

Changes in reactivity of immune cells, in response to removal of melanoma tumors

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In the year 2015 alone, 3951 individuals were diagnosed with melanoma in Sweden. Although melanoma is one of the most manageable cancer types, it is crucial to diagnose it in early stages. Later stages of the disease have a much worse prognosis and it is of great interest to understand the immune response of the body to melanoma. On their surface, tumor cells can carry surface proteins that the immune systems can recognize. These proteins are known as tumor associated antigens and allow the immune system to distinguish the tumor cells from normal functioning cells of the body. Not only can the tumor hide from the immune system by downregulating the expression of these antigens, but it can also fight back with multiple immune suppressive mechanisms. Tumor cells can secrete proteins that inhibit the function of immune cells, recruit suppressive cells to the tumor site and also use markers on their surface that give cell death signals to the immune cells.

Here we hypothesize that by removing melanoma tumors we also remove those immune inhibiting effects. As a result the immune cells should have increased response to tumor associated antigens. We used known melanoma antigens in the study to stimulate the immune cells and analyzed the immune response of T-cells, immune cells that have a big role in adaptive immune response.

We analyzed blood samples from patients before and after they had surgery to remove melanoma tumors. By removing the tumor, patients' T cells become more reactive and majority of patients showed an increase in cell response after surgery. One antigen in particular seems to be a potential biomarker for melanoma and could be used to predict if patients are likely to progress to more severe stages of the disease.

The cells also secrete more cytokines, small proteins that can affect the immune response and cells nearby. We observed that certain cytokine production pattern correlated with progression from stage III to stage IV melanoma. Using these cytokine profiles could also predict suitable treatment or progression of the disease, allowing for more personalized treatment and monitoring of melanoma patients.