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A Novel Approach To Asthma Inhaler Compliance Using Breath Measurement Of Tetrafluoroethane

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BRIEF DESCRIPTION

The invention provides a non-invasive method to determine compliance and treatment efficacy of asthma inhalers. The method is divided into two components, which will measure hydrofluoroalkane (HFA) and then analyze the data to estimate pharmacokinetic parameters. Altogether, the HFA levels and estimated parameters will be used to determine the inhaler's compliance and treatment efficacy.

FULL DESCRIPTION

Inhalers are used to treat many disorders. The most common usage of inhalers is for the treatment for asthma such as corticosteroids. The inhaler is the patient's first line of asthma treatment, therefore should be used properly to avoid any problems. Unfortunately, there is a lack of technology that can measure inhaler compliance and efficacy. Traditionally, patients would self report their use of inhaled corticosteroid. This would include reporting weight of medical canister and actuation counts, neither are suitable for children and adults. These methods are highly inaccurate and limited to those who had access to specific equipment. For these reasons, there is a need to be able to measure the user's inhaler compliance in order to determine that the inhaler is being used properly.

University of CA researchers have created a non-invasive method to determine inhaler compliance and treatment efficacy. The key aspect of the invention is the measurement of hydrofluoroalkane in the exhaled human breath. The invention combines two approaches of using gas chromatography and mass spectrometry with multipartmental analysis. The gas chromatography and mass spectrometry will measure HFA and the analysis will determine the rate constant parameters. Altogether, the invention uses measured HFA levels and mathematical modeling to establish appropriate compliance threshold and treatment efficacy window. The method is highly sensitive far exceeding previously reported levels by manufacturers and currently is not commercially available.

SUGGESTED USES

The invention provides a non-invasive method to determine inhaler compliance and treatment efficacy, such as asthmatic inhalers. Specifically, the technology will enable all inhaler users to determine the usage and efficacy, and therefore significantly improve their treatment to their disorder. The method measures hydrofluoroalkane and determine specific parameters that can determine compliance and efficacy. The elimination parameters should be implemented when determining the steady state with repeated inhaler usages. This invention allows for real time detection and the ability for later assessment at remote locations. These advantages will allow for wide spread implementation of inhaler treatment monitoring.

ADVANTAGES

There are many advantages to using our novel approach to determine asthma inhaler compliance and treatment efficacy:

- » It is non-invasive

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OTHER INFORMATION

CATEGORIZED AS

- » **Biotechnology**
 - » Health
 - » Other
- » **Materials & Chemicals**
 - » Biological
 - » Chemicals
- » **Medical**
 - » Diagnostics
 - » Disease: Respiratory and Pulmonary System
 - » Rehabilitation
- » **Sensors & Instrumentation**
 - » Analytical
 - » Biosensors

- » Extremely sensitive; can detect as low as parts-per-trillion Real time detection or assessment later in time at remote location
- » Does not require collection of biohazard materials (blood), thereby eliminating the need for healthcare workers or laboratory technicians
- » Hydrofluoroalkane is most common volatile aerosol propellant

- » [Medical](#)
- » [Physical Measurement](#)
- » [Agriculture & Animal Science](#)
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PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,581,586	02/28/2017	2014-673

RELATED CASES

2014-673-0

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