Blebbistatin Loaded PLGA Nanoparticles for Reducing Fibrosis and Decreasing Cell Mechanosensitivity

Published date: June 5, 2017

Technology description

This invention relates to a method of using PLGA as a carrier for blebbistatin as a topical treatment for wound healing and scarring treatment. Blebbistatin inhibits myosin II, thus inhibiting excessive scar formation. This method focuses on stopping the mechanism of fibrosis formation as opposed to chemical pathways, which helps against fibrosis.
Scarring is a prevailing medical issue as it affects many patients during illness. Surgery related scarring affects nearly 100,000 per year, and can lead to more severe repercussions such as fibrosis. Many of the current treatments have limited success on the scarring tissue, side effects, or both. Fibrosis is a replacement of the normal structural elements of the tissue by distorted, nonfunctional and excessive accumulation of scar tissue. This causes future problems for the patient such as keloids and hypertrophic scars in the skin, tendon adhesions, transmission blockage following nerve injury, scleroderma, Crohn’ s disease, esophageal strictures, urethral strictures, capsules around breast implants, liver cirrhosis, atherosclerosis, and fibrotic non-union in bone. Current hypotheses suggest scar contraction is caused by myosin II activation and ensuing actin stress fiber formation, focal adhesion development, and cytoskeletal (microtubules and intermediate filaments) reorganization.

Application area

Possible uses include a topical application as well as infusing wound dressings and adhesives with the blebbistatin/PLGA complex. This treatment could be used after surgery or for more severe wounds, but could also be sold over-the-counter due to ease of treatment. It could also be used as a microcarrier system to rapidly expand stem cell population while maintaining their pluripotency.

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