
Real-time cortisol monitoring for stress control

A Data management plan created using the DMPTool

Creator(s): Hyeun Joong Yoon

Affiliation: South Dakota State University

Last modified: January 20, 2017

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Types of data produced

The primary data to be collected is sweat cortisol concentration measured by the cortisol sensor, in response to stressors on the human body. Patterns in the data will be analyzed for prediction of performance based on cortisol level. These data will be shown as (1) cyclic voltammetry (CV) in response to the cortisol concentration in human sweat; (2) real-time chronoamperometric (CA) responses to different cortisol levels; and (3) electrochemical characterization of the developed cortisol sensor. Another type of data to be retained is Matlab code and results from modeling, training, prediction, and calculation from the machine learning algorithms.

Data and metadata standards

The raw data will be processed through the graphing and data analysis program Origin, and will be exported as PNG, JPEG, or PDF files. Investigators can capture the detail of the data by analyzing the recorded current or the voltage measurement shown as the text, or excel file format, which eventually will be processed into the PNG, JPEG, or PDF files.

Policies for access and sharing

Results/data from the research conducted will be shared in several ways. Manuscripts will be submitted for publication in high-quality peer-reviewed journals. Findings will be presented at relevant national or international conferences on biomedical, sensor, material, and chemistry research.

Policies for reuse, redistribution, and derivatives

Data can be cited by referring to the published journal papers. Any researchers/teachers/students studying electrical engineering/chemistry/biomedical engineering will be interested in the data. If intellectual properties are generated, the policies and procedures of the South Dakota Board of Regents and South Dakota State University will govern data access and confidentiality. Once the necessary invention disclosures and/or provisional patents are filed, these data will promptly be disseminated to the scientific community.

Plans for access to data used in publications

The results and data to be shown in the journal papers will be publicly open to anyone without any time limits.

Plans for archiving and preservation

The working physical samples (e.g. cortisol sensor device) that generate data of interest for publications, presentations, and theses/dissertation will be kept in a special storage area in the PI's lab. The stored materials will be labeled with the name of the investigators who created the sample, as well as the sample's name, properties, and generation date. Physical samples will be preserved in the PI's lab for at least three years beyond termination of the award. Long term storage will involve exporting metadata stored within the JPG files (date, time, and tag information) into text files to facilitate access to the metadata and as a safeguard, should the specifics of JPG metadata structure change. The image files will be stored in a single zip file containing the date-hierarchical file structure.