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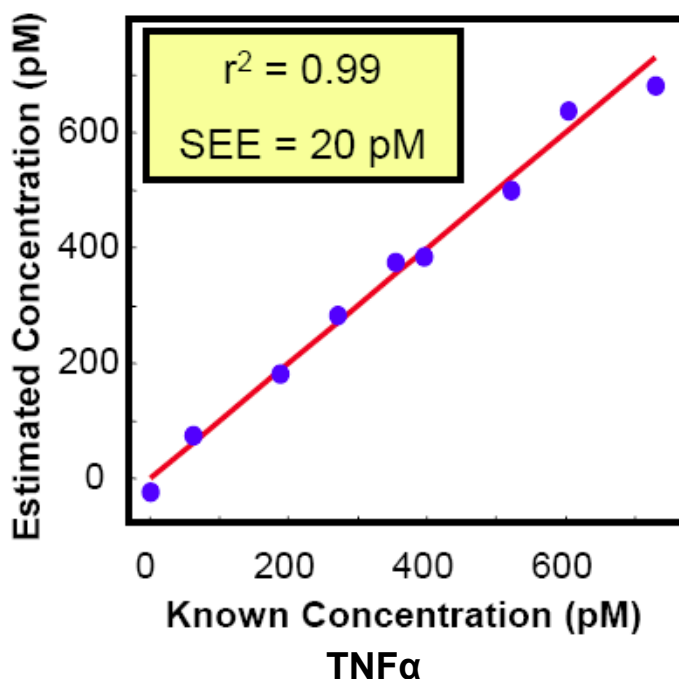


Hydrogel Biosensors for Quantifying Analytes by Ultrasound

Applications: Bioanalysis in human or veterinary samples

Advantages: Simpler, faster and cheaper than ELISA

The inventors have discovered that an antibody (Ab) covalently linked to an ultrasound (US) contrast agent, such as carboxymethyl cellulose (CMC) displays a characteristic ultrasound profile when combined with the relevant antigen. Such an Ab is essentially “transparent” when in the unbound form. Thus it is possible to use the reagent as an immunoassay system without the need to separate bound from free Ab. Pilot studies with a protein (TNF α , see below) or with a small molecule (acetaminophen, not shown) indicate remarkable linear correlation



In other studies using a related approach called “molecular imprinting” of N-isopropylacrylamide, it is possible to detect certain small molecules such as caffeine and theophylline, albeit at a lesser sensitivity (μM – mM).



Lead Inventor

Dr. David Burns Ph.D.

The focus of our research is to develop quantitative non-invasive or minimally invasive measurements of composition and bioenergetic status in biological systems. This effort involves the science of optical spectroscopy, chemometrics, biophysics, image processing, and light propagation physics. There are three distinct facets to the research: (1) development of methodologies to quantify bioenergetic markers of metabolism, (2) development of strategies for quantitative three-dimensional measurements in scattering media, and (3) development of techniques for measurement of low concentration species in biological fluids and food stuffs. The knowledge gained from this approach will provide a powerful new tool to study respiration and metabolism from a systems viewpoint.

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