Protecting, Repairing, and Regenerating Articular Cartilage and Fibrocartilaginous Tissues

The invention provides methods for the protection, repair and regeneration of articular cartilage, and fibrocartilaginous tissues using recombinant parathyroid hormones, such as the FDA approved biologic agent – teriparatide (Forteo®, Eli Lilly).

Problem Solved by This Technology
Currently, the only treatments for cartilage degeneration and osteoarthritis (OA) involve palliation focused on pain management and joint replacement. The longstanding inability to develop a disease-modifying therapy that can rejuvenate joint cartilage is a great unmet need considering the high prevalence of OA nationally (>25% of the US population by 2020) and globally.

Applications
The current invention represents the first and only disease modifying treatment to date that protects against cartilage degradation and regenerates cartilage that has been lost as a result of joint injury or OA. Using a mouse model of posttraumatic OA, the inventors have demonstrated that one month of daily injections of Forteo® prevents progressive articular cartilage loss while inducing chondroregeneration. Specifically, Forteo® stimulates articular cartilage thickening via an induction of cartilage matrix production by cartilage cells. Clinical trials of Forteo® as a cartilage-regenerating therapy in humans have been planned.

Publications

This discovery was featured in the NIH/NIAMS Spotlight on Research in 2012.

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Forteo® induces chondroregeneration. Eight weeks after meniscal knee injury, mice received 4 weeks of daily systemic treatment with saline or Forteo®. Representative histology after 4 weeks of treatment depicts the chondroregeneration, denoted by the greater thickness (yellow bars) of Alcian Blue-stained cartilage in the Forteo®-treated group (c = cartilage, b = bone).

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Intellectual Property Status

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