Medical Xpress

Researchers first to map gene that regulates adult stem cell growth

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A new discovery in stem cell research may mean big things for cancer patients in the future. Gary Van Zant, Ph.D., and a research team at the University of Kentucky published their findings today in *Nature Genetics*.

The researchers genetically mapped a stem cell gene and its protein product, Laxetin, and building on that effort, carried the investigation all the way through to the identification of the gene itself. This is the first time such a complete study on a stem cell gene has been carried out. This particular gene is important because it helps regulate the number of adult stem cells in the body, particularly in bone marrow. Now that it has been identified, researchers hope the gene, along with its protein product Latexin, can be used clinically, such as for ramping up the stem cell count in cancer patients undergoing chemotherapy and bone marrow transplantation.

The researchers agreed that this very process is not only interesting, but important because of its usefulness in a wide variety of future genetics studies.

"We're thinking about cancer in a big way," Van Zant said. "This is a great example of translational research – from the most basic type of genetic research all the way to possible treatments for patients."

One big obstacle chemotherapy patients face is stem cell loss after treatments. This limits the dosage amount and types of chemotherapy

that can be given. But if Latexin were used to increase the stem cell count, patients would be able to receive increased doses of chemotherapy and be able to recover more quickly. Increased stem cell counts also would be valuable during bone marrow transplants, where the greatest number of stem cells are desired to help a patient recover from cancer.

Another possible use for Latexin would be to help increase the number of stem cells available in umbilical cord blood, which also is used to transplant healthy stem cells in blood marrow transplants. Currently, stem cell transplants with cord blood can only be used in children because cord blood does not contain enough stem cells for an amount needed to be transplanted into an adult.

The only stem cell population that has been examined for effects of Latexin to date is in bone marrow. Van Zant said it is possible, even probable, that other stem cell populations in tissues such as the liver, skin, pancreas or brain may be similarly affected by Latexin. This could open up new therapeutic strategies such as using stem cells for the treatment of other diseases and conditions such as liver disease, diabetes and central nervous system damage as a result of trauma or stroke.

The researchers also are looking into the possible role the gene plays in transforming healthy stem cells into cancerous ones, such as in leukemia and lymphomas. If the gene does in fact play such a role, it is possible that it also could provide the keys to new therapies.

Van Zant describes his discovery as an elation. He worked on the project for six years with Ying Liang, a former graduate student who is now a postdoctoral fellow at UK. Van Zant said this research and publication of the journal article is the culmination of a difficult but rewarding scientific journey.

"We think these findings will have an effect on the broad understanding of the molecular mechanisms that are important to stem cell regulation, including how some stem cells turn cancerous," Van Zant said. "The findings also will help scientists develop effective methods to modulate stem cell numbers and function for therapeutic uses, and also provide a better understanding of the age-related changes that occur in stem cells."

Source: University of Kentucky