CD80 as a Biomarker of p53 Activity and Target for Cancer Therapy
Technology #15386

Applications

This technology is a novel method for the characterization of p53 activity in tumorigenic cells using the cell surface expression of CD80 as a biomarker for \textit{in vitro} and \textit{in vivo} studies.

Problem Addressed

Lung cancer is the leading cause of cancer deaths worldwide - specifically, non-small-cell lung cancer (NSCLC), representing 85% of lung cancer cases. Lung adenocarcinoma, a histologic class of NSCLC, is associated with recurrent mutations in several well-defined oncogenes and tumor suppressor genes, such as p53. As a tumor suppressor, p53 plays a critical role in cell cycle regulation, and it is involved in apoptosis, genomic stability, and inhibition of angiogenesis. For instance, p53 is known to be involved in DNA repair, maintaining growth arrest, and ultimately inducing apoptosis if the cell is damaged. In humans, p53 is encoded by the TP53 gene. Exposure to chemicals, radiation, or viruses increases TP53’s probability of becoming mutant. These mutations are significant because over 50 percent of human tumors are associated with a mutation or deletion of the TP53 gene.

Technology

This invention is based on the discovery that genetic restoration of p53 activity effectively cleared tumorigenic cells in a mouse model of human adenocarcinoma. Tumor cell destruction is orchestrated by the immune system’s natural killer cells (NK), which upregulate the expression of the cell surface marker, CD80, in response to p53 activation. This invention uses anti-CD80 antibodies to monitor the status of p53 activity when DNA damage response or other cellular stress related mechanisms are activated.

Cell surface expression of CD80 in response to p53 action is of potential clinical relevance. For instance, the induction of CD80 upon p53 action makes CD80 a useful biomarker for chemotherapeutic success. In addition, cell surface localization of CD80 allows antibody-mediated therapies to specifically target cancer cells with an activated p53 program.

Advantages

- anti-CD80 antibodies make tumor cells a specific target
- CD80 expression useful for monitoring exposure to DNA damage agents or other cellular stresses.
- CD80 in response to p53 activation is of potential clinical relevance
- CD80 is expressed on the cell surface after p53 activation
Categories For This Invention:
Life Sciences
Oncology
Therapeutics

Intellectual Property:
Methods and Products Related to Targeted Cancer Therapy
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Publications:
Stage-specific sensitivity to p53 restoration during lung cancer progression
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