Inspiring urology trainees to enter academic careers

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ABSTRACT

The physician-scientist in academic medical centers has been called as ‘an endangered species’. Adverse socioeconomic pressures, lack of dedicated research time, and increasing difficulties in obtaining grant support, make it more and more difficult to attract talented individuals for this career path, and consequently to recruit and retain them in the urology departments. The challenges facing the young academic faculty, physician-scientists, and the research trainees represent a danger to the future of academic medicine. Only a concerted effort to balance the financial disincentives, providing a protected time, a nurturing environment, and the emphasis on outstanding mentors and role models, can secure the continued research and academic success of urology programs. The disproportionate representation of women and the minorities among academic faculty must be recognized and addressed.

Key words: Academic career, urology trainees, physician-scientists

INTRODUCTION

It has been 30 years since the laconic Wyngaarden,¹ the former director of the National Institutes of Health (NIH), prophesized in a highly quoted essay that the physician-scientist is ‘an endangered species’. Physician-scientists, by most definitions are doctors with a degree of MD or MD/PhD who spend all or the majority of their time in the laboratory, working on basic science projects, whose results they hope to quickly translate into direct patient benefit.² It is excelling in this area of so-called Translational Research - taking fundamental concepts discovered at the laboratory bench and moving them to the bedside - that physician-scientists are depended upon to lead the cutting edge discoveries. If physician-scientists were thought to be an endangered species then, today in urology, as in most surgical specialties, they are downright extinct. However, there exists a highly trained and educated group of clinicians who maintain 20-50% of their time allocation in laboratory research, and/or lead teams of scientists, including PhDs, graduate students, fellows, residents, and students in productive research endeavors. They are a fundamental part of the academic process, the leaders of the research efforts in the clinical department, and essential contributors to the stature of their universities. How can we assure continued success in the future by attracting sufficient numbers of the brightest and best prospects to take up the challenge of becoming physician-scientists, to carry on the torch of discovery, and to bring recognition to their laboratories and institutions and to themselves?

Urology has a rich tradition of basic and clinical research. Many significant discoveries in the genitourinary diseases originated from the work performed in urology departments, some worthy of the Nobel Prize.³⁵ In order to assure that there is a continuum of a high-caliber scientific work performance in the urology departments, we have to generate a steady influx of research-minded individuals into the field, including the academic physician-scientists. This requires a very critical look at how to inspire the trainees to enter academic careers in urology and the various challenges of becoming a physician-scientist.

The physician-scientist embodies an impression that she is the best and the worst that the profession has to offer. Trained in the areas of both clinical medicine and basic research, they have endured hardships inherent with the length of their training, financial obligations, sleep-deprivation, and the sense of having to answer to two masters. They have demonstrated patience, durability, and physical and mental fortitude to reach their goals. Yet, they are often viewed by PhD researchers as ‘inferior’ in their grasp of the scientific process, they are underrepresented when it comes to NIH funding, and on scientific study sections. At the same time, their clinical colleagues look with envy at their protected research time, express concern about this time’s effect on

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Clinical income productivity, and the Chairmen and Deans scrutinize the bottom line of potential clinical income lost for the department.

**CHALLENGES**

**Medical school**

Very few students enter medical school determined to become physician-scientists. A few tend to gravitate towards MD/PhD programs that is offered by about a 100 medical schools, but very few of these students are likely to pursue a career in urology.6 The traditional medical student needs to be actively engaged and enlightened about the research opportunities. This is increasingly difficult because most medical schools have removed laboratory experience from their curriculum.7 Students need to be exposed to appropriate role models, and the likelihood of encountering physician-scientists during their formal curriculum is improbable. Most basic science courses are managed by the basic science faculty, and the emphasis during the later years is on the acquisition of clinical skills.

A few students develop an interest in basic research during their college years, or during a period leading up to medical school. These students have been ‘primed’ as receptive to academic pursuits, and they have to be recognized, sought out, and nurtured.

**The residency experience**

Most future academicians gain their first exposure to meaningful research and high-caliber role models during their urology residency. Residency programs are highly variable regarding the time they offer for dedicated research, ranging from no research at all, to a full year. Most of us agree that anything less than six months is insufficient exposure, and in order to be able to carry out any high-level project in six months requires a great deal of preparation and organization before and after the actual protected time.

Unfortunately, many of the latest regulatory mandates regarding work hour requirements and competencies come at the expense of the research rotation. Accreditation Council for Graduate Medical Education (ACGME) required competencies are for clinical activities, and that competency in research is not a requirement. These are time and resource-consuming mandates,8 which often come at the expense of the research. Most residency programs are unable to provide the time set aside for research protected from clinical activities; the limitations imposed by the work-hour requirements demand that research residents participate in many clinical activities such as call, clinics, etc. The message that this sends is that clinical activities take priority, and are valued higher than research activities. Although, some residencies require that the trainees engage in basic or clinical research, that they publish annually or at least during their training, many only pay lip service to the scientific process. The mad rush to find projects and submit them to the annual meeting of the American Urological Association or other prestigious meetings, just a short time before the abstract submission deadline, is an all too well-recognized phenomenon.

