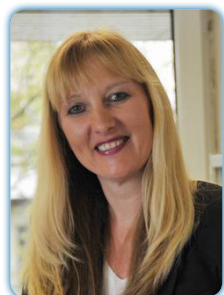


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Dagmar Fischer

Friedrich Schiller University, Germany

Bacterial nano cellulose as controlled drug delivery system in skin applications

The natural hydro-polymer Bacterial Nano Cellulose (BNC) is an innovative biomaterial, produced during fermentation by strains of gram-negative bacteria *Komagataeibacter xylinus* and consisting of about 1% cellulose and 99% water. Although the chemical formula is identical to plant cellulose, the material favors totally different but outstanding material characteristics due to the three-dimensional network of nano-sized fibers. The interest in BNC as drug delivery system dramatically increased during the last years, as the nano-sized 3D-network of BNC is expected to hold a large amount of drug molecules due to its large surface area. However, the highly hydrophilic character limited a broad application especially for the delivery of lipophilic drugs as well as long-term applications. We developed different loading techniques to accomplish a controlled release of drugs from several hours to weeks using BNC produced under lab-scale as well as under high throughput conditions. Native BNC, hybrid systems with different types of the thermo-responsive block-copolymers poloxamers as well as lipid-modified BNC were established. Depending on the type of modification, not only the drug release profile, but also superior material properties such as high compression stability and water binding could be achieved. Using the antiseptic octenidine as model drug, the antimicrobial activity against *Staphylococcus aureus* and *Pseudomonas aeruginosa* was not changed by the use of the modified BNC. Excellent biocompatibility of the loaded BNC could be demonstrated after local administration in a shell-less hen's egg model. In conclusion, controllable short- and long-term delivery systems consisting of poloxamer and lipid modified BNC could be developed as ready-to-use systems e.g. for dermal wound treatment, cosmetics or the use as implants.

Biography

Dagmar Fischer is a Pharmacist. She has more than 20 years of experience in the field of "Nanocarriers based on synthetic and natural polymers, their formulation and biopharmaceutical characterization". Furthermore, she has long-standing successful co-operations with many partners in and outside of Europe, in the field of Nano-safety. After completing her PhD in Habilitation at University of Marburg, she joined a biotech company for several years as Head of Preclinical Research and Development. In 2008, she was appointed as a Professor of Pharmaceutical Technology at University Jena.

dagmar.fischer@uni-jena.de

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