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Commentary: Opposing forces will lead to surgeon scientist extinction

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As surgeons, our patients provide the motivation to pose hypotheses to improve the status quo, and it is imperative that we teach and educate the next generation in such research methods. These goals are at odds with the pressure of meeting relative value unit targets and revenue generation. These opposing forces will lead to the extinction of cardiothoracic surgeon scientists (Figure 1).

Ikonomidis¹ passionately summarizes the barriers faced by surgeon scientists and strategies to attempt to slow the extinction. He highlights the stresses to increase clinical reimbursement, increasing competition and decreased federal funding, and lack of work/life balance as some of the factors leading to dwindling numbers of surgeon scientists. Recommendations are made for improved mentoring; teaching medical students, residents, and fellows the merits of research; alterations in salary structure and value for research in academic departments; and use of philanthropic funds to support research endeavors. All of these are laudable suggestions.

CENTRAL MESSAGE

Our patients depend on us to challenge the status quo; however, cardiothoracic surgeon scientists face significant barriers and extinction if aggressive measures are not taken.

It is important to remember that cardiothoracic surgeons have made tremendous contributions to the field of surgery and to the lives of our patients, and many surgeons have been recipients of the Nobel Prize.² “The surgical personality, which is inherently impatient with the status quo, may be important in driving translational efforts.”³ I would argue that we are precisely the people to know the areas

Opposing Forces on Surgeon Scientists

FIGURE 1. The opposing forces on surgeon scientists often result in more time spent in the operating room. *RVUs*, Relative value units.

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Top 10 Reasons to be a Surgeon Scientist

10. You love pathophysiology
9. You get to answer your own hypotheses
8. You get to work with *wicked smart* collaborators
7. You get to contribute to the future of your field / legacy / We need YOU!
6. You establish your niche / area of expertise
5. You will need to contribute to the literature for academic promotion
4. Career sustainability and strong professional identity (6)
3. It is a mystery and it is fun
2. Intellectual stimulation – tremendous break to clinical and administration work
1. Surgeons are PRECISELY the people to know the areas of need

FIGURE 2. Top 10 reasons to be a surgeon scientist.

of need. We see the needs and problems of our patients on a daily basis and we are heavily invested in the well-being of our patients; we have the ability to collaborate with government, industry, and private institutions; and we directly observe why clinical trials fail. The gap between bench research and clinical application has been named the “Valley of Death.”⁴ There is increasing isolation of basic science researchers in laboratories from physicians who treat patients, and “clinicians who understand a disease as a scientific phenomenon and medical problem are uniquely capable of bridging this divide.”⁴

Surgeon scientists may be described as being focused, ambitious, possessing innate curiosity and a “fire in the belly,”⁵ fearless in the pursuit of complex and difficult problems, undaunted by challenges, persistent, and not afraid to fail.⁵ Being a surgeon scientist is tremendously rewarding,⁶ and this must be modeled for the generations to come (Figure 2). As Ikonomidis notes, there is a tremendous need for more surgical scientist mentors.¹ There has been a lack of growth in the physician scientist workforce since 1980,⁷ and it has been suggested the number of MDs in academia who are competent to conduct trials has declined by 25% compared with a generation ago.⁸ Paralyzed academic investigator’s disease syndrome has been used to describe potential young investigators who lack appropriate training to succeed as clinician scientists.⁹ Even more alarming is the fact that National Institutes of Health funding to academic surgeons is declining relative to nonsurgeons,^{3,10,11} and funding is lower for cardiothoracic surgeons compared with other surgical faculty.¹¹ In addition, female mentors are desperately needed, and unfortunately, women received only 30% of National Institutes of Health RO1 equivalent grants in 2018.¹²

In the words of Louis Pasteur, “to him who devotes his life to science, nothing can give more happiness than

increasing the number of discoveries, but his cup of joy is full when the results of his studies immediately find practical application.” We must continuously be challenged to improve the status quo for our patients. Ikonomidis notes that providing the ideal environment where “an institution-wide culture that... craves, supports, and rewards research” may support growth of surgeon scientists.¹ Sadly, the only weakness of his timely summary may be that it may not have the power needed to produce the changes necessary to avoid the extinction of the surgeon scientist.

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