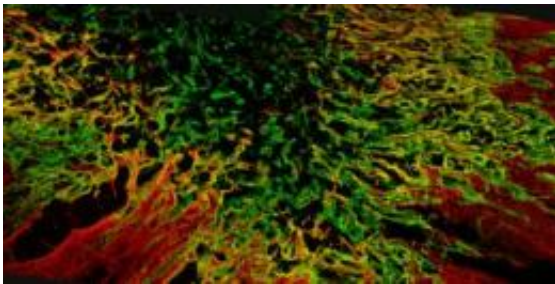


Cancer drug aids cell regeneration after spinal cord injury

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The scar tissue creates a barrier for growing nerve cells in spinal cord injuries. Scientists have now found a way to render this cell wall more permeable for regenerating nerve cells. Credit: Max Planck Institute of Neurobiology / Bradke & Hellal

In a study published today in *Science* (e-publication ahead of print), a global research team reports that the cancer drug Taxol (Paclitaxel) promotes the regeneration of injured nerve cells in the central nervous system (CNS) after spinal cord injury. Scientists from the Max Planck Institute of Neurobiology in Germany and the Kennedy Krieger Institute's International Center for Spinal Cord Injury in Maryland, together with colleagues at the University of Utrecht in the Netherlands and University of Miami in Florida, found that the drug reduces the major obstacles to neural cell repair in the spinal cord of injured rats.

After a [spinal cord](#) injury a number of factors are known to halt the [regeneration](#) of [nerve cells](#), including a poor capacity of neurons to grow

and the development of scar tissue. Microtubules, small protein tubes which compose the cells' cytoskeleton, are jumbled in an injured CNS nerve cell, preventing the regrowth of cells. Concurrently, neural tissue is lost and a strong scar tissue develops, which creates a barrier for regeneration of the severed nerve cells.

Scientists found that Taxol has a dual role in spinal cord repair. It stabilizes the microtubule so that the injured nerve cells regain their ability to grow. Interestingly, the same drug prevents the production of inhibitory substances in the scar tissue. The scar tissue, though reduced, will still develop at the site of injury and carrying out its protective function; yet growing nerve cells are now better able to cross this barrier.

In this study, scientists supplied Taxol to the rats via a miniature pump at the injury site immediately after a partial spinal cord lesion. Within a few weeks the animals showed significant improvement in their movements.

“The drug essentially reorganizes the cells’ microtubules allowing them to ignore ‘stop signs’ and to regrow through diminished scar tissue,” said Dr. Andres Hurtado, study author and research scientist in the International Center for Spinal Cord Injury at Kennedy Krieger Institute. “It is a breakthrough for the cells and it puts us on a very promising path.”

As a clinically approved drug for cancer treatment, Taxol has many advantages, primarily that much is already known about its interactions with the human body, which can help to accelerate the path to human clinical trials. The drug can also be applied directly at the spinal cord injury site, requiring a lower dose. Further, since the drug dosage needed is far less than what is used in cancer therapy, it is likely to have lower side effects. However, the scientists caution that more basic research is needed before clinical trials, including studying whether [Taxol](#) is as

effective when applied a few months post-injury.

Provided by Kennedy Krieger Institute

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