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Chapter 36 - Noninvasive Blood Glucose Measurement

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Abstract

This chapter gives an overview of the technologies that have been employed to develop noninvasive blood glucose measurement techniques over the past few decades, including reverse iontophoresis, bioimpedance spectroscopy, thermal emission spectroscopy, vibrational spectroscopy (mid-infrared, near-infrared, and Raman spectroscopy), photoacoustic spectroscopy, fluorescence, polarimetry, ultrasound, optical coherence tomography, and metabolic heat conformation. Although enormous efforts have been put into this field, no group has achieved complete success so far. Each technology has its advantages and limitations, and unexplained disturbance factors due to both biological conditions and the surrounding environment have commonly been significant barriers. In this chapter, previously developed devices such as the GlucoWatch biographer and Pendra are described (some of which were launched to the market), and ongoing developments such as GlucoTrack and Symphony are briefly introduced.

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Keywords

Blood glucose; Coherence tomography; Fluorescence; Impedance; Metabolic heat conformation; Noninvasive measurement; Polarimetry; Reverse iontophoresis; Spectroscopy; Ultrasound

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