CURF
Clemson University Research Foundation

Analysis of Mammary Tissue for Diagnostic Modeling (2015-056)

Protects and Regenerates Damaged Neural Cells, Non-invasively Treating Acute Spinal Cord

Market Overview

This fine needle biopsy method is used to evaluate mammary tissue collected repetitively over time from the same animal during development, allowing researchers to predict productivity, the animal's quality, health, and chance of disease. The U.S. meat and livestock market is a growing market, forecast to have a value of $203.5 billion by 2019. Currently, the market lacks a model to provide predictive values and better understand animal disease. This poses problems when it comes to understanding cell signaling events in mammals, assessing beef quality, and making genetic decisions regarding animal productivity. Clemson University researchers have developed a non-invasive biopsy procedure that allows for mammary tissue to be analyzed from the same animal over time, therefore, decreasing variation and providing a way to better predict the animal's comprehensive health. This approach is safe, cost effective, time sensitive and could generate a predictive value for animal productivity and well-being before the animal reaches maturity.

Application

Animal health diagnostics; mammary development models

Stage of Development

Animal study validation

Advantages

- Uses a non-invasive, fine needle biopsy to safely collect tissue samples from the same animal over time, eliminating variability that results from using different animals
- Generates a predictive value for an animal's productivity before it reaches reproductive age, allowing better management decisions to be made
- Provides a way to analyze the role of development signaling pathways in the progression of disease in animals, leading to a better understanding of pathophysiology

Technical Summary

This method uses a sterile, fine-needle biopsy device to collect mammary tissue samples once a week during the course of early development. The samples are either paraffin embedded and stained for use in fluorescence microscopy or RNA isolation is performed to evaluate changes in cell signaling over time. This data is then used as a genomic indicator of animal productivity. Recently sequenced transcriptomic data has shown significantly up and down-regulated genes beginning in one-week old animals. The predictive genetic value provided from gene expression will vastly increase the degree of sensitivity at the molecular level of evaluation. Lastly, a comprehensive prediction can be made regarding the animal's health and productivity during its life post-development. This method is repeatable and reproducible, low-cost, and has the potential to allow early prediction of animal health unlike traditional methods of post-mortem analysis.

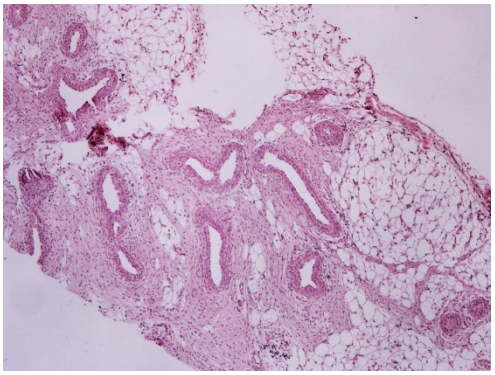

Figure 1: H&E stained section of mammary biopsy from 9 day old pig, 10x

For More Information Contact: Andy Bluvas | bluvasa@clemson.edu | (864) 656-5157 | CURF Reference No. 2015-056

App Type	Country	Serial No.	Patent No.	CURF Ref. Number	Inventors
Provisional	United States	62/256,416	NA	2015-056	Heather Dunn, Kathryn A Elliott, Thomas Scott, Matthew Burns

About the Inventors

Dr. Heather Dunn is a Senior Lecturer in the Department of Animal and Veterinary Science at Clemson University. She received her Ph.D. in Microbiology from Clemson University. She is the recipient of the Clemson University Bradley Award and the CAFLS Teaching Award of Excellence. Her research group studies the mechanisms involved in triple negative basal breast cancers that are associated with poor prognosis and high mortality rates. She has a particular interest in understanding mammary gland development and the implication of developmental cellular events that are reactivated in certain types of invasive human breast cancers.

Dr. Thomas Scott is a Professor and Dean Emeritus in the Department of Animal Veterinary Science at Clemson University. He received his Ph.D. in Poultry Science from the University of Georgia. He is the recipient of numerous awards, including the South Carolina Advocate for Agriculture Award (2014), Honorary America FFA Degree Award (2013), and the Clemson University Board of Trustees Award for Faculty Excellence (2010). His research interests focus on immunity of domestic animal species with an emphasis on studying improved methods for predicting health and productivity.

For More Information

To learn more about this technology, please contact:

Andy Bluvas
Technology Commercialization Officer
bluvasa@clemson.edu
(864) 656-5157