

techman / November 16, 2010 03:13PM

[\[Interdisciplinary\]\[BioMedical\] NCKU SMART Team Achieved Breakthrough in Precision Gene Surgery through Photonic Manipulation of ATLANS](#)

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NCKU Realtime News (2010/11/05) A cross-disciplinary Small Medicine and Advanced Research Translation (SMART) team led by Prof. Dar-Bin SHIEH of the Institute of Oral Medicine in Medical College at National Cheng Kung University (NCKU), Tainan, Taiwan, has announced a breakthrough in the precision in-cell gene scission at pre-designed sequence sites using Artificial Targeting Light Activated Nano Scissors (ATLANS) and a custom build photonic device. This innovative discovery, supported under National Nano Science and Technology Program funded by National Science Council (NSC), is recently accepted by the internationally renowned journal Biomaterials and is currently under patent application.

The nano-enabled novel technology recognize, capture and perform double strand cutting of the desired DNA sequence like restriction endonuclease did, but it is completely artificially synthesized and controlled by specific photon energy. In addition, the team successfully shut down target drug resistant gene STAT3 in cancer cell using ATLANS and created a new inspiration toward future cancer gene therapy.

The leading investigator in SMART team Prof. Dar-Bin SHIEH explained, "The ATLANS is an innovative method and it is also the first time this method is applied for in-cell gene manipulation. This technology uses nanoparticles as a quencher to protect the cutter from non-specific activation at wrong sequence sites and also protect the entire TFO layer from being disrupted by the body before reaching the final destination. Once the genetic targets are locked on, the ATLANS will be activated as the proximity of the photo-cutter is no longer restricted by the particle surface plasma. This precision molecular dynamic control is required during the execution of gene cutting in the atomic level accuracy like a molecular 'Nano Scissors.'"

With the Nano Scissors technology, Prof. Dar-Bin SHIEH's research team further developed a GeneEraser optical system, which functions to "erase" specific target gene in the culture cell. The gene eraser is anticipated to test-run early next year. The GeneEraser system is currently of blue-ray band. The team has successfully tested a second-generation system in test tube for near-infrared laser-scan activation that performs better tissue penetration for diseases in deep organ system.

Further Information:

[NCKU Realtime News 2010/11/05](#)

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[National Science Council International Cooperation Sci-Tech Newsbrief](#)

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Edited 1 time(s). Last edit at 11/16/2010 03:16PM by techman.

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