

ION HOMEOSTASIS DURING THE GROWTH OF HUMAN MESENCHYMAL  
STEM CULTURE. I. DENSITY-DEPENDENT CHANGES OF CELL  $K^+$  AND  $Na^+$  CONTENT  
AND  $Rb^+$  INFLUXES

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In this study, we reported the proliferation-related changes in cell  $K^+$  content and in  $K^+$  influxes in cultivated human mesenchymal stem cells (MSCs). The intracellular  $K^+$  content calculated per cell protein content was found to decrease in growing culture of one passage whereas intracellular  $Na^+$  content was not significantly changed. It was also revealed that at higher densities of hMSCs monolayer, the ouabain-sensitive  $K^+$  influx was decreased thus indicating a decline in  $Na^+, K^+$  pump-mediated transport. We analyzed the cell cycle profiles of hMSCs cultures and found that under optimal culture conditions, in high-density cultures the decline in  $K^+$  content per cell protein was related to the accumulation of  $G_1$  cells in the population and accompanied cell proliferation slowing. It is concluded that cell  $K^+$  content per cell protein is an informative test for assessing the functional status of stem cells *in vitro*.

**Key words:** cell potassium content, cell sodium content, potassium fluxes,  $Na^+, K^+$  pump, proliferation, human mesenchymal stem cells

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