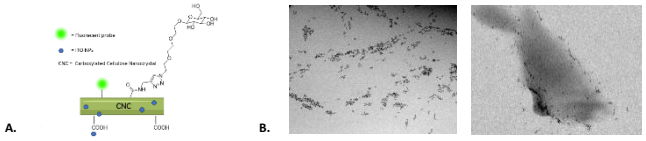

Figure 1. A. ITO NPs drug delivery system nanocellulose **B.** TEM images of nanocellulose decorated with ITO NPs

References

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