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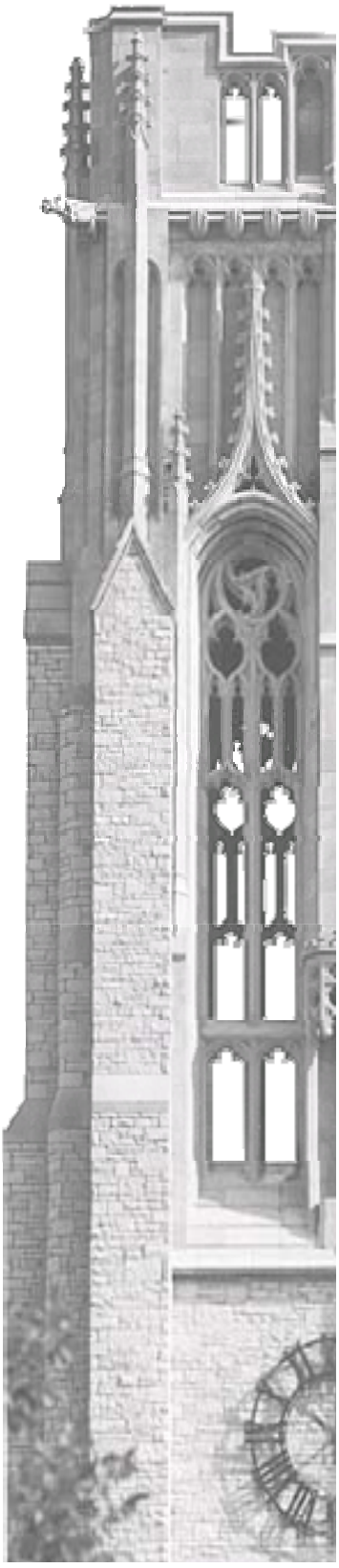
Injectable Biomimetic Hybrid Microparticles for Bone Regeneration



Over 600,000 bone grafting procedures are performed annually in the United States. These numbers will grow as the life expectancy of the population increases. The estimated cost of these procedures approaches $2.5 billion per year. The two main types of bone grafts currently used are autografts and allografts. An autograft is a section of bone taken from the patient's own body, whereas an allograft is taken from a cadaver. These types of grafts are limited due to some uncontrollable factors. For autografts, the key limitation is donor site morbidity, in which the remaining tissue at the harvest site is damaged by the removal of the graft resulting in surgical scars, blood loss, pain, prolonged surgical time and rehabilitation time, increased exposure to blood products, and infection risk. For allografts, key limitations are unfavorable immunologic response and transmission of viral diseases. Considering these issues it is necessary to develop bone substitute materials that can apply for bone healing without any problems. Tissue engineering seeks to develop a viable tissue substitutes that are capable of restoring and maintaining the function of normal human tissues. An ideal bone substitute would possess the biological advantages of an autograft and supply advantages of an allograft, but alleviate the complications of each of these types of grafts. Therefore, a hybrid microparticle system has been developed for bone healing or regeneration using tissue engineering principles.

The University of Toledo is seeking a company interested in utilizing this hybrid microparticle system for bone healing or regeneration.

Applications:

1. Nonunions
2. Segmental defects
3. Osteotomies
4. Arthrodesis
5. Complicated fractures
6. Spine fusion
7. Dental applications

Advantages:

1. Can be prepared in a simple and physiologically friendly gentle environment
2. Can be combined with any vehicle and administered by injection
3. Can be injected with different combinations
4. Can deliver multiple osteogenic factors in a controlled manner
5. Can be adapted to other therapeutic applications

This invention is patent pending

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