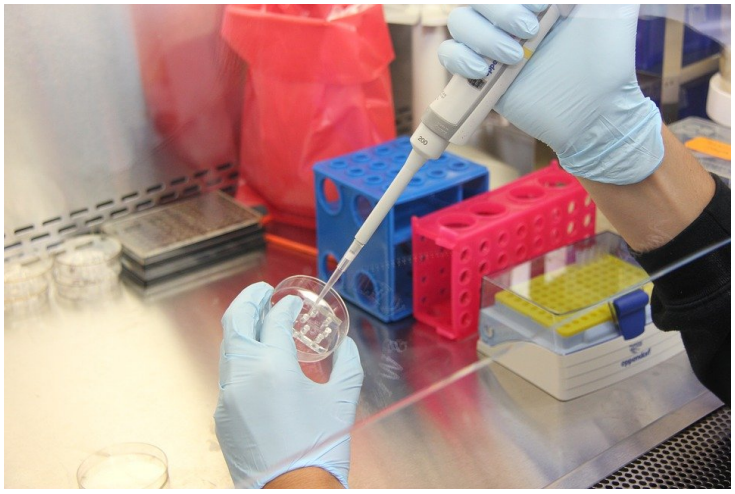
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IIT Ropar researchers working on a low-cost method for Detection of Early Skin Cancer

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Researchers at the Indian Institute of Technology Ropar are working on a new, personalized and cost-effective method for detection of early stage skin cancer.

Led by Dr. Ramjee Repaka, Department of Mechanical Engineering, IIT Ropar, the team has successfully managed to perform early stage cancer detection using Dynamic Thermal Imaging (DTI) in a simple clinical setting. The main concept behind this research is the fact that the thermal properties of cancer and blood are different due to which few features appear at the skin surface quickly than the other under the DTI setting.

In this method, the surface of the skin is cooled with the help of cold gel pack for a short period of time post which the skin surface is allowed to recover from cold stress under a stabilized room condition. During this period, the changes in the temperature distribution is recorded as images and videos using a thermal camera. These recorded images and videos are then analyzed to identify the differential changes in the thermal contrast between healthy and cancerous regions. The study revealed that in a physiologically hot region, the early cancer/small size cancer can be detected within first few minutes of the recovery period featuring large thermal contrast.

Moreover, the microcirculation of blood in the skin plays a vital role in many skin disorders including skin cancer. The microcirculation of blood in the subsurface region leads to temperature changes which can assist in detecting abnormal thermal texture. This abnormal texture is often regarded as early signs of cancer before the formation tumor/lump.

Talking about the research, Prof. Ramjee Repaka, Associate Professor, Department of Mechanical Engineering, IIT Ropar, said “Even today, it is challenging to detect early stage skin cancer due to no lump formation and unavailability of simple imaging systems. At present, we are using DTI for detection of small size mimicking tumor in the tissue phantom with subsurface vascular structures. Further plans are to extend to in vivo experiments for the determination of early skin cancer with possible collaboration with medical institutes.”