MedicalXpress

Scientists find potential new clues for identifying breast cancer risk

June 4 2013

New research provides critical insights into how normal breast precursor cells may be genetically vulnerable to develop into cancer. The research is published June 4th in the inaugural issue of *Stem Cell Reports*, an open-access journal from the International Society of Stem Cell Research (ISSCR) published by Cell Press. Scientists discovered that a particular class of normal breast precursor cells have extremely short chromosome ends (known as telomeres). As a result, these cells would be expected to be prone to acquiring mutations that lead to cancer if they managed to stay alive. These findings suggest new indicators for identifying women at higher risk for breast cancer and provide insights into potential new strategies to detect, treat, and prevent the disease.

Dr. David Gilley's laboratory at the Indiana University School of Medicine in Indianapolis and Dr. Connie Eaves' laboratory at the BC Cancer Agency's Terry Fox Laboratory in Vancouver, Canada, collaborated to determine how telomeres are regulated in different types of normal breast cells. Their studies revealed that a subset of normal breast precursor cells, called luminal progenitors, have dangerously short telomeres and display a correspondingly high level DNA damage response localized at their chromosome ends. This shows how a normal process of tissue development produces a cell type that is predisposed to acquire cancer-causing mutations.

"This is the first report of a particular normal human precursor cell type that shows such telomere malfunction," says Dr. Eaves. "The luminal progenitors we have found to possess this feature are thus now being

brought into the spotlight as a likely stage where breast cancer may 'take off.'" Recent studies have implicated luminal progenitor cells in the development of breast cancers with a mutated BRCA1 gene.

The research highlights the importance of investigating different cell types in normal human tissues to understand the cellular origin of cancer and the factors that may contribute to its development. "An immediate use of our study will be to look into other human epithelial tissues to see if this finding is unique to the breast or a more general phenomenon," says Dr. Gilley.

This advance in breast cancer research reflects the mission of *Stem Cell Reports* to provide an open-access forum that communicates basic discoveries in stem cell research as well as translational and clinical studies. "*Stem Cell Reports* publishes high-quality, peer-reviewed research presenting conceptual or practical advances across the breadth of stem cell research and its applications to medicine," Christine Mummery, editor-in-chief of *Stem Cell Reports* says.

"The ISSCR is delighted to introduce *Stem Cell Reports*, an open-access forum edited by leaders in the field. *Stem Cell Reports* is an important complement to the ISSCR's Annual Meeting series and Regional Forums in promoting the exchange of advances and new ideas in stem cell research," says Nancy Witty, CEO of ISSCR.

"Partnering with the ISSCR in launching their first society journal, *Stem Cell Reports*, represents an exciting opportunity to serve the scientific community in providing high-quality stem cell research in an Open Access format. *Stem Cell Reports* is the second fully Open Access journal published by Cell Press and illustrates our commitment to developing new partnerships with societies across a broad range of publishing initiatives" says Emilie Marcus, CEO of Cell Press and Editor-in-Chief of *Cell*.

More information: *Stem Cell Reports*, Kannan et al.: "The luminal progenitor compartment of the normal human mammary gland constitutes a unique site of telomere dysfunction." dx.doi.org/10.1016/j.stemcr.2013.04.003

Provided by Cell Press