On the other hand, those fortunate enough to encounter strong mentors, productive laboratories, and programs where the time spent in research is valued highly, will get the type of exposure that will increase their enthusiasm for pursuing an academic career, leading to further education in fellowship programs. Mentors should be chosen for their willingness to spend the time and accept the responsibility of a mentorship. Responsible mentors recognize that having trainees is a privilege and not a right. Under their guidance, trainees learn the fundamentals of research: To carry out the project from inception to the communication of the experimental results. It is important to design projects which fall within the trainee’s capabilities, and can be accomplished in the available time period.

**Fellowships**

Fellowships provide highly specialized training in relatively narrow areas of further specialization. Some fellowships are strictly clinical, while others include a year or two of dedicated research time. Compared to residency programs, fellowships are much clearer in the structure of the research activity, and prospective trainees usually have a very clear idea what will follow. Once again, the success of the fellowship experience very much depends on the individual trainee’s dedication and attitude, the dedication and attitude of the mentor, and the environment. The old cliché of ‘seed and soil’ very much determines how well the trainee is prepared for an academic career at the end of the road.

**Academic medicine**

The decision to engage in an academic, research-oriented career, and to join the faculty of an academic medical center, does not come overnight. The experiences of the individual cement such a decision during the residency and fellowship years, and are based upon many of the ingredients described above. However, this decision is not based principally on prior experiences, but the great expectations for an illustrious career.

In their current plight, academic medical centers make academic, and particularly research, careers significantly less financially rewarding than private practice. Many entry-level faculties are burdened by the huge debts accumulated during the medical education. It is estimated that over 50% of graduating residents have student loans to repay in excess of $100 000.9 In order to compensate for the financially less rewarding career pathway, there have to be numerous internalized rewards, including the sense of contribution to the advancement of science, pleasant work environment, the opportunity to work...
with caring and dedicated mentors, the opportunity to write successful grants, the opportunity to publish, and to enjoy the universal respect. However, these are highly idealistic expectations in today’s financially oriented clinical departments. Institutions where the culture of respect for the young academic researcher is not apparent, where protected time is scarce due to the need to generate clinical income, where mentorship is weak or nonexistent, would have a great difficulty recruiting and retaining talented young faculty.

The competitive demands of career, family, and income, are difficult to balance. This concern is even more acutely notable when one looks at the gross under representation of women and the minorities among career physician-scientists. Women constitute only 30-35% of applicants to MD/PhD programs, women with MD degrees represent less than 2% of researchers of the Howard Hughes Medical Institute, and only 12% of active members in the American Society for Clinical Investigation are females. At the same time, while 12.5% of the population of the United States is of Hispanic origin, they represent only 3.4% of the medical school enrollees and 3.5% of the medical school faculty – a serious undersupply in the pool of potential researchers and physician-scientists.

MEASURES TO BE TAKEN

Early stage
The take-home message, the formula of how to inspire urology trainees to enter academic careers, is simple to envision, but harder implementing. The exposure to the value of an academic career has to be reinforced in prospective trainees from a very early stage of their career. Pre-medical and medical students should be exposed to research, enthusiastic and dedicated mentorship, and great role models. Those who show an interest and aptitude must be sought out, encouraged, and nurtured. Medical schools should include research exposure in their curriculum, and allow individuals with sufficient interest to pursue non-traditional pathways to graduation. Such paths could involve the selection of MD/PhD studies, Masters Degree opportunities, or simply independent study under the mentorship of a respected researcher.

Residency and fellowship stage
Residency programs should include dedicated, uninterrupted research time, which is highly valued and respected. Residents should be generously mentored and encouraged to develop the scientific thought process, including course work in epidemiology, biostatistics, ethics, etc. Those with outstanding interest and achievements should be offered the opportunity to get involved and positioned in such a way that they become highly competitive for the fellowship of their choice. Again, the existence of appropriate role models and mentorship is paramount to the success of the enterprise.

These values need to be echoed and elevated to even greater levels of excellence during the fellowship years.

Academic faculty
Academic positions for the physician-scientist have to be competitive and rewarding. The medical school and the clinical department, from the highest level of administration all the way down to the chain of command, must be supportive, encouraging, and have to create a culture that values the academic pursuits. There has to be dedicated time, start-up funds, and, most of all, infinite patience as the aspiring new faculty finds his bearing. One critical issue is the adherence to protected time. Often when such a time is available, but not mentored appropriately, the novice academician may inadvertently allow clinical activities to slip in - this can become a self-propagating activity with the eventual outcome of complete loss of the protected time.

As NIH funding becomes harder and harder to secure, alternative funding mechanisms through the Department of Defense, the Veteran’s Administration system, and private foundations should be pursued, and if successful, accepted and properly credited by the Department Chair.

Young academic faculty should be mentored and supported through appropriate promotion and tenure opportunities, and supported, certainly not hindered in the process of gaining national and international recognition. As they increase their status in the scientific and academic community, so will the reputation of the department grow, and become increasingly successful in attracting talented faculty, until the process becomes self-perpetuating. The opposite can be quite true as well, if the culture, environment, and resources are not available—such a department will cease to exist as a center of excellence and will be unable to attract and replenish a highly regarded academic faculty.

CONCLUSION

The physician-scientist and the future of academic medicine in urology are endangered by the current socioeconomic and regulatory reality of the practice of medicine. However, there is an enthusiastic, interested, and highly talented generation of urologists coming through our training programs. The challenge for those of us, who are senior investigators, academicians, and mentors, is to identify the cream of this crop, encourage them to pursue their dreams, and to provide them with a rich soil that will allow them to become successful. That is the way to recruit and retain the very best that our profession has to offer.

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