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### The Plight of the Investigator

You are listening to ReachMD, The Channel for Medical Professionals. Welcome to GI Insights where we cover the latest critical issues, trends, and technologies in gastroenterological practice. GI Insight is brought to you by AGA Institute and sponsored Takeda Pharmaceuticals North America. Your host for GI Insight is Professor of Medicine and Director of The Digestive Disease Center at the Medical University of South Carolina, Dr. Mark Delegge.

Is medical research being given enough support in the US to maintain scientific leadership with the outlook for young physician scientist considering a career in research. Joining us to discuss the plight of the investigators is Dr. Mark Donowitz, LeBoff Professor of medicine and Director for the Center for Epithelial Disorders at the Johns Hopkins University School of Medicine in Baltimore, Maryland. Dr. Donowitz is also a past President of the American Gastroenterological Association.

### DR. MARK DELEGGE:

Welcome Mark.

### DR. MARK DONOWITZ:

Thank you Mark.

### DR. MARK DELEGGE:

First of all I know that for a lot of people the big apple for research funding is the NIH and I know that drives a lot of research in the US. What's happened to that funding over the past few years, has it gone up, gone down, stayed the same?

### DR. MARK DONOWITZ:

The funding has been from a dollar point of view slightly decreased the first time in history that this ever has occurred, but much more importantly is that inflation hasn't stopped even though the Bush administration has stopped increasing the dollar's flowing. So, overall, the total dollars from a real dollar perspective in the last 4 or 5 years is probably 15% lower than it was prior to that.

**DR. MARK DELEGGE:**

You know with the reduction in funding it sounds to me like things end up being much more competitive, meaning that your chances of getting funded are decreased, would that be correct?

**DR. MARK DONOWITZ:**

It's basically correct. The NIH has worked very hard under Elias Zerhouni to cushion the investigators from having a disaster. He might have predicted the current, in fact, this downturn has not been quite as severe as the downturn in the early 90s where every investigator was basically looking around for another career. Here, a lot of the senior people have been cut back, but they at least have been able to maintain their laboratories, but it's not been a good show out there.

**DR. MARK DELEGGE:**

Mark, I hear the buzz word translational research meaning taking what is in science and bringing it to the patient, what's our biggest needs right now for bringing science to the patient, where are our deficits?

**DR. MARK DONOWITZ:**

Science is at an exciting time, we are really in what's called the post genomic area where the proteins and genes in the human have been identified and we are now in a position at trying to understand the function of a lot of the proteins and how they become abnormal in disease. So, the opportunities are spectacular for moving knowledge forward and for applying that to patients and their diseases, there is a lot to learn at a basic science level. Most people are guessing that we probably know 10%, 15% of what we are eventually going to know when it's all worked out if it ever occurs, so there is tremendous discovery of basic biologic processes going on. We are in nowhere should we assume that we have got all the knowledge; however, we are at a stage where we can really apply a lot of what we have learned to normal physiology to how normal people work and how they don't work so well in disease. The opportunities are really fantastic.

**DR. MARK DELEGGE:**

Mark, I remember when I was in my training, I was surrounded by some pretty good people who were physicians, scientists, they were M.D.s or perhaps M.D., Ph. Ds. Today, do you see less physician scientists actually going off into research?

**DR. MARK DONOWITZ:**

The numbers are pretty clear that the total number of the physician scientists probably has not changed for the last 20 years may be even longer; however, the population is getting a lot larger and the number of people in science have continued to increase kind of linearly, so that the percentage of investigators who are physicians, so called physician scientists is getting smaller and smaller and continues to decline.

**DR. MARK DELEGGE:**

You know, once you glow as a physician or physician scientist into research, you try to build your career and frankly a lot of that

depends on your mentor and your ability to get funding and other things. So, is there a drop out rate meaning we see a pretty steep drop off of people who start off as physician scientists and then leave.

**DR. MARK DONOWITZ:**

I think you have put your finger on what's of greatest concern to most of the leaders in gastroenterology who are looking around to see what the future investigator is going to look like. The number of people starting out is still a significant number. We think that a lot of our very best trainees are still choosing this career may be not as higher percentage and may be not as many of the best and brightest as there was say 20 years ago, but there still is significant number of really brilliant young physician scientists that are initiating careers in research. Of great concern and probably the greatest concern is the very, very high dropout rate. When we analyze this, we have tried to figure out how many people who start this career will stay in at long term and our analysis suggest that if you are in long enough to get your second R01 grant, R grants are the investigator-initiated studies. It suggests that you have committed so much of your effort and you will see this is a long-term career. This probably happens in the mid to early 50s, however, if you don't get that second R01 then most people are going to decide that it's just not worth the sacrifice of effort and sacrifice in pay that most people take to pursue an academic carrier and drop out. So, when we have analyzed what the numbers are, it seems almost incomprehensible, but the numbers suggest that something in the 80%, 90% of people who start these careers dropout by the time they are in their early to mid 50s.

