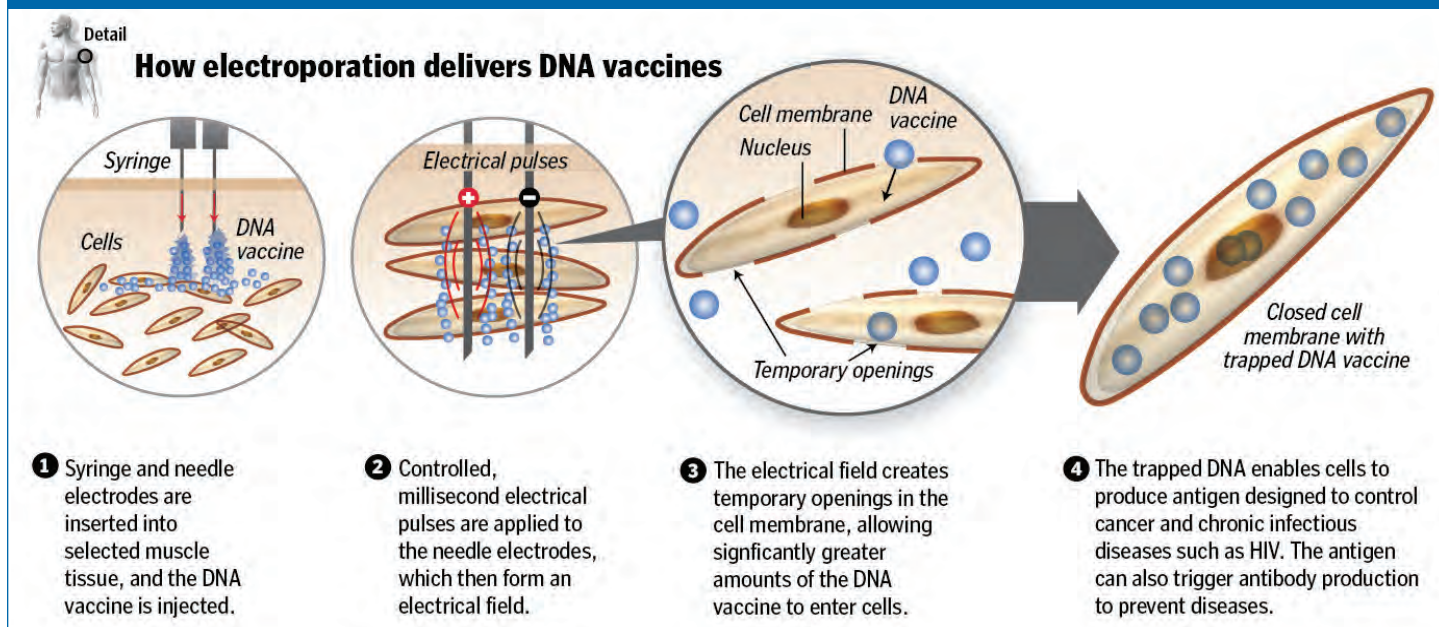


## The promise of DNA vaccines has been thwarted by a lack of an effective delivery vehicle—until now?

Delivering DNA inside targeted cells has proven to be a formidable challenge for the scientific community. Viruses and lipids, once thought to hold great potential for delivering DNA, have recently encountered significant clinical obstacles...

### GROWING EVIDENCE SUGGESTS VACCINE DELIVERY VIA *ELECTROPORATION* MAY BE THE ANSWER



Researchers at the **Centers for Disease Control and Prevention** reported in the November 2007 issue of *JAMA* that **vaccines have cut deaths** from the 13 diseases they prevent by a stunning 99%. These vaccine-preventable diseases include diphtheria, pertussis, tetanus, polio, measles, mumps, rubella, invasive *Haemophilus influenzae* type b, acute hepatitis B, hepatitis A, chickenpox, *Streptococcus pneumoniae* and smallpox.

Unfortunately, **conventional technology** used to create vaccines for these limited number of diseases is **not effective** against cancer, HIV, hepatitis C, and a legion of other deadly and disabling diseases. But the promise of using a **new generation of technology—DNA vaccines**—to stimulate the body's immune responses has been **curtailed by a lack of an effective delivery system**. Use of virus carriers poses uncertainties regarding potential mutation and unwanted immune responses against the carrier. Lipids and the "gene gun" may not achieve sufficient levels of immune response. None of these methods is inexpensive. Now, there is **growing evi-**

**dence** that Inovio's **electroporation-based delivery system** has the potential to become a preferred delivery method for a wide range of **therapeutic and preventive vaccines**.

"After locally injecting a DNA vaccine into muscle and then applying millisecond electrical pulses, our electroporation technology significantly **increases uptake** of that vaccine into cells—and has been shown in pre-

clinical studies to **increase levels of immune response by 100 times or more,**" says Dr. Avtar Dhillon, Inovio's President and CEO, who previously practiced family medicine for more than 12 years. "Electroporation is an easy and effective way to get vaccines to enter into cells and potentially enable a broad spectrum of emerging vaccines against cancer and chronic infectious diseases."

### What's being said and written about *electroporation*...



**RICHARD HELLER, PhD**  
University of South Florida,  
College of Medicine  
"We've seen efficient expression of a DNA vaccine for malignant melanoma with demonstrable immune responses using Inovio's electroporation platform as the delivery vehicle."



**CONNIE A. SCHMALJOHN, PhD**  
US Army Medical Research  
Institute of Infectious Diseases  
USAMRIID researchers have demonstrated that a DNA vaccine delivered via electroporation resulted in survival of a majority of animals after challenge with a Category A pathogen.



**PROFESSOR DANIEL SCHERMAN**  
Pharm. & Biol. Sciences Faculty, Nat'l  
Scientific Research Center, Paris  
"Significantly higher antibody responses for patients who received a DNA vaccine with electroporation have been observed in limited human clinical testing to date. Therefore, there is certainly cause for optimism."