

Development of Polymer Optical Fiber Apta-sensor for the Detection of Cortisol and Geosmin in Aquaculture

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Cortisol is a stress hormone and made in the adrenal glands. Geosmin is produced by various blue-green algae (cyanobacteria) and lead to off-flavoring to the fish meat. Cortisol can impact the fish welfare, growth rate and production of the meat because the stressed fishes utilize most of their energy for the stress related activities. Due to these two molecules the fish farmer faces financial loss. Therefore the sensing of cortisol and geosmin is very important in aquaculture. The so far available methods for the cortisol and geosmin sensing are expensive, time consuming and cannot be used for online monitoring.

Design and Sensing principle: The schematic of the sensor design is shown in fig.1. A thin layer of polyacrylamide gel is placed inside the cavity in which the aptamer and AF488 tagged cortisol is immobilized. The cavity is closed by the membrane. The tagged cortisol is not able to penetrate the membrane while the normal cortisol molecules are able to get in and out through the membrane. Both tagged and normal cortisol can diffuse in and out through the gel and depending on the amount of the normal cortisol, the concentration of the tagged cortisol will vary inside the gel [1, 2]. This will change the fluorescence intensity.

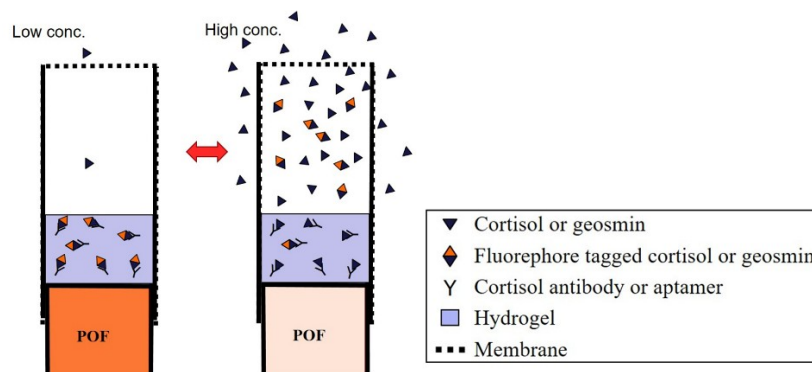


Fig.1. Schematic of the sensor.

References:

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2. Jing C. Zhou et. al. Immunoassays for cortisol using antibody-doped sol-gel silica, J. Mater. Chem, 2004, 14, 2311- 2316.