

## **Keratin-based nanofibres for biomedical applications and electrospun filter media**

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Keratin is a sustainable biopolymer extracted from animal fibres like wool. It can be processed in electrospinning generating materials suitable for biomedical applications and for filtration. In the biomedical field, keratin can mimic natural structures with specific properties (such as biocompatibility, degradability, and stiffness) as cell interfaces and the extracellular matrix of natural tissues. Our studies are focused on electrospun keratin-based nanofibres to improve cell interactions in scaffolds for tissue engineering and to bio-functionalize titanium surfaces with nanostructured coatings suitable for innovative dental implants. The combination of topographical and biochemical signalling can stimulate the biological activity of fibroblasts, enhancing soft tissue growth in trans-mucosal implants. Moreover, keratin nanofibers can link antibacterial compounds, such as silver ions, to have biocidal properties. On the other hand, keratin has demonstrated good adsorption properties for heavy metal ions, VOCs, and dyes. Therefore, when transformed into nanofibres, keratin can be used as a component of advanced filter media for separation and filtration processes due to high porosity, small pore sizes, high permeability, and large specific surface area.