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HKSTP MedTech Co-create *in Action*

Talk Series on Biomedical Technologies - in Collaboration with HKMA

What are the latest technologies in precision medicine and their clinical applications – especially with genetic testing and digital technologies? Want to hear from doctors their first-hand experience and insights on their clinical needs? Have some great ideas and looking for partners to co-create and ride on the trend of precision medicine? Come join us for this MedTech Co-create lecture series!

This Continuing Medical Education (CME) lecture series – brought to you by HKSTP MedTech Co-create Program in collaboration with Hong Kong Medical Association (HKMA) – aims to provide medical professionals and technology providers with updates on recent advances in precision medicine, and to provide a platform to stimulate exchanges and collaborations. More technology innovations will be showcased in the series – including use of novel biomarkers and genetic testing to predict diseases and treatment outcomes, and "-omics" data and healthcare analytics to improve health and wellbeing.

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Talk Series 2023

Talk Highlight – Series 1

Date: 23 March 2023 (Thursday)

Topic: Remote monitoring for cardiovascular disease management

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Speaker: Prof. SIU Chung Wah, David Clinical Professor, Department of Medicine, The University of Hong Kong
Supported by: Comfit Healthcare Devices Limited

Abstract

Cardiovascular disease including stroke and coronary artery disease, has been the major cause of morbidity and mortality globally over the past century. Theoretically, up to 80% of cardiovascular disease can be prevented by prompt preventive measures. However, optimal strategies to monitor a panoply of cardiovascular risk factors followed with prompt implementation of various preventative measures remain challenging. The advances in sensor technology, artificial intelligence-based diagnosis, and instant mobile communications have made possible to develop to remote home-based cardiovascular disease management with the required temporal and spatial granularity to streamline clinical management. In this talk, we will share a few of our ongoing programs on remote heart failure management, and stroke prevention platform using remote physiological monitoring with artificial intelligence-based diagnosis and downstream management pathway. This platform aims to reduce cardiovascular events in high-risk individuals in an efficient and highly automated manner.

Date: 27 April 2023 (Thursday)
Topic: Contemporary Approach to High Risk Percutaneous Coronary Intervention and Heart Failure Management
Speaker: Dr. Sunny TSANG, Associate Consultant, Department of Cardiology, Queen Elizabeth Hospital, Hong Kong
Supported by: OrbusNeich Medical Company Ltd.

Abstract

The term high-risk percutaneous coronary intervention (PCI) refers to a spectrum of procedures in patients with high risk features such as left main/ complex 3-vessel coronary artery disease, intervention on the last patent vessel, LVEF < 35% or extensive comorbidities including severe aortic stenosis or mitral regurgitation. Protected PCI is the latest concept of treating these high-risk patients with elective placement of mechanical circulatory support (MCS). The use of MCS provides a stable environment for the intervention allowing a more complete revascularization as a result.

Guideline-directed medical therapy, with device-based interventions in eligible patients, is the current standard of care for heart failure (HF). With the “4 pillars” HF therapy, 6 additional years of survival can be gained compared with conventional therapy. However, many patients still experience progressive deterioration in their HF status despite the many advances over the years. It is becoming increasingly clear that medical devices, including MCS, will enhance HF

management and improve patient outcomes. The development of new device and medical therapy, associated with management tailored to individual patients, will play a significant role in extending patient lives as well as improving their quality of life.

Talk Highlight – Series 2

Date: 25 May 2023 (Thursday)
Topic: Machine Learning Derived MRI Biomarker for the Management of Alzheimer's Disease
Speaker: Professor Vincent C.T. Mok, Master of S.H. Ho College
Mok Hing Yiu Professor of Medicine
Division of Neurology, Department of Medicine and Therapeutics
Faculty of Medicine
The Chinese University of Hong Kong
Supported by: BRAINNOW MEDICAL TECHNOLOGY LIMITED

Abstract

Detecting Alzheimer's disease (AD) at an early stage and prognosticating whether cognitive impairment in subjects with early AD will progress rapidly are important in the management of AD. Recent randomized clinical studies using either life-style intervention or anti-amyloid therapies show that progression of AD can be slowed down if only it can be intervened at an early stage. To date, the gold standard diagnostic and prognostic methods are to use either amyloid/tau Positron Emission Tomography (PET) or cerebrospinal fluid (CSF) analysis. However, both PET and CSF analysis are not widely accessible. In this lecture, I will present the latest data of how a locally developed machine learning derived brain MRI biomarker and blood based

biomarker can help to detect early AD and to prognosticate whether cognitive impairment in subjects with early AD will progress rapidly.

Date: 15 June 2023 (Thursday)

Topic: Locomotor Recovery in Chronic Complete Spinal Cord Injury

Speaker: Professor Wise Young (PhD, MD), Chairman, Mononuclear Therapeutics Limited

Supported by: MONONUCLEAR THERAPEUTICS LIMITED

Abstract

The wish of many people after spinal cord injury (SCI) is to walk again. Many people are surprised when they find out that walking is a “low-hanging fruit” after SCI, even in people with “complete” SCI or no motor or sensory function below the injury level after SCI. People with chronic complete SCI are not supposed to recover walking. Walking is amongst the first functions to recover after SCI and is often associated with recovery of bowel and bladder function.

People can recover walking after SCI under three circumstances. First, if a person has a “incomplete” SCI, i.e. has sacral sparing, the person has a nearly 90% change of recovering long distance walking within a year after SCi. Second, intensive walking training 6 hours a day, 6 days a week, for 6 months, restores walking in a quarter of people with “complete” SCI after chronic complete SCI. Third, people may have spontaneous regeneration that do not express in function until they do the exercise.

In the 1990's, multiple groups reported that 5% or more people with so-called "complete" SCI (ASIA A) will recover walking when exercised intensely. People who have some preservation of sensory function (ASIA B), particularly proprioception, have a 25% probability of recovering motor function. People who retain some motor and sensory function (ASIA C) have a 90% chance of recovering independent locomotion. People who are ASIA D have nearly 100% chance of recovering independent locomotion.

In 2015, we published a clinical trial showing that 75% of 20 patients with chronic complete SCI recovered long-distance walking if they exercised 6 hours a day, 6 days a week, for 6 months. Eight patients treated in Hong Kong with mononuclear cell transplants in Hong Kong did not recover walking. Although they can walk, patients who recover walking cannot voluntarily move their legs when they were lying prone in bed but can do so when they are bearing their weight on the legs, suggesting that they were walking with their locomotor central pattern generator (CPG) in the L1 spinal segment.

Talk Highlight – Series 3

Date: 24 August 2023 (Thursday)

Topic: Paradigm Shift in HPV Diagnostic – Is it not just a female infection

Speaker: Dr Francois Fong, Founder and CEO, Neo-Health

Supported by: NH LIFE SCIENCES LIMITED

Abstract

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HPV is a common infection affecting both male and female. Both medical profession and general public had learned the linkage between HPV and cervical cancer, to an extend that many have misconception that HPV is affecting women. Men had been ignored in the whole process of HPV infection. So far there had been no proved test for HPV in male. However, we are making the break through to develop an unique HPV test for male through establishing a R&D company at the Hong Kong Science and Technology Park (STP). In this lecture, we would like to share information about advances in male HPV diagnostic and our journey from seeing a clinical need to materialising it at STP and eventually making it into clinical use. We hope this process can be replicated by not only researchers in Universities but also clinicians in private practice.

Date: 28 September 2023 (Thursday)

Topic: The Future of Non-Invasive Treatments for Ocular Diseases and beyond: Ultrasound Drug Delivery Platform

Speaker: Dr Wai Leung Langston SUEN

Supported by: OPHARMIC TECHNOLOGY (HK) LIMITED

Abstract

Retinal diseases are a leading cause of blindness worldwide, and current treatments for these diseases often involve frequent injections that can be inconvenient and uncomfortable for patients. With this in mind, a novel non-invasive drug delivery platform is developed by

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Opharmic - a rapidly upraising local biotech company, to offer a more convenient and patient-friendly treatment option. This seminar will introduce the future of non-invasive treatments for eye diseases, with discussions on exploring the potential of this new drug delivery platform for other organs and applications. In addition, we will cover the challenges and opportunities associated with these potential applications, such as the regulatory and commercial considerations involved.

We will discuss the limitations of current injection-based treatments and the need for more patient-friendly options, as well as the potential benefits of the non-invasive drug delivery platform for patients and healthcare providers. The seminar will cover exclusive data supporting the safety and efficacy of the platform, and address common questions and concerns about its cost-effectiveness, ease of use, and patient acceptance.

This seminar aims to provide general practitioners with a comprehensive overview of a promising new treatment option that could potentially transform the way retinal diseases are managed in the future, as well as the potential applications of the platform beyond retinal diseases.

Date: 26 October 2023 (Thursday)

Topic: ID microbes using metagenomic and big data bioinformatics

Speaker: Dr. Bin Ye, CEO & Co-founder at Decode Cure Limited, Hong Kong

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Supported by: Decode Cure Limited

Abstract

Pathogens like bacterium and fungus cause pneumonia, sepsis and other complex diseases. Blood culture method is the current gold standard method to identify bacterial and fungal species. The culture method takes days or weeks for bacterium and fungus identification respectively. In addition, it is challenging to detect anti-microbial resistance (AMR) using a culture method. PCR technique and MASS spectrometry have been developed to reduce time for species identification. However, PCR technique is for conformational purpose and can't detect viable microbes and AMR. MASS spectrometry requires sample purity because it depends on established profiles. MASS spectrometry can't detect viable species and AMR. Metagenomic sequencing technique and big data bioinformatics can more accurately identify viable species and AMR based on a species genomic information. Decode Cure has developed a platform (PathoID) using our proprietary techniques of metagenomic and big data to identify microbial species and AMR based on its unique genomic information. PathoID has been successfully passed External Quality Assessment (EQA)/Proficiency Testing (PT) from College of American Pathologies (CAP) and Quality Control for Medical Diagnostics (QCMD). At a trial on sepsis symptom at a local hospital, PathoID can identify viable species and AMR of bacterium and fungus in 24 hours or 48 hours respectively. Endogenous antibiotics and sample purity can't interfere with PathoID's accuracy and functions. PathoID can reduce diagnostic time, increase accuracy and reduce medical cost.

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Date: 2 November 2023 (Thursday)

Topic: A novel urinary DNA isolation method to improve HPV detection

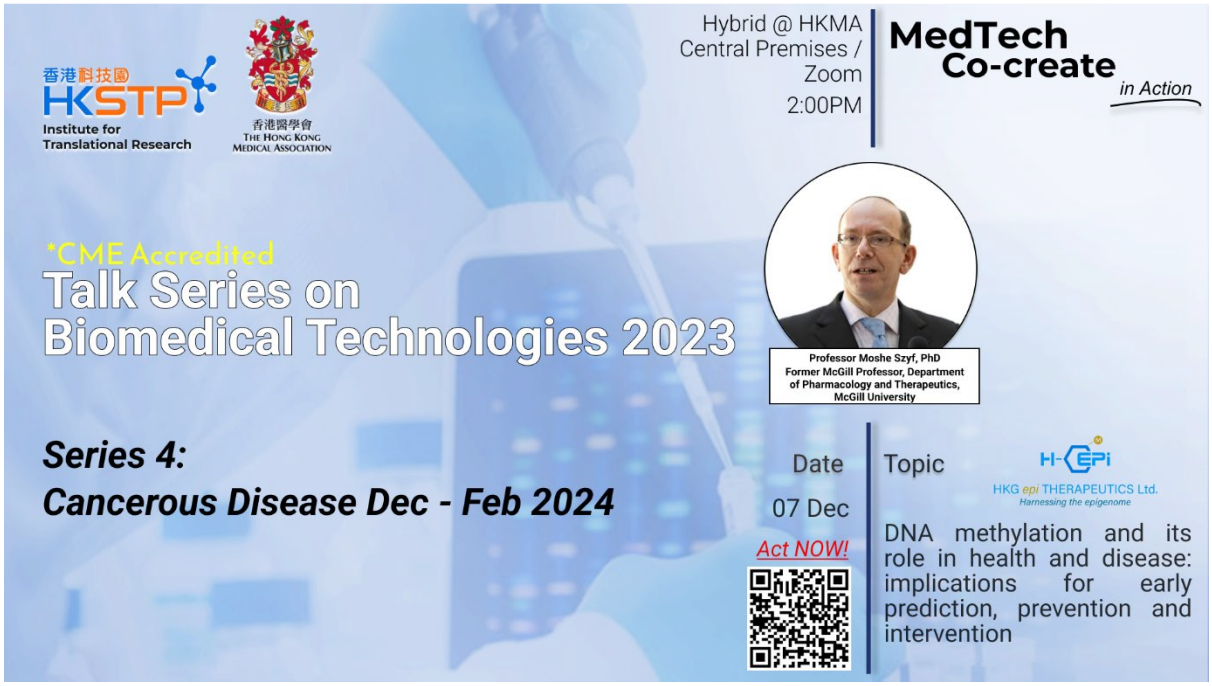
Speaker: Dr Tam Ching Ting, Specialist in Obstetrics and Gynaecology

Dr Kent Cheng, Senior Director, Product Management, PHASE Scientific International Limited

Supported by: **PHASE SCIENTIFIC INTERNATIONAL LIMITED**

Abstract

Human Papillomavirus (HPV) is a ubiquitous group of viruses commonly associated with cervical cancer. Rapid and non-invasive detection of HPV is paramount for early intervention and management. PHASE Scientific introduces PHASiFY Urine, a novel DNA isolation approach from urine samples. By employing our core liquid phase extraction technology, PHASiFY Urine can quickly and efficiently process large quantities of urine and concentrate the viral DNA into small elution volumes, leading to improved sensitivity in the downstream assays. The company developed HPV detection assay utilizes Oxford Nanopore Technology to further enhance the sensitivity for high-risk HPV subtypes and provides a comprehensive genotyping of all HPV strains including high-risk and low-risk HPV subtypes. This offers a non-invasive and private method for both women and men to early detect the presence of HPV, helping to prevent cervical cancer and diseases associated with HPV.



Date: 7 December 2023 (Thursday)

Topic: DNA methylation and its role in health and disease: implications for early prediction, prevention and intervention

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Speaker: Former McGrill Professor, Department of Pharmacology and Therapeutics, McGrill University

Supported by: HKG EPITHERAPEUTICS LIMITED

Abstract

The genome's operating system lies within its gene sequence, while epigenetic processes act as the applicatons that program and functionalize DNA in a temporal, contextual, and spa□al manner. Over the past five decades, extensive research has focused on understanding the biochemical processes involved in epigenetic programming, including covalent modifications of DNA through methylation.

Normal DNA profiles are laid down during embryonic development and are critical for maintaining the normal functioning of our mental and physical health. Disruption of the normal DNA methylation profile was shown by our laboratory and others to trigger cancer three decades ago. In recent years, emerging data from our laboratory and others have shed light on the concept of "epigenetic programming" by experiences, particularly social experiences. This perspective challenges us to consider that our DNA reflects lifelong interactions between multiple environments, ultimately impacting our overall system, including physical health and mental well-being. By recognizing the interconnectedness of our DNA with larger social and physical environments, we can gain a new understanding of health and disease.

DNA methylation serves as a dynamic barometer of our health, offering a framework for comprehending disease detection, prevention, and intervention. In this presentation, we will explore the concept of the epigenetic clock, which measures the cumulative impact of exposures on biological aging. Additionally, we will discuss a novel blood cell-free DNA test that we have developed for the early detection of liver, cervical, and pan-cancers. These tests utilize distinct methylation profiles that categorically differentiate cancerous issues from healthy ones and could be detected using next genera□on sequencing over a background of normal DNA from different issues. They offer the possibility of high throughput screening for early detection of cancer.

These advancements in DNA methylation research present new possibilities for managing health and disease. By leveraging the insights provided by DNA methylation, we can adopt a holistic approach to healthcare that encompasses the intricate relationships between our genetic makeup, our interactions with various environments, and our overall well-being.

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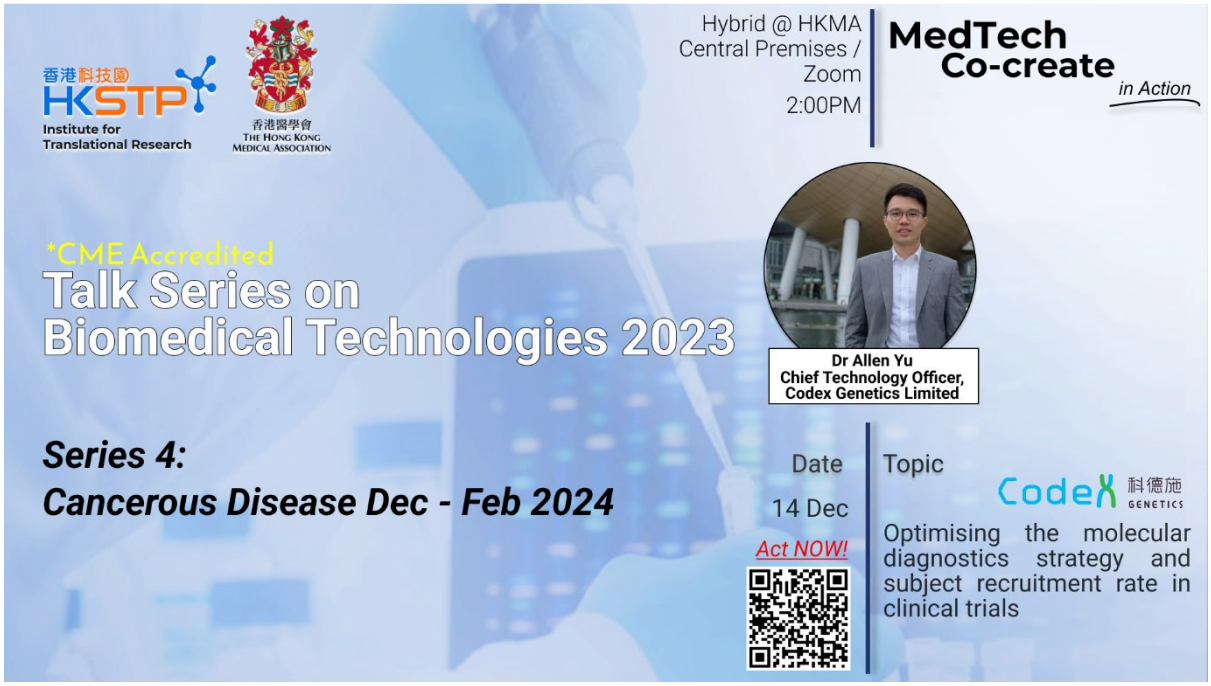


Date: 14 December 2023 (Thursday)

Topic: Optimising the molecular diagnostics strategy and subject recruitment rate in clinical trials

Speaker: Allen Yu Ph.D., Chief Technology Officer, Codex Genetics Limited

Supported by: Codex Genetics

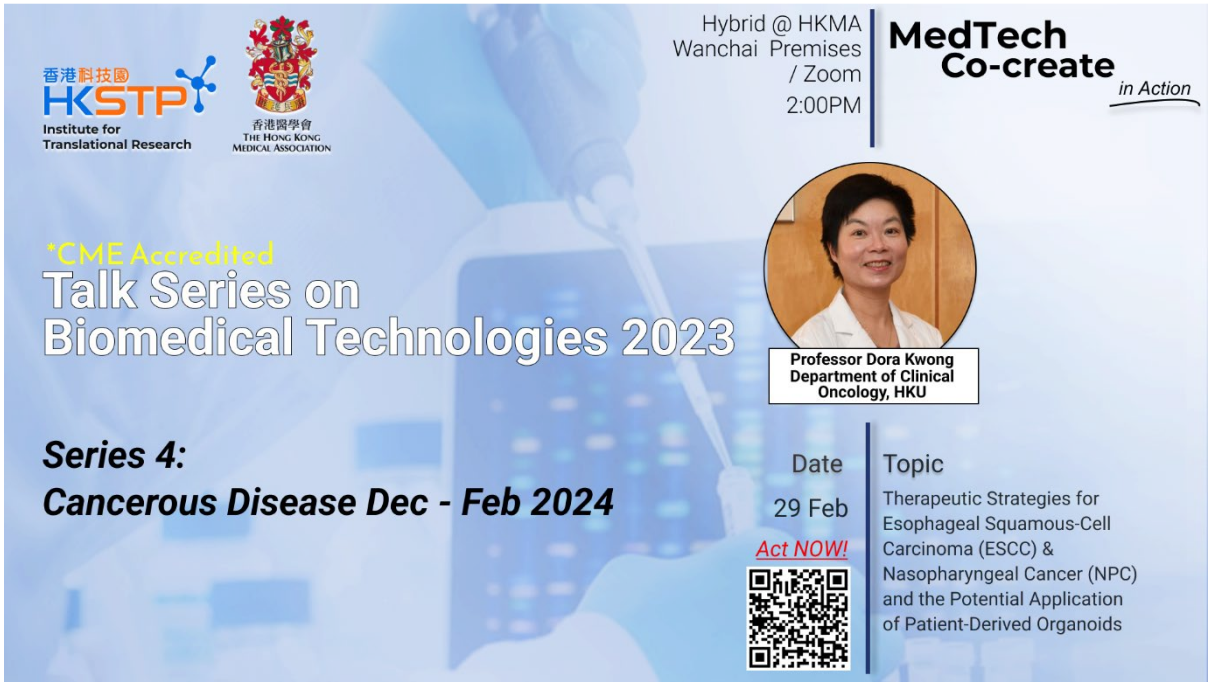
Abstract

In the 2023 policy address, the Chief Executive announced the establishment of a clinical trial institute in the Hong Kong-Shenzhen Hetao area. The institute fosters Hong Kong as a hub for clinical trials of drugs, and it paves the way to setting up a local drug approval body. In this talk, I will discuss key molecular diagnostics and subject recruitment considerations in clinical trials.

Therapeutic approaches based distinctively to patients' demographics, prior treatment and genomic profiles are now being investigated in clinical trials. Current trial subject recruitment process is hampered by manual examination of increasingly challenging eligibility criteria, incomplete patient genomic profile, or time-consuming process of clinical note curation. Therefore, it was estimated that ~80% of clinical trials fail to meet patient enrolment timelines, and over 95% of eligible patients missed out matching trials.

Comprehensive genomic testing (CGP) can improve the efficiency of patient recruitment by identifying a more targeted patient population, reducing the number of patients who do not meet the trial's eligibility criteria. Furthermore, CGP allows better understanding of drug resistance mechanisms that may hinder success of trials.

While platforms for clinical trial matching exists, current solutions cannot support a variety of genomics data, and unstructured clinical notes for trial recommendations. With the help of natural language processing algorithms and machine learning models, Codex's CoGenesis® ClinMatch platform streamlines the clinical trial curation and patient eligibility matching, ultimately improving patient recruitment rate and reduce screen failure rates in trials.



Date: 29 February 2023 (Thursday)
Topic: Therapeutics Strategies for Esophageal Squamous-Cell Carcinoma (ESCC) & Nasopharyngeal Cancer (NPC) and the Potential Application of Patient-Derived Organoids
Speaker: Professor Dora Kwong, MBBS, MD, FRCR, FHKCR, FHKAM, Department of Clinical Oncology, The University of Hong Kong
Supported by: Invitrocue (HK) Limied

Abstract

Tumor heterogeneity among patients contributes to the individual differences in tumor progression and therapeutic response. Despite recent advances in NGS-based precision oncology, the majority of cancer patients do not present druggable mutations. In most circumstances treatment decision has to be made empirically with the only support of general guidelines. As of today, method to predict chemotherapy outcome for individual patient remains an unmet clinical need in oncology diagnostics.

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Patient-derived Organoids (PDOs) is a developing 3D cell-based technology; patient's tumor cells are grown in the laboratory to form many "mini tumors" in dish. Organoid technology has a wide range of applications in medicine. Tumor organoids conserve the biological characteristics including key molecular signatures and oncogenic alterations of the primary tumor, thus hold great promise for personalized medicine. The individual PDOs can serve as a promising tool in the laboratory settings to select the most effective chemotherapy or targeted therapy out of several equivalent treatment options for the individual patient.

On this presentation, Prof. Kwong will walk us through on Therapeutic Strategies for Esophageal Squamous-Cell Carcinoma (ESCC) & Nasopharyngeal Cancer (NPC) and the Potential Application of Patient-Derived Organoids for the cancer treatment.

Date: 28 March 2023 (Thursday)

Topic: The latest directions and potential impact of AI in pathology on patient care

Speaker: Dr. Chan Chi Cheong Ronald, Specialist in Pathology And Honorary Clinical Assistant Professor of The Department of Anatomical and Cellular Pathology at CUHK

Supported by: Imsight Technology Co., Limited

Abstract

- Introduction of latest advancements in digital pathology
- Exploring the Role of AI in Advancing Precision Medicine and Personalized Treatment: Insights and Implications

- Understanding the Potential Considerations and Challenges in Integrating AI into Diagnostic Workflows in healthcare settings

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Talk Series 2022

December 2021

Artificial intelligence in healthcare industry and its clinical applications

Supported by: Imsight Technology

Abstract

Artificial intelligence (AI), especially deep learning with multiple levels of feature representation, has dramatically improved the state-of-the-art recognition performance in many domains including speech recognition, visual recognition, and natural language processing. Despite breakthroughs in above domains, its application to medical image analysis remains yet to be further explored. This talk will share the progress on developing advanced AI techniques and applications for medical image analysis including volumetric deep learning for high-dimension image analysis, human-in-the-loop collaboration, weakly deep learning for scalable pathology image analysis, etc., with an in-depth dive into predictive, diagnosis and prognostic applications covering X-ray/CT/MRI/ultrasound in radiology, OCT in ophthalmology and whole-slide image in pathology. To further unleash the power of AI integrated into clinical scenarios, future promises and pitfalls will also be discussed. Practical application of AI-driven medical tools will also be demonstrated during the talk to showcase how AI adoptions can benefit healthcare providers.

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January 2022

Applications of Pharmacogenomics Tests in The Community Healthcare Setting

Supported by: [Codex Genetics]

Abstract

This talk was designed for continued education of clinicians/pharmacists who are interested in clinical Pharmacogenetics, based on a recent lecture delivered by Prof. Bani Tamraz (PharmD./Ph.D., UCSF) in collaboration with Codex. If you are interested in knowing more about pharmacogenetics (PGx), or deal with questions related to PGx test results, commercial or otherwise, then this presentation will be of interest to you.

The role of clinicians/pharmacists in PGx research, education, and implementation is becoming increasingly important as this field rapidly evolves. The objective of this talk is to provide pharmacist/clinicians a more in-depth analysis of most recent evidence in support of specific clinical guidelines associated with 4 commonly used medications among patients in Hong Kong: tacrolimus, simvastatin, escitalopram and clopidogrel. Furthermore, the presentation will discuss the prevalence of actionable PGx variants among Hong Kong Chinese, providing the audience with potential clinical impact of PGx guided medication treatment in this population in general and for these four medications specifically.

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February 2022

Gut Microbiome Diagnostics and Therapeutics in Atopic Dermatitis

Supported by: Biomed Technology Holdings Limited

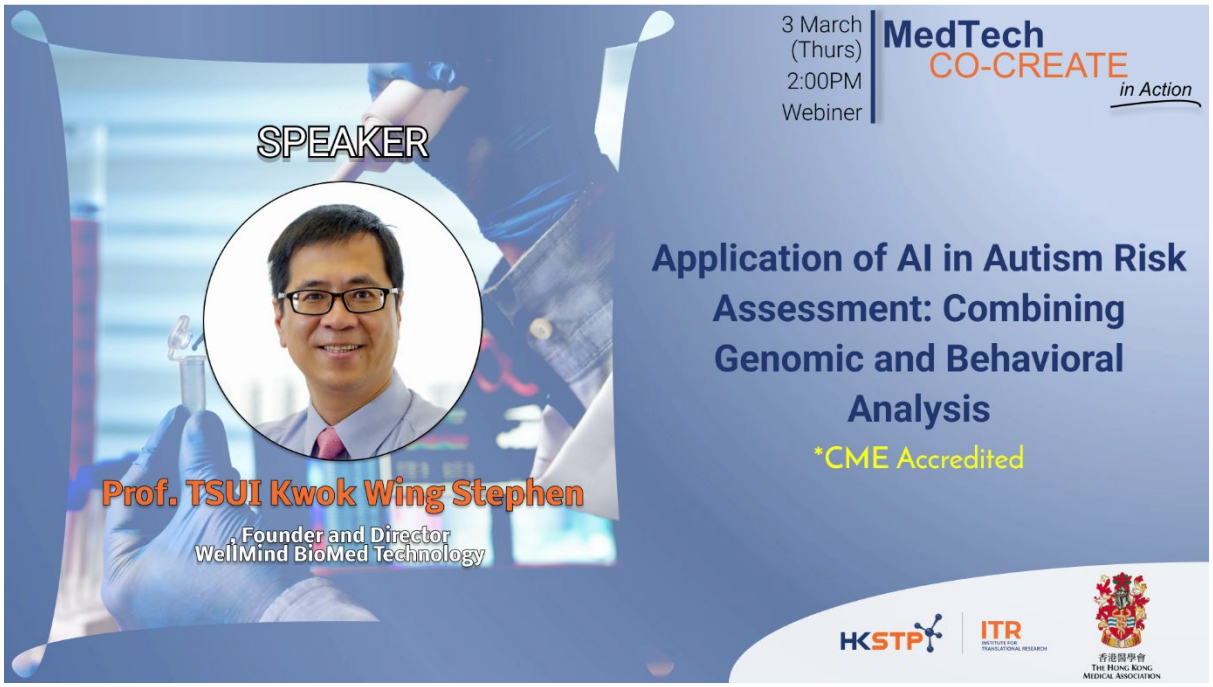
Abstract

Atopic dermatitis (AD) is a common chronic inflammatory skin disease with a worldwide prevalence of approximately 10–20% in children and 2–5% in adults. This distressing “itching disease” can have tremendous physical and quality-of-life impacts on both patients and their family members. The incidence of atopic diseases has increased over the last few decades, especially in industrialized countries, suggesting that a modern lifestyle is one of the major contributing factors to this global epidemic.

The Hygiene Hypothesis, proposed 3 decades ago, stated that reduced exposure to microbes in early childhood affects the natural development of the immune system or immune tolerance, resulting in increased susceptibility to allergic diseases. In recent years, there has been increasing interest in the role of the intestinal microbiota in the disease development of AD. The gut microbiota is involved in regulating a wide range of physiological processes, such as metabolic-endocrine functions, immunological development and regulation, and biosynthesis of various compounds including short-chain fatty acid (SCFA) and neuromediators. Dysbiosis of the human gut microbiota during early childhood have been shown to be a risk factor for a wide range of chronic diseases, including allergies, autoimmune diseases, metabolic diseases, neuropsychiatric disorders, irritable bowel syndrome and inflammatory bowel disease. Implication of gut microbiota in the

development of atopic dermatitis and its potential therapeutic direction will be discussed during the presentation.

March 2022



Application of AI in Autism Risk Assessment: Combining Genomic and Behavioral Analysis

Supported by: [WellMind BioMed Technology]

Abstract

WellMind BioMed Technology Holdings Limited is a research-focused firm that accelerates the frontier of early detection for autism spectrum disorders (ASD). Our vision at Wellmind is to provide affordable, accessible, and accurate services that aids in the early screening of high-risk autistic children and to improve the quality of life of those afflicted. By merging state-of-the-art genomics, eye and motion tracking, artificial intelligence and behavioral analysis, we are able to identify high-risk individuals before three years of age, which is the golden window for therapeutic and behavioral intervention. An intervention centre named WISE Development Centre was also established at North Point in 2021. Through the seamless integration of the screening and intervention services, we believe precision management of ASD children as well as other children will special educational needs could be provided in near future.

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April 2022

The use of C-peptide and other biogenetic markers in the assessment of patients with diabetes

Supported by: GemVCare™

Abstract

Precision medicine is an emerging trend in the management of patients with diabetes. In recent literature, there is increasing discussion on incorporating biogenetic markers as part of clinical assessment especially for young patients in whom the aetiology of diabetes is not immediately clear. Routinely available biogenetic markers include C-peptide, anti-islet autoantibodies and genetic sequencing for monogenic diabetes. In this presentation, I will provide an overview of these biogenetic markers, their interpretation and clinical implementation.

