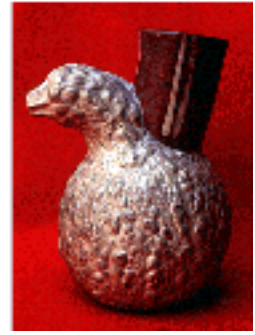




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The Importance of Discovery: An Interview with Dr. Shutsung Liao

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Dr. Shutsung Liao is the director of the new Tang Center for Herbal Medicine Research at the University of Chicago (UC). (For more on the Tang Center see EBL Spring/Summer 2000: <http://www.siu.edu/~ebl/tang.htm>) The Tang Center is independent of all other groups within the university. It is housed in the Ben May Institute for Cancer Research at UC Medical Center. Dr. Liao is also a member of the Ben May Institute, a professor in the Department of Biochemistry and Molecular Biology and in the Committee on Cancer Biology at UC. Dr. Liao's insights into biochemistry and natural products chemistry include comments on the mechanism of action of hormones, therapy for prostate cancer and other hormonal problems, many associated with aging, and the similarity to hormonal action of gamma-Linoleic acid (GLA) from evening primrose oil, and of (-) Epigallocatechin-3-gallate (EGCG), from green tea.

This interview with Dr. Liao showcases his genuine humility, as well as his thoughts on research, discovery, and his devotion to his former mentor, Charles Huggins, MD. Dr. Huggins, a urologist, was awarded the Nobel Prize in 1966 for his work on prostate and breast cancer. Huggins founded the Ben May Laboratory, which was the forerunner of the Institute, and the place where Dr. Liao did his graduate research. Dr. Huggins stressed creativity, and said that science is the art of the 20th century. Dr. Liao also believes in the importance of creativity in research. He needed little prompting, so the interview follows his choice of topics. He spoke with EBL on May 30, 2000. We hope you get the same pleasure reading this that we experienced in talking with Dr. Liao.

Dr. Liao: The Ben May Laboratory for Cancer Research was founded by surgeon Charles Huggins in 1950. Huggins pioneered hormonal therapy for prostate cancer. He removed the testes (castration) of prostate cancer patients and showed that more than 70% of patients with male hormone dependent prostate cancer could benefit from the surgery. Now it is done with antiandrogenic drugs. Huggins won the 1966 Nobel Prize for the hormonal therapy research. After my graduation in 1961 I was headed for Hopkins, but Huggins asked me to stay at Ben May. Since that time I have been studying the molecular mechanism involved in male hormone actions and control of prostate cancer growth.

EBL: At this point Dr. Liao showed [this diagram](#) and explained his discovery in 1968, that in many organs, male hormone action is dependent on the conversion of testosterone by 5 alpha -reductase to 5alpha-dihydrotestosterone (DHT). DHT binds to a specific receptor protein called androgen receptor (AR), and this DHT-AR complex appears to interact with chromatin and modulate gene transcription. There is a list of the effects of both testosterone and DHT. Dr. Liao discovered AR and showed that AR can specifically bind DHT.

Dr. Liao: Before 1968 it was believed that testosterone worked everywhere, in all cells. Our studies suggested that without 5 alpha-reductase reaction, testosterone does not work well in many organs. An increase in DHT may worsen harmful symptoms especially in elders. For example, the development of prostate cancer and benign prostate hyperplasia (BPH) in older men is dependent on DHT. Merck hired a research associate from my laboratory. The researcher, Dr. Liang, found that finasteride was a good inhibitor for the 5 alpha-reductase. Proscar(c) was developed from this, which treats prostate problems including BPH or enlarged prostate. Merck also markets it as Propecia(c) for treatment of male pattern baldness, based on the same principle.

EBL: Dr. Liao went on to explain that gamma-Linoleic acid, is also a good inhibitor of testosterone conversion to DHT.

Dr. Liao: GLA is an essential fatty acid for humans but is also found in evening primrose [*Oenothera* sp. in the Onagraceae] oil and other plant oils. Green tea has EGCG, which also inhibits 5 alpha-reductase.

EBL: So green tea compound can inhibit the growth of prostate cancer. Hasn't black tea been implicated as a cause of stomach cancer?

