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**CYBERTONGUE<sup>®</sup>, a multiplexed biosensing platform where BRET meets flow - for food diagnostic and other applications**

At the same time as the global supply chain for food and food ingredients is diversifying, tolerance for food risk is decreasing and demands for timeliness and cost minimization are intensifying. Current food diagnostic technologies are mainly focused on microbial safety but quality, process ability and chemical composition are increasingly important reasons for testing food. Rather than competing with gold standard analytical methods in accredited centralized testing laboratories, we set out to develop a biosensor platform that can provide rapid, real-time or continuous measurements of a range of different analytes in food, to inform the decisions of food producers and processors. The resulting CYBERTONGUE<sup>®</sup> technology platform uniquely combines three features. 1) The availability of a diverse repertoire of biosensors, all of which transduce a biochemical event into a photonic signal, using bioluminescence resonance energy transfer (BRET), with profound advantages over competing approaches. 2) The biosensors are used in the fluid phase, i.e., they are not fixed to a surface but mix with the sample on a microfluidic chip and are continuously replenished, and avoiding problems of sensor drift and slow regeneration and 3) Whilst single channel mode is the simplest, we have also demonstrated the use of a multichannel chip with different biosensors in each channel, simultaneously measuring different aspects of a single sample. The same principles can also be applied to biosensors for clinical diagnoses. I will describe the technical basis of CYBERTONGUE<sup>®</sup> technology and illustrate it with applications to measuring maltose in beer and spoilage proteases in milk.

**Biography**

Stephen Trowell completed his PhD in Visual Transduction Biochemistry at the Australian National University. In 1989, he was awarded an Australian National Research Fellowship, which he took up at CSIRO, Australia's National Research Agency, where he obtained tenure as a researcher. He is currently a Senior Principal Research Scientist and Group Leader for Innovative Bioproducts. He has authored 54 full papers in international refereed journals and is inventor on 15 patent families. He has served on the Editorial Board of Bioinspiration and Biomimetics since 2010 and is a recipient of CSIRO's Newton-Turner career award.

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