Diagnostic Device & Treatment for Leukotriene Subtypes

Description of Technology

There are two major classes of asthmatics, leukotriene-based and cytokine-based. These two classes can be further differentiated into various subfamilies. Leukotriene based asthmatics potentially have four to five subtypes (LTB₄, LTC₄, LTD₄, LTE₄, n-acetyl-LTE₄), each with the possibility of individualized treatment based on their patterns of metabolite accumulation. Currently, there is no diagnostic tool to identify a patient’s leukotriene subtype. With a proper diagnosis of a patient’s subtype, treatment can be better refined and defined, thereby decreasing the potential risk of adverse drug reactions or side effects.

Researchers at the University of Wyoming have envisioned a device for the specific identification of an asthma patient’s leukotriene subtype. The device would be comprised of a fluid receiving platform, at least one leukotriene specific agent (such as a leukotriene specific antibody), and a marker agent to visually represent the expressed subtype. Fluid samples of saliva or sputum from asthmatic patients would be collected following a pulmonary function test.

After the determination of the leukotriene subtype from a patient’s fluid sample, a therapeutic treatment can be prescribed to the patient. The therapeutic treatment may involve a leukotriene receptor antagonist for asthmatics with a LTC₄ or LTD₄ subtypes or a steroid for patients with a LTB₄ or LTE₄ subtypes. Treatment may also include or be limited to an enzyme therapy. These treatments are meant to promote the removal and/or breakdown of the particular offending leukotriene compounds causing the asthma attack or symptoms.

Applications

The diagnosis and treatment of the mentioned leukotriene subtypes could potentially be administered by clinicians on a global scale to better individually treat leukotriene-based asthmatics. Also, due to the compounds involved, this diagnostic device has cross-over potential for diagnosing chronic obstructive pulmonary disorders (COPD).

Features & Benefits

- Device would be easy to use for the diagnosis of leukotriene subtypes
- Device would be new to market
- Treatment would be better individualized to patient’s leukotriene subtype
- Treatments could potentially have fewer adverse side effects
- Treatment meant to remove/breakdown compounds rather than simply block receptors
Market Opportunity

Patients around the world are suffering with leukotriene-based asthma. The development of a diagnostic device for leukotriene subtypes and individualized treatment of these subtypes could have global ramifications.

Existing treatment on the market for leukotriene based asthmatics relies primarily on zafirlukast (Accolate; AstraZeneca, Wilmington DE) and montelukast (Singulair; Merck, West Point, PA) and their blocking of the \(\text{LTC}_4\) & \(\text{LTD}_4\) receptors. These treatments have known adverse side effects including worsening of asthma symptoms, mood or behavior changes, physical abnormalities, headaches, and/or tiredness\(^1\)\(^2\). It is intended that the new treatment methods will have fewer side effects and promote the removal and/or breakdown of the leukotriene compounds.