Dr. Liao: Ten years ago, black tea was blamed for esophagus and stomach cancer. This was proven wrong. It is due to the high temperature, not due to the tea itself.

EBL: Dr. Liao explained his philosophy as a scientist and administrator and included quotes from himself from a reprint on the life of Charles Huggins.

Dr. Liao: I'm a scientist working with basic research. I am not a development person. Discovery needs a creative brain rather than manpower and money. Development takes a lot of money and manpower. The most important aspect in doing scientific research is to make new discoveries. But both discovery and development are important for the society. But you must make a decision yourself, what kind of person will you be. I decided when I was a student that I would do the creative research. I also decided not to be the head of anything which will take a lot of effort and time for management and take time and brain away from doing creative research. Dr. Huggins' benefactor Dr. Phemister was the one who always asked Huggins what he discovered. Dr. Huggins used, "Discovery is our business" as the motto for the Ben May Lab. When I was a student, Huggins often came to see me around 4 p.m. and asked of what I discovered that day. He would not take 'no' for an answer. I learned to say, "I still have eight more hours

to go." Huggins said you must discover something every day. That is a great guide that should be taken very seriously by every scientist, young or old. (Medicine on the Midway [Eds.], 1997)

Huggins said three things one should not do, for young people. One, do not go to meetings, you are wasting your time. Two, do not go to the library. If you have to go to the library to know what to do, you're not a good scientist. Discovery is made in the brain. Once a discovery is made in the brain, do an experiment to see if it's right or wrong. Once you know your discovery is right, go to the library to see if your discovery is in some way connected to what has been done and past knowledge. Three, do not write long reviews or books.

I violate the third rule once every ten years because I am kind of forced to write reviews. I think Huggins' teaching is right. Discovery is primarily a brain function. For discovery in biosciences you don't need a lot of money or equipment. A real good discovery is very simple. Usually one short sentence can state it. Most of the papers in the journals are unnecessary. When you die it doesn't matter how much knowledge you have or how many papers you publish, just what discovery you have made.

EBL: In today's world, how can a young scientists become established if he does not attend meetings and present his work and see what his colleagues are doing?

Dr. Liao: Attending meetings once or twice to meet people is alright, and later on occasion to present a paper, but creative ideas for research come from one's brain, not from attending meetings. Too much knowledge and hearing of others can hinder one's creativity.

EBL: So what will the Tang Center focus on? Herbal medicine, Chinese Herbal Medicine, cancer or biochemistry? Will it be on a particular plant which you have also worked on, such as ginseng?

Dr. Liao: I would pretty much pattern on Huggins' approach. He always said that to do cancer research you do not have to study cancer cells. New discoveries that help with understanding how cells live and die can contribute very significantly to cancer research. When Huggins hired people for the Ben May Laboratory for Cancer Research, he didn't really care what your background experience was. He looked at whether the person was creative or not. He told them to start anew. None of them continued working on what they had done before. That's the way Huggins told people to do it. Many researchers in Ben May discovered things that are very fundamental to biology and biochemistry which really had nothing to do with Huggins' own work nor directly related to cancer therapy. But Huggins allowed these people to come up with new ideas, test the ideas and prove them (Medicine on the Midway [Eds.], 1997). This is the philosophy which will guide the Tang Center, discover something new. That is why, when accepting the position to run the Center, I insisted that there should be no strings attached.

EBL: Dr. Liao further clarified the direction of the Tang Center:

Dr. Liao: The mission of the Tang Center for Herbal Medicine Research is to study molecular action and herbal medicines in biochemical systems. We like to put science into herbal medicine. We investigate

the molecular actions of herbal medicines and study novel approaches for phytotherapies for cancers and diseases in endocrine, cardiovascular, immune, and central nervous systems. The basic motto is, "Discovery is our business."

EBL: Dr. Liao also quoted his own thoughts from a page of quotes he made to give to his students.

Dr. Liao: "Be creative and not competitive...Find your own pond, get out when others want in, and find another pond...Do things no one-can do, or thought about it...A poem, not a dictionary."

Literature Cited:

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