

Influence of electroporation on apoptosis occurrence in chicken blastodermal cells

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A potential way to produce chicken bioreactors with ability to produce human pharmaceuticals in their tissues is the injection of genetically modified blastodermal cells (BCs) into the recipient embryo at the X stage of development. The main problem of this method is low efficiency of transgene expression, which depends on the number of cells that remain viable (the cells capable of expressing genes). The side effect of the BCs electroporation is necrosis and apoptosis as well. No research which would regulate EP conditions to avoid occurrence of apoptosis in BCs has been conducted before. Safe procedures which would decrease the number of death cells after injection into recipient embryo are not available either. The aim of this study was to investigate the influence of different parameters of electroporation on appearance of apoptosis in BCs.

The cells were electroporated in different conditions of electric field strength (15, 25, 50, 75, 100 and 125V) and different number of delivered pulses (2, 4, 6, 8, and 10). Afterwards the cells were cultured for 24 hours and then different stages of apoptosis were detected using TUNEL staining and flow cytometric analysis. The percent of the apoptotic cells after electroporation varied from 15.6 to 59.4 (control group 14.3). The increasing voltage had statistically significant influence on the cells viability. Thereby to achieve efficiently transected population of BCs, low voltage pulses should be applied.

Keywords: Chicken, blastodermal cells, electroporation, apoptosis