Letter

Revista da Sociedade Brasileira de Medicina Tropical 46(6):798-799, Nov-Dec, 2013
http://dx.doi.org/10.1590/0037-8682-0120-2013

The importance of originality in scientific research on neglected tropical diseases

Antonio R.L. Teixeira[1]

[1]. Laboratório Multidisciplinar de Pesquisa em Doença de Chagas, Faculdade de Medicina, Universidade de Brasília, Brasília, DF.

Dear Editor,

The advancement of scientific research on neglected tropical diseases has been considered slow and is perhaps lagging behind the increasing burdens of tuberculosis, leprosy, malaria, filariasis, leishmaniases and Chagas disease (American trypanosomiasis). Progress has been made toward the treatment and partial prevention of several neglected diseases, but the worldwide spread of leishmaniases and Chagas disease is worrisome[1,2]. To contribute to the discussion on these neglected tropical diseases, the recorded levels of morbidity and mortality, which are now considered a global health problem requiring international solidarity, must be considered[3].

It is well known that neglected infectious diseases are major contributors to hospital expenses and job absenteeism. Additionally, approximately 25% of human suffering stems from *autoimmune diseases* for which a basic understanding of the causal agents and disease mechanisms is missing[4,5]. Therefore, an important question requiring scientific investigation is whether infectious agents of human disease can be triggers of autoimmune diseases.

This essay uses American trypanosomiasis as a case study to discuss how to carry out investigations with the aim of providing relief from the suffering caused by neglected tropical diseases affecting thousands of people on five continents. The scientific research carried out at the Chagas Disease Multidisciplinary Research Laboratory at the University of Brasília is a result of a passionate project undertaken to understand the pathogenesis, prevention and control of Chagas disease[6-9]. Ultimately, we arrived at a puzzling question: How can a genetically driven autoimmune disease be prevented? After twenty years of research, hypothesis-driven investigations have shown that the protozoan *Trypanosoma cruzi* invades the human genome. The results of these hypothesis-driven experiments have yielded benefits, particularly for the treatment of Chagas heart disease. This positive effect can be achieved by killing the diseased bone-marrow cells with cytostatics and replacing them with new marrow cells from a compatible, healthy donor. The treatment of Chagas heart disease has now been deciphered, and this scientific discovery brings hope for thousands of people. Although the studies on Chagas disease pathogenesis have received recognition after publications in prestigious scientific journals[3,6-9], the practical consequences of treating the autoimmune pathology require further progress on bone marrow transplantation immunology for matching histocompatible donors. Ideally, this can be accomplished alongside novel investigations to discover a non-toxic drug to eradicate *T. cruzi* in the candidate graft recipient[10].

For the rapid translation of scientific research into the practice of pathology and laboratory medicine, which will foster creative work in developing countries, it is necessary to stimulate hypothesis-driven investigations that aim to answer important medical and biological questions. For many scientists, a major obstacle preventing solutions to neglected diseases is a lack of creative research proposals, i.e., proposals without similarity to conventional approaches. In other words, many proposals represent *business as usual*.

Possible solutions include creative research proposals that address the origin of disease mechanisms[4]. Funding of such proposals is difficult because it depends on manmade policies. Funding agencies understand that great ideas are priceless and that they may bring solutions to disease and human suffering. However, a price must be put on research because it is very expensive. Therefore, the current scenario is disconcerting because young scientists are often unable to carry out investigations that they believe are important. In fact, paradigm-breaking new ideas have trouble receiving funding because the investment is considered too risky.

This problem can be easily solved. For many in the scientific research field, it is known that creative research that challenges paradigms and provides solutions to longstanding problems stems from the imagination of free-thinking scientists. Today, such scientists may be considered *trouble makers*. Every creative scientist should spare some time in her or his day to read the history of great discoveries, beginning from the recent and continuing to the classics that went unappreciated in their time. Upon quiet reflection, the creative scientist will find inspiration and synthesize this knowledge to pursue his or her intuitions, provided the path to discovery is unfettered and free of obstacles.

Is there hope? Yes. There will always be hope. A great, original idea requires scientists with potent, straightforward minds who are willing to dedicate their lives to realizing something that only exists in their imagination, and they should be able to pursue their most loved idea. A scientist should be able to raise funds with proposals that satisfy policy makers. The ability to fundraise will give creative scientists the freedom to carry out the necessary experiments to pursue their novel ideas.

For scientific research to be rapidly translated into practice, a scientist's most loved idea must be investigated to completion.

Address to: Dr. Antonio R.L. Teixeira. Laboratório Multidisciplinar de Pesquisa em Doença de Chagas/FM/UnB. Caixa Postal 4536, 70910-900 Brasília, DF, Brasil.
Phone: 55 61 3349-4987
e-mail: ateixeir@unb.br
Received 5 June 2013
Accepted 20 September 2013

It is well known that the advancement of science parallels the development of new tools. In this regard, the development of new tools can be anticipated by a keen drive to solve a problem never before posed to any other scientist. Following these criteria, creative research will bring answers. My message to my fellow colleagues is this: dream… take a chance… and manifest your most loved idea into practical solutions.

CONFLICT OF INTEREST

The author declare that there is no conflict of interest.

REFERENCES

1. Costa, CHN. New times: Tropical medicine for the cities and beyond. Rev Soc Bras Med Trop 2012; 45:1.
2. Schmunis GA, Yadon ZE. Chagas disease: a Latin American health problem becoming a world health problem. Acta Trop 2010; 115:14.
3. Teixeira AR, Hecht M, Guimaro MC, Sousa A, Nitz N. Pathogenesis of Chagas disease: Parasite persistence and autoimmunity. Clin Microbiol Review 2011; 24:592-630.
4. Kivity S, Agmon-Levin N, Blank M, Shoenfeld Y. Infections and autoimmunity-friends or foes? Trends Immunol 2009; 30:409-414.
5. Pankuweit S, Richter A, Ruppert V, Maisch B. Familial predisposition and microbial etiology in dilated cardiomyopathy. Herz 2009; 34:110-116.
6. Teixeira AR, Lacava Z, Santana JM, Luna H. Insertion of *Trypanosoma cruzi* DNA in the genome of mammal host cell through infection. Rev Soc Bras Med Trop 1991; 24: 55-58.
7. Nitz N, Gomes C, Rosa AD, D'Souza-Ault MR, Moreno F, Lauria-Pires L, et al. Heritable integration of kDNA minicircle sequences from *Trypanosoma cruzi* into the avian genome: insights into human Chagas disease. Cell 2004; 118:175-186.
8. Hecht MM, Nitz N, Araujo PF, Sousa AO, Rosa AC, Gomes DA, et al. Inheritance of DNA trans ferred from American trypanosomes to human hosts. PLoS One 2010; 12:e9181.
9. Teixeira ARL, Gomes C, Nitz N, Sousa AO, Alves RM, Guimaro MC, et al. *Trypanosoma cruzi* in the chicken model: Chagas-like heart disease in the absence of parasitism. PLoS Negl Trop Dis 2011; 5:e1000.
10. Sfriso P, Ghirardello A, Botsios C, Tonon M, Zen M, Bassi N, et al. Infections and autoimmunity: the multifaceted relationship. J Leukoc Biol 2010; 87:385-395.