

CRI-FHU NEWSLETTER

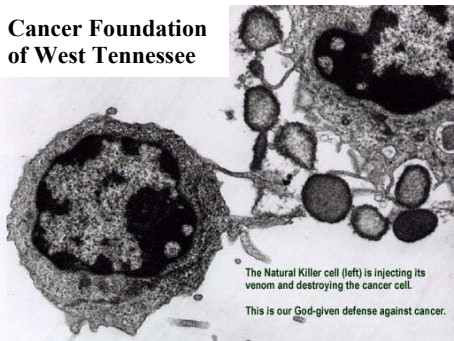
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Natural Killer Cell Discovery

In November, Dr. Thornthwaite was invited to speak at the New Approaches in Molecular Biotechnology for Biomedicine conference in Vienna, Austria where he spoke on his research of Natural Killer Cells (NK Cells). NK Cells are our body's God-given defense against cancer. NK Cells are white blood cells that look for viral infected cells or tumor cells and destroy them on contact. NK Cells discriminate between healthy cells and targets by looking for the

absence of a normal cell surface receptor. Our research continues to study the method of recognition

Cancer Foundation of West Tennessee



This image is a cross-section of a NK Cell attacking a cancer cell.

and killing by the NK cells. Dr. Thornthwaite was the first to discover these cells in 1972, where they killed foreign red blood cells on contact. His current research is involved in finding natural substances that enhance the NK Cell function, especially in cancer patients where the immune system too frequently has been compromised by radiation treatments and chemotherapy. Also, research on the detection of NK Cell activity levels is taking place.

Dr. McDuffee Presents at Conference

Dr. Emily McDuffee traveled to Phoenix, Arizona to take part in the Second Annual American Association for Cancer Research International Conference on "Frontiers in Cancer Prevention Research. She presented a poster titled "Immunostaining of a Newly Identified Cancer Antigen Present in Cell Membranes of Ovarian Carcinoma Tissues." She works with Dr. Thorn-

thwaite and several researchers at UAB to examine the tissue staining comparison between healthy and ovarian tissues. Drs. McDuffee and Thornthwaite will also present their work in Orlando in March of 2004 at the National American Association of Cancer Research meeting.



Dr. McDuffee is pictured here with her poster on tissue staining.

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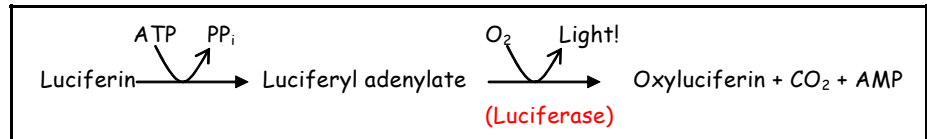
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ATP Assay Research

Joe Deweese has been researching the use of an ATP detection assay to determine the activity of Natural Killer Cells. Joe began this project over the summer with Dr. Wu Ke. Presently, Joe is working with Marshall Hall on further development of this assay.

ATP assays use a very well known reaction between Luciferin and Luciferase in combination with ATP to produce a glowing light that can be quantified in a luminometer. One can visualize this reaction every time a firefly lights up. Scientists have isolated the reagents



needed to reproduce this reaction and is being used by us to measure the destruction of tumor cells.

Joe and Marshall are preparing to conduct tests to determine if this assay will be able to measure NK Cell activity when mixing NK Cells and cancer cells grown at CRIWT.

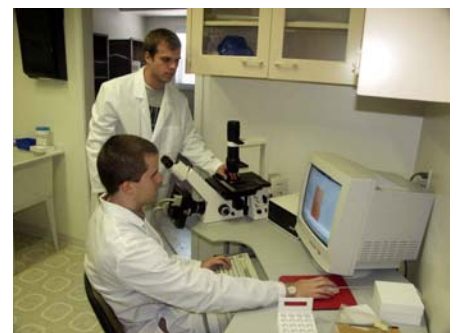
Above: The luciferin/luciferase reaction mechanism.

Below: Here Joe prepares reagents to be used in the assay under a hood.



They will also be researching the CARE Antibody to determine if it has any innate ability to signal a cell for death.

Marshall Hall (top) and Joe Deweese (seated) use the imaging system to photograph cells.



in a very profitable experience for everyone.

Unfortunately, Dr. Thakur was only able to stay a few weeks before traveling to visit a sister who also lives in the U.S. Upon her return to India, she will be able to better direct the research taking place using the CARE Antibody Test. Currently, serum and tissue samples are being sent from India for analysis. Hopefully, these studies will provide further information about the effectiveness of the CARE Antibody Test in the detection of ovarian cancer.

New Lab Students Learn to Culture



Lacey Rupe (left) and Amy Farmer (right) are shown here in the culture room where the cells are grown.

Recently, Amy Farmer and Lacey Rupe began the all important task of maintaining the cell culture laboratory. The cells are a common cancer cell line derived from a leukemia patient. Our lab is very privileged to have its own dual cell culture facilities.

