

Biosensor for single cell entrapment and study of cellular pathways

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All aerobic species on the earth uses O₂ in its respiration. This metabolic process of respiration also produces reactive oxygen species such as super oxides (O₂⁻), hydroxyls (OH[•]), peroxy (LO₂[•]), alcoxyl (LO[•]), hydroperoxyls (HO₂[•]). Toxic effects of these oxidative species can attack DNA, lipids, proteins and nucleic acids present in the body and may even lead to cell death. Mammalian cell has many antioxidants to balance the side effects of these free radicals. When the imbalance between antioxidants and reactive species becomes larger, indicates the pathological condition of body. Oxidative stress has been linked to many diseased conditions in human, such as inflammation, heart disease, cancer, neuronal diseases, etc. 8-hydroxy 2-deoxy guanine (8-OHDG) is the most frequently detected and studied oxidative DNA lesion. We propose to fabricate a lab on chip device to study single cell exocytosis of 8-OHDG under stress conditions. We are also integrating two approaches to trap a single cell by dielectrophoresis and surface modification. Dielectrophoresis allows us to capture a single cell in few seconds while surface modification helps us avoid nonspecific adsorption and longer cell viability during our studies.

Biography

Pratikkumar Shah is pursuing his Ph.D at the Florida International University (FIU) in Biomedical Engineering major. His area of research interests are biosensors, point of care devices and single cell studies. Mr Shah has finished his masters from New Jersey Institute of Technology (NJIT) with an honor of 4.0/4.0 GPA in Biomedical Engineering major before joining FIU. He has been part of many hospitals and industrial corporations including Siemens Hearing Instruments, NJ, USA during his academic and professional track record.

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