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Additive Manufacturing
Aragonite-enriched bone graft substitute

Dental Implant
Osteoinduction using bioactive glass

Plant Virus Hydrogel
Bone repair with osteoporotic animal models

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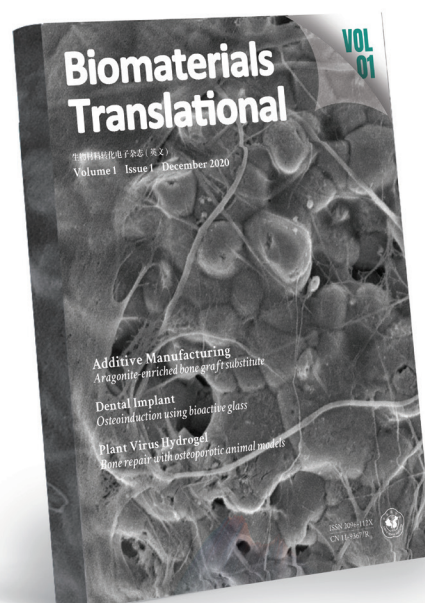
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Biomaterials Translational is an electronic journal, which will be printed on demand of readers.



Biomaterials Translational is an international journal publishing research at the interface of translational medicine, biomaterials science and engineering. The journal publishes original, high-quality, peer-reviewed papers including original research articles, reviews, viewpoints and comments. Translational medicine is an interdisciplinary field that applies emerging new technologies and sciences to the prevention, diagnosis and treatment of human disease, with a particular focus on animal disease models in the application of biomaterials for treatments. Thus, the journal highlights breakthrough discoveries in basic science and clinical application of biomaterials, as well as other significant findings related to the translation of biomaterials.

The scope of the journal covers a wide range of physical, biological and chemical sciences that underpin the design of biomaterials and the clinical disciplines in which they are used.

Original articles will be considered for publication within, but not limited to, the following domains:

- Investigation of human biology and pathogenesis of diseases with potential applications of biomaterials in treatment
- Synthesis, characterization and biomedical potential of metallic, ceramic, polymeric, composite and hybrid biomaterials
- Physical, chemical, biological, pharmaceutical and toxicological features of biomaterials
- Drug and gene delivery system design, with a focus on its application to disease conditions
- Short-term and long-term biocompatibility of biomaterials
- *In vivo* disease models and the biology of the host response in application of novel biomaterials
- Biomaterials design for modern diagnosis and therapeutic clinical practice (bioimaging, biosensing, biotherapy)
- Stem cell–biomaterial-based tissue engineering

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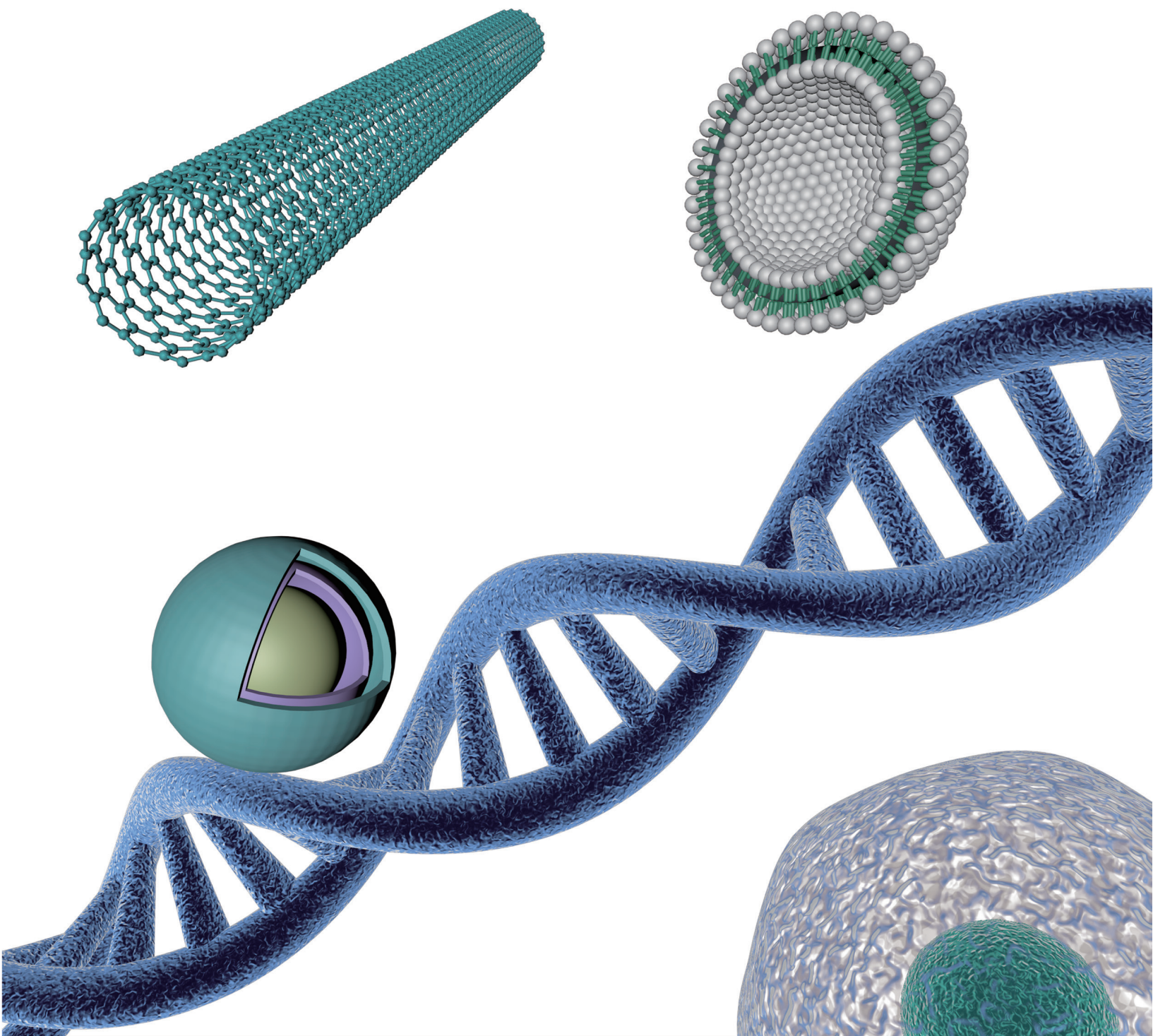
Zhixue Zhu

