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Novelties in Cartilage Tissue Regeneration using Nano Scaffolds

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Introduction: The repair of cartilage lesions constitutes a major challenge in regenerative medicine since the current clinical solutions are limited. Therefore, tissue engineering which aims to create novel and improved tissue and organ substitutes has evoked increasing interest for cartilage repair. The discovery of mesenchymal stem cells (MSCs) catalyzed the fields of tissue engineering and regenerative medicine. But although stem cells hold great potential for the treatment of many injuries and degenerative diseases, several obstacles must be overcome. These include the development of advanced techniques of novel methods to track and guide transplanted stem cells. Our work had focused on creating tissue in the laboratory for implantation repair knee cartilage lesions.

Methods: Adult stem cells were isolated from bone marrow of animal model, expanded in culture as per the protocol standardized in our laboratory. Osteoarthritis (OA) was induced unilaterally in the knee joint of donor animals. Then the stem cells implanted with (nano+) and without Nano fibrous scaffold (nano-) and injected in the injured knee to test their effect. Control animals received sodium hyaluronan alone.

Results: Stem cells survived well and showed stable division in culture, making them ideal targets for *In Vitro* manipulation. The isolated cells possessed the basic features of MSCs. The examination of the treated models showed decrease in overall pain, pain upon limb examination, improvement in gait, performance in daily life activities and vitality with reduction in gross pathological cartilage changes and repair of articular cartilage to histologically normal appearance expressed earlier one week in the nano+ group.

Conclusion: There is a great promise to advance current cartilage therapies toward achieving a consistently successful approach for curing cartilage agonies. Tissue engineering may be the best way to reach this objective via the use of stem cells, novel biologically inspired scaffolds and emerging nanotechnology.

Biography

Laila Montaser MD is a Professor in Clinical Pathology; Chair of Stem Cell, Regenerative Medicine, Nanotechnology and Tissue Engineering (SRNT) Research Group, she served as the President, Founder of Clinical Pathology Department Faculty of Medicine, Menoufia University, Egypt. She is uniquely trained and has a philosophy on how to manage research. Montaser's distinguished career as a Prof. and researcher who had an enormous international impact selected her for three times at 1986, 1998 & 2002 by Council of Menoufia University to Award of "Ideal Doctor" from Egyptian Medical Syndicate and also nominated to two major awards: TWAS prize in Medical Sciences and Nano Science Research Excellence due to her scientific achievements worldwide.