Multi-Wavelength Microscopy

Imaging technique to produce high quality images of cord blood cells for waste reduction when collecting stem cells

Georgia Tech inventors have developed an imaging method that employs oblique back illumination microscopy. The method uses wavelengths deployed from multiple light sources to render high-resolution wide-field images in order to sample cord blood without destroying samples or wasting blood bags. The method is designed to monitor red blood cell viability over time to identify biochemical and biomechanical degradation, i.e., "storage lesion." Further, the method is designed to count mononuclear cells, total nucleated cells, red blood cells, and nucleated red blood cells in umbilical cord blood bags. Blood cells can be visualized, quantified and enumerated within the blood bags without affecting the viability or sterility of the sample or reducing the contents.

Summary Bullets

- **Groundbreaking** - First noninvasive method of assessing the total cell content of a blood bag without breaching the bag and potentially damaging the contents or compromising manufacturing
- **Cheaper** - Laser scanning multi-photon microscopy is 5 to 10 times more expensive
- **Improved Imaging** – Consistent cross-section of the cells and reduced blurriness

Solution Advantages

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Potential Commercial Applications

- Hospitals
- Blood banks
- Labs

Background and More Information

Umbilical cord blood is a valuable source of stem cells, which can be used to treat blood and immune system-related genetic diseases, cancers, and blood disorders. There is also a lower rate of infection when using cord

blood in transfusions. Collection of viable cord blood has become a useful method for further developing stem cells for these application. Before the cord blood is used or stored, it must be examined for nucleated cell count, cell viability, blood group, and bacterial and fungal growth, among other things. The percentage of cord blood samples discarded as waste in public banks is cited to be between 60 and 80% due to the fact that most cord blood collections fail to collect enough usable cells. The current methods used to assess the collections include cell counting, prolypheration test, screening for diseases, and CD4 cell count, all of which are invasive sampling methods that lead to destroying a sample of cord blood.

Inventors

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IP Status

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Publications

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Images

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