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(*Arranged vertically in alphabetical order by their last name)

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EDITORIAL

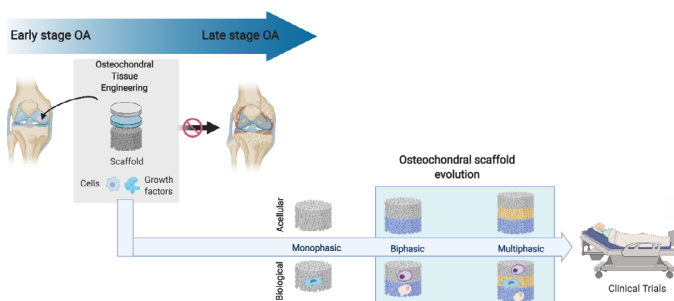
1 *Biomaterials Translational* – The New Vehicle for Translational Medicine

Qian Wang

REVIEWS

3 Osteochondral scaffolds for early treatment of cartilage defects in osteoarthritic joints: from bench to clinic

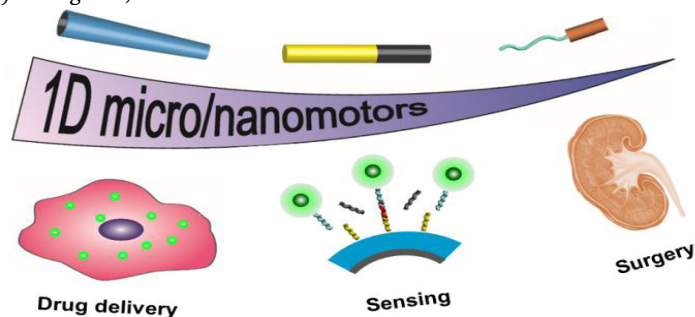
Maryam Tamaddon, Helena Gilja, Ling Wang, J. Miguel Oliveira, Xiaodan Sun, Rongwei Tan, Chaozong Liu



Osteoarthritis (OA) is a joint disease typified by the loss of cartilage and the changes in the underlying bone, leading to joint replacement. Osteochondral scaffold therapy has shown potential for treatment of OA at early stage to slow down its progression and delay the use of joint replacements.

18 One-dimensional micro/nanomotors for biomedicine: delivery, sensing and surgery

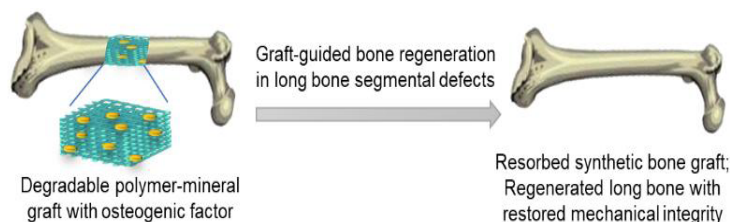
Jiawang Guo, Yuan Lin



One-dimensional (1D) micro/nanomotors are the most promising micro/nanomachines in biomedicine. We have summarized several design rules and fabrication strategies of 1D micro/nanomotors. The biomedicine applications of the motors in drug delivery, sensing and surgery from subcellular to *in vivo* level are discussed.

