Research Assessment Exercise 2020
Impact Overview Statement

University: *City University of Hong Kong*
Unit of Assessment (UoA): *02 - Pre-Clinical Studies*
Total number of eligible staff of the university in the UoA: *15*

Context

The non-academic user groups benefitting from preclinical work at the Jockey Club College of Veterinary Medicine and Life Science (JCC) are predominantly physicians and their patients in Hong Kong (SAR) and mainland China. Hence, most of the impact generated by our unit during the assessment period relates to novel diagnostic tools and treatments, particularly for infectious diseases.

Even though the nature of the underpinning research at our unit is often not explicitly pre-clinical, our results regularly lead to the development of diagnostic tools benefiting patients with various diseases, such as Hepatitis B virus (HBV), enterovirus, liver cancer, breast cancer, colorectum cancers, et al. The case study submitted for the RAE 2020 for this unit of assessment — Novel antiviral strategies — is one of our favourite examples of how our approach to impact translates fundamental research outcomes into benefits for the general public.

Approach to impact

Our approach to impact is guided by two main principles. The first principle is to aim at integrating knowledge from distinct fields of biomedical and veterinary research in order to generate impact on the health of consumers and animals alike. To fill this principle with life, the JCC has recently begun to implement the WHO's One Health Initiative. For instance in 2016, we established the new *Centre for One Health Research and Policy Advice* (OHRP). It provides diagnostic and therapeutic technologies as well as advice to medical and veterinary professionals, government agencies and NGOs based on the results from all research groups working at the JCC. Our second guiding principle is to actively enable and support collaborations with non-academic stakeholders. These can be PhD students who, after completion of their degrees turned their thesis work into biomedical startups with the support of their former supervisors [e.g., Dr. Yue jianbo with his students' company is based on studies in BMS/JCC preclinical]. On the other hand, stakeholders may also be external medical professionals, who were inspired by the potential our published results. The submitted case study in an example of this second path to generating impact.

Strategy and plans

As a future strategy for enabling impact in the preclinical aspect of the JCC, we have spinned off several startup companies in the Science Park that aim to develop new drugs/diagnostic methods

for clinical applications or products for biomedical research and healthcare. Our future plans including: (1) By taking advantage of AI technology and big data, we will develop new markers for the early diagnosis of human cancers; (2) Developing highly effective new tools (e.g., nanoparticles, AAV vectors) for delivery of therapeutic drugs for treating common diseases such as diabetes, human cancers and neurodegenerative diseases; (3) developing novel diagnostic kits with high sensitivity and specificity; (4) develop new molecule tools (e.g., bacterized siRNAs, novel CRISPR/CAS9 library without off-target) for biomedical research and clinical applications; and (5) developing target-based anticancer drugs.

Relationship to the impact case studies

The case study submitted for the unit of assessment *Pre-Clinical Studies* is a fine example of how outcomes of fundamental biomedical research can generate a strong impact on the general public — namely, when the culture of research at an institution is infused with a spirit of openness towards collaboration with non-academic stakeholders. Even though the impact of the submitted case study unfolded before the establishment of the OHRP, it was it is very much in line with spirit of the One Health initiative and the principle of openness to non-academic collaboration.

Back in 2002, a physician, [redacted], resigned from HKU many years and opened a private clinics in the Centra Hong Kong. He enquired with Prof. He Mingliang about potential ways to determine the end-point of an anti-HBV therapy. The resulting collaboration, based on liver biopsy samples provided by the physician and previous research conducted by Prof. Mingliang ultimately lead to the development of the technology for HBV detection described in the submitted impact case study. The first kits were sold by several companies in 2003.Since then, including during the assessment period, hundreds of medical hospitals in China have taken advance of the novel test for Hepatitis B. Throughout the assessment period several Chinese companies have been selling this HBV test to hundreds of high ranked hospitals as a routine test of antiviral treatment, generating a substantial impact on the therapeutic outlook of patients with HBV (see case study). Prof. He has also given a number of lectures about the test both in international/national conferences and top universities in China (Peking university, Fudan University, Sichuan University, Chang Gang University in Taiwan, etc).

In summary, the case study is a fine example of our approach to impact: willingness to collaborate with non-academic stakeholders and a continual search for ways to take our research output from bench to bed.