

Cortisol Biosensor

Rodolfo Nino-Esparza

Abstract: Cortisol, a steroid hormone, is known to be a stress biomarker. Developing devices for point-of-care analysis of salivary cortisol has become important to identify environmental and behavioural triggers towards stress. Saliva-based cortisol sensing has the advantage of obtaining samples in a non-invasive and minimal discomfort to the specimen, minimizing any additional stress. Point-of-care analysis devices should be portable, easy to use, fast, and cost effective. However, standard methods of measurement such as enzyme-linked immunosorbent assay (ELISA) are time-consuming, expensive, and challenging to implement in a point-of-care application.

Lateral flow assays (LFA) have been used for rapid, point-of-care applications for qualitative and quantitative analysis of salivary cortisol concentrations. Two indicator lines, become present as the sample flows through the LFA strip. These lines can then be measured using image processing techniques to quantify the concentration of cortisol in the salivary sample. Therefore, the image processing is an important step in the precise quantification of cortisol in saliva using LFA. An image processing algorithm can be embedded into a smartphone application using the camera, to measure cortisol using LFA. The developed system could enable automated and faster point-of-care measurement of cortisol in saliva.