33 Segmental long bone regeneration guided by degradable synthetic polymeric scaffolds

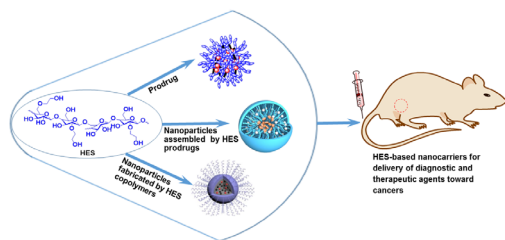
Xiaowen Xu, Jie Song



This review discusses major degradable polymers and their osteoconductive mineral composites as synthetic bone grafts for the regenerative reconstruction of critical-size long bone segmental defects. Emphases are given to the successes and limitations of synthetic bone grafts based on conventional and amphiphilic polyesters, polyanhydrides, polycarbonates and polyethylene glycol-based hydrogels.

46 Hydroxyethyl starch and its derivatives as nanocarriers for delivery of diagnostic and therapeutic agents towards cancers

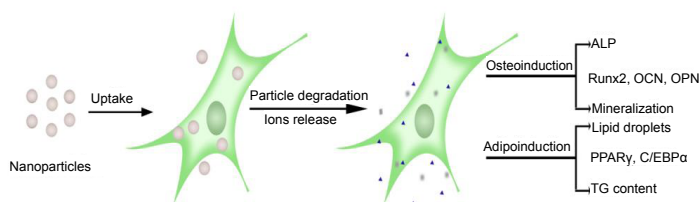
Ronghua Tan, Ying Wan, Xiangliang Yang



Hydroxyethyl starch and its derivatives have been widely used for building nanoscale prodrugs and drug-loaded particles. The resulting nanomedicines with purposely-designed compositions and structures have capacities for delivering diagnostic and therapeutic agents towards cancers with high safety, revealing their promising potential in translation for clinical applications.

58 Nanoparticles and their effects on differentiation of mesenchymal stem cells

Xing Yang, Yuanyuan Li, Xujie Liu, Wei He, Qianli Huang, Qingling Feng

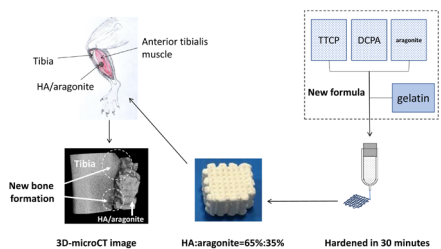


This review focuses on the effects of four nanoparticles (hydroxyapatite, silica, silver, and calcium carbonate) on osteogenic and adipogenic differentiation of mesenchymal stem cells. After uptake, nanoparticles degraded, released ions and might impact the expression of transcription factors and markers of differentiation of mesenchymal stem cells. These effects varied by particle types.

RESEARCH ARTICLES

69 Three-dimensional biofabrication of an aragonite-enriched self-hardening bone graft substitute and assessment of its osteogenicity *in vitro* and *in vivo*

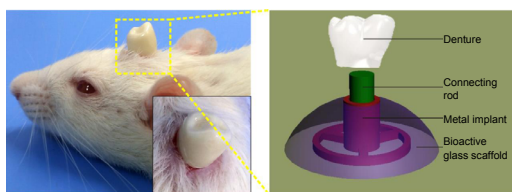
Yunsong Shi, Ruijun He, Xiangyu Deng, Zengwu Shao, Davide Deganello, Chunze Yan, Zhidao Xia



A self-setting hydroxyapatite containing aragonite was fabricated using three-dimensional-printing technique. The product is biodegradable, supporting osteogenic differentiation of mesenchymal stem cell *in vitro* and bone formation *in vivo*.

82 Design and evaluation of a novel sub-scaffold dental implant system based on the osteoinduction of micro-nano bioactive glass

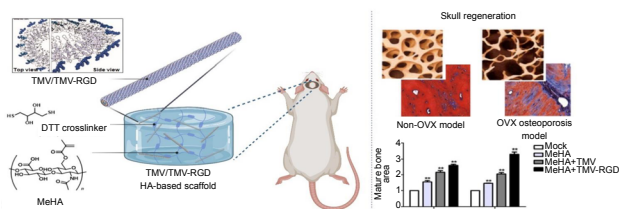
Fujian Zhao, Zhen Yang, Lu Liu, Dafu Chen, Longquan Shao, Xiaofeng Chen



A novel dental implant, sub-scaffold dental implant system (SDIS), is fabricated by combining a metal implant and a micro-nano bioactive glass scaffold. This dental implant can be directly implanted under mucous membranes without adding any biomolecules or destroying the alveolar ridge.

89 Hyaluronic acid-based hydrogels with tobacco mosaic virus containing cell adhesive peptide induce bone repair in normal and osteoporotic rats

Jishan Yuan, Panita Maturavongsadit, Zhihui Zhou, Bin Lv, Yuan Lin, Jia Yang, Jittima Amie Luckanagul



The well-known plant virus, tobacco mosaic virus (TMV), and its mutant expressing surface RGDs have taken their roles in regenerative medicine. By the incorporation of both viruses into three-dimensional hyaluronan-based hydrogel, the implant's bone healing efficiency in normal and osteoporosis rats were increased. The effect was more pronounced with the arginyl-glycyl-aspartic acid (RGD) mutant.