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Activation of Dendritic Cell Subsets Following alum- or MPL-adjuvanted Vaccination

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An understanding of the mechanism of vaccine response is essential to elicit long-term durable antibody protection through vaccination. Why is it that some vaccines achieve lifelong antibody titers, while others begin to lose antibody protection soon after vaccination? In our research, we wished to identify the dendritic cell (DC) subsets involved in the initiation of differential immune responses following alum- or MPL-adjuvanted vaccination. We hypothesized different DC subsets would respond to the different adjuvants, such that each subset is specialized to prime a specific set of T-cells. MPL-adjuvants would be more likely to activate CD24+ DCs to mediate Th1 cell-mediated immune responses, while alum-adjuvants would be more likely to activate DN-DCs to mediate Th2 antibody-mediated immune responses. In order to determine the efficiency of DC antigen presentation, in addition to DC activation, a special peptide antigen was injected into mice along with a particular adjuvant. Mice were subcutaneously injected into the flank with a solution of adjuvant and peptide, and DCs were isolated from the draining lymph nodes 24 hours post-immunization. Another set of mice was intraperitoneally injected with the same solution, and DCs were isolated from the spleen 24 hours post-immunization. Activated DCs were quantified by flow cytometry using DC subset-specific markers compared to unvaccinated controls. Preliminary data has so far suggested there are no differences in DC activation and/or antigen presentation among the different DC subsets in response to injection with different adjuvants.