

GENETICS AND GENODERMATOSES

THE STUDY OF THE RELATIONSHIP BETWEEN MSKPS GROWTH AND PLATING DENSITY

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Background/ Introduction: Skin-derived precursors (SKPs) have been regarded as superior to the other types of stem cells derived from skin, in differentiation potential and cell replacement therapy. However, the issues such as difficult and expensive cell culture, and unsatisfactory yield have hampered further research and application. Multiple methodologies to facilitate cell growth have been reported, including increasing growth factor concentration, introducing growth factor binding protein, and employing stirred suspension bioreactors. Although it is known that SKPs' growth is density-dependent, the effect of cell density on growth has not been studied.

Objective: To investigate whether increasing the cell density could enhance mouse SKPs (mSKPs) growth rate, and to optimize the growth parameters.

Materials and Methods: Six plating densities (104cells/mL, 2.5×104cells/mL, 5×104cells/mL, 105cells/mL, 2.5×105cells/mL, 5×105cells/mL) and two types of flasks (Corning treated flasks and Nest untreated flasks) were employed for mSKPs isolation and cell culture. Growth of mSKPs at different plating densities, in different flasks was monitored and recorded. On the 14th day, the number and the diameter of mSKPs spheres obtained from different culture conditions were compared.

Results: Compared with other lower plating densities (104cells/mL-105cells/mL), the plating densities of 2.5×105cells/mL and 5×105cells/mL produced more adherent cell colonies. The growth of mSKPs was promoted, the amount of mSKPs spheres increased significantly ($p<0.01$), and the diameter of mSKPs spheres increased significantly ($p<0.01$). It was noticed in both Corning treated flasks and Nest untreated flasks.

Conclusions: mSKPs differentiated and migrated out from the adherent cell colonies in the primary culture, and their growth was plating density-dependent. The optimal plating density was 2.5×105cells/mL-5×105cells/mL, which was applicable for both Corning treated flasks and Nest untreated flasks. Compared with other methods, optimization mSKPs growth by increasing plating density is simple and cost effective.