Electron microscopy reveals key differences between tumor and healthy tissue

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Epigenetic properties help determine how an individualâ€™s genes are expressed. Being able to quantify these patterns may provide clues to the development of cancer. For the first time, scientists from Japan have been able to measure large amounts of expression of gene genes in tumors at the site of metastasis in melanoma tumors. Using an immunofluorescence assay, they were able to determine key molecular differences between tumor and healthy tissue. The study was recently published in Cancer Research, a journal of the American Association for Cancer Research.

The most common tumor type in humans is melanoma. It is almost 10 times more common in men than in women. The disease first arises in the skin and usually leads to a tumor forming in nearby tissues. In metastasis, the disease spreads in the blood, bone, and other organs. A reduction in cancer cell death causes the tissues to die. If left untreated, this condition could lead to the formation of metastasis-associated cancers.

To develop immune detection and immune blockade strategy, biologists at the Ibaraki Institute of Medical Sciences (IMS) and Kyushu Institute of Technology (KIT) in Japan came up with immunofluorescence assay (IFA). The IFA has a potential for use in a variety of applications. Experimental studies by the team at KIT analyzed IFA results in human melanoma tumor and normal tissue samples, respectively.

After doing the analyses, the team confirmed that IFA revealed melanoma as a tumor. They then used the same immunofluorescence assay on new samples from a patient with a unique mutation and successfully detected the same tumor as a melanoma in a regional clinic.

Interestingly, tumor and normal cells activated IFA in different ways. The background-dominant cells were reactive to their predefined transcription factors. They sent a signal out, which led to cancer cells-like activity, while intermediate-dominant cells didnâ€™t respond to their transcription factors.

Tumor cells are displaying an excess of nicotinamide adenine dinucleotide (NAD), which is a type of adenosine triphosphate (ATP). In the normal tissue, this product was absent, causing normal tissue to remain inactive. At the tumor site, the immune cells were activated by NAD and lead to the development of the tumor.

The main purpose of this study was to test the feasibility of IFA in melanoma tumor and cell lines. However, it can also serve as a high-quality clinical diagnostic for many tumors. The team is currently conducting cancer immunotherapy with an IFA assay to determine the antigen-presenting cells.

A Close Up Of A Bird On A Tree Branch