# Inducing piezoelectricity in collagenous scaffolds using polarization

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## Technology description

Researchers at New Jersey Institute of Technology in the Department of Biomedical Engineering have invented a novel composition and method for biocompatible, biodegradable, and piezoelectric biomaterial, which mimics the behavior of natural tissues such as bone and cartilage and improves cellular attachment, growth and differentiation.
The use of piezoelectric biomaterials in tissue engineering scaffolds and medical devices allow for electrical stimulus without external power sources or batteries. Conventional piezoelectric biomaterials, such as piezoelectric ceramics or synthetic piezoelectric polymers are either immunogenic or non-biodegradable. Collagen as the most abundant protein in mammalian tissues, is biocompatible and biodegradable. However, due to the randomness of collagen fiber arrangement in most processed collagenous products, the piezoelectricity of the fibers may be diminished or canceled out. The invention is a method to induce piezoelectricity not only in collagen but also in collagen derived materials, such as gelatin, and other proteins for grafts, scaffolds, implants and biomedical devices, by electric poling. Piezoelectric collagen mimics the piezoelectric behavior of natural tissues such as bone and cartilage, and improves cellular attachment, growth and differentiation and will degrade in-vivo leaving behind the regenerated tissue.

## Application area

- Bone defects
- Cartilage defects

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## Advantages

• Increased efficiency
• Mimics the natural environment
• Biodegradable
• Biocompatible

## Institution

New Jersey Institute of Technology

## Inventors

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