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Project Title: Development of an Aspergillus fumigatus vaccine for protection against pulmonary aspergillosis in poultry

Synopsis: Aspergillus fumigatus is the main cause of pulmonary aspergillosis (PA); because of this infection, sick poultry must be discarded, causing huge economic losses each year.

Abstract: In Study 1, a chronic pulmonary aspergillosis was established in immunocompetent Specific Pathogen Free (SPF) chickens by infecting them mucosally with different doses of A. fumigatus spores (3.20x10^6, 5.48x10^7, 2.82x10^8, 5.34x10^8). 8 days post-challenge, lungs and trachea were collected, and colony forming units (CFU)/g determined. Having standardized the infection, we tested the efficacy of a vaccine containing recombinant Aspergillus proteins and the TLR4 adjuvant MPL. Recombinant A3, A9 and He proteins were conjugated to VXL via maleimide. In Study 2, VXL-3Asp vaccines at 5 or 10ug of each antigen/dose were compared with VXL without protein or PBS control in a sublethal immunocompetent SPF chicken challenge model. Chickens were given 3 vaccinations (subcutaneous prime and 2 mucosal boosts) 2 or 3 weeks apart. SPF chickens were challenged mucosally with 5x10^8 viable A. fumigatus conidia/bird. Lungs and tracheas were collected 8 days post-challenge (n=7-10 per group), homogenized, and plated for CFU/g. In order to establish a more severe infection in these birds, a third study was performed using the steroid suppressant Dexamethasone. In Study 3, SPF chickens were treated with a variety of immunosuppressive regimens using 1.5 mg/kg Dexamethasone and were challenged with 4.6x10^8 viable A. fumigatus spores/bird. The experimental groups from Study 3 were compared against a PBS control receiving no immunosuppressive therapy with A. fumigatus challenge, and a control group receiving immunosuppressive therapy without A. fumigatus challenge. Lungs and trachea were collected 8 days post-challenge (n=4/group), homogenized, and plated for CFU/g.