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### **Dendritic cell vaccines for cancer: a mathematical description.**

An increasing number of medical researchers have begun to recognize the importance of harnessing a patient's immune system to combat cancer, and there is a wide array of immune therapies currently under investigation. One promising immune therapy is dendritic cell (DC) treatment. Dendritic cell treatment consists of injecting primed DCs into the patient to trigger an improved immune response to an existing tumor. There are several open questions in DC treatment. One is the timing of the doses: since the immune response is self-regulating, feedback mechanisms can reduce the effectiveness of the vaccine if the dose is too large or if the vaccine is given too often. Another open question is what impact the choice of injection site has on the efficacy of the therapy. In this mathematical model, we describe the trafficking and interactions of DCs and other immune cells in the body. Data from murine studies of the effect of DC injections are used to calibrate the model. The model allows us to investigate various cancer responses to treatment as DC injection sites and doses are varied.