Winners of the BGU-FOR June 2023 Grant:

Population Vulnerability and Resilience Using Wastewater-based Epidemiology

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Wastewater-based epidemiology (WBE), a rapidly evolving field where biomarkers indicative of human behavior, exposure, and activity are assessed through wastewater analysis, may provide a viable option to evaluating changes in public health. Community wastewater has long been known to contain a mixture of toxic chemicals, pathogens, pollutants, drugs, hormones, etc. Therefore, wastewater treatment facilities provide important venues for epidemiological investigations of emerging diseases. Indeed, WBE can monitor large populations and has the potential to provide an early-warning platform for the spread of diseases and/or contaminants. Targeting biomarkers indicative of population behaviors can address public health issues emerging during stressful events. Physiological stress has been shown to affect an individual's mood, sense of well-being, and overall health, with chronic stress linked to the top six leading causes of death. So far, no national-scale social surveys to detect real-time changes during stressful events within a specific community have been conducted. Thus, the main goal of this study is to investigate whether wastewater monitoring for stress markers can provide an important tool to identify the effects of stress at population levels. Using measurable health and stress markers, including levels of endogenous stress hormones (cortisol and cortisone), nicotine, cotinine, caffeine, and anti-depression/anxiety drugs (SSRI, SNRI, and benzodiazepines) in wastewater, combined with sociological surveys, may provide important markers for the detection and prediction of increased stress in a population.
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