

PhD studies in the Hong Kong University Grants Committee the Area of Excellence (AoE) Programme “Developmental Genomics and Skeletal Biology”

Applications are invited from candidates interested in enrolling for a PhD degree in projects under the Hong Kong University Grants Committee the Area of Excellence (AoE) Programme “Developmental Genomics and Skeletal Biology”. This programme focuses on understanding cartilage and bone development and associated diseases, with an emphasis on the growth plate of long bones and the spine. This AoE programme is one of the very few worldwide that is taking large scale, multidisciplinary, multi-pronged approaches, combining molecular, biochemical, cellular, developmental and *in vivo* models with genomic, genetic and clinical studies, to address key issues in skeletal biology such as: *how is normal longitudinal growth of cartilage and bone regulated? How is skeletal integrity maintained? How do gene mutations cause skeletal disease? What genetic factors affect predisposition for degenerative skeletal disorders?*

In the first phase of the programme, a model of scientist-clinician collaboration, we answered key questions regarding molecular controls that regulate cartilage formation and maturation and skeletal growth, and genetic susceptibility to degenerative disc disease (DDD). Our results on genetic susceptibility to degenerative disc disease, linking biology with clinical phenotypes, are beginning to change clinicians’ understanding of low back pain. The team has made exciting discoveries, some of which have changed our concepts of fundamental processes in skeletal biology and disease, which has gained international recognition and placed Hong Kong research firmly on the world-stage.

In the second phase of the AoE programme, we aim to tackle questions at the frontier of developmental biology and skeletal research related to skeletal development and growth, the maintenance of skeletal function and degenerative conditions with an emphasis on the spine. Using state-of-art genomic technologies, bioinformatics, structural biology and animal models, the following key questions will be tackled: *How do genetic risk factors contribute to progression of DDD? Are there gene variants that protect against DDD? In the clinical setting, can these factors be used singly or in combination to identify individuals susceptible to severe DDD? What are the molecular signatures, regulatory pathways and mechanisms that distinguish the cells that make up the intervertebral disc and predispose to degeneration? What molecular mechanisms underpin the differentiation programme and reprogramming of skeletal cells that contribute to the homeostasis of bone? Are there “stem cells” for the intervertebral disc and would they have therapeutic potential?* The answers provided will be applicable beyond DDD to major skeletal diseases such as osteoarthritis and osteoporosis. The discoveries made and knowledge gained will lay a firm scientific foundation for the future development of therapies that could significantly improve the quality of life for millions of people.

Candidates interested in applying under the Hong Kong PhD Fellowship Scheme <http://www.ugc.edu.hk/eng/rgc/hkphd/hkphd.htm> are particularly encouraged to apply. Several projects under the AoE are collaborations with laboratories in the UK (National Institute for Medical Research, London; Sanger Institute, Cambridge) and in Germany (Max Planck Institute for Biochemistry, Munich). There will be opportunities for PhD candidates to carry out research on these collaborative projects in Hong Kong and in the overseas laboratory. PhD candidates should have (or expect to have) BSc first class honours degrees (or equivalent) or a MPhil in molecular sciences /biology/biochemistry/genetics.