PRESIDENTIAL ADDRESS

THERE IS ALWAYS ROOM FOR YOU IN SCIENCE

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Presented by Chun Wu
Mount Marty College
Yankton, SD 57078

ABSTRACT

The number of scientific discoveries seems more 100 years ago than today simply because there were so many unknown areas. As time advanced and many blanks were filled, scientific discoveries seemed to slow down, which tends to discourage potential researchers. The author started the speech with two questions: "Is there still room in sciences?" "Do we have a chance to make a big difference?" After that, the author presented one example to demonstrate how everyday research work can make a difference in science. In cancer treatment, we used to have only two options after surgery: radiation therapy and chemotherapy. Now, the patients hear the third FDA approved option: targeted drug therapy. The primary targets for those targeted drugs are specific proteins, which, when overexpressed, allow abnormal cancer cells to live and multiply. The targeted drugs inhibit the overexpression of those protein targets. Identification of those protein targets was a critical step. Where were those targets identified in the first place? In labs of basic health sciences. That was where students played important roles decades ago. Students usually complain about sitting in the lab doing tedious work day after day, seemingly going nowhere. That work pays off today. The author also pointed out that science develops continuously. During different stages in history, the theoretical form and focus of concern changed. For instance, in Mechanics, there were Aristotle mechanics, Newtonian mechanics and quantum mechanics. Medical science follows a similar trend. Microbiology established by Louis Pasteur could only explain infectious diseases. Endocrinology established by Arnold Berthold described "hormone imbalance", providing a reasonable explanation for slow growth, liver and kidney failure, sexuality recession and obesity. In 1949, Dr. Linus Pauling raised the concept of "molecular diseases", providing a scientific explanation for cancers, cardiovascular diseases and autoimmune diseases.

With respect to the question "Are there still unknown fields?", the author presented a few examples in protein science. There are some proteins. We know how important they are, and how they regulate certain biological functions. But we have not identified them. Once identified, they will have major effects in those fields. One example is the module or pathway controlling the size and

shape of organs. The second question is how exactly homologous recombination occur in meiosis? And which amino acid transporter is the upstream regulator of the mammalian target of the rapamycin pathway, in other words, can we measure extracellular amino acid levels then induce the mammalian target of rapamycin response. What are the cytosolic receptors of gas molecules such as H_2, and H_2S, and what is the molecular identity of the mitochondrial Ca uptake protein? Those questions sound simple, but they are unanswered. Here are some other new frontiers in medical science: DNA methylation plus epigenetics; brain mapping; genome 3D structure; promoter and intron region sequencing; metabolism: isocitrate dehydrogenase mutation, and function of noncoding DNA, etc.

In closing, the author left two final questions to the audience. "Where is your position in sciences?" "How can you fill in the gap in the field your interest?"