

Surface Plasmon Resonance Studies Focused on Heparin-Protein Binding

Jillian Hurst, Dr. Kimberly Forsten-Williams
National Science Foundation Science and Technology Center
Virginia Polytechnic Institute and State University
Blacksburg, VA 24061

Abstract

Angiogenesis is the sprouting of new capillaries from pre-existing vessels. In 1971, it was hypothesized that tumors are angiogenesis dependent and later works have lent credence to this theory. Basic fibroblast growth factor (FGF-2) is one of the proteins secreted by tumor cells to promote angiogenesis. FGF-2 must first bind to a heparan sulfate proteoglycans (HSPG) in order to trigger its receptor, which leads to the activity cascade responsible for much of the angiogenic activity in cells. If the FGF-2 can be prevented from interacting with its receptor in tumor cells, angiogenesis would be reduced, preventing further growth. The purpose of this experiment was to develop a procedure using Surface Plasmon Resonance to study the affinity of FGF-2 for a series of heparin fractions so that the heparin with the greatest affinity for FGF-2 could be identified and then used to create an analog that would block angiogenesis. The paper discusses the experiments undertaken to develop an immobilization process for FGF-2 that would allow it to interact with the heparin fractions to produce strong, clear signals that could be used to determine the k_a and k_d of each reaction.