

NON -TECHNICAL ABSTRACT: Several trials that involve the use of human stem cells to correct heart muscle damage following a heart attack have shown modest results, probably because the cells do not have the correct chemical signals that allow them to fully mature. MicroStem is a company that has developed a research tool to optimize the chemical environment for stem cells that uses a glass slide that can be spotted with different combinations of chemical factors followed by culture with stem cells and observation to determine cell behavior. This approach currently suffers from the problem of cells clumping during the culture process which, in combination with other effects, results in a 90% loss of cells. These problems can be addressed by developing a cell printing device that will control cell deposition and reduce clumping and loss. The end result will be a system that can be commercialized for use in stem cell research laboratories in order to develop better methods to control stem cells. This project could form the basis for more effective disease therapies involving the use of stem cells to replace damaged or diseased tissue.