P-0600 Novel polycationic polymer based oral therapies, for people with diabetes

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Introduction

It is a well-known fact, that people with diabetes (PwD) have higher risk for periodontal problems, denture stomatitis, caries and have higher DMFT index. It means PwD have more oral inflammations, and oral infections like gingivitis, denture stomatitis, postsurgical complications and oral cancer. The reason behind it can be the decreased salivary flow, the slower healing process and the reduced defensive capabilities. These symptoms can help the dentist to diagnose uncontrolled diabetes mellitus.

The polycationic polymers are a very popular topic nowadays, they have antibiotic and antifungal activity. Three antimicrobial mechanisms have been proposed:

I.) the ionic surface interaction resulting in wall cell leakage.

II.) the inhibition of the mRNA and protein synthesis via the penetration of chitosan into the nuclei of the microorganisms.

III.) the formation of an external barrier, chelating metals and provoking the suppression of essential nutrients to microbial growth.

The specific oral pathogens cannot form resistance against these polymers because of these direct antimicrobial contact mechanisms.

Aim

Our aim to create new methods for supporting the oral health against the most common oral infections for PwD. There is a possibility to bind any additional medicine to the polymers and reach wider range, and better effect against the pathogens. Our workgroup has an in vitro project, with polyethyleneimine (PEI). The purpose is to make new additional ways to treat denture stomatitis, using PEI. It has an own antimicrobial effect against the *Candida albicans* - which is the most frequent fungal colonizer - and other pathogen bacteria. We cover all of the mucosal surface of the acrylate denture, and this blocks the oral reinfection by the previously infected denture.

Method

We synthesized a hard lining composite material with PEI and nano-Ag particles (nAP) against the pathogen bacteria and fungi. These active components have widely known antimicrobial effect. They are soluble in water and saliva, therefore itself it is not suitable for acrylate coating. So we applied a polymer bulk material (polylactic-acid) forming this film stable.

After the solved problems with the synthesis and application, we characterized our material. It was measured by dynamic light scattering (DLS), atomic force microscope (AFM), micro-CT, transmission electron microscope (TEM), universal testing machine and gravimetric method. The DLS proved that our active component's size is in nano range. The imaging methods showed the micellar (core, shell) structure of our polymer composite.

Results

The tests demonstrated us, that our material is in nano range, with core-shell structure. The hard line is tightly-attached to the mucosal acrylate surface.

Discussion

In our opinion this novel method can be a successful treatment option for the denture stomatitis in PwD.

Conflict of Interest

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