

Does Needle Size Matter?

Harvinder S. Gill, Ph.D.,¹ and Mark R. Prausnitz, Ph.D.^{1,2}

Abstract

Hypodermic needles are in widespread use, but patients are unhappy with the pain, anxiety, and difficulty of using them. To increase patient acceptance, smaller needle diameters and lower insertion forces have been shown to reduce the frequency of painful injections. Guided by these observations, fine needles and microneedles have been developed to minimize pain and have found the greatest utility for delivery of vaccines and biopharmaceuticals such as insulin. However, pain reduction must be balanced against limitations of injection depth, volume, and formulations introduced by reduced needle dimensions. In some cases, needle-free delivery methods provide useful alternatives.

J Diabetes Sci Technol 2007;1(5):725-729

Author Affiliations: ¹Wallace H. Coulter Department of Biomedical Engineering at Georgia Institute of Technology and Emory University, Atlanta, Georgia; and ²School of Chemical and Biomolecular Engineering, Georgia Institute of Technology, Atlanta, Georgia

Keywords: drug delivery, hypodermic needle, insulin delivery methods, microneedle injection, needle gauge, needle length, pain from needle insertion

Corresponding Author: Mark R. Prausnitz, Ph.D., School of Chemical and Biomolecular Engineering, Georgia Institute of Technology, 311 Ferst Drive, Atlanta, GA 30332-0100; email address prausnitz@gatech.edu