

## Bioinspired Antibacterial Catechol-Amine Coatings

Bolaños, JD<sup>1,2</sup>; Suárez-García, S<sup>2</sup>; Yuste, VJ<sup>1</sup>; Ruiz-Molina, D<sup>2</sup>

Institut de Neurociències, Facultat de Medicina, Universitat Autònoma de Barcelona (UAB), Campus UAB, Cerdanyola del Vallès, 08193 Barcelona, Spain<sup>1</sup>

Catalan Institute of Nanoscience and Nanotechnology (ICN2), CSIC and BIST, Campus UAB, Bellaterra, 08193 Barcelona, Spain<sup>2</sup>

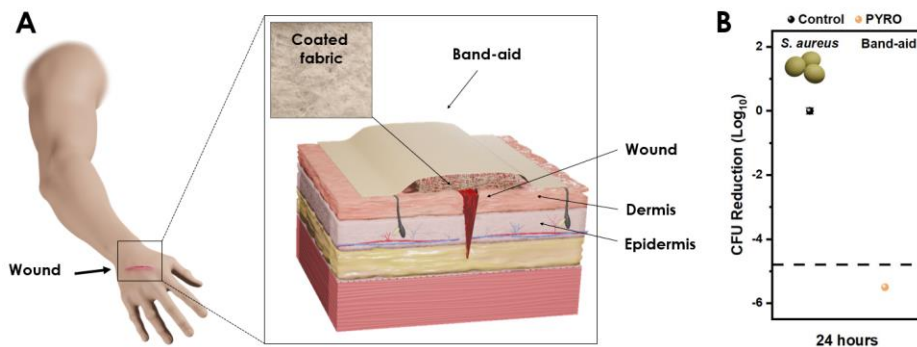
Email: jose.bolanos@uab.cat

The use of **catechols** as functionalizing agents or ligand in the formation of bioinspired materials has been increasing during the past years due the outstanding properties offered by these molecules [1]. Besides, the constant search of new **antimicrobial surfaces** and **fabrics** has increased the use of antibiotics and metallic nanoparticles, among others. However, the functionalization of coatings with them usually implies drawbacks like the leaching (with its consequent loss of activity), as well as the possibility of being toxic for humans.

In this study, combinations of catechol-derivatives (specially **Pyrocatechol** and **Caffeic acid**), with Hexamethylenediamine ligands were performed to obtain coatings on broadly used fabrics (cellulose, cotton and polypropylene) and band-aids, creating and homogeneous and hydrophilic thin-layer over them. The **antibacterial properties** of these materials were determined by counting the colony forming units (CFU) decrease of several pathogenic bacteria, mostly found in hospital environments, achieving reductions near to an outstanding **99,999%**. Worth to mention, the catechol-based coatings are obtained through an **affordable, straightforward** and **environmentally-friendly** production, avoiding the use of harmful solvents, metals or antibiotics and being **compatible** with a broad range of materials. Therefore, this universal and bioinspired platform could be an excellent choice to tune the properties of different fabrics and increase the range of their applications.

### References

[1] Suárez-García, S.; Sedó, J.; Saiz-Poseu, J. & Ruiz-Molina, D. (2017). Copolymerization of a Catechol and a diamine as a Versatile Polydopamine-Like Platform for Surface Functionalization: The case of a Hydrophobic Coating. Biomimetics.



**Figure 1:** Catechol-amine coated Band-aids. a) Schematic proposed application in wound healing. b) CFU reduction obtained with *Staphylococcus aureus*.