

## Tissue Specific Stem Cells

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Tissue specific stem cells are a multi-potent cell population. They have the unique potential to self-renew and differentiate into predetermined cell types. Because of these characteristics, these cells hold great promise for cell replacement therapy and drug screening.

Before the full potential of these stem cells can be realized.....

**Reliable and efficient conditions for differentiation of adult human stem cells into functional cells in vitro need to be developed. In vitro conditions for differentiation partly rely on an appropriate ECMP substrate for attachment and cell signaling.**

MicroMatrix™ is a reliable platform for the study of tissue specific stem cell growth and differentiation. For example, researchers are leveraging the MicroMatrix™ technology to understand conditions for cardiac progenitor cell growth and differentiation and functional cardiomyocyte maintenance *in vitro*.

### Cardiac Progenitor Cell proliferation on MicroMatrix™ platform is ECMP dependant

CPCs attach and proliferate on particular ECM's

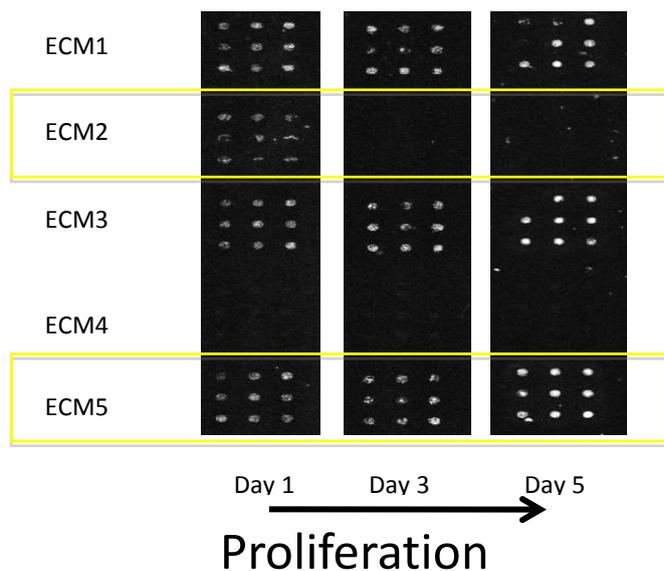


Day 1

Day 3

Day 5

**CPC proliferation and expression of Sca-1 is ECM dependant**

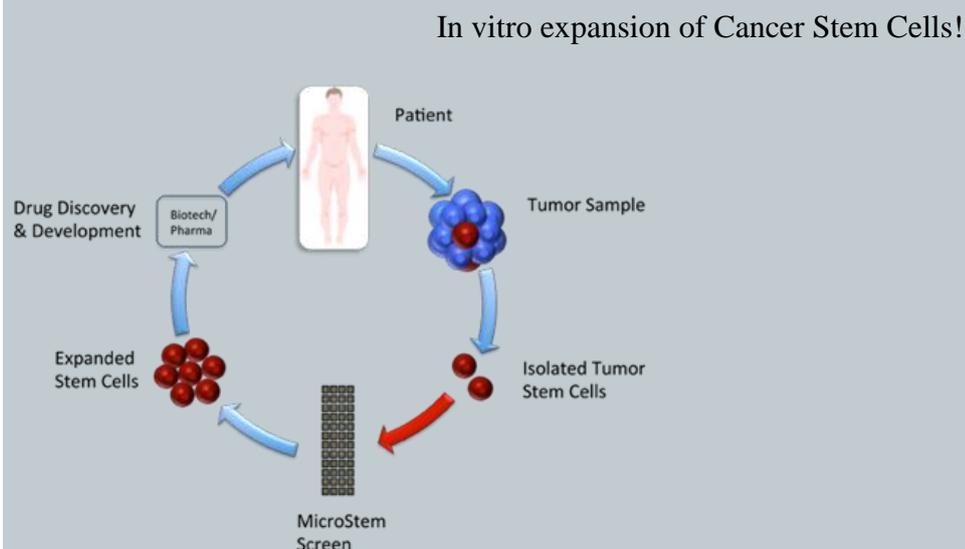


## Cancer Stem Cells

Cancer stem cells (CSCs) or 'Tumor Initiating Cells' are a rare subset of chemo-resistant cancer cells believed to be a source of tumor development, reoccurrence and metastasis. Accordingly, CSCs are a rapidly growing and explosive target for cancer drug discovery and development.

