BEAR: Biologically Enhanced Assay in Real-Time

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Introduction

The current hormone detection methods are costly and time-consuming. The commonly used Enzyme-Linked Immunosorbent Assay (ELISA) kits can cost up to $1000 dollars to test 80 samples, which can take several days from sample collection to analysis. Results can be inaccurate due to degradation prior to testing.

The Lethbridge Entrepreneurial iGEM team is developing a novel method of detecting hormones using synthetic biology principles that can be applied to research, medical and livestock agriculture industries. Extensive sample preparation will be eliminated with our design and will allow researchers and medical practitioners to monitor fluctuations in multiple hormone levels in real-time.

To accomplish this goal, the company Synbiologica Ltd has been incorporated. Our business plan has won first place at two business plan competitions, the South Venture Business Plan Competition and the Chinook Entrepreneurial Challenge.

Research Project

BEAR is a low cost, modular device that will allow scientists to detect hormones in real time. The modularity of BEAR will allow for detection of multiple hormones. These one time use pieces capable of detecting a single hormone can be interchanged depending on the researcher’s need.

Business Plan

BEAR is being proved to be effective in a laboratory setting, with Synbiologica Ltd, currently seeking a patent for the device that will be used with a test subject or patient for monitoring of changing hormone levels in the bloodstream.

MARKET OVERVIEW: BEAR will be a valuable research tool to scientific researchers who specialize in endocrinology or neuroscience. Multiple BEAR apparatus will be needed to detect hormonal changes in each individual subject that requires testing for their studies. An ongoing market will be created since researchers will have to continuously purchase the hormone-detection units for their BEAR apparatus. In the future, BEAR could be applied to the agriculture and livestock industry as a hormone and health monitoring system.

MARKET STRATEGY: Hormone detection units will initially be sold at low prices to break into the research market. A presence at scientific conferences and in scientific journals will be used to advertise our product. Upon finalization, BEAR will be licensed out to a biotechnology or medical diagnostics company that has the resources to manufacture, market and sell it.

MILESTONES:
Table 1. Gant chart outlining the anticipated development of Synbiologica Ltd.

FINANCIALS:
Table 2. Projected Quarterly Income Statement for Synbiologica Ltd. We anticipate that the break-even point will occur in the third year following commercialization. A staged investment strategy will be utilized in which current investment is based on the company achieving set milestones with investors.

Preliminary Results

Figure 2. 15% Coomassie-Blue Stained SDS-PAGE gel of Protein A Overexpression. 1 OD samples were taken 0, 0.5, 1, 2 and 3 hours post-induction. To protect our intellectual property, the names of the proteins used in BEAR cannot be disclosed. Protein A has been overexpressed and purified.

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Figure 1. A) Schematic of hormone detection device. A sample containing the hormone in question will be applied, stimulating the detector to release an identifiable and quantifiable signal. B) Eventually, BEAR will have the capacity to utilize multiple detectors, allowing for the detection of numerous hormones simultaneously.