Breakthrough uses light to manipulate cell movement

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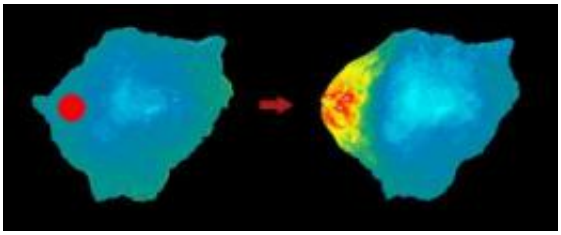

A photoactivatable protein enables control of cell movement in living cells. Activation of Rac in the red circle led to localized cell protrusion and translocation of the kinase PAK to the cell edge (right hand image, Pak in red). Credit: Yi Wu, UNC-Chapel Hill.

One of the biggest challenges in scientists' quest to develop new and better treatments for cancer is gaining a better understanding of how and why cancer spreads. Recent breakthroughs have uncovered how different cellular proteins are turned 'on' or 'off' at the molecular level, but much remains to be understood about how protein signaling influences cell behavior.

A new technique developed by Klaus Hahn, Ph.D. and his colleagues uses light to manipulate the activity of a protein at precise times and places within a living cell, providing a new tool for scientists who study the fundamentals of protein function.

In a paper published today in the journal *Nature*, Hahn, who is the

Thurman Professor of Pharmacology at the University of North Carolina at Chapel Hill and a member of UNC Lineberger Comprehensive Cancer Center, described the technique, which uses light to control protein behavior in cells and animals simply by shining light on the cells where they want the protein to be active.

"The technology has exciting applications in basic research - in many cases the same protein can be either cancer-producing or beneficial, depending on where in a cell it is activated. Now researchers can control where that happens and study this heretofore inaccessible level of cellular control," said Hahn.

"Because we first tested this new technology on a protein that initiates cell movement, we can now use light to control where and how cells move. This is quite valuable in studies where cell movement is the focus of the research, including embryonic development, nerve regeneration and cancer metastasis," he added.

The new technology is an advance over previous light-directed methods of cellular control that used toxic wavelengths of life, disrupted the cell membrane or could switch proteins 'on' but not 'off'.

Source: University of North Carolina School of Medicine (news : web)

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