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The effect of cryopreservation on clonogenic capacity and in vitro expansion potential of umbilical cord blood progenitor cells.

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BACKGROUND: Umbilical cord blood progenitor cells have been demonstrated to possess significant advantages over bone marrow in terms of proliferative capacity and immunologic reactivity. But the low number of hematopoietic stem cells (HSC) is the most important limitation of its use. The ex vivo expansion of cord blood progenitor cells is the current strategy to overcome this problem. Furthermore, among the factors that enable successful cord blood transplantation is the ability to store and subsequently recover a sufficient number of viable cells. Since it would be costly to expand umbilical cord blood (UCB) progenitor cells, it is important to determine the feasibility and reproducibility of progenitor cell expansion after cryopreservation. We evaluated whether cryopreservation procedures might impair the clonogenic capacity and in vitro expansion of UCB. **MATERIALS AND METHODS:** We evaluated the cell viability, clonogenic capacity, CD34⁺38⁻ content and in vitro expansion potential of progenitor cells from UCB (n = 10) separated mononuclear cells (MNC), before and after 1 month of cryopreservation by programmed rate freezing. **RESULTS:** Although cell viability decreased after cryopreservation (P < .05), there was no significant difference in CD34⁺ or CD34⁺38⁻ absolute count, clonogenic capacity and in vitro expansion potential of cord blood progenitor cells (P > .05). **CONCLUSIONS:** Since the survival of CD34⁺ cells was greater than other elements, CD34⁺ cells seem more tolerant to cryopreservation than the other nucleated populations. Moreover in vitro expansion of UCB progenitor cells may be obtained following cryopreservation. Our results suggest that cryopreservation procedures do not impair the clonogenic capacity and in vitro expansion potential of cord blood stem/progenitor cells.

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