

recipe for translational research in INDIA: MD-PhD or PhD-MD?

The current scientific scenario in India over-emphasizes translational research without highlighting need to bring educational and training reforms that can enable such translational research. It is widely believed that there are two cycles of translation, namely T1 cycle which is characterised by bench to bedside approach and the T2 cycle which is characterised by bedside to bench approach. Both cycles are complementary for translational enterprises and are key to raising the basic research investigations for societal benefit. The huge investments in biomedical research are driven by tax payer's money and therefore constitute a precious national resource which needs to be moderated by effective and long term research planning of human resources. The best medical universities outside India have overwhelmingly introduced the concept of MD-PhD program in order to focus on the T2 variant of translational cycle. This is undeniably a significant part of translational research wherein clinical observations define the research goals engendering discoveries in diagnostics and therapeutics. This educational system has led to training of Physician-scientists who are able to reduce the clinical phenotype using the molecular tools and exploit the biological phenomenon that addresses clinical phenotype. Such top to bottom approach is not only essential to apply the imagination of physicians as this platform provides them with the dynamic link between clinical and molecular association but also enhances clinical skills. While India is poised to emulate this model in medical institutes, US, UK, Japan, Europe and Australia have already successfully implemented this exciting career advancement scheme for physicians such that their knowledge can integrate the molecular techniques for clinical benefits. Despite all the euphoria, the pace of

discovery and innovation of biomedical sciences fades to insignificance when compared with pace of innovation in engineering sciences. It is almost negligible in re-emerging economies like India. Is PhD-MD the solution to current crisis? How does PhD-MD program offer new perspective than MD-PhD program? Let us examine the differences. The PhD-MD program pertains to the T1 cycle of translation and serves to exploit the expertise shared by majority of research workers worldwide who work outside medical institute i.e. university, research institute and colleges. These venues lack interface with clinical colleagues and are therefore deprived of the elements of T1 cycle and can thus become useful participants of T2 cycle. The PhD-MD program is therefore argued as the most suitable for the countries of developing world especially India, China, Brazil and South Africa. These countries lack the medical facilities, human resources and are overtly dependent on the import of medical devices and drugs which make the healthcare delivery less affordable for their respective populations. It is here where the PhD-MD program can bridge the deficit and successfully develop knowledge equity by accelerating the T1 cycle of translation. This bottom-top approach is characterised by reductionist to clinical visualisation of biotechnology applications thus enabling the bridging of chasm that exists between reductionist approach and systems approach. This is abysmally lacking in the rudimentary MD-PhD program which starts from clinical observation and later examines the molecular details. The information cascade emanating from molecular investigation to clinical observation is the vital link of the complete T1-T2 cycle of translation. Launching of PhD-MD program is also economically viable for developing country like India which needs to develop

quality care physicians founded on the sound track record of research than quality researchers founded on sound medical knowledge. The number of Ph.D scientists working on biomedical related problems is growing significantly in India over the last decade. However, most of them do not have an exposure to human anatomy and physiology. This exposure can appropriately equip biomedical scientists to make an impact on translational health research. The PhDs in India are recognised worldwide and many of them can be trained in a sizeable portion of medicine to achieve this goal. They can even be used for serving the rural healthcare sector for such countries with little more training rather than exporting them to sophisticated research labs of the west. A similar pattern did happen in the late 1970's and 80's when a number of Indian Ph.D's working in U.S.A. acquired M.D degrees in Mexico and South American countries. Many of them continued with clinical practice while some returned back to academic research. Although several efforts are being made to start M.D/Ph.D program in India, no significant progress has been made in this direction. Perhaps the alternative Ph.D-M.D model can be implemented so that we can have excellent translationally driven biomedical researchers in the country for the future. This can also be even an complementary model rather than an alternative model to M.D/PhD program.

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