Researchers at the University of South Florida have developed a novel method to control drug and gene delivery while significantly improving reproducibility.

Current gene therapies are limited by delivery methods. Non-viral delivery methods have an advantageous safety profile, but expression levels are low. Gene electro-transfer (GET), a delivery method that uses electric pulses to temporarily permeabilize cell membranes, has shown success and thus has lead to an increased number of GET-based therapies. However, further improvement of GET therapy is needed including reducing the necessary applied voltage and increasing the ability to control expression.

USF inventors have created a novel method of thermal assisted gene electro-transfer (TAGET) that uses real-time impedance measurements which allows the use of lower applied voltages, which decreases the adverse effects on the tissue while maintaining gene expression. This method maintains gene expression levels while utilizing 50% lower applied voltage. Furthermore, this method does not result in temperature increases above those induced by the exogenous heating source. This method greatly increases the reproducibility, and can improve the delivery of gene therapies.

**ADVANTAGES:**
- Enhanced targeting and dosing control
- Increased safety and reliability
- Significant improvement on reproducibility

**Method of Thermal Assisted in Vivo Gene Electro-Transfer for Drug Delivery**

**Gene Expression Resulting from TAGET-Pulses With Heat (HE 125V) and Without Heat (ET 125V) vs. Injection With Heat (IO+T) and Without Heat (IO)**