Short Communication **Journal of Microbiology and Biotechnology Reports**

An evolution in biomaterial: Antibacterial Bioglass; Applications and challenges

Fatemeh Yousef Saber

Abstract

The invention of bioactive glasses is considered an inspiring revolution in the field of Biomaterial science. While the first generation of Bioglasses could only contact body fluids with maximum biological inertness, the new generation has been specifically programmed to target cell pathways and trigger genetic regulation mechanisms. Peripheral nerve repair, wound healing, tissue engineering, and drug delivery are just a few examples of their wide biomedical applications. Although Bioglasses have shown significant biological properties, including strong bonding to the bone, controlled degradation rate, increasing angiogenesis and osteogenesis, their biocompatibility and bioactivity in the human body are still by far the most challenging characteristics. During the past few decades, these biomaterials' antibacterial and antibiofilm effects have been enhanced by applying different approaches like doping with biocidal metals or loading with antibiotics. Considering the huge emerge of antibiotic-resistant bacteria and cytotoxicity of metal elements, other options including multilayer surface coating have drawn enormous attention to themselves. The grand challenges for the future use of bioglasses in medical devices can be simply divided into five groups: stable coating, suitable mechanical properties, soft and interfacial tissue engineering, controlled release of biomolecules/ therapeutic agents, and last but not least reliable in vitro and in vivo testing methodologies. Each of these difficulties could be perfectly overcome by applying novel biological methods like using natural polymers and bioactive molecules produced by the vast majority of microorganisms in multilayer coating of bioactive glasses.

animals lack the potential to synthesize maximum of the vitamins, microorganism have inherent ability to provide those metabolites. With contemporary lifestyle, consumers are becoming more fitness conscious and discerned in their food choices. In this kind of situation, riboflavin-offering LAB offer a clean gain over chemical synthesis through growing the nutritional price of food. The riboflavin biosynthesis in bacteria turned into analysed the usage of comparative analysis of genes, operons and regulatory elements.

Chemical synthesis of a diet is being replaced by fermentation processes due to financial and environmental considerations of the latter. Besides the monetary advantages, additional blessings of the microbial synthesis include the use of renewable sources, environmental-friendly approach and superior nice of the final. version for law of riboflavin biosynthesis is primarily based at the formation of opportunity RNA structure regarding the RFN element (a mononucleotide riboswitch is surprisingly conserved RNA element this is discovered frequently inside the 5′ untranslated location of prokaryotic mRNA that encodes for FMN biosynthesis and shipping proteins that is utilized in a later step (lumazine synthase). The 2d and 1/3 enzymatic steps (deamination of the pyrimidine ring of structure and the subsequent discount of the ribosyl side-chain) are controlled by way of some other bi-practical enzyme encoded by means of the first gene of the operon ribG The penultimate step in riboflavin biosynthesis, is catalysed by means of lumazine synthase, the fabricated from the closing rib gene, ribHSo far, records available on entire genomes of numerous microbes has made it clean that riboflavin-producing ability is identified to be strain or subspecies specific. Thus, it may be an attractive technique to bioprospect prolific riboflavin-producing traces from their diversified natural niche and further decorate their capacity to provide this important vitamin with the aid of microbiological and biotechnological interventions. The enzymes required for riboflavin biosynthesis can be completely or partially absent in numerous to be had genomes of microbes; nevertheless, the behavior of more than one coexisting microbial species suggests the opportunity of de novo synthesis of riboflavin.

Bottom Note: *This work is partly presented at 26th World Congress on Industrial Biotechnology at November 20-21, 2021 Chicago, USA*

Fatemeh Yousef Saber

University of Isfahan, Isfahan, Iran, E-mail: fatemeh.ysaber@gmail.com