

ROYAL COLLEGE OF VETERINARY SURGEONS

THE REQUIREMENTS FOR VETERINARY RESEARCH AND THE RECRUITMENT OF VETERINARY SURGEONS INTO RESEARCH

RCVS RESEARCH COMMITTEE

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VISION

The RCVS vision for veterinary research in the UK is of a vibrant, sustainable, well-connected research platform with international excellence as the hallmark of the veterinary research community and its outputs. In our vision, this community competes internationally in attracting research income, produces high quality scientific outputs, ensures effective and efficient knowledge transfer, and provides excellent research training.

INTRODUCTION

The challenges we face today in our society demand a major reliance on science and it is likely that this dependence will increase over the next several decades. Veterinary science is an integral and vital component of the UK science base. Veterinary research is performed by individuals with a range of scientific backgrounds, including veterinary graduates, who have the common strength of understanding the integrated whole organism. Veterinary research in the UK has many internationally recognised strengths. When benchmarked, the UK performs exceptionally well with veterinary research rated top in global comparisons (*Nature* **396**, 615 – 618 (17 Dec 1998) while the most recent assessment of veterinary research in UK Veterinary Schools (HEFCE Research Assessment Exercise, 2002) indicated that all Schools conduct international quality research (all Schools rated 5). Assessment of the veterinary research carried out in research institutes uses different criteria but these include quality as well as relevance to end-users. The majority of UK veterinary research institutes have been rated of international quality, delivering research of excellent end-user relevance. A significant element of veterinary research is also conducted in university departments that are not linked to veterinary schools as well as in the industrial sector. A small amount is carried out in private veterinary practice. In order to build upon our strengths nationally and internationally we must invest in the veterinary science base to compete with countries that are investing heavily in science and technology in support of economic development.

The veterinary profession makes a substantial contribution to the UK economy, underpinning two of its biggest industries, namely the food and leisure industries. In the UK, agriculture contributes £2.15 billion annually to the economy, (agriculture £1.7 billion; aquaculture £0.45 billion), employs 600,000 people, and supplies 67% of UK needs in a food chain worth £60 billion and employing 3.4 million people. Approximately 45% of households in the UK own a pet and there are 7 million cats and 6 million dogs being provided for by a pet food market worth £1.5 billion and employing 7,900 people. The horse-racing and leisure industries employ 50,000 people directly, and some 5 million people have an interest in the horse industries in the UK. In all sectors vets are essential. The productivity and competitiveness of livestock and the health and welfare of all animals are dependent on veterinarians and on the research which develops the tools on which veterinarians depend. Furthermore veterinary control of food mediated and zoonotic diseases in livestock and companion animals is essential to human welfare. In addition, veterinary practices are an outstanding example of successful SMEs which contribute significantly to the national economy.

National crises, such as Bovine Spongiform Encephalopathy and Foot and Mouth Disease, have highlighted the need for high quality veterinary services supported by excellent veterinary research. These have pointed to the gap that has developed between service delivery in practice (particularly in farm animal practice) and the research that underpins the development of veterinary science. Furthermore, a lack of connectivity between veterinary researchers across private and public sectors is evident and it is clear that links between the public sector research organisations could be more fully exploited. These gaps demonstrate the potential damage in the future if the relative paucity of scientists interested in, and trained to undertake, veterinary research is not addressed.

There is also a need to strengthen the peer-reviewed evidence base in all aspects of veterinary medicine. Recent issues in human medicine, such as the "Bristol babies cardiac surgery problem", have highlighted the requirements for evidence to substantiate clinical decisions and effective clinical audit to ensure public confidence. Similarly, recent decisions over PCB and mercury levels and *Salmonellae* in the food chain have been based on a less than adequate evidence base, and both the UK Food Standards Agency and the European Food Standards Authority, each tasked with provision of independent risk assessments based on scientific evidence, have highlighted the current lack of such information in relation to both animal health and

production and animal welfare. The Cochrane Collaboration, an international non-profit and independent organisation founded in 1993, is dedicated to making up-to-date, accurate, healthcare evidence readily available worldwide. It produces and disseminates systematic reviews of healthcare interventions and promotes the search for evidence in the form of clinical trials and other studies. It is highly regarded for the rigorous quality of its outputs which include the Cochrane Reviews. The adoption of a Cochrane style approach to the development of the evidence base in all aspects of veterinary medicine, founded on strong links between Government Research, veterinary schools and veterinary practices, would help to ensure public confidence in the development of all aspects of veterinary medicine and surgical therapies and intervention.

The nature of veterinary research, like medical research, is both basic and applied. It encompasses leading edge molecular biology, including genomics, and market-led testing of vaccines and medicines. It embraces research carried out to advance clinical veterinary practice, animal welfare and food safety. It spans research on diseases and disease prevention in a range of species including those of comparative human relevance, as well as diseases of public health importance. Consequently veterinary research interdigitates with biomedical research (including life sciences) and with research disciplines such as information and mathematical sciences, engineering and social sciences. Veterinary research must be fully connected to excellence in other complementary disciplines, since it is likely to be at these interfaces that significant advances will be made in the next decades.

WHY INVEST IN VETERINARY RESEARCH?

High quality outputs of veterinary research are fundamental to the future health of the UK human and animal population. The post-genomic period presents new and far-reaching opportunities for veterinary (and biomedical) science to harness knowledge for the benefit of human and animal health. Veterinary science has a unique central role to play in this process. Advances in molecular and cell biology require integration with the physiology and developmental biology of the whole organism, a traditional strength of veterinary science with its comparative approach to multiple species. Completion of the human and mouse genome sequences has led to acceleration of analogous programmes in other mammals, birds and fish. This wealth of information presents immense opportunities for applications into animal health. The development of nuclear transfer and cloning techniques further illustrates that veterinary science is in the vanguard of practical application of genetic technologies.

