Method of determining cell chirality for disease detection

Technology #2959

Normal tissue function requires appropriate cell positioning and directional motion. This property, known as chirality, can be altered by genetic and environmental factors, leading to, for example, tumor formation and birth defects. Thus, the analysis of cell chirality can reveal the presence of genetic changes or disease. This technology is an in vitro platform for automated analysis of cell directionality and chirality. This assay determines cell chirality based on phase contrast images of cells grown on a micro-patterned surface and has been successfully used to distinguish between normal and cancerous cell cultures. This technology has potential applications ranging from early diagnosis of prenatal and developmental disorders to screening tools for drug discovery.

Analysis of cell chirality enables determination of cell behavior and disease state

While there exist methods for determining cell alignment, no programs for direct, unbiased analysis of cell chirality are currently available. In this technology, cells are cultured on micropatterned surfaces and the direction and migration patterns of cell growth are observed, as these qualities are influenced by disease state and drug intervention, and are therefore indicative of cell state. A conventional phase contrast microscope is used to image the cells and automated, unbiased analysis of cellular patterns is accomplished through the use of a custom computer algorithm.

In vitro cultures of multiple cell lines, both diseased and normal, have been analyzed and shown to be compatible with this technology.

Lead Inventor:

Gordana Vunjak-Novakovic, Ph.D.

Applications:

• Diagnostic assays of prenatal or developmental disorders
Diagnostic assays for cancer and other diseases
Drug screening
Stem cell screening and selection for therapeutic implantation
Research tool for analysis of mechanisms guiding cell chirality

**Advantages:**

- High throughput platform for disease analysis and drug screening
- Automated and unbiased analysis algorithm
- Compatible with conventional phase contrast microscopes
- Cost effective

**Patent Information:**
Patent Pending (US 20150004643)
Tech Ventures Reference: IR 2869, IR 2959

**Related Publications:**


**Inventors**

Gordana Vunjak-Novakovic