Center for Nasopharyngeal Carcinoma Research (CNPCR)

Under the AoE scheme, we will establish the first large-scale comprehensive Hong Kong-wide research consortium on the study of a cancer of local importance, nasopharyngeal carcinoma (NPC). NPC is a cancer of particular relevance to Hong Kong because of its high incidence among Southern Chinese and its rarity elsewhere in the world. With high prevalence and peak occurrence among "young" cancer patients in the prime of life, the economic and societal impact of NPC in Hong Kong is substantial. At present, the tumor is usually diagnosed only at a late stage; thus, its treatment can be devastating and patients, who are cured of the cancer, may then suffer long-term side effects, adding to the human toll from this deadly disease. Therefore, we seek to better understand the molecular and genetic mechanisms of this cancer to enable early diagnosis and new improved treatment options; we aim to study its epidemiology in order to identify preventable risk factors and to provide public education forums on NPC prevention and detection.

The development of NPC is associated with three co-factors: genetics, infection with a ubiquitous human herpesvirus, Epstein-Barr Virus (EBV), and environmental factors such as diet. Our aim is to elucidate the molecular genetic basis of this cancer in order to develop improved diagnostic tools for early detection of NPC, pioneer novel molecular imaging techniques for visualizing the tumor, and improve the personalization of its treatment.

The *CNPCR* is comprised of three universities (HKU, HKUST, HKBU) and five hospitals (QMH, QEH, PYNEH, PMH, TMH) with 31 members (16 basic and 15 clinical).

The proposed AoE focuses on NPC genomic, EBV, basic cancer, diagnostic, and clinical aspects of NPC, as briefly outlined below.

1. Basic Sciences: NPC genomics, EBV, and basic cancer studies
Basic Aims: 1) understand the molecular genetic basis for NPC development, with emphasis on discovering and understanding the cellular and viral gene interactions and the temporal sequence of events involved in tumorigenesis; 2) determine the role of EBV proteins and other cytokines in cell signalling and NPC tumor development; 3) search for useful biomarkers for detection of the cancer
Practical Applications: 1) identify TSGs, oncogenes, microRNAS, and other genes involved in NPC development and determine their potential usefulness as molecular markers and targets for NPC diagnostics and/or therapeutics; 2) identify key EBV transforming and cytokine proteins and their interacting signalling partners involved in NPC development and determine their potential usefulness as molecular targets for NPC diagnostics and/or therapeutics; 3) determine the clinical efficacy of utilizing new cancer biomarkers of NPC for diagnosis and/or therapeutics

2. Clinical Sciences: biomarker/molecular imaging diagnostics and clinical/translational therapeutic studies
Basic Aims: 1) identify and validate the usefulness of molecular biomarker panels for diagnostic applications; 2) establish a comprehensive and central tissue bank, cell lines, and xenografts for research purposes; 3) develop molecular imaging capabilities to better image actively growing tumors for improved therapeutic targeting; 4) improve clinical outcomes for NPC treatment; 5) develop alternative novel approaches for NPC therapy
Practical Applications: 1) provide improved diagnostic assays to detect early and recurrent cancer, non-invasive screening assays for individuals at risk for NPC, and prognostic markers to stratify patients for personalized treatment of NPC; 2) establish the *Hong Kong NPC Tissue Research Bank* to centralize

Nasopharyngectomy and molecular biomarker studies: *W Wei (Surgery) and D Kwong (Clinical Oncology)*

Salvage nasopharyngectomy may be used for treatment of residual or recurrent NPC after radiation or concurrent chemo-radiotherapy. To improve treatment outcomes and to gain insight as to the critical biomarkers that would be useful to identify those patients who would benefit from adjuvant therapy, molecular biomarker studies will be performed on these resected tissues. The findings are aimed at identifying the differences in the behavior of residual or recurrent tumors and will help guide patient treatment.

卓越學科領域計劃資助項目-- 鼻咽癌研究中心

香港研究人員在鼻咽癌臨床和基礎研究方面一直享譽國際。現今，在卓越學科領域計劃資助下，一個大型及全面研究鼻咽癌的計劃將首次展開。於香港和中國華南地區，鼻咽癌的發病率較高及發病年齡較低。由於鼻咽癌多數於晚期被發現、治療效果不理想及治療藥物的毒副作用大，令死亡率增高，給香港市民增添了沉重的社會和經濟負擔。爲此，我們藉着研究鼻咽癌的形成機制，以求瞭解鼻咽癌的分子及遺傳機理和進一步提高早期診斷及臨床治療效果。我們希望發現可預防的高危誘發因素，爲公眾提供鼻咽癌預防和檢測的指導平臺。

鼻咽癌的形成被認爲和三種因素有一定關係：遺傳作用、艾伯斯坦-巴爾病毒(EBV)的感染、及環境因素 (例如飲食)。我們的目的在於確立鼻咽癌的分子基因基礎，改進診斷技術和工具，提升個性化治療效果。

本項計劃由三所大學(香港大學、香港科技大學及浸會大學)和五所醫院(瑪麗醫院、伊利沙伯醫院、東區尤德夫人那打素醫院、瑪嘉烈醫院及屯門醫院)共 31 名研究人員組成的團隊共同進行，當中包括 16 名基礎科學研究人員及 15 名臨床人員。

本計劃的研究重點包括以下各方面：鼻咽癌的基因學、艾伯斯坦-巴爾病毒（EBV）、鼻咽癌的基礎科學、診斷及臨床研究：

一) 基礎科學研究：基因研究、EBV 及基礎癌症研究

目的在於：

1)理解鼻咽癌的分子基因基礎、瞭解細胞及病毒的相互關係以及腫瘤形成出現的時序。

2)決定 EBV 蛋白的角色及其他細胞因數對腫瘤的影響。

3)尋找有效的生物標記以協助癌症診斷。

實際應用於：

1) 尋找腫瘤抑制基因, 致癌基因, 小核糖核酸, 及其他與鼻咽癌有關的基因，並研究其作爲生物標記和用於診斷的可能性及重要性。
2) 尋找 EBV 的轉化及其細胞因數蛋白對腫瘤的影響
3) 尋求新的癌症生物標記及其作爲臨床診斷或治療的可能性。

定細胞和遺傳進程、識別鼻咽上皮細胞進行惡性轉變的早期生物標記、研究宿主基質因數對鼻咽上皮細胞惡性轉化前的影響及 EBV 基因的表達方式。

建立“香港鼻咽癌組織研究庫”

我們將建立香港鼻咽癌組織研究庫，從五間參與計劃的醫院收集病人樣本，用以尋找及確認新的生物標記。這些寶貴的資源將對卓越學科領域計劃的成員及合作夥伴開放。這項卓越學科領域計劃的目的之一是開發非入侵性的篩選化驗工具及尋找具良好預後作用的新生物標記，以指導個性化病人管理。

發現、診斷及治療鼻咽癌

鼻咽癌分子影像

分子影像有助於細胞及次細胞層面的視察、瞭解其特質及量化生理過程。相對於影像解剖，此技術更能及早診斷癌症、將癌症分期及界定腫瘤狀態表現型，以求使用最少毒性及最大生存機會的治療方法達致良好的個人化的治療效果。

鼻咽癌切除術及分子生物標記研究

搶救性鼻咽癌切除術可用作醫治於放射線治療或協作性化療後剩餘或復發性的鼻咽癌。研究人員將於切除了的鼻咽癌組織中尋找關鍵的生物標記，以求提升治療效果，同時亦可增進對關鍵生物標記的瞭解。這些研究目標在於識別剩餘或復發性的鼻咽癌表現的差異，以指導對病人的治療。