In the post-genomic era a shift in the emphasis of reductionist science is occurring into the direction of integrated whole animal work, an area in which veterinary researchers can excel. There is increasing awareness that the health of the human population is inextricably linked with the animal species which serve as our food sources or share our domestic and working environments. As animal production becomes more intensive and greater international movement of humans and animals occurs, diseases continue to evolve and new zoonotic agents emerge. Veterinary scientists are playing an increasingly important strategic role in disease surveillance and control, while elucidation of pathogen-genome sequences and gene functions presents many new opportunities for rationally designed therapeutic intervention and preventive disease programmes for all domestic animals. Over the past thirty years, animal production for food has greatly intensified. It has also grown to encompass new species such as deer, and salmon. This latter is now Scotland's largest food producing industry and much of this success has been built on the inputs of UK veterinary scientists bringing the basic principles of animal pathology and clinical medicine to bear on the new production systems.

Veterinary research encompasses the goal of environmental sustainability, a key challenge for the 21st century. There are many global issues that require input from veterinary researchers. Consider the challenges posed by genetic modification of plants and animals which have the potential to significantly impact biodiversity, and the impact of climate change which may critically alter the animal and human disease profile currently encountered within the UK. These problems will be addressed adequately only by effective international collaboration with input from a variety of disciplines, including those engaged in veterinary science. To contribute to these global challenges, UK veterinary research and researchers must be internationally competitive.

WHY DO WE NEED VETERINARY GRADUATES CONDUCTING VETERINARY RESEARCH?

Veterinary Research is conducted by a variety of people from different disciplines. This mix is vital for future growth and development but the veterinary graduate scientist, with a unique range of skills, plays a fulcrum role. Of concern therefore is the apparent reduction in the number of veterinary graduates entering research such that, in the future, adequate numbers of veterinary graduates may not be available to the scientific community. The skills and competency base of veterinary graduates encompasses a wide range of both generic and subject-specific attributes which are well documented in the subject benchmark statement for Veterinary Science (QAA Subject Benchmarking Statement; http://www.qaa.ac.uk/academicinfrastructure/benchmark/honours/vet_sci.pdf.

Veterinary graduates receive a broad training in molecular and comparative biology; animal disease pathogenesis; pathology and transmission; disease diagnosis, prevention and management; and in animal health and welfare. Across these themes, population medicine is a core element of the veterinary curriculum. Underpinning this knowledge is “an understanding of the basic sciences allied to veterinary medicine, and of the key principles in biological science relevant to clinical sciences”. Clinical skills and knowledge build upon a scientific foundation equivalent to that obtained from a biosciences undergraduate course. Thus these skills, competences and attributes equip veterinary graduates uniquely for research in veterinary sciences (and for biomedical research) where research directed at improving the health and welfare of animals (and humans) requires a comprehensive understanding of health and disease. Furthermore, as Named Veterinary Surgeons, veterinary graduates are an integral link in the support network for high quality biomedical research.

Of the 355 academic staff employed within 5 of the 6 UK Veterinary Schools in 2003, 205 held veterinary qualifications. Of particular concern is the lack of veterinary graduates at the earlier stages of research careers; of 353 active researchers (research assistants / research fellows) in the UK veterinary schools, only 54 held veterinary qualifications. The number of veterinary graduates employed in research institutes has declined steadily over the past 20 years. For example, in 1980 50 veterinary graduates were based at the Institute for Animal Health (Compton and Pirbright) compared to only 10 in 2001, and 16 (including PhD students and non-MRCVS vets) in 2003. Recent recruitment has been targeted to address this dearth of veterinary qualified researchers. A similar trend is seen in a number of research institutes across the UK - only a few (eg Moredun Research Institute) have been able to retain or increase numbers of employees with veterinary qualifications. Taken together these data suggest that the number of veterinary researchers with the required training and experience to lead research groups is falling, and that leadership of research in future will increasingly become the remit of scientists with other qualifications. This may lead to a diminution of the collaborative interactions between veterinary researchers and other scientists, with a loss of the unique knowledge resource that veterinary graduates bring to research. This will impact not only on veterinary applied research but also on basic research. Evidence shows that the veterinary research community has contributed remarkably effectively to strategic national research leadership given its small size. The lack of veterinary graduates at this level is likely to have a significant impact on the quality of future strategies developed.

REALISING THE VISION

The issues presented in this paper are not new. Indeed they have been raised on many occasions during the last 3 to 4 decades. The contribution of veterinary research to the UK and international research agendas is clear but the situation is fragile in terms of ensuring that veterinary research thrives and grows over the coming years. Recently there have been new initiatives which have afforded the veterinary and science communities a window of opportunity to improve the infrastructural support for veterinary research and training. These include, amongst others, the DEFRA and Funding Councils of England and Scotland Veterinary Training and Research Initiative (VTRI), the Wellcome Trust Exotic Animal Diseases Initiative and the BBSRC Animal Viral Diseases Initiative and Animal Welfare Initiative. The RCVS recognises these major and significant investments and has supported the partnerships being created to facilitate such a 'joined up' approach.

During the next decade we foresee that the fruits of these and other initiatives will deliver significant benefits for the management and control of animal and human diseases, and for the training of future generations of veterinary researchers. There is a renewed environment of collaboration amongst all stakeholders and the RCVS is committed to facilitating this progress to ensure that the focus of future discussions is more on implementing solutions and less on describing problems. Within 10 years we aim to report on our vision of a vibrant, sustainable, well-connected veterinary research platform being realised.

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