Faculty Spotlight—Dr. Robert Dores

Interviewed by Anit Tyagi

1 WHAT ARE YOUR TEACHING INTERESTS?

I like courses that have a cell biology focus, and my passion is the study of endocrinology. I also like courses that deal with some aspect of biodiversity and involve an analysis of physiological systems. As a result, over the years I have taught: Cell Structure and Function, Endocrinology, which is actually the cell biology of endocrine cells, and Physiological Systems. I have also taught Histology, a cell biologist's view of how cells form tissues, and how tissues form organs, and Invertebrate Evolution.

2 WHAT IS YOUR TEACHING PHILOSOPHY?

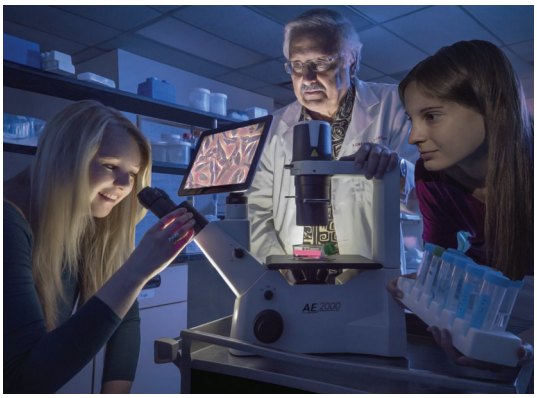
As for teaching philosophy, all of my courses help students develop a vocabulary in a particular sub- discipline. I try to present, in a logical manner, sets of information that students should assimilate. However, in every course I teach there are a list of major themes that are really the important take home messages. Often these major themes lead to open-ended questions that are not currently resolved. Here is an example. In Cell Structure, students learn the ultra-structure of organelles, they are introduced to the basic biochemical composition of each organelle, and they learn facts about how the organelles operate. However, the major themes of Cell are: membranes are used to make sub-compartments, proteins are the macromolecules in cells that do work, and, among others, the role of a signal transduction event in intracellular signaling ,which is the foundation for all of our advanced cell signaling courses. These themes are repeated over and over again throughout the course. When a student comes to grips with these themes, then they understand why learning the vocabulary and the facts is important.

3 HOW HAS THE PROCESS, OR THE PROFESSION OF RESEARCH CHANGED OVER THE PAST FEW DECADES?

The "process" has not change. Observations still lead to unanswered questions. Hypotheses are developed to address unanswered questions. Experiments are done to evaluate hypotheses. The data are analyzed to decide if the hypotheses were answered, or if new hypotheses should be proposed. This approach has not changed. The "profession" has changed because of the technological advances that have emerged in our life time.

4 DESCRIBE YOUR CURRENT RESEARCH IN LAYMAN'S TERMS.

An organism is composed of several trillion cells that must work in a coordinated manner so that the organism can stay ahead of the 2nd Law of Thermodynamics. Chemical signals released into the blood stream, called hormones, from endocrine cells facilitate the functions of specific target cells by acting on hormone-specific receptors in or on the surface of those target cells. My lab studies hormone and receptor interactions at the cellular and molecular levels.



5 WHAT LEGISLATION WOULD YOU CHANGE TO IMPROVE HOW SCIENCE IN YOUR FIELD IS DONE?

Some of the basic research on hormone and receptor interactions have implications for human health. Since repairing defects associated with some endocrine disorders requires gene replacement, or replacement of the diseased endocrine cell type, I would like to see more funds dedicated to stem cells research, and more opportunities for researchers to work with human fetal cell lines.

6 SHARE A TURNING POINT OR DEFINING MOMENT IN YOUR WORK AS A SCIENTIST.

There have been several for me. In February 1978, I found a review article that sparked my interest in the pituitary hormone, ACTH. Shortly thereafter, in October 1978, I attended a seminar on ACTH biosynthesis that led to a postdoctoral fellowship in endocrinology. In 1985, we cloned our first hormone precursor gene; this led to 10 years of projects on the evolution of hormone precursor proteins. Most recently, in 2011, after realizing that the melanocortin-2 receptor of a cartilaginous fish operated in a totally novel manner from its bony vertebrate counterparts, this led to our current research program on cartilaginous fish melanocortin receptors.

7 HOW DID YOU END UP HERE? WHY DID YOU BECOME A SCIENTIST? WHAT DREW YOU TO THIS FIELD? WHAT MAKES YOU GET UP IN THE MORNING?

