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Pollutants, in particular air pollutants, affect human health. Due to a recent surge of alternative motor vehicle fuels, novel air pollutants are on the rise, but their impact on human health is unknown. Unfortunately, the use of animal models to characterize the biological impact of novel pollutants is labor and cost-prohibitive and in vitro models have not been standardized. Our recent work has indicated that whole cell-based biosensors, a technology that could easily be standardized, may be able to detect pollutant-induced changes in cellular function. Ultimately, whole cell-based biosensors should be standardized and should be biologically-relevant. For this project, we seek to determine the feasibility of developing a biologically-relevant whole cell-based biosensor for characterizing the biological impact of pollutants. Additionally, we seek to standardize these biosensors by linking pollutant induced disruption of cellular function, e.g. movement, to specific cellular changes, e.g. intracellular pH (pHi). The project described here is a critical step in seeking extramural funding whose goal is to initiate a research program aimed at developing cell-based biosensors for characterizing the toxicity of novel pollutants. Furthermore, this characterization of pollutants will further the understanding of mechanisms for pollutant-induced cell toxicity, as well as potentially reveal how pollutants lead to adverse human health outcomes.