



THE UNIVERSITY of TEXAS
HEALTH SCIENCE CENTER AT HOUSTON
Office of Technology Management

**SPLICE VARIANT OF THYROID STIMULATING HORMONE-BETA (TSH β)
FOR DIAGNOSING AND TREATING THYROID DISEASES**

Market: The Thyroid Foundation of Canada estimated 200 million people worldwide have thyroid disorders. Further, The American Thyroid Association predicts that more than 12 percent of the U.S. population will develop a thyroid condition during their lifetime. Astonishingly, an estimated 20 million Americans have some form of thyroid disease and up to 60 percent of those with thyroid disease are unaware of their condition. Undiagnosed thyroid disease may put patients at risk for certain serious conditions, such as cardiovascular diseases, osteoporosis and infertility. Women are five to eight times more likely than men to have thyroid problems and one woman in eight will develop a thyroid disorder during her lifetime. Pregnant women with undiagnosed or inadequately treated hypothyroidism have an increased risk of miscarriage, preterm delivery, and severe developmental problems in their children. The American Cancer Society predicts nearly 40,000 Americans will be diagnosed with thyroid cancer this year. Most thyroid cancers respond to treatment, although a small percentage can be very aggressive. Most thyroid diseases are life-long conditions that can be managed with medical attention.

Competitors and Current Problems: Labs performing blood work use overly broad normal ranges of TSH levels. Published research indicates 1-3 $\mu\text{g/ml}$ in the blood is the best range of normal⁴, but many doctors accept values as high as 5.5 as normal. A worse problem is the lack of testing. Thyroid function tests are rarely given as most doctors do not suspect hypothyroidism in their patients because the symptoms are subtle.

The Technology: Scientists at the University of Texas Health Science Center at Houston identified a TSH β splice variant. Expression analysis as compared to the unspliced TSH β showed that both are expressed in the pituitary and the splice variant is also expressed in the thyroid and peripheral blood leukocytes as well as the bone marrow. The splice variant protein was also characterized and found to be 8 kDa, as compared to the 17 kDa normal protein. Recombinant protein was made and analyzed, showing that it is capable of delivering cAMP signal in a dose dependent manner, similar to unspliced TSH β protein. Unlike the unspliced TSH β protein, the splice variant protein is greatly upregulated in the thyroid following systemic virus infection. Potential applications include therapeutics, diagnostics, and pharmacogenomics for TSH β -related disorders such as hypothyroidism, hyperthyroidism, goiter, Pendred's Syndrome, Grave's Disease, cretinism, Hashimoto's thyroiditis, and thyroid cancer.

NON-CONFIDENTIAL TECHNOLOGY DESCRIPTION

The preceding is intended to be a non-confidential summary of a novel technology created at the University of Texas Health Science center at Houston (UTHSCH), for which the University has obtained patent protection.

UTHSC-H Ref. No.: 2009-0040

Inventors: Dr. John R. Klein

Patent Status: pending

License Available: world-wide; exclusive or non-exclusive

To obtain further information about this technology, please contact:
Office of Technology Management, 7000 Fannin, Suite 720, Houston, TX, 77030
Phone: (713) 500-3369 Fax: (713) 500-0331
Email: uthsch-otm@uth.tmc.edu