

## Editorial

# Are we securing our future workforce of physician-scientists in hematology?



João Vitor Facco, Erich V. De Paula \*

Faculdade de Ciências Médicas, Universidade de Campinas (FCM Unicamp), Campinas, SP, Brazil

The physician-scientist stands as a pivotal figure in advancing biomedical sciences, characterized by a fusion of robust scientific knowledge with the inherent clinical skills of medical practice<sup>1</sup>. In a historical and stringent definition, the physician-scientist is regarded as one who dedicates 80% of their time to research and 20% to clinical duties<sup>2</sup>. It's crucial to recognize that this role surpasses occasional publications or submissions to scientific meetings; at its core, physician-scientists dedicates themselves primarily to scientific inquiry, leveraging clinical expertise to pose questions that not only expand scientific understanding but also address critical clinical challenges. This is achieved through a comprehensive approach that involves basic experimentation, translational research, clinical trials, or data analysis<sup>3</sup>.

Despite the rapid progress in biomedical sciences and the escalating demand for new therapies, the number of physician-scientists continues to lag behind this growth. The decrease in the proportion of these professionals can be attributed to various factors. The extensive and costly journey required for a professional to understand the disease and its clinical aspects, alongside the entirety of the scientific process, stands out as one of the main reasons why this career is overlooked by young medical students. In addition to this, the low attractiveness of the academic career compared to the private sector, the reduction in funding opportunities and governmental support, and the limited visibility given to physician-scientist role models all contribute to this scenario<sup>4,5</sup>.

Hematology is a field known for several seminal discoveries that were later expanded to other areas. Therefore, hematology academic services have been closely associated with basic, translational and clinical research. In the Brazilian

context, research in hematology performs well. Between 1980 and 2020, scientists affiliated with Brazilian institutions published 4,186 papers according to the Web of Science database, placing Brazil in 22nd position in terms of the number of papers for the period. This highlights the importance of hematology research conducted by Brazilian scientists<sup>6</sup>.

Although no objective data are available, anecdotal reports from most research-intensive hematology centers in Brazil and in the world show that in recent years it has become more difficult to recruit medical doctors (MDs) for research careers. This represents a problem for the maintenance of the quality of the hematology research in Brazil. Unlike other areas of knowledge, such as the humanities, biological sciences, and exact sciences, which face problems with a lack of vacancies in academia or a lack of scholarships for graduate programs, paucity of academic positions is probably not the main issue here, as we are witnessing less competition for academic positions, even in major research institutions<sup>5,7</sup>.

This problem cannot be underrated as we cannot rely on academic production from abroad. Despite the quality of science from other countries and the importance of engaging in collaborations for international science, it is necessary for us to have scientific independence and the ability to develop research within our territory. As an example, in this number of Hematology, Transfusion and Cell Therapy there are at least four papers addressing issues for which regional data are important. The papers from Pinheiro, R.F. et al, Garnica M. et al, Cançado, R.D. et al e Viana, M.A. et al published in this edition of "Hematology, Transfusion and Cell Therapy", discuss relevant hematological diseases under the Brazilian perspective<sup>8-11</sup>.

The shortage of physician-scientists tends to be heterogeneous within hematology itself. In benign/classical hematology the scenario tends to be more critical, facing greater challenges in the training and retention of this profile of MDs.

\* Corresponding author at: Faculdade de Ciências Médicas, Universidade de Campinas (FCM Unicamp), Campinas, SP, Brazil

E-mail address: [erich@unicamp.br](mailto:erich@unicamp.br) (E.V. De Paula).

<https://doi.org/10.1016/j.htct.2024.05.001>

2531-1379/© 2024 Associação Brasileira de Hematologia, Hemoterapia e Terapia Celular. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

On the other hand, onco-hematology offers a more dynamic scenario permeated with clinical trials, providing at least some minimal exposure of MDs to scientific research<sup>7</sup>. Despite this, it is important to emphasize that scientific training in onco-hematology is still far from ideal for a physician-scientist, and it does not seem appropriate for the training to be linked to the agenda of the pharmaceutical industry.

A relatively high number of solutions have been proposed to overcome this issue. It is important for students to be exposed to scientific practice from the beginning of their education. The inclusion of courses that promote engagement with science and the expansion of undergraduate research programs and scholarships can stimulate students to pursue a scientific career. Additionally, integrated training programs, such as MD-PhD Student Pathway, can contribute to optimizing the training process for physician-scientists, representing an appealing alternative for students seeking to accelerate their educational journey. Recognizing and valuing successful physician-scientists also holds promise as a means to inspire clinical trainees to embrace research endeavors. Additionally, the provision of protected time for research during residency warrants consideration as a viable strategy<sup>4,5,7</sup>.

