Musculoskeletal diseases are a leading cause of disability worldwide. Current treatments for osteoarthritis and low back pain (LBP), however are largely palliative and fail to prevent disease progression. Stem cell delivery treatment to the intervertebral disc in clinical trials may work, albeit on a short-term basis as cells succumb to inflammatory responses. The new technology is an innovative CRISPR-based approach that temporarily silences specific pro-inflammatory genes to regenerate the disc to full functionality. This approach promotes cell survival, stem cell differentiation, and immunomodulation under inflammatory conditions. The epigenome editing vector package can be locally injected, or autologous cells can be modified and delivered to replace the lost disc tissue. Studies with dorsal root ganglion demonstrate inhibition of degenerative intervertebral disc neuron activity and preservation of non-pathologic activity.

**TECHNOLOGY SUMMARY**

Musculoskeletal diseases are a leading cause of disability worldwide. Current treatments for osteoarthritis and low back pain (LBP), however are largely palliative and fail to prevent disease progression. Stem cell delivery treatment to the intervertebral disc in clinical trials may work, albeit on a short-term basis as cells succumb to inflammatory responses. The new technology is an innovative CRISPR-based approach that temporarily silences specific pro-inflammatory genes to regenerate the disc to full functionality. This approach promotes cell survival, stem cell differentiation, and immunomodulation under inflammatory conditions. The epigenome editing vector package can be locally injected, or autologous cells can be modified and delivered to replace the lost disc tissue. Studies with dorsal root ganglion demonstrate inhibition of degenerative intervertebral disc neuron activity and preservation of non-pathologic activity.

**FEATURES AND BENEFITS**

- Provides long term protection against inflammation in musculoskeletal diseases.
- Slows the progression of disc degeneration
- Reduces follow-on surgeries and other treatments by stopping tissue damage.

**RECENT PUBLICATIONS**


**INVENTOR PROFILE**

Robert Bowles, Ph.D., Assistant Professor – Bioengineering