

Serum-free cultures help transplanted MSCs improve efficacy

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Mesenchymal stem cells (MSCs), multipotent cells identified in bone marrow and other tissues, have been shown to be therapeutically effective in the immunosuppression of T-cells, the regeneration of blood vessels, assisting in skin wound healing, and suppressing chronic airway inflammation in some asthma cases. Typically, when MSCs are being prepared for therapeutic applications, they are cultured in fetal bovine serum.

A study conducted by a research team from Singapore and published in the current issue of *Cell Medicine* [2(1)], freely available on-line at: <http://www.ingentaconnect.com/content/cog/cm>, has shown that culturing MSCs in a serum-free media with a 'cocktail' of additives that include growth factors and cytokines, supports cellular growth and increases the potential for adipose and [cartilage tissue](#) engineering.

"Our observations that the serum-free media supported cellular growth were attributed to the signaling cascades triggered by the cytokines presented in the serum-free formulation and the interaction with a collagen substrate," said Dr. Saey Tuan Barnabas Ho, corresponding author. "Our findings demonstrate that it is possible to cultivate MSCs in a serum-free environment that enhances the cells' specific differentiation capacities."

The researchers said that the fetal bovine serum commonly used in [cell cultures](#) is a "complex mixture" with biochemical effects largely undefined and the "composition varying between serum batches" leading to "inconsistent outcomes." There were also safety concerns with cells cultured in fetal bovine serum because of the "potential presence of viruses, prions and mycoplasmas."

The researchers reported that their enhanced, serum-free culture for MSCs aided in the "upregulation of adipogenesis and

chondrogenesis."

"There is an impetus to develop an "off the shelf" serum-free media consisting of cytokines," said Dr. Ho.

The use of a cell culture medium that contains known quantities of specific growth factors and other proteins rather than the mixed bag you get with serum-containing media allows for greater control over the fate of the cells", said Dr. Cesar Borlongan, Editor of *Cell Medicine* and Professor at the University of South Florida Center of Excellence for Aging and Brain Repair. "This study demonstrates that the growth factor-defined, serum-free medium can also improve the cell fate regulation, suggesting that the use of this medium should therefore be encouraged."

Provided by Cell Transplantation Center of Excellence for Aging and Brain Repair

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