The guarantee of maintaining the quality of Brazilian research in hematology depends on the training of professionals capable of reconciling scientific and clinical skills. Universities and research centers have at their disposal a wealth of evidence showing that research is associated with improving the education of their students and professionals, enhancing practical qualifications, and increasing resource acquisition, thus also impacting the institution's reputation<sup>12</sup>. What is now needed is to translate this evidence into actions that result in a more attractive path for young hematologists.

## REFERENCES

1. Permar SR, Ward RA, Barrett KJ, Freel SA, Gbadegesin RA, Kontos CD, et al. Addressing the physician-scientist pipeline: strategies to integrate research into clinical training programs. *J Clin Invest.* 2020;130(3):1058–61. <https://doi.org/10.1172/JCI136181>.
2. Brass LF, Akabas MH. The national MD-PhD program outcomes study: Relationships between medical specialty, training duration, research effort, and career paths. *JCI Insight.* 2019;4(19):e133009. <https://doi.org/10.1172/jci.insight.133009>.
3. Rosenberg L. Physician-scientists—endangered and essential. *Science.* 1999;283(5400):331–2. <https://doi.org/10.1126/science.283.5400.331>.
4. Lin YA. Fixing the Leaky Pipeline: Redefining Physician-Scientist Efforts to Fit the Needs of the New Normal. *Academic Medicine.* 2021;96(12):1628–9. <https://doi.org/10.1097/ACM.0000000000004394>.
5. Mendonça VR, Barral-Netto M. Stimulating the Formation of the Physician-Scientist; Scientific Exposure during the Medical Course in Brazil. *Med.Sci.Educ.* 2011;21(Suppl 1):107–11. <https://doi.org/10.1007/BF03341606>.
6. De Paula EV, Martins MS, De Lorenzo ALB, Duarte BKL, Rezende SM, Costa FF. The landscape of hematology research in Brazil: an analysis of data from citation databases. *Hematol Transfus Cell Ther.* 2023;45(Suppl 2):S57–67. <https://doi.org/10.1016/j.htct.2022.02.001>.
7. Soffer E, Hoots WK. Challenges facing the benign hematology physician-scientist workforce: identifying issues of recruitment and retention. *Blood Adv.* 2018;2(3):308. <https://doi.org/10.1182/bloodadvances.2017011965>.
8. Sampaio LR, Viana MA, de Oliveira VS, Ferreira BV, Melo MM, de Oliveira RT, et al. High PD-L1 expression is associated with unfavorable clinical features in myelodysplastic neoplasms. *Hematol Transfus Cell Ther.* 2024;46(2):146–52. <https://doi.org/10.1016/j.htct.2023.05.002>.
9. Garnica M, Crusoe EQ, Ribeiro G, Bittencourt R, Magalhães RJP, Zanella KR, et al. COVID-19 in multiple myeloma patients: frequencies and risk factors for hospitalization, ventilatory support, intensive care admission and mortality -cooperative registry from the Grupo Brasileiro de Mieloma Múltiplo (GBRAM). *Hematol Transfus Cell Ther.* 2024;46(2):153–60. <https://doi.org/10.1016/j.htct.2023.08.002>.
10. Barros GD, Leal CV, Leite LA, Fujimoto DE, Caçado RD. Real-world evidence of the burden of sickle cell disease: a 5-year longitudinal study at a Brazilian reference center. *Hematol Transfus Cell Ther.* 2024;46(2):161–6. <https://doi.org/10.1016/j.htct.2023.10.001>.
11. Oliveira EL, Belisário AR, Silva NP, Rezende PV, Muniz MB, Oliveira LM, et al. Clinical, laboratory, and molecular characteristics of a cohort of children with hemoglobinopathy S/beta-thalassemia. *Hematol Transfus Cell Ther.* 2024;46(2):167–75. <https://doi.org/10.1016/j.htct.2023.11.002>.
12. Luz PL. Physician-Researcher, Medical Practice and Research: The Importance of the Physician-Researcher in Current Medicine. *Arq Bras Cardiol.* 2022;119(5):801–3. <https://doi.org/10.36660/abc.20220099>.