Mucoadhesive HA-Based Film Releasing Metronidazole to Treat Bacterial Vaginosis

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Bacterial vaginosis is a very prevalent women's health issue that affects millions of women worldwide every year, and many current treatments are messy, inconvenient, and ineffective. Therefore, I wanted to develop a new method of delivering metronidazole that would be more effective, more convenient, and at a low pH similar to that of the normal vaginal environment. Films were made by crosslinking modified hyaluronic acid, using a crosslinker, to create a hydrogel, in which metronidazole or metronidazole benzoate and methylcellulose were incorporated, and was dried to a thin film. Drug release testing was run by placing the films in simulated vaginal fluid and assessing drug concentration in the fluid using UV spectroscopy. Mucoadhesion tests were run by placing strips of film on bovine vaginal tissue that was set at an angle, and running simulated vaginal fluid over the film and tissue using a syringe pump. Swelling of the films was evaluated by hydrating the films, taking pictures using a stereomicroscope, and evaluating the dimensions using ImageJ. Tensile strength tests were conducted with Instron equipment, and were compared to qualitative measures of flexibility of the films. A formulation was found that created films at a pH between 4 and 5, with a controlled release of metronidazole benzoate over multiple days, and adhesion to the tissue for multiple days.

Awards Won: