**Below is a summary of HKU technologies that were exhibited at TCWI 2018.**

Project #1

Title: Arsenol®: The First Oral Formulation of Arsenic Trioxide

Inventors: Professor KWONG Yok Lam and Professor KUMANA Cyrus Rustam, Department of Medicine

Descriptions

Arsenol® is a drug developed entirely in Hong Kong, having a bioactivity similar to the intravenous formulation, but has lower peak plasma arsenic concentrations, hence a lower cardiac toxicity. Arsenol® is also convenient and safe for outpatients, rendering long-term therapy feasible and a massive saving in hospitalization cost.

Project #2

Title: Daidzein and other analogs as agents for purging HIV reservoir

Inventors: Dr LIU Li, Professor CHEN Zhiwei, Mr LIANG Jianguo, Dr CHEN Jianping, Ms ZHENG Xiao, Dr WANG Dongmei and Dr YANG De Po

Descriptions

This new discovery has a potential to develop into a treatment for eradication of HIV thoroughly in combination with highly active anti-retroviral therapy (HAART). In HIV research, proviral latency in specific long-lived cell types is the basis for the concept of one or more viral reservoirs, referring to locations (cell types or tissues) characterized by persistence of latent virus. Specifically, the presence of replication-competent HIV in resting CD4-positive T cells, allows this virus to persist for years without evolving despite prolonged exposure to antiretroviral drugs. This latent HIV reservoir explains the inability of antiretroviral treatment to cure HIV infection. The ability of HIV-1 to establish a latent infection presents a barrier to curing HIV. As special agents, Daidzein and its analogs can safely kick-start production of the dormant virus in patients, so that it might be detected and attacked more easily by the immune system. A combination treatment with Daidzein or its analogs and HAART may lead to complete clearance of HIV infection.

Project #3

Title: Development and Applications of Next Generation Histology for 3D Interrogation of Human Brain

Inventors: Professor WU Wutian and Mr LAI Hei Ming, School of Biomedical Sciences

Descriptions

OPTIClear is developed based on the novel concept of using three key components: (1) A lipid-soluble, membrane refractive index (RI) adjusting agent: selectively adjusts the RI of the lipid-rich compartments of the tissue (2) A water-soluble, cytoplasmic refractive index adjusting agent: selectively adjusts the RI of the aqueous compartments of the tissue (3) A physical homogenizing agent: facilitate true homogenization of the above two agents and the tissue components to achieve better optical homogeneity. Light is bent as it passes through the boundary of different transparent media due to their differences in RI, leading to a perceived boundary. Therefore, one should adjust the RI of each medium to a defined value such that they are equal to each other to minimize the bending of light paths, hence no perceived boundary can be seen and the tissue would become transparent.

Project #4

Title: Omniphobic porous membrane and methods for preparing the same

Inventors: Professor WANG Liqiu, Mr ZHU Ping An, Department of Mechanical Engineering

Award: TechConnect Innovation Award

Descriptions

This innovation is about a method for preparing porous membranes possessing omniphobic property. The porous membranes can repel a wide range of liquids including both water and oils, which as defined to be omniphobic (both hydrophobic and oleophobic). Such membrane contains uniform micro-pores packed densely in hexagonal arrays. The fabrication of a PVA porous membrane consists of 3 major steps: 1. Emulsion deposition; 2. Solvent evaporation; and 3. Template removal.

Project #5

Title: Super Steel- A method for the fabrication of a super-strong and ductile multi-phase steel

Inventors: Dr HUANG Mingxin, Dr HE Binbin, Department of Mechanical Engineering

Award: TechConnect Innovation Award

Descriptions

This innovation is the 3rd generation of the advanced high strength steels (AHSS) which has already been used in the automotive industry. The fabrication process is simple and low-cost with just 4-step : warm rolling, annealing, cold rolling and tempering, this simple process is highly suitable for the broad industrial production. This innovation provides super-strong, lightweight and high ductile multi-phase steel with a super-high yield strength and good ductility that comprises 8-12 wt.% Mn, 0.3-0.6 wt.% C, 1-4 wt.% Al, 0.4-1 wt.% V, and a balance of Fe.

Project #6

Title: Light seeking synthetic nanorobot Orthogonal Navigation of Visible-Light-Driven Artificial Microswimmer

Inventors: Dr TANG Jinyao, Department of Chemistry

Descriptions

It is challenging to make and design sophisticated nanorobots with advanced functions. One difficulty in nanorobot design is to make these nanostructures sense and respond to the environment. Given each nanorobot is only a few micrometer in size which is ~50 times smaller than the diameter of a human hair, it is impossible to squeeze normal electronic sensors and circuits into them with reasonable price. Currently, the only method to remotely control nanorobots is to incorporate ferromagnetic materials inside their bodies and guide their motion via external magnetic field. The Nanorobot developed by Dr Tang’s team use light as the propelling force, and is the first research team globally to explore light-guided nanorobot and demonstrate its feasibility and effectiveness. The research team demonstrated the ability of these light-controlled Nanorobots as they are “dancing” or even spell a word under light control. Dr Tang described the motions as if “they can “see” the light and drive itself towards it”. With size comparable to a red blood cell, these tiny Nanorobots have the potential to be injected into patients’ bodies, helping surgeons to remove tumors as well as enabling more precise engineering of targeted medications.

Project #7

Title: Angle Difference Method for Vehicle Navigation in Multilevel Road Networks

Inventors: Professor YEH Garon, Anthony, Dr ZHONG Teng, Dr YUE Yang, Department of Urban Planning & Design

Descriptions

Existing vehicle navigation systems use consumer-grade GPS that can deal with nonparallel road level when the flyover has a different (x, y) coordinates than the ground level but they cannot deal with parallel flyover system. This invention can help users to determine which road level the vehicle is on when the vehicle is entering or exiting a parallel flyover with accuracy. It improves the safety and reduces stress and uncertainty in driving in multilevel road network of high-density cities such as in Shanghai, Tokyo, Seoul, Bangkok, and Hong Kong often with parallel flyovers. Our Angle Difference Method compares the in-vehicle inclination angle with the inclination angles of different road levels calculated from road elevations stored in a GIS-T database to map match the vehicle to appropriate road level when the vehicle is entering or exiting multilevel road networks. Existing in-vehicle inclinometers are costly and fixed to the vehicle. We enable the in-vehicle inclination angle to be measured in high accuracy with low-cost portable devices, such as smart phones, for implementing the Angle Difference Method. It can be calibrated before using in both stationary-mode and dynamic-mode with external 3D GIS-T database to ensure high accuracy of inclination angle measurement.