











## Cell Isolation Unit

# MPR Develops Unique Automated Cell Separation Technology

### Practice Areas

-  Medical Devices
-  Diagnostics
-  Laboratory Instruments
-  Analytical Instruments
-  Biotechnology
-  Pharmaceuticals

### Product Types

-  Durables
-  Disposables
-  Packaging

### Service Areas

-  Research and Development
-  Voice of the Customer
-  Conceptualization
-  Proof-of-Concept
-  Detailed Engineering
-  Industrial Design
-  Design for Manufacturing
-  Supply Chain
-  Regulatory
-  Intellectual Property
-  Scale-Up
-  Fundraising
-  Device Certification

### CHALLENGE

An MPR client desired to manufacture a medical device to isolate adipose-derived adult stem cells (endothelial cells). A form of human primary cell, endothelial cells are used in a wide range of laboratory activities, from the creation of new therapies addressing human diseases to the healing of wounds and treatment of burns. Traditionally, isolating these cells from other components of human tissue has been a complex process, requiring time-consuming and expensive human intervention with a manual, multi-step and inconsistent methodology.

### SOLUTION

MPR developed a unique automated cell separation technology that substantially streamlines the tissue manipulation process. Using enzymics, human adipose tissue and cell digestion technology, MPR developed a new approach that isolates the endothelial cells using a single-piece disposable element that features a first-of-a-kind integrated digestion and centrifuge chamber. The inputs – collagenase, human adipose tissue, and a media, such as PBS – are loaded into the device. The fully isolated device produces a syringe of endothelial cells in a cell suspension for therapeutic use.

### RESULTS

The resulting process and supporting device increase the quality and quantity of endothelial cells in an automated, repeatable and highly consistent manner. Four new patentable and other ADSC technologies resulted from this project. Development of this new system was taken from napkin sketch to operational device in 10 months.

### TIMELINE 10 Months














## Centrifuge Bowl Molding

### MPR Overcomes Production Method Challenges for Centrifuge Bowl Molding


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#### CHALLENGE

An MPR client develops innovative adult stem cell solutions and technologies addressing needs in the vascular, cardiovascular, and wound treatment sciences. A new cell isolation system developed by MPR required production of a new multi-chamber centrifuge bowl using injection molding. However, because the system prototype employed a special multi-chamber centrifuge bowl, advanced methods for molding and assembly were required. The client engaged MPR to work with a molding vendor to overcome inherent limitations of the injection molding production methodology. Central to the assignment was the need to achieve low production cost and biocompatibility and properly perform multiple fluid and cell handling functions at production speeds of 3,000 revolutions-per-minute.

#### SOLUTION

Using our expertise in injection molding processes, as well as plastic surface finishing, manufacturing methods, and packaging, MPR designed a multi-piece bowl assembly that could be readily produced using injection molding. The company also provided vendor management of this aspect of the product development initiative.

#### RESULTS

MPR successfully created an injection-molded, biocompatible and sterilizable centrifuge bowl assembly at low cost. The bowl includes the same multi-chamber design and rotary coupling assembly, containing three pathways for fluids to be mixed, separated and isolated at 3,000 RPM speeds to facilitate cell harvesting. An integrated tubing kit is incorporated with production bowl assemblies to provide a complete consumable solution for the client's new device.

#### TIMELINE 6 Months