MicroStem's MicroMatrix 36 cell culture arrays have been used to elucidate *in vitro* cell culture conditions for human primary cancer cells. Because of the unique microscale nature of the MicroMatrix platform culturing of rare cells is now a reality.

**To develop drugs against CSCs, conditions need to be defined which allow for the expansion of these cells *in vitro*.**



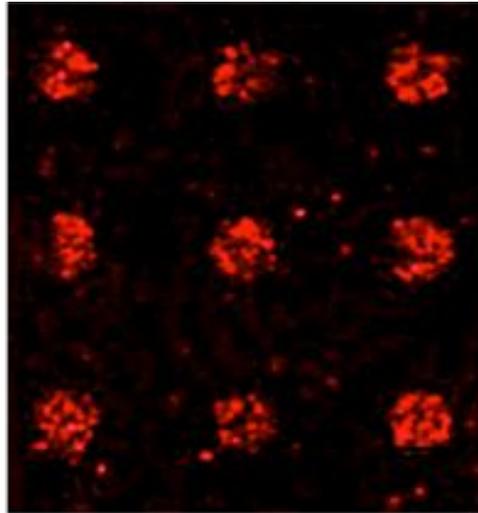
MicroStem allows for the use of patient derived tumor samples as a source for cancer stem cells. The MicroMatrix™ technology enables customers to better understand cell culture conditions for the study of patient derived CSC populations *in vitro*.

### The power of MicroStem's screening platform

MicroStem has leveraged this screening strategy to analyze ECMs and culture conditions that promote cancer stem cell marker expression on patient derived cancer cells. Here 500,000 CD133+ cells were isolated from a 0.5 gram non-small cell lung cancer biopsy (1% of total cells in the sample). Patients cells were screened on the MicroMatrix™ platform for conditions that maintain CD133+ marker expression (in red).



Patient



Patient derived CD133+ non-small cell

## *Induced Pluripotent Stem Cells*



iPS cells represent a new and valuable source of material for drug discovery.

**For drug screening:** iPS cells and their terminally differentiated end products carry genetic abnormalities responsible for the manifestation of a particular disease.

**For cell therapies:** These cells may represent a new source of healthy tissue to replace that damaged by disease or traumatic injury.

1. The MicroMatrix™ screening technology may become a reliable platform for iPS cell growth and differentiation.

2. MicroMatrix™ screening technology can be used to derive a set of cell culture conditions that enable researchers to work with an expanded population of diseased cells from patient tissues that are normally not accessible *in vitro*.

## ***Human Embryonic Stem Cells (hESCs)***



hESC's have the ability to differentiate into any cell type in the body. Thus these cells possess great potential in drug discovery and cell therapies. Before the full potential of hESC's can be realized:

### **1) Reliable protocols for the derivation, growth, and expansion of hESC's need to be established.**

The MicroStem technology has been utilized to develop fully defined xeno-free extracellular matrix conditions (ECM's) that support undifferentiated hESC growth *in vitro*.

### **2) Reliable and efficient conditions for differentiation of adult human stem cells into functional cells *in vitro* need to be developed.**

The MicroStem technology is also being utilized to discovery xeno-free conditions for the directed differentiation of hESCs into a variety of different cell types.

Our scientific founders have utilized this technology to identify microenvironments for the long term propagation of hESCs *in vitro*.

Also available are:

- Media for human and murine embryonic stem cells
- GravityPlus™ Technology for easy hanging drop cultures