**DR. MARK DELEGGE:**

That's unbelievable. I mean I know that there are lucrative carriers say in clinical practice, private practice, or even in the academics. Do you think that the problem is there some sort of flawed business plan for physician scientist, I mean we haven't done this right at least from a monetary standpoint?

**DR. MARK DONOWITZ:**

With a number that large, there is not going to be one answer. Some people are going to decide that they really did have reassessed their sacrifices that they and their family are making, because they are not making as much as another person who is doing practice and those people will drop out. Our analysis suggested that the physician scientists who decides that they are not making a sufficient salary is usually preventive, these are people who usually decide early on as they and their family discuss the opportunities that they are not going to go into research. They have decided that the amount of money is not enough and they will take an alternate route, which of course we are all fortunate of being able to have a wonderful career doing patient care and make a very good living, but I do not believe that the drop out that we just discussed comes from people saying hey, all of a sudden in the middle of their carrier, hey I have decided I am not making enough. I don't think that that is a late life decision, of course, some people will be the answer, some illness will happen, the kids have to go to college, some recognition that they didn't really concern themselves with earlier, so some people will drop out for that reason, but I believe that the major reason that people drop out has to do with the structure of academic investigative careers and it seems to a group of us who have been thinking about this that all of us who have laboratory careers essentially are running small businesses. You have to rent space, which is you pay up to the dean in the form of indirect cost and if you don't think its right to try dealing with the dean when you are not able to pay that. We have to hire employees or postdoctoral fellows and/or technicians. We have to train them. We have to figure out how to pay there life insurance, there disability, we have to worry about their future career planning by sending them off to different meetings and working with them as mentors. We have to purchase equipment and then have to discount it and have to worry about service contracts, all of these things are the kind of charges that a small business has, now the bills for these things come in every month of course in a very linear perhaps progressive fashion; however, our ability to pay these bills comes in a more pulsatile way when we get funding, so that we are always kind of in danger if we lose or miss a grant cycle or miss getting our grants refunded or funded, we are in danger of going bankrupt and the process of getting funding from the NIH is really a repetitive process. You put it in, you get critic, you put your grant back and if you answer good, you can respond to the critic and get funding eventually, but the problem is there are often gaps in funding where you are in great danger of going bankrupt and that's the hardest part I guess for a small business, but also for an investigator where what you lose is your post doctoral fellows and your technicians, which is the life blood of what you have built up, so it seems to this group of us that it's a flawed business plan and the lack

of security always being worried about going bankrupt is the biggest deterrent for people for continuing in a research career. Once you go bankrupt and have to let people go, most people are too discouraged to keep going on and giving the sacrifices that you have to give at that point.

**DR. MARK DELEGGE:**

If you are just tuning in, you are listening to GI Insights on ReachMD, The Channel for Medical Professionals. I am your host, Dr. Mark Delegege, and joining me to discuss the plight of the investigators is Dr. Mark Donowitz, LeBoff Professor of medicine and Director for the Center for Epithelial Disorders at the Johns Hopkins University School of Medicine in Baltimore, Maryland. Dr. Donowitz is also a past President of the American Gastroenterological Association.

Mark, I have heard about 2 models that may be a little bit different for institutions investing in physician scientists to do research. I guess in the face of decreasing NIH funding and I go by the name of the guppy model or the Stanford model, do you have knowledge of these and can you tell us a little bit about those?

**DR. MARK DONOWITZ:**

Sure, the different medical centers have chosen to develop investigators in different ways and I believe that as we talk about these it will become clear that the 2 models lead to different retention rate of young investigators. Most of the big centers invest when they hire their new investigators, so called startup packages and as you try to hire a young scientist you assess what their likelihood of success is and you provide them some money to start them off which includes money to hire some postdocs and to let them get started while they apply for grants. This money is used partially for their salary, partially for their employees, partially for supplies and perhaps some renovations of their laboratory. Now, most institutions believes that that is pretty much their obligation, once a person has been brought in and started, they generally don't feel that they have to provide further support and it's up to the young investigator to make their way either through the NIH or through alternative funding mechanisms, different societies, etc., and associations, which can provide some funding that is a very difficult model to survive in because as we discussed the NIH has its ups and downs. The second model is used by just a few schools, which have decided that they are going to hire less faculty, but that they will continue monitoring the progress of these faculty members so that if they get into trouble they will decide if the person really is still interested in research devoting himself to it. If they have lots of good ideas and if they have the potential for future success and will invest further on a certain number of these. The difference is that the dropout probably is going to be less when the institution continues supporting the investigators during difficult times than if they don't support them.

**DR. MARK DELEGGE:**

I would like to thank my guest from Johns Hopkins University School of Medicine, Dr. Mark Donowitz. Dr. Donowitz thank you very much for being our guest this week on GI Insights.

**DR. MARK DONOWITZ:**

My pleasure, thank you for having me.

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