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ORIGINAL RESEARCH

Production of dendritic cells and cytokine-induced killer cells from banked umbilical cord blood samples

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Abstract— Umbilical cord blood (UCB) is considered to be a source of hematopoietic stem cells (HSCs). All UCB banks have recently become interested in the isolation and storage of HSCs for the treatment of hematological diseases. However, UCB was also recently confirmed as a source of immune cells for immunotherapy such as dendritic cells (DCs) and cytokine-induced killer cells (CIKs). This study aimed to exploit this source of immune cells in banked UCB samples. After collection of UCB samples, mononuclear cells (MNCs) containing stem cells, progenitor cells, and mature cells were isolated by Ficoll-Hypaque-based centrifugation. The MNCs were subjected to freezing and thawing according to a previously published protocol. The banked MNCs were used to produce DCs and CIKs. To produce DCs, MNCs were induced in RPMI 1640 medium supplemented with GM-CSF (50 ng/ml) and IL-4 (40 ng/ml) for 14 days. To produce CIKs, MNCs were induced in RPMI 1640 medium supplemented an anti-CD3 monoclonal antibody, IL-3, and GMC-SF for 21–28 days. Both DCs and CIKs were evaluated for their phenotypes and functions according to previously published protocols. The results showed that banked UCB samples can be successfully used to produce functional DCs and CIKs. These samples are valuable sources of immune cells for immunotherapy. The present results suggest that banked UCB samples are useful not only for stem cell isolation, but also for immune cell production.

Keywords—Banked UCB, Stem cells, Immune cells, Dendritic cells, Cytokine-induced killer cells, Immunotherapy

INTRODUCTION

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MATERIALS AND METHODS

RESULTS

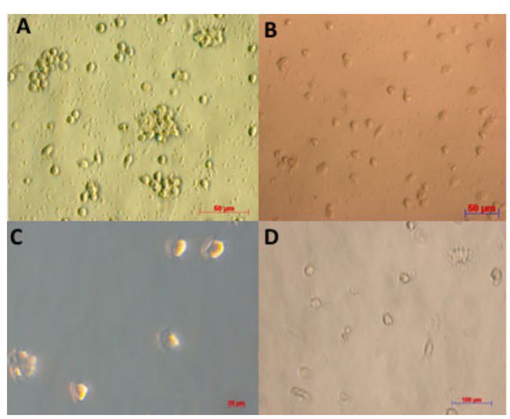

Figure 1. Banked MNCs were successfully induced into dendritic cells. MNCs were thawed from cryoprecryopreserved samples (A), were induced into dendritic cells after 7 days (B) and 14 days (C, D).

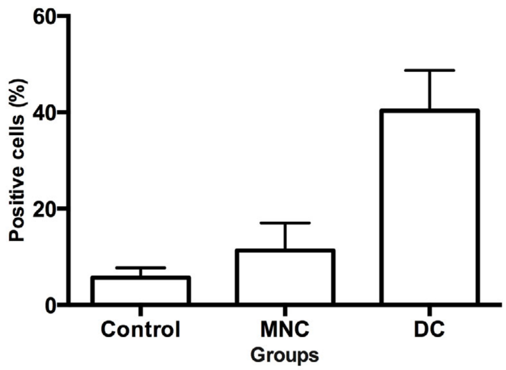

Figure 2. Flow cytometry analysis of DC phagocytosis using FITC-dextran. The induced DCs phagocytose the FITC-dextran compared with control cells.

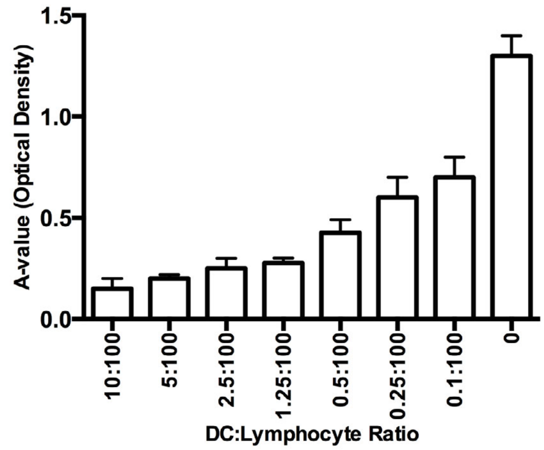

Figure 3. DC candidates stimulate the proliferation of allogenic T cells. DC can stimulate the T proliferation on the ratio of DCs to T cells. The ratio of 1 DC to 10 T cells exhibited the highest stimulating efficacy.

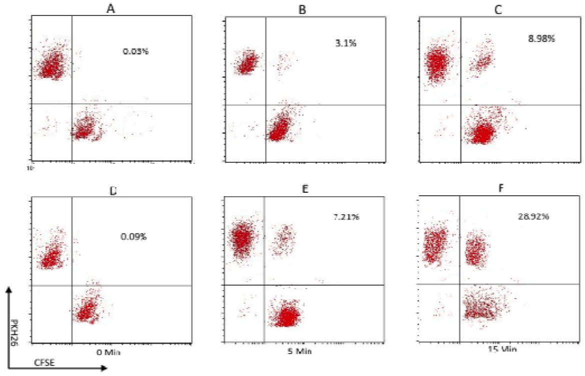

Figure 4. CIKs can bind to target cells (MCF7). In the control group (A-B-C), with EDTA, CIKs also can bind to target cells but with low efficacy; while in the experimental group, CIKs can bind to target and were maximal at 15 min after mixing (D-E-F).

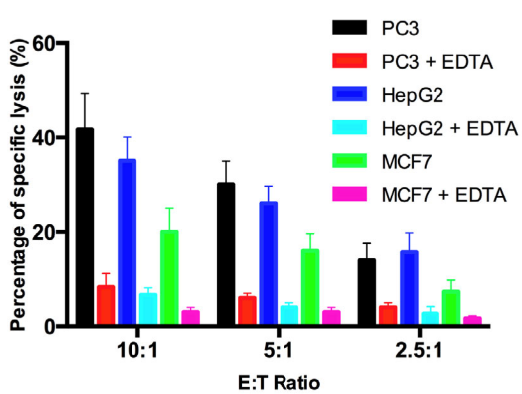

Figure 5. CIKs lysed target cells (HepG2, PC3, and MCF7). CIKs successfully lysed the target cells in a manner dependent on the E:T ratio. CIKs could lyse all three kinds of cancer cells (HepG2, red; PC3, blue; MCF7, black). In the control group, EDTA was added to prevent binding of CIKs to the target cells, and the percentage of lysis was very low (white).

DISCUSSION

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CONCLUSIONS

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Abbreviations

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Acknowledgement

[illegible]

Competing interests

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Open Access

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