STEM CELL SOCIETY
SINGAPORE

STEM CELL SOCIETY SEMINAR

Monday 01 August 2011 • Creation Theatrette, Matrix Building Level 4,
30 Biopolis Street, Singapore 138671

PROGRAMME

4.30 - 5.30pm	Dr Gail Naughton Founder & CEO, Histogen, Inc, USA "Human Embryonic-like ECM (hECM) Stimulates Proliferation and Differentiation in Stem Cells while Killing Cancer Cells"
5.30pm onwards	Network Social Provided by Stem Cell Society Singapore Only for members of Stem Cell Society Singapore; Non-members who wish to attend Network Social are welcome to sign up for membership at www.stemcell.org.sg/scss_membership.php.
Hosted by	Dr Vivek Tanavde Principal Investigator, Bioinformatics Institute

SPEAKER

Dr Gail Naughton

Human Embryonic-like ECM (hECM) Stimulates Proliferation and Differentiation in Stem Cells while Killing Cancer Cells

Abstract

1. Unique characteristics of embryonic-like hECM

There are a number of unique processes seen in the developing fetus that cease post-partum including that tumors rarely form, and scar-less wound healing and digit regeneration occur. In addition, cancer lines have been "reprogrammed" by co-culture with embryonic ECM. We have developed a defined, naturally secreted human ECM (hECM) with embryonic-like characteristics. hECM is secreted by neonatal human fibroblasts grown in microcarrier culture systems under embryonic conditions of hypoxia and low gravity which upregulates a number of substances associated with stem cell niches in the body including various laminins, Collagen 4, CXCL12, NID1, NID2, and NOTCH2. This material has been shown to support proliferation of hESCs and MSCs and can be manufactured reproducibly under GMP conditions.

2. hECM inhibits tumor growth

In addition, research with hECM has demonstrated its ability to diminish or eliminate tumor load in melanoma (B16), adenocarcinoma (MDA-MB-435), colon cancer (HT29) and glioma(C6) in both in vitro and in vivo animal studies. In the tumor chorioallantoic membrane (tumcam) model hECM significantly inhibited tumor growth with tumor mass being reduced in weight by 50-80%. In subcutaneous mouse xenograft experiments, tumor growth was also inhibited from 70-90% among the same cancer cell lines. The inhibitory affect is selective for malignant cells. Co-cultures of fibroblasts and mesothelioma show support of fibroblast expansion with a concurrent inhibition of mesothelioma. hECM coated biopsy needles have statistically significantly ($p<0.03$) reduced tumor cell migration along the needle track. Whereas most cancer therapies target rapidly dividing cells and not cancer stem cell, hECM has been shown to target both cell types through the upregulation of Caspase 9 which forces the cells into apoptosis. These results support the use of hECM to expand hESCs or iPS cells while inhibiting any cancerous or precancerous cells prior to cell delivery in vivo. The hECM has been formulated to be delivered through a 30 gauge needle for local therapeutic delivery of stem cell therapy as well as cancer treatment. A mouse model of human carcinomatosis has been established and weekly i.p. injections of hECM have significantly reduced tumor load and more than doubled the life of treated animals. These data show that hECM has the potential to show benefit in the treatment of various cancers as a coating for biopsy needle, tissue filler post tumor removal, and as an injectable into the tumor site.

SPEAKER

Dr Gail Naughton

Human Embryonic-like ECM (hECM) Stimulates Proliferation and Differentiation in Stem Cells while Killing Cancer Cells

Biography

Dr. Naughton founded Histogen, Inc. in 2007, and currently serves as CEO and Chairman of the Board for the Company. She has spent more than 15 years extensively researching the tissue engineering process, holds more than 90 U.S. and foreign patents and has been extensively published in the field. During her tenure at Advanced Tissue Sciences, where she was the company's co-founder and co-inventor of its core technology, Dr. Naughton oversaw the design and development of the world's first up-scaled manufacturing facility for tissue engineered products, established corporate development and marketing partnerships with companies including Smith & Nephew, Ltd., Medtronic and Inamed Corporation, was pivotal in raising over $350M from the public market and corporate partnerships, and brought four human cell-based products from concept through FDA approval and market launch. In 2000, Dr. Naughton received the National Inventor of the Year award by the Intellectual Property Owners Association in honor of her pioneering work in the field of tissue engineering. She sits on the Board of directors of the City of Hope, Celera (NASDAQ: CRA) and CR Bard (NYSE: BCR).