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Novel Anti-Bacterial, Anti-Fungal Nanopillared Surface

Tech ID: 28677 / UC Case 2017-420-0

BRIEF DESCRIPTION

Medical devices are susceptible to contamination by harmful microbes, such as bacteria and fungi, which form biofilms on device surfaces. These biofilms are often resistant to antibiotics and other current treatments, resulting in over 2 million people per year suffering from diseases related to these contaminating microbes. Death rates for many of these diseases are high, often exceeding 50%. Researchers at UCI have developed a novel anti-bacterial and anti-fungal biocomposite that incorporates a nanopillared surface structure that can be applied as a coating to medical devices.

FULL DESCRIPTION

Microbes that are perilous to human health (i.e. bacteria, fungi) frequently infect commonly used, invasive medical devices. Once they infect these medical device surfaces, microbes form biofilms, which are hard to penetrate and account for 80% of all infections due to contamination of medical devices and surfaces. Treatments for diseases by some of these bacteria or fungi are either non-existent or ineffective. Current solutions to prevent infection involve chemical treatment and antibiotics for medical device surfaces. However, the potency of chemical treatments usually diminishes over time, and microbes often develop antibiotic resistance, rendering antibiotics ineffective.

To prevent infection of medical devices by harmful microbes, researchers at UCI have developed a novel biocomposite composed of certain materials. The key feature is the incorporation of structures called nanopillars, which have been proven to have anti-bacterial and anti-fungal properties. The materials comprising this biocomposite possess the flexibility and mechanical strength required by many invasive medical devices. Thus, the biocomposite can be applied as a film or coating to medical devices that renders the devices anti-bacterial and anti-fungal.

ADVANTAGES

§ Materials are inexpensive, abundant

§ Materials are biocompatible and safe for humans

§ Does not require chemical treatments or antibiotics to devices, making the invention more efficient

§ Non-chemical method for preventing infection (safer for people and better for the environment than current applications)

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,828,394	11/10/2020	2017-420

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OTHER INFORMATION

CATEGORIZED AS

- » **Biotechnology**
 - » Health
- » **Materials & Chemicals**
 - » Biological
 - » Composites
 - » Nanomaterials
 - » Thin Films
- » **Medical**
 - » Devices
 - » Disease: Autoimmune and Inflammation
 - » Disease: Blood and Lymphatic System
 - » Disease: Cancer
 - » Disease: Cardiovascular and

STATE OF DEVELOPMENT

Current State:

The anti-fungal properties of nanopillars have been demonstrated

An antimicrobial film/coating made from a composite of certain materials has been developed

- Circulatory System
 - » Disease: Central Nervous System
 - » Disease: Dental
 - » Disease: Dermatology
 - » Disease: Infectious Diseases
 - » Disease: Kidneys and Genito-Urinary System
 - » Disease: Metabolic/Endocrinology
 - » Disease: Musculoskeletal Disorders
 - » Disease: Ophthalmology and Optometry
 - » Disease: Respiratory and Pulmonary System
 - » Disease: Substance Abuse
 - » Disease: Women's Health
 - » Other
 - » Research Tools
- » **Nanotechnology**
 - » Other
- » **Sensors & Instrumentation**
 - » Medical
 - » Other
 - » Scientific/Research

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2017-420-0

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