

## Treating and Monitoring Rheumatoid Arthritis with PDE5 Inhibitors

A safe and effective treatment for Rheumatoid arthritis using approved drugs.

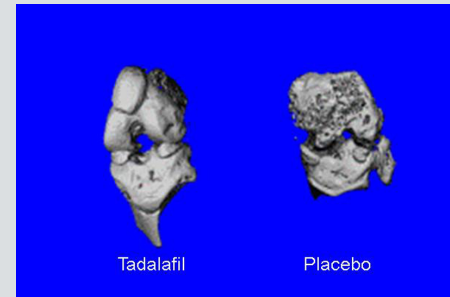
### Problem Solved by This Technology

Rheumatoid arthritis (RA) is a chronic autoimmune inflammatory disorder that causes episodic waves of pain, swelling, stiffness, and loss of function in joints and surrounding tissues. It is estimated that 0.5 - 1% of the population is affected with RA. Available drugs either alleviate symptoms or slow the disease progression, but there is currently no cure for RA. Additionally, the high cost of biologics (TNF inhibitors) limits patient access and leaves a large portion of the market untapped. Moreover, these disease modifying anti-rheumatic drugs (DMARDs) are immunosuppressive with known side effects that include life-threatening opportunistic infections and cancer.

### Applications

Researchers at the University of Rochester have discovered a novel use for PDE5 (phosphodiesterase type 5) inhibitors, such as Viagra, Cialis, and Levitra, which have the potential to ameliorate arthritic flare, as demonstrated in murine models of RA. In TNF transgenic mice, arthritic knee flares were found to be associated with the loss of the lymphatic pulse and B cell clogging of the lymphatic sinuses in lymph nodes that drain inflamed joints. Remarkably, treatment with Tadalafil was shown to restore and increase lymphatic transport, and decrease clogging in the lymph node allowing for decreased joint inflammation. Current treatments for rheumatoid arthritis focus primarily on the inflammatory process, whereas this approach emphasizes reversing impaired lymphatic function and enhancing its function early in the disease process. More importantly, PDE5 inhibitors have an excellent side-effect profile and are long-acting agents. Hence, they can be repurposed to treat this chronic disorder or to prevent a flare with a low FDA regulatory hurdle.

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*uCT images of mouse knee fronts, treated with Tadalafil or a placebo.*

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### Intellectual Property Status

Patent application pending in the United States.

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