

## Recent Progress in Medical Biomaterials

Qiqing Zhang<sup>1,2,3,\*</sup>, Yuan Zhang<sup>4</sup>, Linzhao Wang<sup>4</sup> and Yongzhen Xing<sup>4</sup>

<sup>1</sup>Institute of Biomedical Engineering, Chinese Academy of Medical Sciences & Peking Union Medical College, Tianjin, 300192, China.

<sup>2</sup>Institute Biomedical Engineering, Shenzhen People's Hospital (Medical School Southern University of Science and Technology), Shenzhen, 518020, China.

<sup>3</sup>Institute of Life and Health, Xinxiang Medical University, Xinxiang, 453003, China.

<sup>4</sup>Bote Biotech. Co., Ltd. Fujian, 350013, China.

\*Corresponding Author: Qiqing Zhang. Email: zhangqiq@126.com.

**Abstract:** Guided tissue regeneration (GTR) is a technique that selectively guides cells to attach and proliferate towards an injured site to achieve tissue regeneration through a physical barrier membrane. In this review, we presented a brief overview of the development of GTR technology and GTR materials. Nowadays, new technologies such as electrospinning, nanotechnology, controlled release technique, and 3D printing have been introduced into the study of GTR materials. Resorbable membrane as GTR materials are available as alternatives to conventional non-resorbable membranes. Current GTR materials not only act as a physical barrier membrane but also as a scaffold to play a role in promoting cell proliferation and tissue regeneration. The development trend in GTR materials will be multi-component, functional, and biomimetic composite materials. At the end, we show the research and industrialization of GTR materials in our group.

**Keywords:** Guided tissue regeneration; biomaterial; 3D printing; recent progress

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Qiqing Zhang is professor, doctoral supervisor, researcher of second grade and deputy director of the Academic Committee of Institute of Biomedical Engineering, Chinese Academy Medical Sciences & Peking Union Medical College, Tsinghua University School of Medicine. He is also dean of Institute Biomedical Engineering, Shenzhen People's Hospital (Medical School Southern University of Science and Technology). He used to be visiting professor at College of Pharmacy, University of Toronto, and School of Science and Technology, Aalto University, Finland. He was former director of Biomedical Engineering Research Centre, Xiamen University, dean of Institute of Biomedical and Pharmaceutical Technology of Fuzhou University and dean of Institute of Life and Health, Xinxiang Medical University. He graduated from Department of Chemistry, Xiamen University and obtained PhD.

in Biomedical Engineering from Tianjin University. He had attended Biomechanics workshops in Huazhong University of Science and Technology and Chongqing University (lectured by Prof. Yuan-Cheng Fung) in 1979.

He has been engaged in the research of regeneration and repair of defect caused by injury, tumor, retrogression, etc. by combining diagnosis, precaution, intelligent medical bio-material, tissue engineering, additive manufacturing, nanotechnology, stem cell technology and controlled release drug preparation for about 40 years. As project leader, Prof. Zhang has undertaken more than 160 research projects including Major Research Projects of National Natural Science Foundation of China, National Science Funds for Distinguished Young Scholar, 863, 973, National Support Plan and National Key Research, Development Plan for the 13th Five-year Plan. He has published 508 papers which have been cited over 15,000 times, compiled and co-compiled 10 monographs and guidelines, and led the setting of the first national industrial standard for absorbable surgical suture. He has been granted and authorized 208 patents. He has 5 industrialized achievements, 8 medical device registration certificates and 1 health product license. His products have been widely used in neurosurgery, orthopedics, stomatology, oncology, ent, plastic surgery, cardiovascular surgery, tendon rupture and organ perforation. He has tutored 4 post-doctors, 51 doctors and 291 masters' students. He was awarded 34 awards, such as First Prize of Innovation Achievements in Cooperation Between Industry and Research Institutes in China, Special Prize of China Innovation Award, Outstanding Achievement Award for Chinese Patent, Second Prize of Chinese Medicine Award, Second Prize of Technological Invention by the Ministry of Education, Golden Patent Award and Second Prize of Natural Science by Tianjin City, etc.