Using engineered zinc finger proteins to detect pathogen-specific DNA.

Caleb Seldaka , Minsub Chungb , Moon-Soo Kima

a Department of Chemestry, Western Kentucky University,1906 College Heights Blvd, Bowling Green, KY 42101 USA

b department of Chemical Enginering, Hongik University Seoul, Korea

Zinc Finger Proteins (ZFPs) are one of the most common DNA-binding domains. ZFPs can be engineered to bind to specific genes on a double stranded DNA. Developing a rapid and reliable method for detecting specific pathogens would be greatly beneficial to modern biomedicine as well as more resource-limiting areas. A pair of ZFPs was used in a two-step process to first capture the target DNA and then apply the second detection probe ZFP labelled with a fluorescent molecule. A stx2 gene was chosen as a target DNA,which encodes for Shiga toxin a food born pathogen *E.coli O157*. The ZFP array takes the capture ZFP probe and immobilizes it on an acrylamide gel surface. After target DNA was added, the detection probe a ZFP labeled with a fluoresces molecule was applied to the bound complex of the capture probe and target DNA. At the final step, fluorescence intensity was measured to compare the signals between target DNA and non-target DNA.

Part of this research was carried out through the collaboration between WKU and Hongik University in south Korea through the National Science Foundation IRES Program. This collaboration helps to gain advanced research experience, and as allowed an opportunity to learn and experience Korean culture.