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Concurrent Session 4

Enrichment of putative human epidermal stem cells based on cell size and collagen type IV adhesiveness

Juxue Li[1], Chenglin Miao[1], Weixiang Guo[1], Liwei Jia[1], Jiaxi Zhou[1], Baohua Ma[1], Sha Peng[1], Shuang Liu[1], Yujing Cao[1], Enkui Duan[1]

[1]*State Key Laboratory of Reproductive Biology, Institute of Zoology, CAS, Datun road, Chaoyang, Beijing 100101, China*

The enrichment and identification of human epidermal stem cells (EpSCs) is of paramount importance for both basic research and clinical application. Though several approaches for EpSCs enrichment have been established, enriching a pure population of viable EpSCs is still a challenging task. Improved approach is worth developing to enhance the purity and viability of EpSCs. Here we report that cell size combined with collagen type IV adhesiveness can be used as a improved approach to enrich human EpSCs for high purity and viability. We separated the rapidly adherent keratinocytes into three populations ranged in size from 5 to 7 μm (population A), 7 to 9 μm (population B) and = 9 μm (population C) in diameter and found human putative EpSCs could be further enriched in population A with the smallest size. Among these three populations, population A displayed the highest density of β1 integrin receptor, contained the highest percentage of cells in G0/G1 phase, showed the highest nuclear to cytoplasmic ratio, and possessed the highest colony formation efficiency (CFE). When injected into murine blastocysts, these cells participated in multi-tissue formation. More significantly, compared with previous approach that sorted putative EpSCs based on β1 integrin antibody staining, the viability of the EpSCs enriched by the improved approach was significantly enhanced. Our results provide a putative strategy for human EpSCs enrichment, and encourage further study of the role of the cell size in stem cell biology.

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Correspondence: Enkui DUAN
E-mail: duane@ioz.ac.cn

Enkui DUAN, PhD, is a deputy director of Institute of Zoology (IOZ), Chinese Academy of Sciences. Dr DUAN received a PhD in Embryo Engineering from Northwest Agricultural University, China. He is current Professor in State Key Lab of Reproductive Biology, IOZ and a vice chair of Expert Committee for Developmental and Reproductive Program in MOST, China. He is also members of Journal Editorial Board both in *Endocrine* and in *Integrative Zoology.* Dr DUAN's research focuses on human epidermal stem cells, which have the potential to differentiate into insulin producing cell and oocyte. Please search his lab website for more detail. http://www.rpb.ioz.ac.cn/HTMLenglish/duanenkui.php