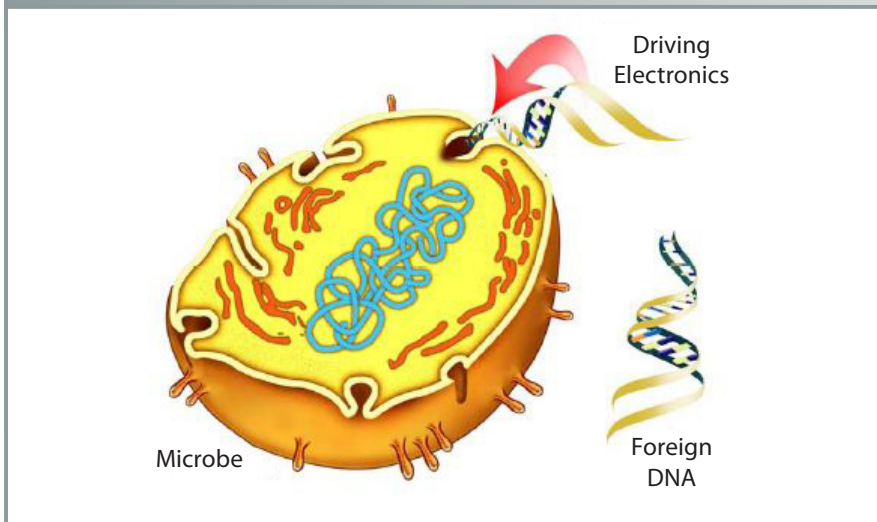


Universal Gene Transfer Technology for Gram Positive Bacteria

UT-B ID 200802139



Technology Summary

A genetic engineering technology invented at ORNL facilitates DNA delivery to a cell by using ultrasound to permeate the cell's plasma membrane. DNA delivery using this technology is simple, quick, inexpensive, and offers a universal method for gene transfer.

Existing methods for DNA delivery all have significant drawbacks, including causing significant damage to the membrane of a cell. These conventional methods require repeated rounds of washing and other treatments, prior to DNA transformation, making the protocol complex and difficult. The ORNL invention provides a sonoporation-based method that using ultrasonic frequencies to effectively modify the permeability of the cell plasma membrane prior to inserting a chosen compound.

The method can be universally applied to deliver nucleic acids, proteins, lipids, carbohydrates, viruses, small organic and inorganic molecules, and nanoparticles to Gram positive bacteria, including *Bacillus*, *Streptococcus*, *Acetobacterium*, and *Clostridium*.

Advantages

- Greatly simplified means of genetic manipulation using sonoporation
- Straightforward, quick, easy, and cost-effective process
- Due to being a mechanical method, the invention may be well suited for many different cell types and tissues

Potential Applications

- Medical, plant biology, and biopharmaceutical research
- Gene therapy holds great promise to cure cancer, HIV, and other hereditary and contagious diseases
- Genetic engineering has been widely adopted in plant science to deliver economical crops
- Transgenic bacteria or fungi in microbiology can be manipulated to produce cheap biopharmaceuticals

Patent

Yunfeng Yang and Youngchao Li,
Transformation of Gram Positive Bacteria by Sonoporation, U.S. Patent Application 20100196983, filed January 29, 2010.

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