Project Logo

Screen capture of PurStem webpage highlighting the work and dissemination activities of PurStem

Screen capture of PurStem website - Beginner's Guide (English)

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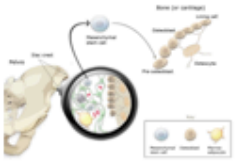
Adult Stem Cells

Adult stem cells
Stem cells exist in the body throughout the entire lifespan from the earliest stages of development through advanced age. Tissue-specific stem cells isolated from adult organisms are usually referred to as adult stem cells. These cells are hidden in the tissues and they need not be active. Such dormant (quiescent) cells have very low metabolism but they become activated in response to some stimuli. For example after a tissue injury that results in a cell loss, the stem cell divides, generates the differentiated cells that replace the lost cells and after the regeneration is completed, the stem cell returns to a dormant state. In contrast to stem cells in the embryo, differentiation potential of adult stem cells is usually restricted to the production of a small number of cell types that are found in a given tissue. Accordingly such multipotent cells are described as *committed* stem cells.



The activity of adult stem cells is controlled by the specific tissue microenvironment in which they reside. This site may be so small that it can accept only one stem cell. It also has a characteristic structure that changes from tissue to tissue; it is formed by adjacent supporting cells, by blood capillaries and extracellular structures like basal lamina and an extracellular matrix. This microenvironment is called the niche. Within a particular tissue there are many niches that contain the tissue-specific stem cell but their number is limited. As a result the pool of stem cells in the tissue is also limited. If the tissue is severely damaged and its niches are lost, the stem cells are lost from the tissue as well.

Under rare conditions even the adult stem cells may be reprogrammed and give rise to cell types different from the original tissue. For example neural stem cells that normally generate nerve cells and glial cells may give rise to blood or muscle cells. This phenomenon is referred to as *stem cell plasticity*. It is generally accepted that a change in the restricted potential of adult stem cells may occur if they leave the original niche and enter another tissue and settle in a new niche. Here, under different molecular control, the fate of the stem cell may be changed so that it starts to produce new types of differentiated cells. Another way to reprogram the cells includes transfection with stem cell-associated genes or by somatic cell nuclear transfer.

Previous: Introduction to Stem Cells

Next page: Stem Cell Isolation

Most Recent News

- March 2012: Review Paper accepted – Stem cells International, 2012, In Press. Markers for characterisation of bone marrow multipotential stromal cells. S.A. Boxall, E.Jones.
- December 2011: PurStem Lecture delivered in Prague. Lecture delivered by Dr. Soukup Tomas. Please click here for video.
- December 2011: Poster delivered at ISCT (Int'l Society for Cellular Therapy). Please click here for a link to the poster.
- May 2011: Dennis McGonagle (UL) presents at Miltenyi Corporate Syposium "New Directions in Cellular Therapy", Rotterdam
- May 2011: PurStem/NUI Galway team member provides insight on GMP.
- April 2011: PurStem seminar in Genoa
- April 2011: Major project meeting in Genoa
- April 2011: CUNI presented PurStem and MSCs to Istanbul University.
- February 2011: New 'Downloads' section brings project assets together
- December 2010: PurStem now on Twitter
- December 2010: PurStem now on FaceBook
- September 2010: NUIG Presentation at the International Cartilage Repair
- October 2010: Society (ICRS) Barcelona.

Dr. Soukup (CUNI) and a seminar audience

Example Student Zone Material (Italian)

PurStem Student Zone

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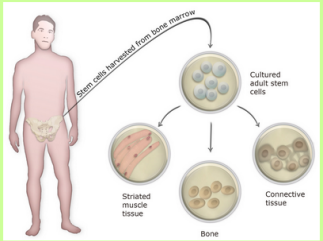
Cellule Staminale Adulte

Non c'è un'età della nostra vita in cui il nostro corpo non possieda cellule staminali. Queste vengono attivate durante il corso di una patologia per rimpiazzare cellule usurate o danneggiate.Esistono diversi tipi di cellule staminali adulte, a seconda dell'organo in cui risiedono. Avremo, quindi, cellule staminali nell'osso, nel muscolo, nel cervello, etc.

Solitamente ciascun tipo di cellula staminale adulta produce solo le cellule dell'organo cui appartiene. Quindi cellule staminali del cervello non produrranno cellule di muscolo o di osso.

Ma gli scienziati stanno trovando eccezioni a questa regola, dimostrando, così, una certa "plasticità" delle cellule staminali adulte. Per plasticità si intende la capacità di una cellula staminale di un certo organo di generare cellule di un altro organo.



Previous page: Le cellule staminali

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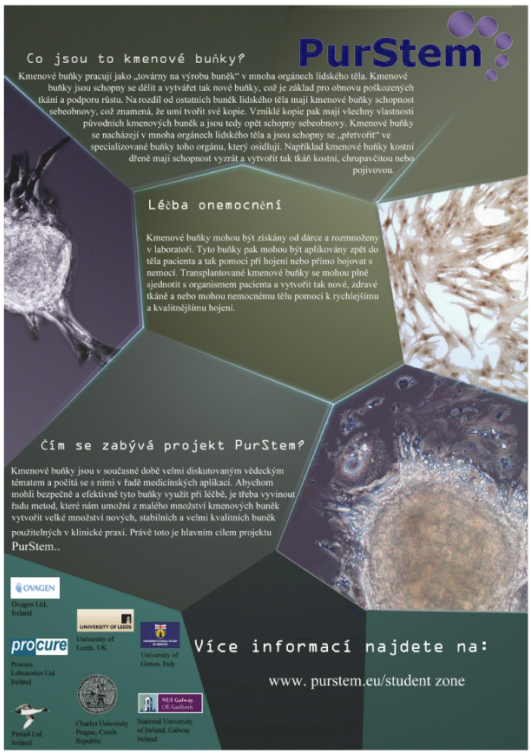
School Flyer (Czech)



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