

# Method and device for non-invasive analyte measurement

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## Technology description

### Technology Overview

People with diabetes can significantly reduce the risk of complications associated with disease by actively monitoring their blood glucose levels. The current standard method of monitoring blood glucose levels involves painful finger sticks and many diabetic patients fail to actively manage their glucose levels for the primary reasons of finger soreness, pain, inconvenience, and fear of needles. Researchers have been searching for ways to noninvasively measure blood glucose in diabetic subjects for years. This research has commonly taken one of two approaches: using infrared or near infrared technology to noninvasively obtain optical signatures that are known to correlate with glucose levels; or taking samples of interstitial fluid for analysis. Both of these approaches pose problems, including accuracy issues, skin irritation, and calibration problems.

OHSU researchers have developed a novel, noninvasive technology for measuring blood glucose levels that uses pressure and the ear. In addition to receiving sound, the normal cochlea in the ear can produce low-intensity sounds called otoacoustic emissions (OAEs) that can be evoked using audio stimuli. OAEs can provide a noninvasive test of the cochlear mechanical response to acoustic stimuli. OAE tests are already widely used in humans and animals to study cochlear function and the efferent system. This technology takes another approach with OAEs and utilizes the measurement of pressure signals related to OAEs and/or the middle ear muscle reflex to determine the concentration of an analyte (e.g., glucose) in the blood of a subject. Sound pressure levels used are well below any levels that would do damage to a subject's hearing during repeated tests. The user product can be a stylish handheld device or headphones.

### Market Overview

#### Diabetes Statistics (US)

- 20.8 million children and adults with diabetes (7% of the population)
- 54 million Americans have pre-diabetes. Pre-diabetes occurs when a person's blood glucose levels are higher than normal but not high enough for a diagnosis of Type 2 diabetes.

#### Worldwide

- 150 million people worldwide with diabetes
- The yearly worldwide market for glucose testing is estimated at \$4 billion and is growing at an annual rate of 12 to 18 percent.

- Complications from diabetes include kidney disease, blindness and increased risk of heart disease.
- An estimated 80 percent of diabetics don' t monitor themselves even once a day.

## Institution

[State of Oregon](#)

## Inventors

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