

## Electrochemical aptamer-based (EAB) sensors: a platform technology supporting real-time molecular monitoring in the living body

Robert H. Batchelor \*

Nutromics Pty Ltd, Melbourne, Australia

### Abstract

Current methods for monitoring specific molecules in the living body, such as the continuous glucose monitor, rely on the enzymatic or chemical reactivity of their targets, and thus are not generalizable to new targets. For this reason, only a handful of metabolites and neurotransmitters can currently be measured in vivo. Against this background, we are developing a molecular measurement platform that: (1) has been demonstrated able to work in the living body and (2) is independent of the reactivity of its targets and thus is general. Our devices use electrochemical aptamer-based (EAB) sensors. Aptamers are engineered nucleic acids generated by an in-vitro method to selectively bind desired molecular targets. The aptamers are designed to undergo a large-scale conformational change upon binding their target. By immobilizing one end of the aptamer to an interrogating electrode and modifying the other end with a redox reporter, target binding can be easily monitored using standard electrochemical techniques. Because every step in this process is rapidly reversible, EAB sensors can selectively monitor rising and falling target concentrations in vivo and in real time. Using 75-micron diameter, 4-millimeter long EAB sensors we have demonstrated the measurement of multiple molecular analytes using sensors placed in situ in the living body [1-4]. The sensors achieve clinically relevant precision and accuracy, and time resolution of seconds. Moving forward, we are adapting this technology to pain-free microneedles and

wearable, wireless electronics to create a convenient, real-time platform for monitoring the molecular physiological status of humans..

### Biography

Robert Batchelor completed both his MS in Pharmacology and BS in Biochemistry at the University of Washington in Seattle, USA. Since then, he has gained over twenty years' experience in the biotech industry and has launched over 50 products to market at several companies, including ThermoFisher. He is an expert on developing electrochemical aptamer-based sensors based on his experience at four startup companies in the US and Australia, including Base Pair Biotechnologies in Houston, Texas, and former wearable medicine sensing industry leader Eccrine Systems in Cincinnati, Ohio. He is currently the Head of Biosensors at Nutromics in Melbourne, Australia.