Biomaterial enriched with propolis extract as a promising chemopreventive dressing material after melanoma excision

Melanoma, a malignant tumor arising from melanocytes, is the deadliest form of skin cancer. It is a heterogeneous and complex disease, which can make it difficult to diagnose. However, in the early stages, melanoma can be cured successfully with surgery and survival rates are high, but after metastasis, survival rates drop significantly. Although melanoma excision is the most effective approach among the available strategies, surgical interventions may cause disfigurements (e.g. by remaining unaesthetic scars) and sometimes require skin grafts for covering large defects. Moreover, there is a high local recurrence risk in skin cancer therapy. Thus, postoperative management should involve the application of wound dressings for promoting skin regeneration and preventing local melanoma recurrence and microbial infections, that unfortunately still represents a major and considerable clinical challenge.

The aim of this study is to develop agarose/curdlan-based dressing material enriched with propolis derived from endemic areas for the management of wounds after melanoma excision which will promote skin regeneration, reveal antibacterial properties, and exert chemopreventive and chemotherapeutic effects (Fig. 1). Propolis is rich in various phyto-components/bioactive agents and possesses a number of biological properties including anti-cancer, antioxidant, antimicrobial activities. Moreover, due to the high variability of flora around the world, propolis possess different chemical compositions depending on the areas from which are derived, also affecting their profile of biological activity. Based on preliminary studies, propolis from endemic areas, like Georgia, Greece, were selected due to their effectiveness against melanoma cells. Moreover, incorporation of propolis derived from endemic areas within the structure of the wound dressing will provide, beyond anticancer activity, a strong antioxidant and antibacterial effect, which are also crucial issues in the treatment of wounds after melanoma excision to accelerate skin regeneration and protection against the development of chronic wound. Thus, results obtained during implementation of this project may have a great impact on the development of regenerative medicine.

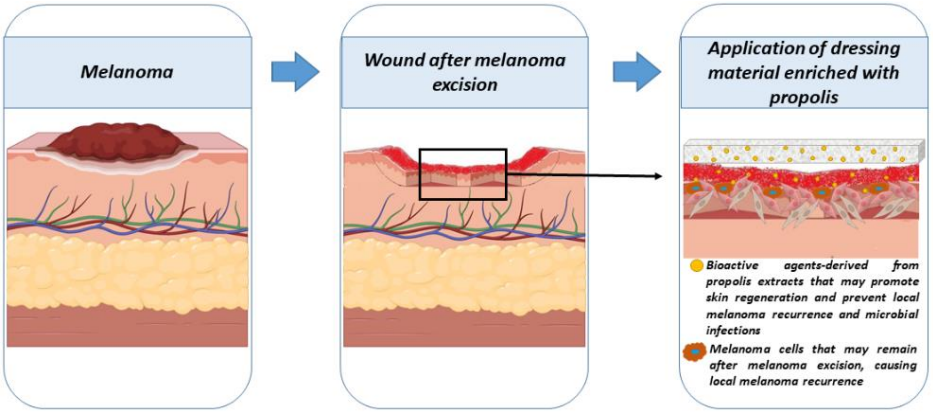

Fig. 1. Graphical representation of the main concept of the project.