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# Preparation and characterization of functionalized heparin-loaded poly-Ɛ-caprolactone fibrous mats to prevent infection with human papillomaviruses

**Daniela Gonzalez**
University of Nebraska Lincoln, USA

Human Papillomavirus (HPV) is the most common sexually transmitted infection world-wide. Persistent infection with high-risk HPV types can induce cell abnormalities that could lead to the development of pre-cancer or cancer of the cervix. Cervical cancer is the second most common cancer among women, and the leading cause of cancer deaths in women in developing countries. Current approaches to reduce its incidence involve cervical cancer screenings and HPV prophylactic vaccines. However, neither HPV vaccines are effective in women who are already infected, nor they protect against all HPV types. Then this study is aimed at developing a specific virus-binding material to prevent HPV infection. Two different approaches to produce heparin-loaded poly-ε-caprolactone (PCL) fibrous materials were applied: one involved a simple matrix encapsulation of heparin (PCL-Hep), while the other was based on the use of chemical cross-linking of heparin to the PCL backbone (PCL-Hep-CL, CL (crosslinked)). Both materials were characterized on the basis of their physical, biocompatible, thermal and biological properties. The PCL-Hep mat showed a sustained heparin release profile, while the heparin in PCL-Hep-CL was shown to be long-term stable. A high binding affinity for HPV16 L1 capsids was found for the crosslinked material. Infectivity assays with HPV16 pseudovirions, demonstrated a 94% and 70% cell infection reduction, for the PCL-Hep and PCL-Hep-CL materials, respectively. The presented results suggest that the proposed materials are a promising candidate to prevent HPV infection, and their use can potentially reduce the incidence of cervical cancer in millions of women that are already infected with HPV.

## Biography

Daniela Gonzalez completed her graduation from the University of Nebraska Lincoln. As a student, she have had the opportunity to understand the importance of interdisciplinary science and engineering, as well as to interact and collaborate with other scientists within the university and in private companies. The original idea of her thesis research, including design and testing of materials, is entirely her contribution. Following her graduation, she is interested in further investigation of her thesis, as well as to work with private companies.

danigo2@gmail.com

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