

BREAST CANCER BIOMARKER

Long non-coding RNA, *ZNF1AS*

Contact Details

Dr Amanda Smith

a.smith@imbcom.com.au

+61 (7) 3346 2188

About IMBcom

IMBcom is The University of Queensland's commercialisation company for the Institute for Molecular Bioscience (IMB). IMBcom have assembled an experienced management team comprised of patent attorneys, and Pharma and biotechnology executives, who have extensive experience in identifying and protecting intellectual property, devising development and business strategies, capital raising, licensing and founding start-up companies. Several of IMBcom technologies have progressed to Phase II.

Summary of the Opportunity

The human long non coding antisense RNA, *ZNF1AS*, is involved in mammary gland development and is significantly down-regulated in breast cancer. There is an opportunity to commercially exploit this discovery through the development of new therapeutics and molecular diagnostics and/or prognostics.

Technology

Protein coding genes account for only 1.2 to 1.8 percent of human genomic DNA. The majority of the genome is instead transcribed into non-protein coding RNAs (ncRNAs). A body of evidence demonstrating that ncRNAs form an epigenetic regulatory network directing gene expression during development and disease is rapidly emerging. Several new ncRNAs have been discovered by the RNomics Group at the University of Queensland's (UQ's) Institute for Molecular Bioscience (IMB).

Transcription of *ZNF1AS* is initiated from the antisense strand of the zinc finger NFX-1-type containing (*ZNF1*) promoter region and is found in both the nucleus and cytoplasm. There are at least five human isoforms of *ZNF1AS* up to 700 nucleotides long. It is expressed in a range of tissues but appears to be higher in those with an alveolar structure such as lung and mammary gland. Initial observations showed that the mouse homolog, *Znfx1as*, is expressed at a lower level in mammary gland during pregnancy suggesting differential expression in highly proliferating cells.

Applications

There is an opportunity to commercially exploit this discovery in a broad range of applications:

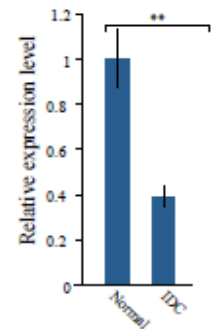
- Cancer diagnostics and prognostics; and
- Treatment of cancer through activation of *ZNF1AS*;

Similar results are anticipated for other cancers – particularly other epithelial cell-derived cancers of alveolar tissues such as the lung.

Proof of Concept

Proof of concept studies demonstrated that *ZNFX1AS* modulates cell proliferation and has a role in breast cancer:

- In vitro knock-down of *Znfx1as* by RNAi results in an increase in the proliferation of the murine mammary gland cell line, HC11;
- Analysis of deep sequencing data shows a significant decrease of *ZNFX1AS* in breast cancer tissues compared to normal tissues; and
- Microdissection and isolation of RNA from epithelial cells of human invasive ductal carcinoma (IDC) breast tissue samples showed that the expression of *ZNFX1AS* is approximately 2-fold lower compared to normal breast tissue.



Opportunity

Molecular diagnostics and prognostics have emerged as the fastest growing segment of the in vitro diagnostics market - estimated to reach \$7 Billion by 2011 (MarketResearch.com).

Whilst still in its relative infancy, the market for epigenetics-based therapeutics has already achieved a market value of more than \$560 million and is tipped to reach \$2.8 billion by 2020. There are now several epigenetics-focused companies throughout the world and growing interest from big pharma is evident through a number of notable strategic acquisitions (Business Insights).

The University of Queensland's intellectual property offers an opportunity to establish a foothold on the commercial exploitation of *ZNFX1AS* through an early stage partnership. The capabilities and bespoke technologies within the IMB further complement any collaborative discovery and development program.

Intellectual Property

A provisional patent application was filed in June 2010 to protect the use of *ZNFX1AS* for cancer therapeutics, diagnostics and prognostics.