Graphene-coated bandages as a smart-bandage platform for improved wound-healing

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We are building an innovative bandage technology platform based on graphene-on -insulator film in order to better support chronic wounds.
Chronic wounds are serious health issues that are currently becoming a major humanistic and economic burden due to the augmentation of the population of elderly and diabetics. Chronic wounds indeed lead to nearly 500,000 amputations each year worldwide and are globally generating direct and indirect costs (stays in hospital) totaling 12 billion € globally. Therefore, there is an urgent need for novel therapies. We believe that monolayer graphene film with its bio stimulating effect (1) is providing the ideal technology to unlock the challenges for a better induce cells regrowth and promote tissue engineering with minimal release of nanoflakes.

Our bandage platform (2) is based on the integration of a monolayer graphene polycrystalline layer back-bonded onto a biocompatible polymer layer. The resulting film can directly be applied onto the bed-wound and is inserted in a commercial bandage. Graphene surface combines healing (speed-up of wound closure) and antibacterial action, optical transparency and electrical conductivity. It is obtained by integrating a large uniform graphene monolayer into a bandage in order to provide a bio-stimulating and electrically-active platform directly applied in contact with the wound. It allows the development of a range of intelligent dressings that combine on the same product both therapeutic and diagnostic actions.

-Therapeutic because graphene functions as a growth matrix, promoting healing but at the same time acting as an electrode in close contact with the wound. This allows the application of electrical pulses whose actions promote faster healing and reduce pain.

-Diagnostic because it plays at the same time the role of an embedded remote measurement physical parameters used to monitor the wound evolution and early stage detection of infection.

The markets of the connected dressing with the remote diagnosis will be addressed in a second phase.

References

[1] F. Veliev et al. Biomat. 86, 33-41, (2016)
[2] www.grapheal.com

Figures

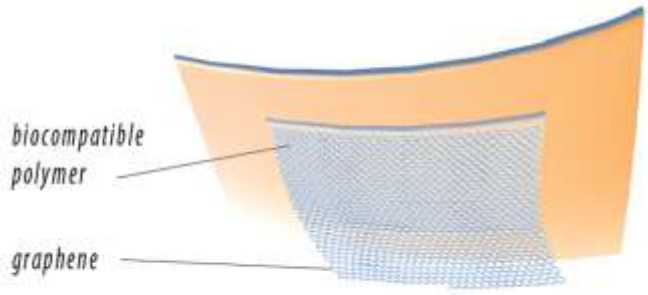

Figure 1: Principle of the graphene-coated bandage