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# Women's Health & Breast Cancer

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### Towards early stage detection of ovarian cancer via lysophosphatidic acid as a biomarker

The existing CA-125 assay for ovarian cancer has been used for many years but is widely regarded to be inadequate, especially for detection of early development of the disease (stages I and II). Accordingly, there is an urgent requirement for a screening assay that can detect the presence of ovarian or fallopian tube tumours at the early stage of the disease via biomarker technology. Our technology involves the biomarker, lysophosphatidic acid (LPA), which has clearly been shown to be present in the early stages of disease. Currently, there is no simple screening assay for this molecule in serum or blood. We are in the process of developing both a simple screening assay, and a biosensor technique specially designed for the clinical biochemistry lab for LPA. The design of our assay is based upon the highly selective disruption of the binding of gelsolin to the protein actin by LPA, which is signalled via a rhodamine dye. We have studied the concentration-dependent break up of the gelsolin-actin-rhodamine complex at LPA concentrations of biological significance (1-50 micromolar). This chemistry has been shown to be effective in serum. In order to produce a future assay, it is necessary to transfer the chemistry to a suitable material surface. This has been successfully achieved by Ni-NTA linkers via their attachment to his-tags on gelsolin (to plastic, silica and metal). For these surfaces, we have developed nanoparticle technology (SiO<sub>2</sub>) that increases the surface area available for protein probe binding. To date, we have demonstrated that LPA concentrations at sub- 20 micromolar concentration can be measured directly in human serum.

### Biography

Michael Thompson has completed his PhD from McMaster University in Hamilton, Ontario. He is a Professor of Bioanalytical Chemistry in both the Department of Chemistry and Institute for Biomedical Engineering at the University of Toronto. He has published close to 300 papers in international journals and has received many prestigious awards for his research. He served on the Editorial Boards of major journals and is currently Editor in Chief of the Royal Society of Chemistry book series on Detection Science. He was a Fellow of the Royal Society of Canada in 1999.

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