



The Realisation of Research

## Bioactive Coating

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33-002

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**Category(s):**

Medical Devices

**Description:**

**Bioactive Coating**

**Available for:** Licensing

**Summary**

A novel method of creating an inter-locked (high bond strength) bioactive coating on metallic substrates for orthopaedic applications

**The Technology and its Advantages**

The lack of methodology for producing strongly-bonded bioactive coatings on metallic alloys is an impediment to the development of economical and robust orthopaedic technologies, such as those encountered in hip replacement. Current practice is dependent on generating an expensive plasma-sprayed coating of a bioactive substance on a metallic surface over a significant time span and high temperatures, even after which the bond strength of the coating on the surface is questionable and can shear away quite easily and unexpectedly. Pre-treatment of the metal surface with grit-blasting techniques, in order to reduce shear, can weaken the material by introducing crack nucleation centres. Thus, orthopaedic engineering of implants, such as hydroxyapatite-coated titanium alloys, are not as well-developed as they should be after several decades of research, which is significant drawback in the healthcare of an ageing population. This technology consists of a unique processing method to overcome this short coming, to prepare an inter-locked patterned bioactive coating on metallic alloys. Firstly, a bond coat is electrohydrodynamically patterned, and then the interstices of the pattern are filled with a bioactive substance by electro-spraying it. The entire procedure takes less than 10 minutes and at ambient temperatures.

**Market Opportunity**

In the healthcare industry, hydroxyapatite has been widely used as a coating material to combine its sound biological properties with the excellent mechanical properties of traditional metallic implant materials. Metallic implants coated in hydroxyapatite have successfully been used in dental and orthopaedic applications due to its well documented promotion of direct bone apposition and osteoconductive properties. With the ageing population worldwide, there is an increasing demand for biomedical implants. In the U.K., there were 43,000 hip replacements carried out in 2003 (UK national audit office report 2003) bringing mobility and relief from pain for patients, and the figure is believed to keep on rising in the future.

The increasing population living for longer in the U.S. is set to rapidly enlarge the hip and knee replacement market. In 2008, the U.S. hip and knee replacement market was valued at \$6.7 billion and is forecast to grow by 11.9% to reach \$14.8 billion in 2015 ('US Hip and Knee Implants: Strategic Market Analysis and Insight to 2015', GlobalData, 2009)

## Intellectual Property Status

Patent regional/national stage.

## Further Information

Please contact Dr. Tim Fishlock, UCL Business PLC, T: +44 (0)20 7679 9000 E: [t.fishlock@uclb.com](mailto:t.fishlock@uclb.com)

## For Information, Contact:

Tim Fishlock  
Business Manager  
UCL Business PLC  
020 7679 9000  
[t.fishlock@uclb.com](mailto:t.fishlock@uclb.com)

## Inventors:

Mohan Edirisinghe  
Jie Huang  
Xiang Li  
William Bonfield  
Mino Esat

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