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[International Cooperation][Molecular Biology] NCKU and NRC Made Innovative Cancer Diagnostic and Treatment Discoveries

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NCKU News (2011/04/12) A Taiwanese research team led by Prof. Dar-Bin SHIEH of Institute of Oral Medicine in Medical College at National Cheng Kung University (NCKU) has partnered with a research group led by Dr. Dennis WHITEFIELD from National Research Council (NRC) of Canada to develop innovative cancer diagnostic and treatment technologies.

According to Prof. Dar-Bin SHIEH, the transnational team, which consists of 7 professors from universities and Academia Sinica in Taiwan and 4 scientists from National Research Council of Canada has participated in the research project for nearly 6 years.

Compared to traditional nano-contrast agents that can only show the tumor's location roughly, an improved nano-contrast agent developed in the first 3 years of the project can precisely locate cancer cells through X-ray computed tomography and nuclear magnetic resonance imaging and reveal the genetic expression profiles of the cancer cells.

This research achievement has been published in a 2010 issue of internationally renowned Journal of the American Chemical Society (JACS) as its cover story.

In addition, the transnational team has verified that the single domain antibodies of Llama in South America could be a new weapon to fight against cancer cells. The antibody is only 1/10 of a regular human IgG and is highly resistant to extreme environment in temperature and pH, and could spontaneously refold back to its functional conformation after recover from the harsh environment.

The team implements the production of the antibody by virus that eats bacteria and uses the virus platform to screen different single domain antibodies with different binding profiles and functional effect to the target cancer cells and amplify the desired groups of antibody. Thus the system could support further industrial scale production of therapeutics at low cost, and high efficiency.

Through the repetitive screening and assay, the team discovered a class of single domain antibody targeting a specific cancer cell membrane glycoprotein that simultaneously inhibit their growth, neoangiogenic activity, metastasis and tumor microenvironment modulation in the two cancer models tested – the pancreatic cancer and the breast cancer.

This finding of possible clinical value in future cancer diagnosis and treatment is currently undergoing patent application and preparation for subsequent publication.

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