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12th May 2022

Diagnosis of common and rare neurological diseases: Technological updates and clinical applications

Supported by: Codex Genetics

Abstract

Neurodegenerative disease (ND) refers to the progressive degeneration of neuron structure and function. Rare NDs, such as hereditary spastic paraplegia, spinocerebellar ataxia, and spinal muscular atrophy affect around 1 in 1000 people in HK. Meanwhile, Alzheimer's disease and Parkinson's disease are common NDs that affect up to 8% of individuals aged over 65. Since the early symptoms of neurodegenerative diseases are often similar, for example, muscle weakness, poor coordination, and mood change, the confirmatory diagnosis of the neurodegenerative disease require a long period of time. According to European Rare Diseases Organisation (EURORDIS), 25% of patients had to wait between 5 and 30 years from early symptoms to confirmatory diagnosis of their diseases, and 40% of patients first received a wrong diagnosis. The prolonged diagnostic journey could lead to unsatisfactory treatment progress or delayed disease management.

Approximately 80% of NDs have known genetic markers or genetic risk factors. Therefore, genetic testing for neurodegenerative diseases can help with confirmatory diagnosis at an early stage. With the advent of biomarker-directed therapies for NDs, such as Onasemnogene abeparvovec, Trehalose, and Aducanumab, genetic testing can help also inform personalized treatment plans for medical professionals. The objective of this talk is to provide medical professionals an overview of recent advances in ND biomarkers researches,

and clinical guidelines associated with genetic testing of NDs. Furthermore, the presentation will discuss how genetic testing assisted the diagnosis of rare ND cases.

16th June 2022

Rhinitis, Sinusitis and Nasopharyngeal carcinoma

Supported by: Take2 Diagnostics Limited

Abstract

The causes of rhinitis are mostly due to allergy or infection. It is estimated that allergic rhinitis affects 30-40% of population in the developed countries. The symptoms include rhinorrhea, nasal obstruction, sneezing and itchiness.

Sinusitis is the inflammation of the paranasal sinus. As the epithelial lining of nasal cavity is in continuity with that of paranasal sinuses, inflammation of the sinus cavities is almost always associated with inflammation of nasal cavities. Thus , the term 'rhinosinusitis' is preferred.

Nasopharyngeal carcinoma is prevalent in the Southern China and South East Asia. It most commonly present at the age of 40-60 and is of male predominance. Diagnosis of NPC at its early stage significantly improve the prognosis and the cure rate.

However, the presenting symptoms of rhinitis, sinusitis and NPC can be quite similar and impose clinical difficulties in the diagnosis and management of these illness. In this presentation, the ways of distinguishing the three disease entities and an overview of their management are discussed.

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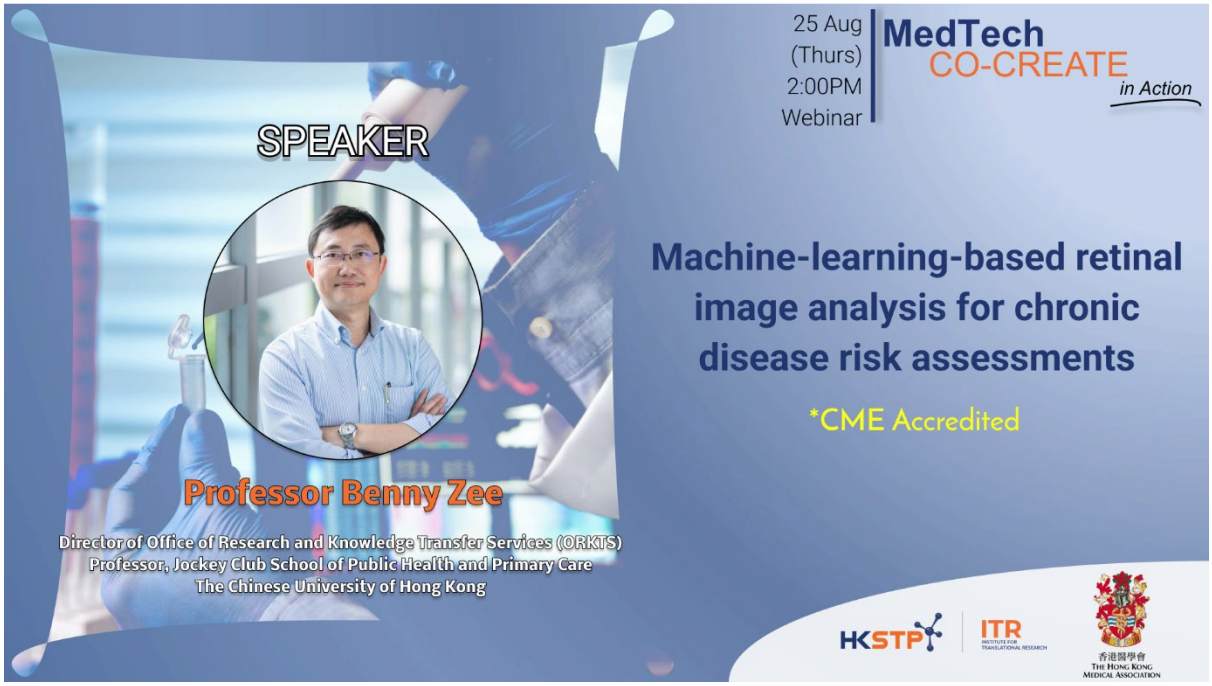
25th Aug 2022



Machine-learning-based retinal image analysis for chronic disease risk assessments

Supported by: Health View Bioanalytics

Speaker: Professor Benny Zee

Director of Office of Research and Knowledge Transfer Services (ORKTS)

Professor, Jockey Club School of Public Health and Primary Care The Chinese University of Hong Kong

Abstract

Due to rapid scientific and technological advancement in the last decades, we now possess high-speed computing power, increased data mobility due to the internet, and an efficient cloud computing environment that gives us unlimited resources to store and process information. Therefore, artificial intelligence (AI), machine learning and big data analytic approaches to solving real-world problems are natural consequences.

