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## Pre-exposure prophylaxis with OspA-specific human monoclonal antibodies protects mice against tick transmission of Lyme disease spirochetes


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**UMass CCTS Research Retreat**  
Poster Abstract Submission

Pre-exposure prophylaxis with OspA-specific human monoclonal antibodies protects mice against tick transmission of Lyme disease spirochetes

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**Background.** Tick transmission of *Borrelia* spirochetes to humans results in significant morbidity from Lyme disease worldwide. Serum concentrations of antibodies against outer surface protein A (OspA) were shown to correlate with protection from infection with *Borrelia burgdorferi*, the primary cause of Lyme disease in the United States.

**Methods.** Mice transgenic for human immunoglobulin genes were immunized with OspA protein of *B. burgdorferi* to generate human monoclonal antibodies (HuMabs) against OspA. HuMabs were generated and tested in *in vitro* borreliacidal assays and animal protection assays.

**Results.** Nearly 100 unique OspA specific HuMabs were generated and four HuMabs (221-7, 857-2, 319-44, and 212-55) were selected as lead candidates based on borreliacidal activity. HuMab 319-44, 857-2 and 212-55 were borreliacidal against one or two *Borrelia* genospecies, whereas 221-7 was borreliacidal (IC<sub>50</sub> <1nM) against *B. burgdorferi*, *B. afzelii* and *B. garinii*, the three main genospecies endemic in the US, Europe and Asia. All four HuMabs completely protected mice from infection at 10 mg/kg in a murine model of tick-mediated transmission of *B. burgdorferi*.

**Conclusions.** Our study indicates that OspA-specific HuMabs can prevent the transmission of *Borrelia* and administration of these antibodies could be employed as pre-exposure prophylaxis for Lyme disease.



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