

Editor's Preface

This special issue contains reviews and original experimental data presented at the International Conference “Biotechnology of New Materials – Environment – Quality of Life” held in the Siberian Federal University in 2017.

Construction and investigation of new biocompatible materials necessary for modern reconstructive biomedical technologies is a major goal of biotechnology. Treatment efficacy and quality of life cannot be enhanced without introducing high technologies into practical reconstructive medicine and using highly functional and specific new materials, including systems capable of mimicking biological functions of the living organism. A number of papers discuss promising polymeric materials and products based on them in terms of medical materials science. The paper of prof A. Kabanov “Biomedical applications of nano-sized polymeric micelles and polyion complexes” will provide a high-level overview of the use of polymeric micelles, polyion complexes, cell mediated drug carriers and exosomes in the therapy of cancer and neurodegenerative diseases. The work of prof. Vasif Hasirci “Differentiation of BMSCs into nerve precursor cells on fiber-foam constructs for peripheral nerve tissue engineering” concentrates on application alignment of electrospun PHBV/Collagen fibers and of bone marrow stem cells (BMSCs) as a nerve guide. A.A. Shumilova et al. reporting about hybrid tissue-engineered biosystems based on polyhydroxyalkanoates (PHA) and bacterial cellulose were constructed using various methods (electrospinning, solution techniques, etc.). A.N. Boyandin et al. present pioneer results of application of biodegradable PHAs for constructing urological stents. The work of prof. C. Brigham “Systems biology of the *Ralstonia eutropha* polyhydroxyalkanoate granule” concentrates on problems of synthesis of polyhydroxyalkanoates as biopolymers of microbial origin which have very many attractive properties that make them promising materials for various applications, including biomedical ones. High performance in-situ composites developed from polypropylene/nylon 6/carbon nanotube blend systems is theme of work of prof. B.D.S. Deeraj et al.

The reviews by Prof. L. Frank “Recombinant hybrid proteins as biospecific reporters for bioluminescent microassay” and M.A. Kirillova et al. “Bioluminescent system of luminous bacteria for detection of microbial contamination” address promising methods of biotechnological assay and diagnosticums based on bioluminescent assays.

The work of S. Bartsev, Al. Belyi, A. Sarangova “The application of mechanistic mathematical and connectionist models in the control of biotechnological processes” concentrates on problems related to the control of complex biotechnological processes, were considered on the example of biooxidation of refractory gold-arsenic sulphide concentrates for the subsequent gold recovery. The concept of an autonomous Arctic eco-energy residential long-term facility is discussed in a work of S. Bartsev, A. Degermendzy et al. where it is shown that factors that impede the development of the Arctic are: 1) long frosts; 2) low quality of indoor air; 3) an unsanitary surroundings due to low activity of biota; 4) deficiency of fresh vitamin-containing food; 5) high dependency of settlements on external supply. The concept of the Arctic Ecological-Energy Autonomous Dwelling (AEEAD) designed to solve the problems is grounded on: 1) the optimal configuration of housing and heat savings; 2) closure of the flows of substances; 3) the use of autonomous energy sources.

Papers published in the special issue will be useful for biologists, biotechnologists, ecologists, materials scientists, teachers and students of biological faculties of universities.