REDUCING VARIABILITY IN CONDITIONS FOR CELL HANDLING IMPROVES MSC YIELDS

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Efficient cell expansion *in vitro* is essential to commercialization of human MSC as a cellular therapy. The cost of goods sold (COGS) is dramatically affected by how long it takes to expand the cells *in vitro* and the cell yield determines the number of doses generated for profit. Therefore, maximizing MSC growth in culture is critical for the success of MSC-based cellular therapies. Studies by others have shown that temperature differences in cell production can adversely affect cell yields. Here we study the effects of variability in temperature and CO2, like changes seen during routine cell handling in a room air BSC, on human MSC yield. We cultured human bone marrow mesenchymal stromal/stem cells for 8 biweekly subpassages (P4-P12) with conventional room air CO2 incubator conditions (37 degrees C/ 5% CO2). The culture was divided into separate cultures for routine cell handling in two different conditions (1) room air BSC conditions (RT/ 0.1% CO2) (variable) or (2) the same conditions as incubation (constant). At each passage, cells were plated in 96-well plates which were assayed over time for cell growth kinetics. Consistently, MSC incubated and handled in constant conditions recovered more quickly after subpassage and were more likely to continue to divide, improving final cell yields. We conclude that constant conditions for cell handling are critical for maximum MSC cell yield.