Healing and Toxicogenomic Effects of Anredera cordifolia Extract on Human Fibroblasts Exposed to Hyperglycemic Conditions

Graziela Moro Meira, Elisa Vanessa Heisler, Fernanda dos Santos Trombini, Ivana Beatrice Mânica da Cruz, Fernanda Barbisan, Maria Denise Schimith

INTRODUCTION: Aging is a natural and multifactorial process characterized by cellular and tissue degeneration, leading to the development of non-communicable chronic diseases (NCDs), such as diabetes mellitus, which is associated with chronic wound healing problems and significantly affects patients' quality of life. The use of medicinal plants as therapeutic alternatives has been increasing, with *Anredera cordifolia* (commonly known as Madeira vine) widely used in traditional medicine. However, its molecular effects are still poorly understood, especially in the context of molecular toxicology and tissue repair. **OBJECTIVE:** To investigate the phytogenomic potential of the ethanolic extract of *A. cordifolia* in modulating the expression of genes associated with the extracellular matrix in human fibroblasts cultured under normoglycemic and hyperglycemic conditions. **MATERIALS AND METHODS:** The ethanolic extract of *A. cordifolia* leaves was evaluated for its genome-modifying capacity using the fluorescent dye PicoGreen® in the GEMO assay. Human fibroblast HFF-1 cells were cultured under normoglycemic and hyperglycemic conditions (cells + 50 mM glucose). After 24 hours, an in vitro wound (scratch) was induced using a pipette tip, and the cells were treated with *A. cordifolia* extract at a concentration of 1 µg/mL. After another 24 hours, gene expression analysis for MMP-1, COL-1A, and FGF-7 was performed using qRT-PCR. **RESULTS AND CONCLUSION:** The extract exhibited a dose-dependent effect on DNA, with concentrations ≤10 µg/mL not affecting cell viability. Under hyperglycemic conditions, a reduction in COL-1A and FGF-7 expression was observed, which was reversed by the treatment with the extract, promoting overexpression of COL-1A under both glycemic conditions. MMP-1 was induced by glucose but was not modulated by the extract. *Anredera cordifolia* demonstrated genoprotective activity and the ability to positively modulate genes involved in extracellular matrix synthesis without inducing cytotoxicity at low concentrations. These findings highlight its potential as a promising agent for therapeutic strategies targeting wound healing disorders, especially under glycemic stress. Further studies are needed to elucidate its mechanisms of action and ensure its safety in preclinical models.