
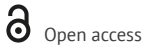


LETTER TO THE EDITOR

Biofabrication of hearts in Colombia as a national project*Biofabricación de corazones en Colombia como un proyecto nacional*Juan Hember Tabares-González¹ ¹ Universidad Nacional de Colombia - Bogotá Campus - Faculty of Medicine - Stem Cell Biology Research Group - Bogotá D.C. - Colombia.

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**Dear Editor**

The biofabrication of hearts is an emerging technology activity in which the Colombian state should invest in order to meet health demands, employ highly skilled professionals, and develop a labor sector that will generate high profits in the coming decades.

The global demographic transition shows a longer life expectancy and thus an increase in the number of elderly people. As a result, the Organisation for Economic Cooperation and Development¹ estimates that there are currently 4 515 763 people over the age of 65 in Colombia, with that figure expected to rise to 6 565 751 by 2030. This situation implies an increase in the need for health care for patients with heart failure and coronary artery disease, which are common conditions in this age group.

In this regard, given the imminent demand for heart disease care, it is necessary to take measures to respond to the needs of each patient in a timely manner, because, for example, in cases where heart transplantation is required, a significant number of people die waiting for a donor; this phenomenon is not endemic, but occurs worldwide, even in developed countries.²

According to Telich-Tarriba *et al.*,³ the use of 3D printing in reconstructive surgery, surgical planning, regenerative medicine, and education has led to new applications for this technology. Its impact has been so great that it is thought to be a matter of time before obtaining a functional heart biofabricated with 3D printing from bioink derived from stem cell cultures from genetically reprogrammed somatic cells and the patient's own cells.^{4,5} In short, with the availability of this technology, hearts could be manufactured to provide a chance of survival to terminally ill patients with heart failure, a disease with an estimated prevalence of 1% to 10% in adults worldwide.^{6,7}

There are few groups researching the biofabrication of hearts; however, companies are already preparing for a revolution in this matter.⁴ It is important to note that achieving this requires a multidisciplinary approach involving professionals from the health, life sciences, and engineering fields.

Colombia has always opted to import technology instead of developing it, which causes cost overruns and puts the country at a disadvantage with respect to other nations that are leaders in production. Moreover, this situation contributes to the continuing drain of brains and skilled workers, as people migrate in search of better opportunities to meet their basic and professional development needs.

Since the biofabrication of hearts is an activity that is just beginning to develop, this is the time when we, as a country, must take on the challenge of being competitive in this emerging industry and get ahead of the traditional powers. The model chosen to meet this challenge must be efficient and quick to implement, with no excessive red tape, as in China, where start-ups and nascent companies are financed until they break even, or in

the United States, where the free enterprise and private investment model is promoted. In either case, the Universidad Nacional de Colombia can actively engage in this process by managing and assisting in the establishment of companies dedicated to the production and development of tissues and human organs, as its engineering, business administration, biology, pharmaceutical chemistry, and medical programs can partner and offer the best advice.

In conclusion, the biofabrication of hearts is a relevant issue in the sense that the development of this industry in the future may represent a sector that contributes significantly to increasing the national gross domestic product and to providing treatment alternatives for heart disease patients; it will also allow for the employment of health professionals and scientific researchers. Given this scenario, it would be particularly exciting, innovative, productive, and academically challenging for Colombia to promote projects to be pioneers in this activity.

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