

## Collagen-based multilayer films for wound healing

Muhammad Haseeb Iqbal<sup>1</sup>, Fouzia Boulmedais<sup>1</sup>, Florent Meyer<sup>2</sup>

1. Centre National de la Recherche Scientifique, CNRS UPR 22, Institut Charles Sadron, 23 rue du Loess, BP 84047, 67034 Strasbourg Cedex 2, France

2. Institut National de la Santé et de la Recherche Scientifique, Unité 1121, Faculté de Chirurgie Dentaire, 11 rue Humann, 67085 Strasbourg Cedex, France

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### ABSTRACT

Collagen, polycationic at acidic pH, is the main component of the extracellular matrix comprising up to 30 % of human skin. Several studies have shown that collagen can induce wound healing by promoting the recolonization and the proliferation of epithelial cells with good hemostatic, low antigenicity, and low inflammatory properties [1, 2]. However, tissue's matrix metalloproteases (MMPs) and bacterial infection may result in the enhancement of the breakdown of collagen-based material [2, 3]. Tannic acid (TA), a polyanionic polyphenol extracted from plants, can form complexes with proteins, further becoming a protective layer of the epithelial tissue [4-6]. Though, TA has shown ample popularity due to its antimicrobial, antioxidant and anti-inflammatory properties, but its cytotoxic nature cannot be neglected as well [7].

We successfully developed collagen/TA films using the layer-by-layer method showing antimicrobial properties and no cytotoxicity (Figure 1a). Build in acidic pH, for solubility issues of collagen, the films in contact with buffer solution at pH 7.4 are stable but release TA in solution until 25 µg/mL leading to a release-killing property of the films towards *Staphylococcus Aureus*.

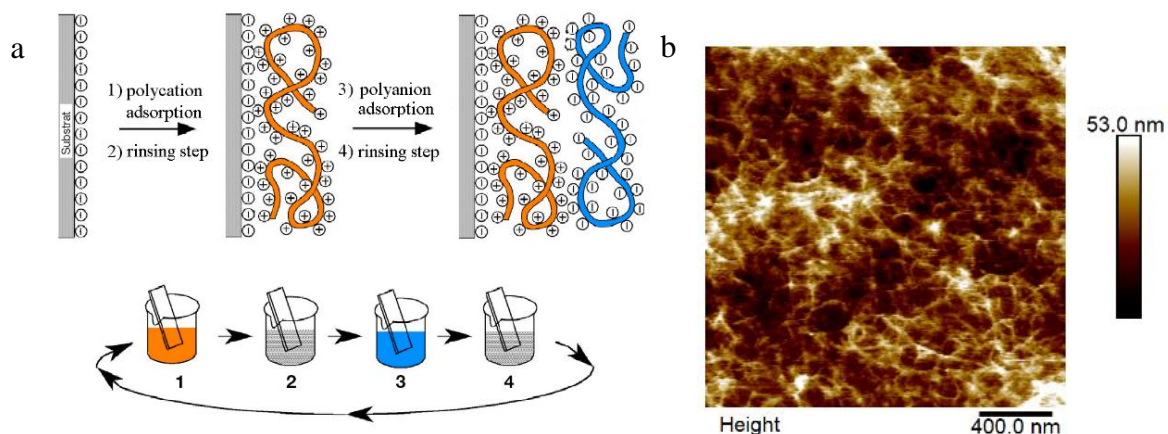


Figure 1: (A) Schematic representation of Layer-by-Layer technique based on the alternated deposition of oppositely charged polyelectrolytes obtained by the dipping process [8] (B) shows the topography of Collagen/tannic acid film observed by Atomic Force Microscopy (AFM).

**ABSTRACT SUBMISSION**

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