INNOVATIVE DEVICE FOR THE DIAGNOSIS OF SKIN TUMORS

An AFM based instrument able to measure the mechanical properties of cancer cells

1. Unmet need

The skin cancers group of conditions includes actinic keratosis, melanoma, cutaneous lymphoma and benign neoplasms. Of these, melanoma is the rarest of skin cancers, but is the most aggressive and the deadliest. It is responsible for up to 75% of skin-cancer related deaths and its early diagnosis is the most important factor for a successful treatment. Melanoma is usually diagnosed by visual examination by a dermatologist or general practitioner. Diagnosing melanoma this way relies on the skill and experience of the pathologist, and it can be difficult to do, thus creating a gap in the ability to accurately diagnose the disease in all cases. Based on this, there is a strong medical need for a test that can rapidly screen and differentiate melanoma from other benign lesions.

2. Technology

The solution consists of an Atomic Force Microscopy (AFM) inspired instrument for the diagnosis of the malignant character of skin tumors. This new handheld nanoindenter based on AFM technology will be able to measure the relative stiffening of the mole tissue, and will infer its malignity without any surgical tissue sampling.

3. Main advantages

The ability to detect the presence of a tumor without the need of a surgical and invasive intervention allows to save time and money; as moles tracking is not required, even a dermatologist at its first inspection may spot malignant moles, also avoiding a surgical operation in the non-malignant cases. The immediate and non-invasive analysis of moles make the test suitable for performing large scale screenings for melanoma.

4. Stage of development

Basic principles have been observed using AFM laboratory equipment at CNR-IOM.

5. Intellectual property

The technology is not patented.

6. Target Markets

The new diagnostic device addresses the market of dermatology devices for skin cancer diagnosis. The global dermatology devices market is expected to reach $14.17 billion by 2021 from $8.22 billion in 2016, at a Compound Annual Growth Rate
(CAGR) of 11.50% during the forecast period. The dermatology devices market for diagnosis includes dermatoscopes, microscopes, and imaging devices, with the latter expecting to account for the largest share of the market during the forecast period. The skin cancer diagnosis segment accounted for the largest share in 2016. The increasing incidences of melanoma and non-melanoma skin cancer, technological advancements and availability of number of diagnostic products are some of the major drivers of skin cancer diagnostics market.

7. Potential Partners

Potential partners are manufacturers of medical analytical devices and nanotechnology/metrology instrumentation.