

Biology in everyday life

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Biology Article Summary #2 How Darwin won the evolution race Stem cells are defined by their ability to self-renew or to differentiate into a range of somatic cell types. Adult stem cells, such as hematopoietic stem cells are found in specialized niches within the body and have been studied for decades. Much of our knowledge about these cells is based on in vitro experiments but the effects of moving them from their in vivo niche to culture conditions are unclear. This Perspective from Penney Gilbert and colleagues from the USA and Sweden focuses on adult stem cells found in skeletal muscle, also known as satellite cells.

They address the problem that, once extracted from muscle and placed into culture, satellite cells quickly lose their ability to self-renew, complicating studies into their biology. The development of new bioengineering approaches, such as hydrogel microwell arrays, could solve this problem. These approaches can accurately monitor the behavior of satellite cells and provide robust data sets, thanks to the number of different tests that can be carried out in parallel. To illustrate the usefulness of such tools, the authors show how stem cell division and self-renewal can be tracked in clonal assays using time-lapse microscopy.

By increasing the stiffness of the hydrogel microwells in the assays, satellite cells can be maintained in culture for up to one week and successfully engraft back into mouse muscle. Stem cells hold the potential to become part of powerful medical treatments and therapies, but only if we understand how we are changing them by removing them from their niche. This Perspective pushes this issue to the fore and offers some suggestions as to

how we can further improve stem cell culture <http://the-scientist.com/2012/04/01/are-cancer-stem-cells-ready-for-prime-time/>