ed stem cells and fibroblasts exposed to a wound healing process. Our results provide evidence that hydrolate of *H. italicum* is a valuable candidate in the treatment of wounds to promote tissue healing. Our data open the way for new studies that can translate the *in vitro* results to future cosmetic or therapeutic treatments.

ODONTOBLASTS DERIVED FROM DOG ENDOMETRIAL STEM CELLS ENCAPSULATED IN FIBRIN GEL ASSOCIATED WITH BMP-2 FOR DENTIN REGENERATION

Davide GERARDI[1], Elham HOVEIZI[2], Hadi NADDAF[3], Sina AHMADIANFAR[3], Sara BERNARDI[1], Serena BIANCHI[1], Guido MACCHIARELLI[1]

[1]Department of Life Health and Environmental Sciences, University of L'Aquila, Italy; [2]Department of Biology, Faculty of Science, Shahid Chamran University of Ahvaz, Iran; [3]Department of Clinical Sciences, Faculty of Veterinary, Shahid Chamran University of Ahvaz, Iran

Dental hard tissues are known to be extremely important to be safeguarded, since their regeneration does not occur: in particular, enamel is a tissue without cells, and dentin regeneration often appears disorganized. The most advanced tissue engineering techniques, applied to regenerative treatment for dental tissue, include stem cell cultures that can be differentiated into target tissues on a three- dimensional network to provide a scaffold, which plays a crucial role in tissue engineering. Endometrial stem cells (EnSCs) isolated from canine endometrium have been identified as a source of mesenchymal stem cells (MSCs) characterized by a self-renewal capability. Furthermore, growth factors play an essential role in cell proliferation and differentiation: bone morphologic protein-2 (BMP-2), which belongs to the transforming growth factor β (TGF- β) family, is fundamental in the growth and regeneration of skeletal tissues and has shown odontogenic and osteogenic properties, both *in vitro* and *in vivo*. Besides, BMP-2 stimulates the differentiation of dental pulp stem cells (DPSCs) into odontoblasts. This study aimed to solve dental pathologies utilizing tissue engineering methodologies. The study employed an *in vitro* model to analyze the proliferation and odontogenic differentiation of canine endometrial stem cells (C-EnSCs) isolated from the biopsy of the uterine endometrium. The dentin regeneration potential of odontoblast-like cells (OD) derived from C-EnSCs was evaluated in rodent models. C-EnSCs were isolated using alizarin red staining in order to detect the differentiation into odontoblasts and the expression of two odontoblastic markers, the dentin sialophosphoprotein (DSPP) and dentin matrix protein-1 (DMP1) genes by qRT-PCR. Then, C-EnSCs were characterized via flow cytometry, using the conjugated antibodies to CD90, CD105, CD34, and CD45. These cells were encapsulated within fibrin gel supplemented with signaling molecules to establish proper conditions for cellular proliferation and differentiation. OD cells were combined with BMP-2 to stimulate dentin formation *in vivo*. The experimental model, employed for assessing the regenerative efficacy of cells and biomaterials, involved the preparation of the left maxillary first molar in twenty male Wistar rats, for direct pulp capping. The animals were divided into four cohorts: group 1 served as the control without treatment, group 2 received fibrin alone, group 3 received fibrin with ODs (fibrin/ODs), and group 4 received fibrin with ODs and BMP-2 (fibrin/ODs/BMP-2). SEM analysis assessed the organization of C-EnSCs attached and spread in fibrin hydrogel, appeared as a 3D open porous and interconnected porosity. Morphological examinations revealed the differentiation of C-EnSCs into ODs. Additionally, histomorphometric and histomorphological analysis of treated teeth, using hematoxylin-eosin staining, demonstrated that fibrin gel combined with BMP-2 at a concentration of 100 ng/mL provided an optimal microenvironment for dentin tissue regeneration in rodents. In conclusion, these results showed the potential utility of OD cells derived from C-EnSCs encapsulated in fibrin gel supplemented with BMP-2 for direct pulp capping and dentin regeneration.

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NEURAL DIFFERENTIATION OF THE SH-SY5Y HUMAN NEUROBLASTOMA CELL LINE ON P3HT POLYMER THIN FILM

Valeria LA FAUCI[1], Luana Vittoria BAUSO[1], Clelia LONGO[1], Paola CAMPIONE[2], Grazia Maria Lucia MESSINA[2], Giovanna CALABRESE[1]

[1]Department of Chemical, Biological, Pharmaceutical and Environmental Sciences, University of Messina; [2]Department of Chemical Sciences, University of Catania, Italy

In the promising field of bioelectronics, the combination of electronics and biology has paved the way for new applications in many medical fields, including implantable devices[1]. Developing techniques, capable to monitor and control the biological systems efficiently and instantaneously, is crucial for many biomedical applications, including drug delivery, electrophysiological recording, and regulation of intracellular activities[2,3]. In this context, conductive polymers- based systems (CPs), provide a useful scaffold to develop multifunctional nano systems able to mimic the properties of biological tissues offering a platform for electrical stimulation, particularly important when targeting differentiation of cells into neurons and glial cells, and application for novel regenerative therapies[4]. Based on the above reported evidences, in this study we investigated the properties of a semiconductive polymer P3HT based-substrate on the neuroblastoma SH-SY5Y cells, in terms of cell adhesion, proliferation, biocompatibility and neural differentiation. For this end, we performed cytotoxicity tests, immunohistochemical analyses with specific neuronal markers, such as β-III Tubulin, MAP2, NF-H, and DAPI staining. Our preliminary results highlighted that the new P3HT based substrate show a good biocompatibility, and high capability to induce neuroblastoma cells adhesion, proliferation and differentiation, from 1 to 15 days even without addition of retinoic acid. These data taken together suggest that the P3HT based substrate represents a step toward creating biocompatible and functional interfaces that hold promise for future biomedical applications, in particular for the development of medical devices for neural tissue engineering.

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