Using Dendritic Cells to Create Cancer Vaccines

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The immune system is the body’s main defense against viruses, tumors, and other foreign invaders by use of antibodies and cytokines secreted from a white blood cell. HIV is an example of a pathogen that targets the immune system, specifically the CD4 helper cells. Tumors however, are more difficult for the immune system to recognize as a threat because it is composed of normal tissue cells (“self “), keeping in mind that the immune system attacks only foreign molecules. Before you can find a cure for cancer, one must target these tumorous cells. Which brings up the topic of using immunotherapy monoclonal antibodies, produced by B cells, to target these cancerous tumors. Monoclonal antibodies are used to find human antibody encoding genes, and have the ability to recognize constitutes of cancerous tumors. These antibodies are produced via recombinant DNA techniques, to isolate the specific antibody and amplify the population in a bacterial organism (rapid division). However, there are limitations to using monoclonal antibodies to treat cancer. First understand, that antibodies are highly specific, therefore a single antibody can only recognize a single target molecule on the tumor. This is why another downside of monoclonal antibody treatment is that since the patient’s immune system is not producing the monoclonal antibodies, it must be administered constantly over time. An additional point mentioned in regards to monoclonal antibodies, is that a single antibody has virtually no effect on a tumor. This limitation is also seen as a positive because the use of monoclonal antibodies in cancer treatment, allows the use of multiple antibodies making the therapy even more effective in fighting off cancer (not a cure), than chemotherapy which targets all cells. Although monoclonal antibodies are non-toxic, they still cause a hypersensitivity reaction in the body. Antibodies of human origin can also recognize proteins produced by other humans. A specific monoclonal antibody is Herceptin, which treats breast cancer.