Effect of Calcitriol on Menstrual Effluent Derived Endometrial Stromal Cell Viability, Decidualization, and Proliferation

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Decidualization is a key process in the endometrium, facilitating embryo implantation through morphological changes of the endometrium. Dysregulation of this process is prevalent in individuals with endometriosis–a condition marked by ectopic growth of endometrial cells, causing infertility in 30% to 50% of patients. Current treatments have limited efficacy in treating endometriosis-associated infertility. This has prompted exploration into calcitriol, the active form of Vitamin D, as a potential therapeutic agent. This study investigates calcitriol's impact on the cell viability, decidualization, and proliferation of menstrual effluent derived endometrial stromal cells (ME-eSC). Menstrual effluent samples were obtained from endometriosis patients and control participants in the Research OutSmarts Endometriosis (ROSE) Study. ME-eSCs were isolated from the samples followed by induction of decidualization using cAMP, progesterone, and estrogen. Cells were treated with dimethyl sulfoxide (negative control), calcitriol, and quercetin (positive control). ELISA assays were used to measure the decidualization markers (IGFBP1 and prolactin), while CYQUANT and Neutral Red assays assessed cell proliferation and viability under calcitriol treatment. Calcitriol showed no cytotoxic or proliferative effects towards ME-eSCs. Results suggested that calcitriol at concentrations of 2x10-7 mM and 1x10-7 mM significantly impacted IGFBP1 and prolactin secretions. Overall, this research suggests that calcitriol may have an impact on decidualization of ME-eSCs, which suggests possible therapeutic potential within this context. Future studies should include an increased number of replicates to reduce the effect of outliers and to provide equal samples from endometriosis patients and controls.