Lacey and Amy are trained to keep the cells alive by continually renewing the media (cell food) in the cultures. They also work with Joe and Marshall to prepare cells of specific concentrations to use in assays such as the ATP release assays discussed above.

Dr. Vinita Thakur Visits from India



Dr. Thakur prepares a meal with Bonita Thornthwaite at the Thornthwaite's home.

In October, CRIWT had another visitor from overseas. Dr. Vinita Thakur visited the lab for a few weeks. She is

from the Batra Hospital and Research Center in New Delhi, India. Dr. and Mrs. Thornthwaite visited with them last January.

A research collaboration in ovarian cancer started when Dr. Thornthwaite visited the Batra hospital last January. The goal of the research is to use the CARE Antibody to test patients with possible ovarian cancer. Dr. Thakur visited in order to further study the CARE Antibody Test and learn about the methods of the test. While here in the lab, she also assisted students with various other projects and learned of the research taking place here. She exchanged ideas and methods with the students

Biochemistry Lab Nears Completion

With the completion of the Brown-Kopel Business Center, many changes have taken place across the campus of FHU. For the Chemistry and Engineering Sciences (CES) Department, this meant the re-acquisition of lab space formerly used by the Telecom services who moved to the new business center.

This lab is currently under renovation as a new biochemistry laboratory. Currently, CES has labs for General Chemistry, Physics, Analytical and Physical Chemistry, and Organic Chemistry. Now, we have a lab that can be used for biochemistry.

The new lab will be complete with new lab desks and a new equipment room. The current equipment room houses the department's FTIR Spectrometer, NMR Spectrometer, X-ray Fluorescence Spectrometer, and other important devices. Some of this equipment will be moved to the new equipment room adjacent to the biochemistry lab.

One very interesting addition to the lab will be a special screen used for viewing molecules in 3D without the need for polarizing glasses.



Drs. Bob Brown and Joe Delay survey the progress in the new biochemistry lab that should be ready for the spring semester.

Students Analyze Molecules in 3d

The new biochemistry lab will feature a state-of-the-art 3D-viewing system. This system includes a Stereo Graphics Synthagram 42" Plasma Screen. This screen is specially designed to display images three-dimensionally without the need for any type of polarizing glasses.

Daniel Simons, Robbie Nichols, and Joe Deweese have been working on making images of molecules to be viewed on this screen. Development of these images requires the use of various imaging programs, as well as, special programs designed for this system.



Daniel Simons (top) and Robbie Nichols (seated) work at the computer used to develop images for the Synthagram Monitor.

The imaging system will supplement the system purchased last year that enables a small number of students to view molecules in 3D using polarized glasses and a special screen overlay.

The new system will be mounted to the wall at the front of the lab. This should enable a large viewing audience for the new equipment. It will be used in Dr. Thornthwaite's Biochemistry and Immunology Courses for molecular viewing, which may lead to publication and grant funding from Stereographics, Inc..

Humanized Antibody in Dubai

Early in the fall semester, Dr. and Mrs. Thornthwaite traveled to Virginia Tech and spoke at the Edward Via Virginia College of Osteopathic Medicine. Dr. Thornthwaite was invited by former



Camels produce some antibodies that are very similar to human antibodies.

FHU professor Dr. Brian Hill. Dr. Hill is currently Assistant Dean for Medical Education at the school.

Dr. Thornthwaite spoke on current research of the CARE Antibody. Collaborations have been established with the University of Brussels on humanizing the CARE Antigen with camels. Immunizing the camels allows researchers to develop a therapeutic antibody that may be "humanized" and not rejected by the patient during treatment. This work is being conducted academically with Dr. Serge Muyldermans who holds patents on camelized antibodies.

Rita McCain shows Dr. Thakur the location of chemicals needed for certain procedures.



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Here Matt is working with chemicals used in staining cancerous tissues for research using light microscopy.

CARE Antibody Staining

Matthew Guy spent the summer working in Dr. William Grizzle's pathology lab at UAB. He worked with CARE Antibody staining a variety of normal and cancerous tissues. Tissue staining with the CARE Antibody is useful to detect the presence of biomarkers that are indicative of malignancy. He is continuing this work here using a microtome and a Zeiss microscope kindly provided by the Biology Department.

As part of his research project for the Biology Department of Union University, Michael Keefer is learning paraffin tissue sectioning and the CARE Antibody staining technique from Dr. McDuffee and Matthew.

Dr. Wu Ke Returns Home

Having spent around four months in the U.S., Dr. Wu's family was certainly ready for him to return. In late July, Dr. Wu returned to his home in Wuhan, China.

During his stay, Dr. Wu worked on

Dr. Wu is shown here processing solid tumors to be analyzed using DNA flow cytometry.



a number of projects with Dr. Thornthwaite and the students working in the lab. In particular, Dr. Wu worked with Joe Deweese on the beginning phases of research into the ATP assay. Dr. Wu also worked with the NPE Analyzer to do DNA analysis of tumors.

Aside from his research accomplishments while here, he also takes pride in another accomplishment. Dr. Wu earned an American driver's license so that he could drive around on his own. Though he did not travel on his own, this license did help him to commute around town.