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Involvement of the PI3K/Akt/mTOR Pathway in Controlling Chondrogenic Differentiation of Endometrial Mesenchymal Stromal Cells

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The present work describes ability to chondrogenic differentiation of human mesenchymal stromal cells (MESCs) derived from desquamated endometrium in menstrual blood. Neither MESCs chondrogenic capacity nor related signaling pathways have been studied yet. MESCs monolayer culture cultivated in chondrogenic medium within 11–14 days demonstrates chondrogenesis markers such as positive staining with Safranin O and with Alcian blue as well as the increased *COL2A1* expression level. We studied linkage between expression of chondrogenic markers and activation status of PI3K and MAPK pathways by cultivating MESCs in chondrogenic medium in the presence of PI3K inhibitor LY294002; we found that PI3K/Akt/mTOR signaling negatively regulates *COL1A1* expression and positively regulates *COL2A1* during differentiation and that it is also involved in regulation of Raf/MEK/ERK kinase activity. These results suggest that PI3K/Akt/mTOR pathway plays significant role in regulation of MESCs chondrogenesis.

Keywords: chondrogenic differentiation, endometrial mesenchymal stromal cells, PI3K/Akt/mTOR pathway, qRT-PCR