In this talk, we present an example of a machine-learning-based approach for early detection of the risks of chronic diseases such as stroke and cognitive health decline using the automatic retinal image analysis (ARIA) method. It serves as an illustration of how these new technologies can be applied in the community to improve the health and wellness of the population.

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15th Sept 2022 **(Rescheduled to 16th Nov 2022)**

Current landscape of treatment-directed molecular testing in cancer

Supported by: ACT Genomics (Hong Kong) Limited

Speaker: Dr Kirsty Wai Chung Lee, Chief Medical Officer, ACT Genomics Holdings Company Limited

Abstract

Rapid advances in 2 decades of genomic and digital technology has revolutionized precision cancer medicine.

This has lead to increasing complexity for doctors trying to arrange and counsel patients to undergo testing. This complexity conflicts with the time required to achieve a comprehensive diagnosis efficiently, yet time is the most precious resource for cancer patients, and a crucial determinant of treatment outcomes. This talk will update on the framework for helping cancer patients to get ready for treatments as soon as possible. It will also touch upon some of the necessary tests that need to be done to ensure that side effects or complications are identified in a timely manner.

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27th Oct 2022

Patient-derived organoids for cancer drug matching: Technology updates and clinical case sharing

Supported by: Invitrocue (Hong Kong) Ltd

Speaker: Dr. POON Ming Chun, Darren, Specialist in Clinical Oncology/ Honorary Consultant in Clinical Oncology

Abstract

Tumor heterogeneity among patients contributes to the individual differences in tumor progression and therapeutic response. Despite recent advances in NGS-based precision oncology, the majority of cancer patients do not present druggable mutations. In most circumstances treatment decision has to be made empirically with the only support of general guidelines. As of today method to predict chemotherapy outcome for individual patient remains an unmet clinical need in oncology diagnostics.

Patient-derived organoids (PDOs) is a developing 3D cell-based technology; patient's tumor cells are grown in the laboratory to form many "mini tumors" in dish. Organoid technology has a wide range of applications in medicine. Tumor organoids conserve the biological characteristics including key molecular signatures and oncogenic alterations of the primary tumor, thus hold great promise for personalized medicine. The individual PDOs can serve as

a promising tool in the laboratory settings to select the most effective chemotherapy or targeted therapy out of several equivalent treatment options for the individual patient. Case sharing will be given on triple-negative breast cancer (TNBC). TNBC remains the most challenging breast cancer subtype to treat. The cases are offered for in vitro drug sensitivity test using PDOs generated from their own surgical tumor specimens. A good correlation of PDO drug responses with clinical treatment outcomes has been observed. Growing evidence suggests that PDOs is a valuable preclinical model in guiding treatment decisions and rationalizing a more personalized treatment approach.

3rd Nov 2022

Era of Minimal Invasive Surgery in Cardiology

Supported by: OrbusNeich

Speaker: Dr. LUK Ngai Hong, Vincent,
Specialist in Cardiology
Honorary Clinical Assistant Professor (HKU)
Honorary Consultant (St. Paul's Hospital)
The Heart Clinic, a member of Virtus Medical Group

Abstract

Surgery was one of the gold standards for difficult coronary artery disease and valvular heart disease. Yet those patients are mostly elderly with high surgical risk. In Chinese population in

general patients are even more reluctant for open heart surgery. Not until recent years with the advancement of technology and totally change the management strategy. And more and more patients can be treated at the same time with less risk and shorter recovery time. There're two hurdles in cardiac intervention : calcified coronary artery disease , valvular heart disease. Different treatment modalities are now available for treating different valvular heart diseases by transcatheter approach (aortic valve, mitral valve, tricuspid valve). And with the help of newly developed technology, calcified coronary artery disease can be treated with better surgical outcome with much lower risk

1st Dec 2022

AI-empowered local bone quality assessment system for osteoporotic bone fracture risk evaluation and surgical planning 智能骨科診療系統的研發與產業化

Supported by: BONE'S TECHNOLOGY LIMITED

Speaker 1: Prof. LU, Weijia William, Ng Chun-Man Professor in Orthopaedic Bioengineering, Dept of Orthopaedics, The University of Hong Kong

Speaker 2: Dr Marvin Chi MA, Chief Executive Officer at Bone's Technology Limited

Abstract

人體結構中骨骼系統是重要的組成部分，同時也是人體各項機能的支架，如果人體的

骨骼出現問題，活動、造血等多個方面都會受到一定的影響。我們幾乎每一個人都無法避免骨質疏鬆症、骨關節炎、椎間盤突出、骨折、脫臼等骨骼系統疾病，這不但嚴重危害人體健康，也令每一個家庭承受著經濟負擔和精神痛苦，給社會帶來了巨大的負擔。

我們將骨科診療數字化，通過人工智能及生物力學技術，解決骨科診療過程中核心的骨質量測量問題。我們提出了骨量-結構-強度局部骨質量評估理論，通過區域化骨密度、三維形態學和骨強度精準評價骨質量並輔助手術規劃。我們結合手術規劃、個體化耗材及智能硬件，完成智能骨科賽道全流程佈局。

提出的骨科診療一體機可以針對每一個病人，設計個體化的手術方案，最符合人體力學強度和結構的數字植入物和手術導板。通過診療一體機，抓住了臨床市場入口，快速進入醫院，積累數據，實現產品迭代。以一體機為旗艦，博志打造了完整的產品矩陣，重新定義骨科診療。