The joys and challenges of being a physician–scientist

Karuna Ganesh

Physician–scientists are uniquely positioned to bridge the gap between practising clinicians and biomedical scientists, but many challenges threaten this career path.

Credit: Image courtesy of Karuna Ganesh

The week begins in oncology clinic: an intense Monday morning of seeing patients with advanced gastrointestinal cancers. Between routine toxicity checks and scan reviews, complex decisions must be made balancing the benefits of life-prolonging therapy with the risks of debilitating adverse effects, and sorrowful conversations had shepherding long-term patients towards hospice care. A patient with steroid-induced hyperglycaemia must be assessed and transferred safely to the emergency room. Fellows must be taught how to translate the results of randomized clinical trials into clinical practice, medical students trained in physical examination, prescriptions written and everything painstakingly documented. Thanks to years of training and my outstanding clinical team, this whirlwind of activity concludes smoothly, the morning busy but satisfying, almost meditative. The walk back to the lab is a chance to shift mental gears and reflect upon the patients seen, the gaps in knowledge and opportunities for improving outcomes.

By mid-afternoon when I arrive in my office, I am re-energized and ready to start the main part of my week running a research laboratory. Here, the imperatives are to publish, teach and obtain grant funding. Unlike the clinic, where feedback is often immediate, project horizons in the lab can stretch to years. While the passion and thrill of scientific discovery can be marred by the insecurity of grant funding, medicine offers humanism and stability, rewarding experience and competence. Physician–scientists who are fluent in the language and culture of both the scientific and clinical realms are well-equipped to conduct mechanistically rigorous, clinically impactful research. Despite distinct workflows, cultures and approaches, the goal in my lab and clinic is the same: to improve outcomes for patients with advanced cancers. Although biological principles can be discovered using uniform simple models, my clinical experiences opened my eyes to heterogeneity as a fundamental obstacle to successful treatment of advanced cancers. In my lab, we therefore generate and use heterogeneous patient-derived organoid models to identify conserved mechanisms of metastasis and therapy resistance. Working with collaborators spanning multiple scientific and clinical disciplines, we aim to translate our insights into improved treatments for patients with cancer.

Blending clinical care with laboratory research offers the possibility of a stimulating and fulfilling career, but there is a [growing shortage of trainees](#) following this path. The protracted training period required to master both a medical specialty and investigative skills is underscored by the [increasing average age of receiving a first independent NIH R01 grant](#), now 45 years for MDs and MD–PhDs. Much attrition occurs at the transition from residency or fellowship to independent faculty positions, when the precarity of grant funding, competing family responsibilities and more stable job alternatives force many aspirants off the research ladder. However, the challenges do not end once a faculty position has been secured. The demands of academic publication and tenure can be at odds with responsive patient care. Colleagues and trainees in the lab might not appreciate the need to abruptly leave a complicated experiment to answer the needs of a patient. On the other hand, keeping up with increasingly complex clinical skills, licensing requirements and documentation can lead to burnout, prompting some established physician–scientists to focus exclusively on the lab. Carefully negotiated protected time and clinical coverage agreements, critical to research success, can fall apart in the face of a crisis such as the COVID-19 pandemic, and might never be fully restored. [Women, minorities](#) and immigrants face particular barriers to entry, mentorship, visibility and promotion, and are severely under-represented in leadership positions. [Various initiatives](#) have been proposed to address these challenges, but much more needs to be done to recruit and retain a diverse cohort of physician–scientists.

Despite these hurdles, being a physician–scientist remains an incredibly rewarding career path. There is no greater privilege than being entrusted with a fellow human's life. The ability to combine such responsibility with curiosity-driven scientific inquiry and the potential to positively influence many lives brings tremendous meaning and joy to the day's work.

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Competing interests

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Molecular Pharmacology Program, Sloan Kettering Institute, and Gastrointestinal Oncology Service, Department of Medicine, Memorial Sloan Kettering Cancer Center, New York, NY, USA.
e-mail: ganeshk@mskcc.org
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