Culture of Adipose-derived Stem Cells on Microcarriers using the Scinus Cell Expansion bioreactor

INTRODUCTION

Adipose-derived stem cells (ASCs) can be isolated from fat tissue obtained after abdominoplasty. Advantages of fat tissue over bone marrow as a source for stem cells include the easier accessibility, and availability of larger volumes. For the production of stem cells for cell therapy in patients, an upgrade to clinical large scale culture (> 200x106 cells) is necessary. Clinical scale cultures require a reproducible and efficient process. For this, a microcarriers based culture is a very suitable method. Within the Scinus Cell Expansion system (see Figure 1) adherent cells can be cultured on microcarriers in a closed environment under GMP conditions. A process for culturing large quantities of ASCs using microcarriers (MCS) using the Scinus Cell Expansion system was developed.

MATERIALS AND METHODS

Isolation of ASCs

Human ASCs were isolated from abdominal fat by enzymatic digestion using collagenase (see Figure 2). The stromal fraction was seeded onto T-flasks, and the adherent cells were used during the experiments.

Core diffusion in microcarriers

Visual inspection showed good cell attachment to the dissolvable microcarrier (see Figure 4). After 7 days of culture, cells were distributed evenly among the microcarriers. At the end of the culture period, almost all microcarriers were completely covered with ASCs, and small microcarrier aggregates had formed. At the end of the culture the total number of ASCs cultured in the Scinus bioreactor was approximately 500 million cells (see Figure 5).

CONCLUSION AND DISCUSSION

Our results showed that high ASC concentrations can be quickly reached, and easily and efficiently harvested using the Scinus Cell Expansion bioreactor.