

Biomedical Research in Hong Kong

Cell biology in Hong Kong has really taken off following the establishment of the University Grants Committee (UGC) and its Research Grants Council (RGC) in 1991. The RGC is a nonstatutory advisory body responsible for advising the Government of the Hong Kong Special Administrative Region of the People's Republic of China. The UGC advises on the needs in funding for academic research projects at specific Hong Kong higher education institutions. Before 1991, while scientific investigation was strong in infectious diseases, the focus had traditionally been on clinically oriented projects.

While Hong Kong has become a dynamic city that hosts eight institutions of higher education, it invests less than 1% of its GDP in research. There are multidisciplinary active research programs in various topics of biomedicine research and cell biology, but Hong Kong students receiving PhDs in cell biology commonly travel out of the country for postdoctoral training. Nevertheless, cell biology is a rapidly growing area of exploration in Hong Kong. Hot areas of research include cancer cell signaling and stem cells, host–pathogen interactions, and the regulation of neuronal differentiation and degeneration. Cell biology research is currently concentrated at City University of Hong Kong (CityU), The Chinese University of Hong Kong (CUHK), The Hong Kong University of Science and Technology (HKUST), and The University of Hong Kong (HKU).

Developing Research and Recognition

In Hong Kong, the UGC and its RGC have supported research at the institutions above since 1991. The UGC works with academic institutions and the scientific community to promote excellence in the higher education sector. The goal is to establish Hong Kong as the education hub of the region and to nurture individuals to promote the economic and social development of Hong Kong. These collective efforts have led to the present culture of research, which is robust, diversified, and flourishing.

Three of the largest universities have achieved international recognition, as confirmed by the

latest rankings. HKU (www.hku.hk), founded in 1910 and the oldest tertiary (undergraduate and graduate) educational institution in Hong Kong, is currently ranked 23rd among the world's top universities (*Times Higher Education*, 2010) and first among Asian universities (*QS Asian University Rankings*, 2009). HKUST (www.ust.hk/eng/index.htm), founded in 1991, has quickly become one of the top universities, ranking 40th in the last *Times Higher Education* rankings and second among Asian universities (*QS Asian University Rankings*, 2010). CHUK was founded in 1963 and now ranks 42nd in the latest world rankings, and fourth among Asian academic institutions.

Main Research Strengths

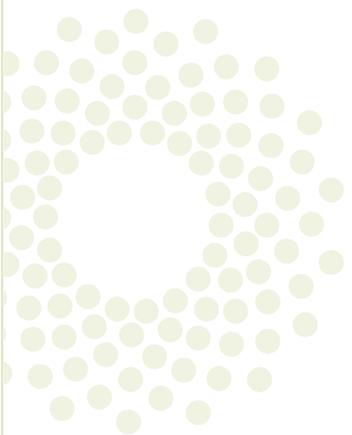
HKU has established its reputation for research excellence and has gained the position of the most successful university in Hong Kong in terms of securing competitive research funding from the RGC. HKU has made major contributions in the field of cellular and molecular virology; this was highlighted by the discovery of the coronavirus responsible for the SARS outbreak in 2003. Work in the area of host–pathogen interactions has led to the emergence of a cluster of laboratories that participate in a so-called “Area of Excellence” scheme, focusing on influenza pathogenesis.

Other areas of investigation at HKU are tumor biology and neurobiology of aging and degeneration. HKU has entered a long-term collaboration with Institut Pasteur (France); this has led to the establishment of the HKU–Pasteur Research Centre, with a strong cell biology focus. The center's goal is to understand how viruses exploit the cell during the early (entry) and late (assembly and budding) stages of the viral life cycle (www.hkupasteur.hku.hk).

Recently, the Faculty of Medicine at HKU established a Faculty Core Facility. The facility houses multiple high performance live cell imaging microscopes and cell sorters for communal use. Stem cell and regenerative research will also be a major research focus.

HKUST has a strong emphasis on neurobiology; groups are working on growth factors, synaptogenesis, neuronal differentiation, and degeneration. Other groups are active in cell signaling through G-protein–coupled





receptors and vesicular transport. HKUST also organizes summer courses and runs a Joint Universities Summer Teaching Laboratory (JUSTL) program. The program is an eight-week intensive research experience for Hong Kong postgraduate students at the Marine Biological Laboratory (MBL) in Woods Hole (Massachusetts, USA). Program activities are centered on a Croucher Foundation-funded summer laboratory at the MBL. JUSTL program participants conduct individual research projects, attend lectures and seminars, as well as undergo training in specialized techniques. The JUSTL ran in June and July 2010. The JUSTL laboratory was located within the “Neuroimaging Cluster” (<http://ihome.ust.hk/~aequorin/justl/html/information.html>).

At CUHK there has been a recent re-organization of basic research by merging the former four preclinical departments of the Faculty of Medicine (Anatomy, Biochemistry, Pharmacology, and Physiology) into the School of Biomedical Science. The major research themes of the newly formed school include: cancer and inflammation; neurodegeneration and repair; reproduction, development, and endocrinology; stem cell and regeneration; and vascular and metabolic biology. A major area of expertise is in epithelial cell biology. Hong Kong research groups have contributed significantly to a number of critical discoveries in this area, including a cell shrinkage-activated cation channel, a novel defensin molecule in the epididymis for sperm maturation, and the role of cystic fibrosis transmembrane conductance regulator in female fertility and infertility.

CityU (www.cityu.edu.hk) assumed full university status in 1994. It has become the 15th ranked university in Asia. The principal center for life sciences is the Department of Biology and Chemistry, which was established in 1993. Each year it offers studies and research in fundamental and applied aspects of life, molecular, and environmental sciences. The department strongly fosters interdisciplinary research and development activities. Recent acquisition of equipment highlighted the multidisciplinary nature of experimental and theoretical research. Examples include the first regional installation of an atomic force microscope coupled to an optical microscope.

This can be used to examine the surface structures of cells and organisms at the nanoscale. CityU’s areas of research include the study of the relationship of the architecture of the mammalian cell nucleus and the regulation of gene expression. Live-cell imaging techniques and classical biochemical approaches are used to investigate protein localization and interactions in the cell nucleus.

Attracting PhD Students

Although there are no specific PhD programs in cell biology, Hong Kong has launched an International PhD Program to attract a highly talented pool of students. The application period opens every year in September and closes in December. There is one call every year. Established in 2009 by the RGC, the Hong Kong PhD Fellowship Scheme aims to attract outstanding students from anywhere in the world to pursue their PhD degree programs at Hong Kong institutions. The fellowship provides a monthly stipend of HK\$20,000 (approximately U.S. \$2,600). It also includes a conference and research-related travel allowance of HK\$10,000 (approximately U.S. \$1,300) per year. Both allowances are for a period of three years. One hundred thirty-five PhD Fellowships have been awarded for the 2010/11 academic year. For candidates who need more than three years to complete the PhD degree, additional support may be provided by the chosen institutions. For details, please contact the institutions concerned directly. For more information, please visit the University Grant Committee website (<http://cerg1.ugc.edu.hk/hkpfs/index.html>).

HKU–Pasteur Research Centre offers an annual Master Class in Cell Biology for MPhil and PhD students (it is mainly for post-undergraduates, but postdocs are also accepted). This is organized in the spring and includes both lectures and practical sessions. The course attracts renowned scientists, who present their most recent studies in the field. It provides a special environment where students can closely interact with leading scientists in an informal atmosphere. (For more details, see www.hkupasteur.hku.hk/index.php/Teaching/Courses/category/cell_biology.) ■

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