# Stem cell research: Method to identify origins of new Leydig cells in males

September 6 2012

(Medical Xpress)—Researchers at the Johns Hopkins Bloomberg School of Public Health have developed a new way to identify and study the stem cells that are capable of giving rise to new Leydig cells in adult testes.

Leydig cells produce testosterone, which affects not only the reproductive system but also muscle mass, cognition, and libido. Adult Leydig cells, once formed, rarely die or divide if left undisturbed, but can regenerate if experimentally depleted. The adult stem cells that give rise to the new cells are difficult to study because they, too, usually remain quiescent and their behavior is tightly controlled by the cells surrounding them.

In a study published in the journal *Endocrinology*, the Johns Hopkins researchers employed two approaches tostudy these cells. In one approach, they isolated and cultured the precursor cells from the testes of rats. In another approach, they isolated and cultured the two major components of the testis, the seminiferous tubules and the interstitium. With the first approach, the researchers isolated undifferentiated cells that were able to self-renew or differentiate in vitro into testosterone-producing cells. Using the second approach, the researchers found that the seminiferous tubules had undifferentiated cells on their surfaces that also were able to self-renew or differentiate. In contrast to the isolated cells, the differentiated cells on the tubule surfaces produced testosterone remarkably robustly. When the newly formed, differentiated cells were removed from the tubule surfaces and the

tubules were cultured again, testosterone-producing cells reappeared. This regenerative ability provided further evidence of the presence of stem cells.

"It is always a challenge to study low-turnover stem cells in adult tissue, and it is difficult to study the factors that regulate the cells because of the complexity of the tissue," said study senior author Haolin Chen, PhD, a senior scientist with the Bloomberg School's Department of Biochemistry and Molecular Biology. "The culture system that we developed has enabled us to begin to examine the behavior of the stem cells in vitro in the presence of their niche."

"The in vitro systems that Dr. Chen and then PhD candidate Erin Stanley developed should enable investigators to obtain critical information about the cellular and molecular mechanisms by which the stem cells self-renew and differentiate. Eventually, these studies might lead to the use of stem cells to treat androgen deficiency in aging men," said Barry Zirkin, PhD, co-author of the study and professor in the Department of Biochemistry and Molecular Biology.

**More information:** "Identification, Proliferation and Differentiation of Adult Leydig Stem Cells", *Endocrinology*, 2012.

Provided by Johns Hopkins University Bloomberg School of Public Health