Office of Technology Transfer

Auburn University

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Reference: Biopolymer

Lead Inventor

Dr. Vitaly Vodyanoy
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Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Joint development opportunities include funded research or venture

Status

- Three issued US Patents (7,022,514; 7,473,550; 7,604,807) and several pending applications
- Reversible extended protection of mammalian cells and bacteria (video of 2 week entrapment) has been well demonstrated

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Preservation of Biological Samples at Room Temperature

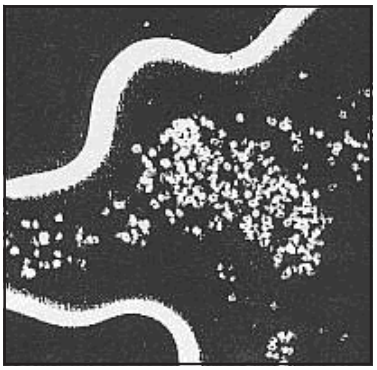
Overview

Auburn University is seeking a licensee or development partner for a naturally occurring biopolymer for the isolation and reversible preservation of a range of biological materials including living cells and tissues. This entrapment process occurs at room temperature and can last for an extended period of time at room temperature or refrigerated conditions with minimal damage to the specimen. The viable biomaterials are released from the polymer system by the application of water. Potential applications for this technology include:

- Preservation and shipment of bacterial cultures and bodily fluids (e.g., blood, semen)
- Medical applications in surgery, wound healing and drug delivery
- Biodegradable packaging
- Forensics

Advantages

- Preservation process is simple, rapid and occurs at room temperature, which lowers labor and cost
- Preservation can last for an extended period of time at room temperature, eliminating need for cumbersome and expensive cryogenic storage; longer preservation times achievable through refrigeration
- Entrapment can be reversed by dissolution in water
- Eliminates steps and materials of traditional preservation methods that can lead to dehydration and damage of biological samples
- Suitable for use in the field
- Naturally occurring polymer that is biodegradable and non-toxic
- Additives can provide optimized formulations for specific samples
- Resistant to almost all organic solvents and most acids



Light micrograph of bacteria sample preserved in acacia film

Description

Modern preservation techniques for biological samples typically include dehydration, immobilization, extreme temperatures (high and low), chemical treatments, and/or irradiation. These methods often damage the biomaterial, are irreversible, are labor intensive, may not be cost-effective and are impractical for use in the field.

Acacia, or arabic, gum is a natural exudate or sap that has been widely used since ancient times and is currently manufactured in multi-ton quantities for use in the food and allied industries. In this invention, an aqueous solution of acacia gum is used to harvest and preserve a biological specimen in a dormant state and, later, the specimen is restored to the condition under which it was isolated by the addition of water and without the use of heat or UV irradiation. By replacing water molecules with polymer molecules, this method protects the specimens from environmental effects for extended periods of time without the need for refrigeration or other treatment.

Additives and additional steps can be provided to allow for optimum performance for a given biological sample. The cured polymer results in a solid protective film which is stable to many organic solvents. This system is compatible with many biological samples including proteins, DNA, receptors, antibodies, antigens, bacteria, mammalian cells, cell surfaces, and tissues. The polymer is also effective in protecting the biological materials on the surfaces of biosensors.