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Anantanarayanan Raman is in the Charles Sturt University and Graham Centre for Agricultural Innovation, PO Box 883, Orange, NSW 2800, Australia.
e-mail: araman@csu.edu.au

Veterinarians as scientific contributors in mainstream biomedical research

Sharvan Sehrawat and Rajeev Kaul

Arguably, veterinarians belong to one of the most respected professions owing to their significant contribution in protecting global food supply, uplifting public health and being the custodians of more number of species than any other professional can claim. The curriculum of veterinary sciences includes knowledge of anatomy and physiology of a variety of animals, pathobiology of developmental, metabolic and degenerative diseases, the epidemiology of zoonotic diseases and reverse zoonosis, in addition to basic sciences and extension-related subjects. Therefore the unique set of skills acquired by veterinarians who choose to become biological scientists makes them better contributors in biomedical research as well. However, their potential remains unharnessed, particularly in India, to fulfil unmet challenges in an ever-changing climate that is bound to impend the ecosystem and pose an unheard scale of public health problems in the not-so-distant future.

Approximately 60% of the pathogens infecting humans originate from animals, which also serve as a reservoir or mixing vessel for emerging pathogens. Therefore, knowledge of disease pathogenesis in animals can be useful for devising interventions to ameliorate human sufferings. Veterinarians are trained to handle and treat animals, and therefore are aptly trained to measure and intervene in normalizing vital parameters during animal experimentation. This suitably prepares them to add value to biomedical research endeavours as well. If such parameters were not factored in during analyses, the outcome of experiments would have limited, if any, translational value. However, if their contributions are relegated to mere caregivers, the whole concept of mutual collaboration would be jeopardized only to significantly halt progress in biomedical science. In the past, veterinarians-turned-scientists have contributed immensely to our understanding of the fundamental phenomena in biology (Table 1). From India also we do have notable contributions in vaccines, diagnostics and mammalian cloning by veterinary scientists. In countries like India

Table 1. Contribution of veterinary scientists in Biomedical Research outside India

Contributors	Discovery
Peter Charles Doherty*	MHC restriction of cytotoxic $CD8^+$ T cells (1976)
Bill Hadlow**	A pioneer on scrapie (1973)
Theobald Smith and Frederick L. Kilbourne	Texas cattle fever transmitted by insects (1893)
Arnold Theiler and W.O. Neitz	Life cycle of many protozoal and tick-borne viral diseases
Peter Biggs, Graham Purchase and Richard Witter	Pioneer in the field of cancer biology (1967)
Josh Fidler	Cancer metastasis and its molecular mechanisms
Friedrich Loeffler and Paul Frosch	Discovered Foot and Mouth disease virus (1898)
Walter Plowright	Rinderpest Virus tissue culture vaccine*** (1968)
Daniel Salmon	Identified salmonella, the causative agent of salmonellosis
Robin A. Coomb	Developed Coomb's test for autoimmune disease diagnosis (1994)
Ralph Brinster****	Mammalian transgenesis and cloning (1994)

*Nobel laureate (1996).
**The field was recognized with two Nobel prizes – Carlton Gajdusek (1976) and Stanley Prusiner (1997).
***The only animal disease eradicated worldwide and FAO recognized the contribution of Plowright.
****US National Science Medal (2010).

where resources are limited, a major emphasis should be in setting our priorities right and tackling them head-on. Concerted and collaborative efforts of both veterinary and biomedical research scientists could immensely help achieve such goals. In the past few decades, particularly in the national context, the situation has changed for good primarily due to reverse brain drain, with many scientists trained in world-renowned laboratories choosing to begin their independent scientific careers in India. However, a myopic vision at this stage would be counterproductive and therefore the need of the hour is to create a conducive research environment that essentially involves building bridges and initiating concerted efforts of veterinary and biomedical researchers in tackling public health problems. Other challenges are perhaps equally if not more alarming are: (1) There seems to be a trend among most veterinarians to choose clinical practice especially in companion animal health, rather than food animals. (2) Few clinicians even bother or have the time to do research, and even fewer are inclined to take up problems at the interface of veterinary and biomedical sciences. (3) Research preferences on 'animal models' rather than on animals are given way too much emphasis. This is for anyone to analyse how many studies performed on 'animal models' are eventually relevant to animals and humans, who do not have the luxury of living in segregated, clean environment. A proposal focusing on the use of Arabian foals rather than severe combined immunodeficiency mice to study primary immunodeficiency disease may find it difficult to get funds as does the use of equine, feline and bovine retroviral diseases to model human immunodeficiency virus and its pathogenesis. This cannot be ascribed to the superiority of mouse, but to our failure in developing reagents, tools and establishing relevant disease models in companion animals and/or livestock. One needs to ask what we think is a pertinent question: Do we have to cure 'models' or real animals and humans? In some cases however, animal models indeed have helped in making fundamental discoveries and identifying drug targets. To make things worse, if someone musters courage to work on such issues, many a time it does not receive encouragement by those involved in decision-making at various levels. This scenario needs to be examined seriously, if our aim is to do something meaningful with intrinsic value and extrinsic rewards. Possible remedies to bridge the gap would be discussed elsewhere.

Sharvan Sehrawat is in the Department of Biological Sciences, Indian Institute of Science Education and Research, Sector 81, Knowledge City, SAS Nagar, PO Manauli, Mohali 140 306, India; Rajeev Kaul is in the Department of Microbiology, University of Delhi South Campus, Benito Juarez Road, New Delhi 110 021, India.*
**e-mail: sharvan@iisermohali.ac.in*