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The influence of N-acetylcysteine on wound healing in an animal model of diabetes mellitus

Streszczenie w języku angielskim

Type II diabetes mellitus is a common disease. One of the most severe complications of this disease is impaired wound healing, which in its advanced form takes the clinical form of diabetic foot ulcers. Currently, there are few interventions with proven efficacy that can be applied locally to improve diabetic wound healing. New interventions should be tested first in preclinical setting using a model that mimics the human processes as closely as possible. db/db and ob/ob murine models rely on impaired leptin function. The consequence is a phenotype resembling type II diabetes, resulting in excessive craving, secondary obesity and associated metabolic abnormalities, including delayed wound healing. In this thesis, I have systematically summarised the literature on the mechanisms of impaired wound healing in a murine model of leptin dysfunction. I have shown that, despite some limitations, this model reflects to some extent the pathophysiology of diabetic wound healing in humans and has been widely used in the literature to date. Due to the need to identify readily available and affordable substances that can promote diabetic wound healing, in this dissertation I focused on the study of N-acetylcysteine. This molecule has so far been shown to have beneficial effects in supporting wound regeneration in healthy animal models and models mimicking the phenotype of type I diabetes mellitus. In the second part of this dissertation, an experiment using hydrogels releasing N-acetylcysteine at different concentrations is described. The efficacy of these hydrogels was compared with placebo, showing that 5% N-acetylcysteine released within the wound was able to accelerate healing at an early stage of regeneration in a murine model of db/db. Further studies are indicated to confirm the current results, optimise the route of administration and the concentration of N-acetylcysteine in the context of diabetic wound healing.