Dendritic cells with lymphocyte-stimulating activity differentiate from human CD133 positive precursors

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CD133 is a hallmark of primitive myeloid progenitors. We have addressed whether human cord blood cells selected for CD133 can generate dendritic cells, and Langerhans cells in particular, in conditions that promote that generation from CD34 progenitors. Transforming growth factor- 1 (TGF- 1) and anti–TGF- 1 antibody, respectively, were added in some experiments. With TGF- , monocytoid cells were recognized after 7 days. Immunophenotypically immature dendritic cells were present at day 14. After 4 more days, the cells expressed CD54, CD80, CD83, and CD86 and were potent stimulators in mixed lymphocyte reaction; part of the cells expressed CD1a and langerin, but not Birbeck granules. Without TGF- , only a small fraction of cells acquired a dendritic shape and expressed the maturation-related antigens, and lymphocytes were poorly stimulated. With anti–TGF- , the cell growth was greatly hampered, CD54 and langerin were never expressed, and lymphocytes were stimulated weakly. In conclusion, CD133 progenitors can give rise in vitro, through definite steps, to mature, immunostimulatory dendritic cells with molecular features of Langerhans cells, although without Birbeck granules. Addition of TGF- 1 helps to stimulate cell growth and promotes the acquisition of mature immunophenotypical and functional features. Neither langerin nor Birbeck granules proved indispensable for lymphocyte stimulation. (*Blood*. 2011;117(15):3983-3995)