As an undergrad, I found that I liked animal diversity, and I had the perception that a career as a scientist would provide me with an opportunity to design experiments that were novel and creative. Then, as a Masters student in a marine physiology graduate program, I took a course in endocrinology, and decided I wanted to specialize in this area. I also found that as a teaching assistant, I liked being in the classroom. So, I wanted a career teaching endocrinology at the college level. To accomplish this, I entered a Ph.D. program and found that I really liked research, so, I decided upon a career where I could teach and do research at the college level. To that end, I did postdoctoral fellowships in endocrinology, at the University of Colorado Medical School, and in neuroscience, at the University of Michigan School of Medicine. These fellowships eventually led to my ideal faculty position, a tenure track position at the University of Denver where I could teach and do research. I was drawn to science because of the dynamic nature of the field, and I love endocrinology because of the way that small amounts of hormone can have such large physiological effects. I get up in the morning on teaching days because I am excited to share the next topic in the course to the class. I like lecturing. On research days, I like looking at results that no one has seen before.

8 DESCRIBE YOUR CAREER TRAJECTORY AND ANY ZIGZAGS YOU ENCOUNTERED.

My career trajectory was rather normal: graduate school, postdoc experiences, and applying for faculty positions. The initial "zigzag" was realizing that for each faculty position I applied to, 50 to 100 other people were also submitting an application, and only one of us would be hired. I started applying for jobs during my postdoc experience in 1982, and I got my first job offers in 1984. I choose DU. Once at DU, the initial issue was obtaining funding from federal agencies. I was able to get grants, early, and then in 1988, I started getting funding from the NSF (National Science Foundation), and that funding lasted to 2011.

More recently, my research has been supported through an endowment set up by two DU alumni. So, funding for my research has not been an issue. While setting up my research program, I became engaged in teaching, and I settled into that assignment rather comfortably. Within five years I had my teaching load set. I have made appearances in other introductory biology. Overall teaching has been comfortable and enjoyable. From 1994 to 2010, I was chair of the biology department, and the administrative commitments required that I lower my teaching load. I also felt that it had an impact on my research. I was able to maintain continuous funding during that period, but based on yearly planning, I felt that I was at least one article behind each year with respect to my publishing rate. After 2010, I started clearing up the backlog of manuscripts, and now I feel I am on track to publish 150 peer reviewed articles by 2023.

9 TELL ME WHAT YOU LIKE TO DO WHEN YOU AREN'T WORKING ON RESEARCH.

Nearly every day I read in the evening, usually, science fiction, but I do like an occasional history book or spy novel. In the summer, I like to take a family vacation, and during the year, visit our sons on the East Coast, or my family in Chicago. I like watching sports on TV including football, golf, hockey, and soccer. I enjoy attending Colorado Avalanche games, and I try to attend 20 each year. I do have some favorite TV shows, NCIS, Bull, Blood and Treasure, Magnum PI, Hawaii 5- O, and Blue Bloods. I like gardening and being with my group of friends for golf, poker, dinner parties.

10 WHAT ARE YOUR VIEWS ON CURRENT PUBLIC POLICY IN SCIENCE, SPECIFICALLY INSULIN DRUG PRICES?

I am a diabetic, and the price of insulin is a national scandal. In general, drug prices are greatly inflated, health insurance should be more affordable. More funds should be devoted to basic and clinical research.

11 WHAT DO YOU THINK IS THE NEXT BIG DISCOVERY OR PROBLEM SOLVED IN YOUR FIELD?

Stem cells technology to replace beta-cells in Type I diabetics.

12 WAS THERE EVER AN OUTCOME IN YOUR RESEARCH THAT WAS UNEXPECTED, OR DID YOU EVER ENCOUNTER A SURPRISING SETBACK? HOW DID YOU REACT AND ADAPT?

Setbacks are common, and it has usually been a technology issue. In the '80s, molecular biology techniques were limited to large labs with big budgets. Today, an undergraduate can clone a gene. In the early part of this century, genome sequencing seemed inaccessible. Today, all the research in my lab revolves around the incredible number of genomes that have been sequenced by researchers around the world. We are currently doing a whale shark project. We have never taken any tissue from a whale shark, but we have access to whale shark gene sequences through the data base. 3-D molecular modeling always seemed out of reach back in 2010, and now we have programs that run on Macs that can generate images of our receptors.

As for unexpected discoveries, those have been happening since 1985, including my first undergraduate project, and they continue to today. We are always uncovering the unexpected, and that is why research is so stimulating.

13 IF YOU COULD GO BACK IN TIME AND GIVE ADVICE TO YOURSELF BEFORE YOU BEGAN YOUR CAREER WHAT WOULD IT BE?

Party less as an undergrad, be as open as possible to new possibilities, and be a better listener.