

Antimicrobial hydrogels: promising materials for medical application

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Abstract: (Limit 600 Words)

The rapid emergence of antibiotic resistance in pathogenic microbes is becoming an imminent global public health problem. Local application of antibiotics might be a solution. In local application, materials need to act as the drug delivery system. The drug delivery system should be biodegradable and prolonged antibacterial effect should be provided to satisfy clinical demand. Hydrogel is a promising material for local antibacterial application. Hydrogel refers to a kind of biomaterial synthesized by a water-soluble natural polymer or a synthesized polymer, which turns into gel according to the change in different signals such as temperature, ionic strength, pH, ultraviolet exposure etc. Because of its high hydrophilicity, unique three-dimensional network, fine biocompatibility and cell adhesion, hydrogel is one of the suitable biomaterials for drug delivery in antimicrobial areas. In this review, studies from the past 5 years were reviewed, and several types of antimicrobial hydrogels according to different ingredients, different preparations, different antimicrobial mechanisms, different antimicrobial agents they contained and different applications, were summarized. The hydrogels loaded with metal nanoparticles as a potential method to solve antibiotic

resistance were highlighted. Finally, future prospects of development and application of antimicrobial hydrogels are suggested. Nowadays, with the rapid development of biomaterials and medical devices, health care-associated infections (HAIs) have posed severe problems on clinicians. For example, in the US, the annual costs associated with HAIs are estimated to be up to \$33 billion.¹ The rapid emergence of antibiotic resistance in pathogenic microbes is becoming an imminent global public health problem.² According to a report in Lancet, most acute sequelae and global mortality were caused predominantly by infectious diseases.³ Medical devices may bring HAIs to patients in hospital. These biomaterials and medical devices including joint implants, wound dressings, catheters, cardiac pacemakers and contact lenses bring implant-associated infection, calling for an urgent need of inherent antimicrobial biomaterials and medical devices. Among all antimicrobial materials, heavy metals and natural extracts have been used for a long time since first discovered. However, these materials still have inherent disadvantages that restrict their application and efficacy.

Biography: (Limit 200 Words)

Florin Eggmann developed his research work in Department of Periodontology, Endodontology and Cariology, University Center for Dental Medicine UZB, University of Basel, Mattenstrasse 40, CH-4058 Basel, Switzerland. Asin Ahmad Haschemi developed his research work in Department of General Pediatric and Adolescent Dentistry, University Center for Dental Medicine UZB, University of Basel, Basel, Switzerland, Dimitrios Doukoudis also developed his research work in Department of General Dentistry, University Center for Dental Medicine UZB, University of Basel UZB, Basel, Switzerland.

About University: (Limit 200 Words)

The University of Basel (Latin: Universitas Basiliensis, German: Universität Basel) is a university in Basel, Switzerland. Founded on 4 April 1460, it is Switzerland's oldest university and among the world's oldest surviving universities. The university is traditionally counted among the leading institutions of higher learning in the country. The associated Basel University Library is the

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largest and among the most important libraries in Switzerland. The university hosts the faculties of theology, law, medicine, humanities and social sciences, science, psychology, and business and economics, as well as numerous cross-disciplinary subjects and institutes, such as the Biozentrum for biomedical research and the Institute for European Global Studies. In 2020 professors.

Importance of Research: (Limit 200 Words)

The lockdown significantly impacted the dental emergency service in terms of patients' diagnoses, treatment needs, and the characteristics of the urgent care that was delivered. The aim of this study was therefore to retrospectively evaluate the dental emergency services that were provided at the UZB during the 6-week lockdown period of wide-ranging public health measures issued by the Federal Council (16 March [starting a midnight] until 26 April 2020). Data on urgent dental care delivered in the 6-week period before and after 17 March and 26 April 2020, respectively, were used to determine if the dental emergency service faced different demands at distinct stages of the pandemic. The demand faced by dental emergency service was defined by the volume and composition of patients seeking urgent care, their treatment needs, and the treatment modalities used in the provision of urgent dental care. Given the urgency of the COVID-19 health crisis and the singularity of the federal lockdown measures, a retrospective study design was chosen. The null hypothesis was that the three time periods assessed would exhibit no difference regarding the patient population, patients' treatment needs, and the characteristics of urgent dental care provision.

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